



# REVIEW OF THE SCIENTIFIC BASIS FOR BREACHING THE MOUTH OF LAKE ST LUCIA ESTUARY



**forestry, fisheries  
& the environment**

Department:  
Forestry, Fisheries and the Environment  
REPUBLIC OF SOUTH AFRICA



**iSimangaliso**  
Wetland Park

# **Review of the Scientific Basis for Breaching the Mouth of Lake St Lucia Estuary**

**Compiled by the Independent Panel of Experts as appointed by the Honourable Minister, Ms Barbara Creecy, Department of Forestry and Fisheries and Environment**

**1 Oct 2021 – 31 March 2022**

## **EXECUTIVE SUMMARY**

The Lake St Lucia, an estuarine lake, is situated within the iSimangaliso Wetland Park, a UNESCO World Heritage Site and Ramsar Wetland of International Importance. The Lake has a long history of anthropogenic intervention including canalisation of some feeder rivers, artificial breaching and maintenance of an opened mouth, water abstraction, dredging, and changes in protection status and management authorities. In 2015 a group of researchers funded by the Global Economic Fund (GEF) produced a comprehensive report of the system and advised that anthropogenic interference regarding management of the Lake should be minimised. To facilitate this, removal of previous dredge spoil as well as relinkage of the St Lucia system to one of its major feeder rivers, the uMfolozi River, was carried out under the GEF project. In 2018, the South African High Court ruled that the mouth of the uMfolozi, an adjoining feeder river, could no longer be artificially breached to alleviate back-flooding in nearby affected farmlands. In October 2020, a multistakeholder symposium was held to determine the best method to breach the St Lucia Lake which had now been closed to the marine environment since 2014. The main objectives for this breach, among others, were to restore the nursery function of the system and to flush out the accumulated silt load originating from the uMfolozi and its catchments. The breach was carried out by iSimangaliso Wetland Park Authority with the advice of a scientific and technical task team. Following the breach, an open letter was written to the Minister of Forestry, Fisheries and the Environment requesting an independent investigation into the breach and its effects as this action directly contravened the recommendations of the extensive GEF report.

An independent panel was appointed to conduct this investigation from 1 October 2021 to 31 March 2022. The panel conducted a review of legislation, management plans, advisory reports and relevant literature. Site visits and meetings with scientific experts, management authorities, amakhosi, farmers, fishers, tour operators, ratepayers, municipal staff and a few relevant government departments were also used to inform the panel along with comments submitted through a gazetted open call for comment.

The findings of the panel are presented in this report and outline the impact of the breach, stakeholder perceptions, and the alignment of the breach to authoritative reports. While the breach did not contravene the recommendations in the Maintenance Management Plan, it does go against the GEF report recommendations. The breach did not appear to have a significant ecological impact and it was found that the circumstances necessitating a breach were largely undefined. “Exceptional circumstances” and “ecological circumstances” need to be explicitly stated to assist authorities with such decisions. To improve accuracy of these descriptions, key documents and studies must be considered and incorporated into future management plans.

Furthermore, the panel highlights a gap in the socio-economic context regarding management plans and modelling of management scenarios. Although hydrological and ecological data provide useful insight into the environmental reality of managing estuarine systems, social actors are important ecosystem components and to exclude social or economic realities from management plans will only further exacerbate conflict between management and related stakeholders.

Lastly, the panel provides key recommendations for the ongoing monitoring and management of the system along with potential directions for future investigation. The panel concludes that the increased attention around the St Lucia system heralds optimism for its ecological well-being and for the subsequent well-being of all interested and affected stakeholders. Equally, this increased attention brings to the fore the contrasting realities of rich natural resources that co-exist with economic marginalisation of local communities. With careful planning, ongoing monitoring and improved multi-stakeholder liaison, there is opportunity for collaboration and co-production of knowledge so that varied inputs can be included in policy decision making and all may benefit equitably from the ecosystem services of this system.

## TERMS OF REFERENCE

The terms of reference were set out as follows:

1. Advise on the significance and impact of the artificial opening of the estuary mouth and how this relates to the implementation of the GEF 5 project interventions and the St Lucia estuary management plan;
2. Advise on the exceptional circumstances, as defined in the estuary management plan, that lead to the decision to breach the mouth, including those of an environmental, social, and economic nature;
3. Advise on the impact of the mouth opening on the functioning of the estuary system and the wetland system as a whole, as well as the associated environmental, social and economic implications;
4. Develop guidelines for the immediate and ongoing management of the system;

## INDEPENDENT PANEL

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for approximately 25 years both in the public sector and as a management strategy consultant privately. Her work is wide-ranging, aimed at improving participation and beneficiation of rural women bordering protected area, working on alien invasive species, working as an observer to several international processes and serving on several boards and trusts.

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**Prof. Derek Stretch** (BScEng, MScEng, PhD (Cantab)) holds a PhD in environmental fluid mechanics from Cambridge University, UK. He is Emeritus Professor in the Civil Engineering program at the University of KwaZulu-Natal, South Africa. He is Director of the Centre for Research in Environmental, Coastal & Hydrological Engineering and his research focuses on the understanding and modelling of environmental flows for applications to the sustainable management of hydro-ecosystems and for renewable energy applications. He has published extensively and is an internationally recognized scientist in his field.

## **ACKNOWLEDGEMENTS**

The panel wishes to extend their gratitude to all participants and contributors who offered their time and knowledge during this investigation. Gratitude is extended to our secretariat Mr Fhumulani Tshamano who was, at all times, professional, helpful and efficient. Ms Thumeka Ntloko is also acknowledged for her guidance and assistance during this process.

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# 1. Introduction and context

## 1.1. St Lucia as a geological and ecological system

The evolution of the St Lucia system<sup>1</sup> over geological time scales is reviewed in detail by Botha et al (2013). An essential feature of this evolution is that the main lake basin has lost any immediate connection with the ocean, and now maintains only a limited connectivity via the Narrows, a 22km long sinuous channel that enters the sea at the town of St Lucia where there is a confluence with the Mfolozi River. Sea level changes over the past 6000 years played a significant role in this evolution and the present shoreline morphology was attained about 1000 years ago. The rivers that feed directly into the lake basins (Mkuze, Mzinene, Hluhluwe, and Nyalazi) are seasonal, flowing mainly during the wet summer months (November to March). The lake basins are a deposition zone for accumulated sediments from these feeder rivers.

Sedimentation rates can be estimated using core samples and dating techniques. Humphries et al. (2016) have analyzed cores from all the main basins of the lake from False Bay, North Lake, and South Lake (Catalina Bay). Their results suggest sedimentation rates in the north of about 2mm/yr for older/deeper samples >2000 years BP, but rates decline to less than 1mm/yr for younger/shallower samples from the last 2000 yrs. In South Lake the cores were somewhat more complex in structure (perhaps due to mixing or bioturbation) but similarly showed a reduced rate for ages less than 4000 years BP. There was evidence of a large depositional event about 8000 years BP.

As a result of these sedimentation processes, in terms of geological (millennial) time scales, it is generally accepted that the St Lucia Lake is on a long-term evolutionary path towards becoming a fresh-water swamp/wetland. However, this can be influenced significantly by uncertain factors such as by global climate change induced sea level rise as well as other local anthropogenic factors such as land-use changes. Currently the annual sea level rise (about 2 – 3 mm/yr and expected to accelerate e.g. Mather et al. 2013) is similar to or exceeds current estimates of sedimentation rate in the St Lucia Lake basins. However, the issue is complex because of the interdependencies of factors such as catchment sediment yields, land-use changes, regional rainfall changes, etc. A review of some of these factors in the context of St Lucia is provided by Mather et al. (2013)

The St Lucia estuarine system covers an area of up to 35 000 ha (depending on the water level), approximately 50% of South Africa's estuarine cover. Within the KwaZulu-Natal province, St Lucia makes approximately 80% of the estuarine area, (Whitfield et al. 2006). This is significant when considering the nursery function of the estuary. Although the tidal prism does not cover the entire area of the system, the St Lucia Lake forms a nursery habitat to several estuarine and marine fish (Whitfield 2021). During periods of mouth closure, fish

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<sup>1</sup> St Lucia system – includes the estuary, the Narrows, South Lake, North Lake (including Selley's Lakes), False Bay, Mkuze Swamps, Mfolozi floodplains (or flats), Eastern Shores and Western Shores, and the inflowing catchment rivers (Mfolozi, Msunduzi, Mkuze, Mzinene, Hluhluwe, Mpate, Nkazana Stream, and other small inflowing streams).

St Lucia Lake – includes the estuary, the Narrows, South Lake, North Lake (including Selley's Lakes), False Bay

are unable to recruit into the system. Significant reductions in fish catches have been recorded during these periods (Cyrus et al. 2011) along with a decrease in diversity (Vivier et al. 2010).

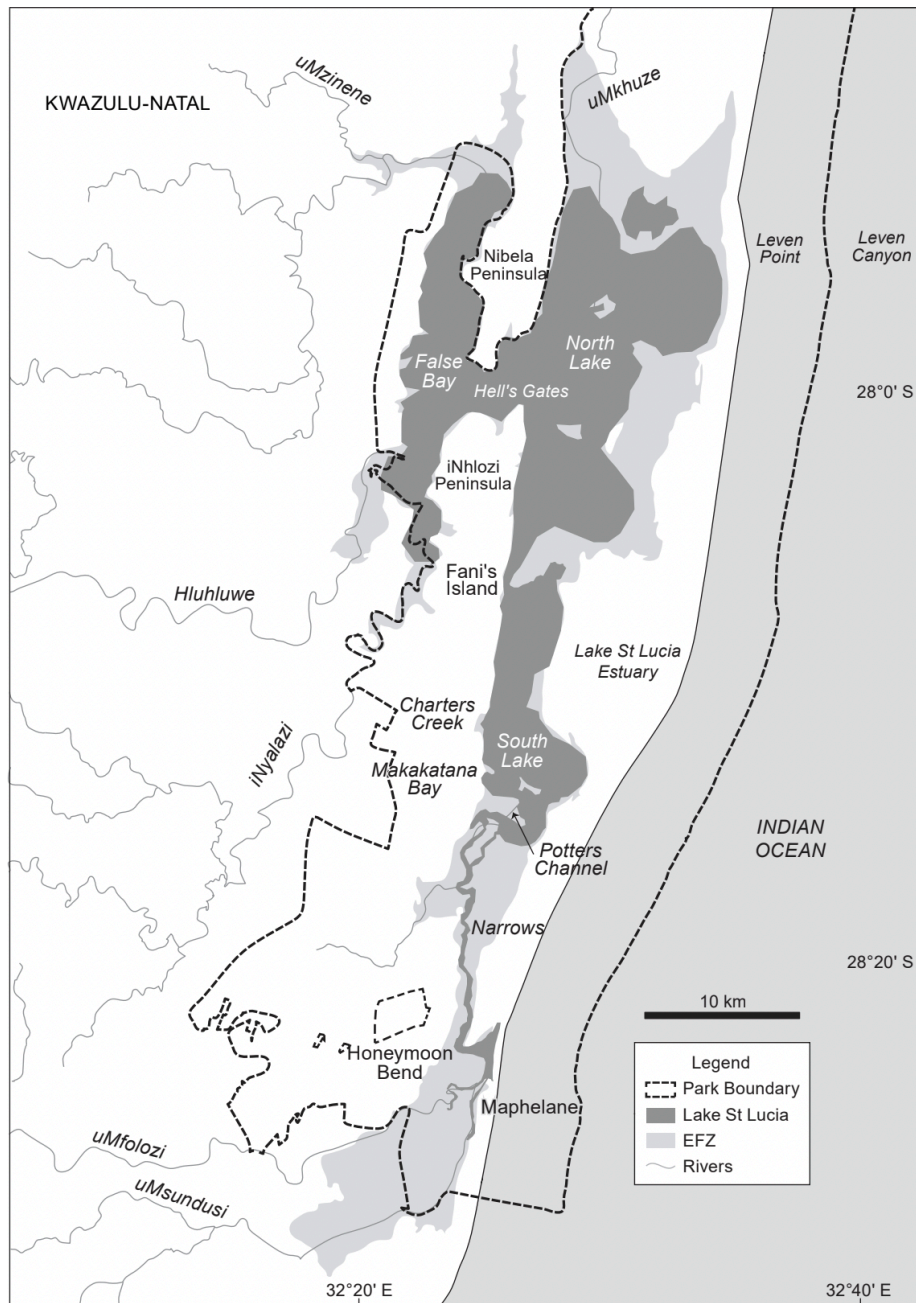


**Figure 1:** As presented in Perissinotto et al. (2013). Highlighting the St Lucia Lake situated on the east coast of KwaZulu-Natal, South Africa. The inset shows the location of the back channel and link canal connecting the St Lucia estuary to the uMfolozu. Key sites around the lake are also highlighted. The inset does not show the relinkage of the uMfolozu and St Lucia mouths via the Beach Channel.

As previously defined, the St Lucia system includes several catchment rivers and the Mfolozu floodplain. The St Lucia estuary is situated at the bottom of the catchment and is therefore a depository of all matter from feeder rivers, such as the uMfolozu, uMsunduzi, and Mkhuze.



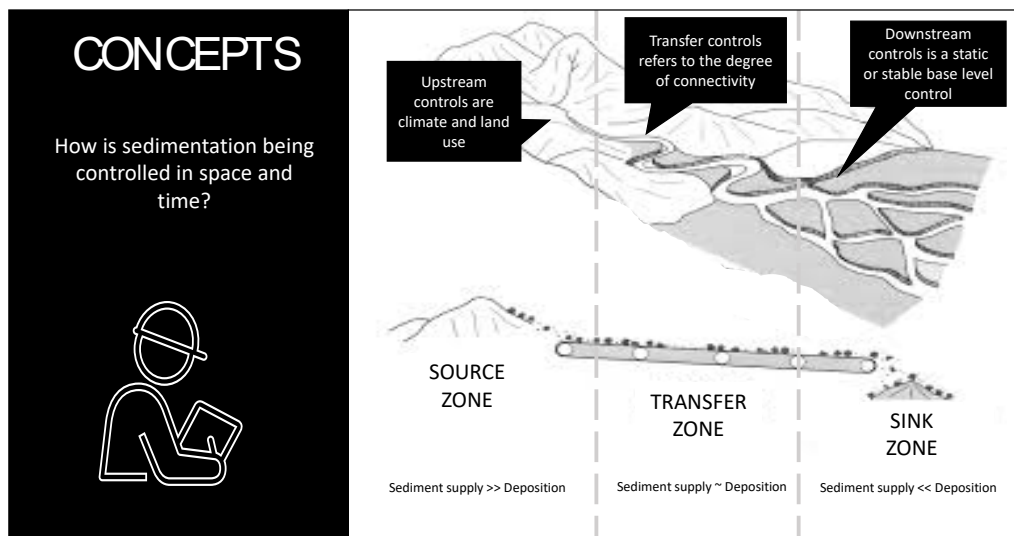
These catchments experience several land uses that are outlined in section 1.2. The Estuarine Functional Zone is defined as “the open water area of an estuary together with the associated floodplain, incorporating estuarine habitat (such as sand and mudflats, salt marshes, rock and plant communities) and key physical and biological processes that are essential for estuarine ecological functioning.” It is generally delineated at the 5mMSL (mean sea level) contour line around the system. This is true for the St Lucia system as outlined in the Estuarine Management Plan (2017 – Figure 3) and is shown in Figure 2.



**Figure 2:** A map of the St Lucia Lake along with feeder rivers, the EFZ and the park boundary. As presented in Forbes et al. (2020).

The St Lucia estuarine system relies heavily on the surrounding feeder rivers (Table 1). Hydrologically, any land use in the broader catchments has direct consequences on volume and quality of water (Figure 3). It is therefore critical that the water balance and water allocations in the catchment, especially those licensed, should consider the water

requirements of the St Lucia system to sustain its ecological functioning, including the natural breaching of the mouth.



**Figure 3:** Conceptualized journey of silt from upper reaches to lower reaches, in a catchment (WRC Report 00584). The severity of erosion is influenced by many factors, including land use, slope, soil type/erosivity index, rainfall intensity, among others.

**Table 1:** St Lucia Estuary- Summary of Ecological Water Requirements (EWR) for rivers feeding the estuary (DWS 2016). This table does not include the minor feeder rivers and groundwater.

Name	Natural MAR (Mm <sup>3</sup> /a)	Present MAR (Mm <sup>3</sup> /a)	EWR	% Natural
Mkuze	271.8	248.7	264.7	97.4%
Hluhluwe	61.5	48.1	48.1	78.2%
Mzinene	26.4	20.3	20.3	76.9%
Nyalazi	123.8	102.6	102.6	82.9%
uMfolozi	1054.4	952.2	978.8	92.8%

The estuarine system hosts several habitat types in terms of vegetation. These include mangrove systems, salt marsh area, sedges and reeds, swamp forests, submerged vegetation and macroalgae, sand- and mud-flats (Lück-Vogel et al. 2016). Each of these habitats is characterized by a unique set of flora and fauna and each contributes to the functions of the estuary. Mangroves and the water column are well-known nursery habitats; salt marsh, mangroves, and submerged macrophytes all have high carbon sequestration capacity; and all these habitat types provide important food sources for the overall estuarine trophic web. Each habitat has a different tolerance to the fluctuation between freshwater and hypersalinity, the varying connectivity to the sea, the silt load and the inflow of nutrients and water.

Currently, the St Lucia Lake system naturally shifts between a wet or dry state on 4 – 10 year cycles. This largely depends on the amount of freshwater inflow into the system (Perissinotto et al. 2013) and the state of the mouth (i.e. open or closed) further determines the salinity

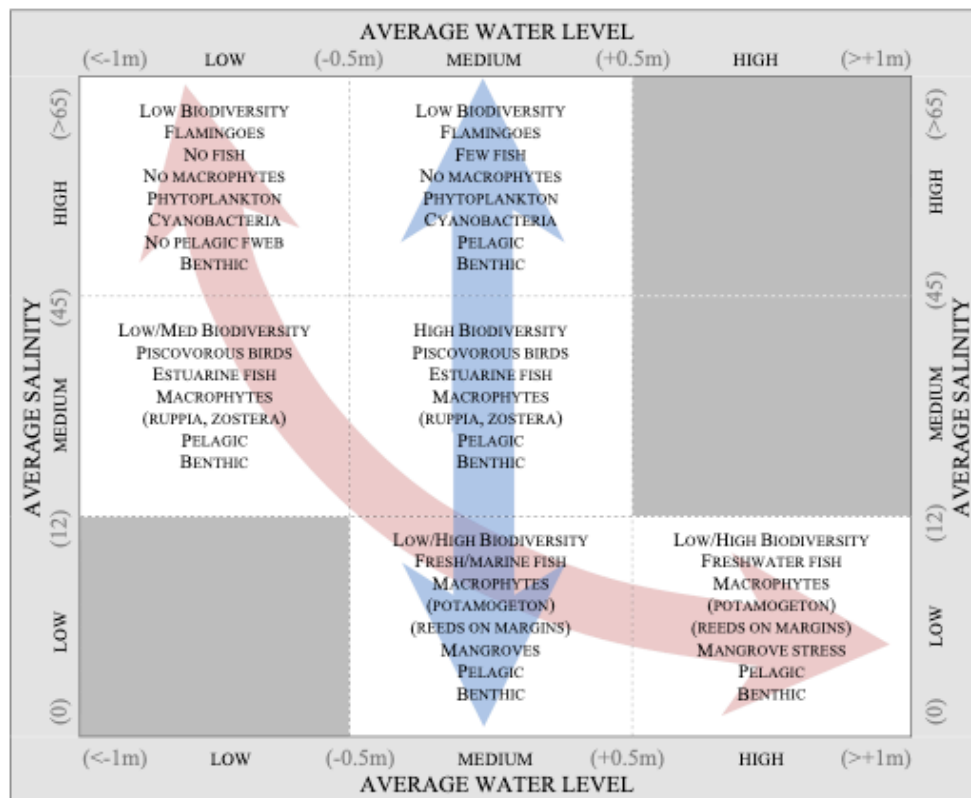
level of the system. During an open mouth state, the Lake St Lucia system experiences tidal exchange with the adjacent marine habitat, biotic exchange between the estuary and the sea, and flushing of the estuarine system including sedimentation. Flushing is dependent on the level of freshwater that has built up in the estuarine system where high freshwater inflow creates a larger flushing or scouring effect as opposed to reduced freshwater inflow from the catchment areas. However, high freshwater inflow also carries increased sediment input. Freshwater inflow in turn is dependent on the amount of rainfall experienced during the wet season. Ideally, high rainfall increases the water level until it is high enough to breach the berm. At this point, the outflowing water would create a deep channel and scour the estuary of its sediment load. During a closed mouth state, low rainfall or drought conditions lead to high salinities as water evaporates and marine salt remains. Often during this state, a reverse salinity gradient is present in the system with the estuary and Narrows displaying brackish to fresh salinity while salinity in the upper lakes often exceeds marine levels (35 PSU). During flood conditions, the system shifts to a freshwater state. When the mouth is closed and high rainfall is experienced, back-flooding is often a consequence of the high water level.

In terms of aquatic life, hippopotamus and crocodiles are the two largest, most visible and consistently occurring aquatic megafauna, both drawing tourists to the area. Birds are also an international drawcard, especially considering the Ramsar status of the estuarine system. Aside from the hippos, crocodiles and birds, ichthyofauna and nekton, specifically penaeid prawns, receive the most public attention due to the recreational fishing industry, the prawn fisheries of the past and the easy visibility of the larger marine fish. During an open mouth state, several marine estuarine-dependent fish species (up to 48 marine species recorded following the 2007 breach – Schutte et al. 2020) enter the system to spawn (Vivier et al. 2010, Schutte et al. 2020). Whitfield (2021) highlighted the importance of the St Lucia system for the Flathead Mullet (*Mugil cephalus*) life cycle and, in turn, the importance of *M. cephalus* as a food source for several bird species and crocodiles within the St Lucia system. Daly et al. (2021) report on the recruitment of Bull Sharks (*Carcharinus leucas*) into the St Lucia system within less than a day of the mouth being breached indicating the suitability of the system as a nursery site. However, when the mouth has been closed for many years and the system becomes freshwater dominated, marine and estuarine species are unable to tolerate the low salinity and are replaced with freshwater species specifically the Nile Tilapia (*Oreochromis mossambicus*) and the Sharptooth Catfish (*Clarius gariepinus*). Similarly, during a closed mouth drought condition, the salinity shift in the system is intolerable for several marine species and a decrease is seen in diversity (Cyrus and Vivier 2006, Whitfield et al. 2006, Whitfield and Taylor 2009, Vivier et al. 2010, Schutte et al. 2020).

Aside from flagship species, the lake system is inhabited by a highly diverse set of invertebrate fauna including molluscs, arthropods, polychaetes among several other unique endemic taxa or species including the scyphozoan jellyfish *Crambionella stuhlmanni* (Neethling et al. 2011), the endemic anemone *Edwardsia isimangalis* (Daly et al. 2012), the freshwater crab *Potamonautes isimangalis* (Peer et al. 2015) and several new species of crustacean gastrotrichs (Todaro et al. 2011, Todaro et al. 2015). The zooplanktonic, macrobenthic, and meiofaunal invertebrates are an important source of food for higher invertebrates, fish, and birds within the lake system. Macrobenthos and meiofauna are also considered ecosystem engineers due to their interaction with the substrata often through grazing, burrowing and general movement. These assemblages retain and recycle nutrients within the system as they feed on a variety of food sources including decomposing detritus making these nutrients available to species higher up the trophic web. In this way, the unique

biodiversity of the St Lucia system is not only a draw card for international tourism, it also provides and facilitates several key ecosystem services.

The aquatic biota shift (Figure 4) according to the predominant state of the system and understanding these shifts has largely driven ecological research in the system. Factors such as sediment size, salinity, turbidity, productivity, and temperature are all influential in structuring the food webs of the system which vary seasonally and spatially as well. Ecologically functional food webs have been shown to persist even in the most extreme hypersaline state albeit with several physical constraints and sometimes unsustainably (Pillay and Perissinotto 2008, Carrasco and Perissinotto 2012, Scharler and Mackay 2013). However, the extreme plasticity of the system ensures that it has remained functional during and recovered following hypersalinity, fragmentation between the lakes, floods, algal blooms and the associated disruption of trophic webs. More detail on diversity, abundance and shifts have been outlined in numerous published papers.



**Figure 4:** A simplified overview of the open/closed mouth states in a water level vs salinity space along with the dominant biological features. The curved, red line represents a closed mouth system and the vertical blue line represents an open mouth system. (Adapted from Figure 7.25 in Stretch et al. 2013).

## 1.2. St Lucia as a socio-economic system

The socio-economic system consists of defined physical geography and administrative boundaries. As a system its boundaries are indeterminate and spread across local, provincial, national, and international interactions.

Framing St Lucia as a socio-economic system within the context of policy development highlights the importance of including policy analyses, legislation and government programmes in the analyses of this socio-economic system.

While this socio-economic system is based on both social and ecological realities, it must be noted that often studies on the estuary are normally delinked from the social context within which the system is embedded. Consequently, social realities are often excluded from the analyses. Indeed, our understanding of St Lucia as an economic system can be enhanced by acknowledging inter-dependent activities that occur in the estuary.

The GEF Report (2014) highlights that uMkhanyakude District (Figure 5) faces serious socio-economic challenges. The district is characterised by low levels of education where only 2% have tertiary education, 26% have no formal education and only 23% have passed grade 12. In the district, more than 80% live on less than R800 per month, 45% have no formal income, 34% earn less than R9 600 per annum, and only 3% earn more than R38 200 per annum.

The local situation of St Lucia is characterised by the co-existence of proximity to rich natural resources and economic marginality. Food security remains a problem and local communities rely on land in a geographic area where arable land is not readily available to support increased number of livelihoods. There is high dependence on government welfare and remittances. In particular, the government sector contributes 19% to the district economy. It must be highlighted that the government sector does not offer visible opportunities for growth in St Lucia.

The district of uMkhanyakude is not a significant player in the provincial economy. It contributes about 2.4% to the KZN provincial economy. Furthermore, it does not have any sector which can be viewed as a driver of the provincial economy and is characterised by low levels of economic diversification.

Tourism, agriculture and manufacturing sustain the local economy. The manufacturing sector is dominated by the sugar mill at Mtubatuba which is strongly linked to the agricultural sector. However, in their current form both agriculture and manufacturing do not offer opportunities for growth in St Lucia. Indeed, the future growth of agriculture is limited because most agricultural activities occur in a flood plain with small-scale farming activities occurring at the lowest parts of the flood plain.

The large conservation areas remain a potential major resource in the district economy and in the development of local livelihoods. However, the population pressure is a potential serious environmental challenge in the wetlands. Nevertheless, rehabilitation and restoration of the system should be continually linked with improving livelihoods of surrounding communities.

Integrating conservation and tourism is less challenging. The greatest challenge is integrating conservation, tourism and livelihoods especially those of economically marginalised and impoverished communities. In St Lucia, part of the challenge is the existence of high levels of poverty among communities surrounding the estuary. These communities are dependent on the estuary and the greater wetland area for their livelihoods.

In St Lucia, the only economic activity that can maintain the universal value of the World Heritage Site and offers better opportunities for growth is eco-tourism. St Lucia is popular as a tourist destination and is acknowledged both nationally and internationally. However, it must be recognised that the benefits of tourism development have not been evenly distributed. Tourism as an industry matches the profile of the unemployed local inhabitants who possess

low levels of skills and are predominantly female (Palmer et al. 2002). Additional opportunities exist in the development of the craft sector especially for the export market.

Limited trade in fish provides important form of income especially at Nibela. The Policy on Small-scale Fisheries recognises the rights of those who lost customary access, particularly the right to pursue their economic development. The policy further recognises the scarcity of economic opportunities in coastal towns.

The economic system of St Lucia highlights that the local economy is dependent on the biophysical system within which it is embedded. What has not been recognised enough is the inter-relationship between the ecology, economy and social realities. The insights gleaned from the inter-relationships and interactions between ecology, local economy and social context can potentially reveal new forms of development.

The forests are a key part of the community. As a resource, forests have a socio-economic value. Indeed, local people make use of the natural resources available in the forest. For example, herbalists are active collectors of medicinal plants. Knowledge of tree species is an important form of cultural capital in this community. Likewise, forest products have a central feature in the local community and contribute to their household economy.

Interactions between local people and the natural environment are embedded in their knowledge of natural resources and their use. For example, women are skilled in grass weaving and produce products such as sleeping mats. For some women-headed households and widows, this is the only form of livelihood available to them. By contrast, men are mainly active in fishing activities.

Wildlife is an important resource in the area. Most of the animals live in the forest, their future is inter-linked to the well-being of the forest habitat (Timmermans in Palmer 2002). Consequently, some local people have set up nurseries for indigenous trees using seeds from the forest. This activity highlights an important interaction and a significant inter-relationship between forests and local inhabitants.

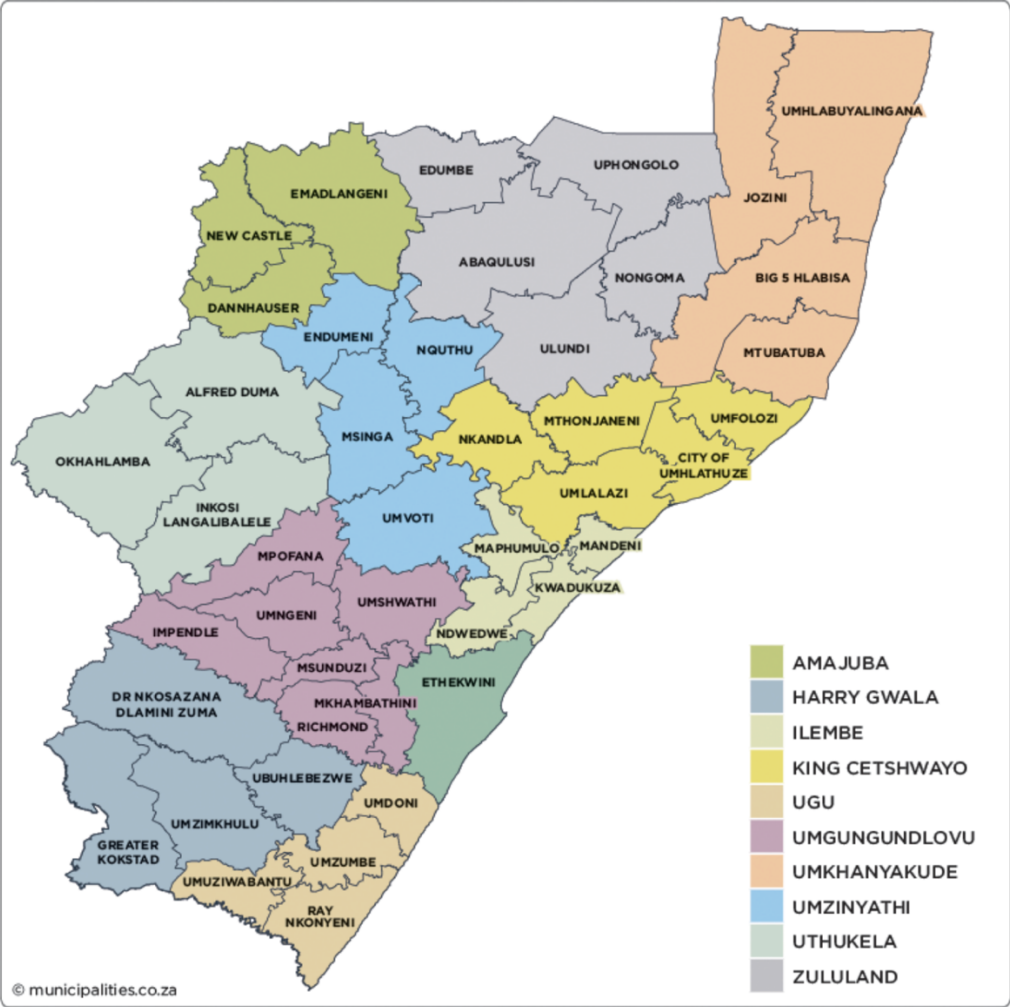
It is encouraging to observe that iSWPA has forms of community liaison. It is a significant gradual move towards more participatory approaches in the development (Fabricius in Palmer 2002).

In sum, the analysis of St Lucia as a socio-economic system recognizes the multifunctionality of St Lucia's space economy. This analysis enables the integration of local knowledge and recognises the nexus between rich natural resources and inclusive local economic development.

Finally, the success of St Lucia as a socio-economic system partly depends on the role of local institutions. Their role remain distinguished from those of administrators and should continue to contribute towards maintaining trust in public institutions. They can support good and sound public decision making and make the administrators more alert of diverse voices and their possible inclusion in policy decision making. This is significant as it ensures inclusion of wide range of perspectives and varied inputs. Bringing universities, local communities, government and non-government institutions to form policy advisory systems can ensure that policy development processes integrate both scientific knowledge and other perspectives including local knowledge.

Lake St Lucia and iSimangaliso Wetland Park exist within the Mtubatuba Local Municipality. With information obtained from the MLM 2021 Situational Analysis and Local Economic Development Strategy reports, a profile is provided herein.

Mtubatuba Municipality is one of five Category “B” Municipalities within the uMkhanyakude District Municipality located in the north-east of KwaZulu-Natal with a total population of 202 176. The municipality forms the southern end of uMkhanyakude District, with the N2 highway almost dividing the municipality into Mtubatuba East, and Mtubatuba West. It is bounded by the uMfolozi River in the south, the Indian Ocean on the east, the Big Five False Bay Municipality in the north and the Hluhluwe-uMfolozi Park as well as the Hlabisa Municipality in the west.



**Figure 5:** Map adapted from municipalities.co.za showing the location of the Mtubatuba Municipality within the uMkhanyakude District and the uMfolozi Municipality within the King Cetshwayo District [Accessed on 25 Feb 2022].

The strategic location of Mtubatuba Municipality along the N2 allows for ease of access to several urban areas including Richards Bay, eThekwini Municipality and SADC countries in the north. The municipality is influenced by provincial and district development trends which also inform spatial planning for the future development of Mtubatuba Municipality. Improved regional connectivity was seen development of the R618 (P237-1) as part of the Renaissance Program of the Department of Transport linking the coast (St Lucia) with the Cultural Heritage Corridor areas of Nongoma and Ulundi. This connectivity further drives development potential (e.g. tourism, commerce) within the municipality, particularly the

town, and other incipient nodes along the corridor. The Municipality area has a railway line but no air transport infrastructure, instead there are small landing strips at Hluhluwe Town and inside Hluhluwe-uMfolozi Game Reserve.

The various economic sectors are generally grouped into a Primary sector – extraction of raw materials – mining, fishing and agriculture; Secondary/manufacturing sector – concerned with producing finished goods, e.g., construction, manufacturing and utilities, and a Tertiary/service sector – concerned with offering intangible goods and services to consumers. This includes retail, tourism, banking, entertainment and IT services. More recently the knowledge economy, education, and research & development form part of the quaternary sector. Agriculture and social services form the largest components of the economy with sugar cane and timber at the forefront of agriculture, and tourism opportunities providing significant income and growth.

In line with national, provincial and district growth, Mtubatuba has recorded relatively low growth since 2010. The economy went into recession in 2015 and 2016, following a drought which led to the drying up of the uMfolozi river, and this recession continued to 2019. In 2020, with the onset of the COVID-19 pandemic, a series of lockdowns and declining tourism further exacerbated this recession.

Although the Mtubatuba Municipality is not considered an authority over the iSimangaliso Wetland Park, which is governed at a national level, there is considerable linkage between the two stakeholder groups. The UNESCO assessment around the focus of “Benefits beyond boundaries” aims to foster a distribution of benefits to actors around parks. This is seen in the tourism potential of Mtubatuba as initiated by the World Heritage status of the park.

As an extension of the estuarine functional zone, the agricultural fields situated in the uMfolozi-uMsunduzi floodplains are located within the uMfolozi Local Municipality in the King Cetshwayo District. Although separated along municipal and district borders, the communities within these zones are all influenced by and hold influence over the St Lucia System.

### **1.3. History of management**

The history of management is outlined in detail by Porter (2013) and Taylor (2013). A summary is presented here.

The first recorded/known management intervention occurred in the late 1800s in response to the depletion of wildlife stocks following hunting. In 1895, St Lucia was declared a game reserve overseen by a conservator assisted by the regional police and game constables. For a short while in the late 1930s, St Lucia Game Reserve was de-proclaimed to allow for veterinary control of the Tsetse fly. Vegetation removal and aerial spraying of DDT ensured the eradication of this disease. During this period there was conflict between the administrations responsible for preservation and disease eradication respectively. The park was re-proclaimed in March 1938 to encompass only the high water mark of the estuary. Areas were added, increasing the park coverage until the World War II.

In 1911, sugarcane farming began in the floodplain with a state-funded local mill constructed as well (Collings 2009). Floodplains behave as streams during low flows, although there may be transmission losses of water and solutes downstream within the floodplain during such periods. However, during flood events, floodwaters are dispersed over a large area such that



the flow is much slower than in a concentrated stream, and floodwaters fill depressions and recharge regional groundwater, so that flood attenuation is inevitable. Due to the presence of clay and silt soils with a high exchange capacity and therefore fertility, floodplains serve as desirable sites on the otherwise dystrophic coastal plain for commercial and small-scale agriculture. Sugarcane farming occupied 30% of Mfolozi floodplains by 1937 and kept expanding to occupy 50% by the 1960s. This was achieved through canalization, straightening of the Mfolozi river to drain flooding water faster into the sea, which inadvertently affected the sediment filtering capacity of the system. The floodplain transformation seems to have substantially impacted the natural filtration of the sediment rich water from the Mfolozi catchment system prior to its discharge into the ocean or St Lucia. In particular the canalisation and drainage channels have significantly impacted these processes. Similar processes occur in the Mkuze swamps, which mainly retains its functionality and yields relatively sediment free water into Lake St Lucia.

In 1948, during a period of intense prolonged drought, the first thorough scientific survey was conducted in the park. Prof. John Day and a team from UCT conducted the physical and ecological surveys and advised the separation of the two mouths to prevent the silt originating in the upper catchment flowing through the Mfolozi floodplain from entering St Lucia. The team also advised maintaining a permanently open mouth to allow for the estuarine nursery function. A technical advisory committee appointed in 1951 supported these recommendations and soon after (1952), the Mfolozi mouth was opened through the Maphelane region. The separation of the two mouths was reinforced by the dredge spoil creating a barrier. The St Lucia mouth was rarely opened following this until the partial installation of a groyne-berm in the 1960s which was to maintain a permanently open mouth. This was never completed but the mouth would remain open with active separation from the Mfolozi mouth until 2002. However, in an effort to minimize hypersalinity, the Link Canal (Figure 1) was constructed in 1975 to bring in freshwater from the Mfolozi. The Link Canal was designed to carry water into the lake without the accompanying sediment load through the use of a settling basin, although the latter was never completed.

