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DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 217

[Docket No. 120820371-3366-01]

RIN 0648-BC46

Taking and Importing Marine Mammals; Precision Strike Weapon and Air-to-Surface Gunnery Training and Testing Operations at Eglin Air Force Base, FL

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

ACTION: Proposed rule; request for comments.

SUMMARY: NMFS has received an application from the U.S. Department of the Air Force, Headquarters 96<sup>th</sup> Air Base Wing (U.S. Air Force), Eglin Air Force Base (Eglin AFB) for authorization to take marine mammals, by harassment, incidental to testing and training activities associated with Precision Strike Weapon (PSW) and Air-to-Surface (AS) gunnery missions, both of which are military readiness activities, at Eglin AFB, FL from approximately June 2013, to June 2018. Pursuant to Marine Mammal Protection Act (MMPA) and its implementing regulations, NMFS proposes regulations to govern that take. In order to implement the final rule and issue a Letter of Authorization (LOA), NMFS must determine, among other things, that the total taking will have a negligible impact on the affected species and stocks of marine mammals and will not have an unmitigable adverse impact on the availability of the species for subsistence use. NMFS' proposed regulations would set forth the permissible methods of take and other means of

effecting the least practicable adverse impact on the affected species or stocks of marine mammals and their habitat. NMFS invites comments on the application and the proposed regulations.

DATES: Comments and information must be received no later than [insert date 30 days after date of publication in the FEDERAL REGISTER].

ADDRESSES: You may submit comments, identified by 0648-BC46, by either of the following methods:

- Electronic submissions: submit all electronic public comments via the Federal eRulemaking Portal <http://www.regulations.gov>
- Hand delivery of mailing of paper, disk, or CD-ROM comments should be addressed to P. Michael Payne, Chief, Permits and Conservation Division, Office of Protected Resources, National Marine Fisheries Service, 1315 East-West Highway, Silver Spring, MD 20910-3225.

Instructions: All comments received are a part of the public record and will generally be posted to <http://www.regulations.gov> without change. All Personal Identifying Information (for example, name, address, etc.) voluntarily submitted by the commenter may be publicly accessible. Do not submit Confidential Business Information or otherwise sensitive or protected information.

NMFS will accept anonymous comments (enter N/A in the required fields if you wish to remain anonymous). Attachments to electronic comments will be accepted in Microsoft Work, Excel, WordPerfect, or Adobe PDF file formats only.

FOR FURTHER INFORMATION CONTACT: Brian D. Hopper, Office of Protected Resources, NMFS, 301-427-8401.

## SUPPLEMENTARY INFORMATION:

### Availability

An electronic copy of the application containing a list of the references used in this document may be obtained by writing to the address specified above, telephoning the contact listed below (see FOR FURTHER INFORMATION CONTACT), or visiting the internet at:

<http://www.nmfs.noaa.gov/pr/permits/incidental.htm>.

Documents cited in this notice may be viewed, by appointment, during regular business hours, at the aforementioned address.

### Background

In the case of military readiness activities (as defined by section 315(f) of Public Law 107-314; 16 U.S.C. 703 note), sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 et seq.) direct the Secretary of Commerce (Secretary) to allow, upon request, the incidental, but not intentional, taking 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 regulations are issued, or if the taking is limited to harassment an Incidental Harassment Authorization (IHA) is issued. Upon making a finding that an application for incidental take is adequate and complete, NMFS commences the incidental take authorization process by publishing in the Federal Register a notice of a receipt of an application for the implementation of regulations or a proposed IHA.

An authorization for the incidental takings may be granted if NMFS finds that the total taking during the relevant period will have a negligible impact on the species or

stock(s), and will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses (where relevant), and if the permissible methods of taking and requirements pertaining to the mitigation, monitoring and reporting of such takings are set forth to achieve the least practicable adverse impact.

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.”

With respect to military readiness activities, 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 behavioral patterns are abandoned or significantly altered (Level B harassment).

#### Summary of Request

On December 30, 2011, NMFS received an application from the U.S. Air Force requesting an authorization for the take of marine mammals incidental to PSW and AS gunnery testing and training operations within the Eglin Gulf Test and Training Range (EGTTR). On June 28, 2012, pursuant to 50 CFR 216.104(b)(1)(ii), NMFS began the public review process by publishing its determination that the application was adequate and complete by publishing a Notice of Receipt in the Federal Register (77 FR 38595). The requested regulations would establish a framework for authorizing incidental take in

future Letters of Authorization (LOAs). These LOAs, if approved, would authorize the take, by Level A (physiological) and Level B (behavioral) harassment, of Atlantic bottlenose dolphin (Tursiops truncatus) and Atlantic spotted dolphin (Stenella frontalis) incidental to PSW testing and training activities. Takes of dwarf sperm whale (Kogia simus), pygmy sperm whale (K. breviceps), Atlantic bottlenose dolphins (Tursiops truncatus), Atlantic spotted dolphin (Stenella frontalis), pan tropical spotted dolphin (S. attenuate), and spinner dolphin (S. longirostris) by Level B harassment would also be authorized incidental to AS gunnery testing and training operations.

PSW missions would involve air-to-surface impacts of two weapons: (1) the Joint Air-to-Surface Stand-off Missile (JASSM) AGM-158 A and B; and (2) the small diameter bomb (SDB) (GBU-39/B), which result in underwater detonations of up to approximately 300 lbs (136 kg) and 96 lbs (43.5 kg, double SDB) of net explosive weight (NEW), respectively. AS gunnery missions would involve surface impacts of projectiles and small underwater detonations. Pursuant to the MMPA, NMFS issued regulations and annual LOAs for PSW activities from 2006 to 2011, and annual Incidental Harassment Authorizations for AS gunnery activities in 2006, 2007, 2008, 2009, 2010, and 2011.

#### Description of the Specified Activities

This section describes the PSW and AS gunnery testing and training missions that have the potential to affect marine mammals present within the test area. Both are considered to be a “military readiness activity” as defined under 16 U.S.C. 703 note, and involve detonations above the water, near the water surface, and under water within the EGTR. The PSW missions involve the two weapons identified above, the JASSM and SDB, and AS gunnery missions typically involve the use of 25-mm, 40-mm, and 105-mm

gunnery rounds. These activities are described in more detail in the following paragraphs.

### PSW Missions

The JASSM is a precision cruise missile designed for launch from a variety of aircraft at altitudes greater than 25,000 ft (7.6 km). The JASSM has a range of more than 200 nautical miles (370.4 km) and carries a 1,000-pound warhead. The JASSM has approximately 300 lbs of TNT equivalent net explosive weight (NEW). After launch from the aircraft, the JASSM cruises at altitudes greater than 12,000 ft (3.7 km) for the majority of its flight until making the terminal maneuver towards the target. The testing exercises involving the JASSM would consist of a maximum of two live shots (single) and four inert shots (single) during the year (Table 1). One live shot will detonate in water and one will detonate in air. Detonation of the JASSM would occur under one of the following three scenarios: (1) detonation upon impact with the target (about 1.5 m above the water's surface); (2) detonation upon impact with a barge target at the surface of the water; or (3) detonation at 120 milliseconds after contact with the surface of the water.

The SDB is a GPS-guided bomb that can be carried and launched from most USAF aircraft, which makes it an important element of the USAF's Global Strike Task Force. The SDB has a range of up to 50 nautical miles and carries a 217-lb warhead. The SDB has approximately 48 lbs of TNT equivalent NEW. After being released from the aircraft at an altitude greater than 15,000 ft (4.6 km), the SDB deploys "Diamond Back" type wings that increase glide time and range as it descends towards the target. Exercises involving the SDB consist of a maximum of six live shots with two of the shots

occurring simultaneously, and a maximum of 12 inert shots with up to two occurring simultaneously (Table 1).

Table 1. Annual PSW Activities

Weapon	Number of Live Shots Per Year	Number of Inert Shots Per Year
JASSM	2 single shots	4 inert shots
SDB	6 shots (2 single and 2 double)	12 shots (4 single and 4 double)

Chase aircraft will accompany the launch of JASSM and SDB ordnance. Chase aircraft include F-15, F-16, and T-38 aircraft. These aircraft would follow the test items during captive carry and free flight, but would not follow either item below a predetermined altitude as directed by Flight Safety. Other airborne assets on site may include an E-9 turboprop aircraft or MH-60/53 helicopters circling around the target location. Tanker aircraft, including KC-10s and KC-135s, would also be used for aerial refueling of aircraft involved in training exercises. In addition, an unmanned barge may also be on location to hold instrumentation. If used, the barge would be up to 1,000 ft (304.8 m) away from the target location.

Based on availability, there are two possible target types to be used for the PSW mission tests. The first is a Container Express (CONEX) target (see figure 1-4 in Eglin AFB's application) that consists of five containers strapped, braced, and welded together to form a single structure. The dimensions of each container are approximately 8 ft by 8 ft by 40 ft (2.4 m by 2.4 m by 12.2 m). Each container would contain 200 55-gallon steel drums (filled with air and sealed) to provide buoyancy for the target. The second type of target is a hopper barge, which is a non-self propelled vessel typically used for transportation of bulk cargo (see figure 1-5 in Eglin AFB's application). A typical hopper barge is approximately 30 ft by 12 ft and 125 ft long (9.1 m by 3.7 m and 38.1 m long). The targets would be held in place by a 4-point anchoring system using cables.

PSW testing and training activities conducted by Eglin AFB would occur in the northern GOM in the EGTTR. Targets would be located in water less than 200 ft (61 m) deep and from 15 to 24 nm (27.8 to 44.5 km) offshore, south of Santa Rosa Island and south of Cape San Blas Site D3-A. PSW test missions may occur during any season of the year, but only during daytime hours.

#### AS Gunnery Missions

AS gunnery missions involve the firing of 25-mm, 40-mm, and 105-mm gunnery rounds from a circling AC-130 gunship. Each round contains 30 g, 392 g, and 2.1 kg of explosive, respectively. Live rounds must be used to produce a visible surface splash that must be used to “score” the round (the impact of inert rounds on the sea surface would not be detected). The U.S. Air Force has developed a 105-mm training round (TR) that contains less than 10 percent of the amount of explosive material (0.16 kg) as compared to the “Full-Up” (FU) 105-mm round. The TR was developed as one method to mitigate effects on marine life during nighttime AS gunnery exercises when visibility at the water surface is poor. However, the TR cannot be used in the daytime because the amount of explosive material is insufficient to be detected from the aircraft. To establish the test target area, two Mk-25 flares are deployed or a target is towed into the center of a 9.3 km cleared area on the water’s surface. A typical gunship mission lasts approximately 5 hrs without refueling and 6 hrs when air-to-air refueling is accomplished. The total anticipated number of missions and rounds for daytime and nighttime activities is shown in Table 2.



Table 2. Annual AS Gunnery Activities

Category	Ordnance	Number of Missions	Rounds Per Mission	Quantity
Daytime Missions	105 mm HE (FU)	25	30	750
	40 mm HE	25	64	1600
	25 mm HE	25	560	14000
Nighttime Missions	105 mm HE (TR)	45	30	1350
	40 mm HE	45	64	2880
	25 mm HE	45	560	25200
Total		70		45780

Water ranges within the EGTTR that are typically used for AS gunnery operations are located in the GOM offshore from the Florida Panhandle (areas W-151A, W151B, W-151C, and W-151D as shown in Figure 1-9 in the Eglin AFB application). Data indicate that W-151A (Figure 1-10 in the Eglin AFB application) is the most frequently used water range due to its proximity to Hurlburt Field, but activities may occur anywhere within the EGTTR. Eglin AFB proposes to conduct AS gunnery missions year round during both daytime and nighttime hours.

Additional information on the Eglin AFB training operations is contained in the application, which is available upon request (see ADDRESSES).

#### Description of Marine Mammals in the Area of the Specified Activity

There are 29 species of marine mammals documented as occurring in Federal waters of the GOM. Cetaceans inhabiting the waters of the GOM may be grouped as odontocetes (toothed whales, including dolphins) or mysticetes (baleen whales), but most of the cetaceans occurring in the Gulf are odontocetes. Typically, very few baleen whales are found in the Gulf and none are expected to occur within the study area given the known distribution of these species. Within the bulk of the EGTTR, over the west Florida continental shelf, the most common species is the bottlenose dolphin (Garrison,

2008), and the Atlantic spotted dolphin also occurs commonly over the continental shelf (Fulling et al., 2003). One species of sirenian inhabits the GOM, the West Indian manatee (Trichechus manatus), which is managed by the U.S. Fish and Wildlife Service and is not considered further in this proposed rule.

Approximately 21 marine mammal species may be found in the vicinity of the proposed action area, the EGTTR. These species are the Bryde's whale (Balaenoptera edeni), sperm whale (Physeter macrocephalus), dwarf sperm whale (Kogia sima), pygmy sperm whale (K. breviceps), Atlantic bottlenose dolphin (Tursiops truncatus), Atlantic spotted dolphin (Stenella frontalis), pantropical spotted dolphin (S. attenuata), Blainville's beaked whale (Mesoplodon densirostris), Cuvier's beaked whale (Ziphius cavirostris), Gervais' beaked whale (M. europaeus), Clymene dolphin (S. clymene), spinner dolphin (S. longirostris), striped dolphin (S. coeruleoalba), 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 Endangered Species Act (ESA) and as depleted throughout its range under the MMPA. While some of the other species listed here have depleted status under the MMPA, none of the GOM stocks of those species are considered depleted. Eglin AFB's 2011 MMPA application contains a detailed discussion on the description, status, distribution, regional distribution, diving behavior, and acoustics and hearing for the marine mammals in the EGTTR. Additionally, more detailed information on these species can be found in Würsig et al. (2000), NMFS' 2008

EA (see ADDRESSES), and in the NMFS U.S. Atlantic and GOM Stock Assessment Reports (SARs; Waring *et al.*, 2010). This latter document is available at:

<http://www.nefsc.noaa.gov/publications/tm/tm210/>.

