



Building Nature's Safety Net Initiative



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Protected area gaps for
threatened Australian animals
identified from recovery plans

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Executive summary

We report here for the first time, an assessment of gaps in protection of habitats for terrestrial and freshwater animal species considered threatened by habitat loss or degradation, based on an analysis of available recovery plans for those species.

Of 402 animal species currently listed as threatened under federal law, only 29% or 115 species could reliably be classified as habitat-constrained using information contained in recovery plans. Almost all were vertebrates, with most major vertebrate classes represented.

Among the 87 species with available trend data, an alarming 94% showed on average declining population trends in the 2002 Terrestrial Biodiversity Assessment.

Only 67% of recovery plans for habitat-constrained species prescribed new protected areas as a recovery action. Private land covenants were commonly prescribed, although it was unclear to what extent this can be taken to mean covenants of high permanency and security of purpose. The remaining recovery plans overwhelmingly recommend improvements in management without clear long term security of arrangements.

Only 54% of recovery plans had sufficient information to estimate the proportion of current habitat protected.

Of the 35 species with recent plans and adequate information, 43% had less than 10% of existing habitat protected, and 60% had less than 50% protected in protected areas at the time of adoption of the plan. Endangered species were more likely to have better protected habitats than vulnerable species, often because their remaining extent of habitat is very small.

Protection of future critical habitats in plans was almost completely lacking, and this flaw must be addressed as a matter of urgency in the light of climate change.

Queensland had the highest proportion of habitat-constrained threatened species, and was also the most poorly protected state in terms of proportion of land area protected. Queensland had the largest share at 39% of species with less than 10% of habitat protected, of those that could be estimated.

However caution should be taken in using threatened species as a basis for prioritization of reserve system growth generally, due to the biased and incomplete nature of species level data. Ecosystem diversity sampling targets as presently used should remain the main guide for reserve system growth.

Recommendations

- ☑ Recovery plans should be developed for threatened species with priority to species endangered by threats that can be readily and cost effectively abated.
- ☑ Recovery planning should be closely and more formally integrated into reserve system planning through bioregional planning processes.
- ☑ Recovery plans ideally should include spatially explicit knowledge of past, present and potential future distributions of habitats critical to recovery of threatened species, factoring in possible range shifts due to climate change where feasible, or time-bound targets for acquiring this information.
- ☑ Special attention is needed for protection of threatened species habitats in Queensland, the state with the lowest proportion of land area protected, and the highest proportion of species with poorly protected habitats.

Introduction

We report here, for the first time, an assessment of the extent of protection of habitats of terrestrial animal species threatened by habitat loss or degradation using data compiled from recovery plans.

Since 1992 Australia has developed a comprehensive framework of commitments to protect biodiversity:

- The Convention on Biological Diversity to which Australia is party in Article 8 on In-situ Conservation states:

"Each Contracting Party shall, as far as possible and as appropriate: (a) Establish a system of protected areas or areas where special measures need to be taken to conserve biological diversity; (b) Develop, where necessary, guidelines for the selection, establishment and management of protected areas or areas where special measures need to be taken to conserve biological diversity;"
- Australia's National Strategy for the Conservation of Australia's Biodiversity implements these CBD commitments. Objective 1.7 seeks to: "Enable Australia's species and ecological communities threatened with extinction to survive and thrive in their natural habitats and to retain their genetic diversity and potential for evolutionary development..." This objective is to be realized amongst other things by Objective 1.4: "Establish and manage a comprehensive, adequate and representative system of protected areas covering Australia's biological diversity."
- The Commonwealth Environmental Protection and Biodiversity Conservation Act ("EPBCA") provides a regime of listing of threatened species, assessment and approval of actions that might adversely affect threatened species, abatement of threats and recovery plans.
- A recent intergovernmental commitment of the Australian, state and territory governments is to include endangered species in the National Reserve System as a priority by 2010.¹

Land and water uses that result in habitat loss or degradation pose the key threats for most threatened species in Australia.² Recovery of threatened species typically requires measures to protect their critical habitats – those habitats that a species needs to recover and avoid extinction.

Species without critical habitats were more likely to be declining and less likely to be recovering than species with critical habitats designated under the US Endangered Species Act.³

Critical habitats are required by the EPBCA to be defined in recovery plans, along with actions required to protect those habitats. However, habitats defined in a recovery plan do not enjoy any statutory protection from harm unless they also appear on the official register, a decision subject to Ministerial discretion. Only five have been registered during the eight years of operation of the EPBC Act. In the absence of an effective critical habitat provision in the EPBCA, protected areas remain the main conservation option for permanently securing actually existing critical habitats from harm.

