Lorna Glen Introduced Predator and Mulgara Monitoring

Pre-bait survey

8 June – 11 June 2013

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June 2013

Summary

- Due to wet weather, the pre-bait survey was reduced to 4 nights on the western lines (5A, 5B, 6,7, 8, 9,10) and 3 nights on the eastern lines (1,2,3). Line 4 could not be used (wet), so an additional line (5B) was established between No. 9 Well, to Christmas Creek Well and ~5 km N. This reduced the sample size from 500 km to 370 km.
- As anticipated, cat activity and density has continued to increase with the TDI now at 19.5, up from 12.9 recorded in August 2012 after the (unsuccessful) July 2012 baiting.
- There is an estimated 29 individual cats recorded on a total of 100 km of sample transect, which is ~26% higher than recorded last year after baiting. This represents the highest level of cat activity since the pre-baiting assessment in winter 2004.
- A significantly higher proportion (~3 X) of small cats were recorded than in previous years - 19% of cats were small (~2.5-3.5 kg); 74% were medium (~3.5-5.0 kg), 7% were large (~5.0-6.0 kg). This suggests that small cats have been susceptible to baiting in the past (except 2012 when baiting was not successful), or that baiting has interrupted breeding (killing breeding / lactating females). Unsuccessful baiting in 2012, coupled with high prey abundance, has resulted in successful breeding in 2012 and into 2013, and more young (small) cats.
- Dog activity is slightly down on last year. There is an estimated 6 dogs on the 100 km of transect. In 2012, we recorded 10 dogs pre-baiting and 8 dogs post-baiting.
- Mulgara track activity is significantly down, from around 60% activity on the 100 lure stations (set every 1 km - non-toxic bait only, no audio) in 2012 to 25% this year. This is still significantly higher than in 2010 (~6%) when mulgara track monitoring commenced.
- There was a significant increase in bilby track activity. Normally, we only record one or two bilby tracks – this survey we recorded bilby tracks, digs or burrows on seven occasions - 200 m south of Squeaky bore, 3 km south of Camel well, between Xmas Creek well and No. 9 well, between Fergy bore and North well, West of No 9 well, north of New Market and between Quartz and King bores. The recent rain seems to have increased their activity.
- Rabbit activity was significantly down compared with 2012 – perhaps predation by cats or disease?
- Echidna activity was high and similar to 2012.
- No possums were recorded, although we could not use Transect 4 (wet), which is where possums are usually recorded.
- Bait uptake by cats was 19% - cats walked past the lure stations 8 times, visited the stations 9 times and took baits 4 times.
- We did not use the tweeters on the lure stations this year as we considered using them to trap cats for radio collaring, so did not want to desensitize them. This could explain the reduced mulgara activity, although away from the stations, mulgara activity, based on tracks, was noticeably lower than last year.
- Bird visitation to lure stations was significantly down due to no tweeters (which attract birds).
- As to be expected at this time of year, reptile activity was very low.
- Seven cats were trapped and fitted with GPS collars (thanks to Colleen Sims and Judy Dunlop). All were males, trapped on pongo (cat faeces / urine). Tweeters were not used because of by-catch concerns, especially owls. One cat was too small to collar, so was destroyed. Collars will be retrieved and down-loaded on 11th-13th August with the help of an aircraft (Peter McGinty).

- Once again, the very high prey availability due largely to the abundance of mulgara may decrease bait uptake and baiting efficacy of aerial baiting scheduled for 3-5 July 2013. However, the higher proportion of younger, naïve cats could increase baiting success?
- Post-bait assessment will be completed by mid August and a comprehensive report prepared by early September.

Recommendations

- Aerial baiting should be followed up with a trapping program if resources are available. The priority for mop-up of cats should be a) around the compound, b) in the vicinity of the bandicoot reintroductions and c) in the vicinity of known bilby populations. Note: This operation dependent on Mike Wysong's needs for live, collared cats and dogs!
- To avoid by-catch, we need to trial the use of the trap buckets set out originally by Dave Algar, and other lures that will attract male and female cats, but not attract non-target animals such as owls and bilbies.
- We were not able to get to Earaheedy due to rain-caused delays, but will explore opportunities to survey Earaheedy after the August baiting, possibly sometime in September.
- Mulgara and bilbies could make good 'indicator species' - indicative of the general condition of small and medium size mammals on Lorna Glen and Earaheedy, so should continue to be monitored.

Data Summary - Pre-bait survey, 8 - 11 June 2013

Table 1: Summary of track activity (TAI) for cats & dogs only. TAI for 10 Transects (each 10 km. Transects 1-3; 3 nights; Transects 4-10; 4 nights.

