

**ENVIRONMENTAL ASSESSMENT ON THE
ISSUANCE OF AN INCIDENTAL HARASSMENT AUTHORIZATION
TO EGLIN AIR FORCE BASE TO TAKE MARINE MAMMALS
INCIDENTAL TO CONDUCTING AIR-TO-SURFACE
GUNNERY EXERCISES IN THE NORTHERN GULF OF MEXICO**

1. PURPOSE AND NEED FOR ACTION

1.1 Introduction

On February 13, 2003, the National Marine Fisheries Service (NMFS) received a request from the U.S. Air Force (USAF), Eglin Air Force Base (Eglin AFB), for an authorization under section 101(a)(5)(D) of the Marine Mammal Protection Act (MMPA; 16 USC 1361 *et seq.*) for the taking, by Level B harassment, of several species of marine mammals incidental to programmatic mission activities within the Eglin Gulf Test and Training Range (EGTTR). The EGTTR is described as the airspace over the Gulf of Mexico (Gulf or GOM) that is controlled by Eglin AFB. A notice of receipt of Eglin's application and proposed Incidental Harassment Authorization (IHA) and request for 30-day public comment was published on January 23, 2006 (71 FR 3474). A 1-year IHA was subsequently issued to Eglin AFB for this activity on May 3, 2006 (71 FR 27695, May 12, 2006). On January 29, 2007, NMFS received a request from Eglin AFB for a renewal of its IHA, which expired on May 2, 2007. This application addendum requested revisions to three components of the IHA requirements: protected species surveys, ramp-up procedures, and sea state restrictions. A *Federal Register* notice of receipt of the application and proposed IHA published on May 30, 2007 (72 FR 29974).

1.2 Purpose and Need for the Proposed Action

The purpose and need of the proposed action is to ensure compliance with the MMPA and its implementing regulations in association with Eglin AFB's proposed programmatic mission activities within the EGTTR.

Sections 101(a)(5)(A) and 101(a)(5)(D) of the MMPA 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, a notice of a proposed authorization is provided to the public for review.

Permission may be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s), will not (where relevant) have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses, and if the permissible methods of taking and requirements pertaining to the mitigation, monitoring, and reporting of such takings are set forth. NMFS has defined "negligible impact" in 50 CFR 216.103 as "...an impact resulting from the specified activity that cannot be reasonably

expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival.”

Subsection 101(a)(5)(D) of the MMPA established an expedited process by which citizens of the U.S. can apply for an authorization to incidentally take marine mammals by harassment. The National Defense Authorization Act (NDAA) of Fiscal Year (FY) 2004 (Public Law [PL] 108-136) amended the definition of “harassment” as applied to military readiness activities. Military readiness activities, as defined in PL 107-314, Section 315(f), include “training and operations of the Armed Forces that relate to combat” and constitute “adequate and realistic testing of military equipment, vehicles, weapons, and sensors for proper operation and suitability for combat use.” These two definitions apply to the programmatic mission activities within the EGTTR. For purposes of “military readiness activities,” harassment is defined as:

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

Eglin AFB determined that conducting air-to-surface (A-S) gunnery exercises and other programmatic mission activities in the EGTTR might potentially disturb marine mammals and, accordingly, submitted an application for an MMPA incidental take authorization (ITA). If the actions proposed in the ITA application will have no more than a negligible impact on the species or stocks, will not have an unmitigable adverse impact on the availability of the species or stock for subsistence uses, and the permissible methods of taking and required monitoring are set forth, then NMFS shall issue the authorization pursuant to the MMPA (16 USC 1361 *et seq*). For military readiness activities (as described in the NDAA), a determination of least practicable adverse impacts on a species or stock includes consideration, in consultation with the Department of Defense, of personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity.

1.3 Proposed Action and Scope of the Proposed Action

The proposed action is issuance of an IHA to the USAF Eglin AFB for A-S gunnery missions in the EGTTR. A-S gunnery missions, a “military readiness activity,” involve surface impacts of projectiles and small underwater detonations with the potential to affect cetaceans that may occur within the EGTTR. These missions typically involve the use of 25-mm (0.98-in), 40-mm (1.57-in), and 105-mm (4.13-in) gunnery rounds containing, 0.0662 lb (30 g), 0.865 lb (392 g), and 4.7 lbs (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 USAF has developed a 105-mm training round (TR) that contains less than

10 percent of the amount of explosive material (0.35 lb; 0.16 kg) as compared to the “Full-up” (FU) 105-mm (4.13-in) round. The TR was developed as one method to mitigate effects on marine life during nighttime A-S gunnery exercises when visibility at the water surface is poor. However, the TR cannot be used in daytime since the amount of explosive material is insufficient to be detected from the aircraft.

Water ranges within the EGTR that are typically used for the gunnery operations are located in the GOM offshore from the Florida Panhandle (areas W-151A, W-151B, W-151C, and W-151D as shown in Figure 1). Data indicate that W-151A (Figure 2) is the most frequently used water range due to its proximity to Hurlburt Field, but activities may occur anywhere within the EGTR.

As required under the 2006 IHA, the AC-130 gunship aircraft was to conduct at least two complete orbits at a minimum safe airspeed around a prospective target area at a maximum altitude of 1,500 ft (457 m). Based on an amendment requested by Eglin AFB and implemented here for safety reasons, NMFS recommends an operational altitude of approximately 4,500 to 10,000 ft (1,372-3,048 m). Ascent occurs over a 10-15 min period. Eglin AFB has noted that the search area for these orbits ensures that no vessels (or protected species) are within an area of 5 nm (9.3 km) of the target. The AC-130 continues orbiting the selected target point as it climbs to the mission-testing altitude. During the low altitude orbits and the climb to testing altitude, aircraft crew visually scan the sea surface within the aircraft’s orbit circle for the presence of vessels and protected species. Primary responsibility for the surface scan is on the flight crew in the cockpit and personnel stationed in the tail observer bubble and starboard viewing window. The AC-130’s optical and electronic sensors are also employed for target clearance. If any marine mammals are detected within the AC-130’s orbit circle, either during initial clearance or after commencement of live firing, the aircraft will relocate to another target area and repeat the clearance procedures. A typical distance from the coast for this activity is at least 15 mi (24 km).

When offshore, the crews can scan a 5-nm (9.3-km) radius around the potential impact area to ensure it is clear of surface craft, marine mammals, and sea turtles. Scanning is accomplished using radar, all-light television (TV), infrared sensors (IR), and visual means. An alternative area would be selected if any cetaceans or vessels were detected within a 5-nm (9.3 km) search area. Once the scan is completed, Mk-25 flares are dropped and the firing sequence is initiated.

A typical gunship mission lasts approximately 5 hours without refueling and 6 hours when air-to-air refueling is accomplished. A typical mission includes: (1) 30 min for take-off and to perform airborne sensor alignment, align electro-optical sensors (IR and TV) to heads-up display; (2) 1.5 to 2 hr of dry fire (no ordnance expended) and includes transition time; (3) 1.5 to 2 hr of live fire and includes clearing the area and transiting to and from the range (actual firing activities typically do not exceed 30 min); (4) 1 hr air-to-air refueling, if and when performed; and (5) 30 min of transition work (take-offs, approaches, and landings-pattern work).