The Natal Parks Board took over management of the park in 1977 together with the Department of Forestry. They were also assigned authority over the St Lucia Marine Reserve which was proclaimed in 1979. During this decade, conservation authorities further canalised the lower Mfolozi creating a link to direct flows into the St Lucia Lake (Collings, 2009, Taylor et al. 2013). This was done to reduce salinity in the lake during drought conditions. The efforts failed probably due to a limited understanding of sediment transportation/filtration, where a meandering system is critical to prevent sediment inflow.

Cyclones Domoina and Imboa moved through the area in 1984 causing extreme flooding and scouring out of the mouth. During these floods, the Link Canal was damaged allowing water from the Mfolozi to flow directly into the lake with the associated sediment load. Following these events, a recommendation was made to allow the St Lucia mouth to breach naturally and periodically and to bar off the link canal. This bar was later eroded, and the canal maintains the connection between the Mfolozi and St Lucia.

In 1990 the eastern shores (which until this point were the subject of afforestation and dune mining) were added to the protected area and collectively renamed the Greater St Lucia Wetland Park.

The Natal Parks Board was renamed as Ezemvelo KZN Wildlife in 1997. This institution continued the management of the Greater St Lucia Wetland Park and in 1999, the park was

proclaimed a UNESCO World Heritage Site. The Greater St Lucia Wetland Park Authority (and later renamed as the iSimangaliso Wetland Park Authority) was appointed to manage the park as a world heritage site in collaboration with EKZNW which would continue to monitor and manage activities within the area. The proposal to mine titanium led by Richards Bay Minerals in a way encouraged the submission of the dossier to declare iSimangaliso, including eastern shores a WHS in 1999. This meant more international laws promoting conservation of the iconic site. The iSimangaliso Wetland Park was South Africa's first World Heritage Site to be accepted and listed by UNESCO.

During the period of management by iSimangaliso, the management of the mouth has undergone several changes. The St Lucia mouth was left to close following a prolonged dry period in 2002. This led to a prolonged mouth closure, during which high evaporation rates caused 90% of the lake to dry up with hypersaline conditions were dominant in the northern lakes. This persisted for almost a decade with a brief respite when Cyclone Gamede caused an open mouth for 4 months in 2007.

In 2012 a beach spillway was used to reconnect the St Lucia and Mfolozi mouths. This was referred to as the Beach Canal and breached to the ocean in September 2012. The spillway remained open for 2 years before closing once more in October 2014. Following recommendations from the GEF project, the dredge spoil and associated vegetation that separated the St Lucia and Mfolozi mouths were partially removed in 2015 – 2016 in order to promote reconnection of the Mfolozi River to St Lucia.

#### **1.4. International and national recognition/status**

The St Lucia region was first formally protected during the colonial era (1895) in response to overhunting with the inclusion of more protected areas over the next century (Porter 2013). In 1927 the entire lake was protected when it was recognized as the St Lucia Bird Sanctuary.

In 1986, the Greater St Lucia Park was state-owned and managed provincially by the Natal Parks Board. During this year a submission for the park to be recognised as a Ramsar Wetland of International Importance was submitted and approved. The park met 3 Ramsar criteria i.e.

Criterion 1: Unique and representative wetlands

Criterion 2: Presence of unique and important plants and animals

Criterion 3: The system support a diverse and abundant waterfowl community

These criteria along with sub-criteria are outlined in the Ramsar Information Sheet (Porter and Blackmore 1998; Porter 2013). Given the international status of the park, South Africa accepted the associated international commitments to conserve the wetland and this obligation led to the prevention of mining activity on the Eastern Shores by South Africa's first democratic government in 1996.

In 1998, once South Africa was readmitted to the United Nations following the end of apartheid, the nomination dossier for the Greater St Lucia Wetland Park, along with other sites, was submitted to the World Heritage Centre in Paris, France. Following evaluation by the IUCN, the Greater St Lucia Wetland Park was instated as South Africa's first World Heritage Site in 1999 based on its outstanding conservation value. The park was included as it performed well in 3 UNESCO World heritage Site criteria (Porter 2013) i.e.

Criterion 7: Superlative natural phenomena and scenic beauty

Criterion 9: On-going ecological and physical processes

Criterion 10: Biodiversity and threatened species.

The park was later renamed to iSimangaliso Wetland Park to reflect the sense of wonder and miracle contained in the space. iSimangaliso Wetland Park Authority (iSWPA) has been the lead authority since then with a board of directors and with Mr Andrew Zaloumis as the initial CEO. In 2018, following the resignation of Mr Zaloumis, the new CEO Mr Sibusiso Bukhosini was appointed and remains CEO today.

The iSimangaliso Wetland Park (iSWP) extends from the southern boundary of the St Lucia Estuary north to the Mozambican border where it lies adjacent to the Ponta d'Ouro Partial Marine Reserve, a serial site, and forms the Ponta do Ouro-Kosi Bay Transfrontier Conservation Area. Currently the reserve is under national Mozambican jurisdiction.

## 2. Overview

### 2.1. Sequence of events

The St Lucia mouth has historically experienced prolonged mouth closure events. This directly influences the ecology of this temporarily open-closed system (Cyrus et al. 2011) as well as communities and individuals who rely on the system. A closed mouth means that heavy rainfall leads to flooding of commercial and small-scale farms in the Mfolozi catchment area, and it means an eventual transition to a freshwater or hypersaline system in some lakes depending on the rainfall, salinity content and depth. Without the exchange to the sea, there is no use of the estuary as a nursery habitat, no input of marine fish into the system, and no nutrient exchange. Furthermore, due to the influx of silt from the Mfolozi system, a closed mouth leads to sediment accumulation in the St Lucia estuary. This affects water clarity, depth, and promotes the growth of dense aquatic vegetation e.g. *Stuckenia* or *Phragmites* reeds. This lack of tidal influence or water exchange also leads to dry, saline and anoxic soil which inhibits plant growth such as mangroves. Early researchers emphasized the disadvantages of a closed mouth i.e. the disconnection with the sea and the lack of new fish and invertebrate stocks into the system (Millard and Broekhuysen 1970, Cyrus and Vivier 2006b).

After decades of human intervention the St Lucia mouth was left to close naturally in 2002. A natural mouth opening occurred in March 2007 following Cyclone Gamede and reclosure occurred in August 2007. Four years later, an artificial opening occurred in 2011 at Maphelane when a court order forced the iSimangaliso Wetland Park Authority to do so for temporary relief of flooded farm land. Following this, the newly combined mouth breached once more in September 2012 when 400 mm of rainfall in the catchment area led to the common inlet opening to the sea and remaining open for two years until it closed in October 2014. During this time, the Lake St Lucia experienced connectivity to the marine environment via the back channel linking the Mfolozi and the St Lucia systems (Whitfield 2014).

In 2015, a court matter was heard in the KZN High Court where the applicants (uMfolozi Sugar Planters Ltd (UCOSP) and associated sugarcane farmers) requested a breach of the uMfolozi mouth to relieve back-flooding on their farmland. The respondents being iSimangaliso Wetland Park along with several government departments. The court granted a

temporary relief ordering iSimangaliso Wetland Park to breach the mouth while waiting for the matter to be heard in the High Court. In 2018, the case appeared in the high court and was dismissed with costs [Umfolozi Sugar Planters Limited v Isimangaliso Wetland Park Authority (873/2017) [2018] ZASCA 144 (1 October 2018)].

After a prolonged closure of 6 years during which time the system experienced no marine connectivity, a multi-stakeholder workshop was held on 13 -14 October 2020. The symposium was co-ordinated by WildOceans, the marine programme of Wildlands Conservation Trust (IT No.4329/1991/PMB) on behalf of iSimangaliso Wetland Park. During this 2 day symposium, stakeholders included commercial farmers, leadership and community representatives from Sokhulu, Dukuduku, Khula Village, Ezwenelisha, Nibela, Nkundusi, land claimants, scientists, government officials, park authorities, recreational users and ratepayers. The symposium was considered a success as several stakeholders cited it as the first time that they had an opportunity to engage with management and scientists and to openly discuss the issues affecting them. However, the discord between the scientific community and community members was also highlighted, centering around the high level discussion and technical language used during the sessions.

Following the symposium, four task teams were appointed on the 25 November 2020 as follows: (1) a scientific technical team, (2) legal and policy technical team, (3) financing and partnerships technical team, (4) communication team. The scientific task team, consisted of several scientists who have been working on the St Lucia system for the last few decades, as well as two ratepayers. It is noted here that no other stakeholders were represented on this task team. The objectives were “To assess and recommend the best way to achieve an effective assisted breach, that will connect the St Lucia Lake with the sea and the uMsunduzi/Mfolozi system with the sea, resulting in water levels in the lake and rivers matching those of the sea, and reinstatement of tidal and marine influences into the system.”. It was noted that the task team intervention was (1) short term only i.e. between Dec 2020 and March 2021 for immediate relief of the system and (2) not all stakeholders would receive benefits from this intervention.

The decision was based on a research-based document compiled by the task team members. A limitation noted here was the unavailability of broader scientific input including individual researchers, and data. The decision to “skim” the berm or “nudge the system towards opening” was considered an ecologically-based short-term intervention in order to restore the estuarine function of the St Lucia mouth which until that point had been closed to the sea for 6 years.

The task team then made the decision how, where and when to breach the mouth as well as the level of intervention required (i.e. skimming, breaching, removal of vegetation, dredging). It was decided that a facilitation of natural breaching (or nudging) should be conducted by skimming the berm down to 1.6 m estuary level (i.e. on the bridge water gauge). Here it is worth noting the discrepancy between the bridge water gauge and actual MSL where the bridge water gauge is 0.35 m below MSL (Fox and Mfeka 2021a). Therefore, a measurement of 1.6 m on the bridge gauge = 1.25 mMSL. The height at the breach site was monitored and the berm was to be skimmed down to 1.25 m MSL in anticipation of the rain and inflowing water. Although the task team suggested that the skimming should occur as soon as possible in December so that heavy rains would more efficiently flush out the accumulated sediment, due to delayed authority received for the proposed skimming (Fox and Mfeka 2020a), activity began on the 4<sup>th</sup> January 2021 and this was supported by all parties involved. The mouth

rejoined the sea on the 6<sup>th</sup> January 2021. On this date, the bridge gauge measured a level of 1.92 m (1.57 m MSL).

The mouth re-established a connection with the sea and several species of ichthyofauna were already seen to move into the system (Whitfield 2021, Daly 2021). The mouth remained connected to the sea until the 3<sup>rd</sup> June 2021 (Fox and Mfeka 2021b).

On the 13<sup>th</sup> January 2021, an open letter was written by concerned scientists addressed to the Minister of Forestry, Fisheries and Environment, Ms Barbara Creecy (Appendix I) requesting an explanation for the opening of the mouth which the authors state was “directly contrary to the outcomes envisaged by this [the GEF Project] substantial commitment” and a “deviation from scientific, evidence-based management decisions by the iSimangaliso Authority.”

## **2.2. Establishment of the independent panel**

In response to this letter, the Minister Ms Creecy appointed an independent panel of experts with knowledge in hydrodynamics, ecology, water quality and flow, social participation, and local economic development. The panel was appointed beginning on the 1<sup>st</sup> October 2021 for a period of 6 months (appointment ending 31 March 2022) during which time they were to investigate the impacts of the breach and provide their findings in a written report.

## **3. Methodological approach**

### **3.1. Documents and literature consulted**

Here we discuss relevant documents consulted in order of authority. We begin with legislative documents including the Constitution and relevant Acts to the St Lucia case. We then draw on management plans which serve as an authoritative document, guiding the management of specific natural systems based on legislation and context. Lastly, we discuss advisory documents that seek to inform management and legislation through comprehensive, rigorous scientific and consultative research.

#### **3.1.1. Legal framework**

The promulgation and the existence of iSimangaliso Wetland Park is guided and abides by the national legislative frame in South Africa. This is briefly discussed within the context of past, present and future due to the change in the nature of laws and acts in different eras.

While the protection of the Park was formed under past, pre-democratic laws, the park is currently governed by present laws, many of which have replaced existing past laws. Rossouw and Wiseman (2004) offer the following perspective regarding pre-democracy environmental policy-making:

“During the apartheid era, environmental policymaking processes were technocratically driven and broader civil society was excluded from policy deliberations. Stakeholder engagement was restricted to small groups of technical experts. Public participation, if it occurred at all, was limited to information distribution and occasional consultation with selected interest groups, such as conservation lobby organisations”

Current legislation seeks to reform the injustice of past laws. Before any piece of legislation in the field of natural resources management is drafted, a guide is already provided under the

country's Constitution, Section 24, the right of citizens to a healthy environment (Act No.108 of 1996). The document states that:

Everyone has the right -

- (a) to an environment that is not harmful to their health or well-being; and
- (b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that –
  - (i) prevent pollution and ecological degradation;
  - (ii) promote conservation; and
  - (iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

The National Environmental Management Act (No. 107 of 1998) accounts matters relating to environmental governance and maintaining environmental function. Within NEMA, the following acts provide more insight and detail for both ecological and socio-economic matters.

- a. The Biodiversity Act (NEM:BA No. 10 of 2004) outlines policy regarding biodiversity research, monitoring and planning across. Policy around dealing with alien invasive species, threatened species and bioprospecting is also established.
- b. The Protected Areas Act (NEM:PA No. 57 of 2003) provides policy for the establishment and ongoing management of protected areas. This Act replaces the National Parks Act which was established under the Apartheid regime.
- c. The Integrated Coastal Management Act (NEM: ICMA No. 24 of 2008) begins by defining coastal zones and boundaries in a national context and goes on to outline policy regarding coastal management, maintenance and planning at a national, provincial and municipal level as well as public participation in the management of these zones.
- d. The Environmental Impact Assessment Regulations and its associated listed notices outline a list of activities that require environmental authorisation.
- e. The World Heritage Convention Act (WHCA No. 49 of 1999) outlines the structure for acquiring land, establishing world heritage sites, and managing these sites in terms of a board, executive, and management plan perspective.

Other legislation includes the Marine Living Resources Act (MLRA) (No. 18 of 1998) which outlines policy around the extraction of resources from the marine environment. This covers the protocol for establishing limits, small-scale and large-scale fisher activities, permitting requirements, and enforcement. MPAs, international fishing agreements and gear protocol are also covered in this act.

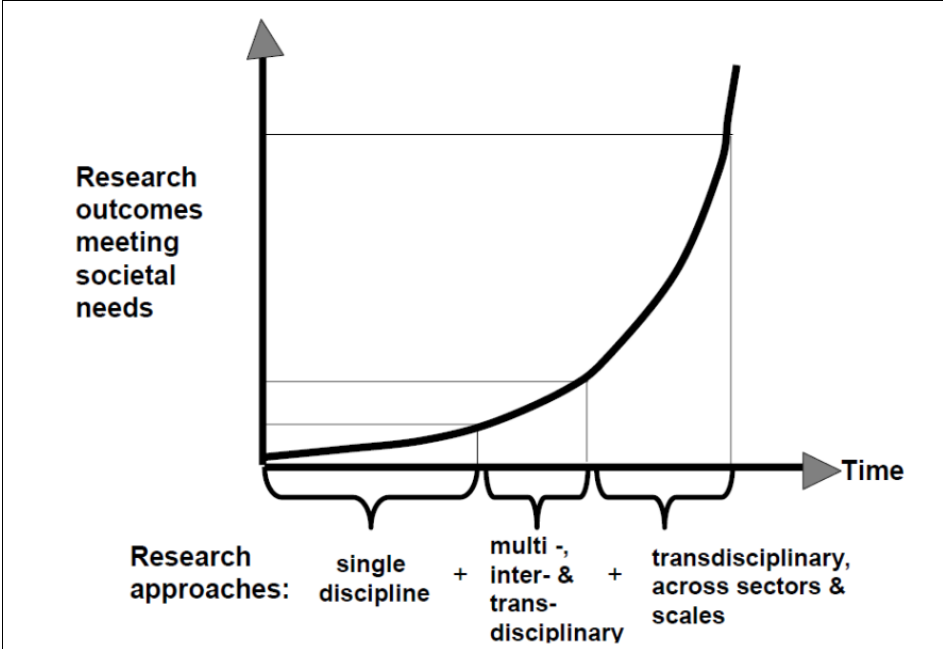
The National Water Act (NWA No. 36 of 1998), recognising that water is a scarce and unevenly distributed resource, occurs in many forms, and is part of many cycles, provides legislation for the management of these resources including the management of catchment areas which are influential to the recipient coastal zones. The Act also covers policy around water quality maintenance, water use permissions, monitoring and safe and efficient distribution.

As gaps are identified in legislation, amendments seek to address these gaps. Policy development is normally undertaken to aid policy decision-making and resource allocation.

Policy making is an integrating field of knowledge and recognises that some fields by their nature produce knowledge and others apply the knowledge. In the application of knowledge, new insights may be developed while other aspects may be discarded.

3.1.2. Authoritative documents

As outlined in the previous section, South Africa is well-known for producing democratically accommodative and environmentally friendly legislation which allows development without compromising the environment for the beneficial use of the next generations. Various pieces of legislation are managed and implemented through different departments occasionally resulting in a silo approach to managing complex landscape dynamics which require an integrated approach. To allow for management and development that meets societal needs while aligning with all relevant legislation, management plans are an opportunity for a trans-departmental and transdisciplinary approach to efficiently deal with growing complex challenges that require complex approaches (multidisciplinary/multisectoral).



**Figure 6:** As depicted in Breen et al. (2013). A conceptual model suggesting that single discipline research can build towards and include transdisciplinary research over time. Research that takes account of various research outcomes, including complexity and integration, acknowledges complex adaptive social-ecological systems, and therefore traverses scale and sector will contribute to research outcomes that have a greater chance of meeting societal needs. This is applied to sectors and government departments ensuring that all facets of the law are involved in solving complex challenges.

As such, Section 34 of the ICMA calls for an estuarine management protocol which sets standards for the management of estuaries and coordination of management of activities that influence the estuary. These are outlined in an estuarine management plan (EMP) which is essentially a plan to coordinate the management actions in and around an estuary.

The EMP places emphasis on estuarine functional zones and boundaries. In the case of St Lucia, the EMP highlights that the mouth of the system opened to the sea is any point on the approximately 3 km stretch of sandy beach between the Maphelane dunes to the south and the higher ground to the north at St Lucia village. The EMP also defines the EFZ for St Lucia as

the “Low lying land adjacent to the river or estuary periodically flooded and where river borne materials are deposited, including areas adjacent to the estuary banks and below the 5 m aMSL for the intermittently open estuaries along the KZN coastline, as described on BGIS”

Key operational aspects of the EMP are as follows:

- To implement the policy of minimum interference in the estuarine system to facilitate as much natural function as possible, limiting artificial breaching and then only for ecological reasons
- To implement restoration measures, including the removal of artificially placed dredge spoil and levies
- To support DWS in the completion of the reserve determination study of St Lucia estuary
- To review the current monitoring programme, identify areas needing strengthening, including selected physico-chemical variables, indicators that reveal presence of contaminants, status of estuarine plants and animals

The 2017-2021 iSimangaliso Integrated Management Plan (IMP) was approved in 2017 by the Minister of the DFFE to provide a broader framework for the ecological management of the iSWP in relationship with neighbouring stakeholders and targets including local economic development. Within this document, the development of the Maintenance Management Plan is referenced as follows:

“An Overarching Environmental Management Programme (EMPr or simply referred to as Maintenance Management Plan) must be designed specifically as a tool that achieves, improves and systematically controls environmental performance levels. A crucial part of an EMPr is monitoring, evaluation and audits.”.

In South Africa, the mandatory Environmental Impact Assessment (EIA) process was introduced in 1993 and current regulations were approved in 2010. This means that developments that are likely to impact ecosystem health and/or society need to go through a formal assessment prior to implementation. There are three lists of activities that require authorisation. There are outlines as:

Listing Notice 1: activities that require basic assessment

Listing Notice 2: activities that require scoping and environmental impact report

Listing Notice 3: activities that require a basic assessment in specific identified geographical areas only.

iSimangaliso Wetland Park Authority, as a legal entity/authority established to manage the Park founded amongst communities, must manage with all other sectors and recognize their laws, including local/ indigenous knowledge. However, it is not always possible to go through applications and approvals before acting on threats to the integrity of the St Lucia System and the entire park, hence 5-yr renewable plans are produced and approved by the DFFE.

The current iSimangaliso Maintenance Management Plan (MMP) was developed in accordance and adhered to prescriptions laid out in the EIA legislation. It was approved in 2019 by the Minister of the DFFE. The aim is to avoid having to apply for an EIA each time a maintenance activity within the Park needs to be executed. There are cases where application for EIA will still be triggered, such as new construction, or excavations. These are all listed explicitly in the MMP.



Activity number 19A of Listing Notice 1 (EIA Regulations within NEMA) lists the activity of “infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from...the seashore, excluding...where the activity is for maintenance purposes undertaken in accordance with a maintenance management plan.”

Activity 19A is the primary trigger for the need to obtain prior environmental authorisation for the clearing of, or excavation of sand from the seashore in order to open-up, or breach, an estuary so that it is open to the sea.

An environmental authorisation is not required to breach an estuary in terms of Listed Activity 19A of Listing Notice 1 where a “maintenance management plan” for breaching has been prepared and approved by the relevant competent authority. In the case of St Lucia, the approved MMP clearly defines the process for artificial breaching in Section 9.21.

The Department of Water and Sanitation (DWS) conducted a low confidence Preliminary Reserve Determination of Ecological Water Requirements (EWR) which was approved in 2017 (DWS 2016). The EWR sought to achieve a balance between development (water use and impact) and protection (securing water quantity and quality for basic human needs and sustaining the resource base).

Preliminary Reserve Determinations are required to assist the DWS in making informed decisions regarding the authorisation of future water use, the magnitude of the impacts of the proposed developments on the water resources in the Water Management Area (WMA), and to provide the input data for classification of the area's water resources, and eventual gazetting of the Reserve. These recommendations are key in water use license authorization (WULA) decisions and are therefore legally binding.

The EWR consists of two parts: - The basic human needs Reserve and the ecological Reserve. The basic human needs Reserve provides for the essential needs of individuals served by the water resource in question and includes water for drinking, for food preparation and for personal hygiene. The ecological Reserve relates to the water required to protect the aquatic ecosystems of the water resource. The Reserve refers to both the quantity and quality of the water in the resource and varies depending on the class of the resource (National Water Act, No 38 of 1998). The focus on the St Lucia System was a result of the high conservation status and importance of various water resources in the catchment and the significant development pressures in the area affecting water availability.

The Present Ecological State (PES) for each site is also presented and describes the overall category representing the current state of health of the water resource. The PES integrates the categories of various biophysical attributes (water quality, flow, hydrodynamics, microalgae, macrophytes, invertebrates, fish, and birds). The 2016 PES for St Lucia is category: “C”, provided the process of removing the dredge spoil that was historically deposited between the St Lucia Narrows and the uMfolozi mouth has been completed with combined mouths.

The Recommended Ecological Category (REC) represents the recommended state of ecological health of the water resource, where this recommendation is also based on the estuarine importance score, current conditions, reversibility of impacts and conservation importance. To safeguard this system of high ecological importance and sensitivity, a REC: “B” was agreed as a consensus. This takes into consideration that the wetlands in the WMA

are dependent on groundwater and indeed river flows (surface water). The 2016 EWR emphasised the importance of biophysical monitoring, particularly of the determined EWR sites, and the 50m buffer zone to ameliorate sedimentation. It was also recommended that no further degradation of floodplains should occur, and that users should rather utilize the existing disturbed areas or implement agricultural activities that are tolerant to waterlogging to avoid drainage of the wetlands.

### 3.1.3. Advisory documents

The St Lucia system has been the subject of intensive research for over a decade. Consequently, numerous books, technical reports and scientific publications are available each outlining a current understanding, potential future scenarios, and suggestions for management and monitoring. A few key documents are discussed here:

The Global Environmental Facility is an international initiative created in 1992 to assist with solving environmental problems. This is achieved through funding support to address issues around five key areas i.e. biodiversity loss, chemicals and waste, climate change, international waters, and land degradation. A GEF grant was awarded in 2009 (Grant no. TF096152) to a project entitled “Development, Empowerment and Conservation in the iSimangaliso Wetland Park and Surrounding Region”. The project has been referred to already throughout the text and will henceforth be recalled as the GEF Project or the GEF Report. The report had 3 main components i.e. (1) Improving/investigating the Hydrology and Ecosystem Functioning of the iSimangaliso Wetland Park, (2) Promoting Conservation-Compatible Local Economic and Cultural Development, (3) Institutional Capacity Building for Biodiversity Conservation. The outcome of this project was a series of 6 reports as follows:

**Table 2:** The six volumes of the GEF Report.

Volume	Topic	Authors
1	Hydrology	Görgens, A.H.M. & Dobinson, L., Walker, N. & Howard, G.
2	Review of sediment dynamics	Illenberger, W. & Clark, B.M.
3	Hydrodynamics and sediment modelling	Basson, G.R. Bosman, D.E., Sawadogo O. & Visser A.J.C.
4	Ecological assessment	Clark, B.M., Turpie, J.K, Adams, J., Cyrus, D., Perissonotto, R.
5	Socio-economics assessment	Turpie, J.K., Feigenbaum, T., Hayman, M., Hutchings, K., Cousins, T., Chipeya, T. & Talbot, M.
6	Synthesis and recommendations	Clark, B.M., Turpie, J.K., Görgens, A., Basson, G., Stretch, D., & Geldenhuys, M.

The reports outline potential scenarios and advise authorities on management based largely on physical processes and ecology. Outlining 4 potential scenarios, the authors recommend a “joined mouth” approach estimating that this would provide the best possible ecological and socio-economic outcome for restoration of the heavily manipulated system. Following this, dredge spoil was excavated from the mouth area to allow the natural rejoining the Mfolozi and St Lucia mouths via a Beach Channel.

In May 2010, a group of researchers all specialising in the St Lucia-Mfolozi system held a workshop during which they presented their research alongside Ezemvelo KZN Wildlife in an investigation of the St Lucia – Mfolozi relinkage. These presentations were drafted into a technical report (Bate et al. 2011) commissioned by the WRC (WRC Project No. K8/930). The report dealt with all hydrological and physical aspects of reconnecting the two systems and provided several management recommendations with a sense of urgency conveyed by the attendees.

“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.” (Bate et al. 2011)

In 2014, a similar workshop was held with the primary aim of identifying research gaps within the system. The symposium culminated in a technical report (Whitfield 2014) commissioned by the WRC (WRC Report No TT 582/13) in which research regarding hydrology, geomorphology, wetlands ecology, floodplain rehabilitation, alien invasive species and biodiversity was outlined in depth by relevant experts.

In 2013, a book entitled “Ecology and Conservation of Estuarine Ecosystems: Lake St Lucia as a Global Model” was published by Cambridge University Press (Perissinotto R, Stretch DD, Taylor RH (Eds.)). The book’s main purpose was “to provide a compendium of accumulated knowledge by scientists and managers that have worked on the system over the last century.”. It outlines the history of the system and its management, research, as well as its hydrology, hydrodynamics, palaeontology, ecology, and sediment processes. It defines terminology, and discusses the lessons learnt over the centuries and includes key threats such as alien invasive species, anthropogenic developments, and possible climate change impacts.

### **3.2. Site visit**

The first site visit took place on the 2 – 4 November 2021. All panelists visited the mouth area, the western shores up to Charters Creek, the eastern shores up to Catalina Bay and the Mfolozi catchment area.

### **3.3. Hydrological and ecological data review and data collection**

A review of the international technical and scientific literature was conducted. Relevant published papers, books and technical reports were consulted to review the existing knowledge on the hydrology and geology of the system, the ecological function of the system over time, and the ecological response to mouth closure, siltation and other abiotic variables. Technical reports included the EWR and the GEF report, Whitfield et al. 2014, Bates et al. 2011. The book entitled “Ecology and Conservation of Estuarine Ecosystems: Lake St Lucia as a Global Model” by Perissinotto et al. 2013 was reviewed along with a list of peer-reviewed publications outlining almost 80 years of research on the St Lucia system.

Through a series of virtual meetings, several scientists were engaged regarding the breaching and management of the St Lucia Estuary. These meetings occurred between 8 – 12 November and 22 – 26 November 2021. The full list of scientists consulted is listed in Appendix II

Aside from a literature review, data were collated from several sources.

**Table 3:** Data requested and sourced to assist with the hydrological and ecological review of St Lucia and the impact of the breach.

Data type	Date covered	Source	Institution	Received as per request
Physico-chemical variables	2019, 2021	Dr N Carrasco	UKZN	Yes
Chlorophyll data	2019, 2021	Dr N Carrasco	UKZN	Yes
Estuary levels and salinity	2010 - 2021	Ms C Fox	EKZN	Yes
Crocodile, hippopotamus and bird counts	1957 - 2021	Ms C Fox	EKZN	Yes
Monthly rainfall	1970 - 2021	Ms C Fox	EKZN	Yes
Monthly rainfall	2010 - 2021	SAWS	SAWS	No

It is worth noting that the physico-chemical and chlorophyll datasets do not contain any 2020 data due to the COVID-19 lockdown restrictions experienced that year. Other key data for the informed management of the system were not available. Ideally an efficient ongoing monitoring programme would have been part of the park management but this is not the case and as such biological data are unavailable to determine the ecological impact of the breach. These include recent data of river flows for the major rivers that feed into the system, as well as rainfall data for the catchments of those rivers. Limited water level measurements were provided by EKZNW (C. Fox), but to an un-surveyed/unspecified datum.

In particular, turbidity, total suspended solids (TSS) and salinity were key physico-chemical variables considered in this review. Salinity is a measure of the salt concentration of the water, turbidity is a measure of visual clarity of the water based on light scattering and attenuation. Similarly, total suspended solids indicate the amount of solid material (>2 microns) per volume of water. Generally the more solids present in the water, the less clarity. A difference in levels of either turbidity or salinity would speak to the ecological impact of the breach on the system as these are key influential factors. Chlorophyll data here are used as a proxy for microalgal biomass (Huot et al. 2007) and informs the ecological function of the system.

Given the scarce quality of ecological data preceding and following the breach, simple comparisons were performed where possible and data are plotted over time.

### 3.4. Hydrological data analyses and modelling

A key driver of the status of St Lucia is the water, salt and sediment budgets<sup>2</sup> of the system. In particular the water and salt budgets, as reflected by water levels and salinities in the lake, drive the biological responses of the system as reflected in Figure 4. Therefore, these budgets are a basic tool that can be used to guide management of the system. For example they allow observational data to be assimilated into indicators of the health of the system, and can be

<sup>2</sup> The word “budget” or “balance” in this context is a process that tracks all the inputs and outputs of the system.

used to predict the outcomes of different management interventions. They should therefore be included in the context of a broader monitoring programme for the system.

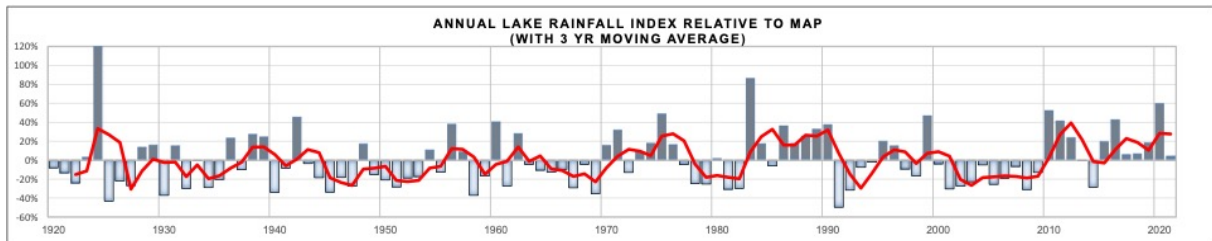
The water and salt balance of St Lucia was first investigated by Hutchison (1976), Hutchison and Pitman (1973, 1977) and Hutchison and Midgley (1978) but their work was limited to the managed open mouth period after 1952 with the Mfolozi separated from the Lake. Lawrie & Stretch (2011a, b) built on that work to include a variable mouth state, and also the analysis of the fate and transport of fine suspended sediments (see Stretch et al, 2013). Some of these developments were used in the subsequent GEF Project modelling work.

As part of the panel's investigations, the water, salt and suspended sediment budget model previously developed by Lawrie & Stretch (2011a,b) and Stretch et al (2013) was adapted and extended to include the most recent period following the completion of the GEF project and the re-connection of the Mfolozi River with the system. The objective was to explore if it can provide any insights into the development of the current situation. Details of the model, including the simplifying assumptions, are discussed in the above-mentioned publications.

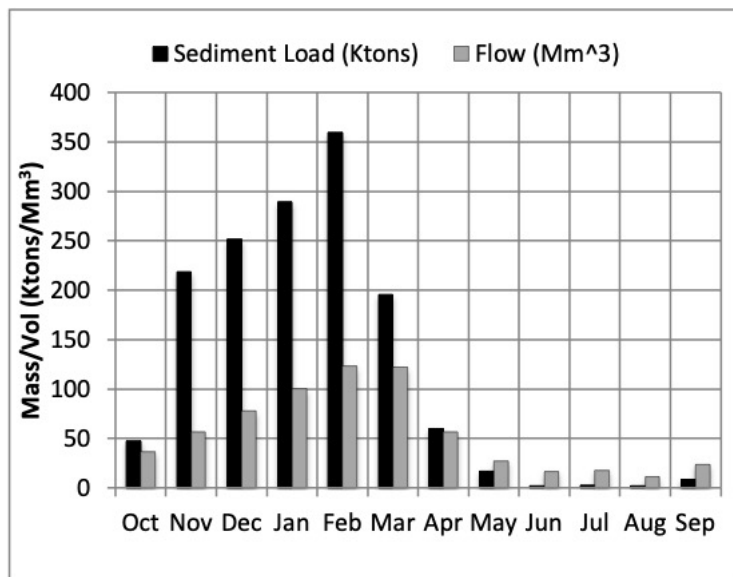
To calculate the water, salt and suspended sediment budgets on a monthly time basis, requires the following basic data:

- monthly inflows for all rivers feeding into the system. These includes the Mkhuze, Mzinene, Hluhluwe, Nyalazi, and Mpate rivers, groundwater inputs from the eastern/western shores of the lake, and inflows from the Mfolozi river (assuming it is linked to the system). The WR2012 resource centre can be consulted for detailed support for simulating monthly/daily flows (<https://waterresourceswr2012.co.za/>)
- Measured monthly rainfall and evaporation for the area. The 100-yr history of annual rainfall for the St Lucia area is show in Figure 7 and illustrates the variability over decadal time scales such as the occurrence of droughts and floods.
- Data related to the mouth state behaviour such as the water level at which overtopping and breaching of the berm takes place (which may reflect either a naturally occurring level or an artificially managed level), and the monthly averaged outflows required to keep the mouth open.
- Suspended sediment concentrations in the Mfolozi river for various flow rates. A monthly distribution of average flows and suspended sediment yields is shown in Figure 8, based on turbidity measurements at the Mtubatuba water works and supplemented by application of the ACRU model (refer Stretch et al., 2013). The sediment yields are highest during the months November to April, with much lower values during the dry season from May to October. Furthermore higher yields occur at the start of the rainy season.
- Flow rates and suspended sediment concentrations (SSC) during breaching outflows that occur at the end of closed mouth periods. Since there is no known direct flow measurements available for these events, the flow rates were inferred from hydraulic models of the Narrows for different lake levels. SSC data during these events are also unavailable but have been estimated in a similar manner to those estimated for the Mfolozi river, and are linked to the flow rates (refer Stretch et al, 2013 for details)

- Suspended sediment concentrations (SSC) during tidal exchange flows when they occur during open mouth phases. Details of this process and associated SSC estimates are given in Stretch et al (2013).



**Figure 7:** Annual rainfall index for the St Lucia lake catchments during the last century, defined as the deviation from the mean normalised by the mean. The 3-year moving average is also shown. Note that rainfall for the last decade has been adapted from records provided for the rain gauge at the eKZNW offices in the St Lucia town (adapted from Fig 7.2 in Stretch et al. 2013)



**Figure 8:** Seasonal average flows in the uMfolozi River and associated average suspended sediment loads derived from turbidity data between 2000 – 2010 at the Mtubatuba Water Works. (adapted from Figure 7.19 in Stretch et al. 2013)

We note that there are important limitations regarding the data that was made available to the panel for analysis. Rainfall was only available for a single station situated at the KZN Wildlife offices in the town of St Lucia. This site’s rainfall is not an accurate representation of the rainfall over all the lake catchments, nor for the catchment of the Mfolozi river. A request to SAWS for additional distributed rainfall data was not fulfilled in time for the panel’s analysis. To address this limitation, the available data from KZN Wildlife was adjusted to produce a reasonable statistical match to available historical rainfall data for the Mfolozi and Lake catchments respectively, and these adjusted data were used for the last decade from 2011 – 2022. Furthermore, since recent streamflow data for the rivers were also not available, the adjusted rainfall data were used to simulate river inflows from the lake catchments and from the Mfolozi river using the technique outlined in Lawrie & Stretch (2011a).

As outlined previously, applications of the above-mentioned modelling tool can provide some management guidance. For example a “maintenance” breaching program can be assessed for its effectiveness in terms of long term implications on the water, salt and sediment balances of the system, and their associated impacts on the overall functioning of the system. The model is currently set up to simulate the last 100yrs at monthly intervals. The effects of different breaching levels, or of making breaching dependant on other specified factors, can thus be assessed using the model by simulating “what-if” scenarios.

### **3.5. Socio-economic data collection**

The socio-economic review of the report was generated utilising social research methods. In particular, qualitative research methods were utilised to collect and analyse the data. Social research focussed on describing the event from the point of view of the participants, these data are useful to address “real life problems”. This is because social research responds to local needs, is embedded in its social context, and creates real life meanings. The information collected is context-bound. Thus social research builds theory from the practice.

The suitability of the social research methods in this context is threefold

- a. Social research is rich in context and does not claim to present neutral facts. This is different from research methods that follow mathematical formalism which creates abstract models and use them to explain aspects of reality and make predictions about the future or policy advice (Spash and Asara 2017). This provides context to the St Lucia system which is often discussed from a quantitative, mathematical perspective.
- b. Social research highlights the weakness of a one-size fits all jacket especially in policy development. Equally, it acknowledges local specificities and highlights the voice and agency to local participants. The results of social research are less generalizable but remain useful to the case study area or similar case area. It is concerned about policy consequences of its arguments. In the case of St Lucia (or iSimangaliso Wetland Park), actors are extremely variable in terms of race, culture, income bracket, and livelihoods. Interests are varied and social research allows these nuanced perspectives to be captured.
- c. Social science research recognises the plurality of sciences including traditional knowledge. It acknowledges that each field of knowledge makes its contribution sometimes independent of other field/s. For example, biology cannot be understood from physics. Similarly, experiments in physics do not necessarily result in an improved understanding of biology. In the St Lucia context, the social issues cannot be addressed simply using studies of ecology and hydrology. While a certain environmental reality must be at the core of all decisions, the needs and knowledge of all actors must be addressed in line with South Africa’s legislation.

Primary data were collected using interviews, witness accounts, field observations, photographs, presentations made by participants, and written material from public sources. A series of stakeholder meetings were held with focus groups belonging to various sectors. These meetings are detailed in Appendix II.

