

GoMMAPPS Fall aerial abundance survey during October – November 2018: Summary Report

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SUMMARY

As part of GoMMAPPS, 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 12 October and 28 November 2018 aboard a NOAA Twin Otter aircraft at an altitude of 600 feet (183 m) and a speed of 100-110 knots (185-204 kph). Survey tracklines were oriented perpendicular to the shoreline and latitudinally spaced 20 km apart. The survey was designed for analysis using Distance sampling with a two-team (independent observer) approach to correct for perception bias in resulting abundance estimates. A total of 11,506 km of trackline were surveyed on effort. Marine mammal records totaled 353 sightings, including two species of cetaceans. Over 98% of the sightings were of common bottlenose dolphins, followed by Atlantic spotted dolphins. Sea turtles totaled 333 sightings of four different species, although nearly 40% 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 12 October – 28 November 2018. 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 and Barataria Bay.

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 between Texas and Panama City, FL. Due to time constraints, every other trackline was flown (40-km intervals) between Key West and Panama City, FL. Fine scale tracklines surveyed over Mississippi Sound were spaced at approximately 5-km intervals and tracklines over Barataria Bay waters were spaced at approximately 6-km intervals.

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 could 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 degrees) to approximately 60 degrees above vertical. When a sea turtle, marine mammal, or other animal of interest was observed, the observer waited until it was perpendicular to the aircraft and then measured the angle to the animal (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 initially observed by one or both teams.

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

RESULTS

The survey was completed in 22 survey-days during the survey window of 12 October - 28 November 2018. A total of 11,506 km of trackline were surveyed on effort along 113 tracklines (Table 1). The average sea state during the survey was 2.4 on the Beaufort scale (Table 1, Figure 1).

A total of 353 marine mammal sightings including 1,845 individuals were recorded (Table 2, Figure 2). The primary species observed was common bottlenose dolphins (*Tursiops truncatus*) with 346 sightings including 1,762 individuals, followed by Atlantic spotted dolphins (*Stenella frontalis*) with two sightings including 44 individuals, and four sightings that could not be distinguished between bottlenose dolphins or Atlantic spotted dolphins (Table 2, Figure 2).

There were a total of 333 unique sightings of sea turtles including 338 individuals (Table 3, Figure 3). Loggerhead (*Caretta caretta*) was the most commonly identified species with 112 sightings, followed by Kemp's Ridley (*Lepidochelys kempii*) with 83 sightings and leatherback (*Dermochelys coriacea*) with five sightings. There was one sighting of a green turtle (*Chelonia mydas*) (Table 3, Figure 3). Unidentified hardshell accounted for nearly 40% of all the sightings (132), 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 manta rays (*Manta* spp.). Two sightings of whale sharks and one sunfish 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/>). The data presented here are preliminary and subject to change as further data auditing and analyses continue.

PERMITS

The SEFSC was authorized to conduct marine mammal research activities during the survey under MMPA Permit No. 14450-05 issued to the SEFSC by the National Marine Fisheries Service (NMFS).

ACKNOWLEDGEMENTS

This study was funded by the U.S. Department of the Interior, Bureau of Ocean Energy Management through an Interagency Agreement M17PG00013 with the U.S. Department of Commerce, National Oceanic and Atmospheric Administration. Additional staff support was provided by the NOAA Fisheries Service, Southeast Fisheries Science Center and NOAA Aircraft Operations Center. We would also like to thank the airplane's crew and observers that were involved in collecting these data.

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 fall 2018.

Date	Effort (km)	Number of marine mammal sightings	Number of turtle sightings	Number of fish sightings	Ave. sea state
10/12/18	628.9	13	28	14	2.5
10/13/18	921.2	16	34	14	3.1
10/14/18	375.7	8	26	16	2.4
10/16/18	446.8	17	29	13	2.2
10/17/18	725.7	9	24	17	2.9
10/27/18	1136.0	28	22	33	2.3
10/28/18	462.5	14	13	17	2.5
10/29/18	984.3	21	13	77	2.2
11/2/18	381.0	9	2	29	2.6
11/3/18	278.5	5	4	2	3.0
11/6/18	415.2	14	5	61	2.4
11/7/18	392.1	6	6	4	2.8
11/11/18**	565.6	30	9	1	2.6
11/15/18	350.8	14	3	3	2.1
11/16/18	838.8	29	28	114	2.1
11/17/18	364.4	10	6	1	2.6
11/18/18	321.2	9	19	6	1.8
11/19/18#	598.6	14	36	23	2.4
11/21/18	252.9	38	0	1	1.9
11/24/18	291.5	13	26	11	1.9
11/27/18	527.2	14	0	0	2.8
11/28/18	247.2	22	0	0	2.1
Total	11506.2	353	333	457	2.4

**12 lines flown on 11/11/18 were re-flown on 11/28/18 in better weather conditions.

#Aft team missing right side observer on 11/19/18 due to illness

Table 2: Summary of marine mammal sightings during GoMMAPPS aerial survey fall 2018.

