The Wilderness Society Sydney Inc
[redacted]

Biodiversity Legislation Review
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Re: The Wilderness Society Submission into the Biodiversity Legislation Review

Dear Sir/Madam,

Thank you for this opportunity to provide a submission on the review of the laws that protect biodiversity in NSW.

CONTENTS

The Wilderness Society is one of Australia's leading conservation organisations with a long history of engagement, campaigning and presence in New South Wales on key environmental issues. New South Wale's and Australia's future prosperity depends on a healthy environment, and the Wilderness Society

works to ensure that our unique but often fragile environment is properly protected from the threats of destructive development, degradation, and neglect.

1. Executive summary

The Wilderness Society exists to protect nature. Our vision is to transform Australia into a society that protects, respects and connects with the natural world that sustains us.

In our view the biggest problem with the current legislation and regulation aimed at maintaining or improving biodiversity in NSW is the lack of a guiding vision to inform the fundamental framework that underpins the legislative framework.

Biodiversity in NSW remains in steady decline. Consequently, we agree the current legislation and regulation protecting biodiversity in NSW requires revisiting. However, this must be done in order to use the current environmental laws and regulations as a foundation to build on, a process of transformation to a new legal framework rather than leading to a weakening of the protections currently in place.

Australians have been connected to the value of nature and conservation through protected areas throughout our history – large, intact landscapes designed to be havens for wildlife. Over a century ago, New South Wales led the way in setting the National Park agenda in Australia with the creation of the Royal National Park, near Sydney – the second National Park to be created in the world. This was subsequently followed in NSW by the creation of the National Parks and Wildlife Act in 1974 and then the Wilderness Act of 1987.

NSW has been a trend setter in conservation efforts since the establishment of these parks. This review provides an opportunity for NSW to again lead the way through the development and implementation of a more stringent and robust legal framework that prioritises ecological values over economic values, contains adequate regulation mechanisms and accounts for a changing climate.

As we outline below, we believe this can be achieved through the strategic development and implementation of a well-resourced single Act - the Ecological Integrity Act, which is underpinned by principles and sets out to achieve the ultimate goal of the current four Acts under review to: "maintain or improve biodiversity."

We believe the people of NSW want to see biodiversity valued, respected and protected for its natural, social, economic and cultural importance to ensure a healthy and sustainable future.

2. Introduction

2.1. Biodiversity decline in Australia

Pressures on nature are increasing, and the condition of nature is decreasing as a result, including its ability to sustain human society.

The problem is that mainstream Australia has limited understanding of the importance of a healthy natural environment to maintaining a healthy society. As a result, degradation of nature continues, and most solutions to this degradation are seen as unnecessary, too expensive, or requiring large sacrifices of personal security and economic well-being. As a result, the will of the community to call for the implementation of these solutions is limited. As a result, the political will to implement these solutions is very limited. As a result, only the cheapest, the simplest, or the most politically expedient solutions are implemented, slowing degradation in some areas or in some sectors. As a result, innovative solutions at the scales required to make a real difference are usually ignored. As a result, ecological degradation continues largely unabated.

Part of the solution is to connect the concept of a healthy natural environment with that of a healthy and wealthy society very clearly in the minds of mainstream Australia. With this achieved, the implementation of the necessary solutions becomes a matter of community will driving political decisions for change.

Another part of the solution is to facilitate innovative and cross-disciplinary approaches to slowing and reversing ecological degradation, in the process demonstrating to mainstream Australia that solutions to ecological degradation are in the best interests of society, in terms of health and wealth.

By addressing mainstream Australia's concerns directly, whilst revealing the true value of nature to their lives and building their capacity to change the structure of our society to reverse ecological degradation, this approach helps build a movement of people in support of our purpose. By working with technical experts and practitioners across a broad range of fields, this approach facilitates credible solutions to ecological degradation, both from a scientific and an economic viewpoint. By developing innovative solutions to ecological degradation, this approach begins to address some of the fundamental drivers of that degradation.

Direct drivers of degradation are increasing

A broad range of drivers of ecological degradation are rising, in some cases rapidly[1, 2, 3]. Unsustainable population growth[4] is tied to unsustainable exploitation and consumption of natural resources[5, 6], under a paradigm of exponential economic growth[7, 8]. Many of our society's measures of progress are based on such economic growth[9, 10], while measures of non-market values are rarely incorporated into economic systems[11].

Nature is declining, despite our efforts

Indicators of the condition and function of nature are declining, in some cases rapidly[12, 13]. Biodiversity and ecological function continue to decline, globally[14, 15] and in Australia[16]. Many human-dominated ecosystems have become highly stressed and dysfunctional[17]. This is despite ongoing increases in protected areas[18, 19, 20, 21], and substantial investments in land management and associated environmental expenditure[22, 23].

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Healthy human society relies on healthy nature

The world's ecosystems are capital assets. If properly managed, they yield a flow of vital services, including the production of goods (such as seafood and timber), life support processes (such as pollination and water purification), and life-fulfilling conditions (such as beauty and serenity). Moreover, ecosystems have value in terms of the conservation of options (such as genetic diversity for future use)[24]. The 'services' provided by these ecosystems are extremely important to human welfare[25, 26, 27, 28]. An 'ecosystem distress syndrome' (EDS)[29] is widely prevalent in both aquatic and terrestrial ecosystems[30, 31, 32, 33]. As stressed ecosystems have become highly degraded[34, 35, 36], they have also become incapable of supplying services to the same level as in the past[37, 38, 39]. The capacity of the environment to sustain economic activity[40, 41] and human health[42, 43, 44, 45, 46] is, therefore, being reduced. The impacts of diversity loss on ecological processes might be sufficiently large to rival the impacts of many other global drivers of environmental change[47]. Ecosystems will continue to degrade

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under pressure of increased demands unless we apply preventative and restorative strategies to achieve the health and integrity of regional- and continental-scale ecosystems[48].
Ecosystem services play a direct role in several drivers of economic well-being[49]. Examples of direct interaction of ecosystem condition and services and economic well-being include renewable and non-renewable natural resources, tourism, fisheries, and agriculture. Indirect interactions of services and economic well-being are demonstrated by the value of undiscovered pharmaceuticals, effects of greenways and trees on housing and property values, and introduction of invasive species[50].

The need to improve environmental management in Australia is urgent because human health, wellbeing and social stability all depend ultimately on maintenance of life-supporting ecological processes. Ecological science can inform this effort, but when issues are socially and economically complex the inclination is to wait for science to provide answers before acting. Increasingly, managers and policy-makers will be called on to use the present state of scientific knowledge to supply reasonable inferences for action based on imperfect knowledge. Hence, one challenge is to use existing ecological knowledge more effectively; a second is to tackle the critical unanswered ecological questions[51].

Mainstream understanding of the values of nature is poor

Although Australians are aware of environmental problems in a general sense[52], understanding of particular causes, possible consequences, and solutions is more limited[53]. Public concern in Australia about the state of the environment has decreased substantially over the last five years[54]. The proportion of Australians who thought the condition of the natural environment was good increased to 50% in 2011–12, up from 29% in 2007–08[55]. Public attitudes towards environmental sustainability fall well behind a range of other economic concerns[56], and this issue has dropped in importance since 2007[57]. Public participation in nature conservation is limited and unlikely to increase, at least without significant incentives or a change in attitudes[58]. The participation of the public in environmental decision-making and management is increasingly seen as essential for the success of conservation initiatives. However, a lack of understanding of biodiversity issues by the public is a barrier to their effective participation in decision-making processes[59, 60]. In fact, many people believe that nature

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provides its services for free and therefore, they are of little or no economic value[61], [62]. Often the importance of ecosystem services is widely appreciated only upon their loss[63, 64].

We don't account for nature

Part of the reason understanding of the values of nature is poor amongst mainstream Australia is that unless it is commodified, nature has no economic value[65]. More specifically, local, regional and national policy makers lack the information to better understand how decisions may impact the delivery of ecosystem goods and services that are important to overall human well-being[66]. A fuller accounting is necessary to measure the influence of environmental policies on aspects of societal welfare and overall human well-being, relative to economic, social and political factors[67]. Alternative, integrated concepts of progress are needed to better understand the health and wealth of our society and its collective relationship to services from the economic, social and environmental sectors.

Solutions exist, but they aren't acted on

Despite some significant information gaps in environmental knowledge at the academic level, e.g. Welbergen et al 2011[68], it can be argued that there is sufficient knowledge at the local, regional, and global scales to identify the nature of the major pressures on the earth's ecosystems[69]. In a great many cases, there is an abundance of information relating anthropogenic stress to ecological consequences, thereby pointing the way to actions that need to be taken in order to prevent further degradation.

However, the reality is that actions are rarely implemented, and those that are are usually the easiest, the cheapest, the most politically expedient, or all three. Partly, this conundrum arises owing to the prevailing political stance, whereby short term economic growth is consistently favoured over environmental protection, regardless of the ultimate economic consequences of environmental degradation[70].

Opportunity to inform and empower

There is an opportunity here to empower the broader Australian community with information about the values of healthy nature, especially as it relates to their own wellbeing and economic security. Linking ecosystem health to the provision of ecosystem services (those functions that are recognised as satisfying human needs) and determining how ecosystem dysfunction relates to these services is a major challenge at the interface of the health, social and natural sciences[71]. By facilitating innovative and collaborative solutions to ecological degradation across disciplines and presenting them in response to critical national issues, TWS has an opportunity to engage a broad audience in changing some of the systems and structures that drive ecological degradation.

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2.2. The global context

At a global scale, seven strategies have been proposed[72] to preserve a large proportion of the Earth's biodiversity and the ecological processes it supports. If implemented soundly and scaled up dramatically, these strategies could have a profound impact on conservation. These are:

1. Actions to stabilise the human population and reduce its material consumption;
2. The deployment of endowment funds and other strategies to ensure the efficacy and permanence of conservation areas;
3. Steps to make human-dominated landscapes hospitable to biodiversity;
4. Measures to account for the economic costs of ecological degradation;
5. The ecological reclamation of degraded lands and restoration of ecologically-significant species;
6. The education and empowerment of people in the rural tropics;
7. The fundamental transformation of human attitudes about nature.

3. Case Study: Conservation in land use planning – The Pilliga Woodland, North West NSW

Current arrangements aimed at ensuring biodiversity values are identified early and properly considered in strategic planning systems are not working. The Government tried to do this due to political pressure before the 2012 election with the Strategic Regional Land Use Plans. Biodiversity fell off the plans between the draft and the final, and mapping of 'Tier 1 biodiversity' was not mapped. Submissions from mining and coal seam gas drilling companies are on the record through this process lobbying the NSW Government to remove the mapping.

Our current political leaders do not take Biodiversity protection seriously. They are ignoring their own department's research and knowingly allowing the destruction of habitat that cannot be offset due its rarity. It is not a good situation when we consider our international obligations for biodiversity protection.

3.1. The Pilliga Woodland, North West NSW

Please find at the link, http://www.stoppilligacoalseamgas.com.au/wp-content/uploads/2011/12/PILLIGA-ECO-REPORT_Web2.pdf, a copy of a scientific report commissioned by environment groups on the natural values of the Pilliga forest. It concludes that the Pilliga is nationally significant. The report finds that the Pilliga has become a 'Noahs Ark' or refuge area for plants and animals that are disappearing from habitats right across the country.

3.1.1. Ecological Significance of the Pilliga

The Pilliga is the largest forest remaining in the heavily cleared wheat-sheep belt of NSW and makes up the largest component of a Western NSW biodiversity corridor spanning over 125kms from the Warrumbungles to Mount Kaputar National Park. Teeming with wildlife, the Pilliga forms part of the Brigalow Belt bioregion National Biodiversity Hotspot and it is a globally listed Important Bird Area.

In 2012, as part of the NSW Government's Strategic Land Use planning process, **the Government mapped significant areas of the Pilliga Forest as 'Tier 1 Terrestrial Biodiversity'**, defining it as, "*Habitat for threatened plants and animals for which habitat loss due to mining and coal seam gas is likely to place them at risk of local extinction*," and, "*coal seam gas should be avoided because the identified natural values cannot sustain further significant loss*". They also class the areas as, "***Unlikely to be offset because of their rarity, extent uniqueness and importance***."[73]

[72] Paul R. Ehrlich and Robert M. Pringle (2008) Where does biodiversity go from here? A grim business-as-usual forecast and a hopeful portfolio of partial solutions. PNAS 105 (Supplement 1) 11579-11586

[73] NSW Government, 2012, Draft Strategic Regional Land Use Plan – New England North West, pages 61 and 91

The Pilliga Forest, in particular the area of the forest earmarked by Santos for a coal seam gas field development, has been identified as having the highest value for conservation and repair within joint research undertaken in 2012 by the NSW Office Environment and Heritage and the University of Southern Queensland, as part of their 'Western Woodlands Way' report of 2012 (see Figure 1. on next page).[74].

