

# **2018 ANNUAL REPORT ON EGLIN GULF TEST AND TRAINING RANGE (EGTTR) MISSION ACTIVITIES:**

## **PROTECTED SPECIES MONITORING AND MITIGATION RESULTS**



**PREPARED FOR:**  
National Marine Fisheries Service  
Office of Protected Resources  
&  
Southeast Regional Office  
Protected Resources Division



**PREPARED BY:**  
Department of the Air Force  
96 CEG/CEIEA  
Eglin Natural Resources Office  
501 DeLeon Street, Suite 101  
Eglin AFB, FL 32542-5133

**JANUARY 2019  
FINAL REPORT**

**This page is intentionally left blank**



**PRINTED ON RECYCLED PAPER**

## **TABLE OF CONTENTS**

	<b><u>Page</u></b>
Executive Summary .....	1
1. Introduction .....	2
1.1 Human Safety Procedures .....	2
1.2 General Mitigation and Monitoring Requirements .....	3
2. AFSOC – Air-to-Surface (A-S) Gunnery Training .....	4
2.1 Mission Set-Up.....	5
2.2 Mitigation and Monitoring Requirements.....	5
2.3 Description of AFSOC A-S Gunnery Training Activities .....	6
3. 780 <sup>th</sup> Test Squadron (780 TS).....	6
3.1 Mission Set-Up.....	6
3.2 Mitigation and Monitoring Requirements.....	7
3.3 Description of 780 TS Tests.....	9
3.3.1 Longbow Missions.....	9
3.3.2 Joint Air-to-Ground Missile (JAGM) Tests.....	11
3.3.3 SDB-II Tests .....	11
4. 86 <sup>th</sup> Fighter Weapons Squadron (86 FWS) – Maritime Weapons Systems Evaluation Program (WSEP) .....	12
4.1 Mission Set-Up.....	12
4.1.1 Targets.....	13
4.1.2 Site Plan and Cameras .....	13
4.1.3 Human Safety Zone .....	14
4.2 Mitigation and Monitoring Requirements.....	15
4.3 Description of Maritime WSEP Missions.....	17
4.3.1 Tuesday 3 April 2018.....	18
4.3.2 Friday 6 April 2018.....	19
5. 413 <sup>th</sup> Flight Test Squadron (413 FLTS) .....	21
6. Summary of all EGTTR Mission Activities .....	21
7. Effectiveness of Mitigation and Monitoring Requirements .....	21
8. Protected Species Stranding Reports .....	22
9. Conclusion .....	25
10. References .....	26
11. Signatures .....	27
Appendix A.....	1

## **LIST OF TABLES**

Table 1-1. Annual Marine Mammal Takes Authorized in the EGTTR LOA.....	2
Table 1-2. Sea Turtle Take Authorizations Included in the ITS of the EGTTR BO .....	2
Table 2-1. AFSOC Gunnery Training Categorized as Representative Mission Days.....	5
Table 2-2. Distance in meters to NMFS Harassment Thresholds for Marine Mammals .....	5
Table 3-1. 780 TS Weapons Testing Categorized as Representative Mission Days .....	7
Table 3-2. Distance in meters to NMFS Harassment Thresholds for Marine Mammals .....	8
Table 3-3. Distance in Meters to NMFS Acoustic Thresholds for Sea Turtles .....	8
Table 3-4. Pre-Mission Survey Results from 16 February 2018 Longbow Mission.....	10
Table 4-1. Mission Day Scenarios for Maritime WSEP.....	15
Table 4-2. Distance in meters to NMFS Harassment Thresholds for Marine Mammals .....	16
Table 4-3. Distance in Meters to NMFS Acoustic Thresholds for Sea Turtles .....	16
Table 4-4. Pre-Mission Survey Results from 3 April 2018 .....	18
Table 4-5. Pre-Mission Survey Results from 6 April 2018 .....	20
Table 6-1. Summary of Survey Results and Live Weapon Releases in the EGTTR.....	21
Table 8-1. 2018 Sea Turtle Stranding Records for Eglin AFB.....	23

## **LIST OF FIGURES**

Figure 2-1. Location of W-151A in the EGTTR .....	4
Figure 3-1. Longbow, JAGM, and SDB-II Mission Site Plan.....	7
Figure 3-2. Trackline of <i>Strugeon 2</i> during Pre-Mission Survey .....	9
Figure 4-1. Maritime WSEP Mission Location .....	13
Figure 4-2. Human Safety Box for 2018 Maritime WSEP Missions .....	14
Figure 4-3. Notice to Mariners (NOTMAR) for April 2018 Maritime WSEP Missions .....	15
Figure 4-4. Survey Zones for Maritime WSEP Protected Species Surveys .....	17
Figure 4-5. Protected Species Sighting and Detonation Location during 3 April 2018 Maritime WSEP Mission.....	19
Figure 8-1. Cumulative Numbers of Stranded Sea Turtles in Okaloosa County during 2018 (Ongoing) and the Previous 5-year and 10-year Averages .....	23

**ACRONYMS AND ABBREVIATIONS**

AF	Air Force
AFB	Air Force Base
BA	biological assessment
BO	Biological Opinion
CCF	Central Control Facility
EGTTR	Eglin Gulf Test and Training Range
FLSTSSN	Florida Sea Turtle Stranding and Salvage Network
ft	feet
GPS	global positioning system
GRATV	Gulf Range Armament Test Vessel
HSMST	high speed maneuverable surface target
IHA	Incidental Harassment Authorization
ITS	Incidental Take Statement
JDAM	Joint Direct Attack Munition
km	kilometers
lb	pound
m	meter
NMFS	National Marine Fisheries Service
NOTMAR	Notice to Mariners
NPV	non-participating vessel
NRO	Natural Resources Office
PTS	Permanent Threshold Shift
SRI	Santa Rosa Island
TTS	Temporary Threshold Shift
UAS	unmanned aerial system
WSEP	Weapon Systems Evaluation Program
ZOI	zone of influence

## **Executive Summary**

---

Eglin Natural Resources Office (NRO) has prepared this report in accordance with the Eglin Gulf Test and Training Range (EGTTR) Letter of Authorization (LOA) under the Marine Mammal Protection Act and the Programmatic Biological Opinion/Incidental Take Statement (BO/ITS) under the Endangered Species Act. The LOA and BO/ITS includes mitigation and monitoring procedures to reduce the potential for adverse impacts to marine mammals (bottlenose dolphins and Atlantic spotted dolphins) and sea turtles (green, loggerhead, Kemp's ridley, and leatherback sea turtles). This report describes the implementation of the mitigation and monitoring procedures, the results of pre- and post-mission surveys, a summary of each mission event, describes any potential take that may or may not have occurred, and analyzes the overall effectiveness of these measures.

A total of five missions by three user groups involved live weapon releases in the EGTTR during calendar year 2018. Two additional live days were planned and attempted, but due to other issues, no weapon releases occurred. Eglin NRO coordinated with each proponent prior to the missions to communicate survey requirements and established survey areas for each mission day, based on the mitigation measures developed and outlined in the LOA and Programmatic BO. For AFSOC gunnery missions, pre- and post-mission surveys were conducted by trained aircrew using techniques and procedures that have been used during previous LOAs. For 780 TS and 86 FWS missions, pre- and post-mission surveys were conducted by between one and five survey vessels, depending on the size of the survey area. For one of the 780 TS and all 86 FWS missions, an Eglin NRO representative observed live video feed from cameras on the instrumentation barge and other assets during the mission. Eglin NRO anticipates the ability to continue monitoring 780 TS missions from Eglin's Central Control Facility (CCF) in future years.

Protected species were observed during pre-mission surveys on two live mission days, consisting of 47 marine mammals and one sea turtle. Two additional sightings occurred during two other mission days, while survey vessels were on guard duty. Specifically, one sea turtle was observed along the safety perimeter (12 nautical miles [NM] from impact point). This individual was initially not considered to be at risk of exposure to acoustic impacts from detonations that would result in mortality, serious injury, or impairment. However it was later determined to be inside the ZOI for the Behavioral Response threshold. Therefore, Eglin NRO concludes that one sea turtle (species unknown) take by Behavioral Responses occurred during this mission. No protected species were observed during any of the post-mission surveys. Since no other protected species sightings during missions coincided with any of the impact thresholds and no protected species were observed during post-mission surveys, this was the only take documented during 2018 EGTTR missions.

Eglin NRO believes all mitigation and monitoring measures were successfully implemented and were effective in protecting marine mammals and sea turtles from negative impacts associated with live detonations during 2018. An analysis of sea turtle stranding data for 2018 concludes that additional impacts from mission activities were not apparent beyond what was observed and reported during post-mission surveys.

## Conclusion

### 1. Introduction

This report has been prepared in compliance with the Letter of Authorization (LOA) and Programmatic Biological Opinion (BO)/Incidental Take Statement (ITS) issued by the National Marine Fisheries Service (NMFS) for mission activities in the Eglin Gulf Test and Training Range (EGTTR). The EGTTR LOA is valid from February 13, 2018 through February 12, 2023 (Federal Register 83(27): 5545-5571, February 8, 2018). The EGTTR Programmatic BO/ITS was issued on January 13, 2017 (Consultation No. FPR-2016-9151) by the NMFS Office of Protected Resources, ESA Interagency Cooperation Division.

The EGTTR LOA addressed the potential for impacts to two species of marine mammals: bottlenose dolphins and Atlantic spotted dolphins. Eglin was authorized Level A Harassment takes in the form of slight lung injury and Permanent Threshold Shift (PTS). Eglin was also authorized Level B Harassment takes in the form of Temporary Threshold Shift (TTS) and Behavioral impacts. The annual numbers of marine mammal takes authorized in the LOA are shown in Table 1-1 below.

**Table 1-1. Annual Marine Mammal Takes Authorized in the EGTTR LOA**

Species	Level A Harassment		Level B Harassment	
	Slight Lung Injury	PTS (SEL)	TTS (SEL)	Behavioral
Bottlenose dolphin	2	7	220	315
Atlantic spotted dolphin	0	2	85	120
<b>TOTAL</b>	<b>2</b>	<b>9</b>	<b>305</b>	<b>435</b>

PTS = permanent threshold shift; TTS = temporary threshold shift; SEL = sound exposure level

The EGTTR Programmatic BO addressed the potential for impacts to four sea turtle species and included an ITS for lethal and non-lethal takes of loggerhead, Kemp's ridley, leatherback, and green sea turtles. The annual numbers of sea turtle takes authorized in the ITS are shown in Table 1-2 below.

