

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

COMPILED BY THE INDEPENDENT PANEL OF EXPERTS
AS APPOINTED BY MINISTER BARBARA CREECY,
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Photo: Dr Ricky Taylor

Revisiting the Terms of Reference

1	Insight into St Lucia
2	Sequence of events
3	The panel's work
4	TOR 1
5	TOR 2
6	TOR 3
7	TOR 4
8	Conclusion

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;

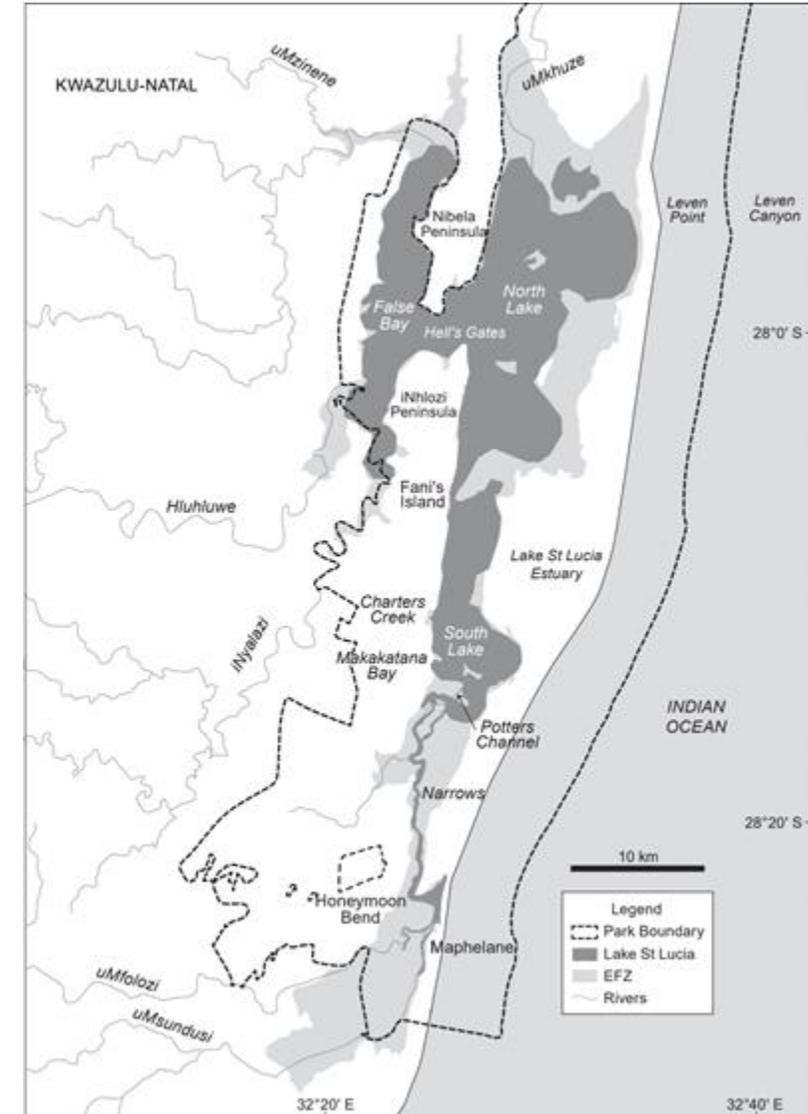
St Lucia as an ecological system

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- Series of lakes connected to the sea via narrow channel
- Seasonal flowing rivers
- Basins are depositional zone for sediment
- Over millenia St Lucia will become a freshwater swamp/wetland
- But climate change, SLR, land use change all need to be considered
- Approx. 50% of SA's estuarine cover – large nursery function
- EFZ – 5 mMSL contour line

St Lucia system – includes the estuary, the Narrows, South & North Lake, False Bay, Mkhuze Swamps, Mfolozi floodplains, Eastern Shores and Western Shores, and the inflowing catchment rivers

St Lucia Lake – includes the estuary, the Narrows, South & North Lake, False Bay



St Lucia as an ecological system

EWR – water balance required for optimal ecological function incl natural breaching.

Ecological function – many functions and biomes. Mangroves, salt marsh, reeds, swamp forests, submerged vegetation, mud flats – carbon sequestration, nursery function, productivity

Unique biodiversity including many endemics, new species.



