WATER NEWS

2022/23 1ST EDITION

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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

SLOGAN:

"INKOMATI-USUTHU CMA, YOUR PARTNER IN WATER MANAGEMENT"

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REPORT WATER POLLUTION *INCIDENTS*

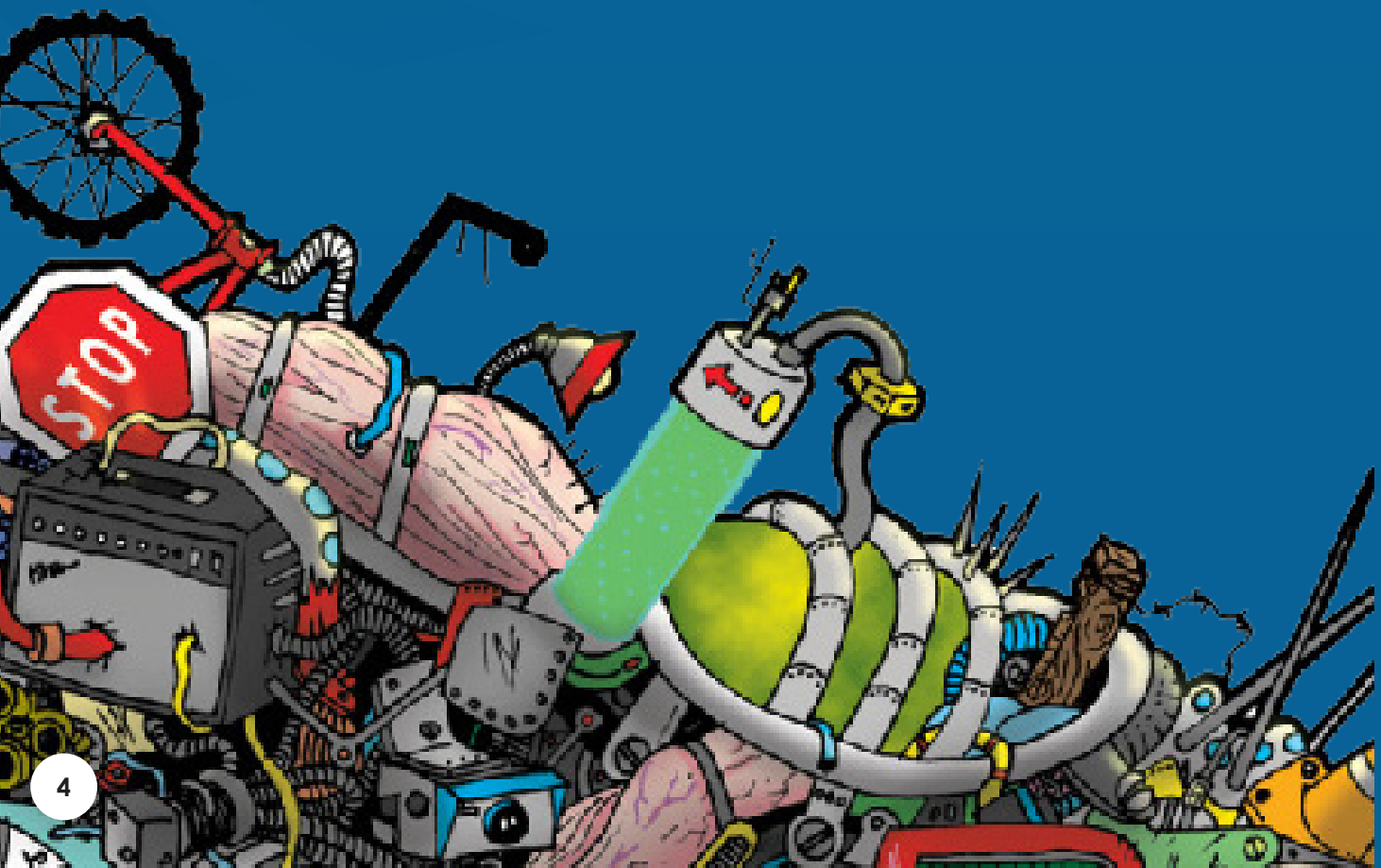
The IUCMA is aware that pollution incidents occur occasinally in the the catchment. Therefore, for any water pollution incidents like sewage leakages and others, please report at **water@iucma.co.za**

OR CALL US AT
013 753 9000

OR ALTERNATIVELY DROP US A MESSAGE ON THE "CONTACT US" BUTTON ON THE WEBSITE.

www.iucma.co.za

You can also report to the Catchment Management Forum in your area.



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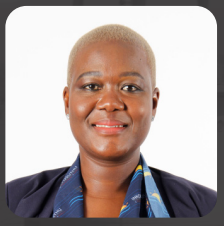

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FOREWORD BY THE CEO

MR LUCKY CHARLES MOHALABA
CHIEF EXECUTIVE OFFICER

Dear Stakeholders

This newsletter comes at a time when the IUCMA has just concluded its Annual Report. This, therefore, allows me to reflect on some of the achievements realised by the Agency. The reports enable our stakeholders to have a clear overview of our activities to provide better understanding and accountability. It further provides the Agency with an opportunity to report on its efficiencies in the fulfilment of our mandate. This newsletter is just a glimpse of some of the sterling work the IUCMA does to protect and care for water resources.

The seal on page 9 of this newsletter bears reference to my pleasure to report that the Agency has received an unqualified audit opinion from the external auditors for the 2021/22 Financial Year. This audit outcome displays the maturity and effectiveness of internal controls and systems which have been put in place by management. This achievement affirms our continued endeavours to ensure that good corporate governance is entrenched within the organisation. It also builds the confidence of our internal and external stakeholders regarding the Agency's ability to pursue its mandate without flaunting established internal controls, policies, and applicable legislation.

On issues of water quality in its various forms (page 22 & page 28), surface water quality in the Inkomati-Usuthu WMA generally complies with the resource quality objectives (RQOs). However, there were problems identified largely attributed to industrial and mining activities as well as the poor state of water service authorities' infrastructure. Enforcement measures are taken to mitigate pollution incidents. Positive outcomes are realised from these actions as most of the matters raised either through inspections or audits get resolved. There is no doubt that the Agency has room for

improvement in this area of concern as microbial pollution remains a human health risk, especially to the vulnerable rural communities that at times have to use the river water for domestic, cultural, and recreational purposes.

Pages 12 & 18 allude to the IUCMA water Mix approach to managing the available water resources. As reflected in the article, the Inkomati-Usuthu WMA water resource availability increased (year–on–year) within the high-water availability analysis band compared to the historical water availability status. The high-water availability in all the river sub-catchment meant that no water use restrictions were imposed. During the same period, when compared to the 10 historic years, the total Inkomati-Usuthu dams' storage volume was at 92.5%, and in this financial year, under review, the storage level is currently 98.6%. Due to the high-river flow level in the Crocodile River catchment, the compliance with international flows (which increased from 0.9 to 1.17m3/s from 1 October 2020) into Mozambique was 100.0 % compared to 100.0 % during the same period in the previous hydrological year. The results show similar compliance compared to the previous year.

Thanking you for your continued support,

Mr Lucky Charles Mohalaba

Editor's Note

This newsletter once more brings a whole host of topics, especially on the purpose of the institution. The IUCMA prides itself in its knowledgeable end professional employees. among other things as most of the scientific work is performed in-house. It continues to caution water users to continue taking care of the environment. this is observed from various awareness-raising information across the newsletter.

The hydrological status, as outlined on page 12, indicates that the 2021/22 financial year was the wettest in the past 10 years. these readings I truly welcome especially looking back at the previous three or four years when the water resources in the country with threatened. All the rivers in the catchment relatively recorded high flows except for the Crocodile River catchment. It needs to be borne in mind that the crocodile river provides water needs so the capital of Mpumalanga province, Including various industries and farmlands. It is therefore required that the use of water within the crocodile river catchment be monitored closely. it also provides water security to the city of Maputo together with the Komati River.

In addition to the surface water as alluded to above, the IUCMA uses the water mix approach to water resource management in the water management area. Groundwater remains one of the most important resource. Monitoring of various points in this regard was performed, and observations and conclusions indicate that the Inkomati catchment area is mostly under pressure while the Usuthu catchment is plenteous. Users in the Usuthu catchment are therefore encouraged to tap into this resource. However, users are always encouraged to register their boreholes so that they are counted and thus assist in the monitoring of groundwater.

Other informative and interesting articles are on page 22 and page 28 on the eutrophication status of water resources and the annual water quality status of the water resources respectively. Poor water quality can be detrimental to various water uses. It is therefore imperative for the IUCMA to take care of its resources by monitoring its uses and its users. The IUCMA has established various nodal monitoring points to ensure that correct steps are taken immediately should there be any threat to the water quality.

Last but not least, as part of its CSI programmes, the IUCMA handed over 2 boreholes to the communities of Makgarula and Phola within the City of Mbombela. Boreholes form part of the initiatives employed by the Agency which seeks to uplift the socio-economic conditions of communities in its area of operation.

