

# Action statement No.265

Flora and Fauna Guarantee Act 1988

Martin's Toadlet *Uperoleia martini*



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# Martin's Toadlet *Uperoleia martini*

## Description

Martin's Toadlets are moderate-sized, ground-dwelling frogs that have a pronounced parotoid gland, roughened dorsal skin, and unwebbed toes. They are relatively large compared to their congeners; males attain an approximate length of 23 mm, females reach 33 mm (Barker *et al.* 1995). This species, along with the sympatric and congeneric species Tyler's Toadlet *U. taylori* is unusual in possessing teeth (Barker *et al.* 1995). Martin's Toadlet can only be distinguished from Tyler's Toadlet, whose distribution in Victoria overlaps that of Martin's Toadlet, by its call. It may be distinguished from another congeneric species, the Smooth Toadlet *U. laevis*, by its pronounced parotoid gland – this gland is 'only moderately developed' in the Smooth Toadlet (Tyler and Knight 2011, p. 148).

## Distribution

Martin's Toadlet occurs in on the coastal side of the Great Dividing Range in East Gippsland and adjacent areas of New South Wales. Victorian records extend from close to the border of New South Wales in the far-east, to near Yarram in South Gippsland. Recent surveys have detected this species at Dutson Downs south-east of Sale, Holey Plains State Park south-west of Sale, Wigan Swamp near Wigan River in East Gippsland, and from three coastal forest sites located adjacent to the Old Coast Road and the beach management track within the Cape Conran Coastal Park (Collyer and Reside 2012, Rohan Bilney pers. comm., 2013, Renee Catullo pers. comm., 2013, Graeme Gillespie pers. comm., 2013, Tim Jessop pers. comm., 2013). However, some of these surveys failed to detect the species at and near most historic records, despite ideal conditions where all other local frogs were active and calling (Renee Catullo pers. comm., 2013; Graeme Gillespie pers. comm., 2013). A habitat preference for swamps and ponds surrounded by extensive woodland appears to have restricted them to protected areas and State Forests, as most other non-flowing water bodies are typically surrounded by cleared land (Renee Catullo pers. comm., 2013).

## Habitat

Martin's Toadlet has been recorded from dry forest, woodlands, shrublands, grasslands and disturbed areas. It is usually found near still water (Anstis 2002), but can be found in dry depressions that later flood (Hero *et al.* 1991). Recent surveys of Martin's Toadlet and Tyler's Toadlet in Victoria and New South Wales by Renee Catullo of the Australian National University suggested that the permanent or semi-permanent swamps and ponds of moderate size with no apparent flow of water are preferred. The species was not detected in large bodies of water, nor in small ephemeral pools. They were only found around or close to water bodies that had woodland or coastal scrub to the edge of the pond. In these areas males were calling from the treeline or a few metres into the treeline, usually from leaf litter. During this work a large number of ponds and dams surrounded by pasture were surveyed. Neither Toadlet species was detected in these modified areas, despite apparently suitable calling conditions determined by calling of males of other frog species that reliably call at sites where Toadlets were detected during concurrent surveys (i.e., if these other species were calling it typically meant that Martin's Toadlet would also call if it was present as conditions were suitable for all of the resident spring/summer breeding frogs to be calling). This calling by syntopic species supports the idea that Toadlets were absent from disturbed sites (Renee Catullo pers. comm., 2013).

Eggs are laid singly, attached to grass stems or other submerged material (Anstis 2002). Tadpoles occur near the bottom of still water bodies, typically amongst litter (Anstis 2002).



Distribution in Victoria (DELWP, 2015)

## Life History and Ecology

Although little is known about the life history of Martin's Toadlet, the *Uperoleia* genus is reported to have extensive burrowing capabilities and both Martin's Toadlet and Tyler's Toadlet retain characters associated with burrowing capabilities (i.e., well-developed metatarsal tubercles), and individuals have been observed burrowing in substrate to escape a perceived predator (Renee Catullo pers. comm., 2013). Both species are also very poor at moving across land. Therefore it is unlikely that they are efficient dispersers, and it is probable that during unsuitable conditions they burrow underground until more suitable conditions arise (Renee Catullo pers. comm., 2013). Due to a combination of a fragmented landscape and poor dispersal abilities, once a population is lost it is unlikely that it will be re-established without assistance.

