Concept Plan SP 2014-003

Cat Eradication on Dirk Hartog Island

Animal Science

Project Core Team

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Approved and active

Document endorsements and approvals as of Dec. 12, 2017, 4:44 p.m.

Project Team	granted
Program Leader	granted
Directorate	granted

Cat Eradication on Dirk Hartog Island

Science and Conservation Division Program

Animal Science

Parks and Wildlife Service

Service 2: Conserving Habitats, Species and Ecological Communities

Aims

Control of feral cats is recognised as one of the most important fauna conservation issues in Australia today and as a result, a national 'Threat Abatement Plan (TAP) for Predation by Feral Cats' has been developed. The TAP seeks to protect affected native species and ecological communities, and to prevent further species and ecological communities from becoming threatened. In particular, the first objective of the TAP is to:

- Prevent feral cats from occupying new areas in Australia and eradicate feral cats from high-conservation-value 'islands'

The eradication of feral cats proposed for Dirk Hartog Island follows a prescribed course of action (phases) used elsewhere in successful eradication campaigns. Their first phase involves a succession of removal events that reduce the pest population to such low levels that further efforts often do not find and remove any more animals. Their second phase attempts to validate or assess whether in fact this lack of detection means eradication may have been achieved. Assuming no more pests are found, their third phase is one of surveillance to confirm the assessment and it may continue until a decision is made to stop and declare the eradication a success. Detecting survivors and interpreting the lack of such detections to set stop rules are critical elements of this strategy. Their process collects spatially explicit data on the numbers of animals removed and on the effort to do this as it proceeds.

The size of Dirk Hartog Island, in particular its length, pose logistical constraints on conducting an eradication campaign across the entire island simultaneously. It is not practical or feasible to monitor for cat activity over such a large area and as such, the eradication campaign will be conducted in stages. Each of these stages is outlined briefly below.

Stage 1 (January-April 2014) will be dedicated to establishment of infrastructure in the southern section (Herald Bay) including accommodation and equipment storage, installation of the southern monitoring track network and construction of the barrier fence. Infrastructure construction will be transportable to provide flexibility in its use and options for utilization elsewhere at the completion of the project. Time restrictions due to delays in delivery of the barge have meant that only infrastructure south of the barrier fence can be established within this time period. Infrastructure north of the fence (Sandy Bay accommodation site) and installation of the northern monitoring track network will need to be established when time permits later in 2014.

Stage 2 (May/June 2014-May/June 2015) [Phase 1] a baiting campaign will be conducted May/June 2014 south of the cat barrier fence, an area of approximately 220km^2. An intensive monitoring program will be adopted following the baiting campaign to locate any cat activity. Where warranted, ground-baiting and trapping will be implemented to remove any cats that remain. [Phase 2] At the completion of the monitoring/trapping program, a team of detector dogs and their handlers will be contracted to independently verify eradication.

Stage 3(May/June 2015-May/June 2016) [Phase 1] a baiting campaign will be conducted May/June 2015 north of the cat barrier fence, an area of approximately 420km^2. As above, an intensive monitoring program will be adopted following the baiting campaign to locate any cat activity. Where warranted, ground-baiting and trapping will be implemented to remove any cats that remain. [Phase 2] At the completion of the monitoring/trapping program, a team of detector dogs and their handlers will be contracted to independently verify eradication.

Stage 4 June 2016-June 2018) [Phase 3] a two year surveillance monitoring program will be instigated for a further two years prior to any native species reintroductions.

There is extensive evidence that domestic cats (Felis catus) introduced to offshore and oceanic islands around the world have had deleterious impacts on endemic land vertebrates and breeding bird populations (eg. van Aarde 1980; Moors and Atkinson 1984; King 1985; Veitch 1985; Bloomer and Bester 1992; Bester et al. 2002; Keitt et al. 2002; Pontier et al. 2002; Blackburn et al. 2004; Martinez-Gomez and Jacobsen 2004; Nogales et al.

2004; Ratcliffe et al. 2009; Bonnaud et al. 2010). Feral cats have been known to drive numerous extinctions of endemic species on islands and have contributed to at least 14% of all 238 vertebrate extinctions recorded globally by the IUCN (Nogales et al., 2013). In addition, predation by feral cats currently threatens 8% of the 464 species listed as critically endangered (Medina et al. 2011; Nogales et al. 2013). Island faunas that have evolved for long periods in the absence of predators are particularly susceptible to cat predation (Dickman, 1992). Dirk Hartog Island–once a high biodiversity island–is no exception.

