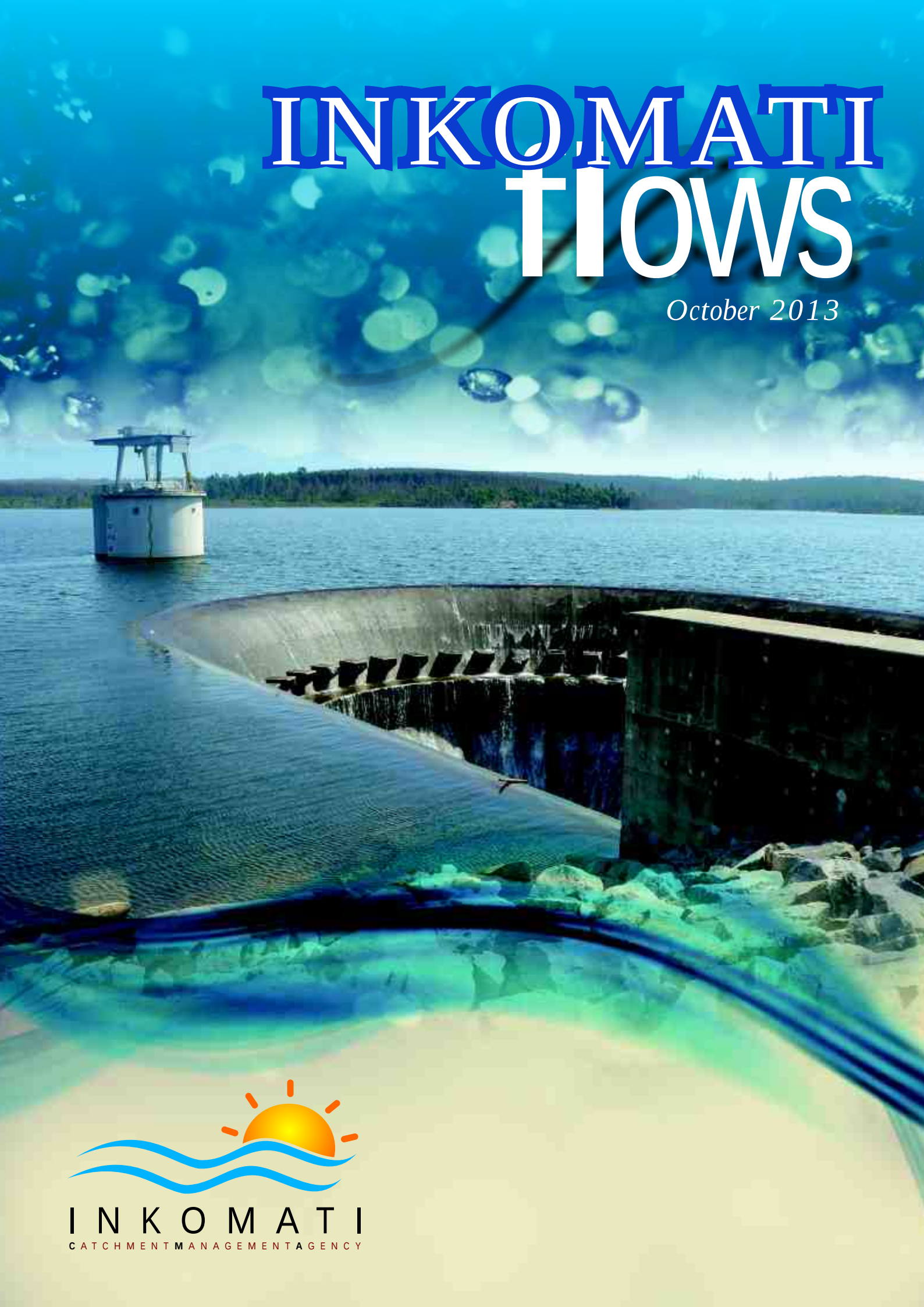
INKOMATI flows

October 2013



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CATCHMENT MANAGEMENT AGENCY

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Vision

Water for all in Inkomati

Mission

Our mission is of a pioneering catchment management system that empowers stakeholders to engage in consensual and adaptive decision making, to achieve reform, and to promote persistent social, economic and environmental justice across the Inkomati catchment.

- The Inkomati CMA supports the co-operative management of the Inkomati basin as an internationally shared water course
- The decision-making environment of the Inkomati CMA, including delegated functions, enables collaborative action towards equity, sustainability and efficiency in a continually evolving socio-economic system.
- The Inkomati CMA manages the resources adaptively, co-operatively and progressively to achieve social, economic and environmental justice, and promote healthy living.

Our Values

- The Inkomati CMA acknowledges the interdependence of our responsibilities for caring for the resource and there is explicit recognition of the diversity achieved by what individual/ group contributes to promoting equity, efficiency, and sustainability as defined in the National Water Act.
- Decisions, actions and outcomes are subject to performance evaluation against measurable goals, indicators and timeframes.
- The Inkomati CMA strives for a trusting, transparent and corrupt-free system of catchment management that is cognisant of existing agreements and promotes fairness before the law, environment and economic development.
- Management is adaptive, open to critique and outcomes driven, with solutions being practical, achievable and implementable.
- The Inkomati CMA practices problem solving that embraces:
- Ethics of Ubuntu (out humanity is defined by how others experience our behaviour), Simunye (we are one) and Batho-pele (people first)
- Consensus driven stakeholder participation
- Decision within our mandate are made and are justified on the basis of the best available social, technical, economic, environmental and governance knowledge.

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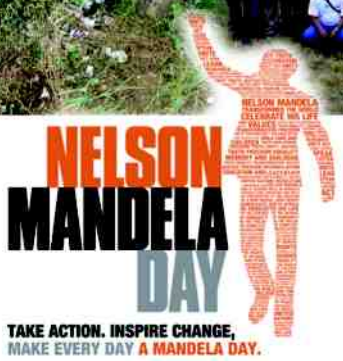
MANDELA DAY

A call for keeping our environment clean

While the hype about Mandela day seems over, the Inkomati Catchment Management Agency (ICMA) calls for community members to make their everyday lives worthwhile by keeping the environment clean. On Mandela day, the ICMA, together with its partners like the Department of water affairs (DWA), SembCorp Silulumanzi, and Theo Technologies painted the town orange in the Rob Ferreira Hospital and Pick n Pay area in an awareness campaign to keep the rivers and the immediate environment clean. While subject is not well spoke about, a healthy environment and clean a clean water resources are the backbone of our livelihoods. It is the responsibly of the ICMA, according to the National Water Act to advice communities on issues of Integrated Water Resources Management (IWRM). In order for this to be realised, communities needs to be educated along this line and the campaign was one of the instruments the ICMA is using to keep the communities informed and aware of what value they can add in the whole value chain.

Littering is scary. It is hazardous to the environment. Only a small portion of that stream that was covered during Mandela day but bags and bags were collected. The litter ranges from pieces of clothing, cardboards, cans, plastics, used condoms, the list goes on. The scariest thing was a strong stench of urine and faeces, it is basically an open air toilet out there. This is disgusting and very unhealthy to the environment and the air we breathe. The area in question is just outside Rob Ferreira hospital where the sick are kept, and yet the community out here keeps on polluting the area. It is about time that the community of Nelspruit and the commuters wake up and start being responsible when it comes to these issues.

Come on Nelspruit, be part of the change and contribute to a carbon free South Africa. Remember, a journey of a thousand miles starts with a single step.



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RIVERS CLASSIFICATION

Determination of Water Resource Classes and associated Resource Quality Objectives in the Inkomati Water Management Area

By Mohlapa Sekoele, Project Manager: Inkomati Classification, Department of Water Affairs

The purpose of this report is to provide an update to stakeholders of the water resource classification process and the determination of resource quality objectives that has been initiated by the Department of Water Affairs in the Inkomati Water Management Area. This process is implemented with the cooperation of the Inkomati Catchment Management Agency (ICMA). Through this process significant water resources within the catchment will be classified in accordance with the Water Resource Classification System and the resource quality objectives will be determined.Stakeholders are invited to participate in the process by corresponding with the public participation office or the technical team at the addresses provided below.

Public participation office
AnelleLötter or SibongileBambisa
Jones and Wagener (Pty) Ltd
P O Box 1434, Rivonia, 2128
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Postnet Suite 40, Private Bag x4,
Menlo Park, Pretoria
Tel: (012) 3652121

Background and purpose of the study

This study entitled “Classification of Water Resources and determination of the Resource Quality Objectives (RQOs) in the Inkomati Water Management Area (WMA)” was commissioned by the Chief Directorate Resource Directed Measures of the Department of Water Affairs (DWA) in April 2013.

The ultimate goal of the study is the implementation of the Water Resource Classification System (WRCS) in the Inkomati WMA according to the steps proposed by the WRCS as well as to determine the Resource Quality Objectives in the WMA.The WRCS is a set of guidelines and procedures for determining the desired characteristics of a water resource, and is represented by a Management Class (MC). The Management Class outlines those attributes that the DWA and society require of different water resources. The WRCS prescribes a consultative process to classify water resources (Classification Process) to help facilitate a balance between protection and use of the nation's water resources.The determination of Management Classes of the significant water resources in the Inkomati WMA will essentially describe the desired condition of the resource, and conversely, the degree to which it can be utilised by considering the economic, social and ecological goals of the users and stakeholders.

Water resources must be classified into one of the following Management Classes:

- Class I water resource is one which is minimally used and the overall ecological condition of that water resource is minimally altered from its pre-development condition;

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- Class II water resource is one which is moderately used and the overall ecological condition of that water resource is moderately altered from its pre-development condition; or
- Class III water resource is one which is heavily used and the overall ecological condition of that water resource is significantly altered from its pre-development condition.

Classes	Description of use	Dominant Ecological categories
Class I	Minimally used	A and or B
Class II	Moderately used	C
Class III	Heavily used	D

Ecological Category (EC) - means the assigned ecologicalcondition to a water resource in terms of the deviation ofits biophysical components from a pre-development condition.

The purpose of determining Resource Quality Objectives is to establish clear goals relating to the quality of the relevant water resources. RQOs capture the Class and the ecological needs into measurable goals that give direction as to how the resources need to be managed. The RQOs can be numeric or descriptive statements relating to the biota, habitat, flow, ecological and user water quality.

Study approach and progress

The Inkomati WMA has been the subject of various studies and information is available for this Classification study. The availability of data and information from past studies is considered for the execution of the study. The most important source is the recently completed high confidence Reserve Determination Studies in the Inkomati WMA. Currently the ICMA is implementing a real time operational water resources management Decision Support System (DSS) including an ecological Reserve model on the Crocodile River system. The process followed in this study, is cognisant of and aligned to the systems already in place at the ICMA. Application of the data in this Classification study is essential to ensure consistency in planning, operation and the selection of the appropriate management classes.

