GoMMAPPS Winter aerial abundance survey during January – March 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 18 January and 14 March 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 8,158 km of trackline were surveyed on effort. Marine mammal records totaled 201 sightings, including two species of cetaceans and one sirenian. Over 97% of the sightings were of common bottlenose dolphins, followed by Atlantic spotted dolphins. Sea turtles totaled 829 sightings of five different species, although over 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 18 January – 14 March 2018. The study area extended from the shoreline to the 200-m isobath between Tampa, FL and Port O'Connor, 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 5-km 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. However, between 18 January and 9 February, only one team composed of a left observer, right observer, and data recorder was operational. After 13 February, the survey was conducted with two teams 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 19 survey-days during the survey window of 18 January - 14 March 2018. A total of 8,158 km of trackline were surveyed on effort along 86 tracklines (Table 1). The average sea state during the survey was 2.6 on the Beaufort scale (Table 1, Figure 1).

A total of 201 marine mammal sightings including 1,682 individuals were recorded (Table 2, Figure 2). The primary species observed was common bottlenose dolphins (*Tursiops truncatus*) with 195 sightings including 1,558 individuals, followed by Atlantic spotted dolphins (*Stenella frontalis*) with four sightings including 120 individuals, and one sighting of dolphins that could not be identified to species (Table 2, Figure 2). One manatee (*Trichechus manatus*) sighting was also recorded (Table 2, Figure 2).

There were a total of 829 unique sightings of sea turtles including 1,009 individuals (Table 3, Figure 3). Kemp's Ridley (*Lepidochelys kempii*) was the most commonly identified species with 231 sightings, followed by loggerhead turtles (*Caretta caretta*) with 139 sightings and leatherback (*Dermochelys coriacea*) with seven sightings. There were two sightings of green turtles (*Chelonia mydas*) (Table 3, Figure 3). Unidentified hardshell accounted for over 50% of all the sightings (450), 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.; 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. 14450-04 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 winter 2018.

Date	Effort (km)	Number of marine mammal sightings	Number of turtle sightings	Number of fish sightings	Ave. sea state
01/18/18**	527.5	19	0	1	2.7
01/19/18	545.4	25	52	4	3.0
02/01/18	435.2	0	18	1	3.3
02/04/18	290.0	5	96	1	2.6
02/06/18	656.2	15	183	1	2.2
02/09/18	195.9	6	46	0	2.0
02/13/18	340.9	6	66	0	2.6
02/14/18	399.3	13	21	12	2.3
02/16/18	381.1	7	76	1	2.2
02/17/18	137.7	0	33	0	2.8
02/18/18	806.7	22	75	79	2.3
02/27/18	360.7	0	7	4	3.3
02/28/18	363.1	6	22	1	3.1
03/01/18	389.4	9	48	4	2.6
03/05/18	393.1	12	38	4	2.5
03/08/18	416.0	9	0	1	3.3
03/10/18**	21.0	2	3	0	2.0
03/13/18	1049.7	33	35	2	2.8
03/14/18	449.3	12	10	2	2.8
Total	**8158.1**	**201**	**829**	**118**	**2.6**

** One line flown on 1/18/18 and two flown on 3/10/18 were re-flown on later dates in better weather conditions.

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

Species	Number of sightings	Number of animals
Atlantic spotted dolphin	4	120
Bottlenose dolphin	195	1558
unid. dolphin	1	3
Manatee	1	1
Total	**201**	**1682**

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

Species	Number of sightings	Number of animals
Green Turtle	2	2
Hardshell	450	606
Kemp's Ridley	231	249
Leatherback	7	7
Loggerhead	139	145
Total	**829**	**1009**

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

Species	Number of sightings	Number of animals
Hammerhead Shark	13	13
Manta Ray	38	44
unid. ray	2	2
unid. shark	65	229
Total	**118**	**288**

