ENVIRONMENTAL ASSESSMENT ON THE PROMULGATION OF REGULATIONS AND THE ISSUANCE OF A LETTER(S) OF AUTHORIZATION TO TAKE MARINE MAMMALS, BY LEVEL B HARASSMENT, INCIDENTAL TO NAVAL EXPLOSIVE ORDNANCE DISPOSAL SCHOOL TRAINING OPERATIONS AT EGLIN AIR FORCE BASE, FLORIDA

I. INTRODUCTION

On November 6, 2009, the National Marine Fisheries Service (NMFS) received an application from the U.S. Department of the Air Force, Headquarters 96th Air Base Wing (U.S. Air Force), Eglin Air Force Base (Eglin AFB) requesting NMFS issue regulations and a future Letter(s) of Authorization (LOA[s]) for the take, by Level B harassment under section 101 (a)(5)(A) of the Marine Mammal Protection Act (MMPA). On November 30, 2010, NMFS received a revised application from the U.S. Air Force for NEODS training operations at Eglin AFB. The revised application includes a marine mammal impacts analysis that re-estimates the safety zones and associated marine mammal takes based on revised thresholds for Level A and Level B harassment. On December 5, 2011, NMFS received another revised application from Eglin AFB with revised monitoring and mitigation measures to reduce the potential for lethal take of bottlenose dolphins due to an event involving the mortality of common dolphins associated with similar explosive training operations at the U.S. Navy's Silver Strand Training Complex near San Diego, California.

NMFS developed a final rule and plans to issue an LOA(s) authorizing the take, by Level B (behavioral) harassment, of Atlantic bottlenose dolphins (*Tursiops truncatus*) incidental to conducting Naval Explosive Ordnance Disposal School (NEODS) training operations and testing at Eglin Gulf Test and Training Range (EGTTR) at Eglin AFB property off Santa Rosa Island (SRI), Florida in the northern Gulf of Mexico (GOM). The LOA(s) will authorize Level B harassment of up to10 individual Atlantic bottlenose dolphins annually and up to 50 individuals over a 5 year period. This Environmental Assessment (EA) addresses impacts to Atlantic bottlenose dolphins that would result from the NEODS training operations and testing using explosives that would be conducted under the LOA(s) mitigation, monitoring, and reporting requirements from 2012 to 2017. NMFS has not yet published a final rule in the *Federal Register*. Once it does, the rule will not become effective until thirty days following the date of its publication.

NMFS issued an Incidental Harassment Authorization (IHA) to Eglin AFB for similar activities in 2005 (70 FR 51341; August 30, 2005), 2006 (71 FR 60693; October 16, 2006), 2007 (72 FR 58290; October 15, 2007), and 2008 (73 FR 56800; September 30, 2008). No training operations have been carried out to date. The past missions have been delayed due to safety issues concerning bringing demolition charges under a bridge and no missions have occurred to date under any of the previously issued IHAs. NEODS missions would involve underwater detonations of small, live explosive charges adjacent to inert mines. Thus, the primary issue of concern has been and remains the potential impact of underwater noise on the specified marine mammals and the scope of analysis in the EA is thus specifically to evaluate those potential impacts.

In July, 2005, an EA was prepared by NMFS to address the issuance of IHAs and LOAs and subsequent promulgation of a five-year rule for the proposed activities to 2011; however, no regulations were actually promulgated by NMFS for NEODS training operations under the MMPA between 2005 to 2011. The EA analyzed the impacts to Atlantic bottlenose dolphins and to spotted dolphins that would result from the NEODS training operations and testing using explosives that would be conducted under the LOA mitigation, monitoring, and reporting requirements from 2005 to 2011. In 2007, NMFS prepared a Supplemental EA to revise the analysis of cumulative impacts to the environment and to analyze the effects to EFH that would result from the NEODS training operations and testing using explosives that would be conducted under the LOA mitigation, monitoring, and reporting requirements from 2005 to 2011. These documents are incorporated here by reference.

II. PURPOSE AND NEED

A. The U.S. Air Force has proposed a military readiness activity that has the potential to result in the incidental take of marine mammals. The take of marine mammals is generally prohibited under the Marine Mammal Protection Act (MMPA). The MMPA, however, under section 101(a)(5)(A) and (D) establish processes pursuant to which the U.S. Air Force may apply for and NMFS must issue authorization for the incidental take of marine mammals related to a military readiness activity. NMFS is proposing to issue that authorization in accordance with the procedures established by section 101(a)(5)(A) of the MMPA as implemented by 50 CFR §§ 216.101-216.105. That process, along with the proposed action by the U.S. Air Force, is described in more detail below. The MMPA thus establishes the need for the proposed action. The purpose of the proposed action is to prepare and issue an authorization that meets the statutory and regulatory requirements, including the development of appropriate mitigation and monitoring.

B. <u>MMPA Incidental Take Authorization Process</u>
In the case of military readiness activities (as defined by Subsection 315(f) of Public Law 107-314; 16 U.S.C. 703 note), sections 101(a)(5)(A) of the MMPA (16 U.S.C. 1361 *et seq*.) directs 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. Upon making a finding that an application for incidental take is adequate and complete, NMFS commences the incidental take authorization process by publishing in the *Federal Register* a notice of a receipt of an application for the implementation of regulations.. NMFS published a Notice of Receipt for the U.S. Air Force's NEODS application in the *Federal Register* on Friday, January 15, 2010 (75 FR 2490). NMFS published a proposed rule in the *Federal Register* on October 1, 2010 (75 FR 60694). After soliciting, reviewing and responding to public comments, NMFS has prepared a final rule for publication in the *Federal Register*.

The U.S. Air Force revised its application based on public comments from the Marine Mammal Commission submitted in response to publication of the proposed rule, and the final rule reflects changes made in response to the comments and revised application. An authorization for the incidental takings may be granted if NMFS finds that the total taking during the period of the authorization will have a negligible impact on the species or stock(s), will not have an

unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses (where relevant); and if the permissible methods of taking and requirements pertaining to the mitigation, monitoring, and reporting of such taking are set forth to achieve the least practicable adverse impact.

NMFS has defined "negligible impact" in 50 CFR 216.103 as "...an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival."

With respect to military readiness activities, the MMPA defines “harassment” as:

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

The Eglin AFB has determined that conducting multi-year NEODS training operations might potentially disturb marine mammals and, accordingly, submitted an application for the promulgation of regulations and issuance of subsequent LOA(s) to authorize incidental take of Atlantic bottlenose dolphins. Under the requirements of the MMPA, if the action proposed in the application will have no more than a negligible impact on the species or stock, 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 (in the regulations and subsequent LOA[s]), then the NMFS shall issue the authorizations. The purpose of the regulations and LOA(s) is to investigate the status of the marine mammals that may be impacted by the action by Eglin AFB, set forth the types and amount of take that may occur, and list the monitoring and mitigation measures required to ensure the least practicable impact to marine mammal species and stocks. The final determination with regard to negligible, while informed by this EA and other supporting documents, is made, if appropriate, in the final rule.

C. NEPA Requirements and Scope of NEPA Analysis

The proposed issuance of authorization for incidental take of marine mammals through 5-year regulations and follow on Letter(s) of Authorization is not categorically excluded from NEPA review. In addition, it is not the type of action normally requiring preparation of an Environmental Impact Statement (EIS). Therefore, NMFS has prepared this EA to assist in determining whether the direct, indirect and cumulative impacts related to its issuance of the authorization for incidental take under the MMPA are likely to result in significant impacts to the human environment, or whether the analysis, contained herein, including documents referenced and incorporated by reference and public comments received on the proposed rule, support the issuance of a Finding of No Significant Impact. Given the limited scope of the decision for which NMFS is responsible (i.e. whether or not to issue the authorization including prescribed means of take, mitigation measures and monitoring requirements) that this EA is intended to

inform, the scope of analysis is limited to evaluating and disclosing the impacts to living marine resources and their habitat likely to be affected by the training activities. As described more fully below, the EA identifies all marine mammals, species protected under the ESA, and essential fish habitat likely to occur within the action area. The primary analysis focuses on the impacts to Atlantic bottlenose dolphins likely to result from the proposed NEODS training operations and testing using explosives that would be conducted under the regulations and LOA(s) and associated mitigation, monitoring, and reporting requirements from 2012 to 2017, impacts that would result from the alternatives that are presented, and to consider potential cumulative environmental impacts. Impacts to other species and habitat located in the action area were considered unlikely, and, thus did not receive detailed evaluation. The need for this EA is to provide a NEPA analysis informing the decision of whether or not to issue the regulations and LOA(s) and to determine whether the proposed action has any potential significant impacts.

Summary

Eglin AFB requested the promulgation of regulations and issuance of a LOA(s) for the take of marine mammals incidental to the NEODS training operations over the next five years. These operations may expose cetaceans that occur within the EGTTR to underwater noise. NEODS missions involve underwater detonations of small, live explosive charges adjacent to inert mines. The NEODS may conduct up to eight two-day demolition training events annually; these missions may occur at any time of the year. Each demolition training event involves a maximum of five detonations. Up to 20 5-lb charges and 20 10-lb charges would be detonated annually in the GOM, approximately 5.6 km (3 nmi) offshore of Eglin AFB. Detonations would be conducted on the sea floor, adjacent to an inert mine, at a depth of approximately 18.3 m (60 ft).

In the marine mammal acoustics impacts analysis, the best marine mammal density estimate, the Zone of Influence (ZOI) of charges employed, and the total number of events per year was used to calculate an annual estimate of the potential number of animals exposed to noise (by Level A and Level B harassment). Without any monitoring and mitigation measures in place, it is estimated that slightly less than four bottlenose dolphins could be exposed annually to a positive pressure level corresponding to Level A harassment (13 psi-msec). Noise levels corresponding to Level B harassment (182 dB re $1\mu Pa^2 \cdot s$) could potentially affect approximately 10 dolphins annually, and approximately 50 dolphins could potentially be exposed to noise levels associated with sub-TTS behavioral harassment each year. Individuals from bay, sound, and estuarine stocks could be affected. Since only bottlenose dolphins would be affected, there is no potential for take of marine mammal species listed as threatened or endangered under the ESA.

Under the requirements of the IHA, NEODS would implement monitoring and mitigation measures to substantially reduce the potential for Level A and Level B harassment. Implementation of the preferred alternative, which includes such measures, would result in only Level B incidental harassment of a small number of bottlenose dolphins annually.

Dates, Duration, and Location of Specified Activity

NEODS missions will occur over the next five years utilizing resources within the Eglin Military Complex, including three sites in the EGTTR (see Figure 1-1 of Eglin AFB's application or Figure 1 above). There will be eight training events annually, with an average of one even occurring every six to seven weeks. Half of the events will involve 5 lb charges and half will involve 10 lb charges. It is expected that 60 percent of the training events will occur in summer, and 40 percent will occur in winter.

W-151: The inshore and offshore boundaries of W-151 are roughly parallel to the shoreline contour. The shoreward boundary is 3 nmi from shore, while the seaward boundary extends approximately 85 to 100 nmi offshore, depending on the specific location. W-151 covers a surface area of approximately 35,145 km^2 (10,247 nmi^2), and includes water depths ranging from approximately 35 to 700 m (114.8 to 2,296.6 ft). This range of depth includes continental shelf and slope waters. Approximately half of W-151 lies over the shelf. Latitude/Longitude of corners of W-151:

- 30.24006° North, -86.808838° West
- 29.539011° North, -84.995536° West
- 28.03949° North, -85.000147° West
- 28.027598° North, -85.199395° West
- 28.505304° North, -86.799043° West

W-151A: W-151-A extends approximately 60 nmi offshore and has a surface area of 8,797 km^2 (2,565 nmi^2). Water depths range from approximately 35 to 350 m (114.8 to 1,148.3 ft) and include continental shelf and slope zones. However, most of W-151A occurs over the continental shelf, in water depths less than 250 m (820.2 ft). Latitude/Longitude of four corners of W-151A:

- 30.24006° North, -86.808838° West
- 30.07499° North, -85.999327° West
- 29.179968° North, -85.996341° West
- 29.384439° North, -86.802579° West

IV. ALTERNATIVES INCLUDING THE PROPOSED ACTION

A. Preferred Alternative

The proposed action is for NMFS to promulgate a five-year rule and issue a LOA(s) authorizing Level B incidental take of Atlantic bottlenose dolphins during NEODS training operations at Eglin AFB. A LOA(s) would then be issued under the new rule from 2012 to 2017. The potential impacts to Atlantic bottlenose dolphins that would result from the proposed NEODS training operations and testing using explosives that would be conducted under the LOA mitigation, monitoring, and reporting requirements from 2012 to 2017 are described in section (VI)(A)(1) and Appendix 2 of this document. The monitoring and mitigation measures and reporting requirements described in Section VI are incorporated into the rule and LOA(s).

B. No Action Alternative

The No Action Alternative is not promulgating regulations and subsequently issuing the LOA(s). The MMPA prohibits all takings of marine mammals unless authorized by a permit or exempted under the MMPA. Thus moving forward with training in a manner that could affect bottlenose dolphins could result in the unauthorized take of marine mammals. While the U.S. Air Force is unlikely to do this, and this alternative is thus not feasible for selection, NMFS has included it in the EA to establish an environmental baseline against which the environmental impacts of the preferred alternative, including mitigation and monitoring, can be sharply compared and contrasted.

C. Promulgation of Regulations and Issuance of LOA(s) with Additional Aerial Monitoring Requirement

This alternative action is for NMFS to promulgate a five-year rule and subsequently issue LOA(s) authorizing incidental take of Atlantic bottlenose dolphins by Level B harassment during NEODS training operations at Eglin AFB, but with added aerial overflight monitoring requirements. This activity would be the same as the preferred alternative, described above, except that Eglin AFB would be required to have aerial monitoring at the same time and with the same mission delay requirements as the vessel monitoring if a marine mammal were sighted in the ZOI). The potential impacts to marine mammals from the promulgation of regulations and subsequent LOA(s) with an additional aerial monitoring component are described in section (VII)(C) of this document.

