WATER IS LIFE - SANITATION IS DIGNITY

water & sanitation
Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

2030 NDP

REFINEMENT OF STRATEGIC GROUNDWATER SOURCE AREAS OF SOUTH AFRICA

BACKGROUND INFORMATION DOCUMNT

PROJECT BACKGROUND AND MOTIVATION

South Africa's water resources are under increasing pressure due to growing demand, climate variability, and pollution. Groundwater, a vital component of the nation's water supply, plays a crucial role in sustaining communities, agriculture, and ecosystems, particularly in arid and semi-arid regions. Recognizing the importance of protecting and managing these resources, the Department of Water and Sanitation (DWS) has initiated a project for the "**Refinement of Strategic Groundwater Source Areas of South Africa**".

The motivation for this project stems from the need to enhance the delineation and management of Strategic Groundwater Source Areas (SWSA-gw). These areas are critical for maintaining water security, supporting biodiversity, and ensuring the resilience of water supply systems. The current delineations of SWSA-gw lack the spatial precision and comprehensive groundwater data integration required for effective on-the-ground resource management. By refining these areas using an updated methodology and incorporating the latest available datasets, the project aims to improve decision-making processes geared towards ensuring the long-term sustainability of South Africa's groundwater resources.

This initiative aligns with national water policies and international best practices, emphasizing the importance of sustainable water resource management. Through collaborative efforts and stakeholder engagement, the project seeks to build a robust framework for groundwater protection that supports the country's development goals and enhances the resilience of its water systems.

PROJECT OBJECTIVES

The primary aim of the project is to enhance the delineation of SWSA-gw to an aquifer-specific scale. This study will build upon the baseline information from Nel, et al. (2013) titled "Defining South Africa's Water Source Areas", the outcomes of which were integrated into the 2013 National Water Resource Strategy (NWRS-2, 2013), and a subsequent study by Le Maitre, et al. (2018) which updated the definition of SWSA to include groundwater resources.

The objectives include developing a scientifically sound methodology for delineating SWSA-gw for both national and transboundary aquifers/aquifer systems, while incorporating considerations for groundwater quality and high contribution baseflow. Additionally, the project aims to review and refine the scale of SWSA-gw and develop an approach for the protection and management of the refined areas. Throughout these processes, the project team aims to ensure consultative stakeholder engagement, keeping all interested and affected parties, stakeholders, and water users informed about the project's developments.

