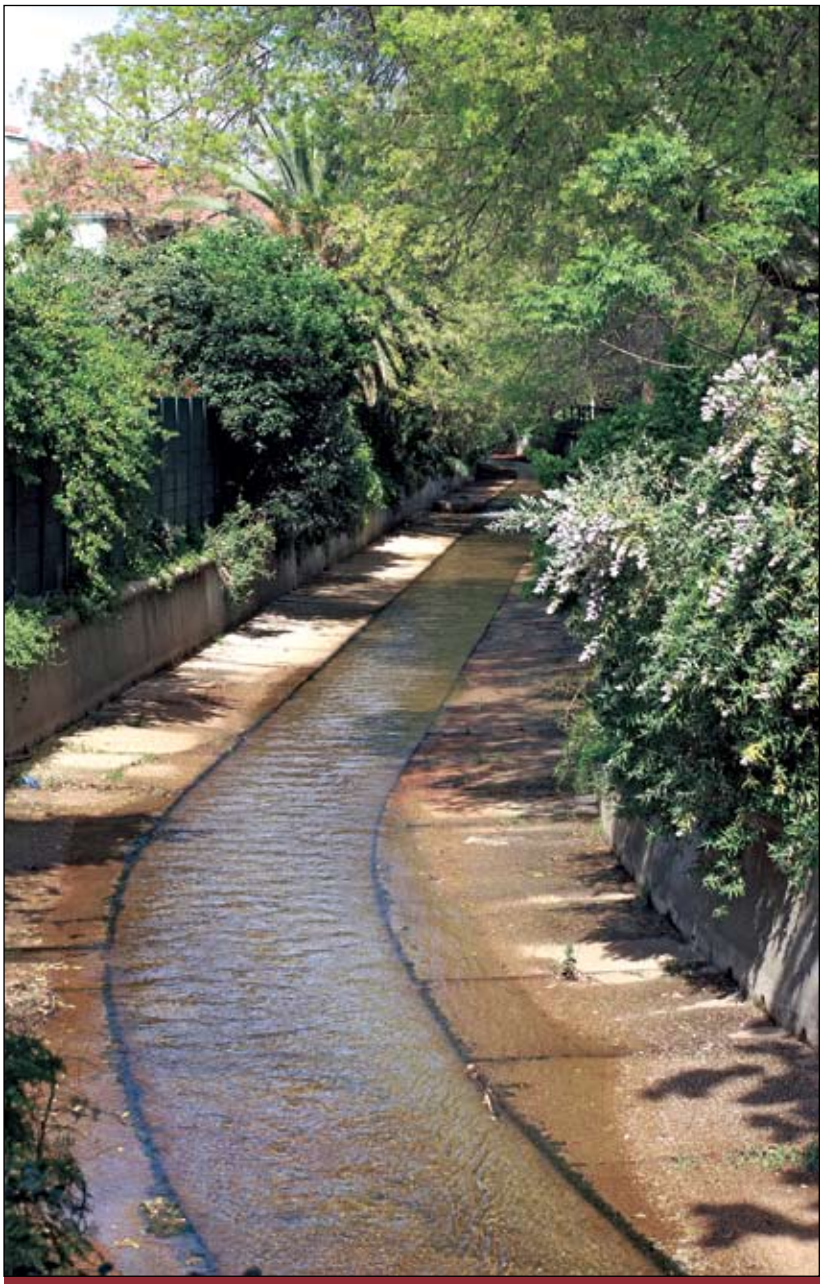
Tracing Van Riebeeck's Footsteps



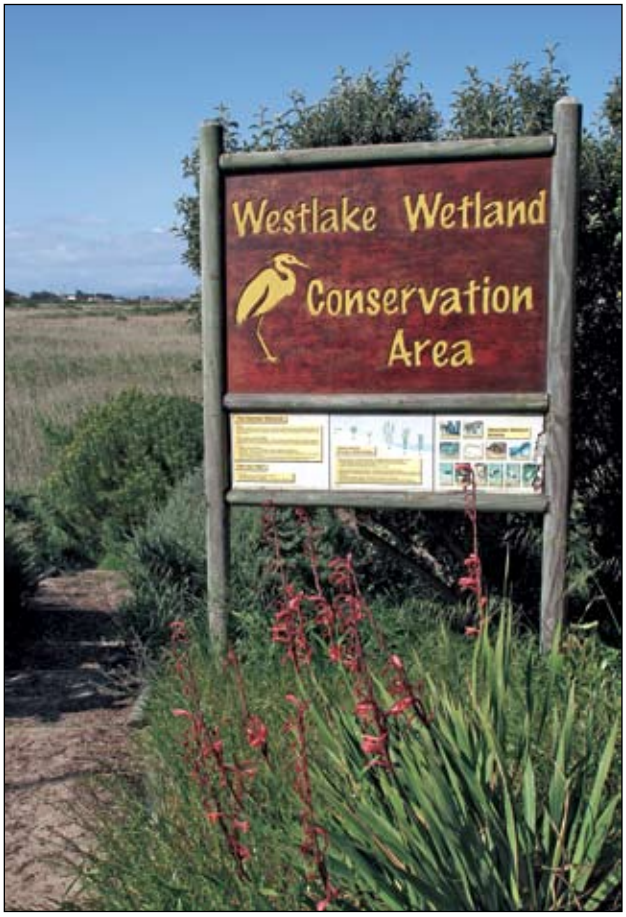
Jan van Riebeeck called the Liesbeek River "the loveliest of fresh rivers" on discovering it on 28 April 1652, and later allocated farmland along its banks to the first free citizens of the Cape settlement. Today some 40% of the river is canalised, but the upper reaches flowing through Bishopscourt are natural havens from the city bustle.

