

REVIEW

What drives modern protected area establishment in Australia?

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Abstract

Protected areas are a fundamental mechanism for ensuring the persistence of biodiversity. The strategic policy objectives set by governments for protected area land acquisition are strong determinants of biodiversity outcomes. An examination of these objectives is necessary to determine those most influential in designing protected area networks and understand why Australia's extinction rates exceed those elsewhere despite actively establishing protected areas over the past several decades. To examine spatio-temporal trends in policy objectives for protected areas, we evaluated the strategic priorities in Federal, State, and Territory policy documents across Australia between 1992 and 2019 using thematic analysis. We classified priorities into seven themes: adequacy, Indigenous and cultural values; representation of ecosystem and species types; threatened species and their habitat; *social* and recreational values; *unique* values and *avoiding* threatening processes. We found that the representation of ecosystem and species types was the most prevalent theme in policy documents, and the least common theme was *social* and recreational values. We posit several reasons for this trend and warn that emphasizing extent, in terms of area or representativeness, may diminish the effectiveness, efficiency, and impact for biodiversity outcomes. We found that policies were generally supportive of the strategic identification of particular species or communities that would quantifiably benefit from protection (referred to as *avoided loss*). Risked-based approaches to the establishment of protected areas are supported by modern conservation literature to enhance the protected area network's effectiveness. To maximize limited resources, we recommend that governments continue encouraging urgency to avoid species and habitat loss in their strategic priorities. This urgency should be accompanied by clear and consistent funding for on-the-ground actions which facilitate the socio-ecological outcomes that characterize modern protected area policy.

KEYWORDS

biodiversity, conservation targets, document analysis, policy, protected areas, strategy

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1 | INTRODUCTION

In the context of increasing human pressure on the Australian environment, policy responses have been developed to prevent biodiversity loss (Kristensen, 2004). Policy responses include the establishment of a protected area network. Indeed, there has been a steady global rise in both the number and total extent of protected areas (Jenkins & Joppa, 2009). To an extent, this was prompted by the adoption of the Convention on Biological Diversity (CBD) (Balmford et al., 2005; Boyle, 1994). This legally binding international conservation treaty focuses on promoting biological diversity through sustainable development. With 196 parties to the convention, the CBD became a crucial catalyst in the global commitment to increase the total area of land set aside for protection in signatory countries (Secretariat for the Convention on Biological Diversity, 2016).

The establishment of protected areas may be guided by a series of priority-setting principles and targets. It is speculated that these conservation principles can be value-laden and subject to fluctuating government incentives, public concern, or increasing scientific knowledge (Stolton et al., 2015). Shifts in policy priorities have known effects on biodiversity conservation (Barton et al., 2015; Reside et al., 2017) but can also result in changes to the resourcing of a policy instrument or program. Thus, assessing the broad changes in policy priorities is a valuable source of knowledge for policymakers who need to consider future options and policy needs. For example, a recent study found that policy uncertainty was a determining factor in forest cover retention or removal (Simmons, Marcos-Martinez, Law, Bryan, & Wilson, 2018).

An example of priority setting in Australia is its commitment to protecting a portion of all native ecosystems by expanding a protected area network. To ensure consistency in prioritizing areas for protection across multiple regions, guiding prioritization principles were developed cooperatively by the Federal and State governments and the resulting agreement was known as the JANIS agreement (Commonwealth of Australia, 1997). The JANIS agreement is a framework for reserve design based on prioritization from systematic conservation planning (Commonwealth of Australia, 1992). The core principles of this framework were: comprehensiveness, adequacy, and representativeness (CAR) (Commonwealth of Australia, 1997b; TFMPA, 1999a, 1999b; Thackway & Cresswell, 1995a) (Table 1). CAR principles were fundamental components of Australia's 1996 Biodiversity Strategy (Commonwealth of Australia, 1996). They became the standard evaluation and appraisal priorities declared by Federal, States, and Territory Governments for the

strategic protection of landscapes in association with expanding reserve networks.

Priority-setting principles can precipitate naturally from the transmission of social values (Hellström & Ryttilä, 1998). Thus, while CAR principles are a fundamental component of Australia's protected areas strategy, they are not the only principles that guide the prioritization of candidate protected areas. Other values associated with protected areas may include recreational or social values (i.e., areas for public use), iconic landscapes, or places of significant cultural or ecological value (Watson et al., 2016). The spectrum of values associated with the reserve estate is reflected in reserve management categories (Dudley, 2008; Queensland Government, 1992), where certain parts of the estate are managed for different socio-ecological values. Understanding what these values are in the Australian context and their prevalence in protected area policies and strategies over time reveals the underpinnings of current practices for reserve design. Attention to fluctuations in these pluralistic criteria could inform future policies' design, possibly because these concepts can now involve competing objectives and priorities (Coffey & Wescott, 2010; Kanowski, 2017; Lane, 2003).

It is necessary to identify and describe prioritization and policy targets, describe temporal shifts, and identify any gaps in strategic reserve planning to maximize limited opportunities and resources to secure biodiversity assets on finite land (Di Marco, Watson, Venter, & Possingham, 2016). This article addresses two fundamental research gaps: (a) what are the conceptual values most commonly represented in Australian protected area policy? And (b) how are these values represented across time and jurisdiction? This allows us to assess and identify gaps in the current framework and evaluate the link between priorities and conservation policy.

