



INKOMATI-USUTHU  
CATCHMENT MANAGEMENT AGENCY

CATCHMENT MANAGEMENT STRATEGY 2023/28



## **VISION**

Sufficient, equitable and quality water resources for all in the  
Inkomati-Usuthu Water Management Area

## **MISSION**

To efficiently manage water resources by empowering our  
stakeholders in our quest to contribute towards transformation  
by promoting equal access to water and protecting the  
environment

## **VALUES**

Integrity

Batho Pele (Stakeholders Orientation)

Accountability

Diversity

Transparency

## FOREWORD BY THE CHAIRPERSON OF THE GOVERNING BOARD



**Dear Stakeholder,**

This document outlines how the Inkomati-Usuthu Catchment Management Agency (IUCMA) embarked on a process of reviewing and updating the first-generation Catchment Management Strategy (CMS) which is a legislative requirement in accordance with the National Water Act (Act 36 of 1998), (NWA). An inherent Catchment Management Agency (CMA) function requires a review and update of a CMS after every five years. Post the amalgamation of the former Inkomati Catchment and the Usuthu Catchment (of the former Usuthu to Mhlatuze Water Management Area), the IUCMA had to review and update the CMS to reflect the newly formed Inkomati-Usuthu Water Management Area (WMA).

It is a pleasure, on behalf of the Governing Board to present to you the Agency's Catchment Management Strategy (CMS). This is a five-year strategy of the agency on how it will charge its mandate and responsibilities to make a positive impact to the resource and its stakeholders within the Water Management Area. The reviewing of the CMS included a rigorous visioning process that included stakeholder consultation in order to properly capture and respond to challenges that all stakeholders are faced with. The CMS is developed for a 5-year period to coincide with the development of the 5-year strategic plan as per the government planning process. The Annual Performance Plans for the next five years will be based on the 5-year CMS and the 5-year strategic plan.

The process of developing CMS was an amalgamation of the internal and external inputs as well as technical status quo reports. The main issues identified during various consultation with stakeholders were the validation and verification of existing lawful water use, the water allocation reform requirements and water allocation plan for the water management area, the localized economic development needs for rapid urbanisation, agriculture and tourism, the financial model for the agency and possible alternative revenue resources.

The IUCMA is progressively working in collaboration with government departments and other institutions whose mandates have the potential of impacting on or being impacted by water resources management activities. To this effect, cooperation working agreements (MoUs) are in place with our different stakeholders within the water resource management sector. With the existing strategic relations with local and some provincial spheres of government within Mpumalanga, including the House of Traditional Leaders and the Disaster Management Forums amongst others to tackle inter alia the material water resource pollution challenge, the IUCMA will further make visible its footprint in Provincial Administrative Forums. The IUCMA actively participates in transboundary water resources management forums/ meetings between the Kingdom of eSwatini, Republic of Mozambique and the Republic of South Africa.

In response to the above identified challenges during the visioning process. The agency has outlined strategies that will be implemented within the duration of the CMS. The success of implementation of the CMS depends on all stakeholders (internal and external) working together and utilizing resources at our disposal.

On behalf of the Governing Board, Chief Executive Officer, Management, and staff, I would like to take this opportunity to thank the Honourable Minister and the Deputy Ministers for their confidence and support to implement the aspirations contained in this Catchment Management Strategy.



**Mr MS Mthembu**  
**CHAIRPERSON OF THE GOVERNING BOARD**

## EXECUTIVE SUMMARY

The Catchment Management Strategy (CMS) represents the five- year Strategic Plan developed for the Inkomati-Usuthu Catchment Management Agency (IUCMA) for implementation in the period 2023 to 2028.

Section 80 (c) of the National Water Act, Act 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 to develop a CMS involves extensive stakeholder consultation from the Visioning Process (development of the Vision, Mission and Values) to the finalisation of the report. The CMS of the IUCMA was developed internally where the management conducted a 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 with WMA stakeholders on the CMS during the tariff and APP consultation process.

Issues that were raised during the engagement of the stakeholders were encouraging. However, the past historical imbalances and the availability of water for the Historically Disadvantaged Individuals (HDIs) were raised as a critical issue that stakeholders indicated as a strategic need to ensure that Water Allocation Reform (WAR) is in line with the constitutional imperative of redress and the spirit of the Act that focuses on equitable access. Historically, majority of the population within the WMA belonged to the former homelands where no rights were 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 yet incomplete verification of Existing Lawful Water Use (ELU) in order to develop the Water Allocation Plans. 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 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, is not covered within the Intergovernmental Relations Framework (IGR) nor strategically represented at the different spheres of government (Local, District and Provincial). This tide has, however, changed during the time of the 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 Incomati and Maputo Watercourse Commission (INMACOM) of the Inco-Maputo Basin is crucial to ensure that the upstream 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 Department of Water and Sanitation (DWS) on behalf of the Minister.

Thus, in the next five years, the Vision of the IUCMA and its stakeholders is to see transformation that translate to Water Allocation Reform so that there is socioeconomic 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 the 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 the improvement of community socioeconomic conditions.

Disregard for compliance by many users including the unauthorised river sand mining creates long-term negative impacts which may see the desertification of rivers in future. This requires a concerted effort of the IUCMA and sector departments such as the Department of Mineral Resources and Energy (DMRE) and Department of Forestry, Fisheries and the Environment (DFFE) as well as the House of Traditional Leadership cooperating to ensure there is sustainable and responsible mining of river sand which has a socioeconomic 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 pact 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)
B-BBEE	Broad-Based Black Economic Empowerment
CMA	Catchment Management Agency
CME	Compliance Monitoring and Enforcement
CMF	Catchment Management Forum
CROCOC	Crocodile River Catchment Operations Committee
DFFE	Department of Forestry, Fisheries and the Environment
DSS	Decision Support System
DMRE	Department of Mineral Resources and Energy
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
HAI	Historical Advantaged Individuals
HDI	Historical Disadvantaged Individuals
IUCMA	Inkomati-Usuthu Catchment Management Agency
IBWiWC	Incomati Basin Women in Water Conference
INMACOM	Incomati and Maputo Watercourse Commission
IIMA	Interim Inco-Maputo Agreement
LG	Local Government

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

## ACKNOWLEDGEMENTS

The Governing Board and Management of the IUCMA wish to acknowledge and thank the stakeholders within the WMA for their continued support and participation during the compilation of this CMS. The following is a non-conclusive list of 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 the 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 detailed in Chapter 7 of the NWA. Part 1 of Chapter 7 details the process of 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 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 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. A few Water User Associations (WUAs) were also established within the WMA. However, they are defunct and need 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 WUAs 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 are 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. *Currently the IUCMA 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 development plans of the Mpumalanga Province, District Municipalities, and Local Municipalities. These plans form an integral part of the Water Allocation Plan (WAP) for 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	<b>Section 19</b>
Management of emergency water resource pollution incidents	<b>Section 20</b>
Surrendering an entitlement to facilitate a particular application	<b>Section 25 (2 and 3).</b>
Assessment of water uses as part of the Water Use Authorisation Application	<b>Section 21</b>
The verification of Existing Lawful Water Use (ELU)	<b>Sections 33 and 35</b>
Administrative function of the water use authorisation for recommendation to the Responsible Authority	<b>Section 40</b>
Compulsory licence application	<b>Section 43</b>
Late applications	<b>Section 44</b>
Proposed Allocation Schedules and Preliminary Allocation Schedules	<b>Sections 45 and 46</b>
Publishing a <i>Gazette</i> stating that a preliminary allocation schedule has become a final allocation schedule	<b>Section 47</b>
Procedure for earlier renewal or amendment of licence condition	<b>Section 52</b>
Rectification of contraventions	<b>Section 53</b>
Implementation of the inherent functions	<b>Section 80</b>
Appointment of authorised persons to implement inspections related to compliance with the NWA which <i>include inspections related to compliance with the NWA</i>	<b>Section 125</b>
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	<b>Section 145</b>

ACTIVITIES	NWA REFERENCE
dams, levels of flood water, risks posed by water quality to life, health or property and any other matters the public needs to know.	

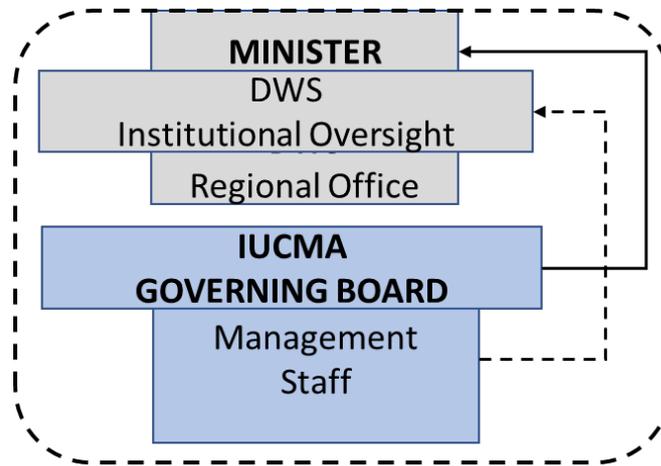
### 1.5 Funding of the CMA

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

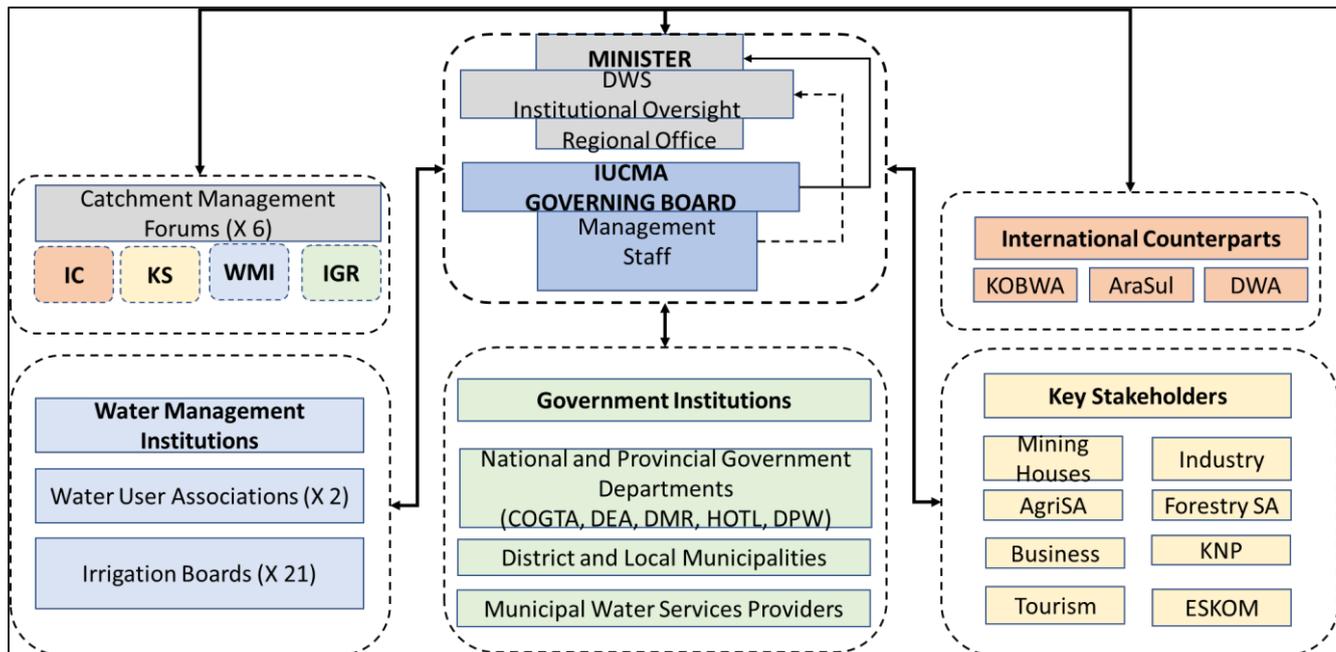
- Money appropriated by Parliament.
- Water use charges.
- Money from any other lawful sources.

### 1.6 Institutional Arrangements

The IUCMA has the following institutional arrangements as part of its legislative framework with the Responsible Authority/ Minister and other stakeholders (Figure 1 and Figure 2).



**Figure 1:** Institutional arrangements with the shareholder (Minister of the Department of 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 was 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 Inkomati-Usuthu WMA (IUWMA) is one of nine (9) WMAs in South Africa. The WMA of approximately 36 256 km<sup>2</sup> 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/ year 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 (Figure 3).

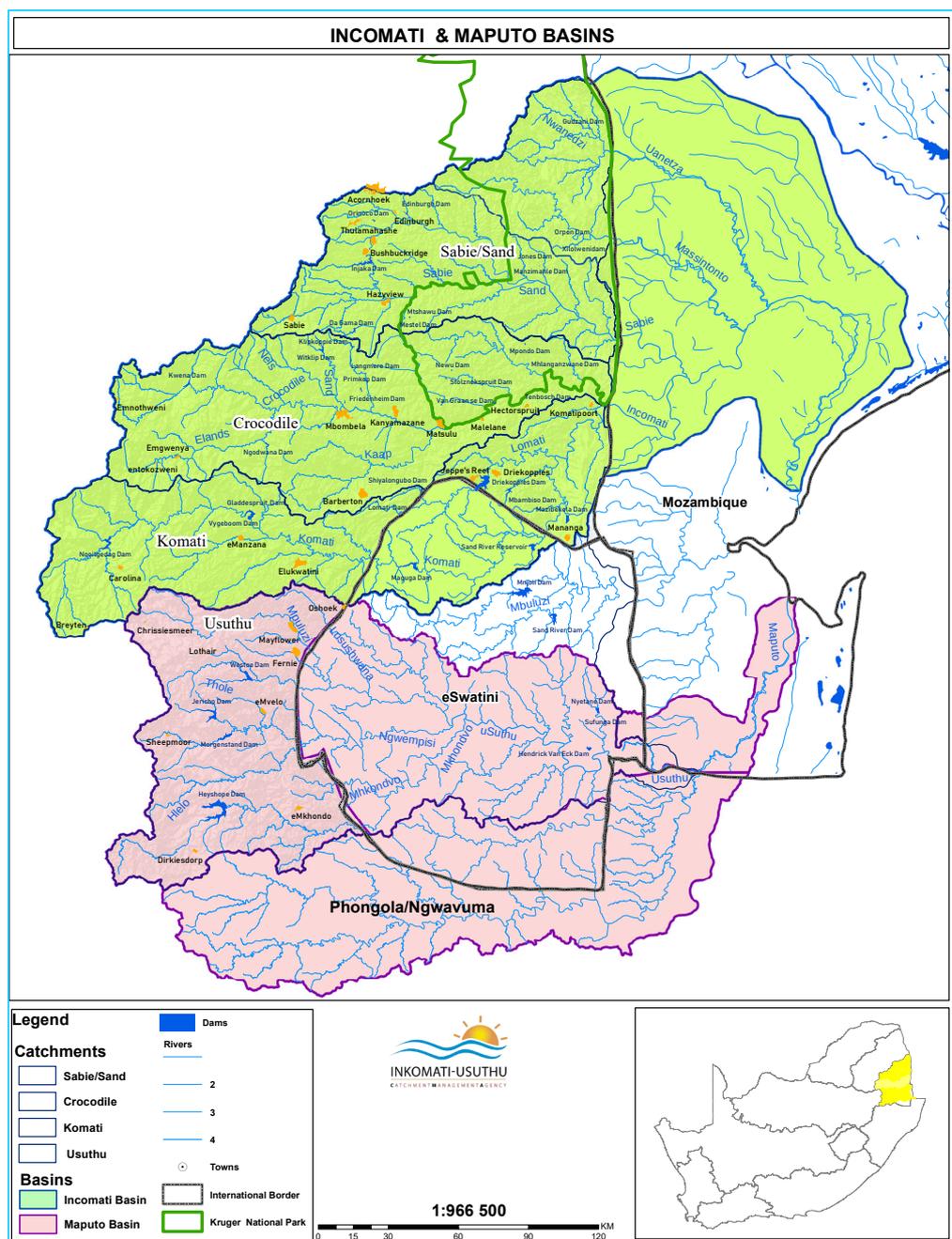


Figure 3: The Inkomati-Usuthu Water Management Area indicating the transboundary location.

As a result, the Inkomati- Usuthu WMA has International Obligations, in terms of the quality and quantity of water that flows across to 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 cooperation on the Protection and Sustainable Utilisation of the water of the Inkomati and Maputo Water Sources (TPTC, 2002).

The IUWMA has four (4) main rivers which subdivide the WMA into four (4) main catchments, namely Sabie/Sand, Crocodile, Komati and Usuthu. The IUWMA is geographically wholly located within Mpumalanga Province and the WMA comprises of three (3) district municipalities and ten (10) local municipalities with varying population as illustrated in. Two of the local municipalities (LMs) namely Msukaligwa and Emakhazeni are cross-boundary, falling into other WMAs. The most part of Msukaligwa and Emakhazeni falls within the Upper Vaal and the Olifants WMAs, respectively.

# INKOMATI-USUTHU WMA :POPULATION ESTIMATE

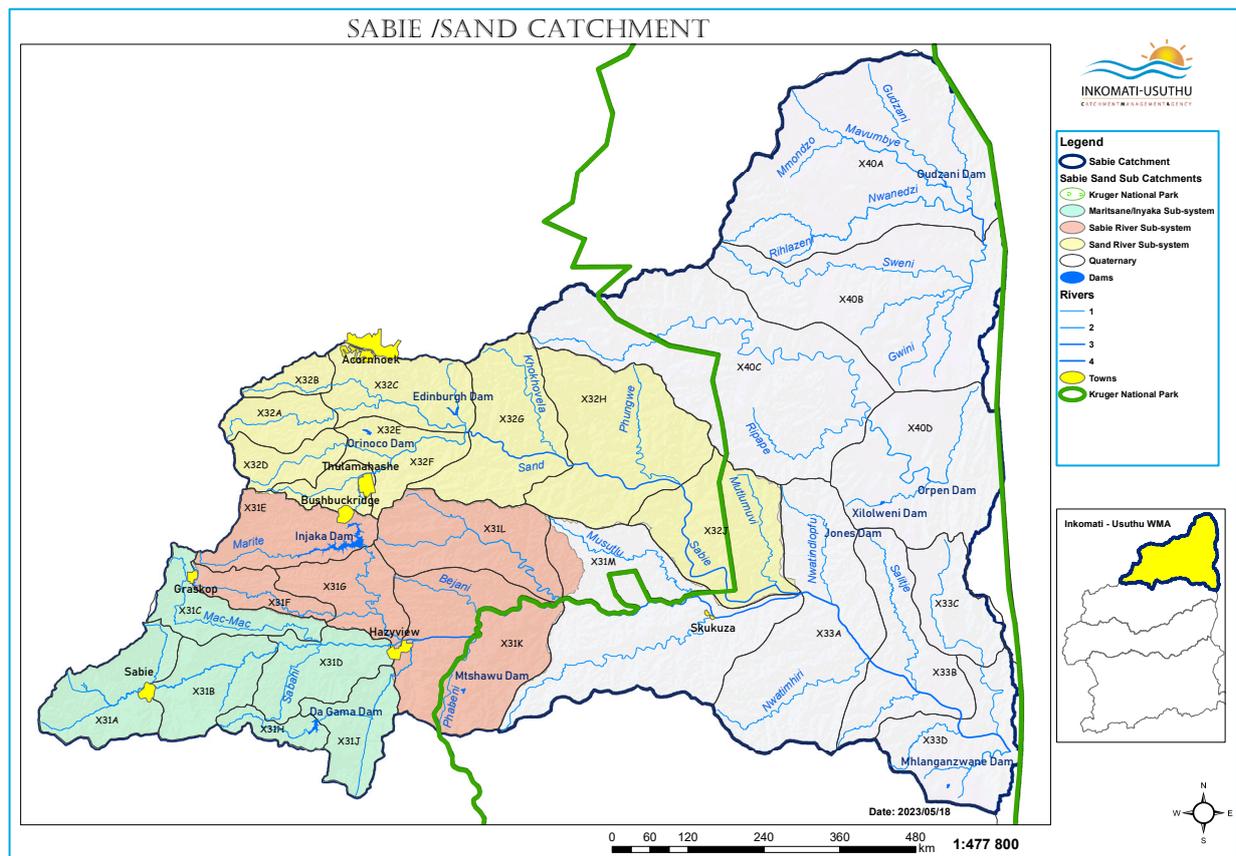


Figure 4: The IUWMA indicating the district and local municipalities.

## 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 <sup>2</sup>
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 <sup>2</sup>	
Towns	Dullstroom, Machadodorp, Nelspruit, Barberton, White River, Malalane, 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 minimum flow requirements to fully implement the International Obligations to Mozambique of 2.6 m <sup>3</sup> /s.	

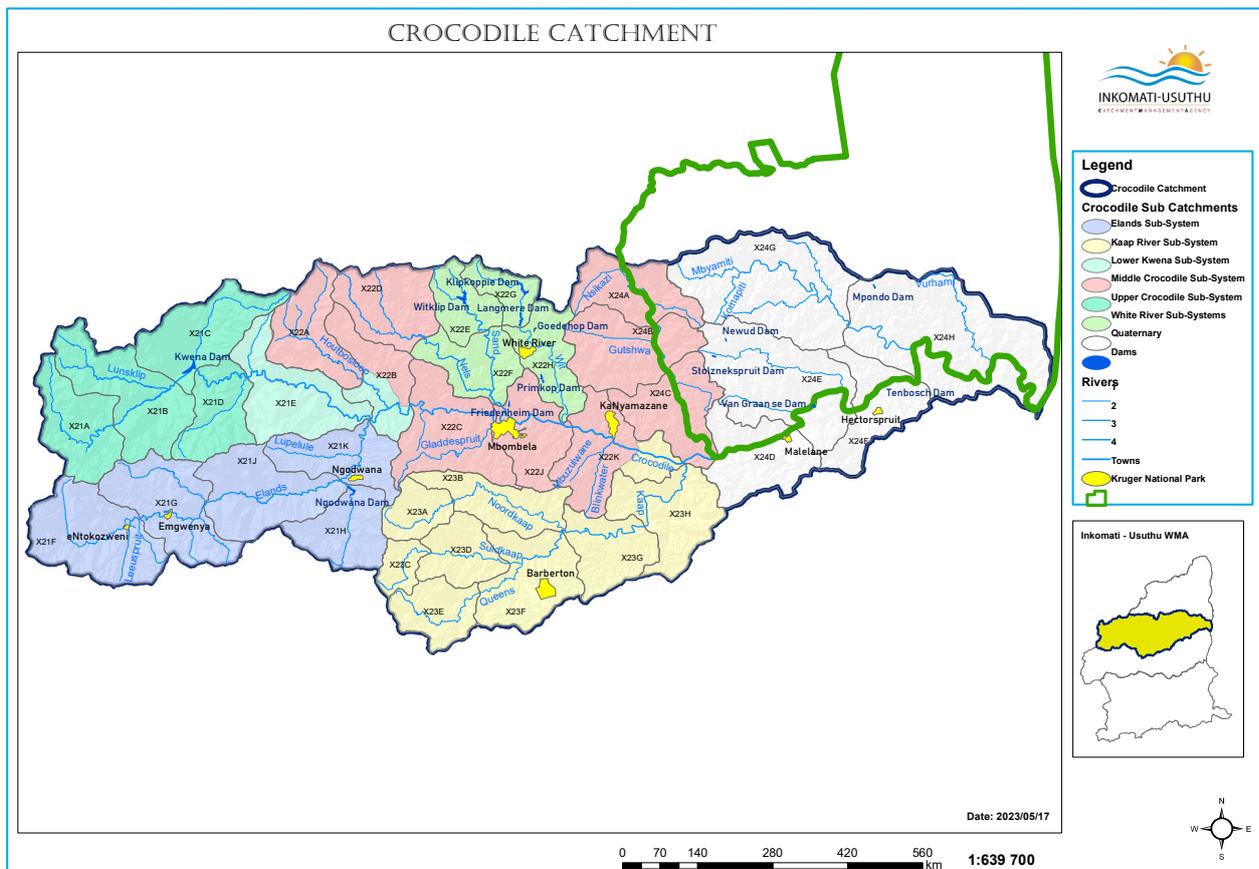


Figure 6: Crocodile Catchment map.

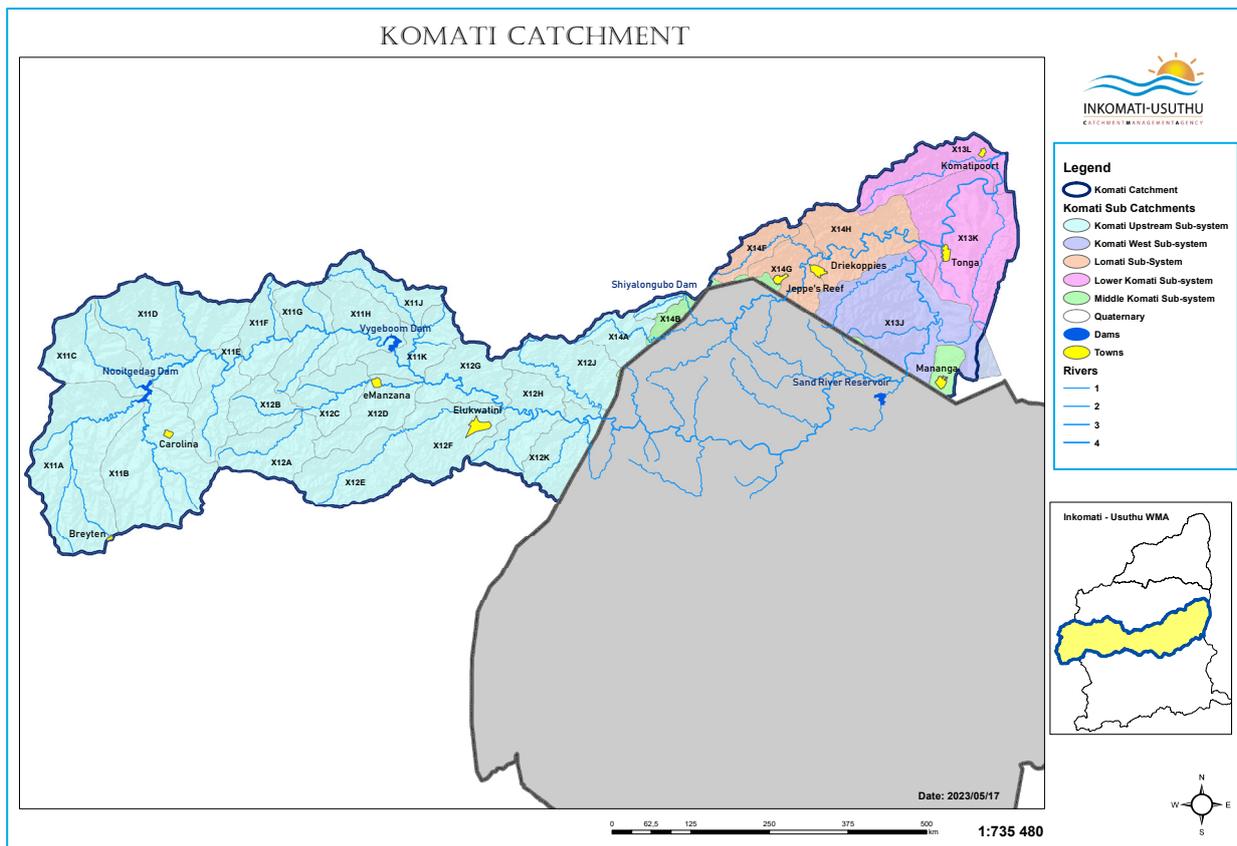
The Sappi paper mill at Ngodwana and the sugar mill at Malalane are the main industrial water users. Most of the water available in this catchment is linked directly to the rainfall patterns resulting in highly variable water availability with most of the runoff occurring far upstream of the major demand 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 subcatchment's potential for economic growth. The Crocodile catchment is also an International River which feeds the International Obligations that South Africa must meet with regard 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.

