

SOURCE WATER

Natural capital accounting – Keeping an eye on our water factories

*South Africa's strategic water source areas recently came under the spotlight in a natural capital accounting report. The Water Wheel summarises some of the findings.
Article by Jorisna Bonthuys.*

Angus Burns/WWF-SA



South Africa, a semi-arid country with limited water sources, is experiencing increased water stress due to factors such as rising demand, pollution, climate change, and inadequate maintenance and investment in water and sanitation infrastructure. Measures must be taken to address these and other issues related to our strategic water source areas to ensure future access to clean and safe water, says Aimee Ginsburg, an ecologist and the natural capital accounting project manager at the South African National Biodiversity Institute (SANBI).

“It is crucial to recognise that what happens in our strategic water source areas significantly impacts the water quality and quantity downstream,” Ginsburg says.

Given the climate crisis and the risk of an El Niño event this coming summer, these water source areas are of considerable value, especially those that are still functioning optimally and

have not been modified by intensive land use or unsustainable practices. (El Niño is associated with increased temperatures and low rainfall in southern Africa.)

“These areas are national ecological infrastructure assets that must be protected, maintained, and restored,” Ginsburg says. (This type of infrastructure comprises naturally functioning ecosystems that provide valuable services and benefits to man.)

Strategic water source areas for surface water make up 10% of the total land area of South Africa. Lesotho and Eswatini and provide 50% of the combined mean annual run-off of these three countries. They cover only about 8% of South Africa's national area. As with built infrastructure, proper management and maintenance are key to preventing the degradation of the ecological infrastructure in these areas.

Reporting on natural capital

Ginsburg and five of her co-workers spent the last 18 months compiling an account of the status and value of South Africa's strategic water source areas. In this regard, they worked closely with colleagues at Statistics South Africa (Stats SA). The resulting report, published by Stats SA, sheds light on land use patterns and the protection levels of strategically important water assets in South Africa over the past three decades. The report, titled *Accounts for Strategic Water Source Areas, 1990 to 2020*, was published in March. The document forms part of Stats SA's Natural Capital series.

This 314-page document presents the results of the country's first set of natural capital accounts for strategic water source areas. This type of accounting for assets such as land, water, and ecosystem services provides valuable insight into the state of these water source areas, particularly in the context of land cover management and the legal protection of land. The report documents the changes in each of the 22 strategic water source areas for surface water in Southern Africa over the last three decades, both on an individual and collective level.

The publication was produced as part of the Ecological Infrastructure for Water Security (EI4WS) project, which started in 2018 and will run until 2025. The EI4WS project is being funded by the Global Environment Facility and implemented by the Development Bank of Southern Africa, with help from the Department of Forestry, Fisheries and the Environment, SANBI, the Department of Water and Sanitation, the Water Research Commission, and other institutions.

The primary goal of the EI4WS project is to enhance water security by integrating biodiversity and ecosystem services into the water value chain. (Ecosystem services such as water purification and natural flood control are provided by nature for the benefit of humans, for free.) As part of this project, Stats SA is partnering with SANBI to develop natural capital accounts for

water-related ecological infrastructure.

Previously, Ginsburg and Nokuthula Mahlangu were involved in two sets of national capital accounts, one focused on land and terrestrial ecosystems and the other on protected areas in South Africa since 1900. More recently, they zoomed in on strategic water source areas with the help of three interns: Mookho Makanyane, Luvuyo Kani, and Phumlani Zuma.

The new accounts deal only with strategic source areas for surface water. Strategic source areas for groundwater still need to be mapped at a sufficiently detailed spatial scale to enable the compilation of similar accounts for such areas. Also, in the case of the seven transboundary strategic water source areas shared with Lesotho and Eswatini, the accounts deal only with the portions of these areas situated within South Africa.

Natural capital accounts strengthen the evidence base for government planning and action, helping to ensure that it is grounded in the best available science and data. "This is accounting in biophysical terms," Ginsburg says. "In our recent work, these accounts are concerned with what's happening in land cover classes and protected areas within strategic water source areas.

"We were able to align time-series data on changes in land cover and protected areas in strategic water source areas with other socioeconomic information, such as population census data. The accounts enable us to see where there's an increasing trend in intensive land use and what the protection levels there are like.

"Each strategic water source area has its own story to tell, with different planning and management implications," Mahlangu says. "The results of our accounts provide key insights into which role-players in intensive land use we should be engaging with to protect these areas."



Lions River in the Northern Drakensberg. Strategic water source areas for surface water make up 10% of the total land area of South Africa.

Angus Burns/MWF-SA



In 2020, the size of the protected area estate across all strategic water source areas was 1,89 million hectares (18,9% of the total extent of strategic water source areas).

