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Cruise Report, Marine Mammal Monitoring
UNITAS GOLD 2009
Jacksonville Range Complex

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List of Acronyms and Abbreviations

AFAST	Atlantic Fleet Active Sonar Training
ASW	antisubmarine warfare
CO	Commanding Officer
ft	feet
EST	Eastern Standard Time
FIREX	Firing Exercise
IMPASS	Integrated Maritime Portable Acoustic Scoring
JAX	Jacksonville Range Complex
kts	knots (nautical miles per hour)
MFAS	mid-frequency active sonar
MMO	Marine Mammal Observer
nm	nautical miles
NMFS	National Marine Fisheries Service
PMAP	Protective Measures Assessment Protocol
XO	Executive Officer
yd(s)	yards

SECTION 1: INTRODUCTION

In order to train with mid-frequency active sonar (MFAS) and explosives, the Navy must obtain a permit from the National Marine Fisheries Service (NMFS) under the Marine Mammal Protection Act and Endangered Species Act. The Atlantic Fleet Active Sonar Training (AFAST) and Jacksonville (JAX) Range Complex Monitoring Plans (DoN 2009a and 2009b), finalized in January 2009 and June 2009, respectively, were developed with NMFS to comply with the requirements under the permits obtained for MFAS and explosives training (NMFS 2009a and 2009b). The monitoring plans and reports will provide science to answer questions regarding whether or not marine mammals are exposed and whether they react to Navy MFAS and/or explosives training. The objectives of the monitoring plan are to answer the following questions:

1. Are marine mammals and sea turtles exposed to MFAS associated with adverse effects (i.e., behavioral harassment, temporary threshold shift, or permanent threshold shift)?

2. If marine mammals and sea turtles are exposed to MFAS in the AFAST study area, do they redistribute geographically as a result of continued exposure? If so, how long does the redistribution last?

3. If marine mammals and sea turtles are exposed to MFAS, what are their behavioral responses to various levels?

4. What are the behavioral responses of marine mammals and sea turtles that are exposed to explosives at specific levels?

5. Is the Navy's suite of mitigation measures for MFAS and explosives (e.g., PMAP [Protective Measures Assessment Protocol], major exercise measures agreed to by the Navy through permitting) effective at avoiding temporary threshold shift (TTS), injury, and mortality of marine mammals and sea turtles?

In order to answer these questions, data is to be collected through various means, including contracted vessel and aerial surveys, tagging, passive acoustics, and placing marine mammal observers (MMOs) aboard Navy warships.

As part of this data collection effort, two U.S. Navy MMOs (Ms. Mandy Shoemaker and Ms. Amy Farak) participated in the UNITAS GOLD 2009 (UNITAS 09) exercise on April 27-30. These MMOs were stationed aboard the *USS HUE CITY* (CG 66). The primary goal of the UNITAS 09 monitoring effort was to collect data on marine mammals observed during operations and to answer the follow questions:

1. Are marine mammals and sea turtles exposed to MFAS and/or explosives
2. If so, at what levels?
3. Did exposed marine mammals/sea turtles show a behavioral response?

A secondary goal for the UNITAS 09 monitoring was to familiarize the MMOs with at-sea Navy operations and to gather information to facilitate future MMO opportunities. This secondary goal is captured as "lessons learned" in Section 5.2.

SECTION 2: UNITAS GOLD 2009 DESCRIPTION

UNITAS GOLD is designed to provide a training environment in which participating Nations conduct joint and combined operations in a realistic scenario. This training provides a venue to develop standardized tactics, techniques and procedures, as well as to promote interoperability and develop coalition building and multi-lateral security cooperation.

U.S. participants in UNITAS 09 included (but was not limited to) *USS HUE CITY* (CG 66), *USS HARRY S. TRUMAN* (CVN 75), *USS NORFOLK* (SSN 714), *USS CARNEY* (DDG 64), *USS OSCAR AUSTIN* (DDG 79), *USS W.S. CHURCHILL* (DDG 81), and *USNS ARCTIC* (TAOE 8).

