

MARINE SPECIES MONITORING

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

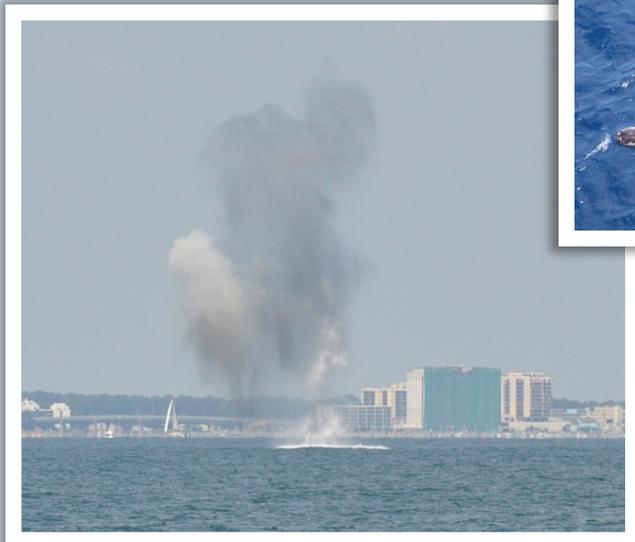
Annual Report for 2011

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LIST OF ACRONYMS AND ABBREVIATIONS

AMR	Adaptive Management Review
BiOp	Biological Opinion
BOMBEX	Bombing Exercise
CFR	Code of Federal Regulations
CHPT	Cherry Point
DoN	Department of the Navy
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
LOA	Letter of Authorization
m	meter(s)
MDE	Multiple Detonation Exercise
MINEX	Mine Neutralization Exercise
MISSILEX	Missile Exercise
MMO	marine mammal observer
MMPA	Marine Mammal Protection Act
NGO	non-governmental organization
NM	nautical mile(s)
NMFS	National Marine Fisheries Service
OPAREA	Operating Area
PAM	passive acoustic monitoring
RHIB	rigid-hulled inflatable boat
SAG	Scientific Advisory Group
U.S.	United States
USFF	U.S. Fleet Forces
VACAPES	Virginia Capes

SECTION I – INTRODUCTION

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 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, 2010). Therefore, as part of the issuance in 2009 of the original LOAs for the Virginia Capes (VACAPES) Range Complex, the Cherry Point (CHPT) Range Complex, and the Jacksonville (JAX) Range Complex [collectively referred to as the East Coast range complexes] (NMFS 2009b, 2009c, 2009d, respectively) and in 2011, for the Gulf of Mexico (GOMEX) Range Complex (NMFS 2011), the 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, 2009b, 2009c, 2011a, respectively).

Based on discussions with NMFS, range-complex monitoring plans were designed as a collection 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 Navy’s suite of mitigation measures for explosives (e.g., Protective Measures Assessment Protocol, major exercise measures agreed to by the Navy through permitting) effective at avoiding temporary threshold shift, 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 Navy-wide science-based program. These research elements include visual surveys from vessels or airplanes, passive acoustic monitoring (PAM), and marine mammal observers (MMOs). Each monitoring technique has advantages and disadvantages that vary temporally and spatially, as well as support one particular study objective better than another. The 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 2011 LOAs (NMFS 2011a, 2011b, 2011c, 2011d). However, a modification to the LOAs has been issued by NMFS 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 2012), 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 2009a,

2009b, 2009c). As a result of discussions with NMFS, the Navy will explore the value of adding field measurements during monitoring of a future mine-neutralization 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 can be collected without unreasonable costs and impacts to training, the Navy will move forward in incorporating the measurements into its monitoring program for East Coast mine-neutralization training.

A summary of the 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 VI-1**.

2. Report Objectives

Design of the range-complex monitoring plans represented part of a new 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-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 Navy-funded marine mammal and sea turtle monitoring conducted in the VACAPES, CHPT, JAX, and GOMEX range complexes during the period from 2 January 2011 to 1 January 2012 (see **Sections II through V**). 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 years of the monitoring program has been on establishing initial monitoring commitments, data collection efforts, and overall organization and coordination of the 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 Navy's 2012 VACAPES, CHPT, JAX, and GOMEX Monitoring Plans as well as presenting progress made towards development of a Strategic Plan for Navy Monitoring that has been facilitated by establishing a Scientific Advisory Group (SAG) to review and provide recommendations on the Navy's monitoring program. Proposed changes primarily reflect input received from the scientific community and other stakeholders. **Section VI** provides an overview of the events that have prompted these most recent adaptive management actions.

SECTION II – VIRGINIA CAPES (VACAPES) RANGE COMPLEX

The geographic scope of the VACAPES Study Area includes the area from the shoreline out to the 3-nautical mile (NM) boundary of the Operating Area (OPAREA), as well as the VACAPES OPAREA (Figure II-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 six species of threatened and endangered sea turtles (reviewed in DoN 2008a).

1. VACAPES Study Questions Overview

The goal of the VACAPES Monitoring Plan is to implement field methods chosen to address the long-term monitoring objectives outlined in the *Introduction* (Section I). In the VACAPES Monitoring Plan (DoN 2009a), the U.S. Navy proposed to implement a diversity of field methods to gather monitoring data for marine mammals and sea turtles in Navy training areas. Specifically, the Navy proposed to use visual surveys (aerial or vessel), deploy PAM devices when possible, and put marine mammal observers aboard Navy vessels to meet its goals during the current time period (Table II-1). Studies were specifically designed to meet the questions outlined in the *Introduction* (Section I).

Table II-1. 2011 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 2011 (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.	

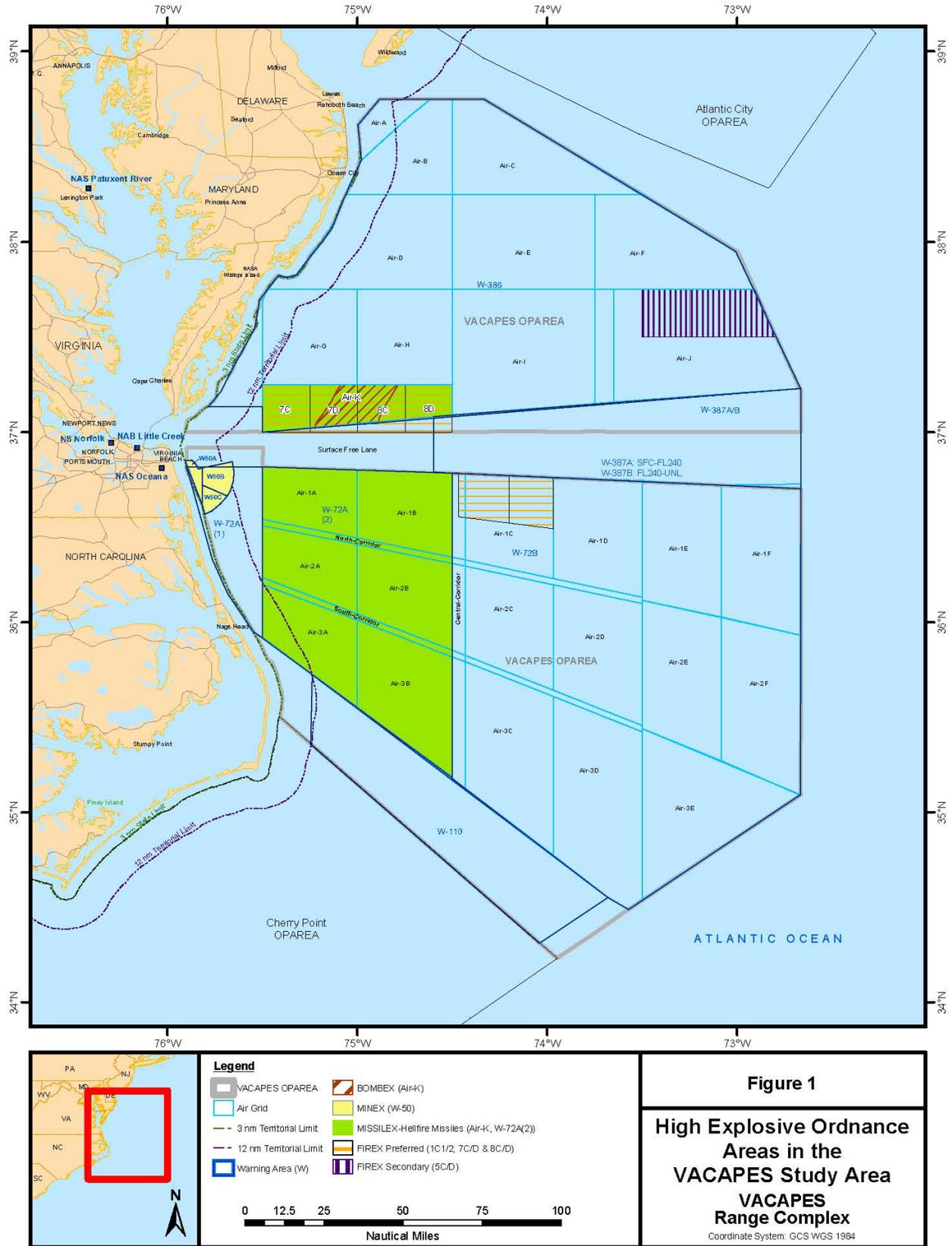


Figure II-1. VACAPES Study Area.

2. VACAPES Monitoring Accomplishments for 2011

During the 2 January 2011 – 1 January 2012 reporting period, U.S. Fleet Forces (USFF) implemented vessel and aerial surveys and deployed PAM devices. The monitoring efforts for 2011 were conducted within the mine neutralization exercise (MINEX) W-50 box in conjunction with a MINEX event, and the Firing Exercise (FIREX) 7C/7D training boxes in conjunction with a FIREX event.

Major accomplishments from the USFF's 2011 compliance monitoring in the VACAPES Study Area are shown in Table II-2 and include:

- Vessel Visual Surveys
 - Completed vessel survey within FIREX box (7C/7D) during a FIREX with Integrated Maritime Portable Acoustic Scoring and Simulator (IMPASS) event. During the event, the mitigation zone was the area within 600 yards (549 meters [m]) of the detonation site or within 70 yards (64 m) of the vessel.
 - Completed vessel surveys within the MINEX (W-50) box before, during, and after a MINEX event. During the event the boat stood off at 1,750 yards (1,600 m), and the MMOs visually surveyed the buffer zone around the detonation site.
- Aerial Visual Surveys
 - Completed aerial surveys within the FIREX (7C/7D) box before, during, and after a FIREX event.
- Passive Acoustic Monitoring
 - Passive acoustic buoys were deployed during a MINEX event to record any marine mammal vocalizations in the area.
- Marine Mammal Observers on Navy Platform
 - Four MMOs were deployed during a FIREX with IMPASS event on board the firing ship. During the event, the ship stood off at 1,775 yards (1,623 m) and the MMOs visually surveyed the area around the detonation site.
 - Seven MMOs were deployed on a Navy ship during a MINEX event. During the event, the boat stood off at 1,750 yards (1,600 m), and the MMOs visually surveyed the area around the detonation site.

Table II-2. U.S. Navy-funded monitoring accomplishments within the VACAPES Study Area from January 2011 to January 2012.

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 during 1 MINEX event and aerial surveys during 1 FIREX event.	MINEX, Missile Exercise (MISSILEX), FIREX, or Bombing Exercise (BOMBEX)	2 events (1 multiple detonation event)	2 events (1 multiple detonation event)
Marine Mammal Observers (studies 1 and 2)	MMOs visually surveyed before, during, and after 1 MINEX event.	MINEX, MISSILEX, or FIREX	1 event	2 events
Passive Acoustic Monitoring (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

2.1 VACAPES Vessel Visual Surveys

Vessel visual surveys for marine mammals were conducted using Navy MMOs during two naval exercises in VACAPES during the reporting period, associated with a FIREX with IMPASS training event in July and a MINEX training event in August.

