

HIGH CONFIDENCE GROUNDWATER RESERVE DETERMINATION STUDY IN THE BERG CATCHMENT

Background Information Document No.03

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water & sanitation

Department:
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PURPOSE OF THIS DOCUMENT

The purpose of this Background Information Document (BID) is to inform stakeholders about the study, initiated by the Department of Water and Sanitation (DWS), to determine a High Confidence Groundwater Reserve in the Berg catchment. This study will determine groundwater Reserve requirements, in terms of quantity and quality, to satisfy the basic human needs (BHN) and to protect aquatic ecosystems in priority water resources within the Berg catchment. Detailed determinations aim to produce high-confidence results, which are based on site-specific data collected by specialists, and are used for all compulsory licensing exercises, as well as for the individual licence applications that could have a large impact on any catchment, or a relatively small impact on ecologically important and sensitive catchments.

Stakeholders are invited to participate by commenting on information sent, attending meetings or workshops, or by corresponding with the stakeholder engagement office or the technical team at the addresses provided below.

CONTACTS

Stakeholder Engagement Office:	David McGibbon Tel: 021 709 6700	Umvoto South Africa (Pty) Ltd. Email: david.m@umvoto.com
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DWS Study Manager:	Philani Khoza Tel: 012 336 7866	CD: Water Ecosystems Management Email: khozap@dws.gov.za

PROJECT WEBSITE LINKS

Study Deliverables

<https://www.dws.gov.za/rdm/currentstudies/default.aspx>

Aim

In order to meet the Terms of Reference (TOR) for this study, the groundwater contribution to BHN (Basic Human Needs) and EWR (Ecological Water Requirement) Reserve was determined for aquifer-specific Groundwater Resource Units (GRUs) in the Berg catchment. This constitutes Step 4 of the eight-step Reserve determination procedure (WRC, 2013). The latest report describes the BHN requirements for the current population relying on groundwater for their essential needs. Groundwater's contribution to EWRs were also analyzed and compared to all draft (scenario-based) and gazetted EWRs for all biophysical/river nodes and priority estuaries in the study area, with the support of analytical and existing numerical groundwater flow models where sufficient data is available. Groundwater dependent ecosystems have already been identified during the surface water study (DWS, 2016) and may be revised in the next step of the Reserve determination (i.e., Step 5). The BHN and EWR Requirement Report is Deliverable 3.3 of Phase 3 of this study. The study approach and scope of work can be found in the projects Inception Report (see Study Deliverable link above).

Basic Human Needs

This study describes the groundwater component of the BHN Reserve as individuals who lack access to a formal water source and live beyond a minimum distance of 500 meters from a perennial river (hereafter referred to as the "Qualifying Population"). The Qualifying Population, estimated to be 257,331 individuals, was used to determine the daily water demand using a fixed value of 25 l/p/d. The groundwater component of the BHN Reserve was calculated to 6 433 275 l/d or 2.35 million m³/a. The highest groundwater BHN Reserve requirements are situated in the Cape Flats, Malmesbury, Stellenbosch-Helderberg, and Wellington GRU's, which make up approximately 65% of the BHN Reserve.

Ecological Water Requirements

This study describes the contribution of groundwater to the EWR Reserve using various baseflow separation methods and a GIS-based water shed analysis technique. The EWR component dependent on groundwater discharge is calculated using desktop derived flow data that has been calibrated to account for the Target Ecological Categories (TECs) for all biophysical/river nodes and priority estuaries in the study area. A "balancing tool" (see DWS, 2017b) was used to account for the cumulative flow in a downstream direction so that the consequences of changes in flow and ecological condition upstream could be calculated for downstream biophysical/river nodes and estuaries (DWS, 2017b). To accurately assess the contribution of groundwater to the EWR per GRU, a detailed GIS-based watershed analysis was used to re-evaluate the extent of the contributing sub-catchment based on the local topography, flow direction, aquifer model extents and available literature. A recharge ratio was then be applied to the total GWBF per contributing catchment to define the groundwater component of the EWR Reserve per GRU and associated RUs (i.e., aquifer types). The EWR Reserve is 737.31 million m³/a, with the Middle-Lower Berg (189.79 M m³/a), Wellington (109.48 M m³/a), Paarl-Franschhoek (89.32 M m³/a), Eendekuil Basin (64.68 M m³/a), and Piketberg (55.75 M m³/a) GRUs making up 62.36% of the EWR Reserve.

