



## LETTER TO THE EDITOR

### *Water hyacinth – solutions exist*

The cover article on eutrophication in *the Water Wheel*, Vol 7 No 5 refers.

The choking of rivers, dams and fish ponds by this beautiful looking pest of a plant is costing a fortune to control the growth.

To date it is removed mechanically and I believe it can be recycled into cattle feed, fertilizer and fuel. Something that is non-

toxic was discovered accidentally in the East that choked and stumped its growth.

This information was passed on but obviously fell on deaf ears or no-one believed me because the problem still exists.

I will now pass on this information only if a financial arrangement is negotiated legally.

**Michael D Blossham**

Letters must be addressed to The Editor and can be faxed to (012) 331-2565 or E-mailed to [laniv@wrc.org.za](mailto:laniv@wrc.org.za).

## Water researcher to lead university scientists

One of the country's leading water researchers Prof Eugene Cloete has been appointed the new dean of the Faculty of Science at Stellenbosch University (SU).

Prof Cloete joins the university from the University of Pretoria (UP) where he was the head of the Department of Microbiology and Plant Pathology as well as chairperson of the School of Biological Sciences. In addition, he was director of UP's Water Institute and of the Edward de Bono Institute of Creativity.

Prof Cloete views the natural sciences as fundamentally important to economic growth, job creation, the eradication of poverty and the general improvement of the quality of life of those living in South Africa and the rest of Africa. "We live in a technically driven world that is built on the basic sciences and high-level expertise. The shortage of human capital in this regard, however, poses great challenges for the country's secondary and tertiary institutions."

Prof Cloete says he is looking forward to the new challenge. "The highly-qualified staff component, which includes many international leaders in their fields of expertise, as well as the high standard of its research outputs, makes the SU Faculty of Science one of the leading faculties in the country."

## Service delivery shortcomings laid bare

Researchers from the Centre of Applied Legal Studies (CALS), the Centre on Housing Rights and Evictions and the Norwegian Centre for Human Rights have released a report identifying key fault lines in water and sanitation policy and implementation.

"South Africa has one of the most progressive legislative and policy frameworks for water services in the world. However, when it comes to implementation at the

local government level, where actual water services provision is located, the reality is quite different," reports CALS researcher Jackie Dugard. The report follows interviews with 15 municipalities across South Africa. In interviews conducted between November 2007 and July 2008, many municipalities cited a fundamental lack of capacity, both financial and technical as a major problem. Having devolved the responsibility of water services delivery to local government in 2000, national government has steadily decreased financial and technical support. This means that municipalities have to do more with less money.

The report, titled *Water Services Fault Lines: an Assessment of South Africa's Water and Sanitation Provision across fifteen Municipalities*, also found wide variance in municipal policies, many of which were inconsistent with national guidelines. Significant problems with the application of free basic water are also highlighted. According to the report, the absence of a national free basic sanitation policy is glaring, and the poor are often heavily under-represented on indigency registers which are used to determine who receives the allocation.



## Mapping South Africa's climate

The *South African Atlas of Climatology and Agrohydrology* is an illustration of the diversity of South Africa's biophysical make-up – its climate, agricultural production and the water-related environment.

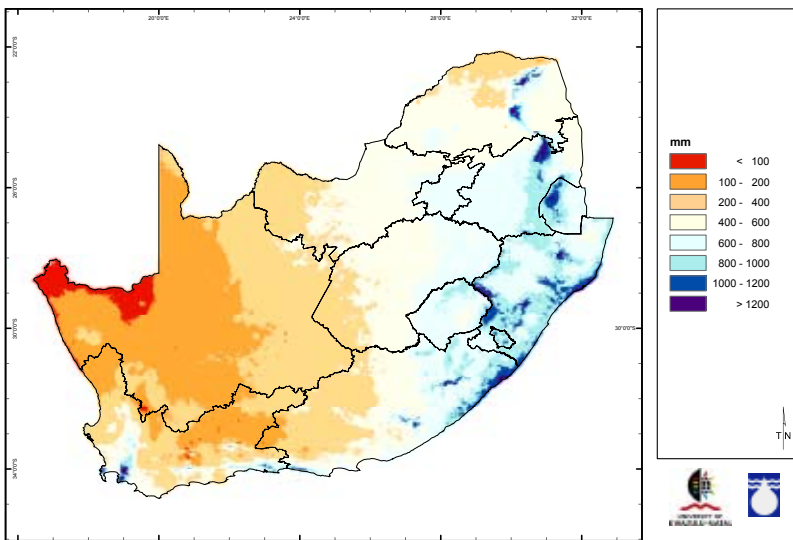
In this project accumulated data, information and knowledge was processed into a set of electronic map coverage for the South African region (including Lesotho and Swaziland).

New soils and baseline land cover information was used in the project while optimum climatic growth areas, yield and the inter-annual variabilities of a range of crops were revised.

