



GLENEAGLES ENVIRONMENTAL CONSULTING CC

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Mr John Pledger
Chairman: SACRAA
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16 November 2015

Re: St Lucia

Dear John

Following on from your e-mail dated 9 November 2015, I have been in touch with Bronwyn James (Senior Manager: Research, Policy & Planning) of the iSimangaliso Wetland Park Authority and she has provided me some documents pertaining to their efforts to restore the ecological functioning of the St Lucia system over the past four years. I have reviewed the documents and have provided a summary of activities and the way forward from iSimangaliso's perspective. The documents were either Background Information Documents (BID) or News Flashes that were distributed to all stakeholders, including the St Lucia Ratepayers Association. As such I am sure that most people who have a vested interest in the future of St Lucia will already be familiar with their content, that includes both past, ongoing and future initiatives.

Bronwyn is more than willing to give a public presentation on this subject if those who raised the issue with you are interested. Her contact details are 035 5901633; 0833754740; or bronwyn@isimangaliso.com.

BID 2011/03/24

This document introduces iSimangaliso's GEF funded project, which comprises three components, the first of which aims to improve the ecological functioning of the St Lucia system by bringing in freshwater from the Mfolozi catchment in the south. This will help restore balance in salinity levels, which become elevated under drought conditions and due to evaporation. It will also maintain water levels and assist in keeping the mouth open. Various alternatives are to be considered and once these have undergone a screening process, the preferred option will be implemented. At the time of publication, an initial screening of the alternatives had been undertaken and the Terms of Reference for a more detailed investigation and subsequent environmental authorization had been produced.

BID 2011/07

This document provides an overview of the historical context of St Lucia that has led to the current situation (i.e. closed mouth and isolated from the Mfolozi), and includes past interventions that have been implemented and which have failed. This overview sets the scene for the GEF project mentioned above that aims to develop a long-term solution based on the best scientific knowledge and expertise.

While the drought situation has certainly had an impact on the St Lucia system in the last decade, with little to no freshwater from its five feeder-rivers entering the estuary, the major impact has been due to the human interventions in the neighboring Mfolozi catchment. These interventions include the transformation of the Mfolozi floodplain and the separation, in the early 1950's, of the Mfolozi and St Lucia at the mouth region where they used to be joined. The loss of freshwater from the Mfolozi completely altered the dynamic of St Lucia, which relied on these flows to maintain water quality (salinity), water levels and an open mouth. Even when high water levels were experienced in the Mfolozi after the 1950's, which could have ultimately flowed into St Lucia, the Mfolozi mouth was artificially breached to prevent flooding of farmlands on the floodplain. Since 1956, the separation of the Mfolozi and St Lucia mouths has been actively maintained due to the threat posed from increased sediment loads from Mfolozi flows. The current train of thought is that this threat was overemphasized and probably not much of a risk.

Past interventions such as 40+ years of dredging, canalization of the mouth using retaining walls and dolosse, and diverting water from the Mfolozi through a canal have failed to restore the hydrological and ecological functioning, hence the reason for the GEF project to find a sustainable long-term solution. Current activities are focused on finding the best option for diverting freshwater from the Mfolozi that would allow the two mouths to join and the system to function as naturally as possible. The joined mouths should remain open except during drought conditions or particularly dry winter periods. Without the substantial freshwater inflow from the Mfolozi and under drought conditions, an open St Lucia mouth (breached and artificially maintained) would allow seawater to flow in resulting in hypersaline conditions due to evaporation and no dilution from freshwater. The result would be a chain reaction that would affect plants (they would die off and the shoreline will be eroded), fish, birds and other animals (hippos and crocodiles) as was seen between 1968 and 1972.

Thus a single strategy of keeping the mouth permanently open would not benefit the system and an alternative that allows for the restoration of the historical state (fully open, partially open and closed depending on season and flow conditions) is required. This will be the focus of the GEF project.

Newsflash July 2011

The three management strategies that will be implemented for 2011/12 are:

1. Diversion of water via the Back Channel from the Mfolozi when water levels are high and the mouth is closed.

2. Allow the Mfolozi and St Lucia mouths to join naturally if conditions allow, i.e. no active maintenance of separation. Joined mouths may be open or closed.
3. Ongoing monitoring of salinity, water levels and system health and adapting management accordingly.

Information from first two BID's are also included that outline the GEF project.

