water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

2030 NDP
NATIONAL DEVELOPMENT PLAN
Our Future - make it work

CLASSIFICATION OF SIGNIFICANT WATER RESOURCES AND DETERMINATION OF RESOURCE QUALITY OBJECTIVES FOR WATER RESOURCES IN THE USUTU TO MHLATHUZE CATCHMENTS (WP11387)

RQO Workshop, Durban, 21 August 2023

ESTUARY RESOURCE QUALITY OBJECTIVES



Estuary Resource Quality Objectives

Lara van Niekerk

Resource Quality Objectives

Component	Eco Specification	Threshold of Potential concern
…		
Salinity	Salinity intrusion should not impact on biota	• Salinity >20 for longer than 3 months at 7 km upstream from mouth • Salinity > 10 above 16 km upstream of the mouth
Fish	Retain fish assemblages (abundance): • Estuarine species (30-40%) • Estuarine associated marine species (60-70%) • Indigenous freshwater species (<1%)	• Estuary associated marine species drops <50% of total abundance • Estuarine species >50% of total abundance • Occurrence of alien freshwater species in the estuary
……		

aMatigulu/iNyoni Estuary

PES:	B/C ↓	REC:	B	TEC:	B

Components that require interventions to halting downwards trajectory and achieving TEC:

The following non-flow interventions will result in restoration of estuarine floodplain and reduce agriculture impacts in the supratidal area of the system.

- Curb illegal fishing activities (i.e. gill netting of targeted species, illegal seine & cast netting) to improve nursery function and prawn abundance (bycatch). 4) Curb recreational activities in the lower reaches through zonation and improved compliance (i.e. development of Estuary Management Plan).
- Control/manage harvesting of *Juncus* and *Phragmities* to prevent overexpliotation (currently managed through a plan)
- Improve protection levels through Contracted Conservation on the North Bank. (Part of DFFE 30 x 30 Estuary Protection Priorities which include expanding uThukela MPA).
- Promote tourism (e.g. bird guides) to reduce impacts and provide benefits to community.
- Create interventions within catchment (agricultural best practise) and institute a buffer zone along river to improve the nutrient status and help with sedimentation issues.
- Remove invasive alien plant to improve baseflows to the estuary.

aMatigulu/Inyoni Estuary

Component/ indicator	Target EC
Hydrology	C
Hydrodynamics	B↑
Physical habitat (sediments)	B
Water quality (salinity)	A
Water quality (general)	D↑
Microalgae	B
Macrophytes	B
Invertebrates	B
Fish	B/C
Birds	B

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uMlalazi Estuary

PES:	B/C ↓	REC:	B	TEC:	B

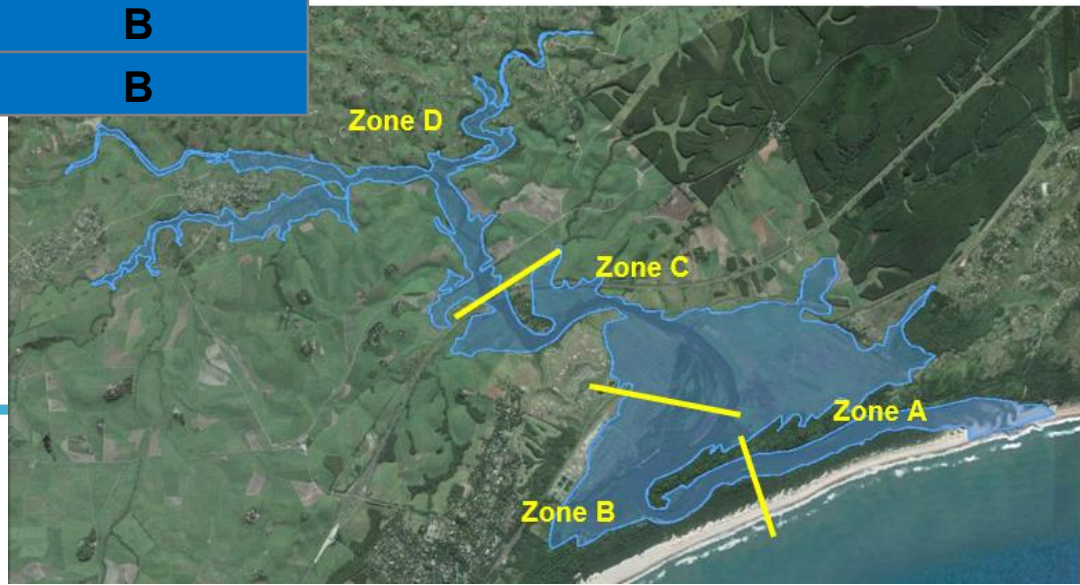
Components that require interventions to halt the negative trajectory and achieve TEC:

The following non-flow interventions will result in the restoration of the estuarine floodplain and reduce agriculture impacts in the supratidal area of the system.

- Deteriorating water quality represents a significant threat to the ecological functioning of the system, the risk is especially high during the closed state. No wastewater should be discharged into the system and agricultural best practices should be implemented to reduce nutrient-rich agriculture return flow. Address diffuse runoff from housing not on reticulation.
- Create interventions within a 500 m buffer zone to improve the nutrient status and reduce sediment inputs.
- Curb illegal fishing (gill netting of targeted species, seine & cast netting) impacting nursery function and prawns.
- Undertake restoration of the uMlalazi EFZ and reduce agriculture impacts in the supratidal area of the system. Rewild banks and restore gentle slopes where possible along the banks of estuary (investigate the option to remove hard structures of aquaculture facilities).
- Manage/control the harvesting of Juncus and Phragmites (plan in place)
- Curb recreational activities in the lower reaches through zonation and improved compliance (i.e. development of an Estuary Management Plan).
- Realign the protected area delineation with the EFZ to increase protection levels, including options for Stewardship/Contracted Conservation being undertaken on the North Bank. DFFE 30 x 30 Priority –
- Manage disturbance to birds (e.g. closed areas, boating controls such as speed zones), including control of vehicle access at the mouth and promoting tourism (bird guides etc.) to reduce impacts and ensure flow of benefits to the community.
- Remove/prevent sand-mining in the upper reaches.
- Maintain hydrological connectivity by ensuring that roads and bridges do not impact tidal and river flows.
- Remove invasive aliens in the catchment to safeguard base flows to prevent mouth closure for periods longer than six to eight weeks and also prevent the water levels from going beyond 4m mean sea level.

uMlalazi Estuary

Component/ indicator	Target EC
Hydrology	C↑
Hydrodynamics	B/C
Physical habitat (sediments)	B
Water quality (salinity)	B
Water quality (general)	D↑
Microalgae	C
Macrophytes	B/C
Invertebrates	B
Fish	B
Birds	B



iSiyaya Estuary

PES:	D/E↓	REC:	C	TEC:	D (Short term) C (Long-term

Restoration project needed to restore functionality and address the negative trajectory:

Short-term (1-2 years): Mechanical interventions are needed to restore estuarine functionality:

