INKOMATI-USUTHU

CATCHMENT MANAGEMENT AGENCY

CATCHMENT MANAGEMENT STRATEGY

2021 - 2026

Final Revised Version 2.0

March 2021

EXECUTIVE SUMMARY

The Catchment Management Strategy (CMS) represent the five (05) year strategic plan developed for the Inkomati-Usuthu Catchment Management Agency (IUCMA) for implementation in the period 2021 to 2026.

Section 80 (c) of the National Water Act (Act No 36 of 1998) mandates a Catchment Management Agency (CMA) to coordinate the related activities of water users and water management institutions within its Water Management Area (WMA). Chapter 8 of the National Water Resource Strategy (NWRS)-2 supports the establishment of Catchment Management Forums (CMFs) to promote, improve and strengthen a value-driven and integrated approach to water resources management at local water management areas.

The process of CMS developed involved extensive stakeholder consultation from the Visioning Process (development of the Vision, Mission and Values) to the finalization of the report.

The CMS of the IUCMA was developed internally where the management conducted stakeholder consultation process and made inputs into the technical reports related to the description of the WMA.

The Governing Board of the IUCMA further engaged the WMA stakeholders on the CMS during the tariff and APP consultation process.

During the engagement of the stakeholders the issues raised were encouraging, however the past historical imbalances and the availability of water for the Historically Disadvantaged Individuals (HDIs) was raised as a critical issue that stakeholders indicated as a strategic need to ensure that there is Water Allocation Reform (WAR) in line with the constitutional imperative of redress and the spirit of the Act that focusses on equitable access. Most of the population within the WMA historically belonged to the former homelands where there were no rights afforded to them. Thus, within the instruments in place to implement WAR, the HDIs have to struggle for the remaining allocation in an already constrained resource within a semi-arid country where the major rivers flow away from the WMA towards the neighbouring countries.

In this regard, the challenge in the face of the IUCMA is the overallocation and reliance of water users on surface water resources which is unsustainable into the future. This is because most of the allocation is earmarked for the Reserve, International Obligations, Strategic Water uses (transfers out of the catchment) and irrigated agriculture (the major water user). There is also, unauthorised water use which is exacerbated by the incomplete Verification of Existing Lawful Water Use (ELUs) project. The disproportionate precipitation (temporally and spatially) and the limited storage within the Crocodile catchment (supplies the capital city of Mpumalanga Province, and must support the economic development within the Mpumalanga Province and linkage between the South African economic hub of Gauteng Province and the neighbouring countries of Republic of Mozambique and the Kingdom of eSwatini) further places constraints on the surface water resources. Thus, the

investigation into the potential for development of the groundwater resources for future use must be prioritised together with the water use efficiency and the compulsory licensing.

The negative water quality impacts emanating from old and poorly managed domestic wastewater infrastructure, mushrooming informal settlements along the watercourses, poor solid waste management by local government within the trust lands, mining effluents, and diffuse pollution from agricultural use pose a risk to human health and economic activity for the WMA that is mainly reliant on agriculture and tourism. The situation is exacerbated by the fact the IUCMA being a catchment - based institution, not covered within the Intergovernmental Relations Framework (IGR) and nor strategically represented at the different spheres of government (Local, District and Provincial). This tide has however, changed during the time of COVID-19 pandemic as the IUCMA participated fruitfully within the Provincial and District Municipality Command Centres due to a recognition of its integral role in the management of water related disasters such as drought and floods.

As a Transboundary WMA, the IUCMA participation at the Tri-Partite Technical Committee (TPTC) of the Inco-Maputo Basin is crucial to ensure that the up-stream obligations towards downstream users (Kingdom of eSwatini and Republic of Mozambique) are met. This was recently implemented through invitation by the Department of Water and Sanitation (DWS). It is hoped that future interventions will see the IUCMA participating fully in support of the mandate of the DWS on behalf of the Minister of Human Settlements, Water and Sanitation.

Thus, in the next five years, the Vision of the IUCMA and its stakeholders is to see transformation that translate to WAR so that there is socio-economic benefit derived by all within the WMA. The process of Land Restitution has seen portions of land with water rights being returned to the rightful HDI owners. However, there is limited support available to communities, and this has translated to previously economically beneficial commercial farms lying fallow. The IUCMA seeks to collaborate with other Sector departments including Department of Agriculture, Provincial and District Municipality Economic Development to strategically intervene and ensure that the farms return to their former glory of contributing to food security, jobs and community socio-economic conditions improvement.

The disregard for compliance by many users including the unauthorised river sand mining creates long-term negative impacts which may see the desertification of the rivers in future. This requires a concerted effort of the IUCMA and sector departments such as the Department of Mineral Resources (DMR) and Department of Environmental Affairs (DEA) as well as the House of Traditional leadership cooperating to ensure there is sustainable and responsible mining of river sand which has a socio-economic benefit without threatening the sustainability of the water resources and subsequent non-compliance to the International Obligations.

The Publication of this CMS will forge a compact between the IUCMA and its stakeholders for sustainable water resources management within the next five years.

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ACRONYM	DESCRIPTION
APP	Annual Performance Plan
ARA-Sul	Aqua Regional Association- South (Mozambique)
CMA	Catchment Management Agency
CME	Compliance Monitoring and Enforcement
CMF	Catchment Management Forum
CROCOC	Crocodile River Catchment Operations Committee
DEA	Department of Environmental Affairs
DSS	Decision Support System
DMR	Department of Mineral Resources
DWS	Department of Water and Sanitation
EIA	Environmental Impact Assessment
EMPR	Environmental Management Programme Report
EWSETA	Energy Water Sector Education Training Authority
EXCO	Executive Committee
GA	General Authorisation
GB	Governing Board
HYDSTRA	Surface Hydrology Information System
IUCMA	Inkomati-Usuthu Catchment Management Agency
IBWiWC	Incomati Basin Women in Water Conference
IT	Information Technology
KJOF	Komati Joint Operations Forum
NWA	National Water Act, Act 36 of 1998
OHS	Occupational Health and Safety Act, Act 85 of 1993
PFMA	Public Finance Management Act, Act 1 of 1999

ACRONYM	DESCRIPTION
REMCO	River and Environment Management Corporation
RMC	Risk Committee Meeting
REMP	River Eco-status Monitoring Programme
SAHRC	South African Human Rights Commission
WAP	Water Allocation Plan
WAR	Water Allocation Reform
WMA	Water Management Area
WUA	Water Users Association
WULA	Water Use Licence Application

ACKNOWLEDGEMENTS

The Governing Board and Management of the IUCMA wishes to acknowledge and thank the stakeholders within the WMA for their continued support and participation during the compilation of this CMS. The following list is non-conclusive stakeholders:

- Minister of Human Settlements, Water and Sanitation
- Department of Water and Sanitation
- Catchment Management Forums
- National Sector Departments
- Provincial Sector Departments
- Local and District Municipalities
- Mpumalanga Tourism and Parks Agency
- Communities
- Water users
- Irrigation Boards
- Staff of the IUCMA
- Komati River Basin Water Authority
- Ara-Sul (Republic of Mozambique)
- Department for Water Affairs (Kingdom of eSwatini)
- Dutch Water Authorities

1 INTRODUCTION AND BACKGROUND

1.1 Establishment

The Inkomati-Usuthu Catchment Management Agency (IUCMA) is a water resource management authority established in terms of section 78 of the National Water Act, (Act 36 of 1998; NWA), to perform water resource management at local level within the Inkomati-Usuthu Water Management Area (WMA). The management of resources entails protection, use, development, conservation, management, and control of water resources within the WMA as contemplated in the NWA. It is listed as a national public entity under Schedule 3A of the Public Finance Management Act, Act 1 of 1999 (PFMA). Thus, IUCMA must comply with the PFMA.

1.2 Legislative Framework

The establishment of the CMA is as detailed in Chapter 7 of the NWA. Part 1 of Chapter 7 details the process pf establishment and the powers and functions of a CMA. The IUCMA was established in terms of section 78 of the NWA. In terms of section 79 of the NWA, a CMA is a body corporate having the powers of a natural person, except those by nature only attached to a natural person or are inconsistent with the NWA. In terms of Chapter 4 of the NWA, the IUCMA Governing Board was appointed and the IUCMA Governing Board has duly established the Executive Committee and the Audit Committee.

1.3 Powers and Functions of the CMA

The inherent functions of a CMA in terms of section 80 (a) to (e) of the NWA are the following:

a) To investigate and advise interested persons on the protection, use, development conservation, management, and control of the water resources in its WMA. *Although, the control of the water resources is a function to be delegated by the Minister in terms of Schedule 3 of the NWA,* the IUCMA collaborates with the DWS and key stakeholders to ensure there is sustainability in the management of the water resources within the WMA.
b) To develop a Catchment Management Strategy (CMS). *The IUCMA developed the first-generation CMS post establishment in the year 2010. This report is the second-generation CMS established to guide the management of the water resources within the next five years and to take stock of the progress of implementation of the first-generation CMS.*
c) To coordinate related activities of water uses and the establishment of the water management institutions within its WMA. *Currently, the IUCMA has established Catchment Management Forums (CMF) which comprise of stakeholders per catchment that hold each other accountable on the issues related to the management of the water resources. There are also, 21 Irrigation Boards (IB) within the WMA which still perform the function of managing the bulk allocation. The process of IB disestablishment commenced in 2015/ 16 but has not yet been finalised by DWS on behalf of the Minister. There are also a few Water User Associations (WUA) established within the WMA. However, these are defunct and require to be revived to ensure that they comply with the NWA requirements. Thus, a process of disestablishment of IB and establishment of the WUA, has recently commenced. From a technical point of view, the IUCMA has looked at the WMA and proposes the establishment of at least 10 WUA in order to amalgamate the IBs to effect the spirit of the NWA to ensure that there is full representation of HDIs. The key objective is to ensure that equitable access to water and redress is effectively implemented.*

d) To promote coordination of its implementation with the implementation of any applicable development plan established in terms of the Water Services Act (Act 108 of 1997). *The IUCMA to date has an existing Memorandum of Understanding (MoU) with the City of Mbombela, Bushbuckridge Local Municipality, the Komati Basin Water Authority (KOBWA), and the University of Mpumalanga which are critical to the implementation of development plans. The IUCMA further actively engages with the House of Traditional Leadership and the Department of Cooperative Governance and Traditional Affairs (COGTA). This has enabled the IUCMA to effectively participate in the conceptualisation of developmental plans of the Mpumalanga Province, District Municipalities, and Local Municipalities. These plans form an integral part of the Water Allocation Plan (WAP) for an effective redress and equitable allocation of water resources.*

e) To promote community participation in the protection, use, development, conservation, management, and control of the water resources in the WMA. *Through the CMFs and river operations committees, the IUCMA has ensured public participation of key stakeholders and communities with interest in the management of water resources.*

1.4 Mandate of the IUCMA

The following activities are implemented by the IUCMA as part of its mandate, either through the inherent functions of the delegated functions as stated in section 80, or as other existing powers and functions in terms of sections 79, 19, 20, 25(1), 57(2), 60(2), 124(1) and 2 and 145 of the Act. These delegations are in line with delegations of 3 July 2018 by the Responsible Authority.

ACTIVITIES	**NWA REFERENCE**
Prevention and remedying of water resource pollution	***Section 19***
Management of emergency water resource pollution incidents	***Section 20***
Surrendering an entitlement to facilitate a particular application.	***Section 25(2 and 3).***
Assessment of water uses as part of the Water Use Authorisation Application	***Section 21***
The verification of Existing Lawful Water Use (ELU)	***Sections 33 and 35***
Administrative function of the water use authorisation for recommendation to the Responsible Authority	***Section 40***
Compulsory licence application	***Section 43***
Late applications	***Section 44***
Proposed Allocation Schedules and Preliminary Allocation Schedules	***Sections 45 and 46***
Publishing a *Gazette* stating that a preliminary allocation schedule has become a final allocation schedule	***Section 47***
Procedure for earlier renewal or amendment of licence condition	***Section 52***
Rectification of contraventions	***Section 53***
Implementation of the inherent functions	***Section 80***
Appointment of authorised persons to implement inspections related to compliance with the NWA which *include inspections related to compliance with the NWA*	***Section 125***
Make information available to the public in terms of Chapter 14 Part 3, section 145 regarding floods, droughts, failing or potentially failing water works, risks post by dams, levels of flood water, risks posed by water quality to life, health or property and any other matters the public needs to know.	***Section 145***

1.5 Funding of the CMA

The sources of funding of a CMA in terms of section 84 of the NWA are:

- Money appropriated by Parliament.
- Water use charges.
- Money from any other lawful sources.

1.6 Institutional Arrangements

The IUCMA has the following institutional arrangements as part of Legislative framework with the Responsible Authority/ Minister (Figure 1) and other stakeholders (**Error! Reference source not found.**).

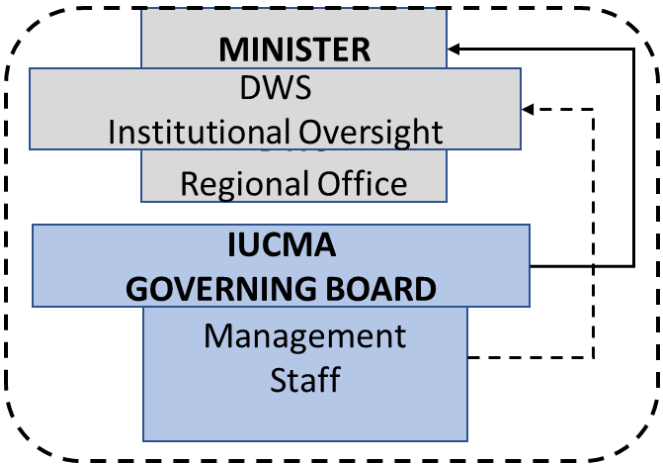


Figure 1: Institutional arrangements with the shareholder (Minister of Human Settlements, Water and Sanitation).

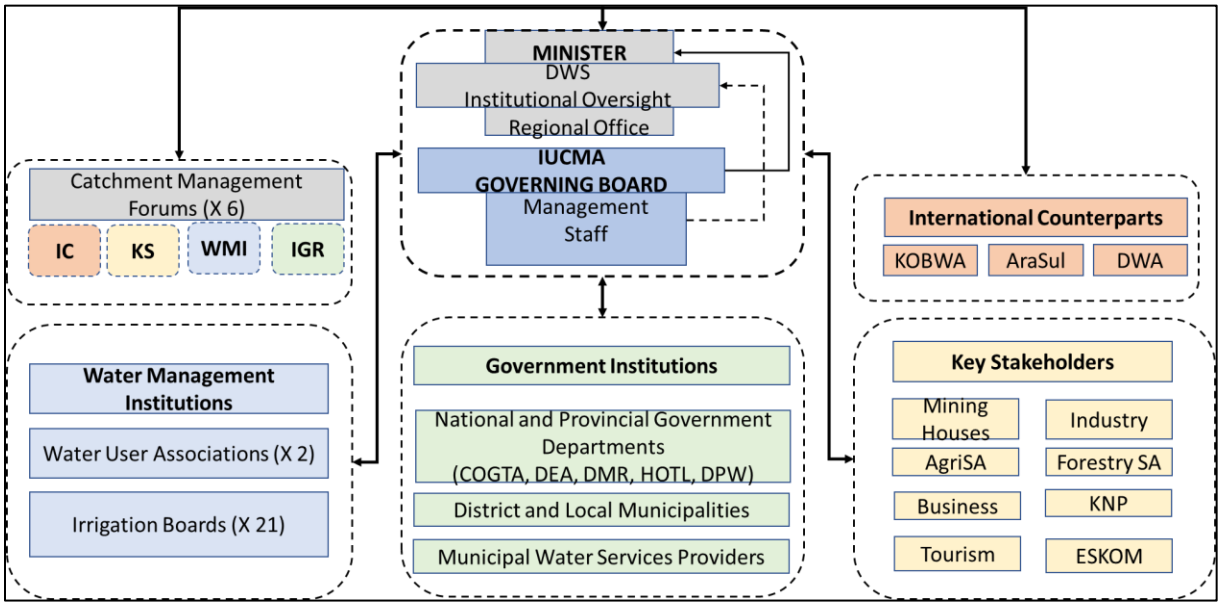


Figure 2: Institutional arrangements as part of the stakeholder engagement plan

1.7 Catchment Management Strategy (CMS), Review and Update

The IUCMA embarked on a process of reviewing and updating the CMS which is a legislative requirement in accordance with the NWA. The process is being conducted in-house without the support/services of a consultant and has been ongoing since the 2017/18 financial year. Delays of the process include the previous undertaking by the DWS to redefine the CMAs to a single CMA. However, the consultative process with the stakeholders took place in 2018. This process is an amalgamation of the external inputs, technical status quo reports and to develop a draft document for the approval of the Governing Board to go out on a further consultation process. The CMS is developed for a five-year period to coincide with the development of the five-year corporate plan as per the government planning cycle.

The review and update cover the following:

- The inclusion of the Usuthu catchment into the former Inkomati WMA to form the Inkomati-Usuthu WMA.
- The Water Resource Class and Resource Quality Objectives (RQOs) of Inkomati catchment as gazetted in December 2016.
- Current and future needs of water users and other stakeholders.
- The incorporation of the 2016 Usuthu Water Availability Assessment Study (UWAAS).
- The Validation and Verification data for the Inkomati and Usuthu catchments.
- The Water Allocation Reform (WAR) requirements and Water Allocation Plan (WAP) for the WMA.
- The localised economic development needs for rapid urbanisation, agriculture and tourism.
- Financial model for the IUCMA.
- Possible alternative revenue resources.

2 OVERVIEW OF THE WATER MANAGEMENT AREA (WMA)

The IUCMA is geographically wholly located within Mpumalanga Province and covers three (3) Districts- and eight (8) local municipalities. Two of the local municipalities (LMs) namely Msukaligwa and Emakhazeni are cross-boundary, falling into other WMAs. The most part of Msukaligwa and Emakhazeni fall within the Upper Vaal and the Olifants WMAs, respectively.

The Inkomati-Usuthu WMA is one of nine (9) WMAs in South Africa. The WMA of approximately 36 256 km^2 is divided by the Great Escarpment (which runs roughly along the Graskop, Sabie, Nelspruit, Barberton axis) into the western plateau and the sub-tropical Lowveld in the east. This affects the rainfall pattern, showing a generalised West-East gradient, with the Westerly mountainous regions receiving as much as 1 200 mm/ yr and the Eastern-most areas as little as 400 mm/yr. Due to the rivers flowing into Swaziland (Usuthu River) and Mozambique (Inkomati River), the IUCMA is of a transboundary nature and forms part of the Incomati International River Basin shared between the Republic of Mozambique, the Kingdom of eSwatini and the Republic of South Africa (**Error! Reference source not found.**).

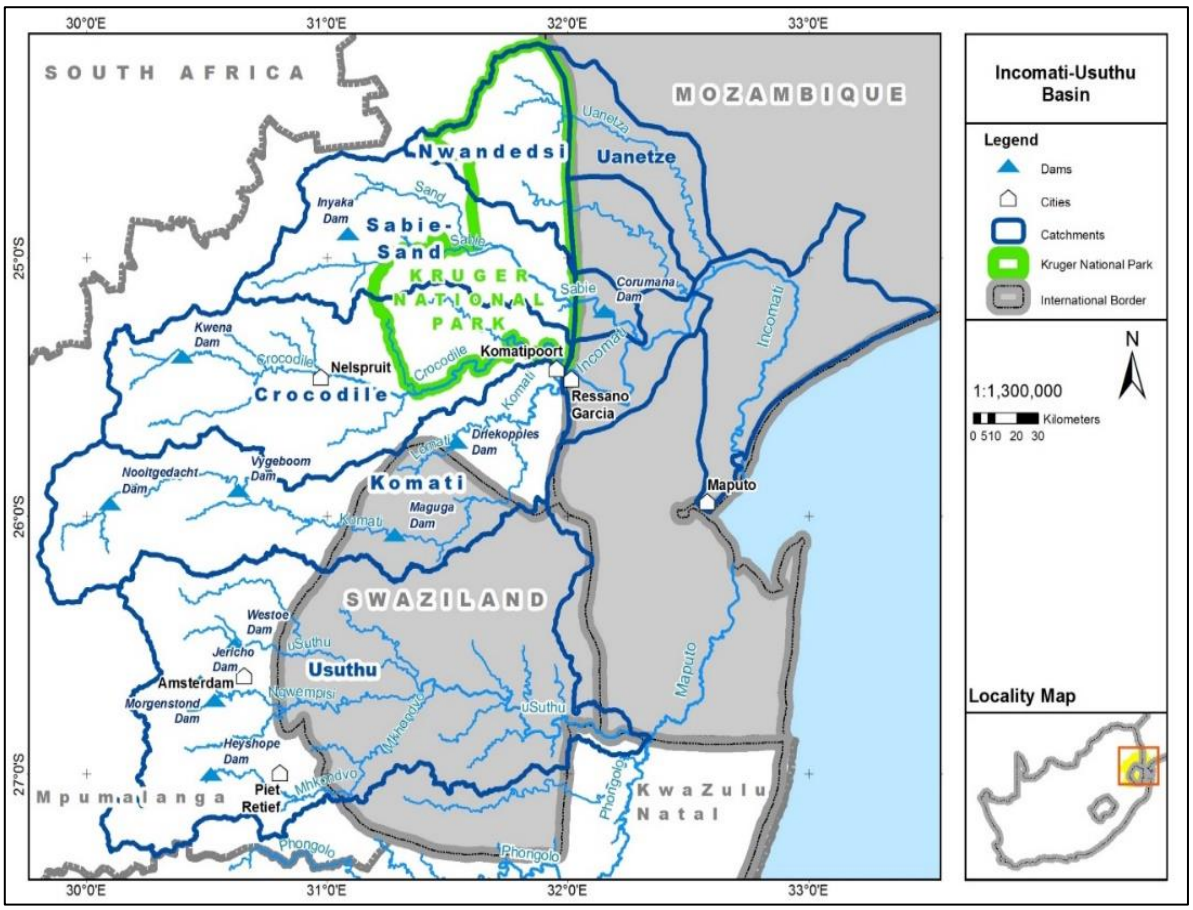


Figure 3: The IUCMA Water Management Area indicating the transboundary location.

As a result, the Inkomati- Usuthu WMA has International Obligations, in terms of the quality and quantity of water that flows across to the neighbouring countries. The existing agreements between

South Africa, Mozambique and Swaziland are documented in the Tripartite Permanent Technical Committee (TPTC) Interim Agreement between the Republics of Mozambique and South Africa as well as the Kingdom of eSwatini for co-operation on the Protection and Sustainable Utilisation of the water of the Incomati and Maputo Water Sources (TPTC, 2002).

The WMA has four (4) main rivers which subdivide the WMA into four (4) main catchments, namely Sabie/Sand, Crocodile, Komati and Usuthu (Figure 4**Error! Reference source not found.**). The WMA comprises of three (3) district municipalities and ten (10) local municipalities with varying population.

Figure 4: The IUCMA WMA indicating the four main catchments.

2.1 Sabie-Sand Catchment

The summary representation of the Sabie-Sand catchment is tabulated and presented in Figure 5.

ITEM	DESCRIPTION
Area	9 304 km^2
Towns	Bushbuckridge, Thulamahashe and Acornhoek Sabie and Graskop
Key economic activities	Forestry, irrigation, and eco-tourism
Water requirements	Domestic use, irrigation, and eco-tourism
Water storage infrastructure	Inyaka Dam, Transfers pipeline from Sabie to Sand catchment, Da Gama
Key challenges	Lack of adequate storage and maintenance of weirs in the sand catchment

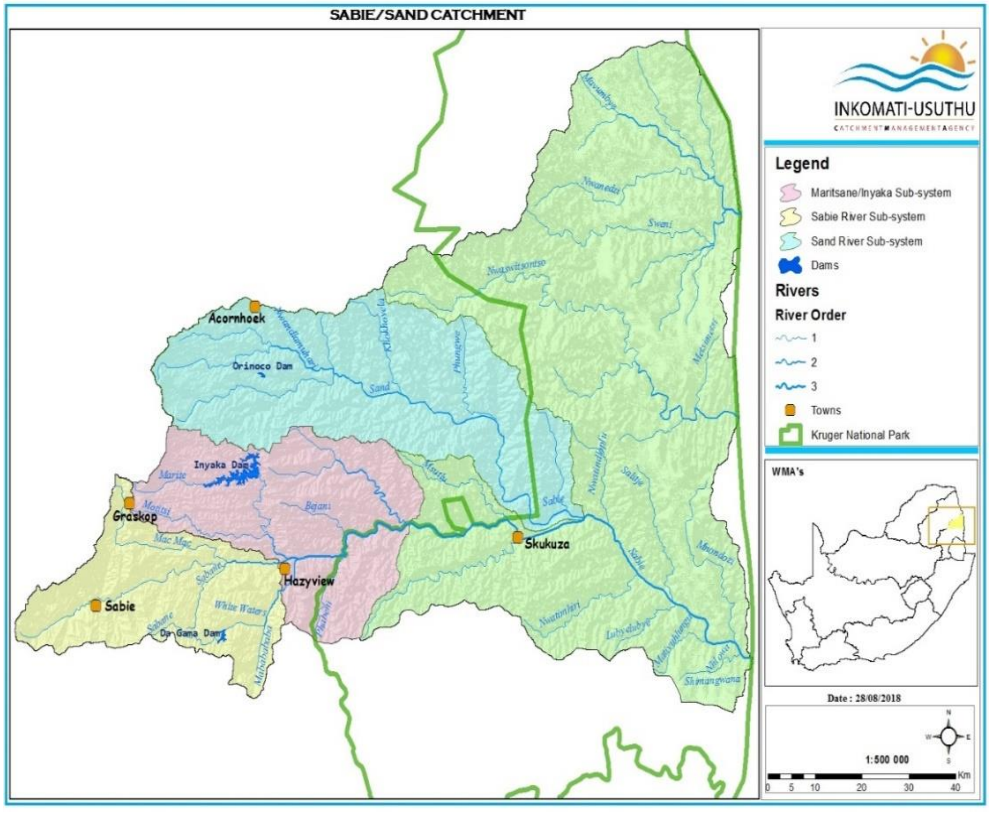


Figure 5: Sabie-Sand catchment map.

The relatively small amount of forestry in the Upper Sand is being rehabilitated to indigenous vegetation and should increase water availability in the Sand sub-area where water requirements exceed water availability.

2.2 Crocodile Catchment

The summary representation of the Crocodile catchment is tabulated and presented in Figure 6.

ITEM	DESCRIPTION
Area	10 446 km^2
Towns	Dullstroom, Machadodorp, Nelspruit, Barberton, White River, Malelane, Komatipoort
Key economic activities	Forestry, irrigation, and industry
Water requirements	Domestic use, irrigation, paper, and sugar mills.
Water storage infrastructure	Kwena Dam, Witklip, Lomati, Klipkopjes, Primkop, Longmere
Key challenges	Lack of adequate storage to support the catchment economic activities including the increased international obligations to Mozambique

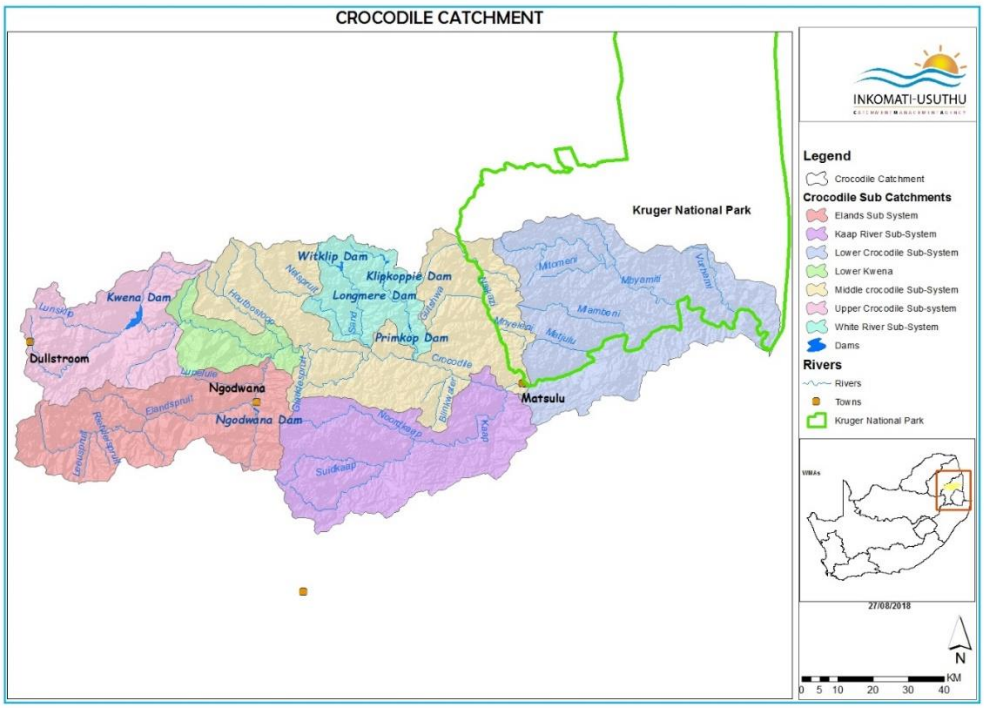


Figure 6: Crocodile catchment map.

The Sappi paper mill at Ngodwana and the sugar mill at Malelane are the main industrial water users. Most of the water available in this catchment is linked directly to the rainfall patterns resulting in highly variable water availability with most of the runoff occurring far upstream of the major demand nodes. Currently, the water requirements exceed availability, and the catchment is stressed. The water-stressed situation in the Crocodile catchment is quite serious, given this sub-catchment's

potential for economic growth. The Crocodile catchment is also an International River which feeds the International Obligations that South Africa must meet with regards to Mozambique. This stress can be relieved by pursuing the existing potential for further catchment dams.

2.3 Komati Catchment

The summary representation of the Komati catchment is tabulated and presented in Figure 7**Error! Reference source not found.**.

ITEM	**DESCRIPTION**
Area	8 621 km^2
Towns	Nkomazi, Carolina and Elukwatini
Key economic activities	Inter-basin transfer to supply strategic water for Eskom. Forestry and irrigation.
Water requirements	Domestic use, irrigation, and eco-tourism
Water storage infrastructure	Vygeboom and Nooitgedacht Dams in the Upper Komati. Maguga Dam in Swaziland and the Driekoppies Dam in Lower Komati.
Key challenge	Growth in domestic water demand in the Lower Komati and increase in international obligations to Mozambique

The Upper Komati sub-catchment water resources strategic importance is reserved by the National Water Resources Strategy (NWRS, 2013).

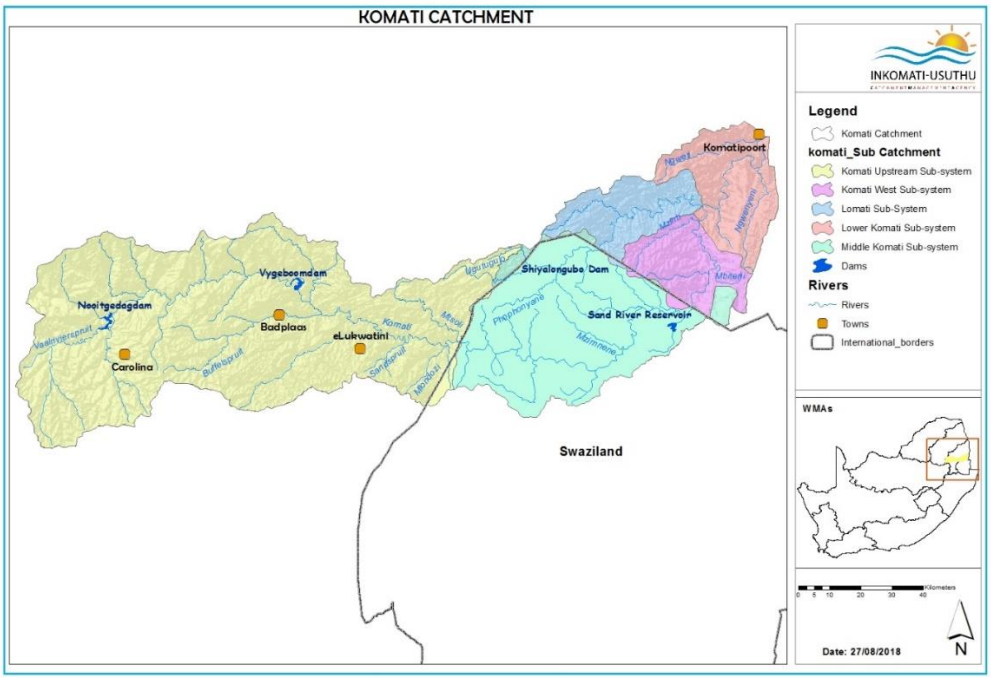


Figure 7: Komati catchment map

Considerable expansion of irrigated areas in the Lower Komati has led to stress on the water resource, but there has been successful development of several emerging farmer enterprises, and the related construction of the Komati sugar mill. A breakdown of the current water use authorisations shows that a large percentage of allocations go to emerging farmers. However, there is a huge demand for additional water use by emerging farmers as well as domestic water requirements and insufficient water availability to meet that demand.

