



Sue Matthews

An angler heads for her fishing spot at the Gamtoos River estuary.

Estuaries Management – TURNING A CONSERVATION VISION INTO REALITY

The development and review of a set of estuary management plans for Western Cape estuaries are the first steps in ensuring the conservation of these unique ecosystems for future generations. Sue Matthews reports.

The departmental restructuring announced with the appointment of President Jacob Zuma's cabinet - which saw components of the Department of Water Affairs & Forestry (DWAF) and Department of Environmental Affairs & Tourism merge into a new Department of Water and Environmental Affairs (DWEA) – was a

positive step for South Africa's estuaries, given their dependence on riverine input. This was the general consensus among estuary scientists and managers attending a workshop in June to review the estuary management plans (EMPs) developed for six pilot estuaries as part of the CAPE Estuaries Programme.

CAPE – the Cape Action Plan for People and the Environment – is a partnership programme that aims to conserve and restore the biodiversity of the Cape Floristic Region's terrestrial, freshwater and marine environments, while delivering significant benefits to the people of the region. The programme is hosted by the South African National Biodiversity

Institute (SANBI) at Kirstenbosch in Cape Town, but much of its funding over the past five years has come from two grants from the World Bank and UNDP – via the Global Environment Facility (GEF) – totalling US\$14-million.

As one of CAPE's 23 signatory partners, the provincial conservation authority, CapeNature, took responsibility for the Estuaries Programme, overseen by programme coordinator Pierre de Villiers. The first phase of the programme has come to an end, marked by the review workshop and the cessation of GEF funding. One of the first outputs during this phase was a regional conservation plan prepared by Anchor Environmental Consultants, which rated temperate South African estuaries on the basis of biodiversity importance, ecosystem health, and economic costs and benefits. At the same time, a Generic Framework for Estuarine Management Plans was compiled by the CSIR, as well as nine supporting Guideline documents by various authors.

These were developed in accordance with the proposed National Estuarine Management Protocol outlined in the new National Environmental Management: Integrated Coastal Management Act, which identifies the need for EMPs to coordinate estuary management at a local level. The Act has been more than a decade in the making, its Green Paper having been published in 1998 and the Act finally only gazetted in February of this year – with a date for its implementation yet to be announced.

“Estuary management is a practical process, with no right or wrong. It’s about coming up with a vision that is acceptable to all stakeholders, finding ways of achieving that vision and implementing them.”

“When the CAPE Estuaries Programme was designed, it was presumed that the Act would be in force by the time the EMP development process began,” says De Villiers. “What has happened is that we’ve essentially ended up testing the implementation of the processes that will be necessary to develop EMPs, and our Generic Framework and Guideline documents can now assist with the drafting of the National Estuarine Management Protocol.”

The usefulness of the Generic Framework was gauged by applying it in the development of EMPs for six pilot estuaries in the Cape Floristic Region – those of the Olifants, Klein, Heuningnes, Breede, Knysna and Gamtoos rivers. For each estuary, the EMP development process was initiated with a desktop situation assessment, covering aspects such as the biophysical and socio-economic environment, the exploitation of living resources, water quality and quantity issues (resource directed measures), legal requirements and institutional structures. Apart from providing

the necessary background information, the situation assessment will be a useful baseline document for five-yearly State of the Estuary reports.

Six different consultancy teams conducted the situation assessments, and then organised workshops with stakeholders to launch the development of the EMP. Each process began by defining a vision of how stakeholders saw the estuary, both now and in the future. The vision needed to be inspirational, but at the same time realistic and achievable, and was designed to ensure that the strategic objectives and management actions subsequently identified for the EMP would help to reach the common goal. It also needed to be in line with the overall vision set for the CAPE Estuaries Programme, which states that: “The estuaries of the Cape Floristic Region will continue to function as viable systems which are beautiful, rich in plants and animals, attract visitors, sustain our livelihoods and uplift our spirits”.

An Estuarine Zonation Plan – a map of the estuary showing its geographical boundaries, important biophysical features, and zones identified for conservation, recreation and development – was ultimately drawn up as a tangible product of the EMP. In addition, an estuarine management forum was set up for each estuary to oversee the implementation of the EMP. The forums are made up of representatives of all relevant government authorities at the national, provincial and local level, as well as stakeholder groups.



A channel cuts through a saltmarsh at the Olifants River estuary on the West Coast.

