



LETTERS TO THE EDITOR

SA laws lagging behind

In view of the pending water crisis I find it strange that the use of grey water i.e. bath, washing and shower water to irrigate gardens is strictly forbidden by most municipalities in South Africa. On the other hand, in Melbourne, Australia, householders are encouraged to harvest grey water and rain water by means of a state subsidy of up to A\$1 500 to assist in installing the necessary equipment and visually friendly storage tanks. Dual flush toilets are also mandatory.

In South Africa regulations stipulate that: all discharge from any sanitary fixture, which includes washing machines, showers, basins, etc., must be disposed of into the water-borne sewage disposal available. That is the municipal sewerage connection provided.

Although municipalities are aware of private use of grey water, its disposal or use for irrigation does not comply with national building regulations; therefore the discharge of grey water to a garden can not be specified for approval by the local municipalities' building department as the applications would be refused. Nor will building inspectors issue occupation certificates once building work is completed should they find out that the drainage installation does not comply with the SABS regulation.

One again we are caught napping. Our authorities warn us of a pending crisis, but they persist in hanging on to antiquated legislation. For heavens sake let's get our act together.

Furthermore I notice from TV coverage that at all meetings involving Eskom and various governmental authorities there is invariably a bottle of bottled water in front of every delegate. Is this because the authorities don't trust our municipal water or are they totally unaware of the electricity, raw materials and disposal costs of hundreds, if not thousands, of these unnecessary items?

Dennis Toens, Somerset West

Articles shows SA in poor light

The article on pages 24 to 27 of the January/February 2008 edition of *the Water Wheel* (SA Drinking Water Standards Under the Microscope) shows South Africa in a very poor light, particularly Rand Water. The maximum limits given in Tables 1 and 2 of this article are incorrect. The actual figures are shown in SANS241 Class II max. We should remember that in December 2005 South Africa effectively reduced our water standards with the issuing of SANS241: 2005 Edition Six.

This reduced our old very high (one of the highest in the world) standards of SABS 241

(2002) edition 5 by removing the class 'O' section. Rand Water continuously run auto analysis and maintain the old class 'O' standard.

No facts are given concerning the inorganic parameters such as calcium, magnesium, cadmium, cobalt and vanadium which are critical in South Africa and included in our standard. As an example cadmium, which is a worse toxin than lead, has a maximum of 10 micrograms per litre. However, some of the boreholes in Johannesburg are showing toxic levels of two milligrams per litre.

Chemical oxygen demand has fallen away and is not mentioned. Dissolved organic carbon has replaced this old parameter but it does not allow for non organic oxydisable parameters in the water, such as sulphides, sulphur, ferrous iron. These are continuously found in South Africa as a result of mine drainage.

The present standards for South Africa in terms of Tables 1 and 2, are tabulated and also show the old standard. All figures are the maximum for the given parameter. High levels of magnesium in drinking water have been shown to cause behavioural problems in humans.

High levels of nitrates lead to conception and pregnancy problems in mammals, including humans.

Other problems relate to the absence of *Cryptosporidium* testing in the SANS 241. *Cryptosporidium* testing is compulsory in the USA. Several major outbreaks have occurred notably in the USA in 1993 when 100 people died and 300 000 were hospitalised. The latest outbreak in the west of Ireland affected 70 000 homes. The common reason given for not testing is the cost. Compare this with hospitalisation expenses.

Then, the article on page 23 of the January/February edition (Mercury Levels in SA Water Resources Probed) refers specifically to mercury. I am now retired but for over 20 years I have regularly had mercury determined in potable water by SANS approved laboratories for this element. At least three laboratories are capable of this evaluation in South Africa.

It is agreed that mercury is a major problem, but far more serious is cadmium, which is rising rapidly. It would appear that whenever old mine (rock) dumps are disturbed, mercury/lead/cadmium all rise rapidly.

It would be of far more use if the full spread of toxic elements were determined in this programme and local resources used instead of costly overseas laboratories.

Waterwatcher

Table 1:

Determined	Unit	NL max limit	SABS 241 2002 Class 'O' max	SANS241 Class 1 max	SANS 241 Class II Max	SA max as Given in report
Aluminium	µg/l	200	150	300	500	300
Ammonia	µg/l	200	200	1000	2000	1000
Antimony	µg/l	5	5	10	50	10
Arsenic	µg/l	10	10	10	50	10
Bromate	µg/l	1	-	-	-	-
Chromium	µg/l	50	250	100	500	100
Copper	mg/l	2	0.5	1	2	1
Iron	µg/l	200	10	200	2000	200
Lead	µg/l	10	10	20	50	20
Manganese	µg/l	50	50	100	1000	100
Mercury	µg/l	1	1	1	5	1
Nickel	µg/l	20	50	150	350	150
Sodium	mg/l	150	100	200	400	200
Zinc	mg/l	3	3	5	10	5
Chloride	mg/l	150	100	200	600	200
Cyanide	µg/l	50	30	50	70	50
Fluoride	mg/l	1.1	0.7	1	1.5	1
Sulphate	mg/l	150	200	400	600	400
Selenium	µg/l	10	10	20	50	20
Nitrate	mg/l	50	26) 44) 88) 10
Nitrite	mg/l	0.1))) 10
Magnesium	mg/l	-	30	70	100	-
Cadmium	µg/l	-	3	5	10	-
Cobalt	µg/l	-	250	500	1000	-
Calcium	mg/l	-	80	150	300	-
Vanadium	µg/l	-	100	200	500	-

Table 2:

Trihalomethanes	µg/l	25	100	200	330	200
DOC	mg/l	-	5	10	20	10

Frogs leaping into distinction

Humanity is facing one of its biggest extinction crises of recent times, with up to half of the world's 6 000 amphibian species in danger of dying out.