**Table 1-2. Sea Turtle Take Authorizations Included in the ITS of the EGTTR BO**

Species	Mortality & Serious Injury	Impairment	Disturbance	Behavioral Response
Green sea turtle – North Atlantic DPS	28	39	1,056	11,139
Kemp's ridley sea turtle	29	40	1,079	10,905
Loggerhead sea turtle – Northwest Atlantic DPS	57	79	2,148	22,610
Leatherback sea turtle	10	17	436	5,257

DPS = distinct population segment

#### 1.1 Human Safety Procedures

Prior to missions that require a closure of any portion of the Gulf of Mexico, Eglin AFB issues a Notice to Mariners (NOTMAR) to notify all local vessels of the upcoming activities which includes a map showing the boundaries of the human safety zone. All boat captains leaving the

## Conclusion

East Pass near Destin, FL are provided with maps and GPS points of the safety zone before they enter the Gulf. Up to 25 Air Force (AF) vessels may conduct range clearing activities for at least two hours before the mission starts to inform and when necessary, escort civilian vessels outside the safety box. Depending on the weapons being deployed, the size and shape of the safety box varies, therefore the number of boats needed to secure the perimeter also varies. The human safety zone restriction also applies to vessels conducting pre-mission surveys for protected marine species (Refer to Section 1.2 below). Safety and survey boat captains maintain radio contact with each other and the Eglin Tower on Test Site A-13B on Santa Rosa Island (SRI Tower) to provide, receive, and relay information needed to clear the range. Once survey boats have completed pre-mission surveys for protected species, they must immediately exit the safety box and typically assist the guard boats with enforcing the safety box. Missions cannot begin until it is confirmed that the entire safety box is clear of human presence. During the missions, the safety and survey boats remain at specific guard locations along the perimeter of the human safety box to restrict boat access into the range, until the mission is completed.

Gunnery missions conducted by the Air Force Special Operations Command (AFSOC) and the 413<sup>th</sup> Flight Test Squadron (FLTS) typically do not require vessel support to clear the Gulf of human presence. The main aircraft platforms these groups use are gunships that are equipped with infrared sensors and low-light TV cameras that provide sufficient zooming and scanning capabilities to survey the mission areas for the presence of non-participating vessels and protected species.

## 1.2 General Mitigation and Monitoring Requirements

Eglin NRO and NMFS developed mission-specific mitigation and monitoring requirements during the consultation processes to minimize the potential for adverse impacts to protected species. Eglin proposed to visually survey mission areas to ensure it is clear of protected species before live missions begin. The size of the survey area depends on the weapons being dropped and the detonation scenario (i.e., surface or subsurface detonation). The discussion of each mission activity in the following sections describes the methodology used to determine the survey area.

All personnel conducting visual surveys for protected species are required to complete a training course in identifying marine species, annually. The training includes a summary of applicable environmental laws, consequences of non-compliance, description of an observer's roles, pictures and descriptions of protected species and protected species indicators, example survey techniques, recommended equipment, and reporting procedures. The training has been given by Eglin NRO biologists. In some cases, training slides are sent directly to the training manager for select user groups, with the requirement that certificates of completion for each prospective observer must be sent to Eglin NRO.

For vessel-based surveys, all boat captains and observers participated in the previous Maritime Strike and Maritime WSEP missions conducted annually from 2013 through 2017. As a result, completion of this training requirement in 2018 served as a refresher course. The vessels and associated crew designated specifically for protected species monitoring for all live EGTR missions in 2018 are *Sturgeon 1*, *Sturgeon 2*, *Snafu*, *El Jefe*, and *Miss Daisy*.



## Conclusion

For aerial-based surveys conducted by mission personnel on gunships, the training slides are provided to aircrew as part of the standard annual training requirements. Digitally-signed training certificates for designated observers are provided to Eglin NRO certifying that the training has been completed and personnel are aware of their observer roles and responsibilities, including reporting procedures. Eglin NRO maintains a list of personnel with updated training certificates.

The following sections summarize activities of each user group that released live weapons in the EGTTTR, describe the implementation of the mitigation and monitoring requirements, identify the levels of take that occurred, and assess the effectiveness of Eglin's mitigation and monitoring procedures.

## 2. AFSOC – Air-to-Surface (A-S) Gunnery Training

The Air Force Special Operations Command (AFSOC) conducts air-to-surface gunnery training activities with multiple types of munitions primarily in Warning Area-151A (W-151A) in the EGTTTR (Figure 2-1). Gunnery rounds include 25-millimeter (mm) high explosive incendiary (HEI), 30-mm HEI, 40-mm HEI, and 105-mm HEI rounds. NEW ranges from about 0.07 to 4.7 pounds. The Air Force developed a 105-mm training round (TR) that contains less than 10 percent of the amount of explosive material contained in the 105-mm full up (FU) round.



Figure 2-1. Location of W-151A in the EGTTTR

## Conclusion

### 2.1 Mission Set-Up

As stated in Section 1.2, the gunships contain sensor systems that can reliably clear areas of the Gulf for non-participating vessels and protected species. In addition, these training units typically do not require the use of target boats, but instead deploy MK-25 flares to shoot at. Therefore, minimal equipment and assets are needed to support these missions.

### 2.2 Mitigation and Monitoring Requirements

AFSOC has been conducting air-to-surface gunnery training operations in the EGTTTR under various MMPA Authorizations since 2006. Accordingly, they have implemented mitigation and monitoring requirements for the protection of marine mammals and sea turtles, which includes conducting aerial surveys immediately prior to commencement of firing gunnery rounds. Table 2-1 lists the Mission Day Scenarios for the AFSOC gunnery missions as described in the EGTTTR LOA application.

**Table 2-1. AFSOC Gunnery Training Categorized as Representative Mission Days**

Mission Day Scenario	Munition	NEW (lbs)	Detonation Type	Munitions per Day	Mission Days/Year	Total Munitions/Year
<b>D</b>	105 mm HE (FU)	4.7	Surface	30	25	750
	40 mm HE	0.87	Surface	64		1,600
	30 mm HE	0.1	Surface	500		12,500
	25 mm HE	0.067	Surface	560		14,000
<b>E</b>	105 mm HE (TR)	0.35	Surface	30	45	1,350
	40 mm HE	0.87	Surface	64		2,880
	30 mm HE	0.1	Surface	500		22,500
	25 mm HE	0.067	Surface	560		25,200
<b>Total</b>					<b>70</b>	<b>80,780</b>

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

Table 2-2 shows the ranges to effects for the various thresholds under each of the above scenarios, also mentioned in the LOA. These distances were used to determine the radius of the area to be monitored during pre- and post-mission surveys.

**Table 2-2. Distance in meters to NMFS Harassment Thresholds for Marine Mammals**

Mission Day Scenario	Mortality <sup>1</sup>		Level A Harassment				Level B Harassment	
			Slight Lung Injury <sup>2</sup>		GI Tract Injury <sup>3</sup>	PTS <sup>4, 5</sup> (SEL)	TTS <sup>4, 6</sup> (SEL)	Behavioral <sup>7</sup> (SEL)
	BND	ASD	BND	ASD				
<b>D</b>	24	30	55	67	59	254	982	1,413
<b>E</b>	10	13	24	30	34	232	878	1,252

<sup>1</sup> Positive impulse metric from the Goertner mortality model equation that uses the mass of a newborn calf of affected species

<sup>2</sup> Positive impulse metric from the Goertner injury model equation that uses the mass of a newborn calf of affected species

<sup>3</sup> Peak pressure metric of 237 dB re 1  $\mu$ Pa (unweighted SPL)

<sup>4</sup> These thresholds use dual criteria, one based on cumulative weighted SEL and one based on peak unweighted SPL. SEL metric was used because the distance was larger than SPL.

<sup>5</sup> Weighted SEL metric of 185 dB re 1  $\mu$ Pa<sup>2</sup>·s

<sup>6</sup> Weighted SEL metric of 170 dB re 1  $\mu$ Pa<sup>2</sup>·s

<sup>7</sup> Weighted SEL metric of 165 dB re 1  $\mu$ Pa<sup>2</sup>·s

ASD = Atlantic spotted dolphin; BND = bottlenose dolphin; dB re 1  $\mu$ Pa = decibels referenced to 1 micropascal; dB re 1  $\mu$ Pa<sup>2</sup>·s = decibels referenced to 1 micropascal-squared second; GI = gastrointestinal; NMFS = National Marine Fisheries Service; PTS = permanent threshold shift; SEL = sound exposure level; SPL = sound pressure level; TTS = temporary threshold shift

## **Conclusion**

Prior to beginning firing activities, the gunships conduct low-altitude orbits around the prospective firing location to ensure the ZOI area is clear of protected species. At least two orbits must be completed before climbing to operational altitudes. The aircraft's sensors are turned on for the duration of the pre-mission survey, the mission, and the post-mission survey. Gunship aircrews have consistently completed and maintained their Marine Species Observer Trainings, allowing them to serve as designated observers during their own missions. Eglin NRO receives completed and signed certificates once trainings are completed. The aircrew also submit mission report forms after each mission is completed with results of pre- and post-mission surveys.

### **2.3 Description of AFSOC A-S Gunnery Training Activities**

Only one AFSOC mission was conducted in 2018, on January 22<sup>nd</sup>. The designated observer used an outdated Protected Species Observer Report Form, which did not include information on the number and types of gunnery rounds that were fired during that mission. However, the form did indicate that pre- and post-mission surveys were completed and no protected species were observed (Appendix A). It is not likely that the authorized number of gunnery rounds were exceeded during a one-hour mission event. Therefore, Eglin NRO concludes that no takes occurred and even though the number of gunnery rounds expended was not documented, AFSOC was still operating within the allotments of the LOA. Eglin NRO incorporated the most recent Observer Report Forms in the Marine Species Observer Training that is required to be completed annually by observers. When aircrew complete their training, in addition to downloading their training certificate, they will also download the correct reporting form. Eglin NRO believes this measure will ensure that the correct and most recent Observer Report Forms will be used during calendar year 2019.

## **3. 780<sup>th</sup> Test Squadron (780 TS)**

The 780<sup>th</sup> Test Squadron (780 TS) conducts testing activities on a variety of weapons, including the AGM-158 (Joint Air-to-Surface Standoff Missile [JASSM]), GBU-39 (Small Diameter Bomb I [SDB-I]), AGM-114L (Longbow missile), GBU-53 (SDB-II), Joint Air-to-Ground Missile (JAGM), and others. Test missions for the 780 TS typically involve a one-time event using multiple weapon systems, with a small number of weather back-up days. Eglin NRO coordinates with the 780 TS prior to each test mission to develop a plan for pre-mission surveys and other monitoring requirements, depending on the weapons being dropped and other mission assets that may be available.

