

## ORIGINAL ARTICLE

# Comparing the fish assemblages and food-web structures of large floodplain rivers

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#### Abstract

1. The Upper Zambezi, Kavango and Kwando are large floodplain rivers with substantial biodiversity, providing water and ecosystem services to a large tract of southern Africa. These rivers differ in hydrological regime. The Upper Zambezi and Kavango rivers are in flood for 4 months (March, April, May, June) while, in the Kwando River, floods are later and last for 1–2 months in July and August. The Upper Zambezi River has the largest annual flood pulse, followed by the Kavango River, while the Kwando River experiences small and unreliable floods. During years of exceptional flooding of the Upper Zambezi and Kavango rivers, the rivers are interconnected at peak flows and therefore share a common ichthyofauna. This provided a natural experiment to investigate the responses of fish communities comprised of the same species to differing flood regimes by comparing the fish assemblages and food-web structures between rivers.
2. Fish assemblage structure was characterised by analysing biomass catch per unit effort data collected using gillnets in all water-level seasons for all three rivers. Whole ecosystem-stable isotope data collected once from each river were used to examine differences in food-web structure and fish feeding ecology between rivers. Due to temporal differences in hydrology, the Upper Zambezi and Kavango river food webs were characterised during the low and falling water seasons, while the Kwando River food web was sampled during the rising water season.
3. In the Upper Zambezi and Kavango rivers, fish assemblages varied with hydrological season due to the homogenising influence of the flood pulse, while in the Kwando River fish assemblages did not change seasonally.
4. The Upper Zambezi River food web had a restricted nitrogen range (NR = 0.90), with a reduced food chain length and predators did not occupy elevated trophic positions compared to those in the Kavango and Kwando river food webs (NR = 1.05 and 0.97 respectively). The Kwando and Kavango rivers are less exploited than the heavily fished Upper Zambezi River, where fishing has reduced the abundance of primary and tertiary consumers, potentially resulting in the observed reduction in food chain length. The Upper Zambezi and Kavango river food webs were based on differing basal resources compared to the Kwando River food web. The Upper Zambezi and Kavango river food webs were