ITEM	DESCRIPTION
Area	8 621 km <sup>2</sup>
Towns	Nkomazi, Carolina and Elukwatini
Key economic activities	Inter-basin transfer to supply strategic water for Eskom. forestry, irrigation and mining
Water requirements	Mining, 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 minimum flow requirements to fully implement the International Obligations to Mozambique of 2.6 m <sup>3</sup> /s.

The Upper Komati subcatchment water resources strategic importance is reserved by the National Water Resources Strategy 11 (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 <sup>2</sup>
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.

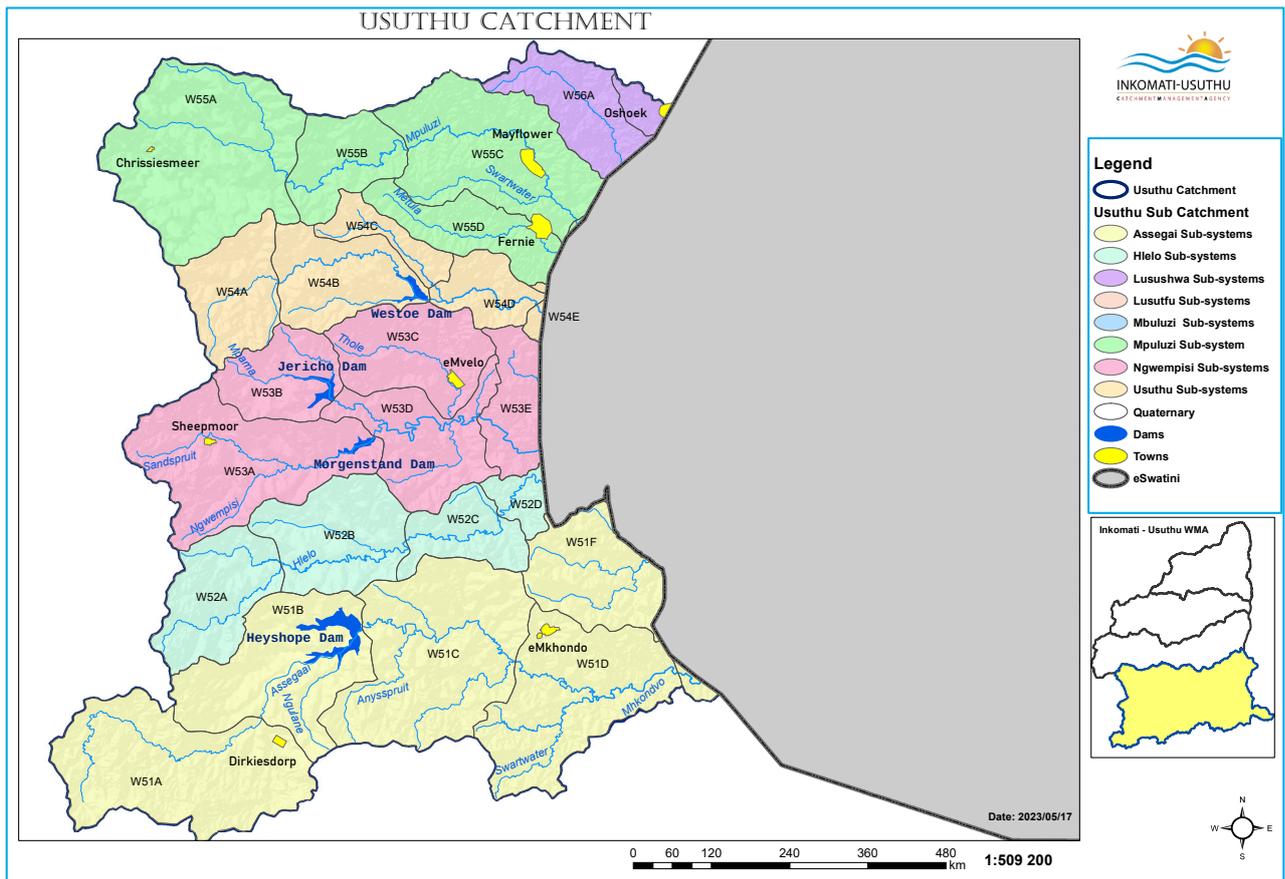


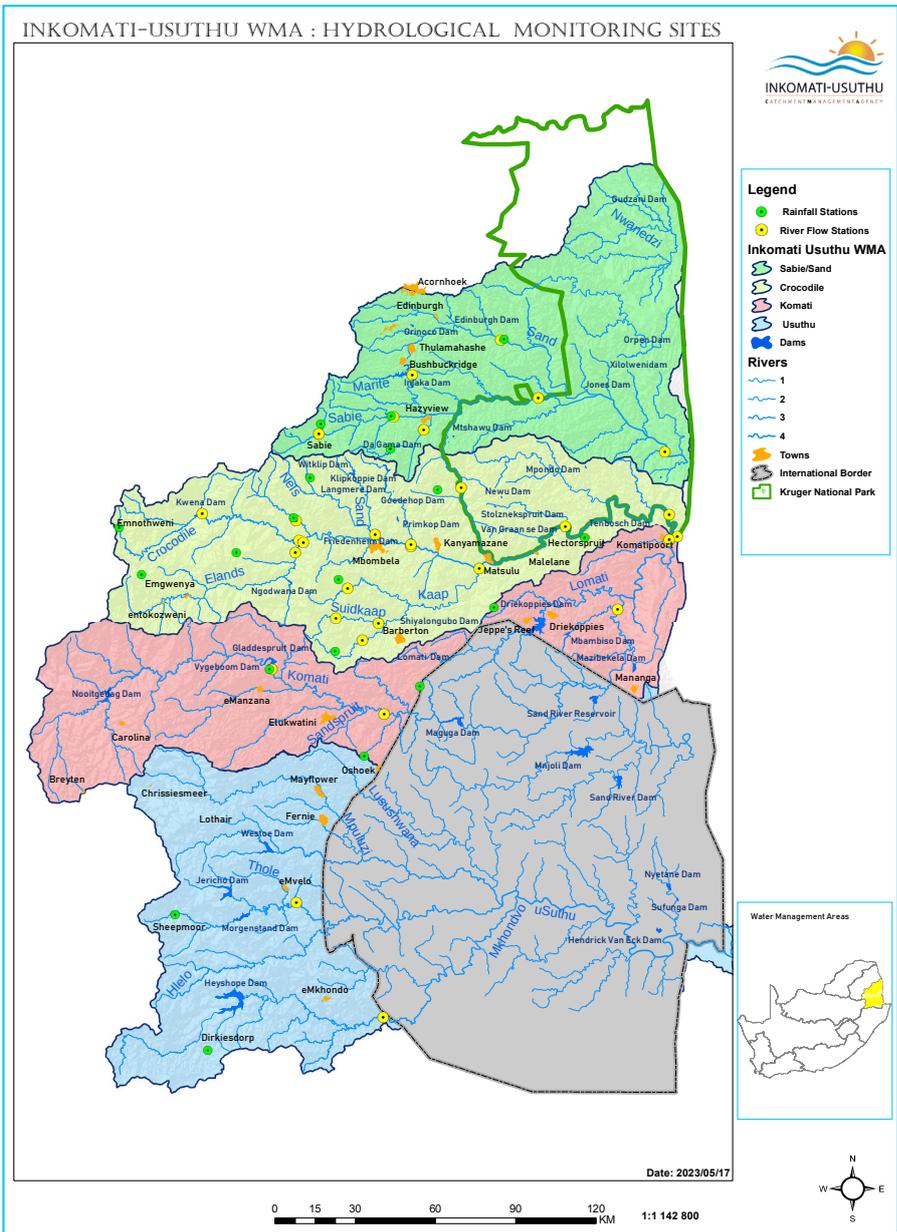
Figure 8: Usuthu Catchment map.

The only significant in-basin use is afforestation with an estimated area of 1 930 km<sup>2</sup> 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<sup>2</sup>.

### 3 SITUATION ASSESSMENT

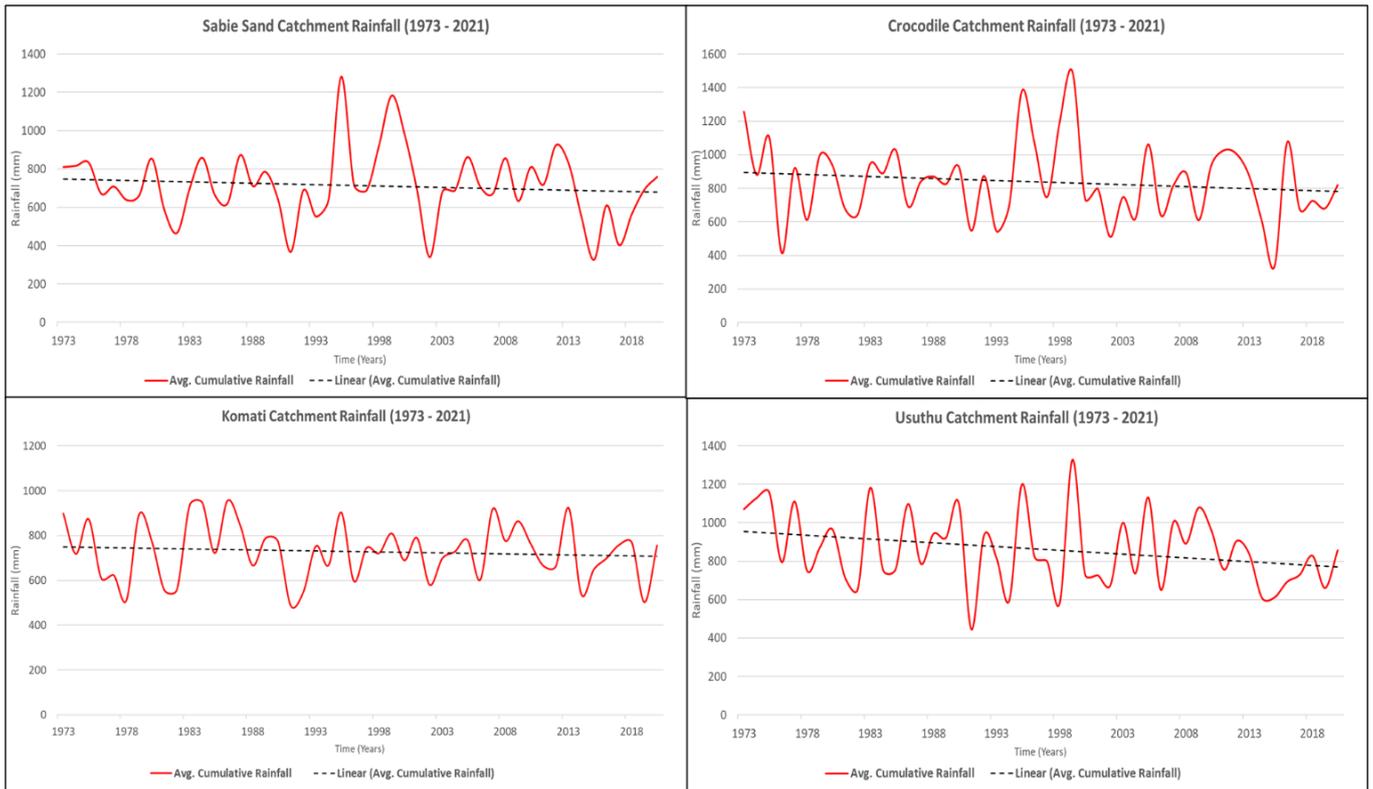
#### 3.1 Hydrological overview

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 :** Map showing hydrometeorological monitoring network within the Inkomati-Usuthu WMA

The average cumulative rainfall trends (Figure 10) for the catchments shows that the rainfall is declining over years from 1973 to 2021 and it is important to recognise the importance of climate change.

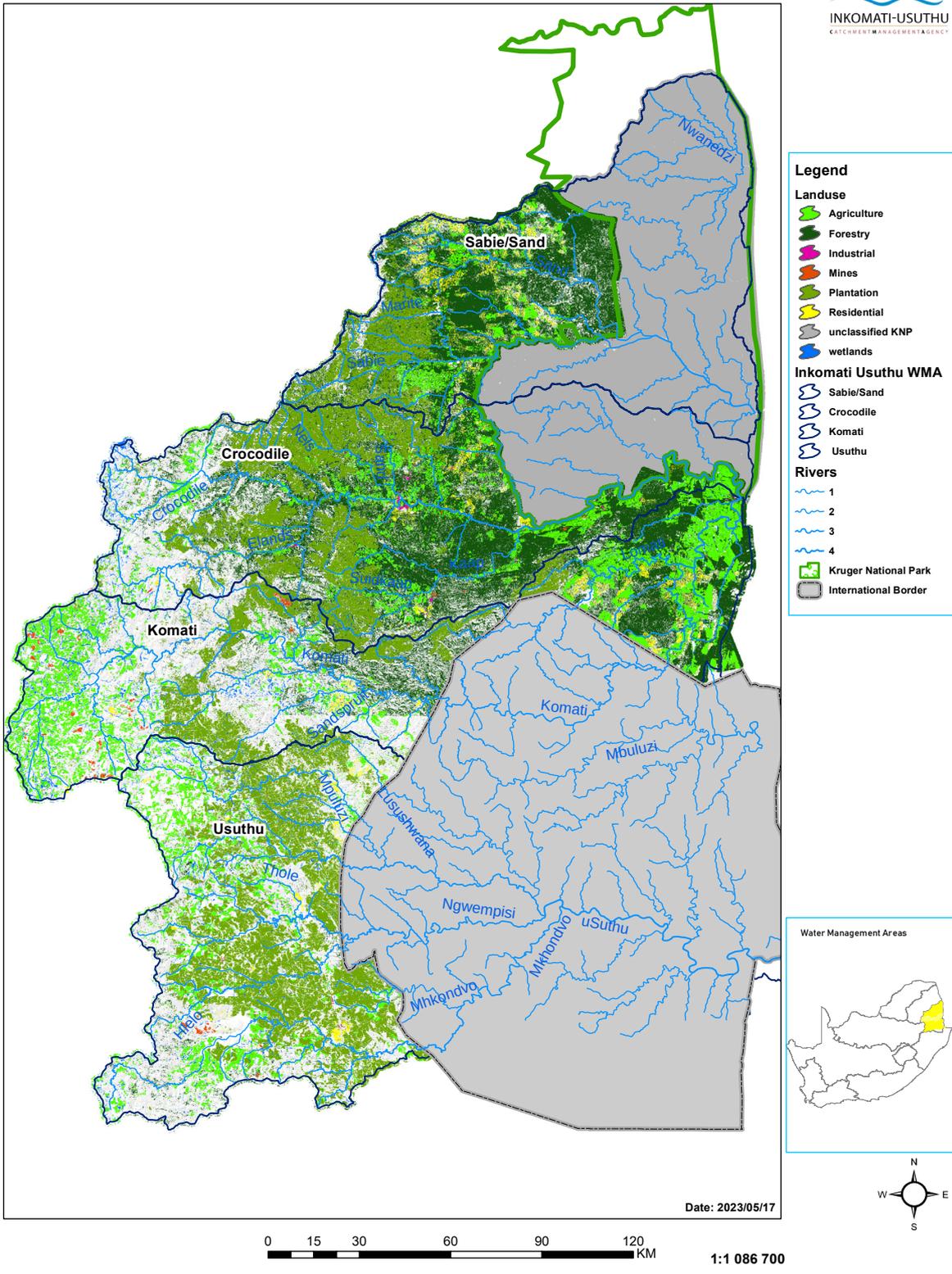


**Figure 10:** Rainfall trends for each catchment

### 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).

# INKOMATI-USUTHU WMA : LAND-USE



**Figure 11:** Characterisation of land use 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. It is important that the quality of the resource remains suitable for recognised

water uses and that the viability of aquatic ecosystems is maintained and protected. This also assists IUCMA to fulfil its mandate for transboundary obligations under the Interim Inco-Maputo Agreement (IIMA) and the SADC Protocol on Shared Watercourses. This also helps IUCMA to achieve the overall objective of maintaining the suitability of water for specific uses and protecting the health of 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 these 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 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). Table 1 shows the distribution of major dams per sector which is the main source of water within the WMA.

Figure 12 shows the percentage volume of Kwena Dam in the Crocodile Catchment from October 1988 to September 2022, with the 2015/16 hydrological year drought identified as one of the critical ones.

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 dams	5	4	1	0	
Agricultural dams	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	

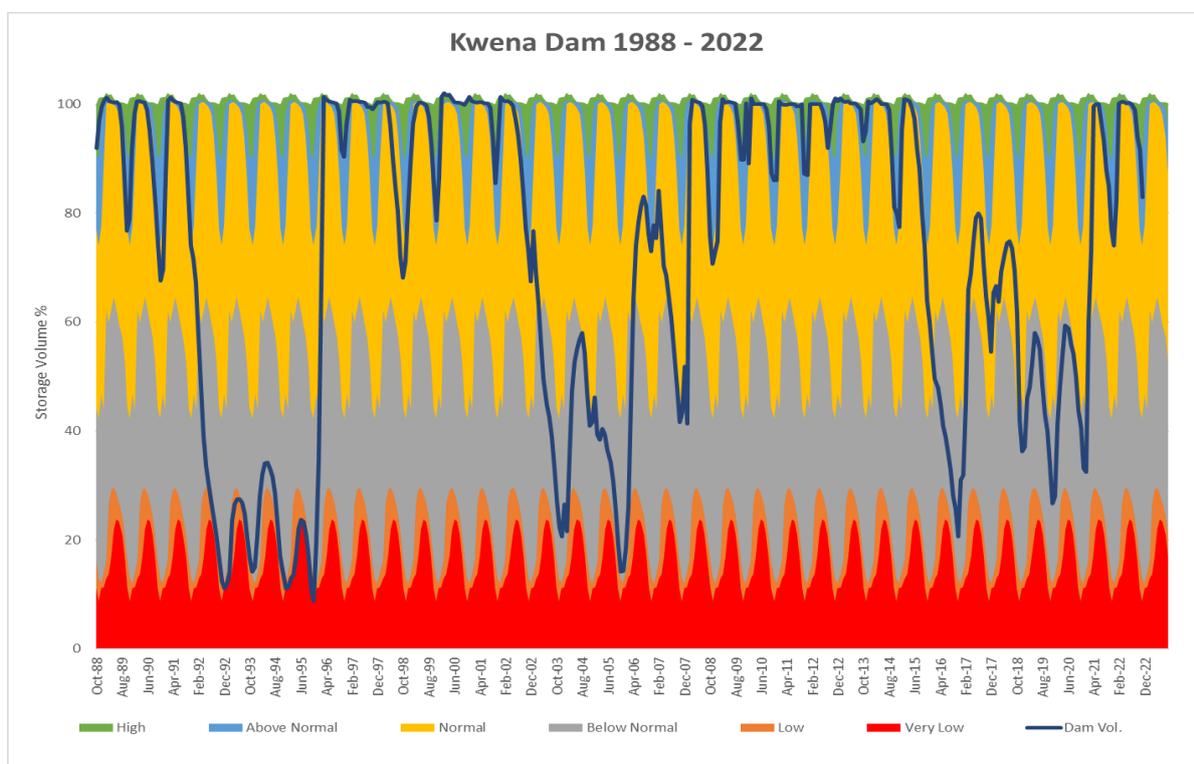
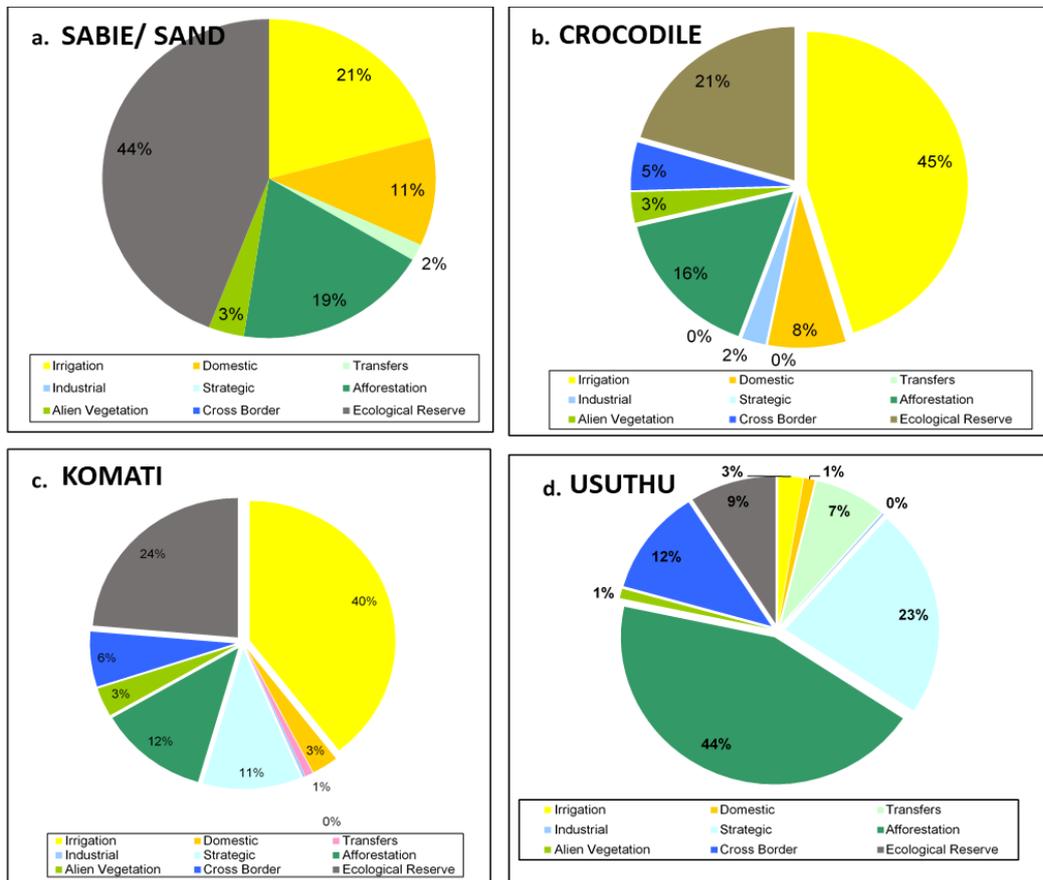


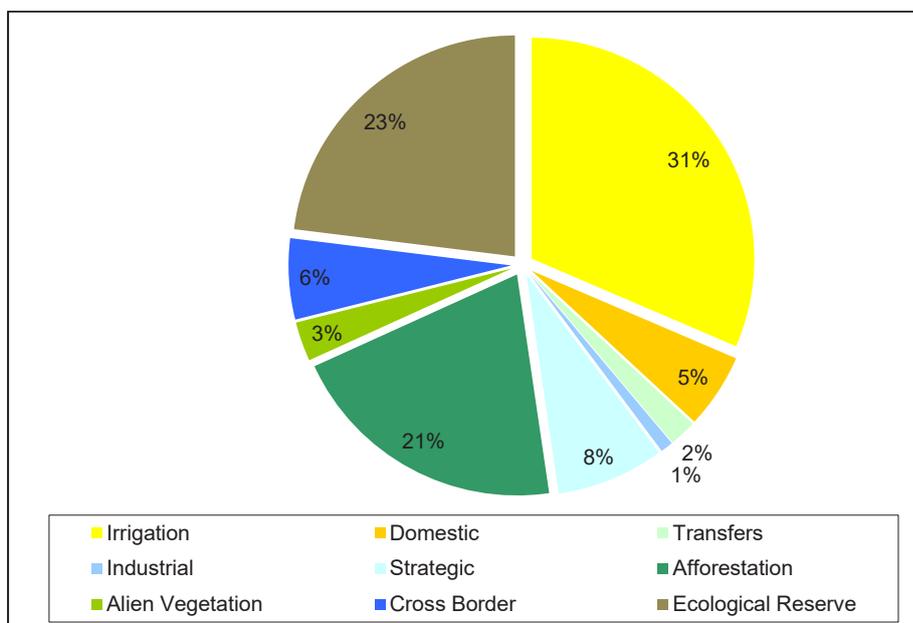
Figure 12: Kwena Dam level in the Crocodile catchment (Oct 1988 – Sept 2022).

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 2018 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).

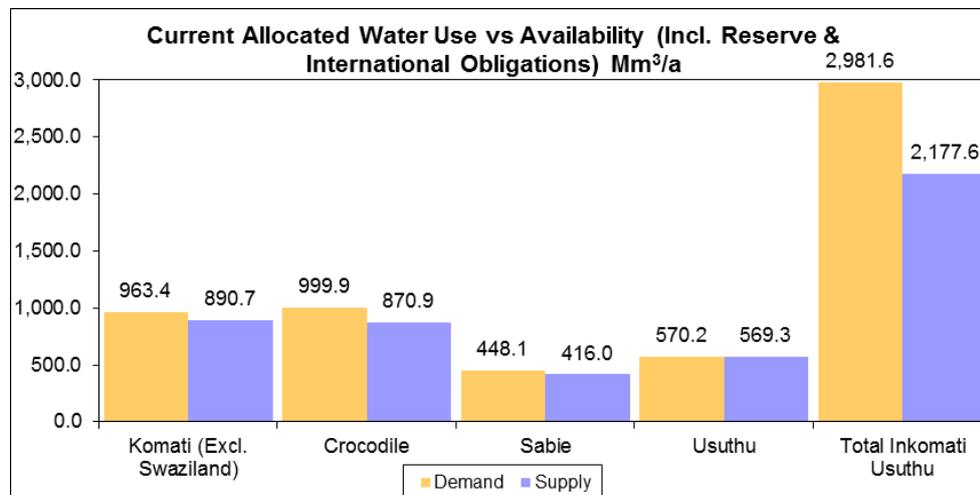
The distribution of water demand for the whole WMA is presented in Figure 14.