Transect	Day 1		Day 2		Day 3		Day 4		Day 5		Totals	
	Cat	Dog	Cat	Dog	Cat	Dog	Cat	Dog	Cat	Dog	Cat	Dog
1	1	0	2	1	0	2						
2	3	0	3	0	3	0						
3	2	1	2	0	1	1						
5A	0	0	0	0	2	0	2	0				
5B	1	0	2	0	0	0	2	1				
6	3	1	1	0	3	1	2	1				
7	3	0	1	0	1	0	1	0				
8	2	0	2	0	3	0	2	0				
9	3	0	3	0	2	0	3	0				
10	3	0	2	0	3	0	2	0				
Total tracks	21	2	19	1	18	4	14	2				
TAI	**21**	**2**	**19**	**1**	**18**	**4**	**20**	**2.8**				
										Mean TAI	**19.5**	**2.5**

Trend in cat density

Figure 1 shows the trend in cat density (based on track activity - TDI) at Lorna Glen since 2003. Notable features are:

- Significant reduction following the initial baiting in 2003.
- Sustained reduction of the TDI (mostly <10, which is low density) as a result of annual aerial baiting up to 2012, when baiting was unsuccessful (see 2012 report).
- Modal trend associated with activity increase between baiting events.
- Inability to eradicate cats, therefore the potential for a relatively rapid increase following good seasons (e.g. 2011 / 2012).
- As indicated above, there has been a rapid increase in cat density over 2012-2013 as a result of good conditions, high prey availability and poor baiting success in 2012. All factors are related.

Figure 1: Mean seasonal cat Track Density Index (TDI) for Lorna Glen from 2003 - 2013. Baiting commenced Winter 2003 (data pre 2010 modified from Algar et al. in press)

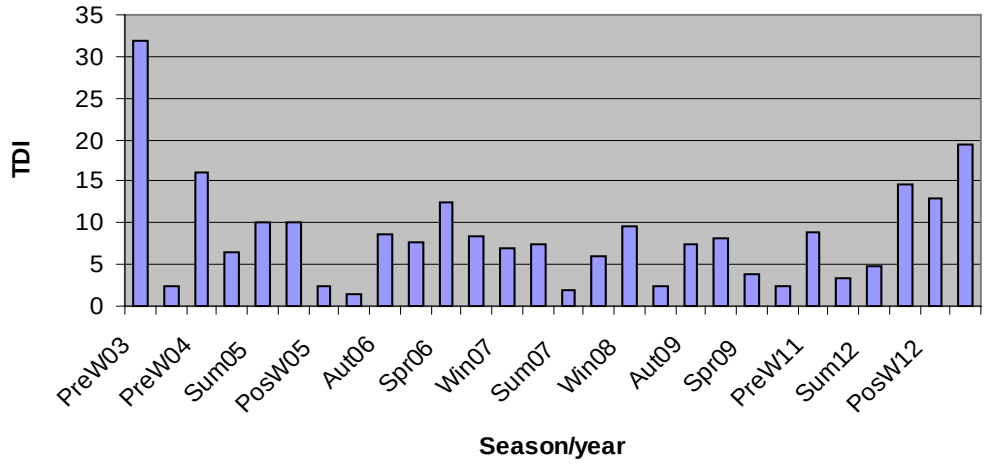

Table 2: Estimated number of individual cats and dogs encountered on 100 km of transects.

Transect	Individual Cats	Individual Dogs
1	2	2
2	4	0
3	3	1
5A	3	0
5B	2	1
6	3	1
7	3	1
8	3	0
9	3	0
10	3	0
Total individual animals June 2013	**29**	**6**
Total individual animals August 2012	**23**	**8**

Figure 2: Mulgara track activity at lure stations from spring 2010 (Spr10) to winter 2013 (PreW13)