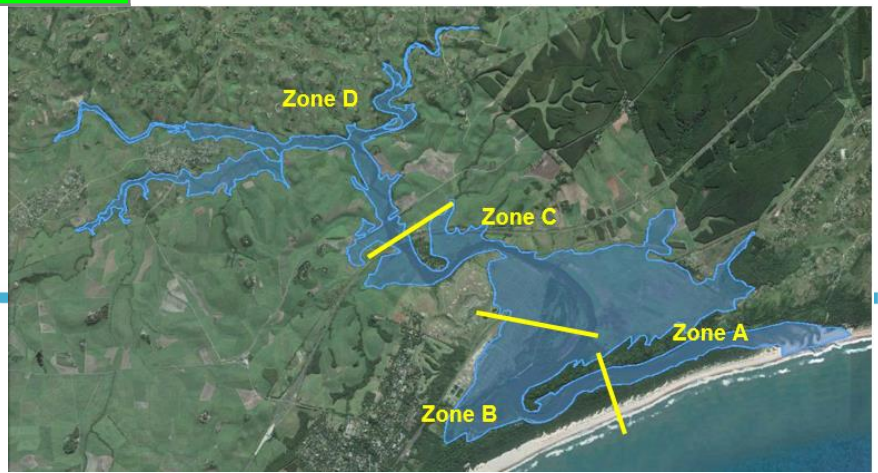
- Remove accumulated organic sludge through dredging of bottom substrate to improve water quality;
- Mechanical removal of reeds in lower reaches to increase open water area;
- Revegetate the dune at the mouth; and
- Develop an Estuary Mouth/Maintenance Management Plan, that considers mechanical removal of sediment that build-up at the mouth to allow for overwash recruitment when closed for long periods. This may also require deepening the estuarine channel and /or bringing the openwater area forward by removing marine sand at the mouth. (Also consider the natural northwards migration of mouth and the risk this entails for the submarine communications cables)

Long-term (3-10 years) Catchment-to-coast approach to:

- Restore the upstream riparian zone and remove alien vegetation to assist with restoring baseflows and act as turbidity and nutrient filters.
- Mitigate the impacts of mining by ensuring a 1 km buffer zone of riparian vegetation around the estuary to reduce the turbidity signal and sediment input from mining. (Forestry in and around the EFZ has removed the natural buffer capacity riparian vegetation provides.
- Reduce the direct impact of forestry on the estuary by instituting buffer zones around the estuary (e.g. 1 km zone), while over longer time scales baseflows should be restored by an overall reduction in forested areas in the catchment.
- Pioneer different footpaths to the beach further north to reduce the disturbance of birds.
- Increase fishing compliance as fishing pressure will escalate if fish communities recover.

iSiyaya Estuary

Component/ indicator	Target EC
Hydrology	C
Hydrodynamics	D↑
Physical habitat (sediments)	B
Water quality (salinity)	B
Water quality (general)	D↑
Microalgae	D ↑
Macrophytes	C
Invertebrates	C
Fish	D ↑
Birds	C



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iSiyaya Estuary

Component/ indicator	Target EC
Hydrology	C
Hydrodynamics	D↑
Physical habitat (sediments)	B
Water quality (salinity)	B
Water quality (general)	D↑
Microalgae	D ↑
Macrophytes	C
Invertebrates	C
Fish	D ↑
Birds	C

uMhlathuze Estuary

PES:	D↓	REC:	D	TEC:	D

The following non-flow interventions will result in halting downwards trajectory and maintaining TEC:

Short term: Key interventions needed to restore/protect this important nursery area (e.g., sharks, rays & economically important fish species):

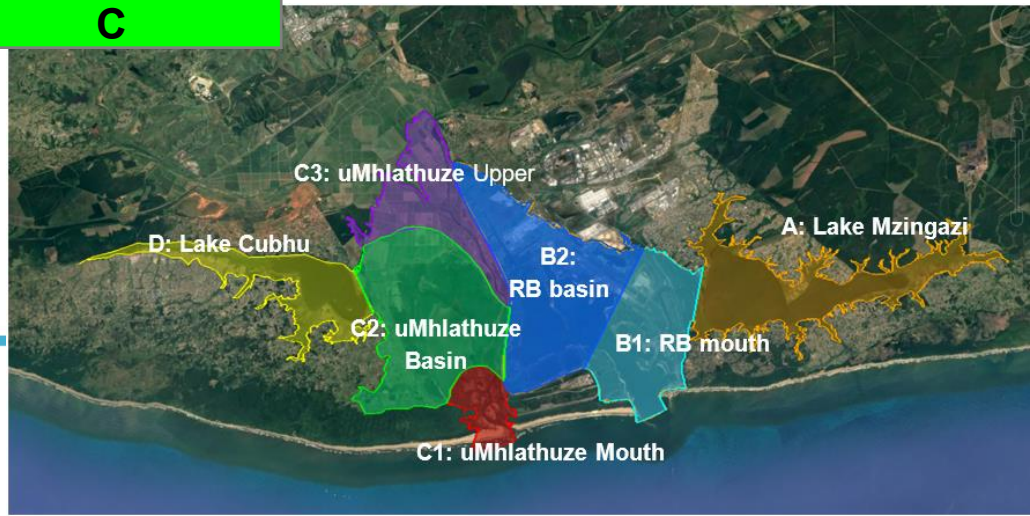
- Reduce very high fishing pressure (poaching and illegal gillnetting) by increasing compliance.
- Increase connectivity between lakes and downstream waters by reinstalling/installing functional fishways.
- Identify and protect areas in which the seagrass *Zostera capensis* reestablishment is occurring, and reestablish/restore this important habitat near the near yacht terminal.
- Improve access to uMhlatuze Estuary to allow for increased compliance, monitoring and research.