**Figure 14:** Overall water demand in the WMA based on 2018 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

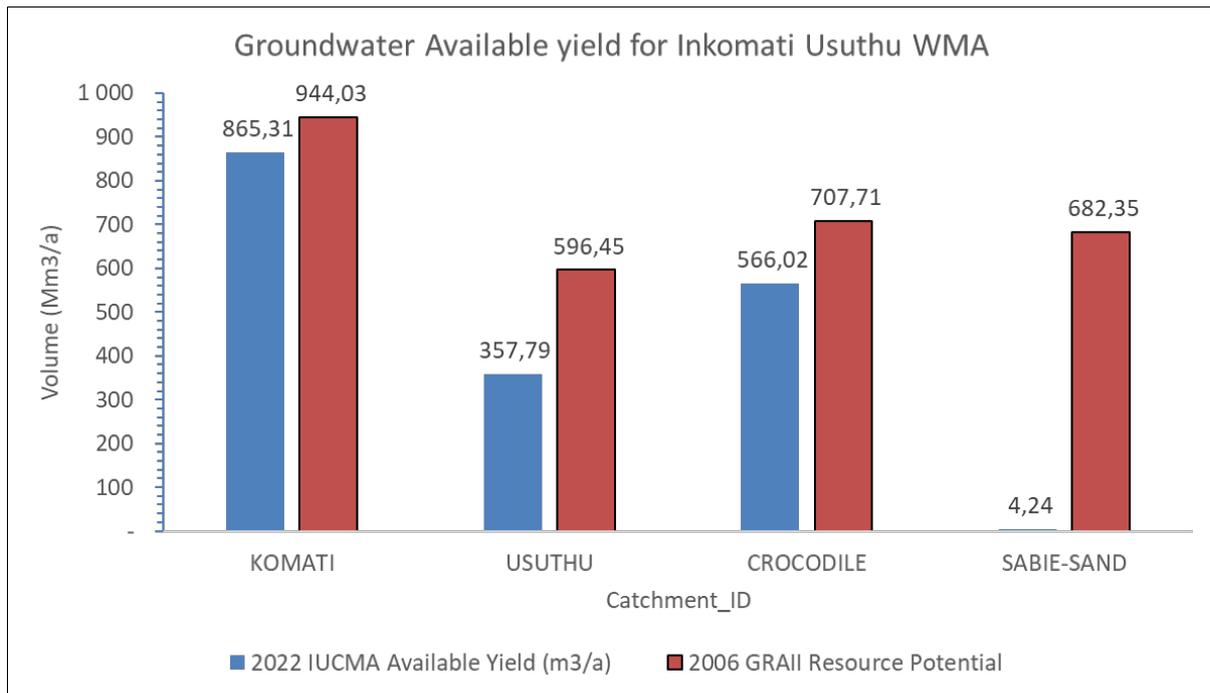
increased population growth. It should be noted that ecological reserve is still to be implemented fully in Komati and Usuthu catchments and is only passively implemented in Crocodile and Sabie Sand catchments, with low flow fully implemented.



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

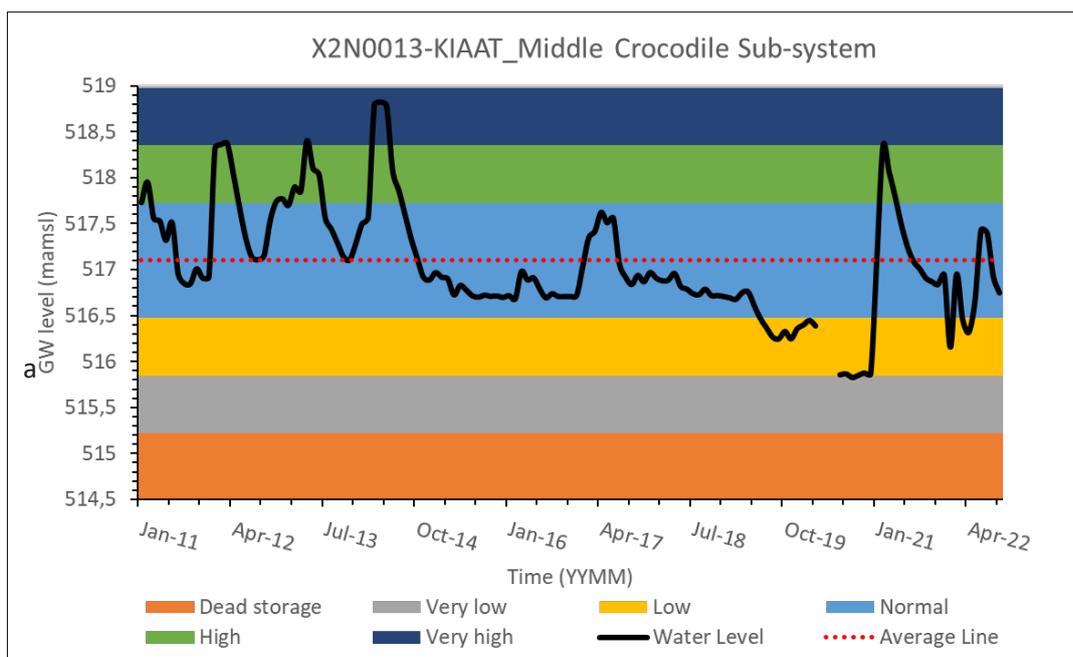
### 3.3.2 Groundwater

Except for Sabie-Sand Catchment, the overall groundwater availability remains high in the other three catchments (Komati, Usuthu and Crocodile). However, the groundwater resource availability has declined for the last 16 years. Komati is characterised by the highest groundwater availability of about 865 Mm<sup>3</sup>/a followed by Crocodile (566 Mm<sup>3</sup>/a) and Usuthu (358 Mm<sup>3</sup>/a) whilst the lowest is estimated for Sabie-Sand at an approximated volume of 4 Mm<sup>3</sup>/a. Compared to the year 2006 estimates by the GRA II, Sabie-Sand is characterised by the highest (678 Mm<sup>3</sup>/a) decline in the groundwater resource availability followed by Usuthu and Crocodile at 239 Mm<sup>3</sup>/and 142 Mm<sup>3</sup>/a, respectively. Komati recorded the lowest groundwater availability decrease of about 78 Mm<sup>3</sup>/a. These declines are potentially due to both the human induced (increased groundwater dependency) and climate induced stresses related to severe meteorological droughts like the one experienced in 2015/2016 hydrological year.



**Figure 16:** Status of groundwater levels within the Inkomati-Usuthu Water Management Area (WMA)

A borehole hydrograph for one of the monitoring boreholes in the crocodile catchment is shown in Figure 17. During 2015/2016 drought, the groundwater level dropped, and some parts of the Inkomati-Usuthu WMA continued to experience groundwater level decrease whilst other parts are characterised by groundwater level recoveries. The former is predominantly in the low to very low band whilst the latter is predominantly within the normal to high band. This is indicative that some areas of the Inkomati-Usuthu WMA are stressed whilst some are not.



**Figure 17:** A hydrograph of groundwater levels in 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 as undesirable levels of water quality have an adverse impact on water users (industrial, agriculture, recreation and domestic) but also impact negatively on aquatic ecosystems. The first step in integrated water quality resources management planning process is evaluating the status quo of water quality across the WMA. The water quality status is evaluated using Resource Directed Measures (RDM) tools developed to manage water quality, for the protection of water resources by setting objectives for the desired condition of resources. The ecological Reserve is one of the components of Reserve within the framework of resource directed measures which also consist of the Management Class (MC) and Resource Quality Objectives (RQOs) for protection of water resources to ensure sustainable development and use of water resource.

The Inkomati Usuthu WMA, Classes and RQOs are determined within the X primary drainage region of Komati (X1), Crocodile (X2), Sabie-Sand (X3) and (X4) and gazetted into law in December 2016 by Government Notice No. 1616. The comprehensive ecological Reserve determination study was also completed and gazetted into law in July 2019 through Government Notice No. 998. The South African Water Quality Guidelines were used to evaluate Usuthu Catchment water quality status quo and where RQOs were not available. However, the classification process to set management class and determine the RQO for the W primary drainage region of Usuthu (W5) is currently being determined by the Department of Water and Sanitation. The data used to evaluate water quality status within the WMA ranges from January 2017 - October 2022.

#### **3.4.1 Overview water quality status**

Generally, surface water quality status within the WMA can be said to be in a good to fair condition. There are areas with increasing trends on certain variable(s) of concern identified as hotspots within respective catchments where salts and nutrients are rising gradually in specific areas within the WMA. However, the concentration of the salts and nutrients, using electrical conductivity and phosphate as indicator variables within the WMA, have not reached an alarming level as they are still tolerable whereas microbial pollution in the WMA is a common challenge. The presence of *E. coli* as the indicator variable for microbial pollution in the water resources is attributed to faecal contamination emanating from either human faecal material or that of animals. Eutrophication status of the major dams within the WMA falls under the oligotrophic status, meaning that the water resources have low nutrients with low potential for plant and algal productivity.

#### **3.4.2 Water quality impacts**

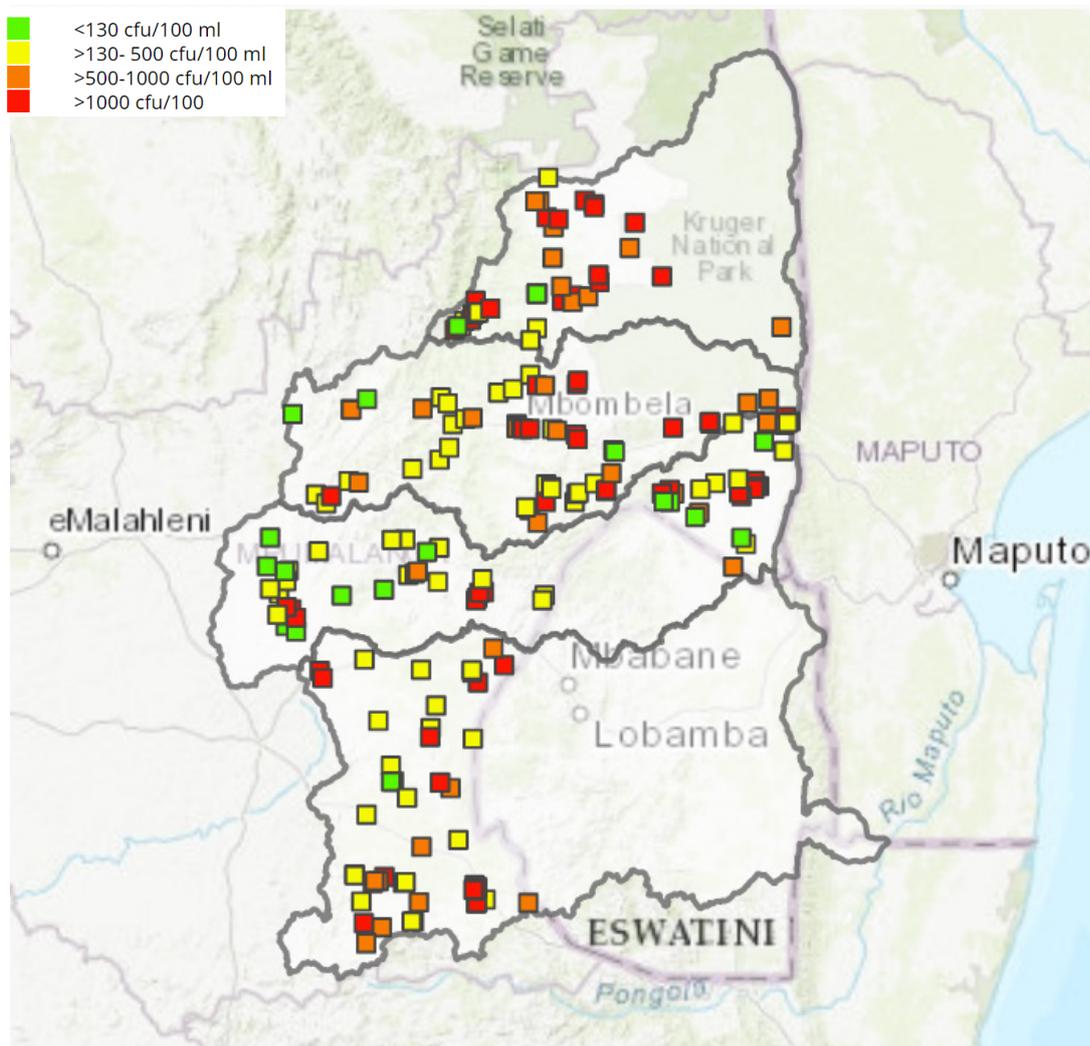
The major impacts on water quality in the WMA are associated with land use activities (point and non-point sources of pollution) such as:

- Agricultural activities (pesticides, fertilisers) and irrigation return flows.
- Residential areas (urban and rural townships) e.g., storm water run-off, poor sanitation services and illegal waste dumping, especially disposable nappies.
- Sewage infrastructure (e.g., non-compliant effluent from WWTWs, overflowing raw sewer manholes and pump stations).

- Industries such as Mining (coal and gold mainly and illegal sand mining activities), Sugar, Saw, Paper and Pulp Mills i.e., toxins from processing plants; water seepage (decants) and improper management of waste streams and closure of mine dumps.

### 3.4.3 Water Quality Status within the WMA

The water quality status within the WMA is in a good to fair condition. However, there are challenges with microbial (*E. coli*) compliance with Resource Quality Objectives (RQOs) and Targeted Water Quality Ranges (TWQR) throughout the entire water management area. But most of the areas have not reached an alarming stage as the coliform counts are still below 1000 (cfu/100ml) as illustrated in Figure 18. Microbial counts greater than (>) 1 000 (cfu/100ml) arise from residential area due to extensive urban and rural stormwater runoff impacts including effluent from WWTWs and its associated infrastructure which discharge partially or/untreated effluent into water resources. These areas with coliform counts greater than (>) 1 000 (cfu/100ml) will be regarded as microbial water quality hotspots as illustrated in Figure 18.



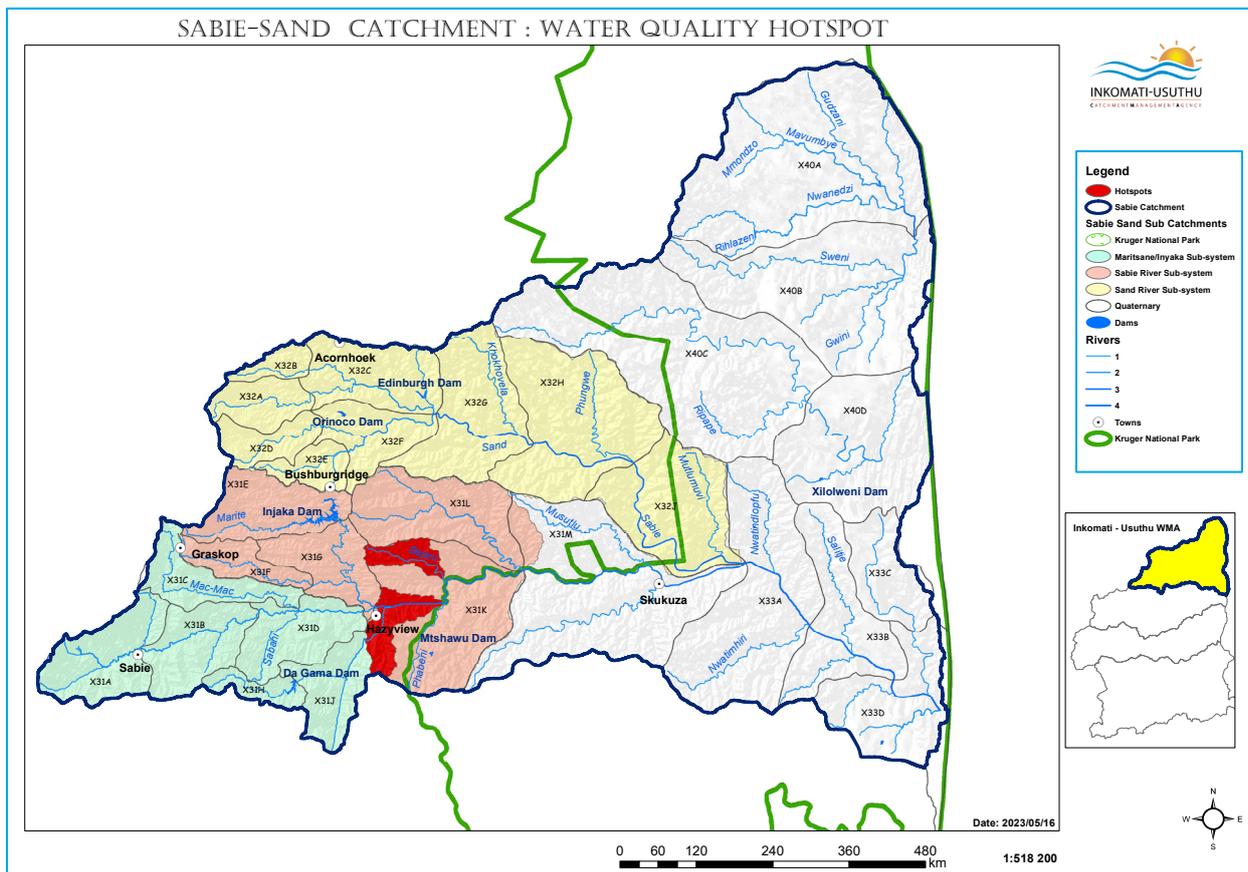
**Figure 18:** A map indicating microbial water quality hotspots (>) 1 000 (cfu/100ml)

## Sabie-Sand Catchment

The water quality in the Sabie/Sand Catchment is generally good as most of the indicator variables comply with the set RQOs. Although there are challenges with electrical conductivity (EC), as an indicator variable for salts, and phosphate as an indicator variable for nutrients in the Langspruit, Noord Sand River and Bejani River and its tributary. These resource units are hotspots as illustrated in Figure 19. and Table 2. The high levels of these indicator variables are attributed to WWTWs effluent and its associated sewer infrastructure, stormwater runoff from formal /informal settlements (Hazyview, Mahushu and Mkhuhlu) as well as extensive agricultural activities (fertilisers and return flows) around Langspruit and Noord Sand River systems.

**Table 2:** Water Quality Hotspots area within the Sabie River System

Resource Units	Resource Name	Variable(s) of concern
X31D	Langspruit	PO <sub>4</sub> and EC
X31J	Noord Sand River	
X31K	Bejani River and its tributary	

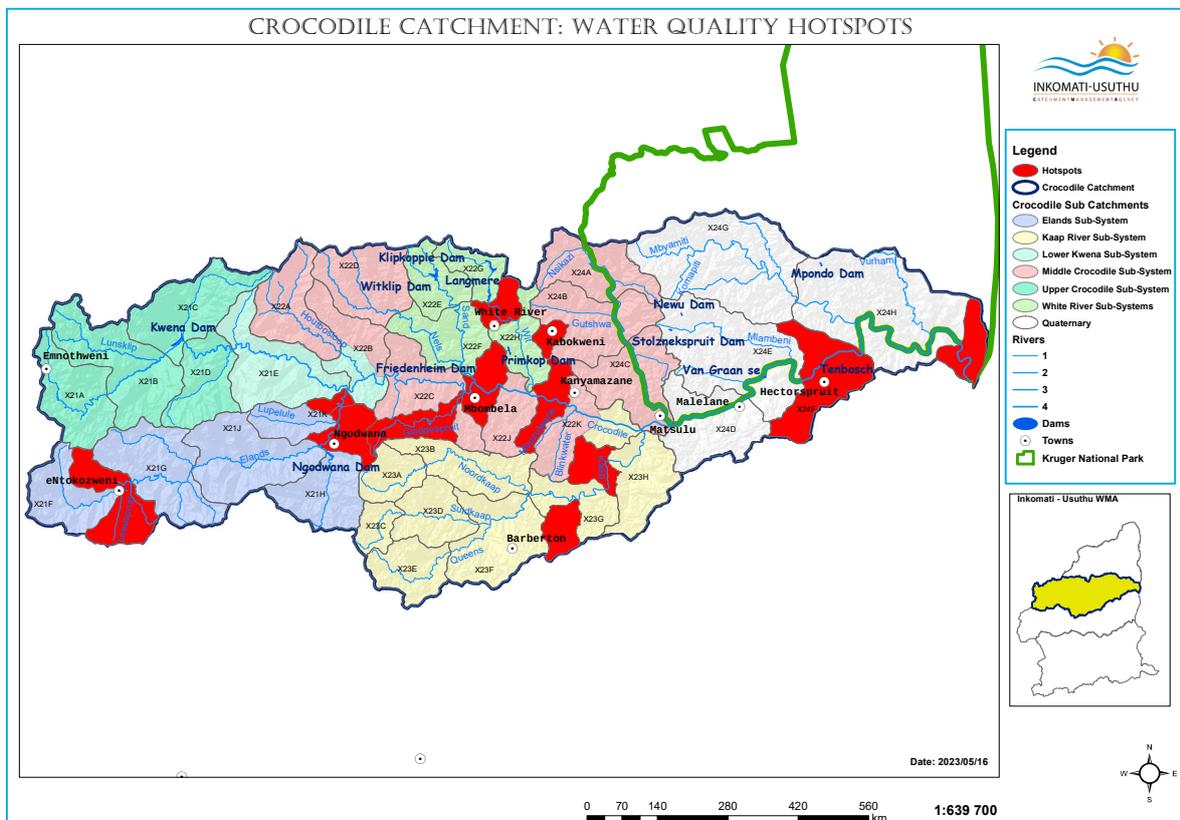


**Figure 19:** Map indicating water quality hotspot for phosphate and electrical conductivity within Sabie-Sand catchment

## Crocodile Catchment

The Crocodile Catchment is generally in a good to fair condition in terms of water quality as most of the indicator variables comply with the set RQOs, with areas of concern (hotspots) as illustrated in Figure 20. There are challenges in terms of Salts (EC) in the Elands River (X21K-01035) downstream of SAPPI Ngodwana Mill, tributary of Gutshwa River (X24B-00903) downstream of Kabokweni WWTW, Crocodile River (X24H) at Tenbosch, Hectorspruit and tributary of Crocodile River at Komatipoort downstream of the WWTWs. The high levels of EC may be due to presence of dissolved inorganic solids such as chloride, phosphate, nitrate, sodium and sulphate arising from industrial activities (mills), WWTWs' effluent, stormwater runoff from formal /informal settlements (Mbombela, White River, Kanyamazana, Hectorspruit and Komatipoort) as well as agricultural runoff and return flows around Marloth Park and Tenbosch.

Furthermore, a deterioration of the quality in the Lower Kaap River system (high levels of arsenic), Gladdespruit and Besterspruit (high levels of manganese) are observed. The impacts are attributed to gold mine activities in the area as well as illegal gold mining within Kaap River, Louws Creek and its tributaries. The mineral manganese can be found naturally in the environment (surface water) or because of land use activities in mining. Phosphates enter surface water from human and animal faecal waste and fertilisers runoff from agricultural activities. High level of phosphate in X24F and X21F quaternary catchment were observed, this is due to run-off and fertilisers from agriculture activities, rural and urban areas as well as WWTWs in the Crocodile Catchment.



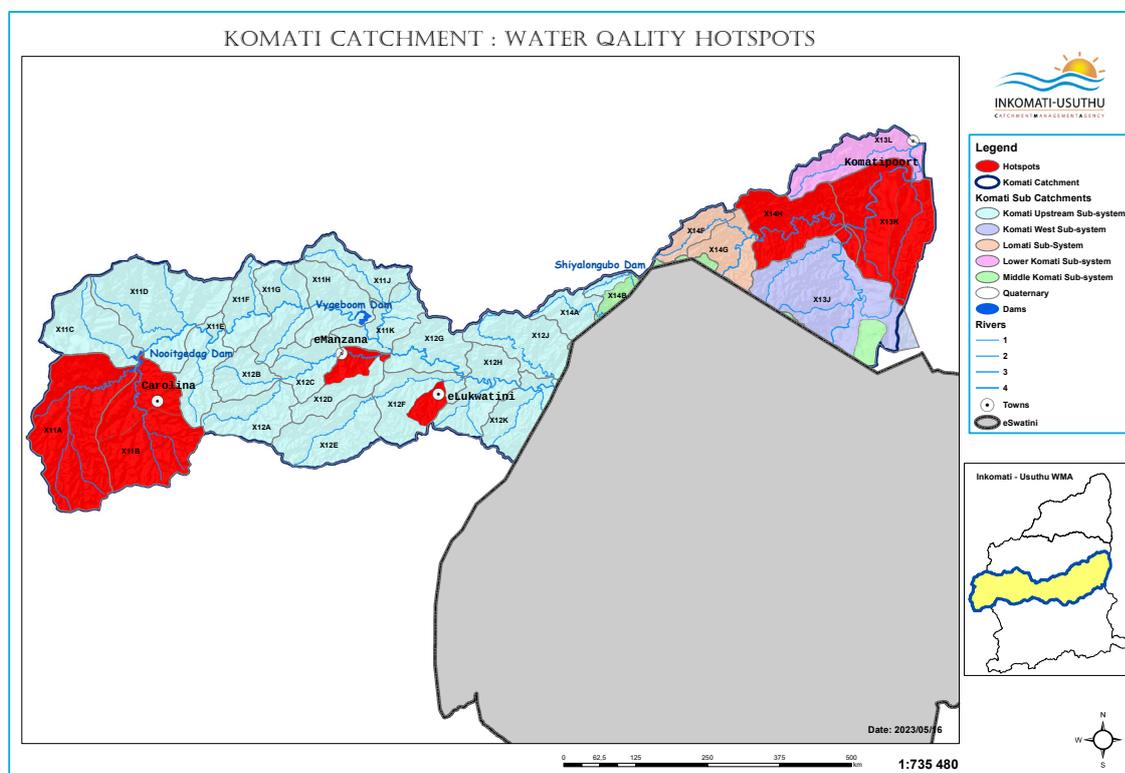
**Figure 20:** Map indicating water quality hotspots for phosphate, arsenic, manganese and electrical conductivity within Crocodile Catchment

## Komati Catchment

The Komati Catchment is generally in a good to fair condition in terms of water quality, with areas of concern (hotspots) occurring at the upper Komati sub-catchment, especially the Boesmanspruit and Vaalwaterspruit which are dominated by mining activities as illustrated in Figure 21 and Table 3. There are challenges of non-compliance with salt concentrations (sulphate and electrical conductivity) within these priority resource units. The Lower Komati sub-catchment is mainly dominated by agricultural activities, especially X13K and X14H. Consequently, irrigation return flows contributes to the high levels of EC in the Lower Komati subcatchment.

