A SURVEY FOR THE BRONZEBACK SNAKE-LIZARD (*Ophidiocephalus taeniatus*)

NEW CROWN AND UMBEARA PASTORAL LEASES

NORTHERN TERRITORY

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Cover photographs by the authors
Top: The mesa country of the Beddome Ranges
Bottom: The Bronzeback snake-lizard (*Ophidiocephalus taeniatus*)

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SUMMARY

The Bronzeback snake-lizard (*Ophidiocephalus taeniatus*) was rediscovered in the Northern Territory in June 2008 after an absence of records over a 111 year period (McDonald in prep.). As a consequence, an intensive targeted survey was carried out in suitable habitat in the vicinity of the location of the June capture. Potential survey areas were identified using Google Earth and Landsat 7 Imagery and specific sites were selected during on-ground visits and surveyed immediately. The survey was undertaken over two field trips; the first was carried out in July 2008 and the second in September/October 2008. At each site, litter mats were raked during daylight hours using a pitchfork attached to a long timber handle.

During the survey, a total of 18 *O. taeniatus* were caught from 15 sites throughout the Beddome Ranges hill complex and its westerly outliers, establishing this area in the extreme south of the Northern Territory as a stronghold for the species. The survey failed to locate *O. taeniatus* near Charlotte Waters (the type locality of the species) or in the Mt Daniel hill complex, possibly as a consequence of high levels of stock disturbance.

The specimens of *O. taeniatus* were found in 10 distinct Land Units on New Crown and Umbeara Pastoral Leases and these units will assist in narrowing down future surveys for the species. Animals were found underneath the litter mats of four species of *Acacias*, including *A. latzii* and *A. sibirica* for the first time. The litter mats of *A. cambagei* and *A. latzii* were the least efficient for locating *O. taeniatus* and it is suggested that this is due to the mats larger size and thickness, making them more time-consuming to rake.

Our finding that *O. taeniatus* is restricted to litter mats, typically in shady areas, supports the work of Ehmann (1981) who concluded that individual *O. taeniatus* restrict their activities (including thermoregulation) to beneath litter mats. Of the 18 animals we examined, the mean snout-to-vent length (SVL) was 94 mm and the mean total length was 197 mm. We captured two distinct size classes. All animals caught under *A. cambagei* fell into the larger size class (100-117mm SVL), whereas all the animals caught under *A. aneura* and A. *sibirica* fell into the smaller size class (83-95mm SVL). As with Ehmann's (1981) observations at Abminga, most of the *O. taeniatus* we observed had lost some portion of their tails prior to capture.

Data collected during this survey provides the first quantitative evidence of disturbance by large introduced herbivores (cattle, horses, donkeys, camels) as a threatening process for *O. taeniatus*. Our results suggest that *O. taeniatus* is more likely to be found at sites where there is no large herbivore disturbance, but the species persists at disturbed sites provided that a proportion of the mats are undisturbed. We suggest that the introduction of large herbivores has severely reduced the amount of suitable microhabitat available to *O. taeniatus* in some areas, particularly in the vicinity of dams and bores.

Similar to the observations of Ehmann (1992) at Abminga, we found several areas where the litter mats had been washed away or altered by siltation. We also found several *O. taeniatus* in elevated situations along narrow rocky drainages and observed that the litter mats in these upper catchment sites were relatively unaffected by past flow events. We suggest that such

areas may be source populations for those areas downstream that are periodically destroyed by flooding.

In addition to *O. taeniatus*, we caught eight species of reptiles underneath litter mats during the survey. Of these, only the skinks *Lerista desertorum* and *L. timida*, and the pygopod *Delma tincta*, were caught in reasonable numbers. A single specimen of the elapid snake *Brachyurophis incinctus* was found underneath a litter mat and represents a considerable range extension for the species in the Northern Territory.

1. INTRODUCTION

1.1 BACKGROUND

The Bronzeback snake-lizard (*Ophidiocephalus taeniatus*) belongs to a monotypic genus within the family Pygopodidae and was described by Lucas and Frost in 1897. The description was based on a single specimen collected by P. M. Byrne who was stationed at Charlotte Waters Telegraph Station in the extreme south of the Northern Territory (Ehmann, 1981). However, it was not until 1978, 81 years after the first animal was collected, that the species was rediscovered at Abminga in northern South Australia, 25 kilometres south of Charlotte Waters (Ehmann and Metcalfe, 1978). Since the rediscovery, *O. taeniatus* has been found at a number of scattered localities in SA between Coober Pedy and Abminga (Brandle, 1998; Brandle *et al.*, 2005; Downes *et al.*, 1997; Hutchinson *pers. comm.*).

