

Biodiversity Coordination Unit
Department for Environment and Water
Government of South Australia
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4 March 2024

Dear Biodiversity Coordination Unit

**Submission by the Environment Institute of The University of Adelaide on A New
*Biodiversity Act for South Australia***

Thank you for the opportunity to provide a submission to this consultation process.

The task of designing and drafting a new Biodiversity Act for South Australia is of particular interest to the Environment Institute. The goals, rules and evidence that underpins protection of South Australia's rich and diverse environments and biodiversity is at the heart of much of the world-leading research expertise held by Environment Institute members and affiliated researchers.

The Environment Institute's aim is to safeguard the environment now, for current and future generations. It connects the knowledge and thought leadership of multidisciplinary researchers to the world's most critical and complex environmental issues. It is committed to identifying actionable solutions that will preserve and restore the environment and deliver tangible and lasting economic, societal, and cultural benefits. The Institute achieves this by working in partnership with industry, Government, and the community.

The Environment Institute began in 2009 and has invested in the future of the environment through world-leading research to halt and reverse environmental decline and influence a future that is healthy, diverse and equitable. The current initiatives include restoration of temperate marine ecosystems; biodiversity climate adaptation and rewilding; water resources, management and policy; green urban futures and planetary health; combatting wildlife and environmental crime; citizen science and engagement; enviro-technology and natural capital; and pollution and natural hazard mitigation.

We begin this submission by briefly emphasising the scale and significance of the threat to biodiversity in this State, before making submissions on seven substantive issues.

The substantive issues that frame this submission are:

- maintaining and protecting biodiversity in South Australia;
- repairing and restoring biodiversity more broadly;
- integrating South Australian and national laws, especially for ecosystems that cross borders;
- valuing nature and creating markets with integrity;
- monitoring impacts and assets;
- building an evidence base for rigorous, high-integrity biodiversity decision making through acquiring, managing and synthesising scientific information; and
- engaging and empowering communities to be part of the Biodiversity Act's broader framework.

We have also provided a high-level recommendation for the establishment of a collaborative **Integrative Biodiversity Centre**, supported by the Environment Institute and The University of Adelaide (or 'Adelaide University' as it will become, with UniSA, in coming years) together with relevant State Government partners (and potentially others), to bring together the expertise required to manage biodiversity in the State, for the future. We propose this Centre as an institution that can play a key role in supporting and partnering with government to implement the ambitious plan for safeguarding South Australia's biodiversity that this new Act will enable. New legislation is a crucial step forwards but, without the supporting framework and partnerships across sectors, disciplines and communities, it risks falling short of its full potential.

We are keen to answer any questions that you have about this submission and, on request, will happily provide additional information or access to any resources that we have relied on.

Finally, we urge the South Australian Government to be courageous as it begins drafting the new Biodiversity Act. This is a unique opportunity to overcome the shortfalls of existing legislative arrangements and create a statute that genuinely conserves and restores South Australia's extraordinary environments. We look forward to reviewing and providing feedback on draft legislation in due course, in support of the Minister's goal to produce a best-practice, nation-leading biodiversity law for SA.

Yours sincerely

Dr Phillipa McCormack, Professor Andy Lowe and Dr Adam Toomes
on behalf of the Environment Institute

The State of Biodiversity in South Australia

South Australia has one of the highest extinction rates in Australia and more than 1,100 native plant and animal species listed as threatened. For reasons that we detail below, many more species, populations and ecological communities are threatened than those that are listed. However, some of those species have not yet been assessed and others have not yet even been taxonomically described. This is a shortfall in our commitment to meeting our national and international obligation to conserve South Australian biodiversity; a shortfall that must be addressed as a matter of the utmost urgency.

We commend the proposal in the Discussion Paper for greater First Nations involvement in management decision-making for biodiversity in South Australia. The State was managed by First Nations people long before colonisation, and 'nature' has never been simply a wilderness in this State. We urge the South Australian government to find ways to acknowledge the deep connection, responsibility and knowledge held by South Australia's First Nations peoples, and give effect to that acknowledgment through overarching goals and substantive provisions, including decision making powers for First Nations peoples.

Biodiversity in South Australia is at a tipping point. If the proposed Biodiversity Act falls short of what is required to conserve nature in this State – as our existing legal framework has – we risk shifting to a track of irreversible decline across the State. In the submission that follows, we highlight particular ways in which the Act must be designed and framed to ensure that it provides new solutions and opportunities for effective conservation and a flourishing future for this State's unique environments. We also emphasise the critical need for high-quality evidence and strong partnerships to ensure the Act is implemented fully and effectively.

1. 'Nature repair' is good but maintaining environmental values is better

The concept of 'nature repair' has become ubiquitous in international and national discussions about environmental law and policy. The Environment Institute supports rapidly increasing South Australia's commitment and investment in enhancing environmental values. However, the costs of losing and then having to 'repair' environmental values are so great that the 'maintenance' of South Australian environments and existing habitat extent should, we suggest, be reiterated in the new legislation as the most important priority – before restoration and repair become necessary.

We support the target of '30 by 30', described in **Topic 8** of the Discussion Paper. We urge the South Australian government to ensure that the new Biodiversity Act equips us to work towards a minimum of 30% extent of habitat under formal protection, in each of SAs ecosystems. Meeting this goal will enable us to maintain species diversity, habitat functionality and avoid future extinctions (including as a result of extinction debt). We also need to avoid any legislative arrangement that might allow ecosystems that currently persist in an area of greater than 30% of original extent to fall back to (or below) a 30% extent. Allowing such decline would be wholly inconsistent with a law based on a 'nature positive' goal. In addition, 30% is the absolute survival minimum for most ecosystems and species, and many systems will need a greater proportional area for long term persistence.

Maintenance of the conservation estate will require that we halt species losses and ecological declines across the full extent of native habitat and biodiversity assets – beyond those that are

already recognised in public, private and Indigenous protected tenures. In order to prioritise the outcome of halting biodiversity decline, we must identify key biodiversity conservation areas and target resources at:

- (a) maximising the conservation of biodiversity and ecosystems in those areas; and
- (b) targeting those areas for management that builds resilient systems to help biodiversity cope with environmental pressures and natural hazards.

Conserving biodiversity through the management and expansion of an effective protected area estate will require a strategic, proactive planning approach across the state. This approach must include identifying 'core' protected areas that need to be designated in one of the categories of protected area that receives the highest standards of protection, but we must also identify buffer zones for those core areas, and corridors of protected habitat between them. Ultimately, the maintenance and conservation of environmental values will require far greater standards of protection both within and beyond conservation tenures, including in urban and regional areas, across working landscapes and for industrial-scale land users such as mining companies.

Specific management plans will also be required for threatened and near-threatened species, but these species-specific efforts should be prioritised in broader, landscape-scale approaches rather than through the individual, case-by-case triage approach that has been pursued around Australia, including in this State, for many decades.

Key partners for tackling the challenges of maintaining important environmental values include: Adelaide University (currently UniSA and The University of Adelaide) and Flinders University, the Department for Environment and Water, Landscapes SA, the International Union for the Conservation of Nature or 'IUCN', regenerative farmers and the environmental non-government sector (including for example Trees for Life, Bush Heritage and Arid Recovery).

In the discussion that follows, we highlight particular issues for maintaining and repairing environmental values in any new Biodiversity Act. This discussion responds to many of the issues raised across the Discussion Paper, including in Topics 2, 4, 5, 6 and 8.

1.1. Key Biodiversity Areas

The designation of protected areas in the past has tended to focus on land that is marginal or too remote for agriculture and urban development, and that has not been identified as valuable for mineral exploration and extraction. We urge the South Australian government to aim for more than simply meeting the 30% area-based target, but to ensure that the ecosystems and habitats that are targeted for priority protection are also areas that are important for biodiversity – at present, or in future as climate and environmental change increase the threats faced by South Australian biodiversity.¹

Interestingly, spatial analyses of Indigenous biocultural knowledge in Australian ecosystem science have examined the biodiversity 'hotspots' currently recognised across the continent, and demonstrated that they differ to those hotspots identified in the 568 place-based Australian

¹ Using, for example, measures described in the Key Biodiversity Areas framework, see: <https://www.keybiodiversityareas.org/>.

