Department of Sustainability and Environment

Action Statement

Flora and Fauna Guarantee Act 1988 No. 142

Corangamite Water Skink

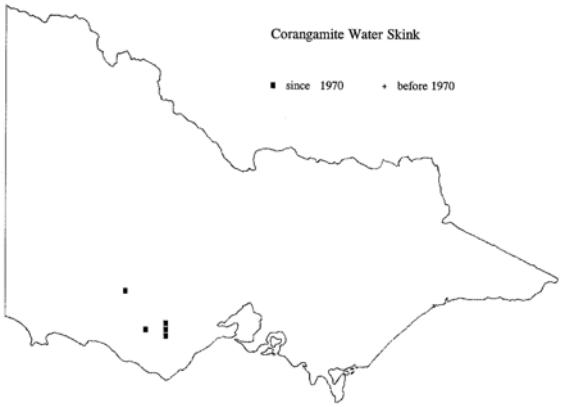
Eulamprus tympanum marnieae

Description and Distribution

The Corangamite Water Skink, *Eulamprus tympanum marnieae* Hutchinson and Rawlinson 1995, is a medium-sized lizard of the family Scincidae. Adults may reach 100 mm snout-vent length, with a tail length of up to 145 mm - they show little sexual dimorphism, and have a body mass up to 20 grams. The Corangamite Water Skink is light to very dark brown on the dorsal surface of the head, body, tail and limbs, overlain by black markings. The general colour is suffused with yellow - often the underside of the belly, limbs and tail is bright yellow (Hutchinson & Rawlinson 1995). The main morphological differences separating the Corangamite Water Skink from the closely related Southern Water Skink (*E. t. tympanum*) are the higher numbers of mid-body and para-vertebral scales, and the distinctive colour patterns.

The Corangamite Water Skink was discovered in 1963 near Lismore, Victoria, and was described in 1995. It has since been found at 29 sites, probably representing at least ten discrete populations. It is restricted to the basalt plains of south-western Victoria, and has been recorded as a number of isolated populations between Colac in the south-east and lake Bolac in the north-west. More areas of seemingly potential habitat further west have been examined recently, with no Corangamite Water Skinks found there.

Corangamite Water Skink
Eulamprus tympanum marnieae
(Photo: Peter Robertson)



Distribution in Victoria
[source: Atlas of Victorian Wildlife, DSE 2004]

Habitat

The Corangamite Water Skink is restricted to Victoria. The subspecies is the only water skink occurring within the naturally treeless grasslands of south-eastern Australia. It inhabits a geographically peculiar Victorian landform, a

region of extensive late Tertiary sheet basalt lava flows, often known as 'stony rises' (Hutchinson and Rawlinson 1995). The rises are basalt ridges and boulder heaps usually left by the collapse of lava tunnels. Most of the area in which the subspecies probably once occurred has been extensively modified, with clearing of vegetation, widespread grazing, moving of rocks into extensive dry-stone walls, and, more recently, removal of boulders and demolition of dry-stone walls for landscape gardening.

Analyses of microhabitat use by Peterson (1997) support this view - areas of high shrub density, short distance to vegetation cover, large rock aggregations and rock fissures appeared to be selectively chosen by the Corangamite Water Skink, and were positively correlated with presence of the lizard.

The ecology of the closely-relaed Southern Water Skink has been extensively investigated. Spellerberg (1972a,b,c,d) reporte on its hermal biology; Schwarzkopf and Shine (1991), Schwarzkopf (1992), and Rohr (1997) have examined its reproductive biology and life history; Blomberg (1997) examined behaviour; Brown (1983) documented diet; and Mather (1978) investigated habitat requirements. Although the Corangamite Water Skink has not received similar attention, one may expect these two subspecies to have some general ecological similarities. Much of our knowledge of the Corangamite Water Skink comes from the incidental observations of many workers, the original description by Hutchinson and Rawlinson (1995), the study by Peterson (1997), recent surveys, and current research (Peterson, unpublished).