Land cover affects water security

South Africa has 22 strategic water source areas spread across five provinces (the Western Cape, Eastern Cape, KwaZulu-Natal, Mpumalanga, and Limpopo). From here, water is distributed across the landscape and into our taps via rivers, dams, and pipelines. Collectively, our strategic water source areas support half of the nation's population, two-thirds of economic activity, 70% of irrigated agriculture, and more than 90% of urban consumers.

The health of these areas has far-reaching implications. What happens in the Maloti-Drakensberg strategic water source area in KwaZulu-Natal, for instance, affects millions of people downstream, far removed from the source.

The SANBI researchers tracked changes in intensive land use within these areas, including those related to timber plantations, commercial field crops, mining, and urban settlements. All types of intensive land use combined made up 29% of the total area of strategic water source areas in 2020. The team found that the degree of intensively modified land cover differed drastically between areas. Strategic water source areas in which there were net increases of greater than 20 000 ha in intensively modified

land cover (for all intensively modified land cover classes combined) between 1990 and 2020 were: Southern Drakensberg (56 011 hectares), Enkangala Grassland (51 186 hectares), Eastern Cape Drakensberg (42 042 hectares), Upper Usutu (21 544 hectares) and Northern Drakensberg (21 384 hectares).

The areas with a net percentage increase of greater than 10,0% in intensively modified land cover (for all intensively modified land cover classes combined) between 1990 and 2020 were: Kouga (123,8%, from a low base of 21 hectares), Enkangala Grassland (35,7%), Northern Drakensberg (19,1%), Eastern Cape Drakensberg (16,1%), Upper Vaal (14,2%) and Mfolozi Headwaters (10,6%).

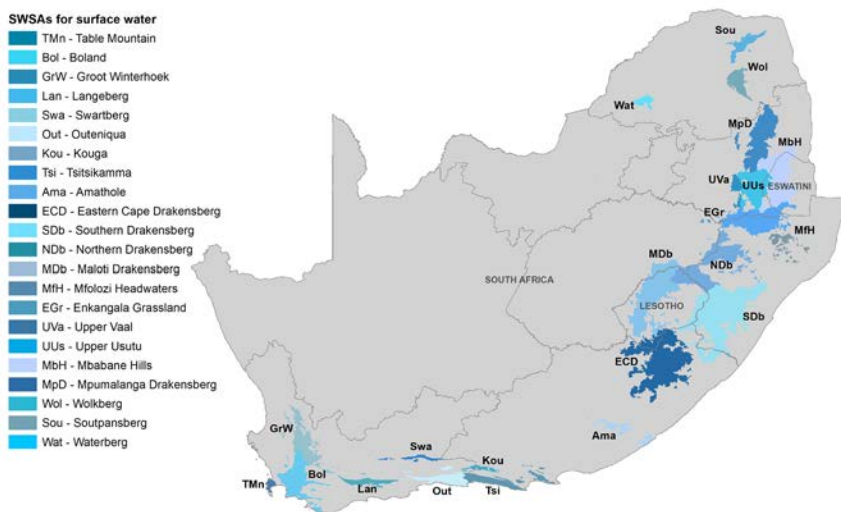
The greater the proportion of land cover that has been modified, the higher the likelihood of ecological functioning being compromised. This can hold serious implications for the ability of highly modified areas to support water security, the researchers highlight.

Ginsburg says these and other findings underscore the importance of monitoring and managing land cover changes in order to protect natural resources and promote sustainable development.

Ecological integrity at risk

As a rule of thumb, ecological functioning may begin to deteriorate when natural land cover drops to constituting less than 60% of a landscape or catchment. Ecosystems begin to take strain as natural land cover declines, usually due to conversion to intensive land uses such as cultivation and urbanisation. Taking these factors into consideration when monitoring land use and economic activities in strategic water source areas is crucial to protecting our valuable water resources for future generations. In three of the strategic water source areas, natural or semi-natural land cover comprised less than 60,0% of their total land area in 2020: the Upper Usutu (40,9%), Table Mountain (50,4%), and Mpumalanga Drakensberg (51,3%) areas. In addition, five strategic water source areas were at or close to the threshold of 60% natural or semi-natural land cover: the Upper Vaal (60,1%), Southern Drakensberg (60,4%), Wolkberg (63,4%), Soutpansberg

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Spatial distribution of SWSAs for surface water in South Africa, Lesotho and Eswatini.

(63,4%), and Mbabane Hills (64,8%) areas.

“Some of our strategic water source areas have high proportions of intensively modified land cover and low levels of protection,” Ginsburg says. “It is crucial that we focus our attention on such areas in order to limit the impacts on water supply and security.”

In Upper Usutu, timber plantations were the largest intensively modified land cover class in 2020, covering 40% of this strategic water source area. “To enhance water security from this area, we will, for instance, have to work closely with the local forestry sector,” Ginsburg points out.

