

Western Australia's Herpetofauna.

North Lake Banksia Woodland.

A species richness study in Beeliar Regional Park, Perth, W.A.



North Lake

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(Independent Study Contract, Semester 1, 2004, Supervisors Dr K C Richardson and
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Abstract

The reptiles and amphibians present in the *Banksia* woodland near North Lake just south of Perth, Western Australia were monitored through pitfall trapping for 30 days in April 2004. Overall 18 species were found to be present in this area after only 1 month of trapping and general observation. Two snake species: *Notechis scutatus* and *Pseudonaja affinis affinis* as well as two lizards, *Varanus gouldii* and *Tilqua rugosa* were observed near to and within the study area, all utilising the same habitat. From the pitfall trapping, 10 lizard and 4 frog species were found. The amphibians were found to be the most numerous with up to 63 individuals of a single species found in a single day. The most common species by far was *Heleioporus eyrie* (Moaning frog). However, with the reptile species recorded, more than one individual from a particular taxa was rarely found in any one day. Each species found was recorded and the results have been presented to provide a basis for continued research in the area and also for potential conservation action, which may be required in future. The capture of a sub-adult and two newly hatched turtle frogs (*Myobatrachus gouldii*) is a good indicator that the *Banksia* woodland of North Lake is in good health.

Introduction to research and study site

The herpetofauna of Western Australia is known to be rich and diverse (Aplin *et al* 1993) and has been well documented (Cogger & Heathwole 1981). It is however difficult to determine the species assemblages of small disturbed areas of woodland. A similar survey was conducted in the area in 1985 by Mead-Hunter, D. and Porter, B. using pitfall traps in combination with drift fences. The results of their study will be used as baseline data and as a comparison for this study. The current study seeks to discover how much of the herpetofauna present 19 years ago is still surviving in an ever-changing area of Swan coastal plain banksia woodland. Land claimed by the construction of the nearby Murdoch University and its grounds for various uses has altered the historic drainage from that region into the North lake system. (pers.com 2004)^{#1}. It would be expected that some fauna species could be adversely affected by the nearby disturbances caused by the extensive urbanisation of the suburbs adjacent to this area. In Western Australia fragments of this type of *Banksia* dominated woodland as small as 4 hectares are considered important habitat for many reptile and amphibian species (Aplin *et al* 1993). Beeliar Regional Park, which includes North Lake and its surrounds, is considered to be an important refuge for both plants and animals.

North Lake is located 22km SSW of Perth and is part of a chain of freshwater wetlands, that extends along the north-south aligned interdunal

depression of the Swan coastal plain. The lake itself covers an area of 28.4 hectares and has a maximum depth of 3 metres (pers.com 2004)^{#2}. The surrounding area has been disturbed by past grazing activities yet on the eastern side the damplands dominated by *Banksia* species are relatively undisturbed. The study area lies on water resistant sandy soils and has a Mediterranean climate. Its vegetation consists primarily of dry heath dominated by members of the *Myrtaceae* and *Proteaceae* families with some acacia species also present. The overstorey is dominated by a (5m) tree stratum of *Banksia attenuata* and *B. menziesii* (Bamford 1986).

Methods

Before the fieldwork could be started an Animal Ethics Application to conduct the survey was filed providing information on the exact methods used to trap the animals. Murdoch University has a veterinary clinic on site. If any animals were found to be injured as a result of the study they would be taken to the clinic for treatment.

A Department of Conservation and Land Management, Scientific Licence #SF004497 was obtained to undertake the study. A Department of Conservation and Land Management, Authority CE000581 was obtained to enter and conduct the survey on the land (North Lake is Freehold land owned by the Western Australian Government, Planning Commission and managed under a section 16 Agreement as a Department of Conservation and Land Management Estate).

The study site was located just southwest of North Lake, adjacent Roe swamp (200 m west) and close to Murdoch University. The current study site is 100 metres away from where a previous study was conducted. It is believed to be at the same vegetation successional state as the earlier survey study of 1986 (pers com 2004)^{#2}.

Twenty traps were placed along an 80m transect in an L shape, each at 4 metre intervals. Special attention was given to native plant species, which were avoided when plotting transects. The traps measured approximately 60cm in depth with an open top diameter of 40cm. These traps were dug into the sand with minimal disturbance to the vegetation. Connecting them in one continuous line was a drift fence ~20cm high. The drift fence was aligned so that it crossed the equator of each trap as it was lain along the length of the transect line. The theory behind this trapping method is that any animal intersecting the transect will hit the fence and follow it until it falls into a trap.