2.4 Usuthu Catchment

The summary representation of the Usuthu catchment is tabulated and presented in Figure 8.

ITEM	DESCRIPTION
Area	7 785 km^2
Towns	Chrissiesmeer, Piet Retief and Mkhondo
Key economic activities	Inter-basin transfer to supply to Vaal and Komati WMA, strategic water for Eskom, SASOL Secunda Complex and third-party users as well as forestry and some irrigation.
Water requirements	Domestic use, strategic use, and forestry
Water storage infrastructure	Heyshope, Jericho, Morgenstond, Westoe
Key challenge	Extensive forestry and urban development

There is a complex water supply system of dams, pumping schemes, diversion weirs, canals, pipelines, and inter-basin water transfer schemes.

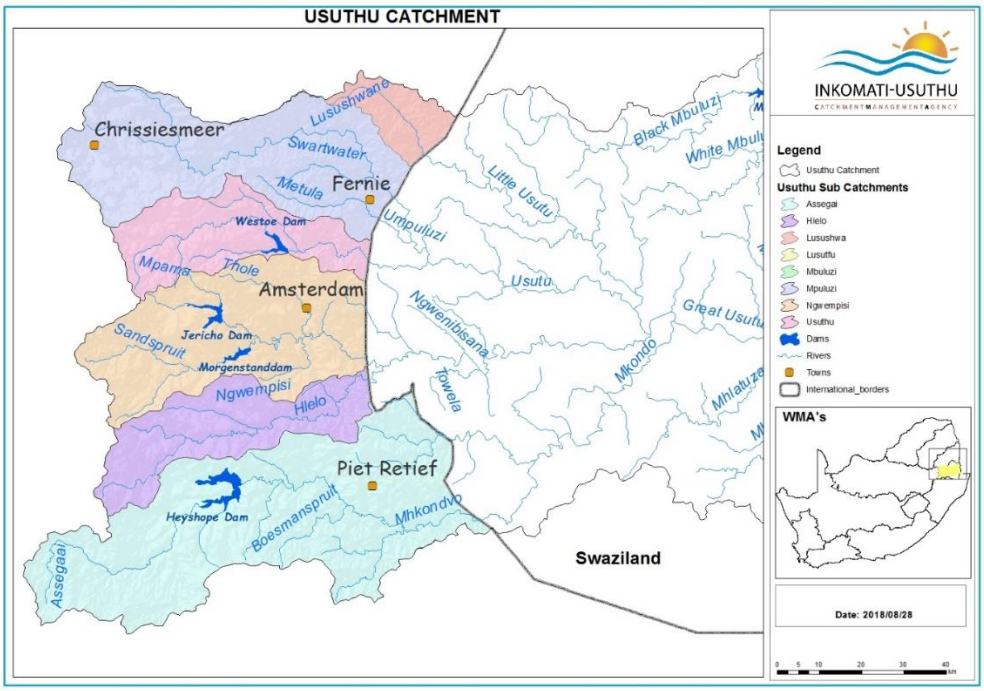


Figure 8: Usuthu catchment map.

The only significant in-basin use is afforestation with an estimated area of 1 930 km^2 situated downstream of the major dams in this catchment with insignificant impact on the yield of these dams. Irrigation is limited to an area of only 27 km^2.

3 SITUATION ASSESSMENT

3.1 Hydrological overview

The Inkomati-Usuthu WMA is marked with seasonality of rainfall with wet summers and dry winters. This is also variable over longer periods with changes in rainfall seen from year to year and longer time scales. Most of the water demand is in the lower, drier, and hotter parts of the WMA where there is little rainfall and runoff. These factors create complexity and an unstable situation for the economy of the region, which is reliant on the availability of water and makes the proper management of the river flows very important. To adequately manage the high variable rainfall and scarce water resource in the WMA, the IUCMA has installed 25 near real-time rainfall gauges and 28 river flow gauges (Figure 9).

Figure 9: Inkomati-Usuthu hydrological monitoring map

The average cumulative rainfall trends (Figure 10) for the catchments shows that the rainfall is declining over years from 2009 to 2018 and it is important to recognise the importance of climate change.

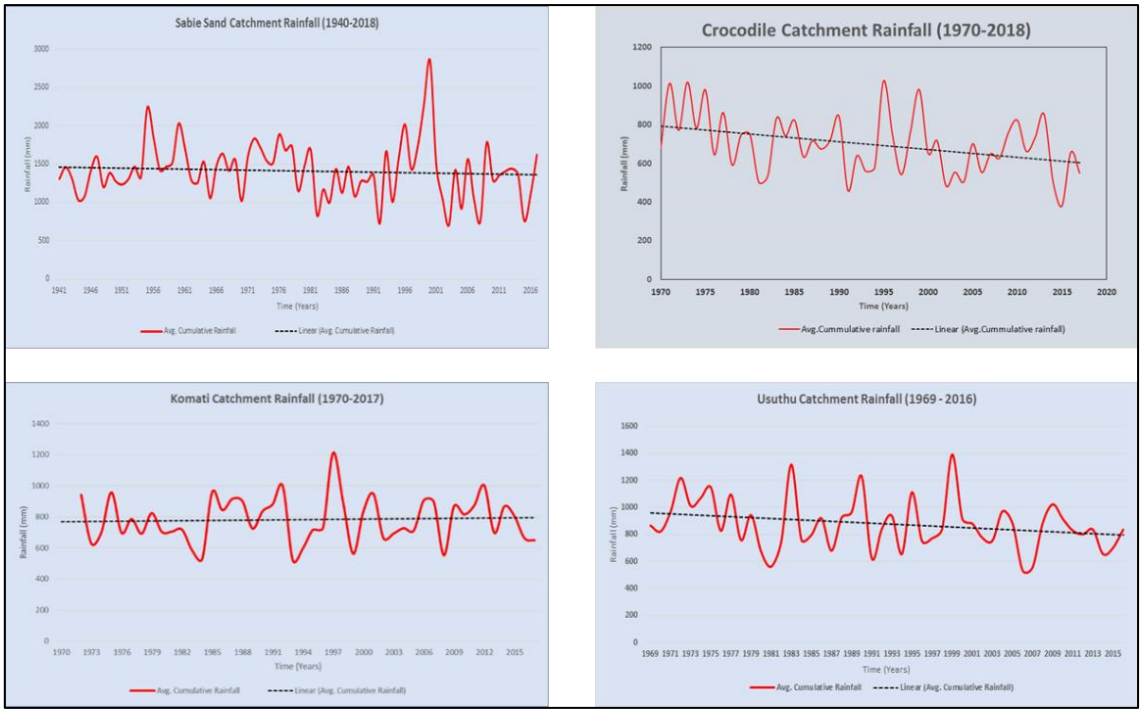


Figure 10: Rainfall trends for each sub-catchment

3.2 Land use within WMA

The Inkomati-Usuthu WMA is characterised by irrigated agriculture (including commercial and emerging farmers), extensive afforestation, strategic water use, international and ecological water requirements as well as significant urban, rural and industrial users (Figure 11).

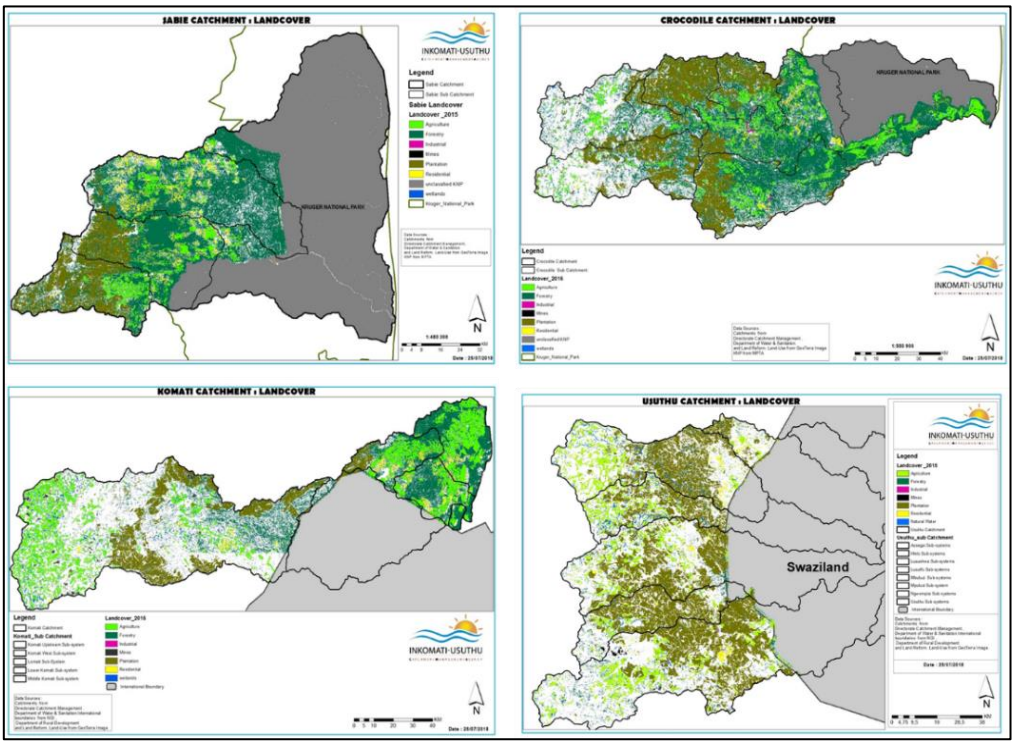


Figure 11: Characterisation of land use per catchment within the WMA.

Ecological Importance

Approximately 37% of the Kruger National Park (KNP) is situated in the Inkomati-Usuthu WMA, and along with many other important nature reserves, underline the importance of providing water to aquatic ecosystems. To sustain this regional economy and ensure the creation of jobs for the community it supports, it is very important that the natural environment is carefully managed, and its resources are allocated to the benefit of all the water users in the WMA.

International Obligations

The Sabie, Crocodile, Komati, and Usuthu rivers flow into other countries (Swaziland and Mozambique). As a result, international treaties and committees have been established on these rivers to control the use of water by the three countries. These treaties set limits to the amount of water that South Africa may utilise out of the rivers as well as the amount of water that the countries are obliged to release downstream. South Africa, and hence the IUCMA is obliged to operate within these international treaties. Currently, South Africa is operating the rivers to meet the Piggs Peak Agreement which requires a minimum flow of 2 cumecs from the rivers of the Inkomati Catchment across the Mozambican border at Ressano Garcia. This has been replaced with more sophisticated flow pattern requirements of the newer Interim IncoMaputo Agreement (IIMA) which has a higher minimum flow requirement of 2.6 cumecs for ecological purposes plus a further amount for downstream demands (TPTC, 2002). This is the next highest priority water use in law after the Reserve.

Strategic Importance

The Inkomati Usuthu WMA is characterised by large transfers out of the catchment (and out of the WMA) to the Vaal system and the Olifants WMA for cooling purposes at power stations; supplies water to Sasol Secunda Complex, Eskom Power Stations and some other users (towns such as Ermelo etc.) through a complex water supply system of dams, pumping schemes, diversion weirs, canals, pipelines and inter-basin water transfer schemes. Most of the water from the Upper Komati and Usuthu catchment is for the use of power generation. This is defined as a water use of strategic importance and it is imperative that the resource is protected so that the availability of water strategic use is secured.

3.3 Water Availability Assessment in the WMA

3.3.1 Surface water

The availability of water from the rivers is generally less than the demand for water out of the resource to enable both a sustainable economy and resource. However, this level of stress is dependent on the level of risk that water users are willing to accept. The implementation of the Reserve, which is an amount of water that must remain in the rivers to enable sustainability in the catchment and for basic human needs, will increase this level of stress and the NWA prioritises the Reserve. Despite the overall state of water stress in the water management area, there is still potential for increased yield and economic development in some areas of the catchments based on reconciliation strategies done for major towns by the Department of Water and Sanitation (DWS). The main source of water is from key major dams within the WMA (Table 1). Figure 12**Error! Reference source not found.** shows the

percentage combined volume of all dams in the WMA from October 2012 to June 2018, with critical drought experienced in 2015/16 hydrological year. **Error! Reference source not found.** shows the distribution of dams per sector in the WMA.

Table 1: Distribution of the dams per sector in the WMA

SECTOR	DAM SIZE				
	TOTAL	SMALL	MEDIUM	LARGE	NOT CLASSIFIED
Department of Water and Sanitation (DWS) dams	19	4	10	5	
Municipal dam	5	4	1	0	
Agricultural dam	223	181	37		5
Other dams	19	11	6	2	
State dams (other than DWS dams)	10	7	3	0	
Irrigation Boards	14	9	3	2	

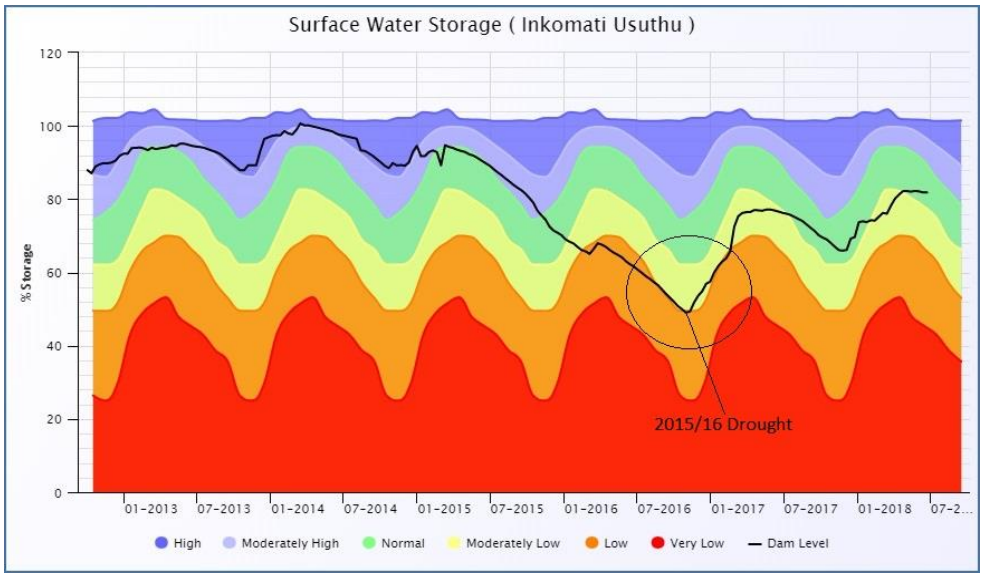


Figure 12: Dam levels of Inkomati Usuthu WMA (Oct 2012 – June 2018).

The **economy** of the water management area is highly dependent on water, with forestry, irrigation-based agriculture, and eco-tourism as the main economic drivers. Consumptive water use reflects this economic situation, with **irrigation** as the largest user, accounting for over half of all water use in the catchment, and the **forestry** sector the third largest user. The second largest water use is for direct transfers out of the area, for international obligations and for nationally directed strategic transfers to Eskom. The distribution of water demand for the different sectors for the various catchments as of 2015 water use data is presented in Figure 13.

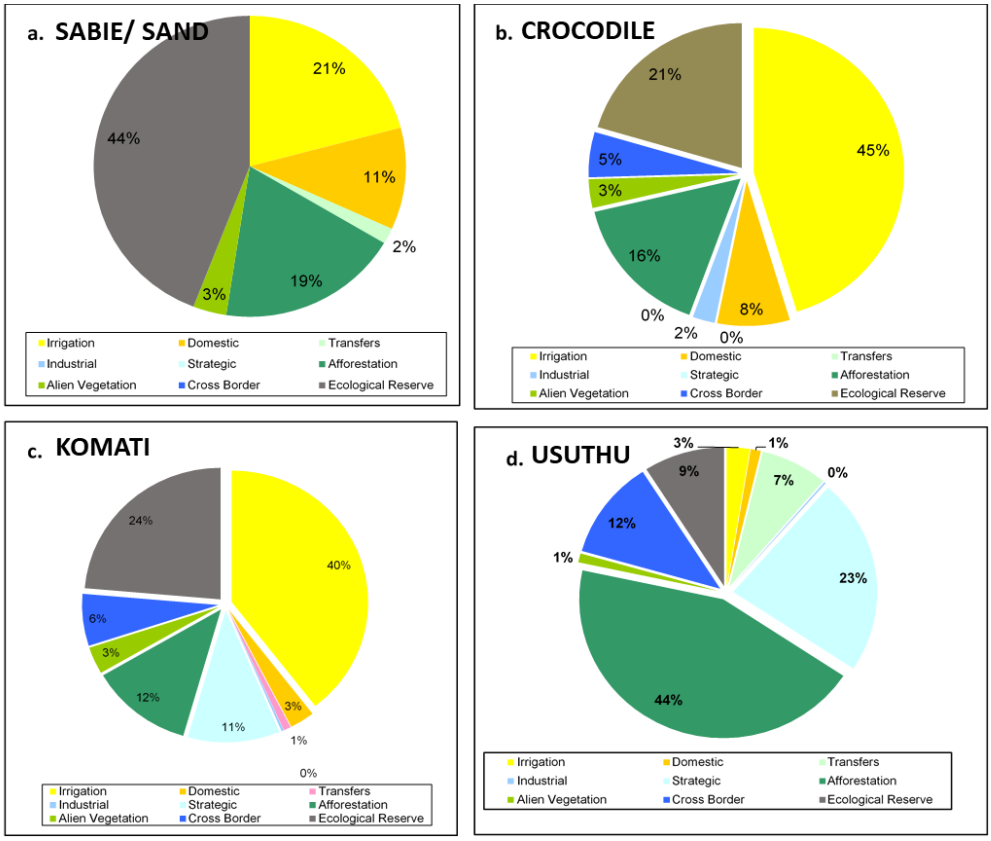


Figure 13: Water demands of the different catchments in the WMA indicating (a. Sabie Sand, b. Crocodile, c. Komati and d. Usuthu).

The distribution of water demand for the whole WMA is presented in Figure 14.

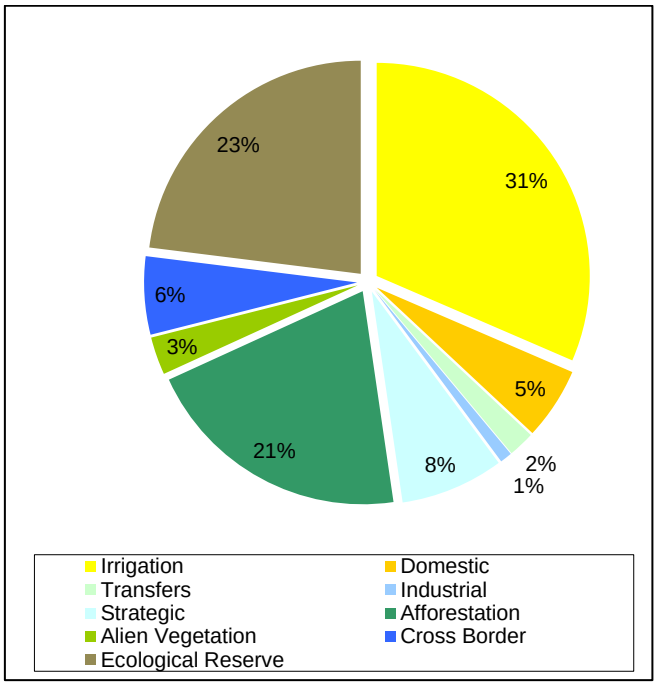


Figure 14: Overall water demand in the WMA based on 2015 water use data.

Figure 15 is a representation of the current estimated combined annual volumetric requirements for the different water use sectors, including ecological reserve indicating that water requirements exceed the water supply in most of the catchments and pressure is increasingly mounting because of increased population growth.

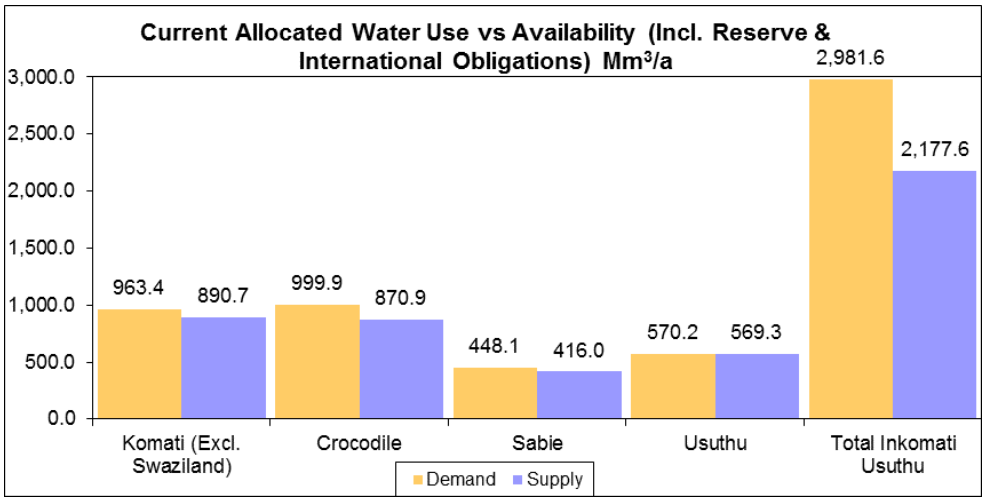


Figure 15: Current Water Availability vs Demand (including possible Reserve Requirements)

3.3.2 Groundwater

The groundwater potential for the whole water management area is not well understood in terms of which catchments still have available groundwater and which are over-utilised. This is due to lack of updated groundwater studies within the WMA. However, Figure 16 shows that the percentage of depleted groundwater levels was high in 2018 compared to the past two years.

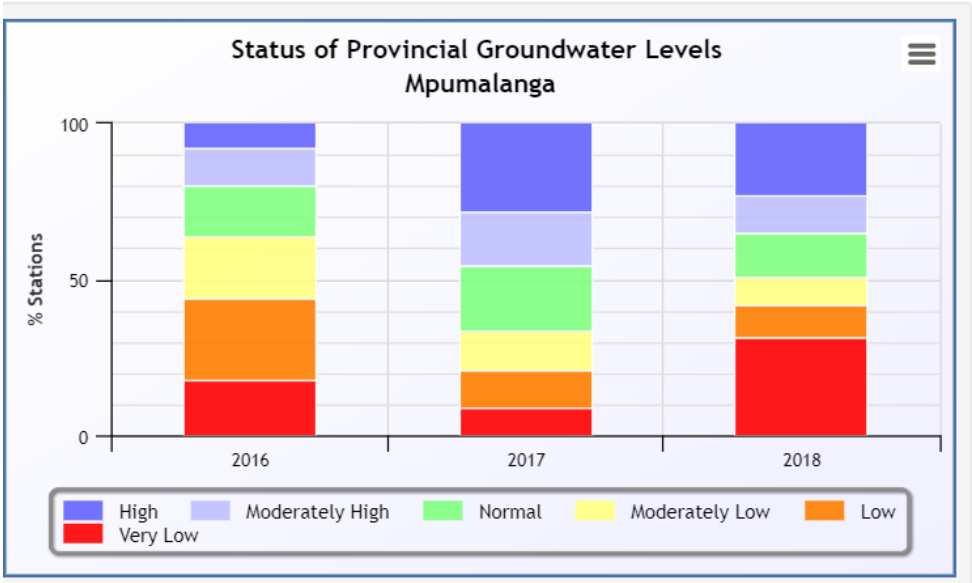


Figure 16: Status of groundwater levels within the Province.

Figure 17 illustrates an example of a station in the Crocodile catchment showing depleting groundwater levels over time from 2007-2017. The quality of groundwater is generally also poor for domestic use.

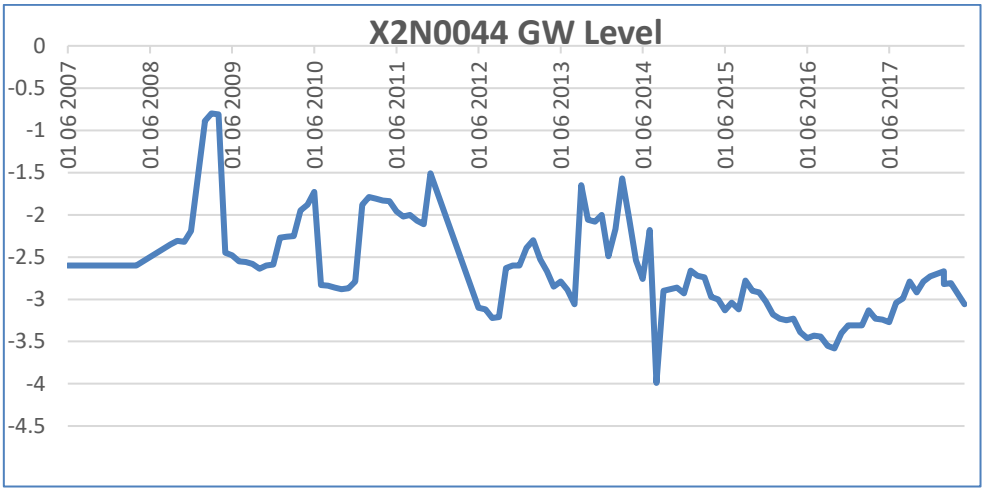


Figure 17: Trends in groundwater levels as represented by a station on the Crocodile catchment.

3.4 Water Quality Status within WMA

Understanding the present water quality status and historical trends is an important part of the strategy. The chemical and microbiological in-stream water quality monitoring within the WMA is conducted monthly. The strategic monitoring points reported consist of Ecological Water Requirement (EWR) sites and International Obligation sites as illustrated in Figure 18.

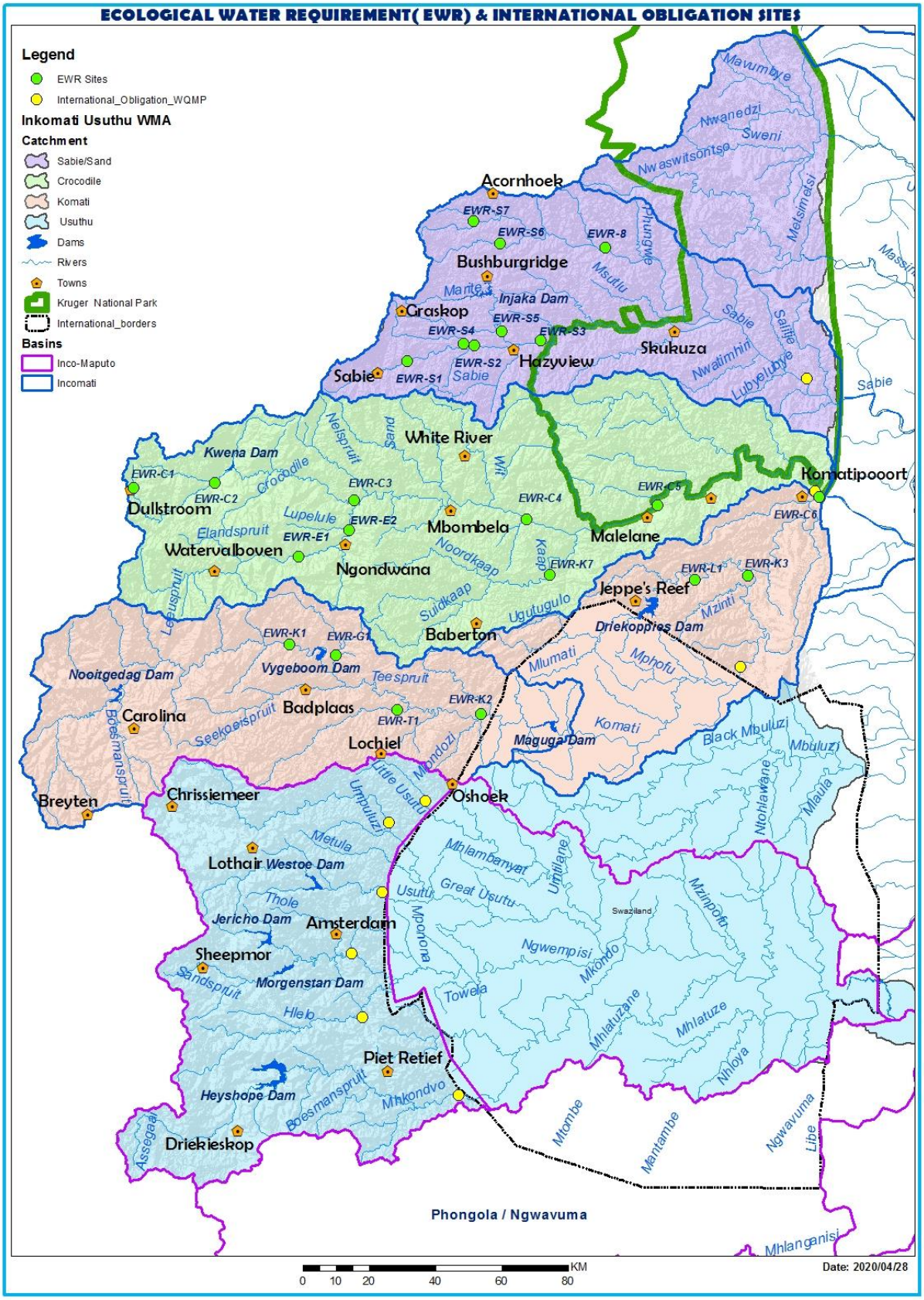


Figure 18: A map showing the EWR and International Obligation sites within Inkomati-Usuthu WMA

For the CMS, four (4) indicator variables were selected as tabulated below in Table 2.

Table 2: Water Quality Variables

Classified water quality variables	**Indicator variables**	**Statistical analysis of data**
Physico-chemical	pH	5 and 95 percentiles
Salts	Electrical Conductivity (EC)	95 percentiles
Nutrients	Phosphate	50 percentiles
Microbial	*Escherichia coli (E. coli)*	Average

To determine the present water quality status, a 36-months data set from January 2017 to December 2019 was selected to enable the determination of compliance of the water resources to the following:

- Gazetted Resource Quality Objectives (RQOs; December 2016) for the former Komati catchment.
- South African Target Water Quality Guidelines (TWQG) limits for the Usuthu Catchment; and
- International Water Quality Guideline limits (to indicate the compliance with International Obligation as per the Interim IncoMaputo Agreement (IIMA) between Republic of Mozambique, the Kingdom of eSwatini and the Republic of South Africa (RSA)) as illustrated in Table 3.

Table 3: Numerical RQOs, International Water Quality Guideline limits and TWQG limits

Site	**pH**	**EC (mS/m)**	**PO_4 (mg/l)**	***E. coli* (cfu/100ml)**
Sabie/Sand Catchment				
EWR S-1 to EWR S-5	6.5 - 8.0	30	0.015	130
EWR S-6	6.5 – 8.8	55	0.125	130
EWR S-7	6.5 – 8.8	42	0.125	130
EWR S-8	6.5 – 8.8	42	0.125	130
Crocodile Catchment				
EWR C-1 to C-3	6.5 - 8.0	30	0.015	120
EWR E1-3	6.5 - 8.0	55	0.015	130
EWR C-4 & 6	6.5 - 8.8	70	0.125	130
EWR C-5	6.5 - 8.8	70	0.075	130
EWR C-7	6.5 - 8.8	200	0.125	130
Komati Catchment				
EWR K-1	6.5 - 8.0	50	0.02	130
EWR G-1	6.5 - 8.0	N/A	0.02	130
EWR T-1	6.5 - 8.0	N/A	0.125	130
EWR K-2	6.5 - 8.0	55	0.02	130
EWR K-3	6.5 - 8.0	85	0.125	130
EWR L-1	6.5 - 8.0	40	0.075	130
International Obligation Site Targets				
	6.5 - 8.5	150	2	*2 000*

Site	pH	EC (mS/m)	PO_4 (mg/l)	*E. coli* (cfu/100ml)
All rivers flowing into Kingdom of eSwatini and Mozambique				
TWQG limits for the Usuthu Catchment				
Surface water resources in Usuthu Catchment	6.5 - 8.5	40	0.02	*130*

3.4.1 Water Quality status for Ecological Water Requirement (EWR) Sites

The compliance status is indicated by colours: compliant (Green) or non-compliant (Red). Figure 19 and Figure 20 show that the pH complied with the set RQOs and International Water Quality Guideline limits within the WMA except EWR site E-2 at Elands River in the Crocodile catchment, which was alkaline.

