**DEPARTMENT OF COMMERCE**

**National Oceanic and Atmospheric Administration**

**50 CFR Part 218**

**[Docket No. 170831846–7846–01]**

**RIN 0648–BH21**

## Taking and Importing Marine Mammals; Taking Marine Mammals Incidental to Testing and Training Activities Conducted in the Eglin Gulf Test and Training Range in the Gulf of Mexico

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

**ACTION:** Proposed rule: request for comments

**SUMMARY:** NMFS has received a request from the United States Air Force (USAF), 96th Civil Engineer Group/Environmental Planning Office (96 CEG/CEIEA) at Eglin Air Force Base (hereafter referred to as Eglin AFB) for authorization to take marine mammals incidental to conducting testing and training activities in the Eglin Gulf Test and Training Range (EGTTR) in the Gulf of Mexico over the course of five years, from February 4, 2018 to February 3, 2023. Pursuant to regulations implementing the Marine Mammal Protection Act (MMPA), NMFS is proposing regulations to govern that take, and requests comments on the proposed regulations.

**DATES:** Comments and information must be received no later than January 26, 2018.

**ADDRESSES:**

You may submit comments on this document by either of the following methods:

- *Federal e-Rulemaking Portal:* Go to *www.regulations.gov,* enter 0648–BH21 in the ''Search'' box, click the ''Comment Now!'' icon, complete the required fields, and enter or attach your comments.
- *Mail:* Comments should be addressed to Jolie Harrison, Chief, Permits and Conservation Division, Office of Protected Resources, National Marine Fisheries Service, 1315 East-West Highway, Silver Spring, MD 20910.

*Instructions:* NMFS is not responsible for comments sent by any other method, to any other address or individual, or received after the end of the comment period. Attachments to electronic comments will be accepted in Microsoft Word or Excel or Adobe PDF file formats only. To help NMFS process and review comments more efficiently, please use only one method to submit comments. All comments received are a part of the public record and will generally be posted on *www.regulations.gov* without change. All personal identifying information (*e.g.,* name, address) voluntarily submitted by the commenter may be publicly accessible. Do not submit confidential business information or otherwise sensitive or protected information.

**FOR FURTHER INFORMATION CONTACT:** Robert Pauline, Office of Protected Resources, NMFS, (301) 427–8408. Electronic copies of the application and supporting documents, as well as a list of the references cited in this document, may be obtained online at: *www.nmfs.noaa.gov/pr/permits/incidental/military.htm.* In case of problems accessing these documents, please call the contact listed above.

**SUPPLEMENTARY INFORMATION:**

### Purpose and Need for Regulatory Action

This proposed rule, to be issued under the authority of the MMPA, would establish a framework for authorizing the take of marine mammals incidental to military aircraft testing and training activities at EGTTR. We received an application from Eglin AFB requesting 5-year regulations and authorization for the take by Level A and Level B harassment of two marine mammal species. The regulations would be valid from February 4, 2018, through February 3, 2023. Please see *Background* below for definitions of Level A and Level B harassment.

### Legal Authority for the Proposed Action

Section 101(a)(5)(A) of the MMPA (16 U.S.C. 1371(a)(5)(A) directs the Secretary of Commerce 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 for up to five years 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 proposed rule containing five-year regulations, and for any subsequent Letters of Authorization (LOA) issued pursuant to those regulations. As directed by this legal authority, this proposed rule contains mitigation, monitoring, and reporting requirements.

The National Defense Authorization Act for Fiscal Year 2004 (Section 319, Public Law 108–136, November 24, 2003) (NDAA of 2004) removed the ''small numbers'' and ''specified geographical region'' limitations and amended the definition of harassment as it applies to a ''military readiness activity'' to read as follows (Section 3(18)(B) of the MMPA, 16 U.S.C. 1362(18)(B)): (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).

### Summary of Major Provisions Within the Proposed Rule

Following is a summary of some of the major provisions in this proposed rule for Eglin AFB's proposed EGTTR activities. We have preliminarily determined that Eglin AFB's adherence to the proposed mitigation, monitoring, and reporting measures listed below would achieve the least practicable adverse impact on the affected marine mammals. They include:

- Monitoring will be conducted by personnel who have completed Eglin's Marine Species Observer Training Course, which was developed in cooperation with the National Marine Fisheries Service;
- For each live mission, at a minimum, pre- and post-mission monitoring will be required. Monitoring will be conducted from a given platform depending on the specific mission. The purposes of pre-mission monitoring are to (1) evaluate the mission site for environmental suitability and (2) verify that the zone of influence (ZOI) is free of visually detectable marine mammals and potential marine mammal indicators. Post-mission monitoring is designed to determine the effectiveness of pre-mission mitigation by reporting sightings of any dead or injured marine mammals;
- Mission delay will be implemented during live ordnance mission activities if protected species, large schools of fish, or large flocks of birds are observed feeding at the surface within the ZOI. Mission activities may not resume until

the animals are observed moving away from the ZOI or 30 minutes have passed;

- Mission delay will be implemented if daytime weather and/or sea conditions preclude adequate monitoring for detecting marine mammals and other marine life. EGTTR missions may not resume until adequate sea conditions exist for monitoring;
- If unauthorized takes of marine mammals (*i.e.,* serious injury or mortality) occur, ceasing operations and reporting to NMFS immediately and submitting a report to NMFS within 24 hours;
- Use of aerial-based monitoring which provides an excellent viewing platform for detection of marine mammals at or near the surface;
- Use of video-based monitoring via live high-definition video feed. Video monitoring typically facilitates data collection for the mission but can also allow remote viewing of the area for determination of environmental conditions and the presence of marine species up to the release time of live munitions;
- Use of vessel-based monitoring; and
- Ramp-up procedures for gunnery operations.

**Background**

Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 *et seq.*) 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 a proposed authorization is provided to the public for review. An authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s), will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses (where relevant), and if the permissible methods of taking and requirements pertaining to the mitigation, monitoring and reporting of such takings are set forth. NMFS has defined ''negligible impact'' in 50 CFR 216.103 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.

**National Environmental Policy Act (NEPA)**

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 review our proposed action (*i.e.,* the issuance of an incidental harassment authorization) with respect to potential impacts on the human environment.

The U.S. Air Force developed an EA in 2015 titled *Eglin Gulf Test and Training Range Environmental Assessment* (Navy 2015). NMFS will review and evaluate the EA for consistency with the regulations published by the Council of Environmental Quality (CEQ) and NOAA Administrative Order 216–6, Environmental Review Procedures for Implementing the National Environmental Policy Act, and determine whether or not to adopt the EA. Information in Eglin AFB's application, the EA, and this notice collectively provide the environmental information related to proposed issuance of the regulations for public review and comment. We will review all comments submitted in response to this notice as we complete the NEPA process, including the decision of whether to sign a Finding of No Significant Impact (FONSI) prior to a final decision on the LOA request. The NEPA documents are available for review at *www.nmfs.noaa.gov/pr/permits/incidental/military.html.*

**Summary of Request**

On September 16, 2015, NMFS received a request for regulations from Eglin AFB for the taking of marine mammals incidental to testing and training activities in the EGTTR (defined as the area and airspace over the Gulf of Mexico controlled by Eglin AFB, beginning at a point three nautical miles (NM) off the coast of Florida) for a period of five years. Eglin AFB worked with NMFS to revise the model used to calculate take estimates and submitted a revised application on April 15, 2017.

On August 24, 2017, we published a notice of receipt of Eglin AFB's application in the **Federal Register** (82 FR 40141), requesting comments and information for thirty days related to Eglin AFB's request. We did not receive any comments from the public. The application was considered adequate and complete on September 29, 2017.

Eglin AFB proposes taking marine mammals incidental to EGTTR activities by Level A and Level B harassment of Atlantic bottlenose dolphins (*Tursiops truncates)* and Atlantic spotted dolphins (*Stenella frontalis*). On April 23, 2012, NMFS promulgated rulemaking and issued an LOA for takes of marine mammals incidental to Eglin AFB's Naval Explosive Ordnance Disposal School (NEODS) training operations at Eglin AFB. This rule expired on April 24, 2017 (77 FR 16718, March 22, 2012). On March 5, 2014, NMFS promulgated rulemaking and issued an LOA for takes of marine mammals incidental to Eglin AFB's Air Force Special Operations Command (AFSOC) precision strike weapons (PSW) and air-to-surface (AS) gunnery activities in the EGTTR, which is valid through March 4, 2019 (79 FR 13568, March 11, 2014). In addition to these rules and LOAs, NMFS has issued Incidental Harassment Authorizations (IHA) for take of marine mammals incidental to Eglin AFB's Maritime Strike Operations (78 FR 52135, August 22, 2013; valid August 19, 2013 through August 18, 2014) and Maritime Weapons Systems Evaluations Program (WSEP) annually in 2015 (80 FR 17394), 2016 (81 FR 7307), and 2017 (82 FR 10747) which currently expires on February 3, 2018. Eglin AFB complied with all conditions of the LOAs and IHAs issued, including submission of final reports. Based on these reports, NMFS has determined that impacts to marine mammals were not beyond those anticipated. Eglin AFB's current rulemaking/LOA application would supersede the existing PSW and AS gunnery rule that is in effect until March 4, 2019, and would include all of Eglin AFB's testing and training activities, including WSEP activities, into one new rule with the exception of NEODS training activities. Eglin AFB has never conducted any NEODS training activities and is not including these activities as part of the new rulemaking. The regulations proposed in this action, if issued, would be effective from February 4, 2018, through February 3, 2023.

**Description of Proposed Activity**

*Overview*

Eglin AFB proposes to conduct military aircraft missions within the EGTTR that involve the employment of multiple types of live (explosive) and inert (non-explosive) munitions against various surface targets. Munitions may be delivered by multiple types of aircraft including, but not limited to, fighter jets, bombers, and gunships. Munitions consist of bombs, missiles, rockets, and gunnery rounds. The targets may vary, but primarily consist of stationary, towed, or remotely controlled boats, inflatable targets, or marking flares. Detonations may occur in the air, at the water surface, or approximately 10 feet (ft) below the surface. Mission activities proposed in the EGTTR have the potential to expose cetaceans to sound or pressure levels

currently associated with mortality, Level A harassment, and Level B harassment, as defined by the MMPA.

Testing and training missions would be conducted during any time of the year. Missions that involve inert munitions and in-air detonations may occur anywhere in the EGTTR. Aside from gunnery operations, mission activities that release live ordnance resulting in surface or subsurface detonations would be conducted at a pre-determined location approximately 17 miles offshore of Santa Rosa Island, in a water depth of about 35 meters (m) (115 ft).

*Dates and Duration*

Due to the total number and variability in types of air-to-surface test and training missions included in this LOA request, missions may occur during any season or month. Missions involving the use of live bombs, missiles, and rockets will occur during daylight hours. However, some activities, such as gunnery training, may occur during day or night. Missions are typically conducted on weekdays, with multiple weapons releases typically occurring per day. The LOA would be valid from February 4, 2018 through February 3, 2023.

*Specific Geographic Region*

All activities will take place within the EGTTR, which is defined as the airspace over the Gulf of Mexico controlled by Eglin AFB, beginning at a point 3 NM from shore. This airspace is controlled by the Federal Aviation Administration, but scheduled by Eglin AFB. The EGTTR is subdivided into blocks consisting of Warning Areas W–155, W–151, W–470, W–168, and W–174, as well as Eglin Water Test Areas 1 through 6 (See Figure 1–2 in Application). Most of the blocks are further sub-divided into smaller airspace units for scheduling purposes (for example, W–151A, B, C, and D). Warning Area W–155 is controlled by the U.S. Navy but is used occasionally to support missions scheduled through Eglin. Over 102,000 square nautical miles ($nmi^2$) of Gulf of Mexico surface waters occur under the EGTTR airspace. However, most of the activities described in this document will occur in W–151, and the great majority will occur specifically in sub-area W–151A due to its proximity to shore (Figure 1–3 in Application). Descriptive information for all of W–151 and for W–151A specifically is provided below.

The inshore and offshore boundaries of W–151 are roughly parallel to the shoreline contour. The shoreward boundary is 3 nmi from shore, while the seaward boundary extends approximately 85 to 100 nmi offshore, depending on the specific location. W–151 covers a surface area of approximately 10,247 $nmi^2$ (35,145 square kilometers ($km^2$), and includes water depths ranging from about 20 to 700 m (66 to 2,297 ft). This range of depth includes continental shelf and slope waters. Approximately half of W–151 lies over the shelf.

W–151A, which occurs directly south of Eglin AFB, extends approximately 60 nmi offshore and has a surface area of 2,565 $nmi^2$ (8,797 $km^2$). Water depths range from about 30 to 350 m (98 to 1,148 ft) and include continental shelf and slope zones. However, most of W–151A occurs over the continental shelf, in water depths less than 250 m (820 ft). Most of the air-to-surface missions occur in the shallower, northern inshore portion of the sub-area (Maritime WSEP test site), in a water depth of about 35 m (115 ft).

*Detailed Description of Specific Activity*

Eglin AFB proposes to conduct the following actions in the EGTTR: (1) 86th Fighter Weapons Squadron (86 FWS) Maritime Weapons System Evaluation Program (WSEP) test missions that involve the use of multiple types of live and inert munitions (bombs and missiles) detonated above, at, or slightly below the water surface; (2) Advanced Systems Employment Project actions that involve deployment of a variety of pods, air-to-air missiles, bombs, and other munitions (all inert ordnances in relation to EGTTR); (3) Air Force Special Operations Command (AFSOC) training, including air-to-surface gunnery missions involving firing live gunnery rounds at targets on the water surface in EGTTR, small diameter bomb (SDB) and Griffin/Hellfire missile training involving the use of live missiles and SDBs in the EGTTR against small towed boats, and CV–22 tiltrotor aircraft training involving the firing of 0.50 caliber (cal.)/7.62 mm ammunition at flares floating on the EGTTR water surface; (4) 413th Flight Test Squadron (FLTS) Precision Strike Program (PSP) activities involving firing munitions at flare targets on the EGTTR water surface and Stand-Off Precision Guided Munitions (SOPGM) testing involving captive-carry, store separation, and weapon employment tests; (5) 780th Test Squadron (TS) activities involving precision strike weapon (PSW) test missions (launch of munitions against targets in the EGTTR) and Longbow Littoral Testing (data collection on tracking and impact ability of the Longbow missile on small boats); (6) 96th Test Wing Inert Missions (developmental testing and evaluation for wide variety of air-delivered weapons and other systems using inert bombs); and (7) 96 Operations Group (OG) missions, which involve the support of air-to-surface missions for several user groups within EGTTR.

During these activities, ordnances may be delivered by multiple types of aircraft, including bombers and fighter aircraft. The actions include air-to-ground missiles (AGM); air intercept missiles (AIM); bomb dummy units (BDU); guided bomb units (GBU); projectile gun units (PGU); cluster bomb units (CBU); wind-corrected munitions dispensers (WCMD); small-diameter bombs (SDB) and laser small diameter bombs (LSDB); high explosive incendiary units (HEI); joint direct attack munitions (JDAM) and laser joint direct attack munitions (LJDAM); research department explosives (RDX); joint air-to-surface stand-off missiles (JASSM); high altitude anti-submarine warfare weapons (inert); high-speed maneuverable surface targets; and gunnery rounds. Net explosive weight (NEW) of the live munitions ranges from 0.1 to 945 pounds (lb).

The EGTTR testing and training missions are classified as military readiness activities and involve the firing or dropping of air-to-surface weapons. Depending on the requirements of a given mission, munitions may be inert (contain no or very little explosive charges) or live (contain explosive charges). Live munitions may detonate above, at, or slightly below the water surface. In most cases, missions consisting of live bombs, missiles, and rockets that detonate at or below the water surface will occur at a site in W–151A that has been designated specifically for these types of activities. Typically, test data collection is conducted from an instrumentation barge known as the Gulf Range Armament Test Vessel (GRATV) anchored on-site, which provides a platform for cameras and weapon-tracking equipment. Therefore, the mission area is referred to as the GRATV target location. Alternative site locations may be selected, if necessary, within a 5-mile radius around the GRATV point. Missions that involve inert munitions and in-air detonations may occur anywhere in the EGTTR but are typically conducted in W–151.

For this LOA request, descriptions of mission activities that involve in-water detonations include a section called Mission-Day Categorization. This subsection describes the mission-day scenario used for acoustic modeling and is based on the estimated number of weapons released per day. This

approach is meant to satisfy NMFS' requests to analyze and assess acoustic impacts associated with accumulated energy from multiple detonations occurring over a 24-hour timeframe. Eglin AFB used all available information to develop each mission-day scenario, including historical release records; however, these scenarios may not represent exact weapon releases because military needs and requirements are in a constant state of flux. The mission-day categorizations provide high-, medium-, and low-intensity mission-day scenarios for some groups and an average scenario for other groups. Mission-day scenarios vary for each user group and are described in the following sections.

Note that additional testing and training activities are planned for the EGTTR that will not result in any acoustic impacts to marine mammals and, therefore, not require any acoustic analyses. Examples include the firing of 0.50 caliber and 7.62 gunnery rounds that do not contain explosives, use of airburst-only detonations, and operations involving simulated weapons delivery. Those activities are described in detail in the Application but are not discussed here.

*86th Fighter Weapons Squadron Maritime Weapons System Evaluation Program*

The 86 FWS would continue to use multiple types of live and inert munitions in the EGTTR against small boat targets for the Maritime WSEP Operational Testing Program. The purpose of the testing is to continue the development of tactics, techniques and procedures (TTP) for USAF strike aircraft to counter small maneuvering surface vessels in order to better protect vessels or other assets from small boat threats. Damage effects of these munitions must be known to generate TTPs to engage small moving boats. The test objectives are to (1) develop TTPs to engage small boats in all weather and (2) determine the impact of TTPs on Combat Air Force training. The test results would be used to develop publishable TTPs for inclusion in Air Force TTP 3–1 series manuals. Maritime WSEP testing is considered a high national defense priority. Incidental Harassment Authorizations have been issued for 2015 (80 FR 17394, April 1, 2015), 2016 (81 FR 7307, February 11, 2016) and 2017 (82 FR 10747, February 15, 2017) Maritime WSEP activities, but these activities will now be part of this new rulemaking to avoid annual IHAs.

Proposed aircraft and munitions associated with Maritime WSEP activities are shown in Table 1. Because the focus of the tests would be weapon/target interaction, no particular aircraft would be specified for a given test as long as it met the delivery requirements. Various USAF active duty units, National Guard, Navy, and USAF reserve units would participate as interceptors and weapons release aircrews, with multiple types of aircraft typically operating within the same airspace.

TABLE 1—MARITIME WSEP MUNITIONS AND EXAMPLE AIRCRAFT

| Munitions | Aircraft |
|---|---|
| AGM–114 (Hellfire) | F–15 fighter aircraft. |
| AGM–176 (Griffin) | F–16 fighter aircraft. |
| AGM–65 (Mavericks) | F–18 fighter aircraft. |
| AIM–9X | F–22 fighter aircraft. |
| BDU–56 | F–35 fighter aircraft. |
| CBU–105 (WCMD) | AC–130 gunship. |
| GBU–12/GBU–54 | A–10 fighter aircraft. |
| GBU–10/GBU–24 | B–1 bomber aircraft. |
| GBU–31 | B–52 bomber aircraft. |
| GBU–38 | B–2 bomber aircraft. |
| PGU–13/B | MQ–1. |
| PGU–27 | MQ–9. |
| 2.75 in Rockets. | |
| 7.62mm/50 Cal. | |
| GBU–39 (Laser SDB). | |
| GBU–53 (SDB II). | |

AGM = air-to-ground missile; AIM = air intercept missile; BDU = Bomb, Dummy Unit; GBU = Guided Bomb Unit; PGU = Projectile Gun Unit; CBU = Cluster Bomb Unit; WCMD = Wind-Corrected Munitions Dispenser; mm = millimeters; SDB = Small Diameter Bomb.

Tests would be conducted at the GRATV target location in various sea states and weather conditions, up to a wave height of 4 ft. Live munitions would be deployed against static (anchored), towed, and remotely controlled boat targets. Static and controlled targets would consist of stripped boat hulls with plywood simulated systems and, in some cases, heat sources. Moving targets would be towed by remotely controlled High Speed Maneuverable Surface Target (HSMST) boats. Damaged boats would be recovered for data collection. Test data collection would be conducted from the GRATV. HSMST boats would be remotely controlled from a facility on Eglin main base and would follow set track lines with specific waypoints at least 2 to 3 nautical miles (NM) away from the GRATV. Additional air assets such as chase aircraft or unmanned aerial vehicles would transit to the target area and set up flight orbits to provide aerial video of the mission site including weapon impacts on boat targets and assisting with range clearing activities. Missions would be controlled and monitored from the Eglin Central Control Facility (CCF) on the main base.

Live munitions would be set to detonate either in the air, instantaneously upon contact with a target boat, or after a slight delay (up to 10 millisecond) after impact, which would correspond to a water depth of about 5 to 10 ft. The annual number, height or depth of detonation, explosive material, and net explosive weight (NEW) of each live munition associated with Maritime WSEP is provided in Table 2. The quantity of live munitions tested is considered necessary to provide the intended level of tactics and weapons evaluation, including a number of replicate tests sufficient for an acceptable confidence level regarding munitions capabilities.

In addition to the live munitions described above, 86 FWS also proposes to expend inert munitions in W–151. The expected number of each munition type expended during a typical year is included in Table 2. Use of inert munitions was analyzed in the 2002 *Eglin Gulf Test and Training Range (EGTTR) Programmatic Environmental Assessment* (2002 PEA) and found to have no significant environmental impact (U.S. Air Force, 2002). The 2002 PEA estimated that a maximum of 0.2 marine mammals could potentially be struck by projectiles, falling debris, and inert munitions each year. This calculation assumed there would be over 600 events conducted per year which accounted for the maximum annual number of expendables over a five-year period (1995–1999), totaling over 626,000 inert items. Live gunnery rounds (*e.g.,* 25-mm, 40-mm, 105-mm) were not included in the direct physical impact analysis since the acoustic analyses constituted a more conservative assessment for exploding rounds. Since 1999, Range Utilization Reports have shown through 2010 the annual average number of inert expendables has decreased to approximately 311,000 items, about 50 percent of the maximum annual number used for calculations for the 2002 PEA. The additional use of inert munitions under the Proposed Action for the 2015 EGTTR Programmatic EA would add another 76,000 items, resulting in a 19 percent increase in inert expendables, based on the annual average from 1999 through 2010. This proposed increase compared to historic use is still less than the maximum baseline levels analyzed in 2002. The estimated abundance of local stocks of bottlenose and Atlantic spotted dolphins has likely increased since the 2002 PEA according to NMFS stock assessment reports. For example, the northern Gulf of Mexico continental shelf stock of bottlenose dolphin increased from 21,531 in 1991–2001 to 51,192 in 2011–2012, which is the most recent available data. Even

with these estimated increases in abundance, the Navy and NMFS believe that the potential for direct physical impacts remains nominal and can be considered discountable. Actual numbers of inert releases may vary somewhat from those shown in the table. However, the items are included in this LOA in order to document the programmatic use of the EGTTR.

TABLE 2—MARITIME WSEP MUNITIONS USE IN THE EGTTR

| Type of munition | Number of munitions | Detonations scenario | Warhead—explosive material | NEW (lbs) |
|---|---|---|---|---|
| GBU–10 or GBU–24 | 2 | Surface or Subsurface | MK–84—Tritonal | 945 |
| GBU–49 | 4 | Surface | Tritonal | 300 |
| JASSM | 4 | Surface | Tritonal | 240 |
| GBU–12/–54 (LJDAM)/–38/–32 (JDAM). | 10 | Surface or Subsurface | MK–82—Tritonal | 192 |
| AGM–65 (Maverick) | 8 | Surface | WDU–24/B penetrating blast-fragmentation warhead. | 86 |
| CBU–105 | 4 | Airburst | 10 BLU–108 submunitions with 4 projectiles, parachute, rocket motor & altimeter. 10.69 lbs NEW/submunition (includes 2.15 lbs/projectile). | 107.63 |
| GBU–39 (LSDB) | 4 | Airburst, Surface, or Subsurface. | AFX–757 (Insensitive munition) | 37 |
| AGM–114 (Hellfire) | 30 | Airburst or Surface, Subsurface | High Explosive Anti-Tank (HEAT) tandem anti-armor metal augmented charge. | 29 |
| GBU–53 (SDB II) | 4 | Airburst, Surface or Subsurface | PBX–N–109 Aluminized Enhanced Blast, Scored Frag Case, Copper Shape Charge. | 22.84 |
| AIM–9X | 2 | Surface | PBXN–3 | 7.9 |
| AGM–176 (Griffin) | 10 | Airburst or Surface | Blast fragmentation | 4.58 |
| Rockets (including APKWS). | 100 | Surface | Comp B–4 HEI | 10 |
| PGU–13 HEI 30 mm | 1,000 | Surface | 30 x 173 mm caliber with aluminized RDX explosive. Designed for GAU–8/A Gun System. | 0.1 |
| GBU–10 | 21 | Inert | N/A | N/A |
| GBU–12 | 27 | Inert | N/A | N/A |
| GBU–24 | 17 | Inert | N/A | N/A |
| GBU–31 | 6 | Inert | N/A | N/A |
| GBU–38 | 3 | Inert | N/A | N/A |
| GBU–54 | 16 | Inert | N/A | N/A |
| BDU–56 | 13 | Inert | N/A | N/A |
| AIM–9X | 3 | Inert | N/A | N/A |
| PGU–27 | 46,000 | Inert | N/A | N/A |

AGM = air-to-ground missile; AIM = air intercept missile; BDU = Bomb, Dummy Unit; CBU = Cluster Bomb Unit; GBU = Guided Bomb Unit; HEI = high explosive incendiary; lbs = pounds; LJDAM = laser joint direct attack munition; LSDB = Laser Small Diameter Bombs; MK = mark; mm = millimeters; NEW = Net Explosive Weight; PGU = Projectile Gun Unit; RDX = research department explosive; SDB = Small Diameter Bomb.