The Atlas also presents the diverse nature of South Africa's inhabitants and the socio-economic milieu which, on the one

hand, they have shaped and which, on the other hand, they have responded to either voluntarily or involuntarily through history, politics and the physical environment. This background is given at the geographic scale of provinces, by demographic indicators, educational and socio-economic indicators, and those related to personal conveniences.

The Atlas is being used as a reference by a wide variety of water sector stakeholders, including all spheres of government, non-governmental and aid organisations, parastatals, research and educational institutions, consultants and agricultural producers. To order a copy of the interactive CD (WRC Number: **1489/1/08**) contact Publications at Tel: (012) 330-0340 or E-mail: [orders@wrc.org.za](mailto:orders@wrc.org.za)



## Pipeline to bring clean water to Delmas

The town of Delmas, which has been plagued with outbreaks of waterborne diseases in the last three years, is getting a new bulk water pipeline.

This follows the signing of an agreement between the Department of Water Affairs & Forestry (DWAF); the Mpumalanga Department of Local Government, Rand Water, and the Delmas municipality. All the entities have agreed to collectively fund the R85-million pipeline, which will be constructed to

transport water for 34 km from Bloemendal to the Mpumalanga town.

According to DWAF, the pipeline forms part of a range of initiatives to improve the quality of drinking water served to residents of the town. Other initiatives include the construction of two water treatment plants and the cleaning and testing of 18 boreholes in the area.

The pipeline will take an estimated 24 months to complete.

## WATER BY NUMBERS

**130** – The estimated number of jobs created through Working for Wetlands' and the South African National Biodiversity Institute's project to rehabilitate and preserve the wetlands in Limpopo's Waterberg area.

**60 Mℓ** – The volume of water that gold-mining company ERPM pumped from its South West Vertical Shaft on the East Rand every day to manage the rising water level on the Central Witwatersrand Basin. The company announced in October that it had decided to cease pumping operations for safety reasons.

**2** – The number of planets we will require by 2030 to keep up with humanity's demand for goods and services, according to WWF's *Living Planet Report 2008*.

**20** – The number of townships which are prioritised for improvement by the Gauteng provincial government. They include Atteridgeville, Soshanguve, Mamelodi, Kagiso, Munsieville, Mohlakeng, Boipatong, Sebokeng, Ratanda, Kwatsaduzza, Wattville, Daveyton and Tembisa, among others.

**70%** – The percentage of Africa's urban residents who stay in slum areas. The latest research indicates that more than 1,6 billion Africans will be living in slums by 2020.

**7 000 ℓ** – The water required to refine one barrel of crude oil.

**70** – The number of countries across five continents which celebrated Global Handwashing Day on 15 October. Two hundred million people, mostly children, participated in special events across the globe.

**R1-billion** – The funds made available from national government to KwaZulu-Natal to bring relief to communities that were affected by fire and storm disasters that ravaged the province last year.

**2 900 ℓ** – The volume of water required to produce one cotton t-shirt.

**102** – The number of bird species recorded at the Nylsvley wetland, in Limpopo. During good rainy seasons the floodplain becomes a hive of activity, with up to 80 000 water birds being recorded at any one time.

## WATER ON THE WEB

<http://africacan.worldbank.org>  
The World Bank Africa Region has launched a new blog from its Chief Economist Shanta Devarajan. The blog serves as an online forum for the sharing of ideas about Africa's development. It includes guest commentary from Devarajan's colleagues at the World Bank and features posts in English and French.

[www.irc.nl/content/download/137692/412831/file/facilitation.pdf](http://www.irc.nl/content/download/137692/412831/file/facilitation.pdf)  
The Facilitation Toolkit is a collection of documents from the IRC International Water and Sanitation Centre explaining the concepts of capacity building, learning and facilitation, and provides a range of tools, methods, skill and exercises to put it into practice.

[www.siswebs.org/water/](http://www.siswebs.org/water/)  
WaterSISWEB is a free social bookmarking website for water resources professionals. It is part of the Scientific Information Syndication websites (SIS-WEBS) family of websites. While the main focus is on the US and Canada, there are regional categories for Africa and Asia.

[www.waterefficiencysa.co.za](http://www.waterefficiencysa.co.za)  
The purpose of this website is, among others, to provide current information and news about water efficient devices available in South Africa, act as an information portal and network for all materials relating to water efficiency in the domestic and commercial sector in South Africa, and highlight innovative best practices regarding water demand management.

[www.wetlands.org](http://www.wetlands.org)  
Wetlands International has launched its new improved website. The new Web system provides users with a lot of information about the organisation's work in general, its projects and publications. All this information is presented in a user-friendly way, varying from clickable maps with projects, videos to search selections for all the organisation's work by topic, region or type of activities.

## SADC students learn more about IWRM

Nine students from four southern African countries participated in the Orange Senqu Fish River Basin Integrated Flow Management and Environment Water Requirement training course undertaken under the auspices of FETWater in 2008.

