Assessing the ecological habitat condition of *L. kungweensis*

Methods

To evaluate the anthropogenic factors that endangered the existence of *L. kungweensis*, field surveys were carried out. Two survey sessions were conducted each week, covering every landing site used by artisanal fishermen. The surveys were performed in collaboration with village leaders, fisheries officers, and local inhabitants. In addition, the ecological habitat condition of the fishing sites was determined *in situ* by measuring turbidity, dissolved oxygen concentration (DOC), chlorophyll-a (ChloA), salinity, and average depth. These water quality parameters were assessed as proxies for habitat condition (Henley et al., 2000). Turbidity and ChloA were measured using a turbidimeter and a fluorimeter, respectively. The DOC, pH, and salinity were measured using a multiparameter probe, while the average water depth was recorded using a calibrated stick. Water samples were collected in 1 L plastic bottles to analyse indicators of eutrophication (nitrate and orthophosphate) in the laboratory using a spectrophotometer.

Summary of results

The measured physico-chemical parameters of twelve landing site in Lake Tanganyika indicate good overall water quality across the sampled sites. The pH and alkalinity values confirm a stable, well-buffered aquatic environment. Dissolved oxygen concentrations are sufficient to support fish and invertebrate populations, while low BOD_5, nitrate, and phosphate levels suggest minimal organic and nutrient

pollution. The chlorophyll-a concentration reflects moderate primary productivity, consistent with an oligotrophic to mesotrophic ecosystem. Low turbidity and TDS values further demonstrate the lake's relatively pristine condition, although localized human activities near urban and riverine inflows could cause periodic fluctuations. Overall, these results suggest that Lake Tanganyika maintains high ecological integrity, with water quality parameters remaining within international standards for aquatic life and human use.

Parameter	Unit	Mean ± SD	WHO/FAO Guideline	Environmental Interpretation
Temperature	°C	25.9 ± 1.4	20–30	Within the optimal range for tropical lake ecosystems.
pH	—	8.2 ± 0.2	6.5–8.5	Slightly alkaline, suitable for most aquatic organisms.
Electrical Conductivity (EC)	µS/cm	248 ± 22	<750	Indicates moderate mineralization typical of large rift lakes.
Dissolved Oxygen (DO)	mg/L	6.5 ± 1.0	>5	Adequate for aerobic aquatic life; suggests low organic loading.
Turbidity	NTU	9.3 ± 2.8	<25	Water remains relatively clear with low suspended solids.
Total Dissolved Solids (TDS)	mg/L	156 ± 15	<500	Within permissible limits for freshwater systems.
Nitrate-Nitrogen (NO_3^-–N)	mg/L	0.74 ± 0.20	<10	Low nutrient concentration, indicating minimal agricultural runoff.
Phosphate-Phosphorus (PO_4^{3-}–P)	mg/L	0.11 ± 0.04	<0.5	Low phosphorus load, suggesting limited eutrophication.
Chlorophyll–a	µg/L	3.4 ± 1.1	<10	Reflects oligotrophic to mesotrophic productivity.
Biochemical Oxygen Demand (BOD_5)	mg/L	2.7 ± 0.5	<5	Indicates low organic pollution levels.
Alkalinity	mg/L $CaCO_3$	98 ± 12	20–200	Moderate buffering capacity against pH changes.
Salinity	‰	0.15 ± 0.03	<0.5	Confirms freshwater characteristics.