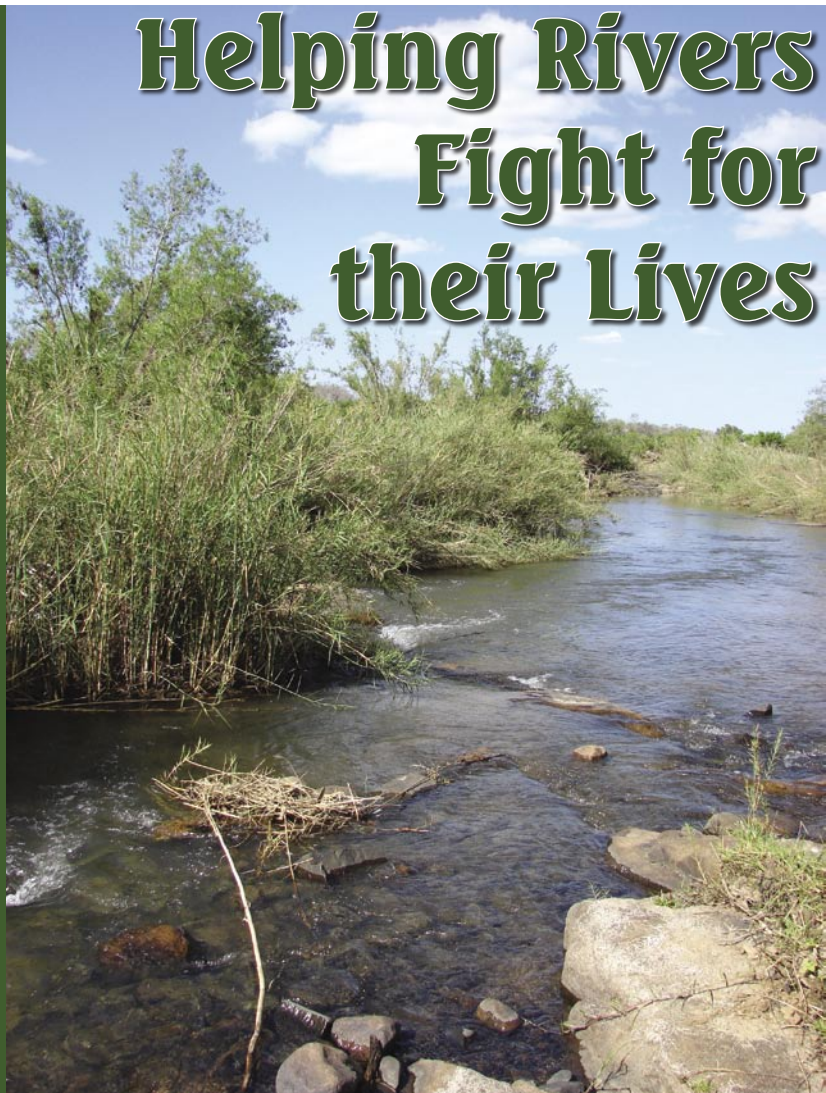


Buckling under the pressures of growing water demand and pollution, the world's freshwater biodiversity and habitats are being lost at an unprecedented rate. International freshwater experts from as far afield as the US and Australia gathered at Skukuza, in the Kruger National Park, to identify solutions for freshwater conservation. Lani van Vuuren reports.



Helping Rivers Fight for their Lives

With large infrastructure developments threatening the flow of the Olifants River, the Sabie River is the last remaining perennial river in the Kruger National Park.

Although freshwater ecosystems occupy less than 1% of the world's surface, they make some of the largest contributions to human welfare. Historically, the world has taken a utilitarian view of rivers (if water is left flowing into the sea it is being wasted). Everyday, more rivers, wetlands, estuaries and groundwater resources are threatened by over-abstraction, damming, urbanisation, industrial and agricultural pollution. In fact, global trends indicate that freshwater biodiversity is declining faster than that of terrestrial and marine biomes.