The species most likely to occur in the area of Eglin AFB’s proposed activities for which takes have been requested include: Atlantic bottlenose dolphin; Atlantic spotted dolphin; pantropical spotted dolphin; spinner dolphin; and dwarf and pygmy sperm whales. Bryde’s whales, sperm whales, Blainville’s beaked whales, Cuvier’s beaked whales, Gervais’ beaked whales, killer whales, false killer whales, pygmy killer whales, Risso’s dolphins, Fraser’s dolphins, striped dolphins, Clymene dolphins, rough-toothed dolphins, short-finned pilot whales, and melon-headed whales are rare in the project area and are not anticipated to be impacted by the PSW and AS gunnery mission activities. Therefore, these species are not considered further in this proposed rule.

Table 3. Marine Mammal Density Estimates Within the Study Area

Species	Density (animals/km <sup>2</sup> )	Dive Profile (% of time at surface)	Adjusted Density (animals/km <sup>2</sup> )
Bottlenose dolphin	0.442600	n/a	0.442600
Atlantic spotted dolphin	0.105700	30	0.352333
Pantropical spotted dolphin	0.042870	30	0.142900
Spinner dolphin	0.038100	30	0.127000
Dwarf/pygmy sperm whale	0.000381	20	0.001905

With one exception, marine mammal densities estimates for species which takes have been requested, as provided in the LOA application, are consistent with those included in a recent LOA request and LOA addendum for Navy actions conducted offshore of Navy Surface Warfare Center Panama City Division (75 FR 3395, January 21, 2010). The geographic area covered by that LOA overlaps the area associated with PSW and AS gunnery activities, and is considered applicable for the purpose of estimating marine mammal occurrence and densities. The one exception is bottlenose

dolphin, for which density estimates were recently provided through a Department of Defense-funded study.

For all species other than the bottlenose dolphin, density estimates were derived from the Navy OPAREA Density Estimates (NODE) for the GOMEX OPAREA report (DON, 2007). Densities were determined using one of two methods: (1) model-derived estimates; or (2) SAR or other literature-derived estimates. For the model-based approach, density estimates were calculated for each species within areas containing survey effort. A relationship between these density estimates and associated environmental parameters such as depth, slope, distance from the shelf break, sea surface temperature, and chlorophyll-*a* concentration was formulated using generalized additive models. This relationship was then used to generate a two-dimensional density surface for the region by predicting densities in areas where no survey data exist. All analyses for cetaceans in the GOM were based on data collected through NMFS-derived vessel surveys conducted between 1996 and 2004. Species-specific density estimates derived through spatial modeling were compared with abundance estimates found in the most current SAR to ensure consistency.

Cetacean density estimates provided by various researchers often do not contain adjustments for perception or availability bias. Perception bias refers to the failure of observers to detect animals, although they are present in the survey area and available to be seen. Availability bias refers to animals that are in the survey area, but are not able to be seen because they are submerged when observers are present. Perception and availability bias result in the underestimation of abundance and density numbers (negative bias). The density estimates provided in the NODE report are not corrected for

negative bias and, therefore, likely underestimate density. In order to address potential negative bias, density estimates were adjusted using submergence factors. Although submergence time versus surface time probably varies between and among species populations based on geographic location, season, and other factors, submergence times suggested by Moore and Clark (1998) were used for this proposed rule.

Bottlenose dolphin density estimates were derived from Protected Species Habitat Modeling in the EGTTR (Garrison, 2008). NMFS developed habitat models using recent aerial survey line transect data collected during winter and summer. In combination with remotely sensed habitat parameters (sea surface temperature and chlorophyll), these data were used to develop spatial density models for cetaceans within the continental shelf and coastal waters of the eastern GOM. Encounter rates during the aerial surveys were corrected for sighting probabilities and the probability that animals were available on the surface to be seen. Given that the survey area completely overlaps the present study area and that these survey data are the most recent and best available, these models are considered to best reflect the occurrence of bottlenose dolphins within the study area. Density estimates were calculated for a number of subareas within the EGTTR, and also aggregated into four principal area categories: (1) North-Inshore; (2) South-Inshore; (3) North-Offshore; and (4) South-Offshore. The proposed action would occur within W-151A and W-151B, which are located in the northernmost portion of the EGTTR in water depths between 30 and 350 m; however, all missions would occur in water depths less than 200 m. Therefore, density in the North-Offshore area is considered to be the most applicable. In order to provide conservative impact estimates, the greatest density

between summer and winter seasons was selected, resulting in an overall density estimate of 0.4426 bottlenose dolphins per square kilometer (km<sup>2</sup>) to be used in this proposed rule.

#### Potential Effects of the Specified Activity on Marine Mammals

PSW and AS gunnery operations have the potential to impact marine mammals by exposing them to impulsive noise and pressure waves generated by ordnance detonation at or near the surface of the water (maximum range of 25 ft (7.6 m) height and 80 ft (24 m) depth). Exposure to energy or pressure resulting from these detonations could result in non-lethal injury (Level A harassment) and disturbance (Level B harassment). Takes in the form of serious injury and mortality are neither anticipated nor requested. For PSW missions, a maximum of six detonations annually were analyzed to assess potential impacts to marine mammals, including two live JASSM, two live single SDB, and two live double SDB missions. This averages one mission every two months, although the actual timing of missions over the 5-year period is unknown. Only one mission would occur in any 24-hour period. A maximum of 70 annual AS gunnery missions were analyzed, which averages one mission approximately every 5 days. Live fire lasts for approximately 30 minutes per mission, which would result in a maximum of one-half hour of noise producing activities every 5 days occurring at a discreet, variable location within the 2,500 nm<sup>2</sup> area of W-151A (although activities could occur within the larger, overall 10,000 nm<sup>2</sup> area of W-151). The potential effects of sound from the proposed PSW and AS gunnery missions may include one or more of the following: tolerance; masking of natural sounds; disturbance; stress response; and temporary or permanent hearing impairment (Richardson et al., 1995). As outlined in previous NMFS documents,

the effects of sound on marine mammals are highly variable, and can be categorized as follows (based on Richardson et al., 1995):

- The sound may be too weak to be heard at the location of the animal (i.e., lower than the prevailing ambient sound level, the hearing threshold of the animal at relevant frequencies, or both);
- The sound may be audible but not strong enough to elicit any overt behavioral response;
- The sound may elicit reactions of varying degrees and variable relevance to the well-being of the marine mammal; these can range from temporary alert responses to active avoidance reactions such as vacating an area until the stimulus ceases, but potentially for longer periods of time;
- Upon repeated exposure, a marine mammal may exhibit diminishing responsiveness (habituation), or disturbance effects may persist; the latter is most likely with sounds that are highly variable in characteristics and unpredictable in occurrence, and associated with situations that a marine mammal perceives as a threat;
- Any anthropogenic sound that is strong enough to be heard has the potential to result in masking, or reduce the ability of a marine mammal to hear biological sounds at similar frequencies, including calls from conspecifics and underwater environmental sounds such as surf sound;
- If mammals remain in an area because it is important for feeding, breeding, or some other biologically important purpose even though there is chronic exposure to sound, it is possible that there could be sound-induced physiological stress; this might in turn have negative effects on the well-being or reproduction of the animals involved; and

- Very strong sounds have the potential to cause a temporary or permanent reduction in hearing sensitivity, also referred to as threshold shift. In terrestrial mammals, and presumably marine mammals, received sound levels must far exceed the animal's hearing threshold for there to be any temporary threshold shift (TTS). For transient sounds, the sound level necessary to cause TTS is inversely related to the duration of the sound. Received sound levels must be even higher for there to be risk of permanent hearing impairment (PTS). In addition, intense acoustic or explosive events may cause trauma to tissues associated with organs vital for hearing, sound production, respiration and other functions. This trauma may include minor to severe hemorrhage.

### Tolerance

Numerous studies have shown that underwater sounds are often readily detectable by marine mammals in the water at distances of many kilometers. However, other studies have shown that marine mammals at distances more than a few kilometers away often show no apparent response to activities of various types (Miller et al., 2005). This is often true even in cases when the sounds must be readily audible to the animals based on measured received levels and the hearing sensitivity of that mammal group. Although various baleen whales, toothed whales, and (less frequently) pinnipeds have been shown to react behaviorally to underwater sound from sources such as airgun pulses or vessels under some conditions, at other times, mammals of all three types have shown no overt reactions (e.g., Malme et al., 1986; Richardson et al., 1995; Madsen and Mohl, 2000; Croll et al., 2001; Jacobs and Terhune, 2002; Madsen et al., 2002; Miller et al., 2005).

### Masking



Marine mammals use acoustic signals for a variety of purposes, which differ among species, but include communication between individuals, navigation, foraging, reproduction, and learning about their environment (Erbe and Farmer, 2000; Tyack, 2000). Masking, or auditory interference, generally occurs when sounds in the environment are louder than, and of a similar frequency as, auditory signals an animal is trying to receive. Masking is a phenomenon that affects animals that are trying to receive acoustic information about their environment, including sounds from other members of their species, predators, prey, and sounds that allow them to orient in their environment. Masking these acoustic signals can disturb the behavior of individual animals, groups of animals, or entire populations.

The extent of the masking interference depends on the spectral, temporal, and spatial relationships between the signals an animal is trying to receive and the masking noise, in addition to other factors. In humans, significant masking of tonal signals occurs as a result of exposure to noise in a narrow band of similar frequencies. As the sound level increases, the detection of frequencies above those of the masking stimulus decreases. This principle is expected to apply to marine mammals as well because of common biomechanical cochlear properties across taxa.

Richardson *et al.* (1995) argued that the maximum radius of influence of an industrial noise (including broadband low-frequency sound transmission) on a marine mammal is the distance from the source to the point at which the noise can barely be heard. This range is determined by either the hearing sensitivity of the animal or the background noise level present. Industrial masking is most likely to affect some species?

ability to detect communication calls and natural sounds (i.e., surf noise, prey noise, etc.) (Richardson et al., 1995).

The echolocation calls of toothed whales are subject to masking by high-frequency sound. Human data indicate that low-frequency sounds can mask high-frequency sounds (i.e., upward masking). Studies on captive odontocetes by Au et al. (1974, 1985, 1993) indicate that some species may use various processes to reduce masking effects (e.g., adjustments in echolocation call intensity or frequency as a function of background noise conditions). There is also evidence that the directional hearing abilities of odontocetes are useful in reducing masking at the higher frequencies these cetaceans use to echolocate, but not at the low-to-moderate frequencies they use to communicate (Zaitseva et al., 1980). A study by Nachtigall and Supin (2008) showed that false killer whales adjust their hearing to compensate for ambient sounds and the intensity of returning echolocation signals. Holt et al. (2009) measured killer whale call source levels and background noise levels in the one to 40 kHz band and reported that the whales increased their call source levels by one dB SPL for every one dB SPL increase in background noise level. Similarly, another study on St. Lawrence River belugas reported a similar rate of increase in vocalization activity in response to passing vessels (Scheifele et al., 2005).

Although masking is a phenomenon which may occur naturally, the introduction of loud anthropogenic sounds into the marine environment at frequencies important to marine mammals increases the severity and frequency of occurrence of masking. For example, if a baleen whale is exposed to continuous low-frequency sound from an industrial source, this would reduce the size of the area around that whale within which it

can hear the calls of another whale. The components of background noise that are similar in frequency to the signal in question primarily determine the degree of masking of that signal. In general, little is known about the degree to which marine mammals rely upon detection of sounds from conspecifics, predators, prey, or other natural sources. In the absence of specific information about the importance of detecting these natural sounds, it is not possible to predict the impact of masking on marine mammals (Richardson et al., 1995). In general, masking effects are expected to be less severe when sounds are transient than when they are continuous. 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 EGTTTR.

### Disturbance

Behavioral responses to sound are highly variable and context-specific. Many different variables can influence an animal's perception of and response to (in both nature and magnitude) an acoustic event. An animal's prior experience with a sound or sound source affects whether it is less likely (habituation) or more likely (sensitization) to respond to certain sounds in the future (animals can also be innately pre-disposed to respond to certain sounds in certain ways) (Southall et al., 2007). Related to the sound itself, the perceived nearness of the sound, bearing of the sound (approaching vs. retreating), similarity of the sound to biologically relevant sounds in the animal's environment (i.e., calls of predators, prey, or conspecifics), and familiarity of the sound may affect the way an animal responds to the sound (Southall et al., 2007). Individuals (of different age, gender, reproductive status, etc.) among most populations will have variable hearing capabilities, and differing behavioral sensitivities to sounds that will be

affected by prior conditioning, experience, and current activities of those individuals. Often, specific acoustic features of the sound and contextual variables (i.e., proximity, duration, or recurrence of the sound or the current behavior that the marine mammal is engaged in or its prior experience), as well as entirely separate factors such as the physical presence of a nearby vessel, may be more relevant to the animal's response than the received level alone.

Because the few available studies show wide variation in response to underwater sound, it is difficult to quantify exactly how sound from PSW and AS gunnery missions would affect marine mammals. Exposure of marine mammals to sound sources can result in, but is not limited to, no response or any of the following observable responses: increased alertness; orientation or attraction to a sound source; vocal modifications; cessation of feeding; cessation of social interaction; alteration of movement or diving behavior; avoidance; habitat abandonment (temporary or permanent); and, in severe cases, panic, flight, stampede, or stranding, potentially resulting in death (Southall et al., 2007). A review of marine mammal responses to anthropogenic sound was first conducted by Richardson (1995). A more recent review (Nowacek et al., 2007) addresses studies conducted since 1995 and focuses on observations where the received sound level of the exposed marine mammal(s) was known or could be estimated. The following subsections provide examples of behavioral responses that provide an idea of the variability in behavioral responses that would be expected given the differential sensitivities of marine mammal species to sound and the wide range of potential acoustic sources to which a marine mammal may be exposed. Estimates of the types of behavioral responses that could occur for a given sound exposure should be determined from the literature that

is available for each species, or extrapolated from closely related species when no information exists.

Flight Response – 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. 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). Flight responses have been speculated as being a component of marine mammal strandings associated with sonar activities (Evans and England, 2001).

Response to Predator – Evidence suggests that at least some marine mammals have the ability to acoustically identify potential predators. For example, harbor seals that reside in the coastal waters off British Columbia are frequently targeted by certain groups of killer whales, but not others. The seals discriminate between the calls of threatening and non-threatening killer whales (Deecke et al., 2002), a capability that should increase survivorship while reducing the energy required for attending to and responding to all killer whale calls. The occurrence of masking or hearing impairment provides a means by which marine mammals may be prevented from responding to the acoustic cues produced by their predators. Whether or not this is a possibility depends on the duration of the masking/hearing impairment and the likelihood of encountering a predator during the time that predator cues are impeded.

