

## Project Plan SP 2016-072

# Threatened animal recovery through feral cat control in Western Australia - South coast component

Species and Communities

### Project Core Team

Supervising Scientist	Manda Page
Data Custodian	Manda Page
Site Custodian	

### Project status as of March 13, 2019, 12:54 p.m.

Pending project plan approval

### Document endorsements and approvals as of March 13, 2019, 12:54 p.m.

Project Team	required
Program Leader	required
Directorate	required
Biometrician	required
Herbarium Curator	not required
Animal Ethics Committee	required

# Threatened animal recovery through feral cat control in Western Australia - South coast component

## Biodiversity and Conservation Science Program

Species and Communities

## Departmental Service

Service 7: Research and Conservation Partnerships

## Project Staff

Role	Person	Time allocation (FTE)
Research Scientist	Dave Algar	0.1
Supervising Scientist	Sarah Comer	0.1
Supervising Scientist	Manda Page	0.0

## Related Science Projects

SP 2016-075 Threatened animal recovery through feral cat control in Western Australia - Dryandra component  
 SP 2016-074 Threatened animal recovery through feral cat control in Western Australia - Kalbarri component  
 SP 2016-068 South West Threatened Fauna Recovery Project: Southern Jarrah Forest  
 SP 2003-005 Development of effective broad-scale aerial baiting strategies for the control of feral cats;  
 SP 2016-018 Ecology of the feral cat (*Felis catus*) in coast heaths of the south coast of Western Australia;  
 SP 2012-022 Conservation of south coast threatened birds

## Proposed period of the project

Feb. 29, 2016 – June 30, 2018

## Relevance and Outcomes

### Background

Over the last 200 years, 50 per cent of the world's mammal extinctions have occurred in Australia (Short and Smith, 1994). In Western Australia alone, 12 mammals and two birds have become extinct and at 30 June 2015, 39 terrestrial mammals and 23 terrestrial birds native to the State were classified as being threatened with extinction. Of these, three mammals and two birds are ranked as critically endangered. For mammals, most extinctions and declines have occurred in medium-sized species, in the so called 'critical weight range' of 35g to 5500g (Burbidge and McKenzie, 1989).

Predation by feral cats (*Felis catus*) and foxes (*Vulpes vulpes*) is a key threatening process in the decline of many, if not all, these species (Department of Environment, 2013 and 2015a). Foxes have been successfully controlled for many years in a range of locations across Western Australia using dried meat sausage baits containing 1080 poison. Over a decade of research by Parks and Wildlife scientists has led to the development of the *Eradicat*® feral cat bait, a moister meat bait, also containing 1080, that is more palatable to feral cats. *Eradicat*® was registered for operational use in Western Australia in December 2014, providing the opportunity to integrate broad-scale feral cat control with existing fox baiting programs and other actions, such as translocation, that are implemented to improve the recovery of threatened native animals.

On 16 July 2015, the Minister for Environment, Hon Albert Jacob MLA, and the Commonwealth Minister for the Environment, Hon Greg Hunt MP, announced \$1.7 million in funding for the Department of Parks and Wildlife to assist threatened animal recovery. The funding will be used to integrate the new *Eradicat*® feral cat bait with current fox baiting in four different Western Australian environments. Sites have been specifically selected to direct the funding to improving conservation of species identified in the Commonwealth's Threatened Species

Strategy, and to align with fauna recovery programs already underway or planned by Parks and Wildlife in the south-west of WA.

This project fits within a broader suite of actions delivered by Parks and Wildlife to reduce the impacts of feral cats and foxes on threatened species in Western Australia. This includes Western Shield, the Integrated Fauna Recovery Project on the south coast, Rangelands Restoration at Matuwa and many other smaller scale projects.

The primary goal of the project is to contribute to the recovery of key threatened mammal and bird species found at each of these sites, through integrating feral cat baiting with existing fox baiting to reduce the impact of introduced predators, and undertaking translocations to establish new, secure populations, where necessary.