Yours in water management

Ms Sylvia Machimana

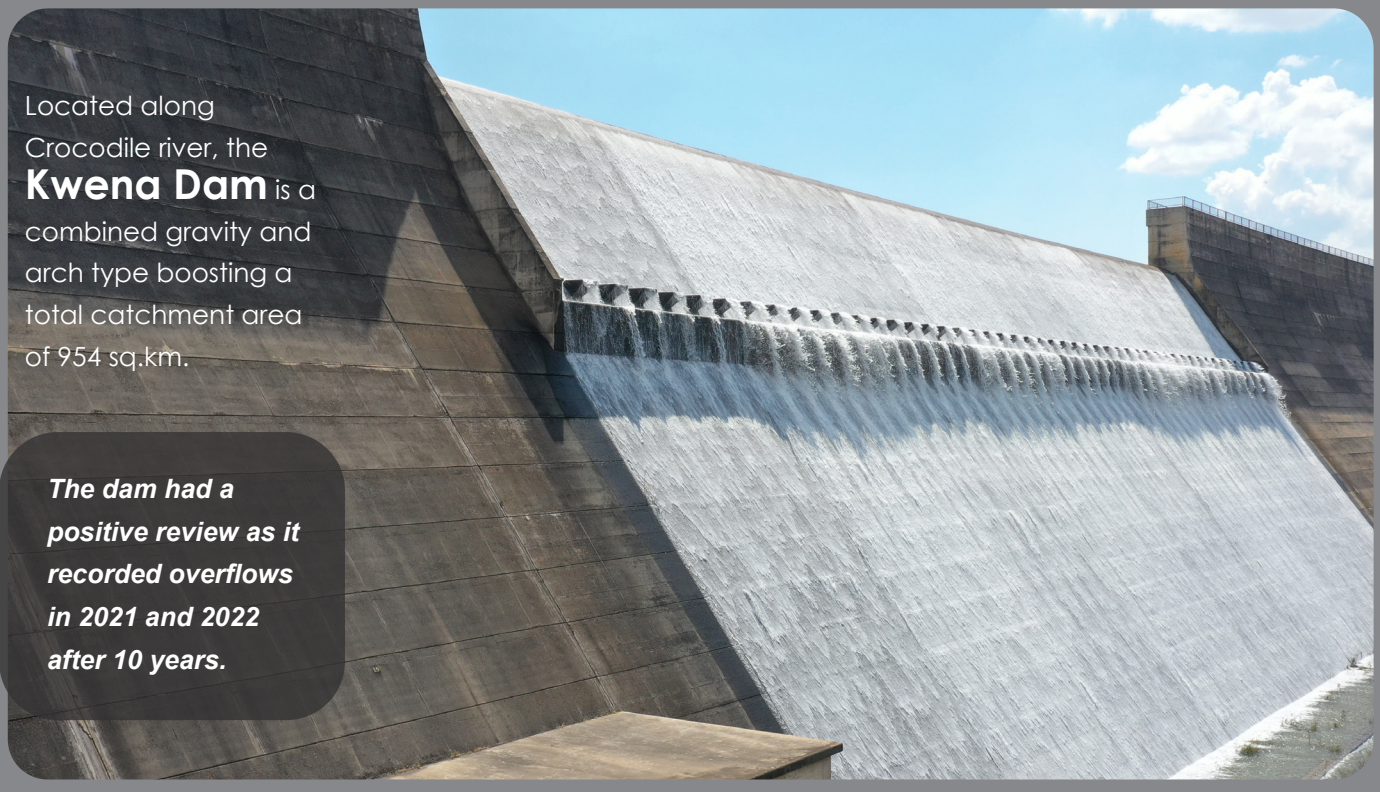
QR CODE FOR THE IUCMA WEBSITE

IUCMA GETS CLEAN AUDIT FOR 2021/22

"Unqualified audit opinions since inception 2006-2022 and still going strong"

SOME OF THE **DAMS** WITHIN THE INKOMATI-USUTHU WATER MANAGEMENT AREA

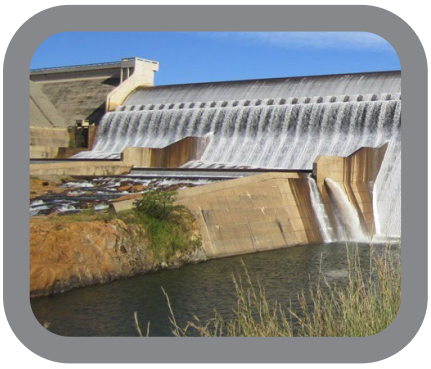
Injaka Dam along the Marite river boost a full capacity of 124 mil.cub.m.



Located along Crocodile river, the **Kwena Dam** is a combined gravity and arch type boosting a total catchment area of 954 sq.km.

The dam had a positive review as it recorded overflows in 2021 and 2022 after 10 years.

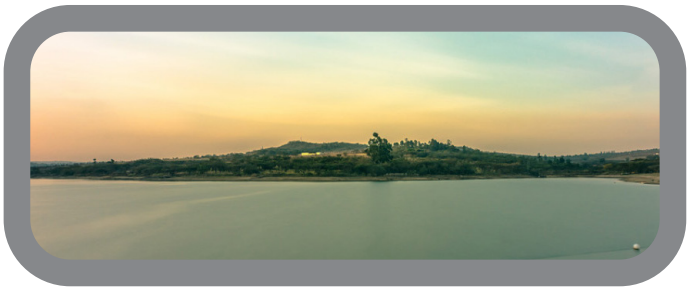
The **Jericho Dam** in Mpama river was built in 1966/68 with a full capacity of 59.5 mil.cub.m.



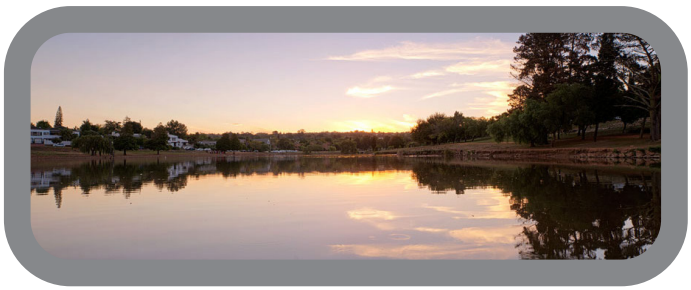
The **Driekoppies Dam** along the Lomati river boost a full capacity of 251 Mm^3 and was opened in 1998.

Da Gama Dam was established in 1977 along the Witwaters river and boost a full capacity of 13.58 mil.cub.m.

Witklip dam along the Sand river near Sabie was opened in 1969 boosting a full capacity of 12.97 mil.



The **Primkop dam** has a total lenght of 5.88 km



The **Vygeboom Dam** built in 1969 along the Komati river boost a full capacity of 78 mil.cub.m.

HYDROLOGICAL STATUS OF THE INKOMATI-USUTHU WATER MANAGEMENT AREA

By (from left to right) Dr Tendai Sawunyama and Mr Sipho Magagula from Resource Planning and Operation

An overview of the surface water resource status issued by the Inkomati-Usuthu Catchment Management Agency (IUCMA)

The 2021-22 hydrological year has been one of the wettest hydrological years over the last 10 years, that saw the Inkomati-Usuthu Water Management Area (WMA) record one of the driest hydrological years in 2015-16 (Figure 2).

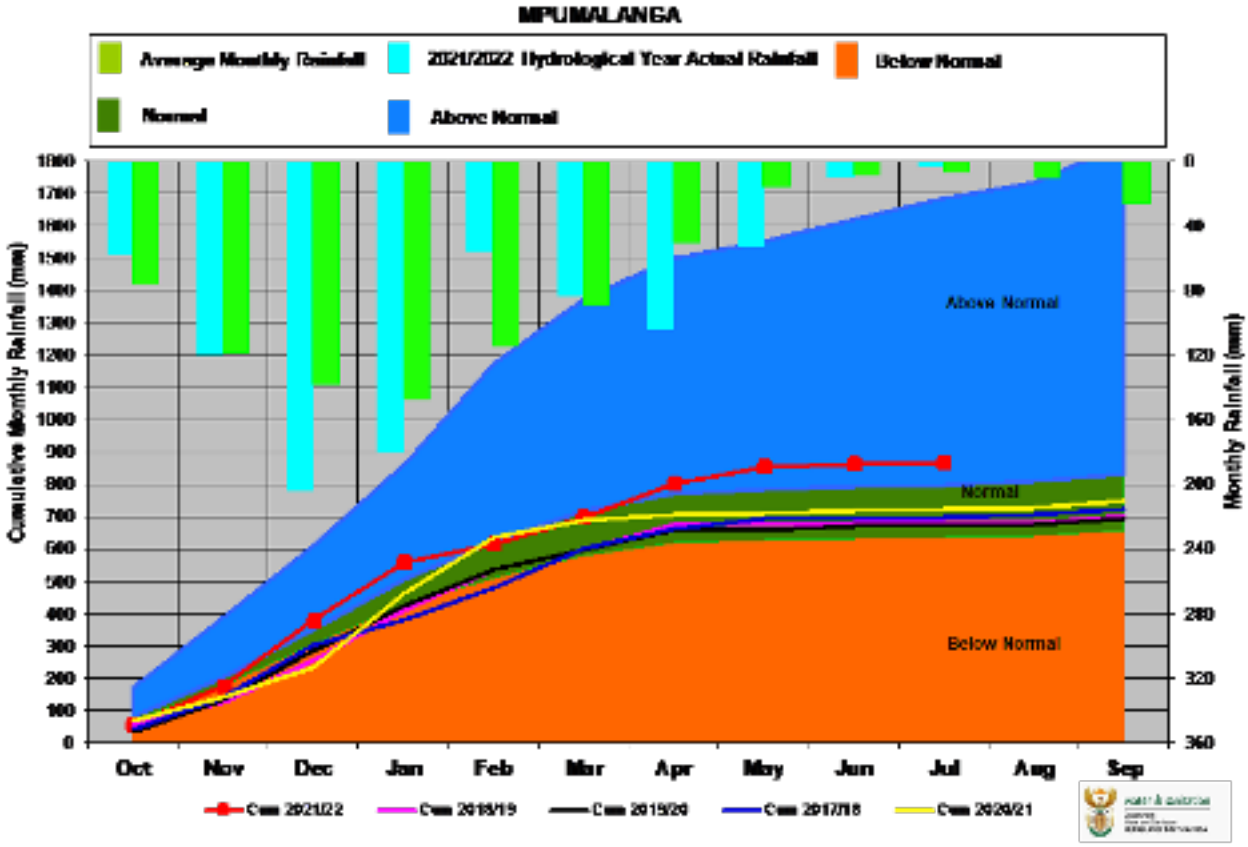


Figure 1: Mpumalanga Rainfall Analysis

As we move closer to the conclusion of the 2021-212 hydrological year all the major dams in the Inkomati-Usuthu WMA are above 80.0%, and the total storage level for all dams is 97.0% compared to 86.0% last year for the same period (Figure 2). The impact of dry winter months has caused all the dams' storage to slightly drop.

