CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES
OF WILD FAUNA AND FLORA

Sixteenth meeting of the Conference of the Parties
Bangkok (Thailand), 3-14 March 2013

CONSIDERATION OF PROPOSALS FOR AMENDMENT OF APPENDICES I AND II

A. Proposal

Delist the extinct *Rheobatrachus vitellinus* from Appendix II in accordance with the Resolution Conf. 9.24 (Rev. CoP 15). The species does not meet the trade criteria (Annexes 2a and 2b) for inclusion in Appendix II.

B. Proponent

Australia, as requested by the Animals Committee, to delete the species from Appendix II (AC 26 WG1 Doc. 2).*

C. Supporting statement

1. Taxonomy

1.1	Class:	Amphibia	
1.2	Order:	Anura	
1.3	Family:	Myobatrachidae	
1.4	Species:	*Rheobatrachus vitellinus* Mahony, Tyler and Davies, 1984	
1.5	Scientific synonyms:	None	
1.6	Common names:	English:	northern gastric-brooding frog, Eungella gastric-brooding frog, stream frog, northern platypus Frog.
		Dutch:	noordelijke maagbroedkikker
		French:	grenouille á incubation gastrique
1.7	Code numbers:		

2. Overview

At the 24th meeting of the Animals Committee (Geneva, April 2009), the northern gastric-brooding frog (*Rheobatrachus vitellinus*) was selected for the periodic review of animal species included in the CITES Appendices. At their 26th meeting (Geneva, March 2012), the Animals Committee recommended that the northern gastric-brooding frog be removed from Appendix II (AC 26 WG1 Doc. 2). The recommendation was made based on information provided by the Australian CITES Scientific Authority.

* *The geographical designations employed in this document do not imply the expression of any opinion whatsoever on the part of the CITES Secretariat or the United Nations Environment Programme concerning the legal status of any country, territory, or area, or concerning the delimitation of its frontiers or boundaries. The responsibility for the contents of the document rests exclusively with its author.*

The northern gastric-brooding frog was discovered and described in January 1984. It occupied a small area of less than 500 km^2 of the Clarke Range in Eungella National Park and Mt Pelion State Forest of mid-coastal Queensland. It was found in rocky fast running streams and creeks of undisturbed rainforest at elevations above 400 m.

Rheobatrachus vitellinus was one of only two species known to brood their offspring within their stomach. Young are subsequently regurgitated through the mouth as fully formed metamorphs. While closely resembling its sister species the southern gastric-brooding frog (*R. silus*) it was distinguished by its paler brown colouration and the yellow patches under its limbs and abdomen (Mahony *et al.,* 1984).

Little is known about the ecology or behaviour of *R. vitellinus* owing to its rapid extinction. Only one year after its discovery, in January 1985, surveys revealed that the population might be in decline as it could no longer be found in the areas at the edges of its range. By March 1985, the northern gastric-brooding frog could not be found in the wild and extensive survey efforts since have failed to relocate it (Winter and McDonald 1986; McDonald 1990; Ingram and McDonald 1993; McNellie and Hero 1994).

The most likely cause for the rapid decline and extinction of *R. vitellinus* was chytridiomycosis resulting from infection with the chytrid fungus. Evidence of infection by the chytrid fungus has been found in remnant populations of the Eungella torrent frog (*Taudactylus eungellensis*) which also suffered drastic population declines around the same time as the extinction of *R. vitellinus* (McDonald 1990; Rettalick *et al.,* 1997). The Eungella torrent frog has also been implicated as a host and reservoir for the chytrid fungus (Retallick *et al.,* 2004). The northern gastric-brooding frog not only co-inhabited streams with Eungella torrent frog but also actively preyed on them (Winter and McDonald 1986), and hence transmission of the chytrid fungus between these two species was likely.