Diving – Changes in dive behavior can vary widely. They 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. Variations in dive behavior may reflect interruptions in

biologically significant activities (e.g., foraging) or they may be of little biological significance. Variations in dive behavior may also expose an animal to potentially harmful conditions (e.g., increasing the chance of ship-strike) or may serve as an avoidance response that enhances survivorship. The impact of a variation in diving 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.

Nowacek et al. (2004) reported disruptions of dive behaviors in foraging North Atlantic right whales when exposed to an alerting stimulus, an action, they noted, that could lead to an increased likelihood of ship strike. However, the whales did not respond to playbacks of either right whale social sounds or vessel noise, highlighting the importance of the sound characteristics in producing a behavioral reaction. Conversely, Indo-Pacific humpback dolphins have been observed to dive for longer periods of time in areas where vessels were present and/or approaching (Ng and Leung, 2003). In both of these studies, the influence of the sound exposure cannot be decoupled from the physical presence of a surface vessel, thus complicating interpretations of the relative contribution of each stimulus to the response. Indeed, the presence of surface vessels, their approach and speed of approach, seemed to be significant factors in the response of the Indo-Pacific humpback dolphins (Ng and Leung, 2003). Low frequency signals of the Acoustic Thermometry of Ocean Climate (ATOC) sound source were not found to affect dive times of humpback whales in Hawaiian waters (Frankel and Clark, 2000) or to overtly affect elephant seal dives (Costa et al., 2003). They did, however, produce subtle effects that varied in direction and degree among the individual seals, illustrating the equivocal nature of behavioral effects and consequent difficulty in defining and predicting them.

Due to past incidents of beaked whale strandings associated with sonar operations, feedback paths are provided between avoidance and diving and indirect tissue effects. This feedback accounts for the hypothesis that variations in diving behavior and/or avoidance responses can possibly result in nitrogen tissue supersaturation and nitrogen off-gassing, possibly to the point of deleterious vascular bubble formation (Jepson et al., 2003). Although hypothetical, the potential process is currently popular and controversial.

Foraging - 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. Noise from seismic surveys was not found to impact the feeding behavior in western grey whales off the coast of Russia (Yazvenko et al., 2007) and sperm whales engaged in foraging dives did not abandon dives when exposed to distant signatures of seismic airguns (Madsen et al., 2006). Balaenopterid whales exposed to moderate low-frequency signals similar to the ATOC sound source demonstrated no variation in foraging activity (Croll et al., 2001), whereas five out of six North Atlantic right whales exposed to an acoustic alarm interrupted their foraging dives (Nowacek et al., 2004). Although the received sound pressure level at the animals was similar in the latter two studies, the frequency, duration, and temporal pattern of signal presentation were different. These factors, as well as differences in species sensitivity, are likely contributing factors to the differential response. A determination of whether foraging disruptions incur fitness consequences will require information on or estimates of the energetic requirements of the individuals and the

relationship between prey availability, foraging effort and success, and the life history stage of the animal.

Breathing – Variations in respiration naturally vary with different behaviors and variations in respiration 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. Mean exhalation rates of gray whales at rest and while diving were found to be unaffected by seismic surveys conducted adjacent to the whale feeding grounds (Gailey et al., 2007). Studies with captive harbor porpoises showed increased respiration rates upon introduction of acoustic alarms (Kastelein et al., 2001; Kastelein et al., 2006a) and emissions for underwater data transmission (Kastelein et al., 2005). However, exposure of the same acoustic alarm to a striped dolphin under the same conditions did not elicit a response (Kastelein et al., 2006a), 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.

Social relationships - Social interactions between mammals can be affected by noise via the disruption of communication signals or by the displacement of individuals. Disruption of social relationships therefore depends on the disruption of other behaviors (e.g., caused avoidance, masking, etc.) and no specific overview is provided here. However, social disruptions must be considered in context of the relationships that are affected. Long-term disruptions of mother/calf pairs or mating displays have the potential to affect the growth and survival or reproductive effort/success of individuals, respectively.



Vocalizations (also see Masking Section) - Vocal changes in response to anthropogenic noise can occur across the repertoire of sound production modes used by marine mammals, such as whistling, echolocation click production, calling, and singing. Changes may result in response to a need to compete with an increase in background noise or may reflect an increased vigilance or startle response. For example, in the presence of low-frequency active sonar, humpback whales have been observed to increase the length of their "songs" (Miller et al., 2000; Fristrup et al., 2003), possibly due to the overlap in frequencies between the whale song and the low-frequency active sonar. A similar compensatory effect for the presence of low frequency vessel noise has been suggested for right whales; 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., 2007). Killer whales off the northwestern coast of the United States have been observed to increase the duration of primary calls once a threshold in observing vessel density (e.g., whale watching) was reached, which has been suggested as a response to increased masking noise produced by the vessels (Foote et al., 2004). In contrast, both sperm and pilot whales potentially ceased sound production during the Heard Island feasibility test (Bowles et al., 1994), although it cannot be absolutely determined whether the inability to acoustically detect the animals was due to the cessation of sound production or the displacement of animals from the area.

Avoidance - Avoidance is the displacement of an individual from an area as a result of the presence of a sound. Richardson et al., (1995) noted that avoidance reactions are the most obvious manifestations of disturbance in marine mammals. It is qualitatively different from the flight response, but also differs in the magnitude of the

response (i.e., directed movement, rate of travel, etc.). Oftentimes avoidance is temporary, and animals return to the area once the noise has ceased. Longer term displacement is possible, however, which can lead to changes in abundance or distribution patterns of the species in the affected region if they do not become acclimated to the presence of the sound (Blackwell et al., 2004; Bejder et al., 2006; Teilmann et al., 2006). Acute avoidance responses have been observed in captive porpoises and pinnipeds exposed to a number of different sound sources (Kastelein et al., 2001; Finneran et al., 2003; Kastelein et al., 2006a; Kastelein et al., 2006b). Short term avoidance of seismic surveys, low frequency emissions, and acoustic deterrents has also been noted in wild populations of odontocetes (Bowles et al., 1994; Goold, 1996; 1998; Stone et al., 2000; Morton and Symonds, 2002) and to some extent in mysticetes (Gailey et al., 2007), while longer term or repetitive/chronic displacement for some dolphin groups and for manatees has been suggested to be due to the presence of chronic vessel noise (Haviland-Howell et al., 2007; Miksis-Olds et al., 2007).

Orientation - A shift in an animal's resting state or an attentional change via an orienting response represent behaviors that would be considered mild disruptions if occurring alone. As previously mentioned, the responses may co-occur with other behaviors; for instance, an animal may initially orient toward a sound source, and then move away from it. Thus, any orienting response should be considered in context of other reactions that may occur.

### Stress Response

An acoustic source is considered a potential stressor if, by its action on the animal, via auditory or non-auditory means, it may produce a stress response in the

animal. Here, the stress response will refer to an increase in energetic expenditure that results from exposure to the stressor and which is predominantly characterized by either the stimulation of the sympathetic nervous system (SNS) or the hypothalamic-pituitary-adrenal (HPA) axis (Reeder and Kramer, 2005). The SNS response to a stressor is immediate and acute and is characterized by the release of the catecholamine neurohormones norepinephrine and epinephrine (i.e., adrenaline). These hormones produce elevations in the heart and respiration rate, increase awareness, and increase the availability of glucose and lipids for energy. The HPA response is ultimately defined by increases in the secretion of the glucocorticoid steroid hormones, predominantly cortisol in mammals. The presence and magnitude of a stress response in an animal depends on a number of factors. These include the animal's life history stage (e.g., neonate, juvenile, adult), the environmental conditions, reproductive or developmental state, and experience with the stressor. Not only will these factors be subject to individual variation, but they will also vary within an individual over time. The stress response may or may not result in a behavioral change, depending on the characteristics of the exposed animal. However, provided a stress response occurs, we assume that some contribution is made to the animal's allostatic load. Any immediate effect of exposure that produces an injury is assumed to also produce a stress response and contribute to the allostatic load. Allostasis is the ability of an animal to maintain stability through change by adjusting its physiology in response to both predictable and unpredictable events (McEwen and Wingfield, 2003). If the acoustic source does not produce tissue effects, is not perceived by the animal, or does not produce a stress response by any other means, we assume that the exposure does

not contribute to the allostatic load. Additionally, without a stress response or auditory masking, it is assumed that there can be no behavioral change.

### Hearing Threshold Shift

In mammals, high-intensity sound may rupture the eardrum, damage the small bones in the middle ear, or over stimulate the electromechanical hair cells that convert the fluid motions caused by sound into neural impulses that are sent to the brain. Lower level exposures may cause a loss of hearing sensitivity, termed a threshold shift (TS) (Miller, 1974). Incidence of TS may be either permanent, referred to as permanent threshold shift (PTS), or temporary, referred to as temporary threshold shift (TTS). The amplitude, duration, frequency, and temporal pattern, and energy distribution of sound exposure all affect the amount of associated TS and the frequency range in which it occurs. As amplitude and duration of sound exposure increase, generally, so does the amount of TS and recovery time. Human non-impulsive noise exposure guidelines are based on exposures of equal energy (the same SEL) producing equal amounts of hearing impairment regardless of how the sound energy is distributed in time (NIOSH 1998). Until recently, previous marine mammal TTS studies have also generally supported this equal energy relationship (Southall et al., 2007). Three newer studies, two by Mooney et al. (2009a, 2009b) on a single bottlenose dolphin either exposed to playbacks of Navy MFAS or octave-band noise (4–8 kHz) and one by Kastak et al. (2007) on a single California sea lion exposed to airborne octave-band noise (centered at 2.5 kHz), concluded that for all noise exposure situations the equal energy relationship may not be the best indicator to predict TTS onset levels. Generally, with sound exposures of equal energy, those that were quieter (lower sound pressure level [SPL]) with longer duration

were found to induce TTS onset more than those of louder (higher SPL) and shorter duration (more similar to noise from AS gunnery exercises). For intermittent sounds, less TS will occur than from a continuous exposure with the same energy (some recovery will occur between exposures) (Kryter et al., 1966; Ward, 1997). Additionally, though TTS is temporary, very prolonged exposure to sound strong enough to elicit TTS, or shorter-term exposure to sound levels well above the TTS threshold, can cause PTS, at least in terrestrial mammals (Kryter, 1985). However, these studies highlight the inherent complexity of predicting TTS onset in marine mammals, as well as the importance of considering exposure duration when assessing potential impacts.

PTS consists of non-recoverable physical damage to the sound receptors in the ear, which can include total or partial deafness, or an impaired ability to hear sounds in specific frequency ranges; PTS is considered Level A harassment. TTS is recoverable and is considered to result from temporary, non-injurious impacts to hearing-related tissues; TTS is considered Level B harassment.

#### Permanent Threshold Shift

Auditory trauma represents direct mechanical injury to hearing related structures, including tympanic membrane rupture, disarticulation of the middle ear ossicles, and trauma to the inner ear structures such as the organ of Corti and the associated hair cells. Auditory trauma is irreversible and considered to be an injury that could result in PTS. PTS results from exposure to intense sounds that cause a permanent loss of inner or outer cochlear hair cells or exceed the elastic limits of certain tissues and membranes in the middle and inner ears and result in changes in the chemical composition of the inner ear fluids. In some cases, there can be total or partial deafness across all frequencies,

whereas in other cases, the animal has an impaired ability to hear sounds in specific frequency ranges. There is no empirical data for onset of PTS in any marine mammal, and therefore, PTS-onset must be estimated from TTS-onset measurements and from the rate of TTS growth with increasing exposure levels above the level eliciting TTS-onset. PTS is presumed to be likely if the hearing threshold is reduced by  $\geq 40$  dB (i.e., 40 dB of TTS). Relationships between TTS and PTS thresholds have not been studied in marine mammals, but are assumed to be similar to those in humans and other terrestrial mammals.

#### Temporary Threshold Shift

TTS is the mildest form of hearing impairment that can occur during exposure to a loud sound (Kryter, 1985). Southall et al. (2007) indicate that although PTS is a tissue injury, TTS is not because the reduced hearing sensitivity following exposure to intense sound results primarily from fatigue, not loss, of cochlear hair cells and supporting structures and is reversible. Accordingly, NMFS classifies TTS as Level B Harassment, not Level A Harassment (injury); however, NMFS does not consider the onset of TTS to be the lowest level at which Level B Harassment may occur (see Behavior section below).

Southall et al. (2007) considers a 6 dB TTS (i.e., baseline hearing thresholds are elevated by 6 dB) sufficient to be recognized as an unequivocal deviation and thus a sufficient definition of TTS onset. TTS in bottlenose dolphin hearing have been experimentally induced. For example, Finneran et al. (2002) exposed a trained captive bottlenose dolphin to a seismic watergun simulator with a single acoustic pulse. No TTS was observed in the dolphin at the highest exposure condition (peak: 207 kPa [30psi];

peak-to-peak: 228 dB re: 1 microPa; SEL: 188 dB re 1 microPa<sup>2</sup>-s). Schludt et al. (2000) demonstrated temporary shifts in masked hearing thresholds in five bottlenose dolphins occurring generally between 192 and 201 dB rms (192 and 201 dB SEL) after exposure to intense, non-pulse, 1-s tones at , 3kHz, 10kHz, and 20 kHz. TTS onset occurred at mean sound exposure level of 195 dB rms (195 dB SEL). At 0.4 kHz, no subjects exhibited threshold shifts after SPL exposures of 193dB re: 1 microPa (192 dB re: 1 microPa<sup>2</sup>-s). In the same study, at 75 kHz, one dolphin exhibited a TTS after exposure at 182 dB SPL re: 1 microPa but not at higher exposure levels. Another dolphin experienced no threshold shift after exposure to maximum SPL levels of 193 dB re: 1 microPa at the same frequency. Frequencies of explosives used at MCAS Cherry Point range from 1-25 kHz; the range where dolphin TTS onset occurred at 195 dB rms in the Schludt et al. (2000) study.