SECTION 3: METHODS

3.1. SHIPBOARD MARINE MAMMAL MONITORING

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/maneuvers, and would remove themselves from the bridge wing if necessary for the *USS HUE CITY* to accomplish its mission objectives. The only exception would be if a marine mammal was sighted by the MMO within the shut-down zone during MFAS (within 200 yards [yds] of the ship) or explosive events (within 700 yds of the target for firing exercise [FIREX] with Integrated Maritime Portable Acoustic Scoring [IMPASS] event) and was not sighted by the lookout, the MMO would report the sighting to the lookout for appropriate reporting and action.

The MMO survey was conducted on the bridge wing of the *USS HUE CITY* (62 feet [ft] above water's surface), with one MMO on each wing. During on-effort surveys, the MMOs would use the naked eye and 7X50 powered binoculars to scan the area from dead ahead to just abaft of the beam. In searching this area, the MMOs would start at the forward part of the sector and search aft. Binoculars were held so that the horizon was in the top third of the field of view. The field of view was scanned from the horizon towards the ship. Once the field of view was scanned, the binoculars were repositioned and the field of view was scanned again (Figure 1). Once the scan with the binoculars was completed, the eyes were rested for a few seconds and the entire sector was scanned with the naked eye.

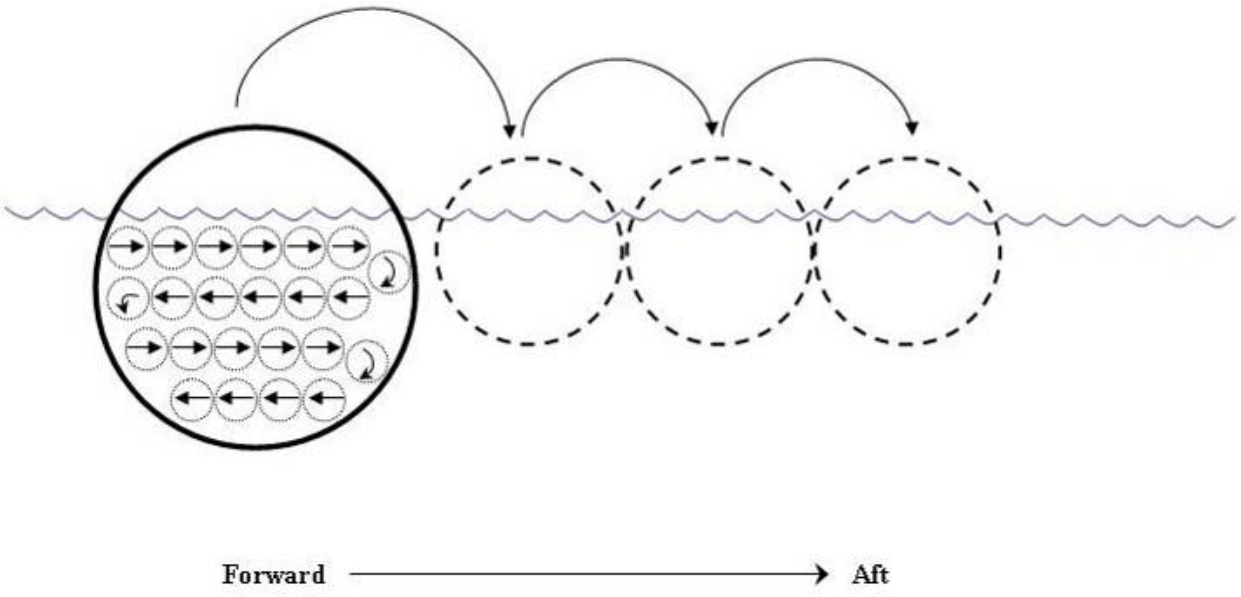

Figure 1. MMO Surface Searching Procedure

When an animal was visually detected the MMO would collect information on twenty-three sighting, environmental, and sonar parameters (Table 1). When practical, still photography was obtained by the MMO.

