

GoMMAPPS Summer aerial abundance survey during June – August 2017: Summary Report

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SUMMARY

As part of the GoMMAPPS program, the Southeast Fisheries Science Center conducted aerial surveys of continental shelf waters (up to the 200-m isobath) in the U.S. Gulf of Mexico. The survey was conducted between 29 June and 17 August 2017 aboard a NOAA Twin Otter aircraft at an altitude of 600 feet (183 m) and a speed of 100-110 knots. Survey tracklines were oriented perpendicular to the shoreline and latitudinally spaced 20 km apart. The survey was designed for analysis using Distance sampling and a two-team (independent observer) approach to correct for perception bias in resulting abundance estimates. A total of 14,799.9 km of trackline were surveyed on-effort. Marine mammal records totaled 293 sightings, including three species of cetaceans and one sirenian (not including unidentified taxa). Nearly 90% of the sightings were of common bottlenose dolphins, followed by Atlantic spotted dolphins. Sea turtles totaled 929 sightings of four different species, although nearly 50% of the sightings were of turtles that could not be identified to species, only classified as “Hardshell.” The data collected during this survey will be analyzed to estimate the abundance and spatial distribution of marine mammals and sea turtles in the U.S. Gulf of Mexico.

OBJECTIVES

The goal of the survey was to conduct line-transect surveys using the Distance sampling approach to estimate the abundance and spatial distribution of marine mammals and sea turtles in waters over the continental shelf in the U.S. Gulf of Mexico.

SURVEY PERIOD AND AREA

This survey was conducted during 29 June – 17 August 2017. The study area extended from the shoreline to the 200 m isobath between Key West, FL and Brownsville, TX, and included estuarine waters of Mississippi Sound.

METHODS

The survey was conducted aboard a DeHavilland Twin Otter DHC-6 flying at an altitude of 183 m (600 ft) above the water surface and a speed of approximately 200 kph (110 knots). Surveys were typically flown only when wind speeds were less than 15 knots or approximately Beaufort sea state 4 or less. The survey was conducted along tracklines oriented perpendicular to the shoreline and spaced latitudinally at approximately 20 km intervals starting at a random point. Fine scale tracklines, spaced at approximately 5km intervals were surveyed over Mississippi Sound waters.

To conduct the survey, two pilots and two teams of three marine mammal observers each were onboard the airplane. Both teams operated independently to implement the independent observer approach to correct for visibility bias (Laake and Borchers 2004). The forward team (Team 1) consisted of two observers stationed in bubble windows on the left and right side of the airplane and an associated data recorder. The bubble windows allowed downward visibility including the trackline. The aft team (Team 2) consisted of a belly observer looking straight down through a belly port window, an observer stationed on the right side of the aircraft observing through a bubble window, and a dedicated data recorder. The side bubble window observer was stationed in a large “vista” window that provided trackline visibility while the belly observer can see approximately 35 degrees on either side of the trackline. Therefore, the aft team had limited visibility of the left side of the aircraft. The two observer teams operated on independent intercom channels so that they were not able to cue one another to sightings.

Data were entered by each team’s data recorder onto a laptop computer running data acquisition software that recorded GPS location, environmental conditions entered by the observer team (e.g., sea state, glare, sun penetration, visibility, etc.) and effort information.

During on effort periods (e.g., level flight at survey altitude and speed), observers searched visually from the trackline (0°) to approximately 60° above vertical. When a turtle, mammal, or other organism was observed, the observer waited until it was perpendicular to the aircraft and then measured the angle to the organism (or the center of the group) using a

digital inclinometer. The belly observer only reported the interval for the sighting based on markings on the window. Fish species were recorded opportunistically.

Sea turtle sightings were recorded independently, without communication, by each team. Only turtles at or barely below the surface were identified to species. For cetacean sightings, if the sighting was made initially by the forward team, they waited until it was aft of the airplane to allow the aft team an opportunity to observe the group. Once both teams had the opportunity to observe the group, the observers asked the pilots to break effort and circle over the sighting. The aircraft circled over the majority of the cetacean groups sighted to verify species identification and group sizes and to take photographs. The data recorders indicated at the time of the sighting whether or not the group was recorded by one or both teams.

Post survey, the turtle data were reviewed to identify duplicate sightings by the two teams based upon time, location, and position relative to the trackline.

