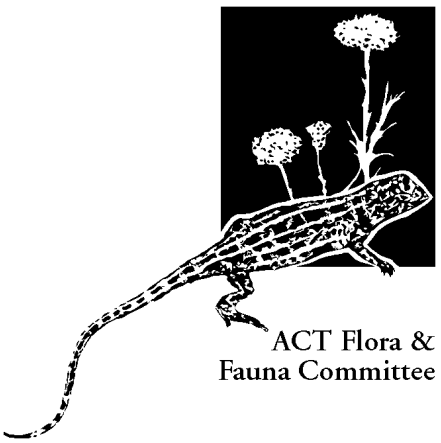
THREATENED SPECIES AND COMMUNITIES IN THE ACT

CRITERIA FOR ASSESSMENT



September 2001

PURPOSE

This document is a revision of the document prepared by the ACT Flora and Fauna Committee in July 1995 (*Threatened Species and Communities in the ACT – Criteria for Assessment*). The original document was prepared by the Committee after considering public submissions to a draft issued in May 1995.

The Flora and Fauna Committee was first appointed by the Minister for the Environment, Land and Planning on 12 January1995. Subsequently, the Committee has been appointed on two occasions by the Minister for Urban Services, most recently in February 2001 for a further three year term.

This document sets out the procedures and criteria specified by the ACT Flora and Fauna Committee for recommending the declaration of endangered or vulnerable species, endangered ecological communities, and threatening processes under the *Nature Conservation Act 1980.*

Anyone who has an interest in protecting biodiversity in the ACT region may nominate a species, community or threatening process for consideration by the Committee.

If you would like further information about making a nomination or the ACT Flora and Fauna Committee please contact:

Secretary
ACT Flora and Fauna Committee
Wildlife Research and Monitoring
Environment ACT
PO Box 144
LYNEHAM ACT 2601

Telephone: (02) 6207 2126
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WORLD-WIDE PROTECTION OF WILDLIFE

World-wide, many species of wildlife, both plants and animals, are in danger of premature extinction. Such imminent losses of biodiversity are largely the direct or indirect result of human activities.

This problem is being addressed globally and on a regional basis. At an international level, organisations such as The World Conservation Union (IUCN) and the governments of numerous countries are working to document, assess and control threats to wildlife. Australia is party to many international agreements (e.g. Convention on International Trade in Endangered Species of Wild Fauna and Flora, Convention on Biological Diversity) aimed at achieving a global approach to conservation. Australia has also developed national strategies for the protection of our unique flora and fauna. In addition, each state and territory provides legislative protection for the wildlife of its region.

In the ACT, protection of the natural environment is primarily provided for under the *Nature Conservation Act 1980*. A 1994 amendment to the Act established the ACT Flora and Fauna Committee whose primary role is to identify native species and ecological communities that are threatened with extinction, and processes that threaten the survival of native species and communities in the ACT region*.

ACT FLORA AND FAUNA COMMITTEE

As required by legislation, the ACT Flora and Fauna Committee is an independent body of seven experts in biodiversity and/or ecology. It provides the Minister for Urban Services with an expert, scientific and objective examination of nature conservation issues relevant to the ACT.

The Committee's primary function is to recommend to the Minister the declaration of those species* and ecological communities* which are at risk of extinction in the ACT region*, and processes which have the potential to threaten the survival of a species or community in the region.

The Committee was required by legislation to develop procedures for preparing nominations and to develop criteria for determining the regional conservation status of species and ecological communities, and the ecological significance of threatening processes*.

A range of disciplines is represented on the Committee so that collectively it can address a variety of issues. Members are appointed by the Minister on a part-time basis and hold office for a maximum of three years. In February 2001 the following people were appointed to the Committee:

Dr Rosemary Purdie
(Chairperson)
Murray Darling Basin Commission

Dr Will Osborne
(Deputy Chairperson)
School of Resource, Environmental and Heritage Sciences
University of Canberra

Dr Chris Tidemann
School of Resource Management and Environmental Science
Australian National University

Dr Richard Norris
Cooperative Research Centre for Freshwater Ecology
University of Canberra

Dr Penny Olsen
Division of Botany and Zoology
Australian National University

Dr Geoff Clarke
CSIRO Entomology

Dr Suzanne Prober
Ecological Interactions

The Minister has also invited the Chairs of the Environment Advisory Committee and the Heritage Council of the ACT to attend ACT Flora and Fauna Committee meetings as observers. Their attendance facilitates communication between the ACT Flora and Fauna Committee and these two committees, and also provides community input to the Committee.

Secretariat support for the ACT Flora and Fauna Committee is provided by Wildlife Research and Monitoring, Environment ACT.

THE DECLARATION PROCESS

The declaration process is prescribed in the *Nature Conservation Act 1980*. It is primarily one of nomination, assessment and formal recognition of the conservation status of a threatened species* or ecological community*, or the ecological significance of a threatening process*. It includes public participation. There are several steps involved:

Nomination *to the Committee of a species, community or process*. A nomination may be rejected if it fails to satisfy the specified guidelines.

Assessment *by the Committee of the conservation status of the species or community, or the ecological significance of the process, using specified criteria and whatever expert advice the Committee considers necessary.* Note: The criteria were specified in an instrument tabled in the ACT Legislative Assembly as Determination No.99 of 1995.

Recommendation *to the Minister by the Committee, if it concludes that a species or community is threatened with extinction or a process is threatening, that the item be declared accordingly; and, if the recommendation is accepted:*

