



WWF

REPORT

AUS

2017

Building Nature's Safety Net 2016:

The state of Australian terrestrial
protected areas 2010-2016

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EXECUTIVE SUMMARY

National parks, reserves and other protected areas are vital to the survival of Australia's unique fauna and flora – animals and plants found nowhere else in the world – and to our valuable nature tourism industry. National parks and other protected areas also provide many other valuable 'ecosystem services' (benefits of nature) including by protecting our rivers, coasts, forests and soils.

Although progress continues to be made towards a truly ecologically representative protected area system which covers at least 17% of Australia's total land area by 2020, Australia remains less than halfway to achieving this important commitment to the United Nations *Convention on Biological Diversity*. Some 1,691 Australian ecosystems and 121 species of national significance lack any representation in protected areas, while only 36 of 85 Australian bioregions have reached the 2020 commitment of 17% of total area protected. Approximately 53 million hectares would need to be protected to reach minimum standards of ecosystem protection.

The key policy initiative needed to meet the Australian commitment under the *Convention on Biological Diversity*, conserve Australian wildlife, plants and ecosystem services, is restoration of the National Reserve System grants program, which was terminated in 2012-13. This could be achieved by the Australian Government restoring \$170 million per year in funding to the National Reserve System Program from the existing Natural Heritage Trust budget. Doing so would provide sufficient funds to meet the 2020 *Convention on Biological Diversity* protected area commitment through the purchase or covenanting and management of new public, private and Indigenous Protected Areas (IPAs). No new budget measures are required.

DESERT WETLAND IN THE NORTHERN TANAMI DESERT
N PARAKU INDIGENOUS PROTECTED AREAS (IPA), WESTERN AUSTRALIA © TANYA VERNES / WWF-AUS



INTRODUCTION

The necessity and value of protected areas

Saving our threatened species and ecological communities requires enduring change in land management to reduce threats. Terrestrial protected areas are places where land management is dedicated in perpetuity to the conservation of nature and the reduction of threats. Protected areas differ fundamentally in intent from the wider landscape where the management priority is natural resource exploitation for production of goods or human habitation.

By conserving nature however, protected areas also maintain economically valuable ecosystem services to satisfy human material and non-material needs including clean water and air, climate regulation, recreation, tourism, pest control, pollination and wild genetic resources for agriculture, industry and pharmaceuticals. The ecosystem services flowing from all Australian terrestrial protected areas into our society exceed \$38 billion every year.¹

Although some ecosystem services can be difficult to quantify in dollar terms, nature tourism is not. Australian nature tourists spend at least \$23.6 billion a year and visitors from overseas comprising the bulk of that figure, one of our biggest export markets and one that relies on the national parks system for its continued existence and whose development is constrained by lack of growth in the national parks system.²

Commitments

All Australian governments in 2009 recognised the primary importance of strategic growth of protected areas to the survival of Australian wildlife and rivers, coasts, forests and soils, and the ecosystem services they provide. All jurisdictions therefore committed to long-term strategic growth targets in *Australia's Strategy for the National Reserve System 2009-2030*.³

In 2010, Australia also committed to the *Convention on Biological Diversity Strategic Plan for 2011-2020*, specifically Aichi Target 11 that:

*By 2020, at least 17% of terrestrial and inland water, and 10% of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.*⁴

Protected areas play an indispensable role in preventing extinction and recovery of species currently declining to extinction.⁵ Aichi Target 11 is a pre-condition to attainment of Target 12 in which Australia also committed that:

*By 2020, the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.*⁶

The Australian Government has asserted that it has already achieved Aichi Target 11.⁷ This briefing shows that this is not correct, by quantifying the 'gap' between the *ecologically representative protected areas* commitment under Aichi Target 11, and present levels of protection at bioregional, ecosystem and species level.

¹ Taylor MFJ, Fitzsimons JA, Sattler PS, 2014. *Building Nature's Safety Net 2014: A decade of protected area achievements in Australia*. WWF-Australia, Sydney (referred to as "BNSN 2014" hereafter).

² Ibid.

³ <https://www.environment.gov.au/system/files/resources/643fb071-77c0-49e4-ab2f-2207333beb30d/files/nrsstrat.pdf>

⁴ In decision X/2, at its 10th meeting in Aichi Prefecture Japan, the Conference of the Parties adopted a *Strategic Plan for Biodiversity for the 2011-2020 period* including 20 so-called Aichi Targets (<https://www.cbd.int/sp/targets/>).

⁵ Taylor MFJ et al, 2011. What works for threatened species recovery? An empirical evaluation for Australia, *Biodiversity and Conservation* 20, 767–777.

⁶ See note 5

⁷ <http://www.greghunt.com.au/Home/LatestNews/tabid/133/ID/3093/Transcript-Doorstop-Sydney.aspx>

SYSTEM PERFORMANCE

Change in area protected

Australia's system of protected areas is also known as the National Reserve System. On land this includes federal, state and local government parks and reserves, Indigenous Protected Areas, sanctuaries run by land trusts and private properties under protected area covenants.⁸ Australia's large multi-jurisdictional marine reserve system is outside the scope of this report.

Terrestrial protected areas⁹ grew from 2010 to 2016 by about 42 million ha, bringing the total land area protected from 13.5% to 19.1% of Australia's land area. Growth was dominated by additions of large Indigenous Protected Areas primarily in Western Australia (WA) and the Northern Territory (NT) and typically in the IUCN multiple-use protected area category VI (Figure 1).

Strict protected areas (primarily national parks in IUCN categories I-II) showed little net growth from 2010 to 2016, remaining at 7.7% of national land area (Figure 2). This derives from two major factors. First, the Australian Government's National Reserve System program of matching grants for strategic acquisitions was discontinued in late 2012, despite having been a major driver of growth of protected areas, particularly new national parks, from 2008 to 2012.¹⁰ Second, strictly protected areas fell in the Northern Territory when three conservation reserves and 15 national parks were changed from IUCN categories I or II to categories IV, V and VI (Figure 2) in the Collaborative Australian Protected Areas Database (CAPAD) 2014. However, this change in categorisation reflects more correct application of the IUCN categories, and does not represent any material shift in management.¹¹

When the 2010 and 2016 versions of CAPAD are compared, a total of 480,000 ha in at least 107 protected areas in 2010 CAPAD ceased to appear as protected areas in 2016 CAPAD. The two major changes were Calperum Station (about 247,000 ha) which was delisted as a Commonwealth protected area in 2012 (Figure 2)¹² and removal of protected area status for state forests previously on track for transfer to national parks in 2012-13 in Queensland, in total covering about 200,000 ha. Fortunately, Calperum Station has since been added back into the National Reserve System by virtue of a Heritage Agreement under South Australian law.¹³

⁸ Covenants are commitments by landholders to refrain from damaging actions or to undertake beneficial actions that encumber land titles and bind successors in title.