The Year 2008 has been declared the Year of the Frog in a bid to raise awareness of the plight of the world's frogs and toads. In South Africa, more than 17% of 114 recorded species are considered critically endangered. Known as nature's indicators, amphibians are among the first species to respond to environmental changes. Habitat loss is a significant threat, as cities expand, streams, ponds and wetlands give way to the needs of farmers and forest lands are destroyed. Other threats include climate change, pesticides, pollution and climate change.

Another major cause for the extinction crisis is a parasitic fungus called *amphibian chytrid*. The fungus, which originated in Africa, attacks the skin of the frog and has a 100% mortality rate. In the last few decades the fungus has spread across the world, endangering whole colonies in the wild.



Pretoria Zoo's amphibian mascot, Fred the African bullfrog, undergoes testing for the chytrid fungus.

In a bid to save the world's amphibians the Amphibian Ark project has been initiated by a group of conservation organisations where zoos are being encouraged to, among others, maintain select species in captivity until they can be secured in the wild. The Pretoria Zoo is also part of this captive breeding programme, and has already tested several of its frog species for the chytrid fungus.

Drinking water experts meet in CT

More than 70 delegates from South Africa, Namibia and Botswana attended the third Techneau Regional Technology Platform (RTP) for safe drinking water held in Cape Town towards the end of last year.

Techneau is an integrated project funded by the European Commission looking at new and improved technologies for drinking water supply. The latest RTP provided some insight into the problems and challenges facing the drinking water sector in southern Africa and enabled an intensive exchange between local water experts and those from the European Union.

Delegates heard how the standard of the water supply and the quality of the drinking water varies significantly throughout the southern African region. In the larger metropolitan areas, the technologies and water quality are comparable with the developed world. However, nearly half of the region's population live in rural areas where villages are widely scattered, making the supply of drinking water difficult and expensive. Treatment plants in these areas are often inadequately maintained.

A range of technologies both high-end (e.g. robust ultrafiltration membrane systems, solar- or wave-powered reverse osmosis systems), and low-end (e.g. sand filtration, solar stills, simple ozonation systems) exist to improve potable water supply, especially in rural areas. However, adequate operation and maintenance remains crucial regardless of the technology selected.

The South African government is pursuing two approaches to operation and maintenance: firstly, treatment plants are monitored remotely and any problems are resolved by a 'roving technician' and, secondly, a national technical assistance centre is being investigated to support small water suppliers with information and practical hands-on assistance.

Other initiatives being initiated or implemented to improve drinking water quality include the municipal electronic drinking water quality management tool, a municipal drinking water quality management tool, and water safety plans, among others.

For more information, visit the techneau website: www.techneau.eu

Water by numbers

- 11 million** – The number of people supplied with potable water by Rand Water.
- 13** – The number of river basins worldwide that are shared by between five and eight riparian nations, according to UNESCO. Five basins, the Congo, Niger, Nile, Rhine and Zambezi, are shared between nine and eleven countries. The river that flows through the most nations is the Danube (18 countries).
- 97,9%** – The percentage of Gauteng's population who have access to piped water, according to Statistics South Africa.
- 157** – The number of countries that have signed the Ramsar Convention on wetlands.
- 90 000** – The estimated number of households who qualify for free basic services in the City of Tshwane. The city is in the process of registering indigent households who will receive 12 Kl of water and 100 kW of electricity free a month.
- 50%** – The estimated percentage of blockages in the City of Cape Town's sewers due to foreign objects and fat in the network. According to the city, carcasses, engine parts and even furniture are finding their way into the network.
- 150 000** – The estimated number of children in need of humanitarian assistance following recent flooding in Mozambique, Malawi, Zambia and other African countries, according to UNICEF.
- US\$202,5-billion** – The funds required to protect to control wastewater pollution in the US for the next 20 years, according to a new report by the country's Environmental Protection Agency.
- 19 500 t** – The amount of medicinal plant material provided annually by South Africa wetlands, according to the Department of Environmental Affairs & Tourism. These plants are used by an estimated 28 million people every year.
- 68 800 km²** – The surface area of Lake Victoria, the world's second-largest freshwater lake and the largest in Africa. The lake is shared between Kenya, Tanzania and Uganda.

Building dams not a lasting solution – WWF

Nature organisation WWF has recommended the Department of Water Affairs & Forestry on its programme to rehabilitate old dams, as opposed to building new ones.

The department initiated its dam safety rehabilitation programme in April 2005.

National Treasury approved R1,25-billion over five years, starting from 1 April 2006, specifically to address the infrastructure maintenance needs of dams. A total of 42 projects are between the planning and construction phases at present.

