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OCCURRENCE PATTERN AND THREATS TO AFRICAN MANATEE (*Trichechus senegalensis*) IN COASTAL AREAS OF ONDO STATE, NIGERIA

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ABSTRACT

The present study aims to assess the occurrence pattern and threats to African Manatee in the coastal area of Ondo State. 51 focus group discussions among the fishermen across 17 communities in Ilaje, Irele, Ese-odo and Okitipupa local government areas were carried out. Field observation as well as 100 well-structured questionnaires were purposively administered to respondents in the study area. A descriptive analysis was used to analyze the questionnaire using SPSS Data editor while data collected on the focus group discussions were analyzed qualitatively through thematic analysis. African Manatee has shown wide distribution in Ondo State with the presence of their indices. 68 damaged nets, 45 grazed vegetation, 5 Dungs, 2 ripples on water and 1 sound production by manatee was confirmed in all the major river (River Oluwa) and its tributaries in the coastal communities. 2 manatees were accidentally captured, 15 sand mining sites and noise pollution was observed in 12 coastal communities during the survey. 85% of the fishermen had negative perceptions towards manatee as a result of destruction of fishing nets and eating of crop cultivated. These threats have the potential to drastically reduce the population of this species if not checked. Therefore, sustainable conservation intervention programme in the coastal areas should be prioritized.

Key words: African manatee; Conservation programme**;** Fishermen perception; Occurrence pattern; Threats.

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INTRODUCTION

Biodiversity is an important resource for African people through consumptive and non-consumptive uses. Identifying pattern of occurrence is important owing to heavy dependence of many African communities on natural resources. Sirenians are a group of placental mammals currently comprise of the family Dugongidae (*Dugong dugon)* and family Trichechidae (Amazonia Manatee (*Trichechus inunguis)*, West Indian manatee (Antillean manatee *T. m. manatus*, Florida manatee *T. m. latirostris*) and African manatee (*Trichechus senegalensis*) (Reynolds *et al.*, 1991). They are great swimmers propelling themselves with their strong tail despite their massive weight (National Geographic Society, 2015). Being the only herbivorous mammal, they spend the dry season in coastal regions and move upstream in wet season, as a result of increased water depth and availability of vegetation. They can consume between 5% and 10% of sea grass and spend most of the day feeding (Marsh *et al.*, 2011). Water temperature and availability of aquatic vegetation affect the distribution pattern of African Manatees across its population ranges (Deutsch *et al.*, 2003). Perrin (2001) reported that African Manatee (*Trichechus senegalensis)* inhabit the coastal marine, inland wetlands and estuarine habitat as well as fresh water rivers and creeks in the West coast of Africa. They are also found in flooded forests, lakes and shallow coastal water (Awobamise, 2008).

Aquatic resources conservation faces many threats ranging from habitat degradation,

overexploitation, negative human-wildlife interactions to mention but few (Daszak *et al.*, 2000). The most significant mortality factor of Manatee in West African is illegal hunting and it is still a common practice (Reeves *et al*, 1988). About 15-25% of all species may become extinct in response to anthropogenic activity by the turn of the century (Ogada *et al.*, 2012). Human activities were reported as the major cause of over 30% of 4000 mortality of manatees in the Florida River in United State of America (Bolen, 2000). Excessive hunting of manatee for reasons other than the products they provide is a major threat to their survival across their ranges (Angelici *et al.*, 2001). African manatee has been reported to eat crops cultivated by human in flooded agricultural areas and destruction of fishing nets (Dodman *et al.*, 2008). These led to negative perceptions of manatee and to their killing in retaliation (Silva and Araujo, 2001).