Under the protected areas program of work of the Convention on Biological Diversity, the preparation of "gap" analyses is a basic commitment of the Australian Government but has yet to be completed. A gap analysis for ecosystems was produced as part of the 2002 Terrestrial Biodiversity Assessment, but not for threatened species.⁴

In this study, we make a preliminary assessment of how well Australia protects the habitats of threatened species in the National Reserve System. The National Reserve System is Australia's network of national parks and nature reserves, Indigenous protected areas, and protected areas on

private land. We scored recovery plans or equivalent documents as to whether habitat protection was an identified need, the extent to which habitat was protected at the time of the plan and the recommended recovery actions for habitat protection. For methods see endnote 5.

Results and Discussion

A total of 402 animal species were listed under the EPBC Act at the time of the analysis. Of these, about 75% were excluded from the study because:

- they were extinct or presumed extinct.
- they were marine or confined to small island which tend to be very special cases for conservation.⁶
- insufficient information was available with which to make a judgement about whether habitat protection was needed for recovery.
- habitat protection was considered in recovery plans to be low priority for recovery. This included species which were threatened primarily by disease (eg frogs threatened by chytrid fungus) or by pervasive threats such as inappropriate fire regimes, pests or weeds.

This left a sample of 115 terrestrial habitat-constrained species for which habitat protection was considered important in the recovery or other relevant plan.

Almost all species in decline

Population trend data were available from the 2002 Terrestrial Biodiversity Assessment for 87 of these habitat-constrained species.

94% were declining according to the Assessment data. Only one species had a recovering or improving population trend. This result suggests that habitat loss and degradation for many habitat-constrained species is ongoing and that habitat loss has not been adequately addressed.

Lack of recovery plans, and lack of plans with adequate information

The limitations of this study derive from the lack of recovery plans and the paucity of useful information in recovery plans.

Many threatened species still lack recovery plans. The poor record of recovery plan development and review was criticized recently by the Auditor General.⁷ Single species recovery plans (but not multi-species plans) have been shown to be statistically strongly associated with recovering populations trends for US endangered species.⁸

For some species, the results shown here likely underestimate true levels of habitat protection because:

- information in older recovery plans is out-of-date and more habitats have been protected since the publication of recovery plans
- habitat loss as a threat has been curtailed by recent reforms such as banning of broad-scale land clearing in Queensland.

However, for other species habitat loss and degradation have increased as a threat, for example due to the expanding urban footprint in coastal areas or increasing fragmentation.

The threefold categorization of species here by proportions of habitat protected is necessarily crude since proportions were estimated from heterogeneous data - some from detailed spatial information about habitat, some from population information, some from simple lists of occupied “sites”.

This study was unable to assess the adequacy of the habitat protection and management achieved by protected areas. Such data were not available in recovery plans in a quantifiable form.

- ☑ Recovery plans should be developed for threatened species with priority to species facing threats that can be readily and cost-effectively abated.

Protected areas recommended in most recovery plans

Of the 402 animal species or subspecies listed under the EPBC Act, only 115 had a recovery plan or equivalent document in which habitat protection was considered relevant to their recovery.

Of these 115 “habitat-constrained” species:

- 103 listed habitat loss as a threat
- 107 listed protection of existing habitat as a recovery goal
- 12 listed protection of potential habitats as a recovery goal
- 11 listed critical habitat designation as a recovery action
- 71 listed protected areas either as reserves or covenants on private lands as recovery actions (Table 1).

Protected areas created by covenants or restrictions on land titles are a common prescription for recovery actions, representing 63% of all plans that prescribed protected areas as a recovery action (Table 1). However it could not be determined from plans if such covenants would be of sufficient standard or permanency of security for meaningful protection. Covenants are not necessarily permanent or long term and vary considerably in levels of security of purpose. Even when a covenant is permanent, landholders may not enjoy sufficient incentive to pursue the conservation actions needed for recovery such as fire, pest and weed management.

Table 1. Protected areas as recovery actions

Protected area prescription	Total
Covenant only	34
Reserve only	26
Both	11
Subtotal	71
None	44
Total	115

Many plans ignore protected areas as a recovery action

Plans for a total of 44 species (38%) did not prescribe protected areas as a recovery action although 42 of these same plants identified habitat loss as a threat. In two of these plans, there was a single remaining population already entirely in a protected area and one had existing critical habitat in a reserve.

