

SA's first freshwater prio

The same kind of commitment, passion, and collaboration that went into the identification of South Africa's priority freshwater ecosystems should be applied to ensure that these areas are indeed protected. This was the main message during the launch of the country's first Atlas of Freshwater Ecosystem Priority Areas towards the end of last year. Article compiled by Lani van Vuuren.

Despite its reputation as a water scarce country, the South African landscape comprises a diverse range of freshwater ecosystems: from sub-tropical in the north-eastern part of the country, to semi-arid and arid in the interior, to the cool and temperate rivers of the fynbos. Apart from inspiring our communities with their beauty, these rivers, wetlands, lakes and estuaries have also long provided for many of our fundamental needs.

It is no secret that South Africa's freshwater ecosystems are under increasing pressure from socio-economic development. Urbanisation, population growth, pollution, and a naturally variable climate with a low average annual rainfall are but some of the threats to the health of our water systems. These do not only influence the quality and quantity of

Deterioration in the health of freshwater ecosystems negatively affects their ability to continue providing important services.

The uThukela water management area has the highest density of freshwater ecosystem priority areas.



water, but also impact on our freshwater fauna – at least one third of freshwater fish indigenous to South Africa is reported as threatened.

Three years ago a need was identified to conserve some natural examples of the different ecosystems that make up the natural heritage of the country for present and future generations. Out of this need came the National Freshwater Ecosystems Priority Areas (NFEPA) project, which aimed to answer the questions around which freshwater ecosystems and how many to protect. In what can be described as arguably the most extensive collaboration between water-related organisations since the drawing up of the National Water Act (NWA), the NFEPA project has drawn together an incredible number

of organisations, from the national and provincial departments of water and environmental affairs, to the CSIR, WRC, South African National Biodiversity Institute (SANBI), World Wildlife Fund (WWF), to the South African Institute for Aquatic Biodiversity (SAIAB) and South African National Parks.

In addition to the project team and reference group, the project also relied on the participation of some 150 stakeholders, representing about 1 000 person years of collective experience in either aquatic science or biodiversity planning. "One of the biggest success factors of this project has been the collaborative spirit of the freshwater scientific community in South Africa," says SANBI Director: Biodiversity Policy,



Dirnie van Rensburg

Priority areas atlas launched



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Mandy Driver. “Freshwater ecologists from around the country spent days in workshops, studying maps, contributing their data and expertise. The freshwater ecologists who have tramped around our rivers over many years have an enormous wealth of knowledge. What we have managed to do through NFEPA, is to capture some of that and to ensure that the collective knowledge from around the country is consolidated.”

FIRST IN SA

The result is South Africa's first comprehensive assessment of its freshwater ecosystems priority areas or those areas of the country that are most important for ensuring the integrity and continued functioning

of our freshwater ecosystems. The priority areas have been summarised as a series of maps contained in the *Atlas of Freshwater Ecosystem Priority Areas in South Africa*.

“In the context of water resources management, catchments can be designed to support multiple levels of use, with natural rivers and wetlands that are minimally used supporting the sustainability of hard-working rivers that often form the economic hub of the catchment,” explains project leader Dr Jeanne Nel of the CSIR. “This concept is firmly embedded in the National Water Act and forms the foundation of the water resources classification system.”

National freshwater priority areas need not be fenced off entirely from human use, but rather they should be supported by good planning, decision-making, and management to ensure that human use does not impact on the condition of these ecosystems.

The criteria for identifying freshwater priority areas were based on earlier work in which government departments agreed on a vision for managing and conserving freshwater ecosystems. These criteria were reviewed during the regional expert review workshops. Other criteria