Table 1. Shipboard MMO Data Category Descriptions

Data Category	Description
Sightings Information	
Effort (on/off)	On effort means actively searching for marine mammals; time spent off effort could result from vacating the bridge wing for operational reasons.
Date	Format in mm/dd/yy.
Time	Time provided in Eastern Standard Time (EST).
Location	This is the location of the USS HUE CITY at the time of the sighting, provided by monitors on the bridge.
Detection Sensor	Either visual or aural (if detected passively by the sonar technician) and which MMO observed the animal.
Species/Group	Determined by the MMO.
Group Size	Estimated by the MMO.
# Calves	Estimated by the MMO.
Bearing (true)	Estimated by the MMO.
Distance (yds)	Estimated by the MMO using reticled binoculars.
Length of contact	Estimated by the MMO.
Environmental Information	
Wave height (ft)	Estimated by the MMO.
Visibility	Estimated by the MMO.
BSS	Estimated by the MMO.
Swell direction (true)	Estimated by the MMO.
Wind direction (true)	Estimated by the MMO.
% glare	Estimated by the MMO.
% cloud cover	Estimated by the MMO.
Operational Information	
Active sonar in use?	Specifically refers to MFAS.
Direction of ship travel	Provided by monitors on the bridge.
Animal motion	Estimated by the MMO.
Behavior	Individual behaviors: breach, porpoise, spin, bowride, feeding, head slap, social, tail slap, pectoral fin slap, other Whale behaviors: blow, no blow rise, fluke up, peduncle arch, unidentified large splash Group behaviors: rest, mill, travel, surface active travel, surface active mill
Mitigation implemented	If MFAS in use, the measures implemented, if any, but the USS HUE CITY.
Comments	Other comments as necessary.

3.2. SCHEDULE OF EVENTS

USS HUE CITY departed Mayport, Florida, on 27 April at 0730 Eastern Standard Time (EST). Antisubmarine warfare (ASW) exercises were conducted from 27-28 April. On 28 April, the *USS NORFOLK* (submarine) assisted the *USS HUE CITY* by providing the lookouts valuable training in how to detect a submarine. In the evening on 29 April, the *USS HUE CITY* escorted and provided guiding lights for night aircraft landings on the *USS HARRY S. TRUMAN* (aircraft carrier). A FIREX using the 5 inch guns (bow and stern) and the IMPASS buoys was conducted on 30 April, followed by the ship returning to Mayport. A detailed schedule of events is provided below in Table 2.

Table 2. Schedule of Events

27 April	
Time	**Notes**
0730	USS HUE CITY underway
0800	MMOs on effort
1130	MMOs off effort
1300	MMOs on effort
1730	MMOs off effort

28 April	
Time	**Notes**
0700	MMOs on effort
0745	MMOs off effort (brief to XO)
0800	MMOs on effort
1130	MMOs off effort
1300	MMO on effort
1700	MMOs off effort

29 April	
Time	**Notes**
0700	MMOs on effort
1130	MMOs off effort
1300	MMO on effort
1700	MMOs off effort

30 April	
Time	**Notes**
0700	MMOs on effort
0730	IMPASS Buoys deployed
0840	FIREX begins
1130	MMOs off effort
1205	MMOs on effort
1243	FIREX ends
1405	IMPASS Buoys retrieved
1600	MMOs off effort
1715	USS HUE CITY returned to port

SECTION 4: RESULTS

MMOs recorded ship positions and Beaufort sea state information periodically while on effort (Table 3). These data allow for a rough ship track to be identified (Figure 2).

Twenty marine mammal and fifteen sea turtle sightings were recorded by the MMOs (Table 4 through Table 8). All of the marine mammal sightings were of dolphins, primarily bottlenose and spotted. Most of the sea turtle sightings were of unidentified hardshell sea turtles, although there were two confirmed sightings of loggerhead sea turtles and one confirmed sighting of a leatherback sea turtle. On 28 April at 1420, one of the helicopters reported back to the *USS HUE CITY* that they sighted a pod of whales more than 5 nautical miles away from the ship. However, due to the distance and the time lag in the reporting, the sighting was unable to be confirmed by the MMOs.

