The impact of using Probaits for fox control on Chuditch (*Dasyurus geoffroii*) in the wild.

Final Report

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SUMMARY

This paper reports on a trial to determine the impact of using a new sausage fox bait, Probait, on a wild population of the threatened chuditch *Dasyurus geoffroii* in Western Australia. Previous studies have shown that fox control using dried meat baits impregnated with 4.5 mg of sodium fluoroacetate (1080) is effective at promoting the recovery of medium sized mammals in the south west of WA. Increasing costs and concerns about continuity of bait supply led to CALM developing a cheaper sausage type bait, or Probait. This bait is as effective at killing foxes as the dried meat baits, however it also needed to be demonstrated that it had no detrimental impacts on native fauna, particularly carnivorous mammals. Bait acceptability trials in the laboratory concluded that the dasyurid marsupials chuditch, mulgara *Dasycercus cristicauda*, and south west WA phascogale *Phascogale tapoatafa* were potentially at risk from toxic Probaits. This study was undertaken to assess the likely risk of operational use of toxic Probaits on chuditch. Chuditch were monitored by trapping and radiotracking before, during and after two successive aerial baitings using toxic (3mg 1080) and rhodamine marked Probaits (5 baits / square km) at Julimar conservation park. The trial was undertaken from November 2004 to June 2005, at a time when young born in July 2004 were growing and dispersing from their natal home ranges. A total of 61 individual chuditch were trapped during this study. Trap success rates varied between 3 and 9 %, and none of the 15 radiocollared chuditch died as a result of ingesting toxic probaits. Approximately 87 whisker samples were collected from 61 individual chuditch, and rhodamine fluorescent banding indicating bait consumption, was recorded in 26 (43%) of these. Traces of rhodamine dye were also found in the scats of six individuals. These results indicate that chuditch will find and consume toxic Probaits in the wild, but that they do not consume a sufficient quantity of baits (> 2-3 baits at a time) to be at risk. While Probait has been registered nationally for use to control foxes, the results of this study are important for CALM to have confidence that non-target species are not at risk and to be able to continue broadscale fox control programs for fauna recovery in WA.

INTRODUCTION

Broadscale fox control programs have been underway in WA since 1996 when the Western Shield fauna recovery program commenced (Wyre 2005). Until recently effective fox control for fauna recovery has been achieved by aerial or ground baiting with dried meat baits impregnated with 4.5 mg of sodium fluoroacetate (1080). Increasing costs of baits (doubling of price in 10 years) and concerns about the long term ability of the Agricultural Protection Board to supply baits, led to CALM developing a cheaper sausage type bait, or Probait. The characteristics of this bait can be found in Martin *et al*. (2002). As part of the APVMA registration process for

this new bait, CALM need to demonstrate that it is effective at killing foxes (see Marlow and Brazell 2002, Marlow *et al*. 2003), and that it does not impact on non-target fauna. Martin *et al.* (2002) undertook acceptability trials on a number of native mammals, comparing the uptake of non-toxic dried meat baits, Probaits and Foxoff (another commercially available fox bait). This study concluded that the dasyurids *Dasyurus geoffroii*, *Dasycercus cristicauda*, and the south west form of *Phascogale tapoatafa*, and the bandicoot *Isoodon obesulus*, were potentially at risk from toxic Probaits. This study also suggested that chuditch, *D. geoffroii,* faced a medium to high potential risk from 4.5 mg dried meat baits. However, Morris *et al.* (2003) have demonstrated that broadscale fox baiting programs using 4.5 mg 1080 dried meat baits have not had a detrimental impact on chuditch populations in the wild, in fact fox control has resulted in an increase in chuditch abundance. Martin *et al.* (2002) acknowledged that laboratory uptake trials should only be used as a guide to direct further field testing of the uptake of toxic baits by wild animals in the presence of natural sources of food. This study was undertaken to determine the risk of using Probaits on chuditch in the wild. A similar study is underway to determine the impact on *Phascogale* sp.nov. (Marlow *pers comm*.)

METHODS

Study site: this study was undertaken at Julimar Conservation Park, 80 km north east of Perth. Chuditch were reintroduced to Julimar in 1992/3 and the population has been monitored at least annually ever since. Julimar covers 24000 ha and comprises predominantly jarrah/marri/wandoo woodlands. Two private, cleared farms are located within Julimar. Julimar is adjacent to the Bindoon Army Training Area, another area of approximately 20 000ha of uncleared bushland, and chuditch are also known from this area.