Mission-day categorizations of weapon releases listed in Table 3 were developed based on historical mission data, project engineer input, and future Maritime WSEP requirements. Categories of missions were grouped first using historical weapon releases per day (refer to Maritime Strike and Maritime WSEP annual reports for 2015 and 2016). Next, the most recent weapons evaluation needs and requirements were considered to develop three different scenarios: Categories A, B, and C. Mission-day Category A represents munitions with larger NEW (192 to 945 pounds) with both surface and subsurface detonations. This category includes future requirements and provides flexibility for the military mission. To date, Category A levels of activity have not been conducted under the 86 FWS Maritime WSEP missions and is considered a worst-case scenario. Category B represents munitions with medium levels of NEW (20 to 86 pounds) including surface and subsurface detonations. Category B was developed using actual levels of weapon releases during Maritime WSEP missions (refer to Maritime WSEP annual reports for 2015 and 2016). Category C represents munitions with smaller NEW (0.1 to 13 pounds) and includes surface detonations only.

TABLE 3—MARITIME WSEP MUNITIONS CATEGORIZED AS REPRESENTATIVE MISSION DAYS

| Mission category | Munition | NEW (lbs) | Detonation type | Munitions per day | Mission days/year | Total munitions/year |
|---|---|---|---|---|---|---|
| A | GBU–10/–24/–31 | 945 | Subsurface (10-ft depth) | 1 | 2 | 2 |
| | GBU–49 | 300 | Surface | 2 | | 4 |
| | JASSM | 240 | Surface | 2 | | 4 |
| | GBU–12/–54 (LJDAM)/–38/–32 (JDAM). | 192 | Subsurface (10-ft depth) | 5 | | 10 |
| B | AGM–65 (Maverick) | 86 | Surface | 2 | 4 | 8 |
| | GBU–39 (SDB) | 37 | Surface | 1 | | 4 |
| | AGM–114 (Hellfire) | 20 | Subsurface (10-ft depth) | 5 | | 20 |

TABLE 3—MARITIME WSEP MUNITIONS CATEGORIZED AS REPRESENTATIVE MISSION DAYS—Continued

| Mission category | Munition | NEW (lbs) | Detonation type | Munitions per day | Mission days/year | Total munitions/ year |
|---|---|---|---|---|---|---|
| C | AGM–176 (Griffin) | 13 | Surface | 5 | 2 | 10 |
| | 2.75 rockets | 12 | Surface | 50 | | 100 |
| | AIM–9X | 7.9 | Surface | 1 | | 2 |
| | PGU–12 HEI 30 mm | 0.1 | Surface | 500 | | 1,000 |

AGM = air-to-ground missile; CBU = Cluster Bomb Unit; GBU = Guided Bomb Unit; HEI = high explosive incendiary; JDAM = Joint Direct Attack Munition; LJDAM = Laser Joint Direct Attack Munition; lbs = pounds; NEW = net explosive weight; PGU = Projectile Gun Unit; mm = millimeter; SDB = Small Diameter Bomb.

A human safety zone will be established around the test area prior to each mission and will be enforced by up to 25 safety boats. The size of this zone may vary, depending upon the particular munition and delivery method used in a given test. A composite safety footprint has been developed for previous tests using live munitions. This composite safety footprint consisted of a circle with a 29 mile-wide diameter circle (14.5 mile-wide radius), which was converted to an octagon shape for ease of support vessel placement and range clearance.

Potential post-test activities consist of Air Force Explosive Ordnance Disposal (EOD) personnel detonating in place any munitions components or items remaining on the target boats that would be considered unexploded ordnance (UXO), debris retrieval, and post-mission protected species surveys. Unexploded bombs, missiles, or other similarly large items would sink to the seafloor and would not be recovered or detonated. However, smaller unexploded items such as cluster bomb submunitions could remain intact on target boats. Once the area has been cleared by the Eglin EOD team, the range will be re-opened for the debris clean-up team and the protected species survey vessels (when live munitions are used). Depending on the specific weapon system used and the location or position of the UXO, the test area could be closed for an extended period of time.

*Advanced Systems Employment Project*

The proposed Advanced Systems Employment Project (ASEP) action includes evaluating upgrades to numerous research and development, as well as Air Force hardware and software, initiatives. F16, F15E, and BAC1–11 aircraft would be used to deploy a variety of pods, air-to-air missiles, bombs, and other munitions. Many of the missions are conducted over Eglin land ranges. However, inert instrumented MK–84 Joint Direct Attack Munition (JDAM) bombs would be expended in W–151 under the Proposed Action. Bombs would be dropped on target boats located 20 to 25 miles offshore. A maximum of 12 over-water missions could be conducted annually, although the number could be as low as 4. There would be no live ordnance associated with ASEP actions in the EGTTR.

*Air Force Special Operations Command Training*

The Air Force Special Operations Command (AFSOC) conducts various training activities with multiple types of munitions in nearshore waters of the EGTTR (W–151). Training activities include air-to-surface gunnery and small diameter bomb/Griffin/Hellfire missile proficiency training. The following subsections describe the proposed actions included in Eglin AFB's LOA request.

Air-to-surface gunnery missions involve firing of live gunnery rounds from the AC–130 aircraft at targets on the water surface in the EGTTR. Ordnance used in this training includes 25 mm high explosive incendiary (HEI), 30 mm HEI, 40 mm HEI, and 105 mm HEI rounds. NEW ranges from about 0.07 to 4.7 pounds. The Air Force has developed a 105 mm training round (TR) that contains less than 10 percent of the amount of explosive material contained in the 105 mm full up (FU) round. The TR variant was developed as a means to mitigate acoustic impacts on marine mammals that could not be adequately surveyed at night by aircraft sensors. Today's AC–130 sensors allow for effective nighttime visual surveys but with reduced explosive material the TR rounds remain a valuable mitigation for reducing acoustic impacts.

Water ranges within the EGTTR that are typically used for gunnery operations include W–151A, W–151B, W–151C, and W–151D. However, W–151A is the most frequently used water range due to its proximity to Hurlburt Field (where the gunnery flights originate). AC–130s normally transit from Hurlburt Field to the water ranges at a minimum of 4,000 ft above surface level. Potential target sites are typically established at least 15 miles from the coast (beyond the 12 nmi territorial sea boundary). Such a location places most mission activities over shallower continental shelf waters where marine mammal densities are typically lower and thus avoids the slope waters where more sensitive species (*e.g.,* Endangered Species Act (ESA)-listed sperm whale) generally reside. Targets consist of either an MK–25 floating flare or an inflatable target. For missions where flares are used, the aircrew scans a 5–NM radius around the potential target area to ensure it is clear of surface craft, protected species, and other objects that would make the site unsuitable. Scanning is accomplished using radar, Electro Optical (EO), infrared (IR) sensors, and visual means. An alternative area is selected if any non-mission vessels or protected marine species are detected within the 5 nmi search area. Once the scan is completed, the marking flare is dropped onto the water surface. The flare's burn time is typically 10 to 20 minutes but could be less if actually hit by one of the rounds. However, flares may burn as long as 40 minutes.

Missions using an inflatable target proceed under the same general protocol. A tow boat transits to a potential target site located at least 15 miles from the coast. The AC–130 then arrives at the site and, as with missions using flares, the aircrew scans an appropriate area around the potential target area (5 nmi radius for non-mission vessels and protected species) using visual observation and the aircraft's sensors. An alternative area would be selected if any protected marine species or non-mission vessels were detected within the search area. Once the scan is complete, the 20-foot target is inflated and deployed into the water. The tow boat then proceeds to pull the target, which is attached to a 2,200-foot cable. The target continues to float even when struck by ordnance and deflated. After the mission, the tow boat recovers any debris produced by rounds

striking the target, although little debris is expected.

After target deployment, the firing sequence is initiated. A typical gunship mission lasts approximately five hours without air-to-air refueling, and six hours when refueling is accomplished. A typical mission includes 1.5 to 2 hours of live fire. This time includes clearing the area and transiting to and from the range. Actual firing activities typically do not exceed 30 minutes. The number and type of munitions deployed during a mission varies with each type of mission flown. The 105-mm TR variants are used during nighttime training. Live fire events are continuous, with pauses during the firing usually well under a minute and rarely from two to five minutes.

Gunnery missions could occur any season of year, during daytime or nighttime hours. The quantity of live rounds expended is based on estimates provided by AFSOC regarding the annual number of missions and number of rounds per mission. The 105 mm FU rounds would typically be used during daytime missions, while the 105 mm TR variants would be used at night.

On March 5, 2014, NMFS issued a 5-year LOA in accordance with the MMPA for AFSOC's air-to-surface gunnery activities which is currently valid through March 4, 2019. This LOA request would supersede that authorization for AC–130 air-to-surface gunnery activities for another five years (2018–2023); it incorporates the updated approach to analysis requested by NMFS. No significant changes to these mission activities are anticipated in the foreseeable future. Table 4 shows the annual number of missions and gunnery rounds currently authorized under the existing LOA which will be carried forward for this LOA request.

TABLE 4—SUMMARY OF ANNUAL AFSOC AC–130 GUNNERY OPERATIONS

| Munition | NEW (lbs) | Total munitions/ year | Number of daytime missions | Number of LI≤ nighttime missions |
|---|---|---|---|---|
| 105 mm HE (FU) | 4.7 | 750 | 25 | 45 |
| 105 mm HE (TR) | 0.35 | 1,350 | ..... | ..... |
| 40 mm HE | 0.87 | 4,480 | ..... | ..... |
| 30 mm HE | 0.1 | 35,000 | ..... | ..... |
| 25 mm HE | 0.067 | 39,200 | ..... | ..... |
| Total | ..... | 80,780 | ..... | ..... |

HE = High Explosive; lbs = pounds; mm = millimeter; NEW = net explosive weight; TR = Training Round; FU = Full Up.

Two mission-day scenarios were developed to represent the average number of gunnery rounds expended during daytime and nighttime AC–130 air-to-surface gunnery missions; category D for daytime missions and category E for nighttime missions. Eglin AFB coordinated with the AFSOC Planning Office to confirm that annual allotments provided in Table 5 would still meet their training needs and averaged the annual number of each gunnery round with the annual number of mission days proposed for daytime and nighttime. The mission-day scenarios developed for AC–130 air-to-surface gunnery missions are shown in Table 5.

TABLE 5—AC–130 GUNNERY OPERATIONS CATEGORIZED AS REPRESENTATIVE MISSION DAYS

| Mission category | Munition | NEW (lbs) | Detonation type | Munitions per day | Mission days/year | Total munitions/ year |
|---|---|---|---|---|---|---|
| D | 105 mm HE (FU) | 4.7 | Surface | 30 | 25 | 750 |
| | 40 mm HE | 0.87 | Surface | 64 | ..... | 1,600 |
| | 30 mm HE | 0.1 | Surface | 500 | ..... | 12,500 |
| | 25 mm HE | 0.067 | Surface | 560 | ..... | 14,000 |
| E | 105 mm HE (TR) | 0.35 | Surface | 30 | 45 | 1,350 |
| | 40 mm HE | 0.87 | Surface | 64 | ..... | 2,880 |
| | 30 mm HE | 0.1 | Surface | 500 | ..... | 22,500 |
| | 25 mm HE | 0.067 | Surface | 560 | ..... | 25,200 |
| Total | ..... | ..... | ..... | ..... | 70 | 80,780 |

HE = High Explosive; lbs = pounds; mm = millimeter; NEW = net explosive weight; TR = Training Round; FU = Full Up.

*413th Flight Test Squadron*

The United States Special Operations Command (SOCOM) has requested the 413th Flight Test Squadron (413 FLTS) to demonstrate the feasibility and capability of the Precision Strike Package and the Stand-Off Precision Guided Munitions (SOPGM) missile system on the AC–130 aircraft. SOCOM, in conjunction with A3 Operations at Wright-Patterson AFB, is fielding the new AC–130J for flight characterization, as well as testing and evaluation. AFSOC is integrating some of the same weapons on the AC–130W. Therefore, the activities described below for the 413 FLTS may involve either of these aircraft variants.

The proposed AC–130J gunnery testing associated with the 413 FLTS's Precision Strike Package would be similar to that described above for AFSOC AC–130 gunnery training in terms of location and general procedures. Testing would occur in W–151A and would involve firing either (1) PGU–44/B (105 mm HE] with FMU–153/B point detonation/delay fuse) or PGU–43B Target Practice (TP) rounds (105 mm TR) from a 105 mm M102 (U.S. Air Force designation M137A1) light-weight Howitzer cannon, or (2) PGU–13 HEI, PGU–46 HEI rounds, or PGU–15 TP rounds (inert) from a 30 mm GAU–23/A gun system. A MK–25 flare would be dropped prior to firing and used as a

target. Management measures would be the same as those described for AFSOC's AC–130 gunnery missions.

413 FLTS mission day scenarios were developed based on the number of mission days planned annually. Up to eleven mission days are planned for 413 FLTS operations annually. The total number of munitions were averaged over each day and are shown in Table 6. All missions would be conducted shoreward of the continental shelf break/200 m isobath as shown in Figure 1–7 in the Application).

TABLE 6—413 FLTS PRECISION STRIKE PACKAGE GUNNERY TESTING CATEGORIZED AS REPRESENTATIVE MISSION DAYS

| Mission category | Munition | NEW (lbs) | Detonation type | Munitions per day | Mission days/year | Total munitions/ year |
|---|---|---|---|---|---|---|
| F | 30 mm | 0.1 | Surface | 33 | 3 | 99 |
| G | 105 mm FU | 4.7 | Surface | 15 | 4 | 60 |
| H | 105 mm TR | 0.35 | Surface | 15 | 4 | 60 |

FU = full up; lbs = pounds; mm = millimeter; NEW = net explosive weight; TR = Training Round.

Stand off precision guided missiles (SOPGMs) are proposed for use in testing feasibility of these missiles on AC–130 aircraft. Weapons include AGM–176 Griffin missiles, AGM–114 Hellfire missiles, GBU–39/B SDBs, and GBU–39B/B Laser Small Diameter Bombs (LSDBs). Initial actions would consist of various ground tests. After ground testing is completed, captive carry, store separation, and weapon employment tests would be conducted. Captive-carry missions would be conducted with an Instrumented Measurement Vehicle (IMV) to collect environmental data or an inert telemetry (TM) missile in order to evaluate the integration of the SOPGM with the AC–130J. Store separation missions would require a TM missile with an inert warhead and a live motor, if applicable, to verify that the weapon can be employed without significant risk to the aircraft.

Weapon employment missions would be flown using any combination of inert and/or live weapons for a final end-to-end check of the system. Missions could be conducted over land or water ranges, with water ranges used for SDB/LSDB and Griffin missile tests. It is expected that over-water testing would be conducted at the GRATV target location. Similar to preceding mission descriptions, pre- and post-test surveys will be conducted within the applicable human and protected species safety zones.

Table 7 shows the mission-day scenarios and annual number of munitions expended annually for SOPGM testing. The 413 FLTS provided the number of munitions required over a span of four years. The numbers in the table represent the average per year (total number of munitions divided by four).

TABLE 7—413 FLTS SOPGM ANNUAL TESTING CATEGORIZED AS REPRESENTATIVE MISSION DAYS

| Mission category | Munition | NEW (lbs) | Detonation type | Munitions per day | Mission days/year | Total munitions/ year |
|---|---|---|---|---|---|---|
| I | AGM–176 (Griffin) | 4.58 | Surface | 5 | 2 | 10 |
| J | AGM–114 (Hellfire) | 29 | Surface | 5 | 2 | 10 |
| K | GBU–39 (SDB I) | 36 | Surface | 3 | 2 | 6 |
| L | GBU–39 (LSDB) | 36 | Surface | 5 | 2 | 10 |

AGM = Air-To-Ground Missile; GBU = Guided Bomb Unit; lbs = pounds; LSDB = Laser Small Diameter Bomb; SDB = Small Diameter Bomb.

*780th Test Squadron*

Testing activities conducted by the 780th Test Squadron (780 TS) include Precision Strike Weapon, Longbow missile littoral testing, and several other various future actions.

The U.S. Air Force Life Cycle Management Center and U.S. Navy, in cooperation with the 780 TS, conducts Precision Strike Weapon (PSW) test missions utilizing resources within the Eglin Military Complex, including sites in the EGTTR. The weapons used in testing are the AGM–158 A and B (Joint Air-to-Surface Standoff Missile (JASSM), and the GBU–39/B (SDB I).

The JASSM is a precision cruise missile designed for launch from outside area defenses against hardened, medium-hardened, soft, and area type targets. The JASSM has a range of more than 200 nmi and carries a 1,000-pound warhead. The JASSM has approximately 240 pounds of 2,4,6-trinitrotoluene (TNT) equivalent NEW. The specific explosive used is AFX–757, a type of plastic bonded explosive (PBX). The JASSM would be launched more than 200 nmi from the target location. Platforms for the launch would include B–1, B–2, B–52, F–16, F–18, and F–15E aircraft. Launch from the aircraft would occur at altitudes greater than 25,000 ft. The JASSM would cruise at altitudes greater than 12,000 ft for the majority of the flight profile until making the terminal maneuver toward the target.

The SDB is a guided bomb that is an important element of the Air Force's Global Strike Task Force. The SDB I carries a 217-pound warhead with approximately 37 pounds NEW. The explosive used is AFX–757. The SDB I may be launched from over 50 nmi away from the target location. Platforms for the launch include F–15E, F–16, and AC–130W aircraft. Launch from the aircraft occurs at altitudes greater than 5,000 ft above ground level (AGL). The SDB I then commences a non-powered glide to the intended target.

Up to two live and four inert JASSM missiles per year may be launched to impact a target at the GRATV target location. The JASSM missile would detonate upon impact with the target. Although impact would typically occur about 5 ft (1.5 m) above the water surface, detonations are assumed to occur at the water surface for purposes of impacts analysis.

Additionally, up to 6 live and 12 inert SDBs could also be deployed against targets in the same target area. Two SDB-Is could be launched simultaneously during two of the live

missions and four of the inert missions. Detonation of the SDBs would occur under one of two scenarios:

- Detonation upon impact with the target.
- Height of burst (HOB) test, which involves detonation 7 to 14 ft (2.2 to 4.5 m) in the air above the surface target.

There would generally be only one detonation per test event and thus no more than one detonation in any 24-hour period. In instances of a simultaneous SDB launch scenario, two bombs are deployed from the same aircraft at nearly the same time to strike the same target. It is expected that the bombs would strike the target within five seconds or less of each another. Under this scenario, the detonations are considered a single event (NEW is doubled) for the purpose of acoustic modeling and marine species impacts analysis. Modeling both detonations as a single event results in a conservative impact estimate. PSW munitions are shown in Table 8.

TABLE 8—SUMMARY OF ANNUAL PRECISION STRIKE WEAPON TESTS

| Munitions | Number of live tests/year | Total number of live munitions | Number of inert tests/year | Total number of inert munitions |
|---|---|---|---|---|
| AGM–158 (JASSM) | 2 | 2 | 4 | 4 |
| GBU–39 (SDB I) Single Launch | 2 | 2 | 4 | 4 |
| GBU–39 (SDB I) Simultaneous Launch | 2 | 4 | 4 | 8 |

JASSM = Joint Air-To-Surface Stand-Off Missile; SDB = Small Diameter Bomb.

Based on availability, one of two potential target types would be used during PSW tests. The first is a Container Express (CONEX) target that consists of up to five containers (each of which is 8 ft 6 in. length, 6 ft 3 in. in width and 6 ft 10.5 in. in height), strapped, braced, and welded together to form a single structure. The CONEX target would be constructed on land and shipped to the target location two to three days prior to the test. The other target type would be a barge target (125 ft in length, 30 ft in width and 12 ft in height), which would also be stationed at the target location two to three days prior to the test. During an inert mission, the JASSM would pass through the target and the warhead would sink to the bottom of the Gulf. Immediately following impact, the JASSM recovery team would pick up surface debris originating from the missile and target. Depending on the test schedule, the target could remain in the Gulf of Mexico for up to one month at a time. If the target is significantly damaged, and it is deemed impractical and unsafe to retrieve it, the target remains could be sunk through coordination with the U.S. Coast Guard or Tyndall AFB. Coordination with the U.S. Army Corps of Engineers would be required prior to sinking a target. PSW test activities would occur in W–151 at the GRATV target location. Targets are located in approximately 115 to 120 ft of water, about 17 miles offshore of Test Area A–3 on Santa Rosa Island (actual distance could range from 15 to 24 miles offshore). This area is the same as the Maritime WSEP test site, which is located 17 miles offshore. Test missions could occur during any time of the year but during daylight hours only.

In addition to the above description, future (Phase 2) testing of the SDB is planned by the Air Force Operational Test and Evaluation Center (AFOTEC) as shown in Table 9. AFOTEC proposes to expend two live and one inert GBU–53 (SDB II) weapons in the EGTTR. The live weapons would be deployed against moving boats with a length of 30 to 40 ft, while the inert weapon would be used against a smaller fiberglass boat.

TABLE 9—SUMMARY OF PHASE 1 AND PHASE 2 PRECISION STRIKE WEAPON LIVE TESTS

| Weapon | NEW (lbs) | Number of live munitions released | Number of inert munitions released |
|---|---|---|---|
| AGM–158 (JASSM) | 240 | 2 | 4 |
| GBU–39 (SDB I) | 37 | 2 | 4 |
| GBU–39 (SDB I) Double Shot * | 74 | 2 | 4 |
| GBU–53 (SDB II) | 22.84 | 2 | 1 |

AGM = Air-To-Ground Missile; GBU = Guided Bomb Unit; JASSM = Joint Air-To-Surface Standoff Missile; lbs = pounds; SDB = Small Diameter Bomb.
* NEW is doubled for each simultaneous launch.

The 780 TS/OGMT missions have been categorized based on the number of weapons released per day, assuming three mission days are planned annually. Representative mission days are shown in Table 10.

TABLE 10—780 TS/OGMT PRECISION STRIKE WEAPON TESTING CATERGORIZED AS REPRESENTATIVE MISSION DAYS

| Mission category | Munition | NEW (lbs) | Detonation type | Munitions per day | Mission days/year | Total munitions/year |
|---|---|---|---|---|---|---|
| M | AGM–158 (JASSM) | 240 | Surface | 2 | 1 | 2 |
| N | GBU–39 (SDB I) | 37 | Surface | 2 | 1 | 2 |
| | GBU–39 (SDB I) Double Shot *. | 74 | Surface | 2 | | 2 |

TABLE 10—780 TS/OGMT PRECISION STRIKE WEAPON TESTING CATERGORIZED AS REPRESENTATIVE MISSION DAYS—Continued

| Mission category | Munition | NEW (lbs) | Detonation type | Munitions per day | Mission days/year | Total munitions/year |
|---|---|---|---|---|---|---|
| O | GBU–53 (SDB II) | 22.84 | Surface | 2 | 1 | 2 |

AGM = Air-To-Ground Missile; GBU = Guided Bomb Unit; JASSM = Joint Air-To-Surface Standoff Missile; lbs = pounds; SDB = Small Diameter Bomb.
* NEW is doubled for each simultaneous launch.

The 780 TS plans to conduct other various testing activities that involve targets on the water surface in the EGTTR. Many of the missions would target small boats or barges. Weapons would primarily be delivered by aircraft, although a rail gun would be used for one test. Live warheads would be used for some missions, while others would involve inert warheads with a live fuse (typically contains a very small NEW). Total future munitions for 780 TS are listed in Table 11. As with the preceding missions using live weapons, safety zone enforcement and pre- and post-mission marine species monitoring would be required.

TABLE 11—780 TS ANNUAL MUNITIONS, OTHER FUTURE ACTIONS

| Munition | NEW (lbs) | Number of releases | Proposed location | Target type | Detonation type |
|---|---|---|---|---|---|
| Joint Air-Ground Missile | 27.41 | 2 | W–151 (subareas A, S5, and S6). | HSMST or Boston Whaler type boat. | 1—Point Detonation 1—Airburst. |
| Navy Rail Gun | Inert | 19 | W–151 | Barge | Penetrating Rod. |
| | 1 | 5 | W–151 | Barge | Airburst. |
| JDAM—Extended Range | Inert | 3 | W–151 | Water surface (2) Barge (1) | Inert. |
| Navy HAAWC | Inert | 2 | W–151 | Water surface | Inert. |
| Laser SDB (live fuse only) | 0.4 | 4 | W–151A | Small boats | Airburst or Surface. |
| SDB II Guided Test Vehicle (live fuse only). | 0.4 | 4 | W–151A | Small boats | Surface. |

HAAWC = High Altitude Anti-Submarine Warfare Weapon Capability; HSMT = High Speed Maneuverable Surface Target; JDAM = Joint Direct Attack Munition; NEW = net explosive weight; SDB = Small Diameter Bomb.

The 780 TS/OGMT future missions primarily consist of one-day test events for each type of munition. Inert munitions and munitions being detonated as airbursts were not included in the development of these scenarios because no in-water acoustic impacts are anticipated. Therefore representative mission days were developed for live munitions resulting in surface detonations, as shown in Table 12.

