Monitoring of the Grassland Earless Dragon *Tympanocryptis pinguicolla* at the Queanbeyan Nature Reserve 2006 and 2007.

Photo: Thomas Polden

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Introduction

Queanbeyan Nature Reserve (Queanbeyan NR) is a 55 hectare block of land on the southern edge of the Queanbeyan suburb of Letchworth and was purchased by DECC in 2002 to protect a range of highly significant communities and species associated with grasslands and grassy woodlands. The reserve contains examples of two endangered ecological communities and populations of three endangered species that are listed on either the NSW *Threatened Species Conservation Act 1995* (TSC Act) or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), or both. They are:

- Natural temperate grasslands of the Southern Tablelands and the ACT (EPBC Act);
- White Box-Yellow Box-Blakelys Red Gum Grassy Woodland (TSC Act and EPBC Act);
- Grassland Earless Dragon *Tympanocryptis pinguicolla* (endangered on both TSC Act and EPBC Act);
- Golden Sun Moth *Synemon plana* (endangered on TSC Act, critically endangered on EPBC Act); and
- Button Wrinklewort *Rutidosis leptorrhynchoides* (endangered on TSC Act).

The Grassland Earless Dragon is known only from populations in the ACT and surrounding areas of NSW, and the Monaro basalt grasslands (Robertson and Cooper 2000). Queanbeyan NR is one of only two conservation reserves with populations of the species, the other being Kuma NR just south-east of Cooma. In the ACT region, Queanbeyan NR is one of only two known sites in NSW, the other being "The Poplars", private property on the south-eastern side of Lanyon Drive, opposite the reserve (Figure 2). The species is also known from nearby areas of the ACT within the Jerrabomberra Valley. They are a habitat specialist, having been found only in areas of primary natural grassland.

This report outlines the monitoring program established for the Grassland Earless Dragon at Queanbeyan NR and summarises the first two years of monitoring data. In addition the report recommends a future monitoring regime and additional surveys that should be undertaken to determine the presence of other potentially occurring threatened reptiles.

Methods

Aims and technique selection

The monitoring program at Queanbeyan NR has been adopted from that prepared for Kuma NR (Cooper *et al.* 1999). The monitoring program aims to minimise disturbance to both the lizards and their habitat and was selected following evaluation of a range of other available techniques in terms of the effort required and the information that can be obtained.

The question to be answered with the monitoring program is a key determinant of the technique and regime. Following analysis of techniques timing and effort Cooper *et al.* (1999) suggested three main possible management questions.

1. Distribution across reserve over time. This question can be easily addressed using spider tubes in transects, particularly as the reserve is relatively small.

2. Evidence of breeding across the reserve. This question can be addressed by timing the monitoring for the autumn when juvenile lizards are most abundant and easily catchable in spider tubes.

3. Impacts of changes in management. To answer this question would require ability to estimate and detect relatively small changes in population size over and above seasonal and annual variability. Given the large degree of variability in catch rates for the species between season in the ACT it is not seen as feasible to attempt to answer this question in the monitoring program. Furthermore, there is no intention at this stage to significantly change the current management regime for the reserve.

The preferred technique for monitoring Grassland Earless Dragons is the use of roofed spider tubes (Figure 1). These 'traps' are easy to install, check and maintain and because they are not traps but artificial habitat shelters they do not need to be checked on a daily basis, allowing survey work to extend over a longer period of time (Cooper *et al.* 1999). This method is minimum disturbance in nature and suited to answering the two questions being addressed at Queanbeyan NR.

Figure 1: Juvenile dragon sitting at entrance to roofed spider tube at Queanbeyan NR. Photo: Thomas Polden.

Monitoring design and regime

To address the two key questions of distribution and breeding over the reserve over time, ten transects of ten spider tubes placed ten metres apart were installed across the reserve, giving a total of 100 spider tubes on site. Transect placement within the grassland aimed to target the drier rises with better quality grassland habitat across the reserve, and the transects were configured to sample as much of this habitat as possible (Figure 2).

The timing of monitoring is targeted to detect the presence of juvenile and adult dragons. The species lays eggs in burrows in late spring and early summer, which then hatch 9-12 weeks later (Langston 1996), meaning juvenile dragons are about the habitat in late summer to early autumn. To give dragons time to detect and

commence using the artificial burrows prior to monitoring the transects were installed in mid-December of 2005. Checking in 2006 did not commence until mid-March and was undertaken roughly weekly on a total of 6 days up to the end of April. Checking in 2007 commenced in early February and was undertaken sporadically on a total of 5 days until late April.

