

ANCHORING THE RIVER HEALTH PROGRAMME IN SOUTH AFRICA

The River Health Programme (RHP) has come a long way since inception. It has now entered the anchoring phase where the concept of adoption and implementation of the programme in the provinces must be embraced. The Anchoring Phase is intended to help the RHP in progressing from a focus on scientific development to becoming a fully incorporated operation of water management institutions. Hence the need to shift from what to do (product development) to how to do it (process development).

History of the RHP to date

The Department of Water Affairs and Forestry (DWAF) initiated the formal design of the River Health Programme (RHP) in 1994. The main purpose was that the programme should serve as a source of information regarding the overall ecological status of river ecosystems in South Africa. For this reason, the RHP primarily makes use of in-stream and riparian biological communities (e.g. fish, invertebrates, vegetation) to characterise the response of the aquatic environment to multiple disturbances. The rationale is that the integrity or health of the biota inhabiting the river ecosystems provides a direct and integrated measure of the health of the river as a whole.

A phased approach was adopted for the design of the monitoring programme, to facilitate:

- **Formulation of a design framework (1994-1995):** A needs analysis was done involving local resource managers and scientists as well as international benchmarking. This exercise resulted in the setting of programme objectives as well as the scope and specifications for guiding the rest of the design phases.
- **Conceptual development of the programme within the design framework (1995-1996):** This phase dealt with selecting and/or developing technical protocols, including: for selecting monitoring and reference sites; for selecting and using ecological indices for measuring the health of river ecosystems; and for storage, management and transfer of information. In order to ensure a critical level of organisational

participation and capacity, a model of shared ownership was pursued. As a result, the Department of Environmental Affairs and Tourism (DEAT) and the Water Research Commission became, together with the DWAF, joint custodians of the programme at a national level. At a provincial and catchment level, Provincial Champions and Provincial Implementation Teams became responsible for implementation initiatives. Provincial implementation initiatives were launched during a consultation planning meeting that was held during September 1996 in Pretoria. This meeting was attended by the RHP custodians and representatives from provincial government, conservation agencies, organisations such as Rand Water and Umgeni Water and others.

- **Small-scale implementation to test and demonstrate the programme**

(1996-1999): This phase was necessary to:

- allow testing and refinement of components of the RHP;
- allow integration of programme components;
- facilitate the identification of additional developments that may be required;
- demonstrate the worth of the programme; and
- provide broad guidelines to facilitate the eventual implementation and maintenance of the programme.

It was shown that information from the RHP is ideally geared to serve state-of-environment reporting, which was demonstrated in a brochure on the State of the Crocodile River, 1998. The determination of ecological reference conditions as well as the present ecological state also contributes to the process of determining an ecological reserve for rivers.

- **Anchoring the RHP so that it becomes part of "the way we do things around here" (current phase):**

This phase is to ensure that the RHP becomes part of the relevant water management institutions in terms of required expertise, skills and budgets. The overall goal of the Anchoring Phase is to help implementation agencies to go through the different steps of implementing the programme as well as to internalise the programme into their organisations.

This is the seventh issue of the River Health newsletter.

We focus on the anchoring phase of the River Health Programme (RHP), the launch of Mini SASS in KwaZulu Natal (KZN), the Rivers database, Crocodile River surveys, and biomonitoring in Gauteng Province.

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HOW YOU CAN CONTRIBUTE

The success of the River Health Programme depends upon the involvement of as many stakeholders in water resource management as possible. If you or your organisation would like to know more about the programme and how you can become involved, please contact:

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The Anchoring Phase

The RHP is intended for national and long-term application. Therefore, the programme has been tailored in recognition of local capacity and the availability of resources such as funds and manpower. The technical specifications of the programme have been kept as simple as possible to encourage adoption and implementation by a broad range of water management institutions. However, the success of adoption and maintenance of the RHP will largely be determined by the operational effectiveness and efficiency with which the programme can be implemented. For this reason, the focus of attention must now shift from what to do (product development) to how to do it (process development).

During the course of 1999, the RHP National Coordinating Committee (NCC) comprising representatives from DWAF, DEAT, WRC, regional, provincial and sectoral representatives and scientific advisors, did an analysis to identify the key processes that would assist operational implementation of the RHP. The Anchoring Phase (2000/01 to 2002/03) is built around the identified processes.

