

WATER NEWS

2019/20 1ST EDITION

DAY

PROTECTING OUR
ENVIRONMENT

WATER SAVING TIPS

WETLANDS
AWARENESS

HHOYI
CAREER
EXPO

SAVE
WATER
SAVE LIFE

RESEARCH & DEVELOPMENT
INITIATIVES IN THE IUCMA

IUCMA DONATES A BOREHOLE TO JERICHO FARM

CELEBRATING THE LIFE OF THE GLOBAL ICON



INKOMATI-USUTHU
CATCHMENT MANAGEMENT AGENCY

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 our environment

VALUES

Integrity
Customer Orientation (Batho pele)
Efficiency
Accountability
Diversity
Transparency

SLOGAN:

“IUCMA, YOUR PARTNER IN WATER MANAGEMENT”

<p>EDITORIAL TEAM</p> <p>EDITOR: Ms Sylvia Machimana</p>	<p>ARTICLES AND OTHER INFORMATION CONTRIBUTIONS:</p> <p>Mr Sizile Minisi (Pages 10, 24, 26, 32, 36, 38)</p> <p>Mr Marcus Selepe (Page 12 and 20)</p> <p>Mr Mthobisi Soko (Page 12)</p> <p>Mr Advocate Gumbi (Page 16 and 32)</p> <p>Mr Hasani Makhubele's article (Page 22)</p> <p>Dr Tendai Sawunyama (Page 28) Mr Siphon Magagula (Page 28)</p> <p>Mr Mahlodi Dikgale (Page 34)</p>
<p>LAYOUT & DESIGN:</p> <p>Mr Advocate Gumbi</p>	

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FOREWORD

BY THE CEO

Dr Thomas Gyedu-Ababio



Colleagues and comrades in water, I say welcome to the summer of 2019. Our water situation has been bad for the past few years. We are in summer and the prospects of rain on our side of the country is not looking good. We should therefore be very conscious of how we use the little that we have. Let us conserve water in all its forms.

The IUCMA has got a new Governing Board. The new board has a mixture of young, matured, experienced and technical capabilities. Let us welcome them into the IUCMA as part of our stakeholders that we can look up to for assistance in our water management activities.

Our Catchment Management Forums are functioning and I will advise all water users and stakeholder groupings in our water management area to become members of the forums to advance the interest of water resources management. We continue to appreciate your contributions in the various catchment management forums: the awareness campaigns, river cleaning programmes and the science programmes initiated by the IUCMA. The impact of climate change is affecting the hydrology of our water management area. We can only survive the threat of climate change if we work as a collective to create awareness and adopt adaptation techniques. We constantly monitor the health of the river ecosystems and we pledge to continuously provide you with our findings.

I say a big thank you to all our stakeholders who have been paying their water use charges. Please, help us to help you. The monies you pay as water use charges enable us to undertake various water resource projects in our water management area.

I conclude by thanking all our stakeholders for your contributions towards water resource management in our water management area in one way another. If we all come together, we can make water work. Contribute your quota.





CATCHMENT MANAGEMENT FORUMS LEADERSHIP BY SUB-CATCHMENTS

CROCODILE CMF

- Chairperson: Mr Steven Mallory
- Deputy Chairperson: Mr Greg Beyers
- Coordinator: Ms Debbie Turner

UPPER KOMATI CMF

- Chairperson: Prof Kevin Rogers
- Coordinator: Elelwani Nethavhani

LOWER KOMATI CMF

- Chairperson: Ms Nombulelo Mkhize
- Deputy Chairperson: Mr Frank Madonsela
- Coordinator: Ms Dumisile Mthembu
- Additional member: Vacant

USUTHU CMF

- Chairperson: Mr Peter Venter
- Deputy Chairperson: Ms Sibonelolesihle Ngema
- Secretary: Ms Nature Khumalo
- Coordinator: Mr Vusi Mnyandu
- Coordinator: Ms Rachel Ngwenya

SAND CMF

- Chairperson: Mr Hamilton Mnisi
- Deputy Chairperson: Ms Faith Madzibile
- Secretary: Mr Speaker Mahlake
- Treasure: Ms Lizy Mthabini
- Additional member: Mr Reckson Mogakane

SABIE CMF

- Chairperson: Mr Sizile Ndlovu
- Deputy Chairperson: Mr December Ndhlovu
- Secretary: Mr Shadrack Gazide
- Deputy Secretary: Mr Esther Modiba
- Additional member: Mr Douglas Mboweni
- Additional member: Mr Themba Mashaba
- Additional member: Mr Pieter Maider
- Additional member: Mr Kobus van Nuwe Huizen
- Additional member: Mr John Mkhonto
- Additional member: Mr Jackson Mdluli



Editor's NOTE

Dear valued stakeholders

Another warm welcome to yet another edition of Water News 2day!

This news comes at a time when we celebrate the appointment of the new Governing Board. This is captured on page nine. This governing board is a melting pot of the age and colour spectrum of the new South Africa. Young, fresh, and dynamic minds have boarded this train and we are looking forward to an eventful 5 years during their tenure. The chairperson of the board, Ms Patience Nyakane-Maluka has led the IUCMA since inception, for almost 15 years. Her appointment at the IUCMA ran concurrently with her chairpersonship and the former Bushbuckridge Water Board, which she also led for many years. It was through her leadership, together with her team, that the IUCMA boast clean audits for the past 15 years.

Please join me in test driving our QR code for the IUCMA website. QR Scanners can be downloaded from your App store or Play store for free. We are trying to go digital. All reports can be downloaded from our website.



I would also like to take this opportunity to congratulate Ms Thembelihle Mjaji-Mbatha CA(SA) and Dr Jennifer Molwantwa for their nominations as to public sector leaders by Impumelelo Top Media award and Standard Bank Top Women award respectively. This showcases the leadership and expertise within the IUCMA. It is human nature to take people for granted but it becomes commendable when someone outside of your organisation notices their worth. This will be covered in the next edition. Make it a date with your special copy.

The IUCMA slogan is 'the Inkomati-Usuthu CMA, your partner in water management'. This simply means that we rely on partnering with you to achieve our goals. The National water Act also identifies stakeholder participation as one of the major components in integrated water resource management. We therefore look forward to hearing from you with suggestions, fears, and concerns so that we can be able to improve on what we are already doing to make it even better. One of our main platforms for stakeholder engagement is the Catchment Management Forums. You will find in this newsletter contact information and pre-scheduled meeting dates for each of our forums. Please get in touch with us to get more information regarding the forums.

Once again, this publication gives you a glimpse of the latest ecological status of the Crocodile River catchment (you can find this on page18-20). It is one of the core mandates of the IUCMA to maintain healthy ecosystems throughout the water management area. On an annual basis, the IUCMA embarks on a thorough study of at least one sub-catchment and compile a comprehensive report that is accessible to all stakeholders. Reports can be collected from our offices in hard copy or CD. Electronic copies can be downloaded from the IUCMA website.

Wishing you a pleasant read.

Regards,

Sylvia Machimana

CATCHMENT MANAGEMENT FORUMS

Catchment management forums (CMFs) are voluntary non-statutory bodies with open membership providing a voice for catchment residents, particularly people who in the past have had little say over the management of resources.

The existence of catchment management forums means that other organisations do not have to set themselves up as consultative bodies, but rather should be represented in the local catchment management forum and may exercise their participatory requirements under the NWA through these forums. The forums are in position to explore water-related issues in their respective regions in a holistic manner, engaging with stakeholders through catchment management forums.

It is expected that these forums can serve as feasible platforms to ensure that a balance is found between the strong, frequently well-organised and resourced “voice” of large scale water users and relatively under resourced, less represented and organised small-scale water users. CMFs are appropriate vehicles to foster cooperative governance between the CMA's, local government, and other stakeholder interest groups, in the interests of integrated management to support Water Resource Management.

Catchment Forum of Forums Meetings

Quarter	Date	Venue
First Quarter	08/06/2019	Nelspruit
Second Quarter	06/09/2019	Nelspruit
Third Quarter	26/11/2019	Nelspruit
Fourth Quarter	20/03/2020	Nelspruit

ITINERARY FOR CATCHMENT MANAGEMENT FORUMS INKOMATI-USUTHU CMA 2019/20

Forum	Date	Coordinator
Sand CMF	10/05/2019	Ms Assah Thibela & Mr Solly Ndlovu
Sabie CMF	17/05/2019	Ms Nomsa Maider
Lower Komati CMF	21/05/2019	Ms Liketso Khaile
Crocodile CMF	24/05/2019	Ms Gugu Motha
Upper Komati CMF	27/05/2019	Mr Tony Sibiya
Usuthu CMF	28/05/2019	Mr Sbonangaye Mkhathswa & Mr Thabiso Nkosi
Sand CMF	13/08/2019	Ms Assah Thibela & Mr Solly Ndlovu
Sabie CMF	16/08/2019	Ms Nomsa Maider
Lower Komati CMF	20/08/2019	Ms Liketso Khaile
Crocodile CMF	23/08/2019	Ms Gugu Motha
Upper Komati CMF	26/08/2019	Mr Tony Sibiya
Usuthu CMF	27/08/2019	Mr Sbonangaye Mkhathswa & Mr Thabiso Nkosi
Sand CMF	11/11/2019	Ms Assah Thibela & Mr Solly Ndlovu
Sabie CMF	15/11/2019	Ms Nomsa Maider
Lower Komati CMF	19/11/2019	Ms Liketso Khaile
Crocodile CMF	22/11/2019	Ms Gugu Motha
Upper Komati CMF	25/11/2019	Mr Tony Sibiya
Usuthu CMF	26/11/2019	Mr Sbonangaye Mkhathswa & Mr Thabiso Nkosi
Sand CMF	11/02/2020	Ms Assah Thibela & Mr Solly Ndlovu
Sabie CMF	14/02/2020	Ms Nomsa Maider
Lower Komati CMF	18/02/2020	Ms Liketso Khaile
Crocodile CMF	21/02/2020	Ms Gugu Motha
Upper Komati CMF	24/02/2020	Mr Tony Sibiya
Usuthu CMF	25/02/2020	Mr Sbonangaye Mkhathswa & Mr Thabiso Nkosi

Mr Joseph Mabunda (Manager: Institutions & Participation)	078 456 3402	mabundaj@iucma.co.za
Mr Hasani Makhubele (Assistant Manager: Institutions & Participation)	062 156 5050	hasanim@iucma.co.za
Ms Nomsa Maider (Community Officer: Sabie)	078 459 0348	maidern@iucma.co.za
Ms Assah Thibela (Community Officer: Upper Sand)	078 451 0166	thibelaa@iucma.co.za
Mr Solly Ndlovu (Community Officer: Lower Sand)	078 459 0344	ndlovusolly@iucma.co.za
Mr Tony Sibiya (Community Officer: Upper Komati)	078 803 5276	sibiyat@iucma.co.za
Ms Liketso Khaile (Community Officer: Lower Komati)	078 459 0344	khail@iucma.co.za
Ms Gugu Motha (Community Officer: Upper Crocodile)	078 459 0349	mothag@iucma.co.za
Mr Sbonangaye Mkhathswa (Community Officer: Southern Usuthu)	061 337 2715	mkhathswas@iucma.co.za
Mr Thabiso Nkosi (Community Officer: Northern Usuthu)	064 757 9254	nkosith@iucma.co.za

IUCMA GOVERNING BOARD

2019-2023



Ms T.P. Nyakane-Maluka
Chairperson



Mr M.S. Mthembu
Deputy Chairperson



Ms L.M. Skhakhane
Member



Mr M. Gangazhe
Member



Ms S.D. Wiggins
Member



Adv M.B. Shabangu
Member



Mr P.A. Tshabangu
Member



Ms L.C. Zulu
Member



Dr T. Kelly
Member



Dr T.K. Gyedu-Ababio
Ex officio Member

NATIONAL WATER WEEK IN THE INKOMATI WATER MANAGEMENT AREA



ACHIEVEMENT: (from left to right) Kurhula Secodary Schools Final Competition winners namely Yinhle Gumede, Philani Mdluli, Surprise Ubisi, Fortune Nkuna, Khaya Gumede and their (Teacher) Mr. C. Sibisi share a lighter moment during the Final Science Schools Competition in Riverside Mall in the City of Mbombela Local Municipality.