The north proposed project area for Santos' coal seam gas operations is home to a number of federally listed threatened species and Endangered Ecological Communities including the Koala, Pilliga Mouse, Narrow-leaved Tylophora and the White Box-Yellow Box-Blakely's Red Gum Grassy Woodland[75].

3.1.2. Water resource significance of the Pilliga

An essential area for water conservation, the Pilliga Forest forms the southern recharge area of the nationally significant Great Artesian Basin. Its creeks flow into the Murray Darling Basin system.

According to Federal Government mapping, the entire Pilliga Forest vegetation is also likely groundwater dependent, with moderate and high potential for groundwater interaction[76].

The Pilliga Sandstone Aquifer has also been found recently to contain rare species of Stygofauna[77].

3.1.3. Coal Seam Gas plans and ecological impacts

Ecologists have identified six key threatening processes that will occur from coal seam gas production in the Pilliga: loss of global climate change refugia, loss of habitat for long-distance migrants, loss of spatially dependent evolutionary potential, disturbance and habitat loss at regional and local scales, pollution of water drainage systems and underground aquifers, and loss of productivity in low-nutrient systems[78].

Ecologists have also raised concerns that local extinctions of some species may occur if this area of the Pilliga is transformed into an industrial gas field. Please find further ecological information at: http://www.stoppilligacoalseamgas.com.au/wp-content/uploads/2011/12/PILLIGA-ECO-REPORT_Web2.pdf.

Despite these clear ecological impacts and the mapping undertaken by the State Government that identifies Tier 1 Biodiversity that cannot be offset across the area proposed by the Santos coal seam gas field, the government has already given public support for the project to go ahead.

[74] NSW Office Environment and Heritage, University of Southern Queensland, 2012, Western Woodlands Way
[75] Milledge et al, 2012, http://www.stoppilligacoalseamgas.com.au/wp-content/uploads/2011/12/PILLIGA-ECO-REPORT_Web2.pdf
[76] National Water Commission and Bureau of Meteorology, 2012, Groundwater Atlas 2012
[77] Serov, P. 2012, Final Baseline Stygofauna Survey Report for Rockdale, Stygoecologia
[78] Milledge et al, 2012, http://www.stoppilligacoalseamgas.com.au/wp-content/uploads/2011/12/PILLIGA-ECO-REPORT_Web2.pdf

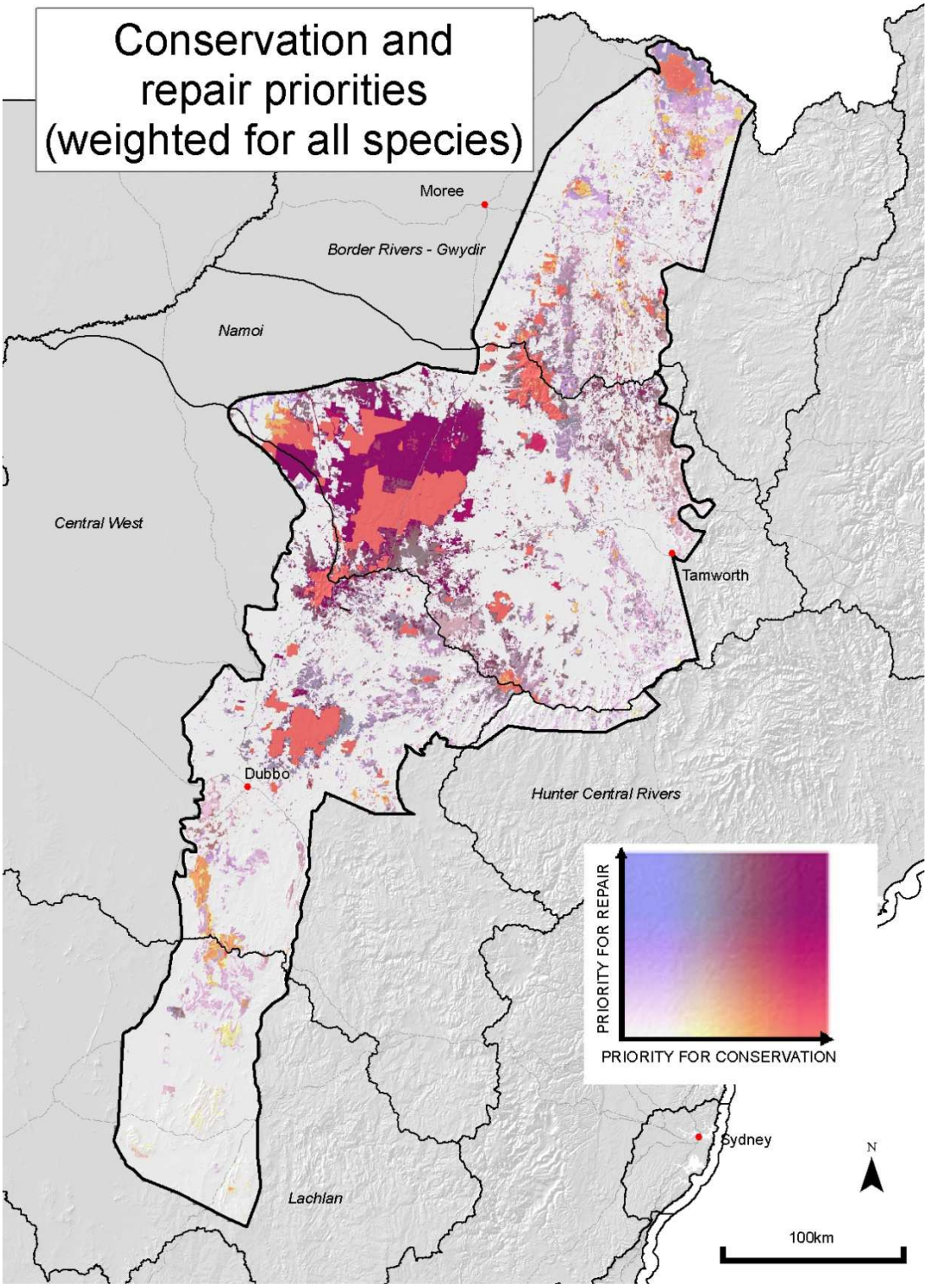

Fig. 1. Combined conserve/repair priority for vegetation based on requirements of all declining fauna species included in the analysis. (Office of Environment and Heritage, University of Queensland, 2012, Western Woodlands Way)

This map clearly shows the Pilliga Forest as a region of vegetation conservation significance, with the central north eastern area of the Pilliga the highest priority for conservation and repair.

3.1.4. The Pilliga Mouse

Known only from the Pilliga Forest, this nationally vulnerable species has a total distribution of only 100,000 hectares. It will be severely impacted by the direct habitat loss, increased predation, and fragmentation leading to impacts on dispersal. The area being targeted for CSG mining is also the habitat of the nationally vulnerable Pilliga mouse, found nowhere else in the world. As its name suggests, the Pilliga mouse (Pseudomys pilligaensis) is known only from the Pilliga State Forest, although its preferred habitat has not yet been established. It is thought to prefer mixed eucalypt forest with a shrubby understorey with logs and litter and may face threat from disturbance of ground storey vegetation (NSW NPWS 2000).

Ecologist David Milledge has stated that coal seam gas "exploratory works have disrupted the breeding cycle of one or more important populations of the Pilliga Mouse". It constitutes a serious threat for this species survival. In addition David Paull explains that Eastern Star Gas works will and has already started to "increase the risk of predation". This is due to the increasing areas of "open spaces", the increasing of the "penetration of hunting success of exotic Predators" especially foxes and cats.

More information:

- http://www.environment.nsw.gov.au/bioregions/BrigalowBeltSouth-Biodiversity.htm
- David-Milledge-SEWPaC compliance review comments 22 Nov 2011.pdf
- David_Paull_EPBC_Significant Impacts criteria_Response_final.pdf

4. Guiding Principles of a new Legislative Framework (the Ferrari)

In order to ensure the Biodiversity Review results in biodiversity being valued, respected and protected for its natural, social, economic and cultural importance the following guiding principles must be upheld:

Principal	Rationale
Measurable ***The framework must build in the ability to measure the progress, success and failure of management tools.***	• Irrespective of the management tools utilized, the success or failure of these tools **must** be able to be measured. • The current State of Environment reports produced by the NSW Government are unable to tell us how funding is equating to conservation outcomes. This needs to be resolved through adequate reporting mechanisms based on environmental indicators. • We need the use of indicators to be integral to environmental protection and to have the means to assess what it means when indicators change. • Goals for conservation must also be able to be measured- we need to be able to ask – how will that be achieved.
Realistic ***The framework must set realistic goals and baselines for conservation.***	• Legislation currently protecting the environment in NSW is based on unrealistic and unattainable goals that aim to restore our natural environment to pre-European times. These unrealistic baselines set us up for

	constant failure. We need new realistic and attainable goals. • Goal setting must also be realistic by accounting for projected climate change impacts including how species will adapt in a different environment.
Flexible ***The framework must be flexible in order to account for changes in science and to take into account projected climate change impacts.***	• The legislative framework protecting the environment needs to be flexible to account for advances in the way we measure progress in relation to the environment. Indicators of successful management are constantly evolving. • Legislation also needs to take into account changes due to climate change impacts.
Enforceable ***The framework must be enforceable and penalties for breaches must be strong.***	• The legislative framework protecting the environment needs to be reliably enforced- particularly where adaptive management is utilised as it relies on different regimes for each area. • In order for the framework to be reliably enforced the NSW Government must have legal authority to hold regulated entities accountable for meeting environmental performance criteria to the core standards. • In addition provisions must be made for the appointment and powers granted to inspectors for enforcement and control of all activities relating to the protection and conservation of biodiversity and related land, water, and atmosphere, any protected areas as prescribed in the framework. • There should be strong convictions for breaches of this framework, including; damaging, altering, transforming and modifying wildlife, habitat and the land, water or atmosphere on which they are dependant. • All revenue from penalties should be paid into a fund dedicated to conservation in NSW. • The framework should include clear instructions on judicial and administrative processes in the event of conflict.
Holistic ***The framework must be based on conserving ecosystem function to ensure the delivery of healthy ecosystem services.***	• Accounting mechanisms for natural assets needs to be based on the health of ecosystem *function* through the delivery of services.
Precautionary ***Within the framework, lack of scientific evidence of the impact of a threat must not be used as justification to proceed with a threat to the environment.***	• Where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. • Permits and licences should not be issued if there have been no studies on the species or

	community that will be affected.
Scientific ***Decision making enshrined in the framework should be assessed using credible science.***	• Decision making enshrined in the legislative framework should be based on Wild Country Principles (see Item 4.)
Independent ***Assessments undertaken as part of the framework must be done by an independent body that does not have a conflict of interest.***	• Assessments, authorisations and issuance of permits and licences should be independently performed to ensure there is no conflict of interest. • The listing of threatened species must be done by an independent scientific committee based on scientific considerations only.
Transparent ***Consultation during decision making must be mandatory and results of assessments easily accessible to the public.***	• Consultation and participation must occur to inform a representative view and to ensure decision making is open and transparent • Ensure the publishing of information to promote environmental compliance.

In addition

- There needs to be an acceptance that some areas are off-limits. Adaptive management frameworks and legislation protecting the environment must build in the ability for decision makers to say 'no' to destructive activities and for some areas to simply be too ecologically sensitive and/or valuable to disturb - *regardless* of the management regime applied.
- Biodiversity planning and environmental accounting needs to take place at a local, regional and strategic planning scale.
- The objective of the one conservation act should be to 'maintain ecological services' and to prevent further net losses to biodiversity.
- Legislation protecting nature must address the key drivers of biodiversity decline.
- Accountability and responsibility need to be clear- through ensuring clear environmental responsibilities to everyone, reporting and review of process, transparent allocation of funding, state of the environment reporting, adequate resource management and effective implementation.
- Acknowledgment of Traditional Indigenous owner's customary rights, respect for traditional knowledge, activities and practices.