2 | METHODS

We collected Australian Federal, State, and Territory policies for biodiversity and protected areas for the 27 years between 1992 and 2019. The year 1992 was seen as a logical starting point for this work as it corresponded with the release of the Australian Government's National Forest Policy Statement (Commonwealth of Australia, 1992), which provides the modern guide for the management of Australian forests. We collected policy documents by searching government websites and online databases, contacting relevant departments at the State and Federal level, and reviewing references to other policy documents within policy documents. The search terms used were:

TABLE 1 Definitions of comprehensiveness, adequacy, and representativeness (CAR)

	Comprehensiveness	Adequacy	Representativeness
Definition ^a	“The inclusion of the full range of forest communities recognized by an agreed national scientific classification at an appropriate hierarchical level.”	“The maintenance of ecological viability and integrity of populations, species and communities.”	“Those sample areas of the forest that are selected for inclusion in reserves should reasonably reflect the biotic diversity of the communities.”
Selection criteria ^b	Does the area: <ul style="list-style-type: none"> • Increase the comprehensiveness of the [National Reserve System] at a continental scale, and to what extent? • Add to the reservation of the full range of ecosystems recognized at an appropriate scale and within each IBRA^c region? To what extent? 	Does the area: <ul style="list-style-type: none"> • Provide long-term security for one or more ecosystems and associated species? • Increase the security provided by the protected area system for one or more ecosystems and associated species, and to what degree? 	Does the area: <ul style="list-style-type: none"> • Add to the representativeness of the [National Reserve System] and to what degree? • Enable better representation of ecosystems across their geographical or environmental range within the IBRA^c region? • Include the intrinsic variability of the ecosystems it represents?

^aANZECC and MCFFA (1997).

^bGuidelines to consider for identifying comprehensiveness, adequacy, and representativeness of protected areas with examples from forest ecosystems (Commonwealth of Australia, 1999).

^cInterim Biogeographic Regionalization for Australia (Thackway & Cresswell, 1995b).

“biodiversity” OR “reserves” OR “protected areas” OR “conservation” AND “Australia” OR “Australian Capital Territory” OR “ACT” OR “Northern Territory” OR “NT” OR “New South Wales” OR “NSW” OR “Queensland” OR “Qld” OR “Tasmania” OR “Tas” OR “South Australia” OR “SA” OR “Western Australia” OR “WA” OR “Victoria” OR “Vic.”

We excluded policy documents if they did not relate to or provided directions for a terrestrial protected area strategy. We also exclude reporting materials that described jurisdictional progress towards targets because these are not priority-setting strategies, though we recognize their importance in informing terrestrial protected area strategies (Miller, Marsh, Cottrell, & Hamann, 2018).

To facilitate comparisons across policy documents, we classified documents into “Overarching strategies” and “context-specific strategies.” Overarching strategies are characterized as having a geographical scale equivalent to the jurisdiction and spanning multiple years. Context-specific documents are characterized as having a constrained scale and have a scope of fewer than 5 years.

2.1 | Thematic analysis

Thematic analysis is useful in identifying patterns in the underlying concepts and ideas of qualitative data. To understand priorities and their prevalence (Bowen, 2009), we performed a latent thematic analysis on each strategic

priority in each policy document using NVivo (Bazeley & Jackson, 2013; Guest, MacQueen, & Namey, 2011; Maguire & Delahunt, 2017). NVivo is a software package used by qualitative researchers to identify trends and characteristics in qualitative data and find insights within these trends. We collated all statements which describe the necessary objectives, actions, or strategic priority within the policy document. We call these statements *priorities*. We then coded each priority into conceptual *themes* forming new themes until concept saturation (see examples of coding for conceptual themes in Table 2). Concept saturation is achieved when enough information has been obtained to represent the data accurately or when new information or concepts are no longer observed (Guest, Bunce, & Johnson, 2006; Ness, 2015; O'Reilly & Parker, 2013). Because there was a conceptual overlap between certain themes, our coding method allowed priorities to fall into multiple themes. There were some conceptual themes that corresponded to the components within CAR principles. For example, representing a full range of genetic diversity is a feature of representativeness, but genetic diversity itself is not a conceptual theme. In such instances, we classified these aspects as *sub-themes* within the significant theme. For example, “*Adequacy*” can refer to the connectivity of the reserve estate or the capacity of the reserve estate to be a refugium for species under climate change. “*Connectivity*” and “*Refugia/Resilience*” were coded as sub-themes to “*Adequacy*.” Notably, comprehensiveness and representation are used interchangeably. Consequently, we combined these into a single “representativeness & comprehensiveness (*R&C*)” theme.

TABLE 2 Major conceptual themes and sub-themes identified during analysis

Major theme	Sub-theme	Definition	Example
Adequacy		Areas that are appropriately sized and configured to allow the persistence of biodiversity to perpetuity	<i>“Reserve design should seek to incorporate ecologically meaningful boundaries and maintain ecosystem functions and processes (Pitman, 1995).”</i>
	Connectivity	Prioritize areas that are contiguous with existing reserves	<i>“...protect perimeters of existing DECC reserves and important corridors and links between them (DECC 2008).”</i>
	Refugia and resilience	Prioritize areas that are identified as climate refugia	<i>“By 2030, include critical areas to ensure the viability, resilience, and integrity of ecosystem function in response to a changing climate, including large and small refuges (Natural Resource Management Ministerial Council., 2009).”</i>
Avoided loss		Preventing or avoiding conflicting land-uses by establishing a protected area	<i>“The priority for reservation of a forest ecosystem is related to how much remains relative to its initial distribution and its vulnerability to threatening processes (Commonwealth of Australia, 1997a).”</i>
Indigenous value		Having cultural value to indigenous populations	<i>“...places where Aboriginal people and other landowners seek to protect cultural values (New South Wales Government, 2008).”</i>
Representativeness & comprehensiveness (R&C)		Sample of species, communities, or other aspects of diversity	<i>“Eighty percent of extant ecosystems in each IBRA sub-region 15 represented in the formal terrestrial conservation reserve system by 2016 (Western Australian Government, 2006).”</i>
	Genetic diversity	Identify and conserve the genetic diversity of each species	<i>“Securing for each component an adequate extent, abundance, and suitable spatial configuration at a landscape scale within NSW to give confidence about its long-term viability, genetic diversity, and evolutionary potential.”</i>
Social value		Contributing to social well-being in the Australian community	<i>“Existing and new public protected areas will be managed to high standards of condition and function, recognizing their significant contribution to conservation, climate change mitigation, tourism, health, recreation and economic outcomes for Queensland (Queensland Government, 2016).”</i>
Threatened		Species of communities listed in federal or state legislation as “of conservation concern”	<i>“Priority attention should be given to rare, vulnerable, and endangered ecosystems and species (Commonwealth of Australia, 1997a).”</i>
Unique		Having unique characteristics or features	<i>“... the number of outstanding or unique biological, zoological, geological, or paleontological features in protected areas (Victoria Government, 2007).”</i>

Note: We define these themes and provide an example from one of the substantive policy documents.

