

Ecological monitoring and conservation initiatives for the protection of endangered fish in Lake Kanyaboli



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Introduction

The fish stocks in Lake Kanyaboli has been declining in the recent past due to a lot of anthropogenic activities. This project aimed at carrying out monitoring within this important satellite lake and promoting community involvement in its conservation. This is part of a continuation of the 1st RSG grant provided by Rufford (2014) that established the inaugural monitoring in the lake. Through the project we managed to establish local networks of different target groups and stakeholders. We continued to empower the Fish Conservation Committees (FCCs) through training and involvement in surveys and monitoring.

Recent history of fishes in the larger Lake Victoria basin illustrates an alarming pace and magnitude of change. The fishery of the lake that once boasted of hundreds of endemic species, now relies mostly on smaller fishes such as *Rastineobola argentea* and the introduced Nile perch and Nile tilapia. The cannibalistic Nile perch is threatening to destroy not only itself but also the entire lake ecosystem.

It has therefore been the recommendation from scientists and conservationists to assess and monitor the species richness and ecological significance of the little known lakes which have now become a refuge and conservation parks for endangered fauna.

Biodiversity in Lake Kanyaboli is both highly diverse and of great regional importance to the survival and livelihoods of the riparian community. Nevertheless, development activities are not harmonious with conservation activities of this resource and its unrepresented in any developmental planning process. This therefore creates an unprecedented result of not being one with nature and leads to unsustainable development. The natural biodiversity is therefore threatened from the anthropogenic activities resulting from development and lack of local community representation. One of the main reasons for lack of representation is inadequate data and information on the status, trend and distribution of the biodiversity. Therefore, our project set out to assess and monitor the endangered and native fish species.

Monitoring and survey of fish stock in Lake Kanyaboli

Method

The sampling sites covered in this study is shown in Fig. 1 below. Four sampling sites were demarcated around the lake. This was done by looking at specific parameters such as distance from the fish land point, shaded areas, possible spawning zones and deep lake areas. The survey was done using boats while fish samples were obtained using gill nets, hand nets and beach seines. The fish were identified and measured using a measuring board. Transparency and water depth were measured using a secchi disc (30 cm diameter).

Results and discussion

In our results of the fish stock we found that site 1 was dominated by *Xystichromis phytophagus* (32%) and *Lipocchromis maxillaris* (19%). Only 5% of *Haplochromis phytophagus* was recorded in site 1. Similar to site 1, *Xystichromis phytophagus* (39%) dominated while the population of *Oreochromis esculentus* and *Oreochromis variabilis*. These two species had the lowest population density in all the four sites. These two fish species are categorized as endangered and this