The African Manatee is the least studied of all sirenians, and its status across much of its range is only poorly known. Data paucity and financial limitations hinder effort to conserve African Manatee and their habitats in developing countries (Antonio *et al.*, 2003). West African manatees have been listed by the IUCN as Vulnerable (IUCN red list 2011), which means that the species is facing a high risk of extinction in the wild. More specifically, by IUCN assessment there are fewer than 10,000 manatees in West Africa of which 30% or more are highly likely to vanish within ninety years (Lefebvre *et al* 2000). The rapid increase in human population and the resultant increase in the socio-economic activities of the people in this area necessitate a study of the ecology of the African Manatee in order to evolve adequate conservation strategies for this interesting aquatic mammal. Therefore, this research aims to assess the Occurrence Pattern of African Manatee in the Coastal areas of Ondo State which will help in further inventory and conservation of the species.

MATERIALS AND METHODS

Study Area

The study was carried out in the coastal areas of Ondo State located in the Southwestern region of Nigeria. It lies between Latitude 5^0 $50^{'}$ N - 6^0 $09^{'}$ N and Longitude 4^0 $45^{'}$ E - 5^0 $05^{'}$ E. Ondo State coastline is about 180 km. The total area covered by the watershed is over 2000$km^{2.}$ It comprises of four local government areas. Okitipupa local government is the most populated local government in this study area with population of 234,138 of land mass of 803 km^2. They are Ikales speaking people. Ilaje local government has an area of 1,318 km2 and is the largest local Government in Ondo State in terms of its landmass with a population figure of two hundred and seventy-seven thousand and thirty-four (277, 034). They belong to Ilaje ethnic group. Ese-Odo local government has an area of 762 km2 and a population of 154,978 and comprises of Ijaw and Apoi ethnic groups. While Irele Local Government is the least populated with population of 145,166 and has an area of 963 square kilometres. They are also Ikales speaking people (National Population Commission, 2006) (Figure 1). Commercial activities in the area are carried out in speedboats and canoes used for transportation of goods and people while fishing and agriculture are the main activities of local residents. (Kabir O Abass *et al.*, 2020).

Climate and Biodiversity

Generally, the riverine areas experience a tropical climate consisting of both wet (April to October) and dry seasons. During the wet season, the average rainfall index is about 3000 mm while the mean temperature is 28^{o}C. The average rainfall index for the dry season is 800 mm with a mean temperature of 32^{o}C (Agunbiade *et al*, 2010). The area is drained by many perennial streams and rivers, that traverse several settlements of the coast, and empties into the open ocean through estuary with exchange of water between the coast and coastline (Agunbiade *et al*, 2010). Mangrove swamp is the dominant vegetation type in this area, especially the red mangrove *Rhizophora racemose an*d the white mangrove *Avicennia spp* typical of swamps. A striking feature of vegetation in this area is the desiccation induced by marine water incursion into about 10,000 hectares of freshwater swamp Forest (Olorunlana *et al*, 2013).

