National Groundwater Quality Monitoring

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The purpose of the monitoring network is to identify temporal and spatial variations of groundwater thus giving status of the water resource in line with the National Water Act No. 36 of 1998. The objective of the National Water Act (NWA) is “to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled in ways which take into account amongst other factors” - in a sustainable and equitable manner, for the benefit of all persons. The ZQM station under the National Groundwater Quality monitoring programme aim at ascertaining the influence of rainfall on the groundwater quality and to determine the time series and spatial trends in the groundwater quality on the national scale.

The National Groundwater Quality Monitoring programme is conducted twice a year where sampling is done before and after the rainfall seasons (October to April). The samples are analysed by the Resource Quality Information Services where trace elements, environmental isotopes and radioactivity are analysed.

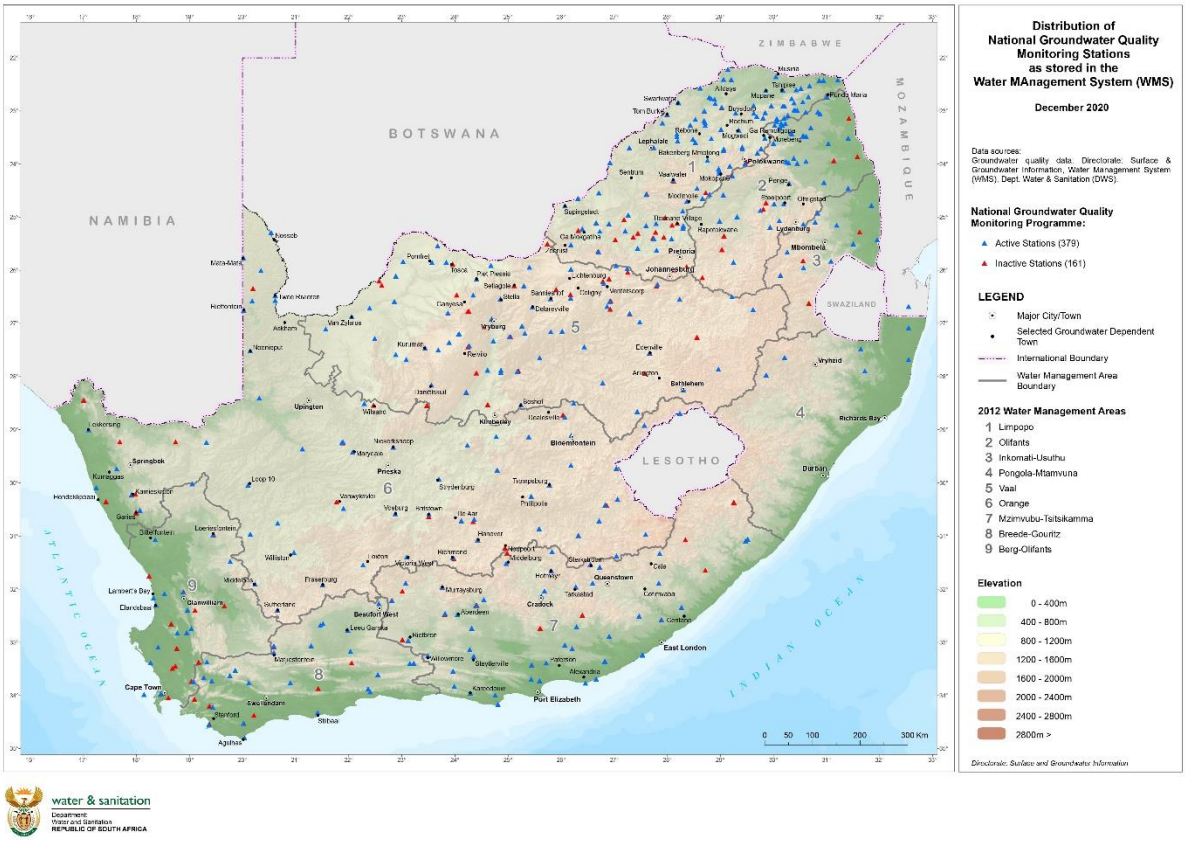

Figure 1: Distribution of groundwater quality monitoring stations

Analysed data and reports are available online on the DWS Water Management Systems (WAMS: https://www.dws.gov.za/iwqs/default.aspx) and https://www.dws.gov.za/NGANet/ and on the National State of Water report at https://www.dws.gov.za/Groundwater.