While the *Eradicat*<sup>®</sup> feral cat bait is the primary tool in achieving effective feral cat control, other methods, such as shooting and/or trapping, may also be employed. For example, some individual cats appear to be reluctant to take baits or local climatic conditions may reduce the effectiveness of baiting alone. Some flexibility is built into the project plan to allow this suite of control options to be employed, as necessary.

This SPP relates to the south coast component of the project, which will build on investment into the implementation of the South Coast Region's adaptive management project, that led to the establishment of the IFRP (DEC, 2009; Comer *et al.*, 2010). Data gathered will inform effectiveness of integrated introduced predator management on conservation of the critically endangered western ground parrot (*Pezoporus flaviventris*), efficacy of *Eradicat*<sup>®</sup> baiting measured through site occupancy in the Fitzgerald River National Park, and protocols to improve feral cat control in south coast ecosystems.

The SPP covers the periods January-June 2016, and the 2016-17 and 2017-18 financial years. A project agreement has been signed with the Commonwealth Government outlining funding to be provided in each financial year and key deliverables.

#### **BACKGROUND FOR SOUTH COAST COMPONENT:**

The south coast component of the South West Fauna Recovery Project will build on work carried out between 2009 and June 2016 under the IFRP, which implemented the South Coast Region's adaptive management project (DEC, 2009; Comer *et al.*, 2010; Comer *et al.*, 2011; Clausen *et al.*, 2016 in prep.). This project was focussed on testing effectiveness and establishing protocols for optimising *Eradicat*<sup>®</sup> baiting, and implementing recovery actions for the critically endangered western ground parrot and other EPBC listed threatened fauna (Appendix IV).

The June 2016, the IFRP Steering Committee recommended that future studies continue to determine the optimal timing for an annual delivery of baits in south coast reserves, and this work consider the numbers and demographics of feral cats that are surviving *Eradicat*<sup>®</sup> baiting. As baiting is thought to significantly change the demographics of a feral cat population in a treatment area (D. Algar, pers. comm.), the direct impacts on demographics can only be tested in a reserve where feral cats have not been exposed to *Eradicat*<sup>®</sup> baits previously, that is a population 'naïve' to the bait. The recommended methodology for this trial would include delivery of non-toxic baits injected with a biomarker (e.g. Rhodamine B), and samples of whiskers taken from cats trapped following either one or two baiting periods analysed for the presence of Rhodamine B (Fisher *et al.*, 1999). Testing a naïve population would provide further value to evaluation for the optimal time for baiting, which is one of the main priorities arising from the IFRP work.

Protocols that use multiple techniques to support baiting effectiveness are also recommended, and ideally will be tested in the field. In spring 2016, it is proposed to run three periods of camera monitoring in the FRNP, both pre- and post-baiting, and with a third period following targeted trapping of feral cats, six and ten weeks post-baiting. Changes in pre-bait site occupancy will then be modelled following baiting, and following baiting both with and without targeted removal of cats. If funding permits, these expanded trials will be replicated in autumn 2017 to further inform optimal season of feral cat control.

The guidance of the IFRP project by a steering committee has resulted in clear directions for future work, and at the final meeting in June 2016 priorities for future work focussed on testing methods to improve bait uptake by feral cats and demonstrating effectiveness of integrated, introduced predator control were agreed to. These included:

1. Conduct study at a new 'naïve' location;
2. Conduct further investigations to determine the influence of environmental conditions on bait palatability and degradation;
3. Improve monitoring of other terrestrial bird species (e.g. in FRNP) that could be impacted by cat predation;
4. Use GPS collar to examine potential for targeted (SMART) baiting;
5. Conduct a second spring baiting trial in FRNP with a wider spread of camera sites;
6. Continue to monitor western ground parrot populations in autumn.

In addition it is proposed that the south coast component of the SW Fauna Recovery Project continues to operate in an active adaptive management framework, guided by a steering committee of appropriate members.