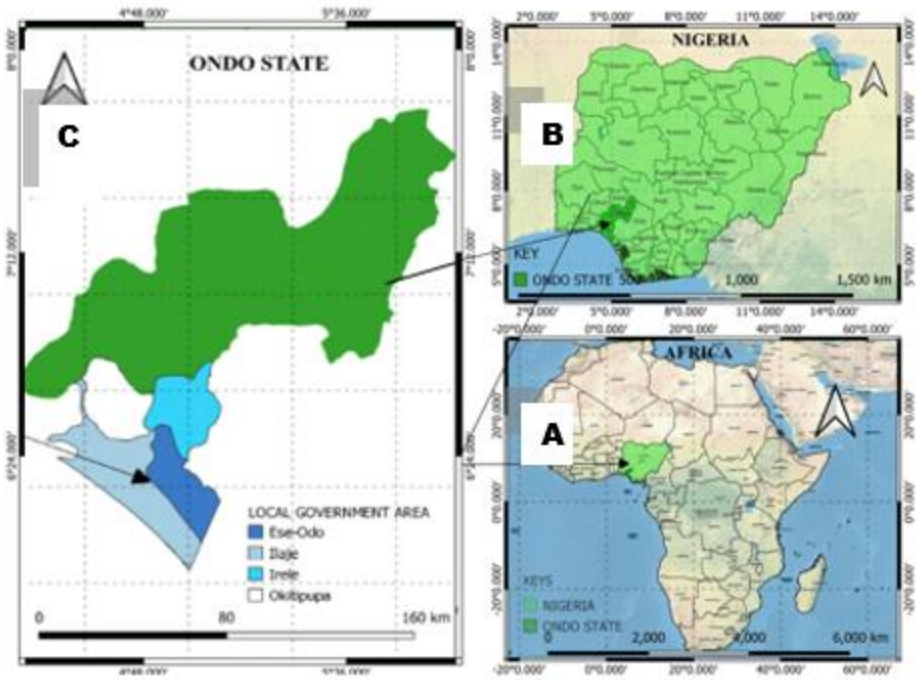

Figure 1:

A: The location of Nigeria in Africa,
B: The location of Ondo State in Nigeria,
C: Map of the study area, showing the Local Government areas in the coastal area of Ondo State, Nigeria.
Source: Field survey, 2021.

Method of Data Collection

In order to assess the occurrence of African Manatee in the area, first conducted reconnaissance survey among the fishermen in the communities who regularly us the coastline and potentially encounter the Manatee. This method is appropriate in assessing relative abundance of some rare species and has been used to assess other wild mammal abundance in hunting terrestrial system (van der Hoeven *et al.*, 2004).

Focus group discussion: A total of 51 Focus group discussions were conducted among fishermen across the communities in the four local government areas. Interviewees with more than 10 years of fishing experience were selected. Subjects relating to whether a respondent has ever seen a manatee before in the area, main activities engaged in, types of fishing gear, any problems with manatees in their daily life activities, how they generally perceived the manatee and what do they do to mitigate manatee-associated problems. A local interpreter was employed to translate the questions into Ijaw language during the discussion among the Ijaw communities in the study area.

Direct Field Observation: To map where the Manatee occurs in the coastal ecosystem, and to confirm information collected from the local experts, we conducted a walking transect along the banks of the rivers from 5:00 am to 6:00 pm each day and using speedboat/canoe on the water bodies was employed. This involve staying and walking along the river banks to observe manatee activities as well as possible threats. The survey was carried out both during day (to look for manatee and signs of their presence) and night (to look for active individuals) using headlamp and torch (Figure 2).

Well-structured Questionnaire: To understand the perceptions of the fishermen on manatee presence in the study area, a questionnaire survey with 100 respondents from 17 communities was conducted. The survey communities and respondents were selected purposively, based on proximity, access and occupation in the target community (Etikan, 2016). The questionnaire

had several questions about the demographic profile of respondents, distribution and pattern of occurrence of African Manatee and the threat factors associated with African Manatee in the area. The information collected was analyzed descriptively and information on focus group discussions was presented thematically. The GPS coordinate taken was processed using GIS tools mainly to generate manatee distribution map in the study area.

