DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 218

[Docket No. 221219–0277]

RIN 0648–BK46

Taking and Importing Marine Mammals; Taking Marine Mammals Incidental to the U.S. Navy Training Activities in the Gulf of Alaska Study Area

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Final rule.

SUMMARY: NMFS, upon request from the U.S. Navy (Navy), issues these regulations pursuant to the Marine Mammal Protection Act (MMPA) to govern the taking of marine mammals incidental to the training activities conducted in the Gulf of Alaska (GOA) Study Area. The Navy's activities qualify as military readiness activities pursuant to the MMPA, as amended by the National Defense Authorization Act for Fiscal Year 2004 (2004 NDAA). These regulations, which allow for the issuance of Letters of Authorization (LOA) for the incidental take of marine mammals during the described activities and timeframes, prescribe the permissible methods of taking and other means of effecting the least practicable adverse impact on marine mammal species and their habitat, and establish requirements pertaining to the monitoring and reporting of such taking.

DATES: Effective February 3, 2023 through February 2, 2030.

ADDRESSES: A copy of the Navy's application, NMFS' proposed and final rules and subsequent LOAs for the existing regulations, and other supporting documents and documents cited herein may be obtained online at *www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-military-readiness-activities.* In case of problems accessing these documents, please use the contact listed here (see **FOR FURTHER INFORMATION CONTACT**).

FOR FURTHER INFORMATION CONTACT: Leah Davis, Office of Protected Resources, NMFS, (301) 427–8401.

SUPPLEMENTARY INFORMATION:

Purpose of Regulatory Action

These regulations, issued under the authority of the MMPA (16 U.S.C. 1361 *et seq.*), provide the framework for authorizing the take of marine mammals incidental to the Navy's training activities (which qualify as military readiness activities) including the use of sonar and other transducers, and in-air detonations at or near the surface (within 10 m above the water surface) in the GOA Study Area. The GOA Study Area is comprised of three areas: the Temporary Maritime Activities Area (TMAA), a warning area, and the Western Maneuver Area (WMA) (see Figure 1). The TMAA and WMA are temporary areas established within the GOA for ships, submarines, and aircraft to conduct training activities. The warning area overlaps and extends slightly beyond the northern corner of the TMAA. The WMA is located south and west of the TMAA and provides additional surface, sub-surface, and airspace in which to maneuver in support of activities occurring within the TMAA. The use of sonar and other transducers, and explosives would not occur within the WMA.

NMFS received an application from the Navy requesting 7-year regulations and an authorization to incidentally take individuals of multiple species of marine mammals (Navy's rulemaking/LOA application or Navy's application). Take is anticipated to occur by Level A harassment and Level B harassment incidental to the Navy's training activities. No lethal take is anticipated or proposed for authorization.

Section 101(a)(5)(A) of the MMPA (16 U.S.C. 1371(a)(5)(A)) directs the Secretary of Commerce (as delegated to NMFS) to allow, upon request, the incidental, but not intentional taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if, after notice and public comment, the agency makes certain findings and issues regulations that set forth permissible methods of taking pursuant to that activity, as well as monitoring and reporting requirements. Section 101(a)(5)(A) of the MMPA and the implementing regulations at 50 CFR part 216, subpart I, provide the legal basis for issuing this final rule and the subsequent LOAs. As directed by this legal authority, this final rule contains mitigation, monitoring, and reporting requirements.

The 2004 NDAA (Pub. L. 108–136) removed the ''small numbers'' and ''specified geographical region'' limitations indicated above and amended the definition of ''harassment'' as applied to a ''military readiness activity.'' The activity for which incidental take of marine mammals is being requested addressed here qualifies as a military readiness activity.

Summary of Major Provisions Within the Final Rule

The following is a summary of the primary provisions of this final rule regarding the Navy's activities. These provisions include, but are not limited to:

- The use of defined powerdown and shutdown zones (based on activity);
- Measures to reduce the likelihood of ship strikes;
- Activity limitations in certain areas and times that are biologically important (*e.g.,* for foraging or migration) for marine mammals;
- Implementation of a Notification and Reporting Plan (for dead or live stranded marine mammals); and
- Implementation of a robust monitoring plan to improve our understanding of the environmental effects resulting from the Navy training activities.

Additionally, the rule includes an adaptive management component that allows for timely modification of mitigation or monitoring measures based on new information, when appropriate.

Background

The MMPA prohibits the ''take'' of marine mammals, with certain exceptions. Sections 101(a)(5)(A) and (D) of the MMPA direct the Secretary of Commerce (as delegated to NMFS) to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are made and either regulations are issued or, if the taking is limited to harassment, a notice of proposed authorization is provided to the public for review and the opportunity to submit comments.

An authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stocks and will not have an unmitigable adverse impact on the availability of the species or stocks for taking for subsistence uses where relevant, including by Alaska Natives. Further, NMFS must prescribe the permissible methods of taking and other means of effecting the least practicable adverse impact on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of the species or stocks for taking for certain subsistence uses

(referred to in this rule as ''mitigation measures''); and requirements pertaining to the monitoring and reporting of such takings. The MMPA defines ''take'' to mean to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal. The Analysis and Negligible Impact Determination section below discusses the definition of ''negligible impact.''

The NDAA for Fiscal Year 2004 (2004 NDAA) (Pub. L. 108–136) amended section 101(a)(5) of the MMPA to remove the ''small numbers'' and ''specified geographical region'' provisions indicated above and amended the definition of ''harassment'' as applied to a ''military readiness activity.'' The definition of harassment for military readiness activities (Section 3(18)(B) of the MMPA) is (i) Any act that injures or has the significant potential to injure a marine mammal or marine mammal stock in the wild (Level A Harassment); or (ii) Any act that disturbs or is likely to disturb a marine mammal or marine mammal stock in the wild by causing disruption of natural behavioral patterns, including, but not limited to, migration, surfacing, nursing, breeding, feeding, or sheltering, to a point where such behavioral patterns are abandoned or significantly altered (Level B harassment). In addition, the 2004 NDAA amended the MMPA as it relates to military readiness activities such that the least practicable adverse impact analysis shall include consideration of personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity.

More recently, Section 316 of the NDAA for Fiscal Year 2019 (2019 NDAA) (Pub. L. 115–232), signed on August 13, 2018, amended the MMPA to allow incidental take rules for military readiness activities under section 101(a)(5)(A) to be issued for up to 7 years. Prior to this amendment, all incidental take rules under section 101(a)(5)(A) were limited to 5 years.

Summary and Background of Request

On October 9, 2020, NMFS received an adequate and complete application from the Navy requesting authorization for take of marine mammals, by Level A harassment and Level B harassment, incidental to training from the use of active sonar and other transducers and explosives (in-air, occurring at or above the water surface) in the TMAA over a 7-year period. On March 12, 2021, the Navy submitted an updated application that provided revisions to the Northern fur seal take estimate and incorporated additional best available science. In August 2021, the Navy communicated to NMFS that it was considering an expansion of the GOA Study Area and an expansion of the Portlock Bank Mitigation Area proposed in its previous applications. On February 2, 2022, the Navy submitted a second updated application that described the addition of the WMA to the GOA Study Area (which previously just consisted of the TMAA) and the replacement of the Portlock Bank Mitigation Area with the Continental Shelf and Slope Mitigation Area. The GOA Study Area supports opportunistic experimentation and testing activities when conducted as part of training activities and when considered to be consistent with the proposed training activities. These activities could occur as part of large-scale exercises or as independent events. Therefore, there is no separate discussion or analysis for testing activities that may occur as part of the proposed military readiness activities in the GOA Study Area.

On January 8, 2021 (86 FR 1483), we published a notice of receipt (NOR) of application in the **Federal Register**, requesting comments and information related to the Navy's request for 30 days. We received one comment on the NOR that was non-substantive in nature. On August 11, 2022, we published a notice of proposed rulemaking (87 FR 49656) and requested comments and information related to the Navy's request for 45 days. All substantive comments received during the NOR and the proposed rulemaking comment periods were considered in developing this final rule. Comments received on the proposed rule are addressed in this final rule in the Comments and Responses section.

The following types of training, which are classified as military readiness activities pursuant to the MMPA, as amended by the 2004 NDAA, will be covered under the regulations and LOA, if issued: Surface Warfare (detonations at or above the water surface) and Anti-Submarine Warfare (sonar and other transducers). The Navy is also conducting Air Warfare, Electronic Warfare, Naval Special Warfare, Strike Warfare, and Support Operations, but these activities do not involve sonar and other transducers, detonations at or above the water surface, or any other stressors that could result in the take of marine mammals. (See the 2022 GOA Final Supplemental Environmental Impact Statement (FSEIS)/Overseas Environmental Impact Statement (OEIS) (2022 GOA FSEIS/OEIS) for more detail on those activities.) The activities will not include in-water explosives, pile driving/removal, or use of air guns.

This is the third time NMFS has promulgated incidental take regulations pursuant to the MMPA relating to similar military readiness activities in the GOA, following regulations that were effective beginning May 4, 2011 (76 FR 25479; May 4, 2011) and April 26, 2017 (82 FR 19530; April 27, 2017). For this third round of rulemaking, the activities the Navy is planning to conduct are largely a continuation of ongoing activities conducted for more than a decade. While the specified activities have not changed, there are changes in the platforms and systems used in those activities, as well as changes in the bins (source classifications) used to analyze the activities. For example, two new sonar bins were added (MF12 and ASW1) and another bin was eliminated (HF6). This was due to changes in platforms and systems. Further, the Navy expanded the GOA Study Area to include the WMA, though the vast majority of the training activities will still occur only in the TMAA.

The Navy's mission is to organize, train, equip, and maintain combat-ready naval forces capable of winning wars, deterring aggression, and maintaining freedom of the seas. This mission is mandated by Federal law (10 U.S.C. 8062), which requires the readiness of the naval forces of the United States. The Navy executes this responsibility by establishing and executing training programs, including at-sea training and exercises, and ensuring naval forces have access to the ranges, operating areas (OPAREA), and airspace needed to develop and maintain skills for conducting naval activities.

The Navy has conducted training activities in the TMAA portion of the GOA Study Area since the 1990s. Since the 1990s, the Department of Defense has conducted a major joint training exercise in Alaska and off the Alaskan coast that involves the Departments of the Navy, Army, Air Force, and Coast Guard participants reporting to a unified or joint commander who coordinates the activities. These activities are planned to demonstrate and evaluate the ability of the services to engage in a conflict and successfully carry out plans in response to a threat to national security. The Navy's planned activities for the period of these regulations would be a continuation of the types and level of training activities that have been ongoing for more than a decade.

The Navy's rulemaking/LOA application reflects the most up-to-date compilation of training activities deemed necessary by senior Navy leadership to accomplish military readiness requirements. The types and

numbers of activities included in the rule account for fluctuations in training in order to meet evolving or emergent military readiness requirements. These regulations cover training activities that will occur for a 7-year period beginning February 3, 2023.

Description of the Specified Activity

A detailed description of the specified activity was provided in our **Federal Register** notice of proposed rulemaking (87 FR 49656; August 11, 2022); please see that notice of proposed rulemaking or the Navy's application for more information. The Navy requested authorization to take marine mammals incidental to conducting training activities. The Navy has determined that acoustic and explosive (in-air, occurring at or above the water surface) stressors are most likely to result in impacts on marine mammals that could rise to the level of harassment, and NMFS concurs with this determination. Descriptions of these activities are provided in section 2 of the 2022 GOA FSEIS/OEIS (U.S. Department of the Navy, 2022) and in the Navy's rulemaking/LOA application (*https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-military-readiness-activities*) and are summarized here.

Dates and Duration

Training activities will be conducted intermittently in the GOA Study Area over a maximum time period of up to 21 consecutive days annually from April to October to support a major joint training exercise in Alaska and off the Alaskan coast that involves the Departments of the Navy, Army, Air Force, and Coast Guard. The participants report to a unified or joint commander who coordinates the activities planned to demonstrate and evaluate the ability of the services to engage in a conflict and carry out plans in response to a threat to national security. The specified activities will occur over a maximum time period of up to 21 consecutive days each year during the 7-year period of validity of the regulations. The planned number of training activities are described in the Detailed Description of Proposed Activities section (Table 3).

Geographical Region

The GOA Study Area is entirely at sea and is comprised of the TMAA and a warning area in the Gulf of Alaska, and the WMA. The term ''at-sea'' refers to training activities in the Study Area (both the TMAA and WMA) that occur (1) on the ocean surface, (2) beneath the ocean surface, and (3) in the air above the ocean surface. Navy training activities occurring on or over the land outside the GOA Study Area are not included in this rule, and are covered under separate environmental documentation prepared by the U.S. Air Force and the U.S. Army. As depicted in Figure 1 of the proposed rule (87 FR 49656; August 11, 2022), the TMAA is a polygon roughly resembling a rectangle oriented from northwest to southeast, approximately 300 nmi (556 km) in length by 150 nmi (278 km) in width, located south of Montague Island and east of Kodiak Island. The GOA Study Area boundary was intentionally designed to avoid Endangered Species Act (ESA)-designated Steller sea lion critical habitat. The WMA is located south and west of the TMAA, and provides an additional 185,806 nmi^2 (637,297 km^2) of surface, sub-surface, and airspace to support training activities occurring within the TMAA. The boundary of the WMA follows the bottom of the slope at the 4,000 m contour line, and was configured to avoid overlap and impacts to ESA-designated critical habitat, biologically important areas (BIAs), migration routes, and primary fishing grounds. The WMA provides additional airspace and sea space for aircraft and vessels to maneuver during training activities for increased training complexity. The TMAA and WMA are temporary areas established within the GOA for ships, submarines, and aircraft to conduct training activities. Additional detail can be found in Chapter 2 of the Navy's rulemaking/LOA application.

Primary Mission Areas

The Navy categorizes many of its training activities into functional warfare areas called primary mission areas. The Navy's planned activities for the GOA Study Area generally fall into the following six primary mission areas: Air Warfare; Surface Warfare; Anti-Submarine Warfare; Electronic Warfare; Naval Special Warfare; and Strike Warfare. Most activities conducted in the GOA are categorized under one of these primary mission areas; activities that do not fall within one of these areas are listed as ''support operations'' or ''other training activities.'' Each warfare community (aviation, surface, and subsurface) may train in some or all of these primary mission areas. A description of the sonar, munitions, targets, systems, and other materials used during training activities within these primary mission areas is provided in Appendix A (Navy Activities Descriptions) of the 2022 GOA FSEIS/OEIS.

The Navy describes and analyzes the effects of its training activities within the 2022 GOA FSEIS/OEIS. In its assessment, the Navy concluded that of the activities to be conducted within the GOA Study Area, sonar use and in-air explosives occurring at or above the water surface were the stressors resulting in impacts on marine mammals that could rise to the level of harassment as defined under the MMPA. (The Navy is not proposing to conduct any activities that use in-water or underwater explosives.) These activities are limited to the TMAA. No activities involving sonar use or explosives would occur in the WMA or the portion of the warning area that extends beyond the TMAA. Therefore, the Navy's rulemaking/LOA application provides the Navy's assessment of potential effects from sonar use and explosives occurring at or above the water surface in terms of the various warfare mission areas they are associated with. Those mission areas include the following:

- Surface Warfare (in-air detonations at or above the water surface); [1] and
- Anti-Submarine warfare (sonar and other transducers).

The Navy's activities in Air Warfare, Electronic Warfare, Naval Special Warfare, Strike Warfare, Support Operations, and Other Training Activities do not involve sonar and other transducers, detonations at or near the surface, or any other stressors that could result in harassment, serious injury, or mortality of marine mammals. Therefore, the activities in these warfare areas are not discussed further in this rule, but are analyzed fully in the 2022 GOA FSEIS/OEIS. Additional detail regarding the primary mission areas was provided in our **Federal Register** notice of proposed rulemaking (87 FR 49656; August 11, 2022); please see that notice of proposed rulemaking or the Navy's application for more information.

Overview of the Major Training Exercise Within the GOA Study Area

The training activities in the GOA Study Area are considered to be a major training exercise (MTE). An MTE, for purposes of this rulemaking, is comprised of several unit-level activities conducted by several units operating together, commanded and controlled by a single Commander, and potentially generating more than 100 hours of active sonar. These exercises typically employ an exercise scenario developed to train and evaluate the exercise participants in tactical and operational

[1] Defined herein as being within 10 meters of the ocean surface.

tasks. In an MTE, most of the activities being directed and coordinated by the Commander in charge of the exercise are identical in nature to the activities conducted during individual, crew, and smaller unit-level training events. In a MTE, however, these disparate training tasks are conducted in concert, rather than in isolation. At most, only one MTE will occur in the GOA Study Area per year (over a maximum of 21 days).

Description of Stressors

The Navy uses a variety of sensors, platforms, weapons, and other devices, including ones used to ensure the safety of Sailors and Marines, to meet its mission. Training with these systems may introduce sound and energy into the environment. The following subsections describe the acoustic and explosive stressors for marine mammals and their habitat (including prey species) within the GOA Study Area. Because of the complexity of analyzing sound propagation in the ocean environment, the Navy relied on acoustic models in its environmental analyses and rulemaking/LOA application that considered sound source characteristics and varying ocean conditions across the GOA Study Area. Stressor/resource interactions that were determined to have de minimis or no impacts (*e.g.,* vessel noise, aircraft noise, weapons noise, and high-altitude (greater than 10 m above the water surface) explosions) were not carried forward for analysis in the Navy's rulemaking/LOA application. The Navy fully considered the possibility of vessel strike, conducted an analysis, and determined that requesting take of marine mammals by vessel strike was not warranted. Although the Navy did not request take for vessel strike, NMFS also fully analyzed the potential for vessel strike of marine mammals as part of this rulemaking. Therefore, this stressor is discussed in detail below. No Sinking Exercise (SINKEX) events are planned in the GOA Study Area for this rulemaking, nor is establishment and use of a Portable Undersea Tracking Range (PUTR) planned. NMFS reviewed the Navy's analysis and conclusions on de minimis and no-impact sources and finds them complete and supportable.

Acoustic stressors include acoustic signals emitted into the water for a specific purpose, such as sonar, other transducers (devices that convert energy from one form to another—in this case, into sound waves), incidental sources of broadband sound produced as a byproduct of vessel movement, aircraft transits, and use of weapons or other deployed objects. Explosives also produce broadband sound but are characterized separately from other acoustic sources due to their unique hazardous characteristics. Characteristics of each of these sound sources are described in the following sections.

In order to better organize and facilitate the analysis of approximately 300 sources of underwater sound used by the Navy, including sonar and other transducers and explosives, a series of source classifications, or source bins, were developed. The source classification bins do not include the broadband noise produced incidental to vessel movement, aircraft transits, and weapons firing. Noise produced from vessel movement, aircraft transits, and use of weapons or other deployed objects is not carried forward because those activities were found to have de minimis or no impacts, as described above.

The use of source classification bins provides the following benefits:

- Provides the ability for new sensors or munitions to be covered under existing authorizations, as long as those sources fall within the parameters of a ''bin'';
- Improves efficiency of source utilization data collection and reporting requirements anticipated under the MMPA authorizations;
- Ensures a precautionary approach to all impact estimates, as all sources within a given class are modeled as the most impactful source (highest source level, longest duty cycle, or largest net explosive weight) within that bin;
- Allows analyses to be conducted in a more efficient manner, without any compromise of analytical results; and
- Provides a framework to support the reallocation of source usage (hours/explosives) between different source bins, as long as the total numbers of takes remain within the overall analyzed and authorized limits. This flexibility is required to support evolving Navy training and testing requirements, which are linked to real world events.

Sonar and Other Transducers

Active sonar and other transducers emit non-impulsive sound waves into the water to detect objects, navigate safely, and communicate. Passive sonars differ from active sound sources in that they do not emit acoustic signals; rather, they only receive acoustic information about the environment, or listen. In this rule, the terms sonar and other transducers will be used to indicate active sound sources unless otherwise specified.

The Navy employs a variety of sonars and other transducers to obtain and transmit information about the undersea environment. Some examples are mid-frequency hull-mounted sonars used to find and track enemy submarines; high-frequency small object detection sonars used to detect mines; high-frequency underwater modems used to transfer data over short ranges; and extremely high-frequency (greater than 200 kilohertz (kHz)) doppler sonars used for navigation, like those used on commercial and private vessels. The characteristics of these sonars and other transducers, such as source level, beam width, directivity, and frequency, depend on the purpose of the source. Higher frequencies can carry more information or provide more information about objects off which they reflect, but attenuate more rapidly. Lower frequencies attenuate less rapidly, so they may detect objects over a longer distance, but with less detail.

Additional detail regarding sound sources and platforms and categories of acoustic stressors was provided in our **Federal Register** notice of proposed rulemaking (87 FR 49656; August 11, 2022); please see that notice of proposed rulemaking or the Navy's application for more information.

Sonars and other transducers are grouped into classes that share an attribute, such as frequency range or purpose of use. As detailed below, classes are further sorted by bins based on the frequency or bandwidth; source level; and, when warranted, the application in which the source would be used. Unless stated otherwise, a reference distance of 1 meter (m) is used for sonar and other transducers.

- Frequency of the non-impulsive acoustic source:
  - Low-frequency sources operate below 1 kHz;
  - Mid-frequency sources operate at and above 1 kHz, up to and including 10 kHz;
  - High-frequency sources operate above 10 kHz, up to and including 100 kHz;
  - Very-high-frequency sources operate above 100 kHz but below 200 kHz;
- Sound pressure level of the non-impulsive source;
  - Greater than 160 decibels (dB) re 1 micro Pascal (μPa), but less than 180 dB re: 1 μPa;
  - Equal to 180 dB re: 1 μPa and up to 200 dB re: 1 μPa;
  - Greater than 200 dB re: 1 μPa;
- Application in which the source would be used:
  - Sources with similar functions that have similar characteristics, such as pulse length (duration of each pulse), beam pattern, and duty cycle.

The bins used for classifying active sonars and transducers that are quantitatively analyzed for use in the TMAA are shown in Table 1 below. While general parameters or source characteristics are shown in the table, the actual source parameters are classified. Acoustic source bins used in the planned activities will vary annually. The seven-year totals for the planned training activities take into account that annual variability.

TABLE 1—SONAR AND OTHER TRANSDUCERS QUANTITATIVELY ANALYZED IN THE TMAA

For annual training activities					
Source class category	Bin	Description	Units	Annual	7-Year total
Mid-Frequency (MF) Tactical and non-tactical sources that produce signals from 1 to 10 kHz.	MF1	Hull-mounted surface ship sonars (*e.g.,* AN/SQS–53C and AN/SQS–60).	H	271	1,897
	MF3	Hull-mounted submarine sonars (*e.g.,* AN/BQQ–10).	H	25	175
	MF4	Helicopter-deployed dipping sonars (*e.g.,* AN/AQS–22).	H	27	189
	MF5	Active acoustic sonobuoys (*e.g.,* DICASS)	I	126	882
	MF6	Active underwater sound signal devices (*e.g.,* MK 84).	I	14	98
	MF11	Hull-mounted surface ship sonars with an active duty cycle greater than 80%.	H	42	294
	MF12	Towed array surface ship sonars with an active duty cycle greater than 80%.	H	14	98
High-Frequency (HF) Tactical and non-tactical sources that produce signals greater than 10 kHz but less than 100 kHz.	HF1	Hull-mounted submarine sonars (*e.g.,* AN/BQQ–10)	H	12	84
Anti-Submarine Warfare (ASW) Tactical sources used during ASW training activities.	ASW1	MF systems operating above 200 dB	H	14	98
	ASW2	MF Multistatic Active Coherent sonobuoy (*e.g.,* AN/SSQ–125).	H	42	294
	ASW3	MF towed active acoustic counter-measure systems. (*e.g.,* AN/SLQ–25)	H	273	1,911
	ASW4	MF expendable active acoustic device countermeasures (*e.g.,* MK3).	I	7	49

Notes: H = hours, I = count (*e.g.,* number of individual pings or individual sonobuoys), DICASS = Directional Command Activated Sonobuoy System.

Explosives

This section describes the characteristics of explosions during naval training. The activities analyzed in the Navy's rulemaking/LOA application that use explosives are described in additional detail in Appendix A (*Navy Activity Descriptions*) of the 2022 GOA FSEIS/OEIS. Explanations of the terminology and metrics used when describing explosives in the Navy's rulemaking/LOA application are also in Appendix B (*Acoustic and Explosive Concepts*) of the 2022 GOA FSEIS/OEIS.

The near-instantaneous rise from ambient to an extremely high peak pressure is what makes an explosive shock wave potentially damaging. Farther from an explosive, the peak pressures decay and the explosive waves propagate as an impulsive, broadband sound. Several parameters influence the effect of an explosive: the weight of the explosive in the warhead, the type of explosive material, the boundaries and characteristics of the propagation medium, the detonation depth, and the depth of the receiver (*i.e.,* marine mammal). The net explosive weight, which is the explosive power of a charge expressed as the equivalent weight of trinitrotoluene (TNT), accounts for the first two parameters. The effects of these factors are explained in Appendix B (Acoustic and Explosive Concepts) of the 2022 GOA FSEIS/OEIS. The activities analyzed in the Navy's rulemaking/LOA application and this final rule that use explosives are described in further detail in Appendix A (Navy Activities Descriptions) of the 2022 GOA FSEIS/OEIS. Explanations of the terminology and metrics used when describing explosives are provided in Appendix B (Acoustic and Explosive Concepts) of the 2022 GOA FSEIS/OEIS.

Explosive detonations during training activities are from the use of explosive bombs and naval gun shells; however, no in-water explosive detonations are included as part of the training activities. For purposes of the analysis in this rule, detonations occurring in air at a height of 33 ft (10 m) or less above the water surface, and detonations occurring directly on the water surface, were modeled to detonate at a depth of 0.3 ft (0.1 m) below the water surface since there is currently no other identified methodology for modeling potential effects to marine mammals that are underwater as a result of detonations occurring in-air at or above the surface of the ocean (within 10 m above the surface). This conservative approach over-estimates the potential underwater impacts due to low-altitude and surface explosives by assuming that all explosive energy is released and remains under the water surface.

Explosive stressors resulting from the detonation of some munitions, such as missiles and gun rounds used in air-air and surface-air scenarios, occur at high altitude. The resulting sound energy from those detonations in air would not impact marine mammals. The explosive energy released by detonations in air has been well studied, and basic methods are available to estimate the explosive energy exposure with distance from the detonation (*e.g.,* U.S. Department of the Navy (1975)). In air, the propagation of impulsive noise from an explosion is highly influenced by atmospheric conditions, including temperature and wind. While basic estimation methods do not consider the unique environmental conditions that may be present on a given day, they do allow for approximation of explosive energy propagation under neutral atmospheric conditions. Explosions that occur during Air Warfare will typically be at a sufficient altitude that a large portion of the sound will refract upward due to cooling temperatures with increased altitude. Based on an understanding of the explosive energy released by detonations in air, detonations occurring in air at altitudes greater than 10 m above the surface of the ocean are not likely to result in acoustic impacts on marine mammals; therefore, these types of explosive activities will not be discussed further

in this document. (Note that most of these in-air detonations would occur at altitudes substantially greater than 10 m above the surface of the ocean, as described in further detail in section 3.0.4.2.2 (*Explosions in Air*) of the 2022 GOA FSEIS/OEIS.) Activities such as air-surface bombing or surface-surface gunnery scenarios may involve the use of explosive munitions that detonate upon impact with targets at or above the water surface (within 10 m above the surface). For these activities, acoustic effects modeling was undertaken as described below.

In order to organize and facilitate the analysis of explosives, explosive classification bins were developed. The use of explosive classification bins provides the same benefits as described for acoustic source classification bins discussed above and in Section 1.4.1 (Acoustic Stressors) of the Navy's rulemaking/LOA application.

The explosive bin types and the number of explosives detonating at or above the water surface in the TMAA are shown in Table 2.

TABLE 2—EXPLOSIVE SOURCES QUANTITATIVELY ANALYZED THAT DETONATE AT OR ABOVE THE WATER SURFACE IN THE TMAA

Explosives (source class and net explosive weight (NEW)) (lb.) *	Number of explosives with the specified activity (annually)	Number of explosives with the specified activity (7-year total)
E5 (>5–10 lb. NEW)	56	392
E9 (>100–250 lb. NEW)	64	448
E10 (>250–500 lb. NEW)	6	42
E12 (>650–1,000 lb. NEW)	2	14

* All of the E5, E9, E10, and E12 explosives would occur in-air, at or above the surface of the water, and would also occur offshore away from the continental shelf and slope beyond the 4,000-meter isobath.

Propagation of explosive pressure waves in water is highly dependent on environmental characteristics such as bathymetry, bottom type, water depth, temperature, and salinity, which affect how the pressure waves are reflected, refracted, or scattered; the potential for reverberation; and interference due to multi-path propagation. In addition, absorption greatly affects the distance over which higher-frequency components of explosive broadband noise can propagate. Appendix B (*Acoustic and Explosive Concepts*) of the 2022 GOA FSEIS/OEIS explains the characteristics of explosive detonations and how the above factors affect the propagation of explosive energy in the water.

For in-air explosives detonating at or above the water surface, the model estimating acoustic impacts assumes that all acoustic energy from the detonation is underwater with no loss of sound or energy into the air. Important considerations must be factored into the analysis of results with these modeling assumptions, given that the peak pressure and sound from a detonation in air significantly decreases across the air-water interface as it is partially reflected by the water's surface and partially transmitted underwater, as detailed in the following paragraphs.

Detonation of an explosive in air creates a supersonic high-pressure shock wave that expands outward from the point of detonation (Kinney and Graham, 1985; Swisdak, 1975). The near-instantaneous rise from ambient to an extremely high peak pressure is what makes the explosive shock wave potentially injurious to an animal experiencing the rapid pressure change (U.S. Department of the Navy, 2017a). As the shock wave-front travels away from the point of detonation, it slows and begins to behave as an acoustic wave-front traveling at the speed of sound. Whereas a shock wave from a detonation in-air has an abrupt peak pressure, that same pressure disturbance when transmitted through the water surface results in an underwater pressure wave that begins and ends more gradually compared with the in-air shock wave, and diminishes with increasing depth and distance from the source (Bolghasi *et al.,* 2017; Chapman and Godin, 2004; Cheng and Edwards, 2003; Moody, 2006; Richardson *et al.,* 1995; Sawyers, 1968; Sohn *et al.,* 2000; Swisdak, 1975; Waters and Glass, 1970; Woods *et al.,* 2015). The propagation of the shock wave in-air and then transitioning underwater is very different from a detonation occurring deep underwater where there is little interaction with the surface. In the case of an underwater detonation occurring just below the surface, a portion of the energy from the detonation would be released into the air (referred to as surface blow off), and at greater depths a pulsating, air-filled cavitation bubble would form, collapse, and reform around the detonation point (Urick, 1983). The Navy's acoustic effects model for analyzing underwater impacts on marine species does not account for the loss of energy due to surface blow-off or cavitation at depth. Both of these phenomena would diminish the magnitude of the acoustic energy received by an animal under real-world conditions (U.S. Department of the Navy, 2018b).

To more completely analyze the results predicted by the Navy's acoustic effects model from detonations occurring in-air above the ocean surface, it is necessary to consider the transfer of energy across the air-water interface. Much of the scientific literature on the transferal of shock wave impulse across the air-water interface has focused on energy from sonic booms created by fast moving aircraft flying at low altitudes above the ocean (Chapman and Godin, 2004; Cheng and Edwards, 2003; Moody, 2006; Sawyers, 1968; Waters and Glass, 1970). The shock wave created by a sonic boom is similar to the propagation of a pressure wave generated by an explosion (although having a significantly slower rise in peak pressure) and investigations of sonic booms are somewhat informative. Waters and Glass (1970) were also investigating sonic booms, but their methodology involved actual in-air detonations. In those experiments, they detonated blasting caps elevated 30 ft (9 m) above the surface in a flooded quarry and measured the resulting pressure at and below the surface to determine the penetration of the shock wave across the air-water interface. Microphones above the water surface recorded the peak pressure in-air, and hydrophones at various shallow depths underwater recorded the unreflected remainder of the pressure wave after transition across the air-water interface. The peak pressure measurements were compared and the results supported the theoretical expectations for the penetration of a pressure wave from air into water,

including the predicted exponential decay of energy with distance from the source underwater. In effect, the air-water interface acted as a low-pass filter eliminating the high-frequency components of the shock wave. At incident angles greater than 14 degrees perpendicular to the surface, most of the shock wave from the detonation was reflected off the water surface, which is consistent with results from similar research (Cheng and Edwards, 2003; Moody, 2006; Yagla and Stiegler, 2003). Given that marine mammals spend, on average, up to 90 percent of their time underwater (Costa, 1993; Costa and Block, 2009), and the shock wave from a detonation is only a few milliseconds in duration, marine mammals are unlikely to be exposed in-air when surfaced.

Vessel Strike

NMFS also considered the chance that a vessel utilized in training activities could strike a marine mammal in the GOA Study Area, including both the TMAA and WMA portions of the Study Area. Vessel strikes have the potential to result in incidental take from serious injury and/or mortality. Vessel strikes are not specific to any particular training activity, but rather are a limited, sporadic, and incidental result of Navy vessel movement within a study area. NMFS' detailed analysis of the likelihood of vessel strike was provided in the ''Potential Effects of Vessel Strike'' section of our proposed rulemaking (87 FR 49656; August 11, 2022); please see that notice of proposed rulemaking or the Navy's application for more information. No additional information has been received since publication of the proposed rule that substantively changes the agency's analysis or conclusions. Therefore, the information and analysis included in the proposed rule supports NMFS' concurrence with the Navy's conclusion and our final determination that vessel strikes of marine mammals, and associated serious injury or mortality, are not likely to result from the Navy's activities included in this seven-year rule, and vessel strikes are not discussed further.

Detailed Description of Specified Activities

Planned Training Activities

The Navy's Operational Commands have identified activity levels that are needed in the GOA Study Area to ensure naval forces have sufficient training, maintenance, and new technology to meet Navy missions in the Gulf of Alaska. Training prepares Navy personnel to be proficient in safely operating and maintaining equipment, weapons, and systems to conduct assigned missions.

The Navy plans to conduct a single carrier strike group (CSG) exercise, which will last for a maximum of 21 consecutive days in a year. The CSG exercise is comprised of several individual training activities. Table 3 lists and describes those individual activities that may result in takes of marine mammals. The events listed will occur intermittently during the 21 days and could be simultaneous and in the same general area within the TMAA or could be independent and spatially separate from other ongoing activities. The table is organized according to primary mission areas and includes the activity name, associated stressor(s), description and duration of the activity, sound source bin, the areas where the activities are conducted in the GOA Study Area, the maximum number of events per year in the 21-day period, and the maximum number of events over 7 years. For further information regarding the primary platform used (*e.g.,* ship or aircraft type) see Appendix A (Navy Activities Descriptions) of the 2022 GOA FSEIS/OEIS.

Not all sound sources are used with each activity. The ''Annual # of Events'' column indicates the maximum number of times that activity could occur during any single year. The ''7-Year # of Events'' is the maximum number of times an activity would occur over the 7-year period of the regulations if the training occurred each year and at the maximum levels requested. The events listed will occur intermittently during the exercise over a maximum of 21 days. The maximum number of activities may not occur in some years, and historically, training has occurred only every other year. However, to conduct a conservative analysis, NMFS analyzed the maximum times these activities could occur over one year and 7 years. (Note the Navy proposes no low-frequency active sonar (LFAS) use for the activities in this rulemaking.)

TABLE 3—TRAINING ACTIVITIES ANALYZED FOR THE 7-YEAR PERIOD IN THE GOA STUDY AREA

Stressor category	Activity	Description	Source bin	Annual # of events	7-Year # of events
		Surface Warfare			
Explosive	Gunnery Exercise, Surface-to-Surface. (GUNEX–S–S)	Surface ship crews fire inert small-caliber, inert medium-caliber, or large-caliber explosive rounds at surface targets.	E5	6	42
Explosive	Bombing Exercise (Air-to-Surface) (BOMBEX [A–S])	Fixed-wing aircraft conduct bombing exercises against stationary floating targets, towed targets, or maneuvering targets.	E9, E10, E12	18	126
		Anti-Submarine Warfare (ASW)			
Acoustic	Tracking Exercise—Helicopter (TRACKEX—Helo)	Helicopter crews search for, track, and detect submarines.	MF4, MF5, MF6	22	154
Acoustic	Tracking Exercise—Maritime Patrol Aircraft. (TRACKEX—MPA)	Maritime patrol aircraft crews search for, track, and detect submarines.	MF5, MF6, ASW2	13	91
Acoustic	Tracking Exercise—Ship (TRACKEX—Ship)	Surface ship crews search for, track, and detect submarines.	ASW1, ASW3, MF1, MF11, MF12.	2	14
Acoustic	Tracking Exercise—Submarine (TRACKEX—Sub)	Submarine crews search for, track, and detect submarines.	ASW4, HF1, MF3	2	14

Notes: S–S = Surface to Surface, A–S = Air to Surface.

Standard Operating Procedures

For training to be effective, personnel must be able to safely use their sensors and weapon systems as they are intended to be used in military missions and combat operations and to their optimum capabilities. Standard operating procedures applicable to training have been developed through

years of experience, and their primary purpose is to provide for safety (including public health and safety) and mission success. In many cases, there are benefits to natural and cultural resources resulting from standard operating procedures.

Because standard operating procedures are essential to safety and mission success, the Navy considers them to be part of the planned specified activities, and has included them in the environmental analysis in the 2022 GOA FSEIS/OEIS. Additional details on standard operating procedures were provided in our **Federal Register** notice of proposed rulemaking (87 FR 49656; August 11, 2022); please see that notice of proposed rulemaking or the Navy's application for more information.

Comments and Responses

We published the proposed rule in the **Federal Register** on August 11, 2022 (87 FR 49656), with a 45-day comment period. With that proposed rule, we requested public input on our analyses, our preliminary findings, and the proposed regulations, and requested that interested persons submit relevant information and comments. During the 45-day comment period, we received four comments. Of this total, one submission was from the Marine Mammal Commission (Commission), and the remaining comments were from a non-governmental organization (NGO) and private citizens. Additionally, 2 days after the public comment period ended, we received a comment letter from the Center for Biological Diversity (CBD).

NMFS has reviewed and considered all public comments received on the proposed rule and issuance of the LOA, including comments received from CBD after the public comment period ended. All substantive comments and our responses are described below. We organize our comment responses by major categories.

Impact Analysis and Thresholds

Comment 1: The Commission strongly recommended that NMFS refrain from using cutoff distances in conjunction with the Bayesian behavioral response functions (BRFs) and re-estimate the numbers of marine mammal takes based solely on the Bayesian BRFs in the final rule, as the use of cutoff distances could be perceived as an attempt to reduce the numbers of takes (85 FR 72326; November 12, 2020). The Commission stated that as such, providing better-substantiated, alternative cut-off distances is unnecessary, as their use in conjunction with the Bayesian BRFs is redundant and potentially contradictory.

Response: The consideration of proximity (cut-off distances) was part of the criteria developed in consultation between the Navy and NMFS, and is appropriate based on the best available science, which shows that marine mammal responses to sound vary based on both sound level and distance. Therefore, these cut-off distances were applied within the Navy's acoustic effects model. The derivation of the BRFs and associated cut-off distances is provided in the 2017 technical report titled ''Criteria and Thresholds for U.S. Navy Acoustic and Explosive Effects Analysis (Phase III).'' To account for non-applicable contextual factors, all available data on marine mammal reactions to actual Navy activities and other sound sources (or other large-scale activities such as seismic surveys when information on proximity to sonar sources was not available for a given species group) were reviewed to find the farthest distance to which significant behavioral reactions were observed. In applying the distance cut-offs in conjunction with the BRFs, these distances were rounded up to the nearest 5 or 10 km interval, and for moderate to large scale activities using multiple or louder sonar sources, these distances were greatly increased—doubled in most cases. The Navy's BRFs applied within these distances provide technically sound methods reflective of the best available science to estimate the impact and potential take for the actions analyzed within the 2022 GOA FSEIS/OEIS and included in this rule. NMFS has independently assessed the thresholds used by the Navy to identify Level B harassment by behavioral disturbance (referred to as ''behavioral harassment thresholds'' throughout the rest of the rule) and finds that they appropriately apply the best available science and it is not necessary to recalculate take estimates.

Comment 2: The Commission recommended that NMFS explain why the constants and exponents for onset mortality and onset slight lung injury thresholds for the current phase of incidental take rulemaking for the Navy (Phase III) that consider lung compression with depth result in lower rather than higher absolute thresholds when animals occur at depths greater than 8 m in the preamble to the final rule.

Response: The derivation of the explosive injury equations, including any assumptions, is provided in the 2017 technical report titled ''Criteria and Thresholds for U.S. Navy Acoustic and Explosive Effects Analysis (Phase III).'' The equations were modified for the current rulemaking period (Phase III) to fully incorporate the injury model in Goertner (1982), specifically to include lung compression with depth. NMFS independently reviewed and concurred with this approach.

The impulse mortality/injury equations are depth dependent, with thresholds increasing with depth due to increasing hydrostatic pressure in the model for both the previous 2015–2020 phase of rulemaking (Phase II) and Phase III. The underlying experimental data used in Phase II and Phase III remain the same, and two aspects of the Phase III revisions explain the relationships the commenter notes:

(1) The numeric coefficients in the equations are computed by inserting the Richmond *et al.* (1973) experimental data into the model equations. Because the Phase III model equation accounts for lung compression, the plugging of experimental exposure values into a different model results in different coefficients. The numeric coefficients are slightly larger in Phase III versus Phase II, resulting in a slightly greater threshold near the surface.

(2) The rate of increase for the Phase II thresholds with depth is greater than the rate of increase for Phase III thresholds with depth because the Phase III equations take into account the corresponding reduction in lung size with depth (making an animal more vulnerable to injury per the Goertner model), as the commenter notes.

Comment 3: The Commission recommended that NMFS use onset mortality, onset slight lung injury, and onset gastrointestinal (GI) tract injury thresholds rather than the 50-percent thresholds to estimate both the numbers of marine mammal takes and the respective ranges to effect for explosives for the final rule. The Commission stated that the current approach is inconsistent with the manner in which the Navy estimated the numbers of takes for Permanent Threshold Shift (PTS), Temporary Threshold Shift (TTS), and behavior for explosive activities, as all of those takes have been and continue to be based on onset, not 50 percent values.

The Commission stated that in addition, the circumstances of the deaths of multiple common dolphins during one of the Navy's underwater detonation events in March 2011 (Danil and St. Leger, 2011) indicate that the Navy's mitigation measures are not fully effective, especially for explosive activities. Recently, Oedekoven and Thomas (2022) also confirmed the ineffectiveness of Navy lookouts to sight marine mammals at various distances

during mid-frequency active (MFA) sonar exercises.

If the Navy does not implement the Commission's recommendation, the Commission further recommended that NMFS (1) specify why it bases explosive thresholds for Level A harassment on onset PTS and Level B harassment on onset TTS and onset behavioral response, while the explosive thresholds for mortality and Level A harassment are based on the 50-percent criteria for mortality, slight lung injury, and GI tract injury, (2) provide scientific justification supporting the assumption that slight lung and GI tract injuries are less severe than PTS and thus the 50-percent rather than onset criteria are more appropriate for estimating Level A harassment for those types of injuries, and (3) justify why the number of estimated mortalities should be predicated on at least 50 percent rather than 1 percent of the animals dying, particularly given the ineffectiveness of lookouts.

Response: For explosives, the type of data available are different from those available for hearing impairment, and this difference supports the use of different prediction methods. Nonetheless, as appropriate, and similar to take estimation methods for PTS, NMFS and the Navy have used a combination of exposure thresholds and consideration of mitigation to inform the take estimates. The Navy used the range to 1 percent risk of onset mortality and onset injury (also referred to as ''onset'' in the 2022 GOA FSEIS/OEIS) to inform the development of mitigation zones for explosives. Ranges to effect based on 1 percent risk criteria to onset injury and onset mortality were examined to ensure that explosive mitigation zones would encompass the range to any potential mortality or non-auditory injury, affording actual protection against these effects. In all cases, the mitigation zones for explosives extend beyond the range to 1 percent risk of onset non-auditory injury, even for a small animal (representative mass = 5 kg). Given the implementation and expected effectiveness of this mitigation, the application of the 50 percent threshold is appropriate for the purposes of estimating take in consideration of the required mitigation. Using the 1 percent onset non-auditory injury risk criteria to estimate take would result in an over-estimate of take, and would not afford extra protection to any animal. Specifically, calculating take based on marine mammal density within the area where an animal might be exposed above the 1 percent risk to onset injury and onset mortality criteria would over-predict effects because a subset of those exposures will not happen because of the reduction provided by the mitigation. The Navy, in coordination with NMFS, has determined that the 50 percent incidence of onset injury and onset mortality occurrence is a reasonable representation of a potential effect and appropriate for take estimation, given the mitigation requirements at the 1 percent onset injury and onset mortality threshold, and the area ensonified above this threshold would capture the appropriate reduced number of likely injuries.

While the approaches for evaluating non-auditory injury and mortality are based on different types of data and analyses from the evaluation of PTS and behavioral disturbance, and are not identical, NMFS disagrees with the commenter's assertion that the approaches are inconsistent, as both approaches consider a combination of thresholds and mitigation (where applicable) to inform take estimates. For the same reasons, it is not necessary for NMFS to ''provide scientific justification supporting the assumption that slight lung and GI tract injuries are less severe than PTS,'' as that assumption is not part of NMFS' rationale for the methods used. NMFS has explained in detail its justification for the number of estimated mortalities, which is based on both the 50 percent threshold and the mitigation applied at the one percent threshold. Further, we note that many years of Navy monitoring following explosive exercises has not detected evidence that any injury or mortality has resulted from Navy explosive exercises with the exception of one incident with dolphins in California, after which mitigation was adjusted to better account for explosives with delayed detonations (*i.e.,* zones for events with time-delayed firing were enlarged).

Furthermore, for these reasons, the methods used for estimating mortality and non-auditory injury are appropriate for estimating take, including determining the ''significant potential'' for non-auditory injury consistent with the statutory definition of Level A harassment for military readiness activities, within the limits of the best available science. Using the one percent threshold would be inappropriate and result in an overestimation of effects, whereas given the mitigation applied within this larger area, the 50 percent threshold results in an appropriate mechanism for estimating the significant potential for non-auditory injury.

While the Lookout Effectiveness Study suggests that detection of marine mammals is less certain than previously assumed, given the modeling results, this does not affect whether use of the 50 percent threshold is appropriate for calculating mortality from explosives. For explosives in bin E12, the bin with the largest net explosive weight (NEW; >650–1,000 lb.) planned for use by the Navy in the GOA Study Area, the average range to 50 percent non-auditory injury for all marine mammal hearing groups (Table 30) is 190 m. The range to 50 percent mortality risk for all marine mammal hearing groups (Table 31) for the same bin (E12) and the smallest (*i.e.,* the most susceptible to mortality) modeled animal size (10 kg), is 55 m. The range to one percent onset mortality for the same bin (E12) and the smallest modeled animal size (10 kg) is 73 m (with a minimum and maximum of 65 m and 80 m, respectively). Considering that zero takes by non-auditory injury were modeled without consideration of the planned mitigation measures, and with a zone almost 3.5 times larger than the 50 percent onset mortality zone for the highest NEW and most susceptible animal weight, mortality as a result of explosives is unlikely to occur, especially at larger distances than that which were modeled, regardless of lookout effectiveness. However, it is also important to note that the ranges to 50 percent and one percent onset mortality for E12 explosives are both significantly smaller than the mitigation zones reported on in the Lookout Effectiveness Study (200, 500 and 1,000 yards; Oedekoven and Thomas, 2022).

Comment 4: The Commission continues to maintain that NMFS has not provided adequate justification for dismissing the possibility that single underwater detonations can cause a behavioral response, and, therefore, again recommended that it estimate and authorize behavior takes of marine mammals during all explosive activities, including those that involve single detonations consistent with in-air explosive events.

Response: NMFS acknowledges the possibility that single underwater detonations can cause a behavioral response. The current take estimate framework allows for the consideration of animals exhibiting behavioral disturbance during single explosions as they are counted as ''taken by Level B harassment'' if they are exposed above the TTS threshold, which is 5 decibels (dB) higher than the behavioral harassment threshold. We acknowledge in our analysis that individuals exposed above the TTS threshold may also be harassed by behavioral disruption and those potential impacts are considered

in the negligible impact determination. Neither NMFS nor the Navy are aware of evidence to support the assertion that animals will have significant behavioral responses (*i.e.,* those that would rise to the level of a take) to temporally and spatially isolated explosions at received levels below the TTS threshold. However, if any such responses were to occur, they would be expected to be few and to result from exposure to the somewhat higher received levels bounded by the TTS thresholds and would thereby be accounted for in the take estimates. The derivation of the explosive injury criteria is provided in the 2017 technical report titled ''Criteria and Thresholds for U.S. Navy Acoustic and Explosive Effects Analysis (Phase III).''

Regarding the assertion in the Commission's letter that the approaches for assessing the impacts from a single underwater detonation and a single in-air detonation are inconsistent, we disagree. Both approaches/thresholds are based on the best available data. As noted above, we are unaware of data suggesting that marine mammals will respond to single underwater explosive detonation below the TTS threshold in a manner that would qualify as a take. Conversely, for single in-air events such as missile launch noise and sonic booms, there are extensive data supporting the application of the lower behavioral thresholds, *i.e.,* pinnipeds moving significant distances or flushing in response to these in-air levels of sounds.

Comment 5: A commenter stated that the Navy must consider the risks of vessel noise on the species. Chronic stress in North Atlantic right whales is associated with exposure to low frequency noise from ship traffic. Specifically, ''the adverse consequences of chronic stress often include long-term reductions in fertility and decreases in reproductive behavior; increased rates of miscarriages; increased vulnerability to diseases and parasites; muscle wasting; disruptions in carbohydrate metabolism; circulatory diseases; and permanent cognitive impairment'' (Rolland *et al.,* 2012). These findings have led researchers to conclude that ''over the long term, chronic stress itself can reduce reproduction, negatively affect health, and even kill outright'' (Rolland *et al.,* 2007). North Pacific right whales likely suffer in the same ways.

Response: NMFS did consider the risks of vessel noise on marine mammals. Navy vessels are designed to be quieter than civilian vessels, and the vessel noise associated with Navy activities is not expected to cause harassment of marine mammals (see the Potential Effects of Specified Activities on Marine Mammals and Their Habitat section in the proposed rule; 87 FR 49656; August 11, 2022). NMFS included an in-depth discussion of stress response in the *Physiological Stress* section of the proposed rule (87 FR 49656; August 11, 2022). There are currently neither adequate data nor mechanisms by which the impacts of stress from acoustic exposure can be reliably and independently quantified. However, stress effects that result from noise exposure likely often occur concurrently with behavioral harassment and many are likely captured and considered in the quantification of other takes by harassment that occur when individuals come within a certain distance of a sound source (behavioral harassment, PTS, and TTS).

Density Estimates

Comment 6: The Commission recommended that NMFS (1) clarify how and for which species uncertainty was incorporated in the density estimates and whether and how uncertainty was incorporated in the group size estimates and specify the distribution(s) used and, (2) if uncertainty was not incorporated, re-estimate the numbers of marine mammal takes in the final rule based on the uncertainty inherent in the density estimates provided in Department of the Navy (2021) or the abundance estimates in the underlying references (NMFS stock assessment reports (SARs), Fritz *et al.* 2016, *etc.*) and the group size estimates provided in Department of the Navy (2020a). Furthermore, if uncertainty is not incorporated in the group size estimates, the Commission recommends that NMFS specify why it did not do so.

Response: Similar to other Navy Phase III training and testing impact analyses, uncertainty was incorporated in species density and group size estimates for those species with uncertainty values available, when distributing the animats in the Navy Acoustic Effects Model. Since 2016, the Navy Acoustics Effects Model has been refined; marine species density estimates have been updated; and NMFS has published new effects criteria, weighting functions, and thresholds for multiple species, that are incorporated into the model analysis. As discussed in the technical report titled ''Quantifying Acoustic Impacts on Marine Mammals and Sea Turtles: Methods and Analytical Approach for Phase III Training and Testing'' (U.S. Department of the Navy, 2018), available at *www.goaeis.com,* marine mammal density data are provided as a 10x10 km grid where each cell has a mean density and standard error. In the Navy Acoustic Effects Model, species densities are distributed into simulation areas. Sixty distributions that vary based on the standard deviation of the density estimates are run per season for each species to account for statistical uncertainty in the density estimates.

Clarification on the incorporation of uncertainty in density estimates is provided in the Density Technical Report ''U.S. Navy Marine Species Density Database Phase III for the Gulf of Alaska Temporary Maritime Activities Area,'' as cited in the 2022 GOA FSEIS/OEIS and available at *www.goaeis.com.* Uncertainty in the density estimates was incorporated into the estimation of take for all species with appropriate measures of uncertainty available, which is most species.

Using a mean density estimate that incorporates appropriate measures of uncertainty, as was done for the species listed in the Commission's comment, is a commonly used and scientifically valid method of estimating a value (*i.e.,* a density in this context). There is equal probability of underestimating and overestimating takes even with a large coefficient of variation (CV) associated with a mean density estimate. Therefore, using the mean density and incorporating the CV into the distribution of animats in the Navy Acoustic Effects Model is reasonable and representative of species distribution in the GOA Study Area.

Regarding pinnipeds, NMFS and the Navy continue to seek appropriate methods for incorporating uncertainty into density estimates for pinnipeds, and by extension, into the Navy's estimates of exposures. As the Commission noted in its comment, of the six pinniped species for which the Navy calculates densities, only the northern fur seal incorporated a CV as a measure of uncertainty in the density estimate. The CV was provided in the SAR (Muto *et al.,* 2020a) as a measure of uncertainty in the abundance of northern fur seals, and that abundance (620,660 northern fur seals) was the basis for the density calculation, making the CV directly applicable to the density estimate. Only limited data were available for calculating densities for California sea lions and ribbon seals in the GOA Study Area, as described in the Density Technical Report, and no estimate of uncertainty in either the abundance or the density was available or could be estimated. The SAR did not provide a CV or other measure of uncertainty in the abundance estimate

for northern elephant seals, so none was available for use in the density calculation. The SAR provided a standard error in the abundance estimates for the four harbor seal stocks (Muto *et al.,* 2020a) as a measure of uncertainty in the abundance; however, those abundance estimates were combined as described in the Density Technical Report and used to calculate an abundance over the continental shelf—the only part of the harbor seal distribution within the GOA Study Area. The stock abundances were not direct inputs into the density calculations; therefore, it would not have been statistically correct to manipulate (*e.g.,* sum or average) four standard error values representing uncertainty in the separate abundance estimates to derive a standard error and apply it to a calculated continental shelf abundance. The abundance for Steller sea lions was taken from Fritz *et al.* (2016) Table 1A (pups) and Table 6 (non-pups for Eastern Gulf). The recommended formula of pup count × 3.5 was used to estimate the Central Gulf non-pup abundance. (Note that Table 6 only included the abundance for Rookery Cluster Area-9, a portion of the Central Gulf abundance.) No measure of uncertainty in the abundance is provided in either table (Fritz *et al.,* 2016). The Navy intends to incorporate, and NMFS intends to consider, uncertainty in its density estimates for pinnipeds in the future, as data or statistically valid methodologies allow.

NMFS concurs with the Navy's use of uncertainty, where available, in the densities applied through their model and reiterates that the best available science was used and applied appropriately to estimate marine mammal take.

Comment 7: The Commission stated that in its January 4, 2021 letter on the 2020 GOA Draft Supplemental Environmental Impact Statement (DSEIS)/OEIS, it recommended that the Navy request a small number of gray whale takes in its rulemaking/LOA application regardless of whether its model estimated zero takes. Density estimates are not available for gray whales in the TMAA, but the whales could occur there within the timeframe that the Navy's activities would occur (Department of the Navy, 2020b and 2021; Ferguson *et al.,* 2015; Palacios *et al.,* 2021). The Navy did not request any gray whale takes in its revised LOA application, but NMFS proposed to authorize four Level B harassment behavioral takes of the Eastern North Pacific (ENP) stock in the proposed rule (87 FR 49656; August 11, 2022) based on group size from Rone *et al.* (2017). The Commission supports that approach but is unsure why NMFS did not also propose to authorize takes of the Western North Pacific (WNP) stock of gray whales. Palacios *et al.* (2021) and Mate *et al.* (2015) have shown that gray whales tagged off eastern Russia have been tracked through the TMAA, similar to and in about equal proportion to ENP gray whales. Telemetry, photo-identification, and genetic studies have all shown movements and interchange between the WNP and ENP stocks of gray whales (Weller *et al.,* 2012, Urbán *et al.,* 2019, Lang *et al.,* 2022). Therefore, the Commission recommends that NMFS include in the final rule four Level B harassment behavioral takes for the ENP and WNP stocks of gray whales, as well as its proposed Level B harassment behavioral takes for the WNP stock of humpback whales.

Response: This final rule authorizes take of four Eastern North Pacific stock gray whales, as proposed. However, it does not authorize four takes of Western North Pacific gray whales as recommended by the Commission. As noted by the Commission, Palacios *et al.* (2021) and Mate *et al.* (2015) show that several gray whales tagged off of eastern Russia entered or came close to the TMAA. However, these occurrences were outside of the time period that the Navy plans to conduct its activity (April to October). Of the whales discussed in Palacios *et al.* (2021), one whale occurred in the TMAA on December 30 and 31, 2011, one whale occurred in the TMAA on March 29 and April 1, 2012, and later passed the TMAA approximately 600–700 km south of its boundary from December 26–31, 2011, and a third whale passed the TMAA approximately 300–400 km south of its boundary from January 22–25, 2011. Of the whales tagged by Mate *et al.* (2015), three whales occurred within the Gulf of Alaska; however, like those tagged by Palacios *et al.* (2021), these whales mainly occurred in the Gulf of Alaska outside of the Navy's planned training period of April to October. Three of the whales' transits between Sakhalin Island, Russia and the Eastern North Pacific occurred during the fall and winter. A return trip to Russia from Baja California, Mexico by one of the three whales took place from February to May 2012. While it is not completely clear, based on Figure 1 of Mate *et al.* (2015), it appears likely that the whale had crossed the Gulf of Alaska by April or in early April. While there are movements and interchange between the Eastern and Western North Pacific gray whales, as noted by the Commission, including migration of Western North Pacific gray whales through the Gulf of Alaska, as noted in Table 4 of the proposed rule (87 FR 49656, August 11, 2022), their occurrence in the TMAA is rare. Given the occurrence information described above and the very low population estimate of Western North Pacific gray whales (290 whales in comparison to 26,960 Eastern North Pacific gray whales), NMFS has not added take of Western North Pacific gray whales to this final rule.

Comment 8: For Baird's beaked whales, the Navy used a presumed density of 0.0005 whales/km^2 from Waite (2003) based on a single sighting of four Baird's beaked whales. The Commission stated that this density estimate is of little value for reasons outlined in its January 4, 2021 letter commenting on the 2020 GOA DSEIS/OEIS. In addition, the Navy specified that six visual sightings and 32 acoustic detections of Baird's beaked whales occurred during the 2013 survey in the TMAA (Department of the Navy 2021). Rone *et al.* (2014) also noted that Baird's beaked whales often travel in large groups. The Navy further specified average group size as 8.08 for Baird's beaked whales, 2.04 for Cuvier's beaked whales, and 6 for Stejneger's beaked whales (see Table 26 in Department of the Navy, 2020a). As such, the Commission asserts that the density from Waite (2003) is a vast underestimate.

The Commission further states that Rone *et al.* (2014) documented the first fine-scale habitat use of a tagged Baird's beaked whale in the region. The tagged individual showed the importance of seamount habitat, remaining approximately nine days, presumably foraging, within a relatively small geographic range inside the TMAA, with approximately six of those days spent in the vicinity of a single seamount (Rone *et al.,* 2014). The greatest density of Cuvier's beaked whales also was attributed to the seamount stratum based on Yack *et al.* (2015). At a minimum, the stratum-specific densities for Cuvier's beaked whales should have been used as surrogates for Baird's beaked whales, with the understanding that the Cuvier's beaked whale densities may still be an underestimate based on the larger group size of Baird's beaked whales. The Commission recommended that NMFS use the three stratum-specific densities of Cuvier's beaked whales as surrogates for Baird's beaked whales and re-estimate the numbers of takes accordingly for the final rule.