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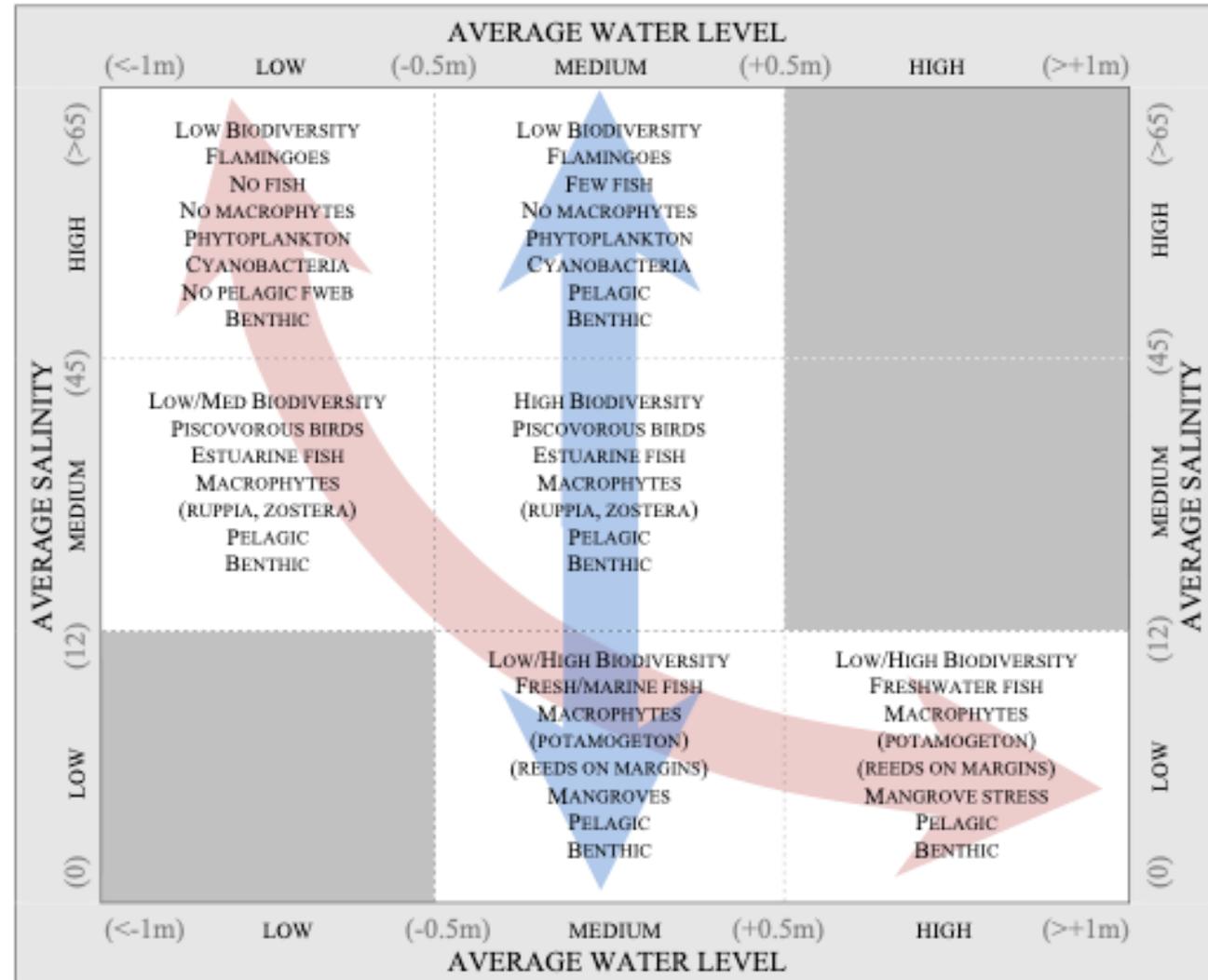
St Lucia as an ecological system

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All affected by estuarine state. Incl mouth condition and amount of freshwater inflow

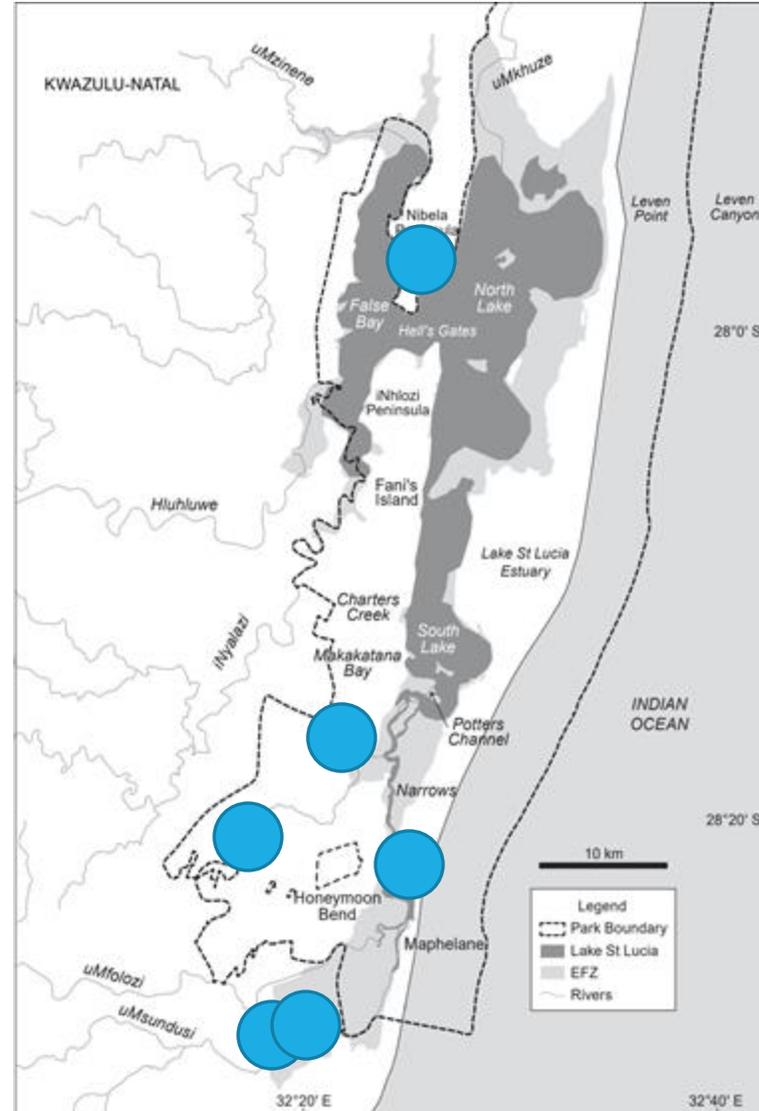
Shifts between 4 – 10 year wet/dry states depending on freshwater inflow – affects salinity and water level

Extreme dynamic system



St Lucia as a socioeconomic system

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The main actors

- Park authority
- Tour operators
- Ratepayers
- Large-scale and small-scale commercial farmers
- Fishers
- Local municipality
- Tourists
- Researchers and monitors

