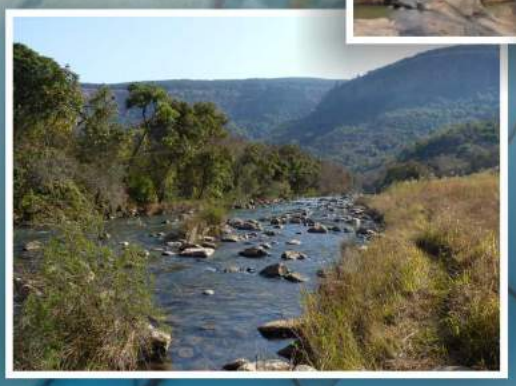
water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

CONTINUATION OF WATER REQUIREMENTS AND AVAILABILITY RECONCILIATION STRATEGY STUDY FOR THE MBOMBELA MUNICIPAL AREA

Extended Executive Summary



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FEBRUARY 2021

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Introduction & Background

This document is an extended executive summary for the detailed report *"The Continuation of Water Requirements and Availability Reconciliation Strategy for the Mbombela Municipal Area"* (DWS, 2021). The continuation followed on from the *Water Requirements and Availability Reconciliation Strategy for the Mbombela Municipal Area (DWA, 2014)*. The overall objective of this Study was to systematically update, improve, and extend the Water Resource Reconciliation Strategy to cover the entire Crocodile (East) and Sabie Sub-Catchments, in order for the Strategy to remain relevant, technically sound, economically viable, socially acceptable and sustainable. This document provides an extended Executive Summary of the detailed Reconciliation Strategy report. A number of supporting reports have been prepared in the update of the Strategy, namely:

- **Demographic and Socio Economic**
- **Water Requirements**
- **Water Conservation and Water Demand Management**
- **Water Resources**
- **Infrastructure and Cost Assessment**

In addition to the update of the Strategy, part of the Study has included the monitoring of progress of implementation of the original Strategy interventions. This has been undertaken in the form of Strategy Steering Committee Meetings whereby responsible Institutions have provided feedback on progress.

What is a Strategy Steering Committee (StraSC)?

The primary function of the StraSC is to ensure the implementation of the Strategy and to make recommendations, on an annual basis, on long-term planning activities required to ensure ongoing reconciliation of requirements and available supply in the Study area.

The Committee includes representative members of all main organisations sharing the water resources, for example, the IUCMA, DWS, irrigators, Municipalities, SANParks etc.

The objectives of the StraSC are to:

- Ensure implementation of the recommendations of the Reconciliation Strategy.
- Update the Strategy to ensure that it is relevant.
- Ensure that the Strategy and its recommendations are appropriately communicated.

Value add of this Update

The Mbombela Strategy (DWA, 2014) excluded portions of the supplying catchments and focussed specifically on the area inside the Mbombela Municipal boundary. Water Resources were included as water allocated to specific users rather than yields and water available from the catchment as a whole. Only the urban sector was considered in the water balances. This Study enhances the previous Strategy as it deals with the catchment as a whole, an integrated system with various resources and users groups.

Study Area

Whilst this Study focusses on the update of the Mbombela Strategy (DWA, 2014), the footprint of the Study Area has been expanded to include the full Crocodile (East) and Sabie Sub-catchments and their associated water users.

The Study Area included both the Crocodile (East) and the Sabie Sub-Catchments, which form part of the Ehlanzeni District Municipality (DM) as illustrated in the Study Area map in Figure 1. The focus of this study was on the City of Mbombela (CoM) Local Municipality (LM), former Umjindi LM, which has been amalgamated with the CoM LM, and Bushbuckridge LM. The remainder of the Study Area incorporated parts of the Emakhazeni LM, Thaba Chweu LM and Nkomazi LM, which are situated and form part of the Crocodile (East) and Sabie Sub-Catchments.

Two major water courses traverse the two Sub-Catchments in the Study Area, which are the Crocodile (East) River and the Sabie River. The Crocodile (East) River, originates at Dullstroom and joins the Lunsklip River before entering the Kwena Dam from which it flows through the Schoemanskloof Mountains. The Crocodile (East) River joins with a major tributary, the Elands River, which originates at Machadodorp and flows through Waterval Boven before its confluence with Ngodwana River. The Crocodile and Elands rivers have their confluence at Montrose. The river meanders through the catchment from West to East, where it joins with smaller tributaries such as the Nels River, Wit River, Kaap River and Nsikazi River. The Crocodile River finally merges with the Komati River close to Komatipoort, where it becomes the Inkomati River.

A major tributary of the Sabie River is the Sand River, which has its origin on the border of Thaba Chweu LM and Bushbuckridge LM and the Marite River, which is regulated by releases from the Inyaka Dam. The Sabie River impounds the Corumana Dam in Mozambique, which is upstream of the confluence with the Sabie River and the Inkomati River (Xivane) within Mozambique, where it discharges into the Indian Ocean as the Inkomati River to the north of the City of Maputo, Mozambique.

There are two major dams in the Study Area, which are the Inyaka Dam in Bushbuckridge LM andKwena Dam in the Thaba Chweu LM, as well as smaller dams in the CoM LM such as Witklip Dam, Longmere Dam, Klipkopje Dam, Primkop Dam and Da Gama Dam.

The Sappi Ngodwana Mill is a major industrial water user in the Crocodile (East) Sub- catchment, which abstracts water from the Ngodwana Dam, on the Ngodwana River, and obtains additional water supply from former irrigation licenses. Other major industrial water users are the TSB Malelane sugar mill in Nkomazi LM in the Lower Crocodile (East) Tertiary Catchment and smaller mining operations in the former Umjindi LM.

The largest water user in the Crocodile (East) Sub-Catchment is the irrigation sector (467 million m^3/annum), followed by commercial afforestation (158 million m^3/annum). The shared watercourses with Mozambique are regulated by an international water sharing agreement (IIMA, 2002).

There are water transfers from the neighbouring Lomati Catchment to support the towns of Barberton and Shiyalongubo. There is also a transfer from the Sabie Sub- Catchment to the Crocodile (East) Sub-Catchment to support the Nsikazi North demand centre.

