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Cruise Report, Marine Species Monitoring & Lookout Effectiveness Study Fleet Exercise, April 2015, Virginia Capes Range Complex



Prepared for:
Commander, United States Fleet Forces Command



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List of Acronyms and Abbreviations

BSS	Beaufort Sea State
DDG	United States Navy guided missile destroyer
DMMO	data marine mammal observer
ESA	Endangered Species Act
ft	foot (feet)
GPS	global positioning system
hr	hour(s)
ICMP	Integrated Comprehensive Monitoring Program
LMMO	liaison marine mammal observer
LO	Lookout
m	meter(s)
min	minute(s)
MFAS	mid-frequency active sonar
MMO	marine mammal observer
MMPA	Marine Mammal Protection Act
NMFS	National Marine Fisheries Service
SMMO	survey marine mammal observer
U.S.	United States
VACAPES	Virginia Capes Range Complex
yd	yard(s)

SECTION 1 INTRODUCTION

In order to train with mid-frequency active sonar (MFAS), the United States (U.S.) Navy has obtained a permit from the National Marine Fisheries Service (NMFS) under the Marine Mammal Protection Act (MMPA) and a Biological Opinion under the Endangered Species Act (ESA). The Navy conducts monitoring within Navy Range Complexes and testing ranges, guided by the Integrated Comprehensive Monitoring Program (ICMP), as required under the MMPA and the ESA (Department of the Navy 2010).

The ICMP provides the overarching framework for coordination of the U.S. Navy Marine Species Monitoring Program (Department of the Navy 2010). The ICMP outlines objectives for marine species monitoring and U.S. Navy-funded research relating to the effects of naval training and testing activities on protected marine species (Department of the Navy 2010). The ICMP includes the following scientific objectives (Department of the Navy 2010):

1. monitor and assess the effects of Navy activities on protected marine species;
2. ensure that data collected at multiple locations is collected in a manner that allows comparison between and among different geographic locations;
3. assess the efficacy and practicality of the monitoring and mitigation techniques; and
4. add to the overall knowledge base of protected marine species and the effects of Navy activities on these species.

In order to address these objectives, data would be collected through various means, including contracted vessel and aerial surveys, tagging, passive acoustic monitoring, and placing marine mammal observers (MMOs) aboard Navy warships. In accordance with objective 3 above, a study was initiated to determine the effectiveness of the Navy lookout team, including lookouts in the pilot house or on the bridge wings. Trained biologists were utilized for the study to collect data that would characterize the likelihood of detecting marine species in the field from a U.S. Navy destroyer (DDG). The University of St. Andrews, Scotland, under contract to the U.S. Navy, developed an initial protocol for use during this study. Necessary changes to the protocol were identified and made during prior cruises. Data collected are intended to be combined with future monitoring efforts in order to determine the effectiveness of Navy lookout teams as a whole, rather than specific to each vessel.

As part of this data collection effort, four U.S. Navy civilian MMOs (Ms. Amy Farak, Mr. Andrew DiMatteo, Ms. Jacqueline Bort, and Ms. Jaime Budzynkiewicz) embarked from 5-6 April 2015 during a Fleet Exercise event in VACAPES. These MMOs were stationed aboard a U.S. Navy guided missile destroyer, hereafter referred to as DDG-M. The goals of the monitoring and this study were to:

1. Collect data to assess the effectiveness of the Navy lookout team.
2. Obtain data to characterize the possible exposure of marine species to MFAS.

SECTION 2 METHODS

MMO surveys were conducted on a not-to-interfere basis, which means that the MMOs would not replace required Navy lookouts, would not dictate operational requirements or maneuvers, and would remove themselves from the bridge wing if necessary for DDG-M to accomplish its mission objectives. The exceptions would be if a marine mammal was sighted by the MMO within the shut-down zone during MFAS operations (200 yards [yds], 183 meters [m]) and was not sighted by the Navy lookout team, or if the vessel was in danger of striking the marine species. In these cases, the MMO would report the sighting to the Navy lookout team for appropriate reporting and action. The initial protocol for data collection was developed by the University of St. Andrews, which was modified by the MMOs on prior surveys. Additional changes were made as necessary during these events. The MMO survey on DDGM was conducted on the bridge wings (elevated 65.6 feet [ft; 20 m] above the waterline), with one MMO on each wing (called survey MMOs, or SMMOs). One MMO acted as a liaison to the starboard and port lookouts (called liaison MMO or LMMO). The fourth MMO was primarily responsible for recording data (data MMO or DMMO) reported by the two SMMOs and the LMMO. A rotation schedule was used, such that an MMO would be on effort for one hour on port, one hour as the LMMO, one hour as an SMMO on starboard, and one hour as DMMO. While on effort, MMOs used naked eye and 7 X 50 magnification binoculars to scan the area from 10 degrees on the opposite side of dead ahead to just aft of the beam. This equates to a 180 degree field in front of the ship that was covered by the MMOs, with a 20 degree overlap in the area forward of the trackline covered by both observers.