V. AFFECTED ENVIRONMENT

A. Sensitive Marine Environments

Both natural and artificial reefs exist in the vicinity, but the closest reef is artificial and located over 3.2 km (2 mi) away. Gulf sturgeon critical habitat may be found within 1.6 km (1 mi) of the proposed training areas, but NMFS has determined (see section (IV)(C) of this document) that it will not be adversely modified by any effects of the proposed action.

B. Marine Mammals

Marine mammal species that potentially occur within the EGTTR include several species of cetaceans and one sirenian, the West Indian (Florida) manatee (see Table 1 below). The marine mammals that generally occur in the proposed training operations area belong to three taxonomic groups: mysticetes (baleen whales), odontocetes (toothed whales), and sirenians (the manatee). Marine mammal species listed as Endangered under the U.S. Endangered Species Act (ESA), includes the humpback (*Megaptera novaeangliae*), sei (*Balaenoptera borealis*), fin (*Balaenoptera physalus*), blue (*Balaenoptera musculus*), North Atlantic right (*Eubalaena glacialis*), and sperm whale (*Physeter macrocephalus*), and Florida manatee (*Trichechus manatus latirostris*). Table 1 below outlines the marine mammal species, their habitat in the region of the proposed project area, and their ESA and MMPA conservation status.

During winter months, manatee distribution in the GOM is generally confined to southern Florida. During summer months, a few may migrate north as far as Louisiana. However, manatees primarily inhabit coastal and inshore waters and rarely venture offshore. While a few manatees may migrate as far north as Louisiana from southern Florida (where there are generally confined in the winter) in the summer, they primarily inhabit coastal and inshore waters and rarely venture offshore. NEODS missions are conducted 5.6 km (1 to 3 nmi) from shore. Therefore, effects on manatees are considered very unlikely, and the discussion of marine mammal species is confined to cetaceans. The primary cetacean occurring in the NEODS area of interest, EGTTR sub-area 197 (see Figure 3-1 of Eglin AFB's application), is the Atlantic bottlenose dolphin and this analysis will focus on that species.

Table 1. The habitat and conservation status of marine mammals inhabiting the action area in the GOM off of Florida.

Species	Habitat	ESA[1]	MMPA[2]
Mysticetes			
North Atlantic right whale (*Eubalaena glacialis*)	Coastal and shelf	EN	D
Humpback whale (*Megaptera novaeangliae*)	Pelagic, nearshore waters, and banks	EN	D
Bryde's whale (*Balaenoptera edeni*)	Pelagic and coastal	NL	NC
Minke whale (*Balaenoptera acutorostrata*)	Pelagic and coastal	NL	NC
Blue whale (*Balaenoptera musculus*)	Pelagic and coastal	EN	D
Sei whale (*Balaenoptera borealis*)	Primarily offshore, pelagic	EN	D
Fin whale (*Balaenoptera physalus*)	Slope, mostly pelagic	EN	D
Odontocetes			
Sperm whale (*Physeter macrocephalus*)	Pelagic, deep seas	EN	D
Cuvier's beaked whale (*Ziphius cavirostris*)	Pelagic	NL	NC
Gervais' beaked whale (*Mesoplodon europaeus*)	Pelagic	NL	NC
True's beaked whale (*Mesoplodon mirus*)	Pelagic	NL	NC
Blainville's beaked whale (*Mesoplodon densirostris*)	Pelagic	NL	NC
Sowerby's beaked whale (*Mesoplodon bidens*)	Pelagic	NL	NC
Dwarf sperm whale (*Kogia sima*)	Offshore, pelagic	NL	NC
Pygmy sperm whale	Offshore, pelagic	NL	NC

(*Kogia breviceps*)			
Killer whale (*Orcinus orca*)	Widely distributed	NL EN – Southern Resident	NC D – Southern Resident, AT1 Transient
Short-finned pilot whale (*Globicephala macrorhynchus*)	Inshore and offshore	NL	NC
False killer whale (*Pseudorca crassidens*)	Pelagic	NL	NC
Melon-headed whale (*Peponocephala electra*)	Pelagic	NL	NC
Pygmy killer whale (*Feresa attenuata*)	Pelagic	NL	NC
Risso's dolphin (*Grampus griseus*)	Pelagic, shelf	NL	NC
Bottlenose dolphin (*Tursiops truncatus*)	Offshore, inshore, coastal, estuaries	NL	NC S – 33 stocks inhabiting the bays, sounds, and estuaries along GOM coast D – Western North Atlantic Coastal
Rough-toothed dolphin (*Steno bredanensis*)	Pelagic	NL	NC
Fraser's dolphin (*Lagenodelphis hosei*)	Pelagic	NL	NC
Striped dolphin (*Stenella coeruleolba*)	Pelagic	NL	NC
Pantropical spotted dolphin (*Stenella attenuata*)	Pelagic	NL	NC D – Northeastern Offshore
Atlantic spotted dolphin (*Stenella frontalis*)	Coastal to pelagic	NL	NC
Spinner dolphin (*Stenella longirostris*)	Mostly pelagic	NL	NC D – Eastern
Clymene dolphin (*Stenella clymene*)	Pelagic	NL	NC
Sirenians			
West Indian (Florida) manatee (*Trichechus manatus latirostris*)	Coastal, rivers, and estuaries	En	D

1 U.S. Endangered Species Act: EN = Endangered, T = Threatened, and NL = Not listed.

2. U.S. Marine Mammal Protection Act: NC = Not classified, D = Depleted, and S = Strategic.

The three species of marine mammals that are known to commonly occur in close proximity to the NEODS training area of the GOM are the West Indian (Florida) manatee, Atlantic spotted dolphin, and Atlantic bottlenose dolphin.

Florida Manatee

The West Indian manatee (*Trichechus manatus latirostris*) in Florida and U.S. waters is managed under the jurisdiction of the U.S. Fish and Wildlife Service (USFWS) and is listed as Endangered under the ESA. They primarily inhabit coastal and inshore waters and NMFS does not anticipate that they will be affected by the proposed action or alternatives.

Atlantic Spotted Dolphins

The Atlantic spotted dolphin (*Stenella frontalis*) is endemic to the Atlantic Ocean in temperate to tropical waters (Perrin *et al*., 1987, 1994). In the GOM, Atlantic spotted dolphins occur primarily from continental shelf waters 10 to 200 m (33 to 656 ft) deep to slope waters greater than 500 m (1,640 ft) deep (Fulling *et al*., 2003; Mullin and Fulling, 2004). 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, 2000). It has been suggested that this species may move inshore seasonally during spring, but data supporting this hypothesis are limited (Caldwell and Caldwell, 1966; Fritts *et al*., 1983).

Eglin AFB has included Atlantic spotted dolphins in previous requested for IHAs to be conservative, although their occurrence is considered unlikely. The stock assessment reports for the northern GOM describe the shoreward range of Atlantic spotted dolphins as 10 m (33 ft). NEODS activities can occur from one to three miles offshore. Maximum water depth of the proposed activities is 18.3 m (60 ft), but they often train in approximately 9.1 m (30 ft) of water, so this species range occurs at the very edge of the proposed activities. Therefore, the chance of impacting Atlantic spotted dolphins is remote, especially given the monitoring and mitigation measures described below.

Less is known of the Atlantic spotted dolphin than the Atlantic bottlenose dolphin and abundance estimates are available for only small portions of their range, and some may be inaccurate due to their similarity in appearance to the pantropical spotted dolphin. Though Atlantic spotted dolphins are sometimes found in groups of up to 50, 5 to 15 individuals in a group is more typical (Reeves *et al*., 2002). Atlantic spotted dolphins feed on small fish, cephalopods, and benthic invertebrates. The calving cycle is 3 to 4 years and females nurse their calves for between 3 and 5 years.

Atlantic spotted dolphins are endemic to the tropical and warm temperate waters of the Atlantic Ocean and can be found from the latitude of Cape May, New Jersey south along mainland shores to Venezuela, including the GOM and Lesser Antilles. In the GOM, Atlantic spotted dolphins occur primarily in continental shelf waters 10 to 200 m (33 to 656 ft) deep out to continental slope waters less than 500 m (1,640.4 ft) deep. One recent study presents strong genetic support for differentiation between GOM and western North Atlantic management stocks, but the GOM stock has not yet been further subdivided.

Abundance was estimated in the most recent assessment of the northern GOM stock of the Atlantic spotted dolphin using combined data from continental shelf surveys (20 to 200 m [66 to 656 ft] deep) and oceanic surveys (200 m [656 ft] to offshore extent of U.S. Exclusive Economic Zone) conducted from 1996 to 2001. The minimum population estimate for the northern GOM is 24,752 Atlantic spotted dolphins (Waring *et al*., 2004).

Density estimates for the Atlantic spotted dolphin within the EGTTR were calculated using abundance data collected during the GulfCet II aerial surveys. In an effort to provide better species conservation and protection, estimates were adjusted to incorporate temporal and spatial variations, surface and submerged variations, and overall density confidence. The adjusted density estimate for Atlantic spotted dolphins within the project area is 0.677 individuals/km^2. A small number of dolphins could not be identified specifically as Atlantic bottlenose or Atlantic spotted and their estimated density was 0.053 individuals/km^2.

Atlantic Bottlenose Dolphins

The marine mammal species potentially affected is the Atlantic bottlenose dolphin (*Tursiops truncatus*). Bottlenose dolphins are distributed worldwide in tropical and temperate waters. Bottlenose dolphins may be found in coastal populations along the continents and around most oceanic islands and atolls, in pelagic populations centered far offshore, as well as in bays, estuaries, and the lower reaches of rivers (Reeves *et al*., 2002). In North American waters, Atlantic bottlenose dolphins are found mainly where surface temperatures are from 10 to 32.2° C (50 to 90° F). Atlantic bottlenose dolphins occur in slope, shelf, and inshore waters of the entire GOM, and their diet consists of mainly fish, crabs, squid, and shrimp (Caldwell and Caldwell, 1983). In addition, a coastal and an offshore form of the bottlenose dolphin have been suggested. Baumgartner *et al*. (2001) suggested a bimodal distribution in the northern GOM, with a shelf population occurring out to the 150 m (492 ft) isobath and a shelf break population out of the 750 m (2,460.6 ft) isobath. Occurrence in water with depth greater than 1,000 m (3,280.8 ft) is not considered likely and not applicable to this assessment. Migratory patterns from inshore to offshore are likely associated with the movements of prey rather than a preference for a particular habitat characteristic (such as surface water temperature) (Ridgeway, 1972; Irving, 1973; Jefferson *et al*., 1992).

Dolphins in bays typically form small groups of 2 to 15 animals, while offshore groups may contain hundreds of individuals. Coastal animals typically feed on invertebrates of fish that live near the bottom, while offshore animals eat pelagic fish and squid, diving up to 500 m (1,640 ft). Calves can be born any time of the year (though typically not in the colder months in temperate areas) after a year of gestation, and are not fully weaned until 18 to 20 months of age (Reeves *et al*., 2002). Though the bottlenose dolphin remains abundant overall, and widely distributed, some local populations are at great risk due to habitat degradation, fishery conflicts, pollution or over-killing. In the U.S. Atlantic and GOM, major die-offs have been linked to viral outbreaks and acute exposure to toxins (Reeves *et al*., 2002).

Based on a combination of geography, ecological, and genetic research, Atlantic bottlenose dolphins have been divided into many separate stocks within the GOM. Within the EGTTR, there are four defined stocks of bottlenose dolphins: the Northern GOM Oceanic Stock, the

Northern GOM Continental Stock, the Eastern GOM Coastal Stock, and the Northern GOM Coastal Stock. In addition, there are 33 stocks of bottlenose dolphins inhabiting the bays, sounds, and estuaries along the GOM coast (Waring *et al*., 2007). NEODS training operations occur offshore of Eglin AFB's SRI property in water depths of approximately 60 ft. This location most closely coincides with the defined boundary of the Northern GOM Coastal Stock, which is considered to occur from the GOM shoreline to the 20 m (65.6 ft isobath. However, individuals from the Northern GOM Bay, Sound, and Estuarine Stocks may also potentially enter the training areas, as movement between various communities has been documented (see Waring *et al*., 2009). NEODS training operations occur geographically between the Pensacola/East Bay and Choctawhatchee Bay stocks, although individuals from other locations could potentially travel through the training areas as well. While the coastal stock is not considered strategic, all bay, sound, and estuarine stocks are designated as strategic.

Prior to the 2007 Garrison survey and model predictions, the best estimates of abundance were between 7 to 15 years old, occurred during different seasons, and each of the surveys suffered from differing degrees of negative bias in abundance estimates because all surveys assumed that all animals on the trackline were seen. Therefore, estimates based on those surveys would be highly uncertain. Based on data from the Protected Species Habitat Modeling in the EGTTR, the total estimate of abundance of bottlenose dolphins from the winter 2007 survey was 65,861 (95 percent CI 36,699 to 118,200) and for the summer 2007 survey was 11,433 animals (95 percent CI 7,346 to 17,793) (Garrison, 2008). For both summer and winter surveys, the highest density of bottlenose dolphins occurred in the northern inshore stratum. The summer survey overall abundance estimate for bottlenose dolphins was approximately 50 percent lower than the winter survey (Garrison, 2008). Bottlenose dolphin stocks for the shelf edge and slope are not considered strategic. The potential for biological removal (PBR) for shelf and slope stocks is 45 dolphins (Waring *et al*., 2001). The exact structure of these stocks is complex and continues to be revised as research is completed.

The presence of fish in the stomachs of some individual offshore bottlenose dolphins suggest that they dive to depths of more than 500 m (1,640 ft). A tagged individual near Bermuda had maximum recorded dives of 600 to 700 m (1,969 to 2,297 ft) and durations of 11 to 12 min. Dive durations up to 15 min have been recorded for trained individuals. Typical dives, however, are more shallow and of a much shorter duration. Data from a tagged individual off Bermuda indicated a possible diel dive cycle (i.e., a regular daily dive cycle) in search of mesopelagic (living at depths between 180 and 900 m [591 and 2,953 ft]) prey in the deep scattering layer.

