MARINE SPECIES MONITORING

For The U.S. Navy's Virginia Capes, Cherry Point, Jacksonville, and Gulf of Mexico Range Complexes

Annual Report for 2012

February 2013

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AMR	Adaptive Management Review
BiOp	Biological Opinion
BOMBEX	Bombing Exercise
CFR	Code of Federal Regulations
CHPT	Cherry Point
C-POD	Click Porpoise Detector
dB re 1 µPa	Decibels Referenced to 1 MicroPascal
DoN	Department of the Navy
EAR	Ecological Acoustic Recorder
ESA	Endangered Species Act
FIREX	Firing Exercise
GOMEX	Gulf of Mexico
ICMP	Integrated Comprehensive Monitoring Program
IMPASS	Integrated Maritime Portable Acoustic Scoring and Simulator
JAX	Jacksonville
lb	Pound(s)
LOA	Letter of Authorization
m	Meter(s)
MAVEX	Maverick Missile Exercise
MDE	Multiple Detonation Exercise
min	Minute(s)
MINEX	Mine-neutralization Exercise
MISSILEX	Missile Exercise
MMO	Marine Mammal Observer
MMPA	Marine Mammal Protection Act
NEPM	Non-Explosive Practice Munition
NM	Nautical Mile(s)
NMFS	National Marine Fisheries Service
OPAREA	Operating Area
PAM	Passive Acoustic Monitoring
SAG	Scientific Advisory Group
SEL	Sound Exposure Level
SPL	Sound Pressure Level
TTS	Temporary Threshold Shift
U.S.	United States
USFF	U.S. Fleet Forces
VACAPES	Virginia Capes
yd	Yard(s)

1. INTRODUCTION

1.1 Background

The United States (U.S.) Navy developed Range Complex monitoring plans to provide marine mammal and sea turtle monitoring as required under the Marine Mammal Protection Act (MMPA) of 1972 and the Endangered Species Act (ESA) of 1973. In order to issue an Incidental Take Authorization for an activity, Section 101(a)(5)(a) of the MMPA states that the National Marine Fisheries Service (NMFS) must set forth "requirements pertaining to the monitoring and reporting of such taking." The MMPA implementing regulations at 50 Code of Federal Regulations (CFR) Section 216.104(a)(13) note that requests for Letters of Authorization (LOAs) must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present. While the ESA does not have specific monitoring requirements, recent Biological Opinions (BiOps) issued by NMFS have included terms and conditions requiring the U.S. Navy to develop a monitoring program (NMFS 2009a, NMFS 2010). Therefore, as part of the issuance in 2009 of the original LOAs for the Virginia Capes (VACAPES) Range Complex (NMFS 2009b), the Cherry Point (CHPT) Range Complex (NMFS 2009c), and the Jacksonville (JAX) Range Complex (NMFS 2009d) (collectively referred to as the East Coast Range Complexes), and in 2011, for the Gulf of Mexico (GOMEX) Range Complex (NMFS 2011), the U.S. Navy published monitoring plans with specific monitoring objectives for the East Coast Range Complexes and the GOMEX Range Complex (Department of the Navy [DoN] 2009a, DoN 2009b, DoN 2009c, DoN 2011a, respectively) for training activities involving the use of explosives.

Based on discussions with NMFS, Range Complex monitoring plans were designed as collections of focused "studies" to gather data that will attempt to address the following questions:

1. What are the behavioral responses of marine mammals and sea turtles that are exposed to explosives at specific levels?
2. Is the U.S. Navy's suite of mitigation measures for explosives (e.g., Protective Measures Assessment Protocol, major exercise measures agreed to by the U.S. Navy through permitting) effective at avoiding temporary threshold shift (TTS), injury, and mortality of marine mammals and sea turtles?

Monitoring methods proposed for the Range Complex monitoring plans include a combination of research elements designed both to support Range Complex-specific monitoring, and to contribute information to a larger U.S. Navy-wide science-based program. These research elements include visual surveys conducted from vessels or airplanes, passive acoustic monitoring (PAM), and Marine Mammal Observers (MMOs) from vessels. Each monitoring technique has advantages and disadvantages that vary temporally and spatially, as well as support one particular study objective better than another. The U.S. Navy uses a combination of techniques so that detection and observation of marine animals is maximized, and meaningful information can be derived to answer the research questions proposed above.

There are no modifications requested for the monitoring plans and LOA monitoring requirements from the 2012 LOAs (NMFS 2012a, NMFS 2012b, NMFS 2012c, NMFS 2012d). NMFS made modifications to the issued 2011 LOAs concerning taking of marine mammals incidental to mine-neutralization training using time-delay firing devices within the three East Coast range complexes, along with revised mitigation measures (NMFS 2012e), to ensure that effects to marine mammals resulting from these

activities will not exceed what was originally analyzed in the Final Rules for these range complexes (NMFS 2009e, NMFS2009f, NMFS 2009g). As a result of discussions with NMFS, the U.S. Navy proposed exploring the value of adding field measurements during monitoring of a future Mine-neutralization Exercise (MINEX) event after evaluating the environmental variables affecting sound propagation in the area, such as shallow depths, seasonal temperature variation, bottom sediment composition, and other factors that would affect our confidence in the data collected. If such data could be collected without unreasonable costs and impacts to training, the U.S. Navy would move forward in incorporating the measurements into its monitoring program for East Coast MINEX training. The U.S. Navy concluded its feasibility review of MINEX field measurements and determined this data would provide benefits by helping to ensure the U.S. Navy's understanding of sound propagation in nearshore environments remains accurate. MINEX field measurements were conducted during 2012 in VACAPES and are further described in **Section 2.6**.

A summary of the U.S. Navy's monitoring progress in the three East Coast Range Complexes and the GOMEX Range Complex to date can be found at the end of the report in **Table 12.**

1.2 Report Objectives

Design of the Range Complex monitoring plans represented part of a new U.S. Navy-wide and regional assessment, and as with any new program, numerous coordination, logistic, and technical details continue to be refined. The scope of the Range Complex monitoring plans was to lay out the background for monitoring, as well as to define initial procedures to be used in meeting certain study objectives derived from NMFS-U.S. Navy agreements.

Overall, and in support of the above statement, this report serves two main objectives under the VACAPES, CHPT, JAX, and GOMEX LOAs:

1. Present data and results from the U.S. Navy-funded marine mammal and sea turtle monitoring conducted in the VACAPES, CHPT, JAX, and GOMEX range complexes during the period from 02 January 2012 to 01 January 2013 (see **Sections 2 through 5**). Included in this assessment are reportable metrics of monitoring as requested by NMFS. This report focuses on summarizing events monitored and data collected, and providing a brief description of the major accomplishments from techniques used this year. Primary focus over the first 4 years of the monitoring program has been concentrated on establishing initial monitoring commitments, data collection efforts, and overall organization and coordination of the U.S. Navy-wide monitoring program.
2. Continue the adaptive management review (AMR) process by providing an overview of meetings and initiatives over the past year that support proposed revisions to the U.S. Navy's 2013 VACAPES, CHPT, JAX, and GOMEX Monitoring Plans, as well as presenting progress made towards development of a Strategic Plan for U.S. Navy Monitoring that has been facilitated by establishing a Scientific Advisory Group (SAG) to review and provide recommendations on the U.S. Navy's monitoring program. Proposed changes primarily reflect input received from the scientific community and other stakeholders. **Section 6** provides an overview of the events that have prompted these most recent adaptive management actions.

1.3 Summary of Monitoring Accomplishments for 2012

During the 02 January 2012 to the 01 January 2013 reporting period, U.S. Fleet Forces (USFF) conducted monitoring during four training events. The monitoring effort for the reporting period was conducted in two primary locations—VACAPES and JAX Operating Areas (OPAREAs).

Major accomplishments from the USFF's compliance monitoring for the East Coast Ranges during this reporting period (02 January 2012–01 January 2013) include:

- **VACAPES**
    - A noise measurement study, vessel survey, MMOs, and PAM during a MINEX event conducted on 11 September 2012.
- **JAX**
    - Aerial surveys before, during, and after a Missile Exercise (MISSILEX) (Maverick Missile Exercise [MAVEX]) event conducted on 28 February 2012.
    - Aerial surveys and MMOs before, during, and after a Firing Exercise (FIREX) with Integrated Maritime Portable Acoustic Scoring and Simulator (IMPASS) event conducted on 07 September 2012.
    - Aerial surveys before, during, and after a MISSILEX (MAVEX) event conducted on 28 September 2012.

Sections 2 through 4 provide the details of monitoring efforts for each of the East Coast Range Complexes.

2. VIRGINIA CAPES (VACAPES) RANGE COMPLEX

The geographic scope of the VACAPES Study Area includes the VACAPES OPAREA, as well as the area between the shoreline and the inner boundary of the OPAREA (3 nautical miles [NM] from the shoreline) (**Figure 1**). The VACAPES Study Area also includes lower Chesapeake Bay.

There are 40 marine mammal species or stocks with possible or confirmed occurrence in the marine waters off Maryland, Virginia, and North Carolina within the VACAPES Range Complex (DoN 2008a). There are 35 cetacean species (e.g., whales, dolphins, and porpoises), four pinniped species (e.g., seals) and one sirenian species (West Indian manatee [*Trichechus manatus*]). There are also five species of threatened and endangered sea turtles (reviewed in DoN 2008a).

2.1 VACAPES Monitoring Objectives Overview

The goal of the VACAPES Monitoring Plan (DoN 2009a) is to implement field methods (i.e., studies) chosen to address the long-term monitoring objectives outlined in the *Introduction* (**Section 1**). In the VACAPES Monitoring Plan, the U.S. Navy proposed to implement a diversity of field methods to gather monitoring data for marine mammals and sea turtles in U.S. Navy training areas. Specifically, the U.S. Navy proposed to use visual surveys (aerial or vessel), deploy PAM devices when possible, and put MMOs aboard U.S. Navy vessels to meet its goals during the current time period. **Table 1** shows the 2012 monitoring objectives as initially agreed upon by NMFS and U.S. Navy from the final VACAPES Monitoring Plan.

Table 1. 2012 VACAPES monitoring obligations under VACAPES Final Rule, LOA and BiOp.

STUDY 1 (behavioral responses)		
Aerial or Vessel Surveys	- 2 explosive events per year (one involving multiple detonations). When feasible, deploy hydrophone array during vessel surveys for passive acoustic monitoring.	Adaptive Management Review for 2012 (AMR)
Marine Mammal Observers (MMO)	- 1 explosive event per year.	
STUDY 2 (mitigation effectiveness)		
MMO/Lookout Comparison	- 1 explosive event per year.	AMR
Vessel or Aerial Surveys Before and After Training Events	- 2 explosive events per year (one involving multiple detonations). When feasible, deploy hydrophone array during vessel surveys for passive acoustic monitoring.	

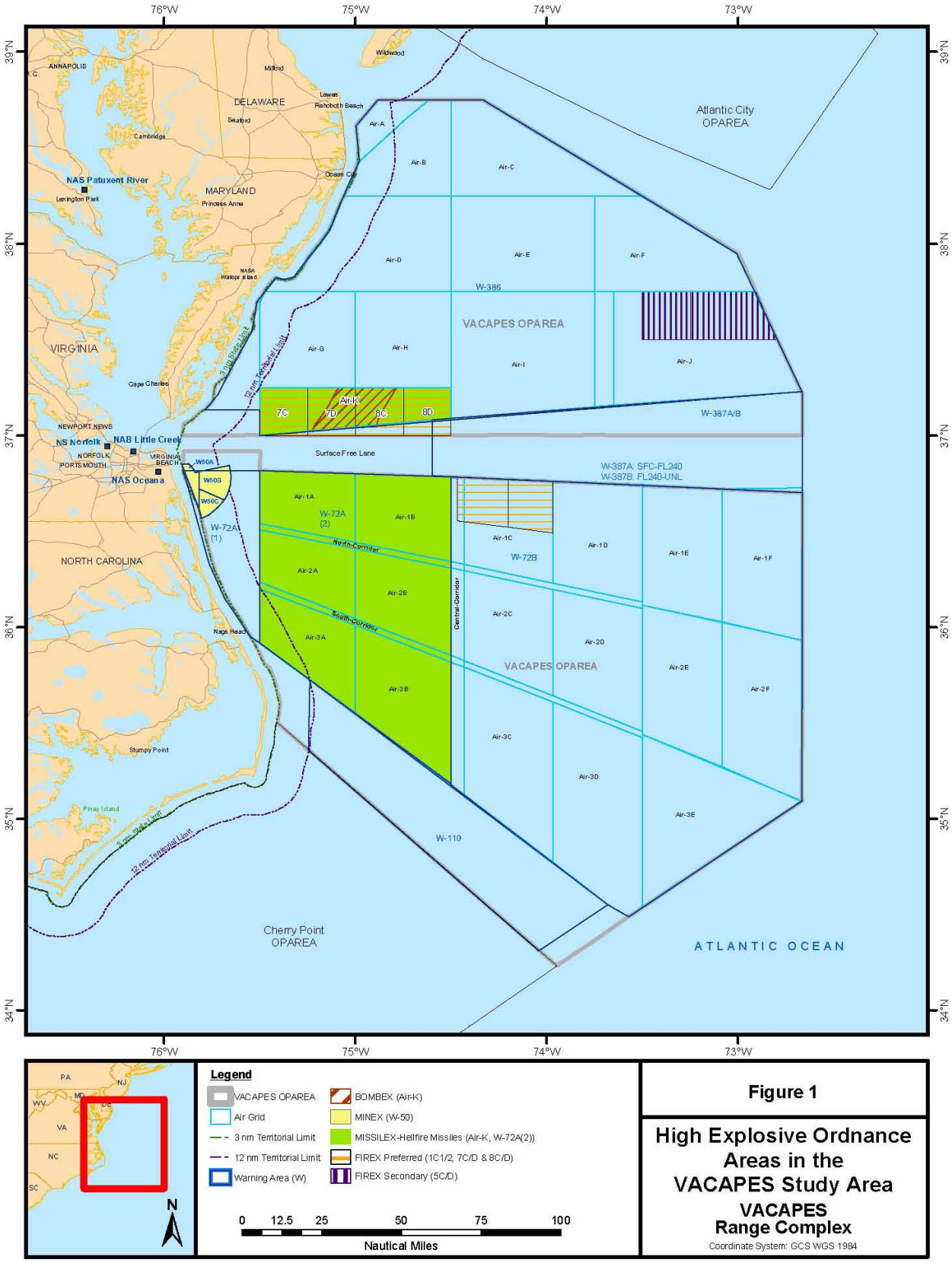

Figure 1. VACAPES Study Area.

2.2 VACAPES Monitoring Accomplishments for 2012

During the 02 January 2012 to 01 January 2013 reporting period, USFF implemented vessel surveys and deployed PAM devices. The monitoring efforts for 2012 were conducted within W-50A/R-6606 in conjunction with a MINEX event.

