Australian Government
Department of Sustainability, Environment,
Water, Population and Communities




Environment Protection and Biodiversity Conservation Act 1999 referral guidelines for the vulnerable striped legless lizard, *Delma impar*

Acknowledgements

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Image credits
Front cover (L-R): striped legless lizard *Delma impar* body, Cairnlea (Nick Clemann), *Delma impar* Deer Park, VIC (Ian Smales), striped legless lizard *Delma impar* (Ian Smales), striped legless lizard *Delma impar* head, Cairnlea (Nick Clemann).
Back cover (L-R): striped legless lizard *Delma impar* head, Cairnlea (Nick Clemann), striped legless lizard *Delma impar* (Ian Smales), *Delma impar* Deer Park, VIC (Ian Smales), striped legless lizard *Delma impar* body, Cairnlea (Nick Clemann).

Important notice

Please note that these guidelines are general in nature and do not remove your obligation to consider whether you need to make a referral to the federal environment minister under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). While these guidelines provide information to help you decide whether to refer your action, the possible impacts of your proposal will depend on the particular circumstances of the action. These circumstances may include issues such as the precise location, mitigation measures and indirect impacts.

These guidelines were made on the basis of the best information available at the time of writing. However, the impacts of proposals will be assessed by the department on the basis of the best information available at that point in time, which may differ from the information on which these guidelines are based.

These guidelines do not provide guidance on requirements under state and local government laws. Information on New South Wales, Australian Capital Territory, Victorian, South Australian and local government council laws can be obtained from the relevant state environment departments and the local councils in or near the proposed project area.

How to use these guidelines

These guidelines are intended to assist you in determining whether your action needs to be referred to the Australian Government Department of Sustainability, Environment, Water, Population and Communities (the department). These guidelines should be read in conjunction with the EPBC Act Policy Statement 1.1 Significant Impact Guidelines – Matters of National Environmental Significance.

These guidelines apply to the striped legless lizard, *Delma impar*, anywhere it may occur in Australia. The striped legless lizard is listed as a vulnerable species under the EPBC Act. Listed threatened species and ecological communities are matters of national environmental significance under the EPBC Act.

