



## Letters to the Editor

### Remember the 'Golden Rules' for water management

I have been a regular subscriber and occasional contributor to *the Water Wheel*.

I have been an ISO 14001 auditor for 13 years in a wide range of industries. I continue to be amazed by the lack of understanding of fundamental water management issues, particularly on industrial sites in municipal areas.

Along the way I have developed my own Golden Rules of water management:

1. Don't waste water (leaking taps, toilet cisterns etc.)
2. Nothing goes into the stormwater system except rainwater. (The most widely breached rule, e.g. car washing, oil spillage in car parks, off-loading of diesel etc.)
3. No industrial effluents to the sewerage system without a permit. (What do you do when there are no bylaws?)
4. No stormwater allowed to go into the sewerage system (why do our sewage plants overflow every time it rains?)
5. No sewage allowed to run into the stormwater system. (Pipes blocked by cigarette packets, cold drink bottles and other rubbish. Perhaps protection of the sewerage system should be rule number six).

On most sites that I visit, at least three rules are breached, in some all five.

My most usual protest is: Where does it say in the legislation that I must/or am not allowed to do, whatever?

Tracking down the specific legal requirements is complicated by the fact that there are over 100 environmental Acts, 1 000s of regulations, nine sets of provincial legislation and about 300 municipalities, some of which do not yet have gazetted bylaws.

There are of course exceptions to the above, e.g. water from dewatering of foundations may be discharged to

stormwater. Contaminated rainwater can be discharged after treatment in terms of a water use license, etc., but I believe the Golden Rules are quite robust for most circumstances.

I would welcome comments on the Golden Rules.

**GW Northwest**

### The sanitation wheel turns

I enjoyed reading your article on the pour flush toilet in the July/August edition of *The Water Wheel*.

The content of which is not dissimilar to a presentation which I delivered at the Zambia Water Conference in 2012 ("... On site Sanitation no one size fits all..."). At least somebody at the conference was paying attention! It seems that the circle of sanitation has turned yet again!

Only this time I hope that we don't repeat the mistakes that were made in the late 1980s when pour flush/low flush toilets that drain into pits were rolled out. Without naming and shaming anybody I urge the WRC to go back in history and learn from the disaster of this type of technology before Carte Blanche is given to its implementation as was the case with the VIP.

It was as a direct result of these failures that lead to Calamite's development of its low flush and pour flush technologies for which it was awarded the Agreement Certificate in 1994 (a world first).



Sadly these technologies had limited success due to the wheel turning in favour (policy) of the VIP toilet where the emphasis was placed on the toilet structure (read concrete structure) rather than the actual sanitation system i.e. from the toilet seat backwards.

It is thus with great interest that I read about the zinc-clad timber frame top structure and rewind to the 1990s when the then Minister of Water Affairs Ronnie Kasrils declared the zinc toilet to be undignified and all but banned its use! I only hope that Minister Mokonyane is better informed on sanitation technologies before she gives her nod of approval! PS. Perhaps an article on all the other types of sanitation would be in order?  
**John Telford, Calcamite Water and Sanitation**

### Grootdraai emergency scheme

Ek het met belangstelling julle artikel oor die Grootdraai Noodskema (*The Water Wheel* July-August 2014) gelees. Toevallig het ek pas my herinneringe aan my loopbaan in wateringenieurswese voltooi en ook oor die onderwerp geskryf.

Ek wil langs hierdie weg iets regstel. Dit gaan oor die woorde: "Said to be the brainchild of Dave George..." Ek weet waar die gerug waarskynlik vandaan kom. Dave wou dieselfde tegniek aan die Departement van Waterwese "verkoop" as alternatief vir die Lesotho Hoogland Waterprojek. Hy het op eie koste 'n groot studie geloods om die Oranjerivier vanaf die samevloeiing met die Vaalrivier in trurat sit, op dieselfde wyse as wat die Vaalrivier tussen die Vaaldam en die Grootdraaidam in trurat gesit is.

