

SHORT COMMUNICATION

Fishers' ecological knowledge of sawfishes in Lake Piso, Liberia

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ABSTRACT

1. A lack of recent data on the presence of sawfishes throughout West Africa inhibits the development of conservation strategies for these endangered elasmobranchs.
2. Short interviews were conducted with 32 fishermen around Lake Piso, Liberia, over three days to assess whether this region might still support a population of sawfishes.
3. Just over half of all interviewees recognized the image of a sawfish and had seen at least one in their lifetime.
4. No respondent claimed to have frequently caught or observed sawfishes in the past, and few fishermen appeared to know if sawfishes were even edible.
5. Seven fishermen stated that they had seen or caught a sawfish within the last five years.
6. The cultural importance attributed to sawfishes in other parts of West Africa was not apparent among the interviewees.
7. These findings suggest that if sawfishes are still present in Lake Piso, they are rare and local ecological knowledge of these fishes is declining.

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INTRODUCTION

Sawfishes (Pristidae) are critically endangered worldwide (Dulvy *et al.*, 2014). Two species of sawfishes, *Pristis pristis* and *Pristis pectinata*, formerly inhabited West African waters. A lack of recent data on the presence of sawfishes throughout West Africa has been interpreted as their likely extinction in much of this region. Fernandez-Carvalho *et al.* (2013) considered it unlikely that sawfishes persist in the southern part

of West Africa (Cameroon to Namibia), but acknowledged that the lack of data for this area introduced a degree of uncertainty. Only two records from Liberia, from 1881 and 1927, were included as part of their study, leaving it unclear whether sawfishes were common in Liberia in the recent past and indeed whether they may still be present there.

Between 1879 and 1882, and again from 1886 to 1887, the Swiss zoologist Johann Büttikofer visited

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Liberia to collect zoological specimens and describe the ecology of the country. He noted:

The Common Sawfish (*Pristis antiquorum*) [*P. pristis*] is sometimes found along the coast. Not rarely, and just like sharks and numerous other saltwater fish, it may even swim into the rivers. During my stay in Robertsport a huge Sawfish was caught in the Sugary River with a seine net The fish was 15 feet long, and the saw alone, armed with large, long, highly polished and knife-sharp teeth, was 3 feet long. The weight of the enormous animal was estimated to be more than 500 pounds. Its meat was a little dry; however, especially after it had been smoked, it didn't taste at all bad. (Dop and Robinson, 2013)

Up-to-date information on the presence, abundance, and distribution of sawfishes in West African waters is urgently required in order to assess whether conservation and management measures should be implemented to protect any remaining populations. To this end, a pilot study was carried out in Liberia over five days in March 2014, in order to assess fishers' ecological knowledge of sawfishes in the Lake Piso region. Recommendations are made for further research on sawfishes in Liberia. Links with local conservation organizations were also established in order to encourage a collaborative approach to any future research and management efforts.

METHODS

The study took place in Robertsport and the village of Tosor on Lake Piso (Figure 1). This area was chosen because previous conversations with locals in this region suggested that sawfishes were familiar to fishermen (T. Dodman pers. comm.). Lake Piso covers an area of approximately 100 km² at a maximum depth of 5 m (Gatter, 1997). It is a designated Ramsar site, with extensive mangrove forests around its shores. The Mafa, Mofe and Mawua rivers and numerous smaller streams empty into the lake, which is connected to the sea via a narrow inlet known locally as the 'bar mouth'. Lake Piso is designated as a Multiple Sustainable Use Reserve. Of the 15 fishing communities using Lake Piso, five operate exclusively in the lake while the remainder also fish in the ocean (R. Sambolah pers. comm.).