The strategic water source areas with the highest proportion of natural or semi-natural land cover in 2020 were the Kouga (99,1%), Swartberg (98,5%), Waterberg (92,7%), Groot Winterhoek (87,1%), and Northern Drakensberg (81,7%).

While the published accounts do indicate where natural or semi-natural areas have been intensively modified, they do not provide information about the ecological condition of the remaining natural or semi-natural areas. For ecosystem condition accounts to be compiled, sufficiently systematic spatial data on these pressures will first need to be collected.

Securing vital areas

South Africa’s strategic water source areas have already been recognised in several national government policies and plans, including the National Water Resource Strategy II (2013) and the Water and Sanitation Master Plan. Although nearly a fifth of these areas in South Africa enjoy formal protection, some of them have much lower levels of protection.

In 2020, the size of the protected area estate across all strategic water source areas was 1,89 million hectares (18,9% of the total extent of strategic water source areas). Compared to 1,39 million hectares or 13,9% in 1990, this represents an increase of 502

818 hectares (36,1%). The proportion of South Africa’s total land area that was formally protected in 1990 was 6,3%, and 9,2% in 2020. This means that, in both years, the proportion of land protected in strategic water source areas was more than double the proportion protected in South Africa as a whole. However, the proportion of protected land varies significantly across the 22 strategic water source areas, from a mere 1,1% in the Eastern Cape Drakensberg area to 76,5% in the Swartberg area.

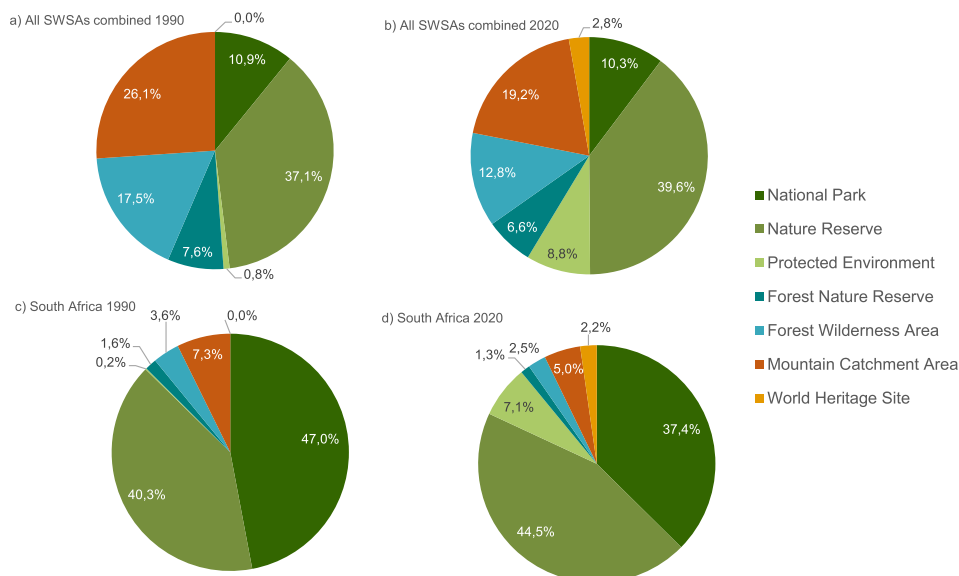
Ginsburg says focused efforts to expand protection in those key areas that currently enjoy very little protection can help secure water quantity and quality for the future. Such efforts include putting in place biodiversity stewardship contracts that involve both landowners and land users in these areas. “The data we collected enables us to make informed decisions towards the protection, management, and restoration of strategic water source areas. There are opportunities to ensure their sound management, including the involvement of role-players in high-intensity land use.”

Efforts are, for instance, underway to enhance stewardship and other conservation agreements in these areas, to secure their legal protection, and to ensure their consideration in municipal planning and spatial development frameworks. Identifying strategic water source areas and their links downstream offers an opportunity for achieving synergy in spatial planning across diverse policy sectors, and enables new patterns of collaboration between government, business, and civil society. “Sustaining the ecological integrity of our strategic water sources will help us meet our water needs,” Mahlangu adds. “This is the area we should be focusing on.”

For further reading:

- **Key findings** and the **data story** from [Stats SA](#) about the *Accounts for Strategic Water Source Areas, 1990 to 2020*
- **Main publication** page for *Accounts for Strategic Water Source Areas, 1990 to 2020* D0401.3

Composition of the protected area estate in all SWSAs combined in 1990 (a) and 2020 (b) and for South Africa’s mainland in 1990 (c) and 2020 (d)



Accounts for Strategic Water Source Areas, 1990 to 2020, Discussion document D0401.3 (March 2023)