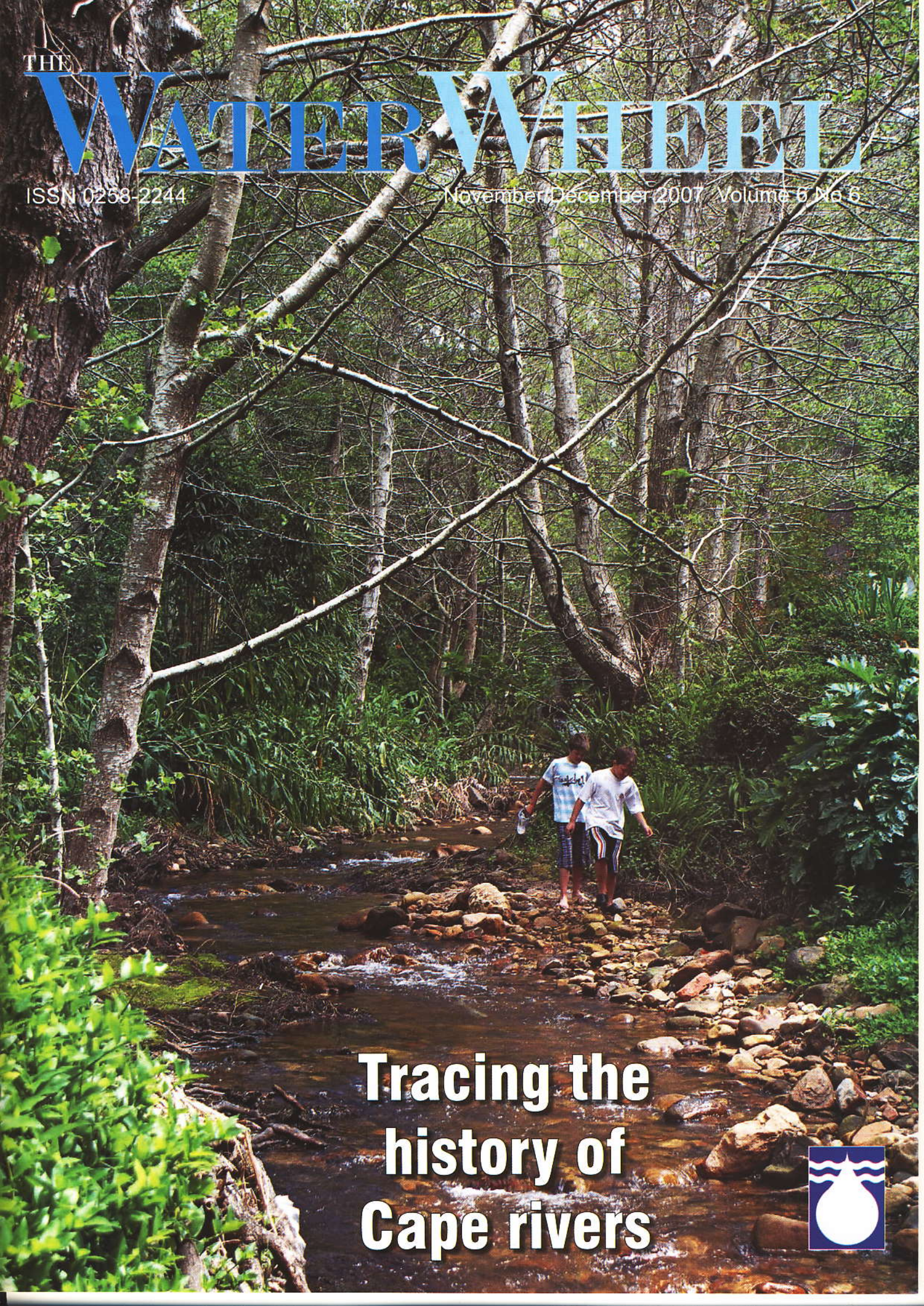
THE WATER WHEEL

ISSN 0258-2244 November/December 2007 Volume 6 No 6

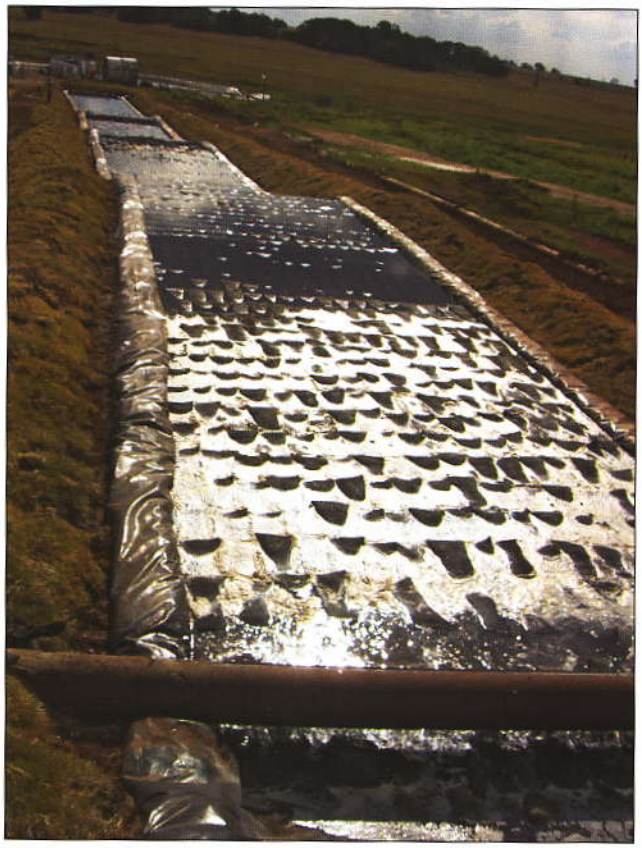


Tracing the history of Cape rivers

Mine-water clean-up goes organic

A locally-developed organic technology is offering a solution to South Africa's enormous polluted mine-water challenge.

SupaZorb, a patented natural, organic hydrocarbon and chemical absorbent, was originally developed to remediate oil spills. Mixed from Casuarina needles and pine bark, the material is now proving its efficiency in the removal of heavy metals and salts from acid mine drainage. This is achieved through ion exchange, microbiological metabolism and organic reactions.



Traditional mine-water cleaning methods use chemicals which, in addition to being expensive, could be hazardous to the environment. "SupaZorb is the only non-chemical treatment of AMD in the world," reports Dr Olaf Pollmann of the School of Science & Development and North West University, who has been researching the product. "It uses no chemical ingredients – only those processes provided by nature."

A series of steps are used to clean the polluted mine-water. First, the organic material intended to clean the water is moistened to open the plant cells in preparation for the process. After a few days the mine-water is run through the different bags filled with bark and needles. The precipitation is then visible on top of the bags.

Following successful laboratory tests, the product has been tested in field conditions using polluted mine-water from a Randfontein gold mine. A test bed of cascades filled with different materials was used. The first cascade was filled with SupaZorb, the second with pine bark only and the third with Casuarina only – both mixed with sand by 50% of weight. Finally, the water passed cascade of dolomite.

The SupaZorb has proven to be most efficient, reports Dr Pollmann. The first phase, which saw the treatment of 6 000 m^3/day of water indicated a saving of more than 60% on the amount and cost of chemicals traditionally used to clean the water. The pH of the water was raised from 2.8 to 7.8 while more than 90% of the heavy metals were removed.