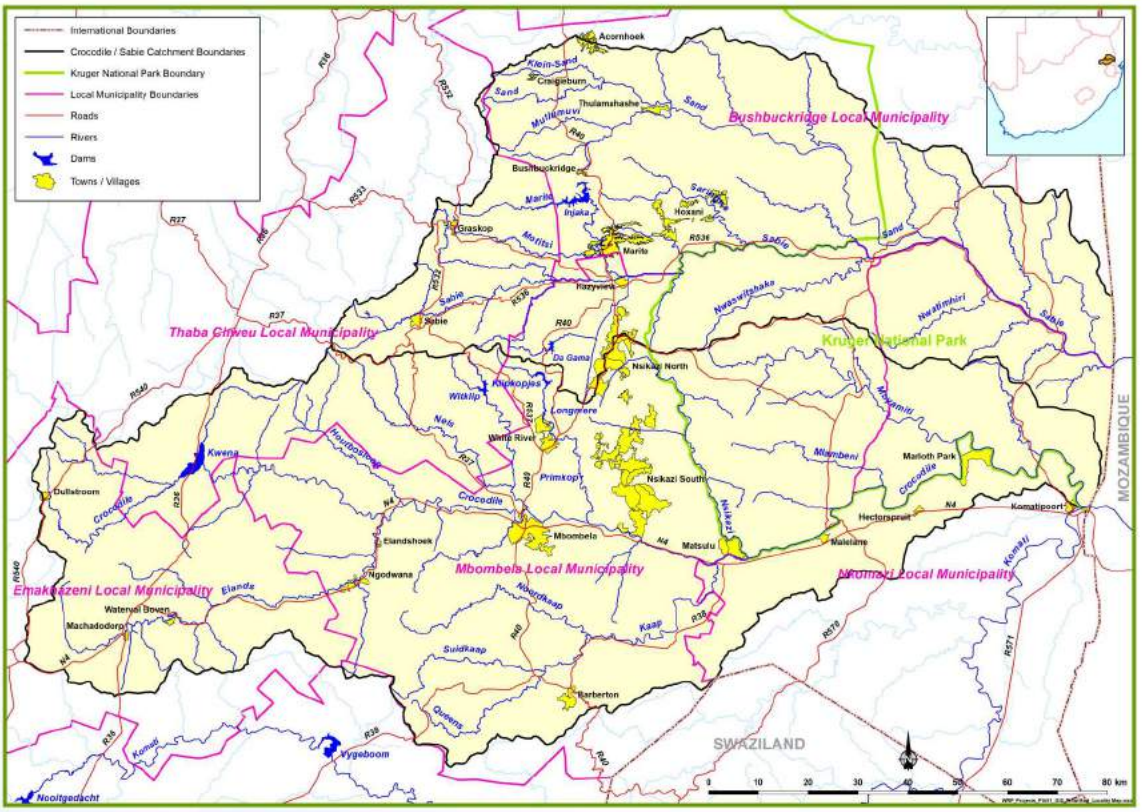
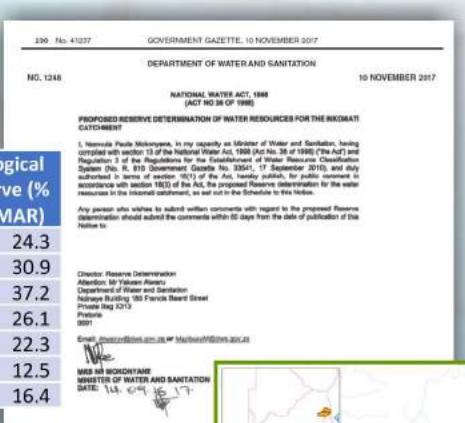


Figure 1: Locality of Study Area

Environmental Water Requirements (EWRs)

The National Water Act (Act 36 of 1998) (NWA) requires that sufficient water must be left in rivers in order to sustain their ecological functioning. This water is referred to in the NWA as the Ecological Reserve. The EWRs of both the Crocodile and Sabie River catchments have been determined and Gazetted as part of the Classification process (DWS, 2014a). EWR structures are based on the cumulative natural flow that occurs from the catchments upstream of the EWR site.



GOVERNMENT GAZETTE, 10 NOVEMBER 2017

DEPARTMENT OF WATER AND SANITATION

NO. 1248 10 NOVEMBER 2017

NATIONAL WATER ACT, 1998
(ACT NO 36 OF 1998)

PROPOSED RESERVE DETERMINATION OF WATER RESOURCES FOR THE INKOMATI CATCHMENT

I, Nomvula Paulia Mokonyane, in my capacity as Minister of Water and Sanitation, having complied with section 13 of the National Water Act, 1998 (Act No. 36 of 1998) ("the Act") and Regulation 3 of the Regulations for the Establishment of Water Resource Classification System (No. R. 810 Government Gazette No. 33541, 17 September 2010), and duly authorised in terms of section 16(1) of the Act, hereby publish, for public comment in accordance with section 16(3) of the Act, the proposed Reserve determination for the water resources in the Inkomati catchment, as set out in the Schedule to this Notice.

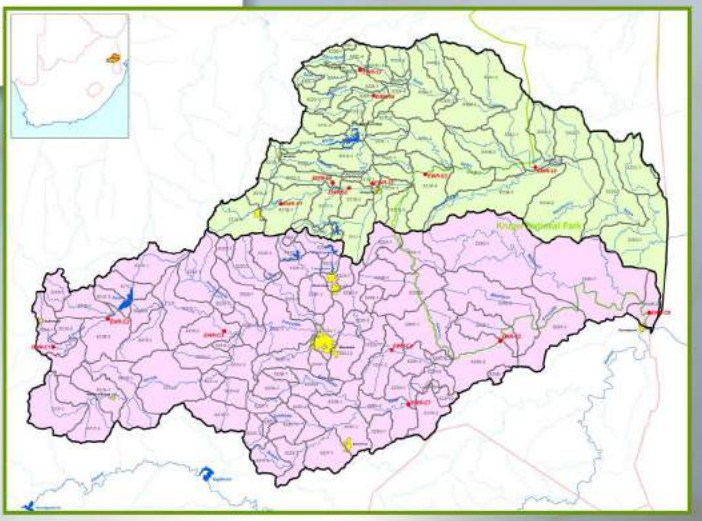
Any person who wishes to submit written comments with regard to the proposed Reserve determination should submit the comments within 60 days from the date of publication of this Notice to:

Director: Reserve Determination
Attention: Mr Yakeen Alexeu
Department of Water and Sanitation
Nobreze Building 185 Francis Baard Street
Private Bag X313
Pretoria
0001

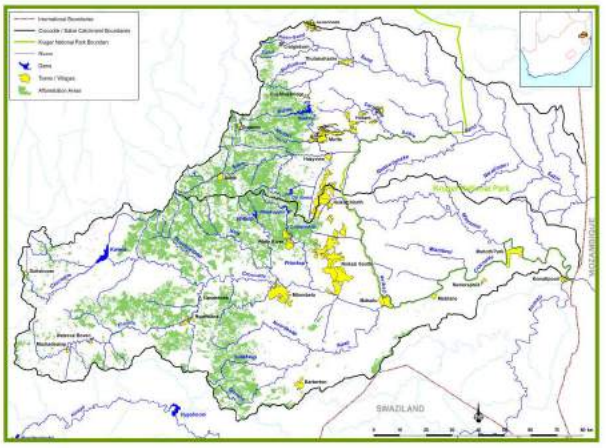
MRS NP MOKONYANE
MINISTER OF WATER AND SANITATION
DATE: 14.09.17

