

Reptiles and amphibians inhabiting the environs of a tributary of Cattai Creek, Annangrove, New South Wales, Australia

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Abstract: Notes are provided on 7 species of Reptilia and 5 species of Amphibia observed/detected within the environs of a 300 metre long tributary of Cattai Creek, Annangrove, New South Wales during July and August 1998. The main finding of the survey was a large viable population of the scheduled endangered frog species, the Red-crowned Toadlet, *Pseudophryne australis* (Myobatrachidae).

Introduction and Methods

During late 1998 I made a number of observations on the reptile and amphibian fauna of a 300 metre long tributary of Cattai Creek, near the present position of Hill Climb Drive, Annangrove, New South Wales, Australia. The surveys were undertaken during daylight hours on the following dates: 30 July 1998 (1100-1545 hrs, Eastern Australian Standard Time, EAST), 14 August 1998 (1100-1610 hrs, EAST), 17 August 1998 (1130-1600 hrs, EAST) and 20 August 1998 (1100-1530 hrs, EAST). More important nocturnal surveys within the study area were undertaken during the following times: 19 August 1998 (1835-2120 hrs, EAST), 21 August 1998 (1800-2130 hrs, EAST) and 24 August 1998 (1730-1940 hrs, EAST).

All ecological niches were searched either during the day or night, i.e. under discarded roofing iron and garbage, under fallen logs and rocks on the ground, under flat embedded or loose rocks on the tops of sandstone outcrops, under sandstone overhangs, under bark and leaf litter on the ground, under exfoliating bark on standing trees etc. Specimens were verified or identified with the assistance of the texts and scientific papers listed in the references section.

Habitat

The area is one dominated by sandstone outcrops and a narrow creekline. The vegetation of the study area is mostly Sydney Sandstone Ridgetop Woodland (SSRW), dominated by such tree species as *Angophora bakeri*, *A. costata*, *A. floribunda*, *Eucalyptus eximia*, *E. sclerophylla*, *E. piperita*, *E. punctata*, *E. gummifera* (Myrtaceae), as well as *Banksia serrata* (Proteaceae) and *Casuarina littoralis* (Casuarinaceae). The shrub and herb layers are variable depending on disturbance and fire history. On the ridgelines there is extensive shrub and herb development comprising of such species as *Pteridium esculentum* (Dennstaedtiaceae), *Actinotus helianthii*, *Xanthosia pilosa*, *X. tridentata* (Apiaceae), *Ozothamnus diosmifolius* (Asteraceae), *Hibbertia bracteata*, *H. diffusa* (Dilleniaceae), *Drosera paniculata* (Droseraceae), *Epacris microphylla*, *E. pulchella*, *Leucopogon muticus*, *Monotoca scoparia* (Epacridaceae), *Micrantheum ericoides*, *Phyllanthus hirtellus* (Euphorbiaceae), *Bossiaea lenticularis*, *B. obcordata*, *Daviesia mimosoides*, *Dillwynia retorta*, *D. floribunda*, *Hovea linearis*, *Kennedia rubicunda* (Fabaceae), *Acacia linifolia*, *A. suaveolens*, *A. ulicifolia* (Mimosaceae), *Angophora hispida*, *Baeckea brevifolia*, *Calytrix tetragona*, *Kunzea ericoides*, *Leptospermum arachnoides*, *Micromyrtus ciliata* (Myrtaceae), *Billardiera scandens* (Pittosporaceae), *Banksia ericifolia*, *B. oblongifolia*, *B. spinulosa*, *Grevillea buxifolius*, *G. speciosa*, *Hakea dactyloides*, *H. sericea*, *Lambertia formosa*, *Persoonia oblongata*, *P. levis*, *Petrophile sessilis* (Proteaceae), *Boronia ledifolium*, *Phebalium squamulosum* (Rutaceae), *Lasiopetalum parvum* (Sterculiaceae), *Caustis flexuosa*, *Cyathochaeta diandra*, *Lepidosperma laterale*, *Ptilantherium deustum*, *Schoenus ericitorum*, *Schoenus sp.*

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(Cyperaceae), *Patersonia longifolia*, *P. sericea* (Iridaceae), *Laxmannia gracilis* (Liliaceae), *Lomandra filiformis*, *L. multiflora*, *L. obliqua* (Lomandraceae), *Dianella pruinina* (Phormiaceae), *Anisopogon avenaceus*, *Aristida vagans*, *Entolasia stricta*, *Eragrostis brownii* (Poaceae), *Lepyrodia scariosa* (Restionaceae) and *Xanthorrhoea media* (Xanthorrhoeaceae).

Reptiles

1. Red-bellied Black Snake, *Pseudechis porphyriacus* (Elapidae)

Observations: One large (female?) specimen measuring about 1.0 metre long, was observed thermoregulating near the edge of a cleared vehicular access track on 30 July 1998. Upon disturbance, it moved away at speed in the opposite direction from where the author was standing.