The Pilot Estuaries Management Programme

The six pilot estuaries have a range of different management issues that need to be addressed, but the process of doing so is guided by the Generic Framework, which provides a consistent format for the Estuary Management Plan. Contentious issues or encouraging aspects in each estuary are highlighted here.

The **Olifants estuary** on the West Coast ranks among the country's top five estuaries in terms of conservation importance. The consultants therefore recommended establishing a marine protected area in the estuary, with zones allowing for different activities. Gill-netting, which targets haarders (mullet) but has a high bycatch of juvenile line-fish, would be banned from the mouth to 12 km upstream. Marine & Coastal Management had earlier indicated that gill-net fishing would be phased out in all estuaries countrywide, but the consultants had brokered a compromise to allow activity to continue in the upper reaches of the estuary, in light of the fishery's importance here. However, the local fishing community has objected to the proposal.

The **Klein estuary** at Hermanus is popular for recreational activities such as dinghy sailing, windsurfing, canoeing and waterskiing, but swimming has been banned due to faecal pollution from leaking sewers. In addition, artificial breaching takes place to protect the adjacent low-lying properties from flooding. To avoid compounding these

problems, the spatial implications of the EMP have been integrated into the local municipality's Spatial Development Framework in the 2011 review. The interest generated in the EMP development process, together with the municipality's commitment, has encouraged the environmental NGO WWF to fund a newly created position for an estuary manager to oversee this and the neighbouring Bot and Onrus estuaries.

The **Heuningnes estuary** near Cape Agulhas – the continent's southern tip – is the smallest of the six estuaries. Its mouth is kept open artificially by Cape Nature, which manages the De Mond Nature Reserve encompassing the lower part of the estuary. This management strategy is in line with a long-standing agreement with local farmers, whose land was flooded in the past when the mouth closed during periods of low flow due to shifting sand. Sensitive wetland habitat occurs on these farmlands, where it is threatened by grazing and other agricultural activity. A more holistic approach to estuary management is therefore needed.

The **Breede estuary** benefits from well-established stakeholder involvement through the Lower Breede River Conservancy, which employs a team of law enforcement officers to oversee compliance with the Marine Living Resources Act and local bylaws passed by the Swellendam Municipality. In addition, various monitoring studies are being conducted by the CSIR, MCM and

DWEA. It is anticipated that these initiatives will facilitate implementation of the EMP, which includes measures to protect sensitive habitats and rehabilitate degraded areas.

The **Knysna estuary**, better known as Knysna Lagoon, is managed by SANParks, so the EMP has been drafted as a Low-level Operational Plan according to the planning format used by SANParks for protected areas. As such, the EMP covers the water area only, and does not address highly sensitive saltmarshes away from the main water body. Although SANParks has provided input to Knysna's recently revised Spatial Development Framework, proper integration with the EMP is required if the estuary is to be protected from further development impacts.

The **Gamtoos estuary**, close to Jeffrey's Bay in the Eastern Cape, is renowned as a prime location for catching large dusky kob – a species so overfished that its population is now less than 5% of its historical breeding stock. A proposal to limit kob angling to a catch-and-release fishery met with opposition from local angling clubs, so it was agreed that effort would instead focus on better enforcement of the existing legislation, which stipulates a bag limit of one kob per day when caught in estuaries and from the shore east of Cape Agulhas. The interest generated by this issue meant that the Gamtoos Estuarine Management Forum was the first to be established.



“We need to build capacity to develop estuary management plans and implement them, both on the ground, at local level, and in the provincial and national departments that need to play a part.”

“In any one estuary, there’s probably four or five government bodies, each with very specific roles to play,” says De Villiers. “It may be appropriate for the local authority to chair the forum and drive the EMP, but representatives of provincial and national government departments must attend to ensure their particular mandates are fulfilled.”

Stakeholder involvement is also considered crucial for the successful implementation of the EMP. “Estuary management is a practical process, with no right or wrong. It’s about coming up with a vision that is acceptable to all stakeholders, finding ways of achieving that vision and implementing them. And you can adapt as you go if necessary – the idea is that the EMP is a living document, which must not be confused with a scientific one. You need science to tell you what has to be managed, you need the stakeholders to agree on a common vision, and you need the legislation to tie it all together. If you focus on any one, it’s not going to work. That’s what happened with previous initiatives, like the Eastern Cape Estuaries Programme. It was great science, but the other two aspects were missing, so there’s been very little implementation.”