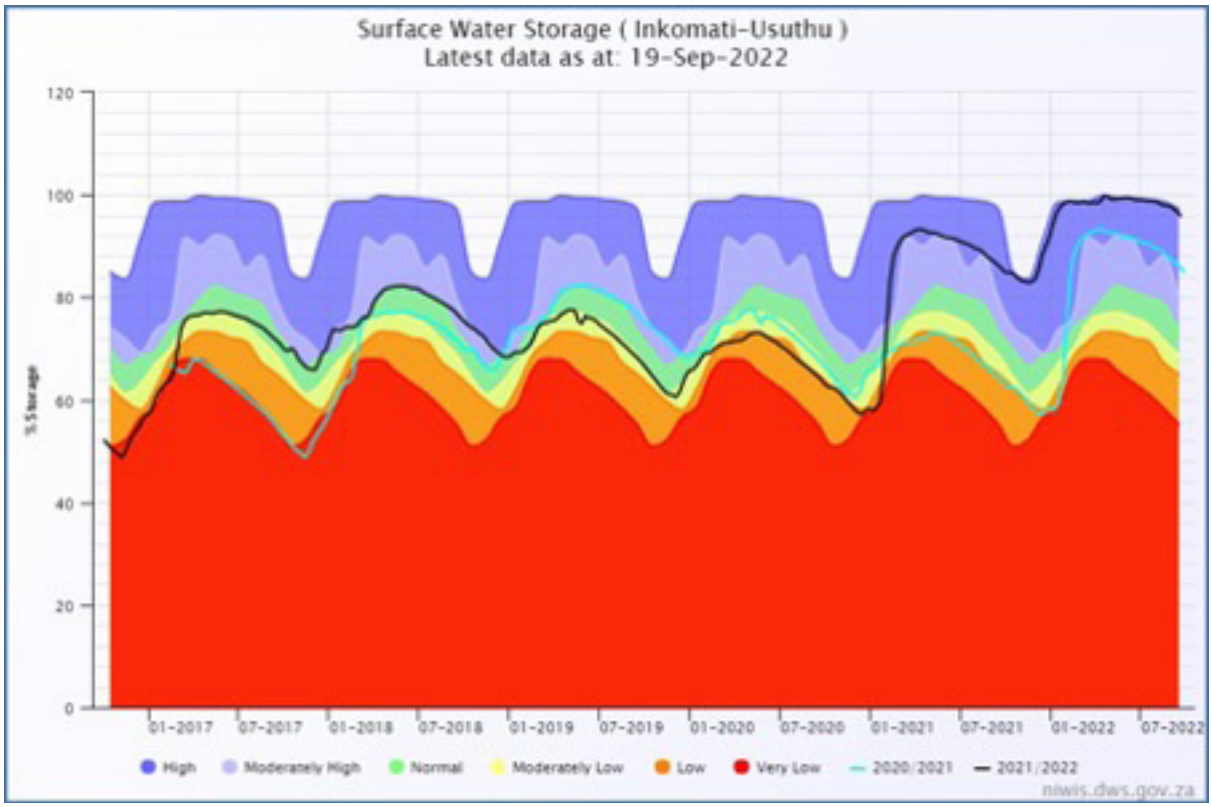


Figure 2: Inkomati-Usuthu WMA dams' storage level status.

The riverflow levels has been generally high in all the major rivers (Crocodile, Sabie, Komati, and Usuthu Rivers) in the WMA since January 2022, with only the Crocodile River requiring dam releases to meet all the water allocation demands. As of 1 September 2022, the release from Kwena dam is 6.0 m^3/s and is projected to not increase.

The current water storages within the major dams in the Inkomati-Usuthu WMA are as presented in Table 1.

Table 1: Dam levels status within the Inkomati Usuthu WMA as of 29 September 2022

Dam Name	**29 September 2022 - % FSC**	**Purpose/Towns**
Da Gama Dam	92.4%	Irrigation
Inyaka Dam	81.2%	Irrigation, Domestic (Bushbuckridge);
Klipkopjes Dam	97.2%	Irrigation, domestic (White River)
Kwena Dam	93.3%	Irrigation, Domestic (Mbombela; Nkomazi)
Longmere Dam	86.2%	Irrigation, domestic (White River)

Nooitgedacht Dam	99.9%	ESKOM
Primkop Dam	86.7%	Irrigation, domestic (White River)
Heyshope Dam	99.4%	ESKOM
Jericho Dam	92.4%	ESKOM
Morgenstond Dam	100.0%	ESKOM
Westoe Dam	75.5%	ESKOM
Vygeboom Dam	100.0%	ESKOM
Witklip Dam	94.3%	Irrigation, domestic (White River)
Lomati Dam	76.9%	Domestic (Barberton)
Driekoppies Dam	97.6%	Irrigation, domestic (Nkomazi LM)

The latest South African Weather Service (SAWS) seasonal climate watch for September 2022 to January 2022 indicates mostly below-normal rainfall for the western parts of the country during spring (Sep-Oct-Nov), with above-normal rainfall expected over most of the remainder of the country. Rainfall conditions are predicted to improve further during the early-summer (Oct-Nov-Dec) into the start of the mid-summer months (Nov-Dec-Jan).

Despite the high-water availability in all main river systems and the forecasted above-normal rainfall for spring to early summer seasons; the IUCMA still encourages water users to continue using water sparingly and implement their water conservation and water demand management strategies. The IUCMA will continue to monitor usage and ensuring compliance and enforcement where necessary.

For latest river flow and dam levels visit:

http://riverops.inkomaticma.co.za

www.dws.gov.za/hydrology

Illegal Dumping
in a watercourse is an
offense and is prohibited

Illegal Damming
in a watercourse is an
offense and is prohibited

Report any water-related illegal activities to the

Inkomati-Usuthu Catchment Management Agency

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INKOMATI-USUTHU
CATCHMENT MANAGEMENT AGENCY

BOREHOLES HANDOVER (CSI Programme)

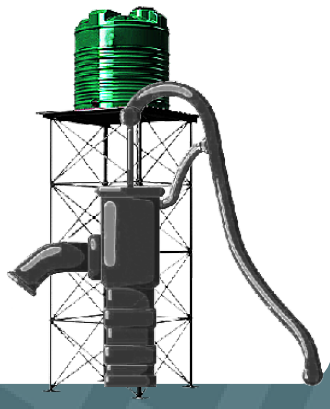
Ms C Zulu from Communication and Intergovernmental Relations

On August 27, 2022, the Inkomati-Usuthu Catchment Management Agency (IUCMA) handed over two boreholes to the communities of Phola (ward 05) and Makgarule (ward 06) in the City of Mbombela.

The boreholes are part of the IUCMA's Corporate and Social Investment (CSI) programme which seeks to uplift the socio-economic conditions of communities within the Inkomati-Usuthu Water Management Area. The initiative was also in line with the Sustainable Development Goal (SGD) no. 6 which provides that everyone must have access to clean drinking water.
The boreholes were officially handed over by the Deputy Minister of the Department of Water and Sanitation Hon David Mahlobo.

In attendance at the handover event was also the MEC for COGTA, Hon Mandla Ndlovu who appreciated the effort by the IUCMA and the Department of Water and Sanitation to bring the much-needed relief to the water stressed communities.
Below are the technical details about each of the installed solar-powered boreholes:
Phola village Solar-powered borehole
The bore is expected to service about 94 households within +a 250m radius. The borehole is expected to provide relief to about 370 to 400 people. According to the Geohydrological studies undertaken, the borehole is confirmed to have a sustainable yield of 14 400L/day. The borehole is equipped with a 10 000L tank, a pump and it is powered by 4 solar panels.

Makgarule village solar-powered borehole
Similarly, the borehole is expected to service about 95 households within a 250m radius. The borehole is therefore expected to provide relief to about 380 or more people. According to the Geohydrological studies undertaken, the borehole is confirmed to have a sustainable yield of 9500L/day. The borehole is equipped with a 10 000L tank, a pump and it is powered by 4 solar panels.



EVENT SETUP: The borehole Handover ceremony being setup for the handover to the community members in Phola

MAKGARULE BOREHOLE: A Jojo tank that was handed over to the community memebre of Makgarule

Spring Water : This is the source of water where the community was getting their water from .

WORDS OF SUPPORT: Deputy Minister of Department of Water and Sanition Mr David Mahlbo giving words of support for the programme.

Success: Inkomati-Usuthu Cma board Chairperson Mr Sam Mthembu giving a thank you to the team and community for the work that has been done.

GEOHYDROLOGICAL STATUS

OF THE INKOMATI-USUTHU WATER MANAGEMENT AREA

By (from left to right) Dr Tendai Sawunyama and Dr Teboho Shakahane from Resource Planning and Operation

An overview of the groundwater quantity status issued by the Inkomati-Usuthu Catchment Management Agency (IUCMA)

The IUCMA continuously monitors and reports on groundwater levels from monitoring boreholes spread across the entire Inkomati-Usuthu Water Management Area (WMA). The ultimate data is used to undertake a groundwater situational assessment including, but not limited to, groundwater recharge, groundwater contribution to environmental flows, water use, and water demands.

A historic groundwater levels data from one of the monitoring boreholes, located in the Sabie Sand, is presented in Fig. 1 wherein the following notes are made:

- For crocodile, groundwater levels are 0,74 m below average level whilst those of Usuthu Catchment are contrarily 2,65 m above average levels.
- Groundwater levels are 2,30 m and 0,08 m above average levels for Lower Komati and Upper Komati catchments respectively.
- Post the 2015/2016 drought, groundwater levels for Sabie-Sand catchment predominantly continue the decreasing trajectory and are currently 1,83 m below average water levels.

Areas whose groundwater levels are below average levels signal a stress condition on the resource. This could be attributable to the imbalance between groundwater recharge and abstraction.

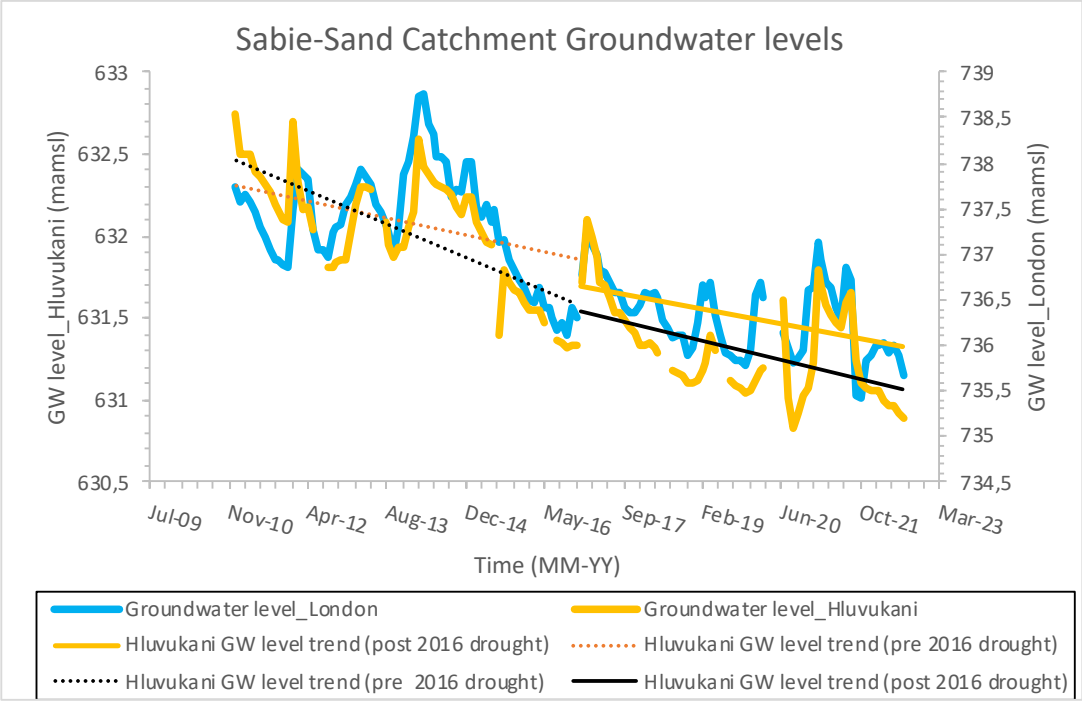


Fig. 1 A groundwater hydrograph from two boreholes in the Sabie-Sand showing sustained groundwater level decline post the 2015/2016 draught

Groundwater recharge, in the Inkomati-Usuthu WMA, was estimated by the Groundwater Resource Assessment Study (GRA II) in 2006. A follow-up study has been recently (2022) completed by IUCMA and the results are presented in Fig. 2. The following observations are made of the groundwater recharge in the WMA:

- The total recharge is 2 126 Mm^3/a of which Komati catchment constitute the highest groundwater amount of about 909 Mm^3/a followed by Crocodile (576 Mm^3/a) and Usuthu (398 Mm^3/a) whilst the lowest is estimated for Sabie-Sand catchment at an approximated volume of 244 Mm^3/a.