Long term:

- Develop bird tourism (will also improve access) that could provide livelihoods for local communities (e.g. Zululand Birding Route.)
- Halt/restore declining water quality by instituting formal reticulation for urban development and implementing agricultural best practices to reduce nutrient enrichment to estuary, lakes and port.

uMhlathuze Estuary

Component/ indicator	Target EC
Hydrology	C
Hydrodynamics	D/E
Physical habitat (sediments)	D
Water quality (salinity)	C/D
Water quality (general)	D
Microalgae	D
Macrophytes	D
Invertebrates	E↑
Fish	D
Birds	C



iNhlabane Estuary

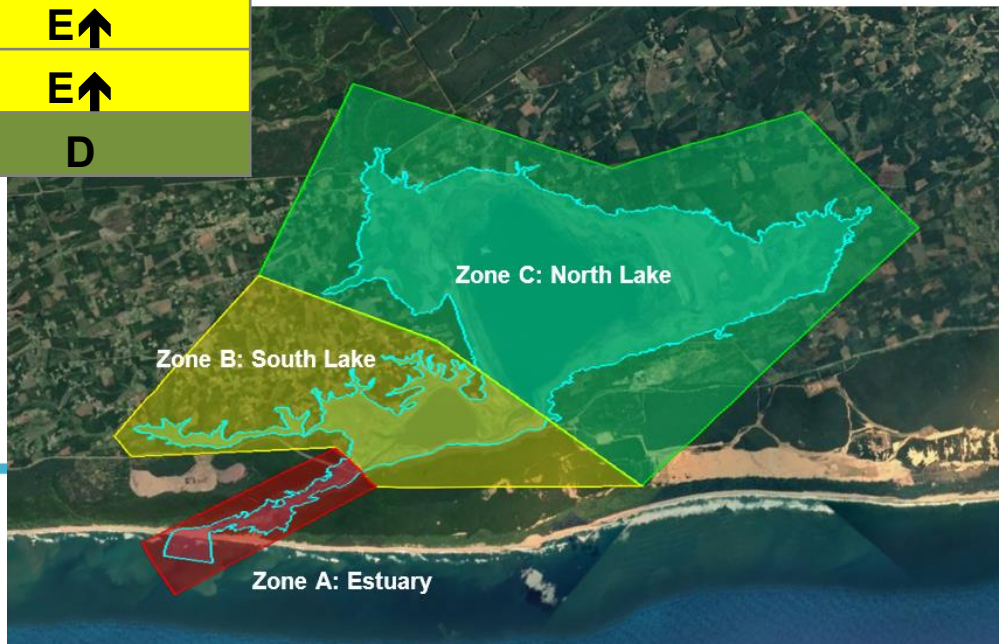
PES:	E	REC:	D	TEC:	D

The following non-flow interventions will result in halting the negative trajectory and maintaining TEC:

- Develop an Estuary Management Plan (requirement of the ICM Act) for the iNhlabane Estuarine Lake System to identify key actions and coordinate restoration efforts.
- Develop an Estuary Mouth/Maintenance Management Plan (EIA regulations) to facilitate artificial breaching of the 10m high berm at the mouth with earth-moving equipment.
- Remove accumulated organic sludge with earth-moving equipment/dredging from the bottom strata to improve water quality (i.e. oxygen levels) in the system. This key intervention will result in multiple benefits to the ecology;
- Prevent disturbance of riparian vegetation, including trampling, cattle, fire, & removal of alien vegetation.
- Ensure connectivity between the estuary and the various parts of the lakes. The current fishways are not functional. Increase connectivity between the estuary and various parts of the lakes by flow releases from the weir and possible reengineering of the fishway. Such flow release will also result in variable lake levels which will also benefit water birds in the lakes. Drawdown of the lakes should not be at levels that could separate North and South Lakes.
- Deteriorating water quality represents a significant threat, the risk is especially high during the closed state. No wastewater should be discharged into the system and agricultural best practices should be implemented to reduce nutrient-rich agriculture return flow. Address diffuse runoff from housing not on formal reticulation systems. Look into innovative ways to manage wastewater in this area, e.g. artificial reed beds. Proactive strategic planning is needed in the area to reduce the impact of future developments - for example, the disposal of waste is a key issue. Waste can not run into estuaries and lakes.
- Increase freshwater runoff to estuary and lakes through management/removal of wood lots.

iNhlabane Estuary

Component/ indicator	Target EC
Hydrology	D
Hydrodynamics	C/D
Physical habitat (sediments)	E
Water quality (salinity)	E↑
Water quality (general)	D
Microalgae	D
Macrophytes	C/D
Invertebrates	E↑
Fish	E↑
Birds	D



uMgobezeleni Estuary

PES:	B↓	REC:	A	TEC:	A

In addition to capping the groundwater utilisation, especially during drought conditions, the following non-flow interventions will result in halting downwards trajectory and achieving TEC:

- Urgent action is needed to create awareness of the importance of mangroves and protect this threatened ecosystem types (e.g., road through mangroves);
- Eradicate illegal gillnets in the lakes;
- Eradicate and monitor occurrence of alien invasive species, e.g. spotted bass *Micropterus punctulatus*;
- Prevent land use clearing in the estuary functional zone;
- Create interventions within a 500 m buffer zone to improve the nutrient status and reduce sediment inputs;
- Prevent removal of bark from mangroves and other trees;
- Maintain hydrological connectivity by ensuring that roads and bridges do not impact tidal and river flows;
- Prevent undue disturbance of birds.

- SWAMP Forest

uMgobezeleni Estuary

Component/ indicator	Target EC
Hydrology	B
Hydrodynamics	B
Physical habitat (sediments)	A/B
Water quality (salinity)	A
Water quality (general)	A
Microalgae	A/B
Macrophytes	B
Invertebrates	A/B↑
Fish	B↑
Birds	A