“WWF believes that rehabilitating our existing dams will be far more cost effective and have lower social and ecological consequences,” the organisation said in a statement. “However WWF also believes the Minister (Lindiwe) Hendricks’ reasoning that dams are going to solve a looming water crisis is flawed, and that this thinking is analogous to saying that building batteries will solve the energy crisis we are currently experiencing.”

According to Dr Deon Nel, manager of the WWF Sanlam Living Waters Partner-



ship, electrical batteries could help one get through a few hours of a power break of load shedding, however, they add little to solving the problem of demand exceed-

ing supply. He went on to explain that similar to the way batteries merely temporarily store electrical energy, dams are merely temporary storage facilities. Dams are only as effective as the amount of water flowing into them.

“Dams will help us get through temporary drought events, but they will not help increasing long-term water supply to match a growing demand. Ultimately, it all comes down to simply managing long-term supply and demand,” said Dr Nel. “We need to invest in the management of our rainfall catchments and freshwater ecosystems, which are the ultimate source of our water supplies. Parallel to this we need to invest in technology and behavioural changes that lead to reducing the demands on our water supplies.”

Raising the status of groundwater

The profile of groundwater in Africa has been raised significantly following the Sixth Ordinary Session of the African Ministerial Council on Water, held in Brazzaville, Congo last year.

The meeting saw the participation of a strong contingent of the UNEP & UNESCO led Africa groundwater network, which made presentations to ministers representing nearly 40 countries. According to Yongxin Xu, UNESCO Chair in Hydrogeology at the University of the Western Cape, several important resolutions were taken on the Africa Groundwater Initiative, including promoting the institutionalisation of groundwater management by river basin organisations to ensure regional ownership of the initiative.

Representatives from the Southern African Development Community (SADC) approached Xu whether a scoping study on the status of groundwater management could be undertaken in the region. The call was met with a positive response from the Water Research Commission.

The first funds that have been approved are being used to develop and test a protocol for this purpose in South Africa and feed it with whatever SADC information can be obtained. A website protocol will also be developed.

Water Diary

SANITATION MAY 19-21

The International Water Association (IWA) is organising an international conference in Wageningen, the Netherlands, to discuss new sanitation concepts and techniques, models of governance and experiences.

Enquiries: Tel: +31 (0)31 7482 023; Fax: +31 (0)31 7482 108; E-mail: Leaf@wur.nl; Visit: www.sanitation-challenge.wur.nl

MINE WATER JUNE 2-5

The Tenth International Mine Water Association Congress will be held in Karlovy Vary, Czech Republic. Topics include water issues in underground & open-pit mining, mine closure, water engineering, and mine-water

legal aspects. *E-mail: imwa2008@itctravel.cz or Visit: www.natur.cuni.cz/imwa2008/*

GROUNDWATER MAY 25-27

The Third International Conference on Managing Shared Aquifer Resources in Africa will take place in Tripoli, Libya.

Enquiries: Ms Krystel Lepresle; E-mail: k.lepresle@unesco.org

MEMBRANE TECHNOLOGY JUNE 2-4

The IWA Regional Conference on Membrane Technologies in Water & Wastewater Treatment will take place in Moscow, Russia.

E-mail: alla@sibico.com; Visit: www.iwamembranes.ru

GROUNDWATER JUNE 25-28

An International Conference on Groundwater and Climate in Africa will be held in Kampala, Uganda. The conference, co-organised by the University College London, Directorate of Water Development (Uganda) and UNESCO-IHP, seeks to bring together water and climate scientists, government departments, the private sector and the donor community to share knowledge and expertise and thereby improve present understanding of the impact of climate variability and change on groundwater resources in Africa. *Enquiries: Richard Taylor; E-mail: r.taylor@geog.ucl.ac.uk; or E-mail: info@gwclim.org;*

Visit: www.gwclim.org

New system to monitor R&D in SA

South Africa's science and technology infrastructure received a major boost following the launch of a Web-based tool to capture statistical information on research and development (R&D) activities at universities, science councils and other government R&D funding agencies.

The so-called Research Information Management System (RIMS) is a strategic tool that will be completely integrated with other existing systems at institutional level. It will provide real-time information on human resources for science, engineering and technology R&D capacity and technology improvement and innovation.

According to Minister of Science & Technology Mosibudi Mangena, who launched the system in Pretoria in February, RIMS will provide government with the necessary tools to obtain a detailed, holistic understanding of where its R&D funds are invested, and how much it is spending on each area of science and technology. "This will certainly enhance decisions in government and at the institutional level," he said.

Government has set aside more than R40-million to the development and implementation of the RIMS project. The initial testing of the system was undertaken at the universities of Witwatersrand, Pretoria and Stellenbosch. The Department of Science & Technology is now ready to pilot the system in the science councils.

Free services for registered poor households

The Tshwane Metropolitan Municipality has embarked on an indigent registration drive which will see poor households receiving free basic services.

According to government news agency BuaNews, indigent households which register for the services will qualify for 12 kℓ of free water and 100 kW of electricity per month. The Mayoral Committee member Sonto Thipe said she hoped to register 90 000 indigent households by the end of June. "We would like to address the plight of our poor residents and provide them with affordable and basic services. We therefore urge those who qualify to register and also to inform others of the registration process."

