

# Jacksonville (JAX) Maverick Missile Exercise (MAVEX) Event

## Marine Species Monitoring

### AERIAL MONITORING SURVEYS

### TRIP REPORT



28-29 February 2012

## ACRONYMS AND ABBREVIATIONS

ft	feet/foot
FIREX	Firing Exercise
hr(s)	hour(s)
ICMP	Integrated Comprehensive Monitoring Program
in	inches
JAX	Jacksonville Range Complex
km	kilometer(s)
km <sup>2</sup>	square kilometers
MAVEX	Maverick Missile Exercise
m	meter(s)
min(s)	minute(s)
MLTR	Missile Laser Training Range
NM	nautical mile(s)
OPAREA	operating area
SPUE	Sightings Per Unit Effort

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## Section 1 Introduction

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Aerial marine species monitoring occurred on 28 February and 29 February 2012 for a Maverick Missile Exercise (MAVEX) training event off the eastern coast of Florida within the U.S. Navy's Missile Laser Training Range (MLTR). These types of events occur periodically throughout the year and allow the U.S. Navy to fulfill essential training requirements.

As part of the compliance requirements of the Marine Mammal Protection Act of 1972 and the Endangered Species Act of 1973, the U.S. Navy developed the Integrated Comprehensive Monitoring Program (ICMP). The ICMP applies by regulation to those activities on U.S. Navy training ranges and operating areas (OPAREAs) for which the U.S. Navy sought and received incidental take authorizations. In order to support the U.S. Navy in meeting regulatory requirements for monitoring established under the Final Rules and to provide a mechanism to assist with coordination of program objectives under the ICMP, monitoring of marine mammals and sea turtles during this exercise included visual surveys from a fixed-wing aircraft.

The results of marine mammal monitoring reported here are part of a long-term monitoring effort under the U.S. Navy's Marine Species Monitoring Program (Contract # N62470-10-D-3011) issued to HDR.

## Section 2 Methods

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### Study Area and Event Details

The U.S. Navy's Jacksonville Range Complex (JAX) OPAREA lies off the eastern coast of the U.S. near the Georgia/Florida border. Protected marine species monitoring conducted during the JAX MAVEX training event was focused on the MLTR area within the JAX OPAREA (**Figure 1**). This area is approximately 120 to 180 kilometers (km) (65 to 98 nautical miles [NM]) offshore, covers an area approximately 2,363 square kilometers (km<sup>2</sup>) in size, and ranges in bottom depth from 20 to 40 meters (m). The MAVEX event occurred on 28 February at 1505 Eastern Standard Time in the MLTR area with the firing of one U.S. Navy Imaging Infrared *Maverick* AGM-65F, which resulted in a successful training mission.

### Aerial-Based Monitoring

Aerial-based monitoring was conducted during the MAVEX within the JAX MLTR on 28 and 29 February (**Figure 1, Table 1**). Survey methods were consistent with currently accepted Distance Sampling theory (Buckland et al. 2001) and followed a well-established protocol used for aerial surveys throughout all U.S. Navy Range Complexes (Smultea et al. 2009). A survey altitude of approximately 1,000 feet (ft) at 100 knots was maintained while on-effort, but might have varied slightly based on weather conditions in the area. Once a marine mammal sighting was made, a focal follow session was initiated at 1,000 ft or higher if conditions were appropriate (Smultea et al. 2009; refer to the survey methods on page five of this document). A lower altitude of approximately 700 to 800 ft was established after focal follow sessions for photography purposes to provide sharper images required for species identification.

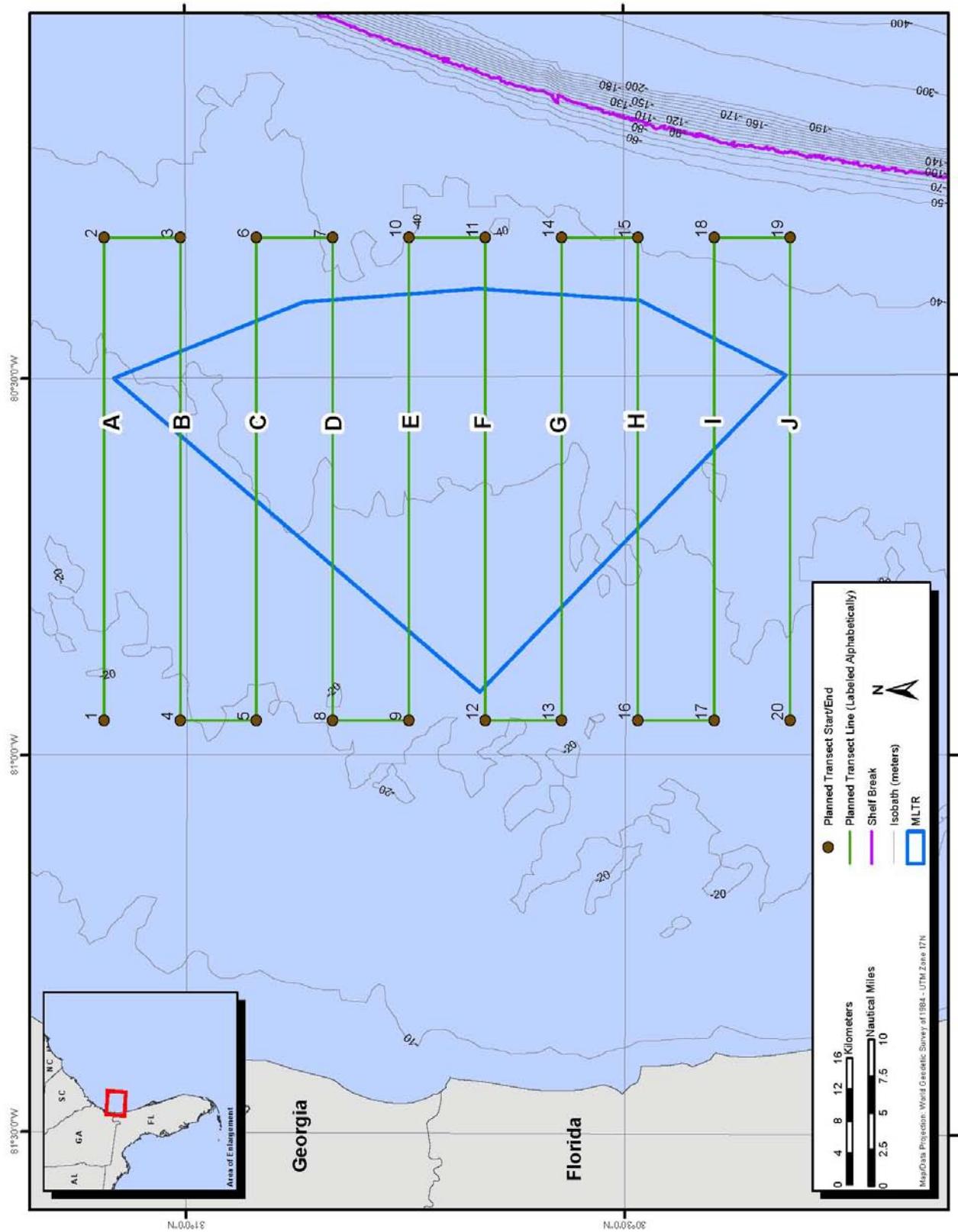


Figure 1. Pre-planned Tracklines for the Survey Effort for JAX MAVEX Monitoring.

**Table 1. Summary of Monitoring Effort for JAX MAVEX Training**

Date	Description	Start Time	Stop Time	Total Survey Minutes*	Total On-Effort Minutes	Trackline On-Effort Distance (km)
28 February	Transect Survey (During-Event)	13:25	17:17	231	207	761.5
29 February	Transect Survey (Post-Event)	10:56	16:55	359	320	1125.4
<b>Total</b>				<b>590 (≈9.8 hrs)<sup>†</sup></b>	<b>527 (≈8.8 hrs)</b>	<b>1,886.9 km</b>

Note: \* Total Survey Minutes reflect minutes occupied in the range/area of interest and include both on-effort (systematic) and off-effort (connector/circling) total minutes. <sup>†</sup>hrs is defined as hours.

The observation platform was a Cessna T337H Turbo Skymaster aircraft operating out of Fernandina Municipal Airport in Fernandina Beach, Florida. Two surveys on 28 and 29 February were conducted following pre-planned transect lines covering and extending approximately 2 to 23 km beyond the boundaries of the MLTR area (**Figure 1, Table 1**). Each survey was limited to a 6-hour (hr) maximum flight time window.

Both aerial observers (**Table 2**) were experienced with line-transect survey methodology, had experience in identification of Atlantic marine mammal and sea turtle species, and were knowledgeable of marine mammal biology and behavior.

**Table 2. Observers and Roles**

Observer	Role(s)
Mari Smultea	Chief Scientist/Observer
Dave Steckler	Observer

Survey effort attempted to cover the entirety of the MLTR area within the JAX OPAREA (approximately 2,363 km<sup>2</sup>). Ten parallel tracklines running from west to east, measuring approximately 61 km long and spaced approximately 9.1 km apart were to be flown during “systematic” efforts throughout the monitoring period and were designed to provide a total survey coverage area of approximately 5,307 km<sup>2</sup> (**Figure 1**). Planned lines were followed when possible, but exact transects flown for each survey day were subject to modifications as a result of range exclusion by live-fire U.S. Navy exercises in the area, unfavorable weather conditions on the range, or hourly contact with naval flight operations requiring an increase in the plane’s altitude (**Figure 2, Table 1**).

