



Imilambo

Issue 1: June 2005

"Rivers... the bearers of life"

Newsletter of the Western Cape River Health Programme

Contents

The RHP: How it all began.....	1
Partners to the WC RHP.....	1
What are River Health Indices.....	2
RHP monitoring in the WC	3
Implementing the RHP in the Outeniqua Nature Reserve.....	4
WC RHP products	5
Building river health capacity.....	6
Assessing water quality in the Eerste River.....	7
Back page information.....	8

The River Health Programme: How it all began

The Department of Water Affairs and Forestry (DWAF) initiated the River Health Programme just over a decade ago in 1994. The overall objective or purpose of this programme being to measure, assess and report on the ecological state of rivers in South Africa.

Although the RHP is a national initiative, implementation in each of South Africa's provinces is co-ordinated at a provincial level where collaboration between a variety of organisations plays a vital role. Each province therefore has a network of implementers who work together under the leadership of a Provincial Champion.

Partners of the Western Cape River Health Programme

The success of the implementation of the River Health Programme is mostly thanks to the very strong partnerships that have been formed in the province. Key partners are DWAF, CapeNature, City of Cape Town and CSIR. Other partners are SANParks, University of Cape Town, University of Stellenbosch, University of the Western Cape, as well as private service providers.

DWAF

The provincial champion of the River Health Programme for the province is Toni Belcher. She is also in charge of RHP activities in the Olifants/Doring Water Management Area (WMA). Other members of the river health team within DWAF are Gareth McConkey who manages the partnership with CapeNature and Tovho Ndiitwani who is in charge of RHP activities within the Berg WMA.



Toni Belcher



Gareth McConkey



Tovho Ndiitwani

CapeNature

The CapeNature River Conservation Unit (RCU) consists of six people. The team is divided into two teams to spread their expertise across the Western Province. Dean Impson, Chantel Petersen and Earl Herdien are based in Jonkershoek, Stellenbosch, while Wietsche Roets, Siyabonga Buthelezi and Dr Cecile Reed are based in George, Southern Cape. The George team is in charge of RHP activities in the Gouritz WMA while the Jonkerhoek team deal with the Breede WMA.



Chantel Petersen



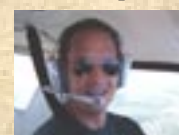
Cecile Reed



Dean Impson



Earl Herdien



Wietsche Roets



Siyabonga Buthelezi



Partners of the Western Cape RHP (cont.)

City of Cape Town

The City contributes towards the RHP data collected within the greater Cape Town area. They have also assisted with most of the State of River assessments for the province. The team consists of Candice Haskins, Robert Siebritz and Dr Dirk van Driel.



Candice Haskins



Robert Siebritz



Dirk van Driel



Joy Leaner



Estie Eloff



Wilma Strydom

CSIR

Dr Joy Leaner and Estie Eloff from the Stellenbosch office of the CSIR, as well as Wilma Strydom of the CSIR in Pretoria have provided invaluable support in the production of materials for the programme.



Ian Russel



Ruth-Mary Fisher

SANParks

Dr Ian Russell and Ruth-Mary Fisher from SANParks Scientific Division at Rondevlei, Sedgefield assist with the Garden Route RHP.

What are River Health Indices?

For practical purposes the RHP uses a series of ecological indicator groups that are representative of the larger ecosystem and are feasible to measure. Seasonal SASS5 assessments are conducted. The other indices are conducted annually or at longer intervals.

Index of Habitat Integrity (IHI) – The availability and diversity of habitats dictate the kinds of biota found. Knowledge of habitat quality is important in an overall assessment of ecosystem health. The IHI assesses the impact of disturbances such as water abstraction, flow regulation and river channel modification on the riparian zone and instream habitats.



Geomorphological Index (GI) – Geomorphological processes determine the size and shape of river channels, which in turn define the types of habitat available. The GI reflects the condition and stability of the river channel. Channel condition is based on the channel impacts (e.g. bridges, dams) and the type of channel (e.g. bedrock or alluvial). Channel stability is based on the erosion potential of the banks and bed.



Riparian Vegetation Index (RVI) – Healthy riparian zones help to maintain the form of the river channel and serve as filters for river sediment, nutrients and light. The RVI is a measure of the degree of modification of the riparian zone from its natural state.

South African Scoring System (SASS) – Aquatic invertebrates require specific habitat and water quality conditions for at least part of their life cycle. Changes in invertebrate communities structure and composition reflect recent and localised changes in river conditions. SASS is a relatively simple index, based on invertebrates families found at a site.

Fish Index (FI) - Fish are good indicators of long term influences on a river and general habitat conditions. The number of fish species (indigenous or alien), the size and the health of the fish are all indicators of river health. The FI is an indication of the degree to which a fish assemblage deviates from its undisturbed condition. The FI has been adapted for the Western Cape to make it applicable to rivers which have low fish diversities.