5. WildCountry

The Wilderness Society's conservation planning is based on the WildCountry scientific framework. WildCountry is founded on the premise that the conservation of biodiversity and related natural heritage values demands a landscape-wide approach to conservation, recognising the importance of ecological connectivity at continental and regional scales.

The processes that sustain and regenerate ecological systems operate across a range of time scales and spatial scales. Many, if not most, work at spatial and time scales that far exceed those at which humans perceive, use and manage land and natural resources. Thus, many important ecological processes involve connections at scales not considered by conventional conservation planning and management.

Protection of Australia's biodiversity into the long term is therefore more probable through conservation based on a multi-scaled, landscape and process-based framework.

5.1. WildCountry concepts

Three key concepts are potentially relevant to the WildCountry scientific framework, namely:

5.1.1. Continental and regional connectivity of large core areas is required to support the long-term conservation requirements of spatially extensive ecological processes;

5.1.2. Complementary land management in surrounding landscapes; and,

5.1.3. Where necessary, restoration of natural processes and disturbance regimes, the control of invasive species, and the reintroduction of native species.

5.2. WildCountry ecological principles

Eight ecological processes have been identified as key to the WildCountry approach to maintenance of healthy country:

5.2.1. Strongly interactive species

Some species play key regulating roles in the habitats in which they live. This may occur from 'top down', for example, predators such as dingoes control grazing animals such as kangaroos; it may also be 'bottom up', with animals like fruit bats providing critical pollination services.

It is important to ensure that such species persist in the landscape in sufficient numbers to perform these roles.

5.2.2. Hydroecology

The presence and absence of water are critical in Australian ecology. There are important links between water, vegetation and wildlife. For instance, spring-fed wetlands in the arid zone form critical refugia for fauna and occasional floods are critical in enabling recruitment. In other regions vegetation plays a critical role in regulating groundwater.

5.2.3. Long distance biological movement

Long distance movement is a key part of the life history of many Australian species. This is frequently determined by Australia's unevenly distributed rainfall. Around half of Australia's birds, for example, are non-residents and move over the landscape seeking resources. Conserving these species may require the protection of very large areas or critical stepping stones in the landscape.

5.2.4. Disturbance regimes

Natural disturbance regimes maintain diversity in many habitats. Fire is one critical source of disturbance, with frequency, spatial pattern and intensity of burns critical for maintenance of some species.

Fire regimes across much of Australia have been altered in the past two centuries resulting in changes to the pattern and function of ecosystems. Likewise, floods are a natural phenomenon that maintains the health of rivers, floodplains and wetlands.

5.2.5. Climate change and variability

Climate is a key environmental determinant, affecting ecological processes at various scales and thus influencing associated species distributions.

A better understanding of the likely ecological interactions with climate will aid management decisions both in response to and for mitigation of human-induced climate change.

5.2.6. Land / coastal zone fluxes

There is interaction and exchange between terrestrial and marine systems. For instance, rivers transport nutrients and sediments (and pollutants) from far inland to the sea.

This affects productivity in the coastal zone. Conversely, seabirds can deposit large amounts of nutrient derived from the ocean on land. Meanwhile, in locations such as the Kimberley, large areas of shoreline have very strong tidal influences.

5.2.7. Long-term, spatially-extensive evolutionary processes

The creation of new species often involves range expansion of the parent species followed by isolation and differentiation between the two populations. This evolutionary process is usually dependent on habitat continuity, when climatic conditions are suitable, allowing movement over relatively long distances.

Destruction or fragmentation of habitat could prevent such processes and lead to local extinctions by inbreeding or random events.

5.2.8. Productivity

The living elements of landscapes vary with the quantity and rate of plant growth - 'productivity'.

Productivity is dependent on local conditions including rainfall, seasonal climatic patterns and soil characteristics.

The uneven distribution of productivity in the Australian landscape - both in time and space - is an important consideration in conservation planning, particularly given the disproportionate loss and degradation of highly productive land compared to less arable land.

The Wilderness Society would like to see these processes underpinning any new Biodiversity management framework in NSW.

6. The Way Forward

The Way Forward: Contemporary Landscape-scale, nil-tenure land management in New South Wales has been included as Appendix 1 to this submission. This report was authored by Alex Gold, PhD to provide a vision for reform and supporting research for The Wilderness Society, Sydney.

One relevant exert from The Way Forward is: Step One: legislation that looks to the future – the development of an *Ecological Integrity Act.* It covers a possible next step in regards to keeping the critical elements of the existing legislation moving forwards.

To achieve its overarching objective the *Ecological Integrity Act* would need to retain those aspects of current environmental legislation that are working, while including innovative items that promote the measurement and achievement of ecological integrity across the state.

Aspects of existing legislation to include in the Ecological Integrity Act:

- Parts of the National Parks and Wildlife Act 1974 that allow for the reservation of land for conservation purposes (e.g. Part 4). Existing designations such as national park, state conservation area, and the like, may remain although this new legislation provides the opportunity to align these classifications with categories of the IUCN Protected Areas Categories System.
- Parts of the National Parks and Wildlife Act 1974 that allow for the restriction of human use of and activity in protected areas.
- Parts of the Native Vegetation Act 2003 that restrict broadscale clearing and allow for vegetation management in accordance with approved property vegetation plans. Decisions as to broadscale clearing and approval of property vegetation plans are to be made in accordance with the overarching objective of maintaining or improving ecological integrity.
- Parts of the Threatened Species Conservation Act 1995 that allow for the listing of key threatening processes, where processes are determined to be a threat to valued functions and thus to ecological integrity. Principles of present-day threat abatement plans are to be included in regional Ecological Integrity Plans.
- Parts of the Threatened Species Conservation Act 1995 that allow for the listing of threatened species, populations, and ecological communities, for the purposes of environmental accounting. Provisions for recovery plans and a Threatened Species Priority Action Statement are not to be included, as management of key threatening processes will be part of regional Ecological Integrity Plans.

Should you wish to discuss this submission, please contact Belinda Fairbrother on 02 9282 9553 or email belinda.fairbrother@wilderness.org.au.

Yours sincerely,

Belinda Fairbrother
NSW Campaign Manager

7. APPENDIX 1

THE WAY FORWARD: CONTEMPORARY LANDSCAPE-SCALE, NIL-TENURE LAND MANAGEMENT IN NEW SOUTH WALES

A vision for reform and supporting research provided for The Wilderness Society, Sydney

By Alexander Gold, PhD

April 2014

Glossary

adaptive management – an iterative approach to land management that identifies uncertainties, structures management actions as experiments to learn about uncertainties, and rigorously monitors and evaluates these actions such that uncertainties may be reduced and change may be detected (cf. *incrementalism*).

command-and-control – an approach to management where a solution is devised by a central bureaucracy and implemented uniformly across a landscape from the top-down (also see *scientific management*).

incrementalism – an approach to management whereby the supposed optimal action is implemented and incremental change is made over time in response to new knowledge generated elsewhere (cf. *adaptive management*).

indicator – An item or process whose measurement over time is used to account for the condition or health of the broader system. A related term is *surrogate*, where an indicator such as number of birds is used as a surrogate to measure or infer broader concepts such as biodiversity or vegetation condition.

nil-tenure (also 'cross-tenure') land management – refers to when a given land manager is eligible to manage across various parcels of land regardless of ownership or tenure

outcomes (also 'long-term outcomes') – the results management hopes to achieve as a result of its outputs, such as improvements in biodiversity or better landscape connectivity.

outputs (also 'short-term outputs') – the immediate deliverables of management action, such as number of trees planted or kilometres of fence erected.

pre-European – refers to the conditions occurring prior to European arrival in Australia. Generally taken to be prior to 1750 in NSW legislation.

resilience – the maintenance of system function in the face of change. Resilient natural systems can adapt, reorganise, and undergo renewal in the face of change. Note that resilience does not mean resisting change to stay the same. Rather, resilient systems can change in the face of changing surroundings such that they still provide valued functions.

scientific management – a cluster of practices where it is assumed that science can arrive at the optimal way to solve any problem. Scientific management assumes that decision-makers can achieve certainty in planning and thus emphasises the planning phase of decision-making and deprioritises monitoring and evaluation activities (also see *command-and-control*).

social-ecological system – A term coined by resilience theorists to account for the fact that all Earth systems at all scales have interacting human and non-human components. The term emphasises the integrated concept of humans in nature and stresses that the delineation between social and ecological systems is artificial and arbitrary.

Foreword

When pressure built to manage landscapes for conservation outcomes, there was no blueprint. It was assumed that setting aside protected areas and entrusting their management to public agencies would contribute to stemming rapid losses in biodiversity and address concerns over quality of ecosystem services. Recent decades have also seen public investment flow to public agencies for devolution to rehabilitation on other lands, sometimes in partnership with private landholders. It is important to recognise, however, that this framework for land management is an experiment. Unfortunately, there are signs that this experiment is failing and in need of reform.

Adding to the urgency of reform is climate change that is already upon us. Climate change shatters assumptions of stationarity and balance in natural systems and replaces them with concepts of constant change and irreversible tipping points. It forces us to revisit our goals for protected areas and for land management more broadly. Rather than conserving some 'pristine' state, we must manage changing conditions while maintaining the health of our communities and the integrity of ecosystems that sustain them. Change must be harnessed and understood, not resisted or ignored. Radical reforms are needed that redefine the goals of land management to embrace change and conserve valued functions, not just individual species.

It is well established that natural system processes do not respect political boundaries. Our management of these processes, however, continues to be piecemeal. Differences in land tenure can result in two adjacent patches being managed for what may be conflicting objectives. Management at the landscape scale has failed to eventuate because of public agency competition and mistrust of government by private landholders. Radical reforms are needed to foster an effective landscape-scale approach to land management.

The current governance framework for land management provides no incentives to continuously improve efficiency and effectiveness of practice, and instead provides every incentive to maintain an ineffective status quo. Accountability measures such as periodic audits have been ineffective when it comes to improving agency performance – one may say they have no 'teeth.' On-ground work using public monies must be held to a higher standard. Radical reforms are needed to improve the effectiveness of management and its accountability in achieving outcomes.

The Way Forward proposes a revolution in land management: a new governance model that will be better suited for improving the sustainability of natural resources on which humanity depends.

Structure of this report

This report is split into two core components. The first and shorter component describes *The Way Forward* as a vision for land management reform comprising of four steps. The second and longer component is a research report providing conclusions to support aspects of *The Way Forward*. The introduction to the second component provides links for the reader to understand which aspects of the research report support which steps of *The Way Forward*.

The Way Forward in four steps:

Step One: legislation that looks to the future

Environmental legislation in NSW maintains objectives of recovering or conserving, to the greatest extent possible, those species, communities, features, or other natural assets that existed prior to

European arrival. While European settlement has dramatically altered the Australian landscape, and often not for the better, these alterations are largely irreversible. Moreover, Australia is home to a continuously growing population whose wellbeing will need to be maintained in the face of inevitable climatic change. Trying to restore a 'pristine' past may actually take resources and attention away from understanding how to sustain a healthy future.

Objectives of restoring a pre-European past exist in the:

- *National Parks and Wildlife Act 1974* – for example, the declaration of a wild river is to conserve it in a condition substantially undisturbed since European occupation of NSW (s 61(4)).
- *Threatened Species Conservation Act 1995*, which has the objective of preventing the extinction of 'indigenous' species, where 'indigenous' means being present in NSW prior to European settlement (s 4(2)).
- *Native Vegetation Act 2003*, which aims to improve the condition of native vegetation and provide for its management (s 3), where native vegetation is vegetation that existed in NSW before European settlement (s 6).

Aims of restoring pre-European conditions leave land managers with impossible goals. Furthermore, the onset of climate change means we must manage to preserve valued functions provided by nature rather than conserving nature by maintaining species assemblages in historic locations. The archaic objectives of current legislation result in reactive policy that attempts to *recover the past* in selected locations rather than to *create a better future* at the landscape level. By throwing money at resisting change, we fail to harness any opportunities change may bring.