Baiting: When Chuditch were first translocated into Julimar in September 1992, ground baiting (baits every 250 m along all tracks) was undertaken. In 1995, quarterly aerial baiting (5 baits / sq km) of Julimar and the adjacent military training area using 4.5 mg 1080 dried meat baits was commenced. On 12 December 2004 and 6 March 2005, Probaits containing 3 mg 1080 and the non-toxic biomarker

Rhodamine B dye were dropped at a density of 5 baits / sq km. Rhodamine was added as it stains pink the mouth, gut, whiskers and faeces of animals that have ingested it (Fisher 1999).

Trapping: Between November 2004 and June 2005 six trapping sessions were undertaken at Julimar to monitor chuditch abundance. Sheffield wire cage traps, baited with peanut butter, oats and sardines (moistened with fish oil) were set at 200m intervals along vehicle tracks within Julimar. A summary of the trapping effort is shown in Table 1.

Month	Trapping Effort (# trapnights)
22-26 November 2004	584
20-23 December 2004	420
10-15 January 2005	437
7-11 February 2005	616
5-9 April 2005	608
20-24 June 2005	660

Table 1. Trapping effort for chuditch at Julimar.

Additional targeted trapping was undertaken when trying to recover radiocollared chuditch towards the end of this study. All chuditch trapped were weighed and measured and their mouth / teeth inspected for pink colouration. A sample of 6-8 whiskers was also collected from most animals for further inspection under a UV light. Faeces deposited in the traps were also inspected for pink colouration and collected if this was present.

Radiotracking: A total of 15 chuditch (12 males, 3 females) were radiocollared with Biotrack TW3 mortality sensing radiotransmitters during this study. However for the majority of the study 11 individual (9 males, 2 females) were radiocollared. These were located every 1-2 weeks and determined to be alive / dead by the signal received. Most were tracked to diurnal refuge sites and details of locations and refuge sites were gathered for a study being undertaken by an ECU Honours student, Melissa York.

Details of the chuditch radiocollared are shown in Table 2. Only animals that were considered to be adult and near, or at maximum weight (females > 900 g, males > 1200 g) were radiocollared as there was a chance that not all these chuditch would be retrapped at the end of the study to allow the collars to be removed. It would have been preferable to radiocollar equal numbers of males and females, however female chuditch loose weight while they are feeding young in the period August to November, and then gain weight to April/May when they start breeding again. Hence, during the period of this study females were weaning young and were at lower body weights, then increasing body weight, and putting on body fat, particularly around the neck where radiocollars are placed. It is unacceptable to place a non-expanding collar on an animal that is likely to grow during the study.

Sex	ID	Initial body weight	Final body weight	# days radiocollared	Date collar removed	Comments
M	Mu1253/1255	1470	1520	28	21/12/04	Chafing
M	Mu1251/1311	1530	1410	148	21/4/05	
M	W6316/6317	1580	1670	78	10/2/05	Chafing
M	Mu1224/1225	1430	N/a	>127	Lost sig	Not Recovered
M	W6310/6311	1600	N/a	42	5/1/05	Drowned
M	W6330/6331	1650	1860	133	6/4/05	
F	Torn ears	1020	1020	132	7/4/05	
M	W6305/6306	1440	1440	133	7/4/05	
F	W6346/6347	1020	1100	107	7/4/05	
M	W6363/6364	1440	1420	105	5/4/05	
F	W6358/6359	820	N/a	15	7/1/05	In python
M	W6309/6350	1210	1350	104	7/4/05	
M	W6351/6362	1320	1150	97	31/3/05	V poor cond
M	W6445	1470	1440	53	5/4/05	
M	W6432/6433	1470	1410	60	21/4/05	

Table 2. Details of chuditch radiocollared at Julimar.

RESULTS

Trapping: Chuditch trap success for all trapping sessions since the first translocation is shown in Figure 1. During this study Chuditch trap success ranged between 3.4 % in November 2004 and 9.1 % in January 2005. Woylies, brushtail possums, quenda, echidnas, *Varanus* sp and bobtail skinks were also caught in the cage traps. Previous annual monitoring of chuditch in June / July has resulted in trap success rates of 1.3 – 4.3 % (Figure 1). The final trapping session was conducted in June 2005 as part of the annual Western Shield monitoring where the trap success was 3.6%. The numbers of chuditch known to be alive ranged between 17 and 34 (Figure 2), however a total of 54 individual chuditch (37 males and 17 females) were trapped during the intensive part of this study (November 2004 to April 2005) (Table 3). Another 7 individuals were trapped during the regular Western Shield monitoring in June 2005. At least 13 (24%) of these were sub adults, born in 2004 and were growing and dispersing away from their natal territories during this study. The smallest chuditch trapped in November was female W6301/6302 at 360 g, and she was re-trapped in April at 740 g. Another juvenile female W6307/6308 (380g) was captured in November and again in April 2005 weighing 730g. A further 11 individuals classified as sub-adult were captured post the December baiting. Seven (63%) of these chuditch were recorded through to the completion of the study. Figure 2 shows the total number of chuditch known to be alive (KTBA) in April 2005 after the 2 aerial baitings. Again this shows a consistent trend through the study.