## Aims

To recover wild populations of western ground parrots at Cape Arid National Park and Fitzgerald River National Park\* through:

- (a) Effective integration of feral cat control with existing fox control;
- (b) Successful translocations, if appropriate; and
- (c) Effective neighbour engagement.

\*includes actions at Fitzgerald River National Park as it is possible western ground parrots are still present at this location.

## Expected outcome

- Continue to inform standard protocols for delivery of *Eradicat*® and the use of other introduced predator control techniques to maximise effectiveness, and optimise integration of feral cat control in south coast ecosystems;
- Monitoring cat and fox populations to measure success of management actions;
- Monitoring western ground parrot populations in Cape Arid National Park as an indication of success of management actions;
- Community awareness and engagement to ensure understanding of and support for management actions.

The retention of IFRP project expertise and synergies with a current PhD study (S. Comer, UWA – “Ecology of the feral cat (*Felis catus*) in coastal heaths of the south coast of Western Australia”) looking at feral cat ecology on the south coast, provides an opportunity for additional outcomes to be achieved in 2016-17 year (i.e. not part of the formal MERI plan). These follow from recommendations made at the final IFRP steering committee meeting, and include:

- Targeted feral cat trapping around habitat of CR EPBC fauna (western ground parrot and Gilbert's potoroo, *Potorous gilbertii*) in Cape Arid NP and Two Peoples Bay NR;
- Analysis of GPS collar data from feral cats in south coast reserves to investigate options for targeting areas during baiting (“smart” baiting);
- Conduct study at a new ‘naïve’ location to optimise timing of baiting programs;
- Conduct further investigations to determine the influence of environmental conditions on bait palatability and degradation;
- Improve monitoring of other terrestrial bird species (e.g. in FRNP) that could be impacted by cat predation;

## Knowledge transfer

- Methods utilised for monitoring western ground parrots will be used by managers of this species, and application of technology for monitoring other threatened bird taxa (e.g. Australasian Bittern (*Botaurus poiciloptilus*) and Noisy Scrub-bird (*Atrichornis clamosus*));
- Knowledge gained through this project will be used by Western Shield and other land managers to inform optimal introduced predator control through timing of baiting and knowledge applicable to landscape/re-serve managers.

## Tasks and Milestones

Acronyms used in Tables

CANP – Cape Arid National Park

FRNP – Fitzgerald River National Park

NNR – Nuytsland Nature Reserve

SCD – Science and Conservation

SCNRM – South Coast NRM

SCR – South Coast Region and Albany/Esperance District staff

SCR-IFRP – IFRP team & South Coast Region (Districts) staff

TPB-MP – Two Peoples Bay – Manypeaks Nature Reserves complex (includes Waychnicup National Park)  
 UWA – University of Western Australia  
 WGP – Western Ground Parrot  
 WR – Warren Region  
 WS – Western Shield

#### Year 1- January – June 2016

Task	Milestones	Outputs	Timeframe	Responsibility
Implement integrated baiting	Autumn <i>Eradicat</i> baiting	Baits delivered CANP-NNR, FRNP, TPB-MP	March – April 2016	WS
Undertake cat/fox monitoring	Camera monitoring completed	Occupancy models/presence & abundance pre- and post-baiting for feral cat, fox, chuditch FRNP	June 2016	SCR-IFRP/UWA
Undertake WGP monitoring	Autumn monitoring of populations at Pasley and Poison Creek completed.	Relative calling activity (No. calls per survey session)	June 2016	SCR-IFRP/SCD
Review and adapt monitoring	Review baiting efficacy data	Baiting efficacy data reviewed by Steering Ctte	June 2016	IFRP Steering Ctte (SCR/SCD/UWA/WR)
Undertake neighbour engagement	Volunteer participation in WGP surveys	No. Volunteer hours	Jan – June 2016	SCR -IFRP
Undertake media /awareness	Public information/media	No. events/articles published	June 2016	SCR-IFRP/SCD
Reporting	Update on activities completed	MERIT	June 2016	SCR/IFRP