There are three DWA processes which forms the basis for the completion of this study. These are the determination of the Management Classes (within the application of the WRCS),the determination of the Reserve (completed),and the description of the RQOs which qualitatively and numerically describe the Management Classes. Each of these processes has specific steps and various methods and tools which have been reviewed and or published by the DWA. The steps for each of the processes are linked and will be applied in an integrated manner during this study. Key aspectsthat will be assessed during this study are the determination of the status quo of the Inkomati WMA, the determinationof the Ecological Water Requirements for various nodes in the WMA and, once the Management Classes have been approved, RQOs will be developed to describe the Management Classes.

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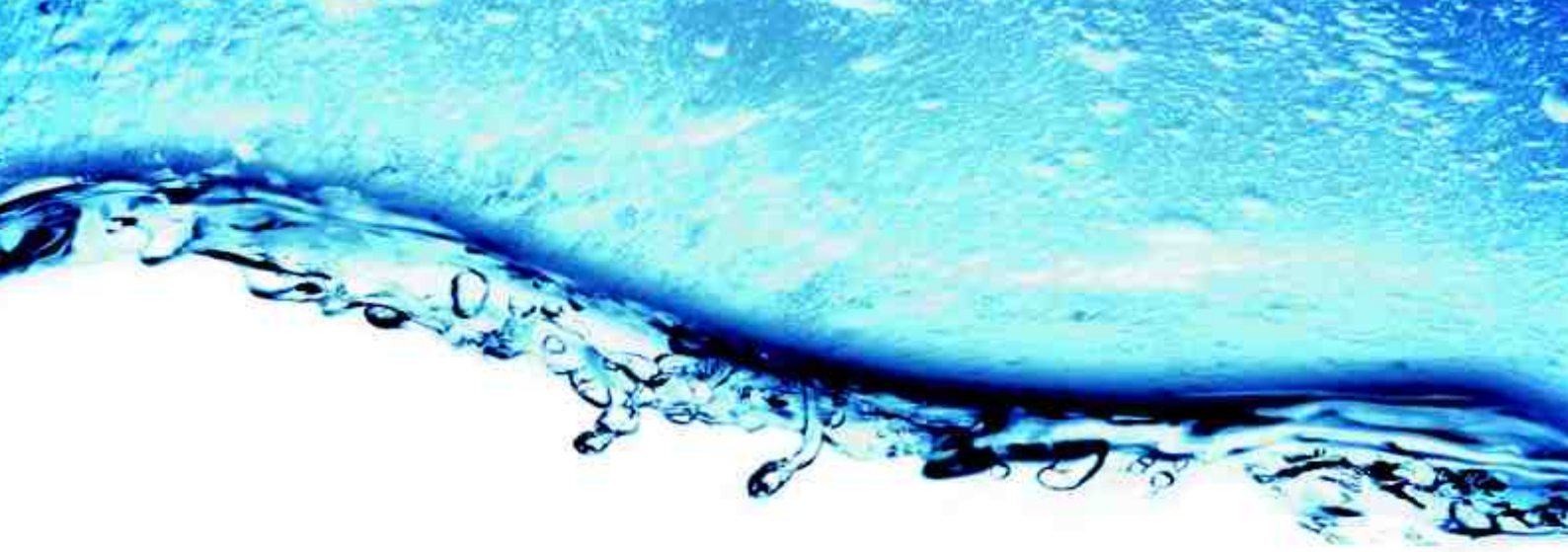

Since the inception of the Study in April 2013, the Inception Report which was compiled to guide the project over its 24 month durationwas available for stakeholder commentand is in the process of being approved by DWA. The Status Quo Reportcompiled to define the current status of the water resources in the study area in terms of the water resource systems, the ecological characteristics, the socio-economic conditions and the community well-being was compiled. Approval of the report is pending comments from the Project Steering Committee members.

A public meeting was held on 12 June 2013 in White River to introduce the study and to obtain stakeholder comments at the beginning of the process. The first Project Steering Committee (PSC) was held on 29 July 2013 in White River. The objectives of the meeting were to establish the PSC, provide comment on the Inception Report as well as on the information contained in the Status Quo Report and to set a vision for the Letaba Catchment. Representative stakeholders from the Crocodile, Sabie and Komati catchments attended the meeting. A Technical Task Group (TTG) meeting to discuss the socio-economic component of the classification process was held on 16 October 2013. A meeting with the mining sector in the WMA is proposed to take place in November 2013 to discuss specific concerns of the mining industry with regards to the WRCS.

The documents mentioned in this section, the minutes and presentation delivered at the mentioned meeting are available on the DWA
web site:
http://www.dwa.gov.za/rdm/WRCS/default.aspx.

Determination of the Status Quo of water resources in the Inkomati WMA
The purpose of determining the status quo of water resources in the study area is to define it in terms of water use, economy, river and wetland ecology, water quality and Ecosystem Services. This information assisted to define the Integrated Unit of Analysis (IUAs). With the IUAs defined, Resource Units (RUs) and biophysical nodes can be identified for different levels of Ecological Water Requirement (EWR) assessment and the setting of RQOs. This task therefore describes the physical template and information for decision making regarding the different levels of investigation for Reserve, Classification and RQO determination.

The status quo for each of the Integrated Units of Analysis (IUAs) is provided in terms of the following aspects:

- Water resource infrastructure and availability;
- Ecological status;
- Socio-economic conditions; and
- Ecosystem services (communities and their well-being).

Below is a summary of the status quo findings which aredetailed in a Status Quo Reportwhich is available on the DWA web site.

Integrated Unit of Analysis (IUA) - What is it and how is it used?

An IUA is a broad scale unit (or catchment area) that contains several biophysical nodes. These nodes define at a detail scale specific attributes which together describe the catchment configuration of the

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IUA	Description	Quaternary catchments
Kom1	The area upstream of the Nooitgedagt Dam	-- --
Kom2	The area between Nooitgedagt and Vygeboom Dam	X11E – X11H
Kom3	The Gladdespruit catchment	X11J
Kom4	Major undeveloped tributaries south of the Komati (Teesrpuit, Seekoeisrpuit, Buffelsspruit, Mtosoli and Mlondizi)	X12A – X12J
Kom5	The main stem of the Komati River between the Vygeboom dam and the Swaziland border	X11K-3, X11K-4, X12G-4, X12H-3, X12K-2
Kom6	Lomati River upstream of Swaziland	X14A, X14B
Kom7	Lomati downstream of Swaziland	X14F, G and H
Kom8	Komati River downstream of Swaziland	X13J
Kom9	Lower Komati River downstrean of confluence with the Lomati river	X13K, X13L
Croc1	Upstream of the Kwena Dam	X21A,B and C
Croc2	Eland River catchment up to Ngodwana	X21F to X21J
Croc3	Ngodwana River	X21H
Croc4	Crocodile downstream of the Kwena Dam to the confluence with the Elands Rivers	X21E
Croc5	Elands River downstream of Ngodwna	X21K
Croc6	Houtbos and Nels River	X22A, X22B-1, X22D, X22F-2
Croc7	Small tributaries south of the Crocodile	*X22C-1, X22C-2,* southern portion of X22J-1,J-2,K-1,K2
Croc8	Main stem of Crocodile River from Montrose falls to Crocodile gorge	X22B-2, X22C-3, northern portion of X22J-1,J-2,K-1,K2, X22K-3
Croc9	Kaap River	X23
Croc10	Sand and White River	X22E,G,H,F-1
Croc11	Nsikasi River	X24A-1,B-1,B-2, C-4, part of X24A-2,B-3 and C-1
Croc12	Main stem of the Crocodile River downstream of Crocodile Gorge	X24D-1, part of X24D-2, E-1,E2, F-1,H-1,H-2
Croc13	Northern tributaries of the Crocodile River located in the Kruger National Park	X24G-1, part of X24A-2,B-3,C-1,D-2,E-1,E-2,F-1,H-1,H-2
Sabie 1	Upper Sabie River	X31A,B,C and X31D-1
Sabie 2	Sabaan River and upper Sabie irrigation	X31D-2,D-3
Sabie 3	Upstream of Inyaka Dam	X31E
Sabie 4	Motitis and Marite Rivers	X31F and G
Sabie 5	Upstream of Da Gama Dam	X31H
Sabie 6	White Water and Noord Sand Rivers	X31J
Sabie 7	Tributaries north of the Sabie	X31L, X31K-3, part of X31K-3, K-4, M-1, M-2
Sabie 8	Tributaries south of the Sabie	X31K-2,M-1,M4, part of X31K-4, M-1, M-2
Sabie 9	Main stem of the Sabie River d/s of the Marite River	part of X31K-1, K-4, M-1, M-2
Sand1	The Sand River	X32
SabieSand	The Sabie River after the confluence with the Sand	X33
X40	The X40 catchment	X40

IUA. Scenarios are assessed within the IUA and relevant implications in terms of the Management Classes are provided for each IUA.

The identification and selection of the Integrated Units of Analysis (IUAs) were based on the following considerations:

- The resolution of the hydrological analysis and available water resource network configurations currently being modelled.
- Location of significant water resource infrastructure.
- Distinctive functions of the catchments in context of the larger system.
- The Present Ecological State (PES) of each biophysical node was considered as well the type of impacts and the homogeneity of the state and impacts.

The following IUAs were delineated in the Inkomati WMA (see map):

A summary of the status quo of the Inkomati WMA is provided below.

Water resources assessment

The Inkomati WMA comprises the Komati, Crocodile East and Sabie/Sand Rivers, as shown in the map. These three major tributaries of the international Inkomati River Basin are operated largely independently of each other and are therefore described as separate entities.The Inkomati WMA was divided into 34 water resource zones based on similar water resource operation, location of significant water resource infrastructure (including proposed infrastructure) and distinctive functions of the catchments in context of the larger system.This process was incorporated into the final identification and selection of the Integrated Units of Analysis (IUAs).

The reality in the Inkomati WMA (as documented in ICMA Catchment Management Strategy and the Mbombela Reconciliation Strategy) is that the water requirements in the WMA exceed the water resource (if expressed as firm yield). What this implies is that restrictions will need to be imposed on users periodically. A Water Resources Modelling Platform (WReMP) is used on a weekly basis as a Decision Support System to advise on releases from dams and to advise on when to impose restrictions on users. Since WReMP is modelling the catchment in this manner it is the logical tool to use to describe the water resources and to model scenarios for this Classification study.