Rather than trying to conserve pre-European assets, land managers must work to understand how ecosystems function and seek to maintain or improve desirable functions in the long-term. This is commonly referred to as building **resilience**, where resilience is defined as maintenance of system function in the face of change. Resilient natural systems can adapt, reorganise, undergo renewal, and maintain their valued functions in the face of change. They maintain high levels of **ecological integrity**.

Legislative change is required that removes references to pre-European conservation and instead promotes the achievement of ecological integrity through building resilience across landscapes.

Ecological integrity thus becomes the endpoint for land management investment on *any parcel of land*, and building resilience is how managers get there. To make the shift to managing for ecological integrity, it is recommended that the *National Parks and Wildlife Act 1974*, the *Threatened Species Conservation Act 1995*, and the *Native Vegetation Act 2003* be combined into a single *Ecological Integrity Act*.

The overarching objective of the *Ecological Integrity Act* will be to provide for management of land that results in the maintenance or improvement of ecological integrity across the state. Ecological integrity is defined by the health of valued ecological functions, as measured by scientifically-determined ecological indicators and tracked using regional environmental accounts. These components will be described later in this report.

To achieve its overarching objective the *Ecological Integrity Act* would need to retain those aspects of current environmental legislation that are working, while including innovative items that promote the measurement and achievement of ecological integrity across the state:

- Aspects of existing legislation to include in the *Ecological Integrity Act*:
    - Parts of the *National Parks and Wildlife Act 1974* that allow for the reservation of land for conservation purposes (e.g. Part 4). Existing designations such as national park, state conservation area, and the like, may remain although this new legislation provides the

opportunity to align these classifications with categories of the IUCN Protected Areas Categories System.[79]
    - Parts of the *National Parks and Wildlife Act 1974* that allow for the restriction of human use of and activity in protected areas.
    - Parts of the *Native Vegetation Act 2003* that restrict broadscale clearing and allow for vegetation management in accordance with approved property vegetation plans. Decisions as to broadscale clearing and approval of property vegetation plans are to be made in accordance with the overarching objective of maintaining or improving ecological integrity.
    - Parts of the *Threatened Species Conservation Act 1995* that allow for the listing of key threatening processes, where processes are determined to be a threat to valued functions and thus to ecological integrity. Principles of present-day threat abatement plans are to be included in regional Ecological Integrity Plans.
    - Parts of the *Threatened Species Conservation Act 1995* that allow for the listing of threatened species, populations, and ecological communities, for the purposes of environmental accounting. Provisions for recovery plans and a Threatened Species Priority Action Statement are not to be included, as management of key threatening processes will be part of regional Ecological Integrity Plans.
- New provisions to be included in the *Ecological Integrity Act* relate to enabling core aspects of *The Way Forward* as described later in this report. These aspects include:
    - Setting up regional agencies charged with defining, monitoring, and investing in ecological integrity of their regions. Although river catchments are sensible boundaries for these regions, the role of these regional agencies will be different to present-day Catchment Management Authorities and as such, the regional agencies will need to be created anew.
    - Requiring regional agencies to draft Ecological Integrity Plans (EIPs) that describe the valued functions in the region, how the integrity of these functions will be measured, and set out management principles for the region.
    - Requiring regional agencies to maintain regional environmental accounts that track the indicators of ecological integrity over time.
    - Allowing for nil-tenure management of valued functions identified in the EIP by accredited land management providers.
    - Setting up a state Ecological Integrity Commission to deliver Standards of Land Management for Resilience and Standards of Environmental Accounting, among other functions described in Step Four.

Step Two: Regional Ecological Integrity Plans

Regional agencies will develop Ecological Integrity Plans (EIPs) that will specify how land management investment will maintain or improve ecological integrity in its region, and how progress will be measured using regional environmental accounts.

EIPs would do this by:

- Identifying the valued landscape functions present in its region. This will require consultation with other government agencies, industry, and the community at large.
- Developing conceptual models of these landscape functions. Landscapes are to be considered social-ecological systems, as per resilience theory. This step will also require consultation in order to ensure social interactions with ecological systems are accounted for.
- Using the conceptual models to derive a suite of social-ecological indicators that may serve as surrogates for the health of valued functions. These indicators would be approved by the Ecological Integrity Commission and comply with Standards for Environmental Accounting.

[79]IUCN (2013)

- Allowing for the testing and validation of these indicators using adaptive management.
- Setting up regional environmental accounts that track the health of these indicators over time.
- Identifying and tracking social and ecological processes that threaten the health of valued functions, and prioritising these processes for management action.

Regional agencies will contribute to the state-wide objective by producing Ecological Integrity Reports that summarise the state of their environmental accounts and detail landscape change in their regions. The reports will be reviewed by the Ecological Integrity Commission and will inform subsequent allocations of state and federal resources for land management. Ecological Integrity Reports will adhere to the Standard for Environmental Accounting. Reports will also review lessons learnt regarding management strategies such that regional agencies can learn from each other through a central land management knowledge base managed by the Ecological Integrity Commission.

EIPs would also rationalise the suite of management plans that exist across government agencies and provide a whole-of-government, landscape-scale approach to land management and threat abatement. They would incorporate the recent recommendations for comprehensive regional plans that coordinate issues management such as weed and feral animal control across tenures and with measurable outcomes.[80]

As they apply to management of all lands within a region, EIPs would negate the need for individual Plans of Management for every protected area in NSW. This reduction in bureaucracy would rationalise the current approach to protected area management planning, allow for effective nil-tenure land management, and enable greater investment to be delivered to on-ground work. Although the objectives of protected areas would remain the same as they are today (i.e. focused on conservation), management of protected areas would fall under the nil-tenure approach suggested in step three below.

Protected areas require a degree of special planning because they remain public land and there is a need to restrict human activities within them. EIPs would also allow for a centralised listing of permitted human activities in protected areas. Again, many of these permissions are shared across protected areas, such that their inclusion in EIPs would render individual Plans of Management unnecessary. At the same time, EIPs would be able to specify unique arrangements for particular protected areas, should the need arise.

Step three: nil-tenure, contract-based management of threats

At present, public funds for land management are split amongst a variety of public agencies. For example, NSW National Parks and Wildlife Service (NPWS) receives recurrent funds each year to manage for conservation outcomes in protected areas. The NSW Government also provides recurrent funds to NSW Local Land Service regions (which from 1 January 2014 incorporate functions of what were NSW Catchment Management Authorities from 2004-2013) to invest in natural resource management outcomes on private land (e.g. Catchment Action NSW).

The current arrangement, therefore, allocates funds to agencies that manage on the basis of land tenure, which is inappropriate because land management issues do not adhere to land tenure boundaries. Inefficiency, frustration, and conflict have resulted from current tenure-based management. Adjacent lands may be managed for very different outcomes, and myriad planning documents are generated by various agencies for lands across the state.

Also of concern is that public agencies such as NPWS are held accountable to priorities based around short-term electoral cycles and report against activities undertaken with annual budget allocations, if they report at all. Management thus reports on delivery of short-term outputs (e.g. kilometres of fences

[80] General Purpose Standing Committee No. 5 (2013, p. 214).

built, number of trees planted) without regard to whether long-term outcomes are achieved. Management acts to maximise delivery of outputs, under the assumption that these outputs will lead to long-term outcomes. There is no incentive to measure long-term outcomes, to prove management effectiveness, nor to innovate to improve management efficiency. This management style is embedded in agency culture and although it does not represent the management style necessary for building resilience, it has withstood several audits suggesting the need for reform.

The emergence of non-government organisations (NGOs) delivering land management, on the other hand, provides an intriguing contrast to the status quo of delivery via public agencies. Many of these NGOs operate on a not-for-profit basis and have made valuable contributions to land management on their own private conservancies or as contractors delivering land management on other lands. They have led several visionary, landscape-scale projects across Australia that require coordinated management of issues across tenures. Unlike public agencies such as NPWS, these NGOs measure long-term outcomes, report transparently to their donors or other funding providers, and continue to innovate in order to ensure their management remains current as conditions change.

A recent review into management of public land in NSW concluded that there is inconsistency and variation in the way lands of different tenure are managed, and in the obligations required of public land managers and private land managers. It also raised concerns over management of public lands such as protected areas, suggesting 'it is clear that the current approach in New South Wales requires improvement and renewal.'[81]

One of the review's recommendations for improvement is to freeze the gazettal of new protected areas pending the outcomes of future reviews. *The Way Forward* does not concur with this recommendation, and notes that reservation of land is an important step to maintaining resilience of entire landscapes by restricting human degradation of high conservation value areas. *The Way Forward* still allows for gazettal of protected areas and provides for restriction of human use in these areas in accordance with Ecological Integrity Plans and conservation priorities of protected areas.

Although *The Way Forward* does not believe the *creation* of reserved land to be a concern, it concurs with the review that the *management* of reserved lands is in need of radical reform. *The Way Forward* builds on the review suggestion that the NSW Government should 'investigate innovative land management models, including the use of private conservancies, for possible application to public land in New South Wales.'[82]

The fact is that resilient landscapes of high ecological integrity require nil-tenure management that measures success, transparently reports outcomes, and innovates so it can remain current in the face of change. Where public agencies such as NPWS, and to an extent, CMAs, have failed to deliver such management, NGOs have been quietly working toward such high standards. It is time to learn from the success of NGO-led land management and make their nil-tenure, visionary landscape-scale projects the norm.

The Way Forward recommends removal of all land management responsibility from public agencies such as NPWS. NPWS would retain responsibilities of managing visitation and enjoyment of protected areas, and enforcement of regulations on human use within protected areas. All public funds for land management would be pooled into a state land management fund, to be administered by the Ecological Integrity Commission and awarded to NGOs to deliver land management outcomes on a contractual basis, in accordance with regional Ecological Integrity Plans.

NGOs would develop visionary, landscape-scale land management projects that address priorities listed in regional Ecological Integrity Plans, and bid for the opportunity to deliver these projects. NGOs would

[81] General Purpose Standing Committee No. 5 (2013, p. xvii).
[82] General Purpose Standing Committee No. 5 (2013, p. 313).

use monitoring to measure environmental accounts for NSW regions, and report on these accounts to regional agencies that would, in turn, consolidate these accounts and report them to the Ecological Integrity Commission. Funding would be tied to the NGO land management provider delivering the necessary measurements, thus allowing for monitoring and evaluation to receive the attention it deserves. NGOs would also be able to leverage other funding sources, such as private donations, to enhance public expenditure on land management.

Step four: policy, planning, and oversight by public authorities

Shifting the provision of public services to NGOs is not without precedent, as it has been accomplished in Australia for social services and internationally for a range of services. When shifting the provision of public services to a competitive market of NGOs, success has been dependent on policy and oversight by public authorities.

In *The Way Forward*, this public policy and oversight is provided at regional and state levels. The role of regional agencies was described earlier. They develop Ecological Integrity Plans and report on regional environmental accounts using results from NGO-led projects.

At the state level, the Ecological Integrity Commission would provide several functions:

- It would set Standards of Land Management for Resilience and Standards for Environmental Accounting. NGO land management providers would be bound by both standards. Regional Ecological Integrity Plans would need to be approved by the Ecological Integrity Commission for alignment with planning provisions in the Standards of Land Management for Resilience.
- It would accredit NGOs as certified land management providers, based on a commitment to apply the Standards of Land Management for Resilience and Standards for Environmental Accounting.
- It would sponsor independent, third-party audits of certified land management providers, and rescind accreditation of those NGOs that fail to uphold the standards.
- It would aggregate regional environmental accounts into NSW environmental accounts, and potentially submit this information to the Australian Government to contribute to national environmental accounts.
- It would use the accounts to track long-term success against the regional EIPs.
- It would award the contracts to NGOs to deliver land management, based on the NGOs contributing to environmental accounts and addressing priorities in regional Ecological Integrity Plans.
- It would develop a land management knowledge base that reviews land management practice, maintains an issues register, and consolidates conceptual models of landscape function included in Ecological Integrity Plans.
- It would hold land management providers accountable for delivering on regional Ecological Integrity Plans, measuring indicators for regional environmental accounts, and contributing to the land management knowledge base.

Support for The Way Forward

The rest of this document spells out the evidence to support the four steps above.

Section 1 explains how advances in contemporary ecology have led to acceptance of the need to steward landscapes through constant change rather than attempt to conserve species in historic locations. The section describes what it means to manage for resilience, and introduces adaptive management as the learning approach required for building resilience in the face of change. It describes cultural resistance to resilience and adaptive management from established land management practices. Finally, it further builds the case for change by highlighting recent climate change research and State of the Environment reporting.