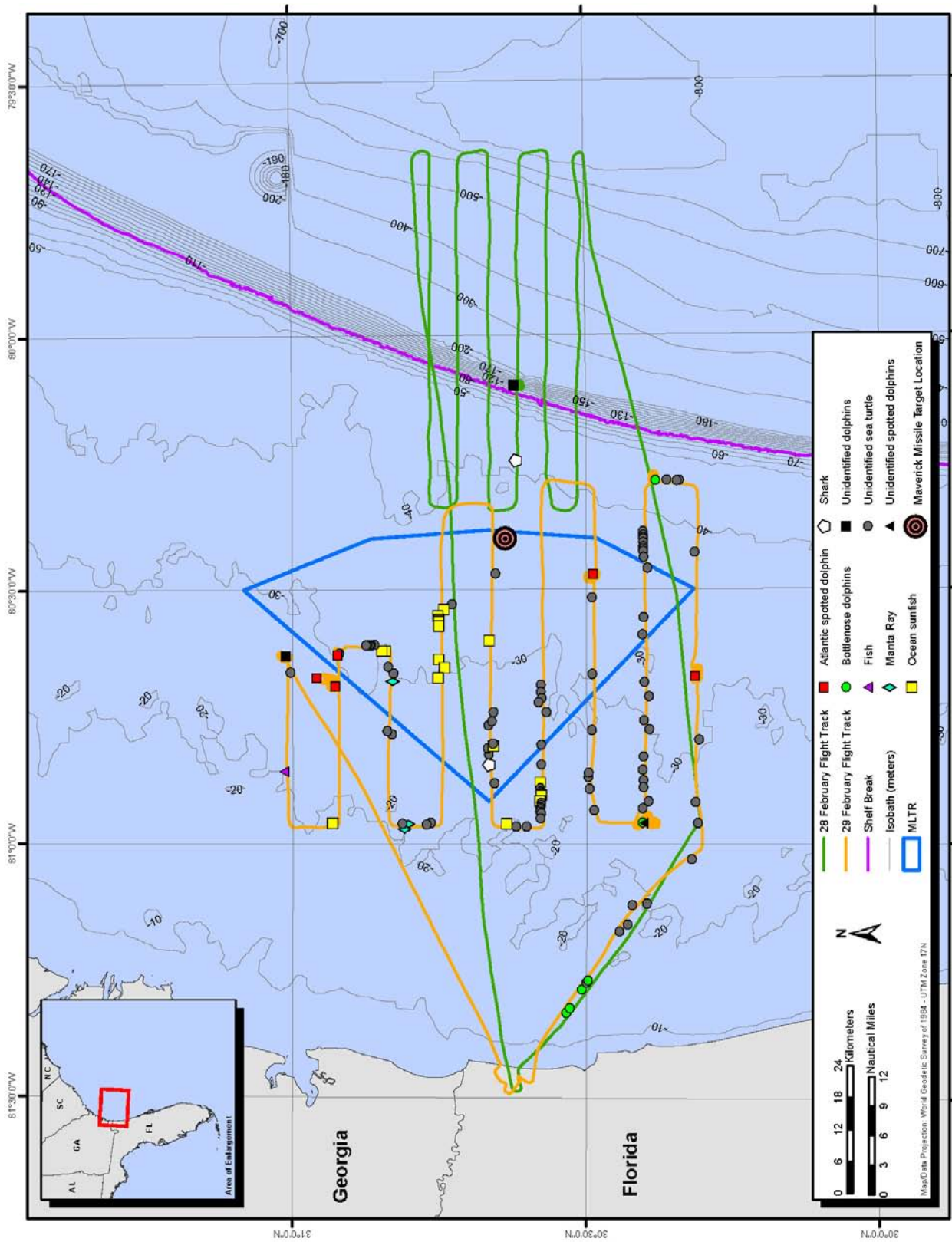


Figure 2. Locations of All Cetacean, Sea Turtle, and Fish Sightings Seen Throughout the JAX MAVEX Monitoring Period (28-29 February)



The following describes the general survey approach:

1. Pre-planned transect lines and waypoints were followed using methods described by Smultea et al. (2009) until a marine mammal/sea turtle group was sighted. Variables such as sea state, glare, and visibility were recorded for each transect flown.
2. Upon sighting a marine mammal/sea turtle group, basic sighting information was recorded per established protocol (see Smultea et al. 2009). As outlined in the Cherry Point Range Complex Monitoring Plan February 2009, information included: (1) species identification and group size; (2) location and relative distance from the missile firing site if available; (3) standard environmental and oceanographic parameters; (4) the behavior of marine mammals and sea turtles; (5) date, time, and visual conditions associated with each observation; (6) direction of travel relative to true North; and (7) duration of the observation.
3. If the sighting appeared suitable for a focal follow, the aircraft increased altitude to approximately 365 to 455 m, and radial distance increased approximately 0.5 to 1.0 km. Then, the aircraft circled the sighting to obtain detailed behavior information as long as possible and logistically feasible. Focal follows occurred for a minimum of 5 minutes, including an observer taking video and digital photographs when possible.
4. If the sighting was not selected for a focal follow, and species and group size were unknown, the aircraft circled the sighting to obtain digital photographs for species identification confirmation and to estimate group size/composition.

## Section 3 Results

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### Survey Effort

Observers visually surveyed 1,886.9 km of on-effort trackline and an additional 164 km off-effort (connector lines) during two survey days for approximately 8.8 hrs of on-effort status (**Table 1**). This survey's efforts were hindered by heavy fog requiring the survey crew to delay start time on both scheduled survey days until safe to depart Fernandina Beach municipal airport. Due to restricted airspace limitations related to the MAVEX event, the MLTR area was unable to be surveyed on 28 February 2012 and an alternate site to the east covering Firing Exercise range boxes BB and CC was surveyed instead. Similar airspace restrictions were in place on 29 February 2012 restricting access to the northeastern quadrant of the MLTR. Beaufort Sea State ranged from 2 to 5 and sightings were made in conditions ranging from 2 to 4 (**Table 3**). **Appendix A** contains a detailed description of environmental, oceanographic, and sighting conditions.

**Table 3. Summary of Sightings**

Sighting No.	Date	Species	Group Size Best/High/Low			Calves	Start Time	Stop Time	Beaufort Sea State	Latitude	Longitude	Vert. Angle	Bearing Angle	Distance off Track (m)	Heading	Bottom Depth (m)	Behavioral Summary
<b>During-MAVEX Sightings – 28 February 2012</b>																	
1	28/2/12	Unid ST	1	1	1	-	10:48	-	3	*	*	058	212	327	-	20-30	Unidentified sea turtle resting at the surface. No disturbance detected. Sighting made off-effort while in transit.
2	28/2/12	Unid	6	8	6	-	12:17	12:26	4	30.622	-80.099	022	007	779	240	100-150	Unidentified dolphin group sighted at surface. No disturbance detected.
3	28/2/12	S	1	1	1	-	12:28	-	4	30.620	-80.247	045	002	424	-	40-50	Unidentified shark sighted at the surface. No disturbance detected.
4	28/2/12	Unid ST	1	1	1	-	13:54	-	3	30.729	-80.529	049	357	379	-	30-40	Unidentified sea turtle resting at the surface. No disturbance detected. Sighting made off-effort while in transit.
<b>Post-MAVEX Sightings – 29 February 2012</b>																	
1	29/2/12	TT	5	6	4	0	11:10	-	2	30.535	-81.333	031	216	830	-	10-20	Small group of bottlenose dolphins sighted milling. Minimum dispersal = 10, Maximum dispersal = 20. Sighting made off-effort while in transit.
2	29/2/12	TT	2	2	2	0	11:10	-	2	30.529	-81.324	033	215	783	270	10-20	Two bottlenose dolphins sighted traveling fast, dispersal = 1. Sighting made off-effort while in transit.
3	29/2/12	TT	1	1	1	0	11:11	-	2	30.509	-81.287	050	215	572	30	10-20	Lone bottlenose dolphin sighted traveling fast. Sighting made off-effort while in transit.
4	29/2/12	Unid ST	1	1	1	-	11:12	-	2	30.501	-81.273	058	218	535	-	10-20	Unidentified sea turtle resting at the surface. No disturbance detected. Sighting made off-effort while in transit.

Sighting No.	Date	Species	Group Size Best/High/Low			Calves	Start Time	Stop Time	Beaufort Sea State	Latitude	Longitude	Vert. Angle	Bearing Angle	Distance off Track (m)	Heading	Bottom Depth (m)	Behavioral Summary
<b>Post-MAVEX Sightings – 29 February 2012 (continued)</b>																	
5	29/2/12	TT	3	3	3	0	11:12	-	2	30.498	-81.269	054	220	535	30	10-20	Small group of bottlenose dolphins sighted traveling fast. Sighting made off-effort while in transit.
6	29/2/12	Unid ST	1	1	1	-	11:14	-	2	30.445	-81.173	054	212	531	-	10-20	Unidentified sea turtle resting at the surface. No disturbance detected. Sighting made off-effort while in transit.
7	29/2/12	Unid ST	1	1	1	-	11:15	-	2	30.431	-81.159	026	218	982	-	10-20	Unidentified sea turtle resting at the surface. No disturbance detected. Sighting made off-effort while in transit.
8	29/2/12	Unid ST	1	1	1	-	11:16	-	2	30.423	-81.121	040	045	699	-	10-20	Unidentified sea turtle resting at the surface. No disturbance detected. Sighting made off-effort while in transit.
9	29/2/12	Unid ST	1	1	1	-	11:16	-	2	30.398	-81.118	024	222	1079	-	20-30	Unidentified sea turtle resting at the surface. No disturbance detected. Sighting made off-effort while in transit.
10	29/2/12	Unid ST	1	1	1	-	11:19	-	2	30.322	-81.031	038	239	611	-	20-30	Unidentified sea turtle resting at the surface. No disturbance detected. Sighting made off-effort while in transit.
11	29/2/12	Unid ST	1	1	1	-	11:22	-	2	30.315	-80.919	036	351	484	-	20-30	Unidentified sea turtle resting at the surface. No disturbance detected.
12	29/2/12	Unid ST	1	1	1	-	11:25	-	3	30.309	-80.796	037	182	450	-	30-40	Unidentified sea turtle resting at the surface. No disturbance detected.
13	29/2/12	SF	16	18	14	1	11:29	11:59	3	30.316	-80.672	052	014	400	190	30-40	Group of approximately 16 Atlantic spotted dolphins traveling at varying speeds with some aerial activity. See <b>Appendix B</b> for focal follow data.

