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Cruise Report, Marine Species Monitoring & Lookout Effectiveness Study

Fleet Exercise, August 2017, Jacksonville 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)
hr	hour(s)
ICMP	Integrated Comprehensive Monitoring Program
JAX	Jacksonville Range Complex
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
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 Letter of Authorization 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 (LO) team, including lookouts in the pilot house or on the bridge wings. Trained biologists are 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 current and future data 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. Jacqueline Bort, Mr. Benjamin Bartley, Ms. Erin Oliveira, and Ms. Christiana Salles) embarked from 7 August-11 August 2017 during a Fleet Exercise event in the Jacksonville Range Complex (JAX). These MMOs were stationed aboard a U.S. Navy guided missile destroyer, hereafter referred to as DDGQ. 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 did not replace required Navy lookouts, would not dictate operational requirements or maneuvers, and would remove themselves from the bridge wings if necessary for DDGQ 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 DDGQ 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 SMMO would generally 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, SMMOs 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° field in front of the ship that was covered by the MMOs, with a 20° 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 routinely collected. The goal of the survey was to set up “trials” for the Navy lookout team such that the SMMO observed an animal before the Navy lookout, and determined if the Navy lookout subsequently detected that animal or not, and at what distance. Sightings that were between 270° and 90° relative to the ship and obtained first by the SMMOs and before the Navy lookout or at the same time as 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 DDGQ would not be 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 would report sightings made by the Navy bridge wing lookouts. The LMMO would also be 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 would be 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 would record all data and make initial determination as to whether sightings were considered a duplicate, e. g., the same animal seen by two observers. The DMMO would record 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 would be 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 would be collected when the MMOs began effort, at

each rotation, and as weather changes occurred. At the conclusion of each observation day, all photographs would be reviewed to assist with species identification.

SECTION 3 RESULTS

The MMO team spent 31.68 hours searching for marine species during the training event (Table 1). For whole days out at sea, an average of 9 hours per day was spent on effort. Several training evolutions occurred that precluded full days of observing (bridge wings occupied during exercise, maintenance on bridge wings, etc.). 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 1 to 3 (Table 1). The majority of observation time was spent in a BSS of 1 or 2 (27.4% and 65.8%, respectively), which amounts to favorable environmental sighting conditions, with the most sightings occurring in a BSS of 1 (50%, Figure 1).

Table 1. Effort Hours and Environmental Conditions

Date	Team Hours On-Effort	Time	Beaufort Sea State (range)	% Cloud Cover (range)	Visibility
7 August	4:56:00	12:41-16:40 18:16-19:13	2	3-23.5	Excellent
8 August	9:20:00	7:25-11:34 12:30-16:40 17:36-18:37	2-3	17.5-80	Excellent
9 August	8:16:00	7:09-11:21 13:12-16:15 17:35-18:36	1-2	42.5-92.5	Moderate to Excellent
10 August	9:09:00	7:06-11:07 12:31-16:39 17:25-18:25	1-2	10-65	Excellent
Total	31 hours 41 minutes		1-3	3 to 92.5	Moderate to Excellent

Visibility: Bad (0.5km); Poor (0.5-1.5km); Moderate (1.5-10km); Good (10-15km); Excellent (>15km)

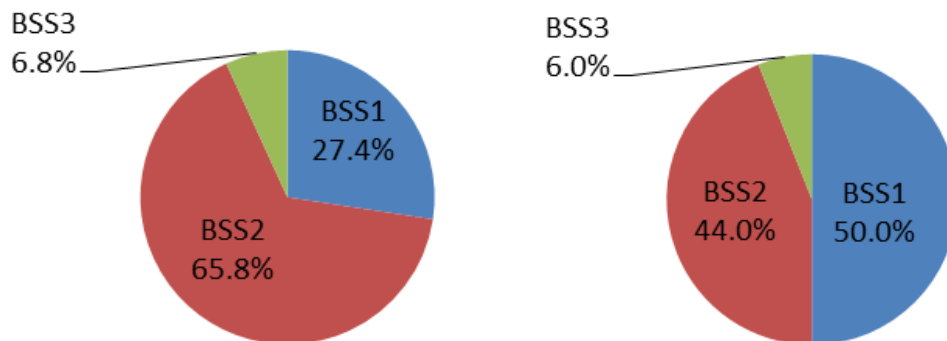


Figure 1. Total Percentage of Effort (Left) and Sightings (Right) at Various Beaufort Sea States (BSS)

