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

Public meeting – Makhado

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

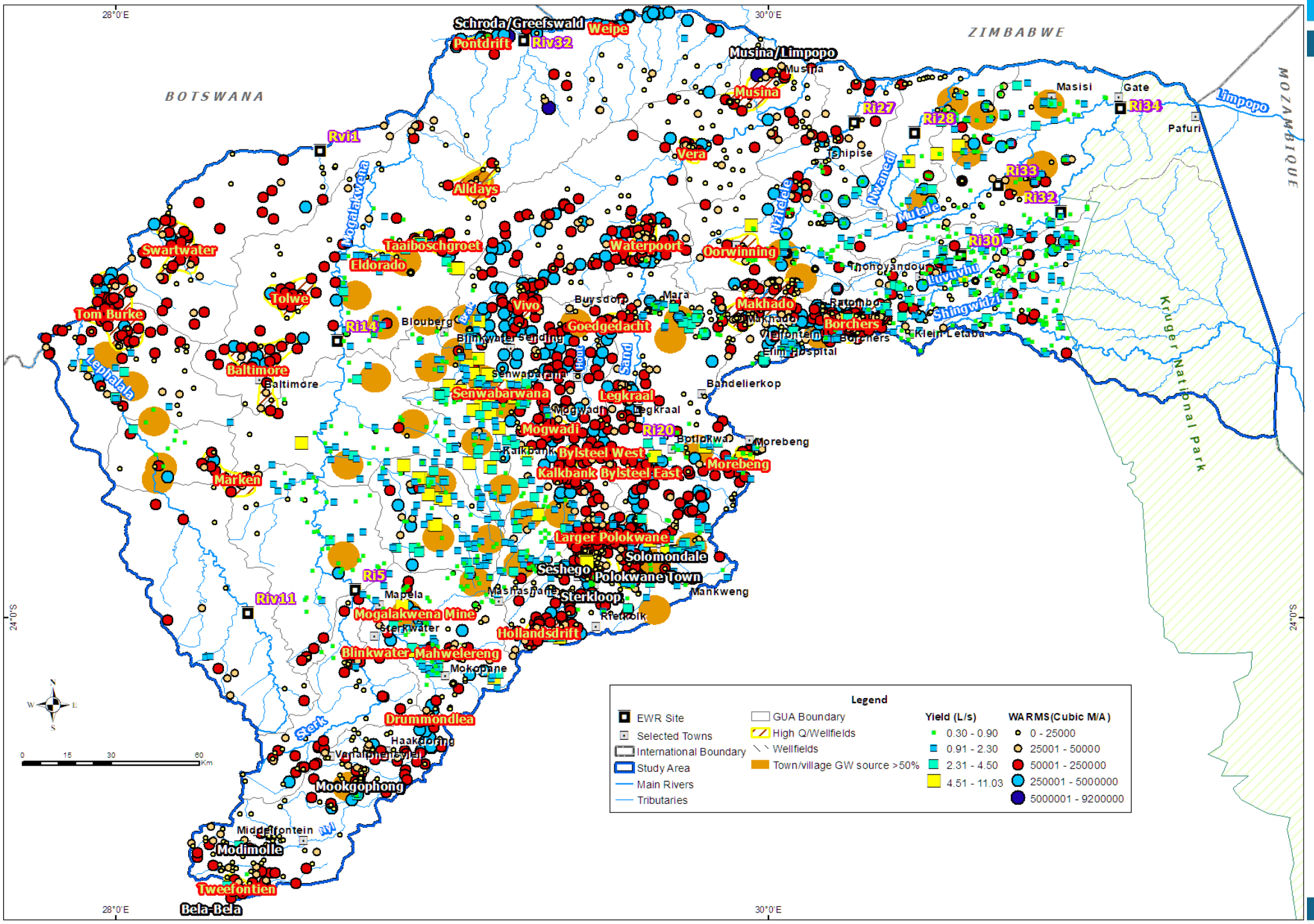
- Groundwater quality from the available databases were compared to the water quality guidelines for acceptable drinking water three water quality classes

- 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)

