REMOVAL OF FERAL CATS WITHIN THE FENCED AREA AT BIG LAGOON, PERON PENINSULA

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Plate 1. Fence at Big Lagoon to prevent access by feral cats

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INTRODUCTION

A fence (see Plate 1), 3.1 km in length, enclosing an area of 1.300 ha was built on the western edge of Big Lagoon towards Cape Lesueur. The fence was designed to prevent access into the site by feral cats however; its construction also potentially 'fenced in' a number of these introduced predators.

Before any fauna translocations into the area could be undertaken, it was critical that the feral cats were removed. This report summarises the removal of these predators from what can be considered a 'fenced island'.

METHODOLOGY

Two methods were used to remove feral cats from within the fenced area. The first method consisted of a baiting program, with baits being laid by hand on the ground. Baits are normally delivered from an aircraft however; the services of the plane were unavailable at the time required. The effectiveness of the baiting program was measured by surveying feral cat activity at monitoring plots before and following the baiting program. The second method involved a trapping program to remove individuals that had survived the baiting campaign.

Surveying introduced predator activity

Each monitoring plot was approximately 1x1 m, located on sandy substrate and cleared of vegetation. An olfactory lure (Cat-astrophic, Outfoxed, Victoria) was used to attract cats to the sand plots during the two survey periods. A total of 57 monitoring plots was established throughout the fenced peninsula in July 2010 .The monitoring plots were placed in a grid system at 500 m intervals and their locations were recorded on a GPS. All locations are recorded in Appendix 1 and their positions are shown in Figure 1.