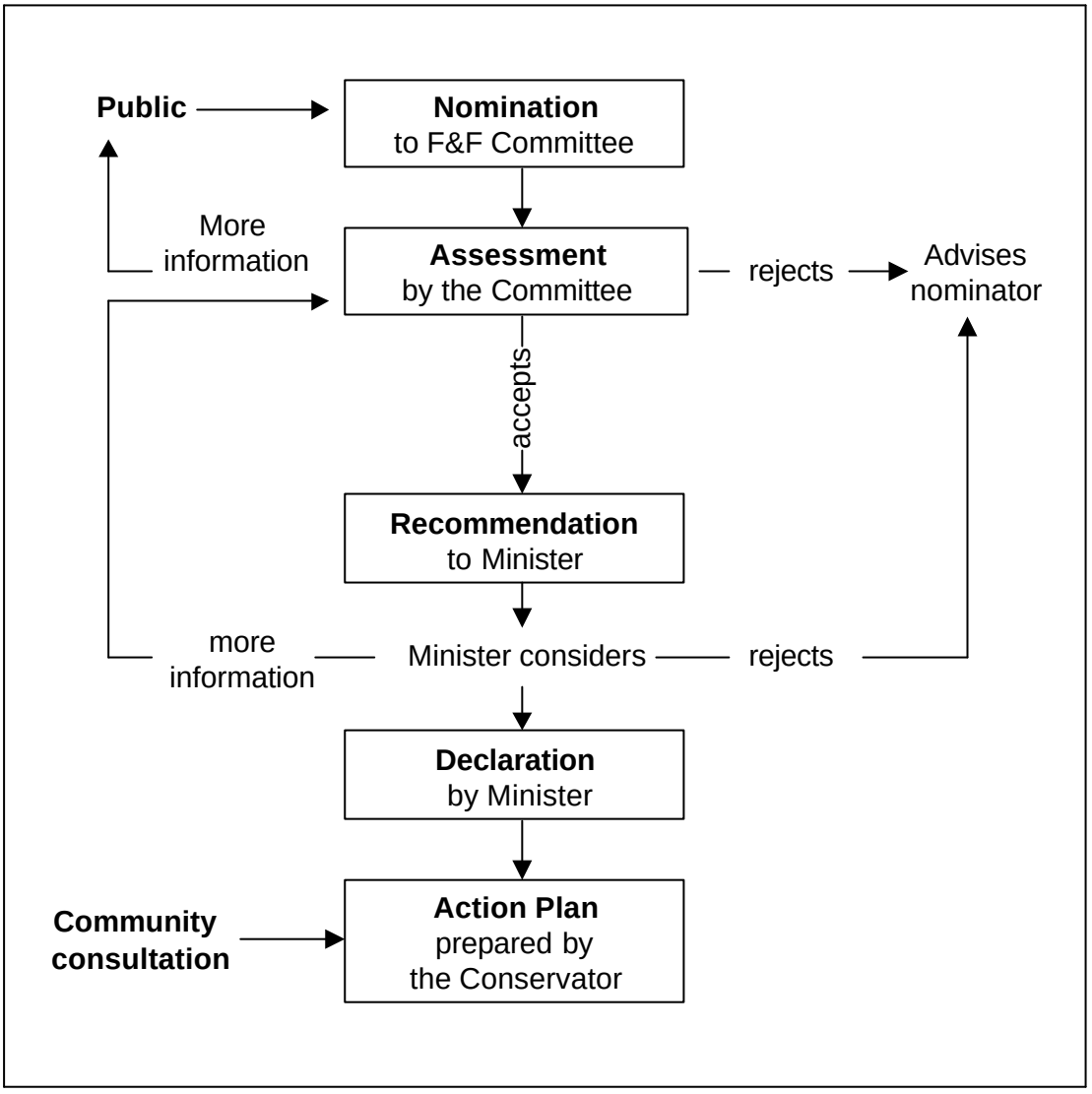
Declaration *by the Minister that a species is vulnerable* or endangered*, that an ecological community is endangered or a process is threatening.* Declaration is a formal statement which is then tabled in the ACT Legislative Assembly, where it may be disallowed.

Action Plan*.* Declaration initiates a management response by the Conservator of Flora and Fauna, who is required to prepare an Action Plan for each declared item. An Action Plan includes an examination of conservation issues and proposed measures for the enhanced conservation of a declared species or community, or management of a declared threatening process. Public comment is sought during the preparation of Action Plans.

If the status of a species, ecological community or threatening process changes, the declaration process allows for the item to be reassessed by the Committee.

A record of each nomination, recommendation and Ministerial decision will be maintained and be available for inspection, on application to the Secretary of the ACT Flora and Fauna Committee.

For further information on the declaration process please contact the Secretary of the ACT Flora and Fauna Committee.



CATEGORIES OF DECLARATION

Items in the following categories can be nominated for declaration under the *Nature Conservation Act 1980*:

SPECIES*

A species may be declared endangered if:*

- it is likely to become extinct in the ACT region* unless the circumstances and factors threatening its abundance, survival or evolution cease; or
- its numbers or habitats* have been reduced to such a level that the species is in immediate danger of extinction in the ACT region.

*A species may be declared as vulnerable** if within the next 25 years it is likely to become endangered in the ACT region unless the circumstances and factors threatening its abundance, survival or evolution cease.

ECOLOGICAL COMMUNITIES*

An ecological community may be declared as endangered if it is in immediate danger of extinction in the ACT region unless the circumstances and factors threatening its distribution*, composition and viability as an ecological unit cease.

THREATENING PROCESSES*

A process may be declared as threatening if it threatens, or may threaten, the survival, abundance or evolution of a species or community in the ACT region.

WORKING CATEGORIES USED BY THE COMMITTEE

Items may be nominated only for those categories specified under the *Nature Conservation Act 1980*. However, the ACT Flora and Fauna Committee recognises that a number of additional categories may prove useful for its work. Items (species*, ecological communities*, or threatening processes*) that are nominated by members of the public but do not meet any of the criteria for declaration may still be identified under one of the Committee's working categories. Items identified in the working categories may be re-considered for declaration under the *Nature Conservation Act 1980.* Action Plans are not required for items listed under these categories.

The working categories are:

Ecological communities at lower risk

These are communities which do not meet any of the criteria for declaration as endangered*, but are sufficiently threatened to cause concern for their viability as an ecological unit in the medium-term. 'Medium-term' is not strictly defined, but a useful guide is within the next 25 - 50 years.

Rare

These are species or ecological communities with small distributions* or small populations* which, although not currently endangered or vulnerable*, are at significant risk from events such as landuse changes, reduced protection measures or major disturbance.

Insufficiently known*

These are species or ecological communities with poorly known distributions or populations, or of uncertain taxonomy, that are suspected to be endangered or vulnerable but for which there is insufficient information available. Threatening processes may also be identified as insufficiently known. The items are then flagged for further survey and/or taxonomic research and kept under review.

