

The zoobenthic fauna of the Nhlabane coastal lake system, KwaZulu-Natal, South Africa, 20 years after construction of a barrage

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Abstract

The zoobenthos of the Nhlabane coastal lake system in northern KwaZulu-Natal was sampled quarterly during 1992 in order to study the zoobenthic fauna of the Nhlabane lake and estuary. The ecology of the system was changed in 1977 when a barrage was constructed across the upper end of the estuary. Physico-chemical parameters revealed that the previously estuarine southern basin of the lake had become completely fresh. The estuary remained closed during the study period due to a drought, the presence of the barrage and water abstraction from the lake. Benthic composition of the lake was typical of a shallow subtropical coastal lake, comprising a dominant estuarine associated crustacean component and a typical freshwater component characterised by oligochaetes, insect larvae and molluscs. Benthic densities varied with sediment type, with highest densities in detrital mud. The benthic composition of the estuary, dominated by estuarine amphipods and polychaetes, differed from that of the lake. There was a marked seasonal change in the benthic community in response to the low salinities in the estuary. Benthic species richness in the estuary was low relative to other estuaries, with a distinct dominance of a few numerically important taxa, indicating an unstable benthic community. Reduced freshwater discharge due to the barrage and the drought was the cause of the estuary mouth remaining closed throughout the study period.

Introduction

The Nhlabane coastal lake system is one of four freshwater coastal lakes in the vicinity of Richards Bay, KwaZulu-Natal. Studies to date on these lake systems focused mainly on water quality and utilisation of water resources (Hemens et al., 1981; Archibald et al., 1983; 1986; Turner, 1983; Fowles et al., 1986; Van Tonder et al., 1986; Walmsley and Grobler, 1986). Benthic data, except for a quantitative study on the benthos of Lake Cubhu (Cyrus and Martin, 1988), are at most limited to one-off biological surveys and unpublished reports (Fowles and Archibald, 1987; Reavell and Cyrus, 1989; Cyrus and Wepener, 1993; Wepener and Cyrus, 1994; Bolt, 1969a; Van der Elst and Chater, 1993). Historical data on the zoobenthic community of the Nhlabane system are totally lacking. Due to the paucity of biological data available and in view of the increasing industrial, mining and residential development in the catchments of these lakes, the need for obtaining basic ecological data was recognised.

The Nhlabane coastal lake system is situated north of Richards Bay in the dune mining lease area of Richards Bay Minerals (RBM). During 1977, a 3.8 m high concrete barrage was constructed across the outflow of the lake to increase the storage capacity for mining purposes (Fig. 1). In 1984, the barrage was raised a further 0.75 m to 4.55 m a.m.s.l. Prior to barrage construction, Lake Nhlabane consisted of two separate lakes, a northern freshwater and a southern estuarine lake, linked by a long, narrow channel. Estuarine conditions extending into the southern lake resulted in the presence of a salinity gradient and an associated estuarine fauna (Begg, 1978). After barrage construction, raising of the water level resulted in the merging of the two lakes into a single

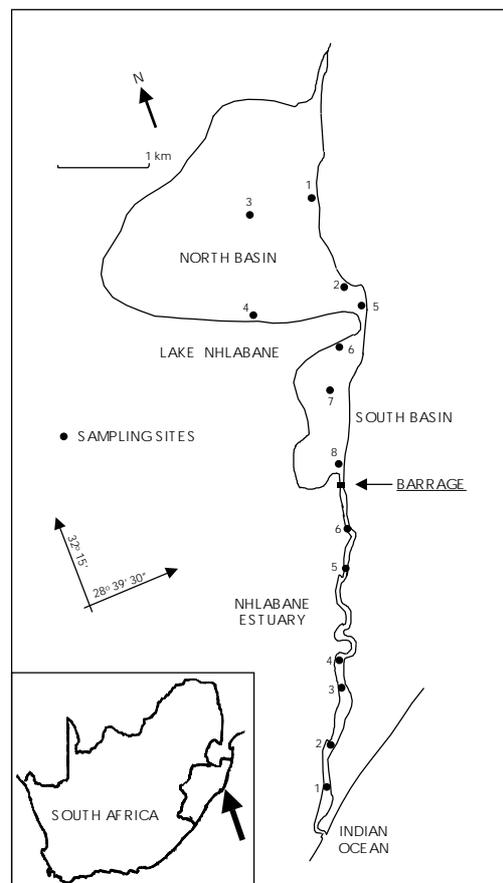


Figure 1

The Nhlabane Coastal lake system in northern KwaZulu-Natal. Sampling localities indicated with dots.

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