**Table 3:** Water Quality Hotspots area within the Komati River System

Resource Units	Resource Name	Variable(s) of concern	Impacts
X11B and X11A	Boesmanspruit, Vaalwaterspruit and their tributaries.	SO <sub>4</sub> , EC and PO <sub>4</sub>	Mining activities, residential areas (Carolina Town) and WWTWs discharge with its associated sewer infrastructure.
X12D and X12F	Seekoespruit, Teespruit and their tributaries.	EC and PO <sub>4</sub>	Residential areas (eManzana and Elukwatini) and WWTWs discharge with its associated sewer infrastructure.
X13K and X14H	Lomati River, middle Komati River and Sikwakwa River	EC and PO <sub>4</sub>	Extensive irrigation and Residential areas (Tonga, Kamaqhekeza, Mzinti and Kamhlushwa) and WWTWs discharge with its associated sewer infrastructure

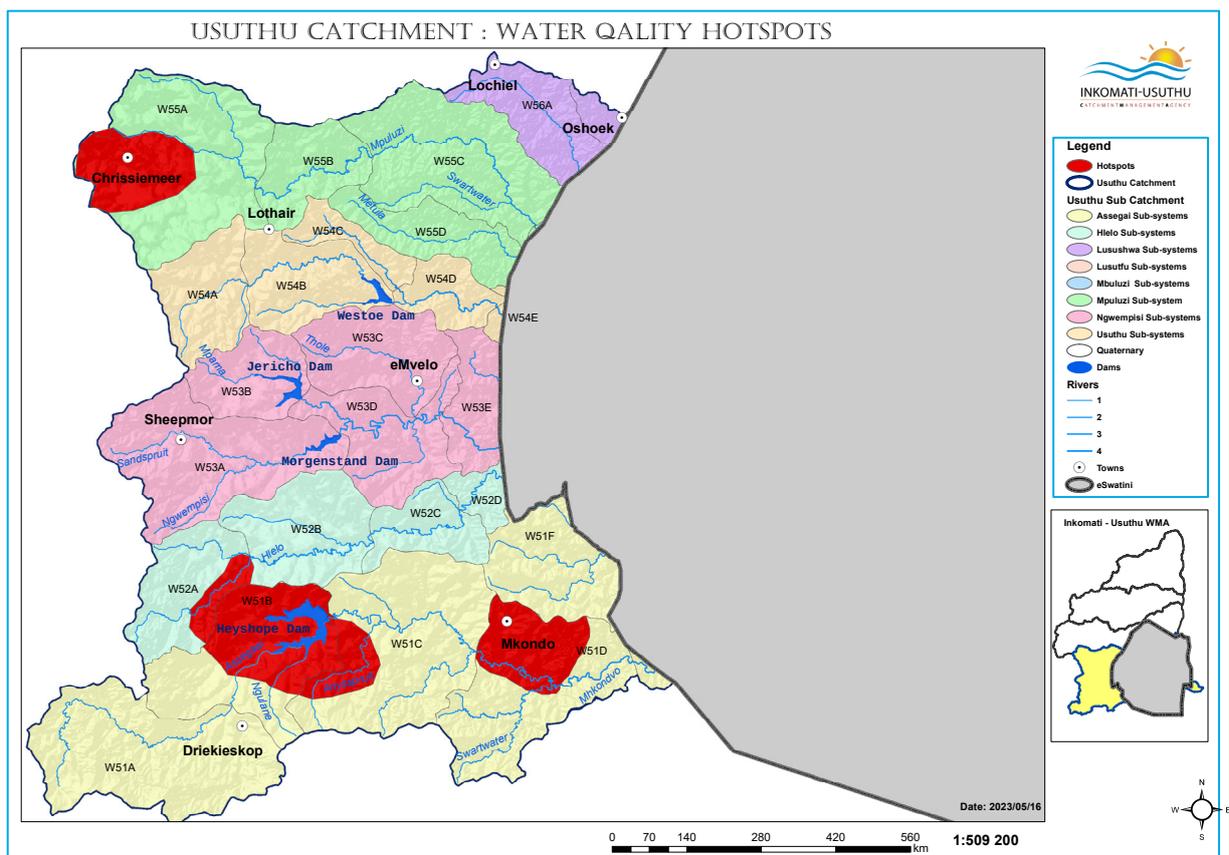


**Figure 21:** Map indicating water quality hotspots for sulphate, phosphate and electrical conductivity within Komati Catchment

## Usuthu Catchment

The water quality in the Usuthu catchment is generally good, with “hotspots” occurring within W55A, W51C, W52A and W51D, specifically at Chrissiesmeer Lake, Annysspruit, tributaries of Heyshope Dam and Hlelo River, Klipmisselspruit and its tributaries as illustrated in

Figure 22. The variables of concern in W55A and W51D are salts and nutrient as EC and PO<sub>4</sub> as indicator variables. These resource units are downstream of urban or rural impacts from the Chrissiesmeer and Mkhondo areas including effluent from WWTWs and its associated infrastructure which discharge/ or overflows into the lake, Klipmisselspruit and its tributaries. The variables of concern in W52A and W51C are salts EC and SO<sub>4</sub> due to mining activities within this resource units.

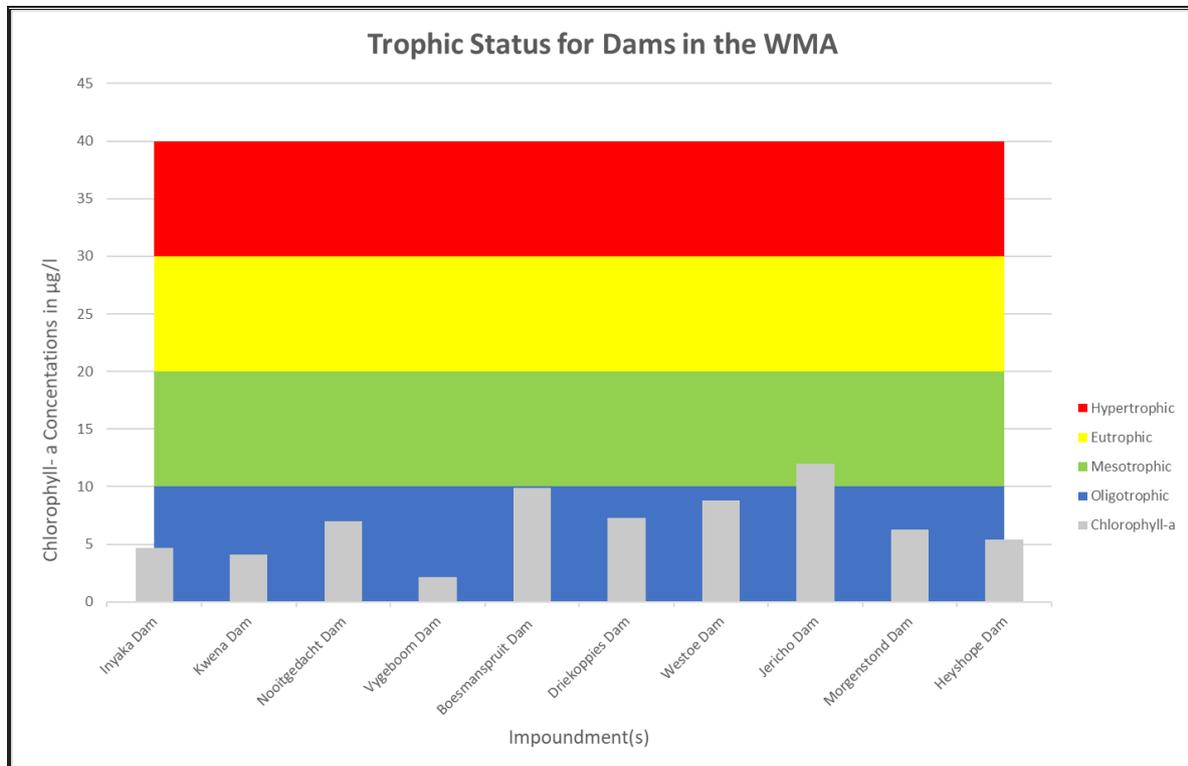


**Figure 22:** Map indicating water quality hotspots for phosphate and electrical conductivity within Usuthu Catchment

### 3.4.4 Eutrophication Status within the WMA

Eutrophication is the process of nutrient enrichment of waters which results in the stimulation of an array of symptomatic changes, amongst which increased production of algae and aquatic macrophytes, deterioration of water quality and other symptomatic changes are found to be undesirable and to interfere with water users. The trophic status of the major impoundments monitored through the NEMP (April-December 2021) data falls within oligotrophic status as illustrated in Figure 23. This means that they are low in nutrients with negligible potential for plant and algal productivity. Jericho impoundment merely makes it to the mesotrophic status which entails an intermediate level of nutrients and moderate potential for plant and algal productivity. Furthermore, the cyanobacteria and trophic status are also monitored through the Cyanolakes application (January-

October 2022) using satellite imagery which shows that all the major impoundments are oligotrophic. There were no cyanobacteria detections that pose an immediate danger to human health for the reported period and based on the trophic status and low cyanobacteria risk level; it was safe to undertake recreational activities that required both full and/or partial contact with the water during the period reported.



**Figure 23:** Trophic status of the major impoundments with Inkomati - Usuthu WMA.

### 3.4.5 Water Quality Compliance Status of Strategic Monitoring Sites Within WMA

Strategic monitoring sites consist of Ecological Water Requirement (EWR) sites and International Obligation (IO), and it is imperative to effectively manage the water quality compliance of this strategic sites in the WMA. Figure 24 illustrates the location of the Ecological Water Requirement (EWR) sites and International Obligation (IO). Data reported for compliance status ranges from January 2017- October 2022 as per the indicator variables in Table 4. The compliance status as illustrated in Table 5 to Table 8 was determined using the following requirements:

- Gazetted Resource Quality Objectives (RQOs; December 2016) for the former Komati Catchment,
- South African Target Water Quality Ranges (TWQR) limits for the Usuthu Catchment, and
- International Water Quality Guideline limits to indicate the compliance with International Obligation as per the Interim Inco-Maputo Agreement (IIMA) between Kingdom of eSwatini Republic of Mozambique and South Africa (RSA).

**Table 4:** Water Quality Variables

<b>Classified Water quality variables</b>	<b>Indicator Variables</b>	<b>Statistical analysis of data</b>
System variable	pH, Temperature and Turbidity	95 percentiles
Salts	Electrical Conductivity (EC)	95 percentiles
Nutrients	Phosphate	50 percentiles
Microbial	<i>Escherichia coli</i> ( <i>E. coli</i> ) and <i>Faecal Coliforms</i> (FC)	Average
Toxic	Arsenic and Cyanide	95 percentiles

ECOLOGICAL WATER REQUIREMENTS (EWR) & INTERNATIONAL OBLIGATION (IO) SITES



Figure 24: A map showing the EWR and International Obligation sites within Inkomati-Usuthu WMA

### Compliance Status of Ecological Water Requirement (EWR) sites

Table 5: Compliance Status of EWR sites within Sabie-Sand Catchment

Resource Units	EWR Site	Turbidity (NTU)		EC (mS/m)		PO <sub>4</sub> (mg/l)		E coli (cfu/100ml)	
		RQO	Results	RQOs	Results	RQOs	Results	RQOs	Results
MRU Sabie A: (Sabie River)	EWR S-1	NR	22	30	14	0.015	0.020	130	1241
MRU Sabie A: (Sabie River)	EWR S-2	NR	73	30	44	0.015	0	130	467
MRU Sabie B: (Sabie River)	EWR S-3	NA	75	30	13	0.015	0	130	796
MRU Mac A: (Mac Mac River)	EWR S-4	NA	17	40*	12	0.025*	0	130*	132
MRU Mar A: (Marite River)	EWR S-5	NR	31	30	10	0.015	0	130	685
MRU Mut A: (Mutlumvi River)	EWR S-6	NR	155	55	77	0.015	0	130	832
MRU Sand A: (Grootsand River)	EWR S-7	NA	26	42	11	0.125	0	130	401
MRU Sand B: (Sand River)	EWR S-8	NR	65	40*	31	0.125	0.020	130	1242

NA: Not available

NR: Not Required

VA: Variable Not Analysed

TWQR\*: Strictest limit from Targeted Water Quality Guideline

**Table 6:** Compliance Status of EWR sites within Crocodile Catchment

Variable	Results ROQs	Resources Units																	
		MRU CROC A Crocodile River		MRU CROC B Crocodile River	MRU ELAN A Elands River	MRU ELAN B Elands River	MRU CROC D Crocodile River	MRU CROC E Crocodile River		MRU KAAP A Kaap River									
		EWR-C1	EWR-C2	EWR-C3	EWR-E1	EWR-E2	EWR-C4	EWR-C5	EWR-C6	EWR-C7									
Temp (°C)	RQO	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Turbidity (NTU)	RQO	Not more than 2 °C from baseline (Aquatic Ecosystem driver)																	
EC (mS/m)	Results	6.4	51	105	4	6	80	75	176	49	NA (Aquatic Ecosystems driver)								
	RQO	30	30	30	30	55	70	70	70	200									
PO <sub>4</sub> (mg/l)	Results	11	15	15	21	87	33	50	82	74									
	RQO	0.015	0.025	0.015	0.025	0.015	0.125	0.075	0.125	0.125									
TIN (mg/l)	Results	0	0	0	0.020	0	0.110	0.060	0.030	0.020									
	RQO	NR	NR	NR	NR	NR	NR	NR	NR	< 4									
E. coli (cfu/100 ml)	Results	NR	NR	NR	NR	NR	NR	NR	NR	NR									
	RQO	120	130	130	130	130	130	130	130	130									
Cn(mg/l)	Results	80	550	505	758	186	1785	1090	427	198									
	RQO	NR	NR	NR	NR	NR	NR	NR	NR	NR									
As (mg/l)	Results	NR	NR	NR	NR	NR	NR	NR	NR	NR									
	RQO	NR	NR	NR	NR	NR	NR	NR	NR	NR									

NA: Not available      NR: Not Required      VA: Variable Not Analysed      TWQR\*: Strictest limit from Targeted Water Quality Guideline

**Table 7: Compliance Status of EWR sites within Komati Catchment**

Resource Units	EWR Site	Turbidity (NTU)		EC (mS/m)		PO <sub>4</sub> (mg/l)		TIN		E. coli (cfu/100ml)	
		RQO	Results	RQOs	Results	RQOs	Results	RQO	Results	RQOs	Results
MRU Komati B: (Komati River)	EWR K-1	NR	60	50	21	0.02	0		NR	130*	222
MRU Komati G: (Gladdespruit River)	EWR G-1	NA	52	40*	33	0.02	0		NR	130*	312
MRU Komati C: (Komati River)	EWR K-2	NA	130	55	21	0.02	0		NR	130	228
MRU Komati T: (Tewaterspruit River)	EWR T-1	NA	45	40*	43	0.125	0.040		NR	130	1193
MRU Komati M: (Lomati River)	EWR L-1	NA	39	40	31	0.015	0	1	<0.01	130	313
MRU Komati D: (Komati River)	EWR K-3	NR	206	85	60	0.125	0	1	<0.01	130	593

NA: Not available

NR: Not Required

VA: Variable Not Analysed

TWQR\*: Strictest limit from Targeted Water Quality Guideline

### Compliance Status of International Obligation (IO) sites

Inkomati-Usuthu WMA which forms part of Inkomati-Maputo River Basin in South Africa, and four (4) indicator variables were selected to determine compliance status on international obligation sites as illustrated in Table 8.

**Table 8:** Water Quality Compliance Status of IO Sites within Inkomati and Maputo Basins

Resource Name	pH		EC (mS/m)		PO <sub>4</sub> (mg/l)		Faecal Coliforms (cfu/100ml)	
	Limits	Results	Limits	Results	Limits	Results	Limits	Results
Sabie River	6.5 – 8.5	7.3-8.3	150	26	2	<0.010	2000	723
Komati River at Ekulindeni	6.5 – 8.5	7.1-8.3	150	21	2	0	2000	287
Komati River at Mananga	6.5 – 8.5	7.3-8.4	150	42	2	0	2000	580
Komati River at Komatipoort	6.5 – 8.5	7.3-8.4	150	90	2	0	2000	241
Lusushwana River	6.5 – 8.5	6.5-7.8	150	10	2	0	2000	647
Mpuluzi River	6.5 – 8.5	6.6-7.8	150	12	2	0.010	2000	957
Usuthu River	6.5 – 8.5	6.6-7.8	150	15	2	0	2000	183
Ngwempsi River	6.5 – 8.5	6.6-8.1	150	13	2	<0.010	2000	728
Hlelo River	6.5 – 8.5	6.7-7.9	150	15	2	0	2000	290
Assegaai River	6.5 – 8.5	6.8-8.1	150	23	2	0.020	2000	643

### 3.4.6 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 & Louw, 2007). The current conditions (ecological category) for the different indicators are determined as a percentage change from the reference. The assessment can be carried out at the sub-quaternary reach or site level.

The following indices are monitored for the REMP following the generic ecological categories for eco-status components as presented in Table 9.

- 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).

Monitoring is carried out annually in the subcatchments and technical reports are produced annually. As the REMP is based on indices, further research projects are conducted in collaboration with local institutions such as UMP and others to identify the causes of changes in the ecosystem. This also contributes to the understanding of the multiple stressors on the ecological and social components of the freshwater ecosystem.

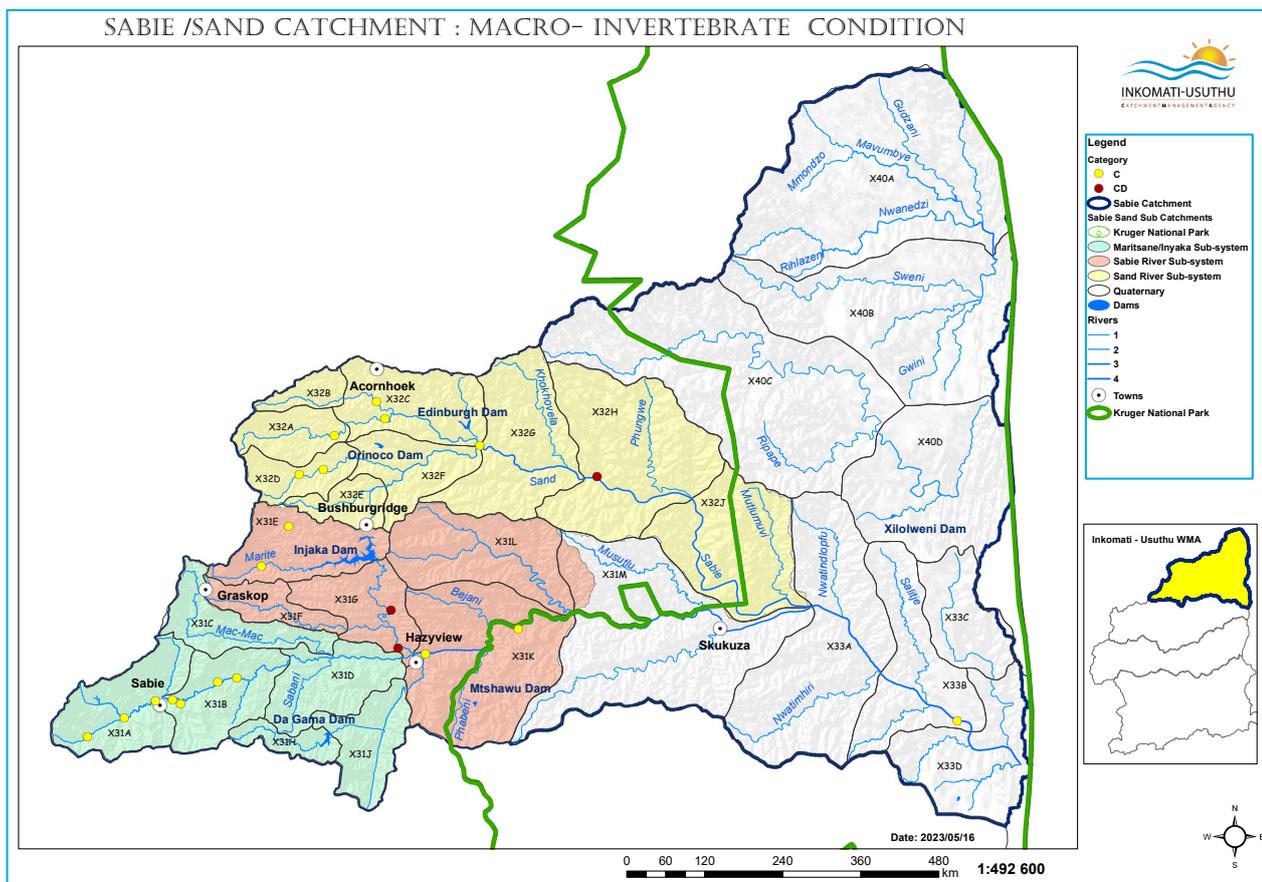
**Table 9:** Generic Ecological Categories for Eco-Status components.

ECOLOGICAL CATEGORY	GENERIC DESCRIPTION OF ECOLOGICAL CONDITIONS	ARBITRARY GUIDELINE SCORE (% OF MAXIMUM THEORETICAL TOTAL)
A	The river is in a natural and undisturbed condition.	>92 – 100
AB	The system and its components are in a close to natural condition most of the time. Conditions may rarely and temporarily decrease below the upper boundary of a B category.	>88 - <= 92
B	Largely natural with few modifications. A small change in the attributes of natural habitats and biota may have taken place in terms of frequencies of occurrence and abundance.	>82 - <=88
BC	Close to largely natural most of the time. Conditions may rarely and temporarily decrease below the upper boundary of a C category.	>78 - <=82
C	Moderately modified. Loss and change of natural habitat and biota have occurred in terms of frequencies of occurrence and abundance. Basic ecosystem functions are still predominantly unchanged.	>62 - <=78
CD	The system is in a close to moderately modified condition most of the time. Conditions may rarely and temporarily decrease below the upper boundary of a D category.	>58 - <=62
D	Largely modified. A large change or loss of natural habitat, biota and basic ecosystem functions have occurred.	>42 - <=58
DE	The system is in a close to largely modified condition most of the time. Conditions may rarely and temporarily decrease below the upper boundary of an E category.	>38 - <=42
E	Seriously modified. The change in the natural habitat template, biota and basic ecosystem functions are extensive.	20 - <=38
F	The river is in a critically or extremely modified state and ecosystem functions are completely lost. The natural habitat and biota are almost completely lost.	<20

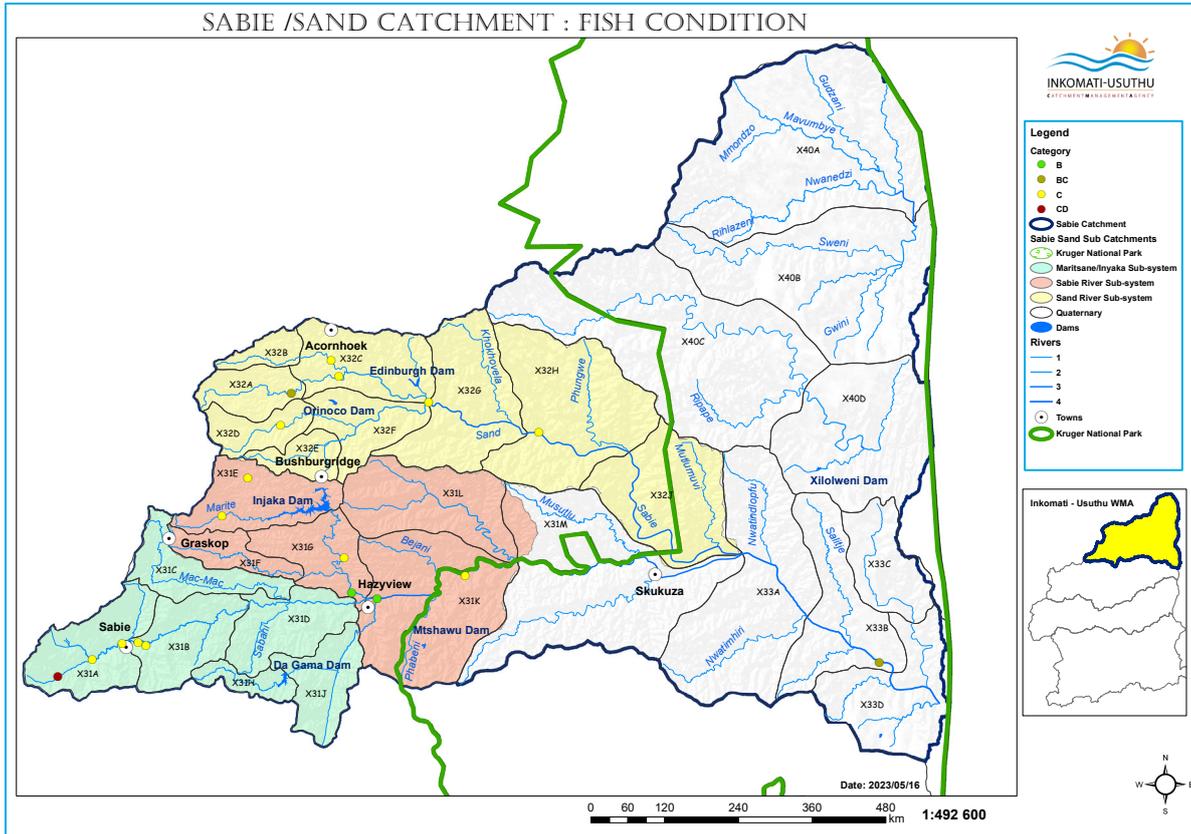
## Sabie-Sand Catchment

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). Visual representation of the biomonitoring status of the Sabie-Sand catchment is provided in Figure 25 to Figure 27.

