

Jacksonville (JAX) MISSILEX

Marine Species Monitoring

AERIAL MONITORING SURVEYS

TRIP REPORT



8–10 AUGUST 2010

HDR

ACRONYMS AND ABBREVIATIONS

ESA	Endangered Species Act
HDR EOC	HDR Environmental Operations & Construction, Inc.
ICMP	Integrated Comprehensive Monitoring Program
JAX	Jacksonville Range Complex
km	kilometer(s)
km ²	square kilometers
m	meter(s)
MISSILEX	Missile Exercise
MLTR	Missile Laser Training Range
MMPA	Marine Mammal Protection Act
NM	nautical mile(s)
OPAREA	operating area
SOCAL	Southern California Range Complex

Table of Contents

ACRONYMS AND ABBREVIATIONS.....	INSIDE FRONT COVER
SECTION 1 INTRODUCTION.....	1
SECTION 2 METHODS.....	1
SECTION 3 RESULTS.....	4
SECTION 4 ACKNOWLEDGEMENTS.....	10
SECTION 5 REFERENCES.....	10

Figures

1. Predetermined Tracklines for the Survey Effort for JAX MISSILEX 2010.....	2
2. Location of All Cetacean and Sea Turtle Sightings Seen During JAX MISSILEX 2010.	7
3. Location of Cetacean and Sea Turtle Sightings Seen Pre-JAX MISSILEX (August 8).....	8
4. Location of Cetacean and Sea Turtle Sightings Seen During JAX MISSILEX (August 9).	9

Tables

1. Summary of JAX MISSILEX Monitoring Effort.....	3
2. Observers and Roles.....	3
3. Summary of Sightings.....	6

THIS PAGE INTENTIONALLY LEFT BLANK

Section 1 Introduction

Between 8 and 10 August 2010, a Missile Exercise (MISSILEX) event using Maverick missiles occurred in the Jacksonville Range Complex (JAX) 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 Navy to fulfill essential training requirements.

As part of the compliance requirements of the Marine Mammal Protection Act (MMPA) of 1972 and the Endangered Species Act (ESA) of 1973, the Navy developed the Integrated Comprehensive Monitoring Program (ICMP). The ICMP applies by regulation to those activities on Navy training ranges and operating areas (OPAREAs) for which the Navy sought and received incidental take authorizations. In order to support the 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 Environmental Operations & Construction, Inc. (HDR EOC).

Section 2 Methods

Study Area

The Navy's Jacksonville Operating Area lies off the eastern coast of the Georgia/Florida border. Protected marine species monitoring conducted during the JAX MISSILEX training event was focused on the MLTR area within the JAX OPAREA (see **Figure 1**). The MLTR is approximately 27 to 60 nautical miles (NM) offshore, covers an area approximately 2,363 square kilometers (km²) in size, and ranges in bottom depth from 20 to 40 meters (m).

Aerial-Based Monitoring

Aerial-based monitoring effort was performed over a 2-day period from 8 to 9 August 2010 (see **Table 1**). Survey methods were consistent with currently accepted Distance Sampling theory (Buckland et al. 2001) and followed a well-established protocol used for surveys in the Southern California (SOCAL) Range Complex (Smultea et al. 2009). A survey altitude of approximately 1,000 feet and air speed of 100 knots was attempted 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 circling session was attempted at 1,000 feet or higher. A lower altitude of approximately 700 to 800 feet was established after focal follows for photography purposes to provide sharper images required for species identification.