Dave het vir laasgenoemde projek net geologiese dienste gelewer en was daarom wel op hoogte van wat daar aangaan. Die



Departement het nie sy voorstel aanvaar nie, hoofsaaklik omdat op die wyse die besoedelde water steeds weer stroomop sou gepomp word!

Dave het die verwerping baie kwalik geneem, want hy was daarvan oortuig dat sy voorstel goedkoper was, alhoewel hy myns insiens die koste van onteiening van die grond wat onder water sou kom al langs die rivier heeltemaal onderskat het.

Trouens, hoe sou 'n geoloog ooit betrokke geraak het by die samesprekings tussen ons en Eskom hoe om die naderende katastrofe op te los? Ek weet dit baie goed want ek was amfshalwe ten nouste betrokke by die krisis.

Ek doen aan die hand dat jy vir Dave George self opspoor en hom vra!

**Dr Theo von Robbroeck, Stellenbosch**

### Appeal to department to support municipal engineers

It was disappointing to see that the Department of Water & Sanitation (DWS) did not have a stall at the Conference of the Institute of Municipal Engineering in Southern Africa (IMESA) held in Port Elizabeth in October 2013. While we know that DWS works closely with the Water Institute of Southern Africa with regards to the Blue/Green Drop system they should also support municipalities through IMESA. The DWS literature and documentation, which is world class, is important to be available to municipal engineers as well as the presence of DWS personnel. I therefore appeal to DWS to have a stall at the IMESA Conference in Durban in October 2014.

**David Raymer, Professional Engineer, Port Elizabeth**

## Overcoming southern Africa's irrigation challenges together

The importance of irrigation for increased food production and food security in southern Africa cannot be overemphasised. One organisation aimed at harnessing the collective power of the region's knowledge towards greater implementation of sustainable irrigation is the Southern African Regional Irrigation Association (SARIA).

Currently comprising members from 15 SADC countries, SARIA's activities are aimed at enhancing research, development and training of appropriate science and technology in irrigation and drainage for gender-balanced poverty eradication and economic development to improve the livelihoods of people in the region.

The Association stimulates and promotes the development and the use of the arts, science and techniques of agriculture, socio-economics and engineering in managing land resources for irrigation and drainage, including human-resource development and capacity building, adapting comprehensive approaches and

up-to-date techniques for sustainable agricultural growth.

Earlier this year, association representatives met in Pretoria to share ideas on agricultural irrigation water issues at a regional level. The meeting was hosted by the Water Research Commission (WRC). The objective of the workshop was to facilitate the exchange of ideas and practices between researchers, advisors and government officials from the SADC countries.

A highlight of the meeting was a field trip undertaken to a commercial mushroom farm in Krugersdorp. Delegates were able to see first-hand how mushrooms are planted, managed and harvested.

Another highlight was the workshop on extension for management of agricultural water. This training workshop for SARIA representatives was presented by Dr Joe Stevens from the University of Pretoria. The workshop was based on WRC-published training material for extension advisors in irrigation water management.

As a major challenge for all SARIA members, it was agreed that the training resource material will be used as a basis for organising further courses in the respective member countries.

The third day of the gathering saw presentations from SARIA country representatives on activities of national committees on irrigation issues. The steering committee meeting also mapped the way forward for SARIA over the next three years. Some of the issues which were discussed during the meeting were the strategic roles and actions for a viable SARIA.

It was also agreed that issues such as: Rainwater harvesting and conservation for food production; as well as aquaculture and fisheries should form part of the SARIA capacity building and knowledge exchange for the year 2014/2015 and the year 2015/2016 respectively. The SARIA workshop was funded and supported by the Department of Agriculture Forestry and Fisheries.



SARIA representatives at the recent meeting in South Africa.

### Water diary

#### Civil engineering October 28-31

The 9<sup>th</sup> World Congress on Engineering Asset Management will be held in Pretoria. Engineering asset management encompasses all types of engineered assets, including built environment, infrastructure, plant, equipment, hardware systems and components. Visit: <http://2014.wceam.com/> for more information.

