DETERMINATION OF WATER RESOURCE CLASSES, RESERVE AND RQOS IN THE LIMPOPO (A5-A9) CATCHMENTS & OLIFANTS (B9) CATCHMENT PRESENTATION TITLE

Public meeting – Polokwane

Results for the Ecological Reserve, Water Resource Classes and the Resource Quality Objectives

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WATER IS LIFE - SANITATION IS DIGNITY

water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

2030 NDP

30 YEARS OF FREEDOM
South Africa 1994 - 2024

RQOs Groundwater (Resource Class, Reserve and RQOs)

- Groundwater quantity ranking (class) approach was applied using the stress index (SI) principle → a measure of the groundwater balance in a groundwater unit, indicating the fraction of how much of the **groundwater recharge** [volume] is used, i.e., the actual **groundwater use/abstraction**

Index	Description
< 0.20 (20 %)	Low
0.20 (20 %) - 0.40 (40 %)	Moderate
0.40 (40 %) - 0.65 (65%)	Moderate to High
0.65 (65 %) - 0.95 (95%) High	High
> 0.95 (95 %)	Critical

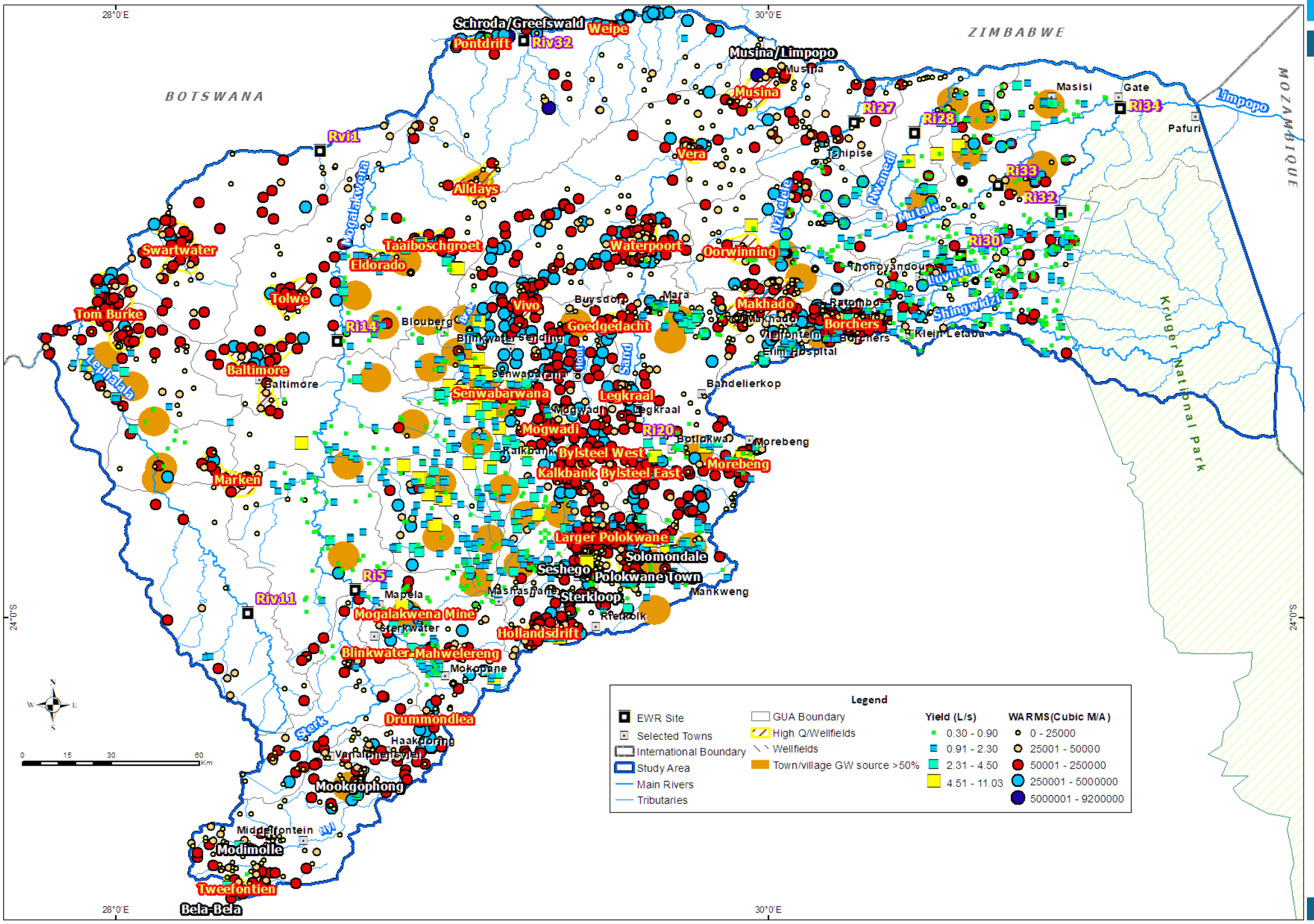
- Groundwater quality from the available databases were compared to the water quality guidelines for acceptable drinking water specified (**Class 0, I, II, III**)