Internal stakeholders included staff members at iSimangaliso Wetland Park Authority, People and Parks, the Department of Forestry and Fisheries, the Department of Water and Sanitation, and the Department of Agriculture.

External stakeholders included large-scale farmers, small-scale farmers, tour operators, ratepayers, fishers, community representatives, women and youth from Sokhulu, Khula Village and Dukuduku, traditional council from Mtubatuba and Sokhulu, social entrepreneurs, and interested parties. Here it is worth noting that the community of Nibela was unavailable for engagement largely due to tensions associated with long-term dispute between management authorities and the communities.

The format of the meetings held between 15 – 18 November 2021 allowed for any attendee to comment or present to the panel. This was followed by a discussion around follow up questions the panel members posed to the attendees or any further comments attendees put forward.

Between 7 – 8 February 2022, panel members visited Dukuduku and Sokhulu for a participatory discussion to engage with communities that don't have ease of access to 'town hall meetings'. Furthermore, the panel sought to ensure adequate community representation in terms of gender and age, as women and youth are often under-represented in public participation processes. The fundamental basis for discussion centred around questions about the St Lucia Estuary which were based on the four terms of reference, simplified and translated into isiZulu. These questions were posed to community participants by panel members and are listed as follows:

- a. What is the St Lucia Estuary?
- b. What is the ecological and agricultural importance of the estuary if any?
- c. What is the community understanding of estuary maintenance?
- d. Do communities understand the economic importance of the estuary in terms of benefit/opportunities for social entrepreneurs or small black-owned businesses bordering the park?
- e. Is there any visible and productive involvement of black communities in the estuary matters, even if it is through available community representative structures?
- f. Are there any black businesses in this community that can be directly linked in any way to the existence of the estuary mouth?
- g. In which economic/business sectors are communities involved in and how beneficial are these?
- h. If there are no benefits are there any suggestions on how the community could benefit/should be benefitting?
- i. Would this community have any traditional knowledge that can be shared with the panel on how the mouth was maintained before there was interference (artificial opening)?
- j. Are there any specific issues that as a community you would want the panel to consider when engaging the minister through the report they will be compiling?

Site visits were also undertaken to view Sokhulu fields, the Butterfly House in Khula Village, and the Maphelane mouth which remains closed.

### **3.6. General public comments**

A Government Notice was gazetted from 20 January 2022 for a period of 30 days (ending on 19 February 2022). The Notice called for public comment regarding the 2021 breach event (Appendix III). A total of 17 comments were received from 16 respondents (Appendix IV).



## 4. The significance and impact of the breach

This section specifically addresses the first Term of Reference i.e. “Advise on the significance and impact of the artificial opening of the estuary mouth and how this relates to the implementation of the GEF 5 project interventions and the St Lucia estuary management plan”

### 4.1. Defining breach terminology

Before discussing the significance of the breaching event, it is helpful to clarify the terminology that has been used to refer to the breaching event by the scientific task team and other stakeholders. Here specifically we define ‘natural breaching’, ‘artificial breaching’, ‘nudging the system towards breaching’, and ‘skimming the berm to cause breaching’.

- **natural breaching** refers to a process where water levels naturally increase to overtop the beach berm that typically attains elevations of 2.5 – 3.5 mMSL in St Lucia through wave and wind action. There are no direct human interventions in this process.
- **artificial breaching** refers to a process where earth-moving machinery (or related mechanical means) are used to excavate a channel through the beach berm to initiate a flow of water from the estuary to the sea. Once initiated, the flows can scour and enlarge the size of the breach channel by natural processes.
- **nudging the system towards breaching** refers to the use of unspecified processes (e.g. reducing the height or width of the beach berm) to encourage the breaching of the berm and outflow to the sea, thus initiating a breach of the berm. This seems to be used as an alternative term for **artificial breaching**, perhaps indicating an intent to minimize the scale and impact of the interventions.
- **skimming the berm to cause breaching** refers to a process where the height of the beach berm is artificially lowered by mechanical means, to facilitate overtopping to occur at lower levels than those that are naturally attained by the berm without human intervention. This term refers to a specific type of “nudging”

### 4.2. Management context and the EWR

An adaptive management strategy informed by improved understanding through science based on monitoring and evidence is key to the management of St Lucia working with nature not by engineering and control only, but complementarily. The lonely built engineering approach without consideration of the nature-based solution or ecological infrastructure has failed since the 1950s’ manipulation of the system until 2002.

It is important to note that the judgement of the supreme court of appeal of South Africa (case No.873/2017; ZSCA 144, 1 Oct 2018) ruled in favour of iSWPA where one mouth of the combined uMfolozi/Msunduzi open into St Lucia lake estuary (and was not artificially breached to alleviate back-flooding), then naturally into the ocean via the St Lucia mouth. Regardless of the intensity of effects, breaching clearly sets a precedent and must be carefully considered, planned for, and monitored if carried out.

In the case of St Lucia, the natural flows within the system and connection to the ocean requires the input of these feeder rivers so that lake meets the specifications of the EWR (DWS 2016). The critical water balance outlines the following requirements in order to sustain an ecologically functioning St Lucia estuary mouth.

- It is estimated that the combined Present Day MAR for all the rivers discharging directly into the St Lucia Lakes (Mkuze, Hluhluwe, Mzinene, Nyalazi) must be increased by 3.8 m<sup>3</sup>/s and that of the uMfolozi by 1.3 m<sup>3</sup>/s to improve the Present Day health of the estuary from a category “C” to “B”.
- The minimum flow from the uMfolozi catchment required to keep the mouth of the St Lucia estuary open is estimated to be between 1.5 and 3.0 m<sup>3</sup>/s, based on historical data. However, given the uncertainties in the measurement flows, particularly in this catchment, it is recommended that flows should not be allowed to drop below 3.0 m<sup>3</sup>/s more than 30% of the time.
- Under Reference conditions flows should exceed 3.0 m<sup>3</sup>/s at least 76% of the time.
- The study concludes that all recommendations for estuaries should be included in Estuary Management Plans.
- Finally, Lake St Lucia estuary mouth should not be breached artificially except in emergency or when exceptional circumstances prevail (e.g. if the berm height rises to >3.5 m MSL). This will allow more river flow north through the Narrows towards the Lake during droughts and, when breaching occurs naturally, it will open up a large mouth with a significant tidal flow.

The catchment currently delivers lesser water than required (Table 1). Furthermore, it does not appear to have been considered or referenced in the management plans of the St Lucia estuary.

#### **4.3. The St Lucia Estuarine Management Plan**

As outlined in section 3.1., the St Lucia EMP states that management should continue to limit artificial breaching adding “and then only for ecological reasons...”. It is unclear what defines and ‘ecological reason’ in this context.

Section 1.1. of the EMP clearly states that the EMP forms part of the Integrated Management Plan (IMP) which includes the Environmental Management Programmes or Maintenance Management Plan (MMP). This is the operational plan which provides authorization for certain activities based on environmental impact assessment. This plan is approved by the DFFE. In line with this, we discuss the MMP.

#### **4.4. The Maintenance Management Plan (MMP)**

The MMP contains a set of Listing Notices for maintenance. In June 2019, a letter from iSWPA requesting permission to carry out specific Listed Activities (including Activities no. 19 and 19A) without an EIA was issued to DFFE for approval (Appendix V). Following a site inspection, approval was granted (Appendix V).

Therefore, since excavating the dune at the St Lucia mouth was a short-term intervention and an approved maintenance activity, it required no application for an EIA. The MMP (Chapter of listed activities and exclusions) makes it clear that the breaching, dredging or soil removal in the estuary must happen where it has been happening since the early 1970s. Chapter:4 of the MMP lists all applicable legislation at the time of drafting/approval, while Chapter 9 specifically section 9.21 lists critical issues to be considered in breaching estuary as a maintenance activity. The following were extracted as they relate directly to breaching:

- The place at which an estuarine mouth should be breached should accurately be positioned as there is often considerable controversy concerning the location where a mouth breaching should take place. This should be done even if a greater amount of sediment needs to be excavated, because this is the optimum position for a successful breaching. However, in the case where breaching has historically been undertaken at a particular and same point (such as in the St Lucia Estuary system) this must not be altered.
- An estuary mouth is highly dynamic and unforeseen events may require special management actions. For example, if the mouth stays open for a very long period it may migrate and start to cut into dunes. No specific levels of height and width of a sand berm at the mouth of an estuary during breaching have been determined at this stage, as this is usually considered together with all the other factors discussed during the practical breaching process and will be included in site specific measures. However, precaution on the channels should be considered
- The beginning of spring (September), to ensure ecological functioning and to coincide with the end of the hydrological year. Normally the mouth should be breached about three/four days before the spring tide in September. Early in September is more beneficial for fish.

Therefore in the panel's view, iSWPA performed the breaching within the mandate as approved through their Maintenance Management Plan as a sub-section of the EIA and aligned to the prescriptions of related legislations as mentioned earlier. Furthermore, written clarification was requested by iSWPA from DFFE on the 14<sup>th</sup> December 2020 (Appendix VI). A representative from the EIA branch of DFFE (Virtual meeting - 14 Jan 2022) confirmed that DFFE approved and advised that breaching was in line with MMP. The letter of approval is attached in Appendix VI.

However, it remains to be proven if the Authority complied to its well outlined legislation and plans. The Inspection Report (Appendix V) clearly states that the Department of Water and Sanitation must be engaged to deal with the issue of flooding on farms. It is unclear whether or not this engagement occurred and no evidence is presented to support such an engagement. Additionally, breaching time, position and approach, including monitoring are just but some of the aspects of utmost importance outlined within the MMP.

MMP Appendix 3, Section A3.3 on compliance monitoring requires amongst the recordings, the following:

iSimangaliso Wetland Park is responsible for continuous monitoring of the conditions in the catchment when water levels become elevated. This can be done at advisory committee/forum meetings or as email communications summarising critical aspects. Monitoring should include the following:

- The actual and expected rainfalls in the catchment
- The water level in the estuary and its rate of increase
- The height and width of the sand berm at the mouth
- The water quality conditions
- Biotic response, such as fish aggregation at the mouth, die-back of macrophytes, formation of algal blooms, bird nesting behaviour

When emergency conditions develop demanding urgent breaching, some of the EMP prescriptions can be waived (but compliance to NEMA section 30 should never be waived), however this must be monitored constantly, and communicated to affected and interested

stakeholders. A breaching report must be produced and form part of the annual reporting. It must carry as detailed information as possible including motivation, and processes followed. This is critical as a lesson for future breaching. The emergency conditions are however not defined leaving the MMP open to interpretation. The MMP also does not involve EWR an exceptional circumstances contained in EWR. Lastly, monitoring records are not clear beyond Ezemvelo KZN Wildlife's standard set of records. A report was produced by iSWPA in April 2021 (iSWPA 2021) but omits several key monitoring indicators.

#### **4.5. GEF recommendations**

In line with the recommended option of facilitating a joint mouth, the GEF report suggests that no artificial breaching should take place. Instead the report suggests that the system could be altered in other ways such as the deepening of the beach canal, removal of alien vegetation, a reduction in water abstraction and partial floodplain restoration. Furthermore, the GEF reports recommend extensive monitoring to modify the recommended plan and to provide feedback.

The January 2021 artificial breaching went against the GEF report recommendations which clearly states that no artificial breaching should take place. The lack of detailed monitoring as outlined by the report further goes against recommendations.

While it is necessary for science to inform policy and authoritative documents, ultimately it is the IMP or MMP which are the official documents used to manage the system. It appears that the GEF report is acknowledged in the EMP (page ii – Preface) however, the recommendations are not discussed nor are they implemented any further.

## **5. Exceptional circumstances leading to the breach**

This section specifically addresses the second Term of Reference i.e. “Advise on the exceptional circumstances, as defined in the estuary management plan, that lead to the decision to breach the mouth, including those of an environmental, social, and economic nature”

### **5.1. Defining exceptional circumstances**

The EMP recognizes that artificial breaching can be ecologically damaging and states in section 2.5.1. that “This policy of minimum interference in the estuarine system to facilitate as much natural functioning as possible, limiting artificial breaching and then only for ecological reasons, will continue to be implemented.” However, these ecological reasons remain undefined.

St Lucia's EWR does refer to artificial breaching (Table 7.1., page 235, volume I – DWS 2016) and states that “Lake St Lucia estuary mouth should not be breached artificially except in emergency or when exceptional circumstances prevail (e.g. berm height rises to >3 m MSL). This will allow more river flow north through the Narrows towards the Lake during droughts and when breaching occurs naturally it will open up a large mouth with a large tidal flow.”. The EWR estimates that the water level should reach 2.5 – 3.0 mMSL before breaching should occur. In line with this, a berm height > 3.0 mMSL could be considered an “exceptional circumstance”. This is also justified in terms of the flow of water required to

flush sediment out of the system and to carve a substantial opening for adequate tidal exchange.

## 5.2. Ecological circumstances

While the “exceptional circumstances” are mentioned in the EWR, only one example of berm height is provided and they remain unclearly defined both in this report and in the authoritative documents (the EMP, IMP and MMP). Other possible ecologically-motivated circumstances are discussed further here:

- a. Unprecedented, closed mouth state – Although the last opened mouth (2012 – 2014) occurred along the beach canal linking the Mfolozi and St Lucia mouth, both systems experienced marine connectivity during this time. The closure of the mouth and lack of marine connectivity has lasted since then leading to a closure of 6 years and 3 months until the artificial breach. This is the longest period of mouth closure, the second longest being the 5 year 1 month period of closure between Cyclone Gamede (August 2007) and the breach of the beach canal (September 2012). Since the St Lucia mouth was allowed to close naturally in 2002, long periods of mouth closure appear to be standard.
- b. Berm build up – An exceptional berm height is clearly defined in the EWR as 3.0 mMSL berm height. There is no evidence that the berm had built up beyond this height and the breach level (1.25 mMSL) was substantially lower than this recommended height.
- c. Sedimentation accumulation – Sedimentation has been an ongoing issue within the St Lucia system for several decades. In the past, authorities responded to sedimentation by dredging (Taylor 2013). Dredging has since been ceased and information from an overwhelming body of literature indicate the detrimental ecological impacts of this practice on water quality, nutrient resuspension, sediment chemical composition, light availability, terrain modification, and benthic fauna (Morton 1977, Johnston 1981, Nayar et al. 2007, Ohimain et al. 2010, Manap and Voulvoulis 2016, Fraser et al. 2017, Rehitha et al. 2017, Caballero et al. 2018, Okoyen et al. 2020, Borland et al. 2022 and references therein). This subsequently affects the overall function of estuaries and is not recommended for the St Lucia system.
- d. Prolonged freshwater state – Aside from an occasional brief increase in salinity, a freshwater state has persisted at the mouth and within the Narrows since November 2017 (EKZNW, unpubl. data). Although this is a fairly prolonged state, it is important to note here that a freshwater state is one of the many states of the St Lucia system and does not necessarily constitute an exceptional circumstance.
- e. Alien invasive species– The proliferation of two floral invasive species (i.e. *Tamarix ramosissima* and *Casuarina equisetifolia*) and one faunal invasive species (*Tarebia granifera*) around the mouth was cited as a concern and evidence for the need of marine connectivity. The proliferation of these species at the mouth has certainly been observed and recorded and is cause for concern (iSWPA 2021). *T. ramosissima* and *C. equisetifolia* appear to be colonizing the mouth region which will lead to greater dune stability and possibly inhibit breaching. The gastropod *T. granifera* has colonized the reeds and mangrove area around the mouth and disrupts the behaviour and ecology of native counterparts (Raw et al. 2013, Miranda and Perissinotto 2014).

- f. Emergent and submerged vegetation in the Narrows and the uMfolozi-Msunduzi rivers – visual observation, satellite imagery, and ongoing reports (Fox and Mfeka 2020b) confirm that reeds are encroaching and constricting water flow. Although reed harvesting is a common practice, there is no control for this encroachment and flushing of the system combined with a substantial increase in salinity could theoretically control this growth (Adams and Bate 1999).
- g. A decrease in biodiversity of fauna within the system – Aside from a decrease in hippo numbers at the mouth, hippos, crocodiles and bird counts were not significantly lower compared to open mouth conditions (EKZNW, unpubl. data). A lack of monitoring of other biota means that it is not possible to substantiate a decrease or shift or decrease in biodiversity aside from an estuarine to freshwater shift in zooplankton (Jones et al. 2020).
- h. A decrease in the nursery function of the estuary – The St Lucia system has been closed to the ocean since 2014 (Forbes et al. 2020). This does indicate that it has been unable to function as a nursery for marine species during this time. Whitfield (2021) discusses this loss of estuarine function in terms of the flathead mullet *Mugil cephalus*. Whitfield (2021) demonstrates that even though marine connectivity does occur via the uMfolozi, this link is insufficient for substantial migration of fish into and out of the St Lucia system. As such, for the St Lucia system to regain its nursery function, a direct mouth opening would be most effective. Considering this, the closure of the St Lucia mouth itself since 2007 does raise a concern regarding the nursery function of this estuarine system.

### 5.3. Socio-economic circumstances

The exceptional circumstances listed, in line with the EMP, do not account for social or economic circumstances. Although it can be argued that socio-economic and humanitarian issues are linked to ecology e.g. the ecological effects of disease-causing biota affecting human health or tourism success and appeal linked to the ecological health of a system. However, these links are not often highlighted in an ecological context which drives the separation between ecology and social/economic issues. Other potential socio-economic circumstances are discussed here:

- a. Back-flooding – a closed common mouth creates back-flooding where farms lying within the EFZ are inundated and crops are lost. These losses have been presented to the panel by both the uMfolozi Sugar Planters (UCOSP) and the small-scale farmers (Appendix VII). Back-flooding is linked to a number of ecological reasons including sediment accumulation and vegetation blockage in the uMfolozi and Msunduzi channels. The flooding of this land has effects beyond crop destruction including mosquito infestations and proliferation of other disease vectors, as well as crime due to reduced income. Although the solution requested by farmers (i.e. to open the uMfolozi mouth directly to the sea) was overruled by the 2018 court verdict, alternative measures to alleviate back-flooding could include clearing the channels of encroaching vegetation.
- b. Damage to infrastructure – the rising water levels caused flooding of jetties, slipways, boardwalks and other infrastructure around the St Lucia system (Fox and Mfeka 2020a). Aside from being unable to make use of these facilities, the financial cost of damage is unknown.

- c. Decrease in tourism and recreational angling – tour operators reported a decrease in recreational angling, a reduced ability to traverse the Narrows due to sediment accumulation, and highly turbid waters leading to reduced megafauna sightings. The economic costs associated with these reports are unknown. In March 2020, COVID-19 lockdown restrictions placed a further strain on tour operators and tourism-related jobs.
- d. Reduction in fishing success – The panel was unable to engage with small-scale fishers during this period. From attendance of the October 2020 symposium and subsequent records, it was noted that vegetation encroachment lead to reduced access to the lake by fishers. Fishers also highlighted the closed mouth as a reason for lower fish catches citing that “water does no longer go to Nkundusi”. Nkundusi, an area in Dukuduku borders the south of False Bay.
- e. Increase in community – conservation conflict – the management of the mouth seems to be linked to the perception of iSWPA as an authority. Several stakeholder groups were in favour of the breach and maintained the perception that the breach would restore the ideal function of the estuary. Here it is important to note that St Lucia as a dynamic system cannot necessarily be confined to one ideal state without a substantial amount of anthropogenic intervention.

## **6. The impact of the mouth opening on the functioning of the estuary and wetland system**

This section specifically addresses the third Term of Reference i.e. “Advise on the impact of the mouth opening on the functioning of the estuary system and the wetland system as a whole, as well as the associated environmental, social and economic implications”

### **6.1. Hydrological, hydrodynamics and sediment dynamics**

A sample of results from 100-yr simulations using the model (refer to section 3.4) are shown in Figures 9 and 10. These results are from simulations with specified breaching levels of 1.25mMSL and 2.5 mMSL respectively. The former was the level used for artificial breaching in January 2021, while the latter is similar to the levels reached in February 2022 (although not breached). Natural breaching levels are typically in the range 2.5 – 3.5 mMSL.

The model results suggest the following:

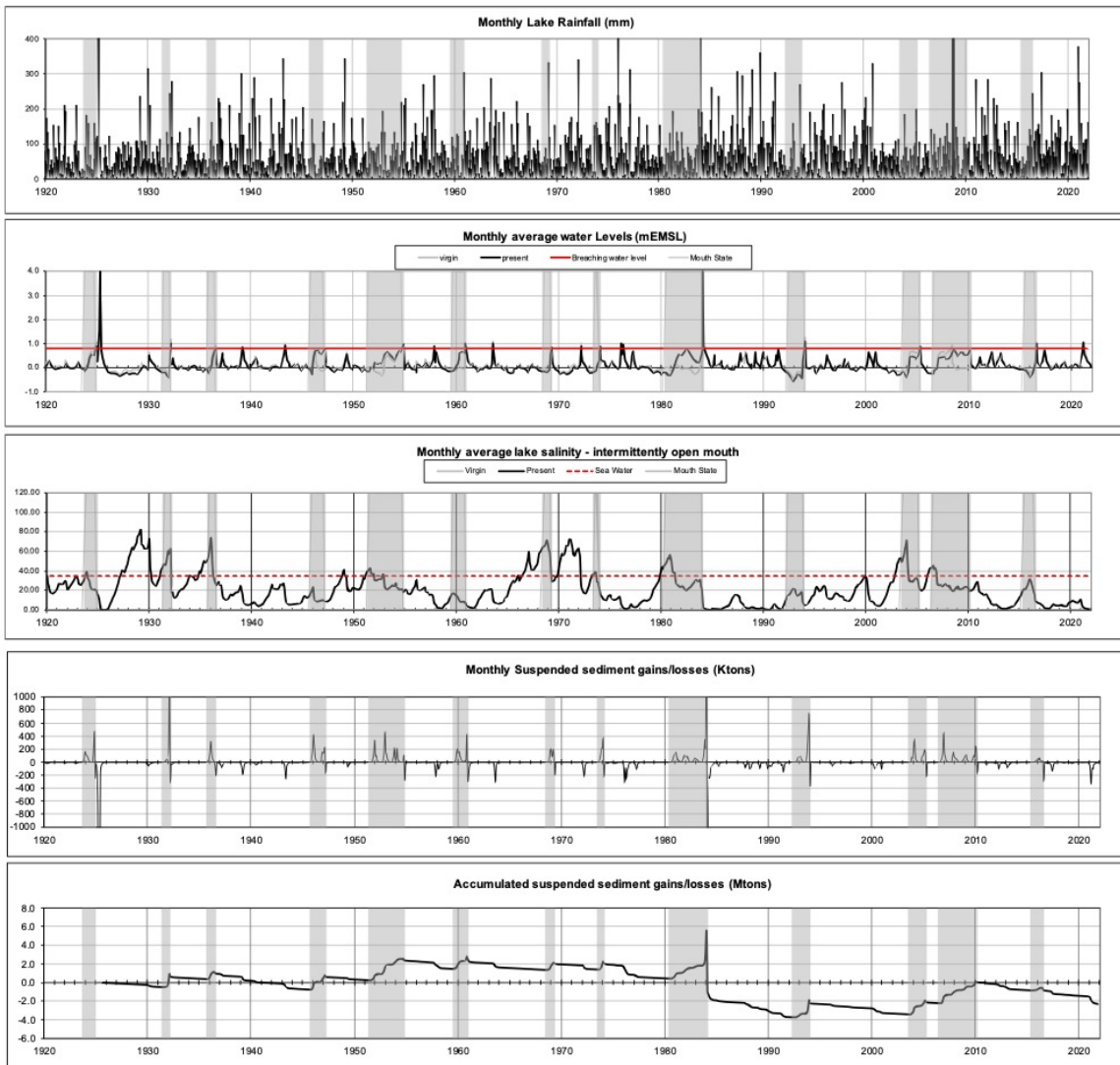
- In terms of mouth states, the results show how lower breaching levels result in an increase in an open state from 67% (at 2.5 mMSL) to 79% (at 1.25 mMSL), with the average duration of open mouth periods increasing from 5.4yrs to 6yrs respectively.. Note that these mouth states are not observed, but are predicted by the mouth state model. There are no detailed mouth state observations available for the 100-yr simulation period, so a mouth state model is required. If specific observations are available they can be used instead of a model.
- In terms of the water balance, the lower breaching level significantly reduces the Mfolozi contribution to the lake’s water balance from 160 Mm<sup>3</sup>/yr to 93 Mm<sup>3</sup>/yr.
- In terms of the salt balance in the system, with lower breaching levels the reduction in inflows from the Mfolozi are replaced by sea water inflows during the open periods

which in turn means that median salinities in the lake are increased from 14 to 19 PSU, and the occurrence of hypersaline conditions (> 35 PSU) increase from 11% to 16%.

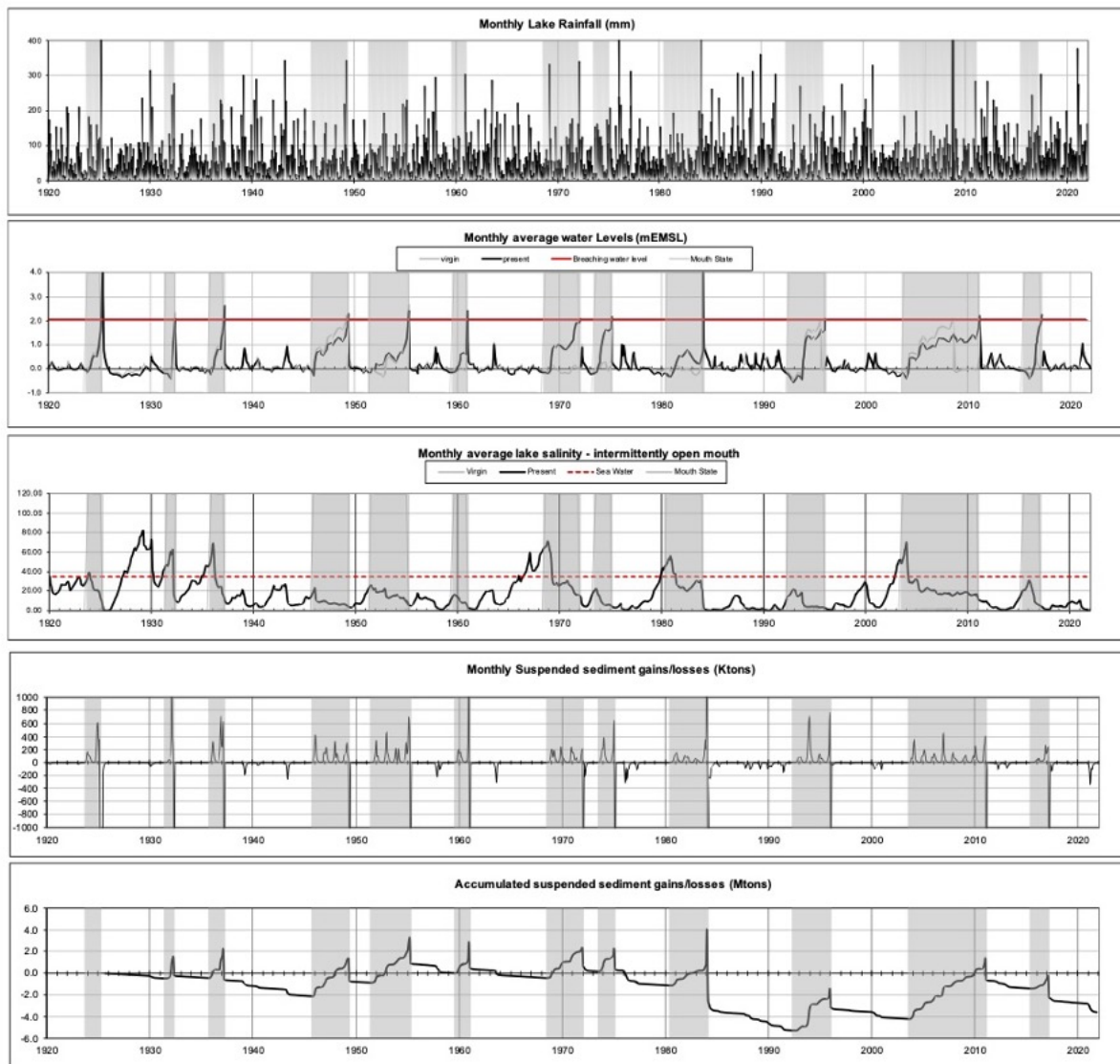
- In terms of the suspended sediment budget, because of the reduced Mfolozi contribution to the water balance for lower breaching levels, the suspended sediment inputs are also reduced from an average of 370 ktons/year (at 2.5 mMSL) to 215 ktons/yr (at 1.25 mMSL). However higher breaching levels remove more sediments during breaching events, so that gains and losses can approximately balance each other in either case i.e. where long closed mouth periods are combined with high breaching levels or vice versa.

The results show that a significant build-up of sediments can take place during extended closed mouth periods, which tend to occur when breaching levels are higher. However, this is balanced by a greater removal of sediments due to the stronger breach outflows in those cases. In situations where the system is artificially breached at low levels after a long closed period, this balance will not occur, as was the case during the recent breaching. As a caveat, we note that there are uncertainties in the sediment balance modelling that require observational data for further calibration and validation. The effects of increases in the sediment loads in the Mfolozi can be investigated using the model, but that analysis should be informed by additional observational data. It is worth noting here that the model results confirm that extended periods of closed mouth conditions can lead to a substantial build-up of fine sediments in the Narrows, with values similar to those estimated and reported to us on site for the current situation (about 5 Mm<sup>3</sup> between the beach and the bridge). Details of how that estimate was obtained are unclear.





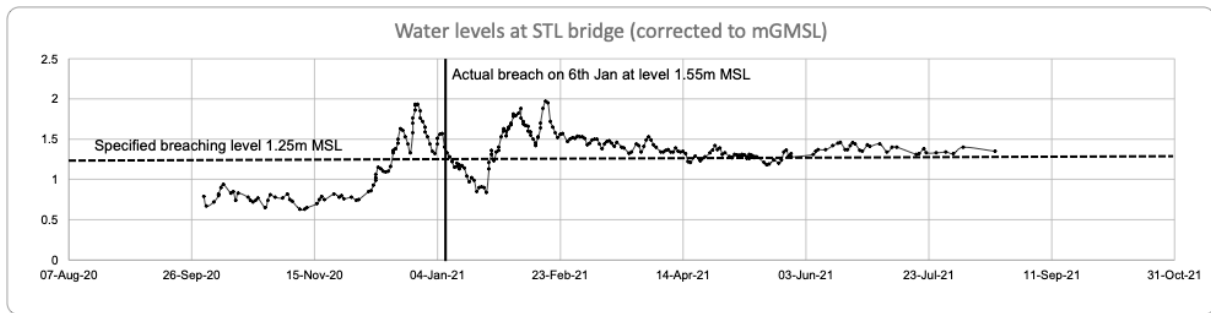
**Figure 9:** Time history simulations of the last 100yrs using a breaching level of 1.25 mMSL  
 The grey-shaded areas indicate periods with a closed mouth



**Figure 10:** Time history simulations for the last 100yrs using a breaching level of 2.5 mMSL. The grey-shaded areas indicate periods with a closed mouth.

Hydrologically, the rainfall index shown in Figure 7 suggests that the breach occurred during a relatively wet period compared to long term average rainfall values. However, as previously noted in section 3.4., the data used for the most recent decade may not be representative of the broader catchment rainfall. Therefore, any conclusion on this issue needs to be informed by more widely distributed rainfall data for the catchments feeding into the system.

In terms of tidal hydrodynamics, it appears that the mouth breaching did not result in significant tidal exchange flows, although no detailed monitoring data are available to confirm it. This can be attributed to the initial dominance of the outflows driven by additional rainfall associated with cyclone Eloise (Fox and Mfeka 2021a) that increased lake water levels after the breaching occurred (Figure 11). The constricted conditions in the mouth region due to accumulated sediments, would also have played a role in limiting the tidal exchanges.



**Figure 11:** Recorded water levels around the time of breaching in Jan 2021.

The breach was timed to coincide with the high summer rainfall and associated high estuary water levels. However, the recommended level was 1.6 m at the bridge gauge plate (approximately 1.25 mMSL). This water level was too low to drive sufficiently high outflows for effective flushing of the large amounts of fine sediments that had accumulated during the preceding 6-yr closed period. Since the size of the breach is related to the volume of the breach outflows (Stretch & Parkinson, 2006) this also implies that the duration of the open mouth was not maintained for as long as it may have been with higher breach levels and associated higher outflow volumes. Nevertheless, salinity profiles shown in Figure 12 indicate some influx of salt water into the system during the open mouth period.

## 6.2. Ecologically

Generally in the context of St Lucia, ecosystem function is discussed in terms of fish and prawn abundance. This is sensible as the estuary is a key nursery habitat and fish are visible so they are good bioindicators of nursery function as well as provisioning ecosystem services. However, simply basing ecological function on fish counts is insufficient as it excludes the many other functions that the estuary plays. Climate regulation, water regulation, sediment retention and fertility, primary productivity, nutrient cycling, waste absorption and the provision of non-consumptive raw materials are some examples of ecosystem services that are not measured by the presence of fish and that the St Lucia system offers. Some of these services are intangible and are thus not easily measured visually with the service often being downplayed.

Since data were not collected before and after the breach, it is difficult to draw significant conclusions regarding the biological and ecological impacts of the breach. However, in the absence of ecological data (including invertebrate diversity and abundance measured by sampling meiofauna, macrofauna and zooplankton populations), salinity (collated from two sources), and turbidity are discussed in terms of the effects on ecology. These two variables were selected due to the availability of data as well as their direct influence on ecology, their relevance to freshwater inflow and closed mouth conditions. Using these data as well as the extensive literature published on St Lucia ecology and similar systems, we discuss the impacts of the January 2021 breach.

After close to a decade, the St Lucia estuary was opened at its mouth for 5 months from January to June 2021. During this time, there was an influx of sea water but no significant scouring of the system occurred. There was also high rainfall during this time due to the effects of Cyclone Eloise.

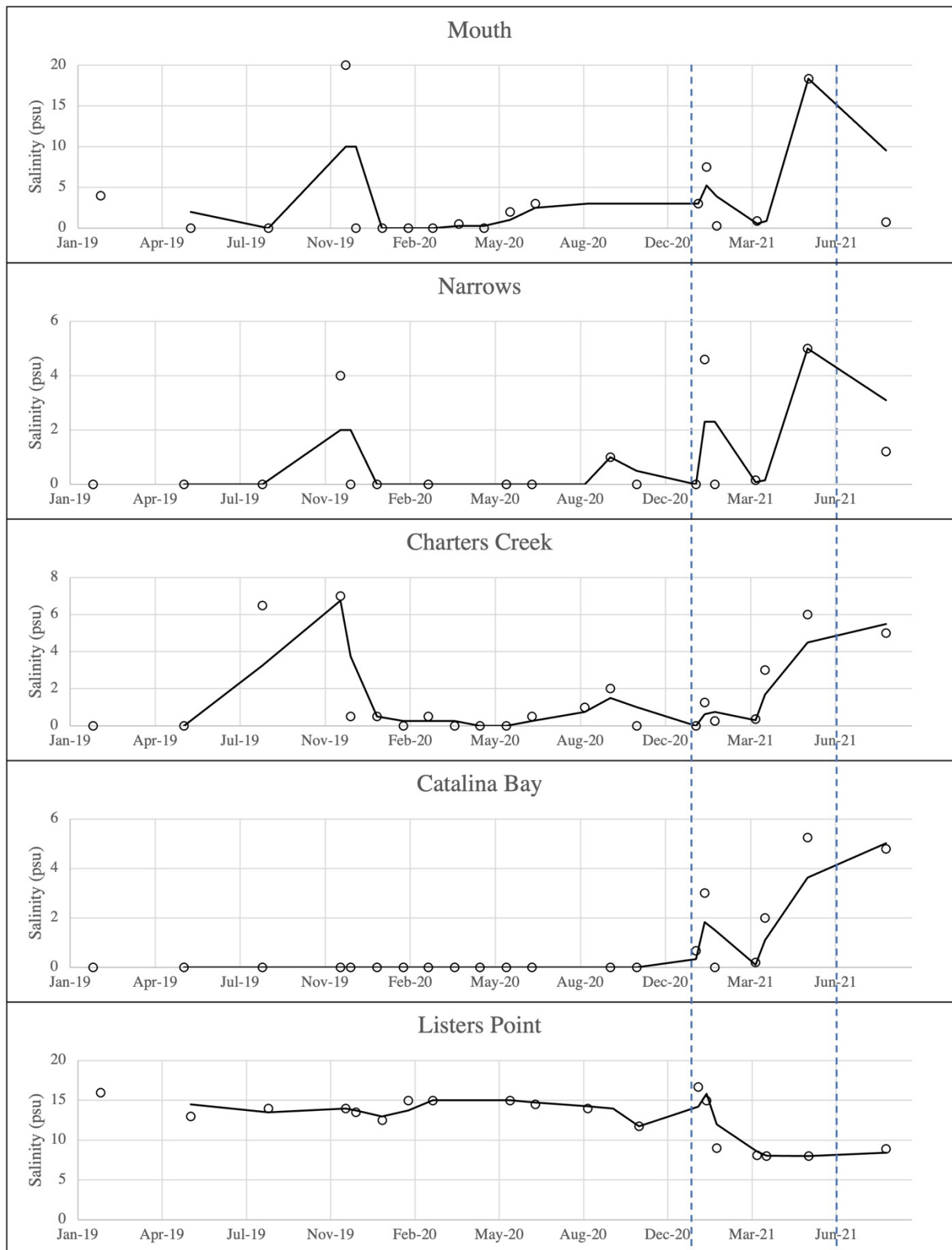
### 6.2.1. Salinity

Salinity values are indicated for five representative stations in Figure 12. Following the breach, salinity increased in the mouth, the Narrows and the South Lake (Charters and Catalina Bay). Initial low salinity following the breach is also due to high rainfall recorded during this time. Listers Point in False Bay is the only site which recorded a decrease in salinity, this is most likely due to the distance from the mouth (and thus low/no marine connectivity) as well as high rainfall. Salinity did not exceed 20 at the mouth and remains below 8 for the Narrows, Charters Creek and Catalina Bay. This is nevertheless a change from the freshwater conditions preceding the breach event. Salinity generally fluctuates within estuarine systems depending on the level of marine inflow and rainfall. The fauna inhabiting these systems are either tolerant to a wide range in salinity or require a specific salinity level between freshwater (0 PSU) and seawater (35 PSU). The St Lucia system is undergoing a freshwater phase, with an open mouth and a shift to brackish conditions (0.5 – 30 PSU), a more diverse range of organisms could occupy this habitat.

The repopulation of marine fish species was observed within a relatively short amount of time (Whitfield 2021, R Daly 2021, Fox and Mfeka 2021b). However, the impact on the freshwater fish species was detrimental with large numbers washing up. These included the Southern Mouthbrooder (*Pseudocrenilabrus philander*), Nile Tilapia (*Oreochromis mossambicus*), Straightfin Barb (*Enteromius paludinosus*), and the African Sharptooth Catfish (*Clarias gariepinus*).