TABLE 12—780 TS OTHER FUTURE ACTIONS CATEGORIZED AS REPRESENTATIVE MISSION DAYS

| Mission category | Munition | NEW (lbs) | Detonation type | Munitions per day | Mission days/year | Total munitions/year |
|---|---|---|---|---|---|---|
| P | Joint Air-Ground Missile | 27.41 | Surface | 1 | 1 | 1 |
| Q | Laser SDB (fuse only) and SDB II Guided Test Vehicle (fuse only). | 0.4 | Surface | 2 | 4 | 8 |

HAAWC = High Altitude Anti-Submarine Warfare Weapon Capability; HSMT = High Speed Maneuverable Surface Target; JDAM = Joint Direct Attack Munition; N/A = not applicable; NEW = net explosive weight; SDB = Small Diameter Bomb.

*96 Operations Group*

The 96 Operations Group (OG), which conducts the 96 TW's primary missions of developmental testing and evaluation of conventional munitions, and command and control systems, anticipates support of air-to-surface missions for several user groups on an infrequent basis. As the organization that oversees all users of Eglin ranges, they have the authority to approve new missions that could be conducted in the EGTTR. Specific details on mission descriptions under this category have not been determined, as this is meant to capture future unknown activities. Subsurface detonations would be at 5 to 10 ft below the surface. Projected annual munitions expenditures and detonation scenarios are listed in Table 13.

TABLE 13—ANNUAL MUNITIONS FOR 96TH OPERATIONS GROUP SUPPORT

| Munition | NEW (lbs) | Detonation scenario | Number annual releases |
|---|---|---|---|
| GBU–10 or GBU–24 | 945 | Subsurface | 1 |
| AGM–158 (JASSM) | 240 | Surface | 1 |

TABLE 13—ANNUAL MUNITIONS FOR 96TH OPERATIONS GROUP SUPPORT—Continued

| Munition | NEW (lbs) | Detonation scenario | Number annual releases |
|---|---|---|---|
| GBU–12 or GBU–54 | 192 | Subsurface | 1 |
| AGM–65 (Maverick) | 86 | Surface | 2 |
| GBU–39 (SDB I or LSDB) | 37 | Subsurface | 4 |
| AGM–114 (Hellfire) | 20 | Subsurface | 20 |
| 105 mm full-up | 4.7 | Surface | 125 |
| 40 mm | 0.9 | Surface | 600 |
| Live fuse | 0.4 | Surface | 200 |
| 30 mm | 0.1 | Surface | 5,000 |

AGM = air-to-ground missile; GBU = Guided Bomb Unit; lbs = pounds; LSDB = Laser Small Diameter Bomb; SDB = Small Diameter Bomb.

The 96 OG future missions have been categorized based on the number of weapons released per day, instead of treating each weapon release as a separate event. This approach is meant to satisfy NMFS requests for analysis and modeling of accumulated energy from multiple detonations over a 24-hour timeframe. Eglin AFB used all available information to determine these daily estimates, including historic release reports; however, these scenarios may not represent exact weapon releases because military needs and requirements are in a constant state of flux. The mission day scenarios for 96 OG annually are shown in Table 14.

Categories of missions for 96 OG were grouped (similar to Maritime WSEP) first using historical weapon releases per day. Next, the most recent weapons evaluation needs and requirements were considered to develop three different scenarios: Categories R, S, and T. Mission-day Category R represents munitions with larger NEW (192 to 945 pounds) and both surface and subsurface detonations. This category includes future requirements and provides flexibility for the military mission. To date, Category R levels of activity have not been conducted under 96 OG missions, and is considered a worst-case scenario. Category S represents munitions with medium levels of NEW (20 to 86 pounds) including surface and subsurface detonations. Category T represents munitions with smaller NEW (0.1 to 13 pounds) and includes surface detonations only.

TABLE 14—96 OG FUTURE MISSIONS CATEGORIZED AS REPRESENTATIVE MISSION DAYS

| Mission category | Munition | NEW (lbs) | Detonation Type | Munitions per day | Mission days/year | Total munitions/ year |
|---|---|---|---|---|---|---|
| R | GBU–10/–24 | 945 | Subsurface (10-ft depth) | 1 | 1 | 1 |
| | AGM–158 (JASSM) | 240 | Surface | 1 | | 1 |
| | GBU–12 or GBU–54 | 192 | Subsurface (10-ft depth) | 1 | | 1 |
| S | AGM–65 (Maverick) | 86 | Surface | 1 | 2 | 2 |
| | GBU–39 (SDB I or LSDB) | 37 | Subsurface | 2 | | 4 |
| | AGM–114 (Hellfire) | 20 | Subsurface (10-ft depth) | 10 | | 20 |
| T | 105 mm full-up | 4.7 | Surface | 13 | 10 | 130 |
| | 40 mm | 0.9 | Surface | 60 | | 600 |
| | Live fuse | 0.4 | Surface | 20 | | 200 |
| | 30 mm | 0.1 | Surface | 500 | | 5,000 |

AGM = air-to-ground missile; GBU = Guided Bomb Unit; HEI = high explosive incendiary; JDAM = Joint Direct Attack Munition; LJDAM = Laser Joint Direct Attack Munition; LSDB = Laser Small Diameter Bomb; lbs = pounds; PGU = Projectile Gun Unit; mm = millimeter; SDB = Small Diameter Bomb.

Proposed mitigation, monitoring, and reporting measures are described in detail later in this document (please see ''Proposed Mitigation'' and ''Proposed Monitoring and Reporting'').

**Description of Marine Mammals in the Area of Specified Activities**

Sections 3 and 4 of the Application summarize available information regarding status and trends, distribution and habitat preferences, and behavior and life history, of the potentially affected species. Additional information regarding population trends and threats may be found in NMFS' Stock Assessment Reports (SAR; *www.nmfs.noaa.gov/pr/sars/*), and more general information about these species (*e.g.,* physical and behavioral descriptions) may be found on NMFS's website (*www.nmfs.noaa.gov/pr/species/mammals/*).

Table 15 lists all species with expected potential for occurrence in the EGTTR that could be subjected to acoustic impacts and summarizes information related to the population or stock, including regulatory status under the MMPA and ESA and potential biological removal (PBR), where known. For taxonomy, we follow Committee on Taxonomy (2016). PBR is defined by the MMPA as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population (as described in NMFS's SARs). While no mortality is anticipated or authorized here, PBR and annual serious injury and mortality from anthropogenic sources are included here as gross indicators of the status of the species and other threats.

Marine mammal abundance estimates presented in this document represent

the total number of individuals that make up a given stock or the total number estimated within a particular study or survey area. NMFS' stock abundance estimates for most species represent the total estimate of individuals within the geographic area, if known, that comprises that stock. For some species, this geographic area may extend beyond U.S. waters. All managed stocks in this region are assessed in NMFS' U.S. 2016 US Atlantic and Gulf of Mexico Marine Stock Assessment Report (Hayes *et al.* 2017). All values presented in Table 15 are the most recent available at the time of publication and are available in the 2016 Stock assessment report (available online at: *http://www.nmfs.noaa.gov/pr/sars/*).

As described below, two marine mammal species (with 7 managed stocks) temporally and spatially co-occur with the activity to the degree that take is reasonably likely to occur, and we have proposed authorizing it.

TABLE 15—SPECIES PROPOSED FOR AUTHORIZED TAKE *

| Common name | Scientific name | Stock | ESA/MMPA status; strategic (Y/N) [1] | Stock abundance (CV, $N_{min}$, most recent abundance survey) [2] | PBR | Annual M/SI [3] |
|---|---|---|---|---|---|---|
| **Superfamily Odontoceti (toothed whales, dolphins, and porpoises)** | | | | | | |
| **Family Delphinidae** | | | | | | |
| Common Bottlenose dolphin. | *Tursiops truncatus* .... | Choctawatchee Bay .. | -/-:Y | 179 (0.04,173, 2007) | 1.7 | 3.4 (0.99) |
| | | Pensacola/East Bay .. | -/-:Y | 33 (0.80, UNK, 1993) | UND | UND |
| | | St. Andrew Bay ..... | -/-:Y | 124 (0.21, UNK, 1993). | UND | UND |
| | | Gulf of Mexico Northern Coastal. | -/-:N | 7,185 (0.21, 6,044, 2012). | 60 | 21 (0.66) |
| | | Northern Gulf of Mexico Continental Shelf. | -/-:N | 51,192 (0.10, 46,926, 2012). | 469 | 56 (0.42) |
| | | Northern Gulf of Mexico Oceanic. | -/-:N | 5,806 (0.39, 4,230, 2009). | 42 | 6.5 (0.65) |
| Atlantic spotted dolphin. | *Stenella frontalis* ..... | Northern Gulf of Mexico. | -/-:N | 37,611 (0.28, UNK, 2004). | UND | 42 (0.45) |

* Hayes *et al.* 2017.

[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 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] NMFS marine mammal stock assessment reports online at: *www.nmfs.noaa.gov/pr/sars/*. CV is coefficient of variation; Nmin is the minimum estimate of stock abundance. In some cases, CV is not applicable [explain if this is the case].

[3] These values, found in NMFS's SARs, represent annual levels of human-caused mortality plus serious injury from all sources combined (*e.g.,* commercial fisheries, ship strike). Annual 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.

An additional 19 cetacean species could occur within the northeastern Gulf of Mexico, mainly occurring at or beyond the shelf break (*i.e.,* water depth of approximately 200 m (656.2 ft)) located beyond the W–151A test area. NMFS and Eglin AFB consider these 19 species to be rare or extralimital within the W–151A test location area. These species are the Bryde's whale (*Balaenoptera edeni*), sperm whale (*Physeter macrocephalus*), dwarf sperm whale (*Kogia sima*), pygmy sperm whale (*K. breviceps*), pantropical spotted dolphin (*Stenella attenuata*), Clymene dolphin (*S. clymene*), spinner dolphin (*S. longirostris*), striped dolphin (*S. coeruleoalba*), Blainville's beaked whale (*Mesoplodon densirostris*), Gervais' beaked whale (*M. europaeus*), Cuvier's beaked whale (*Ziphius cavirostris*), killer whale (*Orcinus orca*), false killer whale (*Pseudorca crassidens*), pygmy killer whale (*Feresa attenuata*), Risso's dolphin (*Grampus griseus*), Fraser's dolphin (*Lagenodelphis hosei*), melon-headed whale (*Peponocephala electra*), rough-toothed dolphin (*Steno bredanensis*), and short-finned pilot whale (*Globicephala macrorhynchus*).

Of these species, only the sperm whale is listed as endangered under the ESA and as depleted throughout its range under the MMPA. Sperm whale occurrence within W–151A is unlikely because almost all reported sightings have occurred in water depths greater than 200 m (656.2 ft). The uncommon Bryde's whale occurs in waters at a depth of 100–300 m and has been proposed for listing under the ESA. However, trained observers will be vigilant in watching for these whales and ensuring they are not in the ZOI during mission activities. As such, Eglin AFB is not anticipating or requesting take for these species.

Because marine mammals from the other 19 species with potential occurrence within the northeast Gulf of Mexico listed above are unlikely to occur within the W–151A area, or are likely to move away from the target area in response to proposed mitigation measures, Eglin AFB has not requested authorization for, nor are we proposing to authorize take for them. Thus, we do not consider these species further in this notice.

Below we offer a brief introduction to the two species and relevant stocks that are likely to be affected by testing and training activities in the EGTTR. We provide a summary of available information regarding population trends and threats, and describe any information regarding local occurrence.

*Common Bottlenose Dolphin*

This species is not listed under the ESA but is protected under the MMPA. Along the United States east coast and northern Gulf of Mexico, the bottlenose dolphin stock structure is well studied. There are currently 34 stocks identified by NMFS in northern Gulf of Mexico including the Continental Shelf stock, Northern Coastal stock, Oceanic stock,

and 31 bay, sound and estuary stocks (BSE) (Waring *et al.* 2016).

Genetic, photo-identification, and tagging data support the concept of relatively discrete bay, sound, and estuary stocks (Waring *et al.,* 2016; Duffield and Wells 2002). NMFS has provisionally identified 31 such stocks which inhabit areas of contiguous, enclosed, or semi-enclosed water bodies adjacent to the northern Gulf of Mexico. The stocks are based on a description of dolphin communities in some areas of the Gulf coast. A community is generally defined as resident dolphins that regularly share a large portion of their range; exhibit similar genetic profiles; and interact with each other to a much greater extent than with dolphins in adjacent waters. Although the shoreward boundary of W–151 is beyond these environments, individuals from these stocks could potentially enter the project area. Movement between various communities has been documented (Waring *et al.,* 2016; Fazioli *et al.* 2006) reported that dolphins found within bays, sounds, and estuaries on the west central Florida coast move into the nearby Gulf waters used by coastal stocks. Air-to-surface activities will occur directly seaward of the area occupied by the Choctawhatchee Bay stock. The best abundance estimate for this stock, as provided in the Stock Assessment Report, is 179. Stocks immediately to the west and east of Choctawhatchee Bay include Pensacola/East Bay and St. Andrew Bay stocks. PBR for the Choctawhatchee Bay stock is 1.7 individuals. NMFS considers all bay, sound, and estuary stocks to be strategic.

Of the 31 stocks of Bay, Sound and Estuary (BSE) bottlenose dolphins recognized by NMFS, only 11 met the criteria for small and resident populations as a biologically important area. The Choctawhatchee Bay Stock has published data suggesting small and resident populations; however, it was one of the 21 remaining stocks that did not meet the biologically important area criteria (LaBrecque *et al.,* 2015). Therefore, no biologically important areas have been identified within or around the EGTTR Study Area.

The bottlenose dolphin is the most widespread and common cetacean in coastal waters of the Gulf of Mexico (Würsig *et al.,* 2000). The species is abundant in continental shelf waters throughout the northern Gulf of Mexico (Fulling *et al.,* 2003; Waring *et al.,* 2016), including the outer continental shelf, upper slope, nearshore waters, the DeSoto Canyon region, the West Florida Shelf, and the Florida Escarpment. Mullin and Fulling (2004) noted that in oceanic waters, bottlenose dolphins are encountered primarily in upper continental slope waters (less than 1,000 m (3281 ft) in bottom depth) and that highest densities are in the northeastern Gulf. Significant occurrence is expected near all bays in the northern Gulf.

Three coastal stocks have been identified in the northern Gulf of Mexico, occupying waters from the shore to the 20-m (66-ft) isobath: Eastern Coastal, Northern Coastal, and Western Coastal stocks. The Western Coastal stock inhabits nearshore waters from the Texas/Mexico border to the Mississippi River Delta. The Northern Coastal stock's range is considered to be from the Mississippi River Delta to the Big Bend region of Florida (approximately 84° W). The Eastern Coastal stock is defined from 84° W to Key West, Florida. Of the coastal stocks, the Northern Coastal Stock is geographically associated with the GRATV target location. PBR is 60 individuals. Prior to 2012, this stock was not considered strategic. However, beginning February 1, 2010 an Unusual Mortality Event of unprecedented size and duration has been ongoing (Litz *et al.,* 2014) that has resulted in NMFS' reclassification of this stock as strategic.

The Northern Gulf of Mexico Oceanic stock is provisionally defined as bottlenose dolphins inhabiting waters from the 200-m (656-ft) isobath to the seaward extent of the U.S. Exclusive Economic Zone. This stock is believed to consist of the offshore form of bottlenose dolphins. The continental shelf stock may overlap with the oceanic stock in some areas and may be genetically indistinguishable. PBR is 42 individuals, and the stock is not considered strategic.

Sounds emitted by bottlenose dolphins have been classified into two broad categories: Pulsed sounds (including clicks and burst-pulses) and narrow-band continuous sounds (whistles), which usually are frequency modulated. Clicks and whistles have a dominant frequency range of 110 to 130 kiloHertz (kHz) and a source level of 218 to 228 decibels (dB) referenced to one microPascal-meter (dB re 1 μPa-m peak-to-peak) (Au, 1993) and 3.4 to 14.5 kiloHertz (kHz) and 125 to 173 dB re 1 μPa-m peak-to-peak, respectively (Ketten, 1998). Whistles are primarily associated with communication and can serve to identify specific individuals (*i.e.,* signature whistles) (Janik *et al.,* 2006). Sound production is influenced by group type (single or multiple individuals), habitat, and behavior (Nowacek, 2005). Bray calls (low-frequency vocalizations; majority of energy below 4 kHz), for example, are used when capturing fishes in some regions (Janik, 2000). Additionally, whistle production has been observed to increase while feeding (Acevedo-Gutiérrez and Stienessen, 2004; Cook *et al.,* 2004). Whistles and clicks may vary geographically in terms of overall vocal activity, group size, and specific context (*e.g.,* feeding, milling, traveling, and socializing) (Jones and Sayigh, 2002; Zaretsky *et al.,* 2005; Baron, 2006).

Bottlenose dolphins can hear within a broad frequency range of 0.04 to 160 kHz (Au, 1993; Turl, 1993). Electrophysiological experiments suggest that the bottlenose dolphin brain has a dual analysis system: one specialized for ultrasonic clicks and another for lower-frequency sounds, such as whistles (Ridgway, 2000). Scientists have reported a range of highest sensitivity between 25 and 70 kHz, with peaks in sensitivity at 25 and 50 kHz (Nachtigall *et al.,* 2000). Recent research on the same individuals indicates that auditory thresholds obtained by electrophysiological methods correlate well with those obtained in behavior studies, except at lower (10 kHz) and higher (80 and 100 kHz) frequencies (Finneran and Houser, 2006).

*Atlantic Spotted Dolphin*

The Atlantic spotted dolphin occurs in two forms that may be distinct subspecies (Perrin *et al.,* 1987, 1994; Viricel and Rosel 2014): the large, heavily spotted form, which inhabits the continental shelf and is usually found inside or near the 200-m isobath; and the smaller, less spotted island and offshore form, which occurs in the Atlantic Ocean but is not known to occur in the Gulf of Mexico (Fulling *et al.,* 2003; Mullin and Fulling 2004; Viricel and Rosel 2014). In the Gulf of Mexico, Atlantic spotted dolphins occur primarily from continental shelf waters 10–200 m deep to slope waters less than 500 m deep (Fulling *et al.,* 2003; Mullin and Fulling 2004).

The most recent abundance estimate is 37,611 individuals in the northern Gulf of Mexico (outer continental shelf and oceanic waters) and is derived from fall surveys in 2000–2011 and spring/summer surveys in 2003–2004. According to the 2016 Stock Assessment Report, since these data are more than 8 years old, the current best population estimate is unknown (Hayes *et al.,* 2017). The northern Gulf of Mexico population is considered to be genetically distinct from western North Atlantic populations. PBR for this species is undetermined and the stock is not considered strategic.

A variety of sounds including whistles, echolocation clicks, squawks, barks, growls, and chirps have been recorded for the Atlantic spotted dolphin. Whistles have dominant frequencies below 20 kHz (range: 7.1 to 14.5 kHz), but multiple harmonics extend above 100 kHz, while burst pulses consist of frequencies above 20 kHz (dominant frequency of approximately 40 kHz) (Lammers *et al.,* 2003). Other sounds typically range in frequency from 0.1 to 8 kHz (Thomson and Richardson, 1995). Recorded echolocation clicks had two dominant frequency ranges at 40 to 50 kHz and 110 to 130 kHz, depending on source level (Au and Herzing, 2003). Echolocation click source levels as high as 210 dB re 1 µPa-m peak-to-peak have been recorded (Au and Herzing, 2003). Spotted dolphins in the Bahamas were frequently recorded during aggressive interactions with bottlenose dolphins (and their own species) to produce squawks (0.2 to 12 kHz broad band burst pulses; males and females), screams (5.8 to 9.4 kHz whistles; males only), barks (0.2 to 20 kHz burst pulses; males only), and synchronized squawks (0.1–15 kHz burst pulses; males only in a coordinated group) (Herzing, 1996).

Hearing ability for the Atlantic spotted dolphin is unknown. However, odontocetes are generally adapted to hear in relatively high frequencies (Ketten, 1997).

*Marine Mammal Hearing*

Hearing is the most important sensory modality for marine mammals underwater and exposure to anthropogenic sound can have deleterious effects. To appropriately assess the potential effects of exposure to sound, it is necessary to understand the frequency ranges marine mammals are able to hear. Current data indicate that not all marine mammal species have equal hearing capabilities (*e.g.,* Richardson *et al.,* 1995; Wartzok and Ketten, 1999; Au and Hastings, 2008). To reflect this, Southall *et al.* (2007) recommended that marine mammals be divided into functional hearing groups based on directly measured or estimated hearing ranges on the basis of available behavioral response data, audiograms derived using auditory evoked potential techniques, anatomical modeling, and other data. Note that no direct measurements of hearing ability have been successfully completed for mysticetes (*i.e.,* low-frequency cetaceans). Subsequently, NMFS (2016) described generalized hearing ranges for these marine mammal hearing groups. Generalized hearing ranges were chosen based on the approximately 65 dB threshold from the normalized composite audiograms, with the exception for lower limits for low-frequency cetaceans where the lower bound was deemed to be biologically implausible and the lower bound from Southall *et al.* (2007) retained. The hearing groups and the associated frequencies are indicated below (note that these frequency ranges correspond to the range for the composite group, with the entire range not necessarily reflecting the capabilities of every species within that group):

- Low-frequency cetaceans (mysticetes): Generalized hearing is estimated to occur between approximately 7 Hz and 35 kHz, with best hearing estimated to be from 100 Hz to 8 kHz;
- Mid-frequency cetaceans (larger toothed whales, beaked whales, and most delphinids): Generalized hearing is estimated to occur between approximately 150 Hz and 160 kHz, with best hearing from 10 to less than 100 kHz;
- High-frequency cetaceans (porpoises, river dolphins, and members of the genera Kogia and Cephalorhynchus; including two members of the genus Lagenorhynchus, on the basis of recent echolocation data and genetic data): Generalized hearing is estimated to occur between approximately 275 Hz and 160 kHz.
- Pinnipeds in water; Phocidae (true seals): Generalized hearing is estimated to occur between approximately 50 Hz to 86 kHz, with best hearing between 1–50 kHz;
- Pinnipeds in water; Otariidae (eared seals): Generalized hearing is estimated to occur between 60 Hz and 39 kHz, with best hearing between 2–48 kHz.

The pinniped functional hearing group was modified from Southall *et al.* (2007) on the basis of data indicating that phocid species have consistently demonstrated an extended frequency range of hearing compared to otariids, especially in the higher frequency range (Hemilä *et al.,* 2006; Kastelein *et al.,* 2009; Reichmuth and Holt, 2013).

Two marine mammal species (common bottlenose and Atlantic spotted dolphins) have the reasonable potential to co-occur with the proposed survey activities. Both species are classified as mid-frequency cetaceans.

**Potential Effects of Specified Activities on Marine Mammals and Their Habitat**

This section includes a summary and discussion of the ways that components of the specified activity may impact marine mammals and their habitat. The ''Estimated Take by Incidental Harassment'' section later in this document includes a quantitative analysis of the number of individuals that are expected to be taken by this activity. The ''Negligible Impact Analysis and Determination'' section considers the content of this section, the ''Estimated Take by Incidental Harassment'' section, and the ''Proposed Mitigation'' section, to draw conclusions regarding the likely impacts of these activities on the reproductive success or survivorship of individuals and how those impacts on individuals are likely to impact marine mammal species or stocks.

The proposed Eglin AFB mission activities have the potential to incidentally take marine mammals by exposing them to impulsive noise and pressure waves generated by live ordnance detonation at and below the surface of the water. Exposure to energy or pressure resulting from these detonations could result in Level A harassment (PTS and slight lung injury) and by Level B harassment (temporary threshold shift (TTS) and behavioral harassment).

*Description of Sound Sources*

Sound travels in waves, the basic components of which are frequency, wavelength, velocity, and amplitude. Frequency is the number of pressure waves that pass by a reference point per unit of time and is measured in hertz (Hz) or cycles per second. Wavelength is the distance between two peaks of a sound wave. Amplitude is the height of the sound pressure wave or the ''loudness'' of a sound, and is typically measured using the dB scale. A dB is the ratio between a measured pressure (with sound) and a reference pressure (sound at a constant pressure, established by scientific standards). It is a logarithmic unit that accounts for large variations in amplitude; therefore, relatively small changes in dB ratings correspond to large changes in sound pressure. When referring to sound pressure levels (SPLs; the sound force per unit area), sound is referenced in the context of underwater sound pressure to 1 µPa. One pascal is the pressure resulting from a force of one newton exerted over an area of one square meter. The source level (SL) represents the sound level at a distance of 1 m from the source (referenced to 1 µPa). The received level is the sound level at the listener's position. Note that we reference all underwater sound levels in this document to a pressure of 1 µPa, and all airborne sound levels in this document are referenced to a pressure of 20 µPa.

Root mean square (rms) is the quadratic mean sound pressure over the

duration of an impulse. Rms is calculated by squaring all of the sound amplitudes, averaging the squares, and then taking the square root of the average (Urick, 1983). Rms accounts for both positive and negative values; squaring the pressures makes all values positive so that one can account for the values in the summation of pressure levels (Hastings and Popper, 2005). This measurement is often used in the context of discussing behavioral effects, in part because behavioral effects, which often result from auditory cues, may be better expressed through averaged units than by peak pressures.

When underwater objects vibrate or activity occurs, sound-pressure waves are created. These waves alternately compress and decompress the water as the sound wave travels. Underwater sound waves radiate in all directions away from the source (similar to ripples on the surface of a pond), except in cases where the source is directional. The compressions and decompressions associated with sound waves are detected as changes in pressure by aquatic life and man-made sound receptors such as hydrophones.