Sighting No.	Date	Species	Group Size Best/High/Low			Calves	Start Time	Stop Time	Beaufort Sea State	Latitude	Longitude	Vert. Angle	Bearing Angle	Distance off Track (m)	Heading	Bottom Depth (m)	Behavioral Summary
<b>Post-MAVEX Sightings – 29 February 2012 (continued)</b>																	
14	29/2/12	Unid ST	1	1	1	-	12:04	-	3	30.316	-80.428	038	001	507	-	30-40	Unidentified sea turtle resting at the surface. No disturbance detected.
15	29/2/12	Unid ST	1	1	1	-	12:08	-	3	30.342	-80.287	032	098	587	-	40-50	Unidentified sea turtle resting at the surface. No disturbance detected. Sighting made off-effort.
16	29/2/12	Unid ST	1	1	1	-	12:08	-	3	30.346	-80.288	045	098	446	-	40-50	Unidentified sea turtle resting at the surface. No disturbance detected. Sighting made off-effort.
17	29/2/12	Unid ST	1	1	1	-	12:09	-	3	30.363	-80.286	041	094	490	-	40-50	Unidentified sea turtle resting at the surface. No disturbance detected. Sighting made off-effort.
18	29/2/12	TT	4	4	4	0	12:09	-	3	30.382	-80.287	053	081	395	090	40-50	Group of four bottlenose dolphins traveling. Diving often; not suitable for focal follow. Sighting made off-effort.
19	29/2/12	Unid ST	1	1	1	-	12:22	-	3	30.404	-80.387	037	000	508	-	30-40	Unidentified sea turtle resting at the surface. No disturbance detected.
20	29/2/12	Unid ST	1	1	1	-	12:22	-	3	30.403	-80.394	041	000	482	-	30-40	Unidentified sea turtle resting at the surface. No disturbance detected.
21	29/2/12	Unid ST	1	1	1	-	12:22	-	3	30.403	-80.399	044	000	451	-	30-40	Unidentified sea turtle resting at the surface. No disturbance detected.
22	29/2/12	Unid ST	1	1	1	-	12:22	-	3	30.403	-80.402	042	001	465	-	30-40	Unidentified sea turtle resting at the surface. No disturbance detected.
23	29/2/12	Unid ST	1	1	1	-	12:22	-	3	30.403	-80.409	045	002	454	-	30-40	Unidentified sea turtle resting at the surface. No disturbance detected.

Sighting No.	Date	Species	Group Size Best/High/Low			Calves	Start Time	Stop Time	Beaufort Sea State	Latitude	Longitude	Vert. Angle	Bearing Angle	Distance off Track (m)	Heading	Bottom Depth (m)	Behavioral Summary
<b>Post-MAVEX Sightings – 29 February 2012 (continued)</b>																	
24	29/2/12	Unid ST	1	1	1	-	12:23	-	3	30.403	-80.417	046	0001	435	-	30-40	Unidentified sea turtle resting at the surface. No disturbance detected.
25	29/2/12	Unid ST	1	1	1	-	12:23	-	3	30.403	-80.422	047	001	433	-	30-40	Unidentified sea turtle resting at the surface. No disturbance detected.
26	29/2/12	Unid ST	1	1	1	-	12:23	-	3	30.403	-80.426	055	001	394	-	30-40	Unidentified sea turtle resting at the surface. No disturbance detected.
27	29/2/12	Unid ST	1	1	1	-	12:23	-	3	30.403	-80.438	058	002	376	-	30-40	Unidentified sea turtle resting at the surface. No disturbance detected.
28	29/2/12	Unid ST	1	1	1	-	12:24	-	3	30.396	-80.459	041	182	497	-	30-40	Unidentified sea turtle resting at the surface. No disturbance detected.
29	29/2/12	Unid ST	1	1	1	-	12:27	-	3	30.403	-80.556	061	358	390	-	30-40	Unidentified sea turtle resting at the surface. No disturbance detected.
30	29/2/12	Unid ST	1	1	1	-	12:28	-	3	30.405	-80.590	026	358	728	-	30-40	Unidentified sea turtle resting at the surface. No disturbance detected.
31	29/2/12	Unid ST	1	1	1	-	12:30	-	3	30.402	-80.683	056	000	363	-	30-40	Unidentified sea turtle resting at the surface. No disturbance detected.
32	29/2/12	Unid ST	1	1	1	-	12:31	-	3	30.394	-80.711	031	180	557	-	30-40	Unidentified sea turtle resting at the surface. No disturbance detected.
33	29/2/12	Unid ST	1	1	1	-	12:33	-	3	30.403	-80.758	039	001	457	-	30-40	Unidentified sea turtle resting at the surface. No disturbance detected.
34	29/2/12	Unid ST	1	1	1	-	12:33	-	3	30.394	-80.776	028	181	625	-	30-40	Unidentified sea turtle resting at the surface. No disturbance detected.

Sighting No.	Date	Species	Group Size Best/High/Low			Calves	Start Time	Stop Time	Beaufort Sea State	Latitude	Longitude	Vert. Angle	Bearing Angle	Distance off Track (m)	Heading	Bottom Depth (m)	Behavioral Summary
<b>Post-MAVEX Sightings – 29 February 2012 (continued)</b>																	
35	29/2/12	Unid ST	2	2	2	-	12:35	-	3	30.404	-80.829	048	002	417	-	20-30	Unidentified sea turtles resting at the surface. No disturbance detected.
36	29/2/12	Unid ST	1	1	1	-	12:36	-	3	30.405	-80.855	038	000	505	-	20-30	Unidentified sea turtle resting at the surface. No disturbance detected.
37	29/2/12	Unid ST	1	1	1	-	12:36	-	3	30.404	-80.876	052	359	405	-	20-30	Unidentified sea turtle resting at the surface. No disturbance detected.
38	29/2/12	Unid ST	1	1	1	-	12:37	-	3	30.404	-80.890	062	000	365	-	20-30	Unidentified sea turtle resting at the surface. No disturbance detected.
39	29/2/12	Unid ST	1	1	1	-	12:37	-	3	30.395	-80.917	034	180	578	-	20-30	Unidentified sea turtle resting at the surface. No disturbance detected.
40	29/2/12	Unid ST	2	2	2	-	12:38	-	3	30.405	-80.931	048	000	452	-	20-30	Unidentified sea turtles resting at the surface. No disturbance detected.
41	29/2/12	TT	3	3	3	0	12:39	-	3	30.405	-80.959	040	132	525	-	20-30	Group of three bottlenose dolphins sighted briefly. No disturbance detected
42	29/2/12	Unid SD	25	30	20	2	12:44	13:13	2	30.403	-80.960	040	159	529	180	20-30	Approximately 25 unidentified spotted dolphins traveling at varying speeds with periods of surface activity. See <b>Appendix B</b> for focal follow data.
43	29/2/12	Unid ST	3	3	3	-	13:16	-	2	30.488	-80.935	048	349	396	-	20-30	Three unidentified sea turtles resting at the surface. No disturbance detected.
44	29/2/12	Unid ST	1	1	1	-	13:18	-	2	30.496	-80.893	042	353	438	-	20-30	Unidentified sea turtle resting at the surface. No disturbance detected.
45	29/2/12	Unid ST	1	1	1	-	13:18	-	2	30.498	-80.870	038	003	497	-	20-30	Unidentified sea turtle resting at the surface. No disturbance detected.

Sighting No.	Date	Species	Group Size Best/High/Low			Calves	Start Time	Stop Time	Beaufort Sea State	Latitude	Longitude	Vert. Angle	Bearing Angle	Distance off Track (m)	Heading	Bottom Depth (m)	Behavioral Summary
<b>Post-MAVEX Sightings – 29 February 2012 (continued)</b>																	
46	29/2/12	Unid ST	1	1	1	-	13:18	-	2	30.497	-80.861	041	006	448	-	20-30	Unidentified sea turtle resting at the surface. No disturbance detected.
47	29/2/12	Unid ST	1	1	1	-	13:21	-	2	30.492	-80.777	048	001	434	-	20-30	Unidentified sea turtle resting at the surface. No disturbance detected.
48	29/2/12	Unid ST	1	1	1	-	13:24	-	3	30.491	-80.667	051	000	417	-	30-40	Unidentified sea turtle resting at the surface. No disturbance detected.
49	29/2/12	Unid ST	1	1	1	-	13:28	-	3	30.491	-80.517	044	000	444	-	30-40	Unidentified sea turtle resting at the surface. No disturbance detected.
50	29/2/12	SF	23	25	20	0	13:29	13:58	3	30.489	-80.471	053	007	387	240	30-40	Group of approximately 23 Atlantic spotted dolphins milling and traveling slowly. Varied group structure. See <b>Appendix B</b> for focal follow data.
51	29/2/12	Unid ST	1	1	1	-	14:16	-	3	30.578	-80.688	039	000	469	-	20-30	Unidentified sea turtle resting at the surface. No disturbance detected.
52	29/2/12	Unid ST	1	1	1	-	14:17	-	3	30.578	-80.702	034	000	526	-	20-30	Unidentified sea turtle resting at the surface. No disturbance detected.
53	29/2/12	Unid ST	1	1	1	-	14:17	-	3	30.577	-80.714	057	000	356	-	20-30	Unidentified sea turtle resting at the surface. No disturbance detected.
54	29/2/12	Unid ST	1	1	1	-	14:17	-	3	30.582	-80.723	018	000	917	-	20-30	Unidentified sea turtle resting at the surface. No disturbance detected.
55	29/2/12	Unid ST	1	1	1	-	14:18	-	3	30.569	-80.742	028	140	636	-	20-30	Unidentified sea turtle resting at the surface. No disturbance detected.
56	29/2/12	Unid ST	1	1	1	-	14:20	-	3	30.578	-80.806	048	001	414	-	20-30	Unidentified sea turtle resting at the surface. No disturbance detected.