Another expected impact of increased salinity was a reduction of extensive reed growth (*Phragmites australis*). From visual observations, it is evident that there was no impact on these dense reed beds. Adams and Bate (1999) examined the tolerance of *P. australis* to saltwater inundation and found that if freshwater was supplied to the roots in the form of groundwater, the species could survive marine inundation for an extended period of time. With the January 2021 breach salinity levels did not extend past 20 PSU and for the majority of the 5 month open mouth period remained below 10. Since the inundation period was too short and not sufficiently saline, *P. australis* reeds were able to survive and no impact was observed.

Theoretically, sudden increases in salinity are hypothesised to control the freshwater *Tarebia granifera* populations (Miranda et al. 2010) with the authors stating that an artificial breach might address the spread of this invasive gastropod in the St Lucia system. However, the study found that at a salinity of 20, there was no significant decrease in *T. granifera* populations. Currently *T. granifera* have expanded to the mouth region where they outnumber and outcompete native counterparts. Since salinity at the mouth region did not increase beyond 20 and in southern regions of the lake barely reached 8, it is unlikely that *T. granifera* experienced a decline in population numbers or that this invasion was controlled by the 2021 breach. A longer, more sustained breach might assist with the control of this species.



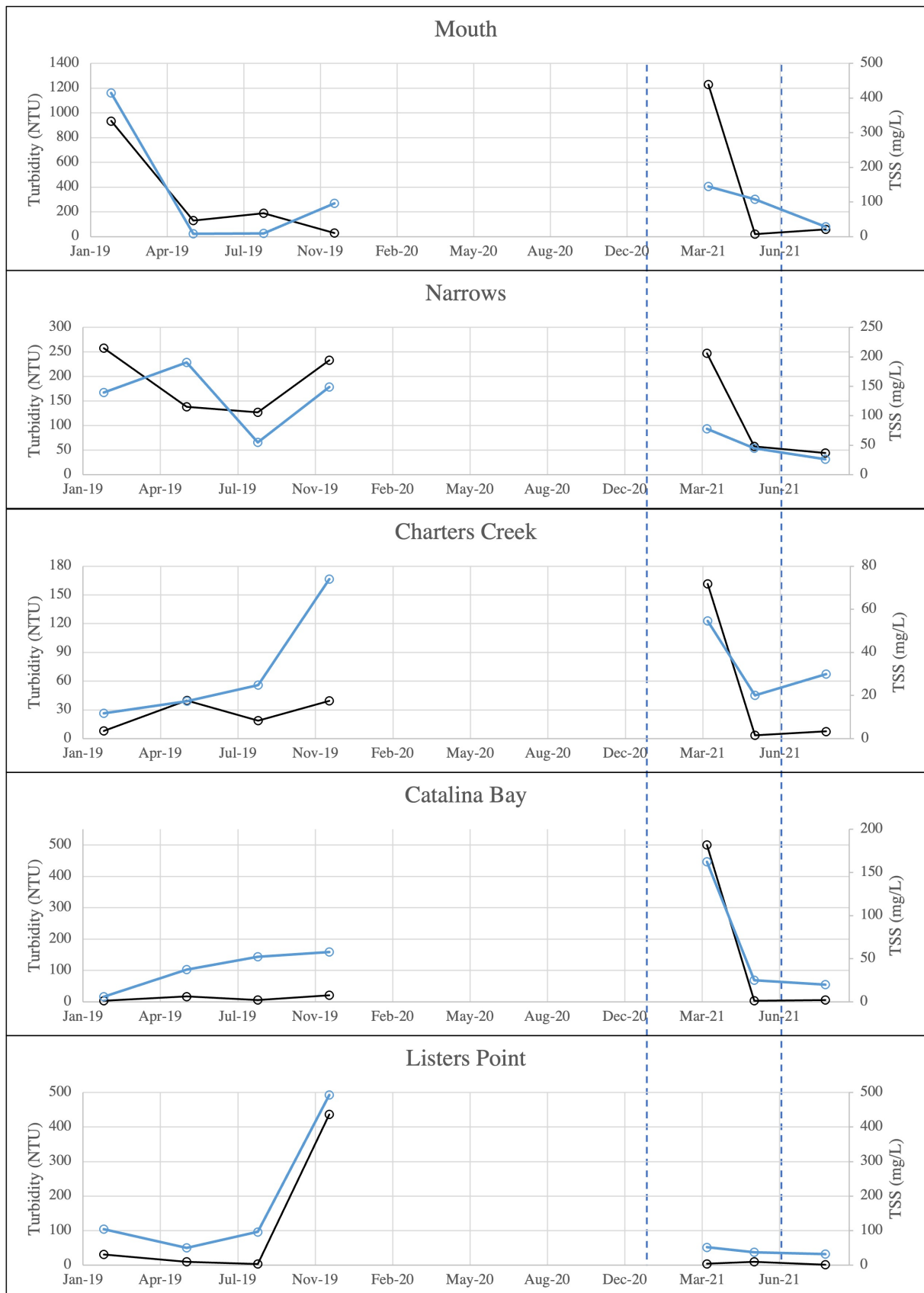
**Figure 12:** Salinity profile at 5 stations around St Lucia from Feb 2019 to August 2021. A trendline is indicated using a moving average with a value of 2. The dotted lines indicate the breach event (first dotted line) and subsequent mouth closure (second dotted line)

### 6.2.2. Turbidity

Turbidity, a measure of visual clarity of the water based on light scattering and attenuation, is presented in Figure 13 for the years 2019 and 2021. Similarly, total suspended solids (TSS)

indicating the amount of solid material per volume of water is presented alongside turbidity in Figure 13. Generally the more solids present in the water, the less clarity. Turbidity measurements are comparable to previously recorded levels in the lake (Tirok and Scharler 2014). The high turbidity levels in the figure are most likely due to seasonal fluctuation where turbidity is higher during the rainy season (October – March). During these months, higher rainfall in the catchment area brings in sediment-laden water from the uMfolozi. High turbidity and total suspended solids reduces light availability in the water column which in turn reduces submerged plant and algal photosynthesis causing lower primary productivity (Tirok and Scharler 2014, Drylie et al. 2018). Turbidity may also cause respiratory clogging in fish and invertebrate species (Engström-Öst et al. 2006, McKenzie et al. 2020). However, turbid environments also provide stronger chemical cues and predator protection for juvenile fish and invertebrate larvae (Blaber and Blaber 1980, Lehtiniemi et al. 2005, Peer et al. 2016).

The consistent decrease in turbidity across all sites in May 2021 could be attributed to a decrease in freshwater inflow (following the end of the rainy season) combined with an open mouth condition and low levels of sediment flushing. If the sediment is moved out of the mouth into the ocean this creates a clear silt-free system. However, an increase in salinity could also contribute to lower turbidity due to the flocculation effect driven by salt concentrations in the lake. This creates a settling of silt which in turn is detrimental to benthic communities (Wantzen 1998, Hinchey et al. 2006).



**Figure 13:** Turbidity (NTU) (black) and Total Suspended Solids (TSS – mg/L) (blue) at 5 stations around St Lucia from Feb 2019 to August 2021. The gap between November 2019 and March 2021 is due to the cessation of sampling during the COVID-19 lockdown of 2020.

### 6.2.3. Productivity

Chlorophyll data are used here as a proxy for microalgal biomass (Huot et al. 2007).

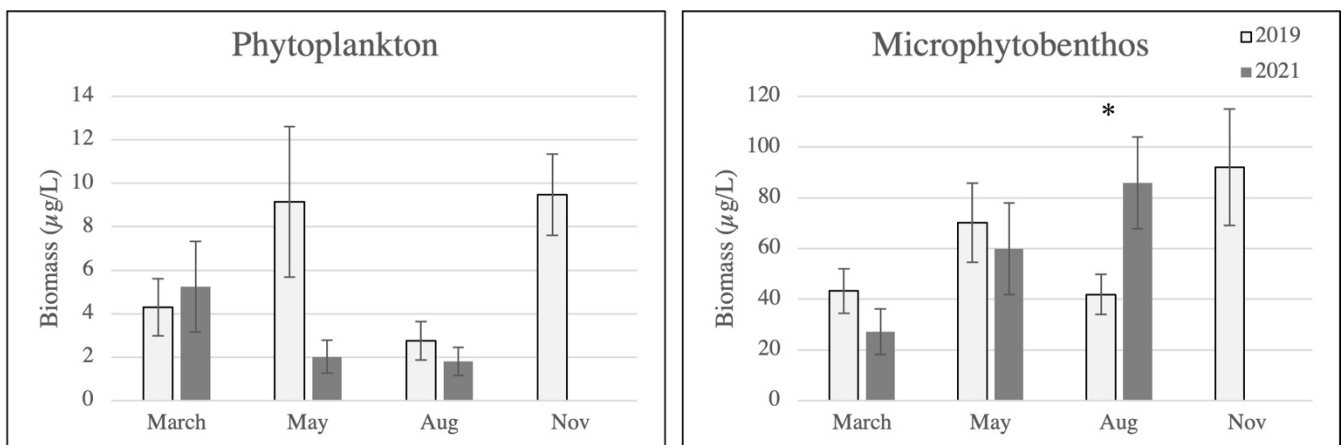
Phytoplankton refers to microalgae in the water column while Microphytobenthos (MPB) refers to microalgae present in the sediment.

The 2019 phytoplankton levels within the lake are comparable to previous measurements (Perissinotto et al. 2010) where levels are highest at the mouth and lowest on other parts of the lake (Figure 16). Following the breach, phytoplankton levels appear to have decreased. Drivers of phytoplankton during a closed mouth condition generally include salinity and turbidity where lower salinity and turbidity promote phytoplankton growth (Perissinotto et al. 2010, Cavalcanti et al. 2022). Additionally, phytoplankton levels are affected by grazers where grazing of phytoplankton by zooplankton and fish can account for up to 100% of the total biomass. Without grazer data it is not possible to infer the causes of decrease in phytoplankton biomass following the breach.

Regarding microphytobenthos, 2019 values are also comparable to past measurements (Perissinotto et al. 2010). The highest biomass was measured in South Lake (Catalina Bay and Charters Creek and the lowest in the Narrows (Figure 16). Following the breach, MPB biomass was generally lower compared to 2019 until the mouth closure when values increased once more. The exception is seen at Charters Creek and the Narrows where benthic productivity seems to have increased following the breach.

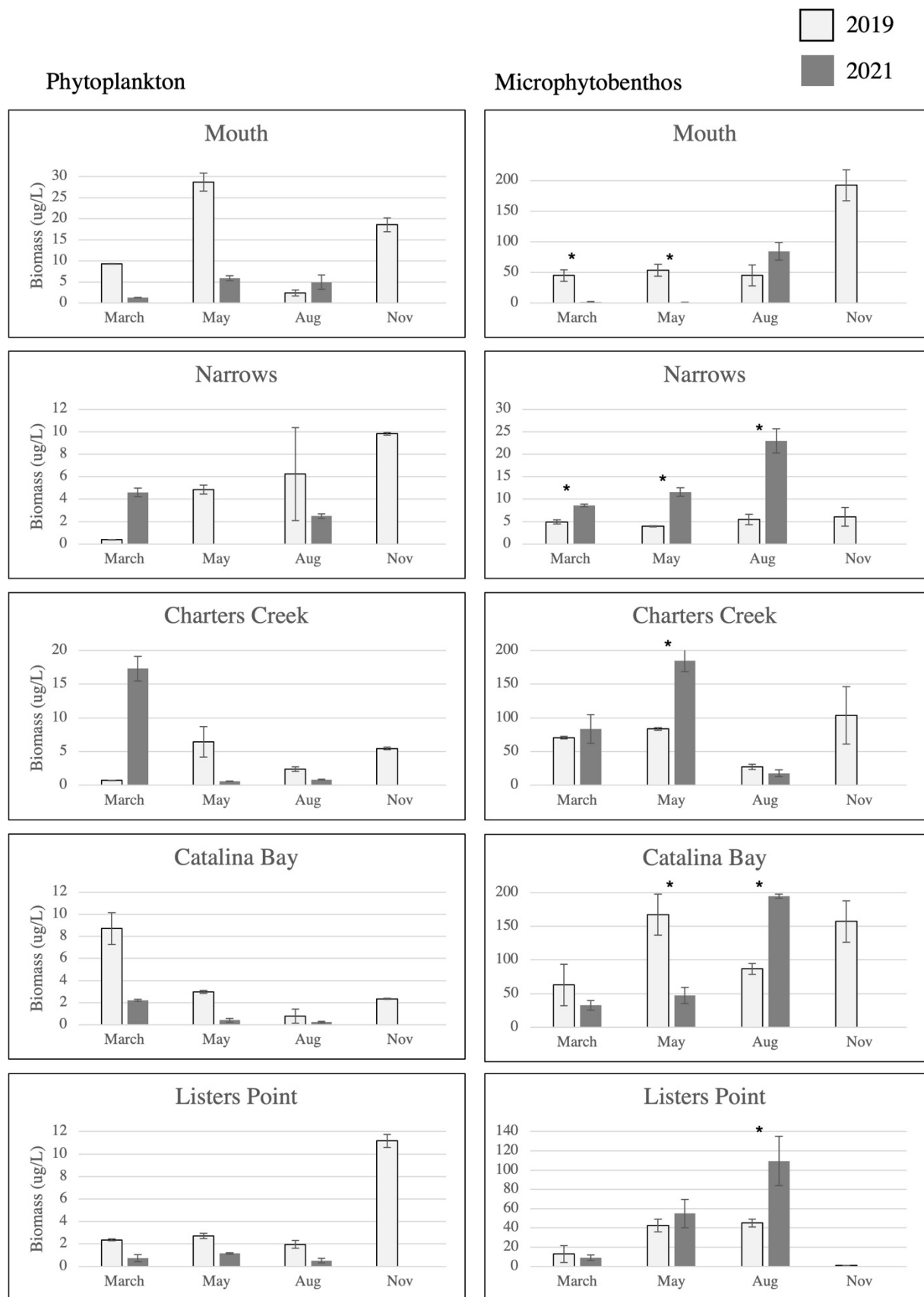
While a decrease in benthic and water column productivity was seen at the mouth following the breach, there appears to be a consistent decrease in phytoplankton throughout the system. MPB, on the other hand, shows a general increase following the breach. Since algae forms the base of the trophic web, a shift in base food availability affects grazers and filter feeders which in turn has knock on effects along the food web.

Shifts in estuarine habitats are common and several researchers highlight the recovery ability of organisms adapted to these dynamic ecosystems (Naicker 2006)



**Figure 15:** A comparison of average microalgae (phytoplankton and microphytobenthos) biomass in the St Lucia Lake between 2019 (closed mouth) and 2021 (post-breach).





**Figure 16:** A comparison of average microalgae (phytoplankton and microphytobenthos) biomass at five sampling stations in the St Lucia Lake between 2019 (closed mouth) and 2021 (post-breach). Aside from the mouth, samples were collected from the Narrows, at Cataline Bay and Charters Creek in the South Lake, and at Listers Point in False Bay (Figure 1).

#### 6.2.4. Impact in terms of ecological objectives

Estuaries generally provide a transitional zone between ocean waters (35 PSU) and inland freshwaters (0 PSU). Many migratory species use these habitats for spawning or as nursery habitats. These organisms require specific ecological conditions created by this mix of water and driven by tides. When the estuary connection to the sea, or the mouth is closed for an extended period (this is specific to each system), recruitment from the marine environment is inhibited, estuarine habitats are transformed and biodiversity is affected, allowing a few species to dominate. Ducrotoy (2021) points out that on a long-term basis, the main objective of estuarine habitat restoration should be to enable the gradual re-establishment of ecological functions, leading to the (re)installation of typical estuarine communities. This can be accomplished through increasing fluxes of water circulating in the estuary and re-establishing connections between the various aquatic components of ecosystems. Whitfield (2021) uses fish to demonstrate the critical importance of the connectivity between the estuary and the sea. He remarks that Mullet fish (*Mugil cephalus*) once moved freely between the sea and the St Lucia Lake sustaining its predators, while using the nursery services of the estuary (fingerlings start their marine journey from the mouth and return as adults). This movement has been cut off since 2002 until the breaching of the berm in January 2021.

Breaching for the ecological functioning of the St Lucia estuary is provided for in the MMP which contains several regulations regarding where, how and when to breach to achieve optimal connectivity between sea and estuary. An extract from the current MMP indicates that breaching should be at “The beginning of spring (September), to ensure ecological functioning and to coincide with the end of the hydrological year. Normally the mouth should be breached about three/four days before the spring tide in September. Early in September is more beneficial for fish”

The restoration of a nursery function was just one of many ecological objectives listed for the Jan 2021 breach. A summary of these objectives as gathered from documents and interviews is provided in Table 4. Drawing on available data, published literature and reports, expert opinions and visual observations, an assessment of the immediate impact of the breach in terms of these objectives is given.

**Table 4:** A summary of objectives for the January 2021 breach and an assessment of whether these objectives were met where ‘positive’ indicates a desired change in the context of an outlined objective, ‘no change’ indicates no measured or observed change, and ‘negative’ indicates an unwanted change compared to the outlined objective.

Objective	Impact measured/observed
Restoration of nursery function	Positive. Whitfield 2021, Daly et al. 2021 and Fox and Mfeka 2021a, 2021b report juvenile fish species. Fox and Mfeka 2021b indicate an increase in crab larvae most likely at the megalopa stage ready to settle in the estuary. These megalopa belong to the species <i>Varuna litterata</i> which lives most of its adult life in freshwater but requires a connection to the ocean to spawn and recruit. Participants also reported prawns sighted in the system following the breach. The late timing of the breach in relation to the MMP guideline indicating September as the most ideal breach time, and the closing of the mouth in June 2021 may have limited recruitment of marine to spawning and nursery grounds.

Reintroduction of marine fish for tourism/recreational fishing	Positive. Whitfield 2021, Daly et al. 2021 and Fox and Mfeka 2021a, 2021b and participants report juvenile fish species. Species include the Bull Shark ( <i>Carcharinus leucas</i> ), Flathead Mullet ( <i>Mugil cephalus</i> ), Grunter ( <i>Pomadasys</i> sp.) and Perch ( <i>Acanthopagrus berda</i> ). Fox and Mfeka 2021a report recreational angling taking place at the mouth following this reintroduction. The late timing of the breach in relation to the MMP guideline indicating September as the most ideal breach time, and the closing of the mouth in June 2021 may have limited recruitment of marine species.
Removal of sediment	No change. Visual observations indicate that sediment was removed by the breach outflows but the relatively long preceding closed mouth period meant that there were significant accumulations of sediment deposits. Some of these had consolidated, making them less susceptible to erosion. Measurements of turbidity and total suspended solids indicate high turbidity in March 2021, after the breach, followed by a sharp decrease in May 2021 (Figures 13 and 14). However, levels of silt remain high (when compared to 2019 levels) and have not been measured since August 2021.
Removal of <i>Phragmites</i> reeds	No change. This is based on visual observations reported in Fox and Mfeka (2021a). Adams and Bate (1999) examined the survival of <i>P. australis</i> in South African estuaries and found that as long as freshwater was supplied to the roots, the species was able to tolerate marine inundation (35 PSU). While the salinity at the mouth did briefly reach 20 PSU, it did not surpass 8 PSU for any other sites within the lake and thus would not have made an impact as reeds will only die off after a few weeks of salinity above 20 PSU (Adams and Bate 1999).
Relief of back-flooding	No change. Interviews with the Sokhulu community indicates that this was already discussed prior to the breach. Farmers (small-scale and large-scale) agreed to a SL breach on condition that further discussions surrounding a Msunduzi breach would be held following the first event. As such, the breach did not alleviate the flooding experienced in the Sokhulu fields as well as low-lying sugarcane fields in the lower uMfolozi, (iSWPA 2021)
Shift from fresh to brackish	Positive. While limited marine input and high rainfall following the breach meant that salinity at the estuary mouth did not exceed 20 PSU (N. Carrasco, unpubl. data, Fox and Mfeka 2021a, b) and remained below 13 PSU within the Narrows, there was an observed spike from freshwater to brackish conditions at the mouth, within the Narrows and in the South Lake (Fig. 12) at least until August 2021. False Bay, which was brackish before the breach with salinity fluctuating around 15 PSU, experienced a lower salinity following the breach which coincided with the high summer rainfall.
Return of megafauna to the mouth area	Positive. It was hypothesised that hippos had been absent from the area due to the excessive silt load. Following the breach, hippos were once more spotted around the mouth area (Fox and Mfeka 2021a).
Shift in avifauna	Negative. The 2021 bird count revealed a total of 6990 birds for the entire system with a decrease in numbers seen for more than 50% of all species compared to 13190 birds counted in 2020. This could be attributed to seasonality since the 2021 count was conducted in July while the 2020 count was conducted in February. However, when comparing the total bird count to previous years, counts done in winter months are not significantly lower than summer counts (EKZN unpubl. data, Appendix VIII)
Decrease in mangrove loss	No change. Mangroves continue to die off (Fox and Mfeka 2021b). This is despite the connectivity to the marine environment for a 5 month period. The continued loss of mangroves in the St Lucia system contributes to its loss of nursery function and carbon storage capacity.
Alien invasive species	No change. <i>Tarebia granifera</i> - Although an increase in salinity is hypothesised to reduce population numbers of this invasive aquatic gastropod, salinity levels were not high enough to have this effect. Healthy

	<p>(juvenile and adult) populations were still observed around the lake in November 2021.</p> <p>Other invasive species include the plants <i>Casuarina equisetifolia</i> and <i>Tamarix ramosissima</i>. These plants are found at the mouth region and appear to be spreading along the mouth. It is doubtful that they were impacted by the breach event and this was not an objective.</p>
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Even though some outcomes were measured or observed as positive, many of these are limited due to the low level of the breach and the short period of open mouth. Overall, the panel’s view is that there was no significant change or impact following the January 2021 breach.

Following the breach and the 5-month marine connection to the mouth, the system has been closed since June 2021. Although high rainfall was experienced in Summer 2021/2022, the mouth did not breach as the dune had re-established in the previous breach location.

Following the breach level of 1.25 mMSL in 2021, the water level rose to 2.25 mMSL in January 2022 and the mouth did not breach. This indicates sediment accumulation and dune build up in the last year. Furthermore, vegetation, including the two alien species *Casuarina equisetifolia* and *Tamarix ramosissima*, appears to be encroaching the dunes around the mouth. This will lead to further stabilization of these dunes.



**Figure 17:** Vegetation encroaching on the dunes at the St Lucia mouth (left). The two alien species are shown on the right. Photos taken by Ms C. Fox, Ezemvelo KZN Wildlife.

The St Lucia Lake system will continue to function as a freshwater system until the next breach. It is unlikely that the system will breach regularly following sediment accumulation at the berm. Ongoing monitoring is necessary to understand the longer term impacts of the breach.

### 6.3. Social

#### 6.3.1. Lack of benefit to farmers

The large-scale and small-scale commercial farmers unequivocally stated that there was no benefit following the 2021 St Lucia mouth breach. Back-flooding, which was the main concern, did not subside and social issues associated with back-flooding persist. These include disease and human health (two participants mentioned a mosquito infestation, this is

also recorded in the public comment no. 15), increased conflict with hippos, crime due to economic impact, unemployment, and reliance on government grants. Dukuduku and Sokhulu participants shared this sentiment. Information requested by the panel regarding the current extent of legal farming, authorizations, hectares occupied by crops in floodplains and alternative means of food security was not available from the relevant institutions. Noting that back-flooding of agricultural land is not likely to end in the future, especially with no artificial breaching allowed at the Maphelane mouth (as ruled by the court case and judgement (873/2017) [2018] ZASCA 144), it seems imperative to explore this social implication further.



**Figure 18:** A visit to the Maphelane old mouth with Sokhulu farmers. On the right of the photograph, the Msunduzi river is seen currently clogged with *Phragmites australis* reeds. This appears to obstruct the flow from the Msunduzi into the St Lucia system and contributes to back-flooding. Photo taken by Mr F. Tshamano, DFFE.

### 6.3.2. Benefit to ratepayers, recreational fishers, and tour operators

During meetings held with tour operators, ratepayers, iSimangaliso Wetland Park Authorities, Ezemvelo KZN Wildlife and scientists, the overwhelming response was that the breach had been beneficial. Participants cited increased movement of fish into and out of the mouth, the plume of sediment visible by drone showing the removal of silt from the system, and the maintenance of an open mouth for 5 months. Tour operators cited improved boat access to the mouth following the breach as well as more hippo sightings. Overall most stakeholders reported that the entire event (both the October 2020 symposium and the events leading up to and including the breach) were novel and welcome as it allowed for multi-stakeholder discussions.

### 6.3.3. Lack of communication and understanding

The issues surrounding the estuary mouth are highly technical in nature, especially considering that communities need to have a thorough understanding of these issues. There appears to be no apparent effort to have these issues communicated in a non-technical

manner. This has a negative effect on communities participating and making informed strategic decisions. Firstly, communities are unable to form part of the discussion which often takes place at a technical level. Secondly, this exacerbates conflict between stakeholders. In the case of the 2021 mouth breach, communities are certain that a promise was made during the October 2020 symposium that the Maphelane mouth would also be opened immediately after the 2021 mouth breach.

Communities also lack an understanding of the 2018 court verdict which indicates that there will be no further breaching at Maphelane. If there is an indication from the authority that this very important piece of information was communicated, this would mean it was not efficiently conveyed. Most of the responses from the community strongly bordered on misinformation and unfulfilled promises.

It is imperative that communities are considered and fully involved in management planning as this process has a direct impact on their livelihoods in the long term. It was evident that the non-consideration has led to resentment towards management authorities, UNESCO and scientists which can have long term undesirable implications on relations, perceptions and conservation success. The root cause would be the lack of deriving any benefits from iSWP.

A statement by a small-scale farmer during the engagement process indicated that “In 1999 the proclamation brought hope which has since disappeared”. The name of the wetland park has such meaning to the bordering black communities. Translated into isiZulu it means “a place of wonder”, and this is the direct opposite of their experience. The undesirable result is resentment toward the proclamation, UNESCO, the authority. UNESCO is seen by the surrounding communities as an independent source and some sentiment included removal of the World Heritage Site status.

#### 6.3.4. Superficial inclusion of communities and lack of equitable gains

There is an unfortunate yet strong feeling that the views and inputs from black communities are not taken serious especially in policy decision making. They are invited to meetings, and participate but they do not see their inputs reflected in management plans. This observation has significant implications in terms of maintaining trust in iSWPA as a public institution.

#### 6.3.5. Non-recognition of community concerns

In all the meetings and community engagement sessions it was extremely eminent the authority is resented. This was visible when at times the panel had to manage the situation when the authority was attacked, when we saw men crying due to the stress they are experiencing, when panel members in some meetings had to beg for an ear because there were cases where we fell short of engaging (until the Maphelane mouth was opened). Leadership intervention assisted greatly in resolving these encounters but it is worth noting here how non-recognition and not engaging with communities exacerbates communication break down and co-operation between stakeholders.

The Sokhulu community has expressed their dissatisfaction in a number of ways; including unrests and writing to the DFFE Minister in 2018 through iSWPA. The letter mentioned here is attached as Appendix IX. To this extent, communities via public comments show strong opposition to the Minister of DFFE responding to a small group of scientists who some do not even reside within the area nor have ever visited and witnessed the flooded crop fields. The

key message is that decision makers should equally listen to the views of local communities especially as they have lived experiences and are directly affected by what occurs within the EFZ.

#### 6.3.6. Lack of an independent liaison between stakeholder groups

During the engagement process, communities indicated that either they are not aware of the presence of an independent liaison programme or they have heard of such a programme although as a strategy it hasn't worked to their benefit as there is no representation to which they can refer. This has dire consequences that have led to community exclusion from participatory processes. There are no defined means of educating/ capacitating them in terms of scientific and technical issues.

This non presence of a solid independent liaison programme in this World Heritage Site has resulted in unstructured and inadequate representation in several forums. The gap has yielded an opportunity for formation of some aligned task teams which are not representing the community at large. A norm has developed that liaising with leaders is equal to and could be taken as encompassing community representation. This has led to overlooking/ sidelining of heterogeneity of "community". This occurs both spatially, where a community might be divided by a physical feature (e.g. a road) or temporally where there might be a high turnover of leadership and continuity is disrupted.

### **6.4. Economic**

Here it is worth mentioning the economic impact of COVID-19 and the accompanying series of lockdowns in South Africa. To some degree it is difficult to disentangle the impact of the COVID-19 pandemic on the economic situation experienced in St Lucia at the time of the breach. The country experienced a nationwide decrease in tourism (Stats SA 2020) and St Lucia, being a World Heritage Site and drawcard for international tourists, undoubtedly shared this experience.

Regarding the economic situation prior to the breach, tour operators report a drastic decrease in tourism while small-scale farmers, commercial farmers and the sugar mill all provided an estimation of loss (as outlined in section 5.3 and Appendix VII). However, there is no evidence to show that the January 2021 breach changed the economic situation. It was well-known and recorded that the breach did not alleviate the back-flooding in the uMfolozi-Msunduzi farmlands and thus similar losses would have been incurred. It is also uncertain whether the opening of the mouth for 5 months had a positive impact on the tourism economy including tour operators, hotel owners and service suppliers within the town. However, observations show that the estuary mouth is an attraction in its own right. For it to remain an attraction, depends on the closing or opening of the mouth, with a view that opening of the mouth enhances tourism activities.

While there may be an economic cost associated with the ecosystem services provided by the estuary, including the nursery function, carbon storage, and the nutrient outflow, these have not been estimated in this report.

While breaching is linked to ecological reasons such as the nursery function of the estuary, in turn, the breaching has a significant effect on fishing as an important livelihood and recreational activity such as wildlife viewing. To understand this economic impact, we draw

on the Cape Estuaries Guideline (Turpie 2007) which highlights that in Kongweni Estuary in KwaZulu-Natal, the declining water quality, which had a dependent effect on tourism, resulted in the estimated loss of between R58 million and R129 million per annum, a significant impact on the local economy. In Knsyna, as an estuary dependent activity, tourism expenditure was estimated to be about R1 billion and R1.4-R2 billion of the property value was attributed to the view of the estuary.

The impact of breaching did not have equitable benefits to all stakeholders. For example, the agricultural communities at Sokhulu saw no benefit in the breaching as they continue to suffer from back-flooding (Sokhulu meetings with the Panel on 17 and 18 November 2021). By contrast, it had a more positive impact on tourism (Tour operator meeting with the Panel on 16 November 2021).

## **7. Future recommendations**

This section addresses the fourth and final Term of Reference i.e. “Develop guidelines for the immediate and ongoing management of the system.”.

### **7.1. Key recommendations**

Based on the data collected, analyses conducted, and panel discussion, a few key recommendations are made that align with the Terms of Reference.

#### **7.1.1. Breaching**

In accordance with the MMP, maintenance breaching could continue in exceptional circumstances. However, these circumstances, ecological or social, need to be clearly defined. It is also essential that breaching does not take place without adequate ecological monitoring before and after the event, and the breach level should be informed by quantitative, recorded measurements to ensure the most efficient breach in terms of the intended objectives as well as potential socio-economic reasons. It is not possible to prescribe a fixed level, this will depend on the period of mouth closure, monitoring, and monitoring. Sediment build up and reed encroachment would theoretically increase with a longer period of closure and thus a higher breach level would be required. These should be clearly documented and communicated. Furthermore, the timing of the breach needs to be informed by monitoring to ensure optimal conditions in terms of rainfall and seasonality.

While it is clearly understood that the GEF report advises against breaching, it is practical and necessary to consider the effects of allowing the mouth to remain closed. As seen in January and February 2022, no breaching was performed despite the lake water level reaching a height of 2.25mMSL. There were two main observations made during this period:

- Despite the skimming of the berm down to 1.25 mMSL in January 2021, the mouth did not breach at 2.25 mMSL indicating that the berm has built up more than 1 m during the past year.
- Although this does not necessarily indicate an exceptionally high berm, there was extensive flooding and damage caused to infrastructure at this lake level. Annual flooding means that infrastructure will require regular maintenance and replacement.



Breaching at the appropriate levels will alleviate the flooding and damage to infrastructure and will address the issue of sedimentation with higher water levels ensuring adequate flushing of silt out of the system. Currently, breaching cannot occur at the Maphelane mouth as ruled by the high court on the 1<sup>st</sup> Oct 2018.

#### 7.1.2. Maintenance of the uMfolozi and Msunduzi Rivers

Breaching the St Lucia mouth does not currently offer relief to farmers in the uMfolozi-Msunduzi floodplain. Back-flooding in this region is caused by the blockage of the Msunduzi channel by extensive reed growth and accumulated sediment. Clearing the Msunduzi and beach channel of vegetation and sediment will allow water to flow freely from the floodplain to the mouth.

#### 7.1.3. Dune maintenance

Based on observations indicating the spread of vegetation across the dunes at the mouth, the panel recommends maintenance of these dunes and the encroaching vegetation. Since at least two alien invasive species are present as part of the encroaching vegetation, this maintenance activity should be prioritised. This is also in line with the GEF recommendations which indicate that alien vegetation should be carefully removed (Clark et al. 2014). The build-up and stabilisation of the dunes at the St Lucia mouth should also be continuously investigated. If conclusive evidence is found for dune build up, this will have further maintenance implications.

#### 7.1.4. Develop and intensify an in-house monitoring plan

Biophysical - iSimangaliso monitoring standards are currently non-existent and the management authority is reliant on Ezemvelo KZN Wildlife which has limited resources. The data collected are limited to bird, crocodile, and hippo counts, water level, salinity and rainfall. The data currently being collected by EKZN are collected regularly and freely available. This must continue. However, we strongly recommend that iSimangaliso employs a dedicated technician/scientist to regularly collect monitoring data in a developed and intensified monitoring plan which could include: water level, salinity, rainfall, sediment size class, water temperature, turbidity, chlorophyll count, fish counts, macrofauna counts, and plankton counts. If external contracts are used, it is recommended that they are focused on capacity building of dedicated iSimangaliso Wetland Park staff members. Building internal capacity and even including citizen science into monitoring practices will directly relate to community involvement and empowerment. Tools already exist to facilitate the involvement of citizen science in monitoring programmes both nationally and internationally (WRC Report TT 763/18).

Socio-economic – These data are also currently non-existent despite the importance of this information. While legislation surrounding conservation makes provisions for public participation and access, it is not explicit in its inclusions. For example, public participation is often limited to members of the public who retrospectively add comments to draft management plans thus there is an opportunity to ensure that social needs are considered before management plans are drawn up. Furthermore, while biodiversity monitoring is

essential for protected areas (Section 43, NEM:PA), there is no mention of monitoring social indicators to ensure that coastal land user needs are met.

Although a stakeholder and liaison staff complement exist within iSWPA and there is a link between iSWPA and surrounding communities, the objectives and efficiency of these interactions are not clearly defined. Basic data could include economic indicators such as employment, social grants, income, skill levels, as well as resource harvesting, health and well-being indicators.

#### 7.1.5. Communication

Objective to achieve better understanding and informed response from recipients. Information must be digestible across all spheres. The need to improve communication is three-fold. First is to communicate policy decisions and improve their impact. Second is to source views of those who are affected and include them in policy decision making. Third, is to assess the relevance of policy decisions in their social context and whether there is a need to adjust or review policies.

Independent liaisons – An objective liaison is required to facilitate communication between communities and iSWPA. Within such a structure, capacity should be developed to understand information across fields and communicate effectively to community stakeholders. An independent liaison would also ensure proper representation of communities and community voices in engagements. This partly depends on strengthening capacities of local institutions to champion alternative forms of community development and to ensure a more sustained impact of development interventions. Within such an institution, there would be a need to include in their functions policy advisory systems. For them to undertake policy advisory services, their capacities need to be strengthened to include policy analysis so that policy decisions are more transparent, inclusive and more effective. Roles would remain distinguished from those of administrators. These would be to support good and sound public decision making and to make the administrators more alert of diverse voices and enable their inclusion in policy making. Bringing universities, government and non-government institutions to form policy advisory systems can enrich policy making. This can ensure policy advice produced by an advisory body will not only be based on scientific knowledge but integrates other perspectives from varied actors and institutions including lived experiences.

iSimangaliso Wetland Park – The park authority is responsible for communicating the development and use monitoring tools and indicators in the effective management of the park. Technical documents and tools must be translated into easily understandable documents to be digested by independent liaisons and other stakeholder groups. Communication between the park and other stakeholders is not transparent, communications should be recorded and easily available to avoid uncertainty around agreements and collaborations.

Researchers – There is an immense importance regarding the placement of ecology in the context of application, where scientific research cannot always just be conducted for the sake of knowledge accumulation. This is especially true in the iSWP where there is an obvious lack of science communication around the St Lucia system. While the ecology and hydrology of such a complex system have been intensely examined over the years, this information or understanding of the system has not been passed on to other stakeholders. Dissemination has been largely in the form of peer-reviewed publications, technical reports, academic books, and datasets. The need for improved science communication is high priority and should be part of

all future research agreements. The gap in research between researchers and other stakeholders no doubt facilitates the conflict around this system. For example, the GEF report (Clark et al. 2014) outlines that the St Lucia system under the recommended management scenario (a common mouth with no artificial breaching) would experience back-flooding along the uMfolozi floodplain and that alternative livelihood options needed to be investigated. It was extremely clear from all stakeholder interactions that this finding was not conveyed to anyone who had did not have easy access to the technical report. A report with such significance as the GEF report should not be published without accompanying material for dissemination to citizens. This will be achieved in close association with social scientists, educators, stakeholder representatives, park management and creators.

## **7.2. Future work**

Moving forward, it is clear that the St Lucia Lake, protected and managed by iSimangaliso Wetland Park Authority, can no longer be managed as an isolated system. Activities in the floodplain and catchment area of the feeder rivers contribute to the health of the St Lucia system. As such, we recommend the following for further investigation.

### 7.2.1. Catchment management

The panel highlights a need to consider management and hydrology of the upper and lower catchments. Issues such as soil erosion, water abstraction, afforestation, and the use of agricultural herbicides all influence the ecosystem health of the St Lucia system and its biota (Buah-Kwofie and Humphries 2021, Humphries et al. 2021, Tyohemba et al. 2021, Tyohemba et al. 2020, Buah-Kwofie et al. 2018). Furthermore, the lack of a functional floodplain in the uMfolozi-Msunduzi region is also flagged for further investigation. The ability of the floodplain to support livelihoods and to perform its necessary ecological function is a key area of investigation. The panel is of the opinion that solutions to maintain economic activity and to restore functionality of the catchment and floodplain regions can be created. These will be more effective with a collaborative and data-informed approach which include adequate multi-stakeholder communication and efficient monitoring systems, as highlighted in section 7.1.

### 7.2.2. Policy development and implementation

Develop a comprehensive EWR – The panel is of the opinion that a thorough and updated investigation of water use and licenses should be conducted as part of a more comprehensive study. This could include forestry, agriculture, and groundwater use. It is important that water use and allocation or water balance investigation happens urgently in the St Lucia Lake system catchment in order to source the recommended flows for a healthy functioning estuary, category “B or higher”. The catchment currently delivers lesser water than required (Table 1) and this directly impacts the breaching of the mouth.

