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HAS THE MANATEE (*TRICHECHUS MANATUS*) DISAPPEARED FROM THE NORTHERN COAST OF THE STATE OF VERACRUZ, MEXICO?

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ABSTRACT: Knowledge about the distribution and abundance of the manatee (*Trichechus manatus)* along the coast of the Mexican state of Veracruz is scarce. Since few studies have been undertaken in this area, boat-based surveys and interviews with local fishermen were carried out to determine if there are remaining herds of manatees in the vicinity of the coastal towns of Tamiahua, Tuxpan, Tecolutla, and Casitas-Nautla. All of the fishermen interviewed noted that they used to see large herds of manatees in the area. Seventy-four percent (371 fishermen) of the survey respondents had not seen a manatee over the last 10 years, and 26% (131 fishermen) responded that the last time they saw large or small groups of manatees was in 1986 and 1995, respectively. However, since 1996, none of the fishermen had observed any manatees in the area. Similarly, no manatees were observed during the boat-based surveys (effort of approximately 1200km). It is almost certain that anthropogenic influences have altered manatee habitat significantly and thus affected the numbers of animals using the area. Also, fishermen speculated that natural phenomena such as cyclones, flooding, and storms caused manatees to move away from the area. More surveys along the coast of Veracruz are needed to determine if manatees still occur in this Mexican state. Also, it is urgent to implement conservation measures in the northern range of the manatee in Mexico to ensure the survival of this species along its original distribution.

RESUMEN: El conocimiento sobre la distribución y la abundancia del manatí (*Trichechus manatus*) a lo largo de la costa del estado de Veracruz, México, es pobre debido a que se han hecho muy pocos estudios en esta área. Por esta razón, se realizaron navegaciones en busca de manatíes y entrevistas con los pescadores locales para determinar si aún existen manadas de manatíes en las aguas costeras de las poblaciones de Tamiahua, Tuxpan, Tecolutla, y Casitas-Nautla. Todos los pescadores entrevistados señalaron que antes se observaban grandes grupos de manatíes en el área. De los pescadores entrevistados, el 74% (371 pescadores) respondieron que no han visto manatíes desde hace 10 años, y el 26% (131 pescadores) respondieron que la última vez que vieron a un grupo grande o a un grupo pequeño fue en 1986 y 1995 respectivamente. Sin embargo, desde 1996, ninguno de los pescadores ha observado manatíes en el área. De igual manera, no se observaron manatíes durante los recorridos en lancha (esfuerzo de aproximadamente 1200km). Es casi seguro que las actividades antropogénicas han alterado el hábitat de estos organismos de una manera significativa y por lo tanto el número de animales utilizando el área. Se necesitan más navegaciones a lo largo de la costa de Veracruz para determinar si los manatíes aún se encuentran en las aguas de este estado mexicano. Así mismo, es urgente implementar medidas de conservación en la parte norte del rango de distribución en México de estos organismos para garantizar su supervivencia a lo largo de la distribución original de esta especie.

KEYWORDS: manatee, *Trichechus manatus,* population status, conservation, Gulf of Mexico

Introduction

West Indian manatees are distributed from U.S. east coast to Brazil (Lefebvre *et al.*, 1989). In Mexico, their known distribution includes the states of Veracruz, Tabasco, Campeche, Yucatán, Quintana Roo and Chiapas (Colmenero and Hoz, 1986; Lefebvre *et al.*, 1989). Manatees have been reported to occur along the entire coast of Veracruz (Colmenero and Hoz, 1986; Colmenero, 1991; Portilla *et al.*, 1999; Ortega-Argueta, 2000). However, the knowledge about manatee distribution and abundance in this state appears to be imprecise (Colmenero, 1991; Morales-Vela *et al.*, 2003). The objective of this study is to update the information regarding manatee distribution and abundance along the northern coast of Veracruz.

Material and Methods

The study area consisted of the northern coast of Veracruz. It included places where manatees had been reported previously: three major river systems and one coastal lagoon. The rivers where our research took place included the Tuxpan, Tecolutla, and Casitas-Nautla rivers; the coastal lagoon of Tamiahua was also surveyed (Figure 1).