CONTACT DETAILS

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EVOLUTION OF SWSA-gw

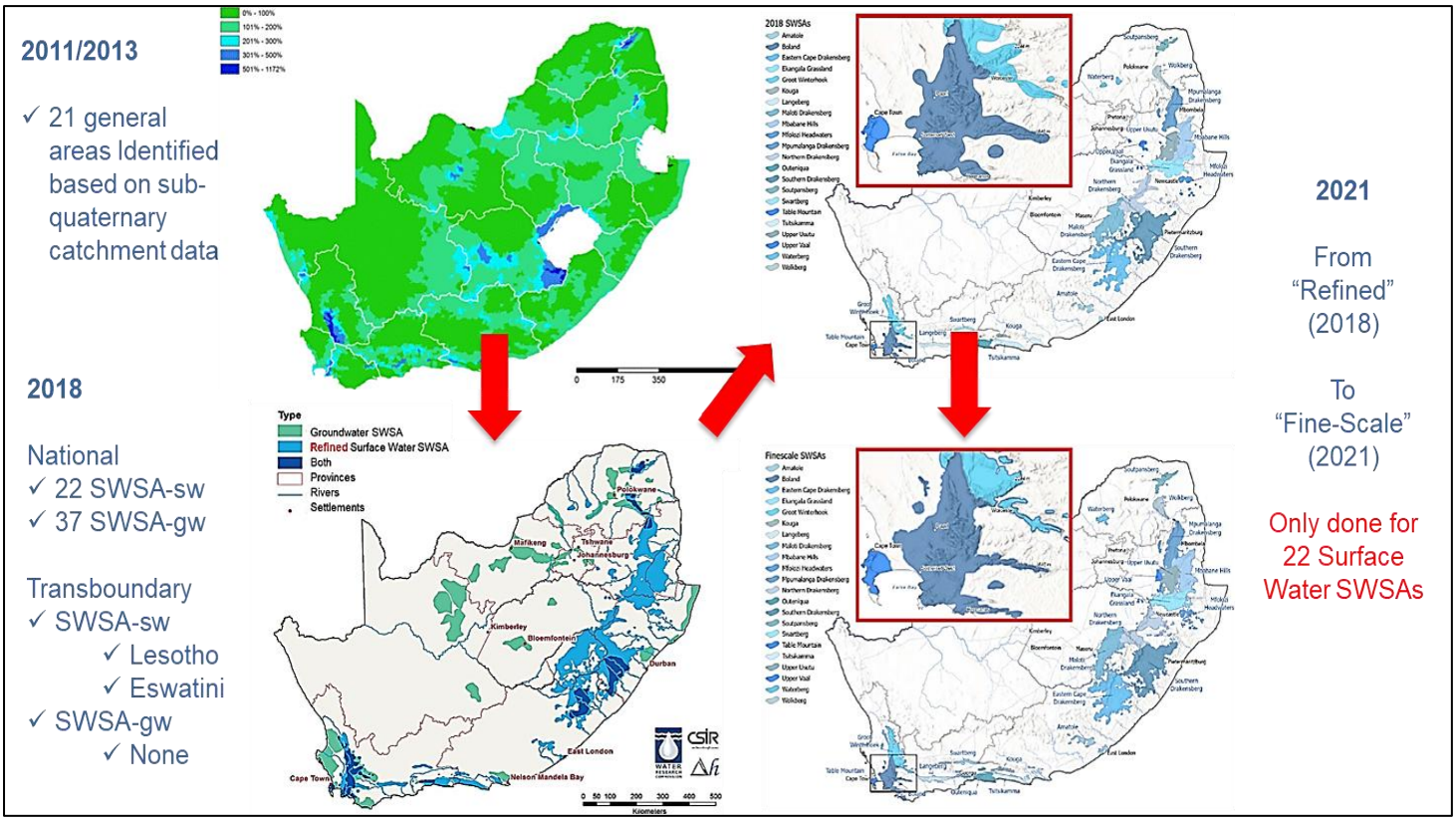


Figure A: **The evolution of SWSA for South Africa (after Nel, et al., 2013); Le Maitre, et al., 2018; and Lötter and Le Maitre, 2021).**