At the time of writing, plans were being finalised to use the treated water to irrigate 20 ha of lucerne. Dr Pollmann reports that, following the positive results achieved during field trials, there has been an increase of interest in the use of this product for AMD treatment.

'Greener' water plant for chemical firm

Chemical manufacture company Chemical Initiatives is completing a new water treatment plant at its Amanzimtoti site, in KwaZulu-Natal.

The demineralisation plant, designed and constructed by VWS Envig, replaces the existing 25-year-old treatment facility, which serves in the manufacture of sulphuric acid. According to VWS Envig project manager: Engineered Systems Gareth Kearns, one of the main requirements of the new plant is to minimise the impact on the environment. "The existing plant with its aged technology is producing 200 m^3 of effluent a day. The new plant, comprising new technology and advanced processes, will cut that amount dramatically to a mere 40 m^3/day, yielding both environmental and cost benefits."

The plant will be completed before the end of the year. "The new water treatment plant will have a capacity of 32 m^3/hour of high-quality water for use in several processes, but mainly as boiler feed water," explained Kearns. "The water will undergo sand filtration to remove solids, carbon filtration to remove organic particles, and degasifying to remove carbon dioxide. The water will also flow through cation and anion removal vessels."

Part of the plant will be pre-assembled at the contractor's factory in Isando, Gauteng, however, the majority of the construction and installation will take place on-site. A raw water tank is also being supplied.

"As part of the commissioning process, we will be training operators in both plant operation and maintenance aspects. Once the new plant is ready, Chemical Initiatives will literally change over from the old plant to the new, thus ensuring no downtime," concluded Kearns.