Indigenous biocultural knowledge documents that the researchers reviewed. That research suggests that Indigenous Biocultural Knowledge (sometimes described as Traditional Ecological Knowledge), if taken seriously, could make 'significant and unique contributions to Australia's conservation priorities'.² We recommend the South Australian government investigate ways to prioritise future land protection based on a combination of Western scientific and Biocultural metrics, to maximise the overlap in protection for these values.

In keeping with the Minister's acknowledgement in the Discussion Paper – that biodiversity has been stewarded by First Nations peoples in Australia for millennia – we recommend that priorities for conservation that are enshrined in the new Biodiversity Act allow decision makers to identify and act on biocultural priorities for conservation in this State.

1.2. Overcome Taxonomic Biases in Defining 'Protected' Animals

Under the *National Parks & Wildlife Act 1972* (SA), animals are defined as 'any species of animal', yet protected animals are defined in a far more restrictive way, as any mammal, bird or reptile that is either indigenous to Australia or which occasionally lives in Australia (e.g., migratory birds). Threats to these under-protected taxa, both within Australia and globally, are becoming increasingly apparent.³

This restrictive definition of 'animal' undermines effective conservation in a range of ways. For example, the definition completely excludes all species of amphibian, fish & invertebrates, without any clear justification, despite the fact that more than 10% of Australia's amphibians are classified as threatened by the IUCN and amphibians have a higher proportion of endangered and critically endangered species compared to other vertebrate taxa.⁴

While protection is provided to some marine species under separate legislation such as the *Marine Parks Act 2007*, amphibians, fishes and invertebrate species that are found, for example, in freshwater systems, on the coasts, and elsewhere across the State, are not protected by either statute. Similarly, no invertebrates are listed for protection under current South Australian laws and, in some South Australian legislation, invertebrates cannot be protected because they are not even included in the definition of 'animal' (e.g., *Animal Welfare Act 1985* (SA)).

These fragmented and restrictive approaches have resulted in a taxonomically biased suite of protections that has no scientific foundation. We urge the South Australian government to ensure that the new Biodiversity Act does not replicate these shortfalls.

A practical example of species under threat and the need for protection: invertebrates

Invertebrates represent 98% of Australia's (and South Australia's) animal biodiversity. They are inherently valuable, they can be indicators for ecosystem health, and they provide important and economically valuable ecosystem services such as pollination, nutrient cycling and pest control.

² Emilie J. Ens et al, Indigenous biocultural knowledge in ecosystem science and management: Review and insight from Australia, *Biological Conservation*, Vol 181, 2015, 133-149, <https://doi.org/10.1016/j.biocon.2014.11.008>.

³ Cardoso, P et al (2020) Scientists' warning to humanity on insect extinctions. *Biological Conservation* 242, 108426; Gillespie, GR et al (2020) Status and priority conservation actions for Australian frog species. *Biological Conservation* 247, 108543.

⁴ Alek, A, Assis, AS, Eiras, N, Amaral, TP, Williams, B, Butt, N, Renwick, AR, Bennett, JR, Beyer, HL (2018) The threats endangering Australia's at-risk fauna. *Biological Conservation* 222, 172-179.

The value of these services to South Australia cannot be understated, and it is likely to increase over time.⁵ Species invasions, including resulting from growing global trade, are also expected to increase, and pest control services provided by invertebrates will likely be a critical component of South Australia's resilience to that threat.

Despite their immense ecological and economic value, the bulk of invertebrate species are not known to science, let alone formally described. This means most invertebrates, largely insects, are considered 'data deficient' and thus unprotected, even when they are known to be threatened. Invertebrate taxa also frequently satisfy criteria to be considered 'short-range-endemics' meaning that the extent of their distribution may span very small geographical areas.⁶ These taxa are particularly susceptible to stressors associated with changing land use, because very localised impacts may affect large proportions of a population. They are also often overlooked in National biodiversity assessments, so State level protection is crucial.

Data deficiency and endemism are conservation threats but, unlike the global IUCN Red List, most state and federal environmental legislation in Australia (e.g., the *Environment Protection and Biodiversity Conservation Act 1999* ('EPBC Act')) do not allow for species listings on these bases. As such, invertebrates are disproportionately negatively impacted. Without adequate protection or recognition, they cannot be the subject of formal conservation management plans.

The proposed Biodiversity Act should include an explicit definition of invertebrates as animals (perhaps in a similar form to the definition of vertebrates in the *Animal Welfare Act 1985*). The Act should also explicitly allow for species to be listed based on short-range endemism and/or data deficiency, and allow for ecological communities, populations and undescribed species to be listed as threatened, because many groups of insects known to be threatened are not formally described as species, and so cannot be protected under existing law.

Recommendation: invertebrates should be better incorporated into the goals and substantive provisions of a new Biodiversity Act, including so that they can be protected through:

- ***formal recognition, accompanied by definitions of invertebrates as animals (phyla: Arthropoda, Mollusca, Annelida, etc.), where distinct evolutionary units (genera, species, and populations). This would allow invertebrates to be 'protected animals', worthy of conservation and protected from knowingly being driven to extinction at even local scales (as is the case in state legislation in WA);***
- ***An equivalent listing system to that for vertebrates, where specific taxa can be listed on a case-by-case basis if sufficient evidence demonstrates that the taxa are at-risk due to anthropogenic activities;***
- ***A framework for protecting listed taxa, including listed invertebrates, from further impacts, with the goal of preventing further biodiversity loss within South Australia; and***

⁵ For example, the likely spread of the Varroa destructor mite is expected to result in the loss of 90-100% of feral honeybee colonies, along with losses in managed hives, leaving native invertebrate pollinators with a disproportionately important role to play.

⁶ Harvey, MS et al (2011) Protecting the innocent: studying short-range endemic taxa enhances conservation outcomes. *Invertebrate Systematics* 25, 1-10.

- ***An improved permitting system for sample/specimen collection that recognises invertebrates outside of National Parks as valuable components of biodiversity that are worthy of protection and conservation.***

A practical example for ecosystems: protecting groundwater dependent ecosystems

Groundwater is a highly valued natural resource that is critical to the biophysical processes supporting natural resource and energy extraction, which had Australian export earnings of \$460 billion in 2022–23.⁷ Groundwater also underpins groundwater-dependent ecosystems ('GDEs'), including high-value biodiversity resources that are unique to Australia, such as aquifers, freshwater springs, caves and their flora and fauna. Protection of GDEs is crucial because they provide essential ecosystem services that maintain underground water condition and quality and most cannot be restored once damaged.⁸

The EPBC Act specifies the protection of a small range of particular species and GDEs in Australia but any other protection under environmental laws must be State-based. Western Australian legislation is the most comprehensive for subterranean fauna, with the *Wildlife Conservation Act 1950* and the *Environmental Protection Act 1986* in that State responsible for regulating the protection of unique habitats and individual taxa (species and subspecies). The Western Australian Environmental Protection Authority (EPA) considers groundwater-dependent fauna to be a key factor for environmental considerations in environmental impact assessment ('EIA') and has an environmental factor guideline⁹ and two technical guidance instruments specific to subterranean fauna survey and sampling methods. These guidelines require proponents of significant activities such as mining and associated infrastructure to survey for subterranean species where subterranean habitat exists and/or subterranean fauna are known to occur, to allow informed assessment of development proposals. Formal EIA processes under the *Environmental Protection Act 1986* (WA) are usually required if a proposal may cause significant change to a habitat containing subterranean fauna, whether stygofauna (underground aquifer-dwelling) or troglodfauna (cave-dwelling). Information presented on subterranean fauna can be evaluated only if it has been collected with adequate sampling effort and appropriate methodologies.¹⁰ As a result, in WA, subterranean fauna are deeply investigated before EIA processes are undertaken.