RESULTS

The survey was completed in 23 survey-days during the survey window of 29 June - 17 August 2017. A total of 14,799.9 km of trackline were surveyed on effort along 125 tracklines (Table 1). The average sea state during the survey was 2.5 on the Beaufort scale (Table 1, Figure 1).

A total of 293 marine mammal sightings including 2,339 individuals were recorded (Table 2, Figure 2). The primary species observed was common bottlenose dolphins (*Tursiops truncatus*) with 261 sightings including 1,990 individuals, followed by Atlantic spotted dolphins (*Stenella frontalis*) with 19 sightings including 274 individuals, followed by 6 sightings that could not be distinguished between bottlenose dolphins or Atlantic spotted dolphins and 1 sighting of 12 rough-toothed dolphins (*Steno bredanensis*) (Table 2, Figure 2). Four manatee (*Trichechus manatus*) sightings including five individuals were also recorded (Table 2, Figure 2).

There were a total of 929 unique sightings of sea turtles including 1,003 individuals (Table 3, Figure 3). Loggerhead turtles (*Caretta caretta*) were the most commonly identified species with 304 sightings, followed by Kemp's Ridley (*Lepidochelys kempii*) with 116 sightings and leatherback (*Dermochelys coriacea*) with 38 sightings. Green turtles (*Chelonia mydas*) accounted for 23 sightings. Unidentified hardshell accounted for nearly 50% of all the sightings, as many were seen below the surface or too far from the trackline (45-60 degrees) and could not be identified to species (Table 3).

Opportunistic fish species sighted primarily included unidentified sharks, hammerhead sharks (*Sphyrnidae* spp.), and unidentified rays. Five sightings of whale sharks including 22 individuals were also recorded (Table 4, Figure 4).

DISPOSITION OF DATA

All data collected during the aerial survey are archived and managed at the Southeast Fisheries Science Center (SEFSC), Miami, FL. The line transect data will be made available online on OBIS-SEAMAP (<http://seamap.env.duke.edu/>).

PERMITS

The SEFSC was authorized to conduct marine mammal research activities during the survey under MMPA Permit No. 14450-04 issued to the SEFSC by the National Marine Fisheries Service (NMFS).

ACKNOWLEDGEMENTS

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REFERENCES CITED

Laake, J.L. and Borchers, D.L. 2004. Methods for incomplete detection at distance zero. In: Advanced Distance Sampling. Buckland, S.T., Anderson, D.R., Burnham, K.P., Laake, J.L., and Thomas, L. (eds.). Oxford University Press, 411 pp.

Table 1: Daily summary of effort and sightings during GoMMAPPS aerial survey summer 2017.

Date	Effort (km)	Number of marine mammal sightings	Number of turtle sightings	Number of fish sightings	Ave. sea state
06/29/17	786.4	17	173	111	1.8
06/30/17	920.5	19	86	41	2.3
07/01/17	636.1	21	73	14	2.4
07/02/17	1135.9	28	101	31	2.0
07/05/17	782.2	18	61	18	2.3
07/13/17	488.0	7	46	3	3.1
07/14/17	770.2	8	36	5	3.5
07/19/17	889.2	12	50	15	2.6
07/20/17	533.0	15	44	35	1.7
07/22/17	467.2	15	31	16	1.9
07/23/17	296.9	1	35	0	2.9
07/25/17	548.9	6	8	4	3.0
07/26/17	655.1	24	34	6	2.3
07/28/17	917.4	9	25	6	2.7
07/30/17	338.4	3	8	2	2.9
07/31/17**	367.0	3	5	0	3.3
08/02/17	513.7	4	9	0	2.3
08/03/17	209.3	7	4	1	3.8
08/04/17	306.9	9	7	6	2.2
08/11/17	891.4	21	18	2	3.1
08/12/17	808.1	13	23	10	2.6
08/13/17	811.7	16	31	9	2.8
08/17/17	726.4	17	21	7	2.7
Total	14799.9	293	929	342	2.5

** Two lines flown on 7/31/17 were re-flown on 8/17/17 in better weather conditions.

Table 2: Summary of marine mammal sightings during GoMMAPPS aerial survey summer 2017.