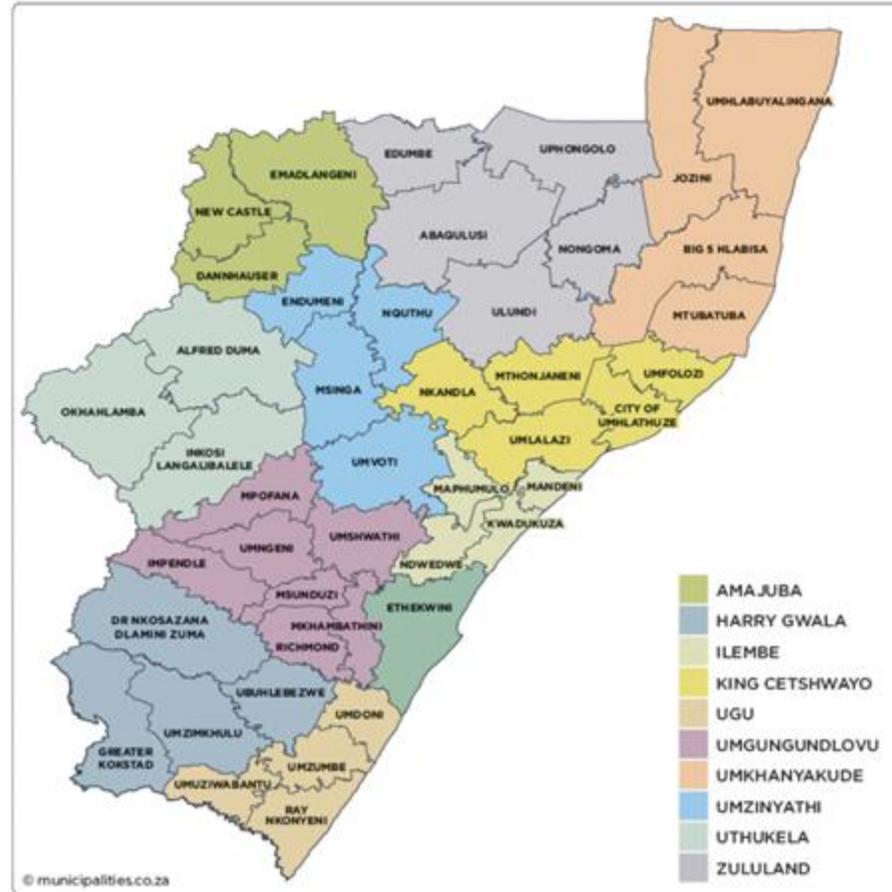
Low education and income rate

Tourism more easily aligned with conservation, other sectors often clash with conservation goals

Historically isolated – liaisons and more integrated workshops shows a move towards a more participatory socio-economic system

St Lucia as a socioeconomic system

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Falls within Mtubatuba Local Municipality

Divided by N2 and surrounded by several Parks – strategic location in relation to cities and to the Mozambican border

Mostly agriculture and social services

Not an authority over iSWPA but strong linkage due to the tourism potential and need for integrated management

A brief history of management

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1895 - first recorded management/protection

1930 – de-proclamation – Tsetse fly

1938 – re-proclamation – only HWM of estuary

1911 – farming in floodplain

1948 – first scientific survey – separation of mouths and link canal. Maintenance dredging was also a management feature during this time – maintenance of an open mouth.

1977 – NPB takes over management

1979 – SL Marine Reserve proclaimed

A brief history of management

1	Insight into St Lucia	1980s – cyclones Domoina and Imboa
2	Sequence of events	1990s – added eastern shore to the SL Marine Reserve
3	The panel's work	
4	TOR 1	1994
5	TOR 2	NPB – EKZNW
6	TOR 3	1999 – iSWP proclaimed as a UNESCO WHS
7	TOR 4	2002 – left to close – prolonged closure and drought 2012 – beach spillway to reconnect two mouths
8	Conclusion	2014 – last mouth closure 2016 – dredge spoil removal



International recognition

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1986 – Ramsar

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

1998 – readmitted to the United Nations

1999 – UNESCO World Heritage Site -
Greater SL Wetland Park, later iSWP



iSimangaliso
Wetland Park

Sequence of events

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- Naturally open/closed – shift between hypersaline and fresh, including shift of biota – encroachment of reeds, some alien species, loss of mangroves
- No marine input – no flushing of silt, no marine input, no nursery function, mangroves die off, infrastructural damage
- Sediment influx from catchment degradation and rejoining of mouths

Court order – UCOSP v iSWPA started in 2015 and ruling in 2018 ruling in favour of iSWP – mouth should not be breached at Maphelane to alleviate back flooding – compromises ecological integrity of the system.

Closed to sea for 6 years at the time of the symposium

Sequence of events

Oct 2020 symposium – overall a success because for the first time, stakeholders all sat together and spoke. BUT also highlighted discord between stakeholders e.g. technical and ecological-focus of scientists vs lived experience and rights of surrounding communities.

4 task teams were formed – scientific, legal and policy, finance, communication

Objectives - “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.”.

Short-term, not all stakeholders would benefit.

