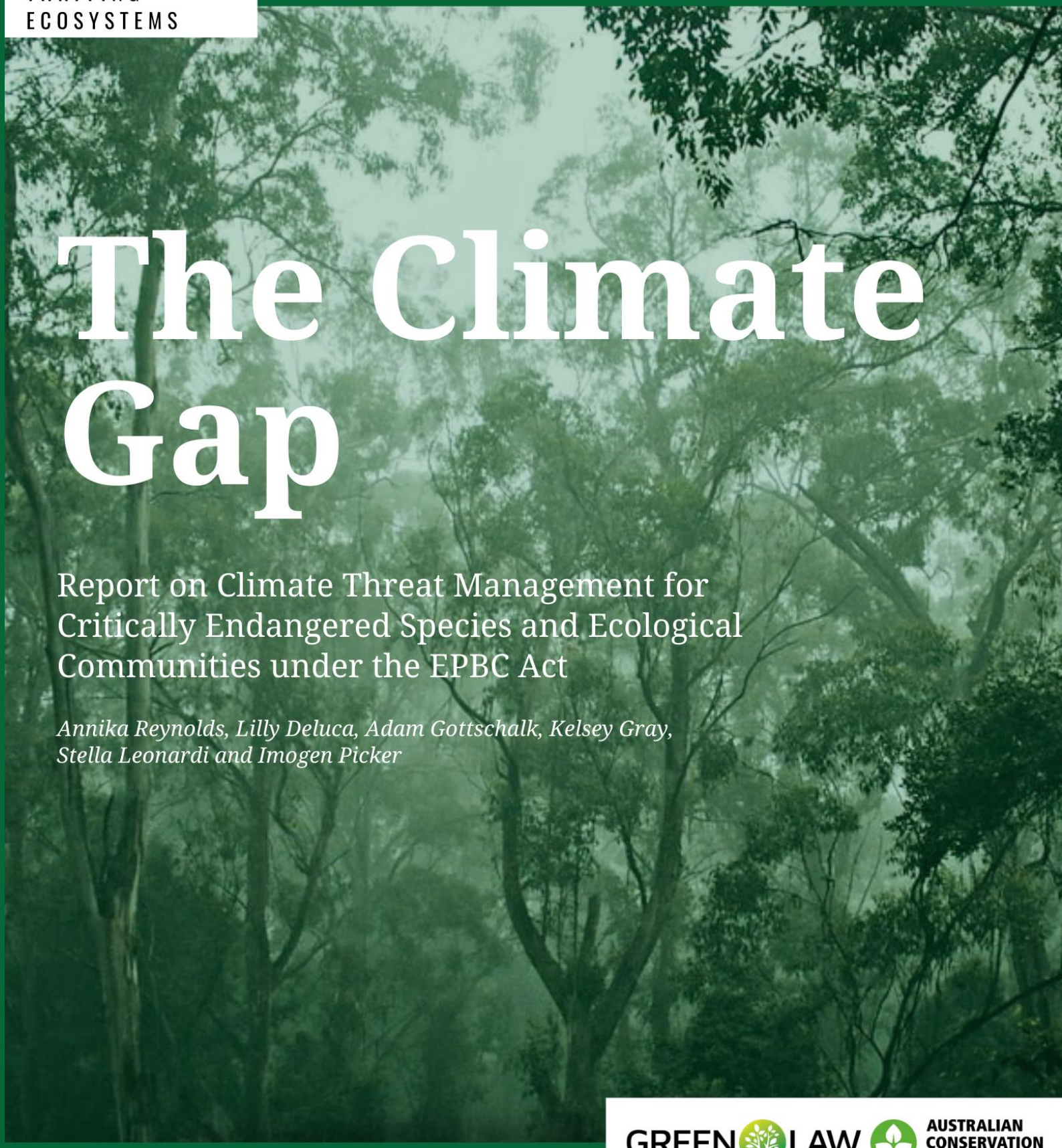
THRIVING ECOSYSTEMS



The Climate Gap

Report on Climate Threat Management for Critically Endangered Species and Ecological Communities under the EPBC Act

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GREEN LAW
AUSTRALIAN CONSERVATION FOUNDATION

Contents

Acknowledgement of Country

We recognise our Aboriginal and Torres Strait Islander nations were the first sovereigns of our lands and waters. This sovereignty was never ceded and continues to this day, informing our connection to land, waters and community.

Indigenous respect and guardianship over the Australian land is an integral part of environmental justice and must be acknowledged and respected for the realisation of environmental justice in this country.

GreenLaw and its members acknowledge we meet on Indigenous land and, in working towards environmental justice, stand beside the traditional guardians of our lands. We pay our respects to Elders past and present.

We recognise that during the writing of this briefing report we connected from Ngunnawal and Ngambri Country, Kaurna Country and the Lands of the Awabakal People.

Acknowledgement of Support

We acknowledge the contribution of Adam Beeson and Brendan Sydes from the Australian Conservation Foundation for commissioning this research, working with us on development and for their comments on drafts of the report.

Our results demonstrate there is a climate change gap, in both the threat assessment and recommended recovery actions under the EPBC Act.

This increases the risk that the climate impacts harming our critically endangered species are occurring unaddressed.

Executive Summary

GreenLaw has been commissioned by the Australian Conservation Foundation to assess threatened species management under the *EPBC Act*.[1] In this briefing report we provide an analysis of how climate change threats and mitigation are addressed in Conservation Advices and Recovery Plans for critically endangered species and ecological communities.

Under the *EPBC Act*, the federal government's central environmental legislation, threatened species conservation is guided by species-specific Conservation Advices and Recovery Plans. These Advices and Plans inform both species-specific actions and the development of broader conservation strategies. Previous studies demonstrate that climate impacts will increase the vulnerability and risk of extinction of Australia's critically endangered species and ecological communities.[2] A 2018 review by Hoeppner and Hughes reviewed the 'climate readiness' of a sample of 100 recovery plans under the EPBC Act and found 'a gulf between knowledge about climate change risk and recovery planning'.[3] Our research explores this problem further by reviewing how climate change impacts are integrated into Conservation Advices and Recovery plans for all critically endangered species and ecological communities under the *EPBC Act*.

The scope of our study included the Conservation Advices and Recovery Plans of all critically endangered species and ecological communities under the EPBC Act, as of July 2021. In total, we assessed 290 Conservation Advices and 114 Recovery Plans for 334 critically endangered species and ecological communities. Our research was guided by the following major questions:

- To what extent do Conservation Advices and Recovery Plans assess climate change impacts?
- To what extent do Conservation Advices and Recovery Plans recommend climate mitigation or adaptation measures?

Our results demonstrate there is a climate change gap, in both the threat assessment and recommended recovery actions under the *EPBC Act*, for Australia's critically endangered species. In total, climate change impacts are omitted in all conservation documents for 178 species and

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[1] *Environment Protection and Biodiversity Conservation Act 1999* (Cth) ('*EPBC Act*').
[2] Barbara A. Cook et al, *Incorporating climate change into recovery planning for threatened vertebrate species in southwestern Australia* (Report No CENRM 142, 2016) 37.
[3] Johanne Hoeppner and Lesley Hughes, 'Climate readiness of recovery plans for threatened Australian species' (2019) *Conservation Biology* 33(3) 534.

ecological communities (approximately 54% of the total number of critically endangered species). Furthermore, even in conservation documents that included climate change impacts, our results show that climate threat analysis tended to be brief and generalised, and that actions recommended to mitigate climate impacts were limited.

The results of our study have significant implications for threatened species management under the *EPBC Act*. The recovery of species threatened by climate change relies on the development and implementation of recovery actions aimed at addressing climate change impacts. The disparity between threat and mitigation analyses in Conservation Advices and Recovery Plans contradicts the premise of both conservation documents, to guide the recovery of nationally listed species through management actions.[4]

Furthermore, our results raise concerns about the efficacy of the environmental impact assessment process and *Threatened Species Strategy*[5] under the *EPBC Act*. The climate gap in these conservation documents directly impacts the quality of information available to decision-makers when assessing controlled actions under the *EPBC Act*. If decision-makers do not have access to climate threat information, they will be unable to take a fully informed 'risk-based approach' to environmental impact assessment, which is considered best practice for procedural and substantive environmental outcomes.[6] Similarly, the *Threatened Species Strategy* is a high-level document, relying on the threat and mitigation analysis in the Conservation Advice and Recovery Plan for prioritised species.[7] The existing climate gap means that the Strategy will be largely climate-blind in its implementation.