The groundwater resource in the Inkomati WMA has been the topic of many studies.A total of nineteen groundwater units of analysis (GUA's) were delineated. Most of the groundwater use in the Inkomati WMA is for rural domestic supplies, as well as for game and livestock watering in its drier parts. Groundwater abstraction for irrigation purposes is also increasing. The following GUAs were delineated:

Sub-Catchment	GUAs	Area Km^2	No of Quats.	Predominant Geology (Rock Type)	Aquifer Rating
Komati Sub-Catchment	GUA1-1	1,588	3	Karoo Supergroup (Vryheid Formation) sandstone, shale and coal seams. Intrusive Dykes.	Insignificant to Minor
	GUA1-2	1,278	4	Pretoria Group (Lydenburg Shale) Shale, mudrock and quartzites, Malmani Sub-Group Dolomites	Minor
	GUA1-3	451	2	Pretoria Group (Lydenburg Shale) Shale, mudrock and quartzites Malmani Sub-Group Dolomites	Minor to Moderate (dolomites)
	GUA1-4	585	3	Karoo Supergroup (Vryheid Formation) sandstone, shale and coal seams. Intrusive Dykes. Pretoria Group (Lydenburg Shale) Shale, mudrock and quartzites. Basement Complex	Minor to Moderate (dolomites)
	GUA1-5	2,511	10	Basement Complex (Granite, Gneiss). Onverwacht Group (Ultramafic, and mafic lavas). Fig Tree Group (Pyroclastic rocks, greywacke)	Minor
	GUA1-6	1,471	4	Basement Complex (Nelspruit Suite) Porphyrytic granite Moodies Group (Sandstone, quartzite, shale, conglomerate) Karoo Supergroup (Basalts, diamictite, mudrock and Sandstone)	Minor
	GUA1-7	908	2	Karoo Supergroup (Basalts, diamictite, mudrock and Sandstone)	Insignificant to Minor
Crocodile Sub-Catchment	GUA2-1	1,174	4	Pretoria Group (Shale, siltstone and quartzites). Diabase (Intrusive). Alluvium and Scree	Minor to Moderate (alluvial aquifers)
	GUA2-2	744	2	Pretoria Group (Shale, siltstone and quartzites). Alluvium	Minor to Moderate (alluvial aquifers)
	GUA2-3	1,926	7	Malmani Sub-Group Dolomites. Pretoria Group (Shale, siltstone and quartzites). Diabase (Intrusive). Alluvium	Minor to Moderate (dolomites/alluvium)
	GUA2-4	2,483	10	Basement Complex (Nelspruit Suite) Porphyrytic granite, and granodiorites)	Insignificant to Minor
	GUA2-5	1,942	9	Kaap Valley Tonalite (Horneblende, biotitetonalite) Moodies Group (Subgreywacke, quartzite, shale, conglomerate) Fig Tree Group (Greywacke and shale)	Minor to Moderate (intergranular aquifers)
	GUA2-6	2,177	4	Basement Complex (Nelspruit Suite) Porphyrytic granite, and granodiorites). Moodies Group (Subgreywacke, quartzite, shale, conglomerate). Fig Tree Group (Greywacke and shale)	Minor to Moderate (intergranular aquifers)
Sabie/Sand Sub-Catchment	GUA3-1	887	5	Malmani Sub-Group Dolomites. Basement Complex (Nelspruit Suite) Porphyrytic granite, and granodiorites). Pretoria Group (Shale, siltstone and quartzites). Diabase (Intrusive)	Minor to Moderate (dolomites)
	GUA3-2	1,367	6	Basement Complex (Nelspruit Suite) Porphyrytic granite, and granodiorites. Timbavati gabbro. Cunning Moor Tonalite	Minor to Moderate (intergranular aquifers)
	GUA3-3	1,072	7	Basement Complex (Nelspruit Suite) Porphyrytic granite, and granodiorites). Makhutswi Gneiss. Cunning Moor Tonalite	Insignificant to Minor
	GUA3-4	2,153	4	Basement Complex (Nelspruit Suite) Porphyrytic granite, and granodiorites). Cunning Moor Tonalite. Alluvium	Minor to Moderate (intergranular aquifers/alluvium)
	GUA3-5	844	3	Karoo Supergroup (Basalts, diamictite, mudrock and Sandstone)	Insignificant to Minor
X4 Sub Catchment	GUA4-1	3,197	4	Basement Complex (Gneiss). Karoo Supergroup (Basalts, diamictite, mudrock and Sandstone). Alluvium	Insignificant to Moderate (alluvium)

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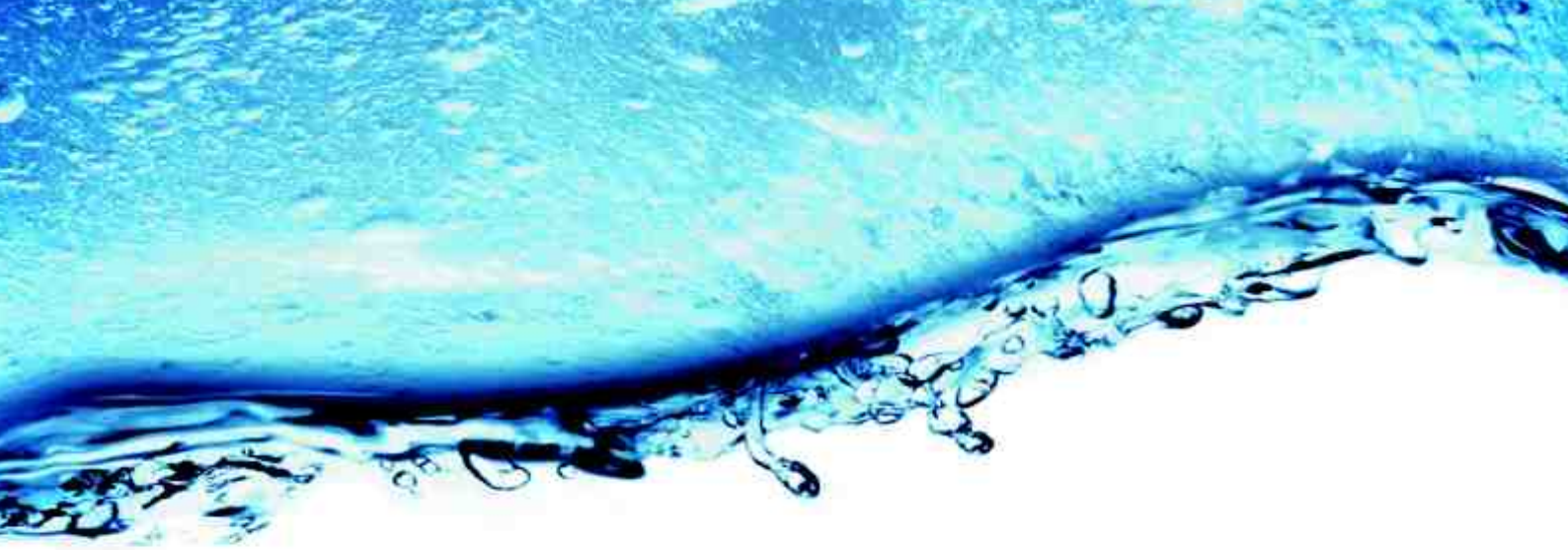


Water quality issues

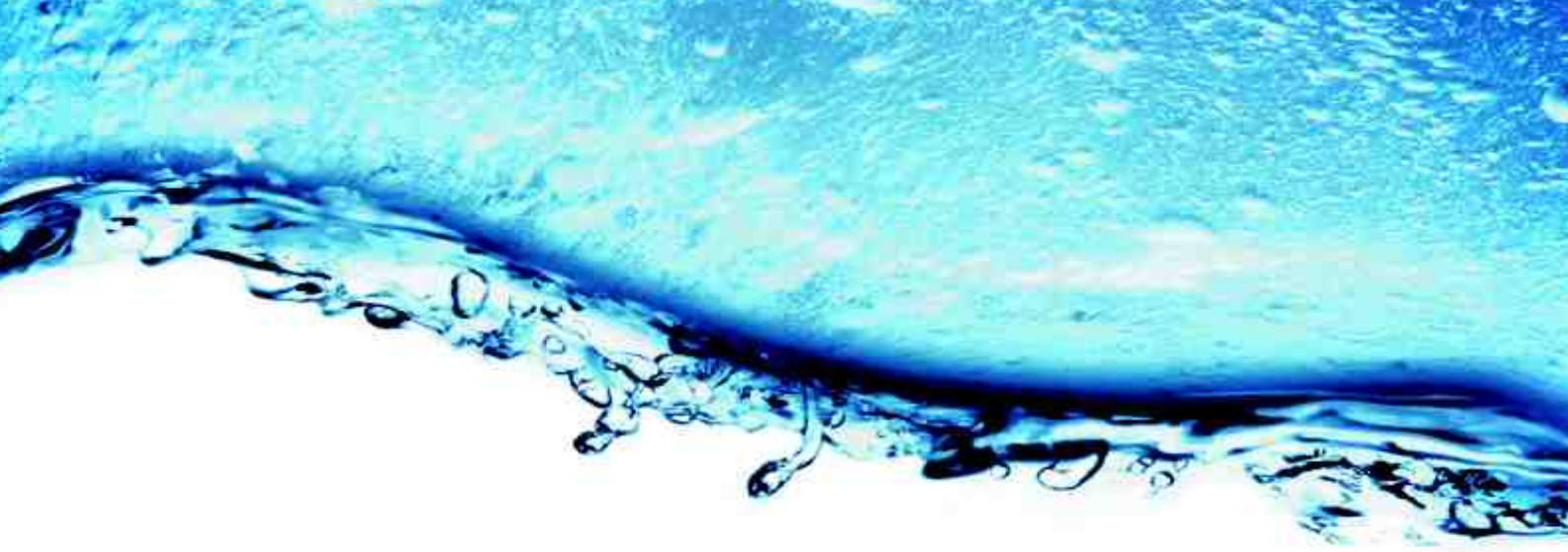
Undesirable levels of water quality not only impact negatively on irrigation crop yields and quality and have an adverse impact on industrial water use, but also impact negatively on aquatic ecosystems, thereby degrading the very resource that so many services are dependent on. Bringing the quality of the water to acceptable levels for specific users can also be a costly process. The first step in the Classification process is evaluating the Status Quo of water quality across the catchment, for which an evaluation of land use is necessary.

The Komati River is generally in a Good - Fair condition in terms of water quality, with a hot spot occurring at the lower Komati, down to the confluence with the Crocodile River (Afridev Consultants, 2006). A “critical risk” was the status for the Tonga Waste Water Treatment Works (WWTW) on the Komati River, catchment code X13J-01130, Nkomanzi Local Muncipality as per the 2012 Mpumalanga Green Drop Report for WWTW.

The water quality in the Crocodile sub-area is generally Fair to Good although deterioration of the quality in the lower Kaap River (often high levels of arsenic) and lower Crocodile River is observed. This is due to return flows from upstream users including irrigation, urban areas and old gold mining activities, as well as wastewater treatments work, extensive sugarcane and sugar processing mills in the lower Crocodile catchment. Irrigation return seepage is noticeable during periods of low flow. The potential water quality problems emanating from the Sappi paper mill at Ngodwana is one the most serious water quality problem in the catchment. Effluent has been disposed of through irrigation for a number of years but the soil has become saturated with salts (especially chlorine) and these leach out into the Elands River and then enter the Crocodile River. Several WWTW received “high risk” and “critical risk” status se per the Green Drop Report.