Develop guidelines for breaching management – Within the authoritative documents, exceptional circumstances need to be clearly and legally defined. The terms of the artificial mouth breach are to be outlined more clearly with exact specifications for when and how the mouth should be breached on a scenario basis. Mouth breaching should not be carried out without monitoring of suitable biophysical and socio-economic indicators before and after the

event. The reasons for breaching should be clearly agreed upon and stated and technical documents, such as the EWR, could be incorporated substantially into future revisions of management plans.

Include local knowledge and perceptions when developing management plans – The inclusion of community knowledge, local knowledge, indigenous knowledge is becoming increasingly recognized as a way forward in scientific and conservation fields. Although UNESCO and Ramsar both mention the consideration of culture and heritage, these sentiments are not reflected in the communities surrounding the St Lucia system where perceptions regarding UNESCO are diverse and not always favourable. Regarding management plans, the public participation process is outlined but stakeholders generally express a feeling of distance from these documents which raises the question of whether or not the EMP adequately accounts for social needs and accurately captures the diverse array of stakeholders during the public participation process. Given the multi-functionality of the system, there is need to review the management plan in order to increasingly recognise the estuary dependent economic activities and the inter-relationship between the wetland, forests, wildlife, marine ecosystem, tourism, and livelihoods. This will require inter-disciplinary contributions from varied fields such as ecology, industry players who understand the demand side of the development, and policy makers who have a long-term view of the development.

Investigate land use and authorization – During the panel’s term, several issues were flagged around land use and ownership. We wish to highlight these for further investigation including and not limited to historical land ownership, current land ownership, land use in relation to park boundaries and the EFZ, the progress around land claims. While the panel cannot provide any further comment regarding specific issues, it is of the panel’s opinion that issues around land use and authorization will further exacerbate conflict between stakeholders.

### 7.2.3. Investigation of artificial levees and canals

The Technical Task Team has suggested blocking the previously constructed link canal from providing a short circuit for the Mfolozi to discharge directly into St Lucia at Honeymoon Bend. This short circuit exacerbates the sedimentation problem at Honeymoon Bend and reduces opportunities to trap sediments in the longer route via Maphelane, the beach channel, and the back channel. This longer route also provides a natural “trigger” mechanism for the Mfolozi to breach the system where it joins the coastline near Maphelane. From this location, an open mouth would then naturally migrate northward towards St Lucia (due to longshore sediment transport). This has been previously observed to be at a rate of about 2m per day, which implies it would take about 2 years for the mouth to link up to the Narrows. This intervention may help to address the back-flooding issue on the flood plain in the short-term, but also carries a risk that Lake St Lucia could be separated from any water inputs from the Mfolozi for an extended period, with attendant impacts on its water balance. We recommend that this option be further investigated and evaluated (e.g. by modelling), in order to fully assess its consequences.

### 7.2.4. Alternative livelihoods

While it is easy to suggest alternative livelihoods, without the necessary engagement and co-investigation alongside affected stakeholders, it is not feasible to provide such suggestions.

Resource users and local stakeholders often hold a sense of ownership and belonging to a practice or a place that cannot always be quantified or captured without this engagement.

However, considering that the current management plan for St Lucia is not designed to address issues of livelihood, this is an investigation that the panel feels should be conducted.

iSWPA strongly promotes commercial opportunities for community involvement and benefit. The panel suggests that a structured SMME development masterplan should be developed and implemented accordingly. Such a document could detail projects to be capitalized on, private sector participation in community economic development, policy frameworks around participation goals and skills transfer, and ecologically aligned economic opportunities. This endeavour would require a multistakeholder and interdisciplinary approach to account for all perspectives, and to ensure a robust and innovative development plan. It could also account for the extreme dynamic nature of the system. For example, ecotourism activities are currently reliant on a very specific state. Shifting a focus to tours involving cultural aspects, environmental wellness, citizen science, and smaller resilient organisms may offer a more sustainable strategy for the dynamic nature of the system and provide more opportunity for indigenous knowledge, practices and communities.

## **8. Concluding remarks**

The panel has undertaken an intensive investigation into the January 2021 St Lucia mouth breach, closely guided by the Terms of Reference set out by the Honourable Minister of Forestry, Fisheries and the Environment. While it appears that the breach was in line with the Maintenance Management Plan outlined for St Lucia and approved by DFFE, the panel suggests that future management plans could consider (1) all relevant models and literature including the Reserve Determination published by DWS which indicates required water quantity and quality; (2) all advisory and technical recommendations published by researchers including the recommendations of the GEF reports which employed intensive data collection and modelling; and (3) social or developmental requirements of the system including stakeholder perspectives and needs. Furthermore, in our view, the St Lucia system can no longer be managed as an isolated system. The influence of activities and inputs from the catchment and floodplain areas should be carefully considered in future management plans. The St Lucia system is highly dynamic and can function in a wide range of ecological states, from a freshwater to hypersaline conditions. However, understanding these states through continuous monitoring will enable management authorities to enforce a more adaptive approach which is better suited to this dynamic system. Hydrological and ecological monitoring of the St Lucia system, as well as its feeder rivers and catchment area, must continue and develop even further to adequately map the states, requirements, and services of the lake. When considering the diverse array of stakeholders, our view is that communication quality between all interested and affected parties is of utmost importance to foster a collaborative relationship and to ensure that no group or community is left behind as the St Lucia system, a World Heritage Site, draws international tourists and creates a variety of economic and social opportunities. In line with this, we are highlighting communication structure, independent liaisons, science communication and regular multi-stakeholder gatherings as priority areas for development. This accounts for (1) the multi-functionality of the St Lucia system; (2) its inter-relatedness to varied stakeholders; and (3) the need to increasingly show the social benefits of science to the surrounding communities. Lastly, while

we have addressed our Terms of Reference, we provide areas for future investigation, specifically the use and management of the catchment and floodplain areas, the consideration of relevant models and studies when developing management plans, and the increased integration of social sciences in the management of the St Lucia system and its related policy decision making processes.

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## 10. APPENDIX I – Open letter to the Minister

**13 January 2021**

Open Letter to Ms Barbara Creecy  
Minister of Forestry and Fisheries and Environmental Affairs  
South Africa

by email *Private Executive Secretary*: Buchule Mbuli [BMbuli@environment.gov.za](mailto:BMbuli@environment.gov.za)  
by email *Chief of Staff*: Feroze Shaik [FShaik@environment.gov.za](mailto:FShaik@environment.gov.za)

### **Recent Artificial Breaching of the Lake St Lucia estuary**

1. We write to you as a concerned group of scientists, some of whom have worked in the Lake St Lucia Estuary since the 1970s, with extensive collective experience of estuaries and their functioning both in South Africa and internationally.
2. Our concern arises from the action taken on the 6 January 2021, when the sand barrier separating the Lake St Lucia Estuary from the sea was artificially breached allegedly by the iSimangaliso Authority.
3. This action is contrary to the recommendations which were arrived at and accepted by this same entity, the iSimangaliso Authority, as well as by the Department of Environment, Forestry and Fisheries after a detailed scientific study was conducted. This study used existing and new research by a highly qualified team of scientists during the iSimangaliso Global Environment Facility (GEF) project which ran from November 2014- February 2017. The major recommendation from that project was that natural processes should be allowed to re-establish; the uMfolozi River should be allowed to re-join the Lake St Lucia Estuary, and allowed to fulfil its dual role as a source of fresh water and a driver of mouth inlet dynamics. It specifically recommended that no artificial breaching of the mouth was to take place.
4. The interventions that have just been implemented also fly directly in the face of the recommendations included in the 2016 Reserve Determination Measures study for this system which state that *“Lake St Lucia estuary mouth should not be breached artificially except in emergency or when exceptional circumstances prevail... and “This will allow more river flow north through the Narrows towards the Lake during droughts and when breaching occurs naturally it will open up a large mouth with a large tidal flow.”* It is our understanding that this environmental flows study report has been signed off by the Department of Water and Sanitation and hence is also legally enforceable. We know of no information nor circumstances preceding this breaching event that could constitute an *“emergency”* or *“exceptional circumstances”*.
5. The Lake St Lucia Estuary, as a dominant feature of the iSimangaliso Wetland Park and the largest estuary in South Africa, was central to the declaration of South Africa’s first World Heritage Site (WHS). This site met three criteria; exceptional biodiversity, outstanding examples of ecological processes and its superlative natural phenomena and scenic beauty, any one of which would have sufficed for the Park to qualify for WHS status.
6. It is the largest estuary in the country and constitutes 60% of the total estuarine area nationally and 80% of the sub-tropical estuarine area with a critical role as a fish and prawn nursery ground along the east coast. Threats and impairments to its functioning are consequently significant on national and regional scales.

7. Despite its importance, the Lake St Lucia Estuary has been extensively manipulated and many of these changes have adversely impacted its functioning and disrupted natural processes.
8. Transformation of the the flood plain of the uMfolozi and uMsunduzi rivers began early in the 20<sup>th</sup> century. This floodplain and its rivers form an essential part of the Lake St Lucia Estuary and their wetlands have now been drained, channels dredged, levees constructed to constrain natural channel switching and overflow channels designed to re-direct high flows.
9. Since the 1950s those responsible for the care of the Lake St Lucia Estuary have intervened to solve the problems generated by these changes, ranging from an extensive dredging operation to the diversion of water from the uMfolozi River through a link canal, all of which failed to address the impaired hydrological and ecological functioning of the Lake St Lucia Estuary.
10. In 1952 unquantified perceptions of increases in sediment load in uMfolozi River water entering the estuary resulted in a management decision to completely separate this important catchment from the estuary.
11. This separation policy was maintained by the conservation authorities for the next 60 years. The consequences were that to maintain an open mouth, groynes had to be constructed on the north and south banks of the inlet, while dredgers were required to work permanently in the estuary.
12. The long-term impact of the loss of uMfolozi water from the Lake St Lucia Estuary, combined with a dry cycle which occurs roughly decadelly in this area, led to the unprecedented drying up of 90% of the estuary in 2005, with devastating consequences for the estuary's biota.
13. The recognition of the disastrous effects of the historical management of the estuary, coupled with the increased knowledge, understanding and appreciation of the drivers of the system made the policy's failure and broad implications glaringly apparent. A re-consideration of all available and new data was brought to the fore during the iSimangaliso GEF Project.
14. The GEF project consolidated and produced new scientific knowledge, and brought together 28 scientists in a multi-disciplinary team which considered hydrology, hydrodynamics, socio-economics and ecological functioning. The final recommendations from the integration of all of these included allowing the system to function naturally, which meant no artificial breaching.
15. This project recognised the existence of the complex matrix of communities, within and surrounding the Lake St Lucia Estuary, with a variety of interests, some of which were in conflict. These included park neighbours struggling for livelihoods, large scale well established sugar farmers, small scale farmers on the edge of the estuary, tourism operators reliant on fishing charters and businesses relying on the Park's biodiversity to support ecotourism. A very comprehensive stakeholder interaction strategy was followed throughout the project to allow all of these different sectors to learn and engage with the multidisciplinary team and their findings.

16. The iSimangaliso Authority implemented the recommendations of the study, adopting a management approach to restore the Lake St Lucia Estuary by allowing natural processes to resume with minimal intervention. This has beneficial impacts on both the Lake St Lucia Estuary and through this on the whole World Heritage Site.
17. In High court proceedings which culminated in a judgement by the Hon J. Moodley on the 20 May 2016, the management approach was endorsed and the judge found that the natural process of backflooding with a closed mouth is part of the natural dynamic of an estuary and to artificially breach would 'prejudice the environmental advances' that had already been made in restoring the Lake St Lucia Estuary.
18. As pointed out in this judgement the Integrated Coastal Management Act (ICMA) has imposed a statutory imperative on the iSimangaliso Authority to manage the Lake St Lucia Estuary in the '*interests of the whole community*' as defined in the ICMA and not to "*privilege the interests of some over others*"; it was also obliged to protect sensitive coastal systems and to secure the natural functioning of dynamic coastal processes.
19. By breaching the estuary mouth on the 6<sup>th</sup> January 2021, the iSimangaliso Authority seems to have abandoned its own management strategy and ignored the scientific evidence on which this strategy is based. In addition to committing significant time and effort to the GEF project and outcomes between 2010-2017, the iSimangaliso Park Authority also made a significant financial contribution to the GEF project, initially committing US\$12.7 million and then being able to leverage extra funds to extend this to a contributed total of US\$49 million to the restoration initiative.
20. The actions taken on the 6<sup>th</sup> January 2021 are directly contrary to the outcomes envisaged by the this substantial commitment and we hope that the current pathway can be halted and the restoration of this estuary brought back to a scientifically robust and data driven process.
21. As scientists and as citizens, we respectfully request that you as the Minister source and provide an explanation regarding this deviation from scientific, evidence-based management decisions by the iSimangaliso Authority.

Signatories to this letter

Ms Nicolette Forbes  
Prof Anthony Forbes  
Prof Derek Stretch  
Dr Barry Clark  
Dr Jane Turpie  
Prof Gerrit Basson  
Mr Eddie Bosman

## 11. APPENDIX II – Panel engagement and meeting activity

**Table A – scientists engaged during the 6 month appointment of the panel**

<b>Name</b>	<b>Institution</b>	<b>Date</b>	<b>Discussion mode</b>
Dr Ricky Taylor	Retired - Ezemvelo KZN Wildlife, University of Zululand	13-Oct-21	written comments
Ms Caroline Fox	Ezemvelo KZN Wildlife	03-Nov-21	in person meeting
Prof. Alan Whitfield	South African Institute for Aquatic Biodiversity	04-Nov-21	written comments
Dr Jean Harris	WildOceans	08-Nov-21	virtual meeting
Dr Ryan Daly	Oceanographic Research Institute	09-Nov-21	virtual meeting
Dr Fiona Mackay	Oceanographic Research Institute	10-Nov-21	virtual meeting
Dr Werner Illenberger	Illenberger & Associates	11-Nov-21	virtual meeting
Prof. Digby Cyrus	Retired - University of Zululand	12-Nov-21	virtual meeting
Dr Gregory Botha	Council for Geoscience	12-Nov-21	virtual meeting
Prof. Janine Adams	Nelson Mandela University	16-Nov-21	written comments
Prof. Anthony Forbes	Marine and Estuarine Research	22-Nov-21	virtual meeting
Dr Lara van Niekerk	Council for Scientific and Industrial Research	24-Nov-21	virtual meeting
Mrs Nicolette Forbes	Marine and Estuarine Research	25-Nov-21	virtual meeting
Mr Santosh Bachoo	Ezemvelo KZN Wildlife	26-Nov-21	virtual meeting

**Table B – panel meetings with stakeholder groups**

<b>Stakeholder group</b>	<b>Venue</b>	<b>Date</b>
Panel meeting 1	virtual	05-Oct-21
Panel induction meeting	virtual	13-Oct-21
Panel meeting 2	virtual	27-Oct-21
iSimangaliso Wetland Park Authority	St Lucia	2-4 Nov 2021
Farmers and sugar mill representatives	St Lucia	15-Nov-21
Tour operators and St Lucia ratepayers	St Lucia	16-Nov-21
Recreational fishers	St Lucia	16-Nov-21
Sokhulu and Dukuduku community representatives	St Lucia	17-Nov-21
Sokhulu and Dukuduku amakhosi and council	Sokhulu and Mtubatuba	18-Nov-21
Department of Water and Sanitation	virtual	19-Nov-21
Mtubatuba Local Municipality	virtual	19-Nov-21
St Lucia Independent Action Group	virtual	02-Dec-21
DFFE Law Reform, World Heritage Convention and Ramsar representative	virtual	06-Dec-21
Panel meeting 3	virtual	07-Dec-21
DFFE Working for Water, EIA representative	virtual	14-Jan-22
Panel meeting 4	Pretoria	17-18 Jan 2022
DFFE Forestry representative	virtual	18-Jan-22
Panel visit to Sokhulu and Dukuduku	Sokhulu and Mtubatuba	7-9 Feb 2022
iSimangaliso Wetland Park Authority - CEO	virtual	09-Feb-22
Panel meeting 5	Pretoria	24-25 Feb 2022
Panel meeting 6	virtual	16-17 March 2022
iSimanagaliso Wetland Park Authority - Board	virtual	24-Mar-22





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**GOVERNMENT NOTICES • GOEWERMENTSKENNISGEWINGS**

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**DEPARTMENT OF FORESTRY, FISHERIES AND THE ENVIRONMENT**

NO. 1688

20 January 2022

**NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998  
(ACT NO. 107 OF 1998)****A GENERAL NOTICE CALLING FOR SUBMISSIONS OF SCIENTIFIC INFORMATION, SOCIO-ECONOMIC INFORMATION OR ANY OTHER RELEVANT INFORMATION TO THE PANEL OF EXPERTS APPOINTED TO LEAD A REVIEW OF THE SCIENTIFIC BASIS FOR THE BREACH OF THE MOUTH OF LAKE ST LUCIA ESTUARY, ISIMANGALISO WETLAND PARK, KWAZULU-NATAL PROVINCE**

The Panel of Experts, appointed under section 3A of the National Environmental Management Act, 1998 (Act No. 107 of 1998) to lead a review of the scientific basis for the breach of the mouth of lake St. Lucia estuary, hereby invites members of the public to submit for consideration, written submissions, scientific information, socio-economic information, or any other relevant information on matters related to the management of Lake St Lucia estuary.

All submissions must be submitted within 30 days from the date of publication of this notice, to the following addresses:

By post to: Chairperson: Panel of Experts  
c/o Department of Forestry, Fisheries and the Environment  
Attention: Mr Fhumulani Tshamano  
Private Bag X447  
PRETORIA  
0001

By hand at: Ground Floor, Environment House, 473 Steve Biko Street, Pretoria, 0001 or  
iSimangaliso Wetland Park Authority, The Dredger Harbour, St Lucia, 3936.

By email at: [ftshamano@dfpe.gov.za](mailto:ftshamano@dfpe.gov.za)

Any enquiries in connection with the notice can be directed to Mr Fhumulani Tshamano at 012 399 8864 or [ftshamano@dfpe.gov.za](mailto:ftshamano@dfpe.gov.za) .

**A GENERAL NOTICE CALLING FOR SUBMISSIONS, SCIENTIFIC INFORMATION, SOCIO-ECONOMIC INFORMATION OR ANY OTHER RELEVANT INFORMATION TO THE PANEL OF EXPERTS APPOINTED TO LEAD A REVIEW OF THE SCIENTIFIC BASIS FOR THE BREACH OF THE MOUTH OF LAKE ST LUCIA ESTUARY, ISIMANGALISO WETLAND PARK, KWAZULU-NATAL PROVINCE**

Inputs received after the closing date may be disregarded.



**CHAIRPERSON**

**PANEL OF EXPERTS APPOINTED TO LEAD A REVIEW OF THE SCIENTIFIC BASIS FOR THE BREACH OF THE MOUTH OF LAKE ST LUCIA ESTUARY**

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### 13. APPENDIX IV – Public comments submitted to the panel

Date & Affiliation Contact Person & Contacts	Folder Number	Comment
24 Jan 2022  Private  Hendrik Du Toit  <a href="mailto:hendrik.water@gmail.com">hendrik.water@gmail.com</a>  <b>Written submission</b>	01	<p>Question 1 : What is the legislated purpose of NEMA?            Section 1(3) of NEMA provide that :            S1(3) A reasonable interpretation of a provision which is consistent with the purpose of this Act must be preferred over an alternative interpretation which is not consistent with the purpose of this Act.            But the Act failed to provide a purpose.            The purpose seems to be left undefined to be used in subsequent law to be stated to suit the purpose of that law.            Section 24 of the Constitution may be the only purpose.            S24. Everyone has the right—            (a) to an environment that is not harmful to their health or wellbeing; and            (b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that—                (i) prevent pollution and ecological degradation;                (ii) promote conservation; and                (iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.            The preamble could be the purpose but it seems to be inconsistent with the Constitution</p> <hr/> <p>Question 2 : What type is the estuary or what is the salinity of the water in the estuary.            The National Environmental Management Coastal Waters Management Act define :            "estuary" means a body of surface water—            (a) that is part of a water course that is permanently or periodically open to the sea;            (b) in which a rise and fall of the water level as a result of the tides is measurable at spring tides when the water course is open to the sea; or            (c) in respect of which the salinity is measurably higher as a result of the influence of the sea:            The National Water Act define :            "estuary" means a partially or fully enclosed body of water –            (a) which is open to the sea permanently or periodically; and            (b) within which the sea water can be diluted, to an extent that is measurable, with fresh water drained from land;</p> <hr/> <p>Question 3 : Please supply me with a map or plan showing            1 where the sand bank will be removed.            2 the high water mark            3 the coastal water management zone.</p> <hr/> <p>Question 4            Are the current vegetation in the wetlands resilient to saline water ?</p> <hr/> <p>Question 5            What will be the effect on the bird life ?</p>

Date & Affiliation Contact Person & Contacts	Folder Number	Comment
		<p>Question 6 Is there any existing or licensed taking of water from the estuary ?</p> <p>Question 7 The National Water Act use the same words (waste and pollution) as used in environmental law but define them differently. S1(xxiii) "waste" includes any solid material or material that is suspended, dissolved or transported in water (including sediment) and which is spilled or deposited on land or into a water resource in such volume, composition or manner as to cause, or to be reasonably likely to cause, the water resource to be polluted; S1(xv) "pollution" means the direct or indirect alteration of the physical, chemical or biological properties of a water resource so as to make it - (a) less fit for any beneficial purpose for which it may reasonably be expected to be used; or (b) harmful or potentially harmful -     (aa) to the welfare, health or safety of human beings;     (bb) to any aquatic or non-aquatic organisms;     (cc) to the resource quality; or     (dd) to property; S1(xix) "resource quality" means the quality of all the aspects of a water resource including -     (a) the quantity, pattern, timing, water level and assurance of instream flow;     (b) the water quality, including the physical, chemical and biological characteristics of the water;     (c) the character and condition of the instream and riparian habitat; and     (d) the characteristics, condition and distribution of the aquatic biota;</p> <p>Sand is transported by water in a stream and are deposited in sand banks which may impede the flow of water and cause the river to breach the banks or close the mouths of estuaries. Therefore sand is a pollutant under water law. Regulation 3 of regulations 704 of 1999 allow sand winning in water courses if the specified conditions are complied with. It could be an advantage to remove the surplus sand that could very soon close off the mouth.</p>
<p>24 Jan 2022</p> <p>SA Cane Growers</p> <p>Theuns Theunissen</p> <p><a href="mailto:Theuns.Theunissen@sacanegrowers.co.za">Theuns.Theunissen@sacanegrowers.co.za</a></p> <p><b>Presentation</b></p>	<p>02</p>	<p><b>SOCIAL IMPACT</b></p> <ul style="list-style-type: none"> <li>● 438 sugarcane farm labourers and their families are directly affected</li> <li>● Representing 1 750 livelihoods</li> <li>● The local small-scale and subsistence farming community is also heavily affected.</li> <li>● A diverse selection of fruits and vegetables secures food security in the form of substance and household income.</li> <li>● The loss in production of sugarcane, fruits, and vegetables forces some local people into criminal activities.</li> <li>● Neighbouring farmers are affected.</li> <li>● Elevated levels of crime affects tourism, which in turn means all local businesses will be affected.</li> <li>● The livelihoods of everyone is at stake.</li> </ul> <p><b>Farmers and the Whole Community under Threat</b></p> <ul style="list-style-type: none"> <li>● Desperate need of disaster relief in the form of short-term immediate interventions, as well as long term preventative measures to be put in place. <ul style="list-style-type: none"> <li>○ Active Management Plan</li> </ul> </li> <li>● Grower losses need to account not only for the complete devastation of the crop on hand, but the complete re-establishment of the area under sugarcane.</li> </ul>

Date & Affiliation Contact Person & Contacts	Folder Number	Comment
		<p><b>Crop Damage</b></p> <ul style="list-style-type: none"> <li>● Impossible to harvest crop</li> <li>● Yield and quality of the crop destroyed</li> <li>● Next season's crop already affected</li> <li>● Water is not receding and a large extend of the area will have no crop for many years to come</li> </ul> <p><b>Estimated Crop Damage:</b></p> <p><b>2021:</b> 125 000 tons x R 643,22 = R80 402 500</p> <p><b>2022:</b> 125 000 tons x R694,47 = R86 808 900</p> <p><b>Total: R167 211 400</b></p> <ul style="list-style-type: none"> <li>● Furthermore, the whole area will need to be replanted.</li> </ul> <p><b>Estimated Replanting:</b> 1 600 hectares x R35 000 = R56 000 000</p> <p><b>Estimated Total Grower Direct Loss:</b> <b>R223 211 400</b></p>
		<p><b>Umfoloji Sugar Mill Collapse</b></p> <ul style="list-style-type: none"> <li>● Small-scale and commercial growers are shareholders in the local Umfolozi Sugar Mill.</li> <li>● The total loss to growers is aggravated even further with the loss in sugar production at the mill.</li> <li>● Should the mill reach a point where economy of scale is diminished and the available sugarcane is not enough to remain profitable, a total collapse of the local economy can be expected.</li> </ul> <p><b>Direct losses in sugar production to growers and the Umfolozi Sugar Mill:</b> <b>1 300 000 tons cane x R 1 085,11 = R1 410 642 187 (R1.4 billion)</b></p>
		<p><b>Multiplier Effect</b></p> <ul style="list-style-type: none"> <li>● The multiplier effect of the sugar industry in the local Umfolozi economy as determined by the Bureau for Food and Agricultural Policy is 3.2.</li> <li>● This is because the income generated by one industry leads to more spending in other local businesses, which creates more income, and so on.</li> </ul> <p><b>Therefore, the knock-on effect to the local economy:</b></p>

Date & Affiliation Contact Person & Contacts	Folder Number	Comment
		<p><b>R1 410 642 187 x 3.2 = R 4 514 055 000 (R 4.5 billion)</b></p> <ul style="list-style-type: none"> <li>Sugarcane farming and processing is the cornerstone of socioeconomic development in Mtubatuba. Local small-scale and large-scale farmers and the sugar mill together give thousands of local people employment opportunities and a means to a secure livelihood.</li> </ul> <p><b>Farmers are in full support of the UCOSP proposal:</b> To assist with drainage of flooded farmlands by opening a narrow canal along the course of the southern Msunduzi and deepening the beach canal connection to the mouth – by removal of vegetation and excavation to remove the raised sediment “plug”.</p>
<p>25 Jan 2022</p> <p>Infor4u</p> <p>Frank Gainsford</p> <p><a href="mailto:frankie2socks@infor4u.co.za">frankie2socks@infor4u.co.za</a></p> <p><b>Email</b></p>	<p>03</p>	<p>Please advise when this committee changed from an independent investigative committee to a committee that pushes the iSimangaliso narrative ! If this is an error, please rectify soonest, coz folks are accusing me of supporting iSimangaliso which I am not doing in any Shape manner or form.</p> <p>I want to see the senior Management of the IWPA behind bars, coz they have deliberately, and with CRIMINAL INTENT destroyed the indigenous rights of those living within Umkhanyakude district Municipality, in terms of section 24 of the constitution, denying access rights, harvesting of natural renewable resources, and trade in the natural renewable resources supplied by lake St. Lucia and the St. Lucia estuary systems, coz in the mind of the IWPA the area is a world heritage site and thus the IWPA may make decisions without following the mandated procedures in many different acts, laws and legislations.</p> <p>The IWPA needs to be held accountable in a court of law, for their gross and criminal neglect of peoples rights of access, as well as utaliadions of the natural renewable resources. The sustainability of these natural renewable resources was in my mind seriously compromised by the criminal intent of the iSimangaliso Wetland Park Authority to remove the indigenous rights of peoples living adjacent to lake St. Lucia or the other components of the greater St. Lucia wetlands park.</p> <p>The fact that these rights have not been discussed at any of the mandated public participation process meetings needs your personal attention, as well as the attention of this committee, and we, the folks on the ground who are suffering lost incomes, destroyed livelihoods and economic disruptions need an explanation from the minister of Forestry Fisheries and Environment, as to why the IWPA has not been taken to task for failure to hold proper public participation process meetings as is mandated in the National environmental management Act and it's subsequent subservient legislations as dictated by the Integrated Coastal Management act, and many other laws, including but not limited to the World Heritage conversations Act.</p> <p>The disastetous state of affairs within the ecological operations of the St. Lucia estuary and lake systems is a direct result of the IWPA attempting to bankrupt the indigenous folks surrounding the lake and estuary systems, so as to enforce their (IWPA) desired control and management of the area, where international tourism is pushed at the expense of domestic tourism, where the IWPA have plans to build large high end international tourism establishments and exclude all local stake holders, on lands that are currently zoned as "WILDERNESS"</p> <p>This is supported by the national government in many areas, where the LSDI or Lubombo Spatial Development initiative and their desired transnational park, which would include Swazi Land, Mocambique, Malawi and South Africa, is the primary driver of many nasty decisions that erode, eradicate or destroy many indigenous rights. Our fishing rights and access rights to natural renewable resources are a case in point, and the 4x4 ban escalated the poverty issues of the Elephant Coast, which the IWPA still supports to this day, with out any consideration for the economy of Umkhanyakude district Municipality.</p> <p>The world heritage convention act protects these rights, but the IWPA with the help and guidance of the LSDI and the department of Forestry Fisheries and Environment has ensured that these rights are minimised, eroded or destroyed.</p> <p>The current situation in January 2022, where the silt from the Umfolozi river is allowed to enter the NORTHERN SECTIONS of Lake St. Lucia and the St. Lucia esturine systems is extremely problematic, as the northern sections of the lake are low energy systems, and do not, and will not ever have the power to remove this extremely heavy silt load. This will require mechanical interventions, at great economic costs.</p> <p>This silt is being deposited in the northern sections of the lake due to the criminally crafted public perception management strategies of the Andrew Zaloumis management team at the iSimangaliso Wetland Park Authority, where the silt load was deliberately, with criminal intent down played, so as to ensure the ecological failure of the greater St Lucia wetlands park, and prepare the public mentally for the proposed mining of the area, which would provide jobs lost as direct result of failed tourism and over utalisation of the natural renewable resources within the St. Lucia lake and estuary systems, which the iSimangaliso Wetland Park have engineered.</p>

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		<p>The primary purpose of the 2017 GEF PROJECT was to ensure that the silt from the Umfolozi river contaminated and polluted the northern sections of the Lake. Those who tell you different are either ignorant, or part of the public perception management team at the IWPA / DEPARTMENT OF FORESTRY FISHERIES AND ENVIRONMENT.</p> <p>If this project ,( 2017 GEF) intended to supply fresh water to the northern sections of the lake, it would have ensured that the water from the silt laden Umfolozi river first slowed down and dropped the major portion of the silt in the high energy Southern sections of the system within the Umfolozi flats, the Sokhulu areas and adjacent flood plains of the Umzunduze river. This was not the case and the Umfolozi river was directly connected to the northern sections of the lake bypassing the natural filter systems in place. There are vast quantities of research around the silt in the Umfolozi and the problems associated with this which the iSimangaliso Wetland Park Authority deliberately and with criminal intent ignored, down played and side stepped through very elegant public perception management strategies, where avoiding public participation process meetings was a very important part of their strategies. Research gate is a very good source of information that is not managed and controlled by the South African government, and I do believe that this committee should take a look at the vast number of research documents discussing the "UMFOLOZI SILT PROBLEM"</p> <p>The Mtubatuba IDP PROCESS MEETINGS, where I personally attempted to get the IWPA INVOLVED in the process during the issues connected to the 4x4 ban need to be examined. The IWPA pulled a very nasty trick and through the department of environmental affairs managed to change their demarcation in such a manner that the IWPA became a DMA or District Management Area, and thus excluded themselves from all municipal restrictions, laws bylaws and areas of jurisdiction. This happened somewhere around 2006. Not sure of exact date.</p> <p>Question ..... Are any of the other world heritage sites in South Africa excluded from local Municipality jurisdictions ?</p> <p>This move gave the IWPA extra powers and ensured that their public perception management strategies would succeed, as the public now had no access to participate in the management affairs of the IWPA giving the iSimangaliso Wetland Park Authority free reign to do as they please.</p> <p>The IWPA needs to be held accountable, and those on the Andrew Zaloumis management team need to be prosecuted.</p> <p>The current (Jan 2022) investigations into these matters by the portfolio management committee for department of Forestry Fisheries and Environment are a testimony to the criminally bad management of the St. Lucia estuary systems by the IWPA , and this committee needs to investigate this matter and include these issues in their report to the minister. My question is " How long before actions are taken ?"</p> <p>The current situation where the mouth of the St. Lucia estuary is closed, allowing vast volumes of silt to settle in the lower southern ends of the estuary and the northern sections of the lake is extremely problematic, as I discussed with this committee at their meetings with stake holders on 15 and 16 November 2021 in St. Lucia.</p> <p>The economy of Umkhanyakude district Municipality is not clearly understood, and the sale of natural renewable resources of lake St. Lucia and the St. Lucia estuary systems is not discussed in any detail at the local Municipality levels, or the district Municipality levels. The major reason is that these activities have been declared illegal by the IWPA, and the department of Forestry Fisheries and Environment has pushed this attitude and agenda through parliament without consulting those who are most affected by these decisions. There is thus no formal avenue for the economy connected to the extraction and sales of natural renewable resources supplied by the lake.</p> <p>The iSimangaliso Wetland Park Authority has also not discussed the very large and negative impacts of the collapsed biodiversity within their annual reporting documents. In my mind there is criminal intent behind this non disclosure. Disclosing these huge economic losses would highlight the failures of the IWPA in many areas and cause many strange impacts within the economic planning of each local municipal as well as the Umkhanyakude district Municipality, and the province of KZN</p> <p>These issues would be reflected in the local Municipality local economic development strategies, and raise serious red flags at district, provincial and national level. But these financial issues are well hidden by the IWPA public perception management tactics, so these economic issues are not discussed within the local economic strategies at the political structures where they should be.</p> <p>This is very disturbing, and has come about due to serious efforts by the Andrew Zaloumis management team at the iSimangaliso Wetland Park Authority, to hide these economic issues and paint a picture of locals as poachers and undesirable individuals. The new management team at the iSimangaliso Wetland Park Authority is carrying on with the past tactics, and still uses many elegant public perception management strategies to keep the public disinforming and unaware of the vast economic troubles caused by the IWPA attitude to utilisation of natural renewable resources. The collapsed prawn industry that was based out of Cape Town, shows how large the biomass within the St. Lucia lake and estuary system was. Instead of processing this large biomass for sale in Cape Town, it should be processed within the iSimangaliso Wetland Park World Heritage site and these jobs offered to the local population of Umkhanyakude. After all this natural renewable resource comes from Umkhanyakude, so why should the associated jobs be outsourced to Cape Town ? On</p>

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		<p>top of that the prawns should be harvested within the iSimangaliso Wetland Park World Heritage site, and not off the Tugela Banks, which should be a doe ial marine protected area, coz rays congregate yo breed there stbthe same time of the year that prawns lay their eggs in the same area.</p> <p>Lake St. Lucia should be able to support a very large prawn industry, and this committee needs to investigate the possibility of processing prawns for public consumption within the iSimangaliso Wetland Park World Heritage site. The lake is over 36 000 hectares in size, and will be able to sustain a rather large biomass if properly maintained, with suitable silt traps and other anti soil errosion tactics in place within the fresh water catchment zones of the St. Lucia lake and the St. Lucia estuary systems, which will drastically impact on the silt problem, reducing fredging cost considerably over time.</p> <p>Besides prawns there is the crab industry and harvesting of fish, as well as marine aquculture which should be introduced into the St. Lucia system to ensure economic stability of the Umkhanyakude district Municipality.</p> <p>The issue of world heritage status should not be used as a tool to destroy the income streams of the local population of Umkhanyakude. The world heritage convention act is clear on this, as all rights and privilagees that any group had prior to the area being declared axworld heritage site, are not xpunged, but tather protected and enshrined in law. The IWPA has acted in bad faith and not held public participation process meetings to discuss this, and used the ignorance of the local folks as a tool against them, sonas tonexclude them where ever possible. Do not be fooled by the IWPA public perception management tactics, which ensured that Andrew Zaloumis recieved international awards for community development projects, rather come and out your toes in the eater and speak directly to the folks on the ground in areas like Sokhulu, Nibela or Nkundse .</p> <p>I can facilitate a meeting with this committee and the public at Nibela peninsula in the northern sections of the lake St the discretion of the independent scientists on this committee.</p> <p>While this committee is gathering information, the St. Lucia lake and estuary systems arebdeteriorating at a significant pace, coz the rainy season is upon us, and the Umfolozi river is running and bringing great volumes of silt into these systems, which will be here causing problems for the foreseeable future. the sooner actions are taken the better.</p> <p>Please act now. Frankie2Socks frankie2Socks@info4u.co.za 0725055111</p>
<p>25 Jan 2022</p> <p>Private</p> <p>Paul van Rooyen</p> <p><a href="mailto:riaden156@iafrica.com">riaden156@iafrica.com</a></p> <p>Email</p>	04	<p>Dear Mr. Tshamano,</p> <p>I thank you for the invitation to submit a consideration. I'm not a scientist but have lived in St Lucia area for 64 years so my submission is a life-long observation of what has been done and what should have been done since iSimangaliso have achieved in destroying the St Lucia Estuary.</p> <p>The Estuary does not exist they have converted it into a large silt trap and destroying all the marine life an estuary is supposed to be the life line for.</p> <p>The Umfolozi river is depositing millions of tons of silt every rainfall season into what was the estuary with no outlet to the sea.</p> <p>The history of St Lucia is well documented so will not repeat what I'm sure and hope will be scrutinized by this new Panel of Experts with open minds and not be convinced by a few scientists who are trying to justify the mistakes made since iSimangaliso took over the management.</p> <p>For many years the Estuary was kept functional through dredging which is done all over the world successfully.</p> <p>My plea to the Panel is please revert to allowing the Estuary to remain open to the ocean as the present plan is an absolute disaster. The ecology is in a dire position, the economy is in serious trouble job losses have been horrific neighbouring properties have been destroyed with no accountability.</p> <p>Having lived here all my life in my opinion the worst has all happened since iSimangaliso took over the management, I'm very surprised the government has allowed such a jewel in the crown of our country to be destroyed the way it is.</p> <p>As a citizen and resident tax payer in our country I hope the Panel is able to advise common sense and practicality to the powers that be, to rectify the present disaster here at St Lucia and surrounding area.</p> <p>I thank you again for the invite and hope revival of the Estuary is soon.</p> <p>Kind Regards, Paul. [Concerned citizen].</p>