Although Ehmann (1981) has suggested that *O. taeniatus* may occur throughout the Finke River drainage basin, no animals had been found in the NT following the collection of the 1897 type specimen. This is despite considerable fauna sampling effort throughout the Finke Bioregion (Neave *et al.*, 2004) and the Finke River floodout area (Eldridge and Reid, 1998).

Currently, *O. taeniatus* is listed as nationally vulnerable (EPBC Act) and as data deficient in the NT (based on IUCN criteria).

1.2 REDISCOVERY IN THE NORTHERN TERRITORY

In June 2008 a single adult *O. taeniatus* was caught by Biodiversity Conservation staff during a survey of the threatened plant *Acacia latzii* on southern New Crown Station, about three kilometres north of the NT/SA border (McDonald in prep.). The animal was found by raking the litter mat underneath a mature *Acacia aneura*, adjacent to a dry sandy watercourse lined with *Eucalyptus coolabah*.

1.3 AIMS OF THE CURRENT SURVEY

The primary aims of the survey were to develop a preliminary map of the species distribution in the southern NT and to gain an understanding of its conservation status and potential threatening processes. Secondary aims were to identify the range of litter producing plant species which are suitable for *O. taeniatus* within the survey area and to complete an inventory of all litter-dwelling reptiles within the survey area.

2. METHODS

2.1 SITE SELECTION

Potential areas to be surveyed, mostly consisting of drainage lines cutting through stony hills and plains, were identified using Google Earth and Landsat 7 Imagery (Geoscience Australia). These areas were targeted based on the NT rediscovery site (McDonald in prep.) and the SA records (Brandle, 1998; Brandle *et al.*, 2005; Downes *et al.*, 1997; Ehmann and Metcalfe, 1978), all of which were along or near drainage lines. The final selection of sites was made on the ground, with a site defined as all the litter mats within a 100 metre radius of a central point (recorded with a handheld GPS). However, not all mats within that radius were searched at all sites.

At each site we recorded the following information: site number, date, start and end time of searching (Central Standard Time), dominant shrub species, number of litter mats searched, presence of disturbance from large introduced herbivores (cattle, horse, donkey, camel) on mats, as well as general notes on mat condition. A site was scored as having disturbance if any mats observed (though not necessarily searched) within that site had sign of trampling or scats from introduced herbivores.

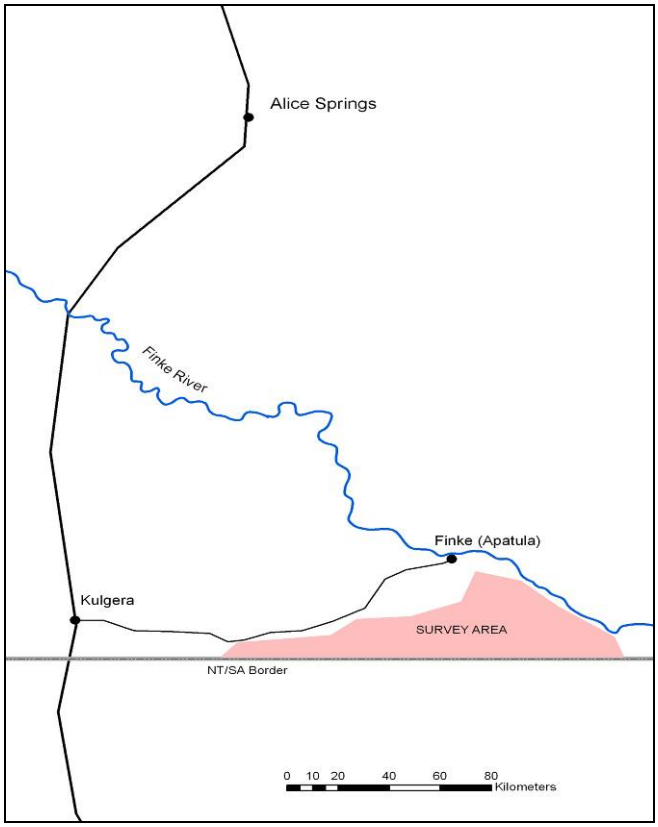

Figure 1 – Map showing the approximate location of the area surveyed

2.2 SURVEY METHODS

The survey was undertaken over two field trips; the first was carried out from the 1st to the 6th July 2008, and involved one experienced herpetologist (PM) raking a small number of sites. The second field trip was carried out from the 23rd September to 1st October 2008 and involved two experienced herpetologists (GF and PM) who intensively targeted *O. taeniatus* over the nine-day period.

Litter mats were raked by hand during daylight hours (0715-1800 hrs on first trip, 0620-1835 hrs on second trip) at each site, using a pitchfork attached to a long timber handle. Attempts were

usually made to rake entire litter mats but in many cases this was not possible as a consequence of impediments such as fallen branches. Raked material was spread loosely over the cleared ground at the conclusion of each mat search. The number of litter mats searched varied between sites, as did the individual size of the mats. Because of this, the time spent searching at each site was recorded as a means of gauging survey effort.