If a marine mammal or sea turtle was visually detected by the SMMOs, information would be collected on both the sighting and concurrent operational parameters. Environmental data were collected routinely. Sightings obtained first by the SMMOs before the Navy lookout were considered to be “trials.” If applicable, photographs would be taken using a Nikon D90 digital camera with a 100 – 300 millimeter zoom lens. No photographs would be taken until the Navy lookout had also made the sighting so as not to inappropriately call attention to the sighting. The track of the DDGM was not altered as result of the sightings. Therefore, the species identification level represents the best ability to recognize species specific characteristics at a distance from the ship, without approaching the animals for study. The LMMO or SMMOs reported sightings made by the Navy bridge wing lookouts. The LMMO was also responsible for noting sightings made by the bridge team or watchstanders. After a sighting by the Navy lookout or bridge team, the LMMO would also query the personnel to clarify information on the sighting such as animals seen, bearing, distance, and time. All four MMOs were equipped with headset two-way radios in order to maintain communications without leaving their post, as well as communicating sighting and effort data without cueing the Navy lookouts to sightings. The DMMO was responsible for recording all data and making initial determination as to whether sightings were considered a duplicate, e. g., the same animal seen by two observers. The DMMO recorded effort-related events (e.g., begin effort, end effort, observer rotation, weather change) in addition to time, location, and weather information as per the protocol. At the time of events and sightings, a waypoint was immediately taken by the DMMO such that the accurate time and location would be recorded, with associated information to be appended. Effort and environmental information was collected when the MMOs began effort, at each rotation, as weather changes occurred, and when the MMOs went off effort. At the conclusion of each observation day, all photographs were reviewed to assist with species identification.

SECTION 3 RESULTS

The MMO team spent 21 hours and 55 minutes searching for marine species during the training event (Table 1). For whole days out at sea, an average of 9.46 hours per day were spent on effort. Figure 1 shows the breakdown of Beaufort Sea State (BSS) as a total of the on-effort observation period and the percentage of sightings that occurred at each BSS. During the event, BSS ranged from 2 to 4 (Table 1). The majority of observation time was spent in a BSS of 2 or 3 (64.5% and 30.9%, respectively), which amounts to favorable environmental sighting conditions, with all of the sightings occurring in a BSS of 2 (Figure 1).

Table 1. Effort Hours and Environmental Conditions

Date	Team Hours On-Effort	Time	Beaufort Sea State (range)	% Cloud Cover (range)	Visibility
5 April	3:00:00	15:00-17:00, 18:00-19:00	2-4	30-40	Good
6 April	9:45:00	07:12-12:14, 14:00-17:05, 17:52-19:30	2-3	27.5-90	Moderate to Good
7 April	9:10:00	07:16-12:07, 13:10-14:35, 15:20-17:15, 17:57-18:56	2	12.5-90	Moderate to Good
Total	21 hours 55 minutes		2-4	12.5-90	Moderate to Good

