

WATER SOURCE

Water factories: The intrinsic value of a critical resource in water-scarce cities

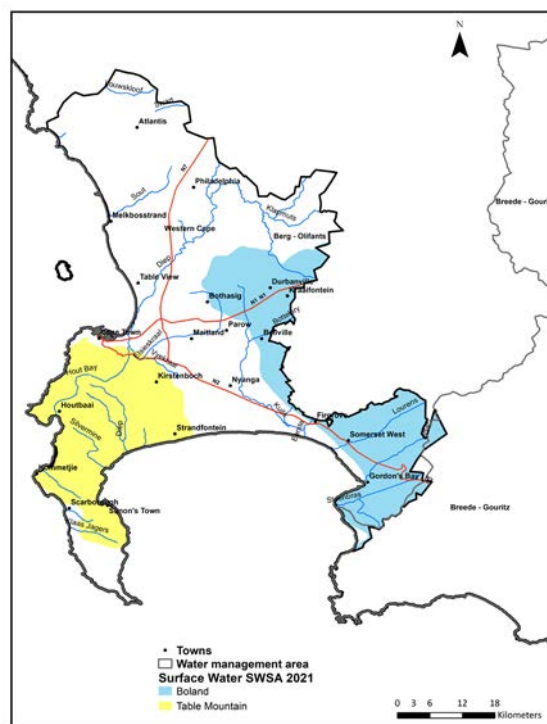
Earl Graham, Chantel Petersen, Lindie Smith-Adao, Ilse Kotzee, Michelle Audouin, Linda Rulumeni and Sarah Davies report on a current project to safeguard South Africa's strategic water source areas.

Water resources are becoming increasingly limited due to a changing climate and increasing population, causing a worldwide decline in water quality, equity and availability. Many water custodians and resource managers recognise the need to improve and provide clean water and sanitation to achieve one of the 17 Sustainable Development Goals by 2030.

Surface water – Strategic water source areas (SW-SWSA's) represent only 10% of the country's land surface area of South Africa, Lesotho and Eswatini but generate 50 % of the region's surface water runoff. Groundwater- strategic water source areas (GW-SWSA's) represent 9% of the land surface in South Africa and generate up to 42% of the baseflow in their areas, performing an important role in the dry season through maintaining surface water flows. Most SWSAs occur in mountain catchments, such as Table Mountain National Park, but others occur as groundwater, such as the Cape Flats Aquifer (see map on this page).

SWSAs provide many benefits to society, including water for domestic (e.g. drinking and cleaning), industrial (e.g. cooling at power stations) and agricultural (e.g. irrigation) purposes. Surface water SWSAs supply water that supports at least half of the population and economic activities that generate more than 64% of Gross Value Add (GVA) and provide water – directly or indirectly – for 70% of irrigated agriculture. The SWSAs are at risk of water pollution and over-exploitation due to an understatement of their importance. For example, only 18 % of these SWSAs surface water areas are formally protected. Pressures and threats on SWSAs are often difficult to fully quantify due to urban sprawl, unplanned or uncontrolled development, industrialisation and agriculture/private land ownership.

Strategic water source areas, especially groundwater areas, do not always follow governmental boundaries and can occur across national, local and private boundaries, presenting challenges in managing and protecting these areas. An innovative project to assist metropolitans and local municipalities in improving the management and protection



Strategic Water Source Areas for surface water (a) and groundwater (b) in the City of Cape Town.

of their SWSAs, thereby supporting the development and the livelihoods of future generations of city dwellers, is the 'Implementation of South Africa's Strategic Water Source Areas (SWSAs): Towards Effective Governance and Protection', which is led by the Council for Industrial and Scientific Research (CSIR) with the support of the Water Research Commission (WRC). Here, 'protection' includes targeted intervention, management and formal protection. The three-year WRC project (April 2022 – March 2025) identified two municipalities as case studies: the City of Cape Town and Wizenberg Municipality. At a local

level, municipal implementation of strategies to maintain and enhance SWSAs is a critical gap that needs to be addressed.

This project developed a user-friendly framework guideline document (publication date to be confirmed) that can assist local municipalities in understanding and determining some of the critical needs surrounding SWSAs, which will, in turn, empower decision-makers and local custodians on how best to manage, protect, and monitor and spatially delineate priority areas for such efforts. The framework will comprise five stages: a situation assessment, a visioning process, the development of strategies, the identification of possible projects and linked activities, and a monitoring and evaluation stage. The guide identifies critical risks to SWSAs (i.e. both for surface water and groundwater) while providing generic strategies around five themes (Figure 2) linked to place-based management recommendations and monitoring indicators to mitigate these risks.