All reptiles caught were identified and released at the site of capture within eight hours; most were released within five minutes of capture. For all reptiles, capture time (CST), litter mat plant species, whether the mat was in the sun or shade at the point of capture, and any observed disturbance to the mats, was recorded. For *O. taeniatus*, the snout-to-vent length (SVL) and total length was recorded, as was the presence of any tail regeneration. In recognition that raking potentially renders litter mats unsuitable for *O. taeniatus* for an unknown period of time, and in order to minimise the destruction of available habitat, once an *O. taeniatus* was caught at a site no more raking was carried out at that site (site 70 was the only exception to this). If an *O. taeniatus* was caught under a mat, the remainder of that mat was left undisturbed.

3. RESULTS

3.1 DISTRIBUTION OF *O. TAENIATUS* WITHIN THE SURVEY AREA

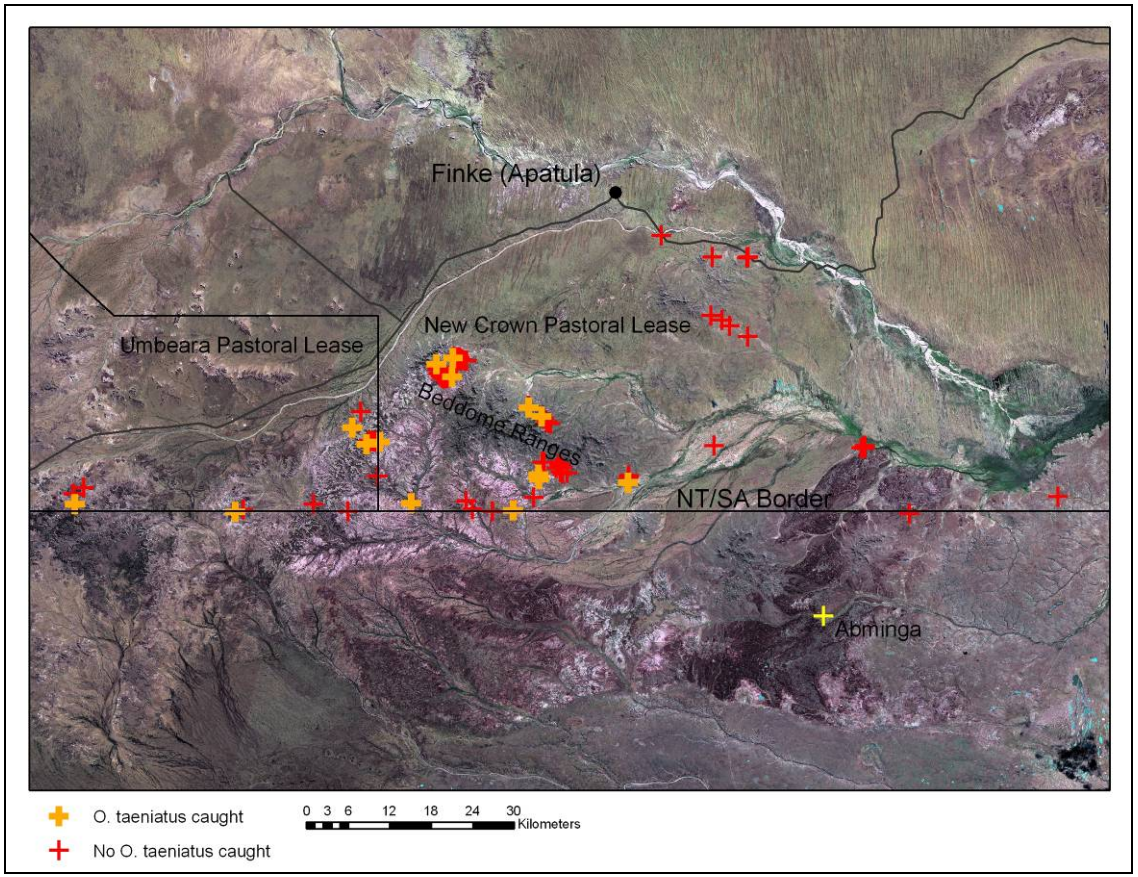

Figure 2 – Map showing the location of survey sites where *O. taeniatus* were found and sites where they were not found. Background Landsat 7 image by produced by Geoscience Australia.