Martin's Toadlet calls from pond edges during spring and autumn. Breeding occurs in spring and early summer (Anstis 2002). Barker *et al.* (1995) describe the call as a 'highly pulsed call lasting for approximately 0.5 sec.' (p. 333), whilst Hero *et al.* (1991, p. 96) describe the call thus: 'aaaaaaaaaaaaaaaaarr'. The call of Tyler's Toadlet is about half the duration of Martin's Toadlet. It is likely that Martin's Toadlet is long-lived (estimated longevity of 5 – 14 years (Renee Catullo pers. comm., 2013)).

Metamorphosis has been observed from late summer to autumn after spring breeding (Anstis 2002). Tadpoles are bottom-dwellers, and are usually well camouflaged amongst leaf litter; they feed on sediment and algae (Anstis 2002).

## Conservation status

### Victorian conservation status

Martin's Toadlet (*Uperoleia martini*) has been listed as threatened under the Victorian *Flora and Fauna Guarantee Act 1988*.

Martin's Toadlet (*Uperoleia martini*) is considered critically endangered in Victoria according to the Department of Environment, Land, Water and Planning (DELWP)'s *Advisory List of Threatened Vertebrate Fauna in Victoria - 2013* (DSE 2013).

## Threats

### Habitat loss and degradation

Loss and degradation of habitat is recognised as one of the primary drivers of declines and losses of amphibians (e.g., Lehtinen *et al.* 1999, Stuart *et al.* 2004, Cushman 2006, Norris 2007), and populations that have suffered from loss, degradation and fragmentation of habitat are likely to be more susceptible to other threatening processes such as disease, drought and predation. Some species may persist in diminishing habitats until a critical threshold is reached (Homan *et al.* 2004), and this pre-threshold persistence can mask the deleterious effects of accumulating damage to or loss of habitat.

Within the known range of Martin's Toadlet in Victoria, loss, degradation and fragmentation of habitat has occurred due to clearing of native vegetation for timber harvesting, agriculture and for the creation and maintenance of roads. Records of Martin's Toadlet have been collected in modified habitats, but it is not known whether populations in such modified landscapes are viable or will be able to persist in the long-term. There is some evidence that *Uperoleia* species, including Martin's Toadlet, may be dependent on forested environments around waterbodies; consequently, conservation of Martin's Toadlet may necessitate protection of this habitat, rather than focusing purely on aquatic habitats (Renee Catullo pers. comm., 2013). The closely related and ecologically similar species Tyler's Toadlet is abundant long distances from water (rather than specifically clustering around waterbodies like several co-occurring frog species) (Westgate *et al.* 2012). This further emphasises the importance of terrestrial habitats, including forested areas, for these frogs. Because this species is likely to be long-lived, population decline based on loss of forested habitat is likely to affect adult females first (they spend more time than males in the forest away from the water's edge), and the presence of persisting calling males could mask detection of losses (Renee Catullo pers. comm., 2013). For this reason, monitoring of this species should not be based solely on aural surveys of calling males.

### Disease

Chytridiomycosis is a disease caused by the Amphibian Chytrid Fungus *Batrachochytrium dendrobatidis* that has caused declines and losses of amphibians throughout the world (Berger *et al.* 1998, Bosch *et al.* 2001, Muths *et al.* 2003, Skerratt *et al.* 2007). The disease has been strongly implicated in severe declines and losses of a number of Australian frog species on the eastern seaboard

in the last three decades (Osborne *et al.* 1999, Speare *et al.* 2001, Hero *et al.* 2006, Clemann *et al.* 2009, Hunter *et al.* 2010, Clemann and Gillespie 2011). The fungus is widespread across temperate, montane and wet tropical parts of Australia (Berger *et al.* 2009).

Some common and widespread frog species appear to be resistant to chytridiomycosis, and may thus be reservoir hosts for the fungus, allowing it to persist in regions where vulnerable frog species are declining (e.g., Hunter *et al.* 2008, Clemann *et al.* 2009). Furthermore, these apparently-resistant frog species tend to be habitat generalists that are able to survive and even exploit habitat disturbance. Consequently, disturbance of the habitat of Martin's Toadlet may have indirect consequences in terms of disease. Martin's Toadlet occurs in temperate areas that are often shaded (Renee Catullo pers. comm., 2013); these conditions are ideal for the persistence of the Amphibian Chytrid Fungus, and for it to be pathogenic.

