

Distribution and current status of the West African manatee (*Trichechus senegalensis*) in
Guinea-Bissau

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Of all species of sirenians, the West African manatee (*Trichechus senegalensis*) is the least known biologically (Reynolds and Odell 1991). This species occurs in the rivers, estuaries, lagoons, and coastal regions of western Africa, from southern Mauritania to the Cuanza River, Angola (Husar 1978, Nishiwaki *et al.* 1982). However, according to Nishiwaki (1984), its distribution is discontinuous, with some populations already extirpated.

The West African manatee was never subjected to large-scale commercial exploitation (Husar 1978). Nevertheless, subsistence hunting by local communities has been intensive in some areas, and probably has been the most important cause of manatee population declines (Reeves *et al.* 1988). Subsistence hunters have heavily exploited manatees in Guinea-Bissau, like in many developing countries. At present, however, incidental by-catch seems to be the most significant threat (Schuhmann 1995).

According to the first distribution map of the species in Guinea-Bissau, the West African manatee occurred in the main rivers (Cacheu, Mansoa, Geba and Corubal) and around the Bijagós Archipelago. More recently, two boat surveys conducted on the Geba and Campossa rivers confirmed the presence of the species in these areas (Schuhmann 1995). The aim of our survey was to determine the current distribution and status of the West African manatee in Guinea-Bissau.

The local office of the World Conservation Union (IUCN) signed a protocol with the Portuguese Institute for the Conservation of Nature (ICN), the Fisheries Applied Research Center (CIPA), and the Forestry and Game Department (DGFC) of Guinea-Bissau to develop a standardized questionnaire designed to document the occurrence, mortality, feeding habits, and behavior of manatees, as described to us by local residents.

Questionnaire data is subjected to a large number of possible biases, which are sometimes difficult to identify and assess. One of these biases may result from the interview design and we tried to avoid it by consulting several researchers who had already worked with questionnaires. IUCN has also considerable experience in designing and analyzing data from questionnaires, and we benefited from the technical assistance of a local expert on the subject. The interviewers were trained to conduct the questionnaire and instructed to avoid influencing the respondent's answers. The interviews were conducted in Creole to facilitate the comprehension of the questions.

Although we tried to overcome all the problems associated with interview surveys, questionnaire data has always some limitations and must be carefully interpreted. Nonetheless, we think data presented in this work can contribute to improve the knowledge on the West African manatee.

Respondents were asked to report on the period 1990 to 1998 and to consider two distinct seasons *i.e.*, rainy and dry. The location of manatee sightings reported by the respondents was recorded on 1:50.000 geographic maps.

We trained two IUCN park rangers and one DGFC technician to conduct the detailed interviews, but before choosing the respondents, a set of general questions (preliminary interview) was asked to a wider number of people in each village. This was done to determine which people might have knowledge about manatees and their willingness to participate in the questionnaire. Based on information gathered by CIPA in 1993, we selected only those villages known to have active fishermen.

Interviews were done in villages and fishing camps located along the coast and main rivers, and in the Bijagós Archipelago. However, a military rebellion in Guinea-

Bissau on 7 June 1998 prevented the completion of the interview survey in the central and eastern areas of the country. For the same reason, the aerial surveys planned for the Bijagós Archipelago could not be done.

The survey began in April 1998, covering three areas: the coastal zones north and south of Bissau, and the Bijagós Archipelago (Fig. 1). In these three areas, 241 villages and fishing camps were visited and 520 people (mainly fishermen, hunters, farmers and former manatee hunters) were questioned. Detailed interviews were given to 329 of the 520 persons. The highest number of detailed interviews was given in the southern area ($n = 140$), followed by the northern area ($n = 104$) and the Bijagós Archipelago ($n = 85$). In the three areas investigated, a total of 256 manatee sightings, involving 439 individuals, was reported for the period 1990 to 1998.

We found that manatees occupied a wide variety of habitats in Guinea-Bissau. They occurred around the islands and mangrove creeks of the Bijagós Archipelago, and in estuaries, freshwater lagoons (*e.g.*, Lagoa da Cufada), major rivers and associated tributaries along the mainland. The species was present in all three areas, although it was more abundant in the Bijagós Archipelago (Fig. 1). Both the average sightings per individual interviewed, and the percentage of persons that claimed to have observed at least one manatee, varied according to the region, reaching the maximum in the Bijagós islands. Over 94% ($n = 106$) of the respondents in the Bijagós observed manatees at least once, whereas in the northern area the proportion was only 71% ($n = 181$). In the southern area, 88% of the 160 persons interviewed claimed to have sighted manatees. The average number of sightings per person interviewed also was highest in the Bijagós (2.57), followed by 1.41 and 1.16 for the northern and southern zones, respectively.