- In the last 16 years (from 2006 to2022), groundwater recharge has dropped by approximately 456 Mm^3/a of which 9 Mm^3/a is in Komati catchment and 16Mm^3/a is in Usuthu catchment whilst that for Crocodile and Sabie-Sand is 226 $Mm^3/$and 205 Mm^3/a respectively.

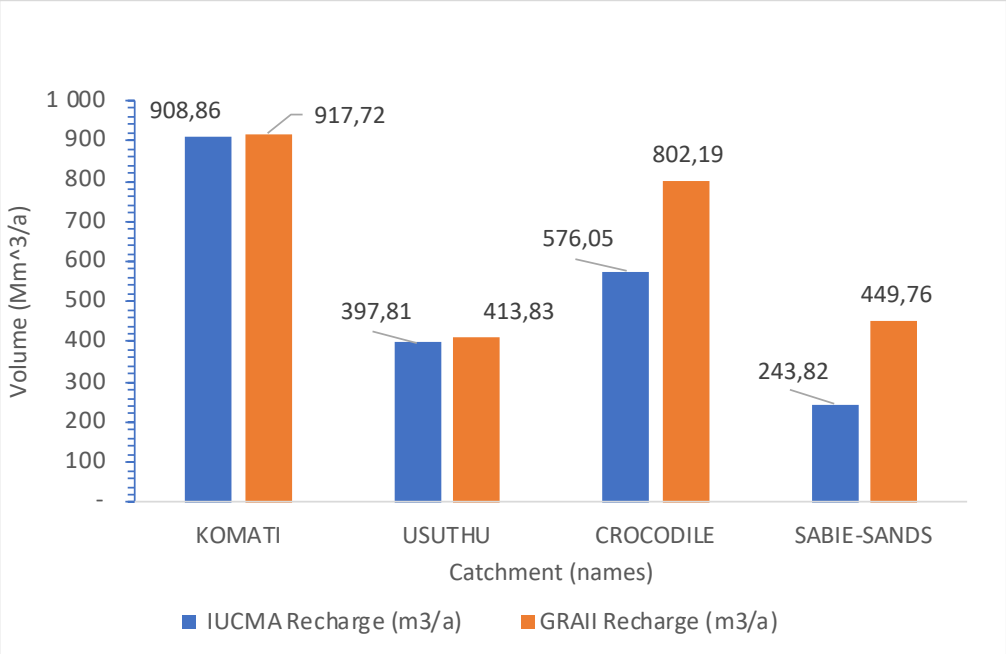


Fig. 2: Groundwater recharge in the Inkomati-Usuthu WMA

As part of the IUCMA study, a groundwater use was estimated. Given uncertainty around groundwater transpiration and actual abstraction, the two were lumped together as (total abstraction) and estimated as a product of a groundwater balance equation. The results are presented in Fig. 3 against which the following notes are made:

- The total abstraction for the Inkomati-Usuthu WMA is approximately 370 Mm^3/a.
- Of the total abstraction, Sabie-Sand catchment constitutes the highest abstraction at approximately 300 Mm^3/a followed by Komati catchment at 35 Mm^3/a then Usuthu and Crocodile catchments at 33 Mm^3/and 0.99 Mm^3/a respectively.
- Compared to the verified data, as found in the Water Use Authorization & Registration Management System (WARMS), the draft is higher because it also includes the transpiration (groundwater uptake by plants) and other contributions to, for example, spring discharges and wetland; the exception is crocodile whose draft is unexpectantly lower compared to both the WARMS and GRA II subtraction data.

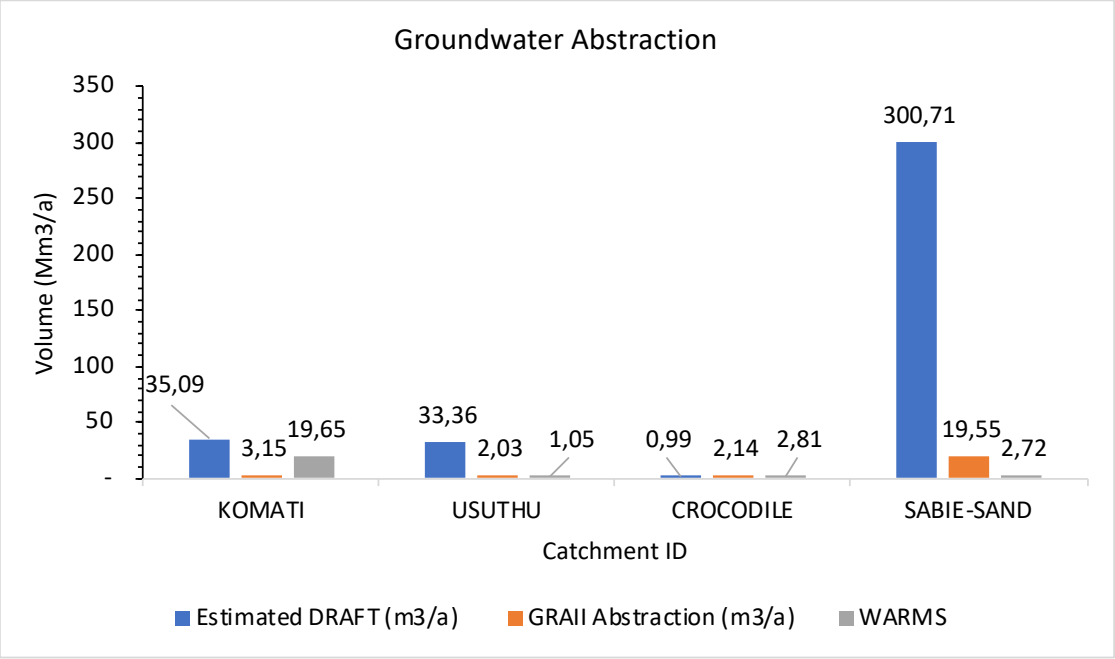


Fig. 3: Groundwater recharge in the Inkomati-Usuthu WMA

The following conclusions are subsequently made:

- The two catchments in the Inkomati-Usuthu WMA, namely, Crocodile and Sabie-Sand catchments, are characterised by groundwater levels that are below the average levels indicative of a potential stress condition.
- In the last 16 years (from 2006 to2022), there has been a significant decrease of groundwater recharge across the entire Inkomati-Usuthu WMA.
- There is a significant imbalance between groundwater recharge and total abstraction in the Sabie-sand, i.e., the catchment is characterised by relatively lower recharge whereas it records the highest abstraction.
- Studies are currently being completed to 1) determine groundwater resource units and their respective stress indexes 2) determine an updated groundwater resource availability in the WMA.

Eutrophication Status within Inkomati-Usuthu WMA

Mr Marcus Selepe from Resource Quality Monitoring

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 found to be undesirable and to interfere with water users. Eutrophication is a natural process resulting from the accumulation or overabundance of nutrients in bodies of water, particularly nitrogen and phosphorus compounds. However, human activities and related water pollution impact on such leaching from fertilised agricultural regions. Erosion, nitrogen deposits from atmospheric pollution, sewage and industrial waste have been reported to accelerate the extent of eutrophication. This results in the intense development of eutrophication symptoms, including blooms of blue-green algae, which causes a reduction of water quality and clarity; an outbreak of alien aquatic plants such as water hyacinth; degradation of recreational opportunities; health risks to people and animals; and thus, an increase in water treatment expenses.

Eleven (11) major dams within the WMA are monitored as part of digital eutrophication monitoring (real time remote sensing data and information on cyanobacteria, algae and more) using Cyanolakes web application to ensure that the development of algal blooms is detected as early as possible to enable appropriate decisions and intervention. Digital monitoring enhances the current monthly National Eutrophication Monitoring Programme (NEMP). **Table 1** and **Table 2** below provides the trophic status classification and criteria used to assign trophic status, respectively.

Table 1: Trophic status classification used for assessment of dams in South Africa

1. **Oligotrophic**	Low in nutrients and not productive in terms of aquatic and animal plant life;
2. **Mesotrophic**	Intermediate levels of nutrients, fairly productive in terms of aquatic animal and plant life and showing emerging signs of water quality problems;
3. **Eutrophic**	Rich in nutrients, very productive in terms of aquatic animal and plant life and showing increasing signs of water quality problems; and
4. **Hypertrophic**	Very high nutrient concentrations where plant growth is determined by physical factors. Water quality problems are serious and can be continuous.

Table 2: Criteria used to assign trophic status for dams and lakes in South Africa

Statistic	Unit	Current trophic status			
Median annual Chl *a*	µg/l	0<x<10	10<x<20	20<x<30	>30
		Oligotrophic (Low)	Mesotrophic (Moderate)	Eutrophic (Significant)	Hypertrophic (Serious)
% of time Chl a> 30µg/l	%	0	0<x<8	8<x<50	>50
		Negligible	Moderate	Significant	Serious

The cyanobacteria risk levels used in the report are based on the 2003 World Health Organisation (WHO) thresholds, and are defined as follows:

Low: 0 - 10 µg/L chlorophyll-a from cyanobacteria (less than 20 000 cells/L or 4 µg/L microcystin)

Medium: 10 - 50 µg/L chlorophyll-a from cyanobacteria (up to 100 000 cells/L or 20 µg/L microcystin)

High: 50 - 100 µg/L chlorophyll-a from cyanobacteria (up to 200 000 cells/L or 40 µg/L microcystin)

Very high: > 100 µg/L chlorophyll-a from cyanobacteria (> 200 000 cells/L or 40 µg/L microcystinThe average results of the eutrophication status and cyanobacteria risk level in various dams monitored from 1 April to 28 June 2022 within the WMA are tabulated below.

