When do coastal inlets become estuaries?

By

Alan Whitfield

South African Institute for Aquatic Biodiversity (SAIAB)

South Africa has more than 100 coastal inlets, most of which arise from streams flowing from small catchments in the immediate surrounding hills. The vast majority of these inlets do not even have names, and the structure and functioning of these systems has never been investigated on either a national or international basis.

In July 2015 a team of scientists from SAIAB, SAEON, NMMU and RU began a comprehensive study of 10 of these systems in the central part of the Eastern Cape Province. Based primarily on size, five of these systems have been provisionally classified as micro-inlets and five as micro-estuaries. Seasonal sampling in each system covers all the major biotic categories, from birds, fish, zoobenthos and zooplankton to aquatic macrophytes, epipsammic microalgae (diatoms) and phytoplankton. Apart from detailed physico-chemical measurements in each system on each sampling occasion, the scientists will also be able to draw on hourly recordings of salinity and temperature data using submerged automatic loggers installed by Dr Shaun Deyzel (SAEON Elwandle Node) that are uploaded every three months.

A tentatively identified Eastern Cape micro-inlet (upper photo) and micro-estuary (lower photo) respectively.

The collecting of bird information is being led by Prof Tris Wooldridge (NMMU), the fish data by Prof Alan Whitfield (SAIAB), the invertebrate sampling by Prof Renzo Perissinotto (NMMU), with the botanical components being co-ordinated by Prof Janine Adams (NMMU), Dr Lucienne Human (NMMU) and Dr Tatenda Dalu (RU). In addition, Ms Lyndle Naidoo and Mr Mandla Magoro are conducting their MSc and PhD studies on the macrophytes and overall ecosystem functioning respectively.

Some of the key questions to be addressed by this project include;

- What are the distinctive features of micro-inlets and micro-estuaries from a physico-chemical and biological perspective that can be used to distinguish them from other estuary types?
- How do spatial and temporal variations in physico-chemical properties influence the abundance and distribution of the biotic components in the two coastal inlet types.
- What is the current ecological status and likely susceptibility of these small systems to anthropogenic influences such as farm dams, weirs and localised pollution events.

At the conclusion of this collaborative project in 2018 we should also be able to define the position of both micro-inlets and micro-estuaries in the range of aquatic ecosystems on the South African coast. We should also be able to answer the fundamental question – when and under what conditions does a micro-inlet become a micro-estuary?

Some of the ‘micro-team’ discussing sampling strategies at one of the Eastern Cape coastal inlets.