FETWater (Framework for Education and Training in Water) is a programme for effective cooperation in research, education, training and capacity building initiatives to achieve integrated water resources management (IWRM) in South Africa. The latest course was presented with financial assistance from the United Nations Education Scientific and Cultural Organisation (UNESCO).

The main focus of the course was to place environmental water requirements within the context of IWRM, with an emphasis on the use of alternative water resource management measures as a means of meeting the environmental water requirements (EWR) for areas where water resources are limited.

The course covered the Orange

Senqu Fish River basin as a case study for demonstrating integrated flow management and EWR in practice. The students were exposed to various aspects of IWRM and EWR in theory and then shown how that theory was working in practice.

The course started at the watershed of the Fish River tributary at Windhoek, Namibia, to the highly utilised and impacted lower Orange River at Upington, South Africa, to the lesser developed Senqu River and Katse Dam in Lesotho. The courses ended in Pretoria at the offices of the Water Research Commission where final presentations were made.



## UNISA students share their research

UNISA's College of Agriculture and Environmental Sciences hosted a successful postgraduate students' research colloquium in September.

The aim of the colloquium, with the theme 'Expanding the Frontier through Research' was aimed at showcasing the research conducted and planned by the college's masters and doctoral students.

Papers presented spanned several topics, including indigenous knowledge/scientific research, environmental sciences, and food sciences. Masters student Robert Karssing received the Best Paper Award for his paper titled 'Influence of Waterfalls on Patterns of Association between Trout and Natal Ghost Frog *Heleophyrne natalensis* tadpoles in two headwater streams'. Initial findings of his research, conducted in the Drakensberg, indicate that waterfalls play an important part in protecting frog species from predation by exotic predators, such as trout.

Adelaide Agyepong won the Best Poster Award for an agriculture-related poster titled 'Possible Contribution of *Moringa Oleifera* Lam Leaves to Diet Quality in Two Communities in Mokopane, Limpopo'.

The colloquium coincided with the Prof G Humphrey Memorial lecture, which was presented this year by Prof JO Okonkwo from Tshwane University of Technology. He spoke on the impact of global warming on food security, human and environmental health and safety. Prof Okonkwo warned that much more attention needed to be given to adaptation to climate change, as there was increasing evidence that the earth was warming, with all fingers pointing to human activities. He noted that poor communities would suffer most as a result of a changing environment. "Higher temperatures could cause a significant drop in the production of maize, which is a staple food in many African countries."

## Hurting river systems leads to leaner wallets

The incessant degradation of the country's water resources through pollution and over-allocation does not only affect aquatic ecosystems, it could also hurt South Africans' pockets.

This is one of the main messages the organisers of the 2009 International Conference on Implementing Environmental Water Allocations, which will be held from 23 to 26 February at the Feather Market Centre in Port Elizabeth, hope to bring home. The conference, which is expected to be attended by about 500 delegates from all over the world, is being organised by the Water Research Commission (WRC) and the Department of Water Affairs & Forestry. The conference also boasts the support of a host of international organisations, including the World Conservation Union, International Association of Hydrological Sciences and the Chartered Institution of Water and Environmental Management.

Research has shown that the demand on South Africa's scarce water resources (including rivers, wetlands, estuaries and groundwater) is increasing. At the same time, there is an overall deterioration of the quality of the country's water resources. Sustainable aquatic ecosystems rely on the availability of water of adequate quantity and quality. While the majority of South African citizens now enjoy access to fresh drinking water from a tap rather than from a river, stream or spring, the pollution of water resources still affects us directly, reports Conference Chair



Dr Stanley Liphadzi. "People often think that the protection of the environment is the sole responsibility of the government or ecologists and conservationists. The truth is that we all have a part to play in safeguarding our water plants and animals."

"We can never separate ourselves from our natural environment," he adds. "When we pollute our rivers or use too much water without considering what aquatic systems need to function properly, we hurt ourselves." Few people realise that the aquatic environment also provides a whole host of goods and services, from food to aesthetic enjoyment. For coastal municipalities, for example, estuaries can provide valuable income through ecotourism.

Dr Liphadzi explains that the more chemicals, metals and other toxins are dumped in our rivers, the more sophisticated (and expensive) treatment systems are required to make the water acceptable for human consumption. "In the end, this pushes up water tariffs, which means we pay more for the same volume of water used."

The conference aims to identify and critique present global trends in the implementation of environmental water allocations in the fields of policy and legislation, integrating ecosystem protection with socio-economic development, defining and involving stakeholders; decision-making for sustainable use; operational management of water allocations; and sharing knowledge and skills. Delegates representing more than 30 countries, including China, Thailand, the USA, Australia and Canada have already registered for the conference.

Concludes Dr Liphadzi: "It is important that the multitude of demands (including ecological, domestic, industrial and agricultural) on our water resources are balanced equitably. We cannot maintain a strong economy and improve social standards in this country without sustaining healthy aquatic ecosystems. There is a need for all sectors to understand and recognise the important link between water in the environment and water in our taps."