With respect to electrical conductivity levels in the WMA, the descriptive RQO stipulates that the 95th percentile of the data collected must comply with the set objectives. The results visually depicted in Figure 19 and Figure 20 show that Electrical Conductivity complies with the set objectives for the water management area. Meanwhile, the RQO for phosphate requires a 50th percentile compliance (50 percent of the data collected must comply with the set RQO).

As indicated below in Figure 19, phosphate indicated non-compliance with the set RQO due to challenges with detection limit of 0.01 (mg/l). The inserted chart on the right of this page shows the period when the detection limit was problematic but was subsequently resolved.

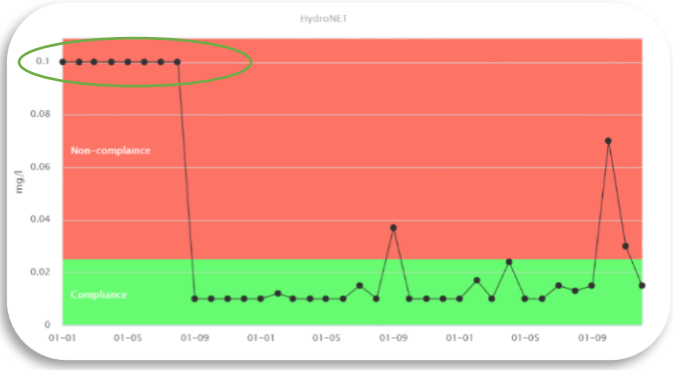


Figure 19 shows that *E. coli* levels of the water resources for all EWR sites throughout the WMA do not comply with the set RQOs of 130 (cfu/100 ml), except for EWR site C1 which indicated compliance with the set RQOs of 120 (cfu/100 ml). The presence of *E. coli* in the water resources can be attributed to pollution emanating from either human faecal material or that of animals. High counts of *E. coli* pose human health risks for vulnerable users that may rely on the resource water for domestic, cultural, and religious uses as well as users that may use the resources for recreational purposes. The resulting impact may include gastro-intestinal and other waterborne diseases, including diarrhoea, cholera, and typhoid. A water quality strategy is required to ensure improvement.

Ecological Water Requirement (EWR) Sites

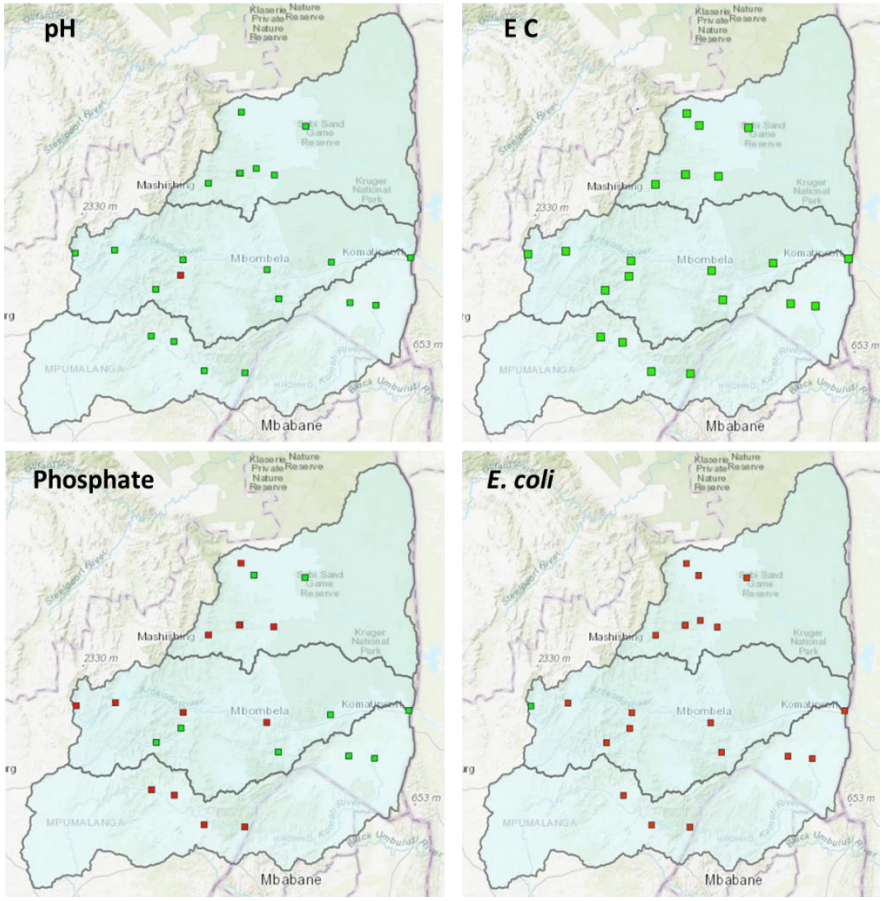


Figure 19: Water quality compliance status within Inkomati-Usuthu MWA showing acidity and basicity (pH), salt concentration (EC), microbial counts (E coli) and nutrient concentration (PO_4)

International Obligation Sites

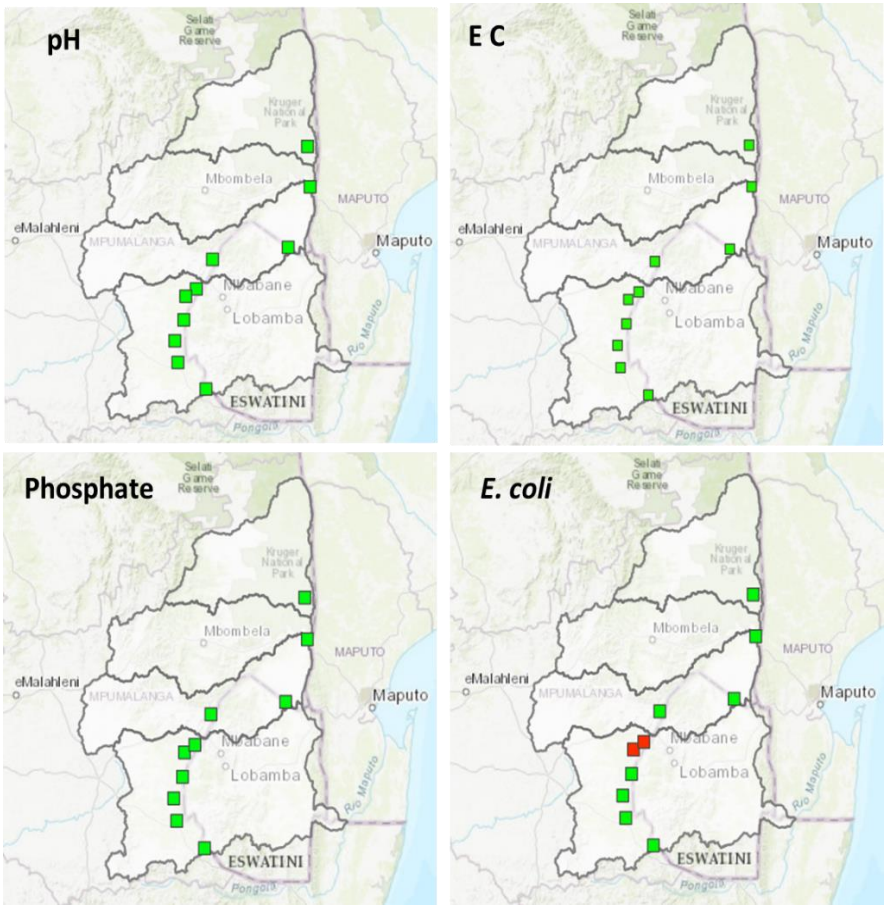


Figure 20: Water quality compliance status within Inkomati-Usuthu WMA showing acidity or basicity (pH), salt concentration (EC), microbial counts (E coli) and nutrient concentration (PO_4).

Impacts from Mining Activities within Inkomati-Usuthu WMA

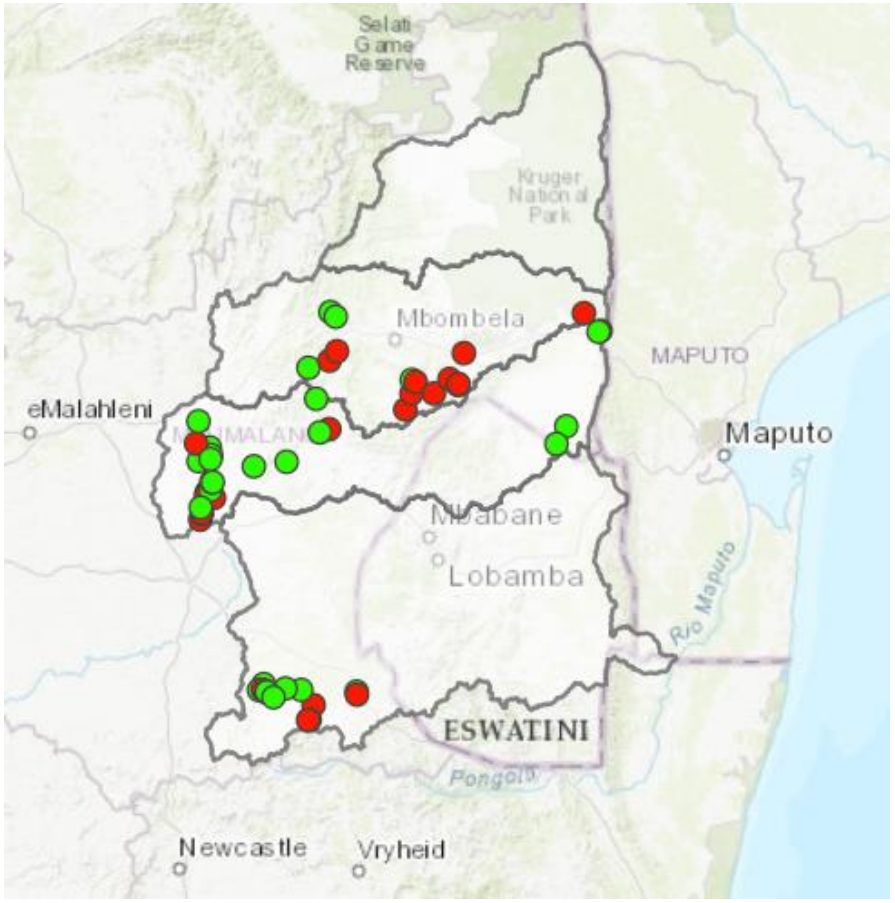


Figure 21: Water quality compliance status within Usuthu-Catchment showing SO_4 concentrations.

There are points that show non-compliance in the Crocodile, Upper Komati and Usuthu catchment especially on the Kaap river system, Boesmanspruit and Assegai systems which are dominated by mine activities. Figure 21 shows non-compliance with the RQO of 80 (mg/l) set for the priority resource units (RU) in the Boesmanspruit and TWQG of 30 mg/l for sulphate concentration throughout the WMA, respectively. These resource units are dominated by coal mines and show high levels of sulphate concentrations which are mostly attributed to active mines and defunct mines, some of which are decanting.

Electrical conductivity and phosphate are not major causes for concern in the Water Management Area as they comply with the 95 and 50 percentile RQOs, respectively. It is only in selected areas where the water quality status related to these parameters is punctuated by non-compliance. The Upper Komati catchment on the Boesmanspruit is being threatened by sulphates arising from mining activities (active mines, defunct mines, and decanting mines).

Surface Water Quality in the Inkomati-Usuthu WMA complied with the RQOs, TWQG and IWQG limits for most of the monitored points and this showed that the water quality within the WMA is relatively good. However, there are challenges with other variables in the water resources, e.g. *E. coli* as indicated above. Based on the performance for two variables (*E. coli* and electrical conductivity), there seems to be an improvement in the quality of the resource where for *E. coli*, 14 out of 23 EWR sites either remained constant or improved. This works out to 60% of sites that improved or remained constant. While for electrical conductivity, 19 out of 23 sites improved or remained constant which adds up to 82% of the sites that improved or remained constant.

3.4.2 River Eco-status

River Eco-status refers to the totality of the features and characteristics of a river and its riparian areas that bear upon its ability to support appropriate natural flora and fauna and its capacity to provide a variety of goods and services. It represents an ecologically integrated state representing the drivers (i.e. hydrology, geomorphology, and physico-chemical parameters) and responders (fish, aquatic macro-invertebrates, and riparian vegetation) (Kleynhans and Louw, 2007). The following indices are monitored for the REMP following the generic ecological categories for eco-status components as presented in Table 4.

- The South African Scoring System (SASS) and Macro-Invertebrates Response Assessment Index (MIRAI) for aquatic macro-invertebrates;
- Fish Response Assessment Index (FRAI); and
- Riparian Vegetation Response Assessment Index (VEGRAI).

Table 4: Generic Ecological Categories for Eco-Status components.

ECOLOGICAL CLASS	ECOLOGICAL STATE	DESCRIPTION	SCORE (%)
A	Natural	No measurable modifications	90 - 100
B	Good	Largely natural with few modifications	80 - 89
C	Fair	Moderately modified	60 - 79
D	Poor	Largely modified	40 - 59
E	Unacceptable	Seriously modified	20 - 39
F	Unacceptable	Critically modified	0 - 19

Sabie-Sand Catchment

The Sabie-Sand catchment falls into three Ecoregions, namely, Ecoregions 3, 4 and 10 where Ecoregion 3 is the Lowveld (characterised by Lowveld Bushveld types such as Mopane Bushveld and Mixed Lowveld Bushveld vegetation); Ecoregion 4 is the North Eastern Highlands (characterised by grasslands and Lowveld Bushveld types with a scattered presence of Afromontane Forest) and is regarded as the transitional zone between Ecoregions 3 and 10; and Ecoregion 10 is the Northern Escarpment Mountains (dominated by grasslands and sparse areas of Sour Lowveld Bushveld).

The Eco-status of the Sabie-Sand catchment was determined through a survey conducted in 2016. A total of eight (8) Environment Water Requirement (EWR) sites were monitored during the survey. The Sabie-Sand catchment was classified in a B Ecological Category. The lower parts of the catchment were classified in Ecological Category AB, attributed to the fact that the lower catchment is characterised by nature conservation areas, including parts of the Kruger National Park. The remainder of the catchment was in Ecological Category C with the Sabaan and North-Sand being in Ecological Categories CD and D, respectively. The EWR sites were generally in Ecological Category B with two sites, namely, X3SAND-CHAMP (Sand River) and X3MUTL-NEWFL1 (Mutlumuvi River), in Ecological Category C. The remaining two sites, X3SABI-SANBO (Sabie River) and X3MARI-SANDF (Marite River) were Ecological Categories AB and BC, respectively.

The three EWR sites met the Target Ecological Category of B at site X1SABI-BRAND; and C at both sites X3MUTL-NEWF1 and X3SAND-CHAMP. The remaining five sites, namely X3SABI-AANDE; X3SABI-SANBO; X3MACM-PICNI; X3MARI-SANDF and X3SAND-SKUKU did not meet the Target Ecological Categories.

The river Eco-status of the Sabie-Sand Catchment has deteriorated from Ecological Category B to C from 2011 to 2016, respectively. This can be attributed to water resource impacts such as sand mining, domestic waste from nearby settlements and untreated sewage effluents from non-functional sewage works.

The integrated Eco-Status considers the Eco-Status calculated for the fish, macro-invertebrates and riparian vegetation using the FRAI, MIRAI and VEGRAI, respectively. The Environmental Water Requirement (EWR) sites highlighted in green indicates target met, while the red depicts sites where the target was not met. **Error! Reference source not found.Error! Reference source not found.** is a visual presentation of the biomonitoring status of the Sabie-Sand catchment.

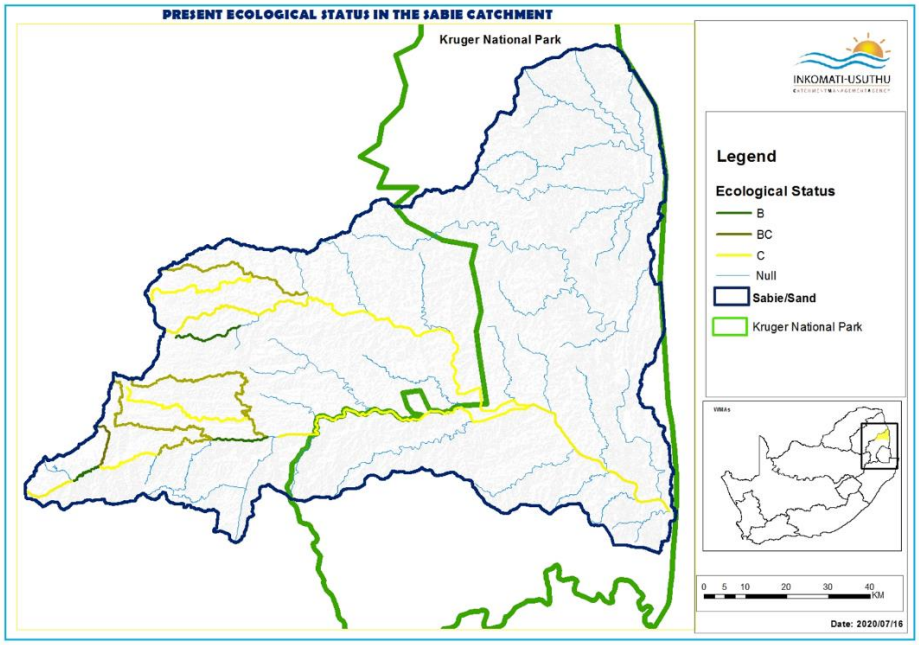


Figure 22: Visual presentation of the biomonitoring results for the river reaches in the Sabie-Sand catchment.

Crocodile Catchment

The Crocodile River is one of the most important rivers in South Africa in terms of its ecology. It comprises a wide range of riverine habitats, ranging from cold mountain streams in the Drakensberg to slow flowing temperate waters where the river meanders through the Lowveld. The Crocodile Catchment falls within four Aquatic Ecoregions and that includes the Lowveld (Ecoregion 3), North Eastern Highlands (Ecoregion 4), Eastern Bankenveld (Ecoregion 9) and Northern Escarpment Mountains (Ecoregion 10); the geomorphological zones of river channels such as the source zone, mountain headwater stream, mountain stream, transitional, upper foothills, lower foothills and lowland rivers. **Error! Reference source not found.** is a presentation of the biomonitoring status of the Crocodile River and its tributaries.

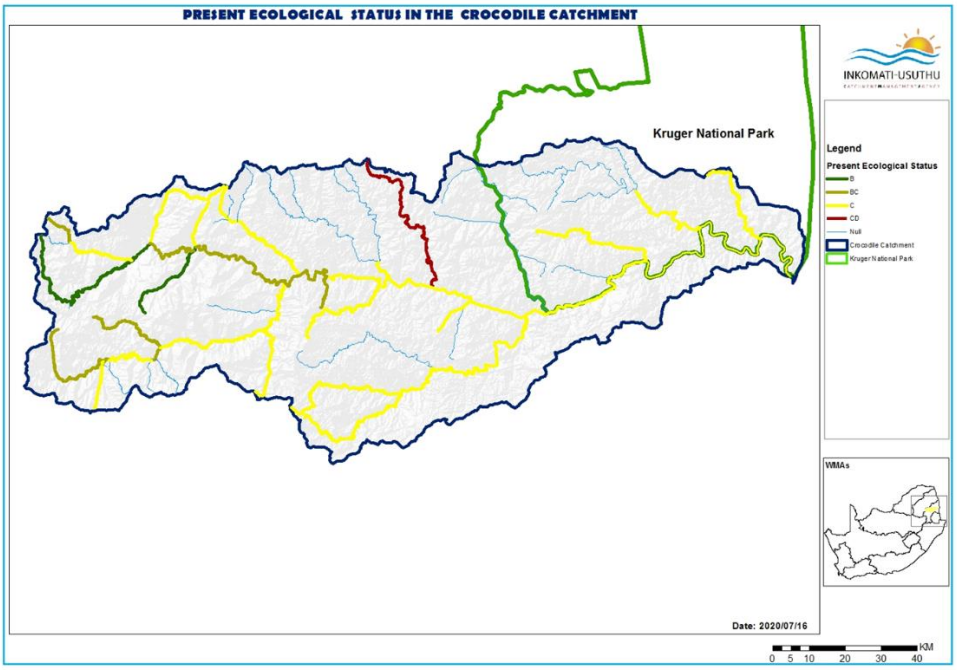


Figure 23: Visual presentation of the biomonitoring results for the river reaches in the Crocodile River catchment.

The Target Ecological Categories (TECs) are also indicated as published in *Government Gazette* No 40531, 30 December 2016. The Eco-Status of the Crocodile catchment was recently determined through a survey conducted in 2017. During the survey, a total of 41 sites were sampled with 17 sites located in the Crocodile River mainstream; 10 sites in the Crocodile River tributaries; 10 sites in the Elands River and its tributaries; 4 sites in Kaap River its tributaries. This includes a total of 9 EWR sites that were monitored during the survey.

The integrated Eco-Status indicates that the Crocodile catchment was mostly in Ecological Category C, meaning the river was moderately modified and is in a fair condition. This catchment generally complies with the TEC with very few sites that do not comply. The upper parts of the catchment in Crocodile River were in a B and B/C Ecological Category, meaning the river is close to its natural condition with negligible modifications and moderately modified. The B ecological category can be attributed to the fact that the upper catchment is characterised by nature conservation areas with very limited activities that may impact on a water resource. Only one site (X2WITR-VALLE) in the catchment was in a C/D ecological category and this may be attributed to the impacts such as commercial forestry, large dams and gauging weirs on the White River, and agricultural activities.

The EWR sites (X2CROC-VALY1, X2CROC-GOEDE, X2CROC-POPLA, X2CROC-N4ROA, X2CROC-MALEL, X2CROC-NKONG and X2KAAP-HONEY) generally complied with the TEC and these sites were in Ecological Categories B and C. Only two sites were not complying, and those sites are X2ELAN-WATER and X2ELAN-ROODE, with an Ecological Category C and the required TEC was B. The EWR sites were mostly in Ecological Category C with two sites, namely X2CROC-VALY1 and X2CROC-GOEDE, in Ecological Category B. The river Eco-Status did not improve or decline from the 2012 biomonitoring survey and only one site (X2CROC-GOEDE) has indicated noticeable improvement and that could be attributed to the fact that the surrounding activities in the catchment remain the same as in 2012 and are properly managed to avoid any further degradation of water resource in terms of fauna and flora.

Komati Catchment

The Komati Catchment is generally within the Aquatic Ecoregions such as Highveld (Ecoregion 11), Lowveld (Ecoregion 3), North Eastern Highlands (Ecoregion 4) and Northern Escarpment Mountains (Ecoregion 10); Geomorphological Zones such as the upper foothills, transitional zones and the lower foothills; with mainly the Mesic Highveld Grassland Bioregion (Grassland Biome) and Lowveld Bioregion (Savanna Biome), which are the vegetation type groups of the catchment. **Error! Reference source not found.** is a visual presentation of the Komati River biomonitoring status.

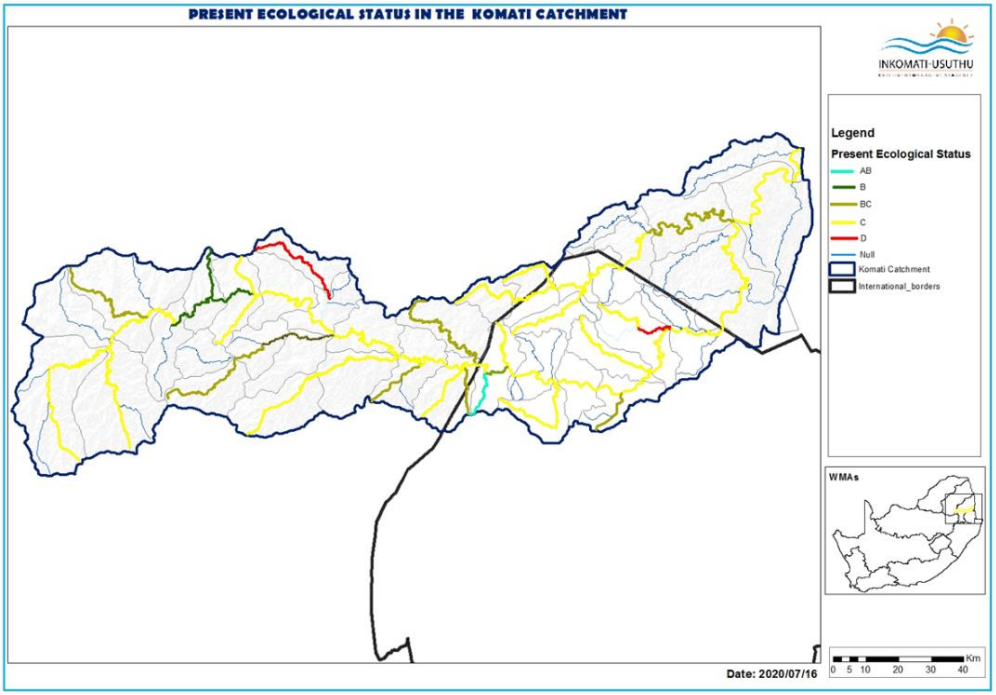


Figure 24: Visual presentation of the biomonitoring results for the river reaches in the Komati River catchment.

The Eco-Status of the Komati catchment was determined using macro-invertebrates, fish and riparian vegetation through a survey conducted in 2018. During the survey, a total of 43 sites were sampled (16 in the main stem of the Komati River, 20 on small tributaries and 7 on Lomati River) within the Komati River sub-catchment. The Komati River Catchment was mostly in Ecological Category C meaning that the catchment was moderately modified. These modifications were attributed to the fact that large part of the catchment is influenced by commercial forestry plantations (alien plant afforestation), agriculture, livestock farming, mining, water abstraction, sawmills, and rural settlement areas. Even though the catchment was moderately modified, few sites (X1KOMA-WATER and X1KOMA-GEVON) were in Ecological Category B (largely natural with few modification), while other sites (X1KOMA-KOMAT, X1KOMA-MALOL, X1KKOM-WELGE and X1BUFF-ZILVE) were in Ecological Category BC (largely natural with few modification to moderately modified). Only one site (X1MALO-MALOL) was in Ecological Category AB (natural to largely natural with few modifications). The Environmental Water Requirements sites (X1KOMA-GEVON, X1KOMA-HOOGE and X1LOMA-KLEIN) complied with the Targeted Ecological Category C and the other Environment Water Requirement sites (X1KOMA-TON3A, X1KOMA-KPOOR and X1GLAD-VAALK) complied with their Targeted Ecological Category D. Although the Ecological Category of the Komati Catchment has slightly deteriorated, most part of the catchment remained unchanged from the previous survey conducted in 2013.

Usuthu Catchment

The Usuthu catchment is divided into seven sub-catchments, namely, Assegai; Hlelo; Ngwempisi; Usuthu; Mpuluzi; Lusushwane and Lusutfu. The Eco-status of the Usuthu catchment was determined through a survey conducted in 2015. A total of 52 sites were sampled during the survey with 13 sites located in the Assegai-Mkhondvo sub-catchment; seven located in Hlelo; 11 in the Ngwempisi, 9 in the Mpuluzi, 2 in Lusushwane and 9 in the Usuthu-Lusutfu. The Usuthu Catchment is a transboundary water resource shared between South Africa, Swaziland, and Mozambique. A total of 12 sites are in Swaziland.

The Usuthu catchment was generally in Ecological Category C, meaning the catchment was moderately modified, and there are losses and changes in the natural habitat and biota. While all the sub-catchment was in Ecological Category C, there were sites that were in Ecological Category D (W5NGWE-LEIDE, W5NGWE-POMPO and W5SAND-ZANDS). The following sites were in Ecological Category CD: W5SWAR-IZIND, W5LUSU-ROBIN and W5LUSU-KUHLE. The 2015 survey was conducted under drought conditions and this had a negative effect on the river. Other challenges that lead to deterioration of the river include over abstraction, mining activities, municipal and industrial wastewater discharges, afforestation and invasive species of flora and fauna. **Error! Reference source not found.** shows the instream Eco-status of the Usuthu catchment. The instream Eco-Status considers the Eco-Status calculated for fish and macro-invertebrates using the FRAI and MIRAI.

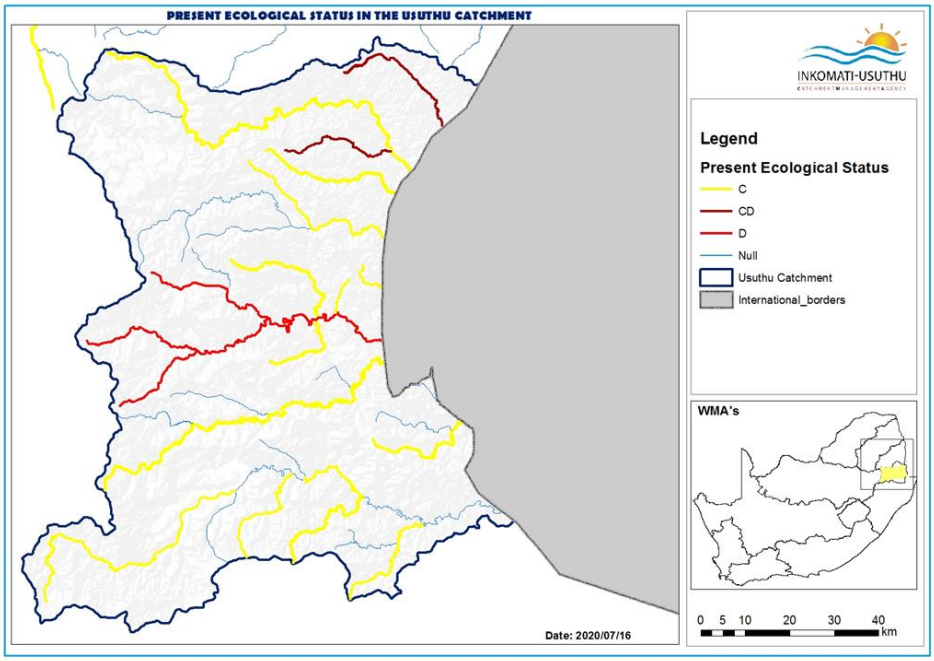


Figure 25: Visual presentation of the biomonitoring results for the river reaches in the Usuthu River catchment.

3.5 STATUS OF WATER USE AUTHORISATION

Water Use Authorisation (WUA) is legislated under Chapter 4 of the National Water Act (Act 36 of 1998; NWA). The uses to be authorised are listed under section 21 of the NWA. The spirit of the Act (NWA) recognises past discrimination where the bulk of the water was held in the economy and owned by a minority of the population. While water is a driver for socioeconomic and other needs, it must be sustainably utilised to ensure that the Reserve, International Obligations, Poverty Eradication are taken care of (NWRS 2, 2014). In the past, water was owned by a person authorised by whichever Act or legislation that was applied. In the NWA, the custodian of the water resources is the Responsible Authority (Minister) on behalf of the people. Thus, there is no ownership of water but after taking care of the Reserve (Ecological and Human Health requirements), the International Obligations (such as the Interim IncoMaputo Agreement, IIMA) and poverty eradication (Schedule 1), the Minister may use a number of instruments to authorise water use (access to water) in order to advance the development and socioeconomic benefits with a bias towards redress and equitable water use. To this extent, the Water Allocation Reform (WAR) is a programme of the department that focuses on the redress of past imbalances and the impact that institutions are having on certain aspects of the WAR Plan to indicate proactive WAR.

The goal is to move towards compulsory licensing where redress can be effectively implemented. However, the NWA also recognises any allocations that were made in the past using other legislation. These are termed Existing Lawful Use (ELU) which applies to water uses that were in use/ authorised within the qualifying period (two years prior to the promulgation of the NWA). The Minister, through the DWS and entities embarked on a project called Validation and Verification (V and V) as per sections 32, 33 and 35 of the NWA. This is the first step towards assessing the volume of water in use of the volume available to have a view on the volume that can be used in the Water Allocation Plan (WAP) for reallocation.

The IUCMA is responsible for the administration of Water Use Authorisation (Licensing), confirmation of General Authorization (GAs) and the declaration of Existing Lawful Use (ELU) through Validation and Verification (V and V). The status quo of water WUA is presented to give an idea of the status within the IUCMA WMA.