For the remaining Australian states, including SA, environmental legislation does not protect GDEs, subterranean fauna or short-range endemic species in the same way, and so subterranean fauna are not considered in cases of potential impact. Groundwater is currently identified in SA's *Environment Protection Act 1993* in the context of contamination by pollutants but the only GDE protected in SA is Great Artesian Basin springs, which are listed as a threatened ecological community under EPBC Act.

⁷ DEECEW Resources and Energy Quarterly (June 2023) www.industry.gov.au/publications/resources-and-energy-quarterly-june-2023.

⁸ AJ Boulton et al (2023). Recent concepts and approaches for conserving groundwater biodiversity. *Groundwater Ecology and Evolution*, 525-550; Saccò, M et al (2024). Groundwater is a hidden global keystone ecosystem. *Global Change Biology*, 30(1), e17066.

⁹ EPA (2016) <https://www.epa.wa.gov.au/policies-guidance/environmental-factor-guideline-subterranean-fauna>.

¹⁰ Ibid.

Recommendations: similar items as that found in WA legislation are required for protection of GDE and subterranean fauna, in order to bring the state closer in line with best practice for mitigating environmental impacts.

1.3. Defining 'Native' and 'Protected' Species Needs an Approach that is both Flexible and Targeted, and that Includes Animals, Plants and Fungi

The new Biodiversity Act must take a scientifically rigorous approach to defining the focus of the Act's protective and management provisions, and must include animals, plants and fungi. It must also take a more rigorous approach to defining the sub-categories of what deserves to be 'protected' and prioritised for conservation under the Act.

At the outset, the definition of the kingdoms ought to be broad. For example, defining 'animals' under the Act could include a definition as broad as:

any individual of a species within the kingdom Animalia.

Under existing legislation, animals defined as 'protected' currently include species that are native to Australia as a whole, but that definition is not necessarily restricted to species native to South Australia. Some 'domestic non-native' populations may cause ecosystem impacts akin to alien invasive species, yet those populations would still fall under the current definition of protected animals. Australia is an extremely large island continent with a wide diversity of ecosystem types, and there are existing examples of 'native' Australian species that have established invasive populations elsewhere within the country. For example, rainbow lorikeets (*Trichoglossus moluccanus*) have established populations in Western Australia and Tasmania and are spreading beyond their introduced range, with negative impacts on species native to those areas with more restricted ranges (this is also the case for plants with taxa native to the east or west coast of Australia, which have naturalised in South Australia). This murky definition of what may qualify as a 'protected' animal also risks introgression, that is, a species that is native to Australia becoming integrated genetically into an indigenous population of a related species (i.e. native to a local area), in a way that threatens the persistence of the unique indigenous population. Cultivated *Grevillea* species have hybridised in this way with indigenous *Grevillea* species.¹¹

Despite the risks that can be posed by protecting species that are native to Australia generally, without distinguishing them from species native to South Australia specifically, the definition of 'native' can, itself, mask some complexity. For example, many animal species had far greater distributions across the Australian continent historically but are now restricted to smaller areas, sometimes within one region or local area. This has occurred for a range of reasons, including changed predation or competition, climate change, human intervention and changes to other regimes such as fire and water flows. There may be arguments for reintroducing or allowing the redistribution of a species that has been distributed widely in the past, including in South Australia, but that only now persists in a restricted range outside South Australia. Where a reintroduction or supported redistribution occurs, the new Act will need to include a mechanism for protecting those species in South Australia. We point, for example, to the conservation

¹¹ Major, R (2008), "Grevillea iaspicula - critically endangered species listing", NSW Threatened Species Scientific Committee: Final determinations 2008-2010. Available at: www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species/nsw-threatened-species-scientific-committee/determinations/final-determinations/2008-2010/grevillea-iaspicula-critically-endangered-species-listing.

approach that is described as 'rewilding', which has become an active movement for conservation in other parts of the world. When done well, rewilding can be consistent with the broader goal of protecting biodiversity and maintaining environmental values, and with restoration goals (which we discuss, below).

The concept of nativeness will also be complicated as the climate continues to change, as a growing number of species will not persist in areas where they are native because the climate is no longer suitable. Those species will require access to climate refugia – places to which they can retreat and persist as the climate changes¹² – and South Australian decision makers may need to choose between protecting those species or allowing them to become globally extinct. Many species are likely to migrate as an adaptation mechanism to a changing climate, resulting in 'climate refugees'. Strategies to facilitate migration (e.g. translocation, assisted dispersal or composite seed provenancing approaches) and make available areas for migration and future survival need to be prioritised. Such consequential decisions should be made proactively – before it is too late to choose to protect these species and habitats – and in a way that is purposeful and well-informed. By facing these challenges head-on, South Australia's legal framework will be better prepared to support positive, rigorous and transparent decision-making processes that have community support.

With that in mind, we submit that a new Biodiversity Act must have the capacity to be both flexible and targeted in its protective and management provisions. The proposed Act could tackle this challenge in a number of different ways.

Recommendations/options to accommodate complexity in category definitions in an Act:

- ***One approach could be to define animals that are native to South Australia, and animals that are native to Australia as a whole, separately. This would allow the Act to afford different levels of protection to each category.***
- ***Another option could be to define species by their environmental impact rather than by an exhaustive and/or complicated definition of 'nativeness' – particularly if defining a species as native risks being both ecologically and historically arbitrary.¹³ This approach would require substantially greater levels of information to support decision making – but the shortfall in information about biodiversity in the State is a fundamental criticism of existing approaches and should be addressed in a new legal framework any case (see below).***
- ***An alternative could be to define biodiversity under the Act as broadly as possible (e.g., for animals, 'any species in the kingdom Animalia'), and then focus the definition of protected species on particular characteristics. This would make explicit the kinds of presumptions that are already relied upon in decision making.***

¹² See, e.g., availability of climatic refugia across the continent by 2085, including in South Australia: <https://nccarf.edu.au/climate-change-refugia-terrestrial-biodiversity-defining-areas-promote-species-persistence/>.

¹³ See e.g., M Davis et al. Don't judge species on their origins. *Nature* 474, 153–154 (2011). <https://doi.org/10.1038/474153a>

For example:

- ***‘nativeness’ could become a rebuttable presumption for protection, such that a species that is native to South Australia would receive protection unless evidence is available to demonstrate that it is causing harm to other native species (that is, the species has become an ‘invasive native’).***
- ***Similarly, ‘endangerment’ could be listed as a rebuttable presumption such that a species that is rare and/or in decline would receive protection unless there was evidence to demonstrate that the species is not an appropriate candidate for protection (i.e. because the animal is invasive and actively being eradicated).***

We would be happy to discuss this idea of rebuttable presumptions further, as the Biodiversity Coordination Unit facilitates the statutory drafting process for the proposed new Act.

Finally, we strongly support bringing native vegetation management within the overall framework of the proposed Biodiversity Act. A substantial benefit of incorporating native vegetation into the broader Biodiversity Act framework is that some features of South Australian biodiversity will be able to be protected for the first time. For example, ***we urge the government to ensure that fungi can be protected under the proposed legislation.*** Fungi is, of course, an entirely separate kingdom from plants and animals and, historically (around Australia and across the world), has been extremely poorly researched, monitored, managed, protected and restored.¹⁴ South Australia has an opportunity to be a leader in providing protective mechanisms for this component of biodiversity that is fundamental to so many native plants, communities and ecosystems.

1.4. Classification of Native Vegetation

Section 3 of the *Native Vegetation Act 1991* defines native vegetation as vegetation that does not include a plant sown or intentionally planted, except in specific conditions, such as when the planting was required in a permit or imposed as part of a penalty by the Native Vegetation Council. ***We do not support this definition and strongly recommend that it is abandoned in the new Biodiversity Act.***

This exclusion of protection for planted/sown vegetation means that the majority of *planted* native plants are not protected by the Native Vegetation Act, and can be cleared without prior approval or subsequent repercussions. This applies to a suite of examples of native plants that provide valuable ecosystem services such as, but not limited to: floral resources for native pollinators, soil stabilisation, nesting sites (including old-growth tree hollows), reduced evaporative losses via shading, carbon sequestration and invasive weed inhibition.

