

Progress Report SP 2012-027

North Kimberley Landscape Conservation Initiative: monitoring and evaluation

Fire Science

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Project Team	granted
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North Kimberley Landscape Conservation Initiative: monitoring and evaluation

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Context

This project is a biodiversity monitoring and evaluation program to inform adaptive management of fire and cattle in the north Kimberley. The adaptive management program that forms the Landscape Conservation Initiative (LCI) of the Kimberley Science and Conservation Strategy commenced in 2011 in response to perceived threats by cattle and fire to biodiversity conservation in the North Kimberley. This initiative is based on the hypothesis that large numbers of introduced herbivores and the impacts of current fire regimes are associated with declines of critical weight range mammals, contraction and degradation of rainforest patches, and degradation of vegetation structure and habitat condition in savannas. This monitoring and evaluation program will provide a report card on performance of landscape management initiatives in the north Kimberley, particularly prescribed burning and cattle culling, in maintaining and improving biodiversity status.

Aims

- Inform management of biodiversity status in representative areas after prescribed burning and cattle control programs have been applied.
- Provide warning when landscape ecological thresholds have been reached, for example decline of mammals to below 2% capture rate, or decline of mean shrub projected ground cover to <2%.
- Compare biodiversity outcomes in intensively managed and unmanaged areas to evaluate the effectiveness of management interventions in maintaining and improving conservation values.
- Investigate cane toad and predator interactions that may influence mammal abundance.
- Elucidate influence of different burning approaches to threatened plant taxa in the North Kimberley.
- Investigate interactions between fire and weed invasion.

Progress

- Recent work comparing mammal populations before and after fire management programs shows that larger marsupials and arboreal species including brush-tailed rabbit rat and the golden backed tree rat have benefited from patchy early dry season burning and have increased in abundance.
- Populations of generalist native rodents including pale field rats and chestnut mice do not benefit from any fire. This suggests that only through achieving net reductions in annual burnt area will these species benefit from managed fire regimes. However populations of these rodents are more stable under early dry season fire regimes because annual fire extent is now less variable than in the period prior to the commencement of broadscale prescribed fire application. Rodent populations are more volatile under the boom-bust fire dynamics that typified the period prior to active fire management.
- Following monitoring in 2018, most sites will have at least five years of data available for analysis, enabling a comprehensive evaluation of the effectiveness of management on conservation reserves across the North Kimberley.

Management implications

- There is strong evidence that cattle have negative influences on critical weight range mammals, including threatened species such as the brush-tailed rabbit rat. Culling programs should be maintained and expanded in important conservation reserves.
- There is statistical evidence that the LCI has shifted the fire regimes in the Mitchell and North Kimberley bioregions from a dominance by late dry season bushfires to predominantly early dry season prescribed burning, with positive benefits to threatened mammals.

- Data on mammal decline and snake increases in Mirima/Kununurra suggest a previously unappreciated mechanism for mammal decline. This implies that the impact of cane toads is more complex than previously thought and that fire management and cattle culling will be insufficient on their own to prevent future mammal declines in the North Kimberley.

Future directions

- Monitoring and evaluation will continue to demonstrate the ongoing management effectiveness of the LCI.
- Factors influencing mammal abundance and richness between years will be evaluated using statistical modelling approaches.
- The response of obligate seeder plants to a systematic ignition approach is being trialled for fire management in some remote parks will be investigated.