



Giant Burrowing Frog

Heleioporus australiacus (Shaw and Nodder, 1795)

Other common name(s): Owl Frog, Southern Owl Frog, Eastern Owl Frog, Spotted Owl Frog, Burrowing Frog

The following information is provided to assist authors of Species Impact Statements, persons undertaking Development Activities that require fauna and flora studies, and consent authorities and others who are required to prepare or review reports or assessments of potential impacts on threatened species, pursuant to the provisions of the Environmental Planning and Assessment Act 1979.

These guidelines should be read in conjunction with the NPWS Information Circular No. 2: Threatened Species Assessment under the EP&A Act: The '8-Part Test' of Significance (November 1996) and the relevant NPWS threatened species information profile.

Survey

Identification of Habitat

The NPWS threatened species information profile describes the habitat for this species. If suitable habitat is present the NPWS requires a targeted survey to be conducted and should give consideration to the following information.

Within its broad distribution, this species will occupy various habitat types ranging from heaths, woodlands, dry sclerophyll and even moist forest types but not rainforest.

Descriptions of the various vegetation communities occupied in the northern portion of its range may be found in Benson (1986, 1992), Benson and Fallding (1981), Benson and Howell (1994), Benson and Keith (1990), Fisher, Ryan and Lembit (1995), Ryan, Fisher and Schaeper (1996) and Keith and Benson (1988).

Giant Burrowing Frogs usually live along clear, small slowly flowing water courses which traverse plateaus and broad upland gullies. They also live adjacent to stream head-waters where they prefer permanently moist soaks and pondages. Many breeding sites have been found to be associated with shallow temporary ponds receiving seepage and the ponded sections of slow flowing creeks that drain ridges and plateaus.

Giant Burrowing Frogs have not been recorded breeding in waters that are even mildly polluted and are adversely affected by small pH changes (Green, 1997).

Burrows are excavated into the earth around, or associated with rocks fissures or boulders, probably to take advantage of water run-off from outcroppings. It has also been reported that yabbie holes are utilised along the beds and banks of drying creeks. Opportunistic use of the excavations of small mammals may also be made.

Survey Techniques

The Giant Burrowing Frog is a large solidly-built species that can reach around 100 mm in length. A description of the species is provided in the NPWS threatened species information profile and may also be found in a range of publications (eg Barker, Grigg and Tyler, 1995; Tyler, 1989, 1992, 1994; Robinson, 1993; Cogger, 2000).

The Giant Burrowing Frog is notoriously difficult to find within its habitat. Its activity period tends to be confined to the Summer months and, within this period, usually on nights of thunderstorm activity or after substantial rainfall.

This provides limited opportunity to detect adults and so the species can be easily overlooked in an area of suitable habitat unless a targeted search effort is undertaken over an extended period.

Targeted surveys should generally include a combination of active search both during the day and night, call-detection, pit-trapping and searching for tadpoles.

Most recent records are opportunistic, based on tadpole searches or call detection. Whilst most activity occurs following periods of thunderstorm activity in Summer, specimens have been found active at temperatures ranging between 10° and 23°C and at all hours of the night. Most activity on the surface takes place well-after sunset, with high levels of activity between 2200-0100 hrs having been observed.

All available water-bodies, including rainwater pools, ephemeral swamps, slow-

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flowing creeks, or even rock pools in non-perennial water courses should be examined for larvae. The tadpoles are quite easy to distinguish and unlikely to be confused with other species within its range and are often present over extended periods due to their slow growth rate. They can attain a very large size prior to metamorphosis (up to 75mm), are relatively short-tailed and very dark brown to blackish dorsally and bluish-grey ventrally.

The call of the Giant Burrowing Frog cannot really be confused with any other species over its range. It has been likened to the soft calling of an owl - 'oo-oo-oo' - hence its other common name of Owl Frog. The call may carry for some distance also, and it is not unusual to hear them calling from positions hundreds of metres away. Calling is usually at night but may also occur during daylight on rainy days, but this is exceptional.

Giant Burrowing Frogs will call in response to taped call play-backs, however unusual noises and torch-light may result in call suppression. Patient listening for periods of 30 minutes or more is often required.

Most sightings of adults have been the opportunistic result of slowly driving roads and tracks through suitable habitat at night, either during or following summer thunderstorms.

Pit-trapping as a technique has been employed but has had limited success and usually only when conditions are ideal. Generally, the NPWS does not consider pitfall trapping a preferred method and the technique should only be employed after other methods have failed to detect the species in potentially suitable habitat.

Life Cycle of the Species

Known details on the ecology of the Giant Burrowing Frog may be found in the threatened species information profile and the references listed therein.

Although there have been few studies on the life-cycle of the species, enough is now known to identify a range of potential threats to the species.

Much of the species existence is apparently spent burrowed underground sometimes beneath deep leaf-litter or in earth-filled rock crevices interspersed with brief periods of activity throughout the year during rainy weather (F. Lemckert; C. Slade unpublished). It is slow-growing, and long-lived with relatively low fecundity producing small numbers of large eggs. It is therefore likely that recruitment to the population from each breeding season's effort is low. Thus, it may be particularly vulnerable not only to a range

of activities that cause increased mortality to adults but also factors which directly effect recruitment such as detrimental changes to water quality, flow regimes and pond duration.