Developing a spatial understanding of key priorities and management needs

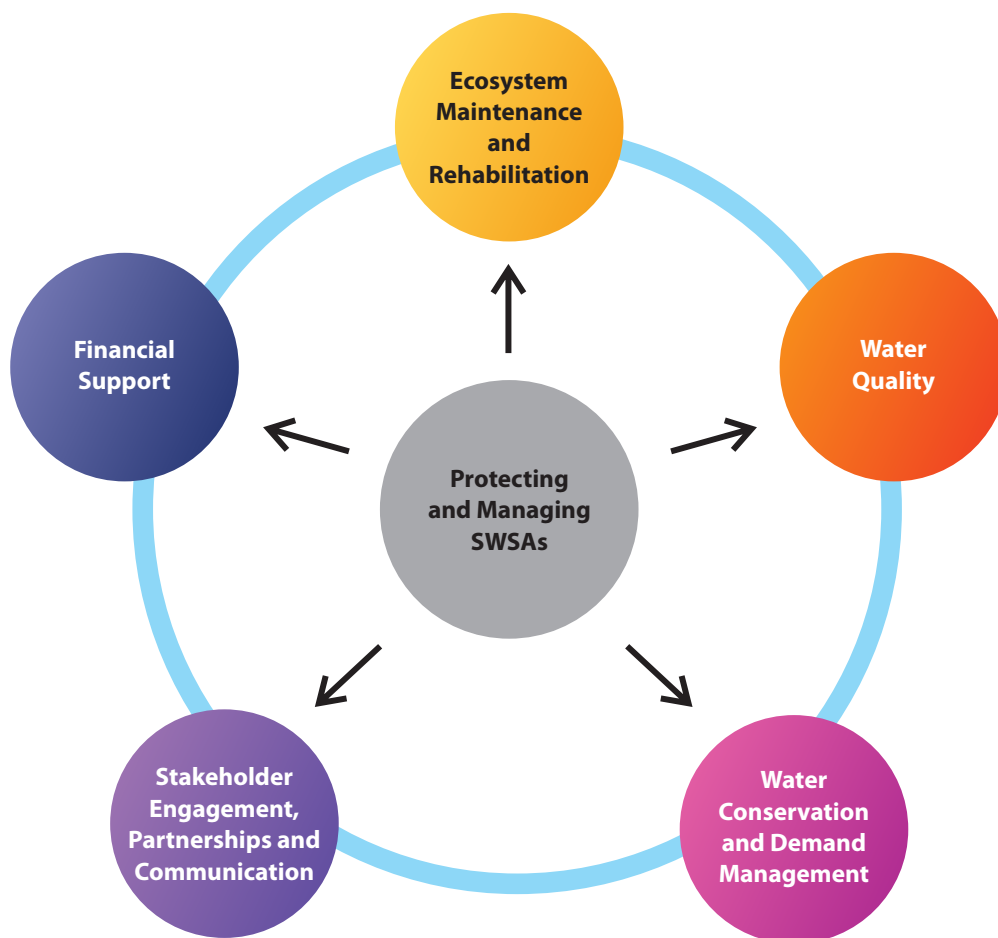
- The spatial mapping of priority areas for surface water and groundwater links the management guidelines developed in the framework to the ground-localised actions (Figure 3). This spatial framework would serve to achieve the following:
 - Understanding the role of and threats to SWSAs
 - Identify key national spatial datasets

- Understand the links between threats, management guidelines, and the strategies and projects identified for SWSAs within local government.
- Improve the management and protection of SWSAs within and between municipal areas.

The project team delineated the spatial framework based on the most significant threats to each SWSA management area. The site-specific projects within those management areas were further reviewed to delineate priority areas and develop site-specific guidelines, allowing for achievable deliverables within measurable timelines. The spatial framework successfully indicated key pressures to SWSAs, with the most frequent pressures being urban development, the spread of invasive alien species and pollution from urban and agricultural runoff. If replicated and enforced, the identified frameworks can significantly assist municipalities in determining budget requirements and ensure that more projects reach their end phase. The spatial framework is intended to inform decision-making around desired land use activities, mitigation actions, biodiversity offsetting, and inform planning. These outputs can also be used for strategic input into municipal Integrated Development Planning (IDP) and Spatial Development Frameworks (SDFs).

The benefits of using the municipalities case study approach are:

- The existing high-level plans, strategies, and monitoring guidelines will be used, along with the developed



Main themes of the proposed strategies for local government protection and management of SWSAs.



Rivers earmarked for rehabilitation activities in the City of Cape Town, Liveable Urban Waterways (LUW) Project include (top left and right): Keyers River, Spaanschemat, (bottom left and right) Prinskasteel and Westlake River, among others.

framework, to inform best practices regarding the effective governance of its SWSAs.

- The project will identify gaps and/or advances in its current plans, strategies and frameworks, aiding the success and efficacy of water governance.
- The overarching project intends to create uniformity and potentially inform a standardised approach to effectively

managing SWSAs, ensuring that local water custodians speak the same language and thus effectively mitigate, protect, and enhance water resources. This key outcome will ensure that the municipality's approaches to water governance remain relevant and that the municipality participates/informs and remains at the forefront of such a change.

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