Updated Methodology to Assess Behavioral Effects of Explosive Training Events on Bottlenose Dolphins in Coastal Virginia Waters

Bort Thornton, Jacqueline[1]; Gormley, Jaime[1]; Bell, Joel[1]; Hotchkin, Cara[1]; Nissen, Jene[2] ; Busch, Laura[2]

1- NAVFAC Atlantic, Norfolk, VA, USA 2- U.S. Fleet Forces Command, Norfolk, VA, USA

Introduction

- U.S. Navy explosive ordnance disposal (EOD) training events have the potential to affect marine mammals.
- The EOD team locates simulated underwater mines and "neutralizes" them using an explosive charge.
- Acoustic and visual monitoring for marine mammals conducted during these events since 2009 for baseline occurrence data.
- A new approach to the project consists of conducting focal follows as well as acoustic monitoring (only during event days.)

Methods

Visual Monitoring

Objectives

- Conduct initial line transect lines and subsequent focal follows by small boat on the day of the exercise

- Study area is defined by behavioral range to effects for 10-20lbs explosive charges as determined by the Navy range to effects modelling for AFTT Phase III

- Data collection method consists of 3-min focal-school scan sampling and assigning a predominant school activity after an instantaneous scan of each individual in the school using the COMPASS iPad application, developed by HDR Inc. for the U.S. Navy marine species monitoring program.

- If dolphins enter the mitigation zone, the exercise is postponed following mitigation protocols outlined in the Navy's LOA from NMFS.
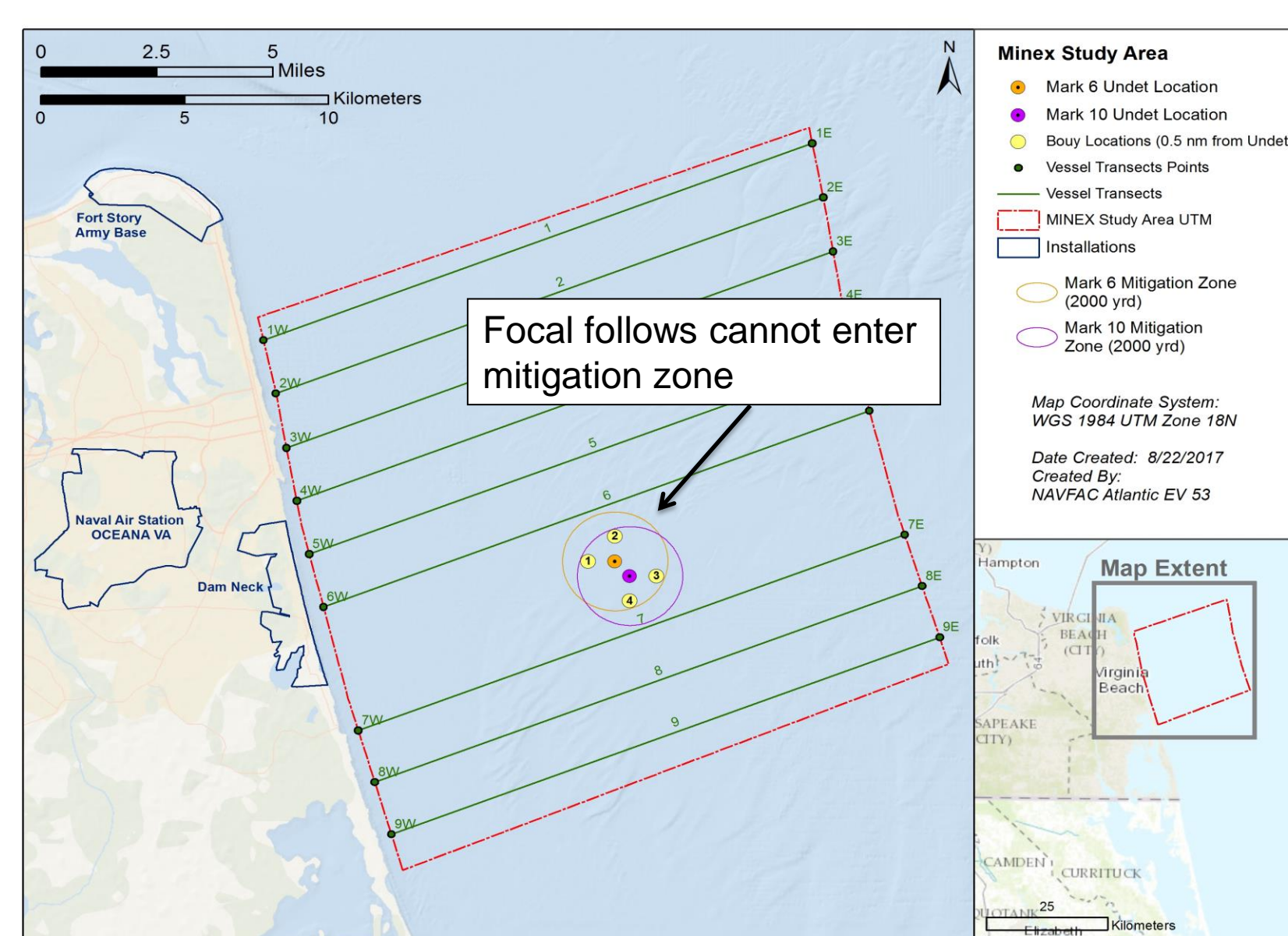
Figure 1. Planned visual line transect lines and UNDET locations for data collection on 23 August 2017.