Reports of manatees were widely distributed in the Bijagós Archipelago, but most of the sightings were from around the Orango islands and in the islands of Bubaque, Rubane, Uno, Eguba, Formosa and Carache (Fig. 1). The species occurs even in the outermost islands (*e.g.*, Unhocomo and Unhocomozinho), where its presence had been previously questioned. In the mainland areas, the Grande de Buba, Cacine, Cumbijã, Pefine, Tor, Quinhâmel, Ome, Mansoa and Cacheu rivers were important for the manatees (Fig. 1). These results are in agreement with earlier studies of the distribution of the West African manatee in Guinea-Bissau, yet showing a more extensive range than previously reported (Schuhmann 1995).

The absence of records in the Geba River and associated tributaries simply reflects the lack of sampling in that area, due to the beginning of the war in June. In fact, according to earlier studies (Schuhmann 1995), Geba River probably constitutes one of the most important areas for the West African manatee in the country. The beginning of the military conflict also prevented the conclusion of the interview survey in the east of the country. However, the people interviewed in this area (approximately 25) informed us that the manatee did not occur in the Gabu region. This could be explained by the presence of a natural physical barrier in the Corubal River (Saltinho and Surire Rapids), which prevent manatees from reaching the upper parts of the river.

The majority of persons interviewed in the three areas believed that manatee abundance was seasonal, with most of the sightings occurring during the rainy season, from June to October. This was suggested by the analysis of manatee sightings reported from 1990 to 1997, where 58% ($n = 93$) of the sightings in the three areas occurred during the rainy season. During the rainy season, manatees may ascend the smaller rivers

and inlets looking for new feeding areas and freshwater springs, thus becoming more visible to the villagers and fishermen of these inland areas. When the water level in the rivers decreases in the beginning of the dry season, manatees may move to the mouth of the larger rivers and to the coastal zones along the mainland. We were also unable to confirm movements of manatees between the Bijagós Archipelago and the mainland, although it is likely that these occur. Although data from the present study seems to suggest seasonal movements in the mainland, these results should be viewed with caution, as they may reflect possible bias in the interview design. Further studies will be needed to confirm this hypothesis and to understand the triggering mechanisms of the phenomenon.

According to our interview results, 209 manatees were killed in the study area between January 1990 and May 1998, yielding an average of 24.8 animals per year. No major differences were found in manatee mortality among regions. Of the 209 deaths, 39% occurred in the southern area, 37% in the Bijagós Archipelago and the remaining 24% in the northern area. Approximately 72% of deaths resulted from the interaction with fishing gear, 13% of the animals were hunted and 4% were accidentally stranded at low tide. In 11% of the cases the cause of death remained unknown.

Entanglement in fishing nets seems to account for the most immediate threat to the manatee population in Guinea-Bissau. According to the results of our interviews, 69 cases of entanglement occurred in a 16 months period (from January 1997 through May 1998), resulting in an average of 3.8 incidents/month. Fishermen said that in more than half of these cases the animal involved managed to escape alive from the fishing net. However, even when manatees survive these encounters, injuries from the entanglement

may result in death later on (Reeves *et al.* 1988). Moreover, although intentional setting of nets to capture manatees is no longer a common practice in Guinea-Bissau, animals accidentally caught in fishing nets are usually butchered. Entanglement situations occurred with similar frequency in both seasons and in each region. According to what was reported to us during the interviews, manatees became entrapped in different fishing gears, such as, set gillnets, seine nets, small nets set across canals and traps.

Although illegal, manatee hunting is still a common practice all over West Africa, and represents one of the most significant mortality factors to the species (Reeves *et al.* 1988). In Guinea-Bissau, however, manatee hunting seems to be declining. It is not possible to assess the real impact of illegal hunting on the manatee population, because hunters and fishermen tend to hide these occurrences for fear of prosecution.

The two main conflicts between manatees and people are the invasion and destruction of rice fields and the destruction of fishing gear. Of the 31 incidences of rice field impacts, 21 occurred in the southern area of the country and the remaining in the northern zone. All the incidents took place during the rainy season, particularly in August and September, and the majority (72%) took place at night. The owners of the rice fields developed some protective measures by building mud banks and pole fences, but they were ineffective. This conflict should not pose a significant threat to manatees because it rarely involves the death of the animals, it is limited to one season and it is mostly restricted to a small area. Entanglement of manatees in fishing nets constituted the main conflict with people in Guinea-Bissau. Approximately half ($n = 155$) of the interviewees claimed to have captured at least one manatee in their fishing nets, resulting, in most of the situations reported (81%), in serious damages to the nets.

The group sizes reported ranged from 1 to 15 individuals, with a mean of 2.5 ± 3.1 (standard deviation) in the Bijagós Archipelago, 1.4 ± 1.1 in the southern area and 1.3 ± 0.8 in the northern area. Most sightings reported were of single animals (63%), although sightings of groups ranging from 3 to 15 individuals accounted for 30% ($n = 28$) of all observations made in the Bijagós Archipelago (Fig. 2). In the mainland areas manatees were not usually seen in large groups, and sightings of manatees in pairs comprised 12% ($n = 12$) and 27% ($n = 29$) of all sightings in the northern and southern areas, respectively.