Surface water quality in the Sabie River catchment is Good. Return flows are limited, and originate primarily from irrigation. Inyaka Dam provides substantial assimilative capacity to maintain good water quality in the Sabie River. Water quality monitoring over a ten year period by Weeks et al. (1996) demonstrated that surface water was suitable for domestic consumption, irrigation and livestock at the time. The Sabie River has been shown to be the least mineralized of all the rivers in the KNP (Van Veelen, 1991). These factors, coupled with observed low Total Dissolved Solids (TDS) concentrations, make this a stable but sensitive system (DWA, 2010b).

The Sand River catchment is a relatively dry catchment with limited water resources but a large semi-urban population. The water requirements in the catchment are mostly for domestic use and irrigation. The water resources of the catchment are not sufficient to meet requirements (DWAF, 2004). The surface water quality in the Sand River sub-catchment is not as good as in the Sabie River sub-catchment due to over-abstraction which reduces the natural assimilative capacity of the river. Occasional elevated levels of nutrients in the Sand River are noted, with informal housing developments a suspected cause. The large number of rural settlements which rely on pit latrines is cause for concern.



Although there are no “critical risk” WWTW in the catchment, some received a “high risk” status according to the Green Drop Report.

Groundwater:

A deterioration of the groundwater quality (salinity) in the WMA from west to east, following essentially the average annual rainfall, is obvious. While the higher rainfall areas in the west have usually a TDS content of less than 300 mg/l, the TDS content in the more arid areas in the east (i.e. GUA 1-7; GUA3-4 and GUA3-5) rises to more than 1000 mg/l – resulting in poor water quality.

Several samples show major ion concentrations (i.e. Mg, Na, Cl, and F) and subsequently electric conductivities elevated to Class II drinking water qualities. This can mostly be related to evaporative concentration of elements in discharge areas or low recharge values, while the occurrence of fluoride is primarily controlled by geology. Therefore, there are no preventative measures under the given spatial limits of water supply to avoid exceedance of applicable drinking water limits in certain regions except treatment.

Current mining activities, including the reprocessing of old waste dumps, present a possible threat to local groundwater resources if applicable environmental legislation is not enforced. Sub-standard sewage treatment plants and agricultural activities also pose a threat to groundwater quality. The water quality in the rural settlements ranges from good to poor. The increase in the use of septic tanks, pit and bucket latrines poses a direct risk to the groundwater quality in terms of nitrate and bacterial or viral concentrations.

Ecological status quo

A desktop analysis was undertaken to determine the ecological status quo (otherwise referred to as the Present Ecological State (PES)) of wetlands and river reaches covering the Inkomati WMA. The PES is described in terms of Ecological Categories (EC) of A to F with A being almost natural and F meaning critically modified. Reasons for the change from “natural” are provided and what is especially important is whether these are flow (eg abstraction) or non-flow (eg riparian vegetation removal or land use practices) related.

The Komati River in South Africa and Swaziland is extensively modified through flow regulation and inundation (large number of dams and weirs). In the lower Komati downstream of Swaziland there are basically no sections of river left that have not been inundated. Other notable impacts in the Komati catchment include forestry, some mining in the upper areas, sections with extensive alien vegetation, overgrazing and sedimentation.There are 10 SQ reaches in a B PES (outside of Swaziland). Most of these reaches are upstream of Swaziland. The reasons for the relatively good state are due to inaccessibility related to the mountainous terrain. Eight of the 10 SQs are source rivers.

The upper Komati (upstream from Swaziland) is primarily in a C (and B/C) PES with the most significant impacts being irrigation, agriculture, mining, flow regulation, inundation, forestry and

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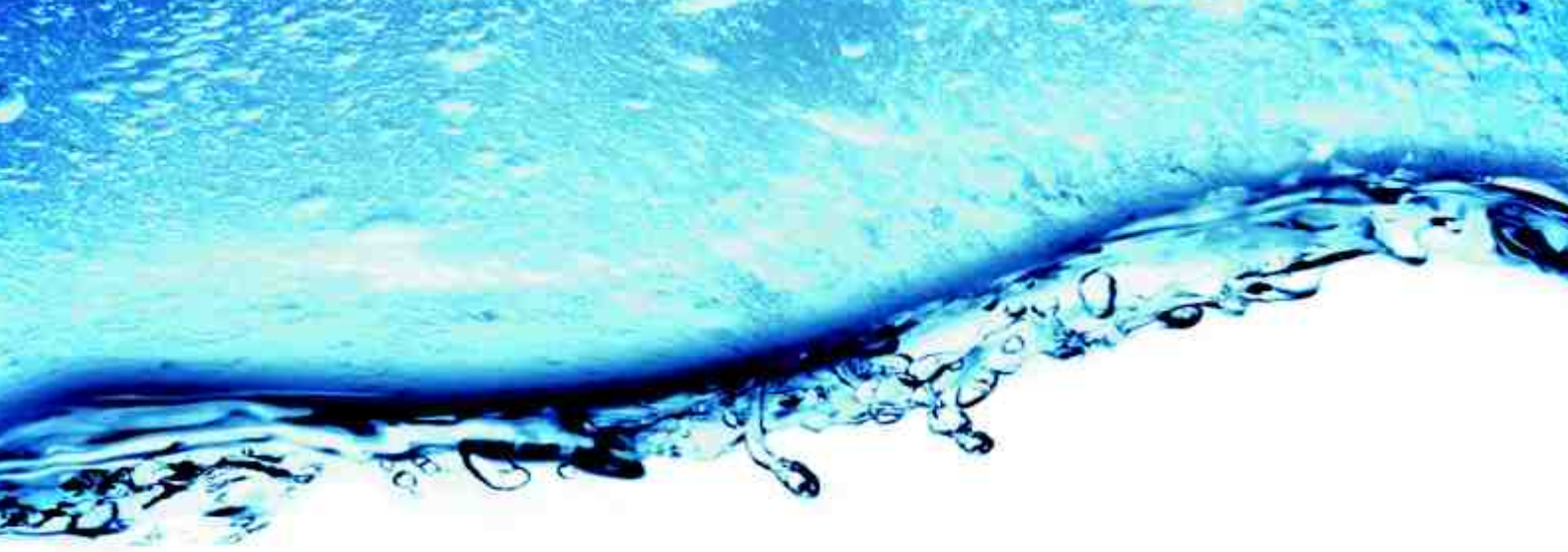


alien vegetation.Downstream of Swaziland and the eastern sections of Swaziland is dominated by D rivers, with 7 SQ reaches in an unacceptable D/E and E PES.

The Crocodile Catchment is heavily utilised and one of the catchments that have been over-allocated. In terms of flow regulation, the Elands River is probably the least impacted. Impacts in the main Crocodile River are dominated by Kwena Dam operation and flow regulation of the downstream river for irrigation. Specific impacts are associated with increased (above natural) flows during the dry season, daily fluctuations due to the pumping and abstraction regime and abstraction of flows to such a degree that the river stops flowing at localised stretches. Irrigation return flows and urban runoff impact on water quality. In tributaries such as the Elands, Kaap and Nels Rivers extensive forestry take place. The lower Crocodile River and its tributaries from the Nsikazi River are bordered by or fall within the KNP.

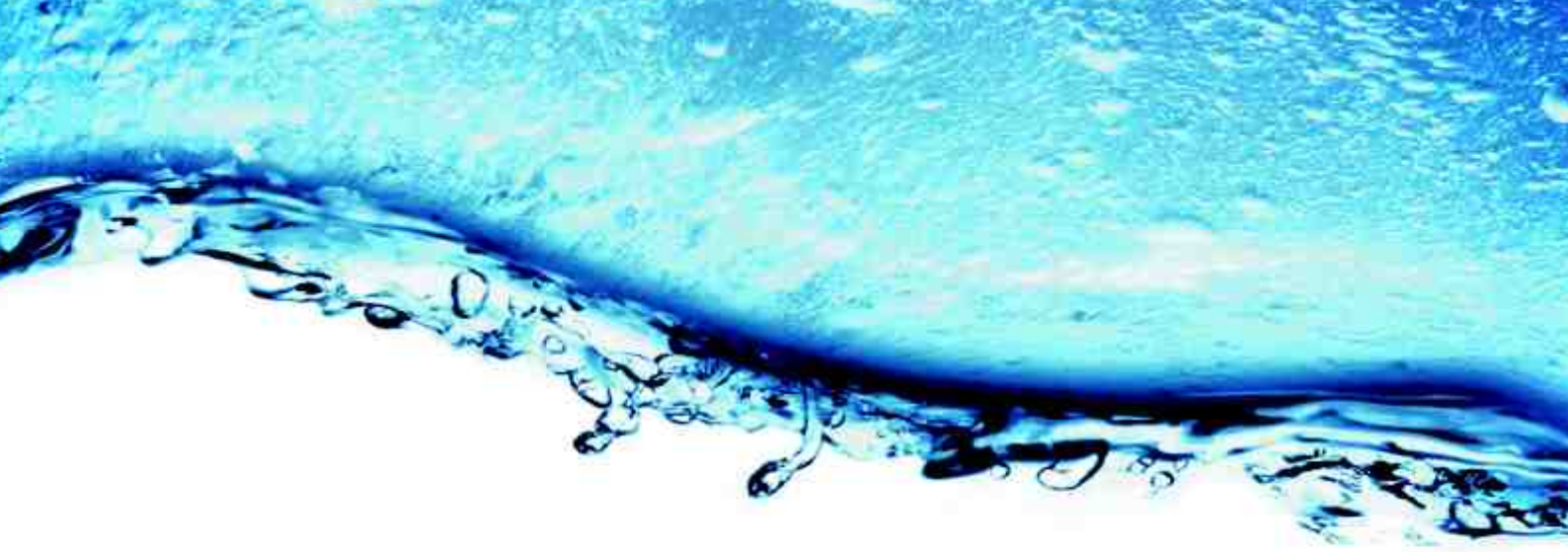
Upstream of the Kaap River confluence, the PES is dominated by a C EC. Downstream of the Kaap River confluence, the Crocodile River is in a D with most of the tributaries being in an excellent state as they are mostly located within the KNP.Twenty one SQ reaches are in A, B or B/C PES. Of these, fifteen fall within the KNP from source to confluence with the Crocodile River or borders the KNP. There is one SQs with PES lower than a D (PES D/E: X22H-00836). This SQ represents the Witrivier with extensive upstream flow modification (abstraction for irrigation), agricultural fields, farm dams and inundation as well as water quality problems with associated algal growth.