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26 January 2022  Werner Illenberger  <a href="mailto:werner.k.i@gmail.com">werner.k.i@gmail.com</a>  <b>Email</b>	05	I have lots of scientific information. I presume I will be paid standard professional rates? regards, Werner Illenberger Illenberger & Associates Port Elizabeth www.illenberger.biz 083 626 1917
27 January 2022  Infor4u  Frank Gainsford  <a href="mailto:frankie2socks@info4u.co.za">frankie2socks@info4u.co.za</a>  <b>Email</b>	06	Greetings from Frankie2Socks again. Many thanx for your past help in passing along submissions / comments and general info. The issues associated with Section 24 of the South African constitution need to be considered by this committee. I have blogged about this issue in a few spaces. This is one that I would like you to pass along. <a href="http://frankie2socks.blogspot.com/2021/06/section-24-of-constitution-and.html?m=1">http://frankie2socks.blogspot.com/2021/06/section-24-of-constitution-and.html?m=1</a> Please supply proof of receipt, and proof of passing along. This is a complicated issue, and I fear legal actions will flow from many angles, as there are those who have errrrrd, who want to cover their tear ends and keep their jobs. Unfortunately when things go wrong like this, coz some folks thought thier plans or ideas above the law, now the smelly stuff is in the wind making machine, and this committee is supposed to make recommendations on how to get rid of the smell, but nobody wants to turn the fan off. Then the question becomes who will clean the fan, coz it is summer time, and the heat is bothering the management, but nobody wants the smell. This committee needs to get serious about understanding the economic impacts of a failed estuary, then understand why the issue was allowed to progress so far before any actions were taken. So who should be held responsible for the economic trauma that the criminally bad ecological management strategies of the Department of Forestry Fisheries and Environment instituted through their employee, the iSimangaliso Wetland Park Authority ? Note to committee... Have fun when you debate who is responsible for these gross economic losses caused by the criminal activities of the iSimangaliso Wetland Park Authority during their actions and activities to implement thier ecological management plans and strategies for the St. Lucia estuary and lake systems in terms of the Integrated Coastal Management Act. After all you as a committee are investigating the reasons behind the January 2021 breach of the St. Lucia estuary. The economy of Umkhanyakude District Municipality needs to be considered and given it's full due. Failure to mention this in your report will be seen as what it is ... A cover up, which needs to be discussed with a magistrate. Take care and do what is right. Frankie2Socks <a href="mailto:frankie2socks@info4u.co.za">frankie2socks@info4u.co.za</a> ,0725055111

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01 February 2022  Umfolozi Sugar Mills  Adrian Wynne  Awynne@usm.co.za	07	<p><b>Impact of Flooding on USM</b></p> <ul style="list-style-type: none"> <li>● The Umfolozi flats represents approximately 55% of USM's total cane supply.</li> <li>● Farms on the Umfolozi Flats that become inundated at 1.2 msl; Water levels have been between 2.8 and 3.0 msl.</li> <li>● Resultant flooding of between 1,200 ha and 1,800 ha.</li> <li>● USM impact is 100,000 to 150,000 tons cane is at risk (dependent on complex environmental</li> <li>● This represents a potential throughput loss of 8% to 12% (total cane crop 1,25 m tons cane).</li> <li>● Milling capital intensive; other than the variable cost of cane all other material costs are fixed</li> <li>● USM's break even tonnage is between 1.10 and 1.20 million tons of cane, subject to changing economic factors.</li> <li>● Extensive flooding could render USM commercially unviable.</li> </ul> <p><b>Impact of Flooding on USM and the Surrounding Community</b></p> <ul style="list-style-type: none"> <li>● USM's annual turnover of approximately R1.3 billion, with a multiplier effect of approximately x3</li> <li>● If USM closes:               <ul style="list-style-type: none"> <li>○ ALL supplying growers will be impacted.</li> <li>○ The entire town of Mtubatuba will be impacted.</li> <li>○ The Umkhanyakude District Municipality will lose 3 x R1.3 billion.</li> <li>○ Contractors from Richards Bay, Durban, JHB will be impacted.</li> </ul> </li> <li>● The Umkhanyakude District Municipality is characterised by high levels of unemployment and poverty; if USM closed down it would be a socio economic catastrophe.</li> <li>● The dtic Sugar Industry Master Plan recognises this and is in the process of making every effort to 'rescue' the sugar industry from economic decline , including USM.</li> <li>● USM supports every effort to secure the viability of the growers affected by the back flooding.</li> </ul> <p><b>Please watch the short USM video on the YouTube link below:</b></p> <p><a href="https://www.youtube.com/watch?v=IeojgAQWHg0&amp;t=3s">https://www.youtube.com/watch?v=IeojgAQWHg0&amp;t=3s</a></p> <p><b>Way Forward</b></p> <p>The Umfolozi Sugar Mill respectfully requests the panel to consider the following solutions to mitigate the devastating impact of the back flooding while at the same time retaining the environmental integrity of the estuary</p> <p>Management of the estuary must be in accordance with the iSimangaliso Management Plan that according to its World Heritage status must take into account socio economic factors that allows for the following</p>



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		a) At environmentally appropriate water levels (e.g. 2.8-3.0 msl), the mouth of the Umfolozi and Msunduzi rivers is allowed to be breached mechanically b) Due to high river silt levels, maintenance of stream flow is allowed in the Umfolozi and Msunduzi river systems, such as dredging and other appropriate activities
11 February 2022  Private  Slindile Nsele  <a href="mailto:slindile.ngethe@gmail.com">slindile.ngethe@gmail.com</a>	08	<p>Dear sir,</p> <p>Let me first appreciate the opportunity for written submissions. Secondly, we appreciated the diversity of the experts appointed because we in this mess with St Lucia Estuary is because only environmental scientists takes decisions without deep consideration of socioeconomic impact of their decisions/ recommendations. Also, we appreciated the manner in which the Panel engaged with us the effected stakeholders during public consultation meetings.</p> <p>St Lucia Estuary is dead - let me start there. The January 2021 assisted breaching was meant to allow the estuary an opportunity to live again. This was carried as recommended the Symposium, informed by concerns of diverse communities including conservationists, fishers, farmers and citizens in common. The group of almost hundred people including more senior scientists all agreed on these recommendations. They represented thousands of people with similar views from effected communities. And just a mere letter of 7 'concerned scientists' stands to steer everything around?</p> <p>Having visited the communities effected by closing of the St Lucia Estuary mouth, you must be with a colourful picture of how dire the situation is. People a suffering. And not only that, more importantly the ecology of the St Lucia Estuary itself is suffocating. In fact this is a catastrophic disaster. This 'do nothing and let nature take its course' policy is a recipe for disaster as iMfolozi river keeps flooding the lake system with tons of mud endlessly. Open this thing and maintain it properly so even if it closes itself it can be able to breach naturally. How can the river climb that mountain/ berm built in from of the supposed 'mouth'? This one will not happen in any near future. We need no PhD to see that. Mangrove trees are dead and will take decades to grow even if the mouth opens today, birdlife is gone and wildlife got disrupted at a wide scale, fish species died down as a result of this closure, tourism is dead in St Lucia, farms are being flooded. The list is endless...</p> <p>We plead with this Panel of Experts to consider these gross distractions, and release a sounding report. The suffering has dragged for far too long I'd also recommend that this report be handed to Minister before 31 March which is way too far, and she be advised to act with urgency.</p> <p>Thank you</p>
11 February 2022  Private  Gugu Dube  <a href="mailto:gugudube.zululand@gmail.com">gugudube.zululand@gmail.com</a>	09	<p>Dear Sir,</p> <p>Thanks for opening this opportunity for written submissions on this thorny issue.</p> <p>I wish to first appreciate the diversity of the panel which we all hope will help ensure that justice is served in the St Lucia Estuary. The inclusion of experts either than only scientists we believe will widen the points of assessment of damage caused through the years by closing of the St Lucia Estuary. The farmers, tour operators, fishers and other communities plead for their perished bread - open the estuary mouth so that the St Lucia Estuary can be alive again and be able to provide all these other benefits to the surrounding communities.</p> <p>St Lucia Estuary itself is suffocating due to mouth closure; reeds are threatening to close the lake, Mangrove trees have perished, birdlife and other wildlife has been disrupted with the muddy water and now ever high water levels. The lake itself is today shallow because of all the sediments being dumped by the iMfolozi river. Through laymen observation, the simultaneous closure of estuary mouth and reconnecting of iMfolozi river to the St Lucia Estuary was a recipe for a disaster - hence, today we witness the brutal disruption of the environment by people entrusted with protecting it.</p> <p>When looking into this matter of the now fragile St Lucia estuarine system one always has to consider many methods which were employed in the past and are still used successfully elsewhere in the world. These are like dredging, and active sediment control. Not this bizarre policy of 'doing nothing' and expecting 'nature to take its course' whereas human had</p>

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		<p>created a problem. So we shall wait for a once in a century cyclone like Domonia to happen? No that is illogical</p> <p>The loudest voices against January 2021 assisted breaching are of scientists living in Durban and across the country - none lives anywhere near St Lucia to witness the damage and suffering. Farms are submerged, tourism is suffering because tourist wants the once pristine St Lucia Estuary restored, fish species for fishers have become extinct, even the ecology of the estuary is in ICU. Apart from a cumulative high water levels &amp; mud, nothing is being achieved by the GEF project. Maybe if the recommended maintenance was done properly it would have produced something better.</p> <p>We, the citizens of Zululand plead with this Panel of Experts to think carefully of the severe damage caused in the St Lucia Estuary itself, zoom into the struggling communities of small scale farmers and fishers, commercial farmers who lost significant amount of their private land due to the closure of St Lucia Estuary</p> <p>We appreciated the decision by Minister Creecy to create this opportunity, and do hope that it is not just a box ticking exercise. Also please consider releasing an interim report or something, we have waited for far too long.</p> <p>Lastly, it is evident that the current St Lucia Estuary is no ideal Estuary - let it reconnect to the sea as nature intended it to</p> <p>Thank you</p>
<p>16 February 2022</p> <p>Private</p> <p>Ricky Taylor</p> <p>ricky.h.taylor@gmail.com</p>	<p>10</p>	<p>The Panel of Experts, appointed under section 3A of the National Environmental Management Act, 1998 (Act No. 107 of 1998) to lead <u>a review of the scientific basis for the breach of the mouth of lake St. Lucia estuary</u>, hereby invites members of the public to submit for consideration, written submissions, scientific information, socio-economic information, <u>or any other relevant information on matters related to the management of Lake St Lucia estuary.</u></p> <p><b>Submission by Dr Ricky Taylor</b></p> <p style="text-align: center;">Ricky.h.taylor@gmail.com</p> <p>Sent by email to: <a href="mailto:ftshamano@dfpe.gov.za">ftshamano@dfpe.gov.za</a></p> <p><b>Abstract:</b></p> <p>The breaching of the St Lucia mouth in January 2021 cannot be seen in isolation. It is important to take a 'big picture' view. The GEF programme and its implementation strategy were badly conceived and poorly communicated. There was no effective monitoring of the system responded to this management strategy – and hence there was no detection and evaluation of geological, ecological or social changes. The signals leading up to the public interventions were not detected.</p> <p>There has been little recognition of the geological trajectory of the system. The estuary is on the brink of flipping to the ecological state of a shallow freshwater coastal lake. The system is currently extremely sensitive to the addition of sediments.</p> <p>The changing social conditions adjacent to the iSimangaliso Park were not recognised or detected. These include the impacts on the sugar farms, the displacement of Sokhulu people by the proliferation of the (informal?) small-forestry enterprises from the Sokhulu area into the Mfolozi Floodplain. This was followed by the subsequent displacement of these subsistence farmers in the Mfolozi Floodplain by commercial madumbe and banana farmers. The 'final straw' was possibly how individuals, in all sectors of society, are impacted by</p>

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		<p>rising flood waters when the St Lucia/Mfolozi Mouth is allowed to breach 'naturally'.            In conceiving the GEF program there was little or no questioning whether a 'natural' management regime can operate given the extensive land use modifications that have occurred everywhere upstream of the combined St Lucia/Mfolozi Mouth. The Mfolozi Floodplain cannot be independently managed by different agencies (Conservation and Agricultural). In the future there must be coordinated management.            For future management there needs to be a multi-disciplinary advisory committee that can guide science-based management interventions in an open and transparent manner.</p> <p style="text-align: center;">-----o0o-----</p> <p><b>Disclaimer</b>  <i>Although I am critical of the GEF management strategy, whenever I was asked my opinion I always responded that we should give it a chance to see if it works or not. My attitude changed radically in September 2020 when I saw the sediment accumulations and associated vegetation responses, learnt about the flooding of the Mfolozi floodplain by backing up water <b>and found out that almost no monitoring or assessment of system responses to this intervention was being done.</b> There were (in my opinion) irreversible changes occurring and nobody was tracking the effectiveness, or otherwise, of the GEF management strategy.            In compiling these comments, due to the scarcity of available information, I have had to rely to a large degree on my general knowledge of the dynamics of the processes driving the St Lucia/Mfolozi Mouth. The issue relates largely to sediments and to a lesser extent on hydrology. The results of these shape the system and hence control the biota. The data collected by C Fox of EKZNNW – and her valuable synthesis reports – have been the source of much of my recent knowledge. However, the comments below are my personal insights and perceptions.</i>            Ricky Taylor. 15 February 2022</p> <p style="text-align: center;">-----o0o-----</p> <p>Contents</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 80%;"></th> <th style="width: 20%; text-align: right;">Page</th> </tr> </thead> <tbody> <tr> <td><b>Context</b></td> <td style="text-align: right;">2</td> </tr> <tr> <td><b>Events leading to the January 2021 breach, and responses to the breach.</b></td> <td style="text-align: right;">3</td> </tr> <tr> <td><b>An evaluation of the planning of the GEF programme and implementation of the GEF management strategy.</b></td> <td style="text-align: right;">5</td> </tr> <tr> <td><b>Flaws in the conceptualisation and design of the GEF programme</b></td> <td style="text-align: right;">5</td> </tr> </tbody> </table>		Page	<b>Context</b>	2	<b>Events leading to the January 2021 breach, and responses to the breach.</b>	3	<b>An evaluation of the planning of the GEF programme and implementation of the GEF management strategy.</b>	5	<b>Flaws in the conceptualisation and design of the GEF programme</b>	5
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<b>Flaws in the conceptualisation and design of the GEF programme</b>	5											

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		<p><b>Going forward</b></p> <p><b>Key Points</b></p> <p><b>Context</b> To understand the breaching of St Lucia in January 2021 it is necessary to understand the context in which it occurred. This must consider the larger spatial, temporal and social contexts. This includes the recognition that St Lucia has country-wide and regional economic importance due to its designation as a site of global significance. As well as being a national asset, it is a site of great economic importance to regional and local stakeholders.</p> <ul style="list-style-type: none"> <li>· <u>Geological progression</u></li> </ul> <p>Geologically speaking, St Lucia is a transient feature. As sediments accumulate, the system passes along a trajectory that takes it from a deep-water estuary to a reed-filled floodplain. Any acceleration in the rate of sediment accumulation reduces its 'lifespan' as an estuary. At present St Lucia is close to the 'tipping point' where it will change from an estuarine system, connected with the sea, to a shallow freshwater coastal lake that only very seldom links with the sea. The system is at a stage where it is very sensitive to any human activity that increases sedimentation.</p> <ul style="list-style-type: none"> <li>· <u>State of the catchments and transport of sediments</u></li> </ul> <p>Catchment deterioration has increased sediment yields very considerably over the past several decades. Deterioration is due to too many people exerting a heavy pressure on the catchment through over-use. This has resulted in increased erosion and the loss of the wetlands that trap sediments. It is most likely that there is now an accelerated infilling of St Lucia due to the degraded state of the catchment. The sediment accumulation is most evident in the lower Narrows where the channel at Honeymoon Bend is now one third of the width it was 10 years ago.</p> <ul style="list-style-type: none"> <li>· <u>State of the Mfolozi Floodplain</u></li> </ul> <p>Aggravating the effects of increased sediment yields from the catchment are the drainage canals in the sugar areas of the Mfolozi floodplain. Instead of the sediments being trapped in the upper reaches of the floodplain, these canals act as conduits carrying the sediments directly to the lower reaches of the floodplain. This is the critical area where the Mfolozi links with St Lucia. In the decade since the link between the Mfolozi River and St Lucia was reinstated there has been an unanticipated and very rapid accumulation of sediments in this lower portion of the floodplain, especially where the Beach Canal links into St Lucia. This is an empirical observation as no monitoring has taken place.</p> <ul style="list-style-type: none"> <li>· <u>Turbidity in the lake</u></li> </ul> <p>Since the re-linkage of Mfolozi with St Lucia there has been increased turbidity in the southern parts of St Lucia. This is due to the suspended fine-grained and colloidal sediments carried in the inflowing water. The biotic effects of this are poorly understood. However, the bird counts indicate few birds in this area with turbid water.</p>

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		<p>· <u>The floodplain must be regarded as a single integrated system</u></p> <p>The Mfolozi floodplain is a single wetland entity. It cannot be managed as separate components. Sugar farming and canalisation have taken place for more than 100 years. Now the impacts of these farming activities have accumulated to such an extent that the wetland can no longer be managed as separate conservation and agriculture activities. All future planning and management has to consider both forms of land use and collaborate to manage for the best outcome for both land uses.</p> <p>· <u>Human incursions into the floodplain</u></p> <p>Incursions into the proclaimed World Heritage Site area of the floodplain have been overlooked by the iSimangaliso Authority – but the livelihoods of these people who moved into the area were not recognised. In the past five years or so, there has been almost no flooding of the Mfolozi River. This unusual situation allowed people from local communities to penetrate into the extreme low-lying portions of the floodplain – exposing themselves and their fields to the risk of being flooded.</p> <p><b>Events leading to the January 2021 breach, and responses to the breach.</b></p> <p>· <u>The October 2020 workshop</u></p> <p>I am not competent to discuss the social components of the situation at St Lucia. But, having lived in the area for four decades, I recognise that there have been severe social tensions. There has not been effective working together with local communities, with commercial farmers or with businesses and tourism. There has been active political incitement by individuals wishing to promote their personal agendas. The dissatisfaction and agitation by various local stakeholders had been building up in momentum for the past few years. The 'workshop' of 13 October 2020 was a good initiative conducted in response to the stakeholder dissatisfaction. It was done with the best of intentions to promote communication – and achieved a certain amount of success. But there was an inadequate understanding of the issues and the geological and ecological processes when planning the meeting. The workshop did not effectively tap into available scientific knowledge. At the workshop there was no recognition that the issue was as much an issue of the Mfolozi Floodplain as of the St Lucia Mouth.</p> <p>The workshop was dominated by a few very assertive individuals who had a large influence on the rest of the participants. The workshop decided that the beach berm should be 'skimmed' to a set level so a 'natural' breach would occur once the water reached that level.</p> <p>· <u>After the workshop</u></p> <p>After the workshop, a scientific 'Task Team' was set up to deliberate the level for skimming – and where this should be (as this would become the mouth location). This was supposed to be in preparation for any possible summer flooding. A level was set – based on Caroline Fox's measurements tied in to the gauge plate at the St Lucia Bridge. Unfortunately, when correlating the gauge plate level with mean sea level an incorrect rectification figure was used – giving readings that were too high relative to msl – but of no consequence when giving a reading of the elevation of the Mfolozi-St Lucia water at the mouth relative to the beach berm i.e. it gives the level the water has to rise to effect a breach by overtopping.</p> <p>· <u>Breaching of the mouth</u></p> <p>The current managers of the mouth took very little account of the available scientific knowledge base. It also did not take into account lessons learnt in the past and it did not adequately tap into available skills and expertise. For instance, why were the Reclamation staff (e.g. Toffie, Sabelo and Charlie) who have opened the mouth many times not engaged</p>

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		<p>on the beach in early January 2021? And why were the engineering skills of UCOSP ignored? The process was to achieve a breach with undue speed, and was then hijacked by a small group of politically-skilled people with their own agendas.  When the breaching site was chosen, misinformation about the quantity of sand needing to be moved resulted in the choice of a site where a much larger quantity of sand than expected had to be shifted. The excavation was done by a private contractor. No profile surveys were done before the excavations were initiated – so the amount of sand to be moved could not even be guessed.  By the time the excavations were underway the water level had risen to above the level set for the skim – so it was felt that the mouth could be breached.</p> <p>· <u>Monitoring the responses to the breach</u></p> <p>The inadequacies of EKZNW and iSWPA managers and field staff to monitor the breach were apparent. There seems to be a lack of local skills for boating, for working on the water and little knowledge of the area (knowing where channels are etc).  C Fox was regularly measuring beach and water levels and water salinities (Before and after the breach). During and after the breach drone imagery was collected.  An important gap was that no bathymetry or sediment sampling was done.  Flows in the Mfolozi Floodplain were done by UCOSP, but not flows through the various canals into St Lucia</p> <p><b>An evaluation of the planning of the GEF programme and implementation of the GEF management strategy.</b>  <b>Flaws in the conceptualisation and design of the GEF programme</b>  It is easy to be critical in hindsight but several flaws in the conceptualisation of the GEF project are apparent. These should all be evaluated in an ‘adaptive management’ process. Some of the flaws are:</p> <p>· <u>Inadequate understanding of the natural processes and past interventions</u></p> <p>The GEF strategy did not adequately consider the accumulated body of scientific knowledge or experience. The GEF programme did not learn from previous management interventions and existing expertise. Previous management strategies were actively dismissed as not having any value. Many people with experience were excluded. Many of the flaws of the strategy could have been foreseen had there been an open workshop when this plan was conceived.</p> <p>· <u>Self-scouring of St Lucia – is it a feasible strategy?</u></p> <p>The basis of the GEF management strategy is that it is possible for a joint St Lucia-Mfolozi mouth to be self-scouring – where floods carry accumulated sediments out to sea. This is based more on modelling and conceptual understanding than on hard facts. The only example of this occurring is during the Domoina flood – a once in 200-year event – and then it was only the sediments near the mouth that were moved into the sea. The concept is that the mouth can function ‘naturally’ – relying on natural processes. There seems to have been little recognition of the extensive modification of the natural processes throughout the catchment, including its floodplain, preclude this.</p> <p>· <u>Fear of hyper-salinity</u></p> <p>As a result of the 2003-2013 drought there was an irrational fear of hyper-salinity conditions, and of the desiccation of large parts of the system. From that, and previous droughts, it has been shown how rapidly the system recovers once the drought has broken. There is no evidence of the loss of any species due to drought. I believe this fear was the main driver</p>

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		<p>of the GEF program.</p> <ul style="list-style-type: none"> <li>· <u>Impacts of prolonged mouth closures</u></li> </ul> <p>A recent evaluation of the impacts of prolonged mouth closure, by Prof Alan Whitfield, indicates that there is a real danger that the St Lucia population of mullets (<i>Mugil cephalus</i>) may not be able to recover from the prolonged period of mouth closure. This may be the case for other species as well. There is a case to be made to artificially open the mouth at regular intervals to prevent the pendulum swing of water salinity to the extreme freshwater state.</p> <ul style="list-style-type: none"> <li>· <u>Inadequate recognition of sediments</u></li> </ul> <p>From the outset, the importance of sediments and the accelerated rate they accumulate was inadequately recognised by the GEF programme. The catchment is shedding sediments at a highly accelerated rate and these sediments, due to the sugar farmers drainage canals, are no longer trapped in the upper parts of the Mfolozi Floodplain. They must end up at the combined St Lucia – Mfolozi Mouth area. The trajectory is for the St Lucia basin to gain sediments and gradually change to a shallow freshwater lake and then to a floodplain. The sediment accumulation has been accelerated by human activities. What was not anticipated was that the fine sediments, once settled, consolidate to become very resilient to erosion by water currents. Also, sediments that enter the upper Narrows and Lake are there forever unless they are moved by dredging.</p> <ul style="list-style-type: none"> <li>· <u>Unforeseen vegetation responses</u></li> </ul> <p>The extent of vegetation growth along the lower Mfolozi water course and on the margins of the Narrows was underestimated. The consequences of waterway constriction (in Narrows as well as in Mfolozi/Msunduzi) have altered flow patterns. – and plugs in channels. Sediment deposition is aided by the growth of emergent plants – which are in turn stimulated to expand by additional shallow water – this is a vicious circle.</p> <ul style="list-style-type: none"> <li>· <u>Too much emphasis on the very large floods – and not the frequent small ones</u></li> </ul> <p>There was also too much emphasis on the effects of the very large, but infrequent, floods. At the time-scales that affect most stakeholders it is the annual small spates in the river that are most important. It is important to recognise the different processes involved in small and large floods. In addition, there seems to have been inadequate recognition of social impacts of the GEF strategy of allowing water levels to rise to the extent that there would be sufficient outflow energy to remove sediments from the mouth area.</p> <ul style="list-style-type: none"> <li>· <u>Lack of coordinated management of the floodplain</u></li> </ul> <p>There was no recognition that the Mfolozi Floodplain has to be managed as a single unit – and that this requires the collaborations of all the stakeholders. The long-term impacts of the court case against the sugar farmers will be felt for decades. The damaged working relationships this created will take a long time to heal.</p> <ul style="list-style-type: none"> <li>· <u>Inadequate understanding of social impacts</u></li> </ul> <p>This leads to the impacts on people. The surveys done by the GEF program do not adequately translate effects of the rising water to the misery of people being flooded. There should be an assessment that equates each rise of (say) 20 cm of water in the floodplain with an assessment of how many people have their livelihoods damaged or destroyed – whether</p>

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		<p>these are subsistence farmers, small-scale commercial farmers, intensive sugar farms, houses, roads, tourism businesses etc. Conservation cannot be conducted any more without recognising the impacts on people beyond the borders of the protected area.</p> <p>· <u>Ineffective communication</u></p> <p>Effective communication of the GEF strategy has been very poor. So much of the GEF programme has been very secretive. The GEF final documents were not allowed to be distributed and each scientist working on the project had to sign confidentially documents. One effect is that there is no public-understanding of the frequency of the above-average rain and flood conditions that are needed to breach a closed mouth – and how the lake can be disconnected from the sea for decades at times. There should have been scientific symposia to present the concepts to the scientific community for comment. For a large multi-disciplinary programme – such as this GEF programme – it is essential to bring in scientists of all disciplines.</p> <p>Communication of the GEF programme was a highly-orchestrated process to ‘tick the boxes’ but while doing so to provide an absolute minimum of information and little opportunity for effective public participation. The level of the stakeholder dissatisfaction after several years of inadequate communication and no collaboration added up to a hostile public.</p> <p>· <u>Lack of transparency</u></p> <p>There was a high degree of secrecy surrounding the GEF project. The confidentiality that each of the consultants was bound to is anathema to free and open scientific discussion This was to the such an extent that Barry Clark from Anchor Environmental (the person who wrote the final report), had to obtain permission from the CEO of iSimangaliso Authority before he was allowed to present a summary of the findings of the GEF study to the 13 October 2020 workshop. The set of final reports were not available to interested parties (including the EKZNW scientists) until October 2020. This secrecy precluded open discussions and questioning of the success, or otherwise, of the GEF management strategy. I believe that this lack of transparency was one of the main reasons why the St Lucia Mouth was breached in the informal manner that it was.</p> <p>· <u>Poor communication of probability of occurrence of ‘natural’ breaching</u></p> <p>There is no general appreciation by the various stakeholders of the probability of a breaching event occurring in any given year – or of the water levels needed in Lake St Lucia to provide a sufficient head of water for such a breach to occur. This simply has not been successfully communicated to interested parties.</p> <p>The GEF project did not seem to consider how many people in the Mfolozi floodplain would first be flooded out before such a breach occurs. Successful communication does rely on community trust in the management authorities – which was severely lacking. I think not enough work was done to consider and communicate the impact higher water levels in the system have on neighbours, farms and infrastructure. With the closed joint mouth, water levels in these lower areas have risen to affect crops. This is partly due to the lack of tidal drainage due to the reconnection and closure of Mfolozi with St Lucia. But there is also another process. This, I believe, is the build-up of sediments at the lower end of the Warner’s Canal - The main canal that carries most of the Mfolozi water through the sugar areas. This is the point where water velocity slows down and a delta of deposited sediment is forming.</p> <p>· <u>Removal of the spoil pile</u></p> <p>Removal of spoil pile – an inordinate amount of money was spent on this – relative to other components of the GEF program. In my opinion this was unnecessary and was a waste of money.</p> <p>· <u>Lack of monitoring and evaluation of impacts of the GEF management strategy</u></p>



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		<p>At St Lucia, for the past few years, there has been empirical evidence of high levels of sedimentation deposition. This has been in the joint mouth basin – and especially at the St Lucia end of the Beach Canal. The tour boat operators have been complaining about the shallowness of the lower Narrows and that plumes of sediment are stirred up by the boats. There has been an influx of high-turbidity water in Catalina Bay. The impacts of this have affected the bird distribution in St Lucia – with the bird counts showing that very few birds have been feeding in the southern parts of the lake. In addition, the shoreline vegetation has been expanding and constricting the estuary channel – especially in the vicinity of Honeymoon Bend. There was no monitoring to detect this.</p> <p>In the final reports there are recommendations for what monitoring should be done. It seems that some scientists were contracted to undertake aspects of this monitoring. However, the iSimangaliso Authority knows little about what monitoring has been conducted, or where the results are. There seems to have been no evaluation of any monitoring since the completion of the implementation phase of the GEF project. There has been no ‘tracking’ of the responses to the GEF management interventions. Without this feedback, there has not been any adaptive management and no early detection of potential problems.</p> <p>There has been an inexcusable failure of effective monitoring – and synthesis of findings and the use of these findings to evaluate the management strategy.</p> <p>· <u>There was no staff capability enhancement</u></p> <p>There has been a serious loss of scientific and management expertise at St Lucia. There has been an almost total regime change in the iSimangaliso Authority, EKZNW has few managers with experience in estuarine management, the Dredge Unit has collapsed and the scientific support is without professional estuarine staff. As there was no training component, the GEF programme has not left a legacy of people with the necessary skills to manage St Lucia.</p> <p><b>Going forward</b></p> <p><u>Management philosophy</u></p> <p>To maintain St Lucia as a functional estuary it will be necessary to intervene frequently – to slow down its progression towards a shallow freshwater lake, and then a floodplain. The job of the managers is to maintain the estuarine functioning for as long as possible as this is the state of the system that has greatest value to society.</p> <p>Management starts with the development of a sound philosophy for management, and well stated objectives. The fundamental management question for St Lucia is “<i>How do we keep St Lucia as a functional estuary with marine connectivity and not as a freshwater lake separated from the sea?</i>” The scenario where St Lucia becomes disconnected from the sea is likely to occur within a decade or so if sediments are allowed to accumulate at present rates (this is my considered opinion). The system is at its tipping point and cannot cope with more sediment without changing fairly rapidly and drastically. After this the linkage between St Lucia and the sea will only occur for a short period after a mega-flood. The probability for this is such that it will only function as an estuarine system for a few months every few decades.</p> <p>It is necessary to salvage the essentials of the GEF strategy. The main objective must still be to (partially or fully) relink Mfolozi to St Lucia – <u>but not at the cost of increasing sediment accumulations.</u></p> <p>It is likely that some dredging will be needed to remove accumulated sediments. Apply appropriate components of the post-Domoina strategy which was based on working with the natural processes.</p> <p>The Mfolozi-St Lucia Link Canal needs to be permanently blocked off and flood-proofed so that this does not become the main Mfolozi channel. If this becomes the permanent channel it will introduce quantities of sediment into the Narrows where it is difficult to remove. It also could wash away the approach road to St Lucia as happened during the Domoina flood.</p> <p>Set up a joint management group to oversee and coordinate all interventions in the full Mfolozi Floodplain. This should involve all stakeholders. The Floodplain has to be regarded as</p>

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		<p>a single integrated system. We can no longer have the farmers implementing actions without consideration of their downstream effects (such as the construction of the Riverview flood diversion spillway or the repair of avulsion breaches within the proclaimed conservation area); and similarly, the conservation authorities cannot unilaterally implement interventions which have impacts on the farmers (such as the GEF strategy). To achieve this coordination, I recommend that the St Lucia Ramsar Site be expanded to include the full floodplain as well as its peripheral pans.</p> <p>As part of the bigger picture, support should be given to programmes to improve the state of all the catchments of St Lucia (To include the Mfolozi, Mkhuze and the other smaller rivers).</p> <p>It is necessary to protect the integrity of the park boundaries. I have estimated very roughly that about 30 000 ha of the iSimangaliso Park has been encroached by local communities. A large portion of this are the incursions into the lower parts of the Mfolozi Floodplain.</p> <p>Develop breaching guidelines. When and how to breach – and the protocols to be followed to achieve this.</p> <p>Adaptive management is the procedure to continually learn by doing and incorporate new insights into the ongoing management strategy. This has been neglected in the past decade.</p> <p>It needs to be recognised that there is a time and place for artificial mouth breaching. It is not possible to restore all the major natural processes, and hence these need to be simulated or mitigated for.</p> <p><b>Beef up the iSWPA and EKZNW management capabilities.</b> There is a need for dedicated estuarine managers – not recycled terrestrial rangers. These staff need to be trained in working on water, handling boats, have the capability to measure water chemistry, measure bathymetry, collect sediment samples, survey beach profiles etc. An important role of the managers is to provide logistic support for visiting scientists.</p> <p>It is necessary to have dedicated <b>engineering expertise</b> – either to manage reclamation operations or undertake them. There may be specialised engineering needs. Some machinery will need to be obtained – such as a long-boom excavator that can be mounted on a pontoon.</p> <p>It is likely that some dredging will be needed.</p> <p>In addition, <b>the Mfolozi-St Lucia Link Canal needs to be permanently blocked off</b> and flood-proofed so that this does not become the main Mfolozi channel.</p> <p>As part of the bigger picture, support should be given to <b>programmes to improve the state of all the catchments of St Lucia</b> (To include the Mfolozi, Mkhuze and the other smaller rivers)</p> <p>Set up a <b>joint management group to oversee and coordinate all interventions in the full Mfolozi Floodplain</b>. This should involve all stakeholders. The <b>Floodplain has to be regarded as a single integrated system</b>. We can no longer have the farmers implementing actions without consideration of their downstream effects (such as the construction of the Riverview flood diversion spillway or the repair of avulsion breaches within the proclaimed conservation area); and similarly, the conservation authorities cannot unilaterally implement interventions which have impacts on the farmers (such as the GEF strategy). To achieve this coordination, I recommend that <b>the St Lucia Ramsar Site be expanded to include the full floodplain as well as its peripheral pans</b>.</p> <p><u>Institutional arrangements</u></p> <p>It is time for a change in approach for the management of the St Lucia estuarine system, the whole iSimangaliso Wetland Park World Heritage Site and Ramsar sites and, indeed, the full catchment area. To achieve this, it is necessary to recognise that the joint management of the system by the iSimangaliso Authority and Ezemvelo has proved to be disastrous and has led to many poor conservation decisions. The Authority is 'lightweight' in conservation circles. It lacks depth and experience and it is too small an organisation to have the critical mass needed to manage a park of this size which has national and global importance. It does not have suitably trained staff and has too short a history to have the institutional expertise needed to manage a system that is dominated by decadal-length cycles.</p> <p>Ezemvelo, on the other hand, is a hollowed-out organisation at present, with inadequate funding. In addition, it is a provincial organisation that does not have the clout of a national agency.</p> <p>I recommend that the full iSimangaliso Wetland Park should fall under SANPARKS who are currently the only organisation with the necessary status and wherewithal to manage such</p>

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		<p>an important conservation asset. Natal opted to manage conservation at a provincial level at the time of the Act of Union in 1910; but that is history as many aspects of that Act have been altered in recent years. This can no longer be the excuse for SANPARKS not operating in KwaZulu-Natal 112 years later.</p> <p>The full complexity of the management of St Lucia needs to be recognised. Many of the processes driving the system are much more rapid than the processes driving terrestrial systems. There is the need to establish a system of advisory bodies to bring in the experience, and to garner the opinions, of a variety of experts.</p> <p>First there needs to be a dedicated <b>Scientific and Technical Sub-committee</b> – composed <u>only</u> of natural scientists (geologists, sedimentologists, hydrologists and ecologists) and engineers. This committee should be tasked to provide the ‘deep’ information needed to manage the system and supervise the filling of knowledge gaps. This would involve:</p> <ul style="list-style-type: none"> <li>· Oversight of the monitoring programme - including the archiving and analysis of data collected and interpreting this on a frequent basis to give a continuous ‘state of the system’ assessment. The monitoring must be nimble and adaptable – to cope with changing conditions and understanding.</li> <li>· Provision of direction for a scientific programme to bring in scientists to undertake necessary studies. (A good start would be to review the 2014 Water Research Commission report edited by Whitfield - Report TT 582/13).</li> <li>· Development of a suite of management plans that cater for processes that occur at different time scales (Dr Greg Botha’s concept). This would include plans for short term (bi-annual), medium-term (18 years quasi-rainfall cycle) and long-term (between cyclonic blow out) management plans – as well as contingency plans for unforeseen events.</li> <li>· Conduct regular reviews of the state of knowledge and the state of the system. To achieve this, regular scientific symposia should be held at St Lucia.</li> <li>· Assess various management strategies and apply an adaptive management approach to existing management activities.</li> </ul> <p>Second there should be a <b>Social Sub-committee</b> – composed of social scientists, human geographers and economists. This needs to consider the human dimensions of managing the system – recognising that there are global, national, provincial and local values to be taken into account. At present the social aspects are entirely dominated by the local communities – often at the expense of the more distant communities. There is a need for a systematic review of the park stakeholders. This should involve the mapping of all neighbouring communities and assessing the impacts (positive and negative) of living on the park boundary. Conversely, and assessment should be made of the impacts these people have on the park (positive and negative). This would be a foundation to improve the human interface of the park. This survey should also balance up the importance of the park for provincial, national and global stakeholders</p> <p>Third a <b>Stakeholders and Communication Sub-committee</b> to gather inputs from all the stakeholders on issues relevant to the interface between the park and society. This committee should be responsible for communication and information dissemination. It is important that an easy, and trusted, line of communication between the park and stakeholders be established.</p> <p>These committees should each feed into a single <b>Coordinating Committee</b> comprised of key people from each of the subordinate committees and also of managers. This committee coordinates the three sub-committees and synthesises, and deliberates on, recommendations from each. They then advise the Board of iSimangaliso on management. The Board needs to sign-off on all issues of consequence.</p> <p>This committee system needs to be nimble enough to respond with days to events when necessary.</p> <p><b>Staff and expertise</b></p> <p>The park needs competent staff on the ground. It is essential to have managers and middle managers that are trained in estuarine management (and are not just not recycled terrestrial managers). Too many of the core functions of the park management have been contracted out in recent years. As a result, the staff do not gain the expertise from doing the task – and also, it is the nature of contractors to ignore anything not described in the TOR for the task. Unforeseen aspects are thus missed.</p> <p>Park staff need to be trained to: work on water; handle boats; have the capability to measure water chemistry; measure bathymetry; collect sediment samples; survey beach profiles etc. An important role of the managers is to provide logistic support for visiting scientists.</p> <p>It is necessary to have dedicated <b>engineering expertise</b> – either to manage reclamation operations or undertake them. There may be specialised engineering needs in the future. Some machinery will need to be obtained – such as a long-boom excavator that can be mounted on a pontoon. And the necessary staff employed who can operate the equipment. It is very likely that some form of dredging will be needed in the future to maintain St Lucia.</p> <p>There is a need to employ a dedicated estuarine ecologist/hydrologist/sedimentologist to detect unexpected changes and to track unpredicted events. This job cannot be contracted out.</p>