Threatening Processes

Key Threatening Processes that have been listed under Schedule 3 of the TSC Act and with at least some relevance to this species include:

- *High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition;*
- *Predation by the European Red Fox Vulpes Vulpes (Linnaeus, 1758);*
- *Predation by the Feral Cat, Felis catus (Linnaeus, 1758); and*
- *Loss of Biodiversity as a result of loss and/or degradation of habitat following clearing and fragmentation of native vegetation (currently a preliminary determination)*

Other threats include:

- habitat loss or degradation through urban development of habitat sites (particularly northern populations);
- Clearing of land for agricultural purposes (particularly in southern populations);
- Erosion and sedimentation of headwater creeklines, particularly where runoff rates and flows are exaggerated through upper catchment development or activity;
- Forestry activities where logging directly disturbs forest habitat or where roading and other activities impact indirectly on breeding sites, however in the south many records are from logged forest;
- Road mortality may be significant where roads traverse and dissect major areas of habitat and particularly where populations are small;
- high nutrient flows, associated weed infestations and pH changes due to urban runoff. (Recsei 1996; Green 1997);
- the frog disease Chytridiomycosis has been implicated in the decline and disappearance of a number of frog species and has the potential to impact on this species; and
- Giant Burrowing Frogs are also occasionally misidentified and killed as Cane Toads.

Fire may significantly impact on this species' habitat. Although there have been no scientific studies on the impact of fire on this species, there is a growing body of anecdotal evidence that suggests the intensity and frequency of bushfires plays a significant role

in the modification of Giant Burrowing Frog habitat.

Among these are habitat loss and changes to water quality and flow rates. Such impacts may be the result of inappropriate urban developments along adjacent ridges and this may directly threaten Giant Burrowing Frogs through habitat destruction or indirectly, via pollution or siltation of watercourses and alterations to the local hydrological regime.

Viable Local Population of the Species

All existing colonies of the Giant Burrowing Frog that are successfully reproducing and recruiting new members into the breeding population must be regarded as viable. The presence of calling individuals, gravid females, deposited eggs and larvae strongly supports the notion that a site has resources available to the species to support a viable local population.

The viability of any local population of this species is likely to be compromised by the above threatening processes if they result in increased mortality of adults or decrease the quality of breeding and/or foraging habitat.

Additionally, protection of habitat surrounding these viable local populations is also likely essential as connectivity between different colonies allows gene flow between them.

A Significant Area of Habitat

Given that the Giant Burrowing Frog is known from a relatively small number of locations within a fragmented distribution, any loss or alteration of habitat should be regarded as significant. Studies to determine population sizes, densities and movement patterns have commenced.

Isolation/Fragmentation

The Giant Burrowing Frog presently survives across its entire range as a number of apparently isolated populations. Some of these isolates are becoming increasingly fragmented due to various landuse changes such as roads, urban developments and other activities. The further fragmentation of already naturally restricted areas of habitat may have unforeseen consequences for the survival of an entire population.

Regional Distribution of the Habitat

The TSC Act defines region as an area identified within the Interim Biogeographic Regionalisation of Australia. The known distribution of the Giant Burrowing Frog is confined to the Sydney Basin, South East Corner and the margin of the South Eastern Highlands regions. Within these regions the Giant Burrowing Frog occupies a relatively

small habitat niche that is described in the NPWS threatened species information profile.

Limit of Known Distribution

There appear to be two main distribution patterns, which have been loosely termed the northern and southern populations.

The northern population is known to occur within an area bounded by Mt Coricudgy and Kings Cross in Wollemi National Park to the Jervis Bay district and west to Mt Victoria. This distribution falls within the Sydney Geological Basin and is very similar to the distribution of the Red-crowned Toadlet.

The southern population occurs from Narooma to north-eastern parts of Victoria, near Walhalla (where it now appears to be locally extinct). Both populations could potentially occur over wider areas than current observation records suggest, as the extent of habitat exists beyond the limit of current specimen records in some areas.

Further survey of potential habitat may identify additional populations and range extensions.

Adequacy of Representation in Conservation Reserves or other similar Protected Areas

Although the species is protected in a number of conservation reserves, it is not known whether the genetic variation of the species is adequately reserved at present. It is known from preliminary genetic analysis, that there is genetic variation between the northern and southern populations (M. Mahony pers. comm.). Some field herpetologists consider that the population in north-eastern Victoria and southern New South Wales may be taxonomically distinct from the Sydney Basin population. Populations of the Giant Burrowing Frog are currently reserved in Ben Boyd, Biamanga, Blue Mountains, Booderee (EA), Brisbane Water, Budderoo, Dharug, Royal, Heathcote, Garigal, Jervis Bay, Ku-ring-Gai Chase, Marramarra, Morton, Mount Imlay, Popran, South East Forest, Wollemi and Yengo National Parks. Barren Grounds, Muogamarra, Nattai, Red Rocks and Nadgee Nature Reserves. Bargo, Dharawal and Parr SRAs. Additionally, although not set aside primarily for conservation purposes, the species is also afforded some conservation benefit via occurrence in a number of State Forests, Water Catchment areas and Department of Defence lands (Holsworthy). The northern population has better reserve representation than the southern population which is known from far fewer records. However population sizes, densities as well as trends and fluctuations are largely

unknown. Projects to address some of these information gaps are currently in progress.

Critical Habitat

Critical habitat cannot be declared for the Giant Burrowing Frog as it is not listed on schedule 1 of the TSC Act. Therefore, this issue does not need to be considered.

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