2.1.1 FIREX with IMPASS Event – July

A vessel survey was conducted on 14 July 2011 in association with a FIREX with an IMPASS training event off the coast of Virginia. Four MMOs were stationed aboard a Navy vessel. One marine species sighting was made by Navy MMOs—a hardshell turtle—and is shown in **Figure II-2** in relation to the detonation location. For additional details, refer to **Appendix A** for the 2011 FIREX with IMPASS Event Trip Report.

Since inert ordnance was used in this FIREX with IMPASS event, there was no potential for exposure of marine mammals and sea turtles to explosions. The turtle sighting mentioned above was made on the ship by the MMOs during a time when rigid-hulled inflatable boats (RHIBs) were recovering a malfunctioning buoy (the firing event was temporarily halted). The sighting was estimated to be approximately 60 yards (54.5 m) from the observation vessel. The sighting was very brief, and no unusual behavior was observed. The area was monitored for 30 minutes, but the animal was not seen again and was assumed to have moved out of the area. Since the animal was not seen for 30 minutes within the 70 yard (64 m) mitigation zone, the second round of firing was able to commence. The second round of firing commenced approximately 45 minutes after the animal was sighted (15 minutes after the mitigation zone requirements were met). No additional marine mammal or sea turtle sightings were obtained within the mitigation zones (within 600 yards [549 m] of the detonation site or within 70 yards [64 m] of the vessel) during the FIREX with IMPASS event. Due to the fact that no marine mammals or sea turtles were observed within the mitigation zones 30 minutes prior to or while gunfire occurred, there are no data to suggest that any animals were exposed to inert ordnance during the event.

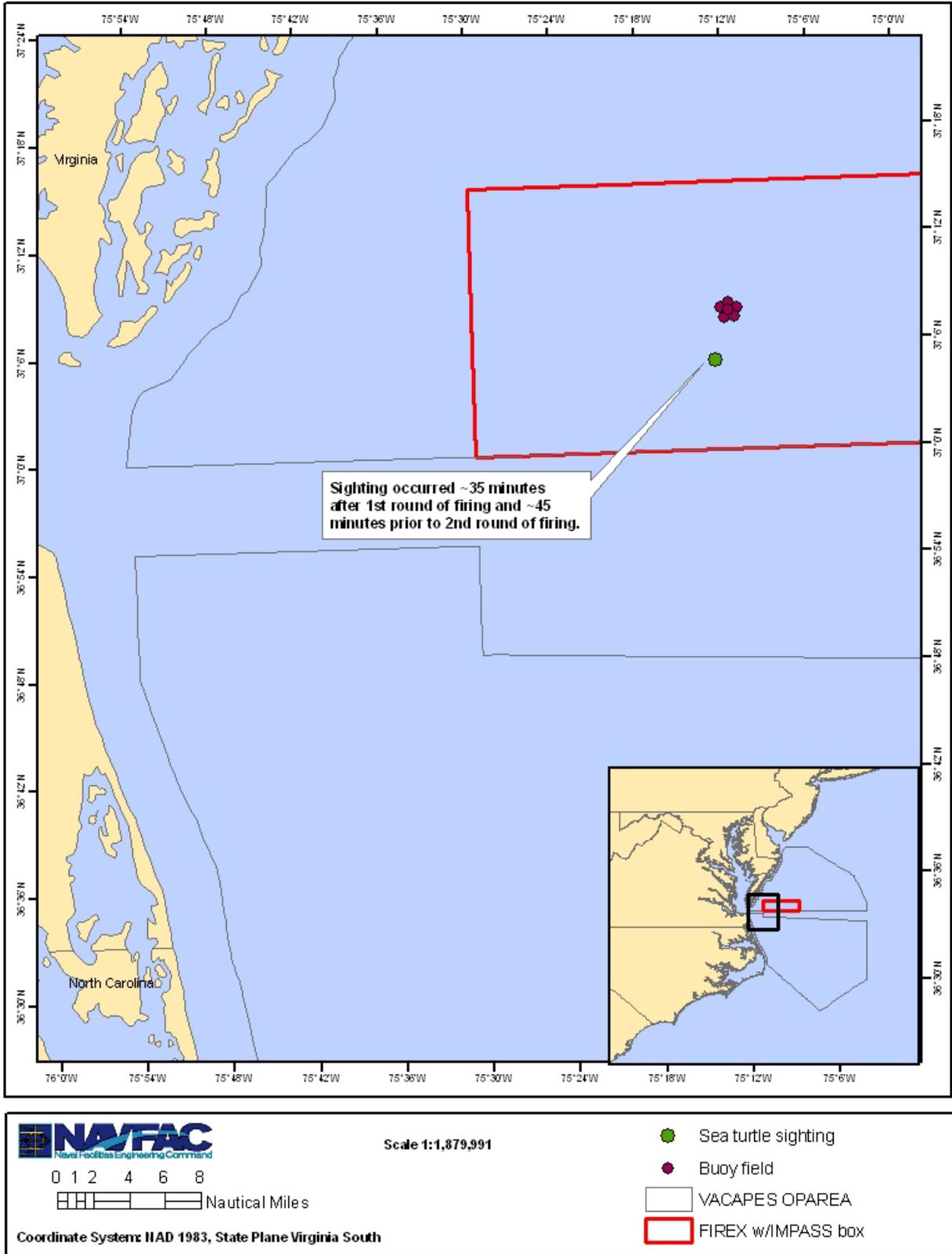


Figure II-2. Location of sea turtle sighting and buoy field location during the FIREX with IMPASS vessel survey conducted on 14 July 2011.

2.1.2 MINEX Event – August

Vessel surveys were conducted in association with a MINEX training event off the coast of Virginia Beach, Virginia. Seven MMOs were stationed aboard a Navy vessel. Surveys were conducted on 7-9 August 2011 before, during, and after the training event.

A total of 19 marine mammal and five sea turtle sightings were recorded by the Navy MMOs during the 3-day monitoring trip (**Table II-3**). All marine mammal sightings were of Atlantic bottlenose dolphins. Three marine mammal and three sea turtle sightings were made on 7 August, the day before the event (**Figure II-3**). Eight marine mammal and two sea turtle sightings were made on 8 August, the day of the MINEX event. The sightings that took place on 8 August are shown in **Figure II-4** in relation to the detonation location. Nine marine mammal sightings were recorded on 9 August, the day after the MINEX event, as shown in **Figure II-5**. For additional details, refer to **Appendix B** for the 2011 VACAPES MINEX Event Trip Report.

Table II-3. Summary of marine species sightings recorded by MMOs while conducting monitoring from a Navy vessel off the coast of Virginia during the August 2011 MINEX event.

Common Name	Scientific Name	Sightings	Individuals
Bottlenose dolphin	<i>Tursiops truncatus</i>	19	91-149*
Loggerhead turtle	<i>Caretta caretta</i>	1	1
Unidentified turtle		4	5

*Three sightings without group size estimates were not included in totals.

No injuries or mortalities of marine mammals or turtles were observed during the MINEX training event on 8 August. For sightings that were obtained between 30 minutes pre-detonation and 30 minutes post-detonation, calculations were made to determine whether it was probable the animals could have been exposed to the detonation. There was only one sighting within this time frame—one unidentified sea turtle, approximately 26 minutes after the detonation on 8 August. The animal was sighted at a distance of approximately 1,730 yards (1,581 m) from the detonation site, which is outside the 700 yard (640 m) mitigation zone for marine mammals. Due to the distance from the detonation site, it is unlikely that the sea turtle was exposed to the explosion. The sighting was brief, and no unusual behavior was observed.

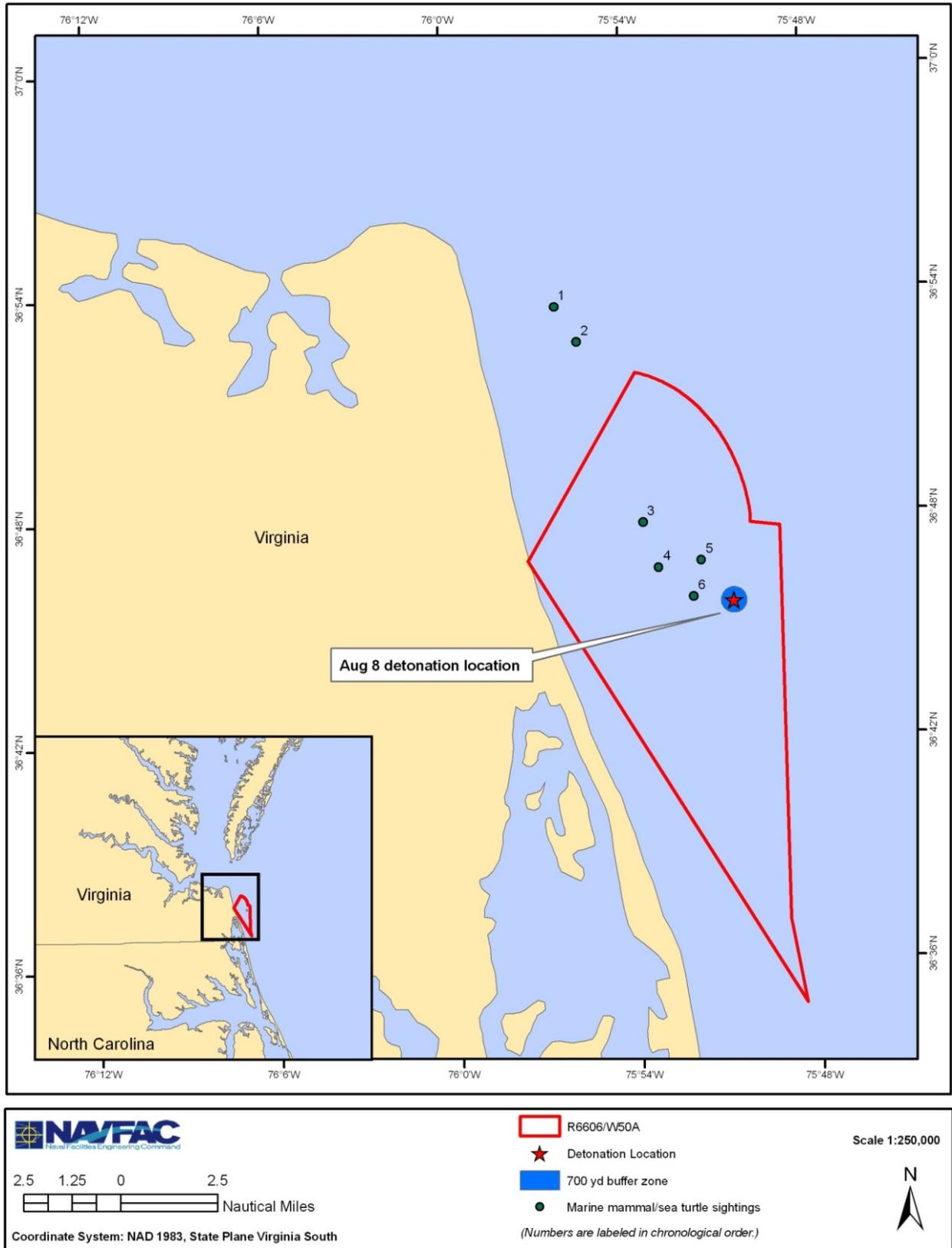


Figure II-3. Locations of sightings during pre-MINEX monitoring (7 August) and approximate detonation location.

