Threatened Species

Action Plan No.2

Striped Legless Lizard *Delma impar*

In accordance with section 21 of the *Nature Conservation Act 1980*, the **Striped Legless Lizard (*Delma impar*)** was declared a **vulnerable** species on 15 April 1996 (formerly Determination No. 29 of 1996 and currently Determination No. 89 of 1997). Section 23 of the Act requires the Conservator of Flora and Fauna to prepare an Action Plan in response to each declaration.
This is the Action Plan for the:

Striped Legless Lizard *Delma impar*

Preamble

The *Nature Conservation Act 1980* establishes the ACT Flora and Fauna Committee with responsibilities for assessing the conservation status of the ACT's flora and fauna and the ecological significance of potentially threatening processes. Where the Committee believes that a species or ecological community is threatened with extinction or a process is an ecological threat, it is required to advise the Minister for the Environment, Land and Planning and recommend that a declaration be made accordingly.

Flora and Fauna Committee assessments are made on nature conservation grounds only and are guided by specified criteria as set out in its publication *"Threatened Species and Communities in the ACT*, July 1995".

In making its assessment of the Striped Legless Lizard, the Committee concluded that it satisfied the criteria indicated in the adjacent table.

An Action Plan is required in response to each declaration. It must include proposals for the identification, protection and survival of a threatened species or ecological community, or, in the case of a threatening process, proposals to minimise its effect.

While the legal authority of this Action Plan is confined to the Australian Capital Territory, management considerations are addressed in a regional context.

Criteria Satisfied

2.1 The species is known to occur in the ACT region and is already recognised as vulnerable in an authoritative international or national listing.

2.2 Species is observed, estimated, inferred or suspected to be at risk of premature extinction in the ACT region in the medium-term future, as demonstrated by the following:

2.2.1 Current serious decline in population or distribution from

evidence based on :

2.2.1.3 serious decline in quality and quantity of habitat;

2.2.1.4 high actual or potential levels of exploitation or persecution; and

2.2.1.5 serious threats from herbivores, predators, parasites, pathogens or competitors.

2.2.2 Imminent risk of serious decline in population or distribution from evidence based on 2.2.1.3 to

2.2.1.5 (above).

2.2.4 Seriously fragmented distribution for a species currently occurring over a moderately small range or having a moderately small area of occupancy within its range.

Links with other Action Plans

This Action Plan interrelates with the Action Plan for Natural Temperate Grassland and other component threatened species, such as the Eastern Lined Earless Dragon (*Tympanocryptis lineata pinguicolla*). Action Plans are listed at the end of this document.

Species Description and Distribution

DESCRIPTION

The Striped Legless Lizard *Delma impar* (Fischer 1882) (Figure 1) is a reptile of the family Pygopodidae. The average snout-vent length of adults is 90 mm (Cogger 1992), with a maximum total length of about 300 mm and an average body weight of 4.1 grams (Coulson 1990). Sexes are externally similar.

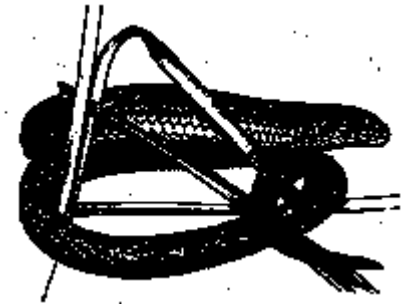

Figure 1: Illustration of the Striped Legless Lizard, *Delma impar*. Scale: Natural size.

The species is variable in colour but is most commonly grey-brown above, with a series of dark brown or blackish longitudinal stripes along the length of the body and tail, commencing at the neck (Cogger 1992). A large amount of variation exists between individuals in colour and intensity of the striping, and in some animals (particularly in the young), striping is indistinct or absent. The colour of the head is darker than that of the body, being dark brown to dark slate grey in adults and black in young individuals. The ventral surface has been described as whitish (Cogger 1992), however some individuals have salmon-pink coloration on the flanks that may extend to the undersurface. Most individuals have yellow coloration on the infralabial and adjacent gular scales, extending back to the tympanum (Coulson 1990).

The Striped Legless Lizard can usually be distinguished from the inornate legless lizard *Delma inornata*, a closely related species which also occurs in the ACT region, by the presence of stripes.

Legless lizards superficially resemble small snakes, however, they can be readily distinguished from snakes by having a visible ear opening, fleshy broad tongue, the presence of remnant hindlimbs (which are reduced to two scaly flaps near the vent) and a tail that is longer than the body, which can be voluntarily shed.

HABITAT

The Striped Legless Lizard is found primarily in lowland native grasslands (Coulson 1990, Osborne *et al.* 1993). This habitat type occurs on flat or gently undulating plains (Coulson 1990, Hadden 1995), and is dominated by perennial, tussock-forming grasses such as Kangaroo Grass *Themeda triandra*, Speargrass *Stipa* spp. and Wallaby Grass *Danthonia* spp. (Coulson 1990, Hadden 1995). The species is also found in some areas dominated by exotic grasses (Coulson 1990, Williams and Kukolic 1991, Kukolic *et. al.* 1994, Rauhala *et. al.* 1995, Hadden 1995). A tussock structure in grassland appears to be an important habitat

characteristic (Wildlife Research Unit 1992, Hadden 1995), although little is known about the way in which the vegetation is utilised. Some evidence exists to suggest that lizards over-winter at the base of grass tussocks or just below the soil surface (Wildlife Research Unit 1994).