A school from a rural area in the Bushbuckridge Local Municipality Kurhula Secondary School, a first time participatory in the competition secured a 1st position in the Final Science Schools Competition which was hosted by the Inkomati-Usuthu Catchment Management Agency (IUCMA), the competition took place at the Riverside Mall in the City of Mbombela Local Municipality on the 14th of March 2019, Rev SA. Nkosi Secondary School from the Chief Albert Luthuli Local Municipality obtained the second position and the 3rd position was secured by Hoyohoyo Secondary School which is also from Bushbuckridge.

The competition was hosted successfully as most learners who attended the event were motivated by the outcomes of the results,

all the eighteen schools who participated on the final level of the competition received some certificate of participation from the CEO of IUCMA Dr Thomas Gydu-Ababio. Learners who wish to form part of the competition must be in grade 10 and grade 11, it should be learners who never participated in the competition on the previous year.

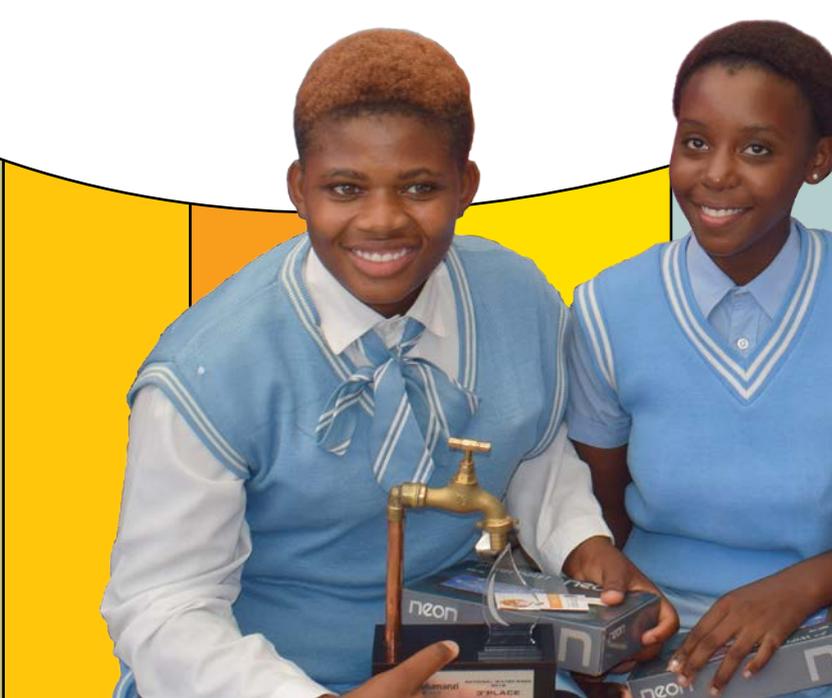
Some certificate of participation for the schools was received by their educators who graced the event, the aim of the event was to inspire some learners to follow some career paths in the science stream and to educate them about the process of purifying water before it can be consumed to the public as a final product. The learners from all different schools have applauded to the good work which was presented by the IUCMA in giving them an exposure on their school careers.



By Mr Sizile Mnisi from Marketing and Communications & Ms Gugu Motha from Institutions and Participation

The prizes for the 1st three winning schools were as follows:

PRIZE	LEARNERS	EDUCATOR	SCHOOL
1 st Prize	R5000.00 cash & Merit Certificate per learner.	<ul style="list-style-type: none"> Voucher to the value of R2500.00 	<ul style="list-style-type: none"> School Trophy, Merit Certificate, Desktop computer
2 nd Prize	R3500.00 cash & Merit Certificate per learner.	<ul style="list-style-type: none"> Voucher to the value of R2000.00 	<ul style="list-style-type: none"> School Trophy, Merit Certificate, Desktop computer
3 rd Prize	R2000.00 cash & Merit Certificate per learner.	<ul style="list-style-type: none"> Voucher to the value of R1500.00 	<ul style="list-style-type: none"> School Trophy, Merit Certificate, Desktop computer
Total	R52500.00	R6000.00	



TEAM: Teachers, Departments and Organisation officials share a lighter moment during the Final Science Schools Competition.



EXCITEMENT: Nkosi Secodary School learners sharing a lighter moment with their Teacher after accomplishing 2nd place during the Final Science Schools Competition.



ACOMPLISHMENT: Hohohoyo Secodary School learners with their Teacher after accomplishing 3rd place during the Final Science Schools Competition.

The Present **Ecological State** of the Komati River in South Africa

The Komati River Catchment originates in the Drakensberg mountains near Breyten in the Mpumalanga Province at an elevation of 1800 m a.s.l. It flows in a north-easterly direction through Swaziland and Mozambique before discharging into the Indian Ocean. The Komati Catchment covers an estimated area of 11200Km², and there are several large dams in the Komati Catchment which include Nooitgedacht, Vygeboom and Driekoppies dams, located in South Africa, and Maguga and Sand-River dams, located in Swaziland.

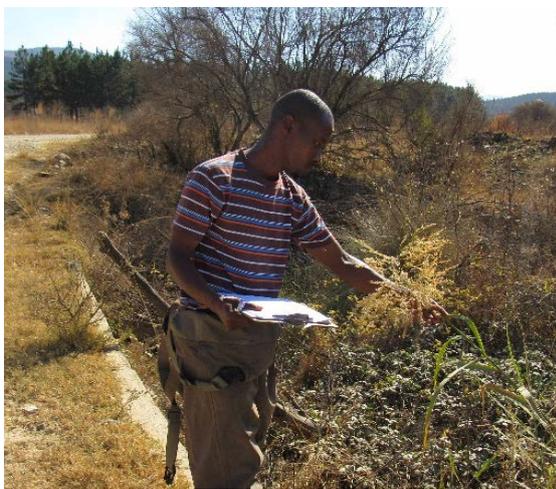


Photo A: vegetation Identification



Photo B: Macro-Invertebrates Identification

The dams have an estimated storage capacity of 770 Mm³ and are mostly used for irrigation purposes. Nooitgedacht and Vygeboom dams are also used in the Inkomati Transfer Scheme, a part of the Komati Water Augmentation Project, which supplies bulk water to the Olifants Catchment for use in Komati, Arnot, Hendrina and Duvha Power Stations. Thus, the Catchment is ecological stressed due to anthropogenic activities along the catchment. The Present Ecological State of the Komati Catchment was determined in the year 2017 using the Ecostatus models such as Macro-Invertebrates Assessment Index (MIRAI) and Fish Response Assessment Index (FRAI).

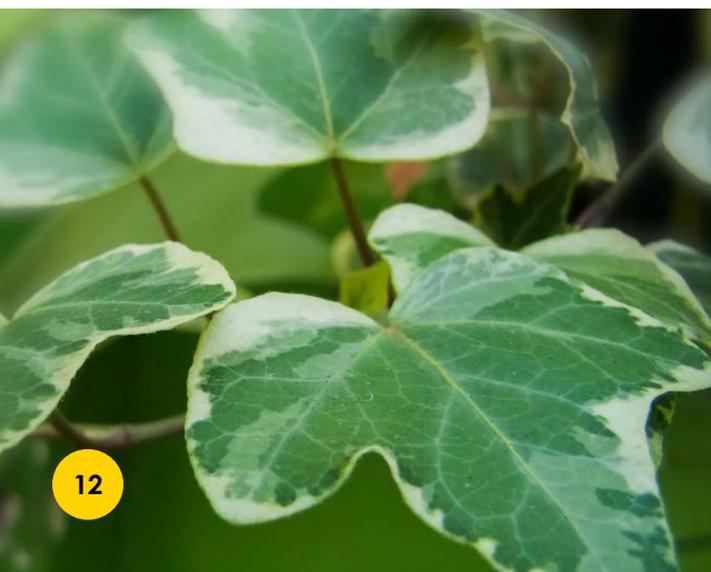




Photo C: Fish Sampling

Although the Komati Catchment is ecological stressed, a diverse number of both macro-invertebrate families and fish species were caught during the survey. The MIRAI results indicated that the mainstem of the river was in B class indicating that the river is largely natural with few modifications based on macro-invertebrates while the FRAI results indicated that the mainstem was in C class showing that the river was moderately modified.

These modifications were attributes of flow modification, habitat cover, and water quality in the catchment. The presence of invasive fish species such as rainbow trout (*Oncorhynchus mykiss*) in the catchment also plays a role in the low abundance of native fish species. Continuous monitoring of the Catchment is utmost important in determining the ecological state of the river, thus it will contribute in good decision-making concerning the management of the catchment.



By (from left to right) Mr Marcus Selepe and Mr Mthobisi Soko from Water Resource Protection and Waste

REPORT WATER POLLUTION INCIDENTS

The IUCMA is aware that pollution incidents occur occasionally 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.



Celebrating the life of the Global Icon.



