Australian Capital Territory

Nature Conservation (Alpine Water Skink) Conservation Advice 2025

Notifiable instrument NI2025-300

made under the

Nature Conservation Act 2014, s 90C (Conservation advice)

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1 Name of instrument

This instrument is the *Nature Conservation (Alpine Water Skink) Conservation Advice 2025*.

2 Commencement

This instrument commences on the day after its notification day.

3 Conservation advice for Alpine Water Skink

Schedule 1 sets out the conservation advice for Alpine Water Skink (*Eulamprus kosciuskoi*).

Linda Neaves
Chair, Scientific Committee
21 May 2025

Schedule 1

(see s 3)

ACT Government
Environment, Planning and Sustainable Development

ACT Scientific Committee

CONSERVATION ADVICE

ALPINE WATER SKINK – *Eulamprus kosciuskoi*

CONSERVATION STATUS

The Alpine Water Skink – *Eulamprus kosciuskoi* (Kinghorn, 1932) – is recognised as threatened in the following jurisdictions:

National	**Vulnerable**, *Environment Protection and Biodiversity Conservation Act 1999*
ACT	**Vulnerable**, *Nature Conservation Act 2014*
NSW	**Vulnerable**, *Biodiversity Conservation Act 2016*
VIC	**Endangered**, *Flora and Fauna Guarantee Act 1988*

ELIGIBILITY

The Alpine Water Skink is listed as Vulnerable in the ACT Threatened Native Species List under IUCN Criterion B – B2ab(i,ii,iii,iv,v) due to a limited area of occupancy (AOO = 940 km^2) and number of locations (2); ongoing declines in AOO, habitat extent and quality; and projected future declines in the extent of occurrence (EOO), number of subpopulations and number of mature individuals (DCCEEW 2024; Attachment 1). A continuing decline in distribution is inferred due to an observed decline in habitat quality and extent caused by widespread high severity fires, the impacts of hard-hooved invasive species (e.g., feral horses, feral deer and feral pigs) and potential for increased vulnerability to predation after fire (McGregor et al. 2015; J. Rossendell 2023. pers comm 17 August in DCCEEW 2024).

DESCRIPTION AND ECOLOGY

The Alpine Water Skink is a robust skink, up to 85 mm in length (adult snout-vent length (SVL)). The dorsal surface is olive-brown in colour with a black vertebral stripe and another black stripe on both sides, all of which extend the length of the body. Just below the black side stripes runs a narrow, dorso-lateral, yellow stripe, under which the body is black with yellow to cream spots. The lower flanks are pale yellow to cream with irregular black spots. The underside is pale yellow to grey and may have some black spots (Cogger 2014; Robertson and Coventry 2019; Wilson and Swan 2021).

Alpine Water Skink (John Bromilow – NatureMapr)

Female Alpine Water Skinks reach maturity at 2–3 years of age. Mating occurs in spring,

and females give birth to live young 10–12 weeks later in late summer and early autumn (Jenkins and Bartell 1980; Robertson and Coventry 2019). The average number of offspring is 1–6 (Greer 1989). Generation length is unknown, but related and ecologically-similar *Eulamprus* species have a generation length of between 3–7 years (Dubey et al. 2013; Attachment A). Longevity is estimated to be 6–10 years (DAWE 2020).