Preliminary research indicates that TTS and recovery after noise exposure are frequency dependent and that an inverse relationship exists between exposure time and sound pressure level associated with exposure (Mooney et al., 2005; Mooney, 2006). For example, Nachtigall et al. (2003) measured TTS in a bottlenose dolphin and found an average 11 dB shift following a 30 minute net exposure to OBN at a 7.5 kHz center frequency (max SPL of 179 dB re: 1 microPa; SEL: 212- 214 dB re:1 microPa<sup>2</sup>-s). No TTS was observed after exposure to the same duration and frequency noise with maximum SPLs of 165 and 171 dB re:1 microPa. After 50 minutes of exposure to the same 7.5 kHz frequency OBN, Natchigall et al. (2004) measured a 4 -8 dB shift (max SPL: 160dB re 1microPa; SEL: 193-195 dB re:1 microPa<sup>2</sup>-s). Finneran et al. (2005)

concluded that a sound exposure level of 195 dB re 1  $\mu\text{Pa}^2\text{-s}$  is a reasonable threshold for the onset of TTS in bottlenose dolphins exposed to mid-frequency tones.

## Assessment of Marine Mammal Impacts from Explosive Ordnance

### PSW Missions

For the acoustic analysis of PSW activities, the exploding charge is characterized as a point source. The components of PSW activities pertinent to estimating impacts include the location of the explosions relative to the water surface and the number of explosions.

SDBs are intended to either strike a target on the surface of the water or detonate in the air over a target at an altitude of up to 25 ft (7.6 m) above the surface of the water. It is assumed that a surface target would be impacted at a point approximately five feet (1.5 m) above the surface. To calculate the range to NMFS' harassment thresholds, these two distances are used to bound the potential height of the explosion (although detonations could occur at any point in between). The effect of the target itself on the propagation of the shock wave into the water column is omitted for the purpose of determining the range to the harassment thresholds. This is considered to be a conservative measure because the target would likely reflect and diffuse the explosive pressure wave, but would not amplify or focus it. SDB "double shots" would involve two bombs being deployed from the same aircraft to strike the same target within a maximum of five seconds of each other. Under the "double shot" scenario, the NEW of each bomb is added in order to calculate the distance to energy thresholds; however, the pressure component is not additive, and pressure estimates are derived from a single charge weight.



The JASSM is intended to impact a target located on the surface of the water. Similar to the description of the SDB above, it is assumed that the missile may strike the target at some distance about the surface. However, the JASSM is substantially heavier than the SDB (approximately 2,240 lbs versus 285 lbs), and would potentially travel at a greater velocity on impact. Therefore, the JASSM would impact the target with greater force, and it is anticipated that the missile could puncture the target and explode in the water column. Under this type of scenario, detonation occurs a maximum of 120 milliseconds after contact with the water, which corresponds to a depth of 70 to 80 ft (21 to 24 m). As a result, impact range calculations are bounded by depth categories of 1 ft (0.3 m) and greater than 20 ft (6.1 m). Only one JASSM would be deployed per mission (i.e., no “double shots”), and both energy and pressure estimates are based on the NEW of one missile.

Table 4 provides the estimated range, or radius, from the detonation point to the various thresholds under summer and winter scenarios. The range is then used to calculate the total area of the zone of influence (ZOI). The Level B harassment (behavioral) threshold (177 dB re 1  $\mu\text{Pa}^2\text{-s}$  EFD) is not included. Sub-TTS harassment is considered to occur when animals are exposed to repetitive disturbance, which for underwater impulsive noise is considered to be more than one detonation within a 24-hour period. No more than one explosion associated with PSW activities will occur within any 24-hour period. The SDB “double shot” is considered to be one detonation because the two explosions are intended to occur within five seconds of each other. In-water ranges for the 30.5 and 13 psi-msec thresholds for explosions occurring in the air are negligible.

Table 4. Estimated Threshold Radii (in meters) for PSW Activities

Ordinance	NEW (lbs)	Height or Depth of Explosion (m)	Mortality	Level A Harassment		Level B Harassment	
			30.5 psi-msec	205 dB re 1 $\mu\text{Pa}^2\text{-s}$ EFD	13 psi-msec	82 dB re 1 $\mu\text{Pa}^2\text{-s}$ EFD	23 psi peak
Summer							
Single SDB	48	1.5 height	0	12	0	47	447
		7.6 height	0	12	0	48	447
Double SDB	96	1.5 height	0	16	0	65	550
		7.6 height	0	17	0	66	550
JASSM	300	0.3 depth	75	170	130	520	770
		>6.1 depth	320	550	1030	2490	770
Winter							
Single SDB	48	1.5 height	0	12	0	47	471
		7.6 height	0	12	0	48	471
Double SDB	96	1.5 height	0	16	0	65	594
		7.6 height	0	16	0	66	594
JASSM	300	0.3 depth	75	170	130	580	871
		>6.1 depth	320	590	1096	3250	871

The ZOIs calculated by using the threshold ranges in Table 4 are combined with the number of live shots (Table 1) and marine mammal densities (Table 3) to estimate the number of animals affected. Because of the mission location in relatively shallow continental shelf waters ranging from approximately 40 to 50 m, the species considered to be potentially affected by PSW mission activities include the bottlenose dolphin, Atlantic spotted dolphin, dwarf sperm whale, and pygmy sperm whale. Potential exposure to energy and pressure resulting from detonations could theoretically occur at the surface or at any number of depths below the surface with differing consequences. As a conservative measure, a mid-depth scenario was selected by Eglin AFB to ensure the greatest direct path for the harassment ranges, and to give the greatest impact range for the injury thresholds.

Tables 5, 6, and 7 provide the annual potential number of exposures associated with mortality, Level A harassment, and Level B harassment. In each case, a range of

numbers is provided. The ranges represent the minimum and maximum number of potential takes, based on various combinations of explosion height, explosion depth, and season. In cases where dual criteria exist, the threshold with the greatest distance and corresponding ZOI is used. For example, for in-water JASSM detonations, the 23 psi threshold provides the largest Level B harassment zone when detonations occur near the surface, while the 182 dB EFD threshold provides the largest Level B harassment zone at depth.

Table 5. Number of Potential Marine Mammal Exposures, Mortalities (30.5 psi-msec)

Species	Number of Potential Exposures, Single SDB (2 shots)	Number of Potential Exposures, Double SDB (2 shots)	Number of Potential Exposures, Single JASSM (2 shots)	Total Number Potential Exposures
Atlantic bottlenose dolphin	0	0	0.0156 – 0.2848	0.0156 – 0.2848
Atlantic spotted dolphin	0	0	0.0125 – 0.2267	0.0125 – 0.2267
Dwarf/Pygmy sperm whale	0	0	0.0001 – 0.0012	0.0001 – 0.0012

Table 6. Number of Potential Marine Mammal Exposures, Level A Harassment

Species	Number of Potential Exposures, Single SDB (2 shots)	Number of Potential Exposures, Double SDB (2 shots)	Number of Potential Exposures, Single JASSM (2 shots)	Total Number Potential Exposures
Atlantic bottlenose dolphin	0.00040	0.00080	0.08037-3.34052	0.08157 – 3.34172
Atlantic spotted dolphin	0.00032	0.00064	0.06398 – 2.65923	0.06494 – 2.66019
Dwarf/Pygmy sperm whale	0.000002	0.000003	0.00035 – 0.01438	0.000355-0.014385

Table 7. Number of Potential Marine Mammal Exposures, Level B Harassment

Species	Number of Potential Exposures, Single SDB (2 shots)	Number of Potential Exposures, Double SDB (2 shots)	Number of Potential Exposures, Single JASSM (2 shots)	Total Number Potential Exposures
Atlantic bottlenose dolphin	0.55566 – 0.61693	0.84124 – 0.98122	0.75197 – 29.37372	2.14887 – 30.97187
Atlantic spotted dolphin	0.44233 – 0.49111	0.66967 – 0.78110	0.59861 – 23.38304	1.71061 – 24.65525
Dwarf/Pygmy sperm whale	0.00239 – 0.00266	0.00362 – 0.00422	0.00324 – 0.12643	0.00925 - 0.13331

The preceding tables illustrate that the potential impacts to marine mammals would primarily be the result of JASSM detonations. Eglin AFB does not anticipate that any marine mammals would be exposed to positive impulse pressure levels associated with serious injury or mortalities. In the absence of mitigation measures, up to approximately 0.3 bottlenose dolphins and 0.2 Atlantic spotted dolphins per year could be exposed to the 30.5 psi-msec threshold; however, where less than 0.5 animals are affected, no take is assumed. Pygmy and dwarf sperm whales are not expected to be affected.

A maximum of approximately three bottlenose dolphins and three Atlantic spotted dolphins could be exposed to noise and/or pressure levels associated with Level A harassment, depending on the season and depth of the JASSM detonation. Similarly, up to a maximum of 31 bottlenose dolphins and 25 Atlantic spotted dolphins could be exposed to level associated with Level B harassment (TTS). Essentially, no pygmy or dwarf sperm whales are expected to experience either Level A or Level B harassment.

#### AS Gunnery Missions

Table 8 provides the estimated range from the detonation point to the various thresholds. This range, or radius, is then used to calculate the total area affected by a gunnery round. For this analysis, it is assumed that all rounds strike the water and detonate at or just below the surface of the water, although this assumption is somewhat conservative because some rounds may strike the target and introduce less noise into the water. The ranges to the thresholds were calculated for two seasons (summer and winter) and depth strata (80 m and 160 m) in order to reasonably bound the environmental

conditions under which AS gunner activities would occur. As a conservative measure, the greatest range within each season and depth strata is used in take estimate calculations. In addition, where dual criteria exist, the criteria resulting in the most conservative estimate (i.e., greater number of takes) are used.

Table 8. Estimated Threshold Radii (in meters) for AS Gunnery Activities

Ordnance Type	Mortality	Level A Harassment		Level B Harassment		
	30.5 psi-msec	205 dB EFD	13 psi-msec	182 dB EFD	23 psi	177 dB EFD
105 mm FU	3.8	22.81	6.96	158.26	216.37	281.78
105 mm TR	2.45	8.86	3.29	49.79	91.45	90.46
40 mm	3.07	12.52	3.69	74.27	123.83	142.11
25 mm	1.26	0	2.52	23.83	52.27	41.24

As described in Section 6 of the LOA application, the number of events may vary for energy and pressure metrics. For energy metrics, the number of events equates to the number of rounds expended and released energy is evaluated as an additive exposure. Pressure-based thresholds are based on the maximum value received by the animal. The method for estimating the number of firing events for 40 mm and 25 mm rounds, as they related to pressure metrics, is based on the firing protocol. These rounds are typically fired in bursts, with each burst expended within a 2- to 10-second time frame. Given the average cetacean density with assumed uniform distribution, and average swim speed of three knots, there would not be sufficient time for new animals to enter the ZOI within the time frame of a single burst. Therefore, only the peak pressure of a single burst would be experienced within a given ZOI. For 40 mm rounds, a typical mission includes 64 rounds, with approximately 20 rounds per burst. Based on the tight target area and small “miss” distance, all rounds in a burst are expected to enter the water within 5 m of the target. As a result, take calculations for 40 mm rounds are based on the total number of rounds fired per year divided by 20. Similarly, for 25 mm rounds, missions typically

include 560 rounds fired in bursts of 100 rounds, and pressure-based take calculations are based on the total number of rounds divided by 100. For energy metrics, however, all rounds are used for estimating exposures.

The firing protocol for 105 mm rounds does not involve bursts of multiple rounds at a time; these round are fired singly, with up to a 30-second interval between rounds, which results in approximately two rounds per minute. Pressure-based exposure calculations are performed based on the total number of rounds expended.

Annual marine mammal takes from AS gunnery activities are then calculated using the adjusted marine mammal density estimates, the ZOI of each type of round fired, and the total number of events per year. Table 9 provides the total number of potentially affected (exposed) marine mammals for all combined gunnery activities, including 105 mm (FU and TR), 40 mm, and 25 mm rounds. The numbers in Table 9 represent the maximum number of exposures considered reasonably possible. It is important to note that these exposure estimates are derived without consideration of mitigation measures (except use of the 105 mm TR, an operational mitigation measure). For Level A harassment calculations, the ZOI corresponding to the 205 dB EFD is used because the criterion results in the most conservative take estimate. Similarly, for Level B physiological harassment calculations, the ZOI corresponding to the 182 dB EFD is used because this criterion results in the most conservative take estimate even though the 23 psi threshold radii are greater than the radii for the 182 dB EFD threshold.

Table 9. Annual Number of Potentially Marine Mammals Takes from AS Gunnery Activities

Species	Adjusted Density (#/km <sup>2</sup> )	Mortality	Level A Harassment		Level B Harassment (TTS)		Level B Harassment (behavioral)
			30.5 psi-msec	205 dB EFD	13 psi-msec	182 dB EFD	
Bottlenose dolphin	0.442600	0.03012721	1.666395	0.078538	96.08673	70.81186	316.66708
Atlantic spotted dolphin	0.352333	0.02398285	1.326539	0.062521	76.49011	56.36998	252.08374
Pantropical spotted dolphin	0.142900	0.00021201	0.011511	0.000688	0.63857	0.65954	2.07718
Spinner dolphin	0.127000	0.00018842	0.010230	0.000611	0.56752	0.58615	1.84606
Dwarf/pygmy sperm whale	0.001905	0.00012967	0.007172	0.000338	0.41357	0.30478	1.36297

Explosive criteria and thresholds for assessing impacts of explosions on marine mammals were originally developed for the shock trials of the USS Seawolf and USS Winston S. Churchill. NMFS provided a detailed discussion in its promulgation of regulations for issuing LOAs to Eglin AFB for Precision Strike Weapon testing activity (71 FR 44001, August 3, 2006), which is not repeated here. Please refer to that document for this background information. However, one part of the analysis has changed. That information is provided here.