Passive Acoustic Monitoring

Objectives

- Continued near real-time localization of marine mammal vocalizations using sonobuoys

- Four sonobuoys are moored 0.25 NM from the EOD exercise location and positioned 0.50 NM apart

- Land-based acoustic analysts direct boats to groups of dolphins in real time

- The buoys are retrieved at the end of each day

Results of Pilot Data Collection

A data collection effort took place on August 23, 2017 to test the new focal follow procedures using the COMPASS application, and archival passive acoustic recorders.
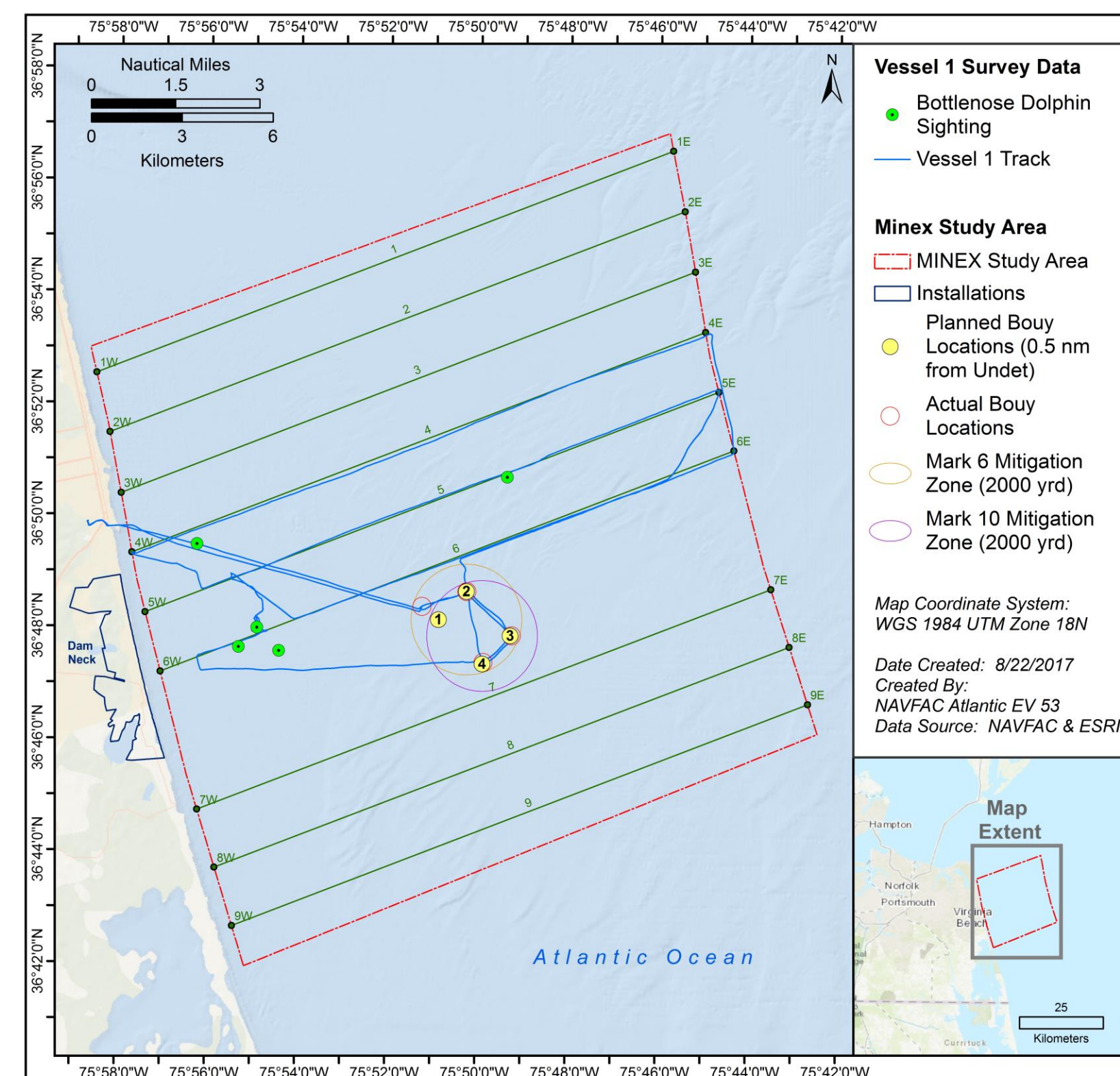
Figure 2. Survey lines and sightings of acoustic/visual boat "Game On" 23 August 2017.
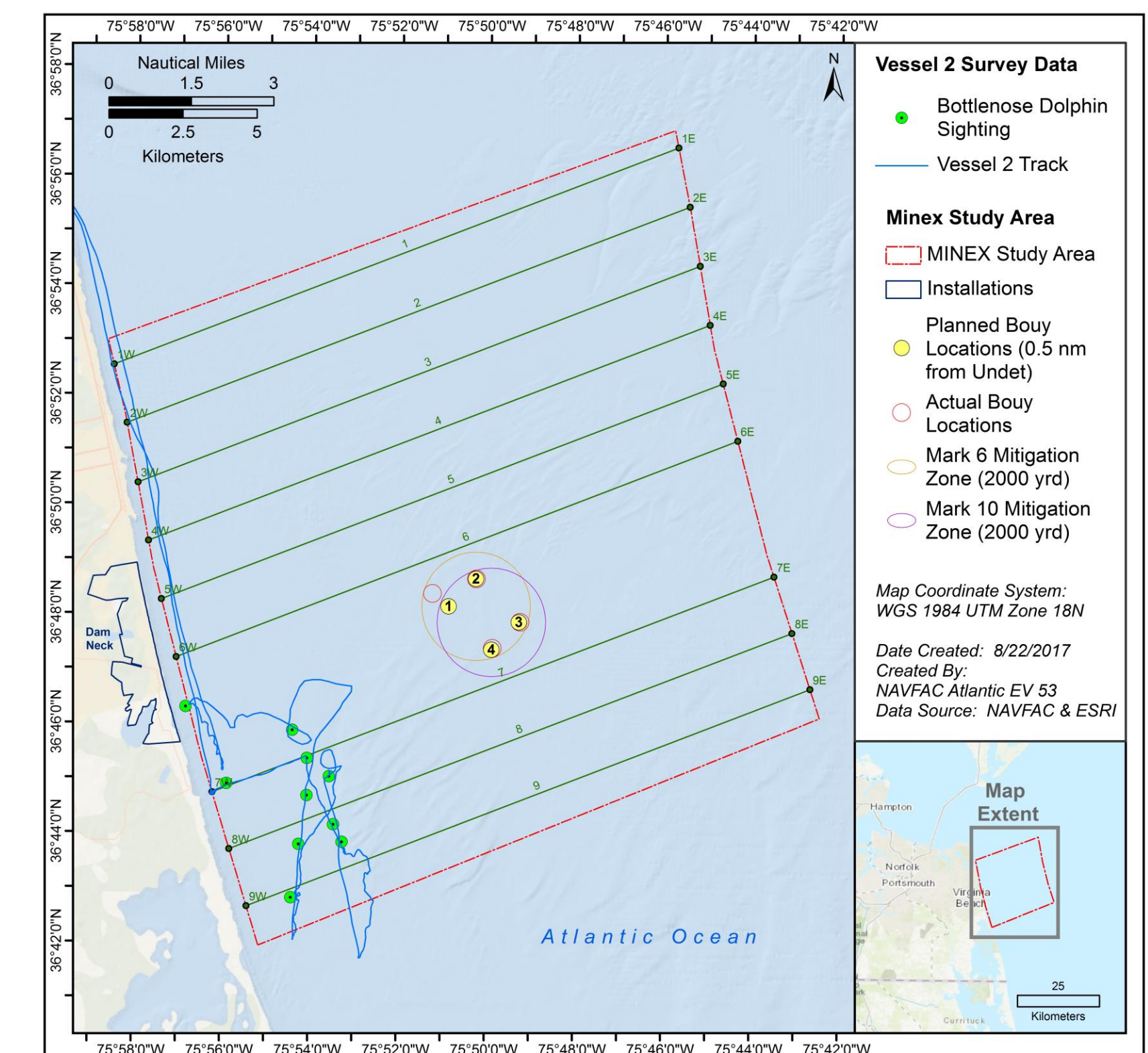
Figure 3. Survey lines and sightings of visual boat "Whale Research" 23 August 2017.
