Giant Burrowing Frog, *Heleioporus australiacus*, and Yurammie State Forest, Eden region NSW

The Giant Burrowing Frog is a large forest dependent frog confined to eastern slopes of the Great Dividing Range and coastal regions from the southern end of the Olney State Forest north of Sydney, NSW to Walhalla, in the Central Highlands of eastern Victoria (Gillespie and Hines 1999, Littlejohn and Martin 1967).

The species listed as vulnerable in NSW, federally and by the International Union Conservation of Nature (IUCN). Current legislation treats all populations of the Giant Burrowing Frog as belonging to the same species although it is widely thought that the northern (north from Jervis Bay, NSW) and southern (south of Narooma NSW and into Victoria) populations are separate species or at least sub-species (Penman et al. 2004, 2005; Gillespie, pers.com.).

The species has never been found in cleared farmland and the southern populations appear to be restricted to forest habitats (Gillespie 1990; Penman et al. 2004). The Giant Burrowing Frog mostly breeds in small, often ephemeral headwater streams (1st to 3rd order) (Penman et al. 2004, 2008b) and spends the majority of its time (95%) living in forests up to 250m away from breeding sites (Lemckert and Brassil 2003; Penman et al 2008a,b). The adult frogs have large non-overlapping ranges (Penman et al 2008a). The southern populations are often subject to drought when headwater streams rarely provide suitable breeding conditions. At a population level, persistence is likely to be dependent on survival of long-lived adults and occasional successful recruitment events. It therefore seems reasonable to conclude that large areas of forest are therefore needed to ensure reasonable sized populations are retained and that the management of this non-breeding habitat is crucial to the persistence of populations.

Because the Giant Burrowing Frog spends the majority of its time on the ground or in burrows in forested slopes and ridges away from streams it is potentially highly sensitive to impacts of logging and post-logging fires (Gillespie pers. com.). Timber harvesting results in massive changes to habitat through immediate and longer-term alterations in forest structure, light penetration levels, moisture and temperature regimes. Logging activities could crush individuals within burrows and compact soils making them unsuitable for burrowing (all harvesting in the Eden region is with large machinery). At a landscape -scale timber harvesting could lead to fragmentation and isolation of populations (Gillespie pers. com.). Timber harvesting and associated activities could also impact on breeding habitats through changes in water temperatures, sedimentation and changes in stream hydrology. The later is of particular concern: Firstly, for the 3-4 years post-harvest the intensity of run-off is much higher, increasing the potential for incision of pools and swamps within small headwater streams and; secondly,

re-growth forests use significantly more water than old growth forests, reducing stream flows in the medium to long-term (5 to 120 years post-harvest) (eg. Roberts et al 2001)

The species is extremely difficult to detect and most records have been based on incidental observations along roads after rain. A combination of tadpole and adult survey methods (pitfall trapping, regular night-time road transects and tadpole surveys within potential breeding areas), undertaken under the right conditions and during the right seasons (see Penman et al. 2006) are required to systematically estimate abundance and distribution of the species (Gillespie pers. com , Penman, pers. com). There are only few locations where this has been done (eg. Broadwater, near Eden , NSW).

In the Eden region of New South Wales previous management prescriptions to protect the species within logging areas were considered inadequate for the species because:

(1) they were dependent on one off pre-logging surveys, which rarely detected the species, even if present and
(2) if present, the exclusion zones were often so large that they effectively prevented timber harvesting from the sub-catchments within which the species was found.

As a result it was recommended that a minimum of five population management zones (400ha to 600ha) be established incorporating key populations, within which breeding activities would be monitored to ascertain population persistence (Penman et al. 2008b). A fundamental underpinning of these population management zones was that they included a number of **known** breeding sites as well as a large number of known non-breeding records (Penman et al. 2008b). However, this information is unknown for most of the Eden area and it was admitted that "additional survey work should be conducted before protection zones can be designed to meet these criteria" (Penman et al. 2008b see http://www.int-res.com/articles/esr2008/5/n005p045.pdf).

One of the population management zones, Yurammie, was established on private lands and within Yurammie State Forest and Gnupa State Forest approximately 20km inland from the coastal town of Pambula (see map below).

The Yurammie Population Management Zone was based only on a small number of incidental records from frequented sections of road. **NO** thorough systematic surveys (using pitfall trapping, regular night-time road transects or tadpole surveys within potential breeding areas) were undertaken in appropriate conditions to determine whether it included the majority of the local population, known breeding habitat and a reasonable area of known non-breeding forest habitat. **NO** estimates of population size within or outside of the management zone were made.