The climate gap in the federal management of our critically endangered species and ecological communities has significant implications. Conservation Advices and Recovery Plans aim to support the recovery of Australia's threatened species. But is that possible if these conservation documents are blind to the climate impacts – the increased temperatures, loss of suitable habitat and more severe natural disasters – that are contributing to the risk of extinction?

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[4] Jane MacDonald et al, 'Improving policy efficiency and effectiveness to save more species: a case study of the megadiverse country Australia' (2015) 182 *Biological Conservation* 102.
[5] Australian Government, *Threatened Species Strategy 2021-2031* (Department of Agriculture, Water and the Environment, 2021) ('*Threatened Species Strategy*').
[6] Andrew Macintosh, 'Best Practice Environmental Impact Assessment: A Model Framework for Australia' (2010) 69(4) *Australian Journal of Public Administration* 401, 407.
[7] *Threatened Species Strategy* (n 5) 29.


In the conservation documents of 54% of all Critically Endangered species and ecological communities, climate change impacts are not discussed at all.

Scope of Report

The Australian Conservation Foundation commissioned GreenLaw to assess how the federal Environment Department manages climate change impacts for Australia's critically endangered species and ecological communities under the *EPBC Act*.

Our research was guided by the following major questions:

- To what extent do Conservation Advices and Recovery Plans assess climate change impacts?
- To what extent do Conservation Advices and Recovery Plans recommend climate mitigation or adaptation measures?

We reviewed all current Conservation Advices and Recovery Plans for all critically endangered species and ecological communities under the EPBC Act, up to July 2021. The review involved the compilation of a database, which enabled inputs for the extent that climate change is identified and assessed as a threatening process and mitigation actions are addressed in the Recovery Plans and Conservation Advices. Select iconic species were also assessed and are listed in the appendix. Iconic species data was not included in the quantitative results.

The report analyses this data and aims to identify and assess any trends regarding the discussion of climate change in these conservation documents and consider the implications for species recovery and the efficacy of the EPBC Act. Conservation Advices and Recovery Plans are intended to operate as blueprints for the recovery of threatened species and must be considered under the EPBC Act's environmental impact assessment regime. Consequently, the extent to which climate change is evaluated in conservation documents is relevant for understanding how the threat of climate change is managed in relation to critically endangered species and ecological communities.

Methodology

We assessed all Conservation Advices and Recovery Plans for all critically endangered species and communities listed under the *EPBC Act*, as of July 2021. In this paper we call these collectively "conservation documents". These documents were accessed through the Species Profile and Threats Database.[8] Data collation occurred between July and September 2021. At this time, there were 334 Critically Endangered species and communities listed under the *EPBC Act*. Our sample included 290 Conservation Advices (87% of critically endangered species and communities) and 114 Recovery Plans (34% of the total number of species and communities), with some species being managed under both conservation documents. We collected the following types of data for each individual species and community, as well as for each Conservation Advice or Recovery Plan:[9]

- Basic information, such as distribution;
- Whether any of the following climate terminology was used: climate, climate change, warming, global warming, sea level rise, greenhouse gas/es, emission/s; and
- Information on climate threat, mitigation and adaptation analysis.

[8] Department of Agriculture, Water and the Environment, 'Species Profile and Threats Database (Online Database, 2021) < http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl>.

[9] Some Recovery Plans covered multiple species and communities. We used slightly modified criteria to assign ratings to these 'Group Recovery Plans'. This allowed reviewers to identify whether the Recovery Plan discussed climate change in relation to specific species and communities or only in relation to the group. Group recovery plans are valid under the *EPBC Act*: (n 1) ss 269A, 283.

We analysed the extent that a document assessed climate change impacts to a species using a standardised metric. We describe this as the "Climate Threat Analysis". Table 1 provides the indicators for the '0' to '5' rating:

Table 1 Outline of Ratings for Climate Threat Analysis

Rating	Indicators
0	No discussion of climate change.
1	Misdirected assessment of climate threats.[10]
2	Brief and generalised discussion of climate threats, typically in a sentence or less.
3	Climate threats are discussed in general terms, with some discussion of major climate threats such as altered fire regimes or increased temperatures.
4	Climate threats are assessed in a species-specific manner over one of more paragraphs, key climate threats to the species outlined. May use scientific literature or statistical analysis.
5	Detailed and species-specific climate threat analysis, utilising scientific literature and statistical analysis, the document may state climate change is a major threat.

We also determined whether the conservation document recommended passive, active or a combination of mitigation actions for a species. Passive versus active actions were categorised based on the approach adopted by Hoeppner and Hughes.[11] We assessed the extent that a document outlined climate mitigation actions for a species using a standardised metric, below Table 2 provides the indicators for the '0' to '6' rating:

Table 2 Outline of Ratings for Climate Mitigation Analysis

Rating	Indicators
0	No discussion of climate change.
1	Misdirected assessment of climate mitigation.[12]
2	Brief and generalised discussion of climate mitigation, typically in a sentence or less.
3	Climate mitigation is generalised and recommends passive actions, such as data gathering.

[10] In this report, a misdirected assessment of climate threats was found if there was an inadequate attempt, where terms may have been incorrectly discussed or analysed, the document may have included incorrect claims about the causes of climate change, or the document states climate impacts are beyond the scope of the document.
[11] Hoeppner and Hughes (n 3).
[12] See above fn 10.

4	Climate mitigation is generalised and recommends both passive actions, such as data gathering, and active actions, such as translocation programs.
5	Climate mitigation is highly detailed and species-specific with both passive and active mitigation actions recommended. Mitigation analysis may include accountability mechanisms, budgets or detailed timeframes to achieve outcomes.
6	Highly detailed climate mitigation analysis, with recommendations addressing the need for emissions reduction to reduce climate threats.

Finally, we collated whether specific climate adaptation actions were recommended, drawing on a list of climate adaptation tools from LeDee et al.[13]

Our research also underwent a blind inter-coder reliability check, resulting in an acceptable error margin of 7.5%. No single author was an outlier, indicating consistency in our review.

[13] Olivia E. LeDee et al, 'Preparing Wildlife for Climate Change: How Far Have We Come?' (2021) 85(1) *The Journal of Wildlife Management* 7.

Results

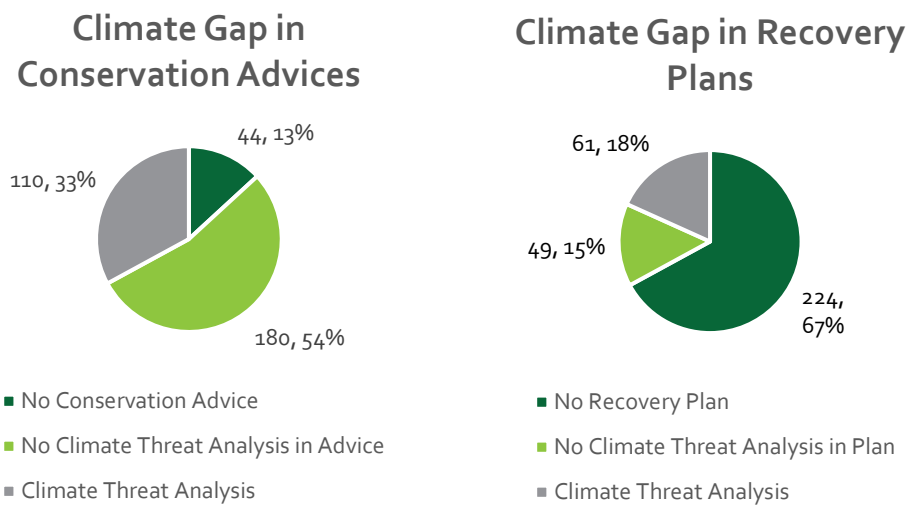
There is a broad scientific consensus that climate change is having a significant, and worsening, impact on Australian species.[14] However, our results demonstrate there is a climate change gap, in both the threat assessment and recommended recovery actions under the *EPBC Act*, for Australia's critically endangered species. This gap indicates the full impacts or climate change are not being directly assessed or mitigated against for our critically endangered species.

The Climate Change Gap

Under the *EPBC Act*, a Conservation Advice must be approved for all threatened species.[15] Despite this, not all critically endangered species have a current Conservation Advice (13% do not have one). For the species and ecological communities that had a Conservation Advice, 62% of those Advices (180 Advices) did not discuss climate change at all.