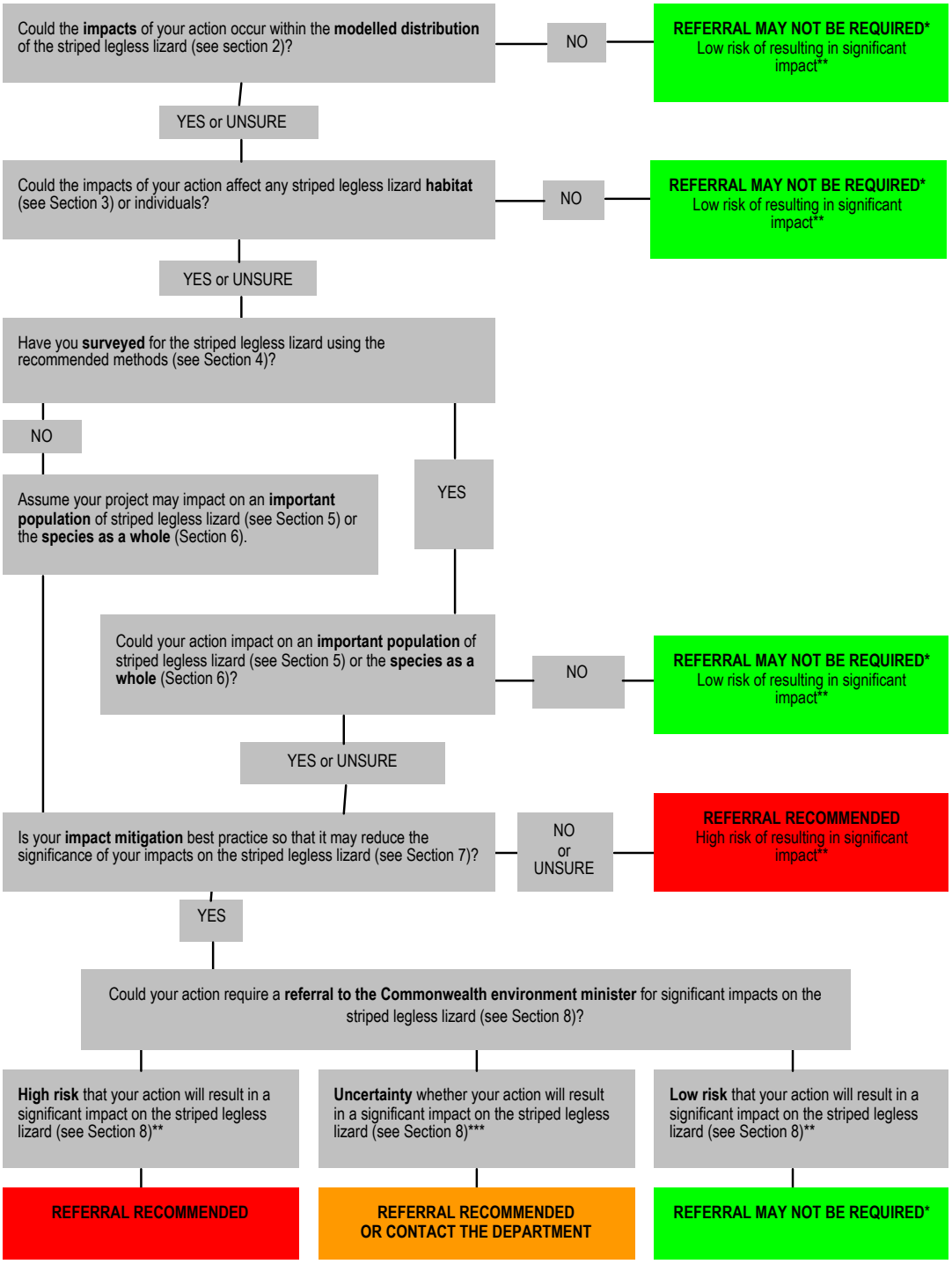
If you plan to undertake an action that has, will have or is likely to have a significant impact on the striped legless lizard you must refer the proposal to the minister before commencing. The minister will then decide, within 20 business days, whether assessment is required under the EPBC Act. The potential significance of each action is judged on a case-by-case basis. Substantial penalties apply for undertaking an action, to which the EPBC Act applies, without approval (civil penalties up to $5.5 million or criminal penalties including up to seven years imprisonment). More information on referral, assessment and compliance is available at www.environment.gov.au/epbc/.

The decision tree in Figure 1 and the rest of these guidelines are designed to assist you in determining whether your proposed action needs to be referred. You may also refer your proposed action if you are uncertain about the need to refer, or if you think the proposal would not have significant impacts on matters of national environmental significance, but would like legal certainty.

Possible exceptions to the need to refer

Certain actions are exempt from the requirement of assessment and approval under the EPBC Act. These include lawful continuations of land use that started before 16 July 2000, or actions that were legally authorised before 16 July 2000. There are a number of criteria that must be satisfied to rely on any such exemptions. More information on exemptions under the EPBC Act is available at www.environment.gov.au/epbc/publications/exemptions.html.

Figure 1: Decision making



* Although it would appear a referral may not be required, you may still refer your proposed action if unsure, or if you think the proposal would not have significant impacts on matters of national environmental significance, but would like legal certainty. An example may be when other matters of national environmental significance, in addition to the striped legless lizard, are potentially affected.

** Risk is the chance of something happening that will have a [significant] impact on objectives [eg protecting matters of national environmental significance] (adapted from Australian / New Zealand Risk Management Standard 4360: 2004).

*** If you are uncertain about the need to refer then you may also contact the Department to discuss your action by emailing epbc.referrals@environment.gov.au

1. What is known about the striped legless lizard?

The striped legless lizard superficially resembles a small snake but is a member of the Pygopodidae family (the legless or flap-footed lizards). It is typically pale grey-brown above and cream below, with the head darker than the body and a series of stripes along the sides of the body which become diagonal bands on the tail. The striped legless lizard can reach up to a total length of 300 mm.