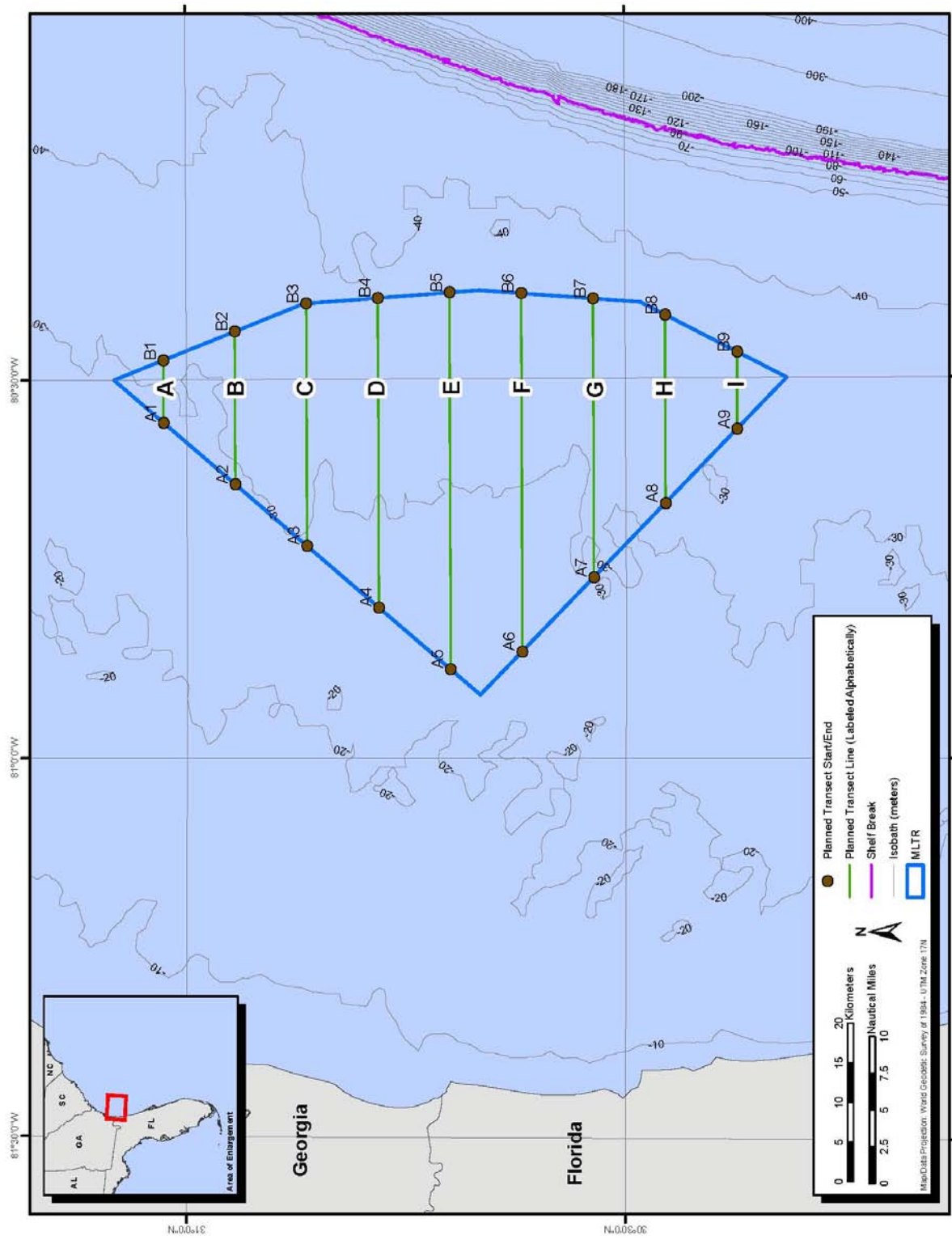


Figure 1. Predetermined Tracklines for the Survey Effort for JAX MISSILEX 2010.

Table 1. Summary of JAX MISSILEX Monitoring Effort

Date	Description	Start Time	Stop Time	Total Survey Minutes*	Total On-Effort Minutes	Trackline On-Effort Distance (km)
August 8	Transect survey (Pre-Event)	1338	1524	106	76	280
August 9 (MISSILEX)	Transect survey (During-Event)	0836	1023	107	76	260
August 9 (MISSILEX)	Transect survey (During-Event)	1632	1857	145	69	241
Total				358 (≈6 hrs)	221 (≈3.7 hrs)	781 km

Note: * Total Survey Minutes reflect minutes occupied in the range/area of interest and include both on-effort (systematic) and off-effort (random) totals minutes.