3. Species characteristics

3.1 Distribution

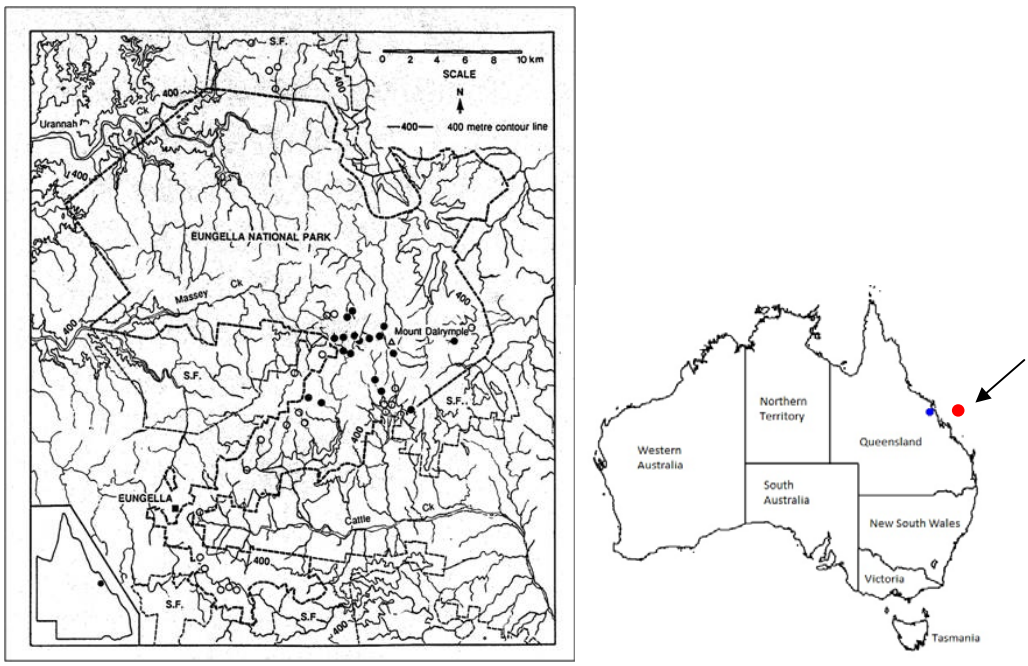

Figure 1. Distribution of the northern gastric-brooding frog (*Rheobatrachus vitellinus*) in Eungella National Park in central coastal Queensland (left). Closed circles indicate sites at which frogs were located; open circles indicate sites searched, but in which frogs were not found. Triangle indicates Mt Dalrymple. S.F. = State Forest (figure reproduceed with permission from Northern Queensland Threatened Frogs Recovery Team 2001) Australia map of occurrence records for *R. vitellinus* (right) (Atlas of Living Australia, 2012).

The northern gastric-brooding frog was found in the Clarke Range at altitudes between 400 m to 1000 m, in Eungella National Park and Mt Pelion State Forest of mid-coastal Queensland (21º00'S, 148º35'E to 21º04'S, 148º41'E) (McDonald 1990). The species was restricted to an area of less than

500 km^2 (McDonald 1990). The discrete and isolated nature of the Clarke Range suggests the distribution was not more widespread prior to its discovery in 1984 (Covacevich and McDonald 1993).

3.2 Habitat

The northern gastric-brooding frog was only found in pristine and undisturbed rainforest at elevations above 400 m where the only form of human disturbance was poorly defined walking trails. It was a predominantly aquatic species that inhabited shallow, rocky, fast flowing creeks and streams (McNellie and Hero, 1994).

3.3 Biological characteristics

The northern gastric-brooding frog was mostly nocturnal. During rain, individuals were observed on exposed rocks in and adjacent to streams (McDonald 1990). Males called between September and December (Winter and McDonald 1986). The call of the northern gastric-brooding frog was similar to that of the southern gastric-brooding frog but deeper, and consisted of several staccato notes (McDonald 2005).

It is not known whether females laid their eggs on land or in water. After external fertilisation, the female would swallow the eggs for brooding in her stomach (McDonald 1990). In the jelly that surrounded the eggs was a substance called prostaglandin E that inhibited the secretion of gastric acids, making the brooding female unable to feed (Tyler *et al.,* 1985). Unlike its sister species (i.e. the southern gastric-brooding frog) gastric brooding did not cause major structural changes to the stomach in the northern gastric-brooding frog, suggesting a dichotomy in the evolution of gastric brooding (Leong *et al.,* 1986). The biochemical and physiological adaptations that enabled *R. vitellinus* to gastric brood remain unknown (Leong *et al.,* 1986). The female was ready to give birth to up to 20 young in January to February each year. Birth was by regurgitation through the mouth with the offspring emerging as fully formed metamorphs (i.e. a young frog that has almost completed metamorphosis from a tadpole into an adult).