### **3.1 Mission Set-Up**

Test missions for the 780 TS were scheduled in Warning Area 151A (W-151A) of the EGTTT. The test site is approximately 17 nautical miles (NM) (31 kilometers [km]) offshore from Santa Rosa Island (SRI). Figure 3-1 shows the location and basic set-up for these test missions. This mission set-up was used for the Longbow, JAGM, and SDB-II test missions scheduled in 2018. Water depth of the mission site was approximately 120 feet (ft) (37 meters [m]). The proposed target was anchored approximately 750 ft north of the Gulf Range Armament Test Vessel

## Conclusion

(GRATV) instrumentation barge. The human safety zone was between 13 NM (24 km) and 15 NM (28 km) in diameter. Human safety procedures similar to those described in Section 1.1 were followed for all 780 TS missions. Given the types of weapons released by the 780 TS and the size of the human safety box, 14 AF vessels were used to enforce the safety box.



**Figure 3-1. Longbow, JAGM, and SDB-II Mission Site Plan**

## 3.2 Mitigation and Monitoring Requirements

Table 3-1 lists the Mission Day Scenarios for the weapons proposed to be released by the 780 TS in the EGTRR LOA application.

**Table 3-1. 780 TS Weapons Testing Categorized as Representative Mission Days**

Mission Day Scenario	Munition	NEW (lbs)	Detonation Type	Munitions per Day	Mission Days/Year	Total Munitions/Year
M	AGM-158 (JASSM)	240	Surface	2	1	2
N	GBU-39 (SDB I)	37	Surface	2	1	2
	GBU-39 (SDB I) Double Shot*	74	Surface	2		2
O	GBU-53 (SDB II)	22.84	Surface	2	1	2
P	JAGM	27.41	Surface	1	1	1
Q	Inert LSDB & SDB II GTV (fuse only)	0.4	Surface	2	4	8

AGM = Air-To-Ground Missile; GBU = Guided Bomb Unit; GTV = Guided Test Vehicle; JAGM = Joint Air-to-Ground Missile; JASSM = Joint Air-To-Surface Standoff Missile; lbs = pounds; LSDB = Laser Small Diameter Bomb; SDB = Small Diameter Bomb

\*NEW is doubled for each simultaneous launch

## Conclusion

Table 3-2 shows the ranges to effects for the various thresholds under each of the above scenarios, also mentioned in the LOA. These distances were used to determine the radius of the area to be monitored during pre- and post-mission surveys.

**Table 3-2. Distance in meters to NMFS Harassment Thresholds for Marine Mammals**

Mission Day Scenario	Mortality <sup>1</sup>		Level A Harassment				Level B Harassment	
			Slight Lung Injury <sup>2</sup>		GI Tract Injury <sup>3</sup>	PTS <sup>4,5</sup> (SEL)	TTS <sup>4,6</sup> (SEL)	Behavioral <sup>7</sup> (SEL)
	BND	ASD	BND	ASD				
M	120	150	249	290	220	447	825	1,123
N	76	96	168	201	149	201	557	982
O	47	60	107	131	101	204	376	640
P	51	65	115	141	107	217	400	527
Q	7	9	16	20	26	53	98	207

<sup>1</sup> Positive impulse metric from the Goertner mortality model equation that uses the mass of a newborn calf of affected species

<sup>2</sup> Positive impulse metric from the Goertner injury model equation that uses the mass of a newborn calf of affected species

<sup>3</sup> Peak pressure metric of 237 dB re 1  $\mu$ Pa (unweighted SPL)

<sup>4</sup> These thresholds use dual criteria, one based on cumulative weighted SEL and one based on peak unweighted SPL. SEL metric was used because the distance was larger than SPL.

<sup>5</sup> Weighted SEL metric of 185 dB re 1  $\mu$ Pa<sup>2</sup>·s

<sup>6</sup> Weighted SEL metric of 170 dB re 1  $\mu$ Pa<sup>2</sup>·s

<sup>7</sup> Weighted SEL metric of 165 dB re 1  $\mu$ Pa<sup>2</sup>·s

ASD = Atlantic spotted dolphin; BND = bottlenose dolphin; dB re 1  $\mu$ Pa = decibels referenced to 1 micropascal; dB re 1  $\mu$ Pa<sup>2</sup>·s = decibels referenced to 1 micropascal-squared second; GI = gastrointestinal; NMFS = National Marine Fisheries Service; PTS = permanent threshold shift; SEL = sound exposure level; SPL = sound pressure level; TTS = temporary threshold shift.

Table 3-3 presents the ranges to effect from JAGM detonations for the various NMFS acoustic thresholds for sea turtles. It is an excerpt from Table 4-5 of the BA and Table 20 of the BO.

**Table 3-3. Distance in Meters to NMFS Acoustic Thresholds for Sea Turtles**

Munition	NEW (lbs)	Detonation Scenario	Mortality	Serious Injury	Impairment	Disturbance	Behavioral Response
JAGM	27.41	Surface	102	234	392	768	61,025

JAGM = joint air-to-ground missile; lbs = pounds; NEW = net explosive weight

Although the Longbow missile (20 lbs NEW) is not included in any of the Mission Day Scenarios listed in Table 3-1 for the 780 TS, Eglin NRO personnel used the NEW for the JAGM (27.41 lbs) and associated Mission Day Scenario P for the Longbow tests. To simplify planning and implementation of requirements, the Level A PTS radius distance for Scenario P was selected for all 780 TS missions. Eglin NRO biologists doubled the distance to account for animals that could swim into the ZOI after surveys are completed. This resulted in a radius equal to 434 m (0.234 NM). For ease of developing survey routes, the survey area was increased to a 500-m radius (0.27-NM) area. The diameter of the survey area was therefore 1 km (0.54 NM). Given the relatively small size of the survey area, only one boat was used for the surveys, *Sturgeon 2*.

### 3.3 Description of 780 TS Tests

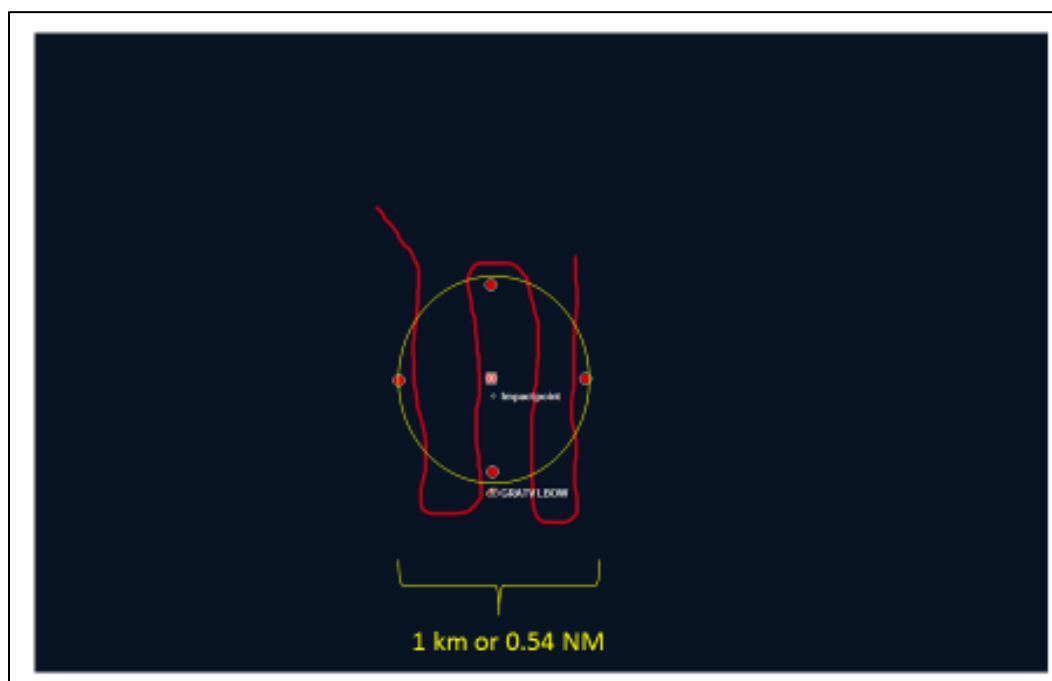
#### 3.3.1 Longbow Missions

The 780 TS test mission involved shooting a Longbow missile at a stationary target on the water. Two live Longbow shots were proposed, including a height of burst (HOB) shot and a surface detonation. The HOB shot consists of the weapon detonating approximately 4 ft above the target (airburst).

##### 3.3.1.1 Thursday 15 February 2018

###### 3.3.1.1.1 Pre-Mission Survey Results

*Sturgeon 2* left the dock at 5:30 AM and arrived at the survey area at 6:30 AM. Wave height was approximately 2 ft with no white caps and visibility was estimated to be 300 m. During mission set-up, there was a delay in evacuating personnel from the GRATV. *Sturgeon 2* remained in the area, but did not begin the pre-mission survey until 7:50 AM and completed it at 8:50 AM. Figure 3-2 shows the trackline of *Sturgeon 2* for the survey. There were no protected species sightings during the delay or the pre-mission survey.



**Figure 3-2. Trackline of *Sturgeon 2* during Pre-Mission Survey**

###### 3.3.1.1.2 Mission Results

Due to technical issues, no weapons were released this day.

###### 3.3.1.1.3 Post-Mission Survey Results

Since no weapons were released, *Sturgeon 2* did not conduct a post-mission survey.

## Conclusion

### 3.3.1.1.4 Take Analysis

No takes occurred during this mission day because no weapons were released.

### 3.3.1.2 Friday 16 February 2018

The mission set-up for this day's mission was identical to the previous day.

#### 3.3.1.2.1 Pre-Mission Survey Results

*Sturgeon 2* left the dock at 6:00 AM and began the pre-mission survey at 8:00 AM. Sea state and visibility conditions were the same as those on the previous day's mission. Two sightings were reported during the survey, which are listed in Table 3-4.

**Table 3-4. Pre-Mission Survey Results from 16 February 2018 Longbow Mission**

#	Time	Vessel	Sighting	Location	Resolution
1	8:30 AM	<i>Sturgeon 2</i>	1 loggerhead sea turtle	30° 06.958 N 86° 34.346 W About 620 m northeast of the impact area on a northerly heading.	Boat captain positioned <i>Sturgeon 2</i> between the impact area and the turtle to confirm it was heading north, away from the mission area and continued visually monitoring the turtle. After 20 min, observers lost visual contact of the animal. Survey was resumed at 8:54 AM.
2	09:00 AM	<i>Sturgeon 2</i>	20 bottlenose dolphins	30° 08.290 N 86° 34.571 W Approximately 3 km north of the impact area.	Sighting occurred outside the ZOI. Biologists monitored the pod for 5 minutes and determined that the group was swimming on a northeast heading away from target area.

After completing resolutions for both protected species sightings and ensuring all animals were outside the ZOI and on headings away from the mission area, the pre-mission survey concluded at 9:05 AM.