EWR	Site Name	Category	Ecological Reserve (% of NMAR)
EWR1	Valyspruit	A/B	24.3
EWR2	Goedehoop	B	30.9
EWR3	Poplar Creek	B/C	37.2
EWR4	KaNyamazane	C	26.1
EWR5	Malelane	C	22.3
EWR6	Nkongoma	C	12.5
EWR7	Honeybird	C	16.4

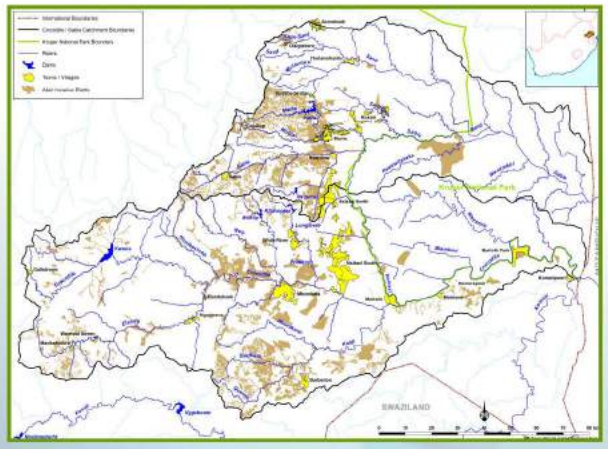
EWR	Site Name	Category	Ecological Reserve (% of NMAR)
EWR1	Upper Sabie	B/C	35.8
EWR2	Aan de Vliet	C	27.3
EWR3	Kidney	A/B	30.8
EWR4	Mac Mac	B	45.4
EWR5	Marite	B/C	21.7
EWR6	Mutlumuvi	C	26.0
EWR7	Upper Sand	C	20.4
EWR8	Lower Sand	B	18.5



Water Requirements

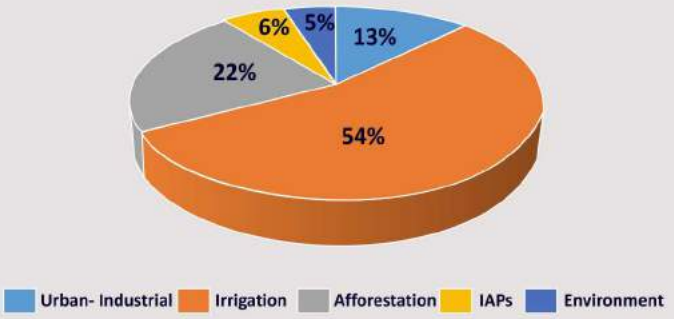


Afforestation: 2794 km^2 using 247 million m^3/annum



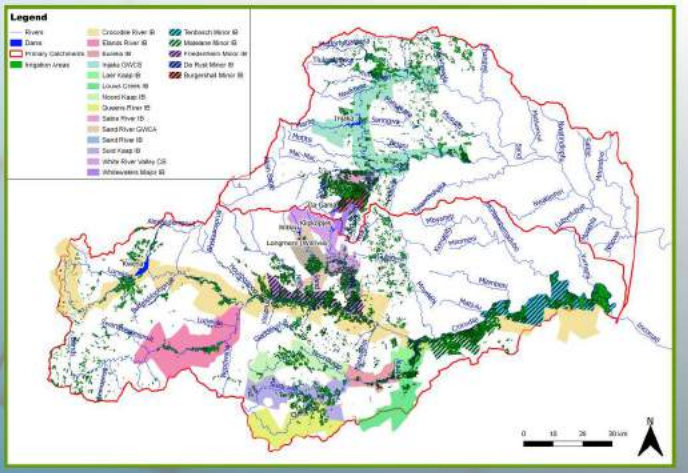
Alien Invasive Plants: 511 km^2 using 64 million m^3/annum

Total Crocodile & Sabie Water Requirements



Cross Border Flows

International Obligations exist for the Crocodile and Sabie Rivers. The requirements are stipulated in the Interim IncoMaputo Water Use Agreement (TPTC 2002). A minimum requirement of 37 million m^3/annum (1.17 m^3/s) is to cross the border into Mozambique. 0.6 m^3/s is the required minimum flow from the Sabie River to cross the border.



Irrigation Sector

Irrigation is a significant user of water in the study area, particularly in the Crocodile catchment. Sugarcane is the most commonly found crop grown in the Crocodile catchment, followed by vegetables and citrus, mainly in the Sabie catchment. Various irrigation Boards are located along the river, all sharing the water resources of the Kwena Dam.

Type	Area (km^2)	Volume (million m^3/annum)
Elands Irrigation Board	42.2	28.7
Upper Croc diffuse	9.1	4.3
Upper Croc diffuse	3.5	1.5
Crocodile Irrigation Board	282.9	304.0
Sand River IB Avalon & Gradely Farms	59.3	10.8
White River IB, Ranch Karino & Curlews		8.4
Manchester & Good Hope IBs		4.0
Middle Croc diffuse	33.7	20.2
Middle Croc diffuse	8.2	4.9
Kaap Upper & Lower IBs	54.2	36.1
Kaap Diffuse	43.8	55.6
Total	536.9	478.5

Type	Area (km^2)	Volume (million m^3/annum)
Sabie Irrigation Board	20.6	10.9
White Waters Irrigation Board	27.8	15.6
Diffuse[1] (Sabie)	79.1	63.1
Diffuse (Sand)	24.7	17.1
Total	152.2	106.7

Domestic Sector

Five Local Municipalities are either partially or fully located in the Study area. These are Mbombela LM, Nkomazi LM, Thaba Chweu LM, Emakhazeni LM and Bushbuckridge LM. The main towns and urban centres are as follows: Mbombela, Nsikazi North and South, White River, Karino, Matsulu, Malelane, Hactorspruit, Dullstroom, Machadodorp, Waterval Boven, Barberton, Acornhoek, Thulamahashe, Hoxane, Marite, Hazyview, Graskop and Sabie.