Among the rest, alternate conservation prescriptions were dominated by changes in land, forest, water or (for bats) roost site management as follows:

- change in management (34)
- regulation (2)
- critical habitat proposed (2)
- habitat restoration (1)
- none (1)

Management prescriptions were often but not always, generically defined and typically took the form of guidelines rather than binding prescriptions.

In the absence of protected areas, the permanence of prescribed changes in management is typically not assured.

- Recovery planning should be closely and more formally integrated into reserve system planning through bioregional planning processes.

Most species lack significant protection of existing habitat

Of the 115 habitat-constrained species, information was sufficient for 62 (54%) to enable categorization of the extent of existing habitat protected at the date of the plan (Table 2).

- 45% had very poor habitat protection, with less than 10% of their habitat in protected areas at the time of publication of their recovery plan
- 69% had very poor to poor habitat protection, with less than 50% of existing habitat protected at time of publication of the plan.

Of the subset of 35 species with recent plans and adequate information, 43% had less than 10% of existing habitat protected, and 60% had less than 50% protected at the time of adoption of the recovery plan (Table 2).

Table 2. Estimates of extent of protection of existing habitats for all species with plans and for species with recent plans only (2001 and later).

% existing habitat protected	EPBC Act status			Total	% all species	% of species with recent plans only
	Critically endangered	Endangered	Vulnerable			
<10% (very poor)	2	16	10	28	44%	39%
10 - <50% (poor)	1	9	6	16	25%	20%
50%+ (substantial)	3	13	4	20	31%	41%
Total	6	38	20	64	100%	100%

Surprisingly, these proportions were not much different in more recent plans compared with all plans, although the reserve system has been growing steadily through the period of interest.⁹

Endangered and critically endangered species were somewhat better off than vulnerable species, with 64% having less than half of existing habitat protected compared with vulnerable species at 81% (Table 2).

Only 41% of those with recent plans had at least 50% of their habitat in protected areas (Table 2).

This should not be taken to indicate however, that these species are well-served by protected areas. Many of these species survive in a very few small populations. Although protected inside parks or reserves small populations are still highly vulnerable to extinction from catastrophic events such as floods, cyclones, fires or epidemics.

Some species only survive now because their last remaining habitat was protected. Their eventual recovery to the point that they are no longer threatened with extinction depends on future expansion into potential or restored habitat which, accordingly, should be protected.

Protection of future critical habitats rarely considered

Very few recovery plans in the sample (12.5% see above) recommended formal protection of potential or future critical habitats; those habitats needed for expansion of recovering populations.

Even fewer attempted to define the extent of potential critical habitats and relevant recovery actions for potential habitats, and this mostly took the form of simply noting the sometimes huge range contractions that species had suffered.

Although some plans might include recovery action, such as planting trees to restore wildlife corridors, the identification and protection of such habitat was generally lacking.

Recovery plans have a short time horizon of five years, so it is understandable that attention should focus on protecting existing habitats. In the absence of a longer view, however, opportunities to secure potential habitat may be lost.

The lack of protection of future critical habitats presents a major problem for Australia's threatened species under climate change. A recent CSIRO assessment found that the National Reserve System is a key adaptation response to climate change for threatened species:

“Protecting habitat is probably the best way to conserve species under climate change”.

But the study also notes that a small scattering of protected areas will not be enough:

“the question of adequacy is much more challenging. In general, larger areas and more populations of species would probably be required to ensure the same viability for species as could be expected without climate change.”¹⁰

The identification and protection of future critical habitats for threatened species must become an essential part of an effective response to climate change. A larger protected area estate is needed within which species can shift to more climatically suitable protected habitats or contract to refuges, and so survive the extra pressures that climate change will bring. The federal government recently announced a program to identify refuges for protection, in response to expert recommendations.¹¹

- ☑ Recovery plans should include spatially explicit knowledge of past, present and potential future distributions of habitats critical to recovery of threatened species, factoring in possible range shifts due to climate change, or time-bound targets for acquiring this crucial information

Queensland has most poorly protected species, least land protected

Habitat-constrained threatened species were predominantly distributed in the eastern states (Table 3).