Note: These guidelines were specified in an instrument signed by the Chair and Deputy Chair of the Flora and Fauna Committee in July 1995

GUIDELINES FOR MAKING A NOMINATION

Any person or organisation may make a nomination to the ACT Flora and Fauna Committee, requesting that the Committee recommend declaration of a species*, ecological community* or threatening process*. These guidelines are provided to help people compile information that will assist the Committee to make a recommendation. We also recommend first reading the glossary, as a number of terms have been defined precisely, some in accordance with the *Nature Conservation Act 1980,* and their meanings may not be entirely as expected. For example, species refers to both species and subspecies*, so that provision for declaration of subspecies may not be immediately apparent.

The ACT Flora and Fauna Committee may reject a nomination if any of the following apply:

- the subject of the nomination is already declared (however, nominations for changing the status of declared items will be considered);
- the subject of the nomination is not normally considered to be native to the ACT region*; or the subject of the nomination is long extinct (i.e. known only from fossil evidence) or does not exist (this does not preclude re-introduction of species or communities presumed extinct*);
- the nominator acts in a mischievous or frivolous fashion, e.g. constantly re-nominating the same item without adequate new evidence;
- the nomination is not accompanied by sufficient basic information;
- after due consideration the nomination does not meet the specified criteria.

Important points to note

The *Nature Conservation Act 1980* obliges the Committee to make its assessment on the grounds of nature conservation issues only, in the context of the ACT region. Declaration of items and subsequent management responses have jurisdiction only within ACT borders.

Although there are many different criteria under which species, communities and threatening processes may be declared, meeting any **one** of these criteria is sufficient to qualify an item to be recommended for declaration.

Most items can be described at a number of different levels. The level used in a nomination should be the most general that incorporates all related items that are at similar risk. For example, if both a subspecies and a species are at risk, only the species should be nominated because its declaration automatically includes the subspecies. Similarly, if all alpine moorland communities are at risk, then it is sufficient to nominate ‘alpine moorland community’; there is no need to nominate all the different types of alpine moorland separately.

All nominations should include the best information available about where the species, community or threatening process currently occurs. However, nominations should avoid being site-specific because sites themselves cannot

be declared under the *Nature Conservation Act 1980*. The species, community or threatening process should be defined by its biological characteristics and if known, its environmental characteristics; it should not be described simply in terms of one isolated population* (unless of course only one population exists in the ACT region).

When producing evidence, always state your source of information correctly and in detail. In the case of unpublished evidence, if you are the main authority for the subject, please provide the name of a referee who can vouch for your standing and authority. If quoting information that has been given to you by an experienced person (i.e. a personal communication, often referred to in scientific articles as 'pers. comm.') please indicate who that person is and his or her standing as an authority. Quoting 'Smith (pers. comm.)' is insufficient if it is not clear who 'Smith' is.

Please make every effort to ensure that the scientific name used for a nominated species* is the correct one, and that it is spelt correctly.

A nomination below the subspecies* level (e.g. a race or variety) or for a narrowly defined community may only be eligible for declaration if there is a **special nature conservation** need to conserve the item. Evidence of this need must be stated in the nomination.

People who are interested in making a nomination are encouraged to contact the Committee Secretary to see if the item is already under consideration.

A NOMINATION SHOULD INCLUDE THE FOLLOWING INFORMATION:

a) Name, address and signature of the nominator(s): Nominations may be submitted by individuals or groups. All parties to the nomination must provide their names, addresses and (if available) their telephone numbers, and must also sign and date the completed nomination. A group of people may appoint one person to make a nomination on its behalf, but that person must show evidence that he or she has been appointed by the group.

b) Name of the nominated item: This is the scientific name and generally accepted common name of the nominated species, or a generally accepted name (if any) of the nominated ecological community*, or a short descriptive name for the nominated threatening process*.

All such names should, where possible, be supported by reference to appropriate books, scientific articles or expert opinion.

Species	Ecological community	Threatening process
For a **species** the name should be specified in accordance with accepted scientific conventions. This usually requires a formal scientific name and its taxonomic author(s); e.g. '*Vombatus ursinus* Shaw, 1800 - common wombat'. A species that has not been conventionally accepted (e.g. an undescribed species) may still be considered if an appropriate taxonomic description and evidence showing that at least one voucher specimen is lodged with a relevant scientific institution (e.g. a recognised Museum or Herbarium) are provided.	For an **ecological community** the name should include reference to the community structure, non-biological components, or dominant species, e.g. 'grassy white box community' or 'alpine box community'. Reference to a dominant species should be made only if it is present in all examples of the community. Place names are not recommended for inclusion in the name as they tie the community to a particular location and do not allow for the community to subsequently be found at additional locations.	For a **threatening process** the name must emphasise the most specific controllable process. For example, with stream sedimentation caused by mining, the threatening process is sedimentation, not the mining itself.

c) Description: Provide a description of the species*, ecological community* or threatening process* that is sufficient to distinguish it from other species, ecological communities or threatening processes. All descriptions should, where possible, be supported by reference to appropriate books, scientific articles or expert opinion.

Species	Ecological community	Threatening process
The description should include an indication of the group of plants or animals it belongs to (e.g. its scientific **family name**) and a description of the variation in its **general appearance**, including, where appropriate, an indication of any variation between sexes or life stages (e.g. for insects you might need to describe the egg, larva or nymph, pupa and adult). It should also include a description of its **habitat***; i.e. the typical environment in which the species occurs. Examples include fast-flowing streams, alpine heaths, granite outcrops, native temperate grasslands. For animals, a brief description of **behaviour** may also be appropriate.	The description should include an indication of its **physical environment**, i.e. the typical climate, geology, soils, hydrology and position in the landscape where the community occurs. It should also include a description of its **biological components**. Some aquatic or invertebrate communities are defined mainly in terms of animal species. Most terrestrial communities are defined in terms of two aspects of their flora: **composition**, i.e. the dominant or important plant species that characterise the community, and **structure**, i.e. the life-forms (such as grass, shrubs, trees) that shape the community. **Processes** such as fire or grazing should also be described where they are important in maintaining the community.	The description should include an indication of the species or ecological communities under threat, the severity of the threat, and how the threatening process is operating now, or may operate in the future. Emphasis should be given to how species or communities may be threatened by the process.

d) Distribution*: Provide the best available description of the current distribution of the item globally, nationally, in the ACT region and within the ACT itself, with more detailed description of specific localities if relevant, and an indication of its likely distribution prior to disturbance associated with European settlement.