Comments: This is a common and widespread species in eastern New South Wales. It is terrestrial and diurnal and is usually encountered foraging or sheltering under slabs of rock and timber (see e.g. Shine *et al.*, 1981; Gow, 1983; Swan, 1990; Cogger, 1996, 2000).

2. Eastern Brown Snake (*Pseudonaja textilis*, Elapidae)

Observations: One individual, measuring approx. 1.0 metre long was disturbed sunning itself on a sandstone rock ledge on 14 August 1998.

Comments: This species is widely distributed within New South Wales where it occurs within a variety of habitats from dry sclerophyll forest to grasslands. It is an aggressive and dangerous snake, always capable of inflicting a fatal bite. It is terrestrial, diurnal and fast moving, and it feeds on lizards, small mammals and frogs (see e.g. Shine, 1977; Hoser, 1980; Wells, 1980; Gow, 1983; Swan, 1990; Cogger, 1996, 2000).

3. Common Blind Snake (*Ramphotyphlops nigrescens*, Typhlopidae)

Observations: One specimen was detected under a flat sandstone rock on a partially exposed sandstone ridgeline in a small gully on 30 July 1998.

Comments: This species is widely distributed in eastern New South Wales and is particularly widespread in the Sydney Bioregion, where many records have been made. It is normally found in soil under rocks, logs or leaf litter etc. [Hawkeswood (2007) recently recorded the species existing in a cleared cow paddock]. They feed on termites, ants and their eggs and pupae, worms and insect larvae (see e.g. Waite, 1918; Miller & McDonald, 1977; Gow, 1989; Swan, 1990; Cogger, 1996, 2000).

4. Wall Lizard (*Cryptoblepharus virgatus*, Scincidae)

Observations: Several specimens were disturbed from under the bark of *Eucalyptus punctata* (Myrtaceae) and at the base of a *Eucalyptus piperita* tree amongst litter and fallen bark within dense woodland on 30 July 1998 and 17 August 1998.

Comments: This species is widespread in eastern New South Wales, where it mostly frequents wooded areas and rocky outcrops; it is often found on fences and buildings; it is arboreal and diurnal, and aggregations of ten or twelve individuals have been found under bark or rock exfoliations; it feeds on spiders and insects such as cockroaches, bugs, wasps and ants (see e.g. Cook, 1973; Rose, 1974; Webb, 1983; Swan, 1990; Cogger, 1996, 2000). This is one of Australia's most common lizards, occurring from northern Queensland to southern Western Australia (Cogger, 1996, 2000). It occupies a variety of habitats from wet and dry sclerophyll

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forests to heathlands and woodlands. The species is usually arboreal, sheltering in crevices or under the bark of trees (e.g. Wilson & Knowles, 1988; Hoser, 1989; Swan, 1990; Cogger, 1996, 2000).

5. Delicate Skink (*Lampropholis delicata*, Scincidae)

Observations: Numerous specimens of this species were observed amongst leaf litter, basking on rocks, or scurrying in a semi-dry creek bed at various locations on most of the days during the field surveys.

Comments: This is one of Australia's most common lizards, occurring from northern Queensland to South Australia (Cogger, 1996, 2000). It occupies a variety of habitats from wet and dry sclerophyll forests to heathlands and woodlands. The species is usually ground inhabiting, sheltering amongst debris and litter on the ground (e.g. Wilson & Knowles, 1988; Hoser, 1989; Swan, 1990; Cogger, 1996, 2000).

6. Copper-tailed Skink (*Ctenotus taeniolatus*, Scincidae)

Observations: Two specimens were located under two flat sandstone rocks on 30 July 1998. Another large specimen was observed in a hollowed out shelter under a flat sandstone rock on a small rock overhang on 14 August 1998.

Comments: This is another common species of lizard, especially within sandstone habitats in the Sydney Bioregion. It is also found widely in eastern New South Wales. The species is terrestrial and diurnal in habits and is usually found under slabs of rock on sandy soil in dry sclerophyll forests and heathlands; the lizards feed on spiders, millipedes, and insects such as beetles, flies, bugs, wasps, ants and grasshoppers (e.g. Jenkins & Bartell, 1980; James, 1983; Swan, 1990; Cogger, 1996, 2000).

7. Common Goanna (*Varanus varius*, Varanidae)

Observations: Although no living specimens were actually sighted, fresh claw marks of this species were observed on several smooth-barked *Eucalyptus sclerophylla* and *E. punctata* trees on 30 July 1998.