Chuditch ID	Sex	Nov 2004	Dec 2004	Jan 2005	Feb 2005	Apr 2005	Comments
MU 1311/1312	M	X		X		X collar removed	150.148
MU1224/1225	M	X		X	X		150.248
Torn ears	F	X	X	X	X	X collar removed	150.337
MU1253/1255 (W6367)	M	X	X collar removed				
W6236/6237	M	X					2004 born
W6238/6239	M	X					2004 born
W6316/6317	M	X			X collar removed		150.208
W6314/6315	F	X	X				2004 born
W6312/6313	M	X					
W6310/6311	M	X	X	Drowned in apiarists water tank			150.326
W6301/6302	F	X				X	2004 born
W6303/6304	F	X					2004 born
W6305/6306	M	X		X		X collar removed	150.355
W6307/6308	F	X			X	X	2004 born
W6330/6331	M	X		X		X collar removed	150.442
W6332/6333	M						2004 born
W6374/6375	M		X	X			2004 born
W6376/6377	F		X	X	X	X	2004 born
W6365/6366	M		X	X	X		2004 born
W6363/6364	M		X	X		X collar	150.349

						removed	
W6309/6350	M		X	X		X collar removed	150.434
W6351/6362	M		X			X collar removed	150.041
W6358/6359	F		X	Eaten by carpet python			150.249 Radiocollar recovered
W6334/6335	F		X	X	X		
W6346/6347	M		X		X	X collar removed	150.025
W6344/6345	M		X	X	X	X	2004 born
W6354/6355	F			X	X	X	
W6352/6379	F			X	X	X	
W6399/6400	M			X			2004 born
W6397/6398	F			X		X	
W6401/6402	F			X			
W6403/6404	M			X			
No ears	F			X	X		Taken to vet, died
W6395/6396	F			X	X		
W6356/6357	M			X	X	X	2004 born
W6378/6380	M				X		
W6448/6449	M				X	X	
W6445/6446	M				X	X radiocollar removed	150.208
W6442/6443	M				X		
W6607/6608	M				X	X	
W6611/6612	M				X		
W6613/6614	F				X		
W6432/6433	M				X	X collar removed	150.325
W6615/6616	M				X	X	
W6622/6623	M				X	X	
W6452/6453	F				X	X	
W6454/6455	F				X	X	
W6630/6631	M					X	
W6585/6586	M					X	
W6642/6643	M					X	
W6472/6473	M					X	
W6676/6677	M					X	
W6644/6645	M					X	
W6583/6584	M					X	
TOTAL TRAPPED	**37M 17F**	**15**	**14**	**21**	**26**	**31**	

Table 3. Details of individual chuditch trapped at Julimar.