#### Municipal engineering October 29-31

The 2014 Conference of the Institute of Municipal Engineering in South Africa (IMESA) will be held at the Durban International Convention Centre, in Durban. Visit: [www.imesa.org.za](http://www.imesa.org.za)

#### Large dams November 5-7

The South African National Committee on Large Dams (SANCOLD) will be holding a conference titled 'Towards sustainable dams in southern Africa' in Gauteng. Enquiries: Lerato Miyen; Tel: (011) 676-3464; Email: [secretariat@sancold2014.org.za](mailto:secretariat@sancold2014.org.za); Visit: [www.sancold.org.za](http://www.sancold.org.za)

#### Irrigation and drainage November 18-20

The South African National Committee on Irrigation and Drainage (SANCID) is holding a symposium titled 'Water, food and energy in the 21<sup>st</sup> century' in Gauteng. Enquiries: Puleng Mofokeng (Chair of Organising Committee), Email: [PulengM@daff.gov.za](mailto:PulengM@daff.gov.za) or SANCID Chair, Felix Reinders, Email: [reindersf@arc.agric.za](mailto:reindersf@arc.agric.za)

#### Health and nutrition November 19-21

The Second International Conference and Nutrition will be held in Rome, Italy. The conference, hosted by the World Health Organisation and the Food and Agriculture Organisation of the United Nations, along with several other parties, will focus on how to address major nutrition challenges over the coming decades. Visit: <http://www.who.int/mediacentre/events/meetings/2014/international-conference-nutrition/en/> for more information.

## New from the WRC

### Report No. KV 330/14

*Dynamic, evidence-based, ecosystem services decision-support model for climate change adaptation: Exploring a method to provide credits to water users in dry climates (SA Mitchell; JG Crafford; and M Wilkinson)*

This exploratory project focused on the need to increase the resilience and robustness of, and to achieve water equity for, vulnerable, poor communities in an uncertain future. The high natural climatic variability in arid and semi-arid southern Africa means that policies and strategies developed to increase the resilience and robustness of social-ecological systems in the face of climate change in the medium to longer term are likely to be immediately relevant in the face of the natural variability. This will give governments the opportunity to finetune their policies and strategies aimed at adaptation to future climate change.

### Report No. 2119/1/14

*Decision-support models for the selection and costing of direct potable reuse systems from municipal wastewater (CD Swartz; CJ Coomans; HP Muller; JA Du Plessis; and W Kamish)*

A need was identified for a decision-support model for municipalities and water boards to identify, evaluate, compare and select appropriate water reclamation and reuse options which can produce sufficient quantities of safe drinking water from available secondary treated wastewater sources. The guide also included the development of a reuse costing model, REUSECOST. This project focused on direct potable reuse as a water-supply option to augment conventional water source in water scarce areas.

### Report No. 2087/3/14

*A choice experiment study of user preferences for levels of water services (SG Hosking; J Hosking; M Du Preez; and JG Hosking)*

Discrete choice experimentation is one form of choice modelling. It utilises a stated preference survey technique to

gather data for modelling choice. The aims of the study were to demonstrate that discrete choice experiment analysis and the survey instrument on which it is based could provide useful information about how consumer groups valued water service delivery and how they rated the water services that they were provided. The motivation for undertaking this study was that technical and cost considerations are inducing greater interest among South Africa's municipal providers of water services to adjust the levels of water service offered to various groups. Such adjustments have consumer welfare implications and potential impacts on the demand for water services, and these implications and impacts need to be considered along with the technical and cost consequences.

