

The potential for a fish ladder to mitigate against the loss of marine–estuarine–freshwater connectivity in a subtropical coastal lake

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ABSTRACT

Increasing water demand in coastal regions has resulted in the construction of weirs and barrages in coastal freshwaters. These form barriers to migrations of estuarine and euryhaline marine fishes and crustaceans. This study assessed the impact of loss of marine–estuarine–freshwater connectivity caused by a weir at the outlet of Lake Mzingazi, a coastal lake on the subtropical east coast of South Africa. Facultative catadromous estuarine and euryhaline marine fishes were most affected by the weir, which blocked their upstream migration. These fishes were absent in the lake and were prevented from accessing potential nursery habitat. Crustaceans were less affected by the outlet weir. Salinity tolerances of most penaeid prawn species occurring in southern African estuaries prevent penetration into freshwater reaches of connected systems. Movements of palaemonid prawns which either spawn in or have larvae dependant on estuarine water, and the marine spawning brachyuran *Varuna litterata*, were not completely impeded by the weir. These species have larvae and juveniles that can climb over the weir in its present form. Historically, the lake served as an estuarine nursery and its physico-chemistry and habitats still offer viable and valuable habitat to estuarine species. There is therefore great potential value in installing a fish ladder at the lake outlet that can be used by juvenile fishes and crustaceans. Re-establishing marine–estuarine–freshwater connectivity here will reinstate a natural migration route that has been impeded for over 70 years and partially restore the ecosystem to its original state.