3.4 Morphological characteristics

Figure 2 Northern gastric-brooding frog (*Rheobatrachus vitellinus*). Source: Queensland Government - Endangered (Department of Environment and Heritage Protection).

The northern gastric-brooding frog was a moderately large squat frog with males and females approximately 55.7 to 58 mm and 62.2 to 83 mm in length respectively. The dorsal surface was pale brown in colour with darker patches and a granular texture. Large skin projections were present on the upper eyelid. The ventral surface was smooth, white or brown in colour, with bright yellow to orange colouration on the abdomen and undersides of the limbs. The tympanum (ear cavity) was not visible externally. The snout was blunt, fingers free and the toes fully webbed (Mahony *et al.,* 1984; Cogger 2000).

3.5 Role of the species in its ecosystem

The northern gastric-brooding frog was an aquatic and stream edge feeder with a diet including small caddis flies, caddis fly larvae, terrestrial and aquatic beetles, and a sympatric frog species, *Taudacdtylus eungellensis* (Winter and McDonald 1986). The northern gastric-brooding frog was also a food source for fauna of higher trophic levels such as birds, fish and other aquatic fauna.

4. Status and trends

4.1 Habitat trends

Eungella was declared a National Park in 1936 and has since spread to extend over 54,000 ha of land. Although there are a number of walking trails, much of the park has remained inaccessible. The northern gastric-brooding frog was formerly found in undisturbed tracts of rainforest at elevations of 400 to 1000 m in Eungella National Park in Queensland, Australia (McNellie and Hero, 1994).

4.2 Population size

There are no recorded estimates of the population size of *R. vitellinus*. A monitoring program initiated by the Queensland government immediately after the species was discovered in 1984 found *R. vitellinus* to be quite common across its range with up to six frogs occurring in a 2 by 5 m stream (McDonald 1990).

4.3 Population structure

There are no published studies on the population structure of *R. vitellinus*.

4.4 Population trends

In 1984, monitoring surveys found *R. vitellinus* to be quite common across its range (McDonald 1990). By January 1985, it was apparent that the population might be in decline with no frogs observed at the edges of its distribution although the species was still present at other sites (Winter and McDonald 1986; McDonald 1990). By March 1985, *R. vitellinus* could not be found in the wild. It was initially thought that the declines observed in 1984 - 1985 were a natural population fluctuation and that residual individuals had retreated to hidden refuges (Winter and McDonald 1986; McDonald 1990). However, despite continued efforts to re-locate *R. vitellinus* since its disappearance in 1985, the species has not been found (Ingram and McDonald 1993; McNellie and Hero 1994; Northern Queensland Frog Recovery Team 2001).

4.5 Geographic trends

The northern gastric-brooding frog was formerly restricted to an area of less than 500 km^2 in Eungella National Park of the Clarke Range in Queensland, Australia (see Figure 1). Range contraction and extinction was rapid within one year of the species' discovery in January 1984.

5. Threats

The cause(s) of extinction of *R. vitellinus* remain unknown. McDonald (1990) found no evidence of over-collecting, drought, floods, habitat destruction, heavy parasite loads or stress due to handling for data collection as being responsible for the population declines. The most likely cause implicated for the extinction of the northern gastric-brooding frog was infection by the chytrid fungus (*Batrachochytrium dendrobatidis*).

The chytrid fungus has been identified in the co-occurring species—the Eungella torrent frog (*Taudactylus eungellensis*) (Retallick *et al.,* 2004)—which also disappeared around the same time as the northern gastric-brooding frog but was later found persisting in small populations (McDonald 1990; Rettalick *et al.,* 1997). Healthy individuals infected with chytrid persist in the remnant populations and it has been suggested that Eungella torrent frog may act as a reservoir and vector of the chytrid fungus (Retallick *et al.,* 2004). The northern gastric-brooding frog co-inhabited streams with the Eungella torrent frog and was observed to feed on this species (Winter and McDonald 1986), and hence transmission of chytrid fungus between these two species was likely.

6. Utilization and trade

6.1 National utilization

There is no trade in the northern gastric-brooding frog as the species is considered extinct. Historical data suggest that it was unlikely that the northern gastric-brooding frog was subject to trade (McDonald, 1990).

6.2 Legal trade

Some northern gastric-brooding frogs were legally taken from the wild for research purposes but over-collection was unlikely to have contributed to its extinction (McDonald 1990).