The Groundwater Reserve

GRU	Groundwaters Contribution to EWR (M m ³ /a)	BHN (M m ³ /a)	GW Reserve (M m ³ /a)
Adamboerskraal	12.5	0.01	12.51
Atlantis	0.25	0.03	0.28
Cape Flats	2.29	0.7	2.99
Cape Peninsula	3.05	0.09	3.14
Cape Town Rim	4.23	0.2	4.43
Darling	0.4	0.02	0.42
Drakensteinberge	59.99	0	59.99
Eendekuil Basin	64.68	0.09	64.77
Elandsfontein	6.55	0.01	6.56
Groot Winterhoek	23.07	0.02	23.09
Langebaan Road	5.58	0.02	5.6
Malmesbury	7.11	0.34	7.45
Middle-Lower Berg	189.79	0.09	189.88
Northern Swartland	5.99	0.05	6.04
Paarl-Franschhoek	89.32	0.13	89.45
Piketberg	55.75	0.04	55.79
Steenbras-Nuweberg	3.55	0.02	3.57
Stellenbosch-Helderberg	17.54	0.24	17.78
Tulbagh	7.84	0.02	7.86
Voëlvllei-Slanghoek	18.81	0.01	18.82
Vredenburg	0	0.01	0.01
Wellington	109.48	0.24	109.72
Wemmershoek	48.34	0	48.34
Witzenberg	1.11	0	1.11
Yzerfontein	0.12	0.01	0.13
TOTAL	737.31	2.35	739.73