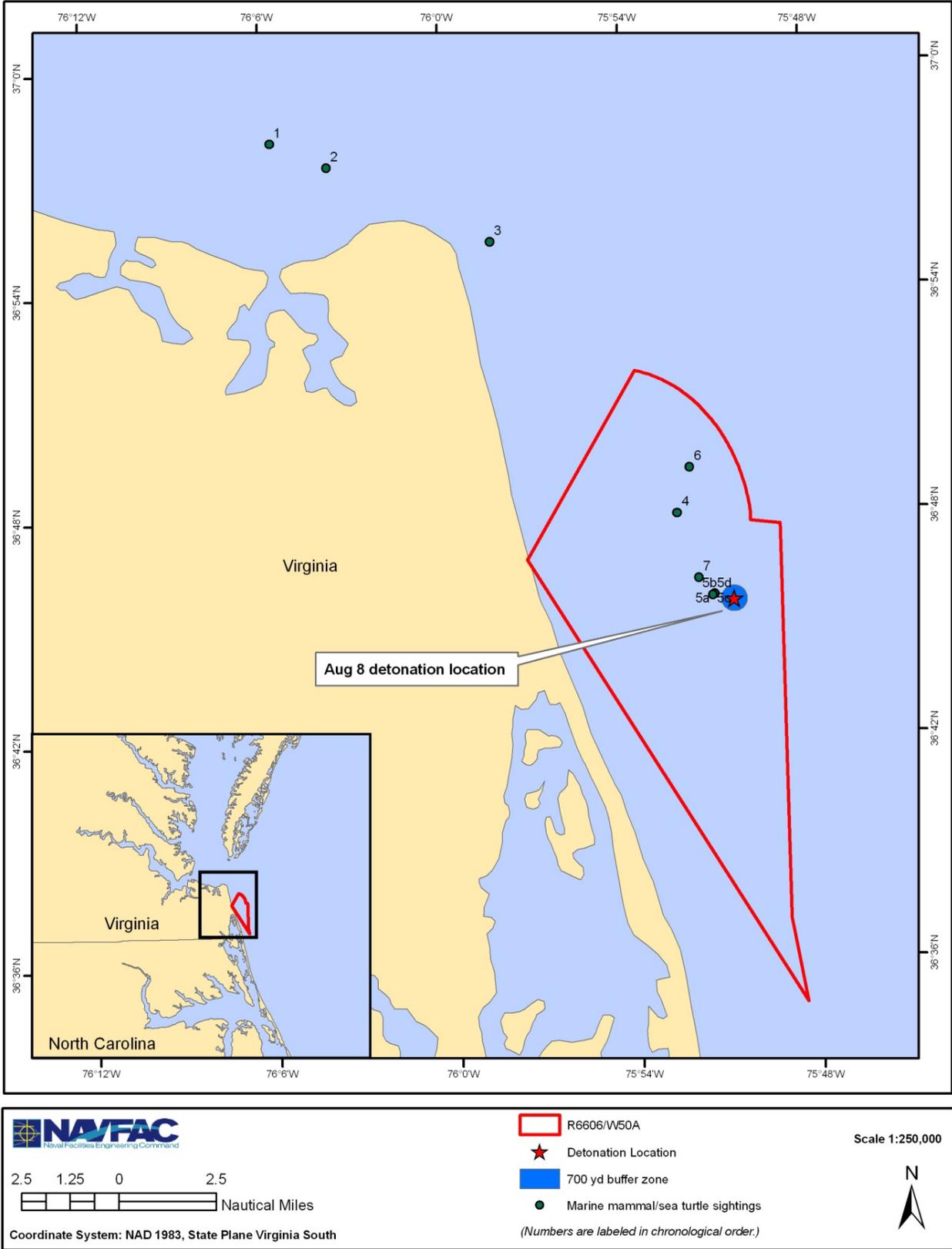


Figure II-4. Locations of sightings during MINEX monitoring (8 August) and approximate detonation location.

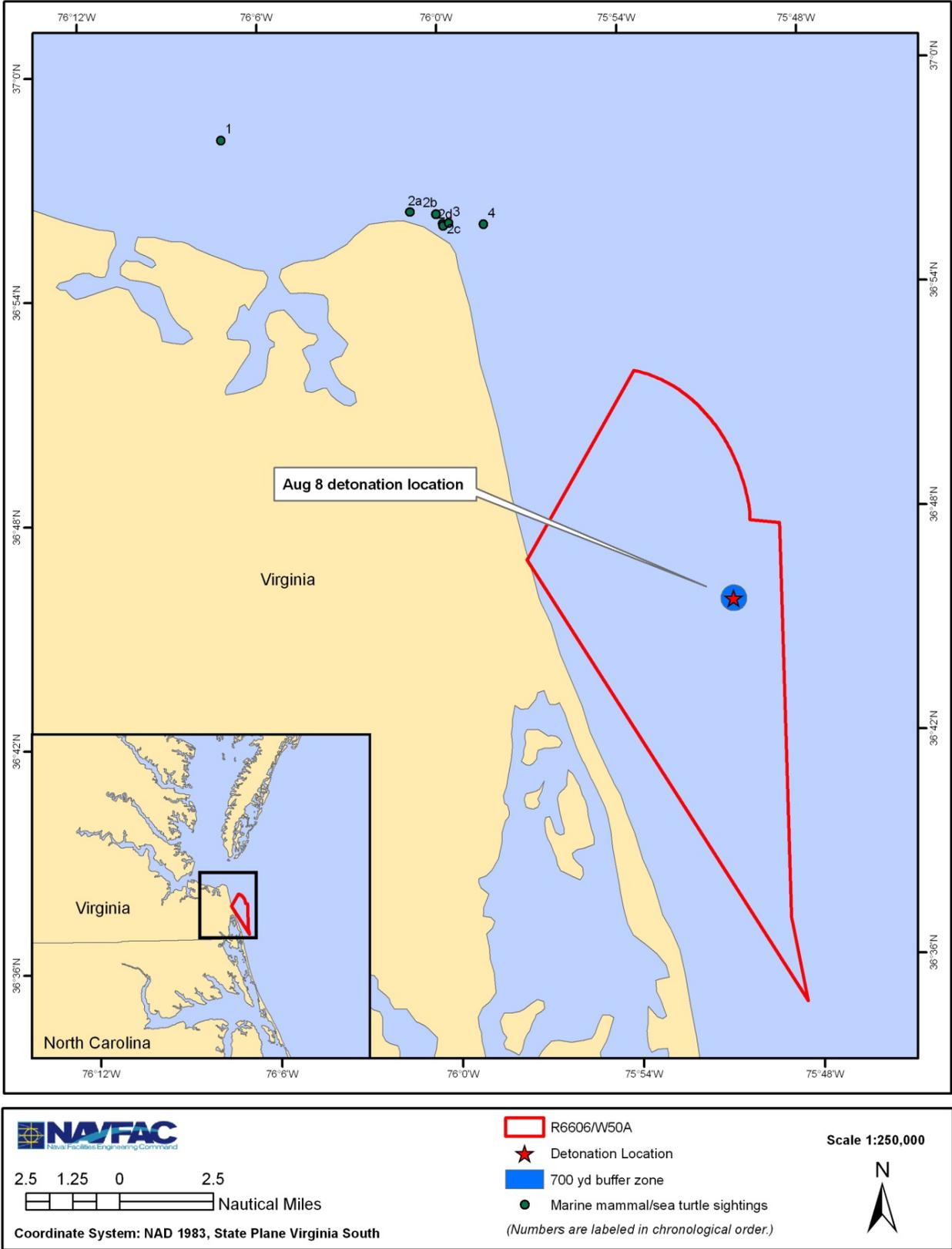


Figure II-5. Locations of sightings post-MINEX monitoring (9 August) and approximate detonation location.

2.2 VACAPES Aerial Visual Surveys

Aerial surveys were conducted in association with a FIREX training event with IMPASS off the coast of Virginia. Line-transect surveys were conducted on 13-15 July before, during, and after the training event. A summary of the sightings are presented in **Table II-4**.

Table II-4. Summary of marine species sightings from the aerial surveys conducted during 13-15 July 2011 for the FIREX with IMPASS training event in VACAPES.

Common Name	Scientific Name	Sightings	Individuals
Bottlenose dolphin	<i>Tursiops truncatus</i>	5	77
Pilot whale	<i>Globicephala</i> spp.	1	45
Unidentified dolphin		3	2*
Loggerhead turtle	<i>Caretta caretta</i>	102	105**
Kemp's ridley turtle	<i>Lepidochelys kempii</i>	1	1
Leatherback turtle	<i>Dermochelys coricea</i>	4	4
Unidentified ray		1	1
Ocean sunfish	<i>Mola mola</i>	1	1

*One sighting didn't have group size determined due to brevity of sighting

**Due to an extremely high sighting rate of sea turtles in the range after the first survey day, surveys for sea turtles were limited to one random transect line on subsequent days (14 and 15 July). Sightings for sea turtles on the chosen random transect line were multiplied by seven (number of transect lines) for total estimated sightings

Three sightings of marine mammals and 37 sightings of sea turtles were made during the 1-day pre-FIREX survey (**Figure II-6**). Due to the extremely high sighting rate of sea turtles in the range during the first survey day, on subsequent days (14 and 15 July) surveys for sea turtles were limited to one random transect line. Sightings for sea turtles on the chosen random transect line were multiplied by 7 (number of transect lines) to estimate total sightings. Two sightings of marine mammals and one sighting of a sea turtle ($n=7$ after multiplier factor) were made throughout the 1-day during-FIREX survey period (**Figure II-7**). Four sightings of marine mammals and nine sightings of sea turtles ($n=63$ after multiplier factor) were made during the 1-day post-FIREX survey (**Figure II-8**). Focal follows of three groups of bottlenose dolphins were conducted pre- and post-FIREX (see **Appendix C**). No injuries or mortalities of marine mammals or sea turtles were observed during the FIREX training event on 14 July. No live explosive rounds were used during the FIREX training. Therefore, no animals were exposed during this VACAPES FIREX with IMPASS training event. For additional details see **Appendix C** for the 2011 VACAPES FIREX Event Trip Report.

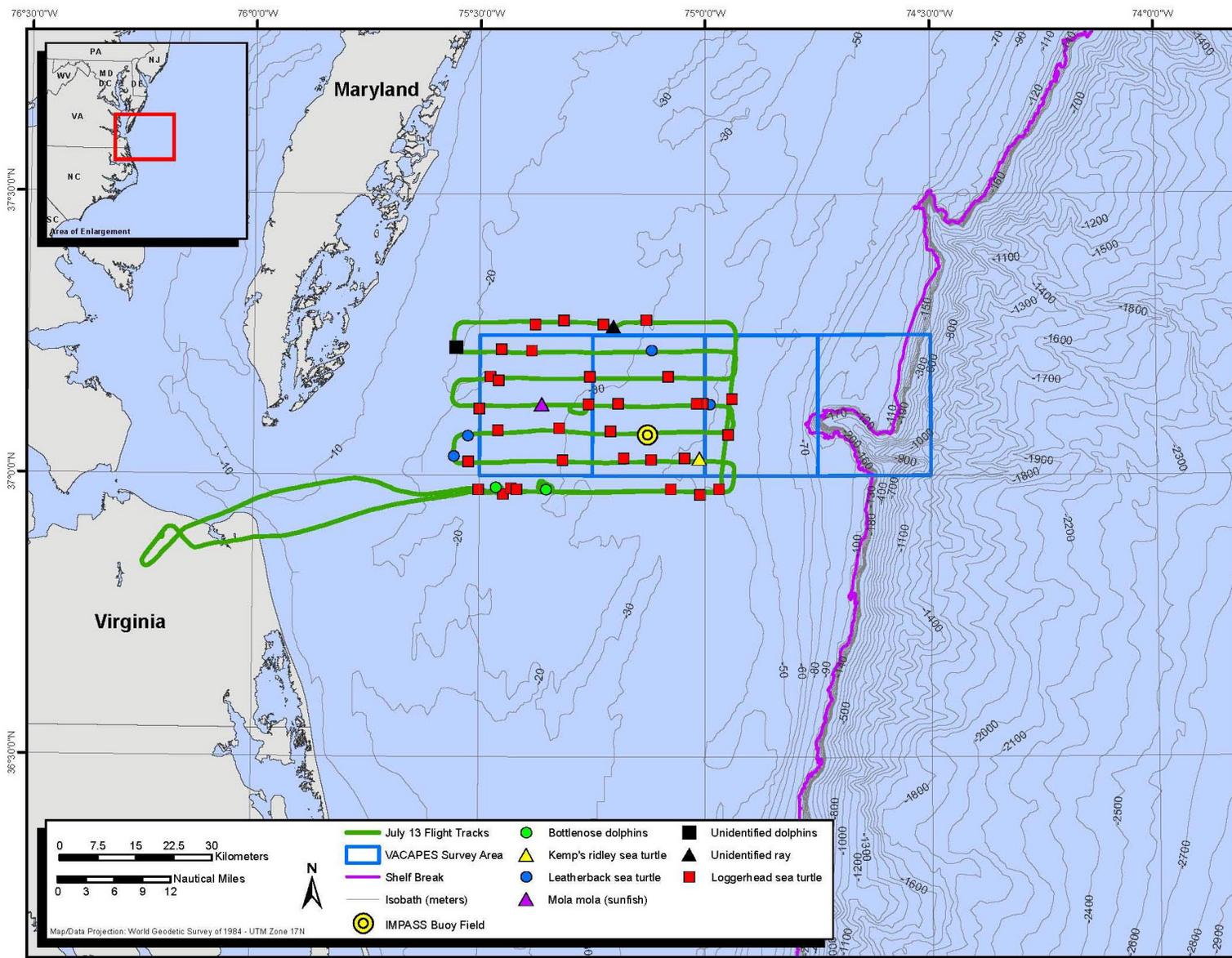


Figure II-6. Locations of cetacean and sea turtle sightings during pre-FIREX surveys (13 July).