In total, 50 unique sightings comprising at least 101 individual marine animals were recorded during the four days of observation (Figure 2). MMOs made 44 sightings independent of the ship's watchstander team (Table 2). The watchstander team made 2 sightings independent of the MMOs. There were 4 sightings made by both teams. There was one sighting of a non-target species, a tiger shark, by the MMOs that was not included in the data. The ship log was obtained at the end of the cruise, but did not contain any new marine mammal or sea turtle information. One entry in the ship log showed that the watchstander team had seen one of the sightings made by the MMO team that was not previously recorded by the LMMO.

Seabird sightings were not recorded on this trip. A total of 97 photographs were taken of sea turtles, dolphins, vessels and environmental conditions.

Table 2. Number of Sightings

Date	Independent MMO Sightings	Independent Navy Watchstander Team Sightings	Sightings by both Teams	Total Number of Sightings
7 August	2	0	0	2
8 August	11	1	1	13
9 August	20	1	2	23
10 August	11	0	1	12
Total	44	2	4	50

Trials were successfully conducted on all days of the event, with 46 of the 50 sightings (92%) available for trials. There was an average rate of 1.58 sightings per hour of effort and an average rate of 1.45 trials per hour of effort across all four days (Table 3). The third day of effort (August 9) had the greatest frequency of trials, with 2.42 trials per hour of effort. The greatest frequency of unique sightings also occurred on August 9, with 2.78 sightings per hour of effort (Table 3).

Table 3. Effort Hours, Sighting Rates, and Trial Rates

Date	Hours MMO Team Effort	# of Unique Sightings	Sightings/Hour	# of Trials	Trials/Hour
7 August	4 hours 56 minutes	2	0.405408	2	0.405408145
8 August	9 hours 20 minutes	13	1.392907	12	1.285760206
9 August	8 hours 16 minutes	23	2.782247	20	2.419345083
10 August	9 hours 9 minutes	12	1.311475	12	1.31147541
Cumulative	31 hours 41 minutes	50	1.578133	46	1.451882713

Of the 50 marine animal sightings, 29 were identified to the species level. Visual sightings included 5 sightings of bottlenose dolphins (*Tursiops truncatus*), 6 sightings of Atlantic spotted dolphins (*Stenella frontalis*), 4 sightings of common dolphins (*Delphinus delphis*), 22 sightings of unidentified dolphin, and 14 loggerhead sea turtles (*Caretta caretta*) (Table 4, Figure 2). Photos of a few of the sightings are provided in Figures 3 through 6.