Table 3: Eutrophication status of the dams

Reservoir	No. of updates	Average chloro-phyll-a (µg/L)	Cyanobacteria risk level	Trophic Status	Recreational advisory	
					Partial contact	Full contact
Injaka Dam	38	2	Low	Oligotrophic	☺	☺
Kwena Dam	56	2	Low	Oligotrophic	☺	☺
Nooitgedacht Dam	49	5	Low	Oligotrophic	☺	☺

Vygeboom Dam	49	3	Medium	Oligotrophic		
Driekoppies Dam	46	1	Low	Oligotrophic		
Westoe Dam	49	2	Low	Oligotrophic		
Jericho Dam	47	4	Medium	Oligotrophic		
Heyshope Dam	49	2	Medium	Oligotrophic		
Morgenstond Dam	50	2	Low	Oligotrophic		
Corumana Dam	44	2	Medium	Oligotrophic		
Maguga Dam	43	2	Low	Oligotrophic		

The dams within the WMA were all oligotrophic (poorly enriched, with an average chlorophyll-a concentration of less than 10 µg/L). No cyanobacteria were detected at seven (7) dams that pose an immediate danger to human health for the reported period. 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. However, cyanobacteria were detected at a medium risk level at four (4) dams, posing an immediate risk to human health and it is recommended that full-contact use not be undertaken during the period, however, partial-contact use is safe.

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ANNUAL TARIFF CONSULTATIONS 2023/24

The Inkomati-Usuthu Catchment Management Agency (IUCMA) is required to submit the first draft of its Annual Performance Plan for 2023/24 to the Minister of Water and Sanitation by no later than 31 August 2022. This should include water resource management charges in respect of abstraction related water uses within its water management area for the 2023/2024 Financial Year starting on 1 April 2023.

This determination is done in terms of section 57(1) and (2) of the National Water Act 36 of 1998 read with paragraph 6.3 of the Pricing Strategy for Raw Water Use Charges published under Government Notice No. 201 of 16 March 2007 in Government Gazette No. 29697.
The Minister of Water and Sanitation may determine water use charges in terms of section 57(1) and (3) of the National Water Act read with Items and 8 of the Pricing Strategy for Raw Water Use Charges.

The following consultation meetings were arranged for interested persons and institutions.

DATE	TIME	VENUE	AREA
28 July 2022	09h30 for 10h00	Evangelical Presbyteran Church (Dwarsloop)	Sabie & Sand
29 July 2022	09h30 for 10h00	RCL Training Centre (Malelane)	Crocodile & Lower Komati
01 August 2022	09h30 for 10h00	Amsterdam Community Hall	Upper Komati & Usuthu
02 August 2022	10h00	Microsoft Teams (Virtual meeting)	Online

The draft 2023/24 Annual Performance Plan, including the draft 2023/24 Budget were submitted. Various presentations provided attendees insight into the establishment of the IUCMA and its powers and functions. In addition, the Department of Water and Sanitation provided some context regarding water use charges as determined by the Minister. These charges are earmarked to fund water resource development and use of waterworks as well as endeavour to provide equitable and efficient allocation of water.

This community participation was convened by the IUCMA as contemplated in section 80(e) of the National Water Act 36 of 1998. Interested parties who confirmed their availability received the documents via e-mail and at the venue on the day of the consultation meeting.

Know more about aquatic life. in dams, rivers and wetlands

The Importance of aquatic life in dams, rivers and wetlands

Freshwater bodies such as dams, wetlands, lakes and rivers are regarded as aquatic ecosystems. They provide habitat for a wide range of aquatic biota, including fish, macro-invertebrates and plants. They form an intricate food chain which results in a dependence upon each other for survival. The importance of such an ecosystem cannot be overemphasised considering that freshwater represents approximately 3% of the total water available on earth.

What role does aquatic life have in the ecosystem?

Aquatic ecosystems are important in the provision of ecosystem goods and services. This includes foods security, flood attenuation, water purification, groundwater recharge, nutrients recycling, and habitat provision. And most importantly, provision of water, which is recognised as an important natural resource. Freshwater ecosystems aid in food security through provision of food such as fish, which can be used for both subsistence and commercial purposes. The importance of a reliable water supply in agriculture for food production cannot be ignored. Wetlands are important natural features which aid in flood attenuation, water purification and through their sponge-like absorbing ability, they help with groundwater recharge.

What are the threats or dangers concerning aquatic life?

Freshwater ecosystems are under severe pressure from anthropogenic and natural activities. Anthropogenic activities refer to man-made activities which result in negative changes to both the habitat and biota in an ecosystem. These include pollution emanating from mining, agricultural and industrial. Such activities introduce pollutants into water bodies which cause deterioration of water quality. Other activities such as wastewater treatment works introduce micro biological organisms such as *E. coli* in the water. All these activities render water unusable for any purpose and the expense of treating the water prior to use are increased. The degradation of wetlands due to developments present add threats to aquatic ecosystems. Wetlands are important natural filters of water and their degradation leads to deteriorating water quality. Other threats include overutilisation of water, overfishing and introduction of invasive species which ultimately disrupts and displace indigenous populations of biota. Natural activities such as flooding, drought and climate change also present unavoidable threats to aquatic ecosystems. Flooding and drought are recurrent climatic events in arid regions such as South Africa. Floods lead to deterioration of habitat through sedimentation and subsequently it affects biota depending on the available habitat. The severity of environmental and structural damage caused by floods are generally increased by the degradation of wetlands. Drought, on the other hand, leads to reduced water quantity in dams and rivers, and as a result affect habitat availability and biota. Climate change is recognised as an emerging threat to aquatic ecosystems with a significant change in temperature expected cause disturbances in pollution and ecosystems in general.

By (from left to right) Mr Marcus Selepe, Dr Mthobisi Soko and Mr Mahlodi Dikgale from Resource Quality and Monitoring

ANNUAL WATER QUALITY STATUS REPORT
FOR THE INKOMATI USUTHU WMA 2021/22

By (From left to right) Mr Marcus Selepe and Ms Caroline Tlowana Resource Quality Monitoring

CHAPTER 1 INTRODUCTION AND BACKGROUND

1.1 Introduction

The Inkomati-Usuthu Catchment Management Agency (IUCMA) is the responsible authority within the jurisdiction of the Inkomati-Usuthu Water Management Area (WMA). The WMA is in the eastern part of the country and falls wholly within the Mpumalanga Provincial boundary as depicted in Figure 1 below as WMA three (3) of the nine (9) demarcated WMAs. The Inkomati-Usuthu WMA comprises of four catchments namely Sabie Sand, Crocodile, Komati and Usuthu catchment and is also part of international basins called the Incomati River Basin and Maputo River Basin. The water resources in the area are strategically important for international obligations as well as inter-basin transfers for power generation. As an authority, the IUCMA is responsible for managing, controlling, protecting, and monitoring water resources in its area of responsibility.

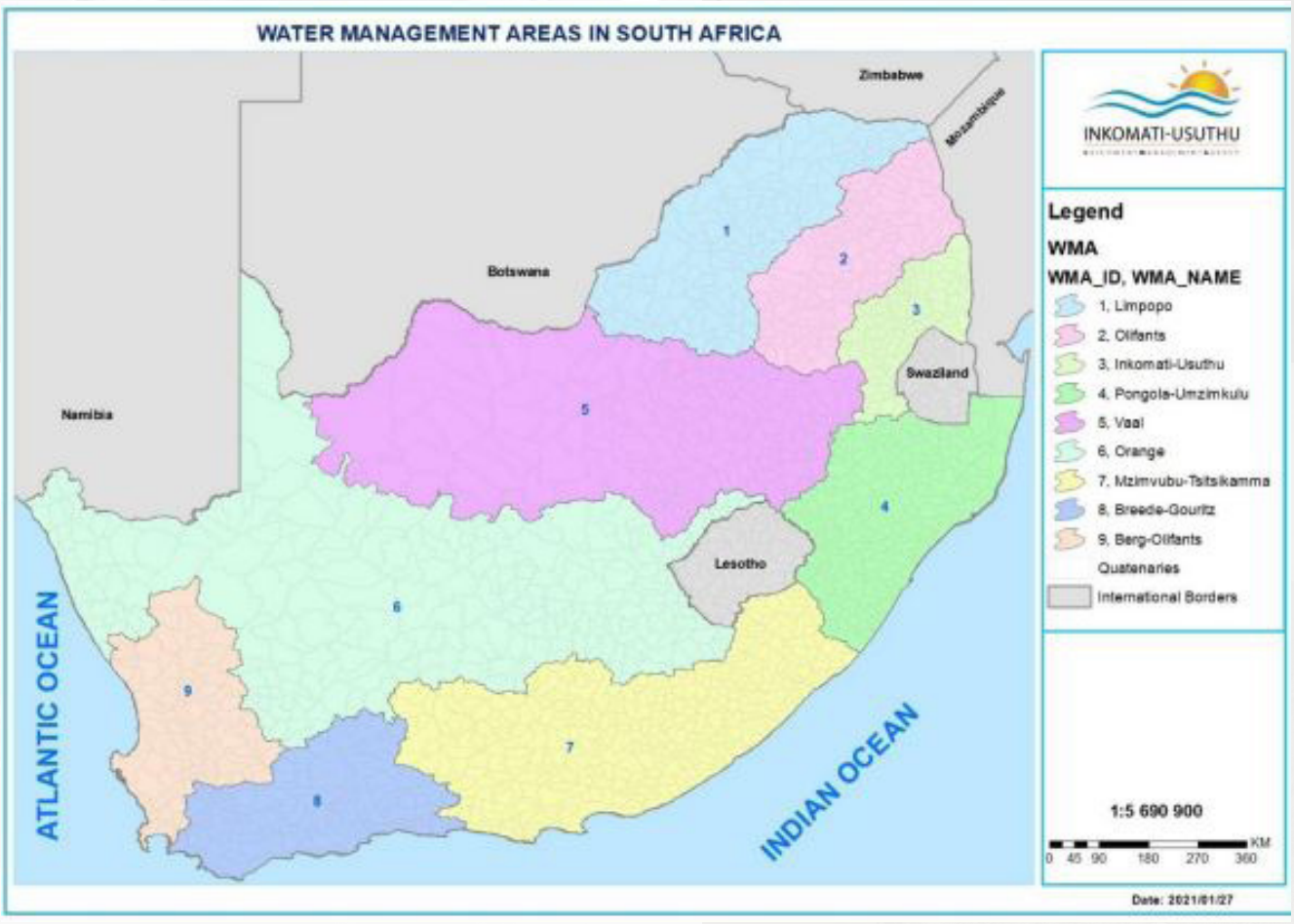

Figure 1: Map of South Africa indicating the nine WMA.