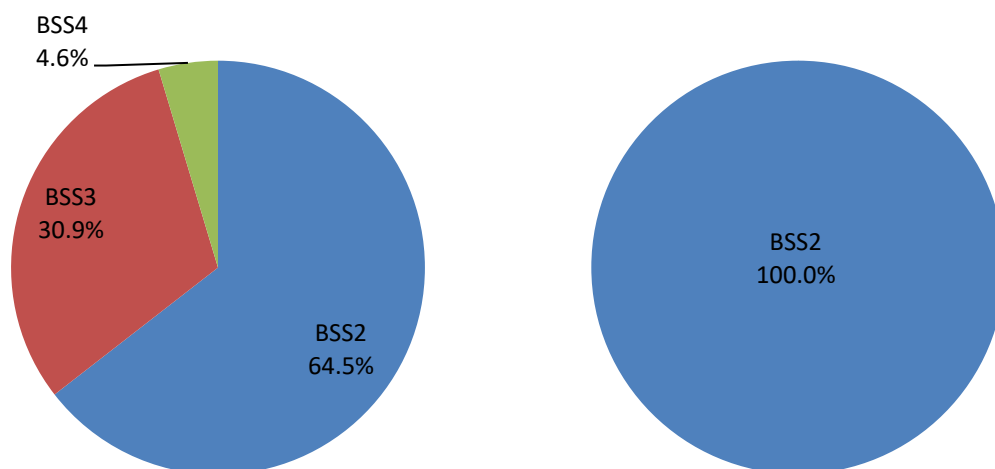


Figure 1. Total percentage of effort (left) and sightings (right) at various Beaufort Sea States (BSS)

In total, 3 unique sightings comprising at least 5 individual marine mammals were recorded during the three days of observation (Figure 2). All three sightings were recorded on the last day of the event (Table 2). MMOs made 2 sightings independent of the ship's watchstander team. The watchstander team did not initially sight any marine animals before confirmation by the MMOs. There was one sighting made by both teams.

Seabird sightings were not recorded on this trip. A total of 46 photographs were taken, none of which include visible cetaceans. All other photos are of vessels, staff, environmental conditions, and procedures.