The observation platform was a Cessna T337H Turbo Skymaster aircraft operating out of Craig Municipal Airport, east of downtown Jacksonville, Florida. Three surveys were conducted: (1) a pre-survey (1 day before the training event), (2) pre-survey (day of and before the training event), and (3) post-survey (day of and after the training event) following pre-determined transect lines covering the entire MLTR (see **Table 1, Figure 1**). An additional post-event (1 day after the event, 10 August) vessel survey was planned for the 70 km² area surrounding the training event’s exact location in accordance with monitoring requirements, but was cancelled due to the 13-m mono-hull (*MV VOLUTE*) vessel’s inability to serve as a productive survey platform in 4- to 6-foot seas and 20-knot winds in the survey area 56 nm offshore.

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

Table 2. Observers and Roles

Observer	Role(s)
Dan Engelhaupt	Chief Scientist/Observer
Kate Lomac-MacNair	Observer

Survey effort within the MLTR consisted of waypoints designed to cover the entire range (approximately 2,363 km²) during each 4-hour maximum flight time window. Nine parallel tracklines running from west to east, ranging in length from 7.8 to 47.7 kilometers (km), and spaced approximately 9.0 km apart were observed during “systematic” efforts throughout the surveys (see **Figure 1**). Original lines were followed when possible, but exact transects followed were subject to modifications depending on inclement weather conditions (see **Figure 2 through 4**).

The general survey approach was as follows:

1. Follow pre-determined transect lines and waypoints using methods described by Smultea et al. (2009) until a sighting is made. Variables such as sea state, glare, and visibility are recorded.
2. Upon sighting a marine mammal/sea turtle group, record basic sighting information per established protocol (see Smultea et al. 2009). As outlined in the JAX Range Complex Monitoring Plan February 2009, information is to include (1) species identification and group size; (2) location and relative distance from the MISSILEX site if available; (3) the behavior of marine mammals and sea turtles including standard environmental and oceanographic parameters; (4) date, time, and visual conditions associated with each observation; (5) direction of travel relative to true north; and (6) duration of the observation.
3. If the species appears suitable for a focal follow, the aircraft increases altitude to approximately 365 to 455 m and radial distance increases approximately 0.5 to 1.0 km and the aircraft circles the sighting to obtain detailed behavior information as possible and logical, for a minimum of 5 minutes, including digital photographs and video.
4. If the species is not selected for a focal follow, and species and group size are unknown, the aircraft circles the sighting to obtain digital photographs for species identification confirmation and estimate group size/composition.

Section 3 Results

Survey Effort

Observers visually surveyed approximately 421 NM (781 km) of systematic (on-effort) trackline and 666 NM (1,233 km) of combined systematic and random (lines covered in transit to the next trackline and during circling maneuvers) tracklines during 2 days for approximately 5.97 hours of total survey effort. Beaufort sea state ranged from 1 to 4 and all sightings were made in Beaufort sea states between 2 and 3 (see **Table 3**). A detailed description of environmental, oceanographic, and sighting conditions was recorded and is available if requested. Sightings per unit effort (SPUE) was calculated as the total survey effort (hours/km/NM) divided by the total number of marine mammal sightings (n=4) or sea turtles (n=2). For this monitoring exercise, the SPUE for marine mammals was equal to 1 sighting per 1.5 hours, 308 km, and 167 NM and the SPUE for sea turtles was equal to 1 sighting per 3 hours, 617 km, and 333 NM.