Demand Centre	Requirement (million m³/annum)				
	2018	2025	2030	2035	2040
Dullstroom	0.85	1.10	1.20	1.30	1.40
Machadodorp	0.95	1.20	1.40	1.50	1.60
Watervalboven	0.95	1.10	1.20	1.30	1.40
Sappi Ngodwana domestic	0.75	0.96	1.14	1.35	1.59
Sappi industrial	14.00	14.00	14.00	14.00	14.00
Elandshoek	0.11	0.14	0.16	0.17	0.19
Barberton, Umjindi	5.39	6.05	6.56	7.02	7.51
Sub-total (Crocodile tributaries)	23.00	24.55	25.66	26.64	27.69
CoM: Nelspruit WTW, part to Rocky drift	17.00	22.28	26.26	30.24	34.22
Karino, Tekwane West	0.92	1.10	1.23	1.35	1.48
Emoyeni, Tekwane North	0.30	0.46	0.58	0.70	0.82
Nsikazi South	25.00	27.97	30.11	32.26	34.40
Shiba Siding	0.11	0.15	0.18	0.19	0.21
Matsulu	6.49	7.50	8.25	8.98	9.76
Malelane	0.73	0.82	0.90	0.90	0.99
Marloth Park	0.92	1.04	1.12	1.19	1.26
Hectorspruit	0.25	0.25	0.28	0.40	0.42
Sub-total (Crocodile main)	51.72	61.57	68.91	76.21	83.56
White River from Witklip Dam	0.28	0.40	0.48	0.56	0.64
White River from Longmere Dam	1.60	2.10	2.51	2.91	3.32
Sub-total (White River)	1.88	2.5	2.99	3.47	3.96
Sabie	1.78	1.78	1.78	1.79	1.79
Graskop	0.83	0.91	0.97	1.04	1.10
Sub-total (Sabie groundwater)	2.61	2.69	2.75	2.83	2.89
Nsikazi North	10.44	11.63	12.51	13.13	13.75
Hazyview	1.61	2.09	2.47	2.70	2.84
Hoxani	14.20	16.00	17.20	18.20	19.20
Marite	3.40	3.90	4.30	4.60	4.80
Acornhoek (own resources)	5.15	7.15	7.85	9.95	10.95
Thulamahashe (own resources)	3.45	4.65	5.45	6.05	6.65
Bushbuckridge Transfer pipeline to Acornhoek and Thulamahashe	25.0	25.0	25.0	25.0	25.0
Sub-total (Inyaka Dam)	63.25	70.42	74.78	79.63	83.19

Water Resource Availability

The Study area was divided into smaller sub-systems for the purpose of the water availability determination. This was done by assessing the individual catchment characteristics and current approach to operation, and resulted in varying yield analyses methodologies being utilized for the various sub-systems.

Groundwater

While some localized use of groundwater exists within the catchments, it is generally accepted that groundwater abstraction on a large scale is not a viable option in the Middle Crocodile, City of Mbombela (Nelspruit) and White River, due to high river flow reductions and drawdown during drought conditions (Musa et al., 2015). Some potential exists in the Kaap and Lower Crocodile, however, this is not where the large domestic demands are located.

Groundwater is used in the Bushbuckridge LM, however, there are many boreholes which are unused, destroyed, not working and blocked.

Hydrology

Surface water runoff is the main source of water for users within the Crocodile and Sabie catchments.

Major River	Tertiary Catchment	IWAAS (maint.) MAR (million m^3/annum)
Sand	X32	135.96
Sabie	X31	526.68
Sabie	X33	12.51
Kaap	X23	204.22
Crocodile	X21	467.24
Crocodile	X22	359.38
Crocodile	X24	106.62

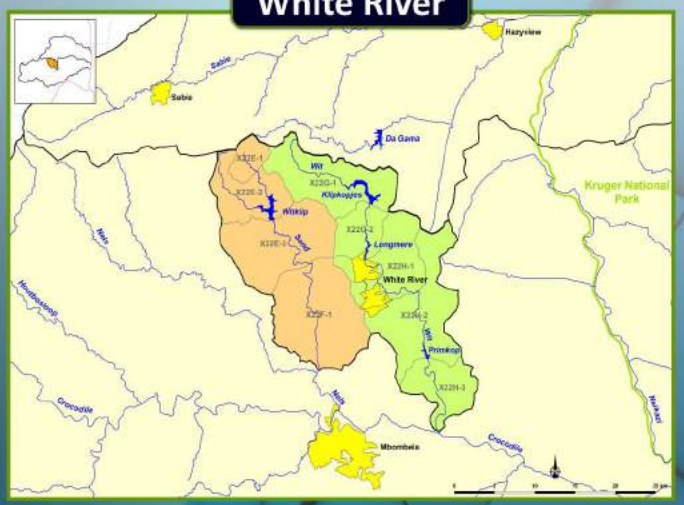
Overview of "Yield"

Historic Firm Yield: The maximum volume of water that can be abstracted from a resource over the historical observed time period (1920-2004) such that the resource is able to provide the abstracted volume in full each and every year.

Long Term Yield at various Recurrence Intervals: 201 natural hydrological time series' (known as stochastic sequences) of 85 year record length are analysed in order to determine the system behavior under different hydrological conditions. The analyses allow for some sequences to fail (not supply the abstraction in full) and the results are quoted in assurance of supply depending on how many sequences fail.

Short Term Yield at various Recurrence Intervals: 501 natural hydrological time series' (known as stochastic sequences) of 5 year record length are analysed in order to determine the system behavior under different hydrological conditions. In this case the resource's starting storage condition is considered as additional yield is available when the storage volume is high compared with when it volume in storage is lower.

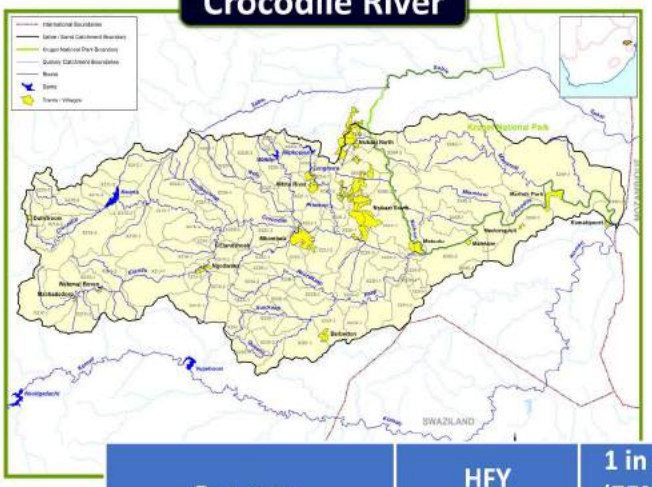
White River



Resource	HFY	1 in 4 (75%)	1 in 10 (90%)	1 in 20 (95%)	1 in 50 (98%)	1 in 100 (99%)
	(million m^3/annum)					
Witklip Dam	8.1	9.4	9.3	9.1	8.6	8.0
Klipkopje, Longmere, Primkop Dams	14.0	17.9	17.6	17.2	16	15.2
Total	22.1	27.3	26.9	26.3	24.6	23.2

The White River system consists of the Witklip, Klipkopje, Longmere and Primkop Dams.

Crocodile River



The Crocodile system contains one major dam, Kwena Dam, which is located in the upper reaches of the catchment. The system provides water to a number of users distributed along a lengthy stretch of river downstream of the Dam. The yield of the Crocodile River System is directly influenced by the size of abstraction and location of the users in the system.