Households are considered indigent if the total gross monthly income of all the members of the household does not exceed R1 700 a month. According to Statistics SA, there are 98 000 households who qualify as indigents in the Tshwane metropolitan area and only half of these are registered.

In June last year the municipality introduced an overall rebate system on property rates for poorer households, those using residential property exclusively as homes and facilities such as old-age homes and those caring for the disabled. Registered indigents with property worth R10 000 and less do not pay property tax and if the property of such families is worth more, a 25% rebate applies.

SA-Romania collaboration seeks researchers

The first call for project proposals has gone out under the South Africa-Romania Joint Science and Technology Research initiative.

The two countries signed an inter-governmental bilateral agreement in 2004 on cooperation in the fields of science and technology. The initiative is jointly implemented and administered by the National Research Foundation in South Africa and the National Authority for Scientific Research of Romania.

South African researchers who are interested in research projects in the priority areas of biotechnology (including agriculture; the environment and food technology); information and communication technology; climate change and energy; applied physics (including laser technology); new materials and technologies (including nano-materials); social science and humanities (including health sciences); and space cooperation may apply.

All South African applications must be submitted by 28 March. For more information, contact Raven Jimmy at Tel: (012) 481-4069; Fax: (012) 481-4044; or E-mail: raven@nrf.ac.za

Water on the Web

www.acsnanotation.org

The American Chemical Society has launched a new nanoscience and nanotechnology community website. The site aims to become the premiere destination for nanoscience and nanotechnology news, highlights and community. Features include research highlights from ACS journals, career resources, podcasts and other multimedia resources, as well as interaction with other scientists.

www.knowwiththeflow.org

This website, hosted by Cap-Net and MetaMeta Communications offers water-related training and education communications materials. It is filled with useful tips for presentations, communication tools, tutorials for the use of common media, software and a picture gallery.

www.drinking-water-engineering-and-science.net

Launched by Delft University and UNESCO-IHE, *Drinking Water Engineering and Science* aims to be the leading scientific open access journal for the publication of original research in drinking water treatment. The focus is on fundamental and applied research in water sources, substances, drinking water treatment processes, distribution systems and residual management.

www.internationalwaterlaw.org

The International Water Law Project aims to serve as the premier resource on the Internet for international water law and policy issues. Its purpose is to educate and provide relevant resources to the public and to facilitate cooperation over the world's freshwater resources. The website also offers information on upcoming water events, courses, publications and general water news.

<http://timecapsule.iah.org>

The Hydrogeologist Time Capsule, launched earlier this year, is a website hosting a collection of interviews of eminent Hydrogeologists who have made a material difference to the profession.

Women more vulnerable to climate change – Minister

Climate change adaptation funds need to assist poor rural women who will be hardest hit by the changes to the planet due to global warming, according to Deputy Minister of Environmental Affairs & Tourism Rejoice Mabudafhasi.



She was addressing the United Nations Environment Programme's Tenth Special Session of the Governing Council in Monaco in February.

The Minister said women were responsible for food production in about 75% of households in sub-Saharan Africa. Because they were so dependent on, for example, agriculture and natural resources such as fishing, it was crucial that climate change adaptation funds target their plight.

The Global Network of Women Ministers and Leaders of the Environment drew the panel's attention to the fact that when poor women lose their livelihoods, they slip deeper into poverty, which, in turn worsens

their inequality and marginalisation. As crop yields and resources become scarcer, women's workloads will expand, jeopardising

their chances to work outside the home or attend school.

Mabudafhasi, said: "We need to make concerted efforts to prioritise women when opportunities arise for green jobs. We should actively encourage girls and young women to choose non-traditional career options such as science and engineering in the areas of mitigation and adaptation to climate change. Strategies should not focus on employing women only as workers, they should also be supported to be managers of companies that provide adaptation and mitigation services. In this way, women will be able to make a fundamental shift from being the victims of climate change to leaders and victors against climate change."

of environmental education into the National Curriculum Statement. People who have previously used the miniSASS tool are invited to put forward their perceptions of the tool and suggestions for its revision. Contact Mark Graham at E-mail: admin@ground-truth.co.za or Clare Peddie at E-mail: sharenet@wessa.co.za

Save water through click of a mouse

For many years, authorities have been trying to establish the levels of wastage from water supply systems.

To support more effective auditing of water use, the Water Research Commission has developed an advanced software tool name Aqualite. This new generation software, developed by Dr Ronnie McKenzie, is designed specifically to assist water suppliers in managing their non-revenue water. It is reportedly one of few models available worldwide not based on an Excel spreadsheet format. The program was developed in collaboration with numerous internationally recognised water loss experts.

The model incorporates a host of features, some of which are not available in other water audit models. These include, among others, a selection of seven different measurement units for use in various countries where metric units do not apply; user-defined confidence limits on all key variables; ability to differentiate between connections and customers in certain calculations; and detailed reporting forms which can be user-defined to provide either a summary report or a detailed report.

Aqualite is available free of charge and can be downloaded from the WRC website, www.wrc.org.za.