⁹ Defined as those with an assigned IUCN Management category in CAPAD.

¹⁰ BNSN2014.

¹¹ Advice provided by the Parks and Wildlife Commission of the Northern Territory 21/6/2017. Also, see Box 5 in BNSN2014 for an earlier example of revising IUCN categories for South Australia.

¹² <http://www.environment.gov.au/system/files/resources/d183eae2-b91f-4200-88c2-d0720070416d/files/stateofparks1112.pdf>

¹³ Department of Environment and Energy advice as of 13/6/2017.

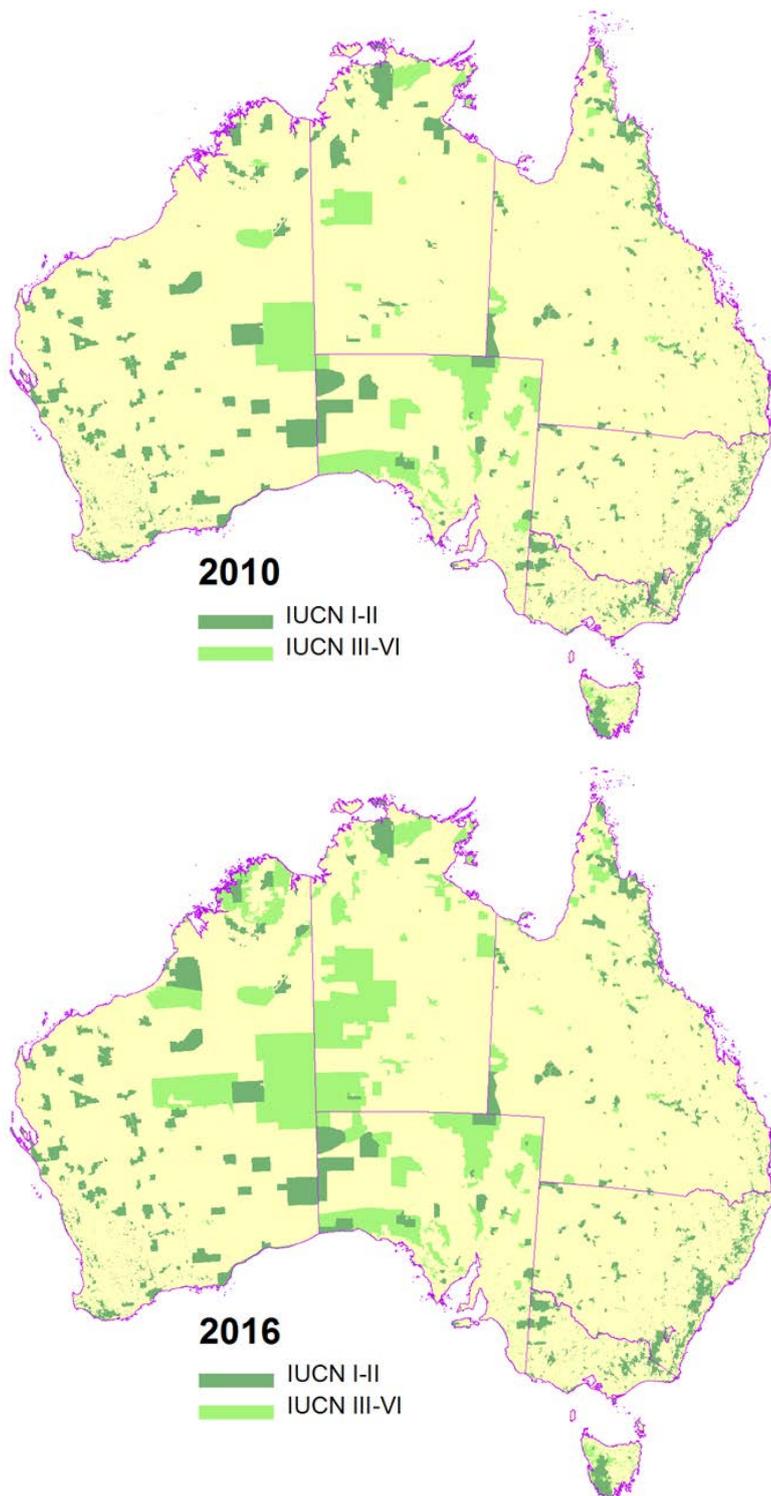


Figure 1. Protected areas on land in Australia, 2010-2016. The 2016 map is based on an interim CAPAD 2016 as provided by the Department of Environment and Energy, not the official CAPAD 2016 release, which had not yet been released at time of publication. Only areas with an assigned IUCN management category are shown.¹⁴

¹⁴ <http://www.environment.gov.au/marinereservesreview/home>

Not shown in these figures (Figure 1, Figure 2), were some major new national parks (Cape York Peninsula Aboriginal Land) in Queensland including Olkola (250,000 ha), and Shelburne National Parks (about 30,000 ha) that were not included in the Australian Government’s 2016 interim CAPAD layer.¹⁵

Likewise missing from CAPAD are many private protected areas under covenants in New South Wales (NSW), Victoria (Vic) and WA. In CAPAD 2014, there were 1,223 protected areas covering 7.3 million ha that were listed as having exclusively private governance. An independent analysis reported in contrast that in 2013 there were approximately 5,000 private protected areas, covering 8.9 million ha, leaving a significant gap of 1.6 million ha unaccounted for in this analysis. Until the locations of these missing protected areas are made public we will be unable to provide a more up to date estimate of the extent to which Australia’s protected area system meets Aichi Target 11.¹⁶

Bioregional protection

Having more than 17% of Australia’s total land area in protected areas is not sufficient to meet Aichi Target 11. The protected area system must also be *ecologically representative*.