Breach on 6 Jan 2021

13 Jan – letter – contrary to GEF recommendations, no adequate monitoring, for a privileged few.

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Literature review

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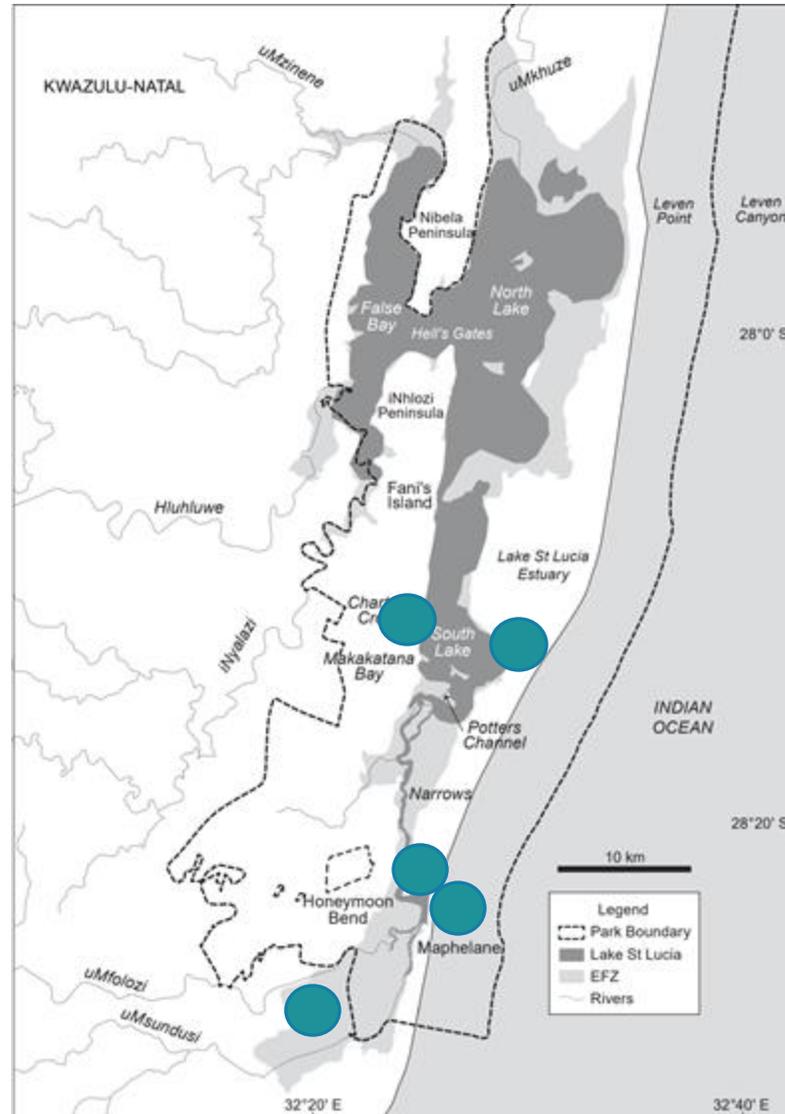
Legislation – The Constitution, NEMA, NEM:BA, NEM:PA, NEM:ICMA, WHCA, MLRA, NWA

Authoritative – EMP, MMP, IMP, EWR

Advisory – GEF report, technical reports (Bate et al. 2011, Whitfield 2014), books (Perissinotto et al. 2013) and peer-reviewed papers.

Site visit – 2 – 4 November 2021

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Guided by iSWPA

Mouth

Western shores

Eastern shores

Bridge/Narrows

uMfolozi floodplains

To observe, to ask questions

To meet with iSWPA and EKZNW

iSWPA – presentation on the events preceding and following the breach

EKZNW – records, photos and videos of the events

Data collection – hydrology and ecology

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- Hydrological and ecological literature review
- Hydrological modelling – salt, water and sediment budget
- Ecological data analyses – salinity, turbidity, productivity

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

- Virtual meetings with scientists
- Discussion on the exceptional circumstances and impacts of the breach

