



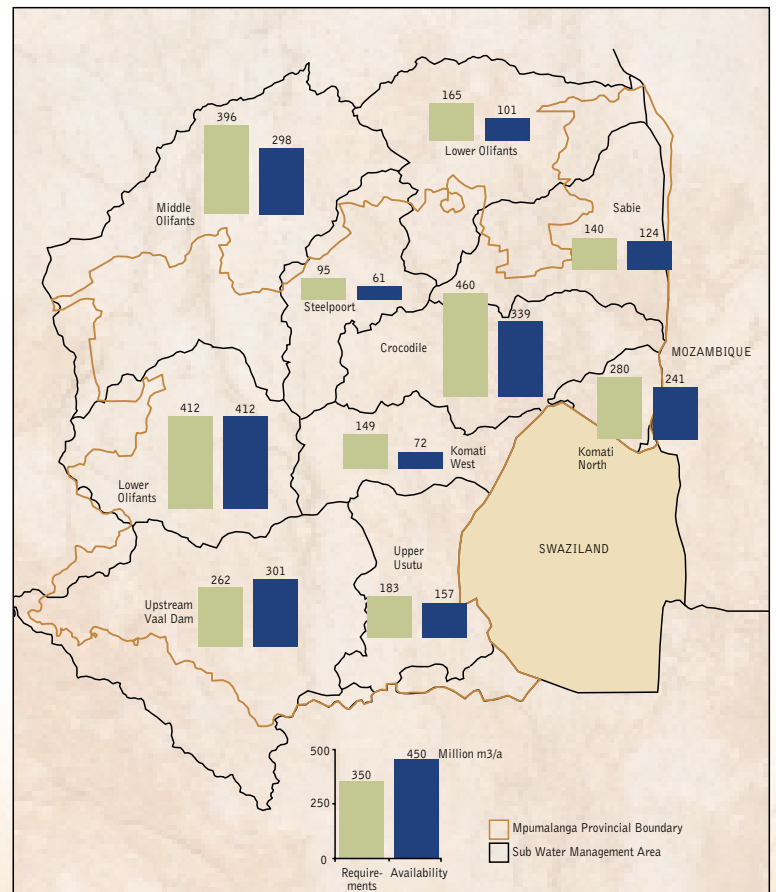
Freshwater is essential to support human life, ecosystems and economic development. Water is a scarce resource in Mpumalanga that needs to be managed carefully if economic development as well as ecological integrity is to be achieved. Mpumalanga forms part of the source of four of southern Africa's major river systems. Four Water Management Areas (WMAs) are located in Mpumalanga: the Inkomati WMA, the Olifants WMA, the Upper Usutu WMA and the Upper Vaal WMA.

Indicators for reporting on water resources in Mpumalanga include:

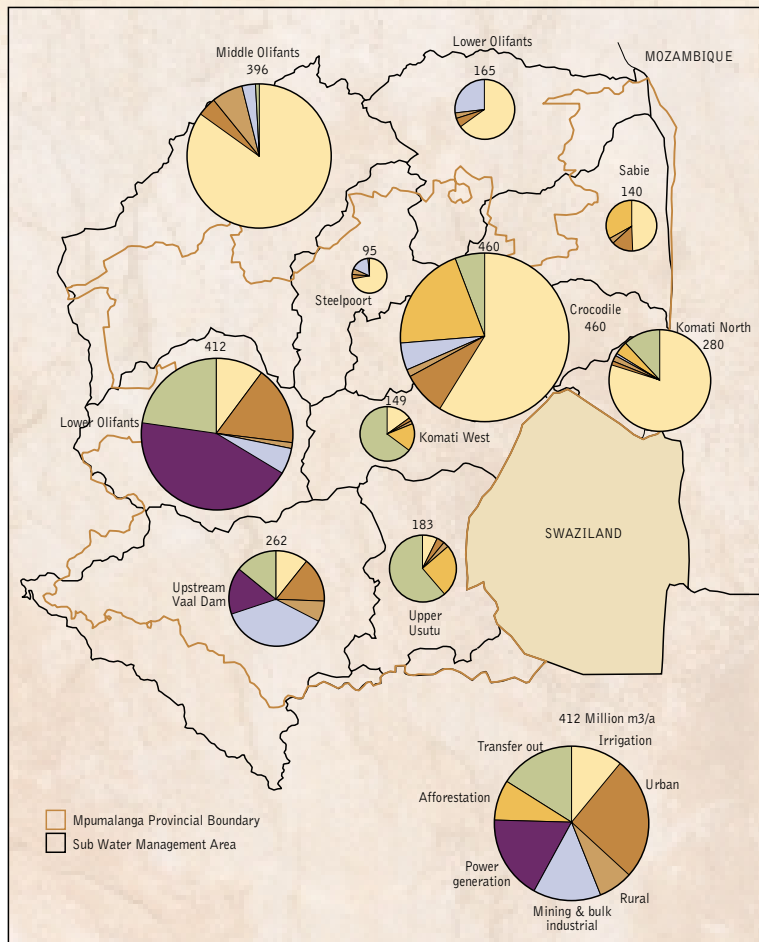
- Total surface water resources available per capita;
- Total surface water used per sector;
- Surface water nutrients;
- Groundwater nutrients; and
- Surface water toxicity.