A minimum condition for *ecologically representative* is that each of Australia’s terrestrial ‘ecoregions’ (termed bioregions in Australia) meet the 17% target.¹⁷

There was substantive improvement in ecological representativeness when measured at the bioregional scale from 2010 to 2016, with an increase of six bioregions moving to 17% or more of total area protected, in protected areas of all types. The number of bioregions with less than 17% of area protected have correspondingly fallen, and there is now only one bioregion (Sturt Plateau in the Northern Territory) which is below 1% protected (Table 1).

Nevertheless, only a minority of bioregions, 36 of 85, have attained the Aichi Target 11 level of 17% protected while nearly a third are still at less than half that level of protection (Table 1).

Table 1. Numbers of bioregions in classes of increasing proportion of total area protected.¹⁸

Bioregional area protected	2010	2016
<1% protected	2	1
1% to <8% protected	26	23
8% to <17% protected	27	25
17%+ protected	30	36

¹⁵ <http://statements.qld.gov.au/Statement/2016/5/11/new-laws-for-national-parks-recognise-traditional-owners-and-improve-tenure-resolution-on-cape-york>; <http://statements.qld.gov.au/Statement/2016/12/15/sands-of-shelburne-returned-to-traditional-owners>

¹⁶ Fitzsimons JA, 2015. Private protected areas in Australia: Current status and future directions. *Nature Conservation* 10, 1-23.

¹⁷ Woodley S et al, 2012. Meeting Aichi Target 11: What does success look like for protected area systems? *Parks* 18, 23-36.

¹⁸ Interim Biogeographic Regionalisation of Australia (IBRA) version 7, excluding small bioregions in external territories.

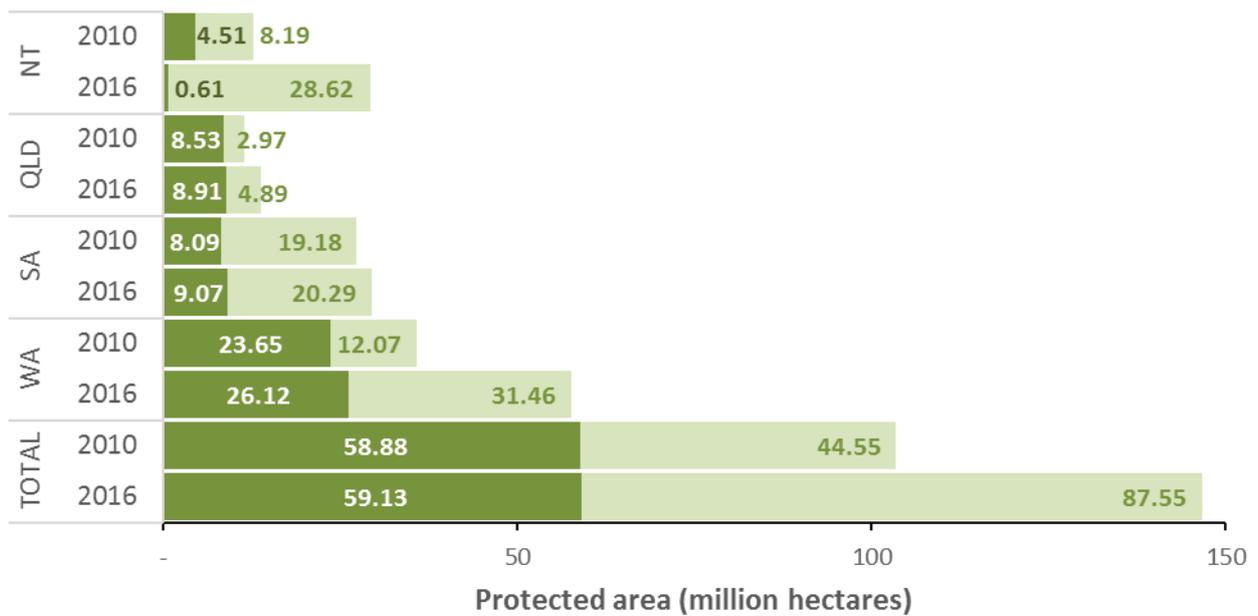
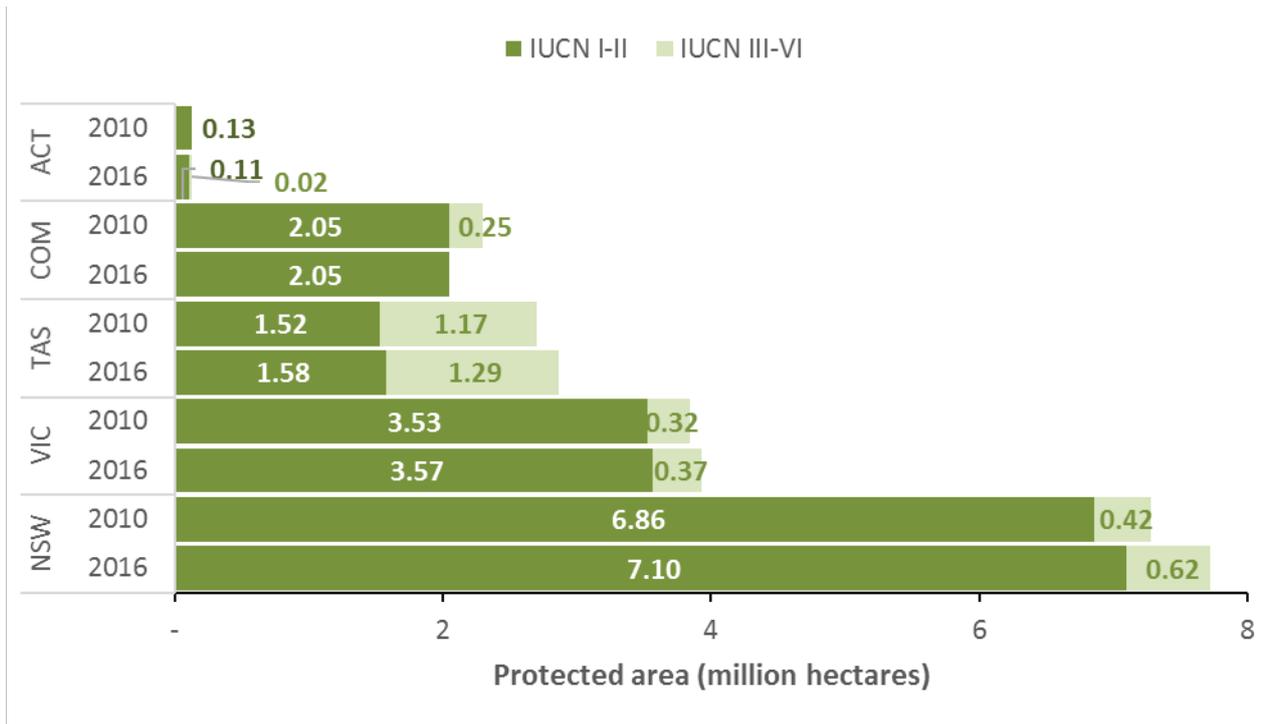
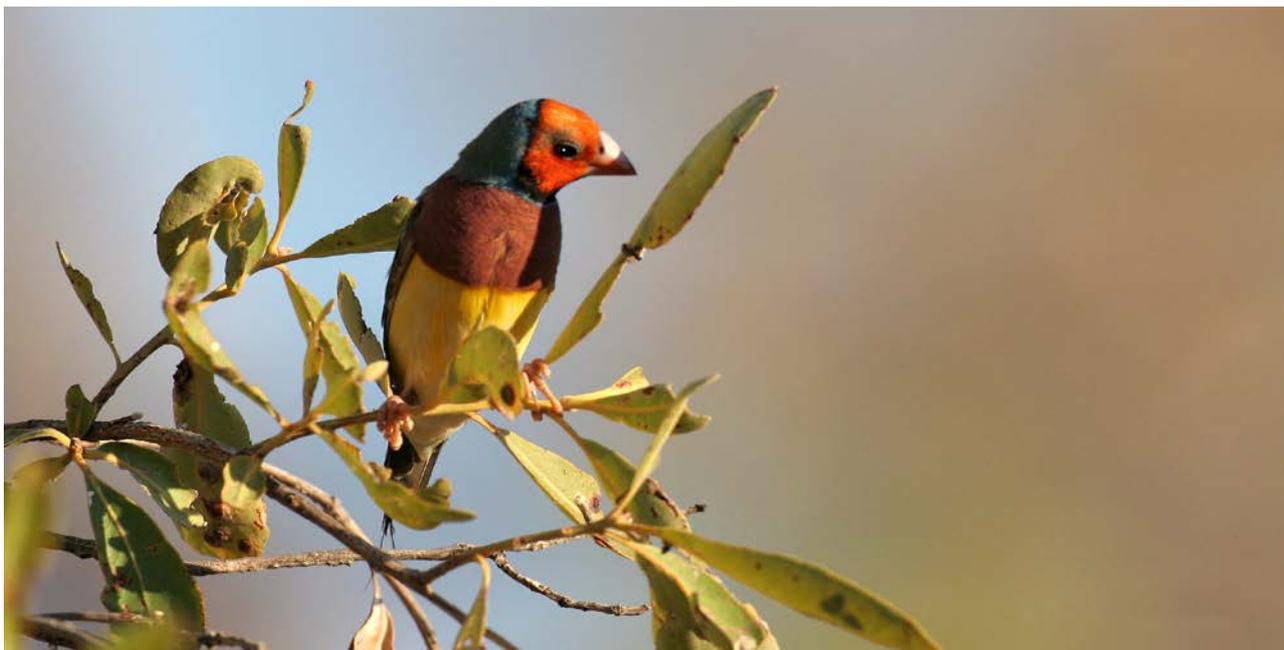