1.2 Background

National Water Act, Act 36 of 1998 (NWA) of South Africa Chapter 14: Requires the Minister to establish national monitoring systems for the collection of appropriate data and information that is adequate and responsive to the present and future challenges of efficient management of the country's water resources. The Inkomati-Usuthu Catchment Management Agency (IUCMA) conducts regional water quality monitoring in the Inkomati-Usuthu WMA which feeds into the national monitoring system.

Water quality is vital as it determines fitness for uses and the protection of the health and integrity of aquatic ecosystems and is described as chemical, physical, and biological characteristics of water (DWS, 1996).
Surface water quality within Inkomati-Usuthu WMA is measured by means of physio-chemical, microbiological and eutrophication monitoring programme(s) conducted monthly through grab sampling and continuous monitoring technique(s). The samples are then submitted to a South African National Accreditation System (SANAS) accredited laboratory for analysis. The variables of concern differ from catchment to catchment and are based on the types of activities occurring within a specific catchment.

Eutrophication monitoring information is conducted only in major dams within the WMA. Eutrophication is the process of excessive nutrient enrichment of waters that typically results in problems associated with macrophyte, algal or cyanobacterial growth.

Water quality is linked with water quantity, instream and riparian habitat and aquatic biota integrity, which are collectively referred to as "resource quality" in terms of the NWA. Resource quality needs to be maintained within certain pre-determined parameters to enable continuous sustainable economic growth and social development.

The pre-determined parameters are Resource Directed Measures (RDM) represented by the Resource Management Class, Resources Quality Objectives (RQOs) and the Reserve. For this report, only Water Quality Component of the resource quality was assessed in relation to pre-determined parameters.
The RDM has been determined and gazetted within Inkomati-Usuthu WMA, except for Usuthu catchment.

The comprehensive ecological Reserve determination study was completed in February 2006, however gazetted into law in July 2019 by government notice No. 998 and the classification and setting of the RQOs studies were completed in April 2015 and gazetted into law in December 2016 by government notice No. 1616, respectively.
The water quality status and compliance within the WMA was evaluated against RQOs and where not available the Target Water Quality Guideline limits (TWQG) will be used. RQOs are intended to give effect to the management class and the ecological needs determined in the reserve to assist resource managers on the protection of the resource.

INFORMATION CONTINIOUS ON PAGE 30 AND 31

The major watercourses within Inkomati-Usuthu WMA form part of the Incomati and Maputo River Basins. Water quality conditions of the ten (10) major watercourses within Inkomati-Usuthu WMA are assessed as part of information and data sharing in terms of Interim Inco-Maputo Basin Agreement (IIMA) for co-operation on the protection and sustainable utilisation of these shared watercourses. Water quality compliance status of international obligation sites will be evaluated against the water quality guidelines resolution of the tripartite permanent technical committee on exchange of information and water quality.

The purpose of the report is to assess and report the water quality status, trends and compliance with the set standards/objectives in the water resource, in a manner that supports balanced decision making and planning to support sustainable development within the Inkomati Usuthu WMA.

1.3 Objectives

• To provide information on the status and trends in terms of the physio-chemical and microbial quality of surface water resources within the Inkomati Usuthu WMA.
• To determine the trophic status of major dams within the Inkomati Usuthu Water Management Area.
• To determine compliance status of applicable variables at Ecological Water Requirements (EWR) Sites and water quality priority Resource Units (RU) with Resource Quality Objectives (RQOs); and
• To determine water quality compliance status at International Obligation sites with the set values in terms of the Interim Inco-Maputo Agreement (IIMA).

CHAPTER 2 METHODOLOGY

2.1 Study Area

The physical, chemical and microbiological programme of water resources takes place within the jurisdiction of the Inkomati-Usuthu WMA and comprises of Sabie/Sand Catchment, Crocodile Catchment, Komati Catchment and Usuthu Catchment as illustrated in Figure 2 below. The IUWMA is situated in the north-eastern part of South Africa in the Mpumalanga Province. It borders on Mozambique in the east and on eSwatini in the south-east.

The water management area extends over several parallel river catchments which all drain in a general easterly direction, and flow together at the border with Mozambique or within Mozambique, to form the Incomati River which discharges into the Indian Ocean immediately North of Maputo at Villa Laisa, while the Usuthu River confluences with Pongola River to form the Maputo River which discharges into the Indian Ocean South of Maputo and is called Maputo basin.

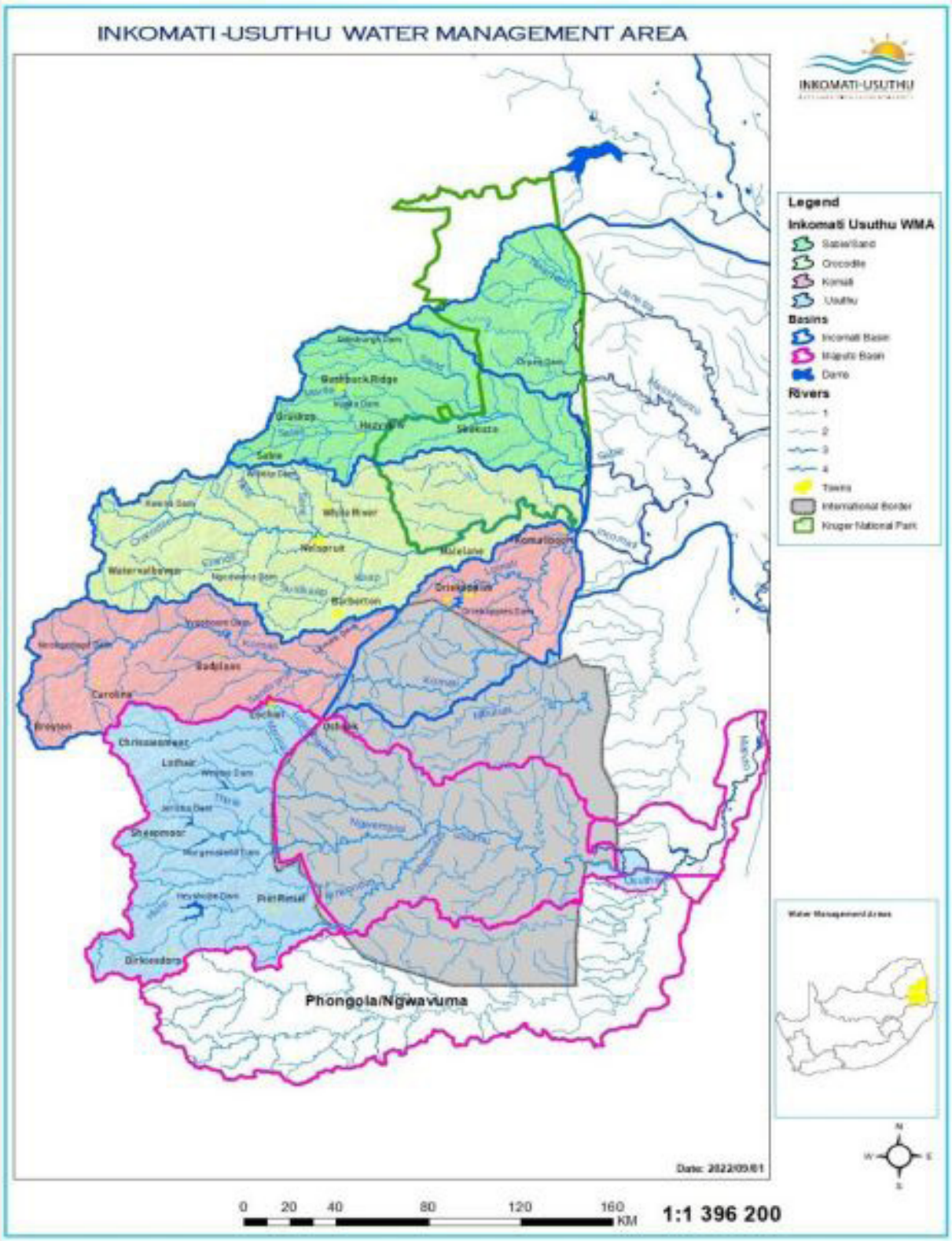

Figure 2: Inkomati-Usuthu Water Management Area

Download the detailed report available on the IUCMA website: www.iucma.co.za

INKOMATI-USUTHU
CATCHMENT MANAGEMENT AGENCY

Illegal Sand Mining in a watercourse is an offense and is prohibited

To report please call IUCMA @ 013 753 9000

WATER
SAVING TIPS

Kettles should
not be filled
to the brim but with just enough water for your needs. This will reduce your electricity bill too.

Taking a bath can use between
80 and 150
litres of water per bath.

Do not overfill
containers like pots, as this may result in using more energy to heat the water.

Fix a **leaking toilet** otherwise it can waste up to
100 000 litres.

LEARNERS CORNER

CIVIL ENGINEERING CONTRIBUTION IN WATER RESOURCE MANAGEMENT

What is Civil Engineering in Relation to Water Resource Management?

Civil engineering is a very versatile field which comprises of various disciplines such as transportation engineering, structural engineering, construction management, environmental engineering, geotechnical engineering, urban engineering, and water engineering. Water engineering is the main focus discipline that contributes in Water Resource Management (WRM) through planning, designing, maintaining, and managing the water-related infrastructures. The infrastructure, equipment, and systems for water resource management such as dams, canals and weirs are constructed under the supervision of a civil engineer (CE).

What Role does Civil Engineering Play in Fulfilling the Purpose of the National Water Act, Act 36 of 1998?