Most animals falling into a trap are held there until collection. Large reptiles and mammals are able to climb out of the traps. The traps were

checked 3 times a day for the 30 days that trapping was conducted. All trapped animals were checked for injury and once cleared were released back near to their capture site. The total number of individuals of each species caught was recorded for each day. Appendix 1 shows the species list for the current study.

Results

Appendix 1 presents the raw collection data for the species found. There was much variation in the apparent density of each taxon (Table 1). The only two species of lizard, that were found more than once on a particular day, were *Menettia greyii* and *Cryptoblepharus plagiocephalis*. In all other species, only a single specimen was found in a single day. Two frog species were abundant with *Heleioporus eyrie* anywhere from 1 – 63 animals being caught on a single day and with *Limnodynastes dorsalis* being less common but even so up to 14 being caught on a single day. Table 1 shows the total number of individuals caught for each species during the study.

April was a month of cooling ambient temperature. Most days were fine and dry. Reptiles were most abundant on the few hot days. The most common reptile species found were *Menetta greyii*, *Morethia obscura* and *Cryptoblepharus plagiocephalis*. However there were periods over the 30 days of the survey when isolated showers and occasionally significant rainfall, occurred. Days 4-7 were cool with scattered showers and days 24-26 had significant rains and were quite cool. From day 26 the temperature dropped further and scattered rains were frequent. The highest catches of frog species occurred during and especially just after rains.

Heleioporus eyrei and *Limnodynastes dorsalis* were by far the most abundant frog species in the area. Individual house mice *Mus musculus* were caught on five occasions.

Species	Total frequency
<i>Morethia obscura</i>	4
<i>Ctenotus lesueurii</i>	2
<i>Menettia greyii</i>	8
<i>Egernia napoleonis</i>	2
<i>Hemiergis quadrilineata</i>	2
<i>Lerista lineata</i>	1
<i>Pogona minor</i>	1
<i>Morethia lineoocellata</i>	1
<i>Varanus gouldii</i>	1 observed only
<i>Bassiniiana trilineatum</i>	1
<i>Cryptoblepharus plagiocephalis</i>	5
<i>Tiliqua rugosa</i>	1 observed only
<i>Heleioporus eyrei</i>	125
<i>Limnodynastes dorsalis</i>	59
<i>Myobatrachus gouldii</i>	3
<i>Litoria moorei</i>	1
<i>Notechis occidentalis</i>	1 observed only
<i>Pseudonaja affinis</i>	1 observed only
<i>Chelodina oblonga</i>	1 observed only

Table 1. Total frequencies of each species

General observations were rare due to the cryptic appearance of the smaller lizards and burrowing habits of the frog species especially *Myobatrachus gouldii*, which lacks an aquatic larval stage and thus is not restricted to surface water, even in the breeding season (Watson *et al* 1959; Bamford 1986). No snake species or large lizards were caught although two snake species (*Pseudonaja affinis* and *Notechis occidentalis*) one bobtail lizard *Tiliqua rugosa* and one varanid *Varanus gouldii* were observed. A single long-necked tortoise *Chelodina oblonga* was observed. These species are generally too large for the traps and are rarely observed in the open woodland.

Discussion

Over the period of this trapping effort, the number and diversity of the reptilian and amphibian species within a small area of Banksia woodland of North Lake was lower than previously reported (Mead-Hunter, D. and Porter, B. 1985). The plant assemblage of the current study site is similar to that of the 1985 study consequently it was expected that the same vertebrate species would be present.

The absence of some expected species such as *Lerista elegans* and members of the family Pygopodidae proven to be present in this type of habitat (Bamford 1986: Davidge 1979), was most probably due to the cooling weather conditions. One species of gecko *Phyllodactylus marmoratus* is known to be common in the study area yet it was not caught. It is highly arboreal (Davidge 1979) and with the trapping techniques used it was unlikely to have been caught. In a previous study in an area dominated by tall (5m+) Banksias, *Cryptoblepharus plagiocephalis* was abundant. Similarly it was trapped on several occasions during this survey. *Varanus gouldii* was not trapped however in this area it is naturally uncommon (Davidge 1979). Surprisingly the bobtail lizard *Tiliqua rugosa* was not caught over the period of the survey. It is quite likely that this was simply because this species is cryptic and sequesters itself away in hiding shortly after the first cool days of autumn occur.