Overview of current monitoring in the Western Cape Province

The Western Cape Province boasts four major catchment areas. Monitoring programmes are currently underway in all four of these catchments as well as in other parts of the province. Out of the total of \pm 524 sites, approximately 344 sites are currently active.



The beautiful Hoogekraal River

Garden Route RHP – Collaboration between SANParks and CapeNature RCU

The Garden Route RHP has been a very successful venture between South African National Parks and the CapeNature. Biomonitoring of these rivers was initiated at the beginning of 2004. Currently 23 sites on 10 rivers between Wilderness and Natures Valley are being monitored seasonally with the aim of producing a technical report by the end of 2005 and a SoR report in 2006.

Goukou and Duiwenhoks River Systems

The Goukou and Duiwenhoks River Systems both originate from two major tributaries on the southern slopes of the Langeberge, above the towns of Riversdale and Heidelberg respectively. A collaboration between CapeNature staff in Riversdale and Stilbaai (Rhett Hiseman and Jean Du Plessis), nearby Private Nature Reserve Staff (Stiaan Conradie) and the RCU resulted in the initiation of a successful monitoring programme in 2004/5. The results from this study will be included in a technical report by the end of 2005 and subsequently included in the Garden Route SoR report.



The Goukou River upstream of the estuary

Gourits River System

Thirty sites are currently being monitored throughout the Gourits catchment. The Gourits River system originates from three major tributaries in the southern Cape and drains one of the most unique and biologically diverse catchments in the world. To the north of the Outeniqua Mountains, the Olifants, Gamka and Touws tributaries drain through the “Central Little Karoo”. After the confluence of these major tributaries, the Gourits River flows south towards the ocean at Gourits Mond.



The Groot tributary of the Gouritz in Meiringspoort



The Nuwejaars River before (above) and after (below) the April 2005 floods



Aerial view of “Die Poort” in the Gouritz River (source: Arne Purves)

Overberg

Twenty-seven biomonitoring sites are currently being monitored in the Overberg. These rivers lie between Botrivier in the west and the Nuwejaarsrivier in the east. The results from the Overberg monitoring programme will be produced in a technical report in September 2005 and subsequently be presented within a SoR report during 2006.





The Groot River, a tributary of the Doring River, at De Mond



The Silvermine River on the Cape Peninsula



The upper reaches of the Berg River

Olifants/Doring River System

Currently more than 40 sites are being monitored seasonally throughout the Olifants/Doring catchment area. The results from this study will be produced in a technical report and SoR report by the end of 2005.

Sandveld Rivers

The three rivers draining the Sandveld are the Verlorevlei, Langvlei and Jakkalsvlei. These rivers flow seasonally into Verlorevlei (Ramsar site), Wadrif wetland and pan and Jakkalsvlei pan. Assessment of these rivers will be included in the SoR assessment of the Olifants/Doring system.

The Greater Cape Town Rivers

A SoR report has just been completed based on river health assessments at more than 50 sites on rivers from the Modder River on the west coast to the Steenbras River on the south coast. The sites in these rivers will be rationalised and continue to be monitored seasonally.

The Berg River System

The Berg River is currently being monitored to determine an understanding of its state prior to the construction of a large instream dam in the upper reaches of the river. During 2003 and 2004, in conjunction with this monitoring, a SoR assessment was undertaken for the system. Monitoring of the system is continuing on a seasonal basis.

Implementing the RHP in the Outeniqua Nature Reserve

The Outeniqua Nature Reserve in the southern Cape comprises about 37 528ha of mostly Mountain Fynbos and includes almost the entire coastal catchment area that supplies water to the Garden Route towns from Mossel Bay to Plettenberg Bay. An area notoriously known for its tremendous rate of development. The Outeniqua Nature Reserve thus conserves some of the most important catchment areas for water supply in the southern Cape.



Pristine mountain streams in the Outeniqua Nature Reserve

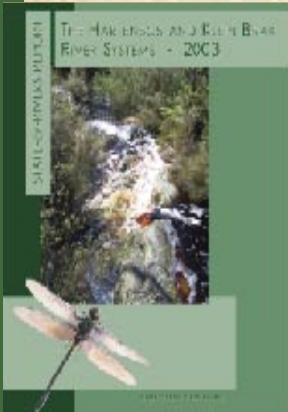
It was decided to adopt the methods and indices used in the RHP to monitor the health of rivers emanating from this protected area. Monitoring sites were selected on 10 rivers throughout the reserve as well as where they flowed out of its boundaries. These sites are monitored seasonally using SASS5 and IHAS. Water quality samples are also collected seasonally and analysed in collaboration with the George Municipality. As expected, results indicated that most sites within the reserve were pristine and could be considered as reference sites for the area, while most sites outside the reserve were severely impacted.