Species	Number of sightings	Number of animals
Atlantic spotted dolphin	2	44
Bottlenose dolphin	346	1762
Bottlenose/Spotted dolphin	4	31
unid. dolphin	1	8
Total	353	1845

Table 3: Summary of sea turtle sightings during GoMMAPPS aerial survey fall 2018.

Species	Number of sightings	Number of animals
Green Turtle	1	1
Hardshell	132	137
Kemp's Ridley	83	83
Leatherback	5	5
Loggerhead	112	112
Total	333	338

Table 4: Summary of fish sightings during GoMMAPPS aerial survey fall 2018.

Species	Number of sightings	Number of animals
Hammerhead Shark	52	52
Manta Ray	27	29
Sunfish	1	1
Whale Shark	2	2
unid. large fish	1	1
unid. ray	23	30
unid. shark	351	439
Total	457	554

Figure 1: Beaufort sea state during GoMMAPPS aerial survey fall 2018.

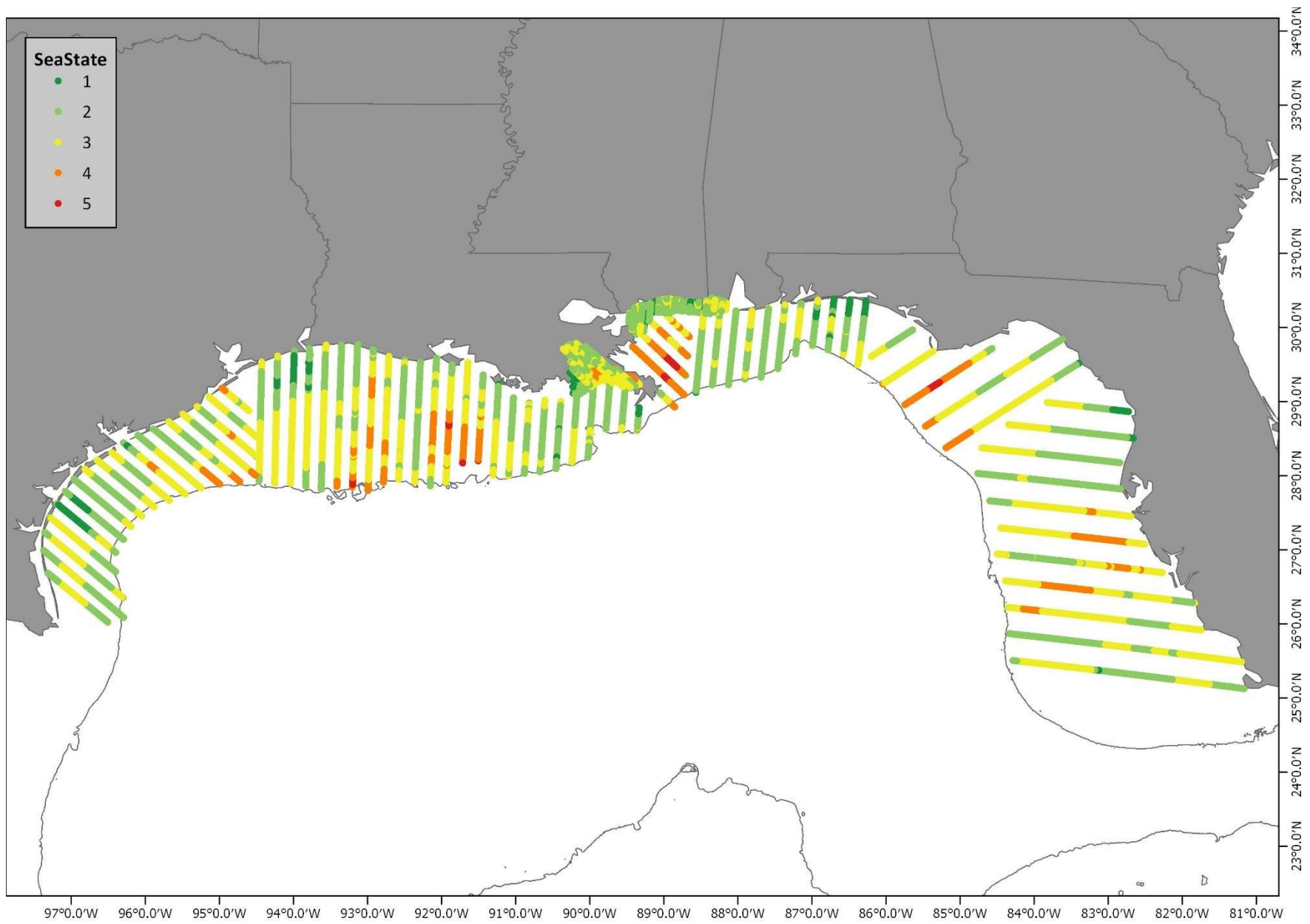


Figure 2: Marine mammal sightings during GoMMAPPS aerial survey fall 2018.

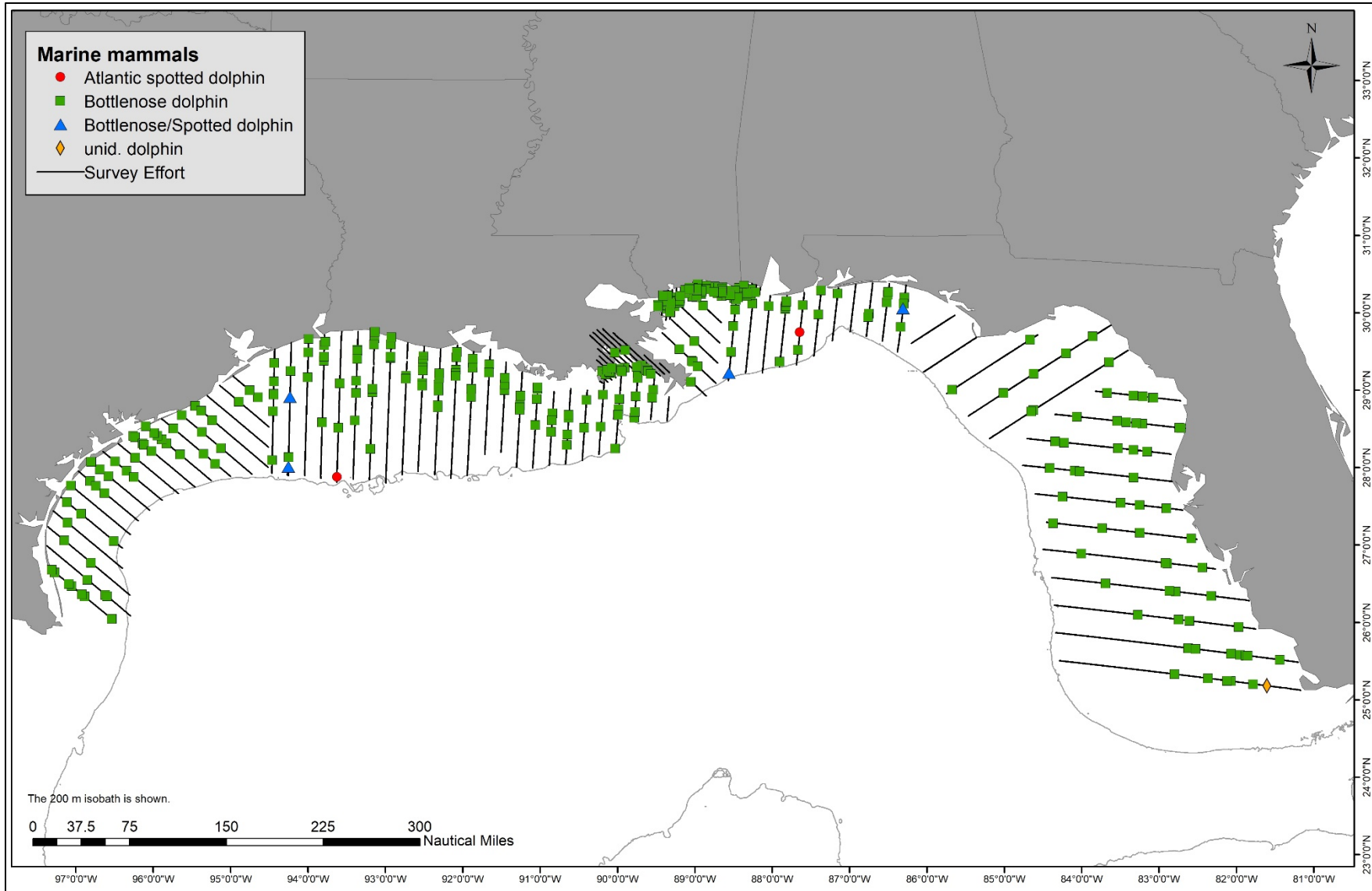


Figure 3: Sea turtle sightings during GoMMAPPS aerial survey fall 2018.