KEY FINDINGS OF THE FRESHWATER PRIORITY AREAS PROJECT

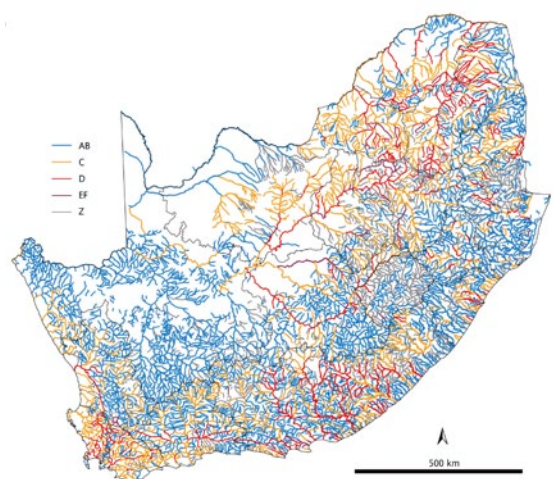
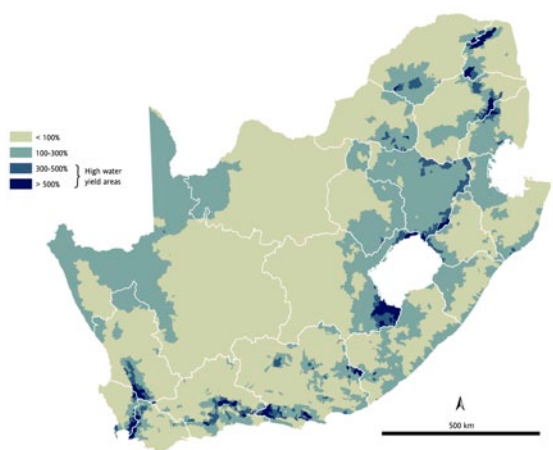
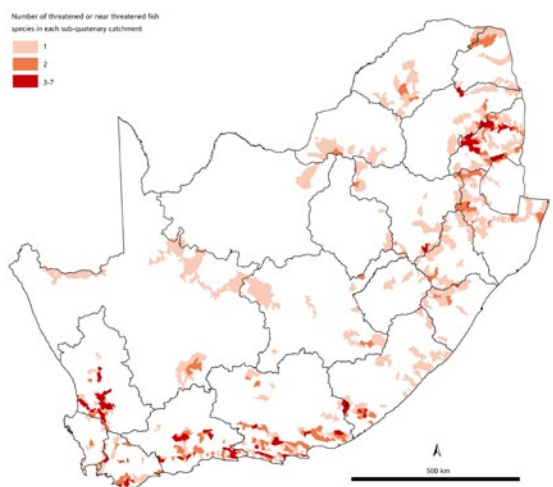
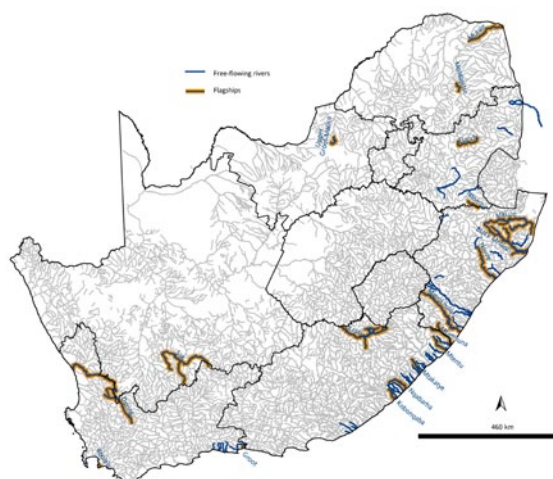
- Only 35% of the length of South Africa's mainstem rivers is in a good condition, compared to 57% of the tributaries.
- Around 57% of river ecosystems and 65% of wetland ecosystems are threatened.
- Only 22% of South Africa's river length has been identified as freshwater ecosystem priority areas.
- South Africa has only 62 free flowing rivers remaining, mostly tributaries.
- The priority areas identified protect over 50 fish species that are on the brink of extinction.

Source: *Atlas of Freshwater Ecosystem Priority Areas in South Africa*

included: areas where populations of threatened or near-threatened freshwater fish occurred; areas that are considered high water yield or high groundwater recharge areas; free flowing rivers and connectedness, as ecosystems that are connected are most likely to support biodiversity. After much investigation, deliberation, debate and refinement,



By protecting a small proportion of South Africa's rivers, it is hoped that the extinction of threatened freshwater species can be avoided.



PROVING THE VALUE OF FREE-FLOWING RIVERS: THE ELANDS RIVER EXAMPLE

The Eland River rises on the grassland plateau of the Drakensberg mountains near Machadodorp, then flows downstream until it reaches the Crocodile River in Mpumalanga, which links with the Incomati River that flows across the Mozambican border where it eventually meets the Indian Ocean.

The Crocodile River is a major supplier of drinking water to Nelspruit, as well as an important source of water for irrigation farmers and the animals of the Kruger National Park. The good water quality and quantity of the Elands River helps to dilute pollutants in the more heavily utilised Crocodile River.

Source: *Atlas of Freshwater Ecosystem Priority Areas in South Africa*



19 freshwater priority maps – one for each water management area in the country – were produced.

In addition to the Atlas, there is a DVD with data and GIS viewer; an implementation manual, and a look-up table listing ecosystem types, species and special features recorded in priority areas. A technical report describing the scientific approach to identify priority areas was also created.

LAST RIVER STANDING

The project has triggered alarm bells in some areas. For example, the Upper Groot Marico River in the

North West was found to be the only free flowing river representative of the entire north-western region of the country, with no other free flowing rivers in Gauteng. (A free-flowing river is a river which flows undisturbed - i.e. without dams or other structures – from its source to the confluence with another large river or to the sea) The Upper Groot Marico River, which plays an enormously important role in the cultural and spiritual lives of the communities living beside it, is currently threatened by several mining applications.

The Eastern Cape and KwaZulu-Natal were found to have the highest number of free-flowing rivers in the country. Many of these rivers will undoubtedly lose their free flowing status as these provinces urgently require development of water resources to improve water supply to households and agriculture.