#### Year 2- 2016/17

Task	Milestones	Outputs	Timeframe	Responsibility
Optimal baiting regime	Spring baiting completed	Baits delivered CANP-NNR*, FRNP, TPB-MP	September – early October 2016	WS
Undertake cat/fox monitoring	Camera monitoring	Occupancy models/presence & abundance pre- and post-baiting for feral cat, fox, chuditch FRNP	December 2016	SCR-IFRP/UWA
Undertake cat/fox monitoring	Trapping	Post-baiting trapping completed around WGP habitat CANP	November 2016 May 2017	SCR-IFRP

Deliver baits to naïve site	Spring (2016 non-toxic) and autumn (2017 toxic) delivery to SRNP	<ul style="list-style-type: none"> <li>Baits delivered</li> <li>Feral cat vibrissae collection &amp; collars fitted (Spring 2016)</li> <li>Feral cat mortality (Autumn 2017)</li> </ul>	Spring16 & April 2017	SCR-IFRP /WS/SCD
Undertake WGP monitoring (Listening and ARUs)	Autumn monitoring of populations at Pasley and Poison Creek completed.	Relative calling activity (No. calls per survey session)	June 2017	SCR-IFRP/SCD
Review and adapt monitoring	Review baiting efficacy data	Baiting efficacy data reviewed by Steering Ctte	June 2017	IFRP Steering Ctte (SCR/SCD/UWA/WR)
Undertake neighbour engagement	Volunteer participation in WGP surveys	No. Volunteer hours	June 2017	SCR
Undertake neighbour engagement	Neighbour participation in feral cat/fox shoots	No. farmers participating	June 2017	SCR/SCNRM
Undertake media /awareness	Public information/media	No. events/articles published	June 2017	SCR/SCD
Reporting	Update on activities completed	MERIT	December 2016 June 2017	SCR

*\*CANP is baited with Eradicat®, but resources only support monitoring of western ground parrots*

### Year 3 – 2017/18

Task	Milestones	Outputs	Timeframe	Responsibility
Implement integrated baiting	<i>Eradicat</i> ® baiting (optimal timing informed by 2016-17 work)	Baits delivered CANP -NNR, FRNP, TPB-MP	To be confirmed s: either spring 2017 or autumn 2018	WS
Undertake cat/fox monitoring	Camera monitoring	Occupancy models/presence & abundance pre- and post-baiting for feral cat, fox, chuditch FRNP	June 2018 timing as above	SCR/UWA
Undertake WGP monitoring	Autumn monitoring of populations at Pasley and Poison Creek completed.	Relative calling activity (No. calls per survey session)	June 2018	SCR
Review and adapt monitoring	Review baiting efficacy data	Baiting efficacy data reviewed by Steering Ctte (IFRP model)	May 2018	SCR/SCD/UWA/WR
Undertake neighbour engagement	Volunteer participation in WGP surveys	No. Volunteer hours	June 2018	SCR

Undertake media /awareness Reporting	Public information/media Update on activities completed	No. events/articles published MERIT	June 2018 June 2018	SCR/SCD SCR
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## References

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## Study design

### Methodology

#### Feral cat control (2016-17)

Efficacy of *Eradicat*® baiting under different seasonal conditions will be tested in three ways, and timing of proposed activities is summarised in Appendix III, with responsibilities summarised in Table 1. As for previous IFRP work, and where possible with the constraints of SWFRP budget, two metrics will be used to determine baiting efficacy. Camera monitoring of the efficacy of *Eradicat*® baiting will be evaluated using a BACI (before-after control-impact) design, with site occupancy modelled using Bayesian models (Comer *et al.*, 2016b). Additional support for testing an autumn baiting success will be evaluated with the direct knock-down of a 'naïve' population of radio-collared feral cats.