In the EGTTR as a whole, there were a total of 281 groups of bottlenose dolphins during the winter survey and 162 groups during the summer survey. According to the species-habitat model for bottlenose dolphins, densities were predicted to be highest in relatively shallow water, with an offshore peak in density between 40 to 60 m (131 to 196.9 ft) depth and in waters ranging between 27.5 to 28.5° C (81.5 to 83.3° F) (Garrison, 2008).

Bottlenose dolphin density estimates for the study area are derived from Protected Species Habitat Modeling in the EGTTR (Garrison, 2008). NMFS developed habitat models using new aerial survey line transect data collected during the winter and summer of 2007. The winter survey was conducted primarily during the month of February (water temperatures of 12 to 15°

C [53.6 to 59° F]) while the summer survey was primarily during July (water temperatures >26° C [78.8° F]). In combination with remotely sensed habitat parameters (sea surface temperature and chlorophyll), these data were used to develop spatial density models for bottlenose dolphins within the continental shelf and coastal waters of the eastern GOM. Encounter rates during the aerial surveys were corrected for sighting probabilities and the probability that animals were available on the surface to be seen. The models predict the absolute density of bottlenose dolphins within the EGTTR. Most, but not all, of the NEODS mission area is contained within the EGTTR subarea 197 (see Figure 2 below). The two westernmost test areas lie within subarea 197, but the easternmost one does not. Dolphin density is not available for the area directly east of subarea 197. However, the physical and biological parameters used to develop density estimates in this subarea likely do not differ significantly between the training areas. The density estimate for subarea 197 is therefore considered the best currently available and is applied to all locations of NEODS training operations.

Table 3-1 of Eglin AFB's application provides median and adjusted bottlenose dolphin densities in EGTTR sub-area 197. These absolute estimates of density (animals per square kilometer [km^2] were produced by combining the spatial density model, sighting probability, and availability model (Garrison, 2008). All environmental terms were retained in the species-habitat model for the winter survey and the summer survey with the exception of glare for the summer survey. The model fits for the winter and summer were highly significant, explained a significant portion of the variability in the data, and resulted in effective predictions of spatial distribution of bottlenose dolphins.

NEODS missions may be executed at any time during the year. It is anticipated that approximately 60 percent of missions will be executed during summer months, and 40 percent executed during winter months. Separate summer and winter density estimates are provided in Table 3-1 of Eglin AFB's application. Months with high CV values (greater than 1) have high degrees of uncertainty in the model predictions. These months include May, June, September, October, and November where density was unknown. In order to compensate for the months without good estimates, interpolation was used between the available months by providing a means of estimating the function at intermediate points through presuming that there were linear seasonal trends. Interpolation assumes that the poorly estimated periods lie somewhere in the middle of the well estimated periods. Adjusted densities for each month were reached after interpolation calculations (see Table 3-1 of Eglin AFB's application). Based on the adjusted densities, January, March, and July have the highest bottlenose dolphin densities while August to December months have the lowest densities. On average, there are 0.81 bottlenose dolphins/km^2 throughout the year in EGTTR sub-area 197. Seasonally there are on average 0.84 dolphins/km^2 during summer and 0.78 dolphins/km^2 during winter in sub-area 197.

Figure 1. Map of the protected species habitat modeling survey area, EGTTR sub-area 197.

Table 2. Bottlenose dolphin densities for EGTTR sub-area 197

Month	Median Density (Individuals/km^2)	CV	Valid	Adjusted Density (Individuals/km^2)[a]
November	0.00	31.62	0	0.51
December	0.52	0.25	1	0.52
January	1.24	0.22	1	1.24
February	0.73	0.20	1	0.73
March	1.22	0.28	1	1.22
April	0.84	0.46	1	0.84
Average Winter Density				
May	0.00	22.41	0	0.95
June	0.00	4.47	0	1.06
July	1.17	0.24	1	1.17
August	0.48	0.22	1	0.48
September	0.01	3.02	0	0.49
October	0.00	20.43	0	0.50
Average Summer Density				0.78
Overall Average Density				0.81

[a] Adjusted through interpolation.

Further information on the biology and local distribution of these species and others in the region can be found in Eglin AFB's application, which is available upon request (see ADDRESSES), and the NMFS Marine Mammal Stock Assessment Reports, which are available online at: http://www.nmfs.noaa.gov/pr/species/

C. Endangered Species

Five species of sea turtles, i.e., the leatherback sea turtle (*Dermochelys coriacea*), green sea turtle (*Chelonia mydas*), Kemp's ridley sea turtle (*Lepidochelys kempii*), hawksbill sea turtle (*Eretmochelys imbricata*), and loggerhead sea turtle (*Caretta caretta*) as well as the Gulf sturgeon (*Acipenser oxyrinchus desotoi*) are found in the area of the NEODS test sites and could potentially be harmed by the proposed activity. Eglin AFB informally consulted with NMFS Southeast Regional Office (SERO) pursuant to section 7 of the ESA regarding these species and the findings are discussed in section (VI)(A)(2) of this document. Information regarding the abundance, distribution, and life history of these species may be found in Eglin AFB's Biological Assessment which is incorporated by reference.

VI. ENVIRONMENTAL CONSEQUENCES

The impact of Federal actions must be considered prior to implementation to determine whether the action will significantly affect the quality of the human environment. In this section, an analysis of the environmental impacts of promulgating regulations and issuing LOA(s) to Eglin AFB and the alternatives to that proposed action are presented. The impacts on marine mammals and marine mammal habitat are discussed in detail in the U.S. Air Force's application, the preamble to the proposed and final rules and the documents that they rely on. Those documents are available to the public [link]. The acoustic impacts analysis is included below as Appendix II.

A. Proposed Action

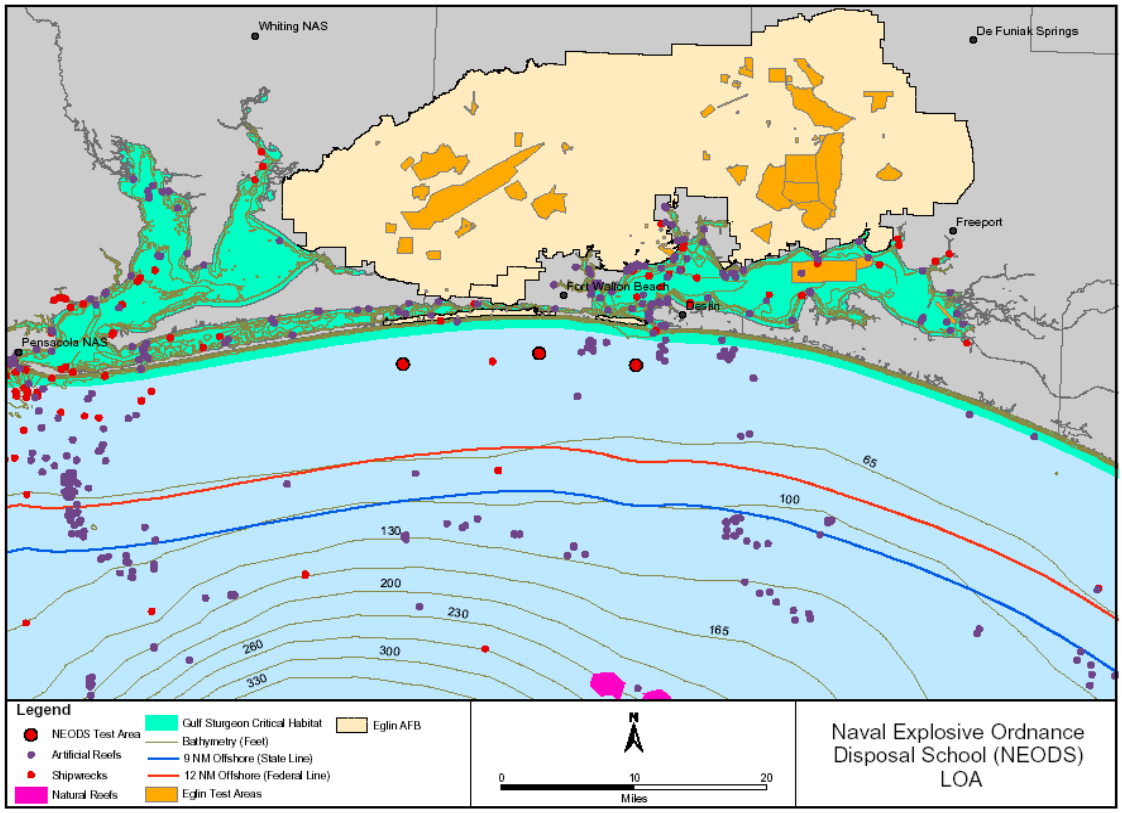
Background

The EGTTR encompasses approximately 222,739 km^2 (86,000 mi^2) within the GOM and consists of the airspace over the GOM, which is scheduled and operated by Eglin AFB. Potential impacts to marine mammals from NEODS testing are expected to occur at the NEODS test areas of Eglin AFB shown in Figure 1-1 of Eglin AFB's application, which are located approximately 5.6 km (3 nautical miles [nmi]) from shore, in approximately 18.3 m (60 ft) of water and in area W-151 of the EGTTR. The proposed operations result in detonation of small, live explosive charges adjacent to the mine disables the mine function. Inert mines are utilized for training purposes. This training would occur up to eight times annually, at varying times within the year.

Without taking into account reductions in type and level of take resulting from the effective implementation of mitigation and monitoring measures, NMFS has determined that the NEODS training operations could result in the Level B harassment taking of 10 Atlantic bottlenose dolphins per year and 50 Atlantic bottlenose dolphin takes over the course of the 5-year rule. NMFS believes that the implementation of the required monitoring and mitigation measures will

make Level A harassment or mortality of any individual bottle nose dolphin highly unlikely (see Section [VI][A]). NMFS has further determined that the anticipated takes incidental to this activity and issuance of these authorizations are expected to result in a negligible impact on affected species and stocks of Atlantic bottlenose dolphins. The Eglin AFB revised application and the analysis in the final rule are incorporated here by reference.

Figure 2. NEODS test locations in the EGTTR.



1. Impacts on Marine Mammals and Estimates of Take by Harassment

Based on the calculation methods discussed in the Marine Mammal acoustics impacts analysis (see Appendix 2), NMFS estimated that under the mitigation requirements of the IHA, the proposed action may result Level B incidental take of up to 10 individual Atlantic bottlenose dolphins annually and up to 50 individuals during the 5-year timeframe of the IHA rulemaking. This amount of take would be authorized by the final regulations and a follow-on LOA(s). However, NMFS expects that implementation of monitoring and mitigation measures will greatly reduce the number of marine mammals affected and that adverse impacts to individual Atlantic bottlenose dolphins would be minimal and short-term, and population-level (i.e., species or stock) impacts to Atlantic Bottlenose dolphins as a result of the proposed action are extremely unlikely.

Possible Effects of Specified Activities on Marine Mammal Habitat

The primary source of marine mammal habitat impact is noise resulting from live NEODS missions. However, the noise does not constitute a long-term physical alteration of the water column or bottom topography, as the occurrences are of limited duration and are intermittent in time. Surface vessels associated with the missions are present in limited duration and are intermittent as well.

Other impacts of the proposed action that may affect marine mammal habitat potentially include the introduction of fuel, debris, ordnance, and chemical residues in the water column. The effects of each of these components were considered in this EA analysis and were determined to not likely adversely affect protected marine species. Marine mammal habitat would not be affected, lost or modified.

NMFS anticipates that the action would result in no impacts to marine mammal habitat beyond short-term and localized impacts to areas within and immediately around the NEODS training operations in the EGTTR shortly after each demolition event. The impacts would be localized and instantaneous. Impacts to marine mammal, invertebrate, and fish species are not expected to be detrimental.

a. *Chemical Residue*

A small amount (5 and 10 lbs) of C-4 explosive will be detonated 30 times per year for five years. Detonation of explosives typically results in the complete combustion of the original materials and any chemicals remaining would be present in extremely low concentrations and would be quickly dispersed by oceanographic processes. All explosives will be either detonated or removed from the test site following the training and ingestion is not a concern. NMFS does not anticipate adverse effects to marine mammals resulting from exposure to chemical residue from the NEODS training exercises.

b. Debris

Although the destruction of mines is expected to result in marine debris, Eglin AFB has proposed to recover and remove all mine shapes and debris after the training operations. The NEODS training exercises are expected to contribute very little floating debris to the marine waters and no adverse impacts to marine mammals are anticipated to result from this marine debris.

2. Endangered Species

Eglin AFB consulted with NMFS's Southeast Regional Office (SERO) pursuant to section 7 of the Endangered Species Act (ESA) regarding impacts to ESA-listed species under NMFS jurisdiction that could potentially result from the proposed action. On May 9, 2010, Eglin AFB provided a letter and Biological Assessment to NMFS's SERO and initiated an informal section 7 consultation, under the ESA, for activities associated with NEODS training operations. On July 28, 2010, NMFS's SERO informal consultation with Eglin AFB concurred with the U.S. Air

Force's assessment and concluded that the proposed action may affect, but is not likely to adversely affect, ESA-listed species or designated critical habitat.

NMFS determined that the green sea turtle (*Chelonia mydas*), Kemp's ridley sea turtle (*Lepidochelys kempii*), loggerhead sea turtle (*Caretta caretta*), leatherback sea turtle (*Dermochelys coriacea*), hawksbill sea turtle (*Eretmochelys imbricata*), and Gulf sturgeon (*Acipenser oxyrinchus desotoi*) are known to occur in the action area of the NEODS training operations.