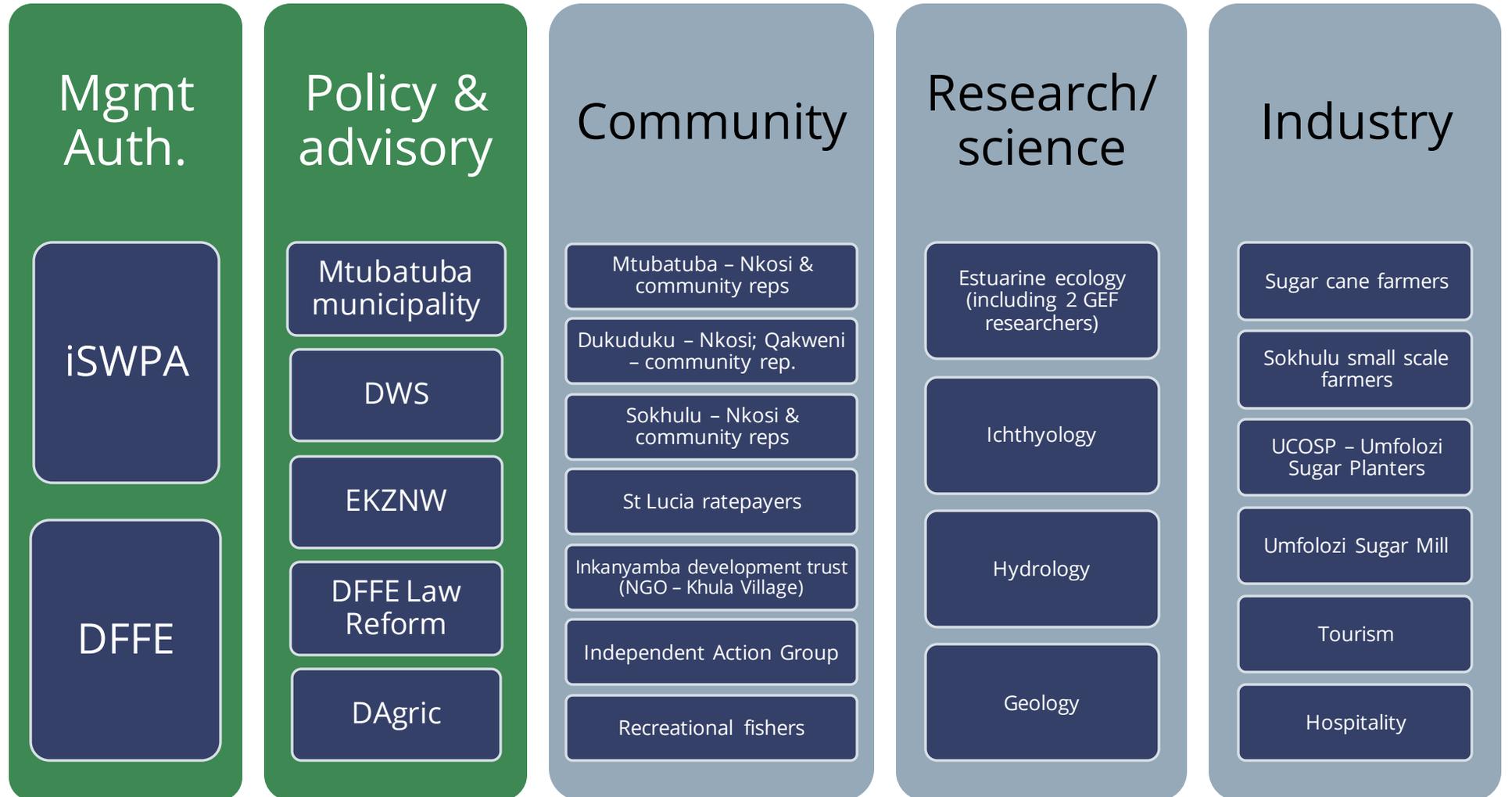
Data collection – social and economic

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- Site visit (2-4 November 2021)
- Meetings with stakeholder groups in St Lucia
- Meetings with amakhosi and community members in communities at Sokhulu and Mtubatuba
- Virtual meetings with internal and external stakeholders
- Open call for comment – 20 January 2022

Data collection – social and economic

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Breach terminology

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- **natural breaching** - water levels naturally increase to overtop the beach berm. Typically around elevations of 2.5 – 3.5 mMSL in St Lucia through wave and wind action. NO direct human interventions.
- **artificial breaching** - earth-moving machinery (or related mechanical means) used to excavate a channel through the beach berm - initiates 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** - 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 - initiating a breach of the berm. Seems to be used as an alternative term for **artificial breaching** - intent to minimize the scale and impact of the interventions.
- **skimming the berm to cause breaching** - the height of the beach berm is artificially lowered by mechanical means - facilitates overtopping to occur at lower levels than natural. A specific type of “nudging”

Management context

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1. Court case ruling – combined mouth approach, no breaching to alleviate back-flooding
1. EWR – indicates an increase in flow required for St Lucia, no artificial breaching except for exceptional circumstances.

Significance in terms of Management Plans

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EMP – management should continue to limit artificial breaching adding “and then only for ecological reasons...”.

- ‘ecological reason’ is not defined in this context.
- Section 1.1 ties in to IMP which refers to the inclusion of the EMPr or MMP.

MMP - contains a set of listing notices and approved activities for maintenance. 2019 – permission granted to carry out certain activities without an EIA. This includes activities for breaching (Sections 19 and 19A).

Breaching was in line with this and appears to have been approved by the relevant authorities

- Conditions and guidelines are provided in Chapter 9.21 – unclear if these were adhered to as the monitoring report does not make specific mention.
- Appendix 3 also refers to monitoring standards – appears that these were not fully considered

Significance in terms of the GEF report

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GEF recommendations – facilitate a joined mouth, no artificial breaching – other alterations e.g. deepening and clearing of channels, removal of alien vegetation, reduce water abstraction, partial floodplain restoration, extensive monitoring

Breach directly contravened the GEF recommendations both because it constitutes an artificial breach and because of the lack of monitoring.

NB to note that the GEF recommendations are also unaccounted for in the latest versions of the MPs

Defining exceptional circumstances

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EMP (section 2.5.1) - “ecological reasons” but these remain undefined

EWR (Vol. 1, Table 7.1) - “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.”

Thus >3 mMSL could be considered an exceptional circumstance. However, this is just one example.

Ecological circumstances

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- a. **Unprecedented, closed mouth state** - 2014 mouth last closed along the beach canal linking the Mfolozi and St Lucia mouth, both systems experienced marine connectivity during this time. Since then, 6 years and 3 months until the artificial breach. The longest period of mouth closure. 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 is an ongoing issue. In the past dredging was the response. This has since been ceased due to the detrimental ecological impacts of this practice on water quality, nutrient resuspension, sediment chemical composition, light availability, terrain modification, and benthic fauna which affects the overall function of estuaries.
- 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. A fairly prolonged state, but a freshwater state is one of the many states of the St Lucia system and does not necessarily constitute an exceptional circumstance.

Ecological circumstances

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- e. **Alien invasive species**—*Tamarix ramosissima*, *Casuarina equisetifolia*, *Tarebia granifera* around the mouth was cited as a concern and evidence for the need of marine connectivity. *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. This is cause for concern.
- f. **Emergent and submerged vegetation in the Narrows and the uMfolozi-Msunduzi rivers** –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. This is cause for concern.
- 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. A lack of monitoring of other biota – not possible to draw a meaningful conclusion.
- h. **A decrease in the nursery function of the estuary** – Unable to function as a nursery since at least 2014. Whitfield (2021) demonstrates that even though marine connectivity does occur via the uMfolozi, this link is insufficient for substantial migration of fish (one species) into and out of the St Lucia system. Requires a direct open mouth. This closure of the actual St Lucia mouth since 2007 does raise a concern regarding the nursery function of this estuarine system.

Social and economic circumstances

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Exceptional circumstances don't account for social or economic reasons.
Ecology linked to social circumstances e.g. poor water quality leads to proliferation of disease-causing biota affecting human health

- a. **Back-flooding** – a closed common mouth creates back-flooding where farms lying within the EFZ are inundated and crops are lost.

UCOSP and Small-scale farmers presented these losses to the panel

Linked to a number of ecological reasons including sediment accumulation and vegetation blockage in the uMfolozi and Msunduzi channels.

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.