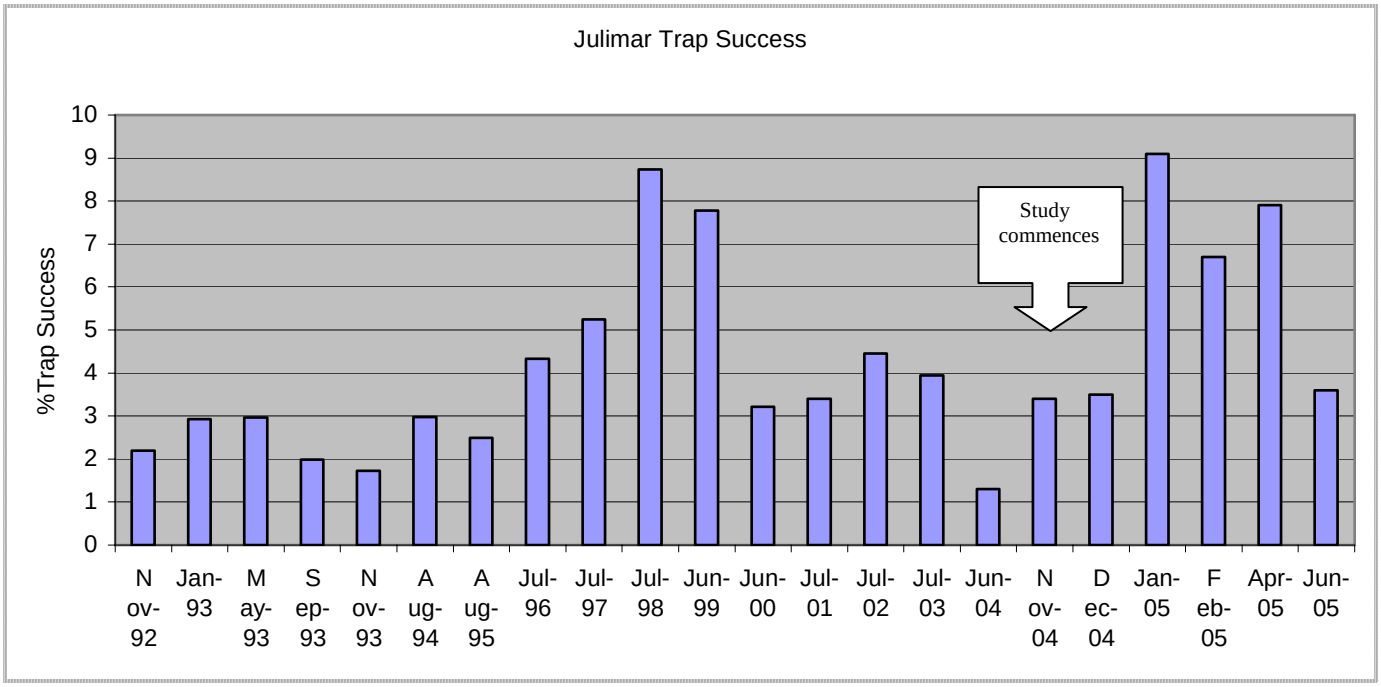

Figure 1. Trap success rates for chuditch at Julimar since 1992.

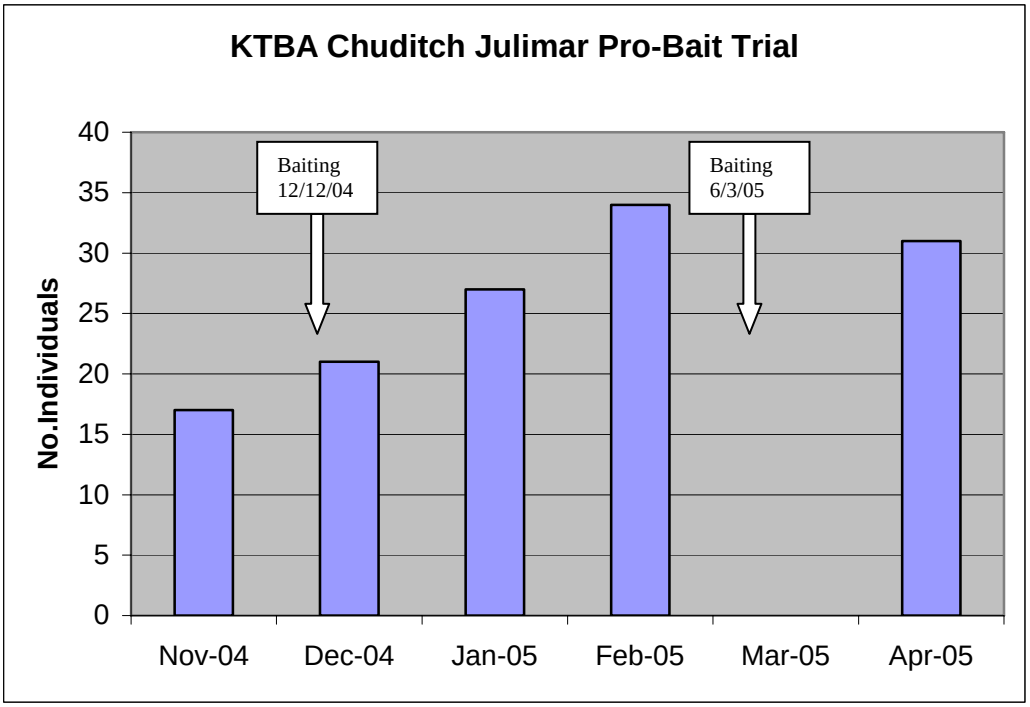

Figure 2. The number of chuditch known to be alive before, during and after the Probait trial at Julimar.