A recent review of sites in Victoria and the ACT, where the species is known to occur (Hadden 1995), has determined that habitat is characterised by a vegetative cover dominated by native tussock grasses, and that soils generally have a moderate to high clay content which often produce cracks in summer. In Victoria, most sites supporting the species have a cover of lightly embedded rocks, although this is not a feature of the species' habitat in the ACT.

Although the Striped Legless Lizard is found in both primary and secondary grasslands, Dorrough (1995) found it to inhabit secondary grasslands but only where this was within two kilometres of primary grasslands.

Most areas where the species persists, are thought to have had low to moderate levels of agricultural disturbance in the past (Coulson 1990, Hadden 1995, Dorrough 1995). It has been suggested (Coulson 1990, Dorrough 1995) that ploughing may be a practice that is particularly incompatible with the survival of the species in an area.

BEHAVIOUR AND BIOLOGY

The Striped Legless Lizard is known to feed on a variety of insects and arthropods including spiders, crickets, cockroaches and caterpillars (Coulson 1990, Wainer 1992, Nunan 1995). Some evidence is available to suggest that the species displays some selectivity in its diet, with *Lepidoptera* larvae (caterpillars) being implicated as a particularly important food resource (Nunan 1995).

The species is diurnal and surface active from late spring to early autumn, with a peak in activity in November and December (Kukolic 1994). Gravid individuals are commonly caught in these months, with two eggs being laid in December. Some evidence is available to suggest that communal oviposition occurs and that at least sometimes, eggs may be laid under rocks or other substrate (Mills 1992, Rauhala 1996). Incubation periods of between 35 and 60 days have been observed in captivity under ideal conditions, however, the incubation period is likely to be longer in the field.

The longevity of the species is not known but a maximum of ten years has been estimated (Webster *et al.* 1991, Dorrough 1995).

DISTRIBUTION - ACT

In the ACT, the potential range of the species prior to European settlement is likely to have been within the more or less continuous area of treeless plains which extended over 20 000 hectares. However, most of this area has been developed for urban and related purposes and the current distribution of the Striped Legless Lizard in the ACT is a fragmented one, with four disjunct populations recognised (Figure 2): Gungahlin, Yarramundi Reach, Majura Valley and the Jerrabomberra Valley (Rauhala *et al.* 1995). These sites are separated from one another by unsuitable habitat, roads and urban development.

Gungahlin

The Gungahlin area can be further divided into several parts, most of which are separated from each other by roads. These are:

- Mulanggary, Gungaderra and Crace: - are separated from each other by roads and form the grassland reserves system in the Gungahlin area.
- Kenny: - an area to the south-east of Gungahlin which is separated from Mulanggary by marginal habitat.

Other relatively small and isolated patches of habitat known to support *D. impar* in the Gungahlin area are:

- Kosciusko Avenue: - Surrounded by roads and the suburb of Palmerston.
- Barton Highway, Kaleen: - Bounded on one side by the suburb of Kaleen and on the other by the Barton Highway, which separates this site from the Crace and Gungaderra grassland reserve units.

- Ginninderra Creek/Gundaroo Road: - located between Ginninderra Creek and Gundaroo Road toward the south-western end of the road.
- Corner Gundaroo Road and Gungahlin Drive: - bordered on two sides by roads and located adjacent to the Gungahlin Town Centre development.

The evidence available to date suggests that areas of Gungahlin are the stronghold for the species in the ACT region, although nearby areas of New South Wales and areas of potentially suitable habitat beyond the ACT border are yet to be thoroughly investigated.

Yarramundi Reach

A small area of grassland on the shores of Lake Burley Griffin. The habitat at this site is separated into two portions by a bicycle path. The survey conducted at this site in 1993 (Kukolic 1994) indicated that the species was scattered across the site and that its densities were low in relation to other sites surveyed during that year.

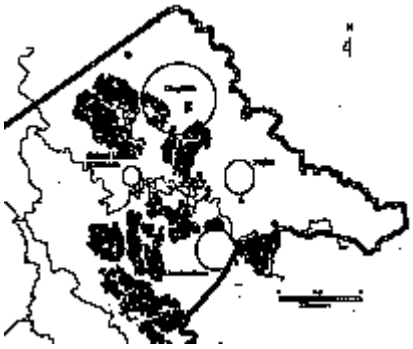

Figure 2: Four areas known to support *Delma impar* in the ACT.

