

Ecological State of Southern Gauteng Rivers

What is river health?

Systematic collection of and reporting on data is needed for the management of aquatic ecosystems. Information obtained from biological indices is used to assess the health of river systems. When the present ecological health does not meet the desired state, management actions must be taken to improve the ecosystem components. Healthy rivers sustain ongoing use of the rivers. This poster presents a summary of river health data collected between 2000 and 2002.

What is impacting our rivers?

URBAN DEVELOPMENTS:

Formal and informal housing, paving and road networks seal natural surfaces. In this way 47% of Gauteng is urbanised and does not allow natural infiltration of rainwater. Urbanisation also harms rivers through concentrated waste disposal, natural plant removal and effluent discharges into rivers.

MINING:

Mine dumps from underground and opencast mining are a common sight. Mine water of poor quality has been released into the rivers for more than a century.

INDUSTRIALISATION:

Industries such as steel mills, paper mills, power stations and factories in the East Rand and the Vereeniging/Vanderbijlpark areas contribute to poor water quality in the catchment. Unregulated liquid and solid waste disposal from smaller industries also contributes to poor river health.

FARMING:

Maize, wheat and cattle farming occur mainly in the eastern areas. Overgrazing can lead to erosion and thus poor river habitats. Water running from cultivated fields often contains high levels of salts, nutrients and even pesticides, that damages river health.

How should we manage our river systems?

MANAGE and CONTROL the quality and quantity of **industrial wastewater, stormwater, sewage effluent and mine water** that pollutes the natural drainage systems.

CONTROL the unnaturally **high volumes of fast flowing urban stormwater runoff** that erode the river channels. Canalised rivers (urban storm water drains) have replaced natural wetlands and streams. These transport large volumes of polluted urban runoff to the rivers causing severe degradation downstream.

Solid waste is unsightly and worsens the already poor water quality.

PROTECT the riparian zones of rivers and streams. **Loss of riparian vegetation** causes erosion and scarring of riverbanks.

Urban erosion causes siltation of natural pools, leading to the loss of fish and invertebrate habitat.

PREVENT the destruction and **disappearance of natural wetlands**. Stop the impairment of natural wetland functions and the loss of plant and animal habitat and diversity.

OPTIMISE the **use of potable water**.

Minimise the amount of water brought in through **transfer schemes**. Manage the **release of return-water** from water treatment works. Unnaturally **high water flows** alter river habitat. Aquatic animals and plants may not be able to adapt to the modified environment.



Catchment information

Grassland plains with hills, lowlands and wetlands slope from the escarpment or "reef" in the north down to the Vaal River, which forms the natural boundary between Gauteng Province and the Free State. Land-use has changed dramatically since the discovery of gold on the Witwatersrand in 1886. Greater Johannesburg, with all its industries, mining, agriculture and urbanisation, has transformed much of the once open grasslands - with bubbling springs, natural streams and functioning wetlands - into a bleak city landscape.

The River Health Programme

The River Health Programme (RHP) monitors and reports on the health of river ecosystems in South Africa. Visit the RHP website (www.csir.co.za/rhp/) for more information e.g. contact persons in the provinces and where to get your own copy of this poster.

We are losing species because of habitat degradation

red data
Nerine (*Nerine gracilis*)
This bulbous plant species has disappeared from impacted systems.

habitat degradation
Bullfrog (*Ptychocheilus adspersus*)

disappeared from catchment
African grass owl (*Tyto capensis*)

vulnerable
Rock catfish (*Austroglanis sclateri*)

disappearing
Greater painted snipe (*Rostratula bengalensis*)

Indicators of river health & what they measure	
Habitat	Describes the in-stream availability and diversity of habitat.
Aquatic invertebrates	A variety of invertebrate organisms (insect larvae, snails, crabs, worms) require specific aquatic habitat types and water quality for at least part of their lifecycle.
Fish populations	Fish (number of species, sensitivity, size and condition) are good indicators of the longer term influences on a river reach and the general habitat conditions.
Riparian vegetation	Healthy riverbanks maintain the form of the river channel, provide habitat for species (aquatic and terrestrial) and filter sediment, minerals & light.
Water quality	The chemical, physical and bacteriological properties of water determine its suitability for use.

River health categories	
Category	Meaning
Natural	No or negligible modification of aquatic habitats and biota
Good	Some human-related impact; biodiversity largely intact
Fair	Significant pressure from development and land-use; sensitive species may be lost
Poor	Extensive use of river ecosystem; natural functioning disrupted
Artificial	Habitat types, biological communities and ecosystem processes bears no or little resemblance to natural conditions, e.g. canalised rivers.



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