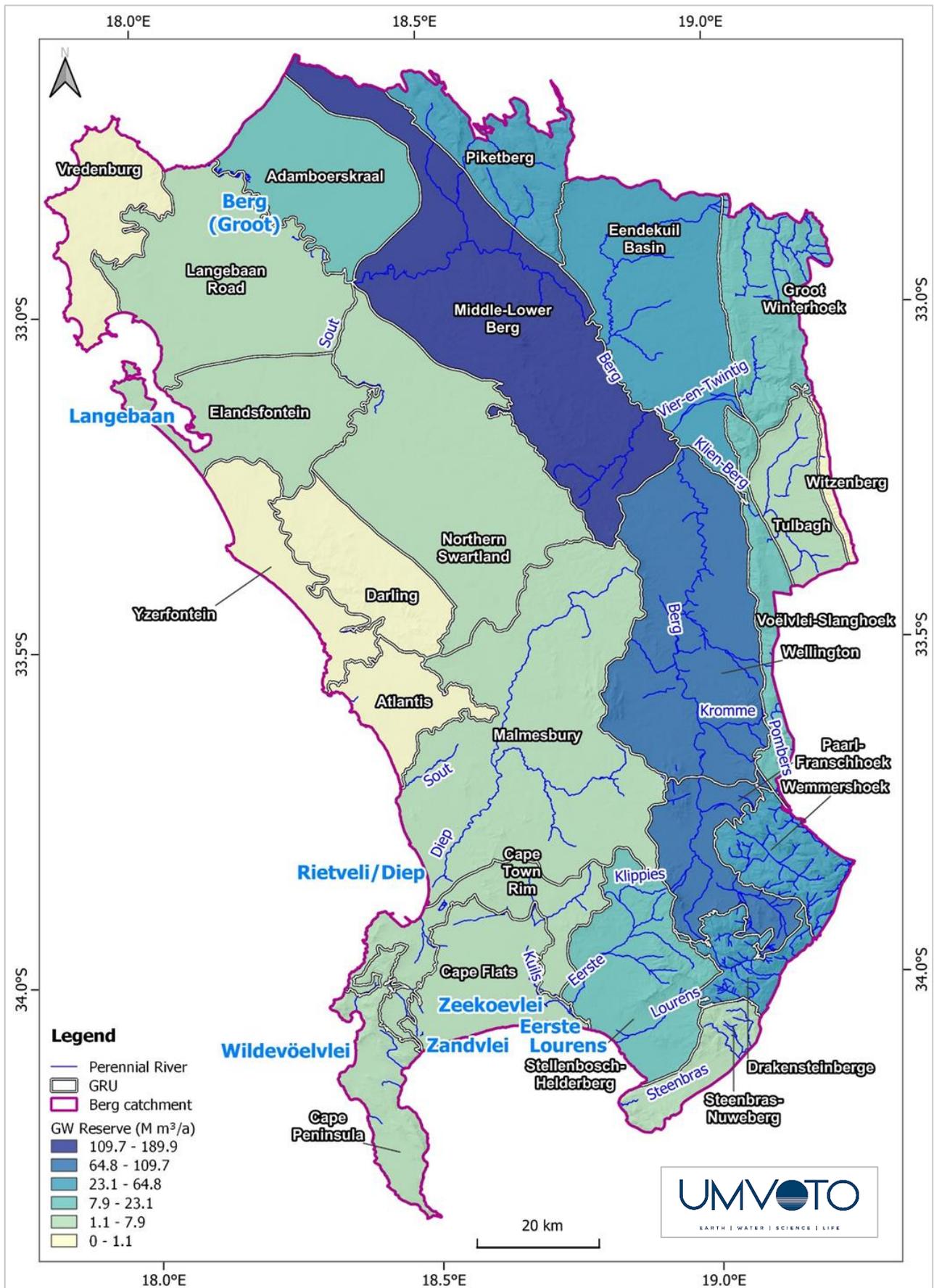


Figure 1 Map of the Groundwater Reserve for the Berg catchment.

Project Plan and Progress

Project Plan and Progress				
PHASE	STEP	OUTCOME	STATUS	
PHASE 1	Inception	<ul style="list-style-type: none"> • Scope of work • Capacity building programme • Expenditure schedule & projections • Stakeholder engagement planning 	Complete	
PHASE 2	Data collection and collation	<ul style="list-style-type: none"> • Collate, review and analyse all available, relevant data and literature pertaining to the project area in the form of a desktop assessment. 	Complete	
PHASE 3	Step 1	Initiate Groundwater Reserve Study	<ul style="list-style-type: none"> • Complete a review of available information and data to determine the process and detail of the assessment and determination • Identify relevant stakeholders to be included in the project. 	Complete
	Step 2	Water RU Delineation	<ul style="list-style-type: none"> • Determine eco-regions, delineate aquifer specific groundwater related RUs (GRUs), select study sites. 	Complete
	Step 3	Ecological Status and Reference Conditions per RU	<ul style="list-style-type: none"> • Determine the reference conditions, Present Ecological Status (PES), Ecological Importance (EI) and Ecological Sensitivity (ES) of each of the selected study sites. 	Complete
	Step 4	Determine BHN and EWR	<ul style="list-style-type: none"> • Determine the groundwater component of the BHN and EWR for all GRUs delineated in the study area, supported by the ecological findings of the gazetted Water Resource Classes and RQOs. 	Complete
	Step 5	Operational Scenarios & Socio-economic	<ul style="list-style-type: none"> • Review current and future operational scenarios and its socio-economic and ecological consequences. 	Not Started
	Step 6	Evaluate scenarios with Stakeholders	<ul style="list-style-type: none"> • Evaluate the scenarios with stakeholders where the outcome of Step 3 – Step 5 will be presented, evaluated, adjusted and agreed upon. 	Not Started
	Step 7	Monitoring Programme	<ul style="list-style-type: none"> • Design an appropriate monitoring programme by taking into account the hydraulic characteristics and the status of identified water resources. 	Not Started
	Step 8	Gazette & implement Reserve	<ul style="list-style-type: none"> • Gazetting template will be drafted, based on the results of the study 	Not Started

Public Meetings

Six PSC meetings will be held during the study, with the third scheduled for the 16 March 2023. The PSC is representative of all major sectors and interests within the study area and are encouraged to provide strategic advice and guidance. Comments can be sent to the Stakeholder Engagement Office, DWS Study Managers or the PSP team for Technical Enquiries.