Major accomplishments from the USFF's 2012 compliance monitoring in the VACAPES Study Area are shown in Table 2 and include:

- Vessel Visual Surveys
    - A noise measurement study was conducted during a MINEX training event. Two vessels (Vessels 1 and 2) were anchored at different distances to monitor five explosive detonations. Vessel 1 was positioned at a distance of 160 meters (m) (175 yards [yd]) from the 0.5-pound (lb) and 1-lb charges and then at a distance of 949 m (1,037 yd) from the 5-lb, 10-lb, and 0.23-lb charges (**Figure 2**). Vessel 2 was at a distance of 429 m (469 yd) from all detonations. The MMOs visually surveyed the buffer zone around the detonation site before, during, and after the event.
- Passive Acoustic Monitoring
    - A noise measurement study was conducted during a MINEX training event. In addition to the acoustic equipment that was measuring noise levels of the detonations themselves, five PAM devices were deployed in the vicinity of this MINEX event. These devices were able to monitor marine mammal vocalization activity before, during, and after the event.
- Marine Mammal Observers on U.S. Navy Platform
    - Seven MMOs were deployed on two vessels during a noise measurement study conducted during a MINEX event, as summarized above under vessel visual surveys. The MMOs visually surveyed the buffer zone around the detonation site immediately before, during, and after the event.

Table 2. U.S. Navy-funded monitoring accomplishments within the VACAPES Study Area from January 2012 to January 2013.

Monitoring Obligation (Study Type)	Description of U.S. Navy EIS/LOA Monitoring Completed	Event Types Available for Monitoring	MMPA/ESA Requirement	Total Accomplished
Vessel or Aerial Surveys – Before and After Event (study 1 and 2)	Vessel surveys before, during, and after 1 MINEX event.	MINEX, MISSILEX, FIREX, or BOMBEX	2 events (1 MDE)	1 event*
Marine Mammal Observers (MMOs) (study 1 and 2)	MMOs visually surveyed before, during, and after 1 MINEX event.	MINEX, MISSILEX, or FIREX	1 event	1 event
Passive Acoustic Monitoring (PAM) (study 2)	Deployed passive acoustic buoys during 1 MINEX event.	MINEX, MISSILEX, FIREX, or BOMBEX	Deploy hydrophone array during vessel surveys when feasible	1 event

*Although the noise measurement study and MMO monitoring did not include surveys 1 day before and after the event, the U.S. Navy feels that the effort met the intent of the monitoring requirement and should receive credit.

Key: BOMBEX = Bombing Exercise; EIS = Environmental Impact Statement; ESA = Endangered Species Act: FIREX = Firing Exercise; LOA = Letter of Authorization; MDE = Multiple Detonation Event; MINEX = Mine-neutralization Exercise; MISSILEX = Missile Exercise; MMOs = Marine Mammal Observers; MMPA = Marine Mammal Protection Act.; PAM = Passive Acoustic Monitoring.

2.3 VACAPES Vessel Visual Surveys

Vessel visual surveys for marine mammals were conducted using U.S. Navy MMOs during one naval exercise in VACAPES during the reporting period. The monitoring was associated with a MINEX training event in September.

2.3.1 MINEX Event – September 2012

A noise measurement study was conducted during a MINEX training event in W-50A/R-6606 off the coast of Virginia Beach, Virginia, on 11 September 2012 (refer to **Section 2.6**). Traditional line-transect vessel surveys were not possible as part of the 11 September 2012 MINEX monitoring events, because the equipment involved in the noise measurement study required that the vessels be anchored. The two vessels (Vessels 1 and 2) were anchored at different distances from the explosive detonations. Vessel 1 was positioned at a distance of 160 m (175 yd) from the 0.5-lb and 1-lb charges and then at a distance of 949 m (1,037 yd) from the 5-lb, 10-lb, and 0.23-lb charges (**Figure 2**). Vessel 2 was at a distance of 429 m (469 yd) for all detonations. Seven U.S. Navy MMOs were stationed aboard the two vessels (Virginia Beach Aquarium research vessel and a private charter vessel). Observations were conducted before, during, and after the training event.

No marine mammals were observed during the events. Only a single unidentified hardshell turtle was sighted by the MMOs (**Table 3**), and is shown in **Figure 2**. The turtle sighting was made approximately 20 minutes (min) prior to the final detonation (0.5-lb charge). The sighting was brief, and the animal surfaced to breathe and then dove. No unusual behavior was observed. For additional details, refer to the September 2012 VACAPES MINEX Event Trip Report.

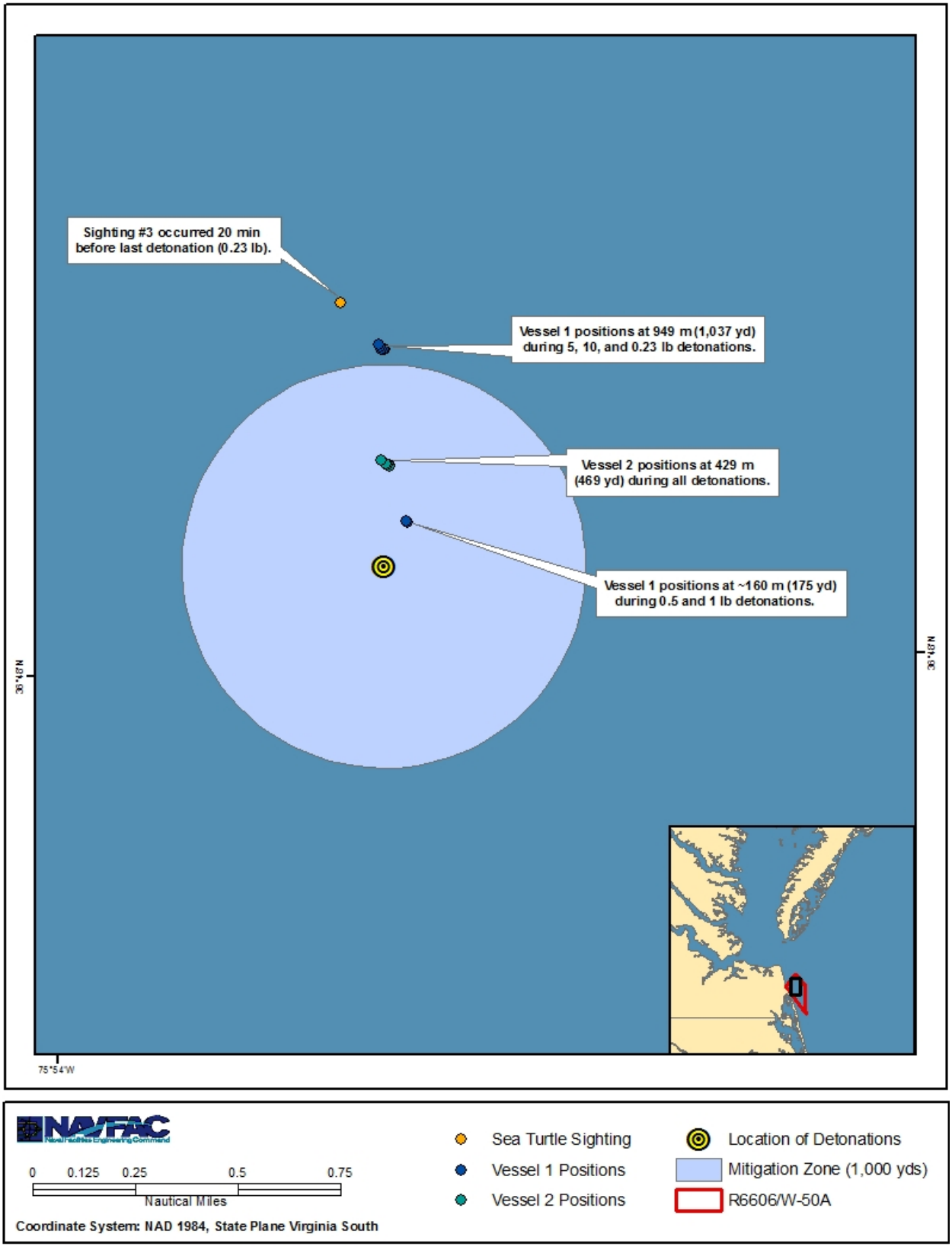

Figure 2. Locations of sightings, observation vessels, and approximate detonation location for September 2012 MINEX training event.

Table 3. Summary of marine species sightings recorded by MMOs while conducting monitoring from U.S. Navy vessels off the coast of Virginia during the September 2012 MINEX event.

Common Name	Scientific Name	Sightings	Individuals
Unidentified hardshell turtle		1	1

No injuries or mortalities of marine mammals or turtles were observed during the MINEX training event on 11 September. For the sighting that was obtained within 30 min of a detonation, calculations were made to determine whether it was probable that the animals could have been exposed to the detonation. As shown in **Figure 2,** the animal was outside of the 914-m (1,000-yd) mitigation zone at the time of the sighting. The 914-m (1,000-yd) mitigation zone is used for MINEX events involving time-delay firing devices to ensure that animals do not have time to swim close enough after the fuse is lit, since the exercise cannot be stopped after this point for safety reasons. However, the estimated range to onset TTS for up to 20-lb charges is only at 640 m (700 yd), and the charge that occurred after the turtle sighting was only a 0.23-lb charge.

Based on an average swim speed of 0.75 NM/hour (1.4 km/hour) (Meylan 1995), the turtle could have traveled approximately 0.25 NM (500 yd or 463 m) before the detonation occurred. The turtle was sighted at a distance of approximately 1,200 m (1,300 yd) from the detonation site, so even if the turtle was swimming directly towards the detonation, it is unlikely that the turtle would have been closer than 640 m (700 yd) from the detonation. Although it is possible that the turtle could have been exposed to sound or energy levels that would cause TTS, it is more likely that the turtle was exposed to sound or energy levels that would cause a minor and temporary behavioral disturbance.

2.4 VACAPES Aerial Visual Surveys

From January 2012 to January 2013, there were no aerial monitoring opportunities available for explosive events in the VACAPES OPAREA. Therefore, there is no aerial monitoring to report at this time.

2.5 VACAPES Marine Mammal Observers (MMOs) on U.S. Navy Platforms

The U.S. Navy undertook monitoring of marine mammals during one naval exercise in VACAPES during the reporting period, associated with a MINEX training event in September.

2.5.1 MINEX Event – September 2012

A noise measurement study was conducted during a MINEX training event within the VACAPES Range Complex on 11 September 2012 (see **Section 2.6**). As part of this data collection effort, U.S. Navy marine mammal biologists (serving as MMOs) performed visual observations. Summary information regarding the visual observations obtained from the vessel surveys is found in **Section 2.3.1**. For additional details, see the September 2012 VACAPES MINEX Event MMO Trip Report.

2.6 VACAPES Passive Acoustic Monitoring (PAM)

As noted in **Section 2.5.1**, five different size explosive charges, consisting of 0.5 lb, 1 lb, 5 lb, 10 lb, and 0.23 lb were used. The detonation depth was within the water column at 9 m (30 feet) from the surface for the 0.5-lb, 5-lb, and 0.23-lb charges, and on the bottom at 14 m (46 feet) for the 1-lb and 10-lb

charges. In addition to the acoustic equipment that was measuring noise levels of the detonations themselves, additional equipment was deployed to monitor marine mammal vocalizations. On the day of the MINEX event, two AN/SSQ-53F Directional Frequency Analysis and Recording sonobuoys were deployed off one of the MMO vessels to monitor marine mammal vocalization activity immediately before, during, and after the event.

In addition, as part of a separate study to determine marine mammal occurrence in areas where MINEX events usually take place, two Ecological Acoustic Recorders (EARs) and one Click Porpoise Detector (C-POD) recorded marine mammal vocalizations. These devices were deployed on 06 August 2012 at the locations shown in **Figure 3**. The EARs were each set up to record at an 80-kilohertz sample rate, with a 50 percent duty cycle for 2 months. The C-POD continuously recorded detected events of echolocation clicks. The EARs and C-POD were recovered on 13 October 2012. EAR B and the C-POD were recovered at the locations in which they were deployed; however, EAR A broke free from the mooring and was found on the beach in Corolla, North Carolina. With regards to EAR A, the time at which it broke free will need to be determined in order to know if the data will be useful. At this time, only a preliminary examination of the data has been completed on the acoustic datasets. Plans are in place for a full analysis and any results that are found will be presented in a subsequent Annual Report for marine species monitoring within the East Coast and GOMEX Range Complexes.

Deployment of the sonobuoys was a pilot study to determine if real-time monitoring during the MINEX events would be feasible. The sonobuoys were deployed from Vessel 2, which was anchored at a distance of 500 m (547 yd) from the detonation site. Three vocalization events of unidentified dolphins were detected by the sonobuoys. The locations of the animals could not be determined; however, the detections were very weak, which suggests that the animals were not close. Only small portions of the acoustic data from the sonobuoys were recorded, mainly data around the vocalization events, but no analysis of the data has been completed at this time. The real-time detections were mainly meant to cue the MMOs that marine mammals may be in the area; however, no marine mammals were visually observed by the MMOs. Additional work regarding the use of sonobuoys during monitoring events is planned for future events. Analysis and any results will be presented in a subsequent Annual Report for marine species monitoring within the East Coast and GOMEX Range Complexes.

There is no detailed analysis completed for the 2010 or 2011 acoustic data collected during MINEX events (see DoN 2011b; DoN 2012).

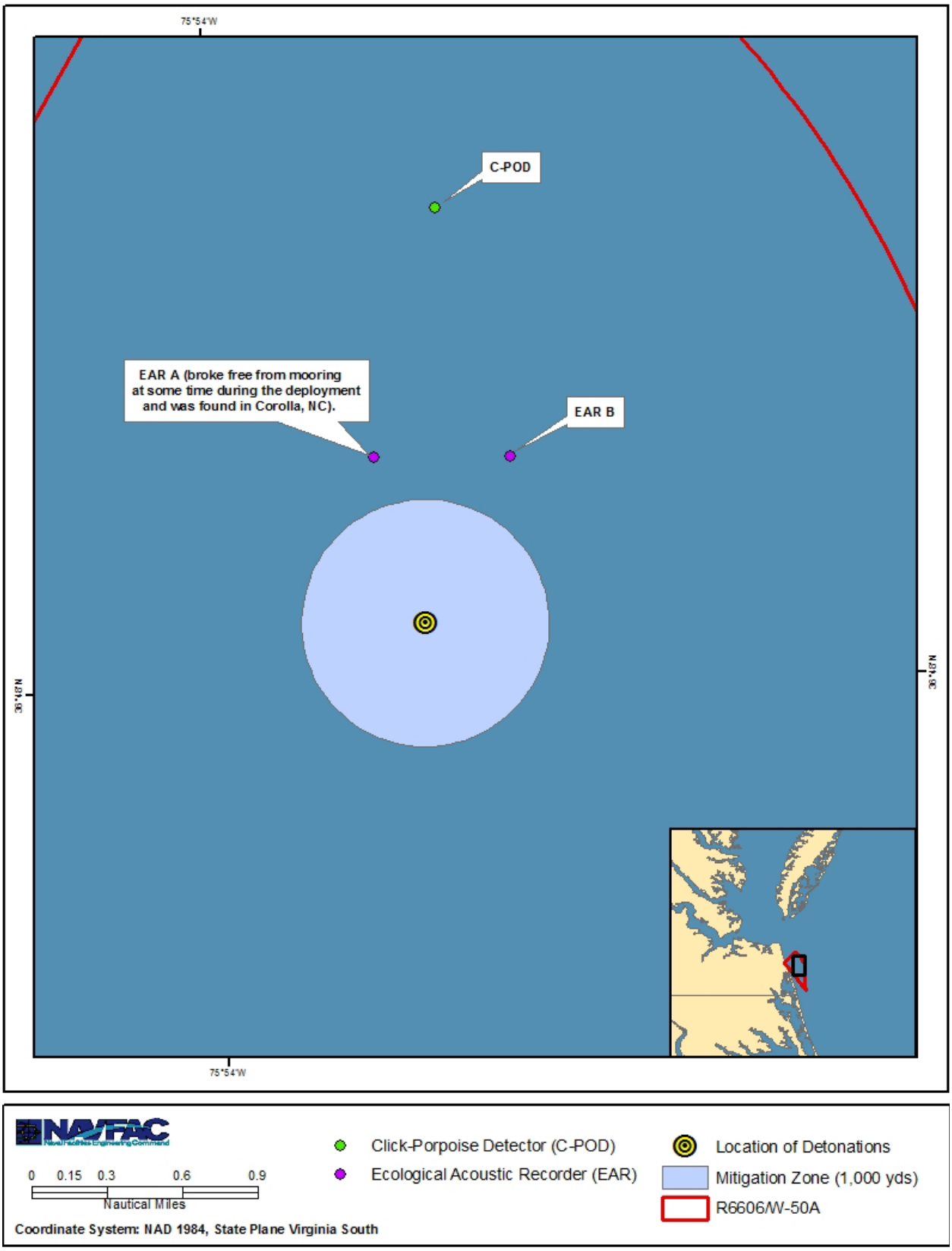

Figure 3. Locations of deployed acoustic data recording devices for September MINEX event in VACAPES.