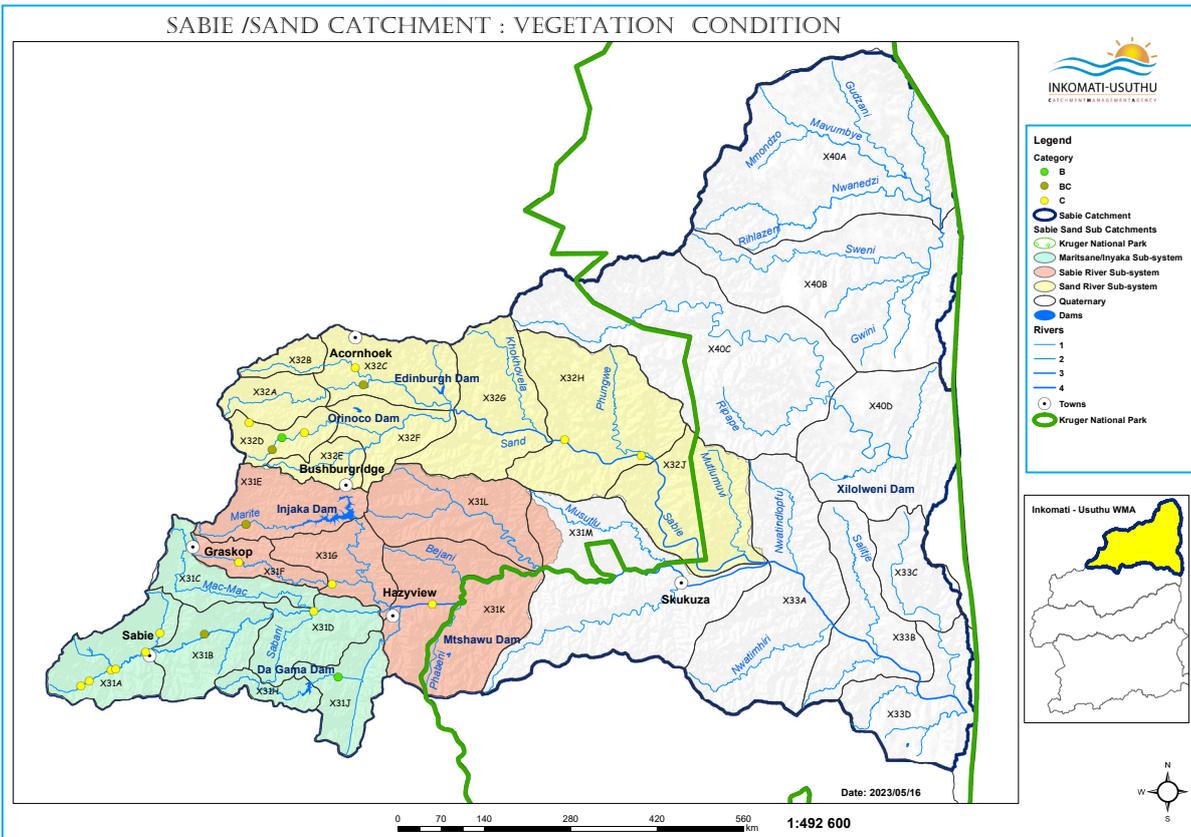
The Eco-status of the Sabie-Sand Catchment was determined through a survey conducted in 2021. This survey included Ecological Water Requirement (EWR) sites. The Sabie-Sand Catchment ecological status is mainly in category C, showing moderately modified conditions. The primary land use activity is commercial forestry in the upper catchment. The middle part of the catchment is mainly dominated by urban and rural settlements as well as associated subsistence agricultural activities. The lower parts of the catchment are mostly in protected areas with a strong presence of nature reserves and the Kruger National Park. Other uses that may affect the river include agricultural activities, both commercial and subsistence. The presence of invasive alien plants in riparian areas has become a major threat to the ecology and functioning of our freshwater river ecosystems. The river Eco-status of the Sabie-Sand Catchment has deteriorated from Ecological Category B to C from 2011 to 2021, 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.



**Figure 25:** Visual representation of the Macro-Invertebrates status in the Sabie-Sand Catchment.



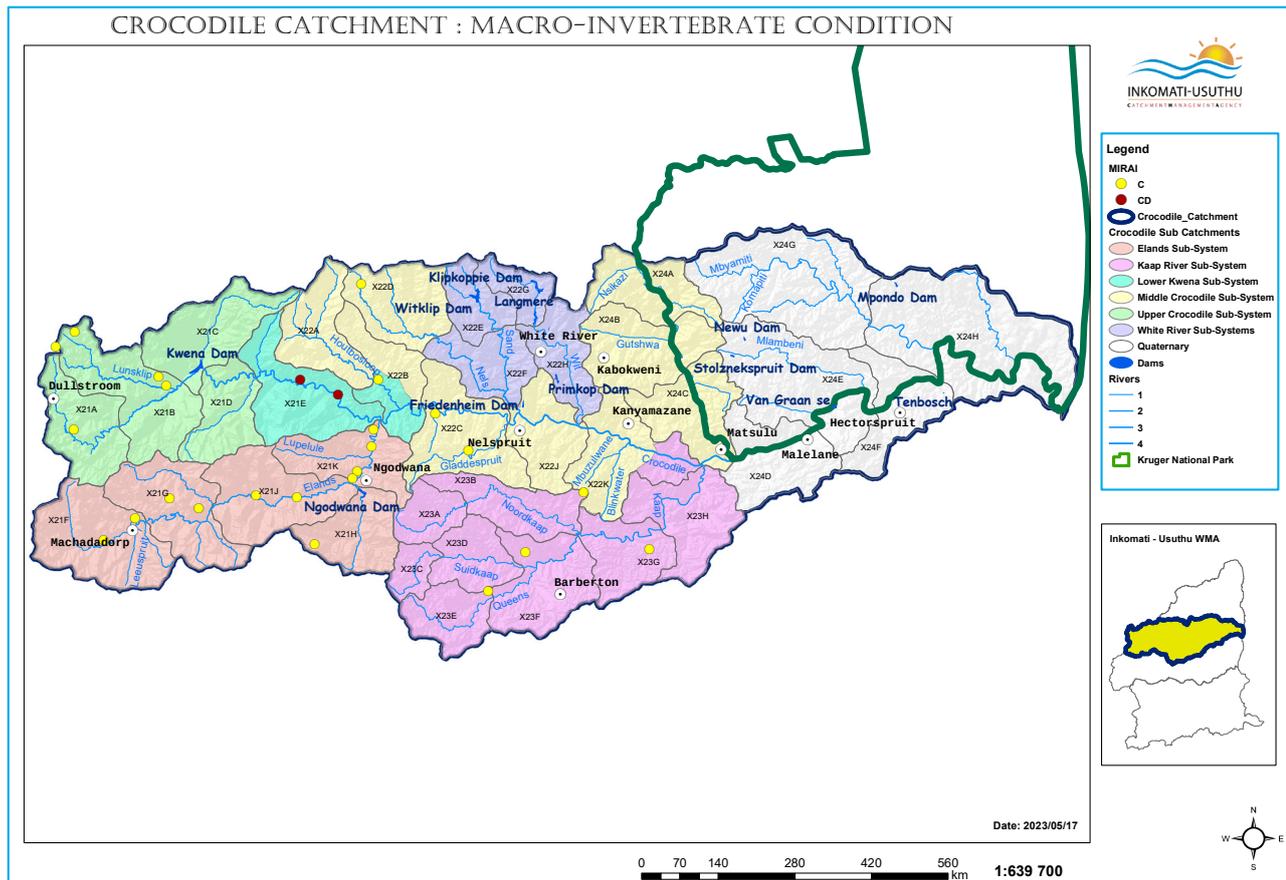
**Figure 26:** Visual representation of the Fish status in the Sabie-Sand Catchment



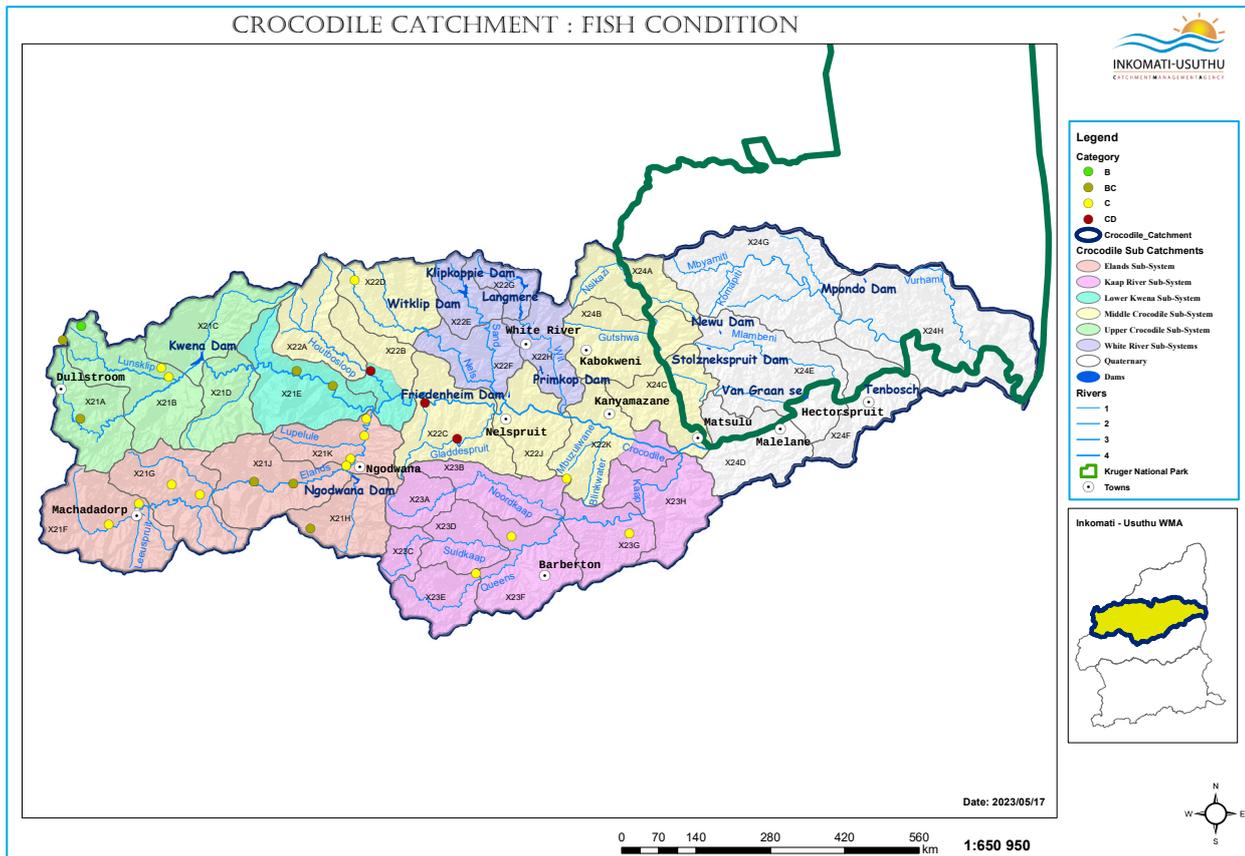
**Figure 27:** Visual representation of the Vegetation status in the Sabie-Sand Catchment

## 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. Visual representation of the ecological status of the Crocodile River and its tributaries are provided in Figure 28 to Figure 29.



**Figure 28:** Visual representation of the Macro-Invertebrates status in the Crocodile Catchment.



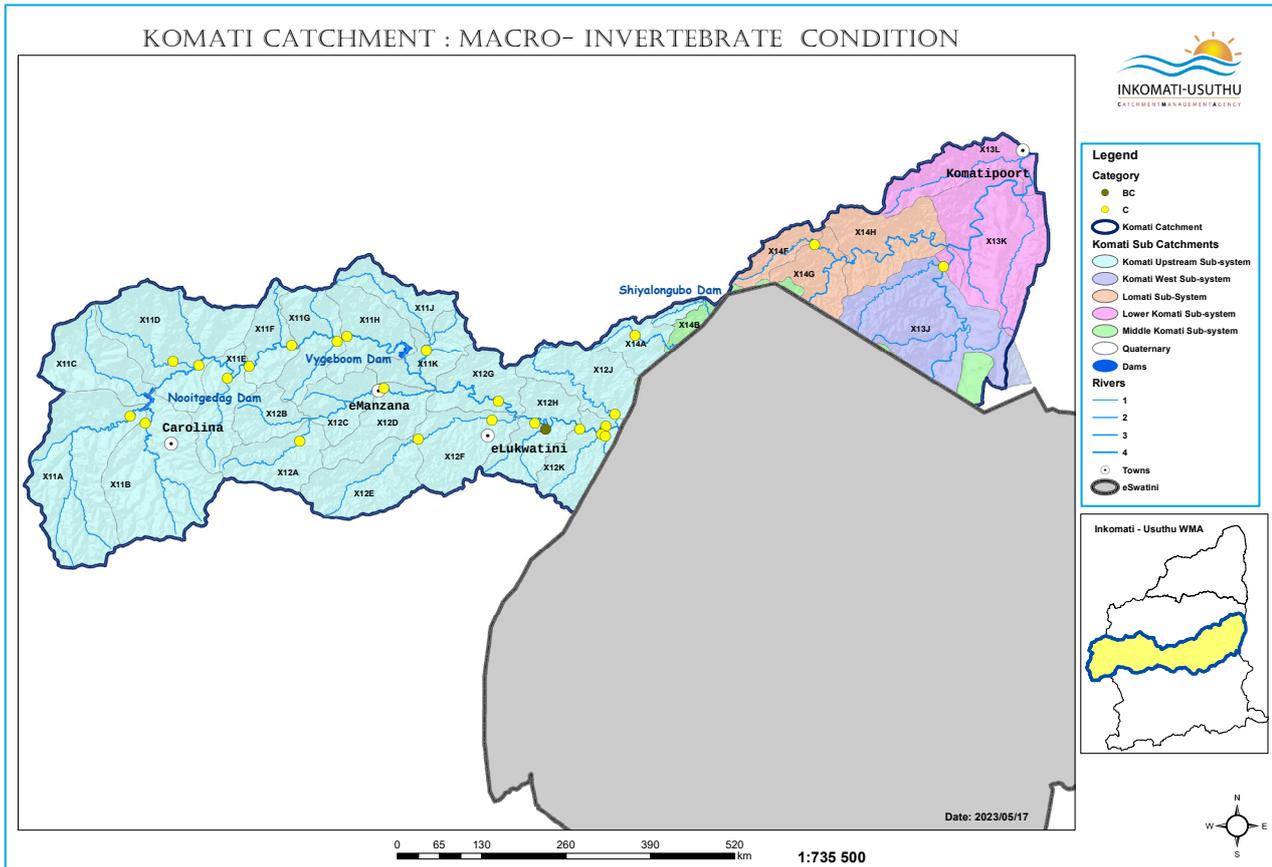
**Figure 29:** Visual representation of the Fish status in the Crocodile Catchment

The Target Ecological Categories (TECs) are also indicated as published in Government Gazette No 40531, 30 December 2016. The present ecological status of the Crocodile Catchment was determined through a survey conducted in 2021. 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 and its tributaries. This includes a total of 9 EWR sites that were monitored during the survey.

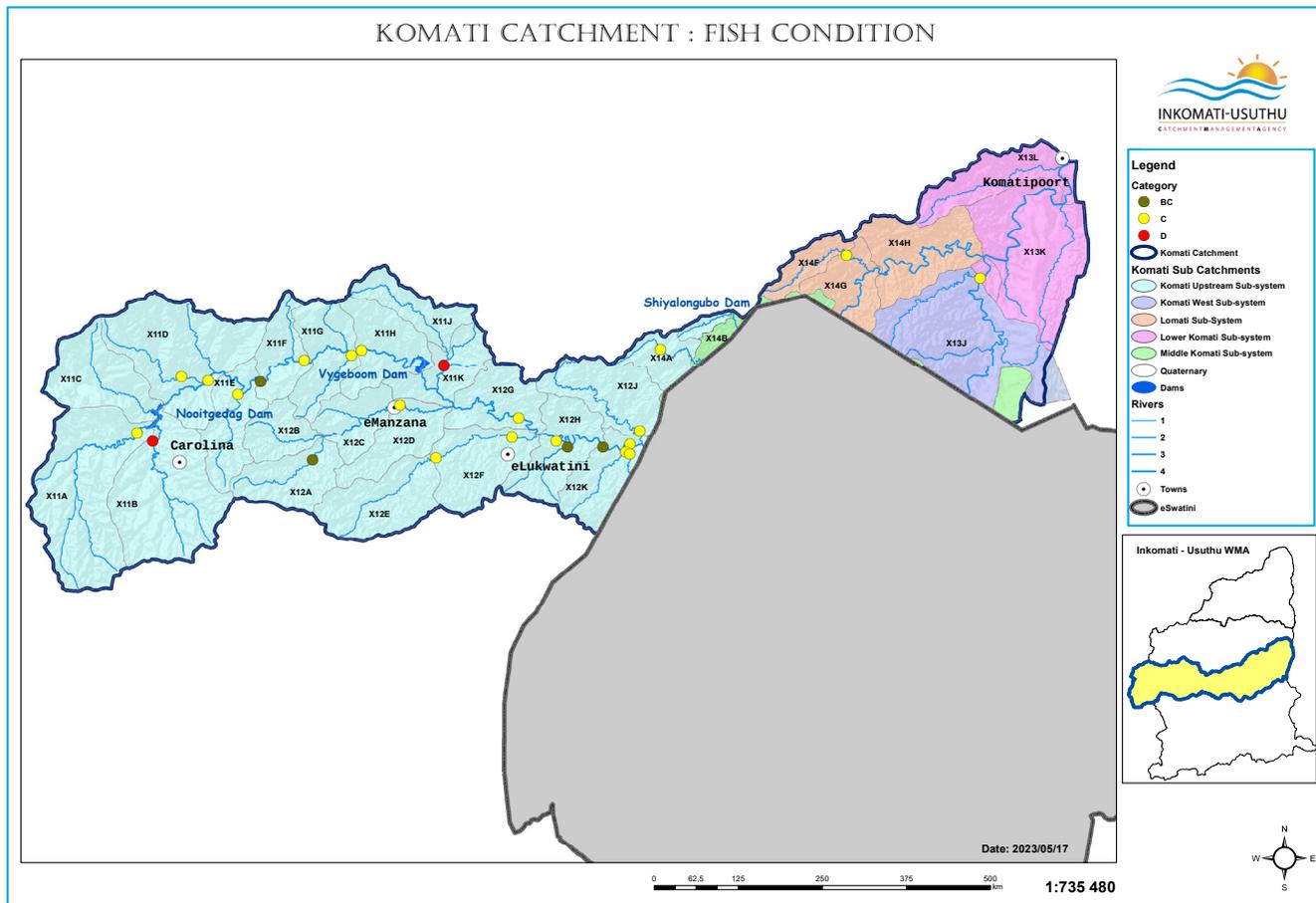
The Eco-Status of the Crocodile Catchment was determined using macro-invertebrates and fish assessments in 2021. The catchment is currently in category C which shows a similar ecological condition as obtained in the previous surveys, but with some parts of the catchment being in categories CD and D. This shows the river is moderately modified and the modifications can be attributed to the anthropogenic activities occurring in the catchment. The modification in the catchment is attributed to habitat loss, flow modifications and poor water quality. It is important to note that the river Eco-Status did not improve or decline from the previous biomonitoring surveys which could be attributed to the fact that the activities in the catchment remain quite similar 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 the 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. Visual representation of the biomonitoring status of the Komati River and its tributaries are provided in Figure 30 to Figure 34.



**Figure 30:** Visual representation of the Macro-Invertebrates status in the Komati Catchment.



**Figure 31:** Visual representation of the Fish status in the Komati Catchment

The Eco-Status of the Komati Catchment was determined using macro-invertebrates and fish through a survey conducted in 2021 (including EWR sites). The ecological status of the catchment remained in an ecological category C class in most reaches of the Komati River with some sites being in category D. This suggests that the catchment is moderately modified in response to the cumulative impacts of anthropogenic activities occurring in the catchment. These modifications were attributed to the fact that a 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. The absence and lower abundance of species in the catchment were found to be attributed by poor habitat because of sedimentation, flow modification because of weirs and dams, poor water quality, which is caused by different activities in the catchment.

### Usuthu Catchment

The Usuthu Catchment is divided into seven (7) subcatchments, namely, Assegai; Hlelo; Ngwempisi; Usuthu; Mpuluzi; Lusushwane and Lusutfu. The Eco-status of the Usuthu Catchment was determined through a survey conducted in 2021 and a total of 38 sites were sampled during this survey. The Usuthu Catchment is a transboundary water resource shared between South Africa, Swaziland, and Mozambique. Visual representation of the biomonitoring status of the Usuthu river and its tributaries are provided in Figure 32 to Figure 34.

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. 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. These activities introduce pollutants in the river indirectly through diffuse pollution or directly through the wastewater treatment works discharging insufficiently treated water into rivers. Activities of concern also includes alien invasive species (fish and plants) and removal of riparian vegetation.

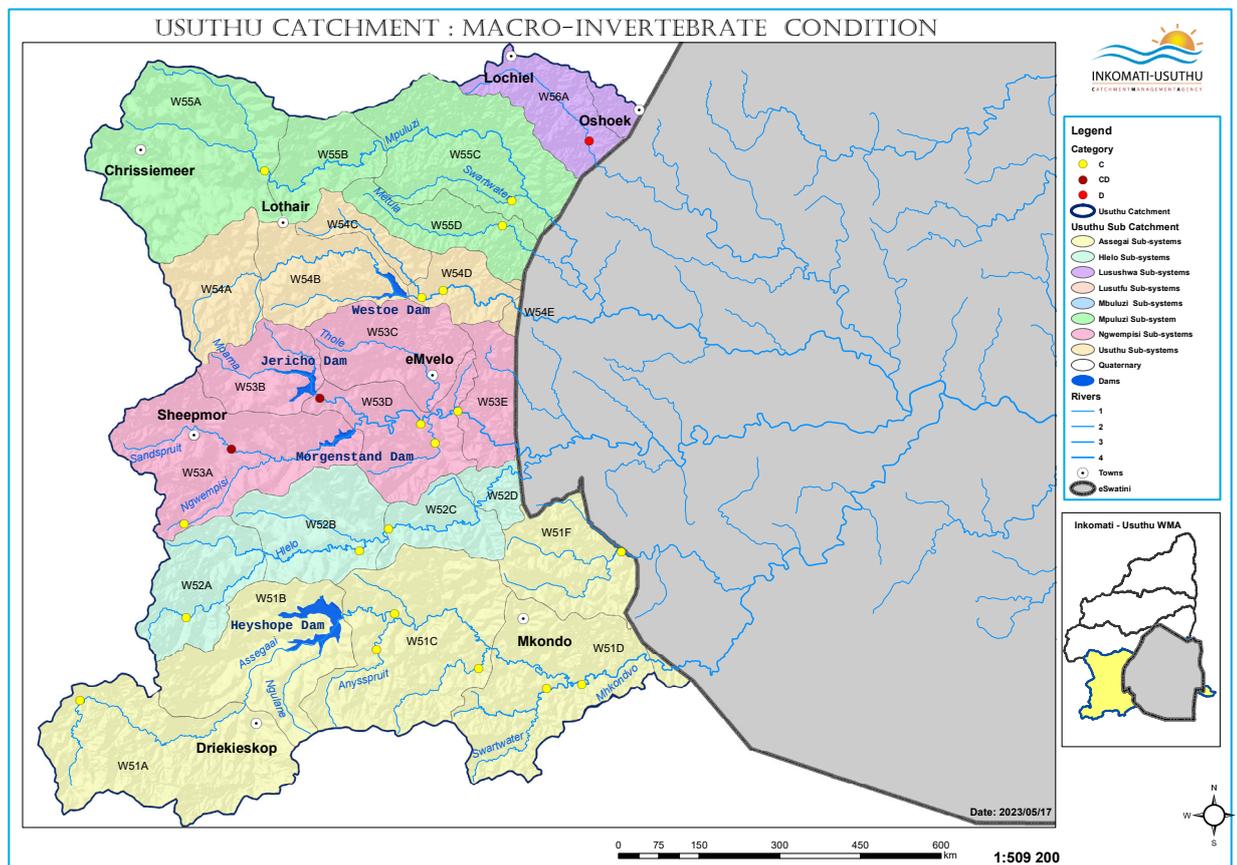
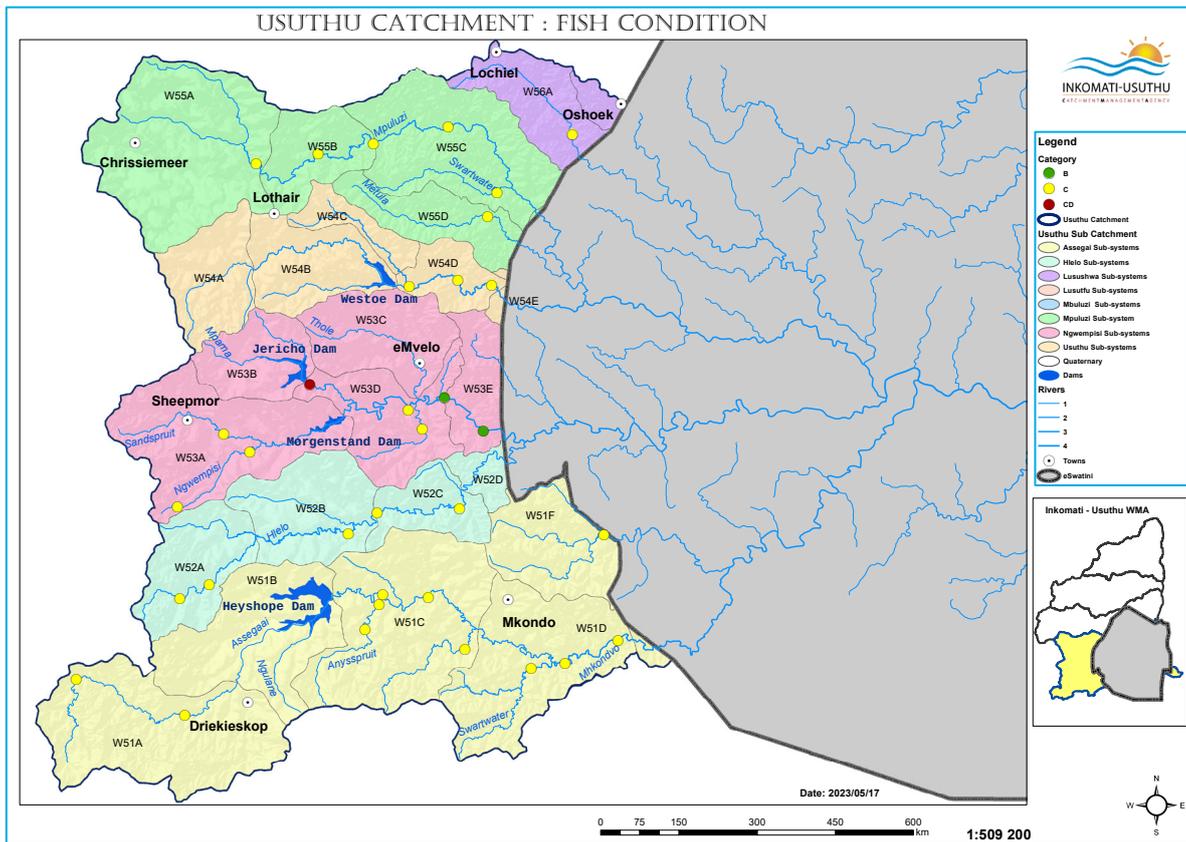
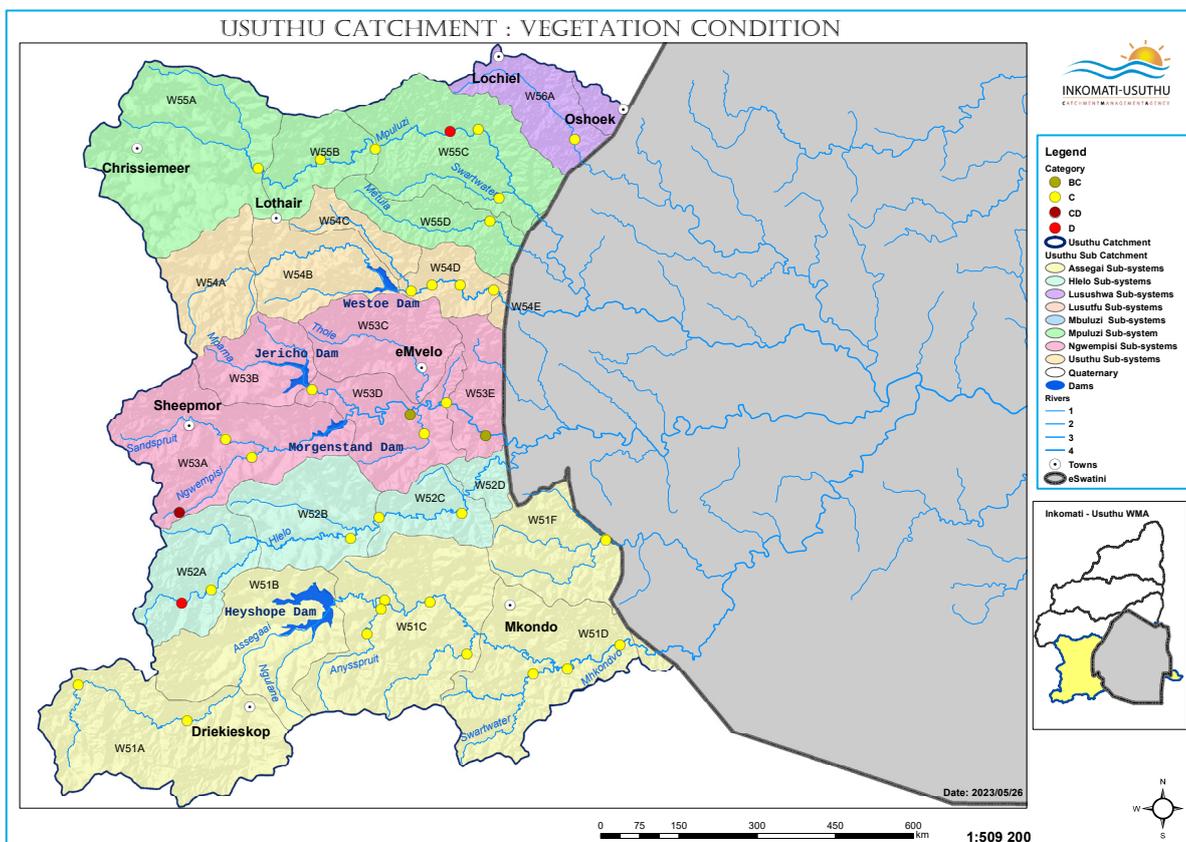


Figure 32: Visual representation of the Macro-Invertebrates status in the Usuthu Catchment.