Sightings

Six sightings were recorded during 5.97 hours of effort (see **Figure 2, Table 3**). No sightings of cetaceans or sea turtles were made on the pre-MISSILEX survey day of August 8 (see **Figure 3, Table 3**). Four sightings of dolphins and two sightings of sea turtles were made on the MISSILEX event day of August 9 (see **Figure 4, Table 3**). A total of 222 digital photographs were collected during three surveys and used to determine or confirm species identification when possible. Sightings included one group of bottlenose dolphins (*Tursiops truncatus*) in water depths between 30 to 40 meters, three groups of unidentified dolphins in water depths between 20 to 40 meters, and 2 sightings of loggerhead sea turtles (*Caretta caretta*) in water depths between 20 to 40 m (see **Figure 2, Table 3**).

Behavior

No visible evidence of distress or unusual behavior was observed during the pre- and post-surveys in the JAX MLTR (see **Table 3**). Detailed focal follow sessions were not possible after initial sightings due to gradual dispersion during species ID circling and difficulties associated with relocating small groups of dolphins in choppy seas and intense bouts of sun glare. Given this project's focus, future surveys will attempt to conduct high altitude (>1000 feet) focal follow behavioral observations before conducting species ID circling at lower altitudes (>700 feet).

Table 3. Summary of Sightings

Sighting No.	Date	Species	Group Size			Calves	Start Time	Stop Time	Beaufort Sea State	Latitude	Longitude	Vert. Angle	Distance off Track (km)	Heading	Bottom Depth (m)	Behavioral Summary
			Best	High	Low											
1	8/9/10	CC	1	1	1	-	10:02	10:02	3	30.538	-80.585	26	0.6	Unk.	30	Loggerhead sea turtle resting at the surface. No visible signs of disturbance.
2	8/9/10	Unid	5	6	4	-	16:50	17:05	2	30.851	-80.577	45	0.3	90	30	Possible <i>Tursiops</i> , surface active traveling, very difficult to follow. No visible signs of disturbance.
3	8/9/10	Unid	4	4	4	-	17:28	17:38	2	30.701	-80.894	48	0.3	Unk.	20	Surface active traveling, very difficult to follow. No visible signs of disturbance.
4	8/9/10	CC	1	1	1	-	17:39	17:39	2	60.699	-80.874	32	0.5	Unk.	20	Loggerhead sea turtle resting at the surface. No visible signs of disturbance.
5	8/9/10	Unid	4	4	4	-	17:45	17:58	2	30.696	-80.660	52	0.2	290	20	Surface active traveling, difficult to follow. No visible signs of disturbance.
6	8/9/10	TT	50	60	40	-	18:03	18:08	3	30.696	-80.513	15	1.1	225	30	Travel southwest at 1–3 knots and 4–6 knots. Group spread out into smaller subgroups over approx. 0.5 km. Dispersal 1–6 body lengths. No calves. Social and milling behavior. Some high leaps by members in subgroups, social contact, and chasing behavior. Maintaining original heading. No visible signs of disturbance.

Key:

CC = loggerhead turtle (*Caretta caretta*)

TT = bottlenose dolphin (*Tursiops truncatus*)

