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Yellow-spotted Bell Frog *Litoria castanea*

Review of Current Information in NSW

July 2008

Current status:

Yellow-spotted Bell Frog *Litoria castanea* is currently listed as Endangered under the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act). The NSW Scientific Committee recently determined that the Yellow-spotted Bell Frog meets criteria for listing as Critically Endangered in NSW under the *Threatened Species Conservation Act* 1995 (TSC Act), based on information contained in this report and other information available for the species.

Species description:

The following description was taken directly from Robertson 1996:

“This frog can reach a length of 80mm. It is dull olive to bright emerald green on the back, with varying amounts of irregular bronze spotting and blotches. There is always a pale green stripe down the back. The tympanum is dark and conspicuous, and the dorso-lateral fold is pale cream and also conspicuous. There are scattered black spots on the back. The groin and hind side of the thighs are blue-green, with large yellow or cream spots, and the belly is white. The skin of the back is warty, and it is glandular on the belly. The toes are fully webbed, with tiny toe discs – narrower than the toe itself. The vomerine teeth are between the choanae, and there are maxillary teeth.”

Taxonomy:

There is some uncertainty surrounding the taxonomic status of the northern and southern populations of the Yellow-spotted Bell Frog. Courtice & Grigg (1975) described the northern population as a separate species, *L. flavipunctata*. However, Thomson *et al.* (1996) suggests that the northern and southern populations represent one species consisting of two disjunct isolates separated by a distance of about 500 km (Osborne *et al.* 1996). The latter is the most widely accepted hypothesis (expert advice 2008).

The Yellow-spotted Bell Frog is distinguished from other members of the group by its fully webbed toes and yellow spots on the groin and the back of the thighs (Cogger 2000).

Synonyms are: *Hyla castanea* (Steindachner 1867); *Litoria flavipunctata* (Courtice & Grigg 1975; Osbourne *et al.* 1996).

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Distribution and number of populations:

The Yellow-spotted Bell Frog has two separate highland ranges, on the New England Tableland and on the southern highlands from Lake George to Bombala (Figure 1). The two areas are separated by distance of about 500 km. There are unconfirmed reports of this species from near Bathurst and Orange in the late 1960s to mid 1970s (White & Pyke 1999).

The northern populations are known from a relatively restricted distribution centered around Guyra on the New England Tablelands, at altitudes between 1 000 and 1 500 m (White & Ehmann 1997a; Mahony 1999). The species once occupied the headwaters of the west flowing Booroolong Creek and to a lesser extent those of the eastern flowing Anne River and Sara River (Heatwole *et al.* 1995). Near Armidale, the species has been recorded from Commissioners Waters, a tributary of the eastern flowing Gara River (Heatwole *et al.* 1995). There are 13 known sites in the region, all of which have been verified by examination of museum specimens or photographs (Mahony 1999).

The earliest record of this population on the northern tablelands was collected sometime prior to 1890 from "Hillgrove" about 25 km south-east of Armidale. The last specimen to be placed in the museum was collected in 1973 (Australian Museum Register in Mahony 1999) and there are no verified records of this population after 1975 (White & Ehmann 1997a).

The southern population has a restricted distribution between Canberra and Bombala, NSW, on the Southern Tablelands at altitudes between 700 and 800 m (Mahony 1999). This population suffered an extensive decline, with no confirmed records since 1980 (Mahony 1999; Osborne *et al.* 1996). The southern population was broadly sympatric with *L. aurea* in the north of its range and with *L. raniformis* in the south-west of the region (Mahony 1999).

A number of areas of habitat previously supporting the Yellow-spotted Bell Frog in NSW are protected in NPWS estate including Little Llangothlin and Mother of Ducks Lagoon Nature Reserves on the New England Tableland and Namadgi National Park on the South Eastern Highlands (NSW NPWS 2001). The species was also known from extensive areas of grassland used for grazing (Tyler 1997).