2.2 | Trend analysis

We quantified, then analyzed themes across time and jurisdiction (i.e., concerning State/Territory). We produced stacked bar graphs in RStudio (RStudio Team, 2015) using the package ggplot2 (Wickham & Chang, 2008). We interrogated correlations in themes using CorrPlot (Wei et al., 2017) (Appendix S1). To explore themes through time, we graphed linear

models to predict the theme occurrence over time. To analyze themes across jurisdictions, we calculated the percent of each theme's total representation per State or Territory and then attributed State boundaries with this percent. We then mapped the attributed state boundaries in ArcMap v10.7 (ESRI, 2014). Spatial data for state boundaries were obtained from the Australian Government's spatial data portal (Australian Government, 2019).

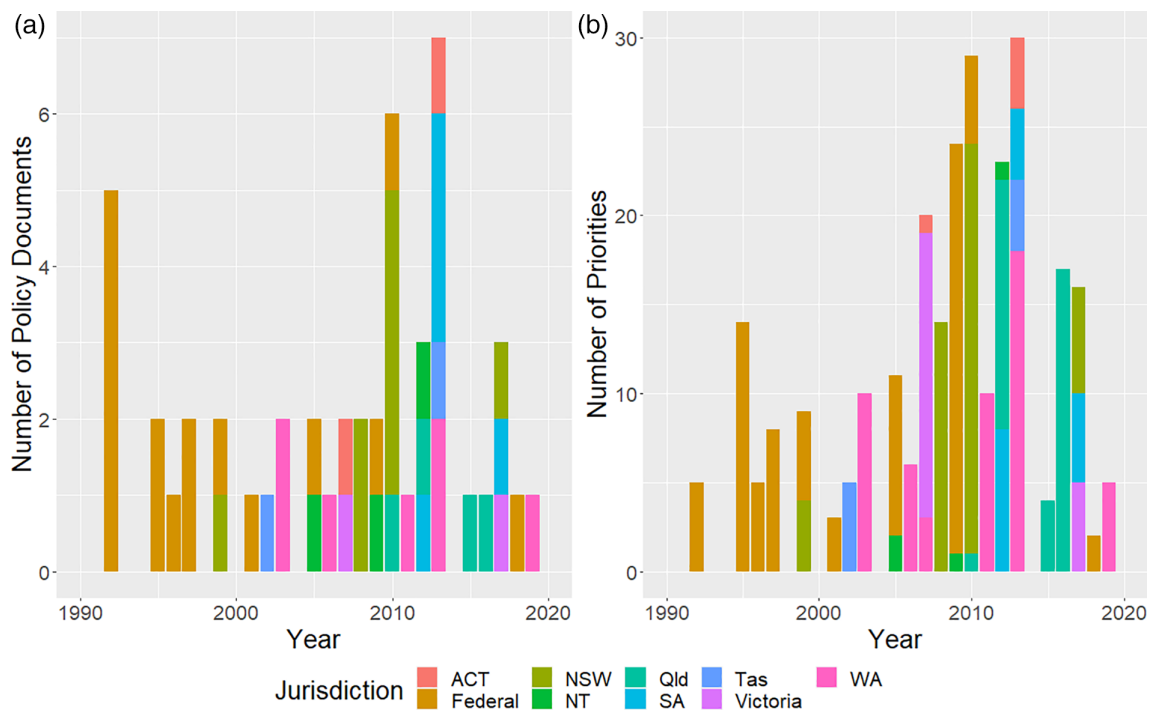


FIGURE 1 (a) Number of policy documents released each year during the sampling period (1992–2019) by jurisdiction. (b) The number of the strategic priorities identified within policy documents during the sampling period (1992–2019) by jurisdiction and the number of policies observed per jurisdiction

3 | RESULTS

3.1 | Overview

We systematically reviewed 43 strategic biodiversity and conservation policies in Australia for the 27-years between 1992 and 2019 (Figure 1). For a complete list of policies included in this analysis, please see Table S1-1. Within these policy documents, we identified a total of 270 strategic priorities (*priorities*) on which we based our conceptual thematic analysis. Seven conceptual themes for protected area priorities emerged as unique categories (Guest et al., 2011) from this analysis: *adequacy*, *avoided loss*, *Indigenous values*, *representativeness*, and *comprehensiveness*, *social values*, *threatened species or communities* and *unique features* (Table 2).

4 | TEMPORAL TRENDS

Most themes were consistent in their representation through time (Figure 2). There was no definite upward or downward trend in the occurrence of any particular theme over time. We did observe a slightly negative relationship through time with the *Adequacy*, *R&C*,

threatened species and communities, and *unique values* themes.

5 | CAR PRINCIPLES AND AVOIDED LOSS

The total number of themes identified was 305. The theme “*Representativeness and Comprehensiveness*” (hereafter, *R&C*) was most common in policy documents across jurisdictions and through time (Figures 2 and 3, Table 3) ($n = 84$; 28%). *R&C*'s representation compared with the total number of priorities per jurisdiction was common in New South Wales ($n = 14$; 20%), Queensland ($n = 11$; 20%), and Tasmania ($n = 3$; 13%) (Table 3). Indeed, the *R&C* theme comprised greater than 20% of all priorities within States and Territories except the ACT, where it was not observed. Despite being common, this theme had a slight downward trend through time (Figure 2).