Sighting No.	Date	Species	Group Size Best/High/Low			Calves	Start Time	Stop Time	Beaufort Sea State	Latitude	Longitude	Vert. Angle	Bearing Angle	Distance off Track (m)	Heading	Bottom Depth (m)	Behavioral Summary
<b>Post-MAVEX Sightings – 29 February 2012 (continued)</b>																	
57	29/2/12	Unid ST	1	1	1	-	14:21	-	3	30.578	-80.845	064	000	344	-	20-30	Unidentified sea turtle resting at the surface. No disturbance detected.
58	29/2/12	MM	1	1	1	-	14:22	-	3	30.579	-80.880	043	000	451	-	20-30	Ocean sunfish sighted at surface. No disturbance detected.
59	29/2/12	Unid ST	1	1	1	-	14:22	-	3	30.580	-80.892	033	358	560	-	20-30	Unidentified sea turtle resting at the surface. No disturbance detected.
60	29/2/12	Unid ST	1	1	1	-	14:22	-	3	30.579	-80.898	039	358	488	-	20-30	Unidentified sea turtle resting at the surface. No disturbance detected.
61	29/2/12	Unid ST	1	1	1	-	14:22	-	3	30.578	-80.901	055	358	374	-	20-30	Unidentified sea turtle resting at the surface. No disturbance detected.
62	29/2/12	MM	1	1	1	-	14:22	-	3	30.578	-80.905	052	358	387	-	20-30	Ocean sunfish sighted at surface. No disturbance detected.
63	29/2/12	MM	1	1	1	-	14:23	-	3	30.580	-80.916	032	000	578	-	20-30	Ocean sunfish sighted at surface. No disturbance detected.
64	29/2/12	Unid ST	1	1	1	-	14:23	-	3	30.578	-80.920	046	000	423	-	20-30	Unidentified sea turtle resting at the surface. No disturbance detected.
65	29/2/12	Unid ST	1	1	1	-	14:23	-	3	30.578	-80.925	052	359	386	-	20-30	Unidentified sea turtle resting at the surface. No disturbance detected.
66	29/2/12	Unid ST	1	1	1	-	14:23	-	3	30.579	-80.929	042	358	472	-	20-30	Unidentified sea turtle resting at the surface. No disturbance detected.
67	29/2/12	Unid ST	1	1	1	-	14:23	-	3	30.579	-80.933	037	356	523	-	20-30	Unidentified sea turtle resting at the surface. No disturbance detected.
68	29/2/12	Unid ST	1	1	1	-	14:23	-	3	30.580	-80.938	030	357	611	-	20-30	Unidentified sea turtle resting at the surface. No disturbance detected.



Sighting No.	Date	Species	Group Size Best/High/Low			Calves	Start Time	Stop Time	Beaufort Sea State	Latitude	Longitude	Vert. Angle	Bearing Angle	Distance off Track (m)	Heading	Bottom Depth (m)	Behavioral Summary
<b>Post-MAVEX Sightings – 29 February 2012 (continued)</b>																	
69	29/2/12	Unid ST	1	1	1	-	14:24	-	3	30.578	-80.941	052	357	393	-	20-30	Unidentified sea turtle resting at the surface. No disturbance detected.
70	29/2/12	Unid ST	1	1	1	-	14:24	-	3	30.579	-80.951	028	357	656	-	20-30	Unidentified sea turtle resting at the surface. No disturbance detected.
71	29/2/12	Unid ST	1	1	1	-	14:25	-	3	30.603	-80.967	058	089	382	-	20-30	Unidentified sea turtle resting at the surface. No disturbance detected. Sighting made off-effort.
72	29/2/12	Unid ST	1	1	1	-	14:26	-	3	30.621	-80.967	060	091	371	-	15-25	Unidentified sea turtle resting at the surface. No disturbance detected. Sighting made off-effort.
73	29/2/12	MM	1	1	1	-	14:26	-	3	30.637	-80.961	028	99	686	-	15-25	Ocean sunfish sighted at surface. No disturbance detected.
74	29/2/12	Unid ST	1	1	1	-	14:29	-	2	30.657	-80.882	038	177	495	-	20-30	Unidentified sea turtle resting at the surface. No disturbance detected.
75	29/2/12	S	1	1	1	-	14:30	-	2	30.667	-80.845	048	356	420	-	20-30	Unidentified shark sighted at surface. No disturbance detected.
76	29/2/12	Unid ST	1	1	1	-	14:30	-	2	30.667	-80.825	068	000	340	-	20-30	Unidentified sea turtle resting at the surface. No disturbance detected.
77	29/2/12	Unid ST	1	1	1	-	14:31	-	2	30.669	-80.813	037	358	523	-	20-30	Unidentified sea turtle resting at the surface. No disturbance detected.
78	29/2/12	MM	1	1	1	-	14:31	-	2	30.659	-80.808	030	179	625	-	20-30	Ocean sunfish sighted at surface. No disturbance detected.
79	29/2/12	Unid ST	1	1	1	-	14:31	-	2	30.660	-80.804	035	180	544	-	20-30	Unidentified sea turtle resting at the surface. No disturbance detected.
80	29/2/12	Unid ST	1	1	1	-	14:32	-	2	30.668	-80.768	058	000	383	-	20-30	Unidentified sea turtle resting at the surface. No disturbance detected.

Sighting No.	Date	Species	Group Size Best/High/Low			Calves	Start Time	Stop Time	Beaufort Sea State	Latitude	Longitude	Vert. Angle	Bearing Angle	Distance off Track (m)	Heading	Bottom Depth (m)	Behavioral Summary
<b>Post-MAVEX Sightings – 29 February 2012 (continued)</b>																	
81	29/2/12	Unid ST	1	1	1	-	14:32	-	2	30.662	-80.760	052	240	411	-	20-30	Unidentified sea turtle resting at the surface. No disturbance detected.
82	29/2/12	Unid ST	1	1	1	-	14:32	-	2	30.659	-80.742	033	181	596	-	20-30	Unidentified sea turtle resting at the surface. No disturbance detected.
83	29/2/12	MM	1	1	1	-	14:36	-	2	30.666	-80.601	054	002	409	-	30-40	Ocean sunfish sighted at surface. No disturbance detected.
84	29/2/12	Unid ST	1	1	1	-	14:40	-	3	30.655	-80.469	041	182	475	-	30-40	Unidentified sea turtle resting at the surface. No disturbance detected.
85	29/2/12	MM	1	1	1	-	14:51	-	3	30.743	-80.540	052	140	565	-	30-40	Ocean sunfish sighted at surface. No disturbance detected.
86	29/2/12	MM	1	1	1	-	14:52	-	3	30.753	-80.552	043	000	647	-	30-40	Ocean sunfish sighted at surface. No disturbance detected.
87	29/2/12	MM	1	1	1	-	14:52	-	3	30.752	-80.559	056	000	526	-	30-40	Ocean sunfish sighted at surface. No disturbance detected.
88	29/2/12	MM	1	1	1	-	14:52	-	3	30.752	-80.563	058	001	527	-	30-40	Ocean sunfish sighted at surface. No disturbance detected.
89	29/2/12	MM	1	1	1	-	14:52	-	3	30.752	-80.572	054	002	556	-	30-40	Ocean sunfish sighted at surface. No disturbance detected.
90	29/2/12	MM	1	1	1	-	14:54	-	3	30.752	-80.638	054	358	542	-	30-40	Ocean sunfish sighted at surface. No disturbance detected.
91	29/2/12	MM	1	1	1	-	14:55	-	3	30.742	-80.654	052	179	546	-	30-40	Ocean sunfish sighted at surface. No disturbance detected.
92	29/2/12	MM	1	1	1	-	14:55	-	3	30.753	-80.674	039	359	694	-	20-30	Ocean sunfish sighted at surface. No disturbance detected.
93	29/2/12	Unid ST	1	1	1	-	15:04	-	3	30.766	-80.960	030	083	626	-	20-30	Unidentified sea turtle resting at the surface. No disturbance detected.
94	29/2/12	Unid ST	1	1	1	-	15:04	-	3	30.773	-80.963	051	087	414	-	20-30	Unidentified sea turtle resting at the surface. No disturbance detected.
95	29/2/12	MB	1	1	1	-	15:05	-	3	30.804	-80.961	038	092	485	-	20-30	Manta Ray sighted at surface. No disturbance detected.