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		<p>Community communication: A lot of effort is needed to engender trust. The bottom line is that the wellbeing of St Lucia is essential for all stakeholders – as an estuarine system that acts as a fish nursery, as a tourism destination and as a <u>sustainable</u> source of natural resources. Management interventions must consider the full system – including both the Mfolozi and Mkhuze Floodplains.</p> <p><u>Funding of future management interventions</u></p> <p>If the objective is to maintain the full estuarine lake in an estuarine state for as long as possible, this will involve the management of the mouth so that it is open at times and closed at other times. Who pays for management interventions? This is where we need to tap into the World Heritage Site and Ramsar status and obtain international funds, tap into the national status and get national funding, tap into the provincial status and get provincial funding, and finally we do need to communicate to the local stakeholders that to have a strategy that works for all, there will be times when they will need to endure the hardships that come with farming in a floodplain.</p> <p><u>Adaptive management: What we know from all previous management interventions, and this recent GEF management strategy</u></p> <p>There is much to be learnt from previous management interventions – and from this most recent one. Some of the lessons learnt include: The separation of the Mfolozi and St Lucia mouths in the 1950s – and subsequent dredging informed us that there are large quantities of sediments involved. These come down the Mfolozi River and, due to the canalisation of the floodplain, are not trapped before ending up in the Mfolozi-St Lucia Mouth area. The 1964 to 1966 Kriel Commission of inquiry into St Lucia helped us to understand the way the Mfolozi links into St Lucia during flood periods. This was understood when the Link Canal was excavated and, although not acknowledged, was the basis of the GEF programme. The Sauerman design of hard structures and training walls – and the subsequent modifications by Lillevang - informs us that hard structures are an extremely expensive option. Continuous pushing out seaward of hard structures is necessary because of the way they trap sediments. Hard structures are lost during major floods – as was seen during Domoina. What was learnt with the dredging of the 1960 and early 1970s is that if sediments are allowed to move too far up the Narrows, it is effectively too expensive to remove them. So – it is necessary to control and remove sediments as close to the sea as is possible. The deposition of spoil is an ongoing problem when dredging. Fundamentally the Link Canal, with its controlled intake of Mfolozi water, was a success (until damaged by Domoina). The failure was the insistence, by the biologists, that the St Lucia Mouth had to be maintained in an open state at all times. Had the canal been managed in conjunction with strategic mouth closures, the quantities of freshwater from the canal would have been effective in preventing hyper-salinity and desiccation. The dredging of a sediment trap immediately in from the mouth was a most successful strategy that was applied in the post-Domoina years. As was the pumping of sediment into the wave zone north of the mouth. These were outcomes of the post-Domoina strategy that were designed to work with natural processes. One thing learnt during the Domoina flood was the pattern of sediment deposition in the upper reaches of the Mfolozi floodplain. This provided insights for Van Heerden's proposal to trap sediments in the Msunduzi basin near Sokhulu. This is a concept that should be further considered. Another lesson from Domoina is that the processes that operate during the infrequent large floods are very different to the processes that operate during more frequent smaller floods. Any management strategy must take this into account. Many lessons were learnt when the strategy of maintaining an open mouth was altered to allow the mouth to close and stay closed for several years at a time if necessary (this decision was taken in about 2000). The main one is that this limits the accumulation of a large salt load within the system during drought periods (i.e. the total mass of salt in the system). With a relatively small salt load, restoration of moderate salinity conditions is rapid once freshwater is added. The desiccation of large parts of the system does not result in permanent damage and that hypersaline water at low lake levels does not kill the peripheral vegetation - as occurred in the 1968-1972 drought. An enhancement of this strategy would have been to breach the mouth for short periods instead of having prolonged closures - to allow seawater to enter and for biota to migrate. The extended droughts of 1968-72, in the early 1980s and in 2003-13 showed that St Lucia does not 'die' from high salinity periods or from desiccation. The hyper-salinity and desiccation do not affect the full system as there are numerous small refugia for the biota to survive in. To date there are no species that one can say have been lost due to prolonged</p>

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		<p>salty and dry conditions. The recovery after a prolonged freshwater period is likely to be very much slower than the recovery after an extreme drought and this may result in the loss of bivalves, and other estuarine or hyper-salinity species.</p> <p>What we have learnt by tracking the state of biota relative to the salinity is that St Lucia functions best as an estuary when it is within the salinity range of 12 to 45 ppt. This is the 'sweet spot' for the system to function at its best as an estuary. Thus, the greatest value of St Lucia to society is when it is a functional estuary and we should consider to manage it in this range for the greatest proportion of time possible. And within this range, it is necessary to have periods when the mouth is open to the sea so that sea-estuary migrations of biota are possible. What is also important is relative stability within this salinity range (i.e. it should not fluctuate rapidly in and out of this range). What is also important is to have a gradient of salinities to maximise the range of salinity habitats available. This way of thinking goes counter to the least intervention approach.</p> <p>From the January 2021 breach we have learnt the volume of the accumulated submerged sediments that deposited was much larger than anticipated. Much of this deposit a fine-grained sediment had consolidated. This consolidated mud proved to be highly resistant to erosion.</p> <p>From the January 2021 breach we learnt that a head of water in the estuary may take months to flow out when the Narrows and Mouth are constricted – and during this period there is almost no salt-water intrusion until the head is lower than that of the marine high tide. But this is the level where the mouth is prone to closure – especially when there are high seas. This is also important for marine to estuary migrations as the salt-water biota then reach a freshwater barrier in the lower Narrows.</p> <p>The January 2021 breach showed that the river channel in the lower Mfolozi (near Maphelane) was severely constricted or blocked by plant growth. This is likely to be due to the combination of accumulated sediment, extended periods of no or low flows in the channel, nutrient enriched water that encourages plant growth, the loss of tidal rise and fall of the water and no penetration of seawater when the mouth is closed. A similar pattern was noted in the Narrows – especially near Honeymoon Bend.</p> <p>The biotic responses to a prolonged freshwater state are that for the most of the time the plants and animals will be freshwater species, not estuarine species.</p> <p>The GEF strategy gives too little recognition to the implications of what may be decades-long decades when the mouth could be closed. This has been clearly expressed by Whitfield's paper expressing concern about the loss of the local mullet population that relies on access to St Lucia every few years.</p> <p>From the social perspective, the GEF strategy has shown that the probability of flooding, or prolonged high rainfall conditions, that will result in a breach, is not commensurate with what is acceptable to the public.</p> <p>The GEF strategy has highlighted the need for the full Mfolozi Floodplain needs to be managed as one entity.</p> <p>The January 2021 breach has shown how important constant monitoring and adaptive management is essential for any management intervention.</p> <p><u>Key points</u></p> <p>The full catchment (Vryheid to the sea) has to be taken into account. The catchment has deteriorated due to overuse by having to support too many people. This means that there is a lot of erosion and whoever manages St Lucia must take this into account. Ideally a catchment rehabilitation programme needs to be initiated.</p> <p>The geological trend is for St Lucia to fill up with sediments to become a shallow freshwater coastal lake, and then a floodplain. We are speeding this up when we allow the increased quantity of sediments to come in from the catchment. We are very close to the tipping point when an ecosystem 'flip' will happen.</p> <p>In its unmodified state the Mfolozi Floodplain would trap sediments near Riverview. But the canals now carry the sediment all the way through the former swampland to deposit it near the sea. This is affecting the dispersion of floodwaters. It is imperative that the Mfolozi Floodplain is managed as a single entity.</p> <p>A Domoina-sized 'mega-flood' may wash away some of the accumulated sediments - but most people are not prepared to place their bets on a 1:200-year event for solving St Lucia's problems.</p> <p>We cannot implement a management strategy that relies on the 'natural processes'. There has been too much damage to the natural processes in the catchment and Mfolozi flats. We do need human interventions. These must be guided by a group of competent people - who understand the area, have historical background, have experience and have the latest scientific knowledge.</p> <p>With the GEF project there has been little monitoring - so none of the managers know what has been happening with sediment accumulations or the plants growing on the</p>

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		<p>accumulated sediments. A system of adaptive management is needed – one that is based on monitoring of changes. Many of the failures of the GEF strategy – that led up to the January 2021 breach - are due to the secretive and non-transparent manner in which the science was conducted and communicated.</p> <p>My assessment is that the intention of the GEF strategy to, partially or fully, re-connect Mfolozi and St Lucia is a good one – but not at the cost of excessive sediment inputs. Can we get Mfolozi water when there is not too much sediment? We should revisit the Link Canal option that was initiated in the 1970s – it had some good ideas that can be used. There will be the need to remove sediments from the Narrows and mouth area and have some degree of mouth open/closed manipulation. I believe that the strategy devised after the Domoina floods should be revisited – it involved having a dredger close to the mouth at times. It did work well. We should not be scared of droughts or very wet conditions – but learn to live with them as they are part of the natural cycle. We will need to intervene to maximise and prolong the benefits of having St Lucia functioning as an estuarine system.</p> <p style="text-align: center;">-----oO-----</p> <p>RH Taylor, 15 February 2022</p>
<p>17 February 2022</p> <p>Private</p> <p>Petrus Viviers</p> <p>petrusviv@gmail.com</p>	<p>11</p>	<p>Dear All</p> <p>Government Gazette</p> <p>Notice No 1668</p> <p>Hope you find this in good faith</p> <p>From:</p> <p>Petrus Viviers</p> <p>13 Katonkel Street</p> <p>St Lucia Estuary</p> <p>Loco Standing</p> <p>Resident since 1969</p> <p>Grew up attending Natal Parks Board School Workshops under</p> <p>Dr Nollie Zaloumis</p> <p>Dr Ricky Taylor</p> <p>Dr Allen Witfield</p> <p>Professor Rudie Van Der Else</p> <p>Dr JBL Smith</p> <p>George Hughs</p> <p>Ian Player</p> <p>Regarding Non Scientific Approach</p> <p>The Estuary Management Plan was Established through 250 years of human intervention. We cannot discard research done by Royal Scientific Society of South Africa, Records of early Mariners and local ancestral knowledge.</p> <p>During the development planning from 1942 onwards a very detailed management plan was developed and implemented by Natal Parks Board. Detailed Information available regarding this from.</p> <p>Caroline Fox</p>

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		<p>Ezemvelo Research St Lucia Estuary By 1968 a well scientific based management plan was adopted and implemented and completed by 1978. The financial impact of this management plan was extravagant and spanned from St Lucia in the East to Vryheid in the West. From Maphelane Bay in the South to Kosi Bay in the North. By 1999 the financial implications of this was well in the access of R7.5 million per annum and the political will to sustain Natal Parks Board was dwindling and various negative decisions made by then Minister of Environmental Affairs and Tourism, Mr Valli Moosa, halted all Sediment Management and education in the Province of Kwa Zulu Natal. More Recent Impact Currently the bio diversity loss of the Greater St Lucia System is calculated at over 6700 Species. The financial impact on Traditional Harvesting Rights impact on 600 000 people Directly and over 4 Million People Indirectly. Government Grants If Government Grants is extended to about 400 000 individuals directly impacted by financial loss regarding Traditional Harvesting Rights this calculation has a Result of R1.6 Billion Rands per annum at a miserable R350.00 per month. This will still starve the children of protein and we will be raising stund developed children for generations to come Funding Estuary Mouth Projected Figueres with inflation and devaluation of the rand roughly puts the annual Estuary Sediment Management Plan into the region of R850 million per year. Ways to fund it can be discussed with me Petrus Viviers petrusviv@gmail.com 13 Katonkel Street St Lucia Estuary (+27)813427371</p> <p>UNESCO Please don't threaten us, the public with UNESCO World Heritage Site Status. We are not scholars based on Science, but me not illiterate either. A campaign to raise this issue with UNESCO is well formulated and on the basis of funding though Vlogging. This campaign is on hold and is very easy to roll out since St Lucia Estuary is very exposed to high concentration of International Tourist. We hoping a positive and amicable solution by Minister Barbara Greecy through this process. If Not we will commence to take The Revive St Lucia Estuary Campaign International. Regards Petrus Viviers 0813427371 Activist - Nature's Advocate</p>
17 February 2022 Ezemvelo KZN Wildlife	12	<p>Dear Mr Tshamano In addition to a number of Ezemvelo KZN Staff meeting with the panel of experts and making presentations and responding to specific questions from the panel, Ezemvelo would like to submit the following document to support the Panels review process. <b>The breaching of the St Lucia/Mfolozi Mouth on the 06th January 2021. A log of events for consideration prepared by Ezemvelo KZN Wildlife, February 2022.</b> The document also makes reference to the following documents which are provided as appendices:</p>

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Craig Mulqueeny Craig.Mulqueeny @kznwildlife.com		Appendix 1- TOR for St Lucia Technical Task Team Appendix 2- Scientific Task Team Recommendations Appendix 3- Request for comments from St Lucia Scientific Technical Advisory Group on Ecological Aspects of Proposed Interventions Appendix 4- St Lucia Estuarine Functional Zone Task Team Recommendations to iSimangaliso Park Authority. Kind Regards Mr Ntsikelelo Dlulane Acting Chief Executive Officer
18 February 2022  Maphumulo Farming  Amanda Maphumulo  mampofu84@mw eb.co.za	13	Date: 17th February 2022 The Chairperson Panel of Experts c/o Department of Forestry, Fisheries and the Environment (DFFE) Private Bag X447 PRETORIA 0001 Attention: Mr Fhumulani Tshamano Email: ftshamano@dffe.gov.za Dear Sir CALL FOR SUBMISSIONS OF SCIENTIFIC INFORMATION, SOCIO-ECONOMIC INFORMATION OR ANY OTHER RELEVANT INFORMATION TO THE PANEL OF EXPERTS APPOINTED TO LEAD A REVIEW OF THE SCIENTIFIC BASIS FOR THE BREACH OF THE MOUTH OF LAKE ST LUCIA ESTUARY MAPHUMULO FARMING – Backflooding damage. It is recorded that copies of the following presentations were submitted to the Panel of Experts following their stakeholder visits on 15 November 2021; <ul style="list-style-type: none"> <li>• UCOSP presentation explaining the back-flooding of commercial farmland and community subsistence farm areas.</li> <li>• South African Canegrowers presentation on the socio-economic impact of farm damage: job losses and local economy losses</li> <li>• Umfolozi Sugar Mill presentation explaining its cane supply sustainability threat to remain operational.</li> </ul> Further to the above, the Dept DFFE Portfolio Committee held a parliamentary session on 8 February 2022 at which I presented the following statement; Large Scale Sugarcane Commercial Farmers Opening Statement to the Portfolio Committee on Environment, Forestry and Fisheries held on 8th of February 2022 via ZOOM, presented by Amanda Maphumulo My family is a beneficiary of the Department Rural Development and Land Reform's PLAS Programme. I stand here before you representing the commercial sugarcane growers who have been affected by the back-flooding as a result of the current and ongoing situation within the St Lucia Estuarine System. Since the initial inundation of water in September 2016, our situation gets dire with each passing year and with each rainfall. We have lost our farm lands, in our case, 440Ha of 497Ha is currently under water and the same applies for my fellow colleagues and neighbours that have been farming for decades on the Umfolozi Floodplain. We have lost income; we have lost employees whose livelihoods depended on the farms. The few remaining employees have to work under harsh conditions as at times they have to work in water and are subjected to dangerous animals such as hippos, crocodiles, mosquitoes that have migrated from the estuary into the farms. Because of this current loss of jobs and uncertainty, there has been a surge in crime and violence as people try to find other ways to feed and support their families. Sadly, for us, as the situation progresses more farm lands on the floodplain are affected and the viability of the Umfolozi Sugar Mill, which is the economic hub on Mtubatuba is put on the line. We have raised some of our concerns and views in the Symposium that was held by iSimangaliso in October 2020, where the general consensus was that the estuary was in a state of emergency and disarray following the implementation of the GEF Project's management plan, which has not brought about the desired effect to the Estuarine System. The assisted opening of the mouth in January 2021 had no impact on the farmlands. The Estuary and Stakeholders at large have seen no benefits instead the system continues to regress and so



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		<p>are the communities around it who have lived off the system for centuries. We are now going into our 2nd year with no communications to date from iSimangaliso with regards to the short, medium- and long-term resolutions that were put forward the Task team in March 2021. 2022 February we are sitting with damage worse than that which was caused by Demoina.</p> <p>We yet again plead for a way-forward as we have been in limbo for too long. If by any chance iSimangaliso would give us an upfront solution, be it compensation for the loss of our land or expropriation it would give us closure and peace of mind other than living with the fear of the unknown. Some of our neighbouring farmers have started to abandon their land as they can no longer afford to continue farming under these conditions.</p> <p>I will leave the technicalities to the experts, some of which who sit amongst us today but I will talk about a farmer who still holds onto his piece of land when all hope is lost. I will talk about a farmer who will wake up and walk to his farm too see nothing but water where once his livelihood came from. I will talk about a farmer who with tears in his eyes has to let go of his employees because he can no longer afford to pay them and a farmer who can no longer afford to feed his family because he has lost all he had.</p> <p>In closing, we humbly request as farmers that the Hon Min Barbara Creecy takes time to come and see for herself what has become of the once glorious farmlands that thrived when the St. Lucia Estuarine System thrived. St Lucia is home to most of us and we fear our future generations will not be able to see the beauty of a functional St Lucia Estuary that supported the communities and biodiversity around it.</p> <p>General Questions and Views posed by the farmers</p> <ol style="list-style-type: none"> <li>1. Was Global warming and Climate change considered in the current St Lucia management plan. If so, was the management plan not supposed to be flexible in order to mitigate some of the unforeseen consequences of climate change?</li> <li>2. Umfolozi has in the past been known for its high silt load. Were these measured and considered in the management plan and has there been subsequent monitoring of the silt post the GEF project?</li> <li>3. The communication between the stakeholders and the previous and current iSimangaliso team is questionable. We request that the current board includes observers from the various stake holders in their meetings for transparency.</li> </ol> <p>The attached UCOSP presentation then explained the technical overview.</p> <p>In conclusion we as Maphumulo Farming and consulting are a black emerging farming entity who benefited from the Land Reform PLAS programme in 2008. We have farmed and supported our surrounding communities by providing employment and supporting the livelihoods of their families to over 80 employees prior to 2016. To date we have lost over 60 employees and the number increases yearly as we lose more farm land to the back flooding.</p> <p>We have lost 440Ha of our 497Ha of farm land that had established sugarcane and the situation continues to deteriorate with each rainfall. Currently the business cannot sustain itself on the remaining cane and this will be another failed Land reform program, whose aim was to enrich and uplift the emerging black farmers and make them self-sustainable.</p> <p>We are fully in support of the Environment and its conservation and have farmed sustainably and in coexistence with the surrounding environment. Our environment remains our first priority and so does the lives and livelihoods of those that depended on our farms.</p> <p>Yours sincerely, Amanda Maphumulo: on behalf of MAPHUMULO FARMING</p>
<p>08 February 2022</p> <p>Dukuduku Small Commercial Farmers</p> <p>Sphamandla Gumedede</p>	<p>14</p>	<p><b><u>DUKUDUKU SMALL COMMERCIAL FARMERS</u></b> <b><u>SOCIO ECONOMIC IMPACT</u></b></p> <p>In our farm land we have both genders. 55% of Female and 45% of males from both of these genders 35% are youth and 65% are adults.</p> <ol style="list-style-type: none"> <li>1. More than 700 farmers in the land which has more than 300 hectares from Ebungwini to the joint of Umfolozi River and Umsunduzi River. We have Banana farms that is our major planting product. All our farmers do have banana in their farms. We have also vegetables in our farms such as sweet potatoes, Amadumbe (yens), Cabbage. I mention only these materials which cost a lot of money.</li> <li>2. Our products are in demand. We are in shot of harvest. Now because of these floods. Our farms have been destroyed. Empangeni, Ingwavuma, Nongoma, New Castle, Vryheid, Ulundi and Durban are in a need of our supply.</li> </ol> <p>A load of Banana in a bakkie cost R5250 transport inclusive when we supply to Empangeni, Manguzi, Jozini and Nongoma. It R7600 transport included when we supply to Ulundi.</p>

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0608522733		<p>R8000 to Vryheid, Newcastle and Durban transport inclusive.  We have farmers who used to have more than one load a day to supply to these places. There were no floods by that time. It created jobs for drivers, packers and farm cleaners which had reduced crime in our society as we know we are the neighbours of St Lucia where tourists use to visit.</p> <p><b>1. 5250 x 21 (working days)</b>  =R110250 a month to the average of 30% farmers each  =R110250 X 210 (farmers 30% out of 700)  =<b><u>R23152500 loss</u></b></p> <p><b>2. R8000 x 21 (working days)</b>  =R168000 X 210 (FARMERS 30% out of 700)  = <b><u>R35280000 loss</u></b></p> <p><b><u>Total loss of those who are supplying direct to customers</u></b>  R23152500 + 35280000  =<b><u>R58432500 in a month</u></b></p> <p>490 farmers (70%) which is dominated by women who feed families also youth who have no parents anymore. Some of those youth they inherited farms from late parents and it is the only source of income into their homes that put food on the table. They are street vendors at Ulundi, Nongoma (Mona market), Manguzi, Pongola town and at some grant pay points areas surrounding Pongola.  These farmers use to hire a lorry 10 ton truck and combine to that truck to the point where they are selling their food. Banana is the major. Four members in a truck load. In each no one earn an amount less than R8000 then they contribute 500 each to pay R2000 for a truck. Each and every one left with R7500 as a profit as they did not buy that product as it has been their own harvest. Since their farms has been flooded some uses to buy to those who still have survived which is a situation that is unacceptable.  <b><u>R7500 x 2 (a person goes twice a month due to time tables they have agreed on at Mona market)</u></b>  =R15000 each and every farmers in a month (minimum)  =R7350000 Loss in a month  <b><u>Sweet potatoes and Cococacia (Amadumbe)</u></b>  This types of material need special attention due to the job that it has therefore not all farmers have these and we spend a lot of money during the process of farming this which creates anger when floods vanishes all.  It is seasonally. If floods have flooded entire farms means you have to wait for another right season to come.  <b><u>Amadumbe 50 kg is R500-550 transport included</u></b>  R 500 x 20 bags (20 bags 50kg)  =R10000 (minimum to the average of 30%)  =R10000 x 210 (farmers 30% as I have mentioned not all farmers are planting Amadumbe)  -R2100000 loss yearly as it takes 9 months to be ready for a harvest  <b><u>Sweet potatoes</u></b>  60% of farmers do have sweet potato farms because it takes only 3 months for being ready for a harvest therefore most of farmers go for a potential for a market. R350-R400 per 50kg  R350 x 20 bags (bags of 50 kg)</p>

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		<p>=R7000 (minimum to the average of 60%)            =R7000 x 420 (farmers 60%)            =R2940000 loss after four months.</p> <p>We have suffered a huge loss as total amount has been shown above. It is the cause of this back flooding as we may never have this economy any more. We need an urgent way of resolving this issue. We have been forced to retrench some of the people we hired to assist in our farms as some have been flooded away and it reduced the product. We are also in fear that some of us their cars will be repossessed due failure of payments. Let us find a way to protect this potential to the next generation. The farmers don't strike for a job because he/she is an employer him/herself.</p>
<p>18 February 2022</p> <p>Small Scale Farmers</p> <p>Sbusiso Mthembu sbusiso.ndabomk hulu@gmail.com</p>	<p>15</p>	<p>Dear sir,            Thank you for affording us, the public effected by closure of St Lucia Estuary, an opportunity to make written submissions.            Attached herein is the presentation made before the <u>parliamentary Standing Committee on Environment, Forestry and Fisheries</u> on the stakeholders meeting held via ZOOM on the 08th of February 2022. Our plight is painful and we look forward to your report and we would appreciate if that could be sooner than March 31, and if the Minister would too be advised to act quickly.            The assisted breaching that happened on 06 January 2021 was the closest thing to having a functional St Lucia Estuary and ruling against that would be detrimental not only to the farmers south of the park but also to the ecosystem itself, and to other sectors reliant to the live St Lucia Estuary - subsistence fishing community, the tourism industry, <i>et al</i>.            Thank you            Regards,            Sbusiso Mthembu</p> <p><b>Small Scale Farmers briefing to the Portfolio Committee on Environment, Forestry and Fisheries            08 February 2022 via ZOOM Meeting, presented by Mr Sbusiso Mthembu            Impact of the Closing of St Lucia Estuary on Small Scale Farmers            Brief Overview of Effected Small Farmers;</b></p> <ol style="list-style-type: none"> <li>1. There are about 550 severely affected small farmers from Sokhulu community and about 350 from Dukuduku community. Each farmer supports an average of about 4-5 dependents.</li> <li>2. Farming is a cornerstone economic activity for these two respective communities. It a daily bread actually. The absence of farming means that reliance on government grants is growing and crime is inevitable. Farming has been happening for over a century in the region, and has graduated from subsistence to recognizable industry.</li> <li>3. In perspective, uMkhanyakude is one of the country's poor districts. Farming is keeping the flag flying. This industry employs more people than does tourism which is still strangled by effects of COVID19. These farmers are self-employed, employing workers for wages. It is so disturbing seeing such a disruption to livelihoods.</li> </ol> <p><b>Economic Impact of Constant Flooding;</b></p> <ol style="list-style-type: none"> <li>4. Farmers were self-sufficient; able to send their own to school and afford basic needs. The constant flooding has pushed all these people out of work, taken away about a thousand job opportunities each year. Fresh farm produce was sold in Mtubatuba, Richards Bay, Empangeni and other towns across Zululand creating further small jobs which are much needed. Wholesaling to vans and trucks is now history.</li> <li>5. Farmers have lost over 4 years' worth of production. This has had a devastating effect in household economy. Poverty is knocking on many doors. We all had to postpone our dreams and attend the current reality caused by closing of St Lucia Estuary. Hope has slowly been fading away with all the tactics that have been played at the expense of these poor farmers. The economic sabotage stings so painfully, in the name of conservation. What is being achieved by destroying one thing for another? All farmers (small &amp; commercial) plead for the bread they've been robbed of.</li> </ol> <p><b>Sideline impact of the Closed St Lucia Estuary</b></p> <ol style="list-style-type: none"> <li>6. Mosquitos: with this constant flooding, our villages have been terrorized by these stinging creatures. Life this side is no longer enjoyable. Their strong presence is threatening the resurgence of the deadlier Malaria disease. Please fix this problem as soon as possible. Even livestock suffers. Before these floods this problem was not here. Mosquitos now have</li> </ol>

Date & Affiliation Contact Person & Contacts	Folder Number	Comment
		<p>wide breeding ground in what used to be our farms.</p> <p>7. Dangers of wildlife attacks on human: constant floods have widened crocodiles' territory further towards our villages. Dogs, in particular have been killed by crocodiles, which signals that soon there could be a human attack. Hippos are now roaming around at night - it's not safe anymore</p> <p><b>Stance on Conservation</b></p> <p>8. Farmers are no enemies of conservation. We are passionate about the environment too. This is our heritage after all. We are not saying that the health of St Lucia Estuary shall be sacrificed for wellbeing of farmlands, NO. Farming and conservation has been coexisting in this area for over a century – it's nothing new. What is new is this 'let nature take its cause' policy being introduced by iSimangaliso Wetland Park.</p> <p>9. Tell us, laymen, we are not scientists; how is the mere Mfolozi river expected to climb that high berm there at St Lucia Estuary area? What else did the GEF Project achieve apart from connecting Mfolozi River to the St Lucia Estuary? The decision which led into excessive silt clogging banks of the lake – introducing reeds which are today threatening to cover the whole lake? Pumping mud that has destroyed kilometers of mangroves? And disturbed habitats of St Lucia Estuary.</p> <p>10. Why was the GEF project implemented selectively? It might have meant well at first but truth is that the ecological catastrophe that we seeing in the St Lucia Estuary is also facilitated by this GEF project. One need not be a scientist to see that the St Lucia Estuary is in an ICU state. In fact is just a muddy swamp. It falls out of the definition of an 'estuary.' A complete opposite of an ideal estuary. A lake, perhaps.</p> <p><b>January 2021 Assisted Breaching</b></p> <p>11. The January 2021 assisted breaching had very little to no impact into farmlands. Shortly after the breaching, Zululand received heavy rains and the mighty Mfolozi River carried all that water to our way through the Msunduze back channel. Hence, February 2021 saw worse floods, though none compares to the ones we are seating with at the moment; about 90% of farmland in Sokhulu is submerged this time!</p> <p><b>What Intermediary Action Would Alleviate the Situation?</b></p> <p>12. For the farmlands to drain, this is proposed;</p> <p>12.1. Cleaning of Msunduze channel</p> <p>12.2. Opening of the St Lucia Estuary mouth</p> <p>12.3. Maintenance of the estuary i.e. implement the 1.6m above mean sea level for natural breach going forward OR buy us a farm to share than keep your swamp!</p> <p>13. We now hung our hopes in this Parliament to see justice being served. Thank you</p>
<p>19 February 2022</p> <p>Private</p> <p>Ian Preston ian.preston96@gmail.com</p>	<p>16</p>	<p>To: Chairperson: Panel of Experts c/o Department of Forestry, Fisheries and the Environment Attention: Mr Fhumulani Tshamano</p> <p>Subject: Response to the General notice calling for submissions of scientific information, socio-economic information or any other relevant information to the panel of experts appointed to lead a review of the scientific basis for the breach of the mouth of Lake St Lucia estuary, iSimangaliso Wetland Park, Kwazulu-Natal Province(Government Notice:Department of Forestry, Fisheries and the Environment - No. 1688 - 20 January 2022)</p> <p>Dear Mr Tshamano</p> <p>A scientific, evidence-based approach that draws on best practice is needed for the decision-making relating to, and the management of, the Lake St Lucia estuary and the rest of the iSimangaliso Wetland Park. The iSimangaliso Wetland Park has been a UNESCO World Heritage site with Outstanding Universal Value since 1999. The Park meets three of UNESCO's four criteria as a natural World Heritage site:</p> <ul style="list-style-type: none"> <li>• (vii) to contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance;</li> <li>• (ix) to be outstanding examples representing significant on-going ecological and biological processes in the</li> </ul>

Date & Affiliation Contact Person & Contacts	Folder Number	Comment
		<p>evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals;</p> <ul style="list-style-type: none"> <li>• (x) to contain the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation.</li> </ul> <p>However, according to UNESCO, in its State of Conservation 2021 Report for iSimangaliso Wetland Park, factors affecting the Park and thus also affecting the Lake St Lucia estuary include:</p> <ul style="list-style-type: none"> <li>• Land conversion</li> <li>• Management systems / management plan</li> <li>• Mining</li> <li>• Other Threats: Conflicting land use</li> </ul> <p>In the past, the hydrological and ecological functioning of Lake St Lucia and its estuary have been heavily modified. In addition, the iSimangaliso Wetland Park (and thus the Lake St Lucia estuary) has long been negatively affected by human-induced changes in the upstream catchment areas, upstream water abstraction and agricultural practices. iSimangaliso Wetland Park's "Integrated Management Plan and its Estuarine Management Plans since 2012 foresee hydrological restoration by allowing the uMfolozi River to follow its natural path back into the St. Lucia estuary and implement a policy of minimum interference in the estuarine system to facilitate as much natural functioning as possible". Ecological restoration is an important management objective of the Lake St Lucia estuary and key to maintaining iSimangaliso's Outstanding Universal Value. The decision to breach the mouth of the Lake St Lucia estuary departed from the management plan and scientific advice. The management of the iSimangaliso Wetland Park, including Lake St Lucia and its estuary, needs to follow scientific, evidence-based approach that draws on on best practice so that it can be protected for current and future generations. This clearly means that the artificial breaching of the mouth of Lake St Lucia estuary should not be done, to conserve what is an already degrading system because of the poor land-use practices in the catchment – ironically including those calling for the artificial breaching of the mouth of the estuary. Greater controls are needed over upstream practices, including inappropriate farming and forestry practices, invasions by alien plants, soil erosion and siltation, and poor water quality and pollution (all of which will be exacerbated by climate change). To ignore those, and compound the problems by disregarding best management practices in artificially breaching the mouth of the estuary, would fail to uphold the mandates of the Department of Forestry, Fisheries and the Environment and its entity.</p> <p>Yours sincerely Ian Preston</p>
<p>19 February 2022 Private Dr Penelope Brown penny.brown@mweb.co.za</p>	<p>17</p>	<p><u>To:</u> The Panel of Experts c/o Mr Fhumulani Tshamano E-mail: ftshamano@dffe.gov.za Protected Areas Multilateral Programmes, Department of Forestry, Fisheries and the Environment Environment House, 473 Steve Biko and Soutpansberg Streets, PRETORIA Tel: (012) 399 8864; Cell: 067 417 3795;</p> <p><u>From:</u> Dr Penelope Brown (by email: penny.brown@mweb.co.za)</p> <p><u>Re:</u> Comment on the Scientific Basis for the Breach of the Mout of lake St Lucia ... as per ... Government Notice: DEPARTMENT OF FORESTRY, FISHERIES AND THE ENVIRONMENT - NO. 1688 <u>20 January 2022</u></p> <hr/> <p>DEPARTMENT OF FORESTRY, FISHERIES AND THE ENVIRONMENT - NO. 2022 NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998)</p>

Date & Affiliation Contact Person & Contacts	Folder Number	Comment
		<p>A GENERAL NOTICE CALLING FOR SUBMISSIONS OF SCIENTIFIC INFORMATION, SOCIO-ECONOMIC INFORMATION OR ANY OTHER RELEVANT INFORMATION TO THE PANEL OF EXPERTS APPOINTED TO LEAD A REVIEW OF THE SCIENTIFIC BASIS FOR THE BREACH OF THE MOUTH OF LAKE ST LUCIA ESTUARY, ISIMANGALISO WETLAND PARK, KWAZULU-NATAL PROVINCE</p> <p>The Panel of Experts, appointed under section 3A of the National Environmental Management Act, 1998 (Act No. 107 of 1998) to lead a review of the scientific basis for the breach of the mouth of lake St. Lucia estuary, <u>hereby invites members of the public to submit for consideration, written submissions, scientific information, socio-economic information, or any other relevant information on matters related to the management of Lake St Lucia estuary.</u></p> <hr/> <p><b>MY COMMENT:</b></p> <p>I have read reports and articles on the various approaches by, and the needs/desires of, different stakeholders in the St Lucia area regarding the optimal management of the Lake St Lucia estuary. I have further listened to presentations on the subject, and also observed the area at intervals over many years.</p> <p>I would like to make the following points:</p> <ol style="list-style-type: none"> <li>1. As most are aware, this estuary is one of the focal points in the ISimangaliso Wetland National Park which is a <u>Natural Heritage Site</u> of huge importance, being our <i>first World Heritage Site</i>. As such, it undoubtedly needs to be managed in a responsible scientific manner with the main focus being to achieving ecological integrity and functioning, in line with the international norms and requirements associated with World Heritage Sites. To do otherwise could endanger this status.</li> <li>2. While the mission of the Park is firstly to protect, preserve and present its World Heritage values for current and future generations, the Park is also required to benefit communities living in and adjacent to the Park by facilitating optimal tourism and related development. However, it is important to bear in mind that <i>such secondary activities</i> (relevant as they are) <i>must necessarily fit in with the primary objective of conservation</i>; and not the other way around.</li> <li>3. A huge amount of funding (much of which was obtained from the World Bank) was spent on rehabilitating the estuary, the flooding regimes and reverting to the original natural flows of the riverine and estuarine systems. This is commendable and such approach needs to be maintained with supportive follow up from the authorities (local and national), the community and other stakeholders.</li> <li>4. Past (and current) <u>bad farming practises</u>, such as planting sugar cane or other crops in areas where is it unsuitable (such as on flood plains) should have long since been discontinued and the compromised land rehabilitated preferably at the expense of whomever was/is responsible for such deviations / unlawful practises in the first place. Bad farming practices must not be allowed to compromise appropriate management of the estuary as determined by rigorous scientific and legal procedures.</li> <li>5. The same logic applies to <u>tourist-related commercial activities</u> taking advantage of the natural facilities that the Park has to offer. Should the rehabilitation of the hydrological system (river and estuary dynamics) compromise some of the tourist-related activities, then the <i>appropriate</i> response should be to adjust the tourist activities and not to compromise the ecosystem rehabilitation activities by, for example, breaching the estuary mouth.</li> <li>6. The law has long since being clear that <u>flood plains should not be compromised</u>; to do otherwise (e.g. to fill or prevent the river or estuary from over overflowing onto the floodplain by canalizing it) will inevitably result in compromising another area of the flood plain and/or areas above the flood plain which would not otherwise have been flooded .</li> <li>7. Five years ago, the appropriateness of a reasoned scientific approach was clearly acknowledged by the <u>landslide victory in court</u> (later supported by the Supreme Court of Appeal) by the ISimangaliso Wetland Park Authority and the then Minister of Environment Affairs over the sugar farmers who were demanding the breaching of the lake. Nothing substantial has changed since then; <u>that perspective needs to be maintained and implemented by the current authorities</u>, including the Minister.</li> <li>8. The scientific findings (and subsequent High Court support thereof), that <u>'back flooding' with a closed mouth</u> is in fact <u>part of the natural dynamic</u> of an estuary and <u>'to artificially breach it would harm the environment'</u> <i>must be acknowledged by the authorities and implemented in the management of this ecosystem</i> and Park.</li> <li>9. Natural water flows and flooding need to be maintained to <u>allow the ecosystem to function</u> as it is meant to. <u>Not to do so will compromise not only the natural environment but also the broader economy of the area and subsequent well-being of the community in general, in the medium- to long-term.</u></li> </ol>

Date & Affiliation Contact Person & Contacts	Folder Number	Comment
		<p>10. This is clearly the dominant advice from specialists in the dynamics of the system – and further those who understand the net long-term implications for sustainable agriculture up-river of the estuary, as well as the tourism, recreational and quality of life implications for those living adjacent to the estuary.</p> <p>Thank you for the opportunity to comment. And best wishes in your endeavours to advise the Park on how best to manage the estuary in a sustainable manner and in line with sound scientific principles. I would appreciate being informed about the outcome of this process and given an opportunity comment further should it be necessary.</p> <p>Please acknowledge receipt of this letter by return mail – thank you.</p> <p>Yours faithfully  Penelope Brown (Dr)  19 February 2022</p>

## 14. APPENDIX V – Approval of updated MMP activities

### Request for approval of specific listed activities (June 2019)



#### Responses and queries to be directed to

Mr Siboniso Mbense  
Tel: 035 590 1633  
Fax: 035 590 1602  
Email address: [siboniso@Simangaliso.com](mailto:siboniso@Simangaliso.com)  
Copy: [shangem@iceboenviro](mailto:shangem@iceboenviro)

National Department of Environmental Affairs  
Director: Integrated Environmental Authorisations  
Private Bag X447  
Pretoria  
0001

Tel: 012 399 8686  
Email: [EIAdmin@environment.gov.za](mailto:EIAdmin@environment.gov.za)

27 June 2019

REQUEST FOR APPROVAL/ADOPTION OF THE ISIMANGALISO OVERARCHING ENVIRONMENTAL MANAGEMENT PROGRAMME AS A MAINTENANCE MANAGEMENT PLAN IN ACCORDANCE WITH THE ENVIRONMENTAL IMPACT ASSESSMENT REGULATIONS, 2014, FOR ACTIVITIES WITHIN THE WORLD HERITAGE SITE (ISIMANGALISO WETLAND PARK).