Adequacy (another component of the CAR principles) was the second most common theme ($n = 60$; 19.7%). When considering *adequacy*'s representation against the total number of priorities per jurisdiction, it was prevalent in Victoria ($n = 12$; 40%), New South Wales ($n = 14$; 21%), and Queensland ($n = 6$; 20%). Unlike *R&C*,

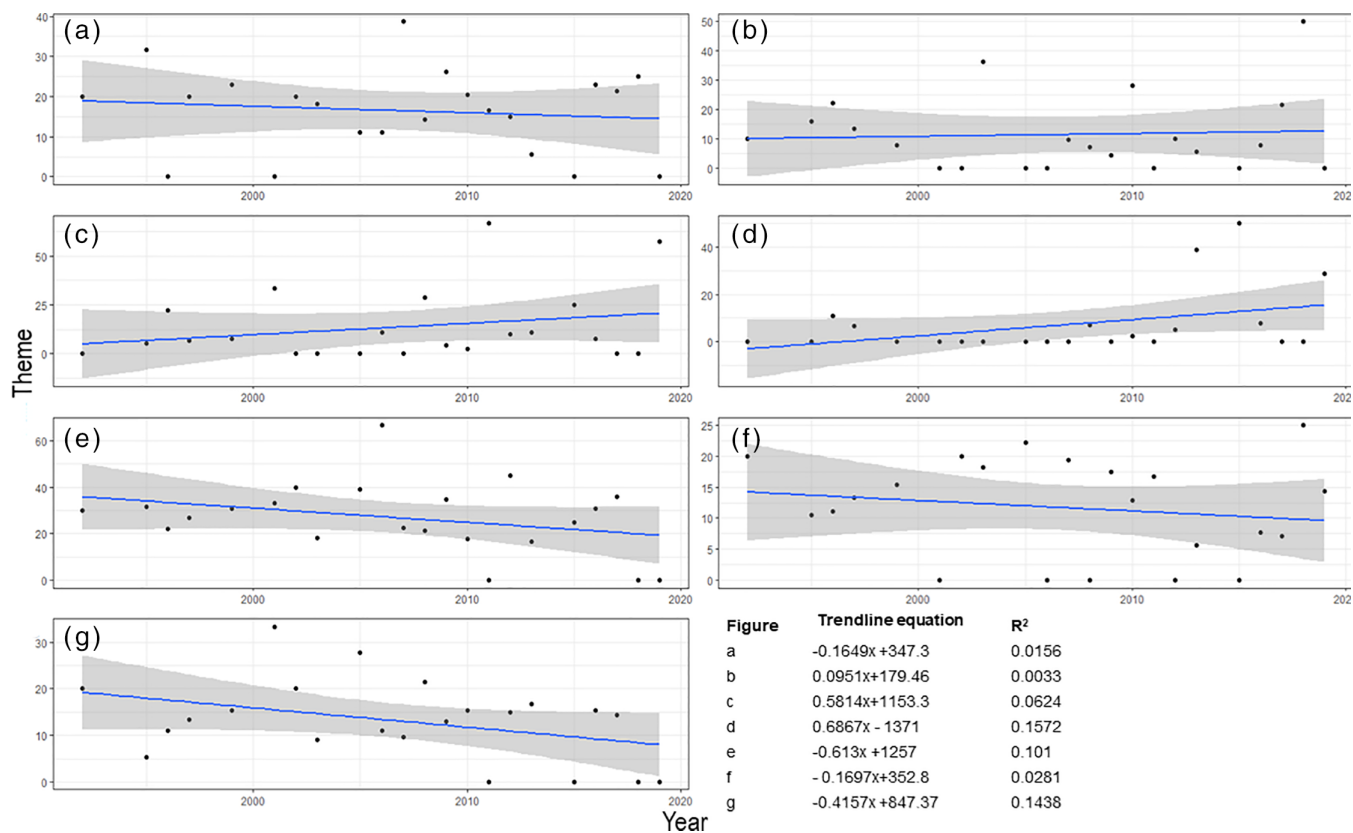


FIGURE 2 The number of theme occurrences per year for the sample period (1992–2019) with a regression line shown in blue and standard error shown in grey. Trendline equations and R^2 values are shown at the bottom of the image. (a) Trendline for the adequacy theme. (b) Trendline for avoided loss theme. (c) Trendline for indigenous values theme. (d) Trendline for social values theme. (e) Trendline for representativeness and comprehensiveness theme. (f) Trendline for threatened species and communities theme. (g) Trendline for unique values theme

however, *adequacy* was not observed in priorities from the Northern Territory or South Australia (Table 3).

The *avoided loss* theme was moderately common and consistent when considering all priorities in our analysis ($n = 38$; 12%). However, when considering the *avoided loss* theme within the policies per jurisdiction, *avoided loss* comprised less than 20% of all State and Territory priorities except for New South Wales ($n = 13$; 20%).

6 | INDIGENOUS AND SOCIAL VALUES

Within jurisdictions, we found that *Indigenous* values were most moderately common in policy documents from Western Australia (22%) and South Australia (22%). This theme became more slightly frequent through time. However, when considering the representation of the *Indigenous* theme within jurisdictions, this theme was not observed in the Australian Capital Territory, the Northern Territory, Tasmania, or Victoria.

In total, the *Social values* theme was common in Western Australia (18%), Queensland (10%), and also appeared in and South Australia (11%) and became slightly more prevalent through time (Figures 2 and 3; Table 3). The *social values* theme constituted less than 3% of the remaining jurisdictions' priorities.