Even in the absence of sound from the specified activity, the underwater environment is typically loud due to ambient sound. Ambient sound is defined as environmental background sound levels lacking a single source or point (Richardson *et al.,* 1995), and the sound level of a region is defined by the total acoustical energy being generated by known and unknown sources. These sources may include physical (*e.g.,* waves, earthquakes, ice, and atmospheric sound), biological (*e.g.,* sounds produced by marine mammals, fish, and invertebrates), and anthropogenic sound (*e.g.,* vessels, dredging, aircraft, and construction). A number of sources contribute to ambient sound, including the following (Richardson *et al.,* 1995):

- *Wind and waves:* The complex interactions between wind and water surface, including processes such as breaking waves and wave-induced bubble oscillations and cavitation, are a main source of naturally occurring ambient noise for frequencies between 200 Hz and 50 kHz (Mitson 1995). In general, ambient sound levels tend to increase with increasing wind speed and wave height. Surf noise becomes important near shore, with measurements collected at a distance of 8.5 km from shore showing an increase of 10 dB in the 100 to 700 Hz band during heavy surf conditions.
- *Precipitation:* Sound from rain and hail impacting the water surface can become an important component of total noise at frequencies above 500 Hz, and possibly down to 100 Hz during quiet times.
- *Biological:* Marine mammals can contribute significantly to ambient noise levels, as can some fish and shrimp. The frequency band for biological contributions is from approximately 12 Hz to over 100 kHz.
- *Anthropogenic:* Sources of ambient noise related to human activity include transportation (surface vessels and aircraft), dredging and construction, oil and gas drilling and production, seismic surveys, sonar, explosions, and ocean acoustic studies. Shipping noise typically dominates the total ambient noise for frequencies between 20 and 300 Hz. In general, the frequencies of anthropogenic sounds are below 1 kHz; and, if higher frequency sound levels are created, they attenuate rapidly (Richardson *et al.,* 1995). Sound from identifiable anthropogenic sources other than the activity of interest (*e.g.,* a passing vessel) is sometimes termed background sound as opposed to ambient sound.

The sum of the various natural and anthropogenic sound sources at any given location and time—which comprise ''ambient'' or ''background'' sound—depends not only on the source levels (as determined by current weather conditions and levels of biological and shipping activity) but also on the ability of sound to propagate through the environment. In turn, sound propagation is dependent on the spatially and temporally varying properties of the water column and sea floor and is frequency-dependent. As a result of the dependence on a large number of varying factors, ambient sound levels can be expected to vary widely over both coarse and fine spatial and temporal scales. Sound levels at a given frequency and location can vary by 10–20 dB from day to day (Richardson *et al.,* 1995). The result is that, depending on the source type and its intensity, sound from the specified activity may be a negligible addition to the local environment or could form a distinctive signal that may affect marine mammals.

The sounds produced by proposed military operations in the EGTTR are considered impulsive, which is one of two general sound types, the other being non-pulsed. The distinction between these two sound types is important because they have differing potential to cause physical effects, particularly with regard to hearing (*e.g.,* Ward, 1997 in Southall *et al.,* 2007). Please see Southall *et al.* (2007) for an in-depth discussion of these concepts.

Impulsive sound sources (*e.g.,* explosions, gunshots, sonic booms, and impact pile driving) produce signals that are brief (typically considered to be less than one second), broadband, atonal transients (ANSI 1986; Harris, 1998; NIOSH 1998; ISO 2003), and occur either as isolated events or repeated in some succession. These sounds have a relatively rapid rise from ambient pressure to a maximal pressure value followed by a rapid decay period that may include a period of diminishing, oscillating maximal and minimal pressures, and generally have an increased capacity to induce physical injury as compared with sounds that lack these features.

*Acoustic Impacts*

Please refer to the information given previously (*Description of Sound Sources*) regarding sound, characteristics of sound types, and metrics used in this document. Anthropogenic sounds cover a broad range of frequencies and sound levels and can have a range of highly variable impacts on marine life, from none or minor to potentially severe responses, depending on received levels, duration of exposure, behavioral context, and various other factors. The potential effects of underwater sound from active acoustic sources can potentially result in one or more of the following: Non-auditory physical or physiological effects; temporary or permanent hearing impairment; behavioral disturbance; stress; and masking (Richardson *et al.,* 1995; Gordon *et al.,* 2004; Nowacek *et al.,* 2007; Southall *et al.,* 2007; Götz *et al.,* 2009). The degree of effect is intrinsically related to the signal characteristics, received level, distance from the source, duration of the sound exposure, and animal's activity at time of exposure. In general, sudden, high level sounds can cause hearing loss, as can longer exposures to lower level sounds. Temporary or permanent loss of hearing will occur almost exclusively as a result of exposure to noise within an animal's hearing range. We first describe specific manifestations of acoustic effects before providing discussion specific to Eglin AFB's activities.

Richardson *et al.* (1995) described zones of increasing intensity of effect that might be expected to occur, in relation to distance from a source and assuming that the signal is within an animal's hearing range. First is the area within which the acoustic signal would be audible (potentially perceived) to the animal, but not strong enough to elicit any overt behavioral or physiological response. The next zone corresponds with the area where the signal is audible

to the animal and of sufficient intensity to elicit behavioral or physiological responsiveness. Third is a zone within which, for signals of high intensity, the received level is sufficient to potentially cause discomfort or tissue damage to auditory or other systems. Overlaying these zones to a certain extent is the area within which masking (*i.e.,* when a sound interferes with or masks the ability of an animal to detect a signal of interest that is above the absolute hearing threshold) may occur; the masking zone may be highly variable in size.

We briefly describe certain non-auditory physical effects which are categorized as Level A harassment as defined in the MMPA. These blast related effects include slight lung injury and gastrointestinal (GI) tract injury (Finneran and Jenkins, 2012).

The threshold for slight lung injury is based on a level of lung injury from which all exposed animals are expected to survive (zero percent mortality) (Finneran and Jenkins, 2012). Similar to the mortality determination, the metric is positive impulse and the equation for determination is that of the Goertner injury model (1982), corrected for atmospheric and hydrostatic pressures and based on the cube root scaling of body mass (Richmond *et al.,* 1973; U.S. Department of the Navy, 2001b). The equation is provided in Appendix A of the Application.

Gastrointestinal (GI) tract injuries are correlated with the peak pressure of an underwater detonation. GI tract injury thresholds are based on the results of experiments in the 1970s in which terrestrial mammals were exposed to small charges. The peak pressure of the shock wave was found to be the causal agent in recoverable contusions (bruises) in the GI tract (Richmond *et al.,* 1973, in Finneran and Jenkins, 2012). The experiments found that a peak SPL of 237 dB re 1 μPa predicts the onset of GI tract injuries, regardless of an animal's mass or size. Therefore, the unweighted peak SPL of 237 dB re 1 μPa is used in explosive impacts assessments as the threshold for slight GI tract injury for all marine mammals.

Marine mammals may experience auditory impacts when exposed to high-intensity sound, or to lower-intensity sound for prolonged periods. They may experience hearing threshold shift (TS) which is the loss of hearing sensitivity at certain frequency ranges (Kastak *et al.,* 1999; Schlundt *et al.,* 2000; Finneran *et al.,* 2002, 2005). TS can be permanent (PTS), in which case the loss of hearing sensitivity is not fully recoverable, or temporary (TTS), in which case the animal's hearing threshold would recover over time (Southall *et al.,* 2007). Repeated sound exposure that leads to TTS could cause PTS. In severe cases of PTS, there can be total or partial deafness, while in most cases the animal has an impaired ability to hear sounds in specific frequency ranges (Kryter 1985).

When PTS occurs, there is physical damage to the sound receptors in the ear (*i.e.,* tissue damage); whereas, TTS represents primarily tissue fatigue and is reversible (Southall *et al.,* 2007). In addition, other investigators have suggested that TTS is within the normal bounds of physiological variability and tolerance and does not represent physical injury (*e.g.,* Ward 1997). Therefore, NMFS does not consider TTS to constitute auditory injury.

Relationships between TTS and PTS thresholds have not been studied in marine mammals. PTS data exists only for a single harbor seal (Kastak *et al.,* 2008) but are assumed to be similar to those in humans and other terrestrial mammals. PTS typically occurs at exposure levels at least several dB above (a 40-dB threshold shift approximates PTS onset; *e.g.,* Kryter *et al.,* 1966; Miller, 1974) that inducing mild TTS (a 6-dB threshold shift approximates TTS onset; *e.g.,* Southall *et al.,* 2007). Based on data from terrestrial mammals, a precautionary assumption is that the PTS thresholds for impulse sounds (such as bombs) are at least 6 dB higher than the TTS threshold on a peak-pressure basis and PTS cumulative sound exposure level thresholds are 15 to 20 dB higher than TTS cumulative sound exposure level thresholds (Southall *et al.,* 2007). Given the higher level of sound or longer exposure duration necessary to cause PTS as compared with TTS, it is considerably less likely that PTS could occur.

When a live or dead marine mammal swims or floats onto shore and is incapable of returning to sea, the event is termed a ''stranding'' (16 U.S.C. 1421h(3)). Marine mammals are known to strand for a variety of reasons, such as infectious agents, biotoxicosis, starvation, fishery interaction, ship strike, unusual oceanographic or weather events, sound exposure, or combinations of these stressors sustained concurrently or in series (*e.g.,* Geraci *et al.,* 1999). However, the cause or causes of most strandings are unknown (*e.g.,* Best 1982). Combinations of dissimilar stressors may combine to kill an animal or dramatically reduce its fitness, even though one exposure without the other would not be expected to produce the same outcome (*e.g.,* Sih *et al.,* 2004). For further description of stranding events see, *e.g.,* Southall *et al.,* 2006; Jepson *et al.,* 2013; Wright *et al.,* 2013.

Temporary threshold shift (TTS) is the mildest form of hearing impairment that can occur during exposure to sound (Kryter 1985). While experiencing TTS, the hearing threshold rises, and a sound must be at a higher level in order to be heard. In terrestrial and marine mammals, TTS can last from minutes or hours to days (in cases of strong TTS). In many cases, hearing sensitivity recovers rapidly after exposure to the sound ends. Few data on sound levels and durations necessary to elicit mild TTS have been obtained for marine mammals, and none of the data published at the time of this writing concern TTS elicited by exposure to multiple pulses of sound.

Marine mammal hearing plays a critical role in communication with conspecifics, and in interpretation of environmental cues for purposes such as predator avoidance and prey capture. Depending on the degree (elevation of threshold in dB), duration (*i.e.,* recovery time), and frequency range of TTS, and the context in which it is experienced, TTS can have effects on marine mammals ranging from discountable to serious. For example, a marine mammal may be able to readily compensate for a brief, relatively small amount of TTS in a non-critical frequency range that occurs during a time where ambient noise is lower and there are not as many competing sounds present. Alternatively, a larger amount and longer duration of TTS sustained during time when communication is critical for successful mother/calf interactions could have more serious impacts.

Currently, TTS data exist only for four species of cetaceans ((bottlenose dolphin, beluga whale (*Delphinapterus leucas*), harbor porpoise (*Phocoena phocoena*), and Yangtze finless porpoise (*Neophocoena asiaeorientalis*)) and three species of pinnipeds (northern elephant seal (*Mirounga angustirostris*), harbor seal (*Phoca vitulina*), and California sea lion (*Zalophus californianus*)) exposed to a limited number of sound sources (*i.e.,* mostly tones and octave-band noise) in laboratory settings (*e.g.,* Finneran *et al.,* 2002; Nachtigall *et al.,* 2004; Kastak *et al.,* 2005; Lucke *et al.,* 2009; Popov *et al.,* 2011). In general, harbor seals (Kastak *et al.,* 2005; Kastelein *et al.,* 2012a) and harbor porpoises (Lucke *et al.,* 2009; Kastelein *et al.,* 2012b) have a lower TTS onset than other measured pinniped or cetacean species. Additionally, the existing marine mammal TTS data come from a limited number of individuals within these species. There are no data available on

noise-induced hearing loss for mysticetes. For summaries of data on TTS in marine mammals or for further discussion of TTS onset thresholds, please see Southall *et al.* (2007) and Finneran and Jenkins (2012).

Behavioral disturbance may include a variety of effects, including subtle changes in behavior (*e.g.,* minor or brief avoidance of an area or changes in vocalizations), more conspicuous changes in similar behavioral activities, and more sustained and/or potentially severe reactions, such as displacement from or abandonment of high-quality habitat. Behavioral responses to sound are highly variable and context-specific and any reactions depend on numerous intrinsic and extrinsic factors (*e.g.,* species, state of maturity, experience, current activity, reproductive state, auditory sensitivity, and time of day), as well as the interplay between factors (*e.g.,* Richardson *et al.,* 1995; Wartzok *et al.,* 2003; Southall *et al.,* 2007; Weilgart, 2007; Archer *et al.,* 2010). Behavioral reactions can vary not only among individuals but also within an individual, depending on previous experience with a sound source, context, and numerous other factors (Ellison *et al.,* 2012), and can vary depending on characteristics associated with the sound source (*e.g.,* whether it is moving or stationary, number of sources, and distance from the source). Please see Appendices B–C of Southall *et al.* (2007) for a review of studies involving marine mammal behavioral responses to sound.

Habituation can occur when an animal's response to a stimulus wanes with repeated exposure, usually in the absence of unpleasant associated events (Wartzok *et al.,* 2003). Animals are most likely to habituate to sounds that are predictable and unvarying. It is important to note that habituation is appropriately considered as a ''progressive reduction in response to stimuli that are perceived as neither aversive nor beneficial,'' rather than as, more generally, moderation in response to human disturbance (Bejder *et al.,* 2009). The opposite process is sensitization, when an unpleasant experience leads to subsequent responses, often in the form of avoidance, at a lower level of exposure. As noted, behavioral state may affect the type of response. For example, animals that are resting may show greater behavioral change in response to disturbing sound levels than animals that are highly motivated to remain in an area for feeding (Richardson *et al.,* 1995; NRC, 2003; Wartzok *et al.,* 2003). Controlled experiments with captive marine mammals have shown pronounced behavioral reactions, including avoidance of loud sound sources (Ridgway *et al.,* 1997; Finneran *et al.,* 2003). Observed responses of wild marine mammals to loud pulsed sound sources (typically seismic airguns or acoustic harassment devices) have been varied, but often consist of avoidance behavior or other behavioral changes suggesting discomfort (Morton and Symonds, 2002; see also Richardson *et al.,* 1995; Nowacek *et al.,* 2007).

Available studies show wide variation in response to underwater sound; therefore, it is difficult to predict specifically how any given sound in a particular instance might affect marine mammals perceiving the signal. If a marine mammal does react briefly to an underwater sound by changing its behavior or moving a small distance, the impacts of the change are unlikely to be significant to the individual, let alone to the stock or population. However, if a sound source displaces marine mammals from an important feeding or breeding area for a prolonged period, impacts on individuals and populations could be significant (*e.g.,* Lusseau and Bejder, 2007; Weilgart, 2007; NRC, 2005). There are broad categories of potential response, which we describe in greater detail here, that include alteration of dive behavior, alteration of foraging behavior, effects to breathing, interference with or alteration of vocalization, avoidance, and flight.

Changes in dive behavior can vary widely and may consist of increased or decreased dive times and surface intervals as well as changes in the rates of ascent and descent during a dive (*e.g.,* Frankel and Clark, 2000; Costa *et al.,* 2003; Ng and Leung, 2003; Nowacek *et al.;* 2004; Goldbogen *et al.,* 2013a, b). Variations in dive behavior may reflect interruptions in biologically significant activities (*e.g.,* foraging), or they may be of little biological significance. The impact of an alteration to dive behavior resulting from an acoustic exposure depends on what the animal is doing at the time of the exposure and the type and magnitude of the response.

Disruption of feeding behavior can be difficult to correlate with anthropogenic sound exposure, so it is usually inferred by observed displacement from known foraging areas, the appearance of secondary indicators (*e.g.,* bubble nets or sediment plumes), or changes in dive behavior. As for other types of behavioral response, the frequency, duration, and temporal pattern of signal presentation, as well as differences in species sensitivity, are likely contributing factors to differences in response in any given circumstance (*e.g.,* Croll *et al.,* 2001; Nowacek *et al.;* 2004; Madsen *et al.,* 2006; Yazvenko *et al.,* 2007). A determination of whether foraging disruptions incur fitness consequences would require information on or estimates of the energetic requirements of the affected individuals and the relationship between prey availability, foraging effort and success, and the life history stage of the animal.

Variations in respiration naturally vary with different behaviors, and alterations to breathing rate as a function of acoustic exposure can be expected to co-occur with other behavioral reactions, such as a flight response or an alteration in diving. However, respiration rates in and of themselves may be representative of annoyance or an acute stress response. Various studies have shown that respiration rates may either be unaffected or could increase, depending on the species and signal characteristics, again highlighting the importance in understanding species differences in the tolerance of underwater noise when determining the potential for impacts resulting from anthropogenic sound exposure (*e.g.,* Kastelein *et al.,* 2001, 2005b, 2006; Gailey *et al.,* 2007).

Marine mammals vocalize for different purposes and across multiple modes, such as whistling, echolocation click production, calling, and singing. Changes in vocalization behavior in response to anthropogenic noise can occur for any of these modes and may result from a need to compete with an increase in background noise or may reflect increased vigilance or a startle response. For example, in the presence of potentially masking signals, humpback whales and killer whales have been observed to increase the length of their songs (Miller *et al.,* 2000; Fristrup *et al.,* 2003; Foote *et al.,* 2004), while right whales have been observed to shift the frequency content of their calls upward while reducing the rate of calling in areas of increased anthropogenic noise (Parks *et al.,* 2007b). In some cases, animals may cease sound production during production of aversive signals (Bowles *et al.,* 1994).

Avoidance is the displacement of an individual from an area or migration path as a result of the presence of a sound or other stressors, and is one of the most obvious manifestations of disturbance in marine mammals (Richardson *et al.,* 1995). For example, gray whales are known to change direction—deflecting from customary migratory paths—in order to avoid noise from seismic surveys (Malme *et al.,* 1984). Avoidance may be short-term, with animals returning to the area once

the noise has ceased (*e.g.,* Bowles *et al.,* 1994; Goold 1996; Stone *et al.,* 2000; Morton and Symonds 2002; Gailey *et al.,* 2007). Longer-term displacement is possible, however, which may lead to changes in abundance or distribution patterns of the affected species in the affected region if habituation to the presence of the sound does not occur (*e.g.,* Blackwell *et al.,* 2004; Bejder *et al.,* 2006; Teilmann *et al.,* 2006).

A flight response is a dramatic change in normal movement to a directed and rapid movement away from the perceived location of a sound source. The flight response differs from other avoidance responses in the intensity of the response (*e.g.,* directed movement, and rate of travel). Relatively little information on flight responses of marine mammals to anthropogenic signals exist, although observations of flight responses to the presence of predators have occurred (Connor and Heithaus 1996). The result of a flight response could range from brief, temporary exertion and displacement from the area where the signal provokes flight to, in extreme cases, marine mammal strandings (Evans and England 2001). However, it should be noted that response to a perceived predator does not necessarily invoke flight (Ford and Reeves 2008), and whether individuals are solitary or in groups may influence the response.

Behavioral disturbance can also impact marine mammals in subtler ways. Increased vigilance may result in costs related to diversion of focus and attention (*i.e.,* when a response consists of increased vigilance, it may come at the cost of decreased attention to other critical behaviors such as foraging or resting). These effects have generally not been demonstrated for marine mammals, but studies involving fish and terrestrial animals have shown that increased vigilance may substantially reduce feeding rates (*e.g.,* Beauchamp and Livoreil 1997; Fritz *et al.,* 2002; Purser and Radford 2011). In addition, chronic disturbance can cause population declines through reduction of fitness (*e.g.,* decline in body condition) and subsequent reduction in reproductive success, survival, or both (*e.g.,* Harrington and Veitch, 1992; Daan *et al.,* 1996; Bradshaw *et al.,* 1998). However, Ridgway *et al.* (2006) reported that increased vigilance in bottlenose dolphins exposed to sound over a five-day period did not cause any sleep deprivation or stress effects.

Many animals perform vital functions, such as feeding, resting, traveling, and socializing, on a diel cycle (24-hour cycle). Disruptions of such functions resulting from reactions to stressors such as sound exposure are more likely to be significant if they last more than one diel cycle or recur on subsequent days (Southall *et al.,* 2007). Consequently, a behavioral response lasting less than one day and not recurring on subsequent days is not considered particularly severe unless it could directly affect reproduction or survival (Southall *et al.,* 2007). Note that there is a difference between multi-day substantive behavioral reactions and multi-day anthropogenic activities. For example, just because an activity lasts for multiple days does not necessarily mean that individual animals are either exposed to activity-related stressors for multiple days or, further, exposed in a manner resulting in sustained multi-day substantive behavioral responses.

An animal's perception of a threat may be sufficient to trigger stress responses consisting of some combination of behavioral responses, autonomic nervous system responses, neuroendocrine responses, or immune responses (*e.g.,* Seyle 1950; Moberg 2000). In many cases, an animal's first and sometimes most economical (in terms of energetic costs) response is behavioral avoidance of the potential stressor. Autonomic nervous system responses to stress typically involve changes in heart rate, blood pressure, and gastrointestinal activity. These responses have a relatively short duration and may or may not have a significant long-term effect on an animal's fitness.

Neuroendocrine stress responses often involve the hypothalamus-pituitary-adrenal system. Virtually all neuroendocrine functions that are affected by stress—including immune competence, reproduction, metabolism, and behavior—are regulated by pituitary hormones. Stress-induced changes in the secretion of pituitary hormones have been implicated in failed reproduction, altered metabolism, reduced immune competence, and behavioral disturbance (*e.g.,* Moberg, 1987; Blecha, 2000). Increases in the circulation of glucocorticoids are also equated with stress (Romano *et al.,* 2004).

The primary distinction between stress (which is adaptive and does not normally place an animal at risk) and ''distress'' is the cost of the response. During a stress response, an animal uses glycogen stores that can be quickly replenished once the stress is alleviated. In such circumstances, the cost of the stress response would not pose serious fitness consequences. However, when an animal does not have sufficient energy reserves to satisfy the energetic costs of a stress response, energy resources must be diverted from other functions. This state of distress will last until the animal replenishes its energetic reserves sufficient to restore normal function.

Relationships between these physiological mechanisms, animal behavior, and the costs of stress responses are well-studied through controlled experiments and for both laboratory and free-ranging animals (*e.g.,* Holberton *et al.,* 1996; Hood *et al.,* 1998; Jessop *et al.,* 2003; Krausman *et al.,* 2004; Lankford *et al.,* 2005). Stress responses due to exposure to anthropogenic sounds or other stressors and their effects on marine mammals have also been reviewed (Fair and Becker 2000; Romano *et al.,* 2002b) and, more rarely, studied in wild populations (*e.g.,* Romano *et al.,* 2002a). For example, Rolland *et al.* (2012) found that noise reduction from reduced ship traffic in the Bay of Fundy was associated with decreased stress in North Atlantic right whales. These and other studies lead to a reasonable expectation that some marine mammals will experience physiological stress responses upon exposure to acoustic stressors and that it is possible that some of these would be classified as ''distress.'' In addition, any animal experiencing TTS would likely also experience stress responses (NRC, 2003).

Auditory masking occurs when sound disrupts behavior by masking or interfering with an animal's ability to detect, recognize, or discriminate between acoustic signals of interest (*e.g.,* those used for intraspecific communication and social interactions, prey detection, predator avoidance, and navigation) (Richardson *et al.,* 1995). Masking occurs when the receipt of a sound is interfered with by another coincident sound at similar frequencies and at similar or higher intensity, and may occur whether the sound is natural (*e.g.,* snapping shrimp, wind, waves, and precipitation) or anthropogenic (*e.g.,* shipping, sonar, and seismic exploration) in origin. The ability of a noise source to mask biologically important sounds depends on the characteristics of both the noise source and the signal of interest (*e.g.,* signal-to-noise ratio, temporal variability, and direction), in relation to each other and to an animal's hearing abilities (*e.g.,* sensitivity, frequency range, critical ratios, frequency discrimination, directional discrimination, age or TTS hearing loss), and existing ambient noise and propagation conditions.

Under certain circumstances, marine mammals experiencing significant masking could also be impaired from maximizing their performance fitness in

survival and reproduction. Therefore, when the coincident (masking) sound is man-made, it may be considered harassment when disrupting or altering critical behaviors. It is important to distinguish TTS and PTS, which persist after the sound exposure, from masking, which occurs during the sound exposure. Because masking (without resulting in TS) is not associated with abnormal physiological function, it is not considered a physiological effect, but it may result in a behavioral effect.

The frequency range of the potentially masking sound is important in determining any potential behavioral impacts. For example, low-frequency signals may have less effect on high-frequency echolocation sounds produced by odontocetes, but are more likely to affect detection of mysticete communication calls and other potentially important natural sounds such as those produced by surf and some prey species. The masking of communication signals caused by anthropogenic noise may be considered as a reduction in the communication space of animals (*e.g.,* Clark *et al.,* 2009) and may result in energetic or other costs as animals change their vocalization behavior (*e.g.,* Miller *et al.,* 2000; Foote *et al.,* 2004; Parks *et al.,* 2007b; Di Iorio and Clark, 2009; Holt *et al.,* 2009). Masking can be reduced in situations where the signal and noise come from different directions (Richardson *et al.,* 1995), through amplitude modulation of the signal, or through other compensatory behaviors (Houser and Moore 2014). Masking can be tested directly in captive species (*e.g.,* Erbe 2008), but in wild populations it must be either modeled or inferred from evidence of masking compensation. There are few studies addressing real-world masking sounds likely to be experienced by marine mammals in the wild (*e.g.,* Branstetter *et al.,* 2013).