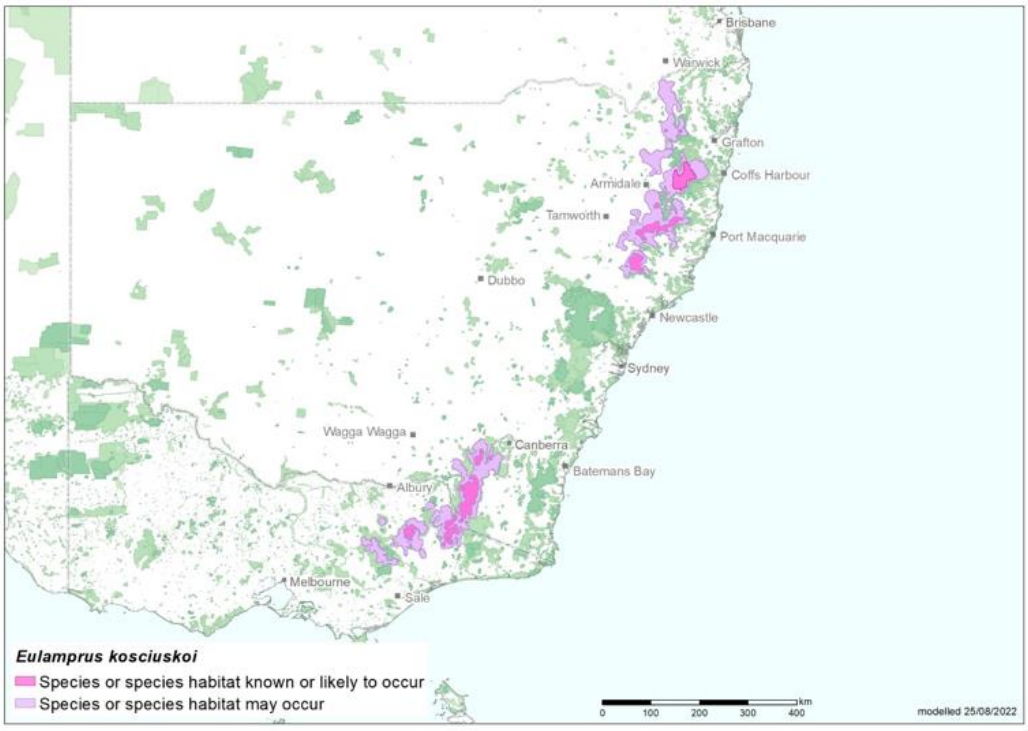
Alpine Water Skinks are active during the day and likely to feed upon aquatic and terrestrial invertebrates, tadpoles, small skinks and occasionally fruit, based on other similar skinks (Australian Museum 2020; OEH 2022).

DISTRIBUTION AND HABITAT

The Alpine Water Skink is found at isolated high elevation sites (1300–2000 m above sea level (asl)) in the Australian Capital Territory (ACT), the Snowy Mountains (NSW) and Victoria (Green and Osborne 1994; Robertson and Coventry 2019). The distribution is naturally fragmented into 'sky islands' (McCormack et al. 2009), which are isolated high elevation sites surrounded by unsuitable lowland habitat.
This species currently comprises two disjunct lineages, one in Northern NSW and the other in the Australian Alps (ACT, NSW and Victoria), both of which are primarily found in national parks and reserves. It is unlikely that there is current gene flow between any of the disjunct sites where the species is known to occur due to the isolated habitat and limited dispersal ability of this species (DCCEEW 2024).

In the Brindabella Range and Snowy Mountains, the species exhibits a high degree of habitat specialisation, being confined to sphagnum bog, fen, wet heath and, less frequently, wet sod-tussock grassland (Green and Osborne 1994). In winter, the species retreats to burrows under rocks, logs and sphagnum (Jenkins and Bartell 1980; Robertson and Coventry 2019). Sphagnum moss cover is inferred to be important for thermoregulation and shelter (Steane et al. 2005).

Figure 1: Modeled distribution of the Alpine Water Skink (Source DCCEEW 2024)



Source: Base map Geoscience Australia; species distribution data Species of National Environmental Significance database.

In the ACT, the species was recorded mostly in sphagnum bog complexes near the NSW border near Mount Ginini, Mount Gingera, Mount Bimberi, Murrays Gap, Mount Murray and Mount Scabby (Helman et al. 1988). Further observations were recorded in the early 1990s and one opportunistic record in 2014 of 4–5 animals in a Franklin Road roadside drain (with *Sphagnum cristatum*, *Empodisma* sp. etc in a *Eucalyptus pauciflora* forest). Some of these were newborn or juvenile around 50mm in length. One larger animal was likely gravid as indicated by the distention of the mid and lower abdomen. While surveying for the Alpine She-oak Skink (*Cyclodomorphus praealtus*) in 2024, an Alpine Water Skink was identified in a bog on Mount Bimberi (Atkins and Pulsford 2024).

Habitat critical to the survival of the species includes areas at high elevation in moist open areas. The skink is often found in association with sphagnum bogs, as well as seepage areas, wet tussock grassland and sometimes the mossy or herb covered banks of slow-moving streams (DCCEEW 2024).