A large section of the eastern part of this catchment falls within the Greater Kruger National Park. All the SQs in the Greater KNP are either in a B or A PES apart from one SQ in the Sabie River which is in a C due to the presence of dams and weirs. There are three SQs in the Sabie River which borders the KNP and are in a C PES.

The Sabie River Catchment outside of the KNP is dominated by forestry and irrigation for agriculture (orchards). Some water quality deterioration is associated with Sabie town effluents. Outside of the KNP, the majority of the SQs are in a C with 5 SQs in a D EC. There are 6 SQs which are in a B or B/C PES.

The Sand River outside of the Greater KNP is dominated by forestry in the upper areas and subsistence agriculture with extensive erosion, overgrazing and human settlements on the lower lying areas. The PES is mostly a C with three D PES SQ reaches. It must be noted though that many of the rivers with their sources in the Drakensberg have A to B sections followed by a much lower PES in the lower section of an SQ (as low as E PES).

In the Inkomati WMA, seventeen SQs were highlighted as having potentially high wetland importance, 28 contained wetland NFEPAs and together 40 were highlighted for PES scoring. These generally coincided with areas highlighted in the wetland scoping report (Rountree, 2010). These 17 SQS, together with SQs that did not score 3 for potential wetland importance but contained FEPA wetlands or Ramsar sites, were assessed in more detail to obtain a final wetland PES and a score for integrated ecological importance and sensitivity.



Ecosystem Services

Ecosystem Services are the goods and services provided by the river (and associated ecological systems) that result in a value being produced for consumers. Provisioning services are the most familiar category of benefit, often referred to as ecosystem 'goods', such as foods, fuels, fibres, medicine, etc., that are in manycases directly consumed. Other services include cultural services (ritual use of rivers, aesthetic or historical importance), regulating services (e.g. water quality inputs), and supporting services (e.g. nutrient formation).

For the purposes of this WMA five different land use forms that reflect types of ecological goods and services that might be associated with the usage have been identified. The land use based zones are:

? Recreation and Game Parks. Here the usage is largely recreational linked to the aesthetic appeal. The Kruger National park and adjacent game parks make up the bulk of these zones.

? Commercial Agriculture and Forestry Plantation: This is largely given over to zones dominated by commercial farming entities. Utilisation of ecological goods and services tends to be low and restricted often to farm workers or incidental recreational aspects.

? Subsistence agriculture: These areas are dominated by subsistence agriculture but in areas where population densities are relatively low. Utilisation of ecological goods and services tends to be higher here and the populations that make use are often poor and marginal.

? Rural Closer Settlement – Subsistence: These are the former homeland/tribal areas that have generally higher population densities than the purely subsistence areas. In some instance densities are high enough to be categorised as closer settlement/informal urban. Utilisation of ecological goods and services tends to be higher here and the populations that make use are often poor and marginal. However, the population densities are such that resources tend to be under pressure. Bushbuckridge is a typical example.

? High Density Formal Urban: These are the SQs heavily influenced by the formal towns such as Nelspruit, Hazyview, Sabie, and Malelane and the surrounding suburbs and satellite townships. The utilisation of ecological goods and services tends to be low as the populations tend to be urbanised and alienated from direct use of the resources.

Economic status quo

The economic analysis consists of the status quo in the Inkomati WMA regarding the large water users such as irrigation agriculture, commercial forestry, mining, the manufacturing industry and eco-tourism. The economic value of water use for each economic sector was determined.

In the Komati Catchment, the mining sector contributes the most to GDP with approximately 62% of total GDP in the catchment. Irrigation agriculture contributes the most jobs in the catchment with 34% of total jobs followed by Mining (24%) and Industry (24%). The most dominant economic activity/sector in the Crocodile Catchment is Industry, contributing 38% of total GDP and 44%

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of the total jobs in the catchment. Irrigation agriculture contributes 30% to total GDP and 37% of the total jobs in the catchment relating to surface water activities. The Sabie Catchment does not have any significant mining activities. The two dominant economic activities are irrigation agriculture and industry. Irrigation agriculture contributes 54% of total GDP in the catchment and 51% of total employment. Industry contributes 31% of total GDP and 28% of employment.

Determining the Resource Quality Objectives (RQOs)

Once the Management Classes have been approved, RQOs will be developed to describe the Management Classes. Some RQOs will be numerical, and other descriptive; all depending on the extent of data available. The numerical RQOs will for example be used in monitoring which is very important to see that the Management Classes are being maintained and improvement within these Management Classes being achieved where necessary.

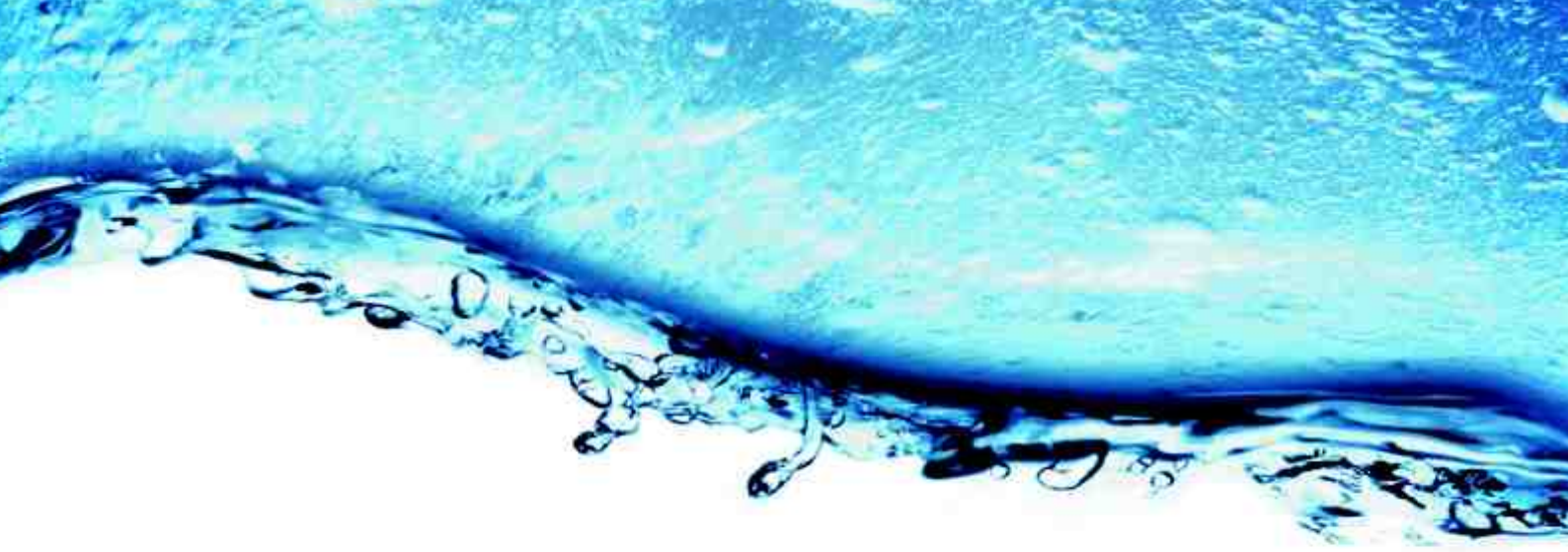
Visioning for the Inkomati Water Management Area

"It is widely acknowledged that a fundamental objective of integrated water resource management (IWRM) is to ensure that resource-based costs and benefits are appropriately distributed in society (Van Wyk et al., 2006a)." Visioning is a process of articulating society's aspirations for the future – in this case, the 'basket' of benefits to be derived from aquatic ecosystem services and the costs associated with their use."

The visioning process is important as it generates a dialogue that promotes ongoing shared awareness and understanding amongst resource users and encourages people to adjust their individual demands on the resource in the broader interests of sustainability and co-operative management. This promotes equity and shared understanding of the costs and benefits of different resource use options.

A visioning for the water resources of the Inkomati WMAwas introduced at the public meeting which took place in June 2013 and at the first PSC meeting (July 2013) the visioning process was taken into further detail. Stakeholders had the opportunity to contribute to the visioning process until the end of July 2013. The visioning assists to link management actions to the vision and ensure that societal values and management objectives are linked and realised. The 'water resource' is defined to include a watercourse, surface water, estuary or aquifer, on the understanding that a watercourse includes rivers and springs, the channels in which water flows regularly or intermittently, wetlands, lakes and dams into or from which water flows, and where relevant the bed and banks of the system." The quality of the resource (the 'resource' being the ecosystem providing services beneficial to people) is defined broadly to include fluxes in flow; physical, chemical and biological characteristics of the water; the character and condition of the in-stream and riparian habitat; and composition, condition and distribution of the aquatic biota.

The Inkomati WMA is a very large and diverse area in terms of its ecology, and the economic and social activities that characterise it. Therefore smaller areas will be used that have been identified based on their similar socio-ecological characteristics. These areas are called the Integrated Units of Analysis (IUA) – see map on page ???. "Use and user needs, plus the state of the resource, are dynamic over space and time."



The Inkomati WMA has therefore been divided into34IUAs based on socio-economic, ecological and water infrastructural characteristics.

A document summarising stakeholder inputs for the Visioning of the Inkomati WMA will soon be published on the DWA web site for stakeholder comments.

Next steps in the process

The Status Quo Report is being reviewed by the DWA and will soon be published for stakeholder inputs before finalisation. The visioning document will be finalised and published on the DWA web site. The next PSC meeting will take place in???? 2014 in White River.

The Ecological Water Requirementswill be quantified, reviewed and analysed. These will be linked to the Ecosystem Services. The outcome of this will be documented and discussed at the next PSC meeting to be held in ??? 2014. At the next meeting, the proposed operational scenarios will be discussed and defined.

Why should you stay involved in this study?
It is important to understand that this study will eventually impact on you as a water user. The outputs of the study will be a set of management goals to satisfy the Management Class objectives.The Management Class outlines those attributes that the DWA and the society require of different water resourcesin terms of quality and quantity. Implementation of the management goals will relate to all water users.

Since this is your catchment, it is important that you become involved in the stakeholder engagement process and technical process. Stakeholders are invited to participate in the process by contributing information at meetings, workshops or to requests by the study team, by communicating with a PSC member or by corresponding with the public participation office with queries and comments.