Masking affects both senders and receivers of acoustic signals and can potentially have long-term chronic effects on marine mammals at the population level as well as at the individual level. Low-frequency ambient sound levels have increased by as much as 20 dB (more than three times in terms of SPL) in the world's oceans from pre-industrial periods, with most of the increase from distant commercial shipping (Hildebrand 2009). All anthropogenic sound sources, but especially chronic and lower-frequency signals (*e.g.,* from vessel traffic), contribute to elevated ambient sound levels, thus intensifying masking.

*Acoustic Effects, Underwater*

Explosive detonations at the water surface send a shock wave and sound energy through the water and can release gaseous by-products, create an oscillating bubble, or cause a plume of water to shoot up from the water surface. The shock wave and accompanying noise are of most concern to marine animals. Depending on the intensity of the shock wave and size, location, and depth of the animal, an animal can be injured, killed, suffer non-lethal physical effects, experience hearing related effects with or without behavioral responses, or exhibit temporary behavioral responses (*e.g.,* flight responses, temporary avoidance) from hearing the blast sound. Generally, exposures to higher levels of impulse and pressure levels would result in greater impacts to an individual animal.

The effects of underwater detonations on marine mammals are dependent on several factors, including the size, type, and depth of the animal; the depth, intensity, and duration of the sound; the depth of the water column; the substrate of the habitat; the standoff distance between activities and the animal; and the sound propagation properties of the environment. Thus, we expect impacts to marine mammals from EGTTR activities to result primarily from acoustic pathways. As such, the degree of the effect relates to the received level and duration of the sound exposure, as influenced by the distance between the animal and the source. The further away from the source, the less intense the exposure should be.

The potential effects of underwater detonations from the proposed EGTTR mission activities may include one or more of the following: Temporary or permanent hearing impairment, non-auditory physical or physiological effects, behavioral disturbance, and masking (Richardson *et al.,* 1995; Gordon *et al.,* 2004; Nowacek *et al.,* 2007; Southall *et al.,* 2007). However, the effects of noise on marine mammals are highly variable, often depending on species and contextual factors (based on Richardson *et al.,* 1995).

In the absence of mitigation, impacts to marine species could result from physiological and behavioral responses to both the type and strength of the acoustic signature (Viada *et al.,* 2008). The type and severity of behavioral impacts are more difficult to define due to limited studies addressing the behavioral effects of impulsive sounds on marine mammals.

*Hearing Impairment and Other Physical Effects*—Marine mammals exposed to high intensity sound repeatedly or for prolonged periods can experience hearing threshold shift. Given the available data, the received level of a single pulse (with no frequency weighting) might need to be approximately 186 dB re 1 μPa2-s (*i.e.,* 186 dB sound exposure level (SEL) or approximately 221–226 dB p-p (peak)) in order to produce brief, mild TTS. Exposure to several strong pulses that each have received levels near 190 dB rms (175–180 dB SEL) might result in cumulative exposure of approximately 186 dB SEL and thus slight TTS in a small odontocete, assuming the TTS threshold is (to a first approximation) a function of the total received pulse energy.

*Non-auditory Physiological Effects*—Non-auditory physiological effects or injuries that theoretically might occur in marine mammals exposed to strong underwater sound include stress and other types of organ or tissue damage (Cox *et al.,* 2006; Southall *et al.,* 2007).

*Serious Injury/Mortality:* The explosions from munitions would send a shock wave and blast noise through the water, release gaseous by-products, create an oscillating bubble, and cause a plume of water to shoot up from the water surface. The shock wave and blast noise are of most concern to marine animals. In general, potential impacts from explosive detonations can range from brief effects (such as short term behavioral disturbance), tactile perception, physical discomfort, slight injury of the internal organs, and death of the animal (Yelverton *et al.,* 1973; O'Keeffe and Young 1984). Physical damage of tissues resulting from a shock wave (from an explosive detonation) constitutes an injury. Blast effects are greatest at the gas-liquid interface (Landsberg 2000) and gas-containing organs, particularly the lungs and gastrointestinal tract, are especially susceptible to damage (Goertner 1982; Yelverton *et al.,* 1973). Nasal sacs, larynx, pharynx, trachea, and lungs may be damaged by compression/expansion caused by the oscillations of the blast gas bubble (Reidenberg and Laitman 2003). Severe damage (from the shock wave) to the ears can include tympanic membrane rupture, fracture of the ossicles, cochlear damage, hemorrhage, and cerebrospinal fluid leakage into the middle ear.

Non-lethal injury includes slight injury to internal organs and the auditory system; however, delayed lethality can be a result of individual or cumulative sublethal injuries (DoN 2001). Immediate lethal injury would be a result of massive combined trauma to internal organs as a direct result of

proximity to the point of detonation (DoN 2001).

*Disturbance Reactions*

Because the few available studies show wide variation in response to underwater sound, it is difficult to quantify exactly how sound from military operations at the EGTTR would affect marine mammals. It is likely that the onset of surface detonations could result in temporary, short term changes in an animal's typical behavior and/or avoidance of the affected area. These behavioral changes may include (Richardson *et al.,* 1995): Changing durations of surfacing and dives, number of blows per surfacing, moving direction and/or speed; reduced/increased vocal activities; changing/cessation of certain behavioral activities (such as socializing or feeding); visible startle response or aggressive behavior (such as tail/fluke slapping or jaw clapping); or avoidance of areas where sound sources are located.

The biological significance of any of these behavioral disturbances is difficult to predict, especially if the detected disturbances appear minor. However generally, one could expect the consequences of behavioral modification to be biologically significant if the change affects growth, survival, or reproduction. Significant behavioral modifications that could potentially lead to effects on growth, survival, or reproduction include:

- Drastic changes in diving/surfacing patterns (such as those thought to cause beaked whale stranding due to exposure to military mid-frequency tactical sonar);
- Habitat abandonment due to loss of desirable acoustic environment; and
- Cessation of feeding or social interaction.

The onset of behavioral disturbance from anthropogenic sound depends on both external factors (characteristics of sound sources and their paths) and the specific characteristics of the receiving animals (hearing, motivation, experience, demography) and is difficult to predict (Southall *et al.,* 2007).

*Auditory Masking*

While it may occur temporarily, we do not expect auditory masking to result in detrimental impacts to an individual's or population's survival, fitness, or reproductive success. Dolphin movement is not restricted within EGTTR area, allowing for movement out of the area to avoid masking impacts, and the sound resulting from the detonations is short in duration. Also, masking is typically of greater concern for those marine mammals that utilize low frequency communications, such as baleen whales and, as such, is not likely to occur for marine mammals in the EGTTR area.

*Vessel and Aircraft Presence*

The marine mammals most vulnerable to vessel strikes are slow-moving and/or spend extended periods of time at the surface in order to restore oxygen levels within their tissues after deep dives (*e.g.,* North Atlantic right whales (*Eubalaena glacialis*), fin whales, and sperm whales). Smaller marine mammals, including dolphins, are agile and move more quickly through the water, making them less susceptible to ship strikes.

Aircraft produce noise at frequencies that are well within the frequency range of cetacean hearing and also produce visual signals such as the aircraft itself and its shadow (Richardson *et al.,* 1995, Richardson and Wursig, 1997). A major difference between aircraft noise and noise caused by other anthropogenic sources is that the sound is generated in the air, transmitted through the water surface and then propagates underwater to the receiver, diminishing the received levels significantly below what is heard above the water's surface. Sound transmission from air to water is greatest in a sound cone 26 degrees directly under the aircraft.

There are fewer reports of reactions of odontocetes to aircraft than those of pinnipeds. Responses to aircraft by pinnipeds include diving, slapping the water with pectoral fins or tail fluke, or swimming away from the track of the aircraft (Richardson *et al.,* 1995). The nature and degree of the response, or the lack thereof, are dependent upon the nature of the flight (*e.g.,* type of aircraft, altitude, straight vs. circular flight pattern). Wursig *et al.* (1998) assessed the responses of cetaceans to aerial surveys in the north central and western Gulf of Mexico using a DeHavilland Twin Otter fixed-wing airplane. The plane flew at an altitude of 229 m (751.3 ft) at 204 km/hr (126.7 mph) and maintained a minimum of 305 m (1,000 ft) straight line distance from the cetaceans. Water depth was 100 to 1,000 m (328 to 3,281 ft). Bottlenose dolphins most commonly responded by diving (48 percent), while 14 percent responded by moving away. Other species (*e.g.,* beluga (*Delphinapterus leucas*) and sperm whales) show considerable variation in reactions to aircraft but diving or swimming away from the aircraft are the most common reactions to low flights (less than 500 m; 1,640 ft).

*Direct Strike by Ordnance*

Another potential risk to marine mammals is direct strike by ordnance, in which the ordnance physically hits an animal. Although strike from an item at the surface of the water while the animals are at the surface is possible, the potential risk of a direct hit to an animal within the target area would be low. Marine mammals spend the majority of their time below the surface of the water, and the potential for one bomb or missile to hit that animal at that specific time is highly unlikely. The 2002 *Eglin Gulf Test and Training Range (EGTTR) Programmatic Environmental Assessment* (Navy 2002) estimated that a maximum of 0.2 marine mammals could potentially be struck by projectiles, falling debris, and inert munitions each year.

*Anticipated Effects on Habitat*

The primary sources of marine mammal habitat impact are noise and pressure waves resulting from live weapon detonations. However, neither the noise nor overpressure constitutes a long-term physical alteration of the water column or ocean floor. Further, these effects are not expected to substantially affect prey availability, are of limited duration, and are intermittent. Impacts to marine fish were analyzed in the *Eglin Gulf Test and Training Range Environmental Assessment* (Department of the Air Force, 2015). While detonations of live ordnance from EGTTR activities have the potential to kill or injure marine fish, most fish species experience large numbers of natural mortalities. Any behavioral reactions of fish in the vicinity of underwater detonations would be relatively short term, localized, and are not expected to have lasting effects on the survival, growth, or reproduction of fish populations. Additionally, the relatively small levels of mortality potentially caused by EGTTR missions would not likely affect fish populations as a whole and would therefore not limit prey availability for marine mammals.

Other factors related to air-to-surface activities that could potentially affect marine mammal habitat include the introduction of metals, explosives and explosion by-products, other chemical materials, and debris into the water column and substrate due to the use of munitions and target vessels. The effects of each were analyzed under National Environmental Policy Act documentation (*Eglin Gulf Test and Training Range Environmental Assessment;* in preparation) and were determined to not be significant. The

analysis in the Range Environmental Assessment is provided in the following paragraphs.

Various metals would be introduced into the water column through expended munitions. The casings, fins, or other parts of large munitions such as bombs and missiles are typically composed primarily of steel but usually also contain small amounts of lead, manganese, phosphorus, sulfur, copper, nickel, and several other metals (U.S. Navy, 2013). Many smaller caliber rounds contain aluminum, copper, and zinc. Aluminum is also present in some explosive materials such as tritonal and PBXN–109. Lead is present in batteries typically used in vessels such as the remotely controlled target boats. Many metals occur naturally in seawater at varying concentrations and some, such as aluminum, would not necessarily be detrimental to the substrate or water column. However, at high concentrations, a number of metals (*e.g.,* lead) may be toxic to microbial communities in the substrate.

Munitions and other metal items would sink to the seafloor and would typically undergo one of three processes: (1) Enter the sediment where there is reduced oxygen content, (2) remain exposed on the ocean floor and begin to react with seawater, or (3) remain exposed on the ocean floor and become encrusted with marine organisms. The rate of deterioration would therefore depend on the specific composition of an item and its position relative to the seafloor/water column. Munitions located deep in the sediment would typically undergo slow deterioration. Some portion of the metal ions would become bound to sediment particles. Metal materials exposed to seawater would begin to slowly corrode. This process typically creates a layer of corroded material between the seawater and metal, which slows the movement of the metal ions into the adjacent sediment and water column. Therefore, elevated levels of metals in sediment would be restricted to a small zone around the munitions, and releases to the overlying water column would be diluted. A similar process would occur with munitions that become covered by marine growth. Direct exposure to seawater would be reduced, thereby decreasing the rate of corrosion.

Munitions that come to rest on the seafloor would slowly corrode and would release small amounts of metals to adjacent sediment and the water column. Metal particles that migrate into the water column would be diluted by diffusion and water movement. Elevated concentrations would be localized and would not be expected to significantly affect overall local or regional water quality. This expectation is supported by the results of two U.S. Navy studies related to munitions use and water quality, as summarized in U.S. Navy (2013). In one study, water quality sampling for lead, manganese, nickel, vanadium, and zinc was conducted at a shallow bombing range in Pamlico Sound off North Carolina immediately following a bomb training event with inert practice munitions. With the exception of nickel, all water quality parameters tested were within the state limits. The nickel concentration was significantly higher than the state criterion, although the concentration did not differ significantly from a control site located outside the bombing range. This suggests that bombing activities may not have been responsible for the elevated nickel concentration. The second study, conducted by the U.S. Marine Corps, included sediment and water quality sampling for 26 munitions constituents at several water training ranges. Metals included lead and magnesium. No levels were detected above screening values used at the water ranges.

Chemical materials with potential to affect substrates and the water column include explosives, explosion by-products, and fuel, oil, and other fluids (including battery acid) associated with vessel operations and the use of remotely controlled target boats. Explosives are complex chemical mixtures that may affect water or sediment quality through the by-products of their detonation and the distribution of unconsumed explosives. Some of the more common types of explosive materials used in air-to-surface activities include tritonal and research department explosive (RDX). Tritonal is primarily composed of 2,4,6-trinitrotoluene (TNT). Therefore, discussion in the remainder of this section will consider TNT and RDX to be representative of all explosives. During detonation, energetic compounds may undergo high-order (complete) detonation or low-order (incomplete) detonation, or they may fail to detonate altogether. High-order detonations consume almost all of the explosive material, with the remainder released into the environment as discrete particles. Analysis of live-fire detonations on terrestrial ranges have indicated that over 99.9 percent of TNT and RDX explosive material is typically consumed during a high-order detonation (USACE, 2003). Pennington *et al.* (2006) reported a median value of 0.006 percent and 0.02 percent for TNT and RDX residue, respectively, remaining after detonation. The annual total NEW for all combined munitions is 30,488 pounds. Using the more conservative (higher) value of 0.02 percent for residual material, a total of about 6.1 pounds of explosive material could be deposited into the EGTTR annually. For purposes of analysis, it may be conservatively assumed that all residual materials are deposited simultaneously and remain within W–151A and within the top 10 ft of the water column (10 ft is the maximum detonation scenario for any munition). In this case, the resulting concentration of explosive material would be about $8 \times 10^{-8}$ milligrams/liter (mg/L). In reality, the materials would be dispersed throughout a larger surface area and water volume by currents, waves, and wind (for in-air detonations). Although there are no regulatory standards specifically for explosive materials in marine waters, this value may be compared with the Department of Defense Range and Munitions Use Working Group marine screening value for the amount of C–4 (another type of explosive composed of mostly RDX) remaining after detonation (as provided in U.S. Navy, 2013). The screening value is 5 mg/L, which is many orders of magnitude greater than the concentration calculated above.

Various by-products are produced during and immediately after detonation of TNT and RDX. During the brief time that a detonation is in progress, intermediate products may include carbon ions, nitrogen ions, oxygen ions, water, hydrogen cyanide, carbon monoxide, nitrogen gas, nitrous oxide, cyanic acid, and carbon dioxide (Becker, 1995). However, reactions quickly occur between the intermediates, and the final products consist mainly of carbon (*i.e.,* soot), carbon dioxide ($CO_2$), water, carbon monoxide (CO), and nitrogen gas (Swisdak, 1975). These substances are natural components of seawater. Other products, occurring at substantially lower concentrations, include hydrogen, ammonia, methane, and hydrogen cyanide, among others.

After detonation, the residual explosive materials and detonation by-products would be dispersed throughout the northern Gulf of Mexico by diffusion and by the action of wind, waves, and currents. A portion of the carbon compounds, such as CO and $CO_2$, would likely become integrated into the carbonate system (alkalinity and pH buffering capacity of seawater). Some of the nitrogen and carbon compounds would be metabolized or assimilated by phytoplankton and bacteria. Most of the gas products that do not react with the water or become

assimilated by organisms would be released to the atmosphere. In addition, many of the detonations would occur in the air or at the water surface. In these cases, some portion of the by-products could be widely distributed by wind. Given that the residual concentration of explosive material would be small, that most of the explosion by-products would be harmless or natural seawater constituents, and that by-products would dissipate or be quickly diluted, impacts resulting from high-order detonations would be negligible.

Low-order detonations consume a lower percentage of the explosive; and, therefore, a portion of the material is available for release into the environment. If the ordnance fails to detonate, the entire amount of energetic compound remains largely intact and is released to the environment over time as the munition casing corrodes. The likelihood of incomplete detonations is not quantified; however, the portion of munitions that could fail to detonate (*i.e.,* duds) has been estimated at between about 3 and 5 percent (USACE, 2007; Rand Corporation, 2005). Due to the potential dud rate, number of live munitions included in the 2015 REA, and NEW in each munition, an un-estimable but small amount of explosive material (TNT and RDX, among others) could enter the EGTTR annually through unexploded munitions. However, most of this material would not be available to the marine environment immediately. Explosive material would diffuse into the water through screw threads, cracks, or pinholes in the munition casings. Therefore, movement of explosive material into the water column would likely be a slow process, potentially ranging from months to decades.

After leaving the munition casing, explosive material would enter the sediment or water column. Similar to the discussion of explosive by-products above, chemical materials in the water column would be dispersed by currents and would eventually become uniformly distributed throughout the northern Gulf of Mexico. Explosive materials in the water column would also be subject to biotic (biological) and abiotic (physical and chemical) transformation and degradation, including hydrolysis, ultraviolet radiation exposure, and biodegradation. The results of a recent investigation suggest that TNT is rapidly degraded in marine environments by biological and photochemical processes (Walker *et al.,* 2006). Marine ecosystems are generally nitrogen limited compared with freshwater systems, and marine microbes such as bacteria may therefore readily use TNT metabolites (*e.g.,* ammonia and ammonium). TNT that is not biodegraded may sorb (bind to by absorption or adsorption) onto particulates, break down into dissolved organic matter, or dissolve into the water column. TNT is also subject to photochemical degradation, known as photolysis, whereby the ultraviolet component of sunlight degrades the compound into products similar to those produced by biodegradation. Photolysis is more effective in waters of shallower depth and/or with greater clarity. Uptake and metabolism of TNT has also been noted in phytoplankton. It is assumed that similar processes could affect other explosives such as RDX.

The results of studies of UXO in marine environments generally suggest that there is little overall impact to water quality resulting from the leaching of explosive material. Various researchers have studied an area in Halifax Harbor, Nova Scotia, where UXO was deposited in 1945. Rodacy *et al.* (2000) reported that explosives signatures were detectable in 58 percent of water samples, but that marine growth was observed on most of the exposed ordnance. TNT metabolites, suspected to result from biological decomposition, were also detected. In an earlier study (Darrach *et al.* 1998), sediment collected near unexploded (but broken) ordnance did not indicate the presence of TNT, whereas samples near intact ordnance showed trace explosives in the range of low parts per billion or high parts per trillion. The authors concluded that, after 50 years, the contents of broken munitions had dissolved, reacted, biodegraded, or photodegraded and that intact munitions appear to be slowly releasing their contents through corrosion pinholes or screw threads.

Hoffsommer *et al.* (1972) analyzed seawater (as well as sediment and ocean floor fauna) at known munitions dumping sites off Washington State and South Carolina for the presence of TNT, RDX, tetryl, and ammonium perchlorate. None of these materials were found in any of the samples. Walker *et al.* (2006) sampled seawater and sediment at two offshore sites where underwater demolition was conducted using 10-pound charges of TNT and RDX. Residual TNT and RDX were below the detection limit in seawater, including samples collected in the plume within five minutes of detonation.

Additional materials produced during air-to-surface activities would include petroleum products (primarily fuel and oil in target boats), battery acid, and plastics. Increased use of remotely controlled target boats and mission support vessels would increase the potential for fuel, oil, and battery acid to be deposited in the water (primarily through destruction of target boats). When hydrocarbons enter the ocean, the lighter-weight components evaporate, degrade by sunlight, and undergo chemical degradation. Many constituents are also consumed by microbes. Higher-weight molecular compounds are more resistant to degradation and tend to persist after these processes have occurred. Microbial breakdown of PCBs has been documented in estuarine and marine sediments (Agency for Toxic Substances and Disease, 2000). In addition, currents would disperse any hydrocarbons produced during test and training activities. It is anticipated that potential impacts to water quality due to petroleum-based products would be insignificant. Similarly, battery acid, while possibly having a temporary and local effect on the water column, would be quickly dispersed and diluted by water currents.

Debris deposited on the seafloor would include spent munitions fragments and possibly pieces of targets (fiberglass, plywood, etc.). Debris would not appreciably affect the sandy seafloor. Debris moved by water currents could scour the bottom, but sediments would quickly refill any affected areas, and overall effects to benthic communities would be minor. Large pieces of debris would not be as prone to movement on the seafloor and could result in beneficial effects by providing habitat for encrusting organisms, fish, and other marine fauna. Target boats have foam-filled hulls, and most of the pieces are designed to float in order to facilitate collection for a damage assessment. Overall, the quantity of material deposited on the seafloor would be small compared with other sources of debris in the Gulf of Mexico. Hardbottom habitats and artificial reefs would be avoided when possible through location of target sites and training missions and would not be likely to be affected by debris. There is a potential for some debris to be carried by currents and interact with the substrate, but damage to natural or artificial reefs is not expected and the impacts would not be significant.

*Previous Monitoring Results*

Below is a summary of annual marine mammal monitoring reports required as part of LOAs and IHAs issued to Eglin AFB. AFSOC gunnery missions were scheduled over nine days in 2012, three days in 2013, 10 days in 2014, and eight days in 2015. There was no recorded

take of marine mammals during this time period. Thirteen days of maritime strike operations took place in 2013 and 2014 with no recorded takes. WSEP missions were held over four days in 2015 and five days in 2016 with no observable takes before, during, and after each mission. In summary, Eglin AFB reports that since 2012 no observable take of marine mammals has occurred incidental to numerous missions and mission activities in the EGTTR.

While we anticipate that the specified activity may result in marine mammals avoiding certain areas due to temporary ensonification, this impact to habitat and prey species would be temporary and reversible. The main impact associated with the proposed activity would be temporarily elevated noise levels and the associated direct effects on marine mammals, previously discussed in this notice. Marine mammals are anticipated to temporarily vacate the area of live detonations. However, these events are usually of short duration, and animals are anticipated to return to the activity area during periods of non-activity. Thus, based on the preceding discussion, we do not anticipate that the proposed activity would have any habitat-related effects that could cause significant or long-term consequences for individual marine mammals or their populations.

**Estimated Take**

This section provides an estimate of the number of incidental takes proposed for authorization through this LOA, which will inform NMFS' consideration of the negligible impact determination.

For this 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 would primarily be by Level B harassment, as use of explosive sources has the potential to result in disruption of behavioral patterns and TTS for individual marine mammals. There is also some potential for auditory injury and tissue damage (Level A harassment) to result. The proposed mitigation and monitoring measures are expected to minimize the severity of such taking to the extent practicable. As described previously, no mortality is anticipated or proposed to be authorized for this activity. Below we describe how the take is estimated.

Described in the most basic way, we estimate take by considering: (1) Acoustic thresholds above which NMFS believes the best available science indicates marine mammals will be behaviorally harassed or incur some degree of permanent hearing impairment; (2) the area or volume of water that will be ensonified above these levels in a day; (3) the density or occurrence of marine mammals within these ensonified areas; and, (4) and the number of days of activities. Below, we describe these components in more detail and present the proposed take estimate.

*Acoustic Thresholds*

Using the best available science, NMFS has developed acoustic thresholds that identify the received level of underwater sound above which exposed marine mammals would be reasonably expected to be behaviorally harassed (equated to Level B harassment) or to incur PTS of some degree (equated to Level A harassment). Thresholds have also been developed to identify the pressure levels above which animals may incur different types of tissue damage from exposure to pressure waves from explosive detonation.

The criteria and thresholds used to estimate potential pressure and energy impacts to marine mammals resulting from detonations were obtained from Finneran and Jenkins (2012). Criteria used to analyze impacts to marine mammals include mortality, harassment that causes or is likely to cause injury (Level A) and harassment that disrupts or is likely to disrupt natural behavior patterns (Level B). Each category is discussed below with additional details provided in Appendix A of the application.

*Mortality*

Mortality risk assessment may be considered in terms of direct injury, which includes primary blast injury and barotrauma. The potential for direct injury of marine mammals has been inferred from terrestrial mammal experiments and from post-mortem examination of marine mammals believed to have been exposed to underwater explosions (Finneran and Jenkins, 2012; Ketten *et al.,* 1993; Richmond *et al.,* 1973). Actual effects on marine mammals may differ from terrestrial animals due to anatomical and physiological differences, such as a reinforced trachea and flexible thoracic cavity, which may decrease the risk of injury (Ridgway and Dailey, 1972).

Primary blast injuries result from the initial compression of a body exposed to a blast wave, and is usually limited to gas-containing structures (*e.g.,* lung and gut) and the auditory system (U.S. Department of the Navy, 2001b). Barotrauma refers to injuries caused when large pressure changes occur across tissue interfaces, normally at the boundaries of air-filled tissues such as the lungs. Primary blast injury to the respiratory system may be fatal depending upon the severity of the trauma. Rupture of the lung may introduce air into the vascular system, producing air emboli that can restrict oxygen delivery to the brain or heart.