To access the conference website, go to [www.wrc.org.za](http://www.wrc.org.za) and click on the conference logo.

### WATER DIARY

#### WATER RESOURCE PROTECTION FEBRUARY 11-13

The Department of Water Affairs & Forestry Directorate: Resource Protection and Waste is finalising the development of a series of Best Practice Guidelines. The Directorate has joined with the WISA Mine Water Division and Chamber of Mines to ensure training for all DWAF staff and mining industry, other government departments, consultants etc on the protection of water resources in the South African mining industry.

Enquiries: *Fhedzisani Ramusiya*; Tel: (012) 336-7506; Fax: (012) 323-0321

#### WASTEWATER TREATMENT FEBRUARY 18-20

Organised by WISA, the Small Wastewater Treatment Conference will be held at the 1-on-1 Conference Centre at Umhlanga Rocks. Enquiries: *Dot Zandberg*; Tel: (011) 805-3537; E-mail: [conference@wisa.org.za](mailto:conference@wisa.org.za)

#### BIODIVERSITY MARCH 9-13

The Biodiversity Planning Forum, hosted by the South African National Biodiversity Institute will provide an opportunity for individuals, agencies and departments involved in spatial biodiversity planning to share and synthesise valuable lessons from projects around South Africa. The core focus of the forum is on systematic biodiversity planning, with a key theme being planning for implementation. Enquiries: *TJ Mashua*; Tel: (012) 843-5228; E-mail: [mashua@sanbi.org](mailto:mashua@sanbi.org); Visit: [www.sanbi.org](http://www.sanbi.org)



## SRK leads challenging Namibian groundwater project

SRK Consulting is leading an ambitious project to quantify Namibia's groundwater resources.

The appointment of the South African consulting firm by the Namibian Ministry of Agriculture, Water & Forestry to manage the NS\$1,5-million project follows SRK's role as the lead consultant during the South African Groundwater Resources Assessment project completed in 2005. "Development is ongoing in Namibia and the information obtained during this project will provide us with better overall data for intelligent future planning," reports Greg Christelis, Deputy Director: Geohydrology for the Namibian government. According to Dr Eric Tordiffe of Namibian firm Karst Geo-Hydro Consultants, who is also involved in the project, the survey is vitally important to Namibia. "We know where most of the aquifers are, but we need to put a figure on our resources to establish how much of this can be utilised, and for this to be sustainable. The main advantage will be for the

*Principal hydrogeologist Peter Rosewarne, who is representing SRK in an ambitious project to quantify Namibia's groundwater resources.*



effective management of our groundwater resources," he says. Dr Tordiffe adds that a survey of this magnitude has never been conducted in Namibia.

Peter Rosewarne, principal hydrogeologist and a partner in SRK is representing the company in the Namibian undertaking. This assessment is a challenging task for the team of mainly Namibian Hydrogeologists and scientists involved, he comments.

## New head for TCTA

TCTA has a new CEO. James Ndlovu has broad experience ranging from development planning, research, land reform as well as banking and development finance. He has worked with a number of institutions, including non-governmental organisations, government and the Development Bank of Southern Africa.

Meanwhile, TCTA's Berg Water Project outside Franschoek in the Western Cape has received two awards for excellence.

First, the project received the Consulting Engineers South Africa Glenrand MIB Award for Engineering Excellence, and later the International Association for Environmental Impact Assessment South Africa Award for Excellence in Environmental Management in Project Execution.

TCTA Acting Head of Capital Investments David Keyser, who was involved in the project from the outset, said the authority strove

to apply international best practice in the engineering and environmental disciplines for the design and construction of the project from the outset. "It is rewarding to achieve recognition from one's peers after the effort to make things happen. The project is also an example that southern Africa has the expertise to successfully implement a quality project of this magnitude, below the initial budget and within a short timeframe," he noted.

All construction work at the project,



## WATER DIARY (CONTINUED)

### WATER MARCH 15-22

The Fifth World Water Forum will be held in Istanbul, Turkey. The theme is 'Bridging Divides for Water'. E-mail: [m.giard@worldwatercouncil.org](mailto:m.giard@worldwatercouncil.org); Visit: [www.worldwatercouncil.org](http://www.worldwatercouncil.org)

### CLIMATE CHANGE MARCH 23-26

An international conference, Greenhouse 2009: Climate Change and Resources, will be held in Perth, Australia. The conference is hosted by CSIRO in conjunction with the Australian Climate Change Science Programme. Visit: [www.greenhouse2009.com](http://www.greenhouse2009.com)

### OXIDATION TECHNOLOGIES MARCH 30-APRIL 1

The 5<sup>th</sup> IWA Specialist Conference on Oxidation Technologies for Water and Wastewater Treatment will be held in Berlin, Germany. E-mail: [aop5@cutec.de](mailto:aop5@cutec.de); Visit: [www.aspd5.com](http://www.aspd5.com)

which started in 2003, has now been completed and the dam is already 100% full. In other news, TCTA's other high-priority project, the R2,7-billion Vaal River Eastern Subsystem Augmentation Project (VRESAP), will only start delivering water from December following unforeseen delays. The project, comprising abstraction works at the Vaal Dam, including a high-lift pump station and a 121 km pipeline, will deliver water to recommissioned and new Eskom power stations and to Sasol in Mpumalanga.

