Lorna Glen Introduced Predator Monitoring

22-26 July 2011post-bait data summary

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Summary

- Annual Western Shield baiting was carried out at Lorna Glen during 29 June – 2 July 2011. The post-bait survey was carried out by G. Hearle and T. Woods over 22-26 July 2011.
- Despite seasonal conditions and concerns about weather (temperature) during the operation, baiting appears to have been effective.
- The track activity index (TAI) of cats and dogs has decreased following baiting; cat TAI has decreased from 8.9 prior to baiting to 3.4 after baiting (61% reduction) and dog TAI from 4.6 to 3.4 (26% reduction). Thus, the cat TAI is well below the target of <10.0.
- The estimated number of individual cats intersecting the transects (IDI) has decreased following baiting from 15.7 to 11.4 (27.4% reduction).
- The estimated number of individual dogs intersecting the transects (IDI) has decreased from 10.0 to 8.6 (14% reduction).
- Visitation by mulgara to active (FAPS) stations is down significantly on the pre-bait measurements in June 2011.
- Bandicoot tracks (possibly 4-5 individuals) were recorded on Transect 10 (outer perimeter of compound). Possible bandicoot tracks recorded on Transect 7 (N & S Gravel Bore). Clearly bandicoots are persisting outside the compound. An individual was also sighted by fire crews during buffer burning operations on the western perimeter of the compound in June.
- Bilby track recorded on Transect 2 (between Sandstone and No. 2 Bores) and possibly on Transect 5 (west of No. 9 well).
- Possum tracks recorded on Transect 4 (No. 1 Well – New Bore), on Transect 6 (N & S No. 2 well) and Transect 10 (around the compound).
- Echidna TAI was 7.8, which is similar to June 2011 (8.8).
- Rabbit TAI was 6.3 which is the same as June 2011.

Recommendations

- Aim to carry out aerial baiting during 'cold spells' when max. temps. during and 3-4 days after baiting are forecast <20^{o}C.
- Carry out hand / track baiting around compound and reintroduction sites when max. temps. <20^{o}C.
- Hold a one day workshop and field trip on site for staff involved in introduced predator surveys to standardize protocols.
- Radio collar at least 5 cats in advance of 2012 aerial baiting to provide additional evidence of baiting efficacy and to help fine tune timing of baiting in relation to diel temperature fluctuations.
- Investigate interactions between mulgara, introduced predators and toxic baiting.

Aerial Baiting 2011

Western Shield aerial baiting (cat baits) was carried out during 29 June - 2 July 2011. As indicated by the data in the Tables below, the baiting was successful with a 61% and 26% reduction in cat and dog track activity respectively. This is a pleasantly surprising result given a) high summer rainfall and consequent prey availability and b) the relatively mild weather conditions during the baiting operation (see Figure below). Daily maximum temperatures decreased soon after the completion of baiting (Figure 1), which may account for the good result. It should be pointed out that different observers were used for the pre- and post- bait