The CE ensures that the purpose of the National Water Act (NWA) according to section 2, protecting, developing, conserving, and managing the nation's water resources are met through the proper planning, designing, maintaining, and managing the water related infrastructures. The commissioning of Water and Waste Water Treatment plants are planned, designed, and managed by CEs to meet the basic human needs of present and future generations. According to the Constitution of South Africa, supplying water that is free of contamination is a basic human need. In essence, the CE ensures the sustainable use of water resource by conserving water through the construction of dams, reservoirs, weirs and conveying water to users. The CEs planning ensures holistic, integrated management of water which balances the growing demand for water use.

In addition to section 2(j) of the NWA, a CE solely promotes dam safety and ensures the public is protected from the safety risk of the dam wall breaking. Chapter 12 of the NWA allows the CE to be the only Approved Professional Person (APP) registered at the Engineering Council of South Africa (ECSA) with a duty of care towards the state and the general public. The APP contributes intensively to the conservation and impoundment of a nation's water resource through the conduction of dam safety evaluation and reports. It can never be denied that South Africa (SA) is a water scarce country and the Department of Water and Sanitation (DWS) conserves this scarce natural resource called water through the construction of dams owned by the state. These dams are designed, constructed, monitored, and maintained by CEs who are also APPs. The responsibilities of APPs pertaining to dams with safety risks are stipulated in section 119 of Chapter 12 in the NWA.

The Importance of knowing the Volume of Water within a Catchment Area

Since SA is a water scarce country, it is very exigent to know the quantity or the volume of water within a catchment in that specific water management area. CEs in conjunction with hydrologists play a very critical role in ascertaining the stream flow in a catchment. The result from the hydrological assessment carried out with the intention of quantifying the flow or volume of water in a catchment assists in promoting equitable access to water. The Water Responsible Authority and Catchment Management Agencies use such information to authorise the appropriate quantity of water to the prospective water users (applicants).

By Mr Mfundo Dlamini from Water Use Authorisation

10 Critical and Grievous Diseases Caused by Water Pollution

Water is a necessity in our daily lives. Nonetheless, its access and availability in many parts of the world has been very difficult because of the contamination caused by water pollution. Pollution by chemicals and other toxic substances has contributed to unhygienic ColdFusion of the surface or groundwater systems and as such, people have contracted serious water-borne diseases.

Many people around the world have at one point been victims of the diseases caused by water pollution either after consuming or bathing in polluted water. Some have also suffered after consuming plant or animal food that lives or has been raised by polluted water. Here are **17 critical and grievous diseases caused by water pollution**.

1. Cholera

Cholera is a serious intestinal tract infection caused by bacteria called *vibrio cholerae*. It leads to acute diarrhoea, dehydration, and it can sometimes cause death. An individual gets cholera by washing or consuming contaminated water or eating food washed or irrigated with contaminated water. The symptoms of cholera include vomiting, headache and abdominal cramps. In highly polluted areas, one infected person can contaminate the water with the disease causing bacteria and affect the whole population.

2. Diarrhoea

Diarrhoea is a disease that causes frequent and watery bowel movements. It manifests as a result of intestinal infection or food poisoning by drinking contaminated water with pathogens from animal or human waste. In most cases, it is caused by water-borne bacteria, viruses and protozoans and is one of the common diseases caused by water pollution. Diarrhoea leads to dehydration, loss of electrolytes, and death in infants and young children.

3. Typhoid

Typhoid is a serious bacterial infection distinguished by acute intestinal ulceration and infection. The bacteria responsible for the infection is known as *salmonella typhosa*. It usually affects one by washing or consuming contaminated water or ingesting food washed with contaminated water. Its symptoms include nausea, loss of appetite and headache and affects approximately 12 million people throughout the world every year.

4. Amoebiasis (Traveller's Diarrhoea)

Just like diarrhoea, Amoebiasis is among the most prevalent diseases caused by water pollution. Also termed as Traveller's Diarrhoea, one suffers the disease by consuming water contaminated with amoeba protozoa. Apart from infecting the large intestine, it can also infect the liver. Amoebiasis symptoms include mild or severe diarrhea with mucus and blood. The likelihood of acquiring amoebiasis are increased as a result of using contaminated water by sewage, poor hygiene, consumption of non-treated water and the presence of flies.

5. Dysentery

Dysentery is an intestinal infection marked by acute diarrhoea with blood and mucus. The disease can also cause vomiting, fever and abdominal pain. It is acquired when one washes with or consumes contaminated water or by eating food washed with contaminated water. It is a bacterial disease and can therefore be prevented by drinking clean water and maintaining good hygiene.

6. Schistosomiasis (Bilharzia)

Schistosomiasis (bilharzia) is caused by parasitic worms that develop in water. Hence, whenever the worms are in a water body, they can penetrate the skin of those washing, swimming or wading in the contaminated water. Once in the body, they can cause infections and damage to the intestines, bladder and the liver. Some types of freshwater snails may also carry the schistosomiasis worms and eggs. The disease affects about 200 million people globally.

7. Cancer

Waters heavily polluted with chemicals such as MTBE and chlorinated solvents increase the risks of getting cancer when one drinks from such water sources. The chemicals damage the DNA which causes cancer tumours. The disease is associated with high medical treatment costs, chronic pain, and death. Cancer has claimed the lives of many people across the world.

8. Hepatitis

Hepatitis is a highly infectious disease that affects the liver. It is acquired through ingestion of water contaminated with the hepatitis virus. Eating food washed with contaminated water can also spread the disease. Its symptoms include abdominal pain, jaundice, depression, fatigue, nausea, weight loss, and fever.

9. Intestinal Worms

Intestinal worms are parasites which can be transmitted by drinking contaminated water or consuming food washed with contaminated water. The types of intestinal worms include whipworms, hookworms, and roundworms/helminthes. The worms are responsible for retarded growth, anaemia and malnutrition especially in children. Intestinal worms affect about 10% of the population with the majority being children.

10. Dracunculiasis (Guinea Worm Disease)

Dracunculiasis is among the serious diseases caused by water pollution. It is also referred to as Guinea worm disease and is very common in Africa. A person is infected by the worm after drinking water contaminated with the larvae. The larvae then develop into a full-grown adult worm and later exits the body after approximately one year. A fully grown Guinea worm can extend up to a meter long and upon leaving the body, they leave one with incapacitating ulcers.

PROVIDING ACCESS TO CLEAN WATER A PRIORITY

The Inkomati-Usuthu CMA must ensure proper management of the resource at the local level involving stakeholders. We do not provide water services, but work with water services, making sure, the resource that they use and give to people is protected, clean and safe.

The IUCMA investigates and advise, as well as empower stakeholders on water use and do verification and validation to authorise whether people have the right to use water. The IUCMA must monitor water allocation, which is a challenge as the Kwena Dam that supplies an area from Nelspruit to Mozambique is not big enough to release water for all the people. The impact of drought on our planning activities in the past year has been bad for us. We have international obligations to honour, with an agreement to supply a certain volume of water to the other side of the Crocodile and Komati rivers across the Mozambique border. We do not have enough water storage for the region, as we also share water with Swaziland and Mozambique. As the first CMA in the country, we are proud of what we have achieved so far. The compilation of the CMS; reduction of pollution in the water management area; empowering stakeholders, especially historically disadvantaged individuals (HDIs) to understand issues of water resources; management and legislation; verification and validation of water uses; Water Use Authorisations and bringing stakeholders together. We have also assisted schools by providing water as part of our Corporate Social Investment.

CAREER GUIDANCE

FOR LEARNERS IN WATER RESOURCE MANAGEMENT

By Ms Charmaine Zulu from Communication & IGR

The Inkomati-Usuthu Catchment Management Agency (IUCMA) is an agency that has been established in terms of the relevant section of the National Water Act, Act 36 of 1998. The IUCMA has been established by the National Department of Water Affairs (DWA) in terms of the Act, to specifically implement certain sections of the Act. The mentioned sections of the Act address the management, protection, development and prevention of pollution of the national water resources.

The IUCMA is the first agency to be established by the DWA in the Mpumalanga area. The IUCMA has the responsibility to protect and manage the Crocodile River, Sabie, Inkomati Rivers and their tributaries within the Inkomati Water Management Area.

Career options and study opportunities in the form of financial assistance are offered by IUCMA. Since the IUCMA is a science focused institution, subject choices during high school should include science, geographical sciences, biological sciences and mathematics.

The breakdown of career choices offered by the IUCMA is indicated below:

1. Water Resource Specialist/Manager

Academic qualifications:

1.1. Bachelor of Science degree in (Aquaculture; Biology; Chemistry; Chemical Engineering; Biochemistry; Microbiology, Limnology; Zoology; Botany; Civil Engineering)

1.2. Bachelor of Science in Environmental Sciences (Geography; Geographical Information System; Geology)

1.3. Bachelor of Technology Water Care

1.4. Bachelor of Technology Analytical Chemistry

2. Hydrologist

Academic qualification:

2.1. Bachelor of Science (Hydrology; Hydrological Modelling; Water Quality Modelling)

3. Aquatic scientist

Academic qualification:

3.1. Bachelor of Science (River Health; Aquaculture; Bio-monitoring; Water and Waste Water; Water Quality Management; Zoology; botany; Limnology)



4. Water Resources Planners
Academic qualification:
4.1. Bachelor of Science/Engineering (Water Engineering; Chemical; Waste Water Treatment; Water Resources Modelling)

5. Water Resources Compliance Monitoring and Enforcement
Academic qualifications:
5.1. Bachelor of Science degree in (Biology; Chemistry; Chemical Engineering; Biochemistry; Microbiology, Environmental Law; Hydrology; Geohydrology; Civil Engineering

5.2. Bachelor of Science in Environmental Sciences in (Geography; Environmental Law, Geographical Information System)

5.3. Law degree (Environmental Law)

6. Geohydrologist
Academic qualifications:
6.1. Bachelor of Science (Hydro-geology; Hydrology)

6.2. Bachelor of Technology (Geo-hydrology; Hydrology; Water Resources Modelling; Water Quality Management)

7. Stakeholder Management
Academic Qualifications:
7.1. Bachelor of Arts (Developmental Studies; Public Administration; Public Management; Social Studies)

7.2. Bachelor of Technology (Developmental Studies; Public Administration; Public Management)

LIST OF SOUTH AFRICAN UNIVERSITIES

EASTERN CAPE

NELSON MANDELA UNIVERSITY

Tel: 041 504 1111
Website: www.mandela.ac.za
Email: info@mandela.ac.za

RHODES UNIVERSITY
Where leaders learn

Tel: 046 603 8148
Website: www.ru.ac.za
Email: registration@ru.ac.za

WSU
Walter Sisulu University

Tel: 047 502 2200
Website: www.wsu.ac.za
Email: postmaster@wsu.ac.za

University of Fort Hare
Together in Excellence

Tel: 040 653 2312
Website: www.ufh.ac.za
Email: admissions@ufh.ac.za

NORTHERN CAPE

SOL PLAATJE UNIVERSITY

Tel: 018 299 1111/2222
Website: www.nwu.ac.za
Email: information@spu.ac.za

"For more Universities view page 36 and 37"