Response: The Navy developed a hierarchical system, described in each

of the density technical reports, for identifying and selecting the best available density data. As described in Section 2.2.2 of the Density Technical Report for the GOA, the density value of a surrogate species can be used as a proxy value when species-specific density data are not available. A density estimate for Baird's beaked whale is available based on sighting data collected within the GOA; therefore, the use of density estimates for a surrogate species would not be consistent with the established hierarchy or the best scientific information available. NMFS and the Navy will update density estimates for Baird's beaked whale in the future if more recent survey data become available. Additionally, take estimates could be modified if other information supported it—however, no such information suggests that the estimated and authorized take are not appropriate, and 106 annual takes continues to represent the best available science.

Comment 9: The Commission stated that the Navy indicated that it used data derived from Hobbs and Waite (2010) to characterize harbor porpoise density in various strata based on published depth distributions (Department of Navy, 2021). The Navy did not stipulate where those depth strata delineations originated or what density from Hobbs and Waite (2010) was used. Hobbs and Waite (2010) provided an uncorrected density of 0.062 porpoises/km² for GOA and a corrected abundance of 31,046 porpoises for the 158,733 km² area surveyed (see Table 2), which would result in a corrected density of 0.198 porpoises/km². Both densities are greater than the 0.0473 porpoises/km² that Navy used for the GOA (Department of the Navy, 2021). If NMFS considers the data in Hobbs and Waite (2010) to be the best available science, the Commission recommends that NMFS use the corrected density of 0.198 porpoises/km² from Hobbs and Waite (2010) for the 100 to 200–m isobath stratum and re-estimate the numbers of takes accordingly for harbor porpoises in the final rule.

Response: Hobbs and Waite (2010) estimated the abundance of the GOA harbor porpoise stock based on aerial surveys conducted in the summer of 1998. The surveys were conducted along transect lines that ran from shore (including inlets, straits, and sounds) out to the 1,000 m depth contour, and were concentrated in nearshore areas where harbor porpoise are known to occur. Once corrected for perception and availability bias, Hobbs and Waite (2010) estimated a total of 31,046 harbor porpoise in the GOA stock (*i.e.,* a density estimate of 0.1956 animal/km² based on a study region of 158,733 km²). Hobbs and Waite (2010) note that, despite the ranges of depth surveyed in the GOA, harbor porpoise were present primarily in waters less than 100 m in depth, which is consistent with aerial surveys off the U.S. West Coast where porpoise are mainly found in 20–60 m depth (Carretta *et al.,* 2001). Based on these data, it was assumed 90 percent of the harbor porpoise are found in waters up to 100 m depth, 10 percent in waters from 100 from 200 m depth, and few in waters from 200 to 1,000 m depth.

Given their nearshore distribution, it would not be appropriate to use an overall harbor porpoise density estimate of 0.1956 animal/km² for analysis in the GOA TMAA; density estimates need to be derived specific to the depth ranges where they are known to occur. To derive density estimates, depth strata were identified consistent with Hobbs and Waite (2010) and are shown below for waters within the GOA TMAA (to be consistent with the survey coverage of Hobbs and Waite (2010), the areas included nearshore regions within inlets, straits, and sounds). The total area within the 1,000 m depth contour = 101,588.64 km².

GOA TMAA depth distribution:

<100 m = 39,332.23 km²
100–200 m = 42,020.44 km²
200–1,000 m = 20,235.97 km²
TOTAL = 101,588.64 km²

Based on the Hobbs and Waite (2010) density estimate of 0.1956 animal/km², approximately 19,871 harbor porpoise could occur within the TMAA. Based on these values, the following density estimates were calculated using the estimate of 19,871 harbor porpoises, the percentages noted above, and the area of each depth strata in the GOA TMAA.

GOA harbor porpoise density estimates:

<100 m = 0.4547 animals/km²
100–200 m = 0.0473 animals/km²
200–1,000 m = 0.00001 animals/km²

Comment 10: The Commission stated that the Navy used abundance estimates divided by given areas to estimate densities, and the areas used were again inconsistent among species. For Northern fur seal, the Commission recommended that NMFS (1) specify why the Navy chose to use the GOA Large Marine Ecosystem (LME) area rather than the U.S. Geological Service (USGS) GOA area, (2) use the most recent northern fur seal abundance estimate of 626,618 rather than 620,660, (3) determine whether the information in the text or in Table 10–2 in Department of the Navy (2021) is correct regarding the assumed delineations of juvenile northern fur seals by sex and re-estimate the abundances provided in Table 10–3 based on the most recent abundance estimate and the correct delineation assumptions, (4) apply to September and October the same assumptions that were made regarding juveniles of both sexes for August, and (5) re-estimate the densities in Table 10–4 and the numbers of takes of northern fur seals in the final rule.

Response: We first note that take estimation is not an exact science. There are many inputs that go into an estimate of marine mammal exposure, and the data upon which those inputs are based come with varying levels of uncertainty and precision. Also, differences in life histories, behaviors, and distributions of stocks can support different decisions regarding methods in different situations. Further, there may be more than one acceptable method to estimate take in a particular situation. Accordingly, while the applicant bears the responsibility of providing by species or stock the estimated number and type of takes (see 50 CFR 216.104(a)(6)) and NMFS always ensures that an applicant's methods are technically supportable and reflect the best available science, NMFS does not prescribe any one method for estimating take (or calculating some of the specific take estimate components that the commenter is concerned about). NMFS reviewed the areas, abundances, and correction factors used by the Navy to estimate take for the GOA Study Area and concurs that they are appropriate. While some of the suggestions the commenter makes could provide alternate valid ways to conduct the analyses, these modifications are not required in order to have equally valid and supportable analyses. In addition, we note that (1) some of the specific recommendations that the commenter makes in this comment and others are largely minor in nature within the context of our analysis (*e.g.,* abundance estimate of 626,618 rather than 620,660) and (2) even where the recommendation is somewhat larger in scale, given the ranges of the majority of these stocks, the size of the stocks, and the number and nature of pinniped takes, recalculating the estimated take for any of these pinniped stocks using the commenter's recommended changes would not change NMFS' assessment of impacts on the rates of recruitment or survival of any of these stocks, or the negligible impact determinations. Below, and in subsequent comment responses, we address the commenter's issues in more detail.

The Navy adopted new methodologies and densities based on the best available science to improve the Navy's pinniped

density estimates in the GOA and Northwest Training and Testing (NWTT) Study Areas. NMFS has reviewed the Navy's analysis and choices in relation to these comments and concurs that they are technically sound and reflect the best available science. The same approach taken for the pinniped density estimates in the NWTT Study Area was applied to density estimates in the GOA Study Area, including the use of haulout factors, telemetry data, and age and sex class distinctions (as data permitted). One difference was the application of a growth rate used to calculate abundances for some pinniped species in the NWTT Study Area. Applying an annual growth rate for pinniped species in the GOA was determined to be unnecessary or inappropriate based on discussions with pinniped subject matter experts at the NMFS Alaska Fisheries Science Center's Marine Mammal Lab. As was done in the NWTT Study Area, the Navy estimated seasonal in-water abundances for each species and divided those abundances by an area representing the distribution of each pinniped species. It would have been inappropriate and less accurate to assume all pinniped species were distributed equally over the same area (*e.g.,* the GOA LME). For example, it would not have been representative of species occurrence to distribute harbor seals over the GOA LME to calculate density; however, the GOA LME was representative of the northern fur seal distribution.

The percentages of northern fur seals occurring in the GOA LME presented in Table 10–2 are consistent with the information presented in the text of the Density Technical Report (U.S. Department of the Navy, 2021). The percentages for January through March were not shown in Table 10–2 because the Navy only presented densities for the period relevant to the planned training in the GOA Study Area (April through October). The percentages for January through April (equivalent to the data in Table 10–2) are provided in the table below.

TABLE 4—MONTHLY PERCENTAGES OF AGE AND SEX CLASSES OF NORTHERN FUR SEAL IN THE GULF OF ALASKA LME FROM JANUARY TO APRIL

Month	Eastern Pacific stock						California stock
	Adult females (percent)	Adult males (percent)	Juvenile females (2 and 3 year olds; percent)	Juvenile males (2 and 3 year old; percent)	Yearlings* (percent)	Pups (percent)	Pups (percent)
January	20	25	35	25	10	10	50
February	20	20	20	20	10	10	50
March	25	25	25	10	15	15	50
April	15	15	35	10	15	15	50

* Assumes yearlings, which are not included in Zeppelin *et al.* (2019) and pups in the Eastern Pacific stock have the same month percentages through June.

As described in the text of the Density Technical Report, the average percentage from January through April is 29 percent for juvenile females and 16 percent for juvenile males. Those averages were used for May and June for females and males, respectively. The process for estimating juvenile abundances, as presented in Table 10–2, is described in the text of the Density Technical Report. For example, the abundance of juvenile females is calculated as:

Abundance = 620,660 × 0.085 × 0.35 = 18,456 juvenile female fur seals; where 8.5 percent is the class percentage of the stock (Density Technical Report Table 10–1, see footnote 2) and 35 percent is the portion of the class occurring in the Study Area in April (Table 10–2).

The estimates of monthly abundances, including for juveniles, were validated by pinniped scientists at the Alaska Fisheries Science Center's Marine Mammal Lab, several of whom are co-authors on the paper by Zeppelin *et al.* (2019). The paper does not provide occurrence data for September, and, as shown in Figure 4 of the paper, the abundance of juveniles in the GOA in October is at or near zero.

Comment 11: The Commission stated that it is unclear why the Navy did not forward-project the abundance estimates of Western Distinct Population Segment (wDPS) Steller sea lions to at least 2021, as trend data are available in NMFS' 2019 SAR and remain the same through 2021 (Muto *et al.,* 2022). They also request clarification as to why the Navy used Fritz *et al.* (2016) for the abundance estimates for western and eastern Steller sea lions. Those abundances were from surveys conducted in 2015 and have been updated by Sweeney *et al.* (2018 and 2019) as referenced in NMFS' 2019, 2020, and 2021 SARs. The Commission recommended that NMFS re-estimate (1) the Steller sea lion densities for the western DPS based on abundance data from Sweeney *et al.* (2018 and 2019) rather than Fritz *et al.* (2016) and forward-project the abundance estimates into 2022 using the trend data provided in NMFS' 2021 SAR, and (2) the number of Steller sea lion takes.

Response: In the NWTT Study Area, the Navy used an annual growth rate to estimate densities for some pinniped species to account for abundance estimates reported in the SARs that were based on older survey data or when abundance estimates were no longer supported by the SAR. The intent of applying a growth rate was to estimate an abundance to the present time (*i.e.,* at the time densities were being calculated). Growth rates were not used to ''forward project'' abundance estimates into the future, but to bring estimates up to the present if a reliable growth rate was available and appropriate to use for the species and location. A similar process was considered for estimating densities in the GOA Study Area; however, the Navy, following discussions with pinniped scientists at the NMFS Alaska Fisheries Science Center's Marine Mammal Lab, determined that applying a growth rate (including the trend data provided in NMFS' 2021 SAR) would not be appropriate for pinniped species occurring in the GOA, because available abundance estimates were considered accurate and representative.

While the SARs do reference more recent surveys (Sweeney *et al.,* 2018, 2019), there is no substantial difference in the relevant abundance data reported

by Sweeney *et al.* (2017, 2018, 2019) and Fritz *et al.* (2016). Sweeney *et al.* (2018) states that, ''there were no—or limited—new data collected for the GOA regions in 2018.'' Table 1 in Sweeney *et al.* (2018) shows that there were only two sites in the Central Gulf that were surveyed (and they were surveyed on a single day) and no sites in the Eastern Gulf that were surveyed. Figure 8 (pups) shows that the realized pup count is approximately the same as the pup count reported by Fritz *et al.* (2016) in Table 1. In both cases, the totals reported by Fritz *et al.* (2016) are higher. Given a lack of new data and that abundance estimates from both sources are similar, Sweeney *et al.* (2018) should not be considered a superior source of abundance data for Steller sea lions in the Eastern Gulf and Central Gulf regions. Sweeney *et al.* (2017) reports more extensive survey data for the Eastern Gulf and Central Gulf than Sweeney *et al.* (2018); however, Figure 7 of the 2017 paper shows that realized pup counts are similar to those reported by Sweeney *et al.* (2018) and lower than those provided by Fritz *et al.* (2016). Lastly, the data, analysis, and discussion presented by Fritz *et al.* (2016) are more comprehensive than the abbreviated information presented by Sweeney *et al.* (2017, 2018) and include information specific to each sub-region (*e.g.,* Central Gulf and Eastern Gulf) within the Western DPS. Given the similarity in abundances estimates, with the abundances in Fritz *et al.* (2016) more conservative for the Navy's analysis, no meaningful change in the density of Western DPS Steller sea lions would result from recalculating densities based on Sweeney *et al.* (2017, 2018, 2019).

A small area east of the 144° W longitude line, which defines the DPS boundary for Steller sea lions, overlapped with a conservatively sized area used by the Navy to delineate where species' densities were needed for modeling. The ''density area'' extended well beyond the TMAA and the Navy's area of potential effects; however, only densities inside the TMAA were reported in the Density Technical Report. The Navy estimated two seasonal densities for the Eastern DPS of Steller sea lions in the portion of the density area defined by the 144° W longitude line and the 500 m isobath (see table below).

TABLE 5—SEASONAL DENSITIES FOR EASTERN DPS STELLER SEA LIONS

Eastern DPS	DPS area name
34,196	Abundance.
63 percent ..	May–August percent in-water (haulout factor).
75 percent ..	April, September–October percent in-water (haulout factor).
21,543	May–August in-water abundance.
25,647	April, September–October in-water abundance.
90,796	Area (km^2)
0.2373	May–August density (animals/km^2)
0.2825	April, September–October density (animals/km^2)

The portion of the Eastern DPS that overlaps with the density area and is in waters less than 500 m is approximately 100 km north of the TMAA. The portion of the Eastern DPS (east of the 144° W longitude line) that overlaps with the TMAA is farther offshore and considerably deeper than 500 m and therefore has a zero density. Table 10–6 in the Density Technical Report specifically indicates densities are only provided inside the TMAA. Therefore, only a zero density for the Eastern DPS is reported in Table 10–6 for areas inside the TMAA. Additional text has been added to the Density Technical Report to explain this in greater detail. Prior to Navy analysis, NMFS reviewed and concurred with all densities used in the Density Technical Report.

Comment 12: The Commission stated that in addition to the Navy's use of an inconsistent geographical area for elephant seals, the Navy used an outdated abundance estimate. The abundance estimate is from 12 years ago, and the Commission asserted that it should have been forward-projected to at least 2021 based on the growth rate included in NMFS' 2019 SAR. Since then, NMFS has updated its elephant seal abundance estimate to 187,386 and its annual growth rate to 3.1 percent based on Lowry *et al.* (2020; Carretta *et al.,* 2022). The Commission recommended that NMFS (1) specify why the Navy chose to use the USGS GOA area rather than the GOA LME area to estimate elephant seal densities in the preamble to the final rule, (2) use the most recent abundance estimate of 187,386 rather than 179,000 and forward-project it into 2022 using the trend data provided in NMFS' 2021 SAR, and (3) re-estimate the number of elephant seal takes in the final rule.

Response: It is not clear what the Commission means by ''inconsistent geographic areas for elephant seals.'' The USGS definition of the GOA represented the distribution information reported in Peterson *et al.* (2015) and Robinson *et al.* (2012), which were the primary sources used to define monthly elephant seal distributions, and was geographically more relevant to the TMAA than the GOA LME, which extends along the coast of southeast Alaska and British Columbia, Canada, far from the TMAA. Female northern elephant seals are primarily distributed throughout the eastern North Pacific following their post-breeding and post-molting migrations. The GOA LME does not adequately represent their distribution, which begins with northward migrations from the Channel Islands off California and is concentrated with highest densities centered near the boundary between the sub-Arctic and subtropical gyres, south of the GOA LME (Robinson *et al.,* 2012). Male elephant seals tend to forage and transit over the shelf closer to shore than females; however, they primarily migrate from the Channel Islands through the GOA to the Aleutian Islands. Unlike northern fur seals, which use much of the GOA LME during migration and their non-breeding season, northern elephant seals occur outside of the GOA LME for a large portion of the year, making the GOA LME less relevant to their distribution and inadequate as an area representing their occurrence in a density calculation. Figure 1 in Peterson *et al.* (2015) illustrates how using the GOA LME as the density distribution area would be problematic. Telemetry data shows that some females migrated into the GOA LME off southeast Alaska and British Columbia, Canada following their post breeding (short) foraging trip; however, none of the tracks reached the GOA. Calculating densities in the southeast portion of the GOA LME was irrelevant to the Navy's analysis in the TMAA, and extrapolating densities from the southeast GOA LME into the TMAA would not have been accurate. The Navy searched for another geographic definition of the GOA that would encompass the entire TMAA but not extend as far south along the coast as the GOA LME. The USGS definition of the GOA met those requirements and allowed the Navy to more accurately estimate the proportion of elephant seals occurring in proximity to the TMAA based on the kernel density distribution data presented by Robinson *et al.* (2012). Based on these considerations, the Navy determined that the USGS definition of the GOA was more appropriate to use in calculating densities for northern elephant seals in the TMAA. NMFS reviewed and concurs with the Navy's determination. Please see Comment 10 for a response to the comment on the

use of different geographic areas for different species.

The Navy does not ''forward project'' abundances for any species, and NMFS concurs with this decision. A growth rate was applied to project an abundance to the present time (*i.e.,* at the time densities were being calculated) for selected species in the NWTT Study Area. A similar process was considered for species in the GOA Study Area; however, the Navy, following discussions with pinniped scientists at the Alaska Fisheries Science Center's Marine Mammal Lab, determined that applying a growth rate would not be appropriate for pinniped species occurring in the GOA Study Area, because available abundance estimates were considered accurate and representative. NMFS concurs with this decision. Elephant seal researchers at the University of California Santa Cruz reviewed the Navy's elephant seal density estimates and confirmed the estimates as reasonable. The Navy is aware that the elephant seal abundance estimate in the SAR is older, and the Navy will continue to seek updated information on elephant seal abundance.

Further, as explained in more detail in response to Comments 10 and 14, take estimation is not an exact science, and updating the density using the most recent northern elephant seal abundance estimate of 187,386 rather than 179,000 is not required in order to have an equally valid and supportable analysis. The change would be minor in nature within the context of our analysis, and recalculating the estimated take using the commenter's recommended changes would not change NMFS' assessment of impacts on the rates of recruitment or survival of any of these stocks, or the negligible impact determinations.

Comment 13: The Commission stated that for harbor seals, the Navy indicated that it derived the proportion of the total population estimates in Table 10–10 of Department of the Navy (2021) from data provided by model A in Table 2 of Hastings *et al.* (2012). While Hastings *et al.* (2012) provided survival estimates of various age classes for seals on Tugidak Island in Table 2, they did not provide relative age-class proportions for the population. The Navy also used abundance estimates from 2015–2018 for the four stocks. As for other pinniped species, those estimates should have been forward-projected to at least 2021 based on the trend data available in NMFS' 2019 SAR. In addition, the Navy did not provide references regarding its assumption that harbor seals would be in the water for 50 percent of the time from June through September and for 60 percent of the time in April, May, and October. Boveng *et al.* (2012) indicated that the proportion of seals hauled out in Cook Inlet peaked at 43 percent in June compared to 32 percent in October. Those haul-out proportions would equate to 57 percent of seals in the water in June and 68 percent of the seals in the water in October—both of which are greater than the Navy's assumptions. For simplicity, the Navy could have used 60 and 70 percent rather than 50 and 60 percent. The Commission recommended that NMFS (1) re-estimate the densities of harbor seals based on the abundance data forward-projected to 2022 using the trend data provided in NMFS' 2021 SAR and based on 60 percent of seals being in the water from June through September and 70 percent of the seals being in the water in April, May, and October as denoted in Boveng *et al.* (2012) and (2) re-estimate the number of harbor seal takes in the final rule.

Response: The Navy calculated relative age class proportions for harbor seal using survival rates and assuming an annual increase of 1,234 harbor seals per year for the South Kodiak stock. The annual increase was based on the 8-year trend estimate from the SAR (Muto *et al.,* 2019). Projections were made out to 35 years, and age class proportions were calculated based on the relative abundances in this hypothetical population after 35 years. This part of the process was not explained in detail in the Density Technical Report (November 2020), but the approach was reviewed by pinniped scientists at the Alaska Fisheries Science Center's Marine Mammal Lab and deemed a reasonable approach for determining relative proportions of each age class represented in the four relevant harbor seal stocks. Additional text was added to the March 2021 Density Technical Report to outline this process in more detail.

The abundances for the four stocks used in the density calculations are the abundances in the 2019 final SAR (Muto *et al.,* 2020b) and were the most recent abundances available at the time the densities were derived. The abundance estimates were provided to the Navy by the Alaska Fisheries Science Center's Marine Mammal Lab in advance of being updated in the SAR. The Navy, following discussions with pinniped scientists at the Alaska Fisheries Science Center's Marine Mammal Lab, determined that applying a growth rate would not be appropriate for pinniped species occurring in the GOA Study Area because available abundance estimates are considered accurate and representative, and particularly in the case of harbor seals, very recent. NMFS reviewed and concurs with all densities used in the Density Technical Report.

The haulout factors used to estimate the number of harbor seals in the water were adapted from Withrow and Loughlin (1995), who estimated that harbor seals were hauled out 58 percent of the time (42 percent in water) during molting season (August–September) on Grand Island in southeast Alaska; Pitcher and McAllister (1981), who estimated seals were in the water 50 percent of the time during pupping season and 59 percent during molting season on Kodiak Island; and Withrow *et al.* (1999) in Withrow *et al.* (1999) who reported seals were hauled out 52 percent of the time (48 percent in water) at Pedersen and Aialik glaciers on the Kenai Peninsula. These references report haulout data from the GOA region and are consistent in their estimates. After reviewing Boveng *et al.* (2012), it appears that the haulout correction factor for October may be 20 percent not 32 percent, as noted in the comment and the abstract (see Table 4 in Boveng *et al.* (2012)). While similar haulout percentages have been reported for harbor seals elsewhere for late fall or winter (Withrow and Loughlin, 1995; Yochem *et al.,* 1987), this proportion (*i.e.,* 20 percent hauled out and 80 percent in the water) appears to be somewhat of an anomaly for the region based on the other studies cited above. Note that the Navy's proposed training activities would occur between April and October (not in late fall or winter) and have historically occurred in late spring or summer. For August, a timeframe more relevant to the Proposed Action, Boveng *et al.* (2012) qualify their results by noting that the number of seals hauled out in August (*i.e.,* 35 percent) was expected to be higher, consistent with other survey results, and that the lower percentage was likely due to tags falling off during the molt in August, limiting available data and leading the authors to use mathematical functions to interpolate the August data and correct their abundance estimate (*i.e.,* effectively discounting their tag-based haulout data). They conceded that the approach outlined in the paper likely underestimates the proportion of seals hauled out in August (see page 31 of Boveng *et al.* (2012)) and that the proportion of seals hauled out during molting season is often higher than during pupping season. Taking this reasoning into consideration, estimating that 50 percent instead of 57 percent of

seals would be in the water for June through September (pupping and molting seasons) is a reasonable approximation and is consistent with the references cited above (Pitcher and McAllister, 1981). Lastly, J. London, one of the co-authors of Boveng *et al.* (2012), reviewed the Navy's density calculations for harbor seals in the GOA and concurred that the density estimates were appropriate for the Navy's model. The Navy has updated the Density Technical Report to better explain the sources for the haulout factors that were used in the analysis. NMFS has reviewed the Navy's analysis and choices in relation to this comment and concurs that they are technically sound and reflect the best available science.

Comment 14: The Commission stated that rather than use the older abundance estimates that informed the densities in Department of the Navy (2021), NMFS correctly used abundance estimates from the most recent SARs, including the 2021 SARs (Carretta *et al.,* 2022, Muto *et al.,* 2022), in its negligible impact determination analysis (Tables 41–46 in the proposed rule; 87 FR 49656; August 11, 2022). NMFS specified in the preamble to the proposed rule that those 2021 SARs represent the best available science (85 FR 49666; August 11, 2022) and then used the associated abundances to inform its analysis. NMFS should not consider one abundance estimate the best available science for its density estimates (85 FR 49716; August 11, 2022) and another abundance estimate best available science for its negligible impact determination analysis for the same species (85 FR 49666; August 11, 2022). The Commission stated that this approach is inconsistent with the tack taken for other Navy rulemakings (*e.g.,* Atlantic Fleet Training and Testing (AFTT)). For its negligible impact determinations in the AFTT rulemaking, NMFS indicated that it compared the predicted takes to abundance estimates generated from the same underlying density estimate instead of certain SARs, which are not based on the same underlying data and would not be appropriate for the analysis (*e.g.,* Tables 72–77; 83 FR 57076 and 57214). It is clear that the more recent SAR data represent best available science, further supporting the need for NMFS to correct the various pinniped density estimates using those data. The Commission recommends that NMFS use the same species-specific abundance estimates to both derive the densities and inform its negligible impact determinations for the various pinniped species in the final rule.

Response: NMFS referenced the latest abundance estimates for all species and stocks, as included in the 2021 final SARs, in its negligible impact determinations. NMFS recognizes that mathematically, it is most appropriate to compare a density/take estimate to an abundance estimate that is derived from the same data. However, in the instances in this rule where a density/take estimate calculated using an older abundance estimate was compared to a newer abundance estimate, the result is very similar as if the take estimate were compared to the same abundance estimate that the corresponding density was derived from. As described above in responses to Comments 10 through 13, older abundance estimates were used to derive some densities given that those data were the best available at the time, and it is impractical to update the densities each time a new abundance estimate is generated (which could be up to two times per year, as an estimate could potentially be updated in both a draft and final SAR each year). Further, neither take estimation nor negligible impact determinations is an exact science. While NMFS does reference the abundance estimates of the stocks in the negligible impact analyses, the comparison between the authorized take and abundance for a given stock is meant to provide a relative sense of where a larger portion of a species or stock is being taken by Navy activities, where there is a higher likelihood that the same individuals are being taken on multiple days, and where that number of days might be higher or sequential. This comparison between authorized take and the stock abundance is not used for making a small numbers determination for this authorization, as authorizations for military readiness activities do not require a small numbers determination. Therefore, referencing an abundance estimate in a negligible impact determination that is more recent than the abundance estimate used to derive a density would not have an impact on the determination unless there is a vast difference in the two abundance estimates, and that is not the case here.

Comment 15: A commenter asserted that, as explained in the Commission's letter, many of NMFS' density and take estimates are inaccurate and underestimated. The Commission specifically recommended that NMFS clarify and ''re-estimate the numbers of marine mammal takes.'' The commenter asserted that NMFS' underestimates are apparent in regard to many of the seal, sea lion, and porpoise species because NMFS estimates that there will be zero takes for those species when all other active LOAs in the area estimate large numbers of takes for those species. Authorizing the take of even more marine mammals will have a non-negligible impact on the species or stocks under the MMPA because it will likely adversely affect the annual rates of recruitment or survival. Thus, NMFS should deny the Navy's LOA application.

Response: NMFS' responses to Comments 6 through 13 address the Commission's density and take estimate recommendations. Regarding take of seals, sea lions, and porpoises, NMFS and the Navy carefully considered the potential for take of all marine mammal species that may occur in the GOA Study Area and the TMAA portion of the GOA Study Area (the portion of the GOA Study Area in which the use of sonar and other transducers and explosives at or near the surface (within 10 m above the water surface) will occur) in particular. Numerous species are not expected to occur in the TMAA, as described in the *Species Not Included in the Analysis* section of this final rule. While harbor porpoise, Steller sea lion, California sea lion, harbor seal, and ribbon seal could occur in the GOA Study Area, modeling indicates that take of these species is unlikely to result from the use of sonar and other transducers or explosives at or near the surface (within 10 m above the water surface).

Further, the comparison of the take estimate for the Navy's GOA training activities to take authorizations for other activities in Alaska is not appropriate given the differences in location among these activities and the likelihood of occurrence of various species at these project sites. The Navy's Gulf of Alaska activities are planned for the GOA Study Area, an offshore area in the Gulf of Alaska (see Figure 1 of the proposed rule; 87 FR 49656; August 11, 2022), while the projects that the commenter has referenced are occurring either at a location on the Alaska shoreline or in the Arctic Ocean. Given that occurrence of marine mammals at shoreline locations is site specific, and the distance of the Arctic Ocean from the GOA Study Area, it is incorrect to assume that occurrence of marine mammals would be similar at all project sites. For the reasons described above, including in the responses to Comments 6 through 13re, authorizing additional takes of marine mammals beyond that proposed for authorization in the proposed rule is not warranted, and the authorized takes will have a negligible impact on the relevant species and stocks as described in the Analysis and

Negligible Impact Determination section of this final rule.

Mitigation

Comment 16: A commenter stated that when the Navy's activity occurs, utmost caution should be exercised in the whereabouts of marine mammals. The commenter further suggested that the Navy should reduce the amount of incidental take of marine mammals.

Response: As discussed in the Mitigation Measures section of this final rule, and in Chapter 5 (Mitigation) of the 2022 GOA FSEIS/OEIS, the Navy will implement extensive mitigation to avoid or reduce potential impacts from the GOA activities on marine mammals. The mitigation measures would reduce the probability and/or severity of impacts expected to result from acute exposure to acoustic sources or explosives, ship strike, and impacts to marine mammal habitat. Specifically, the Navy would use a combination of delayed starts, powerdowns, and shutdowns to avoid mortality or serious injury, minimize the likelihood or severity of PTS or other injury, and reduce instances of TTS or more severe behavioral disruption caused by acoustic sources or explosives. The Navy would also implement two time/area restrictions that would reduce take of marine mammals in areas or at times where they are known to engage in important behaviors, such as foraging or migration, particularly for North Pacific right whales, humpback whales, and gray whales.

Comment 17: A commenter stated that as part of the Navy's mitigation efforts, the Navy requires all bridge watch standers and other applicable personnel to complete Marine Species Awareness Training (MSAT) prior to standing watch or serving as a lookout. However, the commenter stated that absent is any mention of refresher training conducted prior to any major exercises such as the carrier strike group (CSG) exercise. The commenter states that given their experience as a former Surface Warfare Officer and Anti-Submarine Warfare Officer (ASWO), they know that MSAT training is generally required annually and that knowledge in this area among bridge watch standers and especially lookouts is low and quickly atrophies after training. The commenter states that while it would be unreasonable to suggest conducting training prior to every exercise, special consideration should be given to major CSG exercises. Major CSG exercises include multiple ships often testing various capabilities where the risk of taking marine mammals is elevated and can only properly be mitigated if the watch standers are freshly trained. Therefore, the commenter recommended MSAT training be reconducted and documented prior to any major CSG exercise.

Additionally, given the increased use of active sonar during major CSG exercises, the commenter recommended the Combat Acoustics Division, ASWO, and Surface Ship Anti-Submarine Warfare Specialist conduct Sonar Positional Reporting System training prior to any major CSG exercises. The commenter asserted that this will ensure that active sonar use is properly documented and can be later reviewed if a marine mammal is significantly injured to determine if active sonar was a likely cause.

Response: The Navy routinely refines its training modules to improve sailor professional knowledge and skills. It also seeks and provides lessons learned to units periodically on all the environmental compliance tools (Protective Measures Assessment Protocol (PMAP), Sonar POsitional ReporTing System (SPORTS), Marine Species Awareness Training (MSAT)). The Navy requires Lookouts and other personnel to complete their assigned environmental compliance responsibilities (*e.g.,* mitigation, reporting requirements) before, during, and after training activities. MSAT was first developed in 2007 and has since undergone numerous updates to ensure that the content remains current. The MSAT product was approved by NMFS and most recently updated by the Navy in 2018. In 2014, the Navy developed a series of educational training modules, known as the Afloat Environmental Compliance Training program, to ensure Navy-wide compliance with environmental requirements. The Afloat Environmental Compliance Training program, including the updated MSAT, helps Navy personnel from the most junior Sailors to Commanding Officers gain a better understanding of their personal environmental compliance roles and responsibilities.

MSAT, PMAP, and SPORTS training are required for personnel both upon reporting aboard (*e.g.,* newly assigned to a command) and annually thereafter as per Navy policy. Additional MSAT may be required again within an annual period for special circumstance (*e.g.,* large crew transfers, regional ship strikes, as mandated by internal Navy exercise directions). In addition to the required use of PMAP to obtain the procedural and geographic mitigations prior to events in a CSG exercise, pre-exercise orders for exercises in the GOA and in other locations instruct review of MSAT at least once annually. Since each unit is on individual deployment and their own training schedule, additional training for individual units may occur as situations warrant (*e.g.,* bridge team rotation). There are multiple tools for ships' personnel to utilize in support of these procedural requirements, including whale identification wheels. Navy has recently published a revised Lookout Training Handbook (NAVEDTRA 12968–E) to assist in the training of lookout skills and species identification. NMFS and the Navy continue to look for ways to improve lookout effectiveness through the adaptive management process. However, NMFS does not find it appropriate to include a requirement to conduct additional MSAT or SPORTS training prior to an exercise.

Comment 18: A commenter stated that one of the most effective means to protect marine mammals from noise and disturbance is to impose time and area restrictions. The agency should consider additional mitigation and time and area restrictions, including but not limited to the specific recommendations outlined in its letter.

Response: NMFS agrees that time and area restrictions are an effective tool for minimizing impacts of an activity on marine mammals. NMFS addressed the commenter's specific recommendations for additional mitigation in its responses to Comments 19 through 25 and Comments 27, 28, and 30. Please see the Mitigation Measures section of this rule and Section 5.5 (Mitigation Measures Considered but Eliminated) of the 2022 GOA FSEIS/OEIS for a full discussion of additional mitigation measures that were considered.

Comment 19: A commenter recommended extending the mitigation areas to include a buffer zone to protect the biologically sensitive areas from received levels that are above the take threshold.

Response: The mitigation areas included in the final rule and described in Chapter 5 (Mitigation) of the 2022 GOA FSEIS/OEIS represent the maximum mitigation within mitigation areas and the maximum size of mitigation areas that are practicable for the Navy to implement under their specified activity. Implementing additional mitigation (*e.g.,* buffer zones that would extend the size of the mitigation areas) beyond what is included in the final rule is impracticable due to implications for safety, sustainability, and the Navy's ability to continue meeting its mission requirements. However, this Phase III rule includes a new mitigation area, the Continental Shelf and Slope Mitigation Area. Navy personnel will not detonate

explosives below 10,000 ft altitude (including at the water surface) during training at all times in the Continental Shelf and Slope Mitigation Area (including in the portion that overlaps the North Pacific Right Whale Mitigation Area). Previously, the Navy's restriction on explosives applied seasonally within the North Pacific Right Whale Mitigation Area and within the Portlock Bank Mitigation Area. With the development of the Continental Shelf and Slope Mitigation Area, that restriction now applies across the entire continental shelf and slope out to the 4,000 m depth contour within the TMAA. Mitigation in the Continental Shelf and Slope Mitigation Area was initially designed to avoid or reduce potential impacts on fishery resources for Alaska Natives. However, the area includes highly productive waters where marine mammals (including humpback whales (Lagerquist *et al.,* 2008) and North Pacific right whales) feed and overlaps with a small portion of the North Pacific right whale feeding BIA off of Kodiak Island. Additionally, the Continental Shelf and Slope Mitigation Area overlaps with a very small portion of the humpback whale critical habitat Unit 5, on the western side of the TMAA, and a small portion of humpback whale critical habitat Unit 8 on the north side of the TMAA. The Continental Shelf and Slope Mitigation Area also overlaps with a very small portion of the gray whale migration BIA. The remainder of the designated critical habitat and BIAs are located beyond the boundaries of the GOA Study Area. While the overlap of the mitigation area with critical habitat and feeding and migratory BIAs is limited, mitigation in the Continental Shelf and Slope Mitigation Area may reduce the probability, number, and/or severity of takes of humpback whales, North Pacific right whales, and gray whales in this important area (noting that the Navy's Acoustic Effects Model estimated zero takes for gray whales, though NMFS has conservatively authorized four takes by Level B harassment). Additionally, mitigation in this area will likely reduce the number and severity of potential impacts to marine mammals in general, by reducing the likelihood that feeding is interrupted, delayed, or precluded for some limited amount of time.

When practicable, NMFS sometimes recommends the inclusion of buffers around areas specifically delineated to contain certain important habitat or high densities of certain species, to allow for further reduced effects on specifically identified features/species. However, buffers are not always considered necessary or appropriate in combination with more generalized and inclusive measures, such as coastal offsets or other areas that are intended to broadly contain important features for a multitude of species. In the case of this rulemaking, NMFS and the Navy have included two protective areas that will reduce impacts on multiple species and habitats and, as described above, limitations in additional areas is not practicable.

Comment 20: A commenter recommended prohibiting active sonar in the Portlock Bank Mitigation Area.

Response: Increasing the geographic mitigation requirements pertaining to the use of active sonar in the TMAA, either by adding a sonar restriction to Portlock Bank or expanding the size of the North Pacific Right Whale Mitigation Area is not practicable, for the reasons detailed in Section 5.5.1 (Active Sonar) of the 2022 GOA FSEIS/OEIS, which NMFS has reviewed and concurs with. However, mitigation for explosives was included in the 2020 GOA DSEIS/OEIS in a ''Portlock Bank Mitigation Area,'' and this area has since been expanded into the Continental Shelf and Slope Mitigation Area. (Please see the *Mitigation Areas* section of this final rule and Section 5.4 (Geographic Mitigation to be Implemented) of the 2022 GOA FSEIS/OEIS for additional details about the requirements in this area and the ecological benefits.)

Comment 21: A commenter recommended moving the GOA Study Area activities to the fall, after September, which the commenter stated would avoid fishing seasons as well as primary whale feeding months. Alternatively, the Navy should adopt geographic mitigation shoreward of the continental shelf between June and September because that portion of the TMAA is near the biologically important feeding areas for North Pacific right whales, fin whale, humpback whales, and gray whales during those months.

Response: As described in Section 5.4.3 (Operational Assessment) of the 2022 GOA FSEIS/OEIS, it would not be practical to shift the months of the Proposed Action due to impacts on safety, sustainability, and mission requirements. The exercise, Northern Edge, is a U.S. Indo-Pacific Command (USINDOPACOM) sponsored exercise, led by Headquarters Pacific Air Forces. The joint service training exercise typically occurs every other year during odd number years for approximately a two-week period. The Navy has participated in this or its predecessor exercises for decades, and although naval warships and planes play a vital role in Northern Edge, the Navy does not determine the specific dates for conducting each exercise. USINDOPACOM determines exercise dates based on a number of factors, including weather conditions, safety of personnel and equipment, effectiveness of training, availability of forces, deployment schedules, maintenance periods, other exercise schedules within the Pacific region, and important environmental considerations. Although the Navy is unable to further restrict the months when training could be conducted in the GOA Study Area, the Navy is required to implement geographic mitigation in the North Pacific Right Whale Mitigation Area and the Continental Shelf and Slope Mitigation Area.

Mitigation within the North Pacific Right Whale Mitigation Area is primarily designed to avoid or further reduce potential impacts to North Pacific right whales within important feeding habitat. The mitigation area fully encompasses the portion of the BIA identified by Ferguson *et al.* (2015) for North Pacific right whale feeding that overlaps the GOA Study Area (overlap between the GOA Study Area and the BIA occurs in the TMAA only) (see Figure 2 of the proposed rule; 87 FR 49656; August 11, 2022). North Pacific right whales are thought to occur in the highest densities in the BIA from June to September. The Navy will not use surface ship hull-mounted MF1 mid-frequency active sonar in the mitigation area from June 1 to September 30, as was also required in the Phase II (2017–2022) rule (82 FR 19530; April 26, 2017). The North Pacific Right Whale Mitigation Area is fully within the boundary of the Continental Shelf and Slope Mitigation Area, discussed below. Therefore, the mitigation requirements in that area also apply to the North Pacific Right Whale Mitigation Area. While the potential occurrence of North Pacific right whales in the GOA Study Area is expected to be rare due to the species' small population size, these mitigation requirements would help further avoid or further reduce the potential for impacts to occur within North Pacific right whale feeding habitat, thus likely reducing the number of takes of North Pacific right whales, as well as the severity of any disturbances by reducing the likelihood that feeding is interrupted, delayed, or precluded for some limited amount of time.

Additionally, the North Pacific Right Whale Mitigation Area overlaps with a small portion of the humpback whale critical habitat Unit 5, in the southwest

corner of the TMAA. While the overlap of the two areas is limited, mitigation in the North Pacific Right Whale Mitigation Area may reduce the number and/or severity of takes of humpback whales in this important area.

The mitigation in this area would also help avoid or reduce potential impacts on fish and invertebrates that inhabit the mitigation area and which marine mammals prey upon. As described in Section 5.4.1.5 (Fisheries Habitats) of the 2022 GOA FSEIS/OEIS, the productive waters off Kodiak Island support a strong trophic system from plankton, invertebrates, small fish, and higher-level predators, including large fish and marine mammals.

As described in further detail in response to Comment 19, the Continental Shelf and Slope Mitigation Area is expected to reduce the probability, number, and/or severity of takes of humpback whales, North Pacific right whales, and gray whales in this important area (noting that no takes are predicted for gray whales). Additionally, mitigation in this area will likely reduce the number and severity of potential impacts to marine mammals in general, by reducing the likelihood that feeding is interrupted, delayed, or precluded for some limited amount of time.

Comment 22: A commenter recommended capping the maximum level of activities conducted each year.

Response: The commenters offer no rationale for why a cap is needed and nor do they suggest what an appropriate cap might be. The Navy is responsible under Title 10 of the U.S. Code for conducting the needed amount of testing and training to maintain military readiness, which is what they have proposed and NMFS has analyzed. Further, the MMPA states that NMFS shall issue MMPA authorizations if the necessary findings can be made, as they have been here. Importantly, as described in the *Mitigation Areas* section, the Navy will limit activities (active sonar, explosive use, *etc.*) to varying degrees in two areas that are important to sensitive species or for important behaviors in order to minimize impacts that are more likely to lead to adverse effects on rates of recruitment or survival.

Comment 23: A commenter recommended increasing the exclusion zone because some animals are sensitive to sonar at low levels of exposure.

Response: The commenter does not suggest what an appropriate exclusion zone size would be. The Navy, in coordination with NMFS, customized its mitigation zone sizes and mitigation requirements for each applicable training activity category or stressor. Each mitigation zone represents the largest area that (1) Lookouts can reasonably be expected to observe during typical activity conditions (*i.e.,* most environmentally protective) and (2) the Navy can implement the mitigation without impacting safety or the ability to meet mission requirements. The current exclusion zones represent the maximum distance practicable for the Navy to implement during training within the TMAA, as described in Chapter 5 of the FSEIS/OEIS and, further, they encompass the area in which any marine mammal would be expected to potentially be injured. The active sonar mitigation zones also extend beyond the average ranges to temporary threshold shift for otariids and into a portion of the average ranges to temporary threshold shift for all other marine mammal hearing groups; therefore, mitigation would help avoid or reduce the potential for some exposure to higher levels of temporary threshold shift. This final rule includes procedural mitigation and mitigation areas to further avoid or reduce potential impacts from active sonar on marine mammals in areas where important behaviors such as feeding and migration occur.

Comment 24: A commenter recommended imposing a 10-knot ship speed in Mitigation Areas to reduce the likelihood of vessel strikes.

Response: Generally speaking, it is impracticable (because of impacts to mission effectiveness) to further reduce ship speeds for Navy activities, and, moreover, given the maneuverability of Navy ships at higher speeds and the presence of Lookouts, any further reduction in speed would be unlikely to reduce the already extremely low probability of a ship strike (which is not authorized, nor expected to occur in the GOA Study Area). The Navy is unable to impose a 10-knot ship speed limit because it would not be practical to implement and would not allow the Navy to continue meeting its training requirements due to diminished realism of training exercises, as detailed in Section 5.3.4.1 (Vessel Movement) of the 2022 GOA FSEIS/OEIS. The Navy requires flexibility to use variable ship speeds for training, operational, safety, and engineering qualification requirements. Navy ships typically use the lowest speed practical given mission needs. NMFS has reviewed the Navy's analysis of additional restrictions and the impacts they would have on military readiness and concurs with the Navy's assessment that they are impracticable.

The main driver for ship speed reduction is reducing the possibility and severity of ship strikes to large whales. However, even given the wide ranges of speeds from slow to fast that Navy ships have used in training in the GOA Study Area, there have been no documented vessel strikes of marine mammals by the Navy.

As discussed in the 2016 GOA FSEIS/OEIS Section 5.1.2 (Vessel Safety), Navy standard operating procedures require that ships operated by or for the Navy have personnel assigned to stand watch at all times, day and night, when moving through the water (*i.e.,* when the vessel is underway). A primary duty of watch personnel is to ensure safety of the ship, which includes the requirement 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. As described in Section 5.3.4.1 (*Vessel Movement*) of the 2022 GOA FSEIS/OEIS, Navy vessels are also required to operate in accordance with applicable navigation rules. Applicable rules include the Inland Navigation Rules (33 CFR part 83) and International Regulations for Preventing Collisions at Sea (72 Collision Regulations), which were formalized in the Convention on the International Regulations for Preventing Collisions at Sea, 1972. These rules require that vessels proceed at a safe speed so proper and effective action can be taken to avoid collision and so vessels can be stopped within a distance appropriate to the prevailing circumstances and conditions. In addition to standard operating procedures, the Navy implements mitigation to avoid vessel strikes, which includes requiring vessels to maneuver to maintain at least 500 yd distance from whales, and 200 yd or 100 yd distance away from other marine mammals (except those intentionally swimming alongside or choosing to swim alongside vessels, such as for bow-riding or wake-riding). Additionally, please see the Potential Effects of Vessel Strike section of the proposed rule (87 FR 49656; August 11, 2022) for discussion regarding the differences between Navy ships and commercial ships which make Navy ships less likely to affect marine mammals.

When developing Phase III mitigation measures, the Navy analyzed the potential for implementing additional types of mitigation, such as vessel speed restrictions within the GOA Study Area.

The Navy determined that based on how the training activities will be conducted within the GOA Study Area, vessel speed restrictions would be incompatible with practicability criteria for safety, sustainability, and training missions, as described in Chapter 5 (Mitigation), Section 5.3.4.1 (Vessel Movement) of the 2022 GOA FSEIS/OEIS. However, this rule includes mitigation to further reduce the already low potential for vessel strike as described in the Mitigation Measures section of this final rule and in Chapter 5 of the 2022 GOA FSEIS/OEIS. Occurrences of large whales may be higher over the continental shelf and slope relative to other areas of the TMAA. The Navy would issue pre-event awareness messages to alert ships and aircraft participating in training activities within the TMAA to the possible presence of concentrations of large whales on the continental shelf and slope. Large whale species in the TMAA include, but are not limited to, fin whale, blue whale, humpback whale, gray whale, North Pacific right whale, sei whale, and sperm whale. To maintain safety of navigation and to avoid interactions with these species, the Navy will instruct vessels to remain vigilant to the presence of large whales that may be vulnerable to vessel strikes or potential impacts from training activities. Additionally, ships and aircraft will use the information from the awareness messages to assist their visual observation of applicable mitigation zones during training activities and to aid in the implementation of procedural mitigation.

Comment 25: A commenter recommended that NMFS add mitigation for other marine mammal stressors such as dipping sonar and contaminants.

Response: The Navy implements mitigation for active sonar, including dipping sonar, as outlined in Table 34 of this rule, and in Section 5.3.2.1 (Active Sonar) of the 2022 GOA FSEIS/OEIS. Expanding active sonar mitigation requirements would be impractical for the reasons detailed in Section 5.5.1 (Active Sonar) of the 2022 GOA FSEIS/OEIS, which NMFS has reviewed and concurs with. As described in Section 3.8.3.3 (Secondary Stressors) of the 2022 GOA FSEIS/OEIS, potential impacts of secondary stressors (including contaminants), were determined to be discountable, negligible, or insignificant, and not expected to result in the take of any mammal; therefore, mitigation for contaminants is not warranted.

Least Practicable Adverse Impact Determination

Comment 26: The Commission recommended that NMFS—

- clearly separate its application of the least practicable adverse impact requirement from its negligible impact determination;
- adopt a clear decision-making framework that recognizes the species and stock component and the marine mammal habitat component of the least practicable adverse impact provision and always consider whether there are potentially adverse impacts on marine mammal habitat and whether it is practicable to minimize them;
- rework its evaluation criteria for applying the least practicable adverse impact standard to separate the factors used to determine whether a potential impact on marine mammals or their habitat is adverse and whether possible mitigation measures would be effective;
- address these concerns by adopting a simple, two-step analysis that more closely tracks the statutory provisions being implemented and, if NMFS is using some other legal standard to implement the least practicable adverse impact requirements, provide a clear and concise description of that standard and explain why it believes it to be ''sufficient'' to meet the statutory legal requirements; and
- adopt general regulations to govern the process and set forth the basic steps and criteria that apply across least practicable adverse impact determinations.

Response: NMFS has made clear in this and other rules that the agency separates its application of the least practicable adverse impact requirement in the Mitigation Measures section from its negligible impact analyses and determinations for each species or stock in a separate section. Further, NMFS has made this separation clear in practice for years by requiring mitigation measures to reduce impacts to marine mammal species and stocks and their habitat for all projects, even those for which the anticipated take would clearly have a negligible impact, even in the absence of mitigation.

In the Mitigation Measures section of this rule, NMFS has explained in detail our interpretation of the least practicable adverse impact standard, the rationale for our interpretation, and how we implement the standard. The method the agency is using addresses all of the necessary components of the standard and produces effective mitigation measures that result in the least practicable adverse impact on both the species or stocks and their habitat. The commenter has failed to illustrate why NMFS' approach is inadequate or why the commenter's proposed approach would be better, and we therefore decline to accept the recommendation.

Also, in the Mitigation Measures section, NMFS has explained in detail our interpretation and application of the least practicable adverse impact standard. The commenter has recommended an alternate way of interpreting and implementing the least practicable adverse impact standard, in which NMFS would consider the effectiveness of a measure in our evaluation of its practicability. The commenter erroneously asserts that NMFS currently considers the effectiveness of a measure in a determination of whether the potential effects of an activity are adverse, but the commenter has misunderstood NMFS' application of the standard—rather, NMFS appropriately considers the effectiveness of a measure in the evaluation of the degree to which a measure will reduce adverse impacts on marine mammal species or stocks and their habitat, as a less effective measure will less successfully reduce these impacts on marine mammals. Further, the commenter has not provided information that shows that their proposed approach would more successfully evaluate mitigation under the least practicable adverse impact standard, and we decline to accept it.

Further, NMFS disagrees with the commenter's assertion that analysis of the rule's mitigation measures under the least practicable adverse impact standard remains unclear or that the suggested shortcomings exist. The commenter provides no rationale as to why the two-step process they describe is better than the process that NMFS uses to evaluate the least practicable adverse impact that is described in the rule, and therefore we decline to accept the recommendation.

Regarding the assertion that the standard shifts on a case-by-case basis, the commenter misunderstands the agency's process. Neither the least practicable adverse impact standard nor NMFS' process for evaluating it shifts on a case-by-case basis. Rather, as the commenter suggests should be the case, the evaluation itself is case-specific to the proposed activity, the predicted impacts, and the mitigation under consideration.

Regarding the recommendation to adopt general regulations, we appreciate the recommendation and may consider the recommended approach in the future. However, providing directly relevant explanations of programmatic

approaches or interpretations related to the incidental take provisions of the MMPA in a proposed incidental take authorization is an effective and efficient way to provide information to and solicit focused input from the public. Further, this approach affords the same opportunities for public comment as a stand-alone rulemaking would.

Monitoring

Comment 27: A commenter recommended that NMFS improve detection of marine mammals with restrictions on low-visibility activities and alternative detection such as thermal or acoustic methods.

Response: As described in Section 5.5.1 (Active Sonar) of the 2022 GOA FSEIS/OEIS, which NMFS has reviewed and concurs with, although the majority of sonar use occurs during the day, the Navy has a nighttime training requirement for some active sonar systems. Training in both good visibility (*e.g.,* daylight, favorable weather conditions) and low visibility (*e.g.,* nighttime, inclement weather conditions) is vital because environmental differences between day and night and varying weather conditions affect sound propagation and the detection capabilities of sonar. After sunset and prior to sunrise, Lookouts and other Navy watch personnel employ night visual search techniques, which could include the use of night vision devices. The Navy requires flexibility in the timing of its use of active sonar and explosives in order to meet individual training schedules. In June and July, there are approximately 19 hours of daylight per day in the GOA; therefore, there are naturally fewer hours of available nighttime to be used for sonar training. Due to the already limited timeframe of when the Proposed Action can occur in the GOA Study Area based on weather conditions (April through October), time-of-day restrictions on the use of active sonar would prevent the Navy from successfully completing its mission requirements within the necessary timeframes. As described in Section 5.5.4 (Thermal Detection Systems and Unmanned Aerial Vehicles) of the 2022 GOA FSEIS/OEIS, thermal detection systems have not been sufficiently studied in terms of their effectiveness and compatibility with Navy military readiness activities. The Navy plans to continue researching thermal detection systems and will provide information to NMFS about the status and findings of Navy-funded thermal detection studies and any associated practicality assessments at the annual adaptive management meetings described in the Adaptive Management section of this rule. Please see NMFS' response to Comment 28 regarding passive acoustic monitoring.

Comment 28: The Commission asserted that Navy lookouts have been determined to be ineffective, therefore passive and/or active acoustic monitoring must be used to supplement visual monitoring, especially for activities that could injure or kill marine mammals. The Commission recommended that NMFS require the Navy to use passive (*i.e.,* DIFAR and other types of passive sonobuoys, operational hydrophones) and active acoustic (*i.e.,* tactical sonars that are in use during the actual activity and active sonobuoys or other sources similar to fish-finding sonars) monitoring, whenever practicable, to supplement visual monitoring during the implementation of its mitigation measures for all activities that could cause injury or mortality. The Commission stated that at a minimum, sonobuoys deployed (*e.g.,* see Binder *et al.* (2021)) and active sources and hydrophones used during an activity should be monitored for marine mammals—ideally, the Navy should develop and refine new technologies to supplement its visual monitoring, similar to the Department of National Defence in Canada (Binder *et al.,* 2021, Thomson and Binder, 2021). The Commission stated that if NMFS does not adopt this recommendation, it recommends that NMFS justify (1) how it concluded that the Navy's mitigation measures based on visual monitoring do not need to be supplemented for those activities involving injury when Oedekoven and Thomas (2022) have determined that Navy lookouts are ineffective at sighting numerous types of marine mammals at various distances and for those activities involving mortality when marine mammals have been killed previously and (2) how visual monitoring is sufficient for effecting the least practicable adverse impact on the numerous marine mammal species and stocks.

In a related comment, a commenter recommended installing passive acoustic monitoring in the TMAA to inform mariners about the presence of marine mammals.

Response: While we acknowledge that the Lookout Effectiveness Study suggests that detection of marine mammals is less certain than previously assumed at certain distances, we disagree with the assertion that the Lookouts have been shown to be wholly ineffective. Lookouts remain an important component of the Navy's mitigation strategy, especially as it relates to minimizing exposure to the more harmful impacts that may occur within closer proximity to the source, where Lookouts are most effective. Further, as described below, NMFS and the Navy are also considering, through the adaptive management process, whether there are additional measures that would be practicable to implement that would improve effectiveness of Lookouts, such as enhanced personnel training.

The Navy does employ passive acoustic devices (*e.g.,* remote acoustic sensors, expendable sonobuoys, passive acoustic sensors on submarines) to supplement visual monitoring when practicable to do so (*i.e.,* when assets that have passive acoustic monitoring capabilities are already participating in the activity) as discussed in Section 5.2.1 (Procedural Mitigation Development) and Section 5.3 (Procedural Mitigation to be Implemented) of the 2022 GOA FSEIS/OEIS. We note that sonobuoys have a narrow band that does not overlap with the vocalizations of all marine mammals, and there is no bearing or distance on detections based on the number (*e.g.,* one or two) and type of devices typically used; therefore it is not typically possible to use these to implement mitigation shutdown procedures. As discussed in Section 5.5.3 (Active and Passive Acoustic Monitoring Devices) of the 2022 GOA FSEIS/OEIS, which NMFS reviewed and concurs accurately assesses the practicability of utilizing additional passive or active acoustic systems for mitigation monitoring, there are significant manpower and logistical constraints that make constructing and maintaining additional passive acoustic monitoring systems or platforms for each training and testing activity, or instrumented ranges, impracticable. The Navy's existing passive acoustic monitoring devices (*e.g.,* sonobuoys) are designed, maintained, and allocated to specific training units or testing programs for specific mission-essential purposes. Reallocating these assets to different training units or testing programs for the purpose of monitoring for marine mammals would prevent the Navy from using its equipment for its intended mission-essential purpose. Additionally, diverting platforms that have passive acoustic monitoring capability would impact their ability to meet their Title 10 requirements (see Section 1.4, Purpose of and Need for Proposed Military Readiness Training Activities, of the 2022 GOA FSEIS/OEIS) and reduce the service life of those systems.

Furthermore, adding a passive acoustic monitoring capability to additional explosive activities (either by adding a passive acoustic monitoring device to a platform already participating in the activity, or by adding an additional platform to the activity) for mitigation is not practical. For example, all platforms participating in an explosive bombing exercise (*e.g.,* firing aircraft, safety aircraft) must focus on situational awareness of the activity area and continuous coordination between multiple training components for safety and mission success. Therefore, it is impractical for participating platforms to divert their attention to non-mission essential tasks, such as deploying sonobuoys and monitoring for acoustic detections during the event (*e.g.,* setting up a computer station). The Navy does not have available manpower or resources to allocate additional aircraft for the purpose of deploying, monitoring, and retrieving passive acoustic monitoring equipment during a bombing exercise.

As noted in the comment, the Navy conducted a Lookout Effectiveness Study in association with the University of St. Andrews for several years to assess the ability of shipboard Lookouts to observe marine mammals while conducting hull-mounted sonar training activities at sea. The University of St. Andrews' report was provided to NMFS on April 1, 2022 as required by a Term and Condition in the Endangered Species Act (ESA) Incidental Take Statements for the Biological Opinions associated with NMFS' 2020 final rule for Navy training and testing activities in the NWTT and Mariana Islands Training and Testing (MITT) Study Areas. The Lookout Effectiveness Study is available at *https://www.navymarinespeciesmonitoring.us.* Overall, the report provides NMFS and the Navy with valuable contextual information, but requires some level of interpretation with regard to the numerical results. For instance, the study's statistical model assumed that Navy ships moved in a straight line at a set speed for the duration of the field trials, and that animals could not move in a direction perpendicular to a ship. Violation of this model assumption would underestimate Lookout effectiveness for some data points. The Navy and NMFS determined that the Lookout Effectiveness Study results would not alter the acoustic effects quantitative analysis of potential impacts on marine mammals from the specified activities, and that the acoustic effects quantitative analyses included in the 2022 GOA FSEIS/OEIS and in the GOA proposed rule (87 FR 49656; August 11, 2022) did not underestimate the number or extent of marine mammal takes due to the conservative approach already taken by the Navy in its quantitative analysis process. NMFS and the Navy are currently working to determine how and to what extent the Study's results should be incorporated into future environmental analyses. The Navy and NMFS are also considering, through the adaptive management process, whether there are additional measures that would be practicable to implement that would improve effectiveness of Lookouts, such as enhanced personnel training.

Regarding how NMFS concluded that the Navy's mitigation measures based on visual monitoring do not need to be supplemented for those activities involving injury considering Oedekoven and Thomas (2022), NMFS implemented the least practicable adverse impact standard as described in the *Implementation of Least Practicable Adverse Impact Standard* section of the proposed rule and in this final rule. As stated in the *Take Request* section of the proposed rule (87 FR 49656; August 11, 2022) and the *Take Estimation* section of this final rule, for training activities in the GOA Study Area, no mortality or non-auditory injury is anticipated, even without consideration of planned mitigation measures. For the reasons described above in this response, including cost, impact on the specified activities, practicality of implementation, and impact on the effectiveness of the military readiness activity, the Commission's recommendations are not practicable. Therefore, absent additional available techniques for mitigation monitoring, the procedural mitigation and mitigation areas described in this final rule are sufficient for effecting the least practicable adverse impact on the numerous marine mammal species and stocks.

Other Comments

Comment 29: The Commission noted that the Navy recently published the 2022 GOA FSEIS/OEIS for conducting the proposed training activities in GOA (87 FR 54214; September 2, 2022) and requested any comments by October 3, 2022. The public comment period for NMFS' proposed rule closed September 26, 2022 (87 FR 49656; August 11, 2022). The Commission stated it is unclear whether and how any changes to the proposed rule would inform the 2022 GOA FSEIS/OEIS, as it has already been drafted and determinations apparently already made. Under the Administrative Procedure Act (APA), an agency is expected to provide a full and sufficient rationale supporting its action at the time any statutory decision is made. That rationale is comprised in part by the agency's responses to public comments, which in this case were included in Appendix G81 of the 2022 GOA FSEIS/OEIS. Since NMFS was a cooperating agency on the 2020 GOA DSEIS/OEIS and indicated that it plans to adopt the FSEIS that will underpin the final rule (87 FR 49757; August 11, 2022), it can be perceived as though decisions have been made preemptively for the various statutory determinations. Such practice runs counter to the requirements of the APA and undermines the intent of the public process.