Fishers' ecological knowledge (FEK) was collected via structured interviews with fishermen. Fishermen were located by consulting the village chiefs in Kru Town and Ghana town (both in Robertsport), and also by walking through each village area and the nearby landing sites, approaching households and individuals working on nets or attending to boats. Interviews were carried out by RHL, accompanied by Gordon Sambola (GS) of the local NGO Farmers Associated to Conserve the Environment (FACE). Established in 1998, FACE began working in the Lake Piso area in 1999, and currently leads projects on manatee monitoring, conservation of the lake's aquatic habitats and community capacity-building for local resource management (R. Sambolah, pers. comm.). Communities in the area are thus familiar with FACE staff and their activities.

Fishermen were approached by GS, who introduced himself and the author, and explained that the team wished to conduct a short interview on fishes in the area. The fisherman was then asked whether he was willing to participate. Interviews were conducted anonymously and in a conversational manner, guided by a series of questions (Appendix I). The questions focused on

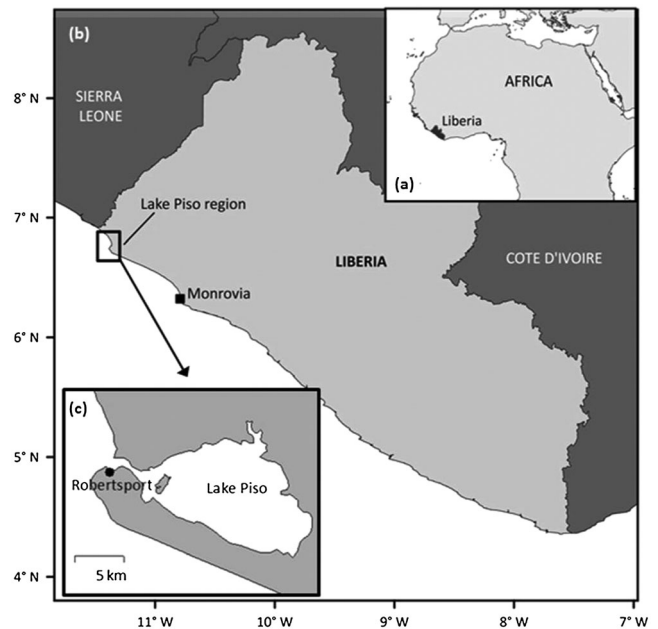


Figure 1. Map of study area showing (a) Liberia's location in West Africa; (b) location of Lake Piso on Liberia's coast; and (c) Lake Piso and Robertsport.

sawfishes but several questions on other sharks and rays were included at the end. Interviews usually took less than 10 minutes to complete. Interviewees were also asked whether they had or knew of any sawfish rostra that the team could photograph and measure. The limited sample size did not allow for any detailed analyses, thus the findings have been summarized and future research priorities have been highlighted.

In collaboration with FACE and local NGO Society for the Conservation of Nature Liberia (SCNL), a poster was developed, requesting that any sawfish landed be reported to one of three contacts in FACE or the Department of Fisheries. FACE staff have posted these notices at fish landing sites and in coastal villages throughout Liberia, in the hope that any future landings of sawfishes will be reported to local field staff, allowing photographs to be taken and data on species and capture location to be collected.

RESULTS

Between 21 and 23 March 2014, 32 interviews were completed in Kru Town (n=17) and Fanti Town (n=11), both part of Robertsport, and in the village of Tosor on Lake Piso (n=4). Respondents were aged between 22 and 'more than 70' (Figure 2). Where the age of a respondent was not definite (e.g. 'more than 70' or 'between 60 and 70'), the minimum age mentioned by the respondent was used. Fifty-six per cent of respondents (n=18) recognized the image of a sawfish and had seen at least one sawfish during their lifetime. These respondents included individuals across the entire age range. Likewise respondents who had never seen a sawfish included both young and older individuals, including five fishermen over the age of 50 (Figure 2).

The majority of interviewees did not know of a local name for the sawfish. Only four individuals provided local names, all in the Fanti language: *sade*, *abrawan*, *yankyen* and *abiti-abiti*. These names did not appear to be widely known even among the Fanti and are apparently not in common usage, at least in Robertsport.

Respondents who had seen a sawfish at least once before were asked when they had last observed one.