A key objective of the Anchoring Phase is to increase institutional capacity for implementing the RHP within provinces, water management areas and catchments. To achieve this, potential implementation agencies in each of the provinces will be visited by national "process coordinators" to synchronise objectives and possible milestone activities.

The formal components supported by the anchoring phase as well as the names of process or component coordinators are listed below:

- **A National Coordination Team (NCT)** has been tasked with driving the anchoring phase, specifically, the coordination of national and regional initiatives. The NCT will also be responsible for activities such as business development through funding partnerships as well as the coordination of related R&D initiatives, provincial implementation activities and processes within the anchoring phase. (Dirk Roux: droux@csir.co.za)
- **Provide training opportunities:** In order to build critical levels of expertise and skills, the existing offerings in terms of training courses need to be expanded. Apart from a general course on the principles and concepts used in biomonitoring, courses need to be developed and presented on the technical application of the various indices as well as managerial applications of river health information. (Nomsa Ntshingila: nomsantshingila@hotmail.com)
- **Implement procedures for quality control and assurance:** Dr Rob Palmer (Afridev) has compiled initial guidelines for quality control and assurance in the RHP. These procedures need to be tested, refined and institutionalised through application. This will include standardisation of scientific techniques and monitoring methodologies, and auditing of data assessment and reporting processes. The ultimate aim of this component is to ensure and continually improve quality. It will therefore take place in close liaison with the training component, by identifying areas where training is needed. (Chris Dickens: chris.dickens@umgeni.co.za)



The National Coordinating Team - Wilma Strydom, Liesl Hill, Vassie Maharaj and Dirk Roux

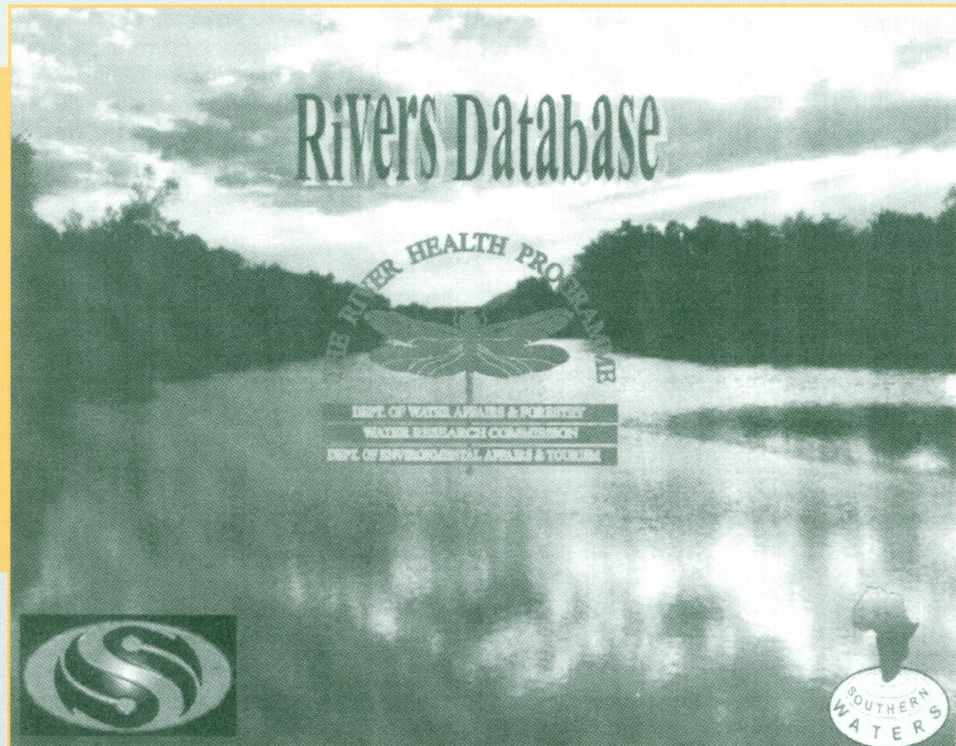
- **Implement procedures for data management:** The Rivers Database (see page 3) has been developed specifically for the RHP. The Rivers Database is a complementary facility to the DWAF's national Water Management System (WMS). The current version of the Rivers Database will primarily be used at local, catchment and provincial levels, where data will be collected, quality checked, captured and used for local reporting and decision-making. From there the data will be transferred to WMS for long-term and secure storage, and for strategic and national use and reporting regarding river health. (Justine Fowler: jfowler@botzoo.uct.ac.za)
- **Implement procedures for information packaging and dissemination:** The final test of the RHP will be the degree to which information resulting from it will become part of the decision-making process in water resources management. In other words, the RHP must become an essential tool in achieving better understanding and management of river ecosystems, and not a programme that conducts monitoring for the sake of monitoring. Reporting formats and dissemination strategies need to be optimised, recognising the variation in target groups (e.g. politicians, resource managers, public at large). This component will make use of both web-based technologies and conventional hard copy reporting. (Anna Ballance: aballance@csir.co.za)
- **Continue and refine communication and awareness creation activities:** This component will build on existing initiatives, for example a grassroots communication and awareness initiative and a quarterly newsletter. Communication is critically important to align the different programme components and to keep the overall programme together and on track. It is also necessary to present the programme to, and obtain feedback from, the user-community and relevant stakeholders. (Vassie Maharaj: vassie@liaison.co.za)

