



# HIPE: Human impacts on ecosystem health and resources of Lake Edward.

## Exploring a poorly known ichthyofauna



Eva Decru, Maarten Van Steenberge, Annelies Heylen, Nathan Vranken, Steven Bouillon, Alberto Borges, Jos Snoeks

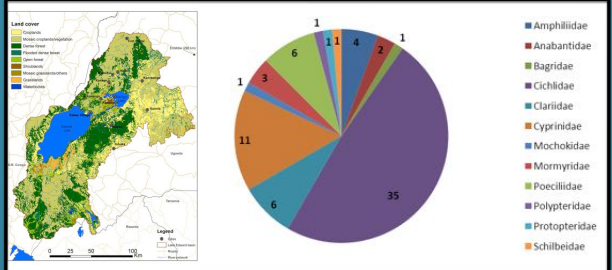


With 2325 km<sup>2</sup>, Lake Edward is the smallest of the East African Great Rift Lakes. It is connected to the smaller and shallower Lake George through the Kazinga channel and both lakes are often treated as a single system. The lake is shared between Uganda and the Democratic Republic of the Congo. Lake Edward is unique amongst the East African Great Lakes as its shoreline is completely surrounded by protected areas. The East African Great Lakes support one of the most important inland fisheries worldwide, providing food and livelihood for millions of people. In the region, Lake Edward stands out due to its high productivity. While the fish fauna of many of the other lakes has been examined to some degree, the diversity, biology and ecology of the ichthyofauna of the Lake Edward system, however, remains largely unknown.

The last decades, the fishery in Lake Edward seemed to have collapsed, especially along the Congolese lakeshore. This decline was not observed to the same degree along the Ugandan side. Besides an increased fisheries pressure, this might be caused by the decimation of the local *Hippopotamus* population, which mobilises large amounts of nutrients into the aquatic system. The decline was especially noticeable in the economically most important species, causing the fishery to shift towards smaller, economically less valuable species. These mostly belong to the endemic *Haplochromis* species flock, which contain up to 90, mostly undescribed, endemic species.

To investigate the causes of this decline, and to gain a better understanding of the recent and past functioning of the ecosystem, a multidisciplinary approach will be used combining biology, ecology, biogeochemistry, and socio-economics. A study of the lake's fish fauna will be performed and preliminary results hereof are presented below.

### ICHTHYOFAUNAL DIVERSITY



Map of the Lake Edward system and species diversity by fish family. Cichlids comprise almost half of the described fish diversity.



The main fisheries target species: Top right to bottom left: the high-value *Oreochromis niloticus* is being replaced by the smaller-sized *Oreochromis leucostictus*; the lungfish, *Protopterus aethiopicus*, and the catfishes *Clarias gariepinus* and *Bagrus docmak* are the main predators in the system; *Moryrus kannume* and *Labeobarbus altianalis* seemed more vulnerable to overfishing and anthropogenic disturbances.



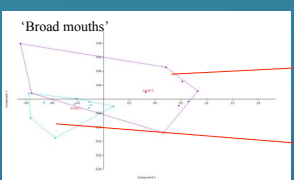
In a nearby crater lake, introduced guppy, *Poecilia reticulata* and crayfish *Procambarus clarkii*, threaten the native *Haplochromis* fauna

### THE HAPLOCHROMIS SPECIES FLOCK

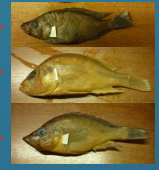
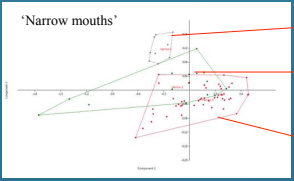
The Lake Edward system might contain up to ninety species of *Haplochromis*. Currently, only 30 species have been listed and most of these are probably misidentifications. A revision of this species-rich group is ongoing.



Some representatives of the Lake Edward *Haplochromis* fauna, illustrating its diversity



Lake Edward *Haplochromis* species can be classified into several trophic groups. Amongst them are the piscivores, of which previously only two species were recorded: *H. squamipinnis* and *H. mentatus*. Morphological analyses suggested the presence of at least five distinct species in two main groups: 'broad mouths' (two species) and 'narrow mouths' (three species).



At least six species of Lake Edward *Haplochromis* were found having hypertrophied lips. These were classified into two trophic groups: insectivores (three species) and paedophages (at least three species). Species in the latter group feed on the young of other mouth brooding *Haplochromis*.