6.3 Parts and derivatives in trade

There were no part or derivatives of the northern gastric-brooding frog used in trade.

6.4 Illegal trade

There was, and is currently, no indication of illegal trade. Illegal trade is not considered to have been a factor in the extinction of the northern gastric-brooding frog.

6.5 Actual or potential trade impacts

Over-collecting of the northern gastric-brooding frog was found not to be a cause of its extinction (MacDonald, 1990). Should the species be rediscovered, it is unlikely that there would be any trade activity for this species. Any potential trade in this species would be strictly regulated under domestic Australian law.

7. Legal instruments

7.1 National

The northern gastric brooding frog, *R. vitellinus,* is listed nationally as Extinct under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

7.2 International

The species is listed as Extinct under the International Union for Conservation of Nature (IUCN) Red List 2012 (Hero *et al.,* 2004). *R. vitellinus* is listed in Appendix II under CITES. Permits are required for the import and export of CITES II listed species.

8. Species management

8.1 Management measures

The Queensland Government developed a threat abatement plan, *Infection of amphibians with chytrid fungus resulting in chytridiomycosis*, to address the spread and impact of this disease. Chytridiomycosis most likely caused the extinction of the northern gastric-brooding frog and contributed to the declines of 13 other high-elevation rainforest frog species (Laurance *et al.,* 1996; Berger *et al.,* 1999; Hines *et al.,* 1999; McDonald and Alford 1999)

8.2 Population monitoring

As part of the National recovery plan for the stream-dwelling rainforest frogs of the Eungella region of mid-eastern Queensland 2000-2004 (Northern Queensland Frog Recovery Team, 2001), an intensive survey was carried out for the *R. vitellinus* during the peak breeding season. The search involved presence/absence surveys along streams at a range of altitudes including historical sites formerly occupied by the northern gastric-brooding frog.

The recovery plan also made the following recommendations:

- Monitor sites where the species was recorded historically to detect any recovery of the species.
- Investigate disease in preserved specimens and in other species occupying similar habitat.
- Train park staff and community volunteers in identification of this species.

O Implement monitoring by park staff of select locations within the national park estate where the northern gastric brooding frog formerly occurred.

In 2010, an extensive survey was carried out by the Amphibian Specialist Group (ASG) for the IUCN for several extinct species of frogs including the northern gastric-brooding frog.

Despite these efforts, *R. vitellinus* has not been relocated in the wild.

8.3 Control measures

8.3.1 International

The EPBC Act regulates trade in CITES listed and Australian native wildlife and their products. Export of live Australian native amphibians is strictly prohibited for commercial purposes but may be exported for specific non-commercial purposes (e.g. for research, education or exhibition). As an Australian native amphibian an Australian native export permit would be required for the export of *R. vitellinus* even if it were delisted from CITES.

8.3.2 Domestic

If the species was rediscovered, any take from the wild would be strictly regulated by relevant Australian domestic environmental legislation.

8.4 Captive breeding and artificial propagation

Captive breeding programs were not established before the extinction of *Rheobatrachus vitellinus* in 1985.

8.5 Habitat conservation

The northern gastric-brooding frog formerly inhabited Eungella National Park which is currently managed by the Queensland Department of National Parks, Recreation, Sport and Racing under the Nature Conservation Act 1992 which aims to preserve and protect Queensland's natural and cultural values.

8.6 Safeguards

Should the northern gastric-brooding frog be rediscovered, it will be afforded protection from international trade by the provisions of Australian wildlife law (the EPBC Act).

9. Information on similar species

The northern gastric-brooding frog, *R. vitellinus,* was one of two species of gastric brooding frog. Its sister species—the southern gastric-brooding frog, *R. silus*—is also considered to be extinct and has not been located in the wild since 1981 (Richards *et al.,* 1983) and the last known individual died in captivity in 1983 (Tyler and Davis 1985).

The northern gastric-brooding frog was readily distinguishable from the southern gastric-brooding frog by its distribution, paler brown colouration and bright yellow patches under the limbs and on its lower abdomen (Mahony *et al.,* 1984). The calls of the northern gastric-brooding frog are similar to the southern gastric-brooding frog but of a deeper pitch, shorter and with fewer repeats.

10. Consultations

The species was endemic to Australia prior to its extinction and therefore consultation with other range States is not required.

11. Additional remarks

None

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