Figure 2. Extents of terrestrial protected areas by jurisdiction in 2010 and 2016. Jurisdictions are ordered by increasing area protected. The Commonwealth jurisdiction ('COM') includes Kakadu and Uluru-Kata Tjuta National Parks in the Northern Territory, Calperum and Taylorville stations in South Australia and Booderee National Park in Jervis Bay Territory, as well as external island territories, but excludes the Australian Antarctic Territory. Sources as in Fig. 1.



Ecosystem protection

Even well represented bioregions may contain *regional* ecosystems that are poorly represented. As in previous reports, we examine ecological representativeness at the finer scale of regional ecosystems.

For ecosystem proxies, we used 6,249 intersections between sub-bioregions and major vegetation subgroups. Intersections less than 100 ha and unclassified or unknown vegetation, were excluded, in total covering about 788,000 ha. While we recognise that these ecosystem proxies are not necessarily adequate proxies of functioning, discrete natural ecosystems, for simplicity we will refer to them here as ecosystems. See Methods section below for more details.

We set a minimum ecosystem protection standard of 15% of the total area of each ecosystem, or greater than 15% for smaller ecosystems.¹⁹

In 2010, 1,905 (30%) ecosystems lacked any protection, and by 2016 this had reduced to 1,691 (27%) (Figure 3). The overall gap area for ecosystem representation declined by over 8 million ha over the study period (Figure 3). As growth over the period was dominated by Indigenous Protected Areas in desert bioregions in the Northern Territory and Western Australia, advances in representation have been highly localised and primarily in arid grasslands and shrublands or semi-arid woodlands (Figure 3).

Representation in strict protected areas declined as a result of changes of IUCN categories in the NT while in other jurisdictions change was minor or static (Figure 3). Correspondingly, forest and woodlands strictly protected to the minimum standard declined over the period of study (Figure 3).

As of mid-2016, the overall ecosystem protection gap (summing across all ecosystems) was about 53 million ha. Australia is now more than halfway toward meeting the minimum protection standard for ecosystems with 55% of the total gap filled, whereas in 2010 it was less than halfway (47% filled, Figure 3).

Among broad vegetative types, wet forest ecosystems are the best protected, while wetland ecosystems have the poorest levels of protection. Only 28% by area of the minimum standard for wetland ecosystems has been met, summing across all ecosystems (Figure 3).

Queensland still has the largest absolute and proportional regional ecosystem protection ‘gap’, in the order of 17.5 million ha (or 71%), though the gap closed by a significant 1 million ha over the study period.

¹⁹ Unless 15% less than 1,000 ha, in which case at least 1,000 ha. If total ecosystem area is less than 1,000 ha, 100% of the ecosystem is required for this standard.

