

Seasonal variations of water and sediment quality parameters in endorheic reed pans on the Mpumalanga Highveld

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Abstract

The Mpumalanga Lakes District consists of approximately 320 pans, of which less than 3% are classified as reed pans. There is limited information available on reed pans and as a result they are at risk of various anthropogenic activities, for example mining and agriculture. Four reed pans were selected and assessed to determine seasonal trends of a variety of water and sediment quality parameters. The study took place over one seasonal cycle from 2008–2009; samples were collected seasonally to account for various hydrological extremes. Water samples were collected and their nutrient and chlorophyll *a* concentrations were determined, while various other water quality parameters were measured *in situ*. Sediment samples were analysed for physical and chemical properties, namely, grain size and organic carbon content. The seasonal changes in concentrations of As, Cr, Cu, Fe, Pb, Mn, Mo, Ni, Se, Sr, U and Zn were also analysed within the surface water and sediment. Increased nutrient concentrations within the water were evident during spring and summer at some of the sites, which influenced other water quality variables, e.g., dissolved oxygen and pH. Seasonal trends in metal concentrations were influenced by the prevailing environmental conditions (e.g., rainfall) experienced at the selected sites as well as physical and chemical properties (e.g., grain size and organic carbon content). This study showed distinct seasonal variability of water and sediment quality parameters in endorheic reed pans on the Mpumalanga Highveld. There is a need for further studies on all of the different types of pans in terms of their water and sediment quality. This type of information will allow for a sound and defensible scientific basis for the assessment of likely impacts (e.g., eutrophication), the evaluation of the significance of these impacts, and the design of remedial and preventative measures.

Keywords: depressional wetlands, endorheic wetlands, eutrophication, metal concentrations, nutrients, reed pans