On Dirk Hartog Island (620km2), which is the largest island off the Western Australian coast (Abbott and Burbidge 1995), 10 of the 13 species of native terrestrial mammals once present are now locally extinct (Baynes 1990; McKenzie et al. 2000) probably due to predation by cats (Burbidge 2001; Burbidge and Manly 2002). The extirpated species of mainly medium-sized mammals include: boodie (Bettongia lesueur),woylie (Bettongia penicillata), western barred bandicoot (Perameles bougainville), chuditch (Dasyurus geoffroii), mulgara (Dasycercus cristicauda), dibbler (Parantechinus apicalis), greater stick-nest rat (Leporillus conditor), desert mouse (Pseudomys desertor), Shark Bay mouse (Pseudomys fieldi), and heath mouse (Pseudomys shortridgei). Only smaller species still inhabit the island: ash-grey mouse (Pseudomys albocinereus), sandy inland mouse (Pseudomys hermannsburgensis), and the little long-tailed dunnart (Sminthopsis dolichura). It is possible that the banded hare-wallaby (Lagostrophus fasciatus) and rufous hare-wallaby (Lagorchestes hirsutus) were also on the island as they are both on nearby Bernier and Dorre Islands, and were once on the adjacent mainland. The island also contains threatened bird species including: Dirk Hartog Island white-winged fairy wren (Malurus leucopterus leucopterus), Dirk Hartog Island southern emu-wren (Stipiturus malachurus hartogi), and the Dirk Hartog Island rufous fieldwren (Calamanthus campestris hartogi). A population of the western spiny-tailed skink (Egernia stokesii badia) found on the island is also listed as threatened.

Since the 1860s, Dirk Hartog Island has been managed as a pastoral lease grazed by sheep (Ovis aries) and goats (Capra hircus). More recently, tourism has been the main commercial activity on the island. Cats were probably introduced by early pastoralists and became feral during the late 19th century (Burbidge 2001). The island was established as a National Park in November 2009, which now provides the opportunity to reconstruct the native mammal fauna (Algar et al. 2011). Dirk Hartog Island could potentially support one of the most diverse mammal assemblages in Australia and contribute significantly to the long-term conservation of several threatened species. Successful eradication of feral cats would be a necessary precursor to any mammal reintroductions.

Expected outcome

The biodiversity outcome from this project will be a measurable decline in the cat population, eventually to zero when eradication is confirmed.

There will be global interest in the outcome of this project and the techniques used. Knowledge and technology transfer to other agencies contemplating cat eradications on islands will be through publication of manuscripts in scientific journals and presentations at various conferences.

Strategic context

This project aligns with the Corporate Plan and Science Division Strategic Plan for Biodiversity Conservation Research as outlined below.

Corporate Plan

1. Conserving biodiversity

1.5 Protect diversity from threatening processes, agents and activities including pest animals

Expand and enhance the Western Shield wildlife recovery program incorporating introduced predator control

Expand programs for the control of pest animals

Implement integrated management strategies to control pests and diseases

Give special attention to the protection of internationally recognised natural values of World Heritage sites

Science Division Strategic Plan for Biodiversity Conservation Research

G2 Understand the threats to biodiversity and develop evidence-based management options to ameliorate threats

Threatened species and communities

2.7 Participate in active adaptive management programs that will lead to improved conservation status of threatened arid zone medium-sized mammals (links with 2.2), a group that has declined significantly since European settlement. Adaptive management plans have been developed for Dirk Hartog Island.

Threatening processes

2.20 Complete research into sustained, effective control of feral cats across a range of biomes.

2.34 Develop safe and effective control technologies for feral cats, camels, goats and pigs on DPaW-managed lands.

G6 Promote and facilitate the uptake of research findings and communicate the contribution of science to biodiversity conservation and natural resource management.

This process has already commenced with a number of manuscripts published on preliminary work (see below).