¹⁴ *State of the World's Plants and Fungi, 5th Edition* (Royal Botanic Gardens, Kew 2023), www.kew.org/science/state-of-the-worlds-plants-and-fungi.

The new Biodiversity Act must include a far-more holistic definition of native vegetation, to ensure that South Australian native vegetation can, in fact, be protected, managed and restored. The new Act could define native vegetation as:

any species of plant that is native to South Australia, whether naturally occurring or human-planted.

[noting that the concept of 'nativeness' may need to be excluded or supplemented, as described at Part 1.3, above]

It may be appropriate for the Act to consider the age of native vegetation plantings and the level and diversity of ecosystem services being provided by those plantings when deciding which protections to afford native vegetation. For example, hollow-bearing trees offer critical ecosystem services that are being lost at a rapid rate. Hollow-bearing trees may need to be able to be protected in South Australia despite any other characteristic, such as having been planted or perhaps even not being native to South Australia.

We encourage the South Australian government to ensure that native vegetation in highly disturbed areas or in small, fragmented patches can still be protected under the Act. For example, extremely vulnerable and ecologically valuable native vegetation can occur in roadside reserves, or in urban settings such as graveyards, urban parks and nature strips, and this vegetation should not fall beyond the protection of effective biodiversity legislation.

1.5. Traditional Ecological Knowledge and First Nations Peoples as Decision Makers

Existing laws have failed entirely to recognise Traditional Ecological Knowledge and other cultural knowledge as evidence and information to underpin decision making, including about biodiversity conservation and other land uses. There are few if any legal contexts in which First Nations people have power to decide how land is used (including in the context of native title, cultural heritage and land rights laws). These failures to recognise the existence, let alone significance, of First Nations knowledge, and the importance of sovereignty to First Nations peoples in decisions about Country, mean that Traditional forms of ecological and cultural knowledge cannot easily be used to improve outcomes for South Australian biodiversity. Just as problematically, these forms of knowledge also cannot easily be protected from misuse and misappropriation.¹⁵ Their absence in formal decision-making processes can make these forms of knowledge both less impactful *and* more vulnerable, at the same time. Irene Watson has illustrated the nature of this barrier, including as a requirement for First Nations people to negotiate decision making contexts where:

the colonial state either denies Indigenous knowledge or, if it acknowledges it at all, treats it within Western social sciences as culture or history...[noting too, that] Indigenous knowledges are viewed as old, static, traditional, rather than "constant", "alive" and contemporary... [On this view, Indigenous knowledges are viewed as] irrelevant, irrational, unscientific, uncivilised....¹⁶

¹⁵ The question of cultural intellectual property is extremely important, but beyond the scope of this submission. However, we acknowledge that the absence of a protective mechanism for cultural IP may be a profound barrier to First Nations knowledge holders being willing or able to share their knowledge and facilitate its culturally appropriate use and management.

¹⁶ Irene Watson (2014) 'Re-Centring First Nations Knowledge and Places in a Terra Nullius Space', 10(5) *AlterNative: An International Journal of Indigenous Peoples*. <https://doi.org/10.1177/117718011401000506>.

Evidence from South Australia's First Nations peoples about where species are distributed, how their distributions are changing over time, what management interventions they may need for their conservation, and what kinds of impacts may be acceptable or unacceptable, are not currently treated in the law as mandatory considerations, evidence or even information that is equivalent to scientific evidence from ecologists, industry priorities or government policy.

Interestingly, despite its strong recommendations about tailored engagement with Aboriginal communities and better integration of Aboriginal knowledge in the conservation of biodiversity in NSW, even Ken Henry's Independent Review of the Biodiversity Conservation Act 2016 in NSW made no mention of Traditional Ecological Knowledge in its discussion of 'Data-informed decision making'.¹⁷ The Australian Government's proposal for better engagement with First Nations peoples around Australia in national environmental law reforms – though they remain in draft form – also appear to fall short of what First Nations peoples themselves have called for.¹⁸

We offer suggestions on this point, rather than recommendations, because our proposals should be considered subject to the aspirations, wishes and expectations of South Australia's First Nations peoples.

Suggestions: We emphasise the need for greater investment into knowledge protocols and protection for Traditional Ecological Knowledge, guided by the aspirations of Traditional Knowledge Holders.

We also propose that the new Biodiversity Act should include clear mechanisms for supporting and investing in Indigenous Ranger programs in South Australia, because these programs provide vital conservation and social values in remote communities, opportunities to develop and transfer Traditional Ecological Knowledge, and give effect to relationships and cultural responsibilities for caring for Country that are resilient, equitable and just.

This Biodiversity Act reform project represents an opportunity for South Australian laws to begin to embody reconciliation and environmental justice in its land, coasts and sea management. We urge the South Australian government to take that opportunity seriously and ensure that First Nations perspectives, priorities and knowledges are given appropriate weight in the new Act.

1.6. Protecting agricultural biodiversity

As the Minister has stated, biodiversity '... purifies our water, pollinates our crops, regulates our weather, and provides us with the resources which underpin our daily lives', but to maintain or regenerate those 'ecosystem services' across South Australia, all biodiversity across land- and seascapes will be important. With that in mind, we have observed that the role of agricultural

¹⁷ NSW Department of Planning and the Environment (NSW Government 2023), 36-38, www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity/overview-of-biodiversity-reform/statutory-review-of-the-biodiversity-conservation-act-2016.

¹⁸ See, e.g., Jake M. Robinson et al, 'Traditional ecological knowledge in restoration ecology: a call to listen deeply, to engage with, and respect Indigenous voices', 2021 29(4): e13381, <https://doi.org/10.1111/rec.13381>; Marcia Langton & Zane Ma Rhea (2005) Traditional Indigenous Biodiversity-related Knowledge, Australian Academic & Research Libraries, 36:2, 45-69, DOI: 10.1080/00048623.2005.10721248; Emilie J. Ens et al, Indigenous biocultural knowledge in ecosystem science and management: Review and insight from Australia, Biological Conservation, Vol 181, 2015, 133-149, <https://doi.org/10.1016/j.biocon.2014.11.008>.

biodiversity is not currently recognised as an important component of the Act in the Discussion Paper, even though it is a core component of the protective provisions of Convention on Biological Diversity and is fundamental to generating ecosystem services.

Human societies are being challenged by climate change and other emergent risks, and diversity within and across landscape and agricultural ecosystems interacts with much important native biodiversity to generate resilience and to provide farmers and their communities with resources to adapt to change.

We submit that highlighting the role of farmers in conserving biodiversity on-farm presents the South Australian government with a great opportunity to value farmers' actions, investment and legacy, and normalise biodiversity conservation actions across agrarian landscapes.

Recommendation: an innovative opportunity exists for the South Australian Biodiversity Act to acknowledge, measure, protect and support the regeneration of agrobiodiversity in South Australia.

In the Act itself, this recommendation could be represented by including agrobiodiversity as a defined term, setting an overarching goal of conserving biodiversity in agricultural landscapes, and articulating specific provisions for incentivising, measuring and reporting on biodiversity conservation in these landscapes.

1.7. Enforcement

Environment Institute researchers have observed, first hand, the environmental ramifications of failed enforcement regimes. The best goals and protective mechanisms in the world will fail if the Biodiversity Act does not include the necessary incentives and penalties to ensure its full and effective implementation. It is difficult to overstate the importance of rigorous, transparent and effective enforcement regimes for this proposed new legislation.