The striped legless lizard feeds selectively on surface active and sedentary arthropod prey, especially spiders, butterfly and moth larvae, field crickets and cockroaches.

The mating system of the striped legless lizard is poorly understood but is assumed to be polygynous, where males mate with more than one female in a single breeding season. The female generally lays two eggs in December / January, which are deposited under rocks or in soil cavities.

The striped legless lizard is the only species in the *Delma* genus restricted to temperate grassland habitats. The species is surface active during the day from late spring to early autumn, with a peak in activity in November and December. The striped legless lizard spends nights and brumation (long periods of rest similar to hibernation but without the extreme temperatures) within the soil layer or at the base of tussocks.

Relevant background information on the biology and ecology of the striped legless lizard is provided in the department's Species Profile and Threats (SPRAT) database.

2. Could the impacts of your action[1] occur within the modelled distribution of the striped legless lizard?

The striped legless lizard has a patchy distribution in grasslands of south-eastern New South Wales, the Australian Capital Territory, north-eastern, central and south-western Victoria, and south-eastern South Australia (refer to Map 1).

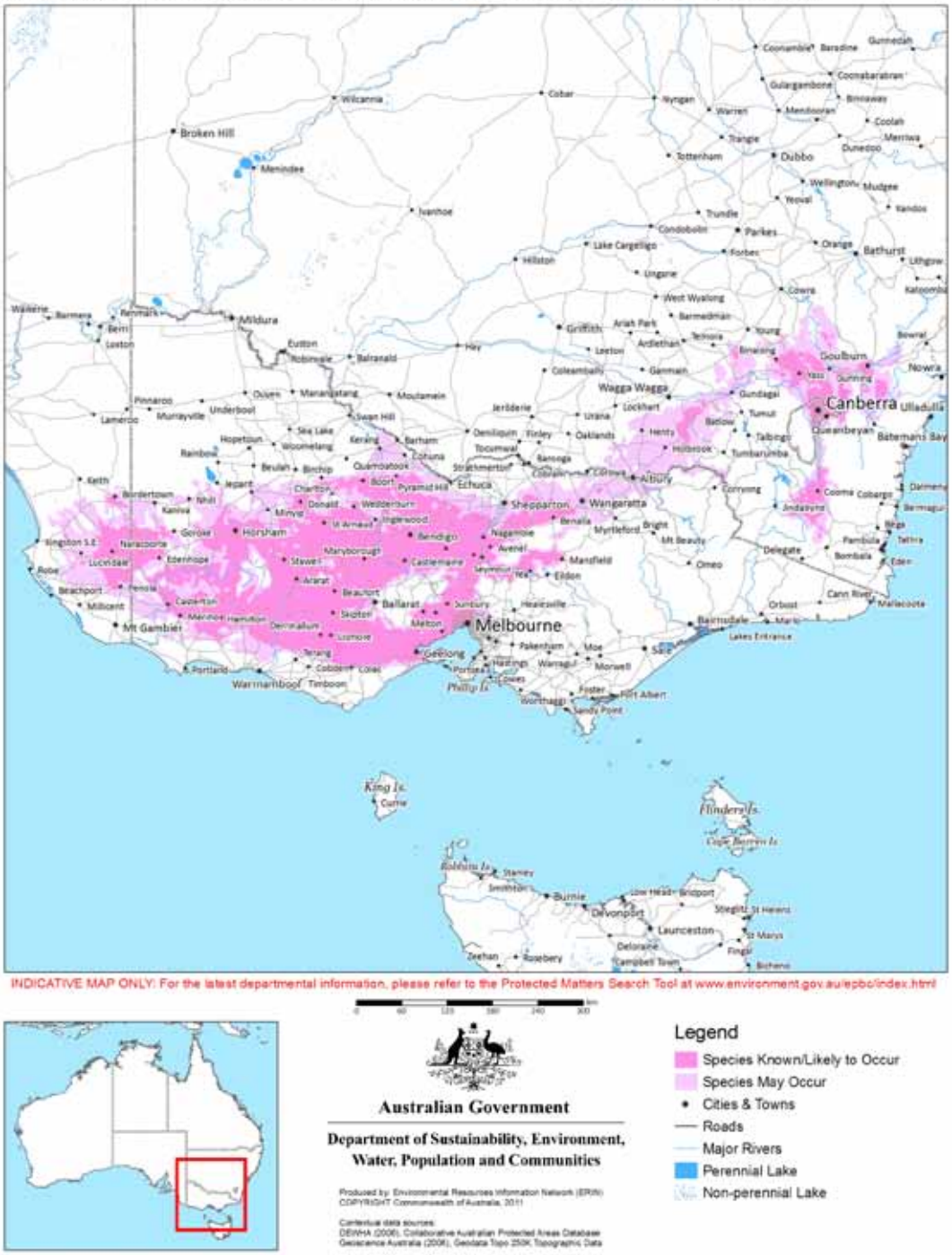
In Victoria, remaining habitat is very limited and severely fragmented. Most recently the species has been recorded from areas west and north of Melbourne, surrounding Ballarat, and near Cressy in the Western District and in roadside remnants in south western Victoria.