3. CHERRY POINT (CHPT) RANGE COMPLEX

The geographic scope of the CHPT Study Area includes the CHPT OPAREA, as well as the area between the shoreline and the inner boundary of the OPAREA (3 NM from the shoreline) (**Figure 4**).

There are 34 marine mammal species expected to occur regularly in the marine waters off North Carolina within the CHPT Study Area (DoN 2008b). There are 32 cetacean species (e.g., whales, dolphins, and porpoises), one pinniped species (e.g., seal) and one sirenian species (West Indian manatee). There are also five species of threatened and endangered sea turtles (reviewed in DoN 2008b).

3.1 CHPT Monitoring Objectives Overview

The goal of the CHPT Monitoring Plan (DoN 2009b) is to implement field methods (i.e., studies) chosen to address the long-term monitoring objectives outlined in the *Introduction* (**Section 1**). In the CHPT Monitoring Plan, the U.S. Navy proposed to implement a diversity of field methods to gather monitoring data for marine mammals and sea turtles in U.S. Navy training areas. Specifically, the U.S. Navy proposed to use visual surveys (aerial or vessel), deploy PAM devices when possible, and put MMOs aboard U.S. Navy vessels, to meet its goals during the current time period. **Table 4** shows the 2012 monitoring objectives as initially agreed upon by the NMFS and U.S. Navy from the final CHPT Monitoring Plan.

Table 4. 2012 CHPT monitoring obligations under CHPT Final Rule, LOA and BiOp.

STUDY 1 (behavioral responses)		
Aerial or Vessel Surveys	- 1 explosive event per year. When feasible, deploy hydrophone array during vessel surveys for passive acoustic monitoring.	Adaptive Management Review for 2012 (AMR)
Marine Mammal Observers (MMOs)	- 1 explosive event per year.	
STUDY 2 (mitigation effectiveness)		
MMO/Lookout Comparison	- 1 explosive event per year.	AMR
Vessel or Aerial Surveys Before and After Training Events	- 1 explosive event per year. When feasible, deploy hydrophone array during vessel surveys for passive acoustic monitoring.	

3.2 CHPT Monitoring Accomplishments for 2012

From January 2012 to January 2013, there were no monitoring opportunities available for explosive events in the CHPT OPAREA. Therefore, there is no monitoring to report at this time.

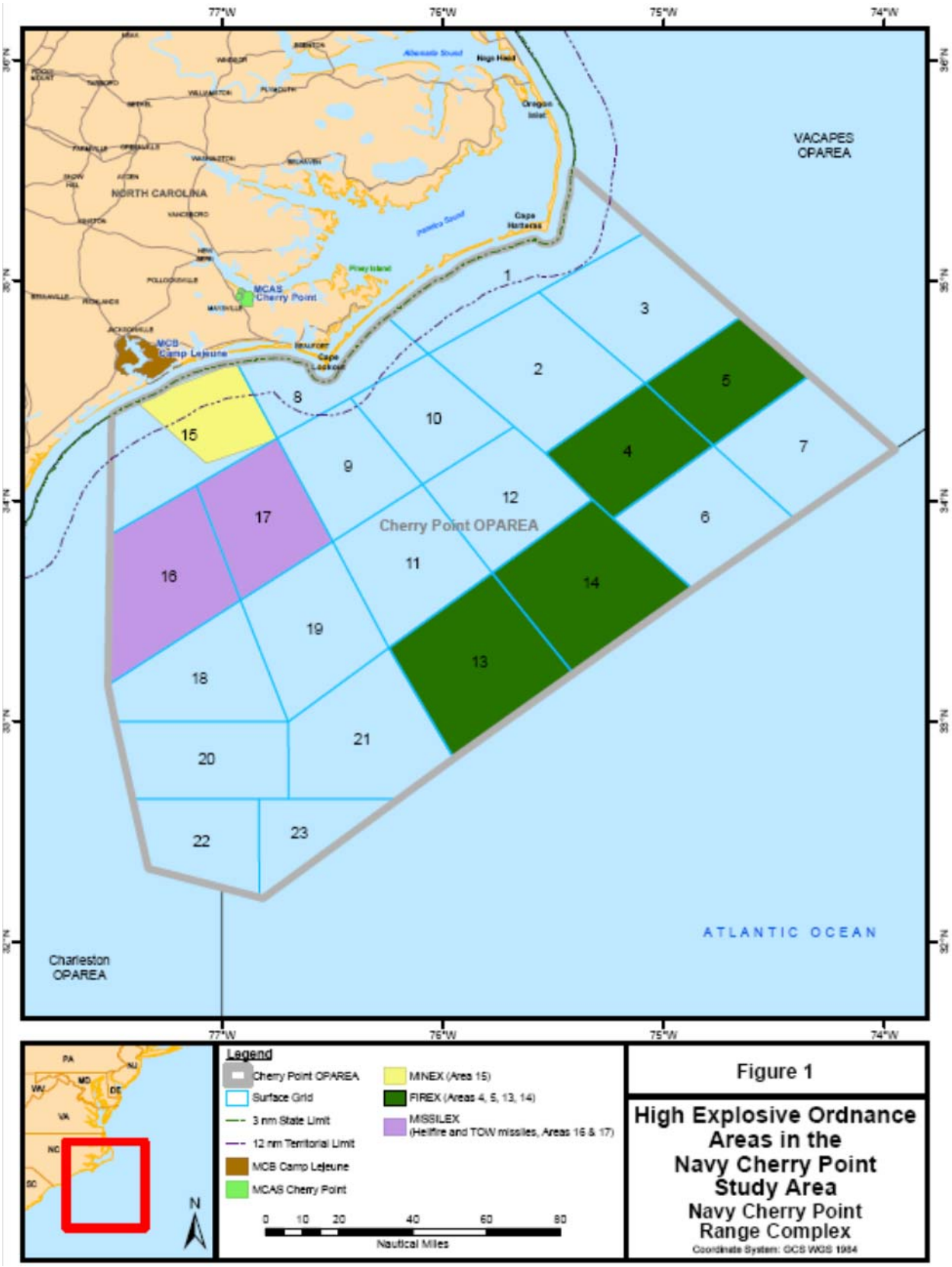

Figure 4. CHPT Study Area.

4. JACKSONVILLE (JAX) RANGE COMPLEX

The geographic scope of the JAX Study Area includes the JAX and Charleston OPAREAs, as well as the area between the shoreline and the inner boundary of the OPAREA (3 NM from the shoreline) (**Figure 5**).

There are 30 marine mammal species or separate stocks with possible or confirmed occurrence in the marine waters off North Carolina, South Carolina, Georgia, and Florida within the JAX Study Area (DoN 2008c). These species or stocks include 29 cetacean species (e.g., whales, dolphins, and porpoises) and one sirenian species (West Indian manatee). There are also five species of threatened and endangered sea turtles (reviewed in DoN 2008c).

4.1 JAX Monitoring Objectives Overview

The goal of the JAX Monitoring Plan (DoN 2009c) is to implement field methods (i.e., studies) chosen to address the long-term monitoring objectives outlined in the *Introduction* (**Section 1**). In the JAX Monitoring Plan, the U.S. Navy proposed to implement a diversity of field methods to gather monitoring data for marine mammals and sea turtles in U.S. Navy training areas. Specifically, the U.S. Navy proposed to use visual surveys (aerial or vessel), deploy PAM devices when possible, and put MMOs aboard U.S. Navy vessels to meet its goals during the current time period. **Table 5** shows the 2012 monitoring objectives agreed upon by NMFS and U.S. Navy from the final JAX Monitoring Plan.

Table 5. 2012 JAX monitoring commitments under JAX Final Rule, LOA, and BiOp.

STUDY 1 (behavioral responses)		
Aerial or Vessel Surveys	- 2 explosive events per year, one of which is a multiple detonation event. When feasible, deploy hydrophone array during vessel surveys for passive acoustic monitoring.	Adaptive Management Review for 2012 (AMR)
Marine Mammal Observers (MMOs)	- 1 explosive event per year.	
STUDY 2 (mitigation effectiveness)		
MMO/Lookout Comparison	- 1 explosive event per year.	AMR
Vessel or Aerial Surveys Before and After Training Events	- 2 explosive events per year. When feasible, deploy hydrophone array during vessel surveys for passive acoustic monitoring.	

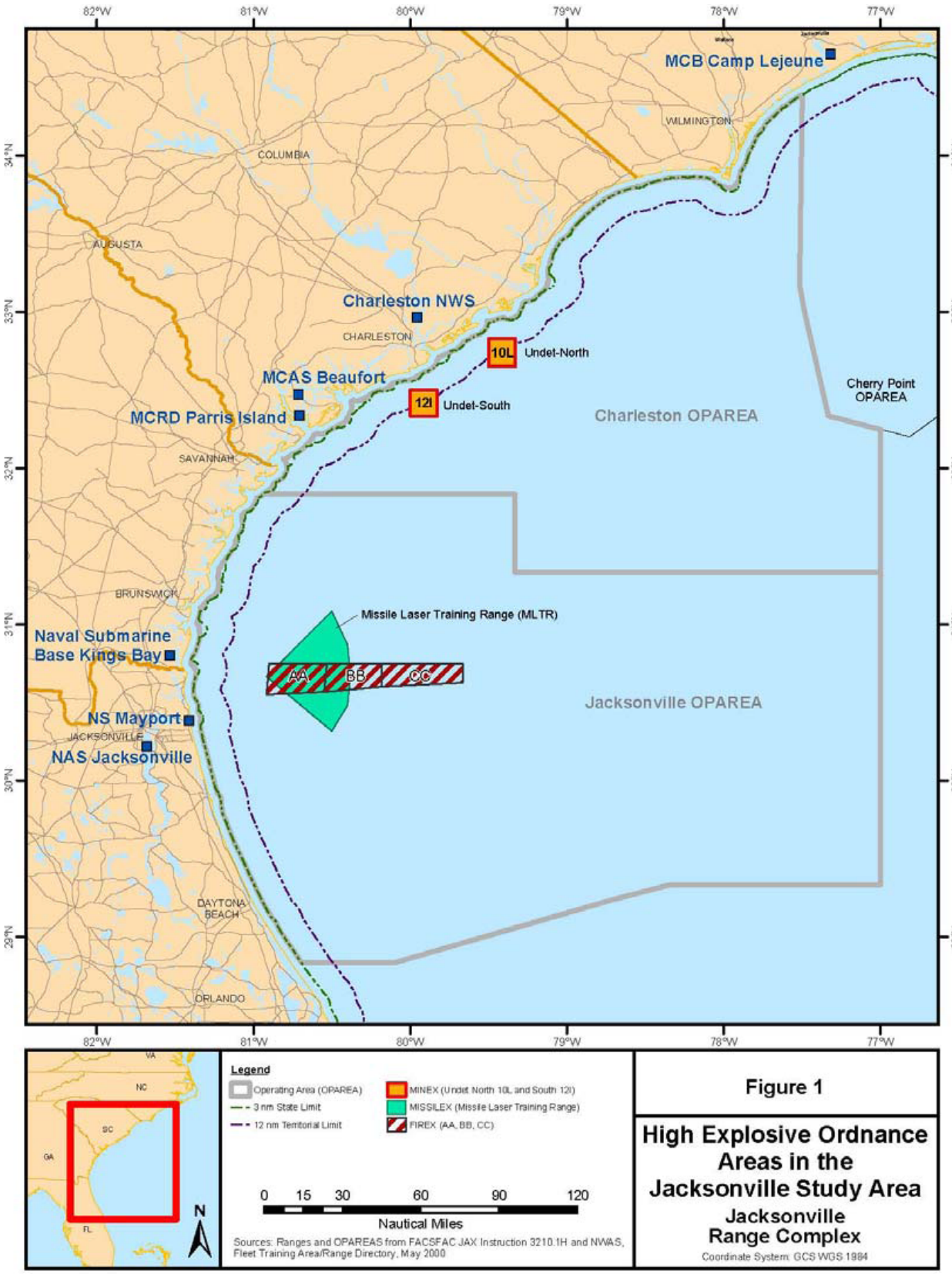

Figure 5. JAX Study Area.

4.2 JAX Monitoring Accomplishments for 2012

During the 02 January 2012 to 01 January 2013 reporting period, USFF monitoring efforts were conducted in conjunction with one FIREX with IMPASS training event and two MISSILEX (MAVEX) events.

Major accomplishments from the USFF's 2012 compliance monitoring in the JAX Study Area are shown in Table 6 and include:

- Aerial Visual Surveys
    - Completed aerial surveys during and after a MISSILEX (MAVEX) adjacent to the FIREX BB/CC training box in February.
    - Completed aerial surveys before, during, and after a FIREX with IMPASS event within the FIREX BB/CC training box in September.
    - Completed aerial surveys before, during, and after a MISSILEX (MAVEX) event within the FIREX BB/CC training box in September.
- Marine Mammal Observers on U.S. Navy Platform
    - Three MMOs were deployed on a U.S. Navy ship during a FIREX with IMPASS event. During the event, the boat stood off at a distance of 549 m (600 yd), and the MMOs visually surveyed the area around the target.

Table 6. U.S. Navy-funded monitoring accomplishments within the JAX Study Area from January 2012 to January 2013.