From a total of 85 survey sites, 18 *O. taeniatus* were caught from 11 sites on New Crown Pastoral Lease and from 4 sites on Umbeara Pastoral Lease (Figure 2). Animals were found on minor and major drainage lines throughout the Beddome Ranges hill complex and appear to be largely associated with the drainages that dissect areas of shale and siltstone mesas (represented by the areas of pink). The largest concentration of these mesas can be seen in the centre left of the map (extending into SA), with outlying areas to the west and north west, and another considerable concentration in SA to the west of Abminga (Abminga was the site of the 1978 rediscovery of the species). We did not locate *O. taeniatus* in the Charlotte Waters area (eastern portion of the survey area) or the isolated Mt Daniel hill complex (north east portion of the survey area).

3.2 LAND UNIT AND VEGETATION ASSOCIATIONS

In the following table, data is presented on the Land Units (soil/vegetation mapping) which have been developed for both New Crown and Umbeara Pastoral Leases. The Land Unit systems of each lease are independent of one another. For example, Land Unit 3.3 on New Crown does not correspond to unit 3.3 on Umbeara.

TABLE 1 – Breakdown of survey effort and *O. taeniatus* captures for each of the Land Units surveyed

Land Unit	**Pastoral lease**	**No. sites**	**Total effort time (minutes)**	**No. of *O. taeniatus***	**No. O. taeniatus/ single person effort hour**
1.1 - The crests and footslopes of the Beddome Ranges	New Crown	3	46	1	1.3
1.3 - Stony silcrete capped mesas	New Crown	6	212	2	0.6
2.2 - Stony rises	New Crown	1	16	0	0
2.4 - Gently undulating gravely rises	New Crown	11	558	1	0.1
3.3 - Gently undulating gilgaied gibber tablelands and plains	New Crown	1	16	0	0
4.1 - Level to very gentle undulating plains	New Crown	11	424	1	0.1
7.1 - Gently sloping alluvial plains	New Crown	13	359	1	0.2
7.2 - Shallow drainage depressions	New Crown	1	1	0	0
7.5 - Watercourses and level floodplains with coolabah and mulga	New Crown	23	1255	8	0.4
1.6 - Sandstone mesas	Umbeara	6	304	1	0.2
1.7 - Plateau	Umbeara	2	32	1	1.9
1.8 - Siltstone rises	Umbeara	1	120	0	0
3.1 - Mulga plains	Umbeara	1	20	0	0
3.3 - Gently sloping plain adjacent to mesas	Umbeara	4	246	1	0.2
5.7 - Broad drainage floor with mulga	Umbeara	1	30	1	2

During the course of the survey, we located *O. taeniatus* in six of the nine Land Units surveyed on New Crown Pastoral Lease and on four of the six land units surveyed on Umbeara Pastoral Lease (Table 1). Land Unit 7.5 on New Crown accounted for the highest number of *O. taeniatus* overall (n=8), with no more than one animal being found in each Land Unit on Umbeara. Animals were caught most efficiently on New Crown in Land Unit 1.1, with unit 1.3 the only other to average greater than 0.5 *O. taeniatus* per hour of search effort. On Umbeara, we captured *O. taeniatus* most efficiently on Land Units 1.7 and 5.7, with both units averaging around two animals per hour of searching effort.

TABLE 2 – Breakdown of survey effort and *O. taeniatus* captures for the four dominant litter species

Dominant mat species	**Total effort time (minutes)**	**No. of *O. taeniatus***	**No. *O. taeniatus* single person effort hour**
Acacia aneura	778	5	0.4
Acacia cambagei	1328	5	0.2
Acacia latzii	1160	6	0.3
Acacia sibirica	336	2	0.4

The majority of search effort was carried out at sites dominated by *Acacia cambagei*, followed by *A. latzii*, *A. aneura* and *A. sibirica* (Table 2). Overall, the capture rate was highest at *A. aneura* and *A. sibirica* dominated sites, lowest at sites dominated by *A. cambagei*, with *A. latzii* sites having intermediate rates. The mats produced by *A. latzii* appear to be intermediate in depth and structure between those produced by *A. aneura/A. sibirica* (thin and relatively unconsolidated) and those produced by *A. cambagei* (thick and consolidated).

3.3 ANIMAL AND MAT CHARACERISTICS

Table 3 lists the mat species under which each *O. taeniatus* was captured. This information differs from that provided in Table 2 where the dominant mat species is listed.