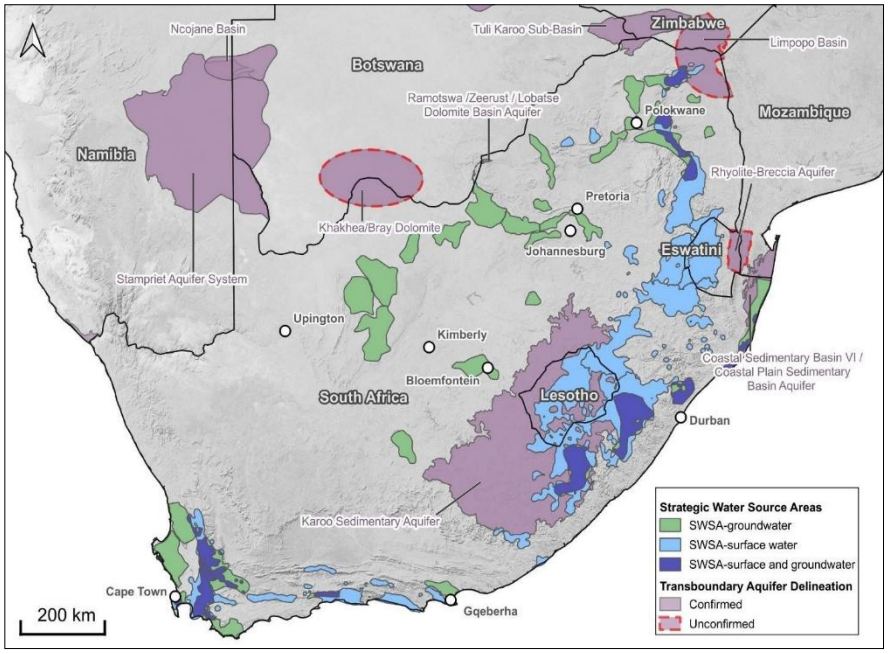


Figure B: **The national and transboundary SWSAs ofSouth Africa, Lesotho, and Eswatini showing both SWSA-sw and SWSA- gw and their overlaps (after Le Maitre, et al., 2018). Transboundary aquifers from IGRAC, 2022 (Scale 1: 50 000 000) are also displayed with Partly Confirmedand Unconfirmed aquifer boundaries shown as red dashed lines.**

For more details, visit: https://www.dws.gov.za/wem/currentstudies/default.aspx

GAP ANALYSIS AND STATUS QUO SUMMARY

GAP ANALYSIS

The Gap Analysis report aimed to systematically collect, organise, review, and analyse all relevant water resource data and information for the project to identify data gaps.

The report evaluates the current groundwater data landscape (for conducting Phase 3 of this study), focusing on assessing the 37 existing SWSA-gw and establishing foundational data to refine methodologies for delineation. The baseline studies provide valuable insights but reveal several gaps in spatial resolution, outdated datasets, and data inconsistencies. However, after reviewing impacts of these data gaps on the overarching project objectives, the existing data was determined to be adequate to proceed with the next phase of the project.

Data Review:

- **Groundwater Use:** WARMS data, municipal hydro-census data
- **Groundwater Levels**: Hydstra, NGA, IGRAC, and SADC
- **Subsurface Information:** NGA, municipal hydro-census, CGS and GRIP
- **Groundwater Quality:** WMS GRIP, NCMP,and NGwQMP.
- **Transboundary Aquifer Data:** DWS collaboration
- **Rainfall-Recharg**e: Comparison of various MAP datasets

Bridging the Gap:

- **Coordinate Verification:** Use GIS techniques and coordinate verifications with DWS to correct dataset inaccuracies.
- **Supplement Datasets:** Leverage additional data sources, including municipal hydro-census data, IGRAC, SADC, and CGS, to improve groundwater levels and borehole information.
- **Data Integration:** Integrate finer scale national and transboundary datasets to create a holistic view of rainfall-recharge-discharge dynamics.
- **Refinement of SWSA-gw:** Use updated, fine-scale data to improve aquifer-specific delineations for enhanced groundwater management and protection.
- **Enhance Groundwater Quality Monitoring**: Supplement monitoring data using GRIP (specifically for Limpopo, KwaZulu Natal and the Eastern Cape.

Status Quo

Phase 3 is a critical stage of the project, representing the phase where the bulk of the work will be accomplished. It is structured to systematically review and refine the methodology for identifying and delineating SWSA-gw, with key objectives including:

1. Reviewing the current status of SWSA-gw as delineated in the WRC (2018) study,
2. Developing an updated methodology incorporating components such as groundwater chemistry and transboundary aquifer systems,
3. Conducting the re-delineation of SWSA-gw using the new methodology, and
4. Creating protection plans aligned with the revised scale objectives.

The Status Quo SWSA-gw Report is Deliverable 3.1 of Phase 3 of this study. The report divides the data into two key sections:

- The **SWSA-gw Description** section, which addresses the geospatial context, hydrology and drainage, and geology.
- The **SWSA-gw Status Quo** section, which evaluates water quality and quantity, threats and risks, and protection status.

The Description section has been completed, and work is actively underway on the Status Quo section.

