

Approved Conservation Advice for *Heleioporus australiacus* (giant burrowing frog)

(s266B of the *Environment Protection and Biodiversity Conservation Act 1999*)

This Conservation Advice has been developed based on the best available information at the time this Conservation Advice was approved; this includes existing and draft plans, records or management prescriptions for this species.

Description

Heleioporus australiacus (giant burrowing frog), family Myobatrachidae, is a large, rotund, slow-moving frog that grows to 10 cm long. It is a powerfully built species with muscular hind limbs and enlarged areas on the feet for burrowing. Adult males have enlarged forearms compared to females. Colour varies from steely blue grey to black on the limbs and upper body and paler on the sides, with a white belly. The body has numerous warts, with some along the flanks creamy white to canary yellow. It has prominent, large eyes with a vertical pupil and silvery iris. Males call from in or adjacent to breeding sites with a low pitched and plaintiff owl-like 'oop oop oop oop' in rapid succession. Tadpoles are large (up to 7.5 cm) and very dark blue to black. The blue/grey ventral surface of the tadpoles allows them to be readily distinguished from tadpoles of other species (OEH, 2012).

Conservation Status

Heleioporus australiacus is listed as vulnerable under the name *Heleioporus australiacus* (Giant Burrowing Frog). This species is eligible for listing as vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act) as, prior to the commencement of the EPBC Act, it was listed as endangered under Schedule 1 of the *Endangered Species Protection Act 1992* (Cwlth).

The species is also listed as vulnerable under the *Threatened Species Conservation Act 1995* (New South Wales), threatened under the *Flora and Fauna Guarantee Act 1988* (Victoria) and vulnerable under the IUCN Red List of Threatened Species (Hero et al., 2004). It is managed as critically endangered by the Victorian Government (DSE, 2007).

Distribution and Habitat

The giant burrowing frog occurs in NSW and Victoria along the coast and adjacent ranges. It occurs in two disjunct populations: a northern population largely confined to the sandstone geology of the Sydney Basin and extending as far south as Ulladulla, and a southern population occurring from north of Narooma through to Walhalla, Victoria (OEH, 2012). The disjunct may be due to the species absence from the area between the populations (a gap of 100 km) or may be a result of limited survey effort in the region (Penman et al., 2004). The species extent of occurrence is about 80 000 km² (Hero et al., 2004). There are no available population estimates and it is difficult to estimate declines as there are few historic records and it is difficult to detect the species. The species may actually be naturally rare.

Smaller breeding populations are scattered within the two disjunct areas and the connectivity of these smaller populations is not known. There is some suggestion that genetic differences between the disjunct populations are substantial, but this is based on small sample sizes so requires further investigation (Penman et al., 2005b). There are also differences in the use of habitat; however, this may be due to differing habitat availability in the two regions, rather than differing habitat preference (Penman et al., 2006).

The giant burrowing frog occurs in areas of native vegetation (Penman et al., 2004) and can be found in heath, woodland and open dry sclerophyll forest on a variety of soils, except clay-based soils (OEH, 2012). The species has not been recorded from cleared land. A BIOCLIM

analysis suggests that the species is not suited to large river valleys, although the species was found to have a climatic envelope beyond its current distribution (Penman et al., 2005b).

The giant burrowing frog spends more than 95% of the time in non-breeding habitats, which are areas up to 300 m from breeding sites. While in these areas, individuals burrow below the soil surface or in the leaf litter. Individual frogs occupy a series of burrow sites, some of which are used repeatedly (OEH, 2012).

Breeding habitat is generally soaks or pools within first or second order streams. It is also found in ephemeral or permanent artificial drainage ditches and culverts on roadsides (with a rock or sand/clay base) (Rescei, 1997). In Victoria, four individuals have been located at dams within forests but it is not known whether dams are used as breeding sites (DSE, 2003). They are also commonly recorded from 'hanging swamp' seepage lines. Individuals move into the breeding site immediately before, or following, heavy rain and occupy these sites for up to 10 days (Penman, 2005a). This species breeds mainly in autumn, but has been recorded calling throughout the year. Egg masses are foamy with an average of approximately 500-800 eggs and are laid in burrows or under vegetation in small pools. After rain, tadpoles are washed into larger pools where they complete their development in ponds. Tadpole development takes between 3-12 months with late developing tadpoles overwintering and completing development when warmer temperatures return (OEH, 2012).

This species occurs within the Sydney Basin, South East Coastal Plain, South East Corner, South Eastern Highlands and Australian Alps IBRA Bioregions and the East Gippsland, West Gippsland, Southern Rivers, Hawkesbury/Nepean and Sydney Metro Natural Resource Management Regions.

The distribution of this species overlaps with the following EPBC Act-listed threatened ecological communities:

- Shale/Sandstone Transition Forest
- Temperate Highland Peat Swamps on Sandstone
- Turpentine-Ironbark Forest in the Sydney Basin Bioregion
- Upland Basalt Eucalypt Forests of the Sydney Basin Bioregion.

The Department of the Environment has prepared survey guidelines for the giant burrowing frog. The survey guidelines are intended to provide guidance for stakeholders on the effort and methods considered appropriate when conducting a presence/absence survey for species listed as threatened under the EPBC Act.