THREATS

Details and the extent to which each threat is operating on the Alpine Water Skink are outlined in the Commonwealth Conservation Advice (DCCEEW 2024). The Alpine Water Skink is primarily threatened in the ACT by:

- habitat loss and changes caused by higher temperatures and impacts from increasingly frequent and more severe fires, both due to climate change, and feral hard-hooved animal impacts on the species habitat (including feral pig damage, Hone (2002))
- compounding impacts including elevated predation levels after fire, especially by feral Cats (*Felis catus*) (Leahy et al. 2015; Woinarski et al. 2018) and European Red Foxes (*Vulpes vulpes*) (Stobo-Wilson et al. 2021)), and habitat degradation by weeds.

An additional and likely underestimated predation impact is predation by invasive alien trout species (Lintermans 1992).

MAJOR CONSERVATION OBJECTIVE

The priority management objective should be to maintain in the long term, viable, wild populations of the species as a component of the indigenous biological resources of the ACT and as a contribution to regional and national conservation of the species. This includes the need to maintain natural evolutionary processes.

CONSERVATION PRIORITIES

Conservation actions are detailed in the Commonwealth Conservation Advice (DCCEEW 2024). Conservation and management priorities for the Alpine Water Skink in the ACT should be to:

- ensure core habitat and projected core habitat under climate change are protected from disturbance (including trails or park infrastructure), planned burns and fragmentation
- undertake climate modelling to predict future distribution of the species within the ACT under a range of climate change scenarios
- in collaboration with other stakeholders and jurisdictions, conduct targeted surveys to improve understanding of the species occurrence in the ACT and habitat requirements and paying specific attention to this species in other relevant surveys such as of bogs and fens, e.g. alongside the ACT Bog Program (Atkins and Pulsford 2024)
- work with other jurisdictions and stakeholders to support the research priorities for the species where practical, including studies of population genetic structure and diversity, possible thermal

sex reversal, microhabitat requirements, minimum tolerable fire intervals and potential to create safe havens from predators and herbivores

- incorporate the ecological needs of the Alpine Water Skink into ecological guidelines (e.g., ACT Government 2019)
- undertake targeted control of invasive predators and weeds within the habitat around skink colonies, particularly post fire, if feasible, to manage impacts on populations; predator control needs to be undertaken so as not to adversely impact on other native species, including the Australian Dingo.
- ensure active surveillance programs are in place to detect the presence of feral horses, deer and other invasive predators (including pigs) around known colonies of Alpine Water Skink, and undertake control as needed
- explore the implications of climate change for population persistence and conduct climate sensitive management actions where feasible (see issues below), including monitoring changes arising from climate change in the dynamic of local extinction and reinvasion within the naturally fragmented distribution of this species
- Opportunities to address knowledge gaps for this species to establish climate change ready management actions may include university and interjurisdictional research collaborations.
- actively seek opportunities to involve members of local indigenous communities in on ground conservation activities for this species
- engage with other jurisdictions to support regional and national recovery of the species.

CONSERVATION ISSUES

It is recommended that quantitative targets and resourcing requirements are clearly identified in any Action Plan or other related projects/programs relevant to this species. Broader conservation issues need to be considered in developing and implementing actions arising from this advice.

Critical Habitat

The Commonwealth Conservation Advice (DCCEEW 2024) identifies 'habitat critical to the survival' of the species and includes high elevation areas (above 1300 m asl in the ACT (Green and Osborne 1994)) in moist open areas in the species distribution. The habitat critical to the survival of the Alpine Water Skink includes the area of the known population and areas of similar adjoining habitat (as described in the habitat section), which provide the potential for range extension (through natural migration or translocations). No Critical Habitat as defined under section 207A of the EPBC Act has been identified or included in the Register of Critical Habitat under the EPBC Act.

Climate Change

Climate change impacts are inevitable and will affect the likelihood of persistence, within the ACT, of many species. Most vulnerable in this regard are those species that occupy highly fragmented habitat with highly restricted distributions, such as this species. Capacity must be developed to model the impact on this species and its habitat under likely climate change scenarios if we are to anticipate and manage the impacts of climate change. This will require a combination of research and the development of in-house capacity for the collection of relevant data and its application in climate change modelling. For species whose physiological limits are known, biophysical models can provide a predictive understanding of the habitats required for persistence in the face of climate change through an integration of data on climate and other environmental variables with measures of morphology, behaviour, physiology and life history of the species.

How to respond to climate change is challenging if we are not to simply monitor resultant declines. Options for on-ground action to assist species such as the Alpine Water Skink to accommodate climate warming (such as assisted dispersal between isolates subject to local extinction) need to be explicitly explored.