The permanent abstraction works is expected to be completed by May 2010. The company reports that the redesign of the coffer dam, due to the unexpected high water level in the Vaal Dam during early construction period and the worse than expected geotechnical conditions at the abstraction works, was the main reason for the delay in the completion date.

## VWS Envig expands into Namibia

South African company VWS Envig has announced the acquisition of Aqua Services & Engineering (ASE), a Namibian-based supplier of water treatment services and equipment, subject to pre-conditions being met.

The acquisition sees the South African company increasing its presence in sub-Saharan Africa. "ASE fell into the right niche. We didn't have much coverage in Namibia and Angola and with this acquisition, we can grow our footprint in these areas along with many others," says VWS Envig MD Gunter Rencken. "The deal offers both companies many advantages. We both now have extra resources at our disposal. It also provides re-assurance for clients, as well as a solid foundation for further growth over the next decade."

The Namibian firm provides a number of services, including consulting work, project



*The recently commissioned Opuwo nanofiltration plant*

evaluation, turnkey project management and construction, commissioning, lifecycle analysis, as well as operation and maintenance of water treatment facilities. The company recently commissioned a 50 000 l/h nanofiltration plant to treat water for the residents of the remote Namibian town of Opuwo.

## New, tougher body for well-known pump range

Pump manufacturer Denorco has launched its upgraded Super D submersible borehole pumps range.

Designed and manufactured for lifetime borehole applications, the range of 100 mm pumps, which was first launched 30 years ago, is now more robust than ever with addition of tough stainless-steel tops and bottoms to the pump, reports Denorco Product Manager Frik Adendorff. "The proven success of the 100 mm series in raising water from any borehole fitted with a single or three-phase electronic connection has now been updated,

concreting the demand for this workhorse for all borehole applications."

Each component of the series is machined from top-quality materials to afford a long life in the toughest conditions. Stringent mechanical, hydraulic and electrical testing, backing by ongoing research and development, ensures reliable operation. "The unsurpassed efficiency of both pump and motor ensures a smooth, silent, and cost-effective operation," explains Adendorff. "The new pumps will be as competitively priced as the previous models, so our clients are receiving even more value for their money."

### WATER DIARY (CONTINUED)

#### WINERY EFFLUENT APRIL 1-3

An IWA Specialist Conference on Sustainable Viticulture: Winery Waste & Ecological Impacts Management will be held in Trento and Verona, Italy. Enquiries: David Bolzonella; Tel: +39 4580 27965; Fax: +39 4580 27965; E-mail: [winery2009@gmail.com](mailto:winery2009@gmail.com); Visit: [www.aidic.it/winery/winery.htm](http://www.aidic.it/winery/winery.htm)



## Large recycled water treatment plant hatches in Oz

International company Hatch had completed design and delivery of an advanced water treatment plant to provide up to 70 Ml/day of purified recycled water to industrial users in Queensland, Australia.

The firm was a member of the consortium which won the contract to design and construct the Luggage Point Advanced Water Treatment Plant – the largest of three advanced water treatment plants to be constructed as part of the Queensland government's Western Corridor Recycled Water Project. This project is reported to be the largest recycled water scheme in the Southern Hemisphere and aims to reduce demand on the region's fresh water supply while securing water supplies for industrial use and reducing the environmental impact on water resources.

The A\$300-million Luggage Point plant uses state-of-the-art technologies to improve the water quality of secondary treated sewage for reuse as potable water and industrial cooling water. It includes: flow equalisation, pre-treatment (coagulation and clarification for phosphate and turbidity removal), microfiltration, reverse osmosis, advanced oxidation (hydrogen peroxide and UV dosing) and final stabilisation of the water together with residues handling (thickening and dewatering).

The plant started producing water in December within 20 months of design commencement. Following a three-month performance testing period, treated water will be conveyed to nearby power stations and the Wivenhoe Dam, the area's principal freshwater storage reservoir.

## Agenda set for climate and health research

More than 80 researchers and representatives from donor and UN agencies gathered at a meeting of the World Health Organisation (WHO) in Madrid, Spain, to draw up a research agenda to better deal with the impacts of climate change on human health.

The aim is to "speed up, focus and intensify climate change and health research," according to Maria Neira, WHO Director of Public Health and Environment. "We want to provide the best possible scientific evidence base for governments to take protective actions to protect people from climate change," she said at a news conference.