Algar, D., Hilmer, S., Onus, M., Hamilton, N. and Moore, J. (2011). New national park to be cat-free. *LANDSCOPE* **26(3)**, 39-45.

Algar, D., Johnston, M. and Hilmer, S.S. (2011). A pilot study for the proposed eradication of feral cats on Dirk Hartog Island, Western Australia. In: Island Invasives: Eradication and Management (eds. C.R. Veitch, M.N. Clout and D.R. Towns) pp 10-16. IUCN, Gland, Switzerland.

Bode, M., Brennan, K.E.C., Helmstedt, K., Desmond, A., Smia, R. and Algar, D. (2013). Interior fences reduce cost and uncertainty when eradicating invasive species from islands. *Methods in Ecology and Evolution***4(9),** 819-827.

Deller, M. (2013). The role of marine species in the diet of the feral cat, *Felis catus*, on Dirk Hartog Island: a dietary analysis. Bachelor of Science (Conservation Biology and Management) SCIE4501-4 FNAS Research Thesis Faculty of Science. The University of Western Australia.

Hilmer, S.S., Algar, D. and Johnston, M. (2010). Opportunistic observation of predation of Loggerhead turtle hatchlings by feral cats on Dirk Hartog Island, Western Australia. *Journal of the Royal Society of Western Australia* **93**,141-146.

Johnston, M., Algar, D., O'Donoghue, M. and Morris, J. (2011). Field efficacy of the Curiosity® feral cat bait on three Australian islands. In: Island Invasives: Eradication and Management (eds. C.R. Veitch, M.N. Clout and D.R. Towns) pp 182-187. IUCN, Gland, Switzerland.

Johnston, M., Algar, D., Onus, M., Hamilton, N. Hilmer, S. Withnell, B. and Koch, K. (2010). A bait efficacy trial for the management of feral cats on Dirk Hartog Island. Arthur Rylah Institute for Environmental Research Technical Report Series No. 205. Department of Sustainability and Environment, Heidelberg, Victoria. 42 pp.

Koch, K., Algar, D. and Schwenk, K. (accepted). Population structure and management of invasive cats on an Australian island. *Journal of Wildlife Management*.

The project also aligns directly with a number of strategic objectives from the 'Dirk Hartog Island National Park Ecological Restoration Project Submission, November 2012.

Ecological objectives for DHI

1. *Eradicate cats from Dirk Hartog Island*.
2. *Reintroduce 10 mammal species that are locally extinct on the island and introduce two mammal species for conservation purposes.*

Sucessful eradication of feral cats would be a necessary precursor to any mammal reintroductions.

Community objectives

1. Promote scientific research associated with the ecological research project, and publish reports on the project as well as scientific findings.

Expected collaborations

This project has been discussed at length with District/Regional staff and various Dirk Hartog committees since the project was proposed almost a decade ago. The umbrella program 'Dirk Hartog Island National Park Ecological Restoration Project' is a collaboration with other Science and Conservation Division Programs. Collaboration with departmental staff, other government agencies, industry, traditional land owners and the broader community has commenced and will continue as the project progresses.

Collaboration with a number of universities is expected. Several projects have already been undertaken with universities as outlined below.

Genetic analysis of DHI and adjacent mainland cat populations (biosecurity) - Johann Wolfgang Goethe University (Frankfurt, Germany)

Koch, K., Algar, D. and Schwenk, K. (accepted). Population structure and management of invasive cats on an Australian island. *Journal of Wildlife Management*.

Cat diet on DHI using stable isotope analysis - University of Western Australia

Deller, M. (2013). The role of marine species in the diet of the feral cat, *Felis catus*, on Dirk Hartog Island: a dietary analysis. Bachelor of Science (Conservation Biology and Management) SCIE4501-4 FNAS Research Thesis Faculty of Science. The University of Western Australia.

Proposed period of the project

Jan. 2, 2014 – Dec. 31, 2018

Staff time allocation

Role	Year 1	Year 2	Year 3
Scientist	1.5	1.5	1.5
Technical	4.5	4.5	4.5
Volunteer	unknown	unknown	unknown
Collaborator	unknown	unknown	unknown

Indicative operating budget

Source	Year 1	Year 2	Year 3
Consolidated Funds (DPaW)	205,000	205,000	205,000
External Funding	1,600,000	750,000	700,000