Population Viability

With highly fragmented and declining species, such as this species, it is important to ensure actions maintain connectivity and genetic diversity to prevent functional extinction. This occurs when populations decline in abundance and become fragmented to such an extent and that the genetic diversity of the species is reduced, leading to genetic problems (e.g., inbreeding depression) and the species no longer has the capacity to rebound should conditions improve or to respond to management intervention. Systematic monitoring and collection of population data, including reproduction and survival data when available, should be used to assess population viability and species distribution. An assessment of genetic variation and inbreeding risk should be made in the case of this species, particularly for small and isolated populations to inform risks. If genetic problems exist more intensive options for bringing the species to a position where it has the potential to recover may need to be explored, such as genetic rescue.

Jurisdictional Collaboration

The location of the species habitat in the ACT high country along the NSW border requires the development of any policies and action/recovery plans to be discussed between relevant jurisdictional entities.

Ngunnawal Community Engagement

The ACT Government should actively facilitate the inclusion of the Ngunnawal people in the conservation of this species and its habitat as part of Ngunnawal Country. Reference to the draft Cultural Resource Management Plan (ACT Government in prep.) would be useful to inform culturally appropriate resource management including of native species that aligns with achieving conservation outcomes for the species.

OTHER RELEVANT ADVICE, PLANS OR PRESCRIPTIONS

- Commonwealth Conservation Advice – Alpine Water Skink (DCCEEW 2024)
- Namadgi National Park Plan of Management (ACT Government 2010)
- ACT KTP Action Plan – ACT High Country Bogs and Fens (ACT Government 2024)

LISTING BACKGROUND

The Alpine Water Skink is listed as a Vulnerable species under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), effective 16 July 2024. It is assessed as Vulnerable under Criterion 2 (B2ab(i,ii,iii,iv,v)) of the EPBC Act. In 2024, under the *Nature Conservation Act 2014*, the ACT Scientific Committee recommended the Alpine Water Skink be listed in the Vulnerable category in the ACT Threatened Native Species List to align with the EPBC Act listing.

ACTION PLAN DECISION

The ACT Scientific Committee does not recommend that the Minister for the Environment should make the decision to have an action plan for the species in the ACT under the *Nature Conservation Act 2014* at this time. The species has only been recorded in the ACT twice since the early 1990s and the key habitat areas of the species are in the ACT High Country Bogs and Fens Endangered Ecological Community along the ACT/NSW border in Namadgi National Park (1300–2000 m above sea level) and its habitat is

protected there. Actions in the High Country Bogs and Fens Action Plan will monitor and manage the habitat of this species and further species-specific priorities above can direct the actions in that action plan. Targeted skink surveys can be conducted alongside the ACT Bog Program (Atkins and Pulsford 2024).

A National Recovery Plan is not proposed to be prepared for the species as it was decided it would not provide a significant conservation planning benefit above existing mechanisms (DCCEEW 2024).

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FURTHER INFORMATION

Further information on the related Action Plan or other threatened species and ecological communities can be obtained from: Environment, Planning and Sustainable Development Directorate (EPSDD). Phone: (02) 132281, EPSDD–Environment website: https://www.act.gov.au/environment

ATTACHMENT A: LISTING ASSESSMENT (DCCEEW 2024)

THREATENED SPECIES SCIENTIFIC COMMITTEE (COMMONWEALTH) ASSESSMENT

Reason for assessment

The devastating bushfires that burnt 10.3 million hectares across southern and eastern Australia in 2019–20 severely impacted native wildlife and habitat. This created an urgent need for hundreds of species and ecological communities (ECs) to be assessed against EPBC Act criteria for threatened listing status, so that the recovery and future resilience of fire-affected species and ECs could be supported by statutory protection commensurate with their post-fire status, and to ensure EPBC Act lists are as current and accurate as possible, helping improve environmental resilience and preparedness for future fire events.

As part of the Australian Government's bushfire response the Department engaged scientific experts to deliver a number of Species Expert Assessment Plans (SEAPs) for groups of fire-affected and non-fire affected species and ECs, to enable hundreds of species and ECs to be assessed against EPBC Act criteria for threatened listing status and improve the currency of EPBC Act lists in a timely manner.

This assessment follows evaluation of the conservation status of the Alpine Water Skink through the SEAP project.