Table 3. Ship Position Report

Map ID*	Date	Time	Location	Beaufort Sea State
1	04/27/09	1000	30°47′31″N 80°55′14″W	3
3	04/27/09	1300	31°51′13”N 79°52′55”W	3
4	04/27/09	1517	30°55′19”N 79°38′06”W	3
5	04/27/09	1730	30°57′44”N 79°16′22”W	3
7	04/28/09	0920	31°52′42”N 79°44′11”W	2
11	04/28/09	1110	31°48′33”N 79°31′16”W	2
12	04/28/09	1300	31°35′34”N 79°14′41”W	2
14	04/28/09	1514	31°36′32”N 79°23′48”W	2
15	04/28/09	1700	31°24′33”N 79°15′25”W	2
16	04/29/09	0700	30°30′16”N 80°22′07”W	2
22	04/29/09	0906	30°28′05”N 80°46′28”W	2
33	04/29/09	1128	30°26′14”N 80°54′23”W	2
34	04/29/09	1300	30°24′25”N 81°11′26”W	2
37	04/29/09	1519	30°19′46”N 81°03′10”W	2
42	04/29/09	1657	30°19′35”N 80°38’57”W	2
43	04/30/09	0700	30°40′21”N 80°34′55”W	1
44	04/30/09	0840	30°45′39”N 80°25′26”W	2
45	04/30/09	0915	30°46′22”N 80°26′55”W	2
46	04/30/09	0954	30°42′54”N 80°28′49”W	2
48	04/30/09	1045	30°40′11”N 80°29′14”W	2
49	04/30/09	1109	30°39′09”N 80°29′22”W	2
50	04/30/09	1121	30°38′40”N 80°29′26”W	2
52	04/30/09	1205	30°36′46”N 80°29′15”W	1
55	04/30/09	1243	30°40′24”N 80°30′38”W	1
56	04/30/09	1405	30°42′53”N 80°35′54”W	2
61	04/30/09	1600	30°25′11”N 81°14′21”W	2

* Map ID related to the labeled numbers in Figure 2.