Majura Valley

This is a large area comprising two main parts separated by the Majura Road. To the east of the Majura Road is an extensive area of habitat made up of part of the Majura Field Firing Range and the Airservice Australia navigational beacon enclosure. The other area lies to the west of the Majura Road and although the extent of the species in this area has not been fully investigated, it possibly extends from the road, west to the grasslands near the Campbell Park Offices where there has been an unconfirmed report of the species. The surveys conducted in the Majura Valley indicate that the species is present in moderate densities. In late February 1997, the Majura Field Firing Range site was subjected to an extensive fire. The impact of this event on the *Delma impar* population at the Range will not be known for some time.

Jerrabomberra Valley

The species is currently known only in the grassland to the east of Jerrabomberra Avenue on the Woden, Bonshaw and Wendover properties, as well as on HMAS Harman. The only site west of this road known to have supported the species was developed in 1996 for the new headquaters for the Australian Geological Survey Organisation. In the Jerrabomberra Valley, *Delma impar* has been found in relatively low densities and is more scattered in distribution compared with the Gungahlin area.

DISTRIBUTION - ELSEWHERE

The total geographic range of the species is confined to south-eastern Australia. It is currently known to occur at scattered locations in several regions of Victoria, mainly on the basalt plains to the north and west of Melbourne and in the western district of the state (Department of Conservation and Environment 1992). In NSW, the most recent isolated records are from near the Federal Highway (Eaglehawk Hill) in 1996, Yass (Dobbin Drive) in 1997, and Goulburn (Gundary) in 1997 A survey for the species was undertaken in 1996 at Bungendore, Queanbeyan and Gundaroo (Gunninah Environmental Consultants 1997). This survey failed to find *D. impar* at these locations. Other records are from Cooma in 1995 (BHP/Westcoast Energy 1995), Goulburn in 1992 (Husband 1995) and Batlow in 1977 (Cogger *et al.* 1993). The species has also been recorded from South Australia, in the extreme south-eastern corner of the state, however,

the most recent records from this area are in 1969, and the area now appears unlikely to support a population of the species (Coulson 1990, Hadden 1995).

Throughout its range in south-eastern Australia, the Striped Legless Lizard is considered to have suffered a substantial contraction in its distribution since European settlement. An investigation by Coulson (1990) indicated that there were few recent records of the species from areas of western Victoria where it had previously been recorded. Subsequent work by Hadden (1995) estimated that of the 125 sites from which the species has been recorded historically, it now occurs in as few as 40 of those sites.

It is believed that a combination of factors, including clearing of grasslands for urban development, some agricultural practices (prolonged heavy grazing by stock, pasture improvement, crop production), habitat fragmentation, weed invasion and inappropriate fire regimes have contributed to the decline of the species (Cogger *et al.* 1993).

Conservation Status

D. impar is recognised as a threatened species in the following sources:

International

Vulnerable. - IUCN (1994).

National

Vulnerable. - ANZECC (1991).
Vulnerable. - Schedule 1, Part 2 of the *Endangered Species Protection Act* 1992 (Commonwealth).

Australian Capital Territory

Special Protection Status Species. - Schedule 6 of *the Nature Conservation Act* 1980.
Vulnerable. - Section 21 of the *Nature Conservation Act 1980,* Determination No. 89 of 1997 (formerly Determination No. 29 of 1996).

New South Wales

Vulnerable. - Schedule 2 of the *Threatened Species Conservation Act* 1995.

Victoria

Threatened taxon. - Schedule 2 of the *Flora and Fauna Guarantee Act* 1988.

The species is also the subject of Action Statement No. 17, prepared by the Victorian Department of Conservation and Environment.

Threats

The major perceived threats to the continued survival of the Striped Legless Lizard are:

- loss and fragmentation of habitat through clearing of grasslands for urban, industrial and infrastructure development and for agricultural purposes;
- modification and degradation of grassland habitat through incompatible and inadequate land management practices; and
- other potential effects of urbanisation, including increased incidence of predation and frequency of fires.

Major Conservation Objective

The major conservation objective of this Action Plan is to maintain in the long term, viable, wild populations of *Delma impar* as a component of the indigenous biological resources of the ACT and as a contribution to regional and national conservation of the species (ACT Government 1994). This is interpreted to include the maintenance of the species' potential for evolutionary development in the wild.

This objective is to be achieved by:

- improving understanding of the biology and ecology of the species as the basis for managing its habitat in reserves, other managed complementary areas and other sites where it persists; and
- protecting several viable populations *in situ*, in a cluster of sites in native grassland across the geographic range of the species in the ACT.

Conservation Issues and Intended Management Actions

The current pattern of distribution of the Striped Legless Lizard in the ACT is largely the result of loss and fragmentation of habitat caused by urban and associated developments. Habitat loss or fragmentation in any areas where viable populations of the species are to be conserved in the long term is undesirable.

- Where possible, further fragmentation of populations will be minimised and habitat linkages will be maintained through planning and sensitive implementation of essential construction activities.

The threatened status of natural temperate grassland communities and several grassland species presents the opportunity to identify areas for conservation and implement management strategies which will not only serve to protect *D. impar* but also its natural grassland habitat and other component species. Protection of *D. impar* will therefore allow for significant and complementary conservation actions.

Whilst understanding of the habitat requirements of the species remains incomplete, there should be no drastic alteration of an existing management regime, in an area where the species is known to occur. However, minor modifications may be appropriate and the effect of any changes on the species requires monitoring and evaluation.