Enforcement provisions will need to include clear implications for breaching the provisions of the Act and for causing harm to South Australian environments. A modern approach to drafting enforcement provisions is appropriate here, with penalties increasing in line with the severity of an offence. ***For the most serious examples of offending, we urge the South Australian government to investigate extremely serious penalties that will dissuade potential offenders from causing the kinds of harm that have occurred under existing legislation.***

The proposed new legislation could also introduce novel forms of penalties and enforcement provisions. Perhaps, if public resources have been invested in facilitating restoration in a particular location, penalties under the Act for harming that restoration site or undermining restoration outcomes could be particularly severe. The Act could include, for example, aggravated offences for harming ecosystems under restoration, exemplary damages for repeat offenders, and new criminal offences that replicate the kinds of punishment and deterrence that accompany serious crimes against humans such as murder, manslaughter and grievous bodily harm. The South Australian government should also consider interim and final orders that allow prosecutors to freeze certain assets of companies and individuals who have committed crimes that harm the environment – to secure any penalty that may be imposed – and ensure that penalties collected as a result of offending behaviour are redirected to restoration activities through a 'proceeds of crime' arrangement for the environment.

The proper enforcement of the proposed Biodiversity Act may rely on investigation and prosecution powers being held at arms-length from the Environment department. This would help to avoid politicisation of the process as well as the corruption or compromise of enforcement proceedings through political lobbying and donations. We would be happy to provide advice and input on a new statutory body or position to hold that responsibility, or a new defined enforcement capacity for the SA EPA.

A practical enforcement example: unauthorised & illegal possession & sale of protected wildlife

The illegal and unsustainable collection of native wildlife to meet demand in both domestic and international wildlife trade markets is a widespread concern across Australia. However, existing penalties for possessing wildlife are wholly insufficient to address this growing challenge. Division 4 of the *National Parks & Wildlife Act 1972* penalises certain activities such as the— (a) unpermitted import and export of protected plants and animals; (b) unpermitted keeping or selling of protected animals; and (c) illegal possession of protected (non-marine) animals, and these activities carry maximum fines ranging between just \$2,000-\$10,000. These penalties are woefully inadequate to deter offending and punish offenders, and to address the rapid growth in offending behaviour, most of which remains unprosecuted.

The rarity and popularity of Australian endemic species in the exotic pet trade, once they are illegally laundered on the international market, mean the value of Australian species can vastly exceed the cost of the current maximum monetary penalties,¹⁹ highlighting a critical gap in the effectiveness of current wildlife protection enforcement. Higher penalties, including price-indexed penalties which scale over time (e.g., adoption of penalty units) could ensure stronger deterrents against environmental crimes and would, in any case, represent a more modern approach to statutory drafting for offence provisions.

A practical example of the need for transparency: regulating the native pet trade

The trade of native pets in Australia involves a large diversity of species, including reptiles, birds, frogs, rodents, freshwater & marine fish, arachnids, insects and other invertebrate taxa. While the majority of trade in these species is supplied by captive breeding, trade that is illegal or that involves unsustainable harvest of native wildlife from the wild, does occur across Australia to supply the domestic and international wildlife trade.²⁰ For example, researchers from the Environment Institute have directly observed instances of invertebrates being advertised for sale that still contain the wild burrows from which they were harvested.²¹

The South Australian government currently regulates the native pet trade through the National Parks & Wildlife Regulations 2019, which allocate species to permit categories depending on their ease of keeping. However, the criteria that determine which permit category applies to a

¹⁹ Australian Broadcast Company (2021) 'Illegal wildlife trafficking concerns rise during COVID-19 pandemic, with more people at home, online.' Accessed on February 23rd 2024 [Available at: <https://www.abc.net.au/news/rural/2021-10-02/illegal-wildlife-trade-reports-of-trafficking-increase/100508584>].

²⁰ Heinrich, S, Toomes, A, Shepherd, C, Stringham, O, Swan, M, Cassey, P (2022) Strengthening protection of endemic wildlife threatened by the international pet trade: the case of the Australian shingleback lizard. *Animal Conservation* 25, 91-100.

²¹ Citing direct observations by Lassaline, Broadbridge and Toomes (Environment Institute researchers) in 2023.

species is not transparent. Both 'Basic' and 'Specialist' permits apply to 'protected animals' as defined in the Act, yet the exact difference between them is unclear (other than the fact that venomous snakes, as a category, are included in the Specialist category).

Clear definitions would support more consistent enforcement and better outcomes under the Act, and ensure that information about the trade can be compared over time, to identify trends and facilitate improvements to the regulatory scheme.

Recommendations:

- ***Providing greater clarity in legislation or regulations about when, how, where and why native species can be collected would greatly improve the enforcement options available to regulate the native pet trade, including to underpin non-penalty interventions such as education, warnings and monitoring.***
- ***The new Biodiversity Act should include a mechanism to declare key threatening processes, which would trigger active management and priority enforcement arrangements. If the native pet trade was declared to be a key threatening process under that kind of mechanism – at least in relation to certain species – the Act could provide for (i) close monitoring to ensure the trade's sustainability; and (ii) direct and specific provisions to disincentivise, prevent and/or aggressively prosecute and penalise breaches of the Act's protective provisions.***
- ***Regulations implemented under the proposed Biodiversity Act could help to control the wildlife trade by specifying transparent, rigorous and scientifically repeatable criteria for different permit categories. Factors that could be considered in new legislation or regulations to manage this trade could include: annual fecundity, presence of venom or other aggressive behaviour, housing & animal husbandry requirements, whether the species is native to South Australia (as opposed to Australia more broadly), and the species' national and regional threat status.***
- ***Insect collection permits are currently only required for invertebrates in National Parks, but many species at risk of extinction occur outside these areas and are likely to experience negative impacts from unrestricted collecting. With more transparent definitions in place, invertebrate collection could be regulated more coherently and invertebrates, better conserved.***

2. Repair and Restoration

Repair and restoration of nature is a major international and national priority and deserves a priority status in South Australia, provided it builds on a strong baseline of goals and obligations to maintain and protect biodiversity, as discussed in Part 1, above.

The State should ensure that it contributes to the national goal for restoration under the new Global Biodiversity Framework, to have 30% of SAs ecosystems and large areas of habitat 'under restoration' by 2030. This would require, in the Mount Lofty region for example, 150,000 ha to be restored to reach the 30% threshold.

The framework of 30% of land, sea, freshwater and coasts under restoration is something that should be interpreted broadly by the South Australian government, but also in an ambitious way, creating a statutory foundation for protecting good quality habitat, fauna and ecological communities for each of the State's ecosystems. To deliver this goal, we will need a clear plan that involves and incentivises NGOs (particularly NGO land managers and private conservation covenant holders), researchers and private land holders. It will be very important to ensure that the regions for the focus of this restoration should be identified and prioritised based on asset and social value. The opportunity to develop new cheaper methods to deliver biodiverse plantings and population recovery also needs to be developed.

The Discussion Paper on the new Biodiversity Act mentions the concept of restoration but does not, we submit, emphasise enough the critical and urgent need for South Australian biodiversity laws to promote, incentivise and govern the restoration of landscapes and seascapes across the State.

In legislation, better arrangements for restoration will require a specific goal or object clause that frames the focus of the Act as enhancing and improving biodiversity, then protecting it from harm, and then restoring nature where it has been harmed. That goal should provide an overarching mandate for more specific powers to require, incentivise and undertake restoration activities, and provide for the long-term protection of environments that are the subject of restoration activities as well as those that have been restored.

Recommendations:

- ***The Biodiversity Act should include an overarching goal about increasing the diversity and extent of healthy ecosystems across South Australia. That goal could be supported by subsidiary objectives that include restoring habitat, ecological communities and ecosystems that have been degraded and are under threat; and, where ecosystems have been lost to human impacts, an object to facilitate the construction and management of new, healthy habitat, communities or ecosystems.***
- ***The Biodiversity Act should include a Division or Part that is dedicated to restoration, recovery, enhancement and improvement, including e.g.:***
 - ***empowering decision makers to prioritise activities that improve environments;***
 - ***streamlining approval processes for activities that will improve the environment (such as ecological restoration projects); and***
 - ***strong and explicit protection for restored places and places that are 'under restoration' (such as the new native oyster reefs, described above).***
- ***The Biodiversity Act should include certainty and support for restoration projects to demonstrate that South Australia is a good place to invest in restoration and participate in new markets such as the Nature Repair Market and mechanisms that may emerge from international Taskforce on Nature-Related Financial Disclosures (TFND) processes.***

Key partners for facilitating repair and restoration in South Australia include: The University of Adelaide, the Department for Environment and Water, Landscapes SA, and

the environmental non-government sector (including Trees for Life, Bush Heritage and Arid Recovery).