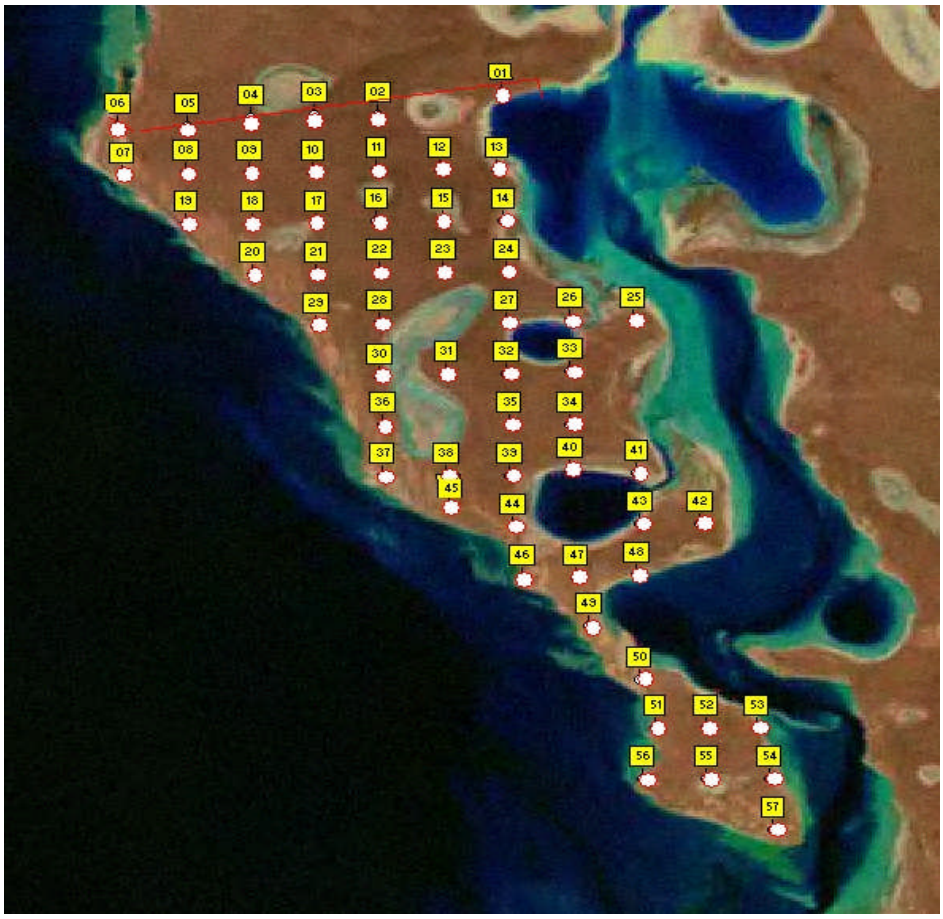

Figure 1. Monitoring plot locations

A sub-sample of 40 monitoring plots was selected to be surveyed both pre-bait and post-baiting (four weeks after the baiting campaign). The locations of monitoring plots used are indicated in Figure 2. This sub-set of plots was selected to enable all plots to be visited daily. Each plot was observed for the presence or absence of tracks, as it was not possible to determine the number of intrusions by individual animals onto the plot. Each day, the plots were swept to clear evidence of previous activity. Cat activity at the sand plots was recorded over five consecutive nights during two survey periods to generate a Plot Activity Index (PAI). This index is expressed as the mean number of sand plots visited by the target species per night. The PAI is formed by calculating an overall mean from the daily means (Engeman *et al*. 1998; Engeman 2005). The VARCOMP procedure within the SAS statistical software package produced the variance component estimates.