Whilst it is not known whether or not chytridiomycosis has affected Victorian populations of Martin's Toadlet, the Amphibian Chytrid Fungus has been detected on this species in Victoria (Speare & Berger 2005; Rohan Bilney pers. comm., 2013), and chytridiomycosis is a plausible threat to this species.

## Drought

Between the late 1990s and 2012 much of south-eastern Australia experienced protracted drought. It is likely that these dry conditions may have resulted in some range contractions for Martin's Toadlet where lentic water bodies dried out. Drought may have resulted in mortality of adults due to heat or water stress, or reduced reproductive success due to reduced availability and persistence of suitable breeding habitats.

## Other potential threats

Foxes and cats are known predators of frogs, but their specific impacts on Martin's Toadlet have not been assessed. Amphibian declines may be exacerbated by interactions among causal factors (Jennings and Hayes 1994, Kuzmin 1994, Pechmann and Wake 1997). Fragmentation of populations may lead to regional extinction by preventing recolonisation of population isolates (Bradford *et al.* 1994), especially as it is likely that Martin's Toadlets are poor dispersers (Renee Catullo, pers. comm., 2013), or by increasing the fragmented population's susceptibility to stochastic threatening processes. Outbreaks of disease may only occur when other stresses reduce immune function (Carey 1993, Ovaska 1997, Donnelly and Crump 1998). Any factor that limits local abundance may be worsened by global climate change (Alford and Richards 1999).

Standard threat	Source of threat	Explanation
Habitat loss and degradation	Vegetation clearance Construction/ maintenance - road, rail or utility	Loss, degradation and fragmentation of habitat is a primary or secondary cause of declines and losses of amphibians, and may exacerbate other threatening processes.
	Drought	Individual survival of Martin's Toadlets and their eggs and larvae is dependent on adequate moisture of shelter sites and adequate water depth and hydroperiod of breeding sites. Drought may affect both of these resources to the detriment of this species.
Disease	Disease - Chytridiomycosis	This disease is known to have caused declines and disappearances of numerous amphibian species around the world, and may be playing a role in declines of Martin's Toadlet.

## Important locations

Martin's Toadlet has a restricted distribution in Victoria, and is believed to have undergone significant declines. As a consequence, all extant Victorian populations are considered important for the persistence of this species in the state. Based on recent records, presumed extant populations occur around Dutson Downs south-east of Sale (Collyer and Reside 2012), Holey Plains State Park south-west of Sale (Rohan Bilney pers. comm., 2013), Wingan Swamp, a series of freshwater swamps surrounded by extensive open woodland at Wingan River in East Gippsland (Graeme Gillespie and Renee Catullo pers. comm., 2013), and Cape Conran Coastal Park in East Gippsland (Tim Jessop pers. comm., 2013).

In addition to the locations listed below, the species has been recorded at other sites such as Howe Flat and Cann River in East Gippsland (VBA, 2015).

Catchment	Location name	Land manager	Bioregion
WEST GIPPSLAND	Dutson Downs	Gippsland Water	Gippsland Plain
	Holey Plains State Park	Parks Victoria	Gippsland Plain
EAST GIPPSLAND	Wingan Swamp	Parks Victoria	East Gippsland Lowlands
	Cape Conran Coastal Park	Parks Victoria	East Gippsland Lowlands

## Past management actions

Apart from the following survey work, no management actions specifically targeting Martin's Toadlet have occurred in Victoria.

Action	Result explanation
Conduct survey to determine abundance/extent	Recent surveys of Martin's Toadlet and Tyler's Toadlet in Victoria and New South Wales by Renee Catullo of the Australian National University suggested that the permanent or semi-permanent swamps and ponds of moderate size with no apparent flow of water are preferred with woodland vegetation (Renee Catullo pers. comm., 2013).

## Conservation objectives

### Long term objective

To ensure that the Martin's Toadlet can survive, flourish and retain its potential for evolutionary development in the wild.

### Objectives of this Action Statement

- To mitigate the impact of threatening processes affecting Martin's Toadlet
- To increase knowledge of biology, ecology or management requirement

## Intended management actions

The actions in this action statement have been developed taking into consideration relevant social and economic matters, as required under the FFG Act.

