



Department of **Biodiversity,  
Conservation and Attractions**

## Felixer™ feral cat grooming trap trials in the presence of northern quolls

Judy Dunlop (DBCA), Neal Birch (DBCA), Harriet Davie (Roy Hill),  
Jared Nelson (FMG) and John Read (Thylation Inc.)



July 2020

Department of Biodiversity, Conservation and Attractions  
Locked Bag 104  
Bentley Delivery Centre WA 6983  
Phone: (08) 9219 9000  
Fax: (08) 9334 0498

[dbca.wa.gov.au](http://dbca.wa.gov.au)

© Department of Biodiversity, Conservation and Attractions on behalf of the State of Western Australia  
2019  
July 2019

This work is copyright. You may download, display, print and reproduce this material in unaltered form (retaining this notice) for your personal, non-commercial use or use within your organisation. Apart from any use as permitted under the *Copyright Act 1968*, all other rights are reserved. Requests and enquiries concerning reproduction and rights should be addressed to the Department of Biodiversity, Conservation and Attractions.

This report/document/publication was prepared by Dr. Judy Dunlop

The recommended reference for this publication is:

Dunlop J, Birch N, Davie H, Nelson J, Read J, 2019, *Felixer feral cat grooming trap trials in the presence of northern quolls*, Department of Biodiversity, Conservation and Attractions, Perth.

This document is available in alternative formats on request.

Cover image : Judy Dunlop

# Contents

Acknowledgments.....5  
Summary .....5  
Introduction .....6  
Methods.....7  
Results and Discussion .....7  
References .....10

# Figures

Figure 1. Feral cats correctly identified as targets during the Pilbara Felixer trials.....8  
Figure 2. A euro that was correctly identified as a non-target, despite triggering the correct sensor arrangement.....8  
Figure 3. Northern quolls visiting the Felixers. Northern quolls crossed only the bottom sensor 99% of the time.....9  
Figure 4. A summary of the 1305 trigger events for three Felixer units deployed in northern quoll habitat in the WA Pilbara. Non-targets are shown in grey, and identified targets in red. ....9



## Acknowledgments

We are grateful to Betty and Colin Brierly who facilitated trials on Indee Station, Todd Edwards and Brad Bessen for their assistance with FMG trials, and Gary Edwards who was key in getting approvals underway.

This work was undertaken with the WA Department of Health medicines and poisons research permit 29564, DBCA animal ethics approvals 2014/19 and 2019-32A, APVMA research approval 80926 / 125193 and DBCA 1080 landholder baiting approval.

## Summary

Feral cats are a primary threat to much of Australia's native fauna and control of feral cats remains a high priority. Automated feral cat grooming traps (Felixers) were tested in photo-only mode in the Pilbara region in the presence of endangered northern quolls and a variety of other species to test for target specificity. From 1305 photo trigger events, no non-target species were targeted by the units. In total, 11 of 25 feral cat triggers were targeted, and cats passed the units multiple times during the trial. We recommend that Felixer units are considered to be safe for use in the presence of endangered northern quolls in the Pilbara for control of feral cats.

## Introduction

Feral cats are implicated in the extinctions of 26% of birds, mammals and reptiles worldwide, and pose a primary threat to many species of native Australian animals (Doherty *et al.*, 2016; Woinarski *et al.*, 2015). Feral cats are likely to have been a significant factor in 27 of the 47 faunal extinctions since European settlement (Woinarski *et al.*, 2019). Control of feral cats is difficult due to their preference for hunting live prey rather than taking baits, their cryptic and nocturnal behaviour, and their ability to persist in almost every habitat across the continent (Woolley *et al.*, 2019; Algar *et al.*, 2020). While combined baiting and trapping tools have been shown to be effective in some areas (Lohr and Algar, 2020), investing in the development of additional novel control technologies remains a high priority (Webber, 2020).

Thylation Ltd have developed an automated Feral Cat Grooming Trap (the “Felixer”) as a new tool for feral cat management. The unit uses an array of lasers to detect the shape and movement of a feral cat and sprays a lethal dose (8mg) of 1080 toxic gel onto the fur of the feral cat from up to four metres away. The feral cat instinctively grooms itself to remove the gel and in doing so ingests a lethal dose of the poison. The Felixer is capable of discharging 20 times (via 20 separate, measured dose cartridges) before the internal magazine needs to be reloaded with new cartridges. The unit takes a photograph every time the detection beams are crossed, allowing managers to assess the efficacy of the trap in differentiating feral cats from non-target species and also allowing Felixers to be used as stand alone, solar powered camera traps. This new technology is being trialled in several locations in Australia, with more than 50 units deployed in different environments, initially with non-toxic cartridges (Read *et al.*, 2019; Moseby *et al.*, 2020).