A WRC-funded project on the history of Cape Town's river systems is providing insight that could help guide their future management. Sue Matthews reports.

Some of Cape Town's rivers are in a sorry state, but efforts to rehabilitate them are hampered by the fact that they have been changed so much from their pre-disturbance condition. In the years since Jan van Riebeeck arrived at the Cape, the water in these rivers has been used for drinking, cooking, irrigation, washing and carrying away sewage and other waste, while their courses have been re-directed, excavated, cased in concrete and silted up with eroded sediment.

The Water Research Commission (WRC) funded project into the history of Cape Town's river systems – aimed at using hindsight to guide the management of urban river systems in South Africa – is documenting these human interventions, drawing on a wealth of information in the libraries of the Cape Town City Council, the State Archives and the University of Cape Town. "We are also looking at the inevitable mistakes that have been made, to see what lessons we can learn from them," explains project leader Dr Cate Brown, of Southern Waters.

At the end of the project the findings will be published as a book containing chapters on the 13 major river and vlei catchments in the area. Much of the historical information for these aquatic systems was gleaned from an unpublished account of the



The Westlake wetlands bordering the vlei form part of the Greater Zandvlei Estuary Nature Reserve. A local community group, the Zandvlei Trust, regularly clears invasive alien vegetation from the wetlands, and has planted an indigenous 'pavement garden' on the wetland edge to draw attention to this biodiversity jewel.

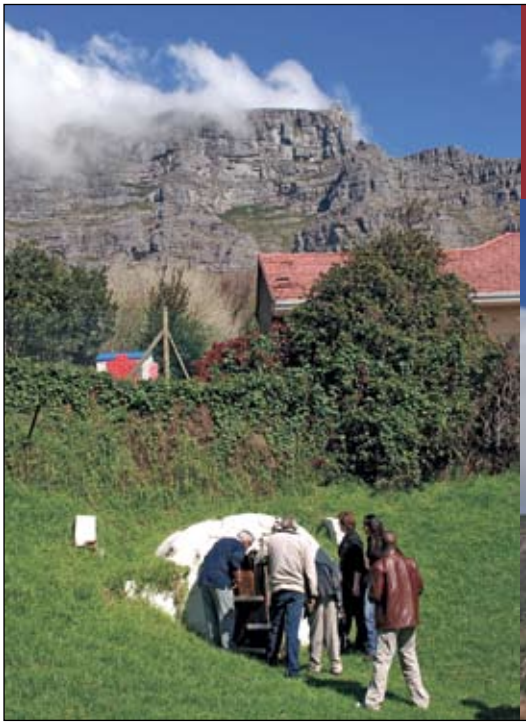
history of Cape Town from an engineering perspective, written by Tony Murray, a retired city council engineer. "We were fortunate that Tony was happy to come on board and incorporate his work, which gave us the basis from which to start," says Dr Brown. "We have now completed a draft version of this 'illustrated history' and will be distributing it to the various Friends groups, asking them to share their knowledge and contribute anecdotal information, photos, and so forth."

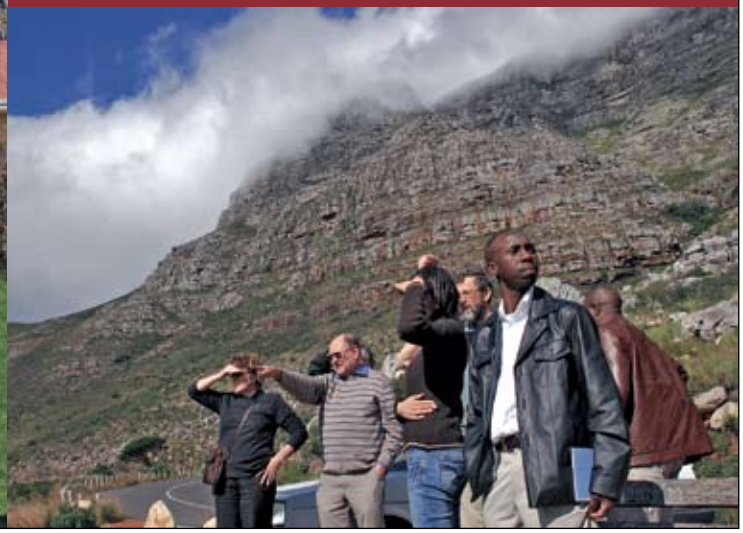
The penultimate chapter of the book will cover the costs and benefits of management interventions on rivers, the aim being to assess whether these were worthwhile from an economic perspective. The cost-benefit analysis will focus on two or three rivers as case studies, and take into account values relating to health, harvested resources, recreational use, aesthetic appeal, and ecosystem services such as water storage, water purification and flood attenuation.