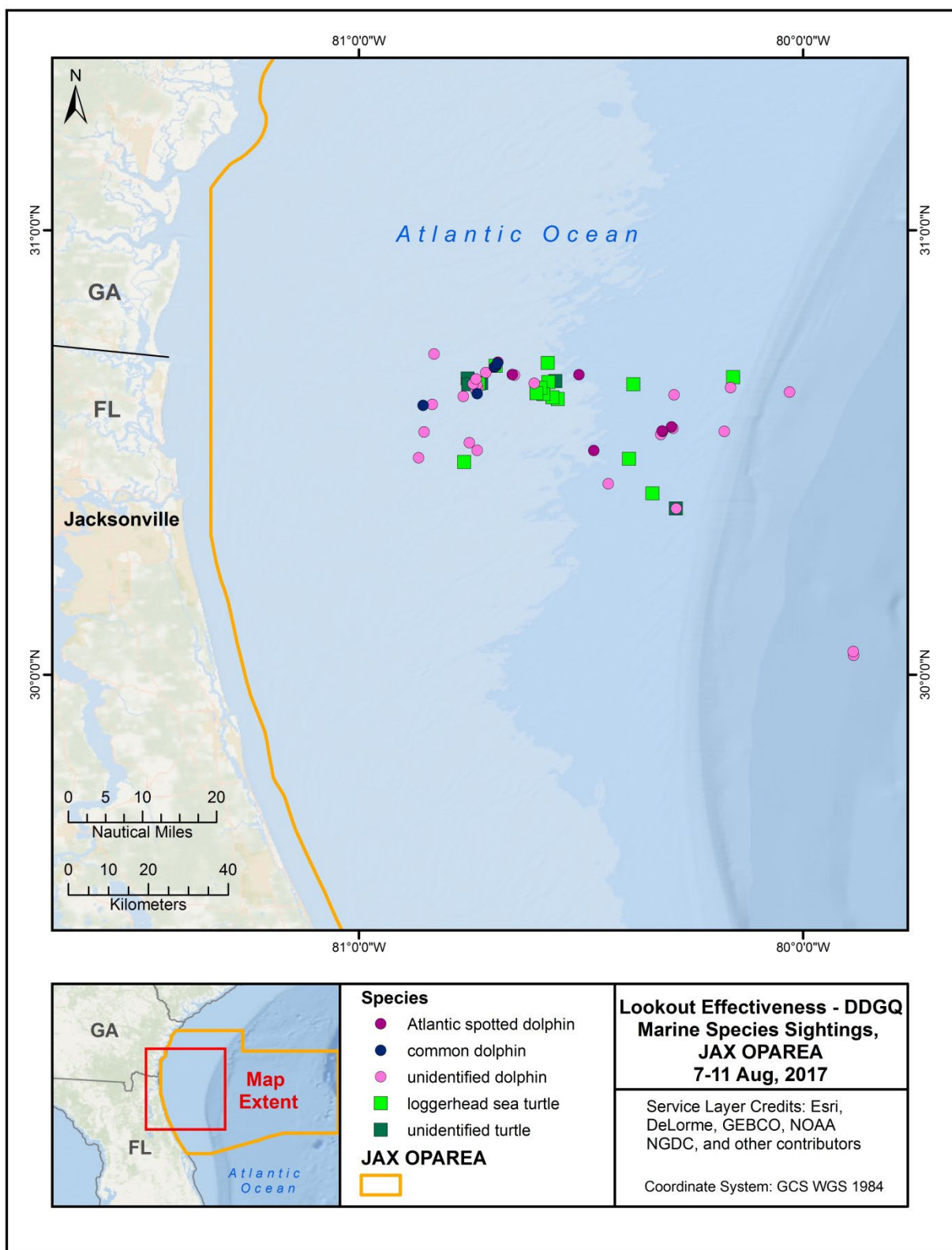


Figure 2. Marine Mammal and Sea Turtle Sightings in the Jacksonville Range Complex



Figure 3. Spotted Dolphins approaching to bow ride from Sighting 44 on 10 August 2017