7 | UNIQUE VALUES AND THREATENED SPECIES

Our results indicate that most jurisdictions are using protected area policy to address *threatened* species decline (Figure 3; Table 3). Within jurisdictions, we observed this theme consistently in priorities from New South Wales ($n = 12$; 11%), Victoria ($n = 6$; 20%), and Western Australia ($n = 5$; 10%). *Threatened* species and communities were not observed in South Australia and comprised more than 10% of the policy priorities released in Tasmania and Queensland (Table 3). This theme had a slight downward trend over time (Figure 2).

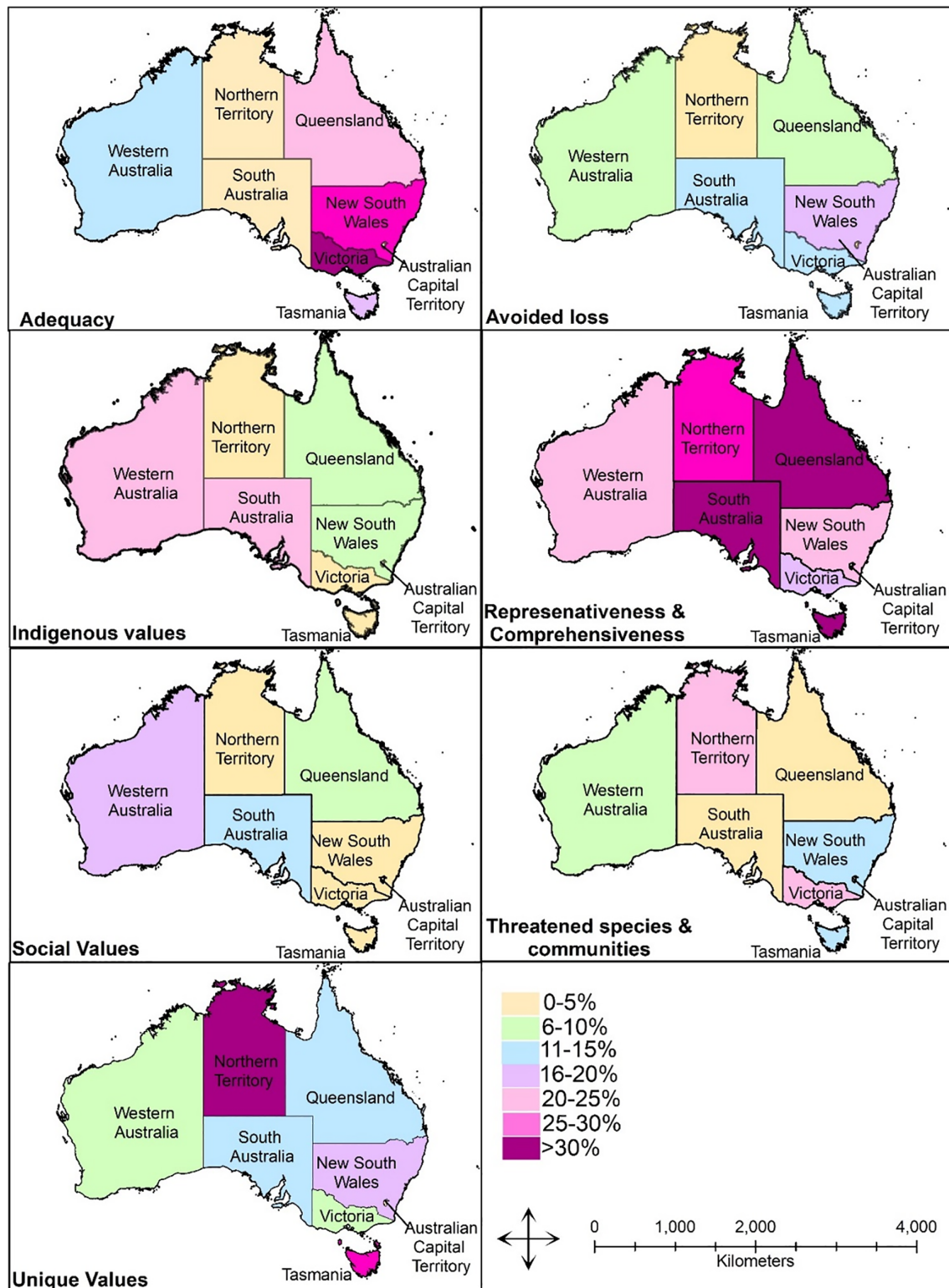


FIGURE 3 Concerning the total number of themes identified for each State or Territory, the above map shows the percent of thematic priority where each panel corresponds to a theme. For example, in NSW, there were a total of 66 themes identified. Of those 66 themes, 14 (or 21%) were coded for “adequacy.” Higher percentages are shown in purple, and lower proportions are shown in yellow

The *unique* theme was observed in all jurisdictions except for the Australian Capital Territory. Within jurisdictions, the *unique* theme appeared in 50% of priorities

from the Northern Territory ($n = 2$), 18% of priorities from New South Wales ($n = 12$), and 25% of priorities from Tasmania ($n = 2$). The *unique* theme trends

TABLE 3 The representation of each conceptual theme as a percentage of the total priorities identified in each State/Territory

Jurisdiction	ACT	Federal	NSW	NT	Qld	SA	Tas	Vic	WA	Total
Number of priorities	5	107	66	4	30	9	8	30	51	305
Adequacy		21	14		6		1	12	6	60
Percent of adequacy	0%	20%	21%	0%	20%	0%	13%	40%	12%	
Avoided loss		12	13		3	1	1	4	4	38
Percent of avoided loss	0%	11%	20%	0%	10%	11%	13%	13%	8%	
Indigenous		7	5		2	2			11	27
Percent of indigenous	0%	7%	8%	0%	7%	22%	0%	0%	22%	
Social values		3	1		3	1			9	17
Percent of social values	0%	3%	2%	0%	10%	11%	0%	0%	18%	
R&C		34	14	1	11	4	3	5	12	84
Percent of R&C	0%	32%	21%	25%	37%	44%	38%	17%	24%	
Threatened		16	7	1	1		1	6	5	37
Percent of threatened	0%	15%	11%	25%	3%	0%	13%	20%	10%	
Unique		14	12	2	4	1	2	3	4	42
Percent of unique	0%	13%	18%	50%	13%	11%	25%	10%	8%	