In fact 50% of the management zone covers private hobby farms, some of which is cleared, despite the fact that **NO** documented surveys have been conducted in those areas and no historic records occur from cleared farm land. In addition, some of the private land is subject to unsuitable management activities e.g. ploughing, fertilizer application, livestock grazing, firewood collection and frequent control burning. There are **NO** management agreements with the private landholders within the zone

Although the original concept of population management zones is sound, the Yurammie Population Management Zone was not based on transparent evidence-based science. It would appear that the Yurammie Population Management Zone was designed not to minimize forestry impacts on the Giant Burrowing Frog but rather to minimize impacts on wood volume extraction from Yurammie and Gnupa State Forests.

Logging is due to start in mid-June 2010 within the Yurammie State Forest Special Prescription Zone, only 250m upstream from recent incidental records on Kingfisher Road. Suitable Giant Burrowing Frog habitat occurs upstream and elsewhere within Yurammie State Forest but has not been systematically surveyed under appropriate conditions. Current logging plans for Yurammie State Forest also include clearing a stream crossing through warm temperate rainforest within the population management zone.

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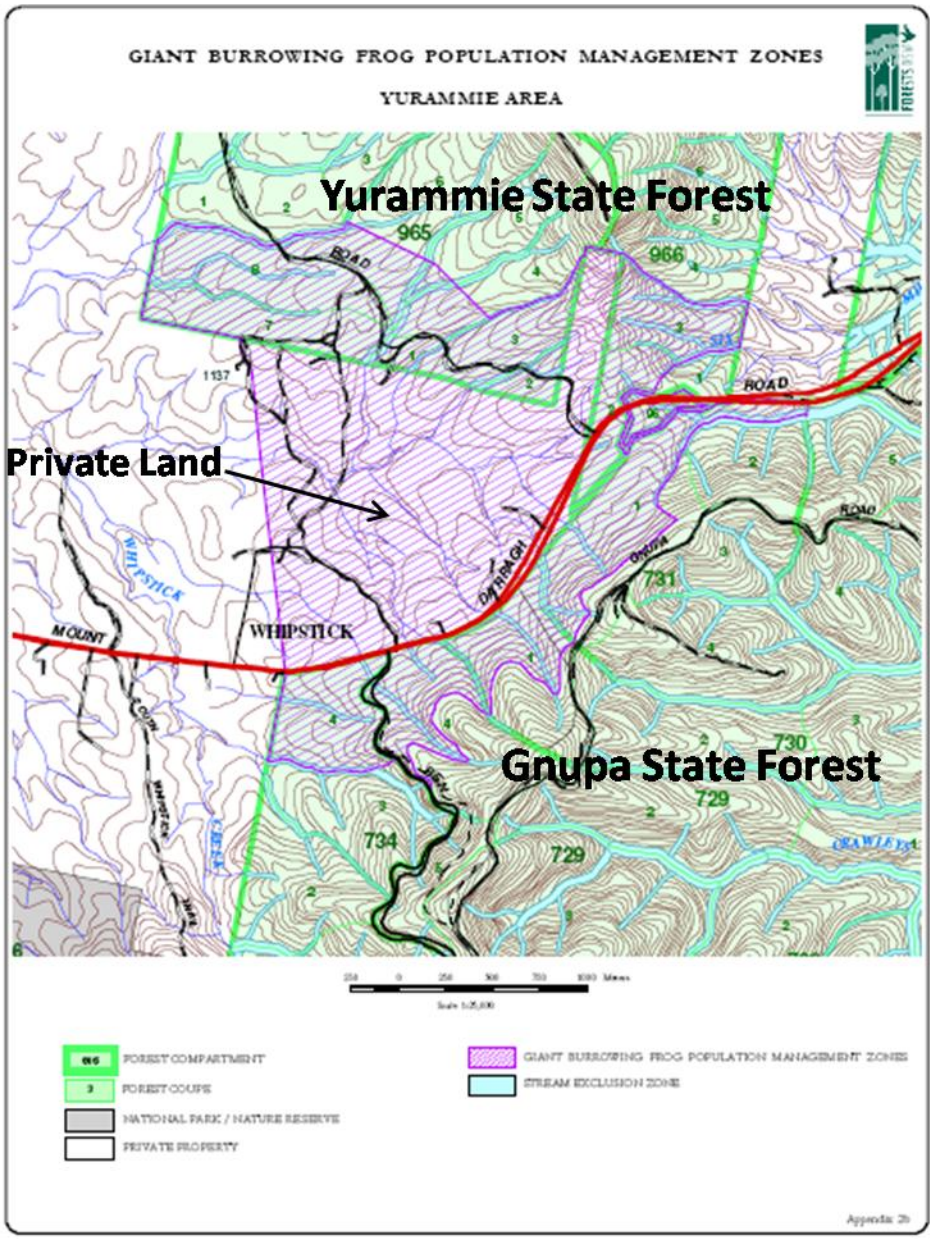

Yurammie giant burrowing frog population management zone.