

**O26.3****Subtropical estuarine ecosystem function during drought conditions: case study of two South African estuaries**

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**Abstract**

Provision of socio-economic and ecological goods and services by estuaries is dependent on all biological components functioning effectively within naturally variable environmental conditions. Global change is predicted to alter the natural variability of environmental conditions experienced by estuaries, such as rainfall patterns, potentially impacting ecosystem functioning. This study aimed to investigate and compare the ecosystem functioning of two subtropical South African estuaries, uMlalazi Estuary, a permanently open system, and uMdloti Estuary, a temporarily open/closed system during drought conditions. *In situ* data and literature-derived information were used to construct seasonal empirical food web networks for each estuary. We holistically assessed estuarine ecosystem functioning by examining food webs as energy networks of trophic connections ('interactions') between species or functional groups ('nodes'). Through the use of computational system analysis tools (e.g. Ecosystem Network Analysis (ENA)), ecosystem metrics based on the interactions between nodes were calculated, providing insight into the functioning of the ecosystems. Results of ENA analysis showed that the two ecosystems responded differently to similar drought conditions. uMdloti Estuary ecosystem size increased during periods of rainfall. However, there was no significant change in ecosystem structure and function between seasons, indicating that the ecosystem is temporally stable. The uMlalazi Estuary ecosystem size remained the same between seasons, however, cycling of energy, flow diversity, and overhead increased during periods of low rainfall. Both ecosystems are shown to be detritivory-based food webs, indicating a degree of stability and higher resilience to perturbations. The different responses of each ecosystem to drought conditions may be as a result of each ecosystems unique hydrological, physiochemical, and anthropogenic stress conditions. The current understanding of unique ecosystem responses to drought conditions, together with regional predictions of global change scenarios, enable forecasts of global change impacts on these ecosystems to be made with greater confidence.

**Keywords**

ecosystem network analysis, estuarine ecosystem function, drought conditions, global change