Assessment of eligibility for listing

This assessment uses the criteria set out in the EPBC Regulations. The thresholds used correspond with those in the IUCN Red List criteria except where noted in criterion 4, sub-criterion D2. The IUCN criteria are used by Australian jurisdictions to achieve consistent listing assessments through the Common Assessment Method (CAM).

Key assessment parameters

Table 3 includes the key assessment parameters used in the assessment of eligibility for listing against the criteria. The definition of each of the parameters follows the Guidelines for Using the IUCN Red List Categories and Criteria.

Table 1 Key assessment parameters

Metric	Estimate used in the assessment	Minimum plausible value	Maximum plausible value	Justification
Number of mature individuals	Unknown	Unknown	Unknown	No population estimates are available for this species.
Trend	Declining			There is currently insufficient evidence available to quantify a trend in the number of mature individuals. However, threats such as climate change, particularly more frequent fires, as well as impacts from feral horses and deer, have caused the disappearance of the species from some previously occupied sites and are likely to be causing declines in the total number of mature individuals now and in the future (Clemann 2023. pers comm 4 April).

Metric	Estimate used in the assessment	Minimum plausible value	Maximum plausible value	Justification
Generation time (years)	5	3	7	Adults mature at 2–3 years (Ofori et al. 2017). Longevity is estimated to be 6–10 years (DAWE 2020). An analysis by Fung & Waples (2017) identified that estimating generation length for reptiles that lack information to develop life history tables is best achieved using the formula: age at maturity + z *(reproductive years), where z represents fecundity and survivorship over time and a z-value of 0.5 indicates equivalent fecundity and survivorship across all reproductive years. Using the parameters outlined above, the minimum estimate is 3.5 years (2 + 0.5*(6-2) = 3.5) and the maximum estimate is 6.5 years (3 + 0.5*(10-3) = 6.5). These estimates have been rounded down to 3 and up to 7, respectively, to represent more realistic figures for use in this assessment. The estimate of 5 used in this assessment reflects the approximate midpoint of these two values.
Extent of occurrence	95,396 km^2	40,671 km^2	118,976 km^2	The EOO was calculated using a minimum convex hull based on the IUCN Red List Guidelines (2022). The estimate used in this assessment of 95,396 km^2 is based on the mapping of all confirmed point records and is considered to represent the current distribution of the species. The minimum plausible value represents point records dating back 20 years (4 generations). The maximum plausible value represents all occurrence records (both confirmed and unconfirmed).
Trend	Contracting			EOO is suspected to be contracting due to threats, including climate change (Cabrelli & Hughes 2015), bushfires (such as the 2003 fires and the 2019–20 bushfires (Legge et al. 2021)) and habitat damage by invasive species (Clemann 2023. pers comm 4 April). Distributional modelling under climate change (using an A2 high emissions scenario) indicate that the alpine water skink will lose up to 65% of climatically suitable habitat by 2050 (Cabrelli & Hughes 2015).
Area of Occupancy	940 km^2	260 km^2	1020 km^2	The AOO was calculated using a 2x2 km grid cell method, based on the IUCN Red List Guidelines (2019). The estimate used in this assessment of 940 km^2 is based on the mapping of confirmed point records and is considered to represent the current distribution of the species. The minimum plausible value represents point records dating back 20 years (4 generations). The maximum plausible value represents all occurrence records (both confirmed and unconfirmed).
Trend	Contracting			See EOO trend justification.