Queensland stands out as having:

- the highest proportion of all habitat-constrained threatened species (Table 3)
- the largest share of species with very poor (39%) and poor (43%) levels of habitat protection (Table 3)
- the smallest percent of land area under protected areas.¹²

Table 3. States in which habitat-constrained, threatened animal species occur.¹³

State	% all species with <10% habitat protected	% all species with <50% habitat protected	% of all species
New South Wales (including Australian Capital Territory)	11%	25%	34%
Northern Territory	7%	5%	8%
Queensland	39%	43%	44%
South Australia	14%	11%	15%
Tasmania	14%	16%	11%
Victoria	11%	18%	21%
Western Australia	18%	16%	15%

Nevertheless, numbers of threatened species in any given state are likely biased and should not be used as the primary basis to determine priority areas for expanding the National Reserve System for the following reasons:

- More species may be listed in these states simply due to greater listing effort compared with less populous states/territories like the NT and northern WA.
 - Many species in more remote areas may actually be endangered now or in future due to climate and land use change, but are simply not yet listed due to lack of effort. It is worth noting here that in contrast to the concentration of threatened species in the south-eastern states, the majority of mammal extinctions in the past 200 years have taken place in remote inland habitats.¹⁴
 - The proxy approach that presently guides National Reserve System growth of sampling ecosystem level diversity represents an unbiased means of sampling all biodiversity in the absence of comprehensive knowledge of distributions and status of threatened species.¹⁵
- ☑ Special attention is needed for protection of threatened species habitats in Queensland, the state with the lowest proportion of land area protected, and the highest proportion of species with poorly protected habitats.

CASE STUDIES

Species with little protection in the reserve system

Not surprisingly, a high proportion of Australia's threatened animals are dependent on the most threatened ecosystems, those that have been most severely affected by clearing and development, and which are poorly protected in the National Reserve System, such as temperate grasslands, eucalypt woodlands and freshwater ecosystems.

Freshwater ecosystems are under extreme pressure in the most developed parts of the country, but have long been neglected in the reserve system.

The Mary River cod (*Maccullochella peelii mariensis*) is one of Australia's most endangered fish. The now out-of-date recovery plan estimated that the species occurred in less than 30% of their former known range in the Mary River system.¹⁶ The remaining populations are isolated from each other due to dams and weirs.

The endangered Mary River turtle (*Elusor macrurus*) does not even have a recovery plan. The 2008 Commonwealth Conservation Advice issued by the Threatened Species Committee records threats due to dams and weirs, clearing and grazing.

These endangered species have no part of their habitat in reserves and are threatened imminently by a proposed dam as well as ongoing degradation of habitat due to pastoral, agricultural and urban land uses in the catchment.

The Conservation Advice for the Mary River turtle includes a recommendation to investigate formal conservation arrangements such as reserves and conservaton agreements. Although the recovery plan for the cod does not address tenure issues, it includes recommendations for large-scale rehabilitation of riparian habitats in the Mary River catchment and a moratorium on dams.

Species whose habitat protection has improved

One of Australia's most threatened habitat types is lowland grasslands in southeastern Australia, with less than 0.5% of the original extent remaining in "even semi-natural condition".¹⁷ Some efforts are being made to reserve some of the remnants and their dependent species.

The Corangamite water skink (*Eulamprus tympanum marnieae*) is endemic to the basalt plains of southwestern Victoria and survives as 11 populations found at only 31 sites.¹⁸ Its now out-of-date recovery plan said it existed mostly on private grazing properties and had no habitat in reserves.¹⁹ The problem for the skink recognised in the plan was that:

"land managers or owners have no obligation to manage the land sympathetically for *E. t. marnieae*, and they have the ability to exterminate populations through inappropriate land-use practices."

The plan recommended protection of habitat in reserves as a priority and also proposed voluntary conservation and land management agreements.

The water skink is now protected in three Lake Reserves. A Nature Conservation Reserve and two private properties were purchased specifically for conservation of the skink.²⁰ Nonetheless, about 90% of its habitat remains on private lands used mostly for agriculture, some of which has been fenced for habitat protection.

The endangered grassland earless dragon has just four populations known to have survived the extensive clearing of grasslands. On the Darling Downs in Queensland, where a genetically distinct

population has recently been rediscovered, only about 1% of original native grassland remains.²¹ The now out-of-date recovery plan for the dragon recommended more inclusion of habitat in reserves as there was only a single reserve at the time of the plan. In 2004 the ACT government announced plans to protect part of one of the populations in reserves.²² However, this has yet to happen and other populations remain mostly unprotected.

Species with all existing habitat protected, but little future critical habitat protected

Protection of all existing habitat in reserves does not guarantee survival for some threatened species, and recovery requires population expansion into potential habitats that are presently unoccupied.