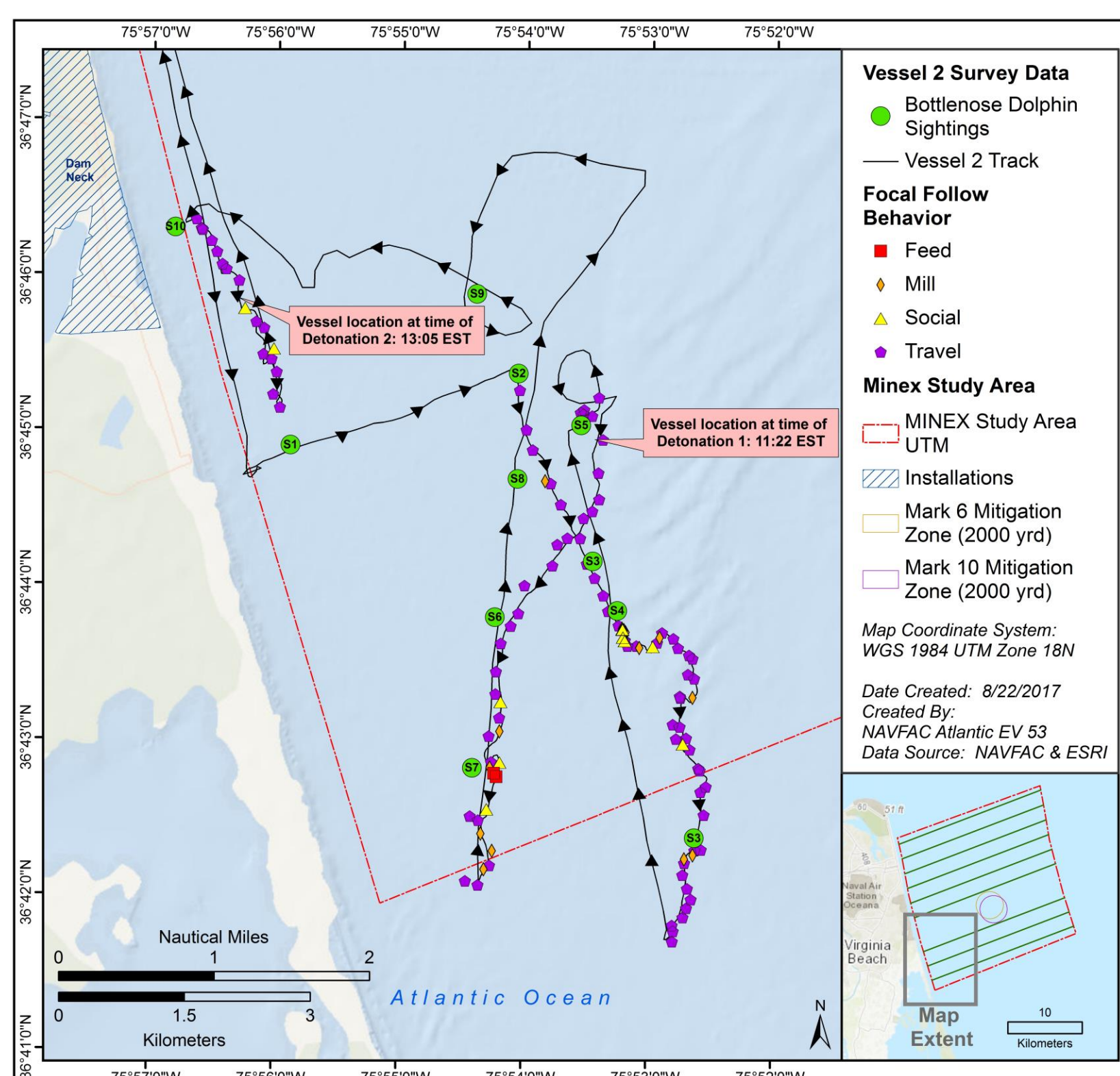
Figure 4. Selection of focal follow data including position of boat at times of detonation
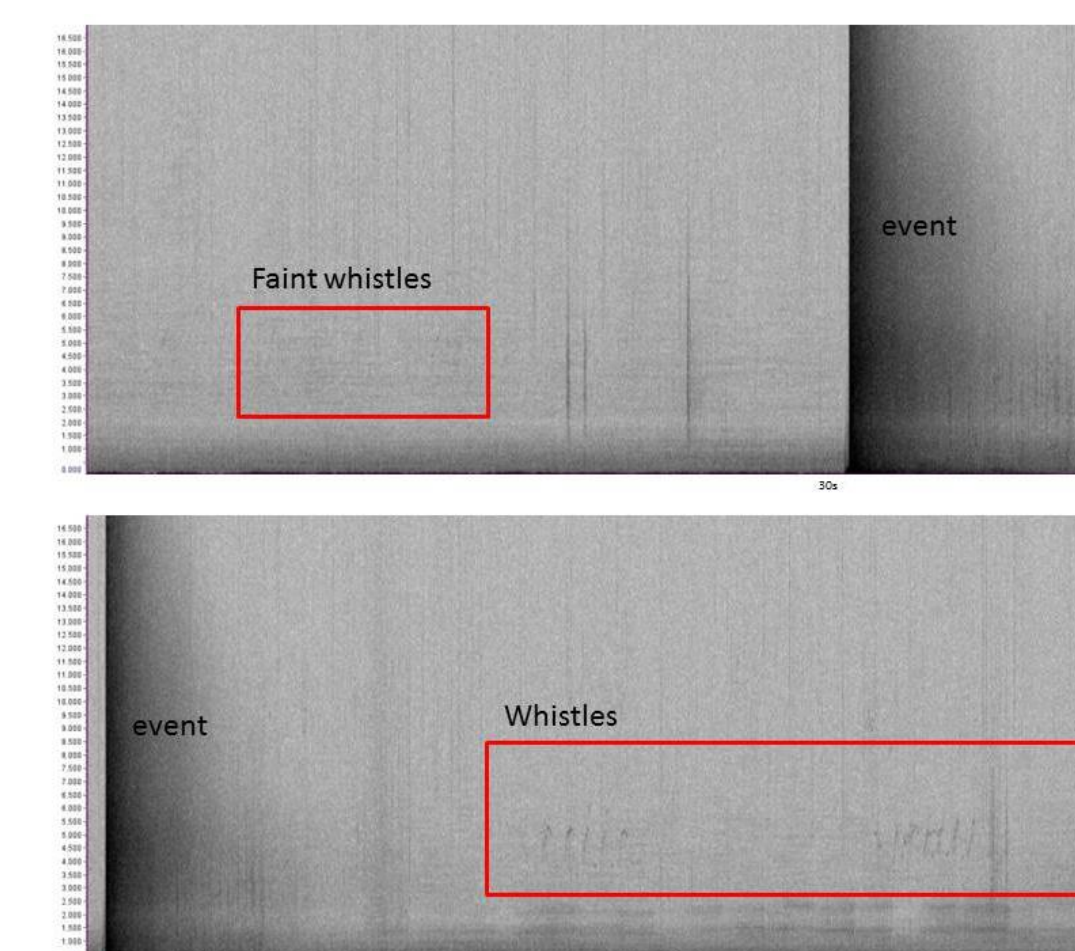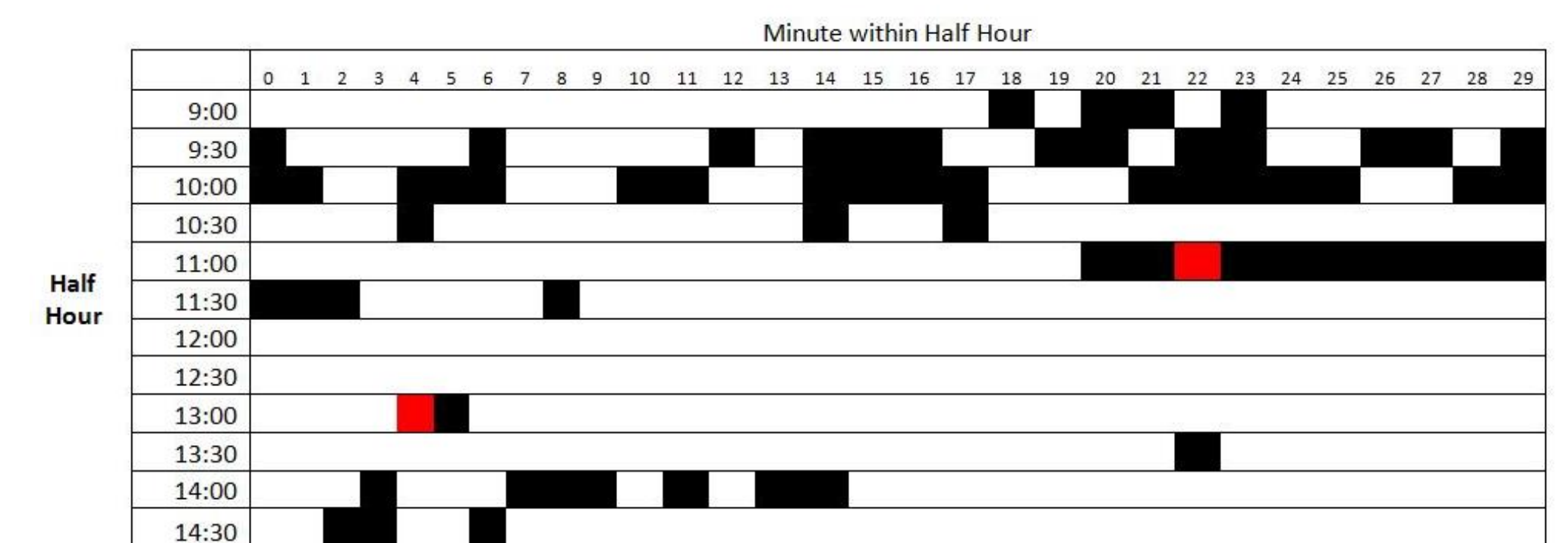
Figure 5 (above). Acoustic detections of dolphins on Buoy 1. Black squares indicate presence of one or more detections of dolphin whistles within that 1-minute time period.

Figure 6 (left). Examples of faint whistles before and clearer whistles after the 11:22am detonation.

Future Work

This project evolved from a successful technology demonstration, showing that sonobuoys can be used to localize dolphins in real-time from a shore-based receiver, to a study that directly addresses behavioral reactions of bottlenose dolphins to EOD training.

Future work will focus on:

- increased monitoring utilizing the real-time localization component from the shore-based receiver to cue vessels to the presence of dolphin groups for focal follow

- Fine-tuning of focal follow protocols to collect fine scale data

- Comparing photo-ID data collected during focal follows to long term visual survey data

Photo: Amy Engelhaupt, NOAA permit #16239

Acknowledgments