A practical example of the need for specific legal support for ecological restoration

Researchers at the Environment Institute have been working on ecological restoration activities, from a practical perspective and in a nationally funded project on the barriers to restoration in laws and policies around the Country, including in South Australia. We have drawn on that experience here, and will happily pass on details from this project as they are available, including as the Biodiversity Act drafting process gets underway.

South Australia's shellfish communities (i.e., habitats formed by native oysters, clams, razorfish) have played a profound role on the functional ecology of SA's coastline. Most of these communities are highly degraded from colonial overfishing (e.g., native oysters, *Ostrea angasi*), but many still form large areas of habitat that are under threat from recreational harvesting (e.g., Razorfish beds, *Pinna bicolor*).

These shellfish communities engineer subtidal and intertidal habitat across the entire SA coastline. This habitat (shell beds on soft sediment and aggregations of shell reef) support extremely high invertebrate biodiversity, which play an important role in coastal food webs and nutrient cycling (i.e., communities of grazers, herbivores, and detritivores). These invertebrate communities are often completely reliant on the shellfish habitat, which increases their ecological resilience of an area from environment change (e.g., reduced climate change impacts from buffer high intertidal temperatures, storm surges, algae blooms).

Shellfish communities are also valued as fish breeding habitats that can increase the productivity of coastal seas, and filter-feeders that can reduce excess nutrients and sediment from the water column, improving water clarity.

There is tremendous capacity to conserve and restore extant and loss shellfish communities, respectively. The oyster reef restoration work in Gulf St Vincent has demonstrated the restoration of a native flat oyster reef within three years of its construction. It is now the first restored *Ostrea angasi* reef in Australia. We have the expertise and know-how in this State to make shellfish restoration a viable means of increasing the health, resilience, and productivity of SA's coastal biodiversity. These kinds of activities should be facilitated, incentivised and celebrated within the framework of the new Biodiversity Act.

3. Integrating South Australian and national laws for environmental water

A large and diverse range of native habitat for endemic animals and plants is contained within sites that straddle State/Territory borders, or that are inextricably linked to and affected by ecosystems that are managed at national or cross-border scales. South Australian habitats that cross borders in this way support a large share of the State's aquatic biodiversity. The health of aquatic habitat has direct effects on terrestrial habitat, such as on river red gum forest within the Chowilla Floodplain.

As a result, while the proposed Biodiversity Act will be specific to South Australia, it should be designed to interface with existing national legislation, including legislation that allocates water

for the environment within the Lower Murray-Darling Basin, that is, the *Basin Plan 2012*, implemented under the national *Water Act 2007*.²² While South Australia's legislation cannot exert extra-territorial powers, many major wetland ecosystems in this State depend on Basin Plan-derived water for the environment. These include three of South Australia's six Ramsar-listed²³ 'wetlands of international importance':

1. The Riverland Ramsar site²⁴ (Including the Chowilla Floodplain,²⁵ which hosts the largest remaining extent of river red gum forest);
2. The Coorong, and Lakes Alexandrina and Albert wetland Ramsar site,²⁶ and
3. The Banrock Station Wetland Complex (located entirely on private land currently managed by Accolade Wines).

Outside of the Murray-Darling Basin, the Coongie Lakes Ramsar wetland site,²⁷ which is situated in the Lake Eyre basin in the floodplain of Cooper Creek which flows from Eastern Queensland, is another example of an aquatic biodiversity hotspot subject to intergovernmental water policy. In the case of the Coongie Lakes, South Australia is a signatory to the Lake Eyre Basin Intergovernmental Agreement,²⁸ alongside Queensland and the Northern Territory.

Recommendation: Given the importance of intergovernmental legislation and agreements on South Australia's aquatic biodiversity, the new proposed Biodiversity Act must be able to intersect with and be consistent with (or better yet, set at a higher standard of protection than) national laws, including the new environmental laws that are being designed by the Commonwealth.

In addition, South Australia's new legislation must be designed in a way that considers and acknowledges the need for continued advocacy by the South Australian government, for the delivery of water on behalf of our key aquatic habitat.

4. Valuing nature and creating markets with integrity

Statistics abound about the variety of values of nature and ecosystem services, ranging from inherent values through to cultural, spiritual, health-related and extraordinary direct and indirect economic values. Improving our understanding of this range of values will provide evidence in support of a strong protective design and implementation of a new Biodiversity Act.

Strong data will create more transparent and rigorous justifications to resist trade-offs for, for example, low-value developments and short-term benefits with much greater long-term losses of biodiversity. In all cases, the economic and social value of biodiversity must be assessed and framed against the impact of decline in these assets (a 'counterfactual'). Taking this approach

²² Accessible at: <https://www.legislation.gov.au/F2012L02240/2021-08-05/text>.

²³ See, www.dcceew.gov.au/water/wetlands/australian-wetlands-database/australian-ramsar-wetlands.

²⁴ See, www.environment.sa.gov.au/topics/water/wetlands/riverland-ramsar-site.

²⁵ See, www.environment.sa.gov.au/topics/river-murray/improving-river-health/wetlands-and-floodplains/chowilla-floodplain.

²⁶ See, www.environment.sa.gov.au/topics/water/wetlands/coorong-and-lakes-alexandrina-and-albert-wetland-ramsar-site.

²⁷ See, www.environment.sa.gov.au/topics/water/wetlands/coongie-lakes.

²⁸ See, www.dcceew.gov.au/water/policy/national/lake-eyre-basin/agreement.

will ensure that valuations occur in their proper context, and facilitate more rigorous, evidence-based decision making over all.

For example, a recent analysis of street trees in South Australia found that the economic and social value of having street trees (shade, mental health) was 1.6 times the cost of planting and maintaining trees over a 40-year period. New market and social drivers (carbon credits, biodiversity certificates and ecosystem service payments) need to be explored to help deliver ongoing conservation and restoration outcomes which work together with government and community support and aspirations.

Important considerations for markets and nature valuation (which we are happy to provide more detail on if the Biodiversity Coordination Committee wishes) include:

- **markets cannot be the first or only mechanism relied on by government to invest in nature protection.** Well-functioning, high-integrity markets have an important role to play. However, clear, well-resourced government regulation and consistent public investment in conservation is a crucial starting point for an effective biodiversity framework. Government has this responsibility to underpin a conservation framework on behalf of, and in collaboration with communities and businesses, because nature is the basis for all life, and an intergenerational public good.
- **additionality must be demonstrated before a proposed market instrument can be issued or justified** (such as a tradeable nature certificate or credit). In a conservation context, this is difficult because there is little/no recognition or opportunity to monetise 'business as usual'. However, a criterion of additionality can help to reinforce the focus on restoration over conservation or protection.
- **Some components of nature cannot be monetised** so South Australian laws must be equipped to assess the effectiveness of financial and social incentives to change behaviour and protect nature in a way that also protects those components of nature that have extraordinary non-monetary values.

As a nature repair market is introduced into Australian policy, new risks and opportunities will be generated for South Australia. If managed effectively, carbon sequestration payments could support biodiversity outcomes, but there are also risks that landowners will prioritise short-term gains in maximising biosequestration opportunities in the short-term, and neglect the potential for appropriate plantings and/or succession. Similar, if landowners are receiving payments for biodiversity gains there is the potential for more trade-offs with clearance of native vegetation and a further weakening of the Native Vegetation Act. That risk should be considered in drafting a new Biodiversity Act.