- An adaptive management approach will be adopted to accommodate the conservation requirements of the taxon as they are clarified through new research.
- However, where there is possible conflict in conservation objectives with other threatened species, the differing requirements will be resolved in the context of documented management arrangements for each location.

Other potential threats associated with urbanisation include the increased incidence of fire and predation.

- The reality and magnitude of these potential threats needs further investigation, however, in the short-term a public awareness campaign will be developed to inform residents who live closest or adjacent to *Delma impar* habitats, of ways in which these potential threats can be reduced.

A number of small isolated sub-populations are known to exist in various sites in the ACT. The long-term viability of these groups is unknown, and some are in areas planned for development.

- The salvage of individuals from such areas will only be attempted where specific research projects using these animals have been developed and can be commenced within a short time frame.

Any management conflicts between those for the species and other threatened species will be resolved through site specific management plans, based on scientific principles.

SURVEY

Distributional surveys for *Delma impar* have been conducted in the ACT annually since 1989. Although there are no substantial areas of potentially suitable grassland habitat that have not yet been investigated in the ACT, some areas, such as Majura Valley (west), may require further assessment to determine the extent of the species' distribution in the area. Adjacent areas of NSW with potentially suitable grassland habitat are largely unsurveyed.

- The need to establish the regional distribution of the species is an essential prerequisite to placing the ACT information into a proper biogeographical context. This will enable the relative

significance of different areas in the region to be assessed for their importance for this species and will assist regional planning for both development and conservation purposes.
- Environment ACT will continue to liaise with NSW National Parks and Wildlife Service to ensure a co-ordinated approach to surveys in the region.

MONITORING

Monitoring is essential to determine the long-term status of the Striped Legless Lizard in the ACT (Coulson 1995), and the success of conservation measures implemented.

- A program will be maintained to monitor sites across the geographical range of the species in the ACT. Where possible this will include monitoring of isolated small populations.
- The monitoring program will be designed to obtain information on population fluctuations over time, and more specifically on how populations respond to changes in their grassland habitat, specific management practices and pressures associated with urbanisation.
- Records will be maintained on the electronic data base system maintained by Environment ACT (Wildlife Research and Monitoring (WR&M)), for analysis of population trends.

RESEARCH

Many aspects of the basic ecology of the Striped Legless Lizard require investigation in order to understand how the species responds to management practices being implemented for grasslands.

- A small captive colony of the species is held at Tidbinbilla Nature Reserve. These animals will be available for research into aspects of the species' biology or behaviour directly relevant to its conservation in the wild.
- Implementing a research program will be dependent on the availability of resources and the cooperation of researchers in tertiary institutions. Research priorities will be coordinated with other research on the species being carried out in Victoria and New South Wales through the Striped Legless Lizard National Recovery Team

Priorities for research include:

1. Population dynamics

- Population viability assessment and required habitat size
- Longevity and age at sexual maturity
- Causes of mortality
- Movements and mobility, and identifying what constitutes a barrier to movement
- Microhabitat selection
- Oviposition and over-wintering requirements
- Absolute population size and how this relates to the indices of abundance obtained during trapping.

2. Capture techniques

- Evaluate the efficiency of the current pitfall trapping configuration with alternative trapping arrays, including grid-based designs.
- Investigate innovative trapping techniques which provide an alternative to conventional pitfall trapping.

3. Marking techniques

- Investigate the effectiveness and reliability of alternative marking techniques for the species.

4. Habitat requirements

Although some information is available regarding the habitat requirements of the species, the fundamental question of what limits its distribution and abundance remains largely unanswered.

- Research and where possible, future surveys, should address specific habitat requirements of the species. Information gained will assist in identifying and managing the species' habitat, and can also be used to develop a program for rehabilitating degraded grassland habitat.

5. Population genetics

Genetic data from the Jerrabomberra Valley population requires analysis to determine whether it is divergent from populations in other areas of the ACT. This is particularly important only in the event of any attempts to move lizards to other locations.

6. Habitat management

The management of grasslands should incorporate where possible measures to maintain and enhance community structure and diversity. The specific habitat requirements of the Striped Legless Lizard, as outlined above, are not well understood at present. Research into habitat management needs to focus on the following:

- The effect of grazing by stock on the habitat of the species, including different levels of intensity, duration and season, as well as the potential use of conservation grazing as a management tool.
- The effect of fires, including wildfire and controlled burns. The appropriate season of burn and frequency are particularly important factors related to the use of fire in the habitat of this species.
- The most appropriate season of mowing, mowing height and the effect of cut grass removal or retention on site.
- The effect of weed invasion, as well as the use of some weeds as habitat, requires examination. Large scale removal of some weeds may adversely affect populations in the short-term where alternative native habitat is not available. The staging of weed control activities in some circumstances appears warranted.