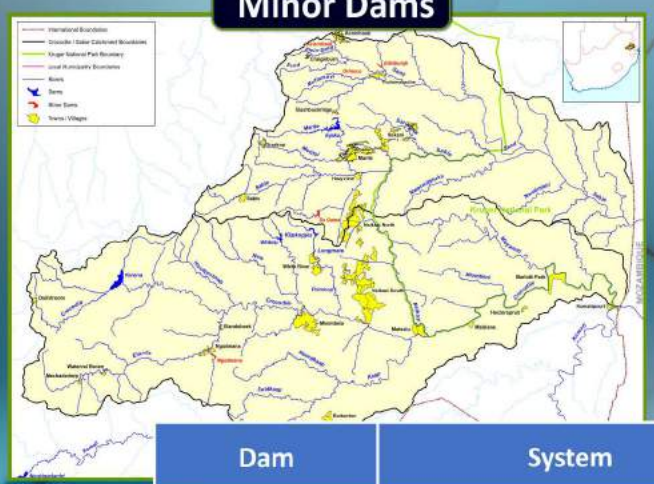
Resource	HFY	1 in 4 (75%)	1 in 10 (90%)	1 in 20 (95%)	1 in 50 (98%)	1 in 100 (99%)
	(million m³/annum)					
Kwena Dam	49.5	67.6	66.3	64.2	57.8	53.8
Croc system (incl Kwena Dam)	186.7	208.7	206.2	202.3	184.8	179.1

Sabie River

The Inyaka Dam is the main water resource infrastructure in the Sabie River, and supplies users both in the Sabie catchment as well as the Sand catchment through the Bushbuckridge Transfer Pipeline.

Resource	HFY	1 in 4 (75%)	1 in 10 (90%)	1 in 20 (95%)	1 in 50 (98%)	1 in 100 (99%)
	(million m³/annum)					
Inyaka Dam	21.3	29.5	28.8	27.6	24.2	22.0

Minor Dams



Dam	System	User	HFY (million m³/annum)
Ngodwana	Crocodile (Elandspruit)	Sappi & Irrigation	21.00
Da Gama	Sabie (Whitewaters)	Whitewaters Irrigation Board	10.30
Edinburgh	Sand	Thulamahashe & irrigation	2.29
Orinoco	Sand	Irrigation	0.34
Acornhoek	Sand	Acornhoek (domestic)	0.33

Water Conservation/ Water Demand Management

Status quo assessment

Review the status quo of the municipalities concerning their institutional, financial, legal, social and technical pillars. The assessments were undertaken to gain a complete understanding of the existing municipal water business, their operations and current key challenges.

Assessment Overview of Individual Demand Centres

To allow for the concise assessment of the water situation, the individual demand centres the individual LM's were assessed and visited to gather information and to gain a better understanding of the status quo. The WCWDM key performance indicators (KPI's) were assessed for each demand centre.

Strategy

Based on the results of the assessments a WCWDM strategy was developed, which was broken down into institutional, financial, social and technical strategy components.

Business Plan

A business plan (targets and budgets) was developed for both the CoM and Bushbuckridge LM and the assumptions were documented.

City of Mbombela LM

Indicator	Current Value	Realistic Target value 10% Reduction	Optimistic Target Value 20% Reduction
System Input volume (million m³/a)	65,48	55,93	51,09
System Input volume (Mℓ / day)	179,27	153,14	139,88
Billed Authorised Consumption (million m³/a)	31,64	30,89	32,80
Unbilled Authorised Consumption (million m³/a)	6,59	5,68	4,66
Water Losses (million m³/a)	27,25	19,36	13,64
Non-revenue Water (million m³/a)	33,84	25,04	18,30
% Non-revenue water	52%	45%	36%
% Water Losses	42%	35%	27%
Input Volume (litres / capita / day)	251	214	196
Input Volume (m³ / household / month)	26	22	20
Authorised Consumption (litres / capita / day)	146	140	143
Authorised Consumption (m³ / household / month)	15	14	15

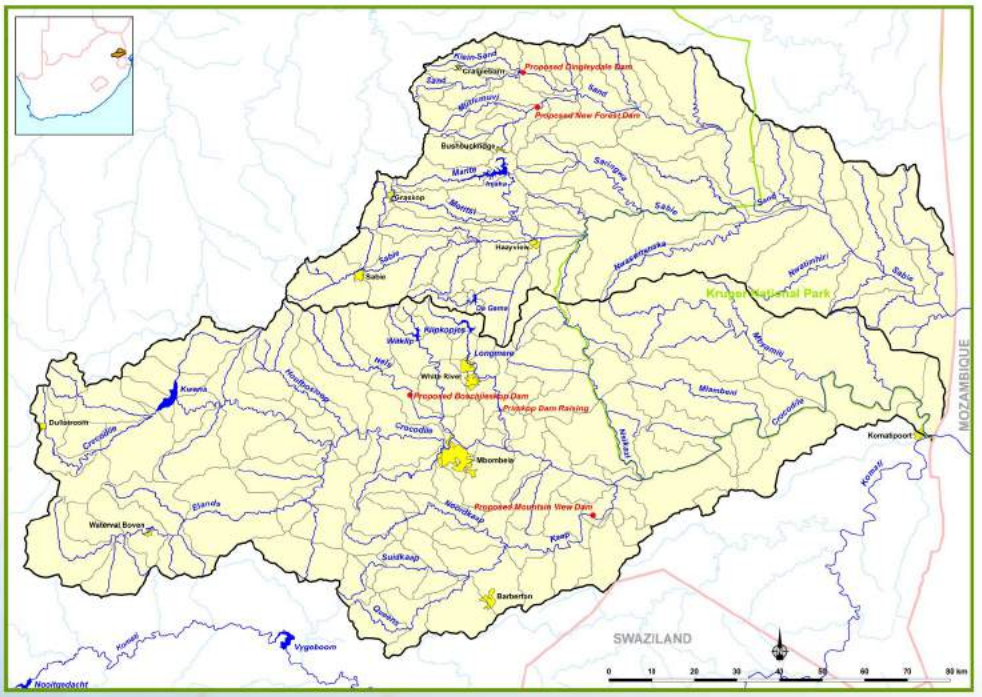
Bushbuckridge LM

Indicator	Current Value	Realistic Target value 15% Reduction	Optimistic Target Value 20% Reduction
System Input volume (million m³/a)	49,68	42,23	39,74
System Input volume (Mℓ / day)	136,02	115,61	108,81
Billed Authorised Consumption (million m³/a)	14,90	16,89	19,87
Unbilled Authorised Consumption (million m³/a)	0,00	4,22	7,95
Water Losses (million m³/a)	34,78	21,11	11,92
Non-revenue Water (million m³/a)	34,78	25,34	19,87
% Non-revenue water	70%	60%	50%
% Water Losses	70%	50%	30%
Input Volume (litres / capita / day)	252	214	201
Input Volume (m³ / household / month)	38	32	30
Authorised Consumption (litres / capita / day)	76	107	141
Authorised Consumption (m³ / household / month)	11	16	21

Infrastructure

The infrastructure options that remain listed for further consideration are as follows:

- Mountain View Dam (Crocodile catchment);
- Boschjeskop Dam (Crocodile catchment);
- Dingleydale Dam (Sabie catchment);
- New Forest Dam (Sabie catchment); and
- Raising of Primkop Dam (Crocodile catchment).