3.5.1 Water Use Authorisation (WUA)

The WUA data used to depict the status is inclusive of data from January 2015 to March 2020. In terms of the NWA, there are four types of WUA as indicated in Table 5 below.

Table 5: Types of Water Use Authorisation (NWA, 1998).

WATER USE NAME	DESCRIPTION	WATER USER ACTION
Schedule 1	Reasonable domestic water use, excluding commercial benefits	Registration on WARMS
Existing Lawful Use (ELU)	Water use activities that commenced two years prior the promulgation of the NWA and were regulated by any other law	Verification of the data on WARMS. IUCMA project of Validation and Verification.

WATER USE NAME	DESCRIPTION	WATER USER ACTION
		Application for ELU declaration by the user.
General Authorisation (GA)	Low impact activities/ water uses and to qualify threshold level must not be exceeded (s39)	Confirmation of the use (quality/ quantity) impact on the resources in line with GA regulations.
Water Use License (WUL)	High impact activities/ water uses e.g. coal mine, extensive agriculture etc. [s40(1)]	Application of the authorisation of section 21 water uses under section 40 of the NWA.

In terms of the different uses, a person can only use water if the water use falls under Schedule 1, is a continuation of an ELU, is a confirmed GA or authorised under Water Use Licence (WUL). In some instances, non-consumptive water uses such as waste disposal can be dispensed with the licenced requirement provided the water user has other environmental authorisation which, in the opinion of the IUCMA, will not adversely affect the water resource [National Water Act (Act 36 of 1998)].

3.5.2 Water Use Authorisation (WUA) Systems

There are two data systems used in the processing of applications and the management of data for record and billing purposes in the IUCMA, namely the Electronic Water Use Authorisation Administrative System(e-WULAAS) and Water Authorisation Resource Management System (WARMS) respectively.

3.5.3 WUA Statistics

Water Use Licencing

The institution established a unit dedicated to deal with WUA applications in 2017. The IUCMA is delegated by the Responsible Authority (through the sub-delegation to the Director General) to process and recommend water use authorisation through licensing as well as confirm General Authorisation of water uses. This entails assessment of the application, presentation of the application to the Water Use Administration Advisory Committee (WUAAC) and finally making a recommendation to the Responsible Authority to approve/ decline an application. It is only the Responsible Authority / Delegated Representative that is empowered to make a final decision to approve/ decline an application.

Before the regulation for the procedural requirements for WULA and appeals were promulgated, all WULA submitted to the DWS/ IUCMA were not subjected to timeframes in terms of mandatory finalisation date. The WULA submitted to the DWS/ IUCMA previously usually took a period of between one (01) year and ten (10) years before being finalised. This had a significant impact on water resources and/or the economy because users utilised water resources unlawfully. The DWS/ IUCMA could not accurately determine the volume that was registered. In some cases, projects that required authorisation of WUL did not commence and there was a loss of investments and subsequent potential economic benefits. During the period between 2015 and March 2020 financial year, a backlog of at least six (6) water use licences was recorded (Table 6). It is however difficult to provide accurate conclusion in terms of whether there was a decrease or increase of applications in the system

as e-WULAAS came into effect long after the Letsema Project (project implemented by DWS to catch up on WULAs).

Table 6: List of Water Use License Application (WULA) backlog as at 2019

FINANCIAL YEAR	NMBER OF APPLICATIONS	COMMENTS
2018/2019	1	Due to lack of specialist comments (civil design)
2019/2020	5	4 of the 5 were recommended to DWS for finalisation

During the above-stated period, IUCMA had processed and finalised consumptive Water Use Licence Applications (WULA) to the total water volume of more than 197 Mm^3/a. The key water user is irrigation being the highest and the lowest being water supply service for domestic and industrial water supply by local government. White males are the highest in terms of user groups (Figure 26).

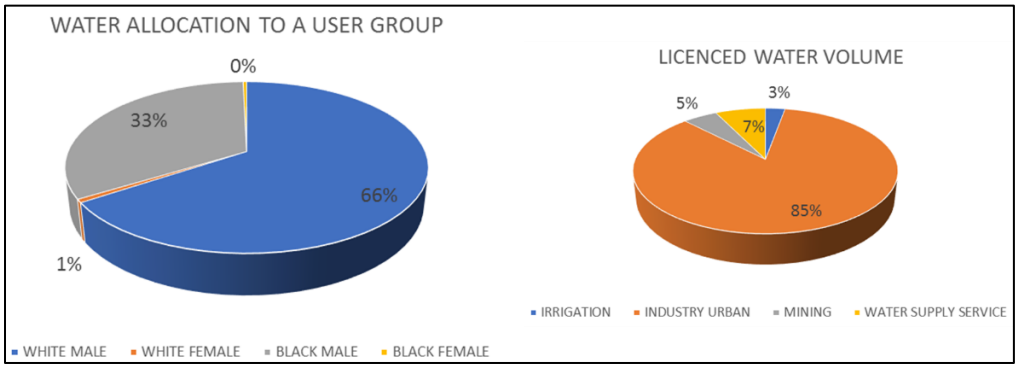


Figure 26: The percentage allocation of **licensed water** according to demographics and user groups.

General Authorisations (GAs)

Figure 27 shows that the highest percentage of water allocated in terms of GA is for irrigation and the lowest being mining. The highest water user group is white males which is linked to land ownership and the lowest being white femaless (IUCMA, 2019).

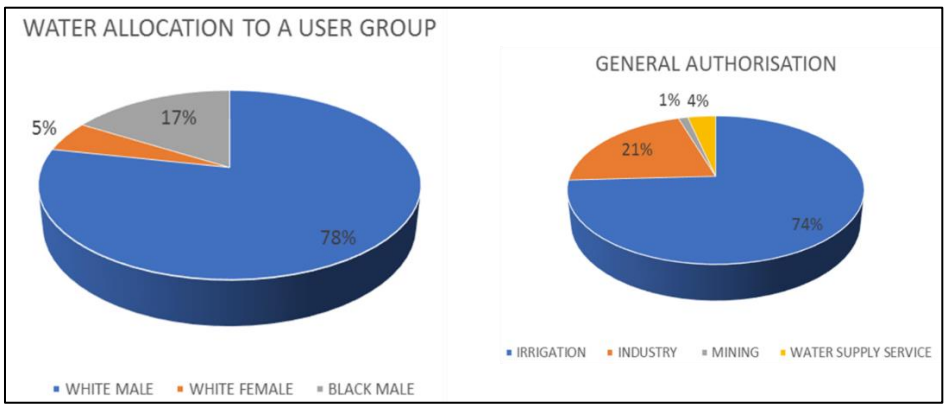


Figure 27: Total volume of water allocated under **General Authorisation** as well as percentage of water allocated to a user group.

Existing Lawful Use (ELU)

Existing Lawful Use (ELU) of water is the recognition of the extent and lawfulness of past water uses before the promulgation of the NWA, as prescribed under sections 32 and 33 of the NWA, with a specific focus on the qualifying period for section 32. The qualifying period for ELU is two years prior the promulgation of the NWA, which is between 1996 and 1998 for groundwater, and between 1997 and 1999 for surface water. To determine the ELU, a water use validation and verification process was conducted from 2011 to 2017 for the former Inkomati WMA and from 2016 to 2019 for the Usuthu catchment.

The validation involves technical assessment of the extent of past water use by merging and superimposing remotely sensed data with registered water uses, cadastral boundary limits, title deeds records and land use datasets.

The verification is the administrative legislative process to confirm the legal status of past water use by engaging specific water users on the determined ELU. The ELU determination was conducted on consumptive water uses which is water for irrigation, domestic and industrial, storage and stream flow reduction (SFR). These are in the main water uses covered under s21(a), (b) and (d)) with the exclusion of the wastewater related water uses.

The total volume of water allocated under existing lawful use in the WMA is indicated in Figure 28. The higher percentage was allocated to agriculture (61%), followed by water supply services (38%) and forestry (1%). In terms of demographics, the ELU is mainly allocated to white males and this reflects the past ownership of land which subsequently was linked to ownership of water. Forestry is less because it is less consumptive (WARMS IUCMA, 2019).

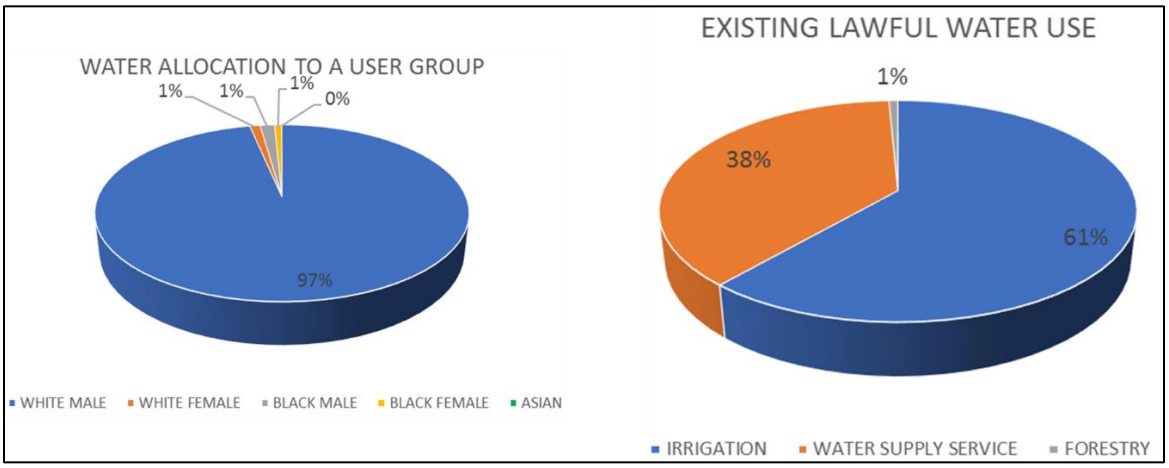


Figure 28: Total volume of water allocated under Existing Lawful Use (ELU).

In the period of between the 2015 and 2019 financial years, there were hundred and eighty (180) applications for water use authorisation of which ninety-nine (99) were General Authorisation and eighty-one (81) were WULAs. Of the eighty-one (81) WULAs, seventy-five (75) were finalised and there is a backlog of only six (6). Of the seventy-five (75) finalised applications, sixty-four (64) were approved and none were declined, and eleven (11) water use licence applications are at the Department of Water and Sanitation for finalisation.

No ELU was converted to a WUL because when compulsory licence is initiated, only water use allocation under ELU will be affected. The position of the DWS is that no ELU will be converted into a licence because by doing so the institution will be locking up the water resources in the hands of historically advantaged individuals (HAI) without subjecting it to the equity, efficiency, and sustainability principles normally followed in the licencing processes. By licencing ELU, the institution will be just be licencing the volume as indicated in the permit or authorisation without subjecting it the founding principles of the NWA. When the opportunity to conduct compulsory licencing is realised, all ELU will be subjected to the process to ensure equity.

The IUCMA envisages that the Water Allocation Plan (WAP) will alter the allocation pattern from land locked/ ownership to volumetric (based on the principle of water use efficiency as well as the water conservation and demand management). This is aimed at ensuring water savings in the system for reallocation to historically disadvantaged individuals (HDIs).

Water Use per Sector

Figure 29 indicates that the highest water use between 2017 and 2019 financial year was 40% to irrigated agriculture, followed by domestic/ industrial at 38% and the lowest being the non-billable sectors.

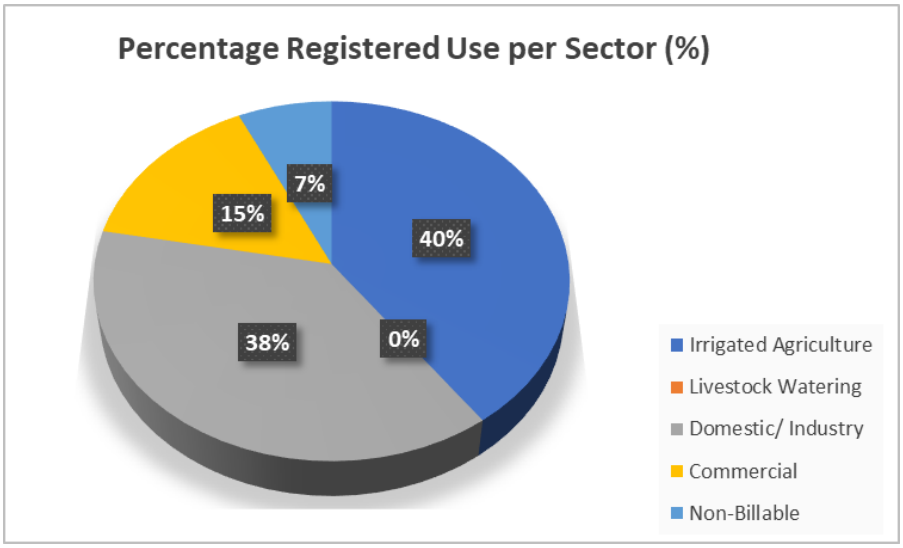


Figure 29: Registered water use per sector within the Inkomati-Usuthu WMA.

Registered Volume of Water Use per Resource Type

Figure 30 shows that the highest volume of water use registered per the type of resource was abstracted from the rivers (up to 95%) and the lowest abstraction was from the Spring/Eye (7%). The 0% recorded for livestock watering does not mean that the activity did not occur. However, against 100% percentage, the watering of livestock contributed less percentage in terms of use. Though irrigation is the highest water user, the challenge of food security is being tested as there is a high volume of application to convert water use from agriculture to residential development. Similarly, farmland is being converted to residential development and other related uses which also threatens food security for the future.

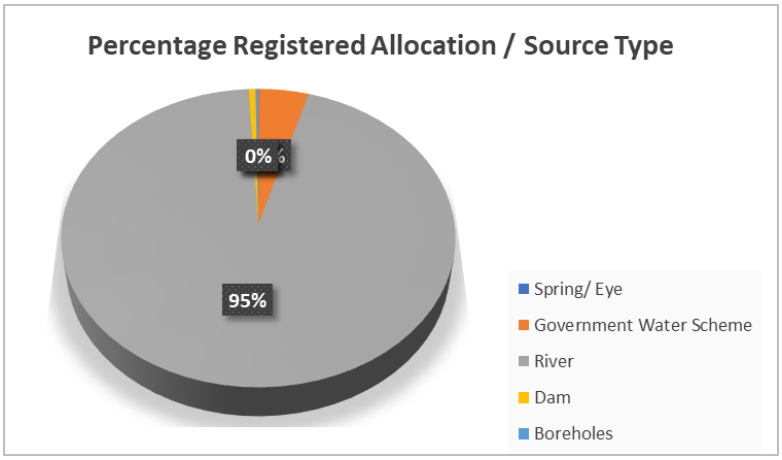


Figure 30: Percentage registered water use per source within the Inkomati-Usuthu WMA.

The reliance on surface water reflects the level of threat to the resource sustainability, especially during drought periods. Thus, a water-mix approach to resource utilisations is required to ensure that groundwater, water re-use and other sources are considered. The bulk of the water allocation is in the irrigation sector.

The opportunity exists for the IUCMA to differentiate the Water Resource Charge per crop and per source in order to facilitate change in behaviour and to further consider incentives for efficient water use, including the implementation of Water Conservation/ Water Demand Management (WC/WDM).

Billable Registered Volume of water

Table 7 and Table 8 below indicate the volume of non-billable and billable water use currently registered on WARMS. Table 8 further indicates high volume of billable registered volume for domestic/industrial in the 2017/18 financial year and less for forestry.

The IUCMA implementation of Strategic Adaptive Management (SAM) for sustainable water resource management has enabled the WMA to cope with the prolonged drought experienced over the last four (4) years. This was mainly achieved through the implementation of water use restrictions in the Crocodile catchment which is the most stressed due to inadequate storage facility as the receiving catchment of Kwena Dam is small. Currently Resource Planning and Operations is implementing a research project with the Water Research Commission (WRC) to determine the efficiency of water use in the irrigation of crops that are identified to use the most water such as sugar cane, citrus, etc.

Table 7: Registered billable volume of water per use/ annum.

SECTOR	REGISTERED BILLABLE VOLUME (MILLION CUBIC METRES/ ANNUM)		
	FY 2017/18	FY 2018/19	FY 2019/20
Irrigation	1097	1065	1070
Watering livestock	3	3	3
Commercial forestry	419	438	428
Domestic / Industrial	1060	541	603
Grand Total	2578	2047	2104

Table 8: Registered non-billable volume of water within the WMA indicating the non-billable sectors.

WMA	VOLUME (MILLION CUBIC METRES/ ANNUM)
Aquaculture	2,14
Community Woodlot	0,038
Recreation	0,082
Schedule 1	2,27
Urban (Excluding Industrial and/or Domestic)	0,75
Grand Total	**5,28**

3.6 Validation and Verification (ELU Declaration)

3.6.1 Former Inkomati Water Management Area (WMA)

The former Inkomati WMA ELU determination was completed in January 2017 after a period of four (4) years. The data indicated at the end of the project that only 62% of all the identified and validated properties (4 960) were declared as ELUs. The properties under the Irrigation Boards were verified by means of section 33 of the NWA (in line with the policy position for rescheduling water in Irrigation Boards and Government Water Control Areas; Circular 18, 2001). The water users outside the Irrigation Boards and Government Water Control Areas were verified by means of section 35 of the NWA. There were properties that were validated but did not respond to the process (non-respondents). The V & V for the former Inkomati catchment was done prior the establishment of the Usuthu catchment, thus the outcome of the verification process is indicated in Table 9 as of the end of 2020.

Table 9: Former Inkomati WMA ELU declaration statistics

VALIDATED PROPERITES	S33 (2) VERIFICATION	S35 (4) VERIFICATION	NON-RESPONDENTS	PERCENTAGE VERIFICATION (%)
4 960 (project original)	2 277	830	1 853	62,6
1 853 (unverified properties after the project)	31 (verified after the project)	157 (verified after the project)	0	10%

Of the total number of validated properties, only 3 107 were verified under s33 and s35, representing 62%. After the close of the project, the IUCMA continued with the verification process.

3.6.2 Usuthu Catchment

The Usuthu Validation and Verification (V and V) project started only after the amalgamation of the Usuthu catchment to the Inkomati-Usuthu WMA. The project of V and V in the Usuthu catchment started in 2016 and was concluded in 2019. The originally validated properties as per WARMS were 1 300 properties. These were to be managed through the section 35 process as there are no Irrigation Boards within the Usuthu catchment. A total of 622 of the 1300 properties were declared ELUs which represents 43%. During the project term, an

additional 137 properties were declared as ELUs since water users that were previously not registered and voluntarily applied for ELU declaration. These were declared ELUs (IUCMA V and V Close out Report, 2019). Thus the total percentage of verification in Usuthu catchment is 52.8% (Table 10).

Table 10: Usuthu ELU declaration statistics

VALIDATED PROPERTIES	S35 VERIFICATION	NON-RESPONDENTS	PERCENTAGE VERIFICATION (%)
1 300 (original)	622	678	43.3
137 (identified non -registered properties)	137	0	9.5
1 437 (cumulative)	759	678	52.8%

A total of 759 properties were verified out of a cumulative total of 1 437 properties; the difference was not verified at the end of the project duration.

The available water in this area can be earmarked for HDI users as part of the WAR which falls under the WAP. The proposed ELU determination outcome by 2021 should be at 90% to ensure that the IUCMA proceeds to compulsory licensing.

Management Actions to deal with the unverified ELU

- The V and V activities require official(s) that will focus on the project to deal with the backlog and to maintain the ongoing applications for ELU declaration. This will succeed with the support of the I &P Division (conducting stakeholder engagement, education and awareness on the non-respondents to facilitate voluntary applications).
- The CME Division, in its activities of enforcing compliance and eliminating unauthorised use, should focus on the areas known to have been validated but not yet verified.

Management Action to deal with the Unlawful ELU

- All unlawful ELUs will be subjected to compulsory licensing.

3.7 COMPLIANCE MONITORING AND ENFORCEMENT

As part of resource protection and use, it is important to ensure that the different users/ uses are compliant with the NWA. The key water uses as identified within the four catchments are indicated in Table 11.

Table 11: Key water use sectors in the different catchments indicating challenges.

CATCHMENT	SECTORS	QUALITY CHALLENGES
Crocodile	Industries	• *E. coli* from WWTW • Salt load from the Elands system
	Municipality	
	Mining	

CATCHMENT	SECTORS	QUALITY CHALLENGES
	Tourism	
Usuthu	Afforestation	• *E. coli* from WWTW • Decanting from old mining and current operations
	Municipality	
	Mining	
Sabie-Sand	Municipality	• Illegal sand mining
	Sawmills	
	Agriculture	
	Forestry	
	Conservation (Kruger National Park)	
	Tourism	
Komati	Mining	• *E. coli* from WWTW • Flooded pits which cannot be rehabilitated • Abandoned and defunct mines
	Municipality	

3.7.1 Status of Mining Activities within WMA

The number of mining activities within the WMA are determined from the WARMS database and the CME activities when the IUCMA officials conduct inspections and audits. There is, however, a possibility of mining activities taking place that are not duly authorised by DMR/ DEA nor DWS and without self-regulation and vigilant stakeholders these may operate under the radar.

Crocodile Catchment

There are nine (9) mines within the Crocodile catchment of which six (6) are authorised and three (3) are not authorised. Of the nine (9) mines two (2) are under business rescue. Four (4) mines audited in the last three years which proved to be non-compliant to the license conditions while three (3) mines have been closed. Figure 31 presents a map of the mining activities within the Crocodile catchment.

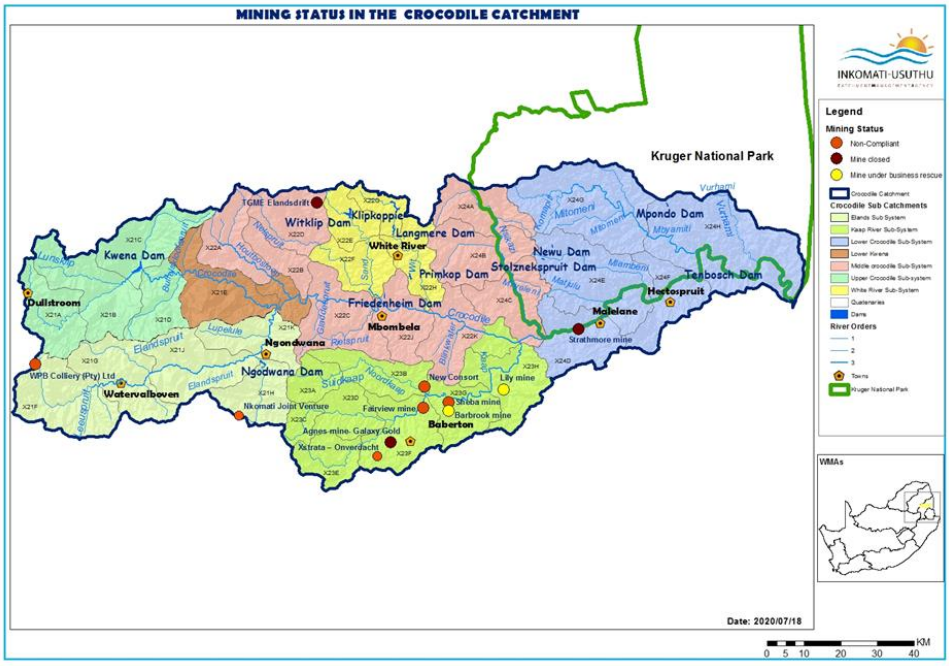


Figure 31: Visual presentation of the mining activities within the Crocodile catchment.

Sabie-Sand Catchment

There are two non-operational mines in the Sabie catchment (Figure 32). These mines were not audited. However, there are complaints from water users related to decanting that may negatively impact on the water resource quality of the Sabie River.

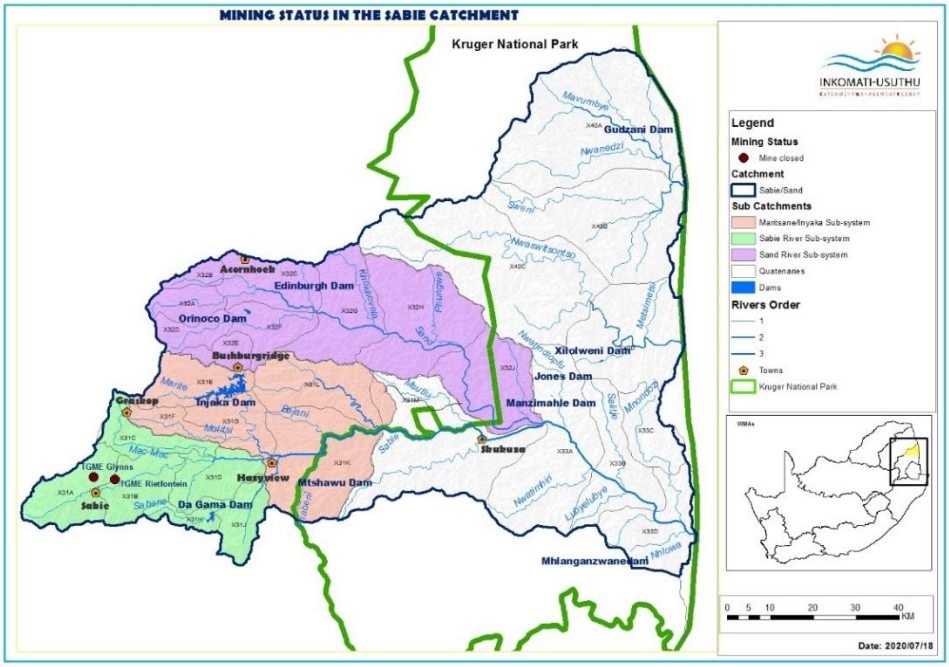


Figure 32: Visual presentation of the mining activities within the Sabie catchment.

Komati Catchment

A total of 36 mines are located within the Upper Komati catchment (Figure 33). Sixteen (16) of the mines have not been audited yet. Of the twenty (20) mines that were audited nine (9) do not comply with the licence conditions while eleven (11) mines are compliant. The non-compliances are addressed through follow-up inspections, issuing of notices and directives and mines making representation to address their non-compliances.

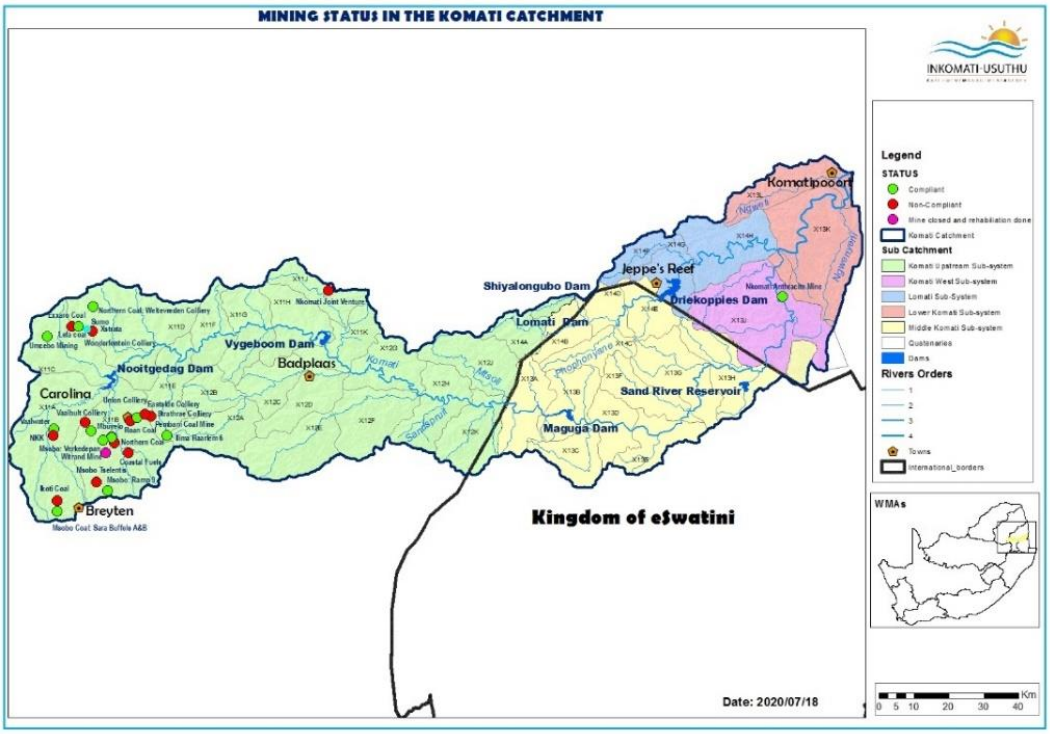


Figure 33: Visual presentation of the mining activities within the Komati catchment.

Usuthu Catchment

There are eleven (11) mines operating in the Usuthu catchment of which seven (7) are compliant (Figure 34). Four (4) mines are operating without licences. However, there are non-compliances with the licence conditions which are addressed through notices and directives.

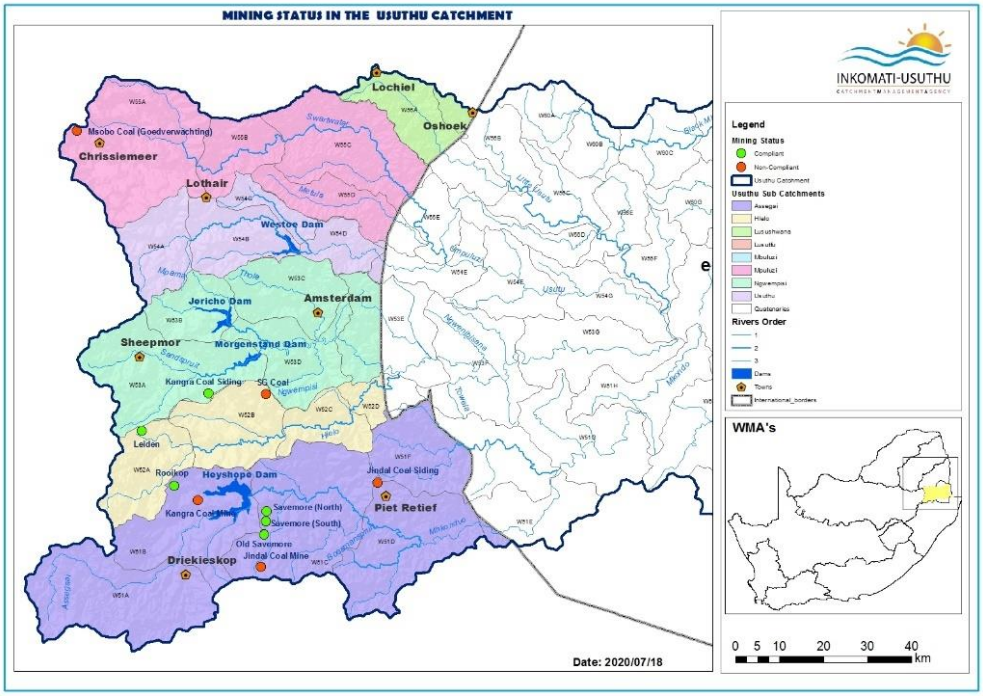


Figure 34: Visual presentation of the mining activities within the Usuthu catchment.

Mining presents a major water quality challenge and mines should all be audited to ensure that there is compliance in terms of authorisations, water quality impacts and the payment of the water resource charges.

3.8 Compliance Status of Wastewater Treatment Works (WWTW) within WMA

There is poor management of domestic wastewater decanted into water resources across the WMA. This is attributed to old infrastructure that is mostly overloaded. Local municipalities do not consider the full water balance when applying for a government grant. It is apparent that there is more focus on bulk water for the provision of drinking water while wastewater treatment works are not considered. It is imperative to note that some of the wastewater treatment works are not authorised as these were never in proper working condition upon handover by the former Department of Water and Forestry (DWAF). A total of 68 WWTW are known in the WMA, of which 33 are compliant while the 35 are non-compliant. The compliance focuses on the impact that the WWTW would have on river health and for the purposes of the report, the Chemical Oxygen Demand (COD), suspended solids (SS) and *E. coli* are taken into consideration.

Compliance of COD is an indication of the oxygen required to break down organic material in water resources. When high levels of organic materials are present, there is a higher demand for oxygen required to break down the organic material. This means that the oxygen content (saturation levels) in the water will be reduced and less available to the aquatic ecosystem and therefore will deprive it of oxygen. Therefore, the compliance with COD means that more oxygen would be available to the aquatic.