NEODS training operations are planned to occur outside (greater than one nmi) of the Gulf sturgeon critical habitat boundary and will not be affected. Some adult Gulf sturgeon may potentially be found in the NEODS test areas, but in very low numbers only during winter months. Sub-adult and adult Gulf sturgeon show a preference for shoreline habitats in water depths less than 3.5 m (11.5 ft) and areas lacking in seagrasses. During winter feeding migrations, the available telemetry data indicates that Gulf sturgeon prefer water depths of 7.6 m (25 ft) or less. Recently, Eglin AFB has been working with the USFWS to conduct a multi-year tagging and tracking project in the Choctawhatchee, Yellow, Blackwater, and Escambia Rivers. Preliminary data show that adults migrate into the GOM in late October/early November and remain off Eglin's Santa Rosa Island property until approximately mid-December when the fish then migrate both east and west out of the area. Data show that 82 percent of the detections occurred within 500 m (1,640.4 ft) of the shoreline in water depths greater less than 12.2 m (40 ft), and 99 percent of the detections occurred within 1,000 m (3,280.8 ft) of the shoreline in water depths less than 18.3 m (60 ft). The NEODS training is proposed to occur in depths of 18.3 m. A maximum of 16 detonations are expected to occur annually during the winter months when Gulf sturgeon may be present. Considering that Gulf sturgeon prefer nearshore habitats in this area, the low expected occurrence in the NEODS training depths, and fewer detonations when Gulf sturgeon occur in the vicinity, the potential for any adverse effects occurring to Gulf sturgeon is so low as to be considered discountable.

Hawksbill sea turtle occurrences are expected to be rare in the action area and this species will not be affected by the action. With respect to the U.S., nesting occurs in Puerto Rico, the U.S. Virgin Islands, and the southeast coast of Florida. The largest hawksbill nesting population occurs in the Yucatan Peninsula of Mexico. Adult foraging habitats in Florida are found mainly along peninsular Florida. This species is expected to occur in such low numbers in the action area that the potential for it to be affected by NEODS training operations is discountable.

Based on the above analysis, NMFS SERO has determined that hawksbill sea turtles and Gulf sturgeon are not likely to be adversely affected by the NEODS training operations.

Considering the effects of noise from the detonations on the likelihood of harm from behavioral reactions in the test area, some possible reactions to single, impulsive noises include startle responses, rapid swimming, diving, and swimming towards the surface at the onset of the sound. The infrequent detonations associated with NEODS training operations could possibly result in these types of startle responses by listed species; however, startle reactions are expected to be short term and sea turtles and Gulf sturgeon are expected to continue their normal behaviors. With implementation of the proposed harm avoidance measures to monitor for sea turtles and

delaying detonations when sea turtles are sighted, the effects of startle responses are expected to be short-term and minor and the risk of injury to sea turtles will be reduced to discountable levels. Startle responses are not expected to result in any adverse effects to Gulf sturgeon or sea turtles.

No ESA-listed marine mammals (i.e., sperm whales, blue whales, sei whales, fin whales, humpback whales, and North Atlantic Right whales) would be affected given the location of the proposed action in nearshore waters. The only ESA-listed marine mammal likely to be found in the northern GOM, the Federal and state-listed endangered sperm whale, occurs farther out on the continental slope in water generally deeper than 600 m (1,968.5 ft). Manatees, which occur in the northeastern GOM during warm months, are not considered likely to occur in the mission areas (see Figure 1-1 of Eglin AFB's application) and are not considered further in this analysis as they are managed under the jurisdiction of the U.S. Fish and Wildlife Service (USFWS).

NMFS would be notified immediately if any of the actions considered in Eglin AFB's Biological Assessment were modified or if additional information on ESA-listed species became available, as a reinitiation of consultation may be required. If impacts to listed species occurred beyond what has been considered in this assessment, all operations would cease and NMFS would be notified. Any modifications or conditions resulting from consultation with NMFS would be implemented prior to commencement of activities.

3. Essential Fish Habitat (EFH)

While underwater detonations would disturb a small area of the sea floor, this would be sandy bottom. Hardbottom habitats and artificial reefs would be avoided and mines would only be placed on sandy bottoms. All physical and chemical materials would be removed from the testing site upon completion of the training exercises. While the proposed NEODS testing would occasionally introduce small quantities of chemical compounds into the marine water, these chemicals would rapidly disperse and are insignificant considering the size and fluidity of the GOM. In addition, testing frequency is minimal (i.e., Eglin AFB may conduct up to eight two-day demolition training events annually, each demolition training event involves a maximum of five detonations) and sites are alternated, minimizing any cumulative effects to any one area.

On July 27, 2007, Eglin AFB initiated consultation with NMFS Southeast Region Habitat and Conservation Division on effects to EFH within the action area pursuant to the Magnuson-Stevens Conservation and Management Act. On August 6, 2007, NMFS provided concurrence with Eglin AFB's determination that NEODS's activities are not likely to adversely affect EFH, and NMFS does not have any EFH conservation recommendations to offer. NMFS has determined that there have been no change in circumstances requiring additional consultation to address potential adverse effects to EFH.

Mitigation, Monitoring, Reporting, and Research

A. Mitigation

In order to issue an Incidental Take Authorization (ITA) under section 101(a)(5)(A) and (D) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to such activity, and other means of effecting the least practicable adverse impact on such species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of such species or stock for taking for subsistence uses. The NDAA of 2004 amended the MMPA as it relates to military readiness activities and the incidental take authorization process such that "the least practicable adverse impact" shall include consideration of personnel, safety, practicality of implementation, and the impact on the effectiveness of the "military readiness activity." NEODS training involves military readiness activities.

The NEODS has proposed a number of mitigation measures that have been incorporated into the regulations and would be carried forward into a follow-on LOA(s) in an effort to substantially decrease potential adverse impacts to marine mammals and other living marine resources. These mitigation and monitoring measures are therefore part of the proposed action and included as part of the preferred alternative. Mitigation consists primarily of conducting visual surveys and taking action to avoid detonating charges when protected species are within the ZOI.

Mitigation consists of visual monitoring of the mission site that is required in order to decrease the likelihood of potential impacts to marine mammals and other protected species. Pre- and post-mission surveys using trained observers are required for each NEODS mission. Survey will be conducted from surface vessels and possibly helicopters. Missions will only be conducted during daylight hours (i.e., an hour after sunrise and an hour before sunset). Dependent on visibility, surface observation would be effective out to several kms.

Trained observers onboard support boats would be staged from the highest point possible. The observer on the vessel will be familiar with marine life in the mission area and must be equipped with optical equipment with sufficient magnification (e.g., binoculars), which should allow the observer to sight and report surfacing marine mammals from a significant distance. The trained observer will have proper lines of communication to make recommendations to the Officer in Tactical Command so that he/she can then decide on whether or not the mission can proceed.

Weather that supports the ability to sight marine life is required in order to mitigate the test site effectively (DON, 1998). Wind, visibility, and surface conditions of the GOM are the most critical factors affecting mitigation operations. Higher winds typically increase wave height and create "white cap" conditions, limiting an observer's ability to locate surfacing marine mammals. NEODS missions would be canceled or delayed if the Beaufort sea state were greater than the Scale Number 3 described in Table 3 (below) and in Table 11-1 of Eglin AFB's application.

Table 3. (see figure 11-1 of Eglin AFB's application) Beaufort sea state scale for marine mammal observation.

Scale Number	Sea Conditions
0	Flat calm, no waves or ripples.
1	Small wavelets, few if any whitecaps.
2	Whitecaps on 0 to 33 percent of surface; 0.3 to 0.6 m (1 to 2 ft) waves.
3	Whitecaps on 33 to 50 percent of surface; 0.6 to 0.9 m (2 to 3 ft) waves.
4	Whitecaps on greater than 50 percent of surface; greater than 0.9 m (3 ft) waves.

During a typical mission in the GOM, visual surveys are conducted out to a distance from the detonation point corresponding to the largest impact ZOI, which would be the Level B sub-TTS behavioral harassment range. However, due to recent dolphin mortalities associated with EOD activities at the Silver Strand Training Complex (SSTC) off of San Diego, California, new survey protocols will be implemented. These protocols represent an agreement between the U.S. Navy and NMFS regarding the size of the visual survey areas for training activities using time-delay fuses. Such fuses are used so that U.S. Navy personnel can safely vacate the area before detonation occurs. The U.S. Air Force will ensure that the U.S. Navy complies with the mitigation and monitoring protocols set forth herein this document, and future reference will be to the U.S. Navy, as the U.S. Navy carries out the NEODS training operations.

Under the new protocol, the survey radius (distance from the detonation point) is increased so that marine mammals would not likely have time to swim into the affected area after the charge has been set and U.S. Navy divers have left the area. Once the system is armed and divers exit the water, they are typically not allowed back into the water to disarm the charge. Therefore, the distance that a dolphin could typically swim during the time delay is added to the survey distance. The typical swim speed for dolphin species is considered to be 5.6 km per hour (three knots), or approximately 93.3 m (102 yards [yd]) per min. Table 4 (Table 11-2 of the application) lists the distance a dolphin might travel at this swim speed during various time delays. In addition, NMFS requested that an additional 182.9 (200 yd) buffer be added to this distance to account for dolphins possibly swimming faster than the average speed of three knots. This additional buffer is shown in the table below.

Table 4. (Table 11-2 of the application) Potential swim distance of a dolphin with an additional 200 yd buffer.

Typical Dolphin Swim Speed	Time Delay	Distance Traveled During Time Delay	Distance Traveled with Additional 200 Yd Buffer
3 knots (102 yd/min)	5 min	510 yd	710 yd
	6 min	612 yd	812 yd
	7 min	714 yd	914 yd
	8 min	816 yd	1,016 yd
	9 min	918 yd	1,118 yd
	10 min	1,020 yd	1,220 yd

The total distance potentially traveled during the time delay, as listed in Table 4, is then added to the range of the applicable NMFS injury criteria to determine the final survey radius. The more conservative (larger) of the ranges between the injury dual criteria is used, which for the document is the 13 psi-msec threshold (see Table 9 below or Table 6-2 of the application). If marine mammals are not observed within the mitigation-monitoring zone before the charge is set, they would be unlikely to swim into the injury zone during the time-delay window. The adjusted survey radius for various time delays is Table 5 below (see Table 11-3 of the application). The injury criterion range and final survey distance are shown in meters in order to be consistent with U.S. Navy standards established for the SSTC.

Table 5. (Table 11-3 of the application) Survey radius for time-delayed firing devices.

Charge Weight (NEW)	13 psi-msec Range	Survey Radius for Time Delay, Adjusted for Swim Distance and Buffer					
		5 min	6 min	7 min	8 min	9 min	10 min
5 lb	171* yd	881 yd	983 yd	1,085 yd	1,187 yd	1,289 yd	1,391 yd
10 lb	247* yd	957 yd	1,059 yd	1,161 yd	1,263 yd	1,365 yd	1,467 yd

*Ranges from Table 9 are converted to yd.

In order to provide a more practical implementation of mitigation measures, the U.S. Navy and NMFS agreed to round survey ranges to distances more easily delineated in the field. Therefore, to be consistent with the method used for missions at the U.S. Navy's SSTC, the survey distances shows in Table 5 are rounded to either 914.4 or 1,280.2 m (1,000 or 1,400 yd). A different number of survey vessels are required for each distance. The final distances are shown in Table 6 (Table 11-4 of the application).

Table 6. (Table 11-4 of the application) Final rounded survey radius for time-delayed firing devices.

Charge Weight (NEW)	Final Rounded Survey Radius by Time Delay					
	5 min	6 min	7 min	8 min	9 min	10 min
5 lb	1,000 yd	1,000 yd	1,000 yd	1,000 yd	1,400 yd	1,400 yd
10 lb	1,000 yd	1,000 yd	1,000 yd	1,400 yd	1,400 yd	1,400 yd

The following visual monitoring requirements will be implemented for each NEODS mission. These requirements are based on the agreement between NMFS and the U.S. Navy for EOD activities conducted in water depths of 7.3 m (24 ft) or greater.

- Underwater detonations using timed delay devices will only be conducted during daylight hours (i.e., an hour after sunrise and an hour before sunset).
- Time delays longer than 10 min will not be used. Initiation of the time device will not start until the mitigation-monitoring zone is clear of marine mammals for 30 min.
- A mitigation-monitoring zone will be established around each underwater detonation location as indicated in Table 6 based on charge weight and length of time-delay used. When conducting surveys within the mitigation-monitoring zone radius (but always outside the detonation plume radius/human safety zone) and travel in a circular pattern around the detonation point, surveying the inner (toward the detonation site) and outer

(away from the detonation site) areas. For a survey radius of 1,000 yd, the boat will be positioned at 457.2 m (500 yd) from the detonation point. Similarly, for a survey radius of 1,400 yd, boats will be positioned at 640.1 m (700 yd) distance.

- For a survey radius of 1,000 yd, two boats are required. For a radius of 1,400 yd, either three boats or two boats/one helicopter are required.
- When using two boats, each boat will be positioned on opposite sides of the detonation location, separated by 180 degrees. When using three boats, each boat will be separated by 120 degrees (equidistant from each other).
- Two observers in each boat will conduct continuous visual surveys of the mitigation-monitoring zone for the entire duration of the training event, including at least 30 min prior to detonation. Observers will search the mitigation-monitoring zone for the presence of marine mammals, and other marine species such as sea turtles, diving birds, large concentrations of fish or jellyfish, and large *Sargassum* mats. The presence of diving birds, fish, jellyfish, and *Sargassum* may indicate an increased likelihood of dolphin presence.
- The mission would be postponed if large concentrations of fish, jellyfish, and/or large *Sargassum* rafts are observed within the mitigation-monitoring zone. The delay would continue until the fish, jellyfish, and/or large *Sargassum* rafts that caused the postponement are confirmed to be outside the mitigation-monitoring zone.
- To the extent practicable, boats will maintain a 18.5 km per hour (10 knot or 11.5 miles per hour) search speed. This search speed is expected to ensure adequate coverage of the buffer zone. While weather conditions and sea state may require slower speeds in some instances, 10 knots is considered a prudent, safe, and executable speed that will allow adequate surveillance. For a 1,000 yd survey zone, a boat travelling at 10 knots and 500 yd from the detonation point would circle the point approximately 3.2 times during a 30 min survey period. By using two boats, approximately 6.4 circles would be completed in total. Similarly, for a 1,400 yd radius, each boat would circle the detonation point approximately 2.3 times within 30 min, and use of three boats would result in 6.9 total circles.
- If available, a U.S. Navy helicopter can be used in lieu of one of the survey boats, so long as safety of flight is not jeopardized. U.S. Navy helicopter pilots are trained to conduct searches for relatively small objects in the water, such as a missing person. A helicopter search pattern is dictated by standard U.S. Navy protocols and accounts for multiple variables, such as size and shape of the search area, size of the object, and environmental conditions, among others.
- The mitigation-monitoring zone will be surveyed for 30 min prior to detonation and continue for 30 min after detonation (concentrated on the area down current of the test site), in order to monitor for marine mammals and other protected species. It is the U.S. Navy's intent to conduct five successive detonations with a maximum time of 20 min between detonations, although a variety of factors can cause a delay of longer than 20 min, including a delay until the following day. Monitoring would continue during the 20 min time between detonations, and would serve as both post-detonation monitoring as well as pre-mission monitoring for the next detonation. If the time between detonations is delayed beyond 20 min, post-mission monitoring will be conducted for 30 min. At the conclusion of the final detonation, post-monitoring will be conducted for 30 min.