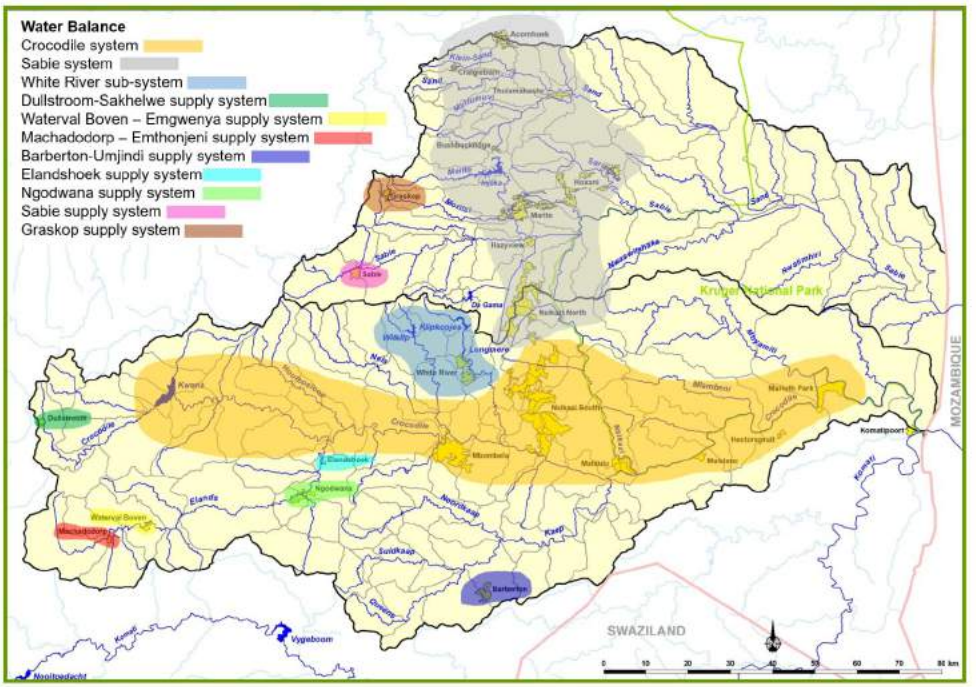


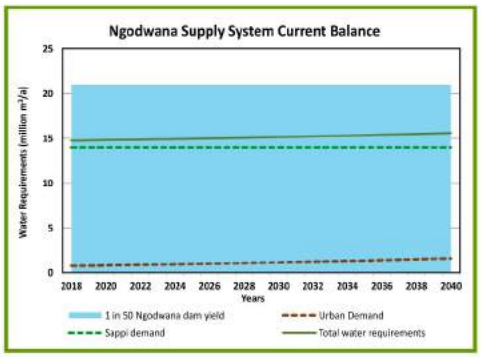
Dam Option	Discount Rate	Total Discounted Costs	Total Discounted Yield (million m³)	URV Rand/m³
Boschjeskop Dam	6%	839,757,728	320.71	2.62
Mountain View Dam	6%	655,827,506	802.79	0.82
Boschjeskop Dam	8%	753,788,822	220.43	3.42
Mountain View Dam	8%	589,473,151	551.79	1.07
Boschjeskop Dam	10%	679,751,438	157.92	4.31
Mountain View Dam	10%	532,223,251	395.28	1.35

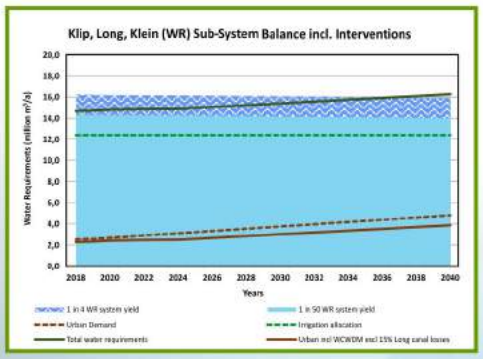
Dam Option	Discount Rate	Total Discounted Costs	Total Discounted Yield (million m³)	URV Rand/m³
Dingleydale Dam(1)	6%	1,041,109,029	211.75	4.92
New Forest Dam(1)	6%	1,258,038,130	201.47	6.24
Dingleydale Dam(2)	6%	2.561.650.988	211.75	12,10
New Forest Dam(2)	6%	2,912,176,817	201.47	14.46
Dingleydale Dam(1)	8%	935,402,444	145.54	6.43
New Forest Dam(1)	8%	1,129,770,523	138.48	8.16
Dingleydale Dam(2)	8%	2,228,887,522	145.54	15,31
New Forest Dam(2)	8%	2,540,326,084	138.48	18.35
Dingleydale Dam(1)	10%	844,231,897	104.26	8.10
New Forest Dam(1)	10%	1,019,229,407	99.20	10.28
Dingleydale Dam(2)	10%	1,964,898,210	145.54	18,85
New Forest Dam(2)	10%	2,243,533,945	138.48	22.62

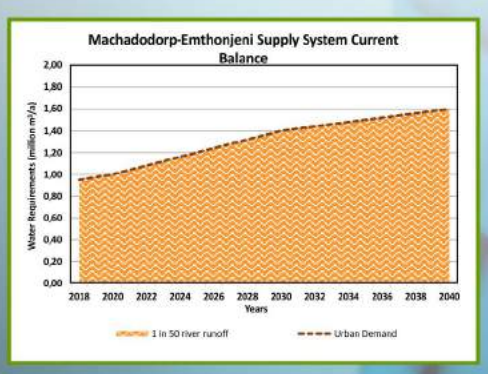
(1) Excluding downstream infrastructure costs.
(2) Including downstream infrastructure costs.

