Title: Status of small cetaceans in Nigeria

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ABSTRACT

Widespread distribution and occurrence of the two major cetaceans (whale and dolphins) have been observed in the Nigerian coastal waters. They have been frequently sighted by small scale artisanal and industrial fishermen, marine mammals observers (MMO) and other scientists from their various crafts or platforms (canoes or vessels) in the near shore coastal waters or deep sea (>2500m). In one of the few quantitative reports, 277 sightings were recorded between November 2007 and December 2009 and comprised of 187 (68%) for whales and 88 (32%) for dolphins. The herds included both adult and young calves. The movements were sometimes associated or identified with various activities including breathing/blowing of water, feeding (mainly at night), bow riding and others. There was no record of directed catch and were rarely caught or entangled in the nets. The physico-chemical parameters were within tolerable limits to support the survival of cetaceans and other living organisms. However in a trawl fishing survey conducted in 2009, large volume of non biodegradable solid waste was observed up to 100m depth. Conservation of the resources and the maintenance of biological diversity are paramount and activities on ecosystem approach to fisheries (EAF) involving all stakeholders have commenced. It is also very important to promote regional and international collaboration and cooperation in order to address issues such as poaching and illegal, unregulated and unreported (IUU) fishing.

INTRODUCTION

Nigeria lies between latitudes $4^{o}16'$-$13^{o}52'$N and longitudes $2^{o}96'$-$14^{o}37'$E. It has a coastline of 853km which borders the Atlantic Ocean in the Gulf of Guinea. It has a maritime surface area of 46000km^2 between 0 and 200m water depth. In 1978 Nigeria declared 200 nautical miles Exclusive Economic Zone (EEZ) which covers an area of 210,900km^2 over which it has sovereign rights for the purpose of exploiting conserving and managing its fisheries resources. The area has remained largely the same except for the recent extension of the edge of the continental shelf to over 300nm.

The area which lies in the West Africa sub-region with a rich biodiversity contains diverse assemblage of fish, shell fish (shrimps, crabs, lobster, gastropods and cephalops), reptiles (sea turtles) and marine mammals (cetaceans) and other living organisms. In contrast to the fish and shell fish resources which have shown signs of over-exploitation, the whales and dolphins have remained largely unexplored and unexploited. Management measures are proffered for maintenance of marine environmental cleanliness and biological diversity.

DISTRIBUTION AND STOCK STRUCTURE

Out of the 5 major groups of marine mammals only two i.e. cetaceans (whales, dolphins and porpoises) and sirenians (manatees) occur in Nigeria.

There are about 10 whale species belonging to 4 families – Physeteridae, Kogiidae, Balaenopteridae and Ziphidae (Jefferson *et. al.* (1993). The species include sperm whale

and short-finned pilot whale. In addition seven dolphin species belonging to one family Delphinidae have been observed to be widely distributed in the coastal waters of Nigeria. Dublin-Green and Tobor (1992) reported the occurrence of the toothed whales, the Odontocedi and the common dolphin, *Dolphin delphis* in the Nigerian and offshore waters.

ABUNDANCE

There is a dearth of quantitative data on the abundance of the cetaceans in the coastal waters of Nigeria. They have been frequently sighted in the coastal water by bystanders on the beach or fishermen and scientists when operating on board canoes and fishing or research vessels.

Available data from sighting of whales and dolphins during the conduct of Marine mammals observers (MMO) project between November 2007 and December 2009 showed that out of 277 sightings, whales were sighted 187 (68%) times while dolphins were sighted 88 (32%) times. Out of 1666 individuals or specimens recorded dolphins constituted 80% and whales 20%. Whales occurred mainly between June/July and December, while dolphins occurred throughout the year.

Plate 1: Some pictures of the Humpback whales recorded during MMO project.

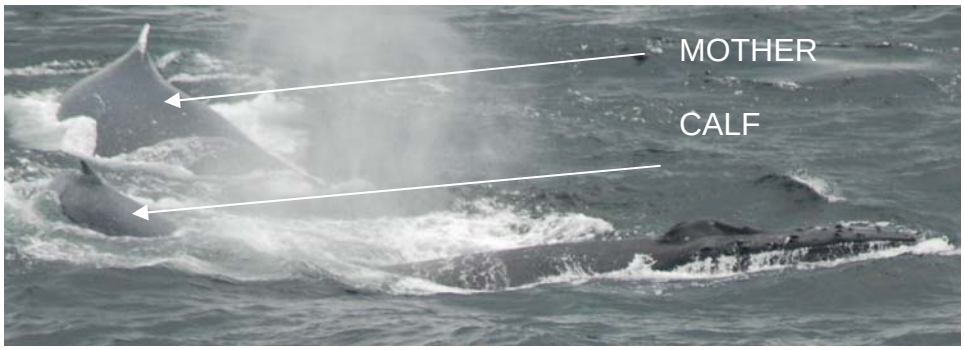

Plate 2: Picture of mother and her calf together with another member of the group