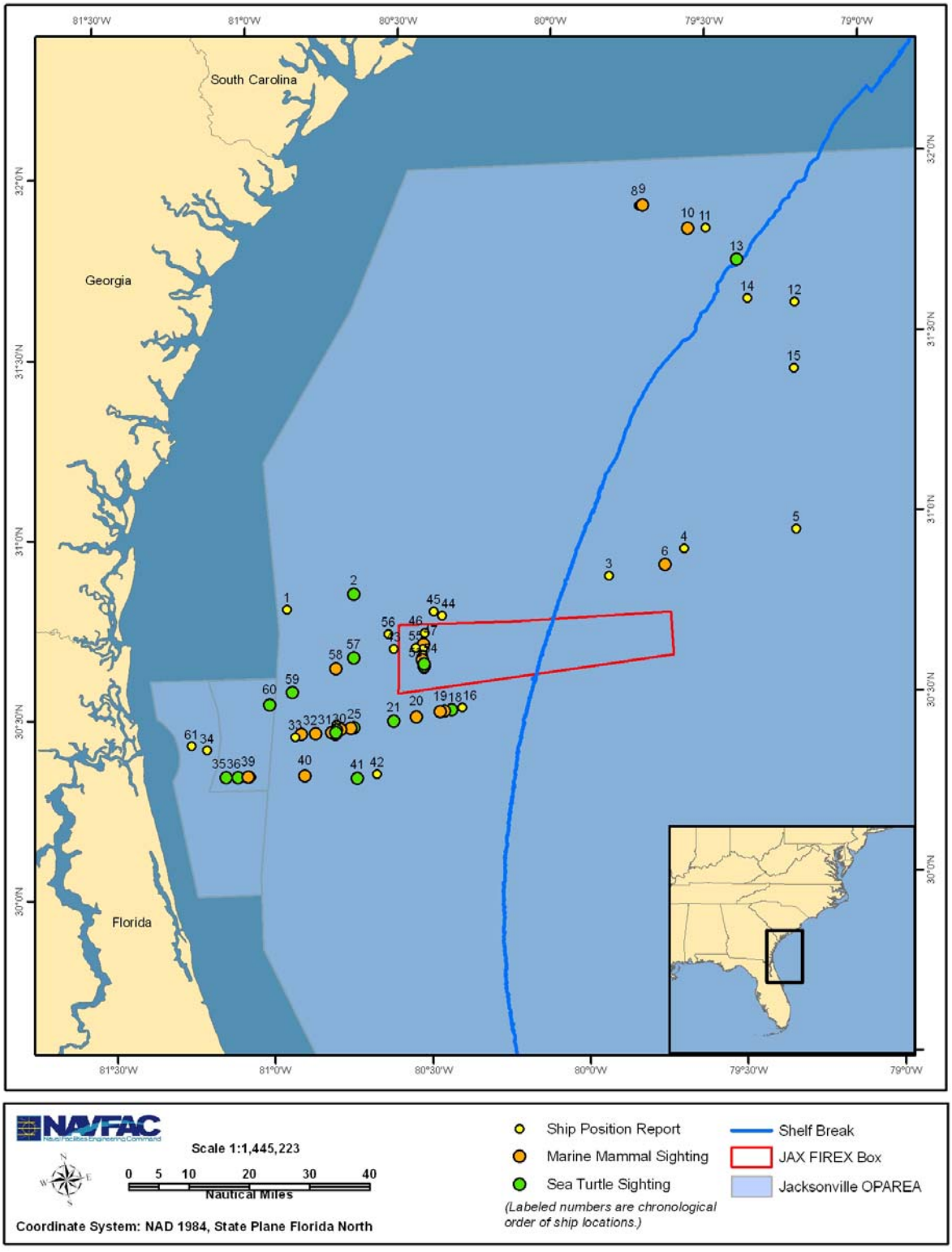

Figure 2. Vessel Locations at Sighting and Position Reports

Table 4. Marine Species Sightings Data

Data Category	Sighting 1	Sighting 2	Sighting 3	Sighting 4	Sighting 5	Sighting 6	Sighting 7
Map ID*	2	6	8	9	10	13	17
Sightings Information							
Effort (on/off)	on	on	on	on	on	on	on
Date	04/27/09	04/28/09	04/28/09	04/28/09	04/28/09	04/28/09	04/29/09
Time	1037	0710	0923	0923	1052	1425	0712
Location	30°49'44"N 80°42'13"W	31°52'42"N 79°42'01"W	31°52'46"N 79°43'28"W	31°52'46"N 79°43'28"W	31°48'30"N 79°34'49"W	31°42'59"N 79°25'31"W	30°29'55"N 80°24'14"W
Detection Sensor	MMO (Farak)	MMO (Farak)	MMO (Farak) & Bridge	MMO (Farak)	MMO (Shoemaker)	MMO (Farak)	MMO (Farak)
Species/Group	hardshell turtle (unid.)	bottlenose dolphins	unid. dolphin	spotted dolphin	bottlenose dolphin	loggerhead turtle	hardshell turtle (unid.)
Group Size	1	10	5	1	1	1	1
# Calves	0	unk	unk	0	0	0	0
Bearing (true)	349°	350°	148°	238°	45°	225°	225°
Distance (yds)	50	20	120	5	200	10	20
Length of contact	3 sec	20 min	20 sec	5 sec	23 min	2 sec	10 sec
Environmental Information							
Wave height (ft)	2	1	1	1	0-3	1	1
Visibility	unrestricted	unrestricted	unrestricted	unrestricted	unrestricted	unrestricted	unrestricted
BSS	3	2	2	2	2	2	2
Swell direction (true)	99°	170°	158°	158°		180°	90°
Wind direction (true)		270°	158°	158°		160°	70°
% glare	20%	20%	10%	10%		10%	0%
% cloud cover	10%	20%	30%	30%		10%	5%
Operational Information							
Active sonar in use?	no	no	no	no	no	no	no
Direction of ship travel	89°		148°		93°	180°	250°
Animal motion	parallel	closing	closing	parallel	closing	parallel	parallel
Behavior	milling	bow riding	bow riding	bow riding	bowriding		milling
Mitigation implemented	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Comments		animals dove under bow, then returned to ride bow	dove under bow	briefly at surface then dove		large, brown turtle seen; ship passed parallel to animal	ship passed parallel to animal

* Map ID related to the labeled numbers in Figure 2.

Table 5. Marine Species Sightings Data (Cont.)