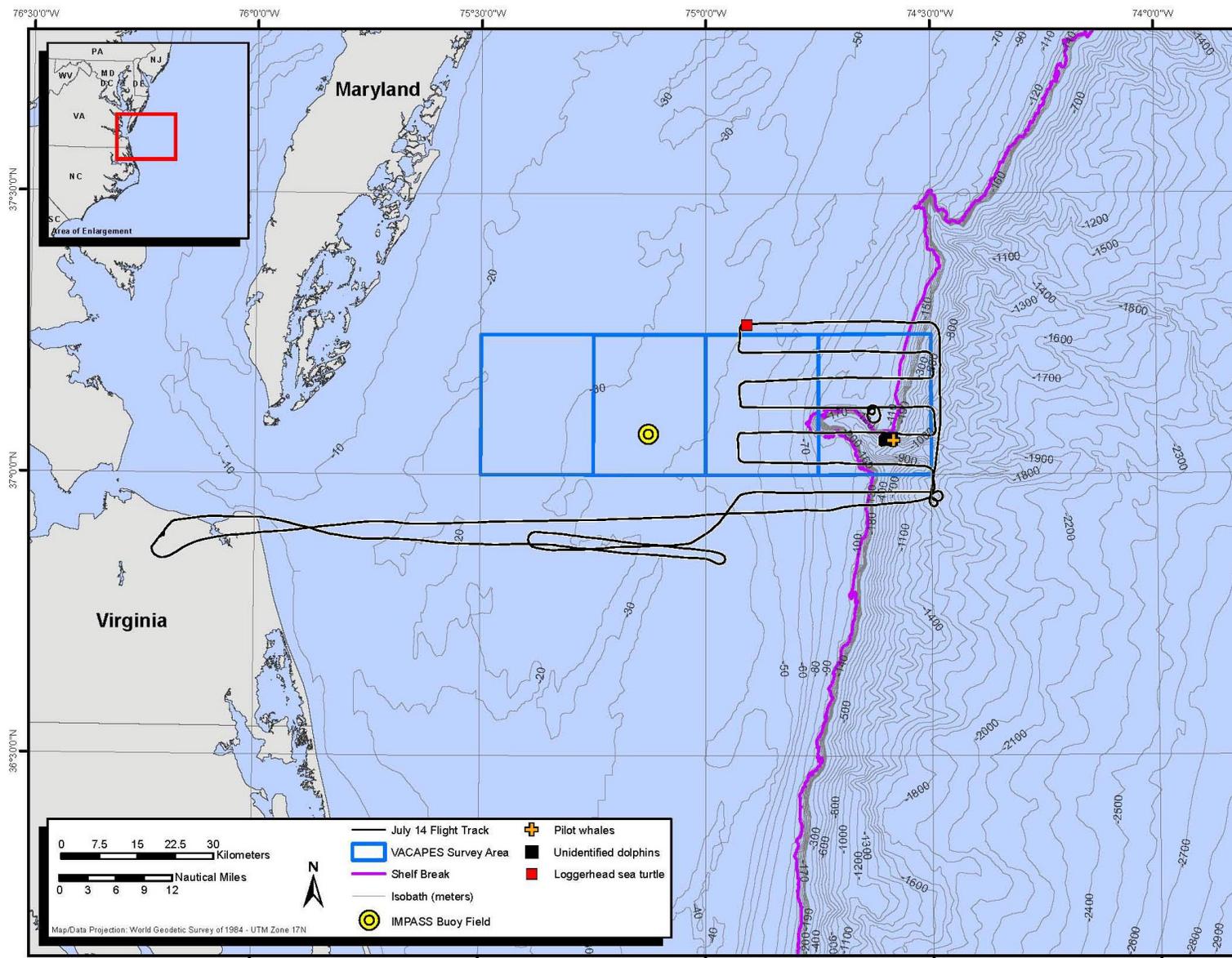


Figure II-7. Locations of cetacean and sea turtle sightings during FIREX surveys (14 July).

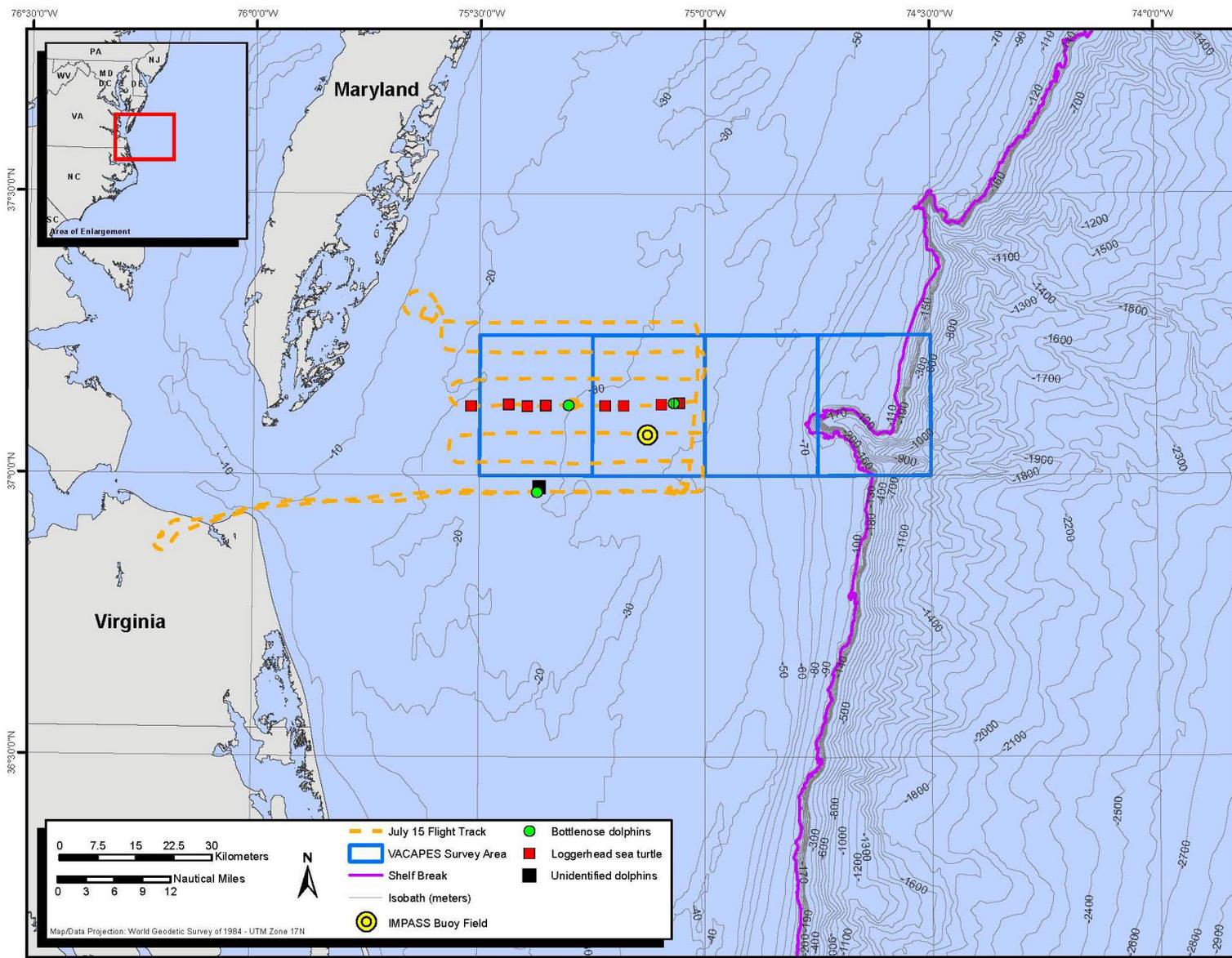


Figure II-8. Locations of cetacean and sea turtle sightings during post-FIREX surveys (15 July).

2.3 VACAPES Marine Mammal Observers (MMOs) on Navy Platforms

The U.S. Navy undertook monitoring of marine mammals during two naval exercises in VACAPES during the reporting period, associated with a FIREX with IMPASS training event in July and MINEX training event in August.

2.3.1 FIREX with IMPASS Event – July

Navy marine mammal biologists performed visual observations associated with a FIREX with IMPASS training event within the VACAPES Range Complex on 14 July 2011. Summary information regarding the visual observations obtained from the vessel survey is found in **Section 2.1.1**. For additional details, see **Appendix A** for the 2011 VACAPES FIREX with IMPASS Event Trip Report.

2.3.2 MINEX Event – August

Navy marine mammal biologists performed visual observations associated with the MINEX training event within the VACAPES Range Complex during 7-9 August 2011. Summary information regarding the visual observations obtained from the vessel surveys is found in **Section 2.1.2**. For additional details, see **Appendix B** for the 2011 VACAPES MINEX Event Trip Report.

2.4 VACAPES Passive Acoustic Monitoring (PAM)

Vessel surveys were conducted in association with a MINEX training event off the coast of Virginia Beach, Virginia in August (see **Section 2.1.2; Appendix B**). Acoustic buoys were deployed on 7 and 8 August to monitor marine mammal vocalization activity before, during, and after the MINEX event (see **Figures II-9** and **II-10**, respectively). Six buoys were deployed on both days (see **Appendix B**). Total successful recording time was approximately 38.3 hours, which included 22.75 hours on 7 August and 15.5 hours on 8 August.

At this time, no detailed analysis has been completed on the acoustic data set, except a quick visualization of the data. A preliminary analysis was performed on the 8 August data using 1-minute spectrogram windows. **Figure II-9** shows a spectrogram from the 8 August 2011 detonation recording on the monitoring buoy named “Beaver.” The portion of the recording outlined in red was investigated further and revealed assumed odontocete whistles. The image in the upper right displays the support RHIBs on site during the exercise. **Figure II-10** shows discrete whistle contours recorded by the monitoring buoy “Beaver” at approximately 13 (box A) and 14 (box B) seconds following the detonation. Based on earlier sightings from that day, the vocalizations are most likely from bottlenose dolphins. Plans are in place to conduct further analyses and any additional results that are found will be presented in the 2012 Monitoring Report.

There is no detailed analysis completed for the 2010 acoustic data (see DoN 2011b).