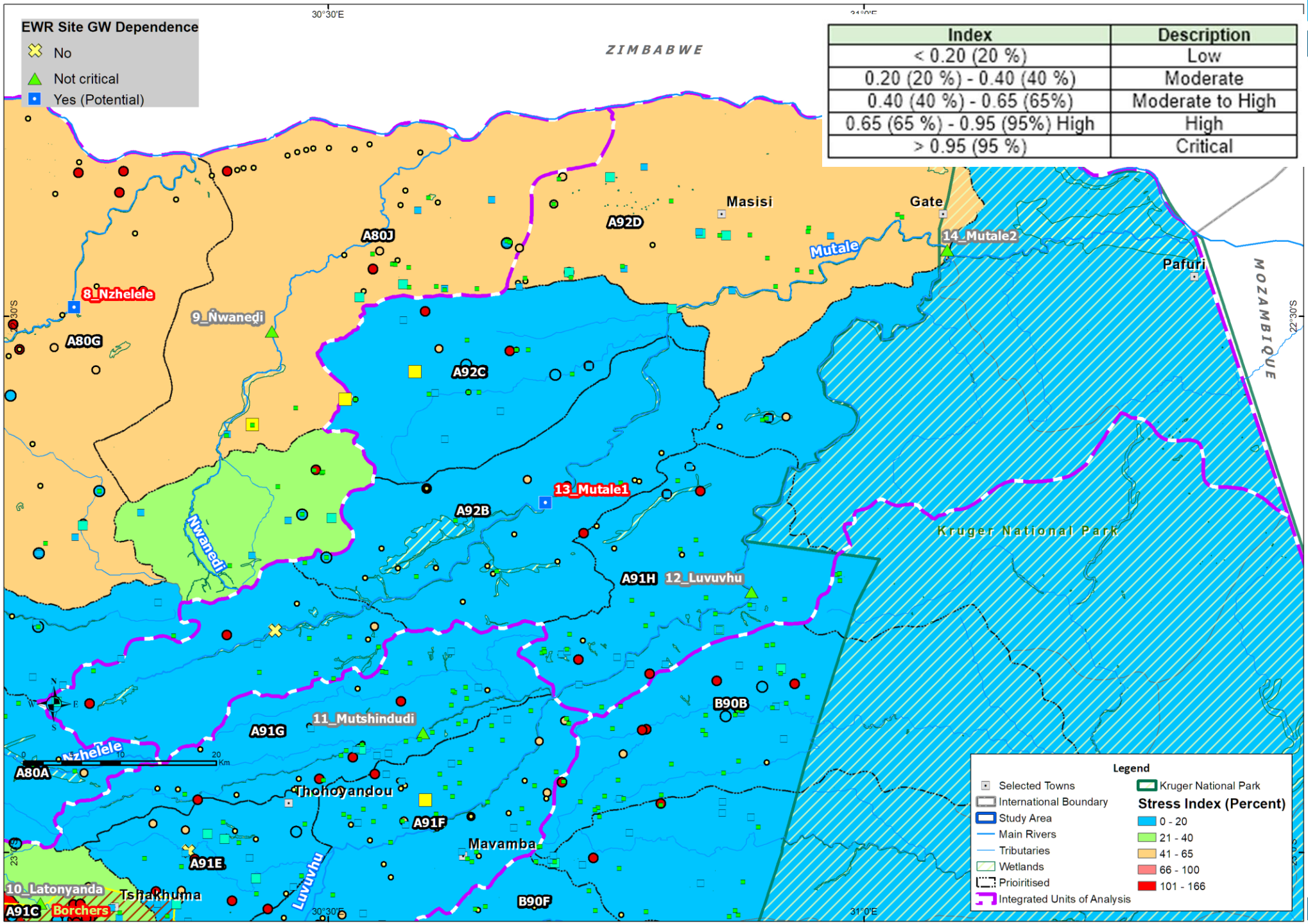
Borehole Dataset



LOWER LUVUVHU/ MUTALE IUA

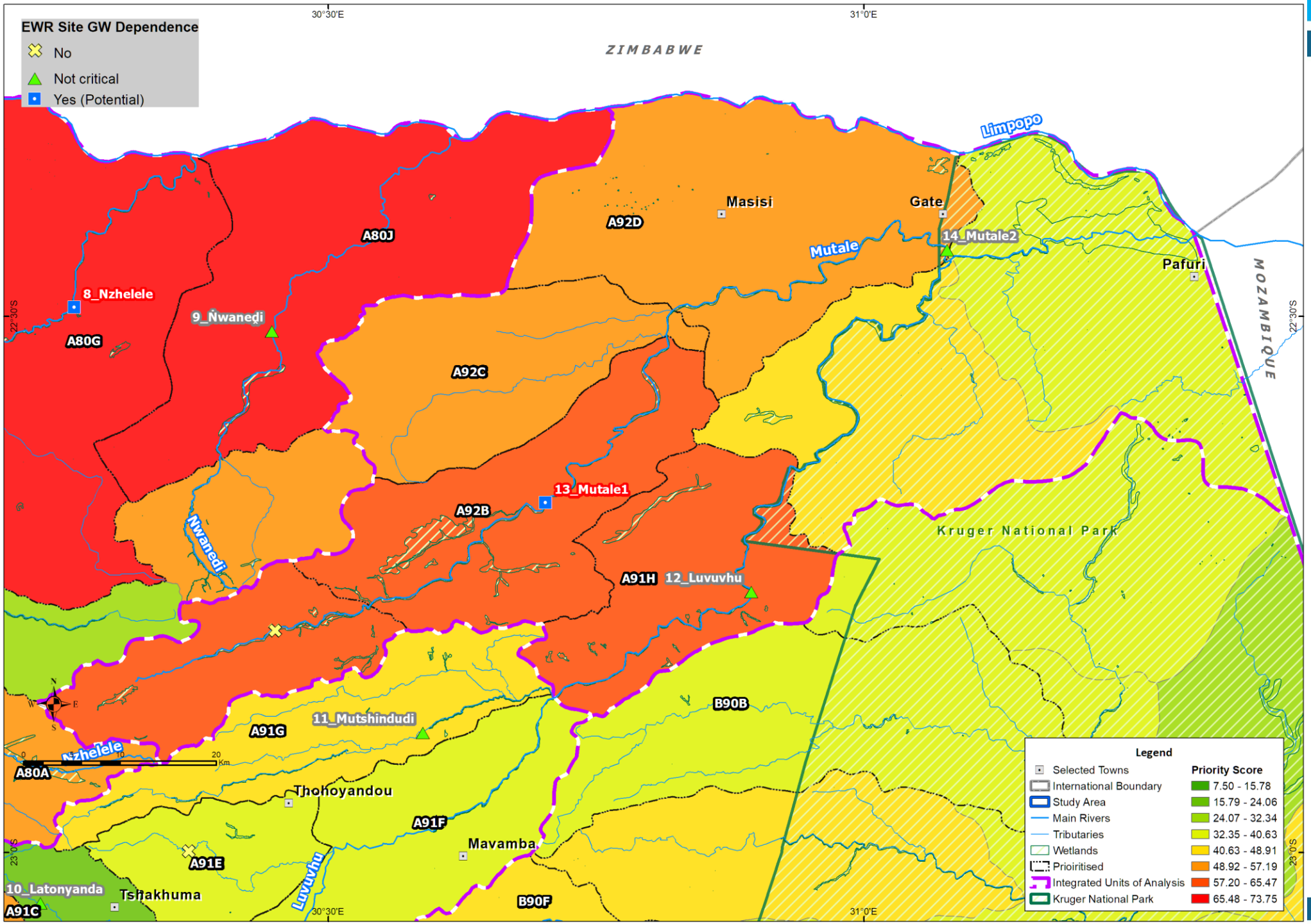
Groundwater Class (Stress Index)

Abstraction ÷ Recharge



LOWER LUVUVHU/ MUTALE 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-term. • Implementation of this RQO requires the authority to isolate the cause of groundwater level decline and identify over-abstraction (unacceptable) from transition to new dynamic equilibrium (unavoidable), drought and climate change (unavoidable).	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.
	Discharge	• In areas where groundwater and surface water are hydraulically connected, it is assumed that the reversal of the natural gradient with surface water could have unacceptable impacts.	Groundwater Levels: Relative water levels between groundwater and surface water (in mamsl) (i.e., losing or gaining streams)
	Low flow in river	• Whilst all abstraction reduces natural discharge to some extent and at some point, in time, it would be unacceptable for abstraction to cause groundwater discharge to reduce below the maintenance low flow value, **at locations** that have been identified as having higher dependence on groundwater.	Gauging Flows: Compliance with the low flow requirements in the river
Quality	Nutrients, Salts	• Groundwater management measures must ensure groundwater quality is protected. • The parameters selected will support identification of a variety of pollution sources (captured in increase in salts) (e.g., mining), agricultural pollution (fertilisers) and industrial, domestic and animal sewage. • The numerical values represent a limit of acceptable deviation from natural background.	Groundwater Quality: NO_3 (as N) and 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 (Mutale/Luvuvhu)

GRU (A91H)	Component	Sub-component	Indicator	RQO Narrative	RQO Numerical
Soutpansberg Basalts weathered and fractured aquifer **Alluvial aquifer** **Low groundwater use to support groundwater schemes and rural water supply. GW could play a 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 5.0 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 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	Ri32 Luvuvhu

RQOs Groundwater (Mutale/Luvuvhu)

GTU (A92B)	Component	Sub-component	Indicator	RQO Narrative	RQO Numerical
Soutpansberg Basalts weathered and fractured aquifer **Alluvial aquifer** **Low to Moderate groundwater use to support groundwater schemes and rural water supply. GW could play a 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 7.0 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.
		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	Ri33 Middle Mutale

RQOs Groundwater (Mutale/Luvuvhu)

GRU (A92D)	Component	Sub-component	Indicator	RQO Narrative	RQO Numerical
Soutpansberg Basalts weathered and fractured aquifer **Karoo aquifer** **Beitbridge Complex weathered and fractured aquifer** **Low to Moderate groundwater use to support groundwater schemes and rural water supply. GW could play a 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 (incl. springs) (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.
		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	Ri34 Lower Mutale