Northern quolls (*Dasyurus hallucatus*) were identified as a potentially problematic non-target species for Felixer use due to their cat-like shape, and vulnerability to doses of 1080 (McIlroy, 1981; King, 1989). Northern quolls are endangered nationally and in Western Australia, with feral cats identified to be a primary threat (Cramer *et al.*, 2016). In collaboration with Roy Hill and FMG, DBCA have been trialling three Felixer units in the Pilbara to determine their safety and efficacy. Proper testing of this new technology is essential for validating the Felixer as an effective and low-risk feral cat management tool and eventually securing APVMA approvals for non-research deployments. False targeting of native non-target species would be a critical error for conservation measures and require adjustments to detection algorithms.

## Methods

Felixers (Model 3, Thylation, SA) were deployed in known northern quoll habitat where feral cats have also been recorded. The two sites used were Indee Station, 50 km S of Port Hedland (-20.879, 118.588) and North Star mine, 100km SSE of Port Hedland (-21.241, 119.056).

Felixers were used on “conservative” photo-only mode with audio lures (see Moseby *et al.* 2020 for details) turned on. Each Felixer was paired with one or two Reconyx PC900 cameras to validate fauna triggers. The units were deployed between 10/4/2018 and 11/1/2019, except for the Dec-Mar cyclone seasons.

## Results and Discussion

The photo-only trial has now been completed. The units recorded a total of 1305 photo trigger events, where each event is at least two minutes apart. We categorised photos by fauna group (Figure 4) and examined the data associated with each image to determine targets and non-targets.

Northern quolls passed the Felixer units on 226 occasions (17.2% of triggers), all of which were non-target events (Figure 3). The majority of other fauna triggers were from birds (33%), humans (4.5%) and euros (*Osphranter robustus*; 1%), all of which were non-targets. Other species included brushtail possums, goannas (*Varanus spp*), echidnas (*Tachyglossus aculeatus*), and rodents (probably *Zygomys* or *Notomys* species). No animals were recorded on 27% of images, so were either triggered by vegetation movement or by an animal (e.g. euro or bird) moving quickly past the cameras.

Only feral cats were identified as targets (Figure 1, Figure 4). There were 25 occasions of feral cats passing by the Felixer units and they were identified as targets on 11 occasions. The units erred on the side of caution – if animals approached from an angle or moved too slowly, they were identified as non-targets. From photos that were identifiable, the same cats appeared to have passed by on more than one occasion so had multiple opportunities to be targeted.

An example of the target specificity of the Felixer units was a euro that was correctly identified as a non-target, despite triggering the correct sensor arrangement (Figure 2). To fire, the L and R sensor must be triggered simultaneously, and top and bottom sensor must be missed. However, the Felixer identified that the object crossing the L and R sensors were too far apart (being on the euro’s head and flank) and the animal not moving smoothly enough to satisfy target requirements. One cat was also identified as a non-target for the same reason. This data is available in the readouts associated with each image, potentially allowing non-target issues associated with a particular location to be addressed.

There were no non-target issues for any of the Pilbara native species observed during this trial, and we recommend that Felixers be considered safe for use in the presence of endangered northern quolls. Felixers are currently in use in toxic mode at six locations in South Australia, including at Venus Bay, APY Lands, Arid Recovery, Secret Rocks, Flinders Rangers and Kangaroo Island, as well as West Island in NT and Cape York in Queensland. The Arid Recovery trial was the most significant Felixer trial to date where Felixers fired at 33 feral cats within a large fauna enclosure, reducing the population of feral cats by approximately 66% (Moseby *et al.*, 2020). Other species detected by the Felixers included boodies (*Bettongia lesueur*), woylies (*Bettongia penicillata*) and bilbies (*Macrotis lagotis*), all of which were labelled non-targets. A Kangaroo Island trial revealed all eight radio-collared cats that were fired upon by

Felixers were recorded dead within 24 hrs (Hodgens, 2019), confirming high mortality rates recorded in pen trials.

These automated units provide a promising method for targeted feral cat control at specific localities. Situations where they may be particularly appropriate include: high-value threatened species populations in restricted areas, predator “sink” locations (such as on the outside of predator exclosures) or “source” locations (such as minesite rubbish tips), in locations where movement of feral cats is restricted (such as peninsulas or islands), or where a large number of non-target species prevent use of other techniques. The units have low maintenance requirements, which is advantageous in remote regions.



*Figure 1. Feral cats correctly identified as targets during the Pilbara Felixer trials.*



*Figure 2. A euro that was correctly identified as a non-target, despite triggering the correct sensor arrangement.*





Figure 3. Northern quolls visiting the Felixers. Northern quolls crossed only the bottom sensor 99% of the time.

