Fish diversity and fisheries of Omo-Turkana Basin in the face of hydrological modifications

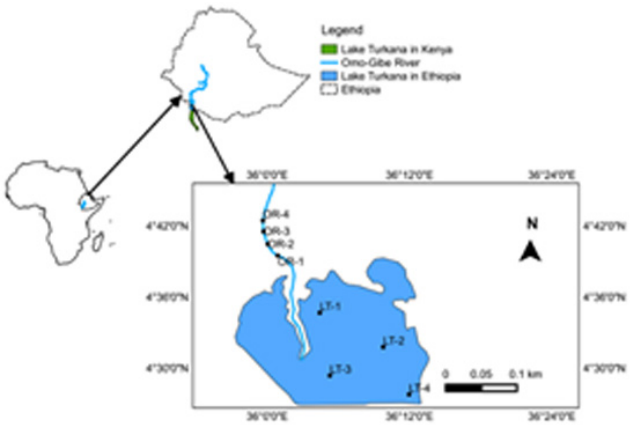
The basin of the Omo River and Lake Turkana spans a large portion of southwestern Ethiopian highlands and northern Kenya. It is presumed to be rich in its fish diversity that supports considerable fisheries. However, despite the widespread development activities with potential hydrological modifications and impacts on the ichthyofauna, the Ethiopian part of the basin generally lacks comprehensive scientific documentation on its fish diversity and fisheries.

To address these gaps, fish were sampled from lower Omo River and Lake Turkana in Ethiopa. Structured questionnaires, focus group discussions, key informant interviews, and personal observations were used to gather data on the fisheries socio-economics and management problems.

The study recorded 79 valid native species for the entire basin and 69 for the part of the basin within the Ethiopian jurisdiction. The Omo River system was found to be richer in species, while Lake Turkana has a higher abundance.

This fertile fishing ground provides a key alternative livelihood for the riparian community (particularly, the Daasanach in Ethiopia), which has much fewer livelihood options apart from pastoralism. However, effective development of fisheries is marred by lack of material and technical support to the fishers, lack of government commitment to capacitate relevant institutions, illegal fishing, and lack of security due to conflicts arising between the Ethiopian and Kenyan fishers in an apparent competition over a fertile fishing ground.

A solution to the development of fisheries therefore requires an approach that integrates conflict resolution and co-management arrangement by the two countries. Moreover, it is highly imperative to capacitate and sustain the scientific roles of the Lake Turkana Advisory Group, a team of professionals from various institutions in Ethiopia and Kenya established in 2019 and supported by the African Center for Aquatic Research and Education. Its goal is to pursue a collaborative, holistic, and integrated approach to a more comprehensive assessment of the basin biodiversity and its management to guide the nations' policy development and actions.



Sampling sites on the lower Omo River (OR1–OR4) and the Ethiopian part of Lake Turkana (LT1–LT4); the reference datum used for geographic coordinates is WGS84.

By Mulugeta Wakjira, Jimma University, and Abebe Getahun, Addis Ababa University, Ethiopia. Detailed findings are published in Check List and Ecohydrology & Hydrobiology.

In the benthos: Bottom-up biodiversity in the Great Lakes

Every great lake has thousands of contributing streams and rivers, and each stream is inexplicably connected to the land around it. Throughout these connected systems is the benthos, a rich ecological community that includes macroinvertebrates that play an important role in ecosystem functions through interactions with the environment. Aquatic invertebrates have different levels of tolerance to water quality, a characteristic that offers a useful tool in biomonitoring assessment and restoration. Diversity measures provide an indication of ecological condition and are useful in understanding the effects of anthropogenic stressors on stream environments.

My research explored the best methodology to sample macroinvertebrate diversity in 19 headwater streams in southwestern Ontario. I hypothesized that a petite ponar grab would sample a better representation of the macroinvertebrate community composition instead of a D-framed sweep net due to stream characteristics resembling a wetland. However, I found that taxa richness was greatest using the D-framed sweep net and results better reflected the biodiversity of the stream.

Although the D-framed sweep net provided a greater diversity, the water quality at the sites ranged from poor to very poor as indicated by the Hilsenhoff Biotic Index. These degraded scores were due to the presence of tolerant taxa. Typically, a stream with good water quality would have greater macroinvertebrate diversity; however, as these results indicate, macroinvertebrate tolerance plays a large role in ecological condition as well.



Sampling macroinvertebrates in Silver Creek, Ontario. Photo by Shayenna Nolan.

In the Healthy Headwaters Lab founded by Dr. Catherine Febria, longer-term local insights into benthic communities are laying the groundwork for new theory to be tested on how restoration strategies can be designed to address negative or unhealthy attributes of resistance and resilience in streams and rivers (Barrett et al. 2021). In continuing to explore macroinvertebrate biodiversity, greater insights can be gained into the assessment, condition, and restoration in systems.

By Alyssa Frazao, Healthy Headwaters Lab, University of Windsor.