Data Category	Sighting 8	Sighting 9	Sighting 10	Sighting 11	Sighting 12	Sighting 13	Sighting 14
Map ID*	18	19	20	21	23	24	25
Sightings Information							
Effort (on/off)	on	on	on	on	on	on	on
Date	04/29/09	04/29/09	04/29/09	04/29/09	04/29/09	04/29/09	04/29
Time	0723	0730	0810	0847	0930	0956	1014
Location	30°29'43"N 80°25'38"W	30° 29'37"N 80°26'22"W	30°28'57"N 80°31'00"W	30°28'21"N 80°35'20"W	30° 27'30"N 80° 43'4"W	30° 27'26"N 80° 43'39"W	30°27'14"N 80°45'39W
Detection Sensor	MMO (Farak)	MMO (Shoemaker)	MMO (Farak)	MMO (Farak)	MMO (Shoemaker)	MMO (Shoemaker)	MMO (Farak)
Species/Group	unid. dolphin	spotted dolphins	Atlantic spotted dolphin	hardshell turtle (unid.)	hardshell turtle (unid.)	unid. dolphins	Atlantic spotted dolphin
Group Size	3+	6	4	1	1	3	2
# Calves	0	0	1	0	0	0	1
Bearing (true)	220°	285°	244°	220°	360°	305°	216°
Distance (yds)	10	100	10	831	20	350	150
Length of contact	20 sec	120 min	60 min	2 sec	20 sec	19 min	4 sec
Environmental Information							
Wave height (ft)	1	0-3	1	1	0-3	0-3	1
Visibility	unrestricted	unrestricted	unrestricted	unrestricted	unrestricted	unrestricted	unrestricted
BSS	2	2	2	2	2	2	2
Swell direction (true)	90°		90°	90°			86°
Wind direction (true)	1		70°	70°			86°
% glare	unrestricted		0%	0%			3%
% cloud cover	2		5%	5%			10%
Operational Information							
Active sonar in use?	no	no	no	no	no	no	no
Direction of ship travel	254°	254°	254°	255°	258°	256°	256°
Animal motion	closing	closing	closing	opening	parallel	unknown	closing
Behavior	bow riding	bowriding	bow riding	milling	traveling	traveling	traveling
Mitigation implemented	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Comments	likely spotted dolphin		animal in group had no spots, assumed calf.	seen milling with head out of water			animal closed ship perp. to bow then dove

* Map ID related to the labeled numbers in Figure 2.

Table 6. Marine Species Sightings Data (Cont.)

Data Category	Sighting 15	Sighting 16	Sighting 17	Sighting 18	Sighting 19	Sighting 20	Sighting 21
Map ID*	26	27	28	29	30	31	32
Sightings Information							
Effort (on/off)	on	on	on	on	on	on	on
Date	04/29	04/29/09	04/29/09	04/29/09	04/29/09	04/29/09	04/29/09
Time	1021	1040	1052	1057	1057	1107	1116
Location	30°27'10"N 80°46'28"W	30° 26'29"N 80° 46'44"W	30° 26'46"N 80° 47'25"W	30°26'46"N 80°46'32"W	30°26'46"N 80°46'32"W	30° 26'44"N 80°50'32"W	30° 26'43"N 80° 53'17"W
Detection Sensor	MMO (Farak)	MMO (Shoemaker)	MMO (Shoemaker)	MMO (Farak)	MMO (Farak)	MMO (Shoemaker)	MMO (Shoemaker)
Species/Group	hardshell turtle (unid.)	Atlantic spotted dolphins	unid. dolphins	Atlantic spotted dolphin	hardshell turtle (unid.)	unid. dolphins	unid. dolphins
Group Size	1	2	25	2	1	2	15
# Calves	0	0	0	0	0	0	0
Bearing (true)	166°	210°	30°	10°	160°	295°	80°
Distance (yds)	30	200	1386	100	30	200	1039
Length of contact	3 sec	5 min	3 min	3 sec	3 sec	1 min	4 min
Environmental Information							
Wave height (ft)	1	0-3	0-3	1	1	0-3	0-3
Visibility	unrestricted	unrestricted	unrestricted	unrestricted	unrestricted	unrestricted	unrestricted
BSS	2	2	2	2	2	2	2
Swell direction (true)	86°			180°	180°		
Wind direction (true)	86°			0°	0°		
% glare	3%			0%	0%		
% cloud cover	10%			5%	5%		
Operational Information							
Active sonar in use?	no	no	no	no	no	no	no
Direction of ship travel	256°	125°	267°	30°	260°	266°	266°
Animal motion	parallel	closing	parallel	closing	parallel	closing	parallel
Behavior	milling	bowriding	traveling	traveling	milling	traveling	milling
Mitigation implemented	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Comments				closed on ship, dove under bow	smaller turtle than previous turtle sightings		

* Map ID related to the labeled numbers in Figure 2.

Table 7. Marine Species Sightings Data (Cont.)