Spectrogram of 8 August Detonation

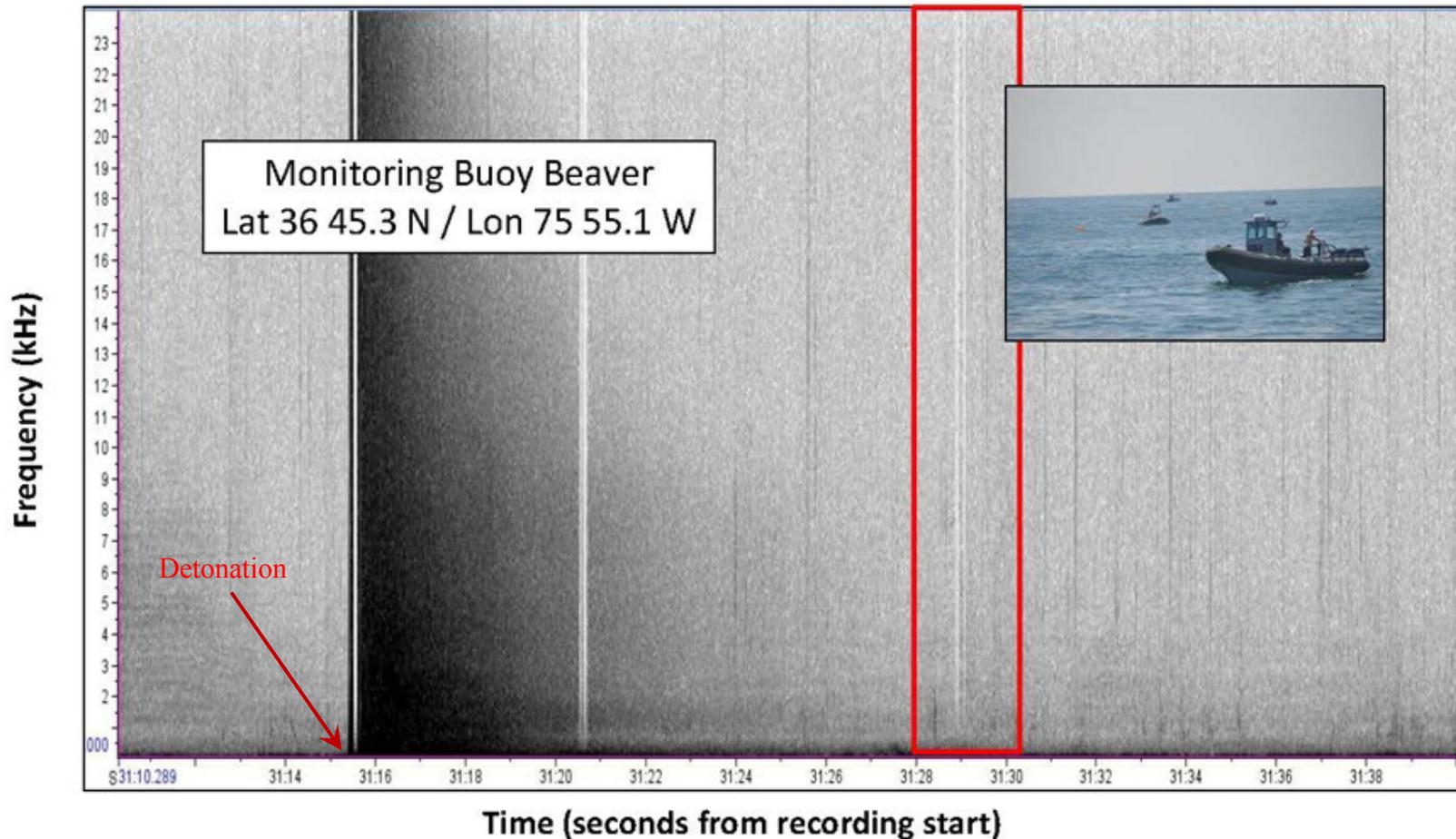


Figure II-9. Spectrogram of 8 August detonation recorded by monitoring buoy "Beaver." The portion of the recording outlined in red was investigated further and revealed what appear to be odontocete whistles; that segment is expanded in Figure II-10. The image in the upper right displays the support RHIBs on site during the exercise.

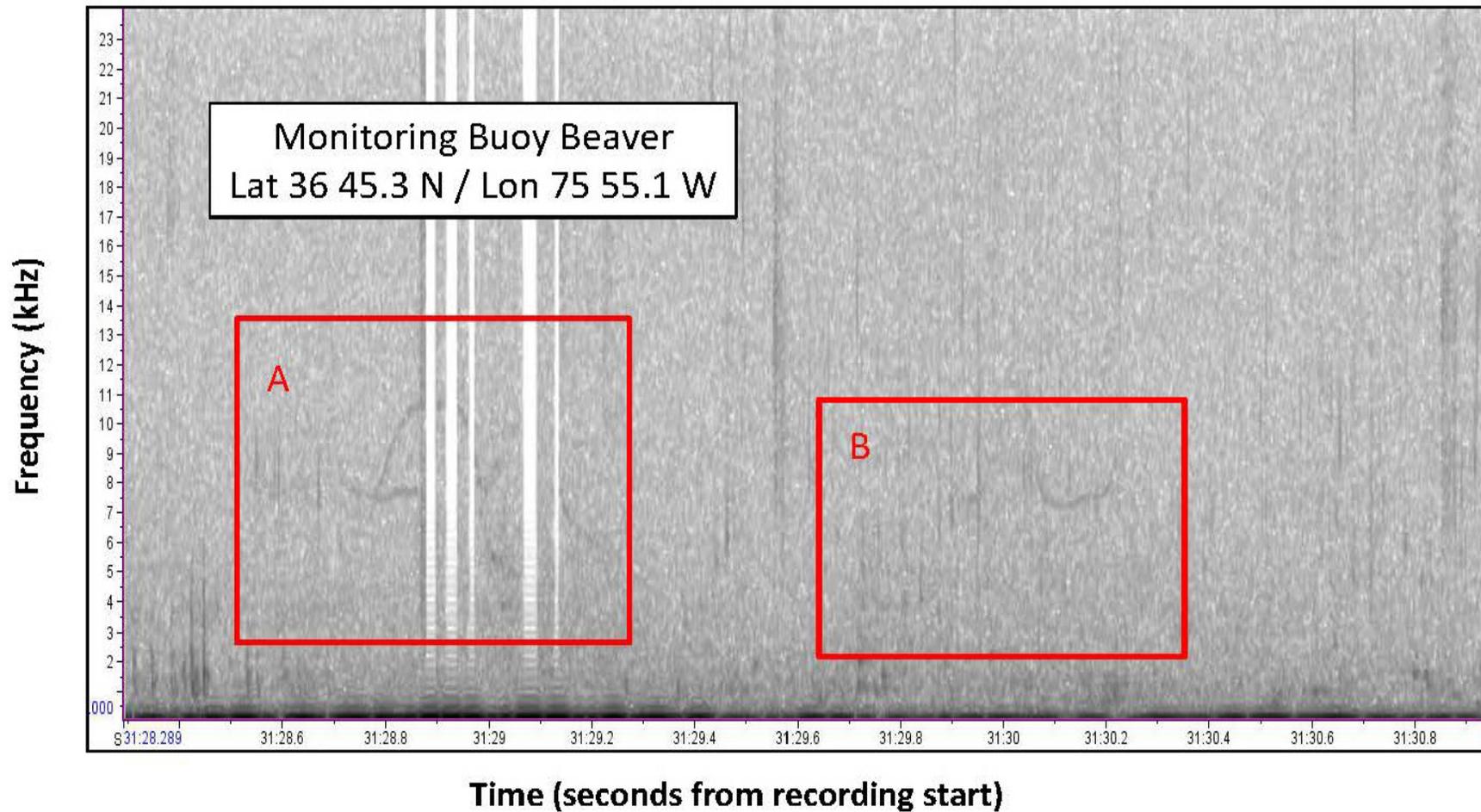


Figure II-10. Spectrogram of whistles in response to 8 August detonation. Discrete whistle contours recorded by monitoring buoy “Beaver” at approximately 13 (A) and 14 (B) seconds following the detonation. Given earlier sightings, the vocalizations are most likely from bottlenose dolphins.

SECTION III – CHERRY POINT (CHPT) RANGE COMPLEX

The geographic scope of the CHPT Study Area includes the area from the shoreline out to the 3 NM boundary of the OPAREA, as well as the Cherry Point OPAREA (**Figure III-1**).

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 six species of threatened and endangered sea turtles (reviewed in DoN 2008b).

1. CHPT Study Questions Overview

The goal of the CHPT Monitoring Plan is to implement field methods chosen to address the long-term monitoring objectives outlined in the *Introduction* (**Section I**). In the CHPT Monitoring Plan (DoN 2009b), the Navy proposed to implement a diversity of field methods to gather monitoring data for marine mammals and sea turtles in Navy training areas. Specifically, the Navy proposed to use visual surveys (aerial or vessel), deploy passive acoustic monitoring devices when possible, and put MMOs aboard Navy vessels, to meet its goals during the current time period. Studies were specifically designed to meet the questions outlined in the *Introduction* (**Section I**). **Table III-1** shows the 2011 monitoring objectives as initially agreed upon by the NMFS and Navy from the final CHPT Monitoring Plan.

Table III-1. 2011 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 2011 (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	- 1 explosive event per year. When feasible, deploy hydrophone array during vessel surveys for passive acoustic monitoring.	

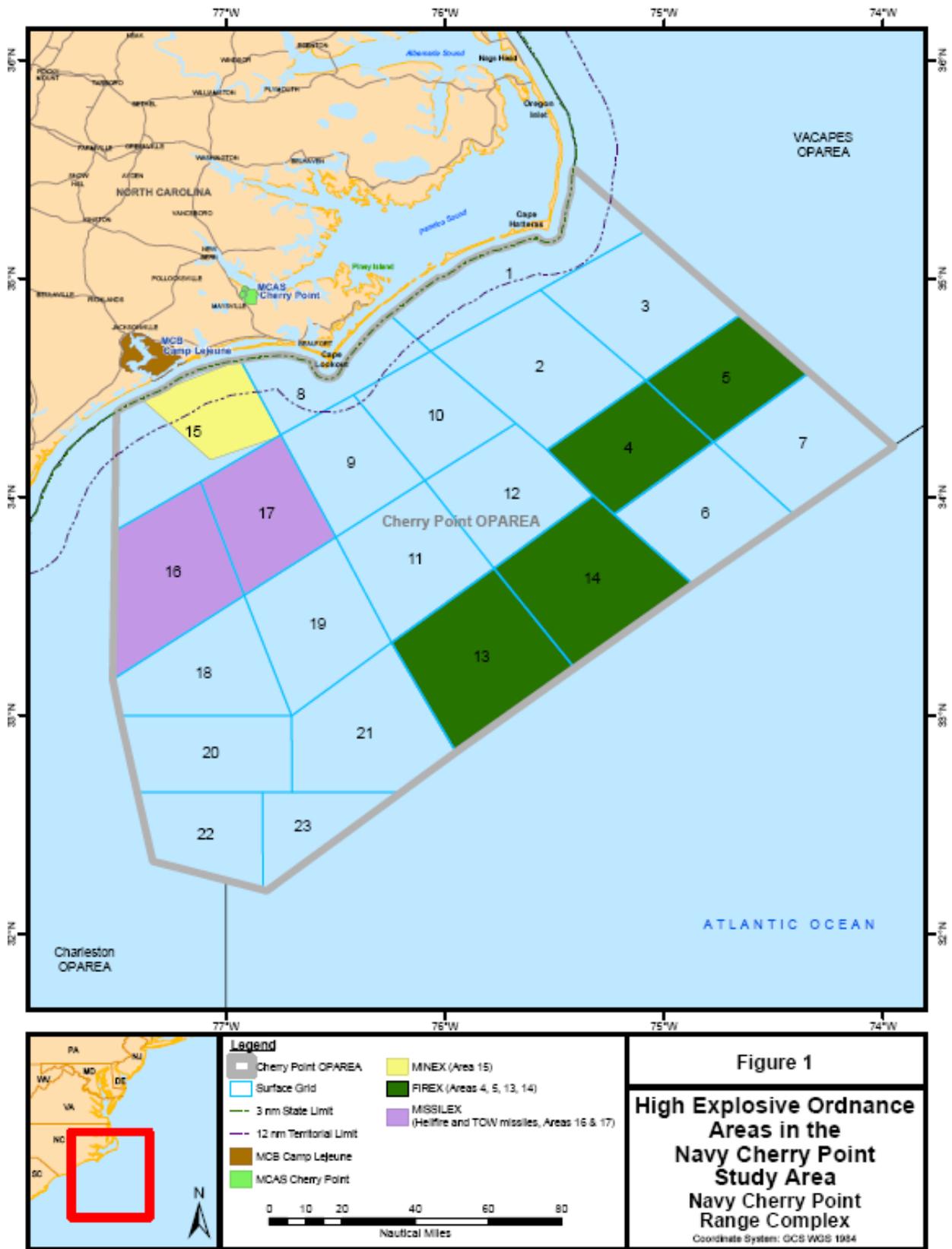


Figure III-1. CHPT Study Area.