Sighting No.	Date	Species	Group Size Best/High/Low			Calves	Start Time	Stop Time	Beaufort Sea State	Latitude	Longitude	Vert. Angle	Bearing Angle	Distance off Track (m)	Heading	Bottom Depth (m)	Behavioral Summary
<b>Post-MAVEX Sightings – 29 February 2012 (continued)</b>																	
96	29/2/12	MB	1	1	1	-	15:05	-	3	30.810	-80.971	045	272	433	-	20-30	Manta Ray sighted at surface. No disturbance detected.
97	29/2/12	Unid ST	1	1	1	-	15:05	-	3	30.814	-80.961	046	92	428	-	20-30	Unidentified sea turtle resting at the surface. No disturbance detected.
98	29/2/12	Unid ST	1	1	1	-	15:10	-	3	30.832	-80.785	044	182	428	-	20-30	Unidentified sea turtle resting at the surface. No disturbance detected.
99	29/2/12	Unid ST	1	1	1	-	15:11	-	3	30.840	-80.779	038	002	480	-	20-30	Unidentified sea turtle resting at the surface. No disturbance detected.
100	29/2/12	MB	1	1	1	-	15:13	-	3	30.830	-80.681	037	181	505	-	20-30	Manta Ray sighted at surface. No disturbance detected.
101	29/2/12	Unid ST	1	1	1	-	15:14	-	3	30.829	-80.665	034	181	549	-	20-30	Unidentified sea turtle resting at the surface. No disturbance detected.
102	29/2/12	Unid ST	1	1	1	-	15:14	-	3	30.838	-80.652	047	001	421	-	20-30	Unidentified sea turtle resting at the surface. No disturbance detected.
103	29/2/12	MM	1	1	1	-	15:15	-	3	30.843	-80.621	024	240	724	-	20-30	Ocean sunfish sighted at surface. No disturbance detected.
104	29/2/12	MM	1	1	1	-	15:15	-	3	30.849	-80.621	024	240	718	-	20-30	Ocean sunfish sighted at surface. No disturbance detected.
105	29/2/12	Unid ST	1	1	1	-	15:16	-	3	30.861	-80.609	039	092	485	-	30-40	Unidentified sea turtle resting at the surface. No disturbance detected.
106	29/2/12	Unid ST	1	1	1	-	15:16	-	3	30.867	-80.610	056	092	378	-	30-40	Unidentified sea turtle resting at the surface. No disturbance detected.
107	29/2/12	Unid ST	1	1	1	-	15:16	-	3	30.870	-80.610	054	092	386	-	30-40	Unidentified sea turtle resting at the surface. No disturbance detected.
108	29/2/12	Unid ST	1	1	1	-	15:16	-	3	30.873	-80.610	048	093	417	-	30-40	Unidentified sea turtle resting at the surface. No disturbance detected.

Sighting No.	Date	Species	Group Size Best/High/Low			Calves	Start Time	Stop Time	Beaufort Sea State	Latitude	Longitude	Vert. Angle	Bearing Angle	Distance off Track (m)	Heading	Bottom Depth (m)	Behavioral Summary
<b>Post-MAVEX Sightings – 29 February 2012 (continued)</b>																	
109	29/2/12	Unid ST	1	1	1	-	15:16	-	3	30.876	-80.610	065	094°	342	-	30-40	Unidentified sea turtle resting at the surface. No disturbance detected.
110	29/2/12	Unid ST	1	1	1	-	15:17	-	3	30.921	-80.626	065	011	376	-	30-40	Unidentified sea turtle resting at the surface. No disturbance detected.
111	29/2/12	SF	6	7	4	0	15:18	-	3	30.924	-80.629	033	010	623	90	30-40	Group of approximately six Atlantic spotted dolphins traveling. No disturbance detected.
112	29/2/12	SF	16	18	8	0	15:23	15:44	3	30.928	-80.690	038	009	540	various	20-30	Group of approximately 16 Atlantic spotted dolphins traveling at various speeds and milling. See <b>Appendix B</b> for focal follow data.
113	29/2/12	SF	35	40	30	0	15:50	15:58	3	30.960	-80.674	045	010	539	various	20-30	Group of approximately 35 Atlantic spotted dolphins milling and traveling slowly. See <b>Appendix B</b> for focal follow data.
114	29/2/12	MM	1	1	1	-	16:07	-	3	30.933	-80.960	029	081	609	-	10-20	Ocean sunfish sighted at surface. No disturbance detected. Sighting made off-effort.
115	29/2/12	F	-	-	-	-	16:12	-	3	31.015	-80.858	045	356	460	-	20-30	Big school of fish sighted at the surface. No disturbance detected.
116	29/2/12	Unid ST	1	1	1	-	16:17	-	3	31.004	-80.663	044	180	462	-	20-30	Unidentified sea turtle resting at the surface. No disturbance detected.
117	29/2/12	Unid	15	20	10	0	16:18	-	3	31.012	-80.631	049	012	425	-	20-30	Unidentified group of dolphins sighted briefly. No disturbance detected.

Note: \*GPS malfunctioned. No position data for this sighting.

Key: Unid ST = Unidentified sea turtle; Unid = Unidentified dolphins; S = Shark; TT = Common Bottlenose Dolphins (*Tursiops truncatus*); SF = Atlantic Spotted Dolphins (*Stenella Frontalis*); Unid SD = Unidentified spotted dolphins; MM = Ocean sunfish (*Mola mola*); MB = Manta Ray (*Manta birostris*); F = School of fish

## Sightings

Fourteen sightings of cetaceans and 84 sightings of sea turtles were recorded during 9.8 hrs of total survey flight time (includes on-effort and off-effort intervals) within the survey area covering a 2-day period (**Figure 2, Table 3**). One sighting of unidentified dolphins and 2 sightings of sea turtles were made during the 1-day during-MAVEX survey on 28 February (**Figure 3, Table 3**). Thirteen sightings of dolphins and 82 sightings of sea turtles were made throughout the 1-day post-MAVEX survey period on 29 February (**Figure 4, Table 3**). Sightings over the 2-day period included 6 sightings of bottlenose dolphins, 5 sightings of Atlantic spotted dolphins, 2 sightings of unidentified dolphins, 1 sighting of unidentified spotted dolphins, 84 sightings of unidentified sea turtles, 3 sightings of manta rays, 17 sightings of ocean sunfish, 2 sightings of sharks, and 1 sighting of a large school of fish. **Table 4** provides a summary of sightings information and bottom depth information. Bottom depths for each sighting were estimated in 10-m ranges from plots of latitude and longitude for each sighting within a Geographic Information System. Due to limitations arising from flight time, glare, altitude, and group dispersal, digital photographs to determine or confirm species identification were not collected for all marine species sighted in the area and consequently these sightings were labeled as unidentified dolphin or unidentified spotted dolphin groups.

**Table 4. Summary of Sightings and Depths Recorded During Monitoring for JAX MAVEX Training**

Species	Number of Sightings	Bottom Depths (m)
Bottlenose Dolphin	6	10-50
Atlantic Spotted Dolphin	5	20-40
Unidentified Dolphin	2	20-150
Unidentified Spotted Dolphin	1	20-30
Unidentified Sea Turtle	84	10-50
Manta Ray	3	20-30
Ocean Sunfish	17	10-40
School of Fish	1	20-30
Shark	2	20-50

### *Sightings Per Unit Effort (SPUE)*

SPUE was calculated as the total survey on-effort (hr/km/NM) divided by the total number of sightings. For monitoring conducted on 28 February in Beaufort sea state ranging from 3 to 5, the SPUE for marine mammals ( $n=1$ ) was equal to one sighting per 3.5 hr, 761.5 km, and 411.2 NM. No SPUE for sea turtles was calculated for 28 February due to zero on effort sea turtle sightings for that day. For monitoring on 29 February in Beaufort sea state ranging from 2 to 4, the SPUE for marine mammals ( $n=8$ ) was equal to one sighting per 0.7 hr, 140.7 km, and 76.0 NM. SPUE for 29 February for sea turtle sightings ( $n=71$ ) was equal to one sighting per 0.1 hr, 15.9 km, and 8.6 NM. For this two-day monitoring exercise across two separate locations, the

overall SPUE for marine mammals ( $n=9$ ) was equal to one sighting per 1.0 hr, 209.7 km, and 113.2 NM, while the SPUE for sea turtles ( $n=71$ ) was equal to one sighting per 0.1 hr, 26.6 km, and 14.3 NM.

## Behavior

No visible evidence of unusual behavior was observed for the during-MAVEX or post-MAVEX surveys (**Table 3**). The survey team conducted five brief focal follows on 29 February. The first focal follow was a period of 20 minutes (min) spent with a group of 16 Atlantic spotted dolphins. The second focal follow was a period of 22 min spent with a group of 25 unidentified spotted dolphins. The third focal follow was a period of 35 min spent with a group of 23 Atlantic spotted dolphins. The fourth focal follow was a period of 20 min spent with a group of 16 Atlantic spotted dolphins. The fifth focal follow was a period of 6 min spent with a group of 35 Atlantic spotted dolphins. Detailed behavioral observations made during the focal follows are presented in **Appendix B**. Photographs and video of suitable quality for species identification purposes were collected during several, but not all, dolphin sightings.

## Section 4 Acknowledgements

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We would like to thank Orion Aviation's Director Ed Coffman and pilots Stan and Dave Huddle. These data were obtained under National Marine Fisheries Service permit no. 14451 issued to Joseph R. Mobley, Jr.