Response: This rulemaking process provided notice and opportunity for the pubic to comment prior to final decision-making by NMFS on both the 2022 GOA FSEIS/OEIS and this MMPA rule. In the proposed rule (87 FR 49656; August 11, 2022), NMFS stated its plan to adopt the GOA SEIS/OEIS for the GOA Study Area provided our independent evaluation of the document found that it included adequate information analyzing the effects on the human environment of issuing regulations and an LOA under the MMPA. We further stated in the proposed rule that we would review all comments prior to concluding our National Environmental Policy Act (NEPA) process and making a final decision on the MMPA rulemaking and request for a LOA, which we have since done.

Neither NMFS nor the Navy signed a Record of Decision (the decision document through which NMFS adopted the 2022 GOA FSEIS/OEIS) until the comments received in both the NEPA and MMPA processes were considered. During this rulemaking process, had comments been received on the proposed rule that warranted changes or additional analysis in the NEPA process, NMFS and the Navy would have addressed these comments through each agency's Record of Decision, or otherwise amended the analysis to address the issues raised by any such comments.

Comment 30: A commenter stated that NMFS should consult with Alaska Native communities and add mitigation for environmental justice impacts.

Response: NMFS invited Alaska Native federally-recognized Tribes in the Gulf of Alaska region to a presentation and opportunity to discuss the proposed rule. A member from one Tribe attended, and indicated that the Tribe would likely submit a letter with recommendations for consideration in

the final rule. Further, the Navy has consulted and will continue to consult with Alaska Native Tribes through government-to-government consultations (see Appendix E (Agency Correspondence) of the 2022 GOA FSEIS/OEIS). One Tribe provided recommendations to the Navy as part of the GOA FSEIS/OEIS process, which NMFS reviewed and considered in preparing its proposed rule (87 FR 49656; August 11, 2022).

It is unclear what the commenter means by ''add mitigation for environmental justice impacts,'' and the commenter did not provide sufficient information in order to incorporate such a recommendation. However, the Portlock Bank Mitigation Area that was included in the 2020 Draft SEIS/OEIS was developed for the purpose of reducing potential impacts on fishery resources in a location important to Alaska Native Tribes. That mitigation area was expanded, as included in NMFS' proposed rule (87 FR 49656; August 11, 2022), this final rule, and in the 2022 GOA FSEIS/OEIS, to cover the entire continental shelf and slope in a new area called the Continental Shelf and Slope Mitigation Area. (Please see the *Mitigation Areas* section of this final rule and Section 5.4 (Geographic Mitigation to be Implemented) of the 2022 GOA FSEIS/OEIS for additional details about the requirements in this area and the ecological benefits.)

The MMPA requires that ITAs must not have an unmitigable adverse impact on subsistence uses (16 U.S.C. 1371(a)(5)(A)(i)), and NMFS has determined that the total taking of affected species or stocks will not have an unmitigable adverse impact on the availability of the species or stocks for taking for subsistence purposes. The Navy's training activities are not expected to impact the ability of Alaska Natives to conduct subsistence hunts or the availability of marine mammals to those hunts. There is no spatial and temporal overlap between the Navy's proposed activities and subsistence whaling or sealing areas. The GOA Study Area is located over 12 nautical miles offshore with the nearest inhabited land being the Kenai Peninsula (24 nautical miles from the GOA Study Area). Information provided by Tribes in harvest reports indicates that harvests tend to occur nearshore, and they do not use the GOA Study Area for subsistence hunting of marine mammals. Please see the Subsistence Harvest of Marine Mammals section for more information.

Comment 31: A commenter stated that NMFS should deny the proposed LOA application because there are already several active LOAs in Alaska that allow the take of many of the same species as requested by the proposed LOA, and that the cumulative impacts of the proposed LOA combined with the active LOAs demonstrates that the proposed LOA will have a non-negligible impact on the impacted species or stocks. The commenter references the following authorizations and the number of authorized takes of marine mammals for each project: USGS Floating Dock Expansion; Hoonah Marine Industrial Center Cargo Dock; Alaska Department of Transportation and Public Facilities Ferry Berth Improvements; NOAA Port Facility Project in Ketchikan, AK; Reissuance of Alaska Department of Transportation and Public Facilities Metlakatla Facility; Hilcorp Alaska, LLC Oil and Gas; AGDC Liquefied Natural Gas Construction; NOAA Fisheries Research in the Arctic Ocean (see Friends of Animals' comment letter for additional detail). Further, the commenter stated that the actual total number of takes for these projects is even greater than the number included in these authorizations because these projects do not include all the active authorizations or the authorizations currently in progress in Alaska. The commenter stated that when considering the projects cumulatively, there is a large number of authorizations authorizing the take of vast numbers of marine mammals in Alaska.

Response: The MMPA requires that NMFS issue an incidental take authorization, provided the necessary findings are made for the specified activity put forth in the application and appropriate mitigation and monitoring measures are set forth, as described in the Background section of this notice. Both the statute and the agency's implementing regulations call for analysis of the effects of the applicant's activities on the affected species and stocks, not analysis of other unrelated activities and their impacts on the species and stocks. That does not mean, however, that effects on the species and stocks caused by other activities are ignored. As described in the GOA Study Area proposed rule (87 FR 49656; August 11, 2022) and this final rule, the preamble for NMFS' implementing regulations under section 101(a)(5) (54 FR 40338; September 29, 1989) explains in response to comments that the impacts from other past and ongoing anthropogenic activities are incorporated into the negligible impact analysis via their impacts on the environmental baseline. Consistent with that direction, NMFS has factored into its negligible impact analyses the impacts of other past and ongoing anthropogenic activities via their impacts on the baseline (*e.g.,* as reflected in the density/distribution and status of the species, population size and growth rate, and other relevant stressors (such as Unusual Mortality Events (UMEs)). See the Analysis and Negligible Impact Determination section of this rule.

Our 1989 final rule for the MMPA implementing regulations also addressed how cumulative effects from unrelated activities would be considered. There we stated that such effects are not separately considered in making findings under section 101(a)(5) concerning negligible impact, but that NMFS would consider cumulative effects that are reasonably foreseeable when preparing a NEPA analysis and also that reasonably foreseeable cumulative effects would be considered under section 7 of the ESA for ESA-listed species.

The cumulative effects of the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions (as well as the effects of climate change) were evaluated against the appropriate resources and regulatory baselines in the 2022 GOA FSEIS/OIES. The best available science and a comprehensive review of past, present, and reasonably foreseeable actions (including construction and oil and gas activities) was used to develop the Cumulative Impacts analysis. This analysis is contained in Chapter 4 of the 2022 GOA FSEIS/OIES. As required under NEPA, the level and scope of the analysis is commensurate with the scope of potential impacts of the action and the extent and character of the potentially-impacted resources (*e.g.,* the geographic boundaries for cumulative impacts analysis for some resources are expanded to include activities outside the GOA Study Area that might impact migratory or wide-ranging animals), as reflected in the resource-specific discussions in Chapter 3 (Affected Environment and Environmental Consequences) of the 2022 GOA FSEIS/OEIS. The 2022 GOA FSEIS/OEIS considered the proposed training activities alongside other actions in the region whose impacts may be additive to those of the proposed training. Past and present actions are also included in the analytical process as part of the affected environmental baseline conditions presented in Chapter 3 of the 2022 GOA FSEIS/OEIS. The 2022 GOA FSEIS/OEIS did so in accordance with 1997 Council on Environmental Quality (CEQ) guidance. Per the guidance, a qualitative approach and best

professional judgment are appropriate where precise measurements are not available. Where precise measurements and/or methodologies were available, they were used. Guidance from CEQ states it ''is not practical to analyze cumulative effects of an action on the universe; the list of environmental effects must focus on those that are truly meaningful.''

Further, cumulative effects to listed species of the specified activity in combination with other activities are analyzed in the ESA biological opinion. This analysis is contained in section 9 (Cumulative Effects). The opinion states that it assumes effects in the future would be similar to those in the past and, therefore, are reflected in the anticipated trends described in the Species and Designated Critical that May be Affected and Environmental Baseline sections of the biological opinion (Sections 0 and 7, respectively).

Comment 32: The Commission recommended that NMFS (1) specify the total numbers of model-estimated Level A harassment (PTS) takes in the preamble to the final rule and (2) authorize the model-estimated Level A harassment takes in the final rule, ensuring that those takes inform the negligible impact determination analyses. If NMFS does not adopt the Commission's recommendation, then the Commission recommended that in the preamble to the final rule NMFS (1) provide details on the specific mitigation effectiveness scores and how the model-estimated Level A harassment takes were reduced based on avoidance and the mitigation effectiveness scores and (2) justify how it can continue to allow the Navy to implement mitigation effectiveness scores to reduce Level A harassment takes when Navy lookouts have been determined to be ineffective at sighting marine mammals. At the very least, the estimated mitigation effectiveness scores from Oedekoven and Thomas (2022) should have been used to reduce any Level A harassment takes that were estimated to occur within 914 m of a surface vessel operating MFA or high-frequency active (HFA) sonar rather than arbitrary, presumed mitigation effectiveness scores that are not supported by best available science. Reducing model-estimated takes based on mitigation effectiveness for other activities remains unsubstantiated. As such, mitigation effectiveness should not be used to reduce the numbers of marine mammal takes for the final rule for GOA or any of the upcoming Phase IV rulemakings.

Response: The consideration of marine mammal avoidance and mitigation effectiveness is an important part of NMFS' and the Navy's overall analysis of impacts from sonar and explosive sources. NMFS has independently evaluated the method and agrees that it is appropriately applied to augment the model in the prediction and authorization of injury and mortality as described in the rule, including after consideration of Oedekoven and Thomas (2022). Details of the analysis are provided in the Navy's 2018 technical report titled ''Quantifying Acoustic Impacts on Marine Mammals and Sea Turtles: Methods and Analytical Approach for Phase III Training and Testing.'' Detailed information on the mitigation analysis was included in the proposed rule, including information about the technical report.

As discussed in the proposed rule, this final rule, and the Navy's report, animats in the Navy's acoustic effects model do not move horizontally or ''react'' to sound in any way. Specifically, this means that the Navy's model does not take into account either the likelihood of avoidance or any consideration of mitigation effectiveness. Accordingly, NMFS and the Navy's analysis appropriately applies a quantitative adjustment to the exposure results calculated by the model to consider avoidance and mitigation.

Regarding avoidance, sound levels diminish quickly below levels that could cause PTS. Specifically, behavioral response literature, including the recent 3S studies (multiple controlled sonar exposure experiments on cetaceans in Norwegian waters) and Southern California behavioral response studies (SOCAL BRS) (multiple cetacean behavioral response studies in Southern California), indicate that multiple species from different cetacean suborders do in fact avoid approaching sound sources by a few hundred meters or more, which would reduce received sound levels for individual marine mammals to levels below those that could cause PTS (see Appendix B of the ''Criteria and Thresholds for U.S. Navy Acoustic and Explosive Impacts to Marine Mammals and Sea Turtles Technical Report'' (U.S. Department of the Navy, 2017) and Southall *et al.* (2019a)). The ranges to PTS for most marine mammal groups are within a few tens of meters and the ranges for the most sensitive group, the HF cetaceans, average about 200 m, to a maximum of 270 m in limited cases. HF cetaceans such as harbor porpoises, however, have been observed reacting to anthropogenic sound at greater distances than other species and are likely to avoid their zones of hearing impacts (TTS and PTS) as well. Section 3.8.3.1.1.5 (Behavioral Reactions—Behavioral Reactions to Sonar and Other Transducers) in Section 3.8 (Marine Mammals) of the 2022 GOA FSEIS/OEIS documents multiple studies in which marine mammals responded to sonar exposure with avoidance at exposures below which PTS would occur.

As discussed in the Navy's report, the Navy's acoustic effects model does not consider procedural mitigations (*i.e.,* power-down or shut-down of sonars, or pausing explosive activities when animals are detected in specific zones adjacent to the source), which necessitates consideration of these factors in the Navy's overall acoustic analysis. Credit taken for mitigation effectiveness is extremely conservative. For example, if Lookouts can see the whole area, they get credit for it in the calculation; if they can see more than half the area, they get half credit; if they can see less than half the area, they get no credit. Not considering animal avoidance and mitigation effectiveness would lead to a great overestimate of injurious impacts and not constitute the best available scientific information. NMFS concurs with the analytical approach used, *i.e.,* we believe the estimated take by Level A harassment numbers represent the maximum number of these takes that are likely to occur and it would not be appropriate to authorize a higher number or consider a higher number in the negligible impact analysis.

The Navy assumes that Lookouts will not be 100 percent effective at detecting all individual marine mammals within the mitigation zones for each activity. This is due to the inherent limitations of observing marine species and because the likelihood of sighting individual animals is largely dependent on observation conditions (*e.g.,* time of day, sea state, mitigation zone size, observation platform) and animal behavior (*e.g.,* the amount of time an animal spends at the surface of the water). The Navy quantitatively assessed the effectiveness of its mitigation measures on a per-scenario basis for four factors: (1) species sightability, (2) a Lookout's ability to observe the range to permanent threshold shift (for sonar and other transducers) and range to mortality (for explosives), (3) the portion of time when mitigation could potentially be conducted during periods of reduced daytime visibility (to include inclement weather and high sea-state) and the portion of time when mitigation could potentially be conducted at night, and (4) the ability for sound sources to be

positively controlled (*e.g.,* powered down).

The adjustment made for mitigation effectiveness is small (no more than ⅓ of the takes by PTS adjusted) to ensure that takes by PTS are not underestimated. The Navy's models predicted take by PTS for fin whale, Dall's porpoise, and northern elephant seal only. Takes by PTS from explosives were not adjusted to account for avoidance or mitigation for any species (*i.e.,* the authorized take by PTS from explosives is equal to the model-estimated PTS from explosives). For fin whale, Navy Acoustic Effects Model (NAEMO) predicted 1.6 takes by PTS from sonar, which was reduced to 0 after consideration of both mitigation credit (−0.5 takes by PTS) and avoidance (−1.05 takes by PTS). For Dall's porpoise, NAEMO predicted 527 takes by PTS from sonar, which was reduced to 19 after consideration of both mitigation credit (−144 takes by PTS) and avoidance (−364 takes by PTS). (Given that the calculation for avoidance incorporates the adjustment made for mitigation effectiveness, for Dall's porpoise, even if no adjustment were made for mitigation effectiveness, the overall number of takes by PTS (from sonar and explosives) would increase by just 7 takes.) For elephant seal, NAEMO predicted 0 takes by PTS from sonar, and therefore, no adjustment was made for mitigation or avoidance.

The g(0) values used by the Navy for their mitigation effectiveness adjustments take into account the differences in sightability with sea state, and utilize averaged g(0) values for sea states of 1–4 and weighted as suggested by Barlow (2015). Using g(0) values is an appropriate and conservative approach (*i.e.,* it underestimates the protection afforded by the Navy's mitigation measures) for the reasons detailed in the technical report. For example, during line-transect surveys, there are typically two primary observers searching for animals. Each primary observer looks for marine species in the forward 90-degree quadrant on their side of the survey platform and scans the water from the vessel out to the limit of the available optics (*i.e.,* the horizon). Because Navy Lookouts focus their observations on established mitigation zones, their area of observation is typically much smaller than that observed during line-transect surveys. The mitigation zone size and distance to the observation platform varies by Navy activity. For example, during hull-mounted mid-frequency active sonar activities, the mitigation zone extends 1,000 yd from the ship hull. During the conduct of training activities, there is typically at least one, if not numerous, support personnel involved in the activity (*e.g.,* range support personnel aboard a torpedo retrieval boat or support aircraft). In addition to the Lookout posted for the purpose of mitigation, these additional personnel observe for and disseminate marine species sighting information amongst the units participating in the activity whenever possible as they conduct their primary mission responsibilities. However, as a conservative approach to assigning mitigation effectiveness factors, the Navy elected to account only for the minimum number of required Lookouts used for each activity; therefore, the mitigation effectiveness factors may underestimate the likelihood that some marine mammals may be detected during activities that are supported by additional personnel who may also be observing the mitigation zone, even considering the mitigation scores reported in Oedekoven and Thomas (2022).

While use of the estimated mitigation effectiveness scores from Oedekoven and Thomas (2022) to reduce Level A harassment takes may be more conservative than the current scores, using the Oedekoven and Thomas (2022) scores would not necessarily be more accurate, given the assumptions made in the report. For small cetaceans in particular, as stated in the report, ''the [Oedekoven and Thomas (2022)] model assumed no horizontal movement, while some small cetaceans are attracted to ships and can move quickly'' or show avoidance behaviors, though, the report does note that despite that limitation, the probability of small cetaceans going undetected is still high. The Navy's mitigation effectiveness adjustments also assume a high probability that an animal would go undetected.

In addition to the differences in assumptions highlighted above, the p(detection) in the Oedekoven and Thomas (2022) takes into account the portion of time an animal or pod is at the surface. For availability, Oedekoven and Thomas (2022) used assumptions about dive behavior based on several representative species (the most sighted species in the study) and applied these assumptions across entire animal groups (rorqual, sperm, and small cetacean). Alternatively, the Navy's analysis uses specific g(0) values for the species in the study area. Given the differences in assumptions between the Navy's methods and those outlined in Oedekoven and Thomas (2022), NMFS does not find it appropriate to modify the mitigation effectiveness adjustment based on the Oedekoven and Thomas (2022) results at this time. However, NMFS and the Navy are continuing to evaluate the report results in order to determine how to best apply mitigation effectiveness moving forward.

Although NAEMO predicted PTS takes from the GOA activities, no mortality or non-auditory injuries were predicted by NAEMO. Therefore, as detailed in the Estimated Take of Marine Mammals section of this rule, and in Section 3.8.3.2.2.1 (Methods for Analyzing Impacts from Explosives) of the 2022 GOA FSEIS/OEIS, the Navy Acoustic Effects Model estimated zero takes by mortality for all marine mammal species in the TMAA. Therefore, mitigation for explosives is discussed qualitatively but was not factored into the quantitative analysis for marine mammals (*i.e.,* mitigation effectiveness scores were not calculated, or used to reduce mortality exposures for explosives). For all of the reasons above, NMFS considers the estimated and authorized take (that was adjusted for aversion and mitigation) appropriate, and that is what has been analyzed in the negligible impact analysis. Accordingly, we decline the commenter's recommendation to analyze and authorize the model-estimated PTS, as it is neither expected to occur nor authorized.

Comment 33: A commenter stated that the Navy could use modern technology in simulators for its training exercises, and that it could use computer simulation and other technological techniques to better train their personnel.

Response: As described in Section 2.5.5 (Simulated Training) in the 2022 GOA Final SEIS/OEIS, the Navy continues to use computer simulation and other types of simulation for training activities whenever possible; however, there are limits to the realism that current simulation technology can provide, and its use cannot substitute for live training. Training through simulated means cannot replicate the conditions in which Navy personnel and platforms are required to conduct military operations. While beneficial as a complementing medium to train and test personnel and platforms, simulation alone cannot accurately replicate both the conditions and the stresses that must be placed on personnel and platforms during actual training. These conditions and stresses are absolutely vital to adequately preparing Naval forces to conduct the broad spectrum of military operations required of them by operational Commanders. Therefore, simulation as an alternative that

completely replaces training in the field does not meet the purpose of and need for the Navy's proposed action and was eliminated from further analysis.

The commenter did not provide sufficient information regarding ''other technological techniques to better training their personnel'' in order to incorporate such a recommendation.

Comment 34: A commenter stated that the Navy should not increase the amount of incidental take of marine mammals in their quest to expand the size of the training zone in the Gulf of Alaska Study Area. The commenter stated that the Navy could better utilize the existing zone at its current size, and that the testing of real weapons should only occur within the existing training zone. Further, when exercises occur, utmost caution should be exercised in the whereabouts of marine mammals.

Response: The inclusion of the WMA in the GOA Study Area is not expected to result in additional take of marine mammals beyond that which will occur in the TMAA portion of the GOA Study Area. As stated in the proposed rule (87 FR 49656; August 11, 2022), no activities involving sonar use or explosives will occur in the WMA or the portion of the warning area that extends beyond the TMAA. The WMA provides additional airspace and sea space for aircraft and vessels to maneuver during training activities for increased training complexity.

Regarding caution around marine mammals, the Navy is required to implement mitigation measures, including procedural mitigation measures, such as required shutdowns and delays of activities if marine mammals are sighted within certain distances, and geographic area mitigation measures, including limitations on activities such as sonar in areas that are important for certain behaviors such as feeding. These mitigation measures were designed to lessen the frequency and severity of impacts from the Navy's activities on marine mammals and their habitat, and ensure that the Navy's activities have the least practicable adverse impact on species and stocks. See the Mitigation Measures section of this final rule for additional detail on specific procedural mitigation measures and measures in mitigation areas.

Changes From the Proposed Rule to the Final Rule

This final rule includes no substantive changes from the proposed rule. However, this final rule includes a minor addition to reporting requirements. The new measure requires the Navy to coordinate with NMFS prior to conducting exercises within the GOA Study Area. This may occur as a part of coordination the Navy does with other local stakeholders.

Description of Marine Mammals and Their Habitat in the Area of the Specified Activities

Marine mammal species and their associated stocks that have the potential to occur in the GOA Study Area are presented in Table 6. The Navy anticipates the take of individuals of 16 marine mammal species by Level A harassment and Level B harassment, and NMFS has conservatively analyzed and authorized incidental take of two additional species. The Navy does not request authorization for any serious injuries or mortalities of marine mammals, and NMFS agrees that serious injury and mortality is unlikely to occur from the Navy's activities. NMFS recently designated critical habitat under the Endangered Species Act (ESA) for humpback whales in the TMAA portion of the GOA Study Area, and this designated critical habitat is considered below (86 FR 21082; April 21, 2021). The WMA portion of the GOA Study Area does not overlap ESA-designated critical habitat for humpback whales or any other species.

The GOA proposed rule included additional information about the species in this rule, all of which remains valid and applicable but has not been reprinted in this final rule, including a subsection entitled *Marine Mammal Hearing* that described the importance of sound to marine mammals and characterized the different groups of marine mammals based on their hearing sensitivity. Therefore, we refer the reader to our **Federal Register** notice of proposed rulemaking (87 FR 49656; August 11, 2022) for more information.

Information on the status, distribution, abundance, population trends, habitat, and ecology of marine mammals in the GOA Study Area may be found in Chapter 4 of the Navy's rulemaking/LOA application. NMFS reviewed this information and found it to be accurate and complete. Additional information on the general biology and ecology of marine mammals is included in the 2022 GOA FSEIS/OEIS. Table 6 incorporates the best available science, including data from the 2021 U.S. Pacific and the Alaska Marine Mammal Stock Assessment Reports (SARs; Carretta *et al.,* 2022; Muto *et al.,* 2022), as well as monitoring data from the Navy's marine mammal research efforts. NMFS has also reviewed new scientific literature since publication of the proposed rule and determined that none of these nor any other new information changes our determination of which species have the potential to be affected by the Navy's activities or the information pertinent to status, distribution, abundance, population trends, habitat, or ecology of the species in this final rulemaking, except as noted below.

To better define marine mammal occurrence in the TMAA, the portion of the GOA Study Area where take of marine mammals is anticipated to occur, four regions within the TMAA were defined (and are depicted in Figure 3–1 of the Navy's rulemaking/LOA application), consistent with the survey strata used by Rone *et al.* (2017) during the most recent marine mammal surveys in the TMAA. The four regions are: inshore, slope, seamount, and offshore.

TABLE 6—MARINE MAMMAL OCCURRENCE WITHIN THE GOA STUDY AREA

Common name	Scientific name	Stock	ESA status, MMPA status, strategic (Y/N) [1]	Stock abundance (CV, N_{min}, year of most recent abundance survey) [2]	PBR	Annual M/SI [3]	Occurrence in GOA study area [4]
Order Artiodactyla Infraorder Cetacea Mysticeti (baleen whales)							
Family Balaenidae (right whales):							
North Pacific right whale.	*Eubalaena japonica*	Eastern North Pacific ..	E, D, Y	31 (0.226, 26, 2008)	[5] 0.05	0	Rare.

TABLE 6—MARINE MAMMAL OCCURRENCE WITHIN THE GOA STUDY AREA—Continued

Common name	Scientific name	Stock	ESA status, MMPA status, strategic (Y/N) [1]	Stock abundance (CV, N_{min}, year of most recent abundance survey) [2]	PBR	Annual M/SI [3]	Occurrence in GOA study area [4]
Family Balaenopteridae (rorquals):							
Humpback whale	*Megaptera novaeangliae.*	Central North Pacific [6]	-, -, Y	10,103 (0.3, 7,891, 2006).	83	26	Seasonal; highest likelihood June to September.
		California, Oregon, and Washington [6].	-, -, Y	4,973 (0.05, 4,776, 2018).	28.7	≥48.3	Seasonal; highest likelihood June to September.
		Western North Pacific	E, D, Y	1,107 (0.3, 865, 2006)	3	2.8	Seasonal; highest likelihood June to September.
Blue whale	*Balaenoptera musculus*	Eastern North Pacific	E, D, Y	1,898 (0.085, 1,767, 2018).	4.1	≥19.5	Seasonal; highest likelihood June to December.
		Central North Pacific	E, D, Y	133 (1.09, 63, 2010)	0.1	0	Seasonal; highest likelihood June to December.
Fin whale	*Balaenoptera physalus*	Northeast Pacific	E, D, Y	3,168 (0.26, 2,554, 2013) [7].	5.1	0.6	Likely.
Sei whale	*Balaenoptera borealis*	Eastern North Pacific [8]	E, D, Y	519 (0.4, 374, 2014)	0.75	≥0.2	Rare.
Minke whale	*Balaenoptera acutorostrata.*	Alaska	-, -, N	UNK	UND	0	Likely.
Family Eschrichtiidae (gray whale):							
Gray whale	*Eschrichtius robustus*	Eastern North Pacific	-, -, N	26,960 (0.05, 25,849, 2016).	801	131	Likely: Highest numbers during seasonal migrations (fall, winter, spring).
		Western North Pacific	E, D, Y	290 (N/A, 271, 2016)	0.12	UNK	Rare: Individuals migrate through GOA.
Odontoceti (toothed whales)							
Family Physeteridae (sperm whale):							
Sperm whale	*Physeter macrocephalus.*	North Pacific	E, D, Y	345 (0.43, 244, 2015) [9]	UND	3.5	Likely; More likely in waters >1,000 m depth, most often >2,000 m.
Family Delphinidae (dolphins):							
Killer whale	Orcinus orca	Eastern North Pacific Alaska Resident.	-, -, N	2,347 [10] (N/A, 2,347, 2012).	24	1	Likely.
		Eastern North Pacific Offshore.	-, -, N	300 (0.1, 276, 2012)	2.8	0	Likely.
		AT1 Transient	-, D, Y	7 [10] (N/A, 7, 2019)	0.01	0	Rare; more likely inside Prince William Sound and Kenai Fjords.
		Eastern North Pacific GOA, Aleutian Island, and Bering Sea Transient.	-, -, N	587 [10] (N/A, 587, 2012)	5.9	0.8	Likely.
Pacific white-sided dolphin.	*Lagenorhynchus obliquidens.*	North Pacific	-, -, N	26,880 (N/A, N/A, 1990).	UND	0	Likely.
Family Phocoenidae (porpoises):							
Harbor porpoise	*Phocoena phocoena*	GOA	-, -, Y	31,046 (0.21, N/A, 1998).	UND	72	Rare; Inshore and Slope Regions, if present.
		Southeast Alaska	-, -, Y	1,302 (0.21, 1,057, 2019).	11	34	Rare.
Dall's porpoise	*Phocoenoides dalli*	Alaska	-, -, N	83,400 (0.097, 13,110, 2015).	131	37	Likely.
Family Ziphiidae (beaked whales):							
Cuvier's beaked whale.	*Ziphius cavirostris*	Alaska	-, -, N	UNK	UND	0	Likely.
Baird's beaked whale.	*Berardius bairdii*	Alaska	-, -, N	UNK	UND	0	Likely.
Stejneger's beaked whale.	*Mesoplodon stejnegeri*	Alaska	-, -, N	UNK	UND	0	Likely.
Order Carnivora Pinnipedia							
Family Otarieidae (fur seals and sea lions):							

TABLE 6—MARINE MAMMAL OCCURRENCE WITHIN THE GOA STUDY AREA—Continued

Common name	Scientific name	Stock	ESA status, MMPA status, strategic (Y/N) [1]	Stock abundance (CV, N_{min}, year of most recent abundance survey) [2]	PBR	Annual M/SI [3]	Occurrence in GOA study area [4]
Steller sea lion	*Eumetopias jubatus*	Eastern U.S.	-, -, N	43,201 [11] (N/A, 43,201, 2017).	2,592	112	Rare.
		Western U.S.	E, D, Y	52,932 [11] (N/A, 52,932, 2019).	318	254	Likely; Inshore region.
California sea lion	*Zalophus californianus*	U.S.	-, -, N	257,606 (N/A, 233,515, 2014).	14,011	>321	Rare (highest likelihood April and May).
Northern fur seal	*Callorhinus ursinus*	Eastern Pacific	-, D, Y	626,618 (0.2, 530,376, 2019).	11,403	373	Likely.
		California	-, -, N	14,050 (N/A, 7,524, 2013).	451	1.8	Rare.
Family Phocidae (true seals):							
Northern elephant seal.	*Mirounga angustirostris*	California Breeding	-, -, N	187,386 (N/A, 85,369, 2013).	5,122	13.7	Seasonal (highest likelihood July–September).
Harbor seal	*Phoca vitulina*	N Kodiak	-, -, N	8,677 (N/A, 7,609, 2017).	228	38	Likely; Inshore region.
		S Kodiak	-, -, N	26,448 (N/A, 22,351, 2017).	939	127	Likely; Inshore region.
		Prince William Sound	-, -, N	44,756 (N/A, 41,776, 2015).	1,253	413	Likely; Inshore region.
		Cook Inlet/Shelikof	-, -, N	28,411 (N/A, 26,907, 2018).	807	107	Likely; Inshore region.
Ribbon seal	*Histriophoca fasciata*	Unidentified	-, -, N	184,697 (N/A, 163,086, 2013).	9,785	163	Rare.

Notes: CV = coefficient of variation, ESA = Endangered Species Act, GOA = Gulf of Alaska, m = meter(s), MMPA = Marine Mammal Protection Act, N/A = not available, U.S. = United States, M/SI = mortality and serious injury, UNK = unknown, UND = undetermined.

[1] Endangered Species Act (ESA) status: Endangered (E), Threatened (T)/MMPA status: Depleted (D). A dash (-) indicates that the species is not listed under the ESA or designated as depleted under the MMPA. Under the MMPA, a strategic stock is one for which the level of direct human-caused mortality exceeds potential biological removal (PBR) or which is determined to be declining and likely to be listed under the ESA within the foreseeable future. Any species or stock listed under the ESA is automatically designated under the MMPA as depleted and as a strategic stock.

[2] The stocks and stock abundance number are as provided in Carretta *et al.,* 2022 and Muto *et al.,* 2022. N_{min} is the minimum estimate of stock abundance. In some cases, CV is not applicable. NMFS marine mammal stock assessment reports online at *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region.*

[3] These values, found in NMFS' SARs, represent annual levels of human-caused mortality and serious injury (M/SI) from all sources combined (*e.g.,* commercial fisheries, ship strike). Annual mortality and serious injury (M/SI) often cannot be determined precisely and is in some cases presented as a minimum value or range. A CV associated with estimated mortality due to commercial fisheries is presented in some cases.

[4] RARE: The distribution of the species is near enough to the GOA Study Area that the species could occur there, or there are a few confirmed sightings. LIKELY: Year-round sightings or acoustic detections of the species in the GOA Study Area, although there may be variation in local abundance over the year. SEASONAL: Species absence and presence as documented by surveys or acoustic monitoring. Regions within the GOA Study Area follow those presented in Rone *et al.* (2015); Rone *et al.* (2009); Rone *et al.* (2014); Rone *et al.* (2017): inshore, slope, seamount, and offshore.

[5] See SAR for more details.

[6] Humpback whales in the Central North Pacific stock and the California, Oregon, and Washington stock are from three DPSs based on animals identified in breeding areas in Hawaii, Mexico, and Central America (Carretta *et al.,* 2022; Muto *et al.,* 2022; National Marine Fisheries Service, 2016c).

[7] The SAR reports this stock abundance assessment as provisional and notes that it is an underestimate for the entire stock because it is based on surveys which covered only a small portion of the stock's range.

[8] This analysis assumes that these individuals are from the Eastern North Pacific stock.

[9] The SAR reports that this is an underestimate for the entire stock because it is based on surveys of a small portion of the stock's extensive range and it does not account for animals missed on the trackline or for females and juveniles in tropical and subtropical waters.

[10] Stock abundance is based on counts of individual animals identified from photo-identification catalogs. Surveys for abundance estimates of these stocks are conducted infrequently.

[11] Stock abundance is the best estimate of pup and non-pup counts, which have not been corrected to account for animals at sea during abundance surveys.

Below, we include additional information about the marine mammals in the area of the specified activities that informs our analysis, such as identifying known areas of important habitat or behaviors, or where Unusual Mortality Events (UME) have been designated.

Critical Habitat

On April 21, 2021 (86 FR 21082), NMFS published a final rule designating critical habitat for the endangered Western North Pacific DPS, the endangered Central America DPS, and the threatened Mexico DPS of humpback whales, including specific marine areas located off the coasts of California, Oregon, Washington, and Alaska. Based on consideration of national security, economic impacts, and data deficiency in some areas, NMFS excluded certain areas from the designation for each DPS.

NMFS identified prey species, primarily euphausiids and small pelagic schooling fishes (see the final rule for particular prey species identified for each DPS; 86 FR 21082; April 21, 2021) of sufficient quality, abundance, and accessibility within humpback whale feeding areas to support feeding and population growth, as an essential habitat feature. NMFS, through a critical habitat review team (CHRT), also considered inclusion of migratory corridors and passage features, as well as sound and the soundscape, as essential habitat features. However, NMFS did not include either, as the CHRT concluded that the best available science did not allow for identification of any consistently used migratory corridors or definition of any physical, essential migratory or passage conditions for whales transiting between or within habitats of the three DPSs. The best available science also currently does not enable NMFS to identify a sound-related habitat feature that is essential to the conservation of humpback whales.

NMFS considered the co-occurrence of this designated humpback whale critical habitat and the GOA Study Area. Figure 4–1 of the Navy's rulemaking/LOA application shows the overlap of the humpback whale critical habitat with the TMAA. As shown in the Navy's rulemaking/LOA application, the TMAA overlaps with humpback whale

critical habitat Unit 5 (destination for whales from the Hawaii, Mexico, and Western North Pacific DPSs; Calambokidis *et al.,* 2008) and Unit 8 (destination for whales from the Hawaii and Mexico DPSs (Baker *et al.,* 1986, Calambokidis *et al.,* 2008); Western North Pacific DPS whales have not been photo-identified in this specific area, but presence has been inferred based on available data indicating that humpback whales from Western North Pacific wintering areas occur in the Gulf of Alaska (NMFS 2020, Table C5)). Approximately 4 percent of the humpback whale critical habitat in the GOA region overlaps with the TMAA, and approximately 2 percent of critical habitat in both the GOA and U.S. west coast regions combined overlaps with the TMAA. The WMA portion of the GOA Study Area does not overlap ESA-designated critical habitat for humpback whales. As noted above in the *Geographical Region* section, the TMAA boundary was intentionally designed to avoid ESA-designated western DPS (MMPA western U.S. stock) Steller sea lion critical habitat.

Biologically Important Areas

BIAs include areas of known importance for reproduction, feeding, or migration, or areas where small and resident populations are known to occur (Van Parijs, 2015). Unlike ESA critical habitat, these areas are not formally designated pursuant to any statute or law, but are a compilation of the best available science intended to inform impact and mitigation analyses. An interactive map of BIAs may be found here: *https://cetsound.noaa.gov/biologically-important-area-map.*

The WMA does not overlap with any known BIAs. BIAs in the GOA that overlap portions of the TMAA include the following feeding and migration areas: North Pacific right whale feeding BIA (June–September); Gray whale migratory corridor BIA (November—January, southbound; March—May, northbound) (Ferguson *et al.,* 2015). Fin whale feeding areas (east, west, and southwest of Kodiak Island) occur to the west of the TMAA and gray whale feeding areas occur both east (Southeast Alaska) and west (Kodiak Island) of the TMAA; however, these feeding areas are located well outside of (>20 nmi (37 km)) the TMAA and beyond the Navy's estimated range to effects for take by Level A harassment and Level B harassment.

A portion of the North Pacific right whale feeding BIA overlaps with the western side of the TMAA by approximately 2,051 square kilometers (km^2; approximately 1.4 percent of the TMAA, and 7 percent of the feeding BIA). A small portion of the gray whale migration corridor BIA also overlaps with the western side of the TMAA by approximately 1,582 km^2 (approximately 1 percent of the TMAA, and 1 percent of the migration corridor BIA). To mitigate impacts to marine mammals in these BIAs, the Navy will implement several procedural mitigation measures and mitigation areas (described in the Mitigation Measures section).

Unusual Mortality Events (UMEs)

A UME is defined under Section 410(6) of the MMPA as a stranding that is unexpected; involves a significant die-off of any marine mammal population; and demands immediate response. There is one UME that is applicable to our evaluation of the Navy's activities in the GOA Study Area. The gray whale UME along the west coast of North America is active and involves ongoing investigations in the GOA that inform our analysis are discussed below.

Gray Whale UME

Since January 1, 2019, elevated gray whale strandings have occurred along the west coast of North America, from Mexico to Canada. As of September 21, 2022, there have been a total of 606 strandings along the coasts of the United States, Canada, and Mexico, with 300 of those strandings occurring along the U.S. coast. Of the strandings on the U.S. coast, 133 have occurred in Alaska, 70 in Washington, 16 in Oregon, and 81 in California. Full or partial necropsy examinations were conducted on a subset of the whales. Preliminary findings in several of the whales have shown evidence of emaciation. These findings are not consistent across all of the whales examined, so more research is needed. As part of the UME investigation process, NOAA has assembled an independent team of scientists to coordinate with the Working Group on Marine Mammal Unusual Mortality Events to review the data collected, sample stranded whales, consider possible causal-linkages between the mortality event and recent ocean and ecosystem perturbations, and determine the next steps for the investigation. Please refer to: *https://www.fisheries.noaa.gov/national/marine-life-distress/2019-2022-gray-whale-unusual-mortality-event-along-west-coast-and* for more information on this UME.

Species Not Included in the Analysis

There has been no change in the species unlikely to be present in the GOA Study Area since the last MMPA rulemaking process (82 FR 19530; April 27, 2017). The species carried forward for analysis (and described in Table 6) are those likely to be found in the GOA Study Area based on the most recent data available and do not include species that may have once inhabited or transited the area but have not been sighted in recent years (*e.g.,* species which were extirpated from factors such as 19th and 20th century commercial exploitation). Several species and stocks that may be present in the northeast Pacific Ocean generally have an extremely low probability of presence in the GOA Study Area. These species and stocks are considered extralimital (*i.e.,* there may be sightings, acoustic detections, or stranding records, but the GOA Study Area is outside the species' range of normal occurrence) or rare (occur in the GOA Study Area sporadically, but sightings are rare). These species and stocks include the Eastern North Pacific Northern Resident and the West Coast Transient stocks of killer whale (*Orcinus orca*), beluga whale (*Delphinapterus leucas*), false killer whale (*Pseudorca crassidens*), short-finned pilot whale (*Globicephala macrorhynchus*), northern right whale dolphin (*Lissodelphis borealis*), and Risso's dolphin (*Grampus griseus*). These species are unlikely to occur in the GOA Study Area, and the reasons for not including each was explained in further detail in the proposed rule (87 FR 49656; August 11, 2022).

One species of marine mammal, the Northern sea otter, occurs in the Gulf of Alaska but is managed by the U.S. Fish and Wildlife Service and is not considered further in this document.

Potential Effects of Specified Activities on Marine Mammals and Their Habitat

We provided a detailed discussion of the potential effects of the specified activities on marine mammals and their habitat in our **Federal Register** notice of proposed rulemaking (87 FR 49656; August 11, 2022). In the Potential Effects of Specified Activities on Marine Mammals and Their Habitat section of the proposed rule, NMFS provided a description of the ways marine mammals may be affected by these activities in the form of, among other things, serious injury or mortality, physical trauma, sensory impairment (permanent and temporary threshold shift and acoustic masking), physiological responses (particularly stress responses), behavioral disturbance, or habitat effects. All of this information remains valid and applicable. Therefore, we do not reprint

the information here, but refer the reader to that document.

NMFS has also reviewed new relevant information from the scientific literature since publication of the proposed rule. Summaries of the new key scientific literature reviewed since publication of the proposed rule are presented below.

Branstetter and Sills (2022) reviewed direct laboratory (*i.e.,* psychoacoustic) studies of marine mammal hearing.

Tougaard *et al.* (2022) reviewed the most recent temporary threshold shift (TTS) data from phocid seals and harbor porpoises, and compared empirical data to the predictive exposure functions put forth by Southall *et al.* (2019), which were based on data collected prior to 2015. The authors concluded that more recent data supports the thresholds used for harbor porpoises (categorized as 'very high frequency' (VHF) cetaceans), which over-estimated the hearing impact for sounds above 20 kHz in frequency. Similarly, the new data for phocid seals show TTS onset thresholds that are well-above the predicted levels for sounds below 5 kHz in frequency. However, phocid seals might be more sensitive to higher frequency sound exposures than predicted, as the TTS onset data for frequencies higher than 20 kHz was below the predicted levels. The interpretation of these data indicate that the criteria and thresholds used to estimate hearing impacts for VHF cetaceans and phocid seals have been conservative overall.

Von Benda-Beckmann *et al.* (2022) assessed whether correcting for kurtosis, a measure of sound impulsiveness, improved the ability to predict temporary threshold shift (TTS) in a marine mammal. The conclusions from this study were that the kurtosis-corrected sound exposure levels (SELs) did not explain differences in TTS between intermittent and continuous sound exposures, likely because silent intervals provided an opportunity for hearing recovery that could not be accounted for by these models. Kurtosis might still be useful for evaluating sound exposure criteria for different types of sounds having various degrees of impulsiveness.

Sweeney *et al.* (2022) examined the difference between noise impact analyses using unweighted broadband sound pressure levels (SPLs) and analyses using auditory weighting functions. The recordings used to conduct parallel analyses in three marine mammal species groups were from a shipping route in Canada. Since shipping noise was predominantly in the low-frequency spectrum, bowhead whales perceived similar weighted and unweighted SPLs while narwhals and ringed seals experienced lower SPLs when auditory weighting functions were used. The data provide a real-world example to support the use of weighting functions based on hearing sensitivity when estimating audibility and potential impact of vessel noise on marine mammals.

An analysis subsequent to Varghese *et al.* (2020) suggested that the observed spatial shifts of Cuvier's beaked whales during multibeam echosounder activity on the Southern California Antisubmarine Warfare Range were most likely due to prey dynamics (Kates Varghese *et al.* 2021).

Manzano-Roth *et al.* (2022) found that cross seamount beaked whales reduced clusters of foraging pulses (Group Vocal Periods) during Submarine Command Course events and remained low for a minimum of three days after the MFA sonar activity. This is consistent with the findings of previous studies of beaked whale responses to sonar discussed in the proposed rule (87 FR 49656; August 11, 2022).

Königson *et al.* (2021) tested the efficacy of Banana Pingers (300 ms, 59–130 kHz frequency modulated, 133–139 dBrms re 1 μPa at 1 m source level) as a deterrent for harbor porpoise in Sweden. As described previously, these pingers were designed to avoid potential pinniped responses. Authors used recorded echolocation clicks with C–PODs to measure the presence or absence of porpoise in the area. Porpoise were less likely to be detected at 0 m and within 100 m of an active pinger, but a pinger at 400 m appeared to have no effect.

Pirotta *et al.* (2022) reviewed the development of bioenergetic models with a focus on applications to marine mammals.

Having considered the new information, along with information provided in public comments on the proposed rule, we have determined that there is no new information that substantively affects our analysis of potential impacts on marine mammals and their habitat that appeared in the proposed rule, all of which remains applicable and valid for our assessment of the effects of the Navy's activities during the seven-year period of this rule.

Estimated Take of Marine Mammals

This section indicates the number of takes that NMFS is authorizing, which is based on the amount of take that NMFS anticipates could occur or the maximum amount that is reasonably likely to occur, depending on the type of take and the methods used to estimate it, as described in detail below. NMFS coordinated closely with the Navy in the development of their incidental take application and agrees that the methods the Navy has put forth described herein to estimate take (including the model, thresholds, and density estimates) and the resulting numbers are based on the best available science and appropriate for authorization.

Takes are in the form of harassment only. For a military readiness activity, the MMPA defines ''harassment'' as (i) Any act that injures or has the significant potential to injure a marine mammal or marine mammal stock in the wild (Level A Harassment); or (ii) Any act that disturbs or is likely to disturb a marine mammal or marine mammal stock in the wild by causing disruption of natural behavioral patterns, including, but not limited to, migration, surfacing, nursing, breeding, feeding, or sheltering, to a point where such behavioral patterns are abandoned or significantly altered (Level B Harassment).

Authorized takes will primarily be in the form of Level B harassment, as use of the acoustic and explosive sources (*i.e.,* sonar and explosives) is more likely to result in behavioral disturbance (rising to the level of a take as described above) or temporary threshold shift (TTS) for marine mammals than other forms of take. There is also the potential for Level A harassment, in the form of auditory injury, to result from exposure to the sound sources utilized in training activities.

Generally speaking, for acoustic impacts NMFS estimates the amount and type of harassment by considering: (1) acoustic thresholds above which NMFS believes the best available science indicates marine mammals will be taken by behavioral disturbance (in this case, as defined in the military readiness definition of Level B harassment included above) or incur some degree of temporary or permanent hearing impairment; (2) the area or volume of water that will be ensonified above these levels in a day or event; (3) the density or occurrence of marine mammals within these ensonified areas; and (4) the number of days of activities or events. Below, we describe these components in more detail and present the take estimates.

Acoustic Thresholds

Using the best available science, NMFS, in coordination with the Navy, has established acoustic thresholds that identify the most appropriate received level of underwater sound above which marine mammals exposed to these sound sources could be reasonably

expected to experience a disruption in behavior patterns to a point where they are abandoned or significantly altered (equated to onset of Level B harassment), or to incur TTS onset (equated to Level B harassment) or permanent threshold shift (PTS) onset (equated to Level A harassment). Thresholds have also been developed to identify the pressure and impulse levels above which animals may incur non-auditory injury or mortality from exposure to explosive detonations (although no non-auditory injury from explosives is anticipated as part of this rulemaking).

Despite the rapidly evolving science, there are still challenges in quantifying expected behavioral responses that qualify as take by Level B harassment, especially where the goal is to use one or two predictable indicators (*e.g.,* received level and distance) to predict responses that are also driven by additional factors that cannot be easily incorporated into the thresholds (*e.g.,* context). So, while the thresholds that identify Level B harassment by behavioral disturbance (referred to as ''behavioral harassment thresholds'') have been refined to better consider the best available science (*e.g.,* incorporating both received level and distance), they also still have some built-in conservative factors to address the challenge noted. For example, while duration of observed responses in the data are now considered in the thresholds, some of the responses that are informing take thresholds are of a very short duration, such that it is possible some of these responses might not always rise to the level of disrupting behavior patterns to a point where they are abandoned or significantly altered. We describe the application of this behavioral harassment threshold as identifying the maximum number of instances in which marine mammals could be reasonably expected to experience a disruption in behavior patterns to a point where they are abandoned or significantly altered. In summary, we believe these behavioral harassment thresholds are the most appropriate method for predicting Level B harassment by behavioral disturbance given the best available science and the associated uncertainty.

Hearing Impairment (TTS/PTS) and Non-Auditory Tissue Damage and Mortality

NMFS' Acoustic Technical Guidance (NMFS, 2018) identifies dual criteria to assess auditory injury (Level A harassment) to five different marine mammal groups (based on hearing sensitivity) as a result of exposure to noise from two different types of sources (impulsive or non-impulsive). The Acoustic Technical Guidance also identifies criteria to predict TTS, which is not considered injury and falls into the Level B harassment category. The Navy's planned activity includes the use of non-impulsive (sonar) and impulsive (explosives) sources.

These thresholds (Table 7 and Table 8) were developed by compiling and synthesizing the best available science and soliciting input multiple times from both the public and peer reviewers. The references, analysis, and methodology used in the development of the thresholds are described in the Acoustic Technical Guidance, which may be accessed at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance.*

TABLE 7—ACOUSTIC THRESHOLDS IDENTIFYING THE ONSET OF TTS AND PTS FOR NON-IMPULSIVE SOUND SOURCES BY FUNCTIONAL HEARING GROUPS

Functional hearing group	Non-impulsive	
	TTS Threshold SEL (weighted)	PTS Threshold SEL (weighted)
Low-Frequency Cetaceans	179	199
Mid-Frequency Cetaceans	178	198
High-Frequency Cetaceans	153	173
Phocid Pinnipeds (Underwater)	181	201
Otarid Pinnipeds (Underwater)	199	219

Note: SEL thresholds in dB re: 1 μPa²s accumulated over a 24-hr period.

Based on the best available science, the Navy (in coordination with NMFS) used the acoustic and pressure thresholds indicated in Table 8 to predict the onset of TTS, PTS, non-auditory tissue damage, and mortality for explosives (impulsive) and other impulsive sound sources.

TABLE 8—THRESHOLDS FOR TTS, PTS, TISSUE DAMAGE, AND MORTALITY THRESHOLDS FOR MARINE MAMMALS FOR EXPLOSIVES

Functional hearing group	Species	Weighted onset TTS [1]	Weighted onset PTS	Slight GI tract injury	Slight lung injury	Mortality
Low-frequency cetaceans	All mysticetes	168 dB SEL or 213 dB Peak SPL.	183 dB SEL or 219 dB Peak SPL.	243 dB Peak SPL	Equation 1.	Equation 2.
Mid-frequency cetaceans	Most delphinids, medium and large toothed whales.	170 dB SEL or 224 dB Peak SPL.	185 dB SEL or 230 dB Peak SPL.	243 dB Peak SPL		
High-frequency cetaceans	Porpoises and *Kogia spp.*	140 dB SEL or 196 dB Peak SPL.	155 dB SEL or 202 dB Peak SPL.	243 dB Peak SPL.		
Phocidae	Harbor seal, Hawaiian monk seal, Northern elephant seal.	170 dB SEL or 212 dB Peak SPL.	185 dB SEL or 218 dB Peak SPL.	243 dB Peak SPL.		

TABLE 8—THRESHOLDS FOR TTS, PTS, TISSUE DAMAGE, AND MORTALITY THRESHOLDS FOR MARINE MAMMALS FOR EXPLOSIVES—Continued

Functional hearing group	Species	Weighted onset TTS [1]	Weighted onset PTS	Slight GI tract injury	Slight lung injury	Mortality
Otariidae	California sea lion, Guadalupe fur seal, Northern fur seal.	188 dB SEL or 226 dB Peak SPL.	203 dB SEL or 232 dB Peak SPL.	243 dB Peak SPL.		

Notes: (1) Equation 1: $65.8M^{1/3}(1+[D_{Rm}/10.1])^{1/6}$ Pa-sec (2) Equation 2: $144M^{1/3}(1+[D_{Rm}/10.1])^{1/6}$ Pa-sec (3) M = mass of the animals in kg (4) D_{Rm} = depth of the receiver (animal) in meters (5) SPL = sound pressure level (6) Weighted SEL thresholds in dB re: 1 μPa^2-s accumulated over a 24-h period.

[1] Peak thresholds are unweighted.

The criteria used to assess the onset of TTS and PTS due to exposure to sonars (non-impulsive, see Table 7 above) are discussed further in the Navy's rulemaking/LOA application (see Hearing Loss from Sonar and Other Transducers in Chapter 6, Section 6.4.2.1, Methods for Analyzing Impacts from Sonars and Other Transducers). Refer to the ''Criteria and Thresholds for U.S. Navy Acoustic and Explosive Effects Analysis (Phase III)'' report (U.S. Department of the Navy, 2017c) for detailed information on how the criteria and thresholds were derived, and to Section 3.8.3.1.1.2 of the 2022 GOA FSEIS/OEIS for a review of TTS research published following development of the criteria and thresholds applied in the Navy's analysis and in NMFS' Acoustic Technical Guidance. NMFS is aware of more recent papers (*e.g.,* Kastelein *et al.,* 2020d; Kastelein *et al.,* 2021a and 2021b; Sills *et al.,* 2020) and is currently working with the Navy to update NMFS' Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing Version 2.0 (Acoustic Technical Guidance; NMFS, 2018) to reflect relevant papers that have been published since the 2018 update on our 3–5 year update schedule in the Acoustic Technical Guidance. We note that the recent peer-reviewed updated marine mammal noise exposure criteria by Southall *et al.* (2019a) provide identical PTS and TTS thresholds and weighting functions to those provided in NMFS' Acoustic Technical Guidance.

NMFS will continue to review and evaluate new relevant data as it becomes available and consider the impacts of those studies on the Acoustic Technical Guidance to determine what revisions/updates may be appropriate. However, any such revisions must undergo peer and public review before being adopted, as described in the Acoustic Guidance methodology. While some of the relevant data may potentially suggest changes to TTS/PTS thresholds for some species, any such changes would not be expected to change the predicted take estimates in a manner that would change the necessary determinations supporting the issuance of these regulations, and the data and values used in this rule reflect the best available science.

Non-auditory injury (*i.e.,* other than PTS) and mortality from sonar and other transducers is so unlikely as to be discountable under normal conditions for the reasons explained in the proposed rule under the Potential Effects of Specified Activities on Marine Mammals and Their Habitat section—Acoustically-Induced Bubble Formation Due to Sonars and Other Pressure-related Impacts and is therefore not considered further in this analysis.

Level B Harassment by Behavioral Disturbance

Though significantly driven by received level, the onset of Level B harassment by behavioral disturbance from anthropogenic noise exposure is also informed to varying degrees by other factors related to the source (*e.g.,* frequency, predictability, duty cycle), the environment (*e.g.,* bathymetry), and the receiving animals (hearing, motivation, experience, demography, behavioral context) and can be difficult to predict (Ellison *et al.,* 2011; Southall *et al.,* 2007). Based on what the available science indicates and the practical need to use thresholds based on a factor, or factors, that are both predictable and measurable for most activities, NMFS uses generalized acoustic thresholds based primarily on received level (and distance in some cases) to estimate the onset of Level B harassment by behavioral disturbance.

Sonar

As noted above, the Navy coordinated with NMFS to develop, and propose for use in this rule, thresholds specific to their military readiness activities utilizing active sonar that identify at what received level and distance Level B harassment by behavioral disturbance would be expected to result. These thresholds are referred to as ''behavioral harassment thresholds'' throughout the rest of this rule. These behavioral harassment thresholds consist of BRFs and associated cutoff distances, and are also referred to, together, as ''the criteria.'' These criteria are used to estimate the number of animals that may exhibit a behavioral response that rises to the level of a take when exposed to sonar and other transducers. The way the criteria were derived is discussed in detail in the ''Criteria and Thresholds for U.S. Navy Acoustic and Explosive Effects Analysis (Phase III)'' report (U.S. Department of the Navy, 2017c). Developing these behavioral harassment criteria involved multiple steps. All peer-reviewed published behavioral response studies conducted both in the field and on captive animals were examined in order to understand the breadth of behavioral responses of marine mammals to tactical sonar and other transducers. NMFS has carefully reviewed the Navy's criteria, *i.e.,* BRFs and cutoff distances for these species, and agrees that they are the best available science and the appropriate method to use at this time for determining impacts to marine mammals from military sonar and other transducers and for calculating take and to support the determinations made in this rule. As noted above, NMFS will continue to review and evaluate new relevant data as it becomes available and consider the impacts of those studies on the Acoustic Technical Guidance.

As discussed above, marine mammal responses to sound (some of which are considered disturbances that rise to the level of a take) are highly variable and context specific, *i.e.,* they are affected by differences in acoustic conditions; differences between species and populations; differences in gender, age, reproductive status, or social behavior; and other prior experience of the individuals. This means that there is support for considering alternative approaches for estimating Level B harassment by behavioral disturbance. Although the statutory definition of Level B harassment for military readiness activities means that a natural behavioral pattern of a marine mammal is significantly altered or abandoned, the current state of science for

determining those thresholds is somewhat unsettled.

In its analysis of impacts associated with sonar acoustic sources (which was coordinated with NMFS), the Navy used an updated conservative approach that likely overestimates the number of takes by Level B harassment due to behavioral disturbance and response. Many of the behavioral responses identified using the Navy's quantitative analysis are most likely to be of moderate severity as described in the Southall *et al.* (2007) behavioral response severity scale. These ''moderate'' severity responses were considered significant if they were sustained for the duration of the exposure or longer. Within the Navy's quantitative analysis, many reactions are predicted from exposure to sound that may exceed an animal's threshold for Level B harassment by behavioral disturbance for only a single exposure (a few seconds) to several minutes, and it is likely that some of the resulting estimated behavioral responses that are counted as Level B harassment would not constitute ''significantly altering or abandoning natural behavioral patterns.'' The Navy and NMFS have used the best available science to address the challenging differentiation between significant and non-significant behavioral reactions (*i.e.,* whether the behavior has been abandoned or significantly altered such that it qualifies as harassment), but have erred on the cautious side where uncertainty exists (*e.g.,* counting these lower duration reactions as take), which likely results in some degree of overestimation of Level B harassment by behavioral disturbance. We consider application of these behavioral harassment thresholds, therefore, as identifying the maximum number of instances in which marine mammals could be reasonably expected to experience a disruption in behavior patterns to a point where they are abandoned or significantly altered (*i.e.,* Level B harassment). Because this is the most appropriate method for estimating Level B harassment given the best available science and uncertainty on the topic, it is these numbers of Level B harassment by behavioral disturbance that are analyzed in the Analysis and Negligible Impact Determination section and are authorized.

In the Navy's acoustic impact analyses during Phase II (the previous phase of Navy testing and training, 2017–2022; see also Navy's ''Criteria and Thresholds for U.S. Navy Acoustic and Explosive Effects Analysis (Phase III)'' technical report, 2012), the likelihood of Level B harassment by behavioral disturbance in response to sonar and other transducers was based on a probabilistic function (BRF), that related the likelihood (*i.e.,* probability) of a behavioral response (at the level of a Level B harassment) to the received SPL. The BRF was used to estimate the percentage of an exposed population that is likely to exhibit Level B harassment due to altered behaviors or behavioral disturbance at a given received SPL. This BRF relied on the assumption that sound poses a negligible risk to marine mammals if they are exposed to SPL below a certain ''basement'' value. Above the basement exposure SPL, the probability of a response increased with increasing SPL. Two BRFs were used in Navy acoustic impact analyses: BRF1 for mysticetes and BRF2 for other species. BRFs were not used for beaked whales during Phase II analyses. Instead, a step function at an SPL of 140 dB re: 1 μPa was used for beaked whales as the threshold to predict Level B harassment by behavioral disturbance. Similarly, a 120 dB re: 1 μP step function was used during Phase II for harbor porpoises.

Developing the behavioral harassment criteria for Phase III (the current phase of Navy training and testing activities) involved multiple steps. All available behavioral response studies conducted both in the field and on captive animals were examined to understand the breadth of behavioral responses of marine mammals to sonar and other transducers (see also Navy's ''Criteria and Thresholds for U.S. Navy Acoustic and Explosive Effects Analysis (Phase III)'' Technical Report, 2017). Six behavioral response field studies with observations of 14 different marine mammal species reactions to sonar or sonar-like signals and 6 captive animal behavioral studies with observations of 8 different species reactions to sonar or sonar-like signals were used to provide a robust data set for the derivation of the Navy's Phase III marine mammal behavioral response criteria. The current criteria have been rigorously vetted within the Navy community, among scientists during expert elicitation, and then reviewed by the public before being applied. All behavioral response research that has been published since the derivation of the Navy's Phase III criteria (December 2016) has been considered, and NMFS will continue to review and evaluate new relevant data as it becomes available and consider the impacts of those studies on the Acoustic Technical Guidance to determine what revisions/updates may be appropriate. However, any such revisions must undergo peer and public review before being adopted, as described in the Acoustic Guidance methodology. In consideration of the available data, any such changes would not be expected to change the predicted take estimates in a manner that would change the necessary determinations supporting the issuance of these regulations, and the data and values used in this rule reflect the best available science.