Both subspecies are diurnally active, heliothermic skinks. They are both viviparous, producing between one and six live young, the Corangamite Water Skink in late December, and the Southern Water Skink in late January. Ovulation in the Corangamite Water Skink occurs in late October to early November. Only one litter is produced each year, with litter size and mass increasing with female size - litter mass averages 30% of female mass. Male Corangamite Water Skinks have been recorded with enlarged testes in April and September, with regressing testes in October-November, and fully regressed testes in December.

While little is known of the diet of the Corangamite Water Skink, one may expect it to be largely insectivorous, like its congeners. It does, however, also consume the fruit of the Tree Violet, which may be an important component of the diet during some periods (Peterson 1997). Lizards may also play an important role in the dispersal and germination of this plant.

Unlike other water skinks, the Corangamite Water Skink is an extremely shy species. Usually observed perched on a rock-pile or fence, it will often take cover when a human observer is still tens of metres distant (Hutchinson and Rawlinson 1995). It can and does swim, but usually takes refuge in deep gaps and fissures in rock piles.

Current conservation status

National conservation status

The Corangamite Water Skink is listed as 'endangered' under the **Environment Protection and Biodiversity Conservation Act 1999.**

Victorian conservation status

The Corangamite Water Skink is listed as threatened under the **Flora and Fauna Guarantee Act 1988.**

The Corangamite Water Skink is considered to be 'Critically Endangered' (DSE 2003).

Decline and threats

Recent surveys indicate that the Corangamite Water Skink has undergone a decline, disappearing from at least two historic sites (Lismore and the north-eastern shore of Lake Bolac). At many of the extant sites the areas of available habitat are very small, and at most sites other land uses potentially threaten the populations.

The main factors involved in the decline of the Corangamite Water Skink are thought to be habitat loss and fragmentation, and degradation of remaining areas of habitat by a range of processes, including: changed grazing regimes, weed invasion, changed fire regimes, rock removal, changed hydrology and/or water quality, use of agricultural chemicals, and the impacts of introduced animals (foxes, cats, rabbits, mice, sheep, cattle) either by predation or by grazing. Introgression with the nominate form (the Southern Water Skink) may be a problem, and 'intergrade' individuals or populations have been reported. For small populations, stochastic ecological and/or genetic effects could become important, as could the potential for inbreeding suppression.

Synergistic effects of combinations of these threats may also be important. For example, cat predation may be more of a problem in small populations close to urban developments.

These threats continue, to varying degrees, at all known sites. Populations are now extremely fragmented - many are very small. The subspecies is not known to occur in any conservation reserve, and it is considered unlikely that it will be found in any existing reserves. Sites where this subspecies has been located recently are generally private land used

for grazing of stock. Three sites are on or adjoin crown land (managed by the shire) used predominantly for recreational purposes. One private land site is managed primarily for conservation of natural values.

The opportunity exists at a number of sites to enhance the habitat for the Corangamite Water Skink without adversely affecting other values and uses. Two elements of the habitat identified as particularly important to the Corangamite Water Skink (Peterson 1997) are large rock outcrops and shrub cover. While both of these attributes may be threatened (by rock collection and grazing respectively), at many sites they could be enhanced by careful management.

Existing conservation measures

- A survey program to investigate the distribution of the Corangamite Water Skink was conducted during the spring and summer of 1997-8.
- Remaining areas in the west of the potential distribution were examined during the spring and summer of 1998-9, with no further populations located.
- Media releases have resulted in the detection of some populations, and have greatly increased local awareness of the subspecies.
- Sixteen monitoring transects have been established, and have been monitored repeatedly for the last two years.
- Some aspects of the habitat and general biology of the Corangamite Water Skink have been investigated (Peterson 1997).
- Further ecological studies are underway, as a postgraduate research project.
- A national Recovery Plan (Robertson 1998) has been prepared, and its implementation is underway.
- Preliminary discussions with landholders regarding grazing management and fencing have begun.