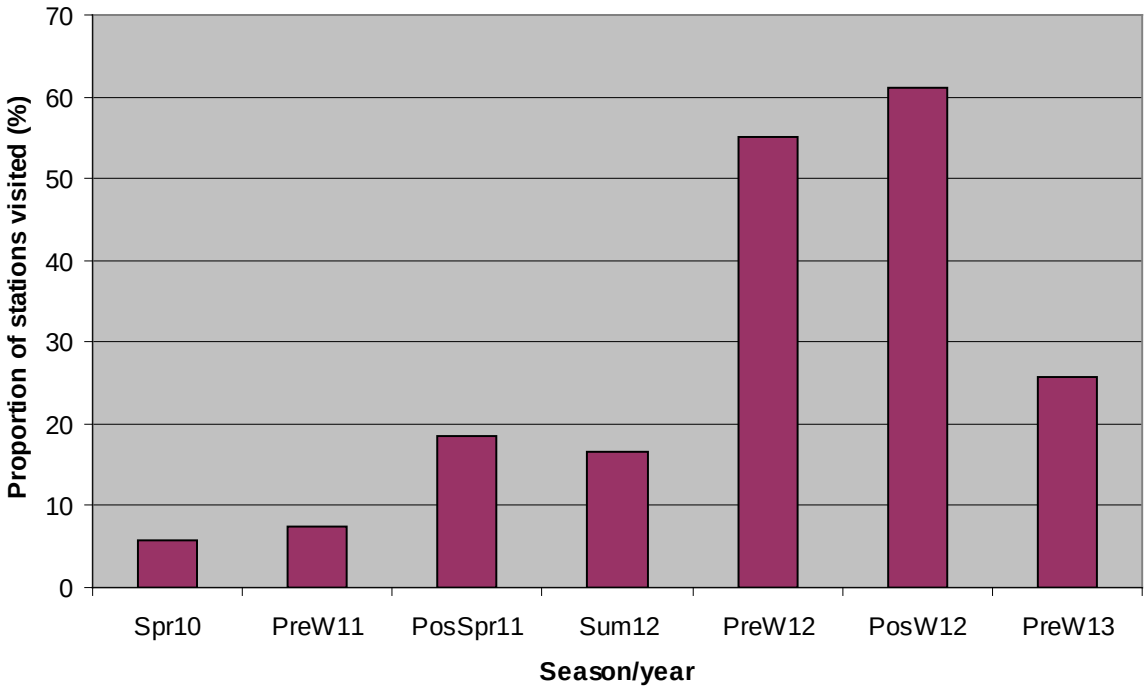

Plate 1: Mulgara tracks

Table 3: Summary of activity on lure stations (non-toxic baits only – no audio).

Transect	Totals over 3 nights for lines 1, 2 &3, and 4 nights for lines 5A, 5B, 6, 7, 8, 9, 10.			
	Nil activity (% of stations)	**Pass (% of stations)**	**Visit (% of stations)**	**Bait take (NTB) (% of stations)**
1 (n=30)	80%	Cat – 3.3%	0%	Mulgara – 16%
2 (n=30)	80%	Cat-6.6%	Cat – 6.6%	Mulgara-10%
3 (n=30)	60%	Cat-3.3%	Bird-3.3%	Mulgara – 26%
5A (n=40)	50%	Cat – 2.5%	Cat – 2.5%	Mulgara – 42% Bird-2.5%
5B (n=40)	70%	Bilby-5%	Cat-2.5% Dog-2.5% Bilby2.5%	Cat-2.5% Bird-7.5% Mulgara-5.0%
6 (n=40)	47%	Bilby – 2.5% Dog 2.5% Cat – 2.5%	Mulgara -7.5% Cat – 2.5%	Mulgara – 10% Bird – 2.5% Ants – 17.5%
7 (n=40)	35%	Dog-5%	Dog-2.5% Mulgara-5%	Cat – 5% Mulgara – 28%
8 (n=40)	45%	Bilby-2.5%	Mulgara -7.5%	Ants-18% Mulgara -20% Bird – 5%
9 (n=40)	40%	Cat – 5%	Cat – 2.5% Mulgara -10%	Mulgara – 27% Ants -10% Birds – 2.5%
10 (n=40)	60%	0%	Cat – 7.5%	Cat – 2.5% Mulgara – 10% Bilby-2.5% Ants-30%
Total (n=370)	**54.0%**	**4.1%** Cat – 2.2% Dog- 0.8% Bilby – 1.1%	**7.8%** Cat – 2.4% Bog – 0.6% Bilby – 1.3% Mulgara-2.7% Bird-0.3%	**34.1%** Mulgara – 22% Bird-2.6% Cat-1.2% Ants-8.4%

Plates below: Fresh bilby burrow, digs, tracks and sedated collared cats

Appendix
Explanatory notes - estimating introduced predator density

Feral cats, and to a lesser extent, wild dogs, are rarely seen and their populations are difficult to determine using trapping or spotlighting techniques. Therefore, indirect measures are used to estimate relative abundance. We use two measures, which rely on skilled observers and some sampling rule sets.

1. The Track Activity Index (TAI), which is calculated from the total number of sets of tracks (footprint sets) recorded over 5 nights for the 10 dragged transects each 10 km long. Algar and Burrows provide a rule set for determining whether a set of discontinuous track sets detected on a transect on the same day is counted as one or more track sets. In essence, if cat tracks are the same size, going in the same direction and are less than 2 km apart, we assume it is the same animal. The TAI is the measure currently used to set thresholds for free range fauna re-introductions (TAI<10.0).

TAI = (total number of track sets counted over 5 nights X 100) / 500).

Where cats have not been controlled in the arid zone, the TAI is usually 25-35. It can be as high as 55-65 in regions such as Shark Bay that sustains very high rabbit populations.

2. The Individual Density Index (IDI): This is calculated from the estimated number of individual animals (cats or dogs) detected by footprints along the dragged transects over 5 nights. That is, after 5 nights, we examine the data and estimate how many individual animals we think there are along the 100 km (10 transects x 10 km) of dragged transects and express this as a number per 100 km. This is estimated based on the size of the cat (or dog) and where along the transect it is detected each night. The IDI is calculated by:

IDI = (No. of individuals X 100) / 100.

The IDI is less reliable than the TDI because it requires somewhat subjective (expert) judgments and assumptions to be made about the actual number of individual animals on the transects over 5 nights.

To compare the TAI and the IDI, consider the following example:

After 5 nights of surveying a 10 km transect, we record one cat track set each night, so the TAI = (5 x 100) / 50 = 10.0. However, because of the size and location of the tracks, we conclude that the tracks have been made by 2 individual cats, so the IDI = (2 x 100) / 10 = 20.0. If we concluded that the tracks were made by 3 cats, then the IDI = (3 x 100) / 10 = 30.0, etc.