Effect of environment changes on the fish community structure of the St Lucia Estuarine system (South Africa) during continued drought conditions.

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St Lucia, the largest estuarine lake system in Africa has been closed since 2002 due to drought conditions. Since then the system has experienced several periods of extreme low lake levels and hypersalinity with only brief periods of marine access due to natural (cyclone) and anthropogenic (artificial connection) activities. This study investigated the effect of these environmental changes on the fish community structure over the last 15 years. Sampling was conducted at six sites in the system using seine nets. Spatial changes in the community were driven by the salinity gradient across the system, while temporal changes coincided with major changes in the salinity state. Five community groupings were identified using cluster analysis; (i) a hypersaline period before mouth breach in 2007 and (ii) a marine dominated system after, leading into another (iii) hypersaline period in 2009/10, (iv) higher water levels with lower salinities followed up to the (v) opening of the beach channel which connected St Lucia to the marine environment via the Mfolozi Estuary. Over the study period, marine species dominated in terms of species number, but freshwater and estuarine species dominated the fish abundance, notably Oreochromis mossambicus and Ambassis ambassis. During periods of low lake levels and hypersalinity, marine fish species diversity was greatly reduced, while O. mossambicus was found in abundance in all parts of the system. Natural and artificial connections to the marine environment allowed the system to partially fill with marine waters restoring the natural salinity gradient and also allowed for recruitment of marine species back into the system. These brief periods showed that the lack of connectivity with the marine environment had the biggest impact on the fish assemblage and a regular, more extensive connection is therefore needed to maintain healthy estuarine and off-shore marine fish populations.