2. CHPT Monitoring Accomplishments for 2011

During the 2 January 2011 – 1 January 2012 reporting period, USFF monitoring efforts were conducted in conjunction with a FIREX with IMPASS training event.

Major accomplishments from the USFF’s 2011 compliance monitoring in the CHPT Study Area are shown in Table III-2 and include:

- Aerial Visual Surveys
 - Completed aerial surveys within the U.S. Navy’s range box W-122 (Area 14) during a FIREX with IMPASS event.

Table III-2. U.S. Navy-funded monitoring accomplishments within the CHPT Study Area from January 2011 to January 2012.

Study Type	Description of U.S. Navy EIS/LOA Monitoring Completed	Event types Available for Monitoring	Annual MMPA/ESA Requirement	Total Accomplished
Vessel or aerial surveys before/during/after event (study 1 and 2)	Aerial or vessel visual surveys during 1 explosive event.	MINEX, MISSILEX, FIREX, or BOMBEX	1 event	1 event
Marine Mammal Observers (studies 1 and 2)	MMOs visually surveying from a Navy ship before, during and after 1 explosive event.	MINEX, MISSILEX, FIREX, or BOMBEX	1 event	Not feasible for events monitored
Passive Acoustic Monitoring (study 2)	Towed hydrophone arrays during shipboard surveys when feasible.	MINEX, MISSILEX, FIREX, or BOMBEX	Deploy hydrophone array during vessel surveys when feasible	Not feasible for events monitored

2.1 CHPT Aerial Visual Surveys

Aerial surveys were conducted in association with a FIREX with IMPASS training event off the coast of North Carolina. The pre-FIREX line-transect survey on 29 November was cancelled due to poor weather and low ceiling conditions. No sightings of marine mammals or sea turtles were recorded during 1.4 hours of total survey flight time (includes on-effort and off-effort intervals) within the survey area covering a 1-day period (30 November). One large unidentified whale was briefly seen approximately 18 kilometers (km) south of Lookout Bight, North Carolina (approximately 100 km outside of the survey area) on the transit back to the airport (**Figure III-2**). Attempts to relocate and confirm species ID in the high sea states were unsuccessful. As a result of the survey plane’s restricted access during the live-fire exercise, no naval vessels were seen within the area. For additional details, refer to **Appendix D** for the 2011 FIREX with IMPASS Event Trip Report.

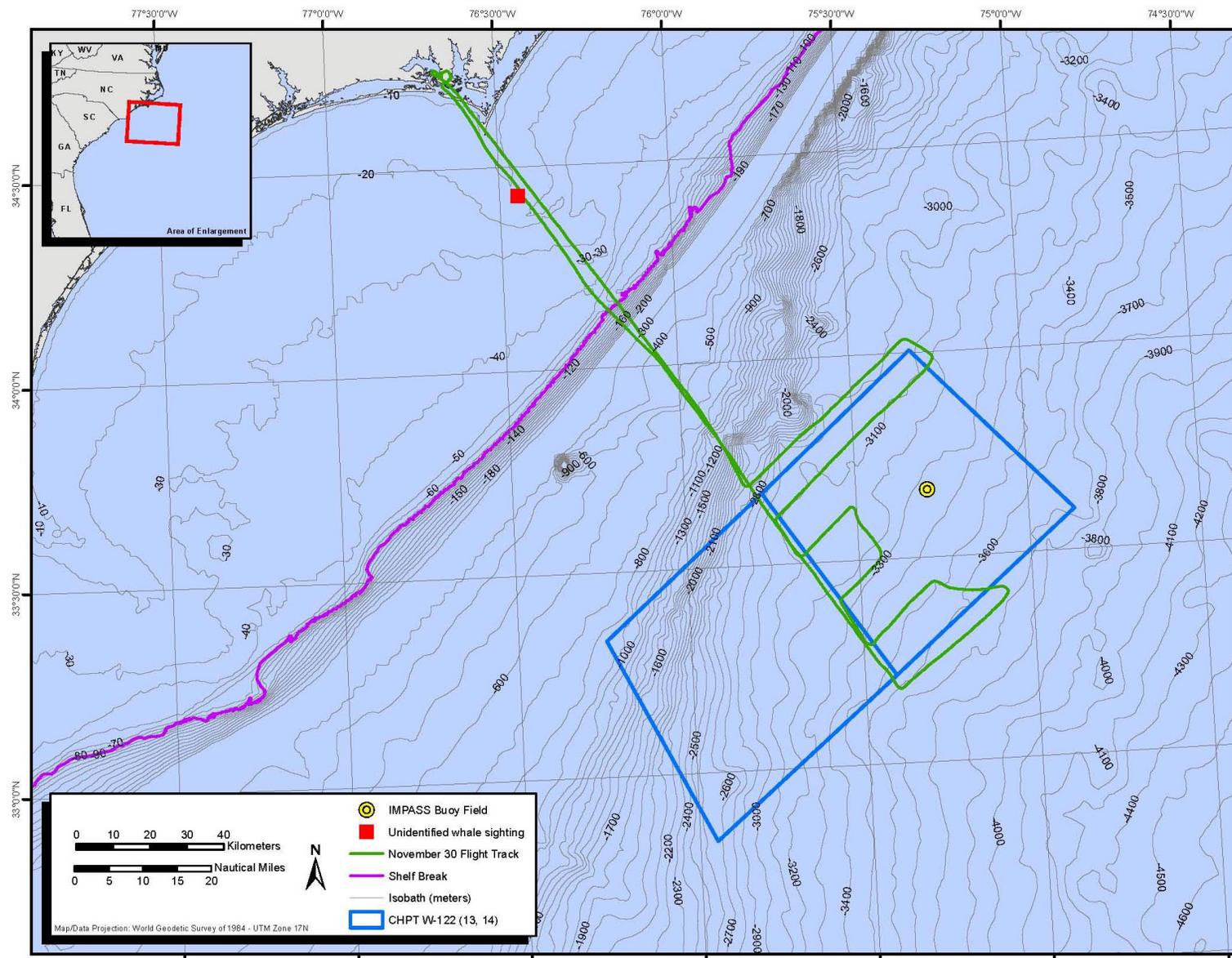


Figure III-2. Locations of all cetacean and sea turtle sightings recorded during FIREX surveys (30 November).

SECTION IV – JACKSONVILLE (JAX) RANGE COMPLEX

The geographic scope of the JAX Study Area includes the area from the shoreline out to the 3 NM boundary of the OPAREA, as well as the JAX OPAREA (**Figure IV-1**).

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). There are 29 cetacean species (e.g., whales, dolphins, and porpoises) and one sirenian species (West Indian manatee). There are also six species of threatened and endangered sea turtles (reviewed in DoN 2008c).

1. JAX Study Questions Overview

The goal of the JAX Monitoring Plan is to implement field methods chosen to address the long-term monitoring objectives outlined in the *Introduction* (**Section I**). In the JAX Monitoring Plan (DoN 2009c), 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 passive acoustic monitoring devices when possible, and put MMOs aboard U.S. Navy vessels, to meet its goals during the current time period. Studies were specifically designed to meet the questions outlined in the *Introduction* (**Section I**) of this document. **Table IV-1** shows the 2011 monitoring objectives agreed upon by NMFS and U.S. Navy from the final JAX Monitoring Plan.

Table IV-1. 2011 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 2011 (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. When feasible, deploy hydrophone array during vessel surveys for passive acoustic monitoring.	

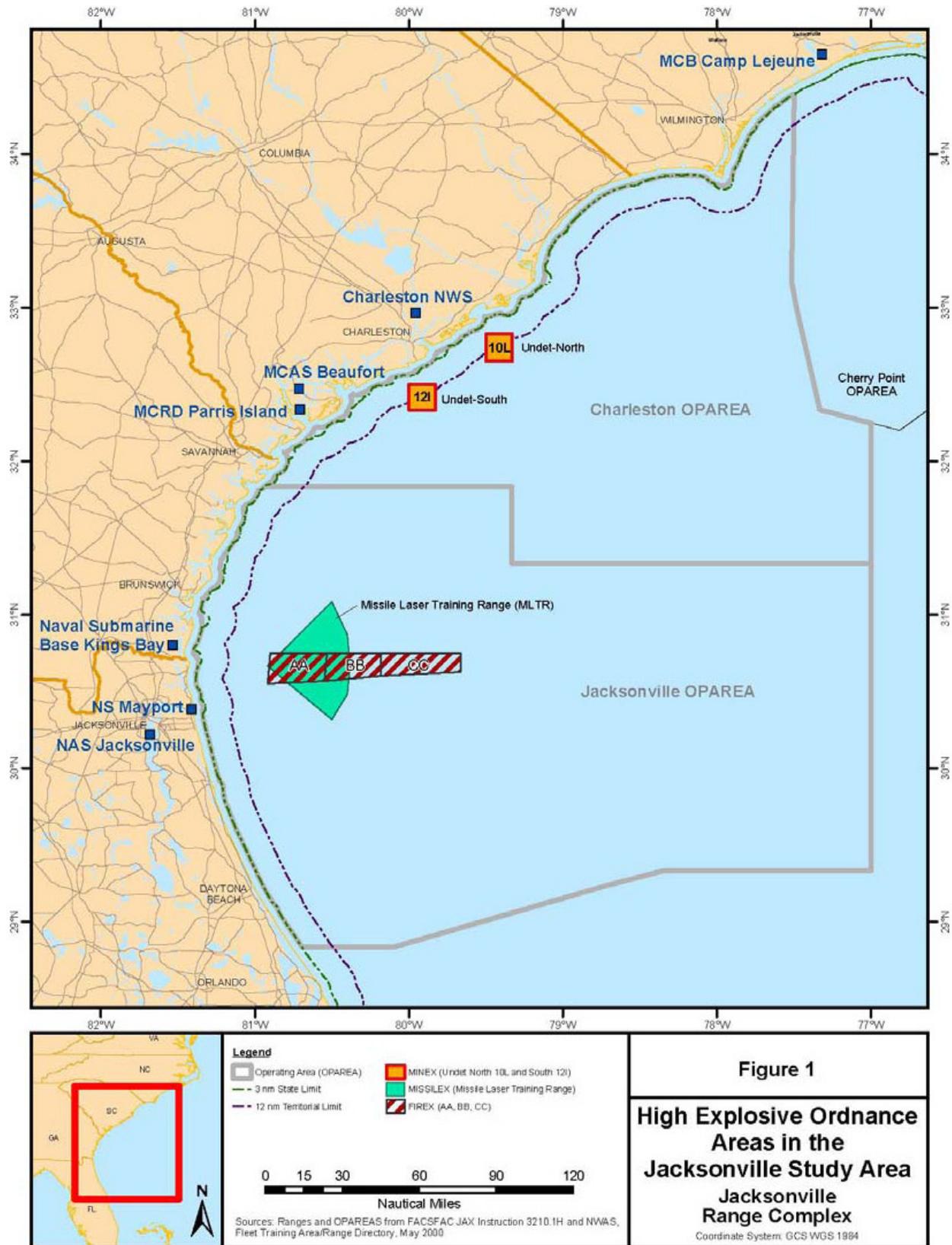


Figure IV-1. JAX Study Area.