In New South Wales, the striped legless lizard occurs in the Southern Tablelands, the South Western Slopes and possibly in the Riverina. Populations are known in the Goulburn, Yass, Queanbeyan, Cooma and Tumut areas, and from Tarcutta.

In the Australian Capital Territory four disjunct populations occur in Gungahlin, Yarramundi Reach, Majura Valley and the Jerrabomberra Valley. The population at Yarramundi reach may have become extinct.

1 When considering whether or not your action will have a significant impact on the striped legless lizard, it is relevant to consider all adverse impacts from the action, including direct, indirect and offsite impacts such as downstream or downwind impacts, upstream impacts and facilitated impacts (impacts that result from further actions, which are made possible or facilitated by the action).

Map 1: Modelled distribution of the striped legless lizard (*Delma impar*)



INDICATIVE MAP ONLY: For the latest departmental information, please refer to the Protected Matters Search Tool at www.environment.gov.au/epbc/index.html

Australian Government

Department of Sustainability, Environment, Water, Population and Communities

Produced by: Environmental Resources Information Network (ERIN)

Contextual data sources:
DEWHA (2008), Collaborative Australian Protected Areas Database
Geoscience Australia (2008), Geodata Topo 250K Topographic Data

Legend

- Species Known/Likely to Occur
- Species May Occur
- Cities & Towns
- Roads
- Major Rivers
- Perennial Lake
- Non-perennial Lake

In South Australia the species is only known to occur in three areas: Bool and Hacks Lagoon, Lake Ormerod and roadside verges along the Riddoch Highway north of Naracoorte. However, there may be undetected populations of striped legless lizards elsewhere in the south east of South Australia.

The distribution map in this document is based on the best available information at the time of publication and remains a static product. For the most up-to-date report of whether striped legless lizard may occur in your project area, always use the Protected Matters Search Tool.

3. Could the impacts of your action affect habitat for the striped legless lizard?

The specific habitat requirements for the striped legless lizard are not fully understood. All sites occupied by striped legless lizard have a grassy ground cover, often with a mixture of native and exotic perennials and annuals. The species shelters under surface rock, in cracks in the soil, or in tussocks.

The striped legless lizard is known to inhabit lowland native grasslands and grassy woodlands, typically dominated by native tussock-forming grass species such as kangaroo grass (*Themeda triandra*), spear grasses (*Austrostipa* spp.), and Poa tussocks (*Poa* spp). The species also inhabits a range of temperate grasslands, including areas dominated by introduced grass species and at sites with a history of grazing and pasture improvement.

