

Research Application Summary

**Population dynamics and impact of trawling on the population structure of four key-indicator fish species in the South East arm of Lake Malawi**

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**Abstract**

A study to assess impact of trawling on fish species population and dynamics has been initiated in Lake Malawi. Population dynamics of four indicator species will be monitored and used as a proxy indicator of the status of fishery in Lake Malawi.

Key words: Lake Malawi, indicator species, trawling

**Résumé**

Une étude visant à évaluer l'impact du chalutage sur les espèces de poissons et la dynamique de la population a été lancée dans le lac Malawi. La dynamique des populations de quatre espèces indicatrices sera suivies et utilisées comme un indicateur de la situation de la pêche en lac Malawi.

Mots clés: Lac Malawi, les espèces indicateur, le chalutage

**Background**

Lake Malawi is the most southern of the great African Rift Valley lakes lying within latitudes 9° 30'S and 14° 30'S. With an area of about 28,000 km<sup>2</sup> (Gonfiantini *et al.*, 1979; Menz *et al.*, 1995), it is the third largest lake by area in Africa. Trawling on Lake Malawi was first introduced in Area A of its South East Arm or the SEA in 1969 (Tarbit, 1972), after a series of trials showed that sufficient fish stocks existed to support a fishery industry. From that time to the present day, trawl fishing has expanded to area B and C of the SEA and now ranks as the most heavily fished area contributing over 38% of the fish landing, yet the area represents only about 5% of the lake surface. In the late 1990s fishing effort stabilized (Banda and Tomasson, 1996) but since then there has been a steady decline in catches and catch per unit effort (cpue). Biomass monitoring surveys have been undertaken in the area since the introduction of trawling but the technical limitation of the surveys (swept area methods) renders the results unreliable. Management measures instituted on the basis of the monitoring surveys results have not yielded any improvement in biomass or cpue.

To address this problem, a study of population dynamics and impact of trawling on the population structure of four key-

indicator species of the trawl fishery in this area has been initiated.

### **Literature Summary**

The main thrust of this study is to model population dynamics of the four key- indicator species. This will involve estimation of age of the fishes and calculation of growth rates. According to Ricker (1975) growth rates indicate fish production and fish spawning stock biomass. Several methods may be used including Dynamic Pool Models (Beverton and Holt, 1957) and Cohort Analysis and Virtual Population analysis (Pitcher and Hart, 1982; Gulland, 1988).

Brander (1973) provides insights of how the ageing for the 4 targeted fish species in the study could be approached. Information on aging is also provided by Chang (1982); Campana and Nelson (1985); and Turner (1996).

### **Study Description**

This study will assess how the population structure of four fish species have been impacted on by trawling in the last decade using commercial catch data as well as past research monitoring surveys data. The population parameters of the four species will be estimated and used to model and optimize their harvesting. The status of the four species will be used as proxy indicators of the status of the entire multi-species fishery in Lake Malawi.

### **Research Application**

The results of the study will be used to guide management of the multi-species deep water fishery of the south east arm of Lake Malawi. It will provide a simpler and quicker means of establishing the status of the fish species and stock.

### **Acknowledgement**

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