Unid = unidentified dolphin

Unk. = Unknown

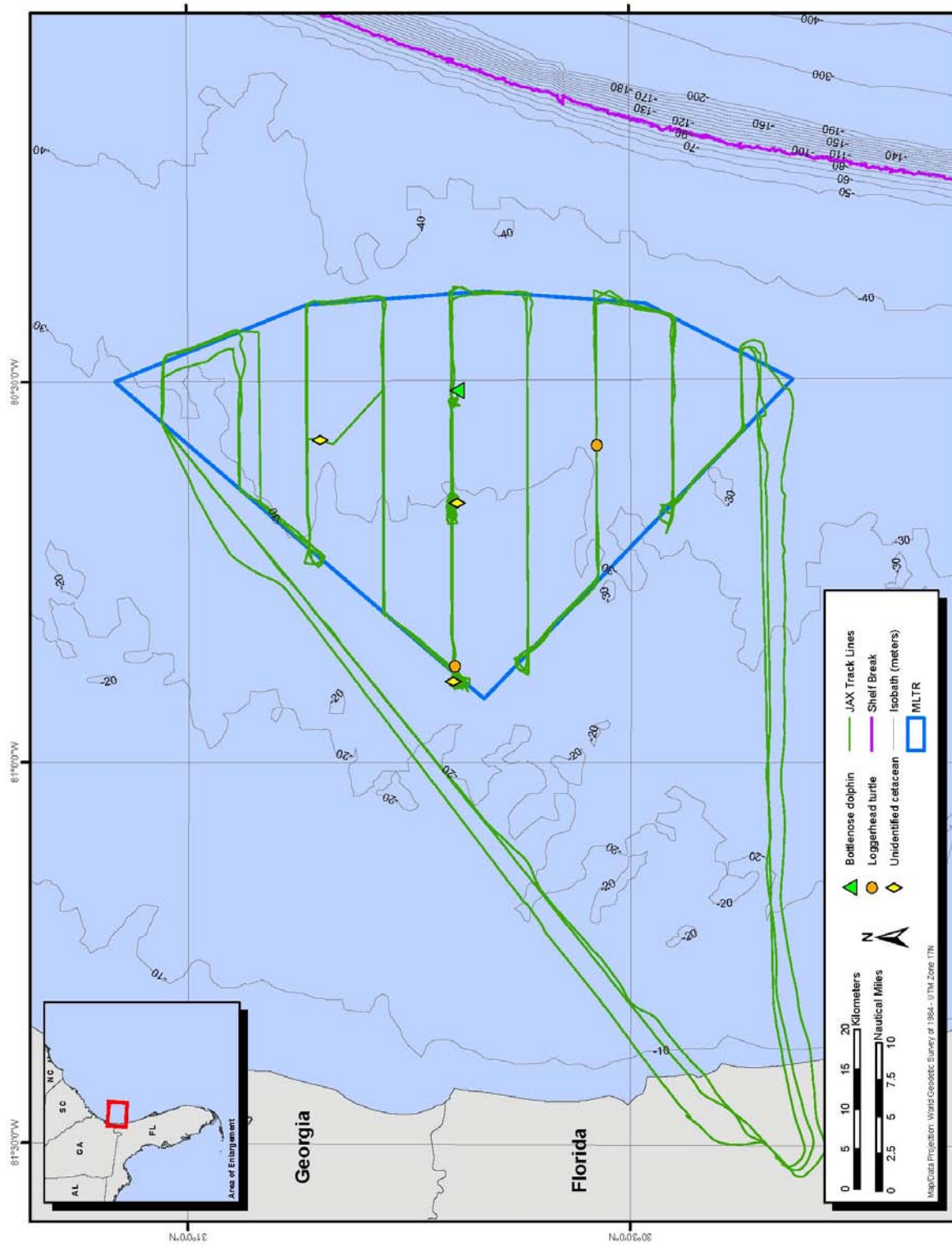


Figure 2. Location of All Cetacean and Sea Turtle Sightings Seen During JAX MISSILEX 2010.