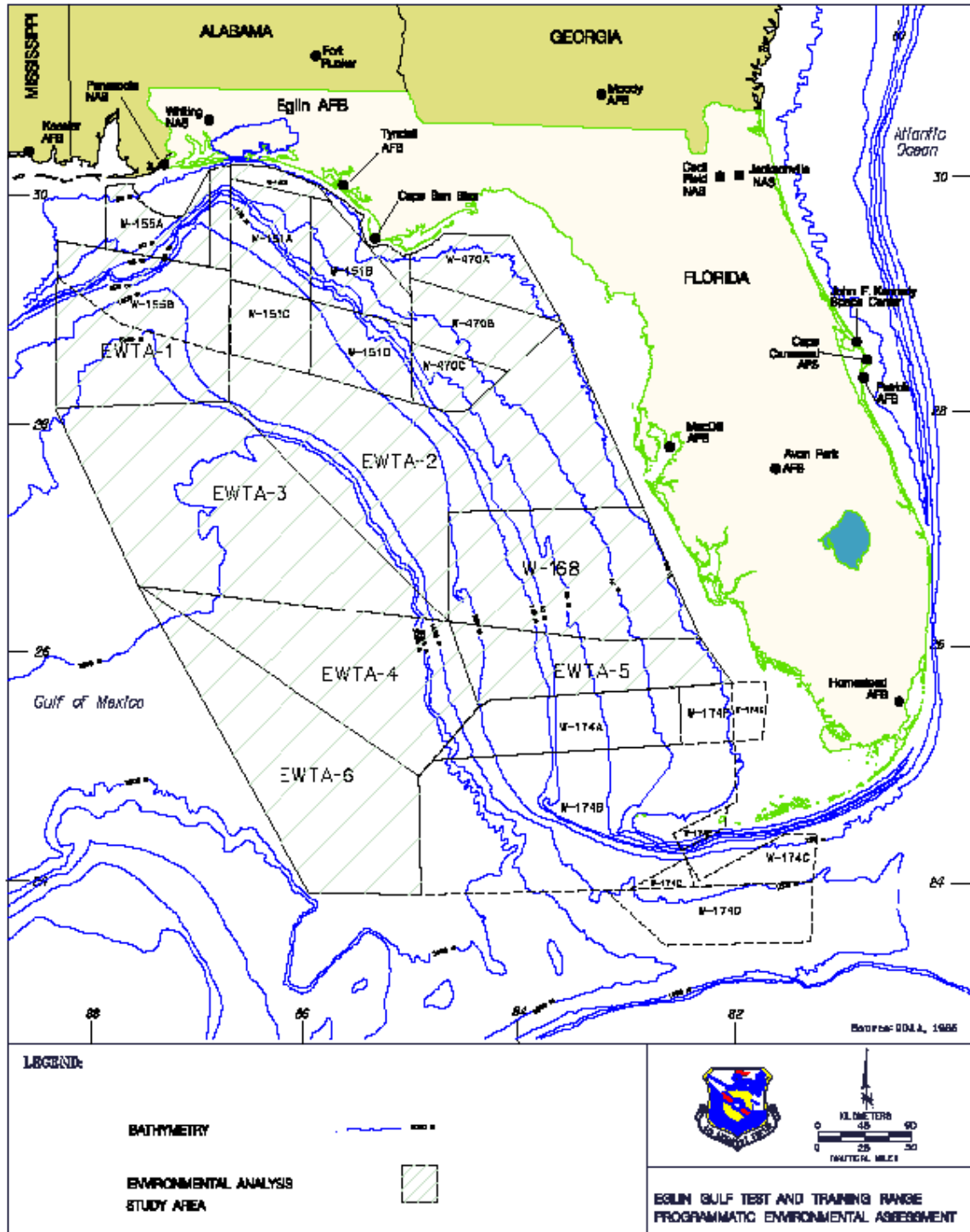


Figure 1. Eglin Gulf Test and Training Range

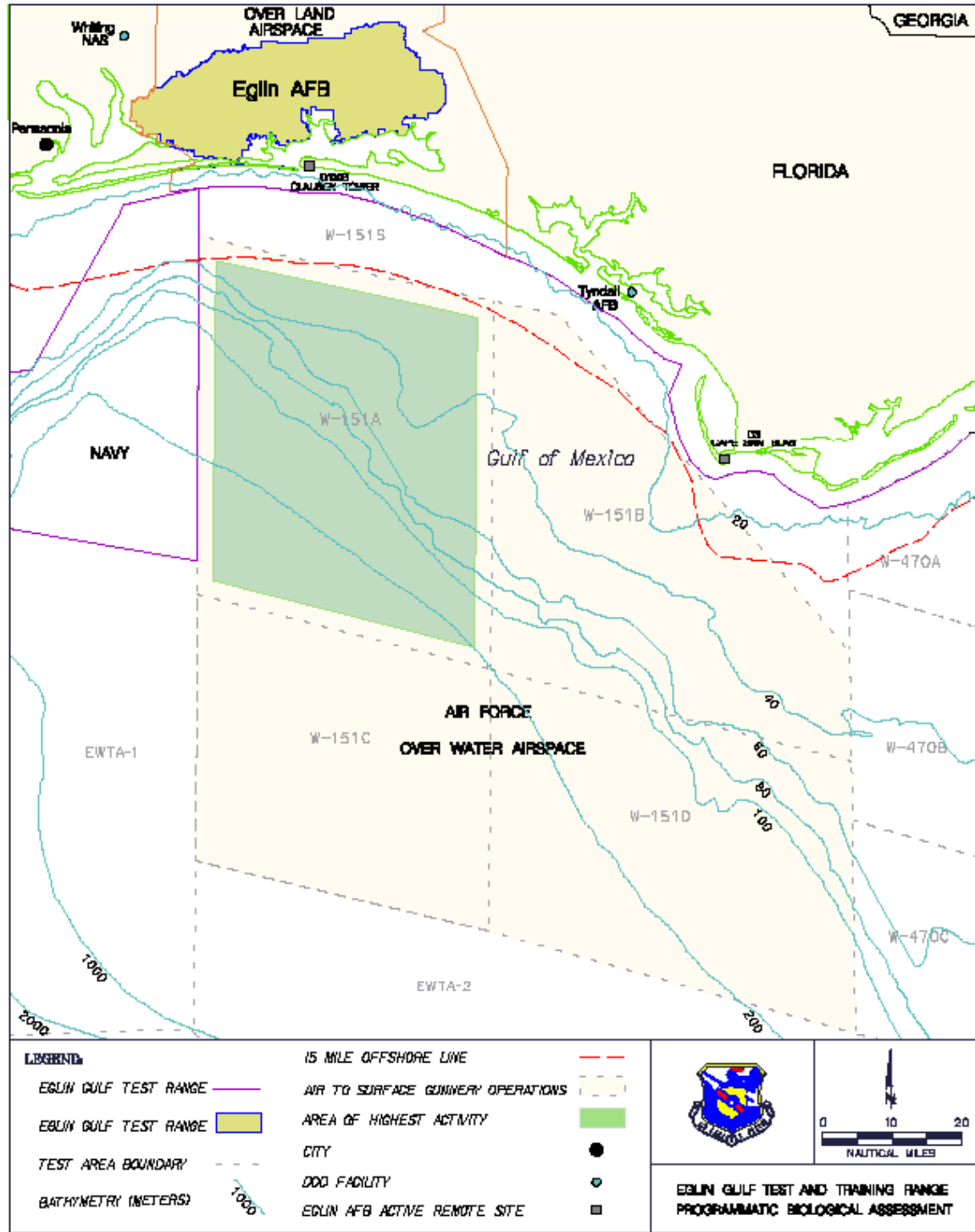


Figure 2. Primary Region for Air-to-Surface Gunnery Missions in the EGTRR

The guns are fired during the live-fire phase of the mission. The actual firing can last from 30 min to 1.5 hr but is typically completed in 30 min. The number and type of A-S gunnery munitions deployed during a mission varies with each type of mission flown. In addition to the 25-, 40-, and 105-mm rounds, marking flares are also deployed as targets. All guns are fired at a specific target in the water, usually an Mk-25 flare, often starting

with the lowest caliber ordnance or action with the least impact and proceeding to greater caliber sizes. To establish the test target area, two Mk-25 flares are deployed into the center of the 5-nm (9.3-km) radius cleared area (visually clear of aircraft, ships, and surface marine species) on the water's surface of the EGTTR. The flare's burn time normally lasts 10 to 20 min but could be much less if actually hit with one of the ordnance projectiles; however, some flares have burned as long as 40 min. Live fires are a continuous event with pauses during the firing usually well under a minute and rarely from 2 to 5 min. Firing pauses would only exceed 10 min if surface boat traffic or marine protected species caused the mission to relocate; if aircraft, gun, or targeting system problems existed; or if more flares needed to be deployed. The Eglin Safety Office has described the gunnery missions as having 95-percent containment with a 99-percent confidence level within a 5-m (16.4-ft) area around the established flare target test area.

Live-fire Event: 25-mm Round

The 25-mm (0.98-in) firing event in a typical mission includes approximately 500 to 1,000 rounds. These rounds are first fired in short bursts. These bursts last approximately 2-3 s with approximately 100 rounds per burst. Based on the very tight target area and extremely small miss distance, these bursts of rounds all enter the water within a 5-m (16.4-ft) area. Therefore, when calculations of the marine mammal Zone of Impact (ZOI) and take estimates are made later in this document for the 25-mm rounds, calculations will be based on the total number of rounds fired per year divided by 100.

Live-fire Event: 40-mm Round

The 40-mm (1.57-in) firing event of a typical mission includes approximately 10 s with approximately 20 rounds per burst. Based on the very tight target area and extremely small miss distance, these bursts of rounds all enter the water within a 5-m (16.4 ft) area. Therefore, when calculations of the marine mammal ZOI and take estimates are made later in this document for the 40-mm rounds, calculations will be based on the total number of rounds fired per year divided by 20.

Live-fire Event: 105-mm Round

The 105-mm firing event of a typical mission includes approximately 20 rounds. These rounds are not fired in bursts but as single shots. The 105-mm firing event lasts approximately 5 min with approximately two rounds per minute. Due to the single firing event of the 105-mm round, the peak pressure of each single 105-mm round is measured at a given distance 90 m (295 ft) for the 105-mm TR and 216 m (709 ft) for the 105-mm FU charge.

As described in detail in Eglin AFB's November 2002 *Eglin Gulf Test and Training Range Final Programmatic Environmental Assessment* (USAF 2002 PEA) and 2003 ITA application, and adopted herein by reference, gunnery testing in this MMPA request includes historical baseline yearly amounts in addition to proposed nighttime gunnery missions. Daytime gunnery testing uses the 105-mm FU round and nighttime gunnery training is proposed using the 105-mm TR. The number of 105-mm rounds including nighttime operations would amount to 1,742. As shown in detail in Tables 1 and 2, Eglin

proposes to conduct a total of 28 daytime missions and 263 nighttime missions annually, expending 3,832 rounds in daytime and 30,802 rounds nighttime (242 105-mm FU and 1,500 rounds would be the 105-mm TR).

Table 1. Summary of Daytime Gunnery Testing Operations in the EGTTR

Test Area	Category	Expendable	Condition	Baseline Quantity of Expendables	Number of Missions	Number of Events
W-151A	GUN	105 mm HE	LIVE	128	6	18
		25 mm HEI	LIVE	1,275	1	1
		40 mm HEI	LIVE	536	6	18
W-151B	GUN	105 mm HE	LIVE	46	2	6
		25 mm HEI	LIVE	294	1	1
		40 mm HEI	LIVE	146	1	3
W-151C	GUN	105 mm HE	LIVE	10	1	3
		25 mm HEI	LIVE	142	1	1
		40 mm HEI	LIVE	50	1	3
W-151D	GUN	105 mm HE	LIVE	39	2	6
		25 mm HEI	LIVE	567	1	1
		40 mm HEI	LIVE	198	2	6
W-151S	GUN	105 mm HE	LIVE	19	1	3
		25 mm HEI	LIVE	283	1	1
		40 mm HEI	LIVE	99	1	3
Total				3,832	28	74

Table 2. Summary of Nighttime Gunnery Training Operations in the EGTTR

Test Area	Category	Expendable	Condition	Alt. 3 Quantity	Number of Missions	Number of Events
W-151A	GUN	105 mm TR	LIVE	902	45	135
		25 mm HEI	LIVE	7,864	8	8
		40 mm HEI	LIVE	9,811	102	306
W-151B	GUN	105 mm TR	LIVE	255	13	39
		25 mm HEI	LIVE	1,452	2	2
		40 mm HEI	LIVE	3,023	31	93
W-151C	GUN	105 mm TR	LIVE	197	9	36
		25 mm HEI	LIVE	2,301	2	2
		40 mm HEI	LIVE	2,302	24	72
W-151D	GUN	105 mm TR	LIVE	133	7	21
		25 mm HEI	LIVE	830	1	1
		40 mm HEI	LIVE	1,583	16	48
W-151S	GUN	105 mm TR	LIVE	13	1	3
		25 mm HEI	LIVE	54	1	1
		40 mm HEI	LIVE	82	1	3
		TOTAL		30,802	263	770

Eglin AFB made a Finding of No Significant Impact (FONSI) determination on August 18, 2003, based on information contained within its November, 2002 Final PEA, that implementation of the subject action is not a major Federal action having significant effects on the environment within the meaning of the National Environmental Policy Act

(NEPA). The USAF determined, therefore, that an environmental impact statement (EIS) would not be prepared. NMFS noted that Eglin AFB had prepared a Final PEA for the EGTTR activity and made this 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 Eglin AFB's Final PEA and, on May 1, 2006, determined that Eglin AFB's Final PEA 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 2002 PEA under 40 CFR 1506.3 and made its own FONSI on May 16, 2006 as the required NEPA analysis to issue an IHA to the USAF Eglin AFB in 2006. The NMFS FONSI also 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).

On January 22, 2007, Eglin AFB requested a new one-year IHA and in that regard, requested certain modifications to the mitigation measures identified in its 2006 IHA. These modifications are related to the: (1) protected species surveys; (2) ramp-up procedures; and (3) sea state restrictions. These proposed modifications are addressed in detail later in this EA. As the issuance of a new IHA to Eglin AFB amends three of the mitigation measures for reasons of practicality and safety, NMFS reviewed Eglin AFB's 2002 Final PEA and determined that a new EA is warranted to address: (1) the proposed modifications to the mitigation and monitoring measures; (2) the use of 23 pounds/square inch (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 Eglin AFB's 2002 Final PEA. Where information or analyses remain the same, NMFS incorporated the USAF PEA by reference. Table 3 compares the scope of the USAF 2002 PEA to the scope of this EA.

Pursuant to NEPA, this EA has been prepared for the purpose of determining the potential impacts that may result from the proposed action, which is the issuance of an IHA to the USAF Eglin AFB for taking, by Level B harassment, of marine mammals during its proposed A-S gunnery missions, as well as other programmatic mission activities, in the EGTTR.

Table 3. A comparison of the content of the USAF 2002 PEA and this EA

Section	USAF 2002 PEA	NMFS 2008 EA
Proposed Action and Purpose and Need for Action	The proposed action is for Eglin AFB to conduct programmatic mission activities in the EGTR, including A-S gunnery missions. The PEA described, in detail, all of the proposed activities in the action area.	Eglin AFB’s proposed activities are briefly described above, with the more detailed descriptions incorporated by reference. Updated the purpose and need of the proposed action to include the statutory and regulatory framework of the marine mammal authorization permitting process.
Alternatives	Four alternatives were evaluated by the USAF.	For the issuance of the IHA, NMFS considered three alternatives: the No Action alternative and two alternatives of issuance of an IHA with and without prescribing mitigation and monitoring measures, respectively.
Affected Environment	Affected meteorological features, physical, biological, and anthropogenic resources, and the socioeconomic environment were analyzed in detail. However, the PEA did not include a thorough analysis of the marine mammal species that could be affected as a result of Eglin AFB’s proposed activities.	Updated and provided additional information on the marine mammal species that could be affected as a result of the proposed Eglin AFB programmatic mission activities.
Environmental Consequences	Environmental impacts from noise, direct physical impacts, habitat alteration, debris, chemical materials, and restricted access were analyzed under four alternatives. Level B temporary threshold shift (TTS) onset resulting from a single impulse was based on outdated information.	For the most part, USAF 2002 PEA was incorporated by reference regarding the environmental consequences from the proposed activities. Updated Level B TTS onset level from a single impulse based on newer information.
Cumulative Impacts	Not included in the USAF 2002 PEA.	Analyzed in this EA.
Mitigation and Monitoring	Not included in the USAF 2002 PEA.	Provided in this EA.

1.4 Statutory and Regulatory Framework

NMFS Statutory and Regulatory Mandates

Under the MMPA, the taking of marine mammals without a permit or exemption from NMFS is prohibited. The term “take” under the MMPA means “to harass, hunt, capture, kill or collect, or attempt to harass, hunt, capture, kill or collect.” For purposes of “military readiness activities,” harassment is defined as:

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

NMFS uses the following acoustic criteria when addressing noise impacts from explosives (Table 4). These criteria remain consistent with criteria established for other

activities in the EGTR and other acoustic activities authorized under section 101(a)(5) of the MMPA.

Table 4. Current NMFS acoustic criteria when addressing harassment from explosives

Level B Behavior	176 dB 1/3 Octave SEL (sound energy level)
Level B TTS ¹ Dual Criterion	182 dB 1/3 Octave SEL
Level A PTS ²	205 dB SEL
Level B Dual Criteria	23 psi (pound per square inch)*
Level A Injury	13 psi-msec
Mortality	30.5 psi-msec
<i>*Further discussion of this criterion is provided in Section 4.</i>	

In order to obtain an exemption from the MMPA’s prohibition on taking marine mammals, a citizen of the U.S. who engages in a specified activity (other than commercial fishing) within a specified geographic region must obtain an ITA under section 101(a)(5)(A) or (D) of the MMPA. In the case of military readiness activities, an ITA shall be granted if NMFS finds that the taking will have a negligible impact on the affected species or stock(s) and will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses. NMFS shall prescribe, where applicable the permissible methods of taking and other means of affecting the least practicable impact on the species or stock and its habitat (i.e., mitigation, monitoring and reporting of such takings). ITAs may be issued as either (1) Letters of Authorization (LOAs) or (2) IHAs, the latter applicable when there is no potential for serious injury and/or mortality or where any such potential can be negated through required mitigation measures.

As part of the MMPA authorization process, applicants are required to provide detailed mitigation plans that outline what efforts will be taken to reduce negative impacts to marine mammals and their availability for subsistence use to the lowest level practicable. In addition, IHAs require that operators conduct monitoring, which should be designed to result in an increased knowledge of the species and an understanding of the level and type of taking that results from the authorized activities. Under the MMPA, NMFS further requires that monitoring be designed to provide information and data verifying (or disputing) that the taking of marine mammals are, in fact, negligible and there are no unmitigable adverse impacts on the availability of marine mammals for subsistence uses.