Kosi Estuary

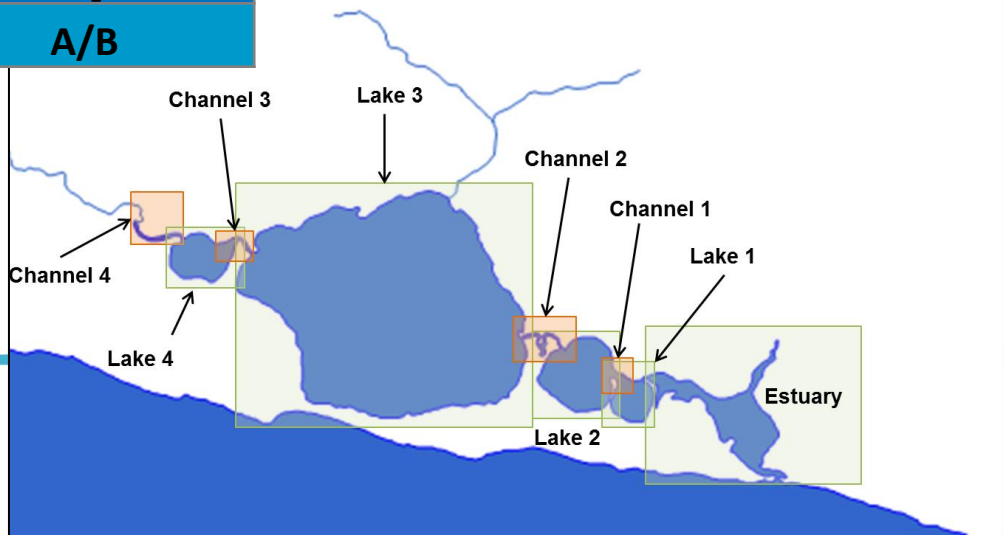
PES:	A/B↓	REC:	A	TEC:	A

In addition to capping the groundwater utilisation, especially during drought conditions, the following non-flow interventions will result in halting downwards trajectory and achieving TEC:

- Reducing plantations, that decrease the winter freshwater input;
- Maintaining the traditional subsistence fishery using traditional methods at sustainable levels (traditional methods refer to the back-facing traps and exclude gear such as diving masks and spear guns, augmented baskets (lined with nets) and gill nets);
- Control and monitor crab harvesting (presently uncontrolled and sold in Durban);
- Control resource utilisation of reeds, sedges, and mangroves through the introduction of rest areas;
- Control the burning of the flood plain, swamp forest and mangroves, e.g. education programme;
- Prevent land-use change and control the clearing and draining of the peatlands for gardening;
- Control the usage of DDT, herbicides and pesticides in the catchment (growing concern that the use of DDT and organic phosphates is having an impact because of their long resident time and vulnerability of the lake system); and
- Create a 2 km buffer around forestry where possible to protect groundwater.

Kosi Estuary

Component/ indicator	Target EC
Hydrology	A
Hydrodynamics	A
Physical habitat (sediments)	A
Water quality (salinity)	A
Water quality (general)	A/B↑
Microalgae	A
Macrophytes	A/B
Invertebrates	B↑
Fish	B↑
Birds	A/B



St Lucia/uMfolozi Estuary

PES:	D ↓↑	REC:	B	TEC:	C (Short term) B (Long-term

Restoration project needed to restore functionality and address the negative trajectory:

- Cap minimum discharge in the Mfolozi at 3 m^3/s to maintain an open mouth,
- Ensure a combined Mfolozi/Mkuze drought discharge of 5 m^3/s (including an additional 1.6 m^3/s in Mkuze); and
- Improve the water quality coming from the Mkuze catchment.

Non-Flow interventions include:

- St Lucia/uMfolozi should have a single mouth and manipulation of the mouth (artificial breaching or closing) kept to a minimum;
- Restore low-lying areas of the iMfolozi floodplain to natural vegetation to allow for natural processes (e.g. carbon sequestration, mouth closure) focusing on the low-lying areas that was exposed during drought and now cultivated).
- Reduce sediment input from catchment (improve agricultural practises & facilitating inundation of low-lying areas on floodplain exposed during drought and now cultivated).
- Remove alien vegetation around the Lake, estuaries and rivers;
- Limit further natural deforestation such as in the Dukuduku Forest;
- Eradicate illegal gillnetting from the system to improve nursery function (export fish to coastal fishery (recreational and artisanal);
- Eradicate and monitor occurrence of alien invasive species (plants, inverts and fish);
- Prevent urbanization in the catchments feeding directly into the Lake and the Narrows;
- Reduce commercial forestation in the lake catchments to increase low flows as much as possible;
- In the uMfolozi River catchment, land care practices should focus on the most critical sub-catchment areas to limit future erosion and land degradation which could further reduce low flows;
- Illegal river abstractions on especially the Mkuze and uMfolozi Rivers must be eliminated.

St Lucia/uMfolozi Estuary

Component/ indicator	Target EC
Hydrology	C
Hydrodynamics	C
Physical habitat (sediments)	C
Water quality (salinity)	D
Water quality (general)	D
Microalgae	D → C
Macrophytes	B
Invertebrates	D
Fish	C
Birds	C