Figure 4. Spotted dolphin jumping from Sighting 44 on 10 August 2017



Figure 5. Spotted dolphin surfacing from Sighting 47 on 10 August 2017



Figure 6. Loggerhead Sea Turtle from Sighting 41 on 10 August 2017

Table 4. Unique Marine Mammal and Sea Turtle Sightings

Data Category	Sighting 1	Sighting 2	Sighting 3	Sighting 4	Sighting 5	Sighting 6	Sighting 7
Sighting Information							
Effort	On	On	On	On	On	On	On
Date	08/07/17	08/07/17	08/08/17	08/08/17	08/08/17	08/08/17	08/08/17
Time (EDT)	12:53	15:59	8:39	8:40	12:37	12:46	13:09
Location	30.6574	30.6529	30.0437	30.0523	30.3742	30.4079	30.5047
	-80.5664	-80.3814	-79.8853	-79.8863	-80.2861	-80.3387	-80.4707
Detection Sensor	MMO	MMO	MMO	LO	MMO/LO	MMO	MMO
Species/Group	Loggerhead sea turtle	Loggerhead sea turtle	Unidentified dolphin	Unidentified dolphin	Bottlenose dolphin	Loggerhead sea turtle	Atlantic spotted dolphin
Group Size estimate (estimated range)	1	1	1	1	3 (3-5)	1	1
# Calves	0	0	0	0	0	0	0
Animal Bearing (relative)	90	90	45	0	0	45	90
Distance (m)	571.43	100	15	10	5	10	15
Animal motion	Parallel	Parallel	Closing	Parallel	Closing	None	Closing
Sighting Cue	Body	Body	Porpoise	Body	Body	Body	Body
Behavior	Resting	Logging	Traveling	Traveling	Traveling	Logging	Traveling
Environmental Information							
Beaufort Sea State	2	2	2	2	3	3	3
Wave Height	L	L	L	L	L	L	L
Visibility	E	E	E	E	E	E	E
Glare (%)	3	35	15	15	0	0	0
Cloud Cover (%)	3.5	15	32.5	32.5	37.5	37.5	37.5
Operational Information							
Sonar	Off	Off	Off	Off	Off	Off	Off
Ship bearing (true)	70	0	349	349	303	305	329
Mitigation implemented	No	No	No	No	No	No	No
Comments	Sighting limited due to 9 people on port bridge for GUNEX		No LO during sighting; only came out after	LO sighted one different animal (than sighting 3)	Bridge team saw at same time		

Visibility: Bad (0.5km); Poor (0.5-1.5km); Moderate (1.5-10km); Good (10-15km); Excellent (>15km)

Table 5. Unique Marine Mammal and Sea Turtle Sightings (cont'd)

Data Category	Sighting 8	Sighting 9	Sighting 10	Sighting 11	Sighting 12	Sighting 13	Sighting 14
Sighting Information							
Effort	On	On	On	On	On	On	On
Date	08/08/17	08/08/17	08/08/17	08/08/17	08/08/17	08/08/17	08/08/17
Time (EDT)	13:42	13:45	13:49	13:54	15:08	15:27	15:35
Location	30.6180	30.6238	30.6305	30.6448	30.6339	30.7014	30.6610
	-80.5455	-80.5638	-80.5843	-80.5935	-80.5999	-80.5745	-80.5574
Detection Sensor	MMO	MMO	MMO	MMO	MMO	MMO	MMO
Species/Group	Loggerhead sea turtle	Loggerhead sea turtle	Loggerhead sea turtle	Loggerhead sea turtle	Loggerhead sea turtle	Loggerhead sea turtle	Bottlenose dolphin
Group Size estimate (estimated range)	1	1	1	1	1	1	2
# Calves	0	0	0	0	0	0	0
Animal Bearing (relative)	52	51	10	30	30	32	70
Distance (m)	571.43	40	100	200	40	20	30
Animal motion	Parallel	Parallel	None	None	None	None	Closing
Sighting Cue	Body	Body	Body	Body	Body	Body	Body
Behavior	Logging	Other	Logging	Other	Logging	Logging	Bowriding
Environmental Information							
Beaufort Sea State	2	2	2	2	2	2	2
Wave Height	L	L	L	L	L	L	L
Visibility	E	E	E	E	E	E	E
Glare (%)	18	18	18	18	10	10	10
Cloud Cover (%)	17.5	17.5	17.5	17.5	25	25	25
Operational Information							
Sonar	Off	Off	Off	Off	Off	Off	Off
Ship bearing (true)	290	290	293	291	270	140	180
Mitigation implemented	No	No	No	No	No	No	No
Comments	No LO present	No LO present. Behavior was diving	No LO present	LO present, but did not see animal. Behavior was diving	Two LOs present, none saw animal	7 crew members on bridge wing, none saw animal	

Visibility: Bad (0.5km); Poor (0.5-1.5km); Moderate (1.5-10km); Good (10-15km); Excellent (>15km)

Table 6. Unique Marine Mammal and Sea Turtle Sightings (cont'd)