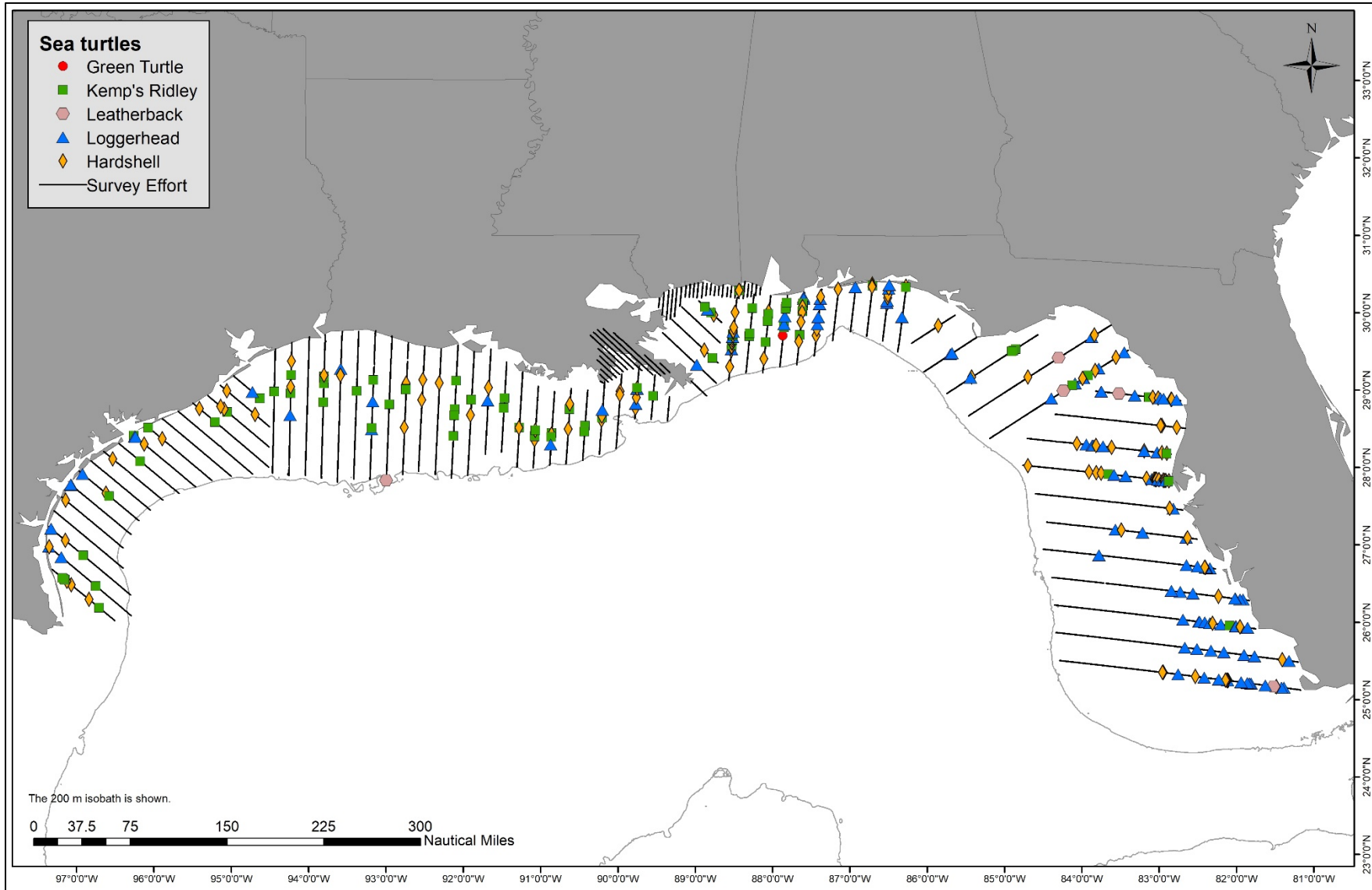


Figure 4: Opportunistic fish sightings during GoMMAPPS aerial survey fall 2018.