TABLE 3 – Data for each *O. taeniatus* and associated litter mats

***O. taeniatus* animal no.**	**Capture time**	**Sun or shade**	**Mat plant species**	**SVL (mm)**	**Total Length (mm)**	**Tail regen. Y/N**
1	1727	Sun	Acacia sibirica	93	226	Y
2	0839	Sun	Acacia latzii	100	180	Y
3	1249	Shade	Acacia sibirica	95	152	N
4	1705	Sun	Acacia cambagei	117	239	N
5	1154	Sun	Acacia cambagei	100	181	Y
6	0815	Shade	Acacia cambagei	100	242	N
7	1035	Shade	Acacia cambagei	101	197	Y
8	1155	Shade	Acacia cambagei	104	234	Y
9	1625	Sun	Acacia latzii	88	196	Y
10	1401	Shade	Acacia aneura	92	132	Y
11	1405	Shade	Acacia aneura	84	208	N
12	1410	Shade	Acacia aneura	83	189	Y
13	1420	Shade	Acacia aneura	86	200	Y
14	0850	Shade	Acacia aneura	84	208	Y
15	1007	Shade	Acacia sibirica	88	137	Y
16	1205	Shade	Acacia latzii	86	184	Y
17	1312	Shade	Acacia latzii	94	211	Y
18	1000	Shade	Acacia latzii	102	239	N

Animals were caught at numerous times throughout the day with capture time ranging from 0815 to 1727 hrs (Table 3). 72% (n=13) of animals were caught in the shaded areas of litter mats and, of those that were caught in sunny areas, only one was caught between the hours of 0900 and 1600. Our captures of *O. taeniatus* were all from under mats produced by four species of *Acacia*. Three of those species (*A. cambagei*, *A. aneura*, *A. latzii*) each accounted for five individuals, with the remaining three animals caught under *A. sibirica*. The snout-to-vent length ranged from 83 to 117 mm, with a mean of 94 mm. Total length varied between 132 and 239 mm, with a mean of 197 mm. 72% (n=13) of *O. taeniatus* caught had lost some portion of their tail prior to capture.

3.4 DISTURBANCE

3.4.1 Disturbance from large introduced herbivores

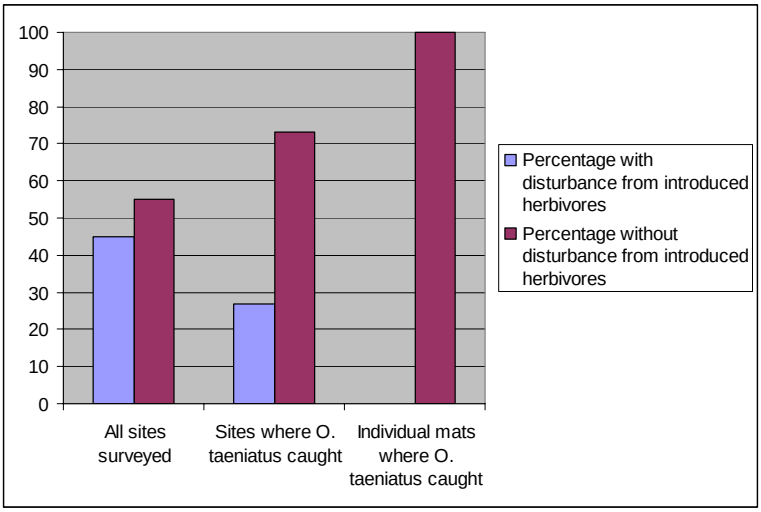

Figure 3 – The relationship between herbivore disturbance to survey sites, individual mats and captures of *O. taeniatus*.

Overall, 45% of our survey sites had some degree of mat disturbance from large introduced herbivores (Figure 3). Of the sites where we captured *O. taeniatus*, 60% had no evidence of disturbance. However, when disturbance was assessed at the scale of individual litter mats, we found that we captured *O. taeniatus* only underneath mats without any evidence of herbivore disturbance.

Cattle disturbance to litter mats appeared to be more pronounced closer to bores and dams, but disturbance was observed up to 18 kilometres (in the absence of rugged terrain) from the nearest permanent water source. No cattle disturbance was observed within the complex of shale and siltstone mesas to the south of the Beddome Ranges, but there was some disturbance on the fringes of this habitat. Camel and, to a lesser extent, horse disturbance and fresh sign (tracks and scats) was present throughout the survey area, including within the core area of mesas. Camel impact was particularly noticeable in areas where groups had 'camped' (become resident for a period of time) and in such areas direct damage to litter mats was caused by camels laying down in the shade of shrubs, as well as trampling mats and snapping branches whilst browsing. Evidence of camel and cattle browsing was observed on *A. aneura* but not on any of the other litter forming species under which *O. taeniatus* was caught.

3.4.2 Surface flow

The impact of surface water flow on litter mats was observed throughout the survey area and provides evidence of a major rainfall event(s) in recent history. The effects ranged from the silting of intact mats, sometimes rendering them as a solid mass adhered to the substrate, to the complete removal of mats. There appeared to be great variability in the degree of impact between sites, including sites that were in close proximity. Lowland sites on level plains were most affected (i.e. suffered a complete loss of litter). Even within sites, variability in the degree of impact to litter mats was often observed.