Metric	Estimate used in the assessment	Minimum plausible value	Maximum plausible value	Justification
Number of subpopulations	7	2	7	Genetic analysis by Pepper et al. (2018) showed a significant genetic split between the northern and southern distribution of the alpine water skink. Within the northern lineage, there are 4 ESUs occurring in geographically distinct areas, whilst within the southern lineage, there are 3 ESUs. Due to the isolated habitat and limited dispersal ability of alpine water skinks, it is unlikely that there is current gene flow between any of the disjunct sites where the species is known to occur.
Trend	Declining			It is suspected that the number of subpopulations will decline in the future. Due to their fragmented, high elevation habitat, alpine water skinks have disappeared from previously known areas and are at risk of becoming locally extinct due to ongoing threats from climate change and invasive species, with recolonisation being unlikely. It is predicted that the alpine water skink will lose up to 65% of climatically suitable habitat by 2050 due to climate change (Cabrelli & Hughes 2015), which will likely further fragment the population. It is possible that the number of subpopulations could increase with a loss of suitable habitat; however, this increase would not reflect a recovery.
Basis of assessment of subpopulation number	A subpopulation is defined by the IUCN Red List guidelines as "geographically or otherwise distinct groups in the population between which there is little demographic or genetic exchange (typically one successful migrant individual or gamete per year or less)" (IUCN Standards and Petitions Committee 2022).			
No. locations	2	2	7	The alpine water skink occurs in two geographically disjunct areas (Australian Alps and northern NSW Tablelands). Within these two regions, there are 7 geographic clusters, which correspond to subpopulations (see above). Given the extent of the bushfires in 2019-20 (Boer et al. 2020; Filkov et al. 2020), it is plausible that fire could impact the entire northern or southern distribution within one generation. In particular, in 2003, fire impacted most of the species' distribution across the Australian Alps (NASA 2023).
Trend	Stable			The number of locations is projected to remain stable, though some subpopulations in Victoria are very susceptible to extirpation.
Basis of assessment of location number	During the 2019–20 bushfire season, over 10,000,000 hectares of southern and eastern Australia was burnt (Legge et al. 2021). Therefore, the most plausible serious threat with the largest potential impact is fire. Given the extent of the 2019–20 bushfires, it is possible that at least half of the modelled distribution of the alpine water skink could be affected in a single fire season. Therefore, the species is estimated to occur at 2 locations.			
Fragmentation	Without population data, it is not known if the population is severely fragmented. The population is disjunct, with all subpopulations found in isolated, high elevation habitat, surrounded by low elevation unsuitable habitat. However, it is not known whether 50% or more of individuals are in subpopulations too small to be viable, as required under the definition of severely fragmented (IUCN Standards and Petition 2022).			
Fluctuations	Alpine water skinks are not subject to extreme fluctuations in EOO, AOO, number of subpopulations, locations or mature individuals.			

Criterion 1 Population size reduction

Reduction in total numbers (measured over the longer of 10 years or 3 generations) based on any of A1 to A4			
	Critically Endangered **Very severe reduction**	**Endangered** **Severe reduction**	**Vulnerable** **Substantial reduction**
A1	≥ 90%	≥ 70%	≥ 50%
A2, A3, A4	≥ 80%	≥ 50%	≥ 30%

A1 Population reduction observed, estimated, inferred or suspected in the past and the causes of the reduction are clearly reversible AND understood AND ceased.

A2 Population reduction observed, estimated, inferred or suspected in the past where the causes of the reduction may not have ceased OR may not be understood OR may not be reversible.

A3 Population reduction, projected or suspected to be met in the future (up to a maximum of 100 years) [(*a) cannot be used for A3*]

A4 An observed, estimated, inferred, projected or suspected population reduction where the time period must include both the past and the future (up to a max. of 100 years in future), and where the causes of reduction may not have ceased OR may not be understood OR may not be reversible.

based on any of the following

(a) direct observation [except A3]

(b) an index of abundance appropriate to the taxon

(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat

(d) actual or potential levels of exploitation

(e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites

Criterion 1 evidence

Insufficient data to determine eligibility

The alpine water skink has a suspected generation length of 5 years, giving a three-generation assessment period of 15 years against which to compare population trends.

There are no standardised alpine water skink monitoring programs to enable an assessment of population trends. However, this species is inferred to be declining due to climate change and other ongoing threats.

Modelling of temperature increases associated with climate change has predicted a 65% reduction in climatically suitable habitat for the species by 2050 (Cabrelli & Hughes 2015). However, it is unknown whether this reduction in suitable habitat would cause ≥ 30% reduction in population over three generations (by 2038).

During the 2019–20 bushfires, it was estimated that 39% and 42% of northern and southern alpine water skink habitat, respectively, was burnt (Legge et al. 2021). While it is likely that fire is associated with declines, it is unclear how much of an impact the 2019–20 bushfires had on alpine water skink population

trends. However, *future impacts from more frequent and severe fires across the distribution and habitats of the alpine water skink are predicted, indicating that declines are likely to increase.*

Although these estimates suggest the species could be eligible for listing under Criterion 1, there is insufficient empirical data to support it meeting the threshold for listing, and there is significant uncertainty. *Therefore,* the Committee considers that there is insufficient information to determine the eligibility of the alpine water skink for listing in any category under this criterion.

