

Impact on Ecotourism by Water Pollution in the Olifants River Catchment, South Africa

Ecotourism has developed rapidly in recent years to become one of South Africa's largest income generator. State and private game reserves have become global players in attracting tourists from around the world. In addition to possessing two of the world's most renowned wildlife reserves, the Kruger National Park and the Kgalagadi Transfrontier Park, South Africa contains over 20 National Parks, about 30 smaller regional parks and numerous private game reserves and game lodges. The Olifants River, often described as one of the most "hard-working" rivers in South Africa, is one of the main river basins in the Mpumalanga Province and is regionally important to the ecotourism industry as source of water. Lake Loskop, a reservoir situated in the Mpumalanga Province is fed by the Olifants and Wilge Rivers, and serves as a large repository for pollutants from the upper catchment of the Olifants River system. Lake Loskop forms part of the 25,000 ha Loskop Nature Reserve, which is situated in the upper Olifants River catchment. The total area of the catchment draining into Lake Loskop is 11,464 km². Land use in the catchment is dominated by extensive coal mining in the Witbank Coalfields, which are located in the headwaters of the Olifants River, upstream of Lake Loskop, as well as mineral processing (Oberholster et al., 2009a) (Fig 1).

Over the past fifteen years isolated incidents of fish mortality have been recorded in Lake Loskop and such incidents have become

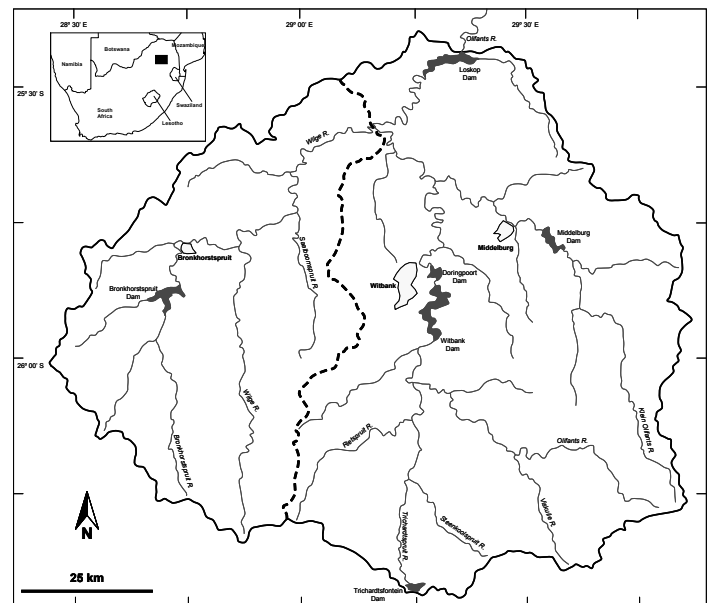
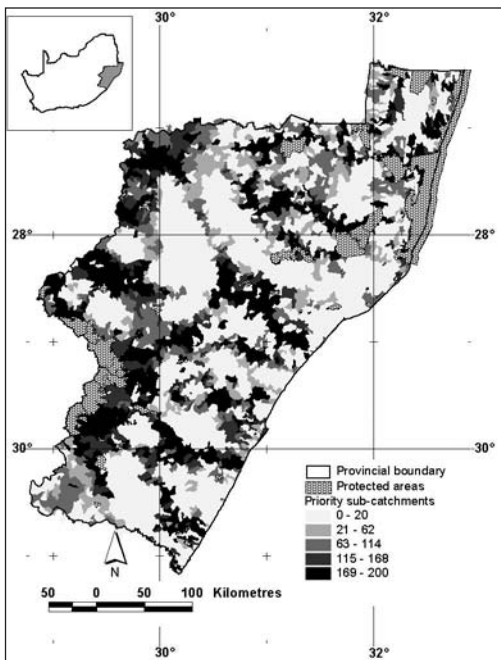


Figure 1. Sketch map showing the Upper Olifants River catchment with Lake Loskop. Inset map shows the area within South Africa; the dashed line separates the Wilge sub-catchment from the Olifants sub-catchment.

more frequent during the past five years. There was a 14 tonne fish die-off during October 2007 (Driescher, 2008). Such fish die-offs have coincided with mortalities of Nile crocodiles and serrated hinged terrapins. The crocodile population in Lake Loskop has declined from about 80 animals in 2003 to just 4 in 2009; the mortality was ascribed to pansteatitis, i.e. the intake of rancid fish fat after a fish die-off resulting in reduction in mobility and inability to swim (Fig 2) (Myburgh & Botha, 2009). The fish die-offs in Lake Loskop were due to both sporadic incidents of acid mine drainage, nutrients flowing into the Lake, and large mixed blooms of *Microcystis aeruginosa* and *Ceratium hirundinella* (Oberholster et al. 2009a). In July 2008, at least 160 crocodile carcasses were counted in the Olifants River Gorge 300 km downstream of Lake Loskop in the Kruger National Park.