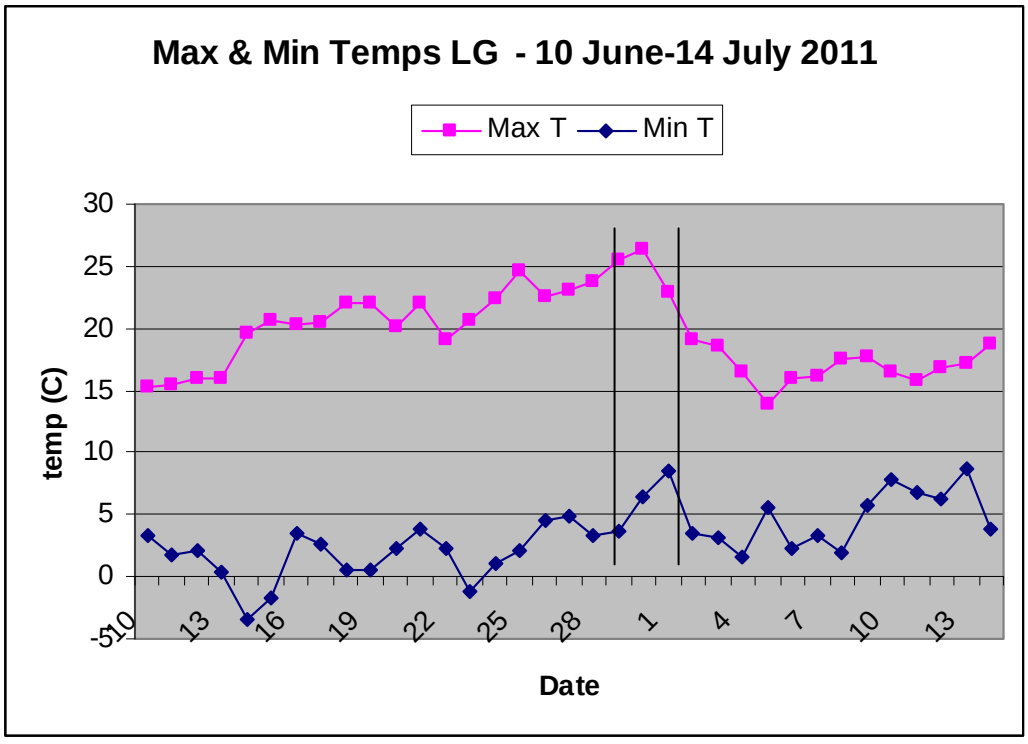
assessments and with such low densities of introduced predators, slight variations in observer detection will result in significant changes in density indices. Nonetheless, the data suggest low cat and dog densities.

It is recommended that all observers involved with introduced predator surveys participate in a one day work shop and field trial to standardise observation and recording protocols.

Baiting efficacy could be improved by aiming to bait in a 'cold spell' during and in the first 3-4 days after baiting. We do not have good data for determining the optimum temperature range at which to carry out aerial baiting, but until better information is available, we should aim to carry out baiting when daily maxima are forecast to be <20^{o}C. The Figure below shows that for this period, there were 19 days out of 35 when the max. temp was <20^{o}C.

Hand baiting (from tracks / roads) around reintroduction sites and the compound should be routinely carried out during 'cold spells' (max. T <20^{o}C).

Prior to the 2012 baiting program, it is recommended that at least 5 (preferably more) cats are fitted with radio collars to provide further evidence of the efficacy of baiting. Radio collaring will also provide valuable information about relationships between cat hunting activity and diel temperature fluctuations, enabling us to improve the efficacy of aerial baiting.



Data and Notes – post-bait survey 22-26 July 2011

Table 1: Summary of track activity (TAI) for cats & dogs only.
TAI for seven lines over five days = (Total individual tracks X 100) / 350

Transect (Drag lines)	Day 1		Day 2		Day 3		Day 4		Day 5		**Total**	
	Cat	Dog	Cat	Dog	Cat	Dog	Cat	Dog	Cat	Dog	**Cat**	**Dog**
1	0	0	1	0	0	0	1	0	0	0	2	0
2	0	1	0	1	1	1	0	0	0	1	1	4
3	2	1	0	0	1	1	0	0	0	0	3	2
5	2	0	0	0	1	0	0	0	0	0	3	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	1	1	0	1	1	0	1	0	0	0	3	2
9	0	0	0	1	0	0	0	1	0	2	0	4
Total tracks	5	3	1	3	4	2	2	1	0	3	12	12
									Mean TAI		**3.4**	**3.4**

Notes Table 1 (above): Track Activity Index (TAI)

- Mean Cat TAI = 3.4 and Dog TAI = 3.4. This is significantly lower than when measured in June 2011 prior to baiting (8.9 and 4.6 respectively).
- The TAI in Table 1 is calculated over 5 nights on the 70 km of transect that are readable (the drag lines).
- The TAI is a measure of track / footprint activity per 100 km of transect, not of the number of individual animals (see Table 1 for density of individuals).
- No cats were recorded on Transect 7; no dogs were recorded on Transects 1, 5 and 7.
- Cats travelled a total distance of 3780 m along the transects (5.4% of total transect distance) and dogs 4900 m (7.0% of total transect distance). The longest continuous distance travelled by a cat was was 900 m and by a dog, 2700m . On five occasions, cats walked across the transects (i.e., did not travel along the transects).
- Recommend hand baiting with cat baits on cold, dry days a) around compound, b) around free range reintroduction areas (max temp<20^{o}C).