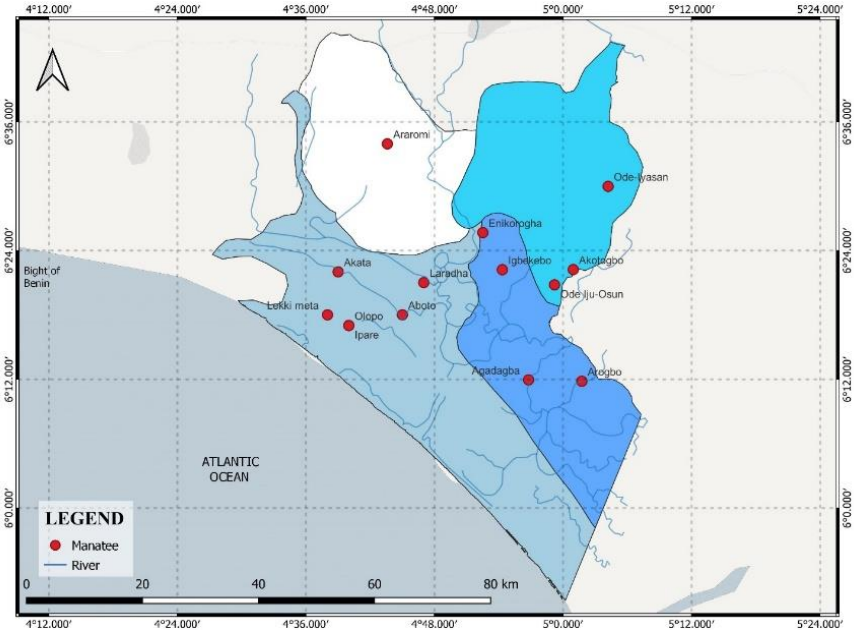

Figure 2: Spatial distribution of African Manatee in the study area.

RESULTS

Distribution and Patterns of Occurrence of African Manatee in the Coastal area of Ondo State.

Table 1 reveals that 57 (57.0%) of the respondents normally see manatee in their areas especially among the Ijaw communities in Ese-odo and Ilaje local government areas. 30 (30.0%) of the respondents said they have seen manatee in their area More than 5 years, 23 (23.0%) of the respondents said they have seen manatee Once in a year while 10 (10.0%) of the respondents said they often seem manatee Once every week. From the research, 42 (42.0%) of the respondents usually sight manatee most in the morning, 23 (23.0%) of the respondents usually sight manatee most in the night while (10.0%) of the respondents usually sight manatee anytime of the day. In addition, almost all the respondents (64, 64.0%) stated that they usually sight manatee most during the rainy season this was followed by 27 (27.0%) of the respondents usually sight manatee during the dry season while 9 (9.0%) of the respondents stated that they usually sight manatee in both seasons. Figure 3 present the habitat type where manatees are seen most by the respondents. Rivers were ranked highest followed by Coastlines, Lakes, and Mangrove estuary.

Table 1: Distribution and pattern of occurrence of African Manatee in the Coastal area of Ondo State

VARIABLE	Frequency	Percentage
Sighting of Manatee in the area		
Yes	57	57.0
No	43	43.0
Frequency of sighting manatees		
Once every week	10	10.0
Once every month	22	22.0
Once in six months	15	15.0
Once in a year	23	23.0
More than 5 years	30	30.0
Period of sighting Manatees		
Morning	42	42.0
Afternoon	13	13.0
Evening	12	12.0
Night	23	23.0
Anytime	10	10.0
Seasonal sighting of Manatee		
Rainy season	64	64.0
Dry season	27	27.0
Both	9	9.0

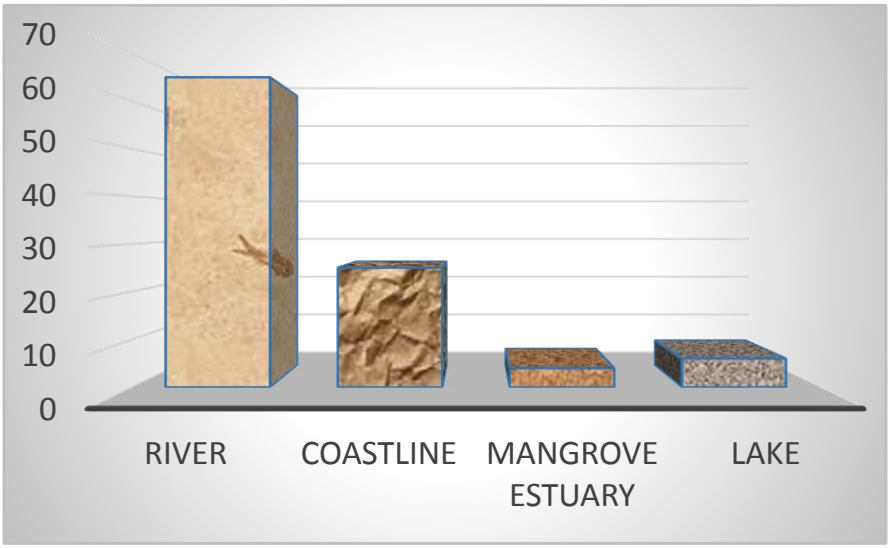

Figure 3: Habitat type of African Manatee in the Coastal area of Ondo State.