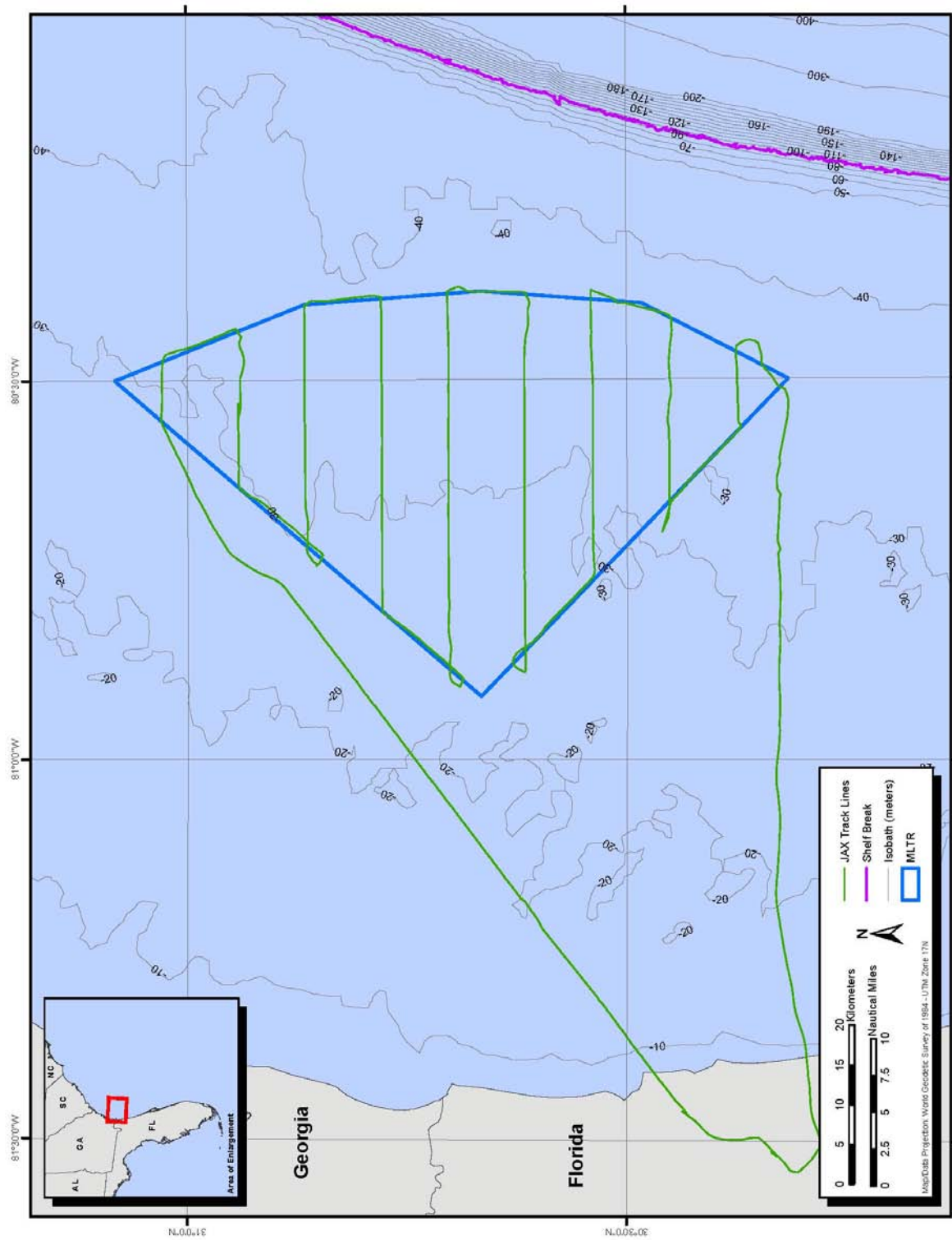


Figure 3. Location of Cetacean and Sea Turtle Sightings Seen Pre-JAX MISSILEX (August 8).