NMFS and USAF Shared Mandates

Section 7 (16 U.S.C. § 1536) of the Endangered Species Act (ESA) states that all Federal agencies shall, in consultation with and with the assistance of the Secretary of the Interior/Commerce (Secretary), ensure that any actions authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered species or threatened species, or result in the destruction or adverse modification of critical habitat of such species. A Section 7 consultation by USAF with the NMFS Southeast Regional Office (SERO) Protected Resources Division under the ESA in regards to the proposed action was conducted. NMFS SERO issued a Biological Opinion

¹ TTS – Temporary threshold shift in hearing sensitivity.

² PTS – Permanent threshold shift in hearing sensitivity.

on October 20, 2004, on the proposed action. The Opinion concluded that the A-S gunnery exercises in the EGTTTR are unlikely to jeopardize the continued existence of sperm whales and leatherback, Kemp's ridley, loggerhead, and green sea turtles or destroy or adversely modify critical habitat. NMFS' SERO has determined that this action, including the modifications to the mitigation and monitoring measures, will not have effects beyond what was analyzed in the 2004 Biological Opinion. The West Indian manatee is an ESA-listed species under the jurisdiction of the US Fish and Wildlife Service (USFWS). However, the USFWS did not issue a Biological Opinion, as the West Indian manatee is not expected to be present in the offshore waters of the EGTTTR.

2. ALTERNATIVES

A total of four alternatives, including the No Action Alternative, were described in detail in Chapter 2 of the USAF 2002 PEA. However, for the issuance of the IHA to the Eglin AFB, NMFS considered and analyzed the following three alternatives.

2.1 Alternative 1 – No Action Alternative

Under the No Action Alternative, NMFS would not issue the IHA to Eglin AFB for the potential harassment of marine mammals incidental to conducting A-S gunnery mission activities in the EGTTR. The MMPA prohibits all takings of marine mammals unless authorized by a permit or exemption under the MMPA. The consequences of not authorizing incidental takes is (1) the conductors of the activity may be in violation of the MMPA if takes do occur, (2) mitigation and monitoring measures cannot be required by NMFS, and (3) mitigation measures may not be performed voluntarily by the applicant. By undertaking measures to further protect marine mammals from incidental take through the authorization program, the impacts of these activities on the marine environment can potentially be lessened. While NMFS does not authorize the A-S gunnery activities itself NMFS does authorize the unintentional, incidental harassment of marine mammals in connection with these activities and prescribes the methods of taking and other means of effecting the least practicable adverse impact on the species and stocks and their habitats. If an IHA is not issued, the USAF could decide either to discontinue the A-S gunnery activities or to continue the activities described in section 1.3 of this EA. If the latter decision is made, the USAF could independently implement (presently unidentified) mitigation measures; however, they would be proceeding without authorization from NMFS pursuant to the MMPA. If the USAF did not implement mitigation measures during A-S gunnery activities, additional takes of marine mammals by harassment could occur in addition to injury and mortality if the activities were conducted when marine mammals were present. Although the No Action Alternative would not meet the purpose and need to allow incidental takings of marine mammals under certain conditions, the CEQ regulations require consideration and analysis of a No Action Alternative for the purposes of presenting a comparative analysis to the action alternatives.

2.2 Alternative 2 – Issuance of IHA with 2006 Mitigation Measures

Under this Alternative, NMFS would issue a one-year IHA to the USAF Eglin AFB allowing the incidental take by Level B harassment of 21 cetacean species incidental to conducting A-S gunnery missions in the EGTTR, using the same mitigation measures that were included in the 2006 IHA. In the USAF 2002 Final PEA, the underlying USAF activities associated with this action are described in Alternative 3 of the 2002 EA, which was adopted by NMFS and became NMFS' preferred alternative for issuance of the 2006 IHA. A complete description of the USAF activities and the NMFS mitigation measures are included in the 2002 PEA, which is incorporated herein by reference. The mitigation and monitoring measures and reporting requirements associated with this alternative are described in Section 6.2 of this EA. Since the MMPA requires holders of IHAs to reduce

impacts on marine mammals to the lowest level practicable, implementation of this alternative would meet NMFS' purpose and need as described in this EA. However, based on experiences by personnel at Eglin AFB, some of the mitigation measures required in the 2006 IHA did not allow the USAF to fulfill the purpose and need of its proposed action, resulting in a refinement of mitigation measures presented as the Preferred Alternative in this EA, which now allows the USAF to fulfill the purpose and need of its proposed action.

2.3. Alternative 3 (Preferred Alternative) – Issuance of IHA with Refined Mitigation Measures

Under Alternative 3, NMFS would issue a one-year IHA to the USAF Eglin AFB allowing the incidental take by Level B harassment of 21 cetacean species incidental to conducting A-S gunnery mission activities in the EGTTR. The refined mitigation measures associated with this alternative are described in section 6.3 of this EA. The alternative would meet the purpose and need for permit issuance in accordance with the MMPA criteria of effecting the least practicable adverse impact on the species or stock and its habitat and that the taking will have a negligible impact on the affected species or stock(s) and will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses. The refinements to the mitigation measures proposed by the USAF are based on their experience with implementing those measures that were required in the 2006 IHA and included in Alternative 2 above.

2.4 Alternatives Considered but Eliminated from Further Consideration

NMFS considered whether other alternatives could meet NMFS' purpose and need and support the USAF required mission. An alternative that would allow for the issuance of an IHA with no required mitigation was considered but eliminated from consideration, as it would not be in compliance with the MMPA. For that reason, this alternative is not analyzed further in this document.

3. AFFECTED ENVIRONMENT

Affected meteorological features (including air quality, climate, storm systems, and ambient noise), physical resources (including waves, currents, water masses, tides, and chemical resources), biological resources (including sensitive habitats and some species), anthropogenic resources (commercial activities, artificial reefs, and military activities), and the socioeconomic environment (including recreation, fishing, boating, shipping, oil and gas production, commercial air traffic, military activity, and cultural resources) were analyzed in detail in Chapter 3 of the USAF 2002 PEA, which is incorporated by reference into this section of this EA. In addition, Sections 3.1 and 3.2 of this EA update the descriptions of the marine mammal species and stocks that could be affected as a result of Eglin AFB's proposed activities.

There are 29 species of marine mammals documented as occurring in Federal waters of the GOM. Of these 29 species of marine mammals, approximately 21 may be found within the proposed action area, the EGTTTR. These species are the Bryde's whale (*Balaenoptera brydei*), sperm whale (*Physeter macrocephalus*), dwarf sperm whale (*Kogia simus*), 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*). Information on those marine mammal species that may be impacted by the A-S gunnery exercises are summarized below. More detailed information on these species can be found in Wursig et al. (2000) and in the NMFS Stock Assessment Reports (Waring et al., 2007). This latter document is available at: <http://www.nefsc.noaa.gov/nefsc/publications/tm/tm205/>. General information on Florida manatees, which is not a species under NMFS jurisdiction, can be found in the *Florida Manatee Recovery Plan* (USFWS, 2001).

Cetacean abundance estimates for the study area are derived from GulfCet II (Davis et al., 2000) aerial surveys of the continental shelf within the Minerals Management Service (MMS) Eastern Planning Area, an area of 70,470 km². Texas A&M University and NMFS conducted the surveys from 1996 to 1998. Abundance and density data from the aerial survey portion of the survey best reflect the occurrence of cetaceans within the EGTTTR, given that the survey area overlaps approximately one-third of the EGTTTR and nearly the entire continental shelf region of the EGTTTR where military activity is highest. Cetaceans inhabiting the study area may be grouped as odontocetes (toothed whales, including dolphins) or mysticetes (baleen whales). Most of the cetaceans occurring in the Gulf are odontocetes. Very few baleen whales exist in the Gulf and most would not be expected to occur within the study area given the known distribution of these species. Table 3-5 in the USAF 2002 PEA lists the abundance and density of cetacean populations in the northern GOM, as estimated from NMFS aerial surveys. However, in order to

provide better species conservation and protection, the species density estimate data were adjusted by incorporating: (1) temporal and spatial variations; (2) surfaced and submerged variations; and (3) overall density estimate confidence (Table 3-1 in Eglin AFB's MMPA authorization request application).

The GulfCet II aerial surveys identified different density estimates of marine mammals for the shelf and slope geographic locations. Accordingly, the greatest species density estimate available for any given location was utilized for conservative impact assessments. The final adjusted density incorporates marine mammal submergence factors and a confidence level of the density estimates. The GulfCet II surveys focus on enumerating animals detected at the ocean surface and therefore do not account for submerged animals. The percent time that an animal is submerged versus at the surface was obtained from Moore and Clarke (1998), and the density estimates were adjusted accordingly. Additionally, the standard deviations of the densities were calculated, and the information was used to provide an approximately 99 percent confidence level for the adjusted densities. The adjusted densities are outlined in Table 3-1 in Eglin AFB's application.

3.1 Baleen Whales

Bryde's whales are distributed worldwide in tropical and sub-tropical waters. Their range in the Atlantic is from Virginia to the southeast Caribbean, including the northern and eastern GOM (Caldwell and Caldwell, 1983). Some researchers believe that the population of Bryde's whales found in the GOM represents a resident stock (Schmidly, 1981; Leatherwood and Reeves, 1983), but there is no information on stock differentiation. They are the only regularly occurring baleen whales in the Gulf of Mexico. Most sightings of the Bryde's whale have occurred during the spring and summer months along the continental shelf edge (Davis et al., 2000). The best estimate of abundance for Bryde's whales is 40. The minimum population estimate for the northern GOM is 25 individuals (Waring et al., 2007). The species is not listed as threatened or endangered under the ESA, and it is not considered a strategic stock under the MMPA.

3.2 Toothed Whales and Dolphins

Atlantic bottlenose dolphins are distributed throughout the continental shelf, coastal, and bay-sound waters of the northern GOM and along the U.S. mid-Atlantic coast. The identification of a biologically-meaningful "stock" of bottlenose dolphins in the GOM is complicated by the high degree of behavioral variability exhibited by this species (Wells, 2003). Currently, bottlenose dolphins in the U.S. GOM are managed as 38 different stocks: one northern GOM oceanic stock, one northern GOM continental shelf stock, three northern GOM costal stocks (western, northern, and eastern Gulf), and 33 bay, sound, and estuarine stocks (Waring et al., 2007). The identification of these stocks is based on descriptions of relatively discrete dolphin communities in these waters. A community includes resident dolphins that regularly share large portions of their ranges, exhibit similar distinct genetic profiles, and interact with each other to a much greater

extent than with dolphins in adjacent waters. Bottlenose dolphin communities do not constitute closed demographic populations, as individuals from adjacent communities are known to interbreed. Nevertheless, the geographic nature of these areas and long-term stability of residency patterns suggest that many of these communities exist as functioning units of their ecosystems. The average herd or group size of Atlantic bottlenose dolphins in shelf and slope waters was approximately 4 and 10 individuals, respectively, per herd as determined by GulfCet II surveys of eastern Gulf waters (Davis et al., 2000). The best estimate of abundance for bottlenose dolphins is 21,531. The minimum population estimate for the northern GOM is 17,084 individuals (Waring et al., 2007). The species is not listed as threatened or endangered under the ESA, and it is not considered a strategic stock under the MMPA.

The **Atlantic spotted dolphin** is endemic to the Atlantic Ocean in temperate to tropical waters (Perrin et al., 1994). In the GOM, this species occurs primarily from continental shelf waters 10 - 200 m (32.8 - 656.2 ft) deep to slope waters less than 500 m (1,640 ft) deep (Fulling et al., 2003). Atlantic spotted dolphins were seen in all seasons during GulfCet aerial surveys of the northern GOM from 1992 to 1998 (Hansen et al., 1996; Mullin and Hoggard, 2003). It has been suggested that this species may move inshore seasonally during spring, but data supporting this hypothesis are limited (Fritts et al., 1983). The best available abundance estimate for the northern GOM stock of the Atlantic spotted dolphin is the combined estimate of abundance for both the outer continental shelf (fall surveys, 1999-2001) and oceanic waters (spring and summer surveys, 2003-2004), which is 27,393, and the minimum population estimate is 22,626 (Waring et al., 2007). The species is not listed as threatened or endangered under the ESA, and it is not considered a strategic stock under the MMPA.

Blainville's beaked whales are mostly limited to temperate and tropical waters of the world (Leatherwood et al., 1976; Leatherwood and Reeves, 1983). Strandings have occurred along the northwest Atlantic coasts from Nova Scotia to Florida (Schmidly, 1981), and there have been four documented strandings and two sightings of this species in the northern GOM (Hansen et al., 1995; Wursig et al., 2000). These animals are deep-divers, feeding mainly on fish, squid, and deep-water benthic (bottom) invertebrates. Blainville's beaked whales are difficult to distinguish from other beaked whales during surveys, but beaked whales in general were sighted in all seasons during the GulfCet II surveys of the northern GOM (Davis et al., 2000). The estimate of abundance for *Mesoplodon* species in oceanic waters, pooled from 2003 to 2004, was 57 (Mullin, 2007), which is the best available abundance estimate for these species in the northern GOM. This is a combined estimate for Blainville's and Gervais' beaked whales. The minimum population estimate for *Mesoplodon* species in the northern GOM is 24 (Waring et al., 2007). This species is not listed as threatened or endangered under the ESA. This is a strategic stock because of uncertainty regarding stock size and evidence of human induced mortality and serious injury associated with acoustic activities. Also, the continuing inability to distinguish between species of *Mesoplodon* raises concerns about the possibility of mortalities of one stock or the other exceeding potential biological removal (PBR).