Note: Jurisdiction refers to the State or Territory (ACT = Australian Capital Territory, Federal = Policies at a Federal Level, NSW = New South Wales, NT = Northern Territory, Qld = Queensland, SA = South Australia, Tas = Tasmania, Vic = Victoria, WA = Western Australia). Below each Theme is a column called percent of "theme." This refers to the number of observations of each theme over the total priorities for the jurisdiction.

slightly downward throughout the sampling period (Figure 2).

8 | DISCUSSION

8.1 | Overview

We observed variation in the number of policy documents released per year. This is expected because expect policies to be released every year because policy documents take many years to develop and have implementation strategies that span multiple years. The interval between years may relate to shifts in environmental policy agendas (Dovers, 2013) (including Australia's commitment to Aichi target 11) or as a consequence of political cycles (Watson et al., 2016).

We observed the fewest policy documents in the ACT and Tasmania. This is to be expected for the Australian Capital Territory because its most recent strategy covers a 10-year period between 2013 and 2023. Furthermore, the Australian Capital Territory represents a relatively small geographical area for which over half is already within the protected area estate (Environment and Sustainable Development Directorate, 2013). Likewise, nearly 60% of Tasmania's land area is included in the reserve estate, and priorities in this State are likely to reflect this estate's

management rather than strategically identifying new areas (Forest Practices Authority, 2017).

9 | JURISDICTIONAL AND TEMPORAL TRENDS

While protected area planning in Australia before the 21st century was typically devised in response to public concerns and cause célèbre [i.e., public attention to controversial issues such as extensive logging or declines in avian species (Carron, 1985)]. As reflected in seven themes, our results demonstrate policy priorities for protected areas have changed over time. Changes in the representation of these themes are not uniform across jurisdictions. A difference in this representation is expected as States and Territories pursue policies that best suit their distinct socio-ecological needs (Brodhag & Talière, 2006).

10 | CAR PRINCIPLES AND AVOIDED LOSS

Despite the differences discussed above, we found that R&C was common across time and jurisdiction. This reveals that R&C is the fundamental principle for Australian protected area policy, reflecting ecologically

representative habitat protection goals globally (Dudley, Parrish, Redford, & Stolton, 2010; Secretariat for the Convention on Biological Diversity, 2016; UNEP, 2011). The prevalence of *R&C* is expected as this theme formed two core components of the CAR principles; however, the slight downward trend in this theme may reflect a shift in policy priorities to other values.

A commitment to *R&C* suggests a commitment to systematic conservation planning (Margules & Pressey, 2000) principles and scientific principles broadly. Systematic conservation planning is a staged operational model for maximizing a reserve network's effectiveness while also minimizing costs (Margules & Pressey, 2000). In its original design, systematic conservation planning consisted of six stages. Stage two of the process included "identifying conservation goals for the planning region" and suggested setting quantifiable conservation targets for species, vegetation types, or other biodiversity features. These quantifiable targets may include the number of species per unit area. The CAR principles have adopted this planning process. Still, they may not have adopted more recent conservation planning design principles, which caution that only targeting systems or species known to be at risk represents an ad hoc approach to reserve design (Adams, Barnes, & Pressey, 2019; Carwardine, Klein, Wilson, Pressey, & Possingham, 2009; Watson, Dudley, Segan, & Hockings, 2014). We posited that because *R&C* and adequacy themes were established simultaneously through the initiation of the CAR principles, we would see consistency in the representation of these two themes.

Contrary to our expectations, *R&C* was more common than *adequacy* in each jurisdiction. This is due to a broader scope of *R&C* principles (i.e., a policy might refer to the representation of habitats, species, or communities). Additionally, this might also be because *R&C* targets are relatively simple to evaluate when comprehensive vegetation or habitat datasets are available. Indeed, a trade-off may come into consideration when limited gazettal resources constrain acquisitions to purchases that add more representation to the network or add more of the same habitats to the network to ensure adequate habitat representation.

Despite the prevalence of area or percentage targets in policy documents, such targets for *R&C* have been widely criticized as politically expedient but failing to accurately reflect scientific knowledge on biodiversity conservation requirements (Barnes, Glew, Wyborn, & Craigie, 2018; Rondinini & Chiozza, 2010; Svancara et al., 2005; Tear et al., 2005; Woodley et al., 2012). Reporting extent as the critical measure of success falsely assigns area-reserved as an outcome of biodiversity conservation policy. Instead, area or percent reserved should be considered a single input to a comprehensive decision process for effective conservation outcomes. Simply targeting total area may be

ineffective in preventing the future decline or anticipate species or communities at risk of becoming threatened (Cook, Valkan, & McGeoch, 2019; Ferraro, 2009; Ferraro & Pattanayak, 2006; Pressey, Visconti, & Ferraro, 2015). Indeed, biodiversity declines can be slowed if priority, evidence-based approaches, are actioned that adequately reflect socio-ecological values (Eklund, Coad, Geldmann, & Cabeza, 2018; Legge et al., 2018).

We called the process of identifying and prioritizing actions based on their vulnerability to likely threatening processes "*avoided loss*." Implicitly, this theme requires strategic planning for current and emerging threats. This indicates that policies acknowledge the need to anticipate or plan for threatening processes rather than manage them as they emerge. Priorities addressing this theme have remained consistent over time, suggesting consistent thinking concerning the *avoided loss* concept.