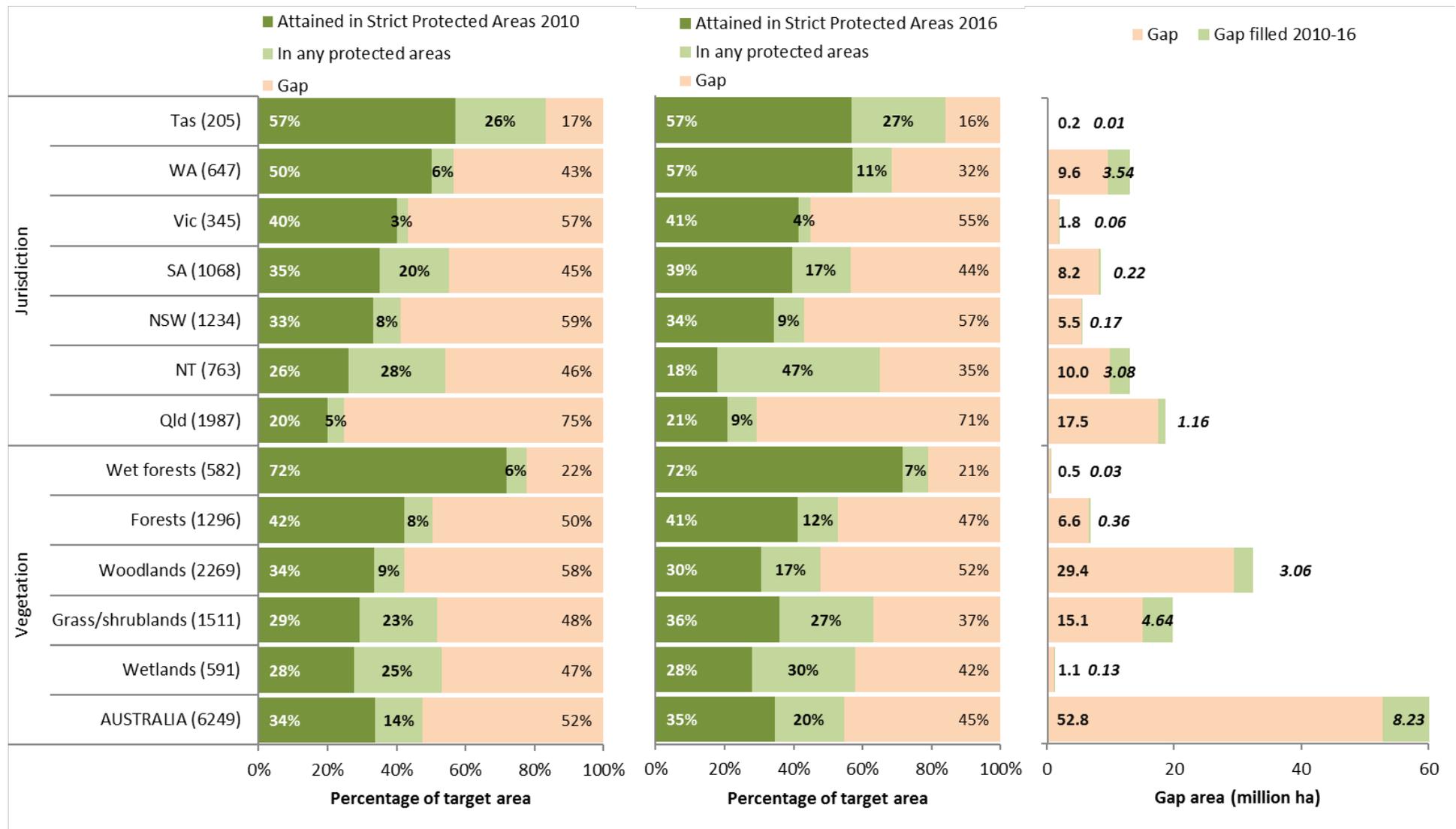


Figure 3. Areas contributing toward the minimum 15% protection standard for 6,249 terrestrial ecosystems, for strict and multiple use protected areas in 2010 and 2016 by jurisdictions and vegetation type, and the gap areas remaining to be filled to reach the standard for all ecosystems (NOTE: In contrast to Fig 2 above, Commonwealth protected areas in this graph are included in the jurisdictions in which they occur rather than being separately accounted for, while the ACT is also included in the NSW subtotal).



Protection of habitats for species of national significance

The final element of ecological representativeness examined here is species. Some 1,733 Species of National Environmental Significance (SNES) listed under the Australian Government *Environment Protection and Biodiversity Conservation Act* (EPBC Act) with terrestrial habitats are included in this analysis because they are the species most pertinent to the Australian Government's biodiversity jurisdiction. This total includes 137 species with both marine and terrestrial habitats, such as sea lions, marine turtles or sea snakes.

As in previous reports, we set a minimum protection standard for these SNES of 30% of the total area of the mapped known- or likely-to-occur habitat as mapped by the Australian Government, or greater than 30% for smaller range size.²⁰ We separately accounted for species meeting the standard in strict protected areas alone, and those meeting the standard in all types of protected areas.

In 2016, 121 SNES had no known- or likely-to-occur habitat in a protected area, down from 133 in 2010. Numbers of SNES lacking protection declined slightly in every jurisdiction except the Northern Territory, Victoria and Tasmania, the latter two jurisdictions already with few species lacking protection (Figure 4).

Numbers of SNES meeting the 30% minimum standard entirely in strict protected areas actually fell from 577 to 574 from 2010 to 2016. However, numbers meeting the standard in any protected area increased from 705 to 741 (Figure 4). The former figure is attributed to the reassignment of national parks to multiple use categories in the NT and latter figure to the extensive growth of multiple use Indigenous Protected Areas over the period relative to strict protected areas (Figure 2).

Not shown as a separate category are species primarily in external and Commonwealth territories (160) or species covering multiple jurisdictions (59 species with less than 50% of range in any given jurisdiction). These species are included in the national totals but not shown in their own category (Figure 4).

As in the previous report, much lower proportions of critically endangered species met the standard in any protected areas. Also, the proportion of critically endangered species with no protection at all (15%) was more than double that for endangered (7%), or vulnerable species (5%) (Figure 5). In 2016, 28 of 190 critically endangered species lacked any habitat protection.

Under-representation of critically endangered and endangered species is associated with generally smaller range sizes. Species with smaller ranges were much less likely to have attained the standard than were large range species (Figure 5). Also, critically endangered and endangered species are more likely to have smaller range sizes (Figure 6).