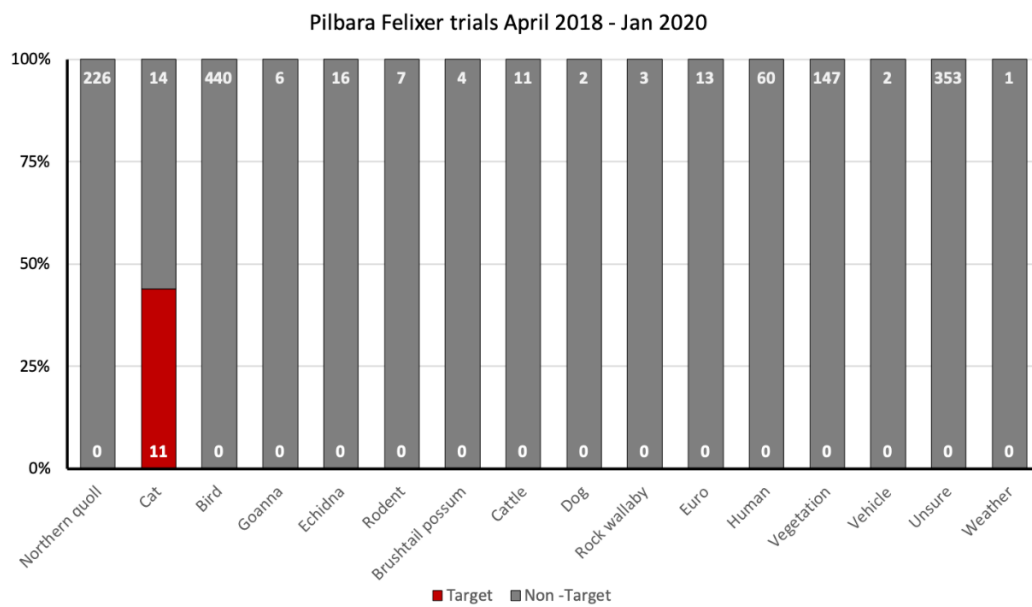


Figure 4. A summary of the 1305 trigger events for three Felixer units deployed in northern quoll habitat in the WA Pilbara. Non-targets are shown in grey, and identified targets in red.

## References

- Algar, D., Johnston, M., Tiller, C., Onus, M., Fletcher, J., Desmond, G., Hamilton, N. and Speldewinde, P.** (2020). Feral cat eradication on Dirk Hartog Island, Western Australia. *Biological Invasions*, 22(3), 1037-1054.
- Cramer, V., Dunlop, J., Davis, R.A., Ellis, R., Barnett, B., Cook, A., Morris, K. and van Leeuwen, S.** (2016). Research priorities for the northern quoll (*Dasyurus hallucatus*) in the Pilbara region of Western Australia. *Australian Mammalogy*, 38(2), 1-14.
- Doherty, T.S., Dickman, C.R., Johnson, C.N., Legge, S.M., Ritchie, E.G. and Woinarski, J.C.Z.** (2016). Impacts and management of feral cats in Australia. *Mammal Review*, 47(2), 87-97.
- Hodgens, P.** (2019). Felixer vs Felis: Innovative engagement of Kangaroo Island landholders in feral cat control activities. Report prepared for Kangaroo Island NRM: Terrain Ecology, Kangaroo Island.
- King, D.R.** (1989). An assessment of the hazard posed to northern quolls (*Dasyurus hallucatus*) by aerial baiting with 1080 to control dingoes. *Wildlife Research*, 16, 569-574.
- Lohr, C.A. and Algar, D.** (2020). Managing feral cats through an adaptive framework in an arid landscape. *Science of the Total Environment*, 720, 137631.
- McIlroy, J.C.** (1981). The sensitivity of Australian animals to 1080 poison. II. Marsupial and eutherian carnivores. *Wildlife Research Wildl. Res.*, 8(2), 385-399.
- Moseby, K.E., McGregor, H. and Read, J.L.** (2020). Effectiveness of the Felixer grooming trap for the control of feral cats: a field trial in arid South Australia. *Wildlife Research*, WR19132.
- Read, J.L., Bowden, T., Hodgens, P., Hess, M., McGregor, H. and Moseby, K.** (2019). Target specificity of the felixer grooming “trap”. *Wildlife Society Bulletin*, 43(1), 112-120.
- Webber, B.** (2020). Increasing knowledge to mitigate cat impacts on biodiversity. The Western Australian Biodiversity Science Institute, Perth.
- Woinarski, J.C.Z., Burbidge, A. and Harrison, P.L.** (2015). Ongoing unraveling of a continental fauna: Decline and extinction of Australian mammals since European settlement. *Proceedings of the National Academy of Sciences*, 112(15), 4531-4540.
- Woinarski, J.C.Z., Legge, S.M. and Dickman, C.R.** (2019). *Cats in Australia: companion and killer*. CSIRO Publishing.
- Woolley, L., Geyle, H.M., Murphy, B.P., Legge, S.M., Palmer, R., Dickman, C.R., Augusteyn, J., Comer, S., Doherty, T.S. and Eager, C.** (2019). Introduced cats *Felis catus* eating a continental fauna: inventory and traits of Australian mammal species killed. *Mammal Review*, 49(4), 354-368.