EDUCATION AND LIAISON

As with any vulnerable species, the importance of information transfer to the community and people responsible for managing their habitat is substantial. Environment ACT will:

- compile and distribute management guidelines and maintain contact with land managers responsible for areas on which populations presently occur;
- prepare and distribute to appropriate target audiences (eg. school children, tourists, building industry personnel) information about the species and its conservation; and
- consider the use of salvaged animals as a basis for community education and captive display programs, in addition to their use for research.

Protection

Conservation effort in the ACT for this species will be focused on protecting viable populations, in functional native grassland habitat in a cluster of sites across the geographic range of the species in the ACT. These sites will be located at Gungahlin, Yarramundi Reach and the Majura and Jerrabomberra valleys.

In the Majura and Jerrabomberra valleys, it may be possible to achieve protection of this species coincidentally with that of grasslands and other threatened species including the endangered Eastern Lined Earless Dragon (*Tympanocryptis lineata pinguicolla)*.

The known *D. impar* populations occur on land under a variety of tenures including Territory Land - Nature Reserve managed by Environment ACT, rural leasehold land, and Commonwealth owned and managed land (National Land).

In Gungahlin, three Nature Reserves have already been established to protect the species. However, there is no formal protection for any part of the other three known disjunct populations. Consideration therefore needs to be given to the survival of the species at Yarramundi Reach, and the Majura and Jerrabomberra valleys.

Protection of main *D. impar* Populations

Protection of *Delma impar* in natural temperate grassland habitat will be achieved through the provisions

of *the Land (Planning and Environment) Act 1991,* the Territory Plan and Memoranda of Understanding with the Commonwealth.

(i) Territory Plan - Hills, Ridges and Buffers with Public Land Overlay of Type Nature Reserve

Reservation is generally recognised as the mechanism for ensuring that sites of high conservation value are not eventually converted to a land use incompatible with their natural values (Caughley and Gunn 1996). Reservation is therefore an important mechanism for the protection of *Delma impar* and its habitat. Reservation does not exclude the option of managing controlled grazing to achieve conservation objectives through agistment arrangements with rural lessees. The reserved natural temperate grassland areas in Gungahlin supporting *D. impar* are listed in Table 1.

Table 1. Hills, Ridges and Buffers: Public Land - Nature Reserve.

Location and site	GAP No.	Area (ha)	Current Status
Gungahlin:			
Mulanggary	6	115	Reserve
Gungaderra	9	272	Reserve
Crace	13	150	Reserve

Note: GAP No. = Grassland Action Plan Number. This number is used as a site reference in the Natural Temperate Grassland Action Plan. Its use in Action Plans for component species, such as *D. impar* indicates that the habitat of the species in question more or less coincides with the natural temperate grassland site referred to.

(ii) Memoranda of Understanding

Memoranda of Understanding (MOU) provide another means of ensuring that sites with high conservation value will be managed so as to maintain their conservation value in perpetuity while enabling other compatible land uses, as identified in the MOU, to occur. An MOU with the Commonwealth does not preclude the possibility of the land being reserved in the future under Commonwealth legislation.

MOU's are appropriate for Commonwealth owned or -occupied land, or other land where long-term land uses will not compromise conservation values (for example, land used for Defence purposes or communication facilities). Areas of National Land supporting *D. impar*, for which an MOU will be negotiated with the Commonwealth, are listed in Table 2 below.

Table 2. Memorandum of Understanding to achieve protection equivalent to reservation.

Location and site	GAP No.	Area (ha)	Current Status
Majura Valley (East) Field Firing Range (parts) and the navigation beacon	28	155	National Land
Yarramundi Reach	24	13	National Land
Jerrabomberra: HMAS Harman- parts	37	159	National Land

Once MOU's have been agreed, there will be populations of *D. impar* protected in each of the four disjunct areas of the ACT where the species occurs in its native grassland habitat.

Other Areas Supporting *D. impar*

There are several areas of varying sizes with modified grassland habitat which support *Delma impar*. These are not proposed to be protected either as nature reserves under the Territory Plan or through an

MOU with the Commonwealth. However, parts of these areas may be appropriately managed to retain their conservation values. Such arrangements include planning and management agreements with non government landholders, property management agreements with rural lessees and protection of sites within the urban fabric.

- Sites will be included where feasible in appropriate Public Land categories under the Territory Plan.
- To ensure that the conservation values of these areas are protected, management agreements that incorporate conservation objectives will be developed for implementation by the relevant agency.

Information on the regional distribution of the species, which will become available through survey work in NSW, is likely to influence the requirements for protection of the species in these areas of the ACT.

(i) Public Land (Urban Open Space)

Most land included in Hills, Ridges and Buffer Areas is identified as Public Land and can therefore be assigned a category under the Territory Plan. This would include (other than nature reserves), Urban Open Space and Special Purpose Reserves. Activities permitted in these land use categories can be compatible with conservation values, provided that appropriate conservation management is in place. In these cases, maintenance of the conservation values of the site is the responsibility of the relevant ACT Government agency. Other similar land uses include road reserves and powerline easements. Areas of Public Land (other than nature reserves) supporting *D. impar* are listed below in Table 3.