#### 3.3.1.2.2 Mission Results

Two missiles were released and detonated as planned. Mission was completed at 2:00 PM.

#### 3.3.1.2.3 Post-Mission Survey Results

The post-mission survey began at 2:30 PM and ended at 3:30 PM. No protected species were observed.

#### 3.3.1.2.4 Take Analysis

Protected species were in the vicinity of the mission area, as evidenced by the sightings recorded during the pre-mission survey. However, biologists conducting the survey ensured the animals were outside the ZOI swimming away from the mission area prior to concluding the survey and determining the range was clear. No additional protected species were observed during the mission or the post-mission survey. Therefore Eglin NRO concludes that no takes occurred on this mission day.

### **3.3.2 Joint Air-to-Ground Missile (JAGM) Tests**

#### **3.3.2.1 Friday 23 February 2018**

Similar to the Longbow missile, the 780 TS proposed to shoot a JAGM missile at a boat target on the water. This missile would detonate upon impact with the target (i.e., surface detonation).

##### *3.3.2.1.1 Pre-Mission Survey Results*

The pre-mission survey started at 7:15 AM and ended at 8:05 AM. No protected marine species were observed during the pre-mission survey.

##### *3.3.2.1.2 Mission Results*

The JAGM missile was released as planned. During the mission at 11:10 AM, *Sturgeon 2* observers saw three bottlenose dolphins while on guard duty along the safety perimeter. The animals were approaching the boat from outside the safety zone and were approximately 11 km (6 NM) away from the impact area, which is well-outside the ZOI for any of the acoustic thresholds shown in Table 3-2. Mission was completed at 12:00 PM.

##### *3.3.2.1.3 Post-Mission Survey Results*

*Sturgeon 2* began the post-mission survey at 12:35 PM and completed it at 1:15 PM. No protected species were observed.

##### *3.3.2.1.4 Take Analysis*

Even though protected species were not observed during the pre-mission survey, biologists on guard duty observed a small pod of bottlenose dolphins (three individuals) towards the end of the range time. As shown in Table 3-1 and Table 3-2, the range to effects for the Level B Behavioral threshold for the JAGM is 527 m or 0.5 km (0.3 NM). The sighting of these dolphins occurred about 11 km (6 NM) away from the impact area. While the time of detonation was not recorded for this mission, the animals were observed on the outside of the safety box and did not exhibit any abnormal behaviors. Eglin NRO believes these individuals were not exposed to acoustic energy or pressure levels that would result in take, as defined by the MMPA. Furthermore, no protected species were observed during the post-mission survey. Therefore, Eglin NRO concludes that no takes occurred on this mission day.

### **3.3.3 SDB-II Tests**

#### **3.3.3.1 Wednesday 12 December 2018**

Two GBU-53s (SDB-IIs) were proposed to be shot by the 780 TS. One SDB-II contained an inert warhead with a live fuze, and the other SDB-II was a full-up round with 22.84 lbs NEW. Both shots would occur on the same mission day. Unlike previous 780 TS missions, an Eglin NRO representative was able to observe the mission from Eglin's Central Control Facility (CCF). The GRATV contained four cameras, whose video feed was transmitted into CCF. It is anticipated that future 780 TS missions will be able to accommodate an Eglin NRO representative to monitor video feed at CCF as a standard measure.



## **Conclusion**

### *3.3.3.1.1 Pre-Mission Survey Results*

Seas were flat with sunny skies. Visibility was excellent. Pre-mission survey began at 7:00 AM and ended at 8:00 AM. No protected species were observed. Video monitoring at CCF began at 7:45 AM.

### *3.3.3.1.2 Mission Results*

Upon arrival at CCF, the Eglin NRO representative was informed that there were mechanical issues with the aircraft. After various attempts to troubleshoot and make adjustments, the test engineer decided to cancel the mission. As a result, no weapons were released. This mission will be rescheduled for early 2019.

### *3.3.3.1.3 Post-Mission Survey Results*

Since no weapons were released, a post-mission survey was not required.

### *3.3.3.1.4 Take Analysis*

No takes occurred during this mission day because no weapons were released.

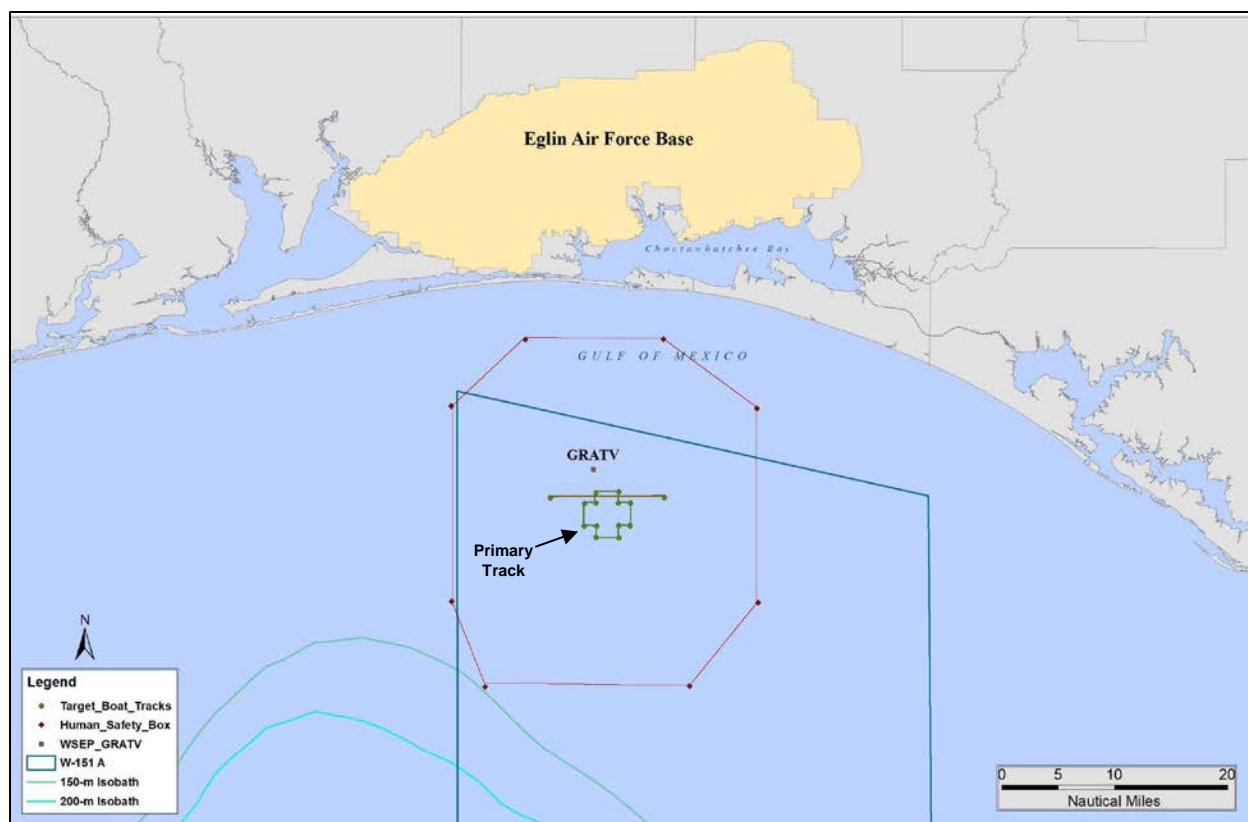
## **4. 86<sup>th</sup> Fighter Weapons Squadron (86 FWS) – Maritime Weapons Systems Evaluation Program (WSEP)**

The 86<sup>th</sup> Fighter Weapons Squadron (86 FWS) evaluates multiple types of live and inert weapons systems to develop tactics, techniques, and procedures for U.S. Air Force (USAF) strike aircraft to counter small, fast, and agile surface vessels. Mission activities in the EGTTTR consist of various types of aircraft releasing multiple live and inert weapons in a given mission day. Each Maritime WSEP cycle includes four consecutive mission days scheduled with an additional day reserved for a weather back-up, if range time is available. During calendar year 2018, missions were planned to occur on 2 – 6 April and 5 – 9 November 2018. Missions conducted in November did not release any live munitions, therefore only the April missions are discussed in this report.

### **4.1 Mission Set-Up**

Maritime WSEP missions are conducted in W-151A of the EGTTTR. The GRATV was anchored approximately 17 NM (31 km) offshore from SRI. Figure 4-1 shows the location and basic site plan used for all Maritime WSEP mission days. Water depth of the mission site from the GRATV anchor point to the southern portion of the Primary Track ranges between 120 ft (37 m) and 150 ft (46 m).

## Conclusion



**Figure 4-1. Maritime WSEP Mission Location**

The following subsections describe the types of targets used, the site plan including vessel tracks and target locations, cameras, and the human safety zone.

### 4.1.1 Targets

Remotely-controlled boats called high speed maneuverable surface targets (HSMSTs) towed the actual target boats between 300 and 500 ft behind them. The proponent set up multiple tracks for the HSMSTs to travel on, including the Primary Track where all live weapon drops were planned. The static boats inside the Primary Track were also used for live weapon targets.

### 4.1.2 Site Plan and Cameras

The entire mission site was continuously monitored from a variety of platforms before and during the mission. Four video cameras were set up on the GRATV. The cameras were remotely-controlled to follow a given target and can zoom in to capture direct weapon impact, or zoom out to determine whether the target was missed. For the April 2018 mission set, the 86 FWS also employed two unmanned aerial systems (UASs) which provided high-definition video of the mission area. While the main purpose of all video footage is to document weapons performance, they also monitored the area for unauthorized civilian boats and protected marine species before the weapons were released. In addition, HSMSTs towing target boats on the Primary Track had cameras facing the target boats to document impacts and help confirm whether detonation occurred. Video feed from all cameras was transmitted to Eglin's Central Control Facility (CCF)

## Conclusion

and monitored by the proponents, Eglin Test Safety, and Eglin NRO personnel. In addition, Eglin utilized the radar from the 300-ft tower at Test Site A-13B on SRI to assist with clearing the human safety zone from civilian vessels.

### 4.1.3 Human Safety Zone

Figure 4-2 shows the human safety box established around the mission site. The size and shape of the safety box takes into account the safety profiles for the weapons and the multiple weapon impact locations along any of the weapon release tracks and the static targets. Based on these factors, the human safety zone was between 27 NM (52 km) and 35 NM (64 km) in diameter. Given the size of the human safety box, multiple AF vessels were on guard duty along the safety perimeter.

