Breach of the Lorna Glen fauna refuge compound by a feral cat
Chronology and lessons learnt

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Background

Operation Rangelands Restoration is an integrated management program aimed at restoring and protecting viable populations of native fauna and flora, restoring healthy ecosystem processes, and preserving indigenous cultural values. In partnership with the local Wiluna Aboriginal community, the Department of Parks and Wildlife (DPaW) has been implementing Rangelands Restoration on Lorna Glen (LG), an ex-pastoral lease of some 245,000 ha, since 2001. Science-based actions in an adaptive management framework include controlling introduced herbivores and predators, ecologically appropriate fire management and the reintroduction of threatened arid zone fauna.

Feral cats are a significant threat to fauna conservation in the semi-arid and arid rangelands. Annual aerial baiting of LG has reduced but not eradicated the feral cat population. Many species of native fauna have responded positively to reduced predation pressure, however, the successful establishment of reintroduced species has been mixed. Knowing that some reintroduced species are able to persist with low levels of predation by feral cats so can 'free range', while others are highly vulnerable to predation, a decision was made in 2008 to construct a predator-proof compound, or an 'inland island', to protect the most vulnerable species such as boodies and mala. Predator-proof refuges are an important complementary fauna conservation strategy where cat eradication cannot be achieved. Since its construction, the compound has been largely successful at excluding introduced predators, resulting in thriving populations of several species of threatened arid zone mammals.

On 4 August 2011, a cat was discovered inside the compound. It had climbed the fence, avoiding the 'hot wires'. The cat was removed within 7 days, with little impact on the native fauna within the compound. The total estimated cost of removing the cat, including staff salaries, was ~$20,000.

A second breach by a feral cat occurred in July 2013. Here, we report on the chronology of key events and make recommendations to reduce the risk of further breaches.

Chronology

17 June 2013: A network of trail cameras at 500 m spacing was installed around the inner and outer perimeter of the compound to monitor native animals.

6 July: A cat was detected in the compound following an incidental inspection of the cameras by the LG volunteer caretakers (Keith and Rhonda) on the south-west boundary (camera 068 - 1km east of the s-w corner). The cat first appeared on the cameras on 20 June 2013, three days after the cameras were installed. We agreed that it appeared to be a female. Later, we became suspicious that she could be pregnant (based on the photos).

We cannot be certain when and how the cat breached the compound, but two scenarios are possible. Given the propensity for cats to patrol roads and tracks, and the likelihood that the cat may have been seeking a way out of the compound, it is most likely that the cat breached the compound on or about 20 June 2013, the time it was first detected by the cameras. It is unlikely that the cat remained in the compound for three days before it was detected by the cameras. This being the case, it is likely that the cat climbed the fence.

An alternative scenario is that the cat breached the compound sometime in March-April following heavy rain and flood damage to the bottom of the fence in late March. Because of access difficulties, the fence was not able to be repaired for some 6 weeks after the flood.

Trail cameras detected the breach and were vital for monitoring the cat's movements and behaviour.

In the time between the departure of the LG Operations Officer and caretakers incidentally discovering a cat in the compound, there was no systematic checking of the compound for breaches.

7 July: Neil Burrows (NB) and Graeme Liddelow (GL), who have overall responsibility for introduced predator control, were notified by Goldfields Region of the breach. Martu trackers were called in and located fresh cat tracks on the western boundary ~1 km north of the SW corner.

8 July: NB and GL departed Perth for LG, arriving on Tuesday 9th.

9 July: Based on track information provided by Martu and images from the cameras, which helped locate the last known position of the cat, NB and GL set 20 ground trap sets on the side of the road, from the main compound gate, west to the western boundary, then north

along the western boundary to Middle Rd. The 'funnel' traps were set at 400-500 m intervals, two small ($1^{1/2}$) soft catch leg hold traps per set, baited with ‘pongo’ and ‘tweeters’.

10 July: Traps were checked. No sign of cat in the vicinity of the traps, or on the cameras on the western side, but there was significant by-catch of boodies and bandicoots. 80% (16 traps) of trap sets had either a boodie (7) or a bandicoot (3) in them or had been disturbed by boodies or bandicoots (6). The trapped animals were released and moved off freely, the only injuries appearing to be superficial skin and soft tissue damage. Because of the by-catch issue, traps were pulled and 24 sets were re-set on the ground but 20 m off the track into the bush. It was clear that the boodies and bandicoots use the tracks as a thoroughfare and we hoped that by moving the traps into the bush it might significantly reduce by-catch.

NB and GL accompanied four Martu (men) trackers, who tracked the cat from the western boundary, where fresh tracks were last seen, east and south into the bush. After ~2 hours tracking, the cat was found in a hollow marble gum stump about 300 m east of the western boundary and about 800 m south of Middle Rd. NB Attempted to shoot the cat with a .22 rifle, but unfortunately, missed the cat (could not see the cat, so pointed the rifle into the stump to approximately where NB thought the cat was). The cat fled. In hindsight, it would have been better to have placed a net, or cloth cover over the hollow and then fired repeated shots into the hollow through the net or cloth, or to have used a shotgun (not available at the time) instead of a rifle. Missing this opportunity so early in the process was very disappointing, especially after the good work done by Martu trackers.