In terms of rainfall and habitat structure and condition there was great seasonal difference between 2006 and 2007. While monitoring in 2006 was undertaken in a year of below average rainfall, monitoring in 2007 commenced at the height of a severe drought. Although some heavy storms brought rain and flash flooding to the reserve in March 2007 the habitat was very sparse and drought affected.

Tube checking and animal processing

The spider tubes were checked by persons walking along the transect and inspecting each tube *in situ* with a small torch. Invertebrate captures, particularly wolf spiders and red-back spiders, were shaken from the tube and any residual web removed with a toothbrush or small scrubbing brush. Dragons located were processed at the place of capture. Firstly, each animal was shaken from the tube into a cloth handling bag. The lizard was then removed from the bag by hand, measured and sexed. In 2006 an attempt was made to identify individual animals by numbering their bellies with a non-toxic marker.

Male dragons were distinguished by a combination of the presence of pre-anal pores, a bulge above the vent indicating hemipenes, and yellow to orange colouring on the throat, chest and flanks. Females lacked the above features, and also were identified by a rapidly narrowing tail posterior to the vent (Lyn Nelson, pers. comm.). Sex determination was not always possible, particularly in sub-adult animals.

Age class of dragons was determined by snout-vent length on first capture. While the reproductive biology of *T. pinguicolla* is poorly known, adult animals were deemed to have a snout-vent length of 50 mm or greater, with smaller animals classed as sub-adult (Lyn Nelson, pers. comm.).

Results

2006

Eight of the ten spider tube transects at Queanbeyan NR captured Grassland Earless Dragons in 2006. A summary of the captures, which included a minimum of 31 individual dragons on a total of 52 occasions, is included in Table 1 below. The captures were well spaced across the reserve with the northern most transect (transect A) and the second southern-most transect (transect G) recording captures (Figure 2). Juvenile dragons were captured on six transects, indicating evidence of breeding over an extensive area of the reserve.

2007

Three of ten spider tube transects captured dragons in 2007. A minimum of 6 dragons were captured a total of 10 times (Table 1). While the captures covered a wide area of the reserve there were large gaps between the captures (Figure 2). Transect B in the northern section of the reserve accounted for most animals and captures. Dragons laid a clutch of 5 eggs in tube B9, which was discovered in early February. Unfortunately, the eggs were damaged when the tube was checked and the eggs did not hatch.

Transect	Captures		Tubes		Individuals		Adults		Juveniles	
	2006	*2007*	*2006*	*2007*	*2006*	*2007*	*2006*	*2007*	*2006*	*2007*
A	5	0	2	0	2	0	2	0	0	0
B	10	7	7	5	7	4	1	4	6	0
C	11	1	6	1	5	1	0	0	5	1
D	7	0	5	0	4	0	0	0	4	0
E	1	0	1	0	1	0	1	0	0	0
F	0	0	0	0	0	0	0	0	0	0
G	2	2	2	2	2	1	1	0	1	1
H	0	0	0	0	0	0	0	0	0	0
I	8	0	5	0	4	0	0	0	4	0
J	8	0	4	0	6	0	0	0	6	0
Totals	**52**	**10**	**32**	**8**	**31**	**6**	**5**	**4**	**26**	**2**