Newsflash November 2011

High water levels in the Mfolozi in the latter half of 2011 meant that up to 19 million cubic meters of freshwater had flowed into St Lucia via the back channels. However, due to threat of rising levels to farmlands on the Mfolozi floodplain, the mouth was artificially breached and flows into St Lucia were drastically reduced.

The document also refers to studies that have shown that sediment loads (silt) from the Mfolozi do not pose a as high a risk to St Lucia as originally thought and that diverted flows will in all likelihood help restore ecological functioning. Recent hydrological modelling has also shown that in the absence of Mfolozi flows into the system, it is unlikely that St Lucia will breach naturally. Restored functioning of St Lucia will pose a risk to farmlands that have been cultivated in floodplain areas as they will become flooded. iSimangaliso has urged farmers to take adequate and functional measures to mitigate flooding. AT the time of publication there were still some farmers who had not done this.

Newsflash February 2012

This document provides evidence that since the breaching of the Mfolozi in November 2011, the mouth has migrated north towards St Lucia by 330 meters. This natural process was enhanced due to high river flows and the effects of Cyclone Dando. To help the migration further there has been active removal of old dredge spoil and marine sediments that have created a berm that deflects the Mfolozi away from St Lucia. A spillway is also being established that should allow unrestricted flow from Mfolozi into St Lucia even if the Mfolozi mouth closes. Rainfall in the St Lucia catchment has meant that some feeder-rivers are flowing into parts of the system creating a reverse salinity gradient, i.e. low in areas closer to the sea and hypersaline in northern parts.

Newsflash March 2012

Water levels in St Lucia rose significantly due to high rainfall brought about by Tropical Storm Irina. Despite this and the high flows in the Mfolozi the two mouths have not yet joined and the St Lucia mouth remains closed. The artificial berm between the two systems has, however been substantially eroded and has assisted in the development of a spillway between them. The Mfolozi mouth continues to migrate northwards.

Newsflash July 2012

High summer rainfall saw the Mfolozi mouth migrate northwards to within 300 meters of the St Lucia mouth. This migration has stopped due to the approach of the dry winter season, but the situation should now allow iSiangaliso to facilitate the joining of the two systems via the spillway. However, the Mfolozi mouth needs to close before the final link can be achieved as this will allow the freshwater to flow into St Lucia. This occurred in May/June and the final excavation of spillway allowed the two systems to rejoin for the first time since 1952. Salinity levels have been lowered due to the preceding high summer rainfall and hypersaline conditions are no longer present. Water levels in St Lucia have remained steady since the link was achieved.

Special Edition News Release (BID 2012/09)

From June, when the link between the Mfolozi and St Lucia was established via the spillway, to September an estimated 16.4 billion litres of water was transferred into St Lucia while the Mfolozi mouth was closed. Heavy early-spring rains in September resulted in increased flows and the Mfolozi breached, thereby creating a link to the sea for St Lucia via the spillway connection. Water from St Lucia flowed out to sea via the spillway and the Mfolozi mouth until water levels fell below the base of the spillway. The water level in St Lucia remained the highest it had been since November 2011 and was still being fed from rivers (swollen from good spring rains) flowing directly into the system. Under natural conditions it is thought that the spillway will continue to intermittently connect St Lucia, Mfolozi and the sea depending on sea state & wave action, St Lucia and Mfolozi water levels (from their respective catchments) and tidal influence. The joined mouth should be open more often than it is closed under normal conditions.

A degree of estuarine functioning has returned with evidence of juvenile estuary-dependent fish species entering St Lucia via the open Mfolozi mouth and the spillway. Monitoring also showed that healthy numbers of birds (up to 50 000) are using the system as well for feeding (e.g. in brackish areas in the northern parts of the Lake and in shallow intertidal areas near the mouth) and breeding (e.g. white pelicans produced more than 700 chicks near Charters Creek). However, recovery will not be rapid as it requires time to recover from 60 years of isolation from the Mfolozi and less than average rainfall from the past nine years. Additional inflows will be needed before the system is able to function at a level considered to be natural and healthy.

The GEF project has entered its final phase of analyzing the selected options, identifying the preferred option and obtaining environmental authorization and is expected to take 12 months. Monitoring of the current intervention and status of the system is ongoing.

