Conservation assessment of South African mammals

by

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Tables of Contents

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Abstract

Clearly established conservation priorities are urgently required for taxa and ecosystems in critical need of conservation. This helps to identify and document taxa most in need of conservation attention, and provides an index of the state of degeneration of biodiversity. Including as much relevant information as possible in a prioritisation assessment will deliver the most accurate classification, yet these variables should not overly complicate the prioritisation process. Conservation assessments depend not just on the taxon's susceptibility to threat (i.e. risk of extinction, or Red List assessments), but also the conservation value, irreplaceability and nature and intensity of the threats. Research into the value and applicability of conservation prioritisation tools at a regional scale, allowed for the assessment of the extinction risk as well as subsequent priority ranking of South African mammals.

At the outset research was directed towards investigating South African mammals in accordance with their respective regional and global World Conservation Union (IUCN) Red List and Red Data Book assessments. The regional Red List assessment drastically improved local knowledge of the current extinction risk of various mammals, and identified 57 marine and terrestrial mammals to be highly threatened.

Up to date regional extinction risk assessments, allowed for the investigation of whether a human activity threat index derived from six human activity variables across South Africa could be used to

highlight mammals threatened with extinction while also being exposed to high human activity. Evidence indicated various threatened and lower risk mammals were exposed to high human activity throughout their range, pointing to high potential threat and future increase in extinction risk.

For relevant prioritisation to take place, components of vulnerability (IUCN Red List assessments, and occupancy data), irreplaceability (endemism and taxonomic distinctiveness), and threat measures (body mass and human density in a taxa distributional range) was introduced into relational priority assessment which allowed for a simplified approach in determining conservation priorities for taxa under various region-specific conditions. The use of different sets of information clearly affected the priority rankings.

South African Chiroptera and Carnivora was used as a case study to addresses whether a simple measure of taxonomic diversity can be used as a proxy for different measures of phylogenetic diversity in determining regional conservation priority of taxa, when such information is limited. Evidence does suggest that the utilisation of the simple taxonomic diversity measure may provide the appropriate information on evolutionary diversity.

Two theoretical concepts were proposed to address some potential shortcomings in the conservation prioritisation arena. The Orange List method offers a system to identify "species [or taxa] of high national importance or of high conservation value" (South African National Environmental Management: Biodiversity Act 2004). In turn the Green Data List essentially represents a radical shift in the traditional approach to the management of both threatened and invasive taxa.

Throughout this thesis, evidence do point to smaller mammals being of high conservation concern in South Africa, with the members from the Orders Rodentia, Chiroptera and Insectivora being constantly identified as high conservation priority. Apart from contributing to our current understanding of the conservation importance/priority of South Africa mammals, this current thesis has resulted in a robust understanding of various assessment techniques.

Key words: Regional conservation prioritisation, IUCN Red List, Red Data Book, vulnerability, irreplaceability, threat assessments, taxonomic distinctiveness, phylogenetic diversity, Orange List, Green Data List

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Disclaimer

This thesis consists of a series of chapters that have been prepared for submission to, or publication in, a range of scientific journals. As a result styles may vary between chapters in the thesis and overlap may occur to secure publication.

In accordance with the 2001 IUCN Red List categories and criteria, the term “taxon” (pl. taxa) is used in this study to represent species, sub-species or sub-populations.