Conservation Objectives

Long term objective

The primary, long-term, recovery objective is to ensure the ability of the Corangamite Water Skink to survive, flourish and maintain its potential for evolutionary development in the wild, across its natural geographic range. Implicit in this is the immediate objective of ensuring the long-term survival of the subspecies throughout its extant distribution.

Objectives of this Action Statement

1. All extant populations of the Corangamite Water Skink are maintained in systems of reserves and/or areas managed specifically for their conservation, and are able to be maintained in the long-term.
2. The nature of the known threats is recognised and managed to ensure the long-term survival of these populations.
3. To increase our understanding of ecology of the Corangamite Water Skink in order to maximise the effectiveness of recovery actions.

Intended Management Actions

The intended management actions listed below are further elaborated in NRE's Priority Actions Information System. Detailed information about the actions and locations, including priorities, is held in this system and will be provided annually to land managers and other authorities.

Site protection

1. Initiate discussions with all relevant landholders and land managers regarding the type of protection appropriate and possible for each site. Initially, efforts will concentrate on fencing to exclude grazing from priority sites, and the prevention of further deleterious developments at sites.

   Responsibility: DSE (SW Region)

2. Provide information and advice, including maps, regarding the location and management of Corangamite Water Skink sites to landholders, land managers and other authorities, especially Catchment Management Authorities and local government authorities.

   Responsibility: DSE (SW Region)

3. Incorporate actions to protect, enhance and restore Corangamite Water Skink habitat into relevant Regional Catchment Strategies or their subordinate strategies via Biodiversity Action Plans. Implement these actions, according to priority, as resources become available, in conjunction with other agencies, community groups and landholders.

   Responsibility: Corangamite and Glenelg Hopkins Catchment Management Authorities

4. Incorporate information regarding the location and management of Corangamite Water Skink sites into local planning schemes, including environmental significance overlays, and apply the Victorian Planning Provisions so as to protect these sites.

   Responsibility: local government authorities

Monitoring of the Corangamite Water Skink

5. Populations will be visited regularly and monitored to experimentally assess the effects of any imposed management, to detect any population changes, and to detect any changes in threats, using the system developed by La Trobe University in conjunction with the National Recovery Team.

   Responsibility: DSE (Biodiversity & Natural Resources Division) Ecological research

6. Inquiries To gain the ecological information necessary to determine optimal management of Corangamite Water Skink populations, it will be necessary to undertake a targeted research program. The program will include:

- Genetic investigations to determine if there is a need for any genetic manipulations, and to determine the extent of genetic interactions with the Southern Water Skink.
- Investigations of the habitat and microhabitat requirements of the Corangamite Water Skink, to enable appropriate and continually refined management.
- Investigations and manipulations of various postulated threatening processes, to determine their impacts on populations and to determine means of ameliorating their effects.
- Investigations to determine various life history parameters of the Corangamite Water Skink, to enable population viability modelling.
- Population viability modelling to assess critical stages in the life history and to explore the advantages of various management scenarios.

Responsibility: DSE (Biodiversity & Natural Resources Division)

Community involvement

7. The success of the Corangamite Water Skink recovery program is heavily dependent on the cooperation and involvement of local community members, particularly landholders. To ensure the cooperation and involvement of the local community, a number of measures are proposed:

- Provide training for land managers involved in activities which may affect the Corangamite Water Skink and its habitat.
- Approach interested landholders and other community groups to provide a forum for community participation in recovery actions.
- Encourage landholder and other community involvement in projects directed at the conservation of the Corangamite Water Skink and native grasslands, and where possible provide support to these groups undertaking approved projects.
- Publicise in various media the conservation status of the Corangamite Water Skink, and encourage the reporting of any sightings.
- Produce a 'Web' site and other materials on grasslands, volcanic plain wetlands, and the Corangamite Water Skink conservation and management, for access by community groups, landholders, and private and government organisations.

Responsibility: DSE (Biodiversity & Natural Resources, SW Region)

Professional development and training

8. Training will be provided for NRE staff to ensure that advice to landholders and other stakeholders is the best available to achieve the conservation objectives of the Recovery Plan.