Study Type	Description of U.S. Navy EIS/LOA Monitoring Completed	Event Types Available for Monitoring	MMPA/ESA Requirement	Total Accomplished
Vessel or Aerial Surveys Before and After Event (studies 1 and 2)	Aerial surveys during 2 MISSILEX events and 1 FIREX event.	MINEX, MISSILEX, FIREX, or BOMBEX	2 events (1 MDE)	3 events (1 MDE)
Marine Mammal Observers (studies 1 and 2)	MMOs visually surveying before, during and after 1 FIREX event.	MINEX, MISSILEX, or FIREX	1 event	1 event
Passive Acoustic Monitoring (study 2)	Not feasible for events monitored.	MINEX, MISSILEX, FIREX, or BOMBEX	Deploy hydrophone array during vessel surveys when feasible	Not feasible for events monitored

Key: BOMBEX = Bombing Exercise; EIS = Environmental Impact Statement; ESA = Endangered Species Act: FIREX = Firing Exercise; LOA = Letter of Authorization; MDE = Multiple Detonation Event; MINEX = Mine-neutralization Exercise; MISSILEX = Missile Exercise; MMO = Marine Mammal Observer; MMPA = Marine Mammal Protection Act.

4.3 JAX Aerial Visual Surveys

4.3.1 MISSILEX (MAVEX) Event – February 2012

Aerial surveys were conducted in association with a MISSILEX (MAVEX) training event off the coasts of Georgia and Florida. Line-transect surveys were conducted on 28 and 29 February during and after the training event. Marine species sightings made during these surveys are presented in **Table 7**.

Table 7. Marine species sightings from the aerial surveys conducted during 28 and 29 February 2012 for the MISSILEX (MAVEX) training event in JAX.

Common Name	Scientific Name	Sightings	Individuals
Atlantic spotted dolphin	*Stenella frontalis*	5	96
Bottlenose dolphin	*Tursiops truncatus*	6	15
Unidentified dolphin		2	21
Unidentified spotted dolphin	*Stenella* sp.	1	25
Unidentified hardshell turtle		84	86
Manta ray	*Manta birostris*	3	3
Ocean sunfish	*Mola mola*	17	17
School of fish		1	
Shark		2	2

Sightings over the 2-day period included 6 sightings of bottlenose dolphins (*Tursiops truncatus*), 5 sightings of Atlantic spotted dolphins (*Stenella frontalis*), 2 sightings of unidentified dolphins, 1 sighting of unidentified spotted dolphins (Atlantic spotted dolphin or pantropical spotted dolphin [*S. attenuata*]), 84 sightings of unidentified hardshell turtles, 3 sightings of manta rays (*Manta birostris*), 17 sightings of ocean sunfish (*Mola mola*), 2 sightings of sharks, and 1 sighting of a large school of fish. This survey's efforts were hindered by heavy fog, requiring the survey crew to delay start time on both scheduled survey days until it was safe to depart the airport. Due to restricted airspace related to the MAVEX event, the area of the Missile Laser Training Range was unable to be surveyed on 28 February 2012 and an alternate site to the east, covering FIREX range boxes BB and CC, was surveyed instead. Similar airspace restrictions were in place on 29 February 2012, restricting access to the northeastern quadrant of the MLTR. One sighting of unidentified dolphins and 2 sightings of sea turtles were made during the 1-day during-MAVEX survey on 28 February (**Figure 6**). Thirteen sightings of dolphins and 82 sightings of sea turtles were made throughout the 1-day post-MAVEX survey period on 29 February (**Figure 7**). No injuries or mortalities to marine mammals or sea turtles were observed during the MISSILEX (MAVEX) training event on 28 February. The survey team conducted five, brief focal follows on 29 February:

- 20 min spent with a group of 16 Atlantic spotted dolphins
- 22 min spent with a group of 25 unidentified spotted dolphins
- 35 min spent with a group of 23 Atlantic spotted dolphins
- 20 min spent with a group of 16 Atlantic spotted dolphins
- 6 min spent with a group of 35 Atlantic spotted dolphins.

For additional details, refer to the February 2012 JAX MAVEX Trip Report.

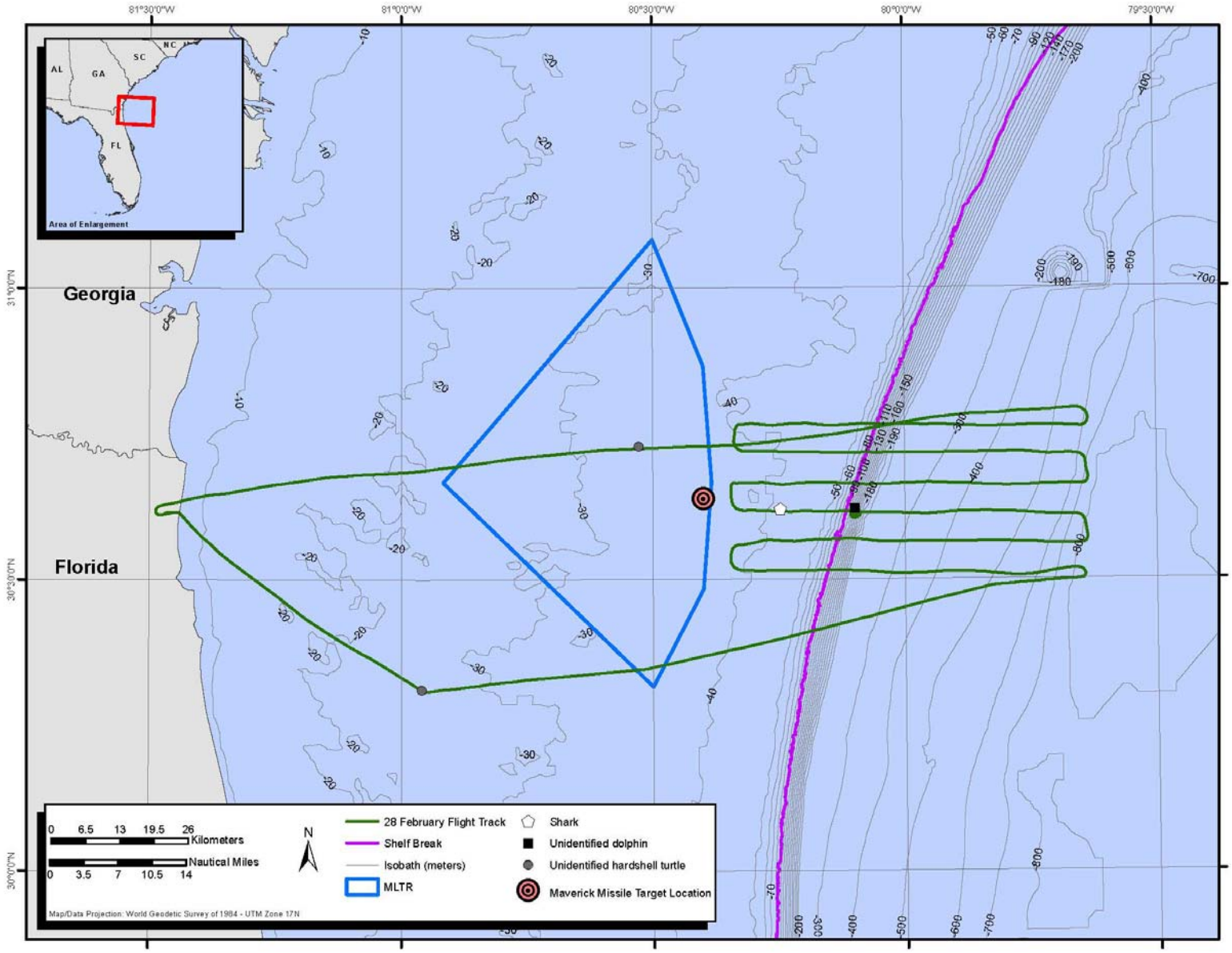

Figure 6. Locations of all cetacean, sea turtle, and fish sightings recorded during JAX MAVEX training (28 February).

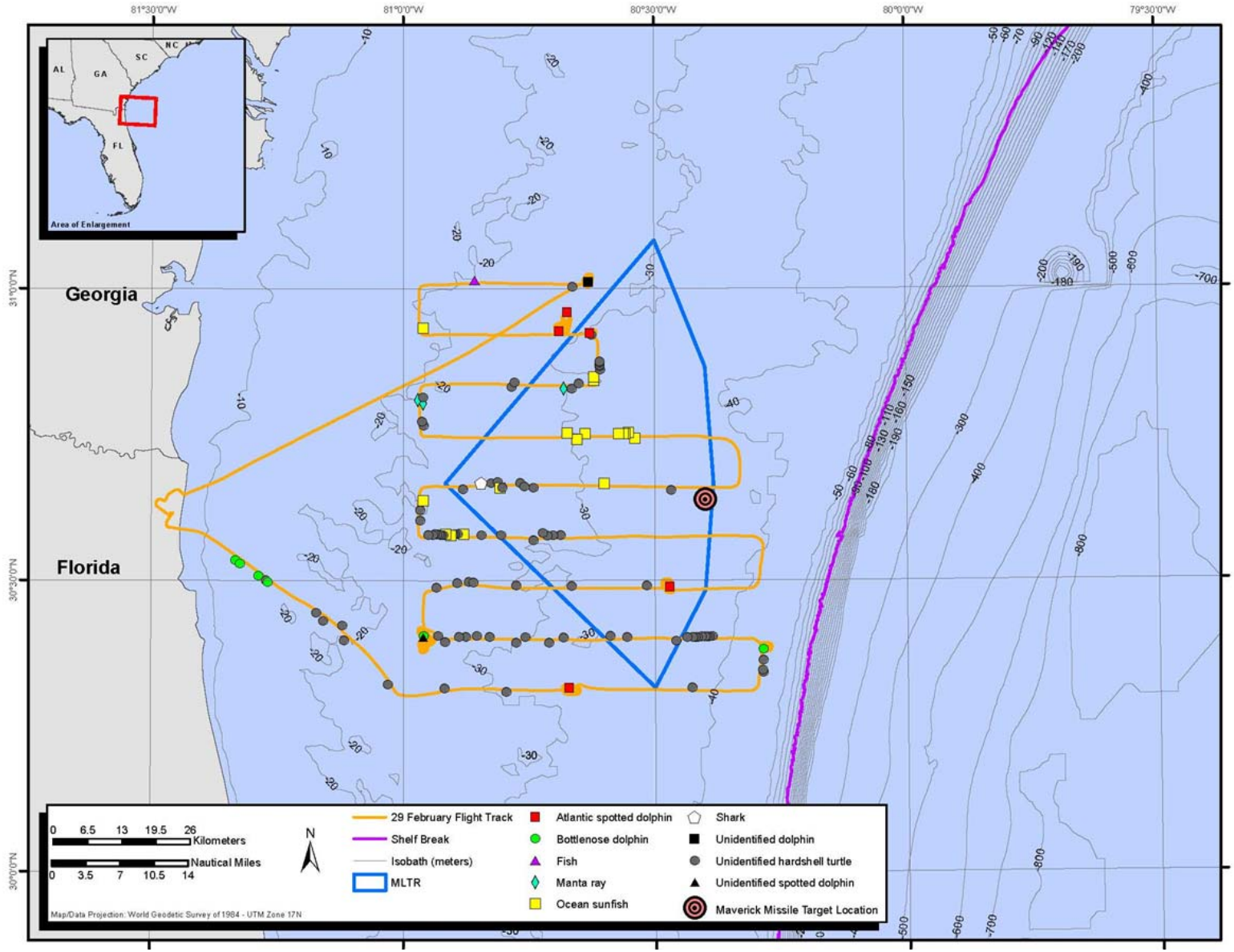

Figure 7. Locations of all cetacean, sea turtle, and fish sightings recorded post-JAX MAVEX training (29 February).

4.3.2 FIREX with IMPASS Event – September 2012

Aerial surveys were conducted in association with a FIREX with IMPASS training event off the coasts of Georgia and Florida. Line-transect surveys were conducted on 05 through 08 September before, during, and after the training event. Marine species sightings made during these surveys are presented in **Table 8**.

Table 8. Marine species sightings from the aerial surveys conducted during 05 through 08 September 2012 for the FIREX with IMPASS training event in JAX.

Common Name	Scientific Name	Sightings	Individuals
Atlantic spotted dolphin	*Stenella frontalis*	7	53
Bottlenose dolphin	*Tursiops truncatus*	3	7
Risso's dolphin	*Grampus griseus*	1	18
Unidentified dolphin		9	20
Loggerhead turtle	*Caretta caretta*	4	4
Unidentified hardshell turtle		1	1
Ocean sunfish	*Mola mola*	2	2

Sightings over the 4-day period included 7 sightings of Atlantic spotted dolphins, 3 sightings of bottlenose dolphins, 1 sighting of Risso's dolphins (*Grampus griseus*), 9 sightings of unidentified dolphins, 4 sightings of loggerhead turtles (*Caretta caretta*), 1 sighting of unidentified hardshell turtles, and 2 sightings of ocean sunfish. Sightings of sea turtles were not recorded throughout the entire survey (i.e., only part of the first day of survey effort), since observers focused instead on looking for marine mammals while working on integrating new survey software as directed by the U.S. Navy. Five sightings of sea turtles and 19 sightings of marine mammals were made during the pre-FIREX surveys on 05 and 06 September (**Figures 8 through 10**). No sightings were made for the during-FIREX survey period (the aircraft track for that day is shown in **Figure 11**). One sighting of a bottlenose dolphin was made during the one-day post-FIREX survey (**Figure 12**). No injuries or mortalities to marine mammals or sea turtles were observed during the FIREX with IMPASS training event on 07 September. Non-Explosive Practice Munition (NEPM) Blind Loaded and Plugged rounds were fired. In addition, the unit also shot five 5-inch NEPM Illumination rounds. No live-explosive rounds were used during the FIREX training. The survey team conducted two focal follows during the pre-FIREX afternoon flight on 06 September. The first focal follow was a period of approximately 17 min spent with a group of 23 Atlantic spotted dolphins. Photographs were taken, but video was not obtained during the first focal follow event. The second focal follow was a period of approximately 16 min spent with a group of 18 Risso's dolphins. For additional details, refer to the September 2012 JAX FIREX Trip Report.

