Broadening the perspective: Water quality and land uses in the Wilderness area

Overview of Wilderness, its lower lake areas and estuary.

Courtesy C Fabricius

Pollution of our water resources not only affects water quality but also the land uses dependent on that water. A new project being undertaken by the CSIR hopes to highlight the importance of maintaining the state of South Africa's water resources. Article by Klaudia Schachtschneider.

Too much and too little water are things most South Africans understand well, living in a highly variable and semi-arid environment. However, increasingly, we as South Africans are also becoming sensitised to local issues of water pollution, especially through reports of acid mine drainage entering our water sources such as the Vaal and Olifants catchments.

More frequently, we get stirred by accounts of water pollution by some land use approaches that break the 'water web' we rely on for our daily services. To avoid this, our perspectives need to broaden, and we need to increase our ability to see the complex interactions between humans and nature, between land and water uses. We also need to ensure that our governing bodies are integrative of these issues, ensuring that they are no longer being dealt with in isolation.

For this reason the CSIR has commenced a challenging three-year project, which aims to integrate and mainstream water quality into land use, water resource and estuary management and decision-making processes in the Wilderness area. The Wilderness area has been identified as a key area at risk of extreme drought and flood events in the last two decades. Stakeholders in the area understand these risks well, but a third risk is on the rise – namely deteriorating water quality.

Towards the end of 2012, a farmer in the Karatara area related the death of a dozen livestock, suspecting a toxic cyanobacterial bloom in the farm dam. For cyanobacteria to bloom, its host water source requires significant nutrient enrichment.

Other water quality issues that have been highlighted by concerned stakeholders are sediment loss and microbiological pollution. All these form water quality issues, that will, if left unattended, affect the water and land uses that Wilderness inhabitants and visitors rely on.

The Wilderness area is small, almost compact, and has several land uses: forestry, dairy and vegetable farming, some permanent urban settlement and a large seasonal

tourism sector. Previous international research, linking water quality to land use, has shown that forestry is often associated with sediment loss, agriculture is often responsible for adding nutrients to water bodies from fertilisation and subsequent runoff.

Microbiological pollution is associated with human and animal wastes. However, inferring the effect of these land uses on water quality in the Wilderness area is insufficient and requires scientific backing.

A multidisciplinary team of scientists is now mapping out actual land uses in the Touws catchment, creating links to water quality. To do this, they are monitoring water quality from source to sea. This, as well as existing runoff data and land use information are used to design a SWAT (Soil and Water Assessment Tool) model for the Touws River system.

The final model will help to visualise the links between land use practices, typical runoff and/or extreme events and water quality. As such, it serves as a communication tool, but it can also aid as a decision-making tool to simulate land use changes and to help locate the best restoration sites.

Restoration is typically linked to the maintenance or restoration of riparian buffer strips. They are 10 m- to 50-m broad natural vegetation strips that line river tributaries. Ongoing land uses have resulted in the severe degradation, or even complete obliteration of these riparian zones, impacting the ecosystem services that these strips naturally provide.

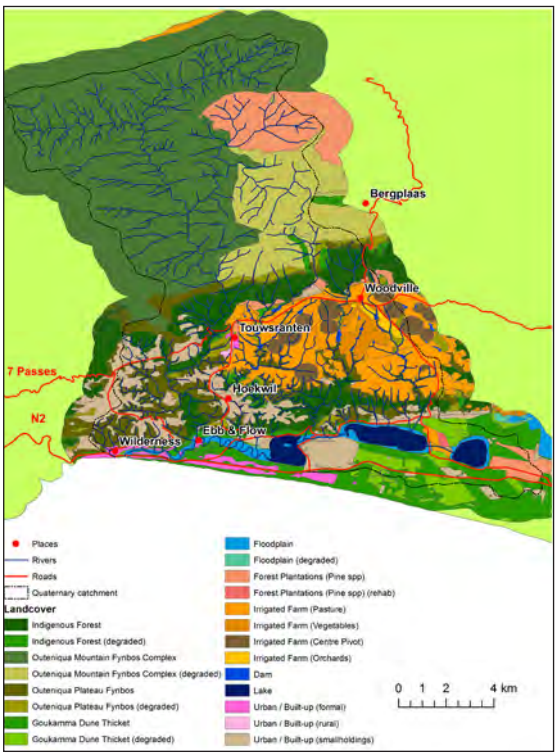
Again, the value of riparian buffer strips to regulate flow, absorb pollutants and retaining sediment has been described widely in literature. A destroyed or degraded riparian buffer zone cannot perform its usual beneficial services, and downstream users bear the consequence.

A PhD study forms part of the project, looking at the capacity of intact versus degraded and invaded riparian zones to trap sediment and to improve water quality. The information is essential to help convince stakeholders and decision-makers of the values that riparian buffer zones can play in the land use, water management interface.

The information generated by this project is closely linked to a Water Research Commission (WRC)-funded project that looks at building resilient landscapes in the Wilderness area. The communication of the water quality findings is tied to the stakeholder engagement process that is central to the WRC project. (See the article 'Exploring the science of involved citizenship' in the July/August 2013 edition of *the Water Wheel* for more information on this research project)

Coincidentally, the two projects are taking place at a time when the area has been earmarked for substantial water-related activity required by the Department of Water Affairs. Firstly, a nationally-driven process of setting up a catchment management agency (CMA) for the Gouritz area is commencing. It means that existing Breede- Overberg CMA is extended to the Gouritz, forming the Breede-Gouritz CMA. Furthermore, the Outeniqua catchments, of which the Touws is one, will undergo extensive scientific studies to set up ecological Reserve determinations.

In lieu of these national-scale endeavours, the water quality and WRC sister-project form an unexpected and, possibly, fortuitous platform, offering stakeholders the opportunity to understand the links between their water resources and land uses. It gives people in Wilderness a chance to formulate their needs in advance of the national processes, and if done well, stakeholders come well-prepared to bring their views and voices to the national water sector changes that are imminent in the Wilderness area. ❑



Courtesy D le Maitre

Figure 1: *Current land cover map based on data supplied by the Garden Route Initiative and SANParks.*


Courtesy L. van Rooyen

CSIR team member taking a water sample.