Data Category	Sighting 15	Sighting 16	Sighting 17	Sighting 18	Sighting 19	Sighting 20	Sighting 21
Sighting Information							
Effort	On	On	On	On	On	On	On
Date	08/08/17	08/09/17	08/09/17	08/09/17	08/09/17	08/09/17	08/09/17
Time (EDT)	17:38	7:09	7:28	8:00	8:05	8:07	8:16
Location	30.5222	30.6113	30.6122	30.6288	30.6468	30.6492	30.6577
	-80.7509	-80.8545	-80.8180	-80.7393	-80.7402	-80.7403	-80.7535
Detection Sensor	MMO	MMO	MMO	MMO	MMO	MMO	MMO
Species/Group	Unidentified dolphin	Common dolphin	Unidentified dolphin	Unidentified dolphin	Unidentified dolphin	Unidentified dolphin	Bottlenose dolphin
Group Size estimate (estimated range)	2 (1-2)	15 (10-20)	10 (5-15)	5 (4-10)	2	3	2
# Calves	0	0	0	0	0	0	0
Animal Bearing (relative)	30	30	325	330	270	45	90
Distance (m)	15	571.43	1333.33	2000	666.67	4000	1000
Animal motion	Closing	Closing	Closing	None	Parallel	Parallel	Parallel
Sighting Cue	Body	Body	Body	Body	Dorsal Fin	Body	Body
Behavior	Traveling	Traveling	Traveling	Breaching	Traveling	Traveling	Traveling
Environmental Information							
Beaufort Sea State	2	1	1	1	1	1	1
Wave Height	L	L	L	L	L	L	L
Visibility	E	E	E	E	E	E	E
Glare (%)	10	4	4	4	4	4	0
Cloud Cover (%)	80	92.5	92.5	92.5	92.5	92.5	90
Operational Information							
Sonar	Off	Off	Off	Off	Off	Off	Off
Ship bearing (true)	210	94	95	0	0	0	163
Mitigation implemented	No	No	No	No	No	No	No
Comments	LMO saw one animal in addition to the port side MMO	Port side LO did not see, sighting made while coming on effort	Several crew members present, none saw animals				

Visibility: Bad (0.5km); Poor (0.5-1.5km); Moderate (1.5-10km); Good (10-15km); Excellent (>15km)

Table 7. Unique Marine Mammal and Sea Turtle Sightings (cont'd)

Data Category	Sighting 22	Sighting 23	Sighting 24	Sighting 25	Sighting 26	Sighting 27	Sighting 28
Sighting Information							
Effort	On	On	On	On	On	On	On
Date	08/09/17	08/09/17	08/09/17	08/09/17	08/09/17	08/09/17	08/09/17
Time (EDT)	8:17	8:31	8:32	8:39	8:38	8:39	8:43
Location	30.6538	30.6327	30.6400	30.6532	30.6532	30.6576	30.6669
	-80.7536	-80.7334	-80.7363	-80.7337	-80.7337	-80.7338	-80.7238
Detection Sensor	MMO	MMO	MMO/LO	MMO	MMO	MMO	MMO
Species/Group	Bottlenose dolphin	Common dolphin	Unidentified dolphin	Unidentified dolphin	Bottlenose dolphin	Unidentified dolphin	Unidentified dolphin
Group Size estimate (estimated range)	1	2 (2-3)	4 (3-6)	2	1	6 (5-7)	2 (2-3)
# Calves	0	0	0	0	0	0	0
Animal Bearing (relative)	353	315	90	30	7	345	280
Distance (m)	5	500	571.43	10	800	800	1000
Animal motion	Closing	Closing	Closing	Parallel	Closing	Closing	Closing
Sighting Cue	Body	Body	Body	Dorsal Fin	Dorsal Fin	Dorsal Fin	Dorsal Fin
Behavior	Traveling	Traveling	Traveling	Traveling	Traveling	Traveling	Traveling
Environmental Information							
Beaufort Sea State	1	1	1	1	1	1	1
Wave Height	L	L	L	L	L	L	L
Visibility	E	E	E	E	E	E	E
Glare (%)	0	0	0	0	0	0	0
Cloud Cover (%)	90	90	90	90	90	90	90
Operational Information							
Sonar	Off	Off	Off	Off	Off	Off	Off
Ship bearing (true)	163	0	0	50	50	50	50
Mitigation implemented	No	No	No	No	No	No	No
Comments		LO present, but did not see animals	LO saw animal 2 minutes after MMO				