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

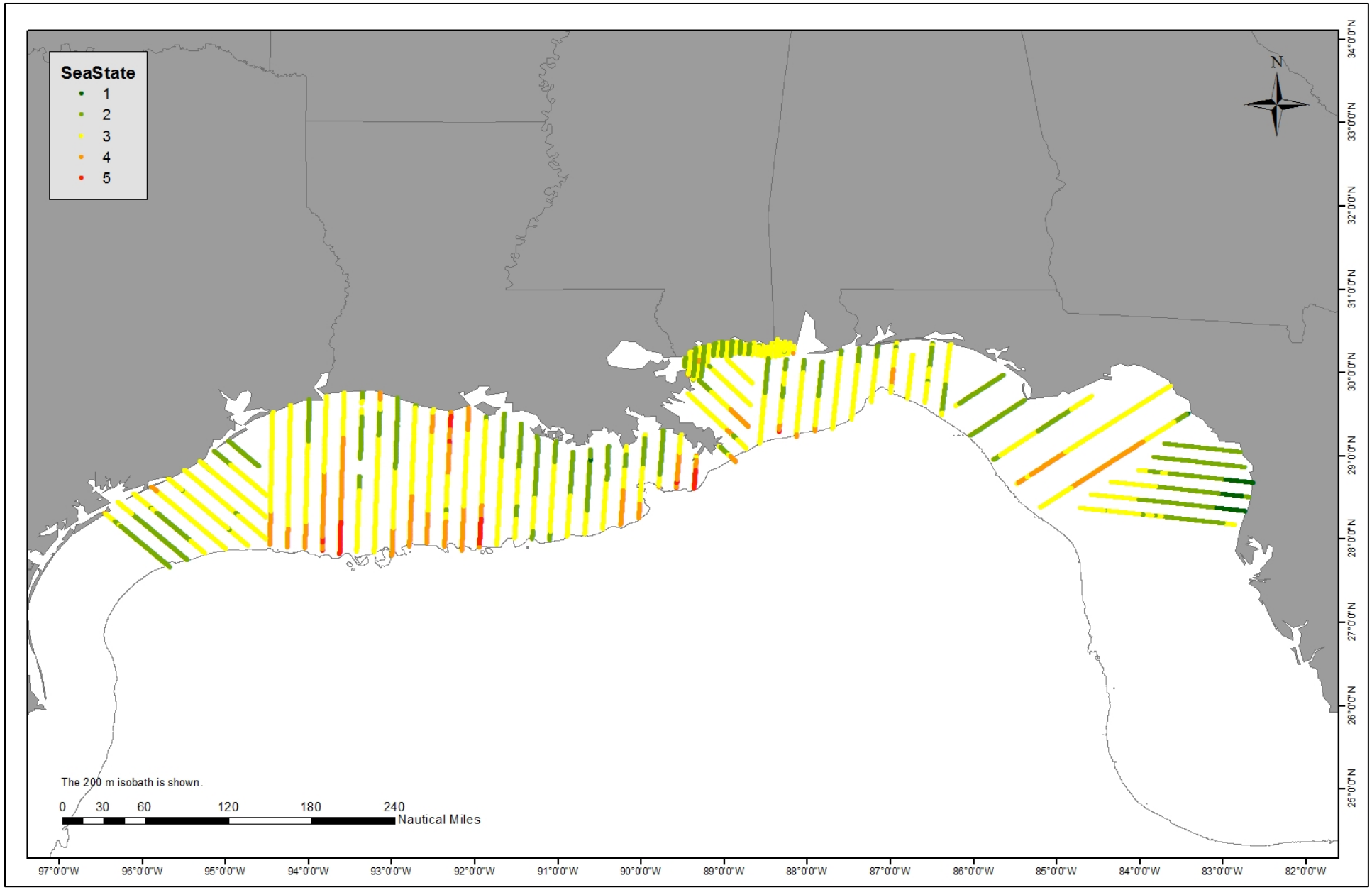

Figure 2: Marine mammal sightings during GoMMAPPS aerial survey winter 2018.