Cuvier's beaked whales range from Massachusetts to the West Indies in the Atlantic, including the GOM (Caldwell and Caldwell, 1983). Strandings have occurred in all months along the east coast of the U.S. (Schmidly, 1981) and throughout the year in the GOM (Wursig et al., 2000). Perhaps the most common beaked whale in the Gulf, these animals have been sighted in all seasons during the GulfCet II surveys of the northern GOM (Davis et al., 2000). The estimate of abundance for Cuvier's beaked whales in oceanic waters, pooled from 2003 to 2004, was 65 (Mullin, 2007), which is the best available abundance estimate for this species in the northern GOM. The estimate for the same time period for unidentified *Ziphiidae* was 337, which may also include an unknown number of *Mesoplodon* species (Waring et al., 2007). The minimum population estimate for the northern GOM is 39 Cuvier's beaked whales (Waring et al., 2007). The species is not listed as threatened or endangered under the ESA, but it is considered a strategic stock under the MMPA because of evidence of human induced mortality and serious injury associated with acoustic activities.

Gervais' beaked whales are relatively unknown with little specific information available on size, distribution, or feeding habits. Occurrences of beaked whales are typically alone or in pairs, and they are often seen covered with circular markings (scratches). Strandings have occurred along the northwest Atlantic coast from Florida to Nova Scotia (Schmidly, 1981), and there have been 16 documented strandings in the GOM (Wursig et al., 2000). Beaked whales have been seen during all seasons of GulfCet II surveys (Davis et al., 2000). The estimate of abundance for *Mesoplodon* species in oceanic waters, pooled from 2003 to 2004, was 57 (Mullin, 2007), which is the best available abundance estimate for these species in the northern GOM. This is a combined estimate for Blainville's and Gervais' beaked whales. The minimum population estimate for *Mesoplodon* species in the northern GOM is 24 (Waring et al., 2007). This species is not listed as threatened or endangered under the ESA. This is a strategic stock because of uncertainty regarding stock size and evidence of human induced mortality and serious injury associated with acoustic activities. Also, the continuing inability to distinguish between species of *Mesoplodon* raises concerns about the possibility of mortalities of one stock or the other exceeding PBR.

Clymene dolphins are endemic to tropical and subtropical waters of the Atlantic (Leatherwood and Reeves, 1983; Perrin and Mead, 1994). The Clymene dolphin is a recently recognized species, having been designated in 1981. In the northern GOM, these animals are primarily sighted over the deeper waters off the continental shelf (Mullin et al., 1994). Clymene dolphins were sighted in winter, spring, and summer during GulfCet aerial surveys of the northern GOM during 1992-1998 (Hansen et al., 1996; Mullin and Hoggard, 2000). The estimate of abundance for Clymene dolphins in oceanic waters, pooled from 2003 to 2004, was 6,575 (Mullin, 2007), which is the best available abundance estimate for this species in the northern GOM. The minimum population estimate for the northern GOM is 4,901 individuals (Waring et al., 2007). The species is not listed as threatened or endangered under the ESA and is not considered a strategic stock under the MMPA.

Both **dwarf and pygmy sperm whales** appear to be distributed worldwide in temperate to tropical waters (Caldwell and Caldwell, 1989). Sightings of these animals in the northern GOM occur primarily in oceanic waters (Mullin et al., 1991; Mullin and Fulling, 2004). Differentiating between the two species at sea is often difficult. Dwarf and pygmy sperm whales have a high percentage of strandings relative to percentage of population of all cetaceans (Mullin et al., 1994). Sightings of *Kogia* species were documented in all seasons during GulfCet aerial surveys of the northern GOM during 1992-1998 (Hansen et al., 1996; Mullin and Hoggard, 2000). The estimate of abundance for dwarf and pygmy sperm whales in oceanic waters, pooled from 2003 to 2004, was 453 (Mullin, 2007), which is the best available abundance estimate for this species in the northern GOM. The minimum population estimate for the northern GOM is 340 dwarf and pygmy sperm whales. Neither species is listed as threatened or endangered under the ESA, nor are they considered strategic stocks under the MMPA.

False killer whales in the Atlantic range from Maryland to Venezuela, including the eastern and northwestern GOM. Sightings of this species in the northern GOM occur in oceanic waters (Mullin and Fulling, 2004). False killer whales were seen in the spring and summer during the GulfCet II surveys of the northern GOM (Davis et al., 2000), and in the spring during vessel surveys (Mullin and Fulling, 2004). The best estimate of abundance for the species in the GOM is 777, with a minimum population estimate of 501 individuals (Waring et al., 2007). The species is not listed as threatened or endangered under the ESA nor is it considered a strategic stock under the MMPA.

Fraser's dolphins are tropical in distribution (Perrin et al., 1994) and should be expected in pelagic waters of all oceans. This species has been sighted in the northern GOM in deeper water (>200 m, 656 ft) off of the continental shelf in all seasons (Leatherwood et al., 1993; Hansen et al., 1996; Mullin and Hoggard, 2000). Sightings of groups of Fraser's dolphins have historically been uncommon to rare. Therefore, both the best available abundance estimate and the minimum population estimate for this species in the northern GOM are unknown (Waring et al., 2007). The species is not listed as threatened or endangered under the ESA. Also, despite an undetermined PBR, this is not a strategic stock under the MMPA because there is no documented human-related mortality or serious injury.

Killer whales are distributed worldwide from tropical to polar regions (Leatherwood and Reeves, 1983). Sightings of these animals in the northern GOM during 1951-1995 occurred primarily in oceanic waters ranging from 256-2,652 m (840-8,701 ft), averaging 1,242 m (4,075 ft), in the north-central GOM (O'Sullivan and Mullin, 1997). Despite extensive shelf surveys (O'Sullivan and Mullin, 1997), no killer whales have been reported on the GOM shelf waters other than those reported in 1921, 1985, and 1987 by Katona et al. (1988). Killer whales were seen only in the summer during GulfCet aerial surveys of the northern GOM between 1992 and 1998 (Hansen et al., 1996; Mullin and Hoggard, 2000), were reported from May through June in vessel surveys (Mullin and Fulling, 2004), and recorded in May, August, September, and November by earlier opportunistic ship-based sources (O'Sullivan and Mullin, 1997). The best estimate of abundance for this species is 49. The minimum population estimate for the northern

GOM is 28 individuals (Waring et al., 2007). The species is not listed as threatened or endangered under the ESA, and it is not considered a strategic stock under the MMPA.

The **melon-headed whale** is distributed worldwide in tropical to sub-tropical waters (Jefferson et al., 1994). Sightings in the northern GOM occur in oceanic waters (Mullin et al., 1994; Mullin and Fulling, 2004). Sightings of melon-headed whales were documented in all seasons during GulfCet aerial surveys in the northern GOM between 1992 and 1998 (Hansen et al., 1996; Mullin and Hoggard, 2000). The best estimate of abundance for melon-headed whales is 3,451. The minimum population estimate in the northern GOM is 2,238 individuals (Waring et al., 2007). The species is not listed as threatened or endangered and is not considered a strategic stock.

Pantropical spotted dolphins are abundant in tropical and some sub-tropical oceans (Perrin et al., 1987; Perrin and Hohn, 1994). In the northern GOM, sightings of this species occur in oceanic waters (Mullin and Fulling, 2004). They were seen in all seasons during GulfCet aerial surveys of the northern GOM between 1992 and 1998 (Hansen et al., 1996; Mullin and Hoggard, 2000). The estimate of abundance for pantropical spotted dolphins in oceanic waters, pooled from 2003 to 2004, was 34,067, which is the best available abundance estimate for this species in the northern GOM. The minimum population estimate for the northern GOM is 29,311 individuals (Waring et al., 2007). The species is not listed as threatened or endangered under the ESA or as a strategic stock under the MMPA.

The **pygmy killer whale** is distributed worldwide in tropical and sub-tropical waters (Ross and Leatherwood, 1994). Sightings of these animals in the northern GOM occur in oceanic waters (Mullin and Fulling, 2004). Sightings of pygmy killer whales were made in all seasons during GulfCet aerial surveys of the northern GOM between 1992 and 1998 (Hansen et al., 1996; Mullin and Hoggard, 2000). The estimate of abundance for pygmy killer whales in oceanic waters, pooled from 2003 to 2004, was 323, which is the best available abundance estimate for this species in the northern GOM. The minimum population estimate for the northern GOM is 203 individuals (Waring et al., 2007). The species is not listed as threatened or endangered under the ESA or as a strategic stock under the MMPA.

Risso's dolphin is distributed worldwide in tropical to warm temperate waters (Leatherwood and Reeves, 1983). Sightings in the Gulf occur primarily along the continental slope (Baumgartner, 1997). This species was seen in all seasons during the GulfCet aerial surveys of the northern Gulf between 1992 and 1998 (Hansen et al., 1996; Mullin and Hoggard, 2000). The best estimate of abundance for Risso's dolphin in Gulf waters is 1,589. The minimum population estimate for the northern GOM is 1,271 individuals (Waring et al., 2007). Risso's dolphin is not listed as threatened or endangered under the ESA. This is not a strategic stock under the MMPA.

Rough-toothed dolphins are distributed worldwide in tropical to warm temperate waters (Leatherwood and Reeves, 1983; Miyazaki and Perrin, 1994). They occur in both oceanic and continental shelf waters in the northern GOM (Fulling et al., 2003; Mullin

and Fulling, 2004). Rough-toothed dolphins are expected to occur throughout the year in the GOM (Jefferson et al., 1992; MMS, 1990). Sightings of this species were recorded in the eastern Gulf in the spring and summer during the GulfCet II surveys (Davis et al., 2000). The best available abundance estimate for the rough-toothed dolphin in the northern GOM is the combined estimate of abundance for both the outer continental shelf and oceanic waters which is 2,942. The minimum population estimate for the northern Gulf is 2,034 individuals (Waring et al., 2007). The species is not listed as threatened or endangered and is not considered a strategic stock.

The **short-finned pilot whale** is distributed worldwide in tropical to temperate waters (Leatherwood and Reeves, 1983). They are more commonly observed in the western and central Gulf than in the eastern Gulf. In the northern GOM, sightings of these animals occur primarily on the continental slope (Mullin and Fulling, 2004). Sightings of short-finned pilot whales occurred in all seasons during the GulfCet aerial surveys of the northern Gulf between 1992 and 1998 (Hansen et al., 1996; Mullin and Hoggard, 2000). The best estimate of abundance for short-finned pilot whales is 716. The minimum population estimate for the northern Gulf is 542 individuals (Waring et al., 2007). The species is not listed as threatened or endangered under the ESA. This is not a strategic stock under the MMPA.

Sperm whales are found throughout the world's oceans in deep waters to the edge of the ice in both poles (Leatherwood and Reeves, 1983; Rice, 1989; Whitehead, 2002). They are the most abundant of the federally endangered whales in the GOM. Sperm whales can be found along the continental slope and shelf break, as well as near seamounts and submarine ridges. Seasonal aerial surveys confirm that sperm whales are present in the northern GOM in all seasons (Mullin et al., 1994; Hansen et al., 1996; Mullin and Hoggard, 2000). The estimate of abundance for sperm whales in oceanic waters, pooled from 2003 to 2004, was 1,665, which is the best available abundance estimate for this species in the northern Gulf. The minimum population estimate in the northern GOM is 1,409 individuals (Waring et al., 2007). The species is listed as endangered under the ESA and is therefore also considered a strategic stock under the MMPA.

Spinner dolphins are found in tropical to temperate waters worldwide (Leatherwood and Reeves, 1983; Perrin and Gilpatrick, 1994). Sightings of these animals in the northern Gulf occur in oceanic waters (Mullin and Fulling, 2004). Spinner dolphins were seen in all seasons during GulfCet aerial surveys of the northern GOM between 1992 and 1998 (Hansen et al., 1996; Mullin and Hoggard, 2000). The best estimate of abundance for spinner dolphins is 1,989. The minimum population estimate in the northern Gulf is 1,356 individuals (Waring et al., 2007). The species is not listed as threatened or endangered and is not considered a strategic stock.

Striped dolphins are distributed worldwide in tropical to temperate oceanic waters (Leatherwood and Reeves, 1983; Perrin et al., 1994). Sightings of these animals in the northern GOM occur in oceanic waters (Mullin and Fulling, 2004), and they were seen in all seasons during GulfCet aerial surveys between 1992 and 1998 (Hansen et al., 1996; Mullin and Hoggard, 2000). The best estimate of abundance for striped dolphins is

3,325. The minimum population estimate in the northern Gulf is 2,266 individuals (Waring et al., 2007). The species is not listed as threatened or endangered under the ESA and is not considered a strategic stock under the MMPA.