Trapping on the adjacent Commonwealth Defence Department property at Bindoon has been undertaken annually since 2002. This transect is approximately 8km north of Julimar and the movement of chuditch between the sites is relatively unhindered. Tissue for DNA analysis has been taken to ascertain if this population is natural or if it is an extension of the reintroduced Julimar population. Baiting is undertaken simultaneously on Bindoon and Julimar and is considered the same baiting cell. Figure 3 shows that the trapping success on this transect has been increasing each

year. The June 2005 trapping results continued this upward trend after the two probait baiting events.

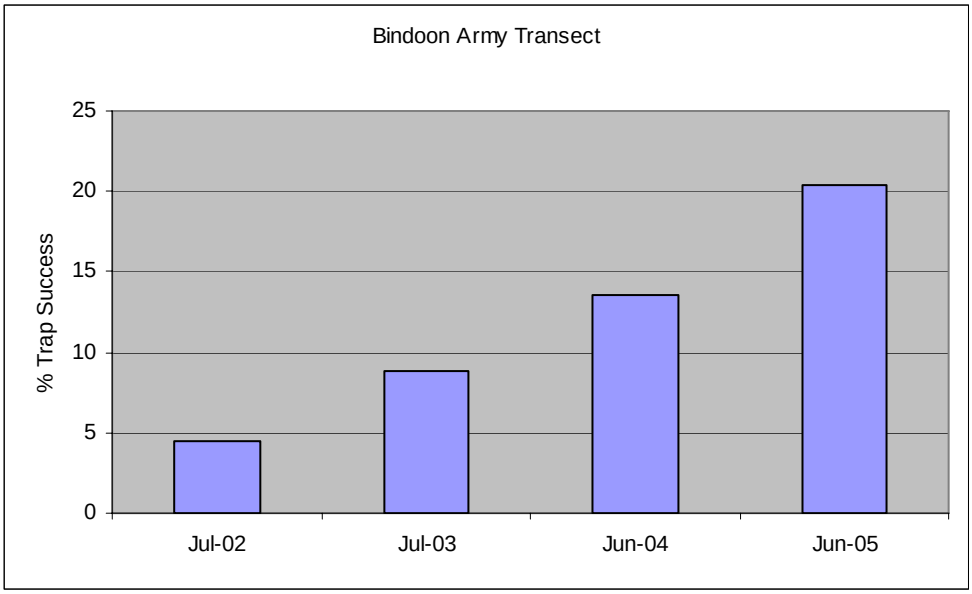

Figure 3. Trap success rates for Chuditch on the Bindoon Army property.

Radiotracking: None of the 15 chuditch radiocollared died as a result of eating a toxic Probait. Seven of those radiocollared chuditch returned positive whisker samples for Rhodamine confirming bait consumption. Two radiocollared chuditch did die: one male drowned in a tank of water used by apiarist to water honey bees, and one female was taken by a carpet python. Another two radiocollars were transferred to other individuals due to severe neck abrasion by the collars.

Rhodamine study: Approximately 87 whisker samples were collected from some 61 individual chuditch. Fluorescent bands were recorded in 26 (42.6%) of the 61 individuals indicating a relatively high bait uptake. Most of these were collected after the first bait drop in December. Seven positives from 11 samples were recorded following the March baiting.

Rhodamine was recorded in faeces from six of the 14 individuals trapped two weeks after the December baiting, but no faeces inspected after the March baiting showed any pink colouration. Five of the six chuditch that had pink faeces after the December baiting were still known to be alive in April 2005.

DISCUSSION

Previous studies have shown the potential risk that wild populations of quolls face from introduced predator control baiting programs (Murray and Poore 2004). However in this study, baiting with Probaits did not appear to detrimentally impact the chuditch population at Julimar. Trap success rates were comparable to previous results, perhaps even higher. Some chuditch did consume toxic baits, or parts of baits, but did not die as a result of this. This result is particularly significant because this study was undertaken at a time when smaller 2004 born animals were dispersing and growing. Smaller body weight animals are at a greater risk of receiving a lethal dose of 1080 (Martin *et al.* 2002). The survival of lower weight juvenile and sub-adult

chuditch during this study was significant. The results of this, and other studies into the risk of using probaits on non-target dasyurids will be important in the process for CALM to have confidence in the use of this alternative fox bait, and hence to continue broadscale fox control programs for fauna recovery.

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