3.5 OTHER REPTILE FAUNA

TABLE 4 - The number of each non-target reptile species caught under the different litter producing Acacias

Species	**No. caught *A. aneura* mats**	**No. caught *A. cambagei* mats**	**No. caught *A. latzii* mats**	**No. caught *A. sibirica* mats**	**Total no. caught**
Lerista desertorum	0	33	0	0	33
L. labialis	1	0	0	0	1
L. timida	6	6	8	0	20
Menetia greyii	0	1	0	1	2
Delma australis	0	1	0	0	1
D. tincta	1	7	1	0	9
Amphibolurus longirostris	1	0	0	0	1
Brachyurophis incinctus	0	1	0	0	1

In addition to *O. taeniatus*, eight species of reptile were found under litter mats during the survey. These included four skinks (*Lerista desertorum, L. labialis, L. timida* – formerly *L. muelleri,* and *Menetia greyii*), two pygopods (*Delma australis* and *D. tincta*), one species of dragon, *Amphibolurus longirostris,* and one species of elapid snake, *Brachyurophis incinctus*. *Lerista desertorum* was the most frequently caught reptile and all 33 animals were found under *A. cambagei* litter mats. *Lerista timida* was the next most frequently caught reptile and was found under each of the dominant litter-producing Acacias except for *A. sibirica*. *Delma tincta* was the only other species caught in reasonable numbers and was mostly caught in *A. cambagei* litter. Although only two *M. greyii* were caught during the survey, lizards thought to be

this species were seen (but not caught) at several other sites. The remaining four species were only caught on one occasion each.

4. DISCUSSION

4.1 DISTRIBUTION OF *O. TAENIATUS* WITHIN THE SURVEY AREA

The presence of *O. taeniatus* at 15 sites, scattered throughout the Beddome Ranges hill complex, establishes this area as a stronghold for the species. Although Ehmann (1981) suggested that *O. taeniatus* would probably occur throughout the Finke River drainage basin, the apparent association between sites where the animals were caught during this survey, and areas of sedimentary mesas, may suggest otherwise. These mesas only occur within a small proportion of the Steep Hills and Broken Stony Plains (SHBSP) and the High Stony Plateaus (HSP) Land Systems of the Finke Bioregion (Neave *et. al.*, 2004). These Land Systems are themselves restricted to a relatively small area of south east NT and are the northern tip of the vast stony deserts which dominate much of north eastern SA (Brandle, 1998) and include the entire known distribution of *O. taeniatus* in that state (Neagle, 2003).

Our failure to find the species in the vicinity of Charlotte Waters and the Mt Daniel hill complex is of note. Previous efforts to locate *O. taeniatus* in the Charlotte Waters area have resulted in no captures, with searchers observing an absence of suitable litter in the area due to trampling by cattle (Ehmann and Metcalfe, 1978; J. van der Reijden, *pers. comm.*). Stock impact was noted again during this survey, as was the complete absence of litter in several areas, apparently caused by a past flow event. All the sites searched in the Charlotte Waters area were along major drainage lines cutting through gibber plains and low stony rises. In contrast, while many of the litter mats searched in the Mt Daniel hill complex also had stock disturbance, their location higher in a catchment along stony creeklines, seems to have limited the effects of surface flow. An intensive survey of the southern and eastern portions of the Mt Daniel hill complex would be required to rule out the presence of *O. taeniatus* in that area.

4.2 VEGETATION AND LAND UNIT ASSOCIATIONS

Any apparent associations between *O. taeniatus* and the Land Units should be viewed with some caution. The Land Unit system has mapped New Crown and Umbeara Pastoral Leases to a scale of 1: 100 000, which means that some of the lesser drainages have not been identified as being unique from their surrounding landscapes (whilst on the ground this is clearly the case). However, the Land Unit mapping is the most detailed form of vegetation/soil mapping currently available for the area and will assist in identifying sites for future surveys. The high capture rate in the two Umbeara Land Units where animals were only caught once (1.7 and 5.7), should also be viewed with caution due to the small sample sizes.

The presence of *O. taeniatus* under the litter mats of four species of Acacias reinforces previous findings that *O. taeniatus* is not limited to *A. cambagei* lined watercourses (Brandle *et al.*, 2005; Downes *et al.*, 1997). To our knowledge, this survey is the first time that *O. taeniatus* has been caught under litter mats produced by *A. sibirica* and the nationally vulnerable *A. latzii*. The relative inefficiency of locating *O. taeniatus* under mats produced by *A. cambagei* and *A. latzii* may simply be due to the nature of the mats, rather than to differences in densities of *O. taeniatus*. These larger and thicker mats require considerably more time and effort to rake.