Invertebrates, fish and reptiles have the lowest proportions of species attaining the minimum standard, while frogs, mammals and birds have higher proportions meeting the standard, a situation little changed since 2010 (Figure 5).

²⁰ For habitats, we used spatial data for known and likely to occur habitats of *Species of National Environmental Significance* provided by the Australian Government in Jan 2016. May-occur habitats and species for which only may-occur habitats were available were disregarded. See Methods below for more detail.

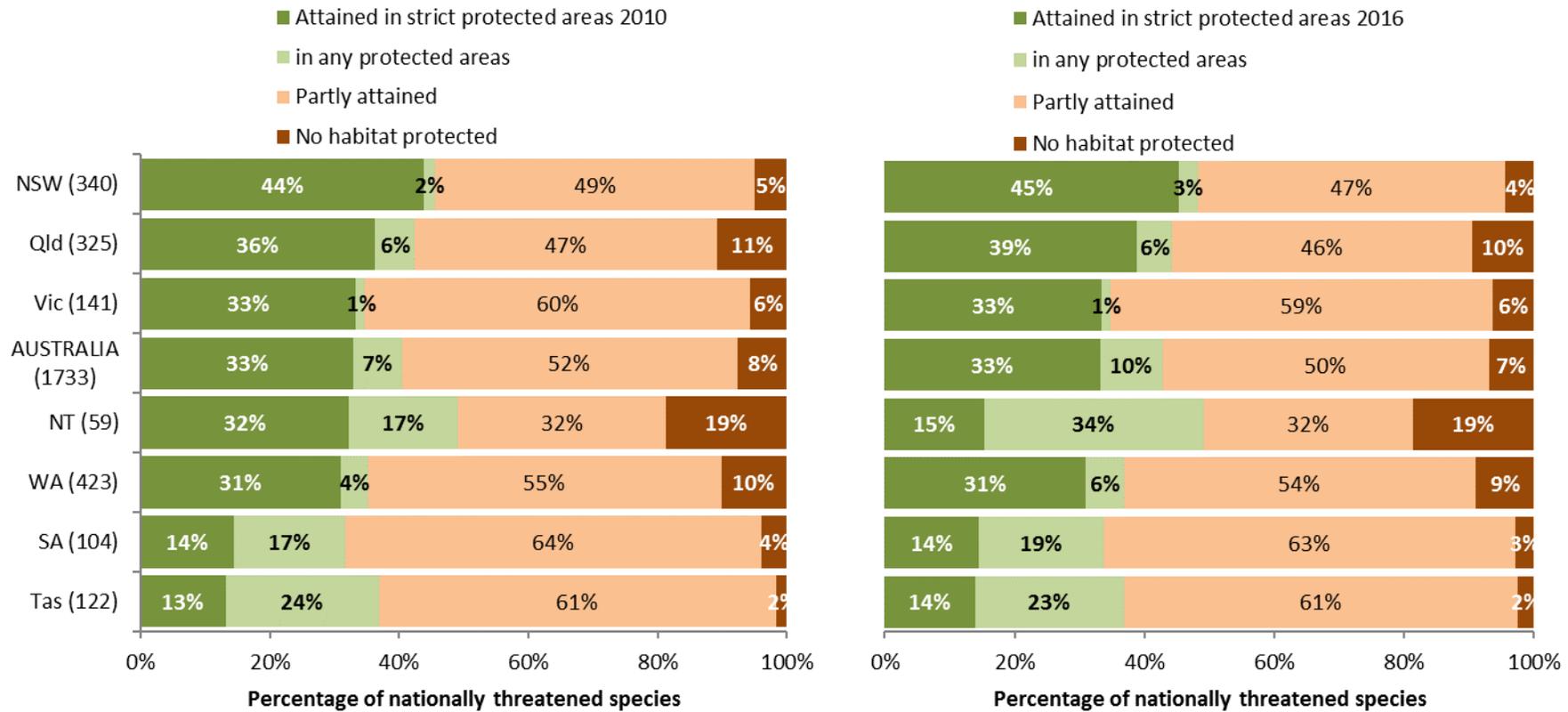


Figure 4. Species of National Environmental Significance (SNES) meeting the minimum 30% habitat protection standard in 2010 and 2016 by jurisdictions in which at least 50% of their range falls. 111 species too wide-ranging to be assigned to a single jurisdiction or in an external or Commonwealth jurisdiction were included in the national total, but not as separate categories.