Section 2 reviews conclusions about the current state of land management in NSW, with a particular focus on protected area management by NPWS.

Section 3 describes progress in environmental accounting. It also reviews progress made by non-government organisations in managing for resilience, applying adaptive management, and delivering landscape-scale nil-tenure land management. It then highlights similarities of the proposed shift of land management to non-government organisations with the recent shift to delivering social housing through community housing providers.

Section 4 describes the new role for government proposed by *The Way Forward*. It explains how the Ecological Integrity Commission can build on existing progress made in setting standards by the current NSW Natural Resources Commission.

1 A new paradigm for land management

The emerging science of landscape ecology tells us that understanding the connections between landscapes is crucial in developing a new approach to land management. When the focus is at the landscape level, the answer is not as simple as creating new protected areas such as national parks. While protected areas play an important role in protecting wildlife and our natural heritage, a new approach is required that works across tenures (e.g. protected areas, private land, crown land) and maintains intact habitat across every region.

Working at the landscape level and across land tenures means that land management needs to integrate the needs of nature with the demands of human use. While the machinery of nature operates best in wilderness, even multiple-use landscapes can maintain natural processes. Maintaining or restoring these processes can be facilitated through rehabilitating vegetation and water flows in farmland, voluntary conservation agreements that protect native vegetation on private land, land managed through traditional Aboriginal practices, and other land uses planned with an eye to their compatibility with nature. Put another way, there need not be a trade-off between conservation and human use, if only land management had a regional eye on focusing conservation and human uses where they are most compatible in the landscape. *The Way Forward* responds to this need by proposing a regionally-focused framework for effective management across tenures.

While we have a general understanding of landscape function and its importance, the details are complex and thus our understanding will always be burdened with a degree of uncertainty. We need to better understand these ecological connections, variability in climate and environment, and availability of food and habitat, both in fragmented and intact landscapes across Australia. A key component of *The Way Forward* is building environmental accounts that tell us about the integrity of landscapes as measured through indicators of ecological function.

At the same time, to wait for a complete understanding is a hopeless prospect. Decisions must be made and resources must be spent now, regardless of uncertainty. The vision presented within *The Way Forward* focuses land management decision-making not only on maintaining and restoring natural processes, but also on learning and reducing our uncertainty about these natural processes. A key component of *The Way Forward* is a standard for land management that requires adaptive management at all scales, which includes effective reporting on both ecological integrity and advances in land management practice.

This strategy will describe not only how land management in NSW is progressing toward contemporary best practice described in *The Way Forward*, but also how certain radical shifts are required in order for *The Way Forward* to ever be realised.

1.1 From conservation to resilience

The last four decades have seen a paradigm shift in mainstream ecology. For most of the nineteenth century, mainstream ecology assumed that natural systems generally gravitate toward a single, 'climax' state. Whenever a new landmass formed, species would colonise it and ecological succession would eventually result in the climax state prevailing. Should the climax state be disturbed in some way, say, through bushfire, weed invasion, or human clearing, the assumption was that once the disturbance was removed, over time the climax state would return.

This traditional view of ecological succession informed the policy and legislation introduced on the heels of the environmental movement of the 1970s. While some of this legislation, such as the

Environmental Planning and Assessment Act 1979 (NSW) and the *National Parks and Wildlife Act 1974* (NSW), has been amended over the years, the objectives have remained largely unchanged. For NSW, the objectives of environmental legislation generally refer to returning the landscape to its condition prior to European arrival and conserving those few features that remain. This pre-European condition is the climax state, often referred to as the 'natural' state, that environmental managers seek to restore by removing or reversing disturbances such as weed invasion, urbanisation, or human use.

Contemporary ecology, however, suggests that natural systems may not actually gravitate to a single climax state. Research under the umbrella of resilience theory[83] puts forward that natural systems may gravitate to multiple climax states, referred to in the literature as 'multiple stable states', and that the makeup of these states themselves may change over time. The existence of multiple stable states has huge implications for land management. No longer can managers assume that natural systems will return to their pre-disturbance state once the disturbance is removed. 'Fast' changes (such as bushfire), 'slow' changes (such as consistent releases of effluent into waterways), or a combination of such changes may change the dynamics of the system such that it crosses a 'threshold' whereby ecological succession results in a different climax state with different species and ecological functions. Often, conventional land management is unable to detect these changes (particularly the slow ones), and ends up trying to restore a system state that is unattainable or maladaptive. Rather than trying to restore the past, managers need to be able to understand how their systems are changing and steward the system toward a desired future.[84]

As just mentioned, these disturbances or slower changes in broader environmental conditions, with climate change a pertinent example, may cause natural systems to evolve in ways such that the original climax state is no longer achievable. In such cases, trying to return the original climax state would be a waste of resources because changes to the underlying environment make it such that natural ecological succession will move the natural system in another direction. As will be discussed further, such is the case for NSW. We live in a vastly different land than in 1788, both because of European settlement, continued population pressures, and climate change, among other factors. Conserving and restoring pre-European conditions is a policy based on old understanding that looks to the past for answers. Although the science has changed, we need a similar paradigm shift in land management that moves beyond 1788 and looks to the future.

Accepting the presence of multiple stable states and that the makeup or character of these stable states may change over time means that the goal of land management cannot be simply to remove human disturbance and try to conserve suites of species in specific locations. In fact, such a goal may be counterproductive as success may result in artificially propping up a system state that always requires management because it would otherwise break down because of changes in underlying environmental conditions. Put another way, a return to pre-European conditions simply would not be possible in Australia today, nor would Australia embrace a return to pre-European conditions. Although many land managers recognise the impossibility of restoring pre-European conditions, 'pre-European' remains an understood baseline for land management, thus preventing effective measurement of contemporary baselines that allow us to look to the future.

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[83]Holling (1973) is credited with the launch of resilience theory, which has been refined over hundreds of works since. Folke (2006) provides a more recent review on how the theory has influenced theories of ecological succession and management, touched on briefly in the text of this document as well. Implications of resilience theory for land management have also been outlined in several works, most recently *Principles of Ecosystem Stewardship: Resilience-Based Natural Resource Management in a Changing World* (Chapin, Kofinas, Folke, & Chapin, 2009), *Resilience Practice: Building Capacity to Absorb Disturbance and Maintain Function* (Walker & Salt, 2012), and *Assessing Resilience in Social-Ecological Systems: Workbook for Practitioners* (Resilience Alliance, 2010).

[84] Such is the idea behind *resilience-based ecosystem stewardship* (Chapin, Kofinas, Folke, & Chapin, 2009). The idea is that natural systems can never be 'managed' or manipulated, but rather should be guided or stewarded through change such that it still provides valued functions despite variations to system components.

How should we manage for the future?

A conclusion of resilience science is that the goals of land management must maximise benefits of future system states by focusing on preserving valued ecological functions. Although natural systems may change over time, the functions they provide may remain given that a variety of species are capable of providing similar functions, and similar species are capable of providing a variety of functions.[85] Furthermore, management must prioritise monitoring and evaluation in order to detect change in the landscape. Such detection of change allows management to steward the landscape away from crossing a threshold and assuming a state of lesser ecological function. Should this be the case, management needs to understand how it can shepherd the environment through the change and promote adaptation, reorganisation, and renewal that preserves valued ecological functions.

To conclude, the complexity and uncertainty unearthed by resilience theory led to the realisation that managing nature for goals of traditional conservation or resource stability were not only impossible, but were also deleterious to long-term sustainability:

In a complex evolving world, the function and future of linked human and nature systems evolve and are highly uncertain. Efforts to freeze or restore a static, pristine state, or to establish a fixed condition are inadequate, irrespective of whether the motive is to conserve nature, to exploit a resource for economic gain, to sustain recreation, or to facilitate development. Short-term success of narrow efforts to preserve and hold constant can establish a chain of ever more costly surprises…[86]

Before moving on, it is important to note that managing for resilience does not mean simply staying the same in the face of change. Such a goal would, in fact, represent the counterproductive artificial support of a stable state mentioned earlier. Rather, managing for resilience involves anticipating and harnessing change to promote system adaptation and renewal for the purposes of maintaining ecological function. Change, not stability, is thus the goal of management.

1.1.1 From command-and-control to adaptive management

Traditional assumptions of stability in natural systems invited a particular approach to land management called command-and-control. Command-and-control is a management approach borne out of 'scientific management' ideology that has pervaded Western societies since the Industrial Revolution.[87] To summarise, scientific management refers to a certain cluster of practices used to respond to societal problems. It generally involves the use of formal science to set targets to be reached as efficiently as possible using technical means. Formal science refers to traditional science that seeks to reduce problems to their constituent parts and generate generalised, universally-applicable 'laws of physics' or 'laws of nature' findings.[88]

[85] When it comes to biodiversity, resilience theory advocates for preserving species functional diversity and response diversity (Walker et al., 2006). Functional diversity refers to the number of functionally different groups, that is, categories such as predators, herbivores, pollinators, decomposers, nutrient transporters, and so on. Response diversity refers to a diversity of types of responses to disturbances within a functional group. A redundancy of function adds to the stability of systems because losing one or a few species from a system will have little or no effect on stability as long as at least one species providing that function is present (L. H. Gunderson, Allen, & Holling, 2010).

[86] Holling & Gunderson (2002, p. 31). The surprises the authors refer to belong to the 'pathology of natural resource management', when the initial success in controlling a natural system leads to its eventual collapse because management resists natural variability (Holling & Meffe, 1996).

[87] Comprehensive reviews of the influence of scientific management on environmental decision-making come from policy sciences work such as Brunner and Lynch (2010) and Brunner et al. (2005).

[88] Ascher et al. (2010).

For command-and-control to be successful, however, the problem to which it is applied must be well-bounded, clearly defined, relatively simple, and generally linear with respect to cause and effect.[89] Put another way, the manager must have enough confidence in his or her knowledge of the system to prescribe a solution and be confident it will deliver the predicted outcome. The application of command-and-control to natural systems led to two powerful assumptions that remain today: (1) that natural systems can be engineered to deliver resource flows to society in predictable fashion and (2) that it is possible to collect enough information on the system to essentially reduce uncertainty to zero.[90]

When environmental problems such as natural resource management and species conservation became issues on the policy agenda, it was easy to extend command-and-control concepts to their management given the pervasiveness of scientific management and the assumption of stability in natural systems.[91] Protected areas were to be set aside to exclude humans and allow nature to persist in its 'natural' state.

Also of importance is that the expectation of certainty in environmental decision-making resulted in an overreliance on management planning to the detriment of management learning. Scientists were assumed to do the 'learning' and pass it on to managers, who would collect enough information to be certain in their decision, and implement it uniformly across the landscape. Such is the essence of scientific management. As will be shown however, uncertainty will always be a feature of environmental decision-making. Covering up this uncertainty fails to harness the learning opportunities it presents to land managers.

1.2 Contemporary best practice land management

The land management governance structures invented in response to the environmental movement in the 1970s used command-and-control bureaucracies to fence off protected areas and maintain them for conservation purposes. Although created with good intentions, such a governance structure was assumed to deliver sustainability based on outdated scientific paradigms. As will be discussed later on, this assumption is in desperate need of review given a failure of these bureaucracies to learn and adapt and effectively manage for landscape resilience.

Managing for resilience recognises that natural systems, regardless of whether they are protected areas, production lands, or urban landscapes, are inextricably linked with human societies. As mentioned in section 1.1, the function and future of such social-ecological systems[92] evolve and is highly uncertain. The need for management to recognise uncertainty rather than try to plan their way to certainty (as per scientific management) gave rise to adaptive management as the management approach required to detect change and thus effectively steward landscapes for resilience.

1.2.1 Adaptive management

[89] Holling and Meffe (1996).
[90] Engineering assumptions are detailed in Brunner and Lynch (2010), Gunderson and Holling (2002), and Barriers and Bridges Gunderson et al. (1995). The assumption that planning can lead to certainty in environmental decision-making has been dubbed 'spurious certitude' (Boyle, Kay, & Pond, 2001; Garmestani, Allen, & Cabezas, 2008; L. Gunderson, 1999).
[91] Brunner and Steelman (2005).
[92] In order to properly define the problem of sustainability as one involving management of combined human and natural systems, resilience theorists coined the social-ecological system as the appropriate unit of analysis. Social-ecological systems are neither humans embedded in ecological systems nor ecosystems embedded in human systems, but a different entity altogether. The term emphasises the integrated concept of humans in nature and stresses that the delineation between social and ecological systems is artificial and arbitrary (Berkes & Folke, 1998; Fischer et al., 2009; Folke, 2006; Gallopín, 2006; Westley, Carpenter, Brock, Holling, & Gunderson, 2002).