2. JAX Monitoring Accomplishments for 2011

During the 2 January 2011 – 1 January 2012 reporting period, USFF monitoring efforts were conducted in conjunction with a FIREX with IMPASS training event.

Major accomplishments from the USFF's 2011 compliance monitoring in the JAX Study Area are shown in Table IV-2 and include:

- Aerial Visual Surveys
 - Completed aerial surveys within the FIREX BB/CC box before, during, and after one FIREX with IMPASS event.

Table IV-2. U.S. Navy funded monitoring accomplishments within the JAX Study Area from January 2011 to January 2012.

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)	Aerial surveys during 2 MISSILEX events and aerial surveys during 2 FIREX events.	MINEX, MISSILEX, FIREX, or BOMBEX	2 events (1 multiple detonation event)	1 event (1 multiple detonation event)
Marine Mammal Observers (studies 1 and 2)	MMOs visually surveying before, during and after 1 FIREX event.	MINEX, MISSILEX, or FIREX	1 event	Not feasible for events monitored
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

2.1 JAX Aerial Visual Surveys

Aerial surveys were conducted in association with a FIREX training event with IMPASS off the coasts of Georgia and Florida. Line-transect surveys were conducted on 19-21 September before, during, and after the training event. A summary of the sightings are presented in **Table IV-3**.

Table IV-3. Summary of marine species sightings from the aerial surveys conducted during 19-21 September 2011 for the FIREX with IMPASS training event in JAX.

Common Name	Scientific Name	Sightings	Individuals
Loggerhead turtle	<i>Caretta caretta</i>	8	8
Unidentified sea turtle		2	2

No sightings of marine mammals were recorded during these surveys. Sightings over the 3-day period included eight sightings of loggerhead sea turtles and two sightings of unidentified sea turtles. This survey was hindered by heavy rain and low cloud ceilings restricting both visibility and safe flying conditions. One sighting of a loggerhead sea turtle was made during the 1-day pre-FIREX survey

(Figure IV-2). Four sightings of sea turtles were made throughout the 1-day during-FIREX survey period **(Figure IV-3).** Five sightings of sea turtles were made during the 1-day post-FIREX survey **(Figure IV-4).** No injuries or mortalities to sea turtles were observed during the FIREX training event on 20 September. No live explosive rounds were used during the FIREX training; therefore, no animals were exposed to any explosive detonations during this JAX FIREX with IMPASS training event. The survey team did not conduct any focal follows because no sightings of marine mammals were recorded during the FIREX monitoring effort. For additional details, see **Appendix E** for the 2011 JAX FIREX with IMPASS Event Trip Report.

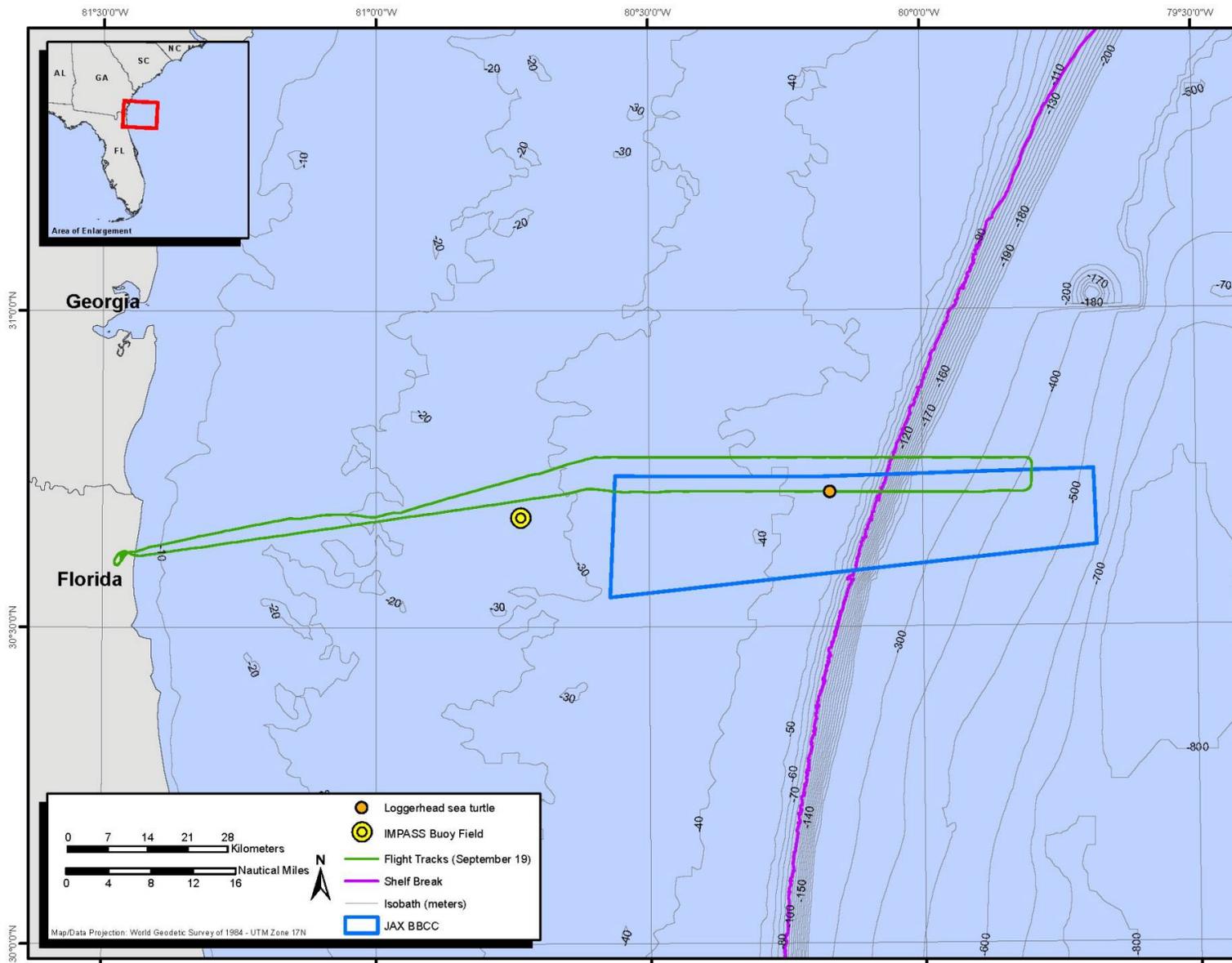


Figure IV-2. Locations of cetacean and sea turtle sightings recorded during pre-FIREX surveys (19 September).

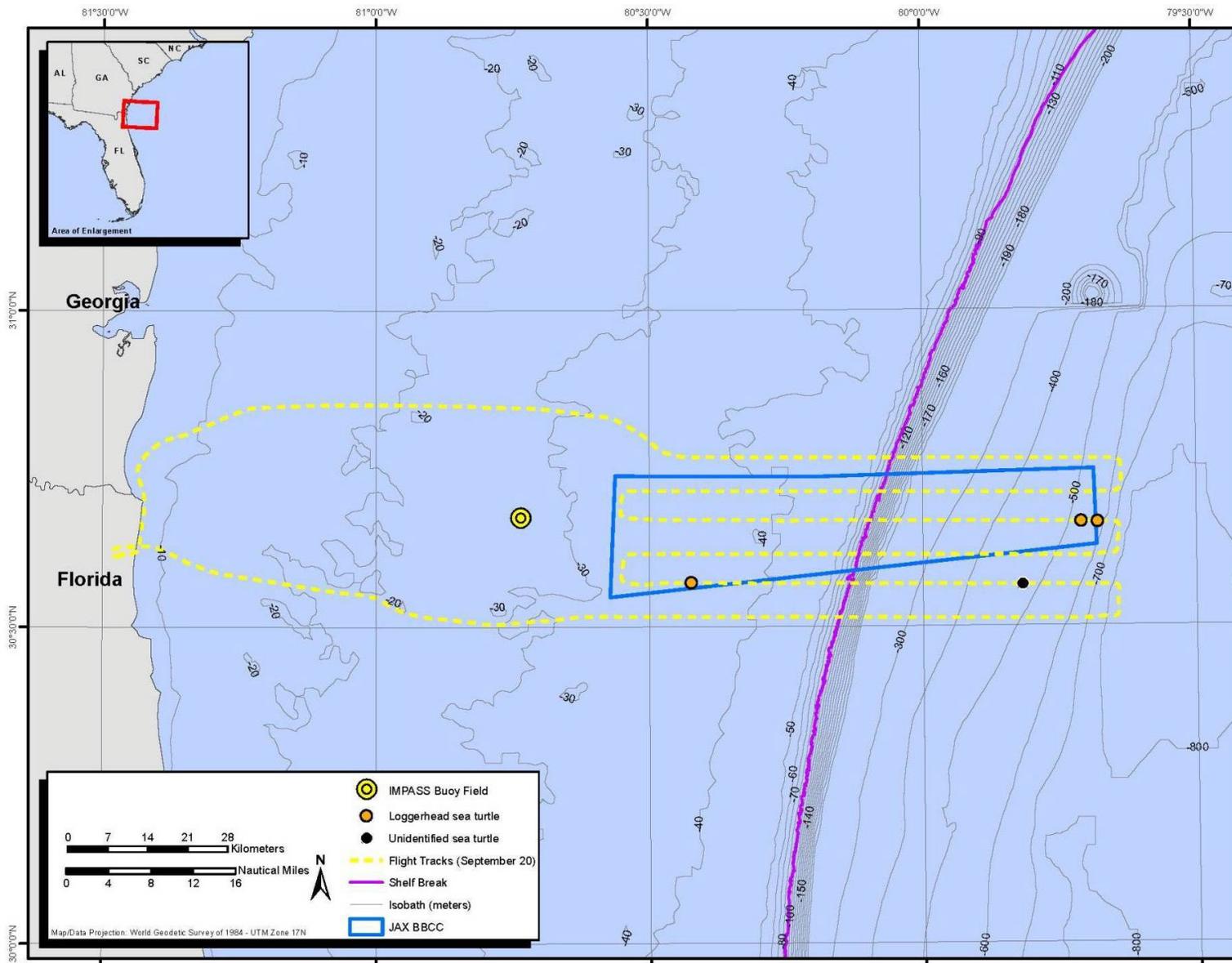


Figure IV-3. Locations of cetacean and sea turtle sightings recorded during FIREX surveys (20 September).