Where distribution information is incomplete, best estimates should be provided, and the basis of the estimates described. Maps are the preferred form of presentation and should, where possible, include relevant supplementary information such as vegetation, soils, topography and land tenure. The location of any appropriate examples of species or ecological communities or threatening processes should also be provided.

e) Criteria satisfied and the reasons why: You should explain why the nominated item meets at least one criterion for declaration. The case must list the criterion (or criteria) that is (are) satisfied, give evidence to show why, and substantiate that evidence, e.g. by reference to appropriate books, scientific articles or expert opinion. There are four categories of item that can be declared:
(1) Endangered Species* (2) Vulnerable Species* (3) Endangered Community*, and (4) Threatening Process*.
Criteria for each category are given in the next section.

f) References: All books and scientific articles referred to must be listed in full. You should also list the name, address and standing of any expert cited.

Note: These criteria were specified in an instrument tabled in the ACT Legislative Assembly as Determination No. 99 of 1995.

1. CRITERIA FOR DECLARINGAN ENDANGERED* SPECIES

To be recommended for declaration a species* must meet at least **one** of these criteria:

1.1 Species is known or suspected to occur in the ACT region* and is already recognised as endangered or presumed extinct* in an authoritative international or national listing (such as the threatened Australian Flora and Fauna lists developed under the auspices of the Australian and New Zealand Environment and Conservation Council).

1.2 Species is observed, estimated, inferred or suspected to be at risk of premature extinction in the ACT region in the near future, as demonstrated by one or more of:

1.2.1 Current severe decline* in population* or distribution* from evidence based on any of:

- **1.2.1.1** direct observation, including comparison of historical and current records
- **1.2.1.2** severe decline in rate of reproduction or recruitment; severe increase in mortality; severe disruption of demographic or social structure
- **1.2.1.3** severe decline in quality or quantity of habitat*
- **1.2.1.4** very high actual or potential levels of exploitation or persecution
- **1.2.1.5** severe threats from herbivores, predators, parasites, pathogens or competitors
- **1.2.1.6** severe threats from hybridisation with exotic or non-local native species, or from hybridisation resulting from recent modification in the environment
- **1.2.1.7** severe threats from pollutants or toxic substances
- **1.2.1.8** other indications of severe decline in population or distribution.

1.2.2 Imminent risk of severe decline in population or distribution from evidence based on one or more of **1.2.1.2** to **1.2.1.8** above.

1.2.3 Continuing decline* or unnaturally extreme fluctuations* in population, or distribution, for a species currently occurring over a small range* or having a small area of occupancy* within its range.

1.2.4 Severely fragmented* distribution for a species currently occurring over a small range or having a small area of occupancy within its range.

1.2.5 Continuing decline or severe fragmentation in population, for species with a small current population.

1.2.6 Extremely small population.

1.3 Species is presumed extinct in the ACT region.

Note: These criteria were specified in an instrument tabled in the ACT Legislative Assembly as Determination No. 99 of 1995.

2. CRITERIA FOR DECLARING A VULNERABLE* SPECIES

To be recommended for declaration a species* must meet at least **one** of these criteria:

2.1 Species is known or suspected to occur in the ACT region* and is already recognised as vulnerable in an authoritative international or national listing (such as the threatened Australian Flora and Fauna lists developed under the auspices of the Australian and New Zealand Environment and Conservation Council).

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 one or more of:

2.2.1 Current serious decline* in population* or distribution* from evidence based on any of:

- **2.2.1.1** direct observation, including comparison of historical and current records
- **2.2.1.2** serious decline in rate of reproduction or recruitment; serious increase in mortality; serious disruption of demographic or social structure
- **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
- **2.2.1.5** serious threats from herbivores, predators, parasites, pathogens or competitors
- **2.2.1.6** serious threats from hybridisation with an exotic or non-local native species, or from hybridisation resulting from recent modification in the environment
- **2.2.1.7** serious threats from pollutants or toxic substances
- **2.2.1.8** other indications of serious decline in population or distribution.

2.2.2 Imminent risk of serious decline in population or distribution from evidence based on one or more of **2.2.1.2** to **2.2.1.8** above.

2.2.3 Continuing decline* or unnaturally extreme fluctuations* in population or distribution, for a species currently occurring over a moderately small range or having a moderately small area of occupancy* within its range.

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.

2.2.5 Continuing decline or serious fragmentation in population, for species with a moderately small current population.

2.2.6 Small population.

Note: These criteria were specified in an instrument tabled in the ACT Legislative Assembly as Determination No. 99 of 1995.

3. CRITERIA FOR DECLARING AN ENDANGERED* COMMUNITY

To be recommended for declaration an ecological community* must meet at least **one** of these criteria:

3.1 Community is presumed extinct*.

3.2 Community is subject to current and continuing threats or other processes likely to lead to premature extinction* as demonstrated by one or more of:

- **3.2.1** Severe decline* in distribution*.
- **3.2.2** Marked alteration of composition or structure.
- **3.2.3** Community is approaching non-sustainability.
- **3.2.4** Loss or decline of species* that play a major role in community function.
- **3.2.5** Small distribution causing the community to be at risk of premature extinction.
- **3.2.6** Community processes* being altered to the extent that interaction between the community components will be impeded.

4. CRITERIA FOR DECLARING A THREATENING PROCESS*

To be recommended for declaration a threatening process must meet at least **one** of these criteria:

4.1 Threatening process is clearly shown to be a significant cause for declaration of any species* as vulnerable* or endangered or any ecological community as endangered.

4.2 Threatening process is clearly shown to have potential for causing any species to become vulnerable or endangered or any ecological community to become endangered.

EXAMPLES

These are imaginary case studies, not real nominations. The cited references dated before 2000 exist and would be appropriate for a real nomination. References dated later than 2000, and most of the species, communities, threatening processes and people mentioned in the examples are fictitious.

All species names and some generic names are also fictitious and their use in this document does **not** constitute a formal publication for nomenclatural purposes.

While the ACT Flora and Fauna Committee would prefer to receive at least the amount of information included in these examples, this may not be possible and the Committee encourages submission of whatever data are available.