Table 3. Public Land - Urban Open Space

Location and site	GAP No.	Area (ha)	Current Status
Gungahlin: Gundaroo Rd S'th	N/A	17	HRB
Kaleen	N/A	58	HRB

Note: HRB = Hills, Ridges and Buffer areas.
N/A = Not applicable

(ii) Other Land Categories under the Territory Plan

Where Territory Land includes other sites of populations of *D. impar*, these may be retained and appropriately managed, within the development context, by consideration at the appropriate stages of the concept planning and development approval process. Such measures provide a means of enabling the primary land use to continue while accommodating the conservation needs of *D impar* habitat on the site, but without the additional protection mechanism of being public land.

<u>Non Urban / Rural Leases</u>

Land located outside the existing urban area can be appropriately managed through property management agreements (PMAs) applying to rural leases. PMAs are required for rural leases when leases are renewed. This provides an opportunity to identify conservation values within the lease and to determine appropriate conservation management of that land, and where necessary, apply constraints on some practices such as ploughing and fertilisation. Such provisions will be developed in consultation with relevant landholders. Areas of Territory Land classified as non-urban which support *D. impar*, for which a site management agreement is the appropriate mechanism for protection, are listed in Table 4 below.

- Where rural sites occur in blocks of land scheduled for development, or where sites have been identified as requiring reservation, property management agreements will be developed to conserve the habitat values until such time as changes occur to the land tenure and use.

In respect to the Gungahlin Cemetery, the Conservator of Flora and Fauna will liaise with the ACT Cemeteries Trust on management and use to protect the conservation values of the site.

Table 4. Planning and Site Management Agreements (outside urban areas)

Location and site	GAP No.	Area (ha)	Current Status
Jerrabomberra: "Bonshaw"	N/A	19	Rural lease
"Woden"	36	72	Rural lease
Gungahlin Cemetery	N/A	5	Broadacre

Urban Leases

Where small sites occur within urban areas, advice can be provided to assist landholders maintain conservation values. This advice may be given as site management guidelines and plans. Similar guidelines are relevant for sites which are currently under rural agistment pending development of areas, such as in the Gungahlin Town. This enables protection and management of areas occurring as road reserves, easements and urban parks, since they can be maintained as landscape features, research resources or buffers. When incorporating these sites into the urban fabric, the entire site may not be retained. In these instances, boundaries of the areas to be incorporated require clarification.

These planning and site management measures do not preclude future land use changes, but are intended to retain the conservation values of the sites until future land use decisions are made. Urban leases supporting *D. impar*, for which negotiation of site management guidelines are appropriate, are listed in Table 5 below.

- Planning and site management mechanisms will be applied as required to both urban and non-urban sites so that, where possible, the natural grassland values of the *D. impar* habitat are conserved in the context of the primary land use.

Table 5. Sites within the urban fabric

Location and site	GAP No.	Area (ha)	Current Status
Gungahlin:			
Kenny	12	198*	Rural lease
North Mitchell	10	2	Industrial

* This area includes extensive *D. impar* habitat which has been significantly modified to the extent that it no longer retains native grassland community values. Small areas may be protected along roadsides and urban parks.

***D. impar* Areas Requiring Further Investigation**

The extent of the *D. impar* presence in the area to the west of the Majura Road (Table 6) is still to be fully investigated, although it possibly extends from the road to the grasslands near the Campbell Park Offices. Further study is required before it is possible to fully assess the conservation significance of the Striped Legless Lizard population at this site. In the meantime, the precautionary principle will be applied to the area and it will be excluded from any development until its significance can be determined. It will be managed through a property management agreement.

Table 6. Site where further assessment is required

Location and site	GAP No.	Area (ha)	Current Status
Majura (West)	N/A	38	Rural lease

Displaced Animals

In situations where urban and other developments preclude protection of the species in viable habitat, it will be necessary to evaluate options for managing and handling displaced animals which will not be protected in reserves or similar areas. Such options include incorporating the species and its grassland habitat in open space within future urban development areas, removal of animals which can be used for research and educational purposes, and destruction without salvage.

- In places where the species is known to exist but long-term protection is not proposed, options for management of displaced animals will be evaluated in the context of available resources and conservation needs of the species at the time development of the habitat is proposed.

Further Supporting Mechanisms

This Action Plan, together with the Draft Canberra Nature Park Management Plan and the Action Plan for Natural Temperate Grassland, provides the conservation management of this species and its habitat.

Environment ACT will work with Planning and Land Management to ensure that land uses in areas adjacent to sites supporting *D. impar* are compatible with conservation objectives and to minimise any adverse impacts.

Socio-economic Issues

The main social benefits of conserving representative sites of natural temperate grassland in which *Delma impar* occurs are:

- meeting community concerns that further loss or extinction of significant ecological communities, together with their component native species, be prevented;
- the amenity and recreation associated with the grasslands reserves, in which the species occurs; and
- the tourism potential of a successful program to protect a threatened species along with its endangered habitat.

The potential for economic utilisation of native grassland habitat sites is relevant for those sites where current management or land uses are deemed to be compatible with the retention of conservation values.

