Structured Decision Making to optimal feral herbivore management for biodiversity conservation in the Kimberley

Animal Science

Project Core Team

Supervising Scientist	Megan D Barnes
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Project status as of June 18, 2020, 4:44 p.m.

Pending project plan approval

Document endorsements and approvals as of June 18, 2020, 4:44 p.m.

Project Team	granted
Program Leader	granted
Directorate	granted

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Biodiversity and Conservation Science Program

Animal Science

Departmental Service

Service 6: Conserving Habitats, Species and Communities

Background

The benefits of integrated landscape management are variable across threatened taxa, which have variable susceptibility to threats and responses to management. Priority Threat Management identified introduced predator control, introduced herbivore control, weed management and fire management as cost-effective actions for managing DBCA assets in the Kimberley (Cawardine 2012, Cons Letters 5(3)196:204). Feral herbivore control was identified as a cost-effective threat management strategy for conserving many threatened and endemic species in the Kimberley, particularly it's small mammal fauna, but the current program is not optimised spatially, rather regional staff annually design a logistically efficient approach within existing budget.

Efficiency and cost-effectiveness could be increased by optimising delivery of this high cost process to maximise biodiversity benefits through two key improvements: (1) characterisation of utility thresholds (i.e. the thresholds at which efficiency and impact decrease below a useful level) to inform "how much shooting is enough", and (2) impact focused spatial action planning, to identify spatially explicit management strategies that balance the conservation needs of multiple species while accounting for other funds and opportunities in that timestep.

Structured Decision Making (SDM) is a formal collaborative process designed to facilitate decision making in multi objective, value-laden contexts characterized by limited resources, uncertainty, and difficult trade-offs such as these (Gregory 2012). Challenges in the Kimberly that met these criteria were collaboratively identified with Kimberley region staff. Emerging from this process domains of management that would benefit from the application of structured decision making were identified. Three of these key challenges are 1) optimising herbivore management to minimise cost while ensuring the program continues to meet biodiversity goals, 2) understanding and characterising synergies and trade-offs, and identifying thresholds to change management (e.g. the most cost-effective strategy may have poor outcomes for particular sites or assets), and 3) understanding the utility of monitoring in this context.

Aims

The aim of this research is to apply Structured Decision Making collaboratively with the Kimberley region and district fauna managers, BCS scientists, and stakeholders to identify cost-effective feral herbivore control strategies.

(1) evaluate the costs and benefits of existing and proposed herbivore control strategies

(2) understand and characterise synergies and trade-offs among alternative management strategies for herbivore control

(3) identify 'decision triggers' - thresholds at which the preferred management strategy changes.

To do this we will (i) Conduct collaborative workshops to identify, document and incorporate the full suite of objectives, constraints and barriers, incorporate diverse values, and collaboratively design feasible alternative management strategies, (ii) identify cost-effective strategies for multiple taxa using a spatially explicit Multi-Criteria Decision Analysis, and (iv) conduct trade-off analysis to identify synergies and trade-offs of strategies across multiple taxa using existing monitoring data. To achieve this Megan Barnes will conduct two trips to the Kimberley to conduct workshops and work with managers, one in each year of the project. To support a spatially explicit decision model, the project will collate, process, serve aerial shoot and other control data from across the region, developing repeatable data pipelines.

Expected outcome

Support cost-effective herbivore management, define decision triggers, identify high-value information (and in so doing inform monitoring and research), and support transparency and accountability in the Kimberley landscape management portfolio.

Strategic context

This project will inform priority threat management implementation by integrating risk, prospects for success and cost-effectiveness, as outlined in Corporate Guideline No. 35 (section 5.5.1), while directly meeting Biodiversity and Conservation Science program goals of conducting excellent "outcome driven" science that directly supports Regional needs and management outcomes (Science Strategic Plan 2017-21). Structured Decision Making and the planned outcomes (e.g. control charts, trade-off analysis, optimal management strategies) also support clearer processes to justify decision making, as specified in the Auditor General's 2017 Report (*Rich and Rare: Conservation of Threatened Species Follow-up Audit*.

Expected collaborations

Ben Corey, Regional Nature Conservation Leader, Kimberley
   Brett Mitchell (CDU) – small mammal data
   Vanessa Adams (University of Tasmania)

Proposed period of the project

Dec. 6, 2019 – Dec. 6, 2021

Staff time allocation

Role	Year 1	Year 2	Year 3
Scientist	0.4	0.4	
Technical	0.1	0.1	
Volunteer			
Collaborator	0.1	0.1	

Indicative operating budget

Source	Year 1	Year 2	Year 3
Consolidated Funds (DBCA)	3000	3000	
External Funding			