EXAMPLEOF SPECIES NOMINATION

(a) Name, address and signature of the nominator(s):

Nominator:
Address:
Phone:
Signature:

(b) Name of the nominated item:

Category of nomination:	Endangered species
Name of species	Grassland spadefoot frog *Neofroggis spadeipes* Osborne, 2010

(c) Description:

Family: Myobatrachidae

General Appearance: A moderate-sized (up to 50 mm body length), stout, burrowing frog with characteristic longitudinal brown and black stripes on either side of a yellow vertebral stripe. It is easily distinguished from other frog genera by its vertical pupil, black metatarsal tubercles, and the absence of tibial glands, and from *Neofroggis fictus*, a closely related species that also occurs in the ACT region, by the presence of longitudinal brown and black dorsal stripes (Cogger 1994).

Habitat: Grassland spadefoot frogs are found only in naturally treeless lowland grasslands dominated by native grasses such as *Stipa* spp. and *Danthonia* spp. Soils characterising sites where the frogs have been found are deep red and yellow podzolics. The frogs breed in small pools in low-lying depressions and seepages in or near these grasslands. Although the pools are small and ephemeral, they are characteristically quite deep (>40 cm) (Osborne and Rauhala 2011).

Behaviour: Grassland spadefoot frogs spend much of the year in deep burrows beneath thick patches of native tussock grasses. They emerge on warm wet nights to feed on earthworms, crickets, moths and caterpillars (Nunan and Howe 2011). Males call from amongst grasses and sedges whilst floating at the edge of the pools. Breeding occurs only after heavy soaking rains in late spring and early summer (October-January) (Osborne and Rauhala 2011).

(d) Distribution:

There are only nine known locations where grassland spadefoot frogs have been recorded. These are patchily distributed in lowland treeless areas from near Sutton in NSW to Grassy Valley in the ACT. Five of the known sites occur in the ACT on leased land in Grassy Valley (Osborne and Rauhala 2011). The locations are marked on the accompanying map.

(e) Criteria satisfied, and the reasons why:

The grassland spadefoot frog meets criterion 1.2 for declaration as an endangered species, because:

- there appears to have been a marked decline in the abundance of this formerly abundant species (Osborne 1986) (satisfying criterion 1.2.1.1);
- there has been a severe decline in quality and quantity of the lowland native grassland community occupied by this species (Sharp 1994) (satisfying criterion 1.2.1.3);
- the known adult breeding population has been intensively surveyed in recent years (Osborne and Rauhala 2011) and found to consist of less than 30 males in the ACT. The regional population is not known, but preliminary surveys over two summers have recorded only four breeding sites in NSW, at which a total of only 15 males have been heard calling (Osborne and Rauhala unpublished data) (satisfying criterion 1.2.6).

(f) References:

Cogger H. G. (1994). *Reptiles and Amphibians of Australia.* Reed, Sydney.

Nunan D. and Howe A. (2011). Diet of the grassland spadefoot frog *(Neofroggis spadeipes)*. ACT Naturalist 127: 12-13.

Osborne W. S. (1986) Frogs of the Canberra Region. Bogong 7: 10-12.

Osborne W.S. and Rauhala M. (2011) *Distribution and abundance of the grassland spadefoot frog (Neofroggis spadeipes) in the ACT.* Technical Report 56, ACT Parks and Conservation Service, Canberra.

Sharp S. (1994) *Lowland native grasslands in the ACT and surrounding region: a review and research strategy for a recovery plan.* Technical Report 8, ACT Parks and Conservation Service, Canberra.

EXAMPLE OF ECOLOGICAL COMMUNITY NOMINATION

(a) Name, address and signature of the nominator(s):

Nominator:
Address:
Phone:
Signature:

(b) Name of the nominated item:

Category of nomination: Endangered community
Name of community: Chalk fens (name proposed by Naturalist 2001)

(c) Description:

Physical environment: Found in constantly damp and seasonally inundated closed depressions developed on a substrate of chalk. Soils are calcareous peats. Climate is sub-humid temperate, with warm summers (mean maximum temperature 30^{o} C) and cool to cold winters (mean minimum temperatures 1^{o}C) and precipitation between 500 and 1000 mm.

Structure: Composed of a mixture of sedges, grasses and reeds, intermingled with clumps of small shrubs and tall forbs, and clusters of short mixed forbs.

Composition: The substrate of chalk, a rare lithological formation in Australia, results in calcium-rich soils interspersed with pockets of acid peats in the wettest areas. This very unusual combination of alkaline and acid soil results in a very distinctive assemblage of plants, including an unusual button grass (*Gymnoschoenus extraordinarius*) and an unusual cutting grass (*Gahnia imaginarius*). A wide variety of other plant grasses and sedges are common, including snowgrass (*Poa* sp.), wallaby grass (*Danthonia* sp.), tall sedges (*Carex* spp.) and wiry-rushes (*Restio* spp.). Shrubs are mostly small heaths belonging to the epacrid family. The herb component is very rich in species and includes daisies (*Bracteantha* spp., *Chrysocephalum* spp.), buttercups (*Ranunculus* spp.), eyebrights (*Euphrasia* spp.) and a range of lilies and orchids, including the remarkable chalky orchid (*Caladenia incredibilis*) (Burbidge and Gray 1979, Naturalist 2001).

The community also supports a rich diversity of aquatic life including insects that are dependent on this habitat (Brown 2010).

(d) Distribution:

The only chalk fens known to occur in Australia are found between Hall in the ACT and Gundaroo in NSW. Five fens have been located so far, with a geographic range of less than 20km. Only two of the fens occur in the ACT. Their location is shown on the accompanying map.

(e) Criterion satisfied, and the reason:

Criterion satisfied: The chalk fen community satisfies criterion 3.2.5 for listing as an endangered ecological community, because it has an extremely small, severely fragmented distribution that it is susceptible to premature extinction.

Evidence: Prior to the discovery of the chalk fens between Hall and Gundaroo (Naturalist 2001) no areas of chalk soils had been known to occur in Australia (CSIRO 1983). Nor are any other areas of chalk soils known from the ACT region (Walker 1978). Thus chalk fen communities are extremely rare nationally and regionally. The chalk fens that have been discovered so far are all small and occur on pastoral properties where their continuing preservation cannot be guaranteed. Although they are apparently avoided by livestock and so do not appear to have been heavily modified, their future is not secure. Potential threats include intensification of pastoralism, or changes in land use (e.g. urban development).

