Research Progress Report

Title: Assessment of the Impact of Sanctuary Areas on Fish, Macrophyte and Macroinvertebrate Biodiversity and Productivity in Lake Malawi, Upper Shire and Lake Malombe

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1 Introduction

This research aims to assess the biodiversity and productivity of artificial sanctuaries in SEA Lake Malawi and Lake Malombe by analysing fish and macroinvertebrate diversity across three water bodies. At the same time, focusing on availability of some species (Oreochromis karongae, Bagrus meridionalis, Rhamphochromis longiceps and opsaridium microlepis) and macroinvertebrates (Bulinus succinoides, Lanistes nasutus and nyassanus, and Bellamya ecclesi and jeffreysi) which are considered endangered and trying to understand the local communities' perception towards these sanctuaries. The study investigates the effects of sanctuary size, distance from the sanctuary, water quality, and seasonality. Additionally, stomach content analysis of selected fish species is being conducted to understand dietary categories and trophic relationships.

2 Objectives

2.1 Objectives

2.1.1 Main objective

- To estimate the availability of fish, macrophyte and macroinvertebrates biodiversity and productivity in the South Eastern Arm of Lake Malawi, Upper Shire and Lake Malombe sanctuaries.

2.1.2 Specific objectives

- To assess the effect of the size of the sanctuary, distance from the sanctuary and water quality on aquatic biodiversity, distribution and productivity of the sanctuary
- To assess the effect of season on aquatic biodiversity and productivity in sanctuary areas
- To characterize the fish trophic categories of interest inside and outside of sanctuary areas
- To evaluate the local community’s knowledge, attitudes and practices towards the sanctuary management

3 Methodology

3.1 Field Data Collection

- Sampling for the first phase has been conducted across selected artificial sanctuaries in Lake Malawi, Upper Shire, and Lake Malombe.
- Water quality parameters (temperature, dissolved oxygen, pH, turbidity, phosphate, ammonia, nitrate, chlorophyll-a and conductivity) have been measured at each site.

- Fish, zooplankton and macroinvertebrate samples have been collected using a seine net, a grab and a zooplankton net.
- Fish and macroinvertebrates identification has been completed
- Data cleaning and data analysis are ongoing, with statistical modeling in progress.

Figure 1: *a) boarding for sampling, b) and c) fishing process and d) picking up macroinvertebrates from the grab sediment sample*

4 Challenges Encountered

- Price fluctuation in the perishable and non-perishable commodities for the research, hiring cost increased to triple than what was budgeted for. Logistical constraints during field sampling.

- Unforeseen weather conditions and variations in water quality affecting the sample consistency.
- We could not do a focus group discussion because it is the cultivation period, so the communities would not spare sometime

5 Next Steps

- Completion of remaining laboratory analyses for zooplankton identification and counting.
- Data analysis
- Planning the second phase of the research, which is in August,2025

6 Conclusion

Significant progress has been made in data collection and cleaning. Ongoing work will refine the results and provide insights into the value of artificial sanctuaries in the presence of these endangered species across the water bodies.

Regards
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