These actions are designed to support the conservation, management or control of flora and fauna and the management of potentially threatening processes, which will assist in mitigating any impact of climate change on the Martin's Toadlet, and will have no impact on greenhouse gas emissions.

The intended management actions listed below are further elaborated in DELWP's Actions for Biodiversity Conservation (ABC) system. Detailed information about the actions and locations, including priorities, is held in this system and will be updated annually for land managers and other authorities.

Standard objective	Objective explanation	
<b>To mitigate the impact of threatening processes affecting Martin's Toadlet</b>	Persistence of Martin's Toadlets requires protection of sufficient habitat and resources. The objective of these actions is to ensure that these resources are protected.	
Standard action	Details	Responsible agents
Negotiate management agreements	Few populations of Martin's Toadlets are known to persist in Victoria. These populations, and any discovered during surveys, will benefit from protection of terrestrial and aquatic habitats, and appropriate hydrological regimes. Populations may occur across a range of land tenures; DELWP should negotiate site protection and the appropriate site management with land managers at these sites.	DELWP
Manage disease	<p>The disease chytridiomycosis has led to widespread catastrophic declines of many amphibian species around the world, including numerous species in south-eastern Australia. Preventing or minimising the arrival and/or spread and impact of the pathogenic Amphibian Chytrid Fungus that causes this disease is a major goal for safeguarding wild populations of Martin's Toadlet.</p> <p>This will be achieved by minimising access to sites (and especially water bodies) where Martin's Toadlet does or might occur where feasible. For people entering sites where Martin's Toadlet is known to occur, adherence to anti-fungal hygiene protocols will be the best way to safeguard against introduction and/or spread of this fungus.</p> <p>Appropriate strategies to evaluate risk of introduction and spread (Phillott <i>et al.</i> 2010) and protocols to reduce spread (Murray <i>et al.</i> 2011) have been developed.</p> <p>Similarly, actions such as research occurring in the wild and in laboratories that seeks to improve understanding of this disease and measures to control the disease will be supported.</p>	DELWP

Standard objective	Objective explanation	
<b>To increase knowledge of biology, ecology or management requirements</b>	Effective management of threatened species such as Martin's Toadlet must be underpinned by robust knowledge of the biology, ecology and management requirements of the taxon and of the threats that have caused the apparent declines to and losses of populations. This objective seeks to source key information that will be used to inform the management of this species, including seeking the prevalence of the Amphibian Chytrid Fungus and possible impacts of chytridiomycosis, the disease that this fungus causes.	
Standard action	Details	Responsible agents
Conduct survey to determine abundance/extent	The distribution of Martin's Toadlet in Victoria is known largely from incidental records or records procured during general fauna surveys or brief 'snapshot' surveys for the species. Surveys specifically for this species are needed in order to refine understanding of the limits of the species' distribution, and to ensure a robust understanding of the habitat and ecological requirements in Victoria. Surveys must apply suitable hygiene precautions (Murray <i>et al.</i> 2011) to minimise as far as possible the risk of introducing or spreading pathogens. All populations of Martin's Toadlets that are detected during surveys should be concurrently sampled for the Amphibian Chytrid Fungus. Results of fungus sampling will inform understanding of the effects of chytridiomycosis on Martin's Toadlets, and help to refine distribution models for this fungus.	DELWP
Undertake detailed population monitoring and collect demographic information	Known populations and any detected during surveys should undergo a robust population demographic monitoring program in order to determine population trends and attempt to determine the processes driving trends. Seasonal monitoring of the status of infection with the Amphibian Chytrid Fungus can occur concurrently with monitoring. Whilst surveys can target calling males, it is important that monitoring involves surveying for females in terrestrial habitats some distances (hundreds of metres) from aquatic breeding sites.	DELWP
Undertaken research to determine habitat	Although this species is known to use forested sites, use of space and habitat is almost unknown. This action involves radio tracking individual frogs in order to better understand these factors.	DELWP



Assess threats	<p>Determine the Amphibian Chytrid Fungus infection status of a representative sample of Martin's Toadlets from known populations and any detected during surveys and monitoring, preferably across seasons.</p> <p>Results of fungus sampling will also inform understanding of the effects of chytridiomycosis on Martin's Toadlets, and help to refine distribution models for this fungus.</p>	DELWP
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