## Section 5 References

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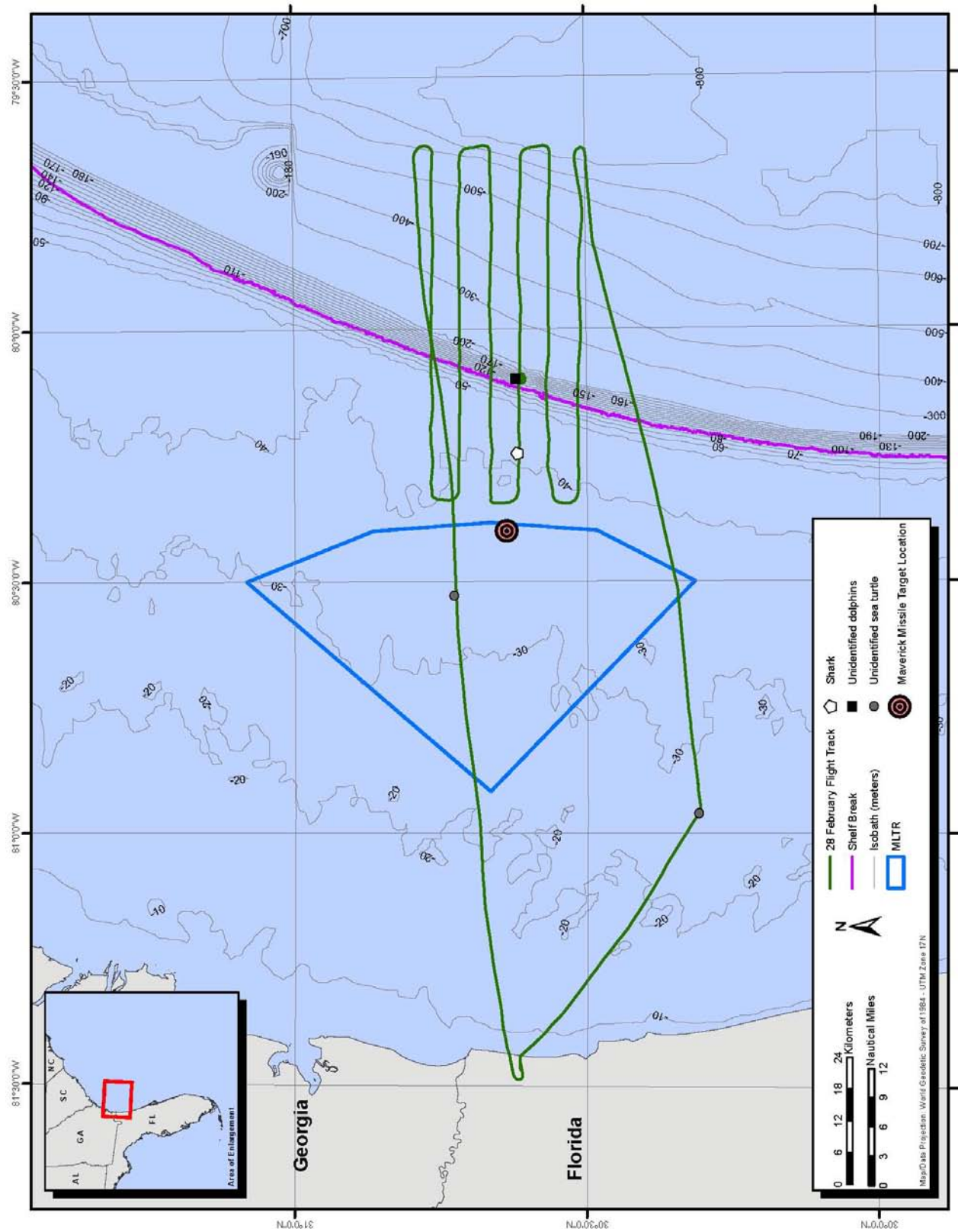


Figure 3. Locations of All Cetacean, Sea Turtle, and Fish Sightings Seen During JAX MAVEX Training (28 February)

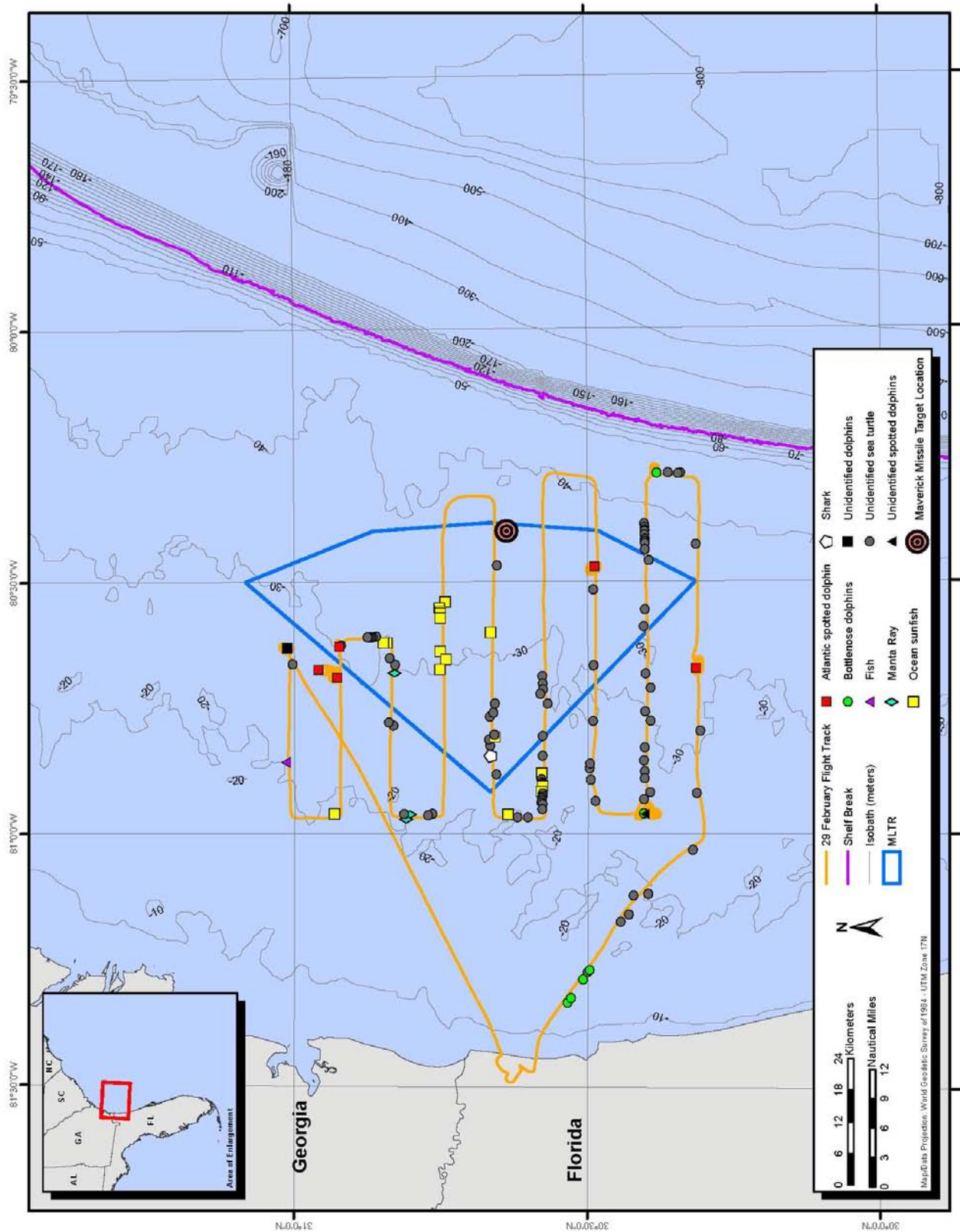


Figure 4. Locations of All Cetacean, Sea Turtle, and Fish Sightings Seen Post-JAX MAVEX Training (29 February)



## APPENDIX A

### Environmental, Oceanographic, and Sighting Conditions

**Table A-1** shows the environmental, oceanographic, and sighting conditions encountered throughout the during-MAVEX and post-MAVEX monitoring efforts.

Time	Beaufort Left MMO	Glare Left MMO (%)	Visibility Distance Left MMO (km)	Beaufort Right MMO	Glare Right MMO (%)	Visibility Distance Right MMO (km)	Cloud Cover (%)
<b>During-MAVEX Survey Effort – 28 February 2012</b>							
12:04	5	11-50	1	5	diffuse	1	50
12:06	5	11-50	1	5	<10	1	0
12:15	4	<10	2	4	diffuse	2	80
12:25	4	11-50	1	4	diffuse	2	0
12:32	4	diffuse	2	4	<10	2	80
12:39	4	diffuse	2	5	<10	1	0
12:42	5	diffuse	2	5	<10	1	0
12:54	5	11-50	1	5	<10	1	80
12:56	5	<10	1	5	<10	1	80
13:06	4	11-50	1	4	<10	1	50
13:12	3	diffuse	2	3	<10	2	100
13:15	3	diffuse	2	3	<10	2	100
13:18	4	<10	2	4	<10	1	20
13:24	5	<10	1	5	<10	1	0
13:36	5	51-75	1	4	<10	2	30
13:51	3	<10	2	3	<10	2	90
<b>Post-MAVEX Survey Effort – 29 February 2012</b>							
11:07	2	<10	2	2	51-75	2	0
11:17	2	<10	2	2	11-50	4	0
11:21	2	<10	2	2	51-75	2	0
11:23	3	<10	2	3	51-75	2	0
12:00	3	<10	2	3	51-75	2	0
12:07	3	11-50	2	3	<10	3	0
12:19	3	11-50	1	3	<10	3	0
12:38	2	11-50	2	2	diffuse	4	0
13:20	2	diffuse	3	2	51-75	1	0

Time	Beaufort Left MMO	Glare Left MMO (%)	Visibility Distance Left MMO (km)	Beaufort Right MMO	Glare Right MMO (%)	Visibility Distance Right MMO (km)	Cloud Cover (%)
<b>Post-MAVEX Survey Effort – 29 February 2012 (continued)</b>							
13:22	3	diffuse	3	2	51-75	1	0
13:27	3	diffuse	3	3	51-75	1	0
13:59	4	<10	2	3	51-75	1	0
14:02	4	11-50	2	4	<10	2	0
14:05	4	51-75	1	4	<10	2	0
14:13	3	51-75	1	3	<10	3	0
14:24	2	11-50	2	3	<10	3	0
14:26	2	diffuse	2	2	51-75	2	0
14:38	3	diffuse	3	3	11-50	1	0
14:43	3	51-75	1	3	11-50	1	0
14:46	3	51-75	1	3	<10	2	0
14:55	3	51-75	1	3	<10	3	0
14:56	2	51-75	1	2	<10	3	0
15:02	3	51-75	1	3	<10	2	0
15:06	3	<10	2	3	11-50	2	0
15:17	3	51-75	2	3	<10	2	0
15:21	3	51-75	2	3	<10	3	0
15:59	3	51-75	2	3	<10	3	0
16:07	3	51-75	2	3	<10	2	0
16:10	3	<10	2	3	11-50	1	0

## APPENDIX B

### Focal Follow Data

**Table B-1** shows the focal follow behavioral data from the JAX MAVEX training 2012 monitoring efforts. Five focal follow events were conducted on 29 February 2012, four groups of Atlantic spotted dolphins and one group of unidentified spotted dolphins, all within the survey area.