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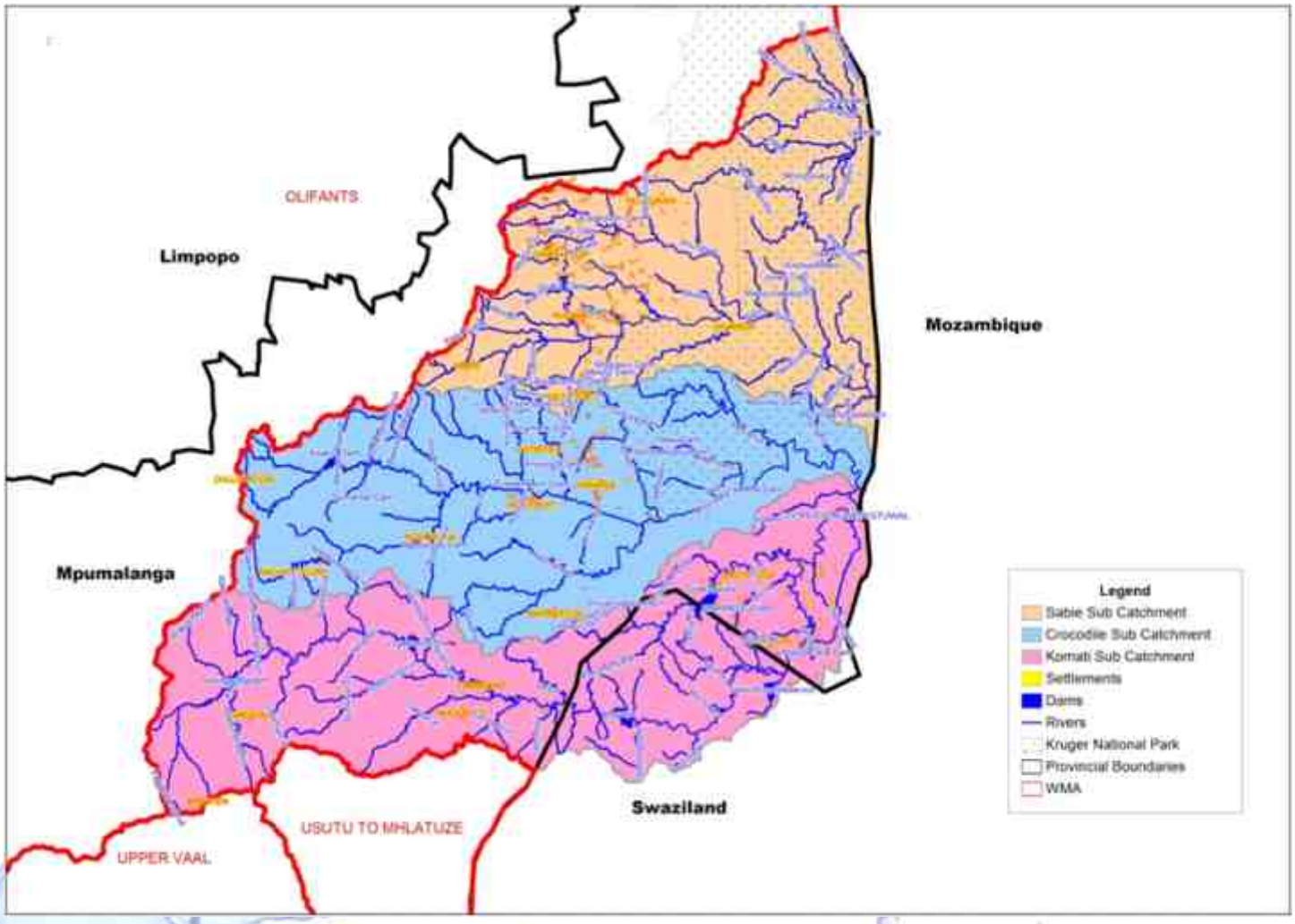

Should you wish to review these documents and completed study reports, you are welcome to access them on the DWA website:http://www.dwa.gov.za/rdm/WRCS/default.aspx

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http://www.dwa.gov.za/rdm/WRCS/default.aspx

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RURAL DEVELOPMENT SEMINAR

The Rural Development seminar organised by the ICMA took place at Sanibonani hotel in Hazyview on 09 may 2013. It was attended by Ms TP Nyakane-Maluka the chairperson of the Governing Board of the ICMA, who gave a key note address. Also in attendance representation of the local traditional authority, the emerging farmers from the three sub-catchments namely: Komati, Crocodile and Sabie & Sand catchment of the Inkomati Water Management Area, Youth in Agriculture & Rural Development (YARD), Cane Growers Association, and the Department of Rural Development and Land Reform and other stakeholders in general.The chairperson of the day indicated that the purpose of the participants to share their experiences on how they can support each other to improve on the economic situation in the Inkomati Water Management Area.

Ms Nyakane-Maluka gave a background on theappointment of the Board since 2005. She believed there are some people who do not know who the Governing Board is and what they do. She explained that as a Governing Board they operate behind the scene responsible for policy development and monitoring work execution. The ICMA have been established by the National Water Act, which cannot work in silosbut in conjunction with other legislations like the Water Services Act and the Systems Act, to mention but a few. These legislation are interdependent. The National Water Act talks about water resources management, such as rivers, dams and ground water. Municipalities, on the other hand uses the Water services and System Act, and they depend on water resources to fulfil legislative mandate. In short, we all need each other.

The chairperson also disclosed her disappointment that stakeholders from the Hospitality Industry are not coming on board. All stakeholder groups needs to come on board to participate in redressing the imbalances of the past. It is very important for all to take care of the water, and that why the theme of the National Water Week for the period of five years which started last year already is “Water is life. Conserve it, Respect it and enjoy it”. She emphasized that we need to take care of the water resources, and that we cannot afford that our rivers be polluted. During construction of the Injaka Dam the community was so excited, but it is very disappointing now that people are being killed and dumped in there.

We all know that water is life. The ICMA has the biggest challenge of being a trend setter in the field of Integrated Water Resources Management (IWRM). The ICMA is positioning itself as a learning institution for the other CMAs yet to be established. The ICMAhas established relationships with Swaziland and Mozambique. It also have international obligations in terms of the amount and quality of water passing through to Mozambique and Swaziland. It is published that 60% of food consumed in Zimbabwe is produced in South Africa. The chairperson encourages the emerging farmers to grow into commercial or large scale farming. Cooperative Governance in Spatial Development is also a matter of concern, as some agricultural activities and housing development occurs in area where wetlands are endangered.

We all know that water is life.
The ICMA has the biggest challenge
of being a trend setter in the field of
Integrated Water Resources Management.

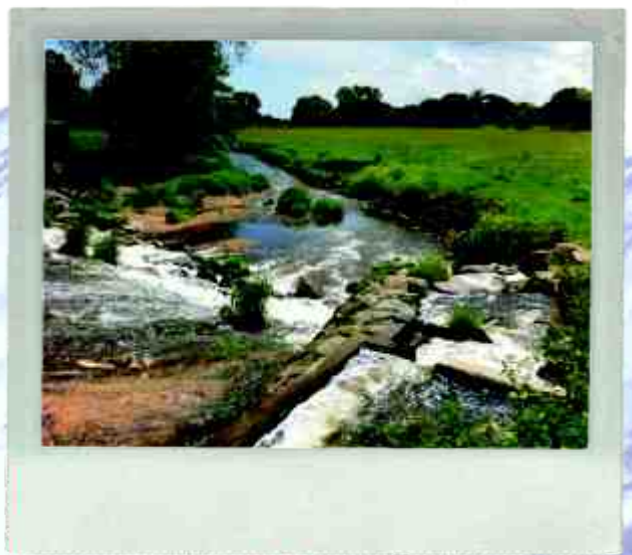
ADOPT A RIVER CAMPAIGN

The Adopt-a-River project is a Ministerial (DWA) flagship project which calls for private sector and communities to jointly work together to protect and manage the nation's water resources in order to meet the needs of current and future generations. The project aims to piece together in a sustainable manner the objectives of aquatic ecosystem health, economic growth, human health and co-dependent land and water use principles. Human behaviour lies at the hub of most, if not all, of these aspects and will be treated as the key success factor in sustainability of the programme.

The Adopt-a-River approach enables active participation of communities in the projects to ensure sustainability. The municipalities, sector partners, tertiary institutions, schools, private sector, agricultural communities, industries, community leaders and women in the vicinity of rivers are the key role players of the Adopt-a-River project. The spin offs here will be water saving, skills development for our youth, job creation, improvement of water quality and of the state of our rivers. The Department intends to swiftly broaden this initiative to other areas in future engaging with, these sector partners; i.e. municipalities, industries and agricultural sectors. And to share lessons learned through this initiative.

"I would like to encourage more partnerships in water conservation, such as a widening of the "Adoption" concept, and other practices aimed at reducing consumption" (taken from the budget vote speech of the Deputy Minister on the 15th April 2010).

The ICMA, in pursue of this initiative, also encourages schools and communities to adopt a river. Thanks to the community officers who work tirelessly to make sure that this programme riches to as many communities as possible. In one of the ICMA's adopt-a-river campaigns which took place at Puledi High School in the Sand River Catchment, a leaner wrote and recited the following poem dedicating it to our nature in general, and Motlamogatsane (a tributary of the Sand River) in particular.



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Nature

by Penelope - Puledi High

If ever there should be a day
A day of change
A day of respect
Not only of people and their dignities
But also of the nature, fauna and flora
Well, that day should be today

It took me only a seconds to expose to everyone the importance of nature and the environment
I value nature as my roots
I see the environment as my daily responsibility
I really do respect what I see everyday

The place we call home
The place we praise
The place we embrace
The place we love a feel joyful every time we are surrounded by it
How do I claim a place that will always belong to us?

As a product of Mother Nature
I feel the enthusiasm and pride when I wake up every day to the peaceful land I call my environment
When I wake up every day and face west I enjoy the beautiful view of mount Drakensberg
Without any hesitation I can hear the sound of the traditional river as it flows
Motlamogatsane, Mapuleng's pride

This sounds like an imaginary world, yet it is real
Thus let us protect and respect nature
Because we depend on it as our pillar of nutrition
And the environment depend on us as its life-saver and guardian

I command respect to the environment
I command sustainability of the environment
I command protection of the environment
I command peace with the environment

I say no to veld fires
I say no to contamination of our environment
Our rivers are not dumping sites, and so is our valleys
Let us come together as major stakeholders and save our environment
Mapulaneng ke legae la rona
Let us love, protect and sustain our environment

ICMA WELLNESS DAY 2013

ICMA Taking care of its employees

The management of ICMA cares about the wellbeing of our employees. The total wellbeing of an employee is very important which is the reason why the wellness day was arranged. We believe that a healthy employee is able to work effectively and that benefits their family also. Different service providers were invited to the wellness day:

ICAS,the ICMA Employee Assistance Program Provider made a presentation to everyone on what is offered by ICAS to every employee. Employees got to understand that they have a 24hour helpline to contact whenever they feel overwhelmed by the challenges of life and there will be someone to talk to and offer counselling to them in a language that they understand.

Biometric screenings were done to determine the well-being in the body.Van Heerden Orchards were doing the tests. Weight was taken to determine the BMI of each tested employee; cholesterol tests were done, sugar level tests were done.

