

Report Highlights Impacts on River Health

Urban development and dense human settlements are impacting, in some cases severely, on the main river system of the Eastern Cape. This is the main finding of the latest State-of-Rivers (SoR) report, which studied the Buffalo River.

The report is the latest published under the River Health Programme (RHP). Initiated by the Department of Water Affairs & Forestry (DWA) in 1994, the programme has been designed to develop the capacity and information base to enable the country to report on the ecological state of its river systems in an objective and scientifically sound manner. At the same time, the RHP audits management strategies and actions related to water resources.

The SoR reporting format was developed as a collaborative venture between CSIR, DWA, the Department of Environment Affairs & Tourism, and the Water Research Commission.

The Buffalo River System report is the first to be undertaken in the Eastern Cape. It highlights the significant impact that underdevelopment and human settlements can have on a river system.

THE SCORING SYSTEM

A number of indices or guides were used to calculate the ecological state of the river. This includes looking at the integrity of the habitat. This index looks at the impact of disturbances on habitats such as water abstraction, flow regulation, and river channel



Littering in a high-density rural area north of Bhisho.

modification on the riparian zone and in-stream habitats.

Also used is the geomorphological index, which assesses river channel condition and channel stability. The channel condition is based on channel impacts evident in a river reach, for example, weirs, bridges or dams, and the type of channels, for example, bedrock or alluvial. The riparian vegetation index looks at the state of the plants growing near or on the banks of the rivers and streams.

Another index is the South African scoring system or SASS which is based on the presence of families of aquatic invertebrate fauna (for example, snails, crabs, worms, insect larvae, mussels and beetles) and their sensitivity to water changes. Their lifecycles are short, so changes in the composition and structure of aquatic invertebrate communities are often the first signs of change in overall river condition.

The last index used is the fish assemblage integrity index (FAII). It is reported that fish live longer and are more mobile, so they are good indicators of longer-term changes in a river reach.

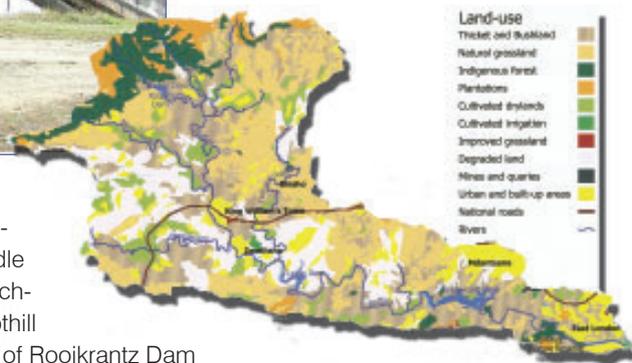
THE BUFFALO RIVER CATCHMENT

Rising at an altitude of 1 200 m, the Buffalo River drains the forested Amatole Mountains of the Eastern Cape. It flows eastwards across the coastal plateau before entering the Indian Ocean at East London harbour. The river is 126 km long. The catchment supports about 570 000 people within its 1 287 km² area, so population pressure on surface water resources is very high. Less than 500 m³ of water is available per person per annum, among the lowest in the country.



Left: The century-old Maden Dam is situated only 7 km from where the Buffalo River starts in the Amatole Mountains.

Bottom: The Buffalo River catchment.



The population density is the highest in the middle and lower reaches of the catchment (as much as 1 000 people per square kilometre). The largest towns are East London, Bhisho, King William's Town, Zwelitsha and Mdantsane.

Agriculture is widespread in the middle reaches of the catchment, from the foothill zone downstream of Rooikrantz Dam to King William's Town and as far downstream as Bridle Drift Dam.

Poor water quality poses a serious health risk for rural communities, since many households rely solely on untreated river water for domestic purposes.

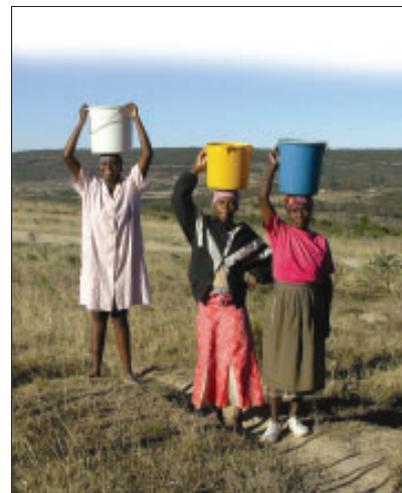
A large proportion of the Buffalo catchment has been transformed from its natural condition. It is reported that almost 17% of the total catchment area is considered to be degraded thicket and grassland. Urban built-up and industrial areas cover almost 12% of the catchment. Along the Buffalo River, four dams supply the main areas of King William's Town, Zwelitsha, Mdantsane and East London. These are Maden Dam, Rooikrantz Dam, Laing Dam and Bridle Drift Dam. The latter is the largest impound on the river. The dam has a full supply volume of 101 million cubic metres.

IMPACTS ON THE RIVER

The SoR found that while the Buffalo River is almost pristine at its source, urban developments and dense peri-urban and rural settlements impact the middle and lower reaches. At the headwater of the river alien plantations are reducing the runoff and thus the river flow.