A NELSON MANDELA FOUNDATION INITIATIVE

The personnel of the Inkomati-Usuthu CMA have honored the life of Nelson Mandela by spending their 67 minutes Clear Rivers Campaign in the area of Ga Relane in Bushbuckridge Local Municipality at Upper Sand Sub-Catchment, including other different sub-catchments of the institution who also participated in Clear Rivers Campaigns which were hosted as follows:

SUB-CATCHMENT	MUNICIPALITY	AREA
Lower Komati	Nkomazi Local Municipality	Jeeps reef
Upper Komati	Chief Albert Luthuli Local Municipality	Carolina
Crocodile	City of Mbombela Local Municipality	Msholazi
Northern Usuthu	Mkhondo and Chief Albert Luthuli Local Municipalities	Kwachibikhulu
Southern Usuthu	Mkhondo Local Municipality	Amsterdam
Lower Sand	Bushbuckridge Local Municipality	Utah
Sabie	Bushbuckridge and Thaba Chweu Local Municipality	Thushanang

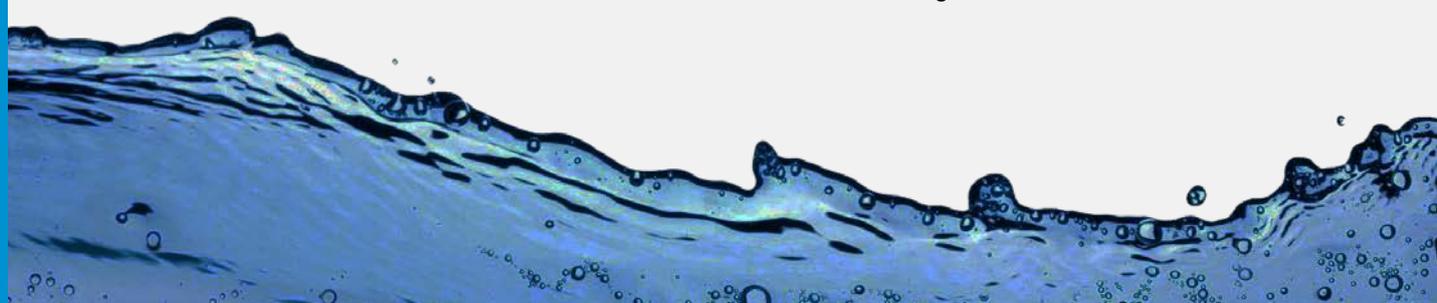
IUCMA's involvement in the campaigns was to support the initiative of the Department of Water and Sanitation. The IUCMA together with the Department of Water and Sanitation and Bushbuckridge Local Municipality visited a nearby river called Matlolane River to encourage the community members to look after the environment which they are living in. Community members of Ga Relane welcomed the initiative brought to them by all the stakeholders in celebrating the life of the global icon.

Mr Fannie Mashaba a resident of Ga Relane addressed the community members about the life of Nelson Mandela, he further encouraged the attendees to follow the footsteps of the first black President of a democratic government. Two learners from Skukuza Secondary School Luyanda Shabangu and Amukelani Mokoena graced the event with an outstanding poem based on the life of Madiba and the significant contributions he has made in liberating the African Continent.

The celebration was welcomed by the community members of Ga Relane, who also committed themselves to look after the wetlands which belong to the community at large, IUCMA was supported by the Department of Water and Sanitation, Bushbuckridge local Municipality, Department of Agriculture and the Department of Rural Development and Land Reform. Such a support amongst organisations really made an impact in the community environmentally.



By Mr Sizile Mnisi from Marketing and Communications

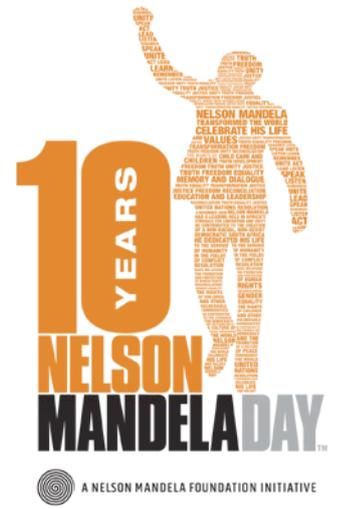




ACTION: The community of Bushbuckridge Local Municipality dedicating their 67 minutes in Clear River Campaign during the Nelson Mandela Day in Ga Relane.



IMPACT: IUCMA's Ms Portia Chuene (White T-shirt) assisting the community during the Clear Rivers Campaign as part of the Nelson Mandela Day Celebration in Ga Relane.



PARTICIPATION: IUCMA's Ms Beuora Lukhele making a change in the Community of Bushbuckridge Local Municipality during the clear rivers campaign.

Dedicate 67 minutes to cleaning rivers and streams

CLEAR RIVERS during July 2019



WATER IS LIFE - SANITATION IS DIGNITY



GRADUATES AND ENTREPRENEUR CONFERENCE



CONCENTRATION: (Right) Mr Moudy Mudzielwana of Tshikovha Graduate academy and His colleague during the Graduates and Entrepreneur Conference in Nkomazi Local Municipality.

The IUCMA supported an initiative by Tshikovha Graduate Academy when they hosted the Graduate and Entrepreneur Conference that took place in the Lower Komati sub-catchment, KaMhlushwa Community hall on the 24th of November 2018. The academy coordinated a platform where graduates and entrepreneurs can access information on opportunities that are available for them in the job market and the business space.

Tshikovha is a Non-Profit Organization which exist to develop graduates and integrate them to the working environment and humanity programmes in communities. The organization identifies local challenges on socio economic issues, health and safety, careers, entrepreneurship, business development and mobilizes for support from companies, international communities and local business and government institutions for support. We respond to challenges that impact on our people now and possible paint a dark future in order to address such challenges.





ATTENDANCE: The community of Nkomazi Local Municipality during the Graduates and Entrepreneur Conference in Nkomazi.

The purpose of the Conference was to empower graduates and small businesses with knowledge of how to succeed and provide a platform for them to network with other businesses, individuals and organizations which attended. As part of the IUCMA CSI initiative, the institution sponsored the conference. Mr Hasani Makhubele has on behalf of the IUCMA gave a message of support as part of the institution and also encouraged graduates and entrepreneurs to participate in the opportunities that are there for them within the IUCMA. Amongst other speakers with was Mr. Joe Modau, who did a motivational talk on how graduates should branch themselves and present themselves in the job market.

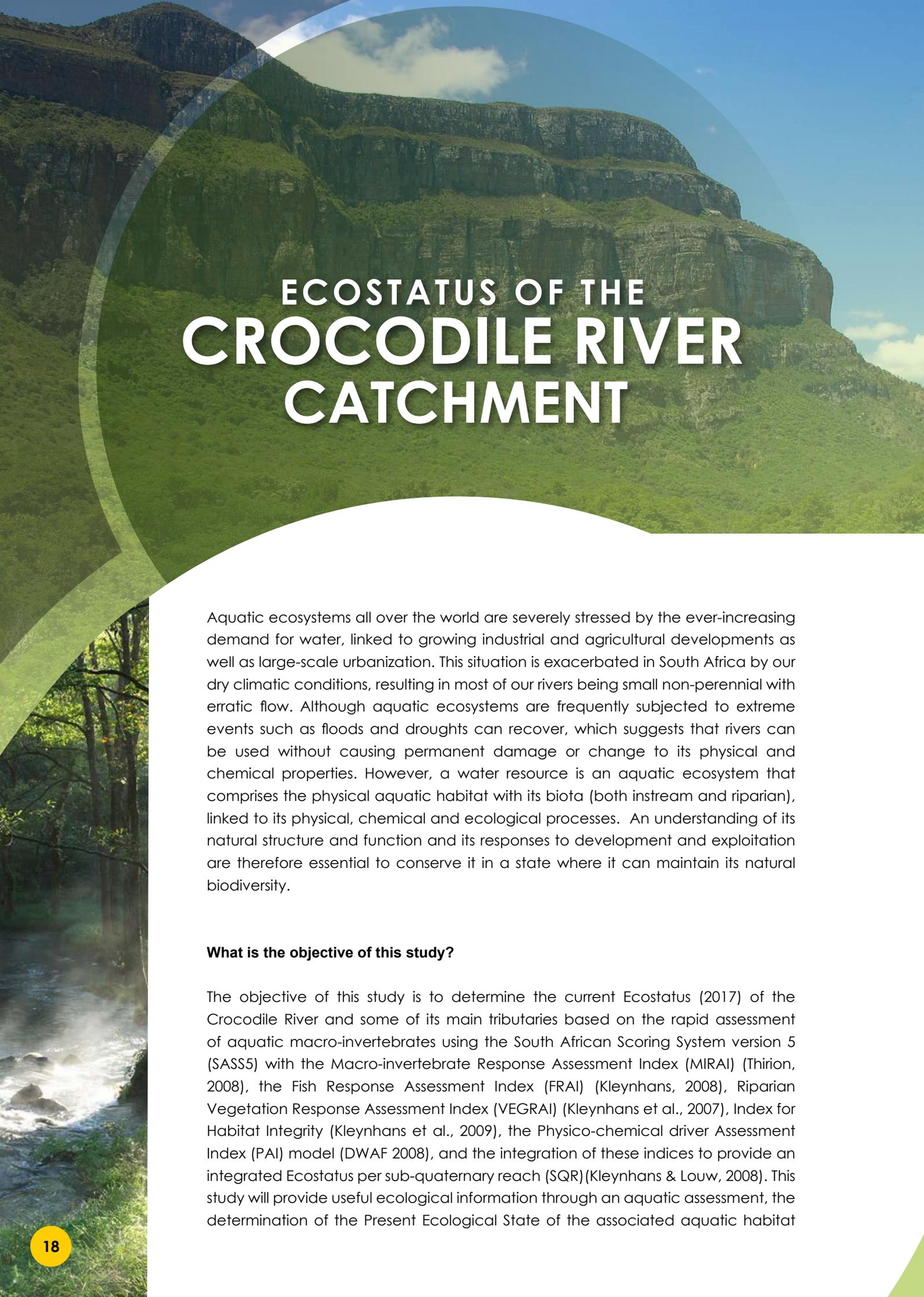
Unemployment is one of the things that causes poverty in communities, the initiation

of educational programmes makes a huge difference in uplifting the youth. Many graduates and businesses loose hope mostly if they are not guided properly. Tshikovha invited guest speakers to give introduction about their companies. The conference was a huge success and attended by 235 graduates and entrepreneurs from around Nkomazi Local Municipality.



By Mr Advocate Gumbi from Marketing and Communications





ECOSTATUS OF THE CROCODILE RIVER CATCHMENT

Aquatic ecosystems all over the world are severely stressed by the ever-increasing demand for water, linked to growing industrial and agricultural developments as well as large-scale urbanization. This situation is exacerbated in South Africa by our dry climatic conditions, resulting in most of our rivers being small non-perennial with erratic flow. Although aquatic ecosystems are frequently subjected to extreme events such as floods and droughts can recover, which suggests that rivers can be used without causing permanent damage or change to its physical and chemical properties. However, a water resource is an aquatic ecosystem that comprises the physical aquatic habitat with its biota (both instream and riparian), linked to its physical, chemical and ecological processes. An understanding of its natural structure and function and its responses to development and exploitation are therefore essential to conserve it in a state where it can maintain its natural biodiversity.

What is the objective of this study?