The striped legless lizard is known to occur in four threatened ecological communities listed under the EPBC Act: the 'Natural Temperate Grasslands of the Victorian Volcanic Plains' (see EPBC Act Policy Statement 3.8), the 'Natural Temperate Grasslands of the Southern Tablelands of NSW and the Australian Capital Territory', the 'Grassy Eucalypt Woodland of the Victorian Volcanic Plain', and the 'White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland'. These four ecological communities are protected under the EPBC Act and significant impacts on them are subject to the referral and assessment process.

Further detail on the habitat requirements of the striped legless lizard, including key habitat characteristics, is available in the SPRAT profile.

4. Have you surveyed for the striped legless lizard using the recommended methods?

A guide to conducting surveys for the striped legless lizard in areas of suitable habitat is outlined below. Surveys should:

- be conducted by a suitably qualified person with demonstrated skill in reptile surveys
- maximise the chance of detecting the species
- account for uncertainty and error (such as false presences and absences).

The following survey methods are recommended for presence / absence surveys. Where it is not possible to conduct surveys in this manner, failure to detect the striped legless lizard should not be considered indicative of its absence.

Prior to carrying out a survey, it is important to assess whether a site supports habitat that is suitable for the striped legless lizard. Adequate targeted surveys for the striped legless lizard should be undertaken at locations within the modelled distribution of the species (see Map 1) which support a mix of native grasses (including derived grasslands) or grassy woodlands, including sites dominated by weeds. A three-step survey protocol, outlined below, is recommended.

Desktop review

A search of relevant literature and Commonwealth and state / territory databases and maps will provide an indication of whether the species has been previously recorded on a particular site and the overall likelihood of the species occurring in the area.

- Is the site within the known or expected range of the species?
- Is the site the only known location for a specific genetic lineage or evolutionary significant unit?

Habitat assessments

Desktop and field assessments of the habitat on the site may provide further indication of the likely presence (or absence) of the species at a site.

- Does the site support known or potentially suitable habitat for the species?
- How close is the nearest known site supporting the species and/or suitable habitat for the species?
- Is there habitat connectivity within the site, and to other areas surrounding the site?

Targeted field survey

Field surveys for the species should be undertaken during the active period of the species (between September and early May). Some survey techniques (such as active searching) may be undertaken during the cooler months of the year, but often with less success. Surveys should target suitable habitat within the site.

Reference sites may need to be monitored during the expected active period of the species and used to guide survey timing at the target site(s).

The striped legless lizard is a cryptic species, and may not be detected by surveys even when present at a site. For this reason, habitat proxies[2] may be appropriate in some circumstances.

2 Proxy habitat is habitat that by its condition or quality infers the likely presence of the species, and can be used in the absence of actual records of the species.

For example, presence of the Natural Temperate Grasslands of the Victorian Volcanic Plain ecological community increases the likelihood that the striped legless lizard is present at a site.

If the species is detected during a survey, all potentially suitable habitat at the site should be considered occupied by the species. All presence / absence data should be provided to a central repository (state environment agencies).

Selecting a targeted field survey method

In areas with surface rock, artificial shelter site surveys should be the primary technique. In areas with little to no rocky habitat (such as the ACT), artificial shelter site surveys or pitfall trapping should be used in conjunction with hand searches around tussocks. Artificial shelter site surveys will almost always be preferable to pitfall surveys, as they cause less damage to habitat and detection rates using artificial shelter sites are nearly double that of pit-falling when undertaken during spring.

Rock turning can be detrimental to striped legless lizard populations, especially when undertaken regularly. Therefore, this method should be used only when other methods are unavailable and it should never be employed for long-term monitoring.

The recommended methods and effort to determine the presence of the striped legless lizard are outlined in Table 1.

Table 1: Survey methods and effort.