Social and economic circumstances

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- b. Damage to infrastructure** – rising water levels caused flooding of jetties, slipways, boardwalks and other infrastructure around the St Lucia system. 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. Unknown economic losses and COVID-19 lockdown restrictions placed a further strain on tour operators and tourism-related jobs.
- d. Reduction in fishing success** – Unable to engage with small-scale fishers during this period. From attendance of the October 2020 symposium and subsequent records - 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.

Breach impact on hydrology

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Simulations accounted for breach levels of 1.25 mMSL (the January 2021 breach) and 2.5 mMSL (a more typical breach for St Lucia)

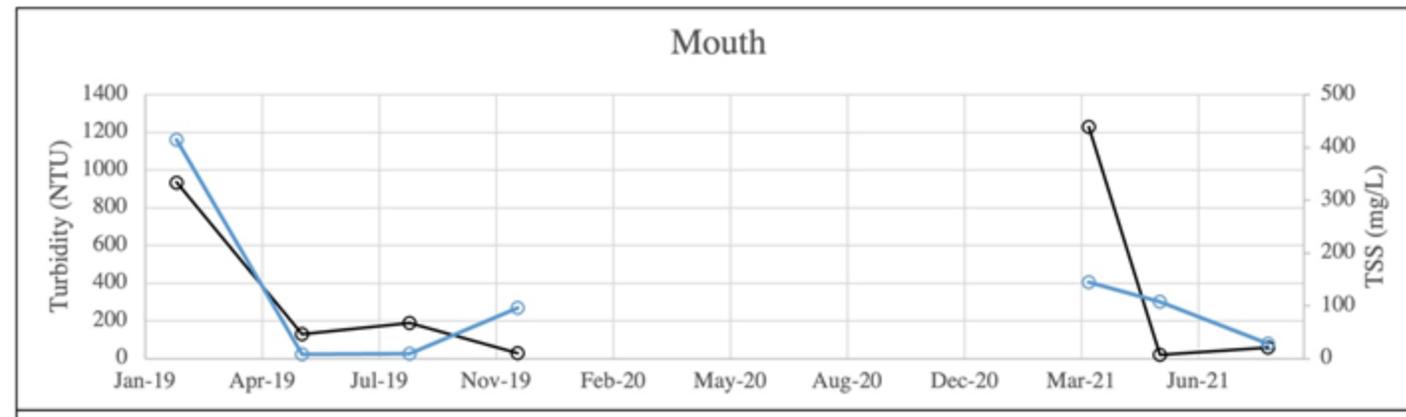
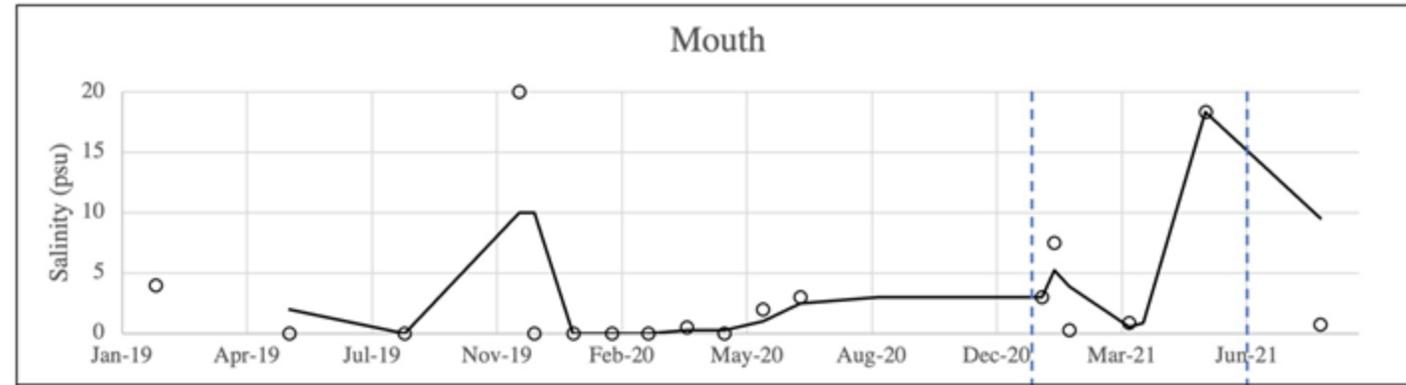
A lower breach level is predicted to:

- a. increase the open mouth state (from 67% to 79%) as well as an increase in the duration of an open mouth period.
- b. reduce the contribution of the Mfolozi to the St Lucia lake
- c. increase the salinity of the system and leads to more salt deposition
- d. reduce the flushing of sediment from the system

Current breach was timed with a wet period (Cyclone Eloise) which increased the lake water level. However, tidal exchange was limited most likely due to consolidated sediment at the mouth and high freshwater flow. The open mouth was also not maintained for more than 5 months due to the low water level at the time of breaching.

Breach impact on ecology

Salinity – There was an increase in salinity following the breach but this was not sustained and did not translate through the entire system – a limited tidal influence



Turbidity – seasonal fluctuation also contributes to high turbidity – high rainfall means high turbidity. Sharp decrease seen in May could be due to flushing but more likely due to decrease in rainfall.