There are four main aspects of planning in Canberra that will be affected by the implementation of this Action Plan. These are:

1. Future Urban Areas

Proposals for the Jerrabomberra Valley, as identified in either the National Capital Plan or the Territory Plan, and provided for in the Residential Land Release Program, may have their viability affected by the size and location of possible future grassland reserves.

2. Transport Facilities

The provision and/or upgrading of the following transport facilities may be affected:

- John Dedman Parkway - this may impact on the Kaleen sites but will be subject to environmental impact assessment in which conservation issues will be considered in terms of road alignment, road construction and verge management.
- Majura Parkway - southern section and connections.
- Very High Speed Train (VHST) corridor (Majura and Jerrabomberra valleys).

In the case of the VHST proposal, Environment ACT is actively involved in in the evaluation of planning options.

3. Industrial Areas

The planning for future industrial areas, in particular, a possible industrial complex associated with the Airport in the Majura Valley. Some habitat adjacent to the Mitchell Industrial Area may also be affected.

4. Rural Leasing Aspects

Some sites in the Jerrabomberra Valley are within rural leases. Preliminary investigations indicate that these leases currently contain withdrawal clauses allowing for the use of land for public purposes. The Rural Policy Taskforce has recently reviewed all aspects of rural leases including the recommendation of appropriate lease terms. Two recommendations of the Taskforce that will affect the Action Plans are that:

- the lease term for the Jerrabomberra Valley be to the year 2020; and
- there be no withdrawal clauses over any part of a rural lease unless it has been clearly defined for an imminent public work, such as a road, stormwater or other infrastructure.

This will mean that the Territory would have to withdraw any area of land having conservation significance at the time of an application for a new lease, or acquire it subsequently under the provisions of the *Land Acquisition Act 1994*.

It is expected that it will be early in 1998 before rural lessees are able to take up a new lease as proposed by the Taskforce. In the meantime, Environment ACT will need to identify areas requiring special conservation measures before applications for extended lease terms are received. In the event that large areas of a lease will be withdrawn for conservation purposes, consideration will be given to the viability of the remainder of the lease. Grazing may be undertaken where it is considered that it will be consistent with the maintenance of the natural temperate grassland conservation values.

In addition to the issues outlined above, there are some site-specific issues which need to be addressed in order to implement the protection measures specified in this Action Plan. These are:

- Kenny: This suburb has yet to have outline planning conducted, however during this process, some *D. impar* habitat in the area will be protected by retaining habitat in areas such as roadside and urban parks.
- Kosciusko Avenue, Palmerston: While preservation of the entire area is not proposed, there is scope to incorporate portions of this area into small parks as part of the development of the area, for example, at the top of the knoll.

Legislative Provisions

The following ACT legislation applies to the conservation of flora and fauna in the ACT:

Nature Conservation Act 1980

The Nature Conservation Act protects native plants and animals. Activities affecting native plants and animals require a licence which may specify conditions to apply to the activity.

- A person may not kill, take, keep, sell, import, export or interfere with the "nest" of a native animal without a licence.

Native plants and animals may be declared as *protected* or having *special protection status* in recognition of a particular conservation concern that warrants additional protection. Increased controls apply to declared species and licensing constraints are specified.

Licence Conditions (SPS)

The Striped Legless Lizard is listed as a Special Protection Status (SPS) species under the Act. This is the highest level of statutory protection available and is conferred on species which are either threatened with extinction or are a migratory animal subject to an international agreement for their protection. Conservation requirements are a paramount consideration and only activities related to conservation of the species or serving a special purpose are permissible.

The Conservator of Flora and Fauna may only grant a licence for activities affecting a species with SPS where satisfied that the act specified in the licence:

- is required to be done for scientific, educational, propagative or other similar purposes;
- is required to be done for the purpose of protecting persons or property and will be conducted in a way that will, so far as is practicable, keep to a minimum any impact on the species concerned;

- is merely incidental to other acts, and will not appreciably reduce the chances of survival or recovery in the wild of the species concerned;
- is of particular significance to Aboriginal tradition and will not appreciably reduce the chances of survival or recovery in the wild of the species concerned.

Other Relevant Provisions

The Nature Conservation Act provides authority for the Conservator to manage Public Land reserved for conservation of the natural environment. Activities that are inconsistent with management objectives for nature conservation are controlled. Special measures for conservation of a species or community of concern can be introduced in a reserved area, including restriction of access to important habitat.

Section 47 of the Act allows the Conservator to give the occupier of land directions for protection or conservation of native plants and animals. This provision is relevant to the management of threats to the conservation requirements of a species or community of concern that occurs on leased land.

Natural Temperate Grasslands, which provide habitat for *D. impar* in many areas, has been declared as an endangered community by the ACT Minister for the Environment, Land and Planning, and as such requires the preparation of an Action Plan for its conservation.

Land (Planning and Environment) Act 1991

The Land (Planning and Environment) Act is the primary authority for land planning and administration. It establishes the Territory Plan and several of its provisions are relevant to the protection of flora and fauna.