The four dams on the river have no mechanisms for releasing water in a controlled pattern, for example, to stimulate natural river flows to maintain functioning aquatic ecosystems. In fact, overflow from the century-old Maden Dam and a trickle from a crack in the Rooikrantz Dam are the only water releases from these two upstream dams. Fortunately side streams augment the river flow.

The dams do offer some benefits, however. For example, Laing Dam, which supplies water to Zwelitsha, Bhisho, Berlin and parts of Mdantsane, acts as a silt trap and a sink for



Dense peri-urban and rural populations are impacting negatively on the quality of the Buffalo River

nutrients. It also dilutes saline effluent from upstream sources.

High population densities have several impacts on the river. These include cemeteries close to the rivers; excessive use of riparian trees for firewood; sand mining in the riverbeds; cattle crossings and



While many people in the Buffalo River catchment are served with at least basic water supply (a standpipe) there are still communities that rely on the river for their basic needs.



Invertebrate classification was one of the indices used to determine the quality of the Buffalo River system.

overgrazing; poor management practices associated with subsistence farming; and solid waste dumps or river banks.

INADEQUATE INFRA-STRUCTURE

Expanding townships put pressure on water and waste systems, which cannot cope with the demand. Blockages in the sewerage systems, inadequate treatment capacity and poor management result in the discharge of partially treated and untreated sewage into the river and dams. For example, at Mdantsane the sewerage system was found to be too old and too small to cope with the large volume of sewage from this area. As a result, sewage flows via small tributaries into the Bridle Drift Dam. Moreover, pump failures at Potsdam wastewater treatment works result in raw sewage overflows, which enter the Bridle Drift Dam via Shangani Stream.

THE MINISTER OF WATER AFFAIRS ON THE BUFFALO RIVER REPORT

This report aims to raise awareness and understanding of the current state of one of our important rivers, the impacts on it and what actions we can take to improve it. Its goal is also to empower people at local level to take ownership of their rivers. This will assist the people of the Eastern Cape region to evaluate resource development issues with due consideration for the environment and conservation. Eastern Cape rivers have a rich potential and their sustainable development for food production, ecotourism, and commercial activities rely on them being kept healthy and protected.

The high nutrient loads cause eutrophication and result in potentially toxic algal blooms in the dam and excessive growth of water hyacinth. High faecal counts also threaten the health of the communities which still rely on the river for drinking water.

Industrial effluents were found to be either inadequately treated or not treated at all. Poor water quality poses a serious health risk for rural communities, since many households rely solely on untreated river water for domestic purposes. The pollution of the Buffalo River basin also extends beyond the estuary, affecting marine and coastal water quality. According to the study the non-compliance with marine water quality standards will render coastal waters unfit for recreational and other beneficial users, including the non-attainment of blue flag beach status, which will in turn impact negatively on coastal tourism and related activities.

RECOMMENDATIONS

The report makes several recommendations to improve the state of the river. This includes establishing alien vegetation control programmes; restoring river banks that have collapsed or eroded; working with land care management programmes, the Working for Water programmes and others to educate the community; and monitoring agricultural practices and educating subsistence farmers about sustainable grazing practices. Improving the sewage treatment works and developing infrastructure to control water quality impacts, enlarging water and sewerage systems to cope with demand; as well as monitoring impacts and trends of nutrient levels; controlling river pollution; and improved management of dumping sites have also been suggested.



• All photographs courtesy of Wilma Strydom.

WATER SUPPLY AND SANITATION IN BUFFALO RIVER CATCHMENT



Type of water supply

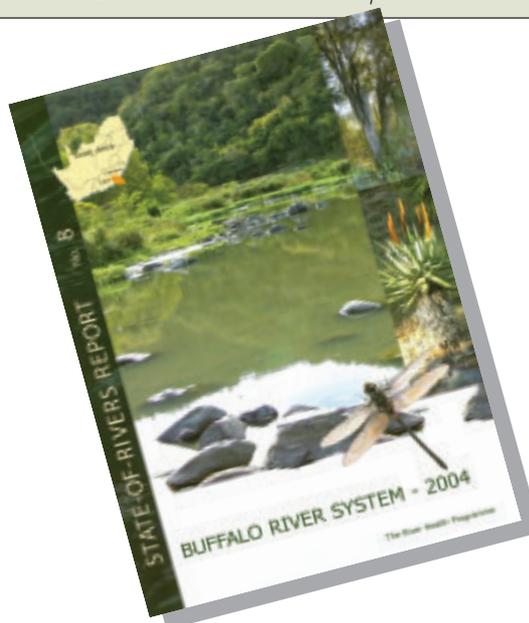
Percentage of population

Clean piped water in the house	30%
Standpipe in the yard	30%
Standpipe within 200 m	18%
Standpipe further than 200 m	16%
Boreholes springs, rain tanks, dams, pools or rivers	6%

Type of sanitation

Flush toilet	64%
Pit latrine (ventilated or unventilated)	25%
Bucket, chemical toilet and septic tank	3%
None	8%

Source: Buffalo River State of Rivers report



All information for this article was obtained from the State-of-Rivers Report: Buffalo River System. For more information, visit www.csir.co.za/RHP/ or contact Wilma Strydom at Tel: (012) 841-2284.