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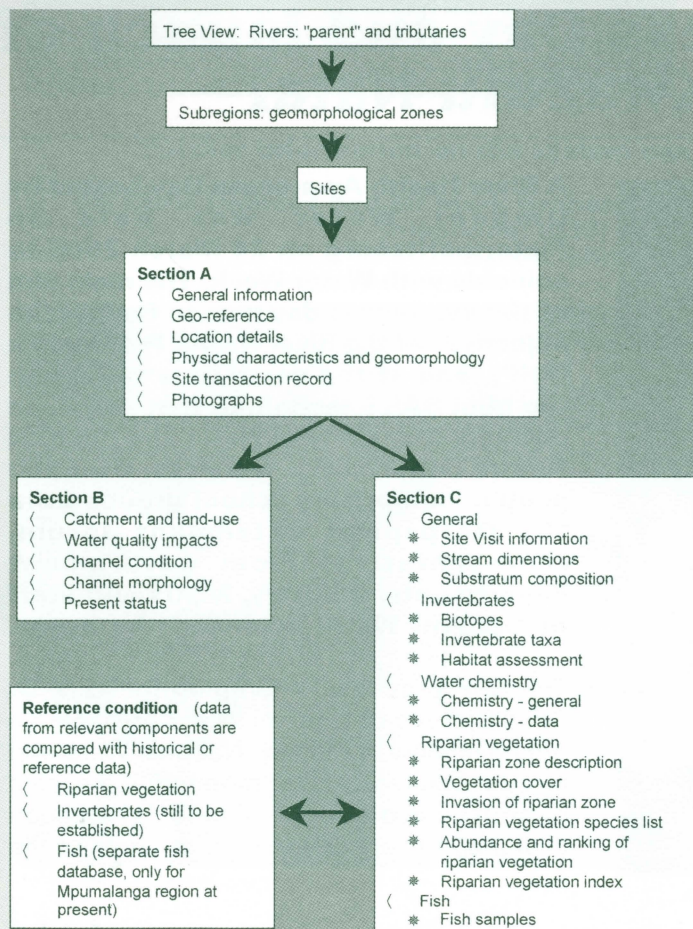
The Rivers Database (Version 1.03)

The Rivers Database was designed specifically for the collation and management of information collected as part of the River Health Programme (RHP). It provides a facility for the storage of information and allows extraction of information via a Query Centre.



The need for a database

The driving force behind the development of the database was the apparent need to develop mechanisms and structures for data storage and management. During the implementation design phase of the RHP, the Rivers Database contributed to the formulation of a standard protocol for the collection of biomonitoring data. Within the last year it has become evident that the development of procedures for the management of such data would contribute significantly to the operational effectiveness of the RHP. Thus, it is anticipated that the Rivers Database will become the primary storage and management mechanism that will be used at regional levels, enabling the transfer of information to the national level.



Structural components of the Rivers Database

The Rivers Database is divided into two broad components:

- A data storage centre where users are allowed to edit and view data
- A Query Centre where users can extract data. The data storage centre has a hierarchical structure, allowing the user to navigate to sites via a system of catchments through to rivers and subregions. The main body is divided into three sections, each of which contains data that are assessed with different frequencies, ranging from basic site information such as location, which is unlikely to change, through to sample specific data which are recorded after every site visit. Information at all levels will be easily accessible to users through the Query Centre.