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Breach impact on ecology

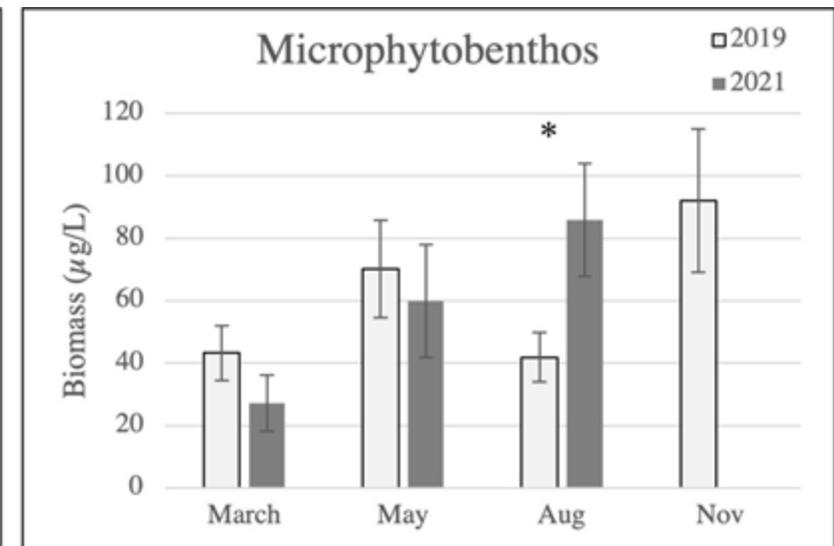
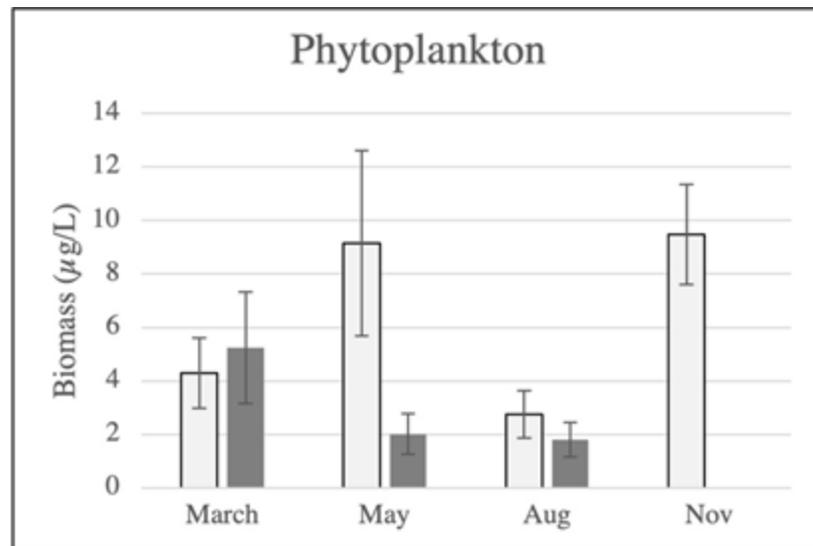
Productivity – in terms of chlorophyll – microalgal biomass

A decrease in phytoplankton activity following the breach

Productivity influences the food webs of the system. In this case there is more benthic productivity which means a shift towards benthic-based food webs.

However, shifts in estuarine habitats are common.

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Breach impact on ecology

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- a. **Restoration of nursery function** – Positive. Limited. An increase in juvenile fish and crab larvae. Participants reported an increase in prawn sightings. Limited because of the late timing of the breach (Jan as opposed to Sep) and the closure after 5 months.
- b. **Reintroduction of marine species** – Positive. Limited. Reports of bull sharks, mullet, perch, and grunter. Recreational angling resumed at the mouth following the breach.
- c. **Removal of sediment** – No change. Some sediment was removed but overall this did not change the observed sediment accumulated in the system. Long closure – increased accumulation and consolidation of sediment. - less susceptible to flushing.
- d. **Removal of reeds** – No change. *Phragmites* reeds require saltwater inundation > 20 PSU for a few weeks. The maximum salinity was 20 PSU for a very brief period at the mouth, nowhere else in the Narrows or South Lake.
- e. **Shift from fresh to brackish** – Positive. Although marine inflow was low, there was a spike from fresh conditions to low brackish conditions at the Mouth, Narrows and the South Lake.

Breach impact on ecology

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- a. **Return of megafauna to the mouth** – Positive. Following the breach, hippos returned to the mouth.
- b. **Shift in avifauna** – Negative. The 2021 bird count revealed a 50% decrease in bird counts compared to 2020. Even though counts were done in different seasons, there generally isn't a seasonal difference in counts.
- c. **Decrease mangrove loss** – No change. Mangroves continue to die off around the lake. Will continue to do so with a lack of marine inflow and tidal regime. Contributes to the lack of nursery function and carbon storage capacity.
- d. **Alien invasive species** – No change. Expected that increased salinity would control *T. granifera* populations at the mouth but they are still prominent. Salinity levels were not high enough to achieve this. Doubtful that *C. equisetifolia* or *T. ramosissima* were impacted (this was not an objective) but they continue to spread at the mouth and may stabilize the dune.

Breach impact on social situation

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- a. **Lack of benefit to farmers** - this was already discussed at the symposium i.e. the St Lucia mouth breach was unlikely to alleviate back-flooding. Participants in the panel meetings referred to increased wildlife encounters and mosquito infestations, increased crime due to ongoing unemployment, reliance on government grants

The blockage of the Msunduzi-uMfolozi by reeds is most likely exacerbating this back-flooding



Breach impact on social situation

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- b. Benefit to ratepayers, tour operators, recreational fishers** – overwhelming response that breach had a positive effect due to increase in fish migration, the visible plume of sediment moving out of the system and the mouth remaining opened for 5 months.
- c. Lack of communication and understanding** - the technical science around the St Lucia system and other important events (e.g. the 2018 court ruling) are not efficiently communicated to all stakeholders leading to a growing distrust in scientists and management. Communities aren't able to fully partake in discussions.
- d. Superficial inclusion of communities and lack of equitable gains** – unfortunate but strong feeling that views of black communities are not taken seriously. Invited to meetings but don't see their contributions reflected in management plans.
- e. Non-recognition of community concerns** – A strong experience of the panel was the unwillingness of the community to listen or engage until the Maphelane mouth was breached to alleviate back-flooding. Communities asked for letters to be included so that their concerns were officially recognized. Strong feelings that response is given to a small group of scientists who don't even reside in the area.
- f. Lack of an independent liaison** – this leads to underrepresentation regarding participatory processes. A norm is seen regarding inclusion of community leaders and equating this to community inclusion. This leads to overlooking the heterogeneity of "community".

