

The Green and Golden Bell Frog *Litoria aurea* in the Station Creek area of Yuraygir National Park

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ABSTRACT

Casual observations of the Green and Golden Bell Frog *Litoria aurea* were made in the Station Creek area of Yuraygir National Park between 1980 and 1995. A description of the habitat, including details of water bodies and vegetation communities is presented. Calling males were located during 1994 and 1995. No amplexing pairs, eggs or tadpoles were found. Yuraygir National Park is one of only four New South Wales national parks that contain populations of the Green and Golden Bell Frog. The preservation of this population should be a major conservation initiative.

INTRODUCTION

The author visited the Station Creek area of Yuraygir National Park (Fig. 1) a number of times during the period 1978 to 1995. Visits in 1980 and 1985, and again in 1994 and 1995 resulted in individuals of the Green and Golden Bell Frog *Litoria aurea* being observed. These observations are reported in this paper.

Station Creek is situated to the south-east of Grafton, on the mid north coast of New South Wales. The Creek enters the ocean at the northern edge of Station Creek Beach. The sand dunes of the area were extensively mined for mineral sands during the 1950s and 60s and a large sand blowout has resulted from the effects of cattle grazing immediately south of the Creek. This blowout is now stabilizing following some remedial action. A small hind dune swamp occurs at the western edge of the sand blowout and immediately south of the Creek. This swamp drains into Station Creek. About 1.5 km to the south of Station Creek there is a moderately large hind dune lagoon, called Blue Lake.

The vegetation of the Station Creek area consists of Coastal Dune Complex. This comprises grass in the foredune area grading westward into wattle, then *Banksia* scrub. The vegetation of the western edge of Blue Lake is swamp open forest dominated by Broad-leaved Paperbark *Melaleuca quinquenervia*. The lake fringes are vegetated with rushes and sedges, including Cumbungi (*Typha* sp.).

A number of disturbances have occurred to the natural habitats in the Station Creek area. The frontal dune area was mined for mineral sands during the 1960s and 70s, although the mining may have been excluded from the vicinity of Blue Lake. Cattle grazing has occurred for many decades and despite the dedication of the area as national park, continued up to early 1995 when a fence was erected. In October

1994, when the observations reported here were made, cattle were regularly observed in the park, especially in the vicinity of Blue Lake. Aquatic vegetation had been trampled and grazed and deep ruts had been formed at the edge of the lake by the cattle's hooves. Small numbers of feral horses also occurred in the park at that time and a few still remain.

It is not known whether Mosquito Fish *Gambusia holbrooki* occur at Station Creek or Blue Lake. However as the species is widespread on the north coast it may be present. There are no likely major sources of pollution which could impact on the water quality at the site. The use of off-road vehicles, both legally and illegally, and out-board boat motors (in Station Creek) could potentially cause fuel or oil pollution to occur, although this would be of a limited nature both spatially and temporally.

OBSERVATIONS

Fifty-eight visits (25 in spring, 17 in summer, 11 in autumn and 5 in winter) were made to the Station Creek area between 1978 and early 1995. None were made specifically to survey frogs, although the late 1994 visits were to survey vertebrate fauna species in general.

The first local record of *L. aurea* was made on 6 January 1980 when a single adult was observed sitting on vegetation adjacent to a foot-bridge that spans a small tributary of Station Creek. This tributary drains out of a small hind dune swamp adjacent to the large sand blowout. The vegetation near the bridge is mainly Cumbungi (*Typha* sp.) with Broad-leaved Paperbarks and Swamp Oaks *Casuarina glauca* nearby. Similar observations occurred at the same location on 20 October and 7 December 1985. The frog present in October was noted as sitting on the leaves of Cumbungi and in December as being in "vegetation" probably also Cumbungi. All of