Indices of African Manatee in the study area. The result (Table 2) of the Focus group discussions revealed that African Manatee occurs along the major rivers in the coastline communities. Its activity was observed directly and indirectly through indices such as dungs, grazed vegetation, ripples on water surface, sound production especially along river Oluwa and its tributaries in the study area (Figure 3 and 4).

Table 2: Sign of Indices of African manatee in the study area.

Indices	Means of Identification	Subjective response	Objective response
• Manatee dung	Field Observation and Focus group discussion	71% of the respondents agreed to have seen manatee dungs in the area while 29% of the respondents said they have not seen manatee dung before.	5 manatee dungs was observed by using speedboats and canoe on water surface at Agadagba and Olopo rivers.
• Grazed vegetation on water surface	Field Observation and Focus group discussion	71% of the respondents agreed to have observed manatee grazed on vegetation on water surface while 29% disagreed.	45 grazed vegetation areas was observed through walking transect along the river banks at Aboto, Igbokoda, Ipare,Olopo, Arogbo, Igbekebo, Akotogbo, Iju-Osun, Araromi, Oloto and Erinje
• Damaged net	Field Observation and Focus group discussion	18% of the respondents agreed to have observed manatee destroying fishing net in the area while 82% of the respondents disagreed.	68 damaged nets was observed through walking transect along the river banks at Aboto, , Olopo, Arogbo, Erinje Igbekebo, Akotogbo,Araromi, Oloto, Ipare,Ode-Iyansan, Akata, Enikorogha, Igbokoda Igbotu, Iju-Osun Agadagba and Ipare.
• Ripple on water surface	Field Observation and Focus group discussion	77% of the respondents agreed while 23% were undecided.	2 ripples on water surface was observed through walking transect along the river banks Akata and Arogbo.
• Sound produce while grazing	Field Observation and Focus group discussion	41% of the respondents agreed while 59% were undecided to sound production by manatee while grazing.	1 Sound production while grazing was observed through walking transect along Arogbo river banks

Figure 4: Grazed Vegetation at River Aboto in Ilaje.

Figure 5: Damaged nets at Igbokoda in Ilaje.

Value of African Manatee in the local communities

The result revealed that all the respondents affirmed that manatee is used as food, source of income generation. There is also a cultural value attached to manatee. Most of the respondents acknowledged that manatee also serves as symbol of honour and prestige to any hunter that killed it. In addition, different parts of manatee are used for traditional medicines (Table 3).

Table 3: Value of African Manatee among the local communities

L.G.A/USES	Meat	Income generation	Symbol of prestige	Aphrodisiac	Oil for treatment	Production of whip
Ilaje	100.0%	85.0%	80.0%	80.0%	60.0%	75.0%
Ese Odo	100.0%	98.0%	100.0%	85.0%	82.0%	100.0%
Irele	85.0%	60.0%	55.0%	50.0%	60.0%	50.0%
Okitipupa	75.0%	55.0%	50.0%	20.0%	25.0%	20.0%

Threat factors Associated with African Manatee

The result (Table 4) of the field observation and Focus group discussions reveals that direct hunting and Accidental capture are major threats to African manatee sustainability in the study area (Figure5)

Table 4: Threat Factors associated with African Manatee in the study area.

