South Africa's Rivers Threatened

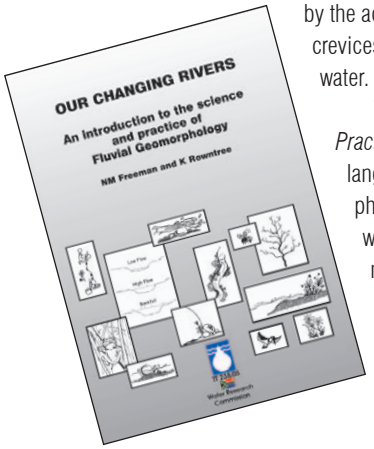
More than 80% of South Africa's rivers are under threat.

This was one of the main findings of the National Spatial Biodiversity Assessment – the first-ever comprehensive spatial evaluation of biodiversity throughout the country. Led by the South African National Biodiversity Institute, the assessment was launched by Environmental Affairs & Forestry Minister Marthinus van Schalkwyk in May.

The assessment showed that a disturbing 44% of the country's rivers are critically endangered, 27% are endangered, 11% are vulnerable and 18% are least threatened. Because South Africa is a water-scarce country, many of its mainstream rivers are heavy utilised, and its river ecosystems are, in general, under more pressure than its terrestrial ecosystems, the assessment found. "Protecting rivers are extremely difficult, as rivers are impacted by activities throughout their entire catchments, so even if a whole river length is included in a protected area, the river is subject to impacts that could originate far away. However, rivers that do flow through protected area show significant recovery (i.e. their health is in much better condition downstream of the protected area than upstream of the protected area)."

Booklet Increases Knowledge of Rivers

A new booklet into the science and practice of fluvial geomorphology has been published by the Water Research Commission.



Fluvial geomorphology is the study of relief features (land shapes and forms) shaped by the action of running water. Mountains, valleys, flood plains, hills, cliffs and crevices are all examples of relief features that have been shaped in some way by water.

The booklet, *Our Changing Rivers: An Introduction to the Science and Practice of Fluvial Geomorphology*, has been written in easy understandable language, with many explanatory sketches. It explains what fluvial geomorphology has to do with understanding rivers; in particular, change caused by water management schemes. Readers will not only come to understand the meaning of usually foreign concepts such as 'hydraulic biotopes', but will learn many interesting facts about water and see how river science relates directly to their lives.

♦ To order this booklet (Report NoTT 238/05), contact Rina Winter or Judas Sindana at the Water Research Commission. Tel: (012) 330-0340, Fax: (012) 331-2565 or E-mail: publications@wrc.org.za.

Job Creation in Sanitation Highlighted

A national seminar to find ways of alleviating poverty through the delivery of sanitation services was held at the St George Hotel in Kempton Park on 28 and 29 April 2005. The conference was a joint initiative by the Department of Water Affairs & Forestry and the Job Creation Trust.

The provision of basic sanitation remains a priority for the South African government as it strives to eliminate the backlog of 18 million people still lacking access to safe sanitation by 2010. At the same time, an estimated 72% of South Africa's total population of poor are resident in rural areas, which are also the biggest target for sanitation delivery. Delegates, which included representatives from government, non-governmental organisations and donors, discussed ways of combining sanitation delivery and job creation to promote economic development in delivery areas.

Several case studies were placed under the spotlight, including the Ethekwini Rural Water & Sanitation Programme, in KwaZulu-Natal, which has already seen the training of 400 contractors in the last three years through the construction of 28 000 toilets in the Ethekwini metropolitan area. In turn, in Alfred Nzo district municipality, in the Eastern Cape, toilet manufacturing yards have been established where rural women are employed to cast concrete toilet pedestals.