Table 2: Estimated number of individual cats and dogs encountered on drag line transects. Individual Density Index (IDI) = (No. individuals X 100) / 70

Transect	Cats	Dogs
1	2	0
2	1	2
3	2	1
5	2	0
7	0	0
8	1	1
9	0	2
Total	8	6
Mean IDI	**11.4 cats / 100 km**	**8.6 dogs / 100 km**

Notes Table 2 (above): Individual Density Index (IDI)

- The IDI is based on the estimated number of individual animals recorded over the 5 nights, not the number of track sets (see above). Unlike the Track Activity Index (TAI), it is calculated on a transect length of 70 km (7 x 10km), not 350 km (5 nights x 70 km), and standardized to 100 km.
- Since baiting in June, the Cat IDI has decreased from 15.7 to 11.4 (27.4% decrease) and the Dog IDI has decreased from 10.0 to 8.6 (14% decrease).

Notes Table 3 - FAPS (below):

- No activity on a high proportion of active stations (64%)
- Cats: 6 passes; 2 visits; 0 bait take
- Dogs: 1 pass; 3 visits; 0 bait take
- Number of non-toxic baits taken by Mulgara has decreased since June 2011 from 93 to 26.
- As mentioned in our last report, the active stations (FAPs and NTBs) are not adding useful information regarding density of introduced predators, but are a useful way of assessing a) distribution and relative density of mulgara b) bait uptake, loss, degradation by ants etc

Other:

- Trapping using wire cage traps and leghold traps (in buckets or on the ground) will be a key response action in the event of a predator breaching the compound, or if there is a need to trap cats outside the compound. To this end, we will be carrying out further trials of trap lures and callers imported from the USA.
- Any cats recorded around a) compound or b) reintroduction sites, should be trapped.
- Copy of data sheets from this session have been forwarded to Dave Algar.

Table 3: Summary of active (FAPs & NTBs) sample points

Transect	Totals over 5 days			
	Nil activity	Pass	Visit	NT- Bait take
1	36	Rabbit – 1, Bird - 1	Bird - 3	Mulgara – 1 Bird – 5 Ants - 2
2	35	Bird - 1	Cat – 1 Dunnart - 2 Bird - 5	Dunnart - 2 Mulgara – 1 Bird - 3
3	25	Bird – 4 Mulgara - 1	Cat – 1 Mulgara – 2 Bird - 3	Dunnart - 3 Mulgara – 5 Bird – 2 Mouse (Mulgara)? -5
4	42	Rabbit - 2	Mouse (Mulgara?) – 2 Bird - 1	Mouse (Mulgara?) – 1 Bird – 1 Ants - 1
5	47	0	Bird - 1	Mulgara – 1 Bird - 1
6	26	0	Bird – 5 Mulgara - 1	Mulgara (mouse?) – 3 Bird – 10 Ants – 2 Possum – 3 Varaid - 1
7	22	Birds - 3	Birds – 6 Mulgara – 5 Dunnart – 1 Unknown - 1	Mulgara – 6 Bird – 2 Dunnart – 3 Ants – 1 Unknown - 2
8	27	Cat-1 Bird - 4	Bird – 8 Mulgara -1	Mulgara – 9
9	22	Dog – 1 Bird - 3	Dog-3 Bird – 12 Mulgara - 5	Mulgara – 3
10	38	Cat – 5 Bird - 1	Mulgara – 1 Bird - 1	Bird – 2 Ants – 1 Unknown - 1
Total	320 (64%)	28 (5.6%) (Cat – 6; Dog-1)	70 (14%) (Cat – 2; Dog – 3)	Mulgara – 26 (5.2%) Mouse? – 9 (1.8%) Dunnart – 8 (1.6%) Possum – 3 (0.6%) Bird – 25 (5%) Ants – 7 (1.4%) Varanid - 1 (0.2%)

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 7 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) / 350.

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 70 km (7 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) / 70.

The IDI is less reliable than the TDI because it requires somewhat subjective (expert) judgements 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.