- Other personnel besides designated observers shall also maintain situational awareness of the presence of marine mammals within the mitigation-monitoring zone to the extent practicable given dive safety considerations.
- Divers placing the charges on mines will observe the immediate underwater area around the detonation site for marine mammals and other marine species such as diving birds, sea turtles, and Gulf sturgeon, and report sightings to surface observers.
- If a marine mammal is sighted within an established mitigation-monitoring zone or moving towards it, underwater detonation events will be postponed or suspended until the marine mammal that caused the postponement/suspension of training operations has voluntarily left the area and the area is clear of marine mammals for at least 30 min.
- If a marine mammal is detected within or about to enter an established mitigation-monitoring zone and subsequently cannot be reacquired, the mission will be postponed or suspended until the last verified location is outside the mitigation-monitoring zone, the animal is moving away from the area, and the area is clear of marine mammals for at least 30 min.
- Any marine mammal observed after an underwater detonation either injured or exhibiting signs of distress will be reported to the Eglin AFB. Eglin AFB will coordinate with other members of marine mammal stranding networks, as appropriate, and report these events to NMFS or USFWS. The report will contain date and time of sighting, location, species description, and indications of the animal's status (see section below for more information on reporting).

NEODS training operations will be suspended and the U.S. Air Force will re-initiate consultation if (1) a marine mammal is killed or seriously injured and the injury or death could be associated with the NEODS training operations, and (2) implementing supplemental mitigation measures is not likely to reduce the risk of serious injury or death to a very low level. The U.S. Air Force will suspend operations until the proper authorization for incidental take is obtained from NMFS.

B. Monitoring and Reporting

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

Mitigation and monitoring measures may include any supplemental activities that are designed, proposed, and exercised to help reduce or eliminate the potential impacts to the marine resources. The U.S. Air Force recognizes the importance of such "in-place" mitigations and is aware that NMFS recommends an approved mitigation plan that outlines the scope and effectiveness of the Proposed Action's mitigations.

The risk of harassment (Levels A and B) to marine mammals has been determined to be relatively small. Eglin AFB has determined that with the implementation and commitment to utilizing the "visual monitoring" mitigations, potential takes are greatly reduced.

For NEODS testing, areas to be used in missions are visually monitored for marine mammal presence from a surface vessel prior to detonation of mine neutralization charges. Monitoring would be conducted before missions to clear marine mammals and sea turtles within the ZOI. If protected animals are inside the ZOI, firing would be postponed until they left the area. The following procedures will be conducted during the mission activities:

- Conduct survey clearance procedures using best operational methods possible.
- Clear ZOI and avoid all dolphins and protected species indicators (e.g., *Sargassum* rafts) to the maximum extent possible.
- Reconduct clearance procedures if dolphins or protected species indicators (e.g., *Sargassum* rafts) are encountered.
- All observers must complete the Marine Observer Certification course annually.
- Conduct post-mission observation and report operations data as required by Eglin's Natural Resources Section, 96 CEG/CEVSN.
- Submit an annual summary (coordinated through 96 CEG/CEVSN) of mission observations to:
  National Marine Fisheries Service
  Southeast Regional Office
  Protected Resources Division
  9721 Executive Center Drive North
  St. Petersburg, FL 33702
  and
  National Marine Fisheries Service
  Office of Protected Resources
  1315 East West Highway
  Silver Spring, MD 20910

Monitoring requirements in relation to Eglin AFB's NEODS training activities would include observations made by the applicant and their associates. Information recorded would include species counts, numbers of observed disturbances, and descriptions of the disturbance behaviors before, during, and after explosive activities. Observations of unusual behaviors, numbers, or distributions of marine mammals in the activity area will be reported to NMFS and USFWS so that any potential follow-up observations can be conducted by the appropriate personnel. In addition, observations of tag-bearing marine mammals, sea turtles, and fish carcasses as well as any rare or unusual species of marine mammals and fish would be reported to NMFS and USFWS.

Eglin AFB would notify NMFS and the Regional Office prior to initiation of each explosive demolition session. If at any time injury or death of any marine mammal occurs that may be a result of the proposed NEODS activities, Eglin AFB would suspend activities and contact NMFS immediately to determine how best to proceed to ensure that another injury, serious injury, or death does not occur and to ensure that the applicant remains in compliance with the MMPA. Any takes of marine mammals other than those authorized by the LOA(s), as well as any injuries or deaths of marine mammals, will be reported to the Southeast Regional Administrator, within 24 hours. An annual draft final report must be submitted to NMFS within 90 days after the conclusion of the NEODS activities. An annual report must be submitted at the time of renewal of the LOA(s) as well. Also, a report must be submitted at least 180 days prior to the expiration

of these regulations. The report would include a summary of the activities undertaken and information gathered pursuant to the monitoring requirements set forth in the regulations and LOA(s), including dates and times of detonations as well as pre- and post-blasting monitoring observations. A final report must be submitted to the Regional Administrator within 30 days after receiving comments from NMFS on the draft final report. If no comments are received from NMFS, the draft final report would be considered to be the final report.

In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by this rule, such as an injury, serious injury or mortality, Eglin AFB will immediately cease the specified activities and immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS at 301-427-8401 and/or by email to Michael.Payne@noaa.gov and Howard.Goldstein@noaa.gov, and the NMFS Southeast Region Marine Mammal Stranding Network at 877-433-8299 (Blair.Mase@noaa.gov and Erin.Fougeres@noaa.gov) (Florida Marine Mammal Stranding Hotline at 888-404-3922). The report must include the following information:

- Time, date, and location (latitude/longitude) of the incident;
- Description of the incident;
- Status of all noise-generating source use in the 24 hours preceding the incident;
- Water depth;
- Environmental conditions (e.g., wind speed and direction, Beaufort sea state, cloud cover, and visibility);
- Description of all marine mammal observations in the 24 hours preceding the incident;
- Species identification or description of the animal(s) involved;
- Fate of the animal(s); and
- Photographs or video footage of the animal(s) (if equipment is available).

Activities shall not resume until NMFS is able to review the circumstances of the prohibited take. NMFS shall work with Eglin AFB to determine what is necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. Eglin AFB may not resume their activities until notified by NMFS via letter or email, or telephone.

In the event that Eglin AFB discovers an injured or dead marine mammal, and the lead observer determines that the cause of injury or death is unknown and the death is relatively recent (i.e., in less than a moderate state of decomposition as described in the next paragraph), Eglin AFB will immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, at 301-427-8401, and/or by email to Michael.Payne@noaa.gov and Howard.Goldstein@noaa.gov, and the NMFS Southeast Region Marine Mammal Stranding Network (877-433-8299) and/or by email to the Southeast Regional Stranding Coordinator (Blair.Mase@noaa.gov) and Southeast Regional Stranding Program Administrator (Erin.Fougeres@noaa.gov). The report must include the same information identified in the paragraph above. Activities may continue while NMFS reviews the circumstances of the incident. NMFS will work with Eglin AFB to determine whether modifications in the activities are appropriate.

In the event that Eglin AFB discovers an injured or dead marine mammal, and the lead observer determines that the injury or death is not associated with or related to the activities authorized in

the final rule (e.g., previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), Eglin AFB will report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, at 301-427-8401, and/or by email to Michael.Payne@noaa.gov and Howard.Goldstein@noaa.gov, and the NMFS Southeast Regional Marine Mammal Stranding Network (877-433-8299), and/or by email to the Southeast Regional Stranding Coordinator (Blair.Mase@noaa.gov) and Southeast Regional Stranding Program Administrator (Erin.Fougeres@noaa.gov), within 24 hours of discovery. Eglin AFB will provide photographs or video footage (if available) or other documentation of the stranded animals sighting to NMFS and the Marine Mammal Stranding Network.

C. Encouraging Research

Although Eglin AFB does not currently conduct independent U.S. Air Force monitoring efforts, Eglin's Natural Resources Section does participate in marine animal tagging and monitoring programs lead by other agencies. Additionally, the Natural Resources Section also supports participation in annual surveys of marine mammals in the GOM with NMFS. From 1999 to 2002, Eglin AFB's Natural Resources Section, through a contract representative, participated in summer cetacean monitoring and research opportunities. The contractor participated in visual surveys in 1999 for cetaceans in the GOM, photographic identification of sperm whales in the northeastern GOM in 2001, and as a visual observer during the 2000 Sperm Whale Pilot Study and the 2002 sperm whale Satellite-tag (S-tag) cruise. In addition, Eglin's Natural Resources Section has obtained Department of Defense funding for two marine mammal habitat modeling projects. The latest such project (Garrison, 2008) included funding and extensive involvement of NMFS personnel so that the most recent aerial survey data could be utilized for habitat modeling and animal density estimates in the northeastern GOM.

Eglin AFB conducts other research efforts that utilize marine mammal stranding information as a means of ascertaining the effectiveness of mitigation techniques. Stranding data is collected and maintained for the Florida panhandle and GOM-wide areas. This is undertaken through the establishment and maintenance of contacts with local, state, and regional stranding networks.

Eglin AFB assists with stranding data collection by maintaining its own team of stranding personnel. In addition to simply collecting stranding data, various analyses are performed. Stranding events are tracked by year, season, and NMFS statistical zone, both GOM-wide and on the coastline in proximity to Eglin AFB. Stranding data is combined with records of EGTTR mission activity in each water range and analyzed for any possible correlation. In addition to being used as a measure of the effectiveness of mission mitigations, stranding data can yield insight into the species composition of cetaceans in the region.

B. No Action Alternative

If the NEODS training operation IHA were not issued, Eglin AFB would not detonate any explosives, and the previously described risk to marine mammals would be eliminated. However, the Eglin AFB would not be able to conduct their training operations and the NEODS mission would be jeopardized.

The no action alternative (i.e., not issuing a rule and subsequent LOA[s]) would restrict the U.S. Air Force from conducting NEODS training operations at Eglin AFB, as carrying out those operations without an LOA or IHA would be in violation of the MMPA. If these activities do not go forward, there would be no impact to the human environment, including EFH, as no detonations would occur. However, not conducting these activities could be considered detrimental to the military defense capabilities of the country. The anticipated effects absent monitoring and mitigation measures are discussed and analyzed in the MMPA final rule and are incorporated here by reference.

C. Promulgation of Regulations and Issuance of a LOA(s) with Additional Aerial Monitoring Requirement

Aerial surveys have been used as an effective complement to vessel observations in activities in the Arctic as well as several larger U.S. Navy GOM exercises. The U.S. Navy has found, however, that detection of Atlantic bottlenose dolphins and Atlantic spotted dolphins by shipboard observers is 100% (DON, 1999, Appendix C). Due to the effectiveness of vessel observation in detecting these species, the low density of marine mammals in the area, and the small area to be monitored, NMFS does not believe that an added aerial monitoring component would be likely to reduce the numbers of marine mammals harassed by the NEODS training activities. Therefore, the direct and indirect impacts of this alternative would be the same as those anticipated for the preferred alternative.

VIII. CUMULATIVE IMPACTS

According to CEQ regulations, 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 effects analysis in a document prepared for purposes of the National Environmental Policy Act should consider potential cumulative environmental impacts. 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, present, and reasonably foreseeable future projects and human activities. Past, present, and reasonably foreseeable future activities that are likely to affect the human environment in the GOM include oil and gas exploration, production, and decommission; ongoing impacts of the Deepwater Horizon oil spill and associated clean up and restoration activities, seismic surveys; shipping; commercial fishing; and military readiness training activities. The following summary describes ongoing and proposed activities in the northern GOM that may contribute to cumulative adverse impacts to the biological and physical environment.

There are many ongoing activities within the EGTTR that affect marine mammals and other protected species, though not necessarily in an area overlapping the area that NEODS training operations will occur. The current main uses of the affected area include commercial fishing, recreational boating and fishing, and the exploration, production, and transport of mineral resources and other waterborne commerce throughout the GOM. These are expected to continue at the present levels of intensity in the near future, as are their associated risks of injury or mortality to protected species posed by incidental capture by fishermen, anthropogenic noise, accidental oil spills, vessel collisions, marine debris, and chemical discharges.

EGTTR test and training missions, such as Precision Strike Weapon and Air-to-Surface Gunnery Exercises, are expected to occur indefinitely and may potentially take marine mammals and sea turtles. NMFS concluded ESA consultation for these activities on October 28, 2004 and March 14, 2005, respectively. The U.S. Air Force currently has a MMPA rule in place for these activities that expires in 2011 and has also requested an IHA for when the current rule lapses. Cumulative impact assessments made in those activities EAs indicated there would not be a cumulative impact. Also, NMFS has consulted with the U.S. Navy to address potential effects on marine mammals and sea turtles resulting from activities associated with the Gulf of Mexico Range Complex and a MMPA final rule and Biological Opinion were issued in February, 2011.