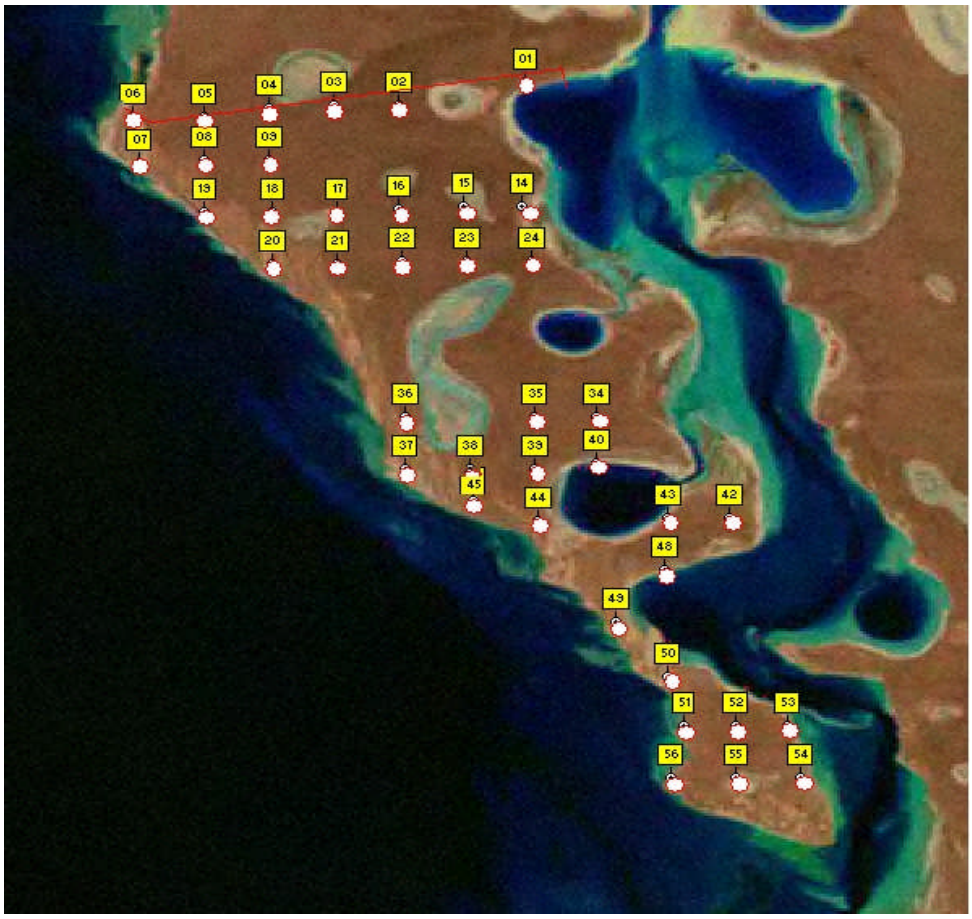

Figure 2. Location of surveyed monitoring plots

Baits and baiting campaign

The feral cat bait (*Eradicat*®) (see detailed description in Algar and Burrows 2004; Algar *et al*. 2007) has proven to be an effective tool in reducing feral cat numbers (Algar *et al*. 2002; Algar and Burrows 2004; Algar *et al*. 2007) and is now used as a control method for feral cat management at a number of sites. *Eradicat*® baits contain 4.5 mg of directly injected toxin '1080' (sodium monofluoroacetate). All baits were sprayed with an ant deterrent compound (Coopex®) at a concentration of 12.5 gl^{-1} as per the manufacturer's instructions. A total of 1,200 *Eradicat*® baits were distributed over three days (August 2-4). Bait application was along transects at intervals approximately 0.5 km apart.

Trapping program

Feral cats were trapped at locations within the fenced area in padded leg-hold traps, Victor 'Soft Catch'® traps No. 3 (Woodstream Corp., Lititz, Pa.; U.S.A.) using a mixture of cat faeces and urine as the attractant. A number of different trap sets were employed. The trapping methodology is described in detail in Algar *et al*. (2010).

Fresh cat activity was used as an indicator for trap placement. Surveys for fresh cat tracks were conducted on-foot and from 'All Terrain Vehicles'.

Two periods of trapping were conducted; the first period was from the 3-22 September 2010. Towards the end of this first trapping period, several cats were still known to be present within the fenced area but proving to be difficult to locate and trap. It was decided to remove all traps and leave the site for a time to allow surviving cats to re-establish a more regular activity pattern and home range usage. The second period of trapping was conducted from 27 October-17 November. A further survey, that systematically covered the entire area, was conducted over the period 13-18 January 2011 to locate any further cat activity that might warrant a further trapping program.

Trapped cats were destroyed using a 0.22 calibre rifle. All animals captured were sexed and weighed; a broad estimation of age (as either kitten, juvenile or adult) was recorded using weight as a proxy for age. The pregnancy status of females was determined by examining the uterine tissue for embryos.

RESULTS

Surveys of monitoring plots pre- and post-baiting

During the pre-bait surveys 13 of the 40 plots were visited by feral cats and 12 of the monitoring plots were visited post-baiting. The location of cat activity pre- and post-baiting is shown in Figures 3 and 4 respectively. There was no significant difference in the PAIs recorded before and after baiting ($z = 0.42$, $P = 0.34$). PAIs (mean $\pm$ s.e.) of 0.09 $\pm$ 0.04 and 0.07 $\pm$ 0.02 were recorded for pre- and post-bait surveys respectively.

Trapping program

During the first trapping period, most cat activity was observed alongside the fence and hence most of the trapping effort was concentrated in this area. Trap locations for this first trapping period are shown in Figure 5. The dates of commissioning and decommissioning trap sets for first trapping period are given in Table 1. The trapping regime during the second period commenced along the fence-line and progressively moved south. Trap locations for this second trapping period are shown in Figure 6. The dates of commissioning and decommissioning trap sets for the second trapping

period are provided in Table 2. No further cat activity, over the six day period, was observed during the survey conducted in January 2011 and no additional trapping was warranted.