Threats faced	Means of Identification	Subjective response	Objective response
• Direct hunting	Field Observation and Focus group discussion	71% of the respondents agreed that direct hunting is a major threat to manatee while 29% of the respondents were undecided.	Not encountered during survey.
• Accidental catch	Field Observation and Focus group discussion	65% of the respondents agreed while 35% were undecided	2 manatees were caught in nets by fishermen survey.
• Noise pollution	Field Observation and Focus group discussion	12% of the respondents agreed while 88% of the respondents were undecided.	This was observed in 12 coastline communities during the survey.
• Killed by insect	Field Observation and Focus group discussion	12% of the respondents agreed while 94% were undecided.	Not encountered during survey.
• Boat/canoe collision	Field observation and focus group discussion	18% of the respondents agreed while 82% were undecided to sound production by manatee while grazing.	Not encountered during survey.
• Sand mining		6% of the respondents agreed while 94% of the respondents disagreed.	15 sand mining sites was observed through walking transect along the river banks

Figure 6: A fisherman holding bones of manatee

Figure 7: A manatee killed at Ipare-Olopo

DISCUSSION

The result of the study shows that African Manatee are mostly found in freshwater habitat in major rivers across the four local government area this is consistent with Powell (1996) who reported that manatee is found manatee occupies the coastal zones, lagoons of estuary, the big rivers from brackish to freshwater. Manatees are normally sighted during the day especially among the Ijaw and Ilaje communities this is because they are predominantly good fishermen and majority lives along the coastlines this agree with the finding of Keith (2019) that manatee can travel either by day or by night to feed.

The African Manatee are used for both consumptive (food, traditional medicine) and non-consumptive (cultural/religious activities, pets and ecotourism) purposes this is consistent with Mondolfi and Muller (1979) that the major use of manatees in Venezuela has been for meat. Soewu (2008) reported that the common dilemma facing all fauna species is the soaring demand for their body parts for the use of medical practices. The bones of Manatees are traditionally use to increase strength of newborn baby. Still (2002) reported that the demand created by the traditional medicine is one of the causes of the over exploitation of population of numerous animals' species.

It is evident from this study that direct hunting, accidental capture and noise pollution are the major threats facing African Manatee in the study area this is consistent with Silva and Araujo (2001) that manatee is still hunted illegally in its entire distribution area but contrary to Husar's (1978) statement that in much of the African Manatee's range the impact of hunting is difficult to ascertain because the animals are now mostly protected and hunting is done secretly. Carter and Rosas (1997) reported that one of the greatest threats to the species is human population growth, which may lead to an increase in the number of riverine communities and, hence, to habitat changes. This agrees with the findings of Bolen (2000) who identified the loss of manatee habitat and changes in their behavior pattern as a result of encroachments due to human activities along their preferred habitats but inconsistent with the finding by Wright *et al.,* (1995) in Florida that Watercraft collision is the largest cause of human-related Manatee mortality. Schuhmann (1995) reported that incidental by-catch is the most significant threat to manatee in Guinea-Bissau. Other threat factors such as sand mining, construction, inadequate law enforcement and habitat destruction affect manatee.

CONCLUSION

African Manatees population is widely distributed in the major rivers across the coastal areas of Ondo State and they are facing serious

threats due to overexploitation and habitat destruction. There is no conservation education and awareness programme about the ecological significant of manatee in the regions. For effective management, there is need for community participation in the formulation of policy as well as effective communication strategy and incentives to the local community.

RECOMMENDATIONS

From the results, these are recommended;

i. Conservation Education, particularly those focusing on Manatee conservation and research should continue monitoring as this will aid effort to understand threat facing the species and best mitigation measure to use in the local communities.
ii. At key Sites, provision of environmental education to local communities to reduce threats and train stakeholders to strengthen legal protection of manatee.
iii. Production of national action plans for manatee conservation and strengthen government capacity to manage manatee/otters in protected areas.
iv. Implementation of a habitat rehabilitation plan for recovery and restructuring of some banks and vegetation cover in order to stabilize condition and improve access to suitable habitat parameters such as food, cover and space for manatee.

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