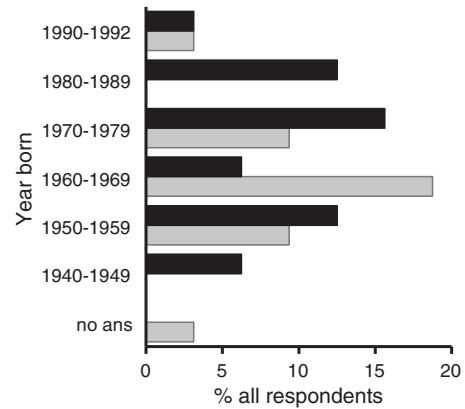


Figure 2. Distribution of age classes of respondents who had (black) and had never (grey) seen a sawfish, as a proportion of all respondents (n=32).

Responses varied from '30 to 35 years ago' to 'several months ago' (Figure 3). Seven respondents stated that they had observed a sawfish within approximately the last five years. In three cases, sawfishes were known to have been caught several miles offshore of Robertsport. An interviewee in Tosor had seen a sawfish landed at Robertsport some three years previously and another, who fished only in Lake Piso, stated that he had observed a sawfish in the lake, only several months earlier. He had seen the sawfish while he was diving underwater to frighten fish into his set net, a method commonly used by fishers in Lake Piso. An interviewee in Fanti Town stated that he had twice observed a sawfish in the water off Marshall, south of Monrovia, most recently in 2012. Finally, another respondent in Fanti Town stated that he caught a sawfish in his net, in deep waters off

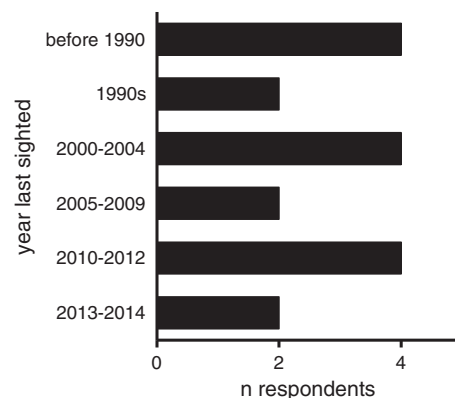


Figure 3. Time periods in which respondents had last observed a sawfish (n=18).

Grand Bassa county, about five years ago. He cut off the saw and threw it back into the sea, but brought the rest of the fish home to eat. Other areas where respondents stated that they had seen or caught sawfishes included the deep waters off Monrovia and in Sinoe (in southern Liberia), as well as 'in Ghana – in the deep sea', Sekondi-Takoradi in western Ghana and in Sierra Leone. Many of the interviewees in Fanti Town had seen sawfishes while they had worked on fishing trawlers operating out of Monrovia. A respondent who worked on trawlers between 1978 and 1990 stated that whenever the trawlers caught sawfishes, they would throw them back into the water, as they considered them too dangerous to take on board.

Questions relating to a change in the number of sawfishes and perceived causes for any change were largely not asked, because the majority of the interviewees who had seen sawfishes had only seen them on one or two occasions. Sawfishes did not appear to hold any cultural importance, nor were sawfish rostra considered as symbolic or even decorative, and no sawfish rostra were observed during the study. Many respondents did not even consider sawfishes as edible, as fishermen appeared unwilling to retain and eat any species of fish which they were unfamiliar with or had rarely encountered. A fisherman in Fanti Town stated that his father had caught a sawfish in 1991; they cut off the saw, buried it onshore and discarded the body. He explained: 'we did not know it and were fearful so we did not eat it'. Another fisher in Fanti Town, who caught three sawfishes in western Ghana around 2002, related how he argued with the other fishers in the boat as to whether to keep the sawfishes or not. There was no consensus on whether the sawfishes could be eaten, and eventually they released all three, two of which were still alive.