The agenda identifies several priority research areas, including how climate change will interact with key factors affecting health, such as economic development, urbanisation, access to care and exposure to health risks. More research is needed to better characterise the long-term effects of climate change – such as drought, fewer freshwater resources and population displacement – on health. Such effects will have a major impact on mental health and increase the risk of conflict, say the researchers.

Source: [www.scidev.net](http://www.scidev.net)



## Glowing results from new method to detect mercury in fish

Researchers at the University of Pittsburgh, in the US, have developed a simple and quick method for detecting mercury in fish using a fluorescent substance that glows bright green when it comes into contact with oxidised mercury. The intensity of the glow indicates the amount of mercury present.

Developed in the laboratory of Kazunori Koide, a chemistry professor in the School of Arts & Sciences, the new method can be used on site and can detect mercury in ten to thirty minutes in fish. "We have developed a reliable indicator for mercury that a person could easily and safely use at home. It could also be used at the fish market, for example."

The fluorescence results from the reaction of mercury ions with hydrocarbons called alkynes – the alkyne is converted into a ketone and creates a fluorescent molecule. Prof Koide's method differs from similar mercury indicators in that it withstands the oxidation process mercury samples must undergo prior to testing. The method can also be used on dental samples.

For more information, Visit: [www.news.pitt.edu/m/FMPro?-db=ma&-lay=a&-format=d.html&id=3524&-Find](http://www.news.pitt.edu/m/FMPro?-db=ma&-lay=a&-format=d.html&id=3524&-Find)

## Nitrate increasing in US groundwater

A 16-year long nationwide study conducted by the US Geological Survey (USGS) indicates that nitrate concentrations of groundwater is increasing in many parts of the US.

Nitrate is the most common chemical contaminant in the world's groundwater. Decadal-scale changes of nitrate concentrations were evaluated in groundwater samples collected from 495 wells in 24 well networks across the US in predominantly agricultural areas. Each well network was sampled once during 1988-1995 and resampled once during 2000-2004. Findings show statistically significant increases in concentrations of nitrate in seven of the 24 well networks. Median nitrate concentrations of three of those seven well networks increase above the maximum allowed contaminant level of ten parts per million.

The findings of the USGS study were published in a companion supplement to the September-October 2008 issue of the *Journal of Environmental Quality*.

## Freshwater pollution hurting American pockets

Phosphorus and nitrogen pollution is hurting Americans' wallets, research by Kansas State University has shown.

Freshwater pollution impacts individuals on a level as basic as how much they spend on bottled water, according to Walter Dodds, professor of biology. "If your municipal water plant has to spend more money to treat the water coming through your tap, your water bills will increase. According to Prof Dodds, monetary damages put environmental problems in terms that make policymakers and the public take notice.

The researchers calculated the money lost from nitrogen and phosphorus pollution, which causes eutrophication of water bodies, by looking at factors such as decreasing lakefront property values, the cost of treating drinking water and the revenue lost when fewer people take part in recreational activities such as fishing or boating. They found that freshwater pollution costs government agencies, drinking water facilities and individual Americans at least US\$4.3-billion. Of that, they calculated that US\$44-million a year is spent just protecting aquatic species from nutrient pollution.



## New global research programme to weather the storms

The International Council for Science (ICSU) has launched a ten-year, international research programme on natural disasters.

The programme is in response to the urgent need to reduce the impacts of natural disasters and is designed to address the gaps in knowledge and methods that are preventing the effective application of science to averting disasters and reducing risk.



Each year hundreds of thousands of people are killed and millions injured, displaced or have their livelihoods destroyed by natural disasters. There has been a dramatic increase in the frequency of disasters from around 30 per year in the 1950s to more than 470 per year since the beginning of this century.

"Integrated Research on Disaster Risk will provide an enhanced capacity around the world to address hazards and make better decisions to reduce their impacts," reported Gordon McBean, Canadian climatologist and Chair of the ICSU Planning Group for Hazards. "In ten years, as a result of this

programme, we would like to see a reduction in loss of life, fewer people adversely impacted, and wiser investments and choices made by governments, the private sector and civil society."

The new programme, which builds on existing research activities, will address the impacts of disasters on all scales, from local to global. It will combine expertise and experience from around the world, and provide an opportunity for the natural and social sciences to work together as never before. The focus is on all hazards related to geophysical, oceanographic, climate and weather trigger events.

## Alien plants smothering Europe

The number of alien plant species in Europe has more than tripled over the last 25 years, scientists have found.

New species that bring about long-term change to ecosystems by, e.g. competing with native species, are regarded as one of the greatest threats to biodiversity. According to research published in the journal *Preslia*, around six new species arrive in Europe each year on average. To date, more than 5 700 plant species have been classified as alien, compared to 1 568 in 1980.

The highest number of alien plant species was reported from Belgium, the UK, and the Czech Republic. The UK, Germany and Belgium have the greatest number of naturalised aliens – new species that have been able to establish stable populations.