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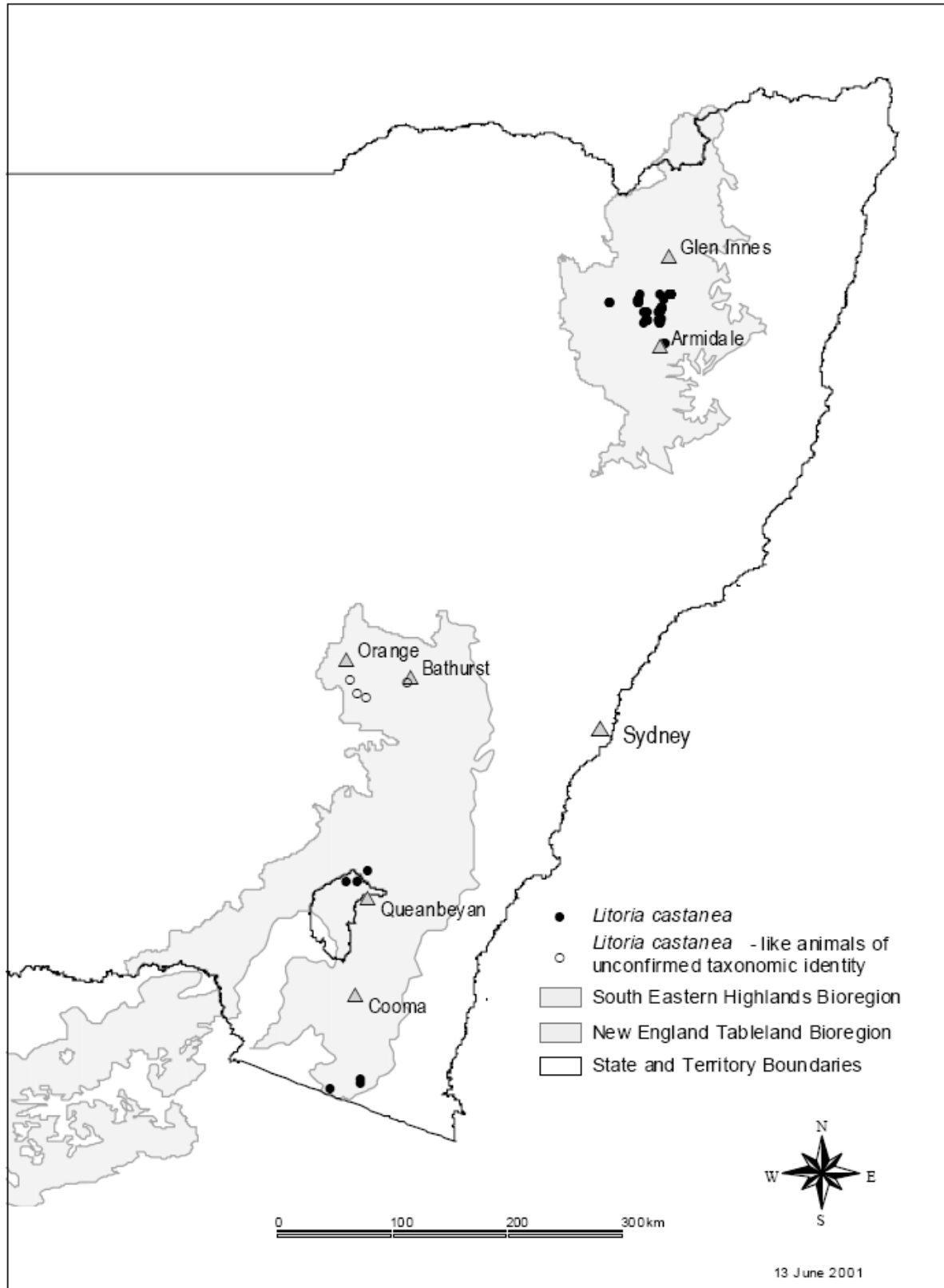


Figure 1. Distribution map showing records of the Yellow-spotted Bell Frog (Source: NSW NPWS 2001).

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Ecology:

Key habitat requirements

The Yellow-spotted Bell Frog occupied/s similar habitats to *L. aurea* and *L. raniformis* which includes permanent ponds, swamps, lagoons, farm dams and the still backwaters of slow flowing streams usually with emergent vegetation such as tall reeds or with overhanging grassy banks (Courtice & Grigg 1975; White & Ehmann 1997a, b). The Yellow-spotted Bell Frog was found to shelter during autumn and winter under fallen timber, rocks, other debris or thick vegetation (Courtice & Grigg 1975).

Life history

Little is known about the biology of the Yellow-spotted Bell Frog, however, it is likely to be similar to that of *L. aurea* and *L. raniformis* (Gillespie *et al.* 1995). Adults are active during spring and summer. They were known to bask on sunny days and forage on grassy banks or float on the water's surface at night. Males call a series of loud, droning grunts from the open water at night and breeding generally occurs during or following rain. Eggs are laid amongst aquatic vegetation and the tadpoles are large, growing to about 80mm with a pinkish-grey body and yellowish fins (NSW NPWS 2001).

Males and females reach sexual maturity at three years and live for approximately six years (Mahony 1999). Thus generation length (IUCN 2008) is estimated to be around four to five years.

Number of mature individuals:

In the northern range of the Yellow-spotted Bell Frog there have been no verified records after 1975 (White & Ehmann 1997a), and in the southern tablelands range no records exist since 1980 (Osborne *et al.* 1996; Mahony 1999).

Given that there are no records of the species since 1980, the total population is likely to include fewer than 50 mature individuals, and may already be extinct. However, the species is not yet considered extinct because of the lack of surveys of potential habitat, especially in areas between the northern and southern populations (expert advice, 2008).