Data Category	Sighting 22	Sighting 23	Sighting 24	Sighting 25	Sighting 26	Sighting 27	Sighting 28
Map ID*	35	36	38	39	40	41	47
Sightings Information							
Effort (on/off)	on	on	on	on	on	on	on
Date	04/29/09	04/29/09	04/29/09	04/29/09	04/29/09	04/29/09	04/30/09
Time	1507	1507	1513	1520	1601	1640	1035
Location	30°19'47"N 81°07'53"W	30°19'47"N 81°07'53"W	30° 19'46"N 81° 5'35"W	30° 19'45"N 81° 3'38"W	30°19'40"N 80°52'47"W	30°19'01"N 80°42'42"W	30°40'58"N 80°29'08"W
Detection Sensor	MMO (Farak)	MMO (Farak)	MMO (Shoemaker)	MMO (Shoemaker)	MMO (Shoemaker)	MMO (Shoemaker)	MMO (Farak)
Species/Group	hardshell turtle (unid.)	hardshell turtle (unid.)	hardshell turtle (unid.)	unid. dolphins	Atlantic spotted dolphins	hardshell turtle (unid.)	unid. dolphin
Group Size	1	1	1	4	2	2	1
# Calves	0	0	0	0	0	0	0
Bearing (true)	0°	0°	185°	210°	150°	110°	90°
Distance (yds)	30	30	50	500	100	30	70
Length of contact	1 sec	1 sec	1 min	5 min	2 min	5 sec	1 sec
Environmental Information							
Wave height (ft)	1	0-3	0-3	1	1	1	2
Visibility	unrestricted	unrestricted	unrestricted	unrestricted	unrestricted	unrestricted	unrestricted
BSS	1	2	2	1	2	2	2
Swell direction (true)	100°			100°			145°
Wind direction (true)	0°			0°			180°
% glare	0%			0%			5%
% cloud cover	0%			0%			70%
Operational Information							
Active sonar in use?	no	no	no	no	no	no	no; FIREX
Direction of ship travel	90°	91°	90°	90°	90°	90°	180°
Animal motion	parallel	parallel	closing	closing	closing	parallel	parallel
Behavior	milling	milling	bowriding	jumping	bowriding	traveling	milling
Mitigation implemented	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Comments	ship passed by animal			animals closed ship then dove under bow			animals following starboard FIREX firing

* Map ID related to the labeled numbers in Figure 2.

Table 8. Marine Species Sightings Data (Cont.)

Data Category	Sighting 29	Sighting 30	Sighting 31	Sighting 32	Sighting 33	Sighting 34	Sighting 35
Map ID*	51	53	54	57	58	59	60
Sightings Information							
Effort (on/off)	on	on	on	on	on	on	on
Date	04/30/09	04/30/09	04/30/09	04/30/09	04/30/09	04/30/09	04/30/09
Time	1124	1214	1220	1447	1456	1515	1525
Location	30°38'25"N 80°29'28"W	30°37'21"N 81°29'10"W	30°37'41"N 80°29'06"W	30°39'08"N 80°42'40"W	30°37'26"N 80°46'14"W	30°33'37"N 80°54'40"W	30° 31'41"N 80°59'11"W
Detection Sensor	MMO (Farak)	MMO (Shoemaker)	MMO (Farak)	MMO (Farak)	MMO (Farak)	MMO (Farak)	MMO (Shoemaker)
Species/Group	A. spotted/ Bnose. dolphin	hardshell turtle (unid.)	loggerhead turtle	hardshell turtle (unid.)	unid. dolphin	leatherback turtle	hardshell turtle (unid.)
Group Size	4	2	1	1	1	1	1
# Calves	unk	0	0	0	0	0	0
Bearing (true)	200°	280°	320°	151°	213°	184°	20°
Distance (yds)	40	30	100	40	50	40	10
Length of contact	20 sec	1 sec	45 sec	2 sec	2 sec	3 sec	5 sec
Environmental Information							
Wave height (ft)	2	1	2	1	1	1	0-3
Visibility	unrestricted	unrestricted	unrestricted	unrestricted	unrestricted	unrestricted	unrestricted
BSS	2	2	2	2	2	2	2
Swell direction (true)	160°		110°	61°	61°	61°	
Wind direction (true)	180°		110°	variable	variable	variable	
% glare	0%		0%	5%	5%	5%	
% cloud cover	60%		20%	20%	20%	20%	
Operational Information							
Active sonar in use?	no; break in FIREX	no; break in FIREX	no	no	no	no	no
Direction of ship travel	180°	90°	20°	241°	243°	244°	244°
Animal motion	closing	parallel	opening	parallel	parallel	parallel	parallel
Behavior	bow riding	traveling	traveling	milling	traveling	milling	traveling
Mitigation implemented	N/A	N/A	N/A	NA	N/A	N/A	N/A
Comments	few jumps, bow riding, then dove under bow		ship passed by animal	ship passed by animal	ship passed by animal; saw dorsal twice	ship passed by animal	