The data obtained to date has formed the basis for a long term monitoring program in this important water catchment area and will form an integral part of any aquatic management decisions taken in future. Furthermore, the data could contribute to future decisions being taken regarding the availability of water for prospective developments within this entire region.



State-of-Rivers Reports

State of River (SoR) reporting describes the present state and trends in the rivers condition, the driving forces and pressures on the river, and the policies and management actions in place to manage the river. Several SoR reports and posters have been produced, in collaboration with the CSIR, since the implementation of the RHP in the province.



Hartenbos and Kleinbrak River Systems - 2003. The first State of Rivers Report in the Western Cape produced in 2003 was based on river health assessments in the Hartenbos and Kleinbrak Rivers in the Southern Cape. The assessment was carried out in 2001 and 2002 and looked at instream and riparian habitat, riparian vegetation, water quality, fish and macro-invertebrates. The indices and protocols for the RHP was generally followed, but in some cases needed to be adapted for Western Cape conditions.



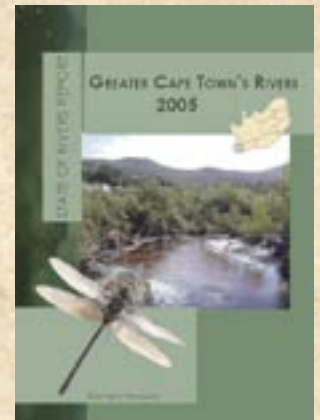
The Diep, Hout Bay, Lourens and Palmiet Rivers - 2003. The Diep, Hout Bay, Lourens and Palmiet SoR report was the second to be produced and was published at the end of 2003. These rivers represent a wide range of river types in the Cape Town area.

- The Lourens River, although degraded in areas is the only SA River that is declared a Protected Natural Environment.
- The Hout Bay Rivers entire upper catchment is situated in the Cape Peninsula National Park, while the lower reaches flow through residential areas.
- The Diep River differs ecologically from the others as a result of different morphology, vegetation and climate characteristics, and flows partially through the Rietvlei Wetland Reserve, which is also a protected Natural environment.
- The Palmiet River has intensive agricultural development in its upper catchment, but is protected downstream, where it flows through the Koegelberg Biosphere Reserve.



The Berg River System - 2004. This third SoR report covers the state of the Berg River and its tributaries.

The Greater Cape Town's Rivers - 2005. This latest SoR report for the Western Cape was initiated as a result of high level concerns over the state of rivers draining the greater Cape Town area. This report has a particular focus on the water quality impacts on river health and how that impacts on the social use of rivers.



The Berg and Greater Cape Town's Rivers posters - 2005. An english and afrikaans poster were produced in support of the Berg River System SoR, while an english and xhosa poster were produced to support the Greater Cape Town's rivers SoR.



Rapid assessments

The RHP team have conducted several rapid assessments of highly stressed rivers in the Western Province. These assessments were conducted for the Duiwenhoks River near Heidelberg, the Goukou River near Riversdale and the Keurbooms and Bitou Rivers near Plettenberg Bay.



Building river health capacity

SASS5 training for CapeNature Staff

The RHP indices have been adopted by CapeNature as the standard tool for aquatic biomonitoring in their nature reserves. The RCU together with staff from DWAF have successfully presented several SASS5 training courses to CapeNature Field Rangers. Most recently, training sessions were held at Jonkershoek and Limietberg Nature Reserves.

The training was aimed at enabling field rangers to carry out river monitoring within the reserves and to identify whether water quality impacts are occurring. This is in line with “Back to Basic Monitoring” within the reserves. Monitoring of sites on the reserves are important because they serve as reference, control or benchmark sites for comparison with the impacted sites or monitoring sites.

Environmental Education: Teaching school groups about rivers

The RCU in Jonkershoek have been involved in environmental education. Last year, “World Monitoring Day” was celebrated with learners from Khayamandi Primary School. These kiddies and their teacher experienced a beautiful pristine river for the first time, as opposed to the severely polluted Plankenbrug River in Khayamandi. Everyone had an enjoyable time and, afterwards, nobody wanted to go back to school!

The RCU in George have, for the past two years, been involved with grade 5 & 6 learners from the Outeniqua Primary and Holy Cross Schools, taking them on short hikes and SASS assessments in the Outeniqua Nature Reserve. They have also conducted similar excursions to schools in Oudshoorn (Van Rheede and Wes-Bank Primary), teaching the kiddies about water and gogga’s in their local rivers.