Key partners for facilitating repair and restoration in South Australia include: The University of Adelaide, the Department for Environment and Water, Landscapes SA, and the environmental non-government sector (including Trees for Life, Bush Heritage and Arid Recovery).

5. Monitoring impacts and assets

Unless we monitor the components of biodiversity that the Act purports to protect, we will not know about changes including declining trends, sudden losses, human- and climate-induced impacts, or unexpected examples of resilience and adaptation. High-quality monitoring will require:

- regular and public reporting on the state of the environment, which at present is woefully inadequate;
- improvements to the state dashboard reporting, including to ensure that the data that underpins reports is transparent, high-quality, well-maintained and comprehensive;
- active investment, and resisting a presumption that 'modelling' and AI will overcome data deficiencies in decision making under new legislation; and
- reporting that tracks shifting baselines, synthesises data for decisions and uses and builds on national databases such as TERN.

We need to bring together the key streams of evidence to understand the state of our biodiversity and its trajectory in this State. The task of bringing together that evidence will require investment, both to understand current conditions and trajectories and also to inform anticipated investment in repair/protection. That is, if we do not know whether investments in restoration or repair have been effective, we will not be able to adjust and adapt investment priorities over the medium-to-longer term.

Modelling work must also focus on developing options for future management, including assessments of cost and community support/barriers. Recent research conducted by the University of Adelaide suggests that natural resource practitioners are supportive of a systematic monitoring approach to understanding biodiversity patterns and condition, but that transformation will need resourcing in the long-term to align state and national activities.

There is also now strong and irrefutable evidence that biodiversity loss has direct, serious, and wide-ranging adverse effects on human health, through the loss of ecosystem services provided by healthy, biodiverse ecosystems. In addition to a climate emergency and a biodiversity emergency, *the planet is now also facing a human health emergency*. This is a threat that the new Act must be equipped to anticipate and respond to.

5.1. Monitor cumulative impacts on biodiversity from genes to ecosystems

Ecosystems face multiple, concurrent stressors from human activity and climate change. This new Act provides an excellent opportunity to move away from single species and single impact provisions or, at least, to supplement those approaches with more holistic and scientifically rigorous approach to protecting ecosystems from cumulative impacts.

Cumulative impacts must be able to be given weight in decision making under the new Biodiversity Act, including in assessing proposed developments or undertaking any other approval processes or determining whether an area, population or ecosystem qualifies for prioritised protection. Details about how this should be done in legislation have been discussed in detail in Graeme Samuels' and Allan Hawke's decadal reports on the EPBC Act.

New monitoring tools should be developed to support new decision-making requirements about cumulative impacts (i.e., remote sensing, eDNA). Ecological condition, status, trends and cumulative impact measures need to be integrated into State environmental reporting and options modelling should be used to examine future trajectories of biodiversity, including the prediction of extinction risk and resilience potential in the face of environmental pressures (climate change, invasive species, habitat clearance, pollution) and nature disasters (fire, floods and drought).

The policy expertise contemplated as part of the proposed Integrated Biodiversity Centre (see below), would be an appropriate forum for examining how novel and emerging monitoring approaches could be integrated into decision making to recognise and manage cumulative impacts under the new Biodiversity Act.

5.2. Monitor the drivers of health emergencies

Monitoring needs in the proposed Biodiversity Act could be designed to support better understanding and monitoring of the biodiversity drivers of health emergencies. This is consistent with emerging biodiversity-and-health integrated approaches such as 'One Health'.

In Public Health at The University of Adelaide, we teach our students that it is better to invest in fences at the tops of cliffs to stop people falling off, than it is to purchase ambulances to retrieve them at the bottom. By analogy, investment in better surveillance systems and environmental data could, for example, reduce the number of hospital admissions for mosquito-borne and bat-borne diseases – as exemplified by the recent Japanese Encephalitis virus and Covid-19 emergencies in Australia. Investing in the avoidance of emergencies is at least as important as dealing with them, and we are increasingly recognising the crucial role that biodiversity conservation and management plays in understanding and managing many health emergencies.

South Australia could be a leader in recognising this interaction in legislation, and facilitating integration and connections across what have historically been fragmented and siloed regimes – to achieve better biodiversity and public health outcomes for South Australians.

5.3. Develop strategic approaches to known threats

A new Act must ensure that threats to biodiversity are not only anticipated and observed, but also the subject of strategic planning and intervention. We demonstrate this idea with a real-world example about declines in pollinators and an opportunity to arrest those declines through forward-looking policy.

A practical example: SA should lead the way towards a national pollinator strategy

Pollinators are crucial for the proliferation of 80% of our plants, and they are therefore key to the maintenance of many of our ecosystems, including to the productivity of 75% of our crop species. Worryingly, many insect species, including pollinators are in decline worldwide, and in Australia, and this is caused by a range of, often synergistically acting stressors. The combination of this threat to both our natural environment and our food supply has led a range of countries (including e.g., Canada, The Netherlands, Brazil, Portugal, Germany), as well as the European Union and the United Nations Food & Agriculture Organization to develop and adopt strategies specifically aimed at maintaining and enhancing the conditions for pollinators.

Australia does not yet have a National Pollinator Strategy, but the adoption of this kind of strategy will be greatly beneficial, both for biodiversity and to foster the attitudinal change needed to deal with the existential environmental problems that humanity has created. The urgent need to transition to a more sustainable use of limited resources is a gargantuan task, and the enormity of this can have a profound paralysing effect on the general public. By contrast, improving the environment for flower-visiting insects and birds involves a suite of measures that range from easy to more difficult to achieve. The beauty of a pollinator strategy is that it provides coordinated opportunities for action undertaken by individuals, NGOs, governmental organisations as well as business partners on various levels, that the actions taken benefit many more organisms than pollinators alone (e.g. plants and insect-eating birds and mammals, as well as contributing to public and mental health strategies), and it creates a wealth of opportunity for outreach and participation for the general public.

A pollinator strategy would consist of a State government-lead network of partner organisations that collaborate on a voluntary basis to achieve a large range of practical initiatives that maintain and enhance pollinators and their services. Such initiatives can include, for example, local conservation action, policy development, changes in management advice for parks and urban greenery, education programs, public engagement and the generation and dissemination of new knowledge. These initiatives can be local, regional or state-wide, and are delivered by a range of partners, sometimes with financial support from government, funding bodies or industry, and can involve actions to benefit the health of both generalist crop pollinators and of endangered species. Collaboration with knowledge centres is fundamental to expand the knowledge-base about our pollinators, to provide scientific background to the initiatives, as well as insight in evidence-based approaches.

Overseas, successful establishment of pollinator strategies had been helped by a Theory of Change approach, which provides a framework for the initiatives, the connectivity of the organisational levels as well as evaluation and feedback, and is informed by the fundamental community changes that are needed (a Theory of Change approach is also extremely relevant to Topics 6, 9 and 10 in the Discussion Paper and should be considered more generally as part of this Biodiversity Act reform process). Partners then collaborate in the creation of an overview of the changes that are needed, the actions that are required to achieve them, and how these actions interact, and the partners involved in the initiatives, as well as a timeline. The Strategy is regularly evaluated and recalibrated.

Recommendations:

- ***South Australia should become the first State in Australia to develop and adopt a Pollinator Strategy.***
- ***The South Australian Government should ensure that the proposed Biodiversity Act includes obligations on public decision makers to take proactive and strategic approaches to important threatening processes and the management of key biodiversity areas or ecosystems.***

Key partners for facilitating effective monitoring practices in South Australia include: The University of Adelaide, the Department for Environment and Water, Landscapes SA, and the environmental non-government sector (including Trees for Life, Bush Heritage and Arid Recovery).

6. Science, evidence and information

The Catalogue of Life is still not complete for South Australia and, without understanding the units of biodiversity (i.e. which species are here), decision makers will not be able to manage these values, protect and repair ecosystems, identify new invasive species, or value the broader contribution of South Australia's environments to landscape resilience, human health, environmental markets and agriculture and other natural resource management and industry.