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University of Venda
Creating Future Leaders

Tel: 015 962 8000
Website: www.univen.ac.za
Email: info@univen.ac.za

UNIVERSITY OF LIMPOPO

Tel: 015 268 9111
Website: www.ul.ac.za
Email: enrolment@ul.ac.za

FREE STATE

Central University of Technology, Free State

Tel: 051 507 3911
Website: www.cut.ac.za
Email: tomttomple@cut.ac.za

UFS·UV
UNIVERSITY OF THE FREE STATE
UNIVERSITEIT VAN DIE VRYSTAAT
YUNIVESITHI YA FREISTATA

Tel: 051 401 2114
Website: www.ufs.ac.za
Email: Studentadmin@ufs.ac.za

KWAZULU NATAL

DUT
DURBAN UNIVERSITY OF TECHNOLOGY

Tel: 031 373 2411
Website: www.dut.ac.za
Email: info@dut.ac.za

UNIVERSITY OF KWAZULU-NATAL

Tel: 031 260 2227
Website: www.unizulu.ac.za
Email: enquiries@ukzn.ac.za

UNIVERSITY OF ZULULAND

Tel: 035 902 6000
Website: www.ukzn.ac.za
Email: info@unizulu.ac.za

MUT
MANGOSUTHU UNIVERSITY OF TECHNOLOGY

Tel: 031 907 7111
Website: www.mut.ac.za
Email: info@mut.ac.za

NORTH WEST

NWU®
NORTH-WEST UNIVERSITY
NOORDWES-UNIVERSITEIT
UNIBESITI YA BOKONE-BOPHIRIMA

Tel: 018 299 1111/2222
Website: www.nwu.ac.za
Email: applicationsug@nwu.ac.za

MPUMALANGA

UNIVERSITY OF MPUMALANGA

Tel: 018 299 1111/2222
Website: www.nwu.ac.za
Email: info@ump.ac.za

GAUTENG

UNIVERSITY OF THE WITWATERSRAND JOHANNESBURG

Tel: 011 717 1102
Website: www.wits.ac.za
Email: studentaffairs@wits.ac.za

UNISA
UNIVERSITY OF SOUTH AFRICA

Tel: 012 429 3111
Website: www.unisa.ac.za
Email: study-info@unisa.ac.za

Tshwane University of Technology
We empower people

Tel: 021 382 5911
Website: www.tut.ac.za
Email: info@ump.ac.za

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Tel: 012 420 4111
Website: www.up.ac.za
Email: ssc@up.ac.za

VUT
Vaal University of Technology
Your world to a better future

Tel: 016 950 9214/5
Website: www.vut.ac.za
Email: reception@vut.ac.za

UNIVERSITY OF JOHANNESBURG

Tel: 011 489 3000
Website: www.uj.ac.za
Email: mylife@uj.ac.za

WESTERN CAPE

UNIVERSITY of the WESTERN CAPE

Tel: 021 959 3900
Website: www.uwc.ac.za
Email: admissions@uwc.ac.za

University of Cape Town • iYunivesithi yaseKapa • Universiteit van Kaapstad

Tel: 021 650 9111
Website: www.uct.ac.za
Email: admissions@uct.ac.za

UNIVERSITEIT STELLENBOSCH UNIVERSITY

Tel: 021 808 9111
Website: www.sun.ac.za
Email: info@sun.ac.za

Cape Peninsula University of Technology

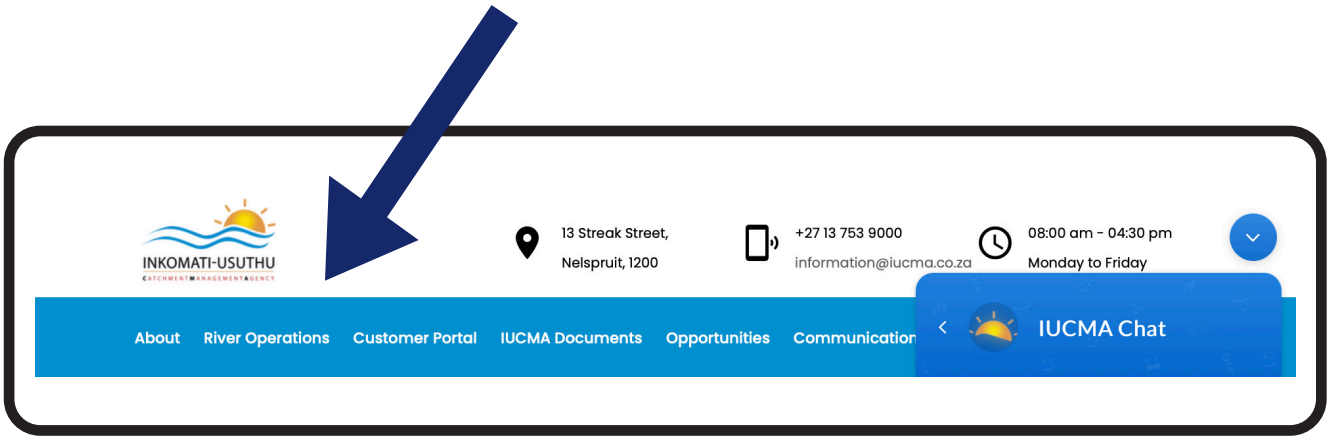
Tel: 021 959 3900
Website: www.cput.ac.za
Email: info@cput.ac.za

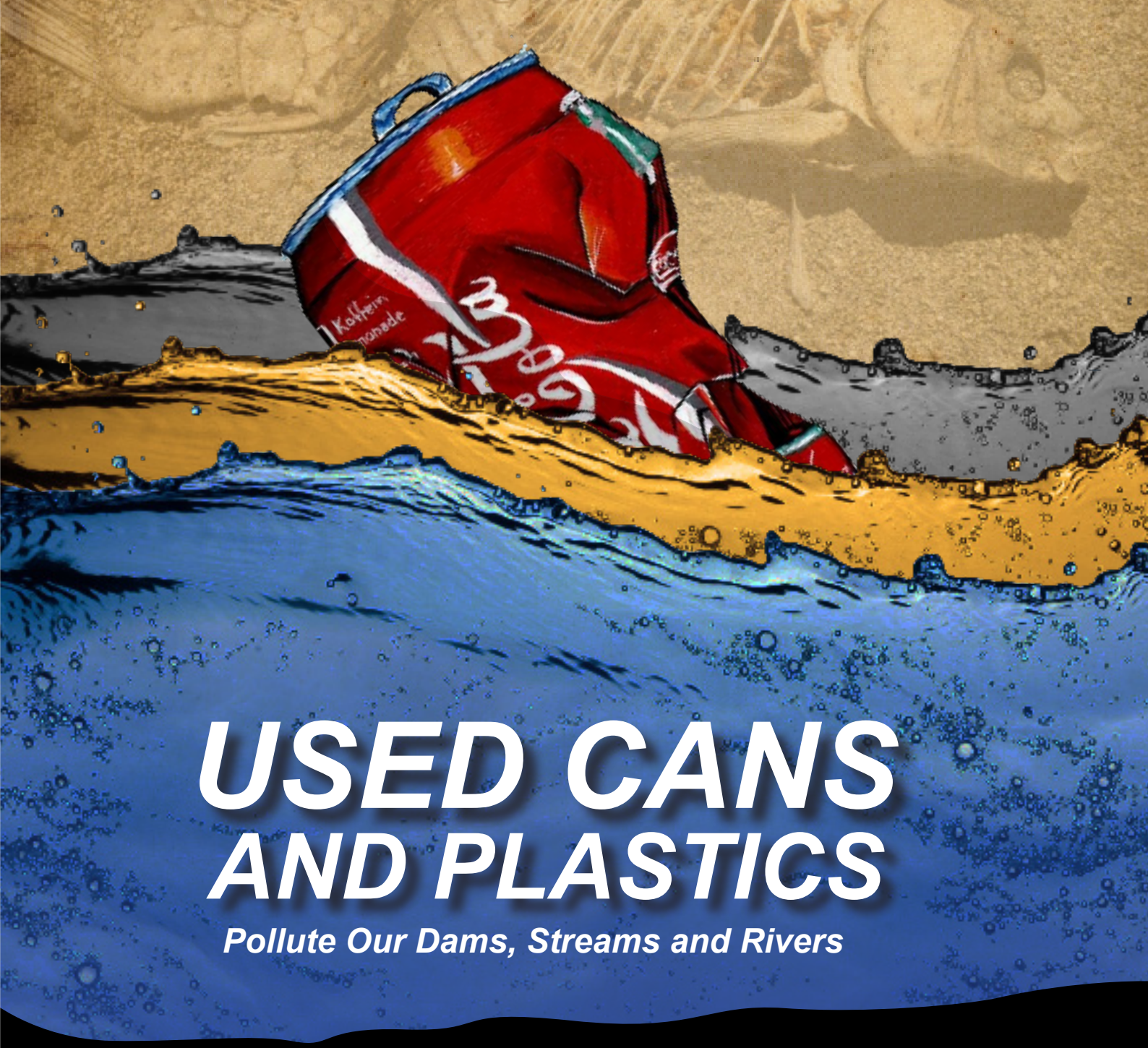
RIVER OPERATIONS WEB PORTAL

The Inkomati-Usuthu Catchment Management Agency is committed to bring you all the information you need to enable you to use water wisely and considerably. The IUCMA has established a web portal for River Operations that brings you the daily flows of the water in the Catchment. To gain access to this information, please log on to

http://riverops.inkomaticma.co.za/

The link to the River Operations portal is also available on the website at www.iucma.co.za to access it go to the **home page of the IUCMA website. click Hydrology water quality status then click the river operations web portal link**





USED CANS AND PLASTICS

Pollute Our Dams, Streams and Rivers

Take action agaisnt pollution and be involved in cleaning campaigns

Tel: 013 753 9000 | Website: www.iucma.co.za

Inkomati-Usuthu CMA, your partner in water management

INKOMATI-USUTHU
CATCHMENT MANAGEMENT AGENCY

Private bag X11214,
Mbombela, 1200

Suite 801, The MAXSA Building,
13 Streak Street, Mbombela, 1200

Tel: 013 753 9000
www.iucma.co.za

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