Geophysical Research Abstracts, Vol. 9, 08997, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-08997

Ecoydrological approaches to managing water and land use for wetland conservation in Kasanka National Park, Zambia

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The 390km2 Kasanka National Park in northern Zambia is home to a range of freshwater habitats, embedded within a wider landscape of savannah woodland (miombo). These include perennial and seasonal rivers, dambos' (seasonal wetlands) and floodplain wetlands. These wetland habitats hold important species of international conservation importance. For example areas of papyrus swamp are home to what is thought to be the world's most visible population of Sitatunga (Tragelaphus spekeii) a rare semi aquatic species of antelope. In addition, certain woodlands within seasonal floodplains are utilized by over 8 million straw coloured fruitbats (EIDOLON HELVUM) in one of the worlds largest gatherings of this species.

Understanding the hydrological processes underpinning the maintenance of these wetland habitats is a prerequisite to their conservation and the protection of the important species that utilise them. Logistical and resource constraints limit the possibilities of direct monitoring. As parts of a project funded by the UK's Darwin Initiative, we have used environmental tracers as tools in identifying and the important hydrological connections between the wetlands and their surrounding catchments. Hydrochemical sampling has been ongoing at 30 sites within the Park since May 2005 in an attempt to ascertain the seasonal patterns of water movement that sustains these important freshwater systems. Stable isotopes of oxygen have been used, along with geochemical tracers to identify the main sources of water sustaining these wetlands and the associated residence times.

The data obtained so far suggests marked spatial and temporal variability in hydro-

logical functioning. In dambos and floodplains, seasonal variability in inputs from rainwater sustain the wetlands which in some cases are dependent upon water sources outwith the National Park. In other cases, such as papyrus swamp, longer term groundwater inflows are also important. Current land management practices such as burning (to reduce long term fire risk) and irrigation withdrawals out with the National Park for agriculture, may be adversely affecting processes of wetland recharge. The results our ecohydrological investigations are feeding into stakeholder discussions aimed at highlighting land management practices that are unsustainable from the point of view of the conservation wetlands and their associated species.