Threats:

The reasons of decline in this species are unknown, but there has been a decline in populations of all taxa within the *L. aurea* complex. Suspected threats include: disease (in particular chytrid fungus); loss or modification of wetlands, swamps and slow-flowing creeks and the adjacent vegetation; changes to natural water flows and water quality; application of herbicides or pesticides in or adjacent to habitat; removal of fallen timber, rocks or other debris used as shelter; predation of eggs and tadpoles by introduced fish, particularly *Gambusia*; increased ultraviolet radiation; predation of frogs by foxes and cats (NSW NPWS 2001; Mahony 1999).

'Infection of frogs by amphibian chytrid causing the disease chytridiomycosis', 'Alteration to the

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natural flow regimes of rivers and streams and their floodplains and wetlands', 'Removal of dead wood and dead', 'Predation by *Gambusia holbrooki* (Plague Minnow or Mosquito Fish)', 'Predation by the European Red Fox *Vulpes vulpes*' and 'Predation by the Feral Cat *Felis catus*' are listed as Key Threatening Processes under the TSC Act in NSW.

Extreme fluctuations:

There is no information/evidence of this species experiencing extreme fluctuations in population size or habitat.

Population reduction and continuing declines:

Northern range - Anecdotal reports in the early 1970s indicate the species was common in farm dams, near large tableland lakes and in still pools of streams in the area. It is reported that staff from the University of New England were able to collect reasonable numbers to use for teaching purposes (Mahony 1999).

The lack of systematic surveys of historic sites and other suitable habitat in the region in the period between 1973 and the early 1990's, meant that the extent of the demise of these populations did not become apparent until the mid 1980's when several herpetologists noted it had been absent since the mid 1970's (Mahony 1996; Mahony 1999).

The first detailed systematic surveys of the northern part of the range were undertaken in breeding seasons of 1994 and 1996 (Mahony 1996). The survey covered known historical sites, nearby areas of suitable potential habitat and other areas across the region. No Yellow-spotted Bell Frogs were found. The New South Wales Frog and Tadpole Study Group (FATSG) also conducted a survey for this species in 16 historical sites and about 30 areas of potential habitat in the region in the summer of 1993-1994 and 1994-1995. Again, no individuals were observed (Ehmann & White 1997).

Southern range - There have been no estimates of population density for this species in the region but anecdotal information suggests that moderately large populations of members of the *L. aurea* complex (specific identity unknown) existed prior to 1980 (Osborne *et al.* 1996).

Surveys of most of known historical sites of the Yellow-spotted Bell Frog in the ACT and nearby areas of NSW on the South Eastern Highlands between 1985 and 1995 recorded no sightings (Osborne *et al.* 1996). Surveys in 1999/2000 around the northern section of the South Eastern Highlands were also unsuccessful in locating any extant populations; however, photographic records were located indicating the previous occurrence in these areas of animals that apparently fit the description of the Yellow-spotted Bell Frog (Mahony *et al.* 2000).

The disappearance of the northern and southern tablelands population of the Yellow-spotted Bell Frog seemed to occur in a similar time frame (Mahony 1999). However, due to the lack of monitoring, the speed at which the decline and disappearance occurred cannot be accurately assessed. Osborne *et al.* (1996) concluded that the declines of members of the *L. aurea* complex

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on the southern tablelands was rapid and occurred sometime between 1978 and 1981 and “did not involve a prolonged stage when the frogs were in low numbers”.

This species is not yet considered extinct because some individuals may persist in unsurveyed potential habitat, especially in areas between the northern and southern populations (expert advice 2008).

Extent of Occurrence (EOO) & Area of Occupancy (AOO):

The current geographic distribution of the species could be highly restricted or very highly restricted, depending on persistence of populations in unsurveyed habitat.

Severe fragmentation:

If this species still exists it would be considered to have a highly fragmented distribution due to the loss of populations and habitat.

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Explanatory note

Between 2007 and 2009 the NSW Scientific Committee undertook a systematic review of the conservation status of a selection of plant and animal species listed under the Threatened Species Conservation Act. This species summary report provides a review of the information gathered on this species at the time the Review was undertaken.

The Scientific Committee's report on the Review of Schedules project and final determinations relating to species that were either delisted or had a change in conservation status can be found on the following website: www.environment.nsw.gov.au .

The Committee gratefully acknowledges the past and present Committee members and project officers who ably assisted the Committee in undertaking the Review of Schedules Project. Information on the people involved in the project can be found in the Acknowledgement section of the project report entitled "Review of the Schedules of the *Threatened Species Conservation Act* 1995. A summary report on the review of selected species" which is available on the abovementioned website.

This species summary report may be cited as:

NSW Scientific Committee (2008) Yellow-spotted Bell Frog *Litoria castanea*. Review of current information in NSW. July 2008. Unpublished report arising from the Review of the Schedules of the *Threatened Species Conservation Act* 1995. NSW Scientific Committee, Hurstville.