In terms of suspended solids (SS), higher levels in the water resources result in the water becoming murky. This reduces the ability of algae to produce food and oxygen for aquatic ecosystems. Suspended solids can also clog the gills of fish killing them or even reducing their growth rate. It also causes poor visibility for fish and other higher forms of organisms disabling them from hiding from their predators as well as affecting their ability to find food and feed since they cannot see clearly due to the reduced clarity of the water. Thus, higher SS has a negative impact on river health.

The WWTW treat wastewater and decant the effluent directly into water resources and when monitored for *E. coli*, there is generally poor quality of water discharged in terms of the *E. coli* which is a determinant of the potential impact on human health, especially for the vulnerable communities that may utilise resource water for domestic purposes. *E. coli* may also impact negative on people that use the resources for recreation and cultural purposes (such as baptism and healing by traditional healers). Table 12 below is a summarised presentation of the status of wastewater treatment works in relation to the selected variables of concern (COD and SS). All WWTWs in the Inkomati-Usuthu WMA indicated non-compliance to *E. coli.* The visual presentation of WWTW within the WMA is indicated in Figure 35.

Table 12: Summary of the compliance status of the WWTW within the WMA.

LOCAL MUNICIPALITY	DISTRICT MUNICIPALITY	COD	SS
Bushbuckridge	Ehlanzeni DM	Thulamahashe WWTW	Tintswalo Hospital and Thulamahashe WWTW
City of Mbombela		Hazyview, White River, and Barberton WWTW	Hazyview, White River, Barberton, Matsulu, and KaNyamazane WWTW
Thaba Chweu			Sabie Sawmill and Sabie WWTW
Nkomazi		Tonga Hospital WWTW	Shongwe Hospital WWTW
Emakhazeni	Nkangala	Milly's filling station, and Emthonjeni WWTW	Emthonjeni, and Waterval Boven WWTW
Msukaligwa		Jerico Dam WWTW	Jerico Dam WWTW
Mkhondo	Gert Sibande	Piet Retief WWTW	Piet Retief WWTW
Chief Albert Luthuli		Carolina WWTW	Carolina WWTW

Figure 35: Visual presentation of the WWTW in the WMA.

3.9 Stakeholder Engagement within the WMA

Section 80 (c) of the National Water Act (Act No 36 of 1998) mandates a Catchment Management Agency (CMA) to coordinate the related activities of water users and water management institutions within its Water Management Area (WMA). Chapter 8 of the National Water Resource Strategy (NWRS)-2 supports the establishment of Catchment Management Forums (CMFs) to promote, improve and strengthen a value-driven and integrated approach to water resources management at local water management areas.

The IUCMA has established six (6) CMFs in all the sub-catchments (Sabie/Sand, Crocodile, Komati and Usuthu). The idea is to create platforms for the stakeholders to come together and make collective decisions about water resource management. Reallocation of water has been slow and skewed since the dawn of the new political dispensation. This has resulted in keeping many historical rights unchanged. The perpetual lack of support to emerging farmers made the situation worse. The CMFs are essentially interactive and multi-stakeholder in nature, thereby enabling the public (anyone interested) to participate meaningfully in water resource management. The CMFs are also instrumental in supporting the development and implementation of the Catchment Management Strategy (CMS).

The CMFs have management committees (Chairperson, Deputy Chairperson and Coordinator) and the Secretariat duties are carried out by the IUCMA community officers.

Issues informing the CMF agenda:

- Water Quality information shared by the IUCMA, municipalities, mining houses and other industries
- Water use and authorisation processes and statistics
- Compliance Monitoring and Enforcement (CME) updates in the water management area
- Hydrological as well as water availability information provided by the IUCMA, Komati Basin Water Authority (KOBWA), the Department of Water and Sanitation (DWS)
- Municipal reports, including the Green and Blue Drop systems and compliance to national standards and the resource quality objectives (RQOs) where available

Statistics regarding stakeholders' representation in the CMF meetings are grouped into the following sectors:

- Agricultural cooperatives
- Agricultural industries (Transvaal Wattle Growers Co-operative Limited (TKW))
- Business/ Enterprise
- Commercial farmers
- Communal Property Associations (CPAs)
- Conservation (SANPARKS, SANBI, etc.)
- Emerging farmers
- Environmental groups
- Forestry Industry (SAPPI, Mondi, etc.)
- Irrigation Boards,
- Mining houses
- Municipalities
- Sector departments
- Traditional Councils,

- Transboundary bodies (KOBWA, Ara-Sul etc.)
- Water committees
- Water Management Institutions such as Rand Water, Sembcorp Silulumanzi, etc.

The sector representations are however different in each catchment. Table 13 shows general sector attendance for the Crocodile Forum while Appendix B shows attendance of different sectors within different catchments in the WMA.

Table 13: Stakeholder attendance statistics: Crocodile Sub-Catchment

GROUPS / SECTORS	**NO OF ATTENDEES**
1. Water Management Institutions (IUCMA)	**10**
2. Municipalities	**2**
3. Agricultural cooperatives	**1**
4. Agricultural industries (**Transvaal Wattle Growers Co-operative Limited** (TWK))	0
5. Forestry industries (SAPPI, Mondi, etc)	**1**
6. Sector departments	**3**
7. Home-based care groups	0
8. Water services providers (Rand Water)	0
9. Water committee	0
10. NGOs	0
11. Traditional authorities	0
12. Industries	**2**
13. Irrigation Boards	**4**
14. Conservation / Environment (SANPARKS)	**1**
15. Emerging farmers	0
16. Mining houses	**1**
17. Universities	**1**
18. Communal Property Associations (CPAs), BLOA, WRRA	**2**
19. Private companies	**2**
Total	**30**

Each catchment has its unique and dynamic demographics, i.e. the Sand, Sabie, Lower Komati and Usuthu are dominated by rural and emerging representatives involved in small-scale farming activities. The Crocodile and the Upper Komati catchments are predominantly commercial and mining activity based. The trends shown in

Figure 36 indicates the pattern of attendance by the collective sectors in each catchment during the 2017/18 financial year. The frequency of the CMF meetings was bi-monthly at the time, which has been changed to one meeting for each catchment per quarter since the beginning of the 2018/19 financial year. This decision was implemented in consultation with the stakeholders.

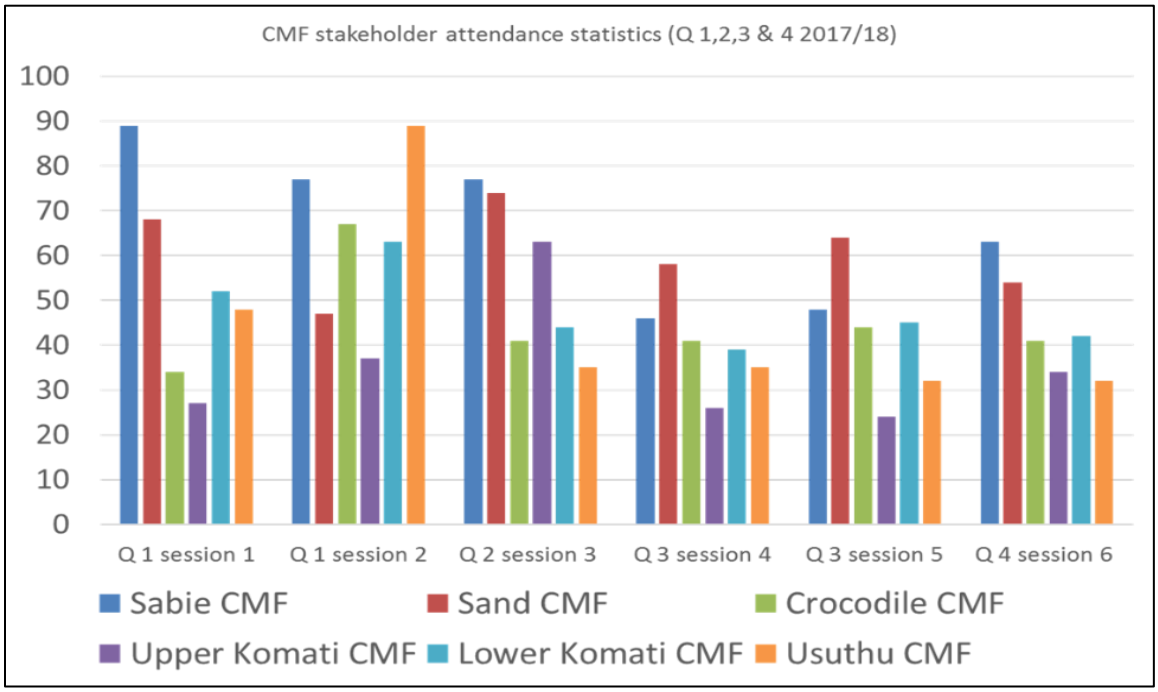


Figure 36: Catchment Management Forum (CMF) attendance statistics

The CMF meetings also have some challenges regarding the consistent attendance by some sector and key role-players like municipalities and some traditional councils. This creates a gap in in the provision of information meant for stakeholders. Efforts are continually made by the IUCMA to engage these sectors to keep the attendance frequency on track. Illiteracy levels also pose a challenge as the scientific expression of some presentations excludes other stakeholders from active participation. However, the IUCMA always strives to provide interpretation into local languages whenever possible.

3.10 Status of Revenue and Billing

Revenue Collection

The billing and recovery of the Water Resource Management charges (WRMC) function was handed over to the IUCMA on 1 November 2017. Some of the customers transferred by the Department of Water and Sanitation (DWS) to the IUCMA were not paying their accounts citing incorrect billing as a reason. The most common factor of the incorrect billing was discovered to be incorrect registered volumes. Some of the corrected accounts include the City of Mbombela, Rand Water, Crocodile Irrigation Board, and other domestic and industry customers such as mining companies and individual accounts.

The IUCMA engaged with all the Irrigation Boards within the WMA and established a quarterly meeting. Quarterly meetings convened during the 2017/18 financial year were successful. The Irrigation Boards managed to submit

all information requested by the IUCMA in order to correct registered volumes which led to corrected billing and invoicing of the Irrigation Boards accounts. Currently, 90% of the Irrigation Boards are paying their current accounts. However, the IUCMA is still engaging with Irrigation Boards to settle the old debt before the transfer of the billing function to IUCMA.

The IUCMA is currently engaging with municipalities to confirm billing points and correction of the registered volumes and accounts. The IUCMA has been actively involved in the Rand Water and Bushbuckridge Local Municipality (BLM) transfer, ensuring that Bushbuckridge Local Municipality is able to take over all the billing points that were registered under Rand Water and ensuring proper registration and correct billing of the new accounts. The IUCMA successfully managed to register as an Eskom Vendor which implies that Eskom will now make Water Resource Charge payments directly to the IUCMA and not to DWS. The status of revenue collection is indicated in Table 14.

Table 14: The status of revenue collection since 2017.

FINANCIAL YEAR	***OUTSTANDING BALANCE (INCLUSIVE OF BALANCE TRANSFERED BY DWS TO THE IUCMA)***	***COLLECTION***
2017/18	*R 222 652 813.67*	*1 648 018.55*
2018/19	*R 182 912 872.96*	*30 859 269.87*
2019/20	*R 223 100 652.97*	*20 845 684.80*
TOTAL		***53 352 973.22***

The significant increase in payment in the 2018/19 financial year was due to the payment of old debt by the Crocodile Irrigation Board to the value of R 18 million. It should be noted that some of the IUCMA water users are still making payments to DWS which would have increased the IUCMA collection. However, communication is regularly sent out to all customers about the change.

The IUCMA is struggling to collect the old debt transferred by the department. The IUCMA has increased emphasis on the implementation of approved strategies, which include, but are not limited to the development of a Revenue Management section. However, the IUCMA has identified that there are still critical areas that consequently deter customers from paying their debt as it becomes due. The challenges on billing include but are not limited to the following:

i. Lack of national intervention to legislate the change of title deeds following sale of property (farms) to include a prerequisite of fee cancellations from the CMA.
ii. Lack of data verification as transferred by the DWS on the 1st of November 2017.
iii. Limited water auditing processes to investigate non-billable water use on the ground against the non-billable water use accounts on the WARMS system.

Tariffs

Currently, the annual budget for the IUCMA is funded through augmentation by DWS (money appropriated from Parliament) and the collection of water resource charges where the current water resource charges are still not sufficient to fully fund the IUCMA annual budget thereby necessitating annual augmentation from DWS which is currently at 70% of the total IUCMA annual budget and 30% to collection of CMA charges. The approved tariffs

for 2019/20 (Table 15**Error! Reference source not found.**) and proposed tariffs for 2020/21 (Table 16) are presented below.

Table 15: The approved tariffs for the **2019/20 financial year.**

SECTOR	*TARIFFS*
Domestic & Industry	*3.28c*
Irrigation	*1.82c*
Forestry	*1.33c*

Table 16: The proposed tariffs for the **2020/21 financial year.**

SECTOR	*TARIFFS*	*% INCREASE*
Domestic & Industry	*3.70c*	*13%*
Irrigation	*1.95c*	*7%*
Forestry	*1.44c*	*8%*

Status of Other Income and Expenditure

Augmentation

The reliance of the IUCMA on predictable income streams is vital for its financial sustainability. This need has required the CMA to forge strong relations with the DWS to ensure that subsidies are received timeously. Albeit the controls to ensure that augmentation is received timeously, the IUCMA recorded a massive delay in receipt of the 2018/19 allocation. The 2018/19 augmentation was only received in November 2019 and was subsequently recognised as income in the same period of transfer. An increase in total revenue between 2019/20 as well as 2018/19 (Table 17) was thus recorded.

Investment Income

An unbudgeted amount for return on investments was recorded at R5,733,230 for 2019/20. This form of passive income has been continuously reviewed to ensure that the IUCMA maximises its investments.

Table 17: Statement of financial performance

STATEMENT OF FINANCIAL PERFORMANCE ***for the period ended 31 March 2020***		
	31-03-2020 **R**	**31-03-2019** **R***
Revenue		
DWS - Grants invoiced	175 725 831	73 014 023
Water Resource Management Charges	47 881 531	59 791 489
Other Income	10 107	136 477
Revenue Adjustments	-	-
Interest Received	5 733 230	3 270 687
	229 350 700	**136 212 676**
Operating and administrative expenditure	**(123 127 570)**	**(132 901 241)**
Surplus from operations	**106 223 130**	**3 311 435**
Finance costs	(15 000)	(40 749)
Surplus for the period	**106 208 130**	**3 270 687**

Expenditure

It continues to be one of the IUCMA's output as mandated by National Treasury to apply cost containment throughout all operations without stifling business process. As a result of applied business prudency, expenditure has remained within budget limitations resulting in an amount of 55% being spent against the actual budget. A detailed unaudited expenditure report (Table 18) for 2019/20 shows overall spend.

The IUCMA is challenging the refusal to pay "old debt" that is said to have been prescribed by Irrigation Boards as the money was already collected from the water users. Thus, the water resource charges, and the infrastructure charges should still be payable to the IUCMA and DWS, respectively.

Table 18: Itemised expenditure report

2019/20 TOTAL SPEND				
Discription	**Annual Expenditure**	**Annual Budget**	**Variance**	**%**
REVENUE	**229 350 700**	**130 443 402**	**-98 907 298**	-76%
Subsidy Income	175 725 831	80 357 384	-95 368 447	-119%
Water Resources Management Revenue	47 881 531	50 086 018	2 204 487	100%
Other Income	10 107		-10 107	100%
Interest Received	5 733 230		-5 733 230	100%
Revenue: CMA Adjustments			-	
	-		-	
SALARIES & WAGES	**75 068 826**	**84 834 265**	**9 765 439**	12%
GOODS AND SERVICES	**43 791 636**	**124 128 868**	**80 337 232**	65%
AUDIT FEES	296 277	774 379	478 102	62%
ADVERTISING & MARKETING	607 385	1 189 728	582 343	49%
ATTENDANCE FEES	1 971 585	1 904 992	-66 593	-3%
BANK CHARGES	74 809	130 416	55 607	43%
CELLPHONE CONTRACTS	1 228 458	1 408 836	180 378	13%
CLEANING	5 343	47 616	42 273	89%
PROJECTS	18 849 814	90 957 384	72 107 570	79%
COURIER CHARGES	26 385	55 704	29 319	53%
CONSUMABLES	184 952	227 496	42 544	19%
DEPRECIATION	1 831 155	-	-1 831 155	-100%
ELECTRICITY	959 523	1 123 200	163 677	15%
MUNICIPAL SERVICES	34 958	52 044	17 086	33%
FINANCE CHARGES	15 000	35 004	20 004	57%
INSURANCE	225 506	174 072	-51 434	-30%
LABORATORY TESTING	1 816 973	1 899 000	82 027	4%
LEGAL AND PROFFESIONAL FEES	1 458 967	2 264 196	805 229	36%
FUEL AND MAINTENANCE	339 508	379 992	40 484	11%
TOLL GATES	12 091	24 492	12 401	51%
VEHICLE HIRE	248 126	424 011	175 885	41%
TRAVEL & SUBSISTANCE	3 001 654	3 448 832	447 178	13%
PRINTING & STATIONERY	247 253	324 828	77 575	24%
PROTECTIVE CLOTHING	332 813	727 500	394 687	54%
RENTAL PREMISES	5 592 623	9 455 028	3 862 405	41%
RENTAL OFFICE EQUIPMENT	80 476	261 684	181 208	69%
SUBSCRIPTION	254 255	500 280	246 025	49%
ACCOMODATION	2 034 034	2 843 976	809 942	28%
INTERNATIONAL TRAVEL	780 746	1 647 288	866 542	53%
TELEPHONE & FAX	267 444	572 292	304 848	53%
RELOCATION COSTS	110 356	158 250	47 894	30%
CONFERENCE FACILITIES	809 124	1 015 104	205 980	20%
WORKMENS COMPENSATION	94 044	101 244	7 200	7%
REPAIRS & MAINTENANCE	**871 266**	**1 714 056**	**842 791**	49%
COMPUTERS	689 871	1 227 448	537 577	44%
OFFICE FURNITURE & EQUIPMENT	181 395	486 608	305 213	63%
TOTAL GOVERNING BOARD COSTS	**3 410 841**	**3 151 630**	**-259 211**	-8%
BOARD STIPENDS	2 181 656	1 853 860	-327 796	-18%
BOARD RELATED COSTS	1 229 185	1 297 770	68 585	5%
EXPENDITURE SUB-TOTAL	**123 142 569**	**213 828 819**	**90 686 250**	42%
CAPITAL OUTLAY: SUMMARY				
COMPUTERS	1 256 045	4 357 500	3 101 455	71%
OFFICE FURNITURE & EQUIPMENT	356 364	7 625 531	7 269 167	95%
MOTOR VEHICLES	-	-	-	0%
PROPERTY	-	-	-	0%
TOTAL CAPITAL OUTLAY	**1 612 409**	**11 983 031**	**10 370 622**	87%
TOTAL BUDGET & EXPENDITURE	**124 754 978**	**225 811 850**	**101 056 872**	45%

The challenges on billing include but are not limited to the following:

- Non-payment of CMA accounts by local government; it requires political and strategic interaction between the Ministers as well as top management.
- National intervention about sale of properties (farms) where legislation should be developed to link the change of title deed to include cancellation fees from the CMA to affect a sale of property. The deeds office must ensure that the new owner makes application or registration with CMA before registration can be finalised as this will assist us when closing the account of the previous owner and to have details of the new owner, which will decrease revenue losses.
- Data cleansing by ensuring that the Water Registration Management System (WARMS) is currently having the correct data for billing.
- A water auditing process to investigate non-billable water use on the ground, against the nob-billable water use accounts on the WARMS system. By conducting verification of all accounts classified under non-billable to ensure completeness of billing.
- Lifting of restrictions on tariff setting as per the current National Water Pricing Strategy, such as the irrigation sector tariff, the application of capping.

4 REVIEW OF THE CATCHMENT MANAGEMENT STRATEGY

Section 9 of the National Water Act (Act No 36 of 1998) stipulates that the CMS must not conflict with the National Water Resource Strategy. It must be reviewed from time to time, and consider relevant legislation, strategies, and plans. The Act further provides for the CMS to be developed in a phased manner. The CMS update by IUCMA is done through consultation with the stakeholders in the Inkomati-Usuthu Water Management Area. The process entails conducting the Visioning workshop for the Usuthu Catchment, followed by the review process of the visioning of the former Inkomati WMA catchments namely (Sabie, Sand, Upper Komati, Lower Komati, and Crocodile).

4.1 CMS Development

The fundamental requirement for developing CMS is to understand information from the **situation assessment including reconciliation of water demand and availability as well as the protection of the resource (water quality status)**. The vision is the link between the situation assessment and strategies aimed at promoting good management of water resources (Resource Directed Measures and Source Directed Controls). It is therefore important that the vision is accepted as legitimate by all stakeholders. Based on the principles of CMS, the strategic goals should focus on:

- Water Resources Management Strategy (with sub-strategies: regulation of water use and water resource protection),
- Facilitation Strategy (with sub-strategies: monitoring and information, public engagement, and funding IWRM), and
- Integration Strategy (Cooperative relationships).

It is important to note that before proceeding with strategy development for the WMA, part of this process would involve balancing water availability versus water demand. Furthermore, it also means that aspects of water resources management e.g. Resource Quality Objectives are considered. The vision provides the basis for

establishing long-term monitoring and evaluation (Figure 37)**. This process was undertaken with stakeholders and the Governing Board in the 2018/19 financial year.**

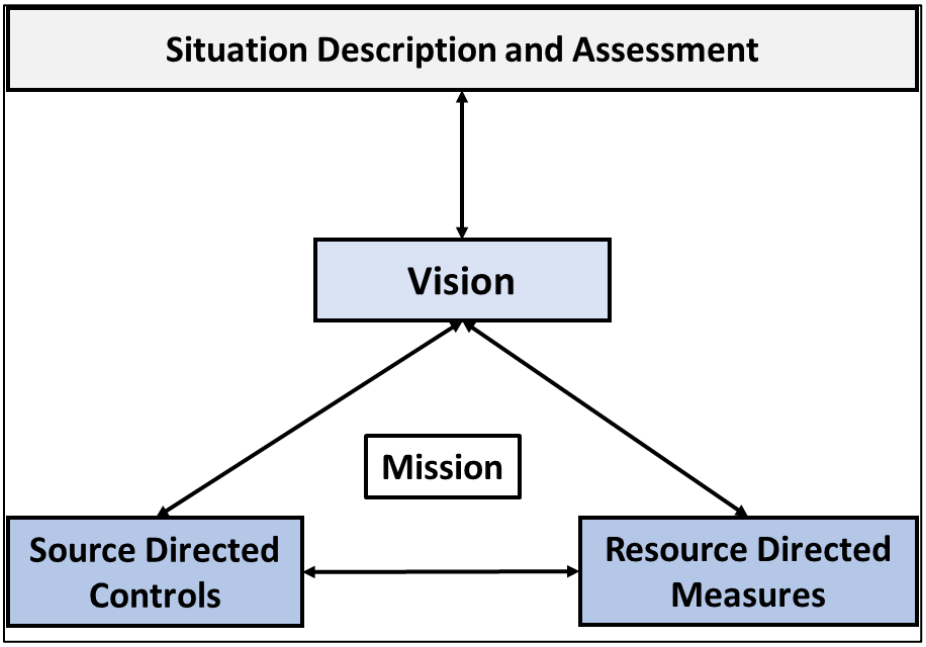


Figure 37: The vision is the link between the situation assessment and strategies aimed at promoting good management of water resources [Resource Directed Measures (RDM) and Source Directed Controls (SDC)]

This process was undertaken with the understanding that water in the Inkomati-Usuthu WMA will support the Mpumalanga Provincial Growth and Development Strategy, the National Water Resources Strategy (NWRS), and the National Development Plan (NDP). It is also recognised that the way the CMS responds to the challenges and opportunities of change in the natural and social environment will determine how people live and work together.

4.2 Risks, Challenges and Opportunities identified In the Wma

There are many risks and challenges as well as opportunities that can be drawn from the WMA and are briefly described:

Risks

The following risks were identified:

- **Schedule 3 Delegations:** Inability to implement effective and sustainable management of water resources including monitoring and management of floods and droughts in the WMA.
- **Litigation:** Negative impact on agricultural produce due to poor resource quality.
- **Reputational Risk**: Non-compliance to International Obligations; stakeholder expectations not being met.
- **Misaligned Systems:** Uncoordinated interface between Authorisation and Compliance Monitoring systems.
- **Old and overloaded infrastructure:** WWTW, manholes, and stormwater management systems are poorly maintained.

- **Low staff morale**: Staff expectations are not met; lives are at risk; systems are not supportive of effective IWRM.

These risks are in line with the current IUCMA strategic risks that are being monitored by the Governing Board.

Challenges

The following key challenges were identified:

- **Unauthorized water use**: Illegal connections to the raw water bulk line; development without planning for water availability; conversion of different water use without approval (forestry to irrigated agriculture).
- **Inability to achieve compliance with RQOs**: some RQOs too stringent that upstream water quality, illegal sand mining result in increased turbidity; unauthorized mines, poor water quality discharge.
- **Slow implementation of the NWA**: Transformation of Irrigation Boards and establishment of Water User Associations; unavailable resources for the Water Allocation Reform (WAR).
- **Unsustainable financial resources**: late transfers from DWS; capping of the water resource tariff.
- **Poor Intergovernmental Relations**: CMA boundary not aligned to Provincial/ Local Government boundary; not being considered a department/ provincial entity.
- **Infrastructure challenges**: lack of proper operation and maintenance; elevated *E. coli* counts throughout water resources.
- **The use of systems that are not aligned**: WMS, WARMS, SAP, WMS, e-WULAAS within the DWS, water users and CMA and broad water sector.

Opportunities

The following opportunities were identified:

- **International Partnerships**: opportunity to learn from peers; improve water quality of the Crocodile catchment through improved relationship with local municipalities; Ministerial attention, and recognition for CMAs
- **Presidential Investment and Infrastructure office (IIO)**: IUCMA presented the Crocodile East Dam for potential funding. The water will serve a transformation role, support domestic use, and promote economic development.
- **An effective Water Use Authorisation Assessment and Advisory Committee (WUAAC)**: the ministerial project ensures that there is fast-tracking of the authorised water use application to ensure socioeconomic benefits to communities and environmental protection.
- **Representation at the TPTC:** IUCMA can influence the transboundary resource management agenda to ensure sustainable compliance with International Obligations.
- **Potential water source for reallocation:** the decommissioning of ESKOM power plants presents an opportunity for water availability and redistribution.
- **Increased influence of the Governing Board**: opportunity to present challenges of the IUCMA/ transformation to the Ministry.

However, some points of interest that should be included in the strategy:

- ***The promotion of public awareness on water use and management*** *for the water users;*
- ***Ring-fencing of operational funds to produce HDI water use application supporting documents****; and*
- ***Bridging the gap between the government departments for HDI resources benefits****.*

5 VISIONING PROCESS

The Constitution (1996) dictates that South Africans have the right to be involved in issues that affect them. Visioning is one of the fundamental steps towards democratising and decentralising water resources management. By collaboratively arriving at a vision, different stakeholders commit to dealing with the realities of the Water Management Area (WMA). The process of visioning is a key step in the CMS development and review process, and it provides a mechanism for involving multiple stakeholders in the strategic planning process from the very outset. The visioning process was crafted to fit into the Integrated Water Resources Management (IWRM) so that the vision statement is able to be expressed as a future state that explicitly addresses a series of overarching goals in relation to the principles of **equity, efficiency and sustainability.** The vision is also geared to provide the basis for **transformation** of water resources management, to achieve social justice and sustainability in the Inkomati-Usuthu WMA.

The Visioning development phase initially focused on the Usuthu sub-catchment, a part of the Inkomati-Usuthu WMA followed by the Visioning revision process for the other 5 sub-catchments in the former Inkomati WMA. These sub-catchments are: Sand, Sabie, Crocodile, Lower Komati and the Upper Komati. This was an internally driven process where the IUCMA personnel facilitated the consultations and the stakeholders (including historically disadvantaged individuals (HDIs) and other emerging water users) within the WMA were given an opportunity to determine the desired future of the catchment based on the current and the projected status of water resources. The process was designed to allow all stakeholders, role-players and water users in the Inkomati-Usuthu Water Management Area to take part in mapping out their vision for the future.

The visioning process ensured that the review of the CMS remains a stakeholder-centred process in determining all the stakeholders' desired future for WMA. This seeks to bring to light the stakeholders' perceptions of the state of water resources in the catchment and their desires for a future well-managed catchment. The desired state of the water resource and management should include the Vision, Values and Attributes.

- A **Vision** is a concise statement describing the (shared) desire for the future conditions of the (sub) catchment.
- The **Values** are the principles that the stakeholders will use to evaluate the consequences of actions (or inaction), to propose and choose between alternative options and decisions.
- The **Vital attributes** are the most important characteristics/properties of the system to be managed. These may be technical, ecological, legal, historical, social or economic.

The summary of sub-visions from the 6 sub-catchments is indicated as follows:

- ***Usuthu Catchment***
    - *Reliable water resources accessible to all in the sub-catchment*
- ***Lower Komati Catchment***
    - *Cooperative protection and management of water resources*
- ***Sabie Catchment***
    - *Sustainable water resources for human and biodiversity*
- ***Sand Catchment***
    - *Protection of water resources and equitable sharing for economic growth*

- ***Crocodile Catchment***
    - *Quality water infrastructure and resources through innovation and management systems*
- ***Upper Komati Catchment***
    - *Sustainable water resources management for economic development and biodiversity*

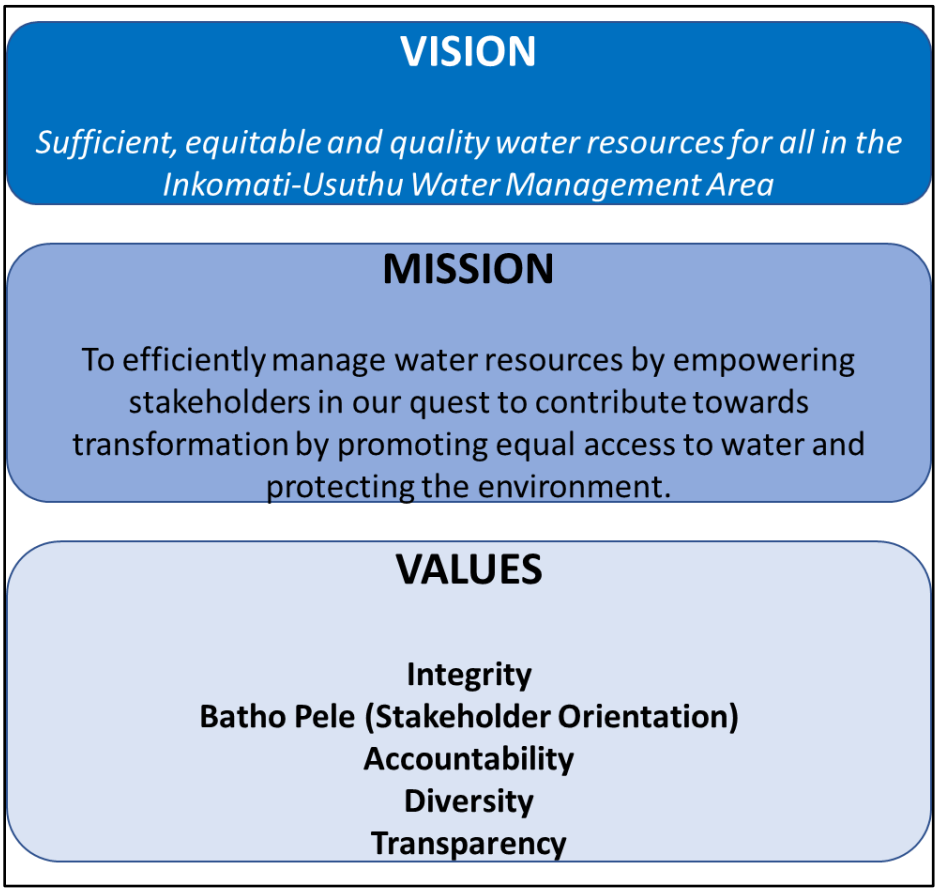
These sub-visions imply a balance between environmental protection and agricultural, tourism and urban development with a focus on the needs and aspirations of the catchment. It highlights the need for adaptation and the possibilities of diversifying the economy through innovative energy and information technologies.

5.1 Structure and Use of this Strategy Document

The strategy document starts with the Vision of the IUCMA which outlines the desired state for water resources management in achieving social, economic, and environmental imperatives, followed by its mission and values. The strategic objectives and actions providing the core of the CMS are presented against the five (5) strategic areas adopted for the CMS. This CMS document should be used in conjunction with the 5-year corporate plan for IUCMA. The CMS will be implemented in the Annual Performance Plans (APP).