Recovery Plans are not mandatory under the *EPBC Act*, and a smaller portion of critically endangered species are managed under a current Recovery Plan. However, the climate threat analysis in Recovery Plans tends to be more extensive than in Conservation Advices. 49% of Recovery Plans do not mention climate change at all. Figure 1 is a graphical representation of our findings:

Figure 1 The Climate Gap in Conservation Advices and Recovery Plans



[14] Ramona Maggini et al, 'Protecting and restoring habitat to help Australia's threatened species adapt to climate change' (2013) *National Climate Change Adaptation Research Facility* 58, 54.
[15] *EPBC Act* (n 1) s 266B(1). This requirement was introduced by amendments in 2006, and thus some species which were listed prior to 2006 do not have a Conservation Advice.

For Conservation Advices and Recovery Plans produced in the last three years, climate threat analysis has improved in both documents. Approximately 69% of those Conservation Advices and all Recovery Plans discuss climate change. This shows that the climate gap is shrinking, although gaps are still present.

However, in some areas the climate gap is large. In our data, climate change impacts are omitted in all conservation documents for 178 species and ecological communities (approximately 54% of the total number of critically endangered species). We found major gaps in the climate analysis for flora, insects and molluscs, and reptiles. The gaps included species where there is genuine scientific uncertainty about the impacts of climate change. But gaps also existed for species where there is evidence of climate change is a threat. For example, there is no mention of climate change in conservation documents for both the Short-nosed Sea Snake and the Leaf-scaled Sea Snake despite scientific evidence indicating that climate impacts, including warming seas and coral bleaching events are major threats to the species.[16]

The Shadow Gap: Climate Change Beyond the Scope

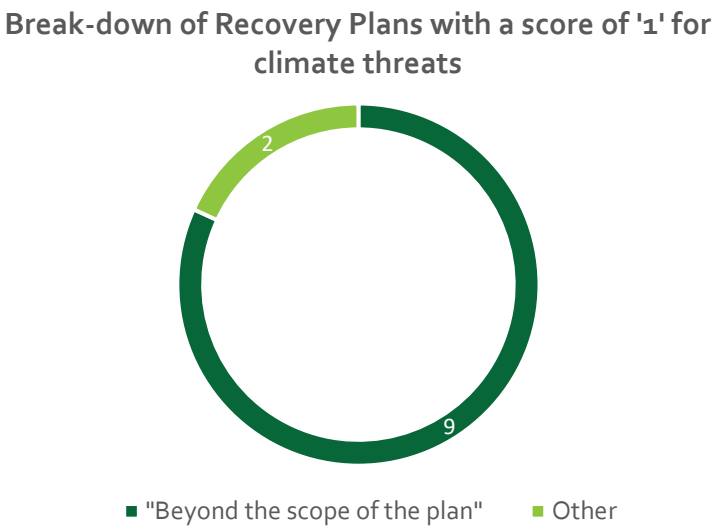
In 11 Recovery Plans (3% of all Recovery Plans) we found that climate threat analysis was misdirected, representing a further climate gap for critically endangered species. In the majority of Recovery Plans where climate threat analysis was misdirected (scoring a '1' for climate threat analysis), it was stated that climate threats are 'beyond the scope' of the Plan. For example, the Recovery Plan for the Ballerina Orchid outlines:

> Although climate change may have a long-term effect on the species, actions taken directly to prevent the impact of climate change are beyond the scope of this plan.[17]

[16] Ruchira Somaweera et al, 'Pinpointing Drivers of Extirpation in Sea Snakes: A synthesis of evidence from Ashmore Reef' (2021) 8 *Frontiers in Marine Science* 1, 13.
[17] Department of Environment and Conservation, *Ballerina Orchid (Caladenia Melanema) Interim Recovery Plan 2007-2012* (Interim Recovery Plan No. 276, Department of Environment and Conservation WA, 2008) 6.

Below is a graphical representation of our findings:

Figure 2 Recovery Plans with Misdirected Climate Threat Analysis



Under the *EPBC Act*, Recovery Plans must 'identify threats to the species or community'.[18] There is no limitation in the Act regarding what kinds of threats should be addressed in Plans, and no explicit exclusion of climate threats in either the legislation or public Department policy.[19] Thus, there is no legal basis for carving out climate threats in this way.

Climate Threat Analysis

Our data further reveals that climate threat analysis, in the Conservation Advices and Recovery Plans that do discuss climate change, tends to be brief and generalised. This indicates that the full extent of climate risk for critically endangered species is not being captured in conservation documents under the *EPBC Act*.

Of the Conservation Advices that discuss climate threats, 55% of them (60 Advices) discuss climate change in generalised terms, often in a sentence or less. In contrast, only 13% of Recovery Plans that discuss climate threats at all, do so in brief and general terms.

Figure 3 is a graphical representation of our findings:

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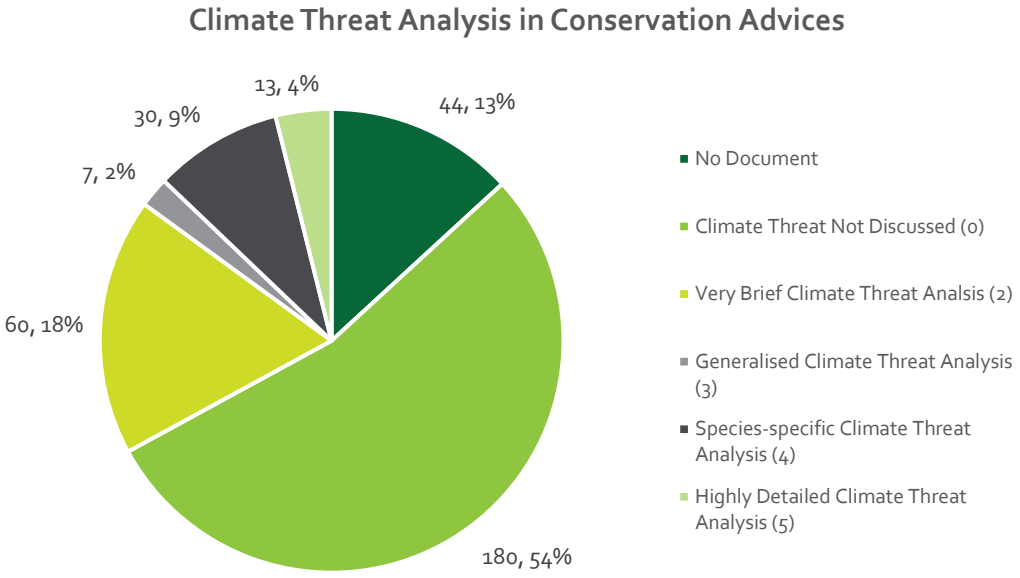
[18] *EPBC Act* (n 1) s 270(2)(ca).

[19] Indeed, anthropogenic climate change is a recognised threat with a specific threat abatement plan under the *EPBC Act*: See Threatened Species Scientific Committee, 'Loss of terrestrial climatic habitat caused by anthropogenic emissions of greenhouse gases' *Department of Agriculture, Water and the Environment* (Web Page, 4 April 2001) < https://www.awe.gov.au/environment/biodiversity/threatened/key-threatening-processes/loss-of-habitat-caused-by-greenhouse-gases>.

Figure 3 Climate Threat Analysis in Conservation Advices[20]

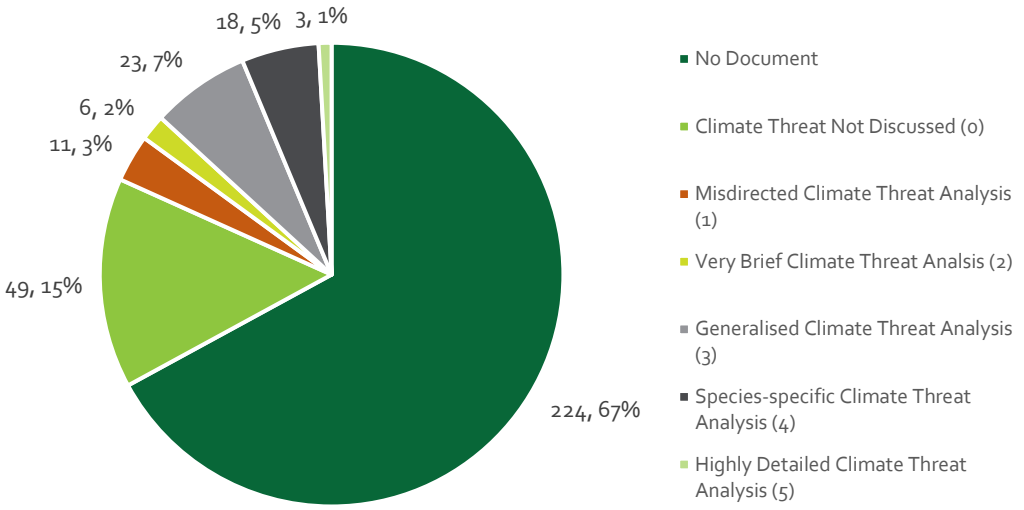


In total only 43 Conservation Advices (15% of all Advices) include a species-specific discussion of climate change threats (scoring a '4' or '5' for climate threat analysis). Recovery Plans, on average scored better, with 49 Recovery Plans (20% of all Plans) discussing climate threats in a species-specific manner (scoring a '4' or '5' for climate threat analysis).