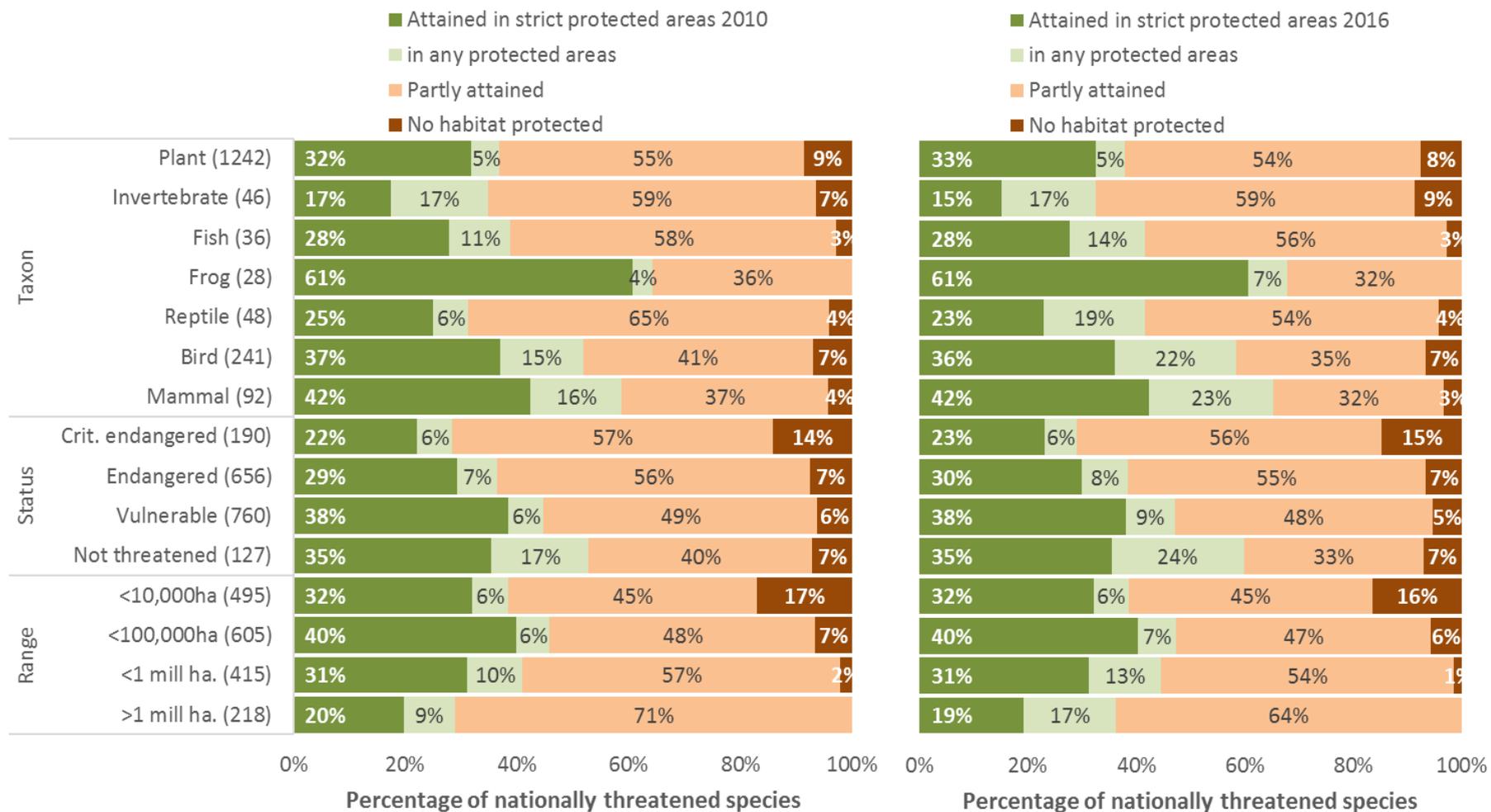


Figure 5. Species of National Environmental Significance (SNES) meeting the minimum 30% protection standard for known or likely to occur habitats, in 2010 and 2016 by taxon, conservation status under the EPBC Act, and range size.

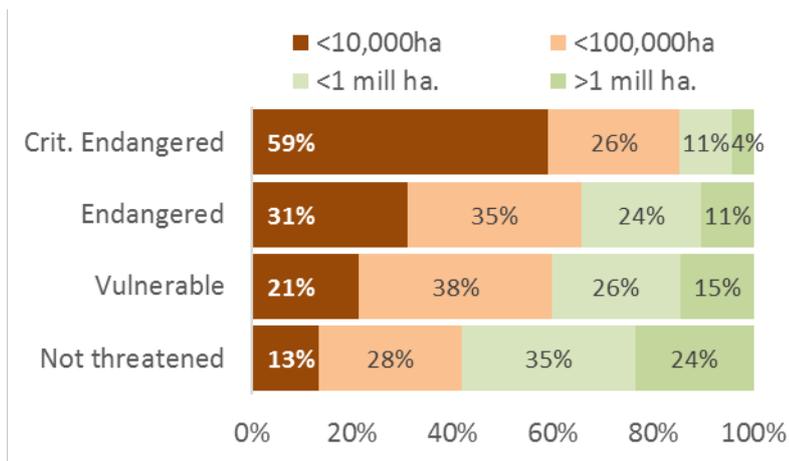


Figure 6. Distributions of range sizes of Species of National Environmental Significance (SNES) of different conservation status.

Application of IUCN categories

As in previous reports, we have distinguished between strict protected areas in IUCN categories I-II (wilderness, scientific reserves and national parks) and other ‘multiple-use’ protected areas (categories III-VI) in which some natural resource exploitation may occur, most commonly livestock.²¹

The presence of commercial natural resource exploitation on protected areas raises the question of whether the protected areas conform to the internationally accepted IUCN definition of protected areas and the management guidelines for the categories claimed to apply.²²

Transparent collection and sharing of evidence is needed to demonstrate that allowed levels and locations of resource exploitation on multiple use protected areas are consistent with IUCN guidance and do not impair the primary nature conservation purpose.

However, even strict protected areas in IUCN categories I-II are not guaranteed to be free of resource exploitation. Queensland has the aberrant situation that 85 separate grazing authorities are current over 32 national parks. Almost all are term leases, the longest of which does not expire until 2039, at such point the current government intent is that they will not be renewed.²³

For purposes of this analysis we have not attempted to analyse whether IUCN category listed in CAPAD is correct. Recent changes in IUCN categories in NT and SA have recognised that previous listing of certain national parks under category II were incorrectly assigned and a significant number of national parks and other reserves have been moved to multiple use categories.

²¹ For example, in Queensland, regional parks are generally IUCN III but can allow livestock grazing. In the NT, the Lake Woods Conservation Covenant listed as IUCN IV, is also grazed by stock.

²² <https://www.iucn.org/theme/protected-areas/about/protected-areas-categories>

²³ Briefing provided by the Dept of National Parks Dec 2015.

CONCLUSION

The chief policy driver for protected area system growth has been Australia's commitment under the Convention on Biological Diversity Aichi Target 11 that "By 2020, at least 17% of terrestrial and inland water" will be protected in "ecologically representative and well connected systems of protected areas" among other things. In this report, we assess the ecological representativeness of Australia's protected area system, a critical performance issue for protected area systems in Aichi Target 11.

Although Australia's terrestrial protected area system covers more than 17% of land area nationwide, it is still far from meeting the *ecologically representative* element of Aichi Target 11 with only 36 of 85 bioregions at or above the 17% protection level, and even within these bioregions, ecological representation may still be poor.

The overall 'ecological representation gap' has been closed by about 8 million ha between 2010-2016. However, to reach minimum ecosystem protection standards for all ecosystems still requires the protection of a further 53 million ha. Some 1,691 ecosystems (27% of the total), and 121 species of national environmental significance (7% of all such species) lack any protection. Forty-three endangered species and twenty-eight critically endangered species lack any habitat protection. Australia's protected area system remains well short of being truly ecologically representative.

Key findings

- Australia has not met Aichi Target 11, primarily because the protected area system is not ecologically representative.
- The Australian Government should restore funding to the National Reserve System Program to at least \$170 million per year with a view to meeting Aichi Target 11 by 2020.²⁴ This funding includes grants to government or non-government partners for strategic acquisitions of new protected areas; and grants for establishing and managing Indigenous Protected Areas (IPAs) and protected areas on private land (PAPL) secured by covenants.