Species	Number of sightings	Number of animals
Atlantic spotted dolphin	19	274
Bottlenose dolphin	261	1990
Bottlenose/Spotted dolphin	6	49
Rough-toothed dolphin	1	12
<i>Stenella</i> sp.	1	8
unid. dolphin	1	1
Manatee	4	5
Total	293	2339

Table 3: Summary of sea turtle sightings during GoMMAPPS aerial survey summer 2017.

Species	Number of sightings	Number of animals
Green Turtle	23	23
Hardshell	448	510
Kemp's Ridley	116	118
Leatherback	38	39
Loggerhead	304	313
Total	929	1003

Table 4: Summary of fish sightings during GoMMAPPS aerial survey summer 2017.

Species	Number of sightings	Number of animals
Hammerhead Shark	43	43
Whale Shark	5	22
Manta Ray	4	4
unid. ray	36	46
unid. shark	254	301
Total	342	416

Figure 1: Beaufort sea state during GoMMAPPS aerial survey summer 2017.

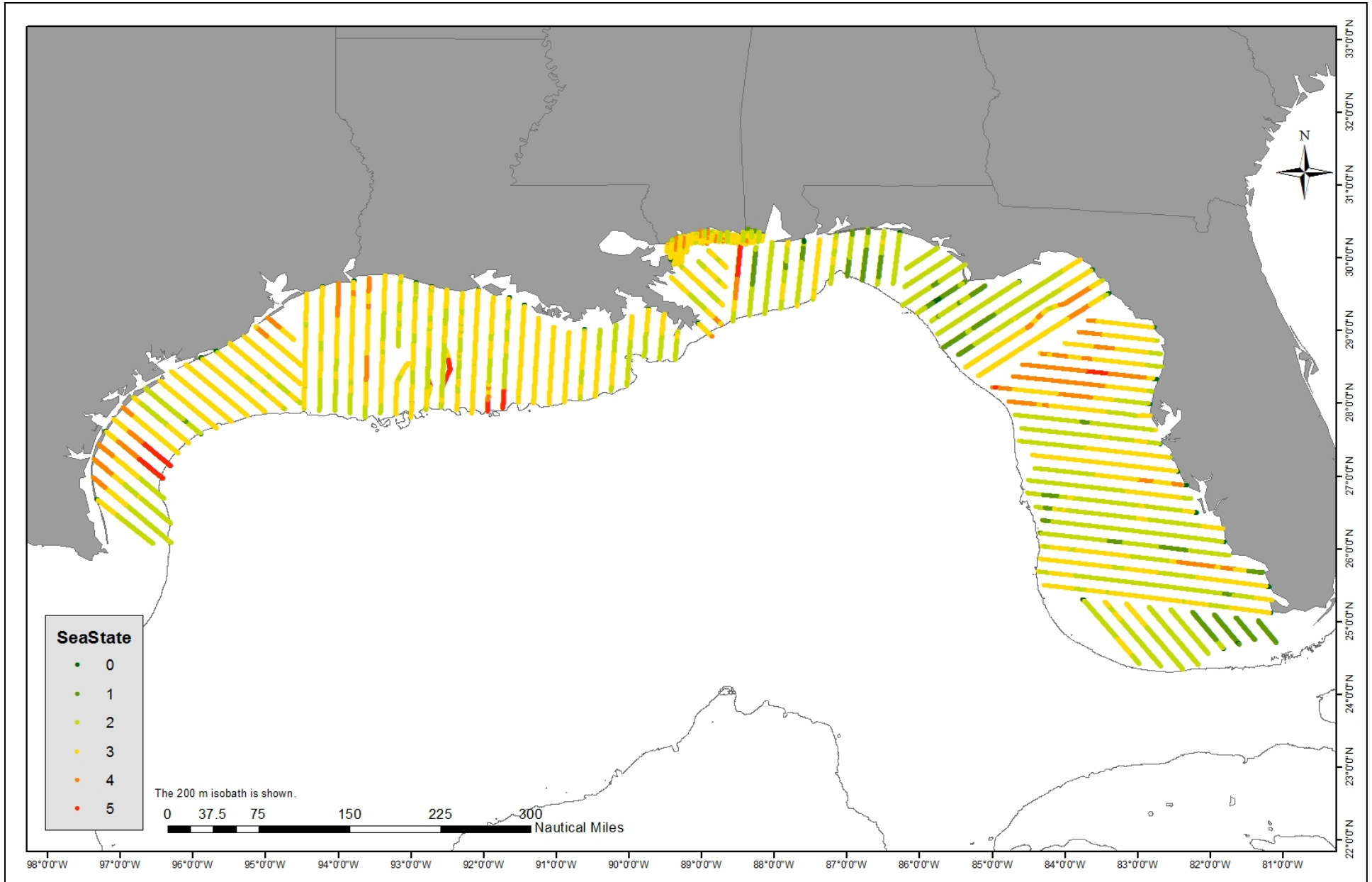


Figure 2: Marine mammal sightings during GoMMAPPS aerial survey summer 2017.