Marine mammal species were placed into behavioral criteria groups based on their known or suspected behavioral sensitivities to sound. In most cases these divisions were driven by taxonomic classifications (*e.g.,* mysticetes, pinnipeds). The data from the behavioral studies were analyzed by looking for significant responses, or lack thereof, for each experimental session. The resulting four Bayesian Biphasic Dose Response Functions (referred to as the BRFs) that were developed for odontocetes, pinnipeds, mysticetes, and beaked whales predict the probability of a behavioral response qualifying as Level B harassment given exposure to certain received levels of sound. These BRFs are then used in combination with the cutoff distances described below to estimate the number of takes by Level B harassment.

The Navy used cutoff distances beyond which the potential of significant behavioral responses (and therefore Level B harassment) is considered to be unlikely (see Table 9 below). These distances were determined by examining all available published field observations of behavioral reactions to sonar or sonar-like signals that included the distance between the sound source and the marine mammal. The longest distance, rounded up to the nearest 5-km increment, was chosen as the cutoff distance for each behavioral criteria group (*i.e.,* odontocetes, pinnipeds, mysticetes, beaked whales, and harbor porpoise). For animals within the cutoff distance, BRFs for each behavioral criteria group based on a received SPL as presented in Chapter 6, Section 6.4.2.1 (Methods for Analyzing Impacts from Sonars and other Transducers) of the Navy's rulemaking/LOA application was used to predict the probability of a potential significant behavioral response. For training activities that contain multiple platforms or tactical sonar sources that exceed 215 dB re: 1 μPa at 1 m, this cutoff distance is substantially increased (*i.e.,* doubled) from values derived from the literature. The use of multiple platforms and intense sound sources are factors that probably increase responsiveness in marine mammals overall (however, we note that helicopter dipping sonars were considered in the intense sound source group, despite lower source levels,

because of data indicating that marine mammals are sometimes more responsive to the less predictable employment of this source). There are currently few behavioral observations under these circumstances; therefore, the Navy conservatively predicted significant behavioral responses that will rise to Level B harassment at farther ranges as shown in Table 9, versus less intense events.

TABLE 9—CUTOFF DISTANCES FOR MODERATE SOURCE LEVEL, SINGLE PLATFORM TRAINING EVENTS AND FOR ALL OTHER EVENTS WITH MULTIPLE PLATFORMS OR SONAR WITH SOURCE LEVELS AT OR EXCEEDING 215 dB RE: 1 μPA AT 1 M

Criteria group	Moderate SL/ single platform cutoff distance (km)	High SL/multi-platform cutoff distance (km)
Odontocetes	10	20
Pinnipeds	5	10
Mysticetes	10	20
Beaked Whales	25	50
Harbor Porpoise	20	40

Notes: dB re: 1 μPa at 1 m = decibels referenced to 1 micropascal at 1 meter, km = kilometer, SL = source level.

The range to received sound levels in 6–dB steps from three representative sonar bins and the percentage of animals that may be taken by Level B harassment under each BRF are shown in Table 10 through Table 12. Cells are shaded if the mean range value for the specified received level exceeds the distance cutoff distance for a particular group and therefore are not included in the estimated take. See Chapter 6, Section 6.4.2.1 (Methods for Analyzing Impacts from Sonars and Other Transducers) of the Navy's rulemaking/LOA application for further details on the derivation and use of the BRFs, thresholds, and the cutoff distances to identify takes by Level B harassment, which were coordinated with NMFS. As noted previously, NMFS carefully reviewed, and contributed to, the Navy's behavioral harassment thresholds (*i.e.,* the BRFs and the cutoff distances) for the species, and agrees that these methods represent the best available science at this time for determining impacts to marine mammals from sonar and other transducers.

Table 10 through Table 12 identify the maximum likely percentage of exposed individuals taken at the indicated received level and associated range (in which marine mammals would be reasonably expected to experience a disruption in behavior patterns to a point where they are abandoned or significantly altered) for mid-frequency active sonar (MFAS).

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Table 10 -- Ranges to Estimated Level B Harassment by Behavioral Disturbance for Sonar Bin MF1 Over a Representative Range of Environments Within the TMAA

Received Level (dB re 1 μPa)	Mean Range (meters) with Minimum and Maximum Values in Parentheses	Probability of Behavioral Disturbance for Sonar Bin MF1 (Percent)				
		Beaked whales	Harbor Porpoise	Mysticetes	Odontocetes	Pinnipeds
196	105 (100–110)	100	100	100	100	100
190	240 (240–240)	100	100	98	100	100
184	498 (490–525)	100	100	88	99	98
178	1,029 (950–1,275)	100	100	59	97	92
172	3,798 (1,525–7,025)	99	100	30	91	76
166	8,632 (2,775–14,775)	97	100	20	78	48
160	15,000 (3,025–26,525)	93	100	18	58	27
154	23,025 (3,275–47,775)	83	100	17	40	18
148	47,693 (10,275–54,025)	66	100	16	29	16
142	53,834 (12,025–72,025)	45	100	13	25	15
136	60,035 (13,275–74,525)	28	100	9	23	15
130	72,207 (14,025–75,025)	18	100	5	20	15
124	73,169 (17,025–75,025)	14	100	2	17	14
118	72,993 (25,025–75,025)	12	0	1	12	13
112	72,940 (27,525–75,025)	11	0	0	6	9
106	73,016 (28,525–75,025)	11	0	0	3	5
100	73,320 (30,025–75,025)	8	0	0	1	2

Notes: (1) Cells are shaded if the mean range value for the specified received level exceeds the distance cut-off range for a particular hearing group. Any impacts within the cut-off range for a criteria group are included in the estimated impacts. Cut-off ranges in this table are for activities with high source levels or multiple platforms. See Table 9 for behavioral cutoff distances. (2) dB re 1 μPa = decibels referenced to 1 micropascal, MF = mid-frequency

Table 11 -- Ranges to Estimated Level B Harassment by Behavioral Disturbance for Sonar Bin MF4 Over a Representative Range of Environments Within the TMAA

Received Level (dB re 1 μPa)	Mean Range (meters) with Minimum and Maximum Values in Parentheses	Probability of Behavioral Disturbance for Sonar Bin MF4 (Percent)				
		Beaked whales	Harbor Porpoise	Mysticetes	Odontocetes	Pinnipeds
196	8 (0–8)	100	100	100	100	100
190	17 (0–17)	100	100	98	100	100
184	34 (0–35)	100	100	88	99	98
178	69 (0–75)	100	100	59	97	92
172	156 (120–190)	99	100	30	91	76
166	536 (280–1,000)	97	100	20	78	48
160	1,063 (470–1,775)	93	100	18	58	27
154	2,063 (675–4,275)	83	100	17	40	18
148	5,969 (1,025–9,275)	66	100	16	29	16
142	12,319 (1,275–26,025)	45	100	13	25	15
136	26,176 (1,775–40,025)	28	100	9	23	15
130	42,963 (2,275–54,775)	18	100	5	20	15
124	53,669 (2,525–65,775)	14	100	2	17	14
118	63,387 (2,775–75,025)	12	0	1	12	13
112	71,709 (3,025–75,025)	11	0	0	6	9
106	73,922 (22,775–75,025)	11	0	0	3	5
100	73,923 (25,525–75,025)	8	0	0	1	2

Notes: (1) Cells are shaded if the mean range value for the specified received level exceeds the distance cut-off range for a particular hearing group. Any impacts within the cut-off range for a criteria group are included in the estimated impacts. Cut-off ranges in this table are for activities with high source levels or multiple platforms. See Table 9 for behavioral cutoff distances. (2) dB re 1 μPa = decibels referenced to 1 micropascal, MF = mid-frequency

Table 12 -- Ranges to Estimated Level B Harassment by Behavioral Disturbance for Sonar Bin MF5 Over a Representative Range of Environments Within the TMAA

Received Level (dB re 1 μPa)	Mean Range (meters) with Minimum and Maximum Values in Parentheses	Probability of Behavioral Disturbance for Sonar Bin MF5 (Percent)				
		Beaked whales	Harbor Porpoise	Mysticetes	Odontocetes	Pinnipeds
196	0 (0–0)	100	100	100	100	100
190	1 (0–3)	100	100	98	100	100
184	4 (0–7)	100	100	88	99	98
178	14 (0–15)	100	100	59	97	92
172	29 (0–30)	99	100	30	91	76
166	59 (0–65)	97	100	20	78	48
160	130 (0–170)	93	100	18	58	27
154	349 (0–1,025)	83	100	17	40	18
148	849 (410–2,275)	66	100	16	29	16
142	1,539 (625–3,775)	45	100	13	25	15
136	2,934 (950–8,525)	28	100	9	23	15
130	6,115 (1,275–10,275)	18	100	5	20	15
124	9,764 (1,525–16,025)	14	100	2	17	14
118	13,830 (1,775–24,775)	12	0	1	12	13
112	18,970 (2,275–30,775)	11	0	0	6	9
106	25,790 (2,525–38,525)	11	0	0	3	5
100	36,122 (2,775–46,775)	8	0	0	1	2

Notes: (1) Cells are shaded if the mean range value for the specified received level exceeds the distance cut-off range for a particular hearing group. Any impacts within the cut-off range for a criteria group are included in the estimated impacts. Cut-off ranges in this table are for activities with high source levels or multiple platforms. See Table 9 for behavioral cutoff distances. (2) dB re 1 μPa = decibels referenced to 1 micropascal, MF = mid-frequency

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Explosives

Phase III explosive thresholds for Level B harassment by behavioral disturbance for marine mammals is the hearing groups' TTS threshold (in SEL) minus 5 dB (see Table 13 below and Table 8 for the TTS thresholds for explosives) for events that contain multiple impulses from explosives underwater. This was the same approach as taken in Phase II for explosive analysis. See the ''Criteria and Thresholds for U.S. Navy Acoustic and Explosive Effects Analysis (Phase III)'' report (U.S. Department of the Navy, 2017c) for detailed information on how the criteria and thresholds were derived. NMFS continues to concur that this approach represents the best available science for determining impacts to marine mammals from explosives. As noted previously, detonations occurring in air at a height of 33 ft (10 m) or less above the water surface, and detonations occurring directly on the water surface were modeled to detonate at a depth of 0.3 ft (0.1 m) below the water surface. There are no detonations of explosives occurring underwater as part of the planned activities.

TABLE 13—THRESHOLDS FOR LEVEL B HARASSMENT BY BEHAVIORAL DISTURBANCE FOR EXPLOSIVES FOR MARINE MAMMALS

Medium	Functional hearing group	SEL (weighted)
Underwater	Low-frequency cetaceans	163
Underwater	Mid-frequency cetaceans	165
Underwater	High-frequency cetaceans	135
Underwater	Phocids	165

TABLE 13—THRESHOLDS FOR LEVEL B HARASSMENT BY BEHAVIORAL DISTURBANCE FOR EXPLOSIVES FOR MARINE MAMMALS—Continued

Medium	Functional hearing group	SEL (weighted)
Underwater	Otariids	183

Note: Weighted SEL thresholds in dB re: 1 μPa²s underwater.

Navy's Acoustic Effects Model

The Navy's Acoustic Effects Model calculates sound energy propagation from sonar and other transducers and explosives during naval activities and the sound received by animat dosimeters. Animat dosimeters are virtual representations of marine mammals distributed in the area around the modeled naval activity and each dosimeter records its individual sound ''dose.'' The model bases the distribution of animats over the TMAA, the portion of the GOA Study Area where sonar and other transducers and explosives are planned for use, on the density values in the Navy Marine Species Density Database and distributes animats in the water column proportional to the known time that species spend at varying depths.

The model accounts for environmental variability of sound propagation in both distance and depth when computing the sound level received by the animats. The model conducts a statistical analysis based on multiple model runs to compute the estimated effects on animals. The number of animats that exceed the thresholds for effects is tallied to provide an estimate of the number of marine mammals that could be affected.

Assumptions in the Navy model intentionally err on the side of overestimation when there are unknowns. Naval activities are modeled as though they would occur regardless of proximity to marine mammals, meaning that no mitigation is considered (*i.e.,* no power down or shut down modeled) and without any avoidance of the activity by the animal. The final step of the quantitative analysis of acoustic effects is to consider the implementation of mitigation and the possibility that marine mammals would avoid continued or repeated sound exposures. For more information on this process, see the discussion in the *Take Requests* subsection below. All explosives used in the TMAA will detonate in the air at or above the water surface. However, for this analysis, detonations occurring in air at a height of 33 ft. (10 m) or less above the water surface, and detonations occurring directly on the water surface were modeled to detonate at a depth of 0.3 ft. (0.1 m) below the water surface since there is currently no other identified methodology for modeling potential effects to marine mammals that are underwater as a result of detonations occurring at or above the surface of the ocean. This overestimates the amount of explosive and acoustic energy entering the water.

The model estimates the impacts caused by individual training exercises. During any individual modeled event, impacts to individual animats are considered over 24-hour periods. The animats do not represent actual animals, but rather they represent a distribution of animals based on density and abundance data, which allows for a statistical analysis of the number of instances that marine mammals may be exposed to sound levels resulting in an effect. Therefore, the model estimates the number of instances in which an effect threshold was exceeded over the course of a year, but does not estimate the number of individual marine mammals that may be impacted over a year (*i.e.,* some marine mammals could be impacted several times, while others would not experience any impact). A detailed explanation of the Navy's Acoustic Effects Model is provided in the technical report ''Quantifying Acoustic Impacts on Marine Mammals and Sea Turtles: Methods and Analytical Approach for Phase III Training and Testing'' (U.S. Department of the Navy, 2018).

Range to Effects

The following section provides range to effects for sonar and other active acoustic sources as well as explosives to specific acoustic thresholds determined using the Navy Acoustic Effects Model. Marine mammals exposed within these ranges for the shown duration are predicted to experience the associated effect. Range to effects is important information in not only predicting acoustic impacts, but also in verifying the accuracy of model results against real-world situations and determining adequate mitigation ranges to avoid higher level effects, especially physiological effects to marine mammals.

Sonar

The ranges to received sound levels in 6–dB steps from three representative sonar bins and the percentage of the total number of animals that may exhibit a significant behavioral response (and therefore Level B harassment) under each BRF are shown in Table 10 through Table 12 above, respectively. See Chapter 6, Section 6.4.2.1 (Methods for Analyzing Impacts from Sonars and Other Transducers) of the Navy's rulemaking/LOA application for additional details on the derivation and use of the BRFs, thresholds, and the cutoff distances that are used to identify Level B harassment by behavioral disturbance. NMFS has reviewed the range distance to effect data provided by the Navy and concurs with the analysis.

The ranges to PTS for three representative sonar systems for an exposure of 30 seconds is shown in Table 14 relative to the marine mammal's functional hearing group. This period (30 seconds) was chosen based on examining the maximum amount of time a marine mammal would realistically be exposed to levels that could cause the onset of PTS based on platform (*e.g.,* ship) speed and a nominal animal swim speed of approximately 1.5 m per second. The ranges provided in the table include the average range to PTS, as well as the range from the minimum to the maximum distance at which PTS is possible for each hearing group.

TABLE 14—RANGES TO PERMANENT THRESHOLD SHIFT (METERS) FOR THREE REPRESENTATIVE SONAR SYSTEMS

Hearing group	Approximate range in meters for PTS from 30 second exposure [1]		
	Sonar bin MF1	Sonar bin MF4	Sonar bin MF5
High-frequency cetaceans	180 (180–180)	31 (30–35)	9 (8–10)
Low-frequency cetaceans	65 (65–65)	13 (0–15)	0 (0–0)
Mid-frequency cetaceans	16 (16–16)	3 (3–3)	0 (0–0)
Otariids [2]	6 (6–6)	0 (0–0)	0 (0–0)
Phocids [2]	45 (45–45)	11 (11–11)	0 (0–0)

[1] PTS ranges extend from the sonar or other transducer sound source to the indicated distance. The average range to PTS is provided as well as the range from the estimated minimum to the maximum range to PTS in parenthesis.
[2] Otariids and phocids are separated because true seals (phocids) generally dive much deeper than sea lions and fur seals (otariids).
Notes: MF = mid-frequency, PTS = permanent threshold shift.

The tables below illustrate the range to TTS for 1, 30, 60, and 120 seconds from three representative sonar systems (see Table 15 through Table 17).

TABLE 15—RANGES TO TEMPORARY THRESHOLD SHIFT (METERS) FOR SONAR BIN MF1 OVER A REPRESENTATIVE RANGE OF ENVIRONMENTS WITHIN THE TMAA

Hearing group	Approximate TTS ranges (meters) [1]			
	Sonar Bin MF1			
	1 second	30 seconds	60 seconds	120 seconds
High-frequency cetaceans	3,554 (1,525–6,775)	3,554 (1,525–6,775)	5,325 (2,275–9,525)	7,066 (2,525–13,025)
Low-frequency cetaceans	920 (850–1,025)	920 (850–1,025)	1,415 (1,025–2,025)	2,394 (1,275–4,025)
Mid-frequency cetaceans	209 (200–210)	209 (200–210)	301 (300–310)	376 (370–390)
Otariids	65 (65–65)	65 (65–65)	100 (100–110)	132 (130–140)
Phocids	673 (650–725)	673 (650–725)	988 (900–1,025)	1,206 (1,025–1,525)

[1] Ranges to TTS represent the model predictions in different areas and seasons within the TMAA. The zone in which animals are expected to incur TTS extends from onset-PTS to the distance indicated. The average range to TTS is provided as well as the range from the estimated minimum to the maximum range to TTS in parenthesis.
Notes: MF = mid-frequency, TTS = temporary threshold shift.

TABLE 16—RANGES TO TEMPORARY THRESHOLD SHIFT (METERS) FOR SONAR BIN MF4 OVER A REPRESENTATIVE RANGE OF ENVIRONMENTS WITHIN THE TMAA

Hearing group	Approximate TTS ranges (meters) [1]			
	Sonar Bin MF4			
	1 second	30 seconds	60 seconds	120 seconds
High-frequency cetaceans	318 (220–550)	686 (430–1,275)	867 (575–1,525)	1,225 (825–2,025)
Low-frequency cetaceans	77 (0–100)	175 (130–340)	299 (190–550)	497 (280–1,000)
Mid-frequency cetaceans	22 (22–22)	35 (35–35)	50 (50–50)	71 (70–75)
Otariids	8 (8–8)	15 (15–15)	19 (19–19)	25 (25–25)
Phocids	67 (65–70)	123 (110–150)	172 (150–210)	357 (240–675)

[1] Ranges to TTS represent the model predictions in different areas and seasons within the TMAA. The zone in which animals are expected to incur TTS extends from onset-PTS to the distance indicated. The average range to TTS is provided as well as the range from the estimated minimum to the maximum range to TTS in parenthesis.
Notes: MF = mid-frequency, TTS = temporary threshold shift.

TABLE 17—RANGES TO TEMPORARY THRESHOLD SHIFT (METERS) FOR SONAR BIN MF5 OVER A REPRESENTATIVE RANGE OF ENVIRONMENTS WITHIN THE TMAA

Hearing group	Approximate TTS Ranges (meters) [1]			
	Sonar Bin MF5			
	1 second	30 seconds	60 seconds	120 seconds
High-frequency cetaceans	117 (110–140)	117 (110–140)	176 (150–320)	306 (210–800)
Low-frequency cetaceans	9 (0–12)	9 (0–12)	13 (0–17)	19 (0–24)
Mid-frequency cetaceans	5 (0–9)	5 (0–9)	12 (11–13)	18 (17–18)
Otariids	0 (0–0)	0 (0–0)	0 (0–0)	0 (0–0)

TABLE 17—RANGES TO TEMPORARY THRESHOLD SHIFT (METERS) FOR SONAR BIN MF5 OVER A REPRESENTATIVE RANGE OF ENVIRONMENTS WITHIN THE TMAA—Continued

Hearing group	Approximate TTS Ranges (meters) [1]			
	Sonar Bin MF5			
	1 second	30 seconds	60 seconds	120 seconds
Phocids	9 (8–10)	9 (8–10)	14 (14–15)	21 (21–22)

[1] Ranges to TTS represent the model predictions in different areas and seasons within the TMAA. The zone in which animals are expected to incur TTS extends from onset-PTS to the distance indicated. The average range to TTS is provided as well as the range from the estimated minimum to the maximum range to TTS in parenthesis.

Notes: MF = mid-frequency, TTS = temporary threshold shift.

Explosives

The following section provides the range (distance) over which specific physiological or behavioral effects are expected to occur based on the explosive criteria (see Chapter 6, Section 6.5.2 (Impacts from Explosives) of the Navy's rulemaking/LOA application and the ''Criteria and Thresholds for U.S. Navy Acoustic and Explosive Effects Analysis (Phase III)'' report (U.S. Department of the Navy, 2017c)) and the explosive propagation calculations from the Navy Acoustic Effects Model (see Chapter 6, Section 6.5.2.2 (Impact Ranges for Explosives) of the Navy's rulemaking/LOA application). The range to effects are shown for a range of explosive bins, from E5 (greater than 5–10 lbs (2.3–4.5 kg) net explosive weight) to E12 (greater than 650 lbs to 1,000 lbs (294.8–453.6 kg) net explosive weight) (Table 18 through Table 31). Ranges are determined by modeling the distance that noise from an explosion would need to propagate to reach exposure level thresholds specific to a hearing group that would cause behavioral response (to the degree of Level B harassment), TTS, PTS, and non-auditory injury. NMFS has reviewed the range distance to effect data provided by the Navy and concurs with the analysis. Range to effects is important information in not only predicting impacts from explosives, but also in verifying the accuracy of model results against real-world situations and determining adequate mitigation ranges to avoid higher level effects, especially physiological effects to marine mammals. For additional information on how ranges to impacts from explosions were estimated, see the technical report ''Quantifying Acoustic Impacts on Marine Mammals and Sea Turtles: Methods and Analytical Approach for Phase III Training and Testing'' (U.S. Navy, 2018).

Table 18 through 29 show the minimum, average, and maximum ranges to onset of auditory and likely behavioral effects that rise to the level of Level B harassment based on the developed thresholds. Ranges are provided for a representative source depth and cluster size (the number of rounds fired, or buoys dropped, within a very short duration) for each bin. For events with multiple explosions, sound from successive explosions can be expected to accumulate and increase the range to the onset of an impact based on SEL thresholds. Ranges to non-auditory injury and mortality are shown in Table 30 and Table 31, respectively.

No underwater detonations are planned as part of the Navy's activities, but marine mammals could be exposed to in-air detonations at or above the water surface. The Navy Acoustic Effects Model cannot account for the highly non-linear effects of cavitation and surface blow off for shallow underwater explosions, nor can it estimate the explosive energy entering the water from a low-altitude detonation. Thus, for this analysis, sources detonating in-air at or above (within 10 m above) the water surface are modeled as if detonating completely underwater at a depth of 0.1 m, with all energy reflected into the water rather than released into the air. Therefore, the amount of explosive and acoustic energy entering the water, and consequently the estimated ranges to effects, are likely to be overestimated.

Table 18 shows the minimum, average, and maximum ranges to onset of auditory and likely behavioral effects that rise to the level of Level B harassment for high-frequency cetaceans based on the developed thresholds.

TABLE 18—SEL-BASED RANGES TO ONSET PTS, ONSET TTS, AND LEVEL B HARASSMENT BY BEHAVIORAL DISTURBANCE (IN METERS) FOR HIGH-FREQUENCY CETACEANS

Range to effects for explosives: high-frequency cetaceans [1]					
Bin [2]	Source depth (m)	Cluster size	PTS	TTS	Behavioral
E5	0.1	1	910 (850–975)	1,761 (1,275–2,275)	2,449 (1,775–3,275)
		7	1,275 (1,025–1,525)	3,095 (2,025–4,525)	4,664 (2,275–7,775)
E9	0.1	1	1,348 (1,025–1,775)	3,615 (2,025–5,775)	5,365 (2,525–8,525)
E10	0.1	1	1,546 (1,025–2,025)	4,352 (2,275–7,275)	5,949 (2,525–9,275)
E12	0.1	1	1,713 (1,275–2,025)	5,115 (2,275–7,775)	6,831 (2,775–10,275)

[1] Average distance (meters) to PTS, TTS, and behavioral thresholds are depicted above the minimum and maximum distances which are in parentheses. Values depict the range produced by SEL hearing threshold criteria levels. No underwater explosions are planned. The model assumes that all explosive energy from detonations at or above (within 10 m) the water surface is released underwater, likely over-estimating ranges to effect. PTS = permanent threshold shift, SEL = sound exposure level, TTS = temporary threshold shift.

[2] Bin (net explosive weight, lb.): E5 (>5–10), E9 (>100–250), E10 (>250–500), E12 (>650–1,000).

Table 19 shows the minimum, average, and maximum ranges to onset of auditory effects for high-frequency cetaceans based on the developed thresholds.

TABLE 19—PEAK PRESSURE-BASED RANGES TO ONSET PTS AND ONSET TTS (IN METERS) FOR HIGH FREQUENCY CETACEANS

Range to effects for explosives: high-frequency cetaceans [1]				
Bin [2]	Source depth (m)	Cluster size	PTS	TTS
E5	0.1	1	1,161 (1,000–1,525)	1,789 (1,025–2,275)
		7	1,161 (1,000–1,525)	1,789 (1,025–2,275)
E9	0.1	1	2,331 (1,525–2,775)	5,053 (2,025–9,275)
E10	0.1	1	2,994 (1,775–4,525)	7,227 (2,025–14,775)
E12	0.1	1	4,327 (2,025–7,275)	10,060 (2,025–22,275)

[1] Average distance (meters) is shown with the minimum and maximum distances due to varying propagation environments in parentheses. No underwater explosions are planned. The model assumes that all explosive energy from detonations at or above (within 10 m) the water surface is released underwater, likely over-estimating ranges to effect. PTS = permanent threshold shift, TTS = temporary threshold shift.
[2] Bin (net explosive weight, lb.): E5 (>5–10), E9 (>100–250), E10 (>250–500), E12 (>650–1,000).

Table 20 shows the minimum, average, and maximum ranges to onset of auditory and likely behavioral effects that rise to the level of Level B harassment for low-frequency cetaceans based on the developed thresholds.

TABLE 20—SEL-BASED RANGES TO ONSET PTS, ONSET TTS, AND LEVEL B HARASSMENT BY BEHAVIORAL DISTURBANCE (IN METERS) FOR LOW-FREQUENCY CETACEANS

Range to effects for explosives: low-frequency cetaceans [1]					
Bin [2]	Source depth (m)	Cluster size	PTS	TTS	Behavioral
E5	0.1	1	171 (100–190)	633 (230–825)	934 (310–1,525)
		7	382 (170–450)	1,552 (380–5,775)	3,712 (600–13,025)
E9	0.1	1	453 (180–550)	3,119 (550–9,025)	6,462 (1,275–19,275)
E10	0.1	1	554 (210–700)	4,213 (600–13,025)	9,472 (1,775–27,275)
E12	0.1	1	643 (230–825)	6,402 (1,275–19,775)	13,562 (2,025–34,775)

[1] Average distance (meters) to PTS, TTS, and behavioral thresholds are depicted above the minimum and maximum distances which are in parentheses. Values depict the range produced by SEL hearing threshold criteria levels. No underwater explosions are planned. The model assumes that all explosive energy from detonations at or above (within 10 m) the water surface is released underwater, likely over-estimating ranges to effect. PTS = permanent threshold shift, SEL = sound exposure level, TTS = temporary threshold shift.
[2] Bin (net explosive weight, lb.): E5 (>5–10), E9 (>100–250), E10 (>250–500), E12 (>650–1,000).

Table 21 shows the minimum, average, and maximum ranges to onset of auditory effects for low-frequency cetaceans based on the developed thresholds.

TABLE 21—PEAK PRESSURE-BASED RANGES TO ONSET PTS AND ONSET TTS (IN METERS) FOR LOW FREQUENCY CETACEANS

Range to effects for explosives: low-frequency cetaceans [1]				
Bin [2]	Source depth (m)	Cluster size	PTS	TTS
E5	0.1	1	419 (170–500)	690 (210–875)
		7	419 (170–500)	690 (210–875)
E9	0.1	1	855 (270–1,275)	1,269 (400–1,775)
E10	0.1	1	953 (300–1,525)	1,500 (450–2,525)
E12	0.1	1	1,135 (360–1,525)	1,928 (525–4,775)

[1] Average distance (meters) is shown with the minimum and maximum distances due to varying propagation environments in parentheses. No underwater explosions are planned. The model assumes that all explosive energy from detonations at or above (within 10 m) the water surface is released underwater, likely over-estimating ranges to effect. PTS = permanent threshold shift, TTS = temporary threshold shift.
[2] Bin (net explosive weight, lb.): E5 (>5–10), E9 (>100–250), E10 (>250–500), E12 (>650–1,000).

Table 22 shows the minimum, average, and maximum ranges to onset of auditory and likely behavioral effects that rise to the level of Level B harassment for mid-frequency cetaceans based on the developed thresholds.

TABLE 22—SEL-BASED RANGES TO ONSET PTS, ONSET TTS, AND LEVEL B HARASSMENT BY BEHAVIORAL DISTURBANCE (IN METERS) FOR MID-FREQUENCY CETACEANS

Range to effects for explosives: mid-frequency cetaceans [1]					
Bin [2]	Source depth (m)	Cluster size	PTS	TTS	Behavioral
E5	0.1	1	79 (75–80)	363 (360–370)	581 (550–600)
		7	185 (180–190)	777 (650–825)	1,157 (800–1,275)
E9	0.1	1	215 (210–220)	890 (700–950)	1,190 (825–1,525)
E10	0.1	1	275 (270–280)	974 (750–1,025)	1,455 (875–1,775)
E12	0.1	1	340 (340–340)	1,164 (825–1,275)	1,746 (925–2,025)

[1] Average distance (meters) to PTS, TTS, and behavioral thresholds are depicted above the minimum and maximum distances which are in parentheses. Values depict the range produced by SEL hearing threshold criteria levels. No underwater explosions are planned. The model assumes that all explosive energy from detonations at or above (within 10 m) the water surface is released underwater, likely over-estimating ranges to effect. PTS = permanent threshold shift, SEL = sound exposure level, TTS = temporary threshold shift.
[2] Bin (net explosive weight, lb.): E5 (>5–10), E9 (>100–250), E10 (>250–500), E12 (>650–1,000).

Table 23 shows the minimum, average, and maximum ranges to onset of auditory effects for mid-frequency cetaceans based on the developed thresholds.

TABLE 23—PEAK PRESSURE-BASED RANGES TO ONSET PTS AND ONSET TTS (IN METERS) FOR MID-FREQUENCY CETACEANS

Range to effects for explosives: mid-frequency cetaceans [1]				
Bin [2]	Source depth (m)	Cluster size	PTS	TTS
E5	0.1	1	158 (150–160)	295 (290–300)
		7	158 (150–160)	295 (290–300)
E9	0.1	1	463 (430–470)	771 (575–850)
E10	0.1	1	558 (490–575)	919 (625–1,025)
E12	0.1	1	679 (550–725)	1,110 (675–1,275)

[1] Average distance (meters) is shown with the minimum and maximum distances due to varying propagation environments in parentheses. No underwater explosions are planned. The model assumes that all explosive energy from detonations at or above (within 10 m) the water surface is released underwater, likely over-estimating ranges to effect. PTS = permanent threshold shift, TTS = temporary threshold shift.
[2] Bin (net explosive weight, lb.): E5 (>5–10), E9 (>100–250), E10 (>250–500), E12 (>650–1,000).

Table 24 shows the minimum, average, and maximum ranges to onset of auditory and likely behavioral effects that rise to the level of Level B harassment for otariid pinnipeds based on the developed thresholds.

TABLE 24—SEL-BASED RANGES TO ONSET PTS, ONSET TTS, AND LEVEL B HARASSMENT BY BEHAVIORAL DISTURBANCE (IN METERS) FOR OTARIIDS

Range to effects for explosives: otariids [1]					
Bin [2]	Source depth (m)	Cluster size	PTS	TTS	Behavioral
E5	0.1	1	25 (24–25)	110 (110–110)	185 (180–190)
		7	58 (55–60)	265 (260–270)	443 (430–450)
E9	0.1	1	68 (65–70)	320 (310–330)	512 (490–525)
E10	0.1	1	88 (85–90)	400 (390–410)	619 (575–675)
E12	0.1	1	105 (100–110)	490 (470–500)	733 (650–825)

[1] Average distance (meters) to PTS, TTS, and behavioral thresholds are depicted above the minimum and maximum distances which are in parentheses. Values depict the range produced by SEL hearing threshold criteria levels. No underwater explosions are planned. The model assumes that all explosive energy from detonations at or above (within 10 m) the water surface is released underwater, likely over-estimating ranges to effect. PTS = permanent threshold shift, SEL = sound exposure level, TTS = temporary threshold shift.
[2] Bin (net explosive weight, lb.): E5 (>5–10), E9 (>100–250), E10 (>250–500), E12 (>650–1,000).

Table 25 shows the minimum, average, and maximum ranges to onset of auditory effects for otariid pinnipeds based on the developed thresholds.

TABLE 25—PEAK PRESSURE-BASED RANGES TO ONSET PTS AND ONSET TTS (IN METERS) FOR OTARIIDS

Range to effects for explosives: otariids [1]				
Bin [2]	Source depth (m)	Cluster size	PTS	TTS
E5	0.1	1	128 (120–130)	243 (240–250)
		7	128 (120–130)	243 (240–250)
E9	0.1	1	383 (380–390)	656 (600–700)
E10	0.1	1	478 (470–480)	775 (675–850)
E12	0.1	1	583 (550–600)	896 (750–1,025)

[1] Average distance (meters) is shown with the minimum and maximum distances due to varying propagation environments in parentheses. No underwater explosions are planned. The model assumes that all explosive energy from detonations at or above (within 10 m) the water surface is released underwater, likely over-estimating ranges to effect. PTS = permanent threshold shift, TTS = temporary threshold shift.
[2] Bin (net explosive weight, lb.): E5 (>5–10), E9 (>100–250), E10 (>250–500), E12 (>650–1,000).

Table 26 shows the minimum, average, and maximum ranges to onset of auditory and likely behavioral effects that rise to the level of Level B harassment for phocid pinnipeds, excluding elephant seals, based on the developed thresholds.

TABLE 26—SEL-BASED RANGES TO ONSET PTS, ONSET TTS, AND LEVEL B HARASSMENT BY BEHAVIORAL DISTURBANCE (IN METERS) FOR PHOCIDS, EXCLUDING ELEPHANT SEALS

Range to effects for explosives: phocids [1]					
Bin [2]	Source depth (m)	Cluster size	PTS	TTS	Behavioral
E5	0.1	1	150 (150–150)	681 (675–700)	1,009 (975–1,025)
		7	360 (350–370)	1,306 (1,025–1,525)	1,779 (1,275–2,275)
E9	0.1	1	425 (420–430)	1,369 (1,025–1,525)	2,084 (1,525–2,775)
E10	0.1	1	525 (525–525)	1,716 (1,275–2,275)	2,723 (1,525–4,025)
E12	0.1	1	653 (650–675)	1,935 (1,275–2,775)	3,379 (1,775–5,775)

[1] Excluding elephant seals.
[2] Average distance (meters) is shown with the minimum and maximum distances due to varying propagation environments in parentheses. No underwater explosions are planned. The model assumes that all explosive energy from detonations at or above (within 10 m) the water surface is released underwater, likely over-estimating ranges to effect. PTS = permanent threshold shift, TTS = temporary threshold shift.
[3] Bin (net explosive weight, lb.): E5 (>5–10), E9 (>100–250), E10 (>250–500), E12 (>650–1,000).

Table 27 shows the minimum, average, and maximum ranges to onset of auditory effects for phocids pinnipeds, excluding elephant seals, based on the developed thresholds.

TABLE 27—PEAK PRESSURE-BASED RANGES TO ONSET PTS AND ONSET TTS (IN METERS) FOR PHOCIDS, EXCLUDING ELEPHANT SEALS

Range to effects for explosives: phocids [1]				
Bin [2]	Source depth (m)	Cluster size	PTS	TTS
E5	0.1	1	537 (525–550)	931 (875–975)
		7	537 (525–550)	931 (875–975)
E9	0.1	1	1,150 (1,025–1,275)	1,845 (1,275–2,525)
E10	0.1	1	1,400 (1,025–1,775)	2,067 (1,275–2,525)
E12	0.1	1	1,713 (1,275–2,025)	2,306 (1,525–2,775)

[1] Excluding elephant seals.
[2] Average distance (meters) is shown with the minimum and maximum distances due to varying propagation environments in parentheses. No underwater explosions are planned. The model assumes that all explosive energy from detonations at or above (within 10 m) the water surface is released underwater, likely over-estimating ranges to effect. PTS = permanent threshold shift, TTS = temporary threshold shift.
[3] Bin (net explosive weight, lb.): E5 (>5–10), E9 (>100–250), E10 (>250–500), E12 (>650–1,000).

Table 28 shows the minimum, average, and maximum ranges to onset of auditory and likely behavioral effects that rise to the level of Level B harassment for elephant seals based on the developed thresholds.

TABLE 28—SEL-BASED RANGES TO ONSET PTS, ONSET TTS, AND LEVEL B HARASSMENT BY BEHAVIORAL DISTURBANCE (IN METERS) FOR ELEPHANT SEALS [1]

Range to effects for explosives: phocids (elephant seals) [2]					
Bin [3]	Source depth (m)	Cluster size	PTS	TTS	Behavioral
E5	0.1	1	150 (150–150)	688 (675–700)	1,025 (1,025–1,025)
		7	360 (350–370)	1,525 (1,525–1,525)	2,345 (2,275–2,525)
E9	0.1	1	425 (420–430)	1,775 (1,775–1,775)	2,858 (2,775–3,275)
E10	0.1	1	525 (525–525)	2,150 (2,025–2,525)	3,421 (3,025–4,025)
E12	0.1	1	656 (650–675)	2,609 (2,525–3,025)	4,178 (3,525–5,775)

[1] Elephant seals are separated from other phocids due to their dive behavior, which far exceeds the dive depths of the other phocids analyzed.
[2] Average distance (meters) to PTS, TTS, and behavioral thresholds are depicted above the minimum and maximum distances which are in parentheses. Values depict the range produced by SEL hearing threshold criteria levels. No underwater explosions are planned. The model assumes that all explosive energy from detonations at or above (within 10 m) the water surface is released underwater, likely over-estimating ranges to effect. PTS = permanent threshold shift, SEL = sound exposure level, TTS = temporary threshold shift.
[3] Bin (net explosive weight, lb.): E5 (>5–10), E9 (>100–250), E10 (>250–500), E12 (>650–1,000).

Table 29 shows the minimum, average, and maximum ranges to onset of auditory effects for elephant seals, based on the developed thresholds.

TABLE 29—PEAK PRESSURE-BASED RANGES TO ONSET PTS AND ONSET TTS (IN METERS) FOR ELEPHANT SEALS [1]

Range to Effects for Explosives: phocids (elephant seals) [2]				
Bin [3]	Source depth (m)	Cluster size	PTS	TTS
E5	0.1	1	537 (525–550)	963 (950–975)
		7	537 (525–550)	963 (950–975)
E9	0.1	1	1,275 (1,275–1,275)	2,525 (2,525–2,525)
E10	0.1	1	1,775 (1,775–1,775)	3,046 (3,025–3,275)
E12	0.1	1	2,025 (2,025–2,025)	3,539 (3,525–3,775)

[1] Elephant seals are separated from other phocids due to their dive behavior, which far exceeds the dive depths of the other phocids analyzed.
[2] Average distance (meters) is shown with the minimum and maximum distances due to varying propagation environments in parentheses. No underwater explosions are planned. The model assumes that all explosive energy from detonations at or above (within 10 m) the water surface is released underwater, likely over-estimating ranges to effect. PTS = permanent threshold shift, TTS = temporary threshold shift.
[3] Bin (net explosive weight, lb.): E5 (>5–10), E9 (>100–250), E10 (>250–500), E12 (>650–1,000).

Table 30 shows the minimum, average, and maximum ranges due to varying propagation conditions to non-auditory injury as a function of animal mass and explosive bin (*i.e.,* net explosive weight). Ranges to gastrointestinal tract injury typically exceed ranges to slight lung injury; therefore, the maximum range to effect is not mass-dependent. Animals within these water volumes would be expected to receive minor injuries at the outer ranges, increasing to more substantial injuries, and finally mortality as an animal approaches the detonation point.

TABLE 30—RANGES TO 50 PERCENT NON-AUDITORY INJURY FOR ALL MARINE MAMMAL HEARING GROUPS

Bin [1]	Range to non-auditory injury (meters) [2]
E5	40 (40–40)
E9	121 (90–130)
E10	152 (100–160)
E12	190 (110–200)

[1] Bin (net explosive weight, lb.): E5 (>5–10), E9 (>100–250), E10 (>250–500), E12 (>650–1,000).
[2] Average distance (m) is shown with the minimum and maximum distances due to varying propagation environments in parentheses.
Notes: All ranges to non-auditory injury within this table are driven by gastrointestinal tract injury thresholds regardless of animal mass.

Ranges to mortality, based on animal mass, are shown in Table 31 below.

TABLE 31—RANGES TO 50 PERCENT MORTALITY RISK FOR ALL MARINE MAMMAL HEARING GROUPS AS A FUNCTION OF ANIMAL MASS

Bin [1]	Animal mass intervals (kg) [2]					
	10	250	1,000	5,000	25,000	72,000
E5	13 (12–14)	7 (4–11)	3 (3–4)	2 (1–3)	1 (1–1)	1 (0–1)
E9	35 (30–40)	20 (13–30)	10 (9–13)	7 (6–9)	4 (3–4)	3 (2–3)
E10	43 (40–50)	25 (16–40)	13 (11–16)	9 (7–11)	5 (4–5)	4 (3–4)
E12	55 (50–60)	30 (20–50)	17 (14–20)	11 (9–14)	6 (5–7)	5 (4–6)

[1] Bin (net explosive weight, lb.): E5 (>5–10), E9 (>100–250), E10 (>250–500), E12 (>650–1,000).
[2] Average distance (m) to mortality is depicted above the minimum and maximum distances, which are in parentheses for each animal mass interval.

Marine Mammal Density

A quantitative analysis of impacts on a species or stock requires data on their abundance and distribution that may be affected by anthropogenic activities in the potentially impacted area. The most appropriate metric for this type of analysis is density, which is the number of animals present per unit area. Marine species density estimation requires a significant amount of effort to both collect and analyze data to produce a reasonable estimate. Unlike surveys for terrestrial wildlife, many marine species spend much of their time submerged, and are not easily observed. In order to collect enough sighting data to make reasonable density estimates, multiple observations are required, often in areas that are not easily accessible (*e.g.,* far offshore). Ideally, marine mammal species sighting data would be collected for the specific area and time period (*e.g.,* season) of interest and density estimates derived accordingly. However, in many places, poor weather conditions and high sea states prohibit the completion of comprehensive visual surveys.

For most cetacean species, abundance is estimated using line-transect surveys or mark-recapture studies (*e.g.,* Barlow, 2010; Barlow and Forney, 2007; Calambokidis *et al.,* 2008). The result provides one single density estimate value for each species across broad geographic areas. This is the general approach applied in estimating cetacean abundance in NMFS' SARs. Although the single value provides a good average estimate of abundance (total number of individuals) for a specified area, it does not provide information on the species distribution or concentrations within that area, and it does not estimate density for other timeframes or seasons that were not surveyed. More recently, spatial habitat modeling developed by NMFS' Southwest Fisheries Science Center has been used to estimate cetacean densities (Barlow *et al.,* 2009; Becker *et al.,* 2010, 2012a, b, c, 2014, 2016, 2017, 2020; Ferguson *et al.,* 2006a; Forney *et al.,* 2012, 2015; Redfern *et al.,* 2006). These models estimate cetacean density as a continuous function of habitat variables (*e.g.,* sea surface temperature, seafloor depth, etc.) and thus allow predictions of cetacean densities on finer spatial scales than traditional line-transect or mark recapture analyses and for areas that have not been surveyed. Within the geographic area that was modeled, densities can be predicted wherever these habitat variables can be measured or estimated.

Ideally, density data would be available for all species throughout the study area year-round, in order to best estimate the impacts of Navy activities on marine species. However, in many places, ship availability, lack of funding, inclement weather conditions, and high sea states prevent the completion of comprehensive year-round surveys. Even with surveys that are completed, poor conditions may result in lower sighting rates for species that would typically be sighted with greater frequency under favorable conditions. Lower sighting rates preclude having an acceptably low uncertainty in the density estimates. A high level of uncertainty, indicating a low level of confidence in the density estimate, is typical for species that are rare or difficult to sight. In areas where survey data are limited or non-existent, known or inferred associations between marine habitat features and the likely presence of specific species are sometimes used to predict densities in the absence of actual animal sightings. Consequently, there is no single source of density data for every area, species, and season because of the fiscal costs, resources, and effort involved in providing enough survey coverage to sufficiently estimate density.

To characterize marine species density for large oceanic regions, the Navy reviews, critically assesses, and prioritizes existing density estimates from multiple sources, requiring the development of a systematic method for selecting the most appropriate density estimate for each combination of species/stock, area, and season. The selection and compilation of the best available marine species density data resulted in the Navy Marine Species Density Database (NMSDD). NMFS vetted all cetacean densities by the Navy prior to use in the Navy's acoustic analysis for the current rulemaking process.

A variety of density data and density models are needed in order to develop a density database that encompasses the entirety of the TMAA (densities beyond the TMAA were not considered because sonar and other transducers and explosives would not be used in the GOA Study Area beyond the TMAA). Because this data is collected using different methods with varying amounts of accuracy and uncertainty, the Navy has developed a hierarchy to ensure the most accurate data is used when available. The ''U.S. Navy Marine Species Density Database Phase III for the Gulf of Alaska Temporary Maritime Activities Area'' (U.S. Department of the Navy, 2021), hereafter referred to as the Density Technical Report, describes these models in detail and provides detailed explanations of the models applied to each species density estimate. The list below describes models in order of preference.

1. Spatial density models are preferred and used when available because they provide an estimate with the least amount of uncertainty by deriving estimates for divided segments of the sampling area. These models (see Becker *et al.,* 2016; Forney *et al.,* 2015) predict spatial variability of animal presence as a function of habitat variables (*e.g.,* sea surface temperature, seafloor depth, etc.). This model is developed for areas, species, and, when available, specific timeframes (months or seasons) with sufficient survey data; therefore, this model cannot be used for species with low numbers of sightings.

2. Stratified design-based density estimates use line-transect survey data with the sampling area divided (stratified) into sub-regions, and a density is predicted for each sub-region (see Barlow, 2016; Becker *et al.,* 2016; Bradford *et al.,* 2017; Campbell *et al.,* 2014; Jefferson *et al.,* 2014). While geographically stratified density estimates provide a better indication of a species' distribution within the study area, the uncertainty is typically high because each sub-region estimate is based on a smaller stratified segment of the overall survey effort.

3. Design-based density estimations use line-transect survey data from land and aerial surveys designed to cover a specific geographic area (see Carretta *et al.,* 2015). These estimates use the same survey data as stratified design-based estimates, but are not segmented into sub-regions and instead provide one estimate for a large surveyed area.

Relative environmental suitability (RES) models provide estimates for areas of the oceans that have not been surveyed using information on species occurrence and inferred habitat associations and have been used in past density databases, however, these models were not used in the current quantitative analysis.

The Navy describes some of the challenges of interpreting the results of the quantitative analysis summarized above and described in the Density Technical Report: ''It is important to consider that even the best estimate of marine species density is really a model representation of the values of concentration where these animals might occur. Each model is limited to the variables and assumptions considered by the original data source provider. No mathematical model representation of any biological population is perfect, and with regards

to marine mammal biodiversity, any single model method will not completely explain the actual distribution and abundance of marine mammal species. It is expected that there would be anomalies in the results that need to be evaluated, with independent information for each case, to support if we might accept or reject a model or portions of the model (U.S. Department of the Navy, 2017a).''

Models may be based on different data sets or may generate different temporal predictions, and in this instance, the Navy's estimate of abundance (based on the density estimates used) in the TMAA may differ from population abundances estimated in NMFS' SARs in some cases for a variety of reasons. The SARs are often based on single years of NMFS surveys, whereas the models used by the Navy generally include multiple years of survey data from NMFS, the Navy, and other sources. To present a single, best estimate, the SARs often use a single season survey where they have the best spatial coverage (generally summer). Navy models often use predictions for multiple seasons, where appropriate for the species, even when survey coverage in non-summer seasons is limited, to characterize impacts over multiple seasons as Navy activities may occur outside of the summer months. Predictions may be made for different spatial extents. Many different, but equally valid, habitat and density modeling techniques exist and these can also be the cause of differences in population predictions. Differences in population estimates may be caused by a combination of these factors. Even similar estimates should be interpreted with caution and differences in models fully understood before drawing conclusions.

In particular, the global population structure of humpback whales, with 14 DPSs all associated with multiple feeding areas at which individuals from multiple DPSs convene, is another reason that SAR abundance estimates can differ from other estimates and be somewhat confusing. For some species, the stock assessment for a given species may exceed the Navy's density prediction because those species' home range extends beyond the GOA Study Area or TMAA boundaries. The primary source of density estimates are geographically specific survey data and either peer-reviewed line-transect estimates or habitat-based density models that have been extensively validated to provide the most accurate estimates possible.

These factors and others described in the Density Technical Report should be considered when examining the estimated impact numbers in comparison to current population abundance information for any given species or stock. For a detailed description of the density and assumptions made for each species, see the Density Technical Report.

NMFS coordinated with the Navy in the development of its take estimates and concurs that the Navy's approach for density appropriately utilizes the best available science. Later, in the Analysis and Negligible Impact Determination section, we assess how the estimated take numbers compare to stock abundance in order to better understand the potential number of individuals impacted, and the rationale for which abundance estimate is used is included there.

Take Estimation

The 2022 GOA FSEIS/OEIS considered all training activities planned to occur in the GOA Study Area. The Navy's rulemaking/LOA application described the activities that are reasonably likely to result in the MMPA-defined take of marine mammals, all of which will occur in the TMAA portion of the GOA Study Area. The Navy determined that the two stressors below could result in the incidental taking of marine mammals. NMFS has reviewed the Navy's data and analysis and determined that it is complete and accurate and agrees that the following stressors have the potential to result in takes by harassment of marine mammals from the Navy's planned activities:

- Acoustics (sonar and other transducers);
- Explosives (explosive shock wave and sound, assumed to encompass the risk due to fragmentation).

The quantitative analysis process used for the 2022 GOA FSEIS/OEIS and the Navy's take request in the rulemaking/LOA application to estimate potential exposures to marine mammals resulting from acoustic and explosive stressors is described above and further detailed in the technical report titled ''Quantifying Acoustic Impacts on Marine Mammals and Sea Turtles: Methods and Analytical Approach for Phase III Training and Testing'' (U.S. Department of the Navy, 2018). The Navy Acoustic Effects Model (NAEMO) brings together scenario simulations of the Navy's activities, sound propagation modeling, and marine mammal distribution (based on density and group size) by species to model and quantify the exposure of marine mammals above identified thresholds for behavioral harassment, TTS, PTS, non-auditory injury, and mortality.

NAEMO estimates acoustic and explosive effects without taking mitigation into account; therefore, the model overestimates predicted impacts on marine mammals within mitigation zones. To account for mitigation for marine species in the take estimates, the Navy conducts a quantitative assessment of mitigation. The Navy conservatively quantifies the manner in which procedural mitigation is expected to reduce the risk for model-estimated PTS for exposures to sonars and for model-estimated mortality for exposures to explosives, based on species sightability, observation area, visibility, and the ability to exercise positive control over the sound source. See the proposed rule (87 FR 49656; August 11, 2022) for a description of the process for assessing the effectiveness of procedural mitigation measures, along with the process for assessing the potential for animal avoidance. Where the analysis indicates mitigation would effectively reduce risk, the model-estimated PTS takes are considered reduced to TTS and the model-estimated mortalities are considered reduced to injury, though, for training activities in the GOA Study Area, no mortality or non-auditory injury is anticipated, even without consideration of planned mitigation measures. For a complete explanation of the process for assessing the effects of mitigation, see the Navy's rulemaking/LOA application (Section 6: Take Estimates for Marine Mammals, and Section 11: Mitigation Measures) and the technical report titled ''Quantifying Acoustic Impacts on Marine Mammals and Sea Turtles: Methods and Analytical Approach for Phase III Training and Testing'' (U.S. Department of the Navy, 2018). The extent to which the mitigation areas reduce impacts on the affected species is addressed separately in the Analysis and Negligible Impact Determination section.

NMFS coordinated with the Navy in the development of this quantitative method to address the effects of procedural mitigation on acoustic and explosive exposures and takes, and NMFS independently reviewed and concurs with the Navy that it is appropriate to incorporate the quantitative assessment of mitigation into the take estimates based on the best available science. We reiterate, however, that no mortality was modeled for the GOA TMAA activities, and, as stated above, the Navy does not propose the use of sonar and other transducers and explosives in the WMA. Therefore, this method was not applied here, as it

relates to modeled mortality. This method was applied to potential takes by PTS resulting from sonar and other transducers in the TMAA, but not for the use of explosives.

As a general matter, NMFS does not prescribe the methods for estimating take for any applicant, but we review and ensure that applicants use the best available science, and methodologies that are logical and technically sound. Applicants may use different methods of calculating take (especially when using models) and still get to a result that is representative of the best available science and that allows for a rigorous and accurate evaluation of the effects on the affected populations. There are multiple pieces of the Navy take estimation methods—propagation models, animat movement models, and behavioral thresholds, for example. NMFS evaluates the acceptability of these pieces as they evolve and are used in different rules and impact analyses. Some of the pieces of the Navy's take estimation process have been used in Navy incidental take rules since 2009 and have undergone multiple public comment processes; all of them have undergone extensive internal Navy review, and all of them have undergone comprehensive review by NMFS, which has sometimes resulted in modifications to methods or models.

The Navy uses rigorous review processes (verification, validation, and accreditation processes; peer and public review) to ensure the data and methodology it uses represent the best available science. For instance, the NAEMO model is the result of a NMFS-led Center for Independent Experts (CIE) review of the components used in earlier models. The acoustic propagation component of the NAEMO model (CASS/GRAB) is accredited by the Oceanographic and Atmospheric Master Library (OAML), and many of the environmental variables used in the NAEMO model come from approved OAML databases and are based on in-situ data collection. The animal density components of the NAEMO model are base products of the NMSDD, which includes animal density components that have been validated and reviewed by a variety of scientists from NMFS Science Centers and academic institutions. Several components of the model, for example the Duke University habitat-based density models, have been published in peer reviewed literature. Others like the Atlantic Marine Assessment Program for Protected Species, which was conducted by NMFS Science Centers, have undergone quality assurance and quality control (QA/QC) processes. Finally, the NAEMO model simulation components underwent QA/QC review and validation for model parts such as the scenario builder, acoustic builder, scenario simulator, *etc.,* conducted by qualified statisticians and modelers to ensure accuracy. Other models and methodologies have gone through similar review processes.

In summary, we believe the Navy's methods, including the underlying NAEMO modeling and the method for incorporating mitigation and avoidance, are the most appropriate methods for predicting non-auditory injury, PTS, TTS, and behavioral disturbance. But even with the consideration of mitigation and avoidance, given some of the more conservative components of the methodology (*e.g.,* the thresholds do not consider ear recovery between pulses), we would describe the application of these methods as identifying the maximum number of instances in which marine mammals would be reasonably expected to be taken through non-auditory injury, PTS, TTS, or behavioral disturbance.

Summary of Estimated Take From Training Activities

Based on the methods discussed in the previous sections and the Navy's model and quantitative assessment of mitigation, the Navy provided its take estimate and request for authorization of takes incidental to the use of acoustic and explosive sources for training activities both annually (based on the maximum number of activities that could occur per 12-month period) and over the 7-year period covered by the Navy's rulemaking/LOA application. The following species/stocks present in the TMAA were modeled by the Navy and estimated to have 0 takes of any type from any activity source: Western North Pacific stock of humpback whale; Eastern North Pacific and Western North Pacific stocks of gray whales; Eastern North Pacific Alaska Resident and AT1 Transient stocks of killer whales; Gulf of Alaska and Southeast Alaska stocks of harbor porpoises; U.S. stock of California sea lion; Eastern U.S. and Western U.S. stock of Steller sea lion; Cook Inlet/Shelikof Strait, North Kodiak, Prince William Sound, and South Kodiak stocks of harbor seals, and Alaska stock of Ribbon seals.

The Phase II rule (82 FR 19530; April 26, 2017), valid from April 2017 to April 2022, authorized Level B harassment take of the Eastern North Pacific Alaska Resident stock of killer whales, Gulf of Alaska and Southeast Alaska stocks of harbor porpoise, California sea lion, Eastern U.S. and Western U.S. stock of Steller sea lion, and South Kodiak and Prince William Sound stocks of harbor seal. Takes of these stocks in Phase II were all expected to occur as a result of exposure to sonar activity, rather than explosive use. Inclusion of new density/distribution information and updated BRFs and corresponding cut-offs resulted in 0 estimated takes for these species and stocks in this rulemaking for Phase III.

NMFS has reviewed the Navy's data, methodology, and analysis for the current phase of rulemaking (Phase III) and determined that it is complete and accurate. However, NMFS has conservatively authorized incidental take of the Western North Pacific stock of humpback whale and Eastern North Pacific stock of gray whale, for the following reasons. For the Western North Pacific stock of humpback whale, in calculating takes by Level B harassment from sonar in Phase III, the application of the Phase III BRFs with corresponding cut-offs (20 km for mysticetes), in addition to the stock guild breakout, which assigns 0.05 percent of the take of humpback whales to the Western North Pacific stock, generated a near-zero result, which the Navy rounded to zero in its rulemaking/LOA application. However, NMFS authorized take of one Western North Pacific humpback whale in the Phase II LOA, and given that they do occur in the area, NMFS is conservatively authorizing take by Level B harassment of one group (3 animals) annually in this Phase III rulemaking. The annual take estimate of 3 animals reflects the average group size of on and off-effort survey sightings of humpback whales reported in Rone *et al.* (2017). For the Eastern North Pacific stock of gray whales, application of the Phase III BRFs with corresponding cut-offs (20 km for mysticetes) resulted in true zero takes by Level B harassment for Phase III. However, Palacios *et al.* (2021) reported locations of three tagged gray whales within the TMAA as well as tracks of two additional gray whales that crossed the TMAA, and as noted previously, the TMAA overlaps with the gray whale migratory corridor BIA (November–January, southbound; March–May, northbound). As such, NMFS is conservatively authorizing take by Level B harassment of one group (4 animals) of Eastern North Pacific gray whales annually in this Phase III rulemaking. The annual take estimate of 4 animals reflects the average group sizes of on and off-effort survey sightings of gray whales (excluding an outlier of an estimated 25 gray whales in one group) reported in Rone *et al.* (2017).

For all other species and stocks, NMFS agrees that the estimates for incidental takes by harassment from all sources requested for authorization are the maximum number of instances in which marine mammals are reasonably expected to be taken. NMFS also agrees that no mortality or serious injury is anticipated to occur, and no lethal take is authorized.

For the Navy's training activities, Table 32 summarizes the Navy's take estimate and request and the maximum annual and 7-year total amount and type of Level A harassment and Level B harassment for the 7-year period that NMFS anticipates is reasonably likely to occur (including the incidental take of Western North Pacific stock of humpback whale and Eastern North Pacific stock of gray whale, discussed above) by species and stock. Note that take by Level B harassment includes both behavioral disturbance and TTS. Tables 6–10 through 6–24 (sonar and other transducers) and 6–41 through 6–49 (explosives) in Section 6 of the Navy's rulemaking/LOA application provide the comparative amounts of TTS and behavioral disturbance for each species and stock annually, noting that if a modeled marine mammal was ''taken'' through exposure to both TTS and behavioral disturbance in the model, it was recorded as a TTS.