[20] The following graph does not include Misdirected Climate Threat Analysis (1) because there were 0 conservation documents in that category.

Below is a graphical representation of our findings:

Figure 4 Climate Threat Analysis in Recovery Plans



Recovery Plans produced in the last three years generally provide a more detailed climate threat analysis with 6 of the total number of Plans receiving a threat analysis rating of '4',[21] representing 67% of the sample. An example of a detailed climate threat analysis is the Baw Baw Frog Recovery Plan which states:

> Climate change, at a global scale (enhanced greenhouse), and a regional scale, are considered serious threats to the long-term survivorship of the Baw Baw Frog. Recent data indicates both warming trends and reduced rainfall in the region occupied by the Baw Baw Frog...[22]

[21] There were no Recovery Plans that scored a '5' for climate threat analysis in the three year sample.
[22] G.J. Hollis, *National Recovery Plan for the Baw Baw Frog Philoria frosti* (Department of Sustainability and Environment Melbourne, 2011) 9.

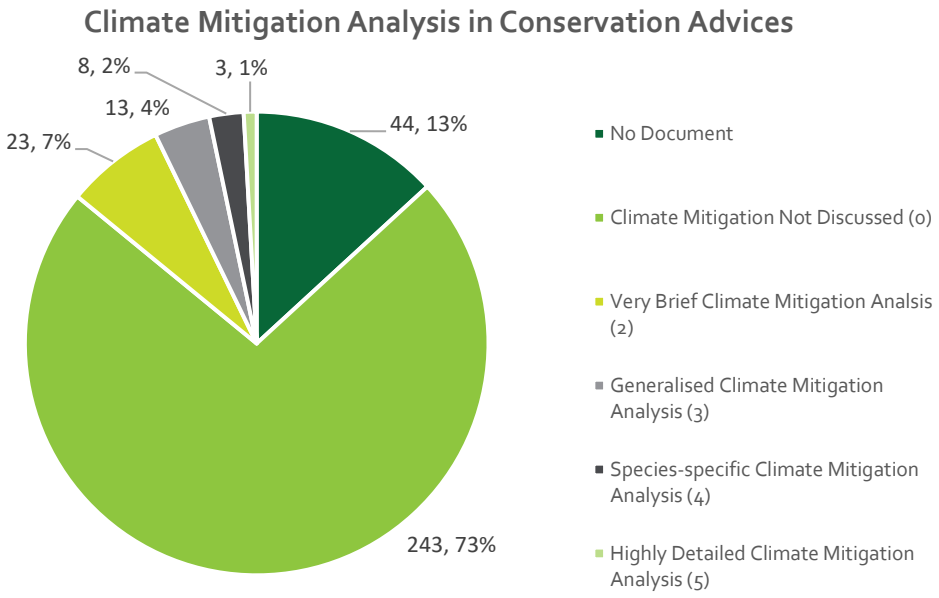
The Baw Baw Frog Recovery Plan discusses climate threats in detail, drawing on a range of scientific sources and assessing local climatic impacts, including how temperature changes are likely to restrict the Frog's geographic range and species recruitment.[23]

Climate Mitigation Analysis

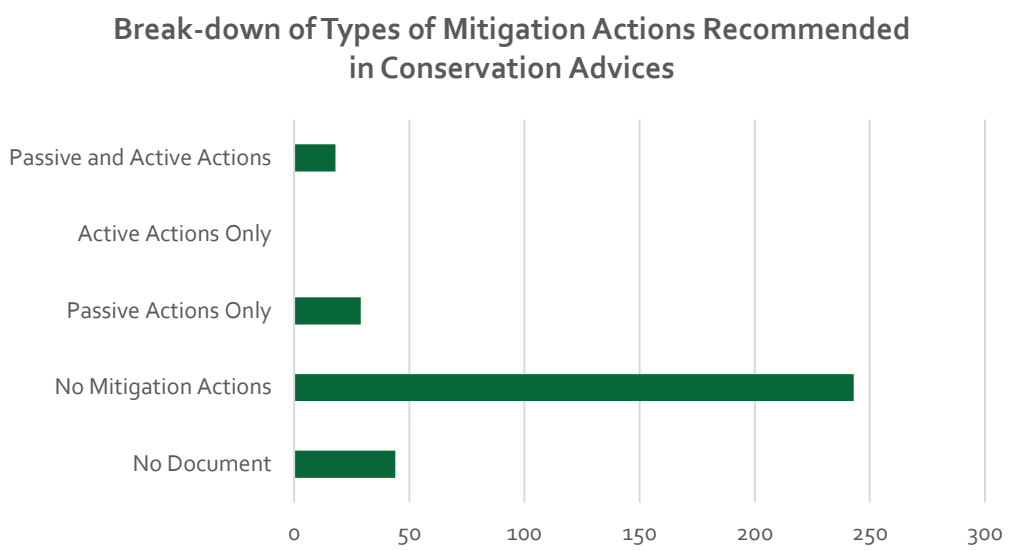
Our results demonstrate there is a major gap in climate mitigation analysis, even in Conservation Advices and Recovery Plans that do discuss climate threats for critically endangered species and ecological communities. In our report, climate mitigation refers to recovery actions that are intended to mitigate climate impacts on species or ecological communities.[24]

In total 46 Conservation Advices outline climate mitigation actions, meaning that just 42% of Advices that discuss climate threats also recommend mitigating actions. Furthermore, only 17 Conservation Advices (16% of all Advices that discuss climate change) recommend active mitigation actions to address climate threats, such as improving habitat connectivity or translocation programs. Figure 5 is the graphical representation of our data:

Figure 5 Climate Mitigation Analysis and Break-down of Types of Mitigation Actions Recommended in Conservation Advices[25]



[23] Ibid.
[24] Cook et al (n 2) 6.
[25] The following graph does not include Misdirected Climate Threat Analysis (1) or Direct Emissions Reduction Recommendation (6) because there were 0 conservation documents in these categories.



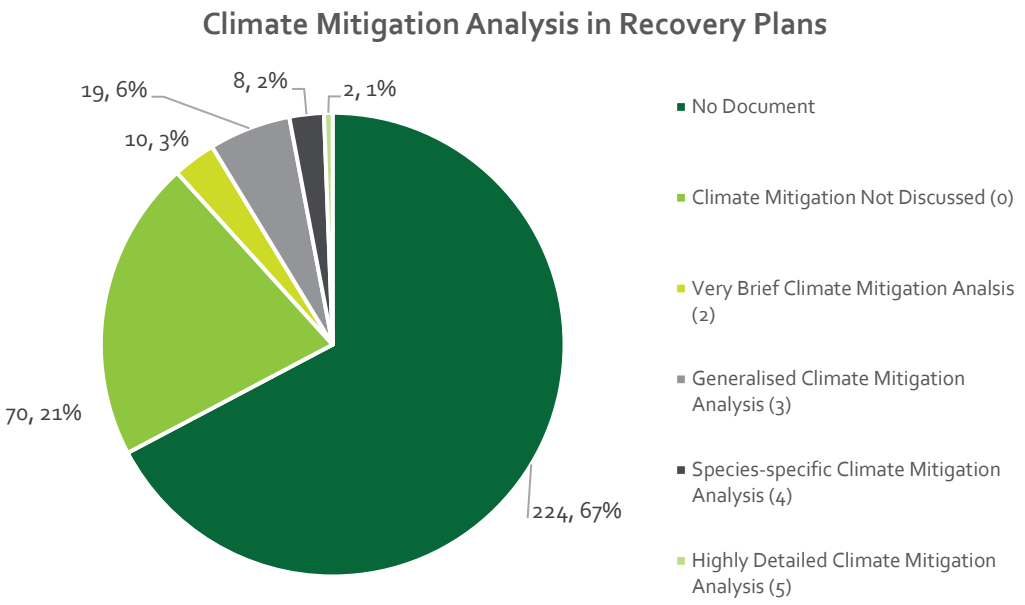
As Figure 5 above demonstrates, the climate mitigation actions recommended in Conservation Advices tended to be brief and generalised with 22% of Advices scoring a '2'. To an extent, this is expected for Conservation Advices. Whilst Advices tend to recommend some preliminary mitigation actions, the purpose of Advices under the *EPBC Act* is to outline the grounds on which the species or ecological community is eligible for the category it is being listed in.[26]