4. ENVIRONMENTAL CONSEQUENCES

4.1 Alternative 1 (No Action)

Under the No Action Alternative, NMFS would not issue the requested IHA to the USAF. In this case, the USAF would decide whether or not it would want to continue with the proposed activities. If the USAF chooses not to conduct the programmatic mission activities, including A-S gunnery activities, then there would be no effects to marine mammals. If the USAF decides to conduct some or all of the activities without receipt of an MMPA IHA, they could operate with or without mitigation measures; however, this would be in violation of the provisions of the MMPA. If the USAF were to operate without mitigation measures, and marine mammals were present in the action area, there is the potential for behavioral disturbance, injury, and mortality of marine mammals, which is prohibited by the MMPA unless provided for by an exemption. If the USAF decides to voluntarily implement mitigation measures similar to those described and analyzed in Chapter 6 of this EA, then the impacts may be similar to those described for Alternatives 2 and 3 below. However, the consequences should not be considered as analyzed in this EA without issuance of an IHA. In addition, the USAF could decide to implement all of the alternatives described in their 2002 PEA. However, without issuance of an IHA, these activities would be conducted in violation of the MMPA. In this case, the impacts to marine mammals would be similar to those addressed in that document (USAF, 2002), but the activities would not be compliant with the MMPA as analyzed in this EA.

4.2 Alternative 2

A-S gunnery operations may potentially impact marine mammals at or near the water surface. Environmental consequences from restricted access, habitat alteration, direct physical impacts (DPI), noise, debris, and chemical materials were described in detail in Chapter 4 of the USAF 2002 PEA (Alternative 3 in the PEA), which is incorporated into this EA by reference. Some additional information is also contained in the information provided in the Supplemental Information Request submitted by Eglin AFB to NMFS in March, 2003. That analysis is incorporated into this EA by reference. Marine mammals could potentially be harassed, injured, or killed by exploding and non-exploding projectiles and falling debris (USAF, 2002). However, based on the analyses provided in the 2002 PEA and the 2003 Supplemental Information Request, NMFS concurs with Eglin AFB that gunnery exercises are not likely to result in any injury or mortality to marine mammals. No additional effects beyond those already analyzed in the USAF 2002 PEA and NMFS' *Federal Register* Notices of a proposed and final IHA (71 FR 3474, January 23, 2006; 71 FR 27695, May 12, 2006) would be expected under this alternative.

4.3 Alternative 3 (Preferred)

Under Alternative 3, the only change from Alternative 2 would be the refinement of certain mitigation measures. Eglin AFB requested modifications to the protected species

surveys, ramp-up procedures, and sea state restrictions. Chapter 6 describes the revised mitigation and includes a comparative analysis of the effectiveness of that mitigation relative to Alternative 2 (i.e., the 2006 IHA measures).

Based on the analysis in Chapter 6, the changes to mitigation would allow the USAF to conduct activities during higher sea state conditions (a change from up to 3.5 on the Beaufort scale to up to 4 on the Beaufort scale), to increase the altitude of protected species surveys (flown at 6,000 ft altitude instead of 1,000-2,000 ft altitude), and to alter the procedures for conducting ramp-up (only conduct ramp-up for the initial gun calibration phase). A change to the sea state restriction is not expected to negatively impact marine mammals in the proposed action area. While whitecaps are fairly frequent on the sea surface in sea states of 4 on the Beaufort scale, A-S gunnery missions are not conducted if such conditions make observation of the gunnery target (the flare) problematic. Eglin and NMFS believe that marine animals can be observed in weather conditions that allow observation of the gunnery flare. Additionally, the protected species surveys will now be flown at 6,000 ft altitude with sensor-based observations as opposed to surveys flown at 1,000 ft altitude using visual observations. Eglin AFB and NMFS believe that the sensor-based survey protocol is superior to the visual-based observations and will allow for easier detection of marine mammals in the proposed action area. Lastly, the ramp-up procedure will allow marine mammals the opportunity to respond to increasing noise levels and leave the area of the A-S gunnery mission activities before live-fire commences.

NMFS' evaluation of these refinements is considered in the context of the least practicable adverse impact standards specific to military readiness activities, which includes consideration, in consultation with the Department of Defense, of personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity. The refinements to the mitigation measures from the 2006 IHA that are being considered for inclusion in the new IHA will put in effect the least practicable adverse impact on the affected marine mammal species or stocks and will have a negligible impact on the affected species or stocks. The provision requiring that the activity not have an unmitigable adverse impact on the availability of the affected species or stock for subsistence uses does not apply for this action since no subsistence activities of marine mammals occur in the proposed action area. The potential impacts on marine mammals under this alternative are expected to be the same as those that would be expected under Alternative 2, as analyzed in the USAF 2002 PEA and NMFS' *Federal Register* Notices of a proposed and final IHA (71 FR 3474, January 23, 2006; 71 FR 27695, May 12, 2006).

4.4 Acoustic Effect Criteria

Subsequent to the issuance of the USAF PEA, NMFS updated one of the dual criteria related to the Level B temporary threshold shift (TTS) onset level. 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 TTS₂ (TTS level 2 minutes 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 minutes 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 (see Table 4). The 23 psi criterion is used in this EA for evaluating the potential for the onset of Level B TTS of 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).

4.5 Estimation of Take and Impact

Estimating the impacts to marine mammals from underwater detonations is difficult due to complexities of the physics of explosive sound under water and the limited understanding with respect to hearing in marine mammals. Detailed assessments were made in the notice for the IHA issued in 2006 (71 FR 27695, May 12, 2006) and in the *Federal Register* Notice of proposed IHA for this action (72 FR 29974, May 30, 2007). These assessments used, and improved upon, the criteria and thresholds for marine mammal impacts that were developed for the shock trials of the *USS SEAWOLF* and the *USS Winston S. Churchill* (DDG-81) (Department of the Navy, 1998; 2001), as described in section 4.4 above. Criteria for assessing impacts from Eglin AFB's A-S gunnery exercises include: (1) mortality, as determined by exposure to a certain level of positive impulse pressure (expressed as psi-msec); (2) injury, both hearing-related and non-hearing related; and (3) harassment, as determined by a temporary loss of some hearing ability and behavioral reactions. Mortality resulting from DPI or the resulting sounds generated into the water column from detonations was determined to be highly unlikely and was not considered further by Eglin AFB or NMFS because of the small amounts of net explosive weight for each of the rounds fired in the EGTTR and the mitigation measures that will be required by NMFS in the IHA.

Potential impacts resulting from A-S test operations include DPI resulting from ordnance. DPI could result from inert bombs, gunnery ammunition, and shrapnel from live missiles falling into the water. Marine mammals swimming at the surface could potentially be injured or killed by projectiles and falling debris if not sighted and firing discontinued. Mainly due to the comparatively large number of rounds expended, small arms gunnery operations offers a worst-case scenario for evaluating DPI of EGTTR operations. Some small-arms gunnery rounds contain small amounts of explosives, but the majority do not. However, the possibility of DPI to marine mammals is considered highly unlikely for the reasons described below. Therefore, the risk of injury or mortality to marine mammals from DPI is low. The assumptions made by Eglin AFB for DPI calculations can be found in the USAF 2002 Final PEA under the analysis for Alternative 1. Approximately 606 small-arms gunnery firing events comprise the baseline level of potential DPI events, as shown here in Table 5.

Table 5. EGTTR A-S Gunnery/Small Arms Operations as Events

Activity/EGTTR Event	Percentage	Number
Small Arms-50 Cal Ball Events	16.3 percent	99
Small Arms 5.56 Linked Events	0.8 percent	5
Small Arms 7.62 mm Ball Events	82.8 percent	502
Total Baseline -Small Caliber Events	100 percent	606

DPI impacts are only anticipated to affect marine species at or very near the ocean surface. As a result, in order to calculate impacts, Eglin AFB used corrected species densities (see Table 4-23 in Eglin’s Final PEA) to reflect the surface interval population, which is approximately 10 percent of densities calculated for distribution in the total water column. As shown in Table 6 here (and thereby correcting PEA Table 4-23), the impacts to marine mammals swimming at the surface that could potentially be injured or killed by projectiles and falling debris was determined to be an average of 0.2059 marine mammals per year. However, NMFS believes that the mitigation measures that Eglin AFB proposes under this action (discussed in section 6 of this EA) would significantly reduce even these low levels.

Table 6. Potential Small Arms DPI Impacts (Annual) to Marine Mammal Species

Species	Density (#/km ²)	Adjusted Density (#/km ²)	Impact Zone Area (km ²)	Animals in Impact Zone (#)	Years To Impact 1 Mammal
Cetaceans	4.381	0.4381	0.047874	2.10E-02	48
ESA-listed Cetaceans	0.011	0.0011	0.047874	5.27E-05	18,989

In addition to small arms, Eglin calculated the potential for other non-explosive items (bombs, missiles, and drones) to impact marine mammals. The number of annual events expected is 551 bombs, 1,183 missiles, and 99 drones. As shown in the USAF 2002 Final PEA and Tables 6 and 7 in this document, the potential for any DPI to marine mammals is extremely remote (1 cetacean per 48 years of activity from small arms and 332 years from non-small arms activities) and can, therefore, be discounted.

Table 7. Potential Non-Small Arms/Non-Gunnery DPI Impacts (Annual) to Marine Mammal Species

Species	Density (#/km ²)	Adjusted Density (#/km ²)	Impact Zone Area (km ²)	Animals in Impact Zone (#)	Years To Impact 1 Mammal (#)
Cetaceans	4.381	0.4381	0.00688	0.003014128	332
ESA-listed Cetaceans	0.011	0.0011	0.0688	0.000007568	132,135

Similar to non-small arms/non-gunnery DPI impacts, DPI impacts from gunnery activities may also affect marine mammals in the surface zone. Again, DPI impacts are anticipated to affect only marine mammals at or near the ocean surface and not animals that are submerged at the time. Accordingly, the density estimates have been adjusted to indicate surface animals only being potentially affected. Using the firing methodology explained earlier in this document, Tables 8 and 9 demonstrate that the potential for any DPI from gunnery activities are extremely remote and can be discounted. Using the largest round (105 mm), it would take approximately 120 years to impact a marine mammal from daytime gunnery activities and approximately 27 years to impact a marine mammal from nighttime gunnery activities.

Table 8. Potential Daytime Gunnery DPI Impacts (annual) to Cetaceans

Species/ Shell Size	Density (#/km)	Adjusted Density (#/km ²)	Impact Zone Area (km ²)	Number of Events (#)	Animals in Impact Zone (#)	Years to Impact 1 Mammal (#)
Cetacea/ 25 mm	4.381	0.4381	0.00007854	26	0.000881198	1,135
Cetacea/ 40 mm	4.381	0.4381	0.00007854	51	0.001770311	565
Cetacea/ 105 mm	4.381	0.4381	0.00007854	242	0.008326827	120

Table 9. Potential Nighttime Gunnery DPI Impacts (annual) to Cetaceans

Species/ Shell Size	Density (#/km)	Adjusted Density (#/km ²)	Impact Zone Area (km ²)	Number of Events (#)	Animals in Impact Zone (#)	Years to Impact 1 Mammal (#)
Cetacea/ 25 mm	4.381	0.4381	0.00007854	125	0.004287972	233
Cetacea/ 40 mm	4.381	0.4381	0.00007854	723	0.024873814	40
Cetacea/ 105 mm	4.381	0.4381	0.00007854	1,061	0.036507285	27

Table 4 (presented earlier in this EA) summarizes the relevant thresholds for levels of noise that may result in Level A (injury) harassment, Level B (TTS) behavioral harassment or Level B (sub-TTS) behavioral harassment to marine mammals. Mortality and injury thresholds are designed to be conservative by considering the impacts that would occur to the most sensitive life stage (e.g., a dolphin calf). Table 10 provides the estimated ZOI radii for the EGTRR ordnance.

Table 10. Estimated Range for a ZOI Distance for the EGTTR Ordnance

Expendable	Level A Harassment-Injurious(205 dB) EFDL (m)	Level B Harassment Non-Injurious (182 dB) EFDL For TTS (m)	Level B Harassment Non-injurious (23 psi) For TTS (m)	Level B Harassment-Non-injurious (176 dB) EFDL For Behavior (m)
105 mm FU	0.79	11.1	216	22.1
105-mm TR	0.22	3.0	90	6.0
40-mm HE	0.33	4.7	122	9.4
25-mm HE	0.11	1.3	49	2.6

EFDL = Energy Flux Density Level; FU = Full-up; TR = Training Round; HE = High Explosive

As mentioned previously, the EGTTR live fire events are continuous events with pauses during the firing usually well under a minute and rarely from 2 to 5 minutes. Live fire typically occurs within a 30 minute time frame, including all ordnance fired: 25 mm (Phase I), 40 mm (Phase II), and 105 mm (Phase III), and where the 105-mm ordnance are fired as separate rounds with up to 30-second intervals, the 25-mm and the 40-mm are often fired in multiple bursts. These bursts include multiple rounds (25 to 100) within a 10- to 20-s time frame. Eglin notes that even if animal avoidance once firing commences is not considered, an average swim speed (1.5 m/s) of the animal would not allow sufficient time for new animals to re-enter the Level B harassment ZOI (23 psi) within the time frame of a single burst. As such, only the peak pressure of a single round is measured per burst and experienced at a given distance (49 m (161 ft; Phase I), 122 m (400 ft; Phase II)).