Key advances

- Traditional Owners were responsible for a massive increase in Indigenous Protected Areas which accounted for most of the growth in protected areas over the 2010-2016 period. The Traditional Owners were assisted with funding by the Australian Government Indigenous Protected Areas program. This program received \$15 million in funding for new Indigenous Protected Areas in the 2017-18 federal budget, although concerns remain over ongoing funding for Indigenous Protected Areas.²⁵
- Queensland gazetted 15 of 25 properties listed as 'gazetted in progress' in the Collaborative Australian Protected Areas Database 2014. This represents 61% of the 674,616 ha covered by the 25 properties.
- Western Australia had the greatest improvement in strict protection, increasing by 2.5 million ha, and the greatest overall reduction in ecosystem protection gap of 3.54 million ha.

Key retreats

- The Australian Government terminated the major engine for advancing the ecological representation of Australia's protected area system, the National Reserve System grants program, in late 2012.

²⁴ For details see BNSN 2014.

²⁵ <http://www.abc.net.au/news/rural/2017-05-30/future-of-existing-indigenous-protected-areas-uncertain/8557532>

- Queensland removed protection from many state forests previously committed to National Parks. Queensland remains the state with the lowest proportion of land area protected and the highest absolute and proportional ecosystem gap.
- The Northern Territory recategorised most of its national parks from IUCN II to IUCN V, but this merely better reflects IUCN category definitions and does not represent any actual change in management.

Key threats

- The threats facing Australian biodiversity have not diminished, and some have grown considerably. The 2016 Australian Government State of the Environment report states:

Australian biodiversity is generally poor, given the current overall poor status, deteriorating trends and increasing pressures. Our current investments in biodiversity management are not keeping pace with the scale and magnitude of current pressures. Resources for managing biodiversity and for limiting the impact of key pressures mostly appear inadequate to arrest the declining status of many species. Biodiversity and broader conservation management will require major reinvestments across long timeframes to reverse deteriorating trends.²⁶

- Protections against large-scale habitat destruction has been significantly weakened in Queensland²⁷ and more recently in NSW.²⁸
- Australian species and ecosystems are already shifting in response to climate change and, as a result, many species are now more vulnerable to extinction.²⁹ Although this might seem to represent a challenge to planning of future reserves, multiple analyses suggest that the ecosystem representation principles are robust to climate change. Existing reserves will also be just as important and valuable in the future as now, although the species inhabiting them will change.³⁰



GREATER BILBY (MACROTIS LAGOTIS), AUSTRALIA © MARTIN HARVEY / WWF

²⁶ Cresswell ID & Murphy HT, 2017. *Australia state of the environment 2016: biodiversity*. Independent report to the Australian Government Minister for the Environment and Energy, Australian Government Department of the Environment and Energy, Canberra.

²⁷ Taylor M, 2015. *Bushland destruction rapidly increasing in Queensland*. WWF-Australia Briefing paper;

²⁸ Perry N, 2016. The NSW government is choosing to undermine native vegetation and biodiversity. *The Conversation*, 9 May 2016 <http://theconversation.com/the-nsw-government-is-choosing-to-undermine-native-vegetation-and-biodiversity-59066>

²⁹ Lee JR et al, 2015. Mapping the drivers of climate change vulnerability for Australia's threatened species. *PLoS one*, 10(5), p.e0124766.

³⁰ Dunlop M et al., 2012. *The implications of climate change for biodiversity conservation and the National Reserve System: final synthesis*. Canberra: CSIRO, p.80.

METHODS

Protected areas

We obtained from the Australian Government Department of the Environment updates to CAPAD 2014 up to Jan 2016, to construct an 'interim' CAPAD 2016. We classified protected areas into strict protected (IUCN I-II) and all other categories ('multiple use'). We flattened layers to remove any overlapping or duplicated protected area polygons, removed any protected areas lacking an IUCN category, and clipped the layer to the Geoscience Australia 1:100,000 coasts and islands dataset, to ensure only entirely terrestrial protected areas were used in analysis.

Ecosystem and bioregional protection

To generate regional ecosystem proxies, we intersected IBRA version 7.0 sub-bioregions, with National Vegetation Information System Major Vegetation Subgroups version 4.2, after converting both to aligned 100 m x 100 m (1 ha) grids. For consistency, we calculated the extents and proportions of bioregions protected for Table 1 using this same intersection. We discarded combinations with a total area 100 ha (1 sq km) or less or for unclassified or unknown Major Vegetation Subgroup (MVS) types. This left 6,249 ecosystem proxies. We intersected the map of ecosystem proxies with the terrestrial protected area layers for 2010 and 2016 (as described above) converted to the same aligned 1 ha grid.

The minimum protection standard was set for each ecosystem in the same way as in BNSN 2014: 15% of the total pre-clearing area of an ecosystem, or if this is less than 1,000 ha then at least 1,000 ha. If pre-clearing extent itself is less than 1,000 ha, then 100% of pre-clearing extent was taken to be the minimum standard.

Ecosystems were assigned to bioregions and jurisdictions based on the subregions which fell in these respective regions. Likewise, they were assigned to broad vegetation type based on the MVS description. Target attainment areas were summed across ecosystems in these different categories to produce aggregate attainment and gap areas.

Species protection

We obtained the Species of National Environmental Significance 2016 release from the Department of the Environment. We retained only terrestrial species, and only 'known' or 'likely to occur' distributions. Species with only 'may occur' distributions were disregarded. We assigned each species to the state or territory with 50% or more of the known or likely range, to prevent double-counting of species in the state and territory breakdown. Species with less than 50% in any given jurisdiction were classed as multi-jurisdictional.

We intersected these species distributions with the terrestrial protected area layers described above, and summed the areas. Species were classified as having attained their minimum standard in strict protected areas, in any protected area, partway to attainment or no protection at all (less than 1 ha protected, to discount errors due to small area intersections). The minimum standard for protection varied depending on distribution size as follows: 30% of the mapped known or likely to occur habitat in the SNES database, or if this is less than 1,000 ha then at least 1,000 ha. If greater than 10 million ha, the minimum standard was capped at 10 million ha. If total habitat itself is less than 1,000 ha, then 100% was the minimum standard.

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