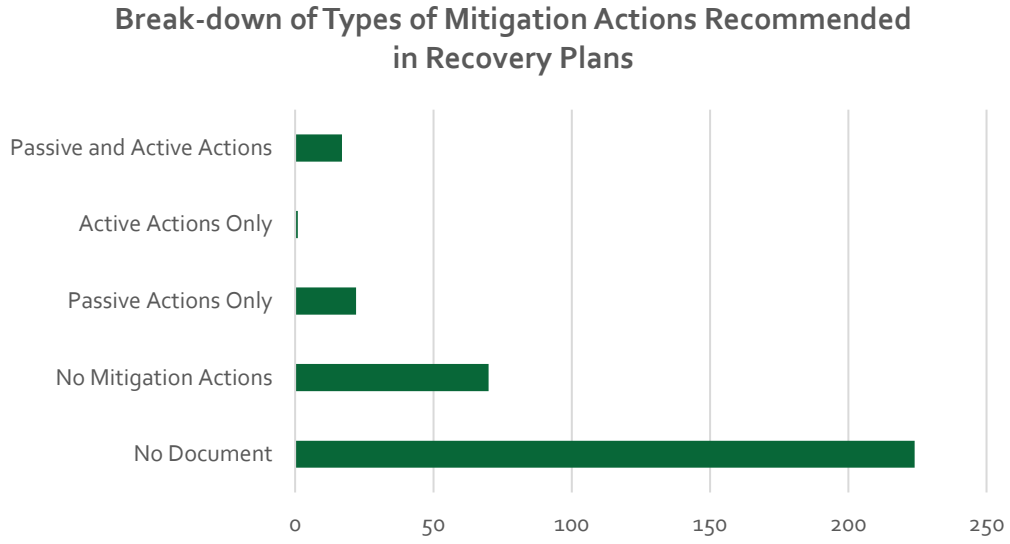
In contrast, 40 Recovery Plans recommend climate mitigation actions, representing 67% of the total number of Recovery Plans that discuss climate threats. Recovery Plans, on average, recommended a greater range of climate mitigation actions. In 30% of Recovery Plans (that discuss climate change) both active and passive climate mitigation actions are discussed. These range from passive actions, including data gathering and monitoring activities, to active strategies, such as improving landscape connectivity or mitigating climate-related threats (for example altered fire regimes).

[26] *EPBC Act* (n 1) s 266B(2)(a)(i).

Below is the graphical representation of our data:

Figure 6 Climate Mitigation Analysis and Break-down of Types of Mitigation Actions Recommended in Recovery Plans[27]



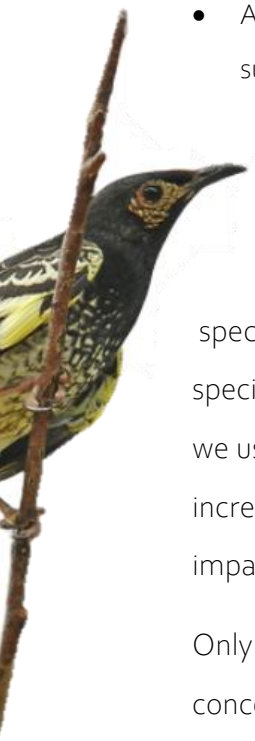


As shown in Graph 6 above, climate mitigation analysis in Recovery Plans, on average, is more comprehensive than Conservation Advices. The majority of Recovery Plans with climate mitigation analysis scored a '3' or above. However, a mere two Recovery Plans scored a '5' for highly detailed recommendations for both passive and active climate mitigation actions. For

[27] The following graph does not include Misdirected Climate Threat Analysis (1) or Direct Emissions Reduction Recommendation (6) because there were 0 conservation documents in these categories.

example, the Coastal Fontainea Recovery Plan[28] identifies anthropogenic climate change as an 'over-arching threat category' for the species and proposes specific mitigation actions for each dimension of the climate, including:

- Increase climate change research and communication of that knowledge to relevant government agencies, the community and other stakeholders;[29]
- Increasing primary and secondary habitat linkages to minimise the long-term impacts of climate change on species habitat;[30] and
- Adapt weed, pest and fire management practices to account for potential climate change impacts, such as more severe bushfire seasons.[31]



Climate Adaptation Analysis

Australia has warmed by 1.4°C since 1910 and it is predicted Australia will continue to experience warming. [32] Climate change is already impacting our critically endangered species. It is therefore critical that climate mitigation strategies to protect critically endangered species (as outlined above) incorporate climate adaptation concepts and actions.[33] In our study, we use the term climate adaptation to refer to interventionist conservation actions designed to increase the species or ecological community's resilience to both current and expected climate impacts. [34]

Only 31 Conservation Advices and 32 Recovery Plans expressly discuss climate adaptation concepts. But across those documents, multiple climate adaptation concepts are recommended, including facilitating geographic shifts in species distribution and reducing other threats to the species to bolster resilience to climate impacts.

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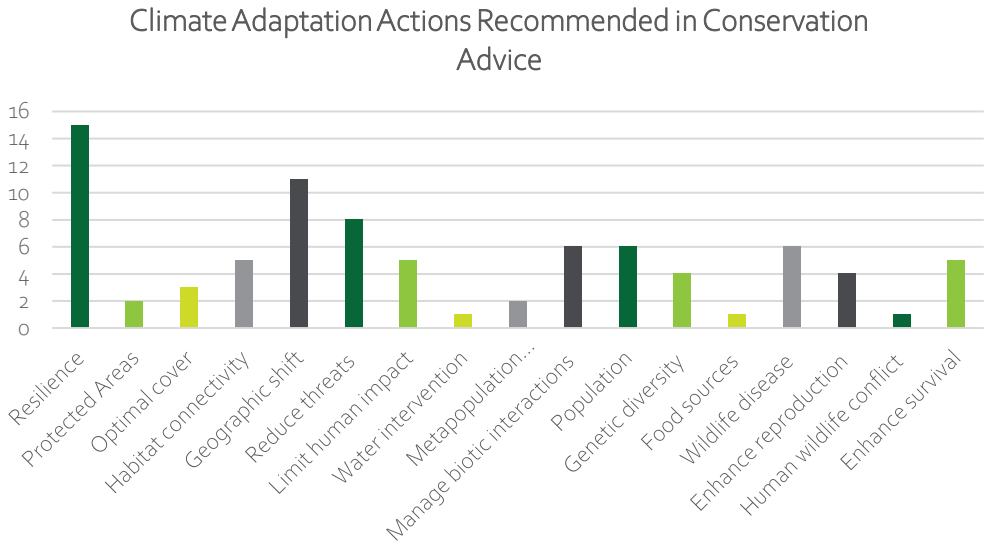
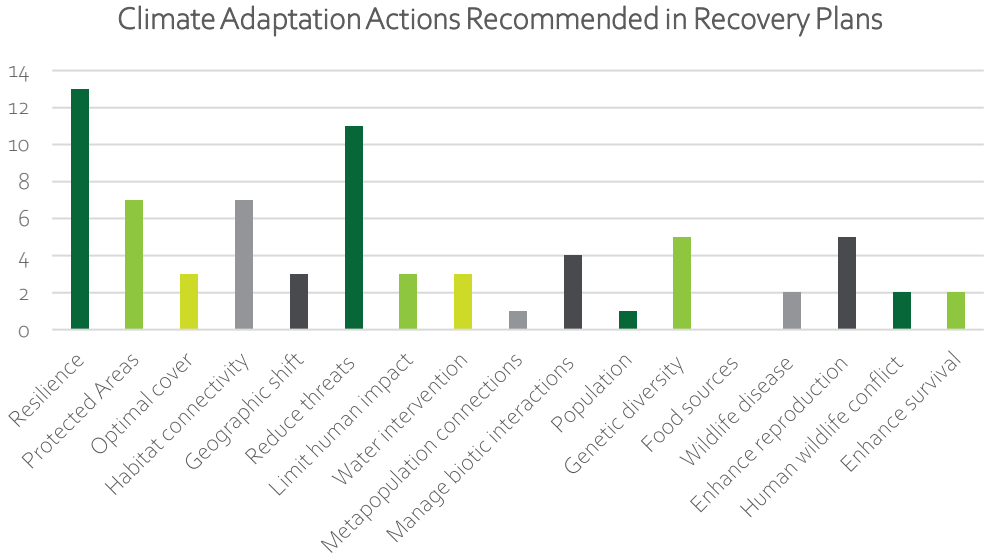
[28] This Recovery Plan was categorised as a Group Recovery Plan.
[29] Department of Environment, Climate Change and Water NSW, *Border Ranges Rainforest Biodiversity Management Plan – NSW & Queensland* (Department of Environment Climate Change and Water NSW, 2010) 62.
[30] Ibid 61.
[31] Ibid.
[32] 'Australia's changing climate', *Bureau of Meteorology* (State of the Climate Report, 2020) <http://www.bom.gov.au/state-of-the-climate/australias-changing-climate.shtml>.
[33] N.E. Heller and R.J. Hobbs, 'Biodiversity Management in the face of climate change: A review of 22 years of recommendations' (2009) 142 *Biological Conservation* 14.
[34] LeDee et al (n 13) 7.