Water Affairs gets new DG

Former DG of the Department of Environmental Affairs & Tourism (DEAT), Pam Yako, has moved departments to become the new DG of the Department of Water Affairs & Forestry (DWAF).

Yako has a B.Comm, a post-graduate Diploma in Labour Law, a certificate in Human Resources Management, a certificate in Provincial and Local Government Law and a Masters Degree in Business Leadership. She was DG of DEAT from April 2005.

Making the announcement in February, DWAF Minister Lindiwe Hendricks expressed her excitement at the appointment of Yako. "Ms Yako joins the department at a very critical time in terms of meeting the service delivery targets, and the need for the department to clean up its act with regard to financial management."

Mini monitoring tool reviewed

The Water Research Commission has launched a project to assess the miniSASS (South African Scoring System) biomonitoring tool as a resource for environmental education in the River Health Programme and to cross-link with the National Curriculum Statement.

The miniSASS tool has been used as a low-cost technology tool for the last six years. Although various shortcomings and perceived limitations have emerged, the tool has provided a scientifically reliable and robust technique to monitor water quality in rivers and streams, having been developed as a simplified method of biomonitoring based on the SASS technique.

Changes and updates to the miniSASS are needed, however, to facilitate the integration



'Business Unusual' Gets Donor Nod



Minister of Water Affairs & Forestry Lindiwe Hendricks at the official launch of Masibambane III. "We need to build strong institutions to be able to handle future water challenges such as those brought on by the impact of climate change," she said.

The European Union (EU) has reconfirmed its commitment to assist the Department of Water Affairs & Forestry (DWAFF) in achieving its development goals, with a support package of some €107-million (R1,25-billion) pledged to phase three of the Masibambane programme.

Masibambane III was officially launched by DWAFF Minister Lindiwe Hendricks and EU Ambassador to South Africa Lodewijk Briët at the Third National Water Summit in Midrand, in March. In addition to its donor funding, South Africa will commit R69-billion of its own resources to the programme.

The nationwide programme, a partnership between DWAFF, the Department of Provincial and Local Government and the South African Local Government Association, the EU and its member states, Irish Aid and the Swiss government, pools multi-donor funds for the purpose of supporting and strengthening the water and sanitation services sector in South Africa. The EU has been the largest contributor since the programme's inception, with €125-million donated between 2001 and 2007.

Through Masibambane the government has, among others, contributed to strengthening governance at local level; placed professionals at municipal level to support local government; driven the agenda of ensuring that cross-cutting issues (such as gender mainstreaming and HIV/AIDS) are included in service delivery and developed a learning sector through the establishment of the Water

Information Network which is located at the Water Research Commission.

"Masibambane is a success story, a demonstration of what can be achieved through a sector-wide approach to development," reported Briët. "When the programme started it was all about bringing water and sanitation to impoverished communities, about the 'nuts and bolts' of service delivery. However, as time progressed we realised there were other 'softer' issues that needed attention," he explained. "Masibambane III looks beyond the nuts and bolts towards systematic and institutional issues."

The theme for the third phase is 'Water for Growth and Development'. "This theme is in recognition of water playing a key role in support of economic growth and social development, as well as strategic use of water infrastructure as a means to contribute to and stimulate growth and development," said Hendricks at the launch.

Over the next five years, Masibambane III will be focused on developing stronger inter-governmental relations; building the interface between water resources and water services; building local government capacity for economic growth and development; developing skills and knowledge sharing and addressing the needs of civil society and indigent communities.

It is foreseen that the programme will also be used to help DWAFF overcome its final restructuring challenges. This includes

establishing and rationalising catchment management agencies and making appropriate institutional arrangements for managing and development national water resources infrastructure; delegating management of government irrigation schemes to water user associations; transferring department-owned water schemes to water services authorities (WSAs) and ensuring effective service delivery by WSAs and institutions.

"We are seeing water for growth and development as contributing towards bridging the gap between the first and second economies by bringing marginalised people into the mainstream economy," noted Hendricks. "It is not only having access to clean water and decent sanitation that will contribute to growth and development, but also involving communities in provision of some of the goods and services required by the water sector, such as brick making. We also see that through access to water a number of new enterprises and small-scale agricultural activities become possible."

In his 2008 State of the Nation address South African President said the country had to adopt a 'business unusual' approach to service delivery. "This business unusual approach must become business usual, in other words, this principal must guide our everyday actions," said Briët. "Globally, regionally and locally we know what the water challenges are and we know what to do to overcome them. We need to get on with it."



European Union Ambassador to South Africa Lodewijk Briët reconfirmed the commitment of the EU to assisting DWAFF in meeting its growth and development goals.



UN Secretary-General pledges action on water resources



United Nations Secretary-General Ban Ki-moon has told participants at the World Economic Forum that the UN would take action to address the challenge of shrinking world water resources in the context of reach-

ing global anti-poverty targets.

“Our experiences tell us that environmental stress, due to lack of water, may lead to conflict, and would be greater in poor nations,” Ban told participants. Population growth will make the problem worse. So will climate change. As the global economy grows, so will its thirst. Many more conflicts lie just over the horizon.”