Whereas a single mortality threshold was previously used in acoustic impacts analysis, species-specific thresholds are currently required. Thresholds are based on the level of impact that would cause extensive lung injury to one percent of exposed animals (*i.e.,* an impact level from which one percent of exposed animals would not recover). (Finneran and Jenkins, 2012). The threshold represents the expected onset of mortality, where 99 percent of exposed animals would be expected to survive. Most survivors would have moderate blast injuries. The lethal exposure level of blast noise, associated with the positive impulse pressure of the blast, is expressed as Pa·s and is determined using the Goertner (1982) modified positive impulse equation. This equation incorporates source/animal depths and the mass of a newborn calf for the affected species. The threshold is conservative because animals of greater mass can withstand greater pressure waves, and newborn calves typically make up a very small percentage of any cetacean group.

For the actions described in this proposed LOA, two species are expected to occur within the EGTTR Study Area: The bottlenose dolphin and the Atlantic spotted dolphin. Finneran and Jenkins (2012) provide known or surrogate masses for newborn calves of several cetacean species. For the bottlenose dolphin, this value is 14 kilograms (kg) (31 pounds). Values are not provided for the Atlantic spotted dolphin and, therefore, a surrogate species, the striped dolphin (*Stenella coeruleoalba*), is used. The mass provided for a newborn striped dolphin calf is 7 kg (15 pounds). Impacts analysis for the unidentified dolphin group (assumed to consist of bottlenose and Atlantic striped dolphins) conservatively used the mass of the smaller spotted dolphin. The Goertner equation, as presented in Finneran and Jenkins (2012) is used in

the acoustic model to develop impacts analysis in this LOA request. The equation is provided in Table 16.

*Injury (Level A Harassment)*

Potential injuries that may occur to marine mammals include blast related injury: Gastrointestinal (GI) tract injury and slight lung injury, and irrecoverable auditory damage. These injury categories are all types of Level A harassment as defined in the MMPA.

*Slight Lung Injury*—This threshold is based on a level of lung injury from which all exposed animals are expected to survive (zero percent mortality) (Finneran and Jenkins, 2012). Similar to the mortality determination, the metric is positive impulse and the equation for determination is that of the Goertner injury model (1982), corrected for atmospheric and hydrostatic pressures and based on the cube root scaling of body mass (Richmond *et al.,* 1973; U.S. Department of the Navy, 2001b). The equation is provided in Table 16.

*Gastrointestinal Tract Injuries*—GI tract injuries are correlated with the peak pressure of an underwater detonation. GI tract injury thresholds are based on the results of experiments in the 1970s in which terrestrial mammals were exposed to small charges. The peak pressure of the shock wave was found to be the causal agent in recoverable contusions (bruises) in the GI tract (Richmond *et al.,* 1973, in Finneran and Jenkins, 2012). The experiments found that a peak SPL of 237 dB re 1 µPa predicts the onset of GI tract injuries, regardless of an animal's mass or size. Therefore, the unweighted peak SPL of 237 dB re 1 µPa is used in explosive impacts assessments as the threshold for slight GI tract injury for all marine mammals.

*Auditory Damage (PTS*)—Another type of injury, permanent threshold shift or PTS, is auditory damage that does not fully recover and results in a permanent decrease in hearing sensitivity. As there have been no studies to determine the onset of PTS in marine mammals, this threshold is estimated from available information associated with TTS. According to research by the Navy (Navy, 2017) PTS thresholds are defined differently for three groups of cetaceans based on their hearing sensitivity: Low frequency, mid-frequency, and high frequency. Bottlenose and Atlantic spotted dolphins that are the subject of the EGTTR acoustic impacts analysis both fall within the mid-frequency hearing category. The PTS thresholds use dual criteria, one based on cumulative SEL and one based on peak SPL of an underwater blast. For a given analysis, the more conservative of the two is applied to afford the most protection to marine mammals. The mid-frequency cetacean criteria for PTS are provided in Table 16.

*Non-Injurious Impacts (Level B Harassment)*

Two categories of Level B harassment are currently recognized: Temporary threshold shift (TTS) and behavioral impacts. Although TTS is a physiological impact, it is not considered injury because auditory structures are temporarily fatigued instead of being permanently damaged.

*TTS*—Non-injurious effects on marine mammals, such as TTS, are generally extrapolated from data on terrestrial mammals (Southall *et al.,* 2007). Similar to PTS, dual criteria are provided for TTS thresholds, and the more conservative is typically applied in impacts analysis. TTS criteria are based on data from impulse sound exposures when available. According to the most recent data (Navy, 2017) the TTS onset thresholds for mid-frequency cetaceans are based on TTS data from a beluga whale exposed to an underwater impulse produced from a seismic watergun. The TTS thresholds consist of the SEL of an underwater blast weighted to the hearing sensitivity of mid-frequency cetaceans and an unweighted peak SPL measure. The dual thresholds for TTS in mid-frequency cetaceans are provided in Table 16.

*Behavioral Impacts*

Behavioral impacts refer to disturbances that may occur at sound levels below those considered to cause TTS in marine mammals, particularly in cases of multiple detonations. During an activity with a series of explosions (not concurrent multiple explosions shown in a burst), an animal is expected to exhibit a startle reaction to the first detonation followed by a behavioral response after multiple detonations. At close ranges and high sound levels, avoidance of the area around the explosions is the assumed behavioral response in most cases. Other behavioral impacts may include decreased ability to feed, communicate, migrate, or reproduce, among others. Such effects, known as sub-TTS Level B harassment, are based on observations of behavioral reactions in captive dolphins and beluga whales exposed to pure tones, a different type of noise than that produced from an underwater detonation (Finneran and Schlundt, 2004; Schlundt *et al.,* 2000). For multiple, successive detonations (*i.e.,* detonations happening at the same location within a 24-hour period), the threshold for behavioral disturbance is set 5 dB below the SEL-based TTS threshold, unless there are species- or group-specific data indicating that a lower threshold should be used. This is based on observations of behavioral reactions in captive dolphins and belugas occurring at exposure levels approximately 5 dB below those causing TTS after exposure to pure tones (Finneran and Jenkins, 2012; Finneran and Schlundt, 2004; Schlundt *et al.,* 2000).

Table 16 outlines the explosive thresholds, based on the best available science, used by NMFS to predict the onset of disruption of natural behavior patterns, PTS, tissue damage, and mortality.

**Table 16. Explosive Criteria and Thresholds Used for Impact Analyses.**

| Mortality* | Level A Harassment | | | Level B Harassment | |
|---|---|---|---|---|---|
| | Slight Lung Injury[1] | GI Tract Injury | PTS | TTS | Behavioral |
| $91.4M^{1/3}\left(\frac{D}{1+10.1}\right)^{1/2}$ | $39.1M^{1/3}\left(\frac{D}{1+10.1}\right)^{1/2}$ | Unweighted SPL: 237 dB re 1 µPa | Weighted SEL: 185 dB re 1 $\mu Pa^2 \cdot s$ | Weighted SEL: 170 dB re 1 $\mu Pa^2 \cdot s$ | Weighted SEL: 165 dB re 1 $\mu Pa^2 \cdot s$ |

*Marine Mammal Occurrence*

Bottlenose and Atlantic spotted dolphin density estimates used in this document were obtained from Duke University Marine Geospatial Ecology Lab Reports (Roberts *et al.,* 2016) which integrated 23 years of aerial and shipboard surveys, linked them to environmental covariates obtained from remote sensing and ocean models, and built habitat-based density models using distance sampling methodology. For bottlenose dolphins, geographic modeling strata from MMPA stock boundaries and seasonal strata were not defined because of the lack of information about seasonality in the Gulf of Mexico, as well as substantial spatial and seasonal biases in survey efforts (Roberts *et al.,* 2015a). Therefore, bottlenose dolphin numbers were modeled in the Gulf of Mexico using a single year-round model. Similarly for Atlantic spotted dolphins, there is no evidence that this species migrates or exhibits seasonal patterns in the Gulf of Mexico, so a single, year-round model that incorporated all available survey data was used (Roberts *et al.,* 2015b). The model results are available at the OBIS–SEAMAP repository found online (*http://seamap.env.duke.edu/*).

Two marine mammal density estimates were calculated for this proposed LOA. One density estimate is considered a large-scale estimate and is used for missions that could occur anywhere in W–151A, shoreward of the 200-m isobath. The mission sets that utilize the entire W–151A area include AFSOC's Air-to-Surface Gunnery Training Operations and 413 FLTS's AC–130J Precision Strike Package Gunnery Testing (Scenarios D, E, F, G, and H). The other density estimate is considered a fine-scale estimate and is used for missions that are proposed specifically around the GRATV target area. The mission sets that utilize the nearshore GRATV target location are 86th FWS Maritime WSEP, 413 FLTS AC–130J and AC–130W Stand-Off Precision Guided Munitions Testing, 780th TS Precision Strike Weapons, 780 TS/OGMT future missions, and 96th OG future missions (Scenarios A, B, C, and I through T). Using two different density estimates based on the mission locations accounts for the differences between inshore and offshore distribution of bottlenose and Atlantic spotted dolphins, and provides more realistic take calculations.

Raster data provided online from the Duke University Marine Geospatial Ecology Lab Report was imported into ArcGIS and overlaid onto the W–151A area. Density values for each species were provided in 10 x 10 km boxes. The large-scale estimates for W–151A were obtained by averaging the density values of these 100 $km^2$ boxes within the W–151A boundaries and converted to number of animals per $km^2$. Fine-scale estimates were calculated by selecting nine 100 $km^2$ boxes centered around the GRATV target location and averaging the density values from those boxes. Large-scale and fine-scale density estimates are provided in Table 17.

TABLE 17—MARINE MAMMAL DENSITY ESTIMATES FOR EGTTR TESTING AND TRAINING ACTIVITIES

| Species | Large-scale density estimate [a] (animals per $km^2$) | Fine-scale density estimate [b] (animals per $km^2$) |
|---|---|---|
| Bottlenose dolphin [c] | 0.276 | 0.433 |
| Atlantic spotted dolphin [d] | 0.160 | 0.148 |

[a] Large-scale estimates incorporate the entire W–151A area.
[b] Fine-scale estimates incorporate the nine 10 $km^2$ boxes centered around the GRATV location.
[c] Densities derived from Roberts *et al.* 2015a.
[d] Densities derived from Roberts *et al.* 2015b.

Density estimates usually assume that animals are uniformly distributed within the prescribed area, even though this is likely rarely true. Marine mammals are often clumped in areas of greater importance, for example, in areas of high productivity, lower predation, safe calving, etc. Furthermore, assuming that marine mammals are distributed evenly within the water column does not accurately reflect behavior. Databases of behavioral and physiological parameters obtained through tagging and other technologies have demonstrated that marine animals use the water column in various ways. Some species conduct regular deep dives while others engage in much shallower dives, regardless of bottom depth. Assuming that all species are evenly distributed from surface to bottom can present a distorted view of marine mammal distribution in any region. Density is assumed to be two-dimensional, and exposure estimates are, therefore, simply calculated as the product of affected area, animal density, and number of events. The resulting exposure estimates are considered conservative, because all animals are presumed to be located at the same depth, where the maximum sound and pressure ranges would extend from detonations, and would, therefore, be exposed to the maximum amount of energy or pressure. In reality, it is highly likely that some portion of marine mammals present near the impact area at the time of detonation would be at various depths in the water column and not necessarily occur at the same depth corresponding to the maximum sound and pressure ranges.

A mission-day based analysis was utilized in order to model accumulated energy over a 24-hour timeframe where each mission-day scenario would be considered a separate event. As described previously, Eglin AFB developed multiple mission-day categories separated by mission groups and estimated the number of days each category would be executed annually. In total, there are 20 different mission-day scenarios included in the acoustic analysis Labeled A–T. Table 18 below summarizes the number of days each mission-day scenario, or event, would be conducted annually in the EGTTR.

TABLE 18—ANNUAL NUMBER OF DAYS PROPOSED FOR EACH MISSION CATEGORY DAY

| Mission groups | Mission category day | Number of mission days/year |
|---|---|---|
| 86 FWS Maritime WSEP | A | 2 |
| | B | 4 |
| | C | 2 |
| AFSOC Air-to-Surface Gunnery | D | 25 |
| | E | 45 |
| 413 FLTS PSP Gunnery | F | 3 |
| | G | 4 |
| | H | 4 |
| 413 FLTS SOPGM | I | 2 |
| | J | 2 |
| | K | 2 |
| | L | 2 |
| 780 TS Precision Strike Weapon | M | 1 |
| | N | 1 |
| | O | 1 |

TABLE 18—ANNUAL NUMBER OF DAYS PROPOSED FOR EACH MISSION CATEGORY DAY—Continued

| Mission groups | Mission category day | Number of mission days/year |
|---|---|---|
| 780 TS Other Tests | P | 1 |
| | Q | 4 |
| 96 OG Future Missions | R | 1 |
| | S | 2 |
| | T | 10 |

*Take Calculation and Estimation*

Eglin AFB completed acoustic modeling to determine the distances from their explosive ordnance corresponding to NMFS' explosive thresholds. These distances were then used with each species' density to determine exposure estimates. Below is a summary of the methodology for those modeling efforts. Appendix A in the application provides additional details.

The maximum estimated range, or radius, from the detonation point to the point at which the various thresholds extend for all munitions proposed to be released in a 24-hour time period was calculated based on explosive acoustic characteristics, sound propagation, and sound transmission loss in the EGTTR. Results are shown in Table 19. These calculations incorporated water depth, sediment type, wind speed, bathymetry, and temperature/salinity profiles. Transmission loss was calculated from the explosive source depth down to an array of water depth bins (0 to 160 m). Impact volumes were computed for each explosive source (based on the total number of munitions released on a representative mission day). The impact volume is a cylinder extending from surface to seafloor, centered at the sound source with a radius set equal to the maximum range, Rmx, across all depths and azimuths at which the particular metric is still above the threshold. The total energy for all weapons released as part of a representative mission day was calculated to assess impacts from the accumulated energy resulting from multiple weapon releases within a 24-hour period. The number of animals impacted is computed by multiplying the area of a circle with radius Rmax, by the original animal density given in animal per $km^2$.

TABLE 19—THRESHOLD RADII (IN KILOMETERS) FOR EGTTR AIR-TO-SURFACE TESTING AND TRAINING

| Mission-day category | Mortality | Level A harassment | | | | Level B harassment | | |
|---|---|---|---|---|---|---|---|---|
| | | Slight lung injury | GI Tract Injury | PTS | | TTS | | Behavioral |
| | Modified Goertner Model 1 | Modified Goertner Model 2 | 237 dB SPL | 185 dB SEL | 230 dB Peak SPL | 170 dB SEL | 224 dB Peak SPL | 165 dB SEL |
| **Bottlenose Dolphin** | | | | | | | | |
| A | 0.427 | 0.768 | 0.348 | 1.039 | 0.705 | 5.001 | 1.302 | 8.155 |
| B | 0.107 | 0.225 | 0.156 | 0.43 | 0.317 | 2.245 | 0.585 | 3.959 |
| C | 0.037 | 0.085 | 0.083 | 0.32 | 0.169 | 1.128 | 0.312 | 1.863 |
| D | 0.024 | 0.055 | 0.059 | 0.254 | 0.12 | 0.982 | 0.222 | 1.413 |
| E | 0.01 | 0.024 | 0.034 | 0.232 | 0.069 | 0.878 | 0.126 | 1.252 |
| F | 0.003 | 0.007 | 0.019 | 0.096 | 0.033 | 0.218 | 0.062 | 0.373 |
| G | 0.024 | 0.055 | 0.059 | 0.167 | 0.12 | 0.552 | 0.222 | 0.809 |
| H | 0.006 | 0.015 | 0.025 | 0.097 | 0.051 | 0.229 | 0.093 | 0.432 |
| I | 0.023 | 0.054 | 0.059 | 0.125 | 0.119 | 0.328 | 0.22 | 0.572 |
| J | 0.045 | 0.101 | 0.096 | 0.167 | 0.195 | 0.555 | 0.36 | 0.812 |
| K | 0.057 | 0.128 | 0.117 | 0.164 | 0.237 | 0.541 | 0.438 | 0.795 |
| L | 0.057 | 0.128 | 0.117 | 0.2 | 0.237 | 0.654 | 0.438 | 0.953 |
| M | 0.12 | 0.249 | 0.22 | 0.211 | 0.447 | 0.761 | 0.825 | 1.123 |
| N | 0.076 | 0.168 | 0.149 | 0.202 | 0.302 | 0.671 | 0.557 | 0.982 |
| O | 0.047 | 0.107 | 0.101 | 0.136 | 0.204 | 0.432 | 0.376 | 0.64 |
| P | 0.051 | 0.115 | 0.107 | 0.116 | 0.217 | 0.271 | 0.4 | 0.527 |
| Q | 0.007 | 0.016 | 0.026 | 0.073 | 0.053 | 0.149 | 0.098 | 0.207 |
| R | 0.427 | 0.768 | 0.348 | 0.811 | 0.705 | 4.316 | 1.302 | 6.883 |
| S | 0.142 | 0.286 | 0.156 | 0.692 | 0.317 | 3.941 | 0.585 | 5.132 |
| T | 0.024 | 0.055 | 0.059 | 0.224 | 0.12 | 0.837 | 0.222 | 1.209 |
| **Atlantic Spotted Dolphin** | | | | | | | | |
| A | 0.504 | 0.886 | 0.348 | 1.039 | 0.705 | 5.001 | 1.302 | 8.155 |
| B | 0.133 | 0.266 | 0.156 | 0.43 | 0.317 | 2.245 | 0.585 | 3.959 |
| C | 0.047 | 0.104 | 0.083 | 0.32 | 0.169 | 1.128 | 0.312 | 1.863 |
| D | 0.03 | 0.067 | 0.059 | 0.254 | 0.12 | 0.982 | 0.222 | 1.413 |
| E | 0.013 | 0.03 | 0.034 | 0.232 | 0.069 | 0.878 | 0.126 | 1.252 |
| F | 0.004 | 0.009 | 0.019 | 0.096 | 0.033 | 0.218 | 0.062 | 0.373 |
| G | 0.03 | 0.067 | 0.059 | 0.167 | 0.12 | 0.552 | 0.222 | 0.809 |
| H | 0.008 | 0.018 | 0.025 | 0.097 | 0.051 | 0.229 | 0.093 | 0.432 |
| I | 0.03 | 0.067 | 0.059 | 0.125 | 0.119 | 0.328 | 0.22 | 0.572 |
| J | 0.057 | 0.124 | 0.096 | 0.167 | 0.195 | 0.555 | 0.36 | 0.812 |
| K | 0.072 | 0.157 | 0.117 | 0.164 | 0.237 | 0.541 | 0.428 | 0.795 |
| L | 0.072 | 0.157 | 0.117 | 0.2 | 0.237 | 0.654 | 0.438 | 0.953 |
| M | 0.15 | 0.29 | 0.22 | 0.211 | 0.447 | 0.761 | 0.825 | 1.123 |
| N | 0.096 | 0.201 | 0.149 | 0.202 | 0.302 | 0.671 | 0.557 | 0.982 |
| O | 0.06 | 0.131 | 0.101 | 0.136 | 0.204 | 0.432 | 0.376 | 0.64 |
| P | 0.065 | 0.141 | 0.107 | 0.116 | 0.217 | 0.271 | 0.4 | 0.527 |
| Q | 0.009 | 0.02 | 0.026 | 0.073 | 0.053 | 0.149 | 0.098 | 0.207 |
| R | 0.504 | 0.886 | 0.348 | 0.811 | 0.705 | 4.316 | 1.302 | 6.883 |
| S | 0.172 | 0.336 | 0.156 | 0.692 | 0.317 | 3.941 | 0.585 | 5.132 |
| T | 0.03 | 0.067 | 0.059 | 0.224 | 0.12 | 0.837 | 0.222 | 1.209 |

The ranges presented above were used to calculate the total area (circle) of the zones of influence for each criterion/threshold. To eliminate ''double-counting'' of animals, impact areas from higher impact categories (*e.g.,* mortality) were subtracted from areas associated with lower impact categories (*e.g.,* Level A harassment). The estimated number of marine mammals potentially exposed to the various impact thresholds was calculated with a two-dimensional approach, as the product of the adjusted impact area, animal density, and annual number of events for each mission-day category. The calculations generally resulted in decimal values, suggesting that, in most cases, a fraction of an animal was exposed. The results were therefore rounded at the annual mission-day level and then summed for each criterion to obtain total annual take estimates from all EGTTR mission activities. A ''take'' is considered to occur for SEL metrics if the received level is equal to or above the associated threshold within the appropriate frequency band of the sound received, adjusted for the appropriate weighting function value of that frequency band. Similarly, a ''take'' would occur for impulse and peak SPL metrics if the received level is equal to or above the associated threshold. For impact categories with multiple criteria (*e.g.,* slight lung injury, GI tract injury, and PTS for Level A harassment) and criteria with two thresholds (*e.g.,* 187 dB SEL and 230 peak SPL for PTS), the criterion and/or threshold that yielded the higher exposure estimate was used for detonation impact analyses shows the total numbers of marine mammals potentially affected by all EGTTR testing and training mission activities annually (See Table 20). These exposure estimates do not take into account the proposed mitigation and monitoring measures which are expected to decrease the potential for impacts.

Acoustic analysis results indicate the potential for injury and non-injurious harassment (including behavioral harassment) to marine mammals in the absence of mitigation measures. Mortality was calculated as one (1) for bottlenose dolphins and zero (0) for Atlantic spotted dolphin. However, because the modeling is conservative and it did not include implementation of the mitigation and monitoring measures, the likelihood of mortality is small and the potential for Level A harassment takes would be significantly reduced. As such, NMFS is not proposing to authorize any take due to mortality.

Animals from the Northern Gulf of Mexico stock of spotted dolphins and the Northern Gulf of Mexico Continental shelf stock of bottlenose dolphins are likely to be affected. There is also a chance that a limited number of bottlenose dolphins from the Gulf of Mexico Northern Coastal stock could be affected. Animals from this stock are known to occur in waters greater than 20 m in depth. Even though the 20 m isopleth delineates the stock's range, it is an artificial boundary used for management purposes and is not ecologically based. However, most of the bottlenose dolphins potentially affected would be part of the Northern Gulf of Mexico Continental shelf stock.

TABLE 20—TOTAL NUMBER OF MARINE MAMMALS POTENTIALLY AFFECTED ANNUALLY BY AIR-TO-SURFACE TESTING AND TRAINING MISSIONS IN THE EGTTR

| Species | Level A harassment | | Level B harassment | |
|---|---|---|---|---|
| | Slight lung injury | PTS (SEL) | TTS (SEL) | Behavioral |
| Bottlenose dolphin | 2 | 7 | 220 | 315 |
| Atlantic spotted dolphin | 0 | 2 | 85 | 120 |
| Total | 2 | 9 | 305 | 435 |

**Proposed Mitigation**

In order to issue an LOA under Section 101(a)(5)(A) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to such activity, ''and other means of effecting the least practicable impact on such species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of such species or stock for taking'' for certain subsistence uses (latter not applicable for this action).

The NDAA of 2004 amended the MMPA as it relates to military-readiness activities and the incidental take authorization process such that ''least practicable adverse impact'' shall include consideration of personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity.

In evaluating how mitigation may or may not be appropriate to ensure the least practicable adverse impact on species or stocks and their habitat, as well as subsistence uses where applicable, we carefully consider two primary factors:

(1) The manner in which, and the degree to which, the successful implementation of the measure(s) is expected to reduce impacts to marine mammals, marine mammal species or stocks, and their habitat. This considers the nature of the potential adverse impact being mitigated (likelihood, scope, range). It further considers the likelihood that the measure will be effective if implemented (probability of accomplishing the mitigating result if implemented as planned) and the likelihood of effective implementation (probability of being implemented as planned); and

(2) the practicability of the measures for applicant implementation, which may consider such things as cost, impact on operations, and, in the case of a military readiness activity, personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity.

*Mitigation for Marine Mammals and Their Habitat*

Eglin AFB has proposed potential practicable and effective mitigation measures, which include a careful balancing of the likely benefit of any particular measure to the marine mammals with the likely effect of that measure on personnel safety, practicality of implementation, and impact on the military-readiness activity. Proposed mitigation measures include the following:

*Timing Restrictions*—With the exception of gunnery operations, missions will take place no earlier than two hours after sunrise. This measure provides observers with adequate visibility necessary for two hour pre-mission monitoring. Missions must also be completed at least 30 minutes before

sunset which will allow adequate visibility for post-mission monitoring.

*Trained Observers*—All monitoring will be conducted by personnel who have completed Eglin's Marine Species Observer Training Course, which was developed in cooperation with NMFS. This training includes a summary of environmental laws, consequences of non-compliance, description of an observer's role, pictures and descriptions of protected species and protected species indicators, survey methods, monitoring requirements, and reporting procedures. The training will be provided to user groups either electronically or in person by an Eglin AFB representative. Any person acting as an observer for a particular mission must have completed the training within the year prior to the mission. Names of personnel who have completed the training will be submitted to Eglin AFB along with the date of completion. In cases where multiple survey platforms are required to cover large survey areas, a Lead Biologist will be designated to lead all monitoring efforts and coordinate sighting information with the Test Director or Safety Officer.

*Pre- and Post-Mission Monitoring*—For each live mission, at a minimum, pre- and post-mission monitoring will be required. Missions will occur no earlier than two hours after sunrise and no later than two hours prior to sunset to ensure adequate daylight for pre- and post-mission monitoring, with the exception of AFSOC and the 413 FLTS gunnery missions. In those cases, aircrews will utilize aircraft instrumentation and sensors to monitor the area.