Below is a graphical representation of all climate adaptation actions listed in the data:

Figure 7 Climate Adaptation Actions Recommended in Conservation Advices and Recovery Plans





Discussion

The Impact of the Climate Gap

Our results demonstrate there is a significant climate gap in Australia's threatened species management. Our research was limited to critically endangered species and communities. However, given they are at greatest risk of extinction it is perhaps reasonable to infer the situation is unlikely to be "better" with respect to other categories of threatened species. It is well-known that climate change will have a dramatic effect on Australia's environment, [35] impacting the habitat and survival status of our threatened species.[36] Studies have found that the climate will become 'unsuitable' for species[37] and threaten many species with extinction. [38] It is therefore notable that climate threats are largely omitted in Conservation Advices and Recovery Plans for critically endangered species.

Generalised statements about climate change threats are overly represented in Conservation Advices. While Recovery Plans contain a higher proportion of species-specific analysis, the presence of generalised language is still concerning because it demonstrates a lack of depth in analysis. Descriptions of general threats, rather than an assessment that address climate impacts specifically for the species, undermines species recovery. In essence, such limited climate analysis restricts recovery actions to a shorter time frame and limits the Plan's effectiveness, particularly its ability to address the synergistic and additive impacts of rapid climate change.[39]

A clear demonstration of this gap is in the Recovery Plans which identify climate change as a threat to the species but state it is 'beyond the scope of the plan' (see Figure 2). This language illustrates that climate change is acknowledged but overlooked, implying that it is not immediately relevant as a threat. Recovery Plans have been found in other studies to provide

[35] Intergovernmental Panel on Climate Change, *Special Report: Global Warming of 1.5°C: Chapter 3 – Impacts of 1.5° global warming on natural and human systems* (2019).
[36] Cook et al (n 2) 37. See also Don PA Sands, 'Important issues facing insect conservation in Australia: now and into the future' (2018) *Austral Entomology* 57(2) 150.
[37] Maggini et al (n 14) 54.
[38] Cook et al (n 2) 37.
[39] MacDonald et al (n 4).

poor information about known and potential threats.[40] This is clearly disconnected from the scientific research identifying the impacts of climate change on the species.[41]

The recovery of species threatened by climate change relies on the development and implementation of recovery actions aimed at addressing climate change impacts. Alarmingly, the proportion of Conservation Advices and Recovery Plans outlining mitigation actions, whether passive and/or active, was consistently lower than the proportion of both documents which identify climate change as a threat. This result is concerning as it suggests that in some instances, even where climate change threats have been identified, no effort has been made to suggest recovery actions to mitigate the impact of those threats on Australia's critically endangered species and ecological communities. The disparity between threat and mitigation analyses in Conservation Advices and Recovery Plans contradicts the premise of both conservation documents, to guide the recovery of nationally listed species through management actions,[42] and undermines their ability to achieve that end.

Disparity in the depth of analysis was also clear between Conservation Advices and Recovery Plans. Mitigation actions recommended in Conservation Advices tended to be more generalised than in Recovery Plans. While this is consistent with the purpose of each conservation document, it is problematic for species for which only a Conservation Advice has been prepared. This finding highlights that Recovery Plans, which are intended to 'stop the decline of, and support the recovery of, listed species',[43] are a key document for the mitigation of climate threats for Australia's critically endangered species.

The overwhelming majority of Recovery Plans which did discuss climate mitigation did not include active mitigation actions. While passive actions, such as monitoring and data collection, are important for developing strategic conservation management, in the absence of more active or interventionist actions, passive actions are insufficient to halt species extinction.[44] Hoeppner

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[40] Alejandro Ortega-Argueta, Greg Baxter, and Marc Hockings, 'Compliance of Australian threatened species recovery plans with legislative requirements' (2011) 92 (8) *Journal of Environmental Management* 2054.
[41] Hoeppner and Hughes (n 3); Maggini et al (n 14) 54; MacDonald et al (n 4) 102.
[42] MacDonald et al (n 4) 102.
[43] *EPBC Act* (n 1) s 270(1).
[44] J Hoeppner and Hughes (n 3) 539.

and Hughes liken this to 'counting the books while the library burns'.[45] The failure to recommend active actions in the vast majority of Conservation Advices and Recovery Plans is concerning, as protection from climate change impacts for those species cannot be accomplished without further recovery planning.

Environmental Impacts

It is undeniable that climate change will have a devastating effect on Australia's threatened species. Climate models confirm that 16-61% of these species will lose the majority of their climatically suitable range by 2085. The results are damning under both 'early mitigation' and 'business as usual' emission scenarios, regardless of how the vulnerability of a species is assessed[46].

Overall Ecological Impact: independent ecological analyses show the gravity of the climate gap for threatened species and ecological communities. Cook et al found that for threatened species deemed 'at risk', 'significantly threatened', or 'potentially at risk from extinction' due to climate change, 58.8% of their Recovery Plans do not identify climate change as a threat[47]. Our findings corroborate these results. Our findings indicate a large portion of the conservation actions implemented or funded under Conservation Advices or Recovery Plans are climate-impacts blind. This increases the risk that ongoing climate impacts on critically endangered species are unaddressed, reducing suitable habitat and negatively affecting species' resilience to other threats.

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[45] Hoeppner and Hughes (n 3) 539 citing David B Lindenmayer, Maxine P Piggott and Brendon A Wintle, 'Counting the books while the library burns: why conservation monitoring programs need a plan for action' (2013) *Frontiers in Ecology and the Environment* 11(10) 549.
[46] Cook et al (n 2).
[47] Ibid 37.

Types of Species are Being Left Behind by the Climate Gap: studies allocating 'risk scores' to the ability of a species to respond to climate change also highlight the climate gap. Butt and Gallagher employed this method and found that only 10% of the 242 species deemed 'high risk' were listed for protection under the *EPBC Act*.[48] Moreover, of these listed species, 70% of their recovery plans do not include crucial actions which may improve the species' ability to respond to climate change. These results highlight deep structural problems in the processes of the Act, including a possible species bias during listing and Recovery Plan creation. Walsh et al found especially low representation of invertebrates, plants and reptiles.[49] This corresponds with our findings that the climate gap is strongest among flora, insects and molluscs, and reptiles. We also found that although the flora listings outnumber all fauna categories combined, 94% of flora Conservation Advices and 70% of flora Recovery Plans did not recommend any climate mitigation measures. Insects are also far less likely to have mitigation measures in their Conservation Advices, yet many of them are likely to become extinct without a concerted effort[50].

Importance of Recovery Plans: even though climate change is inadequately addressed in Recovery Plans, our results show that the climate gap is smaller in Recovery Plans than Conservation Advices. This suggests that increasing the number of Recovery Plans may be beneficial. However, since 2007, Recovery Plans are not legally required, meaning their rate of adoption has slowed.[51] At these rates, it would take approximately 36 years for all currently listed threatened species to be given a Recovery Plan.[52] This is reflective of broader problems with the Australian conservation system.

