

3.0 The Baw Baw Frog



Figure 3.1.1 Baw Baw Frog, Photo – G. Hollis

3.1 Introduction

The Baw Baw Frog (*Philoria frosti*) is endemic to Mount Baw Baw and its associated escarpments and is listed under the IUCN red list as 'critically endangered (IUCN 2004). The confinement of the Frog to the mountainous environment of Mount Baw Baw predisposes it to rarity as they have a restricted distribution (Hollis 2004). The species has recently experienced a massive population decline and is extremely sensitive to logging and other forms of environmental stress (Hollis 2004). In 1996, the majority of the current known population was found on the western and southern escarpments of Mount Baw Baw. These forests were to be logged under existing licensing arrangements. In response to the discovery and given the significance of the Baw Baw Frog, the Department of Sustainability and Environment (DSE) proposed a 'scientific logging experiment' to take place in these forests to determine whether the frog can survive a 'logging operation'. This experiment will be further explored in Chapter 6.

This chapter will provide an overview of:

- Key findings of current scientific research on the Baw Baw Frog (Section 3.2)
- The cause of the decline in the species' population (Section 3.3)

3.2 Key Findings of Scientific Research

The first systematic surveys of the Baw Baw Frog were conducted in 1983-84 within the sub-alpine zone of the Plateau (>1400m ASL) and estimated a male population of 10,000-15,000 male Frogs. In 1993, the then Victorian Department of Conservation and Natural Resources initiated the second survey of the species and revealed a decline in population by several orders of magnitude, measuring only 2% of the previous count from 1983-84 (Hollis 2004). However, the discovery by Hollis (2004) of populations of the Frog in the Montane Forests on the Southern Escarpment of Baw Baw saw a revised estimate of 6728 adult males. It is unknown whether these populations have suffered similar decline as to the sub-alpine populations due to insufficient long-term surveys. However, the study by Hollis (2004) defends the IUCN's red listing of the species as 'critically endangered'.

Key findings of the study by Hollis (2004) are outlined below:

- It has been predicted that the Baw Baw Frog will disappear with a rise in global temperature of 1-3 °C
- Baw Baw Frog is one of 33 amphibians reported to have declined in Australia
- Two-thirds of the extant populations of the Frog occur in State Forest, out of reserves, and the remaining one-third in the National Park continue to decline.
- The Baw Baw Frog is confined to a very narrow range of ecological conditions.

- The habitat preferences, moisture and temperature tolerances of Baw Baw Frog during sheltering, movement and breeding activities infers that the species is likely to be sensitive to natural and anthropogenic influences.
- The rarity of the Baw Baw Frog exacerbates its risk of extinction through habitat loss and degradation.

The study elaborates that the Baw Baw Frog species survival is challenged by:

..... a very narrow geographical range

The confinement of Baw Baw Frog to a small area on Mount Baw Baw and its associated escarpments make the species one of the most restricted amphibians in Australia.

.....a small population

Relative to populations of other amphibians, whose populations extend over significantly greater areas, the Baw Baw Frog can be considered to have a small population size (approximately 7000 adult males), particularly given its recent population decline and contraction in habitat range.

.....low rates of population increase

The potential for Baw Baw Frog to increase population size relative to other amphibians is reduced. The species has low fecundity and recruitment to the terrestrial stage has been estimated to be 8.1%. The longevity of the Frog (~14.5+ years), and prolonged time taken to reach sexual maturity (3.5 years for males and 4.5 – 5.5 years for females) relative to other amphibians, allude to a breeding strategy that has evolved to recruit in a gradual rather than explosive manner.

.....being not effective dispersers

Investigation into the movement patterns of the Baw Baw Frog showed that they are relatively localized, remaining within 82 m distance of breeding sites.

.....requiring specialized niche requirements

Reliance by the Baw Baw Frog on conditions of low temperature and high relative humidity for optimal movement suggests that habitat niches utilized by the species play an important role in extending opportunities for movement and dispersal during periods of less optimal weather.

.....forming permanent or temporary aggregations

Species that form permanent or temporary population centres are more at risk from natural disturbance events or human disturbances (Hollis 2004).



Philoria frosti
 Range area = 103 km²
 range type
 [Red hatched box symbol] Native Extant



— national boundaries
 - - - subnational boundaries
 lakes, rivers, canals
 salt pans, intermittent rivers
 elevation meters
 5000
 4000
 3000
 2000
 1000
 0 240 km
 Map created 08/29/2005



Map 3.2.1 Baw Baw Frog Distribution – restricted to the Plateau and escarpments of Mount Baw Baw

3.3 Causes of Decline

The Decline of Baw Baw Frog and Potential Causative Agents

1. Loss and disturbance of Habitat
2. Increased UV-B Radiation
3. Pathogens
4. Climate Change - Local, Regional and Global
5. Natural Population Fluctuations and Weather Patterns
6. Atmospheric Pollution
7. Multiple and Interacting Factors

The study by Hollis (2004) continues to emphasize that:

- Changes in climate due to factors operating at a regional, or catchment level, may also explain the decline of the Baw Baw Frog.
- The long-term downward trend in total annual rainfall, and smoothing of fluctuations in annual rainfall, at Erica and Noojee may be as a result of the construction of the Thomson Reservoir in 1982.
- Research in China shows that large volumes of water in mountainous areas, like the Thomson Reservoir, act as a temperature moderator, altering rainfall patterns due to changes in temperature range.
- Filling of the Thomson reservoir in 1989, and subsequent downward trend in rainfall and smoothing of peaks of rainfall, correlates with the timing in decline and contraction in range of Baw Baw Frog after the surveys in 1983 and 1984.
- Clear preference by Baw Baw Frog for wetter, cooler, and habitats on the southwestern escarpment of the Baw Baw Plateau emphasizes the refugial nature and importance of this region in the future management and conservation of the species.

Findings from Hollis (2004) state the sensitivity of Baw Baw Frog to habitat disturbance suggests that forestry activities may impact directly or indirectly on the long-term survivorship prospects of the species. This impact may occur through:

1. Direct destruction of frogs and habitat;
2. Changes to climatic and hydrological conditions from activities in and adjacent to frog habitat;
3. Sedimentation of breeding habitat following activities in and adjacent to frog habitat; and
4. Fragmentation of populations, and/or destruction or modification of dispersal corridors

It has been identified that intensive timber harvesting in forest management blocks on the north-eastern and south-western escarpments of the Baw Baw Plateau over the past 20 years, including a number of areas within the potential habitat of Baw Baw Frog may have impacted on the population (Hollis 2004).



Figure 3.3.1 Cool Temperate Mixed Rainforest providing habitat for Baw Baw Frog – Upper Thomson River

Key References

Hollis G (2004), 'Ecology and Conservation Biology of the Baw Baw Frog *Philora frosti* (Anura; Myobatrachidae): Distribution, Abundance, Autoecology and Demography', (PhD Thesis, Department of Zoology, University of Melbourne)

IUCN (2004), 'IUCN Red List', www.redlist.org, accessed 18.02.06