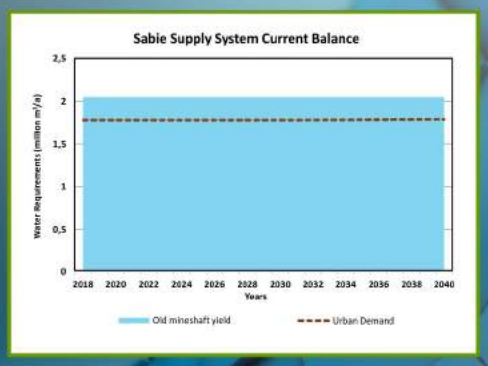
Water Balances

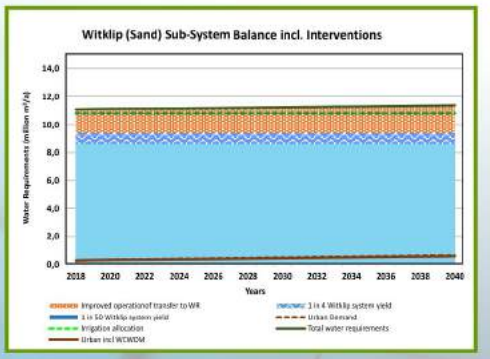


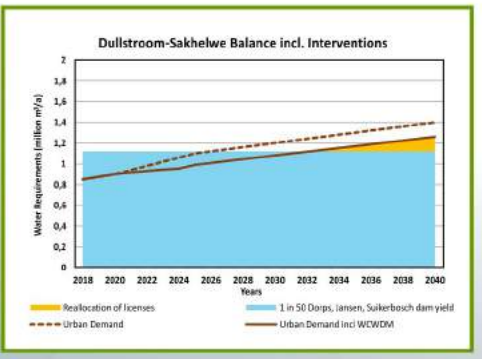


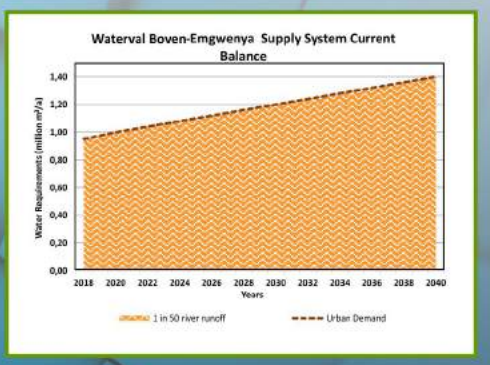


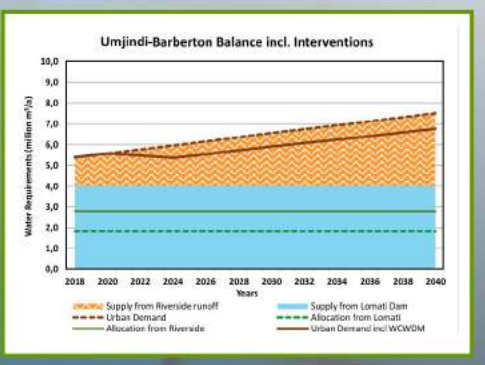


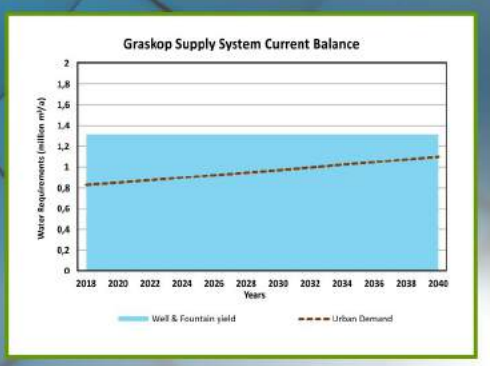


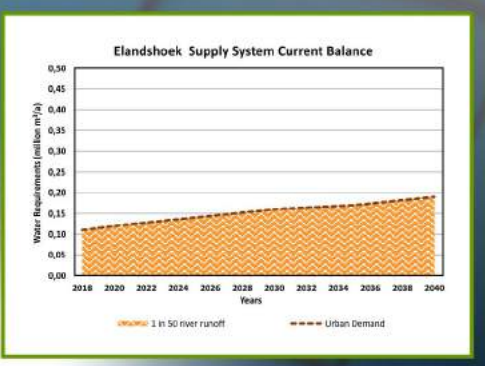


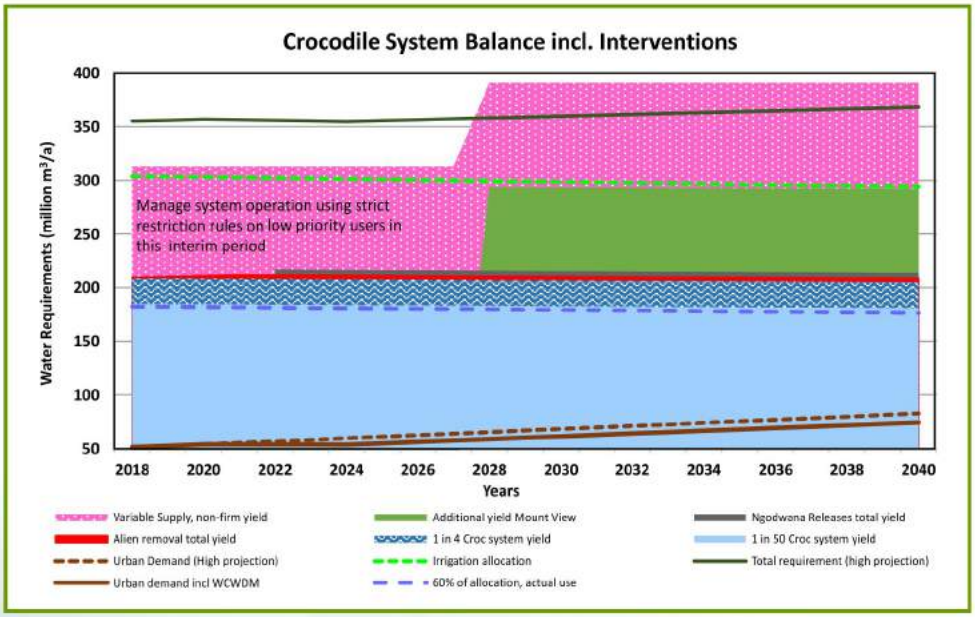












Crocodile System

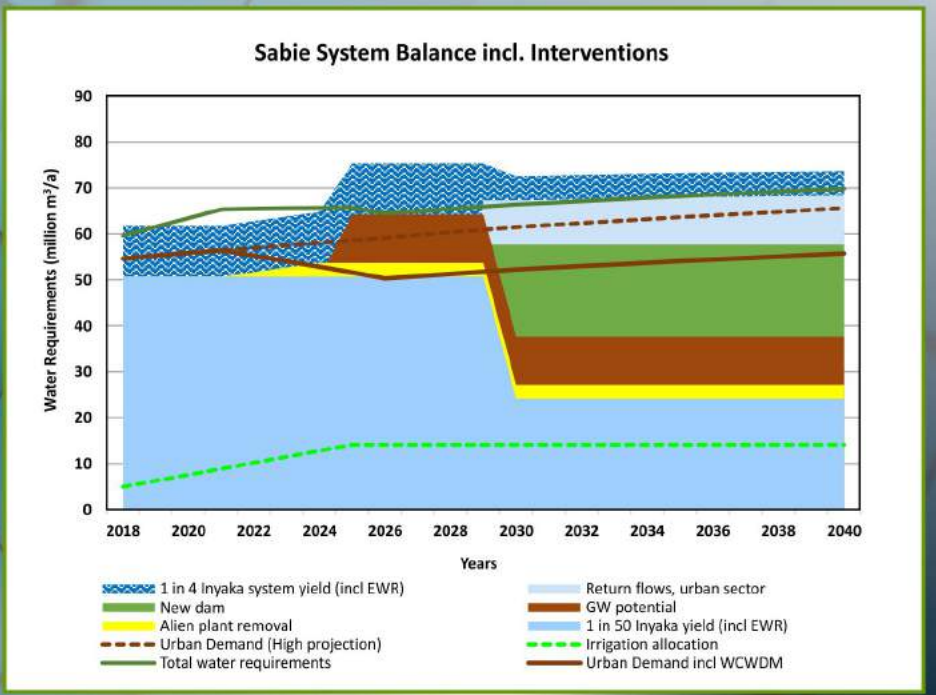
Options for reconciliation for the Crocodile system include the following:

- WCWDM;
- Removal of IAPs;
- Surrender of irrigation allocations;
- Strict restriction rules on low priority users;
- Releases from Ngodwana Dam; and

Sabie System

Options for reconciliation for the Sabie system include the following:

- WCWDM;
- Removal of IAPs;
- Development of groundwater;
- New Dam; and
- Additional return flows from conversion of oxidation ponds to treated effluent



Intervention	Description of Actions	Primary Responsibility	Comments	Target Date (priority)
WCWDM	Implementation of proposed WCWDM plan: Institutional: Improved political backing, capacity building Financial: Enhance revenue collection, improved tariff structure Social: Raise public awareness Technical: reduce water wastage, pressure management, bulk metering	Local Municipalities: City of Mbombela LM, Bushbuckridge LM, Emakhazeni LM, Thaba Chweu LM Nkomazi LM	Bushbuckridge LM to finalise process to appoint service provider to assist with WCWDM activities City of Mbombela to continue with and increase existing WCWDM programme	High priority, implementation to continue/start immediately CoM: 10% savings, reduction in growth by 2023 Bushbuckridge: 15% savings, reduction in growth by 2023
Reduce canal losses	Investigate potential savings and impact on water balance at a pre-feasibility level	City of Mbombela LM	Focus on canal supplying Nelspruit WTW and canals in the White River area	Medium priority level, as and when funds available
Remove alien vegetation	Implement programme to systematically clear alien vegetation and continuously maintain cleared areas Rehabilitate land and re-establish indigenous vegetation	Department of Environmental Affairs, WWF, Sanparks & IUCMA	Focus on areas upstream of Inyaka and Kwena Dams as well as Lomati Dam in the Inkomati catchment	High priority, implementation to continue/start immediately
Water use entitlement exchange from irrigation to urban	Identify irrigation users that are willing to surrender allocations Create awareness amongst irrigators that this option exists Determine status of existing CoM applications and reasons for delay	Department of Water and Sanitation: Directorate to be confirmed City of Mbombela, IUCMA	Follow procedure for reallocation of water licenses as laid out by DWS. It is important that the reasons behind the delay in process are understood in order to streamline future applications	High priority, implementation to continue/start immediately 2021 for existing applications Ongoing for additional applications
Eliminating unlawful uses	Complete Validation process Complete Verification process Establish unlawful users Remove and prosecute unlawful users	IUCMA	The process of V and V has taken significant time and requires completion before any action can take place on this intervention	High priority, implementation to continue/start immediately Target date: 2022
Compulsory licensing	Establish need for Compulsory licensing as last resort intervention Determine economic impact of Compulsory licensing Send out call for license applications Reissue licenses	IUCMA	Should it be deemed necessary that Compulsory licensing take place, a detailed Stakeholder engagement process should be incorporated into the process in order to gain support from user sectors The process should be transparent and clearly defined objectives communicated	Target date: 2025 if required

Action Plan

Intervention	Description of Actions	Primary Responsibility	Comments	Target Date (priority)
Water Reuse	Determine viability at a pre-feasibility level including impact of intervention on water balance	Bushbuckridge LM	This intervention is focused on the Bushbuckridge LM supply area and is designed to add additional resources after the implementation of a new dam	Medium priority level, when new dam constructed
Interim Restriction Rule to Benefit Priority (Primary) Users	Carry out annual operating analyses to determine level of restrictions to be imposed on users on an annual basis, water requirement dependent Implement restrictions on lower priority users according to priority classification table Continuously monitor water use of large users to confirm actual growth is in line with projections	DWS: Directorate Water Resources Planning Systems, IUCMA	DWS has recently awarded a study to a professional service provider that can assist with annual operating analyses for three years. This study will produce dynamic operating rules	Immediate and ongoing
Efficient system operation	Continuous maintenance of real time flow monitoring system, both data capture (measurement) and data sharing (cloud based) Enhancement of real time system based on pre-determined strategic monitoring points	IUCMA and users	The existing system should not be allowed to fail, and should be expanded to additional key flow monitoring points throughout the catchments. It is specifically important to improve the flow monitoring in the White River in order to undertake a more accurate hydrological assessment.	Immediate and ongoing
Groundwater Development	Completion of IUCMA detailed Groundwater assessment Further development of Groundwater resources dependent on outcome of study	IUCMA, Local Municipalities,	This intervention is focused on the Bushbuckridge LM supply area, however, could also benefit the City of Mbombela if the detailed study indicates so	Ongoing
New Dam Construction & Existing Dam Raising	Feasibility Study into three Dam options: Dingleydale and New Forest, first prioritise using pre-feasibility Mountain View requires detailed feasibility including site selection, design and then construction Raising of Primkop Dam Reconnaissance assessment into raising of Wtklip Dam	DWS: Options Analyses (large dams, CoM (Primkop) DWS: NWRP for Wtiklip (part of future Recon update)	Tendering to be undertaken by implementing agent, Construction to be outsourced. Explore further options of Public Private Partnership	Urgent and requires fast tracking. Construction to be complete by 2030.
Water releases from Ngodwana Dam	Detailed assessment of potential water availability in Ngodwana Dam Discussions and negotiations between Sappi and CoM LM to agree on option	DWS: NWRP CoMLM, Sappi	This option requires further investigation in terms of the water availability and viability of the release. Closer monitoring of Ngodwana dam should be undertaken in order to quantify the excess water available	Medium priority level

For more information refer to the following report

Department of Water and Sanitation, South Africa, February 2021.
CONTINUATION OF WATER REQUIREMENTS AND AVAILABILITY RECONCILIATION STRATEGY FOR THE MBOMBELA MUNICIPAL AREA: WATER RECONCILIATION STRATEGY

Or the suite of detailed reports as listed:

Report Name	Report Number	DWS Report Number
Inception	1	P WMA 03/X22/00/6718
Economic Growth and Demographic Analysis	2	P WMA 03/X22/00/6818
Water Requirements and Return Flows	3	P WMA 03/X22/00/6918
Water Conservation and Water Demand Management	4	P WMA 03/X22/00/6718/4
Water Resources Analysis	5	P WMA 03/X22/00/6718/5
Infrastructure and Cost Assessment	6	P WMA 03/X22/00/6718/6
Updated Reconciliation Strategy	7	P WMA 03/X22/00/6718/7
Executive Summary: Updated Reconciliation Strategy	8	This document