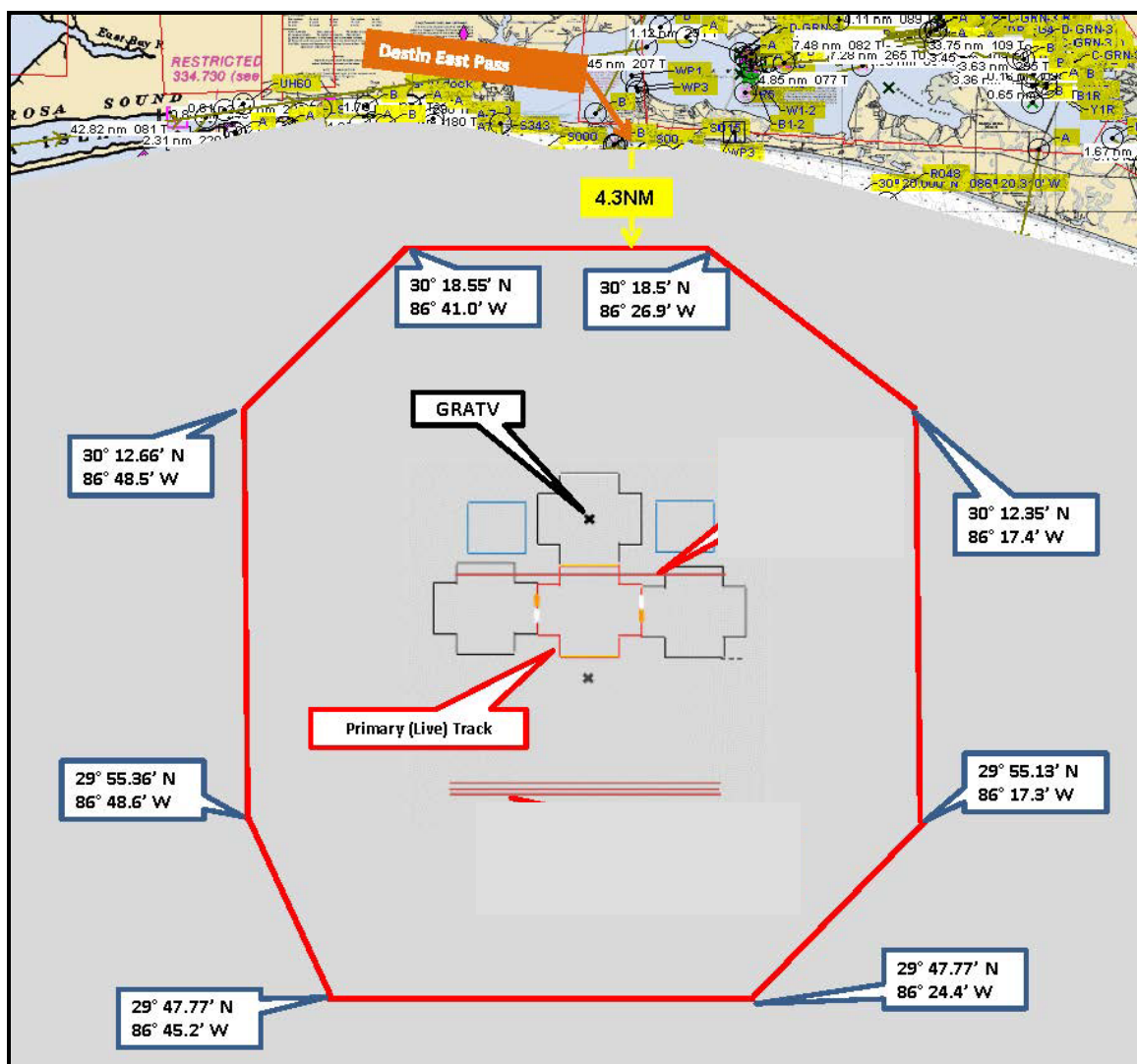


Figure 4-2. Human Safety Box for 2018 Maritime WSEP Missions

Human safety procedures similar to those described in Section 1.1 were followed for all Maritime WSEP missions. Figure 4-3 shows the map issued to non-participating boats that exited the East Pass as part of the NOTMAR.

## Conclusion

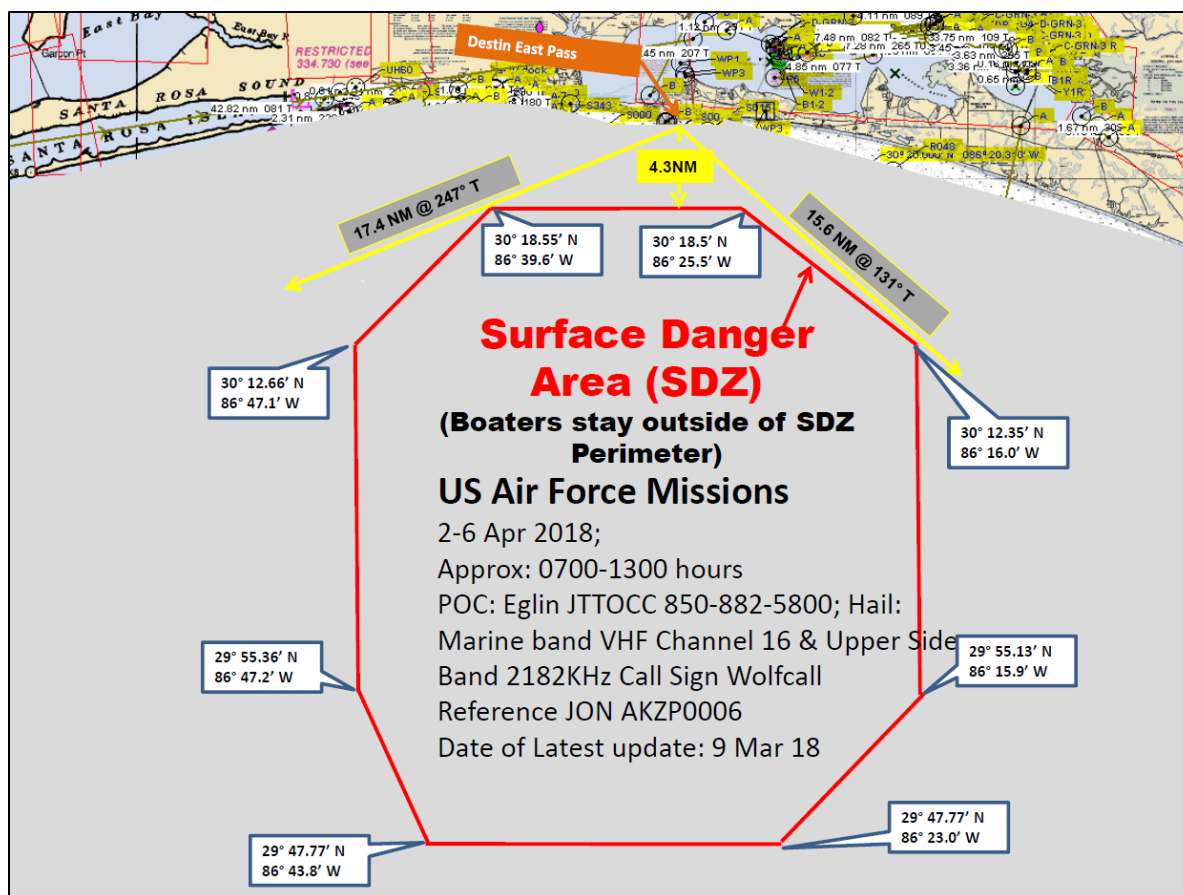


Figure 4-3. Notice to Mariners (NOTMAR) for April 2018 Maritime WSEP Missions

## 4.2 Mitigation and Monitoring Requirements

Two months before the missions, multiple planning meetings were held with the 86 FWS and other participating offices. Among the items discussed was the list of live weapons and proposed schedule for the week. Eglin NRO used this information to select the most appropriate mission day scenario and associated radius or range to effects for NMFS harassment thresholds for the survey area. Maritime WSEP missions were divided into 3 possible scenarios, based on the number and types of weapons, NEW, and detonation scenarios planned per day. These scenarios from the LOA are shown in Table 4-1.

Table 4-1. Mission Day Scenarios for Maritime WSEP

Mission Day Scenario	Munition	NEW (lbs)	Detonation type	Munitions per day	Mission days/year	Total Munitions/Year
A	GBU-10/-24/-31	945	Subsurface	1	2	2
	GBU-49	300	Surface	2		4
	AGM-158 (JASSM)	240	Surface	2		4
	GBU-12/-54/-38/-32 (JDAM or LJDAM)	192	Subsurface	5		10
B	AGM-65 (Maverick)	86	Surface	2	4	8
	GBU-39 (SDB)	37	Surface	1		4
	AGM-114 (Hellfire)	20	Subsurface	5		20

## Conclusion

Mission Day Scenario	Munition	NEW (lbs)	Detonation type	Munitions per day	Mission days/year	Total Munitions/Year
C	AGM-176 (Griffin)	13	Surface	5	2	10
	2.75 Rockets	12	Surface	20		100
	AIM-9X	7.9	Surface	1		2
	PGU-12 30 mm HEI	0.1	Surface	500		1,000

AGM = air-to-ground missile; AIM = air intercept missile; GBU = guided bomb unit; HEI = high explosive incendiary; lbs = pounds; JASSM = Joint Air-to-Surface Standoff Missile; JDAM = Joint Direct Attack Munition; LJDAM = Laser Joint Direct Attack Munition; mm = millimeters; NEW = net explosive weight; PGU = projectile gun unit; SDB = small diameter bomb; WSEP = Weapon Systems Evaluation Program

Table 4-2 shows the ranges to effects for the various thresholds under each of the above scenarios, also taken from the LOA. These distances were used to determine the radius of the area to be monitored during pre- and post-mission surveys.

**Table 4-2. Distance in meters to NMFS Harassment Thresholds for Marine Mammals**

Mission Day Scenario	Mortality <sup>1</sup>		Level A Harassment				Level B Harassment	
			Slight Lung Injury <sup>2</sup>		GI Tract Injury <sup>3</sup>	PTS <sup>4,5</sup> (SEL)	TTS <sup>4,6</sup> (SEL)	Behavioral <sup>7</sup> (SEL)
	BND	ASD	BND	ASD				
A	427	504	768	886	348	1,039	5,001	8,155
B	107	133	225	266	156	430	2,245	3,959
C	37	47	85	104	83	320	1,128	1,863

<sup>1</sup> Positive impulse metric from the Goertner mortality model equation that uses the mass of a newborn calf of affected species

<sup>2</sup> Positive impulse metric from the Goertner injury model equation that uses the mass of a newborn calf of affected species

<sup>3</sup> Peak pressure metric of 237 dB re 1  $\mu$ Pa (unweighted SPL)

<sup>4</sup> These thresholds use dual criteria, one based on cumulative weighted SEL and one based on peak unweighted SPL. SEL metric was used because the distance was larger than SPL.