TABLE 32—ANNUAL AND 7-YEAR TOTAL SPECIES/STOCK-SPECIFIC TAKE ESTIMATES AUTHORIZED FROM ACOUSTIC AND EXPLOSIVE SOUND SOURCE EFFECTS FOR ALL TRAINING ACTIVITIES IN THE TMAA

Species	Stock	Annual		7-Year total	
		Level B	Level A	Level B	Level A
Order Cetacea Suborder Mysticeti (baleen whales)					
Family Balaenidae (right whales):					
North Pacific right whale *	Eastern North Pacific	3	0	21	0
Family Balaenopteridae (rorquals):					
Humpback whale	California, Oregon, & Washington *	10	0	70	0
	Central North Pacific *	79	0	553	0
	Western North Pacific *	[a] 3	0	[a] 21	0
Blue whale *	Central North Pacific	3	0	21	0
	Eastern North Pacific	36	0	252	0
Fin whale *	Northeast Pacific	1,242	2	8,694	14
Sei whale *	Eastern North Pacific	37	0	259	0
Minke whale	Alaska	50	0	350	0
Family Eschrichtiidae (gray whale):					
Gray whale	Eastern North Pacific	[a] 4	0	[a] 28	0
Suborder Odontoceti (toothed whales)					
Family Delphinidae (dolphins):					
Killer whale	Eastern North Pacific, Offshore	81	0	567	0
	Gulf of Alaska, Aleutian Island, & Bering Sea Transient	143	0	1,003	0
Pacific white-sided dolphin	North Pacific	1,574	0	11,018	0
Family Phocoenidae (porpoises):					
Dall's porpoise	Alaska	9,287	64	65,009	448
Family Physeteridae (sperm whale):					
Sperm whale *	North Pacific	112	0	784	0
Family Ziphiidae (beaked whales):					
Baird's beaked whale	Alaska	106	0	742	0
Cuvier's beaked whale	Alaska	433	0	3,031	0
Stejneger's beaked whale	Alaska	482	0	3,374	0
Order Carnivora Suborder Pinnipedia					
Family Otarridae:					
Northern fur seal	Eastern Pacific	3,003	0	21,021	0
	California	61	0	427	0
Family Phocidae (true seals):					
Northern elephant seal	California	2,547	8	17,829	56

* ESA-listed species and stocks within the GOA Study Area.

[a] The Navy's Acoustic Effects Model estimated zero takes for each of these stocks. However, NMFS conservatively authorized take by Level B harassment of one group of Western North Pacific humpback whale and one group of Eastern North Pacific gray whale. The annual take estimates reflect the average group sizes of on and off-effort survey sightings of humpback whale and gray whale (excluding an outlier of an estimated 25 gray whales in one group) reported in Rone *et al.* (2017).

Mitigation Measures

Under section 101(a)(5)(A) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to the activity, and other means of effecting the least practicable adverse impact on the species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of the species or stocks for subsistence uses (''least practicable adverse impact''). NMFS does not have a regulatory definition for least practicable adverse impact. The 2004 NDAA amended the MMPA as it relates to military readiness activities and the incidental take authorization process such that a determination of ''least practicable adverse impact'' shall include consideration of personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity.

In *Conservation Council for Hawaii* v. *National Marine Fisheries Service,* 97 F. Supp. 3d 1210, 1229 (D. Haw. 2015), the Court stated that NMFS ''appear[s] to think [it] satisf[ies] the statutory 'least practicable adverse impact' requirement with a 'negligible impact' finding.'' Expressing similar concerns in a challenge to a U.S. Navy Surveillance Towed Array Sensor System Low Frequency Active Sonar (SURTASS LFA) incidental take rule (77 FR 50290),

the Ninth Circuit Court of Appeals in *Natural Resources Defense Council (NRDC)* v. *Pritzker,* 828 F.3d 1125, 1134 (9th Cir. 2016), stated, ''[c]ompliance with the 'negligible impact' requirement does not mean there [is] compliance with the 'least practicable adverse impact' standard.'' As the Ninth Circuit noted in its opinion, however, the Court was interpreting the statute without the benefit of NMFS' formal interpretation. We state here explicitly that NMFS is in full agreement that the ''negligible impact'' and ''least practicable adverse impact'' requirements are distinct, even though both statutory standards refer to species and stocks. With that in mind, we provide further explanation of our interpretation of least practicable adverse impact, and explain what distinguishes it from the negligible impact standard. This discussion is consistent with previous rules we have issued, such as the Navy's Hawaii-Southern California Training and Testing (HSTT) rule (85 FR 41780; July 10, 2020), AFTT rule (84 FR 70712; December 23, 2019), MITT rule (85 FR 46302; July 31, 2020), and NWTT rule (85 FR 72312; November 12, 2020).

Before NMFS can issue incidental take regulations under section 101(a)(5)(A) of the MMPA, it must make a finding that the total taking will have a ''negligible impact'' on the affected ''species or stocks'' of marine mammals. NMFS' and U.S. Fish and Wildlife Service's implementing regulations for section 101(a)(5) both define ''negligible impact'' as an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival (50 CFR 216.103 and 50 CFR 18.27(c)). Recruitment (*i.e.,* reproduction) and survival rates are used to determine population growth rates [2] and, therefore are considered in evaluating population level impacts.

As stated in the preamble to the proposed rule for the MMPA incidental take implementing regulations, not every population-level impact violates the negligible impact requirement. The negligible impact standard does not require a finding that the anticipated take will have ''no effect'' on population numbers or growth rates: The statutory standard does not require that the same recovery rate be maintained, rather that no significant effect on annual rates of recruitment or survival occurs. The key factor is the significance of the level of impact on rates of recruitment or survival. (54 FR 40338, 40341–42; September 29, 1989).

While some level of impact on population numbers or growth rates of a species or stock may occur and still satisfy the negligible impact requirement—even without consideration of mitigation—the least practicable adverse impact provision separately requires NMFS to prescribe means of effecting the least practicable adverse impact on the species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, 50 CFR 216.102(b), which are typically identified as mitigation measures.[3]

The negligible impact and least practicable adverse impact standards in the MMPA both call for evaluation at the level of the ''species or stock.'' The MMPA does not define the term ''species.'' However, Merriam-Webster Dictionary defines ''species'' to include ''related organisms or *populations* potentially capable of interbreeding.'' See *www.merriam-webster.com/dictionary/species* (emphasis added). Section 3(11) of the MMPA defines ''stock'' as a group of marine mammals of the same species or smaller taxa in a common spatial arrangement that interbreed when mature. The definition of ''population'' is a group of interbreeding organisms that represents the level of organization at which speciation begins. *www.merriam-webster.com/dictionary/population.* The definition of ''population'' is strikingly similar to the MMPA's definition of ''stock,'' with both involving groups of individuals that belong to the same species and located in a manner that allows for interbreeding. In fact under MMPA section 3(11), the term ''stock'' in the MMPA is interchangeable with the statutory term ''population stock.'' Both the negligible impact standard and the least practicable adverse impact standard call for evaluation at the level of the species or stock, and the terms ''species'' and ''stock'' both relate to populations; therefore, it is appropriate to view both the negligible impact standard and the least practicable adverse impact standard as having a population-level focus.

This interpretation is consistent with Congress' statutory findings for enacting the MMPA, nearly all of which are most applicable at the species or stock (*i.e.,* population) level. See MMPA section 2 (finding that it is species and population stocks that are or may be in danger of extinction or depletion; that it is species and population stocks that should not diminish beyond being significant functioning elements of their ecosystems; and that it is species and population stocks that should not be permitted to diminish below their optimum sustainable population level). Annual rates of recruitment (*i.e.,* reproduction) and survival are the key biological metrics used in the evaluation of population-level impacts, and accordingly these same metrics are also used in the evaluation of population level impacts for the least practicable adverse impact standard.

Recognizing this common focus of the least practicable adverse impact and negligible impact provisions on the ''species or stock'' does not mean we conflate the two standards; despite some common statutory language, we recognize the two provisions are different and have different functions. First, a negligible impact finding is required before NMFS can issue an incidental take authorization. Although it is acceptable to use the mitigation measures to reach a negligible impact finding (see 50 CFR 216.104(c)), no amount of mitigation can enable NMFS to issue an incidental take authorization for an activity that still would not meet the negligible impact standard. Moreover, even where NMFS can reach a negligible impact finding—which we emphasize does allow for the possibility of some ''negligible'' population-level impact—the agency must still prescribe measures that will effect the least practicable amount of adverse impact upon the affected species or stocks.

Section 101(a)(5)(A)(i)(II) requires NMFS to issue, in conjunction with its authorization, binding—and enforceable—restrictions (in the form of regulations) setting forth how the activity must be conducted, thus ensuring the activity has the ''least practicable adverse impact'' on the affected species or stocks. In situations where mitigation is specifically needed to reach a negligible impact determination, section 101(a)(5)(A)(i)(II) also provides a mechanism for ensuring compliance with the ''negligible impact'' requirement. Finally, the least practicable adverse impact standard also requires consideration of measures for marine mammal habitat, with particular attention to rookeries, mating grounds, and other areas of similar significance, and for subsistence impacts, whereas the negligible impact standard is concerned solely with conclusions about the impact of an activity on annual rates of recruitment and

[2] A growth rate can be positive, negative, or flat.

[3] Separately, NMFS also must prescribe means of effecting the least practicable adverse impact on the availability of the species or stocks for subsistence uses, when applicable. See the Subsistence Harvest of Marine Mammals section for separate discussion of the effects of the specified activities on Alaska Native subsistence use.

survival.[4] In *NRDC* v. *Pritzker,* the Court stated, ''[t]he statute is properly read to mean that even if population levels are not threatened *significantly,* still the agency must adopt mitigation measures aimed at protecting *marine mammals* to the greatest extent practicable in light of military readiness needs.'' *Pritzker* at 1134 (emphases added). This statement is consistent with our understanding stated above that even when the effects of an action satisfy the negligible impact standard (*i.e.,* in the Court's words, ''population levels are not threatened significantly''), still the agency must prescribe mitigation under the least practicable adverse impact standard. However, as the statute indicates, the focus of both standards is ultimately the impact on the affected ''species or stock,'' and not solely focused on or directed at the impact on individual marine mammals.

We have carefully reviewed and considered the Ninth Circuit's opinion in *NRDC* v. *Pritzker* in its entirety. While the Court's reference to ''marine mammals'' rather than ''marine mammal species or stocks'' in the italicized language above might be construed as holding that the least practicable adverse impact standard applies at the individual ''marine mammal'' level, *i.e.,* that NMFS must require mitigation to minimize impacts to each individual marine mammal unless impracticable, we believe such an interpretation reflects an incomplete appreciation of the Court's holding. In our view, the opinion as a whole turned on the Court's determination that NMFS had not given separate and independent meaning to the least practicable adverse impact standard apart from the negligible impact standard, and further, that the Court's use of the term ''marine mammals'' was not addressing the question of whether the standard applies to individual animals as opposed to the species or stock as a whole. We recognize that while consideration of mitigation can play a role in a negligible impact determination, consideration of mitigation measures extends beyond that analysis. In evaluating what mitigation measures are appropriate, NMFS considers the potential impacts of the specified activities, the availability of measures to minimize those potential impacts, and the practicability of implementing those measures, as we describe below.

[4] Outside of the military readiness context, mitigation may also be appropriate to ensure compliance with the ''small numbers'' language in MMPA sections 101(a)(5)(A) and (D).

Implementation of Least Practicable Adverse Impact Standard

Given the *NRDC* v. *Pritzker* decision, we discuss here how we determine whether a measure or set of measures meets the ''least practicable adverse impact'' standard. Our separate analysis of whether the take anticipated to result from Navy's activities meets the ''negligible impact'' standard appears in the Analysis and Negligible Impact Determination section below.

Our evaluation of potential mitigation measures includes consideration of two primary factors:

(1) The manner in which, and the degree to which, implementation of the potential measure(s) is expected to reduce adverse impacts to marine mammal species or stocks, their habitat, and their availability for subsistence uses (where relevant). This analysis considers such things as the nature of the potential adverse impact (such as likelihood, scope, and range), the likelihood that the measure will be effective if implemented, and the likelihood of successful implementation; and

(2) The practicability of the measures for applicant implementation. Practicability of implementation may consider such things as cost, impact on the specified activities, and, in the case of a military readiness activity, specifically considers personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity (when evaluating measures to reduce adverse impact on the species or stocks).

Evaluation of Measures for Least Practicable Adverse Impact on Species or Stocks

While the language of the least practicable adverse impact standard calls for minimizing impacts to affected species or stocks, we recognize that the reduction of impacts to those species or stocks accrues through the application of mitigation measures that limit impacts to individual animals. Accordingly, NMFS' analysis focuses on measures that are designed to avoid or minimize impacts on individual marine mammals that are likely to increase the probability or severity of population-level effects.

While direct evidence of impacts to species or stocks from a specified activity is rarely available, and additional study is still needed to understand how specific disturbance events affect the fitness of individuals of certain species, there have been improvements in understanding the process by which disturbance effects are translated to the population. With recent scientific advancements (both marine mammal energetic research and the development of energetic frameworks), the relative likelihood or degree of impacts on species or stocks may often be inferred given a detailed understanding of the activity, the environment, and the affected species or stocks—and the best available science has been used here. This same information is used in the development of mitigation measures and helps us understand how mitigation measures contribute to lessening effects (or the risk thereof) to species or stocks. We also acknowledge that there is always the potential that new information, or a new recommendation could become available in the future and necessitate reevaluation of mitigation measures (which may be addressed through adaptive management) to see if further reductions of population impacts are possible and practicable.

In the evaluation of specific measures, the details of the specified activity will necessarily inform each of the two primary factors discussed above (expected reduction of impacts and practicability), and are carefully considered to determine the types of mitigation that are appropriate under the least practicable adverse impact standard. Analysis of how a potential mitigation measure may reduce adverse impacts on a marine mammal stock or species, consideration of personnel safety, practicality of implementation, and consideration of the impact on effectiveness of military readiness activities are not issues that can be meaningfully evaluated through a yes/no lens. The manner in which, and the degree to which, implementation of a measure is expected to reduce impacts, as well as its practicability in terms of these considerations, can vary widely. For example, a time/area restriction could be of very high value for decreasing population-level impacts (*e.g.,* avoiding disturbance of feeding females in an area of established biological importance) or it could be of lower value (*e.g.,* decreased disturbance in an area of high productivity but of less biological importance). Regarding practicability, a measure might involve restrictions in an area or time that impede the Navy's ability to certify a strike group (higher impact on mission effectiveness and national security), or it could mean delaying a small in-port training event by 30 minutes to avoid exposure of a marine mammal to injurious levels of sound (lower impact). A responsible evaluation of ''least practicable adverse impact'' will

consider the factors along these realistic scales. Accordingly, the greater the likelihood that a measure will contribute to reducing the probability or severity of adverse impacts to the species or stock or its habitat, the greater the weight that measure is given when considered in combination with practicability to determine the appropriateness of the mitigation measure, and vice versa. We discuss consideration of these factors in greater detail below.

1. *Reduction of adverse impacts to marine mammal species or stocks and their habitat.*[5] The emphasis given to a measure's ability to reduce the impacts on a species or stock considers the degree, likelihood, and context of the anticipated reduction of impacts to individuals (and how many individuals) as well as the status of the species or stock.

The ultimate impact on any individual from a disturbance event (which informs the likelihood of adverse species- or stock-level effects) is dependent on the circumstances and associated contextual factors, such as duration of exposure to stressors. Though any proposed mitigation needs to be evaluated in the context of the specific activity and the species or stocks affected, measures with the following types of effects have greater value in reducing the likelihood or severity of adverse species- or stock-level impacts: avoiding or minimizing injury or mortality; limiting interruption of known feeding, breeding, mother/young, or resting behaviors; minimizing the abandonment of important habitat (temporally and spatially); minimizing the number of individuals subjected to these types of disruptions; and limiting degradation of habitat. Mitigating these types of effects is intended to reduce the likelihood that the activity will result in energetic or other types of impacts that are more likely to result in reduced reproductive success or survivorship. It is also important to consider the degree of impacts that are expected in the absence of mitigation in order to assess the added value of any potential measures. Finally, because the least practicable adverse impact standard gives NMFS discretion to weigh a variety of factors when determining appropriate mitigation measures and because the focus of the standard is on reducing impacts at the species or stock level, the least practicable adverse impact standard does not compel mitigation for every kind of take, or every individual taken, if that mitigation is unlikely to meaningfully contribute to the reduction of adverse impacts on the species or stock and its habitat, even when practicable for implementation by the applicant.

The status of the species or stock is also relevant in evaluating the appropriateness of potential mitigation measures in the context of least practicable adverse impact. The following are examples of factors that may (either alone, or in combination) result in greater emphasis on the importance of a mitigation measure in reducing impacts on a species or stock: the stock is known to be decreasing or status is unknown, but believed to be declining; the known annual mortality (from any source) is approaching or exceeding the potential biological removal (PBR) level (as defined in MMPA section 3(20)); the affected species or stock is a small, resident population; or the stock is involved in a UME or has other known vulnerabilities, such as recovering from an oil spill.

Habitat mitigation, particularly as it relates to rookeries, mating grounds, and areas of similar significance, is also relevant to achieving the standard and can include measures such as reducing impacts of the activity on known prey utilized in the activity area or reducing impacts on physical habitat. As with species- or stock-related mitigation, the emphasis given to a measure's ability to reduce impacts on a species or stock's habitat considers the degree, likelihood, and context of the anticipated reduction of impacts to habitat. Because habitat value is informed by marine mammal presence and use, in some cases there may be overlap in measures for the species or stock and for use of habitat.

We consider available information indicating the likelihood of any measure to accomplish its objective. If evidence shows that a measure has not typically been effective or successful, then either that measure should be modified or the potential value of the measure to reduce effects should be lowered.

2. *Practicability.* Factors considered may include cost, impact on activities, and, in the case of a military readiness activity, will include personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity (see MMPA section 101(a)(5)(A)(ii)).

Assessment of Mitigation Measures for the GOA Study Area

Section 216.104(a)(11) of NMFS' implementing regulations requires an applicant for incidental take authorization to include in its request, among other things, ''the availability and feasibility (economic and technological) of equipment, methods, and manner of conducting such activity or other means of effecting the least practicable adverse impact upon the affected species or stocks, their habitat, and [where applicable] on their availability for subsistence uses, paying particular attention to rookeries, mating grounds, and areas of similar significance.'' Thus NMFS' analysis of the sufficiency and appropriateness of an applicant's measures under the least practicable adverse impact standard will always begin with evaluation of the mitigation measures presented in the application.

NMFS has fully reviewed the specified activities together with the mitigation measures included in the Navy's rulemaking/LOA application and the 2022 GOA FSEIS/OEIS to determine if the mitigation measures would result in the least practicable adverse impact on marine mammals and their habitat. NMFS worked with the Navy in the development of the Navy's initially proposed measures, which are informed by years of implementation and monitoring. A complete discussion of the Navy's evaluation process used to develop, assess, and select mitigation measures, which was informed by input from NMFS, can be found in Section 5 (*Mitigation*) of the 2022 GOA FSEIS/OEIS. The process described in Chapter 5 (*Mitigation*) of the 2022 GOA FSEIS/OEIS robustly supported NMFS' independent evaluation of whether the mitigation measures meet the least practicable adverse impact standard.

As a general matter, where an applicant proposes measures that are likely to reduce impacts to marine mammals, the fact that they are included in the application indicates that the measures are practicable, and it is not necessary for NMFS to conduct a detailed analysis of the measures the applicant proposed (rather, they are simply included). However, it is still necessary for NMFS to consider whether there are additional practicable measures that would meaningfully reduce the probability or severity of impacts that could affect reproductive success or survivorship.

Overall, the Navy has agreed to procedural mitigation measures that will reduce the probability and/or severity of impacts expected to result

[5] We recognize the least practicable adverse impact standard requires consideration of measures that will address minimizing impacts on the availability of the species or stocks for subsistence uses where relevant. Because subsistence uses are not implicated for this action, we do not discuss them. However, a similar framework would apply for evaluating such measures, taking into account the MMPA's directive that we also make a finding of no unmitigable adverse impact on the availability of the species or stocks for taking for subsistence, and the relevant implementing regulations.

from acute exposure to acoustic sources and explosives, such as hearing impairment, more severe behavioral disturbance, as well as the probability of vessel strike. Specifically, the Navy will use a combination of delayed starts, powerdowns, and shutdowns to avoid or minimize mortality or serious injury, minimize the likelihood or severity of PTS or other injury, and reduce instances of TTS or more severe behavioral disturbance caused by acoustic sources or explosives. The Navy will also implement multiple time/area restrictions that will reduce take of marine mammals (as well as impacts on marine mammal habitat) in areas where or at times when they are known to engage in important behaviors, such as feeding, where the disruption of those behaviors would have a higher probability of resulting in impacts on reproduction or survival of individuals that could lead to population-level impacts.

The Navy assessed the practicability of these measures in the context of personnel safety, practicality of implementation, and their impacts on the Navy's ability to meet their Title 10 requirements and found that the measures are supportable. NMFS has independently evaluated the measures the Navy proposed in the manner described earlier in this section (*i.e.,* in consideration of their ability to reduce adverse impacts on marine mammal species and their habitat and their practicability for implementation). We have determined that the measures will significantly and adequately reduce impacts on the affected marine mammal species and stocks and their habitat and, further, be practicable for Navy implementation. Therefore, the mitigation measures assure that the Navy's activities will have the least practicable adverse impact on the species or stocks and their habitat.

Measures Evaluated But Not Included

The Navy also evaluated numerous measures in the 2022 GOA FSEIS/OEIS that were not included in the Navy's rulemaking/LOA application, and NMFS independently reviewed and concurs with the Navy's analysis that their inclusion was not appropriate under the least practicable adverse impact standard based on our assessment. The Navy considered these additional potential mitigation measures in two groups. First, Section 5 (*Mitigation*) of the 2022 GOA FSEIS/OEIS, in the *Measures Considered but Eliminated* section, includes an analysis of an array of different types of mitigation that have been recommended over the years by non-governmental organizations or the public, through scoping or public comment on environmental compliance documents. As described in Chapter 5 (*Mitigation*) of the 2022 GOA FSEIS/OEIS, the Navy considered reducing its overall amount of training, reducing explosive use, modifying its sound sources, completely replacing live training with computer simulation, and including time of day restrictions. Many of these mitigation measures could potentially reduce the number of marine mammals taken, via direct reduction of the activities or amount of sound energy put in the water. However, as described in Section 5 (*Mitigation*) of the 2022 GOA FSEIS/OEIS, the Navy needs to train and test in the conditions in which it fights—and these types of modifications fundamentally change the activity in a manner that will not support the purpose and need for the training (*i.e.,* are entirely impracticable) and therefore are not considered further. NMFS finds the Navy's explanation for why adoption of these recommendations would unacceptably undermine the purpose of the training persuasive. After independent review, NMFS finds the Navy's judgment on the impacts of potential mitigation measures to personnel safety, practicality of implementation, and the effectiveness of training to be persuasive, and for these reasons, NMFS finds that these measures do not meet the least practicable adverse impact standard because they are not practicable for implementation in either the TMAA or the GOA Study Area overall.

Second, in Chapter 5 (*Mitigation*) of the 2022 GOA FSEIS/OEIS, the Navy evaluated additional potential procedural mitigation measures, including increased mitigation zones, ramp-up measures, additional passive acoustic and visual monitoring, and decreased vessel speeds. Some of these measures have the potential to incrementally reduce take to some degree in certain circumstances, though the degree to which this would occur is typically low or uncertain. However, as described in the Navy's analysis, the measures would have significant direct negative effects on mission effectiveness and are considered impracticable (see Section 5 *Mitigation* of 2022 GOA FSEIS/OEIS). NMFS independently reviewed the Navy's evaluation and concurs with this assessment, which supports NMFS' findings that the impracticability of this additional mitigation would greatly outweigh any potential minor reduction in marine mammal impacts that might result; therefore, these additional mitigation measures are not warranted.

Last, Chapter 5 (*Mitigation*) of the 2022 GOA FSEIS/OEIS also describes a comprehensive analysis of potential geographic mitigation that includes consideration of both a biological assessment of how the potential time/area limitation would benefit the species and its habitat (*e.g.,* is a key area of biological importance or would result in avoidance or reduction of impacts) in the context of the stressors of concern in the specific area and an operational assessment of the practicability of implementation (*e.g.,* including an assessment of the specific importance of that area for training, considering proximity to training ranges and emergency landing fields and other issues). The Navy found that geographic mitigation beyond what is included in the 2022 GOA FSEIS/OEIS was not warranted because the anticipated reduction of adverse impacts on marine mammal species and their habitat was not sufficient to offset the impracticability of implementation. In some cases potential benefits to marine mammals were non-existent, while in others the consequences on mission effectiveness were too great.

NMFS has reviewed the Navy's analysis in Chapter 5 (*Mitigation)* of the 2022 GOA FSEIS/OEIS, which considers the same factors that NMFS considers to satisfy the least practicable adverse impact standard, and concurs with the analysis and conclusions. Therefore, NMFS is not including any of the measures that the Navy ruled out in the 2022 GOA FSEIS/OEIS.

The following sections describe the mitigation measures that will be implemented in association with the training activities analyzed in this document. These are the mitigation measures that NMFS has determined will ensure the least practicable adverse impact on all affected species and their habitat, including the specific considerations for military readiness activities. The mitigation measures are organized into two categories: procedural mitigation and mitigation areas.

Procedural Mitigation

Procedural mitigation is mitigation that the Navy will implement whenever and wherever an applicable training activity takes place within the GOA Study Area. Procedural mitigation is customized for each applicable activity category or stressor. Procedural mitigation generally involves: (1) the use of one or more trained Lookouts to diligently observe for specific biological resources (including marine mammals)

within a mitigation zone, (2) requirements for Lookouts to immediately communicate sightings of these specific biological resources to the appropriate watch station for information dissemination, and (3) requirements for the watch station to implement mitigation (*e.g.,* halt an activity) until certain recommencement conditions have been met. The first procedural mitigation (Table 33) is designed to aid Lookouts and other applicable Navy personnel in their observation, environmental compliance, and reporting responsibilities. The remainder of the procedural mitigation measures (Table 34 through Table 41) are organized by stressor type and activity category and include acoustic stressors (*i.e.,* active sonar, weapons firing noise), explosive stressors (*i.e.,* large-caliber projectiles, bombs), and physical disturbance and strike stressors (*i.e.,* vessel movement, towed in-water devices, small-, medium-, and large-caliber non-explosive practice munitions, non-explosive bombs).

TABLE 33—PROCEDURAL MITIGATION FOR ENVIRONMENTAL AWARENESS AND EDUCATION

Procedural mitigation description
Stressor or Activity: • All training activities, as applicable. *Mitigation Requirements:* • Appropriate Navy personnel (including civilian personnel) involved in mitigation and training activity reporting under the specified activities will complete one or more modules of the U.S. Navy Afloat Environmental Compliance Training Series, as identified in their career path training plan. Modules include: —*Introduction to the U.S. Navy Afloat Environmental Compliance Training Series.* The introductory module provides information on environmental laws (*e.g.,* Endangered Species Act, Marine Mammal Protection Act) and the corresponding responsibilities that are relevant to Navy training activities. The material explains why environmental compliance is important in supporting the Navy's commitment to environmental stewardship. —*Marine Species Awareness Training.* All bridge watch personnel, Commanding Officers, Executive Officers, maritime patrol aircraft aircrews, anti-submarine warfare aircrews, Lookouts, and equivalent civilian personnel must successfully complete the Marine Species Awareness Training prior to standing watch or serving as a Lookout. The Marine Species Awareness Training provides information on sighting cues, visual observation tools and techniques, and sighting notification procedures. Navy biologists developed Marine Species Awareness Training to improve the effectiveness of visual observations for biological resources, focusing on marine mammals and sea turtles, and including floating vegetation, jellyfish aggregations, and flocks of seabirds. —*U.S. Navy Protective Measures Assessment Protocol.* This module provides the necessary instruction for accessing mitigation requirements during the event planning phase using the Protective Measures Assessment Protocol software tool. —*U.S. Navy Sonar Positional Reporting System and Marine Mammal Incident Reporting.* This module provides instruction on the procedures and activity reporting requirements for the Sonar Positional Reporting System and marine mammal incident reporting.

Procedural Mitigation for Acoustic Stressors

Mitigation measures for acoustic stressors are provided in Table 34 and Table 35.

TABLE 34—PROCEDURAL MITIGATION FOR ACTIVE SONAR

Procedural mitigation description
Stressor or Activity: • *Mid-frequency active sonar and high-frequency active sonar:* —For vessel-based active sonar activities, mitigation applies only to sources that are positively controlled and deployed from manned surface vessels (*e.g.,* sonar sources towed from manned surface platforms). —For aircraft-based active sonar activities, mitigation applies only to sources that are positively controlled and deployed from manned aircraft that do not operate at high altitudes (*e.g.,* rotary-wing aircraft). Mitigation does not apply to active sonar sources deployed from unmanned aircraft or aircraft operating at high altitudes (*e.g.,* maritime patrol aircraft). *Number of Lookouts and Observation Platform:* • *Hull-mounted sources:* —1 Lookout: Platforms with space or manning restrictions while underway (at the forward part of a small boat or ship) and platforms using active sonar while moored or at anchor. —2 Lookouts: Platforms without space or manning restrictions while underway (at the forward part of the ship). • *Sources that are not hull-mounted:* —Lookout on the ship or aircraft conducting the activity. *Mitigation Requirements:* • *Mitigation zones:* —1,000 yd (914.4 m) power down, 500 yd (457.2 m) power down, and 200 yd (182.9 m) shut down for hull-mounted mid-frequency active sonar (see *During the activity* below). —200 yd (182.9 m) shut down for mid-frequency active sonar sources that are not hull-mounted, and high-frequency active sonar (see *During the activity* below). • *Prior to the initial start of the activity* (*e.g., when maneuvering on station*): —Navy personnel will observe the mitigation zone for floating vegetation and marine mammals; if floating vegetation or a marine mammal is observed, Navy personnel will relocate or delay the start of active sonar transmission until the mitigation zone is clear of floating vegetation or the *Commencement/recommencement* conditions in this table are met for marine mammals. • *During the activity:*

TABLE 34—PROCEDURAL MITIGATION FOR ACTIVE SONAR—Continued

Procedural mitigation description
—Hull-mounted mid-frequency active sonar: Navy personnel will observe the mitigation zone for marine mammals; Navy personnel will power down active sonar transmission by 6 dB if a marine mammal is observed within 1,000 yd (914.4 m) of the sonar source; Navy personnel will power down active sonar transmission an additional 4 dB (10 dB total) if a marine mammal is observed within 500 yd (457.2 m) of the sonar source; Navy personnel will cease transmission if a marine mammal is observed within 200 yd (182.9 m) of the sonar source. —Mid-frequency active sonar sources that are not hull-mounted, and high-frequency active sonar: Navy personnel will observe the mitigation zone for marine mammals; Navy personnel will cease transmission if a marine mammal is observed within 200 yd (182.9 m) of the sonar source. • *Commencement/recommencement conditions after a marine mammal sighting before or during the activity:* —Navy personnel will allow a sighted marine mammal to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing or powering up active sonar transmission) until one of the following conditions has been 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, speed, and movement relative to the sonar source; (3) the mitigation zone has been clear from any additional sightings for 10 minutes for aircraft-deployed sonar sources or 30 minutes for vessel-deployed sonar sources; (4) for mobile activities, the active sonar source has transited a distance equal to double that of the mitigation zone size beyond the location of the last sighting; or (5) for activities using hull-mounted sonar, the Lookout concludes that dolphins are deliberately closing in on the ship to ride the ship's bow wave, and are therefore out of the main transmission axis of the sonar (and there are no other marine mammal sightings within the mitigation zone).

TABLE 35—PROCEDURAL MITIGATION FOR WEAPONS FIRING NOISE

Procedural mitigation description
Stressor or Activity: • Weapon firing noise associated with large-caliber gunnery activities. *Number of Lookouts and Observation Platform:* • 1 Lookout positioned on the ship conducting the firing. —Depending on the activity, the Lookout could be the same one described in Procedural Mitigation for Explosive Large-Caliber Projectiles (Table 36) or Procedural Mitigation for Small-, Medium-, and Large-Caliber Non-Explosive Practice Munitions (Table 40). *Mitigation Requirements:* • *Mitigation zone:* —30° on either side of the firing line out to 70 yd (64 m) from the muzzle of the weapon being fired. • *Prior to the initial start of the activity:* —Navy personnel will observe the mitigation zone for floating vegetation and marine mammals; if floating vegetation or a marine mammal is observed, Navy personnel will relocate or delay the start of weapon firing until the mitigation zone is clear of floating vegetation or the *Commencement/recommencement* conditions in this table are met for marine mammals. • *During the activity:* —Navy personnel will observe the mitigation zone for marine mammals; if a marine mammal is observed, Navy personnel will cease weapon firing. • *Commencement/recommencement conditions after a marine mammal sighting before or during the activity:* —Navy personnel will allow a sighted marine mammal to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing weapon firing) until one of the following conditions has been 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, speed, and movement relative to the firing ship; (3) the mitigation zone has been clear from any additional sightings for 30 minutes; or (4) for mobile activities, the firing ship has transited a distance equal to double that of the mitigation zone size beyond the location of the last sighting.

Procedural Mitigation for Explosive Stressors

Mitigation measures for explosive stressors are provided in Table 36 and Table 37.

TABLE 36—PROCEDURAL MITIGATION FOR EXPLOSIVE LARGE-CALIBER PROJECTILES

Procedural mitigation description
Stressor or Activity: • Gunnery activities using explosive large-caliber projectiles. —Mitigation applies to activities using a surface target. *Number of Lookouts and Observation Platform:* • 1 Lookout on the vessel or aircraft conducting the activity. —Depending on the activity, the Lookout could be the same as the one described for Procedural Mitigation for Weapons Firing Noise in Table 35. • If additional platforms are participating in the activity, Navy personnel positioned in those assets (*e.g.,* safety observers, evaluators) will support observing the mitigation zone for marine mammals while performing their regular duties. *Mitigation Requirements:* • *Mitigation zones:*

TABLE 36—PROCEDURAL MITIGATION FOR EXPLOSIVE LARGE-CALIBER PROJECTILES—Continued

Procedural mitigation description
—1,000 yd (914.4 m) around the intended impact location. • *Prior to the initial start of the activity* (*e.g., when maneuvering on station*): —Navy personnel will observe the mitigation zone for floating vegetation and marine mammals; if floating vegetation or a marine mammal is observed, Navy personnel will relocate or delay the start of firing until the mitigation zone is clear of floating vegetation or the *Commencement/recommencement* conditions in this table are met for marine mammals. • *During the activity:* —Navy personnel will observe the mitigation zone for marine mammals; if a marine mammal is observed, Navy personnel will cease firing. • *Commencement/recommencement conditions after a marine mammal sighting before or during the activity:* —Navy personnel will allow a sighted marine mammal to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing firing) until one of the following conditions has been 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, speed, and movement relative to the intended impact location; (3) the mitigation zone has been clear from any additional sightings for 30 minutes; or (4) for activities using mobile targets, the intended impact location has transited a distance equal to double that of the mitigation zone size beyond the location of the last sighting. • *After completion of the activity* (*e.g., prior to maneuvering off station*): —Navy personnel will, when practical (*e.g.,* when platforms are not constrained by fuel restrictions or mission-essential follow-on commitments), observe the vicinity of where detonations occurred; if any injured or dead marine mammals are observed, Navy personnel will follow established incident reporting procedures. —If additional platforms are supporting this activity (*e.g.,* providing range clearance), Navy personnel positioned on these assets will assist in the visual observation of the area where detonations occurred.

TABLE 37—PROCEDURAL MITIGATION FOR EXPLOSIVE BOMBS

Procedural mitigation description
Stressor or Activity: • Explosive bombs. *Number of Lookouts and Observation Platform:* • 1 Lookout positioned in the aircraft conducting the activity. • If additional platforms are participating in the activity, Navy personnel positioned in those assets (*e.g.,* safety observers, evaluators) will support observing the mitigation zone for marine mammals while performing their regular duties. *Mitigation Requirements:* • *Mitigation zone:* —2,500 yd (2,286 m) around the intended target. • *Prior to the initial start of the activity* (*e.g., when arriving on station*): —Navy personnel will observe the mitigation zone for floating vegetation and marine mammals; if floating vegetation or a marine mammal is observed, Navy personnel will relocate or delay the start of bomb deployment until the mitigation zone is clear of floating vegetation or the *Commencement/recommencement* conditions in this table are met for marine mammals. • *During the activity* (*e.g., during target approach*): —Navy personnel will observe the mitigation zone for marine mammals; if a marine mammal is observed, Navy personnel will cease bomb deployment. • *Commencement/recommencement conditions after a marine mammal sighting before or during the activity:* —Navy personnel will allow a sighted marine mammal to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing bomb deployment) until one of the following conditions has been 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, speed, and movement relative to the intended target; (3) the mitigation zone has been clear from any additional sightings for 10 minutes; or (4) for activities using mobile targets, the intended target has transited a distance equal to double that of the mitigation zone size beyond the location of the last sighting. • *After completion of the activity* (*e.g., prior to maneuvering off station*): —Navy personnel will, when practical (*e.g.,* when platforms are not constrained by fuel restrictions or mission-essential follow-on commitments), observe for marine mammals in the vicinity of where detonations occurred; if any injured or dead marine mammals are observed, Navy personnel will follow established incident reporting procedures. —If additional platforms are supporting this activity (*e.g.,* providing range clearance), Navy personnel positioned on these assets will assist in the visual observation of the area where detonations occurred.

Procedural Mitigation for Physical Disturbance and Strike Stressors

Mitigation measures for physical disturbance and strike stressors are provided in Table 38 through Table 41.

TABLE 38—PROCEDURAL MITIGATION FOR VESSEL MOVEMENT

Procedural mitigation description
Stressor or Activity: • *Vessel movement:*

TABLE 38—PROCEDURAL MITIGATION FOR VESSEL MOVEMENT—Continued

Procedural mitigation description
—The mitigation will not be applied if (1) the vessel's safety is threatened, (2) the vessel is restricted in its ability to maneuver (*e.g.,* during launching and recovery of aircraft or landing craft, during towing activities, when mooring), (3) the vessel is submerged or operated autonomously, or (4) when impractical based on mission requirements (*e.g.,* during Vessel Visit, Board, Search, and Seizure activities as military personnel from ships or aircraft board suspect vessels).
Number of Lookouts and Observation Platform:
• 1 or more Lookouts on the underway vessel [1]
• If additional watch personnel are positioned on underway vessels, those personnel (*e.g.,* persons assisting with navigation or safety) will support observing for marine mammals while performing their regular duties.
Mitigation Requirements:
• *Mitigation zones:*
—500 yd (457.2 m) around the vessel for whales.
—200 yd (182.9 m) around the vessel for marine mammals other than whales (except those intentionally swimming alongside or closing in to swim alongside vessels, such as bow-riding or wake-riding dolphins).
• *When Underway:*
—Navy personnel will observe the direct path of the vessel and waters surrounding the vessel for marine mammals.
—If a marine mammal is observed in the direct path of the vessel, Navy personnel will maneuver the vessel as necessary to maintain the appropriate mitigation zone distance.
—If a marine mammal is observed within waters surrounding the vessel, Navy personnel will maintain situational awareness of that animal's position. Based on the animal's course and speed relative to the vessel's path, Navy personnel will maneuver the vessel as necessary to ensure that the appropriate mitigation zone distance from the animal continues to be maintained.
• *Additional requirements:*
—If a marine mammal vessel strike occurs, Navy personnel will follow established incident reporting procedures.

[1] Underway vessels will maintain at least one Lookout. Navy policy currently requires some ship classes to maintain more than one Lookout. The requirement to maintain additional Lookouts is subject to change over time in accordance with Navy navigation instruction.

TABLE 39—PROCEDURAL MITIGATION FOR TOWED IN-WATER DEVICES

Procedural mitigation description
Stressor or Activity:
• *Towed in-water devices:*
—Mitigation applies to devices that are towed from a manned surface platform or manned aircraft, or when a manned support craft is already participating in an activity involving in-water devices being towed by unmanned platforms.
—The mitigation will not be applied if the safety of the towing platform or in-water device is threatened.
Number of Lookouts and Observation Platform:
• 1 Lookout positioned on the towing platform or support craft.
Mitigation Requirements:
• *Mitigation zones:*
—250 yd (228.6 m) around the towed in-water device for marine mammals (except those intentionally swimming alongside or choosing to swim alongside towing vessels, such as bow-riding or wake-riding dolphins).
• *During the activity* (*i.e., when towing an in-water device*):
—Navy personnel will observe the mitigation zone for marine mammals; if a marine mammal is observed, Navy personnel will maneuver to maintain distance.

TABLE 40—PROCEDURAL MITIGATION FOR SMALL-, MEDIUM-, AND LARGE-CALIBER NON-EXPLOSIVE PRACTICE MUNITIONS

Procedural mitigation description
Stressor or Activity:
• *Gunnery activities using small-, medium-, and large-caliber non-explosive practice munitions:*
—Mitigation applies to activities using a surface target.
Number of Lookouts and Observation Platform:
• 1 Lookout positioned on the platform conducting the activity.
—Depending on the activity, the Lookout could be the same as the one described in Procedural Mitigation for Weapons Firing Noise (Table 35).
Mitigation Requirements:
• *Mitigation zone:*
—200 yd (182.9 m) around the intended impact location.
• *Prior to the initial start of the activity* (*e.g., when maneuvering on station*):
—Navy personnel will observe the mitigation zone for floating vegetation and marine mammals; if floating vegetation or a marine mammal is observed, Navy personnel will relocate or delay the start of firing until the mitigation zone is clear of floating vegetation or the *Commencement/recommencement* conditions in this table are met for marine mammals.
• *During the activity:*
—Navy personnel will observe the mitigation zone for marine mammals; if a marine mammal is observed, Navy personnel will cease firing.
• *Commencement/recommencement conditions after a marine mammal, sighting before or during the activity:*

TABLE 40—PROCEDURAL MITIGATION FOR SMALL-, MEDIUM-, AND LARGE-CALIBER NON-EXPLOSIVE PRACTICE MUNITIONS—Continued

Procedural mitigation description
—Navy personnel will allow a sighted marine mammal to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing firing) until one of the following conditions has been 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, speed, and movement relative to the intended impact location; (3) the mitigation zone has been clear from any additional sightings for 10 minutes for aircraft-based firing or 30 minutes for vessel-based firing; or (4) for activities using a mobile target, the intended impact location has transited a distance equal to double that of the mitigation zone size beyond the location of the last sighting.

TABLE 41—PROCEDURAL MITIGATION FOR NON-EXPLOSIVE BOMBS

Procedural mitigation description
Stressor or Activity: • Non-explosive bombs. *Number of Lookouts and Observation Platform:* • 1 Lookout positioned in an aircraft. *Mitigation Requirements* • *Mitigation zone:* —1,000 yd (914.4 m) around the intended target. • *Prior to the initial start of the activity* (*e.g., when arriving on station*): —Navy personnel will observe the mitigation zone for floating vegetation and marine mammals; if floating vegetation or a marine mammal is observed, Navy personnel will relocate or delay the start of bomb deployment until the mitigation zone is clear of floating vegetation or the *Commencement/recommencement* conditions in this table are met for marine mammals. • *During the activity* (*e.g., during approach of the target*): —Navy personnel will observe the mitigation zone for marine mammals; if a marine mammal is observed, Navy personnel will cease bomb deployment. • *Commencement/recommencement conditions after a marine mammal sighting prior to or during the activity:* —Navy personnel will allow a sighted marine mammal to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing bomb deployment) until one of the following conditions has been 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, speed, and movement relative to the intended target; (3) the mitigation zone has been clear from any additional sightings for 10 minutes; or (4) for activities using mobile targets, the intended target has transited a distance equal to double that of the mitigation zone size beyond the location of the last sighting.

Mitigation Areas

In addition to procedural mitigation, the Navy will implement mitigation measures within mitigation areas to avoid or minimize potential impacts on marine mammals. NMFS and the Navy took into account public comments received on the 2020 GOA DSEIS/OEIS, 2022 Supplement to the 2020 GOA DSEIS/OEIS, and the 2022 GOA proposed rule, best available science, and the practicability of implementing additional mitigation measures and has enhanced the mitigation measures beyond the 2017–2022 regulations, to further reduce impacts to marine mammals. Of note specifically, as noted in the preamble to the 2017–2022 regulations (82 FR 19530; April 27, 2017), the Navy committed during that rulemaking to mitigation that precluded the use of explosives in the Portlock Bank area. In this rule, this mitigation has been expanded into the Continental Shelf and Slope Mitigation Area, as described in further detail below.

Descriptions of the mitigation measures that the Navy will implement within mitigation areas is provided in Table 42 (see below).

NMFS conducted an independent analysis of the mitigation areas that the Navy will implement and that are included in this rule. NMFS' analysis indicates that the measures in these mitigation areas will reduce the likelihood or severity of adverse impacts to marine mammal species or their habitat in the manner described in this rule and are practicable for the Navy.

Specifically, below we describe how certain activities are limited in feeding areas, migratory corridors, or other important habitat. To avoid repetition in those sections, we describe here how these measures reduce the likelihood or severity of effects on marine mammals and their habitat. As described previously, exposure to active sonar and explosive detonations (in-air, occurring at or above the water surface) has the potential to both disrupt behavioral patterns and reduce hearing sensitivity (temporarily or permanently, depending on the intensity and duration of the exposure). Disruption of feeding behaviors can have negative energetic consequences as a result of either obtaining less food in a given time or expending more energy (in the effort to avoid the stressor) to find the necessary food elsewhere, and extensive disruptions of this sort (especially over multiple sequential days) could accumulate in a manner that could negatively impact reproductive success or survival (though no impacts to reproductive success or survival are anticipated to occur as a result of the specified activity). By limiting impacts in known feeding areas, the overall severity of any take in those areas is reduced and the likelihood of impacts on reproduction or survival is further lessened. Similarly, reducing impacts on prey species, either by avoiding causing mortality or changing their expected distribution, can also lessen these sorts of detrimental energetic consequences. In migratory corridors, training activities can result in additional energetic expenditures to avoid the loud sources—lessening training in these areas also reduces the likelihood of detrimental energetic effects. In all of the mitigation areas, inasmuch as the density of certain species may be higher at certain times, a selective reduction of training activities in those higher-density areas

and times is expected to lessen the magnitude of take overall, as well as the specific likelihood of hearing impairment.

Regarding operational practicability, NMFS is heavily reliant on the Navy's description and conclusions, since the Navy is best equipped to describe the degree to which a given mitigation measure affects personnel safety or mission effectiveness and is practical to implement. The Navy considers the measures in this rule to be practicable, and NMFS concurs.

TABLE 42—GEOGRAPHIC MITIGATION AREAS FOR MARINE MAMMALS IN THE GOA STUDY AREA

Mitigation area description
Stressor or Activity: • Sonar. • Explosives. • Physical disturbance and strikes. *Mitigation Requirements* [1]: • *North Pacific Right Whale Mitigation Area.* —From June 1–September 30 within the North Pacific Right Whale Mitigation Area, Navy personnel will not use surface ship hull-mounted MF1 mid-frequency active sonar during training. • *Continental Shelf and Slope Mitigation Area.* —During training, Navy personnel will not detonate explosives below 10,000 ft. altitude (including at the water surface) in the Continental Shelf and Slope Mitigation Area, which extends over the continental shelf and slope out to the 4,000 m depth contour within the TMAA. • *Pre-event Awareness Notifications in the Temporary Maritime Activities Area.* —The Navy will issue pre-event awareness messages to alert vessels and aircraft participating in training activities within the TMAA to the possible presence of concentrations of large whales on the continental shelf and slope. Occurrences of large whales may be higher over the continental shelf and slope relative to other areas of the TMAA. Large whale species in the TMAA include, but are not limited to, fin whale, blue whale, humpback whale, gray whale, North Pacific right whale, sei whale, and sperm whale. To maintain safety of navigation and to avoid interactions with marine mammals, the Navy will instruct personnel to remain vigilant to the presence of large whales that may be vulnerable to vessel strikes or potential impacts from training activities. Additionally, Navy personnel will use the information from the awareness notification messages to assist their visual observation of applicable mitigation zones during training activities and to aid in the implementation of procedural mitigation.

[1] Should national security present a requirement to conduct training prohibited by the mitigation requirements specified in this table, naval units will obtain permission from the designated Command, U.S. Third Fleet Command Authority, prior to commencement of the activity. The Navy will provide NMFS with advance notification and include relevant information about the event (*e.g.,* sonar hours, use of explosives detonated below 10,000 ft altitude (including at the water surface) in its annual activity reports to NMFS).

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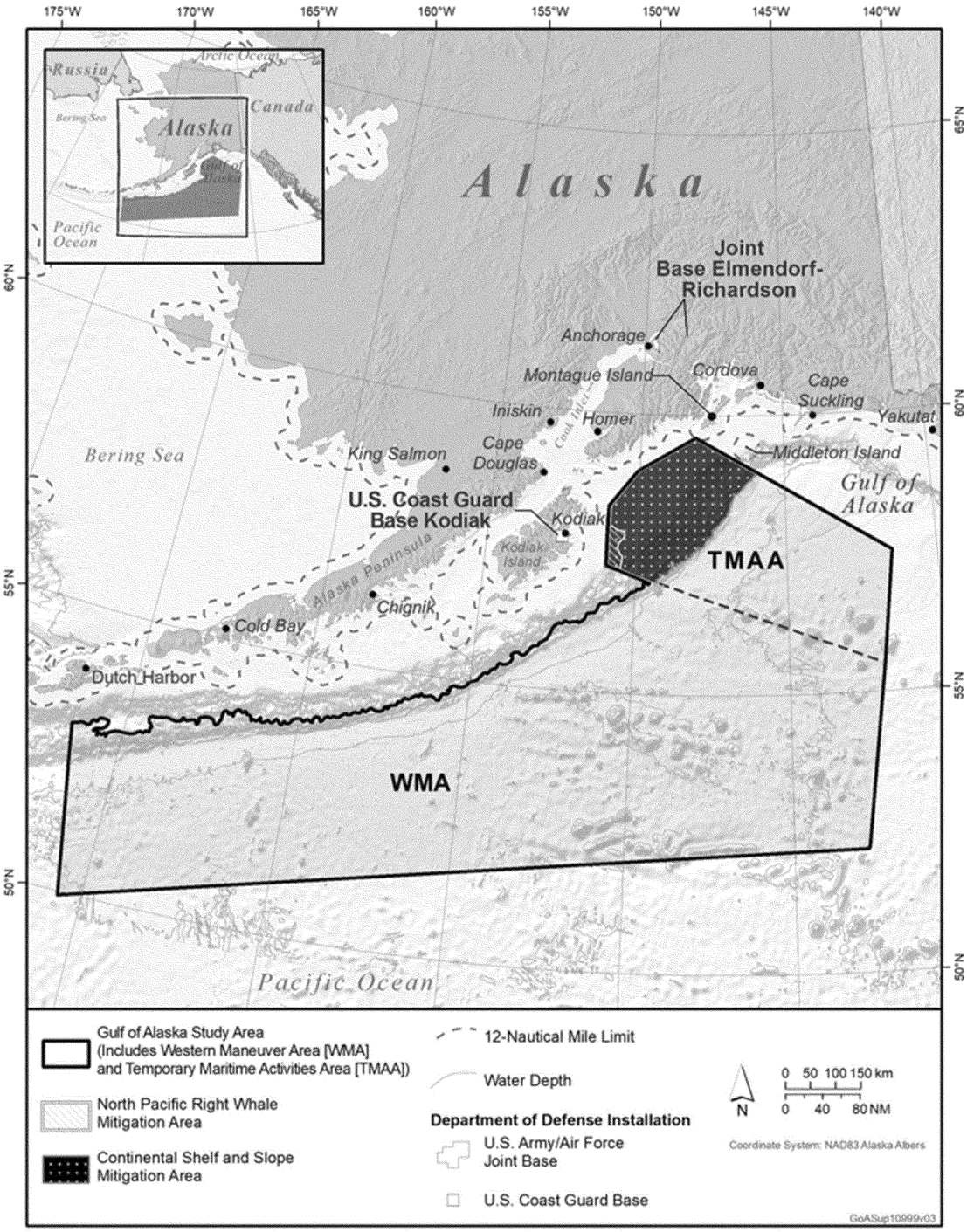

Figure 1 -- Geographic Mitigation Areas for Marine Mammals in the GOA Study Area

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North Pacific Right Whale Mitigation Area

Mitigation within the North Pacific Right Whale Mitigation Area is primarily designed to avoid or further reduce potential impacts to North Pacific right whales within important feeding habitat. The mitigation area fully encompasses the portion of the BIA identified by Ferguson *et al.* (2015) for North Pacific right whale feeding that overlaps the GOA Study Area (overlap between the GOA Study Area and the BIA occurs in the TMAA only) (see Figure 2 of the proposed rule; 87 FR 49656; August 11, 2022). North Pacific right whales are thought to occur in the highest densities in the BIA from June to September. The Navy will not use surface ship hull-mounted MF1 mid-frequency active sonar in the mitigation area from June 1 to September 30, as was also required in the Phase II (2017–2022) rule. The North Pacific Right Whale Mitigation Area is fully within

the boundary of the Continental Shelf and Slope Mitigation Area, discussed below. Therefore, the mitigation requirements in that area also apply to the North Pacific Right Whale Mitigation Area. While the potential occurrence of North Pacific right whales in the GOA Study Area is expected to be rare due to the species' extremely low population, these mitigation requirements would help further avoid or further reduce the potential for impacts to occur within North Pacific right whale feeding habitat, thus likely reducing the number of takes of North Pacific right whales, as well as the severity of any disturbances by reducing the likelihood that feeding is interrupted, delayed, or precluded for some limited amount of time.

Additionally, the North Pacific Right Whale Mitigation Area overlaps with a small portion of the humpback whale critical habitat Unit 5, in the southwest corner of the TMAA. While the overlap of the two areas is limited, mitigation in the North Pacific Right Whale Mitigation Area may reduce the number and/or severity of takes of humpback whales in this important area.

The mitigation in this area will also help avoid or reduce potential impacts on fish and invertebrates that inhabit the mitigation area and which marine mammals prey upon. As described in Section 5.4.1.5 (Fisheries Habitats) of the 2022 GOA FSEIS/OEIS, the productive waters off Kodiak Island support a strong trophic system from plankton, invertebrates, small fish, and higher-level predators, including large fish and marine mammals.

Continental Shelf and Slope Mitigation Area

The Continental Shelf and Slope Mitigation Area encompasses the portion of the continental shelf and slope that overlaps the TMAA (the entire continental shelf and slope out to the 4,000 m depth contour; see Figure 2 of the proposed rule; 87 FR 49656; August 11, 2022). Navy personnel will not detonate explosives below 10,000 ft. altitude (including at the water surface) in the Continental Shelf and Slope Mitigation Area during training. (As stated previously, the Navy does not plan to use in-water explosives anywhere in the GOA Study Area.) Mitigation in the Continental Shelf and Slope Mitigation Area was initially designed to avoid or reduce potential impacts on fishery resources for Alaska Natives. However, the area includes highly productive waters where marine mammals, including humpback whales (Lagerquist *et al.,* 2008) and North Pacific right whales, feed, and overlaps with a small portion of the North Pacific right whale feeding BIA off of Kodiak Island. Additionally, the Continental Shelf and Slope Mitigation Area overlaps with a very small portion of the humpback whale critical habitat Unit 5, on the western side of the TMAA, and a small portion of humpback whale critical habitat Unit 8 on the north side of the TMAA. The Continental Shelf and Slope mitigation area also overlaps with a very small portion of the gray whale migration BIA. The remainder of the designated critical habitat and BIAs are located beyond the boundaries of the GOA Study Area. While the overlap of the mitigation area with critical habitat and feeding and migratory BIAs is limited, mitigation in the Continental Shelf and Slope Mitigation Area may reduce the probability, number, and/or severity of takes of humpback whales, North Pacific right whales, and gray whales in this important area (noting that the Navy's Acoustic Effects Model estimated zero takes for gray whales, though NMFS has conservatively authorized four takes by Level B harassment). Additionally, mitigation in this area will likely reduce the number and severity of potential impacts to marine mammals in general, by reducing the likelihood that feeding is interrupted, delayed, or precluded for some limited amount of time.

Pre-Event Awareness Notifications in the Temporary Maritime Activities Area

The Navy will issue awareness messages prior to the start of TMAA training activities to alert vessels and aircraft operating within the TMAA to the possible presence of concentrations of large whales, including but not limited to, fin whale, blue whale, humpback whale, gray whales, North Pacific right whale, sei whale, minke whale, and sperm whale, especially when traversing on the continental shelf and slope where densities of these species may be higher. To maintain safety of navigation and to avoid interactions with marine mammals, the Navy will instruct vessels to remain vigilant to the presence of large whales that may be vulnerable to vessel strikes or potential impacts from training activities. Navy personnel will use the information from the awareness notification messages to assist their visual observation of applicable mitigation zones during training activities and to aid in the implementation of procedural mitigation.

This mitigation will help avoid any potential impacts from vessel strikes and training activities on large whales within the TMAA.

Availability for Subsistence Uses

The nature of subsistence activities by Alaska Natives in the GOA Study Area are discussed below, in the Subsistence Harvest of Marine Mammals section of this rule.

Mitigation Conclusions

NMFS has carefully evaluated the mitigation measures—many of which were developed with NMFS' input during the previous phases of Navy training authorizations but several of which are new since implementation of the 2017 to 2022 regulations. NMFS has also considered a broad range of other measures (*e.g.,* the measures considered but eliminated in the 2022 GOA FSEIS/OEIS, which reflect other comments that have arisen via NMFS or public input in past years) in the context of ensuring that NMFS prescribes the means of effecting the least practicable adverse impact on the affected marine mammal species or stocks and their habitat. Our evaluation of potential measures included consideration of the following factors in relation to one another: the manner in which, and the degree to which, the successful implementation of the mitigation measures is expected to reduce the likelihood and/or magnitude of adverse impacts to marine mammal species or stocks and their habitat; the proven or likely efficacy of the measures; and the practicability of the measures for applicant implementation, including consideration of personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity.

Based on our evaluation of the Navy's proposed measures, as well as other measures considered by the Navy and NMFS, NMFS has determined that the mitigation measures included in this final rule are the appropriate means of effecting the least practicable adverse impact on marine mammal species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and considering specifically personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity. Additionally, an adaptive management provision ensures that mitigation is regularly assessed and provides a mechanism to improve the mitigation, based on the factors above, through modification as appropriate. Thus, NMFS concludes that the mitigation measures outlined in this final rule satisfy the statutory standard and that any adverse impacts that remain cannot be practicably further mitigated.

Monitoring

Section 101(a)(5)(A) of the MMPA states that in order to authorize incidental take for an activity, NMFS must set forth requirements pertaining to the monitoring and reporting of such taking. The MMPA implementing regulations at 50 CFR 216.104(a)(13) indicate that requests for incidental take authorizations must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present.

Although the Navy has been conducting research and monitoring for over 20 years in areas where it has been training, it developed a formal marine species monitoring program in support of the GOA Study Area MMPA and ESA processes in 2009. Across all Navy training and testing study areas, the robust marine species monitoring program has resulted in hundreds of technical reports and publications on marine mammals that have informed Navy and NMFS analyses in environmental planning documents, MMPA rules, and ESA Biological Opinions. The reports are made available to the public on the Navy's marine species monitoring website (*www.navymarinespeciesmonitoring.us*) and the data on the Ocean Biogeographic Information System Spatial Ecological Analysis of Megavertebrate Populations (OBIS–SEAMAP) site (*https://seamap.env.duke.edu/*).

The Navy will continue collecting and reporting monitoring data to inform our understanding of the occurrence of marine mammals in the GOA Study Area; the likely exposure of marine mammals to stressors of concern in the GOA Study Area; the response of marine mammals to exposures to stressors; the consequences of a particular marine mammal response to their individual fitness and, ultimately, populations; and the effectiveness of implemented mitigation measures. Taken together, mitigation and monitoring comprise the Navy's integrated approach for reducing environmental impacts from the specified activities. The Navy's overall monitoring approach seeks to leverage and build on existing research efforts whenever possible.

As agreed upon between the Navy and NMFS, the monitoring measures presented here, as well as the mitigation measures described above, focus on the protection and management of potentially affected marine mammals. A well-designed monitoring program can provide important feedback for validating assumptions made in analyses and allow for adaptive management of marine resources.