Although interview surveys have limitations (Marsh and Lefebvre 1994), in our case it was an important research tool, enabling us to evaluate for the first time, at national level, the status of manatees in Guinea-Bissau. Guinea-Bissau appears to hold important populations of the West African manatee and we expect that these will play an important role in future conservation efforts at a regional level. In this regard, a more accurate estimate of manatee abundance will be needed, and the habitat preferences and availability should be assessed quantitatively.

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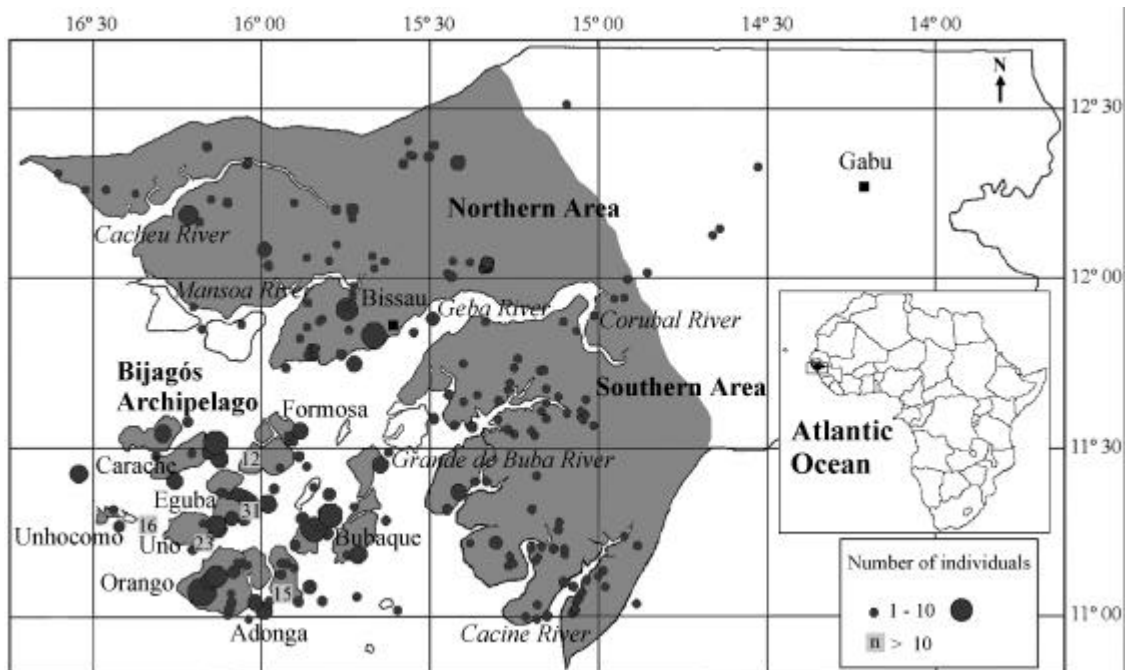


Figure 1 – Map of Guinea-Bissau showing locations of sightings of live manatees reported during our interview survey (number of animals is proportional to symbol size). Areas surveyed are shown in gray.

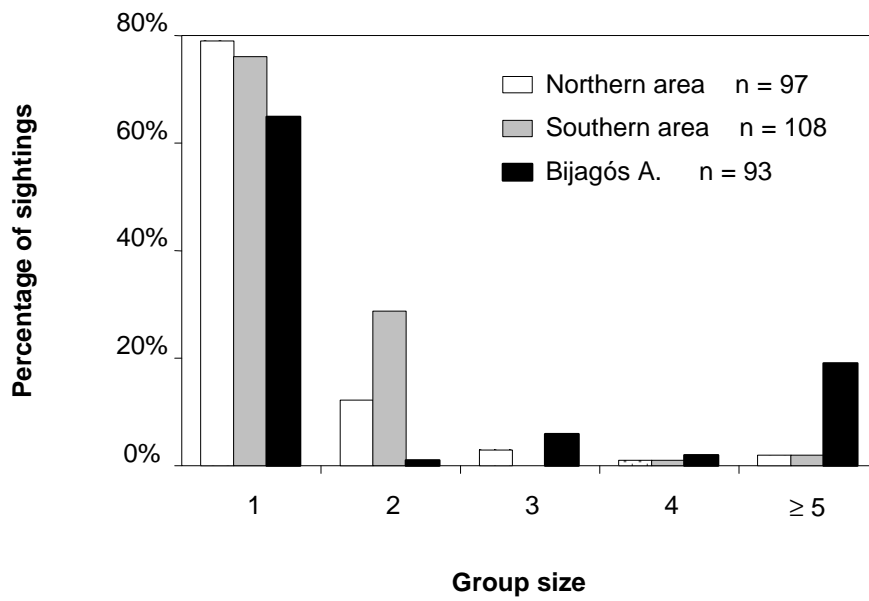


Figure 2 – Average number of manatees observed in each sighting, according to the areas surveyed.