Instead, accurately accounting for *avoided loss* (such as whether or not a protected area network adequately preserves species and ecosystems in the presence of rapidly emerging threats in the absence of protection) requires a more sophisticated approach with the consideration of a counterfactual scenario (Adams et al., 2019). A counterfactual scenario requires a critical assessment of the question, "*What would happen if we did nothing?*" The specialized skill set needed to undertake a rigorous counterfactual analysis might limit its real-world application. A possible consequence of a failure to objectively prioritize species and communities under high threat that would quantifiably benefit from protection is the continued decline of such species and communities (Baylis et al., 2016). There may be a need for greater scientific engagement in the co-design of policies to address this gap and facilitate or create counterfactual policy analysis capacity. For example, if the protected area network is designed to avoid habitat loss, scientists might engage with policymakers to identify the areas most likely to be lost.

11 | INDIGENOUS AND SOCIAL VALUES

Land in Australia continues to play a profound cultural, economic, and spiritual, role for Indigenous Australians, who have managed native landscapes for tens of thousands of years (Hill, Pert, Davies, Walsh, & Falco-Mammone, 2013). The representation of *Indigenous values* as a theme in policy documents increased over time. A significant driver for this theme is the Indigenous Protected Area Program which emerged in 1997 (Australian Government, 2008). Indigenous Owner groups jointly manage Indigenous Protected Areas (IPA) through ongoing voluntary agreements with the Federal Government. Our

results indicate that *Indigenous* values tended to be poorly represented in protected area strategies at the jurisdictional level. However, this is likely due to the management of *Indigenous* values at the Commonwealth resolution through the IPA program. This may be because workshops or other consultations with Traditional Owners may occur as separate processes that are not reflected, specifically, in protected area priority setting policies. Indeed, in Australia, Indigenous Land Corporations will typically hold the titles for IPAs and are heavily involved in the governance, management and representation of cultural objectives (Smyth & Jaireth, 2012). Indigenous land governance typically occurs under acts of Native Title. Native Title may be managed by a Government department separate from protected areas.

Consequently, while *Indigenous* values are indeed adopted into the Australian land planning context, there may be room to improve the representation of *Indigenous* values within the protected area establishment and management context. There is an increasing global recognition for cultural values (Reed, Brunet, Longboat, & Natcher, 2021; Stevens, 2014), particularly in Australia (Tran, Ban, & Bhattacharyya, 2020). Indigenous people across Australia must be involved in all stages of the consultation and priority setting process to ensure that cultural values are appropriately represented in both their traditional and modern understandings and use for the land (English, 2000).

An increase in the thematic representation of *social* values may be because of increasing attention given to the *social* values of protected areas by both governments and members of the public (Angulo-Valdés & Hatcher, 2010; Calvet-Mir, Maestre-Andrés, Molina, & Van den Bergh, 2015; Tenkanen et al., 2017). Increased attention has led to the development of programs and policies purposed with promoting protected areas for their role in human health and well-being (Dustin et al., 2018; Millennium Ecosystem Assessment, 2005; Parks Victoria, 2015). In Victoria, for example, this is promoted through initiatives such as “Healthy Parks, Healthy People,” where parks are beneficial because they provide opportunities for physical activity, provide sanctuary from urban stresses, and help people connect with and explore the natural world (Minnamurra, 2009; Parks Victoria, 2015). Increasing human well-being is facilitated by increased tourism to local and iconic national parks; however, such programs’ effectiveness is not well-understood (Taff et al., 2019). However, it is understood that tourism occurs in areas branded as iconic (Buckley et al., 2019) and those that contain structures for recreation (i.e., picnic benches and sanitary facilities). As *social* values become increasingly important in Australian policy, the equity of access to public recreation areas and how to balance those needs with the ecological considerations of a protected area may be an emerging priority.

We did not interrogate tourism strategies in this analysis. Future work could consider the relationships between tourism or recreational strategies and protected area policies.

12 | UNIQUE PLACES AND THREATENED SPECIES

For centuries, Indigenous Australians conserved unique and significant biodiversity values by traditional practices, nomadism and deliberate restraint (Kothari, 2008). We observed consistent mention of ecologically rare areas, critical habitats, and internationally significant areas in the current protected area policy. We classified these as “*unique*,” and protecting *unique* habitats and species was a consistent theme in our study, increasing representation over time. This trend is expected because Australia has commitments to programs such as ecologically unique or significant places. For example, Australia is a signatory to the Ramsar Convention (Gardner & Davidson, 2011). The Ramsar Convention requires all signatory bodies to halt the worldwide loss, reverse the loss of wetlands, and conserve any remaining. Obligations manage the Australian Government in implementing the “*Convention on Wetlands of International Importance especially as Waterfowl Habitat (the Ramsar Convention)*.” This has been in effect since 1975 and is still prevalent in current policy. This is just one policy that requires the protection of unique ecological areas. In our analysis, the *unique* value was predominately coded against habitats that are rare in the landscape. We also found *unique* values in policies that required protection for migratory species.

Furthermore, *unique* areas are also referred to as iconic or distinct landscapes. Iconic landscapes provide ecotourism areas (Reinius & Fredman, 2007) for the public with documented benefits to mental health (Buckley et al., 2019; Fuller, Irvine, Devine-Wright, Warren, & Gaston, 2007). Indeed, Australia’s first national park (now Royal National Park) was established to provide landscape recreation opportunities in its iconic coastal cliffs, deep river valleys, and vast coastal heathlands (Adam, 2012). Australia also has responsibilities under Environment Protection and Biodiversity Conservation Act, 1999 (EPBC, Federal legislation) to protect areas of outstanding global significance as “World Heritage Area.” Our findings corroborate the role protected areas play in preserving unique and iconic places as a reoccurring philosophy in protected area policy.