Newsflash December 2013

Following on from the successful link between the Mfolozi and St Lucia via the spillway on June 2012, good spring and summer rains have resulted in continued high water levels and a single inter-connected water body. Between October 2012 and October 2013 a total of 1 505mm of rain was recorded in St Lucia town and good rains have also fed the five

feeder-rivers that flow into St Lucia directly. The Mfolozi and St Lucia systems have been consistently joined for the past 14 months and St Lucia is once again a continuous water body. The open Mfolozi mouth has provided a connection to the sea and marine water enters St Lucia via the spillway over spring tides and some of the higher neap tides. Monitoring appears to indicate that natural processes are being restored (e.g. recruitment of estuary-dependent fish and prawn species) and that the system is recovering, with increased habitat diversity and functionality being observed.

Newsflash December 2014

Work to remove the artificially created berm of sand in the St Lucia mouth area is set to begin in 2015. This berm was created by dumping dredge spoil in the area over a 50-year period and continues to impede flows into St Lucia from the Mfolozi side. The St Lucia system experienced a dry winter season in 2014 with resultant falling water levels, but appeared to weather this well. Seawater continued to enter via the open Mfolozi mouth and spillway in early winter and from overtopping by large waves at the St Lucia mouth. Improvements in the system's condition and functioning are expected to continue as the wet summer season approaches.

Newsflash July 2015

Below normal winter rainfall for 2014 and little summer rain for 2014/15 has seen water levels in all systems in iSimangaliso drop significantly. Hypersaline conditions are once again being experienced in the northern parts of the lake. Although conditions are not as severe as during the 2002 to 2010 drought (most likely due to the relief provided by the joining of the Mfolozi via the spillway in 2012), if good summer rains are not received this season (2015/16) the situation could become desperate. iSimangaliso is on record as saying that managers will need to develop responses to the conditions currently being experienced.

Newsflash November 2015

The effects of the current drought are highlighted. In the absence of rain, freshwater inflows into St Lucia (either directly from its feeder-rivers or indirectly via the Mfolozi spillway) are non-existent. As a result, water levels have dropped, the system has become disconnected (southern sections isolated from northern areas) and hypersaline conditions have once again become established due to high evaporation rates.

The beach spillway is still in place and as soon as freshwater flows in the Mfolozi increase the connection to St Lucia should be re-established. Plans to remove a large section of old dredge spoil on the landward side of the existing spillway are underway (site establishment set for early 2016). This spoil forms a berm that restricts flow from the Mfolozi and diverts it away from St Lucia. Once removed the link will be larger and more stable, and in the absence of drought conditions it is estimated that the joined mouth should be open up to 65% of the time.

It is stressed that artificially breaching the St Lucia mouth would only serve to worsen the current situation as once the mouth closes and more water evaporates the hypersaline conditions would be exacerbated to the detriment of fauna and flora and to overall system functioning.

This update also explains the phenomenon that was observed around the beginning of the month and which was displayed in the photographs attached your e-mail John. To quote the newsflash:

“The unseasonal November storm force winds (more severe than gale force), gusting up to 110 km per hour, pushed the Lake St Lucia estuary water northwards in a standing wave known as a ‘seiche’, exposing mud banks along the Narrows and bringing into stark reality the impact of the current drought on the St Lucia Lake system. After the storm force winds ceased (4/5 November), the standing wave (seiche) broke down, water flowed back into the Narrows and levels began to rise. As the water settled back in the southern section of the Lake, boats were able to operate in the estuary again.”

The effect that was observed was therefore a natural phenomenon but the severity was enhanced by the already low water levels brought on by the drought.

Closing statements

The recovery experienced in St Lucia between 2012 and 2014 as a result of the link created with the Mfolozi and its open mouth via the spillway is evidence that this approach works. However, under current drought conditions the reduced freshwater flow from the Mfolozi has meant that the mouth has closed and no freshwater is entering via the spillway. Freshwater inflow from St Lucias own feeder-rivers has also been severely reduced. So not only has the freshwater input been lost but the link to the sea as well. This obviously has had a significant impact on the system. Artificially breaching either the Mfolozi or St Lucia mouth now will allow seawater to flow in over spring high tide periods but the mouth will soon close due to natural processes. Without freshwater input, this inflow of seawater will result in hypersaline conditions becoming quickly established due to evaporation. These conditions do not suit estuary-associated fauna and flora and will do more damage than good while drought conditions prevail.