### Report No. 2165/1/13

*The economics of sustainable aquifer ecosystem services: A guideline for the comprehensive valuation of aquifers and groundwater (D Pearce; J Crafford; K Riemann; C Hartnady; H Peck; K Harris)*

As groundwater gains increasing recognition in South Africa, so the efforts have been bolstered to detail the extent to which the unseen resource is utilised and consumed. The field of research regarding groundwater ecosystem services is in its early phases of development. Using the Millennium Ecosystem Assessment Framework, in combination with a work-shopping method known as a Comparative Risk Assessment, this study investigated the ecosystem services of groundwater resources through the expert analysis of three case studies.

### Report No. 2015/1/13

*Evaluating approaches to and benefits of minimising the formation of acid rock drainage through management of the disposal of sulphide waste rock and tailings (STL Harrison; J-P Franzidis; RP van Hille; T Mokone; JL Broadhurst; CK Mbamba; A Opitz; R Chiume; E Vries; H-M Stander; M Jera)*

The ideal approach to handling of

sulphidic waste rock is to prevent the potential for generation of acid rock drainage through the removal of the sulphide phase before its disposal, thus avoiding the need for long-term mitigation. This report is focused on the goal of establishing feasible approaches for the prevention of the formation of acid rock drainage from mining wastes by the removal of the risk rather than its delay.

### Report No. 2040/1/13

*Sediment as a physical water quality stressor on macro-invertebrates: A contribution to the development of a water quality guideline for suspended solids (AK Gordon; J Niedballa & GC Palmer)*

The Department of Water and Sanitation has undertaken to revise the South African water quality guidelines for fresh waters, and update the current guideline for instream particulates with one based on biological effects. Research undertaken in this report represents the start of work toward providing appropriate biological response data in this regard, and the beginning of investigations into improving the management of this aquatic ecosystem stressor.

### Report No. 2148/1/13

*A non-parametric multi-site stochastic rainfall model with applications to climate change (J Nadirity & J Nyaga)*

The planning and operation of most of the large water resource systems in South Africa has been applying a multi-site monthly streamflow generator since the 1990s, but it has recently been recognised that the use of stochastic rainfall generation may hold advantages over stochastic streamflow generation. As in other parts of the world, climate change is an increasing concern in South Africa. However, climate change impacts have not specifically been incorporated into the comprehensive probabilistic approach applied by the Department of Water Affairs and Sanitation and its consultants. This project then set out to develop and test a monthly non-parametric stochastic rainfall generator

that would comprehensively incorporate climate change and changing variability, including information from global climate change models. The project also compared the non-parametric generator with the parametric PEGRAIM-W generator.

### Report No. 2022/1/13

*The long-term impact of Acacia Mearnsii trees on evaporation, streamflow, low flows and groundwater resources. Phase II: Understanding the controlling environmental variables and soil water processes over a full crop rotation (CS Everson; AD Clulow; M Becker; A Watson; C Ngubo; H Bulcock; M Mengistu; S Lorentz & M Demlie)*

This project was a direct consequence of the need for high-quality scientific research, in response to national needs for application of the National Water Act of 1998 and for future policy and forest management decisions. The main aim of the project has been to answer: 'What processes allow exotic tree plantations to use more water than grassland in areas being converted to commercial forestry plantation?', and 'What are the long-term effects of commercial forestry species on deep soil-water profiles, streamflow and total evaporation?'

### Report No. 2074/1/13

*The role of knowledge in a democratic society: Investigations into mediation and change-oriented learning in water management practices (J Burt, H Lotz-Sisitka, N Rivers, R Berold, M Ntshudu, T Wigley, M Stanford, T Jenkin, M Buzani & E Kruger)*

This project emerged from two previous WRC research projects – one on participation in the establishment of integrated water resources management structures and the other on the use of knowledge and learning resources about water and its management and how such resources were being used. This latest research project had as its main aims to identify and support the skills that are needed to mediate learning about water management practices in an Eastern Cape

community, and to research the development of a knowledge resource that could be used to develop the capacity of community-based mediators of water knowledge.