Of South Africa's last remaining free flowing rivers, only 25 are longer than 100 km. This constitutes only 4% of the length of the entire river

Left from top to bottom:

Map 1 – Remaining free flowing rivers of South Africa.

Map 2 – Fish sanctuaries for threatened and near threatened freshwater fish species indigenous to South Africa.

Map 3 – High water yield areas in South Africa.

Map 4 – River condition in South Africa, with blue indicating unmodified, natural rivers and red and purple indicating largely and seriously modified rivers respectively.

THE MAIN THREATS TO SOUTH AFRICAN RIVER SYSTEMS

Flow alteration – Flows can be altered either by removing water from a freshwater ecosystem or adding more water through return flows or water transfer schemes. In South Africa most large rivers are heavily utilised and regulated to improve water security, and large dams can store up to two thirds of the country's total annual runoff.

Water pollution – This is a very serious and growing problem in South Africa, especially as failing water treatment infrastructure battles to treat the increasing domestic and industrial effluent from towns and cities.

Destruction and degradation of natural habitat – This includes direct impacts, such as bulldozing and planting of crops in wetlands or river channels, and indirect impacts, such as clearing natural vegetation in the surrounding catchment, which results in increased sediment loads and erosion.

Invasive alien species – Invasive alien plants have a substantial impact on riverine habitat and water yield, consuming an estimated 7% of South Africa's total annual runoff.

Climate change – Predicted changes in rainfall and temperature will impact on water resources. These changes are likely to have a disproportionately large impact on runoff and river flow, with implications for future planning and management of water resources, especially around extremes such as floods and droughts.

Source: *Atlas of Freshwater Ecosystem Priority Areas in South Africa*

network in the country. Nineteen of these rivers have been selected as flagship free flowing rivers based on their representativeness of free flowing rivers across the country as well as their importance for ecosystem processes and biodiversity value. These flagship rivers should receive top priority for retaining their free flowing character.

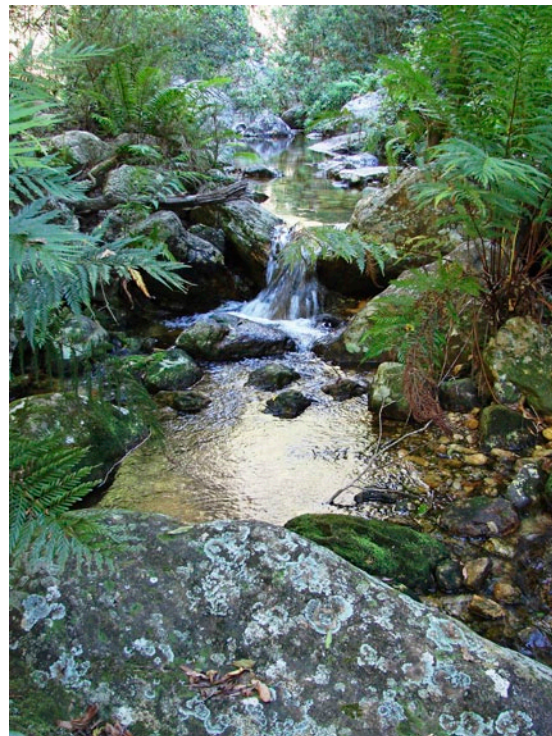
For the first time, threatened freshwater fish species and their surviving populations have been prioritised on a national scale. "The maps are a benchmark for future conservation planning and represent a significant step towards prioritising our efforts to prevent extinction of our unique freshwater fish fauna," notes SAIAB senior scientist, Dr Ernst Swartz. The Olifants/Doorn and Inkomati water management areas, in particular, have been identified as fish biodiversity hotspot areas.

According to Wilma Lutch, Director of Biodiversity Conservation at the Department of Environmental Affairs, the timing of the project is opportune. "We are in the process of implementing various pieces of legislation. This includes the listing of threatened ecosystems in terms of the Biodiversity Act, as well as the implementation of the national protected areas expansion strategy, to which this project will contribute hugely."

ENSURING IMPLEMENTATION

The NFEPA maps are already influencing integrated water resource management plans and decisions in several water management areas. Among other, they are being used for water resource classification, ecological reserve determination and the issuing of water licences. Organisations such as CapeNature, for example, are using the maps to determine the priorities around invasive alien plant clearing and deciding on where alien fish may be stocked.

One of the greatest challenges going forward is to ensure that the



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project maintains its momentum and that the products emanating from the NFEPA initiative do not end up gathering dust on a shelf. "Implementing and sharing the knowledge emanating from this project is now important," says WRC CEO Dhesigen Naidoo. "For this we need to continue to build on the partnerships created by this project."

Opportunities for conserving the country's last remaining free flowing rivers are fast disappearing with the growing demand for development of water resources.

- To order the *Atlas of Freshwater Ecosystem Priority Areas in South Africa* (Report No: TT 500/11) and related reports, contact Publications at Tel: (012) 330-0340; Fax: (012) 331-2565 or Email: orders@wrc.org.za 