Artificial shelter site surveys (for example roof tiles)	• Shelter sites installed at least one month prior to the initial survey/checks (that is, by August). • Typically in vegetated areas (not bare ground). • Arrays consist of 50 tiles, at 5 metre spacing between tiles, arranged in a grid of 10 tiles by five or a transect. • As a minimum, two tile arrays for sites less than two hectares in size. One array per three hectares for sites up to 30 hectares, and 10 arrays for sites greater than 30 hectares in size. • Orientation is important: arrays should preferably be positioned on a northerly aspect. • Shelter sites should be checked when ambient temperatures do not exceed 28°C. Grids may be checked during summer/autumn for the presence of shed skin. • Shelters should be checked for a period of several weeks. In Victoria the Department of Sustainability and Environment recommend at least six months of survey. ACT guidelines recommend a minimum of 10 weeks, with a minimum of 20 checks. • Artificial shelter sites should be checked at least twice a month, and ideally once a week during early September to December. Checking more frequently than once or twice a week may lead to striped legless lizards abandoning the artificial shelters. • Ensure clean-up of site post survey, including revegetation of bare ground resulting from tile use.
Active searching	• Active searching (checks under surface rock and debris and around tussocks) can generally be undertaken throughout the year as long as any limitations with respect to this survey technique are clearly outlined. • Surveyors need to ensure that rocks, logs and other refugia are placed back in the same position. This technique has a low success rate, and usually leads to disturbance of refuge sites. It should only be used where necessary.
Pit-fall trapping	• Typically in vegetated areas (not bare ground). Set traps in the areas most likely to contain the species (refer to Section 3). • Undertaken in warmer months (September to January). • Each pitfall should have a minimum drift line of 5 metres. • Various pitfall configurations (for example single trap, line array, cross shaped array) can be used, but should include up to five pits per configuration. • As a minimum, two pitfall configurations per hectare for sites less than 25 hectares in size, with a minimum of 10 pitfall traps. At least 50 pitfall configurations for sites greater than 25 hectares in size. • Within the pitfall trap provide shelter (for example some leaf litter), a moist sponge to prevent dehydration, and create drainage holes. • Check daily for at least 20 days. • Consider potential disturbance to flora and habitat values as part of the initial installation process and daily checks, and rehabilitate site after survey.

5. Could your action impact on an important population of the striped legless lizard?

Important populations are one consideration when assessing impacts on a vulnerable species as they are important for future conservation, maintaining population viability, supporting gene flow and dispersal.

Under the EPBC Act, an important population is one that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and / or that are:

- key source populations either for breeding or dispersal
- populations that are necessary for maintaining genetic diversity, and/or
- populations that are near the limit of the species range.

An important population of the striped legless lizard is one that meets at least one of the criteria outlined above, and is likely to be viable over the long-term. To be viable, a striped legless lizard population must occur in suitable habitat with the ability for population dynamics (for example breeding, recruitment and dispersal) to occur over time.

The habitat for an 'important population' of striped legless lizard typically comprises native temperate grassland or grassy woodland, where the species is either known (including similar habitat connected / immediately adjacent to the site), or has the potential to occur. The minimum patch size threshold for medium to long-term habitat and population viability is ≥ 0.5 hectares, which supports predominantly tussock-forming grass species (native or non-native).

Given the cryptic nature of the species, and the inherent difficulty in determining the species' population size, habitat proxies may be used to infer whether an important population is likely to occur at a given site. Although the species largely prefers sites supporting key habitat characteristics outlined in the SPRAT profile, it is also known to occupy habitats which superficially appear unsuitable (such as degraded sites dominated by introduced understorey species which are not connected to areas of higher quality habitat). Therefore, the use of habitat characteristics alone in assessing whether a site is likely to support an important population needs to be treated with caution.

A population could also be considered important if it is well-studied, and hence provides opportunity for greater understanding of the species through a long-term dataset.

Across the striped legless lizard's range there are four distinct historically isolated lineages (NSW and ACT; South Australia and central west Victoria; central and south west Victoria;

and eastern Victoria[3]). Each lineage has a high level of genetic divergence, indicating that each should be considered as a separate Evolutionary Significant Unit (ESU) for management purposes. Consequently, the ESUs must be considered when determining an important population. Currently, all populations with the South Australia and central west Victorian lineage are considered important populations.

What is not likely to be an important population?

The following factors need to be considered in determining whether a site is not likely to support an important population under the provisions of the EPBC Act:

- Sites less than 0.5 hectares
- Small isolated areas of habitat which are currently under pressure, or are likely to experience long-term pressures (for example sites located within urban settings, such as adjacent to factories or in residential subdivisions).
- Small sites which support marginal or low quality habitat (for example dominated by high threat weeds).