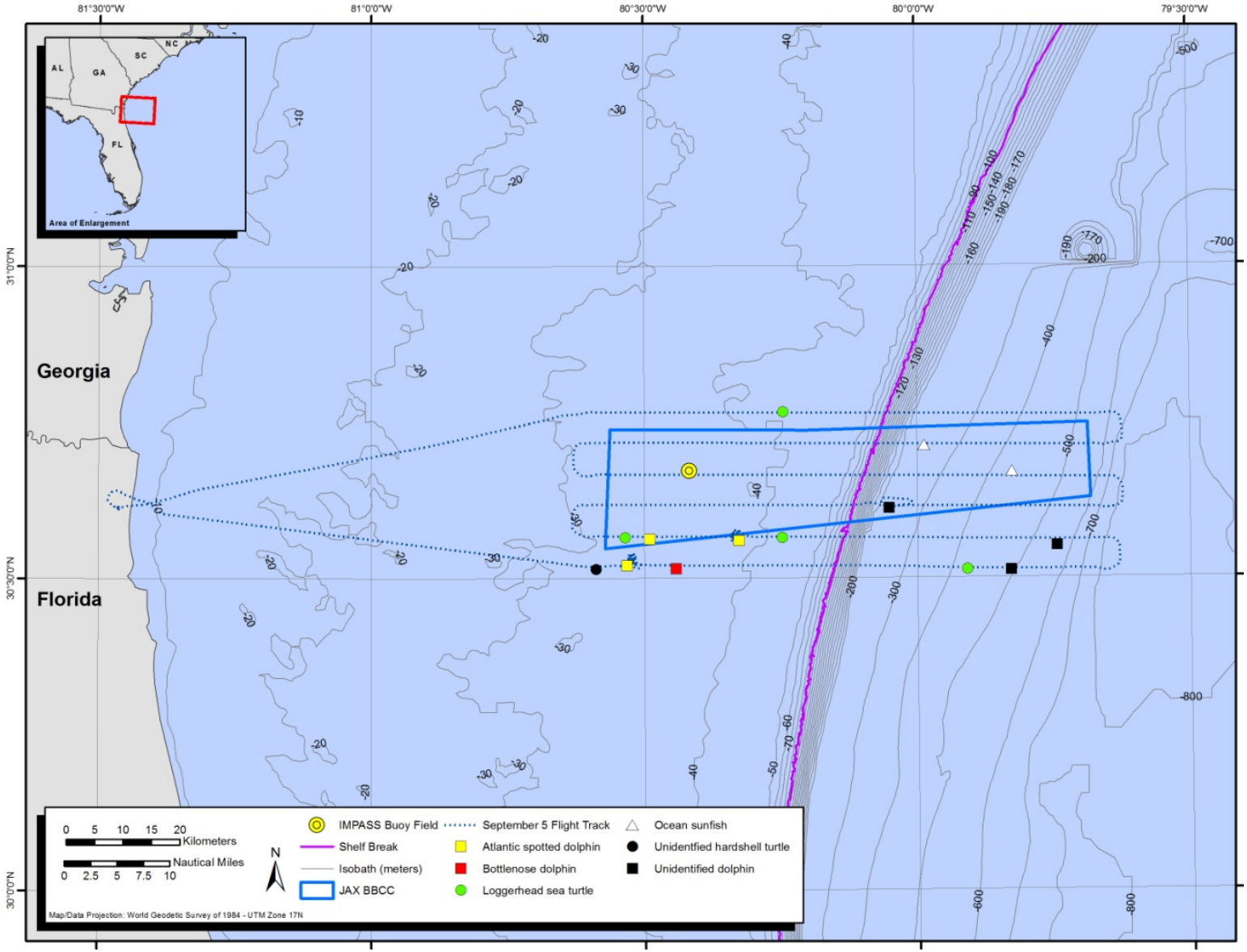

Figure 8. Locations of all cetacean, sea turtle, and fish sightings recorded pre-FIREX training (05 September).

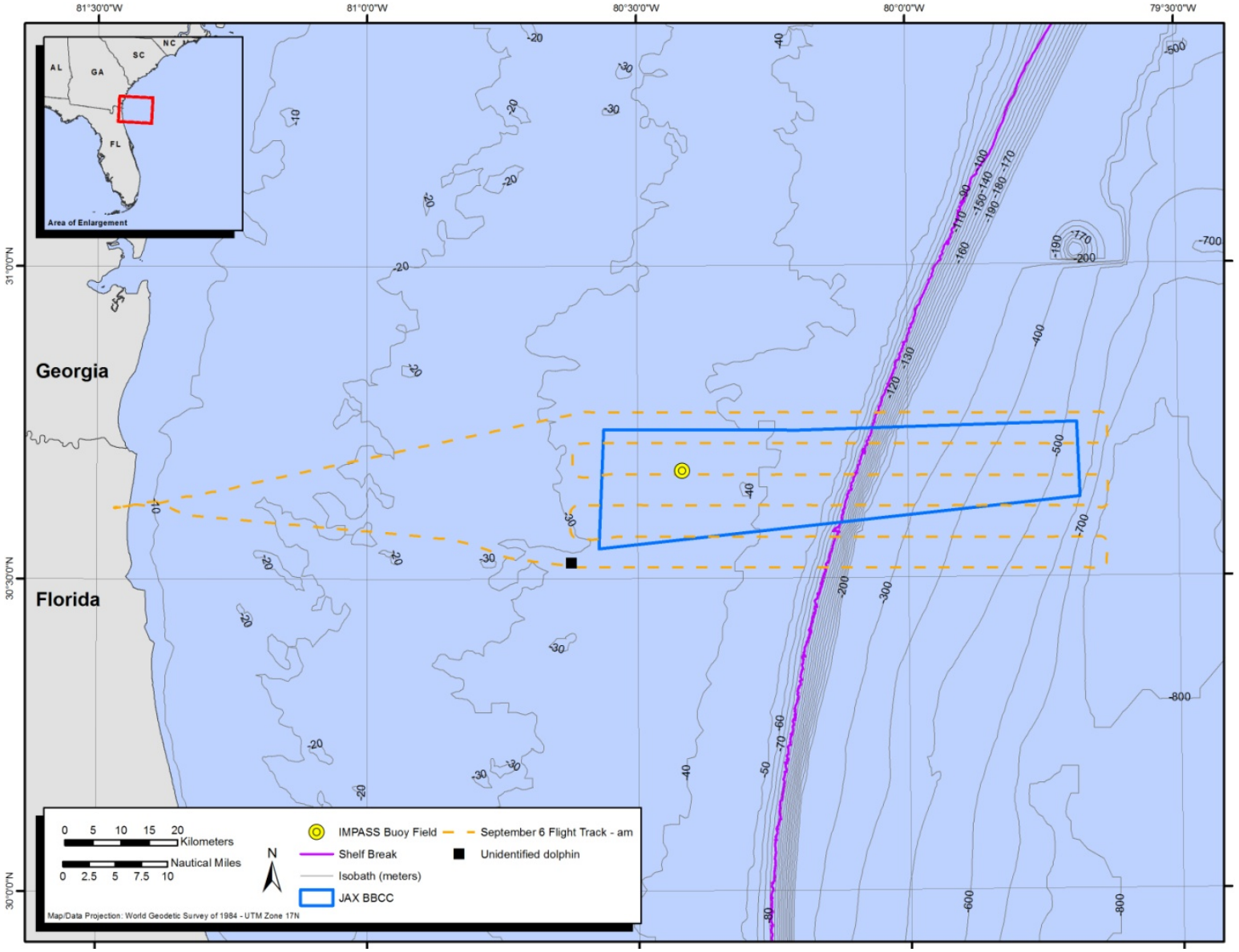

Figure 9. Locations of cetacean sightings recorded pre-FIREX training (06 September morning flight).

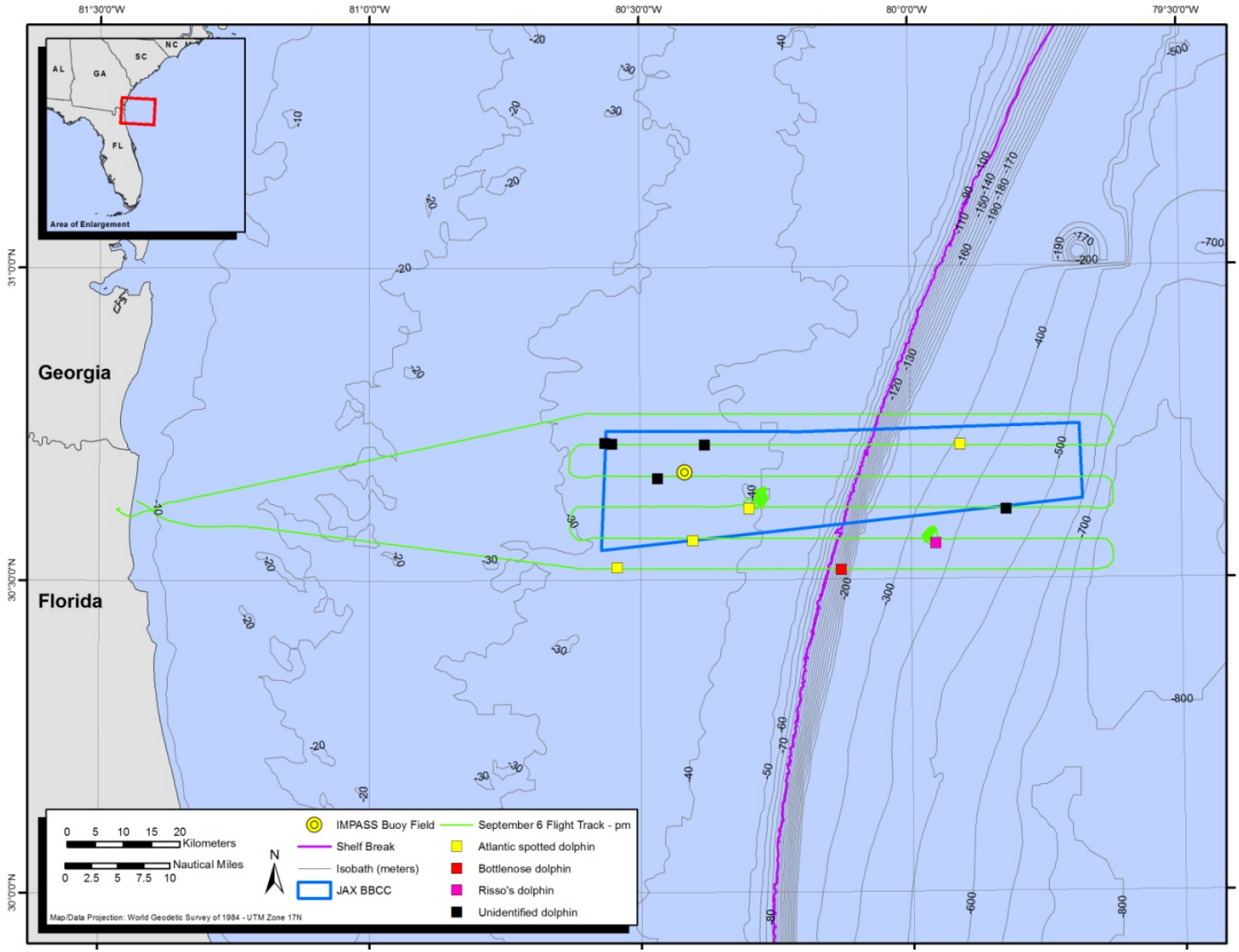

Figure 10. Locations of cetacean sightings recorded pre-FIREX training (06 September afternoon flight).

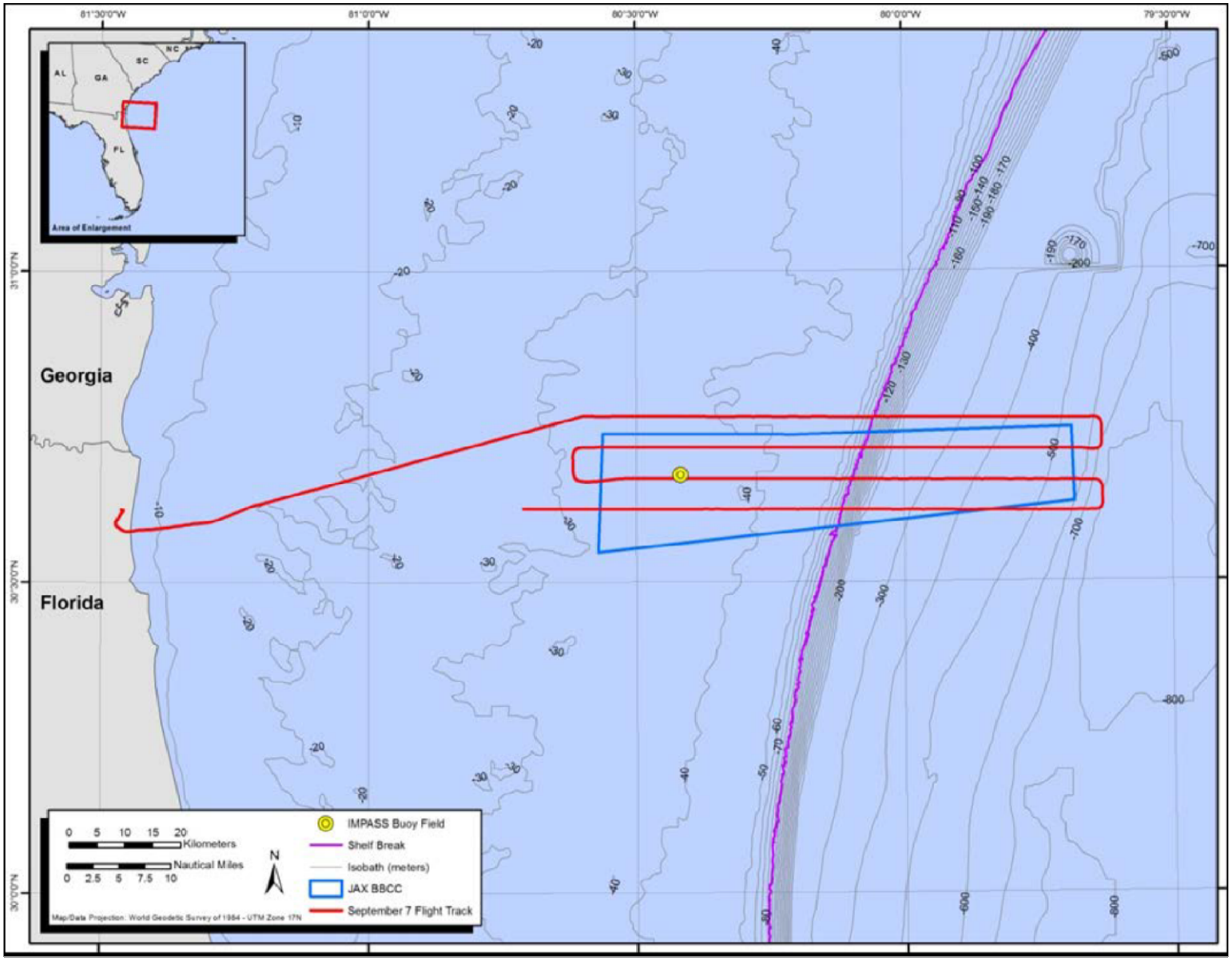

Figure 11. Aircraft track conducted during-FIREX training (07 September).