Users

Any organisation applying the RHP may have access to a copy of the Rivers Database for managing data collected at a regional level. These include both government institutions and private enterprises interested in monitoring the "health" of rivers in a region. Those who would like their data to contribute to the national Rivers Database will need to work through their regional "champion" (details available on RHP website: www.csir.co.za/rhp/) who will be responsible for facilitating and regulating the capture of data at a regional level. For security purposes, all users will need to register with the central body that will manage the Rivers Database at the national level. Once registered, users will be allocated a user name and password. The user will become the "owner" of all data entered and will be the only user able to edit data entered under their user name. Nevertheless, all users will be able to view all data.

Data transfer between a regional and national Rivers Database

During the current Anchoring Phase of the RHP, Southern Waters will function as the central body that will manage the Rivers Database at a national level. Southern Waters will ensure that all data captured at a regional level are transferred and synchronised into a single, national database that will be available to all users via the internet. It is envisaged that the transfer of data at all levels will take place via an FTP site on the internet.

Link between the Rivers Database and the Water Management System (WMS)

Mechanisms of linking the Rivers Database with the WMS will be explored as part of the current phase of the RHP. The WMS is currently being developed by DWAF and will ultimately house all water resource related data.

Data currently housed on the Rivers Database

The Rivers Database currently houses data for Mpumalanga, mostly within the Crocodile, Sabie and Olifant River catchments. This includes data collected as part of the RHP pilot study and historical data (mostly SASS, water chemistry and habitat

characteristics) collected by the Institute for Water Quality Studies (IWQS) since 1993.

Plans currently underway to develop and refine the Rivers Database

As part of the Anchoring Phase of the RHP, the following components of the Rivers Database will be further developed:

- processes for data transfer (regional and national)
- processes for linking to the WMS
- incorporation of components still being refined such as the Riparian Vegetation Index and Fish Assemblage Integrity Index
- a mechanism for data quality control.

The potential for incorporating a Geographical Information System (GIS) interface for navigating to sites will be investigated.

The ultimate aim is to see the Rivers Database up and running in as many provinces as possible. It is only through broad testing and use of the database that improvements may be made such that the RHP ultimately ends up as a sound and efficient mechanism for the storage and extraction of RHP information.

Obtaining a copy of the Rivers Database

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River Health Awareness Day and launch of Mini SASS in KwaZulu Natal



Over 100 people attended the KwaZulu Natal RHP Awareness Day and were treated to demonstrations on SASS, Mini SASS, fish surveys and habitat assessments.

A River Health Awareness Day hosted by Umgeni Water was held in Pietermaritzburg on 24 March 2000 to coincide with Water Week. The main aim of the awareness day was to further the objectives of the River Health Programme (RHP), and at the same time to launch the Mini SASS technique that had been developed by Umgeni Water and the KZN Nature Conservation Services. Over 100 people, comprising school groups from the Dorpspruit catchment forum, representatives from government departments, industry, NGOs and staff of Umgeni Water attended the event.

The RHP provincial champion for KZN, Dr Chris Dickens of Umgeni Water presented a brief overview of the new National Water Act and its requirements for monitoring the state of aquatic ecosystems. The RHP has been designed to service the requirements of the Act.

The Mini SASS technique is a simplified version of SASS. SASS monitoring forms the backbone for the RHP and uses the presence or absence of invertebrate life in rivers as an indicator of the health of the river. Mini SASS has been specifically designed for school groups and others, who are not sufficiently skilled to carry out a full SASS assessment.

SASS, Mini SASS, fish surveying and habitat assessments were demonstrated to the group at the confluence of the Dorpspruit and Msunduze rivers. After examining the results, the group was treated to a demonstration of the full suite of survey techniques at the Botanical Gardens, which lies close to the Dorpspruit. This time, greater emphasis was placed on Mini SASS. Dr Rob O'Donoghue of the KZN Nature Conservation Services demonstrated simple and economical ways of making Mini SASS sampling equipment, and Mr Mike Coke of KZN Nature Conservation Services gave an interesting presentation

on the abundance of fish in the stream. All scores obtained from the different techniques were integrated by Mr Mark Graham of Umgeni Water. The results showed a remarkable similarity between SASS and Mini SASS scores.

Schools are requested to join a national programme to monitor the health of rivers in their area, using the Mini SASS technique. A dedicated web site has been set up for this purpose. Schools will be able to interact with the web site, and will be able to place their own river health data onto a map of the country, and in this way contribute to the large-scale monitoring of rivers, albeit at a low confidence level. School children will also be able to make use of the postal system to contribute and receive information. The system will become an integral part of school water and environment projects, and has been enthusiastically received by teachers who plan to make it part of their teaching curriculum.