6. Could your action impact on the species as a whole?

Potential impacts on important populations should be considered when determining whether to refer your action. However, you should also consider referring your action if it is likely to have a significant impact on a vulnerable species as a whole (that is, including populations that do not meet the definition of an "important population").

Therefore, in addition to considering important populations, you should also consider impacts on a vulnerable species through the one or more of the following criteria stated in significant impact guidelines 1.1 if your action is likely to:

- adversely affect habitat critical to the survival of a species
- modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
- result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat
- introduce disease that may cause the species to decline
- interfere substantially with the recovery of the species.

Section 8 provides guidance for when one or more of these criteria may trigger the need to refer your action.

3 See Maldonado, S. (2009). Human-induced vs. historical habitat shifts: Identifying the processes that shaped the genetic structure of the Striped Legless Lizard, *Delma impar*. Honours Thesis, University of Melbourne.

7. Is your impact mitigation best practice so that it may reduce the significance of your impacts?

Mitigation has the principle aim of avoiding significant impacts and should be applied in a hierarchical order:

1. Avoid impacts – preserve important populations and habitat to avoid further loss.
2. Mitigate impacts – prevent habitat degradation and retain habitat function.
3. Monitor effectiveness of mitigation – ensure mitigation is effective and feeds back into an adaptive management plan.

Table 2 outlines the main threats to the striped legless lizard, their impacts and mitigation. It is not intended to be exhaustive or prescriptive.

Table 2: Primary threats, impacts and mitigation

Threat	Impact	Mitigation
Habitat loss, degradation and modification	• Deterioration of grassland and grassy woodland habitat, such as alteration to vegetation diversity and structure. • Removal of or disturbance to habitat features such as rocks and coarse woody debris. • Disturbance through construction and use of pipelines, windfarms, quarries etc • Inappropriate fire (for example in spring and summer), grazing and mowing regimes leading to loss of populations. • Loss or decline of striped legless lizard habitat and food sources through clearing, cropping, ploughing, pesticide use, pasture improvement, weed invasion etc.	• Design roads or easements to avoid suitable striped legless lizard habitat and to minimise disturbance. • Use trenchless installation of pipelines by subterranean tunnelling at a depth of > 0.5 m. • Incorporate appropriate buffer zones of at least 50 m around the known or potential habitat. • Maintain existing management regime if the site currently supports striped legless lizard (e.g. current biomass reduction management, weed control). • Ensure that any surface and/or embedded rocks, or other refuge sites (e.g. logs) are not removed from the site. Where possible, reintroduce or increase the cover of surface refuges to augment existing habitat. • Ensure the current biomass management program is maintained. Avoid frequent burns (greater than once every three years) and burning in spring/early summer. Late summer or autumn burning may be conducted to reduce biomass if necessary. • Establish revegetated areas prior to the removal of occupied habitat. • Public education/interpretation. • Develop site-specific Conservation Management Plan (CMP) and/or Construction Environmental Management Plan relating to the long term management and monitoring of the species and associated habitats. • Ongoing population and habitat monitoring over 5 to 10 years to ensure objectives of the CMP are achieved. • Ensure that there is secured funding for management of reserves (for example bonds, body corporate arrangement).