- The **groundwater component of the Reserve** is the part of the groundwater resource that sustains basic human needs (BHN) and contributes to EWR

$$Reserve(\%) = \frac{EWR_{gw} + BHN_{gw}}{Re} \times 100$$

- RQOs for groundwater → prioritisation process which informs the overall **groundwater significance** of GRU
  - Develop components, sub-components and indicators (and set RQO narratives and numerical limits)

Borehole Dataset

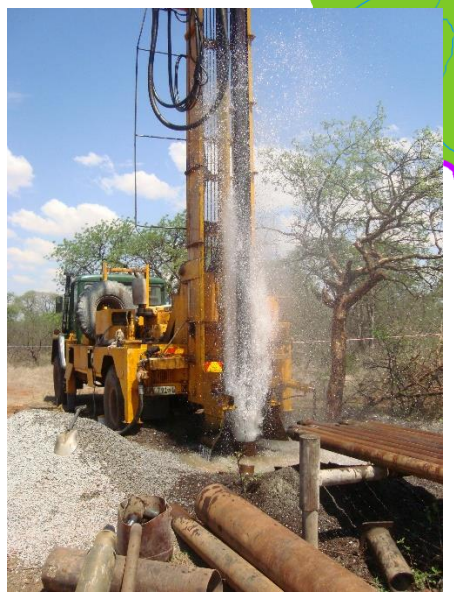


NYL/ STERK \IUA

Groundwater Class (Stress Index)