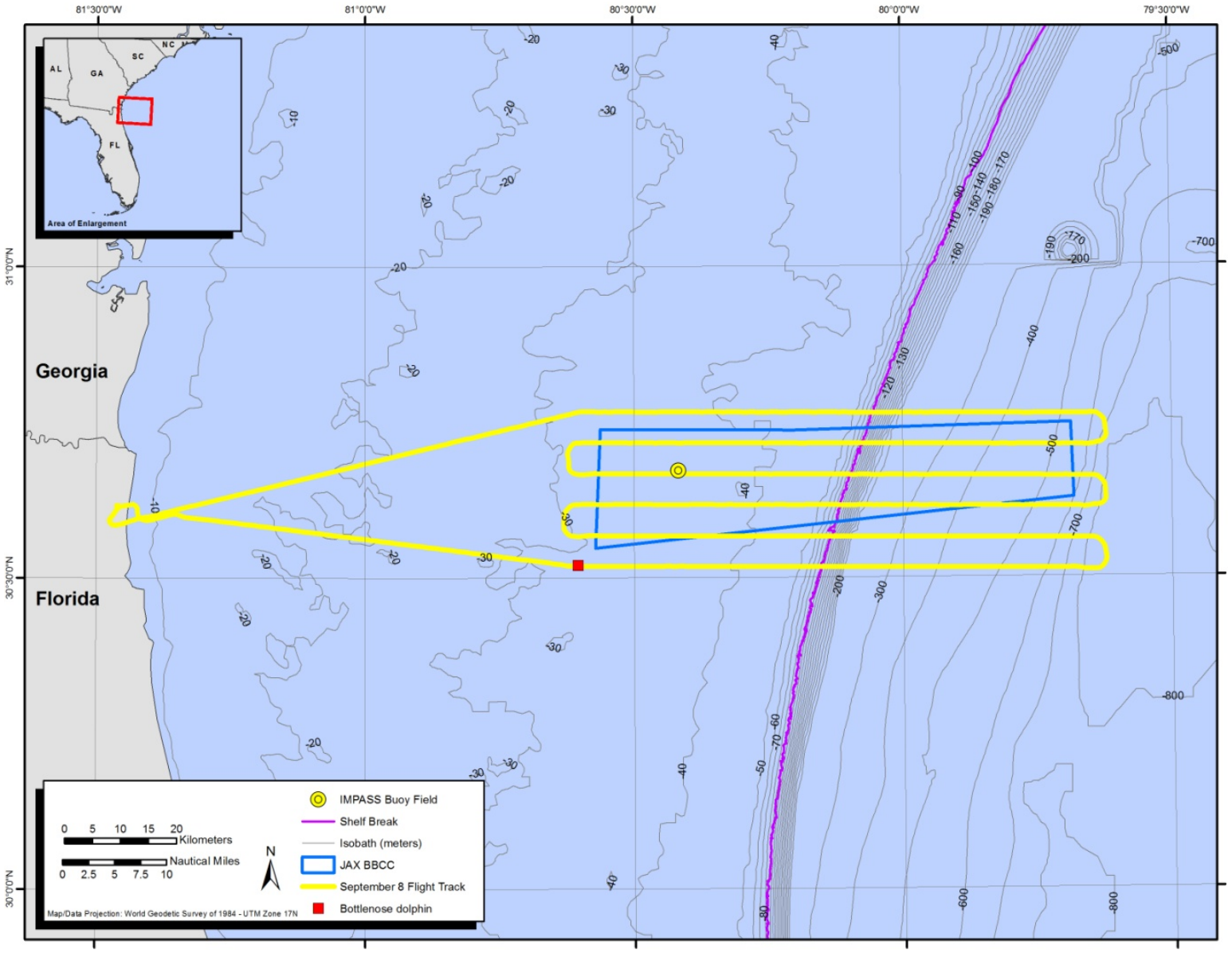

Figure 12. Locations of cetacean sightings recorded post-FIREX training (08 September).

4.3.3 MISSILEX (MAVEX) Event – September 2012

Aerial surveys were conducted in association with a MISSILEX (MAVEX) training event off the coasts of Georgia and Florida. Line-transect surveys were conducted on 26 through 29 September before, during, and after the training event. Marine species sightings made during these surveys are presented in **Table 9**.

Table 9. Marine species sightings from the aerial surveys conducted during 26 through 29 September 2012 for the MISSILEX (MAVEX) training event in JAX.

Common Name	Scientific Name	Sightings	Individuals
Atlantic spotted dolphin	*Stenella frontalis*	1	6
Bottlenose dolphin	*Tursiops truncatus*	2	39
Risso's dolphin	*Grampus griseus*	1	4
Unidentified dolphin		5	20
Kemp's ridley turtle	*Lepidochelys kempii*	2	2
Loggerhead turtle	*Caretta caretta*	55	57
Unidentified hardshell turtle		7	7

Eleven sightings of sea turtles were made during the morning of the 1-day pre-MAVEX survey on 26 September (see **Figure 13**). One sighting of an unidentified dolphin and seven sightings of sea turtles were made during the afternoon of the 1-day pre-MAVEX survey period on 26 September (see **Figure 14**). No surveys were conducted on 27 September due to poor weather resulting in unsafe flying conditions. The during-MAVEX monitoring on 28 September's morning flight resulted in an alternate survey area and just two lines were surveyed due to the U.S. Navy's request to exit the primary area. Three sightings of dolphins and 17 sightings of sea turtles were made during the morning of the 1-day during-MAVEX survey period on 28 September (see **Figure 15**). One sighting of a dolphin and two sightings of sea turtles were made on the afternoon of the during-MAVEX survey period on 28 September (see **Figure 16**). Four sightings of dolphins and 28 sightings of sea turtles were made throughout the 1-day post-MAVEX survey period on 29 September (see **Figure 17**). No live-explosive rounds were used during the MAVEX event on 28 September; therefore, no animals were exposed to explosive sounds during this training event. The survey team conducted one focal follow during the during-MAVEX morning flight of 28 September. The focal follow was a period of approximately 16 min spent with a group of approximately 35 bottlenose dolphins. For additional details, refer to the September 2012 JAX MAVEX Trip Report.

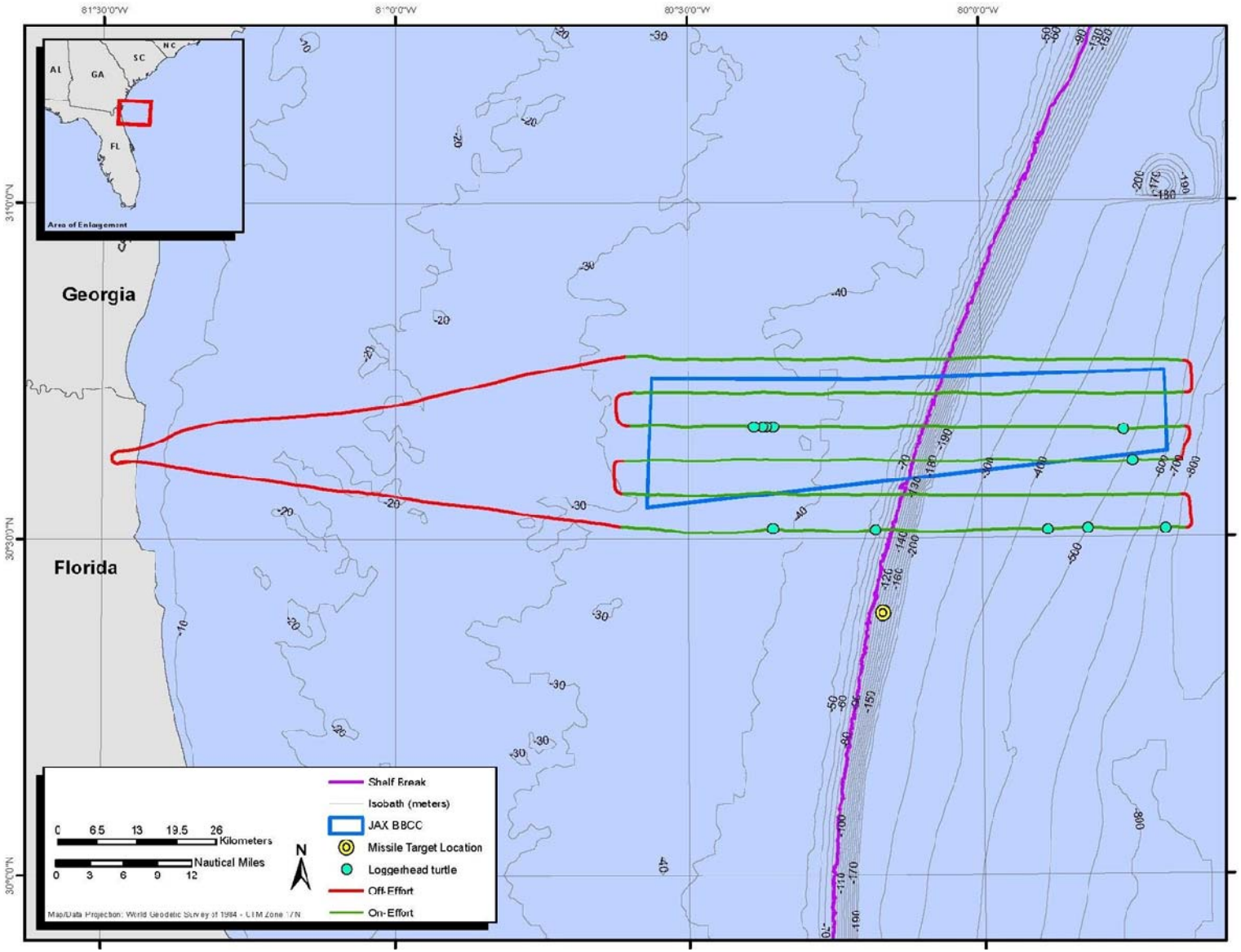

Figure 13. Locations of sea turtle sightings recorded pre-MAVEX training (26 September morning flight).

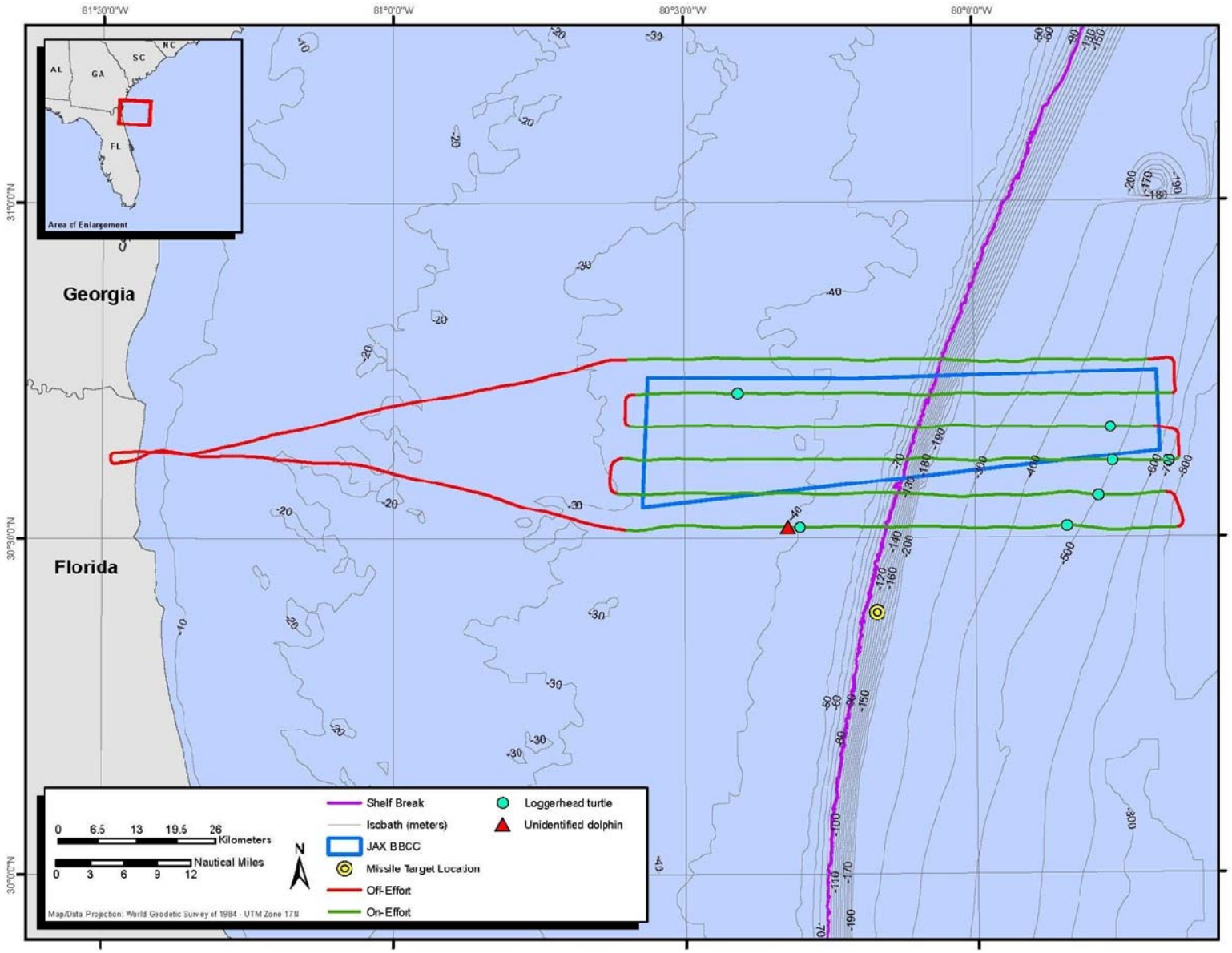

Figure 14. Locations of cetacean and sea turtle sightings recorded pre-MAVEX training (26 September afternoon flight).

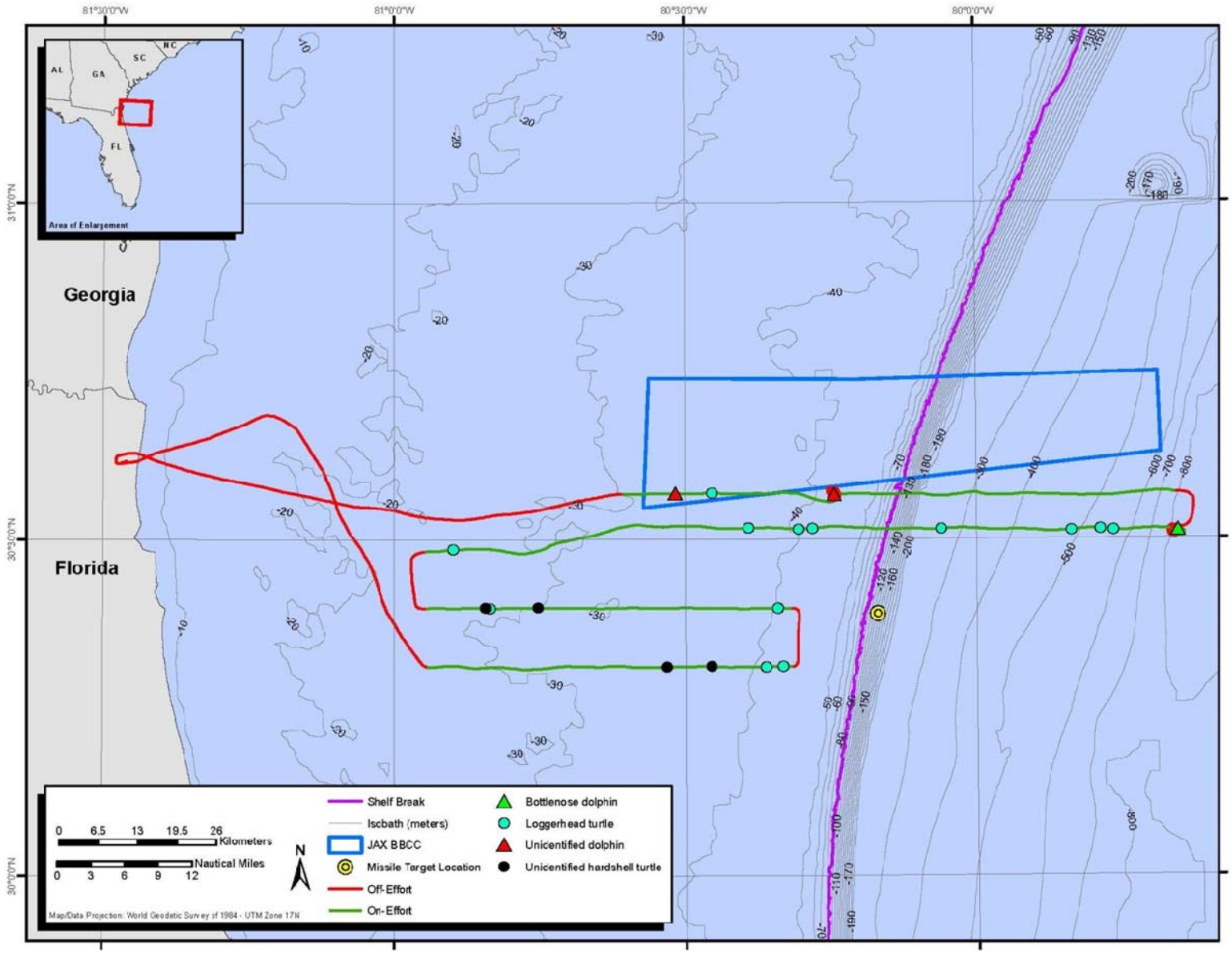

Figure 15. Locations of cetacean and sea turtle sightings recorded during-MAVEX training (28 September morning flight).