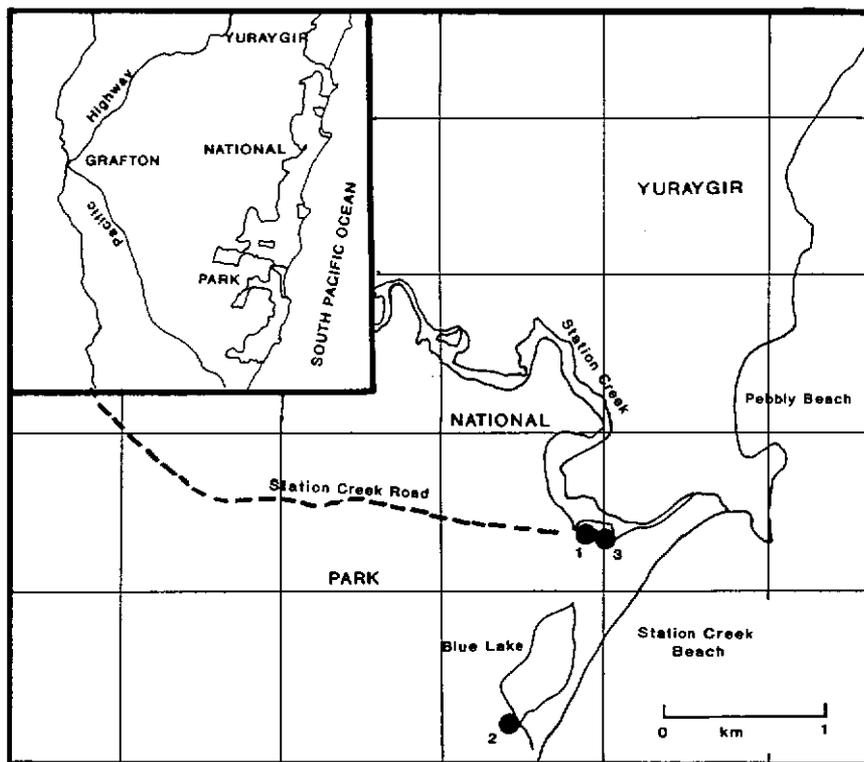


Fig. 1. Location of *L. aurea* observation sites in Yuraygir National Park. Site 1, 1980, 1985; Site 2, 1994; Site 3, 1995.

these observations were made during the day and the frogs were silent.

At 2030 hrs on 18 October 1994 a *L. aurea* was heard calling at Blue Lake (Plate 4a). A pre-recorded tape of the call of this species was played near to where the call had been heard. Up to four individuals vocally responded with the eyes of two being detected by their reflections in the spotlight beam. One was seen to swim towards the position of the tape recorder on the bank, getting progressively closer with each call played. This individual was caught by hand and noted to be a male with dark nuptial pads, indicating that it was in breeding condition. Its colouration was predominantly brownish-olive, lacking any bright green areas. This frog was released the following day.

On 8 March 1995 the distinctive call of *L. aurea* was heard in the vicinity of the large sand blowout to the east of Station Creek Rest Area. The call, which was first heard at 1405 hrs, appeared to be coming from a temporary pond that had formed in a hollow in the centre of the blowout (Plate 4c). The lack of vegetation cover at the pond caused us (Kerrie Metzler and myself) to initially believe that the call must have emanated from a site further west of the pond. However, the frog was located at the western edge of the pond. As we walked around the pond a second animal jumped into the water from its resting place on the sand bank about

400 mm above the pond. Both animals, which were about 60 mm long were caught, closely examined and then released. One was noted to be a male because it had dark nuptial pads on its "thumbs" and a distended throat. The second animal was not inspected for nuptial pads however its throat was noted to be not obviously distended.

At the time these records were made conditions were warm with a moderate southerly wind and storm clouds. The few days preceding the observation had been wet and windy with a cyclonic depression, which had declined in strength, having crossed the coast the day before.

The pond was approximately 80 m by 50 m, oriented roughly SE-NW, being variable in depth with a maximum depth of approximately 300 mm. The vegetation of the pond, which was sparse, comprised terrestrial species that had been temporarily inundated including; *Spinifex Spinifex sericeus*, Pennywort *Hydrocotyle bonariensis*, Evening Primrose *Oenothera indecora* and *Isolepis Isolepis nodosa*.