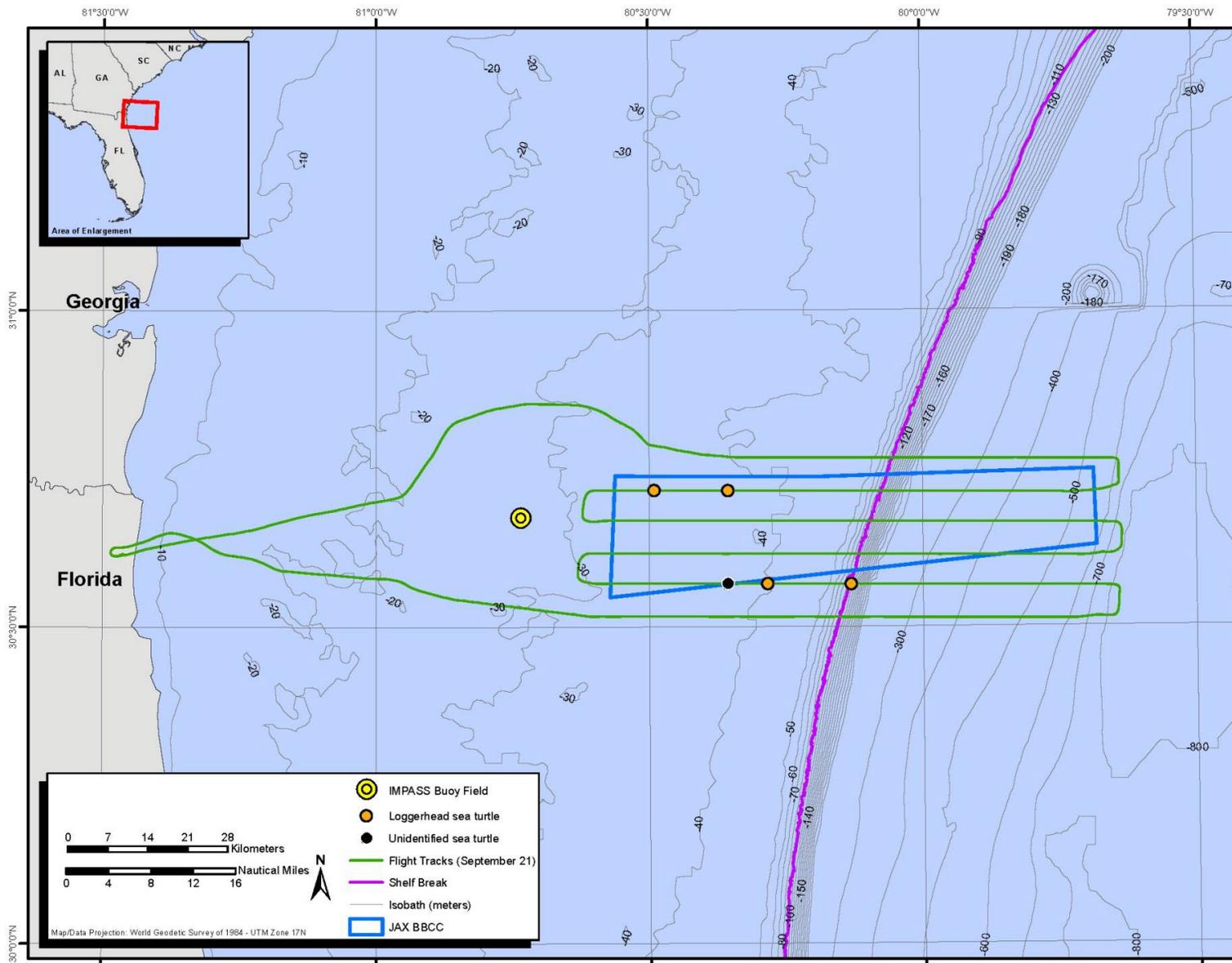


Figure IV-4. Locations of cetacean and sea turtle sightings recorded during post-FIREX surveys (21 September).

SECTION V – GULF OF MEXICO (GOMEX) RANGE COMPLEX

The geographic scope of the GOMEX Study Area includes the area from the shoreline out to the 3 NM boundaries of the Corpus Christi OPAREA, New Orleans OPAREA, Pensacola OPAREA, and Panama City OPAREA, as well as the OPAREAs (**Figure V-1**).

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).

1. GOMEX Study Questions Overview

The goal of the GOMEX Monitoring Plan is to implement field methods chosen to address the long-term monitoring objectives outlined in the *Introduction* (**Section I**). In the GOMEX Monitoring Plan (DoN 2011), 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 passive acoustic monitoring devices when possible, and put MMOs aboard U.S. Navy vessels, to meet its goals during the current time period. Studies were specifically designed to meet the questions outlined in the *Introduction* (**Section I**) of this document. **Table V-1** shows the 2011 monitoring objectives agreed upon by NMFS and U.S. Navy from the final GOMEX Monitoring Plan.

Table V-1. 2011 GOMEX monitoring commitments under JAX 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 2011 (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	- 1 explosive event per year. When feasible, deploy hydrophone array during vessel surveys for passive acoustic monitoring.	

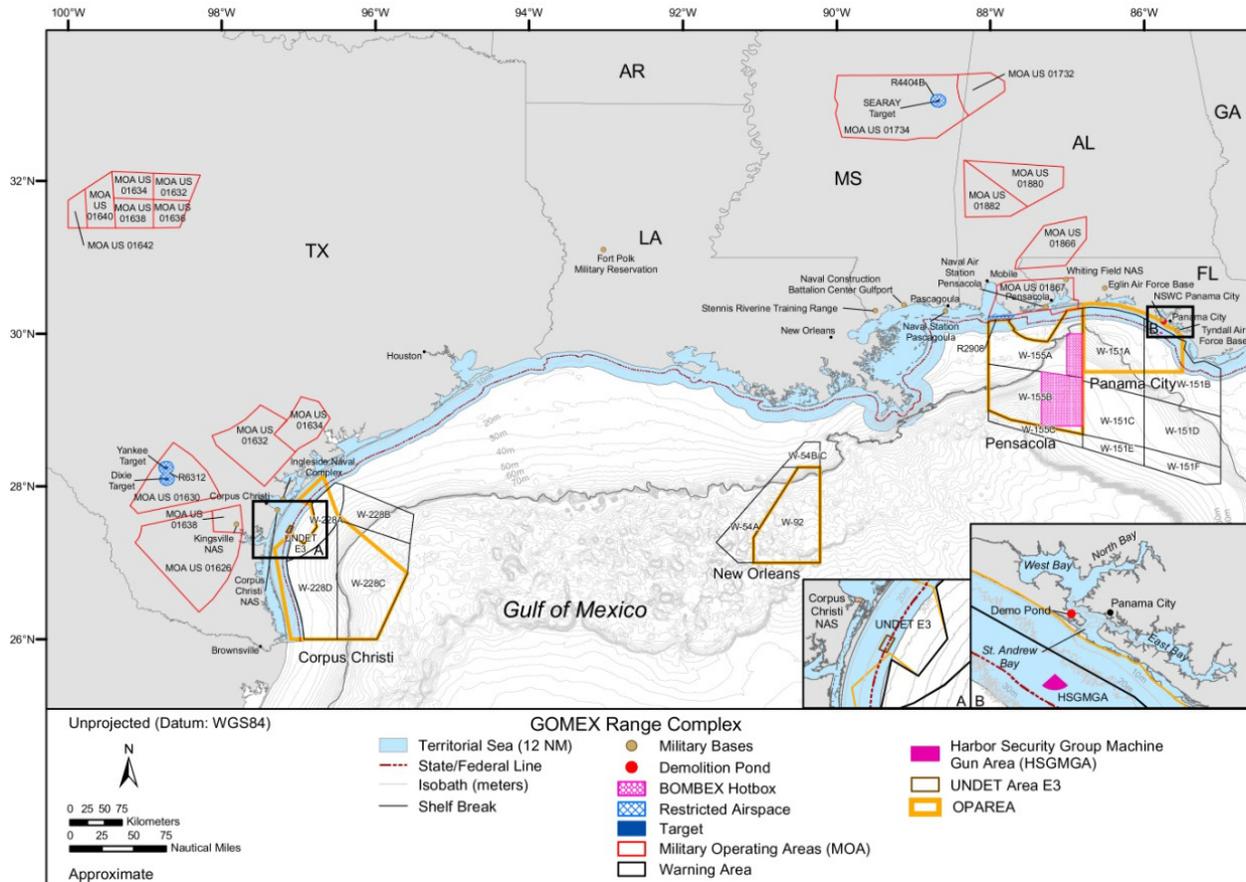


Figure V-1. GOMEX Study Area.

2. GOMEX Monitoring Accomplishments for 2011

From March 2011 – January 2011, there were no monitoring opportunities available for explosive events in the GOMEX OPAREA. Therefore, there is no monitoring to report at this time.

SECTION VI – 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.

A 2010 Navy-sponsored monitoring meeting in Arlington, Virginia initiated a process to critically evaluate the current Navy monitoring plans and begin development of revisions/updates to both existing region-specific plans and the Navy-wide Integrated Comprehensive Monitoring Program (ICMP). Discussions at that meeting as well as the Navy/NMFS annual adaptive management meeting (October 2010) established a way forward for continued refinement of the 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 Plan for Navy monitoring. The Strategic Plan is intended to be a primary component of the ICMP and to provide a "vision" for 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 to satisfy MMPA (LOA) regulatory requirements. The objective of the Strategic Plan is to continue the evolution of Navy marine species monitoring towards a single integrated program, incorporating SAG recommendations, and establishing a more transparent framework for soliciting, evaluating, and implementing monitoring work across the Fleet range complexes. The Strategic Plan is currently being developed in coordination with input from NMFS Headquarters and the Marine Mammal Commission and will establish the process for soliciting, reviewing, and selecting the most appropriate monitoring projects to invest in across the Navy. It is anticipated that some current efforts will continue but the level of effort and investment may be allocated differently across Navy ranges.

Originally, five study questions were developed jointly by NMFS and the 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 Navy monitoring program has historically been compartmentalized by range-complex and focused on effort-based metrics (e.g., survey days, trackline covered, etc.).

The Navy established the SAG in 2011 with the initial task of evaluating current Navy monitoring approaches under the ICMP and existing LOAs to develop objective scientific recommendations that would form the basis for the Strategic Plan. While recommendations were fairly broad and not prescriptive from a range complex perspective, the SAG did provide specific programmatic

recommendations that serve as guiding principles for the continued evolution of the Navy Marine Species Monitoring Program and provide a direction for the Strategic Plan development.

In June 2011, the Navy hosted a Marine Mammal Monitoring Workshop, with guidance and support from NMFS, which included scientific experts and representatives of environmental non-governmental organizations (NGOs). 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 plans and to develop a single Strategic Plan for Navy Monitoring that will improve the return on investment by focusing specific objectives and projects where they can most efficiently and effectively be addressed throughout the Navy range complexes. The Strategic Plan is currently in development and will be incorporated as a primary component of the ICMP.

VACAPES Range Complex

There are no additional modifications requested for the VACAPES Monitoring Plan as amended by the June 2011 LOA monitoring requirements.

As noted in the *Introduction (Section I)*, the Navy will explore the value of adding field measurements during monitoring of a future mine-neutralization 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 can be collected without unreasonable costs and impacts to training, the Navy will move forward in incorporating the measurements into its monitoring program for east coast mine-neutralization training.

CHPT Range Complex

There are no additional modifications requested for the VACAPES Monitoring Plan as amended by the June 2011 LOA monitoring requirements.

JAX Range Complex

There are no additional modifications requested for the VACAPES Monitoring Plan as amended by the June 2011 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 3 (to date) is shown below in **Table VI-1**.

Table VI-1. Summary of monitoring progress for Years 1 through 3.

Range Complex	Monitoring Event	Annual Requirement	Year 1	Year 2	Year 3	Total	
			5 June 2009 - 4 June 2010	5 June 2010 - 4 June 2011	5 June 2011 - 4 June 2012	Required	Completed
VACAPES	Aerial or Vessel Survey	2 (1 Multiple Detonation Exercise [MDE])	2 MINEX (with PAM)	1 MINEX (with PAM), 1 IMPASS (1 MDE)	1 MINEX (with PAM), 1 IMPASS (1 MDE)	6 (3 MDE)	6 (2 MDEs)
	MMO on Navy Platform	1	2 MINEX	1 MINEX	2 (1 IMPASS, 1 MINEX)	3	4
CHPT	Aerial or Vessel Survey	1	0*	0*	1	3	1
	MMO on Navy Platform	1	0*	0*	0	3	0
JAX	Aerial or Vessel Survey	2 (1 MDE)	0	2 MISSILEX, 2 IMPASS (2 MDEs)	1 IMPASS (1 MDE)	6 (3 MDE)	5 (2 MDEs)
	MMO on Navy Platform	1	0	1 IMPASS	0	3	1
Range Complex	Monitoring Event	Annual Requirement	Year 1	Year 2	Year 3	Total	
			18 March 2011 - 17 March 2012	18 March 2012 - 17 March 2013	18 March 2013 - 17 March 2014	Required	Completed
GOMEX	Aerial or Vessel Survey	1	0*			3	0
	MMO on Navy Platform	1	0*			3	0

*No monitoring due to no training events being conducted.

NA = not applicable

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