* Map ID related to the labeled numbers in Figure 2.

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SECTION 5: CONCLUSION

5.1. MARINE MAMMAL MONITORING

The goal of the UNITAS 09 monitoring effort is provided below, with a conclusion regarding each of the specific questions that were asked:

1. Are marine mammals and sea turtles exposed to MFAS or explosives?

   No marine mammal or sea turtle sightings were obtained by *USS HUE CITY* MMOs during MFAS use.

   Two marine mammal and two sea turtle sightings were obtained by *USS HUE CITY* MMOs during the FIREX. However, these sightings were at distances very close to the ship (<100 yds), not in the impact area of the detonation site. No marine mammal or sea turtle sightings were obtained near the impact area.

2. If so, at what levels?

   No marine mammals or sea turtles were observed.

3. Did exposed marine mammals/sea turtles show a behavioral response?

   No marine mammals or sea turtles were observed.

5.2. LESSONS LEARNED

A few lessons learned were noted for the UNITAS 09 exercise, and are separated into those for shipboard monitoring and operational information below.

5.2.1. Shipboard Marine Mammal Monitoring

- Given the layout of the bridge, MMOs need to be located out on the bridge wing during on-effort surveys. The view from the pilot house does provide 180° view from port to starboard, but window pillars and personnel obstruct the view for the MMOs. Additionally, the lookouts are required to be on the bridge wing during MFAS use, and the MMOs would need to also be in this location.

- Methods are needed to continue to improve the close aboard distance estimation by MMOs. Reticled binoculars were used for longer distance sightings, however at a bridge height of 62 ft, this method was not useful for close aboard sightings. Suggest that MMOs practice close aboard distance estimation if possible.

- A third MMO observing from the water aft of the ship would help determine when dolphins first encountered the ship. Many dolphin sightings occurred as the animals were approaching the bow of the ship from the rear, so it is unclear how long the animals may

have been associated with the vessel. An aft observer would likely detect these animals as they approached the ship rather than when they started bow riding.

5.2.2. Operational Information

- Future monitoring efforts aboard Navy ships should make every attempt possible to attend the pre-sail brief and present the goals of the monitoring. This was not possible in this case and it created confusion.

- Once MMOs embark on the Navy ship, the Commanding Officer (CO) and Executive Officer (XO) should be briefed (along with whomever they see fit to attend) on the specifics of the monitoring. This was not done immediately which created some confusion.

- Need to continue to improve pre-planning coordination between operators and MMOs to ensure that monitoring opportunities and data gathering is maximized. Ships that are participating in a wide variety of both ASW and explosive events allow for the greatest opportunities.

SECTION 6: ACKNOWLEDGEMENTS

We thank the officers and crew of the *USS HUE CITY* (CG 66) for their outstanding support and hospitality during this cruise and Mr. Jene Nissen (USFF) for pre-planning coordination.

SECTION 7: REFERENCES

DoN. 2009a. Atlantic Fleet Active Sonar Training Monitoring Plan-Final 27 January 2009. Department of the Navy, Commander. U.S. Fleet Forces Command.

DoN. 2009b. Jacksonville Range Complex Monitoring Plan-Final 15 June 2009. Department of the Navy, Commander. U.S. Fleet Forces Command.

NMFS. 2009a. Taking and Importing Marine Mammals; U.S. Navy Atlantic Fleet Active Sonar Training; Final Rule. January 27, 2009. 74FR4844.

NMFS. 2009b. Taking and Importing Marine Mammals; U.S. Navy Training in the Jacksonville Range Complex; Final Rule. June 15, 2009. 74FR28349.