5.2 Vision, Mission and Values

The Vision, Mission and Values of the IUCMA are indicated below.



6 CURRENT STRATEGIC OBJECTIVES

The five (5) Strategic Objectives of the IUCMA are highlighted:

ENSURE EFFECTIVE, EFFICIENT AND SUSTAINABLE MANAGEMENT OF AVAILABLE WATER RESOURCES

- Develop/implement empowerment programmes that promote strategic and consensual decision making across the stakeholder base.
- Develop/implement systems and strategies (e.g. the CMS and river operating systems) that facilitate improved and equitable access to the resource being mindful of the constitutional imperative to redress the results of racial and gender discrimination in performing the functions of the IUCMA.
- Develop/implement cost-effective early warning and monitoring programmes that serve strategic, adaptive, and consensual decision making.
- Ensure integrated planning and operation of systems.

ENSURE COLLABORATIVE AND CO-ORDINATED IWRM FOR WISE SOCIO-ECONOMIC DEVELOPMENT

- Grow multi-level, multi-sectoral (private, NGO and Gov.) governance networks and engagement processes that keep IUCMA agendas at the forefront, taking advantage of existing structures wherever they can achieve this purpose.
- Structure the IUCMA's advisory function, within resource constraints, to ensure IUCMA needs are served alongside those who are requesting advice.
- Support the development, and where appropriate transformation of other WRM institutions (WUA, CMC, IBs etc.).
- Develop and implement rules and procedures for operational river management.

PROMOTE AND PURSUE AN INTERNATIONAL DEVELOPMENTAL AGENDA

- Improve cross-boundary stakeholder relationships and understanding of current agreements.
- Strategically improve understanding of local catchment conditions and IWRM needs to inform decision-making about international obligations under changing circumstances (i.e. do not wait for a crisis or demand from a neighbour).
- Exchange of knowledge and expertise.
- Sharing resources to optimise transboundary water resource management in respect of inter alia flow monitoring, reporting, early warning systems, etc.

PROMOTE KNOWLEDGE GENERATION AND DISTRIBUTION

- Design and implement a system of data and meta-data management, pertinent to participative IWRM in the Inkomati-Usuthu that is accessible to all stakeholders.
- Identify, collect, and collate data/information for the system and map the stakeholder network, including the distribution of STEEP competencies, activities, needs, decision-making mandates, etc.
- Develop a strategic plan for knowledge acquisition that will guide future partnerships with stakeholders, and with other knowledge/skills providers.
- Develop/implement strategic empowerment programmes that are explicit about the transfer and diffusion of knowledge/skills across the stakeholder network.
- Do statutory reporting to the Minister of Water and Sanitation and National Treasury.
- Do strategic interaction with stakeholders in the WMA.

ENSURE EFFECTIVE AND EFFICIENT MANAGEMENT OF IUCMA RESOURCES

- Ensure an effective, relevant, and enabling financial and corporate environment.
- Explore and internalise the characteristics and processes of an enabling environment for pioneering IWRM in an emerging African democracy.
- Ensure appropriate capacity is built within the IUCMA for participative IWRM.
- Coordinate and align the adaptive systems that serve the IUCMA objectives.
- Improve internal and external networking.
- Improve internal service infrastructure e.g. the computer network.

7 REVIEW OF THE STRATEGIC PRIORITY AREAS (OUTCOMES)

The current performance indicators are based on the Strategic Objectives which were developed taking into consideration the impact on the Society, Technical, Environment, Economy, and Political (STEEP) imperatives of the Inkomati-Usuthu WMA. Howerver, in line the new planning framework, the planned performance is Outcome basd. The optimal operating model design was utilized to organize organizational capabilities into a programme structure to implement strategy as follows:

- Programme 1: Administration and Governance, aligned to Outcome 1;
- Programme 2: Human Resources and business support, aligned to Outcome 2;
- Programme 3: Financial sustainability, aligned to Outcome 3; and
- Programme 4: Protected water resources, aligned to Outcome 4.

SDG GOALS	MTSF PRIORITIES	SONA	DWS OUTCOMES	IUCMA OUTCOMES
Goal 6: Ensure availability and sustainable management of water and sanitation for all	Priority 1: Capable, Ethical and Developmental State	Finalization and implementation of the revised Raw Water Pricing Strategy which will have a positive impact on the funding model of the organization;	Outcome 1: Efficient, effective and development orientated department	Outcome 1: Increased stakeholder satisfaction
	Priority 7: A better Africa and World			Outcome 2: Enhanced human resources capabilities
				Outcome 3: Maintain financial

				sustainability
	Priority 5: Spatial Integration, Human Settlements and Local Government	Reviving the Green Drop and Blue Drop programs to strengthen water quality monitoring which will enhance the quality and health of our water resources	Outcome 2: Ecological infrastructure protected and restored	Outcome 4: Protection and use of water resources
			Outcome 3: Water demand reduced, and water supply increased.	
	Priority 7: A better Africa and World	Finalization of water use licenses within a revised timeframe of 90 days	Outcome 5: Enhanced regulation of the water and sanitation sector	

7.1 Programme 1: Administration and Governance

The purpose of this programme is to support the business of the IUCMA in terms of planning, risk management, assurance services, governance structures and setting of appropriate parameters for organisational performance. The extent of the programme is within the Office of the Chief Executive Officer within the areas of business management and governance as reflected in the former statement. Further, this programme is also responsible for stakeholder engagement and international liaison to ensure that all the material issues of engagement with stakeholders, locally and internationally are addressed to mitigate against the potential reputational risk.

7.2 Programme 2: Human Resources and Business Support

This programme supports and provides enhanced capabilities for other programmes in a shared services model. The scope of this programme is provision of a full scope of human resources, adequate enablement of Information Communication and Technology (ICT), records management and stakeholder engagement.

The programme consists of the following sub-programmes:

7.2.1 Sub-Programme 2.1: Human Resources Management

The objective of this sub-programme is development of human resources including communities in the WMA through transformation, skills development, and local employment. This extent to supplier development through initiatives intended towards enterprise development. The scope of the sub-programme serves towards full scope talent management for the IUCMA employees, provision of learnerships and traineeship in the form of internship programmes. To as far as enterprise development is concerned, the scope of this sub-programmes is procurement from local emerging micro enterprises.

7.2.2 Sub-Programme 2.2: Business Support

This sub-programme enables business support in provision of effective and efficient Information Communication and Technology (ICT), legal services, custody of information in the form of records management including facilities management.

ICT architecture and plans should align with business priorities so that resources are appropriately deployed such that there is continuous improvements and ongoing ICT service delivery.

The National Archives and Record Service Act (No. 43 of 1996) provides the terms and conditions under which public records must be managed. The IUCMA should thus embrace this compliance and business imperatives of effective records management within the ambit of good governance, accountability, and transparency.

In addition to the factors mentioned above, this sub-programme seeks to reduce reportable safety, health and disabling incidents through effective management and provision of facilities in compliance with applicable quality and safety standards.

7.3 Programme 3: Financial Sustainability

The objective of this programme is to ensure that adequate capital base is built to ensure financial sustainability of the organization. The scope of the programme is management of the balance sheet, income statement, cost management, tariff setting and overall management of working capital. This programme also provide capabilities for funding of capital infrastructure and expansions when required.

The programme consists of the following sub-programmes:

7.3.1 Sub-Programme 3.1: Supply Chain Management

The objective of this sub-programme is to ensure that there is value for money on acquisition of goods and services by the IUCMA and a seamless operation of the organizational value chain. Further, the sub-programme is an enabler to the IUCMA by attaching how commodities are sourced to delivery of the organizational mandate.

7.3.2 Sub-Programme 3.2: Financial Management

This sub-programme ensures sound financial accounting in accordance with applicable standards and legislation. Its scope is full general ledger management and that financial resources of the IUCMA are safeguarded through

compliant processing of transactions. These measures are ultimately reflected effective working capital management, optimal capital structures and growth of the business.

7.3.3 Sub-Programme 3.3: Revenue

This sub-programme ensures continuous and effective management of billing accuracy, customer payment plans and that credit control procedures are consistently applied. The sub-programme also provides capabilities to ensure that the tariff determination and consultation processes are effected.

7.4 Programme 4: Protection and Use of Water Resources

This programme effects the core mandate area of the IUCMA in ensuring effective, efficient, and sustainable management of water resources. The scope of the programme is management of resources in water quality monitoring, resource planning and operations, compliance monitoring and enforcement, water use authorisations including, data information and management.

The programme has the sub-programmes detailed below.

7.4.1 Sub-Programme 4.1: Resource Quality Monitoring, Planning and Operations

The sub-programme implements effective river operations within the WMA to manage droughts, surface and groundwater management, water allocation plan and data management systems to effect the mandate of the IUCMA. The sub-programme also implements water quality routine monitoring plans.

7.4.2 Sub-Programme 4.2: Water Use Authorisations

The Water Use Authorisation (WUA) function has been delegated to the IUCMA to perform administrative function through the assessment of applications which is a function performed by this sub-programme. This is to ensure that water use applications are assessed and submitted with recommendations to the Responsible Authority within the regulated period. Those authorisations include water use licences (WULs) and General Authorisations (GAs).

7.4.2 Sub-programme 4.3: Compliance monitoring and enforcement

This sub-programme performs inspections and audits, including investigations of reported incidents of resource pollution in compliance with the NWA and other environmental legislation. Implementation of a comprehensive education and awareness campaigns to ensure that water users and law enforcement agencies are aware of their role in supporting the work of the IUCMA are carried out.

In a subsequent Management Workshop, the above priorities were considered and used to develop strategic measures with management objectives and plans. These will assist the development of the Annual Performance Plan (APP) and ensure sustainable Integrated Water Resources Management (IWRM).

8 STRATEGIC AREAS FOR IMPLEMENTATION OF THE CMS

The strategic implementation of the CMS in the short term and long term is presented in the sections below in relation to the strategic priorities. The following are taken into consideration:

- Management measures,
- Management objectives, and
- Management actions.

8.1 PROTECTION AND USE OF WATER RESOURCES

8.1.1 Strategic Measure A: Development and Management of Functional Data Monitoring Network

The water monitoring networks support a wide range of values and uses within the WMA. It entails the use of water from the rivers, streams, groundwater, and dams for ensuring that the Reserve, International Obligations, strategic use (transfers out of the catchments) is guaranteed. The remaining water us utilised for irrigation, domestic, industrial use, and water for development. These uses must be managed to avoid adverse effects on instream uses and values associated with other waterbodies, such as recreational, ecological, and cultural values. Knowledge of the hydrological patterns, trends and status of water quality is vital for achieving sustainable management of water resources. Thus, IUCMA needs to have a functional monitoring network (surface and groundwater) for water quantity and water quality in both historical and real time.

MANAGEMENT MEASURE	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION
Development and Management of Functional Data Monitoring Network	*Objective 1:* Ensure that the monitoring networks enable the IUCMA to manage and deliver water that is fit for the purpose for which it is to be used in an efficient, effective, and safe manner. *Objective 2:* To operate the rivers and groundwater efficiently and effectively to provide water resources commitments for all users, including international obligations.	• Development of manual and procedures for data collection and processing. • Standardisation of climate and hydrological data collection techniques such as the use of telemetry system to allow registration of online data in databases. • Standardisation of equipment and methods to collect climate data by implementing data loggers to complement all manual stations. • Effective management, maintenance, repair, renewal and replacement, and the protection of the monitoring stations to provide real time data. • Effective management and mitigation of any emergencies occurring at monitoring stations. • Implementation of risk management procedures to deal with an emergency that occur at all strategic stations.

8.1.2 Strategic Measure B: Integrated Planning and Operation of Water Resources Systems

Water stress is evident in large parts of South Africa and the Southern African region. It affects the region's food and energy production and its ecological needs, and adversely impacts on the health and livelihoods of its populations. Climate change and associated uncertainty will exacerbate matters. The demand for water is increasing because of rapid economic development, increasing urbanisation, and the large growth in population and its impacts on food production. Investments in energy, urban, and water infrastructure will require a hitherto unseen attention to the risks posed by water within the water management area. The availability and use of accessible water (both surface and groundwater) play a dominant role in the sustainable development within the WMA. The lack of adequate sanitation and robust wastewater management also compound matters by contributing to the unchecked pollution of accessible water—this adversely affects the health and welfare of many millions of people in the WMA. In order that appropriate decisions are made in terms of water resource availability and water allocation, integrated water resource planning is very crucial.

MANAGEMENT MEASURE	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION
Integrated Planning and Operation of Water Resources Systems	*Objective 1*: To provide updated and reliable water resources data to support integrated planning and decision making. *Objective 2:* To ensure adequate water availability and reliability of supply to existing users and new allocations.	*a) Finalisation of validation and verification studies in the WMA* The IUCMA has a duty to validate and verify the Existing Lawful Water Use (ELU) of water use activities that took place two years prior to the promulgation of the NWA and that were regulated by any other law. This is required by section 35 of the NWA. The IUCMA has through the approved structure established an on-site help desk for the Validation and Verification of water resources (both registered and unregistered). *b) Update water availability and assessment studies (WAAS)* The determination of water availability and assessment will entail but are not limited to: • Description of the quality and quantity of water in the prescribed area. • Description of the impacts of land use change on water quality and quantity.

MANAGEMENT MEASURE	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION
		• Description of the demand for water resources, including demand from irrigation, industrial, commercial, domestic, and recreational uses. • Specification of water requirements for the environment. • Specification of sustainable abstraction volumes. • Provision of criteria for granting licences. • Provision of new options for achieving sustainable use of water resources that will: -Promote efficient water use. -Specify policies for the reuse of water. -Establish trigger mechanisms/thresholds for highlighting changes to water resource conditions such as flow rate and downstream quality. *c) Maintenance and operation of Decision Support Systems* To achieve the objectives for providing water supply to all water users, IUCMA is required to maintain and operate long term and short-term Decision Support Systems (DSS) that will assist in decision making processes by the Water Managers. ***Long-term operations*** involve an annual analysis to be carried out in the month in which the dams are historically at their fullest, which is May of each year and this allows water managers to make decisions about the implementation of operating rules (dam levels and restrictions levels are reviewed). The Decision Support Systems allow the Implementation of ecological reserve and international obligations. ***Short-term operations*** allow water managers to regulate the water use by water users on a weekly basis from catchment water resources to be equitable, efficient, and sustainable in line with the vision and goals. A short-term

MANAGEMENT MEASURE	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION
		operations Decision Support System (DSS) allow storage of different types of data (e.g. time series) and integrate data with models on a real-time basis and report using dashboards and other technologies on the outputs/operation indices to assist the short-term operations of water resource infrastructures within the Inkomati-Usuthu Water Management Area. *d) Construction of off-channel storage dams and regulating weirs* The purpose is to determine the additional water yield after identifying as many sensible weir sites, along with their particular characteristics, that would be able to improve the overall system yield and thereby contribute toward meeting the water use and river regulation requirements of the supply area within our major rivers. Investigations will be carried out for sites identified in the past as well as for new identified sites which exhibit sensible storage potential. There are limitations in the siting of weirs along the main leg of the major rivers and thus emphasis will also be placed on potential off-channel sites on the farms to increase assurance of supply for users.

8.1.3 Strategic Measure C: Water Allocation Plan (WAP)

In catchments where the water resource is already overallocated such as Crocodile, Sabie and Komati catchments**,** the compulsory licensing process will be initiated as soon as circumstances allow, or as outlined in the National Water Resource Strategy. In areas where there is no available allocable water, water may have to be reallocated using compulsory licensing to ensure fair and equitable use of water, to correct over-allocations or to protect aquatic ecosystems. In these cases, special attention will be given to the possible social, economic, and ecological implications of the reallocation process. The water allocation entails meeting urban requirements, reallocating water to emerging farmers and assessing impacts of infrastructure development and associated increased allocation of ecological requirements and other users. The issue of integrated water quality management with allocation planning to achieve fitness for use by agriculture, environment, and tourism, while maximising available water and reducing dilution requirements is also critical in the water allocation plan.

On the other hand, allocating water without ensuring that all users have the capacity to use this water productively will limit these benefits. Consequently, the water allocation process should not only aim at realizing the above goals but should work closely with all spheres of government to promote the productive and responsible use of water. Likewise, water allocations should try to minimise the impacts on existing lawful users of water who are already contributing to our development. As such, water allocations should promote shifts in water use patterns that are equitable but also gradual and carefully considered.

MANAGEMENT MEASURE	**MANAGEMENT OBJECTIVES**	**MANAGEMENT ACTION**
Water Allocation Plan (WAP)	*Objective 1:* The allocation of water should, therefore, promote equity, address poverty, generate economic growth and create jobs. *Objective 2:* The water allocation process must also recognise that redressing the effects of previous discriminatory legislation also provides social stability, which in turn promotes economic growth. *Objective 3:* The water allocation process must allow for the sustainable use of water resources and must promote the efficient and non-wasteful use of water.	*a) Establish Water Allocation and Transfer policy* The Water Allocation Plan should establish: • Principles by which water is allocated. • Principles by which water can be transferred. • The method by which existing licensed water allocations (hectares) will be converted to volumetric allocations. • Policies for the management of volumetric allocations. • Policies for the protection of groundwater. • Phase in the change of water use entitlements from Existing Lawful Use to licences under the National Water Act. *b) Ensure protection of ecosystems* The Water Allocation Plan should: • Specify the water needs of water dependent ecosystems (Implement the ecological flow requirements/Reserve and the Resource Quality Objectives). • Specify the environmental impacts of water use within the prescribed area and downstream, including impacts relating to water quality and quantity. *c) Investigate the economic and social development of water allocation* The Water Allocation Plan will:

MANAGEMENT MEASURE	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION
		• Describe the social and economic values inherent in the allocation of water within the prescribed area for landholders and the wider community. • Describe the social and economic impacts of water allocation, both short term and long term, including the effects on the value of land. *d) Development of water allocation framework to give practical ideas on how water allocation can be balanced between the environment, existing lawful users and new potential productive users of water;* *e) Identify opportunities for productive water use with particular emphasis on HDIs* *f) Identify local and regional planning initiatives that need water, or that could support the productive use of water by HDIs* g) *Outline the water* availability, requirements, and identify possible curtailments.

8.1.4 Strategic Measure D: Reducing Water Demand through Implementation of Water Conservation and Demand Management (WC/WDM) Principles

A good understanding of water use of the major land uses is key to assessing and improving the efficient use of water. The National Water Act (1998) (DWAF, 1998) clearly states that water should be used efficiently. Irrigated agriculture is a key economic activity in the WMA, which together with forestry, employ up to 60% of the work force in the catchment. There is need to increase the area under irrigation to ensure food security, create jobs, and to support economic growth, according to the National Development Plan (NDP). However, this must be done using the existing water resources since available water in the catchment is almost fully allocated. Therefore, there is need to increase water use efficiencies to free up some water, especially in the irrigation sector that uses the bulk of the catchment's resources (57%) for possible redistribution and reallocation. Studies have been done in the water management area to quantify the water use of key irrigated crops. Examples include citrus and macadamia nuts (Gush and Taylor, 2014), maize and sugarcane (Jarmain et al., 2014) while avocados and macadamia nuts are the subject of an ongoing study by the Council for Scientific and Industrial Research (CSIR).

In the urban sector, based on the findings of assessments done within Ehlanzeni District Municipality for instance, there is significant scope for WC/WDM in WMA. WC/WDM will result in both a reduction of Non-Revenue Water (NRW) and the total system input volumes. A serious concern, however, is the pervasive limitation in institutional capacity and technical skills to embark on WC/WDM programmes in the municipalities.

MANAGEMENT MEASURE	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION
Reducing Water Demand through implementation of Water Conservation and Demand Management (WC/WDM) Principles	*Objective:* To improve water use efficiency with agricultural, domestic, and industrial water use sectors through implementation of WCDM	*a) Develop an implementation plan on water use efficiency by the irrigation sector to ensure 20% water saving by 2040* Water losses through current irrigation practices range between 30 and 40%. This level of inefficiency is itself indicative of the significant potential for water conservation and demand management. One aim of the strategy promoting equitable and efficient use of water is to provide a regulatory support and incentive framework to improve irrigation efficiency and to increase productivity. The strategy also seeks to promote optimal use of water to release water for the marginalised farmers and other water use sectors. IUCMA will develop a decision support system that will be used to estimate optimal water use for different crops within the water management area. The development of the decision support system requires accurate measured data from key irrigated crops in the WMA. Therefore, the first step is to collect data on the daily and seasonal water use patterns of selected important crops whose water use rates are not currently known. The second step is to develop a system for estimating the water use efficiency of, and water allocation to, crops. The decision support system will be in the form of either a smart phone application or a computer model that uses readily available information to predict crop water use. Water use efficiency defined here as yield per unit of water consumed will be calculated using the observed maximum yields of a specific crop type in each defined (e.g. quaternary) catchment in the WMA. It is expected that water use efficiency will enable water managers in future to allocate water based on actual crop water use instead of scheduled volumes per hectare. *b) Develop an implementation plan on Water Conservation and Demand Management by domestic and industrial sector to ensure 15% reduction in water losses by 2040*

MANAGEMENT MEASURE	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION
		IUCMA ensures that local municipalities develop implementation plans for WC/WDM. The per capita water use is very high in most of the local municipalities compared to the international guideline of 120 litres per capita per day. It is important to note the different operational boundaries for water resources management and water services. Water resources management is undertaken on a catchment basis, whereas water services are provided according to municipal demarcation. It is envisaged that local municipalities will have a greater focus on demand management for domestic and industrial use within its area of jurisdiction. The IUCMA will coordinate the activities of those local municipalities residing within the WMA and ensure the implementation of WC/WDM practices in new developments. The goal is to reduce the water losses and inefficiencies with set targets and timelines.

8.1.5 Strategic Measure E: Climate Change Resilience Strategy

There is need for a sustainable governance and adaptation towards building resilience to climate change within water management areas. In many water parts of the world, the impacts of climate change on ecosystems and on society are becoming more and more visible. Building resilience becomes a major issue as climate change affects water quantity and quality, water temperature, water-related ecosystems and the magnitude and occurrence of extreme weather events such as floods and droughts. Through its impacts on water resources, climate change is affecting many sectors, including agriculture, energy, fisheries, tourism, health, and biodiversity. Both water resources and climate change know no borders. According to the Southern African Development Community (SADC) Policy Paper on Climate Change, evidence of the potential impact of a drier SADC is already evident. In several SADC countries, changes to the length of the growing season are already evident leading to a drop in agricultural productivity due to lower crops yields. These reports are increasing and becoming persistent, leading to an increase in food insecurity and a rise in food prices (Lesolle, 2012). The potential impact of Global Climate Change (GCC) in water management areas is a key concern for the future sustainability of humanity, as well as economic development. It is therefore imperative that we develop a climate change adaptation strategy.

MANAGEMENT MEASURE	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION

Climate Change Resilience Strategy	*Objective 1:* To effectively manage climate change impacts on the water management area's water and sanitation through interventions that build and sustain the social, economic, and environmental resilience and emergency response capacity; and *Objective 2:* To promote the application of integrated water management as a priority tool to reduce climate vulnerability (including extreme events – drought and floods).	The aim is to assess the impacts of climate change, prioritise associated risks and opportunities, and develop climate risk management strategies for water management areas to build resilience in vulnerable communities. a) Explore how impacts of climate change affect water supply and quality. b) Evaluate priority climate-related risks in terms of the hazards and consequences. c) Identify the most important short-term, medium-term, and long-term strategies that can be implemented in the basin to reduce the risks and impacts of climate change.

8.1.6 Strategic Measure F: Water Allocation Reform (WAR) Strategy

The resources are finite but equitable redress needs to be achieved. However, equity needs to be defined. There is need to understand what and how much we have in order to determine how much will go to industry, domestic, etc. (prioritisation).

MANAGEMENT MEASURE	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION
Water Allocation Reform (WAR) Strategy	Improve the reallocation/allocation of water resources to HDIs as a means of redress to achieve transformation.	• Revise the Water Allocation Reform Strategy once the verification of existing lawful use is complete. • There needs to be transformation of Irrigation Boards to establish uniform tariffs. This includes scrutinising Service Level Agreements. • Stronger stakeholder engagements are needed to understand where water is, as well as improved collaboration between different government departments. • The "Use It or Lose It" principle needs to be applied about water.

MANAGEMENT MEASURE	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION
		• Need to know the potential of water resources (including groundwater) and how they can be exploited. • Phased approach on implementation of compulsory licensing.

8.1.7 Strategic Measure G: Ensure effective Water Quality Monitoring

According to section 137 of the NWA, the Minister must establish national monitoring systems on water resources, which must provide for the collection of appropriate data and information necessary to assess:

- The quality of water resources,
- The use of water resources,
- Compliance with the resource quality objectives, and
- The health of aquatic ecosystems.

In addition to the above listed aspects, it is also necessary for the system to be able to assess compliance to international obligations in catchments that are transboundary in nature. It should be mentioned that the systems in and by themselves are of no use if the required data are not collected and captured in such systems to enable its manipulation into information to enhance decision making.

8.1.8 Strategic Measure H: Processing of Water Use Authorisation (WUA)

The overall objective of the National Water Act (Act 36 of 1998) (NWA) is to protect, manage, develop, conserve, use and control of water resources. It is centred on three principles which is sustainability, efficiency, and equity. There are 11 water uses in terms of section 21 of NWA that must be authorised. There are tools for controlling the impact of water use, namely Source-Directed Measures and Resource Directed Measures.

The IUCMA has the mandate from the Department of Water and Sanitation (DWS) to process and recommend water use authorisation, and the Water Resource Utilisation (WRU) division is leading that role through the implementation of Source Directed Measures.

MANAGEMENT MEASURE	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION
Processing of Water Use Authorisation (WUA)	One of the functions that the IUCMA is the assessment and processing of water use authorisation applications, that include water use licences (WULs) and General Authorisations (GAs). The recommended WULs are submitted to DWS (the Responsible Authority) to make the final decision.	The DWS as the custodian of the water resources has developed a system called Electronic Water Use Licence Authorisation Administrative System (e-WULAAS) to be used by both the water users (the Applicants) and assessors. This is an online system where the Applicant lodge an application which is accessible to all assessors. The WRU will continue with the processing and recommendation of water use authorisation using e- WULAAS until such time when the DWS develops another system. Additionally, the IUCMA needs full delegations of power for processing and finalising water use licences. The IUCMA should come up with mechanism to fast track the replacement of ELUs with licences. The IUCMA must appoint an engineer with experience on civil design to provide specialist comments on WULAs. Similarly, there is need for the IUCMA to appoint in-stream officials that will deal with s21 (c) and (i) water uses.

8.1.9 Strategy Measure I: Co-operative Governance

Section 24 (Bill of Rights) of the Constitution of the Republic of South Africa states *that "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".*

Based on the above, it is required by related legislation that Government departments support each other in protecting the environment and the health of human beings with the aim of promoting economic, social, and cultural success.

MANAGEMENT MEASURE	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION
Cooperative Governance	To provide support/review of environmental authorisation by sector departments.	The IUCMA provides support to other Government departments by providing technical input on the Environmental Impact Assessment (EIA) or Environmental

MANAGEMENT MEASURE	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION
		Management Programme Reports (EMPr) of all the listed activities (activities that may or have significant impact on the environment). The IUCMA is assessing all the above-mentioned reports received, for example, EMPr for mining activities from the Department of Mineral Resources (DMR), be it for mining right, mining permit etc. and EIAs either directly from the consultants or the Departments of Agriculture, Rural Development, Land Reform, municipalities, etc. The regulated timeframe to provide technical input in terms of the National Environmental Management Act (Act 107 of 1998) is 60 days. IUCMA will continue to provide support as and when required to other Government departments and provide comments within the regulated timeframe. The IUCMA will, after assessment of the reports, send letters to the respective institutions with a set of conditions/comments for consolidation for either a permit or a licence. The IUCMA has developed a system called Orbit with access for all officials. It registers and sends notification of the received application for allocation to assessors.

8.1.10 Strategy Measure J: Validation and Verification

The IUCMA has a duty to validate and verify the Existing Lawful Water Use (ELU) of water use activities that took place two years prior the promulgation of the NWA and that was regulated by any other law. This is required by section 35 of the same Act.

MANAGEMENT MEASURE	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION
Validation and Verification	To fully account for the water use in the WMA inclusive of current and historical use.	The IUCMA finalised validation and verification for both the Inkomati and Usuthu catchments. A total of 1 300 properties were identified for Usuthu

MANAGEMENT MEASURE	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION
		catchment and 4969 for Inkomati catchment. The Inkomati verification is currently at 65% of the 90% target and the Usuthu at 58% of the 90% target. The project is focusing on section 21 (a) – abstraction of water, (b) – storage of water and (d) – stream flow reduction. This forms part of billable water use. The IUCMA has established an on -site help desk where the V and V team meets with the water users (both registered and unregistered) and conduct verification on site. a) Though the V and V project contract has ended, the IUCMA will continue with verification of the ELUs on site for both the Inkomati and Usuthu catchments. The IUCMA should appoint additional resources to render the functions of the V and V (a fully-fledged structure). The on-site help desk will continue to be utilised. b) Conduct an audit on water uses in the tributaries and bulk water uses. c) Removal of unlawful water uses in the irrigation sector.

8.1.11 Strategic Measure K: Ensure Improved Water Quality, Compliance to Authorised Abstraction Limits/ Water Use Licence (WUL) Conditions

The IUCMA performs a regulatory function as outlined in the Constitution of the Republic of South Africa (No.108 of 1996) under section 24 of the Bill of Rights in the Constitution. The division should ensure that everyone has the right to an environment that is not harmful to their health or wellbeing; and to have the environment protected for the benefit of present and future generation, through reasonable legislative and other measures that:

- Prevent pollution and ecological degradation,
- Promote conservation, and
- Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

MANAGEMENT MEASURE	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION
Ensure Improved Water Quality, Compliance to Authorised Abstraction	To ensure improvement in water quality, adherence to condition of the issued water use licence, and abstraction limits	• Ensure that all reported complaints/pollution are attended to and enforcement actions are taken for all non-compliance observed.

MANAGEMENT MEASURE	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION
Limits/ Water Use Licence (WUL) Conditions		• Ensure that enforcement actions taken are consistent, transparent, and proportional. • Continue to regularly engage with NPA, SAPS, municipalities, Department of Environmental Affairs, Department of Water and Sanitation, interested and affected parties, and other relevant stakeholders. Furthermore, the division will continue to conduct awareness with other relevant stakeholders. • Identify and investigate big polluters and refer such matters to the NPA for prosecution. • Identify and investigate major non-compliant abstractors within the catchment and recommend to the NPA for prosecution. • Prosecute users who completely disregard the IUCMA advice on matters related to pollution and abstraction. • Continue to conduct audits/inspections/pollution incidents as outlined in section 125 of the National Water Act (Act No.36 of 1998). • Furthermore, perform an enforcement function as mandated in terms of section 31D of the National Environmental Act 107 (NEMA). The Environmental Management inspector (EMI) is also regarded as being a peace officer and may exercise all powers assigned to a peace officer, or to a police officer who is not a commissioned officer, in terms of Chapters 2, 5, 7 and 8 of the Criminal Procedure Act, Act No 51 of 1977. In addition to the above listed aspects, it is also necessary for the system to be able to assess compliance to international obligations in catchments that are transboundary in nature. It must be mentioned that the systems in and by themselves are of no use if the required data are not collected and captured in such systems to enable its manipulation into information to enhance decision making.

8.2 INCREASED STAKEHOLDER PARTICIPATION

8.2.1 Strategic Measure A: Establish Water User Associations (WUA) and Develop a Stakeholder Relations and Engagement Plan

The National Water Act No 36 of 1998, sections 79 and 80 stipulate that upon the establishment of a CMA, amongst the initial functions of a CMA should be the co-ordination of related activities of water users and water management institutions (WMI) within its water management area. The CMA should also recognise the need for the integrated management of all aspects of water resources and, where appropriate, delegate management functions to a regional or catchment level body such as a Water User Association (WUA) to enable everyone to participate. The IUCMA, through the Institutions and Participation (I &P) division, has initiated the establishment of various platforms at local and international levels in order to enable stakeholders to collaborate on water resource management and decision-making processes and issues that have an impact on the use and development of water resources. The I &P has also developed and implemented empowerment programmes that promote strategic and consensual decision making across the stakeholder base.