The Secretary-General emphasised that water resources must be protected. “There is still enough water for all of us – but only so long as we keep it clean, use it more wisely, and share it fairly,” he said.

Micropollutants invade crops, water supply

Toxins produced by a common fungus are reportedly spreading beyond food crops and invading the environment, including water supplies, with unknown consequences, researchers in Switzerland report.

Their study, which reveals a need for stronger monitoring and control of these overlooked micropollutants was published in the American Chemical Society’s *Journal of Agricultural and Food Chemistry*.

The contaminants are members of a large family of fungal-produced toxins called mycotoxins. In the report, Thomas Bucheli and colleagues note that scientists have studied two of the most common mycotoxins – deoxynivalenol and zearalenone – in food and animal feed products for decades. However, scientists know very little about the distribution of these toxins elsewhere in the environment.

In the new study, the researchers exposed a winter wheat field to *Fusarium graminearum*, a major fungal source of deoxynivalenol and zearalenone, and subsequently monitored these toxins in the field’s drainage water before, during and after harvest. Using high-tech lab instruments, they found that levels of these toxins increased significantly after harvest. Levels of deoxynivalenol, for instance, rose by almost 4 000-fold. Traces of these toxins were also found in a number of Swiss rivers, they note.

Groundwater used to pinpoint gold

So-called hydrogeochemical exploration, groundwater sampling to locate promising areas of mineralisation, is proving a cost-effective new technique able to detect metals such as gold, nickel, copper, zinc and uranium.

Scientists with the Minerals Down Under National Research Flagship are analysing groundwater samples from one of Australia’s most prospective regions to help mineral explorers pinpoint areas for further investigation. The project is taking place over a vast

area of northern Yilgarn Craton in the west of the country.

“The northern Yilgarn is an arid area with potable groundwater, so it is dotted with mindmills and bores used for agriculture. This gives us direct access to groundwater without the need for drilling,” reports David Gray of CSIRO.

The project follows closely on the heels of a similar successful hydrogeochemical exploration project along the Leonora-Wiluna belt last year.

Coated silica particles filter out toxins, pathogens

Tiny particles of pure silica coated with an active material could be used to remove pollutants such as chemicals, viruses and bacteria from water much more effectively and at lower cost than conventional water purification methods, according to Australian researchers.

Peter Majewski and Chiu Ping Chan of the Ian Wark Research Institute at the University of South Australia investigated how silica particles can be coated with a nanometre-thin



David Gray of CSIRO and Patrice DeCaritat of Geoscience Australia conduct field measurements and filtration for a northern Yilgarn groundwater sample.

Global news snippets

- ◆ The Zambian government has fined a Mopani Copper Mines manager and three other employees for the pollution of the **Mfulira water system** in January. The company reportedly polluted the water supply system affecting 800 Mfulira residents.
- ◆ The **Mississippi**, North America's largest river, is being dramatically changed by farming practices that have increased its water volume and carbon levels, according to scientists from the Louisiana State University's Coastal Ecology Institute. Since the 1950s, there has been a 40% increase in carbon levels in the river as well as a 9% increase in the amount of water flowing from the Mississippi.
- ◆ Canadian city Montreal plans to be the first large metropolis in the world to disinfect all its wastewater using **ozonation**. The multimillion dollar plant will reportedly be the third-largest in the world, treating about 32 m²/s of water.

layer of active material based on a hydro-carbon with a silicon-containing anchor. The coating is formed through a chemical self-assembly process so involves nothing more than stirring the ingredients to make the active particles.

These active particles, called surface engineered silica, were then tested to demonstrate that they could remove biological molecules, pathogens such as viruses, bacteria, and parasites. "The results show clearly that organic species can efficiently be removed at pH ranges of drinking water by stirring the coated particles in the contaminated water for up to one hour and filtering the powder," reported the researchers. They point out that the filtration process occurs through an electrostatic attraction between the pathogens and the surface engineered particles.

Key US lake could be dry by 2021

There is a 50% chance Lake Mead, a key source of water for million of people in the southwestern US, including Las Vegas, will be dry by 2021 if climate change as expected and future water usage is not curtailed.

So maintain researchers at Scripps Institutions of Oceanography at the University of California San Diego. Without Lake Mead and neighbouring Lake Powell, the Colorado River

system has no buffer to sustain the population of the Southwest through an unusually dry year. In such an event, water deliveries would become highly unstable and variable, according to research marine physicist Tim Barnett and climate scientist David Pierce.

The two researchers concluded that human demand, natural forces such as evaporation, and human-induced climate change are creating a net deficit of millions of cubic metres of water per year from the Colorado River system. Their analysis indicates that the water system could run dry even if mitigation measures now being proposed are implemented.

"We were stunned at the magnitude of the problem and how fast it was coming at us," said Barnett. "This water problem is not a scientific abstraction, but rather one that will impact each and every one of us that live in the Southwest."