1.) The northern shelf in the GOM has large reservoirs of oil and natural gas. As of the late 1990's over 83% of the crude oil and 99% 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 the search for natural gas and oil on the GOM Outer Continental Shelf (OCS) (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 29 km (18 mi) 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 370,149 line km (230,000 line mi) of seismic survey work has been conducted per year in that area, including over 342,790 km (213,000 mi) in 2002. Oil and natural gas production is believed to potentially result in acoustical harassment to marine mammals. Natural resources within state waters (3 nmi of the coast) are regulated by the state and U.S. Army Corps of Engineers, and beyond state waters are regulated by the Bureau of Ocean Energy Management, Regulation, and Enforcement.

2.) Marine mammal and seismic survey research 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. In 2003 and 2007-2008, the Lamont-Doherty Earth Observatory of Columbia University was issued an IHA to conduct this type of seismic research in the northern GOM from the R/V *Maurice Ewing* and R/V *Marcus G. Langseth*, respectively. Monitoring reports from other seismic surveys suggest that impacts are no more severe than those anticipated in the IHAs.

Furthermore, based on the number of marine mammal observations, it appears that fewer marine mammals were exposed than anticipated.

3.) Four of the United States' busiest ports are also located in the GOM; handling about 45% of U.S. shipped tonnage (Würsig *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, the occurrence of ship strikes to dolphins are 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.

4.) The GOM is also a major area for commercial and recreational fishing; it provides almost 20% of the commercial fish catches in the U.S. annually (MMS, 2000) and, together with recreational fishing, generates $2.8 billion annually. Along the Atlantic and GOM coast, almost 2.8 billion pounds of fish were commercially caught with a value of over $2.1 billion. In addition, over 12 million Americans participate in saltwater recreational fishing along the Atlantic and GOM coast (NMFS, 2007c). 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 GOM. These activities could result in by-catch of marine mammals, entanglement in fishing gear, and reduce prey availability for marine mammals.

5.) Pollution in the GOM is estimated to have more than doubled since 1950. Leading factors are 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 deadzone in the northern GOM which expands more than 20,000 km^2 (7,722 mi^2) 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.

6.) On April 20, 2010, an explosion on the Deepwater Horizon MC252 drilling platform in the GOM caused the rig to sink and oil began to leak. Approximately five million barrels of oil were released into the GOM until the well was finally capped in mid-July, 2010. The spill caused significant impacts to wildlife and the fishing community in the GOM region, specifically along the coastal areas of Texas, Louisiana, Mississippi, Alabama, and Florida. Oil spills have been documented to have direct toxic impacts on a variety of species of fish and invertebrates (which includes commercially important aquatic life, e.g., blue crabs, squid, and shrimp), marine mammals, sea turtles, birds, and habitat. Toxins in the oil can kill these species or have other harmful effects such as genetic damage, liver disease, cancer, and reproductive, developmental, and immune system impairment. NMFS is working with other Federal, state, and tribal co-trustees to conduct short-term and long-term restoration projects of coastal and marine natural resources and their habitats impacted by oil to pre-spill conditions. To help determine the type and amount of restoration needed to compensate the public for harm to natural resources and lost public uses as a result of the oil spill, NOAA will study the effects of the spill by conducting a

process known as the Natural Resources Damage Assessment (NRDA). Restoration projects have included: enhancing beach shoreline; creating and restoring wetlands; create oyster reefs and other shellfish habitat; restore coral and seagrass beds; acquire, restore, and protect waterfowl habitat; conduct species recovery and monitoring programs; and provide recreational opportunities.

7.) NMFS has declared an unusual mortality event (UME) (mostly bottlenose dolphins) in the GOM. As of February 5, 2012, the UME involves 647 cetacean strandings in the northern GOM (5% stranded alive and 95% stranded dead). Of these, 114 cetaceans stranded prior to the response phase for the oil spill, between February 1, 2010 and April 29, 2010. Between April 30 to November 2, 2010, 122 cetaceans stranded or were reported dead offshore during the initial response phase to the oil spill. After the initial response phase ended, 411 cetaceans stranded between November 3, 2010 and February 5, 2012. The number of cetaceans stranded after the initial response phase ended includes six dolphins that were killed incidental to fish related scientific data collection and one dolphin killed incidental to trawl relocation for a dredging project.

In addition to investigating all other potential causes, scientists are investigating the role *Brucella* bacterial infections may have in the UME. Scientists have sampled and tested 21 dolphins for *Brucella* so far, with five dead animals testing positive between June, 2010 and February, 2011. NMFS is working with a team of marine mammal health experts, including veterinarians, epidemiologists, biologists, and toxicologists, to investigate the cause of death for as many of the stranded dolphins as possible as well as to develop a multi-tiered approach. The findings of the investigations may take years to complete and will be made public when scientifically and legally appropriate. Given the decomposition of some of the carcasses, some analyses cannot be performed.

8.) Military Readiness Activities

In addition to the proposed NEODS training activities, Eglin AFB currently conducts Precision Strike Weapons (PSW) Testing and anticipates 5 more foreseeable training and testing missions in the future within the GOM. These mission activities are detailed below. Impacts to marine mammals from PSW Testing has been analyzed; however, analyses of potential effects to marine mammals from the 5 listed foreseeable operations have not been conducted as no applications for IHAs or LOAs have been received by NMFS for those activities.

<u>Precision Strike Weapon (PSW) Testing</u>

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 136.1 kg (300 lbs) and 43.5 kg (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 27.8 to 44.5 km (15 to 24 nmi) 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 have the potential

for causing harassment, injury or mortality to four species of marine mammals: Atlantic bottlenose dolphins, Atlantic spotted dolphins, dwarf sperm whales (*Kogia sima*), and pygmy sperm whales (*Kogia breviceps*). 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. A LOA was issued for this activity on April 1, 2010, and expires on March 31, 2011.

Marine Expeditionary Unit (WEU) Readiness Training

The MEU Readiness Training involves the development of training for the U.S. Marine Corp prior to deployment. The training is anticipated to occur twice per year with each training event having a total duration of 10 days, or less if only a portion of the activities is conducted. It is possible that training could only occur once during some years and possibly not at all in others.

There are 17 proposed training activities that fall under this mission: Insertion of Forward Command Element; Insertion of Reconnaissance and Surveillance Teams MEU Aviation Operations; Helicopter Raids; Rapid Ground Refueling; Small Boat Raids; Amphibious Landing Rehearsal; 2 Mechanized Raids (wet and dry); MEU Landing; Major Highway Crossing; Supporting Arms Coordinating Exercise; Live Fire and/or Maneuver; Non-combatant Evacuation Operation; Direct Action; Tactical Exercise Control Groups/Opposing Force Requirements; and Withdrawal. These activities involve one or more of five basic elements that are the building blocks of training; amphibious landings, ground movement, aviation operations, munitions use, and pyrotechnics.

Navy Offshore Petroleum Distribution System (OPDS)

The Navy OPDS provides for the delivery of fuels from an offshore source up to a beach combat fuel depot via a flexible 8 inch (20.3 cm) diameter pipe; however, fuel would not be pumped at any time. The purpose of the project is to test pipe deployment and recovery procedures and pumping capabilities using salt or freshwater. The testing would consist of a 20-day practice period and a 5-day acceptance test period to begin in late 2007.

Passive and Active Data Collection

A third foreseeable future event involves the collection of passive and active multi-spectral seeker/sensor data of obstacles and simulated mines in littoral waters and inland environments from several potential systems using an airborne platform. Tests would be carried out by the Airborne Littoral Reconnaissance Technologies team and would occur at Test Site A-15 on the Eglin AFB portion of SRI. Tests would utilize a wide field view of diode laser illuminator array flown in an aircraft 152.4 to 914.4 m (500 to 3,000 ft) above the targets. The target area would incorporate the Gulf Coast beach area (out to 3 m [10 ft] depth), the bay side coastal area, and an

intermittent area between the two coastal areas and include mines and obstacles on the island and in the water. Personnel would install the targets at A-15 over a 3 to 4 day period in a fashion to simulate actual mine layouts. After installation, missile flights would commence, during which a laser array would scan the minefields. Testing could occur at any time of the year, day or night. Upon test completion, personnel would remove targets from the test sure over a 2 to 3 day period. The mines and obstacles would remain on land and in the water for no longer than 2 weeks.

Fiber Optic Cable Installation

Eglin AFB also has plans to install a fiber optic cable in conduits to repair the communications infrastructure on SRI that was destroyed during hurricanes Ivan and Dennis. Contractors would use a directional boring method for the entire length of SRI and install an 8-inch diameter pipe pulling in two 288 strand fiber cables and bore under the sound from A-15 to Windhaven to complete the fiber loop to A-20-points to tie the pipe together at the end of each bore. The depth of the bore and tie in points would be a minimum of 6.1 m (20 ft).

Santa Rosa Island Dune and Beach Restoration

Eglin AFB plans to carry out an SRI dune and beach restoration project. The project's goals are to protect facilities at risk of damage from storm surge and wave action with 27.4 km (17 mi) of shoreline requiring restoration. The U.S. Air Force Air Armament Center (AAC) would restore dunes at 23 general locations along Air Force owned SRI. The U.S. Army Corps of Engineers would oversee contracts to dredge sand from an offshore location and pump it onto the beach. Corps contractors would then bulldoze the sand into place for either shoreline restoration or dune restoration.

Gulf of Mexico Range Complex

The U.S. Navy has planned training; research, development, testing, and evaluation activities; and associated range capabilities enhancements in the Gulf of Mexico Range Complex. The action area is composed of four operating areas (OPAREAs) (i.e., Corpus Christi, New Orleans, Pensacola, and Panama City); at-sea special use airspace (warning areas); the area from the shoreline to the Corpus Christi, Pensacola, and Panama City OPAREAs; overland airspace (military operating areas) in Texas, Mississippi, Alabama, and Florida; the NSA Panama City Demolition Pond; and two inland range areas – the McMullen County Range and Noxubee County Range. The potential effects to physical, biological, and mad-made environments from the testing and training alternatives were studied to determine how the action could affect these resources. The U.S. Navy has completed an extensive cumulative impacts analysis in the Gulf of Mexico Range Complex Final Environmental Impact Statement/Overseas Environmental Impact Statement with regard to the impacts of that proposal, that analysis is hereby incorporated by reference.

Conclusion

The commercial, scientific, military, and recreational activities, as described above, which occur in the northern GOM, would not occur within the NEODS training acoustic zone of impact due to safety concerns. Furthermore, given the small spatial scale and infrequent occurrence of the proposed activity and the required mitigation, NMFS anticipates there would be minimal synergistic adverse environmental impacts from the NEODS training activities under the regulations and implementing LOA(s) will Therefore, NMFS has determined that NEODS training activities would not produce any significant cumulative impacts to the human environment.

Despite the other activities going on in the area, NMFS does not believe that significant cumulative impacts are likely to occur at Eglin AFB as a result of the issuance of this LOA(s) over a five year period for the take of marine mammals, by Level B harassment, incidental to the NEODS training operations in the EGTTR. NMFS anticipates impacts to be limited to temporary behavioral disturbance of Atlantic bottlenose dolphins, during the time of the detonations.

IX. SOCIO-ECONOMICS/ENVIRONMENTAL JUSTICE

Environmental justice impacts are defined as disproportionately adverse health effects on low income or minority populations. An environmental justice analysis requires identification of minority and low-income populations, as is done here, and analysis of whether the Proposed Action would have a disproportionately high and adverse effect on those populations. Analysis includes a review of (a) the demographic characteristics of the populations affected when compared to the general population, (b) potential impacts identified in other portions of this document (e.g., noise), and (c) the location and significance of those effects. Impact analyses described in other portions of this document were reviewed by the U.S. Air Force to determine the potential for environmental and health effects on human populations that would exceed criteria thresholds. The review was based on the potential for noise related impacts to cause annoyance to some people.

Using the Noise Assessment and Prediction Capability (NAPS) Model, it was determined that, while noise would extend beyond the Eglin Reservation boundary, the levels would be below the threshold for moderate risk of annoyance to the public. Associated hazardous pollutants from explosive detonations should be contained within the area of concern. As a result, there would be no disproportionately adverse health effects on low income or minority populations. Consequently, there would be no environmental justice impacts (DAF, 2002).

X. CONCLUSION

As a result of this environmental review, NMFS has determined that the promulgation of a 5-year rule and issuance of a LOA(s) to take small numbers of marine mammals by Level B harassment incidental to the U.S. Air Force's NEODS training operations at Eglin AFB will not significantly affect the quality of the human environment.

XI. LIST OF PREPARERS AND AGENCIES CONSULTED

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APPENDIX I. Information on NEODS Background, Mission, and Operations

Military Readiness Activity

NEODS supports the Naval Fleet by providing training to personnel from all four armed services, civil officials, and military students from over 70 countries. The NEODS facility supports the Department of Defense Joint Service Explosive Ordnance Disposal training mission. The U.S. Navy and the U.S. Marine Corps believe that the ability of Sailors and Marines to detect, characterize, and neutralize mines from their operating areas at sea, on the shore, and inland, is vital to their doctrines.

The U.S. Navy believes that an array of transnational, rogue, and sub-national adversaries now pose the most immediate threat to American interests. Because of their relative low cost and ease of use, mines will be among the adversaries' weapons of choice in shallow-water situations, and they will be deployed in an asymmetrical and asynchronous manner. The U.S. Navy needs organic means to clear mines and obstacles rapidly in three challenging environments: shallow water; the surf zone; and the beach zone. The U.S. Navy also needs a capability for rapid clandestine surveillance and reconnaissance of minefields and obstacles in these environments. The NEODS mission in the Gulf of Mexico (GOM) offshore of Eglin AFB are properly considered a "military readiness activity" pursuant to the National Defense Authorization Act of 2004 (NDAA) (Public Law 108-136).

Mission and Goal of NEODS Operations

The mission of NEODS is to detect, recover, identify, evaluate, render safe, and dispose of unexploded ordnance (UXO) that constitutes a threat to people, material, installations, ships, aircraft, and operations. The U.S. Navy EOD force of approximately 1,000 men and women has the equipment, mobility, and flexibility to tackle the global spectrum of threats in all world environments. Mine Countermeasures (MCM) detonations is one function of the U.S. Navy EOD force, which involves mine-hunting and mine-clearance operations. The NEODS facilities are located at Eglin AFB, Florida. The proposed training at Eglin AFB involves focused training on basic EOD skills. Examples of these fundamental skills are recognizing ordnance, reconnaissance, measurement, basic understanding of demolition charges, and neutralization of conventional and chemical ordnance.