<http://www.environment.gov.au/resource/survey-guidelines-australias-threatened-frogs-guidelines-detecting-frogs-listed-threatened>

Threats

The main threats to the giant burrowing frog include:

- Habitat loss through clearing for agricultural (particularly in the southern part of the range) and urban development (particularly in the northern part of the range) (Penman et al. 2004). Conservation of narrow buffers along streams does not sufficiently protect the species habitat.
- Hydrological changes caused by longwall mining subsidence, stormwater run-off, water extraction and activities increasing rates of sediment deposition, resulting in:
 - altered hydroperiods (wet/dry periods)
 - ponds drying prior to tadpoles reaching metamorphosis
 - chemical pollution of breeding sites (DSE, 2003), which has been observed to detrimentally impact breeding of the sympatric red-crowned toadlets (*Pseudophryne australis*) (Thumm & Mahony, 1999)
 - blanketing of tadpole food sources (Green et al., 2004)

- altered water pH (Green et al., 2004).
- Forest disturbance associated with forestry operations resulting in:
 - disturbance and compaction of areas used for burrowing (Penman, 2005)
 - loss of vegetation, particularly the understorey, that reduces microhabitat shading (Penman, 2005)
 - vehicle strike (Lemckert et al., 1998).
- Chytridiomycosis caused by infection with chytrid fungus (*Batrachochytrium dendrobatidis*) (Berger et al., 1999; DEH, 2006).

Potential threats include:

- Inappropriate fire regimes, especially those that alter vegetation structure and composition (Penman et al., 2008) and affect water attributes (sedimentation load, nutrient load and oxygenation). Low intensity fires are not likely to represent a serious threat.
- Cattle grazing (Penman et al., 2004) due to the impacts on vegetation structure, burrowing habitat and riparian vegetation.
- Predation by European red foxes and cats, which are known to eat frogs (Gillespie & Hines, 1999) though the level of impact is unknown.
- Predation by *Gambusia holbrooki* and trout, which are known to eat tadpoles and eggs (Gillespie & Hines, 1999) and could significantly impact the species due to its long tadpole phase. These fish are unlikely to easily invade the ephemeral streams where the giant burrowing frog occurs, although vigilance against their invasion is essential, especially in areas where ephemeral pools could become permanent.
- Vehicle strike on both sealed and unsealed roads especially if traffic frequency increases (Mahony, 1993).

Research Priorities

Research priorities that would inform future regional and local priority actions include:

- assess demography and distribution to determine the demography of populations and spatial requirements across its range
- determine whether the currently recognised species represents one or two taxa
- determine the threats and other management issues affecting key populations, including: whether prescribed and/or unplanned fire has significant impact; the chytrid levels within populations; and the effects of introduced terrestrial and aquatic predators
- determine whether current forestry prescriptions (e.g. erosion control and stream buffers in production forests) are maintaining breeding populations under different logging regimes.

Priority Actions

The following priority recovery and threat abatement actions can be done to support the recovery of the giant burrowing frog:

- Develop a list of key populations of the giant burrowing frog to focus recovery actions.
- Develop a protocol for monitoring populations throughout the species range. Once a monitoring protocol is developed, incorporate it into site management plans.
- Determine priorities for populations to be included in a gene bank to provide an assurance for populations that may become extinct.
- Develop a captive husbandry protocol in case rapid declines occur.

- Conduct surveys in Victoria around historic locations and within areas of likely high quality habitat to assess the status of the species at the southern end of its range.
- Ensure records are accurately collated.
- Coordinate implementation, including management and analysis data, reviewing the progress of recovery and effectiveness of management actions, and adapting actions if necessary.

Habitat Disturbance and Modification

- Prepare and implement site specific management plans to protect key giant burrowing frog populations from identified threats.
- Apply alternative forestry management if current actions not considered suitable.
- Protect breeding sites from disturbance, sedimentation and pollution.
- Retain native vegetation and minimise ground disturbance where the species occurs, especially within 300 metres of known breeding sites.

Conservation Information

- Engage the community and stakeholders regarding conservation of giant burrowing frogs.
- Develop habitat management guidelines that can be used by land managers to protect local populations and habitats across the landscape.
- Facilitate the adequate consideration of giant burrowing frogs during biodiversity certification of environmental planning instruments.

This list does not necessarily encompass all actions that may be of benefit to the giant burrowing frog, but highlights those that are considered to be of highest priority at the time of preparing the Approved Conservation Advice.

Existing Plans/Management Prescriptions that are Relevant to the Species

- Threat abatement plans for infection of amphibians with chytrid fungus resulting in chytridiomycosis (DEH, 2006).
- Threat abatement plans for predation by European red foxes (DEWHA, 2008a) and feral cats (DEWHA, 2008b).
- NSW Government environmental impact assessment guideline for the species (NSW NPWS, 2001), hygiene protocol for the control of disease in frogs (NSW NPWS, 2008) and threat abatement plan for predation by *Gambusia holbrooki* (NSW NPWS, 2003).
- Victorian Government action statement (DSE, 2003).

These plans/prescriptions were current at the time of publishing; please refer to the relevant agency's website for any updated versions.

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