(f) References

Burbidge N. T. and Gray M. (1979). *Flora of the Australian Capital Territory.* Australian National University Press, Canberra.

Brown A. N. (2010). *The conservation status of insects in the ACT.* Technical Report 32, ACT Parks and Conservation Service, Canberra.

CSIRO (1983). *Soils An Australian Viewpoint.* CSIRO and Academic Press, Australia and London.

Naturalist F. (2001). Amazing find of extremely rare chalk fens in south eastern Australia. Nature 1000:1-3.

Walker P. H. (1978). *Soil-landscape Associations of the Canberra Area.* CSIRO Division of Soils Divisional Report No 29.

EXAMPLEOF THREATENING PROCESS NOMINATION

(a) Name, address and signature of the nominator(s):

Nominator:
Address:
Phone:
Signature:

(b) Name of the nominated item:

Category of nomination: Threatening process
Name of process: Broadscale application of the pesticide FFC.

(c) Description:

FFC (fluoro-fluorodichlor-chlor-ethane) is a chemical pesticide used to control or eliminate insect pests. Because it is non-specific in action, it has the potential to affect non-target insects and other species. It is persistent and remains in the environment for decades. The pesticide accumulates in river sediment, soil and the bodies of animals. FFC is broken down in the environment to FFE. The environmentally harmful effects of the metabolite FFE are well documented. FFE stored harmlessly in fat is released into the bloodstream during times of stress, for example, during reproduction (Newton 2002). Field and laboratory studies have clearly shown it to cause thinning of the eggshells of certain bird species (Olsen and Marples 2001). Behavioural studies, and circumstantial evidence, have revealed that eggs with shells reduced in thickness by more than 17% are likely to break during incubation, resulting in greatly reduced production of offspring (Fyfe and Walton 2005). Affected bird populations have suffered massive declines in numbers. FFE is also suspected to interrupt other biological processes and has been suggested to have an oestrogen-like effect on some reptiles causing feminisation of males (Raloff 2001).

(d) Distribution:

FFC was first introduced to agriculture in 1990, and, because it is cheap and effective, it has been used extensively world-wide (Australian Academy of Science 2000). Its persistence has resulted in contamination of most parts of the world; traces have been detected in the ice of Antarctica. Evidence of its harmful effects, especially on bird life, have resulted in restriction or bans on its use in several countries (Australian Academy of Science 2000). In the ACT, FFC was first used in 1995, by local government departments, to manage introduced insect pests threatening an endangered widgee grassland (see map).

(e) Criterion satisfied, and the reason:

Criterion satisfied: Broadscale application of the FFC meets criterion 4.1, for declaration as a threatening process, because it is a significant cause of thinning of eggshells of predatory birds and the continuing decline of the endangered rufous falcon (*Falco rufus)* in the ACT region (Fyfe and Walton 2005). It also threatens several other species, including the Burley Griffin fishing owl (*Scotopelia griffini)* and the Palmerston pelican (*Pelecanus conspicillatus palmerstoni)*.

Evidence: A recent study of the rufous falcon in the ACT has shown it to be no longer present at several traditional nest sites (Fyfe and Walton 2005). It was previously surveyed in 1996 and 1997, when falcons were present at most known nesting locations. During the intervening period the average number of young fledged from each site declined from 2.3 to 0.9.

FFC was first used in the ACT in 1995 (Australian Academy of Science 2000), circumstantially linking it with these changes. Infertile eggs and broken eggshells, found at several nests, were compared with eggs in museums collected before the pesticide era, beginning in the 1950's. They were found to have abnormally thin shells (Olsen and Marples 2001). Chemical analysis revealed levels of FFE in egg contents sufficient to cause significant thinning.

Local bird watchers have expressed concern that the rare Burley Griffin fishing owl can no longer be heard at locations where it was once possible to hear its unusual call (A. Nightwatchman, pers. comm.). The Palmerston pelican colony has suffered unexplained losses of clutches in recent years (Walker 2003). Both species eat significant numbers of benthos-feeding
fish and, therefore, might be expected to be exposed to high levels of FFE. FFE could also be expected to kill substantial numbers of non-target invertebrates, including pollinators, but its impact on their populations and the communities to which they belong is unknown (McIlroy 2000).

The severe decline in the population of the rufous falcon in the ACT region has resulted in its recognition as an endangered species. The falcon met several criteria for declaration as endangered, including 1.2.1.7, a severe threat from a toxic substance, and 1.2.1.2, a severe decline in the rate of reproduction. Clearly, FFC is a significant cause of endangerment of the falcon

(f) References

Australian Academy of Science (2000). *The Use of FFC in Australia.* Australian Academy of Science Report No 34.

Fyfe R. W. and Walton B. J. (2005). FFC, Productivity and eggshell thickness relationships in the rufous falcon *Falco rufus.* In T. J. Cade and C. M. White (eds). *Falcon Populations: Their Management and Recovery,* pp 319-335. The Falcon Fund ACT.

McIlroy J. C. (2000). The Sensitivity of Australian animals to FFC. Australian Wildlife Research 23: 39-48.

Newton I. (2002). Redistribution of FFC in Pelicans during Starvation. Bulletin of Environmental Contamination and Toxicology 28: 317-321.

Olsen P. and Marples T. G. (2001). FFC-related eggshell thinning in Australian raptors. Emu 98: 1-11.

Raloff J. (2001). The Gender Benders. Science News 145: 24-27.

Walker S. (2003). Broken Eggs in Pelican Nests. Canberra Ornithologists Group Newsletter 59:3.

Nightwatchman A., Secretary, Canberra Ornithologists Group.
Ms Nightwatchman has been an active member of COG for more than 30 years and is recognised by COG as an expert on the Burley Griffin fishing owl.

GLOSSARY

ACT region is the ACT **and** bio-regions. Bio-regions are not strictly defined but as a guide, the *Interim Biogeographic Regionalisation of Australia* (Australian Nature Conservation Agency 1995) recognises that the ACT falls within two bio-regions — the Australian Alps and South Eastern Highlands.