Water by numbers

* **9%** – Africa's share of global fresh water resources.
* **1 200** – The estimated number of dams in Africa. More than 60% of these (539) are located in South Africa and Zimbabwe (213).
* **21%** – The percentage of South Africa that receives less than 200 mm rain a year.
* **21 billion m³** – The estimated total volume of water utilised for human activities in South Africa. Of this volume, 52% is used for agriculture and irrigation, 4% for forestry, 4% for industry, 10% for domestic use, and 19% allocated to ensuring a sustainable environment.
* **20 000** – The estimated number of work opportunities created to date by the Working for Water programme.
* **70%** – The percentage of industrial waste dumped untreated in developing countries' water resources.
* **40%** – The percentage of the world's population without basic sanitation.
* **40 000** – The work hours lost every year in Africa to the need to fetch drinking water.
* **1 000** – The estimated tons of water required to produce one ton of grain.
* **25%** – The estimated percentage of people in developing country cities that buy their water from private water vendors.
* **60%** – The percentage of the world's 227 largest rivers that have been severely fragmented by dams, diversions, and canals, leading to the degradation of ecosystems.
* **12%** – The average growth of the global bottled water industry every year. The world bottled water market represents an annual volume of 89 billion litres, and is estimated to be worth US$22-billion. The consumption of bottled water in Africa increases by about 3% a year.
* **6** – The number of fish species in the world that have become extinct since the 1970s.
* **55,2%** – The percentage of South Africa's poor served by Free Basic Water, according to the Department of Water Affairs & Forestry.

Three-year Water Resources Study Underway

A consortium of South African consulting firms has embarked on a three-year assessment of the water resources in the country as well as its neighbouring states, Lesotho and Swaziland. The study includes surface and groundwater resources, as well as water quality assessments. Funding is being provided by the Water Research Commission (WRC).

"The study, to be completed in March 2007, is crucial as it will be used to assist with future planning in southern Africa," reports Brian Middleton, managing director of SRK Consulting, one of the members of the consortium. The other members are Stewart Scott, Knight Píesold, Ninham Shand, Arcus Gibb, PD Naidoo and Umfula Wempilo. "This project, dubbed WR2005, is a broad-based water resources baseline study that puts the whole country on an equal footing," says Middleton.

The objective of the study is to provide information for national water resources planning. In any catchment, the present day condition will be known. A future scenario may then be constructed, Middleton explains. New developments might include town or city

A three-year study into the water resources of South Africa and its neighbouring states Lesotho and Swaziland is currently underway.

expansion, or industrial, mining or other kinds of development in a particular area. From this an assessment can be made on whether or not there would be sufficient water in a development situation.

This is the fourth in a series of assessments being undertaken for the WRC. The first was done through the Hydrological Research Unit (HRU) at the University of the Witwatersrand. The second was undertaken through the HRU in 1980, followed by a third in 1990 done by a consortium of consulting firms.

Interestingly, this is the first time this type of assessment will integrate surface water, groundwater and water quality. In addition, new modelling and spatial data handling tools will be developed in this project to provide a more accurate, reliable and comprehensive countrywide water resources assessment.

As to how the work is to be done, Middleton explains that there are 22 primary drainage regions in southern Africa and 19 catchment management authorities. For more effective management, the drainage regions are further sub-divided into about 2 000 quaternary sub-catchments. "Our task is to compute the naturalised runoff sequence from these divisions and to assess what is derived from rainfall/surface runoff and what is derived from groundwater."

"The project is too big for one consulting firm, and for this reason we have teamed up with others. Our team will comprise hydrologists, water engineers, hydrogeologists, water quality specialists, and development specialists, among others," Middleton points out. An important aspect of this project will be knowledge transfer for the benefit of previously disadvantaged individuals who will be involved in the research effort.