Table 10. Current NMFS acoustic criteria when addressing harassment from explosives

Level B Behavior	176 dB 1/3 Octave SEL (sound energy level)
Level B TTS Dual Criterion	182 dB 1/3 Octave SEL
	23 psi (peak pressure)
Level A PTS (permanent threshold shift)	205 dB SEL
Level A Injury	13 psi-msec
Mortality	30.5 psi-msec

Subsequent to the issuance of the USAF 2002 PEA, NMFS updated one of the dual criteria related to the onset level for temporary threshold shift (TTS; Level B harassment). The USAF 2002 PEA describes the onset of TTS by a single explosion (impulse) based on the criterion in use at that time. Newly available information based on lab controlled experiments that used a seismic watergun to induce TTS in one beluga whale and one bottlenose dolphin (Finneran et al., 2002) showed measured TTS<sub>2</sub> (TTS level 2 min after exposure) was 7 and 6 dB in the beluga at 0.4 and 30 kHz, respectively, after exposure to intense single pulses at 226 dB re: 1 μPa p-p (peak to peak). This sound pressure level (SPL) is equivalent to 23 pounds per square inch (psi). Hearing threshold returned to within 2 dB of the pre-exposure value within 4 min of exposure. No TTS was observed in the bottlenose dolphin at the highest exposure condition (228 dB re 1 μPa p-p). Therefore, NMFS updated the SPL from impulse sound that could induce TTS to 23 psi, from the previous 12 psi. Table 10 in this document outlines the acoustic criteria used by NMFS when addressing noise impacts from explosives. These criteria remain consistent with criteria established for other activities in the EGTTR and other acoustic activities authorized under sections 101(a)(5)(A) and (D) of the MMPA. The 23 psi criterion is used in this document and NMFS' 2008 EA for evaluating the potential for the onset of TTS (Level B harassment) in marine mammals. Additional information on the derivation of the 23 psi criterion can be found in the Final Environmental Impact Statement/Overseas Environmental Impact Statement for the Shock Trial of the Mesa Verde (LPD 19) (Department of the Navy, 2008).

Anticipated Effects on Habitat



The primary source of marine mammal habitat impact is noise resulting from live PSW and AS gunnery missions. However, the noise does not constitute a long-term physical alteration of the water column or bottom topography, is not expected to affect prey availability, is of limited duration, and is intermittent in time. Surface vessels associated with the missions are present in limited duration and are intermittent as well. Therefore, it is not anticipated that marine mammal utilization of the waters in the study area will be affected, either temporarily or permanently, as a result of mission activities.

Other factors related to PSW and AS gunnery mission activities that could potentially impact marine mammal habitat include the introduction of fuel, debris, ordnance, and chemical materials into the water column. The potential effects of each were analyzed in the PSW Environmental Assessment and EGTR Programmatic Environmental Assessment and determined to be insignificant. For a complete discussion of potential effects on habitat, please refer to pages 4-1 to 4-7 in the 2005 EA and section 4 of the 2002 PEA.

#### Proposed Mitigation

In order to issue an Incidental Take Authorization under section 101(a)(5)(A) and (D) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to such activity, and other means of effecting the least practicable adverse 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. The NDAA of 2004 amended the MMPA as it relates to military readiness activities and the incidental take authorization process such that “the least practicable adverse impact” shall include consideration of personal safety,

practicality of implementation, and the impact on the effectiveness of the “military readiness activity.” Training activities involving PSWs and AS gunnery are considered military readiness activities.

Eglin AFB would require mission proponents to employ mitigation measures, which are discussed below, in an effort to decrease the number of marine mammals potentially affected. Mitigation measures primarily consist of visual observation of applicable areas of the ocean surface to detect the presence of marine mammals. Eglin AFB has also assessed missions to identify opportunities for operational mitigations (e.g., modifications to the mission that potentially result in decreased impacts to protected species) while potentially sacrificing some mission flexibility.

#### Mitigation Proposed for PSW Activities

Visual monitoring would be required during PSW missions from surface vessels and aircraft. Based on the particular ordnance involved in a given training event, Eglin AFB would survey the largest applicable ZOI for the presence of marine mammals on each day of testing. For example, the largest possible ZOI associated with the JASSM is 2,490 m (summer) or 3,250 m (winter), based on the 182 dB EFD Level B harassment threshold range for a detonation at depths greater than 20 m. For SDB detonations, the largest ZOI would be between 447 m and 594 m, depending on season and whether the detonation is a single or double SDB, based on the 23 psi range.

Prior to the mission, trained Air Force personnel aboard an aircraft would visually survey the ZOI for the presence of marine mammals. Trained observers aboard surface support vessels would provide additional monitoring for marine mammals and indicators of the presence of marine mammals (e.g., large schools of fish). Because of safety issues,

observers would be required to leave the test area prior to the commencement of detonations; therefore, the ZOI would not be surveyed for approximately one hour before detonation. To account for this, an additional buffer zone equal to the radius of the largest threshold range would be monitored for marine mammals.

Fair weather that supports the ability to observe marine mammals is necessary to effectively implement monitoring. Wind, visibility, and surface conditions of the GOM are the most critical factors affecting mitigation implementation. Higher winds typically increase wave height and create “white cap” conditions, both of which limit an observer’s ability to locate marine mammals at or near the surface. PSW missions would be delayed if the sea state is greater than a force 3 on the Beaufort scale (see Table 11-1 of the application) at the time of the activity. Such a delay would maximize detection of marine mammals. Visibility is also an important factor for flight safety issues. A minimum ceiling of 305 m and visibility of 5.6 km would be required to support mitigation and flight safety concerns.

#### Survey Team

A survey team would consist of a combination of Air Force, and civil service/civilian personnel. Aerial and surface vessel monitoring would be conducted during all PSW missions. A survey team leader would be designated for surface vessel observations and video monitoring. The team leader would be an Eglin AFB Natural Resources Section representative or designee. Marine mammal sightings and other applicable information would be communicated from surface vessel observers and the video controller to the team leader, who would then relay this information to the test director. Aircraft-to-surface vessel communications are not likely to be available;

therefore, marine mammal sightings from the aerial team would be communicated directly to the test director. The test director would be responsible for the overall mission and for all final decisions, including possible delays or relocations due to marine mammal sightings. The test director would, however, consult with the survey team leader regarding all issues related to marine mammals before making final decisions.

The survey teams would have open lines of communication to facilitate real-time reporting of marine mammals and other relevant information, such as safety concerns. Direct communication between all personnel would be possible with the exception of aircraft-to-surface vessel communication, which would not be available. Survey results from the aircraft would be relayed to the test director, and results from the video feed and vessel surveys would be relayed to the team leader, who would coordinate with the test director. The team leader would also communicate recommendations to the test director.

#### Video Controller

Video monitoring may be conducted for some PSW missions. After consulting with the survey team leader, the test director will determine if video monitoring would be used to supplement monitoring from aircraft and vessels. If the decision is made to conduct video monitoring, PSW missions would be monitored from a land-based control center via live video feed. Under this scenario, video equipment would be placed on a barge or other appropriate platform located near the periphery of the test area. Video monitoring would, in addition to facilitating assessment of the mission, make remote viewing of the area for marine mammals possible. Although not part of the surface vessel survey team, the video controller would report any marine mammal sightings to the survey team leader. The entire ZOI may or may not be visible through the video feed,

depending on the type of ordnance and specific location of the video equipment; therefore, video observation is considered supplemental to observation from aircraft and surface vessels.

#### Aerial Survey Team

Aircraft typically provide an excellent viewing platform for detection of marine mammals at or near the surface. The aerial survey team would consist of the aircrew (Air Force personnel) who would subsequently conduct the PSW mission. The pilot would be instructed on protected marine species survey techniques and would be familiar with marine species expected to occur in the area. One person in the aircraft would act as a data recorder and would be responsible for relaying the location, species (if possible), direction of movement, and number of animals sighted to the test director. The aerial team would also identify large schools of fish (which could indicate the potential for marine mammals to be in the area), and large, active groups of birds (which could indicate the presence of a large school of fish). The pilot would fly the aircraft in such a manner that the entire ZOI and buffer zone would be observed. Aerial observers would be expected to have adequate sighting conditions within the weather limitations noted above. The PSW mission would 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.

#### Surface Vessel Survey Team

Marine mammal monitoring would be conducted from one or more surface vessels concurrent with aerial surveys in order to increase mitigation effectiveness. Monitoring activities would be conducted from the highest point feasible on the vessel.

Vessel-based observers would be familiar with the area's marine life and would be equipped with optical equipment with sufficient magnification to allow observation of surfaced marine mammals. If the entire ZOI cannot be adequately observed from a stationary point, the surface vessel(s) would conduct transects to provide sufficient coverage.

#### Proposed Mitigation Plan

The applicable ZOI and buffer zone would be monitored for the presence of marine mammals and marine mammal indicators. Implementation of PSW mitigation measures would be regulated by Air Force safety parameters. Although unexpected, any mission may be delayed or aborted due to technical issues. In the event of a technical delay, all mitigation procedures would continue until either the mission takes place or is canceled. To ensure the safety of vessel-based survey personnel, the team would depart from the test area approximately one hour before the live mission commences.

#### Pre-mission Monitoring

The purposes of pre-mission monitoring are to: (1) evaluate the test site for environmental conditions suitable for conducting the mission; and (2) verify that the ZOI and buffer zone are free of visually detectable marine mammals, as well as potential indicators of the presence of these animals including large schools of fish and flocks of birds. On the morning of the test mission, the test director and survey team leader would confirm that there are no issues that would preclude proceeding with the mission and that the weather is adequate to support monitoring and mitigation measures.

Approximately Five Hours Pre-mission to Daybreak

The surface vessel survey team would be on site near the test target approximately five hours prior to launch (no later than daybreak). Observers on board at least one vessel, including the team leader, would assess the overall suitability of the test site based on environmental conditions (e.g., wind, visibility, and sea surface conditions) and visual observations of marine mammals or indicators (e.g., large schools of fish or large flocks of active birds on or near the water). This information would be relayed to the test director.

#### Two Hours Prior to Mission

Aerial and vessel-based surveys would begin two hours prior to launch. Aerial-based observers would evaluate the test site for environmental suitability in addition to surveying for protected marine species. The aerial team would monitor the test site, including but not limited to the ZOI and buffer zone, and would record and relay species sighting information to the test director. Surface vessel-based observers would also monitor the ZOI and buffer zone, and the team leader would record all marine mammal sightings, including the time of sighting and direction of travel, if known. In addition to the primary survey vessel, additional vessels may be used for conducting surveys. Surveys would continue for approximately one hour.

#### One Hour Prior to Mission

Approximately one hour prior to launch, surface vessel-based observers would be instructed to leave the test site and remain outside of the safety area (10 nm) for the duration of the mission. The survey team would continue to monitor for marine mammals from outside the safety zone. The team leader would continue to record sightings and bearings for all marine mammals detected. The monitoring activities

conducted outside of the safety area would be supplemental to marine mammal monitoring for mitigation purposes due to the distance from the target. During this time, the aircraft crew would begin cold sweeps, which consist of clearing the range and confirming technical parameters, among other things. During cold sweeps, the aerial crew would continue to be able to monitor for marine mammals, although this will not be their primary task. Any marine mammal sightings during this time would be reported to the test director.

#### During the PSW Mission

Immediately prior to commencement of the live portion of the PSW mission, the survey team leader and test director would communicate to confirm the results of the marine mammal surveys and the appropriateness of proceeding with the mission.

Although the test director, with input from the survey team leader, decides whether to, postpone, move, or cancel the mission, the mission would be postponed if:

- (1) Any marine mammal is visually detected within the ZOI. The delay would continue until the marine mammal(s) that triggered the postponement is/are confirmed to be outside of the ZOI due to the animal(s) swimming out of range.
- (2) Any marine mammal is visually detected in the buffer zone and subsequently cannot be reacquired. Under this scenario, the mission would not continue until (a) the last verified location is outside of the ZOI and the animal is moving away from the mission area, or (b) the animal is not re-sighted for at least 15 minutes.
- (3) Large schools of fish are observed in the water within the ZOI, or large flocks of active birds (potential indicator of fish presence) are observed on or near the



surface of the water. The delay would continue until these potential indicators are confirmed to be outside the ZOI.

In the event of a postponement, pre-mission monitoring would continue as long as weather and daylight hours allow. The aircraft crew would not be responsible for marine mammal monitoring once the live portion of the mission begins.

#### Post PSW Mission Monitoring

Post-mission monitoring is designed to determine the effectiveness of pre-mission monitoring by reporting sightings of any dead or injured marine mammals. Post-detonation monitoring via surface vessel-based observers would commence immediately following each detonation. The vessel(s) would move into the ZOI from outside the safety zone and continue monitoring for at least 30 minutes, concentrating on the area down-current from the test site. The monitoring team would document any marine mammals that were killed or injured as a result of the test and, if practicable, coordinate with the regional marine mammal stranding response network to recover any dead animals for examination. The species, number, location, and behavior of any animals observed by the monitoring teams would be documented and reported to the team leader.

#### Mitigation Proposed for AS Gunnery Activities

##### Visual Monitoring

Areas to be used in AS gunnery missions would be visually monitored for marine mammal presence from the AC-130 aircraft prior to commencement of the mission. If the presence of one or more marine mammals is detected, the target area would be avoided. In addition, monitoring would continue during the mission. If marine mammals are detected at any time, the mission would halt immediately and relocate as necessary or

be suspended until the marine mammal has left the area. Visual monitoring would be supplemented with infra-red (IR) and TV monitoring. As nighttime visual monitoring is generally considered to be ineffective at any height, the EGTTTR missions will incorporate the TR.

#### Pre-mission and Mission Monitoring

The AC-130 gunships travel to potential mission locations outside U.S. territorial waters (typically about 15 nm from shore) at an altitude of approximately 6,000 ft (1,829 m). The location of AS gunnery missions places these 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., ESA-listed sperm whales) generally occur. After arriving at the target site, and prior to each firing event, the aircraft crew will conduct a visual survey of the 5-nm (9.3-km) wide prospective target area to attempt to sight any marine mammals that may be present (the crew will do the same for sea turtles and Sargassum rafts). The AC-130 gunship would conduct at least two complete orbits at a minimum safe airspeed around a prospective target area at a maximum altitude of 6,000 ft (1,829 m). Provided marine mammals (and other protected species) are not detected, the AC-130 would then continue orbiting the selected target point as it climbs to the mission testing altitude. The initial orbits occur over a time frame of approximately 15 minutes. Monitoring for marine mammals, vessels, and other objects would continue throughout the mission. If a towed target is used, Air Force Special Operations Command would ensure that the target is moved in such a way that the largest impact threshold does not extend beyond the 5 nm cleared area. In other

words, the tow pattern would be conducted so that the maximum harassment range of 282 m (Table 8) is always within the 5 nm cleared area.