The IUCMA, has a responsibility of improving the lives of communities within which it exists. It embraces Corporate Social Investment (CSI) as one of the strategic tools through which it can contribute towards social development and economic growth of the water management area. CSI has the potential of projecting IUCMA as a responsible corporate citizen, while providing a secondary platform for corporate branding and marketing. IUCMA's CSI Programme is aligned to the institutional vision, mission, and strategic focus. To give effect to this intent, the IUCMA commits itself to invest in development and empowerment projects that embrace the diversity of stakeholders and assist in becoming a significant player in the field of community upliftment.

As part of community social responsibility programme, creating job and enhancing revenue the following will be implemented:

- Re-establish Dingledale irrigation scheme in Chochocho and transform it into Water User Associations. There is enough supply from N'wa dlamarhi river and rand water pipeline from Inyaka Dam. The areas to be managed by this entity is Chochocho, Roooboklaagte, Casteel, Dwarsloop, Manyeleti and Rolle.
- The establishment of Water Use Association to manage area irrigators under Mkhuhlu, Skukuza, Area, Marite and Thulamahashe.

MANAGEMENT MEASURE	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION
Establish Water User Associations (WUA) and Develop a Stakeholder Relations and Engagement Plan	*Objective 1*: To establish and Support Water Management Institutions *Objective 2:* To facilitate and conduct stakeholder empowerment and interactions. *Objective 3:* Implement Corporate Social Investment (CSI)	The institution aims to establish institutions such as Water User Associations (WUAs) which will be responsible for water resources management where all stakeholders in the water management area will converge and discuss matters related to integrated water resources management (IWRM) at catchment level. This will leverage the institution's capacity to keep track of all water use activities and their impacts on the resource (surface, ground, ecology) within the WMA and to keep the public informed of all developments (policy change/implementation, compliance/violations, new projects, knowledge sharing). The IUCMA will continuously implement activities which seeks to progressively transform the sector and empower water users within the water management area with a special focus on the historically disadvantaged individuals (HDIs) and black communities. This is aimed at ensuring that everyone is involved in redressing past political imbalances in water allocation and access for socioeconomic development. The IUCMA uses CSI to support its strategic positioning as a contributor to the socioeconomic development of the WMA. The IUCMA also utilises the initiative to contribute towards Government's poverty eradication programmes. It seeks to enhance IUCMA's corporate identity while promoting the IUCMA as a caring corporate citizen; and provides opportunities to build relationships with business through partnerships.

8.2.2 Strategic Measure B: Participate in Transboundary and International Water Resources Agreements

The revised protocol on shared watercourses provides for State parties to individually and, where appropriate, jointly, protect and preserve the ecosystems of a shared watercourse as well as prevent, reduce and control the pollution and environmental degradation of a shared watercourse that may cause significant harm to other watercourse States or to their environment, including harm to human health or safety, to the use of the waters for any beneficial purpose or to the living resources of the watercourse. Furthermore, the Tripartite Permanent Technical Committee (TPTC) between the Republic of Mozambique and Republic of South Africa and the Kingdom of Swaziland for co-operation on the sustainable utilisation of Incomati and Maputo watercourses have reached a resolution on the exchange of information and water quality.

The scope of the resolution covers among other things, the following:

- The minimum flows that are required to meet international obligations,
- Water quality management goals and criteria until the water quality objectives and criteria are determined, and
- Implementation of exchange of and access to information and data.

The IUCMA is the implementing agent on behalf of the Department of Water and Sanitation in respect of this resolution and should therefore be involved in the structures that have been developed for this purpose to enable it to report accordingly on the data and information that it collects in its area of responsibility.

- In addition to the endeavours to participate meaningfully in the international space, the IUCMA has, together with equivalent transboundary institutions in the kingdom of eSwatini and the Republic of Mozambique established the Rivers and Environmental Management Cooperation (REMCO) platform for cooperation in transboundary water resource management. The REMCO Steering Committee was established during an interactive water management conference in Swaziland in October 2010. The REMCO initiative is also in line with one of the principles of the SADC Revised Protocol on Shared Watercourses, which encourages the State parties to pursue and establish close cooperation regarding the management of shared watercourses.
- Furthermore, looking at the existent transboundary management setup for the Incomati through the IIMA, a final agreement has not been reached to ensure the practical and effective implementation of joint management of the Incomati system. Thus, REMCO is a promising initiative for cooperation in the use and management of the river system, since it includes institutions which operate at local level and also acknowledges the national interest and sovereignty of all three countries.

MANAGEMENT MEASURE	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION
Participate in Transboundary and International Water Resources Agreements	To promote an international agenda in the sustainable management of transboundary resources.	The revised Southern African Development Community (SADC) Protocol provides an overarching framework for the countries to follow. This protocol is considered in the development of the treaties. There are numerous ongoing initiatives, projects, and programmes in the water management area that will impact the Integrated Catchment Management Strategy and its implementation. As information from these projects becomes available it will be incorporated into the planning and management of resources by the IUCMA through interaction with stakeholders. Real-time flow data must be made available and be transparent for all parties in relation to floods and droughts. The water quality management goals and criteria of the TPTC resolution on exchange of information and water quality states that the objective of water quality management is to ensure that the watercourses are used in a sustainable manner according to the interim agreement, in particular Article 8. It further indicates that the parties shall individually, or where appropriate, jointly develop processes to classify the watercourses and determine water quality objectives. The parameters or variables that need to be monitored have been listed and the frequency of monitoring also determined for both basins. The Republic of South Africa as a party to the agreement has individually classified the watercourses of the Inkomati Water Management Area excluding the Usuthu catchment which forms part of the Maputo Basin. Monitoring of the required variables must be conducted at the frequency required in terms of the agreement and reported accordingly. The resolution further obligates the parties to exchange or facilitate the exchange of information to achieve the objectives of the resolution at the frequencies or periods indicated and on the required parameters or variables.

MANAGEMENT MEASURE	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION
		The management actions required to promote and pursue an international developmental agenda are as follows: • Conduct monitoring at all the monitoring sites identified, on the required parameters and at the required frequency. • Produce and exchange the annual water quality status at the designated monitoring stations. • Participate in the structures created for purposes of transboundary water management engagements and reporting. • IUCMA participates in Technical Committees for Joint Water Commission (JWC) and TPTC. • Use the REMCO Steering Committee to create an effective platform for the River Basin Authorities (RBAs) to exchange knowledge about operational methods and practices, to foster co-learning and to enhance cooperation between the RBAs and other water management institutions through informed and consensus driven decision making • Identify and set up joint projects (or scale-up existing projects) that are beneficial for the catchment, e.g. a Transboundary Basin Management Strategy or facilitate twinning arrangements with other water management Institutions. • Continue to participate in twin agreement with Dutch Water Authorities in Netherlands. • Conduct innovative research and development

8.2.3 Strategic Measure C: Improve Communication and Information Management

Access to information is a constitutional requirement. The National Water Act (Act 36 of 1998) (NWA) places an obligation on Catchment Management Agencies (CMAs) to encourage the involvement of stakeholders and interested parties in matters of Integrated Water Resource Management (IWRM). The Promotion of Access to Information Act (Act No. 2 of 2000) (PAIA) provides that the public has the right to information held by an organ of state. It is therefore upon this premise that the Inkomati-Usuthu Catchment Management Agency (IUCMA) must find effective ways to enhance and sustain a two-way communication between itself and its target audience/ stakeholders (both internally and externally). The key responsibility is to ensure that all parties have access to information that will enable their meaningful participation in IWRM matters.

MANAGEMENT MEASURE	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION
Improve Communication and Information Management	*Objective 1:* Build the IUCMA's reputation through open and honest communication. *Objective 2:* Ensure effective communication will all stakeholders.	The Communication and Marketing division works with all the divisions to develop communication tools and systems that disseminate all related information through electronic and print media to the stakeholder base. To create awareness and understanding of IWRM in stakeholders and influence their attitude towards IWRM matters by: • Influencing the culture of participation on IWRM by stakeholders; • Promoting successful IUCMA initiatives, both nationally and internationally; Incorporating IWRM information into regional communication initiatives; and • Capacitating staff regarding general communications, marketing principles and water stewardship.

8.2.4 Strategic Measure D: Improve Reporting and Information Sharing

The IUCMA has a duty to make information available to the public in terms of section 145 of the NWA. Decision making must be consultative and ensure that stakeholders and interested and affected parties are involved in the way water resources are protected, used, conserved, managed, and controlled. The IUCMA is further obligated to ensure that the public or stakeholders have knowledge of its responsibilities, powers, and mandate to ensure meaningful participation by such stakeholders in the effective and efficient management of water resources. Distributing information and ensuring knowledgeable stakeholders are critical in ensuring that stakeholders participate meaningfully and collaborate with the IUCMA in the protection, use, conservation, management, and control of water resources.

MANAGEMENT MEASURE	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION
Improve Reporting and Information Sharing	To promote transparency and involve stakeholders in the IWRM implementation.	It is necessary for the public or stakeholders to have knowledge of the responsibilities, powers, and mandate of the IUCMA to ensure meaningful participation by such stakeholders in the effective and efficient management of water resources. *This will enhance the collaboration of stakeholders with the IUCMA in the protection, use, conservation, management, and control of water resources.* To promote knowledge generation and distribution, the IUCMA needs to share the information produced in terms of the water quantity and water quality status as well as the health of aquatic ecosystems. This must be achieved through: • Presentation of such reports at stakeholder forums as well as at sector specific platforms such as emerging farmers' meetings. The information must be packaged in simple language that is easy to understand, and where possible in local languages of the intended audiences. • Besides actual presentations, reports produced must also be distributed and shared among stakeholders for both water quality and the River Eco-Status Monitoring Program (REMP) or aquatic ecosystem health status.

8.3 ENHANCED HUMAN RESOURCES CAPABILITY

8.3.1 *Strategic Measure A: Improved and Effective Human Resources Capability*

The IUCMA provides support to the institution through its Human Resources division by ensuring that competent people with the right skills at the right time are appointed for the institution to achieve its goals and objectives. In terms of the Skills Development Act, it is the responsibility of the institutions to train and develop their employees. IUCMA has the following approved policies which are implemented for both internal employees and external people: Training policy, internal and external bursary policies, Graduate Development Programme and experiential learning policy.

MANAGEMENT MEASURE	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION
Improved and Effective Human Resources Capability	To promote the development of employees, unemployed graduates and undergraduates with practical experience and students who need financial assistance to study water-related qualifications.	IUCMA has the following approved policies which are implemented for both internal employees and external people: Training policy, internal and external bursary policies, Graduate Development Programme, and experiential learning policy.

8.3.2 Strategic Measure B: Effectiveness of the Institution's Risk Management Systems, Practices and Procedures

Section 51(1) (a)(i) of the Public Finance Management Act 1 of 1999 stipulates that an Accounting Authority for a public entity must ensure that a public entity has and maintains effective, efficient, and transparent systems of financial and risk management and internal control.

MANAGEMENT MEASURE	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION
Effectiveness of the Institution's Risk Management Systems, Practices and Procedures	To ensure a comprehensive (enterprise-wide) risk management process is implemented to effectively manage uncertainty, respond to risk and exploit opportunities as they arise.	• To conduct Strategic and Operational risk assessment exercises to produce approved risk registers which will be used as a basis of monitoring implementation risk mitigation plan and reporting. • To facilitate the Risk Management Committee for the review (risk mitigation or implementation plans, risk data reports analysis) of the risk management process to ensure that the target maturity level is achieved. • To report, the overall performance on risk management to the Audit Committee for oversight and governance review.

8.3.3 Strategic measure C: Effective Internal Audit

Internal auditing is an independent, objective assurance and consulting activity designed to add value and improve an organisation's operations. It helps an organisation accomplish its objectives by bringing a systematic, disciplined approach to evaluate and improve the effectiveness of risk management, control, and governance processes. Internal Audit is governed by an approved Internal Audit Charter, approved by the Audit Committee. It independently appraises the adequacy and effectiveness of the institution's systems, financial internal controls and accounting records, reporting its findings to Management and the External Auditors, as well as the Audit Committee.

MANAGEMENT MEASURE	**MANAGEMENT OBJECTIVES**	**MANAGEMENT ACTION**
Effective Internal Audit	*Objective 1*: To give assurance that the controls in place are adequate, effective, and operating as intended. *Objective 2:* To give assurance that transactions are performed timely, recorded accurately, complete and are properly authorised. *Objective 3:* To make recommendations, which if implemented will improve the system of internal controls. *Objective 4:* To provide consulting services to management on areas where there are no controls in place.	To ensure effective and efficient management of IUCMA resources, Internal Audit will compile an Internal Audit Three-Year Rolling and Annual Operational Plan based on strategic risks identified by Management and the Board through a formal process. The Operational Plan is updated annually, based on risk assessment and results of the audit work performed. This ensures that the audit coverage is focused on and identifies areas of high risk. On a quarterly basis, the Internal Audit reports to the Audit Committee on all audit reviews conducted in relation to the approved Internal Audit Annual Operational Plan, as well as consulting and advisory services provided. Liaison with the External Auditors is performed through submission of all Internal Audit Reports and discussions to ensure that there is no duplication of efforts, between the two assurance providers.

8.3.4 Strategic Measure D: Effective information technology and data management systems

The information technology division is responsible for the management and provision of software, hardware, information security, IT governance, and desktop support and further ensures that business goals and information technology goals are bidirectionally aligned, thus bridging the gap of silo-operated units and business systems. When this aspect is thoroughly managed, information technology can then realise its potency by ensuring that, business goals are achieved through use of technology, business processes are automated and business information is protected against theft and unauthorised access. Information Technology must enable the catchment management strategy by ensuring availability of networks and applications to constantly access and transfer data to IUCMA databases which in turn is used in decision-making processes, real-time data availability to our stakeholders. e.g. (RiverOps, HydroNET, Hydstra, DSS Models, etc.).

MANAGEMENT MEASURE	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION
Effective information technology and data management systems	• To create a desirable behaviour whereby IUCMA customers are technology centric. • To strengthen IT governance controls by ensuring sustainable of conformance to legislative prescripts and other best practices governing information technology. • To be preferred supplier of information systems. • To deliver effective and efficient IT applications and systems. • To obtain reasonable business contribution from IT investment. • To develop opportunities to answer future challenges (4IR).	• Review and implementation of Master Systems Plan (MSP). • Review and implementation of IT policies and procedures. • Review and implementation of IT Governance Framework. • IT Governance quarterly reporting through IT Steering Committee and other structures of the Board. • Renewal of subscription and maintenance contracts for the support software for Decision Support Systems (short term and long term).

8.4 MAINTAIN FINANCIAL SUSTAINABILITY

8.4.1 Strategic Measure A: Improve Water Authorisation Registration Management System (WARMS)

The functions of WARMS include the registration of water quantity (volume) of all the issued water use licences and all the confirmed general authorisations (21 (a) and (b) related), registration of the ELU and other functions. WARMS is the primary feeder to finance for billing purposes. It must be noted that, should WARMS not provide information (data) to finance, the IUCMA will not generate income and no billing of water uses will happen. It must further be noted that WARMS is linked to both licensing and finance.

MANAGEMENT MEASURE	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION
Improve Water Authorisation Registration Management System (WARMS)	To ensure that water users are registered in WARMS. The IUCMA capture and register both the authorised, unauthorised and ELUs water use activities and that is done for none other than billing, record, and monitoring purposes.	It must be noted that the IUCMA does not own the WARMS system that is currently in operation and they connect via the DWS system. In addition to the above, in order for this system to perform optimally, it has different roles of which it requires more human resources; core to this being capturing of data, quality checking and approval of data and reporting to finance. The IUCMA has only four WARMS officials and that is a non-compliance to WARMS SOP/IUCMA internal controls as the available resources are allocated roles that they are not supposed to be doing.

8.4.2 Strategic Measures B: Improving revenue collection.

Water is severely under-priced and cost recovery is not being achieved. To achieve water security, the current capital funding gap is estimated around R33 billion per annum for the next 10 years which needs to be closed. However, this must be reviewed to align to the fiscal constraints and to stimulate innovative financing and investment models, including a combination of improved revenue generation and a significant reduction of costs.

MANAGEMENT MEASURE	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION
Improving revenue collection	To ensure financial sustainability through improved revenue collection.	The IUCMA has embarked on a process of exploring other sources of funding recognised by the National Water Act, National Water Pricing Strategy and PFMA to reduce IUCMA financial dependency on the department.

MANAGEMENT MEASURE	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION
		• The IUCMA has approved a Revenue Enhancement Strategy which will relate to e.g. determining new license application fees and a review of the financial model for the CMAs. • Establish proper debt management processes and procedures such as implementing the Dunning process system. • Improving revenue generation through activities in Table 19.

Table 19: Improving Revenue generation activities.

Project name	Expected Registered Volume or loads in cubic meter per annum (m3/a) or milligram per litre (mg/l)	Projected Revenue in rands
Implementation of Groundwater use registration in the area under water management institutions	100 000 000 m3/a	R 50 000 000
Implementation of water management institutions database audit	50 000 000 m3/a	R 25 000 000
Implementation of cancelled and deleted water use audit	5 000 000 m3/a	R2.5 000 000
Implementation of Schedule 1 and aquaculture database audit	2 000 000 m3/a	R 1 000 000
Implementation of 3 yearly validations of irrigation of water use	5 000 000 m3/a	R25 000 000
Implementation of waste discharge levy for polluters in line with waste discharge charge system resource quality objectives	3 000 000 mg/l	R 10 000 000
Implementation of hotels/lodges groundwater use registration drive	10 000 000 m3/a	R5 000 000

9 CONCLUSIONS AND RECOMMENDATIONS

In the next five years, the Vision of the IUCMA and its stakeholders is to see transformation that translate to WAR so that there is socio-economic benefit derived by all within the WMA. The process of Land Restitution has seen portions of land with water rights being returned to the rightful HDI owners. However, there is limited support available to communities, and this has translated to previously economically beneficial commercial farms lying fallow.

The IUCMA seeks to collaborate with other Sector departments including Department of Agriculture, Provincial and District Municipality Economic Development to strategically intervene and ensure that the farms return to their former glory of contributing to food security, jobs and community socio-economic conditions improvement.

The disregard for compliance by many users including the unauthorised river sand mining creates long-term negative impacts which may see the desertification of the rivers in future. This requires a concerted effort of the IUCMA and sector departments such as the Department of Mineral Resources (DMR) and Department of Environmental Affairs (DEA) as well as the House of Traditional leadership cooperating to ensure there is sustainable and responsible mining of river sand which has a socio-economic benefit without threatening the sustainability of the water resources and subsequent non-compliance to the International Obligations.

The Publication of this CMS will forge a compact between the IUCMA and its stakeholders for sustainable water resources management within the next five years.

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ANNEXURE A: WATER QUALITY STATUS TRENDS WITHIN WMA

E coli

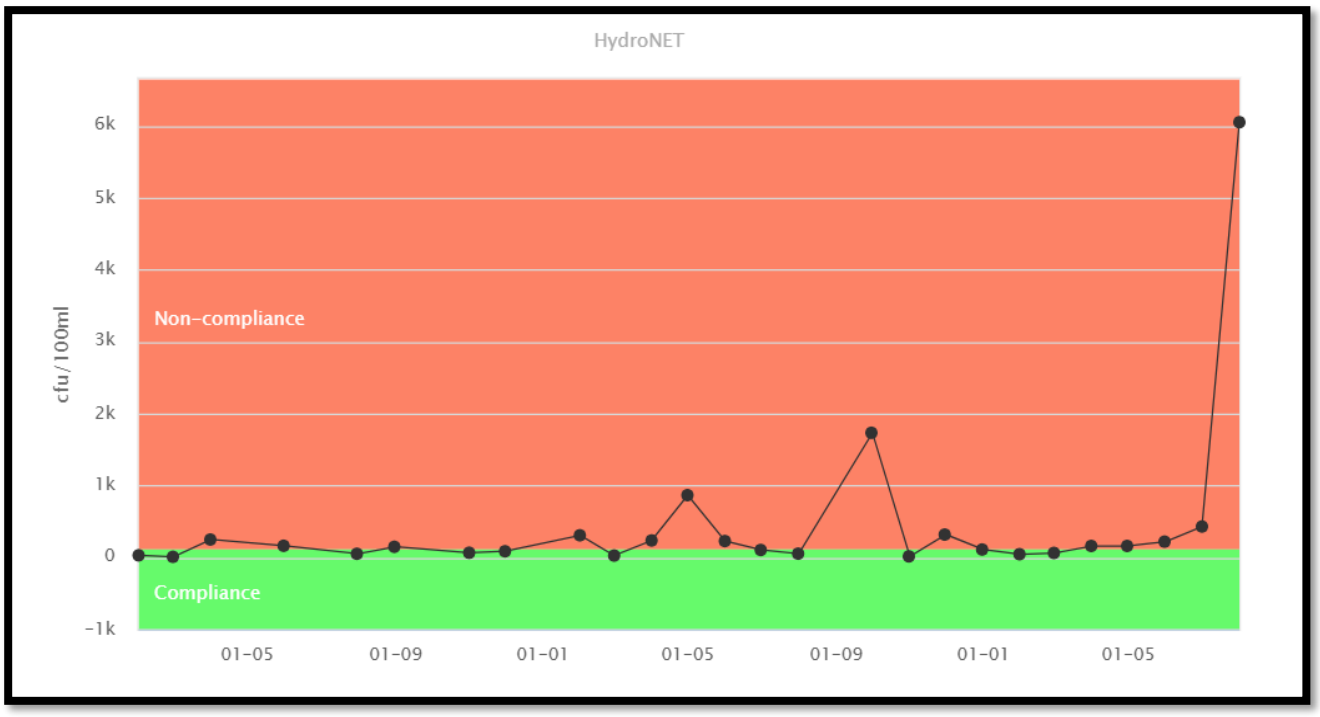


*Chart showing compliance or non-compliance at **Ecological Water Requirement (EWR) Sites S8** at Sand River@ Exeter Kruger National Park.*

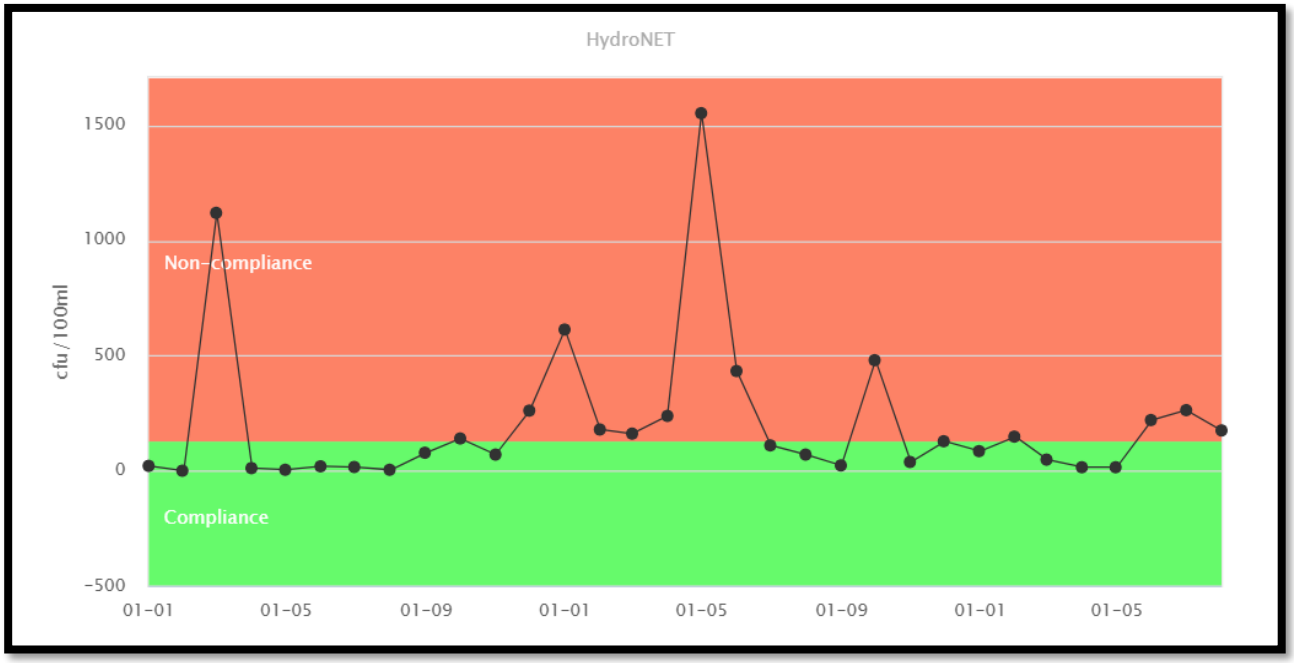


*Chart showing compliance or non-compliance at **Ecological Water Requirement (EWR) Sites C6** Crocodile River@ D/S of Komatipoort Golf Course*.

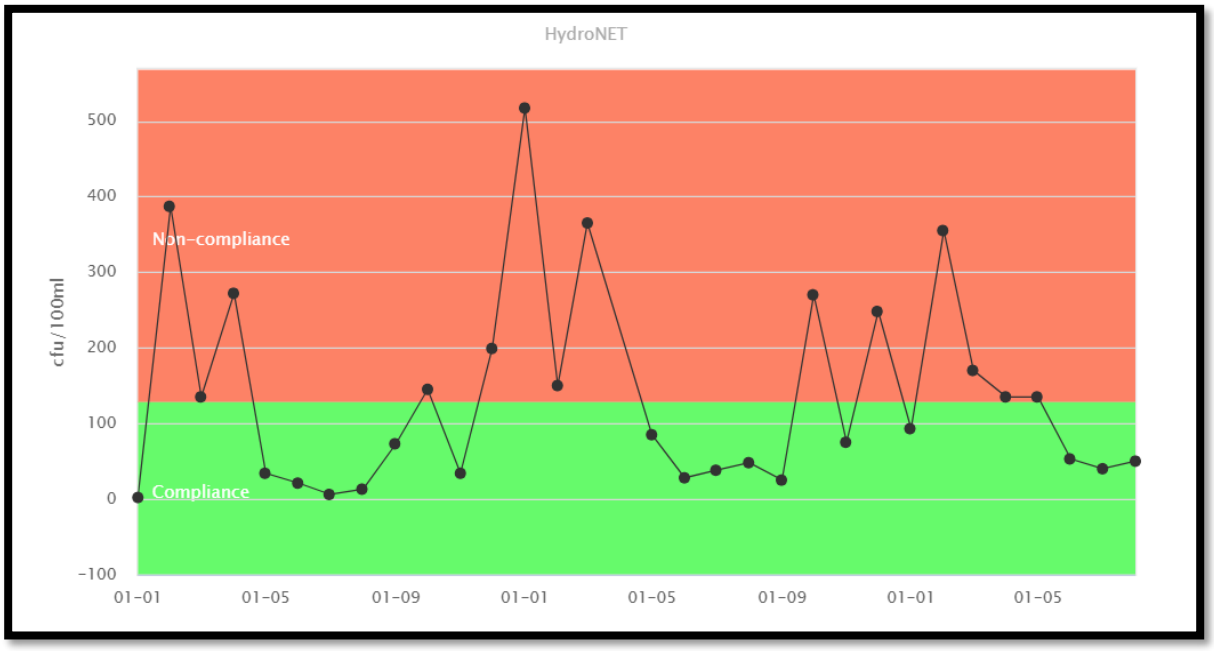
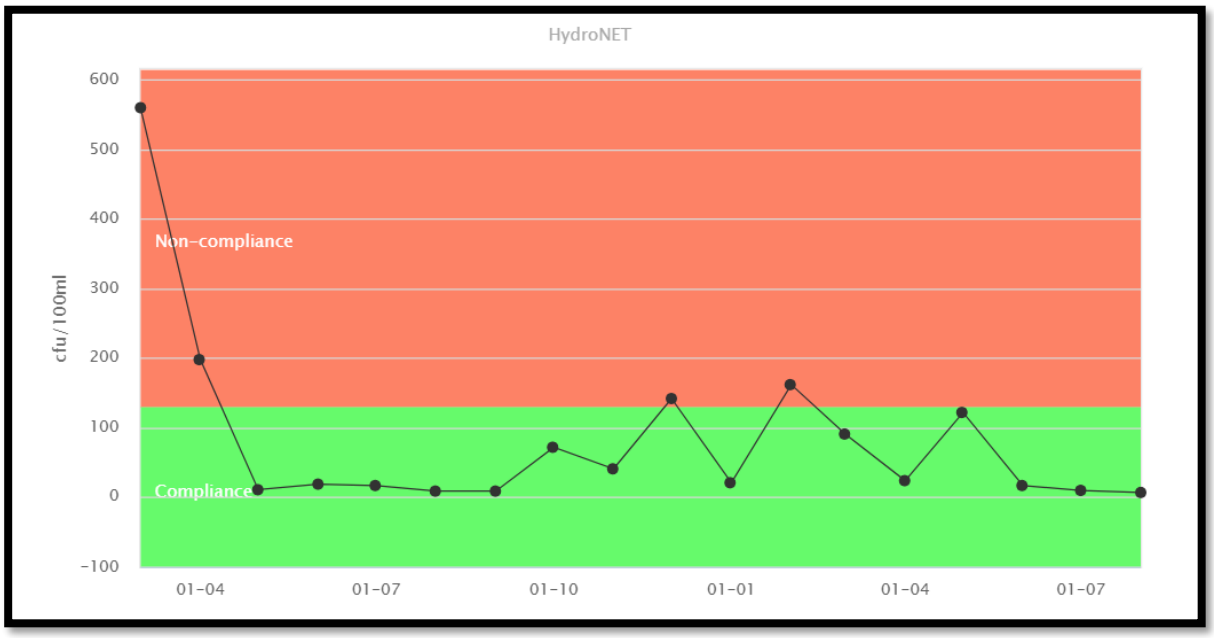
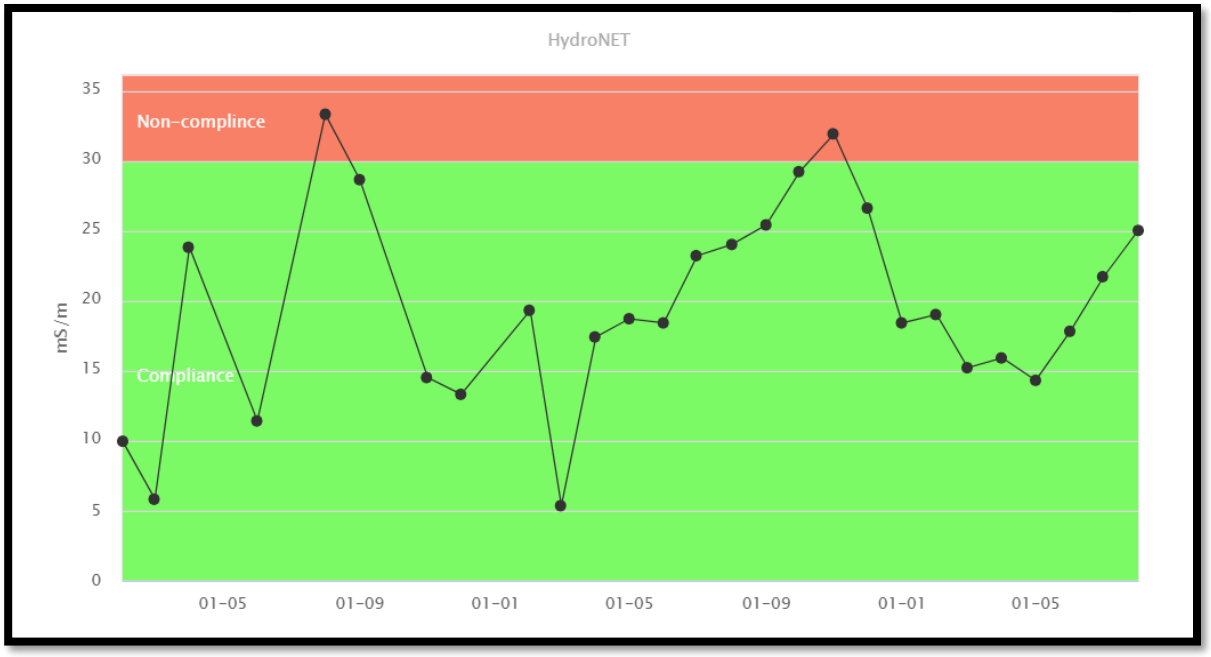


*Chart showing compliance or non-compliance at **Ecological Water Requirement (EWR) Sites K2** at Komati River@Ekulindeni Bridge Swazi Border.*



Charts showing compliance or non-compliance at Usuthu River at the Weir B4 Nerston Border Gate.