"Cape Town's rivers and wetlands were originally shaped by forces that had nothing to do with humans."

Of course, Cape Town's rivers and wetlands were originally shaped by forces that had nothing to do with humans, so the book begins with background information about the area's geology and geomorphological history, and the effect of long-term climate change and sea level oscillations, dating back to 250 million years ago. For example, the low-lying Cape Flats would at one time have been covered with numerous inter-connected shallow vleis, which probably dried up during the dry season. But with the last emergence from the sea, changes in topography altered the drainage, and wind-blown sand filled up many of the depressions, isolating the remaining waterbodies. Most of these have since disappeared, sucked dry by the water-thirsty invasive acacias, Port Jackson and Rooikrans – introduced in the mid 1800s to stabilise the Cape Flats' driftsands – or filled in and built over for urban expansion. Those that remain have been heavily modified.

The earliest inhabitants of the Cape – the San and Khoikhoi people – had little impact on the area's rivers and





The project team and steering committee view the city centre from the slopes of Table Mountain – the source of countless streams and springs – and extraction chambers built in the mid-1800s to exploit springs on the farm Oranjezicht.

vleis. They lived in harmony with their surroundings, visiting each summer to graze their animals, hunt wild game and harvest edible plants in Table Valley. It was only after Jan van Riebeeck arrived in 1652 to establish a provision station for the Dutch East India Company that the aquatic environment began suffering at human hands.

The British took permanent occupation in 1806, gaining full control in 1813, when the Cape became a colony of the British Empire. By 1880 sanitation problems, water shortages and flooding from stormwater had reached a dire state. So in 1894 construction commenced on Woodhead reservoir – the first of five dams on Table Mountain – and a viable sewerage system was finally implemented between 1897 and 1903. The first phase of a stormwater scheme was completed by 1899, but had to be amended as land was reclaimed

One of the historical reservoirs on Table Mountain

Courtesy NLSA

for the construction of Duncan Dock and development of the Foreshore.

As the city grew, land-use changes meant that natural fynbos and cultivated fields were replaced by buildings, roads and other hardened surfaces, reducing the ability of soils to absorb rainwater. The resulting increased runoff turned gentle rivers into raging torrents, in some cases causing bank and bed erosion.

The 'engineering solution' was to canalise the rivers to whisk the water away more efficiently. And where the rivers once drained into seasonal wetlands, the lower reaches are today confined in concrete canals or earth channels dug by bulldozers. Due to the flat topography of these areas, though, the gradient is insufficient to generate flows needed to 'flush' the systems of poor quality water, while silt constantly settles out, reducing channel depth and providing a substrate for plants that thrive in these nutrient-enriched environments.

Invasive alien weeds like water hyacinth and parrot's feather now form such dense infestations that they clog the channels and obstruct the flow of stormwater, necessitating annual 'river maintenance' – which is expensive and often ecologically destructive – before the onset of winter rains.

The water quality problems in most of Cape Town's aquatic systems are largely due to polluted stormwater, often contaminated with faecal matter from informal settlements, leaking pipelines and septic tanks, and pump malfunctions. However, five systems – the Black, Mosselbank, Diep, Kuils and Eerste Rivers – receive effluent discharges directly from one or more of the city's 21 wastewater treatment works. In fact, the summer flow in some of these rivers is 100% treated effluent.

While there is growing awareness of the important role river corridors play in linking fragments of remaining habitat, restoration projects are typically done on a site-specific basis – some conducted as mitigation measures for new developments, and others taken on by local community groups keen to make a difference in their own 'back yard'. "We are highlighting the value of these small projects," says Dr Brown. "Individually they might not do much for biodiversity conservation, flood attenuation and water purification, but their collective impact could be significant".

Higher in the catchment, restoration of the Prinskasteel River is being conducted as a Working for Wetlands project. Gabions have been built to arrest erosion that was resulting in loss of wetland habitat.

Zandvlei, on the False Bay coast, has been extensively modified over the last 150 years, particularly with the construction of Marina da Gama during the 1970s. The vlei is a popular recreational site, used for sailing, canoeing, fishing and birdwatching.

The book concludes with a chapter entitled 'Looking to the future', offering some practical suggestions for improving river and wetland functioning while dealing with the challenges of flooding and waste disposal. A line in its introduction, however, cautions against high expectations: "In a nutshell, much has been done, more needs to be done, and it's easier said than done."