The marine fish assemblage of the East Kleinemonde Estuary over 20 years: declining abundance and nursery function?

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Human impacts have depleted species and habitats in estuaries. Although continuous long-term data is needed to better define the extent of change and identify their causes, data series are often insufficient to determine whether ecological change is directional, rather than random fluctuations, or part of a cyclical change. Few long-term monitoring programmes have dealt with estuarine ecosystems, particularly microtidal estuaries. In order to address this, marine fishes in the intermittently open East Kleinemonde Estuary, in the warm-temperate Western Indian Ocean, were sampled using seine nets over a twenty year period between 1994 and 2014. Analysis of this 20-year dataset reaffirmed the importance of mouth state and habitat availability as drivers of abundance for marine fish in this estuary and other microtidal estuaries. The marine opportunist species composition in the East Kleinemonde Estuary remained fairly similar over the 20 year period, with seven species comprising over 90% of the catch each year. As in earlier decadal studies of the fish assemblage, inter-annual changes in the abundance of some species could be attributed to habitat availability and mouth state. The overall species abundance follows a cyclical pattern with two to three years of low abundance and two to three years of high abundance. This pattern was evident for the first 15 years of the study, but it was only with 20 years of monitoring that overall declines in species abundance became apparent, with consistently low catches of almost all marine species recorded. This may be related to variability in rainfall (and subsequently mouth state), habitat loss and overfishing. Determining the exact causes of ecological change is, however, challenging in estuarine systems because human and natural perturbations often interact. Further monitoring is required to determine if this trend has continued and it is recommended that long-term monitoring in estuaries should span multiple decades in order to detect directional changes in the fish community.

Submission themes: Critical habitats and Environmental and climate vulnerability