Dear Mr S Malaza

The iSimangaliso Wetland Park and the iSimangaliso Wetland Park Authority (iSimangaliso) were established in terms of the World Heritage Convention Act, 1999 (Act 49 of 1999) and Regulations published there under and, as such, iSimangaliso is the legal management authority for the Park. Furthermore, iSimangaliso is governed by the National Environmental Management: Protected Areas Act, 2003 (Act 57 of 2003) and Regulations published there under and, as such, iSimangaliso is the designated Protected Area Manager for the iSimangaliso Wetland Park. As the authority mandated to protect and develop the iSimangaliso Wetland Park, a proclaimed World Heritage Site, iSimangaliso is required by law to ensure that development and activities taking place within and adjacent to the Park do not negatively affect the Park's World Heritage values or the Principles of Integrated Environmental Management as laid in Chapter 2 of the National Environmental Management Act (NEMA).

To achieve this, iSimangaliso developed its Integrated Management Plan (IMP) for the period 2017 – 2022 which incorporates an Overarching Environmental Management Programme as one of the key underlying environmental management tools. The IMP was approved by the Minister of Environmental Affairs (then Minister of Water and Environmental Affairs) in 2017.

In order to produce a holistic Overarching Environmental Management Programme which is compiled as our Maintenance Management Plan, that addresses current legislative requirements and objectives, this document was revised to align with



the NEMA EIA Regulations published in December 2014 and to provide for management and maintenance activities within iSimangaliso. To this end, the revised Overarching EMPr provides management measures for the following:

- Management measures for all new infrastructure developments within iSimangaliso.
- Management measures for the maintenance of all existing infrastructure within iSimangaliso.
- Management measures for maintenance activities within iSimangaliso consistent with the exclusion clauses contained within the December 2014 EIA Regulations as provided for in Section 24(2) and 24D of the National Environmental Management Act. This relates specifically to Listing Notice 1 (R 983) Activities 18, 19, 19A and 27, Listing Notice 2 (R 984) Activities 15 and 24, and Listing Notice 3 (R 985) Activity 12.

This Overarching Environmental Management Programme (EMPr) covers the principles, responsibilities and requirements applicable in order to implement effective environmental management during pre-construction, construction, site rehabilitation and maintenance activities within the iSimangaliso Wetland Park<sup>1</sup> (the Park). The aim of this Overarching EMPr is to ensure that activities are conducted in accordance with the policies and management practices of the iSimangaliso Wetland Park Authority (the Authority) and the principles of Integrated Environmental Management laid out in Chapter 2 of the National Environmental Management Act.

Due to the nature of the area being a World Heritage Site and a Protected Area, the submission and request for approval of individual Maintenance Management Plans in accordance with the EIA Regulations for all the activities within the Park would result in an administrative burden to the Department and great cost and delays to us (iSimangaliso) in dealing with minor maintenance activities. Which is why iSimangaliso is requesting the Department of Environmental Affairs to approve/adopt our Overarching Environmental Management Programme as a Maintenance Management Plan in line with the EIA Regulations, 2014 as well.

Your positive consideration and approval of this request and the attached iSimangaliso Overarching Environmental Management Programme would be greatly appreciated.

Yours sincerely,  
Mr. S Bukhosini

Chief Executive Officer  
iSimangaliso Wetland Park Authority

Letter signed by:



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S Sibiya  
Executive Manager: Biodiversity Conservation  
iSimangaliso Wetland Park Authority  
Environmental Management Inspector (EMI) – Grade 1: National Designated

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## Site inspection report (Aug 2019)



### environmental affairs

Department:  
Environmental Affairs  
REPUBLIC OF SOUTH AFRICA

#### SITE INSPECTION REPORT

<b>File number</b>	14/12/16/3/3/1/5/98
<b>Responsible officer</b>	Makhosazane Yeni
<b>Date of site inspection</b>	08 August 2019
<b>People who attended site inspection</b>	Makhosazane Yeni (DEA), Siboniso Mbense, Sibu Bukhosini (iSimangaliso)
<b>Proposed activity</b>	The overarching Maintenance Management Plan (MMP) in accordance with the Environmental Impact Assessment Regulations, 2014 for Activities within the World Heritage Site (iSimangaliso Wetland Park), KwaZulu Natal

#### 1. INTRODUCTION

iSimangaliso submitted a request for approval of the Overarching Maintenance Management Plan (MMP) in accordance with the Environmental Impact Assessment Regulations, 2014 for Activities within the World Heritage Site (iSimangaliso Wetland Park), UMkhanyakude District Municipality, KwaZulu Natal. The purpose of the site visit was to provide the competent authority with an opportunity to familiarise with the location and condition of the proposed site and surrounding area, and to present a brief overview of the findings of the MMP.

#### 2. INSPECTION FINDINGS

The proposed project is located in iSimangaliso Wetland Park which is a huge protected area along the coast of South Africa's KwaZulu-Natal Province. The park's centrepiece is the vast Lake St. Lucia, home to large numbers of hippos, crocodiles, pelicans and flamingos. Elephants, giraffes and leopards inhabit the grasslands and forests of the nearby Western Shores and Charters Creek areas. To the north, Sodwana Bay is known for its colourful coral reefs. The lands use surrounding the development site comprises of the commercial practices further south with natural vegetation to the east as well as the Indian ocean to the north east.

**Observations and discussions on site**

- ✓ Entry was gained to the St Lucia River mouth, the EAP of Icebo Enviro Projects together with iSimangaliso officials walked us through the site to observe the area of much concern that is the river mouth and its surroundings.
- ✓ The Sokhulu farming community, were also present on site, their concern is that their farms were flooded, and plead that iSimangaliso must open the river mouth.
- ✓ The Sokhulu farmers are of the view that the linking of the Msunduze River, which converges with the Umfolozi River to the sea, will help with the water situation.



✓ **The sand that has accumulated over time where the Umfolozi river mouth used to flow into the sea**



The vegetation that has grown over time where the Umfolozi river mouth and Umsunduzi river used to converge before flowing into the sea



**Umfolzi River with its reeds**



**Figure 1: Overview of the proposed site**



**The community members that are affected by flooding of their agricultural lands**

**CONCLUSIONS AND RECOMMENDATIONS**

The Officer recommends that the MMP be approved however authorities such as Department of Water and Sanitation must be

engaged to deal with the issue of the flooding of the farms.

## Approval of listed activities (Oct 2019)



### environmental affairs

Department:  
Environmental Affairs  
REPUBLIC OF SOUTH AFRICA

Private Bag X 447· PRETORIA · 0001· Environment House · 473 Steve Biko Road · Arcadia · PRETORIA

DEA Reference: 14/12/16/3/1/5/98/MP1

Enquiries: Ms Makhosazane Yeni

Telephone: 012 399 9400 E-mail: [myeni@environment.gov.za](mailto:myeni@environment.gov.za)

Mr Siboniso Mbense  
iSimangaliso Wetland Park Authority  
Private Bag X05  
ST LUCIA  
3936

Telephone: (035) 590 1633  
E-mail: [siboniso@iSimangaliso.com](mailto:siboniso@iSimangaliso.com)

#### PER E-MAIL / MAIL

Dear Mr. Mbense

#### APPROVAL OF THE ISIMANGALISO OVERARCHING ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr) REVISION 15 AS A MAINTENANCE MANAGEMENT PLAN IN ACCORDANCE WITH THE ENVIRONMENTAL IMPACT ASSESSMENT REGULATIONS, 2014, AS AMENDED FOR THE ACTIVITIES WITHIN THE WORLD HERITAGE SITE OF ISIMANGALISO WETLAND PARK IN THE KWAZULU-NATAL PROVINCE

The final overarching Environmental Management Programme (EMPr) Revision 15 dated August 2019 for the abovementioned project received by this Department on 06 September 2019, refer.

The Department has evaluated the submitted overarching EMPr Revision 15 as a Maintenance Management Plan (MMP) which has adequately addressed the possible impacts associated with the construction and rehabilitation phases of the project. The overarching EMPr Revision 15 as a MMP is hereby approved.

The Maintenance Management Plan was submitted in terms of the following listed activities of GN R.983; GN R.984 and GN R.985 of the Environmental Impact Assessment (EIA) Regulations, 2014 as amended:

#### R. 983, Listing Notice 1 of 2014 as amended:

##### Activity No. 18.

The planting of vegetation or placing of any material on dunes or exposed sand surfaces of more than 10 square meters, within the littoral active zone, for the purpose of preventing the free movement of sand, erosion or accretion, excluding where —

- (i) the planting of vegetation or placement of material relates to restoration and maintenance of indigenous coastal vegetation undertaken in

This activity may be required in future. Currently only the Sodwana Bay redevelopment included the restoration of dune vegetation through replanting.

This was authorized specifically in a separate Environmental Authorisation process.

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<p>accordance with a maintenance management plan; or                  (ii) such planting of vegetation or placing of material will occur behind a development setback</p>	
<p><b>R. 983, Listing Notice 1 of 2014 as amended:</b>  <b>Activity No. 19</b>  <i>The infilling or depositing of any material of more than 10 cubic meters into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic meters from a watercourse; but excluding where such infilling, depositing, dredging, excavation, removal or moving—</i></p> <p>a) will occur behind a development setback;                  b) is for maintenance purposes undertaken in accordance with a maintenance management plan;                  c) falls within the ambit of activity 21 in this Notice, in which case that activity applies;                  d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or                  e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.</p>	<p>The common developments wherein this activity is applicable within the Park being the cleaning of culverts which are commonly clogged or blocked with debris including soil. This is an activity undertaken monthly to ensure infrastructure remains intact and is not compromised. This will also be extended to include any soil removed within the St Lucia Estuary, should any removal be necessary for ecological purposes. It must be noted that such removal will be within the existing area where dredging (removal of dredge spoil) and opening of the mouth has been occurring since the early 1970s.</p> <p>This was included previously in the original DEA approved maintenance plan (this is an amendment to the original to include one additional maintenance activity).</p>
<p><b>R. 983, Listing Notice 1 of 2014: Activity No. 19A</b>  <i>The infilling or depositing of any material of more than 5 cubic meters into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic meters from—</i></p> <p>(i) the seashore;                  (ii) the littoral active zone, an estuary or a distance of 100 meters inland of the high water mark of the sea or an estuary, whichever distance is the greater; or                  (iii) the sea; —</p> <p><i>but excluding where such infilling, depositing, dredging, excavation, removal or moving—</i></p> <p>(f) will occur behind a development setback;                  (g) is for maintenance purposes undertaken in accordance with a maintenance management plan;</p>	<p>The common developments wherein this activity is applicable within the Park being the cleaning of culverts which are commonly clogged or blocked with debris including soil. This is an activity undertaken monthly to ensure infrastructure remains intact and is not compromised. This will also be extended to include any soil removed within the St Lucia Estuary, should any removal be necessary for ecological purposes. It must be noted that such removal will be within the existing area where dredging (removal of dredge spoil) and opening of the mouth has been occurring since the early 1970s.</p> <p>This was included previously in the original DEA approved maintenance plan (this is an Amendment to the original to include one additional maintenance activity).</p>

DEA Reference: 14/12/16/3/1/5/98/MP1

Approval of the Maintenance Management Plan (MMP) in accordance with the Environmental Impact Assessment Regulations, 2014 for Activities within the World Heritage Site (iSimangaliso Wetland Park), KwaZulu Natal Province

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Listed Activities Applied For	Activity in the Deeds Plan
<p>(h) falls within the ambit of activity 21 in this Notice, in which case that activity applies;</p> <p>(i) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or</p> <p>where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.</p>	
<p><b>R. 983, Listing Notice 1 of 2014: Activity No. 27</b></p> <p>The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for—</p> <p>(i) the undertaking of a linear activity; or</p> <p>(ii) maintenance purposes undertaken in accordance with a maintenance management plan.</p>	<p>Typically within the Park this would include removal of vegetation growing along the road verge to maintain integrity of the road infrastructure, management of vegetation growing through infrastructure which may compromise the infrastructure (parking areas, areas around water pipes etc.). The existing road verge which has always been in place since 2007 with a maximum of 1m either side of the roads infrastructure within the Park.</p> <p>This was included previously in the original DEA approved maintenance plan (this is an amendment to the original to include one additional maintenance activity).</p>
<p><b>R. 984 Listing Notice 2 of 2014: Activity No.15</b></p> <p>The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for—</p> <p>(i) the undertaking of a linear activity; or</p> <p>(ii) maintenance purposes undertaken in accordance with a maintenance management plan.</p>	<p>Typically within the Park this would include removal of vegetation growing along the road verge to maintain integrity of the road infrastructure, management of vegetation growing through infrastructure which may compromise the infrastructure (parking areas, areas around water pipes etc.).</p> <p>This was included previously in the original DEA approved maintenance plan (this is an amendment to the original to include one additional maintenance activity).</p>
<p><b>R. 984 Listing Notice 2 of 2014: Activity No. 24</b></p> <p>The extraction or removal of peat or peat soils, including the disturbance of vegetation or soils in anticipation of the extraction or removal of peat or peat soils, but excluding where such extraction or</p>	<p>This work would involve the removal of alien vegetation around and within wetlands to maintain their ecological functionality, however; no removal or moving of peat soils. Working for wetlands rehabilitation projects which are funded by the DEA</p>

DEA Reference: 14/12/16/3/1/5/98/MP1

Approval of the Maintenance Management Plan (MMP) in accordance with the Environmental Impact Assessment Regulations, 2014 for Activities within the World Heritage Site (iSimangaliso Wetland Park), KwaZulu Natal Province

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<p>removal is for the rehabilitation of wetlands in accordance with a maintenance management plan.</p>	<p>and have undergone an EIA process driven by Aurecon as the independent Environmental Assessment Practitioner.</p>
<p><b>R. 985 Listing Notice 3 of 2014: Activity No.12</b></p> <p><i>The clearance of an area of 300 square meters or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.</i></p> <p><b>d. KwaZulu-Natal</b></p> <ul style="list-style-type: none"> <li>(i) <i>Trans-frontier protected areas managed under international conventions;</i></li> <li>(ii) <i>Community Conservation Areas;</i></li> <li>(iii) <i>Biodiversity Stewardship Programme Biodiversity Agreement areas;</i></li> <li>(iv) <i>Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;</i></li> <li>(v) <i>Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</i></li> <li>(vi) <i>Within the littoral active zone or 100 meters inland from high water mark of the sea or an estuarine functional zone, whichever distance is the greater, excluding where such removal will occur behind the development setback line on erven in urban areas;</i></li> <li>(vii) <i>On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning;</i></li> <li>(viii) <i>A protected area identified in terms of NEMPAA, excluding conservancies;</i></li> <li>(ix) <i>World Heritage Sites;</i></li> <li>(x) <i>Sites or areas identified in terms of an international convention;</i></li> <li>(xi) <i>Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority or zoned for a conservation purpose;</i></li> </ul>	<p>Typically within the Park this would include removal of vegetation growing along the road verge to maintain integrity of the road infrastructure, management of vegetation growing through infrastructure which may compromise the infrastructure (parking areas, areas around water pipes etc.). The existing road verge which has always been in place since 2007 with a maximum of 1m either side of the roads infrastructure within the Park.</p> <p>This was included previously in the original DEA approved maintenance plan (this is an amendment to the original to include one additional maintenance activity).</p>

DEA Reference: 14/12/16/3/1/5/98/MP1

Approval of the Maintenance Management Plan (MMP) in accordance with the Environmental Impact Assessment Regulations, 2014 for Activities within the World Heritage Site (iSimangaliso Wetland Park), KwaZulu Natal Province

4

*M.S*

Listed Activities Approach	Regulation
(xii) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; or (xiii) In an estuarine functional zone.	

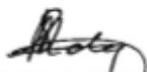
Please note that the Maintenance Management Plan is agreed to in terms of the NEMA EIA Regulations, 2014 as amended, only for the listed activity mentioned above. If any other listed activities are triggered, an environmental authorisation will have to be obtained in terms of the NEMA EIA Regulations, 2014 as amended. It remains the responsibility of the proponent to determine if any other listed activities are triggered.

All other reconstruction and maintenance activities must be within and must not result in any expansion of the existing footprints of the affected relevant structures.

The fact that the Maintenance Management Plan is agreed to by the competent authority does not absolve you from your general "duty of care" set out in Section 28(1) of the NEMA which states that "Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment." (Note: When interpreting their "duty of care" responsibility, cognisance must be taken of the principles of sustainability as contained in Section 2 of the NEMA).

The approved MMP should be regarded as a 'living document', which may be amended from time to time as and when the need arises. The proponent is reminded that should new information be presented at any stage, or the development deviate from the project description contained in the MMP, this Department reserves the right to reconsider this approval.

Yours faithfully



Mr Sabelo Melaza  
Chief Director: Integrated Environmental Authorisations  
Department of Environmental Affairs

Date: 09/10/2019



## 15.APPENDIX VI – Approval regarding the January 2021 breach

### Request for confirmation of the approved maintenance activities (Dec 2020)



#### Responses and queries to be directed to

Mr Siboniso Mbense  
Tel: 035 590 1633  
Fax: 035 590 1602  
Email address: [siboniso@isimangaliso.com](mailto:siboniso@isimangaliso.com)

National Department of Environmental Affairs  
Director: Integrated Environmental Authorisations  
Private Bag X447  
Pretoria  
0001

Tel: 012 399 8686  
Email: [EIAapplications@environment.gov.za](mailto:EIAapplications@environment.gov.za)

14 December 2020

REQUEST FOR CONFIRMATION ON APPLICABILITY OF APPROVED MAINTENANCE MANAGEMENT PLAN FOR THE ISIMANGALISO WETLAND PARK AUTHORITY – WORLD HERITAGE SITE.

Dear Mr S Malaza

The iSimangaliso Wetland Park and the iSimangaliso Wetland Park Authority (iSimangaliso) were established in terms of the World Heritage Convention Act, 1999 (Act 49 of 1999) and Regulations published there under and, as such, iSimangaliso is the legal management authority for the Park. Furthermore, iSimangaliso is governed by the National Environmental Management: Protected Areas Act, 2003 (Act 57 of 2003) and Regulations published there under and, as such, iSimangaliso is the designated Protected Area Manager for the iSimangaliso Wetland Park. As the authority mandated to protect and develop the iSimangaliso Wetland Park, a proclaimed World Heritage Site, iSimangaliso is required by law to ensure that development and activities taking place within and adjacent to the Park do not negatively affect the Park's World Heritage values or the Principles of Integrated Environmental Management as laid in Chapter 2 of the National Environmental Management Act (NEMA).

The National Department of Environment, Forestry and Fisheries (DEFF) approved the iSimangaliso Wetland Park amended maintenance management plan on the 09<sup>th</sup> of October 2019, the maintenance plan specifically made mention of the Msunduze River in terms of breaching primarily due to the issue of the Sokhulu farmers, however the activity itself which is maintenance would apply throughout St Estuary Mouth as this is where historical artificial breaching from the 1950s through to the later 2010s has been taking place. This request thus aims to obtain confirmation from the National Department of Environment, Forestry and Fisheries of the interpretation that the maintenance activities (artificial breaching) has been undertaken within the St Lucia Estuary mouth for some time and as a result the maintenance management plan as approved by the DEFF is applicable in the whole beach area of Estuarine Functional Zone as indicated in figure 1 below.



Figure 1: Estuary Beach Area within Estuarine Functional Zone

For ease of reference we have attached the St Lucia Estuary Management Plan (page 18 and 23) which indicates the current estuary mouth and project area where the Global Environment Facility funded activities were implemented. We have also attached the amended Maintenance Management Plan and associated approval.

Your urgent consideration of this request would be greatly appreciated.

Yours sincerely,

*PP: S.E. Sibiyi*

Mr S Sibiyi  
 Executive Manager: Biodiversity Conservation  
 iSimangaliso Wetland Park Authority  
 Environmental Management Inspector (EMI) – Grade 1: National Designated

## Confirmation letter that breaching is approved (March 2021)



### environment, forestry & fisheries

Department:  
Environment, Forestry and Fisheries  
REPUBLIC OF SOUTH AFRICA

Private Bag X 447- PRETORIA · 0001- Environment House · 473 Steve Biko Road, Arcadia- PRETORIA  
Tel (+ 27 12) 399 9372

DEFF Reference: 14/12/16/3/1/5/114

Enquiries: Mr. Rthulani Kubayi

Telephone: 012-399-8883/ 076 940 8911 Email: [rkubayi@environment.gov.za](mailto:rkubayi@environment.gov.za)

Mr. S. Sibiya: Executive Manager: Biodiversity Conservation  
iSimangaliso Wetland Park  
Private Ban x05  
ST LUCIA  
3936

E-mail address: [siboniso@iSimangaliso.com](mailto:siboniso@iSimangaliso.com)

PER EMAIL / MAIL

Dear Mr Mbense

#### REQUEST FOR CONFIRMATION ON APPLICABILITY OF APPROVED MAINTENANCE MANAGEMENT PLAN FOR THE ISIMANGALISO WETLAND PARK AUTHORITY - WORLD HERITAGE SITE

Your request for confirmation of the applicability of the approved Maintenance Management Plan for the iSimangaliso Wetland Park Authority that was sent to this department by email on the 14<sup>th</sup> of December 2020, refers.

#### PROJECT BACKGROUND

The National Department of Environment, Forestry and Fisheries (DEFF) approved Revision 15 of the Overarching Environmental Management Programme (EMPr) for iSimangaliso Wetland Park as a Maintenance Management Plan (MMP) that was deemed to have adequately addressed all potential impacts associated with all construction and rehabilitation phases of the project.

Your letter requesting comments confirms that the MMP specifically made mention of the Msunduze River in terms of breaching primarily due to the issue of the Sokhulu farmers. However, the breaching activity itself which is maintenance would apply throughout St Estuary Mouth as this is where historical artificial breaching from the 1950s through to the later 2010s has been taking place. Your request thus aimed to obtain confirmation from DEFF of the interpretation that the maintenance activities (artificial breaching) has been undertaken within the

St Lucia Estuary mouth for some time and as a result the maintenance management plan as approved by the DEFF is applicable in the whole beach area of the Estuarine Functional Zone.

#### LISTED ACTIVITIES IN THE APPROVED IN THE MAINTENANCE MANAGEMENT PLAN

The final overarching Environmental Management Programme (EMPr) that was approved as an MMP the Department was accepted as having sufficiently addressed all potential impacts associated with construction and rehabilitation activities through all phases of the project. The activities that are relevant to breaching as included in the environmental authorisation have been cited below:

Listed Activity	Description of project activity
<p><b>R.983, Listing Notice 1 of 2014 as amended:</b></p> <p><b>Activity 19:</b></p> <p>The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;</p> <p>but excluding where such infilling, depositing, dredging, excavation, removal or moving—</p> <p>(a) will occur behind a development setback;</p> <p>(b) is for maintenance purposes undertaken in accordance with a maintenance management plan;</p> <p>(c) falls within the ambit of activity 21 in this Notice, in which case that activity applies;</p> <p>(d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or</p> <p>(e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.</p>	<p>The common developments wherein this activity is applicable within the Park being the cleaning of culverts, which are commonly blocked with debris including soil. This is an activity undertaken monthly to ensure infrastructure remains intact and is not compromised. This will also be extended to include any soil removed within the St Lucia estuary, should any removal be necessary for ecological purposes. It must be noted that such removal will be within the existing area where dredging (removal of dredge spoil) and opening of the mouth has been occurring since the early 1970s.</p> <p>This was included previously in the original DEA approved maintenance plan (this is an amendment to the original to include one additional maintenance activity).</p>
<p><b>R. 983, Listing Notice 1 of 2014:</b></p> <p><b>Activity No. 19A:</b></p> <p>The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand,</p>	<p>The common developments wherein this activity is applicable within the Park being the cleaning of culverts which are commonly clogged or blocked with debris including soil. This is an activity undertaken monthly to ensure infrastructure remains intact and is not compromised. This will also be extended to include any soil removed within the St Lucia estuary, should any removal be necessary for ecological purposes. It must be</p>

DEFF REF: 14/12/16/3/1/6/14

REQUEST FOR CONFIRMATION ON APPLICABILITY OF APPROVED MAINTENANCE MANAGEMENT PLAN FOR THE ISIMANGALISO WETLAND PARK AUTHORITY - WORLD HERITAGE SITE

<p>shells, shell grit, pebbles or rock of more than 5 cubic metres from -</p> <ul style="list-style-type: none"> <li>(i) The seashore;</li> <li>(ii) The littoral active zone, an estuary or a distance of 100 meters inland of the high water mark of the sea or an estuary, whichever distance is the greater; or</li> <li>(iii) The sea</li> </ul> <p>But excluding where such infilling, depositing, dredging, excavation, removal or moving -</p> <ul style="list-style-type: none"> <li>(f) Will occur behind a development setback;</li> <li>(g) Is for maintenance purposes undertaken in accordance with a maintenance management plan.</li> <li>(h) Falls within the ambit of activity 21 in this notice, in which case that activity applies;</li> <li>(i) Occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or</li> </ul> <p>Where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.</p>	<p>noted that such removal will be within the existing area where dredging (removal of dredge spoil) and opening of the mouth has been occurring since the early 1970s.</p> <p>This was included previously in the original DEA approved maintenance plan (this is an amendment to the original to include one additional maintenance activity).</p>
--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

#### DEPARTMENT'S DECISION

The MMP specifically authorised all activities to do with the cleaning off culverts which are commonly blocked, which would be extended to include removal of soil within the broader St Lucia Estuary should this be deemed necessary to improve the ecological functioning of the estuary. Necessarily, this would include the whole Estuarine Functional Zone as highlighted in the map on your enquiry letter. Your interpretation that the maintenance management plan as approved by DEFF is applicable in the whole beach area of the Estuarine Functional Zone is correct. As confirmed in the in the description of project activity accompanying the approved listed activities, the maintenance activities would be extended to include any any soil removed within the St Lucia estuary.

The activities approved are those detailed in the maintenance management plan as per Revision 15 of the Overarching Environmental Management Programme for the iSimang'iso Wetland Park, with the two cited above being the ones that concern artificial breaching per your query activities.

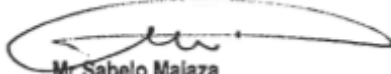
We wish to bring to your attention that the 'NEMA Applicability Form' is no longer available online as it was removed from the Departmental website. The onus is on the Applicant/EAP to ascertain whether activities are

listed or not. However, if there are any specific EIA queries related to the proposed development you may email it to [EIAAdmin@environment.gov.za](mailto:EIAAdmin@environment.gov.za) and if you have any EIA Regulation related interpretation queries you may email them to [IQ@environment.gov.za](mailto:IQ@environment.gov.za).

You are further reminded of your **general duty of care** towards the environment in terms of section 28(1) of NEMA which states: *"Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment."*

This department reserves the right to revise or withdraw its comments or to request further information from you should new information on this matter become available.

Yours faithfully



Mr Sabelo Malaza  
Chief Director: Integrated Environmental Authorisations  
Department of Environment, Forest and Fisheries  
Letter signed by: Mr Simon Moganetsi  
Designation: Director: IEM Systems and Tools Coordination  
Date: 05/03/2021

Cc

Name	Organisation	Email address
ioSimangaliso Wetland Park Authority	IWPA	<a href="mailto:wetlandauthority@isimangaliso.com">wetlandauthority@isimangaliso.com</a>
Kacy Rengasamy	KZN Department of Economic Development, Tourism and Environmental Affairs	<a href="mailto:Kacy.Rengasamy@kznedtea.gov.za">Kacy.Rengasamy@kznedtea.gov.za</a>



## 16. APPENDIX VII – Calculations of economic loss

### Small-scale farmer economic loss calculations

#### DUKUDUKU SMALL COMMERCIAL FARMERS:

#### **SOCIO ECONOMIC IMPACT**

IN OUR FARM LAND WE HAVE BOTH GENDERS. 55% OF FEMALES AND 45% OF MALES .FROM BOTH OF THESE GENDER 35% YOUTH.65% ARE ADULTS.

1. More than 700 farmers in the Land which has more than 3000hectars from Ebungwini to the Joint of Umfolozi River and Umsunduzi River. We have Banana farms that is our Major planting product .all our farmers do have banana in their farms. We also have vegetables in our farms such as sweet potatoes, Amadumbe (yens), Cabbages. I mention only these materials which cost a lot of money.
2. Our products are in demand. We are in shot of harvest now because of these floods .our farms have been destroyed. NUF, NIN, NND, NN, NV, NKUand ND are in need of our supply.

**A load of Banana in a bakii cost R5250 transport inclusive when we supply to Empangeni, Manguzi, Jozini and Nongoma. It R7600transport included when we supply to Lundi. R8000 to Vryheid, Newcastle and Durban transport inclusive.**

We have farmers who used to have more than one load a day to supply to these places. There were no floods by that time .it created jobs for drivers, packers and farm cleaners which had reduced crime in our society as we know we are the neighbours of St Lucia where tourists use to visit.

1.5250x 21(working days)

=R110250 a month to the average of 30%farmers each .

=R110250x210 (farmers30% out of 700)

**=R23152500 Loss**

2.R8000x21(working days )

=R168000x210(farmers 30% out of 700)

**=R35280000 Loss**

#### **Total loss for those who are supplying direct to customers**

R23152500+35280000

**=R58432500 in a month**

490 farmers (70%) which is dominated by women who feed their families also youth who have no parents anymore .some of those youth they inherited farms from late parents and it is the only source of income into their homes that put food on the table .they are street venders at Ulundi,Nongoma(Mona market),Manguzi ,Phongola town and at some grant pay points areas surrounding Pongola.



S.A.N

These farmers use to hire a lorry 10tone truck and combine to that truck to the point where they are selling their food. Banana is the major. Four members in a truck load.in each no one earn an amount less than R8000 then they contribute 500 each to pay R2000 for a truck .each and every one left with R7500 as a profit as they did not buy that product as its been their own harvest. Since their farm has been flooded some uses to buy to those who still have survived which is a situation that is unacceptable.

R7500x2 (a person goes twice a month due to time tables they have agreed on at Mona market)

=R15000each an every famers in a month (minimum)

R15000x490 (farmers70%)

R7350000 Loss in a month

#### Sweet potatoes and Cococacia (Amadumbe)

This types of material need special attention due to the job that it has therefore not all farmers have these and we spend a lot of money during the process of farming this which creates anger when bloods vanishes all.

It is seasonally .if floods have flooded entire farms means you have to wait for another right season to come.

Amadumbe50kg is R500-550 transport included

R500x20bags (20 bags 50kg)

=R10000 (minimum to the average of 30%)

=R10000x210 (farmers30% as I have mentioned not all farmers are planting Amadumbe)

=R2100000 loss. Yearly as it takes 9months to be ready for a harvest.

sweet potatoes

60% of farmers do have sweet potato farms because it takes only 3months for being ready for a harvest therefore most of farmers go for a potential for a market.R350-R400per 50kg.

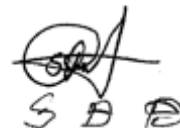
R350x20bags (bags of 50 kg's)

=R7000(minimum to the average of 60%)

=R7000x420(farmers60%)

=R2940000Loss after four months.

We have suffered a huge loss as total amount has been shown above.it is the course of this back flooding as we may never have this economy any more .we need an urgently way of resolving this issue. We been forced to retrenched some of people we been hired to assist in



our farm as some have been flooded away and it reduced the product. We are also in fear that some of us their cars will be repossessed due the failure of payments. Let us find a way to protect this potential to the next generation. The farmer doesn't strike for a job because she/he is an employer him/herself.

A handwritten signature in black ink, consisting of a circular mark followed by several loops and a trailing line.

# UMFOLOZI SUGAR MILL

## DFFE Panel of Experts

# ISIMANGALISO ESTURARY

15 November 2021



## Extent of the flooding



## Impact of Flooding on USM

- The Umfolozi flats represents approximately 55% of USM's total cane supply.
- Farms on the Umfolozi Flats that become inundated at 1.2 msl; Water levels have been between 2.8 and 3.0 msl.
- Resultant flooding of between 1,200 ha and 1,800 ha.
- USM impact is 100,000 to 150,000 tons cane is at risk (dependent on complex environmental factors).
- This represents a potential throughput loss of 8% to 12% (total cane crop  $\pm 1,25$  m tons cane).
- Milling capital intensive; other than the variable cost of cane all other material costs are fixed
- USM's break-even tonnage is between 1.10 and 1.20 million tons of cane, subject to changing economic factors.
- Extensive flooding could render USM commercially unviable.



## Impact of Flooding on USM and the Surrounding Community

- USM's annual turnover of approximately R1.3 billion, with a multiplier effect of x3.
- If USM closes:
  - ALL supplying growers will be impacted.
  - The entire town of Mtubatuba will be impacted.
  - The Umkhanyakude District Municipality will lose 3 x R1.3 billion.
  - Contractors from Richards Bay, Durban, JHB will be impacted.
- The Umkhanyakude District Municipality is characterised by high levels of unemployment and poverty; if USM closed down it would be a socio-economic catastrophe.
- The dtic Sugar Industry Master Plan recognises this and is in the process of making every effort to 'rescue' the sugar industry from economic decline, including USM.
- USM supports every effort to secure the viability of the growers affected by the back flooding.



Please support our community



<https://www.youtube.com/watch?v=IEojgAQWHg0&t=3s>

Stay Safe  
USM  
Umfolozi Sugar Mill



Stay Safe  
USM  
Umfolozi Sugar Mill



## 17. APPENDIX X – Ecological statistics

**Table A:** t-test statistics for microphytobenthic differences between 2019 and 2021 at 5 different samples stations and St Lucia Lake

		Mouth	Narrows	Charters Creek	Catalina Bay	Listers Point	Total
	df	4	4	4	4	4	28
March	t	-4,490	-30,992	0,605	-0,965	-0,419	-1,288
	p-value	0,005	0,000	0,289	0,195	0,349	0,104
	df	4	4	4	4	4	28
May	t	-5,384	7,980	6,165	-3,671	0,775	0,827
	p-value	0,003	0,001	0,002	0,011	0,241	0,208
	df	4	4	4	4	4	28
Aug	t	1,766	5,911	-1,481	12,717	2,481	2,233
	p-value	0,076	0,002	0,106	0,000	0,034	0,017

**Table B:** Summer and winter bird counts over 8 years along with t test statistics evaluating the seasonality of bird counts. A p value > 0.05 indicates non-significance therefore there is no significant difference in bird counts between seasons.

Year	Summer	Winter
2008	13495	10567
2009	15836	10477
2010	21792	7437
2011	29653	26079
2012	43683	35677
2013	146498	110379
2014	292996	220758
2015	585992	441516

df	14
t-statistic	0.398
p value	0.348

# 18. APPENDIX IX – Letters from Sokhulu

P O Box 113  
Kwa-Mbonambi  
3915  
28 March 2018  
Contact no: 078 4051738

ISimangaliso  
Maphelane/St Lucia  
Mtubatuba  
3935

## INCWADI YESIKHALO SABALIMI BAKWASOKHULU

Siwumphakathi wakwaSokhulu sihlukunyezwa ngamanzi emasimini ethu, adalwe ukuvaleka komlomo woMfunduze neMfolozi ukuba ungene owandle, sesike sazama ukukhulumisana nabamele uSmangaliso ukuthi abasivulele kodwa sibona akwenzeki lutho, namanje sithi asigcizelele ukuthi asicele ukuba shvulelwe umlomo. ISimangaliso uma singavula umlomo singabe siwukhululile umphakathi wakwaSokhulu okhathazekile, futhi abalimi bangakuthakasela ukuthi ukuya nabamele uSmangaliso ezingoxweni kubaphumelelile.

Esikushoyo sikusho sikuqonda kahle ukuthi yonke imifula ichithela owandle nathi sicela kube njalo ngokushesha.

Siyabonga

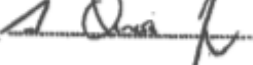
Ozithobayo

uSikhalo wabalimi

Mnumzane Petros Mlaba



Omele ISimangaliso



INKOSI P B MTHIYANE



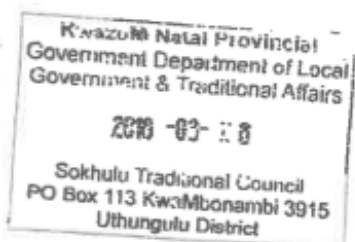
OFFICIAL STAMP

*Ukukhululile yabalimi*

RECEIVED

28 MAR 2018

AM Zulu  
NB MBUYAZI  
P ZWANE  
S MTHEMBU  
J MFEKAYI  
M MADINGA







SOKHULU FARMERS  
P.O.BOX 113  
KWA-MBONAMBI  
3915  
SOKHULUTRIBAL@GMAIL.COM  
MBUYAZINIABULO90@GMAIL.CO  
0784051738/0788309049  
16 NOVEMBER 2018

MINISTER/NGQONGQOSHE  
SIWUMPHAKATHI WABALIMI KWA SOKHULU. SIKHOLWA UKUTHI UZOSIZWA UQONDE  
NGOMONAKALO ESIBHEKENE NAWO.  
SIBENEMIHLANGANO EMININGI NABAMELE ISIMANGALISO WET LAND PARK ST LUCIA. KODWA  
KUKHOMBA UKUTHI ASIKHO ISIXAZULULO.SITHATHE ISINQUMO SOKUCELA WENA NJENGOMHHOLI  
WALOMNYANGO, UKUBA UGUNYAZE UKUVULA UMLOMO WOMSUNDUZE UNGENE OLWADLE  
NJENGOBA BEKWENZEKA EMINYAKENI ENDLULE NOMA WENZE IMIZAMO YOKUKHIPHA AMANZI  
EMASIMINI ETHU.SICELA UKUKUNIKEZA ITHUBA KUNGADLULU UMHLAKA 05 DECEMBER 2018.  
SIZOHLALA SIKULINDE USABHEKA LOMONAKALO.

WE ARE SOKHULU COMMUNITY FARMERS, WE BELIEVE THAT YOU WILL HEAR AND UNDERSTAND  
THE DESASTER WE FACED . WE MEET SEVERAL TIMES WITH ISIMANGALISO WET LAND PARK  
REPRESENTATES. BUT OUR MEETINGS SHOWS THAT THERE IS NO CONCLUSION. THAN WE DESIDED  
TO ASK YOU TO PRODUCE AUTHORESETOIN OF OPENING UMSUNDUSE MOUTH RIVER TO THE SEA  
AT MAPELANE PARK ST LUCIA,OR CREAT A PLAN OF MOVING WATER IN OUR FARMING FIELD.WE  
ASK YOUR DECISION TO BE NOT LATER THAN 05 DECEMBER 2018, WE WILL WAIT WHILE YOU ARE  
INVESTIGATING THIS DESASTER  
SIYABONGA/THANKS

P MLABA

  
[USIHLALO WABALIMI KWASOKHULU]  
AM ZULU  
  
[ISEKELA SIHLALO]

RECIEVED ON THE 16<sup>th</sup> of NOVEMBER 2018.  
By. N.J. MLAMBO, Cll. DEPUTY MAYOR



**Department of Forestry, Fisheries and the Environment**

**Environment House, 473 Steve Biko Road,  
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