

1. Introduction

The Kruger National Park (KNP) has adopted a Strategic Adaptive Management (SAM) program with clear ecosystem management goals based on environmental indicators and their thresholds of potential concern (TPC). TPCs are a set of operational goals that together define the spatiotemporal conditions for which the Kruger ecosystem is managed. TPCs are essentially upper and lower limits along a continuum of change in selected environmental indicators. When the upper or lower TPC levels are reached, or when modeling predicts that they will soon be reached, this prompts an assessment of the cause of the extent of change. This assessment provides the basis for deciding whether management action is needed to moderate the change or whether the TPC should be recalibrated in the light of new knowledge and/or understanding.

Groundwater has been recognized as one of the environmental indicators that needs to be monitored and for which TPCs will have to be developed in the park. Two aspects of groundwater that need TPCs and associated monitoring programs have been identified, namely (i) groundwater quantity and (ii) groundwater quality. The Department of Water Affairs and Forestry (DWAF) assists the KNP with the groundwater quantity TPCs. A short 5 month project led by the University of Pretoria assists the KNP to develop a strategic groundwater quality monitoring network and to set the TPC levels correctly and for an appropriate suite of constituents. In order to achieve this goal the project team used the readily available data from the National Groundwater Archive/Database (maintained by DWAF) to provide a regional characterization of the groundwater chemistry in the KNP. Incorporating land use practices outside the park as well as geological maps potential groundwater problem hotspots were identified and sampled. The outputs from the above are used to propose a groundwater monitoring program for the KNP.

2. Geological setting

The Kruger National Park contains rocks that represent the earliest parts of South Africa's geological history as well as relatively young lithologies (Fig. 3). Archaean rocks present in the KNP include both Archaean granitoid intrusions and Archaean greenstone belt fragments. Archaean granitoid intrusions cover small areas within the western central and western northern parts of the Park containing the following (Robb et al., 2006):

- The Makhutswi Gneiss: a complexly folded light grey migmatitic gneissic unit that consists predominantly of plagioclase, quartz, microcline and biotite.
- The Goudplaats Gneiss: a unit that consists of a wide variety of gneissic rocks.

The Archaean Greenstone Belt lithologies within the KNP form part of the Barberton Greenstone Belt, Murchison Greenstone Belt and Giyani Greenstone Belt. The Onverwacht group is the lowermost unit of the Barberton Greenstone Belt and