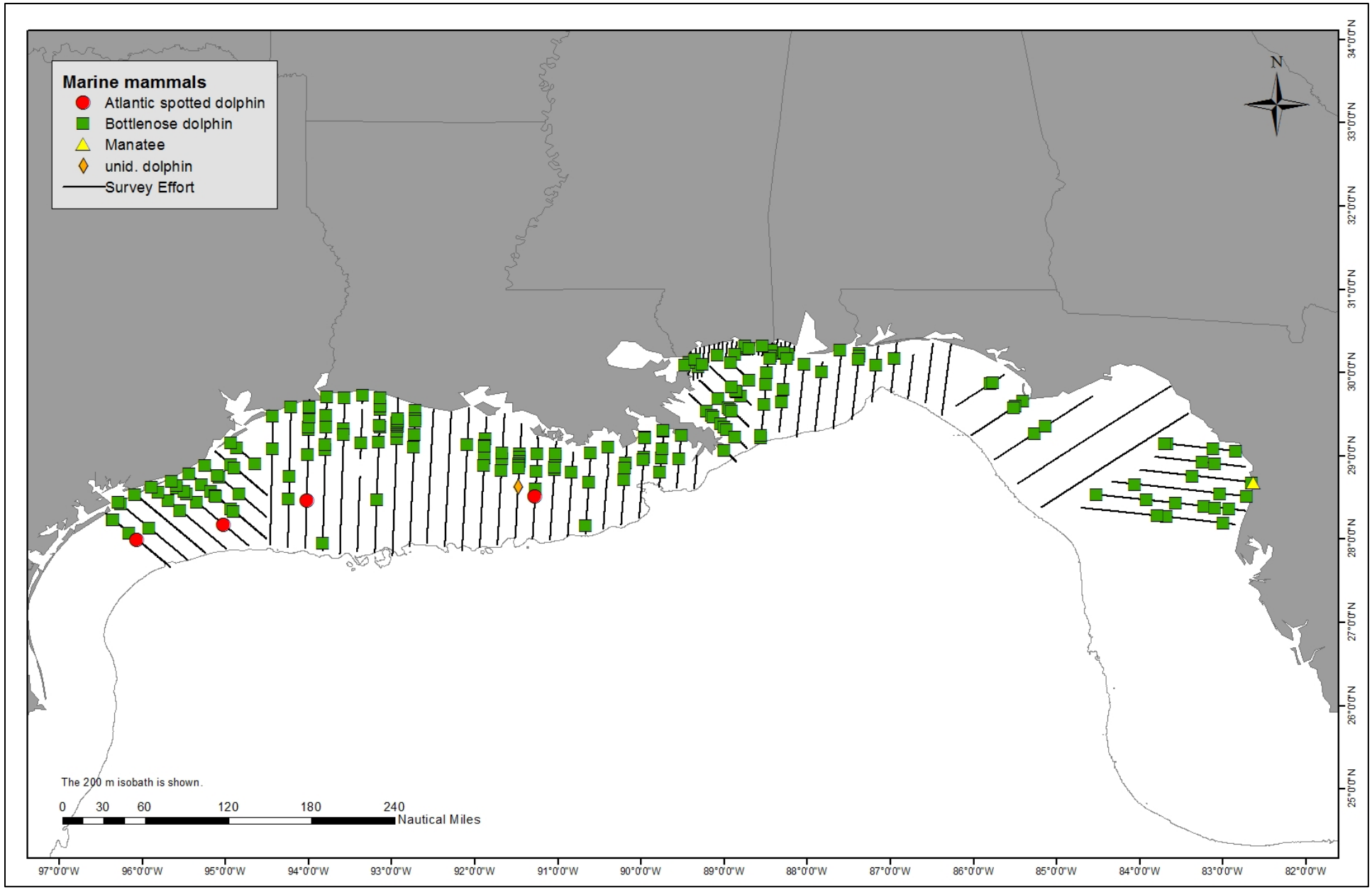

Figure 3: Sea turtle sightings during GoMMAPPS aerial survey winter 2018.