Interviews with local fishermen and boat-based surveys were carried out. Interviews took place between November 2004 and June 2006 in the most important fishing towns and villages located along the northern coast of Veracruz. Individual and group interviews were conducted by trained students from the Marine Mammal Laboratory and by the authors. Only fishermen with 15 or more years of fishing

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experience were interviewed. Prior to each interview, fishermen were shown photographs of manatees to ensure that they were familiar with this species. Interviews were conducted in the fishing communities where fishermen lived, or in their homes. They were intended to obtain information on the historic and present distribution of manatees, whether manatee numbers have increased or decreased over time, if any manatees had been found in nets, and the time and location of recent sightings. Boat-based surveys were carried out on the coast, estuarine systems, lagoons, and rivers. During 2005 a total of 14 boat-based surveys covering 1197 km were done in the entire study area. The boat-based surveys were done on a 7-m *panga* powered by an outboard 65HP engine at a cruising speed of 15km/h. Four observers (two on each side of the boat) searched for manatees for about four hours each survey.

Results

We interviewed 502 fishermen. Table 1 summarizes the number of people interviewed by area and the main comments made by interviewees. Seventy-four percent (371) of fishermen noted that they had not seen a manatee over the last 10 years in Tamiahua, Tuxpan and Tecolutla, and 26% (131) informed us that they had seen a manatee less than 10 years prior in the Tecolultla and Casitas-Nautla areas (Table 1). In the Tecolutla area, 77% of people assured us that they had not seen a manatee within the last 10 years, and the remaining 23% told us that the last time they saw a manatee was within the last 10 years. In the Casitas-Nautla area, 83% of interviewees told us that the last time they saw a manatee was within the last 10 years. Four fishermen from Casitas mentioned that they had found an entangled manatee in their nets more than 10 years ago.

