# Science for Saving Species

**Research findings factsheet** Project 4.4: Identifying and managing refuges from threats



National Environmental Science Programme

## **Protected areas for threatened species conservation:** Are they enough?

In Australia, as around the world, protected areas have a central role in halting biodiversity decline. Australia is one of the first nations to have claimed to have met the target of terrestrial area coverage of 17% protected areas. With the expansion of protected area networks here and worldwide, it is vital to understand their effectiveness at conserving biodiversity. Australia makes a useful case study, with its history of recent extinctions and a further 1749 species listed as threatened under the EPBC Act as of early 2017. We set out to assess the extent to which protected areas can abate the processes that threaten species.



Figure 1: The number of Australian threatened species facing each of the major threat classifications (a) and the relative impact of each major threat classification on Australian threatened species (b). "Relative impact" is the cumulative number of specific threats within a major threat, for example, a species may be threatened by an invasive plant species and an invasive animal species and therefore be impacted twice by the major threat classification, "Invasive species".



#### Scope of the research

We looked at the major threats impacting each Australian threatened species for which data was available. We asked if simply designating an area as protected was sufficient to alleviate threats to each species. And if not, how much benefit do protected areas provide on their own. We also examined whether targeted management within protected areas is effective in achieving conservation of threatened species.

The study considered all threatened terrestrial and freshwater vertebrate, invertebrate and plant species, as well as marine species that rely on land or freshwater for a part of their life-cycle, numbering 1555 of the total 1749 currently threatened species.

The Endangered matchstick banksia (Banksia cuneata) is threatened by weed invasion, rabbits, road maintenance and inappropriate fire regimes. Photo: Jean and Fred Flickr CC 2.0



#### **Identifying threats**

We used the Species Profiles and Threats (SPRAT) database to identify both Australian threatened species and the specific pressures they face. Its information is compiled using a range of sources including listing advice, recovery and action plans, published literature and expert knowledge. It is likely that this information is not exhaustive and that the listed threats are those that are obvious and tangible to managers of threatened species – meaning that subtle threats may be overlooked and not reported. The SPRAT database follows the Standardized Threats Classification Scheme, which is used by the IUCN for the Red List process. It allows for classification across regions and taxonomic groups. The Scheme sets out 11 direct threat types and one type for new and emerging threats, and is based on a three-level hierarchy. The first level, major threat, is the broadest; the second level, sub-threat, is more defined; and the third level, specific threat, is at the finest scale of detail. The 11 categories of major threat and their sub-threats are set out in Table 1.

 Table 1: Descriptions of major threat classifications.
 For each major threat we have also listed: typical conservation actions taken to mitigate the threat; and an assessment of the management of that threat within protected areas.

Major threat classification	Description	Sub-threats	Key conservation actions	Threat management scenario
Residential & commercial development	Threats from human settlements or other non- agricultural land uses with a substantial footprint	Commercial & industrial areas, housing & urban areas, residential & commercial development, tourism & recreation areas	Site/area protection	Unmanaged
Agriculture & aquaculture	Threats from farming $\vartheta$ ranching as a result of agricultural expansion $\vartheta$ intensification, including silviculture, mariculture $\vartheta$ aquaculture (includes the impacts of any fencing around farmed areas)	Agriculture, aquaculture, livestock farming/grazing, timber plantations	Site/area protection	Unmanaged
Energy production &mining	Threats from production of nonbiological resources	Oil & gas drilling, mining, quarrying & renewable energy	Site/area protection	Unmanaged
Transportation & service corridors	Threats from long, narrow transport corridors & the vehicles that use them including associated wildlife mortality	Roads & railroads, shipping lanes, transportation & service corridors, utility & service lines	Site/area protection	Unmanaged
Biological resource use	Threats from consumptive use of wild biological resources including both deliberate & unintentional harvesting effects; also persecution or control of specific species	Fishing/harvesting/collecting/ gathering terrestrial, marine & aquatic species	Site/area protection & management, compliance & enforcement	Well-managed
		Commercial logging	Site/area protection	Unmanaged
Human intrusion & disturbance	Threats from human activities that alter, destroy & disturb habitats & species associated with non- consumptive uses of biological resources	Human intrusion & disturbance, recreational activities, work & other activities, military exercises	Site/area protection & management	Well-managed
Natural system modifications	Threats from actions that convert or degrade habitat in service of managing natural or seminatural systems, often to improve human welfare	Dams & water management	Policies & regulations	Landscape management
		Fire & fire suppression, other ecosystem modification	Site/area protection & management	Well-managed
Invasive & other problematic species, genes & diseases	Threats from non-native $\vartheta$ native plants, animals, pathogens/microbes, or genetic materials that have or are predicted to have harmful effects on biodiversity following their introduction, spread $\vartheta$ /or increase in abundance	Invasive non-native species, problematic native species	Site/area protection & invasive/problematic species control	Well-managed
		Invasive diseases, pathogens & parasites	Invasive/problematic species control	Landscape management
Pollution	Threats from introduction of exotic &/or excess materials or energy from point & non-point sources	Garbage & solid waste	Site/area management, compliance & enforcement	Well-managed
		Agricultural & forestry pollutants, excess energy, urban sewage & waste water; industry/ military pollution	Legislation & policies & regulations	Landscape management
Geological events	Threats from catastrophic geological events	Landslides	Habitat & natural process restoration	Well-managed
Climate change & severe weather	Threats from long-term climatic changes that may be linked to global warming $\vartheta$ other severe climatic/ weather events that are outside of the natural range of variation, or potentially can wipe out a vulnerable species or habitat	Climate change, severe weather, droughts, storms & flooding, temperature extremes, habitat shifting/ alteration	Habitat & natural process restoration & species reintroduction	Well-managed