Integrated Comprehensive Monitoring Program (ICMP)

The Navy's ICMP is intended to coordinate marine species monitoring efforts across all regions and to allocate the most appropriate level and type of effort for each range complex based on a set of standardized objectives, and in acknowledgement of regional expertise and resource availability. The ICMP is designed to be flexible, scalable, and adaptable through the adaptive management and strategic planning processes to periodically assess progress and reevaluate objectives. This process includes conducting an annual adaptive management review meeting, at which the Navy and NMFS jointly consider the prior-year goals, monitoring results, and related scientific advances to determine if monitoring plan modifications are warranted to more effectively address program goals. Although the ICMP does not specify actual monitoring field work or individual projects, it does establish a matrix of goals and objectives that have been developed in coordination with NMFS. As the ICMP is implemented through the Strategic Planning Process (see the section below), detailed and specific studies that support the Navy's and NMFS' top-level monitoring goals will continue to be developed. In essence, the ICMP directs that monitoring activities relating to the effects of Navy training and testing activities on marine species should be designed to contribute towards one or more of the following top-level goals:

- An increase in the understanding of the likely occurrence of marine mammals and/or ESA-listed marine species in the vicinity of the action (*i.e.,* presence, abundance, distribution, and density of species);
- An increase in the understanding of the nature, scope, or context of the likely exposure of marine mammals and/or ESA-listed species to any of the potential stressors associated with the action (*e.g.,* sound, explosive detonation, or military expended materials), 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/or ESA-listed marine species with the action (in whole or part), and (4) the likely biological or behavioral context of exposure to the stressor for the marine mammal and/or ESA-listed marine species (*e.g.,* age class of exposed animals or known pupping, calving, or feeding areas);
- An increase in the 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 the 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 impacts on annual rates of recruitment or survival);
- An increase in the understanding of the effectiveness of mitigation and monitoring measures;
- A better understanding and record of the manner in which the Navy complies with the incidental take regulations and LOAs and the ESA Incidental Take Statement;
- An increase in the probability of detecting marine mammals (through improved technology or methods), both specifically within the mitigation zones (thus allowing for more effective implementation of the mitigation) and in general, to better achieve the above goals; and
- Ensuring that adverse impact of activities remains at the least practicable level.

Strategic Planning Process for Marine Species Monitoring

The Navy also developed the Strategic Planning Process for Marine Species Monitoring, which establishes the guidelines and processes necessary to develop, evaluate, and fund individual projects based on objective scientific study questions. The process uses an underlying framework designed around intermediate scientific objectives and a conceptual framework incorporating a progression of knowledge spanning occurrence, exposure, response, and consequence. The Strategic Planning Process for Marine Species Monitoring is used to set overarching intermediate scientific objectives; develop individual monitoring project concepts; identify potential species of interest at a regional scale; evaluate, prioritize, and select specific monitoring projects to fund or continue supporting for a given fiscal year; execute and manage selected

monitoring projects; and report and evaluate progress and results. This process addresses relative investments to different range complexes based on goals across all range complexes, and monitoring leverages multiple techniques for data acquisition and analysis whenever possible. The Strategic Planning Process for Marine Species Monitoring is also available online (*https://www.navymarinespecies monitoring.us/).*

Past and Current Monitoring in the GOA Study Area

The monitoring program has undergone significant changes since the first rule was issued for the TMAA in 2011, which highlights the monitoring program's evolution through the process of adaptive management. The monitoring program developed for the first cycle of environmental compliance documents (*e.g.,* U.S. Department of the Navy, 2008a, 2008b) utilized effort-based compliance metrics that were somewhat limiting. Through adaptive management discussions, the Navy designed and conducted monitoring studies according to scientific objectives, thereby eliminating the previous level-of-effort metrics. Furthermore, refinements of scientific objectives have continued through the latest authorization cycle.

Progress has also been made on the conceptual framework categories from the Scientific Advisory Group for Navy Marine Species Monitoring (U.S. Department of the Navy, 2011), ranging from occurrence of animals, to their exposure, response, and population consequences. The Navy continues to manage the Atlantic and Pacific program as a whole, including what is now the GOA Study Area, with monitoring in each range complex taking a slightly different but complementary approach. The Navy has continued to use the approach of layering multiple simultaneous components in many of the range complexes to leverage an increase in return of the progress toward answering scientific monitoring questions. In the GOA, the Navy conducts three types of monitoring: (1) Passive acoustic monitoring (including technologies such as stationary moored high-frequency acoustic recording packages or non-stationary (*i.e.,* mobile) gliders (*e.g.,* Klinck *et al.,* 2016, Rice *et al.,* 2020), (2) visual surveys (*e.g.,* Crance *et al.,* 2022, and Rone *et al.,* 2017), and (3) satellite tagging of marine mammals and fish (*e.g.,* Palacios *et al.,* 2021, and Seitz and Courtney, 2022).

Numerous publications, dissertations, and conference presentations have resulted from research conducted under the marine species monitoring program, including research conducted in what is now the GOA Study Area (*https://www.navymarinespeciesmonitoring.us/reading-room/publications/*), resulting in a significant contribution to the body of marine mammal science. Publications on occurrence, distribution, and density have fed the modeling input, and publications on exposure and response have informed Navy and NMFS analyses of behavioral response and consideration of mitigation measures.

Furthermore, collaboration between the monitoring program and the Navy's research and development (*e.g.,* the Office of Naval Research) and demonstration-validation (*e.g.,* Living Marine Resources) programs has been strengthened, leading to research tools and products that have already transitioned to the monitoring program. These include Marine Mammal Monitoring on Ranges (M3R), controlled exposure experiment behavioral response studies (CEE BRS), acoustic sea glider surveys, and global positioning system-enabled satellite tags. Recent progress has been made with better integration with monitoring across all Navy at-sea study areas, including study areas in the Pacific and the Atlantic Oceans, and various other testing ranges. Publications from the Living Marine Resources and Office of Naval Research programs have also resulted in significant contributions to information on hearing ranges and acoustic criteria used in effects modeling, exposure, and response, as well as in developing tools to assess biological significance (*e.g.,* population-level consequences).

NMFS and the Navy also consider data collected during procedural mitigations as monitoring. Data are collected by shipboard personnel on hours spent training, hours of observation, hours of sonar, and marine mammals observed within the mitigation zones when mitigations are implemented. These data are provided to NMFS in both classified and unclassified annual exercise reports, which will continue under this rule.

NMFS has received multiple years' worth of annual exercise and monitoring reports addressing active sonar use and explosive detonations within the TMAA and other Navy range complexes. The data and information contained in these reports have been considered in developing mitigation and monitoring measures for the training activities within the GOA Study Area. The Navy's annual training and monitoring reports may be viewed at *https://www.navymarinespecies monitoring.us/reporting/.*

The Navy's marine species monitoring program typically supports monitoring projects in the GOA Study Area. Additional details on the scientific objectives for each project can be found at *https://www.navymarinespecies monitoring.us/regions/pacific/current-projects/.* Projects can be either major multi-year efforts, or one to 2-year special studies. The emphasis on monitoring in the GOA Study Area is directed towards passive acoustic monitoring and analysis, visual surveys, and marine mammal and salmonid telemetry. At least 15 GOA regional studies occurred under the marine species monitoring program during the previous GOA TMAA rule (effective April 2017 to April 2022), including 13 studies on marine mammals and two on salmonids.

Specific monitoring under the previous regulations included the following projects:

- The continuation of the Navy's collaboration with NOAA on the *Pacific Marine Assessment Program for Protected Species (PacMAPPS)* survey. A systematic line transect survey in the Gulf of Alaska was completed in 2021 (Crance *et al.,* 2022). A second PacMAPPS survey is planned for the Gulf of Alaska in 2023, pending ship availability. These surveys will increase knowledge of marine mammal occurrence, density, and population identity in the GOA Study Area (Crance *et al.,* 2022).
- A *Characterizing the Distribution of ESA-Listed Salmonids in Washington and Alaska* study. The goal of this study is to use a combination of acoustic and pop-up satellite tagging technology to provide critical information on spatial and temporal distribution of salmonids to inform salmon management, U.S. Navy training activities, and Southern Resident killer whale conservation. The study seeks to (1) determine the occurrence and timing of salmonids within the Navy training ranges; (2) describe the influence of environmental covariates on salmonid occurrence; and (3) describe the occurrence of salmonids in relation to Southern Resident killer whale distribution. Methods include acoustic telemetry (pinger tags) and pop-up satellite tagging. Reports include Smith and Huff (2019, 2020, 2021, 2022).
- A *Telemetry and Genetic Identity of Chinook Salmon in Alaska* study. The goal of this study is to provide critical information on the spatial and temporal distribution of Chinook salmon and to utilize genetic analysis techniques to inform salmon management. Tagging is

occurring at several sites within the Gulf of Alaska. Reports include Seitz and Courtney (2021 and 2022).

• A *North Pacific Humpback Whale Tagging* study. This project combines tagging, biopsy sampling, and photo-identification efforts along the United States west coast and Hawaii to examine movement patterns and whale use of Navy training and testing areas and NMFS-identified BIAs, examine migration routes, and analyze dive behavior and ecological relationships between whale locations and oceanographic conditions (Irvine *et al.,* 2020; Mate *et al.,* 2017a, 2017b, 2017c, 2018a, 2018b, 2019a, 2019b, 2019c, 2020; Palacios *et al.,* 2020a, 2020b, 2020c, 2021).

• A *Passive Acoustic Monitoring of Marine Mammals in the Gulf of Alaska* study. The objective of this study was to determine the spatial distribution and occurrence of beaked whales, other odontocetes, and baleen whales in offshore areas using bottom-mounted passive acoustic recorders and deep-diving autonomous gliders (Rice *et al.,* 2018, 2019, 2020, 2021; Wiggins *et al.,* 2017 and 2018).

Future monitoring efforts in the GOA Study Area are anticipated to continue along the same objectives: determining the species and populations of marine mammals present and potentially exposed to Navy training activities in the GOA Study Area, through tagging, passive acoustic monitoring, refined modeling, photo identification, biopsies, and visual monitoring, as well as characterizing spatial and temporal distribution of salmonids, including Chinook salmon.

Projects that are currently under consideration for the 2022–2029 rule are listed below. Monitoring projects are typically planned one year in advance; therefore, this list does not include all projects that will occur over the entire period of the rule.

• *PacMAPPS Survey*—A second PacMAPPS survey is planned for the GOA in 2023, pending ship availability. These surveys will increase knowledge of marine mammal occurrence, density, and population identity in the GOA Study Area. The survey design would cover a portion of the WMA and the continental shelf where NMFS is currently considering revising the North Pacific Right Whale critical habitat.

• *Analysis of Killer Whale Ecotypes in the Gulf of Alaska*—This study would use previously recorded passive acoustic monitoring data to analyze killer whale ecotypes in the Gulf of Alaska.

• *Passive Acoustic Monitoring in the WMA*—The objective of this study would be to determine the spatial distribution and occurrence of beaked whales, other odontocetes, and baleen whales in offshore areas using bottom-mounted passive acoustic recorders and deep-diving autonomous gliders.

• *Telemetry of Chinook Salmon in Alaska*—Efforts will continue to track active tags that were previously deployed on salmon.

Adaptive Management

The regulations governing the take of marine mammals incidental to Navy training activities in the GOA Study Area contain an adaptive management component. Our understanding of the effects of Navy training and testing activities (*e.g.,* acoustic and explosive stressors) on marine mammals continues to evolve, which makes the inclusion of an adaptive management component both valuable and necessary within the context of 7-year regulations.

The reporting requirements associated with this rule are designed to provide NMFS with monitoring data from the previous year to allow NMFS to consider whether any changes to existing mitigation and monitoring requirements are appropriate. The use of adaptive management allows NMFS to consider new information from different sources to determine (with input from the Navy regarding practicability) on an annual or biennial basis if mitigation or monitoring measures should be modified (including additions or deletions). Mitigation measures could be modified if new data suggests that such modifications will have a reasonable likelihood of more effectively accomplishing the goals of the mitigation and monitoring and if the measures are practicable. If the modifications to the mitigation, monitoring, or reporting measures are substantial, NMFS will publish a notice of the planned LOA in the **Federal Register** and solicit public comment.

The following are some of the possible sources of applicable data to be considered through the adaptive management process: (1) results from monitoring and exercise reports, as required by MMPA authorizations; (2) compiled results of Navy funded research and development studies; (3) results from specific stranding investigations; (4) results from general marine mammal and sound research; and (5) any information which reveals that marine mammals may have been taken in a manner, extent, or number not authorized by these regulations or subsequent LOAs. The results from monitoring reports and other studies may be viewed at *https://www.navymarinespeciesmonitoring.us.*

Reporting

In order to issue incidental take authorization for an activity, section 101(a)(5)(A) of the MMPA states that NMFS must set forth requirements pertaining to the monitoring and reporting of such taking. Effective reporting is critical both to compliance as well as ensuring that the most value is obtained from the required monitoring. Reports from individual monitoring events, results of analyses, publications, and periodic progress reports for specific monitoring projects will be posted to the Navy's Marine Species Monitoring web portal: *https://www.navymarinespeciesmonitoring.us.*

There were several different reporting requirements pursuant to the 2017–2022 regulations. All of these reporting requirements will continue under this rule for the 7-year period; however, the reporting schedule for the GOA Annual Training Report has been slightly changed to align the reporting schedule with the activity period (see the *GOA Annual Training Report* section, below).

Notification of Injured, Live Stranded, or Dead Marine Mammals

The Navy will consult the Notification and Reporting Plan, which sets out notification, reporting, and other requirements when injured, live stranded, or dead marine mammals are detected. The Notification and Reporting Plan is available at *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-military-readiness-activities.*

Annual GOA Marine Species Monitoring Report

The Navy will submit an annual report to NMFS of the GOA Study Area monitoring, which will be included in a Pacific-wide monitoring report and include results specific to the GOA Study Area, describing the implementation and results of monitoring from the previous calendar year. Data collection methods will be standardized across Pacific Range Complexes including the MITT, HSTT, NWTT, and GOA Study Areas to the best extent practicable, to allow for comparison among different geographic locations. The report will be submitted to the Director, Office of Protected Resources, NMFS, either within 3 months after the end of the calendar year, or within 3 months after the conclusion of the monitoring year, to be determined by the Adaptive Management process. NMFS will submit comments or questions on the draft monitoring report, if any, within 3 months of receipt. The report will be

considered final after the Navy has addressed NMFS' comments, or 3 months after submittal if NMFS does not provide comments on the report. The report will describe progress of knowledge made with respect to monitoring study questions across multiple Navy ranges associated with the ICMP. Similar study questions will be treated together so that progress on each topic is summarized across all Navy ranges. The report need not include analyses and content that does not provide direct assessment of cumulative progress on the monitoring plan study questions. This will allow the Navy to provide a cohesive monitoring report covering multiple ranges (as per ICMP goals), rather than entirely separate reports for the MITT, HSTT, NWTT, and GOA Study Areas.

GOA Annual Training Report

Each year in which training activities are conducted in the GOA Study Area, the Navy will submit one preliminary report (Quick Look Report) to NMFS detailing the status of applicable sound sources within 21 days after the completion of the training activities in the GOA Study Area. Each year in which activities are conducted, the Navy will also submit a detailed report (GOA Annual Training Report) to the Director, Office of Protected Resources, NMFS within 3 months after completion of the training activities. The Phase II rule required the Navy to submit the GOA Annual Training Report within 3 months after the anniversary of the date of issuance of the LOA. NMFS will submit comments or questions on the report, if any, within one month of receipt. The report will be considered final after the Navy has addressed NMFS' comments, or one month after submittal if NMFS does not provide comments on the report. The annual reports will contain information about the MTE, (exercise designator, date that the exercise began and ended, location, number and types of active and passive sonar sources used in the exercise, number and types of vessels and aircraft that participated in the exercise, *etc.*), individual marine mammal sighting information for each sighting in each exercise where mitigation was implemented, a mitigation effectiveness evaluation, and a summary of all sound sources used (total hours or quantity of each bin of sonar or other non-impulsive source; total annual number of each type of explosive(s); and total annual expended/detonated rounds (bombs and large-caliber projectiles) for each explosive bin).

The annual report (which, as stated above, will only be required during years in which activities are conducted) will also contain cumulative sonar and explosive use quantity from previous years' reports through the current year. Additionally, if there were any changes to the sound source allowance in the reporting year, or cumulatively, the report will include a discussion of why the change was made and include analysis to support how the change did or did not affect the analysis in the GOA SEIS/OEIS and MMPA final rule. The analysis in the detailed report will be based on the accumulation of data from the current year's report and data collected from previous annual reports. The final annual/close-out report at the conclusion of the authorization period (year seven) would also serve as the comprehensive close-out report and include both the final year annual use compared to annual authorization as well as a cumulative 7-year annual use compared to 7-year authorization. This report will also note any years in which training did not occur. NMFS will submit comments on the draft close-out report, if any, within 3 months of receipt. The report will be considered final after the Navy has addressed NMFS' comments, or 3 months after the submittal of the draft if NMFS does not provide comments. Information included in the annual reports may be used to inform future adaptive management of activities within the GOA Study Area. See the regulations below for more detail on the content of the annual report.

Other Reporting and Coordination

The Navy will continue to report and coordinate with NMFS for the following:

- Annual marine species monitoring technical review meetings that also include researchers and the Marine Mammal Commission (currently, every two years a joint Pacific-Atlantic meeting is held); and
- Annual Adaptive Management meetings (in-person or remote, as circumstances allow and agreed upon by NMFS and the Navy) that also include the Marine Mammal Commission (and occur in conjunction with the annual monitoring technical review meetings).

Further, the Navy will coordinate with NMFS prior to conducting exercises within the GOA Study Area. This may occur as a part of coordination the Navy does with other local stakeholders.

Analysis and Negligible Impact Determination

General Negligible Impact Analysis

Introduction

NMFS has defined negligible impact as an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival (50 CFR 216.103). A negligible impact finding is based on the lack of likely adverse effects on annual rates of recruitment or survival (*i.e.,* population-level effects). An estimate of the number of takes alone is not enough information on which to base an impact determination. In considering how Level A harassment or Level B harassment (as presented in Table 32), factor into the negligible impact analysis, in addition to considering the number of estimated takes, NMFS considers other factors, such as the likely nature of any responses (*e.g.,* intensity, duration) and the context of any responses (*e.g.,* critical reproductive time or location, migration), as well as effects on habitat and the likely effectiveness of the mitigation. We also assess the number, intensity, and context of estimated takes by evaluating this information relative to population status. Consistent with the 1989 preamble for NMFS' implementing regulations (54 FR 40338; September 29, 1989), the impacts from other past and ongoing anthropogenic activities are incorporated into this analysis via their impacts on the environmental baseline (*e.g.,* as reflected in the regulatory status of the species, population size, and growth rate where known).

In the Estimated Take of Marine Mammals section, we identified the subset of potential effects that are expected to rise to the level of takes both annually and over the seven-year period covered by this rule, and then identified the maximum number of harassment takes that are reasonably expected to occur based on the methods described. The impact that any given take will have on an individual, and ultimately the species or stock, is dependent on many case-specific factors that need to be considered in the negligible impact analysis (*e.g.,* the context of behavioral exposures such as duration or intensity of a disturbance, the health of impacted animals, the status of a species that incurs fitness-level impacts to individuals, *etc.*). For this rule we evaluated the likely impacts of the enumerated maximum number of harassment takes that are reasonably

expected to occur, and are authorized, in the context of the specific circumstances surrounding these predicted takes. Last, we collectively evaluated this information, as well as other more taxa-specific information and mitigation measure effectiveness, in group-specific assessments that support our negligible impact conclusions for each stock or species. Because all of the Navy's specified activities will occur within the ranges of the marine mammal stocks identified in the rule, all negligible impact analyses and determinations are at the stock level (*i.e.,* additional species-level determinations are not needed).

As explained in the Estimated Take of Marine Mammals section, no take by serious injury or mortality is authorized or anticipated to occur.

The specified activities reflect representative levels of training activities. The Description of the Specified Activities section describes annual activities. There may be some flexibility in the exact number of hours, items, or detonations that may vary from year to year, but take totals will not exceed the maximum annual totals and 7-year totals indicated in Table 32. (Further, as noted previously, the GOA Study Area training activities will not occur continuously throughout the year, but rather, for a maximum of 21 days once annually between April and October.) We base our analysis and negligible impact determination on the maximum number of takes that are reasonably expected to occur annually and are authorized, although, as stated before, the number of takes are only a part of the analysis, which includes extensive qualitative consideration of other contextual factors that influence the degree of impact of the takes on the affected individuals. To avoid repetition, we provide some general analysis in this *General Negligible Impact Analysis* section that applies to all the species listed in Table 32, given that some of the anticipated effects of the Navy's training activities on marine mammals are expected to be relatively similar in nature. Then, in the *Group and Species-Specific Analyses* section, we subdivide into discussions of Mysticetes, Odontocetes, and pinnipeds, as there are broad life history traits that support an overarching discussion of some factors considered within the analysis for those groups (*e.g.,* high-level differences in feeding strategies). Last, we break our analysis into species (and/or stocks), or groups of species (and the associated stocks) where relevant similarities exist, to provide more specific information related to the anticipated effects on individuals of a specific stock or where there is information about the status or structure of any species or stock that would lead to a differing assessment of the effects on the species or stock. Organizing our analysis by grouping species or stocks that share common traits or that will respond similarly to effects of the Navy's activities and then providing species- or stock-specific information allows us to avoid duplication while assuring that we have analyzed the effects of the specified activities on each affected species or stock.

Harassment

The Navy's harassment take request is based on a model and quantitative assessment of procedural mitigation, which NMFS reviewed and concurs appropriately predicts the maximum amount of harassment that is likely to occur, with the exception of the Eastern North Pacific stock of gray whale, and the Western North Pacific stock of humpback whale, for which NMFS has proposed authorizing 4 and 3 Level B harassment takes annually, respectively, as described in the Estimated Take of Marine Mammals section. The model calculates sound energy propagation from sonar, other active acoustic sources, and explosives during naval activities; the sound or impulse received by animat dosimeters representing marine mammals distributed in the area around the modeled activity; and whether the sound or impulse energy received by a marine mammal exceeds the thresholds for effects. Assumptions in the Navy model intentionally err on the side of overestimation when there are unknowns. Naval activities are modeled as though they would occur regardless of proximity to marine mammals, meaning that no mitigation is considered (*e.g.,* no power down or shut down) and without any avoidance of the activity by the animal. As described above in the Estimated Take of Marine Mammals section, no mortality was modeled for any species for the TMAA activities, and therefore the quantitative post-modeling analysis that allows for the consideration of mitigation to prevent mortality, which has been applied in other Navy rules, was appropriately not applied here. (Though, as noted in the Estimated Take of Marine Mammals section, where the analysis indicates mitigation would effectively reduce risk, the model-estimated PTS are considered reduced to TTS.) NMFS provided input to, independently reviewed, and concurred with the Navy on this process and the Navy's analysis, which is described in detail in Section 6 of the Navy's rulemaking/LOA application that was used to quantify harassment takes for this rule.

Generally speaking, the Navy and NMFS anticipate more severe effects from takes resulting from exposure to higher received levels (though this is in no way a strictly linear relationship for behavioral effects throughout species, individuals, or circumstances) and less severe effects from takes resulting from exposure to lower received levels. However, there is also growing evidence of the importance of distance in predicting marine mammal behavioral response to sound—*i.e.,* sounds of a similar level emanating from a more distant source have been shown to be less likely to evoke a response of equal magnitude (DeRuiter, 2012, Falcone *et al.,* 2017). The estimated number of takes by Level A harassment and Level B harassment does not equate to the number of individual animals the Navy expects to harass (which is lower), but rather to the instances of take (*i.e.,* exposures above the Level A harassment and Level B harassment threshold) that are anticipated to occur annually and over the 7-year period. These instances may represent either brief exposures (seconds or minutes) or, in some cases, longer durations of exposure within a day. Some individuals may experience multiple instances of take (*i.e.,* on multiple days) over the course of the 21-day exercise, which means that the number of individuals taken is smaller than the total estimated takes. Generally speaking, the higher the number of takes as compared to the population abundance, the more repeated takes of individuals are likely, and the higher the actual percentage of individuals in the population that are likely taken at least once in a year. We look at this comparative metric to give us a relative sense of where a larger portion of a species or stock is being taken by Navy activities, where there is a higher likelihood that the same individuals are being taken on multiple days, and where that number of days might be higher or more likely sequential. Where the number of instances of take is 100 percent or less of the abundance and there is no information to specifically suggest that a small subset of animals will be repeatedly taken over a high number of sequential days, the overall magnitude is generally considered low, as it could on one extreme mean that every individual taken will be taken on no more than one day annually (a very minimal impact) or, more likely, that some smaller portion of individuals are taken on one day annually, some are taken on more than one day, and some are not taken at all.

In the ocean, the Navy's use of sonar and other active acoustic sources is often transient and is unlikely to repeatedly expose the same individual animals within a short period, for example within one specific exercise. However, for some individuals of some species or stocks repeated exposures across different activities could occur over the 21-day period. In short, for some species or stocks we expect that the total anticipated takes represent exposures of a smaller number of individuals of which some will be exposed multiple times, but based on the nature of the Navy activities and the movement patterns of marine mammals, it is unlikely that individuals from most stocks will be taken over more than a few non-sequential days and, as described elsewhere, the nature of the majority of the exposures is expected to be of a less severe nature and based on the numbers and duration of the activity (no more than 21 days) any individual exposed multiple times is still only taken on a small percentage of the days of the year. We also note that, in the unlikely event that an individual is taken on two or three sequential days (and the total number of days in which the individual was taken in a year remained low), such takes would not be expected to impact an individual's (of any hearing sensitivity) reproduction or survival.

Physiological Stress Response

Some of the lower level physiological stress responses (*e.g.,* orientation or startle response, change in respiration, change in heart rate) discussed in the proposed rule would likely co-occur with the predicted harassments, although these responses are more difficult to detect and fewer data exist relating these responses to specific received levels of sound. Takes by Level B harassment, then, may have a stress-related physiological component as well; however, we would not expect the Navy's generally short-term, intermittent, and (typically in the case of sonar) transitory activities to create conditions of long-term continuous noise leading to long-term physiological stress responses in marine mammals that could affect reproduction or survival.

Behavioral Response

The estimates calculated using the BRF do not differentiate between the different types of behavioral responses that rise to the level of take by Level B harassment. As described in the Navy's application, the Navy identified (with NMFS' input) the types of behaviors that would be considered a take: moderate behavioral responses as characterized in Southall *et al.* (2007) (*e.g.,* altered migration paths or dive profiles; interrupted nursing, breeding, or feeding; or avoidance) that also would be expected to continue for the duration of an exposure. The Navy then compiled the available data indicating at what received levels and distances those responses have occurred, and used the indicated literature to build biphasic behavioral response curves and cutoff distances that are used to predict how many instances of Level B harassment by behavioral disturbance would occur in a day. Take estimates alone do not provide information regarding the potential fitness or other biological consequences of the reactions on the affected individuals. We therefore consider the available activity-specific, environmental, and species-specific information to determine the likely nature of the modeled behavioral responses and the potential fitness consequences for affected individuals.

Use of sonar and other transducers would typically be transient and temporary. The majority of acoustic effects to individual animals from sonar and other active sound sources during training activities would be primarily from ASW events. It is important to note that although ASW is one of the warfare areas of focus during Navy training, there are significant periods when active ASW sonars are not in use. Behavioral reactions are assumed more likely to be significant during MTEs than during other ASW activities due to the use of high-powered ASW sources as well as the duration (*i.e.,* multiple days) and scale (*i.e.,* multiple sonar platforms) of the MTEs.

On the less severe end, exposure to comparatively lower levels of sound at a detectably greater distance from the animal, for a few or several minutes, could result in a behavioral response such as avoiding an area that an animal would otherwise have moved through or fed in, or breaking off one or a few feeding bouts. More severe effects could occur when the animal gets close enough to the source to receive a comparatively higher level of sound, is exposed continuously to one source for a longer time, or is exposed intermittently to different sources throughout a day. Such effects might result in an animal having a more severe flight response and leaving a larger area for a day or more or potentially losing feeding opportunities for a day. However, such severe behavioral effects are expected to occur infrequently.

To help assess this, for sonar (MFAS/high frequency active sonar (HFAS)) used in the TMAA, the Navy provided information estimating the percentage of animals that may be taken by Level B harassment under each BRF that would occur within 6-dB increments (percentages discussed below in the *Group and Species-Specific Analyses* section). As mentioned above, all else being equal, an animal's exposure to a higher received level is more likely to result in a behavioral response that is more likely to lead to adverse effects, which could more likely accumulate to impacts on reproductive success or survivorship of the animal, but other contextual factors (such as distance) are also important. The majority of takes by Level B harassment are expected to be in the form of milder responses (*i.e.,* lower-level exposures that still rise to the level of take, but would likely be less severe in the range of responses that qualify as take) of a generally shorter duration. We anticipate more severe effects from takes when animals are exposed to higher received levels of sound or at closer proximity to the source. However, depending on the context of an exposure (*e.g.,* depth, distance, if an animal is engaged in important behavior such as feeding), a behavioral response can vary between species and individuals within a species. Specifically, given a range of behavioral responses that may be classified as Level B harassment, to the degree that higher received levels are expected to result in more severe behavioral responses, only a smaller percentage of the anticipated Level B harassment from Navy activities might necessarily be expected to potentially result in more severe responses (see the *Group and Species-Specific Analyses* section below for more detailed information). To fully understand the likely impacts of the predicted/authorized take on an individual (*i.e.,* what is the likelihood or degree of fitness impacts), one must look closely at the available contextual information, such as the duration of likely exposures and the likely severity of the exposures (*e.g.,* whether they will occur for a longer duration over sequential days or the comparative sound level that will be received). Ellison *et al.* (2012) and Moore and Barlow (2013), among others, emphasize the importance of context (*e.g.,* behavioral state of the animals, distance from the sound source) in evaluating behavioral responses of marine mammals to acoustic sources.

Diel Cycle

Many animals perform vital functions, such as feeding, resting, traveling, and socializing on a diel cycle (24-hour cycle). Behavioral reactions to noise exposure, when taking place in a

biologically important context, such as disruption of critical life functions, displacement, or avoidance of important habitat, are more likely to be significant if they last more than one day or recur on subsequent days (Southall *et al.,* 2007) due to diel and lunar patterns in diving and foraging behaviors observed in many cetaceans, including beaked whales (Baird *et al.,* 2008, Barlow *et al.,* 2020, Henderson *et al.,* 2016, Schorr *et al.,* 2014). Henderson *et al.* (2016) found that ongoing smaller scale events had little to no impact on foraging dives for Blainville's beaked whale, while multi-day training events may decrease foraging behavior for Blainville's beaked whale (Manzano-Roth *et al.,* 2016). Consequently, a behavioral response lasting less than one day and not recurring on subsequent days is not considered severe unless it could directly affect reproduction or survival (Southall *et al.,* 2007). Note that there is a difference between multiple-day substantive behavioral reactions and multiple-day anthropogenic activities. For example, just because an at-sea exercise lasts for multiple days does not necessarily mean that individual animals are either exposed to those exercises for multiple days or, further, exposed in a manner resulting in a sustained multiple day substantive behavioral response. Large multi-day Navy exercises such as ASW activities, typically include vessels that are continuously moving at speeds typically 10–15 kn (18.5–27.8 km/hr), or higher, and likely cover large areas that are relatively far from shore (typically more than 3 nmi (6 km) from shore) and in waters greater than 600 ft (183 m) deep. Additionally, marine mammals are moving as well, which would make it unlikely that the same animal could remain in the immediate vicinity of the ship for the entire duration of the exercise. Further, the Navy does not necessarily operate active sonar the entire time during an exercise. While it is certainly possible that these sorts of exercises could overlap with individual marine mammals multiple days in a row at levels above those anticipated to result in a take, because of the factors mentioned above, it is considered unlikely for the majority of takes. However, it is also worth noting that the Navy conducts many different types of noise-producing activities over the course of the 21-day exercise, and it is likely that some marine mammals will be exposed to more than one activity and taken on multiple days, even if they are not sequential.

Durations of Navy activities utilizing tactical sonar sources and explosives vary and are fully described in Appendix A (Navy Activity Descriptions) of the 2020 GOA FSEIS/OEIS. Sonar used during ASW would impart the greatest amount of acoustic energy of any category of sonar and other transducers analyzed in the Navy's rulemaking/LOA application and include hull-mounted, towed array, sonobuoy, and helicopter dipping sonars. Most ASW sonars are MFAS (1–10 kHz); however, some sources may use higher frequencies. ASW training activities using hull mounted sonar planned for the TMAA generally last for only a few hours (see Appendix A (Navy Activity Descriptions) of the 2022 GOA FSEIS/OEIS). Some ASW training activities typically last about 8 hours. Because of the need to train in a large variety of situations, the Navy does not typically conduct successive ASW exercises in the same locations. Given the average length of ASW exercises (times of sonar use) and typical vessel speed, combined with the fact that the majority of the cetaceans would not likely remain in proximity to the sound source, it is unlikely that an animal would be exposed to MFAS/HFAS at levels or durations likely to result in a substantive response that would then be carried on for more than 1 day or on successive days (and as noted previously, no LFAS use is planned by the Navy).

Most planned explosive events are scheduled to occur over a short duration (1–3 hours); however, the explosive component of these activities only lasts for minutes. Although explosive exercises may sometimes be conducted in the same general areas repeatedly, because of their short duration and the fact that they are in the open ocean and animals can easily move away, it is similarly unlikely that animals would be exposed for long, continuous amounts of time, or demonstrate sustained behavioral responses. All of these factors make it unlikely that individuals would be exposed to the exercise for extended periods or on consecutive days, though some individuals may be exposed on multiple days.

Assessing the Number of Individuals Taken and the Likelihood of Repeated Takes

As described previously, Navy modeling uses the best available science to predict the instances of exposure above certain acoustic thresholds, which are equated, as appropriate, to harassment takes (and, for PTS, further corrected to account for mitigation and avoidance). As further noted, for active acoustics it is more challenging to parse out the number of individuals taken by Level B harassment and the number of times those individuals are taken from this larger number of instances. One method that NMFS uses to help better understand the overall scope of the impacts is to compare these total instances of take against the abundance of that species (or stock if applicable). For example, if there are 100 estimated harassment takes in a population of 100, one can assume either that every individual will be exposed above acoustic thresholds in no more than one day, or that some smaller number will be exposed in one day but a few of those individuals will be exposed multiple days within a year and a few not exposed at all. Where the instances of take exceed 100 percent of the population (*i.e.,* are over 100 percent), multiple takes of some individuals are predicted and expected to occur within a year. Generally speaking, the higher the number of takes as compared to the population abundance, the more multiple takes of individuals are likely, and the higher the actual percentage of individuals in the population that are likely taken at least once in a year. We look at this comparative metric to give us a relative sense of where a larger portion of a species or stock is being taken by Navy activities and where there is a higher likelihood that the same individuals are being taken across multiple days and where that number of days might be higher. It also provides a relative picture of the scale of impacts to each species or stock.

In the ocean, unlike a modeling simulation with static animals, the use of sonar and other active acoustic sources is often transient, and is unlikely to repeatedly expose the same individual animals within a short period, for example within one specific exercise. However, some repeated exposures across different activities could occur over the year with more resident species. Nonetheless, the episodic nature of activities in the TMAA (21 days per year) will mean less frequent exposures as compared to some other ranges. In short, we expect that for some stocks, the total anticipated takes represent exposures of a smaller number of individuals of which some could be exposed multiple times, but based on the nature of the Navy's activities and the movement patterns of marine mammals, it is unlikely that individuals of most species or stocks would be taken over more than a few non-sequential days within a year.

When comparing the number of takes to the population abundance, which can be helpful in estimating both the proportion of the population affected by

takes and the number of days over which some individuals may be taken, it is important to choose an appropriate population estimate against which to make the comparison. The SARs, where available, provide the official population estimate for a given species or stock in U.S. waters in a given year (and are typically based solely on the most recent survey data). When the stock is known to range well outside of U.S. Exclusive Economic Zone (EEZ) boundaries, population estimates based on surveys conducted only within the U.S. EEZ are known to be underestimates. The information used to estimate take includes the best available survey abundance data to model density layers. Accordingly, in calculating the percentage of takes versus abundance for each species or stock in order to assist in understanding both the percentage of the species or stock affected, as well as how many days across a year individuals could be taken, we use the data most appropriate for the situation. For the GOA Study Area, for all species and stocks except for beaked whales for which SAR data are unavailable, the most recent NMFS SARs are used to calculate the proportion of a population affected by takes.

The stock abundance estimates in NMFS' SARs are typically generated from the most recent shipboard and/or aerial surveys conducted. In some cases, NMFS' abundance estimates show substantial year-to-year variability. However, for highly migratory species (*e.g.,* large whales) or those whose geographic distribution extends well beyond the boundaries of the GOA Study Area (*e.g.,* populations with distribution along the entire eastern Pacific Ocean rather than just the GOA Study Area), comparisons to the SAR are appropriate. Many of the stocks present in the GOA Study Area have ranges significantly larger than the GOA Study Area and that abundance is captured by the SAR. A good descriptive example is migrating large whales, which occur seasonally in the GOA. Therefore, at any one time there may be a stable number of animals, but over the course of the potential activity period (April to October) the entire population may enter the GOA Study Area. Therefore, comparing the estimated takes to an abundance, in this case the SAR abundance, which represents the total population, may be more appropriate than modeled abundances for only the GOA Study Area.

Temporary Threshold Shift

NMFS and the Navy have estimated that multiple species and stocks of marine mammals in the TMAA may sustain some level of TTS from active sonar. As discussed in the proposed rule in the Potential Effects of Specified Activities on Marine Mammals and their Habitat section, in general, TTS can last from a few minutes to days, be of varying degree, and occur across various frequency bandwidths, all of which determine the severity of the impacts on the affected individual, which can range from minor to more severe. Table 43 to Table 48 indicate the number of takes by TTS that may be incurred by different species and stocks from exposure to active sonar and explosives. The TTS sustained by an animal is primarily classified by three characteristics:

1. Frequency—Available data (of mid-frequency hearing specialists exposed to mid- or high-frequency sounds; Southall *et al.,* 2019) suggest that most TTS occurs in the frequency range of the source up to one octave higher than the source (with the maximum TTS at ½ octave above). The Navy's MF sources, which are the highest power and most numerous sources and the ones that cause the most take, utilize the 1–10 kHz frequency band, which suggests that if TTS were to be induced by any of these MF sources it would be in a frequency band somewhere between approximately 2 and 20 kHz, which is in the range of communication calls for many odontocetes, but below the range of the echolocation signals used for foraging. There are fewer hours of HF source use and the sounds would attenuate more quickly, plus they have lower source levels, but if an animal were to incur TTS from these sources, it would cover a higher frequency range (sources are between 10 and 100 kHz, which means that TTS could range up to 200 kHz), which could overlap with the range in which some odontocetes communicate or echolocate. However, HF systems are typically used less frequently and for shorter time periods than surface ship and aircraft MF systems, so TTS from these sources is unlikely. As noted previously, the Navy is not planning LFAS use for the activities in this rulemaking. The frequency provides information about the cues to which a marine mammal may be temporarily less sensitive, but not the degree or duration of sensitivity loss. The majority of sonar sources from which TTS may be incurred occupy a narrow frequency band, which means that the TTS incurred would also be across a narrower band (*i.e.,* not affecting the majority of an animal's hearing range). TTS from explosives would be broadband.

2. Degree of the shift (*i.e.,* by how many dB the sensitivity of the hearing is reduced)—Generally, both the degree of TTS and the duration of TTS will be greater if the marine mammal is exposed to a higher level of energy (which would occur when the peak dB level is higher or the duration is longer). The threshold for the onset of TTS was discussed previously in this rule. An animal would have to approach closer to the source or remain in the vicinity of the sound source appreciably longer to increase the received SEL, which would be difficult considering the Lookouts and the nominal speed of an active sonar vessel (10–15 kn; 19–28 km/hr) and the relative motion between the sonar vessel and the animal. In the TTS studies discussed in the Potential Effects of Specified Activities on Marine Mammals and their Habitat section of the proposed rule, some using exposures of almost an hour in duration or up to 217 SEL, most of the TTS induced was 15 dB or less, though Finneran *et al.* (2007) induced 43 dB of TTS with a 64-second exposure to a 20 kHz source. However, since hull-mounted sonar such as the SQS–53 (MFAS) emits a ping typically every 50 seconds, incurring those levels of TTS is highly unlikely for such sources (though higher duty cycle hull mounted systems (bin MF12) could be used in the TMAA). Since any hull-mounted sonar, such as the SQS–53, engaged in Anti-Submarine Warfare training would be moving at between 10 and 15 kn (19–28 km/hr) and nominally pinging every 50 seconds, the vessel would have traveled a minimum distance of approximately 257 m during the time between those pings. A scenario could occur where an animal does not leave the vicinity of a ship or travels a course parallel to the ship, however, the close distances required make TTS exposure unlikely. For a Navy vessel moving at a nominal 10 kn (19 km/hr), it is unlikely a marine mammal could maintain speed parallel to the ship and receive adequate energy over successive pings to suffer TTS.

In short, given the anticipated duration and levels of sound exposure, we would not expect marine mammals to incur more than relatively low levels of TTS (*i.e.,* single digits of sensitivity loss). To add context to this degree of TTS, individual marine mammals may regularly experience variations of 6 dB differences in hearing sensitivity across time (Finneran *et al.,* 2000, 2002; Schlundt *et al.,* 2000).

3. Duration of TTS (recovery time)—In the TTS laboratory studies (as

discussed in the Potential Effects of Specified Activities on Marine Mammals and their Habitat section of the proposed rule), some using exposures of almost an hour in duration or up to 217 SEL, almost all individuals recovered within 1 day (or less, often in minutes), although in one study (Finneran *et al.,* 2007), recovery took 4 days.

Based on the range of degree and duration of TTS reportedly induced by exposures to non-pulse sounds of energy higher than that to which free-swimming marine mammals in the field are likely to be exposed during MFAS/HFAS training exercises in the TMAA, it is unlikely that marine mammals would ever sustain a TTS from MFAS that alters their sensitivity by more than 20 dB for more than a few hours—and any incident of TTS would likely be far less severe due to the short duration of the majority of the events during the 21 days and the speed of a typical vessel, especially given the fact that the higher power sources resulting in TTS are predominantly intermittent, which have been shown to result in shorter durations of TTS. Also, for the same reasons discussed in the Analysis and Negligible Impact Determination—- *Diel Cycle* section, and because of the short distance within which animals would need to approach the sound source, it is unlikely that animals would be exposed to the levels necessary to induce TTS in subsequent time periods such that their recovery is impeded. Additionally, though the frequency range of TTS that marine mammals might sustain would overlap with some of the frequency ranges of their vocalization types, the frequency range of TTS from MFAS would not usually span the entire frequency range of one vocalization type, much less span all types of vocalizations or other critical auditory cues for any given species.

Tables 43 to 48 indicate the maximum number of incidental takes by TTS for each species or stock that are likely to result from the Navy's activities. As a general point, the majority of these TTS takes are the result of exposure to hull-mounted MFAS (MF narrower band sources), with fewer from explosives (broad-band lower frequency sources), and even fewer from HFAS sources (narrower band). As described above, we expect the majority of these takes to be in the form of mild (single-digit), short-term (minutes to hours), narrower band (only affecting a portion of the animal's hearing range) TTS. This means that for one to several times within the 21 days, for several minutes to maybe a few hours at most each, a taken individual will have slightly diminished hearing sensitivity (slightly more than natural variation, but nowhere near total deafness). More often than not, such an exposure would occur within a narrower mid- to higher frequency band that may overlap part (but not all) of a communication, echolocation, or predator range, but sometimes across a lower or broader bandwidth. The significance of TTS is also related to the auditory cues that are germane within the time period that the animal incurs the TTS. For example, if an odontocete has TTS at echolocation frequencies, but incurs it at night when it is resting and not feeding, it is not impactful. In short, the expected results of any one of these limited number of mild TTS occurrences could be that (1) it does not overlap signals that are pertinent to that animal in the given time period, (2) it overlaps parts of signals that are important to the animal, but not in a manner that impairs interpretation, or (3) it reduces detectability of an important signal to a small degree for a short amount of time—in which case the animal may be aware and be able to compensate (but there may be slight energetic cost), or the animal may have some reduced opportunities (*e.g.,* to detect prey) or reduced capabilities to react with maximum effectiveness (*e.g.,* to detect a predator or navigate optimally). However, given the small number of times that any individual might incur TTS, the low degree of TTS and the short anticipated duration, and the low likelihood that one of these instances would occur in a time period in which the specific TTS overlapped the entirety of a critical signal, it is unlikely that TTS of the nature expected to result from the Navy activities would result in behavioral changes or other impacts that would impact any individual's (of any hearing sensitivity) reproduction or survival.

Auditory Masking or Communication Impairment

The ultimate potential impacts of masking on an individual (if it were to occur) are similar to those discussed for TTS, but an important difference is that masking only occurs during the time of the signal, versus TTS, which continues beyond the duration of the signal. Fundamentally, masking is referred to as a chronic effect because one of the key potential harmful components of masking is its duration—the fact that an animal would have reduced ability to hear or interpret critical cues becomes much more likely to cause a problem the longer it is occurring. Also inherent in the concept of masking is the fact that the potential for the effect is only present during the times that the animal and the source are in close enough proximity for the effect to occur (and further, this time period would need to coincide with a time that the animal was utilizing sounds at the masked frequency). As our analysis has indicated, because of the relative movement of vessels and the sound sources primarily involved in this rule, we do not expect the exposures with the potential for masking to be of a long duration. Masking is fundamentally more of a concern at lower frequencies, because low frequency signals propagate significantly further than higher frequencies and because they are more likely to overlap both the narrower low-frequency (LF) calls of mysticetes, as well as many non-communication cues such as fish and invertebrate prey, and geologic sounds that inform navigation (although the Navy is not planning to use LFAS for the activities in this rulemaking). Masking is also more of a concern from continuous sources (versus intermittent sonar signals) where there is no quiet time between pulses within which auditory signals can be detected and interpreted. For these reasons, dense aggregations of, and long exposure to, continuous LF activity are much more of a concern for masking, whereas comparatively short-term exposure to the predominantly intermittent pulses of often narrow frequency range MFAS or HFAS, or explosions are not expected to result in a meaningful amount of masking. While the Navy occasionally uses LF and more continuous sources (although, as noted above, the Navy proposes no LFAS use for the activities in this rulemaking), it is not in the contemporaneous aggregate amounts that would accrue to a masking concern. Specifically, the nature of the activities and sound sources used by the Navy do not support the likelihood of a level of masking accruing that would have the potential to affect reproductive success or survival. Additional detail is provided below.

Standard hull-mounted MFAS typically pings every 50 seconds. Some hull-mounted anti-submarine sonars can also be used in an object detection mode known as ''Kingfisher'' mode (*e.g.,* used on vessels when transiting to and from port) where pulse length is shorter but pings are much closer together in both time and space since the vessel goes slower when operating in this mode (note also that the duty cycle for MF11 and MF12 sources is greater than 80 percent). Kingfisher mode is typically operated for relatively shorter durations. For the majority of other sources, the pulse length is significantly shorter than

hull-mounted active sonar, on the order of several microseconds to tens of milliseconds. Some of the vocalizations that many marine mammals make are less than one second long, so, for example with hull-mounted sonar, there would be a 1 in 50 chance (and only if the source was in close enough proximity for the sound to exceed the signal that is being detected) that a single vocalization might be masked by a ping. However, when vocalizations (or series of vocalizations) are longer than the one-second pulse of hull-mounted sonar, or when the pulses are only several microseconds long, the majority of most animals' vocalizations would not be masked.

Most ASW sonars and countermeasures use MF frequencies and a few use HF frequencies. Most of these sonar signals are limited in the temporal, frequency, and spatial domains. The duration of most individual sounds is short, lasting up to a few seconds each. A few systems operate with higher duty cycles or nearly continuously, but they typically use lower power, which means that an animal would have to be closer, or in the vicinity for a longer time, to be masked to the same degree as by a higher-level source. Nevertheless, masking could occasionally occur at closer ranges to these high-duty cycle and continuous active sonar systems, but as described previously, it would be expected to be of a short duration when the source and animal are in close proximity. While data are limited on behavioral responses of marine mammals to continuously active sonars (Isojunno *et al.,* 2020), mysticete species are known to be able to habituate to novel and continuous sounds (Nowacek *et al.,* 2004), suggesting that they are likely to have similar responses to high-duty cycle sonars. Furthermore, most of these systems are hull-mounted on surface ships and ships are moving at least 10 kn (18.5 km/hr), and it is unlikely that the ship and the marine mammal would continue to move in the same direction with the marine mammal subjected to the same exposure due to that movement. Most ASW activities are geographically dispersed and last for only a few hours, often with intermittent sonar use even within this period. Most ASW sonars also have a narrow frequency band (typically less than one-third octave). These factors reduce the likelihood of sources causing significant masking. HF signals (above 10 kHz) attenuate more rapidly in the water due to absorption than do lower frequency signals, thus producing only a very small zone of potential masking. If masking or communication impairment were to occur briefly, it would more likely be in the frequency range of MFAS (the more powerful source), which overlaps with some odontocete vocalizations (but few mysticete vocalizations); however, it would likely not mask the entirety of any particular vocalization, communication series, or other critical auditory cue, because the signal length, frequency, and duty cycle of the MFAS/HFAS signal does not perfectly resemble the characteristics of any single marine mammal species' vocalizations.

Other sources used in Navy training that are not explicitly addressed above, many of either higher frequencies (meaning that the sounds generated attenuate even closer to the source) or lower amounts of operation, are similarly not expected to result in masking. For the reasons described here, any limited masking that could potentially occur would be minor and short-term.

In conclusion, masking is more likely to occur in the presence of broadband, relatively continuous noise sources such as from vessels, however, the duration of temporal and spatial overlap with any individual animal and the spatially separated sources that the Navy uses are not expected to result in more than short-term, low impact masking that will not affect reproduction or survival.

PTS From Sonar Acoustic Sources and Explosives and Non-Auditory Tissue Damage From Explosives

Tables 43 to 48 indicate the number of individuals of each species or stock for which Level A harassment in the form of PTS resulting from exposure to active sonar and/or explosives is estimated to occur. The Northeast Pacific stock of fin whale, Alaska stock of Dall's porpoise, and California stock of Northern elephant seal are the only stocks which may incur PTS (from sonar and explosives). For all other species/stocks only take by Level B harassment (behavioral disturbance and/or TTS) is anticipated. No species/stocks have the potential to incur non-auditory tissue damage from training activities. No species/stocks have the potential to incur non-auditory tissue damage from training activities.

Data suggest that many marine mammals would deliberately avoid exposing themselves to the received levels of active sonar necessary to induce injury by moving away from or at least modifying their path to avoid a close approach. Additionally, in the unlikely event that an animal approaches the sonar-emitting vessel at a close distance, NMFS has determined that the mitigation measures (*i.e.,* shutdown/powerdown zones for active sonar) would typically ensure that animals would not be exposed to injurious levels of sound. As discussed previously, the Navy utilizes both aerial (when available) and passive acoustic monitoring (during ASW exercises, passive acoustic detections are used as a cue for Lookouts' visual observations when passive acoustic assets are already participating in an activity) in addition to Lookouts on vessels to detect marine mammals for mitigation implementation. As discussed previously, these Level A harassment take numbers represent the maximum number of instances in which marine mammals would be reasonably expected to incur PTS, and we have analyzed them accordingly.

If a marine mammal is able to approach a surface vessel within the distance necessary to incur PTS in spite of the mitigation measures, the likely speed of the vessel (nominally 10–15 kn (19–28 km/hr)) and relative motion of the vessel would make it very difficult for the animal to remain in range long enough to accumulate enough energy to result in more than a mild case of PTS. As discussed previously in relation to TTS, the likely consequences to the health of an individual that incurs PTS can range from mild to more serious dependent upon the degree of PTS and the frequency band it is in. The majority of any PTS incurred as a result of exposure to Navy sources would be expected to be in the 2–20 kHz range (resulting from the most powerful hull-mounted sonar) and could overlap a small portion of the communication frequency range of many odontocetes, whereas other marine mammal groups have communication calls at lower frequencies. Regardless of the frequency band, the more important point in this case is that any PTS accrued as a result of exposure to Navy activities would be expected to be of a small amount (single digits of dB hearing loss). Permanent loss of some degree of hearing is a normal occurrence for older animals, and many animals are able to compensate for the shift, both in old age or at younger ages as the result of stressor exposure. While a small loss of hearing sensitivity may include some degree of energetic costs for compensating or may mean some small loss of opportunities or detection capabilities, at the expected scale it would be unlikely to impact behaviors, opportunities, or detection capabilities to a degree that would interfere with reproductive success or survival.

The Navy implements mitigation measures (described in the Mitigation

Measures section) during explosive activities, including delaying detonations when a marine mammal is observed in the mitigation zone. Nearly all explosive events will occur during daylight hours to improve the sightability of marine mammals and thereby improve mitigation effectiveness. Observing for marine mammals during the explosive activities will include visual and passive acoustic detection methods (when they are available and part of the activity) before the activity begins, in order to cover the mitigation zones that can range from 200 yd (182.9 m) to 2,500 yd (2,286 m) depending on the source (*e.g.,* explosive bombs; see Table 36 and Table 37). For all of these reasons, the mitigation measures associated with explosives are expected to further ensure that no non-auditory tissue damage occurs to any potentially affected species or stocks, and no species or stocks are anticipated to incur tissue damage during the period of the rule.

Group and Species-Specific Analyses

In this section, we build on the general analysis that applies to all marine mammals in the GOA Study Area from the previous section, and include first information and analysis that applies to mysticetes or, separately, odontocetes, or pinnipeds, and then within those three sections, more specific information that applies to smaller groups, where applicable, and the affected species or stocks. The specific authorized take numbers are also included in the analyses below, and so here we provide some additional context and discussion regarding how we consider the authorized take numbers in those analyses.

The maximum amount and type of incidental take of marine mammals reasonably likely to occur and therefore authorized from exposures to sonar and other active acoustic sources and in-air explosions at or above the water surface during the 7-year training period are shown in Table 32. The vast majority of predicted exposures (greater than 99 percent) are expected to be non-injurious Level B harassment (TTS and behavioral reactions) from acoustic and explosive sources during training activities at relatively low received levels. A small number of takes by Level A harassment (PTS only) are predicted for three species (Dall's porpoise, fin whales, and Northern elephant seals).

In the discussions below, the estimated takes by Level B harassment represent instances of take, not the number of individuals taken (the less frequent Level A harassment takes are far more likely to be associated with separate individuals), and in some cases individuals may be taken more than one time. Below, we compare the total take numbers (including PTS, TTS, and behavioral disturbance) for species or stocks to their associated abundance estimates to evaluate the magnitude of impacts across the species or stock and to individuals. Generally, when an abundance percentage comparison is below 100, it suggests the following: (1) that not all of the individuals will be taken; (2) that, barring specific circumstances suggesting repeated takes of individuals (such as in circumstances where all activities resulting in take are focused in one area and time where the same individual marine mammals are known to congregate, such as pinnipeds at a haulout), the average or expected number of days for those individuals taken is one per year; and (3) that we would not expect any individuals to be taken more than a few times in a year, or for those days to be sequential. When it is more than 100 percent, it means there will definitely be some number of repeated takes of individuals. For example, if the percentage is 300, the average would be each individual is taken on 3 days in a year if all were taken, but it is more likely that some number of individuals will be taken more than three times and some number of individuals fewer or not at all. While it is not possible to know the maximum number of days across which individuals of a stock might be taken, in acknowledgement of the fact that it is more than the average, for the purposes of this analysis, we assume a number approaching twice the average. For example, if the percentage of take compared to the abundance is 800, we estimate that some individuals might be taken as many as 16 times. Those comparisons are included in the sections below.

To assist in understanding what this analysis means, we clarify a few issues related to estimated takes and the analysis here. An individual that incurs a PTS or TTS take may sometimes, for example, also be subject to behavioral disturbance at the same time. As described above in this section, the degree of PTS, and the degree and duration of TTS, expected to be incurred from the Navy's activities are not expected to impact marine mammals such that their reproduction or survival could be affected. Similarly, data do not suggest that a single instance in which an animal accrues PTS or TTS and is also subjected to behavioral disturbance would result in impacts to reproduction or survival. Alternately, we recognize that if an individual is subjected to behavioral disturbance repeatedly for a longer duration and on consecutive days, effects could accrue to the point that reproductive success is jeopardized, although those sorts of impacts are generally not expected to result from these activities. Accordingly, in analyzing the number of takes and the likelihood of repeated and sequential takes, we consider the total takes, not just the takes by Level B harassment by behavioral disturbance, so that individuals potentially exposed to both threshold shift and behavioral disturbance are appropriately considered. The number of Level A harassment takes by PTS are so low (and zero in most cases) compared to abundance numbers that it is considered highly unlikely that any individual would be taken at those levels more than once.

Occasional, milder behavioral reactions are unlikely to cause long-term consequences for individual animals or populations, and even if some smaller subset of the takes are in the form of a longer (several hours or a day) and more severe response, if they are not expected to be repeated over sequential days, impacts to individual fitness are not anticipated. Nearly all studies and experts agree that infrequent exposures of a single day or less are unlikely to impact an individual's overall energy budget (Farmer *et al.,* 2018; Harris *et al.,* 2017; King *et al.,* 2015; NAS 2017; New *et al.,* 2014; Southall *et al.,* 2007; Villegas-Amtmann *et al.,* 2015).

If impacts to individuals are of a magnitude or severity such that either repeated and sequential higher severity impacts occur (the probability of this goes up for an individual the higher total number of takes it has) or the total number of moderate to more severe impacts occurs across sequential days, then it becomes more likely that the aggregate effects could potentially interfere with feeding enough to reduce energy budgets in a manner that could impact reproductive success via longer cow-calf intervals, terminated pregnancies, or calf mortality. It is important to note that these impacts only accrue to females, which only comprise a portion of the population (typically approximately 50 percent). Based on energetic models, it takes energetic impacts of a significantly greater magnitude to cause the death of an adult marine mammal, and females will always terminate a pregnancy or stop lactating before allowing their health to deteriorate. Also, the death of an adult female has significantly more impact on population growth rates than reductions in reproductive success,

while the death of an adult male has very little effect on population growth rates. However, as will be explained further in the sections below, the severity and magnitude of takes expected to result from Navy activities in the TMAA are such that energetic impacts of a scale that might affect reproductive success are not expected to occur at all.

The analyses below in some cases address species collectively if they occupy the same functional hearing group (*i.e.,* low, mid, and high-frequency cetaceans), share similar life history strategies, and/or are known to behaviorally respond similarly to acoustic stressors. Because some of these groups or species share characteristics that inform the impact analysis similarly, it would be duplicative to repeat the same analysis for each species. In addition, similar species typically have the same hearing capabilities and behaviorally respond in the same manner.

Thus, our analysis below considers the effects of the Navy's activities on each affected species or stock even where discussion is organized by functional hearing group and/or information is evaluated at the group level. Where there are meaningful differences between a species or stock that would further differentiate the analysis, they are either described within the section or the discussion for those species or stocks is included as a separate subsection. Specifically, below we first provide broad discussion of the expected effects on the mysticete, odontocete, and pinniped groups generally, and then differentiate into further groups as appropriate.

Mysticetes

This section builds on the broader discussion above and brings together the discussion of the different types and amounts of take that different species and stocks will likely incur, the applicable mitigation, and the status of the species and stocks to support the negligible impact determinations for each species or stock. We have described above (in the *General Negligible Impact Analysis* section) the unlikelihood of any masking having effects that will impact the reproduction or survival of any of the individual marine mammals affected by the Navy's activities. We have also described in the Potential Effects of Specified Activities on Marine Mammals and their Habitat section of the proposed rule that the specified activities would not have adverse or long-term impacts on marine mammal habitat, and therefore the unlikelihood of any habitat impacts affecting the reproduction or survival of any individual marine mammals affected by the Navy's activities. No new information has been received that affects that analysis and conclusion.

For mysticetes, there is no predicted non-auditory tissue damage from explosives for any species, and only two fin whales could be taken by PTS by exposure to in-air explosions at or above the water surface. Much of the discussion below focuses on the behavioral effects and the mitigation measures that reduce the probability or severity of effects. Because there are species-specific and stock-specific considerations, at the end of the section we break out our findings on a species-specific and, for one species, stock-specific basis.

In Table 43 below for mysticetes, we indicate for each species and stock the total annual numbers of take by Level A harassment and Level B harassment, and a number indicating the instances of total take as a percentage of abundance.