Table 1: Summary of captures 2006 and 2007

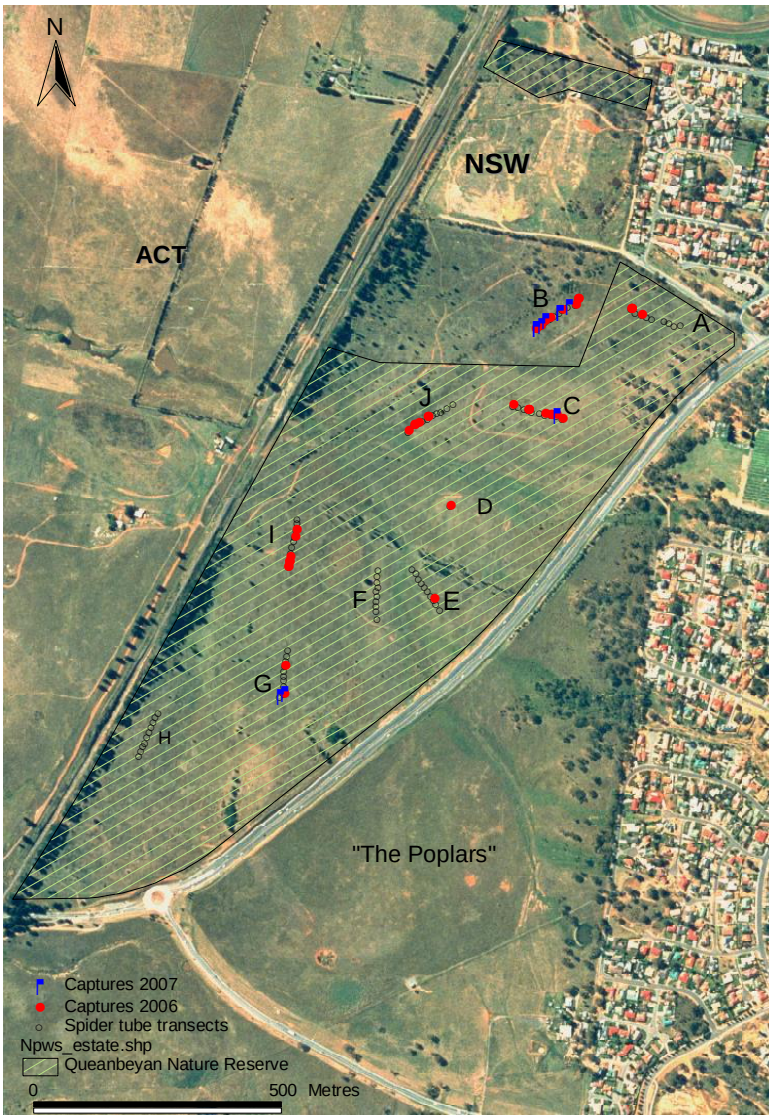

Figure 2: Location of spider tubes and earless dragon captures 2006 & 2007

Discussion

At the commencement of monitoring in 2006 Grassland Earless Dragons were present across the majority of sites sampled on Queanbeyan NR, with evidence of breeding being found across the majority of the reserve. The sampling period in 2006 ran from mid-May to the end of April and was undertaken approximately weekly. This monitoring regime appears to have been sufficient to determine answer to the two main questions of the monitoring program.

In 2007 dragons were found on very few of the transect lines and in much reduced numbers. It must be noted that the monitoring regime differed from the 2006 monitoring in that it commenced earlier and was more sporadic in nature, with monitoring undertaken on 5 occasions over approximately 12 weeks. This is considered insufficient to have adequately answered the monitoring questions for 2007.

It must be noted that the environmental conditions were a significant factor affecting the grassland habitat at Queanbeyan NR in 2007. Prolonged severe drought and very high grazing pressure from a resident kangaroo population estimated at around 200-300 animals meant the habitat in 2007 was extremely sparse, with very little vegetation and almost no tussock structure. Dragon numbers in the ACT have also been reported to be low in the 2007 survey season. There were very few juvenile dragons captured in 2007 compared with juveniles being the majority of captures in 2006. A low juvenile to adult ratio was also recorded from "The Poplars" when that site was surveyed in early 2003, again at the end of a significant drought year.

Recommendations for future monitoring

Monitoring of Grassland Earless Dragons at Queanbeyan NR should be undertaken at least every two years, if not annually. The preferred survey season is between February and April inclusive. It is recommended that monitoring consist of 6-10 weekly visits to the site during this period to ensure that enough data is collected to answer the monitoring questions. Furthermore, it is recommended that the spider tubes be closed outside the monitoring period to preclude the use of the tubes as egg deposition sites to avoid the prospect of accidental destruction or other disturbance to the life cycle of the species.

References

Robertson, P., and Cooper, P. (2000). Recovery Plan for the Grassland Earless Dragon (*Tympanocryptis pinguicolla*). Unpublished report to Environment Australia, Canberra.

Cooper, P., Dorrough, J., and Nelson, L. (1999). Monitoring regime for the Striped Legless Lizard *Delma impar* and the Grassland Earless Dragon *Tympanocryptis pinguicolla* at the proposed Kuma Nature Reserve. Unpublished report to New South Wales National Parks and Wildlife Service, Queanbeyan.