We continued tracking the cat in hope that it may have taken refuge in a hollow or up a tree, but we lost its tracks on hard ground. While tracking it, we came across tracks of what appeared to be a smaller cat, leading us to think we may have two cats in the compound, which proved not to be the case.

11 July: We checked the ground traps set ~20m into the bush. Once again, there was a high level of by-catch (5 boodies, 3 bandicoots, 1 rabbit, 1 possum), and all traps had been visited and disturbed by boodies or bandicoots. All trapped animals were released, appeared uninjured apart from skin abrasions, and moved off freely.

Given the high level of by-catch and disturbance we pulled the traps. It was now apparent that ground trapping was not an option because of the very high density of boodies and bandicoots (and rabbits) and their desire to visit the traps. We had to elevate the traps to avoid by-catch.

Caretakers Keith and Rhonda checked the cameras daily and were able to advise us of the cat’s movements and whereabouts that night. Because of the high density of other animal tracks on the roads, it was very difficult to locate the cat based on footprints – the cameras were invaluable. On the night of 11 July, the cameras had detected the cat patrolling along the northern end of the western boundary. We were able to scrounge up 23 x 20 litre plastic buckets and a half 44 gal drum, which were filled with sand, set 500 m apart, a palisade constructed and a trap placed in the top of each bucket (see photos below). Tweeters and pongo were used alternately as a lure.

12 July: We checked the traps and while there was no by-catch, we did not trap the cat. Cameras revealed that the cat had not visited the trap line or the traps and was not in the area. We spent another 2 hours with Martu (who were on their way home) tracking in the south-west but no sign of the cat. The cameras revealed that the cat had moved from the western sector of the compound to the northern boundary. Looking through the camera history, it was evident that the cat had spent considerable time on the northern boundary between cameras 108 (~500 m from the NW corner) to 115 (~3 km from the SE corner). 100 plastic buckets arrived from Kalgoorlie, and with the assistance of Goldfields Region staff

(Vanessa and Matt), we continued the arduous task of setting traps in buckets around the entire internal perimeter of the compound and along Middle Rd. at 400 m intervals. We now had 44 bucket trap sets out.

13 July: We checked the traps - no by-catch, but no cat. The high volume of animal traffic on the roads each night made searching for cat tracks difficult. Cameras detected the cat ~1km N of the Middle Rd intersection with the western boundary and then further east around the northern boundary. Being new objects in its environment, the cat was clearly wary of the bucket traps. The camera pictures have confirmed it is the same cat - no other cats have shown on the cameras and we have not found any other cat tracks since the small cat tracks mentioned above. We made up and placed toxic baits on gantries ('swingers') opposite cameras on the western and northern boundaries (15 gantries from camera 101 to camera 115 - 500 m apart).

14 July: We checked the bucket traps. Caught one possum (bucket placed against a tree) and one boodie (bucket placed between 2 large rocks). Both released unharmed. Inspected tracks and cameras. Cat was located by cameras at cameras 111 and 112 on northern boundary. From the cameras, it had walked past the bucket traps but had shown considerable interest in the swingers, stopping to sniff the suspended baits, but it did not take the baits. As the cat was patrolling the roads passed the cameras and showing considerable interest in the swingers, we decided to set 2 continuous lines of leg hold traps ('trap wall') across the road opposite the cameras on the northern boundary. To minimise by-catch, we set 40 cage traps 50m apart either side of the leg hold traps, with a view to trapping boodies and bandicoots in the vicinity of the trap walls.

Preparing a 'wall of traps' across the track to intercept the patrolling cat.

15 July: Checked all buckets and the trap walls set across the road. Nothing in buckets, but had 2 boodies in the trap walls, released them ok. Decided to persist with the trap walls across the road because the cameras had shown the cat patrolling the northern boundary track on a regular basis. We removed traps from buckets on southern boundary, Middle Rd and half way up the western boundary and set another 2 trap walls across the road opposite cameras and where the cat was patrolling most often. We set up 'swingers' at end of trap

walls to attract the cat. To minimise by-catch we set 110 cage traps at 50 m intervals along the road edge and on nearby boodie mounds.

16 July: Checked all traps - no by-catch in bucket traps, but no cat. Trap walls across the road had 3 boodies and 1 bandicoot. Frustratingly, the cat had walked across one of the trap walls but missed a trip plate by 4 cm – it had walked between 2 traps. We caught 31 boodies and 29 bandicoots in the cage traps. Because of the abundance of boodies and bandicoots, cage-trapping them to keep them off the trap lines was not feasible, so we closed the cage traps and pulled up the trap walls.