TABLE 43—ANNUAL ESTIMATED TAKES BY LEVEL B HARASSMENT AND LEVEL A HARASSMENT FOR MYSTICETES AND NUMBER INDICATING THE INSTANCES OF TOTAL TAKE AS A PERCENTAGE OF SPECIES/STOCK ABUNDANCE

Species	Stock	Instances of indicated types of incidental take [1]			Total takes	Abundance (NMFS SARs) [2]	Instances of total take as percentage of abundance
		Level B harassment		Level A harassment			
		Behavioral disturbance	TTS (may also include disturbance)	PTS			
North Pacific right whale	Eastern North Pacific	1	2	0	3	31	9.7
Humpback whale	California, Oregon, & Washington	2	8	0	10	4,973	<1
	Central North Pacific	11	68	0	79	10,103	<1
	Western North Pacific	[3] 3	0	0	[3] 3	1,107	<1
Blue whale	Central North Pacific	0	3	0	3	133	2.3
	Eastern North Pacific	4	32	0	36	1,898	1.9
Fin whale	Northeast Pacific	115	1,127	2	1,244	[4] 3,168	39.3
Sei whale	Eastern North Pacific	3	34	0	37	519	7.1
Minke whale	Alaska	6	44	0	50	[5] 389	12.9
Gray whale	Eastern North Pacific	[3] 4	0	0	[3] 4	26,960	<1

[1] Estimated impacts are based on the maximum number of activities in a given year under the specified activity. Not all takes represent separate individuals, especially for behavioral disturbance.
[2] Presented in the 2021 SARs or most recent SAR.
[3] The Navy's Acoustic Effects Model estimated zero takes for each of these stocks. However, NMFS conservatively authorized take by Level B harassment of one group of Western North Pacific humpback whale and one group of Eastern North Pacific gray whale. The annual take estimates reflect the average group sizes of on- and off-effort survey sightings of humpback whale and gray whale (excluding an outlier of an estimated 25 gray whales in one group) reported in Rone *et al.* (2017).
[4] The SAR reports this stock abundance assessment as provisional and notes that it is an underestimate for the entire stock because it is based on surveys which covered only a small portion of the stock's range.
[5] The 2018 final SAR (most recent SAR) for the Alaska stock of minke whales reports the stock abundance as unknown because only a portion of the stock's range has been surveyed. To be conservative, for this stock we report the smallest estimated abundance produced during recent surveys.

The majority of takes by harassment of mysticetes in the TMAA are caused by ASW activities. Anti-submarine activities include sources from the MFAS bin (which includes hull-mounted sonar). They are high level, narrowband sources in the 1–10 kHz range, which intersect what is estimated to be the most sensitive area of hearing for mysticetes. They also are used in a large portion of exercises (see Table 1 and Table 3). Most of the takes (88 percent) from the MF1 bin in the TMAA would result from received levels between 166 and 178 dB SPL, while another 11 percent would result from exposure between 160 and 166 dB SPL. For the remaining active sonar bin types, the percentages are as follows: MF4 = 97 percent between 142 and 154 dB SPL and MF5 = 97 percent between 118 and 142 dB SPL. For mysticetes, exposure to explosives would result in comparatively smaller numbers of takes

by Level B harassment by behavioral disturbance (0–11 per stock) and TTS takes (0–2 per stock). Based on this information, the majority of the takes by Level B harassment by behavioral disturbance are expected to be of low to sometimes moderate severity and of a relatively shorter duration. Exposure to explosives would also result in two takes by Level A harassment by PTS of the Northeast Pacific stock of fin whale. No mortality or serious injury and no Level A harassment from non-auditory tissue damage from training activities is anticipated or authorized for any species or stock.

Research and observations show that if mysticetes are exposed to sonar or other active acoustic sources they may react in a number of ways depending on the characteristics of the sound source, their experience with the sound source, and whether they are migrating or on seasonal feeding or breeding grounds. Behavioral reactions may include alerting, breaking off feeding dives and surfacing, diving or swimming away, or no response at all (Department of Defense, 2017; Nowacek, 2007; Richardson, 1995; Southall *et al.,* 2007). Overall, mysticetes have been observed to be more reactive to acoustic disturbance when a noise source is located directly on their migration route. Mysticetes disturbed while migrating could pause their migration or route around the disturbance, while males en route to breeding grounds have been shown to be less responsive to disturbances. Although some may pause temporarily, they will resume migration shortly after the exposure ends. Animals disturbed while engaged in other activities such as feeding or reproductive behaviors may be more likely to ignore or tolerate the disturbance and continue their natural behavior patterns. Alternately, adult females with calves may be more responsive to stressors.

As noted in the Potential Effects of Specified Activities on Marine Mammals and Their Habitat section of the proposed rule, while there are multiple examples from behavioral response studies of odontocetes ceasing their feeding dives when exposed to sonar pulses at certain levels, blue whales were less likely to show a visible response to sonar exposures at certain levels when feeding than when traveling. However, Goldbogen *et al.* (2013) indicated some horizontal displacement of deep foraging blue whales in response to simulated MFAS. Southall *et al.* (2019b) observed that after exposure to simulated and operational mid-frequency active sonar, more than 50 percent of blue whales in deep-diving states responded to the sonar, while no behavioral response was observed in shallow-feeding blue whales. Southall *et al.* (2019b) noted that the behavioral responses they observed were generally brief, of low to moderate severity, and highly dependent on exposure context (behavioral state, source-to-whale horizontal range, and prey availability).

Richardson *et al.* (1995) noted that avoidance (temporary displacement of an individual from an area) reactions are the most obvious manifestations of disturbance in marine mammals. Avoidance is qualitatively different from the startle or flight response, but also differs in the magnitude of the response (*i.e.,* directed movement, rate of travel, *etc.*). Oftentimes avoidance is temporary, and animals return to the area once the noise has ceased. Some mysticetes may avoid larger activities as they move through an area, although the Navy's activities do not typically use the same training locations day-after-day during multi-day activities, except periodically in instrumented ranges, which are not present in the GOA Study Area. Therefore, displaced animals could return quickly after a large activity or MTE is completed.

At most, only one MTE would occur per year (over a maximum of 21 days), and additionally, MF1 mid-frequency active sonar is prohibited from June 1 to September 30 within the North Pacific Right Whale Mitigation Area. Explosives detonated below 10,000 ft. altitude (including at the water surface) are prohibited in the Continental Shelf and Slope Mitigation Area, including in the portion that overlaps the North Pacific Right Whale Mitigation Area. In the open waters of the Gulf of Alaska, the use of Navy sonar and other active acoustic sources is transient and is unlikely to expose the same population of animals repeatedly over a short period of time, especially given the broader-scale movements of mysticetes and the 21-day duration of the activities.

The implementation of procedural mitigation and the sightability of mysticetes (especially given their large size) further reduces the potential for a significant behavioral reaction or a threshold shift to occur (*i.e.,* shutdowns are expected to be successfully implemented), which is reflected in the amount and type of incidental take that is anticipated to occur and authorized.

As noted previously, when an animal incurs a threshold shift, it occurs in the frequency from that of the source up to one octave above. This means that the vast majority of threshold shifts caused by Navy sonar sources will typically occur in the range of 2–20 kHz (from the 1–10 kHz MF bin, though in a specific narrow band within this range as the sources are narrowband), and if resulting from hull-mounted sonar, will be in the range of 3.5–7 kHz. The majority of mysticete vocalizations occur in frequencies below 1 kHz, which means that TTS incurred by mysticetes will not interfere with conspecific communication. Additionally, many of the other critical sounds that serve as cues for navigation and prey (*e.g.,* waves, fish, invertebrates) occur below a few kHz, which means that detection of these signals will not be inhibited by most threshold shift either. When we look in ocean areas where the Navy has been intensively training and testing with sonar and other active acoustic sources for decades, there is no data suggesting any long-term consequences to reproduction or survival rates of mysticetes from exposure to sonar and other active acoustic sources.

All the mysticete species discussed in this section would benefit from the procedural mitigation measures described earlier in the Mitigation Measures section. Additionally, the Navy will issue awareness messages prior to the start of TMAA training activities to alert vessels and aircraft operating within the TMAA to the possible presence of concentrations of large whales, including mysticetes, especially when traversing on the continental shelf and slope where densities of these species may be higher. To maintain safety of navigation and to avoid interactions with marine mammals, the Navy will instruct vessels to remain vigilant to the presence of large whales that may be vulnerable to vessel strikes or potential impacts from training activities. Further, the Navy will limit activities and employ other measures in mitigation areas that would avoid or reduce impacts to mysticetes. Where these mitigation areas are expected to mitigate impacts to particular species or stocks (North Pacific right whale, humpback whale, gray whale), they are discussed in detail below.

Below we compile and summarize the information that supports our determinations that the Navy's activities would not adversely affect any mysticete species or stock through effects on annual rates of recruitment or survival.

North Pacific Right Whale (Eastern North Pacific Stock)

North Pacific right whales are listed as endangered under the ESA, and this species is currently one of the most endangered whales in the world

(Clapham, 2016; NMFS, 2013, 2017; Wade *et al.,* 2010). The current population trend is unknown. ESA-designated critical habitat for the North Pacific right whale is located in the western Gulf of Alaska off Kodiak Island and in the southeastern Bering Sea/Bristol Bay area (Muto *et al.,* 2017; Muto *et al.,* 2018b; Muto *et al.,* 2020a); there is no designated critical habitat for this species within the GOA Study Area. North Pacific right whales are anticipated to be present in the GOA Study Area year round, but are considered rare, with a potentially higher density between June and September. A BIA for feeding (June through September; Ferguson *et al.,* 2015b) overlaps with the TMAA portion of the GOA Study Area by approximately 2,051 km^2 (approximately 7 percent of the feeding BIA and 1.4 percent of the TMAA). This BIA does not overlap with any portion of the WMA. This rule includes a North Pacific Right Whale Mitigation Area and Continental Shelf and Slope Mitigation Area, which both overlap with the portion of the North Pacific right whale feeding BIA that overlaps with the TMAA. From June 1 to September 30, Navy personnel will not use surface ship hull-mounted MF1 mid-frequency active sonar during training activities within the North Pacific Right Whale Mitigation Area. Further, Navy personnel will not detonate explosives below 10,000 ft altitude (including at the water surface) during training at all times in the Continental Shelf and Slope Mitigation Area (including in the portion that overlaps the North Pacific Right Whale Mitigation Area). These restrictions will reduce the severity of impacts to North Pacific right whales by reducing interference in feeding that could result in lost feeding opportunities or necessitate additional energy expenditure to find other good foraging opportunities.

Regarding the magnitude of takes by Level B harassment (TTS and behavioral disturbance), only 3 instances of take by Level B harassment (2 TTS, and 1 behavioral disturbance) are estimated, which equate to about 10 percent of the very small estimated abundance. Given this very small estimate, repeated exposures of individuals are not anticipated. Regarding the severity of individual takes by Level B harassment by behavioral disturbance, we have explained that the duration of any exposure is expected to be between minutes and hours (*i.e.,* relatively short) and the received sound levels largely below 172 dB with a small portion up to 184 dB (*i.e.,* of a moderate or sometimes lower level). Regarding the severity of TTS takes, they are expected to be low-level, of short duration, and mostly not in a frequency band that would be expected to interfere with North Pacific right whale communication or other important low-frequency cues. Therefore, the associated lost opportunities and capabilities are not at a level that would impact reproduction or survival.

Altogether, North Pacific right whales are listed as endangered under the ESA, and the current population trend is unknown. Only three instances of take are estimated to occur (a small portion of the stock), and any individual North Pacific right whale is likely to be disturbed at a low-moderate level. This low magnitude and severity of harassment effects is not expected to result in impacts on the reproduction or survival of any individuals, let alone have impacts on annual rates of recruitment or survival of this stock. No mortality or Level A harassment is anticipated or authorized. For these reasons, we have determined, in consideration of all of the effects of the Navy's activities combined, that the authorized take will have a negligible impact on the Eastern North Pacific stock of North Pacific right whales.

Humpback Whale (California/Oregon/Washington Stock)

The California/Oregon/Washington (CA/OR/WA) stock of humpback whales includes individuals from three ESA DPSs: Central America (endangered), Mexico (threatened), and Hawaii (not listed). A small portion of ESA-designated critical habitat overlaps with the TMAA portion of the GOA Study Area (see Figure 4–1 of the Navy's rulemaking/LOA application). The ESA-designated critical habitat does not overlap with any portion of the WMA. No other BIAs are identified for this species in the GOA Study Area. The SAR identifies this stock as stable (having shown a long-term increase from 1990 and then leveling off between 2008 and 2014). Navy personnel will not use surface ship hull-mounted MF1 mid-frequency active sonar from June 1 to September 30 within the North Pacific Right Whale Mitigation Area, which overlaps 18 percent of the humpback whale critical habitat in the TMAA. Further, Navy personnel will not detonate explosives below 10,000 ft altitude (including at the water surface) during training at all times in the Continental Shelf and Slope Mitigation Area (including in the portion that overlaps the North Pacific Right Whale Mitigation Area), which fully overlaps the portion of the humpback whale critical habitat in the TMAA. These measures will reduce the severity of impacts to humpback whales by reducing interference in feeding that could result in lost feeding opportunities or necessitate additional energy expenditure to find other good opportunities.

Regarding the magnitude of takes by Level B harassment (TTS and behavioral disturbance), the number of estimated total instances of take is 10 (8 TTS and 2 behavioral disturbance), which is less than 1 percent of the abundance. Given the very low number of anticipated instances of take, only a very small portion of individuals in the stock are likely impacted and repeated exposures of individuals are not anticipated. Regarding the severity of those individual takes by Level B harassment by behavioral disturbance, we have explained that the duration of any exposure is expected to be between minutes and hours (*i.e.,* relatively short) and the received sound levels largely below 172 dB with a small portion up to 184 dB (*i.e.,* of a moderate or sometimes lower level). Regarding the severity of TTS takes, they are expected to be low-level, of short duration, and mostly not in a frequency band that would be expected to interfere with humpback whale communication or other important low-frequency cues. Therefore, the associated lost opportunities and capabilities are not at a level that will impact reproduction or survival.

Altogether, this population is stable (even though two of the three associated DPSs are listed as endangered or threatened under the ESA), only a very small portion of the stock is anticipated to be impacted, and any individual humpback whale is likely to be disturbed at a low-moderate level. No mortality or serious injury and no Level A harassment is anticipated or authorized. This low magnitude and severity of harassment effects is not expected to result in impacts on the reproduction or survival of any individuals, let alone have impacts on annual rates of recruitment or survival of this stock. For these reasons, we have determined, in consideration of all of the effects of the Navy's activities combined, that the authorized take will have a negligible impact on the California/Oregon/Washington stock of humpback whales.

Humpback Whale (Central North Pacific Stock)

The Central North Pacific stock of humpback whales consists of winter/spring humpback whale populations of the Hawaiian Islands which migrate

primarily to foraging habitat in northern British Columbia/Southeast Alaska, the Gulf of Alaska, and the Bering Sea/Aleutian Islands. The population is increasing (Muto *et al.,* 2020), the Hawaii DPS is not ESA-listed, and no BIAs have been identified for this species in the GOA Study Area. Navy personnel will not use surface ship hull-mounted MF1 mid-frequency active sonar from June 1 to September 30 within the North Pacific Right Whale Mitigation Area, which overlaps 18 percent of the humpback whale critical habitat within the TMAA. As noted above, the Hawaii DPS is not ESA-listed; however, this ESA-designated critical habitat still indicates the likely value of habitat in this area to non-listed humpback whales. Further, Navy personnel will not detonate explosives below 10,000 ft altitude (including at the water surface) during training at all times in the Continental Shelf and Slope Mitigation Area (including in the portion that overlaps the North Pacific Right Whale Mitigation Area), which fully overlaps the portion of the humpback whale critical habitat in the TMAA. These measures will reduce the severity of impacts to humpback whales by reducing interference in feeding that could result in lost feeding opportunities or necessitate additional energy expenditure to find other good opportunities.

Regarding the magnitude of takes by Level B harassment (TTS and behavioral disturbance), the number of estimated instances of take compared to the abundance is less than 1 percent. This information and the complicated far-ranging nature of the stock structure indicates that only a very small portion of the stock is likely impacted. While no BIAs have been identified in the GOA Study Area, highest densities in the nearby Kodiak Island feeding BIA (July to September) and Prince William Sound feeding BIA (September to December) overlap with much of the potential window for the Navy's exercise in the GOA Study Area (April to October). Given that some whales may remain in the area surrounding these BIAs for some time to feed during the Navy's exercise, there may be a few repeated exposures of a few individuals, most likely on non-sequential days. Regarding the severity of those individual takes by Level B harassment by behavioral disturbance, we have explained that the duration of any exposure is expected to be between minutes and hours (*i.e.,* relatively short) and the received sound levels largely below 172 dB with a small portion up to 184 dB (*i.e.,* of a moderate or sometimes lower level). Regarding the severity of TTS takes, they are expected to be low-level, of short duration, and mostly not in a frequency band that would be expected to interfere with humpback whale communication or other important low-frequency cues. Therefore, the associated lost opportunities and capabilities are not at a level that will impact reproduction or survival.

Altogether, this population is increasing and the associated DPS is not listed as endangered or threatened under the ESA. Only a very small portion of the stock is anticipated to be impacted and any individual humpback whale is likely to be disturbed at a low-moderate level. This low magnitude and severity of harassment effects is not expected to result in impacts on individual reproduction or survival, let alone have impacts on annual rates of recruitment or survival of this stock. No mortality or Level A harassment is anticipated or authorized. For these reasons, we have determined, in consideration of all of the effects of the Navy's activities combined, that the authorized take will have a negligible impact on the Central North Pacific stock of humpback whales.

Humpback Whale (Western North Pacific Stock)

The Western North Pacific stock of humpback whales includes individuals from the Western North Pacific DPS, which is ESA-listed as endangered. A relatively small portion of ESA-designated critical habitat overlaps with the TMAA (2,708 km^2 (1,046 mi^2) of critical habitat Unit 5, 5,991 km^2 (2,313 mi^2) of critical habitat Unit 8; see Figure 4–1 of the Navy's rulemaking/LOA application). The ESA-designated critical habitat does not overlap with any portion of the WMA. No other BIAs are identified for this species in the GOA Study Area. The current population trend for this stock is unknown. Navy personnel will not use surface ship hull-mounted MF1 mid-frequency active sonar from June 1 to September 30 within the North Pacific Right Whale Mitigation Area, which overlaps 18 percent of the humpback whale critical habitat within the TMAA. Further, Navy personnel will not detonate explosives below 10,000 ft altitude (including at the water surface) during training at all times in the Continental Shelf and Slope Mitigation Area (including in the portion that overlaps the North Pacific Right Whale Mitigation Area), which fully overlaps the portion of the humpback whale critical habitat in the TMAA. These measures will reduce the severity of impacts to humpback whales by reducing interference in feeding that could result in lost feeding opportunities or necessitate additional energy expenditure to find other good opportunities.

Regarding the magnitude of takes by Level B harassment (behavioral disturbance only), the number of estimated total instances of take is three, which is less than 1 percent of the abundance. Given the very low number of anticipated instances of take, only a very small portion of individuals in the stock are likely impacted and repeated exposures of individuals are not anticipated. Regarding the severity of those individual takes by Level B harassment by behavioral disturbance, we have explained that the duration of any exposure is expected to be between minutes and hours (*i.e.,* relatively short) and the received sound levels largely below 172 dB with a small portion up to 184 dB (*i.e.,* of a moderate or sometimes lower level).

Altogether, the status of this stock is unknown, only a very small portion of the stock is anticipated to be impacted (3 individuals), and any individual humpback whale is likely to be disturbed at a low-moderate level. No mortality, serious injury, Level A harassment, or TTS is anticipated or authorized. This low magnitude and severity of harassment effects is not expected to result in impacts on the reproduction or survival of any individuals, let alone have impacts on annual rates of recruitment or survival of this stock. For these reasons, we have determined, in consideration of all of the effects of the Navy's activities combined, that the authorized take will have a negligible impact on the Western North Pacific stock of humpback whales.

Blue Whale (Central North Pacific Stock and Eastern North Pacific Stock)

Blue whales are listed as endangered under the ESA throughout their range, but there is no ESA designated critical habitat and no BIAs have been identified for this species in the GOA Study Area. The current population trend for the Central North Pacific stock is unknown, and the Eastern North Pacific stock is stable.

Regarding the magnitude of takes by Level B harassment (TTS and behavioral disturbance), the number of estimated total instances of take compared to the abundance is 2 percent for both the Central North Pacific stock, and the Eastern North Pacific stock. For the Central North Pacific stock, only 3 instances of take (TTS) are anticipated.

Given the range of both blue whale stocks, the absence of any known feeding or aggregation areas, and the very low number of anticipated instances of take of the Central North Pacific stock, this information indicates that only a small portion of individuals in the stock are likely impacted and repeated exposures of individuals are not anticipated. Regarding the severity of those individual takes by Level B harassment by behavioral disturbance, we have explained that the duration of any exposure is expected to be between minutes and hours (*i.e.,* relatively short) and the received sound levels largely below 172 dB with a small portion up to 184 dB (*i.e.,* of a moderate or sometimes lower level). Regarding the severity of TTS takes, we have explained that they are expected to be low-level, of short duration, and mostly not in a frequency band that would be expected to interfere with blue whale communication or other important low-frequency cues. Therefore, the associated lost opportunities and capabilities are not at a level that would impact reproduction or survival.

Altogether, blue whales are listed as endangered under the ESA throughout their range, the current population trend for the Central North Pacific stock is unknown, and the Eastern North Pacific stock is stable. Only a small portion of the stocks are anticipated to be impacted, and any individual blue whale is likely to be disturbed at a low-moderate level. The low magnitude and severity of harassment effects is not expected to result in impacts on the reproduction or survival of any individuals, let alone have impacts on annual rates of recruitment or survival of this stock. No mortality and no Level A harassment is anticipated or authorized. For these reasons, we have determined, in consideration of all of the effects of the Navy's activities combined, that the authorized take will have a negligible impact on the Central North Pacific stock and the Eastern North Pacific stock of blue whales.

Fin Whale (Northeast Pacific Stock)

Fin whales are listed as endangered under the ESA throughout their range, but there is no ESA designated critical habitat and no BIAs have been identified for this species in the GOA Study Area. The SAR identifies this stock as increasing.

Regarding the magnitude of takes by Level B harassment (TTS and behavioral disturbance), the number of estimated total instances of take compared to the abundance is 39 percent (though, as noted in Table 43, the SAR reports the stock abundance assessment as provisional and notes that it is an underestimate for the entire stock because it is based on surveys which covered only a small portion of the stock's range, and therefore 39 percent is likely an overestimate). Given the large range of the stock and short duration of the Navy's activities in the GOA Study Area, this information suggests that notably fewer than half of the individuals of the stock will likely be impacted, and that most affected individuals will likely be disturbed on a few days within the 21-day exercise, with the days most likely being non-sequential. Regarding the severity of those individual takes by Level B harassment by behavioral disturbance, we have explained that the duration of any exposure is expected to be between minutes and hours (*i.e.,* relatively short) and the received sound levels largely below 172 dB with a small portion up to 184 dB (*i.e.,* of a moderate or sometimes lower level). Regarding the severity of TTS takes, they are expected to be low-level, of short duration, and mostly not in a frequency band that would be expected to interfere with fin whale communication or other important low-frequency cues. Therefore, the associated lost opportunities and capabilities are not at a level that will impact reproduction or survival.

For these same reasons (low level and frequency band), while a small permanent loss of hearing sensitivity (PTS) may include some degree of energetic costs for compensating or may mean some small loss of opportunities or detection capabilities, at the expected scale the estimated two takes by Level A harassment by PTS will be unlikely to impact behaviors, opportunities, or detection capabilities to a degree that would interfere with reproductive success or survival of those individuals. Thus, the two takes by Level A harassment by PTS are unlikely to affect rates of recruitment and survival for the stock.

Altogether, fin whales are listed as endangered under the ESA, though this population is increasing. Only a small portion of the stock is anticipated to be impacted, and any individual fin whale is likely to be disturbed at a low-moderate level. This low magnitude and severity of harassment effects is not expected to result in impacts on reproduction or survival of any individuals, let alone have impacts on annual rates of recruitment or survival of this stock. No mortality or serious injury and no Level A harassment from non-auditory tissue damage is anticipated or authorized. For these reasons, we have determined, in consideration of all of the effects of the Navy's activities combined, that the authorized take will have a negligible impact on the Northeast Pacific stock of fin whales.

Sei Whale (Eastern North Pacific Stock)

The population trend of this stock is unknown, however sei whales are listed as endangered under the ESA throughout their range. There is no ESA designated critical habitat and no BIAs have been identified for this species in the GOA Study Area.

Regarding the magnitude of takes by Level B harassment (TTS and behavioral disturbance), the number of estimated total instances of take compared to the abundance is 7 percent. This information and the rare occurrence of sei whales in the TMAA suggests that only a small portion of individuals in the stock will likely be impacted and repeated exposures of individuals are not anticipated. Regarding the severity of those individual takes by Level B harassment by behavioral disturbance, we have explained that the duration of any exposure is expected to be between minutes and hours (*i.e.,* relatively short) and the received sound levels largely below 172 dB with a small portion up to 184 dB (*i.e.,* of a moderate or sometimes lower level). Regarding the severity of TTS takes, they are expected to be low-level, of short duration, and mostly not in a frequency band that would be expected to interfere with sei whale communication or other important low-frequency cues. Therefore, the associated lost opportunities and capabilities are not at a level that will impact reproduction or survival.

Altogether, the status of the stock is unknown and the species is listed as endangered, only a small portion of the stock is anticipated to be impacted, and any individual sei whale is likely to be disturbed at a low-moderate level. This low magnitude and severity of harassment effects is not expected to result in impacts on individual reproduction or survival, much less annual rates of recruitment or survival. No mortality and no Level A harassment is anticipated or authorized. For these reasons, we have determined, in consideration of all of the effects of the Navy's activities combined, that the authorized take will have a negligible impact on the Eastern North Pacific stock of sei whales.

Minke Whale (Alaska Stock)

The status of this stock is unknown and the species is not listed under the ESA. No BIAs have been identified for this species in the GOA Study Area.

Regarding the magnitude of takes by Level B harassment (TTS and behavioral disturbance), the number of estimated total instances of take compared to the abundance is 13 percent for the Alaska stock (based on, to be conservative, the smallest available provisional estimate in the SAR, which is derived from surveys that cover only a portion of the stock's range). Given the range of the Alaska stock of minke whales, this information indicates that only a small portion of individuals in this stock are likely to be impacted and repeated exposures of individuals are not anticipated. Regarding the severity of those individual takes by Level B harassment by behavioral disturbance, we have explained that the duration of any exposure is expected to be between minutes and hours (*i.e.,* relatively short) and the received sound levels largely below 172 dB with a small portion up to 184 dB (*i.e.,* of a moderate or sometimes lower level). Regarding the severity of TTS takes, they are expected to be low-level, of short duration, and mostly not in a frequency band that would be expected to interfere with minke whale communication or other important low-frequency cues. Therefore, the associated lost opportunities and capabilities are not at a level that will impact reproduction or survival.

Altogether, although the status of the stock is unknown, the species is not listed under the ESA as endangered or threatened, only a small portion of the stock is anticipated to be impacted, and any individual minke whale is likely to be disturbed at a low-moderate level. This low magnitude and severity of harassment effects is not expected to result in impacts on individual reproduction or survival, let alone have impacts on annual rates of recruitment or survival of this stock. No mortality, serious injury, or Level A harassment is anticipated or authorized. For these reasons, we have determined, in consideration of all of the effects of the Navy's activities combined, that the authorized take will have a negligible impact on the Alaska stock of minke whales.

Gray Whale (Eastern North Pacific Stock)

The Eastern North Pacific stock of gray whale is not ESA-listed, and the SAR indicates that the stock is increasing. However, recent (2021–2022) surveys conducted by NMFS' Southwest Fisheries Science Center estimated that the population has declined to 16,650 whales, though the authors note that this stock has historically shown a pattern of population growth and decline that has not impacted the population in the long term (Eguchi *et al.,* 2022). The TMAA portion of the GOA Study Area overlaps with a gray whale migration corridor that has been identified as a BIA (November–January (outside of the potential training window), southbound; March–May, northbound; Ferguson *et al.,* 2015). The WMA portion of the GOA Study Area does not overlap with any known important areas for gray whales.

Regarding the magnitude of takes by Level B harassment (behavioral disturbance only), the number of estimated total instances of take is four, which is less than 1 percent of the abundance, regardless of whether the number of takes is compared to the abundance in the SAR or Eguchi *et al.* (2022). Given the very low number of anticipated instances of take, only a very small portion of individuals in the stock are likely impacted and repeated exposures of individuals are not anticipated. Regarding the severity of those individual takes by Level B harassment by behavioral disturbance, we have explained that the duration of any exposure is expected to be between minutes and hours (*i.e.,* relatively short) and the received sound levels largely below 172 dB with a small portion up to 184 dB (*i.e.,* of a moderate or sometimes lower level).

Altogether, while we have considered the impacts of the gray whale UME, this population of gray whales is not endangered or threatened under the ESA. No mortality, Level A harassment, or TTS is anticipated or authorized. Only a very small portion of the stock is anticipated to be impacted, and any individual gray whale is likely to be disturbed at a low-moderate level. This low magnitude and severity of harassment effects is not expected to result in impacts on the reproduction or survival of any individuals, let alone have impacts on annual rates of recruitment or survival of this stock. For these reasons, we have determined, in consideration of all of the effects of the Navy's activities combined, that the authorized take will have a negligible impact on the Eastern North Pacific stock of gray whales.

Odontocetes

This section builds on the broader discussion above and brings together the discussion of the different types and amounts of take that different species and stocks will likely incur, the applicable mitigation, and the status of the species and stocks to support the negligible impact determinations for each species or stock. We have described (above in the *General Negligible Impact Analysis* section) the unlikelihood of any masking having effects that will impact the reproduction or survival of any of the individual marine mammals affected by the Navy's activities. We have also described above in the Potential Effects of Specified Activities on Marine Mammals and their Habitat section of the proposed rule that the specified activities would not have adverse or long-term impacts on marine mammal habitat, and therefore the unlikelihood of any habitat impacts affecting the reproduction or survival of any of the individual marine mammals affected by the Navy's activities. No new information has been received that affects this analysis and conclusion. There is no anticipated PTS from sonar or explosives for most odontocetes, with the exception of Dall's porpoise, which is discussed below. There is no anticipated M/SI or non-auditory tissue damage from sonar or explosives for any species. Here, we include information that applies to all of the odontocete species, which are then further divided and discussed in more detail in the following subsections: sperm whales; beaked whales; dolphins and small whales; and porpoises. These subsections include more specific information about the groups, as well as conclusions for each species or stock represented.

The majority of takes by harassment of odontocetes in the TMAA are caused by sources from the MFAS bin (which includes hull-mounted sonar) because they are high level, typically narrowband sources at a frequency (in the 1–10 kHz range) that overlaps a more sensitive portion (though not the most sensitive) of the MF hearing range and they are used in a large portion of exercises (see Table 1 and Table 3). For odontocetes other than beaked whales (for which these percentages are indicated separately in that section), most of the takes (95 percent) from the MF1 bin in the TMAA will result from received levels between 160 and 172 dB SPL. For the remaining active sonar bin types, the percentages are as follows: MF4 = 98 percent between 142 and 160 dB SPL and MF5 = 94 percent between 118 and 142 dB SPL. Based on this information, the majority of the takes by Level B harassment by behavioral disturbance are expected to be low to sometimes moderate in nature, but still of a generally shorter duration.

For all odontocetes, takes from explosives (Level B harassment by behavioral disturbance, TTS, or PTS) comprise a very small fraction (and low number) of those caused by exposure to active sonar. For the following

odontocetes, zero takes from explosives are expected to occur: sperm whale, killer whale, Pacific white-sided dolphin, Baird's beaked whale, and Stejneger's beaked whale. For Level B harassment by behavioral disturbance from explosives, one take is anticipated for Cuvier's beaked whale and 38 takes are anticipated for Dall's porpoise. No TTS or PTS is expected to occur from explosives for any stocks except Dall's porpoise. Because of the lower TTS and PTS thresholds for HF odontocetes, the Alaska stock of Dall's porpoise is expected to have 229 takes by TTS and 45 takes by PTS from explosives.

Because the majority of harassment takes of odontocetes result from the sources in the MFAS bin, the vast majority of threshold shift would occur upon receipt of a single frequency within the 1–10 kHz range and, therefore, the vast majority of threshold shift caused by Navy sonar sources would be at a single frequency within the range of 2–20 kHz. The frequency range within which any of the anticipated narrowband threshold shift would occur would fall directly within the range of most odontocete vocalizations (2–20 kHz) (though phocoenids generally communicate at higher frequencies (Soerensen *et al.,* 2018; Clausen *et al.,* 2010), which would not be impacted by this threshold shift). For example, the most commonly used hull-mounted sonar has a frequency around 3.5 kHz, and any associated threshold shift would be expected to be at around 7 kHz. However, odontocete vocalizations typically span a much wider range than this, and alternately, threshold shift from active sonar will often be in a narrower band (reflecting the narrower band source that caused it), which means that TTS incurred by odontocetes would typically only interfere with communication within a portion of their hearing range (if it occurred during a time when communication with conspecifics was occurring) and, as discussed earlier, it would only be expected to be of a short duration and relatively small degree. Odontocete echolocation occurs predominantly at frequencies significantly higher than 20 kHz (though there may be some small overlap at the lower part of their echolocating range for some species), which means that there is little likelihood that threshold shift, either temporary or permanent, would interfere with feeding behaviors. Many of the other critical sounds that serve as cues for navigation and prey (*e.g.,* waves, fish, invertebrates) occur below a few kHz, which means that detection of these signals will not be inhibited by most threshold shift either. The low number of takes by threshold shift that might be incurred by individuals exposed to explosives would likely be lower frequency (5 kHz or less) and spanning a wider frequency range, which could slightly lower an individual's sensitivity to navigational or prey cues, or a small portion of communication calls, for several minutes to hours (if temporary) or permanently. There is no reason to think that the vast majority of the individual odontocetes taken by TTS would incur TTS on more than one day, although a small number could incur TTS on a few days at most. Therefore, odontocetes are unlikely to incur impacts on reproduction or survival as a result of TTS. The number of PTS takes from these sources are very low (0 for all species other than Dall's porpoise), and while spanning a wider frequency band, are still expected to be of a low degree (*i.e.,* low amount of hearing sensitivity loss) and unlikely to affect reproduction or survival.

The range of potential behavioral effects of sound exposure on marine mammals generally, and odontocetes specifically, has been discussed in detail previously. There are behavioral patterns that differentiate the likely impacts on odontocetes as compared to mysticetes. First, odontocetes echolocate to find prey, which means that they actively send out sounds to detect their prey. While there are many strategies for hunting, one common pattern, especially for deeper diving species, is many repeated deep dives within a bout, and multiple bouts within a day, to find and catch prey. As discussed above, studies demonstrate that odontocetes may cease their foraging dives in response to sound exposure. If enough foraging interruptions occur over multiple sequential days, and the individual either does not take in the necessary food, or must exert significant effort to find necessary food elsewhere, energy budget deficits can occur that could potentially result in impacts to reproductive success, such as increased cow/calf intervals (the time between successive calving). However, the relatively low impact of the Navy's activities on odontocetes in the TMAA indicate this is not likely to occur. Second, while many mysticetes rely on seasonal migratory patterns that position them in a geographic location at a specific time of the year to take advantage of ephemeral large abundances of prey (*i.e.,* invertebrates or small fish, which they eat by the thousands), odontocetes forage more homogeneously on one fish or squid at a time. Therefore, if odontocetes are interrupted while feeding, it is often possible to find more prey relatively nearby.

All the odontocete species and stocks discussed in this section would benefit from the procedural mitigation measures described earlier in the Mitigation Measures section.

Sperm Whale (North Pacific Stock)

This section builds on the broader odontocete discussion above and brings together the discussion of the different types and amounts of take that sperm whales would likely incur, the applicable mitigation, and the status of the species/stock to support the negligible impact determination for the stock.

Sperm whales are listed as endangered under the ESA. No critical habitat has been designated for sperm whales under the ESA and no BIAs for sperm whales have been identified in the GOA Study Area. The stock's current population trend is unknown. The Navy will issue awareness messages prior to the start of TMAA training activities to alert Navy ships and aircraft operating within the TMAA to the possible presence of increased concentrations of large whales, including sperm whales. This measure would further reduce any possibility of ship strike of sperm whales.

In Table 44 below for sperm whales, we indicate the total annual numbers of take by Level A harassment and Level B harassment, and a number indicating the instances of total take as a percentage of abundance.

TABLE 44—ANNUAL ESTIMATED TAKES BY LEVEL B HARASSMENT AND LEVEL A HARASSMENT FOR SPERM WHALES IN THE TMAA AND NUMBER INDICATING THE INSTANCES OF TOTAL TAKE AS A PERCENTAGE OF SPECIES/STOCK ABUNDANCE

Species	Stock	Instances of indicated types of incidental take [1]			Total takes	Abundance (NMFS SARs) [2]	Instances of total take as percentage of abundance
		Level B harassment		Level A harassment			
		Behavioral disturbance	TTS (may also include disturbance)	PTS			
Sperm whale	North Pacific	107	5	0	112	[3] 345	32.5

[1] Estimated impacts are based on the maximum number of activities in a given year under the specified activity. Not all takes represent separate individuals, especially for disturbance.
[2] Presented in the 2021 SARs or most recent SAR.
[3] The SAR reports that this is an underestimate for the entire stock because it is based on surveys of a small portion of the stock's extensive range and it does not account for animals missed on the trackline or for females and juveniles in tropical and subtropical waters.

Regarding the magnitude of takes by Level B harassment (TTS and behavioral disturbance), the number of estimated total instances of take compared to the abundance is 33 percent. Given the range of this stock, and the fact that the abundance estimate is an underestimate for the entire stock given that it is based on surveys of a small portion of the stock's extensive range and does not account for animals missed on the trackline or for females and juveniles in tropical and subtropical waters, this information indicates that fewer than half of the individuals in the stock are likely to be impacted, with those individuals disturbed on likely one, but not more than a few non-sequential days within the 21 days per year. Additionally, while interrupted feeding bouts are a known response and concern for odontocetes, we also know that there are often viable alternative habitat options in the relative vicinity. Regarding the severity of those individual takes by Level B harassment by behavioral disturbance, we have explained that the duration of any exposure is expected to be between minutes and hours (*i.e.,* relatively short) and the received sound levels largely below 172 dB (*i.e.,* of a lower, to occasionally moderate, level and less likely to evoke a severe response). As discussed earlier in the Analysis and Negligible Impact Determination section, we anticipate more severe effects from takes when animals are exposed to higher received levels or for longer durations. Occasional milder Level B harassment by behavioral disturbance, as is expected here, is unlikely to cause long-term consequences for either individual animals or populations, even if some smaller subset of the takes are in the form of a longer (several hours or a day) and more moderate response. Regarding the severity of TTS takes, they are expected to be low-level, of short duration, and mostly not in a frequency band that would be expected to interfere with sperm whale communication or other important low-frequency cues. Therefore, the associated lost opportunities and capabilities are not at a level that will impact reproduction or survival.

Altogether, sperm whales are listed as endangered under the ESA, and the current population trend is unknown. Fewer than half of the individuals of the stock are anticipated to be impacted, and any individual sperm whale is likely to be disturbed at a low-moderate level. This low magnitude and severity of harassment effects is not expected to result in impacts on reproduction or survival for any individuals, let alone have impacts on annual rates of recruitment or survival of this stock. No mortality, serious injury, or Level A harassment is anticipated or authorized. For these reasons, we have determined, in consideration of all of the effects of the Navy's activities combined, that the authorized take will have a negligible impact on the North Pacific stock of sperm whales.

Beaked Whales

This section builds on the broader odontocete discussion above and brings together the discussion of the different types and amounts of take that different beaked whale species and stocks would likely incur, the applicable mitigation, and the status of the species and stocks to support the negligible impact determinations for each species or stock. For beaked whales, no mortality or Level A harassment is anticipated or authorized.

In Table 45 below for beaked whales, we indicate the total annual numbers of take by Level A harassment and Level B harassment, and a number indicating the instances of total take as a percentage of abundance.

TABLE 45—ANNUAL ESTIMATED TAKES BY LEVEL B HARASSMENT AND LEVEL A HARASSMENT FOR BEAKED WHALES IN THE TMAA AND NUMBER INDICATING THE INSTANCES OF TOTAL TAKE AS A PERCENTAGE OF SPECIES/STOCK ABUNDANCE

Species	Stock	Instances of indicated types of incidental take [1]			Total takes	Abundance (NMFS SARs) [2]	Instances of total take as percentage of abundance
		Level B harassment		Level A harassment			
		Behavioral disturbance	TTS (may also include disturbance)	PTS			
Baird's beaked whale	Alaska	106	0	0	106	NA	NA
Cuvier's beaked whale	Alaska	430	3	0	433	NA	NA
Stejneger's beaked whale	Alaska	467	15	0	482	NA	NA

[1] Estimated impacts are based on the maximum number of activities in a given year under the specified activity. Not all takes represent separate individuals, especially for disturbance.
[2] Reliable estimates of abundance for these stocks are currently unavailable.

This first paragraph provides specific information that is in lieu of the parallel information provided for odontocetes as a whole. The majority of takes by harassment of beaked whales in the TMAA will be caused by sources from

the MFAS bin (which includes hull-mounted sonar) because they are high level narrowband sources that fall within the 1–10 kHz range, which overlap a more sensitive portion (though not the most sensitive) of the MF hearing range. Also, of the sources expected to result in take, they are used in a large portion of exercises (see Table 1 and Table 3). Most of the takes (98 percent) from the MF1 bin in the TMAA will result from received levels between 148 and 166 dB SPL. For the remaining active sonar bin types, the percentages are as follows: MF4 = 97 percent between 130 and 148 dB SPL and MF5 = 99 percent between 100 and 148 dB SPL. Given the levels they are exposed to and beaked whale sensitivity, some responses will be of a lower severity, but many will likely be considered moderate, but still of generally short duration.

Research has shown that beaked whales are especially sensitive to the presence of human activity (Pirotta *et al.,* 2012; Tyack *et al.,* 2011) and therefore have been assigned a lower harassment threshold, with lower received levels resulting in a higher percentage of individuals being harassed and a more distant distance cutoff (50 km for high source level, 25 km for moderate source level).

Beaked whales have been documented to exhibit avoidance of human activity or respond to vessel presence (Pirotta *et al.,* 2012). Beaked whales were observed to react negatively to survey vessels or low altitude aircraft by quick diving and other avoidance maneuvers, and none were observed to approach vessels (Wursig *et al.,* 1998). Available information suggests that beaked whales likely have enhanced sensitivity to sonar sound, given documented incidents of stranding in conjunction with specific circumstances of MFAS use, although few definitive causal relationships between MFAS use and strandings have been documented (see Potential Effects of Specified Activities on Marine Mammals and their Habitat section). NMFS did not authorize mortality of beaked whales (or any other species or stocks) resulting from exposure to active sonar, as mortality is not anticipated for the reasons described in the Potential Effects of Specified Activities on Marine Mammals and Their Habitat section of the proposed rule (87 FR 49656; August 11, 2022).

Research and observations show that if beaked whales are exposed to sonar or other active acoustic sources, they may startle, break off feeding dives, and avoid the area of the sound source to levels of 157 dB re: 1 μPa, or below (McCarthy *et al.,* 2011). For example, after being exposed to 1–2 kHz upsweep naval sonar signals at a received SPL of 107 dB re 1 μPa, Northern bottlenose whales began moving in an unusually straight course, made a near 180° turn away from the source, and performed the longest and deepest dive (94 min, 2,339 m) recorded for this species (Miller *et al.,* 2015). Wensveen *et al.* (2019) also documented avoidance behaviors in Northern bottlenose whales exposed to 1–2 kHz tonal sonar signals with SPLs ranging between 117–126 dB re: 1 μPa, including interrupted diving behaviors, elevated swim speeds, directed movements away from the sound source, and cessation of acoustic signals throughout exposure periods. Acoustic monitoring during actual sonar exercises revealed some beaked whales continuing to forage at levels up to 157 dB re: 1 μPa (Tyack *et al.,* 2011). Stimpert *et al.* (2014) tagged a Baird's beaked whale, which was subsequently exposed to simulated MFAS. Changes in the animal's dive behavior and locomotion were observed when received level reached 127 dB re: 1 μPa. However, Manzano-Roth *et al.* (2013) found that for beaked whale dives that continued to occur during MFAS activity, differences from normal dive profiles and click rates were not detected with estimated received levels up to 137 dB re: 1 μPa while the animals were at depth during their dives. In research done at the Navy's fixed tracking range in the Bahamas, animals were observed to leave the immediate area of the Anti-Submarine Warfare training exercise (avoiding the sonar acoustic footprint at a distance where the received level was ''around 140 dB SPL,'' according to Tyack *et al.* (2011)), but return within a few days after the event ended (Claridge and Durban, 2009; McCarthy *et al.,* 2011; Moretti *et al.,* 2009, 2010; Tyack *et al.,* 2010, 2011). Joyce *et al.* (2019) found that Blainville's beaked whales moved up to 68 km away from an Atlantic Undersea Test and Evaluation Center site and reduced time spent on deep dives after the onset of mid-frequency active sonar exposure; whales did not return to the site until 2–4 days after the exercises ended. Changes in acoustic activity have also been documented. For example, Blainville's beaked whales showed decreased group vocal periods after biannual multi-day Navy training activities (Henderson *et al.,* 2016). Tyack *et al.* (2011) reported that, in reaction to sonar playbacks, most beaked whales stopped echolocating, made long slow ascent to the surface, and moved away from the sound. A similar behavioral response study conducted in Southern California waters during the 2010–2011 field season found that Cuvier's beaked whales exposed to MFAS displayed behavior ranging from initial orientation changes to avoidance responses characterized by energetic fluking and swimming away from the source (DeRuiter *et al.,* 2013b). However, the authors did not detect similar responses to incidental exposure to distant naval sonar exercises at comparable received levels, indicating that context of the exposures (*e.g.,* source proximity, controlled source ramp-up) may have been a significant factor. The study itself found the results inconclusive and meriting further investigation. Falcone *et al.* (2017) however, documented that Cuvier's beaked whales had longer dives and surface durations after exposure to mid-frequency active sonar, with the longer surface intervals contributing to a longer interval between deep dives, a proxy for foraging disruption in this species. Cuvier's beaked whale responses suggested particular sensitivity to sound exposure consistent with results for Blainville's beaked whale.

Populations of beaked whales and other odontocetes on the Bahamas and other Navy fixed ranges that have been operating for decades appear to be stable. Behavioral reactions (avoidance of the area of Navy activity) seem most likely in cases where beaked whales are exposed to anti-submarine sonar within a few tens of kilometers, especially for prolonged periods (a few hours or more) since this is one of the most sensitive marine mammal groups to anthropogenic sound of any species or group studied to date and research indicates beaked whales will leave an area where anthropogenic sound is present (De Ruiter *et al.,* 2013; Manzano-Roth *et al.,* 2013; Moretti *et al.,* 2014; Tyack *et al.,* 2011). Research involving tagged Cuvier's beaked whales in the SOCAL Range Complex reported on by Schorr *et al.* (2022) indicates year-round prolonged use of the Navy's training and testing area by these beaked whales and has documented movements in excess of hundreds of kilometers by some of those animals. Given that some of these animals may routinely move hundreds of kilometers as part of their normal pattern, leaving an area where sonar or other anthropogenic sound is present may have little, if any, cost to such an animal. Photo identification studies in the SOCAL Range Complex, have identified approximately 100 Cuvier's beaked whale individuals with 40 percent having been seen in one or more prior years, with re-sightings up to

7 years apart (Falcone and Schorr, 2014). These results indicate long-term residency by individuals in an intensively used Navy training and testing area, which may also suggest a lack of long-term consequences as a result of exposure to Navy training and testing activities. More than 8 years of passive acoustic monitoring on the Navy's instrumented range west of San Clemente Island documented no significant changes in annual and monthly beaked whale echolocation clicks, with the exception of repeated fall declines likely driven by natural beaked whale life history functions (DiMarzio *et al.,* 2018). Finally, results from passive acoustic monitoring estimated that regional Cuvier's beaked whale densities were higher than indicated by NMFS' broad scale visual surveys for the United States West Coast (Hildebrand and McDonald, 2009).

Below we compile and summarize the information that supports our determinations that the Navy's activities would not adversely affect any of the beaked whale stocks through effects on annual rates of recruitment or survival.

Baird's, Cuvier's, and Stejneger's Beaked Whales (Alaska Stocks)

Baird's beaked whale, Cuvier's beaked whale, and Stejneger's beaked whale are not listed as endangered or threatened species under the ESA, and the 2019 Alaska SARs indicate that trend information is not available for any of the Alaska stocks. No BIAs for beaked whales have been identified in the GOA Study Area.

As indicated in Table 45, no abundance estimates are available for any of the stocks. However, the ranges of all three stocks are large compared to the GOA Study Area (Cuvier's is the smallest, occupying all of the Gulf of Alaska, south of the Canadian border and west along the Aleutian Islands. Baird's range even farther south and Baird's and Stejneger's also cross north over the Aleutian Islands).

Regarding abundance and distribution of these species in the vicinity of the TMAA, passive acoustic data indicate spatial overlap of all three beaked whales; however, detections are spatially offset, suggesting some level of habitat portioning in the Gulf of Alaska (Rice *et al.,* 2019, 2020, 2021). Peaks in detections by Rice *et al.* (2021) were also temporally offset, with detections of Baird's beaked whale clicks peaking in winter at the slope and in spring at the seamounts. Rice *et al.* (2021) indicates Baird's beaked whales were highest in number at Quinn seamount, which overlaps with the southern edge of the TMAA, and therefore, a portion of this habitat is outside of the TMAA. Baumann Pickering *et al.* (2012b) did not acoustically detect Baird's beaked whales from July–October in the northern Gulf of Alaska (overlapping with the majority of the Navy's potential training period), while acoustic detections from November–January suggest that Baird's beaked whales may winter in this area. Rice *et al.* (2021) reported the highest detections of Baird's beaked whales within the TMAA during the spring in the portion of the TMAA that is farther offshore, with lowest detections in the summer and an increase in detections on the continental slope in the winter, indicating that the whales are either not producing clicks in the summer or they are migrating farther north or south to feed or mate during this time.

Data from a satellite-tagged Baird's beaked whale off Southern California recently documented movement north along the shelf-edge for more than 400 nmi over a six-and-a-half-day period (Schorr *et al.,* Unpublished). If that example is reflective of more general behavior, Baird's beaked whales present in the TMAA may have much larger home ranges than the waters bounded by the TMAA, reducing the potential for repeated takes of individuals.

Regarding Stejneger's beaked whale, passive acoustic monitoring detected the whales most commonly at the slope and offshore in the TMAA (Rice *et al.,* 2021; Rice *et al.,* 2018b; Rice *et al.,* 2020). At the slope, Stejneger's beaked whale detections peaked in fall (Rice *et al.,* 2021). Rice *et al.* (2021) notes that to date, there have been no documented sightings of Stejneger's beaked whales that were simultaneous with recording of vocalizations, which is necessary to confirm the vocalizations were produced by the species, and therefore, detections should be interpreted with caution. Baumann-Pickering *et al.* (2012b) recorded acoustic signals believed to be produced by Stejneger's beaked whales (based on frequency characteristics, interpulse interval, and geographic location; Baumann-Pickering *et al.,* 2012a) almost weekly from July 2011 to February 2012 in the northern Gulf of Alaska.

Regarding Cuvier's beaked whale, passive acoustic monitoring at five sites in the TMAA (Rice *et al.,* 2015, 2018b, 2019, 2020, 2021) has intermittently detected Cuvier's beaked whale vocalizations in low numbers in every month except April, although there are generally multiple months in any given year where no detections are made.

Regarding the magnitude of takes by Level B harassment (TTS and behavioral disturbance), the anticipated takes would occur within a small portion of the stocks' ranges (including that none of the stocks are expected to occur in the far western edge of the TMAA; U.S. Department of the Navy, 2021) and will occur within the 21-day window of the annual activities. In consideration of these factors and the passive acoustic monitoring data described in this section, which indicates relatively low beaked whale presence in the TMAA during the Navy's planned training period, it is likely that a portion of the stocks would be taken, and a subset of them may be taken on a few days, with no indication that these days will be sequential.

Regarding the severity of those individual takes by Level B harassment by behavioral disturbance, we have explained that the duration of any exposure is expected to be between minutes and hours (*i.e.,* relatively short) and the received sound levels largely below 166 dB, though with beaked whales, which are considered somewhat more sensitive, this could mean that some individuals would leave preferred habitat for a day (*i.e.,* moderate level takes). However, while interrupted feeding bouts are a known response and concern for odontocetes, we also know that there are often viable alternative habitat options nearby. Regarding the severity of TTS takes (anticipated for Cuvier's and Stejneger's beaked whales only), they are expected to be low-level, of short duration, and mostly not in a frequency band that would be expected to interfere with beaked whale communication or other important low-frequency cues. Therefore, the associated lost opportunities and capabilities are not at a level that will impact reproduction or survival. As mentioned earlier in the odontocete overview, we anticipate more severe effects from takes when animals are exposed to higher received levels or sequential days of impacts.

Altogether, none of these species are ESA-listed, only a portion of the stocks are anticipated to be impacted, and any individual beaked whale is likely to be disturbed at a moderate or sometimes low level. This low magnitude and moderate to lower severity of harassment effects is not expected to result in impacts on individual reproduction or survival, let alone have impacts on annual rates of recruitment or survival of this stock. No mortality, serious injury, or Level A harassment is anticipated or authorized. For these reasons, we have determined, in consideration of all of the effects of the Navy's activities combined, that the authorized take will have a negligible

impact on the Alaska stocks of beaked whales.

Dolphins and Small Whales

This section builds on the broader odontocete discussion above and brings together the discussion of the different types and amounts of take that different dolphin and small whale species and stocks are likely to incur, the applicable mitigation, and the status of the species and stocks to support the negligible impact determinations for each species or stock. For all dolphin and small whale stocks discussed here, no mortality or Level A harassment is anticipated or authorized.

In Table 46 below for dolphins and small whales, we indicate the total annual numbers of take by Level A harassment and Level B harassment, and a number indicating the instances of total take as a percentage of abundance.

TABLE 46—ANNUAL ESTIMATED TAKES BY LEVEL B HARASSMENT AND LEVEL A HARASSMENT FOR DOLPHINS AND SMALL WHALES IN THE TMAA AND NUMBER INDICATING THE INSTANCES OF TOTAL TAKE AS A PERCENTAGE OF SPECIES/STOCK ABUNDANCE

Species	Stock	Instances of indicated types of incidental take [1]			Total takes	Abundance (NMFS SARs) [2]	Instances of total take as percentage of abundance
		Level B harassment		Level A harassment			
		Behavioral disturbance	TTS (may also include disturbance)	PTS			
Killer whale	Eastern North Pacific Offshore.	64	17	0	81	300	27.0
	Eastern North Pacific Gulf of Alaska, Aleutian Islands, and Bering Sea Transient.	119	24	0	143	587	24.4
Pacific white-sided dolphins	North Pacific	1,102	472	0	1,574	26,880	5.9

[1] Estimated impacts are based on the maximum number of activities in a given year under the specified activity. Not all takes represent separate individuals, especially for disturbance.
[2] Presented in the 2021 SARs or most recent SAR.

As described above, the large majority of Level B harassment by behavioral disturbance to odontocetes, and thereby dolphins and small whales, from hull-mounted sonar (MFAS) in the TMAA will result from received levels between 160 and 172 dB SPL. Therefore, the majority of takes by Level B harassment are expected to be in the form of low to occasionally moderate responses of a generally shorter duration. As mentioned earlier in this section, we anticipate more severe effects from takes when animals are exposed to higher received levels or for longer durations. Occasional milder occurrences of Level B harassment by behavioral disturbance are unlikely to cause long-term consequences for individual animals, much less have any effect on annual rates of recruitment or survival. No mortality, serious injury, or Level A harassment is expected or authorized.

Research and observations show that if delphinids are exposed to sonar or other active acoustic sources they may react in a number of ways depending on their experience with the sound source and what activity they are engaged in at the time of the acoustic exposure. Delphinids may not react at all until the sound source is approaching within a few hundred meters to within a few kilometers depending on the environmental conditions and species. Some dolphin species (the more surface-dwelling taxa—typically those with ''dolphin'' in the common name, such as bottlenose dolphins, spotted dolphins, spinner dolphins, rough-toothed dolphins, *etc.,* but not Risso's dolphin), especially those residing in more industrialized or busy areas, have demonstrated more tolerance for disturbance and loud sounds and many of these species are known to approach vessels to bow-ride. These species are often considered generally less sensitive to disturbance. Dolphins and small whales that reside in deeper waters and generally have fewer interactions with human activities are more likely to demonstrate more typical avoidance reactions and foraging interruptions as described above in the odontocete overview.

Below we compile and summarize the information that supports our determinations that the Navy's activities will not adversely affect any of the dolphins and small whales through effects on annual rates of recruitment or survival.

Killer Whales (Eastern North Pacific Offshore; Eastern North Pacific Gulf of Alaska, Aleutian Islands, and Bering Sea Transient)

No killer whale stocks in the TMAA are listed as DPSs under the ESA, and no BIAs for killer whales have been identified in the GOA Study Area. The Eastern North Pacific Offshore stock is reported as ''stable,'' and the population trend of the Eastern North Pacific Gulf of Alaska, Aleutian Islands, and Bering Sea Transient stock is unknown.

Regarding the magnitude of takes by Level B harassment (TTS and behavioral disturbance), the number of estimated total instances of take compared to the abundance is 27 percent for the Eastern North Pacific Offshore stock and 24 percent for the Eastern North Pacific Gulf of Alaska, Aleutian Islands, and Bering Sea Transient stock. This information indicates that only a portion of each stock is likely impacted, with those individuals disturbed on likely one, but not more than a few non-sequential days within the 21 days per year. Regarding the severity of those individual takes by Level B harassment by behavioral disturbance, we have explained that the duration of any exposure is expected to be between minutes and hours (*i.e.,* relatively short) and the received sound levels largely below 172 dB (*i.e.,* of a lower, to occasionally moderate, level and less likely to evoke a severe response). Regarding the severity of TTS takes, they are expected to be low-level, of short duration, and mostly not in a frequency band that would be expected to interfere with killer whale communication or other important low-frequency cues. Therefore, the associated lost opportunities and capabilities are not at a level that will impact reproduction or survival.

Altogether, these killer whale stocks are not listed under the ESA. The Eastern North Pacific Offshore stock is reported as ''stable,'' and the population trend of the Eastern North Pacific Gulf

of Alaska, Aleutian Islands, and Bering Sea Transient stock is unknown. Only a portion of these killer whale stocks is anticipated to be impacted, and any individual is likely to be disturbed at a low-moderate level, with the taken individuals likely exposed on one day but not more than a few non-sequential days within a year. This low magnitude and severity of harassment effects is unlikely to result in impacts on individual reproduction or survival, let alone have impacts on annual rates of recruitment or survival of either of the stocks. No mortality or Level A harassment is anticipated or authorized for either of the stocks. For these reasons, we have determined, in consideration of all of the effects of the Navy's activities combined, that the authorized take will have a negligible impact on these killer whale stocks.

Pacific White-Sided Dolphins (North Pacific Stock)

Pacific white-sided dolphins are not listed under the ESA and the current population trend of the North Pacific stock is unknown. No BIAs for this stock have been identified in the GOA Study Area.

Regarding the magnitude of takes by Level B harassment (TTS and behavioral disturbance), the number of estimated total instances of take compared to the abundance is 6 percent. Given the number of takes, only a small portion of the stock is likely impacted, and individuals are likely disturbed between one and a few days, most likely non-sequential, within a year. Regarding the severity of those individual takes by Level B harassment by behavioral disturbance, we have explained that the duration of any exposure is expected to be between minutes and hours (*i.e.,* relatively short) and the received sound levels largely below 172 dB (*i.e.,* of a lower, to occasionally moderate, level and less likely to evoke a severe response). However, while interrupted feeding bouts are a known response and concern for odontocetes, we also know that there are often viable alternative habitat options nearby. Regarding the severity of TTS takes, they are expected to be low-level, of short duration, and mostly not in a frequency band that would be expected to interfere with dolphin communication or other important low-frequency cues. Therefore, the associated lost opportunities and capabilities are not at a level that will impact reproduction or survival.

Altogether, though the status of this stock is unknown, this stock is not listed under the ESA. Any individual is likely to be disturbed at a low-moderate level, and those individuals likely disturbed on one to a few non-sequential days within a year. This low magnitude and severity of harassment effects is not expected to result in impacts on individual reproduction or survival, let alone have impacts on annual rates of recruitment or survival of this stock. No mortality, serious injury, or Level A harassment is anticipated or authorized. For these reasons, we have determined, in consideration of all of the effects of the Navy's activities combined, that the authorized take will have a negligible impact on the North Pacific stock of Pacific white-sided dolphins.

Dall's Porpoise (Alaska Stock)

This section builds on the broader odontocete discussion above and brings together the discussion of the different types and amounts of take that this porpoise stock would likely incur, the applicable mitigation, and the status of the stock to support the negligible impact determination.

