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## Recent Observations of the Whale Shark (*Rhincodon typus*) in the Northcentral Gulf of Mexico

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**SHORT COMMUNICATION****RECENT OBSERVATIONS OF THE WHALE SHARK (*RHINCODON TYPUS*) IN THE NORTHCENTRAL GULF OF MEXICO****Eric R. Hoffmayer<sup>1</sup>, James S. Franks<sup>1</sup>, and John P. Shelley<sup>2</sup>**<sup>1</sup>Center for Fisheries Research and Development, Gulf Coast Research Laboratory, and the<sup>2</sup>Department of Coastal Sciences, The University of Southern Mississippi, 703 East Beach Drive, Ocean Springs, Mississippi 39564 USA, E-mail [eric.hoffmayer@usm.edu](mailto:eric.hoffmayer@usm.edu)**INTRODUCTION**

The whale shark (*Rhincodon typus* Smith, 1828) is the world's largest fish, reaching 15 meters (m) and 18 metric tons (Colman 1997) and is found in all tropical and warm temperate seas (Compagno 2001). The whale shark is listed as 'vulnerable' by the International Union for the Conservation of Nature and Natural Resources (IUCN 2004) and is included in Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES 2004). Little is known about whale sharks in the Gulf of Mexico (Gulf). Only reports on the occurrence of whale sharks off Texas (Baughman 1950, Baughman and Springer 1950, and Hoffman 1981) and accounts of the occurrence and feeding in the northcentral Gulf (Gudger 1939, Springer 1957) are available. Due to the lack of information on whale sharks in the Gulf, we developed a survey ([http://www.usm.edu/gcrl/whale-shark\\_survey](http://www.usm.edu/gcrl/whale-shark_survey)) to compile records of recent sightings and associated observations that are summarized here.

**MATERIALS AND METHODS**

Details of whale shark sightings were obtained from recreational fishers, charter fishing operators, and divers by personal interview or the internet survey. Information requested from individuals who sighted whale sharks included date, location (e.g., GPS coordinates, direction and distance from a coastal landmark, or identifier number of specific offshore petroleum platforms), estimated total length (TL, ft), number of individuals, behavior (e.g., swimming, feeding), and associated fishes. Sightings greater than two years old were not included in the database unless sufficient documentation (e.g., log entry) of their validity was provided.

**RESULTS**

Interviews provided information for 26 sightings involving 46 whale sharks between July 2002 and November 2004. Additionally, four large aggregations (30–100 individuals) of whale sharks were also reported; however, information reported for the aggregations was

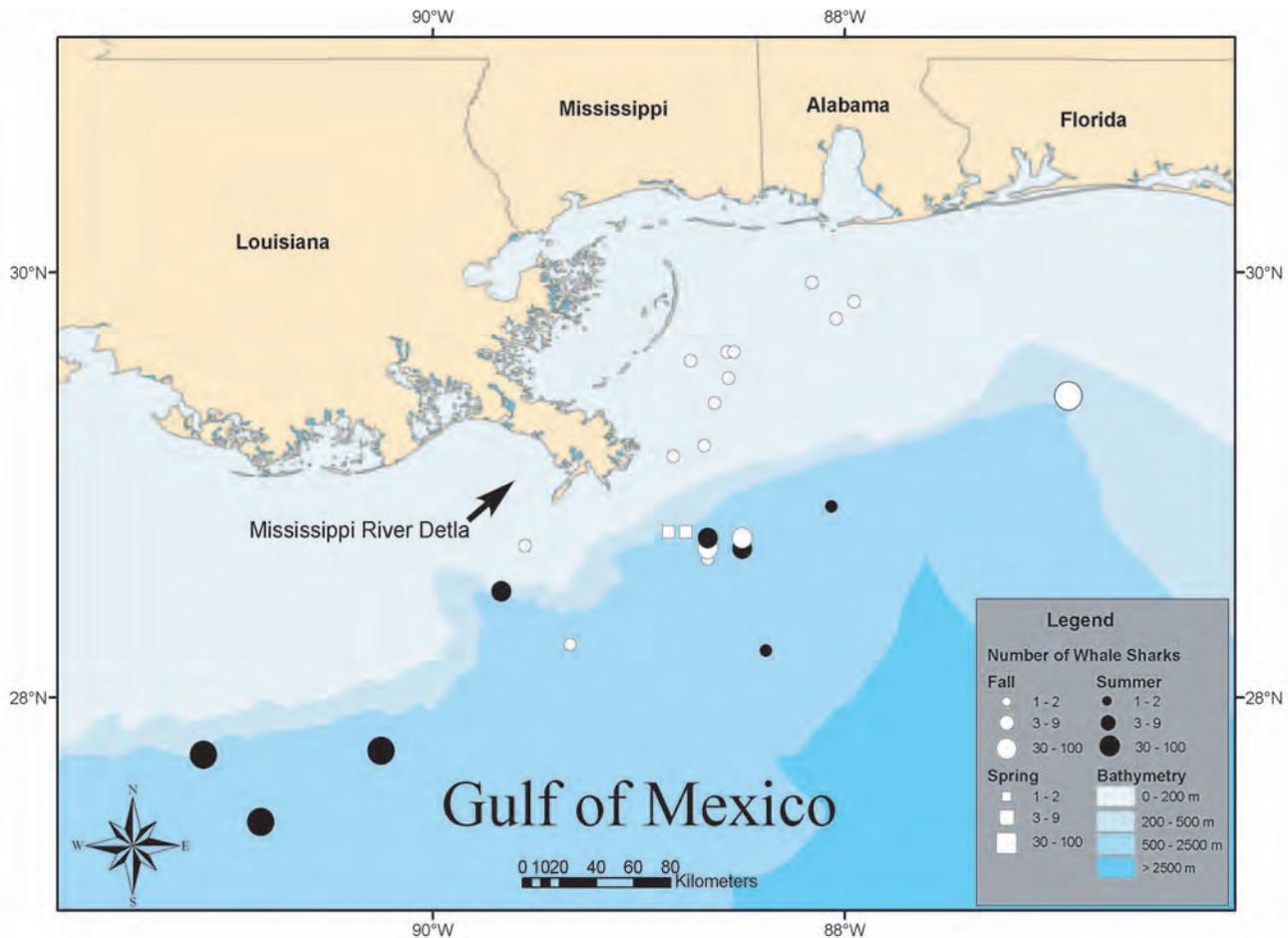
scant and not included in the data analysis. Nineteen sightings were of individual whale sharks, with seven sightings consisting of two to seven sharks. The seasonal distribution and the number of whale sharks are shown in Figure 1. Sightings occurred in waters with depths from 20 to 1,000 m. Most whale sharks (80%) were observed swimming horizontally near the surface of the water, while the others were observed in vertical profile, apparently suction-feeding on small prey.