The objective of this study is to determine the current Ecostatus (2017) of the Crocodile River and some of its main tributaries based on the rapid assessment of aquatic macro-invertebrates using the South African Scoring System version 5 (SASS5) with the Macro-invertebrate Response Assessment Index (MIRAI) (Thirion, 2008), the Fish Response Assessment Index (FRAI) (Kleynhans, 2008), Riparian Vegetation Response Assessment Index (VEGRAI) (Kleynhans et al., 2007), Index for Habitat Integrity (Kleynhans et al., 2009), the Physico-chemical driver Assessment Index (PAI) model (DWAF 2008), and the integration of these indices to provide an integrated Ecostatus per sub-quaternary reach (SQR) (Kleynhans & Louw, 2008). This study will provide useful ecological information through an aquatic assessment, the determination of the Present Ecological State of the associated aquatic habitat



of the Crocodile River and trends in aquatic health over time, as well as a comparison with previous surveys (2012) to inform on management interventions required to address systemic and point specific impacts. Monitoring is only a valid term to use if the results of this survey is measured against targets (Greenwood & Robinson, 2006.)

The results of this survey should therefore be compared to the gazetted Target Ecological Categories (TECs) and associated Resource Quality Objectives (RQOs) defined for water quantity and quality, and habitat and biota. TECs and RQOs are defined for each prioritised Resource Unit (RU) within every Integrated Unit of Analysis (IUA) (Government Gazette No 40531, 30 December 2016; DWA, 2014b).

What is EcoStatus?

EcoStatus or Ecological Status refers to an integrated ecological category for rivers. In other words, the ecological category derived for each of the biological response components for a particular river is used to derive an overall, integrated ecological state or EcoStatus.

Inkomati River catchment description

The Inkomati River drains parts of Mpumalanga, Swaziland and Mozambique between the Limpopo River system in the north and the Pongola River system in the south (Figure 1). The Inkomati River basin is one of the most important river basins in South Africa and it consists of three adjacent sub-basins, the Komati, Crocodile and Sabie (Figure 1). The Inkomati River basin incorporates the Mpumalanga Province in southern Africa, part of northern Swaziland and a part of southern

Mozambique. The main river descends from the highland plateau in Mpumalanga and Swaziland and flows through the coastal plains of Mozambique towards the Indian Ocean. The river flows eastwards through the Lowveld region of Mpumalanga and Swaziland where it is heavily used for agricultural purposes before finally flowing into Mozambique where it discharges into the Indian Ocean just north of Maputo at Villa Laisa. The total basin area is about 46,800 km² of which 63% is in South Africa, 5% in Swaziland and 32% in Mozambique. The average discharge of the Inkomati Water Course at the estuary is about 100 m³s⁻¹ to 200 m³s⁻¹, corresponding to about 3,600 million m³ per year, to which South Africa contributes 82%, Swaziland about 13% and Mozambique about 4% (Darwall et al., 2009; DWS, 2015).

There are several dams in the basin which can be classified as large and most of them are in South Africa. Dams with more than 2,060 million m³ combined storage capacity have been built in the Inkomati basin in South Africa and Swaziland, these dams are primarily used for irrigation. Two of these major dams are in the lower komati basin, the Driekoppies Dam in South Africa and the Maguga Dam in Swaziland. These dams disrupt the natural flow regimes of the rivers and are managed by Komati Basin Water Authority (KOBWA) which is responsible for the Komati River Basin Development Plan (Roux, 2013). Both these dams have no provision for fish ways and are completely obstructing the upstream movement of fish. Other large dams in the Komati River include the Nooitgedacht and Vygeboom Dams. Water use is intense, with 50% of the water generated in the basin being abstracted. Water scarcity has been evident since the mid – 1980's, and has become more severe, as well as the effects of droughts

Information continues on page 20

and floods. The intensive use of water of the Inkomati system for irrigation has impacted on the health of the river system. Loss and degradation of habitats also threaten the health of the river system, particularly as a result of excessive sedimentation and eutrophication, flow modification and the introduction of alien invasive species. In addition, extensive coal mining in the headwaters is a further threat, with high risks of pollution from acid mine waters (Darwall et al. 2009).

The most unique topographical feature of the drainage area is the Drakensberg Escarpment that follows a winding course across the area, its general trend being from north to south. From the escarpment steep slopes trail down eastwards and merge with the granite hills of the typical Middleveld. The land west at the Great Escarpment is mountainous and deeply dissected. From west to east, the basin comprises the Precambrium granites and gneiss of the primitive systems, the Cretaceous (west of the Lebombo) and Karroo lavas of the Mesozoic period followed by Cretaceous basins east of the Lebombo (Darwall et al., 2009).

The fish fauna is dominated by Zambezan elements and is characterized by relative high endemism with many restricted range species. The Inkomati support an estimated 56 species of fish (16% of the regional total), 120 species of Odonata (73% of the national total) have been recorded to date, 202 of the selected aquatic plants (39% of the regional total), and 24 Molluscs (21% of the regional total) (Darwall et al., 2009).

Crocodile River

The Crocodile River is from an ecological point of view one of the most important rivers in South Africa. This is due to the broad range of riverine habitats, ranging from cold mountain streams in the Drakensberg to slow flowing temperate waters where the river meanders through the Lowveld. As a result of this, the Crocodile River is

also one of the most biological diverse systems in the country, with at least 49 fish species (Roux et al., 1999). The Crocodile River catchment has an area of 10 440 km² and rises at an altitude 2000 m above sea level in the Steenkampsberg Mountains near Dullstroom. The Upper Catchment consists of steep sided valleys, with sharply defined cliff slopes on the eastern edge of the Escarpment. From the Escarpment the river levels out in the Kwena Dam Basin, from where the Crocodile River winds along the valley of the Schoemanskloof down to the Montrose Falls and the confluence of the Elands River (Roux et al., 1999).

Between Montrose Falls and the town of Nelspruit the Crocodile River is slightly incised into a broad, flat bottomed valley. Further downstream the steep sided river banks are densely covered with riparian vegetation and reed beds. Downstream of its confluence with the Kaap River, the gradient of the Crocodile River flattens out until its confluence with the Komati River at the town of Komatipoort. The river in this zone is meandering, incised into a wide sandy river bed and in some sections the river flows through multiple bedrock channels (Roux et al., 1999). This river segment can be described as 40 m to 50 m wide, with mostly large sandy pools, occasional rapids and few riffles. This stretch is further characterised by a gentle slope with Lebombo riparian thickets and limited rhyolite bedrock patches.



By (from left to right) Mr Marcus Selepe from IUCMA's Resource Protection and Waste and Mr Francois Roux from Mpumalanga Tourism and Parks Agency

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

IUCMA DONATES A DRINKING WATER TANK TO EKHIYENI PRIMARY SCHOOL



A LIGHTER MOMENT: IUCMA's Dr Jennifer Molwantwa (middle left), Ekhiyeni Primary School Principal Ms Nonhlanhla Dlamini (Blue dress), and the school officials share a lighter moment during the official Water Drinking Tank hand over.

The Inkomati-Usuthu Catchment Management Agency (IUCMA) is giving back to a needy community, As part of the Corporate Social Responsibility programmes a new Jojo tank was donated to Ekhiyeni Primary school situated in Barberton in the City of Mbombela Local Municipality, the event was graced by stakeholders from the City of Mbombela, a representative from the office of the ward councillor, and the Department of Water and Sanitation.

An Executive Water Resource Management of Inkomati-Usuthu CMA Dr Jenifer Molwantwa outlined the main purpose of the event which was the official opening of a water tank requested

by the Principal Ms Nonhlanhla Dlamini on behalf of the school after the Principal saw a big need that the learners of the school were struggling to get clean water. Dr Molwantwa urged the learners and the educators of the school to use water sparingly as it is a scarce resource in the country. She also pleaded to all stakeholders to look after this infrastructure as it forms part of Nation building.

The principal of the school expressed her mouthful gratitude's to the great work done by the IUCMA in ensuring that the learners and the staff of Ekhiyeni Primary School are having access to clean water. Principal Dlamini together with the staff of educators committed themselves to look after the infrastructure so it could be used by the future generations. Learners presented poems and speeches which supports the initiative of the IUCMA.



By Mr Sizile Mnisi from Marketing and Communications

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

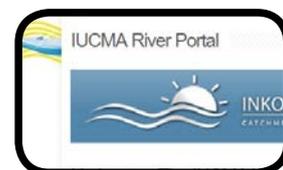
<http://riverops.inkomaticma.co.za/>

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**

STEP 1



STEP 2



Research & Development initiatives in the IUCMA

The IUCMA, as a water resources management institution is keeping itself abreast of developmental issues through research and development (R&D) initiatives. The fourth industrial revolution and climate change are human and natural phenomena that are already influencing the paradigm shift in water resources management and the sector in particular.

The IUCMA through its diverse teams of specialists is partnering with research bodies and institutions of higher learning. As a local water resources management institution (WRMI) the IUCMA deals with scientific and social issues that affect and impact water users in their daily operations.

Currently the IUCMA is engaged in 16 research projects that are being undertaken in partnership with the Water Research Commission (WRC) and other universities. These research projects are looking at a variety of water resources management areas that will assist not only the IUCMA, but the entire country in improving adaptive management and planning approaches throughout the water value chain.

The divisions that are involved in the projects are Water Resources Protection & Waste (WRP&W), Institutions & Participation (I&P), River Systems Planning & Operations (RSP&O) and the office of the Executive Water Resources Management (EWRM). The research project members are Mr Marcus Selepe, Dr. Tendai Sawunyama, Mr Hasani Makhubele and Dr. Jennifer Molwantwa. These projects will also influence the strategic direction of the IUCMA as outlined and reflected in the Catchment Management Strategy (CMS) which is currently under review.

In addition to these collaborative research projects there are research students within and outside the organization who are conducting their studies in the water management area and therefore accessing data and some resources in the IUCMA. This R&D programme benefits the IUCMA and ensure that there is continuous Knowledge Sharing with other entities and individuals. Below are the current projects indicating how each of them is benefiting the IUCMA.

Project Number	Project Title	Relevant Division	IUCMA Official	Benefits to IUCMA
K5/2943	Assessing the consequences of delays in institutional arrangements for decentralised water resource management	I & P	Mr Hasani Makhubele	Understanding the consequences of delays on institutional arrangements for decentralised water resource management
K5/2932	Aligning land and water allocation reform processes for more equitable development in south Africa in the IUCMA WMA	I & P	Mr Hasani Makhubele	Achieving equitable development in South Africa
K5/2754	The development of a preliminary approach to sediment site evaluation and associated risk	WRP & W	Mr Marcus Selepe	Availability of an approach for evaluation of sediment site and associated risk
K5/2755	Water quality of the Sabie River and Injaka Dam in relation to land use practices.	WRP & W	Mr Marcus Selepe	Understanding the influence of land use on water quality in the Sabie River catchment.
K5/2418	Implementation of adaptive operational governance dashboard (AOGD) for the IUCMA WMA.	WRP & W	Mr Marcus Selepe	Availability of an adaptative operational governance Dashboard (AOGD) .