DIARY

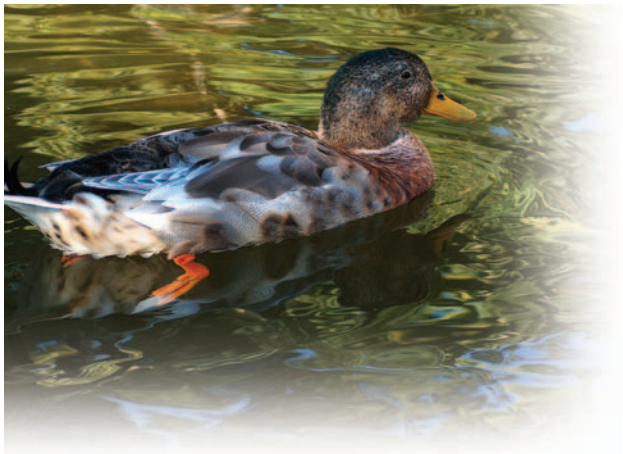
WATER SERVICES: JUNE 8-10

The second Annual Water Services Convention with the focus on Rural Water Supply will take place at Gallagher Estate, Midrand. *Enquiries: Dale Newman; Tel: (011) 803-0009; Fax: (011) 803-5500; E-mail: dale@tci-sa.co.za; Web: www.tci-sa.co.za*

GROUNDWATER POLLUTION: JUNE 20-22

The second Annual Conference on Site Assessment & Remediation for Groundwater and Soil Pollution will take place at Melrose Estate, Johannesburg. *Enquiries: Tel: (011) 669-5000; Fax: (011) 669-5069; E-mail: registration@iqpc.co.za ; Web: www.iqpc.co.za*

Degraded Ecosystems Curb Development



Preserving healthy ecosystems is essential for alleviating global poverty and achieving sustainable development, according to a new report.

The world will not be able to effectively alleviate poverty and hunger if its ecosystems continue to be destroyed. So warns a new global report on the world's ecosystems.

The *Millennium Ecosystem Assessment*, conducted by 1 300 experts from 95 countries, reveals that about 60% of the ecosystem services that support life on Earth – such as fresh water, capture fisheries, air and water regulation, and the regulation of regional climate, natural hazards and pests – are being degraded or used unsustainably. These ecosystems are considered essential in meeting the Millennium Development Goals (MDGs), a series of eight global targets to reduce poverty and disease by 2015.

According to the report: "Many of the regions facing the greatest challenges in achieving the MDGs coincide with those facing significant problems of ecosystem degradation. Rural poor people, a primary target of the MDGs, tend to be most directly reliant on ecosystem services and most vulnerable to changes in those services. More generally, any progress achieved in addressing the MDGs of poverty and hunger eradication, improved health, and environmental sustainability is unlikely to be sustained if most of the ecosystem services on which humanity relies continue to be degraded. In contrast, the sound management of ecosystem services provides cost-effective opportunities for addressing multiple development goals in a synergistic manner."

The report found that over the past 50 years, humans have changed ecosystems more rapidly and extensively than in any comparable period of time in human history. For example, the amount of water impounded behind dams quadrupled since 1960, and three to six times as much water is held in reservoirs as in natural rivers. Water withdrawals from rivers and lakes doubled since 1960; most water use (about 70% worldwide) is for agriculture.

The continual degradation of ecosystems could have significant effects on people's health and wellbeing. Exports warn that changes in ecosystems such as deforestation influence the abundance of human pathogens such as malaria and cholera, as well as the risk of emergence of new disease.

The picture is not entirely bleak. According to the report, the challenge of reversing the degradation of ecosystems while meeting increasing demands can be met under some scenarios involving significant policy and institutions changes. "However, these changes will be large and are not currently underway." The report mentions options that exist to conserve of enhance ecosystem services that reduce negative trade-offs or that will positively impact other services. Protection of natural forests, for example, not only conserves wildlife, but also supplies fresh water and reduces carbon emissions.

The report is the first in a series of seven synthesis and summary reports and four technical volumes that assess the state of global ecosystems and their impact on human well-being.

To access the report, visit www.maweb.org.