Monitoring will be conducted from a given platform depending on the specific mission. The purposes of pre-mission monitoring are to (1) evaluate the mission site for environmental suitability and (2) verify that the ZOI is free of visually detectable marine mammals and potential marine mammal indicators. Air Force range clearing vessels and protected species survey vessels will be on-site at least two hours prior to the mission. Vessel-based surveys will begin approximately one and one-half hours prior to live weapon deployment. Surveys will continue for approximately one hour or until the entire ZOI has been adequately surveyed, whichever comes first. At approximately 30 minutes prior to live weapon deployment, marine species observers will be instructed to leave the mission site and remain outside the safety zone, which on average will be 15 miles from the detonation point.

The duration of pre-mission surveys will depend on the area required to be surveyed and survey platforms (vessels versus aircraft). All marine mammal sightings including the species (if possible), number, location, and behavior of the animals will be documented on report forms that will be submitted to Eglin AFB after each mission. Missions will be postponed, relocated, or cancelled based on the presence of protected species within the survey areas.

Post-mission monitoring is designed to determine the effectiveness of pre-mission mitigation by reporting sightings of any dead or injured marine mammals. Post-detonation monitoring surveys will commence once the mission has ended or, if required, as soon as the mission area is declared safe. Vessels will move into the survey area from outside the safety zone and monitor for at least 30 minutes. The duration of post-mission surveys will vary based on survey platform. Similar to pre-mission surveys, all sightings would be properly documented on report forms and submitted to Eglin AFB. Any authorized marine mammals that are detected in the ZOI during post-mission surveys will be counted as Level B takes.

If any marine mammals are killed or injured as a result of the mission, Eglin AFB would be contacted immediately. Observers would document the species or description of the animal, location, and behavior and, if practicable, take pictures and maintain visual contact with the animal. Eglin AFB must notify the Director, Office of Protected Resources, NMFS, or designee, by telephone (301–427–8401), and the Southeast Regional Office (phone within 24 hours of the injury or death) and await further instructions or the arrival of a response team on-site, if feasible. Activities shall cease and not resume until NMFS is able to review the circumstances of the prohibited take.

*Mission Delay under Poor Sea State Conditions*—Weather conducive to marine mammal monitoring is required to effectively conduct the pre- and post-mission surveys. Wind speed and the resulting surface conditions are critical factors affecting observation effectiveness. Higher winds typically increase wave height and create ''whitecap'' conditions, both of which limit an observer's ability to locate marine species at or near the surface. Air-to-surface missions will be delayed or rescheduled if the sea state is greater than number 4 as listed in Table 21 at the time of the mission. Protected species observers or the Lead Biologist will make the final determination of whether or not conditions are conducive to sighting protected species.

TABLE 21—SEA STATE SCALE FOR EGTTR PRE-MISSION SURVEYS

| Sea state No. | Sea conditions |
|---|---|
| 0 | Flat, calm, no waves or ripples. |
| 1 | Light air, winds 1–2 knots; wave height to 1 foot; ripples without crests. |
| 2 | Light breeze, winds 3–6 knots; wave height 1–2 feet; small wavelets, crests not breaking. |
| 3 | Gentle breeze, winds 7–10 knots; wave height 2–3.5 feet; large wavelets, scattered whitecaps. |
| 4 | Moderate breeze, winds 11–16 knots; wave height 3.5–6 feet; breaking crests, numerous whitecaps. |

Visibility is also a critical factor for flight safety issues when aerial surveys are being conducted. Therefore, a minimum ceiling of 305 m (1,000 ft) and visibility of 5.6 km (3 nmi) is required to support monitoring efforts and flight safety concerns.

*Determination of ZOI Survey Areas*—The ZOI is defined as the area or volume of ocean in which marine mammals could be exposed to various pressure or acoustic energy levels caused by exploding ordnance. Each threshold range listed in Table 19 represents a radius of impact for a given threshold of each munition/detonation scenario. These ranges will be used for determining the size of the area required to be monitored during pre-mission surveys for each activity. For any mission involving live munitions (other than gunnery rounds) an area extending out to the PTS harassment range for the corresponding mission-day scenario will be completely cleared of marine mammals prior to release of the first live ordnance. Depending on the mission-day scenario, the corresponding radius could be between 73 m for a live fuse surface detonation associated with mission-day scenario Q, and 1,039 m associated with mission-day scenario A. This would help ensure that no marine mammals will be within any of the Level A harassment or mortality zones during a live detonation event, significantly reducing the potential for these types of impacts to occur.

Some missions will be delayed to allow survey platforms to evacuate the human safety zone after pre-missions surveys are completed. For these delayed missions, Eglin proposes to include a buffer around the survey area

that would extend to the TTS harassment zone for the corresponding mission-day scenario. This would double, and in some cases triple, the size of the survey area for the PTS zone. This buffer will mitigate for the potential that an animal outside the area during pre-mission surveys would enter the Level A harassment or mortality zones during a mission. However, missions that consist solely of gunnery testing and training operations will actually survey larger areas based on previously established safety profiles and the ability to conduct aerial surveys of large areas from mission aircraft. These ranges are shown in Table 22. Comparing the monitoring area below with behavioral harassment threshold radii for Atlantic spotted dolphins for mission-day categories D through H (between 0.4 km and 1.4 km (0.2 and 0.8 nmi)) shows that a much larger area will be covered by this monitoring procedure.

*Mission Delay Associated with Animals in Zone of Influence*— A mission delay of live ordnance mission activities will occur if a protected species, large schools of fish, or large flocks of birds feeding at the surface are observed within the Level B harassment ZOI. Mission activities cannot resume until one of the following conditions is met: (1) Marine mammal is confirmed to be outside of the ZOI on a heading away from the target area; (2) marine mammal is not seen again for 30 minutes and presumed to be outside the Level A ZOI; or (3) large groupings of fish or birds leading to required delay are confirmed outside the ZOI.

*Mission Abort if Sperm or Baleen Whales observed during Pre-mission Monitoring*—Marine mammal species found in the Gulf of Mexico, including the federally listed sperm whale and the Bryde's whale, which is proposed for ESA listing, occur with greater regularity in waters over and beyond the continental shelf break. To avoid impacts to the sperm whale, AFSOC has agreed to conduct all gunnery missions within (shoreward of) the 200-m isobath, which is considered to be the shelf break for purposes of this document. Furthermore, mission activities will be aborted/suspended for the remainder of the day if one or more sperm or baleen whales are detected during pre-mission monitoring activities as no takes of these species have been authorized. This measure will incidentally provide greater protection to several other species as well. Trained observers will also be instructed to be vigilant in ensuring Bryde's whales are not in the ZOI.

TABLE 22—MONITORING AREA RADII FOR GUNNERY MISSIONS

| Aircraft | Gunnery round | Monitoring area | Monitoring altitude | Operational altitude |
|---|---|---|---|---|
| AC–130 gunship | 25 mm, 30 mm, 40 mm, 105 mm (FU and TR). | 5 nmi (9,260 m) | 6,000 ft | 15,000–20,000 ft. |
| CV–22 Osprey | .50 cal, 7.62 mm | 3 nmi (5,556 m) | 1,000 ft | 1,000 ft. |

cal = caliber; ft = feet; FU = full up; m = meters; mm = millimeter; nmi = nautical miles; TR = Training Round.

*Mitigation Measures for Gunnery Actions*—Eglin AFB has identified and required implementation of operational mitigation measures for gunnery missions, including development of the 105-mm TR, use of ramp-up procedures (explained below), re-initiation of species surveys if live fire activities are interrupted for more than 10 minutes, and eliminating missions conducted over waters beyond the continental shelf.

The largest type of ammunition used during gunnery missions is a 105-mm round, which contains 4.7 pounds of high explosive (HE). This is several times more HE than that found in the next largest round (40 mm). As a mitigation technique, the Air Force developed a 105-mm TR that contains only 0.35 pounds of HE. The TR was developed to substantially reduce the risk of harassment during nighttime operations, when visual surveying for marine mammals is of limited effectiveness (however, monitoring by use of the AC–130's instrumentation is effective at night).

Ramp-up procedures refer to the process of beginning with the least impactive action and proceeding to more impactive actions. In the case of gunnery activities, ramp-up procedures entail beginning a mission with the lowest caliber munition and proceeding to the highest, which means the munitions would be fired in the order of 25 mm, 40 mm, and 105 mm. The rationale for the procedure is that this process may allow marine species to perceive steadily increasing noise levels and to react, if necessary, before the noise reaches a threshold of significance.

If use of gunship weapons is interrupted for more than 10 minutes, Eglin AFB would be required to reinitiate applicable protected species surveys in the ZOI to ensure that no marine mammal species entered into the ZOI during that time.

The AC–130 gunship weapons are used in two phases. First, the guns are checked for functionality and calibrated. This step requires an abbreviated period of live fire. After the guns are determined ready for use, the aircraft deploys a flare onto the surface of the water as a target, and the mission proceeds under various test and training scenarios. This second phase involves a more extended period of live fire and can incorporate use of one or any combination of the munitions available (25-mm, 40-mm, and 105-mm rounds).

A ramp-up procedure will be required for the initial calibration phase and, after this phase, the guns may be fired in any order. Eglin AFB believes this process will allow marine species the opportunity to respond to increasing noise levels. If an animal leaves the area during ramp-up, it is unlikely to return during the live-fire mission. This protocol provides a more realistic training experience for aircrews. In combat situations, gunship crews would not necessarily fire the complete ammunition load of a given caliber gun before proceeding to another gun. Rather, a combination of guns might be used as required by real-time situations. An additional benefit of this protocol is that mechanical or ammunition problems with an individual gun can be resolved while live fire continues with functioning weapons. This diminishes the possibility of pause in live fire lasting 10 minutes or more, which would necessitate reinitiation of protected species surveys.

Based on our evaluation of Eglin AFB's proposed measures, NMFS has preliminarily determined that the proposed mitigation measures provide the means effecting the least practicable impact on the affected species or stocks and their habitat, while also considering personnel safety, practicality of implementation, and the impact of effectiveness of the military readiness activity.

**Proposed Monitoring and Reporting**

In order to issue an 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.'' The MMPA implementing regulations at 50 CFR 216.104(a)(13) indicate that requests for 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 in the proposed action area. Effective reporting is critical to compliance as well as ensuring that the most value is obtained from the required monitoring.

Monitoring and reporting requirements prescribed by NMFS should contribute to improved understanding of one or more of the following:

- Occurrence of marine mammal species or stocks in the area in which take is anticipated (*e.g.,* presence, abundance, distribution, density);
- Nature, scope, or context of likely marine mammal exposure to potential stressors/impacts (individual or cumulative, acute or chronic), through better understanding of: (1) Action or environment (*e.g.,* source characterization, propagation, ambient noise); (2) affected species (*e.g.,* life history, dive patterns); (3) co-occurrence of marine mammal species with the action; or (4) biological or behavioral context of exposure (*e.g.,* age, calving or feeding areas);
- Individual marine mammal responses (behavioral or physiological) to acoustic stressors (acute, chronic, or cumulative), other stressors, or cumulative impacts from multiple stressors;
- How anticipated responses to stressors impact either: (1) Long-term fitness and survival of individual marine mammals; or (2) populations, species, or stocks;
- Effects on marine mammal habitat (*e.g.,* marine mammal prey species, acoustic habitat, or other important physical components of marine mammal habitat); and
- Mitigation and monitoring effectiveness.

The following monitoring options have been developed to support various types of air-to-surface mission activities that may be conducted in the EGTTR. Eglin AFB users covered by this proposed LOA must meet specific test or training objectives and safety requirements and have different assets available to execute the pre- and post-mission surveys. The monitoring options and mitigation measures described in the subsections below balance all mission-essential parameters with measures that will provide adequate protection to marine mammals. Monitors will search for both authorized and non-authorized marine mammal species. Monitors will be instructed to be extra vigilant in ensuring that species of concern, including the sperm whale (listed as endangered under the ESA) and Bryde's whale (proposed for listing under the ESA) are clear of the ZOI during testing and training activities.

*Vessel-based Monitoring*—Pre-mission surveys conducted from surface vessels will typically begin at sunrise. Trained observers will be aboard designated vessels to conduct protected species surveys before and after each mission. These vessels will be dedicated solely to monitoring for protected marine species and species indicators during the pre-mission surveys. For missions that require multiple vessels to conduct surveys based on the size of the survey area, a Lead Biologist will be designated to coordinate all survey efforts, compile sighting information from the other vessels, function as the point of contact between the survey vessels and Tower Control on Santa Rosa Island, and provide final recommendations to the Safety Officer/Test Director on the suitability of the mission site based on environmental conditions and survey results.

Survey vessels will run pre-determined line transects, or survey routes, that will provide sufficient coverage of the survey area. Monitoring activities will be conducted from the highest point feasible on the vessels. There will be at least two dedicated observers on each vessel, and they will utilize optical equipment with sufficient magnification to allow observation of surfaced animals.

All sighting information from pre-mission surveys will be communicated to the Lead Biologist on a pre-determined radio channel to reduce overall radio chatter and potential confusion. After compiling all the sighting information from the other survey vessels, the Lead Biologist will inform Tower Control on Santa Rosa Island on whether the area is clear of protected species or not. If the range is not clear, the Lead Biologist will provide recommendations on whether the mission should be delayed or cancelled. For example, a mission delay would be recommended if a small number of protected species are in the ZOI but appear to be on a heading away from the mission area. The delay would continue until the Lead Biologist has confirmed that the animals are no longer in the ZOI and traveling away from the mission site. On the other hand, a mission cancellation could be recommended if one or more protected species in the ZOI are found and there is no indication that they would leave the area on their own within a reasonable timeframe. Tower Control on Santa Rosa Island will relay the Lead Biologist's recommendation to the Safety Officer. The Safety Officer and Test Director will collaborate regarding range conditions based on the information provided by the Lead Biologist and the status of range clearing vessels. The Safety Officer will have final authority on decisions regarding delays and cancellations of missions.

*Air Force Support Vessels*—Air Force support vessels will consist of a combination of Air Force and civil service/civilian personnel responsible for mission site/target setup and range clearing activities. Air Force personnel will be within the mission area (on boats and the GRATV) for each mission well in advance of weapon deployment, typically near sunrise. They will perform a variety of tasks including target preparation, equipment checks, etc., and will observe for marine mammals and indicators as feasible throughout test preparation. However, such observations are considered incidental and would only occur as time and schedule permits. Any sightings would be relayed to the Lead Biologist.

The Eglin Safety Officer, in cooperation with the Tower Control on Santa Rosa Island will coordinate and manage all range clearing efforts and be in direct communication with the survey vessel team, typically through the Lead Biologist. All support vessels will be in radio contact with one another and with Tower Control. The Safety Officer will monitor all radio communications, but Tower Control will relay messages between the vessels and the Safety Officer. The Safety Officer and Tower Control will also be in continual contact with the Test Director throughout the mission and will convey information regarding range clearing progress and protected species survey status. Final decisions regarding mission execution, including possible mission delay or cancellation based on protected species sightings or civilian boat traffic interference, will be the responsibility of the Safety Officer, with concurrence from the Test Director.

*Aerial-based Monitoring*—Aircraft typically provide an excellent viewing platform for detection of marine

mammals at or near the surface. Depending on the mission, the aerial survey team will either consist of Eglin AFB personnel or their designees aboard a non-mission aircraft or the mission aircrew who have completed the Marine Species Observer Training. A description of each follows.

For non-mission aircraft, the pilot will be instructed in protected marine species survey techniques and will be familiar with marine species expected to occur in the area. One person in the aircraft will act as data recorder and is responsible for relaying the location, species (if possible), direction of movement, and number of animals sighted to the Lead Biologist. The aerial team will also identify protected species indicators such as large schools of fish and large, active groups of birds. Pilots will fly the aircraft in such a manner that the entire ZOI (and a buffer, if required) is monitored. Marine mammal sightings from the aerial survey team will be compiled by the Lead Biologist and communicated to the Test Director or Safety Officer. Similar to survey vessel requirements, all non-mission personnel will be required to exit the human safety zone before the mission can commence. As a result, the ZOI may not be monitored up to immediate deployment of live weapons. Due to this fact, the aerial team may be required to survey an additional buffer zone unless other monitoring assets, such as live video monitoring, can be employed.

Some mission aircraft have the capability to conduct aerial surveys immediately prior to releasing munitions. In those instances, aircrews that have completed the marine species observer training will make several passes over the target area to ensure the area is clear of all protected species. For mission aircraft in this category, aircrews will operate at reasonable and safe altitudes (dependent on the aircraft) appropriate to either visually scan the sea surface or utilize available instrumentation and sensors to detect protected species. Typical missions in this category are air-to-surface gunnery operations from AC–130 and CV–22 gunships. In some cases, other aerial platforms may be available to supplement monitoring activities for pre-mission surveys and during the missions.

*Video-based Monitoring*—Video-based monitoring may be accomplished via live high-definition video feed transmitted to CCF. Video monitoring typically facilitates data collection for the mission but can also allow remote viewing of the area for determination of environmental conditions and the presence of marine species up to the release time of live munitions. There are multiple sources of video that can be streamed to multiple monitors within CCF. When authorized for specific missions (*e.g.,* Maritime WSEP), a trained marine species observer from Eglin AFB will monitor all live video feed transmitted to CFF and will report any marine mammal sightings to the Safety Officer, who will also be at CCF. Employing this measure typically resolves any lapse between the time survey vessels or aircraft leave the safety zone after completing pre-mission surveys but before the mission actually begins.

The primary platform for video monitoring would be through the GRATV. Four video cameras are typically positioned on the GRATV (anchored on-site) to allow for real-time monitoring and data collection during the mission. The cameras will also be used to monitor for the presence of protected species. All cameras have a zoom capability of up to at least a 300-mm equivalent. At this setting, when targets are at a distance of 2 nmi from the GRATV, the field of view would be 195 ft by 146 ft. Video observers can detect an item with a minimum size of 1 square foot up to 4,000 m away. The GRATV will typically be located about 183 m (600 ft) from the target area; this range is well within the zooming capability of the video cameras.

Supplemental video monitoring can also be accomplished through the employment of additional aerial assets, when available. Eglin's aerostat balloon provides aerial imagery of weapon impacts and instrumentation relay. When utilized, it is tethered to a boat anchored near the GRATV but outside weapon impact areas. The balloon can be deployed to an altitude up to 2,000 ft above sea level. It is equipped with a high-definition camera system that is remotely controlled to pivot and focus on a specific target or location within the mission site. The video feed from the camera system is transmitted to CCF. Eglin may also employ other assets such as intelligence, surveillance, and reconnaissance aircraft to provide real-time imagery or relay targeting pod videos from mission aircraft. Unmanned aerial vehicles may also be employed to provide aerial video surveillance. While each of these platforms may not be available for all missions, they typically can be used in combination with each other and with the GRATV cameras to supplement marine mammal monitoring efforts.

Even with a variety of platforms potentially available to supply video feeds to CCF, the entire ZOI may not be visible for the entire duration of the mission. However, the targets and immediately surrounding areas will typically be in the field of view of the GRATV cameras and the observer will be able to identify any protected species that may enter the target area before weapon releases. In addition, the observer will be able to determine if any animals were injured immediately following the detonations. Should a protected marine species be detected on the live video, the weapon release can be stopped almost immediately because the video camera observer is in direct contact with Test Director and Safety Officer at CCF.

*Acoustic Monitoring*—Eglin will conduct a NMFS-approved passive acoustic monitoring (PAM) study as an initial step towards understanding acoustic impacts from underwater detonations. During a live mission event, the Eglin AFB proposes to collect data that measures energy and pressure levels from varying distances away from weapon impact points. The data would likely be recorded by hydrophones attached to buoys that are deployed just before the mission. After mission activities, the buoys would be collected, then the data would be downloaded and analyzed. The results would be compared to the various ranges to effects for Level A and Level B Harassment that were calculated with the acoustic model.

Eglin AFB and NMFS discussed the possibility of employing PAM as a required mitigation measure during EGTTR activities. However, human safety concerns and the inability to make mission go/no-go decisions in a timely manner are the most immediate obstacles for Eglin AFB implementing real-time PAM during live weapon missions in the EGTTR.

Eglin's current boat and aerial pre- and post-mission visual surveys have been successful in preventing impacts to marine mammals because no unauthorized takes have occurred as a result of these procedures under previous incidental take authorizations. Until Eglin AFB is confident that this first step toward a rudimentary PAM study is successfully implemented, the Air Force cannot commit to PAM as a mitigation measure, which would add multiple layers of complexities required to detect and localize marine mammals during a live mission event. Furthermore, Eglin would need to gain better understanding of PAM capabilities so mission-appropriate procedures could be developed for making go/no-go decisions in a timely manner. Given the level of success with current mitigation procedures and the high level of unknowns associated with

implementing PAM as part of mitigation procedures for Air Force activities, Eglin AFB and NMFS agreed that using PAM as a real-time mitigation measure is not practicable at this time.

*AC–130 and CV–22 Gunship Procedures*—After arriving at the mission site and prior to initiating firing events, gunships will conduct at least two complete orbits around the survey area at a minimum safe airspeed around the mission site at the appropriate monitoring altitude. Provided that marine mammals (and other protected species or indicators) are not detected, the aircraft will then begin the ascent to operational altitude, continuing to orbit the target area as it climbs. The initial orbits occur over a timeframe of approximately 10 to 15 minutes. Monitoring for marine mammals, vessels, and other objects will continue throughout the mission. If a towed target is used, mission personnel will ensure that the target remains in the center portion of the survey area to ensure gunnery impacts do not extend past the ZOI.

During the low-altitude orbits and climb, the aircrew will visually scan the sea surface within the aircraft's orbit circle for the presence of marine mammals. The surface scan will primarily be conducted by the flight crew in the cockpit and personnel stationed in the tail observer bubble and starboard viewing window. During nighttime missions, crews will use night vision goggles during observation. In addition to visual surveys, aircraft optical and electronic sensors will also be used for site clearance. AC–130 gunships are equipped with low-light TV cameras and infrared detection sets (IDSs). The TV cameras operate in a range of visible and near-visible light. Infrared systems are capable of detecting differences in temperature from thermal energy (heat) radiated from living bodies or from reflected and scattered thermal energy. In contrast to typical night-vision devices, visible light is not necessary for object detection. Infrared systems are equally effective during day or night use. The IDS is capable of detecting very small thermal differences. CV–22 aircraft have similar visual scanners and operable sensors; however, they operate at a much lower altitudes than the AC–130 gunships, and no HE rounds will be fired from these aircraft.

If any marine mammals are detected during pre-mission surveys or during the mission, activities will be immediately halted until the ZOI area is clear of all marine mammals, or the mission will be relocated to another target area. If the mission is relocated, the pre-mission survey procedures will be repeated. In addition, if multiple firing missions are conducted within the same flight, clearance procedures will precede each mission.

Gunship crews will conduct a post-mission survey beginning at the operational altitude and proceeding through a spiraling descent to the designated monitoring altitude. It is anticipated that the descent will occur over a three- to five-minute time period. During this time, aircrews will use similar equipment and instrumentation to scan the water surface for animals that may have been impacted during the gunnery mission. During daytime missions, visual scans will be used as well.

*Coordination with Eglin Natural Resources Office*—Prior to conducting live missions, proponents will coordinate with Eglin Natural Resources to be briefed on their mitigation and monitoring requirements. Throughout coordination efforts, mission assets available for monitoring will be identified and an implementation plan will be developed. Based on the assets, survey routes will be designed to incorporate the size of the monitoring area and determine whether a buffer will be required. Training and reporting requirements will also be communicated to the proponents

The following table lists known proponents and the monitoring platforms that may be employed for marine mammal monitoring before, during, and after live air-to-surface missions. As stated above, coordination with proponents before live missions will ensure these options are still available, as well as any changes to assets or mission capabilities for new proponents that would fall under this authorization. Eglin Natural Resources will ensure all practical measures will be implemented to the maximum extent possible to comply with the mitigation and monitoring requirements while meeting mission objectives

TABLE 23—MONITORING OPTIONS AVAILABLE FOR LIVE AIR-TO-SURFACE MISSION PROPONENTS OPERATING IN THE EGTTR

| Mission [1] | Monitoring Platform | | |
|---|---|---|---|
| | Vessel | Aerial | Video |
| 86 FWS Maritime Weapons System Evaluation Program (WSEP) | • | ..... | • |
| **Air Force Special Operations Command (AFSOC) Training** | | | |
| Air-to-Surface Gunnery | ..... | • | |
| Small Diameter Bomb/Griffin Missile Training | ..... | • | |
| CV–22 Training | ..... | • | |
| **413th Flight Test Squadron (FLTS)** | | | |
| AC–130J Precision Strike Package Testing | ..... | • | |
| AC–130J Stand-Off Precision Guided Munitions Testing | ..... | • | |
| **780th Test Squadron** | | | |
| Precision Strike Weapon | • | • | |
| Longbow Littoral Testing | • | | |

86 FWS = 86th Fighter Weapons Squadron.

**Monitoring and Reporting Measures**

In addition to monitoring for marine species before and after missions, the following monitoring and reporting measures will be required.