Project Number	Project Title	Relevant Division	IUCMA Official	Benefits to IUCMA
K5/2248	Water Resources Management in South Africa: Towards a New Paradigm	WRP & W	Mr Marcus Selepe	Understanding of the Management of Water Resource towards a new paradigm
K5/2834	Reference group in connection with impacts of climate change in determining the ecological reserve	RSP & O	Dr Tendai Sawunyama	Understanding the reference group in connection with impacts of climate change in determining the ecological reserve.
K5/2520	Integrated land use and water use in water management areas, with a view on future climate and land use changes.	RSP & O	Dr Tendai Sawunyama	Understanding integration of land use and water use in water management areas.
K5/2746	Development of an integrated (Early Warning) system for adaptation and mitigation to hydrological drought in South Africa	RSP & O	Dr Tendai Sawunyama	Adaptation and mitigation of hydrological drought in South Africa.
K5/2418	Implementation of adaptative operational governance dashboard (AOGD) for the IUCMA.	RSP & O	Dr Tendai Sawunyama	Availability of an adaptative operational governance Dashboard (AOGD) .
K5/2448	Extending functionality and knowledge transfer of the Water Quality Systems Assessment model	RSP & O	Dr Tendai Sawunyama	Extended functionality and knowledge transfer of the Water Quality Systems Assessment model.
K5/2432	Cholera monitoring and response guideline	EWRM	Dr Jennifer Molwantwa	Availability of a response guideline for cholera
K5/2754	The development of a preliminary approach to sediment site evaluation and associated risk	EWRM	Dr Jennifer Molwantwa	Evaluation of sediment site and associated risk
K5/2594	Emerging and Persistent Contaminants/ Pathogens: Risk assessment, quantification and fate of HIV/ARVs in Water Resources	EWRM	Dr Jennifer Molwantwa	Determining emerging and persistent contaminants. Also risk assessment of HIV/ARVs in water resources.
K5/2446	The development of portable Immunoassays for the detection of enteric pathogen species for water quality monitoring	EWRM	Dr Jennifer Molwantwa	Detection of enteric pathogen species for water quality monitoring.
K5/7152	The construction of a portable pathogen capture and detection system for water quality monitoring	EWRM	Dr Jennifer Molwantwa	Availability of a portable pathogen capturing and detecting system for water quality monitoring.



**By Mr Hasani Makhubele from
Institutions and Participation**

PROTECTING OUR ENVIRONMENT



INFORMATION SHARING: Mr Themba Khoza from the Department of Water and Sanitation sharing the information about Water to the community of Mganduzweni in the City of Mbombela Local Municipality during the 2019 World Environmental Day Celebration.

The City of Mbombela Local Municipality hosted a “world environmental day celebration” at Mganduzweni village outside Whiteriver, officials from the Municipality together with the Inkomati-Usuthu Catchment Management Agency (IUCMA) officials, Working On Fire and the Department of Water and Sanitation also participated on this initiative, the team of officials in all different stakeholders was led by the Head of Communications of the City of Mbombela Local Municipality Mr Joseph Ngala. Residents of the village also formed part of this campaign by joining the officials in cleaning the environment, members of the community welcomed the initiative and vowed to protect their environment so it could be used by the future generation.

A major challenge of which the officials unexpectedly faced is the community members who are dumping diapers on a nearby river which causes harmfulness to the water consumption, the celebration of the environmental day awarded the

villagers with the opportunity to work hand in hand with their stakeholders by voicing the issues which they face on their daily basis. After the cleaning campaign the community gathered at the Phumelela Bible College were some officials educated the community members about the service of which they rendering to the public.

A representative from Ehlanzeni District Municipality presented to the audience about diseases caused by pollution, she emphasized to the community that everyone is having a tremendous task to prevent pollution and the diseases caused by water pollution. Members of the village and the surrounding areas committed themselves to start on a new chapter and put everything that they have acquired in this gathering into practice. Pastor M.M. Mndzebele who honoured the event also highlighted some challenges which the village is facing which involves illegal dumping and the challenges of air pollution in the area.

Community members were urged to look after the environment by not littering papers to the river as this can cause a huge threat to the water. A representative from the Department of Water and Sanitation, Mr Themba Khoza urged all the attendees to use water sparingly as it is a scarce

resource to the entire nation, during his address he requested that all individuals must take care of environmental water, as this will result to a situation whereby ground water will be used as an alternative. He further mentioned that pollution also causes Acid rain which can be harmful to the Environment. Mr Khoza concluded that "Water has no substitute, so let us make every drop count".

The IUCMA division of Marketing and Communications together with the Department of Water and Sanitation, issued pamphlets of water saving tips, a latest IUCMA newsletter, and water report CD's, the main purpose in this was to create awareness to external stakeholders. To those that attended the celebration they all have a primary responsibility to disseminate information to the public in general.



**By Mr Sizile Mnisi from
Marketing and Communications**

For more pictures view page 26





INFORMATION SHARING: IUCMA's Mr Sizile Mnisi hands over the Department of Water and Sanitation, pamphlets and IUCMA pamphlets during the 2019 World Environmental Day at Mganduzweni.



ACTION: The Community of Mganduzweni engages in a Clean Up Campaign which was initiated by the City of Mbombela Local Municipality during 2019 World Environmental Day at Mganduzweni.

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
of water in one year.

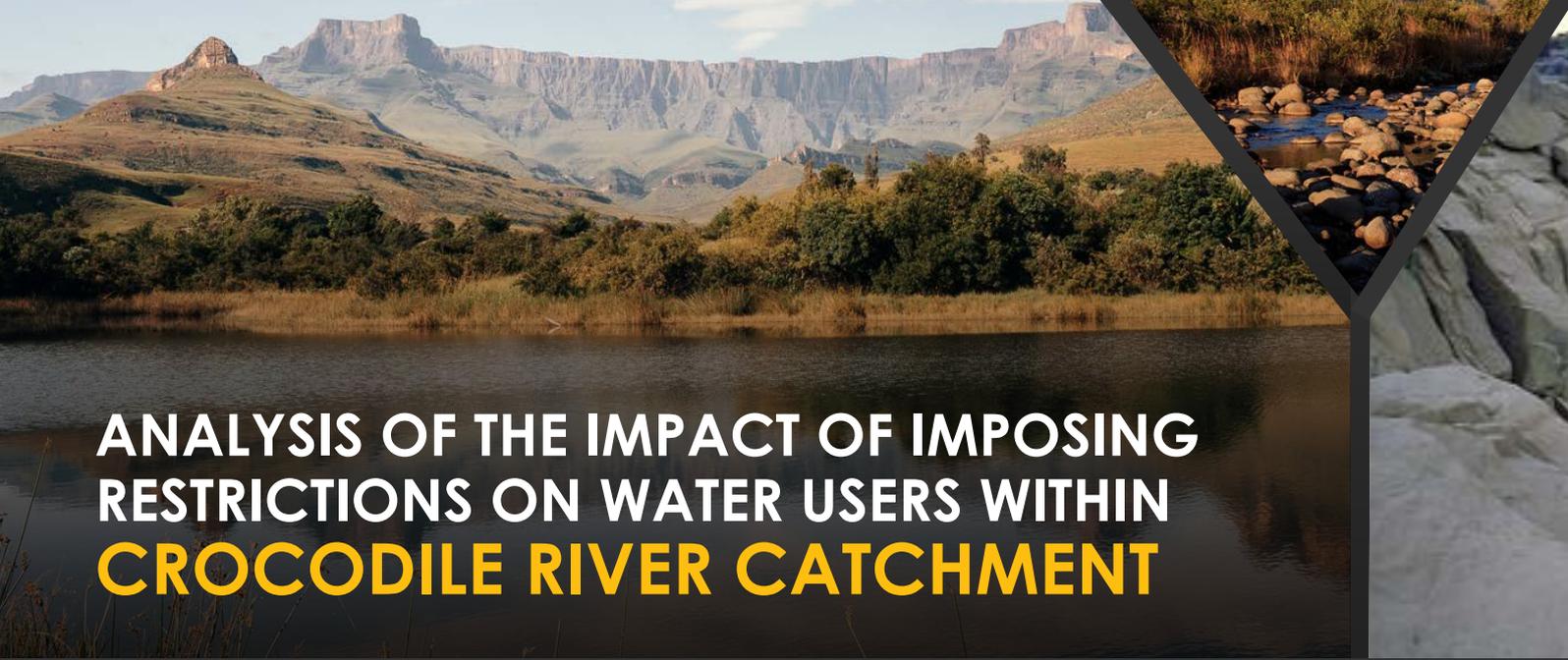
WETLANDS

ARE HABITATS OF ANIMALS, AND A NATURAL
STORAGE FOR WATER RESOURCES.
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*Inkomati-Usuthu CMA, your
partner in water management*



ANALYSIS OF THE IMPACT OF IMPOSING RESTRICTIONS ON WATER USERS WITHIN CROCODILE RIVER CATCHMENT

1. Introduction

The South African Weather Service has issued a Seasonal Climate Watch (June to October 2019) on 31 May 2019. The overview is such that El Niño -Southern Oscillation (ENSO) remains in a moderate El Niño state and forecasts indicate it will remain in at least weak El Niño state throughout spring. Caution however is that ENSO forecasts are weak in winter and spring. There is an early indication of drier conditions over eastern parts of the country during spring (August-September-October) and connected to this, early spring forecasts for eastern parts of the country indicate a lower number of rainy days above 15mm, but higher number of days above 5mm. This suggests that rainfall may still be regular, however less intense than normal. With regards to temperatures, mostly higher than normal are expected for northern parts of the country.

The IUCMA has noted with concern that some water users within the Crocodile River catchment were not adhering to the directive to reduce water consumption. As such a scenario was modelled by IUCMA to indicate the risk and implication of this non-adherence. The data indicates that there is a higher risk of BULK WATER SUPPLY SYSTEM FAILURE if restrictions are not applied. Failure in this context refers to storage in the dam (If the dam storage drops to below 20 million m³), then this would be considered a failure. Thus, the failure to supply of water to high priority users (Ecological Water Requirements (EWR), the cross-border flows to Mozambique and Basic Human Needs).

2. Methodology

The investigation looked at historical data and prediction of the future. Historical data indicates that when no water restrictions are in place, releases from the Kwena Dam are

approximately 5 m³/s or more, while the introduction of restrictions at their current level reduces the release to approximately less 3.5 m³/s. A stochastic analysis was carried out with these two release scenarios to determine the risk of failure of the dam. The starting storage used in this analysis was for 1 May 2019 at which the point the dam was 57% full. The cross-border flows under these two scenarios were also analysed.

3. Results

Figure 3.1 (A) shows the probabilistic trajectory of the dam with restrictions imposed, that is, releases reduced to 3.5 m³/s. This plot shows that with the current level of restrictions there is a minimal chance of the dam emptying this year. However, should below average rainfall persist, there is a 25% chance of the dam failing next year. Hence, increased restriction might be required next year unless above normal rainfall is received this year.

Figure 3.1 (B) shows that without imposing restrictions, Kwena Dam will still not empty this year but there will be a greater than 50% probability of the dam failing next year. This is an unacceptably high level of risk.