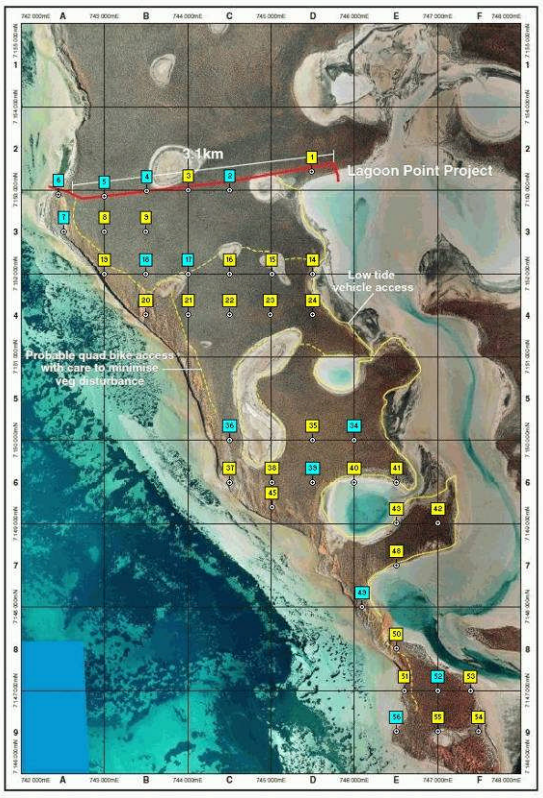

Figure 3. Pre-bait assessment, blue plots indicate cat activity

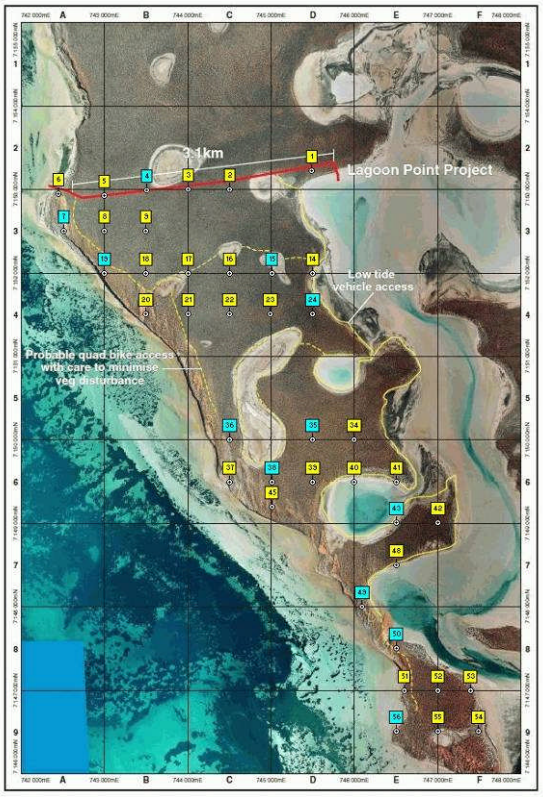

Figure 4. Post-bait assessment, blue plots indicate cat activity

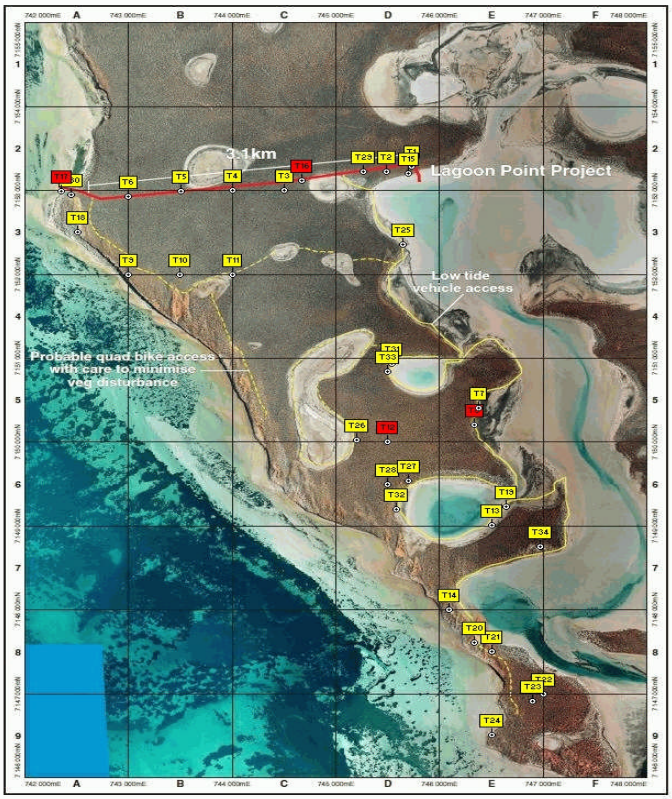

Figure 5. Trap locations for this first trapping period (red plots are where cats were caught)

Table 1. Dates of commissioning and decommissioning trap sets for first trapping period

Trap Number	Date commissioned	Date decommissioned	Total Trap nights
1-6, 8	03/09/10	22/09/10	133
7	03/09/10	08/09/10	5
9-14	04/09/10	22/09/10	108
15-23	08/09/10	22/09/10	97
24	08/09/10	11/09/10	3
25-26	09/09/10	22/09/10	24
27-28	12/09/10	22/09/10	20
29-32	15/09/10	22/09/10	28
33-34	18/09/10	22/09/10	8
Total			**426**

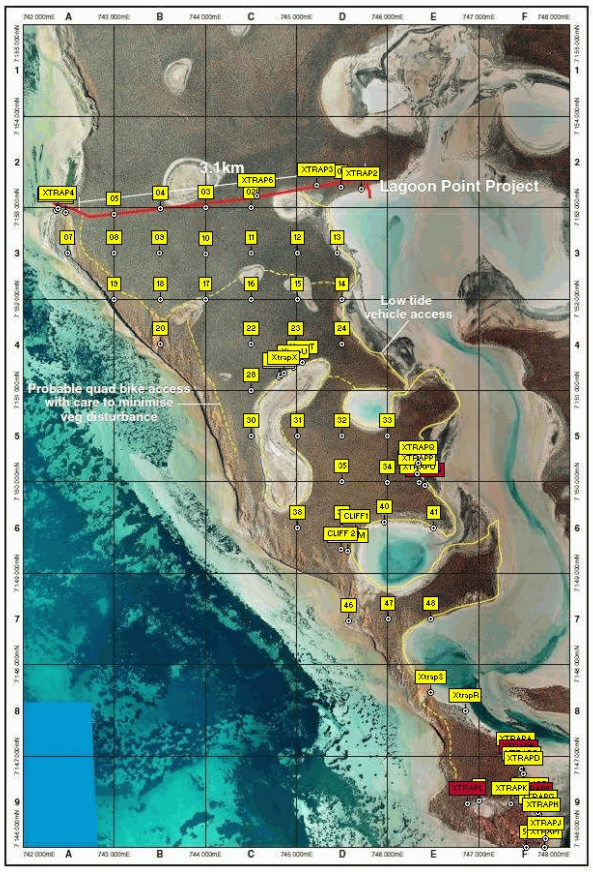

Figure 6. Trap locations for this first trapping period (red plots are where cats were caught)

Table 2 .Dates of commissioning and decommissioning trap sets for the second trapping period

Trap Number	Date commissioned	Date decommissioned	Total Trap nights
1-5	27/10/10	3110/10	20
6	27/10/10	14/11/10	18
7-16	27/10/10	2/11/10	60
17-20	28/10/10	3/11/10	24
57	28/10/10	17/11/10	20
3e-w mangrove	28/10/10	17/11/10	60
Big-lagoon	28/10/10	17/11/10	20
22-24	28/10/10	17/11/10	60
30-32	28/10/10	4/11/10	21
Mangrove area 1-8	28/10/10	17/11/10	160
34, 35, 39	3/11/10	16/11/10	39
38	4/11/10	17/11/10	13
2 in Cliff area	12/11/10	17/11/10	10
46-48	12/11/10	17/11/10	15
extra traps r & s	12/11/10	17/11/10	10
Total			**550**

A combined tally of 976 trap-nights for the first trapping period (426) and second trapping period (550) resulted in eight feral cats (five female and three male) being caught. The capture locations and records are presented in Table 3 and shown in Figures 5 and 6. Both female cats trapped during the first trapping period were pregnant with three and two embryos *in utero* respectively. The two adult females trapped during the second trapping period were both lactating with one having one placental scar and the other having two placental scars. The two trapped kittens were from the second she cat.