SolarBee Solutions for Water Quality Problems

Freshwater benefits

- Treat epilimnion and/or hypolimnion
- Control harmful blue-green algae blooms
- Improve aesthetics, taste, odour, water clarity & biodiversity
- Improve fish habitat & eliminate fish kills
- Reduce release of Mn, Fe, H₂S, P from sediment
- Improve DO (dissolved oxygen) & pH levels
- Reduce invasive aquatic weed growth

Potable/Finished Water Storage benefits

- Reduce loss of residual chlorine or chloramines
- Prevent thermal stratification and long water age
- Reduce nitrification and high heterotrophic plate counts

Wastewater benefits

- Reduce energy consumption in partial & total mix systems
- Improve performance of facultative pond systems
- Improve BOD, TSS & ammonia reduction
- Control odours (odour capping systems available)
- Improve sludge digestion & reduce need to dredge
- Reduce short-circuiting & fecal coliform counts

Solar powered long distance circulators

SolarBee Inc., USA, www.solarbee.com

Distributed by AmanziBee cc, SA; lindas@solarbee.com; +27 (0)83 273 8111

Better plant for soft drink maker

VWS Envig has completed a water treatment upgrade project for Coca-Cola Fortune in Nelspruit, Mpumalanga.

The project, awarded through tender, included the revamp and automation of the existing plant. According to John Heffill, manager: engineering at VWS Envig, the plant uses a municipal water source, and treats the incoming water according to specifications for use as process water. "The customer required a more modern plant, which was to be as automated as possible. We have not only delivered that, but also a plant which uses less water and chemicals, while operating more efficiently and is more user-friendly."

The old plant was operated manually and consisted of chemical dosing, a clarifier, sand and carbon filtration units, and a



polishing filter. The chemical dosing and clarification units were reworked. Automated

valves were supplied for the filtration units while a backwash recovery system was added which feeds water into the cooling towers.

VWS Envig also supplied an additional pump as well as all process instrumentation, controls and cables. Training was supplied to operators during commissioning.

The project was completed on a tight schedule, said Heffill. "The client needed the plant to be commissioned to coincide with the end of the bottling plant shutdown. This presented a challenge in that we had to physically dismantle much of the existing equipment for us to complete the refurbishment. However, we completed the project on time, and even went as far as supplying a temporary water source to the bottling plant in the midst of the revamp."

News snippets

- ◆ **TCTA** chairman Malixole Gantsho died tragically at his farm outside East London, in the Eastern Cape, in January following a tractor accident. He was appointed chairman of the TCTA Board in 2006. Meanwhile, TCTA has appointed Londiwe Mthembu as new CEO to succeed Martie Janse van Rensburg, who resigned from the company. Mthembu will serve as CEO until the establishment of the National Water Resources Infrastructure Agency, which is currently awaiting legislation.
- ◆ Investment company, **Lonrho**, has announced that it has set up a new water company in South Africa to build a 800 000 l/m bottling plant. The new company, Lonrho Springs, has reportedly bought the existing water use rights from Aquamine, which sources its water from a natural spring in the Cradle of Humankind, outside Johannesburg.
- ◆ Diana Duthé has been appointed as a Partner of **SRK Consulting**. Duthé holds an MSc (Hydrogeology) from the Centre de Hydrogéologie Université de Neuchâtel in Switzerland.
- ◆ Wayne Taljaard has been appointed to the position of General Manager: Engineered Systems at **VWS Envig**. Taljaard joined the company in 2005 and previously held the position of Manager: Tenders and Executions.

Mpumalanga refurb contract extended

Specialist consulting engineering and project managing group SSI has received an extension until July to a contract awarded in January last year by the Thaba Chweu Municipality in Mpumalanga. Funded by the Department of Water Affairs & Forestry (DWAF), the contract calls for the refurbishment of rural municipal water-related infrastructure.

This project is a key component of the Provincial Water Sector Plan, which comprises a schedule of interventions over the next five years to help achieve the objectives of the Mpumalanga Growth and Development Strategy, the National Water Resources Strategy and the Strategic Framework for Water Services. "DWAF is in the process of handing over the management and operation of provincial infrastructure to local municipalities and one of the requirements of this development is that the infrastructure must be handed over in its original operational condition," explained SSI's Theo Kleynhans.

From January to July 2007, the company was tasked with providing the professional services related to and management of the refurbishment exercise pertaining to infrastructure such as borehole pump stations, reservoirs and reticulation in three rural

villages on the northern border of the municipal area – Lerero, Matibidi and Moremela. "This required assessing the status of the infrastructure, determination of the refurbishment requirements, drafting schedules of quantities and tender documents and project administration," said Kleynhans. "With the extension of our contract we will continue with further refurbishment in the area."

Soweto reservoir to be fixed

Johannesburg Water is refurbishing the Diepkloof reservoir in Soweto following supply difficulties due to numerous technical and infrastructure problems.

According to a statement, the company will be able to improve water supply services in the area once the reservoir has been upgraded. "Johannesburg Water is aware of the problems that have been caused by old and outdated municipal water infrastructure. That is why we have launched a comprehensive programme to upgrade and rehabilitate municipal water infrastructure throughout Soweto," said MD Gerald Dumas.

One of the main components to be replaced during the Diepkloof reservoir upgrade is the main water flow valve, which has not been functioning properly leading to low supplies in peak hours.

The project is due for completion in May.