### Total surface water resources available per capita

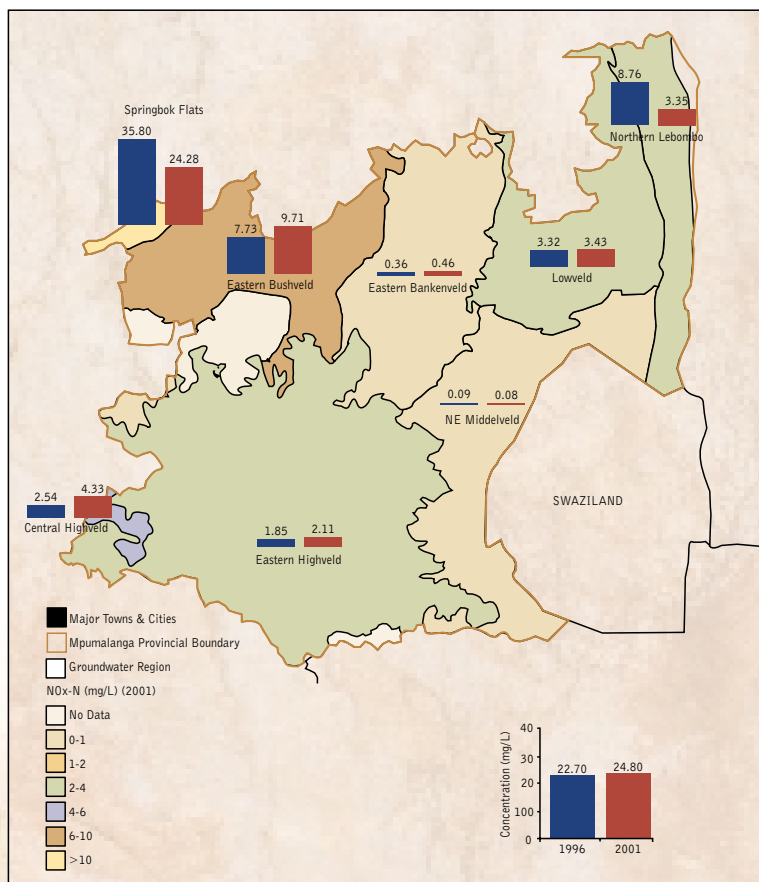
The Olifants, Inkomati and Usutu Water Management Areas face a water deficit as their water requirements exceed available water resources, while the Upper Vaal Water Management Area has a greater volume of water available than required. There are differences in water availability within each of the WMAs although the bulk of water in the province is available as surface water.



Volume of water required and water available in WMA's in Mpumalanga (Department of Water Affairs & Forestry)



Total surface water used per sector (Department of Water Affairs & Forestry)



Groundwater nutrient levels in 1996 and 2001 (Department of Water Affairs & Forestry)

### Total surface water used per sector

Water use in Mpumalanga is dominated by irrigation water for agricultural purposes. The second largest requirement for water in the province is for 'transfers out'. The water requirements within each sub-WMA are obviously different, with some sub-WMAs requiring water mostly for irrigation and others requiring water mostly for power generation or mining.

### Surface water nutrients

Surface water can become contaminated by a host of substances, including physical soil particles and organic detritus, micro-organisms, inorganic chemical salts and radioactive substances. Surface water quality is measured through the ratio of total inorganic nitrogen to orthophosphate (TIN : PO<sub>4</sub>). The Inkomati, Olifants and Usutu WMAs all display a decline in water quality since 1996.

### Groundwater nutrients

Groundwater nutrient concentrations below 6 mg/l NOx-N are said to have negligible health risk. Concentrations between 6 and 10 mg/l present no significant health risk from ingestion, while concentrations above 10 mg/l can induce both chronic and acute risk to human health. Groundwater resources around the Elands River and Rhenosterkop Dam area contained NOx-N concentrations in excess of 24 mg/l in 2001 making the Springbok Flats Groundwater Region unsuitable for domestic purposes. The elevated nitrate concentrations in this area are typically natural and are not attributed to anthropogenic sources.

### Surface water toxicity

Due to a lack of comprehensive data this indicator assesses water quality on the basis of "suitability for use" for domestic, industrial and agricultural purposes. Water quality (measured as "suitability for use") varies greatly in the different WMAs. Many of the water management areas contain high levels of toxic substances (including metals) which exceed water quality guidelines. These high levels can render the water unfit for use or may result in scaling, a decrease in crop productivity, or high costs in water treatment before use.