4.3 ANIMAL AND MAT CHARACTERISTICS

Our ability to locate *O. taeniatus* under litter mats throughout the day, offers support to Ehmann's (1981) conclusion that *O. taeniatus* restricts its activity (at least diurnally) to below the litter surface. The tendency of individuals to be found in the shaded sections of the mats,

especially between 0900 and 1600 hrs, suggests that animals thermoregulate by moving horizontally underneath the mats, further supporting the conclusions of Ehmann. Because the snout-to-vent length of *O. taeniatus* at sexual maturity is unknown (Hutchinson, *pers. comm.*), we are unable to ascertain whether the smaller individuals captured during this survey were adults or sub-adults. However, our captures fall into two non-overlapping size classes; 83-95 mm and 100-117 mm SVL. Interestingly, most of the animals (5 of 7) in the larger size class were found under *A. cambagei* mats, with all those animals found under *A. aneura* and *A. sibirica*, belonging to the smaller size class. Our observation that most *O. taeniatus* had some degree of tail regeneration is similar to that of Ehmann (1981) at the Abminga population.

4.4 DISTURBANCE

4.4.1 Disturbance from introduced large herbivores

Our observations identify disturbance by large introduced herbivores as a potential threatening process for *O. taeniatus*. The data presented in this report suggest that *O. taeniatus* is more likely to be found at sites where there is no disturbance by large introduced herbivores, but that individuals are able to persist in sites with some disturbance, providing they have access to mats which are undisturbed. Even at survey sites close to bores, there were generally some litter mats which, due to topography or horizontal branches, were protected from herbivore damage. However, it is apparent that the amount of suitable habitat (undisturbed litter mats) for *O. taeniatus* has been severely reduced as a result of the introduction of large herbivores (especially cattle, horses and camels).

In the areas where cattle were absent, litter disturbance from feral camels and horses varied depending on the terrain and vegetation. Most of the impact was limited to the larger *E. coolabah* lined drainages where *A. aneura* or *A. sibirica* were the dominant shrubs; presumably because of the food resources these areas offer to large herbivores (Jessop and King, 1997; Kennedy and Bazzacco, 2002). In contrast to the major drainages, the *A. latzii* dominated minor creeklines and mesas were largely devoid of camel and horse impact, probably as a consequence of the absence of edible plants (Jessop and King, 1997; Kennedy and Bazzacco, 2002) and rugged terrain. This highlights the potential importance of *A. latzii* habitat for the conservation of *O. taeniatus* in the NT.

4.4.2 Surface flow

The apparent local extinction of a population of *O. taeniatus*, caused by a flood event, was recorded by Ehmann (1992) at his Abminga study site. Similarly, several of the sites we searched (which appeared otherwise suitable) were completely devoid of litter mats due to a previous flow event(s). However, some insight into how *O. taeniatus* populations may recover from flow events was demonstrated in one area of Umbeara Pastoral Lease. First a creek site which was on a clay flat, adjacent to an extensive area of hills, was searched. The site had what looked to be ideal soil and numerous individuals of *A. aneura* and *A. sibirica*. However, on closer inspection we discovered that those shrubs within the drainage line had had their litter washed away. Even those shrubs elevated well above the creek had litter mats that were covered in silt or washed away by sheet flow. We then checked an *A. latzii* site on the same drainage line near its source, up in the rocky hills, and found an *O. taeniatus* under the first litter mat searched. The mat was completely intact and without any evidence of surface flow. Based on this and other observations, we conclude that the levels of flow impact on mats will decrease with increasing elevation within the catchment. Further, we propose that the 'lowland' populations of *O. taeniatus*, which are periodically devastated by flood events, will rely on being repopulated by animals from higher up their catchment or from other nearby elevated areas. Importantly, the presence of *O. taeniatus* on elevated rocky drainages (five other animals were

found in similar situations) shows the species can persist in these areas despite major flood events.

4.5 OTHER REPTILE FAUNA

Although *L. desertorum* was the most frequently caught reptile during the survey, its distribution within the study area appears to be limited to the eastern half of the Beddome Ranges hill complex and it was only found under *A. cambagei* litter mats. This is surprising as both authors are familiar with the species from litter produced by *A. aneura* and various other plant species elsewhere in the southern NT. Differences in soil type appear to be the most likely explanation for its absence from much of the area surveyed. The smaller *L. timida* was distributed throughout southern New Crown and Umbeara pastoral leases, though it does not appear to be particularly abundant and was never caught more than twice at any site. Of the two *Delma* species caught, *D. tincta* was the only one captured more than once and appears to be fairly common in areas of *A. cambagei*. Only two *D. tincta* were found in mats produced by other plant species and this probably highlights the structural differences between the *Acacia* mats. Ehmann (1981) observed that *D. australis* is active on or within the litter mat itself during the day. Although most of the Delmas caught were underneath the mats, they demonstrated a considerable ability to move through the 'matrix' of matted leaves to avoid capture. It seems likely that, of the four *Acacia* species, the thick mats produced by *A. cambagei* are the most suitable for *Delma* species as these are the only mats which provide considerable vertical structure. The single specimen of the elapid *Brachyurophis incinctus* caught during the survey represents a southerly range extension of about 150 km (NT Fauna Atlas) for the species and suggests that it may also occur in areas of nearby SA.