New from the WRC

Report No: KV 202/07

Guideline to Develop a Sustainable Urban River Management Plan (Nemai Consulting)

This study aimed to create a guideline document to aid in the compilation of a plan that addresses the impacts and management of specifically urban rivers. Salient themes surrounding urban rivers, such as pollution and impact sources and the concomitant effects, are discussed in the bulk of the document. The document culminates in a guideline which navigates the reader through steps required to prepare a sustainable urban river management plan.

Report No: TT 287/07

Guidelines for the Planning, Design and Operation of Fishways in South Africa (Ralph Heath; Anton Bok; Pieter Kotze; Paul Fouché; Hylton Lewis; Jan Rossouw and Matthew Ross)

Historically, there has been limited research funding available in South Africa to investigate fishway facilities designed to cater for indigenous species under local environmental conditions. However, in 2000, the Water Research Commission (WRC) started funding a fishway research programme to improve knowledge in this regard. A number of reports have been produced as part of the programme over the years, finally culminating in this publication. The guideline has been developed

through a collaborative and consultative process with leading South African fish experts, ecologists, hydraulic engineers and hydrologists. Among others, the guideline provides ways of determining if a fishway should be built and how to deter-

mine the specific fishway design for South African conditions. The guideline also includes a detailed inventory of the fishways to be found in the country – one of the most important outcomes of the fishway research programme. Other important issues, such as the construction, operation, maintenance and monitoring of fishways are also included.

Report No: 1528/1/07

Polyelectrolyte Determination in Drinking Water (S Majam and P Thompson)

Polyelectrolytes are water soluble organic polymers used as primary coagulants in the treatment of drinking water. Although it is desirable to remove traces of polyelectrolytes added during the treatment process, residual amounts of these substances may persist in solution after the filtration stage. Evidence suggests that several of these contaminants could have an adverse effect on the health of water consumers if ingested in sufficient quantity over time. Consequently, water treatment plant operators are required to know the residual concentration of polyelectrolytes at various stages in the treatment process and the eventual quality of the treated water.

The study investigated several techniques to determine polyelectrolytes in drinking water. Two simple and practical analysis methods were developed. Application of either or both of these methods is recommended for monitoring purposes and for ensuring the safety of final, treated drinking water.

Report No: 1510/1/08

Application Procedure for the Development and Use of Groundwater (R Parsons; L Eichstadt; J Crowther and J Blood)

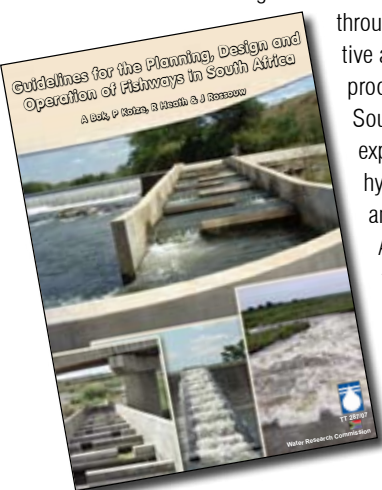
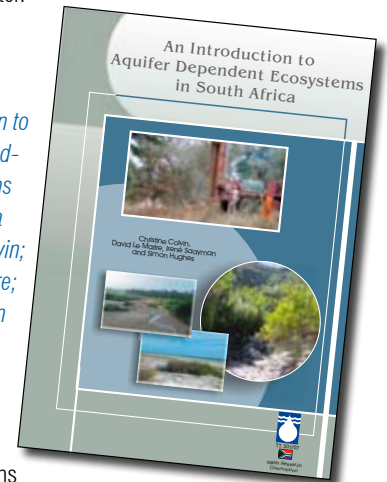
The lack of clear guidance from responsible authorities in matters relating to the authorisation of development and use of groundwater, in as far as compliance with legislation is concerned, necessitated a multi-disciplinary study to develop this report, which is essentially a groundwater licensing guide. The key

purpose of the guide is to help officials make decisions in an efficient and consistent manner on the process that has to be followed when applying for approval to develop and use groundwater.

Report No: TT 301/07

An Introduction to Aquifer Dependent Ecosystems in South Africa (Christine Colvin; David Le Maitre; Irené Saayman and Simon Hughes)

Aquifer dependent ecosystems (ADEs) occur throughout the South African landscape in areas where aquifer flows and discharge influence ecological patterns and processes. They are ecosystems which require groundwater from aquifers for all or part of their lifecycle, to maintain a habitat with a water budget or water quality that contrasts with the surrounding ecosystems. Examples of known South African ADEs include in-aquifer ecosystems in the dolomites (North West); springs and seeps in the Table Mountain Group sandstone (Western Cape); terrestrial keystone species such as *Acacia erioloba* in the Kalahari; lakes and punctuated estuaries on the shallow sand aquifers of the east coast in KwaZulu-Natal, and seeps on the Karoo dolerite sills. The main objectives of this project were to produce a summary of known and probable groundwater dependent ecosystems; to guide decision-makers in assessing the importance and vulnerability of ADEs; to test the application of the tools identified for measuring groundwater use and dependency; and to identify significant knowledge gaps and to recommend a strategy for further research to address key issues relating to ADEs.



To order any of these reports, contact Publications at Tel: (012) 330-0340; Fax (012) 331-2565; E-mail: orders@wrc.org.za or visit: www.wrc.org.za