The results of an analysis of cross border flows into Mozambique is shown in Figure 3.2 which expresses the flows as a duration curve. The Ecological Water Requirements (EWR) are



also shown as reference since these are the flow requirements that are targeted at the outlet from the Crocodile catchment. Theoretically, the EWR can be fully met with the current restriction rules. However, if no restrictions are put in place, there will be no flow at the outlet to the catchment for approximately 12% of the time. This would result in a serious contravention of the Interim IncoMaputo Water Use Agreement (IIMA) entered into with the Republic of Mozambique.

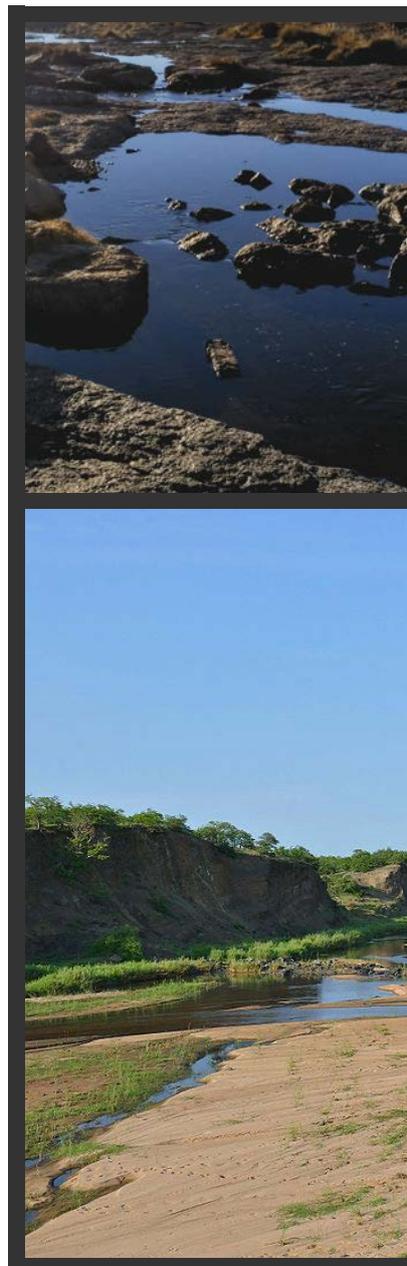
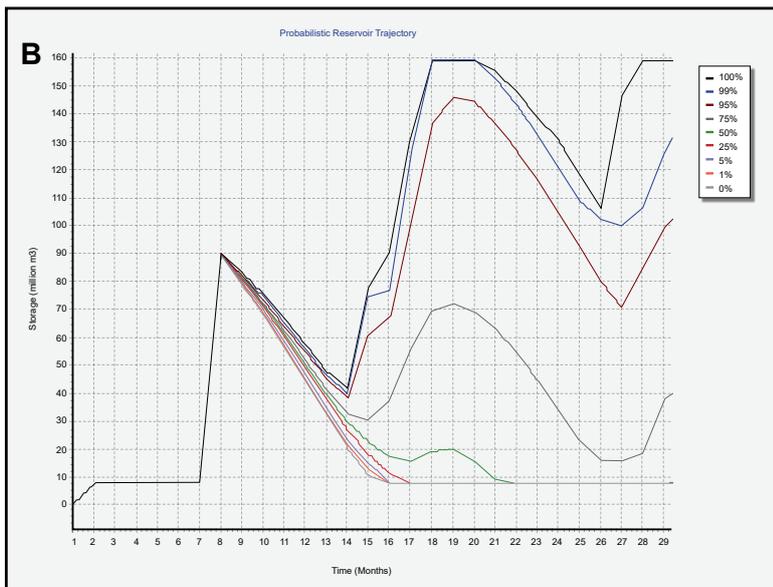
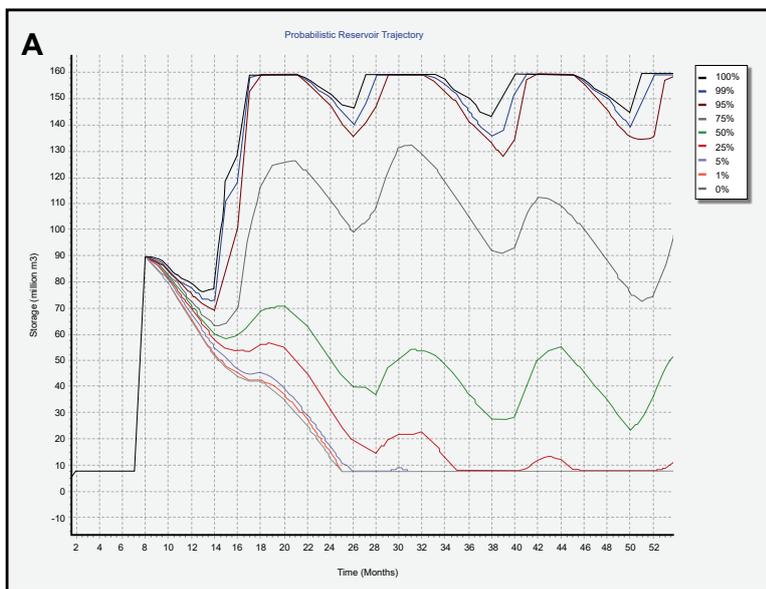


Figure 3.1: Probabilistic trajectory of the Kwena Dam: (A):with restrictions imposed and (B): without restrictions

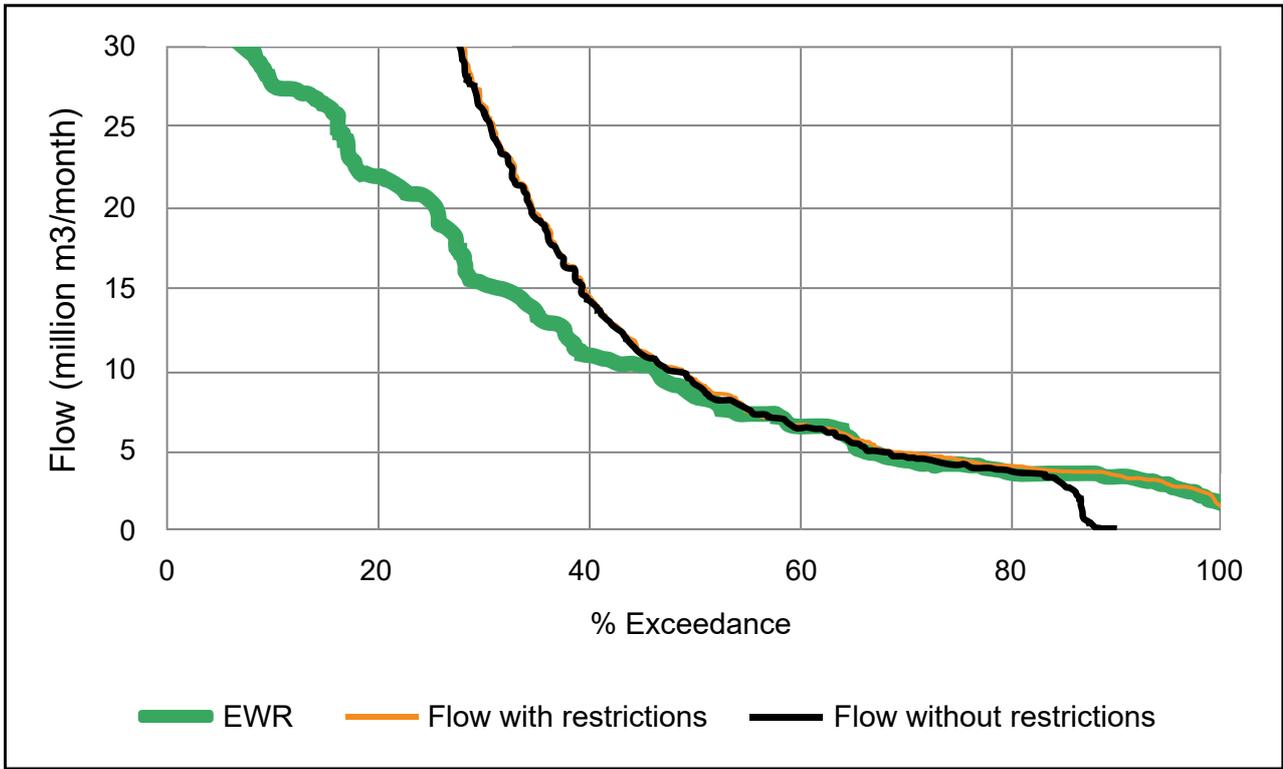


Figure 3.2: Assessment of the Ecological Water Requirements and Cross border flows.

4. Conclusions

It is clear from these analyses that imposing restrictions on users during times of drought is not optional but an absolute necessity. While South Africans may conceivably opt to take the risk and not restrict their use during drought (hence, a risk getting no water at some time in the future), the National Water Act is clear about the rights of the Reserve (ecological water requirements and basic human needs) and International Obligations, both which will be seriously violated should the catchment not be managed in a rational manner by restricting water use during periods of drought. This on-going modelling and update is part of the IUCMA and Department of Water and Sanitation (DWS) Strategic Adaptive management and if implemented will result in a sustainable system.

However, non-adherence by any of the users may result in a self-induced drought and may have serious legal implications for the transgressing parties.



By (from left to right) Dr Tendai Sawunyama and Mr Siphon Magagula from River Systems Operations and Planning

IUCMA donates a Borehole to Jericho Farm



ENLIGHTENING MOMENT: (from left to right) IUCMA's Mr Thabiso Nkosi, Ms Alice Mabasa, Jericho Farms representative Mr Marko, Jericho farm community member Mr Isaac Dlamini, IUCMA's Governing Board Deputy Chairperson Mr Mandlakayise Mthembu, Mr Dereck Cholo from the Department of Water and Sanitation and IUCMA's Dr Tendai Sawunyama.

Water is a basic need to every citizen in this country, it is imperative for everyone to have access to clean water, residents of Jericho Farm have benefited from an initiative of the Inkomati Usuthu Catchment Management Agency (IUCMA). A borehole was donated to the farm where all residents of the area will use this resource to their extra advantage. The official opening of the borehole was attended by Mr. Marko from the farm management, Department of Water and Sanitation and officials of the IUCMA.

The opening of the borehole was warmly welcomed by the residents of the farm, as they were joyful about the recent development, they committed themselves to maintain the infrastructure which was built for them. Water is basic need to every citizen it is important for everyone to have access to clean water. Amongst those who attended the official opening of the Borehole was members of the IUCMA Personnel and the Deputy Chairperson of the IUCMA Governing Board Mr Mandlakayise Mthembu.

A representative of the residents' farm Mr Isaac Dlamini applauded the great work done by the IUCMA institution, he also expressed his concern about an area in the farm which is not having access to the borehole. Such was concluded that in the meantime the residences can't be assisted due to the fact that they are not situated close to the borehole. The residences were advised that such matters should be taken to the Municipality that is responsible for the area but however such a need can be catered for if the IUCMA is able to assist by donating another borehole.

Dr Tendai Sawunyama outlined the purpose of the day to the farm residents, he further encouraged them to look after the infrastructure. Mr Thabiso Nkosi a community officer in the Usuthu catchment expressed his deepest gratitude to the residents that volunteered their service in the installation of the borehole.