Visibility: Bad (0.5km); Poor (0.5-1.5km); Moderate (1.5-10km); Good (10-15km); Excellent (>15km)

Table 8. Unique Marine Mammal and Sea Turtle Sightings (cont'd)

Data Category	Sighting 29	Sighting 30	Sighting 31	Sighting 32	Sighting 33	Sighting 34	Sighting 35
Sighting Information							
Effort	On	On	On	On	On	On	On
Date	08/09/17	08/09/17	08/09/17	08/09/17	08/09/17	08/09/17	08/09/17
Time (EDT)	8:51	8:52	8:52	8:55	8:58	10:29	10:42
Location	30.6922	30.6951	30.6951	30.7034	30.7166	30.6756	30.6659
	-80.6952	-80.6921	-80.6921	-80.6868	-80.8297	-80.5040	-80.6535
Detection Sensor	MMO	MMO/LO	MMO	MMO	MMO	MMO	LO
Species/Group	Common dolphin	Common dolphin	Loggerhead sea turtle	Atlantic spotted dolphin	Unidentified dolphin	Atlantic spotted dolphin	Unidentified dolphin
Group Size estimate (estimated range)	1	4 (3-5)	1	1	4 (3-5)	2	2 (2-3)
# Calves	0	0	0	0	0	0	0
Animal Bearing (relative)	270	5	280	355	315	0	60
Distance (m)	50	100	5	5	571.43	50	1000
Animal motion	Closing	Closing	None	Closing	Closing	Closing	None
Sighting Cue	Dorsal Fin	Dorsal Fin	Body	Body	Dorsal Fin	Body	Body
Behavior	Traveling	Traveling	Traveling	Breaching	Traveling	Traveling	Breaching
Environmental Information							
Beaufort Sea State	1	1	1	1	1	1	1
Wave Height	L	L	L	L	L	L	L
Visibility	E	E	E	E	E	E	E
Glare (%)	0	0	0	0	0	20	20
Cloud Cover (%)	90	90	90	90	90	65	65
Operational Information							
Sonar	Off	Off	Off	Off	Off	Off	Off
Ship bearing (true)	26	26	26	26	26	180	180
Mitigation implemented	No	No	No	No	No	No	No
Comments	LO present, but did not see animal	LO saw at same time. MMO sighted same group at 08:54		LO present, but did not see animal		MMO sighted same group at 10:30	LO sighted with Big Eyes, MMO saw same group at 10:47

Visibility: Bad (0.5km); Poor (0.5-1.5km); Moderate (1.5-10km); Good (10-15km); Excellent (>15km)

Table 9. Unique Marine Mammal and Sea Turtle Sightings (cont'd)