Among the most widespread of the new plant species are Canadian fleabane (*Conyza Canadensis*), Jerusalem artichoke (*Helianthus tuberosus*) and black locust or false acacia (*Robinia pseudoacacia*), which all originated in North America. More than three-quarters of all new plant species have been brought to Europe unintentionally.

More information: [www.europe-aliens.org](http://www.europe-aliens.org)

## Indigenous values guide Australian research

The value of rivers and wild food resources to Australia's indigenous people is the focus of new research that will help transform water management in northern Australia, CSIRO reports.

"Indigenous people in the north have a large stake in water resource planning and management based on their distinct cultures, ways of life and substantial land holdings. Yet their interests and values in water are poorly understood by decision makers," says CSIRO researcher Dr Sue Jackson. "Our research will increase understanding of the importance of river systems to indigenous people and help water planners and managers their indigenous people's water needs into consideration."

The TRACK (Tropical Rivers and Coastal Knowledge) funded research will

record indigenous people's social and cultural knowledge relating to water and will survey them to quantify the economic benefit households derive from their use of aquatic plants and animals.

Indigenous people will also be employed in the survey and monitoring components of the research and as advisors on river health. "Our survey will involve asking questions such as how many fish people have caught or bush cucumbers they have collected over the past few weeks and we will compare the cost of purchasing the same amount of food from the community store," explains Dr Jackson. "We will also be looking at what effect different water levels, or flow regimes, have on the patterns of resource used by indigenous people."



Wagiman children with turtles caught on their traditional territory near Pine Creek, Northern Territory.



## New from the WRC

### Report No: KV 212/08

*Technical Report on the State of Yellowfishes in South Africa 2007 (ND Impson; IR Bills and L Wolhuter)*

This status report has been compiled for nine of South Africa's yellowfish species, six true yellowfishes (*Labeobarbus* spp.) and three large *Barbus* species that closely resemble yellowfishes. Yellowfishes are among the most popular indigenous freshwater fishes caught by anglers across the country, and hence support valuable and growing recreational and subsistence fisheries. Three of the nine species are threatened and two are endangered. Threats to these fish are numerous and varied. The most threatened species are all in the Western and Northern Cape. These fishes have experienced huge declines in their distribution ranges and population densities since the 1930s – the main causes being the introduction of alien species, water abstraction from rivers, and water pollution.

### Report No: TT 353/08

*Water Services Barometer Study (Sigodi Marah Martin)*

This is the first comprehensive study to provide a barometer of the general public's knowledge and understanding of the water services messages as communicated, and their involvement in, and preferences for, consultative processes. The study provides a 'reading' of the current state of knowledge and awareness among the South African public regarding five key water services knowledge areas (free basic water, basic water as a constitutional right, responsibilities, water quality, health and hygiene and institutional roles).

### Report No: KV 214/08

*Links Between Water Temperatures, Ecological Responses and Flow Rates: A Framework for Establishing Water Temperature Guidelines for the Ecological Reserve (NA Rivers-Moore; DA Hughes and S Mantel)*

The National Water Act provides legal status to the quantity and quality of water required to maintaining the ecological functioning of

river systems through the declaration of the Ecological Reserve. To date, no methods have been developed for the water temperature component of the Reserve, although the importance of water temperatures in maintaining river systems is fully recognised. Based on temperature time series analyses, this report argues that a suitable water temperature model for use in Ecological Reserve determinations should be dynamic, include flow and air temperature variables, and be modified by a heat exchange coefficient term.

### Report No: TT 354/08

*Environmental Flow Assessment for Rivers: Manual for the Building Block Methodology (Updated Edition) (JM King; RE Tharme and MS de Villiers)*

This report was first published under the same title in 2000. The Building Block Methodology is essentially a prescriptive approach, designed to construct a flow regime for maintaining a river in a predetermined condition. This manual describes its basic nature and main activities, and provides guidelines for its application. It also introduces the links between the methodology and procedures for determination of the Ecological Reserve as embodied in the National Water Act.

### Report No: KV 200/08

*Assessing the Appropriateness of Wetland Mitigation Banking as a Mechanism for Securing Aquatic Biodiversity in the Grassland Biome of South Africa (D Cox and D Kotze)*

The National Spatial Biodiversity Assessment established that 30% of grasslands in South Africa are irreversibly transformed and only 2,8% are formally conserved. This project investigated the concept of mitigation banking for wetlands with the potential to achieve the conservation of aquatic biodiversity within the priority areas of the grassland biome. A background to the development of the mechanism is provided in the main report along with a definition and overview of the concept. This is followed by a more detailed view of the policy, legislation, tools, processes and the respon-

sibilities of different roleplayers involved in establishing and operating mitigation banks.