By Mr Sizile Minisi from Marketing and Communications

EVALUATION: The Jericho Farm community member tests the new Borehole with IUCMA's Dr Tendai Sawunyama during the Borehole Handover Ceremony

IUCMA INITIATES THE 1ST HHOYI CAREER EXPO



ENGAGEMENT: Inkhosikati Ngomane engages the Learners, departments and organisations during the Hhoiyi Career Expo at Hhoiyi Traditional Council in Nkomazi Local Municipality.

The Inkomati-Usuthu Catchment Management Agency and Hhoiyi Traditional Council partnered in organizing the Hhoiyi Career Expo which took place during the 16th of August 2019. The Event was coordinated by IUCMA's Ms Liketso Khaile from the Institutions and Participation Division who is responsible for activities which occur in the Lower Komati Sub-Catchment.

The event was graced by the royal Queen Inkhosikati Ngomane and organisations such as the Department of Water and Sanitation, Tshikova Graduates Academy, Khosithi Artisan & Skills Training Institute, KOBWA, NYDA, Working on Fire and Damelin. Induna Mr Makhushwa welcomed the schools who attended the event highlighting that the event was about them as they are the most important guests for the event.

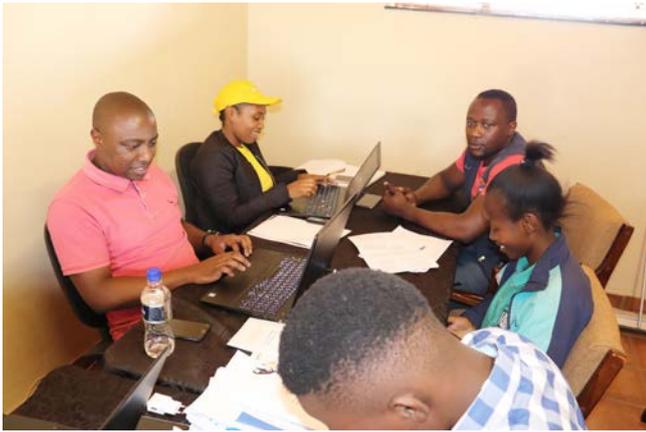
IUCMA's Mr Hasani Makhubele from Institutions and Participation spoke about IUCMA's management system, how it functions, to briefly generate information and introduce the learners to the company's

mandate. Such an information was crucial to create interest for the learners who are planning to pursue science careers as it makes a lot of impact in water quantity and quality Nationally and internationally.

IUCMA's Mr Golden Mthembi from Compliance Monitoring and Enforcement Division shared more information about the Technical involvement of the IUCMA and what kind of courses to choose when you want to be e.g. Environmental Officer or a Hydrologist, Mr Mthembi announced the availability of the internet cafe which was made available for the learners who are ready to apply to the Universities which they want to pursue courses at.



By Mr Advocate Gumbi from Marketing and Communications



ACTION: (from left to right) IUCMA's Mr Zomakahle Ndlovu, Ms Lindeni Thubana and Mr Golden Mthembu assisting a learner with a tertiary application during the Hhoyi Career Expo at Hhoyi Traditional Council.



CONCENTRATION: The Schools from the community of Nkomazi Local Municipality concentrating during the Hhoyi Career Expo at Hhoyi Traditional Council.



ACTION: IUCMA's Ms Gugu Mocha (Pink T-shirt) exhibiting the Career information about IUCMA to the learners during the Hhoyi Career Expo.



INFORMATION SHARING: IUCMA's Mr Golden Mthembu engaging the learners during the Hhoyi Career Expo.



ENGAGEMENT: IUCMA's Mr Hasani Makhubele engaging the learners during the Hhoyi Career Expo.



SUPPORT: IUCMA's Mr Mpendulo Shongwe (Green T-shirt) and Ms Mandisa Molo (Yellow T-shirt) assisting learners with Tertiary applications during the Hhoyi Career Expo.

TRENDS IN THE ECOLOGICAL STATUS OF THE SABIE-SANDS CATCHMENTS

The Sabie-Sands Catchment is one of the four catchments under the management of the Inkomati-Usuthu Catchment Management Agency. It is the smallest of the four catchments with an estimated surface area of 6320 km². The other catchments are Crocodile, Komati and Usuthu. The Sabie-Sands catchment originates in the eastern escarpment at an elevation of 2207 meters above sea level. The main Sabie River flows in an easterly direction for approximately 235 km from its source to its confluence with the Inkomati River in Mozambique. The main land uses in the catchment include commercial forestry, sawmills, industries, subsistence and commercial agriculture, trout hatcheries, rural and urban residential areas, and wastewater treatment works. There are also tourism activities with several nature reserves, including the world-renowned Kruger National Park, occurring in the catchment. There are several large dams, such as Injaka and Da Gama dams, in the catchment. All the afore-mentioned activities have potential to negatively impact on the health of the aquatic ecosystem. This can either be directly through discharges of wastewater into the rivers or indirectly through run-off from agricultural and residential areas. It was with this potential impacts in mind that studies to determine the present ecological state of the catchment were conducted.

The IUCMA through the division Water Resource Protection and Waste implements the River Ecostatus Monitoring Programme to determine the present ecological state of rivers within the Water Management Area. The Present Ecological Status of a river is expressed in terms of various abiotic and biotic factors which are then integrated to provide the Ecostatus of the river. The biotic factors (i.e. macro-invertebrates, fish and riparian vegetation) provide an indication of biological responses to the changes in the abiotic factors (i.e. physico-chemical, geomorphology and hydrology), which serve as drivers. The division uses a suite of models as prescribed through the Ecostatus Approach and these are Macro-Invertebrates Assessment Index (MIRAI), Fish Response Assessment Index (FRAI), Riparian Vegetation Response Assessment Index (VEGRAI) and Geomorphological Assessment Index (GAI). Macro-invertebrates are able to show localized and short term impact on a river while fishes are able to show long term impacts on a larger scale. Riparian vegetation shows the extent to which human activities encroach into the riparian zone as well as an extent to which invasive species occur. The integration of the macro-invertebrates, fish and riparian vegetation data are therefore able to show an accurate measure of the extent to which human activities impact on water resources.

The implementation of the River Ecostatus Monitoring Programme in the Sabie-Sands Catchment commenced in 2012 and was done again in 2016. The two surveys were done by the Mpumalanga Tourism and Parks Agency as an appointed Professional Service Provider. Additional surveys were conducted internally by the IUCMA officials in 2017 and 2018. An average of 38 sites were sampled per survey and the sites remained unchanged during the four surveys to ensure comparability of the results. The sites are located from the upstream of the catchment through the middle reaches into the lower reaches. The methods used for the collection of data and analyses are SASS5, MIRAI, FRAI and VEGRAI. Macro-invertebrates and fish samples were collected in all four surveys while vegetation assessments were conducted in three surveys from 2016 to 2018 surveys.

The MIRAI results obtained in the 2012 surveys showed the catchment to be generally in a B category indicating largely natural conditions with fewer modifications. There were five reaches which were in a B/C category indicating largely natural to moderately modified habitats and biota while one reach was in a C category indicating moderate modification in the habitat and biota when compared to the Reference Conditions. The 2016 survey shows the catchment to be generally in a C category indicating moderate modifications in response to anthropogenic activities. There were reaches which were in a C/D and D categories, indicating moderate to large and large modifications while other reaches were in a B category, indicating largely natural conditions. The results from the 2017 and 2018 were fairly constant showing the catchment to be in a C category indicating moderate modifications. The FRAI results obtained in the 2012 survey shows the catchment to be in a B category with some reaches in B/C, C and C/D categories. The 2016 results show the river to be in a B/C category with other parts of the catchment being in B, C and C/D categories. The 2017 and 2018 surveys show the catchment to be in B to C categories with one reach being in a D category in both surveys. The VEGRAI results obtained in the 2016 survey shows the catchment to generally be in a C category

but with some reaches being in B, B/C, C/D and D categories. The 2017 and 2018 surveys show the catchment to be in largely similar categories as those obtained in the 2016 survey.

The results obtained from four surveys show general deterioration in the Ecological Status of the Sabie-Sands Catchment. Figures 1, 2 and 3 illustrates the trends in MIRAI, FRAI and VEGRAI, respectively, for years 2012, 2016, 2017 and 2018. The deterioration can be directly attributed to human activities which lead to the declines in the water quality through pollution from surrounding land use activities. Through the degradation of the rivers, the available habitat to maintain fish and macro-invertebrates population is reduced. There were several activities which were identified in the catchment that have adverse effect on the water resources, and this includes commercial forestry which is a stream flow reduction activity, commercial and subsistence agricultural practices, rural and urban residential areas, and sawmills. Urban residential areas such as Sabie have dysfunctional wastewater treatment plants which discharge untreated water directly into the Sabie River. This leads to further deteriorations in water quality. Rural areas on the other hand have inadequate domestic waste removal services and rivers and riparian zones are used as waste disposal sites as was observed at several sites on the Sabie, Klein Sabie, Sand, Maritsana and Mutlumuvi rivers. Other emerging environmental problems in the catchment include Sand Mining which was observed on several sites as well as the presence of invasive alien species of fauna and flora. In addition to

anthropogenic activities, the river is impacted by natural processes such as drought. The 2016 survey was conducted during a drought period and there were lower flows in the river which reduces available habitat for biota. It is therefore important that action be taken to mitigate the impacts that both human and natural activities have on the river. This includes concerted efforts to repair the dysfunctional wastewater treatment plants, removal of domestic waste from rivers, establishing suitable waste disposal sites for communities, removal of alien invasive species, and limiting sand mining in the catchment. The importance of education and awareness in the protection of water resources cannot be overemphasized and should be at the forefront of any mitigation action to minimize the impacts of anthropogenic activities on the Sabie-Sands Catchment.