<sup>5</sup> Weighted SEL metric of 185 dB re 1  $\mu$ Pa<sup>2</sup>·s

<sup>6</sup> Weighted SEL metric of 170 dB re 1  $\mu$ Pa<sup>2</sup>·s

<sup>7</sup> Weighted SEL metric of 165 dB re 1  $\mu$ Pa<sup>2</sup>·s

ASD = Atlantic spotted dolphin; BND = bottlenose dolphin; dB re 1  $\mu$ Pa = decibels referenced to 1 micropascal; dB re 1  $\mu$ Pa<sup>2</sup>·s = decibels referenced to 1 micropascal-squared second; GI = gastrointestinal; NMFS = National Marine Fisheries Service; PTS = permanent threshold shift; SEL = sound exposure level; SPL = sound pressure level; TTS = temporary threshold shift

Based on planning meetings, Hellfire missiles were the only live weapons that would be released and detonated on the water surface. Therefore, Eglin NRO determined that Mission Day Scenario B and the associated ranges to effects would be used to develop the monitoring area and routes for the protected species surveys. The radius distance for Level A Harassment by PTS for Scenario B is 430 m (Table 4-2). Table 4-3 presents the ranges to effect from AGM-114 detonations for the various NMFS acoustic thresholds for sea turtles. It is an excerpt from Table 4-5 of the BA and Table 20 of the BO.

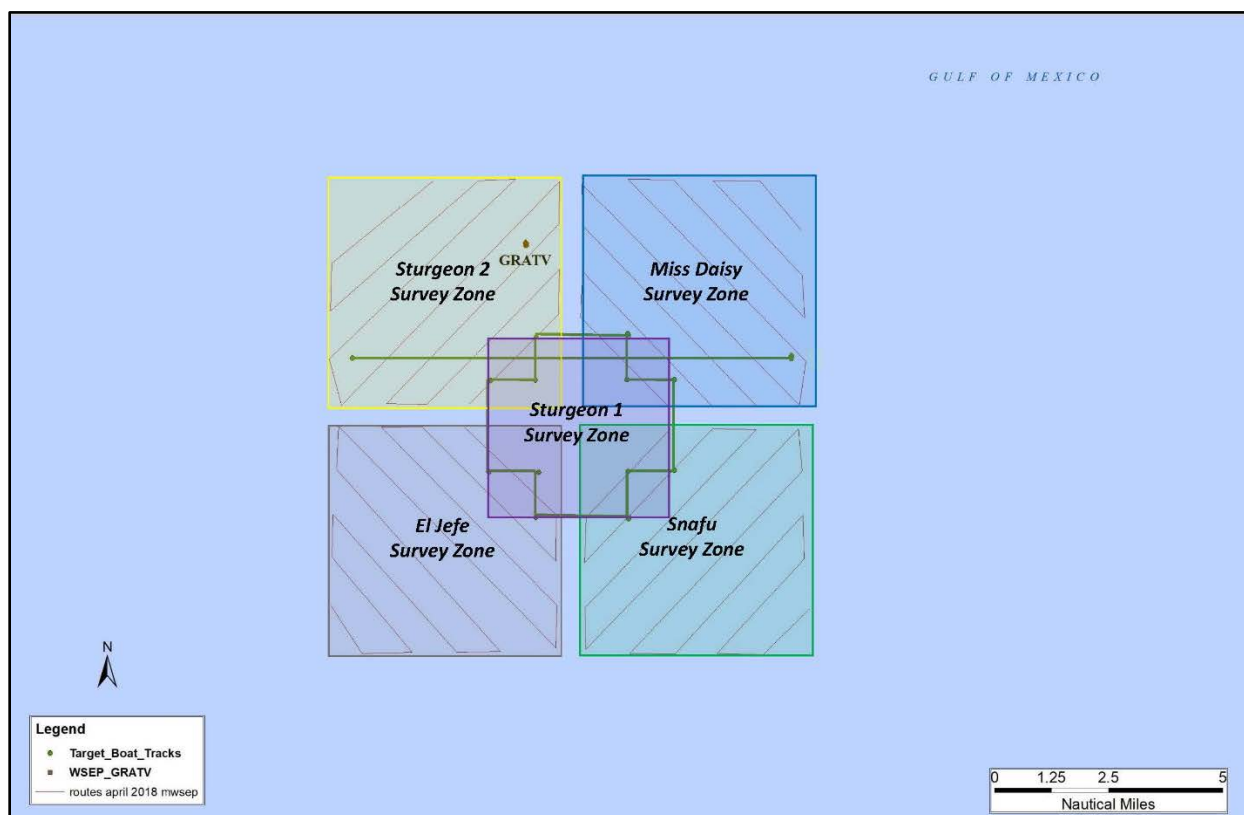
**Table 4-3. Distance in Meters to NMFS Acoustic Thresholds for Sea Turtles**

Munition	NEW	Detonation Scenario	Mortality	Serious Injury	Impairment	Disturbance	Behavioral Response
AGM-114 (Hellfire)	20 lbs	Surface	92	211	352	692	54,942
		Subsurface	95	213	354	694	55,145

AGM = air-to-ground missile; lbs = pounds; NEW = net explosive weight

## Conclusion

Eglin NRO biologists doubled the distance for Scenario B to account for animals that may swim into the ZOI after surveys are completed. This resulted in a radius equal to 860 m (0.5 NM). As stated in Section 4.1.1, live weapons could detonate anywhere along the Primary Track. As a result, the survey radius extended from the endpoints of the entire Primary Track with an even larger buffer area. The resulting survey area essentially consisted of a 19-km x 19-km (10-NM x 10-NM) square. Given the large size of the survey area, five boats were used to complete the pre- and post-mission surveys: *Sturgeon 1*, *Sturgeon 2*, *Miss Daisy*, *El Jefe*, and *Snafu*. The approximate survey zones are depicted in Figure 4-4.



**Figure 4-4. Survey Zones for Maritime WSEP Protected Species Surveys**

For the duration of Maritime WSEP missions, the *Sturgeon 1* vessel captain was designated as the Lead Biologist, to whom all sightings were reported and documented. It was the Lead Biologist's responsibility to document each sighting reported to him by the other survey vessel captains and provide recommendations to Eglin Tower on whether a mission needed to be delayed or canceled based on either sea state or protected species activity around the detonation sites. After all missions were completed the Lead Biologist provided results from the pre- and post-mission surveys to Eglin NRO.

### 4.3 Description of Maritime WSEP Missions

Due to inclement weather, high sea states, and limited availability of live weapons, only two days of April WSEP missions included live weapon releases.

## Conclusion

### 4.3.1 Tuesday 3 April 2018

Survey boats left the Destin East Pass at 5:45 AM and transited to their survey start point locations. Weather and sea state conditions were good with cloudy skies and 1-ft to 2-ft waves inshore of 10 NM. Past 10 NM closer to the GRATV location, waves were between 3-ft and 4-ft. Sea states were between 1 and 3, with no white caps. Visibility was near 500 m. No protected species were observed while vessels were en route to survey location nor upon arrival to mission location.

#### 4.3.1.1 Pre-Mission Survey Results

The pre-mission survey began at 6:30 AM and ended at 7:30 AM. No protected species were observed during the pre-mission survey. Video monitoring from CCF began at 7:30 AM.

#### 4.3.1.2 Mission Results

When the range was determined to be clear of vessels and protected species, Green Range was declared at 8:30 AM. The mission began with four inert weapon releases. Then, two live missiles (associated with Mission Day Scenario B) were released and surface detonation was documented at 9:24 AM and 9:36 AM by video in real time. Additional inert weapons were dropped, followed by a third live missile release with confirmed surface detonation at 10:36 AM. After a couple more inert weapon releases, the mission was completed and the Range re-opened at 11:02 AM. One sea turtle was observed by *Sturgeon 2* while on guard duty along the safety perimeter. The turtle was approximately 12 NM (22 km) away from the GRATV and 14 NM (26 km) away from the detonation point. Table 4-4 lists the details associated with this sighting.

**Table 4-4. Pre-Mission Survey Results from 3 April 2018**

#	Time	Vessel	Sighting	Location	Resolution
1	9:20 AM	<i>Sturgeon 2</i>	1 sea turtle	12 NM north of the GRATV 30° 18.74' N 86° 34.88' W	None required. Sighting was over 12 NM away from detonation point.

GRATV = Gulf Range Armament Test Vessel; N = north; NE = northeast; W = west; ZOI = zone of influence

#### 4.3.1.3 Post-Mission Survey Results

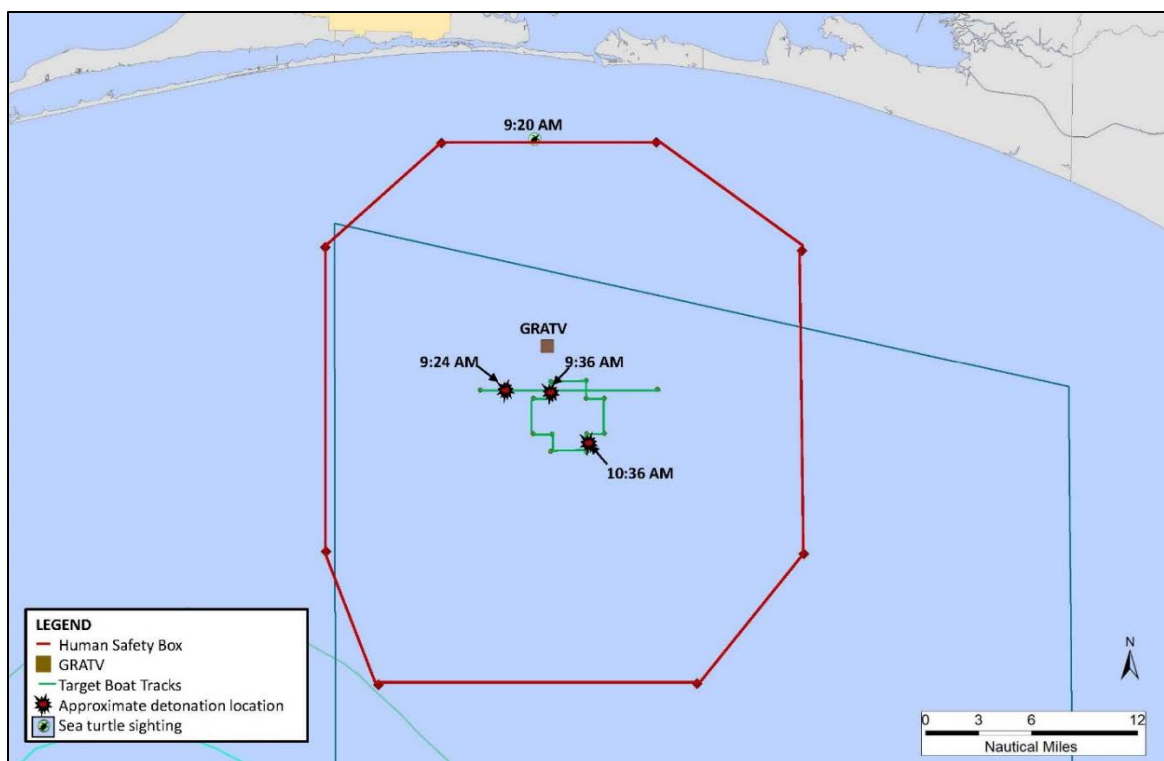
Post-Mission survey vessels arrived at test site at 12:40 PM and completed post-mission survey at 1:10 PM. No protected species sightings were reported.