Fragmentation and isolation of populations	• Construction of barriers to lizard movement (for example buildings, solid fences and roads). • Urban development and degradation of habitat which may limit dispersal potential between patches. • Removal of vegetated corridors to adjacent habitat, preventing or limiting movement between suitable sites by increasing exposure.	• Retain habitat corridors with a minimum width of 30 to 100 m. • Design the development in a way that maximises the total area of suitable habitat for the striped legless lizard and allows for connection to other suitable habitat(s) adjoining the site. Design should consider likely future developments which could also affect these aspects. • Sufficiently fence the site to restrict vehicular and pedestrian access, using a fencing design that allows lizard movement where appropriate. • Place pathways (if necessary) outside of the reserve and consider interpretive/ educational signage to highlight conservation significance. • Create grassed areas (primarily native grasses) that 'connect' existing areas of grassland and/or grassy woodland.
Invasive plants and animals	• Changes in floristic diversity and structure through weed invasion and spread. Some weed species (for example serrated tussock) may provide habitat for the species. • Predation by invasive animals such as foxes and cats.	• Maintain hygiene on vehicles and machinery passing through striped legless lizard habitat, to minimise weed spread. • Avoid introducing weeds or non-Indigenous plants into site. • Reduce weed cover, taking care to avoid drift of herbicides onto native vegetation (for example use selective herbicide application and not aerial application). • Prevent or limit tree planting in certain habitats (for example Plains Grassland). • Cat free areas.

8. Could your action require a referral to the federal environment minister for significant impacts on the striped legless lizard?

As the person proposing the action it is your responsibility to decide whether or not to refer your action. If you believe your action is at high risk of having a significant impact on an important population of striped legless lizard or the species as a whole you should refer the action to the federal environment minister. If you are uncertain whether your action will have a significant impact on the striped legless lizard you may also refer your action or contact the department. Table 3 provides general guidance on what, in the department's view, may be at high and low risk of requiring a referral to the department as well as providing some guidance on uncertainty.

Table 3: Referral guidelines

High risk of significant impacts on the striped legless lizard: referral recommended
• Important population detected during survey: any fragmentation, loss or long term modification[4] of habitat that may result in the population becoming non-viable or that may restrict breeding, dispersal or recruitment (see Section 5). • Important population not detected, but site occurs in Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP)[5]: Removal or modification of 0.5 hectares or more of known habitat, or habitat that has a moderate to high potential to support the species (see Section 3). • Significant change to management regime (e.g. burning, grazing, pest management, weed spraying) in habitat that supports or has high potential to support an important population (see Section 3). • Introduction of threats, such as introduced predators or weeds, which may impact on or spread to an important population or affect the species as a whole. • Limiting dispersal between populations or habitat patches, such as through removal of a vegetated corridor or creation of a physical barrier. • Changes in soil structure and terrestrial cover (such as removal of rocks and/or fallen timber) in habitat supporting an important population.
Uncertainty: referral recommended or contact the department
• Actions which do not directly affect striped legless lizards, but which have the potential for indirect impacts such as, but not limited to, altering hydrology or connectivity, introducing non-indigenous species or increasing introduced predators. • Long-term modification of habitat with a 50 m buffer of known or potential habitat.
Low risk of significant impacts on the striped legless lizard: referral may not be required but you may refer for legal certainty
• Proposed actions that will not directly or indirectly affect striped legless lizard important populations, suitable habitat or the species as a whole. • Actions that occur outside the mapped distribution of the species. • Actions that retain buffers of 50 m or more to important populations of striped legless lizard and adopt relevant mitigation measures recommended in Table 2.

4 Modification includes changes to the floristic composition, soil structure, and terrestrial cover (such as rocks and fallen timber).

5 As the species is cryptic, surveys may not always detect the species even when it is present. Given the likelihood of the species being present in NTGVVP, this habitat proxy should be used for actions occurring in the NTGVVP if an important population is not known conclusively to be present.

9. Where can you get more information?

The SPRAT profile for this species provides the biological and ecological context for survey guidelines, significant impact guidance and mitigation measures. It can be accessed at www.environment.gov.au/cgi-bin/sprat/public/sprat.pl.

Other EPBC Act policy statements are available to help you understand the EPBC Act and your obligations. They are available from the department's website at www.environment.gov.au/epbc/guidelines-policies.html or by contacting the community information unit by email: ciu@environment.gov.au or by phone: 1800 803 772. The department can provide assistance in ensuring your action complies with the EPBC Act, especially when contacted early in the planning process.

The Protected Matters Search Tool can provide a good starting point for determining the likelihood of having matters of national environmental significance in your area. State and territory government agencies may also hold relevant information including habitat and species distribution information.

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