For daytime firing it is assumed that the average swim speed per cetacean is approximately 3 knots or 1.5 m/sec. As a conservative scenario, Eglin assumes that there is one animal present within or near the 216-m ZOI (FU 105-mm round ZOI) which may be potentially ensonified within the 23-psi TTS exposure at the time that the 105-mm live firing begins. Density distributions have assumed an even distribution of approximately 4.38 animals/km² or approximately 500 m (1640 ft) apart (all species) for the analyses for take estimates. At this density distribution and typical swim speed, the next available cetacean would approach the perimeter of the 216-m (709 ft) ZOI (23-psi TTS ZOI) in approximately 5.5 minutes, assuming a straight line path. With live fire events of the 105-mm occurring at a rate of approximately 2 rounds per minute, nearly one half (or 10 rounds) of the total 105-mm rounds (20 rounds) would potentially be expended within this 5.5 minute time frame. If the concept of marine mammal avoidance of an area once firing commences is not considered, an average swim speed of 1.5 m/s (4.9 ft/s) would allow sufficient time for new animals to re-enter the 23-psi TTS impact area. Allowing for a potential 2 minute break in firing after 10 rounds are expended, it is, therefore, conservative and reasonable to assume that nearly 3 to 4 individual animals could be exposed to the 23-psi TTS sound level during a typical 20 round firing event. Therefore, the ZOI and Level B harassment take estimate calculations are based on the total number of rounds fired per year divided by 5, or approximately 20 percent. This approach assumes that although single animals may be ensonified more than once due to the time

required to exit the 23 psi TTS ZOI, animals are not considered to be "taken" more than once for the purposes of estimating take levels.

Similarly, as a conservative approach for nighttime firing, Eglin assumes that there is one animal present within or near the 90-m (295-ft) ZOI (105-mm TR ZOI) which may be potentially ensonified within the 23-psi TTS exposure zone at the time that the 105-mm round live firing phase begins. Density distributions have assumed an even distribution of approximately 4.38 animals/km² or approximately 500 m (1640 ft) apart (all species) for the analyses for take estimates. At this density distribution and typical swim speed, the next available cetacean would approach the perimeter of the 90-m (295-ft) ZOI (23-psi TTS ZOI) in approximately 5.5 minutes or the same time as with the 216-m ZOI (used for the 105-mm FU). The difference is the amount of time it takes the animal to exit the ZOI or in other words, how long the animal resides within the ZOI on a straight line path. With live fire events of the 105-mm round occurring at a rate of approximately 2 rounds per minute, nearly one half (or 10 rounds) of the total 105-mm rounds (20 rounds) would potentially be expended within this 5.5-minute time frame. If the concept of marine mammal avoidance of an area once firing commences is not considered, an average swim speed (1.5 m/s) of animals would allow sufficient time for new animals to re-enter the 23-psi TTS impact area. Allowing for a potential 2-min break in firing after 10 rounds are expended, it is conservative and reasonable to assume that nearly 3 to 4 individual animals may be potentially exposed to the 23-psi TTS sound level during a typical 20 round firing event. Therefore, the ZOI and take estimate calculations are based on the total number of rounds fired per year divided by 5, or approximately 20 percent. This approach assumes that, although single animals may be ensonified more than once due to the time required to exit the 23-psi TTS ZOI, individual animals are not considered to be "taken" more than once for the purposes of estimating take levels.

Based on this discussion, Table 11 provides Eglin AFB's estimates of the annual number of marine mammals, by species, potentially taken by Level B harassment, by the gunnery mission noise. It should be noted that these estimates are derived without consideration of the effectiveness of Eglin AFB's proposed mitigation measures (except use of the TR), which are discussed in section 6 of this EA. While the exact numbers in the IHA may differ slightly, these estimated numbers are considered within the appropriate range of individual harassment incidents that may occur annually associated with the proposed A-S mission activities. The estimated numbers provide NMFS with one input to assess in evaluating the MMPA standards of negligible impact and least practicable adverse effects to stocks and populations.

Table 11. Yearly Estimated Number of Marine Mammals Affected by Gunnery Mission Noise

Species	Adjusted Density (#/km²)	Level A Harassment Injurious 205 dB* EFD For Ear Rupture	Level B Harassment Non-Injurious 182 dB* EFD For TTS	Level B Harassment Non-Injurious 176 dB* EFD For Behavior
Bryde's whale	0.007	<0.001	0.010	0.041
Sperm whale	0.011	<0.001	0.016	0.064
Dwarf/pygmy sperm whale	0.024	<0.001	0.035	0.139
Cuvier's beaked whale	0.10	<0.001	0.015	0.058
<i>Mesoplodon spp.</i>	0.019	<0.001	0.028	0.110
Pygmy killer whale	0.030	<0.001	0.044	0.174
False killer whale	0.026	<0.001	0.038	0.151
Short-finned pilot whale	0.027	<0.001	0.039	0.157
Rough-toothed dolphin	0.028	<0.001	0.041	0.163
Bottlenose dolphin	0.810	0.006	1.177	4.706
Risso's dolphin	0.113	0.001	0.164	0.657
Atlantic spotted dolphin	0.677	0.005	0.984	3.934
Pantropical spotted dolphin	1.077	0.008	1.565	6.258
Striped dolphin	0.237	0.002	0.344	1.377
Spinner dolphin	0.915	0.007	1.330	5.316
Clymene dolphin	0.253	0.002	0.368	1.470
Unidentified dolphin**	0.053	<0.001	0.077	0.308
Unidentified whale	0.008	<0.001	0.012	0.046
All marine mammals	4.325	0.032	6.29	25.13

* dB = dB re 1 μ Pa·s

** Bottlenose dolphin/Atlantic spotted dolphin

Based on the above discussion, NMFS believes that Eglin AFB's A-S operations and programmatic mission activities in the EGTRR will have a negligible impact on the affected species or stocks and will not have an unmitigable adverse impact on the availability of the affected species or stocks for subsistence uses. Impacts will be limited to Level B harassment. No injury or mortality is anticipated from these activities.

5. CUMULATIVE IMPACTS

Cumulative impact is defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such other actions” (40 CFR §1508.7). Cumulative impacts may occur when there is a relationship between a proposed action and other actions expected to occur in a similar location or during a similar time period. This relationship may or may not be obvious. Actions overlapping within close proximity to the proposed action can reasonably be expected to have more potential for cumulative effects on “shared resources” than actions that may be geographically separated. Similarly, actions that coincide temporally will tend to offer a higher potential for cumulative effects.

Cumulative effects refer to the impacts on the environment that result from a combination of past, existing, and reasonably foreseeable projects and human activities. Past, present, and reasonably foreseeable future projects that are likely to affect the human environment in the GOM include oil & gas exploration and production, geophysical related seismic surveys, commercial shipping, commercial fishing, and military training activities. The USAF 2002 PEA did not analyze any of these cumulative impacts; therefore, they are addressed in this document. The following describes projects based in the Northern Gulf of Mexico that may, but would not necessarily, result in cumulative adverse impacts to the biological and physical environment.

5.1 Oil and Gas Exploration and Production Related Activities

The northern shelf in the GOM has large reservoirs of oil and natural gas. As of the late 1990s, over 83 percent of the crude oil and 99 percent of the natural gas produced offshore in the U.S. came from the GOM (Davis et al., 2000). The oil and gas industry is characterized by production and pumping platforms, tanker traffic, seismic surveys, explosive removal of platforms from expired lease areas, and associated vessel and aircraft support (Wursig et al., 2000). As of 2003, there were 3,462 offshore production platforms active in extracting natural gas and oil on the Gulf outer continental shelf (MMS, 2003). There is also a deepwater crude-oil terminal offshore of Louisiana, known as the Louisiana Offshore Oil Port (LOOP). This facility is located 18 mi (29 km) south of Grand Isle, Louisiana (MMS, 2000). LOOP provides facilities for offloading, temporary storage, and transport of crude oil; the use of this facility reduces vessel traffic in coastal and inland ports (MMS, 2000). From 1981 to 1996, about 3,350 tankers used this facility (MMS, 2000). Seismic surveys on behalf of the oil industry have been and remain very common in the northern GOM. From 1998 to 2002, an average of 230,000 line-miles (370,149 line-km) of seismic survey work has been conducted per year in that area, including over 213,000 mi (342,790 km) in 2002. Oil and natural gas production is believed to result in acoustical harassment of marine mammals, which can result in temporary changes in behavior (i.e., brief cessation of foraging or increased swimming speed) or short-term habitat displacement.

In addition to the oil and gas exploration and production activities discussed above, seafloor structures that were used during exploration, development, and production operations for mineral extraction in the GOM are required to be removed by the MMS within one year of lease termination or after such structures have been deemed obsolete or unusable. The MMS typically uses two methodologies for cutting and decommissioning these structures: nonexplosive and explosive severance. The explosive-severance activities use specialized charges that would result in incidental take of nearby marine mammals. On February 28, 2005, NMFS received an application from MMS to take marine mammals by harassment incidental to explosive severance activities at offshore oil and gas structures in the GOM. NMFS issued regulations on June 19, 2008 (73 FR 34875), authorizing the incidental take of marine mammals from the explosive removal of offshore structures. NMFS anticipates that approximately 90-100 offshore structures will be removed annually under LOAs issued to companies responsible for their removal.

Based on observations by marine mammal observers provided by NMFS, no marine mammals have been observed killed or seriously injured in the past 30 years as a result of explosive severance activities. Based on calculations for all explosive-severance monitoring scenarios and stated in the final rule, Level A harassment takes would be limited to five bottlenose dolphins, one Atlantic spotted dolphin, and one pantropical spotted dolphin over the five-year period of the regulations authorizing incidental take of marine mammals from the explosive removal of offshore structures. It is anticipated that the annual Level B harassment takes would be limited to 227 bottlenose dolphins, 65 Atlantic spotted dolphins, 77 pantropical spotted dolphins, 27 Clymene dolphins, 12 rough-toothed dolphins, 14 striped dolphins, 15 melon-headed whales, 10 pilot whales, five spinner dolphins, three Risso's dolphins, and two sperm whales. These take estimates represent less than one percent of the population or stock size for each of the species. Therefore, takes of marine mammals in the northern Gulf as a result of explosive removal of offshore structures would not add a significant cumulative effect when considered with the activities analyzed in this EA. It should be noted that Level A and Level B harassment estimates are conservative and are made without consideration of the implementation of mitigation measures to protect marine mammals, so actual harassment numbers would likely be lower.

5.2 Marine Mammal Research and Geophysical Seismic Surveys

Marine mammal research and geophysical seismic survey cruises operate within the GOM. While some marine mammal surveys introduce no more than increased vessel traffic impacts to the environment, seismic surveys use various methods (*e.g.*, airgun arrays) to conduct research. Other studies that involve biopsy sampling and tagging might result in Level B or even Level A harassment to marine mammals. Currently there are six active General Authorizations in the nearshore region of the GOM for marine mammal vessel surveys, photo-identification, observation, and close approaches, and four research permits that allow more invasive research procedures such as biopsy sampling and tagging.

In 2007, the Lamont-Doherty Earth Observatory (L-DEO) was issued an IHA to conduct an acoustic calibration and seismic testing program using the *R/V Marcus G. Langseth* in the northern Gulf. The GOM calibration cruise occurred from November 21, 2007, to February 5, 2008. The primary airgun array used during the study included the full 36-airgun and an 18-airgun subset of the array, with total discharge volume of 6,600 and 3,300 in³, respectively. The monitoring report for this operation explained that the estimated number of marine mammals potentially affected by L-DEO's survey was much lower than initially anticipated (Holst and Beland, 2008). Holst and Beland (2008) state that a total of 118 individual marine mammals in 16 groups were recorded during the study in the northern GOM. In its *Federal Register* notice of issuance of an IHA, NMFS noted that the "best estimate" of animals that might be exposed, absent any mitigation measures, seismic sounds with received levels of 160 dB re 1 μ Pa (rms) was 3,770 and the "maximum estimate" was 7,082 (72 FR 45744, August 15, 2007). All takes of marine mammals were by Level B behavioral harassment. Of the "useable" cetacean sightings, two occurred during seismic operations. Holst and Beland (2008) state that the two dolphin groups that were sighted during seismic operations did not demonstrate detectable differences in observed movement or behavior from those observed during periods with no seismic activity. No deaths or detectable injuries of marine mammals were observed during the seismic program (Holst and Beland, 2008).

5.3 Commercial Shipping

Four of the U.S.' busiest ports are also located in the GOM; handling about 45 percent of U.S. shipped tonnage (Wursig et al., 2000). Thus, vessel traffic in the area is extensive. Tanker traffic in the northern Gulf is most intense between the Mississippi River and Sabine River, Texas; in 1998, there were 40,599 tanker trips between the Mississippi River and Sabine River (MMS, 2000). Ship strikes are potential sources of serious injury or mortality to large whales; however, occurrence of ship strikes to dolphins is rare. Effects to dolphins from large commercial vessels are believed to be limited to acoustical harassment, which could decrease social communication, foraging success, and predator detection.

