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Project Rangelands Restoration: developing sustainable management systems for the conservation of biodiversity at the landscape scale in rangelands of the Murchison and Gascoyne bioregions–managing fire and introduced predators

Ecosystem Science

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Project Team	granted
Program Leader	granted
Directorate	granted

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Context

Despite the relatively pristine nature of most of the arid interior (desert bioregions) and rangelands (beyond the pastoral zone), there has been an alarming and recent loss of mammal fauna, with about 90% of medium-size mammals and 33% of all mammals either becoming extinct or suffering massive range contractions. There is also evidence of degradation of some floristic communities due to altered fires regimes. The extent and nature of change in other components of the biodiversity, including extant mammals, birds, reptiles and invertebrates is unknown. The most likely causes of the decline and degradation in biodiversity are introduced predators, especially the fox (*Vulpes vulpes*) and the feral cat (*Felis catus*), and altered fire regimes since the departure from traditional Aboriginal burning practices over much of the region. Taking an adaptive experimental management approach in partnership with DEC's Goldfields Region, this project aims to reconstruct some assemblages of the original native mammal fauna on Lorna Glen, a pastoral lease recently acquired by DEC. This will be achieved by an integrated approach to controlling introduced predators and herbivores, ecologically appropriate fire management, and fauna translocations.

Aims

- Develop efficient, effective and safe introduced predator (fox and feral cat) control technologies for the interior rangelands and the arid region.
- Reconstruct the original suite of native mammal fauna through translocation once sustainable feral cat control can be demonstrated.
- Implement a patch-burn strategy to create a fine-grained, fire-induced habitat mosaic to protect biodiversity and other values.
- Describe and predict pyric (post-fire) plant succession and describe the life histories of key plant species.
- Monitor the long-term trends in species assemblages and abundance of small mammals and reptiles in an area where introduced predators are not controlled compared with an area where they are controlled.
- Model the relationship between seasons (rainfall) and the frequency and size of wildfires.

Progress

- Cat, fox and wild dog aerial baiting carried out in July 2012 as part of the Western Shield program was ineffective due to the high availability of live prey, particularly mulgara (*Dasycercus cristicauda)*.
- As a result of good seasons (rainfall) and high prey availability, the feral cat population is increasing, and is now double the density of two years ago. Dog/dingo density remains low, and foxes are absent.
- Five feral cats were trapped and radio-collared prior to baiting to assist with measuring baiting effectiveness.
- A PhD project commenced to investigate interactions between dogs/dingoes and feral cats.
- Mulgara population size has declined since last year, but is still relatively high. Mulgara continue to be recorded across virtually all landform systems and in all ages of spinifex.
- The new fire management plan was implemented, including installation of fuel-reduced buffers around some fire management cells and some core ignition, with mixed success.
- A draft spinifex fuel model was developed and tested. This will simplify operational use of the spinifex rate of spread guide.
- The bilby population continues to increase slowly despite relatively high cat density.
- A manuscript has been prepared on the value of burrowing animals as ecosystem engineers.

- A paper was published on the use of observers on horseback to monitor bilby populations.

Management implications

- This project is providing insurance populations of threatened arid zone mammals.
- Information will inform guidelines for the proactive management of fire in the arid zone rangelands to reduce the severity (scale and intensity) of wildfires and to provide habitat choice through mosaic burning.
- Guidelines for controlling introduced predators in the arid zone rangelands will reduce this threat to native fauna. Reintroduction and protection of mammals of the arid zone rangelands, other extant fauna, vegetation and other elements of the biota will provide reconstruction of animal and plant assemblages in an arid zone ecosystem.
- A framework and protocol for assessing and reporting trends in ecosystem condition in arid zone rangelands will provide a basis for ecosystem condition monitoring.

Future directions

- Report on effectiveness of feral cat baiting in 2010–2013.
- Write up trials of revised spinifex fuel model.
- Write up trends in mulgara population in response to seasons and introduced predator control.
- Expand the highly successful predator-proof compound.