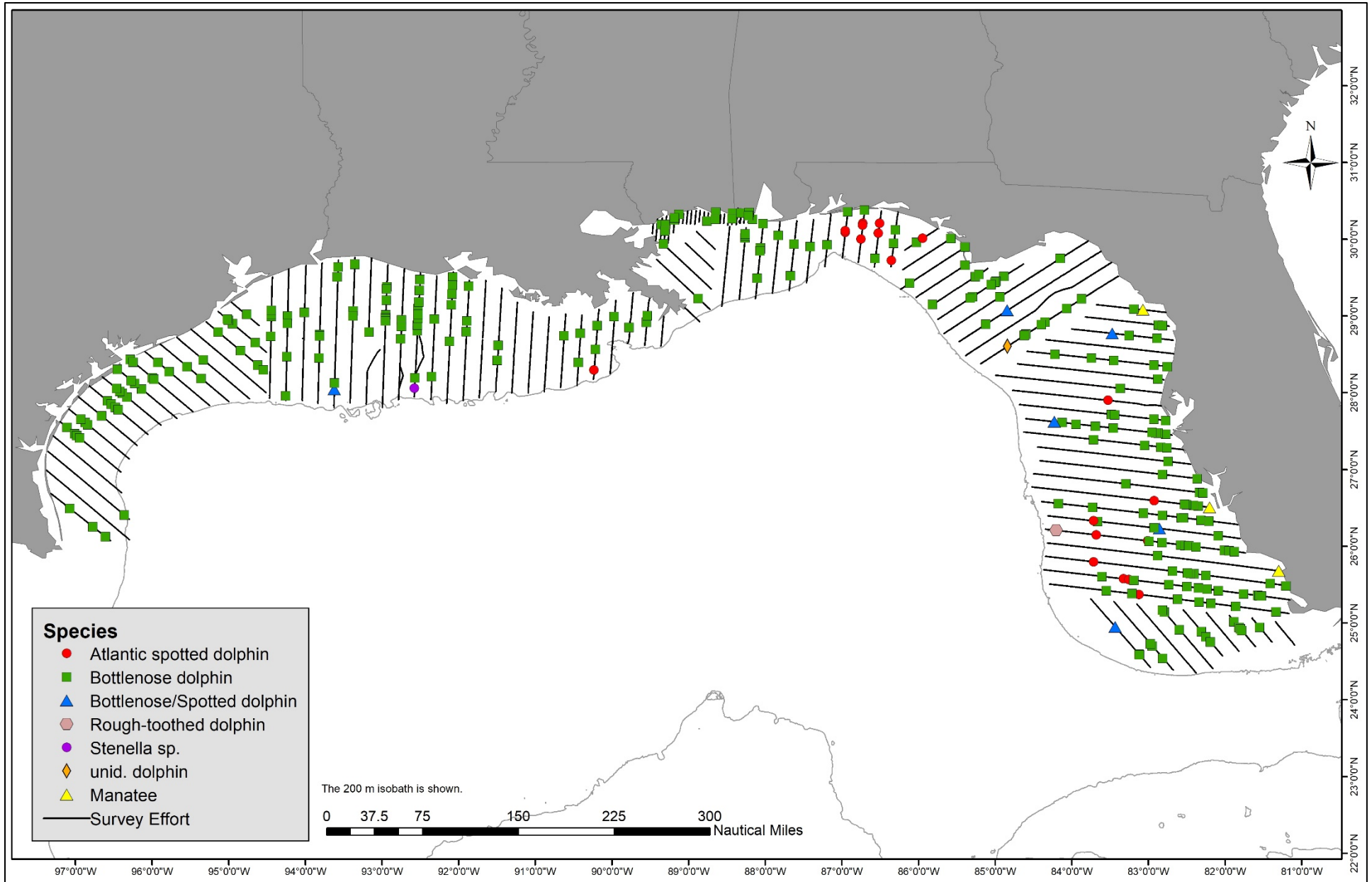


Figure 3: Sea turtle sightings during GoMMAPPS aerial survey summer 2017.

