



water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

CLASSIFICATION OF WATER RESOURCES AND DETERMINATION OF THE COMPREHENSIVE RESERVE AND RESOURCE QUALITY OBJECTIVES IN THE MVOTI TO UMZIMKULU WATER MANAGEMENT AREA

1.1 UMNGENI RIVER SYSTEM SCENARIOS

Table 1 shows the scenario summary matrix indicating the drivers of the scenario (different columns) for the list of scenarios provided by the rows.

Table1: uMngeni: Summary of operational scenarios

Scenario	Scenario Variables							
	Update Water Demands	Update Demands & Return Flows (2022)	Ultimate Development Demands & Return Flows (2040)	EWR ¹	MMTS2 ²	MWP ³	Darvill Re-use	eThekwini Re-use
UM1	Yes	No	No	No	No	No	No	No
UM2	No	Yes	No	No	Yes	No	No	No
UM41	Yes	No	Yes ⁴	No	Yes	No	No	No
UM42	Yes	No	Yes ⁵	No	Yes	No	No	No
UM51	Yes	No	Yes ⁴	No	Yes	No	Yes	Yes
UM52	Yes	No	Yes ⁵	No	Yes	No	Yes	Yes

Notes:

1 Ecological Water Requirement

2 Mooi-Mgeni Transfer Scheme Phase 2 (Spring Grove Dam)

3 Mkomazi Water Project (Smithfield Dam)

4 All future return flows from Phoenix and Mhlanga WWTW to the Mgeni System.

5 All future return flows from Phoenix, Umhlanga & Tongati WWTW to the Mgeni System

Each scenario is described in the following sections.

1.1.1 Scenario UM1: Present Day with MMTS2

Scenario representing the present day conditions with respect to abstractions and return flows, existing storage and conveyance infrastructure and applying the prevailing operating rules in the system.

1.1.2 Scenario UM2: 2022 Development Level, MMTS2

Scenario UM2 incorporate the Mooi - Mgeni Transfer Scheme Phase 2 (MMTS2) (Spring Grove Dam and transfer infrastructure) to augment the water supply of the KZN Metropolitan area. Water requirement and return flows as it is projected for the year 2022 development scenario, one year prior to the expected implementation of the uMkhomazi Water Project. The MMTS2 interbasin transfer discharges into the Mpofana River, which is a tributary of the Lions River that flows into Midmar Dam catchment and will mainly impact on these two rivers.

The uMgeni System is operated for this scenario such that the maximum load shift volume from the Upper to the Lower Mgeni River System via the Western Aqueduct (direct support from Midmar Dam to the eThekwini Durban Heights WTW) is taking place while maintaining the 3 months available storage in Midmar Dam as a buffer storage for supplying the Upper Mgeni Demand Centres. The reason for this buffer storage level in Midmar Dam is to protect the water users that can only be supported from the Upper nMgeni River system (that is while other users can receive water from both the Upper and Lower nMgeni Systems).

1.1.3 Scenario UM41 and UM42: Ultimate Development, MMTS2 and MWP

This scenario represents the long term future conditions representative expected for the year 2040. This is representative of the "Ultimate Development Level" also reflecting the developmental vision set by the Ethekwini Spatial Development Framework. The uMkhomazi River Water Project is assumed to deliver water to the nMgeni River System in accordance with the DWS Water Reconciliation Strategy Study for the Kwazulu Natal Coastal Metropolitan Areas.

*There are several existing and planned WWTW in the Mgeni catchment and water is also transferred from the Mhlanga River (Phoenix WWTW) to a tributary (Piesangs River) of the Mgeni River. The Ethekwini WWTW ultimate waste water generation was included for the diversion of return flows from neighbouring catchments as described in the footnotes of **Table 3.1**.*

(Note that additional wastewater discharge scenarios affecting the estuary are described in subsequent sections).

1.1.4 Scenario UM51 and UM52: Ultimate Development, PES/REC EWR, MMTS2, MWP, Darvill Re-use and Ethekwini Direct Re-use

As for Scenarios UM41 and UM42 with the Darvill Re-use and the Ethekwini Direct Re-use options operational. Discharges from the Darvill WWTW (Pietermaritzburg area) enter the Msunduze River and affect the flow and especially the water quality of the river. Umgeni water is currently investigating the potential of re-using effluent from the Darvill WWTW, which could have a future impact on the uMsunduze River and the Mgeni River after the uMsunduze/Mgeni confluence. The eThekwini Municipality has conducted a feasibility study for the re-use of treated effluent in the eThekwini metropolitan area. The implementation of the investigated re-use schemes will have an impact on the WWTW return flows entering the Mgeni River System in the future.

1.2 LOVU RIVER SYSTEM

Table 2 scenario summary matrix indicating the drivers of the scenario (different columns) for the list of scenarios provided by the rows.

Table 2 Summary of the Lovu Scenarios

Scenario	Scenario Variables			
	Update Water Demands	Ultimate Development Demands & Return Flows (2040)	EWR	Reduced Abstraction and Afforested Areas
LO1	Yes	No	No	No
LO2	Yes	Yes	No	No
LO3	Yes	Yes	No	Yes (25% reduction)
LO4	Yes	Yes	No	Yes (50% reduction)

1.2.1 Scenario LO1: Present Day

This Scenario represents the present day conditions with respect to abstractions and return flows, existing storage and conveyance infrastructure and applying the prevailing operating rules in the system.

1.2.2 Scenario LO2: Ultimate Development

This scenario represents conditions with increased water use and return flows for the domestic sector due to population growth and improved service delivery for the ultimate development scenario. The return flows are from WWTW higher up in the catchment (U70B, Richmond and township) and information on increased water use and return flows for the domestic sector will be sourced from the DWA All Towns Strategies and other sources such as municipal documents if available.

The purpose of the scenarios is to monitor the flows at the EWR sites and into the estuary for the ultimate development scenario.

1.2.3 Scenario LO3: Ultimate Development, Reduced Abstraction and Afforestation Areas (25%)

This scenario is based on Scenario LO2 with a reduction of abstraction from Lovu Dam in the upper part of the catchment as well as a reduction in the afforested areas in order to increase base flows by 25% included. The aim with this scenario is to increase the base flow into the estuary.

1.2.4 Scenario LO4: Ultimate Development, Reduced Abstraction and Afforestation Areas (50%)

This scenario is based on Scenario LO3 with a reduction of abstraction from Lovu Dam in the upper part of the catchment as well as a reduction in the afforested areas by 50% in

order to increase base flows included. The aim with this scenario is to increase the base flow into the estuary.

1.3 SCENARIO GI IN IUA CC

Scenario GI for the uMdloti and uThonghati Estuaries:

uThonghati:

- *All wastewater from uThonghati is reused (via Hazelmere Dam).*
- *Indirect re-use option could take many years to implement.*
- *Interim option to accommodate development pressure: Allow further discharge into uThonghati (Ecological health will reduce to an EC = E over medium term.)*

uMdloti:

- *Increase wastewater discharged into uMdloti estuary as it will improve the estuary depending the volume and concentrations.*
- *Once the stage has been reached that the uMdloti estuary starts to degrade, then alternative means for the waste must be found, eg indirect re-use through Hazelmere, sea outfall.*