By Mr Mahlodi Dikgale from Resource Protection and Waste

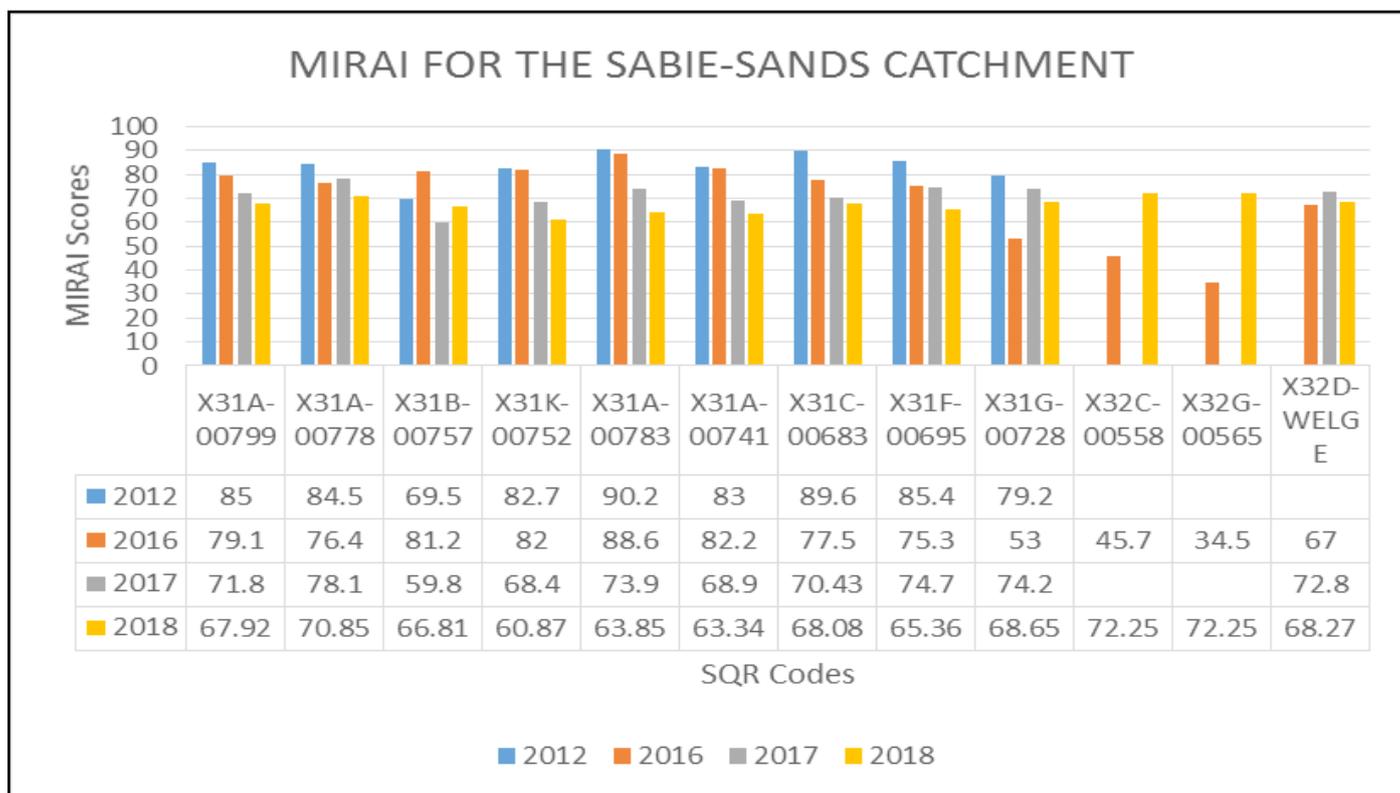


Figure 1: A graph showing the Macro-Invertebrates Response Assessment Index results for the Sabie-Sands Catchment for surveys conducted in 2012 to 2018.

FRAI FOR THE SABIE-SANDS CATCHMENT

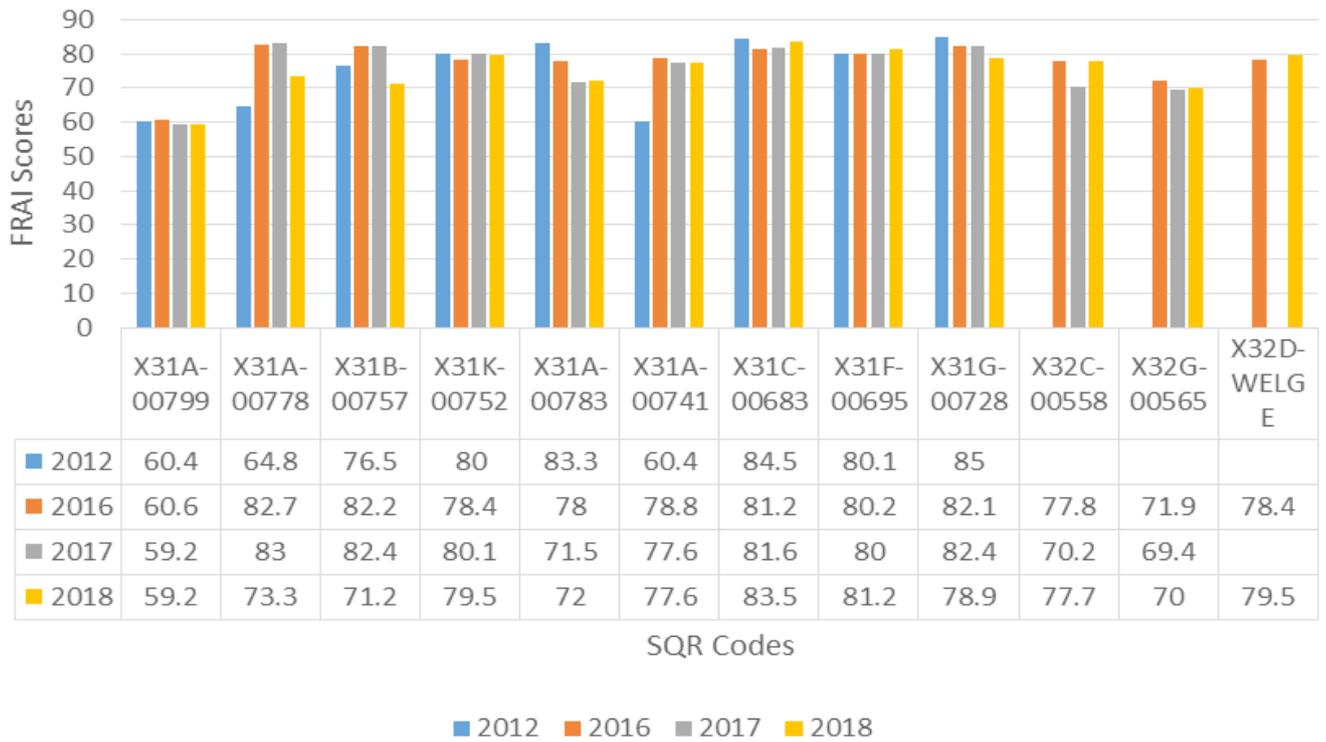


Figure 2: A graph showing the Fish Response Assessment Index results for the Sabie-Sands Catchment for surveys conducted in 2012 to 2018.

VEGRAI FOR THE SABIE-SANDS CATCHMENT

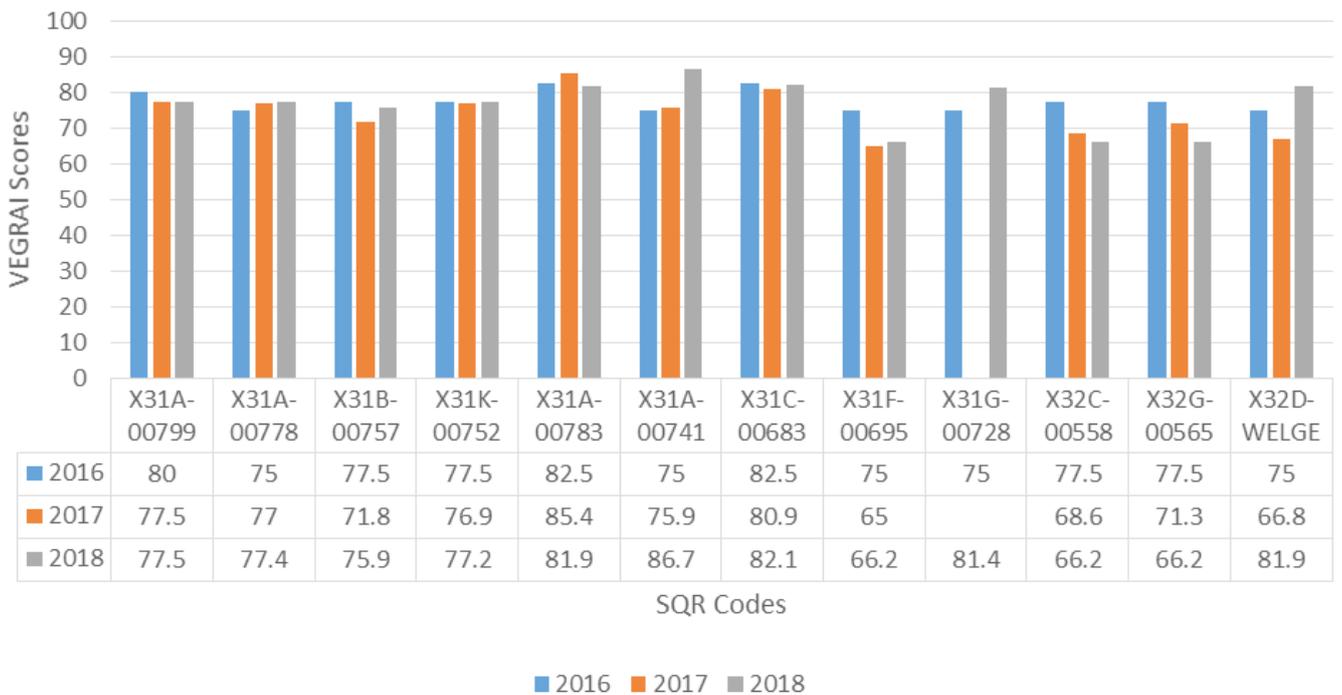


Figure 3: A graph showing the Vegetation Response Assessment Index results for the Sabie-Sands Catchment for surveys conducted in 2016 to 2018. Vegetation assessments were not conducted in the 2012 survey.

CAREER GUIDANCE

FOR LEARNERS IN WATER RESOURCE MANAGEMENT

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)



2019 NATIONAL SCIENCE WEEK

The National Science Week took place at the Mondi Science Centre which situated in Mkhondo Local Municipality in Piet Retief from 29 July 2019 to 02 August 2019. The National Science Week was attended by a group of IUCMA employees and a number of graduate trainees in different divisions of the institution, the IUCMA personnel was encouraging learners in Grade 11 & 12 to pursue careers in the science stream and also in the water management sector. The graduate trainees were assisting learners with online applications and application requirements in all South African Public Higher institutions of learning and Training.

The learners well received the opportunity presented to them by the officials, accessing of information by them was an extra advantage as they managed to gather enough information which will improve their lives. IUCMA was joined by numerous stakeholders which includes the likes of the Department of Water and Sanitation, Eskom, Transnet, Vaal University of Technology (VUT) and many more. The aim of the exhibition was to assist learners living in the rural areas and in farms to access internet and seeking information about the institution.

Having access of information, it bridges the gap between those who are living in the rural areas and those who are living in the townships, as they are able to gather more



ACTION: IUCMA's Ms Pamela Mokoena and Ms Mandisa Moloji assisting the learners with University applications during the National Science Week at Mondi Science Centre in Mkhondo Local Municipality (Piet Retief).

information using the platforms, professionals present about their different science careers to the learners.

Science expo provides a platform for the students, where they can learn from each other's experiences and get motivated to design and develop something new and innovative.



By Mr Sizile Mnisi from Marketing and Communications

References

EcoStatus definition

www.dwa.gov.za/IWQS/rhp/rh_assessment.html



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