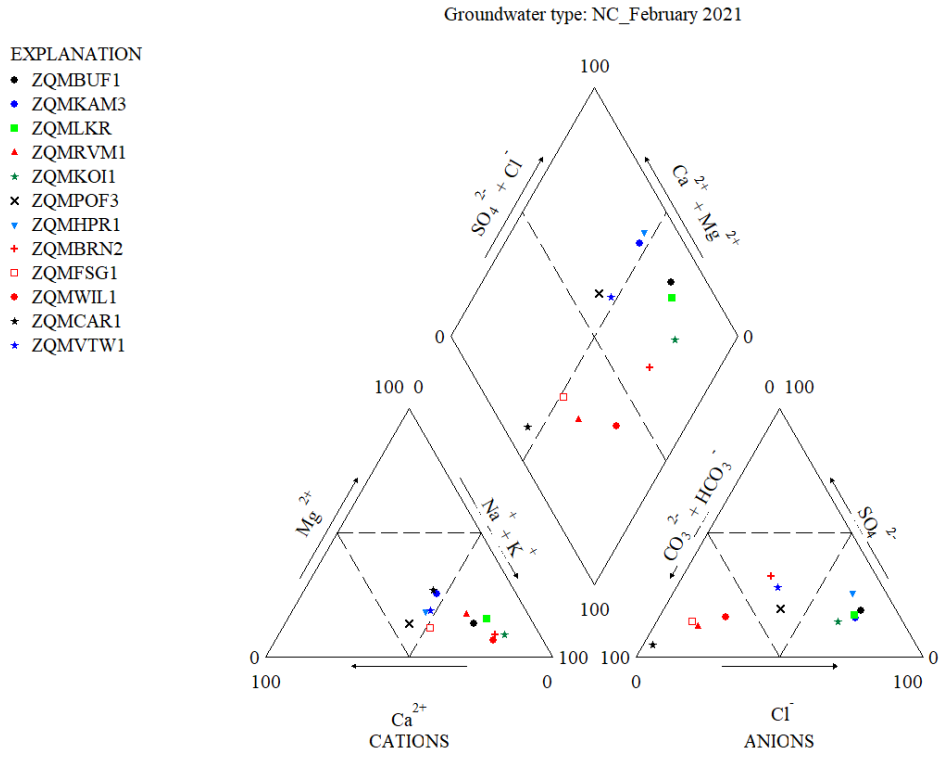

Figure 2: Graphical representation of groundwater type (Piper diagram)

Table 1 summarises chemical composition of groundwater

Parameter	pH	EC	TDS	Ca	Mg	Na	K	Cl	HCO3	NO3	F	SO4
Min	3,6	8	66	2	0	5	1	8	4	0	0	1
Max	9,4	423	2306	189	181	552	23	966	1105	67	4,9	630
Mean	7	132	872	64	54	99	5	189	390	16	0,6	65
SD	0,8	95,8	615,4	48,4	44,7	108,1	5,3	216,7	274,1	16,3	1,1	118,3
SANS 241 (2015)	5-9,7	170	1200	150	70	200	50	300		11	1,5	250

In depth analysis of the groundwater quality can be accessed in the National State of Water Resource Report available online DWS website.

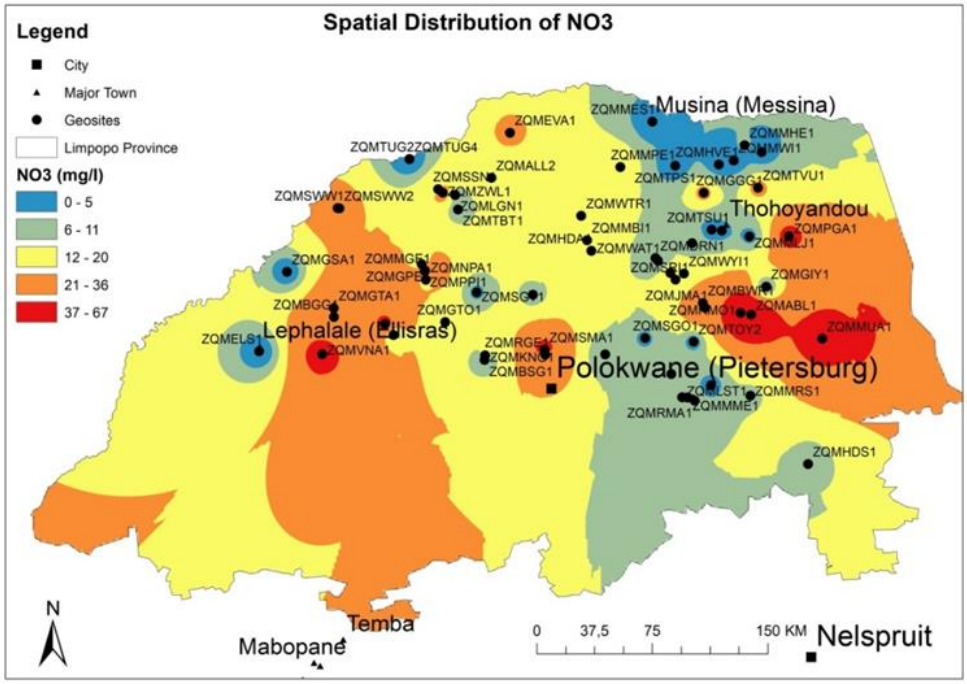

Figure 3: Spatial distribution of Nitrate

Table 3: Suitability of groundwater for irrigation

Parameter	Range	Water class	No. of Samples	%
Na%	<20	Excellent	37	55,2
	20-40	Good	14	21
	40-60	Permissible	9	13,4
	60-80	Doubtful	6	8,9
	>80	Unsuitable	1	1,5
SAR (meq/l)	<2	Excellent	45	67,1
	(2-8)	Good	20	29,9
	(8-15)	Doubtful	2	3
	>15	Unsuitable	0	0
MH (%)	<50	Suitable	5	7,5
	>50	Unsuitable	62	92,5
PI (%)	Class I (>75)	Good	4	4,5
	Class II (75-25)	Permissible	20	29,9
	Class III (<25)	Unsuitable	46	65,6
RSC (meq/l)	<2,5	Suitable	66	98,5
	>2,5	Unsuitable	1	1,5

Sustainability and future plans:

Expansion of the network is underway to implement the recommendation made from the Optimisation of the South African Water Resources Monitoring Network project. The optimisation network project available online at https://www.dws.gov.za/Projects/NWRM/ includes plans on expansion and improvement of the national groundwater quality monitoring programme.