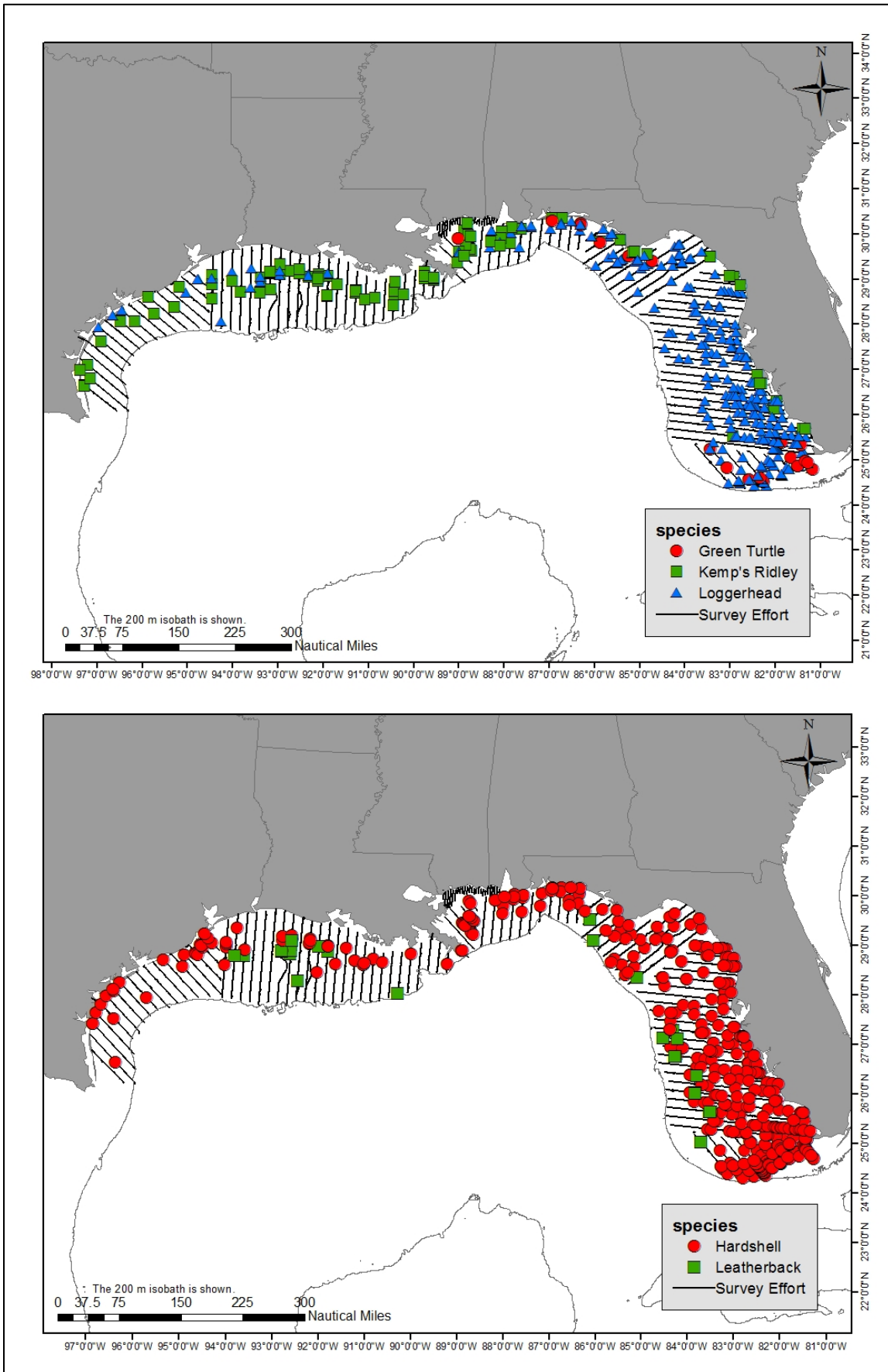


Figure 4: Opportunistic fish sightings during GoMMAPPS aerial survey summer 2017.