**Figure 33:** Visual representation of the Fish status in the Usuthu Catchment



**Figure 34:** Visual representation of the Vegetation status in the Usuthu 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 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 Authorisation (GAs) and the declaration of Existing Lawful Use (ELU) through Validation and Verification (V and V). The status quo of WUA is presented to give an idea of the status within the IUWMA.

#### 3.5.1 Water Use Authorisation (WUA)

The WUA data used to depict the status is inclusive of data from January 2015 to March 2022. In terms of the NWA, there are four (4) types of WUA as indicated in Table 10 below.

**Table 10:** Types of Water Use Authorisation (NWA)

WATER USE NAME	DESCRIPTION
Schedule 1	Reasonable domestic water use, excluding commercial benefits
Existing Lawful Use (ELU)	Water use activities that commenced two years prior the promulgation of the NWA and were regulated by any other law
General Authorisation (GA)	Low impact activities/ water uses and to qualify threshold level must not be exceeded (s39)

<b>WATER USE NAME</b>	<b>DESCRIPTION</b>
Water Use Licence (WUL)	High impact activities/ water uses e.g., coal mine, extensive agriculture etc. [s40(1)]
Dispensing Authorisation	Listed activities in terms of other legislation in South Africa that may have detrimental impact on the environment, with the focus of protecting the water resources.

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).

### **3.5.3 WUA Statistics**

#### **Water Use Licencing (WUL)**

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 or decline an application.

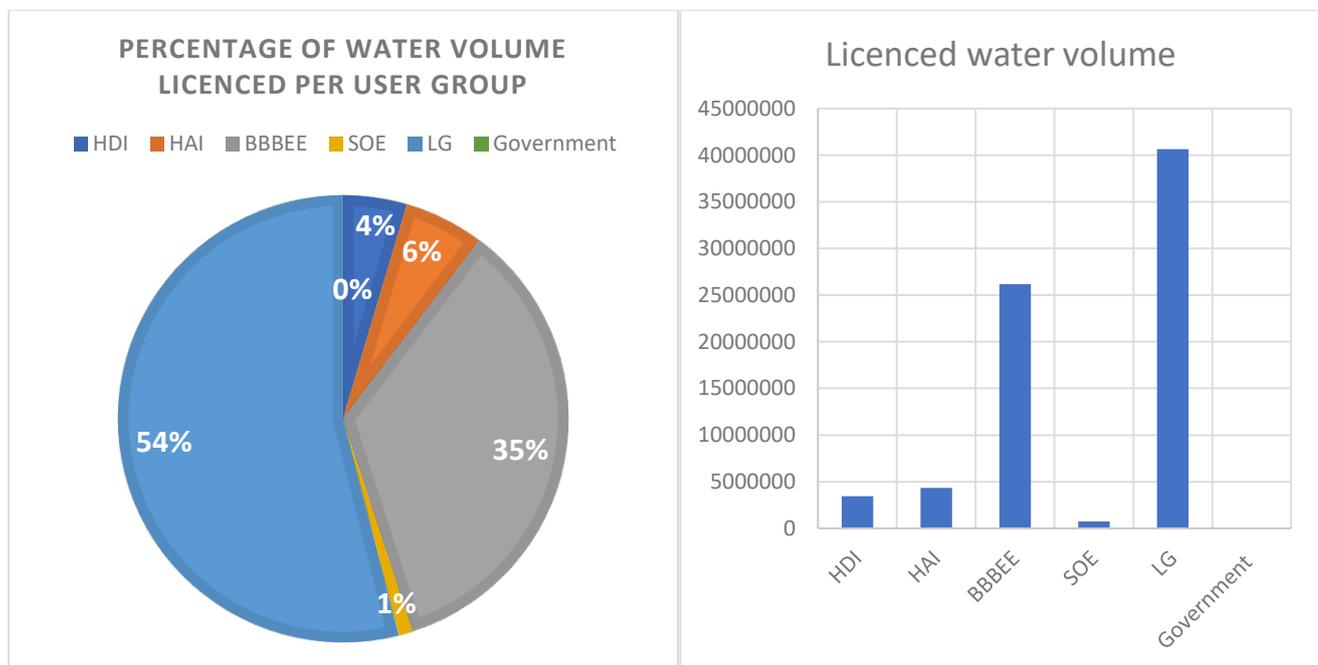
Before the regulation for the procedural requirements for WULA and appeals were promulgated, all WULA submitted to the DWS/ IUCMA were not subjected to timeframes in terms of a mandatory finalisation date. The WULA submitted to the DWS/ IUCMA previously usually took a period of between one (01) and ten (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. 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).

In March 2017, Regulation No 267, regarding the procedural requirements for water use licence application and appeal was gazetted. Its purpose partly was to eliminate unnecessary delays in processing water use authorisation applications. The Regulation required that the General Authorisation application should take 30 days and the licence applications should take 300 days. Due to the fact that the licencing process was not fine-

tuned because of transition from old ways of doing things, wherein a licence can even take more than 5 years before it is issued, applications which were more than 300 days, were recorded as backlog and this placed the IUCMA and DWS under pressure to finalise these applications.

The Department realised the Regulation to finalised licences within 300 days was still hampering economic development of the country and a proposal was put forth for licences to be finalised within 90 days. The regulation in this regard has not yet been gazetted, however, the IUCMA and the DWS have already adopted a turnaround time of 90 days to process and finalise water use authorisation applications in time. The IUCMA has realised that in order to achieve the 90 days' timeline period, the licensing organisational structure must be fully populated resulting in the IUCMA not experiencing Water Use Licence backlogs currently.

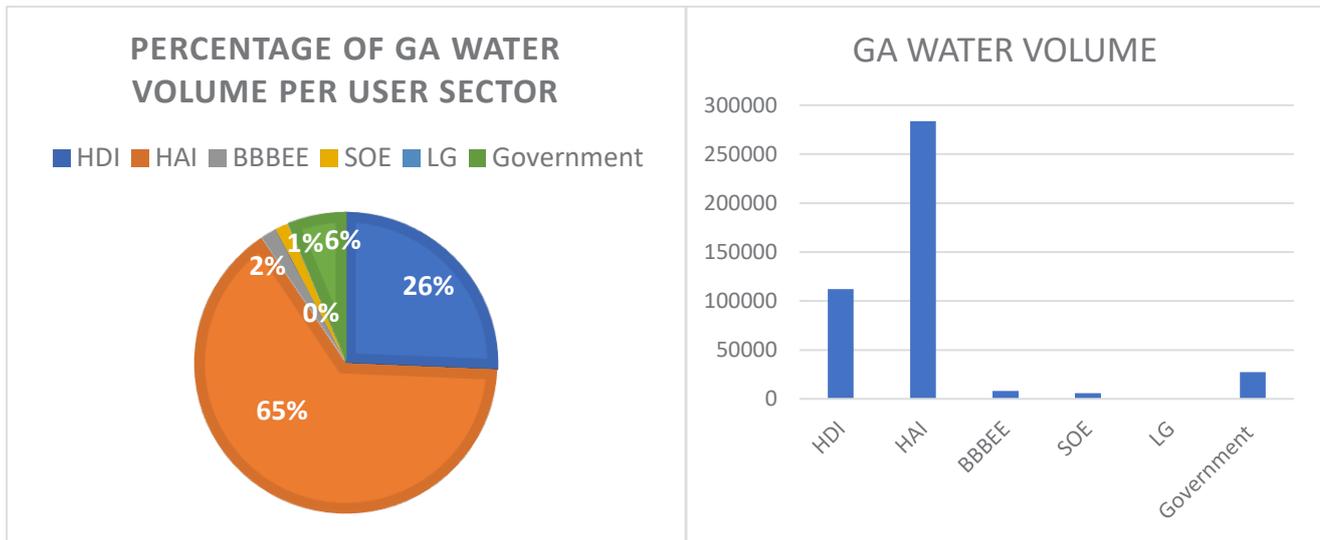
From the 2014 to 2022 performance cycle, the IUCMA has processed and finalised consumptive WULA to the total water volume of 75.36 Mm<sup>3</sup>/a. The major water user group is the LG (Municipality) followed by B-BBEE which are different companies (Figure 35). The HAIs and HDIs were allocated a total volume of 10% with the HAIs getting a larger share of water equating to 4.7 Mm<sup>3</sup>/a.



**Figure 35:** The percentage allocation of licensed water according to demographics and user groups

### General Authorisations (GAs)

During the same period, from the 2014 to 2022 performance cycle, the IUCMA has processed and finalised consumptive GAs to the total water volume of 436 848 m<sup>3</sup>/a. The major water user group is the HAI followed by HDI (Figure 36). The HAIs and HDIs were allocated a total volume of 91%, with the HAIs getting a larger share of water equating to 283 663 m<sup>3</sup>/a.



**Figure 36:** 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 October 1996 and September 1998. 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 on all water registered with the water use registration under Regulation 1352 using professional service providers. Since then the IUCMA has been conducting the process using internal resources.

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. Verification being 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 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), excluding wastewater-related water uses.

Table 11 indicates achieved progress to date on ELU verification per subcatchments; deduction thereof is that the Upper Komati has achieved less compared to the other subcatchments/areas. The Upper Komati subcatchment ELU verification is important but not a high priority, since there is not much water use activities, but it is an important source for International Obligations, predominantly for eSwatini. Crocodile and Lower Komati sub-areas are 73% and 79%, respectively and Usuthu is trailing at 57.9%.

**Table 11:** ELU verification progress of subcatchments

Catchment	ELU verified	Total Identified	Percentage (%)
Usuthu	832	1437	57.9
Upper Komati	201	606	33.2
Lower Komati	326	409	79.7
Crocodile	2348	3201	73.3

Detailed examination (Table 12) for Kaap and Sabie-Sand sub-catchments, without forestry identified properties, [duped Stream Flow Reduction (SFR)], the progress thereof on Kaap and Sabie-Sand is 90.4% and 48.4%, respectively. The Kaap and Sabie-Sand, remaining unverified none SFR (forestry) properties are 12 and 180, respectively. The Kaap is intended to provide basis for the Water Allocation Plan as well as compulsory licensing and the Sabie-Sand gained its priority because of its extensive irrigation, and Kruger National Park (KNP) for environmental water use.

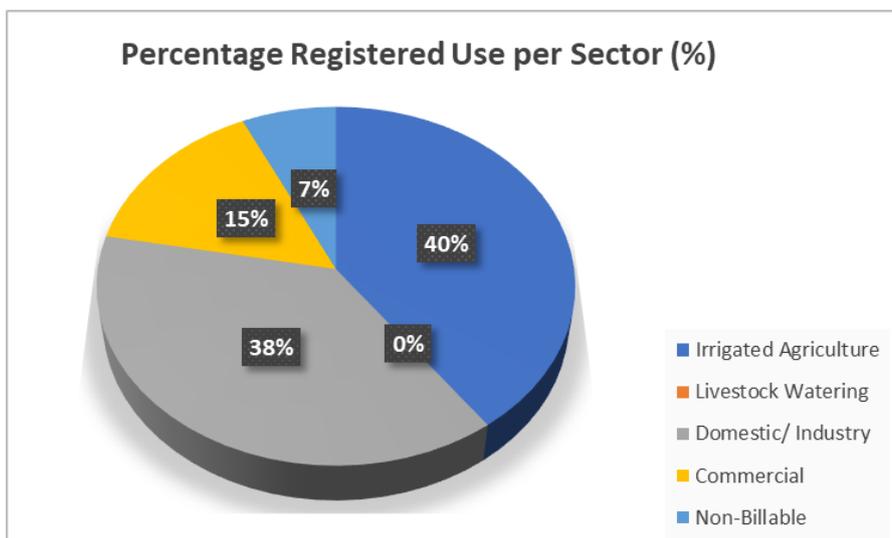
**Table 12:** Progress of the Kaap and Sabie-Sand subcatchments

Catchment	WARMS registered and identified ELU properties			Late registered/ never registered on WARMS			Percent
	Verified	Outstanding		Verified	Outstanding		
	SFR None	None SFR	SFR	SFR&None	None SFR	SFR	
Sabie/ Sand	181	180	153	34	49	6	215/444= 48.4%
Kaap	113	12	17	0	0	0	113/125=90,4%

*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 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

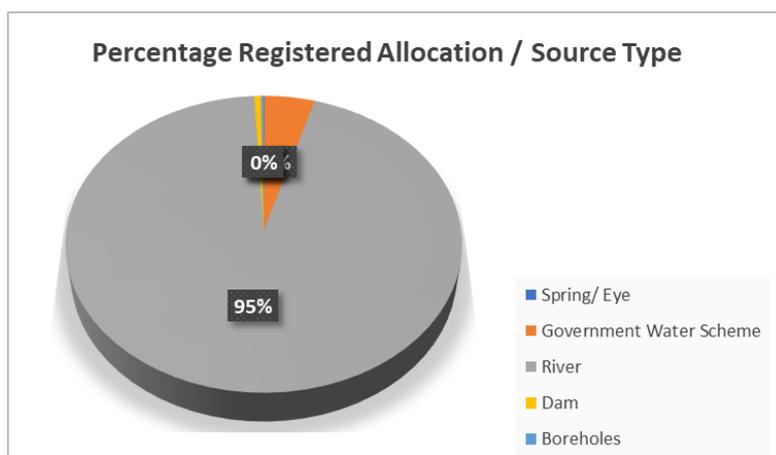
Figure 37 indicates agriculture as the highest water user, followed by domestic and industry, then Commercial (forestry), and the least is non-billable water use sectors.



**Figure 37:** Registered water use per sector within the Inkomati-Usuthu WMA

## Registered Volume of Water Use per Resource Type

Figure 38 shows that the highest volume of water use registered per 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 threaten food security for the future.



**Figure 38:** 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 reuse 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 13 and Table 14 below indicate the volume of non-billable and billable water use currently registered on WARMS. Table 14 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 13:** 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	FY 2020/21	FY 2021/22
Irrigation	1097	1065	1070	1068	1 067
Watering livestock	3	3	3	2,7	2,6
Commercial forestry	419	438	428	429	428
Domestic / Industrial	1060	541	603	449	448
<b>Grand Total</b>	<b>2578</b>	<b>2047</b>	<b>2104</b>	<b>1949</b>	<b>1946</b>

**Table 14:** Registered non-billable volume of water within the WMA indicating the non-billable sectors.

WMA	VOLUME (MILLION CUBIC METRES/ ANNUM)
Aquaculture	1,23
Community Woodlot	0,038
Recreation	0,053
Schedule 1	1,33
Urban (Excluding Industrial and/or Domestic)	0,51
<b>Grand Total</b>	<b>3,16</b>

### 3.6 Validation and Verification (ELU Declaration)

#### 3.6.1 Inkomati and Usuthu Water Management Area (WMA) ELU verification

In the Inkomati WMA, ELU verification progress stands at 71.7 % (see Table 15). The remaining properties for verification out of a grand total of 4964 identified properties are 1406 properties. Therefore, 3558 properties have been verified to completion. Properties under Irrigation Boards were verified by means of section 33 of the NWA (in line with the policy position for scheduling 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).

Usuthu catchment ELU verification scope of work was on 1 300 properties but as verification progressed, additional 137 late registers were added. These were to be managed through the section 35 process as there are no Irrigation Boards within the Usuthu catchment. A total of 832 properties have been verified to finality, which represents 57.9%.

**Table 15:** Inkomati-Usuthu WMA ELU verification statistics

CATCHMENTS	TOTAL PROPERTIES	VERIFIED	PERCENTAGE VERIFICATION (%)
Inkomati	4964	3558	71.7
Usuthu	1437	832	57.9

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 2025 should be at 100% to ensure that the IUCMA proceeds to compulsory licensing.

#### Management Actions to deal with the Unverified ELU

- The ELU verification has a dedicated team of officials that focus on the maintenance of ELU to deal with the backlog and to maintain the ongoing applications for ELU declaration. Success in this regard depends on conducting stakeholder engagement, education and awareness on 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 (4) catchments are indicated in Table 16.

**Table 16:** Key water use sectors in the different catchments indicating challenges

Catchment	Sectors	Quality challenges
Crocodile	Industries	<ul style="list-style-type: none"> <li>• <i>E. coli</i> from WWTW</li> <li>• Salt load from the Elands system</li> <li>• Illegal sand mining activities</li> <li>• Decant from old mining activities</li> <li>• Nutrient enhancement</li> </ul>
	Municipality	
	Mining	
	Tourism	
Usuthu	Afforestation	<ul style="list-style-type: none"> <li>• <i>E. coli</i> from WWTW</li> <li>• Decanting from old mining and current operations</li> <li>• Illegal sand mining activities</li> <li>• Nutrient enhancement</li> </ul>
	Municipality	
	Mining	
Sabie-Sand	Municipality	<ul style="list-style-type: none"> <li>• Illegal sand mining activities</li> <li>• <i>E. coli</i> from WWTW</li> <li>• Decant from old mining activities</li> <li>• Nutrient enhancement</li> </ul>
	Sawmills	
	Agriculture	
	Forestry	

Catchment	Sectors	Quality challenges
	Conservation (Kruger National Park)	
	Tourism	
<b>Komati</b>	Mining	<ul style="list-style-type: none"> <li>• <i>E. coli</i> from WWTW</li> <li>• Flooded pits which cannot be rehabilitated</li> <li>• Abandoned and defunct mines</li> <li>• Illegal sand mining activities</li> <li>• Nutrient enhancement</li> </ul>
	Municipality	

### 3.7.1 Status of Mining Activities within WMA

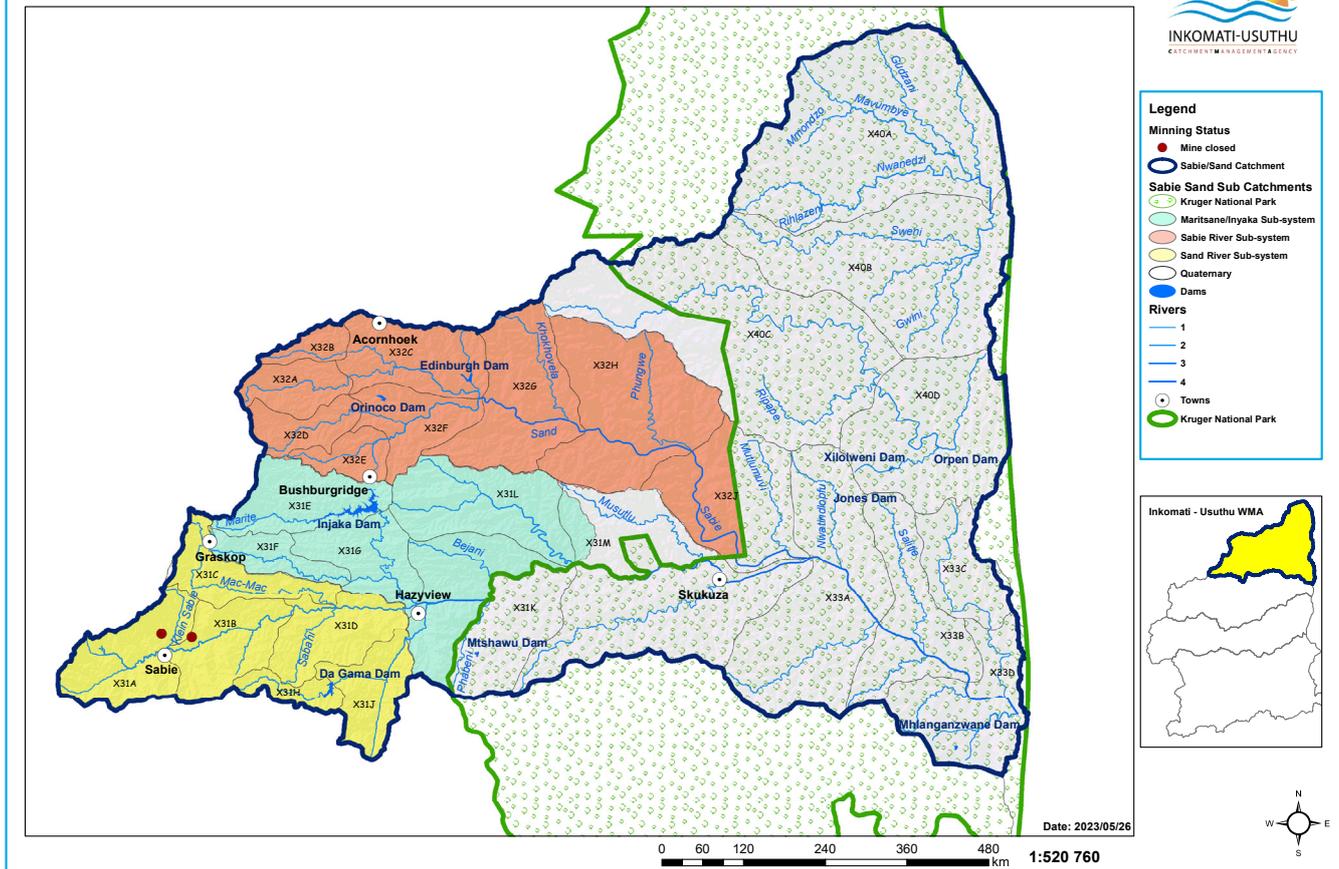
The number of mining activities within the WMA are determined from the WARMS database and the CME activities when the IUCMA officials conduct inspections and audits. There is, however, a possibility of mining activities taking place that are not duly authorised by DMRE/ DFFE nor DWS and without self-regulation 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 proved to be non-compliant to the licence conditions while three (3) mines have been closed. Figure 39 presents a map of the mining activities within the Crocodile Catchment.