Abstraction ÷ Recharge

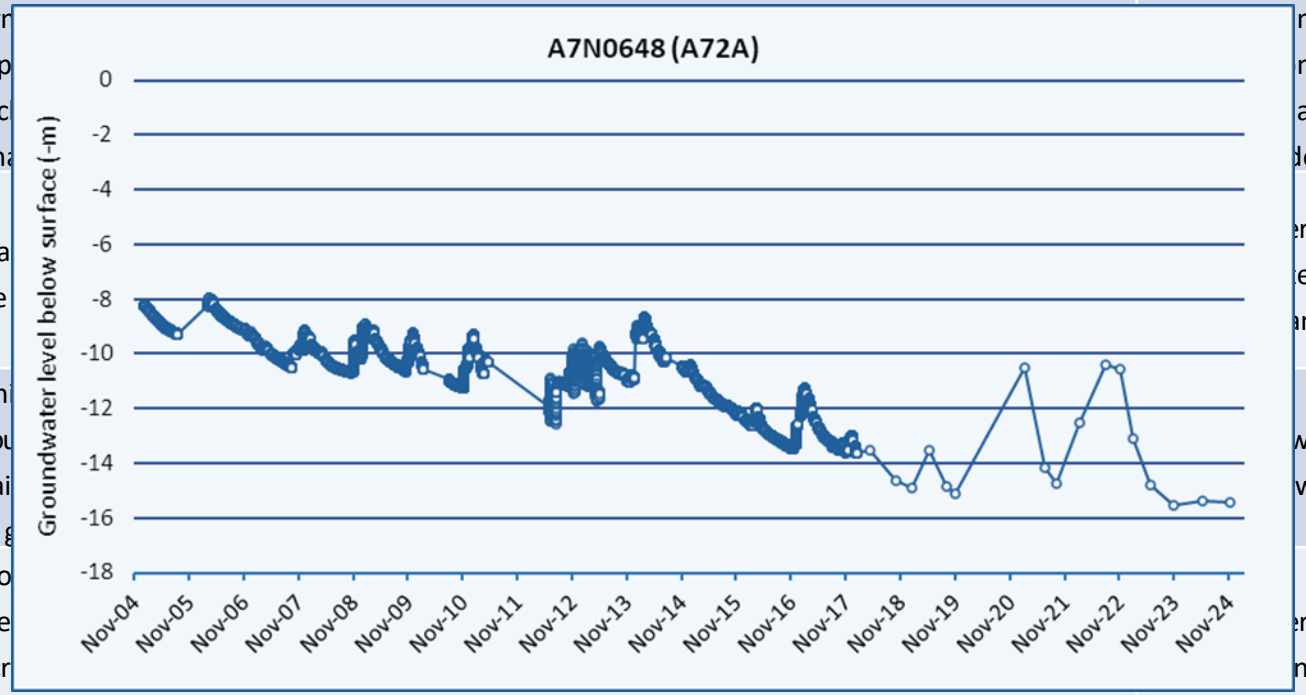
NYL/ STERK \IUA



Prioritized Groundwater Units - RQOs

Groundwater Sub-component prioritisation and indicator selection

Component	Sub-Component	Rationale for sub-component choice	Indicator Selection
Quantity	Abstraction (available yield)	• Over the long-term, groundwater use should be sustainable for all users and the environment. The RQO essentially implies that groundwater mining is considered unacceptable in the long-terr • Imp dec (una	Groundwater Levels: (Seasonal abstraction) water level recovers from mpact during wet season, under n of climate change and drought cycles. abstraction) water level decline stabilises deration of aquifer response time.
	Discharge	• In a the	r Levels: er levels between groundwater and surface amsl) (i.e., losing or gaining streams)
	Low flow in river	• Wh wou mai on g	ws: with the low flow requirements in the river
Quality	Nutrients, Salts	• Gro • The incr animal sewage. • The numerical values represent a limit of acceptable deviation from natural background.	r Quality: nd EC (other parameters i.e., SO_4, F, Ca, Mg, Cl, Na.
	Pathogens	• The parameters selected will support identification of pollution from wastewater (pathogens) and other bacteriological sources. The numerical value is based on drinking water quality standards.	Groundwater Quality: E-coli, Total Coliform



RQOs Groundwater (Nyl/Sterk)

GRU (A61A)	Component	Sub-component	Indicator	RQO Narrative	RQO Numerical
Waterberg Group, comprising of sedimentary and metamorphic rocks weathered and fractured aquifer **High groundwater use to support groundwater schemes and Modimolle wellfield. GW play a moderate role in supporting baseflow**	Quantity	Abstraction (Available Yield)	Groundwater Levels: (Seasonal abstraction) water level recovers from abstraction impact during wet season, under consideration of climate change and drought cycles. (Permanent abstraction) water level decline stabilises under consideration of aquifer response time.	Groundwater use should be sustainable for all users and the environment	Water level fluctuations should not exceed long-term averages of 7 m. Medium to long-term water trends should show recovery.
		Discharge	Groundwater Levels: Relative water levels between groundwater and surface water (in mamsl)	The natural gradient between groundwater and surface water should be maintained	Reverse groundwater gradient river towards wellfield in a 250 m zone along main stem not allowed.

RQOs Groundwater (Nyl/Sterk)

GRU (A61B)	Component	Sub-component	Indicator	RQO Narrative	RQO Numerical
Waterberg Group, comprising of sedimentary and metamorphic rocks weathered and fractured aquifer **Low to Moderate groundwater use to support rural water supply. GW play a moderate role in supporting baseflow (and wetlands)**	Quantity	Abstraction (Available Yield)	Groundwater Levels: (Seasonal abstraction) water level recovers from abstraction impact during wet season, under consideration of climate change and drought cycles. (Permanent abstraction) water level decline stabilises under consideration of aquifer response time.	Groundwater use should be sustainable for all users and the environment	n/a (Add (Hydstra mon. borehole to catchment)
		Discharge	Groundwater Levels: Relative water levels between groundwater and surface water (in mamsl)	The natural gradient between groundwater and surface water should be maintained	Reverse groundwater gradient (river towards wellfield in a 250 m zone along main stem not allowed.
		Low flow in river	Compliance with the low flow requirements in the river (as per riverine RQO)	Maintain the low flow requirements in the river	Ri1 (Olifantspruit RQO)

RQOs Groundwater (Nyl/Sterk)

GRU (A61D)	Component	Sub-component	Indicator	RQO Narrative	RQO Numerical
Upper Nyl River Valley alluvial aquifers and Karoo weathered aquifer **Low to Moderate groundwater use to support groundwater schemes and Mookgophong wellfield. GW play a moderate role in supporting baseflow (and wetlands)**	Quantity	Abstraction (Available Yield)	Groundwater Levels: (Seasonal abstraction) water level recovers from abstraction impact during wet season, under consideration of climate change and drought cycles. (Permanent abstraction) water level decline stabilises under consideration of aquifer response time.	Groundwater use should be sustainable for all users and the environment	Water level fluctuations should not exceed long-term averages of 8.5 m.
		Discharge	Groundwater Levels: Relative water levels between groundwater and surface water (in mamsl)	The natural gradient between groundwater and surface water should be maintained	Reverse groundwater gradient river towards wellfield in a 250 m zone along main stem (and wetland) not allowed.
	Quantity	Nutrients/Salts	NO_3 (as N) EC	Groundwater should be fit for domestic use after treatment; and groundwater quality shall not show a deteriorating trend from natural background	< 1 mg/l < 100 mS/m
		Pathogens	E.coli Total Coliform		0 counts / 100ml <10 counts / 100ml