Additional information was provided by Patrick Sayon, coordinator of the inshore and coastal marine resource monitoring programme in Liberia. He first observed a sawfish in the 1980s, in the town of Grand Cess (southern Liberia), when his father caught a sawfish close to shore, in shallow water. He also caught a sawfish himself in 2004 while fishing with friends at the mouth of the Lofa River, on a fishing ground known as *Jacoba*. He

cut off the rostrum and threw it into the sea, as it was considered 'poisonous'. He has been involved in monitoring the beach seine fishery at Lake Piso since 2009, and has never observed a sawfish among the landings.

DISCUSSION

Even accounting for the small sample size, the proportion of interviewees in Liberia who recognized the image of a sawfish and had seen a sawfish at least once was surprisingly low. Eighty-five per cent of interviewees in Guinea-Bissau ($n=274$) and 80% in The Gambia ($n=30$) recognized an image of a sawfish (Leeney and Poncelet, 2013; Leeney and Downing, in press). In Guinea-Bissau, the majority of interviewees who did not recognize the image of a sawfish or had never seen one were younger than 40 years of age (Leeney and Poncelet, 2013). Such a pattern was not evident in this study, and indeed several respondents who stated that they had seen sawfishes in the past were only in their twenties, but the small sample size limits any interpretation of the data.

Local names for sawfishes abound in some parts of West Africa (Leeney and Poncelet, 2013; Leeney and Downing, in press). The scarcity of local names for sawfishes in the present study, and the rarity of repeat captures among interviewees who had encountered sawfishes, might suggest that sawfishes have not been common around Lake Piso, at least in recent memory. The historical account of Büttikofer, however, suggests that in the 19th century, sawfishes were fished close to Robertsport, at least occasionally (Dop and Robinson, 2013). Whilst previous studies have suggested that sawfishes are culturally important for societies in West Africa (Robillard and Séret, 2006; Leeney and Poncelet, 2013), there was no indication among interviewees in Liberia that sawfishes had held any significance. Most surprising was the practice amongst fishers of discarding any sawfish they caught, because they were unsure whether it could be eaten. This is in stark contrast to attitudes in Guinea-Bissau, where sawfish meat is highly regarded, and The Gambia where sawfish, when captured, were used as food

(Leeney and Poncelet, 2013; Leeney and Downing, in press). These findings may indicate that sawfish populations in Liberian waters declined some time ago and local knowledge, for example regarding the uses or significance of these fishes, has been lost. This has been termed ‘shifting baseline syndrome’ – a loss of local knowledge of previously abundant or important species among younger generations, as these species have become rare (Turvey *et al.*, 2010). Alternatively, sawfishes may never have been particularly common in this part of West Africa. The lack of historical data from this region limits any understanding of past abundance and recent declines.

Additional interview data from communities around Lake Piso’s expansive perimeter would be valuable, however, as would data from other fishing communities throughout Liberia, particularly at the numerous river mouths and wetland areas along the Liberian coast. There is little ongoing research on marine vertebrates in Liberia at present (R. Leeney pers. obs.) and as such, a lack of information on sawfishes should not be interpreted as an absence.

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APPENDIX

QUESTIONNAIRE

1. Village/landing site
2. Age of interviewee
3. Sex of interviewee
4. Number of years fishing
5. Type of fishing gear used
6. Do you recognize this (show image of sawfish here) – if not, go to question 13.
7. What is the name for this fish in your local language?
8. Have you ever seen a sawfish (or use local name)? When was the last time?
9. Where did you see it?
10. Have you noticed a change in the number of sawfishes in this region (or wherever the interviewee used to see/catch them)? If yes, give details of the change (decrease/ no change/ increase).
11. What do you think is the cause of this change?
12. Are/were sawfishes important culturally in your village or family? If you caught a sawfish, what did you use it for?
13. Do you regularly catch sharks or rays?
14. If yes, do you sell:

(a) The whole animal?	To who?	Price:
(b) The fins?	To who?	Price:
(c) The body?	To who?	Price:
(d) The gill rakers?	To who?	Price:
(e) Any other part?	To who?	Price:
15. Do you eat shark or ray meat?