### Report No: TT 329/08 to TT 332/08

*River Ecoclassification: Manual for Ecotatus Determination (Version 2) Modules A, D, E, and F (CJ Kleynhands; MD Louw; J Moolman; JA Mackenzie and C Thirion)*

These are the first in a series of manuals for ecotatus determination. Module A provides the background to and scientific rationale for the ecological classification and ecological status processes; module D (Volume 1 & 2) provides a step-by-step guideline to use the Fish Response Assessment Index, while Volume E does the same on the use of the Macroinvertebrate Response Assessment Index. Volume F provides guidance on the use of the Riparian Vegetation Response Assessment Index.

### Report No: 1696/1/08

*Nitrate Leaching from Soils Cleared of Alien Vegetation (NZ Jovanovic; A Hon; S Israel; D le Maitre; F Rusinga; L Soltau; G Tredoux; MV Fey; A Rozanov and N van der Merwe)*

Many alien invasive species targeted by the Department of Water Affairs & Forestry's Working for Water programme are nitrogen-fixing legumes. The hypothesis in this study was that clearing invasive alien vegetation might disturb the vegetation-microorganism-soil nitrogen cycling system by producing a large episodic input of fresh litter rich in nitrogen and by eliminating a large nitrogen sink. Among others, the study found that nitrogen levels in soil and groundwater were higher in areas invaded by alien plants compared to fynbos areas; that a quick release of NO<sup>3</sup> into groundwater occurred after clearing land from alien invasive legumes; and that the long-term effect of clearing alien invasive legumes is the reduction of nitrogen concentrations in groundwater. Clearing land of alien invasive legumes may therefore have a beneficial effect on reduced groundwater contamination from nitrate, besides reducing water use in catchments.

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**Practical operating guidelines for waste stabilisation ponds will soon be available from the Water Research Commission (WRC).**

Waste stabilisation ponds (also known as oxidation ponds) remain internationally accepted low unit cost wastewater treatment systems suited especially to smaller communities where electricity supply is minimal and there are limited trained personnel available for process control. These wastewater treatment systems are installed in various parts of South Africa where they have historically been effective in limiting environmental pollution and associated health impacts.

Waste stabilisation ponds can treat a variety of wastewater types, including domestic waste (including nightsoil from bucket toilets) and industrial waste (provided no abattoir waste is received). While these systems require low maintenance, they are not completely maintenance free. The last few years has seen many of these systems being neglected and/or overloaded due to upgrades and expansions of sanitation services.

A need was consequently identified to document the occurrence of pond systems throughout South Africa, investigate their present operational status and practices followed, identify in what instances the technology is applicable or whether alternative technologies should be considered, identify how operation and maintenance of these systems can be improved, and assess the potential for reusing treated effluent from pond systems. These aims were addressed in a project undertaken for the WRC by consulting firm Emanti Management, with the Free State, Eastern and Northern Cape used as case study areas.

Project leader Unathi Jack explains that the project team interacted with selected municipalities in the Free State and Eastern Cape to identify their pond systems document, present operation and maintenance procedures followed and review existing effluent quality monitoring data (if any). The pond systems were assessed using the following categories: design, maintenance, operation and performance, water quality monitoring, safety, supervision and management.



More than 70 pond systems were assessed during 2005 and 2007.

Overall, the systems evaluated scored lowest in the maintenance category, followed by the supervision and management categories. "Even though pond systems are simple to operate and do not require very skilled personnel, they still need to be well maintained in order to operate effectively," explains Jack. "Safety was found to be a particular issue of concern, as some of the systems were not enclosed by fences, allowing free entry by members of the adjacent community." Vandalism at most sites (e.g. stealing of fences) underlined the importance of community awareness and education.

Most of the pond systems were found to be overloaded due to population growth and/or upgrade from bucket toilets to waterborne sewerage systems. The issue of land availability for the extension of ponds (which require large tracts of land) was also noted. In addition, there was a general lack of knowledge of upgrading the pond systems other than building more pond basins.

Pond systems are meant to be closed systems, i.e. they are not meant to discharge effluent into the environment. In cases where there is a discharge of overflow, the final effluent should be monitored and comply to the Department of Water Affairs & Forestry General Authorisation limits for discharge.

The study showed, however, that only about 1% of the pond systems where discharge was taking place were conducting monitoring.

The results of the survey and effluent quality standards were shared with the municipalities concerned. In many cases the local authorities admitted to failing to properly plan for the bucket eradication programme by also upgrading the pond systems. "The good news is that through the survey they became more aware of what was expected of them, and there has since been an improvement in most of the systems mainly in terms of maintenance," Jack tells *the Water Wheel*.

The project is in the stage of being finalised. Four reports will emanate from the research, namely a *status quo* report containing all the information regarding the assessed systems; a management guide to assist managers in terms of understanding when pond systems are appropriate, and the most effective design and operation; a operation and maintenance guide for on-site personnel; and a guide on how to use the pond assessment tool which has been made available on the electronic water quality maintenance system. "Waste stabilisation ponds still have a place in the wastewater treatment sector and we hope that these documents will assist in the improved operation, maintenance and monitoring of these systems," concludes Jack.