Participants at the KZN River Health Awareness Day actively examining samples collected in the Dorpspruit.

Comparing SASS and Mini SASS scores

There was a remarkable similarity between the SASS and Mini SASS scores, which convinced everyone of the efficacy of Mini SASS, even though sampled by school children using ice-cream box "sieves" and other improvisations! Mark Graham and Chris Dickens have completed an investigation of the validity of Mini SASS results when compared to SASS results. The findings of the investigation can be obtained directly from them and will be published soon.

Further information on the system can be obtained from: www.riverhealth.co.za

or

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TO KICK OR NOT TO KICK

For field sampling of aquatic invertebrates, did you know that sampling of stones in the current of a river can be carried out in two main ways? The first way, "stone washing", is to sample stone by stone, washing and hand-picking the animals from each stone, off the stones into a net or bucket. The second way is to "kick sample", in which process the stones on the bottom of the river are vigorously moved about using booted feet. The collecting net is held in a position where the animals, dislodged from the stones and the sand which is often present between and below the stones, will be carried by the current into the net. The specialist animals, which cling tenaciously to the stones tend to be under-represented in kick sampling, whereas the specialists living in the sand and gravel below the stones tend to be under-represented in stone washing. The two sampling methods do not give identical collections from a single site on a river.

The SASS method of Dr Mark Chutter (Afridev) is based on "kick sampling".

Crocodile River Survey, 2000

The second round of monitoring of the Crocodile River system in Mpumalanga began in June this year. The Crocodile River system was first monitored in its entirety during late 1996 to early 1997. It is one of the most biologically diverse river systems in South Africa with 49 species of fish occurring within the system.

A planning meeting was held in February this year in Nelspruit. Key role players from the Institute for Water Quality Studies (IWQS), Mpumalanga Parks Board, Kruger National Park, CSIR as well as a representative from the Working for Water Programme discussed monitoring objectives, confirmation of existing monitoring sites and dates for monitoring trips. Membership of the core monitoring team was also agreed upon. No less than 69 monitoring sites within the Crocodile River catchment were earmarked for monitoring during 2000. Data collected will reflect upon the current status/integrity of the river system. It was also established that monitoring data could be used and integrated into the determination of an ecological reserve for the Crocodile River, which is due in the near future.

Five monitoring trips were planned to allow for comprehensive monitoring of the river system, with the first trip covering the upper Crocodile catchment and the last trip monitoring the Crocodile River as it meanders through the Lowveld, forming the southern border of the Kruger National Park.

The first monitoring trip took place from 19-23 June. The team was based in Lydenburg and traveled daily to the monitoring sites. Throughout the week, various interested parties joined the team, some for a day or

two, others for the entire week. The objective of these interested parties was to find out what the monitoring trips entail, for example, what biological indices are used to assess what, what sampling techniques are used per biological entity being sampled and what is SASS anyway? Representatives from DWAF (Pretoria and Western Cape), Eko-tek Consultants, CSIR, IWQS and Mpumalanga Parks Board showed keen interest throughout the week.

The second monitoring trip took place more recently, from 17-21 July, with the monitoring of the Kaap River, a tributary of the Crocodile River, taking place. The monitoring team was based in Barberton for the duration of the trip. Interested parties again joined the team. Representatives from DWAF (Pretoria & Mpumalanga) as well as a consultant from KwaZulu-Natal showed keen interest.

The third and fourth monitoring trips took place from 14-18 August with monitoring of the Elands River and middle section of the Crocodile River (4-8 September). The final monitoring trip is due to take place from 18-22 September. It is however uncertain at this stage whether the final trip will go ahead because of high flows in the Crocodile River which make it difficult to work in the river and also because the flow conditions may affect the results. No decision in this regard has as yet been made.

To date, the trips have been enormously successful: sampling has been effectively carried out, capacity is being continually developed, and interested parties have been present and shown huge amounts of enthusiasm and interest in the project.

If your interest has been piqued by reading this article and you are keen to find out more, please contact:

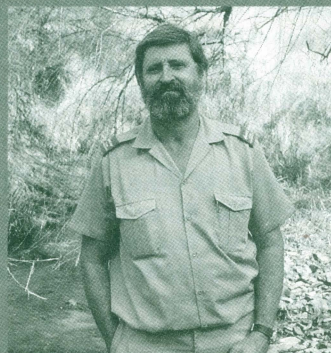
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Identification of collected invertebrates always attracts interest - even on a very cold morning in the headwaters of the Crocodile River near Dullstroom

Gauteng Province River Health Programme, Up and Running!