DIRECTED AND INCIDENTAL TAKES

There was no record of directed or intentional capture method targeted at the cetaceans by either the artisanal small scale or industrial fishermen. Moore et. al (2010) observed that the cetaceans were rarely caught or entangled in the fishing nets or gear of the artisanal or industrial fishermen. The artisanal fishermen maintained that it was dangerous venture to capture whales which could result in capsizing of the canoe apart from the damage to the nets. The dolphins were observed to be very smart and avoided the nets.

Currently the industrial fleet is made up essentially of shrimp trawlers for targeting demersal fin fish and shrimps in the **inshore** coastal waters mainly between 10 and 50m depth. About 156 vessels were registered in 2009 mainly for targeting shrimps with large volume of fish as by-catch. The catch was mainly constituted of very large percentage of small size juvenile fish as shrimps by-catch which was an indication of over-fishing. Nigeria is turtle excluder device (TED) compliant. All the industrial shrimp trawl nets are fitted with TEDs which basically allow the endangered sea turtles to escape if caught in the net during trawling operations. It is apparent that large fish species and marine mammals will also escape if encountered.

HABITAT DEGRADATION

During a trawl survey of the coastal waters conducted by the NIOMR, Lagos, Nigeria, astronomically high volume of solid waste/debris was recorded against the mega-fauna fish catch at a ratio which ranged between 4 : 1 and 8 : 1 respectively (Solarin *et. al* 2010). Solid waste/debris sometimes recorded more than 68.81 % of the trawl catch in some hauls up to 100m depth. This was due to indiscriminate dumping of solid wastes including non biodegradable nylon and plastic products and household items as shown in Plate 3. Awosika *et. al*.(1995) reported about half tonne of debris/solid waste in beach clean up exercise.

Plate 3. Solid wastes hauled up by trawl net.

There were indications that the loss of biodiversity was being accentuated or exacerbated by continuous habitat degradation caused by uncontrolled commercial fish/shrimp trawling. For each trip, each vessel fitted with 2 - 4 nets trawl for 2 – 3 hrs before the nets were hauled up and the trawling operations were conducted both day and night for 45 – 55 days non stop. Lokkerborg (2005) mentioned that physical disturbance from trawling affect the benthic assemblage mainly through re-suspension of surface sediments. Pollution of the environment from accidental oil discharge had also been reported.

LIFE HISTORY

There are no detailed reports on the 2 major groups of cetaceans i.e. endemic and migratory species which occur in Nigerian coastal waters. The life history invariably depends on many factors which include but not limited to suitable oceanographic conditions, availability of food and conducive environment to raise the young ones. The herds were observed to contain both adult and young calves. MMOs sighted whales 339 times made up of 83% adults and 17% juveniles or young calves. Dolphins were sighted 1327 times made up of 46% adults and 54% juveniles.

ECOLOGY

Several ecological factors govern the abundance of fish, shell fish stocks off Nigeria. Climatic cycles for example determine seasonal and annual river discharge fluctuations and their silt load. Resulting there from, the Niger – Benue complex and its numerous distributaries interrupt the coastline forming expansive delta, characterized by a 10000 km^2 mangrove system. The extensive estuarine interface constitutes the spawning and

nursery grounds for many marine, brackish and fresh water species. Nigeria has a diversity of some 199 species from 78 families in the brackish and marine habitats. The coastal fish resources include the demersal and pelagic fish resources. The demersal fish are classified into 3 main faunistic groups up to 400m depth and included mainly the croakers, threadfins, soles and bigeye (Dublin-Green & Tobor 1992; Solarin *et. al.* 2010). The shell fishes include shrimps, lobsters, crabs and mollusks (gastropods, bivalves and cephalopods). Offshore pelagic resources include tuna and tuna-like fishes viz.: the skip jack, yellow fin tuna, frigate tuna and sword fishes which have remained largely unexplored and unexploited.. The endangered sea turtles include the leatherback, loggerhead, hawksbill, olive ridley and green sea turtles.
Table 1 shows the physico-chemical parameters of the coastal waters which were within tolerable limits for the survival of living organisms. In some other study, temperature as low as $6.0^{O}C$ was recorded at 500m depth.