[48] Nathalie Butt and Rachael Gallagher, 'Using species traits to guide conservation actions under climate change' (2018) 151 *Climatic Change* 317, 317.
[49] Walsh et al, 'Trends and biases in the listing and recovery planning for threatened species: An Australian case study' (2013) 47 *Oryx* 134.
[50] Sands (n 36).
[51] Walsh et al (n 49).
[52] Ibid.

The climate gap impedes our ability to plan effective threatened species management now and in the future.

We are choosing a path that risks the extinction of Australia's Critically Endangered species and ecological communities.

Legal Impacts

Furthermore, the climate gap has implications for the efficacy of federal environmental impact assessment processes and non-assessment threatened species and ecological community management. We note that climate change impacts, despite being listed as a key threatening process, are not managed under a threat abatement plan.[53] Therefore, individual Conservation Advices and Recovery Plans are currently the only conservation documents with legal force that may address climate impacts and inform climate mitigation and adaptation. It is critical these conservation documents accurately reflect the full extent of climate impacts for critically endangered species and ecological communities to ensure the ongoing effectiveness of the *EPBC Act*.

The *EPBC Act* prohibits developments that would have a 'significant impact' on threatened species and ecological communities.[54] The environmental impact assessment process under the *EPBC Act* empowers the Minister to approve developments that may have a significant environmental impact (termed controlled actions), by assessing the full impact of the development and imposing conditions to minimise impacts.[55] In this assessment process, the Minister is required to consider relevant Conservation Advices,[56] and must act consistently with relevant Recovery Plans.[57]

Therefore, the climate gap in Conservation Advices and Recovery Plans has the following impacts on the efficacy of the *EPBC Act's* environmental impact assessment process:

Information gaps in the environmental impact assessment process: a core theory justifying environmental impact assessments, is that decision-makers require comprehensive information to make decisions that will improve ecological and development outcomes.[58] If Conservation Advices and Recovery Plans suffer from a climate gap, then the entire environmental impact assessment process will also suffer from this gap.[59] In particular, decision-makers will be unable

[53] See above fn 19.
[54] *EPBC Act* (n 1) s 18(1).
[55] Macintosh (n 6); Peta Norris, 'Seeking balance: The promise and reality of biodiversity offsetting' (2014) 31 *Environmental and Planning Law Journal* 137, 138.
[56] *EPBC Act* (n 1) s 139(2).
[57] Ibid s 139(1).
[58] Macintosh (n 6).
[59] Ibid 403.

to take a fully informed 'risk-based approach' to environmental impact assessment, which is considered best practice for procedural and substantive environmental outcomes.[60]

Considering the overall impact of a development on climate change: there is no climate change trigger under the *EPBC Act*, despite climate change being a major threat to Australia's overall environment. In practice Conservation Advices and Recovery Plans are one of the only legislated mechanisms for climate impacts to be considered in controlled action approvals. Filling the climate gap in these documents would facilitate better environmental impact assessment decisions, that can consider the overall climate impact of a proposal. For example, the full ecological impacts of a heavy greenhouse gas emitting development would be considered, as well as the full ecological benefits of a renewable energy development.[61]

Undermining the benefits of mitigation and offset packages in approval conditions: the climate gap means the Minister is not consistently assessing climate impacts, mitigation or adaptation in controlled action approval conditions. In particular, this increases the risk that mitigation and offset conditions are not addressing the full impact on the species, and not achieving the key aim of 'no net biodiversity loss' to the species or ecological community.[62] Best practice offsets, affirmed by the judiciary,[63] require the decision-maker to be able to accurately assess whether: the loss of biodiversity values is irreparable, the impact constitutes an interim threat to the species before the offset benefits accrue and the offset will provide long-term value commensurate with impact of the development.[64] Climate change fundamentally influences each of these considerations, and should be accounted for to ensure the true value of a mitigation and offset package is determined prior to the approval of a controlled action.

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[60] Ibid 407.

[61] Both of which may be assessed under the *EPBC Act* in a climate-blind manner, which undermines the integrated assessment principle of best practice Environmental Impact Assessment: See generally Macintosh (n 6); Robert V. Bartlett and Priya A. Kurian, 'The Theory of Environmental Impact Assessment: Implicit models of policy making' (1999) 27(4) *Policy & Politics* 415.

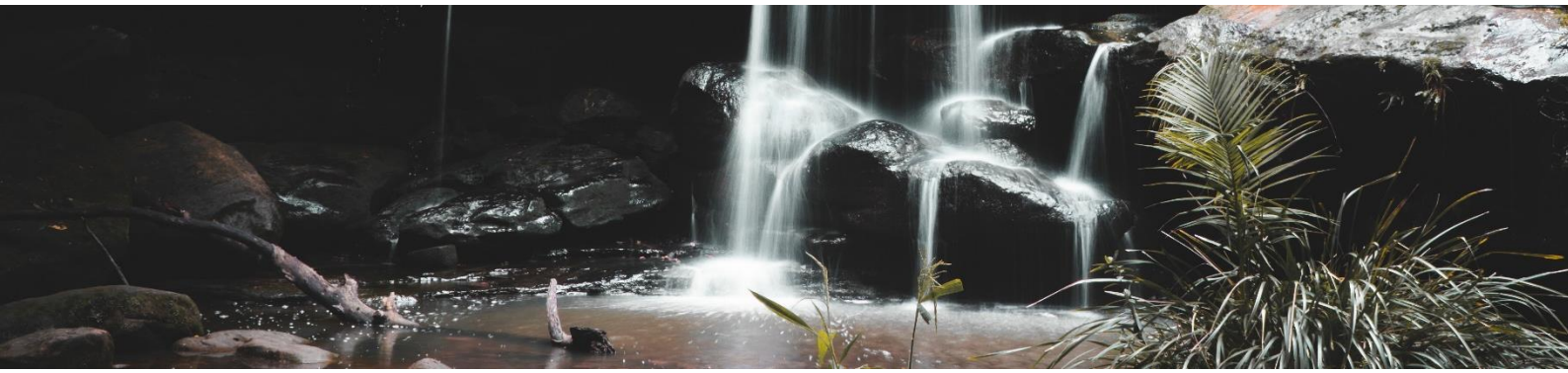
[62] See generally Philip Gibbons et al, 'A Loss-Gain Calculator for Biodiversity Offsets and the Circumstances in Which No Net Loss is Feasible' (2016) 9(4) *Conservation Letters* 252.

[63] See, eg, *Bulga Milbrodale Progress Association Inc v Minister for Planning and Infrastructure* (2013) LGERA 347.

[64] Norris (n 55).

At a federal level, threatened species and ecological community conservation extends beyond environmental impact assessment processes. This year, the federal government released the *Threatened Species Strategy 2021-2031*, which aims to 'improve the trajectories of priority threatened species by 2031' through 5-year action plans.[65] Although the first 5-year action plan has yet to be finalised, it is anticipated the plans will engage in direct mitigation and conservation actions including 'climate change adaptation and resilience', as well as supporting actions for more effective planning and community engagement.[66]

However, the climate gap in existing Conservation Advices and Recovery Plans is likely to have two significant impacts on the efficacy of the *Threatened Species Strategy* and broader conservation for all critically endangered species.



The Importance of Conservation Advices and Recovery Plans for the Strategy and Action Plans: both the Strategy and Action Plans are high-level documents, which will rely on the threats mitigation actions identified in the Conservation Advice and Recovery Plan for prioritised species.[67] The existing climate gap means that the Strategy and Action Plans, despite identifying climate change as a broad threat, will be largely climate-blind in how on the ground actions are designed and implemented for species conservation.

Furthermore, the previous Strategy (2015-2020) for priority species recovery utilised three-year score cards to assess recovery efforts.[68] The three-year score card for each priority species were

[65] *Threatened Species Strategy* (n 5) 5 and 24.
[66] Ibid 28.
[67] Ibid 29.
[68] See, eg, H.M. Geyle et al, *Report to Office of the Threatened Species Commissioner: 3-year review of progress on priority bird and mammal species* (Threatened Species Recovery Hub, 27 November 2019).