The goal of the training is to give NEODS students the tools and techniques to implement MCM through real scenarios. The students would be taught established techniques to implement MCM through real scenarios. The students would be taught established techniques for neutralizing mines by diving and hand-placing charges adjacent to the mines.

NEODS Operations

MCM training classes are 51 days in duration, with four days of on-site training in the GOM. Two of these four days will be utilized to lay the inert mines prior to the training. The other two days will require the use of live detonations in the GOM. One large safety vessel and five MK V inflatable 3.1 m (10 ft) rubber boats with 50 horsepower (HP) engines would be used to access

the GOM waters during training activities. The training procedures during the two "live demolition" days are described as follows.

First Live Demolition Day: Five inert mines will be placed in a compact area on the GOM floor in approximately 18.3 m (60 ft) of water. These five mines will be utilized for the one or two live demolition days. Divers will locate the mines by hand-held sonars (AN/PQS-2A acoustic locator and the Dukane Underwater Acoustic Locator System), which detect the mine casings (mine shape reacquisition). The hand-held sonar has been evaluated by the U.S. Navy and the sound source levels and sonar frequency ranges are below the threshold considered Level B harassment for marine mammals for sonar use (see Table 1-1 of Eglin AFB's application). Approximately 50,000 hrs of use would be required to affect one dolphin. It is expected that maximum sonar use associated with NEODS operations will be approximately 300 hrs annually. Therefore, potential noise impacts from sonar use are not included in this analysis.

Five charges packed with C-4 explosive material (either 2.3 kg [5 lb] NEW or 4.6 kg [10 lb] NEW) will be set up adjacent to the inert mines. A charge includes detonation cord, non-electric caps, time fuses and fuse igniters. No more than five charges will be utilized over the two-day period. Live training events will occur eight times annually, averaging once every six to seven weeks. Four of the training events will involve five-lb charges, and four events will involve ten-lb charges. Because five detonations (maximum) are expected during each event, there will be up to 20 five-lb detonations and twenty ten-lb detonations annually, for a total of forty detonations. It is expected that 60 percent of the training events will occur in summer, and 40 percent will occur in winter. Therefore, analyses of potential marine mammal impacts in Section 6 of Eglin AFB's application reflect this seasonal tempo. Overpressure from the detonation is intended to disrupt the electrical charge on the mine, rendering it safe. The five charges will be detonated individually with a maximum separation time of 20 minutes between each detonation. The time of detonation will be limited to an hour after sunrise and an hour before sunset. Mine shapes and debris will be recovered and removed from the GOM waters when training is completed.

Second Live Demolition Day: Each team has two days to complete their entire evolution (detonation of five charges). The second day will be utilized only if the teams cannot complete their evolution on day one.

Table 7. (see Table 1-1 of Eglin AFB's application) Hand-held sonar characteristics

	AN/PQS-2A	Dukane
Operating Frequency	115 kHz to 145 kHz	37.5 kHz +/- 1 kHz
Sound Pressure Level	178.5 dB re 1 μPa @ 1m	157 to 160.5 dB re 1 μPa @ 1m

The AN/PQS-2A sonar system produces a non-continuous audible tone in the diver's headset when a target is located. The AN/PQS-2A sonar's frequency range is within the hearing range of

Atlantic bottlenose dolphins. The U.S. Navy evaluated the use of AN/PQS-2A sonar (in addition to many other types of sonar systems) in a 2009 Environmental Impact Statement for activities in the Panama City, Florida area. Using a bottlenose dolphin density of 0.81 animals/km^2, it would require approximately 50,000 hrs of use to reach a take level of 0.5 animals. As a point of comparison, if the AN/PQS-2A sonar was in use for 12 hrs per day on every day of training in the GOM, the total number of hrs of use would be 384 annually. Eglin AFB considers that there would be no impacts to bottlenose dolphins from AN/PQS-2A sonar use.

Additional details regarding the proposed NEODS training operations can be found in Eglin AFB's LOA application, which can be found online at:
http://www.nmfs.noaa.gov/pr/permits/incidental.htm#applications

APPENDIX 2. Marine Mammal Acoustics Impacts Analysis

a. Acoustic Impacts

In general, potential impacts to marine mammals from explosive detonations could include non-lethal injury (Level A harassment), serious injury, and mortality, as well as Level B harassment, which can consist of behavioural disturbance or temporary shift of hearing sensitivity. In the absence of monitoring and mitigation, marine mammals may be killed or injured as a result of an explosive detonation due to the response of air cavities in the body such as the lungs and bubbles in the intestines. Effects are likely to be most severe in near surface waters where the reflective shock wave creates a region of negative pressure called "cavitation." While these direct physiological effects are possible, they are considered unlikely in association with the specified activities due to the monitoring and mitigation measures described below as well as the comparatively small size of detonations.

A second possible cause of mortality is the onset of extensive lung hemorrhage. Extensive lung hemorrhage is considered debilitating and potentially fatal. Suffocation caused by lung hemorrhage is likely to be the major cause of marine mammal death from underwater shock waves. The estimated range for the onset of extensive lung hemorrhage to marine mammals varied depending upon the animal's weight, with the smallest mammals having the greatest potential hazard range.

The primary potential impact to the Atlantic bottlenose occurring in the EGTTR from the proposed detonations is Level B harassment from the acoustic effects of the explosions. There is a slight potential, absent monitoring and mitigation, that a very small number of marine mammals may be injured or killed due to the energy generated from an explosive force on the sea floor.

Level A Harassment

Level A harassment is defined as any act that injures or has the potential to injure a marine mammal or marine mammal stock in the wild. In relation to acoustics, Level A harassment usually takes the form of tympanic membrane (TM) rupture and the onset of slight lung injury. TM rupture is well correlated with permanent hearing impairment (Ketten, 1998) indicates a 30 % incidence of permanent threshold shift (PTS) at the same threshold). The threshold currently used by NMFS for injury (Level A harassment) corresponds to a 50% rate of TM rupture, which can be stated in terms of an energy flux density (EFD) value of 205 dB re 1 μPa^2 s. This means that more than 50% of animals exposed to this energy level are thought to sustain TM rupture, and that any animal exposed to this level of energy is assumed to have suffered Level A harassment. This exposure criteria for NEODS noise impacts to cetaceans is based on thresholds initially presented in U.S. Navy Environmental Impact Statements (EISs) for ship shock trials of the *Seawolf* submarine and the *Winston S. Churchill* (*Churchill*) vessel (DON, 1998; DON, 2001) and subsequently adopted by NMFS (NMFS, 2001). Supplemental criteria and thresholds have been introduced in the EGTTR Programmatic Environmental Assessment (U.S. Air Force, 2002), subsequent EGTTR LOA (U.S. Air Force, 2003) permit request, Precision Strike

Weapons (PSW) LOA (U.S. Air Force, 2004), and (Naval Surface Warfare Center Panama City Division LOA (U.S. Navy, 2008).

A Zone of Influence (ZOI), a circle with a radius extending the farthest distance from the source (circle center) at which an animal is exposed to the EFD level referred to, was calculated for the detonations for NEODS training operations. Neither injury (Level A harassment), serious injury, nor mortality of marine mammals are expected or authorized during the five year rule and subsequent LOA(s) issued to Eglin AFB.

Level B Harassment

Level B (non-injurious, behavioral) harassment is defined as 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.

Acoustically, Level B harassment is measured in terms of temporary (auditory) threshold shift (TTS), a slight, recoverable loss of hearing sensitivity. TTS can manifest itself as meaningful changes in the behavior of the affected animal, such as a reduced ability to detect predators or prey. NMFS uses dual criteria for Level B harassment to address the separate effects of energy and pressure waves that result from an explosion. Based on data presented in the Navy EISs mentioned above, NMFS uses 182 dB re 1 μPa^2 s maximum Energy Flux Density (EFD) level in any 1/3-octave band above 100 Hz for toothed whales (e.g., dolphins) as the energy exposure threshold for Level B harassment. Based on newer and more applicable information presented in Finneran *et al*.'s 2002 publication, the pressure exposure threshold for Level B harassment is 23 psi.

Level B harassment also includes behavioral modifications resulting from repeated noise exposures (below TTS) to the same animals (usually resident) over a relatively short period of time. Threshold criteria for this particular type of harassment is a level below the TTS threshold, which would be 177 dB re 1 μPa^2 s. Due to the infrequency of the detonations, the potential variability in target locations, and the continuous movement of marine mammals off the northern GOM, behavioral modification from repeated exposures to the same animals is considered highly unlikely.

Table 8. NMFS acoustic criteria and thresholds for Level A and Level B harassment for explosives.

Criterion	**Criterion Definition**	**Threshold**
Mortality	Onset of severe lung injury (mass of dolphin calf)	31 psi-msec
Level A harassment (non-lethal injury)	50% animals would experience ear drum rupture	205 dB re 1μPa^2-s EFD
Level A harassment (non-lethal injury)	Onset of slight lung injury (mass of dolphin calf)	13 psi-msec
Level B harassment	TTS and associated behavioral disruption (dual criteria)	12 psi peak pressure (>2,000 lb) 23 psi peak pressure (<2,000 lb)
Level B harassment	TTS and associated behavioral disruption (dual criteria)	182 dB re 1 μPa^2-s EFD, 1/3 octave band
Level B harassment	Sub-TTS behavioral disruption (for multiple detonations only)	177 dB re 1 μPa^2-s EFD, 1/3 octave band

Potential Effects of Specified Activities on Marine Mammals

Marine mammals potentially may be harassed due to noise from NEODS missions involving underwater detonations. The potential numbers and species taken by noise are assessed here. Three key sources of information are necessary for estimating potential noise effects on marine resources: (1) the number of distinct firing or test events; (2) the ZOI for noise exposure; and (3) the density of animals that potentially reside within the ZOI.

For the acoustic analysis, the exploding charge is characterized as a point source. The impact thresholds used for marine mammals relate to potential effects on hearing from underwater detonation noise. No ESA-listed marine mammal would be affected given the location of the proposed action in nearshore waters. The only ESA-listed marine mammal likely to be found in the northeastern GOM, the Federal and state-listed endangered sperm whale, occurs farther out on the continental slope. Manatees are not considered likely to occur in the mission areas (see Figure 1-1 of Eglin AFB's application) and are therefore not considered in this analysis.

For the explosives in question, actual detonation depths would occur at 60 ft near the sand bottom. Potentially, the inert mines and sea floor may interact with the propagation of noise into the water. However, effects on the propagation of noise into the water column cannot be determined without in-water noise monitoring at the time of detonation. Potential exposure of a sensitive species to detonation noise could theoretically occur at the surface or at any number of depths with differing consequences. A conservative acoustic analysis was selected to ensure the greatest direct path for the harassment ranges and to give the greatest impact range for the injury thresholds. The criteria and thresholds are discussed above.

Criteria and thresholds that are the basis of the analysis of NEODS noise impacts to cetaceans were initially used in U.S. Navy Environmental Impact Statements for ship shock trials of the *Seawolf* submarine and the *Churchill* vessel (DON, 1998; DON, 2001) and adopted by NMFS (NMFS, 2001). Supplemental criteria and thresholds have been introduced in the EGTTR Programmatic Environmental Assessment (U.S. Air Force, 2002), subsequent EGTTR LOA (U.S. Air Force, 2003) permit request, Precision Strike Weapons (PSW) LOA (U.S. Air Force, 2004), and Naval Surface Warfare Center Panama City Division LOA (U.S. Navy, 2008)

Standard impulsive and acoustic metrics were used for the analysis of underwater pressure waves in this document.

- EFD is the time integral of the squared pressure divided by the impedance. EFD levels have units of dB re 1 $\mu Pa^2 \cdot s$.
- 1/3 octave EFD is the energy flux density in a 1/3 octave frequency band; the 1/3 octave selected is the hearing range at which the subject animal's hearing is believed to be most sensitive.
- Peak pressure is the maximum positive pressure for an arrival of a sound pressure wave that a marine mammal would receive at some distance away from a detonation.
- Positive impulse represents a time-averaged pressure disturbance from an explosive source with units in psi-milliseconds (psi-msec).
- Units used here are pounds per square inch (psi) and dB levels.

Level A harassment is non-lethal injury, the onset of which is estimated based on levels associated with eardrum rupture (i.e., tympanic-membrane [TM] rupture) and the onset of slight lung injury. These are considered indicative of the onset of injury. The thresholds for TM rupture corresponds to a 50 percent rate of rupture (i.e., 50 percent of animals exposed to the level are expected to suffer TM rupture); this threshold is stated in terms of an EFD value of 1.17 in-lb/in^2, which is about 205 dB re 1 $\mu Pa^2 \cdot s$. Use of this value acknowledges that TM rupture is not necessarily a life-threatening injury, but is a useful index of possible injury that is well-correlated with measures of permanent hearing impairment. Ketten (1998) indicates a 30 percent incidence of permanent threshold shift (PTS) at the same threshold. The onset of slight lung injury is the second threshold considered indicative of non-lethal injury. A dolphin would be expected to recover from this type of injury. Slight lung injury is considered to occur at a positive impulse level of 13 psi-msec. At distances closer to the detonation, the pressure wave could cause extensive lung injury, leading to mortality. It is assumed that the range of extensive lung injury is less than that of slight injury; therefore, using the range of slight lung injury provides a more conservative take estimate.

Public Law (PL) 108-136 (2004) amended the definition of Level B harassment under the MMPA for military readiness activities, such as this action (and also for scientific research on marine mammals conducted by or on the behalf of the Federal government). For military readiness activities, Level B harassment is now defined as "any act that disturbs or is likely to disturb a marine mammal or marine mammal stock in the wild is 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." Unlike Level A harassment, which is solely associated with physiological effects, both physiological and behavioral effects may cause Level B harassment.