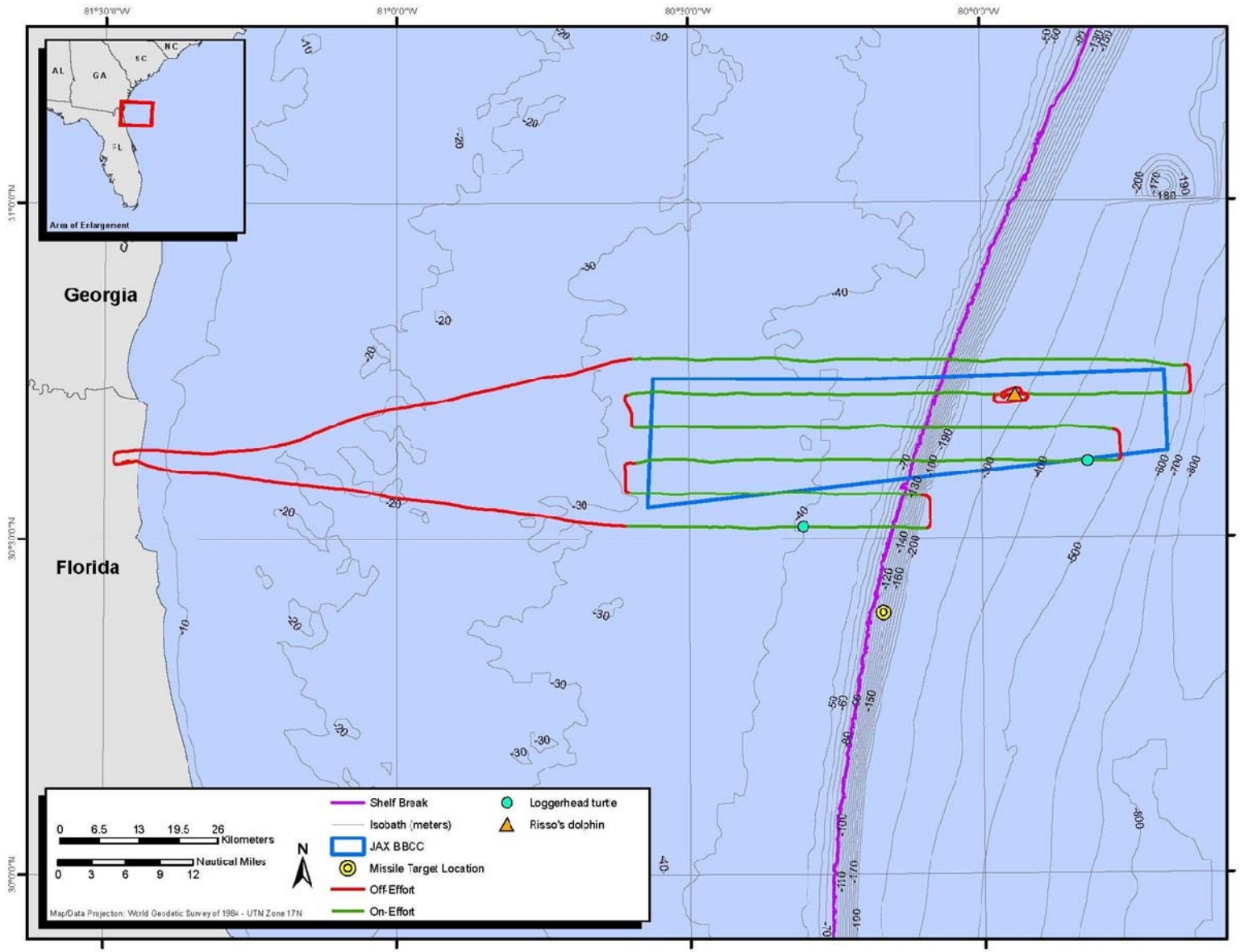

Figure 16. Locations of cetacean and sea turtle sightings recorded during-MAVEX training (28 September afternoon flight).

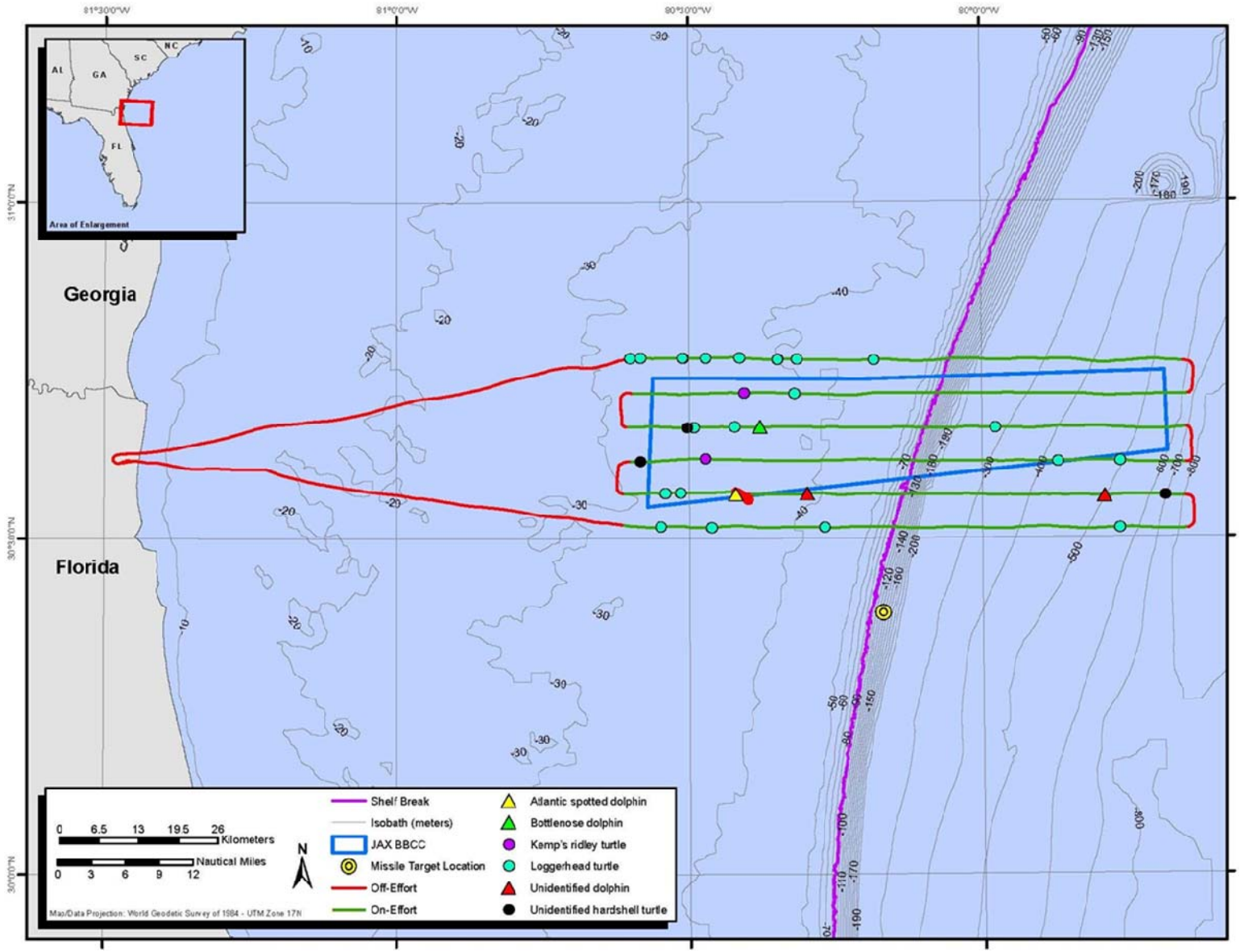

Figure 17. Locations of cetacean and sea turtle sightings recorded post-MAVEX training (29 September).

4.4 JAX Marine Mammal Observers (MMOs) on U.S. Navy Platforms

A vessel survey was conducted on 07 September 2012 in association with a FIREX with IMPASS training event off the coasts of Georgia and Florida. Three MMOs were stationed aboard a U.S. Navy vessel. Three marine mammal and four sea turtle sightings were recorded (**Table 10**). The sightings are shown in **Figure 18** in relation to the IMPASS buoy field location. For additional details, refer to the September 2012 FIREX with IMPASS Event MMO Trip Report.

Table 10. Marine species sightings recorded by MMOs while conducting monitoring from a U.S. Navy vessel in JAX during the September 2012 FIREX with IMPASS training event.

Common Name	Scientific Name	Sightings	Individuals
Atlantic spotted dolphin	*Stenella frontalis*	1	2
Unidentified spotted dolphin	*Stenella* sp.	1	2
Unidentified dolphin		1	1
Unidentified hardshell turtle		4	4

Since inert ordnance was used in this FIREX with IMPASS event, there was no potential for exposure of marine mammals and sea turtles to explosives. A 183-m (200-yd) mitigation zone was implemented around the target to avoid direct strike of an animal; however, no animals were sighted within the mitigation zone around the target. Sighting #1 was observed the closest, estimated at a distance of over 1,372 m (1,500 yd) from the target (**Figure 18**). One sighting (Sighting #6) of two Atlantic spotted dolphins occurred during the FIREX with IMPASS event, shortly after the shot was fired, and within 27.4 m (30 yd) of the observation vessel (**Figure 18**). Firing was delayed until the dolphin exited the mitigation zone around the ship's hull. The dolphins followed the ship for a short period of time (approximately 5 to 10 min), then swam underneath the vessel towards the non-firing side of the ship, and were lost aft of the ship. No unusual behavior was observed. The ship continued traveling away from the sighting at approximately 4 knots and did not recommence firing until the ship was a minimum distance of 64 m (70 yd) from the last known observation location.

No additional marine mammal or sea turtle sightings were obtained within the mitigation zones (within 549 m [600 yd] of the detonation site or within 64 m [70 yd] of the vessel) during the FIREX with IMPASS event. Because no marine mammals or sea turtles were observed within the mitigation zones 30 min prior to or while gunfire occurred, there are no data to suggest that any animals were exposed to inert ordnance during the event.

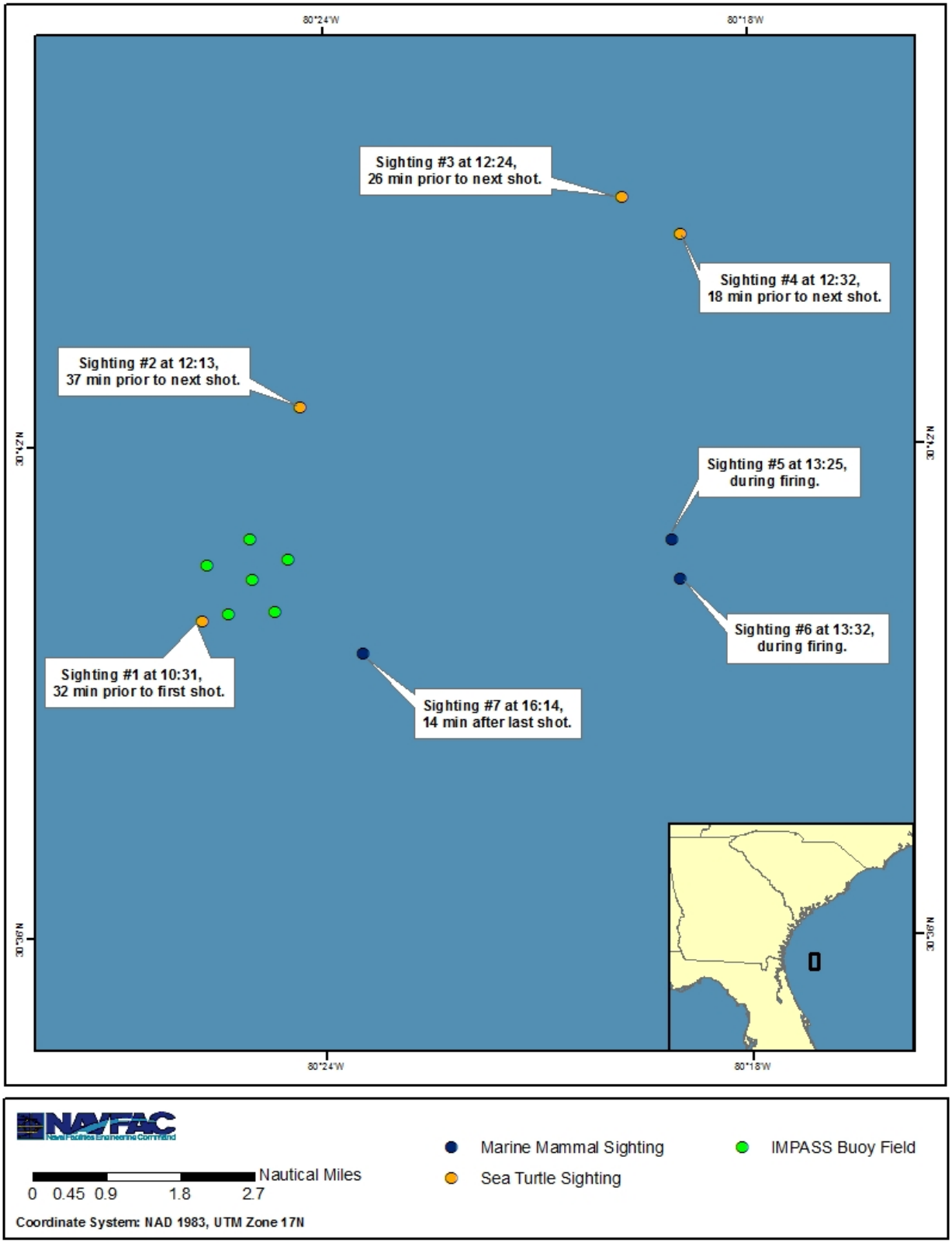

Figure 18. Locations of sightings relative to the IMPASS buoy field location during FIREX monitoring (07 September).