With resilience theory's understanding of change and uncertainty in natural systems came a conclusion that formal scientific study could never provide the complete understanding of social-ecological systems required for certainty in environmental decision-making. Because of such irreducible uncertainty, there was a need for an approach to land management that acknowledged uncertainty in management planning and allowed for managers to learn from their actions and detect system change. Adaptive management was formulated to address such a need. Where command-and-control seeks to reduce or eliminate uncertainty prior to a decision, adaptive management identifies uncertainties about both our understanding of natural systems and the management strategies we propose to improve them. Actions are then monitored and evaluated as to their effectiveness and as to whether the outcome can inform any of the identified uncertainties.

In this way, adaptive management treats management policies and actions as experiments. Because our understanding of natural systems and the impacts of our actions is always incomplete, as touched on previously, there will always be a degree of uncertainty as to our understanding of whether a proposed action (e.g. building a fence along a river to exclude stock) will lead to the desired outcome (e.g. improvements of biodiversity in riparian corridors). It is because of this uncertainty that monitoring management actions is so vital for generating learning via adaptive management. Monitoring and evaluation leads to learning about both the effectiveness of management actions and about changes to the system of interest. Incorporating such learning into subsequent rounds of management action allows management to truly be adaptive by adapting its actions to lessons learnt and improvements in knowledge of how the system is changing.

An analogy using traditional science

A scientist conducting an experiment does not initiate it then walk away and assume his or her hypothesis is supported. Rather, he or she conducts careful monitoring and evaluation to see if the hypothesis is confirmed or not. In fact, such monitoring and evaluation is perhaps the most important part of the experiment because it provides the ingredients (results) that allow for learning to take place at all. Land management typical of command-and-control, however, resembles that of the scientist initiating the experiment and simply walking away. Because command-and-control decisions assume a context of certainty and stability in natural systems, monitoring and evaluation is deemed unnecessary.[93] Unfortunately, this approach results in a failure to learn about system change and any need for renewed management strategies. The result is often wasted resources, obsolete management targets, and resource collapse, as management fails to adapt to changing circumstances and instead intensifies misdirected effort to maintain the stability it tried to engineer in the first place.

1.2.2 Open Standards for the Practice of Conservation

The Conservation Measures Partnership (CMP) has worked over the past decade to combine principles and best practices in adaptive management from conservation and land management to create the *Open Standards for the Practice of Conservation* (*Open Standards*).[94] The *Open Standards* bring together common concepts, approaches, and terminology in conservation project design, management, and monitoring in order to help practitioners improve the practice of conservation.

The *Open Standards* have been published since 2002 and are currently released as Version 3.0. CMP continuously welcomes feedback from organisations using the *Open Standards* in order to ensure they remain current and applicable.

[93] The deprioritisation of monitoring by traditional land management has been the subject of several works (e.g. Baskerville, 1985; Hajkowicz, 2009; Halbert, 1993; Holling, 1995; S. Paton, Curtis, McDonald, & Woods, 2004; B. Taylor, Kremsater, & Ellis, 1997).
[94] The Conservation Measures Partnership (2013).

The *Open Standards* are organised into a five-step project management cycle:
Step 1. Conceptualise the Project Vision and Context
Step 2. Plan Actions and Monitoring
Step 3. Implement Actions and Monitoring
Step 4. Analyse Data, Use the Results, and Adapt
Step 5. Capture and Share Learning.

Figure 1 The adaptive management cycle recommended by the *Open Standards*.[95]

The reader is directed to the *Open Standards* themselves for a comprehensive treatment of each step in its adaptive management cycle. Of importance here is that the *Open Standards* represent a high standard of land management practice, regardless of whether the goal is conservation, production, restoration, or development. They respond to contemporary understanding by recommending an adaptive management framework, and may be considered current best practice because they are consistently open to review and amendment as they are tested in the field. The *Open Standards* themselves are thus subject to adaptive management, being refined and tested by land management agencies worldwide.

Perhaps most importantly, however, the *Open Standards* recognise and respond to the reality that 'few conservation organizations can say consistently what is working, what could be improved, and what approaches need to be changed.'[96] They respond to the need 'to practice adaptive management based

[95] Figure from The Conservation Measures Partnership (2013, p. 5).
[96] The Conservation Measures Partnership (2013, p. 1).

on the systematic evaluation of results' and to 'use this information to learn from one another about what works and what does not work.'[97]

As will be discussed further on, current land management in NSW cannot determine what is working, what could be improved, and what approaches need to be changed. *The Way Forward* recommends the use of standards for land management built on adaptive management principles such as the *Open Standards*. At the same time, attempts to implement adaptive management in NSW and worldwide have been met with an institutional inertia that favours the status quo despite a failure to determine management effectiveness and a continued decline in natural system health. As the next section will show, the reality is that embracing adaptive management, and by extension managing for landscape resilience, requires radical reforms to generate the necessary cultural shift away from the bureaucratic control structures of the 1970s.

1.2.3 A matter for cultural change

Applying many elements of the *Open Standards* adaptive management cycle identified in Figure 1, such as identifying objectives, implementing plans, and analyzing results seems like simple common sense. Yet despite adaptive management being around for nearly four decades, successes in applying adaptive management frameworks such as the *Open Standards* have been few and far between. Rather than providing a much-needed revolution in land management, adaptive management has been suffering an 'implementation crisis.'[98] This crisis persists today, with recent research confirming that despite adaptive management being rife in the peer-reviewed literature, only a small number of projects have been able to effectively apply adaptive management to complex problems.[99]

Many of the reasons adaptive management has failed to transition from theory to practice relate to issues around organisational change and conflicts with traditional management culture. To embrace adaptive management, the focus of management must shift from the 'front end' of a decision to the 'back end'. That is, management must shift its focus from information gathering and trying to achieve certainty in planning *prior* to a decision, to comprehensive monitoring and evaluation *after* a decision. For managers trained in the way of command-and-control, however, such a shift in decision-making culture is not easy. Attempts to layer adaptive management onto existing management culture often fails to result in the fundamental shift required to promote the learning approach needed to manage for change. Rather, adaptive management is isolated to a once-off management experiment highlighted in annual reporting rather than becoming the default approach to all management action.[100] Other times it is resisted or abandoned altogether.[101]

Some of the most common barriers to effective adaptive management mentioned in the literature include cultural orientations to decision-making and the roles of land managers. Reviewing some of these barriers here is important for the discussion of NSW land management that follows later in this report. Such barriers include:

A failure to identify uncertainties during the planning phase

[97] The Conservation Measures Partnership (2013, p. 1).
[98] Rogers (2003).
[99] Westgate et al. (2013).
[100] e.g. Stankey et al. (2006) Koontz & Bodine (2008), Moore et al. (2011).
[101] Resistance and abandonment often results from a fear of experimentation or acting on uncertainty (e.g. L. Gunderson, 1999; Kallis, Kiparsky, & Norgaard, 2009; Stankey et al., 2006; B. Taylor et al., 1997; K. A. Taylor & Short, 2009; Volkman & McConnaha, 1993).

Instead of being transparent about uncertainties, managers use models or other technical means of approximating certainty to come to a decision.[102] While adaptive management suggests models may be helpful, the models referred to are conceptual models that help identify what is known and what is not known about a system, thus allowing management to identify uncertainties and review conceptual understanding as management learns from its action. Without identifying uncertainties, however, actions are assumed to be appropriate and management will fail to learn because it has not identified knowledge gaps. Identifying uncertainties, therefore, is the critical first step in setting up appropriate monitoring.

A perception that monitoring is too resource-intensive

Suggesting that monitoring is too resource-intensive represents a true failure of recognising the importance of shifting the focus to the back end. The truth is, all land management activities, from planning, implementation, monitoring and evaluation are expensive and time-intensive, and there is only so much money available to spend and hours available to work. Management thus prioritises those activities *it deems most necessary*.

Suggesting monitoring and evaluation is too resource-intensive, therefore, implies that it is less of a priority than other actions management is taking. As argued earlier, such is the culture of command-and-control, which seeks certainty in decision-making such that it can implement actions efficiently and does not need to monitor the outcome. Monitoring under command-and-control is often done reluctantly and only if required by legislation, as it takes resources away from priorities of increasing numbers of feral animals trapped or kilometres of fence built.[103] Any monitoring undertaken rarely is evaluated as to its potential to inform future management actions.[104]

A fear of failure

Another reason traditional land management agencies are reluctant to monitor is that it may expose failure in management actions. As mentioned, traditional approaches to land management reward the efficient achievement of targets (i.e. numbers of trees planted, hectares of land placed under conservation covenants, etc.), so should a management action fail, its significance is usually minimised by the responsible manager.

Another reason for the downplay of failure under traditional management is a bit more complex. When decision-making prioritises planning prior to a decision (the front end), it often expends great effort to generate a sense of certainty around the 'correct' solution to a problem. The solution is then implemented, with little or no monitoring because it is both assumed the solution is correct and because investing in monitoring would take resources away from investing in planning and implementation elsewhere. Sometimes, however, management actions fail because, as mentioned throughout this report so far, natural systems are complex and variable, and the certainty that accompanied the decision was spurious. When so much confidence had been placed in the suitability of the proposed solution, however, the management failure is likely to be ascribed to the assumed

[102] One counterproductive consequence of trying to approximate certainty with models are 'modelling wars' where different constituencies arrive with their own model of system function and are unable to reach agreement on which one is 'correct' (Ladson & Argent, 2002). Rather than try to reach certainty prior to a decision, adaptive management would highlight uncertainties in each model and use management action as a learning tool to inform these uncertainties and improve the models.
[103] e.g. Koontz & Bodine (2008).
[104] Using evaluation to inform subsequent management action is referred to as 'closing the loop' and failure to do so is a common pitfall of attempts at adaptive management. Instead, monitoring is undertaken as a cursory activity and does not inform future action ((Argent, 2009; Chapple et al., 2011; Stalmans, Balkwill, Witkowski, & Rogers, 2001; B. Taylor et al., 1997).

incompetence of the managers responsible for its implementation.[105] So when it comes to admitting failure to promote learning, why would a manager be transparent about failure if it is only going to result in an admission that targets may not be met as well as a reputation of incompetence from his or her colleagues?

The reality is that management actions often fail. As adaptive management suggests, they are experiments, and experiments often fail. While failure is unfortunate, even less fortunate is sweeping failure under the rug such that it is forgotten. Instead, because learning is an explicit aim of adaptive management, adaptive management treats failure as a learning opportunity. However, to be transparent about failure and thus capitalise on its learning potential, a management culture is required that rewards learning rather than simply the efficient implementation of actions.

Furthermore, such a learning culture is vital for promoting the innovation and risk-taking necessary to successfully adapt management to changing conditions. Moreover, it is simply prudent to ensure management can learn from its actions and not repeat mistakes. As suggested, however, the resistance to developing such a learning culture has been at the heart of adaptive management's implementation crisis. The *Open Standards* recognise the need for a learning culture by including 'Create learning environment' as a specific item in its Capture and Share Learning step.

1.2.4 The trap of incrementalism

It is important to note that many traditional land management agencies suggest they are applying adaptive management by simply leaving actions open to change in light of new information. Such a 'flexibility in decision-making' definition of adaptive management fails to recognise the core of the concept and ends up simply maintaining the status quo.