17 July: We decided to persist with the elevated traps to reduce/eliminate by-catch but opted for a larger platform, which we thought might be more enticing to a cat than the relatively small platform presented by the plastic buckets. We cut four old 44 gal drums in half and filled each half with soil to make elevated platforms for the traps. Using information from the cameras, we set the drum traps up where the cat was most recently recorded. Following its 'scare' in the hollow tree stump, it had set up a routine nightly patrol along the northern boundary, the cameras revealing that it started patrolling about 1 hour after sunset and stopped about 1 hour before sunrise, with breaks in between. The drum traps were set on the edge of the track opposite cameras (500 m apart) so we could record how the cat responded to the drum traps. A palisade of sticks with a single gap was constructed around the top of the drum so the cat could only get up onto the drum from one direction. A single trap was placed on top of the drum in the gateway and concealed beneath sand. Each drum trap was baited with swingers (lures hanging from a gantry) and some with tweeters. Because the cat had previously shown considerable interest in the suspended sausage baits, these were suspended in the drum traps. Given the very high prey availability, we were unsure whether the cat would be enticed by a food lure, so also included tweeters in some sets. In all, 8 drum traps were set at 500 m intervals opposite cameras on the northern boundary.

18 July: Checked drum traps. No by-catch, but no cat. From the cameras, it was evident that the cat was wary of the new objects in its environment – the drum traps - it walked around them. We decided to persist with the drum traps in hope that the cat would become familiar with them, and eventually, overcome by curiosity, jump up to investigate the lures.

Meanwhile, we were devising alternative strategies, including planning to acquire night vision gear and build a hide near the edge of the track from which to 'ambush' the cat with a shotgun.

Arranged for Mike Onus and Jim Rolfe (Science Division Woodvale) to relieve NB and GL, who reluctantly departed LG for Perth around midday. Keith and Rhonda were asked to check the drum and bucket traps and the cameras daily to keep track of the cats movements until Mike Onus and Jim Rolf arrived (Thursday following week) to continue trapping pressure on the cat.

19 July: NB contacted Keith (caretaker) for an update – cameras showed that the cat was still patrolling the northern boundary, but was avoiding the drum traps.

20 July: As above.

21 July AM: NB received an excited phone call from Keith that the cat was trapped in a drum trap. Keith had used a dead parrot as a lure. Cat was a small female. It was not weighed, but from the photos, it appears to be about 3-3.5 kg. It was not dissected, so not sure whether it was pregnant.

Cat is investigating the drum trap.

Cat is caught in the leg hold drum trap

Deceased female cat – compound clear

Observations and recommendations:

- The fence can still be breached by climbing and avoiding the hot wires, or via damage to the bottom of the fence from flooding. Another hot wire should be placed about 1.5 m above ground and flood-prone areas fortified with stone and drainage works.
- The cable ties on the hot wire are brittle and cracking, so should be replaced, or an alternative method of holding the hot wire near the netting investigated.
- The very high density of native animals in the compound compared with when the last breach occurred precludes using ground traps because of by-catch and lack of trap availability.
- Traps on elevated platforms such as 44 gal drums cut in half, with lures suspended on gantries, proved to be successful. Half drums should be installed around the edge of the tracks inside the compound and at 500 m. Left in place to become 'part of the environment', the drums can then be 'armed' if and when there is another breach. It may take several nights, but it is highly likely that eventually the offending cat will investigate the lures suspended on gantries atop the drums.
- The trail cameras were invaluable. A network of cameras at 1 km intervals should be placed around the inside perimeter of the compound and checked weekly (and if funds permit, around the outside as well). In addition to the information they provide, cameras are a much more cost effective, certain, time saving means of surveillance compared with dragging and tracking.
- A network of drums or buckets should be placed around the outside perimeter in readiness for 'arming' once signs of cat(s) are detected patrolling the outer perimeter – eventually they will pressure the fence to get to the animals inside.
- Damage caused by the cat – it is difficult to estimate how many native animals were killed by the cat while it was in the compound. Assuming it killed at least one animal per night (this is conservative), and it was in the compound for at least 30 nights, so probably killed at least 30 animals.
- Have not done a detailed costing, but it is estimated that the full cost of removing this cat was similar to that following the first breach in 2011, i.e., ~ $15,000-$20,000.

- In conclusion, while we had some frustrating moments and could have removed it much earlier, we eventually removed the cat 14 days after it was first detected.

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Thanks for invaluable assistance provided by Keith and Rhonda, volunteer caretakers at LG - they were a great help with checking the cameras, and the traps when we left LG. It was also Keith's idea to suspend a dead parrot over the drum traps. Thanks to Martu trackers – sorry we let you down with the shooting. Thanks to Vanessa and Matt, Goldfields Region for helping out with setting traps. Vanessa also came up with the idea of using 44 gal drums cut in half instead of 20 l buckets. Thanks to Goldfields Region office (Nev, Tjokkie and Nigel) for being responsive to our requests for assistance. We will use the remaining buckets to trap cats outside the compound – I'm sure they will work if we get the cats familiar with them.