The Kruger National Park is one of the largest conservation areas (19,485 km²) in Africa (Oberholster et al., 2009b). In this area the total number of crocodile population declined due to pansteatitis from over a 1000 in 2008 to only 347 in 2009. Interestingly, a large

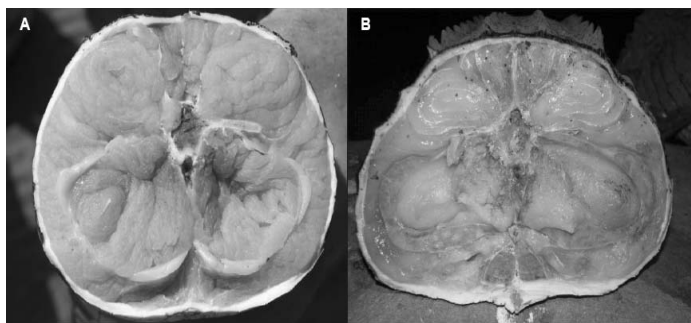


Figure 2. Cross section of crocodile tails from, (A) a healthy crocodile, and (B) a crocodile with pansteatitis (Photos: Jan Myburgh).

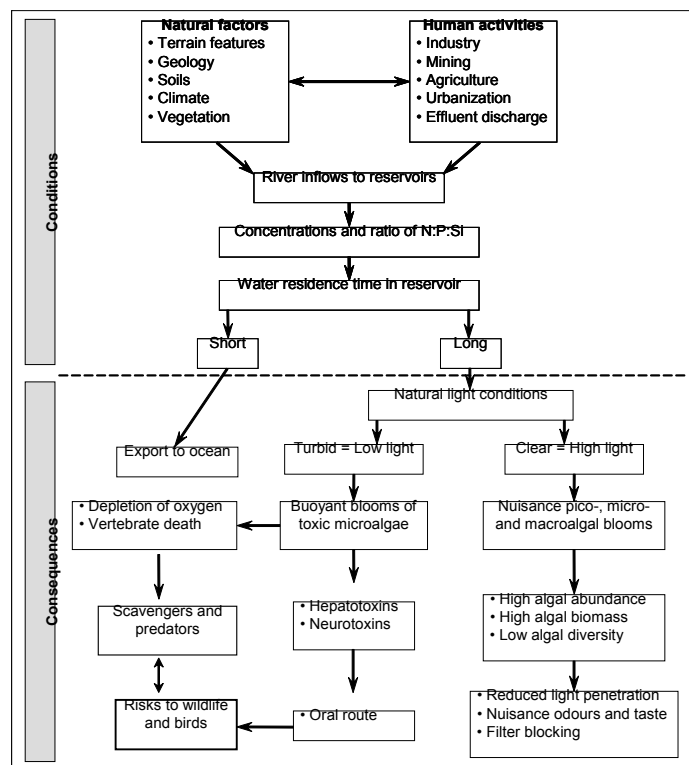


Figure 3. Overview of the sequence of interacting factors and the potential consequences of nutrient enrichment of freshwater in man-made impoundments and rivers.

bloom of *Microcystis* sp. as well as low numbers of *Ceratium* sp. were reported to coincide with the period of crocodile mortalities.

The situation has aggravated even more due to decline of water-bird numbers along the Olifants River down to Kruger National Park. White-breasted cormorants numbers declined in this area compared with 20 years ago. In the Kruger National Park downstream of Lake Loskop there was recently a 35 % decline of in African fish eagle numbers comparing with reports from 1992. The number of White-crowned lapwings also dropped from 104 birds counted in 1992 to only 67 birds, while Goliath heron are rare nowadays. Scientists are speculating that the reduction in Goliath heron can possibly be caused by pansteatitis (Myburgh & Botha, 2009).

The lack of continuous assessment of surface waters for the appearance of cyanobacterial blooms, as well as the limnological drivers behind the development of cyanobacterial blooms in national parks is major problem. Death of wildlife due to cyanobacteria has a negative impact on the growing economy of South Africa, as ecotourism rely on wildlife (i.e. game farming) as the main tourist attraction.

References

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