Eye screening because the eye is a very important part of the employee without good eye sight the world is seen blurry. Ilanga eyewear gave every employee who tested a picture of their eye which was amazing to see how the eye looks like on the inside.
The SANBS were there to make a presentation on the need for blood donation, the types of donations that can be done. Even those who said are scared of the needle after the presentation went to join and donated blood, lives were saved by ICMA employees.
Virgin Active offered an aerobic class, employees got active and there was lots of sweat going around. There were also very funny things happening where the manager Water Utilisation was seen in his formal wear because he had a meeting to attend later in the day was busy with aerobics. He said formal wear will not stop him from getting active.

It was about wellness even in the food, a braai was held to at least burn the fats of the meat in the fire. The braai team got very busy on the braai stand, everyone had more than enough food to eat.

Team work was seen most employees participated in making the day a success, there were volunteers to go buy what was needed, volunteers to make the salads, the wellness spirit was seen even in the way the team relates.

Financial wellness was not left out, ABSA was part of the wellness day where they were advising employees on how to manage their finances and how to better save. Employees were seen visiting the ABSA table to have discussion with the team from ABSA.
Internal talent was also discovered when a poem written by ICMA's own Golden Mcanyi Mthembi was read out to the women of ICMA in celebration of Women's month.

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WATER QUALITY STATUS

Water quality Status of the Inkomati Water Management Area.

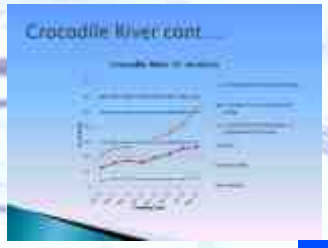
By Adolph Mbetse, Chief Environmental Officer (ICMA)

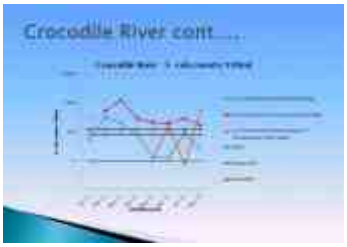
One of the main functions of the ICMA is to monitor ware quality. This has also proven to be one of the main concerns of the stakeholders within the catchment.

The Main stems of the Inkomati Catchment were selected for this report, namely: Crocodile, Komati and Sabie River. It targets the most upstream, middle and last monitoring points of each main stem, including their major tributaries. The report is mainly a graphical representation of the status quo with regard to water quality in the identified sampling points. The red dots on each sub-catchment map represent the sampling points, of which the water quality data is reported on.

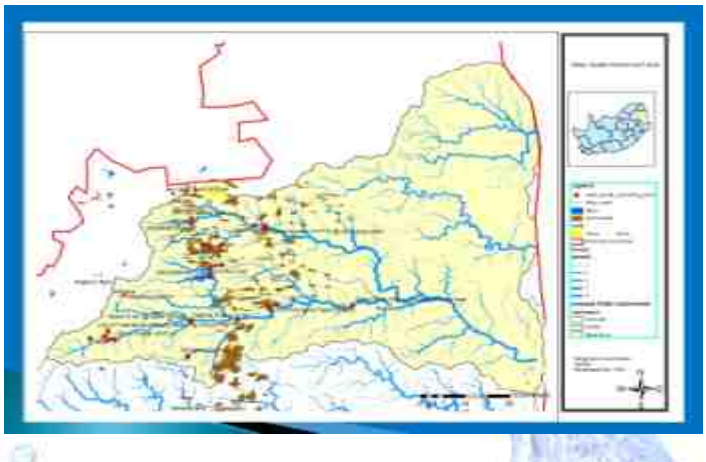
The Crocodile Catchment

Map of the Crocodile catchment

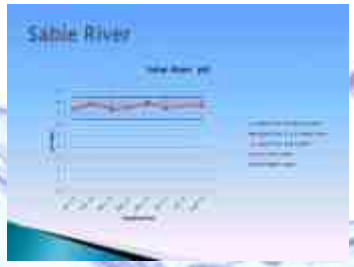


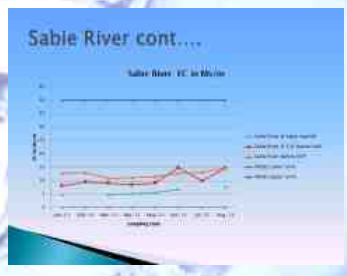


Sabie-Sand Catchment



Map of the Sabie-Sand Catchment





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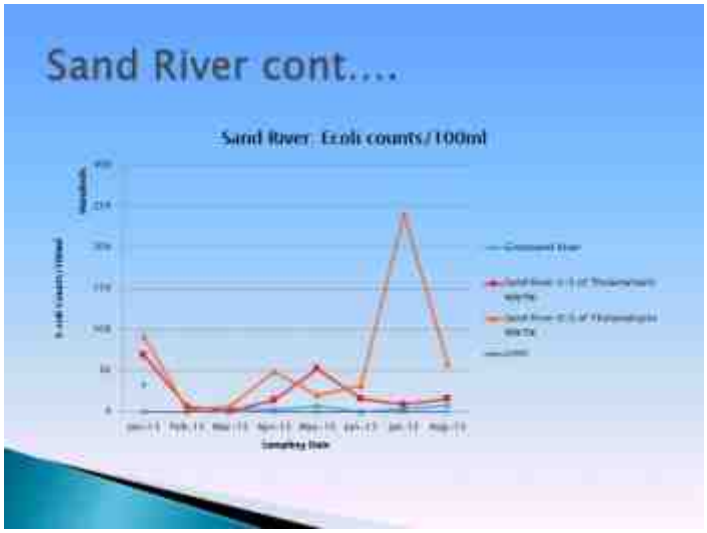
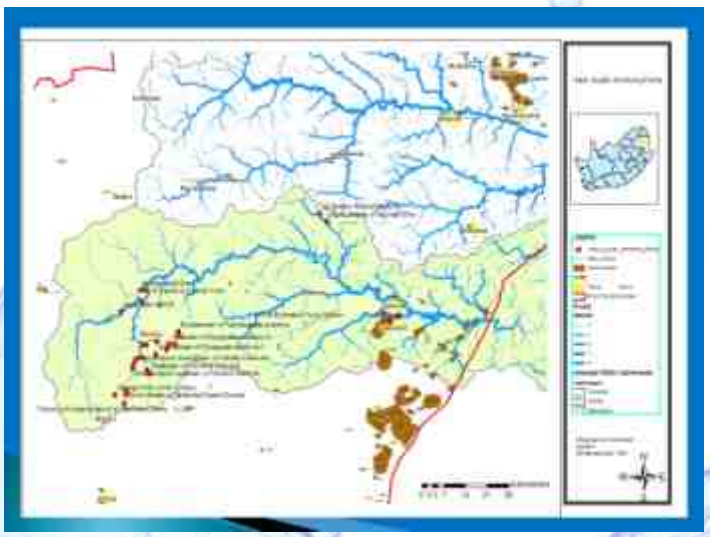
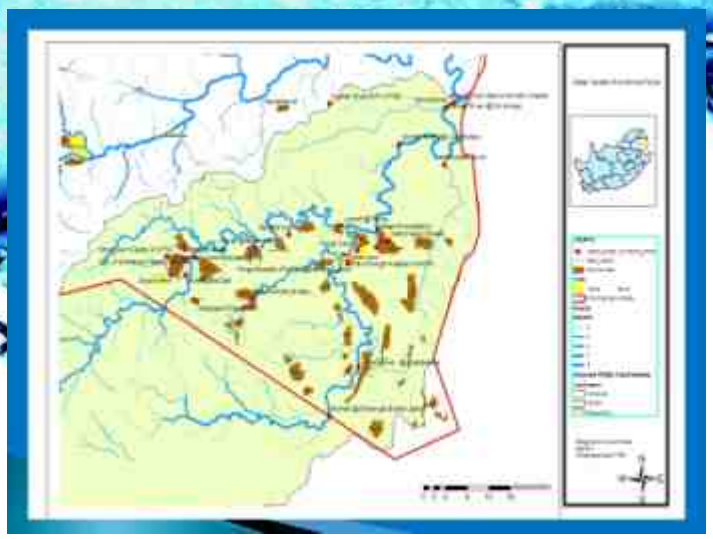


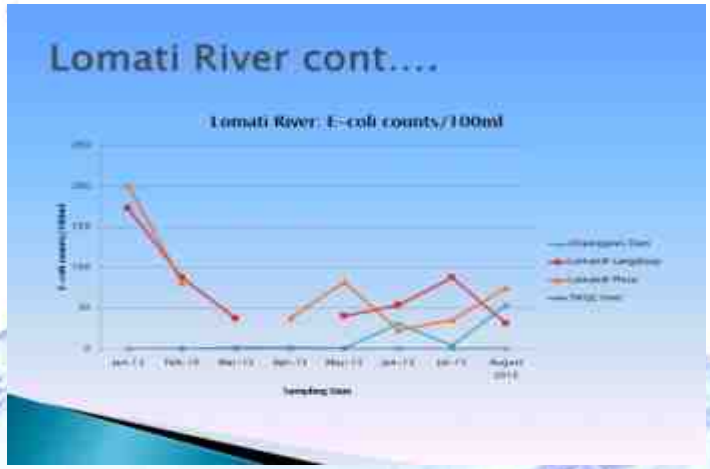
The Komati Catchment





Map of the Upper Komati

Map of the Lower Komati



In summary, the pH values on the selected monitoring points were within compliance values; all chosen points were within the tolerable levels (60mS/m) for EC. Sampling points which are not compliant on E-coli are mainly due to partially treated waste water in the treatment works, poor maintenance of municipal infrastructure and pollution incidents within the catchments.

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Sharing experiences of the SA-Young Water Professionals (YWP) Mpumalanga Chapter Launch

By Dr Tendai Sawunyama (Mpumalanga YWP Chairperson)

Dr Tendai Sawunyama, (the current Chairperson of YWP Mpumalanga Chapter and was the Director of Launch) and some few members drawn from municipalities, private sector and governments department recognised the need to formulate a Young Water Professional (YWP) Chapter in Mpumalanga province which was launched successfully on 27 August 2013 at the Mbombela stadium, in South Africa. The launch received extensive media coverage within South Africa as it came at the right time in preparation of the Water Southern Africa (WISA) 2014 conference that will be held at the same venue where YWP are expected to play a key role, said Dr Inga Jacobs, the current national SA-YWP president and is the Executive Manager of Water Research Commission in South Africa.