Criterion 2 Geographic distribution as indicators for either extent of occurrence AND/OR area of occupancy

		Critically Endangered Very restricted	Endangered Restricted	Vulnerable Limited
B1.	Extent of occurrence (EOO)	**< 100 km²**	**< 5,000 km²**	**< 20,000 km²**
B2.	Area of occupancy (AOO)	**< 10 km²**	**< 500 km²**	**< 2,000 km²**
AND at least 2 of the following 3 conditions:				
(a)	Severely fragmented OR Number of locations	**= 1**	**≤ 5**	**≤ 10**
(b)	Continuing decline observed, estimated, inferred or projected in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) area, extent and/or quality of habitat; (iv) number of locations or subpopulations; (v) number of mature individuals			
(c)	Extreme fluctuations in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) number of locations or subpopulations; (iv) number of mature individuals			

Criterion 2 evidence

Eligible under Criterion 2 B2ab(i,ii,iii,iv,v) for listing as Vulnerable

The alpine water skink has an estimated extent of occurrence (EOO) of 95,396 km^2 and an estimated area of occupancy (AOO) of 940 km^2. The AOO meets the threshold for Vulnerable under Criterion B2.

The alpine water skink has a disjunct distribution, with isolated subpopulations occurring in high elevation areas surrounded by unsuitable habitat (see Distribution section). Therefore, the species has limited capacity for dispersal between sites or recolonisation following extirpation. Ski resort development has contributed to further habitat fragmentation and created barriers to dispersal (Sato et al. 2014a; Sato et al. 2014b).

The most serious plausible threat to the alpine water skink is fire. Given the species' susceptibility to fire and the possible extent of the distribution that could be covered in a single fire season, the estimated number of locations is two (Table 3).

A continuing decline in distribution is inferred due to an observed decline in habitat quality and extent caused by widespread high severity fires, the impacts of hard-hoofed invasive species (e.g., feral horses, feral deer and feral pigs) and potential for increased vulnerability to predation after fire (McGregor et al 2015; Rossendell 2023. pers comm 17 August). During the 2019–20 bushfires, 14% of alpine water skink habitat was burnt in high to very high severity fire, with a further 25% burnt in low to moderate severity

fire (Legge et al. 2021). Invasive herbivores, such as feral horses (as well as recreational riding), feral deer and feral pigs, and livestock, such as cattle, are known to damage sphagnum bogs that the alpine water skink relies on, by trampling and wallowing (DSE 2003b). After fire, habitat degradation is often compounded by trampling and grazing by hard-hoofed animals, as it can slow down the already slow recovery of the alpine environment.

The EOO, AOO, number of subpopulations, and number of mature adults are all projected to decline in the future as climate change progresses and habitat at lower altitudes becomes unsuitable. Tree line encroachment (Wearne & Morgan 2001) and upslope migration of alpine plants (Auld et al. 2022) may have implications for the maintenance of structurally and thermally suitable alpine water skink habitat. Future climate models suggest that up to 65% of climatically suitable habitat for the species could be lost by 2050 (Cabrelli & Hughes 2015). Given the species occurs on 'sky islands', loss of suitable habitat may result in local extinctions of subpopulations and related decline in mature individuals as the species would be unable to repopulate these sites naturally.

The Committee considers that the alpine water skink's geographic distribution (AOO) is limited, the number of locations is restricted, and continuing decline is inferred in the EOO, AOO, area, extent and quality of habitat, number of subpopulations, and number of mature individuals. Therefore, the alpine water skink has met the relevant elements of Criterion 2 to make it eligible for listing as Vulnerable.

Criterion 3 Population size and decline

	Critically Endangered **Very low**	**Endangered** **Low**	**Vulnerable** **Limited**
Estimated number of mature individuals	**< 250**	**< 2,500**	**< 10,000**
AND either (C1) or (C2) is true			
C1. An observed, estimated or projected continuing decline of at least (up to a max. of 100 years in future)	**Very high rate** **25% in 3 years or 1 generation** **(whichever is longer)**	**High rate** **20% in 5 years or 2 generation** **(whichever is longer)**	**Substantial rate** **10% in 10 years or 3 generations** **(whichever is longer)**
C2. An observed, estimated, projected or inferred continuing decline AND its geographic distribution is precarious for its survival based on at least 1 of the following 3 conditions:			
(a) (i) Number of mature individuals in each subpopulation	**≤ 50**	**≤ 250**	**≤ 1,000**
(a) (ii) % of mature individuals in one subpopulation =	**90 – 100%**	**95 – 100%**	**100%**
(b) Extreme fluctuations in the number of mature individuals			

Criterion 3 evidence

Insufficient data to determine eligibility

There are no population estimates available. The Committee considers that there is insufficient information to determine the eligibility of the species for listing in any category under this criterion.