- **Public Land** is reserved via the Territory Plan. Land reserved as wilderness area, national park or nature reserve has conservation of the natural environment as a paramount management objective. The Conservator of Flora and Fauna must prepare a **plan of management** setting out how management objectives are to be implemented or promoted.
- **Places of natural heritage significance**, including important habitat for native species, may be entered in the Heritage Places Register, with conservation requirements specified.
- **Environmental Assessments and Inquiries** may be initiated as part of the approvals process for defined land use and development decisions or activities prescribed as controlled. Assessments are required to address potential environmental impact, including threats to a species of flora and fauna, an ecological community or an area.

COMMONWEALTH

Endangered Species Protection Act 1992

Under this legislation, *Delma impar* has been declared a **vulnerable** species. This places an obligation on the Commonwealth to prepare and implement recovery plans for the species as it occurs in Commonwealth areas. The Commonwealth is also required to cooperate with both the ACT and NSW authorities in protecting the species, and joint preparation and implementation of a recovery plan across State and Territory boundaries is encouraged (ANCA, 1994). This is being achieved through joint membership on the National Recovery Team, which will be preparing a national recovery plan for the species.

Consultation and Community Participation

Environment ACT (WR&M) is a member of the regional Striped Legless Lizard Working Group (SLLWG), which also comprises representatives from the New South Wales National Parks and Wildlife Service, the Australian National University, University of Canberra and the ACT Herpetological Association. This group coordinates survey, research and the regional conservation of the species. The regional SLLWG group is represented on the National Recovery Team, set up in 1995 to direct and facilitate appropriate research and management of the species and to prepare a National Recovery Plan. The membership of the National Recovery Team also includes representatives from the Victorian Striped Legless Lizard Working Group, South Australia and the Commonwealth.

Community participation with activities assisting the conservation of native grasslands and the Striped Legless Lizard will be encouraged through groups such as the Herpetological Association, Friends of Grasslands and Park Care Groups operating near grassland areas supporting the species. Information on the conservation of the Striped Legless Lizard will be incorporated into community education programs conducted by Environment ACT.

Implementation and Review

RESPONSIBILITY FOR IMPLEMENTATION

Environment ACT (WR&M) will have responsibility for coordinating the implementation of this Action Plan, subject to the availability of Government resources. Primary responsibility for conservation and management of the species on Territory Land will rest with the ACT Parks and Conservation Service, whilst relevant Commonwealth agencies will have responsibility on National Land, however, provisions in the *Nature Conservation Act 1980* (ACT) are still applicable. In addition, the Commonwealth has its own statutory obligations to protect the species under the *Commonwealth Endangered Species Protection Act 1992.*

EVALUATION

Implementation of this Action Plan will be a collaborative exercise between government agencies, landholders and the community generally. Commonwealth and NSW participation will be critical in some cases. The Action Plan will be reviewed after three years. The review will comprise an assesssment of progress using the following performance indicators:

- completion of commitments that can reasonably be expected to be finalised within the review timeframe (e.g. introduction of a statutory protection measure for a species; development of a management plan);
- completion of a stage in a process with a time line that exceeds the review period (e.g. design or commencement of a research program);
- commencement of a particular commitment that is of a continuing nature (e.g. design or commencement of a monitoring program for population abundance); and
- expert assessment of achievement of conservation objectives of the Action Plan.

The review will be reported to the ACT Flora and Fauna Committee. This will provide an opportunity for Environment ACT and the Flora and Fauna Committee to assess progress, take account of developments in nature conservation knowledge, policy and administration and review directions and priorities for future conservation action.

The following conservation actions will be given priority attention:

- completion of surveys in native grassland sites yet to be fully assessed, where the species is known to occur;
- establishment of a monitoring program to provide information on how populations respond to management practices and environmental pressures;
- commencement of the research program, especially on priority research topics;
- putting in place protection measures; and
- establishing liaison mechanisms with NSW authorities and determining the regional distribution and conservation status of the species.

This plan will also be reviewed in the context of a National Recovery Plan for the species when it is developed.

Acknowledgements

The illustration of the species (Figure 1) was prepared for Environment ACT by
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List of Action Plans - December 1997

In accordance with Section 23 of the *Nature Conservation Act 1980,* the following Action Plans have been prepared by the Conservator of Flora and Fauna:

No. 1: Natural Temperate Grassland - an endangered ecological community.

No. 2: Striped Legless Lizard (*Delma impar*) - a vulnerable species.

No. 3: Eastern Lined Earless Dragon (Tympanocryptis lineata pinguicolla) - an endangered species.

No. 4: A leek orchid (*Prasophyllum petilum*) - an endangered species.

No. 5: A subalpine herb (*Gentiana baeuerlenii*) - an endangered species.

No. 6: Corroboree Frog (*Pseudophryne corroboree*) - a vulnerable species.

FURTHER INFORMATION

Further information on this Action Plan or other threatened species and ecological communities can be obtained from:

Environment ACT
(Wildlife Research and Monitoring)
Phone: (02) 6207 2126
Fax: (02) 6207 2122

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ACT Government, 1997. *Striped Legless Lizard* (Delma impar): *A vulnerable species*. Action Plan No. 2. Environment ACT, Canberra.