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APPENDIX A - Examples of *O. taeniatus* habitat

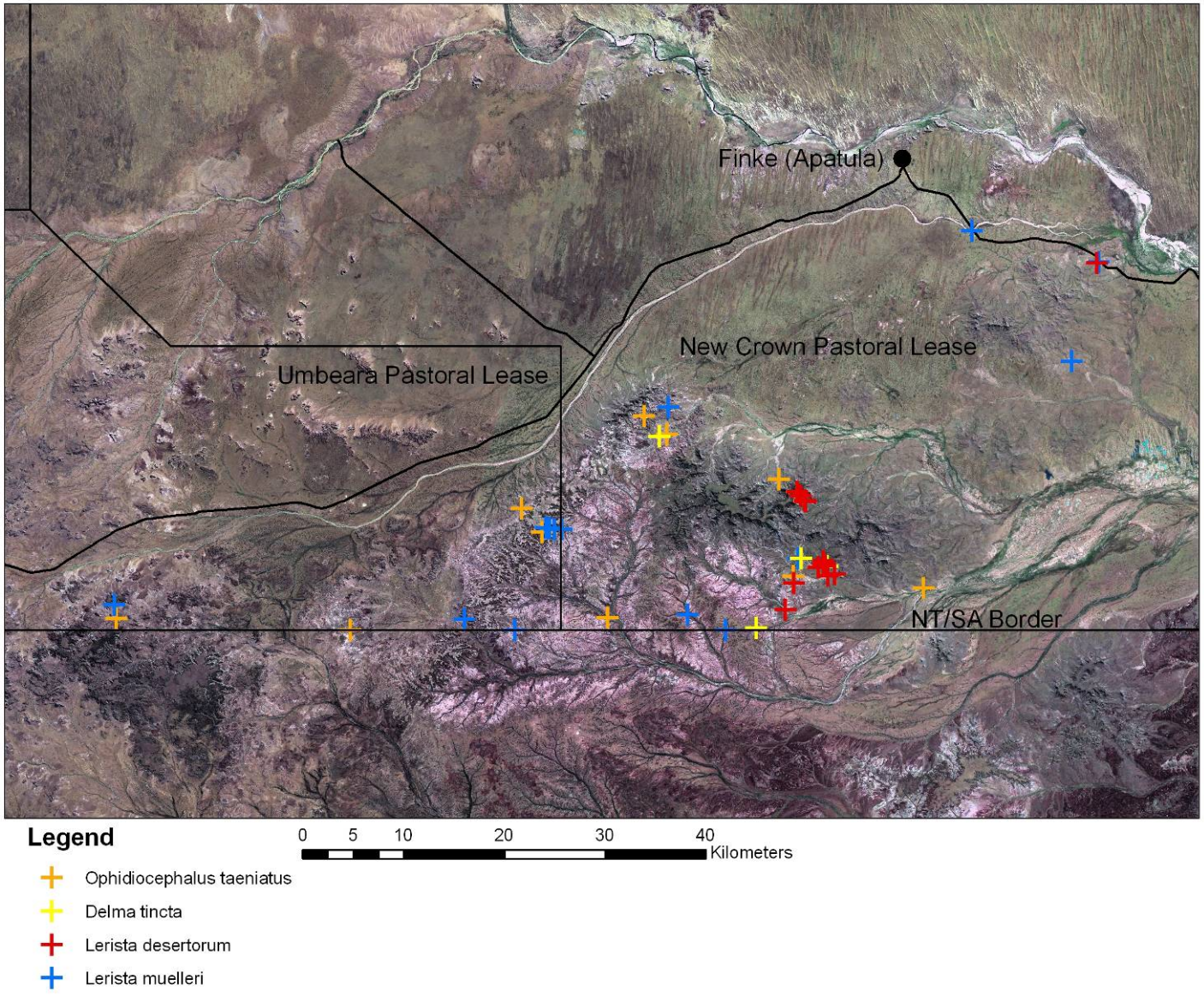
Major *Eucalyptus coolabah* lined watercourse with *A. sibirica*. Note the mesas in the background.

Stony *A. cambagei* lined minor watercourse. This site was less than 4km from a dam.

Dense *A. latzii* along a minor watercourse. This extensive area of mesas is largely unaffected by introduced herbivores.

A small stand of *Acacia latzii* in an isolated area of mesas.

APPENDIX B - Capture sites of the most frequently encountered reptiles



Map showing the capture sites of the four most frequently encountered litter-dwelling reptile species.