In Table 47 below for Dall's porpoise, we indicate the total annual numbers of take by Level A harassment and Level B harassment, and a number indicating the instances of total take as a percentage of abundance.

TABLE 47—ANNUAL ESTIMATED TAKES BY LEVEL B HARASSMENT AND LEVEL A HARASSMENT FOR DALL'S PORPOISE IN THE TMAA AND NUMBER INDICATING THE INSTANCES OF TOTAL TAKE AS A PERCENTAGE OF SPECIES/STOCK ABUNDANCE

Species	Stock	Instances of indicated types of incidental take [1]			Total takes	Abundance (NMFS SARs) [2]	Instances of total take as percentage of abundance
		Level B harassment		Level A harassment			
		Behavioral disturbance	TTS (may also include disturbance)	PTS			
Dall's porpoise	Alaska	348	8,939	64	9,351	83,400	11.2

[1] Estimated impacts are based on the maximum number of activities in a given year under the Specified Activity. Not all takes represent separate individuals, especially for disturbance.
[2] Presented in the 2021 SARs or most recent SAR.

Dall's porpoise is not listed under the ESA and the current population trend for the Alaska stock is unknown. No BIAs for Dall's porpoise have been identified in the GOA Study Area.

While harbor porpoises have been observed to be especially sensitive to human activity, the same types of responses have not been observed in Dall's porpoises. Dall's porpoises are typically notably longer than, and weigh more than twice as much as harbor porpoises, making them generally less likely to be preyed upon and likely differentiating their behavioral repertoire somewhat from harbor porpoises. Further, they are typically seen in large groups and feeding aggregations, or exhibiting bow-riding behaviors, which is very different from the group dynamics observed in the more typically solitary, cryptic harbor porpoises, which are not often seen bow-riding. For these reasons, Dall's porpoises are not treated as an especially sensitive species (versus harbor porpoises which have a lower behavioral harassment threshold and more distant cutoff) but, rather, are analyzed similarly to other odontocetes (with takes from the sonar bin in the TMAA resulting from the same received levels reported in the *Odontocete* section above). Therefore, the majority of Level B harassment by behavioral disturbance is expected to be in the form of milder responses compared to higher level exposures. As mentioned earlier in this section, we anticipate more severe effects from takes when animals are exposed to higher received levels.

We note that Dall's porpoise, as a HF-sensitive species, has a lower PTS threshold than other groups and therefore is generally more likely to experience TTS and PTS, and potentially occasionally to a greater degree, and NMFS accordingly has evaluated and authorized higher numbers. Also, however, regarding PTS from sonar exposure, porpoises are still likely to avoid sound levels that would cause higher levels of TTS (greater than 20 dB) or PTS. Therefore, even though the number of TTS takes are higher than for other odontocetes, any PTS is

expected to be at a lower to occasionally moderate level and for all of the reasons described above, TTS and PTS takes are not expected to impact reproduction or survival of any individual.

Regarding the magnitude of takes by Level B harassment (TTS and behavioral disturbance), the number of estimated total instances of take compared to the abundance is 11 percent. This indicates that only a small portion of this stock is likely to be impacted, and a subset of those individuals will likely be taken on no more than a few non-sequential days within a year. Regarding the severity of those individual takes by Level B harassment by behavioral disturbance, we have explained that the duration of any exposure is expected to be between minutes and hours (*i.e.,* relatively short) and the received sound levels largely below 172 dB (*i.e.,* of a lower, to occasionally moderate, level and less likely to evoke a severe response). Regarding the severity of TTS takes, they are expected to be low-level, of short duration, and mostly not in a frequency band that would be expected to interfere with communication or other important low-frequency cues. Therefore, the associated lost opportunities and capabilities are not at a level that will impact reproduction or survival.

For the same reasons explained above for TTS (low to occasionally moderate level and the likely frequency band), while a small permanent loss of hearing sensitivity may include some degree of energetic costs for compensating or may mean some small loss of opportunities or detection capabilities, the estimated annual takes by Level A harassment by PTS for this stock (64 takes) are unlikely to impact behaviors, opportunities, or detection capabilities to a degree that will interfere with reproductive success or survival of any individuals.

Altogether, the status of the Alaska stock of Dall's porpoise is unknown, however Dall's porpoise are not listed as endangered or threatened under the ESA. Only a small portion of this stock is likely to be impacted, any individual is likely to be disturbed at a low-moderate level, and a subset of taken individuals will likely be taken on a few non-sequential days within a year. This low magnitude and severity of Level B harassment effects is not expected to result in impacts on individual reproduction or survival, much less annual rates of recruitment or survival. Some individuals (64 annually) could be taken by PTS of likely low to occasionally moderate severity. A small permanent loss of hearing sensitivity (PTS) may include some degree of energetic costs for compensating or may mean some small loss of opportunities or detection capabilities, but at the expected scale the estimated takes by Level A harassment by PTS for this stock are unlikely, alone or in combination with the Level B harassment take by behavioral disturbance and TTS, to impact behaviors, opportunities, or detection capabilities to a degree that will interfere with reproductive success or survival of any individuals, let alone have impacts on annual rates of recruitment or survival of this stock. No mortality or serious injury and no Level A harassment from non-auditory tissue damage is anticipated or authorized. For these reasons, we have determined, in consideration of all of the effects of the Navy's activities combined, that the authorized take will have a negligible impact on the Alaska stock of Dall's porpoise.

Pinnipeds

This section builds on the broader discussion above and brings together the discussion of the different types and amounts of take that different species and stocks will likely incur, the applicable mitigation, and the status of the species and stocks to support the negligible impact determinations for each species or stock. We have described (earlier in this section) the unlikelihood of any masking having effects that will impact the reproduction or survival of any of the individual marine mammals affected by the Navy's activities. We have also described above in the Potential Effects of Specified Activities on Marine Mammals and their Habitat section of the proposed rule that the specified activities would not have adverse or long-term impacts on marine mammal habitat, and therefore the unlikelihood of any habitat impacts affecting the reproduction or survival of any of the individual marine mammals affected by the Navy's activities. For pinnipeds, there is no mortality or serious injury and no Level A harassment from non-auditory tissue damage from sonar or explosives anticipated or authorized for any species.

Regarding behavioral disturbance, research and observations show that pinnipeds in the water may be tolerant of anthropogenic noise and activity (a review of behavioral reactions by pinnipeds to impulsive and non-impulsive noise can be found in Richardson *et al.* (1995) and Southall *et al.* (2007)). Available data, though limited, suggest that exposures between approximately 90 and 140 dB SPL do not appear to induce strong behavioral responses in pinnipeds exposed to non-pulse sounds in water (Costa *et al.,* 2003; Jacobs and Terhune, 2002; Kastelein *et al.,* 2006c). Based on the limited data on pinnipeds in the water exposed to multiple pulses (small explosives, impact pile driving, and seismic sources), exposures in the approximately 150 to 180 dB SPL range generally have limited potential to induce avoidance behavior in pinnipeds (Blackwell *et al.,* 2004; Harris *et al.,* 2001; Miller *et al.,* 2004). If pinnipeds are exposed to sonar or other active acoustic sources they may react in a number of ways depending on their experience with the sound source and what activity they are engaged in at the time of the acoustic exposure. Pinnipeds may not react at all until the sound source is approaching within a few hundred meters and then may alert, ignore the stimulus, change their behaviors, or avoid the immediate area by swimming away or diving. Effects on pinnipeds that are taken by Level B harassment in the TMAA, on the basis of reports in the literature as well as Navy monitoring from past activities, will likely be limited to reactions such as increased swimming speeds, increased surfacing time, or decreased foraging (if such activity were occurring). Most likely, individuals will simply move away from the sound source and be temporarily displaced from those areas, or not respond at all, which will have no effect on reproduction or survival. While some animals may not return to an area, or may begin using an area differently due to training activities, most animals are expected to return to their usual locations and behavior. Given their documented tolerance of anthropogenic sound (Richardson *et al.,* 1995 and Southall *et al.,* 2007), repeated exposures of individuals of any of these species to levels of sound that may cause Level B harassment are unlikely to result in hearing impairment or to significantly disrupt (through direct disturbance or opportunities lost during TTS) foraging or resting behaviors in a manner that would reduce reproductive success or health. Thus, even repeated Level B harassment of some small subset of individuals of an overall stock is unlikely to result in any significant realized decrease in fitness to those individuals that would result in any adverse impact on rates of recruitment or survival for the stock as a whole.

While no take of Steller sea lion is anticipated or authorized, we note that the GOA Study Area boundary was intentionally designed to avoid ESA-designated Steller sea lion critical habitat.

All the pinniped species discussed in this section will benefit from the procedural mitigation measures described earlier in the Proposed Mitigation Measures section.

In Table 48 below for pinnipeds, we indicate the total annual numbers of take by Level A harassment and Level B harassment, and a number indicating the instances of total take as a percentage of abundance.

TABLE 48—ANNUAL ESTIMATED TAKES BY LEVEL B HARASSMENT AND LEVEL A HARASSMENT FOR PINNIPEDS IN THE TMAA AND NUMBER INDICATING THE INSTANCES OF TOTAL TAKE AS A PERCENTAGE OF SPECIES/STOCK ABUNDANCE

Species	Stock	Instances of indicated types of incidental take [1]			Total takes	Abundance (NMFS SARs) [2]	Instances of total take as percentage of abundance
		Level B harassment		Level A harassment			
		Behavioral disturbance	TTS (may also include disturbance)	PTS			
Northern fur seal	Eastern Pacific	2,972	31	0	3,003	626,618	<1
	California	60	1	0	61	14,050	<1
Northern elephant seal	California	904	1,643	8	2,555	187,386	1.3

[1] Estimated impacts are based on the maximum number of activities in a given year under the specified activity. Not all takes represent separate individuals, especially for disturbance.
[2] Presented in the 2021 SARs or most recent SAR.

The majority of takes by harassment of pinnipeds in the TMAA are caused by sources from the MFAS bin (which includes hull-mounted sonar) because they are high level sources at a frequency (1–10 kHz) which overlaps the most sensitive portion of the pinniped hearing range, and of the sources expected to result in take, they are used in a large portion of exercises (see Table 1 and Table 3). Most of the takes (>99 percent) from the MF1 bin in the TMAA would result from received levels between 166 and 178 dB SPL. For the remaining active sonar bin types, the percentages are as follows: MF4 = 97 percent between 148 and 172 dB SPL and MF5 = 99 percent between 130 and 160 dB SPL. Given the levels they are exposed to and pinniped sensitivity, most responses would be of a lower severity, with only occasional responses likely to be considered moderate, but still of generally short duration.

As mentioned earlier in this section, we anticipate more severe effects from takes when animals are exposed to higher received levels. Occasional milder takes by Level B harassment by behavioral disturbance are unlikely to cause long-term consequences for individual animals or populations, especially when they are not expected to be repeated over sequential multiple days. For all pinnipeds except Northern elephant seals, no take is expected to occur from explosives. For Northern elephant seals, harassment takes from explosives (behavioral disturbance, TTS, and PTS) comprise a very small fraction of those caused by exposure to active sonar.

Because the majority of harassment takes of pinnipeds result from narrowband sources in the range of 1–10 kHz, the vast majority of threshold shift caused by Navy sonar sources will typically occur in the range of 2–20 kHz. This frequency range falls within the range of pinniped hearing, however, pinniped vocalizations typically span a somewhat lower range than this (<0.2 to 10 kHz) and threshold shift from active sonar will often be in a narrower band (reflecting the narrower band source that caused it), which means that TTS incurred by pinnipeds will typically only interfere with communication within a portion of a pinniped's range (if it occurred during a time when communication with conspecifics was occurring). As discussed earlier, it would only be expected to be of a short duration and relatively small degree. Many of the other critical sounds that serve as cues for navigation and prey (*e.g.,* waves, fish, invertebrates) occur below a few kHz, which means that detection of these signals will not be inhibited by most threshold shifts either. The very low number of takes by threshold shifts that might be incurred by individuals exposed to explosives would likely be lower frequency (5 kHz or less) and spanning a wider frequency range, which could slightly lower an individual's sensitivity to navigational or prey cues, or a small portion of communication calls, for several minutes to hours (if temporary) or permanently.

Neither of these species are ESA-listed and the SAR indicates that the status of the Eastern Pacific stock of Northern fur seal is stable, the California stock of Northern fur seal is increasing, and the California stock of Northern elephant seal is increasing. BIAs have not been identified for pinnipeds.

Regarding the magnitude of takes by Level B harassment (TTS and behavioral disturbance) for the Eastern Pacific and California stocks of Northern fur seals, the estimated instances of takes as compared to the stock abundance is <1 percent for each stock. For the California stock of Northern elephant seal, the number of estimated total instances of take compared to the abundance is 1 percent. This information indicates that only a very small portion of individuals in these stocks are likely impacted, particularly given the large ranges of the stocks. Impacted individuals would be disturbed on likely one, but not more than a few non-sequential days within a year.

Regarding the severity of those individual takes by Level B harassment by behavioral disturbance for all pinniped stocks, we have explained that the duration of any exposure is expected to be between minutes and hours (*i.e.,* relatively short) and the received sound levels largely below 178 dB, which is considered a relatively low to occasionally moderate level for pinnipeds.

Regarding the severity of TTS takes, they are expected to be low-level, of short duration, and mostly not in a frequency band that would be expected to interfere with pinniped communication or other important low-frequency cues. Therefore, the associated lost opportunities and capabilities are not at a level that will impact reproduction or survival. For these same reasons (low level and frequency band), while a small permanent loss of hearing sensitivity may include some degree of energetic costs for compensating or may mean some small loss of opportunities or detection capabilities, the 8 estimated Level A harassment takes by PTS for the California stock of Northern elephant seal would be unlikely to impact behaviors, opportunities, or detection capabilities to a degree that will

interfere with reproductive success or survival of any individuals.

Altogether, none of these species are listed under the ESA, and the SARs indicate that the status of the Eastern Pacific stock of Northern fur seal is stable, the California stock of Northern fur seal is increasing, and the California stock of Northern elephant seal is increasing. No mortality or serious injury and no Level A harassment from non-auditory tissue damage for pinnipeds is anticipated or authorized. Level A harassment by PTS is only anticipated for the California stock of Northern elephant seal (8 takes by Level A harassment). For all three pinniped stocks, only a small portion of the stocks are anticipated to be impacted and any individual is likely to be disturbed at a low-moderate level. This low magnitude and severity of harassment effects is not expected to result in impacts on individual reproduction or survival, let alone have impacts on annual rates of recruitment or survival of these stocks. For these reasons, in consideration of all of the effects of the Navy's activities combined, we have determined that the authorized take would have a negligible impact on all three stocks of pinnipeds.

Determination

Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and their habitat, and taking into consideration the implementation of the monitoring and mitigation measures, NMFS finds that the total marine mammal take from the specified activities will have a negligible impact on all affected marine mammal species or stocks.

Subsistence Harvest of Marine Mammals

In order to issue an incidental take authorization, NMFS must find that the specified activity will not have an ''unmitigable adverse impact'' on the subsistence uses by Alaska Natives. NMFS has defined ''unmitigable adverse impact'' in 50 CFR 216.103 as an impact resulting from the specified activity: (1) That is likely to reduce the availability of the species to a level insufficient for a harvest to meet subsistence needs by: (i) Causing the marine mammals to abandon or avoid hunting areas; (ii) Directly displacing subsistence users; or (iii) Placing physical barriers between the marine mammals and the subsistence hunters; and (2) That cannot be sufficiently mitigated by other measures to increase the availability of marine mammals to allow subsistence needs to be met.

When applicable, NMFS must prescribe means of effecting the least practicable adverse impact on the availability of the species or stocks for subsistence uses. As discussed in the Mitigation Measures section, evaluation of potential mitigation measures includes consideration of two primary factors: (1) The manner in which, and the degree to which, implementation of the potential measure(s) is expected to reduce adverse impacts on the availability of species or stocks for subsistence uses, and (2) the practicability of the measure(s) for applicant implementation.

The Navy has met with and will continue to engage in meaningful consultation and communication with several federally recognized Alaska Native tribes that have traditional marine mammal harvest areas in the GOA (though, as noted below, these areas do not overlap directly with the GOA Study Area). Further, the Navy will continue to keep the Tribes informed of the timeframes of future joint training exercises.

To our knowledge, subsistence hunting of marine mammals does not occur in the GOA Study Area where training activities would occur. To date, neither the Navy nor NMFS have received correspondence from Alaska Native groups regarding subsistence use, or any other concern with the MMPA rulemaking and authorizations. As described below in the Tribal Engagement section, NMFS requested input from Tribes on its proposed regulations to govern the take of marine mammals incidental to the U.S. Navy Training Activities in the Gulf of Alaska Study Area (87 FR 49656; August 11, 2022), and as part of that request, NMFS specifically requested feedback on whether the proposed rule raised any concerns regarding effects on the Tribe or potential impacts to the Tribe's subsistence uses of marine mammals.

The TMAA portion of the GOA Study Area is located over 12 nmi from shore with the nearest inhabited land being the Kenai Peninsula (24 nmi from the TMAA portion of the GOA Study Area). The landward border of the WMA portion of the GOA Study Area is generally farther offshore than the TMAA. The WMA is approximately 45 nmi (84 km) from Kodiak (the border's closest point to land), and approximately 117 nmi (216 km) from Chignik on the Alaska Peninsula (the border's farthest point from land). Information provided by Tribes in previous conversations with the Navy, and according to Alaska Department of Fish and Game (1995), indicates that harvest of pinnipeds occurs nearshore, and the Tribes do not use the GOA Study Area for subsistence hunting of marine mammals. The TMAA portion of the GOA Study Area is the closest to the area of nearshore subsistence harvest conducted by the Sun'aq Tribe of Kodiak, the Native Village of Eyak, and the Yakutat Tlingit Tribe (Alaska Department of Fish and Game, 1995). The WMA is offshore of subsistence harvest areas that occur in Unalaska, Akutan, False Pass, Sand Point, and King Cove (Alaska Department of Fish and Game, 1997). The Tribes listed above harvest harbor seals and sea lions (Alaska Department of Fish and Game, 1995, 1997).

In addition to the distance between subsistence hunting areas and the GOA Study Area, which will ensure that the Navy's activities do not displace subsistence users or place physical barriers between the marine mammals and the subsistence hunters, there is no reason to believe that any behavioral disturbance or limited TTS or PTS of pinnipeds that occurs offshore in the GOA Study Area would affect their subsequent behavior in a manner that would interfere with subsistence uses should those pinnipeds later interact with hunters, particularly given that neither harbor seals, Steller sea lions, or California sea lions are expected to be taken by the Navy's training activities. The specified activity will be a continuation of the types of training activities that have been ongoing for more than a decade, and as discussed in the 2011 GOA FEIS/OEIS and 2016 GOA FSEIS/OEIS, no impacts on traditional subsistence practices or resources are predicted to result from the specified activity.

Based on the information above, NMFS has determined that the total taking of affected species or stocks will not have an unmitigable adverse impact on the availability of the species or stocks for taking for subsistence purposes.

Tribal Engagement

NMFS invited Tribes in the Gulf of Alaska region to a virtual Tribal engagement meeting on September 20, 2022 to seek Tribal input on the proposed regulations to govern the take of marine mammals incidental to the U.S. Navy Training Activities in the Gulf of Alaska Study Area (87 FR 49656; August 11, 2022). One Tribe attended the meeting. NMFS gave a presentation on the proposed regulations and invited the Tribe to ask questions and provide recommendations. NMFS specifically requested feedback on whether the proposed rule raised any concerns regarding effects on the Tribe or

potential impacts to the Tribe's subsistence uses of marine mammals, whether the Tribe had any recommendations for modifications to NMFS' action, and whether the Tribe had any additional feedback on the proposed rule. The Tribe did not have questions or provide recommendations or feedback during the meeting. NMFS invited the Tribe to provide written comments following the meeting, but did not receive written comments.

Classification

Endangered Species Act

There are eight marine mammal species under NMFS jurisdiction that are listed as endangered or threatened under the ESA (16 U.S.C. 1531 *et seq.*) with confirmed or possible occurrence in the GOA Study Area: North Pacific right whale, humpback whale (Mexico, Western North Pacific, and Central America DPSs), blue whale, fin whale, sei whale, gray whale (Western North Pacific DPS), sperm whale, and Steller sea lion (Western DPS). The humpback whale has critical habitat recently designated under the ESA in the TMAA portion of the GOA Study Area (86 FR 21082; April 21, 2021). As discussed previously, the GOA Study Area boundaries were intentionally designed to avoid ESA-designated critical habitat for Steller sea lions.

The Navy consulted with NMFS pursuant to section 7 of the ESA for GOA Study Area activities, and NMFS also consulted internally on the promulgation of this rule and the issuance of an LOA under section 101(a)(5)(A) of the MMPA. NMFS issued a biological opinion concluding that the promulgation of the rule and issuance of a subsequent LOA are not likely to jeopardize the continued existence of threatened and endangered species under NMFS' jurisdiction and are not likely to result in the destruction or adverse modification of designated or proposed critical habitat in the GOA Study Area. The biological opinion is available at *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-military-readiness-activities.*

National Environmental Policy Act

To comply with the National Environmental Policy Act of 1969 (NEPA; 42 U.S.C. 4321 *et seq.*) and NOAA Administrative Order (NAO) 216–6A, NMFS must evaluate our proposed actions and alternatives with respect to potential impacts on the human environment. NMFS participated as a cooperating agency on the 2022 GOA FSEIS/OEIS, which was published on September 2, 2022 (87 FR 54213), and is available at *https://www.goaeis.com/.* In accordance with 40 CFR 1506.3, NMFS independently reviewed and evaluated the 2022 GOA FSEIS/OEIS and determined that it is adequate and sufficient to meet our responsibilities under NEPA for the issuance of this rule and associated LOA. NMFS therefore, has adopted the 2022 GOA FSEIS/OEIS. NMFS has prepared a separate Record of Decision. NMFS' Record of Decision for adoption of the 2022 GOA FSEIS/OEIS and issuance of this final rule and subsequent LOAs can be found at *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-military-readiness-activities.*

Executive Order 12866

The Office of Management and Budget has determined that this rule is not significant for purposes of Executive Order 12866.

Regulatory Flexibility Act

Pursuant to the Regulatory Flexibility Act (RFA; 5 U.S.C. 601 *et seq.*), the Chief Counsel for Regulation of the Department of Commerce has certified to the Chief Counsel for Advocacy of the Small Business Administration during the proposed rule stage that this action would not have a significant economic impact on a substantial number of small entities. The factual basis for the certification was published in the proposed rule and is not repeated here. No comments were received regarding this certification. As a result, a regulatory flexibility analysis was not required and none was prepared.

List of Subjects in 50 CFR Part 218

Exports, Fish, Imports, Incidental take, Indians, Labeling, Marine mammals, Navy, Penalties, Reporting and recordkeeping requirements, Seafood, Sonar, Transportation.

Dated: December 19, 2022.

Samuel D. Rauch III,

Deputy Assistant Administrator for Regulatory Programs, National Marine Fisheries Service.

For reasons set forth in the preamble, 50 CFR part 218 is amended as follows:

PART 218—REGULATIONS GOVERNING THE TAKING AND IMPORTING OF MARINE MAMMALS

■ 1. The authority citation for part 218 continues to read as follows:

Authority: 16 U.S.C. 1361 *et seq.,* unless otherwise noted.

■ 2. Add subpart P to read as follows:

Subpart P—Taking and Importing Marine Mammals; U.S. Navy Training Activities in the Gulf of Alaska Study Area

Sec.
218.150 Specified activity and geographical region.
218.151 Effective dates and definitions.
218.152 Permissible methods of taking.
218.153 Prohibitions.
218.154 Mitigation requirements.
218.155 Requirements for monitoring and reporting.
218.156 Letters of Authorization.
218.157 Renewals and modifications of Letters of Authorization.
218.158 [Reserved]

Subpart P—Taking and Importing Marine Mammals; U.S. Navy Training Activities in the Gulf of Alaska Study Area

§ 218.150 Specified activity and geographical region.

(a) Regulations in this subpart apply only to the U.S. Navy (Navy) for the taking of marine mammals that occurs in the area described in paragraph (b) of this section and that occurs incidental to the activities listed in paragraph (c) of this section.

(b) The Gulf of Alaska (GOA) Study Area is entirely at sea and is comprised of three areas: a TMAA, a warning area, and the WMA located south and west of the TMAA. The TMAA and WMA are temporary areas established within the GOA for ships, submarines, and aircraft to conduct training activities. The TMAA is a polygon roughly resembling a rectangle oriented from northwest to southeast, approximately 300 nautical miles (nmi; 556 km) in length by 150 nmi (278 km) in width, located south of Montague Island and east of Kodiak Island. The warning area overlaps and extends slightly beyond the northern corner of the TMAA. The WMA provides an additional 185,806 nmi^2 of surface, sub-surface, and airspace training area to support activities occurring within the TMAA. The boundary of the WMA follows the bottom of the slope at the 4,000 m contour line.

(c) The taking of marine mammals by the Navy is only authorized if it occurs incidental to the Navy conducting training activities, including:

(1) Anti-Submarine Warfare; and

(2) Surface Warfare.

§ 218.151 Effective dates and definitions.

(a) Regulations in this subpart are effective February 3, 2023 through February 2, 2030.

(b) In additions to the definitions contained in section 2 of the Marine Mammal Protection Act (MMPA), 16 U.S.C. 1362, and § 218.103, the following definitions apply to this subpart:

(1) *GOA Study Area* means the area described in § 218.150(b).

(2) *TMAA* means Temporary Maritime Activities Area, as described in § 218.150(b).

(3) *WMA* means Western Maneuver Area, as described in § 218.150(b).

(4) *LOA* means a Letter of Authorization issued under §§ 216.106 of this chapter and 218.156.

(5) *MTE* means major training exercise.

(6) *Navy* means United States Department of the Navy.

(7) *Navy personnel* means active-duty and reserve uniformed Navy personnel and Navy civil servants.

(8) *Navy contractor* means any individual, firm, corporation, partnership, association, or other legal non-Federal entity that enters into a contract directly with the Navy to furnish services, supplies, or construction and is performing or acting in furtherance of those duties.

(9) *Lookout* means an individual designated the responsibility of visually observing mitigation zones.

(10) *Training activities* means military readiness activities described in § 218.150.

§ 218.152 Permissible methods of taking.

(a) Under an LOA issued pursuant to §§ 216.106 of this chapter and 218.156, the Navy may incidentally, but not intentionally, take marine mammals within the TMAA only, by Level A harassment and Level B harassment associated with the use of active sonar and other acoustic sources and explosives, provided the activity is in compliance with all terms, conditions, and requirements of this subpart and the applicable LOA.

(b) The incidental take of marine mammals by the activities listed in § 218.150(c) is limited to the following species:

TABLE 1 TO § 218.152(b)

Species	Stock
Blue whale	Central North Pacific.
Blue whale	Eastern North Pacific.
Fin whale	Northeast Pacific.
Humpback whale	Western North Pacific.
Humpback whale	Central North Pacific.
Humpback whale	California/Oregon/Washington.
Minke whale	Alaska.
North Pacific right whale	Eastern North Pacific.
Sei whale	Eastern North Pacific.
Gray whale	Eastern North Pacific.
Killer whale	Eastern North Pacific Offshore.
Killer whale	Eastern North Pacific Gulf of Alaska, Aleutian Islands, and Bering Sea Transient.
Pacific white-sided dolphin	North Pacific.
Dall's porpoise	Alaska.
Sperm whale	North Pacific.
Baird's beaked whale	Alaska.
Cuvier's beaked whale	Alaska.
Stejneger's beaked whale	Alaska.
Northern fur seal	Eastern Pacific.
Northern fur seal	California.
Northern elephant seal	California.

§ 218.153 Prohibitions.

(a) Except for incidental takings contemplated in § 218.152(a) and authorized by an LOA issued under §§ 216.106 of this chapter and 218.156, it shall be unlawful for any person to do any of the following in connection with the activities listed in § 218.150(c):

(1) Violate, or fail to comply with, the terms, conditions, and requirements of this subpart or an LOA issued under §§ 216.106 of this chapter and 218.156;

(2) Take any marine mammal not specified in § 218.152(b);

(3) Take any marine mammal specified in § 218.152(b) in any manner other than as specified in the LOA; or

(4) Take a marine mammal specified in § 218.152(b) if the National Marine Fisheries Service (NMFS) determines such taking results in more than a negligible impact on the species or stocks of such marine mammal.

(b) [Reserved]

§ 218.154 Mitigation requirements.

(a) When conducting the activities identified in § 218.150(c), the mitigation measures contained in any LOA issued under §§ 216.106 of this chapter and 218.156 must be implemented. If Navy contractors are serving in a role similar to Navy personnel, Navy contractors will follow the mitigation applicable to Navy personnel. These mitigation measures include, but are not limited to:

(1) *Procedural mitigation.* Procedural mitigation is mitigation that the Navy must implement whenever and wherever an applicable training activity takes place within the GOA Study Area for acoustic stressors (*i.e.,* active sonar, weapons firing noise), explosive stressors (*i.e.,* large-caliber projectiles, bombs), and physical disturbance and strike stressors (*i.e.,* vessel movement, towed in-water devices, small-, medium-, and large-caliber non-explosive practice munitions, non-explosive bombs).

(i) *Environmental awareness and education.* Appropriate Navy personnel (including civilian personnel) involved in mitigation and training activity reporting under the specified activities must complete the environmental compliance training modules identified in their career path training plan, as specified in the LOA.

(ii) *Active sonar.* Active sonar includes mid-frequency active sonar and high-frequency active sonar. For vessel-based active sonar activities, mitigation applies only to sources that are positively controlled and deployed from manned surface vessels (*e.g.,* sonar sources towed from manned surface platforms). For aircraft-based active sonar activities, mitigation applies only to sources that are positively controlled and deployed from manned aircraft that do not operate at high altitudes (*e.g.,*

rotary-wing aircraft). Mitigation does not apply to active sonar sources deployed from unmanned aircraft or aircraft operating at high altitudes (*e.g.,* maritime patrol aircraft).

(A) *Number of Lookouts and observation platform for hull-mounted sources.* For hull-mounted sources, the Navy must have one Lookout for platforms with space or manning restrictions while underway (at the forward part of a small boat or ship) and platforms using active sonar while moored or at anchor; and two Lookouts for platforms without space or manning restrictions while underway (at the forward part of the ship).

(B) *Number of Lookouts and observation platform for sources not hull-mounted.* For sources that are not hull-mounted, the Navy must have one Lookout on the ship or aircraft conducting the activity.

(C) *Prior to activity.* Prior to the initial start of the activity (*e.g.,* when maneuvering on station), Navy personnel must observe the mitigation zone for floating vegetation and marine mammals; if floating vegetation or a marine mammal is observed, Navy personnel must relocate or delay the start of active sonar transmission until the mitigation zone is clear of floating vegetation or until the conditions in paragraph (a)(1)(ii)(F) of this section are met for marine mammals.

(D) *During the activity for hull-mounted mid-frequency active sonar.* During the activity, for hull-mounted mid-frequency active sonar, Navy personnel must observe the following mitigation zones for marine mammals.

(*1*) *Powerdowns for marine mammals.* Navy personnel must power down active sonar transmission by 6 dB if a marine mammal is observed within 1,000 yd (914.4 m) of the sonar source; Navy personnel must power down active sonar transmission an additional 4 dB (10 dB total) if a marine mammal is observed within 500 yd (457.2 m) of the sonar source.

(*2*) *Shutdowns for marine mammals.* Navy personnel must cease transmission if a marine mammal is observed within 200 yd (182.9 m) of the sonar source.

(E) *During the activity, for mid-frequency active sonar sources that are not hull-mounted, and high-frequency active sonar.* During the activity, for mid-frequency active sonar (MFAS) sources that are not hull-mounted and high-frequency active sonar (HFAS), Navy personnel must observe the mitigation zone for marine mammals. Navy personnel must cease transmission if a marine mammal is observed within 200 yd (182.9 m) of the sonar source.

(F) *Commencement/recommencement conditions after a marine mammal sighting before or during the activity.* Navy personnel must allow a sighted marine mammal to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing or powering up active sonar transmission) until one of the following conditions has been met:

(*1*) *Observed exiting.* The animal is observed exiting the mitigation zone;

(*2*) *Thought to have exited.* The animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the sonar source;

(*3*) *Clear from additional sightings.* The mitigation zone has been clear from any additional sightings for 10 minutes (min) for aircraft-deployed sonar sources or 30 minutes for vessel-deployed sonar sources;

(*4*) *Sonar source transit.* For mobile activities, the active sonar source has transited a distance equal to double that of the mitigation zone size beyond the location of the last sighting; or

(*5*) *Bow-riding dolphins.* For activities using hull-mounted sonar, the Lookout concludes that dolphins are deliberately closing in on the ship to ride the ship's bow wave, and are therefore out of the main transmission axis of the sonar (and there are no other marine mammal sightings within the mitigation zone).

(iii) *Weapons firing noise.* Weapons firing noise associated with large-caliber gunnery activities.

(A) *Number of Lookouts and observation platform.* One Lookout must be positioned on the ship conducting the firing. Depending on the activity, the Lookout could be the same as the one provided for in paragraphs (a)(1)(iv)(A) and (a)(1)(viii)(A) of this section.

(B) *Mitigation zone.* Thirty degrees on either side of the firing line out to 70 yd (64 m) from the muzzle of the weapon being fired.

(C) *Prior to activity.* Prior to the initial start of the activity, Navy personnel must observe the mitigation zone for floating vegetation and marine mammals; if floating vegetation or a marine mammal is observed, Navy personnel must relocate or delay the start of weapons firing until the mitigation zone is clear of floating vegetation or until the conditions in paragraph (a)(1)(iii)(E) of this section are met for marine mammals.

(D) *During activity.* During the activity, Navy personnel must observe the mitigation zone for marine mammals; if a marine mammal is observed, Navy personnel must cease weapons firing.

(E) *Commencement/recommencement conditions after a marine mammal sighting before or during the activity.* Navy personnel must allow a sighted marine mammal to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing weapons firing) until one of the following conditions has been met:

(*1*) *Observed exiting.* The animal is observed exiting the mitigation zone;

(*2*) *Thought to have exited.* The animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the firing ship;

(*3*) *Clear from additional sightings.* The mitigation zone has been clear from any additional sightings for 30 min; or

(*4*) *Firing ship transit.* For mobile activities, the firing ship has transited a distance equal to double that of the mitigation zone size beyond the location of the last sighting.

(iv) *Explosive large-caliber projectiles.* Gunnery activities using explosive large-caliber projectiles. Mitigation applies to activities using a surface target.

(A) *Number of Lookouts and observation platform.* One Lookout must be on the vessel or aircraft conducting the activity. Depending on the activity, the Lookout could be the same as the one described in paragraph (a)(1)(iii)(A) of this section. If additional platforms are participating in the activity, Navy personnel positioned in those assets (*e.g.,* safety observers, evaluators) must support observing the mitigation zone for marine mammals while performing their regular duties.

(B) *Mitigation zones.* 1,000 yd (914.4 m) around the intended impact location.

(C) *Prior to activity.* Prior to the initial start of the activity (*e.g.,* when maneuvering on station), Navy personnel must observe the mitigation zone for floating vegetation and marine mammals; if floating vegetation or a marine mammal is observed, Navy personnel must relocate or delay the start of firing until the mitigation zone is clear of floating vegetation or until the conditions in paragraph (a)(1)(iv)(E) of this section are met for marine mammals.

(D) *During activity.* During the activity, Navy personnel must observe the mitigation zone for marine mammals; if a marine mammal is observed, Navy personnel must cease firing.

(E) *Commencement/recommencement conditions after a marine mammal sighting before or during the activity.* Navy personnel must allow a sighted marine mammal to leave the mitigation

zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing firing) until one of the following conditions has been met:

(*1*) *Observed exiting.* The animal is observed exiting the mitigation zone;

(*2*) *Thought to have exited.* The animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the intended impact location;

(*3*) *Clear of additional sightings.* The mitigation zone has been clear from any additional sightings for 30 minutes; or,

(*4*) *Impact location transit.* For activities using mobile targets, the intended impact location has transited a distance equal to double that of the mitigation zone size beyond the location of the last sighting.

(F) *After activity.* After completion of the activity (*e.g.,* prior to maneuvering off station), Navy personnel must, when practical (*e.g.,* when platforms are not constrained by fuel restrictions or mission-essential follow-on commitments), observe for marine mammals in the vicinity of where detonations occurred; if any injured or dead marine mammals are observed, Navy personnel must follow established incident reporting procedures. If additional platforms are supporting this activity (*e.g.,* providing range clearance), Navy personnel positioned on these Navy assets must assist in the visual observation of the area where detonations occurred.

(v) *Explosive bombs*—(A) *Number of Lookouts and observation platform.* One Lookout must be positioned in an aircraft conducting the activity. If additional platforms are participating in the activity, Navy personnel positioned in those assets (*e.g.,* safety observers, evaluators) must support observing the mitigation zone for marine mammals while performing their regular duties.

(B) *Mitigation zone.* 2,500 yd (2,286 m) around the intended target.

(C) *Prior to activity.* Prior to the initial start of the activity (*e.g.,* when arriving on station), Navy personnel must observe the mitigation zone for floating vegetation and marine mammals; if floating vegetation or a marine mammal is observed, Navy personnel must relocate or delay the start of bomb deployment until the mitigation zone is clear of floating vegetation or until the conditions in paragraph (a)(1)(v)(E) of this section are met for marine mammals.

(D) *During activity.* During the activity (*e.g.,* during target approach), Navy personnel must observe the mitigation zone for marine mammals; if a marine mammal is observed, Navy personnel must cease bomb deployment.

(E) *Commencement/recommencement conditions after a marine mammal sighting before or during the activity.* Navy personnel must allow a sighted marine mammal to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing bomb deployment) until one of the following conditions has been met:

(*1*) *Observed exiting.* The animal is observed exiting the mitigation zone;

(*2*) *Thought to have exited.* The animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the intended target;

(*3*) *Clear from additional sightings.* The mitigation zone has been clear from any additional sightings for 10 min; or

(*4*) *Intended target transit.* For activities using mobile targets, the intended target has transited a distance equal to double that of the mitigation zone size beyond the location of the last sighting.

(F) *After activity.* After completion of the activity (*e.g.,* prior to maneuvering off station), Navy personnel must, when practical (*e.g.,* when platforms are not constrained by fuel restrictions or mission-essential follow-on commitments), observe for marine mammals in the vicinity of where detonations occurred; if any injured or dead marine mammals are observed, Navy personnel must follow established incident reporting procedures. If additional platforms are supporting this activity (*e.g.,* providing range clearance), Navy personnel positioned on these Navy assets must assist in the visual observation of the area where detonations occurred.

(vi) *Vessel movement.* The mitigation will not be applied if: the vessel's safety is threatened; the vessel is restricted in its ability to maneuver (*e.g.,* during launching and recovery of aircraft or landing craft, during towing activities, when mooring); the vessel is submerged or operated autonomously; or when impractical based on mission requirements (*e.g.,* during Vessel Visit, Board, Search, and Seizure activities as military personnel from ships or aircraft board suspect vessels).

(A) *Number of Lookouts and observation platform.* One or more Lookouts must be on the underway vessel. If additional watch personnel are positioned on the underway vessel, those personnel (*e.g.,* persons assisting with navigation or safety) must support observing for marine mammals while performing their regular duties.

(B) *Mitigation zone*—(*1*) *Whales.* 500 yd (457.2 m) around the vessel for whales.

(*2*) *Marine mammals other than whales.* 200 yd (182.9 m) around the vessel for all marine mammals other than whales (except those intentionally swimming alongside or closing in to swim alongside vessels, such as bow-riding or wake-riding dolphins).

(C) *When underway.* Navy personnel must observe the direct path of the vessel and waters surrounding the vessel for marine mammals. If a marine mammal is observed in the direct path of the vessel, Navy personnel must maneuver the vessel as necessary to maintain the appropriate mitigation zone distance. If a marine mammal is observed within waters surrounding the vessel, Navy personnel must maintain situational awareness of that animal's position. Based on the animal's course and speed relative to the vessel's path, Navy personnel must maneuver the vessel as necessary to ensure that the appropriate mitigation zone distance from the animal continues to be maintained.

(D) *Incident reporting procedures.* If a marine mammal vessel strike occurs, Navy personnel must follow the established incident reporting procedures.

(vii) *Towed in-water devices.* Mitigation applies to devices that are towed from a manned surface platform or manned aircraft, or when a manned support craft is already participating in an activity involving in-water devices being towed by unmanned platforms. The mitigation will not be applied if the safety of the towing platform or in-water device is threatened.

(A) *Number of Lookouts and observation platform.* One Lookout must be positioned on a manned towing platform or support craft.

(B) *Mitigation zone.* 250 yd (228.6 m) around the towed in-water device for marine mammals (except those intentionally swimming alongside or choosing to swim alongside towing vessels, such as bow-riding or wake-riding dolphins).

(C) *During activity.* During the activity (*i.e.,* when towing an in-water device), Navy personnel must observe the mitigation zone for marine mammals; if a marine mammal is observed, Navy personnel must maneuver to maintain distance.

(viii) *Small-, medium-, and large-caliber non-explosive practice munitions.* Gunnery activities using small-, medium-, and large-caliber non-explosive practice munitions. Mitigation applies to activities using a surface target.

(A) *Number of Lookouts and observation platform.* One Lookout must be positioned on the platform conducting the activity. Depending on the activity, the Lookout could be the same as the one described in paragraph (a)(1)(iii)(A) of this section.

(B) *Mitigation zone.* 200 yd (182.9 m) around the intended impact location.

(C) *Prior to activity.* Prior to the initial start of the activity (*e.g.,* when maneuvering on station), Navy personnel must observe the mitigation zone for floating vegetation and marine mammals; if floating vegetation or a marine mammal is observed, Navy personnel must relocate or delay the start of firing until the mitigation zone is clear of floating vegetation or until the conditions in paragraph (a)(1)(viii)(E) of this section are met for marine mammals.

(D) *During activity.* During the activity, Navy personnel must observe the mitigation zone for marine mammals; if a marine mammal is observed, Navy personnel must cease firing.

(E) *Commencement/recommencement conditions after a marine mammal sighting before or during the activity.* Navy personnel must allow a sighted marine mammal to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing firing) until one of the following conditions has been met:

(*1*) *Observed exiting.* The animal is observed exiting the mitigation zone;

(*2*) *Thought to have exited.* The animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the intended impact location;

(*3*) *Clear of additional sightings.* The mitigation zone has been clear from any additional sightings for 10 minutes for aircraft-based firing or 30 minutes for vessel-based firing; or

(*4*) *Impact location transit.* For activities using a mobile target, the intended impact location has transited a distance equal to double that of the mitigation zone size beyond the location of the last sighting.

(ix) *Non-explosive bombs*—(A) *Number of Lookouts and observation platform.* One Lookout must be positioned in an aircraft.

(B) *Mitigation zone.* 1,000 yd (914.4 m) around the intended target.

(C) *Prior to activity.* Prior to the initial start of the activity (*e.g.,* when arriving on station), Navy personnel must observe the mitigation zone for floating vegetation and marine mammals; if floating vegetation or a marine mammal is observed, Navy personnel must relocate or delay the start of bomb deployment until the mitigation zone is clear of floating vegetation or until the conditions in paragraph (a)(1)(ix)(E) of this section are met for marine mammals.

(D) *During activity.* During the activity (*e.g.,* during approach of the target), Navy personnel must observe the mitigation zone for marine mammals and, if a marine mammal is observed, Navy personnel must cease bomb deployment.

(E) *Commencement/recommencement conditions after a marine mammal sighting prior to or during the activity.* Navy personnel must allow a sighted marine mammal to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing bomb deployment) until one of the following conditions has been met:

(*1*) *Observed exiting.* The animal is observed exiting the mitigation zone;

(*2*) *Thought to have exited.* The animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the intended target;

(*3*) *Clear from additional sightings.* The mitigation zone has been clear from any additional sightings for 10 min; or

(*4*) *Intended target transit.* For activities using mobile targets, the intended target has transited a distance equal to double that of the mitigation zone size beyond the location of the last sighting.

(2) *Mitigation areas.* In addition to procedural mitigation, Navy personnel must implement mitigation measures within mitigation areas to avoid or reduce potential impacts on marine mammals.

(i) *North Pacific Right Whale Mitigation Area.* Figure 1 to this paragraph (a)(2) shows the location of the mitigation area.

(A) *Surface ship hull-mounted MF1 mid-frequency active sonar.* From June 1–September 30 within the North Pacific Right Whale Mitigation Area, Navy personnel must not use surface ship hull-mounted MF1 mid-frequency active sonar during training.

(B) *National security exception.* Should national security require that the Navy cannot comply with the restrictions in paragraph (a)(2)(i)(A) of this section, Navy personnel must obtain permission from the designated Command, U.S. Third Fleet Command Authority, prior to commencement of the activity. Navy personnel must provide NMFS with advance notification and include information about the event in its annual activity reports to NMFS.

(ii) *Continental Shelf and Slope Mitigation Area.* Figure 1 to this paragraph (a)(2) shows the location of the mitigation area.

(A) *Explosives.* During training, Navy personnel must not detonate explosives below 10,000 ft. altitude (including at the water surface) in the Continental Shelf and Slope Mitigation Area, which extends over the continental shelf and slope out to the 4,000 m depth contour within the TMAA.

(B) *National security exception.* Should national security require that the Navy cannot comply with the restrictions in paragraph (a)(2)(ii)(A) of this section, Navy personnel must obtain permission from the designated Command, U.S. Third Fleet Command Authority, prior to commencement of the activity. Navy personnel must provide NMFS with advance notification and include information about the event in its annual activity reports to NMFS.

(iii) *Pre-event awareness notifications in the Temporary Maritime Activities Area.* The Navy must issue pre-event awareness messages to alert vessels and aircraft participating in training activities within the TMAA to the possible presence of concentrations of large whales on the continental shelf and slope. Occurrences of large whales may be higher over the continental shelf and slope relative to other areas of the TMAA. Large whale species in the TMAA include, but are not limited to, fin whale, blue whale, humpback whale, gray whale, North Pacific right whale, sei whale, and sperm whale. To maintain safety of navigation and to avoid interactions with marine mammals, the Navy must instruct personnel to remain vigilant to the presence of large whales that may be vulnerable to vessel strikes or potential impacts from training activities. Additionally, Navy personnel must use the information from the awareness notification messages to assist their visual observation of applicable mitigation zones during training activities and to aid in the implementation of procedural mitigation.

Figure 1 to Paragraph (a)(2)—Geographic Mitigation Areas for Marine Mammals in the GOA Study Area

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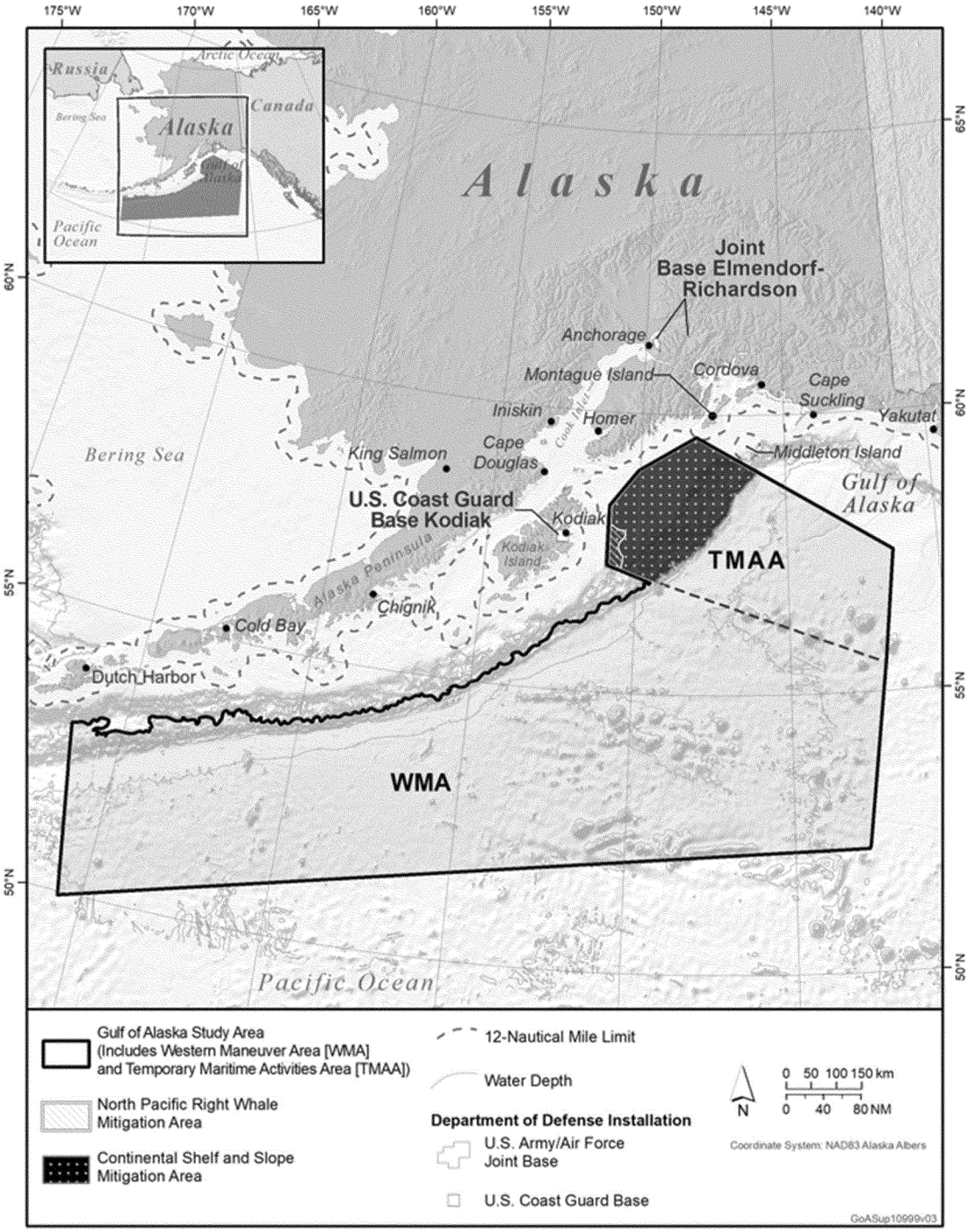

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(b) [Reserved]

§ 218.155 Requirements for monitoring and reporting.

(a) *Unauthorized take.* Navy personnel must notify NMFS immediately (or as soon as operational security considerations allow) if the specified activity identified in § 218.150 is thought to have resulted in the mortality or serious injury of any marine mammals, or in any Level A harassment or Level B harassment of marine mammals not authorized under this subpart.

(b) *Monitoring and reporting under the LOA.* The Navy must conduct all monitoring and reporting required under the LOA, including abiding by the U.S. Navy's Marine Species Monitoring Program. Details on program goals, objectives, project selection process, and current projects are available at *www.navymarinespeciesmonitoring.us.*

(c) *Notification of injured, live stranded, or dead marine mammals.* Navy personnel must consult the Notification and Reporting Plan, which sets out notification, reporting, and other requirements when dead, injured, or live stranded marine mammals are detected. The Notification and Reporting Plan is available at *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-military-readiness-activities.*

(d) *Annual GOA Marine Species Monitoring Report.* The Navy must submit an annual report of the GOA Study Area monitoring, which will be included in a Pacific-wide monitoring report and include results specific to the GOA Study Area, describing the implementation and results from the previous calendar year. Data collection methods must be standardized across Pacific Range Complexes including the Mariana Islands Training and Testing (MITT), Hawaii-Southern California Training and Testing (HSTT), Northwest Training and Testing (NWTT), and Gulf of Alaska (GOA) Study Areas to allow for comparison among different geographic locations. The report must be submitted to the Director, Office of Protected Resources, NMFS, either within 3 months after the end of the calendar year, or within 3 months after the conclusion of the monitoring year, to be determined by the adaptive management process. NMFS will submit comments or questions on the report, if any, within 3 months of receipt. The report will be considered final after the Navy has addressed NMFS' comments, or 3 months after submittal if NMFS does not provide comments on the report. This report will describe progress of knowledge made with respect to intermediate scientific objectives within the GOA Study Area associated with the Integrated Comprehensive Monitoring Program. Similar study questions must be treated together so that progress on each topic can be summarized across all Navy ranges. The report need not include analyses and content that does not provide direct assessment of cumulative progress on the monitoring plan study questions. This will continue to allow the Navy to provide a cohesive monitoring report covering multiple ranges (as per Integrated Comprehensive Monitoring Program goals), rather than entirely separate reports for the GOA, NWTT, HSTT, and MITT Study Areas.

(e) *GOA Annual Training Report.* Each year in which training activities are conducted in the GOA Study Area, the Navy must submit one preliminary report (Quick Look Report) to NMFS detailing the status of applicable sound sources within 21 days after the completion of the training activities in the GOA Study Area. Each year in which activities are conducted, the Navy must also submit a detailed report (GOA Annual Training Report) to the Director, Office of Protected Resources, NMFS, within 3 months after completion of the training activities. NMFS must submit comments or questions on the report, if any, within one month of receipt. The report will be considered final after the Navy has addressed NMFS' comments, or one month after submittal if NMFS does not provide comments on the report. The annual reports must contain information about the major training exercise (MTE), including the information listed in paragraphs (e)(1) and (2) of this section. The annual report, which is only required during years in which activities are conducted, must also contain cumulative sonar and explosive use quantity from previous years' reports through the current year. Additionally, if there were any changes to the sound source allowance in the reporting year, or cumulatively, the report must include a discussion of why the change was made and include analysis to support how the change did or did not affect the analysis in the GOA Final Supplemental Environmental Impact Statement/Overseas Environmental Impact Statement (FSEIS/OEIS) (*https://www.goaeis.com/*) and MMPA final rule (87 FR [INSERT FR PAGE NUMBER], [January 4, 2023). The analysis in the detailed report must be based on the accumulation of data from the current year's report and data collected from previous annual reports. The final annual/close-out report at the conclusion of the authorization period (year seven) will also serve as the comprehensive close-out report and include both the final year annual use compared to annual authorization as well as a cumulative 7-year annual use compared to 7-year authorization. This report must also note any years in which training did not occur. NMFS must submit comments on the draft close-out report, if any, within 3 months of receipt. The report will be considered final after the Navy has addressed NMFS' comments, or 3 months after the submittal if NMFS does not provide comments. Information included in the annual reports may be used to inform future adaptive management of activities within the GOA Study Area. In addition to the information discussed above, the GOA Annual Training Report must include the following information.

(1) *MFAS/HFAS.* The Navy must submit the following information for the MTE conducted in the GOA Study Area.

(i) *Exercise information (for each MTE).* (A) Exercise designator.

(B) Date that exercise began and ended.

(C) Location.

(D) Number and types of active sources used in the exercise.

(E) Number and types of passive acoustic sources used in exercise.

(F) Number and types of vessels, aircraft, etc., participating in exercise.

(G) Total hours of observation by Lookouts.

(H) Total hours of all active sonar source operation.

(I) Total hours of each active sonar source bin.

(J) Wave height (high, low, and average during exercise).

(ii) *Individual marine mammal sighting information for each sighting in each exercise where mitigation was implemented.* (A) Date/time/location of sighting.

(B) Species (if not possible, indication of whale/dolphin/pinniped).

(C) Number of individuals.

(D) Initial detection sensor (*e.g.,* sonar or Lookout).

(E) Indication of specific type of platform observation made from (including, for example, what type of surface vessel or testing platform).

(F) Length of time observers maintained visual contact with marine mammal.

(G) Sea state.

(H) Visibility.

(I) Sound source in use at the time of sighting.

(J) Indication of whether animal was less than 200 yd (182.9 m), 200 to 500 yd (182.9 to 457.2 m), 500 to 1,000 yd (457.2 to 914.4 m), 1,000 to 2,000 yd (914.4 to 1,828.8 m), or greater than 2,000 yd (1,828.8 m) from sonar source.

(K) Whether operation of sonar sensor was delayed, or sonar was powered or shut down, and how long the delay was.

(L) If source in use is hull-mounted, true bearing of animal from ship, true direction of ship's travel, and estimation of animal's motion relative to ship (opening, closing, parallel).

(M) Lookouts shall report, in plain language and without trying to categorize in any way, the observed behavior of the animals (such as animal closing to bow ride, paralleling course/speed, floating on surface and not swimming, *etc.*) and if any calves present.

(iii) An evaluation (based on data gathered during all of the MTEs) of the effectiveness of mitigation measures designed to minimize the received level to which marine mammals may be exposed. This evaluation shall identify the specific observations that support any conclusions the Navy reaches about the effectiveness of the mitigation.

(2) *Summary of sources used.* (i) This section shall include the following information summarized from the authorized sound sources used in all training events:

(A) *Total hours.* Total annual hours or quantity (per the LOA) of each bin of sonar or other non-impulsive source; and

(B) *Number of explosives.* Total annual number of each type of explosive exercises and total annual expended/detonated rounds (bombs, large-caliber projectiles) for each explosive bin.

(f) *Pre-event notification.* The Navy must coordinate with NMFS prior to conducting exercises within the GOA Study Area. This may occur as a part of coordination the Navy does with other local stakeholders.

§ 218.156 Letters of Authorization.

(a) To incidentally take marine mammals pursuant to this subpart, the Navy must apply for and obtain an LOA in accordance with § 216.106 of this chapter.

(b) An LOA, unless suspended or revoked, may be effective for a period of time not to exceed the expiration date of this subpart.

(c) If an LOA expires prior to the expiration date of this subpart, the Navy may apply for and obtain a renewal of the LOA.

(d) In the event of projected changes to the activity or to mitigation, monitoring, or reporting (excluding changes made pursuant to the adaptive management provision of § 218.157(c)(1)) required by an LOA issued under this subpart, the Navy must apply for and obtain a modification of the LOA as described in § 218.157.

(e) Each LOA will set forth:

(1) Permissible methods of incidental taking;

(2) Geographic areas for incidental taking;

(3) Means of effecting the least practicable adverse impact (*i.e.,* mitigation) on the species and stocks of marine mammals and their habitat; and

(4) Requirements for monitoring and reporting.

(f) Issuance of the LOA will be based on a determination that the level of taking is consistent with the findings made for the total taking allowable under this subpart.

(g) Notice of issuance or denial of the LOA will be published in the **Federal Register** within 30 days of a determination.

§ 218.157 Renewals and modifications of Letters of Authorization.

(a) An LOA issued under §§ 216.106 of this chapter and 218.156 for the activity identified in § 218.150(c) may be renewed or modified upon request by the applicant, provided that:

(1) The planned specified activity and mitigation, monitoring, and reporting measures, as well as the anticipated impacts, are the same as those described and analyzed for this subpart (excluding changes made pursuant to the adaptive management provision in paragraph (c)(1) of this section); and

(2) NMFS determines that the mitigation, monitoring, and reporting measures required by the previous LOA were implemented.

(b) For LOA modification or renewal requests by the applicant that include changes to the activity or to the mitigation, monitoring, or reporting measures (excluding changes made pursuant to the adaptive management provision in paragraph (c)(1) of this section) that do not change the findings made for this subpart or result in no more than a minor change in the total estimated number of takes (or distribution by species or stock or years), NMFS may publish a notice of the proposed changes to the LOA in the **Federal Register**, including the associated analysis of the change, and solicit public comment before issuing the LOA.

(c) An LOA issued under §§ 216.106 of this chapter and 218.156 may be modified by NMFS under the following circumstances:

(1) After consulting with the Navy regarding the practicability of the modifications, NMFS may modify (including adding or removing measures) the existing mitigation, monitoring, or reporting measures if doing so creates a reasonable likelihood of more effectively accomplishing the goals of the mitigation and monitoring.

(i) Possible sources of data that could contribute to the decision to modify the mitigation, monitoring, or reporting measures in an LOA include:

(A) Results from the Navy's monitoring from the previous year(s);

(B) Results from other marine mammal and/or sound research or studies; or

(C) Any information that reveals marine mammals may have been taken in a manner, extent, or number not authorized by this subpart or a subsequent LOA.

(ii) If, through adaptive management, the modifications to the mitigation, monitoring, or reporting measures are more than minor, NMFS will publish a notice of the proposed changes to the LOA in the **Federal Register** and solicit public comment.

(2) If NMFS determines that an emergency exists that poses a significant risk to the well-being of the species or stocks of marine mammals specified in LOAs issued pursuant to §§ 216.106 of this chapter and 218.156, an LOA may be modified without prior notice or opportunity for public comment. Notice would be published in the **Federal Register** within 30 days of the action.

§ 218.158 [Reserved]

[FR Doc. 2022–27951 Filed 1–3–23; 8:45 am]

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