Changing direction in the face of new information is an interpretation of adaptive management known as *incrementalism*. Incrementalism is a 'muddling through' model where incremental adjustments to practice are made as experience is accumulated and external sources provide new information.[106] While some learning inevitably occurs even with incrementalism simply from experience, it is nonetheless a reactive approach that lacks a purposeful direction with regard to learning about uncertainty and simply reaps whatever benefits derive from earlier experiences.[107] Adaptive management, on the other hand, 'means much more than simply altering objectives and practices in response to new information; it implies a formal, rigorous approach to management, where activities are treated as opportunities for generating information about the system being managed.'[108]

Until management agencies are capable and willing to embrace uncertainty and to systematically learn from their actions, adaptive management will not succeed but will be redefined in a weak context of incrementalism and flexibility in decision-making.[109]

1.3 Drivers of change, and the importance of climate change

Managing for resilience involves understanding how natural systems change, and where possible, managing drivers of change such that functions provided by natural systems are maintained. The driver

[105] As put forth by Ascher et al. (2010): 'when scientists, analysts, and policymakers assume that correct policies are straightforwardly derived from correct knowledge, the explanations for policy failures may be assumed to lie in the recalcitrance of affected publics or in the incompetence of the agencies responsible for implementation' (p. 106).
[106] Lindblom (1959), Stankey et al. (2006).
[107] Gunderson (1999), Dovers (2003), Stankey et al. (2006).
[108] Taylor et al. (1997, p. 5).
[109] Gunderson (1999).

affecting the largest number of threatened species in NSW (87%) is the clearing and disturbance of native vegetation, followed by invasive pest and weed species (70%).[110] At the same time, climate change is expected to exacerbate the effects of existing drivers and introduce additional pressures.[111]

Climate change is a focus of this report not only because it will have impacts on all natural systems in some way, but also because it further underlines the need for a management strategy that learns about change in the landscape and promotes adaptation. As climates change, to try and conserve assets in historic places is truly throwing good money after bad.

A recent synthesis of climate change impacts on biodiversity conservation from the CSIRO suggests that climate change necessitates a radical rethink of biodiversity conservation and landscape management.[112] Key findings of the CSIRO report relating to the interactions between climate change and biodiversity include:

- Climate change will lead to most places in Australia having, by 2070, environments that are more ecologically different from current conditions than they are similar.
- Within decades, therefore, environments across Australia will be substantially different from those currently experienced by biodiversity at most locations. As a result, biodiversity management may need to change significantly to minimise future losses.
- The responses of species, ecosystems and landscapes to climate change will all be affected by ecological processes and management operating across landscapes, as well as in individual habitat patches.
- The different processes of ecological change, each driven by climate change, will combine to make prediction about the details of change and likely loss of biodiversity very difficult. As a result, managers will be faced with ongoing uncertainty about some aspects of the future changes to the systems they manage, and this will constrain the choice of options for managing biodiversity.
- The spatial variation in biodiversity, in Australia's landscapes and in climate change provides many opportunities for management to facilitate the natural adaptation of biodiversity through ecological and evolutionary processes.

With an understanding of the complexity climate change adds to biodiversity conservation, the CSIRO report makes seven recommendations, many of which align with the contemporary focus on managing for resilient functions:

1. Reassess biodiversity objectives.
    a. Many current conservation mechanisms primarily aim to preserve species and communities in their historical locations. This paradigm of conservation will become increasingly unachievable and less effective for guiding conservation investment and actions.
    b. The CSIRO report suggests there is a need to consider conserving values associated with ecosystems as their composition and identity change, and values associated with landscapes as their land uses and ecosystems change. (Note here that these reassessed objectives require management that allows for change and learns about what values are important and how they are changing over time as well. The conclusion aligns with *The Way Forward* by suggesting a need for allowing ecosystem change yet retaining valued functions.)
2. Create management strategies that are robust to uncertainty
    a. The CSIRO report suggests it may be increasingly necessary to adopt robust strategies, which are effective under a wide range of future magnitudes and types of change, for a wide range of species.

[110] NSW Environment Protection Authority (2012, p. 218).
[111] Steffen et al. (2009), Hughes (2011).
[112] Dunlop et al. (2012). Another relevant synopsis is provided by Steffen et al. (2009).

    b. Using adaptive management as described in section 1.2.1 allows for robust decision-making by highlighting uncertainties and asking decision-makers to assess how policies and actions would fare given identified uncertainties.
3. Plan and manage for biodiversity changes at landscape scales
    a. Managing at landscape scales will help reduce future losses in biodiversity because the responses of biodiversity to climate change will be affected by ecological processes, including threats, operating beyond the scale of individual habitat patches or reserves.
4. Expand the network of protected areas to accommodate significant ecological changes
    a. The CSIRO report suggests a need to accommodate and manage establishment of new species and changes in ecosystems in protected area management. This requires management that can detect and respond to change.
    b. The CSIRO report identifies a need to work with neighbours to minimise the impacts of land-use change in whole landscapes. This signals a need for nil-tenure, landscape-scale management.
5. Carefully manage interactions between biodiversity and changing land and water use
    a. The CSIRO report suggests anticipating and responding to complex landscape interactions among land uses and the potential negative impacts of adaptation in other sectors. Key elements of this include anticipating future threats, monitoring and responding to new threats, and significantly increasing the management of all threats.
6. Adapt our biodiversity conservation institutions to new challenges and information
    a. One aspect of this recommendation is the design of management experiments to test the effectiveness of different adaptation options – a core idea behind adaptive management (section 1.2.1).
    b. The recommendation also notes a need to develop adaptation pathways with a long-term outlook, thus flagging the need for long-term objectives for management.
7. Address knowledge gaps to respond to the biodiversity impacts of climate change
    a. Of the several components of this recommendation, one mentioned a need for more understanding and better use of tools to deal with uncertainty. Such an understanding is important because there will always be uncertainty facing environmental decision-making and to wait for more knowledge is often a recipe for inaction.

Leading research, therefore, suggests a need for a radical rethink of traditional land management based on controlling species populations and traditional conservation objectives citing pre-European baselines. Instead, land management must respond to uncertainty, manage for conservation of ecosystem functions at landscape scales, and steward societies and natural systems through landscape change.

It is also important to note that learning is an important component of adaptive capacity, making it a crucial ingredient in the climate change adaptation arena.[113] Management's capacity for learning, and its ability to contribute to broader social learning, therefore, will determine whether it successfully anticipates system change or fails to adapt. Management learning is a crucial component of *The Way Forward*. Standards of Land Management for Resilience will mandate adaptive management by land managers and require reporting on lessons learned. The land management knowledge base housed at the Ecological Integrity Commission will provide a central portal for these lessons learnt, allow for projects to learn from each other, and allow for the Ecological Integrity Commission to allocate funds on the basis of what has worked and what has not.

[113] Chapin et al. (2009), Hinkel (2011).

1.4 The need for reform: The urgency of our current state

Despite the continued expansion of protected areas and resources invested in them and in off-reserve conservation, biodiversity continues to decline and natural processes continue to suffer. The *New South Wales State of the Environment 2012* report[114] concluded:

- The overall diversity and richness of native species in NSW remain under threat with another 35 species listed as threatened under NSW legislation since 2009. 11 of these are terrestrial vertebrate species.
- While a general pattern of decline is evident, many species have maintained their levels of distribution. 66% of terrestrial vertebrate species are not considered to be threatened.
- The decline of NSW species is ongoing and the long-term sustainability of many species is poor.
- Of the 903 terrestrial vertebrate species that inhabited NSW, 662 or 73% were not listed as threatened in the first assessment of conservation status, completed in 1995. This number has declined to 590 or 65% in 2011. There is no reason to doubt that other, less well-studied groups are declining similarly.
- Habitat destruction, including clearing, and invasive species are the greatest threats to biodiversity in NSW.
- Many invasive pest and weed species are now widespread across NSW and have had a major impact on native species, while fungal diseased are a growing threat. In particular, foxes and cats have been implicated in the extinction of numerous small- to medium-sized ground-dwelling mammals. The cost of pest animal control alone exceeds $60 million per year. Weeds account for $1.2 billion per annum in lost production and control costs in NSW alone.
- Historically, birds have been significantly less susceptible to the pressures that have affected other terrestrial vertebrates, particularly mammals. However, shorter-term data on bird populations produced over the past ten years indicates that their numbers and range have recently declined significantly.[115] This suggests that the relatively good outcomes for birds recorded over longer time frames may not be sustainable. Populations of woodland birds have declined the most because of the extensive clearing of woodlands and drought conditions.[116]
- 61% of NSW is covered by native vegetation, of which only nine per cent is considered to be in close to natural condition. Condition has deteriorated in the remaining 52%.

Noting the imminence of climate change and the continued declines in biodiversity and natural values, the *State of the Environment* suggests a shift in land management that mirrors the shift recommended by both the CSIRO report and *WildCountry*:

Programs that deliver targeted on-ground actions regionally within a strategic framework are likely to achieve the most effective outcomes. Measures to improve connectivity across landscapes and build the health and resilience of the land will enhance the capacity of species and ecosystems to adapt to, and cope with, disturbance.[117]

Researchers, government agencies, and the public, therefore, are crying out for a new paradigm for land management. *The Way Forward* proposes such a paradigm.

Implementation of this new paradigm, however, requires radical reform in NSW land management governance. Radical reform is needed because as will be shown in the next section, traditional conservation paradigms and management cultures are entrenched in current management practice. This entrenchment of traditional management culture means we must rebuild land management from the ground up, as existing bureaucracies have resisted implementing the necessary changes.

[114] NSW Environment Protection Authority (2011)
[115] Garrett et al. (2011).
[116] MacNally et al. (2009), Paton & O'Connor (2010).
[117] NSW Environment Protection Authority (2012, p. 223).

2 Concerns over current land management

This chapter will show how land management in NSW, particularly protected area management, does not align with contemporary best practice nor with the vision for reform put forward by leading researchers and the aforementioned *State of the Environment* report.

Concerns about conservation objectives linked to a pre-European baseline in environmental legislation were addressed in detail in Step One of *The Way Forward*. Simply changing legislation from pre-European baselines to goals of resilience, however, is unlikely to bring about the necessary reforms on its own. This is because the management culture of public land management agencies does not align with the culture required for adaptive management (section 1.2.1). Performance audits of, and other research into, the NSW National Parks and Wildlife Service (NPWS) has uncovered such a culture at work and in need of reform to bring about the nil-tenure, landscape-scale land management necessary for building resilience in the face of climate change.

Audits and research have uncovered that NPWS does not set objectives for its management, is not transparent with its resource allocation, and does not measure its success. These findings will be discussed now.

2.1 Objective setting and resource allocation

Setting objectives for management is a vital component of the adaptive management cycle (section 1.2.1). Without adequate operational definition of the desired endpoint, in the form of achievable, testable, and auditable objectives, effective management is unlikely.[118] Ecological integrity is a science-based example of such an endpoint, and has been recommended here in *The Way Forward*. Those who have managed for ecological integrity have broken it down into suites of indicators for species and ecosystems. Management then monitors its action as to its effect on these indicators and how indicators may change in the absence of management.[119] In *The Way Forward*, these indicators form the bases of regional environmental accounts, which are reported to the Ecological Integrity Commission and aggregated into state-wide accounts. Proper adaptive management results in learning from monitoring going back to inform effectiveness of actions as well as suitability of the indicators themselves, which when aggregated to the state scale, can inform the selection of indicators elsewhere.

2.1.1 A world without objectives

Too often, however, broad motherhood endpoints such as improved ecological integrity, ecosystem health, or biodiversity remain undefined and thus fail to give necessary direction to managers implementing on-ground action. Such is the case for the NPWS, the public agency that delivers land management within NSW protected areas. The NPWS has responsibility for administering and achieving the objectives of the *National Parks and Wildlife Act 1974* (NSW). Core objectives of the NPW Act include:

- The conservation of nature, including biodiversity at the species and genetic levels, ecosystems and ecosystem processes, landforms of significance, and landscapes of significance including wilderness and wild rivers.

[118] Rogers and Bestbier (1997), Rogers and Biggs (1999). Jones (2009) provides an example of such objectives as Key Desired Outcomes for the Tasmanian Wilderness World Heritage Area.
[119] Further description of the use of ecological integrity as a management endpoint is given in Woodley (2010).