Description

1. Geospatial Context

- **Geospatial Context**
  - ✓ Topography
  - ✓ Boundaries
  - ✓ Spatial Features

2. Hydrology & Drainage

- **Hydrology & Drainage**
  - ✓ Surface Water Features
  - ✓ Flow Regimes
  - ✓ Catchment Characteristics

3. Geology

- **Geology**
  - ✓ Lithology
  - ✓ Structural Geology

Status Quo

4. Quantity

5. Quality

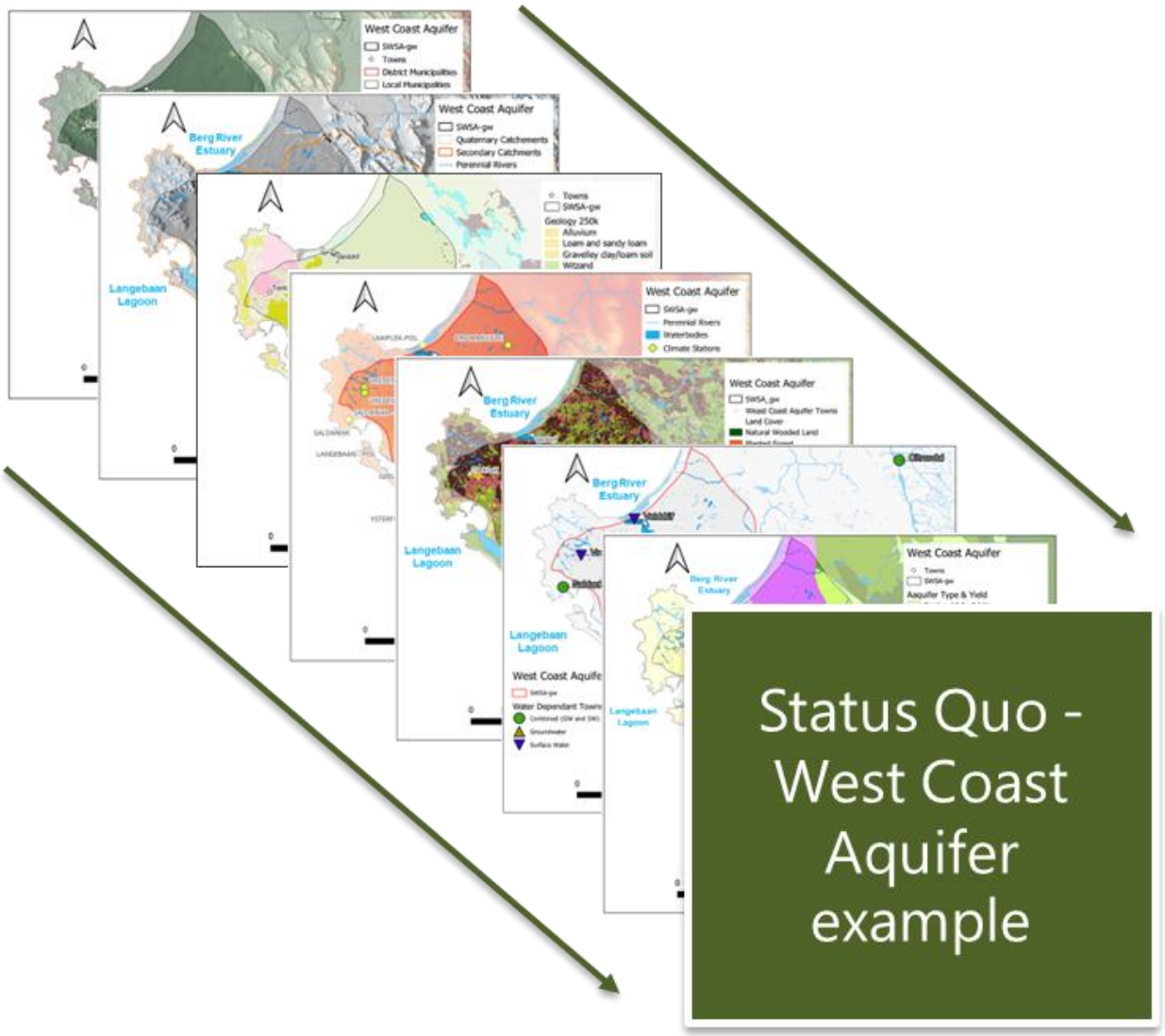
- **Hydrogeology**
  - ✓ Aquifer Type
  - ✓ Groundwater Recharge
  - ✓ Hydraulic Properties
  - ✓ Groundwater Use
  - ✓ Groundwater Quality
  - ✓ Socio Economic