Reptile and amphibian species were numerous in the area, justifying the use of pitfall trapping. This technique is particularly effective in trapping small lizards and frogs, however it is less effective for larger reptiles. Other studies show that the most effective time for trapping lizards is at the beginning of summer (Bamford 1986: Mead-Hunter *et al* 1985). The overall low abundances of both adult and juvenile lizards indicate that the autumn climate is less than optimal for catching these reptiles. According to Davidge (1979), adult lizards are rarely caught in late summer/autumn a result confirmed by this study. Davidge (1979) showed frog abundance to be high at this time of year, a result also confirmed by this study. Individuals were not marked before release, consequently it was not possible to determine whether individuals were recaptured. Therefore the population sizes of species in this Banksia woodland community could not be determined.

In the 1985 study in the same area of woodland, one species of tortoise *Chelodina oblonga* was caught. It was not observed in the immediate study area over the period of this survey however it was seen elsewhere in the North lake area.

It may have been expected that due to the disturbed nature of the area that some species would be missing. From the data gained it would seem that 20 species were missing from this woodland according to the species list from the last study in this site. Trapping here was less extensive than in the 1985 study, this along with the timing of the fieldwork accounts for some species not being present. Evidence that the urbanisation in the area has had any discernable affect on the herpetofaunal community was not proven and clearly much further study would be needed before any conclusions concerning this issue could be made.

Considering the short trapping period and that the fieldwork was carried out in autumn, this study has successfully confirmed that many of the reptilian and amphibian species reported to be present in the late 1980s are still present in the area. The newly emerged Turtle frogs *Myobatrachus gouldii* measuring ~11mm found on two occasions during this study suggest a successful breeding population. This is a good indicator that this area of coastal banksia woodland is in good health (Bamford, *pers. com.*).

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APPENDIX 1

Reptile and amphibian list from North Lake Herpetofauna Diversity Study 2004 Ken Richardson, D. Mead-Hunter & T. Cornwell, Murdoch University

Snakes

Notechis scutatus occidentalis

Pseudonaja affinis

Frogs

Heleioporus eyrei

Limnodynastes dorsalis

Myobatrachus gouldii

Litoria moorei

Lizards

Pogona minor

Cryptoblepharus plagiocephalis

Ctenotus lesueurii

Egernia napoleonis

Hemiergus peronii quadrilineata

Lerista lineata

Bassiniiana trilineatum

Menettia greyii

Morethia lineocellata

Morethia obscura

Tiliqua rugosa

Varanus gouldii

APPENDIX 2

Reptile and amphibian list from 1986 North Lake Draft Management Plan, editor Dr Frank Murray, Murdoch University. Information gathered by D. Mead-Hunter and B. Porter (1985, unpublished).

Tortoises

Chelodina oblonga (Long-necked Tortoise)

Snakes

Ramphlotyphlops australis (Blind snake)

Notechis scutatus occidentalis (Western Tiger Snake)

Pseudonaja affinis (Dugite)

Rhinoplocephalus gouldii (Black-headed Snake)

Vermicella fasciolata fasciolata

Frogs

Crinia (Ranidella) glauerti

Crinia (Ranidella) insignifera

Heleioporus eyrie (Moaning Frog)

Limnodynastes dorsalis (Pobblebonk)

Myobatrachus gouldii (Turtle Frog)

Pseudophryne guentheri

Litoria moorei (Motorbike Frog)

Litoria adelaidensis (Slender Tree Frog)

Lizards

Gekkonidae

Phyllodactylus marmoratus

Agamidae

Pogona minor (Bearded Dragon)

Tympanocryptis adelaidensis (Sandhill Dragon)

Pygopodidae

Aprasia repens

Delma fraseri

Lialis burtonis (Burton's Snake Lizard)

Pletholax gracilis

Pygopus lepidopus (Common Scaly-foot)

Scincidae

Cryptoblepharus plagiocephalis

Ctenotus lesueurii

Egernia napoleonis

Hemiergus peronii quadrilineata

Lerista elegans

Lerista lineata (Lined Skink)
Bassiniiana trilineatum
Menetia greyii
Morethia lineocellata
Morethia obscura
Tiliqua rugosa
Egernia kingii

Varanidae

Varanus gouldii (Gould's Goanna)
Varanus tristis