Most governments afford low priority to improved freshwater ecosystem management, with decision makers and communities often being unaware of the threats and opportunities to conserve freshwater ecosystems. "Conserving river ecosystems depend on whole catchment management, where land and water is managed in an integrated manner aimed at achieving ecological and socio-economic sustainability," noted Jeanne Nel of CSIR's Natural Resources & the Environment Unit. "This requires the development of integrative assessment and planning approaches that proactively consider

the needs of both terrestrial and freshwater ecosystems."

SAVING WATER FOR SOCIETY

"Conservation of freshwater ecosystems is crucial for providing reliable and clean water supplies needed to sustain people and nature," noted Jamie Pittock, Director of WWF's Global Freshwater Programme. An example of the extent of the problem is the fact that two thirds of the world's large rivers (longer than 1 000 km) have already been diverted

for human use. In Africa, there are 23 rivers longer than 1 000 km of which 35% remains free-flowing.

Many of the last remaining free-flowing rivers have been earmarked for future development. WWF estimates that of the world's remaining 64 large free-flowing rivers, at least 17 are in danger of being dammed by 2020, most of these in developing countries.

Global pressures to reduce poverty are conflicting with demands to sustain biodiversity. "The United Nations Millennium Development Goals call for countries to halve the number of those without access to basic water and sanitation, increase food production and use alternative sources of energy (including hydropower) on the one hand, and to protect biodiversity on the other hand," Pittock told delegates. "International donor aid for water is shrinking, and remains largely focused on development of infrastructure. "The environment always ends up at the bottom of the to-do list."

TOO LITTLE, NOT TOO LATE

In South Africa, such as elsewhere in the world, the focus has historically fallen on the protection of terrestrial ecosystems, with river ecosystems being in a much poorer state overall. A study undertaken of South Africa's 112 main rivers as part of the National Spatial Biodiversity

Assessment in 2004/05 emphasised how hard most of the country's rivers are working to meet its economic and social development needs.

The country's main rivers are heavily utilised and regulated to improve water security for socio-economic use, and there are widespread water transfer schemes across the country to cater for areas where water requirements exceed the natural water availability. About 84% of the ecosystems of main rivers are threatened, 44% of them critical.

In addition, the analysis of the data collected on South Africa's River Health Programme, which measures rivers' ecological conditions, shows that only 1,6% of the 13 river systems that have thus far been studied are in a natural condition, 26,6% are in a good condition, 42,8% are in a fair condition and 29% are in a poor state.

By threatening freshwater habitats we also threaten the species reliant on them. About 30% of South Africa's indigenous fish species are considered threatened, of which seven are critically endangered, six are endangered and nine are vulnerable. A major threat is the introduction

of alien aquatic animals. All of South Africa's main rivers are inhabited by alien fish species.

At least 33 species of introduced alien aquatic animals and 25 species of translocated indigenous species have been recorded in natural water bodies in South Africa. It is reported that introduced freshwater fish such as trout and bass threaten rare indigenous fish,

such as redfin minnows in the Western Cape, and have led to the near extinction of Treur River barb.

The introduction of trout in neighbouring streams in Lesotho 70 years ago have also nearly eradicated the Maloti minnow, the country's only known endemic fish species, explained Dr Ernst Swartz, an aquatic biologist at the Institute of Aquatic Biodiversity. The fish has already become extinct in South Africa.

Furthermore, the Mohale reservoir, constructed as part of the first phase of the Lesotho Highlands Water Project (LHWP), flooded 77% and 99% of the existing habitat of the



Courtesy of SA Tourism

All over the world, freshwater biodiversity is disappearing faster than terrestrial and marine biomes.

population in the Jordane and Bokoaneng rivers respectively. Fish in these rivers were translocated to four sanctuary streams in an effort to save the Maloti minnow from extinction. While reports from LHWP developer TCTA indicate that the translocated minnows are thriving, conservationists remain concerned as

one catchment area to another. While alien plant control programmes are well spread within South Africa, there are no known national or even catchment-level control programmes to eradicate alien fish yet. However, the Cape Action for People and Environment is leading a project to clear some priority rivers in the Cape Floristic Region of invasive alien species.

SAVING WHAT IS LEFT

There is no doubt that efforts to reverse declining trends need to increase.