6. Threats & Risks

- **Climate**
- **Land Use**

7. Protection Status

- **Biodiversity and Conservation**



DURATION OF STUDY

The study duration is 36 months, commencing in April 2024 and concluding at the end of March 2027.

The project is structured into four primary phases, each with its distinct set of deliverables, complemented by an ongoing project management phase.

Phase 0: Project Management, Administration, Communication, and Capacity Building
Phase 1: Project Inception
Phase 2: Information and Data Gathering
Phase 3: Refinement of SWSA-gw
Phase 4: Project Closure

These phases ensure a comprehensive approach to managing and executing the study, with a focus on effective communication and capacity building throughout the project lifecycle.

PROJECT TEAM

Umvoto South Africa (Pty) Ltd will serve as the Professional Service Provider (PSP) responsible for executing the study under the auspices of the Department of Water and Sanitation's *Chief Directorate: Water Ecosystems Management (DWS CD: WEM).*

A Project Management Committee (PMC) has been established to provide guidance and technical input. The PMC includes officials from DWS CD: WEM, representatives from other DWS Directorates, and the PSP's project team.

Additionally, a Project Steering Committee (PSC) has been formed to support the PMC. The PSC includes external reviewers, local authorities, and other relevant public stakeholders, ensuring that the study's outputs consider various stakeholder interests and impacts.

PROJECT STEERING COMMITTEE MEETINGS

Project Steering Committee meetings are scheduled to occur every 6 months during the 36-month study period, involving a diverse group of stakeholders. Attendees will include officials from DWS CD: WEM, the PSP's project team, other DWS Directorates, and external reviewers.

With a total of 6 PSC meetings planned, these sessions will be conducted online via Microsoft Teams to ensure balanced representation from various regions.

PROJECT PHASES AND PROGRESS

Phase 0: Project Management, Administration, Communication and Capacity Building				Progress
P0	**P0.1**	General Project Management		ONGOING
	P0.2	PMC Meetings		
	P0.3	PSC Meetings		
	P0.4	PS Meetings		
	P0.5	Ad Hoc Meetings		
	P0.6	Monthly Progress Reports		
	P0.7	Capacity Building		
Phase 1: Project Inception				
P1	**D1.1**:	Inception Report	**T1.1.1**: Lit Review	COMPLETE
Phase 2: Information and Data Gathering				
P2	**D2.1**:	Gap Analysis Report	**T2.1.1**: Data and Information Assessment **T2.2.1**: Inventory of Water Resource Tools	COMPLETE
Phase 3: Refinement of SWSA-gw				
P3	**D3.1:**	Status Quo SWSA Report	**T3.1.1**: Status Quo SWSA Assessment	IN PROGRESS
	D3.2:	Refined Methodology Report	**T3.2.1**: Refined Methodology Assessment	NOT STARTED
	D3.3:	Delineation of Refined SWSA-gw Report	**T3.3.1**: Delineation of Refined SWSA-gw **T3.3.2**: Groundwater Quality **T3.3.3**: Transboundary Aquifers **T3.3.4**: Updated Status Quo SWSA Assessment	NOT STARTED
	D3.4:	SWSA-gw Protection and Management Report	**T3.4.1**: SWSA-gw Protection and Management	NOT STARTED
Phase 4: Project Closure				
P4	**D4.1**:	Refined Strategic Groundwater Source Areas of South Africa Report	**T4.1.1**: Report Integration	NOT STARTED
	D4.2:	External Review Summary Report		NOT STARTED
	D4.3:	Electronic Database		NOT STARTED
	D4.4:	Close Out Report		NOT STARTED