5.4 Commercial Fishing

The GOM is also a major area for commercial fishing; it provides almost 20 percent of the commercial fish catches in the U.S. annually (MMS, 2000), and, together with recreational fishing, generates 2.8 billion dollars annually. Nearshore and offshore waters east of the Mississippi River Delta have especially diverse fishery resources (MMS, 2000). In addition, recreational and charter fishing vessel activities are highly popular on the shelf and offshore Gulf. These activities could result in by-catch of marine mammals, entanglement in fishing gear, and reduce prey availability for marine mammals.

5.5 Pollution and Habitat Degradation

Pollution in the Gulf is estimated to have more than doubled since 1950. Leading factors include ever increasing amounts of dissolved nitrogen and phosphorous from agricultural runoff. According to the Mississippi River/Gulf of Mexico Watershed Nutrient Task Force (2001), this increase in excess nutrient runoff has created a large seasonal hypoxic dead zone in the northern GOM which spans more than 20,000 km² and red tide algae blooms. These waters do not carry enough oxygen to sustain marine life, and the enlarging dead zone is a major threat to the fishing industry and to public health. Red tide algal blooms can kill fish and marine mammals and cause respiratory problems in humans when the blooms come close to shore.

5.6 Military Readiness Activities

The term “military readiness activities”, as defined in Public Law 107-314, Section 315(f), includes “training and operations of the Armed Forces that relate to combat” and constitute “adequate and realistic testing of military equipment, vehicles, weapons, and sensors for proper operation and suitability for combat use.” The NDAA of FY 2004 (PL) amended the MMPA definition of “harassment” as applied to military readiness activities, and discussions of potential Level A and Level B harassment in this subsection are in accordance with those specific definitions.

In addition to the proposed A-S gunnery missions and other EGTTR programmatic activities, Eglin AFB currently conducts Precision Strike Weapons (PSW) Testing and Naval Explosive Ordnance Disposal School (NEODS) training and will soon begin surf zone testing/training, amphibious vehicle training, and weapon testing training activities. In addition, the U.S. Navy (Navy) is conducting naval active sonar training and other mission activities within the vicinity of the proposed action area, and these activities are proposed to be continued and expanded. These current and proposed naval operations include Atlantic Fleet active sonar training (AFAST) activities and the Naval Surface Warfare Center Panama City Division (NSWC PCD) mission activities. These activities are described below.

Precision Strike Weapon (PSW) Testing

PSW missions involve air-to-surface impacts of two weapons, the Joint Air-to-Surface Stand-off Missile (JASSM) AGM-158 A and B and the small-diameter bomb (SDB) that result in in-air and underwater detonations of up to approximately 300 pounds (lbs) and 96 lbs (double SDB) of net explosive weight, respectively. As many as two live and four inert JASSM missiles per year can be launched from an aircraft above the GOM at a target located approximately 15 to 24 nautical miles offshore of Eglin AFB, and as many as six live and 12 inert SDBs can also be dropped on targets annually for the next five years. All missions are to be conducted on shelf waters only.

Detonation of the JASSM and SDB has the potential for causing harassment, injury, or mortality to four species of marine mammals: Atlantic bottlenose dolphins, Atlantic spotted dolphins, dwarf sperm whales, and pygmy sperm whales. However, due to

implementation of mitigation and monitoring measures, similar to those approved by NMFS for use during Navy shock trials, takings will be limited to Level B harassment in the form of a temporary change in the hearing threshold in the dolphin and whale species that might be in the vicinity of the detonations. The mitigation and monitoring measures, which are outlined in the final rule (71 FR 67810, November 24, 2006), include safety zones and aerial and shipboard monitoring surveys that will be conducted at various time intervals on the day of the launch, beginning five hours prior to launch and continuing at least two hours after the launch ends. LOAs were issued for this activity on February 20, 2007, and March 19, 2008. The current LOA expires on March 18, 2009. No monitoring was conducted under the 2007 LOA since only one Focused Lethality Mission, a low collateral variant of the SDB, was conducted over the GOM during the effective dates of the LOA. It was a single release of a Guided Test Vehicle (GTV) with an inert fuse. The GTV has no explosives. This was not a live PSW test and therefore did not have any impacts to marine mammals.

Navy Explosive Ordnance Disposal School (NEODS) Training

The mission of NEODS is to train personnel to detect, recover, identify, evaluate, render safe, and dispose of unexploded ordnances that constitute a threat to people, material, installations, ships, aircraft, and operations. The NEODS proposes to utilize three areas within the EGTTR, consisting of approximately 86,000 mi² within the GOM and the airspace above, for Mine Countermeasures detonations, which involve mine-hunting and mine-clearance operations. The detonation of small, live explosive charges disables the function of the mines, which are inert for training purposes. The proposed training would occur approximately one to three nautical miles (1.9 to 5.6 km) offshore of Santa Rosa Island (SRI) six times annually, at varying times within the year.

Each of the six training classes would include one or two “Live Demolition Days.” During each set of Live Demolition Days, five inert mines would be placed in a compact area on the sea floor in approximately 60 ft (18.3 m) of water. Five charges packed with five pounds (2.3 kg) of C-4 explosive material will be set up adjacent to each of the mines. No more than five charges will be detonated over the two-day period. Detonation times will begin no earlier than two hours after sunrise and end no later than two hours before dusk and charges utilized within the same hour period will have a maximum separation time of 20 min. Mine shapes and debris will be recovered and removed from the water when training is completed. Six training sessions per year, with five detonations per session, equals a total of 30 detonations per year, or 180 detonations over the course of six years. The proposed NEODS training activities is expected to have only Level B harassment to marine mammal species in the study area. Eglin AFB received IHAs to cover these activities in 2006 and 2007. No test missions involving the NEODS in the EGTTR occurred in the 2006 or 2007 calendar years. The current IHA for this training is valid from October 5, 2008, through October 4, 2009.

Surf Zone, Amphibious Vehicle, and Weapons Testing/Training on SRI

Major surf zone test exercises include neutral (inert) systems and live (containing explosive material) systems, which are detonated in shallow water. Current and proposed future surf zone testing would involve detonations of mine clearing line charges and

bombs for obstacle clearing. These activities include line-charge mine clearance testing, shallow water assault breaching (SABRE) mine clearing testing, and beach obstacle clearing and neutralization. Amphibious vehicles include the Landing Craft Air Cushion (LCAC) and the Amphibious Assault Vehicle (AAV). Both of these vehicles have the capability to transit through the land/water interface and are utilized in a variety of mission types. These activities would be intermittent yet ongoing. The activities would occur on Eglin AFB's SRI, Florida, property, including the shoreline of the GOM seaward to a depth of 30 ft (9.1 m). The distance from the shoreline that corresponds to this depth varies from approximately 0.5 mi (0.8 km) at the western side of the USAF property to 1.5 mi (2.4 km) at the eastern side, extending into the inner continental shelf. Training involving live-fire exercises would be carried out a maximum of twice per year (one during daytime and/or one at night). These missions would involve special operations personnel, a LCAC, or an AAV on the north shore of the island or in Santa Rosa Sound firing at a target located on SRI.

Impacts to marine mammals could occur from the noise and from DPI as a result of these activities. The two species anticipated to be in the area of the activities are Atlantic bottlenose and Atlantic spotted dolphins. However, through the incorporation of mitigation and monitoring measures, which are outlined in the IHA *Federal Register* notice of issuance (73 FR 45994, August 7, 2008), no injury or mortality is anticipated. Effects to marine mammals are expected to be limited to Level B harassment. NMFS issued an IHA to Eglin AFB to conduct surf zone testing/training and amphibious and weapons testing/training from SRI on July 25, 2008, for a period of one year. Eglin AFB did not conduct any surf zone testing/training or amphibious and weapons testing/training under their previous IHA in the 2007 calendar year.

AFAST Exercise

The Navy conducts mid- and high-frequency active sonar training activities along the U.S. Atlantic coast and in the GOM as described in the Draft EIS for "Atlantic Fleet Active Sonar Training" released February 15, 2008 (73 FR 8856, 8869). Components of this active sonar training occur within the vicinity of the proposed action area in the Gulf. In addition, the Navy is seeking to designate areas where mid- and high-frequency active sonar and the improved extended echo range system training, maintenance, and research, development, test, and evaluation (RDT&E) activities would occur within and adjacent to existing operating areas, and to conduct these activities. The proposed AFAST activities may cause various impacts, including Level A and Level B harassments, to marine mammal species in the study area. NMFS has received an application from the Navy for the AFAST exercises and has published a notice of proposed rulemaking.

NSWC PCD Mission Activities

The Navy proposed its mission activities to enhance NSWC PCD's capability and capacity to meet littoral and expeditionary warfare requirements by providing RDT&E and in service engineering for expeditionary manoeuvre warfare, operations in extreme environments, mine warfare, maritime operations, and coastal operations. Under the proposed NSWC PCD mission activities, a variety of naval assets, including ships, aircraft, and underwater systems would be used to support the action for eight primary

test operations that occur within or over the water environment up to the high water mark. These operations include air, surface, and subsurface operations, sonar, electromagnetic energy, laser, ordnance, and projectile firing. The proposed NSWC PCD mission activities may cause various impacts, including Level A and Level B harassments, to marine mammal species in the study area. NMFS has received an application from the Navy for its NSWC PCD mission activities and is in the rulemaking process.

5.7 Conclusion

While the commercial, scientific, military, and recreational activities, as described above, occur in the northern Gulf surrounding the action area, these activities do not occur within the EGTTR due to safety concerns. Furthermore, given the small scale and infrequent occurrence of the proposed activity, and its anticipated minimal environmental effects, the proposed A-S gunnery mission activities, as described in the application, would not contribute significantly or measurably to the overall environmental effects of other natural phenomena or human activities in the northern GOM. Therefore, NMFS has determined that the proposed activities considered with these other activities would not produce any significant cumulative impacts to the human environment.

6. MITIGATION, MONITORING, AND REPORTING

6.1 Mitigation Measures

Under the previous IHA (issued in 2006), Eglin AFB employed a number of mitigation measures in an effort to substantially decrease the number of animals potentially affected. These mitigation measures are discussed first. The modifications to the mitigation measures requested by Eglin AFB as part of its IHA request for renewal for this IHA follow. Modifications were requested for the protected species surveys, ramp-up procedures, and sea state restrictions.

Development of the Training Round (TR)

The largest type of ammunition used during typical gunnery missions is the 105-mm (4.13-in) round containing 4.7 lbs (2.1 kg) of high explosive (HE). This is several times more HE than that found in the next largest round (40 mm/1.57 in). 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.

Visual Mitigation

Areas to be used in gunnery missions are 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 will be avoided. In addition, monitoring will continue during the mission. If marine mammals are detected at any time, the mission will halt immediately and relocate as necessary or be suspended until the marine mammal has left the area. Daytime and nighttime visual monitoring will be supplemented with IR and TV monitoring. As nighttime visual monitoring is generally considered to be ineffective at any height, the EGTTR missions will incorporate the TR. However, visual monitoring of the operational area during daylight hours can be a very effective means of detecting the presence of marine mammals. This is particularly true of several of the species likely to be present (e.g., bottlenose and Atlantic spotted dolphins) due to their tendency to occur in groups, their relatively short dive time, and their relatively high level of surface activity. In addition, the water clarity in the northeastern GOM is typically very high.

Ramp-Up

In 2006, Eglin incorporated a ramp-up procedure by beginning with the smallest round (or the round having least impact) and proceeding to subsequently larger size rounds (in this case the lowest caliber of munitions up to the 105-mm FU round). Theoretically, this allows animals to perceive steadily increasing sounds and to react, if necessary. Alerting animals in advance of injurious sound waves by transmitting low-power “warning” signals a short time before the action provides a safeguard where there is a potential for the risk of injury.

Other Mitigation

Under the 2006 IHA, NMFS required additional mitigation measures to protect marine life. These requirements were:

(A) Test firing will be conducted only when sea surface conditions are sea state 3.5 or less on the Beaufort scale.

(B) 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 protected species that may be present (e.g., marine mammals, sea turtles, and Sargassum rafts). The AC-130 gunship will conduct at least two complete orbits at a minimum safe airspeed around a prospective target area at a maximum altitude of 1,500 ft (457 m), with a recommended altitude of 1,000 ft (305 m). Provided protected species are not detected, the AC-130 can then continue orbiting the selected target point as it climbs to the mission testing altitude. During the low altitude orbits and the climb to testing altitude, the aircraft crew will visually scan the sea surface within the aircraft's orbit circle for the presence of listed and non-listed marine mammals and sea turtles. Primary emphasis for the surface scan will be upon the flight crew in the cockpit and personnel stationed in the tail observer bubble and starboard viewing window. The AC-130's optical and electronic sensors will also be employed for target clearance. If any marine mammals are detected within the AC-130's orbit circle, either during initial clearance or after commencement of live firing, the aircraft will relocate to another target and repeat the clearance procedures. If multiple firing events occur within the same flight, these clearance procedures will precede each event.

(C) The aircrews of the A-S gunnery missions will initiate location and surveillance of a suitable firing site immediately after exiting U.S. territorial waters (less than or equal to 12 nm (22 km)). This would potentially restrict most gunnery activities to the shallower continental shelf waters of the GOM where marine mammal densities are typically lower, and thus potentially avoid the slope waters where the more sensitive species (e.g., endangered sperm whales) typically reside.