During the low altitude orbits and the climb to testing altitude, the aircraft crew would visually scan the sea surface within the aircraft's orbit circle for the presence of marine mammals. Primary emphasis for the surface scan would be upon the flight crew in the cockpit and personnel stationed in the tail observer bubble and starboard viewing window. During nighttime missions, crews would use night vision goggles during monitoring. The AC-130's optical and electronic sensors would also be employed for target clearance.

If any marine mammals are detected during pre-mission surveys or during the mission, activities would be immediately halted until the area is clear of all marine mammals for 60 minutes, or the mission would be relocated to another target area. If the mission is relocated, the survey procedures would be repeated at the new location. In addition, if multiple firing events occur within the same flight, these clearance procedures would precede each event.

#### Post-mission Monitoring

Aircraft crews would conduct a post-mission survey beginning at the operational altitude of approximately 15,000 to 20,000 ft elevation and proceeding through a spiraling descent to approximately 6,000 ft. It is anticipated that the descent would occur over a 3- to 5-minute time period. During this time, aircrews would use the Infrared Detection Sets and low-light TV systems to scan the water surface for animals that may have been impacted during the gunnery exercise. During daytime missions, visual scans would be used as well.

## Sea State Limitations

If daytime weather and/or sea conditions preclude adequate aerial surveillance for detecting marine mammals and other marine life, AS gunnery exercises would be delayed until adequate sea conditions exist. Daytime live fire missions would be conducted only when sea surface conditions are sea state 4 or less on the Beaufort scale (see Table 11-1 in the LOA application).

## Operational Mitigation Measures

Eglin AFB has identified three operation mitigation measures for implementation during AS gunnery missions, including development of a training round, use of ramp-up procedures, and limitations on the number of missions conducted over the waters beyond the continental shelf. The largest type of ammunition used during typical gunnery missions is the 105-mm round containing 4.7 lbs 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 USAF developed a 105-mm TR that contains only 0.35 lb (0.16 kg) of HE. The TR was developed to dramatically reduce the risk of harassment at night and Eglin AFB anticipates a 96 percent reduction in impact by using the 105-mm TR (Table 11).

Table 11. Example of Mitigation Effectiveness Using the 105 mm Training Round

Threshold (dB)	105 mm TR (~0.3 lbs HE)		105 mm FU (~4.7 lbs HE)		Mitigation (Percent Reduction)	
	ZOI (km <sup>2</sup> )	Affected Animals (#)	ZOI (km <sup>2</sup> )	Affected Animals (#)	ZOI (%)	Affected Animals (%)
160	6.8	40.9	179.2	1,078.8	96	96

The ramp-up procedure refers to the process of beginning an activity with the least impactful action and proceeding to subsequently more impactful actions. The rationale for requiring ramp-up procedures is that this process may allow animals to

perceive steadily increasing noise levels and to react, if necessary, before the noise reaches a threshold of significance. In the case of AS gunnery activities, ramp-up procedures involve 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 AC-130 gunship's weapons are used in two activity phases. First, the guns are checked for functionality and calibrated. This step requires an abbreviated period of live fire. After the guns are determined to be ready for use, 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-, 40-, and 105-mm rounds).

The ramp-up procedure shall be required for the initial gun calibration, and, after this phase, the guns may be fired in any order. Eglin AFB and NMFS believe 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 while the live-fire mission is proceeding. This protocol allows a more realistic training experience. In combat situations, gunship crews would not likely fire the complete ammunition load of a given caliber gun before proceeding to another gun. Rather, a combination of guns would likely be used as required by an evolving situation. An additional benefit of this protocol is that mechanical or ammunition problems on an individual gun can be resolved while live fire continues with functioning weapons. This also diminishes the possibility of a lengthy pause in live fire, which, if greater than 10 min, would necessitate Eglin's re-initiation of protected species surveys.

Many marine mammal species found in the GOM, including the ESA-listed sperm whale, occur with greater regularity in waters over and beyond the continental shelf break. As a conservation measure to avoid impacts to sperm whales, Eglin AFB would conduct only one mission per year beyond the 200 m isobaths, which is considered to be the shelf break. This measure is expected to provide greater protection to several other marine mammal species as well. Eglin AFB has established a line delineating the shelf break, with coordinates of N 29° 42.73' W 86° 48.27' and N 29° 12.73' W 85° 59.88' (see Figure 1-12 in Eglin's LOA application). A maximum of only one mission per year would occur south of this line. The exposure analysis assumed that the single mission beyond the shelf break would occur during the day, so that 105 mm FU rounds would be used.

#### Proposed Monitoring and Reporting

In order to issue an ITA for an activity, Section 101(a)(5)(D) of the MMPA states that NMFS must, where applicable, 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 ITAs 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.

For PSW and AS gunnery missions, prospective mission sites would be monitored for the presence of marine mammals prior to the commencement of activities. Monitoring would continue throughout gunnery missions and up to one hour prior to the launch of ordnance for PSW missions, and post-mission surveys would be conducted

after all missions. Monitoring would be conducted using visual surveys from aircraft and, for PSW mission, surface vessels and aircraft using monitoring enhancement instruments (including the IDS and low-light TV systems). If marine mammals are detected during pre-mission monitoring (up to one hour prior to ordnance launch for PSW missions) or during the mission for AS, activities would be immediately halted until the area is clear of all marine mammals, or for AS gunnery the mission would be relocated to another area.

In addition to monitoring for marine mammals before, during, and after missions, the following monitoring and reported measures would be required:

(1) Aircrews would participate in the marine mammal species observation training. Each crew members would be required to complete the training prior to participating in a mission. Observers would receive training in protected species survey and identification techniques.

(2) Eglin AFB Natural Resources Section would track use of the EGTTR and protected species observations through the use of mission reporting forms.

(3) For AS gunnery missions, coordinate with next-day flight activities to provide supplemental post-mission observations for marine mammals in the operations area of the previous day.

(4) A summary annual report of marine mammal observations and mission activities would be submitted to the NMFS Southeast Regional Office (SERO) and the NMFS Office of Protected Resources either at the time of a request for renewal of an LOA or 90 days after expiration of the current authorization if a new permit is not requested. This annual report would include the following information: (i) Date and

time of each exercise; (ii) a complete description of the pre-exercise and post-exercise activities related to mitigating and monitoring the effects of mission activities on marine mammal populations; (iii) results of the monitoring program, including numbers by species/stock of any marine mammals noted injured or killed as a result of missions and number of marine mammals (by species if possible) that may have been harassed due to presence within the activity zone; and (iv) for AS gunnery missions, a detailed assessment of the effectiveness of sensor-based monitoring in detecting marine mammals in the area of A-S gunnery operations.

(5) If any dead or injured marine mammals are observed or detected prior to testing, or injured or killed during mission activities, a report would be made to NMFS by the following business day.

(6) Any unauthorized takes of marine mammals (i.e., mortality) would be immediately reported to NMFS and to the respective stranding network representative.

#### Research

Although Eglin AFB does not currently conduct independent studies, Eglin's Natural Resources Section participates in marine mammal tagging and monitoring programs lead by other agencies. In addition, the Natural Resources Section supports participation in annual surveys of marine mammals in the GOM with NMFS. From 1999 to 2002, Eglin AFB, through a contract representative, participated in summer cetacean monitoring and research efforts. The contractor participated in visual surveys in 1999 for cetaceans in the GOM, photo-identification of sperm whales in the northeastern Gulf in 2001, and as a visual observer during the 2000 Sperm Whale Pilot Study and the 2002 sperm whale Satellite-tag (S-tag) cruise. Eglin AFB's Natural Resources Section



has also obtained funding from the Department of Defense for two marine mammal habitat modeling projects. One such project (Garrison, 2008) included funding for and extensive involvement of NMFS personnel to apply the most recent aerial survey data to habitat modeling and protected species density estimates in the northeastern GOM.

Based on this information, NMFS has preliminarily determined that the proposed PSW and AS gunnery mission activities will not have any impact on the food or feeding success of marine mammals in the northern GOM. Additionally, no loss or modification of the habitat used by cetaceans in the GOM is expected. Marine mammals are anticipated to temporarily vacate the area of live fire events. However, these events usually do not last more than 90 to 120 min at a time, and animals are anticipated to return to the activity area during periods of non-activity. Thus, the proposed activity is not expected to have any habitat-related effects that could cause significant or long-term consequences for individual marine mammals or on the food sources that they utilize.

#### Impact on Availability of Affected Species or Stock for Taking for Subsistence Uses

There are no relevant subsistence uses of marine mammals 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.

#### Negligible Impact Analysis and Preliminary Determinations

Except with respect to certain activities not pertinent here, the MMPA defines "harassment" as: any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild [Level A harassment]; or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by

causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [Level B harassment].

The NDAA's definition of harassment as it applies to a military readiness activity is: (i) any act that injures or has the significant potential to injure a marine mammal or marine mammal stock in the wild [Level A Harassment]; or (ii) any act that disturbs or is likely to disturb a marine mammal or marine mammal stock in the wild by causing disruption of natural behavioral patterns, including, but not limited to, migration, surfacing, nursing, breeding, feeding, or sheltering, to a point where such behavioral patterns are abandoned or significantly altered [Level B Harassment].

We propose to authorize take by Level A and Level B harassment for the proposed activities. There is no evidence that planned activities could result in serious injury or mortality within the specified geographic area for the requested authorization. The required mitigation and monitoring measures would minimize any potential risk for serious injury or mortality.

Pursuant to our regulations implementing the MMPA, an applicant is required to estimate the number of animals that will be "taken" by the specified activities (i.e., takes by harassment only, or takes by harassment, injury, and/or death). This estimate informs the analysis that we must perform to determine whether the activity will have a "negligible impact" on the species or stock. 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." In making a negligible impact determination, NMFS considers a variety of factors, including but not limited to:

(1) the number of anticipated serious injuries and mortalities; (2) the number and nature of anticipated injuries (Level A harassment); (3) the number, nature, intensity, and duration of Level B harassment; and (4) the context in which the takes occur.

As mentioned previously, NMFS estimates that six species of marine mammals could be potentially affected by Level A or Level B harassment over the course of the five-year period. No take by serious injury or death is anticipated or would be authorized. By incorporating the proposed mitigation measures, including monitoring and shut-down procedures described previously, impacts to individual marine mammals from the proposed activities are expected to be limited to Level A (injury) or Level B (TTS and behavioral) harassment.

The USAF has described its specified activities based on best estimates of the number of hours that the USAF will conduct PSW and AS gunnery missions. The exact number of missions may vary from year to year, but will not exceed the annual totals indicated in Tables 1 and 2.

Taking the above into account, considering the sections discussed further, and dependent upon the implementation of the proposed mitigation measures, NMFS has preliminarily determined that the total level of incidental take authorized for PSW and AG gunner missions over the five-year effective period of the regulations will have a negligible impact on the six marine mammal species and stocks affected in operational areas in the Gulf of Mexico.

The U.S. Air Force complied with the requirements of the previous LOAs and IHAs issued for PSW and AS gunnery activities, and reported zero observed takes of marine mammals incidental to these training exercises. For this proposed rulemaking,

NMFS has preliminarily determined that, based on the information provided in Eglin's application, the Final PEA and this document, the total taking of marine mammals by PSW and AS gunnery activities will have a negligible impact on the affected species or stocks over the 5-year period of take authorizations. No take by serious injury or mortality is anticipated during this period, and no take by serious injury or mortality is proposed to be authorized.

In addition, the potential for temporary or permanent hearing impairment and injury is low and through the incorporation of the proposed mitigation measures specified in this document would have the least practicable adverse impact on the affected species or stocks. The information contained in Eglin's EA, PEA, and incidental take application support NMFS' finding that impacts will be mitigated by implementation of a conservative safety range for marine mammal exclusion, incorporation of aerial and shipboard survey monitoring efforts in the program both prior to and after detonation of explosives, and delay/postponement/cancellation of detonations whenever marine mammals or other specified protected resources are either detected within the safety zone or may enter the safety zone at the time of detonation or if weather and sea conditions preclude adequate aerial surveillance. Since the taking would not result in more than the incidental harassment of certain species of marine mammals, will have only a negligible impact on these stocks, will not have an unmitigable adverse impact on the availability of these stocks for subsistence uses (as there are no known subsistence uses of marine mammal stocks in the GOM), and, through implementation of required mitigation and monitoring measures, will result in the least practicable adverse impact on the affected

marine mammal stocks, NMFS has preliminarily determined that the requirements of section 101(a)(5)(A) of the MMPA have been met and this proposed rule can be issued.

The proposed number of animals taken for each species can be considered small relative to the population size. Based on the best available information, NMFS proposes to authorize take, by Level B harassment only, of 2,200 bottlenose dolphin (444 annually), 1,765 Atlantic spotted dolphin (353 annually), 15 pantropical spotted dolphin (3 annually), 15 spinner dolphin (3 annually), 10 dwarf/pygmy sperm whale (2 annually), representing 4.9, 5.7, 0.02, 0.12, and 1.3 percent of the populations, respectively.

However, this represents an overestimate of the number of individuals harassed over the duration of the proposed rule and LOAs because these totals represent much smaller numbers of individuals that may harassed multiple times. In addition, NMFS proposes to authorize take, by Level A harassment, of 25 bottlenose dolphin (5 annually) and 20 Atlantic spotted dolphin (4 annually). No stocks known from the action area are listed as threatened or endangered under the ESA or otherwise considered depleted. Five bottlenose dolphin stocks designated as strategic under the MMPA may be affected by AS gunnery activities. In this case, under the MMPA, strategic stock means a marine mammal stock for which the level of direct human-caused mortality exceeds the potential biological removal level. These include Pensacola/East Bay, Choctawhatchee Bay, St. Andrew Bay, St. Joseph Bay, and St. Vincent Sound/Apalachicola Bay/St. George Sound stocks; however, large numbers of dolphins would not be affected because the missions generally occur more than 15 miles (24 km) from shore. No serious injury or mortality is anticipated, nor is the proposed action likely to result in long-term impacts such as

permanent abandonment or reduction in presence with the EGTTR. No impacts are expected at the population or stock level.