Data Category	Sighting 36	Sighting 37	Sighting 38	Sighting 39	Sighting 40	Sighting 41	Sighting 42
Sighting Information							
Effort	On	On	On	On	On	On	On
Date	08/09/17	08/09/17	08/09/17	08/10/17	08/10/17	08/10/17	08/10/17
Time (EDT)	13:23	14:41	14:44	7:28	8:13	9:21	9:46
Location	30.6505	30.5465	30.4885	30.6361	30.6460	30.6686	30.6718
	-80.7277	-80.8531	-80.8656	-80.2810	-80.1628	-80.1610	-80.1155
Detection Sensor	MMO	MMO	MMO	MMO	MMO	MMO	MMO
Species/Group	Loggerhead sea turtle	Unidentified dolphin	Unidentified dolphin	Unidentified dolphin	Unidentified dolphin	Loggerhead sea turtle	Unidentified dolphin
Group Size estimate (estimated range)	1	1	2	1	2	1	2 (2-5)
# Calves	0	0	0	0	0	0	0
Animal Bearing (relative)	5	315	10	45	45	80	45
Distance (m)	571.43	20	20	1000	10	300	8000
Animal motion	None	Closing	Closing	Parallel	None	Parallel	None
Sighting Cue	Body	Body	Body	Body	Body	Body	Splash
Behavior	Logging	Traveling	Traveling	Traveling	Traveling	Logging	Resting
Environmental Information							
Beaufort Sea State	1	1	1	1	1	2	2
Wave Height	L	L	L	L	L	L	L
Visibility	E	E	E	E	E	E	E
Glare (%)	10	10	10	5	30	30	40
Cloud Cover (%)	60	75	75	22.5	65	20	20
Operational Information							
Sonar	Off	Off	Off	Off	Off	Off	Off
Ship bearing (true)	330	214	216	72	89.5	90	99
Mitigation implemented	No	No	No	No	No	No	No
Comments		LO present, but did not see animal	No LOs present		2 crew members (not LOs) present, but did not see animals		

Visibility: Bad (0.5km); Poor (0.5-1.5km); Moderate (1.5-10km); Good (10-15km); Excellent (>15km)

Table 10. Unique Marine Mammal and Sea Turtle Sightings (cont'd)

Data Category	Sighting 43	Sighting 44	Sighting 45	Sighting 46	Sighting 47	Sighting 48	Sighting 49	Sighting 50
Sighting Information								
Effort	On	On	On	On	On	On	On	On
Date	08/10/17	08/10/17	08/10/17	08/10/17	08/10/17	08/10/17	08/10/17	08/10/17
Time (EDT)	12:37	12:40	13:02	13:18	13:19	15:02	15:50	18:23
Location	30.5634	30.5579	30.5459	30.5479	30.5481	30.4820	30.4301	30.4791
	-80.2979	-80.2970	-80.3033	-80.3163	-80.3169	-80.3857	-80.4383	-80.7613
Detection Sensor	MMO	MMO	MMO	MMO/LO	MMO	MMO	MMO	MMO
Species/Group	Unidentified dolphin	Atlantic spotted dolphin	Unidentified dolphin	Atlantic spotted dolphin	Atlantic spotted dolphin	Loggerhead sea turtle	Unidentified dolphin	Loggerhead sea turtle
Group Size estimate (estimated range)	1	2 (2-3)	5 (4-8)	5 (4-5)	1	1	3	1
# Calves	0	0	0	0	0	0	0	0
Animal Bearing (relative)	45	90	90	90	30	45	350	350
Distance (m)	1000	100	1333.33	1	30	571.43	10	100
Animal motion	Closing	Closing	Parallel	Closing	Closing	None	Closing	Opening
Sighting Cue	Body	Body	Dorsal Fin	Body	Body	Body	Dorsal Fin	Body
Behavior	Traveling	Traveling	Resting	Traveling	Traveling	Logging	Traveling	Other
Environmental Information								
Beaufort Sea State	2	2	2	2	2	2	2	2
Wave Height	L	L	L	L	L	L	L	L
Visibility	E	E	E	E	E	E	E	E
Glare (%)	7	7	7	7	7	8	30	45
Cloud Cover (%)	22.5	22.5	22.5	22.5	22.5	35	45	10
Operational Information								
Sonar	Off	Off	Off	Off	Off	On	Off	Off
Ship bearing (true)	180	180	271	292	292	171	290	45
Mitigation implemented	No	No	No	No	No	No	No	No
Comments	No LOs present			Bridge team saw animals at same time	ONI alerted pilot house to animals	Ship went active during mad maggies	One LO present, did not see animals	

Visibility: Bad (0.5km); Poor (0.5-1.5km); Moderate (1.5-10km); Good (10-15km); Excellent (>15km)

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 seventeenth aboard a DDG in which data were collected to determine effectiveness; data will be combined with current and future data sets 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 if the ship was using sonar during an MFAS event.

SECTION 5 REFERENCES

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