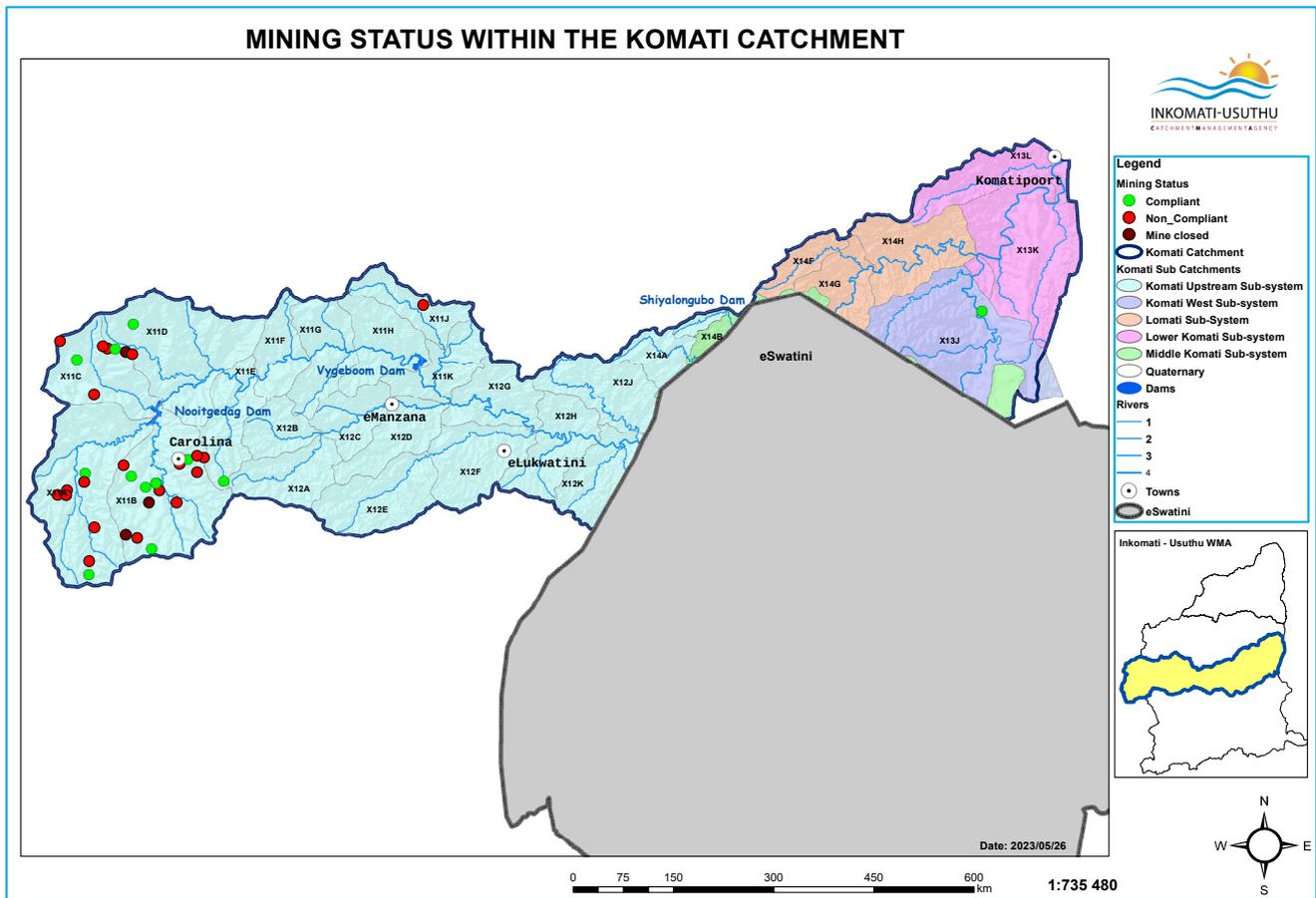
## MINING STATUS WITHIN THE SABIE / SAND CATCHMENT



**Figure 40:** Visual presentation of the mining activities within the Sabie-Sand Catchment

### Komati Catchment

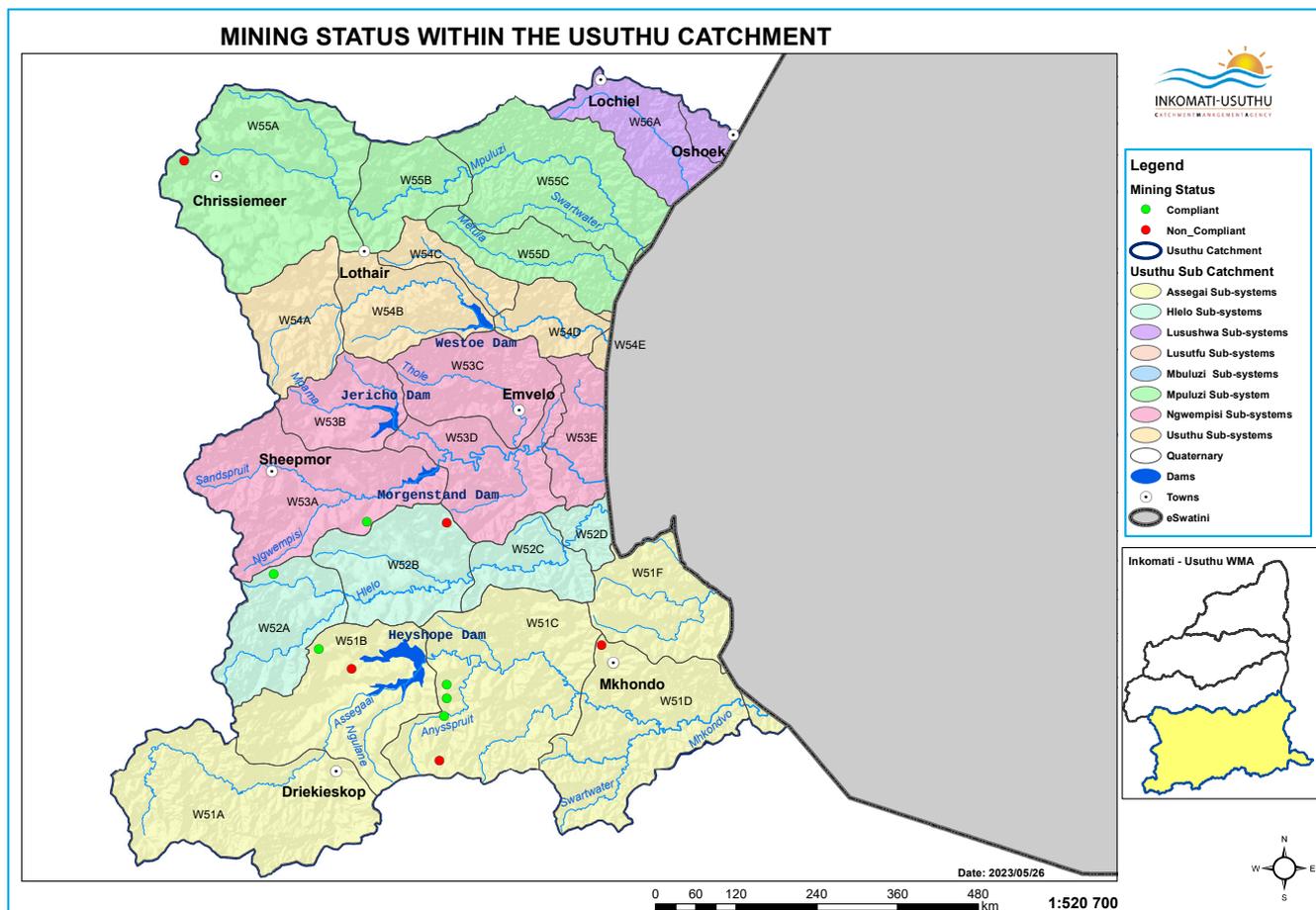
A total of 36 mines are located within the Upper Komati Catchment (Figure 41). Sixteen (16) of the mines have not been audited yet. Of the twenty (20) mines that were audited nine (9) do not comply with the licence conditions, while eleven (11) mines are compliant. Non-compliance is being addressed through follow-up inspections, issuing of notices and directives and mines making representation to address their non-compliances.



**Figure 41:** 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 42). Four (4) mines are operating without licences. However, existing non-compliance with the licence conditions are addressed through notices and directives.



**Figure 42:** 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 WWTWs are known in the WMA, of which 33 are compliant while 35 are not. 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 breakdown 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 will, therefore, deprive it of oxygen. Hence, 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 17 below is a summarised presentation of the status of wastewater treatment works in relation to the selected variables of concern (COD and SS). All WWTW in the Inkomati-Usuthu WMA indicated non-compliance to *E. coli*. The visual presentation of WWTW within the WMA is indicated in Figure 43.

**Table 17:** 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

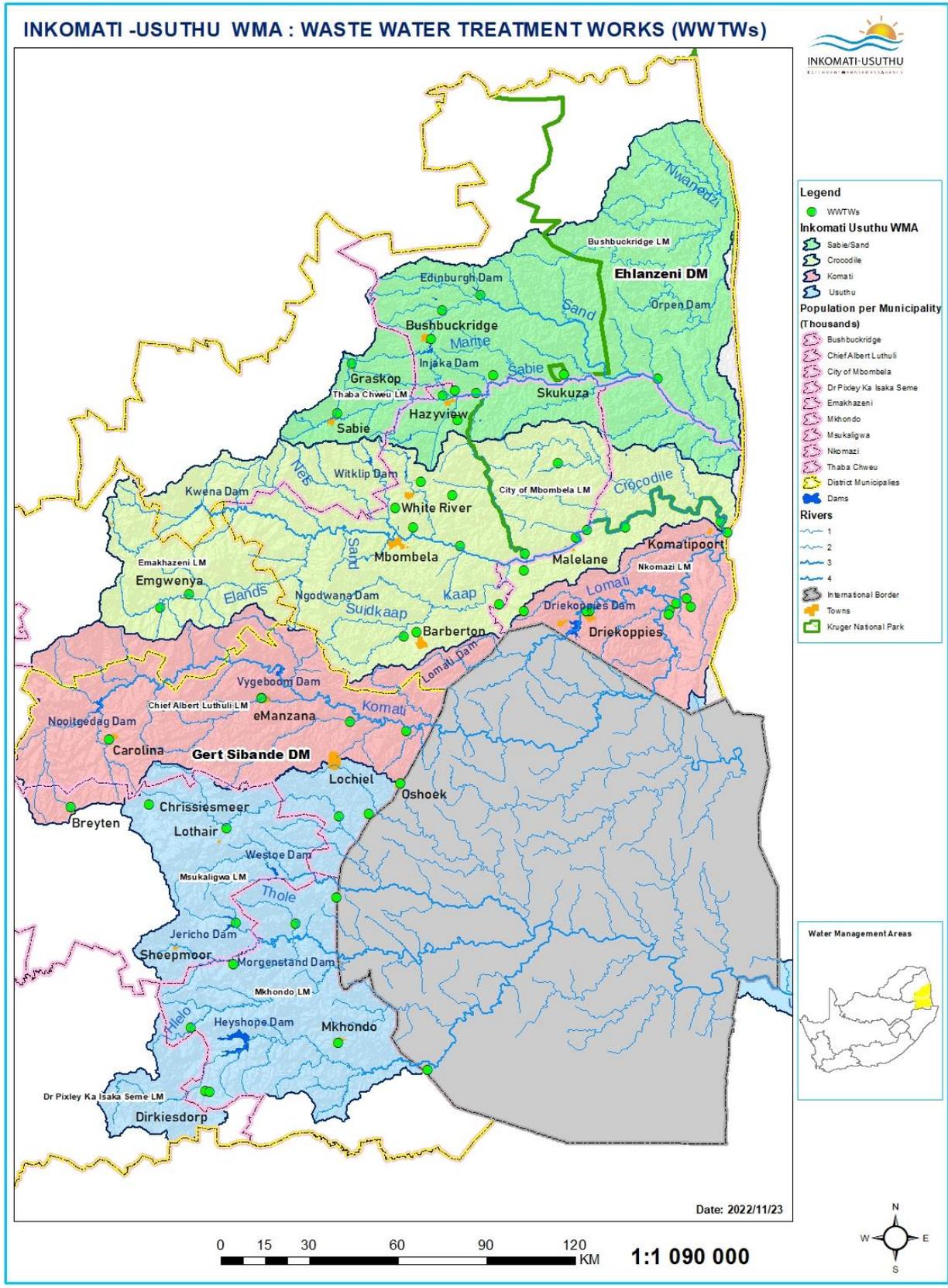


Figure 43: Visual presentation of the WWTW in the WMA.

### 3.9 Water Allocation Plan

It is a requirement of the National Water Act that the Catchment Management Agency shall develop a Water Allocation Plan (WAP). Broadly, the process for a Water Allocation Plan is to develop a range of scenarios for the catchment from a 'do nothing' scenario to various development, conservation and reallocation options. To assess the scenarios, one needs to develop principles for allocation/reallocation, particularly using the priorities for allocation in the NWRS2 below:

#### Priority 1

In line with the Constitution and the National Water Act, the highest allocation priority is afforded to water for the purposes of the Reserve. The first objective is to ensure that sufficient quantities of raw water are available to provide for the basic water needs of people. In terms of current policy, a quantity of 25 litres per person per day has been incorporated in the Reserve determination. Even though this is the minimum volume, this will be progressively increased where appropriate. The second objective is ensuring sufficient water of an appropriate quality to sustain healthy aquatic ecosystems. Comprehensive work is continuing in this regard.

#### Priority 2

South Africa is committed to managing shared river basins in line with the revised Protocol on Shared Watercourses in the SADC, and in terms of specific agreements with riparian states. The second-highest priority, therefore, is meeting international water requirements in terms of the agreements with riparian countries.

#### Priority 3

The third highest priority is accorded to the allocation of water for poverty eradication, the improvement of livelihoods of the poor and the marginalised, and uses that will contribute to greater racial and gender equity.

#### Priority 4

The fourth highest priority is accorded to the allocation of water for uses that are strategically important to the national economy, as described in section 6(1)(b)(iv) of the National Water Act. These are uses that are of critical importance to the nation and must be authorised by the Minister. These uses include:

- The transfer of water from one water management area to another.
- The continued availability of water to be used for electricity generation throughout the country.

#### Priority 5

The fifth priority will be water used for general economic purposes, which includes commercial irrigation and forestry. In this category, allocation is best dictated by prevailing local and regional dynamics and requirements. Demand will reflect the value of water in particular economic sectors and will encourage uses that create employment, contribute to the economy (GDP) and are efficient. All five (5) priorities must give effect to allocations that promote equity.

Since this is not a task that the Inkomati-Usuthu Catchment Management Agency (IUCMA) has undertaken before pending finalisation of verification of ELU, it was decided to pilot the process on small subcatchments before rolling it out to the remainder of the Inkomati-Usuthu Water Management Area. These Water Allocation Plans are applicable for the Kaap River and White River catchments which were conducted in 2019. Before finalising the plans, the different scenarios for water allocation for the two subcatchments were presented at stakeholder meetings and feedback was obtained from stakeholders who were afforded the opportunity to

suggest additional scenarios. The scenarios were modelled using a water resources model and outcomes were presented in terms of water supply (volume and assurance of supply) to the various water use sectors in the catchment. Impacts on the ecological water requirement were also considered, while the socioeconomic impacts of reallocation are still pending. The IUCMA and Water Research Commission have therefore initiated a study to develop the tools for assessing socioeconomic impacts of water reallocation and other developmental options.

The Crocodile and Sabie water allocations plans are currently underway and once finalised this CMS will be updated. The Usuthu and Komati assessments are also planned in the 2023/2024 financial year. It is expected that progress is made on the finalisation of verification of ELU, which influence the WAP and, therefore, compulsory licensing in overstressed catchments such as the Crocodile Catchment.

### **White River Catchment**

The White River Catchment was selected as one of the pilot catchments because of its limited extent (two quaternary catchments), it is fairly well understood and has a good institutional backing with the bulk water supply being managed by the White River Valley Conservation Board and minor irrigation boards. There are also a number of pressing issues which the WAP can hopefully resolve or at least be used to formulate the IUCMA's policy for the catchment.

The scenarios modelled for the White River Catchment indicate that this catchment is fully allocated after taking the EWR into account. There is scope to save significant volumes of water through water conservation and demand management in the irrigation sector by replacing the extensive old canal infrastructure with pipelines. While some of this water could conceivably be allocated to emerging farmers, the extremely low application rates and assurance of supply to existing irrigators in the White River Catchment also need to be addressed. While water losses within the municipality are high as a proportion of the bulk supply, a reduction in these losses will not make significant volumes of water available. Efficient water use must nevertheless be pursued as a priority.

There are limited options for developing the water resource in the White River Catchment. The most promising option is to raise the Primkop Dam. However, the cost of pumping the water back to White River would be high and this water could be better utilised in Kabokweni and Kanyamazane. There is also a need to consider the proposed conjunctive use of Witklip system, and new transfer infrastructure will not make additional water available for allocation but will improve the assurance of supply to all users. The joint utilisation of the Sand River and White River by irrigators through a reallocation of the water resource would result in an application rate of 3 650 m<sup>3</sup>/ha/annum in the upper White River and Sand River catchments and 4 150 m<sup>3</sup>/ha/annum from Primkop Dam.

### **Kaap River Catchment**

The water allocation scenarios modelled for the Kaap River Catchment indicate that this catchment is fully allocated, and the available water resource is fully utilised. While water conservation and demand management must always be implemented as a priority to address water shortages, there is limited scope for this in the Kaap River Catchment since the largest water use sector (irrigation) appears to be efficient. While municipal water

supply is not efficient, improvements in this sector will not free up significant volumes of water due to the relatively small allocations to the municipal and domestic use.

There are two options to make additional water available for allocation. Firstly, the development of new dams, and secondly, the reduction of the application rates to existing irrigators. There are several good dam sites in the Kaap River Catchment with the proposed Mountain View Dam being the largest. This dam could make significant volumes of water available for emerging farmers although these farmers would be better located on the lower Crocodile River downstream of the dam. Reducing application rates would be a complex and legally challenging process and will require further input from agricultural scientists and economists.

### **3.10 Stakeholder Engagement within the WMA**

Chapter 7 of the National Water Act, Act 36 of 1998 presents one of the main functions of the Catchment Management Agency (CMA), which is to promote community participation in the protection, use, development, conservation, management, and control of the water resources in its water management area. Public participation constitutes the cornerstone of democracy by way of creating platforms through which society at large will provide input on services and activities that affect them. This principle is also applicable in the management of natural resources, in this instance, the management of water resources.

Section 80(c) of the National Water Act, Act 36 of 1998 further 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.

During this CMS review process, the IUCMA made use of the already established six (6) CMFs (Sabie, Sand, Crocodile, Lower Komati, Upper Komati and Usuthu), which are subcatchments of the Inkomati-Usuthu Water Management Area. 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 instrumental in supporting the review process of this Catchment Management Strategy (CMS) and other related policy documents and processes.

The CMFs have management committees (Chairperson, Deputy Chairperson and Coordinator) and the Secretariat duties are carried out by the IUCMA community officers. These Committees ensured that all proceedings of the consultation process were recorded including the attendance of stakeholders in all the consultation sessions.

Below is the approach of how the ordinary and ongoing CMFs are conducted. There are specific issues that are always discussed during the forum meetings, however, if there are specific and special sessions such as the consultation on the development or review of policy-related documents such as the CMS, these are featured in the CMF agenda items.

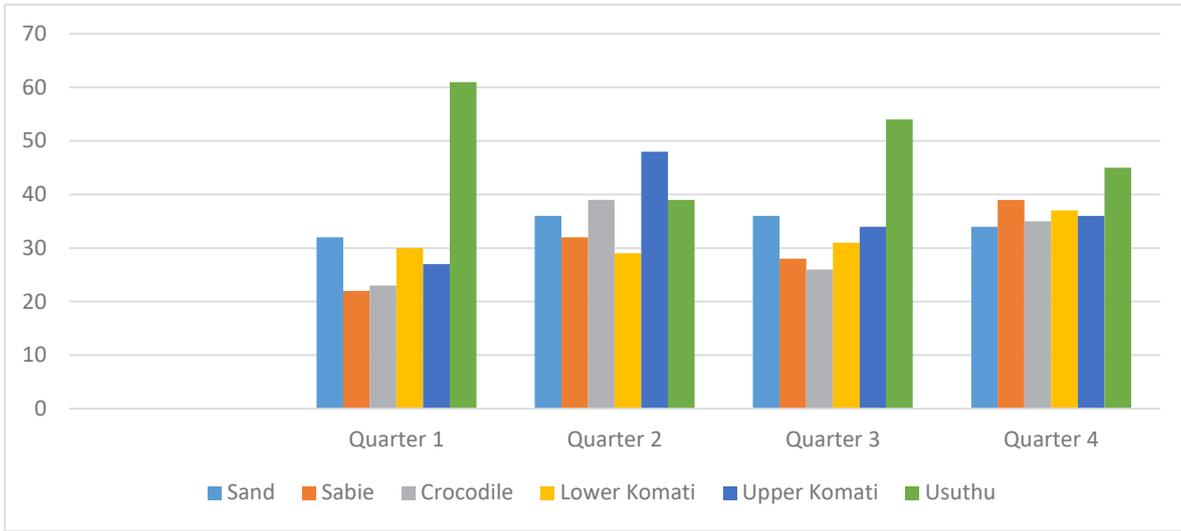
The following issues inform the CMF agenda:

- 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.

The average statistics regarding stakeholders' representation in the CMF meetings between 2017/2018-2021/2022 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 trends of stakeholder attendance during Catchment Management Forum meetings are presented in Figure 44 . These stakeholders represent a variety of sectors as depicted in Table 18. 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 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. 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.



**Figure 44:** Trends of number of stakeholder attendance from Quarter 1 to Quarter 4 in the 2021/2022 financial year

**Table 18: Sectoral attendance to CMFs per catchment**

	<b>Groups / Sectors:</b>	<b>Sand</b>	<b>Sabie</b>	<b>Crocodile</b>	<b>Lower-Komati</b>	<b>Upper-Komati</b>	<b>Usuthu</b>	<b>Total WMA</b>
1	Water Management Institutions	13	12	12	10	10	09	66
2	Municipalities	01	01	01	4	02	00	9
3	Agricultural Cooperatives	13	04	03	22	0	26	68
4	Agricultural Industries (TKW, CLR, etc)	0	0	0	0	01	0	1
5	Forestry Industry (SAPPI, Mondi, etc.)	0	0	02	0	0	0	2
6	Sector Departments	02	11	03	0	05	04	25
7	Home-based Care Groups	0	0	0	0	0	0	0
8	Water Services Providers	02	0	01	0	0	0	3
9	Water committees	0	0	01	0	03	0	4
10	Non-governmental organizations (NGOs)	02	04	01	0	0	03	10
11	Traditional Authorities	0	0	01	0	0	0	1
12	Industries/ Business/ Enterprises	0	0	02	0	0	0	2
13	Irrigation Boards	0	0	03	0	0	0	3
14	Conservation (SANPARKS, SANBI, etc.) / Environmental Groups/ Consultants	0	01	02	0	07	0	10
15	Emerging Farmers	0	06	0	0	01	0	7
16	Commercial Farmers	0	0	0	0	0	03	3
17	Mining Houses	0	0	0	1	07	0	8
18	Universities	0	0	01	0	0	0	1
19	Communal Property Associations (CPAs)	0	0	0	0	0	0	0
20	Private Companies	0	0	02	0	0	0	2
21	Transboundary Bodies (KOBWA, Ara-Sul etc.)	0	0	0	0	0	0	0
22	Traditional Health Practitioners	01	0	0	0	0	0	1
	<b>Total in the sub-catchments</b>	<b>34</b>	<b>39</b>	<b>35</b>	<b>37</b>	<b>36</b>	<b>45</b>	<b>226</b>

### 3.11 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 Irrigation Boards within the WMA and established quarterly meetings which were successfully convened during the 2017/18 financial year. 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 and Eskom now makes Water Resource Charge payments directly to the IUCMA and not to DWS. The status of revenue collection is indicated in Table 19.

**Table 19:** The status of revenue collection since 2017.

<i>Financial year</i>	<i>Outstanding balance (Inclusive of balance transferred by DWS to the IUCMA)</i>	<i>Collection</i>
2017/18	R 222 652 813.67	R 1 648 018.55
2018/19	R 182 912 872.96	R 30 859 269.87
2019-20	R 117 643 116	R 20 845 685
2020-21	R 105 579 495	R 32 880 946
2021-22	R 108 688 990	R 23 614 065

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 1<sup>st</sup> 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 2022/23 (Table 20 and proposed tariffs for 2023/24 (Table 21) are presented below.

**Table 20:** The proposed and approved tariffs for the 2022/23 financial year.

Sector	2022-23 Proposed Tariff	Increase %	2022-23 Approved	Approved %
D & I	4,26c	10%	4,13c	6.7%
Irrigation	2,09c	6.7%	2,09c	6.7%
Forestry	1,71c	10%	1,66c	7%

**Table 21:** The proposed tariffs for the 23/24 financial year.

Sector	Tariffs	% Increase
D & I	4,67c	13.1%
Irrigation	2,36c	13%
Forestry	1,83c	10%

## Status of Other Income and Expenditure

### Augmentation

The reliance of the IUCMA on predictable income streams is vital for its financial sustainability. The agency is still partly dependent on the Department of Water and Sanitation Water Trading Entity (DWS WTE) for continued augmentation for the funding of operations. The Minister of Water and Sanitation approved and applied a lower than anticipated percentage increase on augmentation for the 2021/22 financial year. An increase in total revenue between 2020/21 as well as 2021/22 (Table 19) was thus recorded.

The agency has again realised a downward adjustment of its grant appropriated by Parliament in year 2022/23. The applied lower budget allocation continues and is highly likely to be applied in future years which exerts pressure on the agency's ability to meet its mandate given prevalent competing activities and priorities. In response to the downward budget adjustment, management has urgently incepted internal mechanisms to contain costs that include but not limited to the development and implementation of a responsive cost containment strategy.

### **Investment Income**

An amount for return on investments was recorded at R 3 483 994,00 for 2021/22 being 204% against the budget.

**Table 22:** Statement of financial performance

<b>STATEMENT OF FINANCIAL PERFORMANCE</b>		
<b>for the period ending 31 March 2022</b>		
	<b>31-03-2022</b>	<b>31-03-2021</b>
	<b>R</b>	<b>R</b>
<b>Revenue</b>		
DWS - Grant Invoiced	122 867 035	95 230 311
Water Resource Management Charges	33 366 987	34 466 136
Other Income	700 898	454 290
Revenue Adjustments	-	-
Interest Received - Trading Debtors	1 998 536	6 487 160
Interest Received - Investment	3 483 994	3 203 780
	<b>162 417 450</b>	<b>139 841 677</b>
<b>Operating and Administrative Expenses</b>	<b>(153 714 286)</b>	<b>(145 162 380)</b>
<b>Surplus from Operations</b>	<b>8 703 164</b>	<b>(5 320 703)</b>
Finance Costs	(43 680)	(19 651)
<b>Surplus for the period</b>	<b>8 659 484</b>	<b>(5 340 354)</b>

### **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 lower budget allocation, annual expenditure exceeded annual budget resulting in an amount of 14% being overspent against the actual budget. A detailed audited expenditure report (**Error! Reference source not found.**) for 2021/22 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 water users. Thus, the water resource charges, and the infrastructure charges should still be payable to the IUCMA and DWS, respectively.