   Responsibility: DSE (Biodiversity & Natural Resources Division, SW Region)

Periodic review

9. Management guidelines will be continually refined and updated as further information becomes available from the research actions, identification of threats, and monitoring.

   Responsibility: DSE (Biodiversity & Natural Resources Division)

Salvage and translocation protocols

10. Develop salvage and translocation protocols to guide decision-making in circumstances where the short-term survival of populations is threatened.

    Responsibility: DSE (Biodiversity & Natural Resources Division)

Captive maintenance

11. Determine feasibility and desirability of maintaining a captive population for research and community education purposes.

    Responsibility: DSE (Biodiversity & Natural Resources Division)

References

Blomberg, S. (1997) Intraspecific aggression in the skink *Eulamprus tympanum* (Lacertilia, Scincidae): form and determinants of agonistic behaviour. *Copeia* (in press).

Brown, G. W. (1983) *Comparative feeding ecology of southeastern Australian scincids.* Unpublished Ph.D. thesis. La Trobe University, Melbourne.

DSE (2003) *Advisory List of threatened vertebrate fauna in Victoria - 2003.* Department of Sustainability & Environment. Biodiversity & Natural Resources Division: Melbourne.

DSE (2004) Atlas of Victorian Wildlife (electronic fauna database). Department of Sustainability & Environment. Biodiversity & Natural Resources Division: Melbourne.

Hutchinson, M. N. & Rawlinson, P. A. (1995) The Water Skinks (Lacertilia: Eulamprus) of Victoria and South Australia. Records of the South Australian Museum 28(2): 185-207.

Mather, P. B. (1978) An assessment of the ecological requirements of Sphenomorphus tympanum (Scincidae) – a forest-dependent resident. Unpublished B.Sc. Hons. Thesis. La Trobe University, Melbourne.

Peterson, G. (1997) Ecology, evolution and conservation of the Eulamprus quoyii complex in central southwestern Victoria. Unpublished B.Sc. Honours thesis, La Trobe University.

Robertson, P. (1998) Corangamite Water Skink Eulamprus tympanum marnieae – National Recovery Plan 1998-2003. Environment Australia, Canberra.

Rohr, D. H. (1997) Demographic and life history variation in two proximate population of a viviparous skink separated by a steep altitudinal gradient. Journal of Animal Ecology 66, (in press).

Schwarzkopf, L. (1992) Annual variation of litter size and offspring size in a viviparous skink. Herpetologica 48(4): 390-395.

Schwarzkopf, L and Shine, R. (1991) Costs of reproduction in lizards: escape tactics and susceptibility to predation. Behavioural Ecology and Sociobiology 31: 17-25.

Spellerberg, I. F. (1972a) Temperature tolerances of Southeast Australian reptiles examined in relation to reptile thermoregulatory behaviour and distribution. Oecologia 9: 23-46

Spellerberg, I. F. (1972b) Thermal ecology of allopatric lizards (Sphenomorphus) in southeast Australia. I. The environment and lizard critical temperature. Oecologia 9: 371-383.

Spellerberg, I. F. (1972c) Thermal ecology of allopatric lizards (Sphenomorphus) in southeast Australia. II. Physiological aspects of thermoregulation. Oecologia 9: 385-398.

Spellerberg, I. F. (1972d) Thermal ecology of allopatric lizards (Sphenomorphus) in southeast Australia. III. Behavioural aspects of thermoregulation. Oecologia 11: 1-16.

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Further information can be obtained from Department of Sustainability and Environment Customer Service Centre on 136 186.

Flora and Fauna Guarantee Action Statements are available from the Department of Sustainability and Environment website: http://www.dse.vic.gov.au

This Action Statement has been prepared under section 19 of the Flora and Fauna Guarantee Act 1988 under delegation from Professor Lyndsay Neilson, Secretary, Department of Sustainability and Environment, September 2003.

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