

EXECUTIVE SUMMARY

This report is structured around 14 contributions from various scientific disciplines, together with a synthesis section (see pages 256-260), all of which assist in understanding how the Mfolozi/Msunduzi rivers and floodplain link with the functioning of the St Lucia ecosystem. The end result is an endorsement for the relinkage of the Mfolozi and St Lucia estuaries and the implementation of measures that will reduce any excessive input of sediment from the former into the latter system.

Historical evidence from early maps and anecdotal evidence at our disposal indicate that changes in the Mfolozi/Msunduzi floodplain have had profound impacts on the Mfolozi Estuary and indeed on the whole St Lucia system. The separation of the Mfolozi from St Lucia in the early 1950s resulted in a major change in the way that St Lucia functioned. Only now are we beginning to see and experience the full implications of that separation for the well-being of the ecosystem, with the lake virtually drying out completely for the first time in living memory. However, it is not simply the loss of this riverine input to the salinity and water levels of the lake compartments that has caused the ecological 'pendulum' to swing off the scale and endanger St Lucia's World Heritage status. There are many other impacts, some of which are well documented scientifically, while others are based primarily on observation or the behaviour of models, including:

- The St Lucia mouth closes more frequently than in the past and, once closed, remains closed for much longer. Modeling of these impacts has shown that the mouth, instead of staying closed for less than 30% of the time after closure, could now remain closed for as much as 80% of the time before breaching naturally.
- River sediment dynamics are affected. Mouth closure means that, with full connection, more river sediment during the high-flow periods enters St Lucia than if the mouth was functioning naturally. Under natural mouth regimes, when the mouth is more likely to be open during wet periods, much of the river sediment would be flushed into the sea. Under closed mouth conditions these sediments may accumulate within the system.
- Marine sediment dynamics are affected. These sediments tend to accumulate inside the estuary mouth, carried in by inflowing tidal water. In the former configuration, the combined flow from the Mfolozi and St Lucia through a single mouth would have been stronger than is the case for either of the separated mouths. Thus marine sediment dynamics are likely to be very different from what they were under natural conditions.
- Sediment flushing on a large scale would have occurred whenever the combined mouth breached, especially when there was a substantial head of water at the time of breaching (estimated to have been approximately 4.6 m above MSL in one case). Separation of the Mfolozi from the St Lucia system and artificial breaching has effectively resulted in a loss of this massive scouring process in the 'bay' area.
- Biotic connectivity between the Mfolozi and St Lucia has shown that freshwater prawns can breed prolifically in the Mfolozi wetlands. Their larvae are carried into St Lucia by small floods and there are likely to be several other similar cases for other species when there is a connection between the two systems.
- Prolonged mouth closure affects recruitment and breeding of many species of fish and crustaceans. This should be seen in the context of the life histories of key taxa (*e.g.* fish and penaeid prawns). For estuary-associated marine fish species in particular, once the populations in St Lucia have been reduced or extirpated locally, it takes several years after larval recruitment for the fish populations to recover and be able to contribute to the South African marine spawner stock.

In the future it will be necessary to maintain an overview perspective where each component is seen as part of a larger whole. At this stage, the need is to consolidate existing knowledge about the Mfolozi Estuary and associated floodplain and its relationship to St Lucia, a primary goal of this report. With the most recent expert opinion condensed within this report, it is now possible to proceed with rehabilitation measures with a greater measure of confidence. In this connection, a Global Environmental Fund (GEF) grant has recently been obtained to implement remedial measures and it is hoped that this report will be of value to that initiative.

Part of the reason it has not been possible to effectively link the Mfolozi to St Lucia is that relatively little has been known about the estuarine portion of the Mfolozi/Msunduzi system and how best to create the link between it and St Lucia. This report has collated much of that information and highlighted directly and indirectly that Mfolozi connectivity is of great importance to the future of the St Lucia system. The socio-economic assessments in this report have made a start at addressing relinkage issues around the Mfolozi and St Lucia systems. They also highlight the value of the St Lucia system on a national basis and the need for more work in this area in order to convince administrators and politicians of the necessity to support bold management actions.

Individual aspects that, according to the researchers involved in the workshop, require urgent research attention are highlighted on page 259 of this report. In broad terms, attention needs to be focused on:

- The linkage of the Mfolozi to St Lucia and how to divert large quantities of fresh water northwards when the St Lucia mouth is closed.
- How to reduce sediment input into St Lucia if the Mfolozi water is diverted.
- How to maintain the biotic connection between St Lucia and the sea in as near a natural state as possible.

A number of conceptual ideas are presented in this report to help stimulate a debate that might ultimately lead to a successful management plan for this unique area. Foremost amongst these is a suggestion that the natural subsidence of the floodplain be used as a 'sink' for new sediments flowing down the Mfolozi River. Similarly, a number of useful ideas are discussed in terms of the practical re-linkage of the Mfolozi to the St Lucia system and how this may be 'managed' to a certain degree using 'soft' engineering based solutions.

The overwhelming sentiment that came through at the 'indaba', and in the subsequent printed versions of the presentations, is that the time for talking has passed and the time for action to ameliorate the extreme environmental conditions at St Lucia has arrived. The Mfolozi and St Lucia system cannot wait another decade whilst more research is undertaken – sufficient information is already available for management to implement a plan for the long-term benefit of one of South Africa's most important World Heritage Sites.