1. Bait uptake will be determined in the FRNP using occupancy models in spring 2016 and early autumn 2017, with pre- and post-bait occupancy determined from remote cameras. Treatment and control sites will be established in the Fitzgerald River National Park (Figure 1), and data collected using methods described in Comer *et al.*, (2016a). Bayesian models will be run in Winbugs, using spatial and heterogeneity models (Comer *et al.*, 2016b). Trapping will be carried out in the treatment cell following baiting, in order to remove animals that have not taken baits, and cameras redeployed to determine occupancy following both baiting and trapping (Figure1).
2. To provide further evidence for optimal timing of feral cat control on the south coast, a spring and autumn trial of *Eradicat*® uptake will be tested on a naïve population of feral cats (previously not exposed to *Eradicat*®) in the Stirling Range National Park. In spring 2016, non-toxic *Eradicat*® baits containing rhodamine biomarker will be delivered to approximately 40,000ha of the park, in conjunction with Western Shield fox baiting (e.g. Figure 2). While the eastern end of the Park is favoured, the exact location of the proposed cell is currently being confirmed, and will be dependent on the accessibility of tracks to field staff. Four to six weeks post-baiting, feral cats will be trapped in the Park, and vibrissae removed to determine level of bait take (Fisher *et al.*, 1999). These cats will be fitted with VHF radio collars and released at the capture location. Neighbour engagement will also be sought through existing NRM collaborations, with adjoining farmers invited to participate in feral cat shoots to collect vibrissae from animals on the perimeter of the park that may have taken baits. In autumn 2017, a toxic delivery of *Eradicat*® (also including rhodamine biomarker if toxic baiting is not approved) will be carried out in SRNP, and effectiveness determined by knockdown of collared cats and camera trapping to determine probability of site occupancy pre- and post-baiting.
3. Following spring 2016 and autumn 2017 *Eradicat*® baiting in CANP, feral cat trapping will be conducted around WGP habitat. Trap success will be used as a measure of the effectiveness of the aerial baiting program, and this targeted removal of individuals that have survived baiting will enhance protection of habitat for ground parrots

#### Monitoring cat and fox numbers to determine effectiveness of management actions

Fox and cat numbers will be monitored in the FRNP as a direct result of the activities carried out in A (above). In addition, the remote camera monitoring grid established in Two Peoples Bay Nature Reserve (Clausen *et al.*, 2016) will continue to provide information on cat and fox numbers and activity in response to introduced predator management, and areas requiring targeted trapping and baiting with raised suspension devices (Algar and Brazell, 2008). Targeted trapping in Cape Arid (from section A) and Two Peoples Bay will provide a metric of trap success, and genetic material collected from trapped cats will be analysed for modelling effective population size.

#### Monitoring Western Ground Parrot populations (2016-18)

Western ground parrot populations will be monitored in autumn, with both human listening in known population areas and automated recording units (ARUs) installed on established survey grids for the monitoring period in three areas: two established grids in core areas of un-burnt habitat in Cape Arid National Park (Poison Creek, Pasley Track) and a new grid in Nuytsland Nature Reserve.

Grids contain up to 36 survey points in ground parrot habitat on a pre-determined 400x400m square array. Units will be deployed on at least 12 randomly selected grid points for eight weeks between March and May. ARUs are programmed to record for a 30 minute period from 20 - 50 minutes after sunset to monitor the peak calling period (Burbidge *et al.*, 2007). A subset of recordings will be analysed for each unit to determine a call



rate for the point and mean rate for the monitoring site, with at least 20% of recording data analysed for each unit and selection of recordings for analysis based on wind data for each day (with calmest days selected as a priority).

Community volunteers (including Friends of the Western Ground Parrot) will be involved in western ground parrot monitoring trips, with a small number of volunteers joining staff on monitoring trips.

Table 3: Timing of activities proposed for this project. Pink cells require APVMA approval (pending), WS indicates baiting will be covered through Western Shield Program, IFRP work that will be carried out by the IFRP team, and SC indicates the South Coast Region and Albany/Esperance Districts will complete works in these periods if further funds cannot be found to support the retention of IFRP staff.