Initiated in 1998, the Eastern Cape Estuaries Programme was led by the Pietermaritzburg-based Institute of Natural Resources and funded largely by the Water Research Commission (WRC). It spawned a number of research reports and popular publications, including the guideline document *Managing Estuaries in South Africa: a Step by Step Guide (WRC Report No TT 243/04)*. Although the recommendations have generally



Lani van Vuuren

The Klein estuary at Hermanus is popular for recreational activities such as dinghy sailing, windsurfing, canoeing and waterskiing.

not been put into practice, this is not to say that the research effort was wasted.

“The strategic adaptive management approach was developed and tested for estuaries on the Eastern Cape Estuaries Programme, and the same principles are now being applied in these EMPs,” says Prof Janine Adams, Chair of the WRC Board and a member of the CAPE Estuaries Programme technical working group. “In addition, a number of WRC-funded research programmes have contributed to the understanding of environmental water requirements of estuaries, and our recent review of the six completed EMPs clearly indicated that where a DWAF

environmental water requirement study had been completed on an estuary, the available information provided valuable input to the EMP. Many postgraduate students were involved with this research, so training and capacity-building has been an important aspect.”


De Villiers agrees that scientific training is vitally important, but highlights the need to train and employ estuary managers countrywide. “We need to build capacity to develop EMPs and implement them, both on the ground, at local level, and in the provincial and national departments that need to play a part,” he says. “We’ve used consultants for the

CAPE Estuaries Programme because we had to get the pilot EMPs up and running quite quickly. Since then we've already started developing another five EMPs – for the Berg, Verlorenvlei, Diep, Bot and Gouritz estuaries – and will soon be advertising another five."

"Beyond the Cape Floristic Region, however, we've liaised with colleagues at the KwaZulu-Natal and Eastern Cape parks boards, and they're now applying our Terms of Reference and the Generic Framework – which covers everything that a manager should need to develop an EMP – to their own estuaries. The main aim was to test the EMP development process to see if it works country-wide, but at the same time the managers are gaining practical experience, while

government officials and stakeholders are learning more about estuaries – and they're all talking to one another."

"So through the CAPE Estuaries Programme, we've created a massive

amount of energy and support out there at a local level. But we're at a crucial stage now, because developing an EMP is just the first step – the actual implementation is the huge task ahead!" 



The Knysna lagoon remains one of the top tourist attractions in South Africa.

SA Tourism

ESTUARIES IN SOUTH AFRICA

Estuaries are generally recognised as being partially enclosed, coastal bodies of water which are either permanently or periodically open to the sea and within which there is a measurable variation of salinity due to the mixture of sea water with freshwater derived from land drainage. These water bodies are therefore linked to a river, stream or other freshwater input on the one side and to the sea at the other.

The southern African coastline from Mozambique in the east to Angola in the west is uniquely characterised amongst Southern Hemisphere coastlines by the combination of few near shore islands, strong wave action, especially in the southern Cape, and the very small number of sheltered bays. Therefore, South Africa's estuaries are virtually the only protected coastal habitats which are able to provide an environment which combines predominantly marine or near marine salinities, shelter from wave action and relatively fine sediments. This combination is preferred by a variety of animal and plant species.



Estuaries are dynamic systems and virtually any physical or chemical feature associated with them is subject to rapid and sometimes extreme changes. The mouths of South African estuaries, unless pinned by some rocky feature, tend to meander under the influence of currents, wind and wave action and sediment movement. Under flood conditions major mouth changes involving thousands if not millions of cubic meters of sand may occur in a few hours.

The fauna and flora of estuaries are typically capable of tolerating the constant change within estuaries. Those that can tolerate the estuarine environment are often very successful and abundant in their chosen environment, e.g. sand prawns

(*Callinassa kraussi*) and mud-prawns (*Upogebia africana*), mullet and fish that feed on the bottom or eat plankton.

A feature of the life styles of a variety of estuarine species is migration. Most of the larger fish species as well as invertebrates such as the estuarine swimming prawns and the mangrove crab (*Scylla serrata*) breed at sea where salinity, temperature and oxygen availability are much more constant than in an estuary. This favours the sensitive larval stages which then, at a later stage of development, move to the estuarine nursery grounds for a time to grow and develop into mature animals before migrating back to the sea. In invertebrates such as the swimming prawns or fish like the Cape stumpnose (*Rhabdosargus holubi*) there is no return migration. Fish like grunter (*Pomadasys commersonii*) may move repeatedly between marine spawning grounds and estuarine nursery or feeding grounds as at St Lucia.

Source: www.upe.ac.za/cerm/