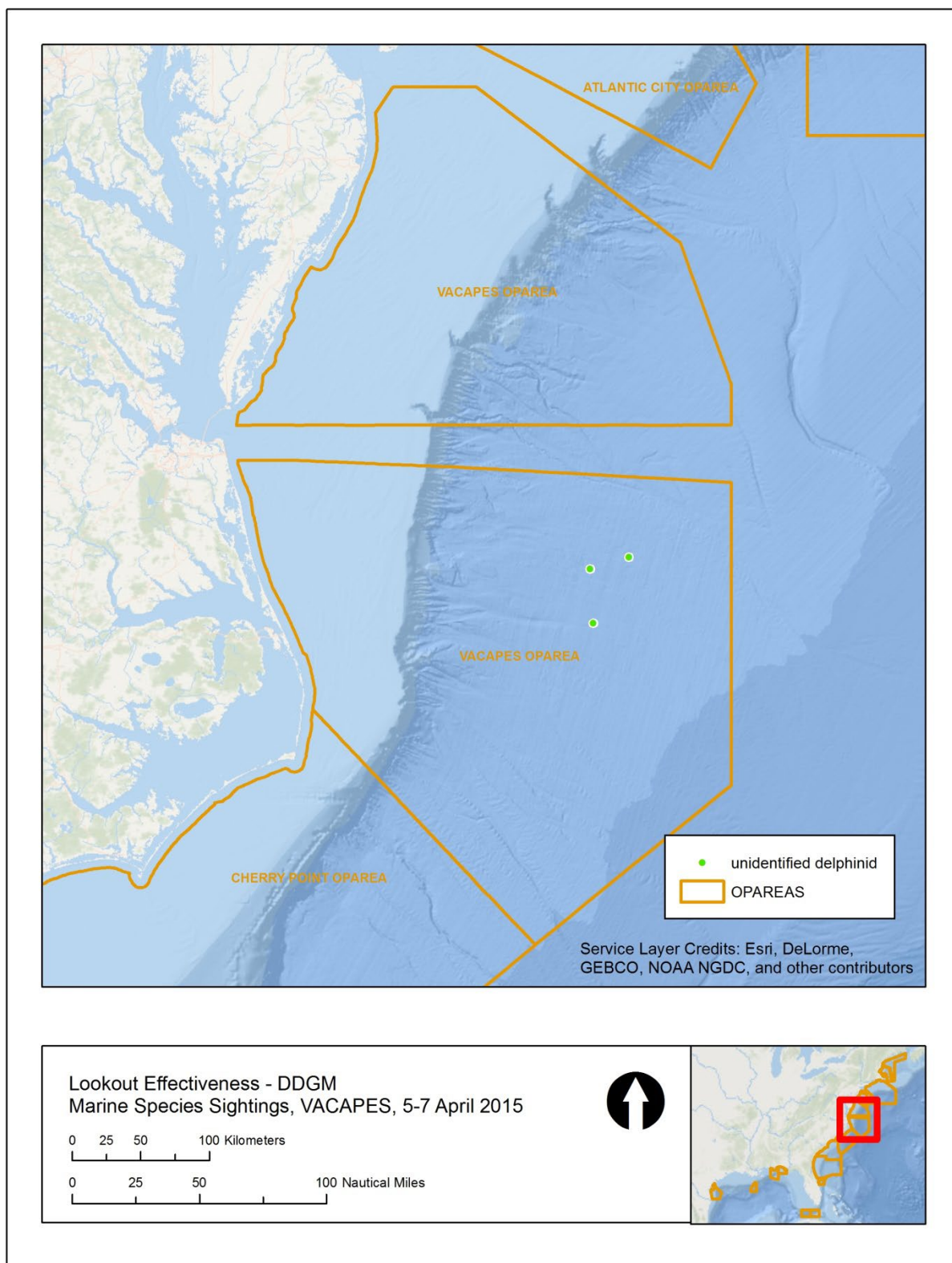
Table 2. Number of Sightings

Date	Independent MMO Sightings	Independent Navy Watchstander Team Sightings	Sightings by both Teams	Total Number of Sightings
5 April	0	0	0	0
6 April	0	0	0	0
7 April	2	0	1	3
Total	2	0	1	3

Trials were successfully conducted on one day of the event, with all 3 of the sightings available for trials (Table 3). There was an average rate of 0.14 sightings per hour of effort and an average rate of 0.14 trials per hour of effort across all three days.

Table 3. Effort hours, sighting rates, and trial rates

Date	Hours MMO Team Effort	# of Unique Sightings	Sightings/ Hour	# of Trials	Trials/Hour
5 April	3 hours	0	0	0	0
6 April	9 hours 45 minutes	0	0	0	0
7 April	9 hours 10 minutes	3	0.33	3	0.33
Cumulative	21 hours 55 minutes	3	0.14	3	0.14



Of the 3 marine mammal sightings, none were identified to the species or genus level due to the brevity of the sightings. Visual sightings included 3 unidentified dolphin (Table 4). The third day of effort had the greatest frequency of unique sightings, with 0.33 sightings per hour of effort (Table 3).

Table 4. Unique Marine Mammal Sightings

Data Category	Sighting 1	Sighting 2	Sighting 3
Sighting Information			
Effort	On	On	On
Date	4/7/2015	4/7/2015	4/7/2015
Time (HST)	8:57:00	11:53:00	16:35:00
Location	36.30349159	36.24939195	35.95757219
	-73.33260974	-73.58815814	-73.56880763
Detection Sensor	MMO/LO	MMO	MMO
Species/Group	Unidentified Dolphin	Unidentified Dolphin	Unidentified Dolphin
Group Size estimate (estimated range)	3 (2-5)	3 (2-3)	1
# Calves	0	0	0
Bearing (relative)	320	355	10
Distance (m)	117.04	365.76	45.72
Animal motion	Parallel	Parallel	Closing
Sighting Cue	Body	Splash	Dorsal fin
Behavior	Jumping	Other	Bowriding
Environmental Information			
Wave height (ft)	L	L	L
Visibility	Good	Moderate	Good
Beaufort Sea State	2	2	2
Cloud cover (%)	35	27.5	50
Glare (%)	0	0	10
Operational Information			
Sonar	OFF	OFF	OFF
Ship bearing (true)	202	20	192
Mitigation implemented	None	None	None
Comments	Lookouts saw at same time as MMO	Lookouts did not see	Lookouts did not see. No Lookout on Bridge wing

SECTION 4 CONCLUSIONS

The goals of the lookout effectiveness monitoring effort are provided below, with a conclusion regarding each of the goals:

1. Collect data to determine the effectiveness of the Navy lookout team.

This event was the thirteenth aboard a DDG in which data were collected to determine effectiveness; data will be combined with future monitoring efforts in order to determine the effectiveness of Navy lookouts as a whole, rather than specific to each vessel.

2. Obtain data to characterize the possible exposure of marine species to MFAS.

Sighting information included the bearing and distance of the animal to the DDG. This information can be used to determine the level of exposure a marine mammal or sea turtle may experience during an MFAS event.

SECTION 5 REFERENCES

Department of the Navy (2010). United States Navy Integrated Comprehensive Monitoring Program 2010 Update, 20 December 2010.