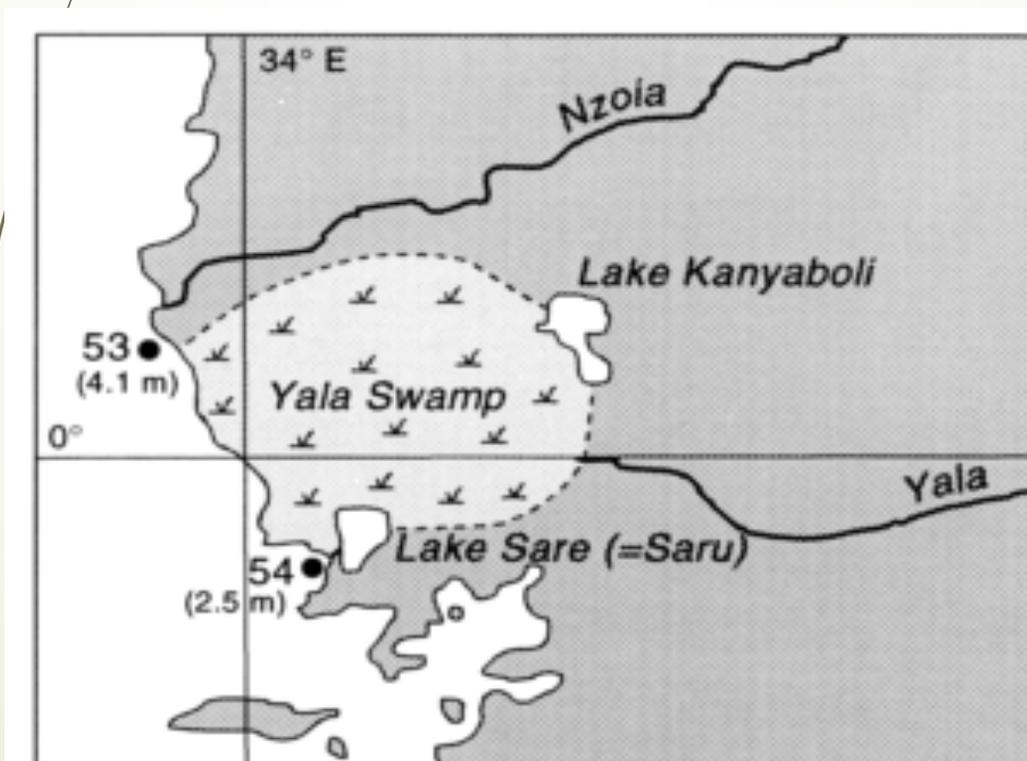
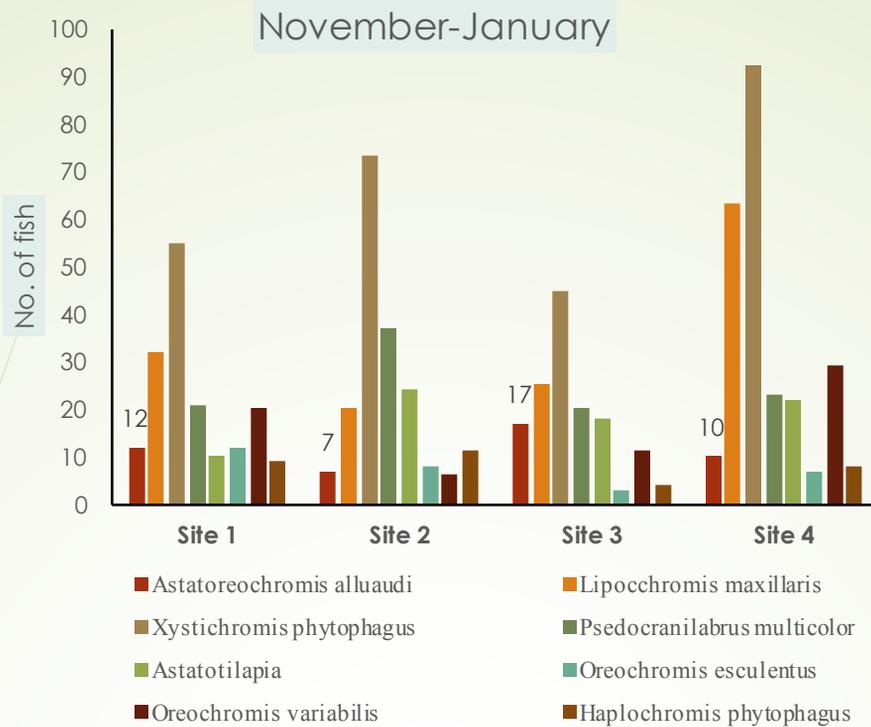


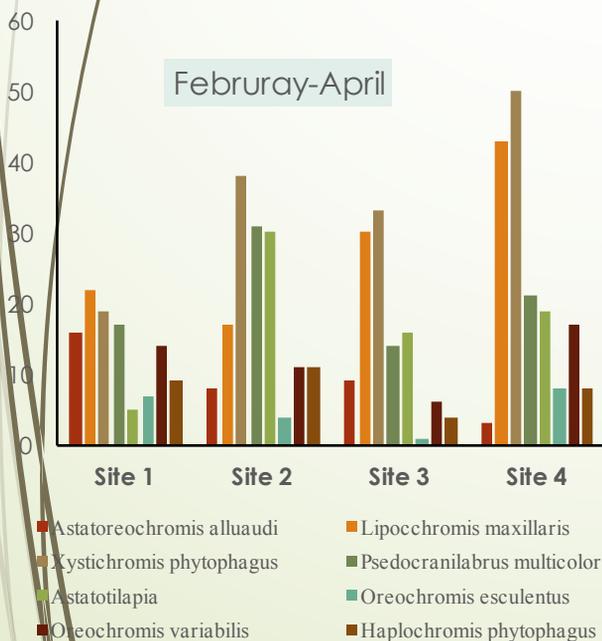
Fig 1: Map showing the Lake Kanyaboli ecosystem



therefore signifies the low population density in the lake. Many fishermen say its really been difficult to get any catch of the two species in the last 15 years.