Comments: This is the most common species of goanna in eastern New South Wales where it occurs in forests, woodlands and plains; it feeds on nestling birds as well as other tree-dwelling and ground animals and carrion; it is common around human habitation where it may frequent picnic grounds and rubbish dumps (compost heaps) seeking food scraps; the lizard takes refuge in trees, clinging to the opposite side of the trunk from danger (e.g. Worrell, 1966; Schmida, 1985; Lunney & Barker, 1986; Wilson & Knowles, 1988; Hoser, 1989; Cogger, 1996, 2000; Swan, 1990).

Amphibians

1. Striped Marsh Frog or Tock Frog (*Limnodynastes peronii*, Myobatrachidae)

Observations: Several specimens were heard calling from both sides of the creekline on the study site during the nights of 19 & 24 August 1998.

Comments: This frog species is found in a wide variety of habitats throughout its range, often long distances from water, and coastally it is found in trees and shrubs (e.g. Cogger, 1960, 1962, 1996, 2000; Clyne, 1969; Barker & Grigg, 1977; Hoser, 1989; Griffiths, 1997; Robinson, 1998; Turner, 2004). Away from water it forages on the ground on humid nights (e.g. Cogger, 1996;

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Griffiths, 1997; Robinson, 1998). The species is widespread in eastern Australia and New South Wales; the males call while foraging in water, or when on land near the water's edge; the call can be heard throughout the year; their call is a loud 'tok' or 'whuck' noise, similar to the sound of a tennis ball being struck (e.g. Cogger, 1996, 2000; Griffiths, 1997; Robinson, 1998).

2. Red-crowned Toadlet (*Pseudophryne australis*, Myobatrachidae)

Observations: Over 20 males were heard calling amongst vegetation and litter near and within a small waterfall on the night of 19 August 1998 and one male specimen was obtained amongst leaf litter and within a depression at the base of the waterfall for final verification/identification purposes and later released at the same position.

Comments: The Red-crowned Toadlet grows to about 30 mm long and is dark brown to black above, often washed with red or with scattered reddish flecks and has a bright red or orange (rarely yellow) triangle on the head and a red or orange coccygeal stripe; there is a white patch on the base of each arm and the ventral surface has large black and white blotches mixed with grey, black and white mottling; there is also a large, flat femoral gland on each hindlimb (e.g. Moore, 1957, 1961; Cogger, 1960, 1962, 1972, 1996, 2000; Barker & Grigg, 1977; Hoser, 1989; Wellington, 1996; Griffiths, 1997; Robinson, 1998; Wells, 2001; Turner, 2004).

It is a secretive species, usually found within close proximity to non-perennial streams (e.g. Harrison, 1922; Cogger, 1960, 1962, 1996, 2000; Barker & Grigg, 1977; Hoser, 1989; Griffiths, 1997; Thumm & Mahoney, 1997; Robinson, 1998; Wells, 2001). With the coming of autumn (or late summer rains), the dry creek beds where they occur, fill with water and the frogs return to breed; they deposit their eggs in a small depression or egg chamber beneath rocks, logs and mulch at the water's edge (e.g. Harrison, 1922; Jacobsen, 1963; Barker & Grigg, 1977; Cogger, 1960, 1962, 1996, 2000; Woodruff, 1976, 1977; Griffiths, 1977; Hoser, 1989; Robinson, 1998; Wells, 2001). The eggs develop in this damp environment and with continuing rain some weeks later, they are flooded or washed into pools where the tadpoles swim free (e.g. Cogger, 1960, 1962; Griffiths, 1997; Wells, 2001). The species is able to take advantage of eroded gutters by the sides of fire trails, where it establishes in the mulch which accumulates there; in these situations, the frog populations may be much higher than in natural habitats (Griffiths, 1997). The call is reported to be a soft, squelch-like "eeek eeek" (e.g. Griffiths, 1997; Wells, 2001) or a grating "ark" or "squelch" (e.g. Robinson, 1998; Wells, 2001; Turner, 2004). [In my opinion, the call is more like "crick crick" of varying intensities depending on the population]. The males call from concealed sites on land and in burrows throughout the year; as the species is frequently found in colonies, several will usually be heard answering each other (e.g. Robinson, 1998; Wells, 2001).

Cogger (1996, 2000) claimed that the species occurs within a radius of about 160 km of Sydney, and within this area, that it is almost exclusively confined to the Hawkesbury Sandstone Formation. However, Wells (1997, 2001) reported that the Red-crowned Toadlet has a slightly wider distribution, occurring from near Mudgee in the north to south of Nowra and east to Mt. Victoria, all present locations being within the Sydney Geological Basin. Within this region, it is not confined to Hawkesbury Sandstone formations, but also occurs extensively in areas of Narrabeen Formation. The Red-crowned Toadlet has been listed as a Vulnerable species under Schedule 2 of the New South Wales Threatened Species Conservation Act (1995) which amends the Environmental Protection Act (1979).