Criterion 4 Number of mature individuals

	Critically Endangered Extremely low	Endangered Very Low	Vulnerable Low
D. Number of mature individuals	< 50	< 250	< 1,000
D2.[1] *Only applies to the Vulnerable category* Restricted area of occupancy or number of locations with a plausible future threat that could drive the species to Critically Endangered or Extinct in a very short time			D2. Typically: area of occupancy < 20 km² or number of locations ≤ 5

[1] The IUCN Red List Criterion D allows for species to be listed as Vulnerable under Criterion D2. The corresponding Criterion 4 in the EPBC Regulations does not currently include the provision for listing a species under D2. As such, a species cannot currently be listed under the EPBC Act under Criterion D2 only. However, assessments may include information relevant to D2. This information will not be considered by the Committee in making its recommendation of the species' eligibility for listing under the EPBC Act, but may assist other jurisdictions to adopt the assessment outcome under the *common assessment method*.

Criterion 4 evidence

Insufficient data to determine eligibility

The number of mature individuals is unknown and therefore there is insufficient information to assess the species under criterion D1.

The alpine water skink is estimated to occur in ≤ 5 locations, meeting the threshold for listing under D2. However, there are no conceivable threats that could drive this species to Critically Endangered or Extinct in a very short time (within two generations or 10 years for the alpine water skink). Therefore, the alpine water skink has not met the required elements of Criterion D2.

The Committee considers that there is insufficient information to determine the eligibility of the alpine water skink for listing in any category under this criterion.

Criterion 5 Quantitative analysis

	Critically Endangered Immediate future	Endangered Near future	Vulnerable Medium-term future
Indicating the probability of extinction in the wild to be:	**≥ 50% in 10 years or 3 generations, whichever is longer (100 years max.)**	**≥ 20% in 20 years or 5 generations, whichever is longer (100 years max.)**	**≥ 10% in 100 years**

Criterion 5 evidence

Insufficient data to determine eligibility

Quantitative analysis has not been undertaken. Therefore, there is insufficient information to determine the eligibility of the alpine water skink for listing in any category under this criterion.

Adequacy of survey

Although there has been some survey work on this species and this assessment is based on the data currently available, further surveys are recommended to improve data on subpopulation numbers and number of mature individuals, to inform future assessment. The Committee, however, considers there is sufficient evidence currently to recommend the listing decision.

Public consultation

Notice of the proposed amendment and a consultation document was made available for public comment for 32 business days between 29 June 2023 and 11 August 2023. Any comments received that were relevant to the survival of the species were considered by the Committee as part of the assessment process and provided to the Minister for the Environment with the Committee's advice.

Listing and Recovery Plan Recommendations

The Threatened Species Scientific Committee recommends:

i) that the list referred to in section 178 of the EPBC Act be amended by **including** *Eulamprus kosciuskoi* in the list in the Vulnerable category.

ii) that there not be a Recovery Plan for this species in accordance with the provisions of the EPBC Act and the Committee's conservation planning principles as follows:

- An approved conservation advice is an effective, efficient and responsive document to guide the implementation of priority management actions, mitigate key threats and support the recovery for this EPBC Act listed Vulnerable species.
- An approved conservation advice would support the species' recovery by identifying priority actions, stakeholders for engagement, and the survey and research priorities to facilitate a better understanding of key threats as well as biological and ecological knowledge gaps.
- The threats facing the entity, and the recovery actions needed can most effectively be guided via an approved conservation advice.

- The species is affected by a range of threats across two locations, notably habitat loss as a result of increased temperatures and increased fire frequency and severity, and habitat damage from hard-hoofed animals. However, these major threats are well-known and can be managed at local and state scales without the need for a recovery plan.
- The species is known from two locations, one in northern NSW and one in the Australian Alps across the ACT, NSW and Victoria. The key stakeholders are the NSW National Parks and Wildlife Services (NPWS), the ACT Environment, Planning and Sustainable Development Directorate, the Victorian Department of Energy, Environment and Climate Action (DEECA) and Zoos Victoria.

iii) Having regard to the above factors, a recovery plan is not required as it would not provide a significant conservation planning benefit above existing mechanisms.