Table 3. Capture records of trapped cats

Date	Sample No	Trap No	Sex	Weight (kg)	Colour	Age
06/09/10	Peron 1	8	Female	3.5	Black	Adult
10/09/10	Peron 2	17	Male	5.1	Tabby	Adult
15/09/10	Peron 3	12	Female	3.3	Tabby	Adult
20/09/10	Peron 4	16	Male	4.6	Tabby	Adult
10/11/10	Peron 5	Xtrapn	Female	3.3	Tabby	Adult
11/11/10	Peron 6	Xtrapl	Female	3.3	Tabby	Adult
15/11/10	Peron 7	Xtrapb	Female	0.6	Tabby	Kitten
17/11/10	Peron 8	xtrapf	Male	0.6	tabby	Kitten

In addition to the target species, five Sand Monitors (*Varanus gouldii*), three Echidnas (*Tachyglossus aculeatus*) and two Little Crows (*Corvus bennetti*) were captured and released unharmed. Three rabbits (*Oryctolagus cuniculus*) were caught and euthanized. One Euro (*Macropus robustus*) removed a trap from the beach location and was later destroyed by Project Eden staff.

DISCUSSION

Eradication of feral cats within the fenced area at Big Lagoon appears to have been successful. No new tracks of adult cats were observed for a period of six days following capture of the last cat (Peron 6) and no further evidence of cat activity was observed during the survey conducted the following January. Kitten tracks appeared on the night of 13 November but these two kittens were subsequently trapped. It is unlikely these animals would have survived as they were still lactating and would have probably perished or been predated. The kitten from the other she cat would undoubtedly have suffered the same fate.

The baiting program did not have a significant impact on cat control. The optimum time to conduct baiting programs is under cool, dry conditions in late autumn/early winter (Algar and Burrows 2004; Algar *et al*. 2007). At this time rainfall, which will cause degradation of feral cat baits is less likely to occur than during the summer months, and the abundance and activity of all prey types, in particular predator-vulnerable young mammalian prey and reptiles, is at its lowest and bait degradation due to rainfall, ants and to hot, dry weather, is significantly reduced. Unfortunately, fence construction was not completed until August, which delayed deployment of the

baits. Weather conditions in August had begun to warm and reptiles and small mammals had become active. Thus the presence of a significant prey resource, which also included an abundance of rabbits and the appearance of fledging birds would have reduced or limited the incidence of bait uptake. The planning of future control/eradication programs must take into account the timing of baiting programs if the technique is to be used effectively.

The trapping program was highly effective and resulted in the removal of all cats that survived the baiting program. Once again though, the timing was sub-optimal as the adult female cats were either in the latter stages of pregnancy or had recently given birth. At this time, female activity patterns and movement distances are restricted and there is therefore less likelihood of them entering a trap. As a consequence, the trapping program takes longer to complete as it is more difficult to locate and then trap the target animal. A similar situation occurred on Hermite Island in the Montebellos where it took almost a month to trap the last cat; a female that had just given birth (Algar *et al*. 2002).

To ensure that the fenced area remains 'cat-free', a dedicated monitoring effort will need to be undertaken. Whether the fence construction (in particular its height) provides an effective, long-term barrier to cat movement can only be determined if routine surveys for cat tracks are conducted within the fenced area and in particular along the fence-line.

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APPENDIX 1

GPS readings for monitoring points

Datum, WGS 84

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