#### Report No. KV 326/14

*The South African water history archival repository (SAWHAR) project at North-West University (Vaal) and a historical overview of the Waterlit collection (J Tempelhoff & G Stopforth)*

This report consists of two sections. The first provides an overview of the progress made towards establishing the South African Water History Archival Repository (SAWHAR) at North-West University's Vaal campus in Vanderbijlpark. Details are provided of the organisational structure and lines of communication established with key stakeholders, such as information scientists at the University of South Africa, the National Archives Repository in Pretoria and the WRC. The history of the so-called Waterlit Collection, which forms a seminal part of the SAWHAR project, is discussed in the second part of the report.

#### Report No. 1962/1/13

*Implementation of the rule-based agent for Microcystis in Rietvlei Dam (S Barnard, CE van Ginkel, LZ Coetzee & S Booyens)*

In the hypertrophic Rietvlei Dam, in Pretoria, long distance circulators are used as an advanced treatment option. The application of these circulators is based on the principle of habitat disturbance by means of continuously circulating the dam's epilimnion where maximum algal

growth takes place. This project tested the robustness of an early warning/prediction tool, CEGAP, in case of advanced water treatment procedures. The main aim of this study was to use data collected prior to, as well as after the deployment of the circulators to implement the model and assess its applicability and robustness as an early warning/prediction tool for algal blooms.

#### Report No. 2037/1/13

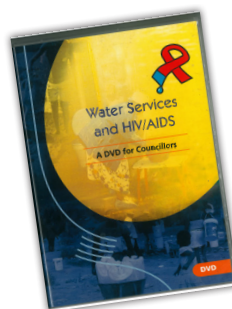
*Hyperspectral remote sensing to detect biotic and abiotic stress in water hyacinth (Eichhornia Crassipes) (SW Newete, BFN Erasmys & MJ Byrne)*

Water hyacinth is the most notorious aquatic weed in the world. South Africa has released seven biocontrol agents against water hyacinth since 1974, none of which have achieved a satisfactory result to reduce the scourge. As a result, water hyacinth control in the country has shifted to integrated management, which combines the application of herbicides with biological control methods. However, this requires regular monitoring of the weed's physiological status in relation to the habitat, in order to facilitate the decision when to intervene and what intervention measures are appropriate and timely. Remote sensing of vegetation reflectance has the potential to be that monitoring tool.

#### Report No. 2085/1/14

*Wastewater treatment plants: The financing mechanisms associated with achieving Green Drop rating (SA Mitchell, MP de Wit, JN Blignaut & D Crookes)*

### Multimedia products available from the WRC



In addition to its paper-based reports, the Water Research Commission has various multimedia resources available to the public.

One of the most popular multimedia products is the *mini-SASS guideline video*. This DVD explains the miniSASS method and tools to assess river health as well as how this tool can be used to create awareness of river health in South African communities. Also popular is *Water from Stone:*

*Groundwater in South Africa*. This DVD, featuring former 50:50 television new presenter, Erald Felix, takes viewers to varied landscapes around South Africa to explore groundwater-dependent ecosystems.

There are also two DVDs focused on local government. The first, *Blue Horizons: Local government and water resource management*, introduces key water resource challenges facing local government, followed by examples of good practice and innovative solutions by local government in South Africa today. The second DVD, *Water Services and HIV/AIDS: A DVD for councillors*, aims to raise awareness of the central role that municipal services delivery plays in managing the impact of HIV/AIDS. It features home-based care workers in Jeppe's Reef, Mpumalanga. This DVD is designed for use in training environments, as a discussion aid, as well as for general awareness raising.

All of these DVDs can be ordered free of charge from the Publications Office.



The objectives of this project were to determine challenges and their contribution to the cumulative risk rating that various categories of wastewater treatment works are facing, to determine what the financial cost implications are for improving the performance of wastewater treatment works, to determine the

high-level environmental, health and economic implications of not improving the performance of wastewater treatment works and lastly, to determine a pricing and financing mechanism towards improving the performance and cumulative risk rating of wastewater treatment works.

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



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