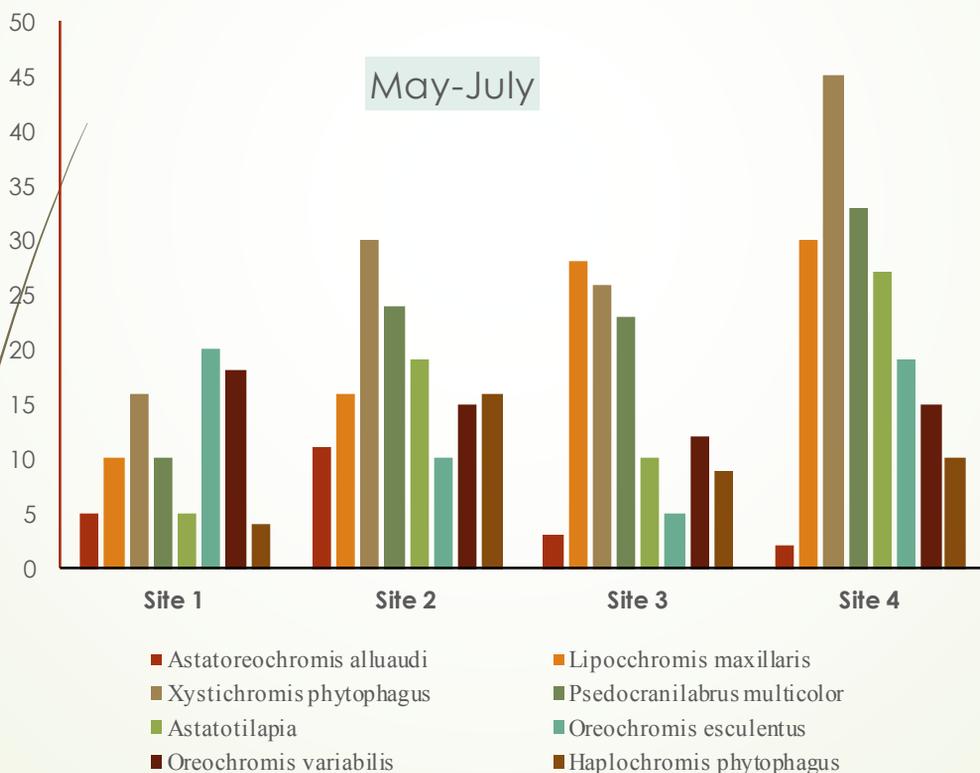
The higher fish catch was mostly in the deep waters and shaded areas of the lake.

We were also able to record higher catches in areas with zooplanktons and phytoplankton. *Astatoreochromis alluaudi* was commonly found in the catches and was found to be present in many sampling areas where all water bodies inhibited by Haplochromines and this was attributed to food chain links.



From the sampling we did not record any Nile perch in the lake. This could be as a result of the shallowness of Lake Kanyaboli and the size which might not be conducive for Nile perch. It is however possible that through course ways and dams, juvenile Nile perch could find refuge here. Therefore, this lake amongst other small lakes might function as a nursery ground for the main Lake Victoria fishery.

phytoplankton was mostly dominated by cyanobacteria and green algae. We were able to identify three diatom communities. Just as the one found in Lake Sare in previous research the *Cylindrospermopsis africana* was the dominant algae. This algae is of significant importance as it is known to produce toxins which causes skin irritation, affects vital organs such as kidney and liver.



Lake Kanyaboli has a rich community of phytoplanktons and zooplanktons. Previous work done on the lake shows a great diversity and health of these plants. This probably is indicative of the pristine and The lakes

Recent investigations have revealed significant changes in the chemical characteristics and phytoplankton's community of Lake Kanyaboli.

Bacillariophyta	Euglenophyta	Chlorophyta
<i>Amphora sp</i>	<i>Glenodinium pernardii</i>	<i>Chlorella</i>
<i>Closterium navicula</i>	<i>Phacus longicauda</i>	<i>Botrococcus braunii</i>
<i>Navicula spp</i>	<i>Phacis spp.</i>	<i>Kirchneriella contorta</i>
<i>Nitzschia spp</i>		
<i>Synedra ulna</i>		

The lake biomass has increased and blooms of cyanobacteria, which had always been observed in the larger Lake Victoria are now dominant. Increase in cyanobacteria is always associated with a decrease in other diatoms which indicate climatic, physical, chemical or biological processes together with anthropogenic activities. As a result of these changes indigenous fishes are now found to be declining.

Training on Ecosystem approaches to fisheries management in Lake Kanyaboli

Ecological Advantages of Ecosystem Approaches in Fisheries

1. Increased yields from aquatic ecosystems
3. Reduced impact on threatened and endangered species
4. Less habitat damage due to more attention on fishing impact on ecosystems

3. Reduced contribution of fisheries to climate change
4. Improved understanding of aquatic systems.
5. Proper networking of various stakeholders and partners.