#### 4.3.1.4 Take Analysis

One sea turtle was observed by a boat on guard duty along the perimeter of the human safety box a few minutes prior to the first detonation. The distance between the sea turtle and the GRATV is approximately 12 NM (22 km); therefore, this individual was not considered to be at risk of exposure to acoustic impacts from detonations that would result in mortality, serious injury, or impairment. Continuous video monitoring of the target area from CCF confirmed no protected species were in the vicinity of the detonations before or immediately after live weapons were released. Refer to Figure 4-5 for approximate locations of the sea turtle sighting and detonations.



## Conclusion



**Figure 4-5. Protected Species Sighting and Detonation Location during 3 April 2018 Maritime WSEP Mission**

The sea turtle was observed approximately 27 km (14 NM) away the impact points. Comparing this distance with the ranges to effect in Table 4-3, the sea turtle was outside the ZOIs for Disturbance, Impairment, Serious Injury, and Mortality. However, the animal's location occurred within the ZOI for Behavioral Response threshold. Two detonations occurred within 16 minutes of the sighting and the last detonation occurred approximately one hour and 15 minutes after the sighting. Even with the delay in weapon drops, it is not very likely that this turtle traveled more than 32 km (17 NM) towards the weapon impact area within that timeframe. After the first two detonations and inert weapon drops, the turtle may have avoided the area altogether, resulting in a behavioral response. Since no protected species were observed during post-mission surveys or during debris clean-up activities, no mortality, injury, impairment, or disturbance takes were documented. Therefore, Eglin NRO concludes that one behavioral response take of an unknown sea turtle species occurred on this day.

### 4.3.2 Friday 6 April 2018

Weather and sea state conditions were good to marginal with partly cloudy skies and 2-ft waves. No protected species were observed while vessels were en route to survey location or upon arrival to mission location.

#### 4.3.2.1 Pre-Mission Survey Results

The pre-mission survey began at 6:22 AM and ended at 7:30 AM. Table 4-5 lists all the sightings documented during the survey.



## Conclusion

**Table 4-5. Pre-Mission Survey Results from 6 April 2018**

#	Time	Vessel	Sighting	Location	Resolution
1	6:30 AM	<i>Miss Daisy</i>	7 bottlenose dolphins	Heading due north 30° 06.99' N 86° 32.34' W	Continued monitoring this pod.
1a	6:35 AM	<i>Miss Daisy</i>	7 bottlenose dolphins update from sighting #1	Heading due north	Continued monitoring this pod for 5 min to confirm northerly travel. Confirmed continuous movement north away from mission area.
2	6:33 AM (waited for Miss Daisy to finish report of previous sighting)	<i>Sturgeon 2</i>	~20 bottlenose dolphins	Milling and feeding. Heading unknown at this time 30° 05.505' N 86° 33.227' W	Continued monitoring this pod.
2a	6:46 AM	<i>Sturgeon 2</i>	~20 bottlenose dolphins	Milling and feeding in general area 30° 05.689' N 86° 33.014' W	Extended survey time to continue monitoring this pod. <i>Sturgeon 2</i> captain called SRI Tower who relayed question to CCF on which target track was being used. Captain was informed that missiles would be fired against the static targets at the center of the Primary Track. It was determined that this pod would be outside of the ZOI for Scenario B.
7:30 AM		Pre-mission survey ended. All observed protected species confirmed to be outside the ZOI. Video Monitoring began.			

min = minutes; N = north; NE = northeast; W = west; ZOI = zone of influence

### 4.3.2.2 Mission Results

Green Range was declared at 8:48 AM. The mission began with an airburst and inert weapon release. Due to aircraft issues, there was a delay in the next weapon releases. Two missiles (Mission Day Scenario B) were fired and detonated at 10:21 AM and 10:23 AM respectively. Additional airburst and inert weapon releases occurred and at 11:20 AM the mission was completed and the range was opened. No protected species were observed by guard duty boats or Eglin NRS personnel in CCF during the mission.

### 4.3.2.3 Post-Mission Survey Results

Survey vessels re-entered the safety box and arrived at the detonation site for post-mission surveys which began at 12:30 PM and ended at 1:00 PM. No sightings were reported. Approximately five AF vessels picked up debris and were down-current of the impact location for approximately one hour. No protected species sightings were reported during debris clean up.

### 4.3.2.4 Take Analysis

Pre-mission sightings were all confirmed to leave the ZOI for Mission Day Scenario B. Since no protected species were observed during the mission, post-mission surveys or debris clean-up activities, no takes occurred on this day's mission.

## Conclusion

### 5. 413<sup>th</sup> Flight Test Squadron (413 FLTS)

The 413 FLTS did not conduct any live missions over the EGTTR in calendar year 2018.

### 6. Summary of all EGTTR Mission Activities

Table 6-1 below summarizes results from protected species surveys and live weapon releases in the EGTTR during calendar year 2018.

**Table 6-1. Summary of Survey Results and Live Weapon Releases in the EGTTR**

Mission Group	Mission Date	Pre-Mission Survey Results		During Mission Survey Results		Live Weapons Releases			Post-Mission Survey Results	
		# MM	# ST	# MM	# ST	Type	NEW	#	# MM	# ST
AFSOC	1/22/2018	0	0	0	0	Gunnery	0.07 – 4.7 lbs	Unk.	0	0
780 TS	2/15/2018	0	0	0	0	No weapons were released			N/A	N/A
	2/16/2018	20	1	0	0	Missile	20 lbs	2	0	0
	2/23/2018	0	0	3	0	Bomb	27.41 lbs	1	0	0
	12/12/2018	0	0	0	0	No weapons were released			N/A	N/A
86 FWS	4/3/2018	0	0	0	1	Missile	20 lbs	3	0	0
	4/6/2018	27	0	0	0	Missile	20 lbs	2	0	0
<b>Total # species observed</b>		<b>47</b>	<b>1</b>	<b>3</b>	<b>1</b>				<b>0</b>	<b>0</b>

# = number; AFSOC = Air Force Special Operations Command; AGM = air-to-ground missile; FWS = Fighter Weapons Squadron; JAGM = Joint Air-to-Ground Missile; lbs = pounds; MM = marine mammals; N/A = not applicable; NEW = net explosive weight; ST = sea turtles; TS = Test Squadron; Unk. = unknown

The primary species observed during surveys were bottlenose dolphins. Two sea turtles were also observed, but only one was positively identified as a loggerhead. All sightings occurred either during the pre-mission survey or along the safety perimeter during the mission. For all live missions in the EGTTR, the safety box boundaries extended well-beyond the ZOIs for mortality, serious injury, permanent/temporary injury, impairment, and some behavioral thresholds for marine mammals and sea turtles. As described in Section 4.3.1, the sea turtle observed along the safety perimeter during the 86 FWS Maritime WSEP mission was within the ZOI for the Behavioral Response threshold (Table 4-3**Error! Reference source not found.**). Therefore, Eglin NRO concludes that one sea turtle (species unknown) take by Behavioral Responses occurred during this mission activity. Since no other protected species sightings during missions coincided with any of the impact thresholds and no protected species were observed during post-mission surveys, this was the only take documented during 2018 EGTTR missions.

### 7. Effectiveness of Mitigation and Monitoring Requirements

The mitigation and monitoring methods proposed in the LOA request were successfully implemented in support of EGTTR mission activities. In cases where protected species were observed, Eglin NRO believes all reasonable measures were taken to ensure sighted animals would not be at risk of exposure to acoustic levels resulting in mortality or physical injury thresholds during live weapon releases. Continuing to use the same marine species observers for vessel-based

## **Conclusion**

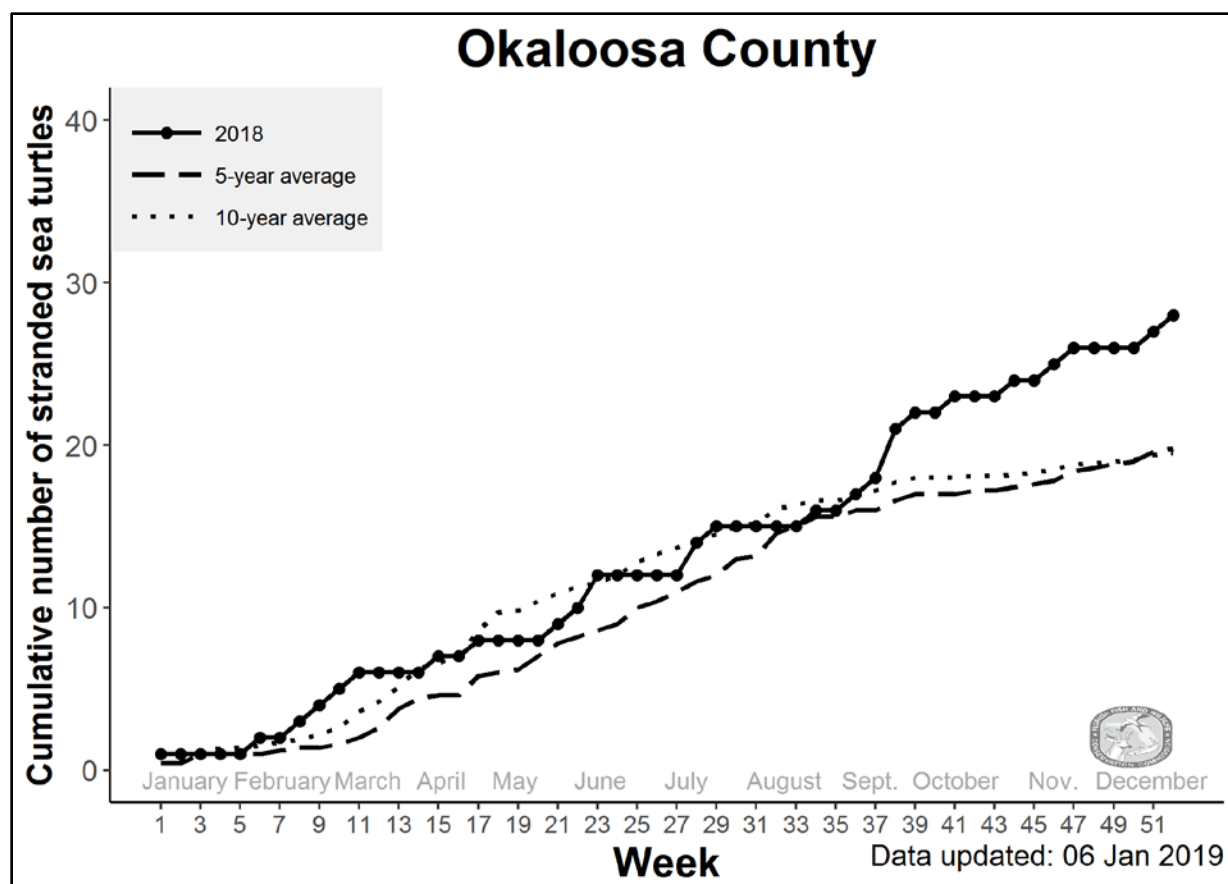
surveys has likely increased the reliability of sighting data as boat captain and observers are expected to improve surveying techniques over the last five years.

