Geophysical Research Abstracts
Vol. 16, EGU2014-12140, 2014
EGU General Assembly 2014
© Author(s) 2014. CC Attribution 3.0 License.

Understanding controls on biotic assemblages and ecological status in Zambian rivers for the development of sustainable monitoring protocols

Michael Kennedy (1), Chris Gibbins (1), Steven Lowe (2), Helen Dallas (3), Jonathan Taylor (4), Pauline Lang (5), Kothelani Saili (6), Henry Sichingabula (6), and Kevin Murphy (2)

(1) Northern Rivers Institute, School of Geosciences, University of Aberdeen. AB24 3UF, United Kingdom (c.gibbins@abdn.ac.uk), (2) Institute of Biodiversity, Animal Health and Comparative Medicine, University of Glasgow, G12 8QQ, United Kingdom , (3) Nelson Mandela Metropolitan University, P.O. Box 77000, Port Elizabeth, 6031, South Africa, (4) Research Unit for Environmental Science and Management, North-West University, Potchefstroom, South Africa, (5) Ecology Assessment Unit, Scottish Environment Protection Agency, East Kilbride, UK, (6) School of Natural Sciences, University of Zambia, Lusaka, Zambia

The water resources of Zambia are likely to experience increasing multiple pressures in the future as a result of very high predicted population growth, industrial development, land use change, and potentially, altered regional rainfall patterns. It is well known that rivers in tropical regions typically have a rich biodiversity, controlled in part by inter-annual variability in climate and discharge, and in part by local catchment conditions. However, till recently little country-wide work had had been carried out on the biota of Zambian rivers, and little was therefore known about the ecological status, or degree of catchment alteration of many of the rivers.

To underpin sustainable water management, protocols have been developed to assess the ecological status of Zambian rivers. This paper describes the development of the protocols and their application to provide the first extensive assessment of the ecological status of rivers in the country.

The protocols were designed to be simple, and hence rapid, easy and relatively inexpensive to apply. Status scores were derived for individual sites using sensitivity weightings from 3 major groups (macrophytes, diatoms and macroinvertebrates). The general approach was based on schemes used successfully elsewhere, with species and family sensitivity weightings modified so as be appropriate to Zambia. Modifications were based on a survey of 140 Zambian rivers, incorporating data on species distributions, physical habitat conditions and water quality.

Analysis of historical data suggests that established Freshwater Ecoregions reflect hydro-climatic variability across Zambia. Survey data indicate that most of the spatial variation in biological assemblages across the country reflects these same hydro-climatic gradients, in addition to hydrochemical differences linked to geology. Site status scores suggest that rivers are generally in good health, although exceptions occur in some large urban areas and a small number of catchments with major industrial activity. Data form an important baseline against which to assess future changes related to population growth and climate change, and will therefore help inform policy within Zambia for sustainable river monitoring and management.