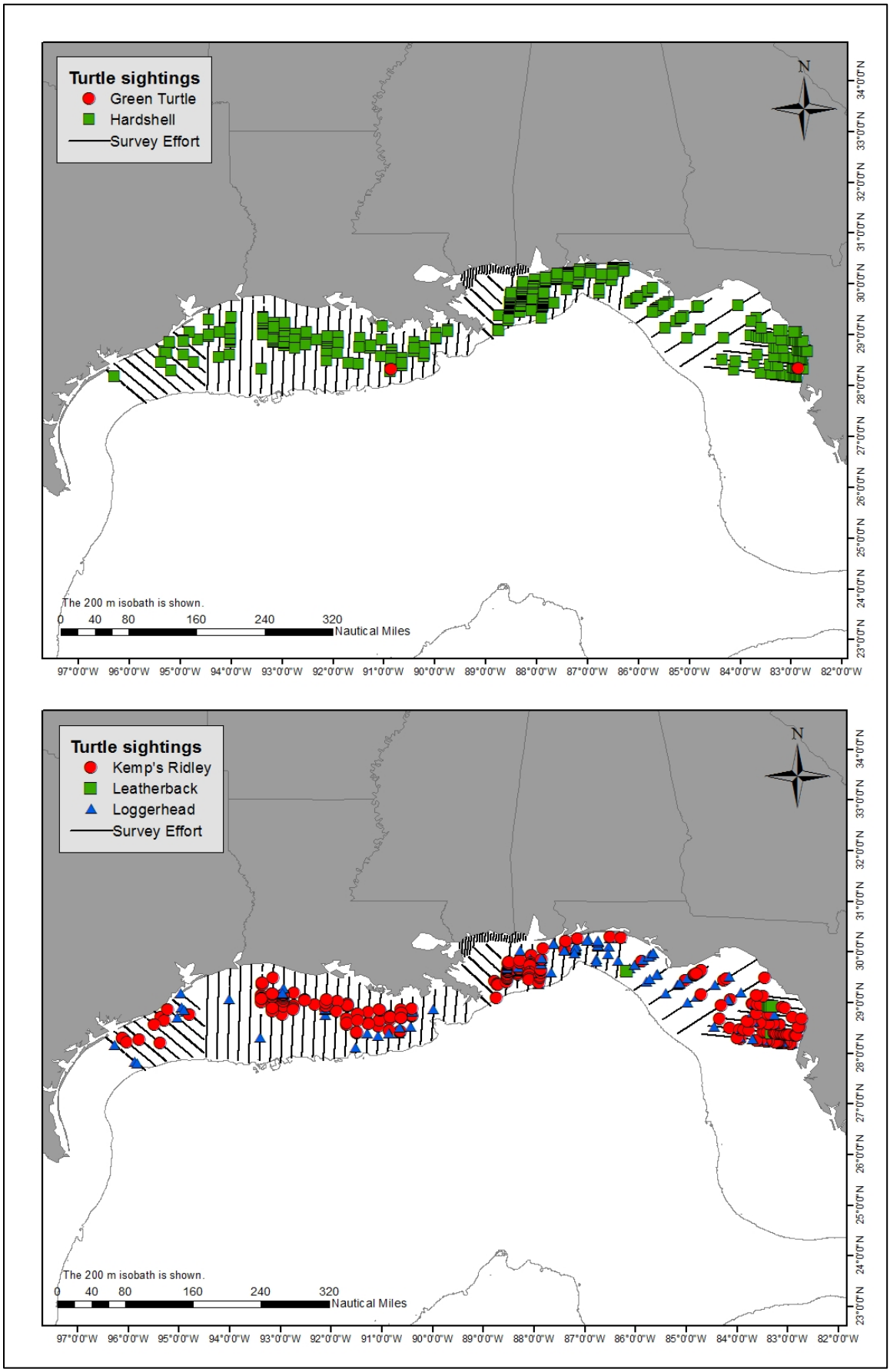

Figure 4: Opportunistic fish sightings during GoMMAPPS aerial survey winter 2018.