

Situation analysis of water quality in the Umtata River catchment

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Abstract

The Umtata River was characterised by using standard physico-chemical and microbiological methods to assess the present water quality in the river. The results indicated high turbidity, gross microbiological and cadmium pollution. Turbidity values ranged from 0.28 NTU to 1 899 NTU highlighting the known problem of donga erosion in the catchment. Faecal coliform counts varied between 0 and 21 000 counts/100 mL while the total coliform counts ranged from 0 to 69 000 counts for all the sites sampled. The levels of cadmium varied between 0.01 mg/L and 1.0 mg/L. Nutrient levels were also high. Nitrate values ranged from 0.01 mg/L to 28.0 mg/L as N while phosphate values varied between 0.02 mg/L and 5.0 mg/L as P. The high coliform counts and the nutrient values exceeding acceptable limits are indicative of pollution from domestic wastes from several informal settlements located along the riverbank. Water uses in the area were determined and were found to be mainly domestic and recreational. The gross pollution of the river exposes the local people who depend on it for their primary water source to serious health risk. Another use included livestock watering.

Introduction

Water resource management in South Africa is going through a period of major change. This is reflected in two new acts, the Water Services Act of 1997 (Act No. 108 of 1997) and the National Water Act (Act No 36 of 1998). The acts are founded on the principles of efficient service delivery and sustainable use of water resources. Resource quality monitoring, assessment and a national information system in support of decision-making are primary requirements of both acts.

South Africa's water resources have been under increasing threat of pollution in recent years due to rapid demographic changes which have coincided with the establishment of human settlements lacking appropriate sanitary infrastructure. This applies especially to peri-urban areas, which surround the larger metropolitan towns in the country, where many such settlements have developed with no proper water supply and sanitation services. People living in these areas, as well as downstream users, often utilise the contaminated surface water for drinking, recreation and irrigation, which creates a situation that poses a serious health risk to the people (Verma and Srivastava, 1990).

Description of the river catchment

The Umtata River rises in the plateau region of the Eastern Cape, approximately midway between the Drakensburg escarpment and the Indian Ocean. The catchment of the river itself is some 100 km long and up to 50 km in width. The main tributary of the Umtata River is the Ngqungqu River that enters the main river on the right bank about 27 km from the coast. The catchment is generally undulating, hilly and broken towards the coast with a steep

escarpment in the headwaters. In the vicinity of Umtata, the river flows through a wide plain with a flat gradient. Further downstream, the river is incised in a deep gorge. The geology of the catchment is constituted by mudstones and sandstones of the Beaufort group from the headwaters to about 30 km from the coast, and thence, by shales, mudstones and sandstones of the Ecca group, with exposures of dolerite intrusions mostly in the higher lying areas. There are scattered deposits of alluvium in some valleys. Soils in the catchment are moderate to deep and vary between sandy loam in the upper half to clayey loam in the downstream half. There are extensive plantations in the headwaters (DWAF, 1998).

The quality of water in the Umtata River has given cause for concern and data have always been very scanty. However, the deterioration in water quality in the middle and lower reaches of the river has given rise to concerns that water supplied from the river will be unfit for domestic use or that water treatment will have to become more sophisticated and more expensive. Of particular concern is the health of the communities along the banks of the river that depend on it primarily for their domestic water supply.

Background to the study

Generally, the major uses of water are domestic water supply, agriculture, industrial, recreation and aquatic life. The major uses of water from the Umtata River are mainly domestic and recreational. The main land use activity in the area is agricultural including livestock farming and the use of water from the river to feed livestock is common. Many uses are restricted within narrow ranges of water quality (Hammer, 1975).

South Africa can be described as a water-scarce country and with the growth in population and development there has been a large increase in municipal and industrial pollution of water. Such pollution and its related environmental impacts have remained largely unmeasured and ignored in many poor communities. For most developing communities, there is very little treatment of municipal or industrial wastewater. Where there is sufficient water to adequately dilute the pollution, the rivers may carry out natural

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