All observations occurred between May and November with 83% of the sightings occurring between July and October (Figure 2). There was a prevalence of sightings southwest of the Mississippi River Delta during summer and northeast of the Delta during the fall (Figure 1). Many sightings (63%) occurred at or near petroleum platforms (Figure 3). Estimated size (feet converted to meters) ranged from 3.7 to 10.7 m TL ( $n = 41$ , Figure 4). Gender was not noted.

Ten teleost and two shark species were observed with whale sharks during 69% of the sightings (Table 1). Tunas were the most commonly reported, particularly blackfin, *Thunnus atlanticus*, skipjack, *Katsuwonus pelamis*, and yellowfin, *Thunnus albacares*. The authors and colleagues caught blackfin and skipjack tuna from large schools of tuna associated with two whale sharks in September 2002.

**DISCUSSION**

The information reported here represents recent accounts of whale shark sightings in the northcentral Gulf. These data plus unpublished accounts (K. Mullins, NOAA Fisheries, Pascagoula Facility, per. comm.) suggest that whale sharks occur frequently in the northern Gulf during warmer months, entering the northcentral Gulf from the west or southwest in the late spring/early summer. They appear to move northeastward during the fall, and are perhaps absent during the winter. These apparent seasonal patterns are based only on surface observations. We assume there is no seasonal variability in vertical position of this species within the Gulf and thus no bias in these observations. Although whale sharks are considered to be



**Figure 1.** Locations of whale shark, *Rhincodon typus*, sightings in the northcentral Gulf of Mexico between 2002 and 2004. Some symbols may overlap due to the proximity of individual sightings. Only the smallest symbol for spring is shown.

highly migratory throughout much of their range (Eckert and Stewart 2001), available data provide no insight into whether whale sharks in the northern Gulf are transient or comprise a resident population.

Aggregations of whale sharks (up to 30 individuals) were previously reported in the northern Gulf (Gudger 1939; W. Driggers, NOAA Fisheries, Pascagoula Facility, per. comm.). The significance of whale shark aggregations is unknown, but Colman (1997) reported that aggregations may occur in areas with dense prey. The four large aggregations as well as the majority of other sightings reported here occurred at or near petroleum platforms, which function as fish aggregating devices (Franks 2000). However, the predominance of sightings at petroleum platforms is likely attributable to the use of platforms as preferred recreational fishing destinations. Whale sharks themselves attract other fishes (Gudger 1941, Baughman and Springer 1950, Hoffman et al. 1981, Clark and Nelson 1997), and we report the highest diversity of pelagic fishes documented in association with whale sharks.

Although most whale sharks in this study were observed swimming horizontally, it was not always evident that they were feeding. However, 20% of the whale sharks were observed suction-feeding while in vertical profile, similar to reports by Gudger (1941), Springer (1957) and Hoffman et al. (1981). Springer (1957) reported five whale sharks feeding vertically on small fishes in a school of blackfin tuna in the northcentral Gulf. Running-ripe male and female blackfin tunas caught during the author's 2002 whale shark encounter regurgitated small clupeids on deck. However, we could not determine if the whale sharks were feeding on clupeids or the spawn of the tuna. Colman (1997) suggested that whale sharks and associated fishes may feed on the same prey, and Heyman et al. (2001) reported whale sharks feeding on snapper spawn, suggesting that this feeding behavior may also be occurring here.