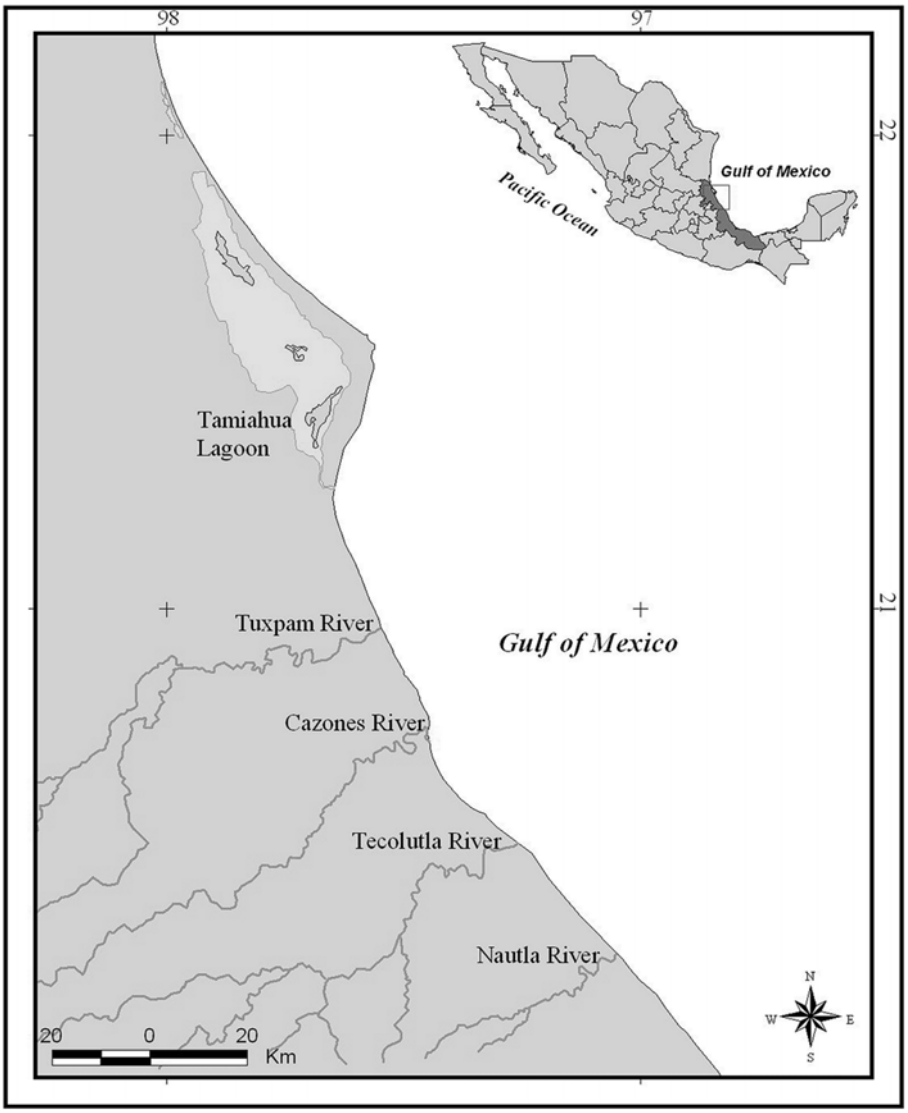

Figure 1. The study area, encompassing the Tamiahua lagoon and the northern coast of Veracruz down to the Nautla River.

Table 1. Locations, number of interviewees (N), and main comments during interviews from the northern coast of Veracruz.

LOCATION	N	COMMENTS
Tamiahua	180	Manatees were commonly observed in the area, but have not been seen there in the last 30 years
Tuxpan	85	Manatees used to be common in the area, but have not been seen there in the last 30 years
Tecolutla	111	Twenty-six fishermen (23%) stated that they used to see manatees until 1999. They attributed the cease of manatee sightings to hurricane Gilbert in 1988 and to tropical depression No. 11 in 1999.
Casitas - Nautla	126	One hundred and five people (83%) saw manatees before 1999. They commented that after tropical depression No.11 in 1999, no manatees have been seen.

Fishermen that worked in the Tamiahua and Tuxpan areas noted that they had not seen a manatee in 30 years. All the interviewees agreed that the manatees were abundant in the area 30 years ago.

The boat-based survey effort was 1200 km for the entire study area. Even though surveys were done with experienced fishermen who have seen manatees, we did not observe any during the survey.

Discussion

The methodology that we used to carry out the interviews was similar to that used by Gallo (1983), Colmenero and Hoz (1986) and Morales-Vela *et al.* (2003). Interviewees noted that manatees were extremely common in the past and that they seem to have disappeared from the area. Our boat-based surveys confirm these results. The only precise manatee records for the state of Veracruz are for the following rivers: Tecolutla and Nautla (Colmenero and Hoz, 1986; Ortega-Argueta, 1999) and in the Alvarado lagoon (Colmenero and Hoz, 1986; Portilla *et al.*, 1999; Ortega-Argueta, 2000). Our results indicate that there may be no manatees left in the Tecolutla-Nautla area or in other parts of northern Veracruz.

One of the reasons for the manatee decline in the area could be the increase of net-fishing activities over the last several years. These activities have increased in more than 100% over the last 10 years (INEGI, 2004*a*). Fishing nets and lines are used in freshwater areas, inlets, rivers, and calm water channels known to be frequented by manatees; thus, manatee entanglements could have increased. Entanglements have been reported for other areas of the state (Ortega-Argueta, 1999; 2000) and the rest of the country (Morales-Vela *et al.*, 2003). The increasing number of fishing boats in over 100% over the last 10 years (INEGI, 2004*a*) may have also frightened manatees away from the area. There has been an increase in tourism in the area (sport fishing, boating, etc.), fishing activities, and oil industry activities in over 150% over the last 10 years in the area (INEGI, 2004*b*). Langtimm and Beck (2003) and Aipanjiguly *et al.* (2003) report a significant difference in the number of manatee deaths in areas where boat traffic is restricted and areas with high boat traffic.

In the Tecolutla and Casitas-Nautla areas, interviewees mentioned that there was a drastic decrease in manatees after strong weather phenomena such as tropical storms and severe flooding. Interviewees noticed a significant decrease in manatee numbers after hurricane Gilbert in 1988. Eleven years later, in the same area, tropical depression number 11 caused severe flooding and changed riverbeds. According to fishermen from Tecolutla and Casitas-Nautla, manatees were no longer seen after this weather phenomenon had occurred. Similarly, a decline in manatee numbers after weather phenomena has been reported by several studies (Marsh, 1989; Aipanjiguly *et al.*, 2003; Langtimm and Beck, 2003; Morales-Vela *et al.*, 2003). Clearly, the decrease in manatee abundance along the northern coast of Veracruz has been caused by several factors. More studies on manatee distribution and abundance need to be carried out in this areato determine the number of manatees lef, if any. In addition, it is urgent to implement conservation strategies for the manatee in northern Mexico to ensure this species survival along its original distribution.

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