Electrical Conductivity



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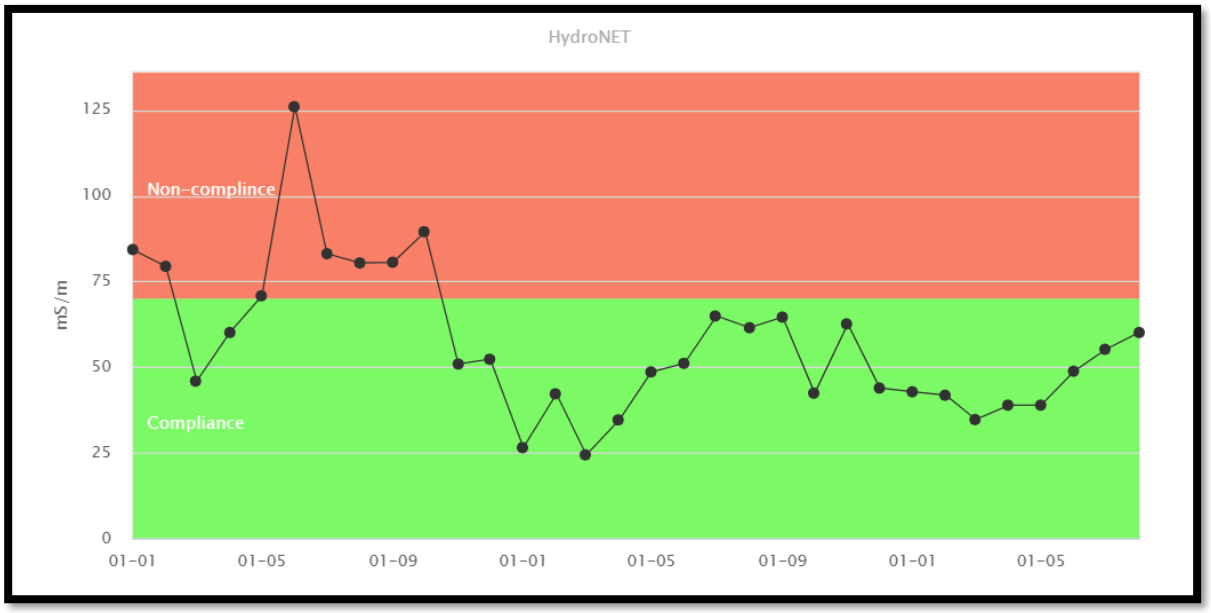
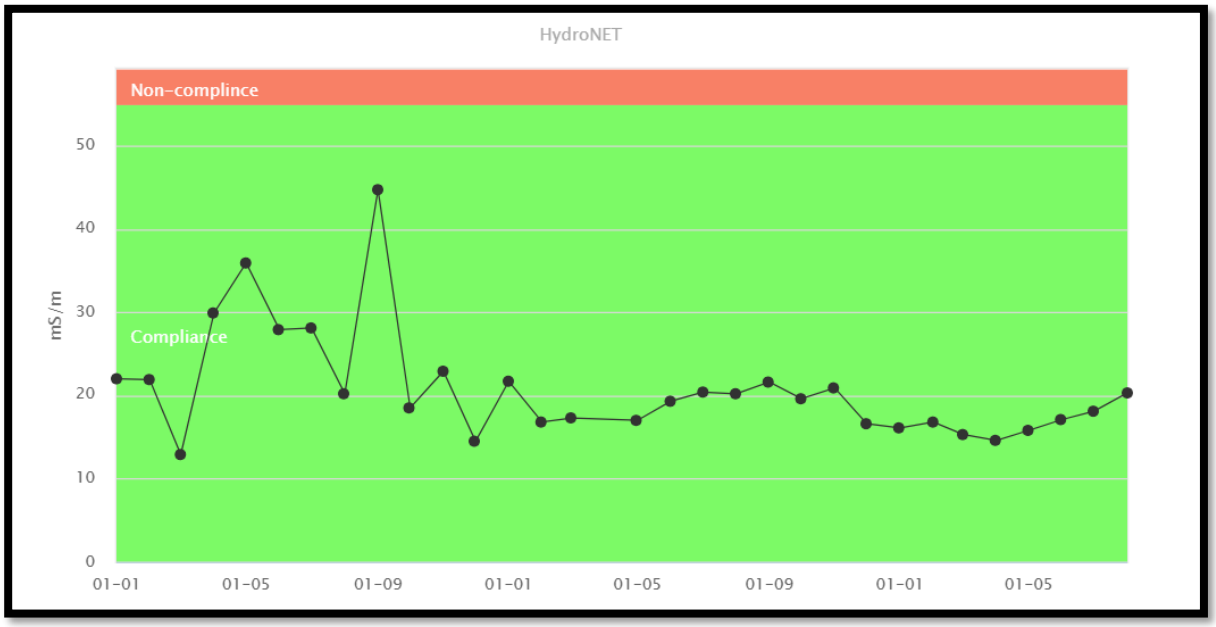
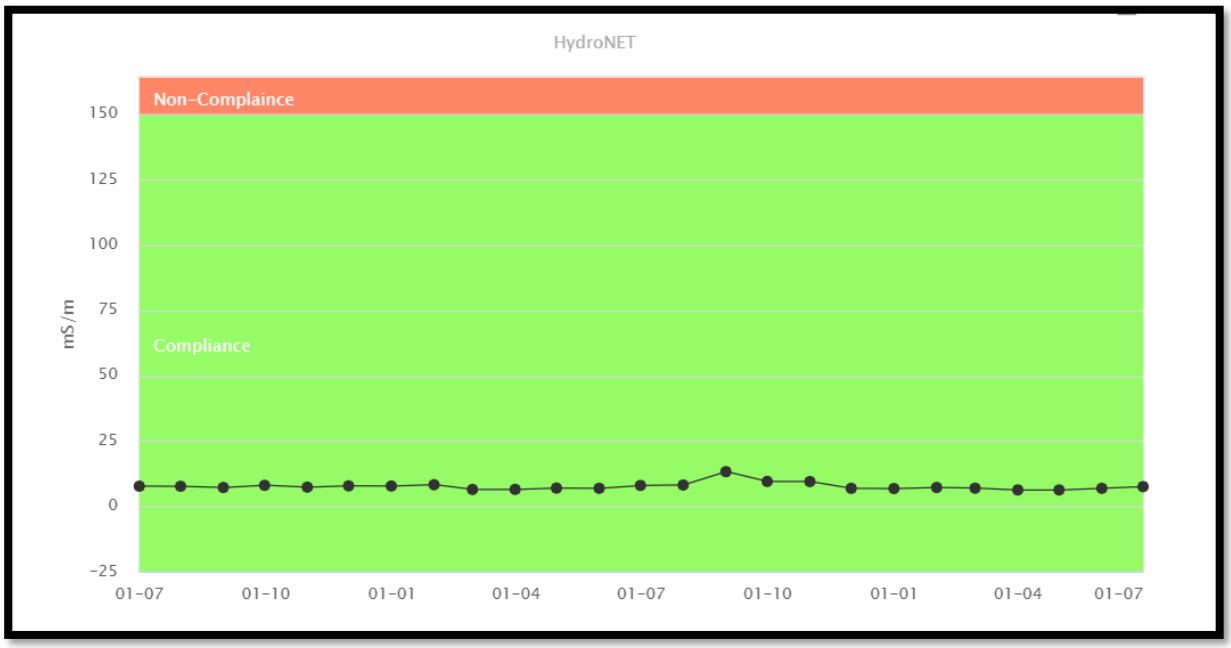


*Chart showing compliance or non-compliance at **Ecological Water Requirement (EWR) Sites C6** Crocodile River@ D/S of Komatipoort Golf Course.*



*Charts showing compliance or non-compliance at **Ecological Water Requirement (EWR) Site K2** at on Komati River@Ekulindeni Bridge Swazi Border.*



Charts showing compliance or non-compliance at Usuthu River at the Weir B4 Nerston Border Gate.

Phosphate

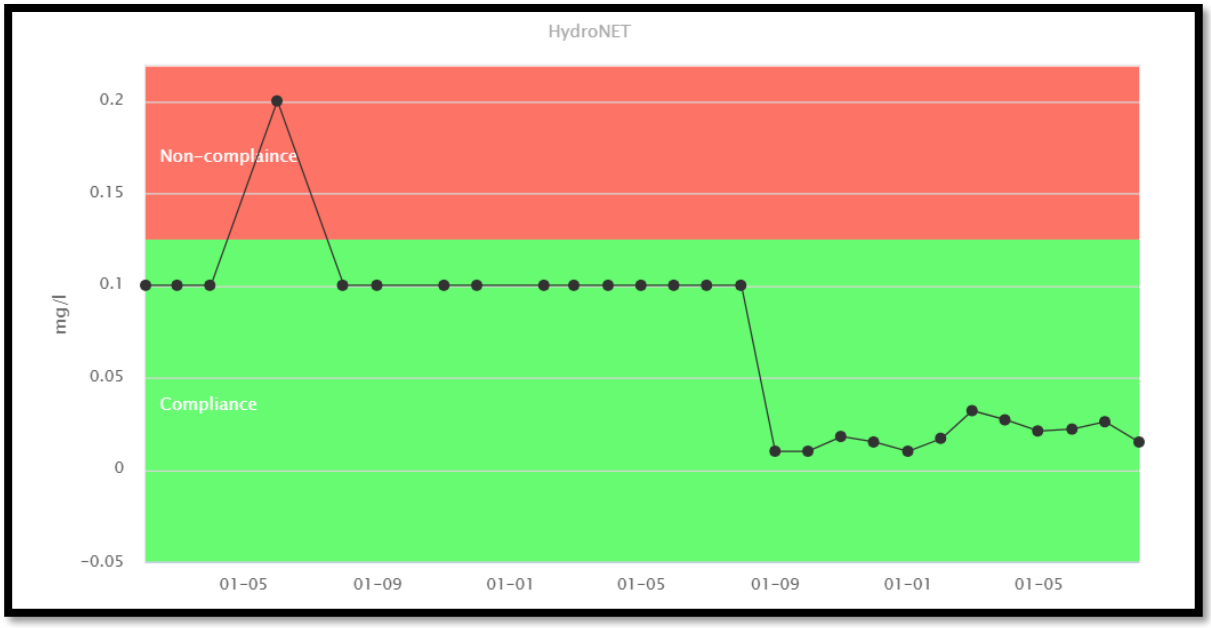


*Chart showing compliance or non-compliance at **Ecological Water Requirement (EWR) Sites S8** at Sand River@ Exeter Kruger National Park.*

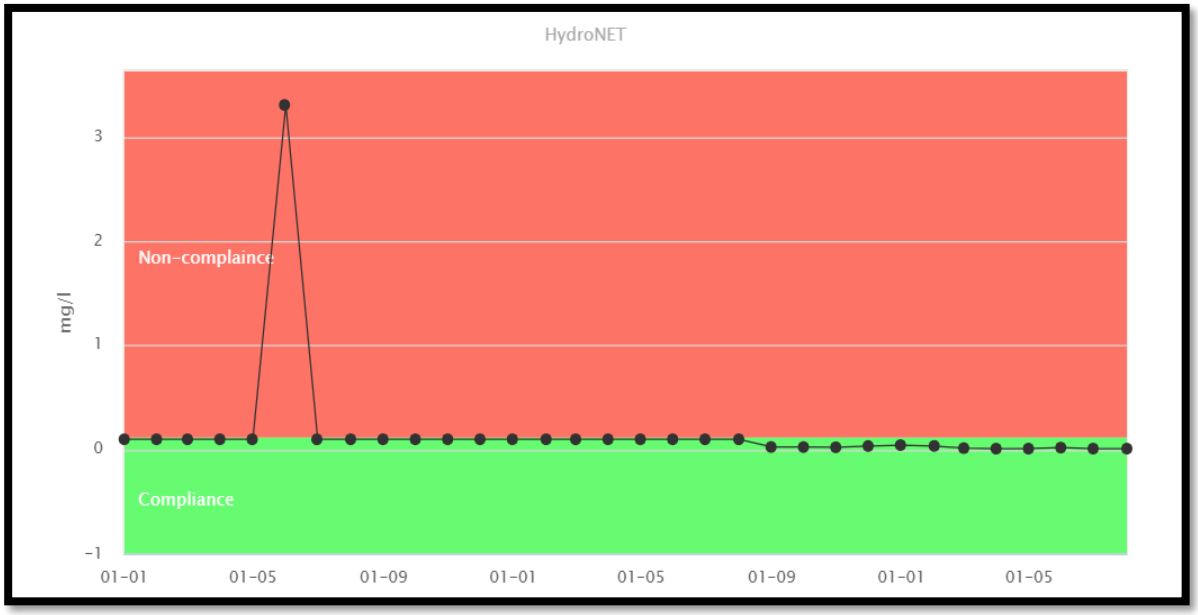
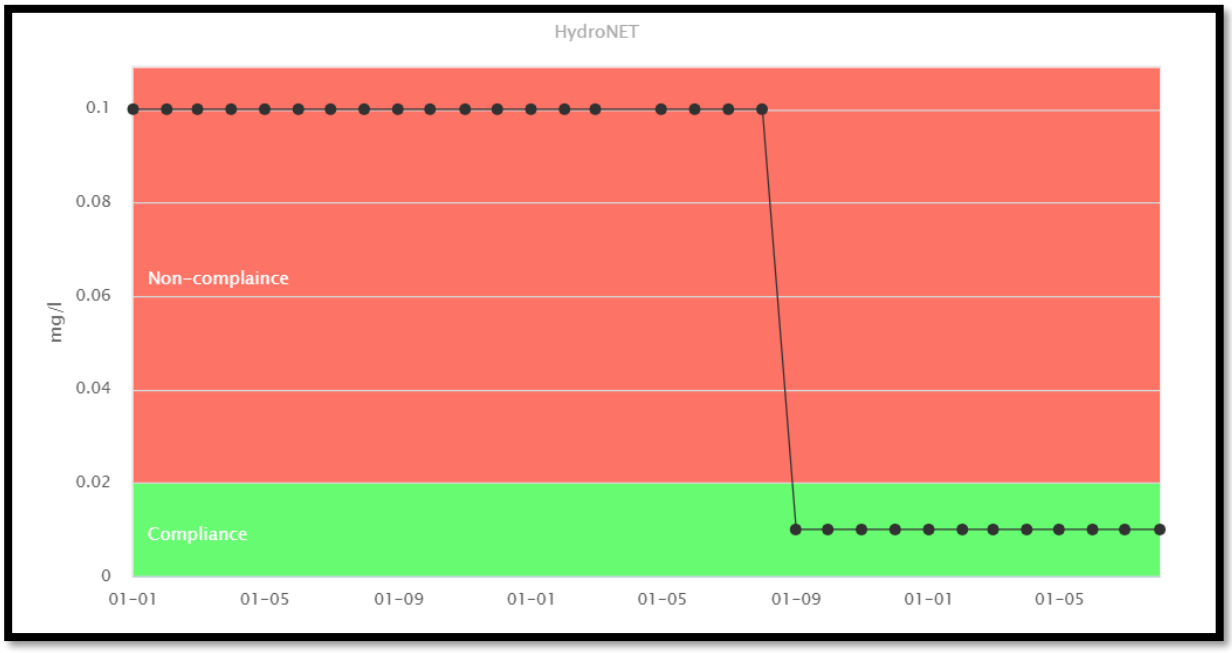
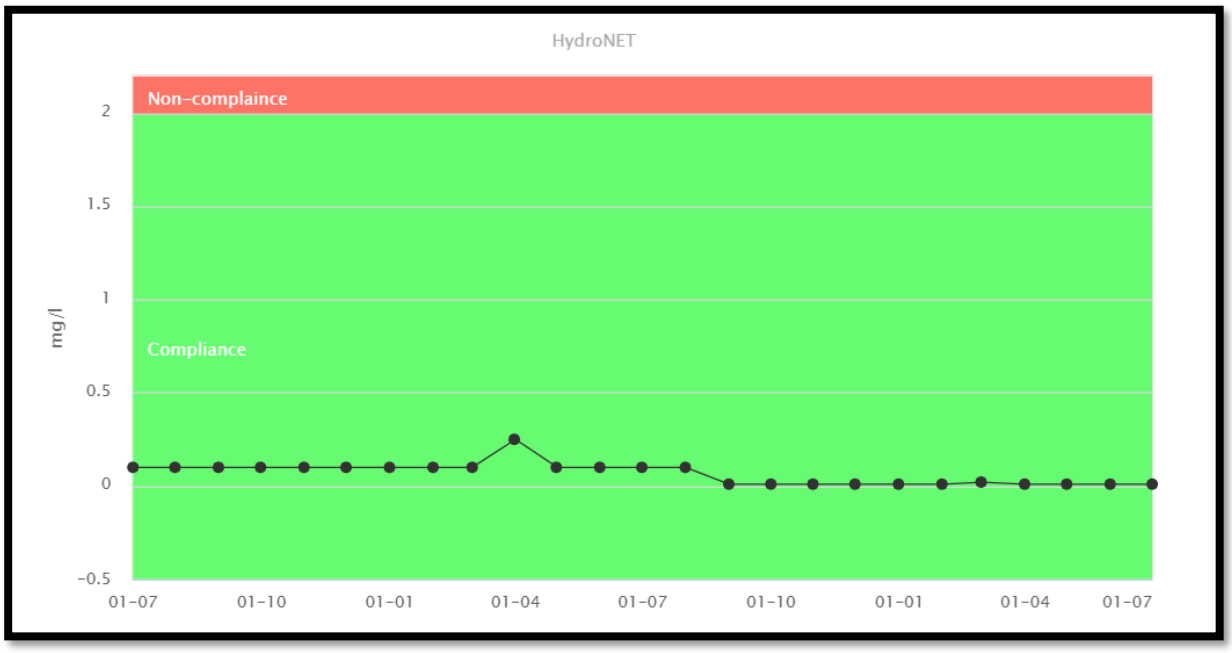


*Chart showing compliance or non-compliance at **Ecological Water Requirement (EWR) Sites C6** Crocodile River@ D/S of Komatipoort Golf Course.*



*Charts showing compliance or non-compliance at **Ecological Water Requirement (EWR) Site K2** at Komati River@Ekulindeni Bridge Swazi Border.*



Charts showing compliance or non-compliance at Usuthu River at the Weir B4 Nerston Border Gate.

pH

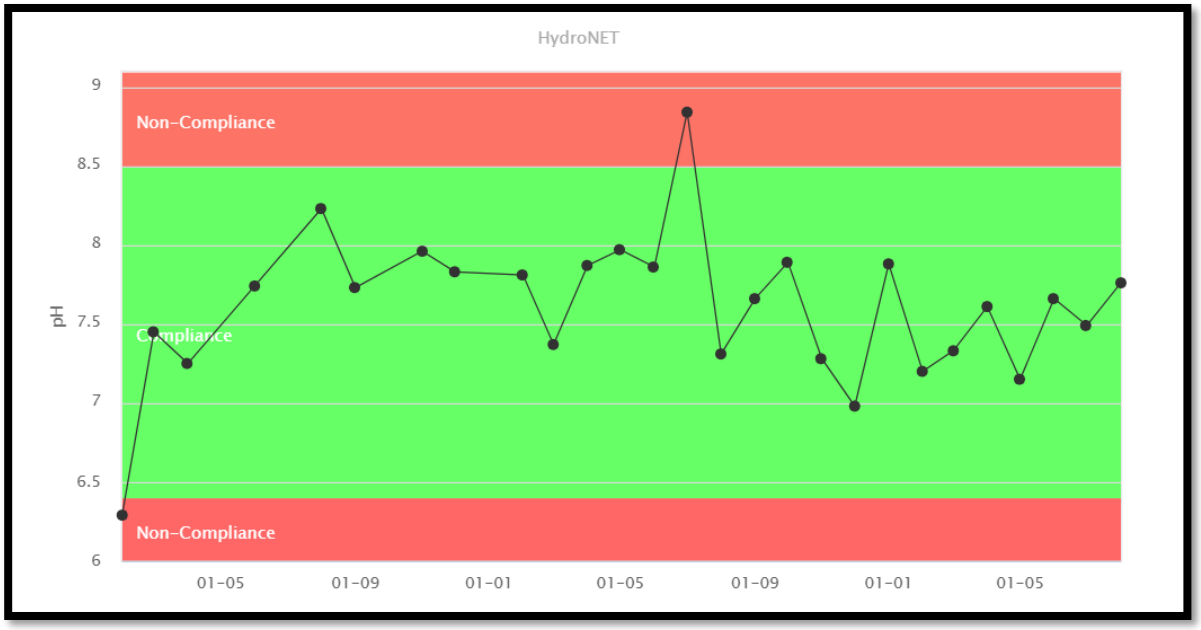
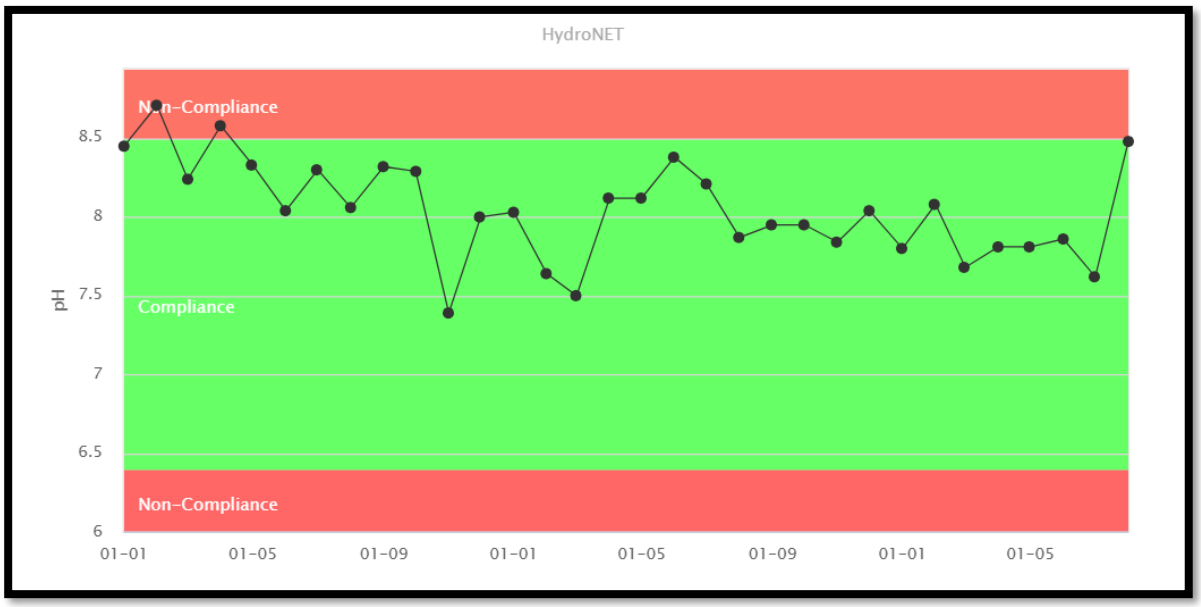


*Chart showing compliance or non-compliance at **Ecological Water Requirement (EWR) Sites S8** at Sand River@ Exeter Kruger National Park.*



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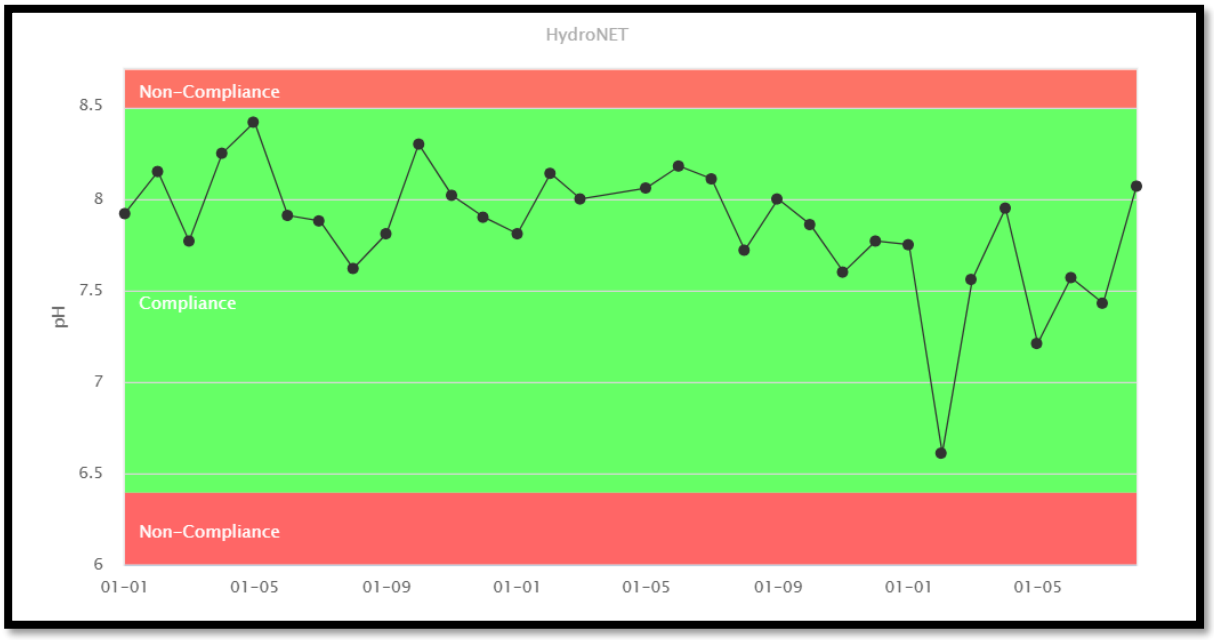

*Chart showing compliance or non-compliance at **Ecological Water Requirement (EWR) Sites K2** at Komati River@Ekulindeni Bridge Swazi Border.*

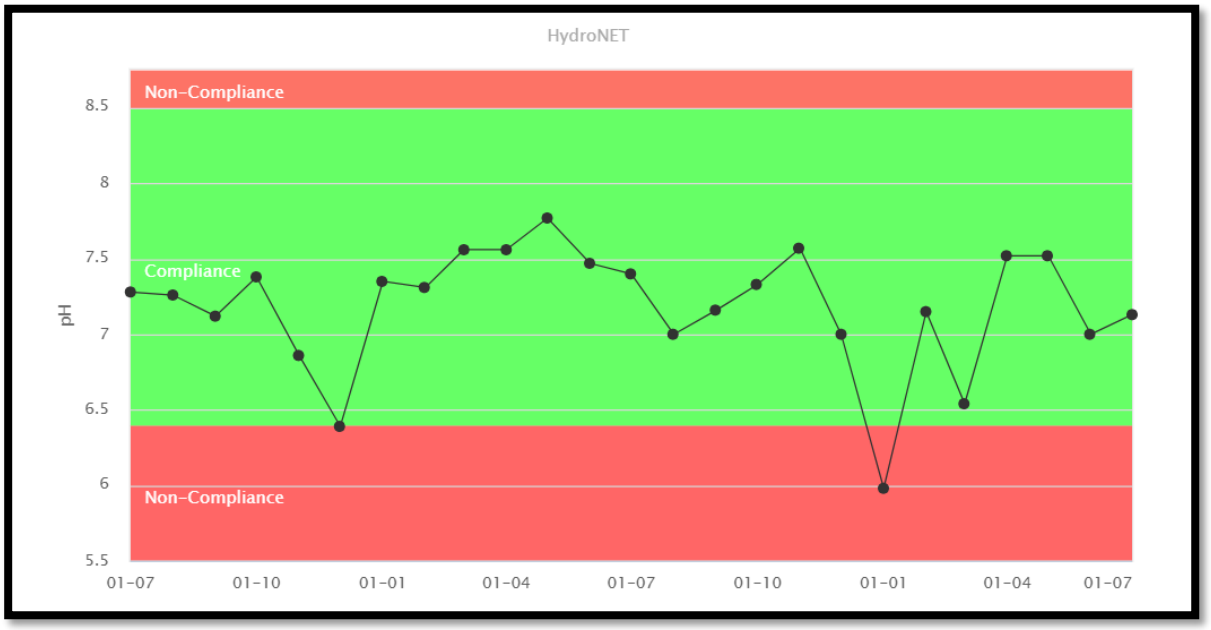

Chart showing compliance or non-compliance at Usuthu River at the Weir B4 Nerston Border Gate.

ANNEXURE B: STAKEHOLDER ATTENDANCE STATISTICS WITHIN WMA

1. **Stakeholder attendance statistics: Crocodile Sub-Catchment**

DATE	VENUE	EVENT	GROUPS / SECTORS	NO OF ATTENDEES
24/08/2018	Crocodile Lapa Malalane	Crocodile CMF	1. Water Management Institutions (IUCMA)	10
			2. Municipalities	2
			3. Agricultural cooperatives	1
			4. Agricultural industries (TKW, CLR, etc.)	0
			5. Forestry industries (SAPPI, Mondi, etc.)	1
			6. Sector departments	3
			7. Home-based care groups	0
			8. Water servicers providers (Rand Water)	0
			9. Water committee	0
			10. NGOs	0
			11. Traditional authorities	0
			12. Industries	2
			13. Irrigation Boards	4
			14. Conservation / Environment (SANPARKS)	1
			15. Emerging farmers	0
			16. Mining houses	1
			17. Universities	1
			18. Communal Property Associations (CPAs), BLOA, WRRA	2
			19. Private companies	2
			Total	30

2. Stakeholder attendance statistics: Upper Sand Sub-catchment

DATE	VENUE	EVENT	GROUPS / SECTORS	NO OF ATTENDEES
			20. Water Management institutions (IUCMA)	7
			21. Municipalities	
			22. Agricultural cooperatives	41
			23. Agricultural industries (TKW, CLR, etc)	
			24. Forestry industries (SAPPI, Mondi, etc)	
			25. Sector departments	
			26. Home-based care groups	
			27. Water services providers (Rand Water)	
			28. Water committee	
			29. NGOs	
			30. Traditional authorities	
			31. Industries	
			32. Irrigation Boards	
			33. Conservation / Environment (SANPARKS)	
			34. Emerging farmers	
			35. Mining houses	
			36. Universities	
			37. Communal Property Associations (CPAs)	

3. Stakeholder attendance statistics: Southern Usuthu Sub-catchment

DATE	VENUE	EVENT	GROUPS / SECTORS	NO OF ATTENDEES
			1. Water Management Institutions (IUCMA)	2
			2. Municipalities	4
			3. Agricultural cooperatives	16
			4. Agricultural industries (TKW, CLR,etc)	
			5. Forestry industries (SAPPI, Mondi, etc)	6
			6. Sector departments	14
			7. Home-based care groups	
			8. Water services providers (Rand Water)	
			9. Water committee	
			10. NGOs	
			11. Traditional authorities	3
			12. Industries	
			13. Irrigation Boards	
			14. Conservation / Environment (SANPARKS)	
			15. Emerging farmers	60
			16. Mining houses	
			17. Universities	
			18. Communal Property Associations (CPAs)	3
			Total	102

4. Stakeholder attendance statistics: Lower Komati Sub-catchment

DATE	VENUE	EVENT	GROUPS / SECTORS	NO OF ATTENDEES
			1. Water Management Institutions (IUCMA)	6
			2. Municipalities	3
			3. Agricultural cooperatives	6
			4. Agricultural industries (TKW, CLR, etc)	
			5. Forestry industries (SAPPI, Mondi, etc)	
			6. Sector departments	1
			7. Home-based care groups	4
			8. Water services providers (Rand Water)	
			9. Water committee	
			10. NGOs	
			11. Traditional authorities	
			12. Industries	
			13. Irrigation Boards	
			14. Conservation / Environment (SANPARKS)	
			15. Emerging farmers	9
			16. Mining houses	
			17. Universities	
			18. Communal Property Associations (CPAs)	
			Total	**29**

5. Stakeholder attendance statistics: Sabie Sub-Catchment

DATE	VENUE	EVENT	GROUPS / SECTORS	NO OF ATTENDEES
			1. Water Management Institutions (IUCMA)	6
			2. Municipalities	7
			3. Agricultural cooperatives	
			4. Agricultural industries (TKW, CLR, etc)	
			5. Forestry industries (SAPPI, Mondi, etc)	
			6. Sector departments	3
			7. Home-based care groups	
			8. Water services providers (Rand Water)	
			9. Water committee	
			10. NGOs	
			11. Traditional authorities	1
			12. Industries	
			13. Irrigation Boards	
			14. Conservation / Environment (SANPARKS)	4
			15. Emerging farmers	25
			16. Mining houses	
			17. Universities	
			18. Communal Property Associations (CPAs)	1
			Total	47