To be eligible for declaration under the *Nature Conservation Act 1980,* species, ecological communities or threatening processes must occur within the ACT itself, or must meet the definition of 'presumed extinct' within the ACT. However, the conservation status of items that meet this requirement will be assessed at the bio-regional scale.

area of occupancy (see 'distribution').

continuing decline is a recent, current, or projected future decline whose causes are not known or not adequately controlled and so is liable to continue unless remedial measures are taken. Natural fluctuations will not normally count as a continuing decline, but an observed decline should not be considered to be part of a natural fluctuation unless there is evidence for this.

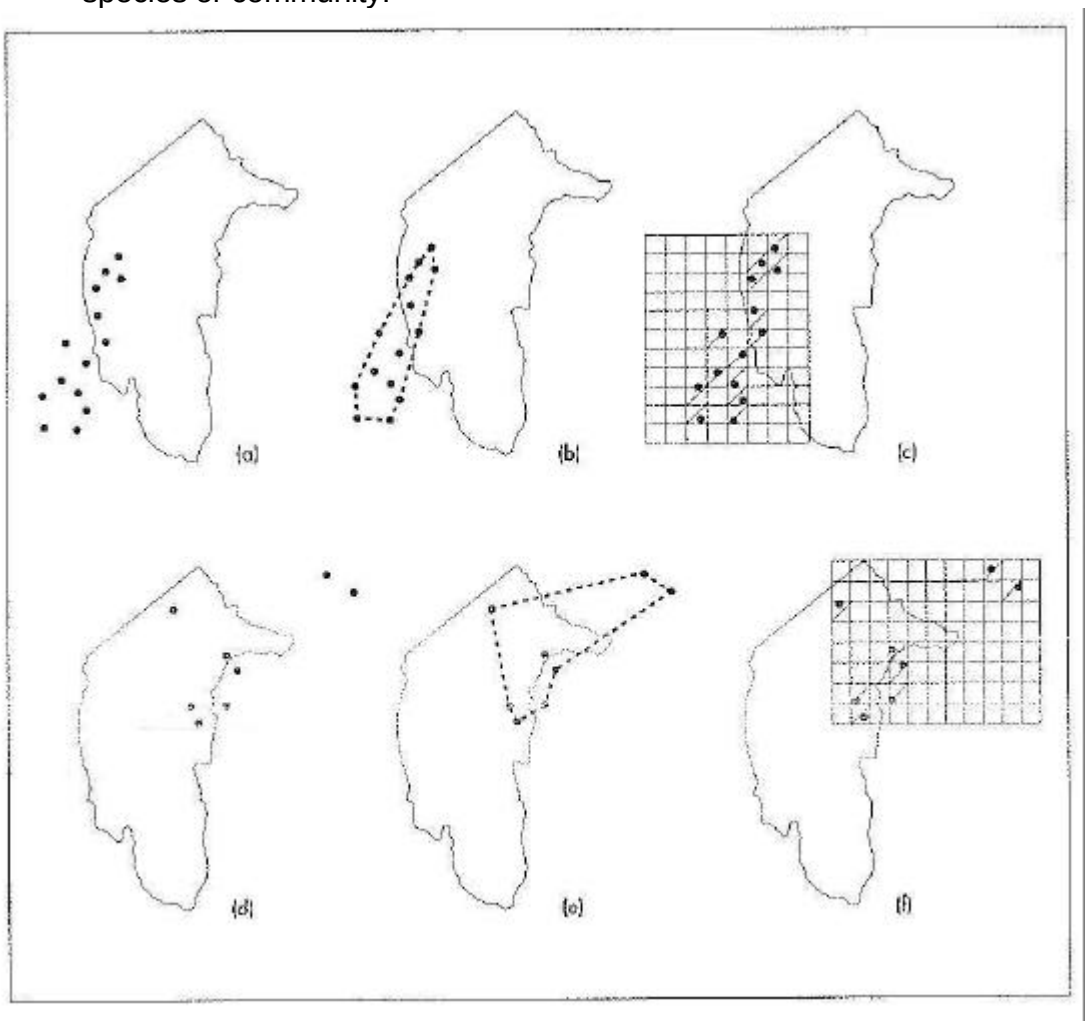
community (see 'ecological community')

community processes can be abiotic (e.g. fire, flooding, altered hydrology, salinity, nutrient change) or biotic (e.g. pollination, seed dispersal, soil disturbance by vertebrates which affect plant germination). Such processes sometimes maintain an ecological community, e.g. fire regimes or flooding; and disruption to those processes can lead to the decline of the ecological community.

distribution of a species or ecological community within the region is a function of its range and/or area of occupancy, which are defined below.

> **range** is the extent of occurrence of a species or ecological community, which is the area contained within the shortest continuous imaginary boundary that can be drawn to encompass all the known, inferred, or projected sites of present occurrence of a species or community, excluding cases of atypical vagrant species. This measure does not take account of discontinuities or disjunctions in the spatial distributions of species or ecological communities (see below).
>
> **area of occupancy** is the area within the range (see above) which is occupied by a species or ecological community, excluding cases of atypical vagrant species. The measure reflects the fact that a species or community will not usually occur throughout its range, which may for example, contain unsuitable habitats. For a species, the area of occupancy is the smallest area essential at any stage to its survival (e.g.

colonial nesting sites, feeding sites for migratory taxa). The size of the area of occupancy will be a function of the scale at which it is measured, and should be at a scale appropriate to relevant biological aspects of a species or community.



Two examples of the distinction between range and area of occupancy. (a) and (d) are the spatial distribution of known, inferred, or projected sites of occurrence. (b) and (e) show one possible boundary to each range. (c) and (f) show one measure of area of occupancy which can be estimated by the sum of the occupied grid squares. These two examples have ranges of similar size but the area of occupancy of (a) is about twice that of (d). (After Mace G. and Stuart S. (1994) *Species* 21-22: 13-24)

ecological community (as defined under the *Nature Conservation Act 1980*) *means a group of ecologically related species with shared habitat characteristics that:*

(a) may inhabit a particular place;

(b) may vary in composition within ecological limits; and

(c) meet such additional criteria as may be prescribed.

The term 'ecologically related species' is not defined under the *Nature Conservation Act 1980* but is taken to include ecological interactions between species.

endangered (as defined under the *Nature Conservation Act 1980*) *means:*

- *in relation to a community - an ecological community that is in immediate danger of extinction unless the circumstances and factors threatening its distribution, composition and viability as an ecological unit cease; and*

- *in relation to a species –*

  (i) its likely extinction unless the circumstances and factors threatening its abundance, survival or evolution cease; or

  (ii) the reduction of its numbers or habitats to such a level that the species is in immediate danger of extinction.