(D) Observations will be accomplished using all-light TV, IR sensors, and visual means for at least 60 minutes prior to each exercise.

(E) Aircrews will utilize visual, night vision goggles (NVGs), and other onboard sensors to search for marine mammals while performing area clearance procedures during night-time pre-mission activities.

(F) If any marine mammals are sighted during pre-mission surveys or during the mission, activities will be immediately halted until the area is clear of all marine mammals for 60 minutes or the mission location relocated and resurveyed.

6.2 Monitoring and Reporting

The Incidental Take Statement in NMFS' Biological Opinion on this action required certain monitoring and reporting measures to protect marine life. NMFS also imposed these same requirements, as well as additional ones, under Eglin AFB's 2006 IHA as they related to marine mammals. They included:

(1) Development and implementation of a marine species observer-training program in coordination with NMFS. This program will provide expertise to Eglin's

testing and training community in the identification of protected marine species during surface and aerial mission activities in the GOM. Additionally, the A-S gunnery mission aircrews will participate in the species observation training. As a result, designated crew members will be selected to receive training as protected species observers. Observers will receive training in protected species survey and identification techniques through a NMFS-approved training program.

(2) 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 initiating a spiraling descent down to an observation altitude of approximately 1,500 ft (457 m) elevation. Rates of descent will occur over a three to five minute time frame.

(3) Eglin will track their use of the EGTTR for test firing missions and protected species observations, through the use of mission reporting forms.

(4) A-S gunnery missions will coordinate with next-day flight activities to provide supplemental post-mission observations for marine mammals in the operations area of the previous day.

(5) A summary annual report of marine mammal observations and A-S activities will be submitted to the NMFS Southeast Regional Office and the Office of Protected Resources either at the time of a request for renewal of an IHA or 90 days after expiration of the current IHA if a new IHA is not requested.

(6) If any dead or injured marine mammals are observed or detected prior to testing, or injured or killed during live fire, a report must be made to the NMFS by the following business day.

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

6.3 Modifications to the 2006 Mitigation and Monitoring Requirements

As of October 27, 2006, two A-S gunnery missions have been attempted (one of the missions was ultimately aborted due to sea state). As a result of flying live missions over the ocean, aircrews have requested a modification to three components of the 2006 IHA requirements. These components are: (1) protected species surveys, (2) ramp-up procedures, and (3) sea state restrictions. This section describes the requested changes and analyzes whether or not they will achieve the least practicable adverse impact on the affected species or stocks and their habitats.

Protected Species Surveys-Altitude and Equipment

Currently, pre-mission surveys for marine mammals and other protected species must be commenced at a maximum altitude of 1,500 ft (457 m) with 1,000 ft (305 m) recommended during the day and at 2,000 ft (610 m; 1,500 ft (457 m) recommended) at night. Visual scans, as well as all applicable instruments, are to be used to survey for protected species at the water surface. Aircrews have reported that these altitudes are not safe and that the onboard instrumentation used for surveys actually performs better at a higher altitude.

The propeller-driven AC-130 aircraft, which is used for all A-S gunnery missions, is among the largest and heaviest in the USAF, weighing up to approximately 150,000 lbs (68,040 kg) depending on equipment configuration. If an emergency situation, such as a malfunction of one or more engines, occurred during the protected species surveys, the aircraft would likely lose altitude initially. The AC-130 does not perform well with less than a full compliment of engines. At 1,000 to 2,000 ft (305 to 610 m), the pilots would have little time to recover before striking the water surface, which would result in potential human fatalities and certain loss of the aircraft. The AC-130 is typically flown at a minimum altitude of 4,500 ft (1372 m). The proposed action in the USAF 2002 Final PEA is for flights to be conducted at a higher altitude than 1,500-2,000 ft (457-610 m). Both Eglin AFB and NMFS note that the 2004 NDAA amendments to the MMPA explicitly require consideration of personnel safety during military readiness activities.

AC-130 gunships are equipped with low-light TV cameras and ANIAAQ-26 Infrared Detection Sets (IDS). The TV cameras operate in a range of electromagnetic radiation of 532 to 980 nanometers (visible and near-visible light), and the IDS system operates in the IR portion of 7.5 to 11.7 micrometers. IR systems are capable of detecting differences in temperature from thermal energy (heat) radiated from living bodies, or from reflected and scattered thermal energy. In contrast to typical night-vision devices, visible light is not necessary for object detection. IR systems are equally effective during day or night use.

The ANIAAQ-26 IDS system produces a composite video signal which is displayed on an onboard television monitor. The IDS provides imagery and accurate line-of-sight information for an operator to detect, acquire, identify, and track targets. Additional capabilities include providing imagery suitable for reconnaissance and low-level navigation. The IDS is capable of detecting very small thermal differences (the exact thermal sensitivity is classified). Three fields-of-view (FOV) are available for the IDS. All are typically used during a mission to survey the area and acquire targets. These are:

(1) Wide FOV (1.80 magnification) aides in low altitude flight, navigation, and area search, and also provides sufficient resolution to recognize typical terrain features such as roads, rivers, and bridges.

(2) Medium FOV (10.8 magnification) provides for immediate target area orientation and target detection.

(3) Narrow FOV (42.9 magnification) provides small target identification, target recognition, and precise line-of-sight angular adjustments. A 2X FOV (85.80 magnification) provides electronic magnification of the Narrow FOV.

The IDS provides pointing information regarding its optical line-of-sight, and features a continuous 360-degree azimuth Field of Regard (FOR) and +60 degree up-look to -105 degree down-look elevation FOR. The line-of-sight is inertial-stabilized with regard to airplane angular motions and is directed to pointing angles via programmed commands, operator commands, or position commands from the avionics systems.

IR and low-light TV systems are used during both daytime and nighttime missions (ambient light is sufficient for the TV system at night). The IDS is the primary detection system and is used during all AC-130 gunship missions. Low-light TV and visual

surveys are used to supplement the IDS system as appropriate. The magnification of the TV system is comparable to that of the IDS. Although the IDS is capable of detecting infrared emissions at altitudes in excess of 12,500 ft (3810 m), an altitude range of 6,000 to 9,000 ft (1829 to 2743 m) affords the optimal slant range for overall sensor performance and target orientation.

The sensor suite is considered superior to the human eye for detecting targets on the water surface, even at altitudes as low as 1,000 ft (305 m). This is particularly true for night observations. IR systems have been used to detect whales and dolphins (Baldacci et al., 2005). Although the central portion of cetacean bodies are insulated with blubber, peripheral areas such as the flukes and fins are relatively poorly insulated. These areas may be detected thermally. Also, the movement of a cetacean's body at the surface causes heat to be radiated at different angles, resulting in an apparent temperature difference that can be detected by IR sensors. Additional areas of thermal discrimination include the blowhole, the blow, and areas of water disturbance where water of different temperatures is mixed. However, high humidity, rain, fog, high waves, and whitecap conditions can decrease the effectiveness of IR detection.

Figure 1 in Eglin AFB's January 29, 2007 renewal request illustrates examples of all FOVs for the IDS system, as an operator would see them on a monitor. All examples represent a 7.8-ft (2.4 m) dolphin at 6,000 ft (1829 m) altitude (above ground level, or AGL) and at a slant range of 8,000 ft (2438 m). All four FOVs would be used during protected species surveys. Based on the above discussion, the AC-130 aircrews recommend a protected species survey altitude of 6,000 ft (1829 m), using all sensors, for both day and night missions. NMFS concurs and plans to make this modification to the proposed 2008 IHA for Eglin AFB's A-S gunnery exercises.

The gunship sensor suite provides the best daytime and nighttime performance in normal weather and sea conditions at this altitude range. At lower altitudes, the sensors' area of coverage is smaller for any given field of view. In addition, the sensors' effectiveness is diminished due to magnification factors. For example, at an altitude of 1,000 ft (305 m), the 2X and Narrow FOV settings would cause over-magnification, resulting in decreased ability to discriminate targets. In addition to considerations of sensor performance, a 6,000-ft (1829-m) survey altitude would be significantly safer than the current 1,000- to 2,000-ft (305- to 610-m) range.

Therefore, based on Eglin AFB's request, NMFS is requiring Eglin to implement a revised protocol for protected species surveys from that conducted under the previous IHA. The AC-130 gunship is to travel to a potential mission location at an altitude of approximately 6,000 ft (1829 m). After arriving at the site, the aircrew is to initiate a surface vessel and protected species survey at the 6,000 ft (1829 m) altitude. The aircraft is to circle the target site and continue the survey for at least 15 minutes. During the survey, aircrews are to use the ANIAAQ-26 IDS to search the water surface for vessels and marine species. The low-light TV system is to be used to supplement the IDS system. For missions conducted during daylight hours, the aircrew is to visually scan the water surface as well. The live-fire phase of the mission will not begin until the site is

determined to be clear of vessels and protected species during the 15-minute survey. If a marine mammal is identified during the pre-mission survey or during the mission, or if any object besides the target is detected but cannot conclusively be identified, the mission shall be paused or relocated as appropriate. Aircrews shall conduct a post-mission survey for 5 minutes at an altitude of 6,000 ft (1829 m) using the IDS and low-light TV systems and, for daytime missions, visual scans. In summary, NMFS and Eglin AFB believe that sensor-based observation effectiveness at 6,000 ft (1829 m) altitude is superior to visual survey effectiveness at 1,000 ft (305 m) altitude and can replace the previous mitigation measure. Additionally, the change to this mitigation measure also now adheres to the requirement to consider, pursuant to the 2004 NDAA, personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity. Increasing the altitude at which protected species surveys are flown will increase the safety of those flying the surveys.

Ramp-up Procedures

The 2006 IHA stipulates that ramp-up procedures are to be used during A-S gunnery missions, which is described in Section 6.1. 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 deemed 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). Eglin AFB believes the 2006 IHA was somewhat ambiguous regarding whether the ramp-up procedure was required only for the first (calibrating) phase or throughout the entire mission. As a result, Eglin AFB and NMFS concur that the ramp-up procedure should be required for the initial gun calibration, and that after this phase the guns may be fired in any order. Eglin 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 minutes, would necessitate re-initiation of protected species surveys by Eglin AFB. As required by the MMPA, this mitigation measure will still ensure that the impacts of the activity are negligible. Also, as required by the 2004 NDAA, the revision to this mitigation measure from what was required in 2006 considers the impact on the effectiveness of the military readiness activity.

Sea State Restrictions

The 2006 IHA states that A-S gunnery missions are to be conducted only in sea states of 3.5 or less on the Beaufort scale. A sea state of 3 or less, with a maximum wind speed of 10 knots (11.5 mph, 18.5 km/hr) which is considered a gentle breeze, is fairly common off the Gulf coast of Florida; however, a large portion of time can be categorized as a sea

state of 4 (1-16 knots (13-18 mph, 21-29 km/hr)), which is considered a moderate breeze. Therefore, the availability of the EGTTR for A-S gunship use is limited during anything over sea state 3, especially during the winter. Eglin AFB requested gunship missions be allowed in sea states up to 4 on the Beaufort scale. NMFS concurs with this request. Under these conditions, whitecaps are fairly frequent on the sea surface, but sea spray does not occur. Sea spray, whitecaps, and large waves can decrease the effectiveness of LR detection. However, A-S gunnery missions are not conducted if such conditions make observation of the gunnery target (the flare) problematic. Eglin and NMFS believe that marine animals can be observed in weather conditions that allow observation of the gunnery target flare. As wave height is difficult to determine from the air, particularly at night, Eglin believes that wind speed, as provided by accepted forecasting outlets such as the National Weather Service, be the determining factor for weather restrictions. NMFS concurs and plans to make this modification to the 2008 IHA for Eglin AFB's A-S gunnery exercises. As with the other two modifications requested for the proposed IHA, a change to the sea state restriction will not negatively impact marine mammals in the proposed action area, and it will allow the USAF to conduct its military readiness activity.

Conclusion

In summary, NMFS concurs with the determinations made by Eglin AFB and proposes to make the following modifications to the mitigation and monitoring measures in Eglin AFB's A-S Gunnery IHA: (1) Amend the requirement for visual surveys to be conducted at a 6,000 ft (1829 m) altitude as the sensor-based observation effectiveness is superior to visual survey effectiveness; (2) if there is an initial gun calibration period, the ramp-up procedure is required for the initial gun calibration, and that after this phase the guns may be fired in any order; and (3) gunship missions may proceed when sea states are up to 4 on the Beaufort scale. The inclusion of these mitigation and monitoring measures, along with the others described earlier in this EA will ensure the least practicable adverse impact on affected marine mammal species and stocks, will have a negligible impact on the affected species or stocks, and will not have an unmitigable adverse impact on the affected species or stocks for subsistence uses. For military readiness activities (as described in the NDAA), a determination of least practicable adverse impacts on a species or stock includes consideration, in consultation with the Department of Defense, of personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity. The proposed modifications to the protected species surveys, ramp-up procedures, and sea state restrictions ensure compliance with these considerations as well. Finally, NMFS has determined that Eglin AFB's A-S gunnery exercises will not result in significant impacts to the human environment as a result of the implementation of the mitigation and monitoring requirements.

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