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A SPATIAL ASSESSMENT OF RIVERINE ECOSYSTEMS AND WATER SUPPLY IN A SEMI-ARID ENVIRONMENT

L. B. SMITH-ADAO,^{a*} J. L. NEL,^a D. LE MAITRE,^a A. MAHERRY,^a and E. R. SWARTZ^b

^a CSIR, Natural Resources and the Environment, PO Box 320, Stellenbosch 7599, South Africa

^b South African Institute for Aquatic Biodiversity, Private Bag 1015, Grahamstown 6140, South Africa

ABSTRACT

A spatial assessment was conducted in the semi-arid area of South Africa, to: (1) identify priority areas for the conservation of river and groundwater ecosystems; (2) examine surface and groundwater quality for human consumption and (3) investigate the rehabilitation of degraded areas to highlight 'win-win' situations for both environmental and human use. A systematic conservation plan was produced, highlighting river conservation areas (river types, fish species and connectivity areas), moderate-impact management areas (groundwater-surface water interaction and recharge areas) and river rehabilitation areas. The proposed river selections would achieve the biodiversity targets of 33 (66%) of the 50 river types; feasible rehabilitation would increase this to 92%. The greatest groundwater-surface water interaction and recharge (30 to >50mm⁻¹) values are concentrated around the mountainous regions of the Little Karoo. This is because the main aquifers in the mountains, table mountain group (TMG) quartzites, yield naturally good quality water for human consumption. River reaches of unacceptable surface water quality were classified as degraded water resource delivery areas where the poor water quality was primarily due to saline return flows from irrigation and the impacts of other anthropogenic activities including abstraction of freshwater which otherwise would have diluted the return flows. Only the middle reaches of the Gouritz and Groot Rivers represent a possible win-win situation for both the environment and human use. Copyright : 2010 John Wiley & Sons, Ltd.

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