Video monitoring in CCF was accomplished for three live mission days, including two 86 FWS Maritime WSEP missions and one 780 TS test. Eglin NRO plans to incorporate video monitoring for all future EGTTR live missions when operationally feasible. Discussions with the 780 TS have already occurred for upcoming SDB-II missions planned for early 2019. Eglin NRO will also reach out to AFSOC and the 413 FLTS to ensure the aircrews are using the most updated version of the mission reporting forms for future mission activities. Implementing these improvements in the monitoring requirements will further increase Eglin's effectiveness in protecting marine mammals and sea turtles during live weapon missions in the EGTTR.

## **8. Protected Species Stranding Reports**

As part of Eglin NRO's marine mitigation program, protected marine species strandings are reviewed and analyzed for potential mission-related impacts. No marine mammal strandings occurred on Eglin AFB property or were reported to Eglin NRO during calendar year 2018. This discussion will only focus on sea turtle stranding data.

According to the Florida Sea Turtle Stranding and Salvage Network (FLSTSSN) archived stranding data, Okaloosa County has reported an average 19.5 sea turtle strandings per year over the last 10 years (FLSTSSN, 2019). As shown in Figure 8-1, 28 sea turtle strandings were reported in Okaloosa County in 2018, including 9 loggerheads, 7 green, and 12 Kemp's ridley (FLSTSSN, 2019). Comparing 2018 data with the 10-year average, there was a marked increase in sea turtle strandings above the 5- and 10-year averages beginning in September.



**Figure 8-1. Cumulative Numbers of Stranded Sea Turtles in Okaloosa County during 2018 (Ongoing) and the Previous 5-year and 10-year Averages**  
Source: (FLSTSSN, 2019)

Specifically for Eglin AFB property in 2018, nine turtles were found stranded on Eglin's property on SRI (Okaloosa County) and 21 turtles were found stranded on Eglin's property in Cape San Blas off St. Joseph Bay (Gulf County). Information on each of these strandings is presented in Table 8-1.

**Table 8-1. 2018 Sea Turtle Stranding Records for Eglin AFB**

Date	# of Animals	Species	Location Found	Condition of the Animal(s)
1/2/2018	1	Loggerhead	Between Test Sites A-13A and A-13B on SRI	Dried carcass with barnacles on carapace and plastron. Missing half of right front flipper.
1/17/2018	2	Green	Eglin AFB property on St. Joseph Bay	Freshly dead and moderately decomposed carcasses. Both turtles washed up during cold stun event.
2/2/2018	19	Green (18) and Kemp's ridley (1)	Eglin AFB property on St. Joseph Bay	Carcasses ranged from moderately decomposed to dried carcass. One turtle was missing a right front flipper that was healed over. Another had external carapace damage. Remaining turtles did not contain

## Conclusion

Date	# of Animals	Species	Location Found	Condition of the Animal(s)
				any abnormalities. All turtles assumed to be cold stunned.
4/24/2018	1	Kemp's ridley	0.5 miles east of A-10 on SRI	Carcass was decomposed and all soft tissues were dried to the point where only skeletal shell, bones, and dried skin remained. No apparent wounds or injuries were observed. The carcass was partially buried in the sand. It is possible this was a previously-buried animal that was uncovered during a winter storm event.
5/8/2018	1	Kemp's ridley	A-15 on SRI	Moderately decomposed carcass. Both rear flippers were missing, but thought to be from decomposition rather than injury.
5/22/2018	1	Kemp's ridley	300 yards east of Test Site A-13B on SRI	Only the carapace was found. No head or flippers remaining. Carcass was dug up the beach, likely by coyotes.
6/13/2018	1	Kemp's ridley	Behind dune on Eglin AFB public beach adjacent to East Pass, Destin west jetty	Dried carcass with head and carapace deformed or smashed.
7/23/2018	1	Green	2.5 miles west of SRI Tower at A-13B	Juvenile found severely decomposed and bloated. Entangled with monofilament fishing line around the neck and right flipper, cutting into soft tissues. Monofilament line contained several small hooks attached, appeared to be a bait jig. Post-mortem shark bites were also observed.
8/27/2018	1	Green	1.5 miles east of SRI Tower at A-13B	Carcass was considered fresh dead and only slightly bloated. No apparent signs of injury.
9/5/2018	1	Kemp's ridley	200 yards east of SRI Tower at A-13B	Moderately decomposed carcass, with moderate bloating, skin discoloration, distended cloaca, and no apparent signs of injury.
9/22/2018	1	Loggerhead	100 yards west of SRI Tower at A-13B	Moderately decomposed carcass appeared emaciated. Two large gashes/cracks on carapace were observed, but were not fresh.

The loggerhead stranding in January, which occurred prior to the AFSOC gunnery mission, and the strandings related to cold stun events in January and February were not related to EGTTTR live mission activities. The Kemp's ridley sea turtle found on April 24, 2018 was likely a previously-buried animal that was uncovered during a winter storm event, which suggests the animal died long before it was discovered on SRI, and likely before 780 TS and 86 FWS missions were conducted in mid- to late-February and early April (Table 6-1). Therefore, cause of death for this individual is not considered to be the result of exposure to live weapons detonations. The green

## **Conclusion**

sea turtle stranding found in July is assumed to result from fisheries interaction, as evidenced by the monofilament line tightly wrapped around the neck and flipper. Subsequent strandings that were found in late August and September consisted of either fresh dead or only moderately decomposed carcasses, suggesting that time of death did not correlate with the previous 86 FWS live mission activities that were completed in early April. Eglin NRO concludes causes of death for stranded sea turtles found on Eglin AFB property were not related to EGTTR live mission activity; therefore, no mortality takes of sea turtles occurred during calendar year 2018.

## **9. Conclusion**

No additional impacts to protected species have been reported since the missions were completed on November 7, 2017. Eglin NR believes this document fulfills the reporting requirements outlined in the LOA and BO. The findings in this report indicate that Eglin successfully implemented all the mitigation and monitoring requirements.

## **10. References**

FLSTSSN. (2019). *Current Information on Stranded Sea Turtles in Florida*. Retrieved January 7, 2019, from Florida Sea Turtle Stranding and Salvage Network: <http://ocean.floridamarine.org/seaturtle/flstssn/cOkaloosa.html>

## 11. Signatures

### 2018 Annual Report on EGTR Mission Activities

#### Final Report

#### Eglin Air Force Base, Florida


Prepared by:



Amanda Robydek  
Marine Scientist  
Eglin Natural Resources/Leidos

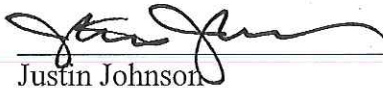
2/20/19  
Date

Reviewed by:



Rodney Felix  
Endangered Species Biologist  
Eglin Natural Resources Office

20 February 2019  
Date



Justin Johnson  
Supervisory Biologist  
Eglin Natural Resources Office

20 Feb 2019  
Date



Bruce Hagedorn  
Chief  
Eglin Natural Resources Office

20 Feb 2019  
Date



## **Appendix A**

### **Protected Species Observer Report Forms**

Protected Species Observer Report Form	
<b>This section to be completed regardless of whether or not protected species are sighted</b>	
Date* <u>22 Jan 18</u> Observer Name <u>Capt Frey</u> Mission Description <u>AG-1304 Live Fire</u> Mission Location: <u>N 29 51.86</u> Latitude/Longitude <u>W 086 46.16</u> Mission Time: <u>Day</u> Night Water Depth <u>Unknown</u>	Arrival Time at Site <u>0850</u> Pre-mission Survey Start Time <u>0850</u> Pre-mission Survey End Time <u>0900</u> Mission Start Time <u>0900</u> Mission End Time <u>1020</u> Post-mission Survey Start Time <u>1020</u> Post-mission Survey End Time <u>1030</u> Flight(s) conducted in same location next day? Y <u>(N)</u> Was a protected species or indicator observed at any time? Y <u>(N)</u> If Yes, complete the following section(s), using a separate block for each sighting.
<b>*Use a separate form for each date</b>	
<b>Sighting #1</b>	
1. Time _____ 2. Sea State (see scale on page 6) _____ 3. Marine Mammal or Sea Turtle Indicator Sighted ___ Large School(s) of Fish ___ Large Flock(s) of Feeding Birds ___ Sargassum Mat(s) ___ Large Jellyfish Aggregation(s) ___ Other (describe): _____ 4. Species Class Sighted ___ Large Whale ___ Schooling Dolphin ___ Undetermined Marine Mammal ___ Manatee ___ Sea Turtle 5. Species Name (if known) _____ If Unknown, Provide Description _____ 6. Estimated Number of Animals: Adult _____ Young _____ 7. Latitude/Longitude of animal(s) _____ and compass heading _____ 8. Mission Status at Time of Observation ___ Pre-mission Survey ___ During Mission ___ Post-mission 9. Was animal(s) in ZOI at any time? Y    N 10. Resolution of Sighting ___ Animal Left Observation Range Before Mission Began ___ Mission Delayed or Location Changed Due to Presence of Protected Species ___ Mission Delayed or Location Changed Due to Other Factors (weather, etc.) ___ Animal Remained in Observation Range During Mission, but Outside ZOI ___ Animal was in ZOI During Mission - Take Occurred 11. Post-mission Survey Results If animal(s) was observed during a post-mission survey, describe behavior/condition: ___ Normal ___ Erratic Swimming ___ Remained at Surface ___ Injured ___ Dead ___ Other: _____	
<b>Eglin environmental personnel contact information: Page 6</b>	
1	