RIVERS IN PERIL INSIDE AND OUTSIDE PROTECTED AREAS: A SYSTEMATIC APPROACH TO CONSERVATION ASSESSMENT OF RIVER ECOSYSTEMS

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ABSTRACT

This paper establishes a framework within which a rapid and pragmatic assessment of river ecosystems can be undertaken at a broad, sub-continental scale, highlighting some implications for achieving conservation of river biodiversity in water-limited countries. The status of river ecosystems associated with main rivers in South Africa was assessed based on the extent to which each ecosystem had been altered from its natural condition. This requires consistent data on river integrity for the entire country, which was only available for main rivers; tributaries were thus excluded from the analyses. The state of main river ecosystems in South Africa is dire: 84% of the ecosystems are threatened, with a disturbing 54% critically endangered, 18% endangered, and 12% vulnerable. Protection levels were measured as the proportion of conservation target achieved within protected areas, where the conservation target was set as 20% of the total length of each river ecosystem. Only 16 of the 112 main river ecosystems are moderately to well represented within protected areas; the majority of the ecosystems have very low levels of representation, or are not represented at all within protected areas. This is the first assessment of river ecosystems in South Africa to apply a similar approach to parallel assessments of terrestrial, marine and estuarine ecosystems, and it revealed that main river ecosystems are in a critical state, far worse than terrestrial ecosystems. Ecosystem status is likely to differ with the inclusion of tributaries, since options may well exist for conserving critically endangered ecosystems in intact tributaries, which are generally less regulated than main rivers. This study highlights the importance of healthy tributaries for achieving river conservation targets, and the need for managing main rivers as conduits across the landscape to support ecological processes that depend on connectivity. We also highlight the need for a paradigm shift in the way protected areas are designated, as well as the need for integrated river basin management plans to include explicit conservation visions, targets and strategies to ensure the conservation of freshwater ecosystems and the services they provide.

Key words
Conservation assessment, conservation biogeography, conservation status, freshwater biodiversity, freshwater conservation planning, integrated river basin management, protected areas.