3. Bibron's Toadlet, *Pseudophryne bibronii* (Myobatrachidae)

Observations: One specimen was collected from a creekline and at least two others were heard calling from a large pond at the end of the creekline on 14 August 1998.

Comments: This species occurs throughout eastern New South Wales where it occurs within

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forest, heathland or grassland; its eggs are laid in damp leaf mould or burrows under rocks and logs and they hatch when rain floods the burrows; the males call from their burrows in damp soil or while concealed in damp leaf litter, under rocks, or within grass clumps (e.g. Moore, 1961; Cogger, 1996, 2000; Robinson, 1998). The call of this frog is a grating “ark” or “squelch”; the males call throughout the year, even in winter temperatures as low as 4 degrees C (e.g. Cogger, 1996, 2000; Robinson, 1998).

4. Common Eastern Froglet (*Crinia signifera*, Myobatrachidae)

Observations: This was the most common species of frog calling during the day and night in creeks and rivulets in the central portion of the surveyed area as well as in creeks and rivulets, small ponds and pools in other areas. Specimens were collected/observed/heard most days and all nights when surveys were undertaken i.e. 30 July 1998 and 13, 14, 19, 21 & 24 August 1998.

Comments: This species is one of the most common species of frogs in eastern Australia, where it occurs from south-eastern Queensland, New South Wales to Victoria and south-eastern South Australia and Tasmania (e.g. Moore, 1961; Cogger, 1996, 2000; Robinson, 1998). The species occurs in almost every habitat within its range, from supra-littoral soaks behind benches to drier inland areas (e.g. Moore, 1961; Macnally, 1985; Hoser, 1989; Cogger, 1996, 2000; Robinson, 1998). The frogs shelter beneath rocks, logs, thick vegetation etc. during dry periods, later emerging to breed in slow-moving creeks, claypans, lagoons, gutters, roadside pools, rock holes etc., after rain, calling from within shallow water or fringing grass or leaf-litter. (e.g. Main, 1957; Moore, 1961; Hoser, 1989; Williamson & Bull, 1989; Cogger, 1996, 2000; Tyler, 1982, 1994). The call is rather distinctive and is best described as a loud “crick, crick, crick” (e.g. Moore, 1961; Cogger, 1996; Robinson, 1998), often fast and building up in speed for up to 10-15 seconds in each call burst (T.J. Hawkeswood, pers. obs.).

5. Green Leaf Tree Frog (*Litoria phyllochroa*, Hylidae)

Observations: One specimen was heard calling from thick vegetation associated with the creekline on the night of 21 August 1998.

Comments: This species is a type of tree frog and is usually found associated with creek-side vegetation, often sitting on the leaves of *Callicoma* around Sydney during daytime (Robinson, 1998). The call sounds like “erk erk erk”, and the males call from low vegetation, and have been heard calling from October to March, frequently beside running water (Robinson, 1998). The unusual rainfall during August 1998 in the Sydney district was undoubtedly responsible for the early appearance of adult frogs of this species and that of the Red-crowned Toadlet, *Pseudophryne australis*.

Discussion

The species list presented above for reptiles and amphibians inhabiting the environs of a tributary of Cattai Creek is fairly typical for the type of sandstone habitat existing there although there was no evidence for such usually relatively common reptiles as the Bearded Dragon (*Pogona barbata*, Agamidae), which would normally be found in this habitat (see Hawkeswood, 2006a). Also apparently absent from the study area was the Water Dragon (*Physignathus lesuerii*, Agamidae), which has also been found along another tributary of Cattai creek (Hawkeswood, 2006a).

The discovery of 5 species of frog is in keeping with the frog biodiversity recorded within other small areas of sandstone habitat and in other areas of coastal New South Wales (see Hawkeswood, 2006b, and references contained therein).

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The most significant find of the survey was the rather large population of the threatened species, the Red-crowned Toadlet, *Pseudophryne australis*. It appeared to be confined to the waterfall area and the associated banks of the tributary. The species was not detected anywhere else along the Cattai Creek tributary. Unfortunately time did not allow further research on this rare species. However, a return visit to the site on 26 August 2007 failed to find the species even after heavy rains during the previous two weeks or so. The site and waterfall area in particular, were however, now occupied by the Common Eastern Froglet, *Crinia signifera* (Myobatrachidae) which may indicate a change in water quality (R.W. Wells 2007, pers. comm.). Presumably the water quality in the area has changed significantly during the 9 years since the first observations, as a result of land clearing, road construction and residential development in the immediate and surrounding areas and that *C. signifera* has since displaced *P. australis*. During 1998, there was much less development in the area and there was more retained bushland. However, some virtually pristine remnants of bushland remain along the tributary and it is possible that the Red-crowned Toadlet may still refuge there.

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