ACTIVITY	LOCATION	Autumn 2016	Spring 2016	Autumn 2017	Spring 2017	Autumn 2018
Baiting ( <i>Eradicat</i> ®)	FRNP	WS	APVMA	WS		WS
Baiting ( <i>Eradicat</i> ®)	CANP/NNR	WS	APVMA	WS		WS
Baiting ( <i>Eradicat</i> ®)	TPB-MP	WS	APVMA	WS		WS
Baiting (non-toxic)	SRNP		IFRP	IFRP		
Monitoring - fox & cat	FRNP	IFRP	IFRP	IFRP		
Monitoring - fox & cat	TPB-MP	IFRP	IFRP	IFRP	SC	SC
Monitoring - cat	SRNP		IFRP	IFRP		
Monitoring - cat	CANP	IFRP	IFRP			
Monitoring - WGP	CANP/NNR	IFRP		IFRP		SC

### Proposed Site Baiting Prescription

#### South Coast sites – Fitzgerald River and Cape Arid cells

Current prescription: Two times aerial fox bait and one times aerial feral cat bait + quarterly ground fox baiting.

Proposed prescription:

2016 Two times aerial fox bait and two times aerial feral cat bait in part cell+ quarterly ground fox baiting.

2017-18 Two times aerial fox bait and one times aerial feral cat bait in part cell+ quarterly ground fox baiting.

#### South Coast sites – Manypeaks and Two People's Bay cells

Current prescription: three times aerial fox bait and one times aerial feral cat bait of both cells. Manypeaks = quarterly fox baiting of cell. Six times ground baiting of potoroo enclosure. TPB = monthly ground fox baiting. Other measures as conducted under IFRP.

Proposed prescription:

2016 two times aerial fox bait and two times aerial feral cat bait of both cells

2017-18 three times aerial fox bait and one times aerial feral cat bait of both cells.

Manypeaks = quarterly ground fox baiting of cell. Six times ground baiting of potoroo enclosure. TPB = monthly ground fox baiting.

#### South Coast sites – Stirling Range cells

Current prescription: three times aerial fox bait + quarterly ground fox baiting.

2016 spring include non-toxic *Eradicat*® with rhodamine-b biomarker over 40,000 ha of park

2017 autumn include toxic *Eradicat*® over 40,000 ha of park

Other complementary measures, including engagement with reserve neighbours: Encourage baiting, trapping and shooting around all reserves, with timing to coincide with on-reserve management activities where appropriate (eg rhodamine trials).

Note: further work on determining the most effective time for feral cat baiting at south coast sites (autumn or spring) will continue in the 2016 and 2017 period with at Fitzgerald River NP and Stirling Range NP.

### **Biometrician's Endorsement**

required

### **Data management**

#### **No. specimens**

#### **Herbarium Curator's Endorsement**

not required

### **Animal Ethics Committee's Endorsement**

required

### **Data management**

Hard copies of data will be kept on files, with scanned copies of raw data sheets on Albany workcentre shared drive. Digital data will continue to be stored in MS Access databases including the western ground parrot survey database and existing databases developed or used for the IFRP project, feral cat database and images stored on Camerabase for Images (Tobler, 2013). Data extracts can be provided for incorporation into corporate datasets.

Data custodian: Sarah Comer

## **Budget**

### **Consolidated Funds**

Source	Year 1	Year 2	Year 3
FTE Scientist	0.5	0.5	0.5
FTE Technical		0.5	0.5
Equipment			
Vehicle			
Travel			
Other			
Total	60,000	150,000	150,000

### **External Funds**

Source	Year 1	Year 2	Year 3
Salaries, Wages, Overtime			
Overheads			
Equipment			
Vehicle			
Travel			
Other			

Source	Year 1	Year 2	Year 3
Total			