- Within a year before the planned missions, all protected species observers will receive the Marine Species Observer Training Course developed by Eglin in cooperation with NMFS.
- Eglin AFB will track use of the EGTTR and protected species observation results through the use of protected species observer report forms.
- A summary annual report of marine mammal observations and mission activities will be submitted to the NMFS Southeast Regional Office and the NMFS Office of Protected Resources 90 days after completion of mission activities each year or 60 days prior to the issuance of any subsequent LOA for projects at the EGTTR, whichever comes first. A final report shall be prepared and submitted within 30 days following resolution of comments on the draft report from NMFS. This annual report must include the following information:
  - Date and time of each mission.
  - A complete description of the pre-mission and post-mission activities related to mitigating and monitoring the effects of mission activities on marine mammal populations.
  - Results of the visual monitoring, including numbers by species/stock of any marine mammals noted injured or killed as a result of the missions, and number of marine mammals (by species if possible) that may have been harassed due to presence within the activity zone.
  - If any dead or injured marine mammals are observed or detected prior to mission activities, or injured or killed during mission activities, a report must be made to the NMFS Southeast Region Marine Mammal Stranding Network at 877–433–8299, the Chief of the Permits and Conservation Division, Office of Protected Resources, at 301–427–8401 and the Florida Marine Mammal Stranding Hotline at 888–404–3922 within the next business day.
  - Any unauthorized impacts on marine mammals must be immediately reported to the National Marine Fisheries Service's Southeast Regional Administrator, at 727–842–5312, and the Chief of the Permits and Conservation Division, Office of Protected Resources, at 301–427–8401.

**Adaptive Management**

NMFS may modify (including augment) the existing mitigation, monitoring, or reporting measures (after consulting with Eglin AFB regarding the practicability of the modifications) if doing so creates a reasonable likelihood of more effectively accomplishing the goals of the mitigation and monitoring measures for these regulations.

Possible sources of data that could contribute to the decision to modify the mitigation, monitoring, or reporting measures in an LOA include: (1) Results from Eglin AFB's acoustic monitoring study; (2) results from monitoring during previous year(s); (3) results from other marine mammal and/or sound research or studies; and (4) any information that reveals marine mammals may have been taken in a manner, extent or number not authorized by these regulations or subsequent LOAs.

If, through adaptive management, the modifications to the mitigation, monitoring, or reporting measures are substantial, NMFS will publish a notice of proposed LOA in the **Federal Register** and solicit public comment. If, however, NMFS determines that an emergency exists that poses a significant risk to the well-being of the species or stocks of marine mammals in the Gulf of Mexico, 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.

**Negligible Impact Analysis and Determination**

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 addition to considering estimates of the number of marine mammals that might be ''taken'' through harassment, NMFS considers other factors, such as the likely nature of any responses (*e.g.,* intensity, duration), 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's 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, ongoing sources of human-caused mortality, or ambient noise levels).

To avoid repetition, the discussion of our analyses applies to bottlenose dolphins and Atlantic spotted dolphins, given that the anticipated effects of this activity on these different marine mammal stocks are expected to be similar. There is little information about the nature or severity of the impacts, or the size, status, or structure of any of these species or stocks that would lead to a different analysis for this activity.

For reasons stated previously in this document and based on the following factors, Eglin AFB's specified activities are not likely to cause long-term behavioral disturbance, serious injury, or death. Because the exposure model was conservative and calculated a single bottlenose dolphin death, along with the required mitigation and monitoring measures not incorporated into the model, NMFS does not anticipate or propose to authorize any take by mortality. The takes from Level B harassment would be due to disturbance of normal behavioral patterns and TTS. The potential takes from Level A harassment would be due to PTS and slight lung injury (not gastrointestinal tract injury).

NMFS has determined that direct strike by ordnance is highly unlikely. Although strike from a munition at the surface of the water while the animals are at the surface is possible, the potential risk of a direct hit to an animal within the target area would be low. The Air Force (2002 PEA) estimated that a maximum of 0.2 marine mammals could potentially be struck by projectiles, falling debris, and inert munitions each year.

Disruption of normal behavioral patterns constituting Level B harassment would be limited to reactions such as startle responses, movements away from the area, and short-term changes to behavioral state. These impacts are expected to be temporary and of limited duration due to the likely avoidance of the action area by marine mammals, short period of individual explosions themselves (versus continual sound source operation), and relatively short duration of the EGTTR operations (*i.e.* ranging from a few minutes to no more than four hours per day depending on the mission category).

Level B harassment in the form of TTS was modeled to occur in both

species for which take is authorized. If TTS occurs, it is expected to be at low levels and of short duration. As explained previously, TTS is temporary with no long term effects to species. The modeled take numbers are expected to be overestimates since NMFS expects that successful implementation of the required aerial-based, vessel-based and video-based mitigation measures could avoid TTS. Furthermore, monitoring results from previous Authorizations has demonstrated that it is uncommon to sight marine mammals within the ZOI, especially for prolonged durations. Results from monitoring programs associated with Eglin AFB's 2015 and 2016 Maritime WSEP activities have shown the absence of marine mammals within the ZOI during and after maritime operations.

NMFS expects that successful implementation of the required aerial-based, vessel-based and video-based mitigation measures would reduce take by Level A harassment in some instances. Marine mammals would likely begin to move away from the immediate target area once bombing begins, decreasing exposure to the full amount of acoustic energy. There have also been no marine mammal observations in the ZOI according to monitoring reports from previous years. Therefore, we anticipate that, because of the mitigation measures, low observation rate of marine mammals in the target area, and the likely limited duration of exposures, any PTS incurred would be in the form of only a small degree of PTS, rather than total deafness.

Other than for mortality, the take numbers proposed by NMFS do not consider mitigation or avoidance. Therefore, NMFS expects that Level A harassment is unlikely to occur at the numbers proposed for Authorization. However, since it is difficult to quantify the degree to which the mitigation and avoidance will reduce the number of animals that might incur Level A harassment (*i.e.* PTS, slight lung injury), NMFS proposes to authorize take by Level A harassment at the numbers derived from the exposure model. Moreover, the mitigation and monitoring measures proposed for the Authorization (described earlier in this document) are expected to further minimize the potential for both Level A and Level B harassment.

Impacts to habitat are not anticipated. Noise and pressure waves resulting from live weapon detonations are not likely to result in long-term physical alterations of the water column or ocean floor. These effects are not expected to substantially affect prey availability, are of limited duration, and are intermittent. Impacts to marine fish were analyzed in the *Eglin Gulf Test and Training Range Environmental Assessment* (Department of the Air Force, 2015). In the EA, it was determined that fish populations were unlikely to be affected and prey availability for marine mammals would not be impaired. Other factors related to EGTTR activities that could potentially affect marine mammal habitat include the introduction of metals, explosives and explosion by-products, other chemical materials, and debris into the water column and substrate due to the use of munitions and target vessels. However, the effects of each were analyzed in the EA and were determined to not be significant.

While animals may be impacted in the immediate vicinity of the target area, because of the short duration of the actual individual explosions themselves (versus continual sound source operation) combined with the relatively short duration of daily operations (*i.e.* ranging from a few minutes to no more than four hours per day depending on the mission category), NMFS has preliminarily determined that there will not be a substantial impact on marine mammals or their habitat in Gulf of Mexico ecosystems in the EGTTR. We do not expect that the proposed activity would impact rates of recruitment or survival of marine mammals since we do not expect mortality (which would remove individuals from the population) or serious injury to occur. In addition, the proposed activity would only occur in a small part of their overall range, so the impact of any potential temporary displacement would be negligible and animals would be expected to return to the area after the cessations of activities. Although the proposed activity could result in Level A (PTS and slight lung injury) and Level B (behavioral disturbance and TTS of lesser degree and shorter duration) harassment of marine mammals, the level of harassment is not anticipated to impact rates of recruitment or survival of marine mammals because the number of exposed animals is expected to be low due to the relatively short-term and site-specific nature of the activity. Furthermore, we do not anticipate that the effects would be detrimental to rates of recruitment and survival because we do not expect serious extended behavioral responses that would result in energetic effects at the level to impact fitness.

In summary and as described above, the following factors primarily support our preliminary determination that the impacts resulting from this activity are not expected to adversely affect the species or stock through effects on annual rates of recruitment or survival:

- No mortality is anticipated or authorized and only 11 instances of Level A harassment are authorized. Remaining impacts would be within the non-injurious TTS or behavioral effects zones (Level B harassment consisting of generally temporary modifications in behavior);
- Effectiveness of mitigation and monitoring requirements which are designed and expected to avoid exposures that may cause serious injury and minimize the likelihood of PTS, TTS, or more severe behavioral responses;
- Adverse impacts to habitat are not expected; and
- Results from previous monitoring reports did not record any marine mammal takes associated with military readiness activities occurring in the EGTTR.

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 proposed monitoring and mitigation measures, NMFS preliminarily finds that the total marine mammal take from the proposed activity will have a negligible impact on all affected marine mammal species or stocks.

**Unmitigable Adverse Impact Analysis and Determination**

There are no relevant subsistence uses of the affected marine mammal stocks or species implicated by this action. Therefore, NMFS has preliminarily determined that the total taking of affected species or stocks would not have an unmitigable adverse impact on the availability of such species or stocks for taking for subsistence purposes.

**Endangered Species Act (ESA)**

Section 7(a)(2) of the Endangered Species Act of 1973 (ESA: 16 U.S.C. 1531 *et seq.*) requires that each Federal agency insure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat. To ensure ESA compliance for the issuance of LOAs, NMFS consults internally, in this case with Southeast Regional Protected Resources Division Office, whenever we propose to authorize take for endangered or threatened species.

No incidental take of ESA-listed marine mammal species is proposed for authorization or expected to result from

the proposed activities. Therefore, NMFS has determined that formal consultation under section 7 of the ESA is not required for this action.

**Classification**

The Office of Management and Budget has determined that this proposed rule is not significant for purposes of Executive Order 12866. This rule is not an Executive Order 13771 regulatory action because this rule is not significant under Executive Order 12866.

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 that this proposed rule, if adopted, would not have a significant economic impact on a substantial number of small entities. The RFA requires a Federal agency to prepare an analysis of a rule's impact on small entities whenever the agency is required to publish a notice of proposed rulemaking. However, a Federal agency may certify, pursuant to 5 U.S.C. 605 (b), that the action will not have a significant economic impact on a substantial number of small entities. A description of this proposed rule and its purpose are found earlier in the preamble for this action and is not repeated here. Eglin AFB is the sole entity that will be affected by this rulemaking and is not a small governmental jurisdiction, small organization, or small business, as defined by the RFA. Any requirements imposed by LOAs issued pursuant to these regulations, and any monitoring or reporting requirements imposed by these regulations, will be applicable only to Eglin AFB.

NMFS does not expect the issuance of these regulations or the associated LOAs to result in any impacts to small entities pursuant to the RFA. Because this action, if adopted, would directly affect Eglin AFB and not a small entity, NMFS concludes the action would not result in a significant economic impact on a substantial number of small entities. Accordingly, no regulatory flexibility analysis is necessary, and none has been prepared.

This action does not contain any collection of information requirements for purposes of the Paperwork Reduction Act of 1980 (44 U.S.C. 3501 *et seq.*).

**List of Subjects in 50 CFR Part 218**

Exports, Fish, Imports, Marine mammals, Penalties, Reporting and Recordkeeping requirements.

Dated: December 18, 2017.

**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 proposed to be amended as follows:

## PART 218—REGULATIONS GOVERNING THE TAKE OF MARINE MAMMALS INCIDENTAL TO SPECIFIED ACTIVITIES

■ 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 G consisting of §§ 218.60 through 218.69 to read as follows:

**Subpart G—Taking of Marine Mammals Incidental to Testing and Training Activities Conducted at the Eglin Gulf Test and Training Range in the Gulf of Mexico**

Sec.

218.60 Specified activity and specified geographical region.
218.61 Effective dates.
218.62 Permissible methods of taking.
218.63 Prohibitions.
218.64 Mitigation.
218.65 Requirements for monitoring and reporting.
218.66 Letters of Authorization.
218.67 Renewals and Modifications of Letters of Authorization.
218.68 [Reserved]
218.69 [Reserved]

## Subpart G—Taking of Marine Mammals Incidental to Testing and Training Activities Conducted at the Eglin Gulf Test and Training Range in the Gulf of Mexico.

### § 218.60 Specified activity and specified geographical region.

(a) Regulations in this subpart apply only to Eglin Air Force Base (Eglin AFB) and those persons it authorizes to conduct activities on its behalf, for the taking of marine mammals as outlined in paragraph (b) of this section and incidental to testing and training missions in the Eglin Gulf Test and Training Range (EGTTR).

(b) The taking of marine mammals by Eglin AFB pursuant to a Letter of Authorization (LOA) is authorized only if it occurs at the EGTTR in the Gulf of Mexico.

### § 218.61 Effective dates.

Regulations in this subpart are effective February 4, 2018 through February 3, 2023.

### § 218.62 Permissible methods of taking.

Under a Letter of Authorization (LOA) issued pursuant to § 216.106 of this chapter and § 218.66, the Holder of the LOA (herein after Eglin AFB) may incidentally, but not intentionally, take marine mammals by Level A and Level B harassment associated with EGTTR activities within the area described in § 218.60, provided the activities are in compliance with all terms, conditions, and requirements of these regulations in this subpart and the appropriate LOA.

### § 218.63 Prohibitions.

Notwithstanding takings contemplated in § 218.60 and authorized by an LOA issued under § 216.106 of this chapter and § 218.66, no person in connection with the activities described in § 218.60 of this chapter may:

(a) 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 § 218.66.

(b) Take any marine mammal not specified in such LOAs;

(c) Take any marine mammal specified in such LOAs in any manner other than as specified;

(d) Take a marine mammal specified in such LOAs if NMFS determines such taking results in more than a negligible impact on the species or stocks of such marine mammal; or

(e) Take a marine mammal specified in such LOAs if NMFS determines such taking results in an unmitigable adverse impact on the species or stock of such marine mammal for taking for subsistence uses.

### § 218.64 Mitigation requirements.

When conducting activities identified in § 218.60, the mitigation measures contained in the LOA issued under § 216.106 of this chapter and § 218.66 must be implemented. These mitigation measures shall include but are not limited to the following general conditions:

(a) If daytime weather and/or sea conditions preclude adequate monitoring for detecting marine mammals and other marine life, EGTTR operations must be delayed until adequate sea conditions exist for monitoring to be undertaken.

(b) Restrictions on time of activities.

(1) Missions involving the use of live bombs, missiles and rockets will only occur during daylight hours.

(2) Missions during daylight hours will occur no earlier than two hours after sunrise and no later than two hours prior to sunset.

(c) Required delay of live ordnance mission activities will occur if a protected species, large schools of fish or large flocks of birds feeding at the surface are observed within the ZOI.

Mission activities cannot resume until one of the following conditions is met:

(1) Protected species marine mammal(s) is confirmed to be outside of the ZOI on a heading away from the target area; or

(2) Protected species marine mammal(s) is not seen again for 30 minutes and presumed to be outside the Level A harassment ZOI.

(3) Large groupings of fish or birds leading to required delay are confirmed outside of the ZOI.

(d) Gunnery operations shall require employment of the following mitigation measures.

(1) Use of 105-mm training rounds (TR) during nighttime missions.

(2) Ramp-up procedures requiring the use of the lowest caliber munition and proceeding to the highest, which means the munitions would be fired in the order of 25 mm, 40 mm, and 105 mm.

(3) Any pause in live fire activities greater than 10 minutes shall require reinitiation of protected species surveys.

(4) Missions shall be conducted within the 200-m isobaths to provide greater protection to several species.

(e) If one or more sperm or baleen whales are detected during pre-mission monitoring activities, mission activities will be aborted/suspended for the remainder of the day.

(f) Additional mitigation measures as contained in an LOA.

**§ 218.65 Requirements for monitoring and reporting.**

(a) Holders of LOAs issued pursuant to § 218.66 for activities described in § 218.60(a) are required to cooperate with NMFS, and any other Federal, state, or local agency with authority to monitor the impacts of the activity on marine mammals. If the authorized activity identified in § 218.60(a) is thought to have resulted in the mortality or injury of any marine mammals or take of marine mammals not identified in § 218.60(b), then the Holder of the LOA must notify the Director, Office of Protected Resources, NMFS, or designee, by telephone (301)427–8401, and the Southeast Regional Office (phone within 24 hours of the injury or death).

(b) Monitoring will be conducted by personnel who have completed Eglin's Marine Species Observer Training Course, which was developed in cooperation with the National Marine Fisheries Service.

(c) The Holder of the LOA will use mission reporting forms to track their use of the EGTTR for testing and training missions and to track marine mammal observations.

(d) Depending on the mission category, visual aerial-based, vessel-based, or video-based marine mammal surveys shall be conducted before and after live ordnance mission activities each day.

(e) Vessel-based surveys will begin approximately one and one-half hours prior to live weapon deployment and shall be completed 30 minutes prior to the start of mission.

(f) Surveys will continue for approximately one hour or until the entire ZOI has been adequately surveyed, whichever comes first.

(g) Post-mission monitoring surveys shall commence once the mission has ended or as soon as the mission area is declared safe.

(h) Vessel-based post-mission surveys shall be conducted for 30 minutes after completion of live ordnance missions.

(i) Any authorized marine mammals that are detected in the ZOI during post-mission surveys shall be counted as Level B takes.

(j) A minimum of two dedicated observers shall be stationed on each vessel.

(k) Observers shall utilize optical equipment with sufficient magnification to allow observation of surfaced animals.

(l) The size of the survey area for each mission shall be determined according to the radius of impact for the given threshold of each munition/detonation scenario. These ranges shall be monitored during pre-mission surveys for each activity.

(m) Some missions shall be delayed to allow survey platforms to evacuate the human safety zone after pre-missions surveys are completed.

(n) Any aerial-based pre-mission surveys shall be conducted by observers aboard non-mission aircraft or mission aircraft who have completed the Marine Species Observer Training.

(o) Gunship standard procedures initiated prior to initiation of live-firing events shall require at least two complete orbits around the survey mission site at the appropriate airspeed and monitoring altitude and include the following:

(1) Monitoring for marine mammals shall continue throughout the mission by mission crew.

(2) Where applicable aircraft optical and electronic sensors shall be used for marine mammal observation.

(3) If any marine mammals are detected during pre-mission surveys or during the mission, activities will be immediately halted until the ZOI area is clear of all marine mammals, or the mission will be relocated to another target area. If the mission is relocated, the pre-mission survey procedures will be repeated.

(4) If multiple firing missions are conducted within the same flight, standard clearance procedures will precede each mission.

(5) Gunship crews will conduct a post-mission survey beginning at the operational altitude and proceeding through a spiraling descent to the designated monitoring altitude.

(p) Video-based monitoring from the GRATV shall be conducted where appropriate via live high-definition video feed.

(1) Supplemental video monitoring shall be conducted through the employment of additional aerial assets including aerostats and drones when available.

(2) [Reserved]

(q) Acoustic Monitoring:

(1) Eglin AFB will conduct a passive acoustic monitoring (PAM) study as an initial step towards understanding acoustic impacts from underwater detonations, once funding is approved.

(2) The results of the PAM study will be submitted to NMFS OPR as a draft monitoring report within 90 days of completion of the study, will be incorporated into any subsequent LOA request or, if no request is made, no later than 90 days after expiration of the LOA.

(r) The Holder of the LOA is required to:

(1) Submit a draft report to NMFS OPR on all monitoring conducted under the LOA within 90 days of the completion of marine mammal monitoring, or 60 days prior to the issuance of any subsequent LOA for projects at the EGTTR, whichever comes first. A final report shall be prepared and submitted within 30 days following resolution of comments on the draft report from NMFS. This report must contain, at a minimum, the following information:

(i) Date and time of each EGTTR mission;

(ii) A complete description of the pre-mission and post-mission activities related to mitigating and monitoring the effects of EGTTR missions on marine mammal populations; and

(iii) Results of the monitoring program, including numbers by species/stock of any marine mammals noted injured or killed as a result of the EGTTR mission and number of marine mammals (by species if possible) that may have been harassed due to presence within the zone of influence.

(2) The draft report will be subject to review and comment by NMFS. Any recommendations made by NMFS must be addressed in the final report prior to acceptance by NMFS. The draft report will be considered the final report for

this activity under the LOA if NMFS has not provided comments and recommendations within 90 days of receipt of the draft report.

(s) Reporting injured or dead marine mammals:

(1) In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by the LOA, such as an injury for species not authorized (Level A harassment), serious injury, or mortality, Eglin AFB shall immediately cease the specified activities and report the incident to the Office of Protected Resources, NMFS, and the Southeast Regional Office, NMFS. The report must include the following information:

(i) Time and date of the incident;

(ii) Description of the incident;

(iii) Environmental conditions (*e.g.,* wind speed and direction, Beaufort sea state, cloud cover, and visibility);

(iv) Description of all marine mammal observations in the 24 hours preceding the incident;

(v) Species identification or description of the animal(s) involved;

(vi) Fate of the animal(s); and

(vii) Photographs or video footage of the animal(s).

(2) Activities shall not resume until NMFS is able to review the circumstances of the prohibited take. NMFS will work with Eglin AFB to determine what measures are necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. Eglin AFB may not resume their activities in the EGTTR until notified by NMFS.

(3) In the event that Eglin AFB discovers an injured or dead marine mammal, and the lead observer determines that the cause of the injury or death is unknown and the death is relatively recent (*e.g.,* in less than a moderate state of decomposition), Eglin AFB shall immediately report the incident to the Office of Protected Resources, NMFS, and the Southeast Regional Office, NMFS.

(i) The report must include the same information identified in paragraph (p)(1) of this section. Activities may continue while NMFS reviews the circumstances of the incident. NMFS will work with Eglin AFB to determine whether additional mitigation measures or modifications to the activities are appropriate.

(ii) In the event that Eglin AFB discovers an injured or dead marine mammal, and the lead observer determines that the injury or death is not associated with or related to the activities authorized in the LOA (*e.g.,* previously wounded animal, carcass with moderate to advanced decomposition, scavenger damage), Eglin AFB shall report the incident to the Office of Protected Resources, NMFS, and the Southeast Regional Office, NMFS, within 24 hours of the discovery. Eglin AFB shall provide photographs or video footage or other documentation of the stranded animal sighting to NMFS.

(4) Additional Conditions.

(i) The Holder of the LOA must inform the Director, Office of Protected Resources, NMFS, (301–427–8401) or designee prior to the initiation of any changes to the monitoring plan for a specified mission activity.

(ii) A copy of the LOA must be in the possession of the safety officer on duty each day that EGTTR missions are conducted.

(5) The LOA may be modified, suspended or withdrawn if the holder fails to abide by the conditions prescribed herein, or if NMFS determines the authorized taking is having more than a negligible impact on the species or stock of affected marine mammals.

**§ 218.66 Letters of Authorization.**

(a) To incidentally take marine mammals pursuant to these regulations, Eglin AFB must apply for and obtain an LOA.

(b) An LOA, unless suspended or revoked, may be effective for a period of time not to exceed the expiration date of these regulations.

(c) If an LOA expires prior to the expiration date of these regulations, Eglin AFB must apply for and obtain a renewal of the LOA.

(d) In the event of projected changes to the activity or to mitigation and monitoring measures required by an LOA, Eglin AFB must apply for and obtain a modification of the LOA as described in § 218.67.

(e) The LOA will set forth:

(1) Permissible methods of incidental taking;

(2) Number of marine mammals, by species and age class, authorized to be taken;

(3) Means of effecting the least practicable adverse impact (*i.e.,* mitigation) on the species of marine mammals authorized for taking, on its habitat, and on the availability of the species for subsistence uses; and

(4) Requirements for monitoring and reporting.

(f) Issuance of an LOA shall be based on a determination that the level of taking will be consistent with the findings made for the total taking allowable under these regulations.

(g) Notice of issuance or denial of an LOA will be published in the **Federal Register** within 30 days of a determination.

**§ 218.67 Renewals and Modifications of Letters of Authorization.**

(a) An LOA issued under § 216.106 of this chapter and § 218.66 for the activity identified in § 218.60(a) will be renewed or modified upon request by the applicant, provided that:

(1) The proposed specified activity and mitigation, monitoring, and reporting measures, as well as the anticipated impacts, are the same as those described and analyzed for these regulations (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 under these regulations were implemented.

(b) For an LOA modification or renewal request by the applicant that includes changes to the activity or the mitigation, monitoring, or reporting (excluding changes made pursuant to the adaptive management provision in paragraph (c)(1) of this section) that do not change the findings made for the regulations or result in no more than a minor change in the total estimated number of authorized takes (or distribution by species or years), NMFS may publish a notice of proposed LOA in the **Federal Register**, including the associated analysis illustrating the change, and solicit public comment before issuing the LOA.

(c) An LOA issued under § 216.106 of this chapter and § 218.66 for the activity identified in § 218.60(a) may be modified by NMFS under the following circumstances:

(1) Adaptive Management—NMFS may modify (including augment) the existing mitigation, monitoring, or reporting measures (after consulting with Eglin AFB regarding the practicability of the modifications) if doing so creates a reasonable likelihood of more effectively accomplishing the goals of the mitigation and monitoring set forth in the preamble for these regulations.

(2) Possible sources of data that could contribute to the decision to modify the mitigation, monitoring, or reporting measures in an LOA are:

(i) Results from Eglin AFB's annual monitoring reports;

(ii) Results from other marine mammal and sound research or studies; or

(iii) Any information that reveals marine mammals may have been taken in a manner, extent or number not

authorized by these regulations or subsequent LOAs.

(3) If, through adaptive management, the modifications to the mitigation, monitoring, or reporting measures are substantial, NMFS will publish a notice of proposed LOA in the **Federal Register** and solicit public comment.

(4) Emergencies—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 LOAs issued pursuant to § 216.106 of this chapter and 218.60 of this chapter, 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.

**§ 218.68 [Reserved]**

**§ 218.69 [Reserved]**

[FR Doc. 2017–27580 Filed 12–26–17; 8:45 am]

BILLING CODE 3510–22–P