

Site 3: Red-crowned toadlet case study

Scientific name:	Pseudophryne australis (The genus name Pseudophryne literally means 'false toad'.)	Status: Threatened (vulnerable)
Description:	Small (<30mm) dark brown frog, with large obvious orange-red patch on the head and also along the back. The belly is marbled black and white.	
Habitat:	Only found in forests, heaths & woodlands growing on sandstone soils. They typically occupy the 1st and 2nd order watercourses high on hillsides & plateaus.	
Ecological niche:	Small insectivorous predator. Often found below sandstone ridges, generally where shale lenses are weathering at the base of cliff lines with abundant leaf litter	
Predators/competitors:	Competition for food from other species of leaf-litter dwelling insectivorous animals. Toadlets and bandicoots do not compete for the same food. Predation, disease & food abundance are generally NOT limiting factors for the toadlet. (Human impacts are the problem).	
Disease:	Both wild and captive populations are known to have been infected by amphibian chytrid fungus .	
Diet and feeding:	Dietary specialists. They feed on tiny leaf litter invertebrates, particularly small ants, termites, thrips and springtails .	
Reproductive notes:	Reproductive specialists. They do not need open water to reproduce. They lay encapsulated eggs that can remain in damp soil for many months without dying. If it doesn't rain the embryos may complete their development inside the egg and finally emerge from the egg as a fully formed tiny frog. The only food source that the tadpoles have is the yolk in the eggs. For this reason, female toadlets typically only lay small numbers of eggs with large amounts of yolk in them. The eggs also have the ability to absorb water from the surrounding soil and so the embryo can remain fully hydrated even in dry soil.	
Physiological/structural adaptations:	A range of secretory glands in their skin that do different jobs: 1. Oil glands that lubricate the skin and help with its permeability, 2. Fungicidal and bacterial secretions that prevent skin infections, 3. Toxin glands that produce a highly toxic poison that is specific for reptiles and some birds. (This is why the toadlets have a red crown - they are advertising to any would-be predator that they are toxic.) Toadlets can absorb water through their belly skin (they do not drink).	
Behavioural adaptations:	They can dig using hind feet. Most digging occurs when the soil begins to dry out (eg at the start of a drought). Toadlets seek out clay lens in the sandstone and "go to ground" during extended dry periods. Toadlet behaviour is 'cryptic'- they rarely come out in the open, even at night. The toadlets move between cracks in the sandstone or beneath the leaf litter.	
Human influences:	The red-crowned toadlet is mainly threatened by urban development. Specific human threats include: 1. Loss of habitats from land clearing . 2. Changes to ground water quality and volume due to stormwater drains. 3. Introduced weeds that restrict the amount of the toadlets' insect food. 4. Formal WALKING TRACKS - which are largely free from leaf litter and have compacted soil, which limit toadlet movement in breeding season. 5. Removal of habitat features such as bush rock, fallen timber and leaf litter for track construction and landscaping. 6. Changes to bushfire regimes - repeated burns in an area removes the leaf litter and fallen timber cover and repeatedly kills off the soil micro-organisms. Bushfire dries out the soil and adds layers of inorganic ash, making the soil unfit for toadlets.	