Record Number	Time	Date	Latitude	Longitude	Recorded Behavior
<b>Sighting Number 13</b>					
Species: <i>Stenella frontalis</i> . Group size: 16.					
1	11:31:32	29/2/2012	30.313	-80.684	Fast travel heading 190. Minimum Dispersal = 1, Max Dispersal = 3.
2	11:34:23	29/2/2012	30.313	-80.682	Fast travel heading 190. Minimum Dispersal = 1, Max Dispersal = 2.
3	11:35:35	29/2/2012	30.308	-80.681	Fast travel heading 190. Minimum Dispersal = 1, Maximum (Max) Dispersal = 2.
4	11:36:29	29/2/2012	30.307	-80.668	Medium speed travel. Minimum Dispersal = 1, Max Dispersal = 10. Spread out more.
5	11:37:11	29/2/2012	30.316	-80.677	Some splashing at surface.
6	11:37:24	29/2/2012	30.316	-80.669	Group out of view.
7	11:37:48	29/2/2012	30.307	-80.665	Slow travel heading 090. Minimum Dispersal = 1, Max Dispersal = 5. Group is more spread out.
8	11:38:40	29/2/2012	30.317	-80.670	Group out of view - in glare.
9	11:39:12	29/2/2012	30.305	-80.667	Slow travel heading 090. Minimum Dispersal = 1, Max Dispersal = 15. Some milling, 3 off to side.
10	11:39:53	29/2/2012	30.317	-80.671	Group out of view - in glare.
11	11:40:27	29/2/2012	30.307	-80.663	Surface active milling. Group heading 090. Minimum Dispersal = 1, Max Dispersal = 5.
12	11:41:11	29/2/2012	30.318	-80.672	Minimum Dispersal = 1, Max Dispersal = 5. A few individuals off to the side,
13	11:41:18	29/2/2012	30.319	-80.668	Group out of view - in glare.
14	11:41:56	29/2/2012	30.306	-80.663	Slow travel heading 090. Minimum Dispersal = 1, Max Dispersal = 7. Spread out laterally.
15	11:42:28	29/2/2012	30.313	-80.675	Some splashing.

Record Number	Time	Date	Latitude	Longitude	Recorded Behavior
<b>Sighting Number 13 (continued)</b>					
16	11:43:35	29/2/2012	30.305	-80.668	Surface active travel heading 090. Minimum Dispersal = 1, Max Dispersal = 5. Spread out longitudinally.
17	11:43:51	29/2/2012	30.313	-80.673	Big splash.
18	11:43:58	29/2/2012	30.316	-80.670	Group out of view - in glare.
19	11:44:32	29/2/2012	30.310	-80.657	Travel heading 090. Minimum Dispersal = 1, Max Dispersal = 2. Two separated out.
20	11:45:16	29/2/2012	30.314	-80.670	Surface active travel heading 090. Minimum Dispersal = 1, Max Dispersal = 4.
21	11:45:46	29/2/2012	30.312	-80.656	Splash.
22	11:45:55	29/2/2012	30.309	-80.656	Surface active travel heading 090. Minimum Dispersal = 1, Max Dispersal = 2. Two groups, one calf spotted.
23	11:46:51	29/2/2012	30.316	-80.660	Eight in main group, a few others out in another group.
24	11:47:20	29/2/2012	30.306	-80.658	Medium speed travel heading 060. Minimum Dispersal = 1, Max Dispersal = 3. Spread out more laterally.
25	11:48:04	29/2/2012	30.319	-80.665	Surface active travel.
26	11:48:51	29/2/2012	30.305	-80.659	Surface active travel heading 090. Minimum Dispersal = 1, Max Dispersal = 2. Tighter together - groups of 9 and approx. 5.
27	11:49:29	29/2/2012	30.319	-80.663	Group out of view - in glare.
28	11:49:55	29/2/2012	30.312	-80.653	Group heading 060. Minimum Dispersal = 1, Max Dispersal = 6. Main group tight.
29	11:50:30	29/2/2012	30.306	-80.666	Surface active travel heading 150. Spread out longitudinally.
30	11:50:46	29/2/2012	30.314	-80.667	Medium speed travel.
31	11:50:52	29/2/2012	30.317	-80.664	Group out of view - in glare.
32	11:51:18	29/2/2012	30.312	-80.653	Stopping video - taking stills.
<b>Sighting Number 42</b>					
Species: Unidentified spotted dolphins Group size: 25.					
1	12:48:47	29/2/2012	30.405	-80.952	Surface active milling. Group heading 180. Minimum Dispersal = 1, Max Dispersal = 7.

Record Number	Time	Date	Latitude	Longitude	Recorded Behavior
<b>Sighting Number 42 (continued)</b>					
2	12:49:43	29/2/2012	30.394	-80.956	Surface active milling. Group heading 180. Minimum Dispersal = 1, Max Dispersal = 10. Lots of subgroups all around this area.
3	12:50:23	29/2/2012	30.400	-80.945	Group out of view - in glare.
4	12:50:47	29/2/2012	30.392	-80.952	Group heading 200. Minimum Dispersal = 1, Max Dispersal = 7. Two subgroups coming together.
5	12:51:09	29/2/2012	30.401	-80.959	Surface active travel. Minimum Dispersal = 1, Max Dispersal = 7. A couple calves.
6	12:51:53	29/2/2012	30.393	-80.949	Medium speed travel heading 180. Minimum Dispersal = 1, Max Dispersal = 5. Few off to the side of subgroup - main subgroup of 10-12 off to left.
7	12:52:36	29/2/2012	30.405	-80.952	Group out of view - in glare and under wing.
8	12:53:09	29/2/2012	30.392	-80.951	Group heading 180. Minimum Dispersal = 1, Max Dispersal = 7. Two cutting across front.
9	12:53:37	29/2/2012	30.402	-80.959	A couple scattered individuals - group in sort of v formation - coming closer together.
10	12:53:45	29/2/2012	30.404	-80.954	Surface active travel.
11	12:53:52	29/2/2012	30.404	-80.951	Group out of view - in glare and under wing.
12	12:54:32	29/2/2012	30.391	-80.957	Group heading 200. Minimum Dispersal = 1, Max Dispersal = 10. Pretty clumped - a couple out front
13	12:54:50	29/2/2012	30.401	-80.961	Elongated group.
14	12:54:57	29/2/2012	30.404	-80.958	Group out of view - in glare and under wing.
15	12:55:35	29/2/2012	30.392	-80.951	Slow travel heading 200. Minimum Dispersal = 1, Max Dispersal = 12. Lots of splashes.
16	12:56:20	29/2/2012	30.403	-80.954	Group out of view - in glare and under wing.
17	12:56:43	29/2/2012	30.394	-80.949	Surface active swimming - fast travel heading 200. Minimum Dispersal = 1, Max Dispersal = 18. Split up into small subgroup on right and in front.

Record Number	Time	Date	Latitude	Longitude	Recorded Behavior
<b>Sighting Number 42 (continued)</b>					
18	12:57:47	29/2/2012	30.400	-80.949	Group out of view - in glare and under wing.
19	12:58:27	29/2/2012	30.389	-80.961	Slow travel heading 180. Minimum Dispersal = 1, Max Dispersal = 10. Still in two groups.
20	12:58:56	29/2/2012	30.402	-80.960	Surface active travel. Lunging, leaping; they started moving.
21	13:00:01	29/2/2012	30.392	-80.965	Group heading 210. Minimum Dispersal = 1, Max Dispersal = 3. At least 10 individuals in main group.
22	13:01:18	29/2/2012	30.385	-80.961	Minimum Dispersal = 1, Max Dispersal = 3. Main group on right, rest on left.
23	13:01:38	29/2/2012	30.393	-80.968	Dolphins are all over the place out there; lots of little groups, some bigger groups. Visible off both left and right side of plane.
24	13:01:47	29/2/2012	30.398	-80.966	Group heading 200. Minimum Dispersal = 1, Max Dispersal = 15.
25	13:02:00	29/2/2012	30.401	-80.957	Group out of view - in glare and under wing.
26	13:02:57	29/2/2012	30.385	-80.963	Surface active travel heading 190. Minimum Dispersal = 1, Max Dispersal = 3. Thirteen or 14 in subgroup.
27	13:03:17	29/2/2012	30.395	-80.968	Medium speed travel.
28	13:03:28	29/2/2012	30.401	-80.963	Splash.
29	13:04:16	29/2/2012	30.385	-80.955	Group out of view - in glare and under wing.
30	13:04:20	29/2/2012	30.384	-80.957	Slow travel heading 180. Minimum Dispersal = 1, Max Dispersal = 3. Main group has about 12, dispersal 1-3.
31	13:04:55	29/2/2012	30.397	-80.965	Group out of view - in glare and under wing.
32	13:06:00	29/2/2012	30.383	-80.963	Medium speed travel heading 180. Minimum Dispersal = 1, Max Dispersal = 12. Some splashes, three subgroups.
33	13:06:27	29/2/2012	30.396	-80.967	Surface active travel, some splashing.
34	13:06:39	29/2/2012	30.400	-80.959	Group out of view - under wing.
35	13:07:33	29/2/2012	30.382	-80.961	Medium speed travel heading 160. Minimum Dispersal = 1, Max Dispersal = 5. Ten or 12 in main group.
36	13:07:55	29/2/2012	30.392	-80.968	Surface active travel. Some lunging.