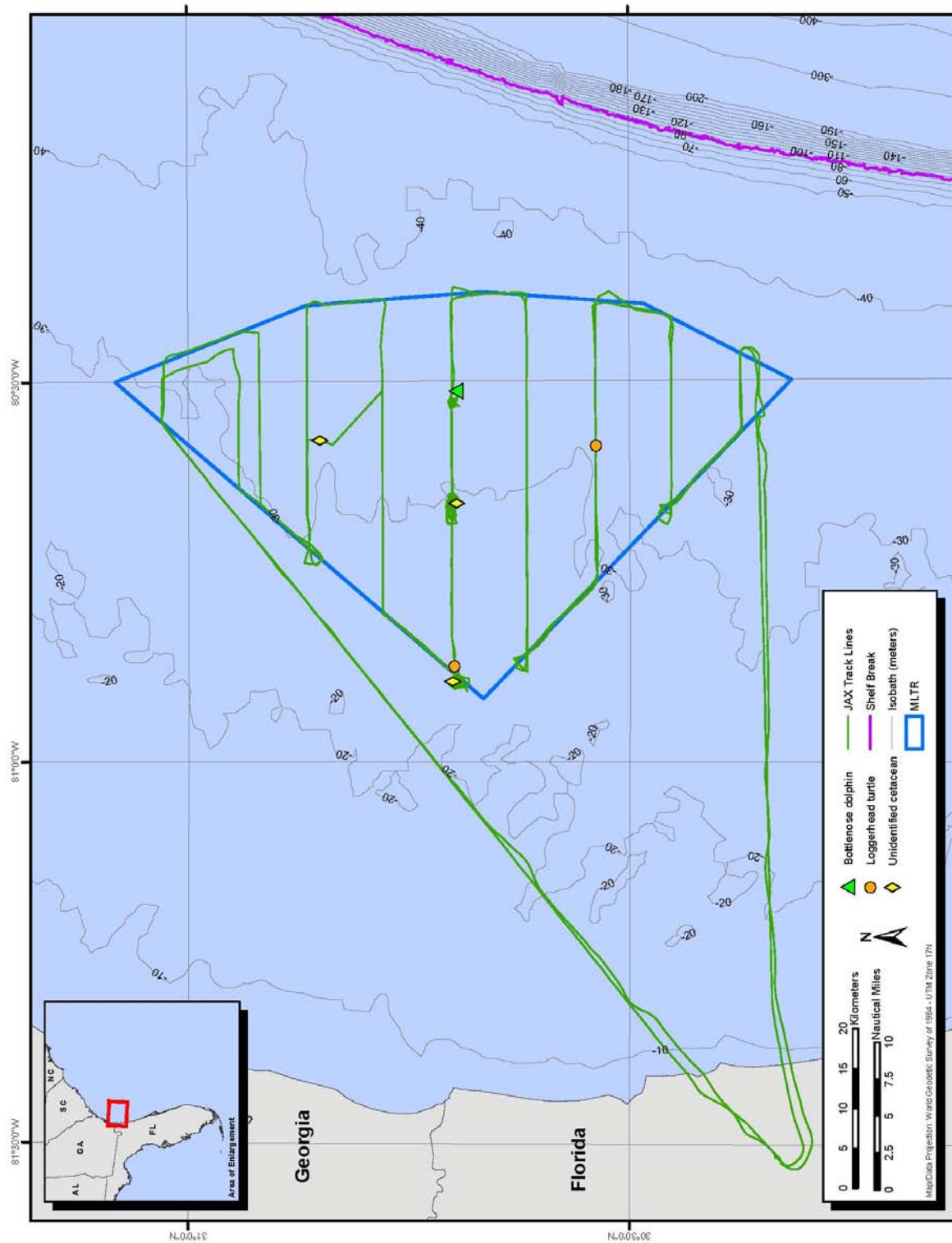


Figure 4. Location of Cetacean and Sea Turtle Sightings Seen During JAX MISSILEX (August 9).

Section 4 Acknowledgements

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

Section 5 References

- Buckland et al. 2001. Buckland, S.T., D.R. Anderson, K.P. Burnham, J.L. Laake, D.L. Borchers, and L. Thomas. 2001. *Introduction to distance sampling: Estimating abundance of biological populations*. Oxford University Press.
- Smultea, M.A., J.R. Mobley, Jr., and K. Lomac-MacNair. 2009. *Aerial Survey Monitoring for Marine Mammals and Sea Turtles in Conjunction with US Navy Major Training Events off San Diego, California, 15-21 October and 15-18 November 2008, Final Report*. Prepared by Marine Mammal Research Consultants, Honolulu, HI, and Smultea Environmental Sciences, LLC., Issaquah, WA, under Contract No. N62742-08-P-1936 and N62742-08-P-1938 for Naval Facilities Engineering Command Pacific, EV2 Environmental Planning, Pearl Harbor, HI.