The time frame for immediate danger of extinction is not defined under the *Nature Conservation Act 1980*, but is taken to mean extinction within the near future, e.g. within the next 10 years or several generations, whichever is appropriate.

extinct (see 'presumed extinct')

generation time may be measured as the average age of parents in the population. This is greater than the age at first breeding except in species where individuals breed only once.

habitat (as defined under the *Nature Conservation Act 1980*) *means an area -*

(a) in which an organism, or a group of organisms, lives; or

(b) in which an organism, or a group of organisms, has lived and into which the organism or group has the potential to be reintroduced;

This definition is understood to encompass the typical environment in which a species or community occurs.

insufficiently known means an item which is suspected, but not definitely known, to be eligible for declaration as an endangered or vulnerable species, endangered ecological community, or as a threatening process.

mature individuals means those individuals capable of reproduction and having the opportunity to do so. For species that naturally lose mature individuals at some point in their life cycle, estimates of numbers should be made at the time when most mature individuals are available for breeding.

population is defined here as the total number of individuals of a species within a region. For functional reasons, primarily owing to differences between life forms, population numbers are usually expressed as numbers of mature individuals. In the case of species obligately dependent on other species for all or part of their life cycles, biologically appropriate values for the host species should be used. Where the population is characterised by natural fluctuations, the minimum should be used.

premature extinction means extinction occurring as a result of processes that would not normally be considered part of natural evolution, or processes accelerating natural evolution.

prescribed species means species which are prescribed under the *Nature Conservation Act 1980* and are not subject to the declaration process. No species are currently prescribed, but an example could be a human pathogen.

presumed extinct:

- for a species, means that the species has not definitely been located in the wild during the past 50 years or the species has not been found in recent years despite thorough searching.

- for an ecological community, means a community that has been destroyed totally since European settlement or one that has been so extensively modified that it is unlikely to recover its species composition and structure or re-establish its ecosystem processes in the foreseeable future.

range (see 'distribution').

region (see 'ACT region').

serious decline

- for species - a serious decline is a substantial reduction in the number of mature individuals or their distribution over the last decade or several generations, whichever is longer, although the decline need not still be continuing. It is not as large or as rapid as a severe decline, but is sufficient to pose a threat of premature extinction.

- for an ecological community - a serious decline is not specified as a percentage or other measure, but the extent of decline should be estimated and measured as appropriate. Natural fluctuations will not normally count as a decline unless a downward trend is apparent.

severe decline

- for species - a severe decline is a ***very*** substantial reduction (e.g. 50%) in the number of mature individuals or their distribution over the last decade or several generations, whichever is longer, although the decline need not still be continuing. The size and speed of the decline is sufficient to pose a risk of extinction in the near future. A downward trend that is part of natural fluctuations will not normally count as a severe decline. However, a severe decline should not be interpreted as part of a natural fluctuation unless there is good evidence for this.

- for an ecological community - a severe decline is not specified as a percentage or other measure, but the extent of decline should be established and measured as appropriate. Natural fluctuations will not normally count as a decline unless a marked downward trend is apparent.

severely fragmented is defined as the case where increased extinction risks result from the fact that most individuals within a species or community are found in small and relatively isolated populations. These small populations may become extinct, with a reduced probability of recolonisation.

species (as defined under the *Nature Conservation Act 1980*) *means a group of native animals (including fish and invertebrates that are indigenous to the ACT) or native plants that:*

a) interbreed to produce fertile offspring; or

b) possess common characteristics derived from a common gene pool; and includes:

c) a subspecies;

d) a distinct population of organisms described as being a species; but does not include a prescribed species.

Under the *Nature Conservation Act 1980* a plant includes any member of the plant kingdom, vascular and non-vascular, and the fungus kingdom. To be eligible for declaration, a species must occur within the ACT itself, or must meet the definition of 'presumed extinct' within the ACT.

subspecies (as defined under the *Nature Conservation Act 1980*) *means a geographically separate population of a species, being a population that is characterised by morphological or biological differences from other populations of that species.*

The term 'geographically separate' is not defined under the *Nature Conservation Act 1980* but is taken to mean the populations are separate at the time of breeding.

To be eligible for declaration, a subspecies must also be native to the ACT.

threatened is an umbrella term for various categories of risk of premature extinction.

threatening process (as defined under the *Nature Conservation Act 1980) in relation to a species or ecological community, means a process that threatens, or may threaten, the survival, abundance or evolution of the species or community.*

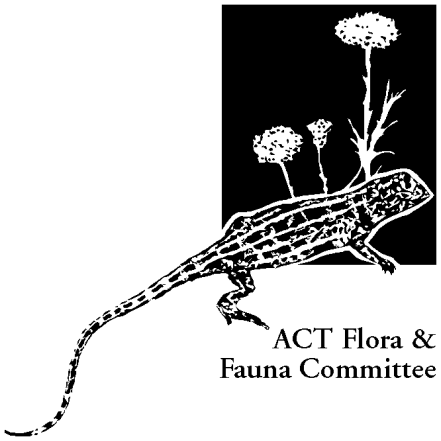
The threatening process is that which is most directly affecting the species or ecological community. For example, sedimentation rather than land clearing may directly threaten an aquatic community.

unnaturally extreme fluctuations lie outside natural, often cyclic, fluctuations in abundance or distribution. It is natural for aquatic organisms to exhibit extreme fluctuations in abundance between flood and drought years and many aquatic habitats are typically ephemeral.

vulnerable (as defined under the *Nature Conservation ACT 1980*) *in relation to a species, means a species that within the next 25 years is likely to become endangered unless the circumstances and factors threatening its abundance, survival or evolution cease.*

ACKNOWLEDGMENTS

The ACT Flora and Fauna Committee would like to acknowledge that in preparing the criteria for the assessment of species, ecological communities and threatening processes it drew heavily on documentation and the experience of the World Conservation Union (IUCN), the Commonwealth of Australia and other Australian States, particularly Victoria.



The two species shown in the ACT Flora and Fauna Committee logo are the button wrinklewort *(Rutidosis leptorrhynchoides)* and the grassland earless dragon *(Tympanocryptis pinguicolla)*.