The welcome note was given by Councillor ZaydBoroko who is the Political Head of Technical Services from the Mbombela Municipality office. Councillor Boroko encouraged the YWP members about the theme "Don't avoid rough waters". He urged members to be courageous and tackle water scarce resource challenges.Mr Brain Jackson from the Inkomati Catchment Management Agency (ICMA), who is the Manger responsible with River Systems Operations and Management, gave an extensive presentation on the functions of the ICMA under the topic "No turning back". He pointed out on the complexity of the integrated water resource management and referred to it as wicked problem due its nature comprising of solutions linked to one another. Mr MpoMakhavhu, who is the Manager responsible for Water Services from Bushbuckridge Water Board, said illegal connections and mushrooming of villages give a strain of water supply and majority of people end up not having water. Dr. Inga Jacob gave success stories and lessons learned from 2009-2013 for SA-YWP.Ms Dudu Hlebela, a professional lawyer and is the current National YWP Secretary gave a motivational speech and was impressed by the kick start of the launch. She encouraged the members to be active and make a difference the communities and society.

YWP members were encouraged to enhance skills development, internships, and mentorship and to form clubs within organisations. There were approximately 40 members from government departments, municipalities and private sector who attended the launch.

The following were elected into the New Committee.

- Chairperson – **Dr Tendai Sawunyama: IWR Water Resources Pty Ltd**
- Vice-chairperson - **Ms Nthabiseng Ntoampe: ESKOM**
- Secretary – **Ms NcikiMatshiyane: Baycity**
- Treasurer – **Mr Sampie Shabangu Department of Water Affairs**
- Committee member (events) - **Ms Yolanda Oosthuizen: Sebcorp Silulumanzi**
- Committee member (events) - **Mr MpoMakhavhu: Bushbuckridge Water Board**
- WISA 2014 YWP Task Team – **Ms Bertha Seloane: Mbombela Local Municipality; Mr Sonnboy Mhlongo: ICMA; Mr Peter Bakker: ChemiCorp**

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HERITAGE DAY 2013

Unity in diversity: Heritage Day in the ICMA

The ICMA staff honoured heritage day by dressing in their colourful cultural regalia to celebrate South African cultural diversity.

Heritage day (24 September), also known as National Braai Day as the result of a pointed 2005 media campaign, was not originally intended to be an official South African public holiday. But when the Inkatha Freedom Party, a political party with a large Zulu membership, refused to sign the Public Holiday's Bill that was being presented to the Parliament of South Africa because it omitted the inclusion of Shaka Day, a day that commemorated the famous Zulu King Shaka, a concession was made.

Quite aptly, just as King Shaka was instrumental in uniting Zulu clans into a cohesive nation, Heritage Day (appointed in place of King Shaka Day) encourages South Africans to come together to celebrate the rich cultural heritage and the diversity of our rainbow nation.

Former South African President Nelson Mandela concisely explained it when he said the following in a Heritage Day speech:

"When our first democratically-elected government decided to make Heritage Day one of our national days, we did so because we knew that our rich and varied cultural heritage has a profound power to help build our new nation".

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TAILING SPILLAGE FROM BARBROOK MINE

Tailings spillage took place at Barbrook Mine due to the burst of the steel pipeline which transports tailings from the plant into the Tailings/Slurry Dam. The tailings overflowed into an unlined Catchment Dam which spilled tailings into the Sofala Creek (Manzi Abovu River) which is a tributary of the Low's Creek. According to Mr Mike Begg, the steel pipe burst incident took place around 3:00 am on Sunday 15 September 2013 and the incident was reported to the Nkomazi Local Municipality, the Irrigation Board and the community, however it was not reported to the Inkomati Catchment Management Agency (ICMA) and the Department of Water Affairs as required in terms of sections 20(3)(a) and 20(3)(c) of the NWA.

On the 16 September 2013 the officials of the Inkomati Catchment Management Agency (ICMA) Mr Fairbridge Mnisi and Ms Bongiwe Sambo together with the Barbrook Mine General Manager Mr Mike Begg, Nkomazi Local Municipality official Ms Dudu Sifunda, the Department of Health official Mr Mndeni Msomi and the Democratic Alliance Counsellor Ms Marriete Preddy conducted an investigation on site to determine the cause and extent of the incident. During the investigation the following were discussed and observed:

- The burst steel pipeline that resulted in the spillage of tailings was repaired and there was no more tailings spillage from the steel pipeline.

Figure 1: Burst steel pipe welded

- The unlined Catchment Dam was full of tailings; however there was no more overflow of the tailings into the Sofala Creek (Amanzi abovu River).

Figure 2: Unlined catchment dam full of tailings

- The area where the tailings spillage took place was still dirty with traces of tailings and no clean up procedures had been undertaken as required by section 20(4)(b) of the NWA.

Figure 3: Traces of tailings spillage

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- About six (6) goats were estimated to have died downstream of the tailings spillage and it was alleged that the cause of death was related to the tailings spillage and the overflow into the Sofala Creek (Amanzi abovu River).

- The Nkomazi Local Municipality suspended the operation and treatment of drinking water from their two drinking water package plants due to the tailings spillage and the community was supplied with drinking water from two water tankers.

The ICMA issued a verbal directive on the 16 September 2013 on site to the Mine General Manager, Mr Mike Begg in terms of Section 20 (4)(d) of the NWA, to:-

- Undertake clean-up procedures and remediate the contaminated land;
- Remove the welded pipeline and replace it with a new pipeline.

The ICMA took sample on the 16 September 2013 and the analysis was done on the 18 September 2013 are and the analysis results are indicated below, it is evident that the spillage had an negative impact on the water resource because Cyanide and Iron shows elevated figures which were above both the Interim Resource Quality Objective (IRQO) and the Target Water Quality Guide (TWQG)

- The verbal directive was then confirmed in writing and issued to the Mine General Manager, Mr Mike Begg in terms of Section 20 (4)(d) of the NWA.
- The mine made representation in writing to the directive and is currently implementing the directive.





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SAND MINING:
WHAT YOU NEED TO KNOW

What is Sand Mining?

Mining is of great importance to the South African economy. It should however be recognised that the processes of prospecting, extracting, concentrating, refining and transporting minerals have great potential for disrupting the natural environment (Rabie et al., 1994). The environmental effects caused by the mining of sand from a river, is no exception, often causing adverse impacts to biota and their habitats.

The Department considers fresh water aquatic ecosystems to be "the base from which the [water] resource is derived" (DWAF, 1994). Because we depend on many services provided by healthy aquatic ecosystems, these ecosystems, as the resource base, must be effectively protected and managed to ensure that our water resources remain fit for the different water uses on a sustained basis (DWAF, 1996). The establishment of the Ecological Reserve is an important step in this direction since, under previous legislation, there was only limited provision to reserve a quantity of water for environmental protection purposes (DWAF, 1997).

As stated in the White Paper on a National Water Policy for South Africa (1997), effective resource protection requires two separate sets of measures. The first are resource-directed measures, which set clear objectives for the desired level of protection for each resource. The second are source-directed controls which aim to control what is done to the water resource - by way of registration of sources of impact, standards for waste discharges, best management practices, permits and impact assessments - so that the resource protection objectives are achieved.

Damage to resources, other than pollution such as habitat destruction, will be controlled by means of regulatory measures which will be introduced where appropriate (DWAF, 1997).

Illegal sand mining in the Inkomati Water Management Area

a) The Inkomati Water Management Area is facing some serious challenges with regards to the illegal sand mining because of the negative impact it has on the water resource These negative impact may include the following:

- Excessive sand mining is a threat to bridges, river banks and nearby structures.

Figure 1: Kanyamazane bulk sewer line

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- Instream sand mining results in the destruction of aquatic and riparian habitat through large changes in the channel morphology. Impacts include bed degradation, bed coarsening, lowered water tables near the streambed, and channel instability. These physical impacts cause degradation of riparian and aquatic biota and may lead to the undermining of bridges and other structures. Continued extraction may also cause the entire streambed to degrade to the depth of excavation.

Figure 2: Thulamahashe area in Bushbuckridge

- Soil contamination is mainly caused by oil spills by trucks and machinery used to extract sand. Even though the area of contamination would be localised, the presence of any hydrocarbons on the ground is undesirable and can lead to surface and ground water pollution. After the rain, contamination may subsequently spread over larger areas. Thus sand mining not only causes serious disturbance to soil, severe soil erosion, and loss of topsoil and removal of top cover but can indirectly cause soil and water pollution too.

Figure 3: Heavy machinery

Figure 4: Trucks collecting sand

Figure 5: Serious water pollution

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- Sand mining also affects the adjoining groundwater system and the uses that local people make of the river
- Illegal sand mining may results in deep and wide pits on the riverbed and these pits, may affect the natural flow of water into the river.

b) Legal Requirement for Sand Mining in terms of the National Water Act, 36 of 1998 (NWA)

- In terms of section 21 of the NWA, in-stream mining of sand is a water use activity and requires authorisation in terms of section 22 of the NWA. The water uses related to sand mining are the following
  - Section 21 (c) of the NWA: impeding or diverting the flow of water in a watercourse;
  - Section 21(1) of the NWA: altering the bed, banks, course or characteristics of a watercourse;
- In terms of Government Notice No. 704 of 4 June 1999 in terms of NWA, Regulations of the use of water for mining and related activities aimed at the protection of the water resource, Regulation 10 (1), 10 (2) makes provision for additional regulation related to winning sand and alluvial minerals from a watercourse as follows:
  - No person may extract sand, alluvial minerals or other materials from the channel of a watercourse or estuary, unless reasonable precautions are taken to-
    - Ensure that the stability of the watercourse or estuary is not affected by such operations;
    - Prevent scouring and erosion of the watercourse or estuary which may result from such operations or work incidental thereto;
    - Prevent damage to in-stream or riparian habitat through erosion, sedimentation, alteration of vegetation or structure of the watercourse or estuary, or alteration of the flow characteristics of the watercourse or estuary; or
  - Every person winning sand, alluvial minerals or other materials from the bed of a watercourse or estuary must-
    - Construct treatment facilities to treat the water to the standard prescribed in Government Notice No. R.991 dated 26 May 1984 as amended or by any subsequent regulation under the Act before returning the water to the watercourse or estuary;
    - limit stockpiles or sand dumps established on the bank of any watercourse or estuary to that realised in two days of production, and all other production must be stockpiled or dumped outside of the 1:50 year flood-line or more than a horizontal distance of 100 metres from any watercourse or estuary; and
    - Implement control measures that will prevent the pollution of any water resource by oil, grease, fuel or chemicals

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2014 CATCHMENT FORUM MEETING DATES

SABIE FORUM					
Feb 17	Apr 21	Jun 23	Aug 18	Oct 20	Nov 24

SAND FORUM					
Feb 18	Apr 22	Jun 24	Aug 19	Oct 21	Nov 25

UPPER KOMATI FORUM					
Feb 19	Apr 23	Jun 25	Aug 20	Oct 22	Nov 26

LOWER KOMATI FORUM					
Feb 20	Apr 24	Jun 26	Aug 21	Oct 23	Nov 27

CROCODILE FORUM					
Feb 21	Apr 25	Jun 27	Aug 22	Oct 24	Nov 28

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INKOMATI CMA

wishes you a

Merry Christmas

and a prosperous New Year

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