Snapshot Safari – South Africa: 
A country-wide occupancy assessment and monitoring of mammals

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Background

- South Africa is rich in biodiversity
- Do not have a comprehensive understanding of mammal distribution across South Africa

Anthropocene
Background

• Convention on Biological Diversity
• Regional mammal Red List assessment –
  • 17% of species listed as Threatened
  • 10% of species listed as Near Threatened
  • 66% of revised listings were ‘up listings’
  • 11% of species were data deficient

Child et al. 2016
Project Details

• Snapshot Safari – South Africa was launched in response to the need for more accurate assessment of mammal occupancy and populations
• Funded by the Foundational Biodiversity Information Programme
Project Objectives

The aim of the project is to provide extensive mammal occupancy and distribution data from conservation priority areas in South Africa and to develop and test survey methodology as well as conservation effectiveness assessments:

1 - To generate knowledge on mammal occupancy and distribution patterns in a country-wide survey of key protected area expansion areas
2 - To supply a baseline set of mammal occupancy and population data of several key protected areas in South Africa
3 - To test novel ways of assessing mammal occupancy and distribution in key biodiversity areas under different land tenure
4 - To develop a methodology to measure protected area effectiveness in protecting mammal biodiversity.
5 - To contribute barcodes to the current South African mammal DNA Barcode of Life Data System
Methods

- Camera Traps
- Participatory Mapping
- DNA Metabarcoding
- Bio-blitz
Note that numbering of focus areas is simply for ease of reference and does not reflect order of importance or any other ranking.
Camera Traps

- Permanent (19) and Roaming (14) camera trap grids
  - 20 x 5 km²
  - 3 month intervals
- Once classified and validated, the camera-trap data will be made available to several biodiversity databases for scientific and educational purposes
Data Management and Utilisation
Participatory Mapping

• Standardised semi-structured interviews and voluntary GIS mapping
• Identification workshops
• Confront the inventory and distribution map with the results of camera traps
• Compare contrasted land-use in two ecosystems:
Identifying Biodiversity from Scats

- Understanding carnivore diets is necessary in clarifying predator-prey interactions

- Develop a universal and standardised tool for molecular, non-invasive diet assessment of small to medium carnivores in South Africa:
  - Establish a method based on DNA metabarcoding and NGS to accurately and efficiently identify the taxon (species, genus, family) of prey DNA present in faeces collected in the field
  - Construct a DNA reference library of potential small mammal prey items

- Non-invasive sampling of fresh scats
Bio-Blitz

• Traditional mammal survey techniques will be used to record small to large mammal occupancy and diversity:
  • Sherman and Tomahawk trap lines
  • Spotlight surveys
  • Road transects
  • Dung transects
  • Mist netting

• Compare results with results from:
  • Camera trap survey (meso- to large mammals)
  • Participatory mapping (meso- to large mammals)
  • DNA from scats (small to large mammals)

• Voucher specimens (DNA Barcoding)
DNA Metabarcoding

• Barcode of Life Data System (BOLD):
  • Mammals - 15 (4.8%) of the 307 mammal species are represented in BOLD (da Silva and Willows-Munro, 2016)
  • Almost no mammal records for some of the provinces (da Silva and Willows-Munro, 2016)

• Contribute DNA barcodes for at least 15 species to the BOLD data base, with a target of five individuals from different localities for each species (75 specimens)
  • Rodents and shrews
Mammal Assemblage Intactness Index

• Current measures:
  • Threshold of Potential Concern
  • Management Effectiveness Tracking Tool

• Knowledge gaps in the proportion and types of biodiversity conserved

• Mammal Assemblage Intactness Index
  • Methodology to identify and mitigate risks to mammal assemblages
  • Rating scale based on mammal assemblage integrity
  • Evaluate different conservation strategies adopted in various protected areas
Post-graduate Research

- PhD 1: *Mammal diversity and community ecology in South Africa: Conservation implications in the Anthropocene*
- PhD 2: *Use of metabarcoding in ecological studies of mammalian carnivores*
- MSc 1: *Measuring mammal biodiversity: An assessment of the effectiveness of different methods in assessing mammal biodiversity*
- MSc 2: *The effect of mammal diversity and community structure on burrowing ecosystem engineers*
- Honours/BTech projects will focus on mammal biodiversity and/or community studies in areas close to the relevant academic supervisor’s home base.
- And a Post doctoral researcher
Thank You

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