The entire remaining population of about 115 northern hairy-nosed wombats (*Lasiorchinus krefftii*) is protected in 300ha of remnant habitat inside Epping Forest national park in central Queensland. The park was excised from two cattle stations in 1971 and gazetted specifically to save this last remaining population. However, as the recovery plan notes, there are grave risks associated with maintaining just one population, which could be wiped out by predators, fire, disease, flood or drought.²³

A major objective of the recovery plan for the once widespread wombat is to establish new wild populations. To this end, potential habitat from Charters Towers to St George has been mapped. The Queensland government recently announced the first translocation attempt, which will see a small colony of wombats moved to a new nature refuge on private property near St. George.²⁴

Endnotes and References

- 1 Natural Resource Management Ministerial Council. 2004. *Directions for the National Reserve System – A Partnership Approach*. Department of the Environment and Heritage, Australian government, Canberra. ('Directions')
- 2 Sattler P, Creighton C, 2002. *Australian Terrestrial Biodiversity Assessment*. Australian government, National Land and Water Resources Audit, Canberra. <http://www.anra.gov.au/topics/vegetation/pubs/biodiversity>
- 3 Taylor MFJ, Suckling KF, Rachlinski JJ, 2005. The Effectiveness of the Endangered Species Act: A Quantitative Analysis. *BioScience* 55, 360-367.
- 4 A gap analysis simply identifies species and ecosystems that lack sufficient protection in a protected area system. CBD programme of work target 1.1.5 is for completion of PA system gap analyses at national and regional levels by 2006 <http://www.cbd.int/decisions/?m=COP-07&id=7765&lg=0>

5 Methods

The study is confined to terrestrial animal species officially listed as threatened and for which habitat loss or degradation was considered important in recovery plans.

A total of 402 animal species are listed under the EPBC Act. Of these about 75% were excluded because:

- species were extinct or presumed extinct.
- species were marine or small island confined (even if they formerly inhabited the mainland), the latter because they tend to be very special cases for conservation.
- insufficient information was available with which to make a judgment about whether habitat protection was relevant to recovery.
- habitat protection was considered a minor consideration for recovery. This included species which were threatened primarily by disease (eg frogs threatened by chytrid fungus) or by pervasive landscape factors such as inappropriate fire regimes, pests or weeds.

This left a sample of 115 species for which habitat protection was considered relevant to recovery based on information contained in the recovery or other plan. These species are termed "habitat-constrained" species. For each of these habitat-constrained species, recovery plans (including drafts, 62%), Commonwealth Listing or Conservation Advices (20%), and state/territory recovery strategies/plans (18%) (collectively referred to as "plans") that were readily available were scored for the identified need for habitat protection in four categories:

- habitat loss was a known, likely or potential threat
- protection of existing habitat was a recovery goal
- protection of potential habitat was a recovery goal
- habitat protection was recommended as a recovery action either through (i) new reserves, (ii) registrations of critical habitats or (iii) covenants on private land.

For these species the proportion of current or potential habitat under protected areas was scored in three broad categories, where known:

- <10% protected (very poor),
- 10-50% protected (poor),
- >50% protected (good-fair)

Some of this information was explicit in the plans/advices, but in a few cases was implied and so has been interpreted.

The categories of % habitat protected were not always based on area. For instance, where a plan said only one of three populations of a threatened species was protected in a reserve it was assumed that 33% of habitat was protected even though in reality the one protected population might cover much greater or lesser an area than the other two.

Terrestrial Biodiversity Assessment database InkSpecies table contains estimates of subregional population trends for some of these species. A species-wide trend was derived by averaging trends across bioregions, after quantifying the qualitative trend scores as follows: Extirpated from subregion -3, Rapidly declining -2, Declining -1, Stable 0, Improving 1.

The species in the final filtered dataset included:

- | | |
|-----------------|-----|
| • Invertebrates | 10% |
| • Fish | 10% |
| • Amphibians | 7% |
| • Reptiles | 21% |
| • Birds | 31% |
| • Mammals | 22% |

6 Nevertheless many of the same problems of habitat loss and degradation occur on inhabited islands, and these species will be included and treated separately in a subsequent paper.

- 7 The Auditor General. 2007. *The Conservation and Protection of National Threatened Species and Ecological Communities, Department of the Environment and Water Resources*. Performance Audit Report No.31 2006–07, Australian National Audit Office, Canberra.
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- 24 Queensland Government 2008. *Mining Leader Digs Deep for Endangered Wombats*. 9 May 2008 media release.