At 1607 hrs the two frogs were still present at the pond, one animal in the shallows, about 15 cm from the edge of the pond, and the second on the sand bank about 15 cm above the waterline. It was partly shaded by *Spinifex* grass and the sand bank. The frog in the pond responded almost immediately to an imitation of



Plate 4a. Site of capture of *Litoria aurea* at Blue Lake, Yuraygir National Park on 18 October, 1994. Photo: K. Metzler.



Plate 4b. Male *L. aurea* at edge of a temporary pond, Station Creek, on 8 March 1995. Photo: G. Clancy.



Plate 4c. Temporary pond in sand blow out at Station Creek on 8 March 1995. Photo: G. Clancy.

its call and continued to respond whenever the call was mimicked. We left the pond for about 20 minutes before returning at 1630 hrs. As we approached an adult Brahminy Kite *Haliastur indus* took off from the edge of the pond in the vicinity of the frog sightings. An inspection of the site located one frog sitting in the shelter of the bank of the pond, partly concealed by *Spinifex* (Plate 4b). The second frog was not

immediately visible but was then located submerged, lying prostrate on the floor of the pond. Only one frog could be detected on the following day. It was a calling adult male. An additional three individuals were heard to the south of the pond although their exact location could not be determined (R. Jago, pers. comm.). There were a number of other temporary pools to the south of the large blowout and presumably the frogs were calling from one or more of these.

During a brief visit to the site on 4 April 1995 (26 days later), the pond was found to have dried out considerably with some shallow water still present. A search revealed no tadpoles in the remaining water.

DISCUSSION

The sporadic nature of the observations of the Green and Golden Bell Frog *L. aurea* in the Station Creek area may be due to the infrequency of visits to the site. Despite the fact that the author has made numerous visits (58) to the area during the period 1978 to the present, these visits were often very brief and not specially timed to coincide with ideal conditions for Bell Frog observation or calling. The chance of encountering the species, in the absence of a thorough search or the existence of ideal climatic conditions coinciding with the visits, would be slight. The status of the population at Blue Lake cannot be accurately estimated as this site had only been visited rarely and for a short duration prior to the late 1994 observations.

The population of *L. aurea* in the Station Creek area may be relatively stable considering the long, albeit scant, history of records there. It is possible that the permanent freshwaters of Blue Lake could provide a core habitat from which the species could radiate out in wet periods to occupy ephemeral wetlands for breeding. The importance of ephemeral wetlands as fish free areas has been previously identified (White 1995). An alternative scenario to explain the presence of Bell Frogs in the temporary ponds at Station Creek is that they originated from the small, but relatively permanent, swamp adjacent to the sand blowout.

White (1995) states that the only populations of Green and Golden Bell Frogs that occur in national parks are those found in the Botany Bay National Park and the Jervis Bay National Park. Some also apparently occur in Seven Mile Beach National Park (B. Buttemer, pers. comm.). The presence of a population, or populations, of the Green and Golden Bell Frog, at Station Creek means that Yuraygir National Park would constitute only the fourth National Park in New South Wales with known populations of this species. A recent record exists of

the species in the Diggers Camp area of Yuraygir National Park, to the north of Station Creek (H. Hines, pers. comm.). Therefore the possibility remains that the Park may well hold a substantial population of the frog at a number of locations. A survey of all potential sites in the Park at the most optimal time (spring-summer following rainfall events) for census is required to determine if this is, indeed, the case. There are very few records of this species north of Yuraygir National Park.

The population of *L. aurea* in the Station Creek area has been present since at least January 1980. Recent observations, although of a limited nature, suggest that a breeding population still exists at the site. Major disturbances, such as mineral sands mining and cattle grazing no longer occur in the area. The site is protected as part of the Yuraygir National Park and major impacts such as pollution are not likely to occur. A four-wheel drive track passes within metres of Blue Lake. As this track is regularly utilized some impact on frog habitat may occur.

The Green and Golden Bell Frog has never been particularly abundant in the northern part of its range. Its survival at Yuraygir will be

essential for maintaining some genetic consistency in Bell Frog populations in northern New South Wales. Unlike many extant populations in the state this population survives in a reasonably natural environment that has a history of minor past disturbances. This population could act as a control in studies of the species in disturbed sites elsewhere. It may also hold clues as to the cause of the state-wide decline in the species.

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