Seasonal distribution of whale sharks in the northcentral Gulf may be influenced by hydrologic/oceanographic features (e.g., Loop Current, Mississippi River plume, convergent zones, upwellings, temperature discontinuities).

## WHALE SHARK OBSERVATIONS IN GULF OF MEXICO

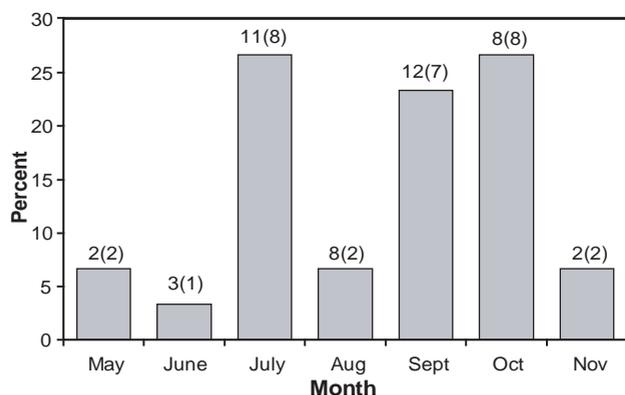


Figure 2. Percent occurrence by month of whale sharks, *Rhincodon typus*, observed in the northcentral Gulf of Mexico from July 2002 to November 2004. Numbers above histograms indicate sample size, and numbers in parentheses indicate the number of sightings.

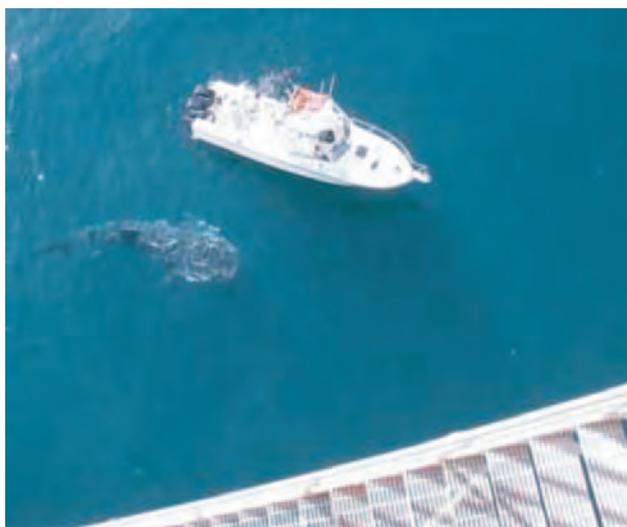


Figure 3. An estimated 8 m whale shark, *Rhincodon typus*, near a sport fishing boat at a petroleum platform in the northcentral Gulf of Mexico on October 30, 2003.

Such features provide optimal conditions for the production of plankton (Govoni et al. 1989, Richards et al. 1993), a food source of whale sharks (Colman 1997). These features also aggregate primary consumers such as crustaceans, small fishes, and jellyfish which are also known prey of whale sharks (Gudger 1941, Colman 1997, Heyman et al. 2001), thereby creating spatially discrete feeding areas. Finally, Wilson et al. (2001) noted that whale sharks may time their seasonal movements to coincide with localized productivity events or behavioral changes in their prey.

The individuals reported here ranged from 3.7 to 10.7 m TL and 56% appear to be immature as Joung et al. (1996), Beckley et al. (1997) and Wintner (2000) reported

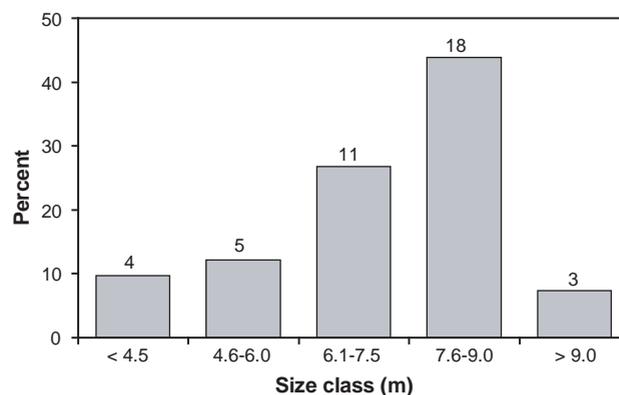


Figure 4. Length frequency plot of whale sharks, *Rhincodon typus*, observed in the northcentral Gulf of Mexico from July 2002 to November 2004. Numbers above histograms indicate sample size.

that maturity occurs at 9.0 m TL and 10.5 m TL for males and females, respectively. These data, along with Baughman's (1955) reported collection of an aborted whale shark egg case off Texas, imply that the Gulf may be a whale shark nursery area, as was suggested by Gudger (1939).

Limited data are available on life history, movement, and habitat requirements of whale sharks in the northcentral Gulf. Furthermore, their designation as "vulnerable" by IUCN and their listing by CITES demonstrate the need for greater understanding of this species throughout its range. Hoffmayer et al. (in press) proposed a plan of research, which includes population surveys, biological assessments, and habitat use evaluation to advance the scientific understanding of whale sharks in the Gulf for the develop of future management plans and protection measures for the species.

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