Water on the Web

www.groundwater.com.au
This is an interesting site for those interested in the water that appears underground. The Centre for Groundwater Studies is an international cooperative research and education organisation with strong focus on groundwater recharge, discharge, contamination, remediation and management. Research is undertaken under four main themes, namely sustainability of groundwater supply; resource recovery; groundwater and the environment; and groundwater as a geological agent. The site offers information on interesting research topics as well as direct access to the researchers involved.

www.iwha.net
The International Water History Association was established in 2001. Members are historians of water, historians with an interest in water or policy makers with an interest in history. Water history touches on and informs many areas, including economic business and political history, the history of science and medicine, history of technology, development, environmental sciences and geography. The website includes papers from previous water history conferences as well as interesting water history links.

New R8,5-m Lab Opened

The East Rand Water Services Company (ERWAT) has officially opened its new R8,5-million laboratory.

Situated in Kempton Park, next to the company's head office, the new 2 000 m^2 facility was necessitated by continuously growing demand for the company's laboratory services. The new laboratory caters for chemical, microbiological and biological services, with the main focus on chemical and microbiological analysis and related services. Lab manager Alison Chapman tells *The Water Wheel* that the laboratory receives about 4 000 samples a month, with between 40 000 and 50 000 analyses undertaken each month.

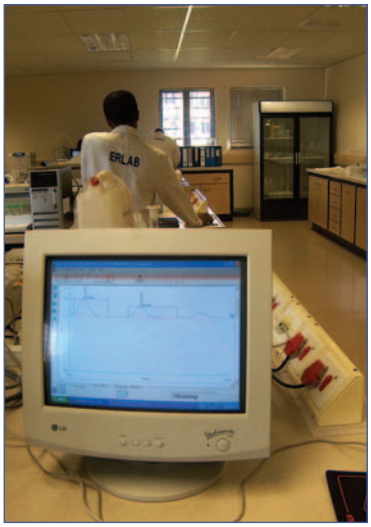
Just as the old laboratory, the new laboratory is also SANAS 17025 accredited. Sean MacCurtain of SANAS explains that this means that the laboratory has all the necessary systems in place to deliver consistently accurate results.

ERWAT Laboratory Services offers an analytical and microbiological analysis as well as industrial effluent monitoring and management programme which include process control, product loss control, pollution risk surveys, stormwater pollution control, borehole sampling and evaluations. These surveys are rendered to local authorities, metropolitan municipalities, industry consultants and the private sectors.

Among the laboratory's services is the development of a password-protected On-line facility where preliminary and verified results can be viewed and downloaded by clients are soon as they become available. The laboratory also actively participates in water forums and research activities, and offers practical training to chemistry, microbiology and chemical engineering students.

Apart from its new state-of-the-art analytical equipment and machinery, the new laboratory also include some practical features, such as wide aisles for the easy manoeuvring of sample-carrying trolleys; a separate sample receiving room; and kitchen and office facilities.

Members of the public (e.g. schools) are welcome to visit the new facility. Please contact Wanda Henning at Tel: (011) 929-7040 or Fax: (011) 929-7740 or e-mail: wandah@erwat.co.za.



(Left) *The new ERWAT laboratory includes new state-of-the-art equipment to handle large volumes of samples.*

(Right) *The microbiology laboratory can undertake bacteriological identification and analysis of wastewater, drinking water, swimming pool water, dairy and food products, rivers, and boreholes, among others.*

www.livinglakes.org
Living Lakes is an international network and partnership whose mission is to enhance the protection, restoration and rehabilitation of lakes, wetlands and other fresh water bodies of the world and their catchment areas. The Living Lakes partnership promotes voluntary international collaboration among organisations that carry out projects benefiting lakes, wildlife and people.

www.transboundarywaters.orst.edu
The Transboundary Freshwater Dispute Database has been created by the Oregon State University Department of Geosciences, in collaboration with the Northwest Alliance for Computational Science and Engineering. It offers much insight into transboundary water basins, including an atlas of international freshwater agreements; an international freshwater treaties database, an international water event database; and an international river basin register, which lists the world's international river basins, delineated by continent.