Economic advantages

1. Higher catch
2. Reduced fishing costs
3. Higher value of fishery
4. Better livelihood opportunities for the locals in Kanyaboli
5. Reduced conflict amongst the different lake users

Management benefits

1. Better integration in management across fisheries, and with other aquatic uses
2. Improved compliance due to more community participation in management practices
3. Better balancing of multiple uses, leading to increased net societal benefits.

Training on Fish policies and gazette ment of community beaches

The fisheries sector is regulated and controlled by the Ministry of Agriculture, Livestock and Fisheries with some specific regulation related issues. The fisheries department is a national institution whose main mandate is to enforce the Fisheries Act (cap 378). The act mandates the director of fisheries to amongst other functions ensure the proper management of specific fisheries, including possibility of declaring closed seasons and/or areas, access limitations and restrictions on fishing methods, gear and the characteristics of fish that may be caught.



The community was informed that there are about 307 gazette beaches along the Lake Victoria basin while there are also some fish landing beaches that are not recognized by the government but could be well known to the communities for social activities. Gazette ment of a beach follows a procedure where inspection for the minimum requirements of social amenities is carried out. Those that qualify to be gazzeted are listed in the official government newsletter (The Kenya Gazette) and become a recognized place for landing fish.



Perceptions from the community

Most of the community members acknowledged themselves as fish mongers/traders and being very satisfied with their job. Based on the interviews and community meetings, most of the members of Kanyaboli view fish trading as a high status economic activity. Most of the fish traders say that fishing has improved their livelihood through increased income and protein intake.

The literacy levels have increased owing to the income hence availability of school fees.



Future management of Lake Victoria and conservation efforts should put into consideration for the satellite lakes such as Lake Kanyaboli. The involvement of the local community in monitoring has played a major role in the conservation of the endangered fish species and the Lake in general. We have seen a greater attitudinal change on the community shown through the response given during the monitoring and evaluation of the project. Many community members in Lake Kanyaboli now identify themselves as custodians of the lake and the fisheries in it. We believe the continued monitoring and community outreach will go a long way in conserving and preserving this pristine ecosystem.

Acknowledgment

On behalf of the project team and the community members in lake Kanyaboli we would like to thank all the partners and stakeholders who were involved in the project. Special thanks to Rufford Foundation for providing us with the financial assistance in the past two periods.

Bird species in Lake Kanyaboli

Common name

Barn owl

African fish eagle
Hamerkop
Hadada Ibis
Cattle Egret
Long-tailed cormorant
Black kite
Emerald-Spotted wood dove
Africa mourning dove
Red-eyed dove
Ring-necked dove
Nyanza swift
Speckled mousebird
Speckled pigeon
Long-crested eagle
Woodland kingfisher
Grey-headed kingfisher
Malachite kingfisher
Pied kingfisher
Africa pygmy kingfisher
African pied wagtail
Common bulbul
Africa paradise flycatcher
Red-bellied paradise flycatcher
Blue-cheeked bee-eater
White-browed robin-chat
White-browed coucal
Red chested sunbird
Black headed weaver
Specke's weaver
Black headed gonolek
Pied crow
Common fiscal
Black-headed heron
Grey heron
Green-backed heron
Squacco heron
Yellow-billed egret
Little egret
Long-tailed cormorant

Scientific name

Tyto alba affinis
Haliaeetus vocifer
Scopus u. umbretta
Bostrychia h. brevirostris
Bubulcus i. ibis
Phalacrocorax a. africanus
Milvus m. migrans
Turtur chalcospilos
Streptopelia perspicillata
Streptopelia semitorquata
Streptopelia c. somalica
Apus niansae
Coluis striatus kikuyuensis
Columba guinea
Lophaetus occipitalis
Halcyon s. senegalensis
Halcyon leucocephala
Alcedo cristata galerita
Ceryler rudis
Ispidina picta
Motacilla aguimp vidua
Pycnonotus barbatus
Terpsiphone viridis
Terpsiphone rufiventer emini
Merops percicus
Cossypha heuglini
Centropus superciliosus
Nectarinia erythrocerca
Ploceus cucullatus
Ploceus spekei
Laniarius erythrogaster
Corvus albus
Lanius collaris humeralis
Ardea melanoceph
Ardea cinerea
Butorides striatus atricapillus
Ardeolaralloides
Mesophox intermedia
Egetta garzetta
Phalacrocorax carbo lucidus