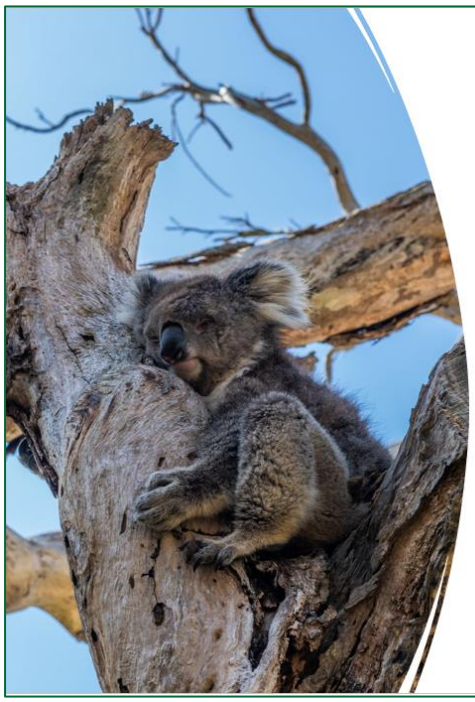
largely reliant on Conservation Advices and Recovery Plans, for example carrying across criteria for recovery from the species Plan. Thus, climate gaps in the Advice or Plan fundamentally influences how priority species recovery is assessed, potentially hiding significant risks to the long-term recovery of the species.

Compounding Gaps for Critically Endangered Species: the Strategy and Action Plans are confined to a mere 100 priority species.[69] Priority species have been selected on a range of metrics and not all species are critically endangered. Therefore, the majority of critically endangered species and ecological communities will not benefit from the additional conservation efforts imbedded in the Strategy and Action Plans. Instead, these species will rely solely on the threat identification and mitigation actions recommended in their specific Conservation Advice and Recovery Plan. This means that climate gaps in Conservation Advices and Recovery Plans will have significant flow-on effects for the on-the-ground conservation actions taken for these species and ecological communities.

[69] Australian Government, *100 Priority Species* (Threatened Species Strategy, October 2021).

Appendix A: Iconic Species

In addition to the review outlined in our main report, we have also assessed several of Australia's threatened iconic species, providing snapshots of how climate change is managed for each species under the *EPBC Act*, as of July 2021:



Koala (vulnerable)

The Koala's Conservation Advice mentions climate change once. At this stage, the Koala does not have a Recovery Plan.

The Advice outlines that the main threats to the Koala include 'drought and incidences of extreme heat'. However, the link these threats and climate change is only briefly discussed in the research priorities section. In our analysis we rated the climate change assessment of the Koala as being limited and generalised.

This is concerning given the Koala is vulnerable to a range of climate impacts including drought, extreme heat, more intense bushfire seasons, and long-term impacts on eucalypt species that increase the risk of malnutrition.

Mahogany Glider (endangered)

The Mahogany Glider does not have a current Conservation Advice. In the Glider's Recovery Plan, approved in 2008, climate change is not discussed at all.

However, scientific evidence, from as early as 2000, strongly suggests climate change is a serious threat to the Mahogany Glider. Climate impacts on the Mahogany Glider include more extreme natural disasters, increased temperatures and reduction in suitable habitat.

Whale Shark (vulnerable)

The Whale Shark's Conservation Advice mentions climate change twice. At this stage, the Whale Shark does not have a Recovery Plan.

The Advice, approved in 2015, states that climate change is a 'less important threat' to the species. It outlines the most significant threats to the Whale Shark are mortality from fishing, boat strike and habitat disruption.

The Advice recommends further research into how climate change may impact Whale Sharks but recommends no other climate mitigation actions.

Spectacled Flying Fox (endangered)

Both the Conservation Advice and Recovery Plan for the Spectacled Flying Fox discusses climate change, although the discussion is highly generalised.

The Flying Fox's Conservation Advice outlines that climate change is a 'potential' future threat, and that extreme natural disasters and increased temperatures may impact the mortality of the species. Similar conclusion are outlined in the Recovery Plan.

Despite the recognition that climate change is a threat, neither the Flying Fox's Conservation Advice or Recovery Plan recommends climate mitigation actions.

Greater Glider (vulnerable)

The Greater Glider has a Conservation Advice, approved in 2016 but no current Recovery Plan. The Greater Glider's Conservation Advice provides a detailed climate threat and mitigation analysis.

The Conservation Advice rates climate change as a 'severe' threat to the Greater Glider. The Advice outlines that climate change will severely restrict the suitable range for the Glider and that higher temperatures increase the risk of heat stress and mortality.

The Advice further recommends a combination of passive and active climate mitigation measures. Passive measures include population modelling and further research into the impact of altered fire regimes. Active measures include mitigating bushfire risks and to avoid further fragmentation of habitat that reduces Glider resilience.

Southern Elephant Seal (vulnerable)

The Southern Elephant Seal's Conservation Advice, approved in 2016, does not discuss climate change. The Seal's Recovery Plan, approved in 2004, discusses climate change in a limited and misdirected manner.

The Southern Elephant Seal's Recovery Plan recognises that climate change is a threat to the Seal but states that climate impacts are beyond the scope of the Plan, because climate change cannot be 'effectively or realistically managed'.

However, scientific evidence demonstrates that climate change is impacting Southern Elephant Seals altering their suitable habitat and causing Seal populations to shift their geographic distribution.

Port Davey Skate (endangered)

The Port Davey Skate's Conservation Advice, approved in 2008, does not mention climate change impacts. At this stage, the Port Davey Skate does not have a Recovery Plan.

The Port Davey Skate is a relic species with a highly restricted range in Tasmania. Although the exact impacts of climate change on the species is unknown, scientific evidence suggests climate change will likely threaten the resilience of the species. Climate change may also alter the marine habitat of the Port Davey Skate, with warming ocean temperatures linked to sea urchin infestations that threaten the local ecosystem and food sources on which the Skate relies.

Spotted Tree Frog (endangered)

The Spotted Tree Frog's Conservation Advice, approved in 2017, mentions climate change in general terms. In contrast, the Frog's Recovery Plan, approved in 2001, does not discuss climate change at all.

In the Conservation Advice, it is noted that 'models of habitat suitability under climate change scenarios suggest that both habitat availability and population abundance of Spotted Tree Frogs may decrease'. Despite identifying climate change as a threat, no mitigation actions are recommended.

It is likely climate change will have a severe impact on the Spotted Tree Frog, as climate impacts will restrict its suitable habitat and natural disasters, like bushfires, have significant impacts on mortality rates.

Shy Albatross (endangered)

Climate impacts are discussed in both the Conservation Advice and Recovery Plan for the Shy Albatross. In both documents climate impacts are detailed and species-specific mitigation actions are recommended.

The Shy Albatross' Conservation Advice outlines that climate impacts, including warmer temperatures will likely lead to declining breeding success for the Albatross and that storm surges will increase nest habitat damage. Both the Conservation Advice and Recovery Plan identify artificial nest projects as a key intervention to tackle climate impacts.

An artificial next project is ongoing at Albatross Island, with high usage rates by the Shy Albatross. This highlights the positive impact climate aware conservation documents can have on species recovery.

Ghost Bat (vulnerable)

The Ghost Bat's Conservation Advice does not discuss climate change at all. The Ghost Bat also does not have a Recovery Plan.

The Conservation Advice, approved in 2016, outlines that key threats to the Ghost Bat include habitat loss and human disturbance. The Advice does not outline how heat extremes, natural disasters or other climatic impacts may impact the Ghost Bat.

However, it is likely that the Ghost Bat will be impacted by climate change. The declining population rate has been linked to climate change, including mortality from extreme heat and loss of food sources.

Southern Black-Throated Finch (endangered)

The Southern Black-Throated Finch does not have a Conservation Advice. It's Recovery Plan, approved in 2008, does not mention climate change at all.

The Recovery Plan outlines that habitat loss, including from altered fire regimes and changes to aquatic environments, are a major threat to the Southern Black-Throated Finch. It is likely that these threats are worsened by climate change.

Since 2008, research into the Southern Black-Throated Finch has highlighted the species is at risk from ongoing habitat loss. It is likely suitable habitat will be further eroded by climate impacts.

Giant Burrowing Frog (vulnerable)

The Giant Burrowing Frog's Conservation Advice does not discuss climate change at all. The Giant Burrowing Frog also does not have a Recovery Plan.

The Conservation Advice, approved in 2014, outlines that key threats include 'inappropriate fire regimes' and changes to the Giant Burrowing Frog's aquatic habitat.

This is a major concern, given scientific research into the Giant Burrowing Frog indicates the species is at risk of extinction from climate change impacts, notably the long-term reduction in suitable habitat and the impacts of bushfires.

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