#### **Identifying management**

The team used government threat abatement plans and peer reviewed literature to identify potential management actions to mitigate each of the 11 threat types. We classified each of the threat types according to how effectively the protected area network could overcome it, based on three distinct threat management scenarios for protected areas:

- 'unmanaged', for legally designated protected areas where threat management does not take place
- 'well-managed', for those legally designated areas where funding and resources are adequate to effectively manage threats within their boundaries
- Wider-scale 'landscape management', for where coordinated responses are required across protected and non-protected areas for those threats that can't be adequately mitigated even in the bestmanaged protected areas, for example, invasive diseases and pathogens.

Taking into account that local context influences the most appropriate action to overcome each threat, we identified the conservation action or combination of actions that would generally be used to mitigate each threat.

#### **Key findings**

Australian threatened species are under pressure from numerous threats. Many of these operate irrespective of land tenure (e.g., invasive species, changed fire regimes), which means that intensive on-ground landscape management is needed to reduce their impacts.

Based on these protected area management scenarios, unmanaged protected areas can remove one or more threats to 1185 species (76%) and all threats to only very few species (3%, n = 51).

Well-managed protected areas would remove one or more threats to almost all species (n = 1551, or approximately 100%) and all threats to almost half of the species (n = 740, or 48%).

Finally, a total of 815 species (52%) face one or more threats that require landscape management, or coordinated conservation actions that protected areas alone could not remove.

Table 2: How effectively major threats to threatened species can be removed by unmanaged protected areas, well-managed protected areas, landscape scale management (co-ordinated management of threats across all land tenures outside of protected areas) or well-managed protected areas plus landscape management.

	'Unmanaged' protected area scenario	'Well-managed' protected area scenario	Landscape management	All management types combined
Total number of threats removed to all threatened species	3,056 (26%)	10,220 (86%)	1,651 (14%)	11,871 (100%)
Number of threatened species with one or more threats removed	1,185 (76%)	1,551 (100%)	815 (52%)	1,555 (100%)
Number of threatened species with all threats removed	51 (3%)	740 (48%)	4 (<1%)	1,555 (100%)

While habitat loss has impacted on the growling grass frog, on of the major threats, chytrid fungus, cannot be mitigated by protected a Photo: Matt from Melbourne CC by 2.0



### For more information:

Stephen Kearney, Vanessa Adams, Richard Fuller, Hugh Possingham and James E.M. Watson (2018) Estimating the benefit of well-managed protected areas for threatened species conservation, Oryx https://doi.org/10.1017/S0030605317001739



biggest threats to the Northern Quoll. Photo: Nicolas Rakotopare

#### Implications for reserves and the national reserve estate

While we acknowledge that few protected areas are unmanaged, based on published information available on the topic (NSW Government 2007, Taylor et al. 2011, Victorian Government 2015), it is likely that many protected areas are not being adequately resourced to manage the threats posed to species within their boundaries. Where this is the case, these protected areas are unlikely to be achieving their fundamental goal of conserving biodiversity.

Far greater emphasis needs to be placed on the management of protected areas. Simple reporting of how much of the country is within a protected area means very little for species conservation.

Additionally, 10% of species have no representation in protected areas (Watson et al. 2011).

For over half of Australia's threatened species, landscape scale management beyond protected areas is needed to manage at least one major threat. So, conservation actions beyond protected areas remain vital to the conservation of threatened species.

#### Recommendations

Our findings highlight a need to improve the evaluation of threat management effectiveness within and beyond protected areas, and to accurately report on it. New protected areas should be established and, critically, management both within and outside the current protected area network needs to be adequately funded if protected areas are to achieve their fundamental purpose of the conservation of threatened species. As the majority of Australian species face multiple threats requiring management to abate, unmanaged protected areas cannot effectively remove the majority of threats to Australian species.

The best-case scenario of 48% of threatened species having all threats removed is contingent on adequate funding. We support the findings of Taylor et al., who made a case that an estimated seven-fold increase in investment is needed to fill the

current management and protection gap in Australia's protected area network. We base our support on the finding that where protected areas are inadequately funded to undertake threat management, few species (3%, n = 51) will have all threats removed.

A further recommendation is to provide committed funding for programs such as 'Country Needs People', as they are critical to managing the threats to Australian biodiversity.

A too-narrow focus on the simple expansion of the protected area network to 17% of terrestrial land coverage is highly likely to lead to inadequate responses to halting biodiversity decline. With the efforts of the global community focusing on halting threatened species decline in protected areas facing comparable challenges, we expect our findings to be similar for many other nations.

#### References

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