There is also a lack of knowledge of the social aspects of managing biodiversity in South Australia. As the state moves to a whole-of-landscape approach with nature repair, heritage agreements and community actions greatly enhancing the natural environment, more could be achieved in understanding what support or constraints on behaviours would be appropriate.

In particular (and building on our recommendations about definitions in the Act, as set out in Part 1, above):

- most existing biodiversity legislation only applies to species with a valid scientific name (Genus species). This is inadequate for invertebrates particularly, but also an important barrier to protecting fungi and other groups of highly diverse but understudied taxa. Ideally a new Biodiversity Act would have scope for animals, plants, fungi and so on, to be recognised and covered under the Act in other ways, for example with genetically discrete units (often called Operational Taxonomic Units, OTUs); and
- most invertebrates do not yet have a scientific name but they still require protection; they could be candidates for being listed as threatened; and they should be able to be protected under conservation legislation. A system of recognising valid taxonomic units as a proxy for species until they have been formally described is important so that the Act does not exclude the 70% of species which do not have a formal scientific name (see, Taxonomy Decadal Plan Working Group 2018).

If the new legislation ignores categories such as populations, significant units, and short range endemic 'taxa', we risk losing a substantial range of genetic diversity from South Australia's unique environments without even knowing, and certainly without having made any attempt to prevent it. The development of this new Act, without precedent in South Australia, represents a wonderful opportunity to do something *new*, and something that will genuinely improve conservation outcomes across the State.

Key partners for gathering, synthesising and communicating important information to support decision making under the proposed Biodiversity Act include: The University of Adelaide, the Department for Environment and Water and the State Herbarium, Department of Primary Industries & Regions SA, and the South Australian Museum.

7. Engage and empower communities

The Environment Institute supports the introduction of a 'biodiversity duty of care', with obligatory compliance and penalties for non-compliance. However, we urge the Government to ensure that this duty of care is accompanied by broad endorsement by the communities, individuals and corporate entities to which it will apply. That is, we emphasise the need for biodiversity conservation to be a common goal with community-wide support. This will involve creating

awareness through education, and broadening the support base for this legislation by including stakeholders in planning, activities, data collection collation, interpretation and dissemination of information, and ultimately, in decision-making. A recent study with Friends-of-parks and other community groups in South Australia suggests that state governments could work more effectively with such groups to value their knowledge and actions in the context of broader state conservation priorities.

Research in the State has consistently demonstrated that South Australians care deeply about their environment, want to participate in action to protect it, and believe that more action to protect the environment is both necessary and appropriate. For example, the South Australian Government's Survey on Nature found that, of the >2,500 South Australians that participated:

- 79% were concerned that there are native plants and animals in South Australia that are at risk of serious decline or becoming extinct; and
- 84% were concerned about the clearing of trees and bushland.

Moreover, surveys conducted by Green Adelaide (1200 responses across two surveys) and the South Australians and the Environment Survey in 2021 (1200 responses) demonstrated that:

- 60% of people living in Adelaide are concerned about environmental issues (despite 80% of those surveyed believing that the environment in Adelaide's 17 metropolitan council areas is in good-to-excellent condition);
- 96% have some interest in playing a role in creating a more sustainable natural environment; and
- 69% agree that there is not enough emphasis at present on protecting the environment.

[Note: survey data collated and reported by Green Adelaide www.greenadelaide.sa.gov.au/news/2023-adelaide-enviro-market-research-surveys].

Yet, there are also emerging risks from biodiversity assets that need to be managed to ensure the ongoing support of South Australians for a strong Biodiversity Act. If, for example, farmers believe that they are going to be forced to bear the majority of the costs of conservation; or if swimmers argue for shark culls; or if peri-urban households want to clear more of their landscapes to mitigate the risks of bushfires or falling trees, the goals of a Biodiversity Act will confront the opposition of local communities. The Act will need to look for novel ways to engage with such stakeholder groups to ensure mutually beneficial outcomes.

A range of actions can help to engage communities effectively. While we recognise that these actions are not statutory in nature, they will be a critical component of an effective legal framework, and should be kept in mind as the Act is designed and drafted:

- ***We need to understand the motivations and position of communities in relation to nature.*** Perceptions of biodiversity, nature or the environment do not remain static, and particularly as climate change drives new risks of environmental hazards, research by the University of Adelaide has shown that many people in peri-urban areas around Adelaide and Port Lincoln are feeling vulnerable to bushfire risk.
- The new Biodiversity Act would benefit from including a requirement to involve stakeholders in all aspects of biodiversity management, and being framed by a ***clear, government-endorsed, Theory of Change model*** with a very broad base. This might,

for example, include activities and discussion around changing diets and lifestyles, engaging with art and music, changing production systems to regenerate landscapes, and engaging with the ways in which people manage their own 'places', from backyard gardens to rangelands.

- The word 'Biodiversity' carries a lot of different values, but it is largely used as a buzzword – it does not necessarily support people to understand the importance of genetic material through to biomes in ensuring the future health, function and resilience of the planet. Engaging communities in understanding the relationships between 'their places', the places they love to visit, and the challenges of managing a healthy environment, could be supported by **a clearer understanding of what biodiversity means**; from managing invasive species, through to the importance of local habitat, to state investments in nature conservation across landscapes.

Key partners for engaging and empowering communities in South Australia include: The University of Adelaide, the Center for International Forestry Research or 'CIFOR', Landscapes SA, and the Department for Environment and Water, and community groups (e.g. SA Nature Alliance, Conservation Council SA, Landcare Association of SA).

8. Establish a Biodiversity Centre to Support and Sustain Ambitious Biodiversity Conservation in South Australia

We recommend supporting the establishment of an ***Integrated Biodiversity Centre*** that is tasked with focusing on the areas the subject of this submission. The Centre would bring together expertise from across the State to develop a strong evidence base about South Australia's biodiversity and its trends, and recommend ambitious, best-practice management to ensure the survival of biodiversity, its capacity to continue to underpin economies that rely on nature (agriculture, tourism etc), and to sustain community wellbeing and enrichment from nature.

8.1. The Value of a Dedicated Biodiversity Centre

To achieve an integrated approach to conserving biodiversity in South Australia, this proposed Integrated Biodiversity Centre would need a multi-disciplinary mandate. It would bring together expertise from across biodiversity sciences, modelling, monitoring, conservation planning, ecological restoration, ecosystem services, social value, law, policy and community engagement, along with funding and delivery partners from government and non-government sectors, and would need dedicated, ongoing resourcing.

A Centre for dedicated research and providing cutting-edge, policy-focused advice to government will be crucial for the successful implementation of the major Biodiversity Act reform that is proposed by the Government of South Australia. The Centre's work could ensure that South Australian decision-makers understand the biodiversity of the state and its trends and trajectories; better equip land managers to maintain and actively restore biodiversity on public and private land, including in protected areas; build knowledge about ecological baselines, even as climate and other environmental changes shift management goals; provide dedicated funding for taxonomy and monitoring; support accurate valuations of nature to inform environmental markets that have high levels of integrity and trust; and avoid maladaptive and conflicting policy interventions that cause confusion and undermine outcomes.

8.2. Policy Expertise as a Specific Branch of the Biodiversity Centre's Work

Given the history of biodiversity loss and the trajectories of currently biodiversity decline, avoiding perverse outcomes in the development of a new Biodiversity Act is a clear priority. The Environment Institute is well-placed to support South Australian government departments through new policy synthesis capabilities, as they develop and implement key aspects of the proposed Biodiversity Act over coming years.

Recommendation: establish a new, Integrated Biodiversity Centre, with policy synthesis capability for biodiversity policy.

The proposed Integrated Biodiversity Centre could bring together key partners including: The University of Adelaide (sciences, public policy and legal expertise), Department for the Environment and Water, Department of Primary Industries & Regions SA, and Landscapes SA.

9. People involved in this submission

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