Table 1. Range of physico-chemical parameters of the coastal waters up to 100m depth

Physico-chemical parameters	Data
Water temperature	25.0 – 34.5 ^{O}C
Air temperature	28.0 – 31.0 ^{O}C
Sediment temperature	21.0 – 30.0 ^{O}C
P^{H}	8.27 – 8.53
Conductivity (mS/cm)	46.7 – 53.5
Salinity	30.4 – 34.9 ppt.
Dissolved Oxygen	2.4 – 8.8 mg/l
Transparency	3.4 – 22.4m

The currents also play important roles in the abundance, distribution and migration of cetaceans. In general, climate change will also affect the stocks.

STATUS

There is need to conduct a comprehensive survey on the occurrence, abundance and distribution including quantitative stock assessment in order to determine the current status of the cetaceans and their potentials for future survival. The marine mammals observation project should involve quantitative measures and collection of data and information for protecting marine mammals from adverse effects of seismic and related activities as indicated by Madsen *et. al*. (2006).

CONCLUDING DISCUSSION

There is need for NIOMR to acquire a multipurpose fisheries and oceanographic vessel for regular and seasonal research activities in both the territorial and the high seas. International cooperation and regional collaboration should be encouraged for resources survey and enforcement of regulations including the introduction of vessel monitoring systems (VMS). Poaching should also be curbed as well as the need to deter illegal, unregulated and unreported (IUU) fishing practices. Nigeria is committed to national policies and guidelines as well as international agreements, instruments and legal

framework that will ensure sustainable development based on proper management of the resources and the environment in order to meet the needs of the present and future generations.

Biodiversity conservation and/maintenance have positive correlation and are intricately intertwined with the sustenance of the livelihoods of fishermen in coastal communities; the loss of the former invariably leads to the loss of the latter. Loss of biodiversity exacerbated by habitat degradation by trawling and pollution of the environment from accidental oil discharge and indiscriminate dumping of solid non biodegradable wastes should also be addressed through all stakeholders' based ecosystem approach to fisheries (EAF) management.

REFERENCES

Awosika, L. R., Folorunsho, R., Isebor, C., Adegbie, A. T. and Dublin-Green, C. O. (1995) 1994 International beach clean up exercise at the Bar Beach, Lagos, Nigeria. NIOMR Tech. Pap. No. 98 14pp.

Dublin-Green, C. O. and Tobor, J. G. (1992). Marine resources and activities in Nigeria. NIOMR Tech. Pap. No. 84 25pp.

Jefferson, T. A., S. Leatherwood and M. A. Webber (1993). FAO species identification guide. Marine Mammals of the World. FAO, Rome 320pp.

Lokkeborg, S. (2005). Impacts of trawling and scallop dredging on benthic habitats and communities. FAO Fisheries Tech. Pap. No. 472, 58pp.

Madsen, P. T. , M. Johnson, P. J. O. Miller, N. A. Aguillar Soto, J. Lynch and P. Tyack (2006). Quantitative measures of air-gun pulses recorded on sperm whales (Physeter macrocephalus) using acoustics tags during controlled exposure experiments. J. Acoust. Soc. Am. **120** (4) : 2366 – 2379.

Moore, J. E., T. M.Cox, R. L. Lewison, A. J. Read, R. Bjorkland, S. L. McDonald, L. B. Crowder,, E. Aruna, I. Ayissi, P. Espeut, C. Joynson-Hicks, N. Pilcher, C. N. S. Poonian, B. Solarin and J. Kiszka (2010) An interview-based approach to assess marine mammal and sea turtle captures in artisanal fisheries. Biological Conservation Vol.143:795-805.

Oyebanji, M. O., Olwajoba, E. O., A. B. Williams and A. Y. Gadzekpo (2008). Marine Mammals Observation Project 2008 NIOMR Ann. Rep. pp 35 – 45.

Solarin, B. B., A. B. Williams, Hamzat, M. B., A. Rabiu, O. R. Oguntade, D. A. Bolaji and M. Oramadike (2010). Report on survey of fish and other living resources of the Nigerian coastal waters conducted between 14th April and 6th June 2009. NIOMR, Lagos. 57pp.