#### Endangered Species Act (ESA)

No ESA-listed marine mammals are known to occur within the action area. Therefore, there is no requirement for NMFS to consult under Section 7 of the ESA on the promulgation of regulations and issuance of LOAs under section 101(a)(5)(A) of the MMPA. However, ESA-listed sea turtles may be present within the action area. On October 20, 2004 and March 14, 2005, NMFS issued Biological Opinions (BiOps) on AS gunnery and PSW exercises in the EGTTR, respectively. The BiOps, which are still in effect, concluded that AS gunnery and PSW exercises are unlikely to jeopardize the continued existence of the endangered green turtle (*Chelonia mydas*), leatherback turtle (*Dermochelys coriacea*), Kemp's ridley turtle (*Lepidochelys kempi*), or threatened loggerhead turtle (*Caretta caretta*). No critical habitat has been designated for these species in the action area; therefore, none will be affected.

#### National Environmental Policy Act (NEPA)

##### AS Gunnery Missions

The USAF prepared a Final PEA in November 2002 for the AS gunnery activities within the EGTTR. NMFS made the USAF's 2002 Final PEA available upon request on January 23, 2006 (71 FR 3474). In accordance with NOAA Administrative Order 216-6 (Environmental Review Procedures for Implementing the National Environmental Policy Act, May 20, 1999), NMFS reviewed the information contained in the USAF's 2002 Final PEA, and determined that the document accurately and completely described the proposed action, the alternatives to the proposed action, and the potential impacts on

marine mammals, endangered species, and other marine life that could be impacted by the preferred alternative and the other alternatives. Accordingly, NMFS adopted the USAF's 2002 Final PEA and made its own FONSI on May 16, 2006. In the course of adopting the USAF's 2002 Final PEA and reach a FONSI NMFS took into consideration updated data and information contained in NMFS' Federal Register document noting issuance of an IHA to Eglin AFB for this activity (71 FR 27695, May 12, 2006), and previous notices (71 FR 3474, January 23, 2006; 70 FR 48675, August 19, 2005) and determined that the proposed action had not changed substantially or presented new circumstances or environmental concerns such that supplemental NEPA analysis was necessary.

The issuance of the 2008 IHA to Eglin AFB amended three of the mitigation measures for reasons of practicality and safety, therefore, NMFS reviewed the USAF's 2002 Final PEA and determined that a new EA was warranted to address: (1) the proposed modifications to the mitigation and monitoring measures; (2) the use of 23 psi as a change in the criterion for estimating potential impacts on marine mammals from explosives; and (3) a cumulative effects analysis of potential environmental impacts from all GOM activities (including Eglin mission activities), which was not addressed in the USAF's 2002 Final PEA. Therefore, NMFS prepared a new EA in December 2008 and issued a FONSI for its action on December 9, 2008. NMFS has reviewed the environmental impacts on the human environment presented by this rulemaking and annual LOAs to Eglin AFB and found that they are not substantially different from the action analyzed in Eglin's EA. No new incremental change would occur under this new authority. NMFS has preliminarily determined that the proposed action has not changed

substantially and that no significant new circumstances or environmental concerns bearing on the proposed action or its impacts exist. As the environmental impacts for this proposed action fall within the scope of the NMFS 2008 EA, NMFS presently does not intend to issue a new EA, a supplemental EA, or an environmental impact statement for the issuance of a LOA to Eglin AFB to take marine mammals incidental to this activity. NMFS, however, will review all comments submitted by the public in response to this notice before making a final determination on the need to supplement the 2008 EA and whether to reaffirm the FONSI.

#### PSW Missions

In December 2003, Eglin AFB released a Draft PEA on PSW activities within the EGTR. On April 22, 2004 (69 FR 21816), NMFS noted that Eglin AFB had prepared a Draft PEA for PSW activities and made this PEA available upon request. Eglin AFB updated the information in that PEA and issued a Final PEA and a Finding of No Significant Impact (FONSI) on the PSW activities. NMFS reviewed the information contained in Eglin AFB's Final PEA and determined that the PEA accurately and completely describes the preferred action alternative, a reasonable range of alternatives, and the potential impacts on marine mammals, endangered species, and other marine life that could be impacted by the preferred and non-preferred alternatives. Based on this review and analysis, NMFS has preliminarily determined that this proposed rule is within the scope of the Eglin AFB PEA and intends to adopt the PEA for this proposed action. The impacts on the human environment by issuance of this rulemaking and annual LOAs to Eglin AFB are not substantially different from the action analyzed in Eglin's PEA and as no new incremental change would occur under this new authority. NMFS has



therefore preliminarily determined that the proposed action has not changed substantially and that no significant new circumstances or environmental concerns bearing on the proposed action or its impacts exist. As the environmental impacts for this proposed action fall within the scope of the Eglin AFB PEA. NMFS has preliminarily determined that it is not necessary to issue a new EA or supplemental EA, for promulgation of this rule and issuance of a LOA to Eglin AFB to take marine mammals incidental to this activity. NMFS, however, will review all comments submitted by the public in response to this notice before making a final determination on the need to prepare a separate EA or supplement the Eglin AFB PEA and make an independent FONSI.

Having reviewed the information in the past Federal Register notices issuing IHAs and regulations for the proposed activities, public comments submitted in response to them, as well as the serious of EAs discussed above, NMFS does not anticipate that a comprehensive authorization for the incidental take of marine mammals for both PWS and AS gunnery exercises is likely to result in new or significant cumulative impacts. We will consider comments submitted by the public on this issue.

#### Request for Information

NMFS requests interested persons to submit comments, information, and suggestions concerning Eglin's application and this proposed rule (see ADDRESSES). All comments will be reviewed and evaluated as NMFS prepares a final rule and makes final determinations on whether to issue the requested authorization. In addition, this notice and referenced documents provide all environmental information relevant to our proposed action for the public's review and we solicit comments which we will also consider as we make final NEPA determinations.

## Classification

This action has been determined to be not significant for purposes of Executive Order 12866.

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. This proposed rule would apply only to the U.S. Air Force, a Federal agency, which is not considered to be a small governmental jurisdiction, small organization or small business, as defined by the Regulatory Flexibility Act. This rulemaking authorizes Eglin Air Force Base to take of marine mammals incidental to a specified activity. The specified activity defined in the proposed rule includes the use of explosive detonations, which are only used by the U.S. military, during training activities that are only conducted by the U.S. Air Force. Additionally, any requirements imposed by a Letter of Authorization issued pursuant to these regulations, and any monitoring or reporting requirements imposed by these regulations, will be applicable only to Eglin Air Force Base.

This action may indirectly affect a small number of contractors providing services related to reporting the impact of the activity on marine mammals, some of whom may be small businesses, but the number involved would not be substantial. Further, since the monitoring and reporting requirements are what would lead to the need for their services, the economic impact on any contractors providing services relating to reporting impacts would be beneficial. Because the Chief Counsel for Regulation certified that this

proposed rule would not have significant economic impact on a substantial number of small entities, a regulatory flexibility analysis is not required and none has been prepared.

List of Subjects in 50 CFR Part 217

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

Dated: April 30, 2013.

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Alan D. Risenhoover  
Director, Office of Sustainable Fisheries,  
performing the functions and duties of the  
Deputy Assistant Administrator for Regulatory Programs,  
National Marine Fisheries Service.

For reasons set forth in the preamble, 50 CFR part 217 is proposed to be amended as follows:

PART 217--REGULATIONS GOVERNING THE TAKING AND IMPORTING OF  
MARINE MAMMALS

1. The authority citation for part 217 continues to read as follows:

Authority: 16 U.S.C. 1361 et seq.

2. Subpart L is added to part 217 to read as follows:

Subpart L--Taking Marine Mammals Incidental to Conducting Precision Strike Weapon and Air-to-Surface Gunnery Missions at Eglin Gulf Test and Training Range (EGTTR) in the Gulf of Mexico

Sec.

217.110 Specified activity and specified geographical region.

217.111 Effective dates.

- 217.112 Permissible methods of taking.
- 217.113 Prohibitions.
- 217.114 Mitigation.
- 217.115 Requirements for monitoring and reporting.
- 217.116 Applications for Letters of Authorization.
- 217.117 Letters of Authorization.
- 217.118 Renewal of Letters of Authorization.
- 217.119 Modifications to Letters of Authorization.

Subpart L--Taking Marine Mammals Incidental to Conducting Precision Strike Weapon and Air-to-Surface Gunnery Missions at Eglin Gulf Test and Training Range (EGTTR) in the Gulf of Mexico

§ 217.110 Specified activity and specified geographical region.

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

(b) The taking of marine mammals by the Air Force is only authorized if it occurs within the Eglin Air Force Base Gulf Test and Training Range (as depicted in Figure 1-9 of the Air Force's Request for a Letter of Authorization). The EGTTR is the airspace over the Gulf of Mexico beyond 3 nm from shore that is controlled by Eglin Air Force Base. The specified activities will take place within the boundaries of Warning Area W-151. The inshore and offshore boundaries of W-151 are roughly parallel to the shoreline contour. The shoreward boundary is 3 nm from shore, while the seaward boundary extends approximately 85 to 100 nm offshore, depending on the specific location. W-151

has a surface area of approximately 10,247 nm<sup>2</sup> (35,145 km<sup>2</sup>), and includes water depths ranging from approximately 20 to 700 m.

(c) The taking of marine mammals by the Air Force is only authorized if it occurs incidental to the following activities within the designated amounts of use:

(1) The use of the following Precision Strike Weapons (PSWs) for PSW training activities, in the amounts indicated below:

(i) Joint Air-to-Surface Stand-Off Missile (JASSM) AGM-158 A and B - two live shots (single) and 4 inert shots (single) per year;

(ii) Small-diameter bomb (SDB) GBU-39/B - six live shots per year, with two of the shots occurring simultaneously, and 12 inert shots per year, with up to two occurring simultaneously.

(2) The use of the following ordnance for daytime Air-to-Surface (AS) Gunnery training activities, in the amounts indicated below:

(i) 105 mm HE Full Up (FU) – 25 missions per year with 30 rounds per mission

(ii) 40 mm HE – 25 missions per year with 64 rounds per mission

(iii) 25 mm HE – 25 mission per year with 560 rounds per mission

(3) The use of the following ordnance for nighttime Air-to-Surface (AS) Gunnery training activities, in the amounts indicated below:

(i) 105 mm HE Training Round (TR) – 45 missions per year with 30 rounds per mission

(ii) 40 mm HE – 45 missions per year with 64 rounds per mission

(iii) 25 mm HE – 45 mission per year with 560 rounds per mission

§ 217.111 Effective dates.

Regulations in this subpart are effective from [Insert date of publication of the final rule in the Federal Register] until [Insert date 5 years after date of publication of the final rule in the Federal Register].

§ 217.112 Permissible methods of taking.

(a) Under a Letter of Authorization issued pursuant to §§ 216.106 and 217.117 of this chapter, the Holder of the Letter of Authorization may incidentally, but not intentionally, take marine mammals by Level A and Level B harassment within the area described in § 217.110(b), provided the activity is in compliance with all terms, conditions, and requirements of these regulations and the appropriate Letter of Authorization.

(b) The activities identified in § 217.110(c) must be conducted in a manner that minimizes, to the greatest extent practicable, any adverse impact on marine mammals and their habitat.

(c) The incidental take of marine mammals under the activities identified in § 217.110(c) is limited to the following species, by the indicated method of take and the indicated number:

(1) Level B harassment.

(i) Atlantic bottlenose dolphin (Tursiops truncatus) – 2,200 (an average of 444 annually).

(ii) Atlantic spotted dolphin (Stenella frontalis) – 1,765 (an average of 353 annually).

(iii) Pantropical spotted dolphin (S. attenuate) – 15 (an average of 3 annually).

(iv) Spinner dolphin (S. longirostris) – 15 (an average of 3 annually).

(v) Dwarf or pygmy sperm whale (Kogia simus or Kogia breviceps) – 10 (an average of 2 annually).

(2) Level A harassment.

(i) Atlantic bottlenose dolphin (Tursiops truncatus) – 25 (an average of 5 annually).

(ii) Atlantic spotted dolphin (Stenella frontalis) – 20 (an average of 4 annually).

§ 217.113 Prohibitions.

No person in connection with the activities described in § 217.110 shall:

(a) Take any marine mammal not specified in § 217.112(c);

(b) Take any marine mammal specified in § 217.112(c) other than by incidental take as specified in § 217.112(c)(1) and (c)(2);

(c) Take a marine mammal specified in § 217.112(c) if such taking results in more than a negligible impact on the species or stocks of such marine mammal; or

(d) Violate, or fail to comply with, the terms, conditions, and requirements of these regulations or a Letter of Authorization issued under §§ 216.106 and 217.117 of this chapter.

§ 217.114 Mitigation.

(a) The activities identified in § 217.110(c) must be conducted in a manner that minimizes, to the greatest extent practicable, adverse impacts on marine mammals and their habitats. When conducting operations identified in § 217.110(c), the mitigation measures contained in the Letter of Authorization issued under §§ 216.106 and 217.117 of this chapter must be implemented.

(b) Precision strike weapon missions -- (1) Safety zones.

(i) For the JASSM, the Air Force must establish and monitor a safety zone for marine mammals with a radius of 2.0 nm (3.7 km) from the center of the detonation and a buffer zone with a radius of 1.0 nm (1.85 km) radius from the outer edge of the safety zone.

(ii) For the SDB, the holder of the Letter of Authorization must establish and monitor a safety zone for marine mammals with a radius of no less than 5 nm (9.3 km) for single bombs and 10 nm (18.5 km) for double bombs and a buffer zone from the outer edge of the safety zone with a radius of at least 2.5 nm (4.6 km) for single bombs and 5 nm (18.5 km) for double bombs.

(2) For PSW missions, the holder of the Letter of Authorization must comply with the monitoring requirements, including pre-mission monitoring, set forth in §217.115(c).

(3) When detonating explosives:

(i) If any marine mammals or sea turtles are observed within the designated safety zone or the buffer zone prescribed in paragraph (b)(1) of this section or that are on a course that will put them within the safety zone prior to JASSM or SDB launch, the launching must be delayed until all marine mammals are no longer within the designated safety zone.

(ii) If any marine mammals are detected in the buffer zone and subsequently cannot be reacquired, the mission launch will not continue until the next verified location is outside of the safety zone and the animal is moving away from the mission area.

(iii) If large Sargassum rafts or large concentrations of jellyfish are observed within the safety zone, the mission launch will not continue until the Sargassum rafts or



jellyfish that caused the postponement are confirmed to be outside of the safety zone due to the current and/or wind moving them out of the mission area.