The Gauteng River Health Programme (RHP) is back on track under the leadership of Mr Piet Muller of the Gauteng Department of Agriculture, Conservation and Environment (DACE). The acting provincial champion, Piet Muller and his technical team have received practical training by members of the Mpumalanga RHP team and experts from the Institute for Water Quality Studies (IWQS) during the surveys done in the Elands River and Bronkhorstspuit in Gauteng as part of the Olifants River catchment surveys. Two members of the team, Piet Muller and Hermien Roux also attended a 10 day course in SASS4 in Natal during March 2000, which included an intensive course in the identification of aquatic invertebrates.



Piet Muller of DACE, the acting RHP provincial champion for Gauteng

Gauteng programme

Gauteng is situated within three of the 19 identified national water management areas, the Olifants, the Crocodile-Marico, and the Upper Vaal region.

Olifants Catchment

The Elands River, Wilge River and the Bronkhorstspuit form part of the Olifants catchment and were surveyed during 1999 as part of the Mpumalanga surveys. The data collected was captured on the National Rivers Database by the Mpumalanga champion, Dr Johan Engelbrecht. Aerial surveys were undertaken by members of the Gauteng monitoring team to identify possible monitoring points in the Elands River system. These points were verified by Dr Engelbrecht and other members of the Mpumalanga team and were included in the National Rivers Database.

Crocodile/Marico Catchment

During the last seven months the team has concentrated on the sections of the Crocodile-Marico system which falls within the Gauteng provincial boundaries, and has to date covered the Pienaars River, including the Morelettaspruit, Swavelpoortspuit and the Boekenhoutspuit, as well as the Apies River and the Soutpanspruit. Monitoring points were identified on the Hennops River, the Blaibankspruit and the lower Jukskei Rivers. The heavy rains during February and March 2000 has caused the rivers to flood so severely that most of the selected monitoring points in the Hennops River and lower Jukskei River have been totally destroyed. This has diverted the focus onto the upper Jukskei River. Monitoring points on this system will coincide with existing monitoring points where water quality sampling is currently taking place.

Upper Vaal Catchment

Aerial surveys on the Upper Vaal catchment is planned for October/November 2000. These surveys are aimed at familiarizing the team with the extent of the catchment as well as to identify monitoring points in addition to those already in use by Rand Water and other institutions.

The Blesbokspruit Monitoring Committee was established as a sub-committee of the Blesbokspruit Forum for the specific reason of coordination and standardization of monitoring in the Blesbokspruit/Suikerbosrand River catchment. The provincial champion for Gauteng will coordinate all biomonitoring and collate all data for the National Rivers Database in the Upper Vaal region within the province.

Active biomonitoring in the Upper Vaal region by the Gauteng team is scheduled for March – September 2001.

Courses in fish identification, water quality sampling as well as toxicity testing protocols are scheduled for October/November 2000. This additional training will equip the team with substantial knowledge and insight to undertake their task as a fully fledged biomonitoring team.

The importance of the work of the Gauteng RHP cannot be understated. The survival of present and future generations is inextricably linked to access to potable water. The success of the team hinges largely on the awareness and involvement of the public in coordinated efforts to safeguard water quality and quantity.



For further information:

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Piet Muller and his biomonitoring team. Sean West (FAI - Fish Assemblage Integrity Index), Hermien Roux (SASS4 - South African Scoring System 4 & IHAS - Invertebrate Habitat Assessment System), Lorainne Mills (RVI - Riverine Vegetation Index), Sizakele Zwane (Biomonitoring), and nature conservation technical assistants, Richard Koko, Aron Matabane, Wilson Molaba, Job Motsamai and Jacob Makola.

River Health Programme Reports Available on Website

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THE SOUTH AFRICAN RIVER HEALTH PROGRAMME GOES WWW

- Do you know what the *goal and objectives* of the RHP are?
- Have you seen all the previous issues of the *newsletters*?
- River Health surveys: visit the *Photo Gallery* and "partake" in the activities of the teams.

<http://www.csir.co.za/rhp/>



All the above reports are available on the RHP website – www.csir.co.za/rhp/
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