Record Number	Time	Date	Latitude	Longitude	Recorded Behavior
<b>Sighting Number 42 (continued)</b>					
37	13:08:02	29/2/2012	30.396	-80.966	Some porpoising. Looks like they are chasing something.
38	13:08:21	29/2/2012	30.397	-80.954	Minimum Dispersal = 1, Max Dispersal = 5. Spreading out.
39	13:09:00	29/2/2012	30.380	-80.956	Surface active travel heading 160. Lunging and sprinting at front of group - chasing something?
40	13:09:30	29/2/2012	30.389	-80.966	Surface active travel - leaping.
<b>Sighting Number 50</b>					
Species: <i>Stenella frontalis</i> . Group size: 23.					
1	13:31:18	29/2/2012	30.489	-80.472	Surface active milling. Group heading 240. Minimum Dispersal = 1, Max Dispersal = 2. Two subgroups.
2	13:32:52	29/2/2012	30.495	-80.482	Group heading 250. Minimum Dispersal = 1, Max Dispersal = 3. Got video of plane shadow passing, some dove may be related.
3	13:33:52	29/2/2012	30.491	-80.484	Group heading 260. Minimum Dispersal = 1, Max Dispersal = 4. Maybe group of 5 breaking off at back - dispersal 1-3 in right group; otherwise, 8 lengths.
4	13:34:18	29/2/2012	30.497	-80.472	Group out of view - in glare.
5	13:38:56	29/2/2012	30.486	-80.479	Group heading 270. Minimum Dispersal = 1, Max Dispersal = 2.
6	13:38:59	29/2/2012	30.487	-80.481	Milling. Group heading 270. Minimum Dispersal = 1, Max Dispersal = 2. Clumped up.
7	13:40:21	29/2/2012	30.495	-80.482	Milling. Group heading 270. Minimum Dispersal = 1, Max Dispersal = 2. Just hanging out.
8	13:40:37	29/2/2012	30.499	-80.473	Group out of view - in glare.
9	13:41:19	29/2/2012	30.489	-80.480	Milling. Group heading 270. Minimum Dispersal = 1, Max Dispersal = 6.
10	13:41:46	29/2/2012	30.499	-80.473	Slow travel. Minimum Dispersal = 1, Max Dispersal = 3.
11	13:41:56	29/2/2012	30.496	-80.470	Group out of view - in glare.
12	13:42:30	29/2/2012	30.489	-80.481	Slow travel heading 240. Minimum Dispersal = 1, Max Dispersal = 1. Tightened up into blob.
13	13:42:42	29/2/2012	30.496	-80.482	Group out of view - under wing.
14	13:42:58	29/2/2012	30.499	-80.473	Group out of view - in glare.

Record Number	Time	Date	Latitude	Longitude	Recorded Behavior
<b>Sighting Number 50 (continued)</b>					
15	13:44:02	29/2/2012	30.499	-80.480	Surface active travel. Minimum Dispersal = 1, Max Dispersal = 4.
16	13:44:15	29/2/2012	30.499	-80.472	Group out of view - under wing.
17	13:44:55	29/2/2012	30.489	-80.480	Slow travel heading 210. Minimum Dispersal = 1, Max Dispersal = 1. Tight row group formation.
18	13:47:15	29/2/2012	30.492	-80.467	Milling. Group heading 210. Minimum Dispersal = 1, Max Dispersal = 3. Slow mill.
19	13:48:11	29/2/2012	30.498	-80.481	Minimum Dispersal = 1, Max Dispersal = 3. Clumped ball.
20	13:48:24	29/2/2012	30.499	-80.473	Group out of view - under wing.
21	13:49:13	29/2/2012	30.491	-80.482	Milling. Group heading 330. Minimum Dispersal = 1, Max Dispersal = 2. Tight clump, some underneath.
22	13:49:32	29/2/2012	30.500	-80.477	Criss-crossing
23	13:49:49	29/2/2012	30.497	-80.469	Group out of view - in glare and under wing.
24	13:50:19	29/2/2012	30.487	-80.475	Slow travel heading 270. Minimum Dispersal = 1, Max Dispersal = 3.
25	13:53:25	29/2/2012	30.490	-80.484	Slow travel heading 240. Minimum Dispersal = 1, Max Dispersal = 3.
26	13:53:44	29/2/2012	30.499	-80.481	Group out of view - under wing.
27	13:54:52	29/2/2012	30.492	-80.484	Slow travel heading 270. Minimum Dispersal = 1, Max Dispersal = 3. Spread out a little, another couple trailing by 8 body lengths.
28	13:55:19	29/2/2012	30.500	-80.473	Group out of view - in glare.
29	14:06:24	29/2/2012	30.576	-80.336	Reacted to plane shadow on last pass by sprinting, splashing.
<b>Sighting Number 112</b>					
Species: <i>Stenella frontalis</i> . Group size: 16.					
1	15:25:05	29/2/2012	30.928	-80.690	Medium speed travel heading 090. Minimum Dispersal = 1, Max Dispersal = 5. Three to 4 subgroups all within one kilometer.
2	15:26:45	29/2/2012	30.934	-80.699	Majority of group underwater, some individuals jumping. Group heading 100. Minimum Dispersal = 1, Max Dispersal = 2.



Record Number	Time	Date	Latitude	Longitude	Recorded Behavior
<b>Sighting Number 112 (continued)</b>					
3	15:26:56	29/2/2012	30.939	-80.693	Medium speed travel. Minimum Dispersal = 1, Max Dispersal = 5. Two subgroups.
4	15:27:43	29/2/2012	30.925	-80.693	Medium speed travel heading 100. Minimum Dispersal = 1, Max Dispersal = 1. Tight group.
5	15:28:03	29/2/2012	30.936	-80.699	Minimum Dispersal = 1, Max Dispersal = 3. Two Subgroups.
6	15:28:10	29/2/2012	30.940	-80.695	Group out of view - under wing.
7	15:29:06	29/2/2012	30.930	-80.695	Surface active milling, probable foraging.
8	15:29:20	29/2/2012	30.937	-80.693	Sprint.
9	15:29:45	29/2/2012	30.931	-80.681	Group out of view - in glare and under wing.
10	15:30:01	29/2/2012	30.926	-80.688	Group underwater. Minimum Dispersal = 1, Max Dispersal = 1. Eleven in this group.
11	15:30:18	29/2/2012	30.934	-80.695	Milling. Minimum Dispersal = 1, Max Dispersal = 1. Another group has joined with them.
12	15:31:17	29/2/2012	30.929	-80.693	Milling. Group heading 120. Minimum Dispersal = 1, Max Dispersal = 1.
13	15:31:34	29/2/2012	30.939	-80.690	Group in glare. Minimum Dispersal = 1, Max Dispersal = 3. Two groups coalescing.
14	15:32:29	29/2/2012	30.931	-80.692	Medium speed travel heading 120. Minimum Dispersal = 2, Max Dispersal = 3. Some milling.
15	15:33:33	29/2/2012	30.929	-80.692	Medium speed travel heading 090. Minimum Dispersal = 1, Max Dispersal = 2. At least 15 animals together.
16	15:34:56	29/2/2012	30.930	-80.692	Surface active milling. Minimum Dispersal = 1, Max Dispersal = 3.
17	15:35:54	29/2/2012	30.927	-80.688	Medium speed travel heading 120. Minimum Dispersal = 0.5, Max Dispersal = 0.5. Group size at least 14.
18	15:36:55	29/2/2012	30.925	-80.683	Medium speed travel heading 090. Minimum Dispersal = 1, Max Dispersal = 2. Subgroup behind main group.
19	15:37:10	29/2/2012	30.932	-80.690	Medium speed travel. Minimum Dispersal = 1, Max Dispersal = 8. Spreading out

Record Number	Time	Date	Latitude	Longitude	Recorded Behavior
<b>Sighting Number 112 (continued)</b>					
20	15:38:18	29/2/2012	30.928	-80.686	Slow travel heading 080. Minimum Dispersal = 1, Max Dispersal = 2. Sixteen to 18 individuals.
21	15:39:26	29/2/2012	30.928	-80.685	Milling. Minimum Dispersal = 1, Max Dispersal = 2. Spread out a little more.
22	15:40:54	29/2/2012	30.937	-80.685	Slow travel heading 090.
23	15:41:58	29/2/2012	30.927	-80.686	Group underwater.
24	15:42:25	29/2/2012	30.939	-80.679	Surface active milling. Minimum Dispersal = 1, Max Dispersal = 4. Splashes.
25	15:43:04	29/2/2012	30.929	-80.684	Milling. Minimum Dispersal = 1, Max Dispersal = 2. Social 14-15 in the main group.
26	15:43:29	29/2/2012	30.938	-80.675	Slow travel. Minimum Dispersal = 1, Max Dispersal = 2. Second subgroup of 15 or so.
27	15:44:06	29/2/2012	30.932	-80.685	Surface active milling. Two subgroups. Big tail slap.
28	15:44:42	29/2/2012	30.936	-80.672	Group heading 270. Minimum Dispersal = 1, Max Dispersal = 6. Groups are 1/4 or so mile apart.
<b>Sighting Number 113</b>					
Species: <i>Stenella frontalis</i> . Group size: 35.					
1	15:52:13	29/2/2012	30.955	-80.680	Group heading 210. Minimum Dispersal = 1, Max Dispersal = 12. Lots and lots of dolphins here.
2	15:53:23	29/2/2012	30.953	-80.681	Milling. Group heading 190. Minimum Dispersal = 1, Max Dispersal = 4. At least 30+ animals.
3	15:54:30	29/2/2012	30.952	-80.684	Milling. Minimum Dispersal = 1, Max Dispersal = 2. Spread out
4	15:56:06	29/2/2012	30.954	-80.670	Possibly split into two groups. Largest subgroup out of sight.
5	15:56:56	29/2/2012	30.950	-80.685	Milling. Group heading 060. At least three subgroups now.
6	15:57:21	29/2/2012	30.956	-80.671	Minimum Dispersal = 1, Max Dispersal = 3. Groups moving various directions.
7	15:58:16	29/2/2012	30.951	-80.684	Slow travel heading 240. Minimum Dispersal = 1, Max Dispersal = 5. Two or three subgroups.