Breach impact on economics

- COVID-19 lockdown – affected South Africa’s tourism industry. Difficult to disentangle the effects of this from a closed mouth as tour operators report a decrease in income.
- Farmer losses were estimated to remain the same and possibly be projected into 2022 due to the 2021/2022 flooding of crops.
- Impact of breaching did not have equitable benefits to all stakeholders.
- Economic value associated with ecosystem services were not investigated here.

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Key recommendations - maintenance

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- In accordance with the MMP, maintenance breaching could continue. However,
- Ecological and social reasons must be clearly defined
 - the breach level should be informed by quantitative, recorded measurements. Breaching at the appropriate levels will address the issue of sedimentation.
 - These should be clearly documented and communicated in the authoritative documents (in the MMP).
 - Breaching cannot occur at the Maphelane mouth as ruled by the high court in 2018
 - Lessons learnt from 2021/2022: (1) 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. (2) Not necessarily an exceptionally high berm (EWR) - extensive flooding and damage caused to infrastructure at this lake level. Annual flooding means that infrastructure will require regular maintenance and replacement.

Key recommendations - maintenance

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Clear the Msunduzi and beach channel of vegetation and sediment to allow water to flow freely from the floodplain to the mouth. This will assist with back-flooding of farms.

Maintain the dune – the dune builds up and is currently being stabilized with vegetation including two alien species i.e. *Casuarina* and *Tamarix*. Not only do these species draw on groundwater resources, these will also inhibit breaching in the future. This is also in line with the GEF recommendations which indicate that alien vegetation should be carefully removed.



Key recommendations - monitoring

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Biophysical

- iSimangaliso monitoring measures are virtually non-existent and reliant on Ezemvelo KZN Wildlife which has limited resources. The data currently being collected by EKZN are collected regularly and freely available. **This must continue.**
- Data collected are limited to bird, crocodile, hippo counts, water level, salinity and rainfall. **The GEF report details appropriate data to be collected and these recommendations should be strongly adhered to.**
- 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. Internal capacity and citizen science in monitoring - community involvement and empowerment.

Key recommendations - monitoring

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Socio-economic

- Currently non-existent although very important.
- 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 and there is a link between iSWP 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.

Key recommendations - communication

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Independent liaison

- This institution needs structure and dedication.
- The objective is to act as liaison between communities and parks but this liaison does not exist in the St Lucia and iSWPA context.
- Structure should ensure that capacity is developed to understand information across fields and communicate effectively to community stakeholders. To ensure proper representation of communities and community voices in engagements. To undertake policy advisory roles.

Key recommendations - communication

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iSimangaliso Wetland Park Authority

- 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 entities such as P and p and other stakeholder groups.
- Communication between the park and other stakeholders is not transparent, communications should be recorded and easily available.

Key recommendations - communication

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Researchers

- Conducting research in the context of application, not just for the sake of knowledge accumulation. An obvious lack of science communication around the St Lucia Estuary system.
- Ecology and hydrology – heavily researched over the last century but this information or understanding is not accessible 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 could be part of all future research agreements.**
- Gap between researchers and other stakeholders – increased conflict around this system. E.g. GEF recommendations misunderstood. Required accompanying material for dissemination to citizens. This will be achieved in close association with social scientists, educators, stakeholder representatives, park management and creators.
- Currently, funding applications include sections for science engagement and communication. These sections are generally under-utilized.
- Perhaps part of the research agreement with iSWP could include a clearly-defined section regarding reporting which will cover accompanying material for dissemination to non-technical stakeholder groups.

Future work

Catchment management

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- Urgent 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.
- 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.
- 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.

Future work

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Develop a comprehensive EWR

A thorough and updated investigation of water use and licenses should be conducted as part of a more comprehensive study.

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 and this directly impacts the breaching of the mouth.

Future work

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Develop guidelines for breaching management

- Within the IMP and MMP, 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.

Future work

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.
- UNESCO and Ramsar both mention the consideration of culture and heritage - not reflected in the communities surrounding the St Lucia system where perceptions regarding UNESCO are diverse and not always favourable.
- Management plans - public participation process is outlined but stakeholders express a feeling of distance. Does the EMP adequately account for social needs and does it accurately capture the diverse array of stakeholders during the public participation process?
- Multi-functionality of the system - Requires inter-disciplinary contributions from varied fields such ecology, social development, industry players, and policy makers

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Future work

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Investigate land use and authorization

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.

Future work

Investigation of artificial levees and canals

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- Technical Task Team suggestion – block 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.
- Longer route could provide 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.
- May help to address the back-flooding 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.

Future work

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Alternative livelihoods

- Easy to suggest alternative livelihoods but without the necessary engagement and co-investigation alongside affected stakeholders, it is not feasible to provide such suggestions – cannot always account for sense of ownership and belonging to a practice or a place
- The panel feels this is an area to be explored with a dedicated, interdisciplinary study.
- iSWPA strongly promotes commercial opportunities for community involvement and benefit - 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.

Concluding remarks

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- The breach was in line with the management plans, but we suggest that these plans account for the EWR, advisory reports such as the GEF report, and the social needs of the system.
- Although exceptional circumstances are currently unclearly defined, there were several circumstances of concern which all motivated for the breach.
- St Lucia can no longer be managed as an isolated system and activities in the catchments and floodplains should be considered when developing future management plans.
- St Lucia is dynamic and can function in a wide range of ecological states. However, monitoring will enable more adaptive management of such a system. This includes biophysical and socio-economic monitoring.
- Structured and transparent communication will be key for the future of this system. It will be a collaborative relationship, structured to facilitate knowledge transfer and create space for innovative solutions.

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