(iv) If weather and/or sea conditions preclude adequate aerial surveillance for detecting marine mammals or sea turtles, detonation must be delayed until adequate sea conditions exist for aerial surveillance to be undertaken. Adequate sea conditions means the sea state does not exceed Beaufort sea state 3.5 (i.e., whitecaps on 33 to 50 percent of surface; 0.6 m (2 ft) to 0.9 m (3 ft) waves), the visibility is 5.6 km (3 nm) or greater, and the ceiling is 305 m (1,000 ft) or greater.

(v) To ensure adequate daylight for pre- and post-detonation monitoring, mission launches may not take place earlier than 2 hours after sunrise, and detonations may not take place later than 2 hours prior to sunset, or whenever darkness or weather conditions will preclude completion of the post-test survey effort described in § 217.115.

(vi) If post-detonation surveys determine that a serious injury or lethal take of a marine mammal has occurred, the test procedure and the monitoring methods must be reviewed with the National Marine Fisheries Service and appropriate changes to avoid unauthorized take must be made prior to conducting the next mission detonation.

(vii) Mission launches must be delayed if aerial or vessel monitoring programs described under § 217.115 cannot be fully carried out.

(c) Air-to-surface gunnery missions -- (1) Sea state restrictions.

(i) If daytime weather and/or sea conditions preclude adequate aerial surveillance for detecting marine mammals and other marine life, air-to-surface gunnery exercises must be delayed until adequate sea conditions exist for aerial surveillance to be undertaken. Daytime air-to-surface gunnery exercises will be conducted only when sea

surface conditions do not exceed Beaufort sea state 4 (i.e., wind speed 13-18 mph (11-16 knots); wave height 1 m (3.3 ft)), the visibility is 5.6 km (3 nm) or greater, and the ceiling is 305 m (1,000 ft) or greater.

(ii) [Reserved]

(2) Pre-mission and mission monitoring.

(i) The aircrews of the air-to-surface gunnery missions will initiate location and surveillance of a suitable firing site immediately after exiting U.S. territorial waters (> 12 nm).

(ii) Prior to each firing event, the aircraft crew will conduct a visual and/or instrument survey of the 5-nm (9.3-km) wide prospective target area to locate any marine mammals that may be present.

(A) The AC-130 gunship will conduct at least two complete orbits at a minimum safe airspeed around a prospective target area at an altitude of approximately 6,000 ft (1,829 m).

(B) If marine mammals are not detected, the AC-130 can then continue orbiting the selected target point as it climbs to the mission testing altitude.

(C) During the low altitude orbits and the climb to testing altitude, aircraft crew will scan the sea surface within the aircraft's orbit circle for the presence of marine mammals.

(D) The AC-130's optical and electronic sensors must be employed for target detection, especially at night when visibility will be poor.

(E) If any marine mammals are detected within the AC-130's orbit circle, either during initial clearance or after commencement of live firing, the mission will be

immediately halted and relocated as necessary or suspended until the marine mammal has left the area. If relocated to another target area, the clearance procedures described in paragraph (c)(2)(ii) of this section must be repeated.

(F) If multiple firing events occur within the same flight, these clearance procedures must precede each event.

(iii) If no marine mammals are detected, gunnery exercises may begin with the deployment of MK-25 flares into the center of the designated 5-nm target area.

(3) Operational mitigation measures.

(i) Ramp-up air-to-surface gunnery firing activities by beginning with the lowest caliber munition and proceeding to the highest, which means the munitions would be fired in the following order: 25 mm; 40 mm; and 105 mm.

(ii) Air-to-surface gunnery exercises conducted after sunset must use the 105-mm training round instead of the 105-mm full up round.

(iii) One mission per year may be conducted beyond the 200 m isobaths, which is south of a line delineated the shelf break with coordinates of 29° 42.73'N, 86° 48.27'W and 29° 12.73' N, 85° 59.88' W (Figure 1-12 in Eglin AFB's LOA application). The single mission beyond the shelf break will occur during daylight hours only.

(4) Post-mission monitoring.

(i) Aircrews will initiate the post-mission clearance procedures beginning at the operational altitude of approximately 15,000 to 20,000 ft (4572 to 6096 m) elevation, and then initiate a spiraling descent down to an observation altitude of approximately 6,000 ft (1,829 m) elevation. Rates of descent will occur over a 3- to 5-minute time frame.

(ii) If post-detonation surveys determine that an injury or lethal take of a marine mammal has occurred, the test procedure and the monitoring methods must be reviewed with the National Marine Fisheries Service and appropriate changes to avoid unauthorized take must be made, prior to conducting the next air-to-surface gunnery exercise.

§ 217.115 Requirements for monitoring and reporting.

(a) The Holder of the Letter of Authorization issued pursuant to §§ 216.106 and 217.117 of this chapter for activities described in § 217.110(c) is required to conduct the monitoring and reporting measures specified in this section and §217.114 and any additional monitoring measures contained in the Letter of Authorization.

(b) The Holder of the Letter of Authorization is required to cooperate with the National Marine Fisheries Service, and any other Federal, state or local agency monitoring the impacts of the activity on marine mammals. Unless specified otherwise in the Letter of Authorization, the Holder of the Letter of Authorization must notify the Director, Office of Protected Resources, National Marine Fisheries Service, or designee, by letter or telephone (301-427-8401), at least 2 weeks prior to any modification to the activity identified in § 217.110(c) that has the potential to result in the serious injury, mortality or Level A or Level B harassment of a marine mammal that was not identified and addressed previously.

(c) Monitoring procedures for PSW missions.

(1) The Holder of this Authorization must:

(i) Designate qualified on-site individual(s) to record the effects of mission launches on marine mammals that inhabit the northern Gulf of Mexico;

(ii) Have on-site individuals, approved in advance by the National Marine Fisheries Service, to conduct the mitigation, monitoring and reporting activities specified in these regulations and in the Letter of Authorization issued pursuant to §§ 216.106 and 217.117 of this chapter.

(iii) Conduct aerial surveys to reduce impacts on protected species. The aerial survey/monitoring team will consist of two experienced marine mammal observers, approved in advance by the Southeast Region, National Marine Fisheries Service. The aircraft will also have a data recorder who would be responsible for relaying the location, the species if possible, the direction of movement, and the number of animals sighted.

(iv) Conduct shipboard monitoring to reduce impacts to protected species. Trained observers will conduct monitoring from the highest point possible on each mission or support vessel(s). The observer on the vessel must be equipped with optical equipment with sufficient magnification (e.g., 25X power “Big-Eye” binoculars).

(2) The aerial and shipboard monitoring teams will maintain proper lines of communication to avoid communication deficiencies. The observers from the aerial team and operations vessel will have direct communication with the lead scientist aboard the operations vessel.

(3) Pre-mission monitoring: Approximately 5 hours prior to the mission, or at daybreak, the appropriate vessel(s) would be on-site in the primary test site near the location of the earliest planned mission point. Observers onboard the vessel will assess the suitability of the test site, based on visual observation of marine mammals and sea turtles, the presence of large Sargassum mats, seabirds and jellyfish aggregations and

overall environmental conditions (visibility, sea state, etc.). This information will be relayed to the lead scientist.

(4) Three hours prior to mission:

(i) Approximately three hours prior to the mission launch, aerial monitoring will commence within the test site to evaluate the test site for environmental suitability.

Evaluation of the entire test site would take approximately 1 to 1.5 hours. The aerial monitoring team will begin monitoring the safety zone and buffer zone around the target area.

(ii) Shipboard observers will monitor the safety and buffer zone, and the lead scientist will enter all marine mammals and sea turtle sightings, including the time of sighting and the direction of travel, into a marine animal tracking and sighting database.

(5) One to 1.5 hours prior to mission launch:

(i) Depending upon the mission, aerial and shipboard viewers will be instructed to leave the area and remain outside the safety area. The aerial team will report all marine animals spotted and their directions of travel to the lead scientist onboard the vessel.

(ii) The shipboard monitoring team will continue searching the buffer zone for protected species as it leaves the safety zone. The surface vessels will continue to monitor from outside of the safety area until after impact.

(6) Post-mission monitoring:

(i) The vessels will move into the safety zone from outside the safety zone and continue monitoring for at least two hours, concentrating on the area down current of the test site.

(ii) The holder of the Letter of Authorization will closely coordinate mission launches with marine animal stranding networks.

(iii) The monitoring team will document any dead or injured marine mammals or turtles and, if practicable, recover and examine any dead animals.

(d) Monitoring procedures for A-S gunnery missions. In addition to the monitoring requirements in § 217.114(c), the holder of the Letter of Authorization must:

(1) Cooperate with the National Marine Fisheries Service and any other Federal, state or local agency monitoring the impacts of the activity on marine mammals.

(2) Require aircrews to initiate the post-mission clearance procedures beginning at the operational altitude of approximately 15,000 to 20,000 ft (4572 to 6096 m) elevation, and then initiate a spiraling descent down to an observation altitude of approximately 6,000 ft (1,829 m) elevation. Rates of descent will occur over a 3- to 5-minute time frame.

(3) Track their use of the EGTTR for test firing missions and marine mammal observations, through the use of mission reporting forms.

(4) Coordinate air-to-surface gunnery exercises with future flight activities to provide supplemental post-mission observations of marine mammals in the operations area of the exercise.

(e) In accordance with provisions in § 217.118(b)(2), the Holder of the Letter of Authorization must conduct the research required under the Letter of Authorization.

(f) Reporting.

(1) Unless specified otherwise in the Letter of Authorization, the Holder of the Letter of Authorization must conduct all of the monitoring and reporting required under

the LOA and submit an annual report to the Director, Office of Protected Resources, National Marine Fisheries Service by a date certain specified in the LOA. This report must include the following information:

- (i) Date and time of each PSW/air-to-surface gunnery exercise;
- (ii) A complete description of the pre-exercise and post-exercise activities related to mitigating and monitoring the effects of PSW/air-to-surface gunnery exercises on marine mammal populations;
- (iii) Results of the monitoring program, including numbers by species/stock of any marine mammals noted injured or killed as a result of the training exercises and number of marine mammals (by species if possible) that may have been harassed due to presence within the applicable safety zone;
- (iv) A detailed assessment of the effectiveness of sensor-based monitoring in detecting marine mammals in the area of air-to-surface gunnery operations; and
- (v) Results of coordination with coastal marine mammal stranding networks.

(2) The final comprehensive report on all marine mammal monitoring and research conducted during the period of these regulations must be submitted to the Director, Office of Protected Resources, National Marine Fisheries Service at least 240 days prior to expiration of these regulations or 240 days after the expiration of these regulations if new regulations will not be requested.

§ 217.116 Applications for Letters of Authorization.

To incidentally take marine mammals pursuant to these regulations, the U.S. citizen (as defined at § 216.103 of this chapter) conducting the activities identified in § 217.110(c) must apply for and obtain either an initial Letter of Authorization in



accordance with §§ 216.106 and 217.117 of this chapter or a renewal under § 217.118 of this chapter.

§ 217.117 Letters of Authorization.

(a) A Letter of Authorization, unless suspended or revoked, will be valid for a period of time not to exceed the period of validity of this subpart.

(b) Each Letter of Authorization will set forth:

(1) Permissible methods of incidental taking;

(2) Means of effecting the least practicable adverse impact on the species, its habitat, and on the availability of the species for subsistence uses; and

(3) Requirements for monitoring and reporting.

(c) Issuance and renewal of the Letter of Authorization will be based on a determination that the total number of marine mammals taken by the activity as a whole will have no more than a negligible impact on the species or stock of affected marine mammals.

§ 217.118 Renewal of Letters of Authorization.

(a) A Letter of Authorization issued under § 216.106 and § 217.117 of this chapter for the activities identified in § 217.110(c) will be renewed based upon:

(1) Notification to the National Marine Fisheries Service that the activity described in the application submitted under § 217.116 will be undertaken and that there will not be a substantial modification to the described work, mitigation or monitoring undertaken during the upcoming period of validity;

(2) Timely receipt (by the dates indicated in the Letter of Authorization issued under this subpart) of the monitoring report required under

§ 217.115(f); and

(3) A determination by the National Marine Fisheries Service that the mitigation, monitoring and reporting measures required under § 217.114 and the Letter of Authorization issued under §§ 216.106 and 217.117 of this chapter, were undertaken and will be undertaken during the upcoming period of validity of a renewed Letter of Authorization.

(b) If a request for a renewal of a Letter of Authorization issued under §§ 216.106 and 217.118 of this chapter indicates that a substantial modification to the described work, mitigation, monitoring or research undertaken during the upcoming season will occur, the National Marine Fisheries Service will provide the public a period of 30 days for review and seek comment on:

(1) New cited information and data that indicates that the determinations made for promulgating these regulations are in need of reconsideration, and

(2) Proposed changes to the mitigation, monitoring and research requirements contained in these regulations or in the current Letter of Authorization.

§ 217.119 Modifications to Letters of Authorization.

(a) Except as provided in paragraphs (b) and (c) of this section, no substantive modification (including withdrawal or suspension) to a Letter of Authorization issued pursuant to §§ 216.106 and 217. 117 of this chapter shall be made until after notification and an opportunity for public comment has been provided. For purposes of this paragraph, a renewal of a Letter of Authorization under § 217.118, without modification (except for the period of validity), is not considered a substantive modification.

(b) NMFS in response to new information and in consultation with Eglin AFB, may modify the mitigation or monitoring measures in LOAs if doing so creates a reasonable likelihood of more effectively accomplishing the goals of mitigation and monitoring. Below are some of the possible sources of new data that could contribute to the decision to modify the mitigation or monitoring measures:

(1) Results from Eglin AFB's monitoring from the previous year (either from the EGTTTR or other locations).

(2) Results from specific stranding investigations.

(3) Results from general marine mammals and sound research.

(4) Any information that reveals marine mammals may have been taken in a manner, extent, or number not anticipated by these regulations or Letters of Authorization.

(c) If the Assistant Administrator determines that an emergency exists that poses a significant risk to the well-being of the species or stocks of marine mammals specified in § 217.112(c), a Letter of Authorization issued pursuant to §§ 216.106 and 217.117 of this chapter may be substantively modified without prior notification and an opportunity for public comment. Notification will be published in the Federal Register within 30 days subsequent to the action.

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