Table 23: Itemised expenditure report

2021/22 TOTAL SPEND				
DESCRIPTION	Annual Expenditure	Annual Budget	Variance	%
<b>REVENUE</b>	<b>160 418 914</b>	<b>139 709 068</b>	<b>(20 709 846)</b>	<b>-15%</b>
Subsidy Income	122 867 035	88 861 371	(34 005 664)	-38%
Water Resource Management Revenue	33 366 987	49 702 637	16 335 650	33%
Other Income	700 898	-	(700 898)	100%
Interest Received	3 483 994	1 145 060	(2 338 934)	-204%
Revenue : CMA Adjustment	-	-	-	-
<b>SALARIES &amp; WAGES</b>	<b>97 832 045</b>	<b>96 939 141</b>	<b>(892 904)</b>	<b>-1%</b>
<b>GOODS AND SERVICES</b>	<b>52 868 610</b>	<b>38 567 426</b>	<b>(14 301 184)</b>	<b>-37%</b>
Audit Fees	453 399	316 500	(136 899)	-43%
Advertising & Marketing	462 174	410 350	(51 824)	-13%
Training and Development	1 723 607	1 160 500	(563 107)	-49%
Extrenal Bursaries	-	527 500	527 500	100%
Bank charges	74 031	127 720	53 689	42%
Cellphone Charges	2 829 510	1 198 608	(1 630 902)	-136%
Cleaning	7 600	47 137	39 537	84%
Projects	23 133 955	14 063 396	(9 070 559)	-64%
Courier Charges	39 238	64 644	25 406	39%
Consumables	144 336	217 918	73 582	34%
Depreciation	1 933 758	-	(1 933 758)	-100%
Electricity	1 283 016	960 000	(323 016)	-34%
Water	31 712	17 050	(14 662)	-86%
Finance Charges	7 923	101 007	93 084	92%
Insurance	429 251	202 014	(227 237)	-112%
Laboratory Testing	2 029 536	3 165 000	1 135 464	36%
Legal Fees	3 551 977	1 070 825	(2 481 152)	-232%
Fuel	88 272	154 700	66 428	43%
Toll Gates	3 615	46 417	42 802	92%
Vehicle Hire	108 005	364 950	256 945	70%
Travel & Subsistance	2 246 640	2 989 475	742 835	25%
Printing & Stationery	590 652	919 416	328 764	36%
Protective Clothing	-	411 450	411 450	100%
Rental Premises	7 049 598	5 561 561	(1 488 037)	-27%
Rental Office Equipment	27 860	80 000	52 140	65%
Security Services	3 920	-	(3 920)	100%
Gardening Services	-	-	-	0%
Subscription	153 835	333 290	179 455	54%
Accomodation	1 307 724	2 702 700	1 394 976	52%
International Travel	-	153 075	153 075	100%
Telephone & Fax	724 418	426 250	(298 168)	-70%
Relocation Costs	1 410 816	158 250	(1 252 566)	-792%
Conference Facilities	448 229	521 450	73 221	14%
Bad Debts Written Off	467 052	-	(467 052)	100%
Workmens Compensation	102 951	94 273	(8 678)	-9%
<b>REPAIRS &amp; MAINTENANCE</b>	<b>779 813</b>	<b>518 850</b>	<b>(260 963)</b>	<b>-50%</b>
Computers	139 889	239 150	99 261	42%
Office Furniture & Equipment	336 422	89 700	(246 722)	-275%
Motor Vehicles	70 412	190 000	119 588	63%
Land and Building	233 090	-	(233 090)	-100%
<b>TOTAL GOVERNING BOARD COSTS</b>	<b>2 233 817</b>	<b>2 110 000</b>	<b>(123 817)</b>	<b>-6%</b>
Board Stipends	1 884 242	1 107 750	(776 492)	-70%
Board Related Costs	349 575	1 002 250	652 675	65%
<b>EXPENDITURE SUB - TOTAL</b>	<b>153 714 286</b>	<b>138 135 417</b>	<b>(15 578 869)</b>	<b>-11%</b>
<b>CAPITAL OUTLAY: SUMMARY</b>	<b>4 527 305</b>	<b>1 120 150</b>	<b>(3 407 155)</b>	<b>-304%</b>
Computers	1 490 313	346 500	(1 143 813)	-330%
Office Furniture & Equipment	2 297 473	427 150	(1 870 323)	-438%
Motor Vehicles	-	346 500	346 500	100%
Property Piet Retief	739 519	-	(739 519)	-100%
<b>TOTAL BUDGET &amp; EXPENDITURE</b>	<b>158 241 591</b>	<b>139 255 567</b>	<b>(18 986 024)</b>	<b>-14%</b>

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) contains correct data for billing.
- A water auditing process to investigate non-billable water use on the ground, against the non-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

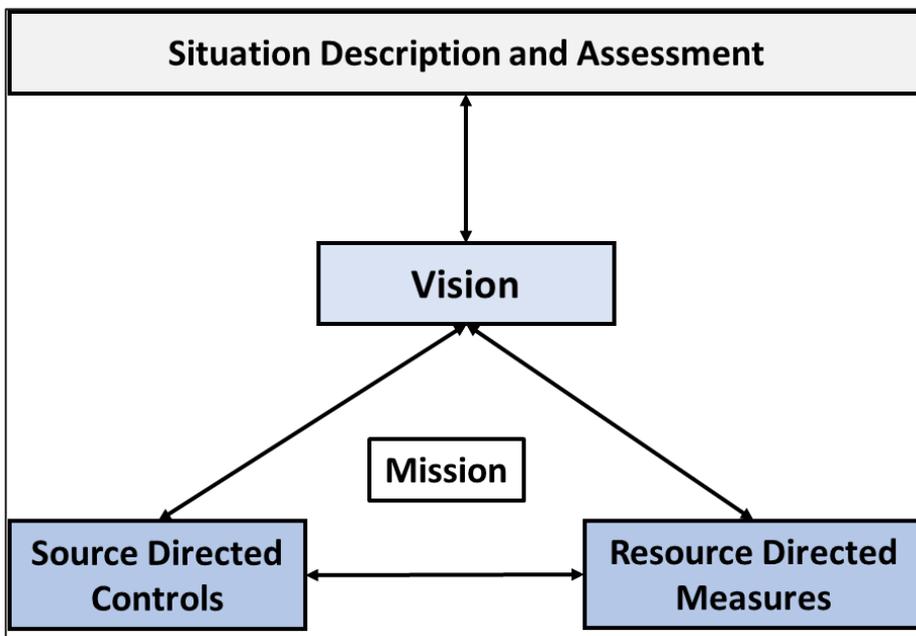
Section 9 of the National Water Act, Act 36 of 1998 stipulates that the CMS must not conflict with the National Water Resources Strategy. It must be reviewed from time to time, and consider relevant legislation, strategies, and plans. The Act further provides for the CMS to be developed in a **phased manner; thus some parts of this CMS will not be complete such as the Water Allocation Plan for the whole Water Management Area**. The CMS update by IUCMA was done through consultation with the stakeholders in the Inkomati-Usuthu Water Management Area. The process entailed 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 substrategies: regulation of water use and water resource protection),
- Facilitation Strategy (with substrategies: 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 and this was completed for the whole WMA. 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 45). **This process was initially undertaken with stakeholders and the Governing Board in the 2018/19 financial year and recently, in the second quarter of 2021/2022 financial year during mid-term review of the strategic plan.**



**Figure 45:** 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:

- **Unauthorised 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 are too stringent that upstream water quality, illegal sand mining result in increased turbidity; unauthorised 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 departmental/ 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, the following points of interest 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 to 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 subcatchment, a part of the Inkomati-Usuthu WMA followed by the visioning revision process for the other five (5) subcatchments in the former Inkomati WMA. These subcatchments 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 state 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 six (6) subcatchments is indicated as follows:

- **Usuthu Catchment**
  - *Reliable water resources accessible to all in the subcatchment*
- **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 STRATEGIC PRIORITY AREAS (OUTCOMES)

In line with the new planning framework, the planned performance is now outcome-based and directly linked with DWS outcomes, the SONA, MTSF Priorities and SDG Goals. Thus, an optimal operating model design was utilised to organise organisational capabilities into a programme structure to implement the 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	Finalisation and implementation of the revised Raw Water Pricing Strategy which will have a positive impact on the funding model of the organisation.	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
	Priority 5: Spatial Integration,			Outcome 3: Maintain financial sustainability
		Reviving the Green Drop and Blue Drop	Outcome 2: Ecological infrastructure	

	Human Settlements and Local Government	programmes to strengthen water quality monitoring which will enhance the quality and health of our water resources.	protected and restored.  Outcome 3: Water demand reduced, and water supply increased.	Outcome 4: Protection and use of water resources
	Priority 7: A better Africa and World	Finalisation of water use licences within a revised timeframe of 90 days.	Outcome 5: Enhanced regulation of the water and sanitation sector.	

### 6.1 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.

### 6.2 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:

#### 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-programme is procurement from local emerging micro enterprises.

## **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, Act 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.

### **6.3 Programme 3: Financial Sustainability**

The objective of this programme is to ensure that adequate capital base is built to ensure financial sustainability of the organisation. 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 provides capabilities for funding of capital infrastructure and expansions when required.

The programme consists of the following sub-programmes:

#### **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 organisational value chain. Further, the sub-programme is an enabler to the IUCMA by attaching how commodities are sourced to delivery of the organisational mandate.

#### **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 in effective working capital management, optimal capital structures and growth of the business.

#### **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.

## 6.4 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 consists of the following sub-programmes:

### 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.

### 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).

### Data and Information Management

This sub-programme ensures that data are collected, managed and stored, and it supports various sub-programmes including registration of authorisations and provide data for billing.

### 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 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 Plans (APP) and ensure sustainable Integrated Water Resources Management (IWRM).

## 7 STRATEGIC AREAS FOR IMPLEMENTATION OF THE CMS

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

- Management measures **(used to track progress in achieving objectives and goals)** ,

- Management objectives (**measurable steps**), and
- Management actions (**how to get it done**)

## 7.1 PROTECTION AND USE OF WATER RESOURCES

### 7.1.1 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 is 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	<p><i>Objective 1:</i> 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.</p> <p><i>Objective 2:</i> To operate the rivers and groundwater efficiently and effectively to provide water resources commitments for all users, including International Obligations.</p>	<ul style="list-style-type: none"> <li>• Development of manual and procedures for data collection and processing.</li> <li>• Standardisation of climate and hydrological data collection techniques such as the use of telemetry system to allow registration of online data in databases.</li> <li>• Standardisation of equipment and methods to collect climate data by implementing data loggers to complement all manual stations.</li> <li>• Effective management, maintenance, repair, renewal and replacement, and the protection of the monitoring stations to provide real-time data.</li> <li>• Effective management and mitigation of any emergencies occurring at monitoring stations.</li> <li>• Implementation of risk management procedures to deal with an emergency that occurs at all strategic stations.</li> </ul>

### 7.1.2 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	<p><i>Objective 1:</i> To provide updated and reliable water resources data to support integrated planning and decision making.</p> <p><i>Objective 2:</i> To ensure adequate water availability and reliability of supply to existing users and new allocations.</p>	<p><i>a) Finalisation of validation and verification studies in the WMA</i></p> <p>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).</p> <p><i>b) Update water availability and assessment studies (WAAS)</i></p> <p>The determination of water availability and assessment will entail but are not limited to:</p> <ul style="list-style-type: none"> <li>• Description of the quality and quantity of water in the prescribed area.</li> <li>• Description of the impacts of land use change on water quality and quantity.</li> <li>• Description of the demand for water resources, including demand from irrigation, industrial, commercial, domestic, and recreational uses.</li> <li>• Specification of water requirements for the environment.</li> <li>• Specification of sustainable abstraction volumes.</li> <li>• Provision of criteria for granting licences.</li> <li>• Provision of new options for achieving sustainable use of water resources that will: <ul style="list-style-type: none"> <li>-Promote efficient water use.</li> <li>-Specify policies for the reuse of water.</li> <li>-Establish trigger mechanisms/thresholds for highlighting changes to water resource conditions such as flow rate and downstream quality.</li> </ul> </li> </ul> <p><i>c) Maintenance and operation of Decision Support Systems</i></p>

MANAGEMENT MEASURE	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION
		<p>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 Water Managers.</p> <p><b>Long-term operations</b> 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.</p> <p><b>Short-term operations</b> 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 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.</p> <p style="text-align: center;"><i>d) Construction of off-channel storage dams and regulating weirs</i></p> <p>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 towards 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.</p> <p style="text-align: center;"><i>e) Invasive alien plants removal</i></p>

MANAGEMENT MEASURE	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION
		<p>Alien invasive plants are one of the identified risks within the WMA. They threaten the aquatic system's ability to maintain a crucial integral component in the landscape. The removal of invading alien plants in the river systems (Sabie, Crocodile, Usuthu and Komati rivers) can substantially improve the hydrology (runoff and inflows into dams) of the catchments. The removal of alien plants may not necessarily result in increased yield of the system, but assurance of supply for runoff river users will increase.</p> <p><i>f) Construction of a new regional dam in the Crocodile River catchment</i></p> <p>Water shortages that are frequently experienced by both the domestic and agricultural sectors in the Crocodile River catchment must be addressed in order to achieve the objectives of providing water supply to all water users. Both the public and private sectors have requested additional yield from new storage dam construction within the Crocodile River Catchment to address water shortages and to support new development. Previous water requirements and availability reconciliation strategies recommended three dam sites: the Nels River's Boschjeskop Dam, the Kaap River's Mountain View Dam, and the Strathmore Dam, an off-channel storage facility downstream of the Kaap and Crocodile River confluence. The DWS has begun the technical feasibility study for the construction of a new regional dam in the Crocodile River Catchment.</p> <p><i>g) Rainwater harvesting</i></p> <p>As a way of promoting rural household farming and access to water, rainwater harvesting programme must be implemented. This progress has already started in the Bushbuckridge Local Municipality where 100 households are expected to benefit.</p>

### 7.1.3 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 overallocations

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 are 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 realising 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)	<p><i>Objective 1:</i> The allocation of water should, therefore, promote equity, address poverty, generate economic growth and create jobs.</p> <p><i>Objective 2:</i> 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.</p> <p><i>Objective 3:</i> The water allocation process must allow for the sustainable use of water resources and must promote the efficient and non-wasteful use of water.</p>	<p><i>a) Establish Water Allocation and Transfer policy</i> The Water Allocation Plan should establish:</p> <ul style="list-style-type: none"> <li>• Principles by which water is allocated.</li> <li>• Principles by which water can be transferred.</li> <li>• The method by which existing licensed water allocations (hectares) will be converted to volumetric allocations.</li> <li>• Policies for the management of volumetric allocations.</li> <li>• Policies for the protection of groundwater.</li> <li>• Phase in the change of water use entitlements from Existing Lawful Use to licences under the National Water Act.</li> </ul> <p><i>b) Ensure protection of ecosystems</i> The Water Allocation Plan should:</p> <ul style="list-style-type: none"> <li>• Specify the water needs of water dependent ecosystems (Implement the ecological flow requirements/Reserve and the Resource Quality Objectives).</li> <li>• Specify the environmental impacts of water use within the prescribed area and downstream, including impacts relating to water quality and quantity.</li> </ul> <p><i>c) Investigate the economic and social development of water allocation</i></p>

MANAGEMENT MEASURE	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION
		<p>The Water Allocation Plan will:</p> <ul style="list-style-type: none"> <li>• Describe the social and economic values inherent in the allocation of water within the prescribed area for landholders and the wider community.</li> <li>• Describe the social and economic impacts of water allocation, both short term and long term, including the effects on the value of land.</li> </ul> <p>d) <i>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;</i></p> <p>e) <i>Identify opportunities for productive water use with particular emphasis on HDIs</i></p> <p>f) <i>Identify local and regional planning initiatives that need water, or that could support the productive use of water by HDIs</i></p> <p>g) <i>Outline the water availability, requirements, and identify possible curtailments.</i></p>

#### **7.1.4 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) (DWA, 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 & 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
<p>Reducing Water Demand through implementation of Water Conservation and Demand Management (WC/WDM) Principles</p>	<p><i>Objective:</i> To improve water use efficiency with agricultural, domestic, and industrial water use sectors through implementation of WCDM</p>	<p><i>a) Develop an implementation plan on water use efficiency by the irrigation sector to ensure 20% water saving by 2040.</i></p> <p>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 to promote 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 marginalised farmers and other water use sectors.</p> <p>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.</p>

MANAGEMENT MEASURE	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION
		<p><i>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.</i></p> <p>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.</p>

### **7.1.5 Strategic Measure E: Climate Change Resilience Strategy**

There is need for 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	<p><i>Objective 1:</i> 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</p> <p><i>Objective 2:</i> To promote the application of integrated water management as a priority tool to reduce climate vulnerability (including extreme events – drought and floods).</p>	<p>The aim is to assess the impacts of climate change, prioritise associated risks and opportunities, and develop climate risk management strategies for water management area to build resilience in vulnerable communities. Through DWS Climate Change Response Strategy study, the IUCMA will:</p> <ol style="list-style-type: none"> <li>Explore how impacts of climate change affect water supply and quality.</li> <li>Evaluate priority climate-related risks in terms of the hazards and consequences.</li> <li>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.</li> </ol>

#### 7.1.6 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. A need exists 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.	<ul style="list-style-type: none"> <li>Revise the Water Allocation Reform Strategy once the verification of existing lawful use is complete.</li> <li>There needs to be transformation of Irrigation Boards to establish uniform tariffs. This includes scrutinising Service Level Agreements.</li> <li>Stronger stakeholder engagements are needed to understand where water is present, as well as improved collaboration between different Government departments.</li> </ul>

MANAGEMENT MEASURE	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION
		<ul style="list-style-type: none"> <li>• The “Use It or Lose It” principle needs to be applied about water.</li> <li>• Need to know the potential of water resources (including groundwater) and how they can be exploited.</li> <li>• Phased approach on implementation of compulsory licensing.</li> </ul>

### 7.1.7 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.

### 7.1.8 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 eleven (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 of the IUCMA is the assessment and processing of water use authorisation applications, that include water use licences (WULs) and General Authorisations (GAs). The	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 lodges an application

MANAGEMENT MEASURE	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION
	recommended WULs are submitted to the DWS (the Responsible Authority) to make the final decision.	<p>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.</p> <p>Additionally, the IUCMA needs full delegations of power for processing and finalising water use licences. The IUCMA should come up with mechanisms to fast track the replacement of ELUs with licences. The IUCMA must appoint an engineer with experience in 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.</p>

### 7.1.9 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), Basic Assessment (BA) or Environmental 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 and Energy (DMRE), be it for mining right, mining permit

MANAGEMENT MEASURE	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION
		<p>etc. and EIAs either directly from the consultants or the Departments of Agriculture, Rural Development, Land Reform, municipalities, etc.</p> <p>The regulated timeframe to provide technical input in terms of the National Environmental Management Act, Act 107 of 1998 and its regulations as amended is 60 days, whereas for the EIA/BAR is 30 days.</p> <p>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.</p> <p>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.</p>

#### **7.1.10 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.	<p>The IUCMA finalised validation and verification for both the Inkomati and Usuthu catchments. A total of 1 300 properties were identified for Usuthu 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.</p> <p>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</p>

MANAGEMENT MEASURE	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION
		<p>water users (both registered and unregistered) and conduct verification on site.</p> <p>a) Though the V and V project contract has ended, the IUCMA will continue with verification of the ELU 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.</p> <p>b) Conduct an audit on water uses in the tributaries and bulk water uses.</p> <p>c) Removal of unlawful water uses in the irrigation sector.</p>

#### **7.1.11 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 Act, Act 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 Limits/ Water Use Licence (WUL) Conditions	To ensure improvement in water quality, adherence to condition of the issued water use licence, and abstraction limits	<ul style="list-style-type: none"> <li>• Ensure that all reported complaints/pollution are attended to and enforcement actions are taken for all non-compliance observed.</li> <li>• Ensure that enforcement actions taken are consistent, transparent, and proportional.</li> <li>• 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</li> </ul>

MANAGEMENT MEASURE	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION
		<p>division will continue to conduct awareness with other relevant stakeholders.</p> <ul style="list-style-type: none"> <li>• Identify and investigate big polluters and refer such matters to the NPA for prosecution.</li> <li>• Identify and investigate major non-compliant abstractors within the catchment and recommend to the NPA for prosecution.</li> <li>• Prosecute users who completely disregard the IUCMA advice on matters related to pollution and abstraction.</li> <li>• Continue to conduct audits/inspections/pollution incidents as outlined in section 125 of the National Water Act, Act 36 of 1998.</li> <li>• 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 51 of 1977.</li> </ul> <p>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.</p>

## 7.2 INCREASED STAKEHOLDER PARTICIPATION

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

The National Water Act, Act 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, 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 organisation 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, Rooiboklaagte, 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	<p><i>Objective 1:</i> To establish and Support Water Management Institutions</p> <p><i>Objective 2:</i> To facilitate and conduct stakeholder empowerment and interactions.</p> <p><i>Objective 3:</i> Implement Corporate Social Investment (CSI)</p>	<p>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).</p> <p>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.</p> <p>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.</p>

### 7.2.2 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 eSwatini for cooperation 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 eSwatini 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 State parties to pursue and establish close cooperation regarding the management of shared watercourses.
- Furthermore, with regard to the existent transboundary management, the Incomati and Maputo Watercourse Commission was established to ensure the practical and effective implementation of joint management of the Incomati system.

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.	<p>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.</p> <p>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 state 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</p>

MANAGEMENT MEASURE	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION
		<p>frequency of monitoring also determined for both basins.</p> <p>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.</p> <p>The management actions required to promote and pursue an international developmental agenda are as follows:</p> <ul style="list-style-type: none"> <li>• Conduct monitoring at all the monitoring sites identified, on the required parameters and at the required frequency.</li> <li>• Produce and exchange the annual water quality status at designated monitoring stations.</li> <li>• Participate in the structures created for purposes of transboundary water management engagements and reporting.</li> <li>• IUCMA participates in Technical Committees for Joint Water Commission (JWC) and Incomati and Maputo Watercourse Commission.</li> <li>• 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</li> <li>• Identify and set up joint projects (or scale up existing projects) that are beneficial for the</li> </ul>

MANAGEMENT MEASURE	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION
		<p>catchment, e.g., a Transboundary Basin Management Strategy or facilitate twinning arrangements with other water management Institutions.</p> <ul style="list-style-type: none"> <li>• Continue to participate in twin agreement with Dutch Water Authorities in Netherlands.</li> <li>• Conduct innovative research and development</li> </ul>

### 7.2.3 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 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	<p><i>Objective 1:</i> Build the IUCMA's reputation through open and honest communication.</p> <p><i>Objective 2:</i> Ensure effective communication with all stakeholders.</p>	<p>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.</p> <p>To create awareness and understanding of IWRM in stakeholders and influence their attitude towards IWRM matters by:</p> <ul style="list-style-type: none"> <li>• Influencing the culture of participation on IWRM by stakeholders;</li> <li>• Promoting successful IUCMA initiatives, both nationally and internationally; Incorporating IWRM information into regional communication initiatives; and</li> <li>• Capacitating staff regarding general communications, marketing principles and water stewardship.</li> </ul>

#### 7.2.4 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
<p>Improve Reporting and Information Sharing</p>	<p>To promote transparency and involve stakeholders in the IWRM implementation.</p>	<p>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. <i>This will enhance the collaboration of stakeholders with the IUCMA in the protection, use, conservation, management, and control of water resources.</i></p> <p>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:</p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• Besides actual presentations, reports produced must also be distributed and shared among stakeholders for both water quality and the River Eco-Status Monitoring Programme (REMP) or aquatic ecosystem health status.</li> </ul>

### 7.3 ENHANCED HUMAN RESOURCES CAPABILITY

#### 7.3.1 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.

#### 7.3.2 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, 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.	<ul style="list-style-type: none"> <li>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.</li> <li>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.</li> </ul>

MANAGEMENT MEASURE	MANAGEMENT OBJECTIVES	MANAGEMENT ACTION
		<ul style="list-style-type: none"> <li>To report on the overall performance on risk management to the Audit Committee for oversight and governance review.</li> </ul>

### 7.3.3 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	<p><i>Objective 1:</i> To give assurance that the controls in place are adequate, effective, and operating as intended.</p> <p><i>Objective 2:</i> To give assurance that transactions are performed timely, recorded accurately, complete and are properly authorised.</p> <p><i>Objective 3:</i> To make recommendations, which if implemented will improve the system of internal controls.</p> <p><i>Objective 4:</i> To provide consulting services to management on areas where there are no controls in place.</p>	<p>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.</p> <p>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.</p>

### 7.3.4 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	<ul style="list-style-type: none"> <li>• To create a desirable behaviour whereby IUCMA customers are technology centric.</li> <li>• To strengthen IT governance controls by ensuring sustainable of conformance to legislative prescripts and other best practices governing information technology.</li> <li>• To be preferred supplier of information systems.</li> <li>• To deliver effective and efficient IT applications and systems.</li> <li>• To obtain reasonable business contribution from IT investment.</li> <li>• To develop opportunities to answer future challenges (4IR).</li> </ul>	<ul style="list-style-type: none"> <li>• Review and implementation of Master Systems Plan (MSP).</li> <li>• Review and implementation of IT policies and procedures.</li> <li>• Review and implementation of IT Governance Framework.</li> <li>• IT Governance quarterly reporting through IT Steering Committee and other structures of the Board.</li> <li>• Renewal of subscription and maintenance contracts for the support software for Decision Support Systems (short term and long term).</li> </ul>

## 7.4 MAINTAIN FINANCIAL SUSTAINABILITY

### 7.4.1 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 confirmed general authorisations [related to 21 (a) and (b)], 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)	<ul style="list-style-type: none"> <li>To ensure that water users are registered and contacts are continuous maintained and updated on WARMS.</li> <li>The IUCMA continuously capture; register and update authorised water use activities which is done for none other than billing, record, and monitoring purposes. ELU is carried on Regulation 1352, registered water uses.</li> </ul>	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 interfacing with SAP for water charges revenue collection. The IUCMA WARMS sub-division, comprises of a Supervisor, three WARMS Information Officers, with different roles for segregation of duties. But the WARMS team lacks technical capacity, with a risk of reduced quality control of some of the registered information on WARMS.

#### 7.4.2 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 at approximately 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.	<p>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.</p> <ul style="list-style-type: none"> <li>The IUCMA has approved a Revenue Enhancement Strategy which will relate to e.g., determining new licence application fees and a review of the financial model for the CMAs.</li> <li>Establish proper debt management processes and procedures such as implementing the Dunning process system.</li> <li>Improving revenue generation through activities in Table 24.</li> </ul>

**Table 24:** Improving revenue generation activities

<b>Programme</b>	<b>Expected Registered Volume or loads in cubic meter per annum (m3/a) or milligram per litre (mg/l)</b>	<b>Projected Revenue in rands</b>
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 groundwater use registration drive for hotels/lodges	10 000 000 m3/a	R5 000 000

## 8 CONCLUSIONS AND RECOMMENDATIONS

For the 2021-2026 period, the Vision of the IUCMA and its stakeholders is to see transformation that translates to Water Allocation Reform so that socioeconomic benefit could be 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 impacts of climate change on water security remains key and hence water mix is a very important strategic intervention.

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 the improvement of community socioeconomic conditions.

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 and Energy (DMRE) and Department of Forestry, Fisheries and the Environment (DFFE) as well as the House of Traditional leadership cooperating to ensure there is sustainable and responsible mining of river sand which has a socioeconomic benefit without threatening the sustainability of the water resources and subsequent non-compliance to the International Obligations.

The financial sustainability of CMA requires greater attention and hence various activities are proposed to improve revenue generation.

The Publication of this CMS will forge a pact between the IUCMA and its stakeholders for sustainable water resources management within the next five (5) years.

## 9 REFERENCES

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SOURCE OF INCOME	Applied Budget 2023/24	Proposed Budget 2024/25	Proposed Budget 2025/26	Proposed Budget 2026/27	Proposed Budget 2027/28
Main Account	128,234,765	129,857,935	137,231,168	141,684,900	150,701,642
WTE- IUCMA	54,042,511	57,189,336	60,524,887	64,060,859	67,809,700
Interest Received	3,270,000	3,564,300	3,885,087	4,234,745	4,615,872
<b>TOTAL FUNDING SOURCES</b>	<b>185,547,276</b>	<b>190,611,571</b>	<b>201,641,142</b>	<b>209,980,504</b>	<b>223,127,214</b>

EXPENDITURE	Applied Budget 2023/24	Proposed Budget 2024/25	Proposed Budget 2025/26	Proposed Budget 2026/27	Proposed Budget 2027/28
Salaries and Wages	114,864,901	121,757,783	129,063,250	136,807,045	145,015,468
Goods and Services	65,339,930	63,472,372	66,833,777	68,266,299	72,861,084
Repairs and Maintenance	667,445	714,166	764,157	817,649	874,884
Total Governing Board Costs	2,675,000	2,862,250	3,062,608	3,276,990	3,506,379
Capital Layout	2,000,000	1,805,000	1,917,350	812,522	869,398
<b>TOTAL EXPENDITURE</b>	<b>185,547,276</b>	<b>190,611,571</b>	<b>201,641,142</b>	<b>209,980,504</b>	<b>223,127,214</b>









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