5. GULF OF MEXICO (GOMEX) RANGE COMPLEX

The geographic scope of the GOMEX Study Area includes the Corpus Christi OPAREA, New Orleans OPAREA, Pensacola OPAREA, and Panama City OPAREA, as well as the area between the shoreline and the inner boundary of the OPAREA (3 NM from the shoreline) (**Figure 19**).

There are 29 marine mammal species with possible or confirmed occurrence in the marine waters off Texas, Louisiana, Mississippi, Alabama, and Florida within the GOMEX Study Area (DoN 2007). There are 28 cetacean species (e.g., whales and dolphins) and one sirenian species (West Indian manatee). There are also six species of threatened and endangered sea turtles (reviewed in DoN 2007).

5.1 GOMEX Monitoring Objectives Overview

The goal of the GOMEX Monitoring Plan is to implement field methods (i.e., studies) chosen to address the long-term monitoring objectives outlined in the *Introduction* (**Section 1**). In the GOMEX Monitoring Plan (DoN 2011b), the U.S. Navy proposed to implement a diversity of field methods to gather monitoring data for marine mammals and sea turtles in U.S. Navy training areas. Specifically, the U.S. Navy proposed to use visual surveys (aerial or vessel), deploy PAM devices when possible, and put MMOs aboard U.S. Navy vessels, to meet its goals during the current time period. **Table 11** shows the 2012 monitoring objectives agreed upon by NMFS and the U.S. Navy from the final GOMEX Monitoring Plan.

Table 11. 2012 GOMEX monitoring commitments under GOMEX Final Rule, LOA, and BiOp.

STUDY 1 (behavioral responses)		
Aerial or Vessel Surveys	- 1 explosive event per year. When feasible, deploy hydrophone array during vessel surveys for passive acoustic monitoring.	Adaptive Management Review for 2012 (AMR)
Marine Mammal Observers (MMOs)	- 1 explosive event per year.	
STUDY 2 (mitigation effectiveness)		
MMO/Lookout Comparison	- 1 explosive event per year.	AMR
Vessel or Aerial Surveys Before and After Training Events	- 1 explosive event per year. When feasible, deploy hydrophone array during vessel surveys for passive acoustic monitoring.	

5.2 GOMEX Monitoring Accomplishments for 2012

From 02 January 2012 to 01 January 2013, there were no monitoring opportunities available for explosive events in the GOMEX OPAREA. Therefore, there is no monitoring to report at this time.

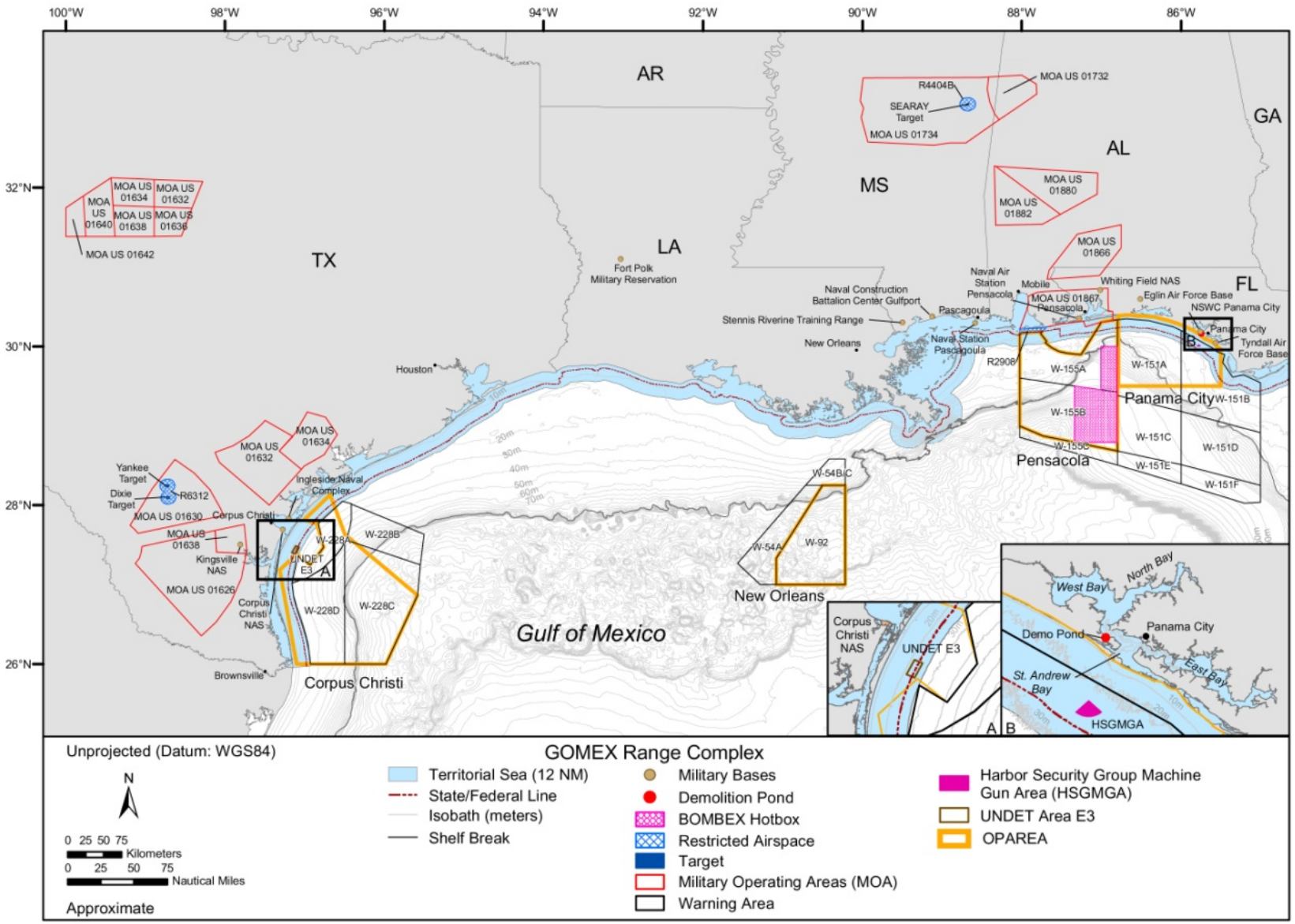

Figure 19. GOMEX Study Area.

6. ADAPTIVE MANAGEMENT RECOMMENDATIONS

Adaptive management is an iterative process of optimal decision making in the face of uncertainty, with an aim to reducing uncertainty over time via system monitoring (Williams et al. 2009). Within the natural resource management community, adaptive management involves ongoing, real-time learning and knowledge creation, both in a substantive sense and in terms of the adaptive process itself. Adaptive management focuses on learning and adapting, through partnerships of managers, scientists, and other stakeholders who learn together to achieve an overall net gain for ecosystems. Adaptive management helps science managers maintain flexibility in their decisions, knowing that uncertainties exist, and provides managers the latitude to change direction that will improve understanding of ecological systems to achieve management objectives. Taking action to improve progress towards desired outcomes is another function of adaptive management.

Originally, five study questions were developed jointly by NMFS and the U.S. Navy as guidance for developing monitoring plans for both sonar and explosive training events, and all existing range-specific monitoring plans attempted to address each of these study questions as appropriate (not all questions applied to training activities being reported on here). However, the state of knowledge for the various range complexes is not equal, and many factors including level of existing information, amount of training activity, accessibility, and available logistics resources, all contribute to the ability to perform particular monitoring activities. In addition, the U.S. Navy monitoring program has historically been compartmentalized by range complex and focused on effort-based metrics (e.g., survey days, trackline covered, etc.).

A 2010 U.S. Navy-sponsored monitoring meeting in Arlington, Virginia initiated a process to critically evaluate the current U.S. Navy monitoring plans and begin development of revisions/updates to both existing region-specific plans and the U.S. Navy-wide Integrated Comprehensive Monitoring Program (ICMP). Discussions at that meeting as well as the U.S. Navy/NMFS annual adaptive management meeting (October 2010) established a way forward for continued refinement of the U.S. Navy's monitoring program. This process included establishment of a SAG, composed of leading marine mammal scientists, with the initial task of developing recommendations that would serve as the basis for a Strategic Planning Process for marine species monitoring.

The SAG was established in 2011 with the initial task of evaluating current naval monitoring approaches under the ICMP and existing LOAs to develop objective scientific recommendations (SAG 2011). While recommendations were fairly broad from a geographic perspective, the SAG did provide specific programmatic recommendations that serve as guiding principles for the continued evolution of the U.S. Navy Marine Species Monitoring Program. Notable keystone recommendations from the SAG include:

- Working within a conceptual framework of knowledge, from basic information on the occurrence of species within each range complex, to more specific matters of exposure, response, and consequences.
- Striving to move away from a “box-checking” mentality – monitoring studies should be designed and conducted according to scientific objectives, rather than on merely cataloging effort expended.

- Approaching the monitoring program holistically and select projects that offer the best opportunity to advance understanding of the issues, as opposed to establishing range-specific requirements.
- Facilitating collaboration among researchers in each region, with the intent to develop a coherent and synergistic regional monitoring and research effort.

In June 2011, the U.S. Navy hosted a Marine Mammal Monitoring Workshop, with guidance and support from NMFS, which included scientific experts and representatives of environmental non-governmental organizations. The purpose of the workshop was to present a consolidated overview of monitoring activities accomplished in 2009 and 2010 pursuant to the MMPA Final Rules currently in place, including outcomes of selected monitoring-related research and lessons learned, and to seek feedback on future directions. A significant outcome of this workshop was a recommendation to continue consolidating monitoring efforts from individual Range Complex monitoring plans in order to improve return on investment by focusing on specific objectives and projects which can most efficiently and effectively be addressed throughout the U.S. Navy Range Complexes.

The objective of the Strategic Planning Process is to continue the evolution of U.S. Navy marine species monitoring towards a single integrated program, incorporating expert review and recommendations, and establishing a more transparent framework for evaluating and implementing monitoring work across the U.S. Navy Range Complexes and study areas. The Strategic Planning Process is intended to be a primary component of the ICMP and provide a "vision" for U.S. Navy monitoring across geographic regions—serving as guidance for determining how to most efficiently and effectively invest the marine species monitoring resources to address ICMP top-level goals and satisfy MMPA LOA regulatory requirements. The Strategic Planning Process is currently being developed in coordination with input from NMFS Headquarters and a draft is currently available on the NMFS Office of Protected Resources web site – Strategic Planning Process.

The draft Strategic Planning Process has five major implementation steps:

1. Identify overarching intermediate scientific objectives
2. Develop individual monitoring project concepts
3. Evaluate, prioritize, and select monitoring projects
4. Execute selected monitoring projects
5. Report and evaluate progress and results.

These steps serve three primary purposes: 1) to facilitate the U.S. Navy in developing specific projects addressing one or more intermediate scientific objectives; 2) to establish a more structured and collaborative framework for developing, evaluating, and selecting monitoring projects across all areas where the U.S. Navy conducts training and testing activities; and 3) to maximize the opportunity for input and involvement across the research community, academia, and industry.

This Strategic Planning Process will serve as the single marine species monitoring requirement for all U.S. Navy testing and training activities under the Atlantic Fleet Training and Testing LOA, which will supersede the current LOAs for Atlantic Fleet Active Sonar Training and the East Coast/GOMEX Range Complexes beginning in 2014. Along with the ICMP, it clearly identifies the goals and objectives of the U.S. Navy monitoring program, presents the guidance and expert review that will be used to direct efforts, and defines the process for evaluating and selecting how the U.S. Navy's Marine Species Monitoring Program budget is invested.

Additional information is available on the U.S. Navy's Marine Species Monitoring Program website (www.navymarinespeciesmonitoring.us). The website serves as an online portal for information on the background, history, and progress of the program, and also provides access to reports, documentation, data, and updates on current monitoring projects and initiatives.

VACAPES Range Complex

There are no additional modifications requested for the VACAPES Monitoring Plan as amended by the June 2012 LOA monitoring requirements.

CHPT Range Complex

There are no additional modifications requested for the CHPT Monitoring Plan as amended by the June 2012 LOA monitoring requirements.

JAX Range Complex

There are no additional modifications requested for the JAX Monitoring Plan as amended by the June 2012 LOA monitoring requirements.

GOMEX Range Complex

There are no additional modifications requested for the GOMEX Monitoring Plan.

A summary of current monitoring progress for the VACAPES, CHPT, JAX, and GOMEX Range Complexes for Year 1 through Year 4 (to date) is shown below in **Table 12**.

Table 12. Summary of monitoring progress for Years 1 through 4.

Range Complex	Monitoring Event	Annual Requirement	*Year 1* 05 June 2009 - 04 June 2010	*Year 2* 05 June 2010 - 04 June 2011	*Year 3* 05 June 2011 - 04 June 2012	*Year 4* 05 June 2012 - 04 June 2013	Total	
							Required	Completed
VACAPES	Aerial or Vessel Survey	2 (1 MDE)	2 MINEX (with PAM)	1 MINEX (with PAM), 1 IMPASS (1 MDE)	1 MINEX (with PAM), 1 IMPASS (1 MDE)	1 MINEX (with PAM)	8 (4 MDEs)	**7 (2 MDEs)**
	MMOs on U.S. Navy Platform	1	2 MINEX	1 MINEX	1 IMPASS, 1 MINEX	1 MINEX	4	**6**
CHPT	Aerial or Vessel Survey	1	0*	0*	1 IMPASS (1 MDE)	0*	4	**1 (1 MDE)**
	MMOs on U.S. Navy Platform	1	0*	0*	0	0*	4	**0**
JAX	Aerial or Vessel Survey	2 (1 MDE)	0	2 MISSILEX, 2 IMPASS (2 MDEs)	1 MISSILEX, 1 IMPASS (1 MDE)	1 MISSILEX, 1 IMPASS (1 MDE)	8 (4 MDEs)	**8 (4 MDEs)**
	MMOs on U.S. Navy Platform	1	0	1 IMPASS	0	1 IMPASS	4	**2**
Range Complex	**Monitoring Event**	**Annual Requirement**	***Year 1* 18 MAR 2011 - 17 MAR 2012**	***Year 2* 18 MAR 2012 - 17 MAR 2013**	***Year 3* 18 MAR 2013 - 17 MAR 2014**	***Year 4* 18 MAR 2014 - 17 MAR 2015**	**Total**	
							Required	**Completed**
GOMEX	Aerial or Vessel Survey	1	0*	0*	NA	NA	2	**0***
	MMOs on U.S. Navy Platform	1	0*	0*	NA	NA	2	**0***

*No monitoring due to no training events being conducted.

Key: CHPT = Cherry Point; GOMEX = Gulf of Mexico; IMPASS = Integrated Maritime Portable Acoustic Scoring and Simulator; MDE = Multiple Detonation Event; MINEX = Mine-neutralization Exercise; MISSILEX = Missile Exercise; MMO = Marine Mammal Observer; NA = Not Applicable; PAM = Passive Acoustic Monitoring; VACAPES = Virginia Capes.

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