SASS5 Training and Accreditation

By Siyabonga Buthelezi

The River Health Team together with CapeNature, SANParks and Overstrand Municipality employees, and students from PE Technikon (now Nelson Mandela Metropolitan University) attended a three-day SASS5 training/accreditation workshop (17 - 19 August 2004). The workshop was held at SANParks’ Ebb and Flow accommodation centre (Wilderness National Park) and was attended by more than 10 persons.

Experts presenting were:

Dr. Brian Allanson (Private/Consultant) introduced SASS5 and gave a brief introduction to freshwater ecology;

Ms. Toni Belcher (RHP Provincial Champion/DWAF, Western Cape) introduced the different invertebrates;

Ms. Tovho Ndiitwani (DWAF, Western Cape Province) presented the sampling techniques; and

Mr. Mark Graham (Umgeni Water Board) helped with the practical component and proficiency testing.

Attendees were not only impressed by the high standard of the workshop and exuberance by which it was given, but also by beautiful rivers coupled with stunning scenery and majestic mountains that the Garden Route boasts.



Where’s the megalop?



This is how high you must jump!



Assessing water quality impacts on the Eerste River

Chantel Petersen

Introduction: The Eerste River is a typical urban river that has been physically and biologically modified due to human disturbance. This has caused a growing concern about the deterioration in water quality. The tributaries of the Eerste River also contribute to the deteriorating water quality of which the Kuils (major tributary, lower river) and the Plankenbrug rivers are the main contributors. Both these rivers drain urban and low cost residential areas.

The river has been classified into different physical zones from its source to estuary, that includes a headwater zone, mountain stream zone, foothill zone and a lowland zone. The study area includes the upper river (mountain stream and foothill zone), which forms the section dominated by a cobble substrate. Nine sites were selected to specifically illustrate the variation in water quality due to impacts along the Eerste River and assessed monthly.



Unimpacted Jonkershoek stream

Human impacts: The upper river reaches are protected from human impact as it is located within the Jonkershoek Nature Reserve, which serves as a reference site. The riparian vegetation is indigenous although further downstream the river flows through a Forest Reserve with plantations of *Pinus radiata* and the Kleinplaas Dam (with the trout cage farming) also occurs here. The Interbasin Transfer (IBT) further impacts the water quality during summer months.

The sites located below the Nature Reserve are affected mostly by farming practices. The indigenous vegetation was replaced by exotic species and in certain areas no riparian zone is present as the land is cultivated up to the riverbanks. Over-abstraction also occurs reducing the base flows, which is supplemented by the IBT. Stellenbosch impacts on the river through storm water runoff and the discharge of sewage and wine effluents. Numerous weirs also occur along the river.



The polluted Plankenbrug tributary of the Eerste River



A canalised section of the Eerste River

Results and conclusions: The results obtained thus far show the same trends. The reference site and the less impacted sites have the higher SASS5 scores and Average Score Per Taxon, which indicates good habitat and water quality. The weirs have a very localised effect on the invertebrates as they alter the habitats. Slower flowing water causes sediment/silt to settle between the spaces and on the cobbles so that only invertebrates tolerant of these conditions are found. The sites located below the Veldwagters and the Plankenbrug confluences show the lowest scores and there is no recovery below these sites.

Another problem which occurs is habitat destruction. Riparian landowners often bulldoze the riverbed and banks to alter the flow or create wider channels to slow the water flow. These activities completely change the substrate type, e.g. from cobbles to sand, with little or no chance of recovery.



Contact Information :

Department of Water Affairs and Forestry
Western Cape Region
Private Bag X16
Sanlamhof
7532
Tel: 021 950 7100

CSIR
Environmentek
P.O. Box 320
Stellenbosch
7599
Tel: 021 888 2553

Scientific Services: River Conservation Unit
Western Cape Nature Conservation Board
Private Bag X5014
Stellenbosch
7599
Tel: 021 866 8022

City of Cape Town
Scientific Services Department
P. O Box 16548
Vlaeberg
8018
Tel: 021 684 1000

Cape Nature George
Private Bag X6546
George
6530
Tel: 044 801 5329

SASS equipment:
Southern Waters
Tel: 021 465 1335

Water test kits:
Somerset Education
Tel: 0422 43 2030

Useful Websites

River Health Programme: www.csir.co.za/rhp
CSIR: www.csir.co.za
DWAF: www.dwaf.gov.za
DEAT: www.environment.gov.za
SANParks: www.sanparks.org
CapeNature: www.capenature.co.za



Last, but not least

"...I was looking at a river bed. And the story it told of a river that flowed made me sad to think that it was dead..."

From the song, A horse with no name
by Dewey Bunnell.



Imilambo compiled by: Toni Belcher(belchea@dwaf.gov.za) and Cecile Reed (aquatics@pgwc.gov.za). Comment on this issue are welcome.