The physiological effect associated with non-injurious Level B harassment is known as temporary threshold shift (TTS), which is defined as a temporary, recoverable loss of hearing sensitivity (NMFS, 2001; DON, 2001). Two criteria are considered indicative of the onset of peak pressure at 23 psi. This threshold is derived from the Environmental Impact Statement for the *Churchill* shock testing and was subsequently adopted by NMFS in its final rule on the unintentional taking of marine mammal incidental to the shock testing (NMFS, 2001). The original criteria in *Churchill* incorporated 12 psi. The current criteria and threshold for peak pressure over all exposures was updated from 12 psi to 23 psi for explosives less than 907 kg (2,000 lb) based on an IHA issued to the U.S. Air Force for a similar action (NMFS, 2006a). Peak pressure threshold are much greater than those for the energy metric when charge weights are small, even when source and animal are away from the surface. In order to more accurately estimate TTS for smaller detonations while preserving the safety feature provided by the peak pressure threshold, the peak pressure threshold is appropriately scaled for small shot detonations. This scaling is based on the similitude formulas (e.g., Urick, 1983) used in virtually all compliance documents for short ranges. Further, the peak-pressure threshold for TTS due to explosives offers a safety margin for source or animal near the ocean surface. The more conservative isopleths of the criteria for estimating TTS will be used in take analysis.

Behavioral reactions may occur at noise levels below those considered to cause TTS in marine mammals, particularly in cases where multiple detonations occur. Behavioral effects may include decreased ability to feed, communicate, migrate, or reproduce, among others. Such effects are known as sub-TTS Level B harassment. Although repetitive exposures (below TTS) to the same animals are considered unlikely due to the infrequent test events (no more than 5 detonations over a one or two day period), the potential variability in target locations, and the continuous movement of marine mammals in the northeastern GOM, the potential exists for a marine mammal to be impacted during multiple detonations. In this document, behavioral effects associated with such a scenario are considered to occur at an EFD level of 177 re 1 $\mu Pa^2 \cdot s$. Table 2 (above) provides a summary of threshold criteria and metrics for potential noise impacts to sensitive species.

Noise ZOIs were calculated for bottom detonation scenarios at 60 ft both lethality and harassment (Level A and B harassment). To determine the number of potential “takes” or animals affected, cetacean population information from surveys was applied to the various ZOIs. The impact calculations for this section utilize marine mammal density estimates that have been derived from a Legacy funded NMFS/Air Force project (Garrison, 2008). The species density estimate data were adjusted to reflect the best available data and more realistic encounters of these animals in their natural environment (Garrison, 2008). These calculations and estimates are explained in detail in Section 3, and adjusted density estimates are provided in Table 3-1 of Eglin AFB’s application. Although mission schedules are variable and may occur during any time of the year, 60 percent (24 detonations) are expected to occur during summer and 40 percent (16 detonations) are expected to occur in winter. Therefore, seasonal bottlenose dolphin density estimates (0.78 dolphins/km^2) in summer and 0.84 dolphins/km^2 in winter) are used for take analysis.

Table 6-2 of Eglin AFB's application gives the estimated impact ranges for the two explosive weights. The proposed test locations are one to three nmi south of SRI. NEODS detonations were modeled for bottom detonations at 60 ft.

Table 9. (6-2 of the application) ZOI for underwater explosions.

Ordnance	NEW (lbs)	Depth of Explosion (m)	Ranges for 205 dB EFDL (m)	Ranges for 13 psi-msec (m)	Ranges for 182 dB EFDL (m)	Ranges for 23 psi (m)	Ranges for 177 dB EFDL
Summer							
NEODS MCM 2.3 kg (5 lb) charge	5	18	52.1	156	227.5	222	520
NEODS MCM 4.5 kg (10 lb) charge	10	18	77	225	385	280	845
Winter							
NEODS MCM 5 lb charge	5	18	52.2	156	229.8	222	529
NEODS MCM 10 lb charge	10	18	77	226	389	280	880

EFDL = Energy Flux Density Level

Applying the harassment ranges in Table 6-2 of the application to the species densities of Table 3-1 of the application, the number of animals potentially occurring within the ZOI was estimated. These results are presented in Tables 6-3, 6-4, and 6-5 of the application. For Level A harassment calculations (Table 6-3 of the application), the ZOI corresponding to 13 psi-msec is used because this radius is in all cases greater than the radius corresponding to 205 dB EFDL. For Level B harassment calculations (Table 6-4 of the application), the ZOI corresponding to the 182 dB re 1 $\mu Pa^2 \cdot s$ metric is used because this radius is in all cases greater than the radius corresponding to 23 psi. A whole animal (and potential take) is defined as 0.5 or greater, where calculation totals result in fractions of an animal. Where less than 0.5 animals are affected, no take is assumed. The calculations in Tables 6-3 and 6-4 of the application are based on the expected tempo of: (1) 40 total detonations per year, (2) one-half of detonations are of 5 lb charges, and one-half are of 10 lb charges, and (3) 60 percent of detonations occur in summer, and 40 percent occur in winter.

Table 10. (6-3 of the application) Marine mammal densities and risk estimates for Level A harassment (13 psi-msec positive pressure).

Species	Density (animals/km^2)	ZOI (km)		Number of Animals Exposed to Level A Harassment	
		5 lb Charge	10 lb Charge	5 lb Charge	10 lb Charge
Summer					
Bottlenose Dolphin	0.78	0.156	0.225	0.72 (12 detonations)	1.49 (12 detonations)
Winter					
Bottlenose Dolphin	0.84	0.156	0.226	0.51 (8 detonations)	1.08 (8 detonations)
Total Number Animals Potentially Exposed To Level A Harassment Annually			3.80		

Table 11. (6-4 of the application) Marine mammal densities and risk estimates for Level B harassment (182 dB EFD 1/3 Octave Band) noise exposure.

Species	Density (animals/km^2)	ZOI (km)		Number of Animals Exposed to Level B Harassment (TTS)	
		5 lb Charge	10 lb Charge	5 lb Charge	10 lb Charge
Summer					
Bottlenose Dolphin	0.78	0.2275	0.385	1.52 (12 detonations)	4.36 (12 detonations)
Winter					
Bottlenose Dolphin	0.84	0.2298	0.389	1.11 (8 detonations)	3.19 (8 detonations)
Total Number Animals Potentially Exposed To Level B Harassment Annually			10.18		

Table 12. (Table 6-4 of the application) Marine mammal densities and risk estimates for Level B harassment (177 dB EFD 1/3 octave band) noise exposure.

Species	Density (animals/km^2)	ZOI (km)		Number of Animals Exposed to Level B Harassment (Behavioral)	
		5 lb Charge	10 lb Charge	5 lb Charge	10 lb Charge
Summer					
Bottlenose Dolphin	0.78	0.520	0.845	7.95 (12 detonations)	20.99 (12 detonations)
Winter					
Bottlenose Dolphin	0.84	0.529	0.880	5.91	16.35
Total Number Animals Potentially Exposed to Level B Harassment (Behavioral) Annually				51.20	

The tables above indicate that the potential for non-injurious (Level B) harassment, as well as the onset of injury (Level A harassment) to cetaceans is possible but unlikely even without any monitoring and mitigation measures. Slightly less than four bottlenose dolphins are estimated to be exposed annually to a positive pressure level corresponding to Level A harassment (13 psi-msec). Noise levels corresponding to Level B harassment (182 dB re 1 $\mu Pa^2 \cdot s$) would potentially affect approximately 10 dolphins. Finally, approximately 50 dolphins could be exposed to noise levels associated with sub-TTS behavioral harassment. None of the above impact estimates take into account the monitoring and mitigation measures that will be employed by the proponent to minimize potential impacts to protected species. These monitoring and mitigation measures are described in Eglin AFB's application (see below) and are anticipated to substantially reduce the potential impacts to marine mammals.

Based on the analyses and results provided here and in Section 6 of Eglin AFB's application, approximately four Atlantic bottlenose dolphins could be exposed to pressure levels (13 psi-msec) corresponding to Level A harassment annually in the absence of monitoring and mitigation measures. Approximately 10 dolphins could be exposed to noise levels corresponding to Level B harassment (TTS), while 50 individuals could be exposed to noise levels corresponding to Level B harassment. It is expected that monitoring and mitigation measures (described in Section 11 of Eglin AFB's application) would substantially reduce the number of animals impacted. The individuals potentially affected could be part of the Northern GOM Coastal Stock and/or part of one or more of the Northern GOM bay, sound, and estuarine stocks. While the coastal stock is not considered strategic under the MMPA, all bay, sound, and estuarine stocks are strategic. Although the NEODS training area lies outside the defined range of the bay, sound, and estuarine stocks, movement between such stocks has been documented in GOM coastal waters, as described in Waring *et al*. (2009). Movements have ranged from travel through adjacent communities to movement over several hundred kilometers off Texas, and may include seasonal movements into GOM waters. NEODS training operations will occur between the ranges of the Pensacola/East Bay and Choctawhatchee Bay Stocks, although individuals from other locations could potentially travel through the training areas as well. These stocks and their movements are not fully understood; therefore, there is a possibility that individuals from these

stocks could be affected. Potential biological removal has not been determined for the coastal stock due to insufficient information. Similarly, potential biological removal has been determined for many of the bay, sound, and estuarine stocks, including the Pensacola/East Bay and Choctawhatchee Bay stocks.

Based on the calculation methods discussed above, NMFS estimated take numbers per year of 10 individuals and 50 individuals during the rule for Atlantic bottlenose dolphins. The actual number of individual animals being exposed or taken may be less due to the implementation of monitoring and mitigation measures.

APPENDIX 3. EFH

The Magnuson-Stevens Fishery Conservation and Management Act of 1976 (MSA) (16 U.S.C. 1801 *et seq*.) established jurisdiction over marine fishery resources within the U.S. Exclusive Economic Zone (EEZ). The MSA mandated the formation of eight fishery management councils (FMC), which function to conserve and manage certain fisheries within their geographic jurisdiction. The councils are required to prepare and maintain a Fishery Management Plan (FMP) for each fishery and requires management. Amendments contained in the Sustainable Fisheries Act of 1996 (Public Law 104-267) require the councils to identify EFH for each fishery covered under a FMP. EFH is defined as the waters and substrate necessary for spawning, breeding, or growth to maturity. The term "fish" is defined as "finfish, mollusks, crustaceans, and all other forms of marine animals and plant life other than marine mammals and birds."

In addition to the regional FMCs, the Gulf States Marine Fisheries Commission (GSMFC) and NMFS also have management responsibilities for certain fisheries. The GSMFC is an organization of five states from the Gulf coast of Florida to Texas that manages fishery resources in state waters of the GOM. The GSMFC provides coordination and administration for a number of cooperative state/federal marine fishery resources. NMFS has jurisdiction over highly migratory species in federal waters of the GOM. Typically, the GSMFC and NMFS work closely with regional councils in preparing and implementing fisheries management strategies.

The GSMFC manages seven fishery resources in federal waters off the coasts of Texas, Louisiana, Mississippi, Alabama, and the west coast of Florida to Key West. The coral and coral reef FMP includes over 300 coral species. The reef fish FMP includes 43 species of snappers, groupers, sea bass, triggerfish, jacks, wrasses, sand perch, and tilefish. Fish in this FMP are generally demersal, subtropical species that utilize similar habitats and are harvested by similar methods, both recreationally and commercially. Shrimp species include brown, white, pink, and royal red. The spiny lobster fishery is managed jointly by the GSMFC and the SAFMC, with the GSMFC acting as the lead council. The Coastal Migratory Pelagics Management Unit consists of king mackerel, Spanish mackerel, cobia, dolphin, little tunny, cero mackerel, and bluefish.

In addition to establishing EFH, the MSA also directs NMFS and the FMCs to characterize Habitat Areas of Particular Concern (HAPCs). There are no HAPCs in the area of NEODS activities.

Table 12. Managed species for which EFH has been identified in the GOM.

GOM Fishery Management Council Jurisdiction	
Managed species or species group	*EFH designation in the area of NEODS activities*
Coastal migratory pelagics (7 species)	GOM waters and substrates out to depths of 100 fathoms
Coral and coral reefs (over 300 species)	N/A
Red drum	N/A
Reef fish (43 species)	GOM waters and substrates out to depths of 100 fathoms
Shrimp (4 species)	GOM waters and substrates out to depths of 100 fathoms
Spiny lobster	N/A
Stone crab	GOM waters and substrates out to depths of 10 fathoms

N/A = EFH designation is not applicable to the area of NEODS activities.

EFH is designated within the action area for nine species of invertebrates (e.g., shrimp, lobster, and crab) and fish (e.g., mackerel, red drum, and gray snapper). A list of these species and where EFH is designated based on life stage can be found at: http://galveston.ssp.nmfs.gov/research/fisheryecology/EFH/index.html. In addition to EFH, Gulf sturgeon critical habitat extends from the mean high-water line to 1.6 km (1 mile [mi]) offshore. However, NEODS testing would occur 1.6 to 4.8 km (1 to 3 mi) offshore; therefore, critical habitat for this species would not be physically affected.

On July 27, 2007, Eglin AFB initiated consultation with NMFS Southeast Region Habitat and Conservation Division on effects to EFH within the action area pursuant to the Magnuson-Stevens Conservation and Management Act. On August 6, 2007, NMFS provided concurrence with Eglin AFB's determination that NEODS training operations are not likely to adversely affect EFH and NMFS does not have any EFH conservation recommendations to offer. Testing frequency during NEODS training operations is minimal (24 detonations during summer, 16 detonations during winter) and sites are alternated, minimizing any cumulative effects to any one area.

The no action alternative (i.e., not issuing the IHA) would restrict Eglin AFB from conducting NEODS training activities, as carrying out those operations without an IHA would be in violation of the MMPA. If the activities do not go forward, there would be no impact to the human environment, including potential for adverse effects to EFH, as no detonations would occur. However, not conducting these activities could be considered to the military defense capabilities of the country. Therefore, the direct and indirect impacts on habitat would be the same as those anticipated for the preferred alternative.