Australia is considered mega-diverse because it supports 70% of the world’s known plant and animal species (Mittermeier & Mittermeier, 1997). However,

environmental changes caused or influenced by human activity have increased the current rate of extinction by 100–1,000 times the standard background rate (Ceballos et al., 2015). The reduction or loss of habitat for conversion to extractive uses, urban development, or resource production is a significant threat to biodiversity (Kingsford et al., 2009). In Australia (Evans, 2016), and particularly in Queensland (Bradshaw, 2012), there has been a persistent and gradual reduction in native forest cover due to human activities. Consequently, the number of threatened species in Australia has led to a biodiversity crisis whereby the number of species listed as vulnerable to extinction or already extinct is rising (Walsh, Watson, Bottrill, Joseph, & Possingham, 2013). Protected areas are keystone actions in global efforts to prevent or slow species decline (Dudley et al., 2010). Our findings demonstrate that providing habitat for threatened species (or species that are listed as vulnerable to extinction under State or Federal legislation) is a consistent theme in protected area policy. Indeed, several priorities explicitly state that vulnerable species should be given priority attention. However, the effectiveness of protected areas in the absence of adequate funding for threat management (Kearney, Adams, Fuller, Possingham, & Watson, 2018) and complementary land restoration activities lies in question (Mackey, Watson, Hope, & Gilmore, 2008). Given increasingly limited time, resources, and imminent threats to biodiversity (Woinarski, Burbidge, & Harrison, 2015), it is imperative to evaluate the integration of protected areas programs with other management actions to ensure maximum effectiveness and secure better outcomes for the persistence of biodiversity. However, we did not observe any policy documents within our analysis that interrogated other land management activities across the distributional range of threatened species.

13 | CONCLUSION

Evidence-based, contextual analysis is critical to effective decision-making and policy development (Pullin, Knight, & Watkinson, 2009). When aimed at the decisions made by on-the-ground managers, systematic qualitative reviews are essential tools in conservation decision-making (Cook, Possingham, & Fuller, 2013; Macura et al., 2019). Using a qualitative review, we found that protected areas are growing, and humanity's values imbue them with are changing. Our systematic review of policy documents between 1992 and 2019 revealed differences in the strategic priorities for protected areas between jurisdictions and over time. Protected areas were pioneered as government-owned and government managed land for protection and recreation.

However, previous research has highlighted that model is incomplete (Phillips, 2003) because it cannot fully address the collaborative and multi-tiered governance needs for protected areas (Lockwood, 2010). Our results highlight the need for strategic and purpose-fit management actions to capture the range of values for protected areas and then clearly articulates the necessary on-ground effort to ensure these values are maintained. That is, better management actions that are firmly grounded in evidence-informed practices, which may answer critical questions around “What actions are needed?” and “How should these actions be implemented?” for each protected area value (Hallstrom & Hvenegaard, 2021).

Despite criticism in the scientific literature, it was clear that representativeness and comprehensiveness in policy appear consistently across time and jurisdictions. Immediate outputs of this priority (i.e., increased areas in reserve systems) may appear satisfactory, but it is challenging to demonstrate long-term benefits in terms of beneficial outcomes for biodiversity (Maxwell et al., 2020). Notwithstanding these considerations, there is insufficient evidence to support the success of the *R&C* objective, which is perhaps due to a lack of on-the-ground action (Knight et al., 2008). A lack of action has been discussed extensively in the literature and attributed to a knowledge-action boundary. The knowledge-action boundary can be crossed by promoting institutional mechanisms for increasing communication across scientists and decision-makers (i.e., implementing a knowledge brokerage system) (Cook, Mascia, Schwartz, Possingham, & Fuller, 2013). In this context, knowledge brokers (such as species specialists, conservation planners, and ecosystem community mappers) should be utilized extensively to ensure the salience and legitimacy of implementing impactful *R&C* objectives. Indeed, given an increased understanding of modern threatening processes and the stark reality of climate change, the lingering “*CAR*” principles may need revision to better address a clear need for an integrated strategic approach for landscape-scale conservation actions (Leclère et al., 2020).

It has been nearly three decades years since the development of cross-jurisdictional protected area priorities in Australia (Commonwealth of Australia, 1997b). Despite this undertaking, biodiversity continues to decline (Butchart et al., 2010), and a *CAR* system has not been realized. This demonstrates a lack of on-the-ground action following policy announcements. We recommend future policies incorporate a cross-jurisdictional approach with outcome-focused priorities directed at anticipating and planning interventions that minimize the potential loss of cultural, ecological, and *social* values. At a national level, there is the need for mutually reinforcing policies. To meaningfully achieve a system of reinforcing policies a bottom-up

approach may be needed where Federal policies are fed by needs at the State or Territory level.

Our study identifies and describes the patterns (both spatial and temporal) in policy priorities. This is an essential step in developing National policy because a failure to acknowledge the differences across jurisdictions risks undermining other priorities (Barry, King, & Matthews, 2010; Brodhag & Talière, 2006) by possibly shifting resources towards a particular goal or activity. In other words, because representation is the most common priority, resources and funding may directly target this goal while others are less well-resourced. Therefore, further research should consider investigating the resourcing of the identified priorities to identify gaps or changes.

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CONFLICT OF INTEREST

The authors declare no conflicts of interest.

AUTHOR CONTRIBUTION

Stephanie Hernandez: Conceived the project and carried out analysis and writing. **Stephanie Duce:** Provided project oversight and contributed significantly to writing the manuscript. **Marcus Sheaves:** Provided project oversight and contributed significantly to writing the manuscript. **Claudia Benham:** Provided project oversight and contributed significantly to writing the manuscript. **Rachel Miller:** Provided technical support for NVivo analysis and contributed to writing.

DATA AVAILABILITY STATEMENT

Please contact the corresponding author to obtain copies of the data.

ETHICS STATEMENT

This article does not contain any studies involving human participants performed by any of the authors.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of this article.

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