But how to effect that positive change is far from obvious.

One possible solution debated by Skukuza symposium delegates was the improved establishment and management of protected areas.

While large areas of freshwater habitats are incorporated into protected areas already, for example, Ramsar sites (such as St Lucia Lake), these have been found not to be properly representative of the diversity of habitats. Most existing protected areas have neither been designated nor managed for freshwater conservation. In South Africa, 90% of the country's main rivers fall outside protected areas, while an additional 5% serve as boundaries

of these areas, leaving them effectively unprotected.

While it is recognised that conserving whole river systems in protected areas is seldom a practical management option, changing the way in which future protected areas are designated or expanded could help improve the representation of freshwater ecosystems within protected area systems. For example, by delineating protected areas to coincide with catchment boundaries, as opposed to using rivers themselves to mark protected areas.

"Integrated protected areas need not stop at a river's mouth. For instance, a combined terrestrial-freshwater-marine protected area might be built around meeting the linked goals of maintaining water quality in freshwater and marine systems by protecting both critical management zones and catchment management zones on the terrestrial landscape," reported Dr Robin Abell of WWF-US.

Freshwater ecosystems that do fall within protected areas are often viewed and managed as a necessary resource for conserving terrestrial biodiversity rather than for their intrinsic biodiversity value. Due to the linear characteristic of rivers, freshwater ecosystems inside protected areas are especially vulnerable to exogenous threats. For example, the Olifants River flowing through the Kruger National Park stopped flowing for the

no barriers have been constructed to date to keep predator alien fish out of the sanctuary streams.

According to Dr Swartz, translocated species, indigenous fish that have been translocated either intentionally or unintentionally into catchments in which they were not naturally distributed, can be just as threatening if not more so than alien fish. "This often leads to hybridisation (genetic mixing) between species of which the outcome is unpredictable. Different species have their own genetic makeup that has been influenced by its adaptation to specific habitats. Resultant hybrids can be sterile or could be viable causing one species to dominate the other."

Great engineering feats, such as the Orange-Fish tunnel, have been considered an environmental disaster as they became enormous conduits for fish species to translocate from

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Courtesy of SA Tourism



We hold the future of our aquatic ecosystems in our hands.



Courtesy of SA Tourism

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first time on record for 78 days in 2005 due to drought and growing demands on its water. Planned upstream infrastructure developments, such as the De Hoop Dam, on the Steelpoort River and the rehabilitation of the Massingir Dam in Mozambique, further threaten the park's freshwater.

According to Dr Harry Biggs of the Kruger National Parks' scientific

services, it is important for managers to take cognisance of the influences of upstream activities on freshwater within their protected area. "Conserving freshwater ecosystems within the fence often means spending more time outside the park taking part in catchment management decisions." Integrated catchment management as well as the provision of adequate water flows are critical, delegates concurred.

Symposium participants committed themselves to several actions, including preparing and distributing guidelines and case studies on management guidelines for optimal conservation of freshwater biodiversity in protected areas; and supporting governments to implement national protected area systems to conserve freshwater biodiversity.

KEEPING FLOWING RIVERS FREE

Another concept that received much attention at the symposium was that of free-flowing rivers. These are rivers, or distinct sections of rivers, that flow undisturbed without encountering any dams, weirs or barrages. A free-flowing river should have sufficient flows to sustain the full range of freshwater ecological attributes. Also known as 'wild' or 'heritage' rivers, the concept has taken off in countries such as Canada, the US and parts of Australia where these free-flowing rivers are important new conservation icons and tourist attractions.

South Africa has very few free-flowing rivers left. Most of these rivers are situated in the Eastern Cape and KwaZulu-Natal, and have already been earmarked for future infrastructure development. The largest of these is reported to be the Mzimvubu River, which only has a few small farm dams on its tributaries.

From the symposium it is hoped to develop criteria, guidelines and case studies and to develop a place where rivers that are protected as free-flowing rivers can be registered and celebrated.

Freshwater protection is for many countries still a novel concept. However, it is hoped that by working together across boundaries and disciplines, that a sustainable solution might be found before it is too late. 