- The conservation of objects, places or features of cultural value such as Aboriginal heritage, places of social value to the people of NSW, or places of other historic, architectural or scientific significance.
- Fostering public appreciation, understanding and enjoyment of nature and cultural heritage and their conservation.[120]

Three reviews of NPWS performance suggests it has struggled to translate the objectives of the NPW Act into objectives for management of protected areas. In 1998, it was found that the NPWS had difficulties determining priorities for the multiple objectives of conserving reserved lands and providing for public enjoyment.[121] A 2004 audit was more blunt: 'The [NPWS] is yet to effectively translate the objects in the act to overarching, specific, measurable management objectives.'[122] Even in 2013, it was found the NPWS still lacks overarching objectives for its management and has not identified agency-wide priorities across the park estate or determined which assets it can maintain within expected funding.[123]

2.1.2 Resource allocation in a world without objectives

The observation that NPWS cannot determine which assets it can maintain within expected funding hints at broader concerns over how resources are allocated given a lack of management objectives. In fact, the 2013 audit recently determined that because of a lack of overarching objectives, the NPWS does not allocate resources on the basis of statewide prioritisation across its heritage asset base (p. 2). Rather, regional budget allocations are largely based on previous years' funding levels rather than on current needs (p. 3). Targeted funding quarantined for heritage projects has been static since it was introduced in 1995 but the amount of heritage assets managed by NPWS has increased over this period (p. 3). This would confirm the idea that funding is based on previous years' levels and monitoring or assessment of asset levels and condition either does not occur or does not feed back to inform management planning and resource allocation.[124]

The 2013 audit also found that budget allocations are not linked to regional operations plans or other planning processes, which is unsurprising given the above finding that allocations are largely based on previous years' levels (p. 3). The lack of rolling program funding has resulted in frustrations within NPWS about the inability to plan ahead, the limited capacity to enter into multi-year contracts, and the piecemeal responses that can result (p. 21).

Concerns about the strategy of resource allocation have been known to NPWS for years. The 2004 audit found that in general, funding allocations to priority areas is based on limited information and that the NPWS relies on broad objectives and a subjective approach to key funding matters. These matters

[120] *National Parks and Wildlife Act 1974* (NSW) s 2A.

[121] To quote the 1998 review: '…the absence of a policy statement about where [NPWS] sits on the question of biodiversity maintenance versus recreational and other uses of reserved lands and the relationship it proposes between biodiversity maintenance or conservation and the protection of cultural values…is a strategic vacuum.' Australia Street Company, cited in Audit Office of New South Wales (2004, p. 17).

[122] Audit Office of New South Wales (2004). References to the '2004 audit' refer to this report.

[123] Audit Office of New South Wales (2013). Further references to the '2013 audit refer to this report. Although the 2013 audit analyses the management of historic heritage only, as opposed to both historic and natural heritage (the focus of the 2004 audit), its findings remain relevant when analyzing NPWS management structures and culture. The fact is that if the NPWS remains unable to set objectives for the conservation of static, man-made historic heritage, there is no reason to doubt that it remains unable to set conservation objectives for natural processes given that setting objectives for management of natural processes is more complex than that of historic heritage.

include what the money needs to be spent on and what has been achieved from the expenditure (p. 5). The audit found that because the NPWS cannot account for the time spent by its staff on its core responsibility of managing natural and cultural heritage, it simply assigns costs to broad functional areas such as its Branches, Regions, or Areas (p. 19). Furthermore, the audit could not find reliable information as to the outputs or accomplishments of its expenditure. Failures to account for expenditure and monitor accomplishments will be discussed further in section 2.2.1.

A failure to link resource allocation to concrete objectives and a failure to account for how money is spent on reserve management points to a severe lack of accountability within the NPWS. The service has not been able to define a strategy for allocating funds and thus can neither account for where its money is spent nor what it achieves with the expenditure. Such a lack of objectives and lack of accountability are a far cry from the high standard of land management described in section 1.2.

The recent 2013 audit suggested that a planned approach based on agreed priorities and more predictable funding would provide scope for achieving greater efficiencies in maintenance spend and enable the development of increased expertise and greater value from contracts (p. 21). *The Way Forward* delivers on these suggestions by basing all land management on priorities defined within regional Ecological Integrity Plans, and delivering land management outcomes using long-term contracts to non-government organisations.

2.1.3 Plans of management in a world without objectives

Under the NPW Act, NPWS must prepare a plan of management (PoM) for a park as soon as possible after park gazettal. PoMs consider the principal values of the park and identify the desired outcomes for management and the strategies required to achieve them. PoMs are one of a range of management plans prepared by NPWS, which include reserve fire management strategies, regional pest management strategies, and branch visitation management plans, among others.

Following a scathing 2004 audit demonstrating that less than one-third of reserves had a PoM, that many have been without a PoM for many years, and that many parks with PoMs were without one for a long time, NPWS appears to have made a concerted effort to deliver PoMs for its reserves. They report that at June 2010, 418 parks, representing almost 75 per cent of the NSW park system, had a PoM.[125] A further 8.9 per cent of the park system (100 parks) had a PoM on public exhibition. Given that there were over 800 parks and reserves at that stage, this means at least 35% of parks still are not living up to their legal obligation of having a PoM.

Despite the improvement in drafting PoMs for parks and reserves, it remains unclear whether concerns over the effectiveness of PoMs have been addressed. The 2004 Audit suggested that although PoMs involve extensive community engagement and have improved over time, they:

- Do not clarify standards of park management or include associated targets, performance indicators, and monitoring programs,
- Do not integrate well with the NPWS strategic planning or link strongly with corporate priority setting and resource allocation,
- Do not dictate what *needs to be done* but rather what *can be done* within the constraints of existing financial resources.

Although some progress in the number of PoMs and prioritisation through internal Regional Operations Plans may be seen as progress made since 2004, the 2013 audit suggests NPWS still has not established statewide outcomes for its asset base. The lack of overall priorities and funding determinations suggests PoMs remain unconnected with strategic planning and financing, and likely lack standards and performance indicators to track progress against overall goals (because there are no overall goals).

[125] NSW Department of Environment, Climate Change and Water (2011)

Agreeing on overall goals for the state reserve systems appears to be an intractable task for NPWS. In 1998, a review of PoMs identified that there was no policy framework with a comprehensive, integrated, and consistent set of broad policy statements, principles, criteria and objectives, on which to base the management of the reserved areas. The review held that such a framework would make for consistency and less work if its broad policies and principles were available to those preparing PoMs. Taken together with the 2004 audit and the 2013 audit, the 1998 review suggests that NPWS has been made aware of a lack of objectives for reserve management and within PoMs on at least three separate occasions in the past fifteen years.

There are also serious questions about the dynamism and accountability associated with PoMs. The 2004 audit suggested that PoMs have a projected lifespan of five years but often remain unchanged for much longer. This is despite the NPWS strategic planning cycle of three years, with annual reviews and readjustments. There is thus a lack of connection between NPWS planning/funding allocation and PoMs, with PoMs potentially serving as legal burdens with no functional connection to overall priority setting and budget allocations. Furthermore, although the drafting of PoMs requires extensive community consultation, it is troubling that they lack monitoring programs that would be required to assess progress against community-driven goals and thus allow the NPWS to report on progress. Although NPWS suggests PoMs are audited from time to time, results of any audits are not readily available, nor is any proof given that they actually occur. This points to a severe lack of accountability regarding the use of public money for achieving community-driven objectives.

The Way Forward integrates protected area planning into regional ecological integrity plans, thus negating the need for PoMs for individual parks. Integrating protected area management planning with regional plans also allows for effective management of protected areas and their connections with the surrounding landscape rather than managing protected areas as islands within the landscape.

2.2 Concerns over monitoring and evaluation

Monitoring the completion of management actions (e.g. setting feral pig traps, planting a certain number of trees) and evaluating the achievement of outcomes or objectives (e.g. reducing the decline of threatened species, improvement of canopy biodiversity) is absolutely vital to judge management effectiveness, measure management efficiency, and improve management over time. As argued in section 1.2, monitoring and evaluating landscape condition (by identifying and measuring indicators of ecosystem integrity) is also critical for land management agencies to be able to detect change in the landscape and promote effective adaptation to climate change. Despite the importance of monitoring and evaluation for understanding management effectiveness and responding to climate change, evidence suggests that monitoring and evaluation have been low priorities for NPWS. A failure to prioritise monitoring and evaluation often results from entrenched management culture (section 1.2.3), and evidence of such a culture within NPWS will be discussed shortly.

2.2.1 Reviews of NPWS performance: monitoring and evaluation

Audits of NPWS performance have uncovered a paucity of monitoring activity across the agency, which has resulted in an inability of NPWS to determine the return on its investment and to track its progress. In 2004 it was found that the NPWS could not:

- Reliably determine which reserves, and their contents, are at an acceptable standard and which are not,
- Reliably assess how well it conserves NSW natural and cultural heritage,
- Reliably account for the time spent by staff on its core role of conservation and relate these costs to its accomplishments.

Because it cannot determine whether its activities are sufficient nor relate costs to activities themselves, it cannot determine whether its budget is sufficient in any given year.

In the 2004 audit, NPWS replied that it could not provide for effective monitoring and evaluation because it gives higher priority to managing issues, threats, and impacts and considers this prioritisation appropriate. Given these priorities, NPWS finds it difficult to effectively coordinate and implement key initiatives and commit sufficient resources to measuring its success. A failure to monitor and evaluate by public land management agencies is a global phenomenon, and a lack of resources is often cited as the reason (section 1.2.3).

However, the 2004 audit makes an important observation that casts doubt on whether a lack of resources is a valid excuse for not engaging in monitoring and evaluation. The legitimacy of the NPWS claim that it cannot monitor and evaluate because of a lack of resources depends on NPWS' ability to show that its current resource base is inadequate for achieving other objectives and thus it is overstretched in meeting these other objectives and must cut out monitoring. Because NPWS cannot reliably assess whether it is efficient and effective in meeting other objectives, however, it also cannot assess what it is unable to do within the limits of current resources (i.e. conduct monitoring) and the risks and implications of the things it cannot do because of any lack of resources. Because NPWS cannot reliably assess whether its resourcing is sufficient, therefore, it is in no position to successfully argue that resourcing is insufficient to engage in monitoring and evaluation.

As hinted at earlier, monitoring is not resourced because it is deprioritised by NPWS and NPWS considers such deprioritisation appropriate. Such deprioritisation points to a management culture contrary to what is necessary for land management in the face of climate change and consistent with contemporary understanding.

2.2.2 State of the Parks

Despite its criticisms of NPWS monitoring and evaluation, the 2004 audit described how the (as it then was) recently developed State of the Parks program promised a great deal and was an ambitious approach to measure results. At its inception, State of the Parks intended to measure achievement of management objectives through both a qualitative questionnaire distributed to park managers and quantitative data collection in a sample of reserves. The 2004 audit claimed that State of the Parks, if implemented as intended, should provide most information on efficiency and effectiveness sought by external agencies over time.

The 2013 audit provides a recent verdict on whether NPWS monitoring and evaluation has improved and whether State of the Parks has delivered on the aspirations of the 2004 audit. The verdict is not positive. The 2013 audit found that although NPWS funding seeks to deliver social, economic, and environmental benefits, there are no measures in place to monitor the achievement of these outcomes. This means NPWS cannot say with certainty how efficiently and effectively it is managing heritage assets overall. The audit notes that while State of the Parks is a source of qualitative information about park management and trends over time, it does not provide a robust assessment of the efficiency of the agency's management. Furthermore, NPWS has yet to establish quantitative measures of heritage asset or service performance.

Why has State of the Parks failed?

The initial vision for the NSW State of the Parks system was based on the collection of quantitative data on a sample of parks from across the state. This sought to capture, through a series of indicators, detailed information on natural, cultural, and social values within the park system, and the management of threats to these values. The indicators were selected through consultation with field and research staff and stakeholder groups. A selection of 22 parks that represented different park types and geographical locations were chosen for sampling. Data were collected firstly as a pilot study to ensure the indicators were feasible and then on another two occasions over a two-year period.

Because this quantitative data collection was considered too onerous and resource-intensive, NPWS favoured a 'rapid assessment' component based on questions to be answered by staff responsible for managing reserves.[126] State of the Parks is thus a questionnaire given to reserve managers asking them to assess the status of reserves they manage.

As such, the State of the Parks is based on a questionnaire given to parks staff, which staff felt required 'a major time commitment' of between a half-day and one day to complete.[127] The first state-wide State of the Parks was completed in 2004. It was completed again in 2007, with the 2007 survey representing the most recent State of the Parks data publicly available. At the time of writing (September 2013), the NSW Government website presenting the 2007 results says 'the 2010 survey is currently underway' and gives no indication that there is a State of the Parks on the cards for 2013.[128]

NPWS makes the following claims from its 2007 dataset, which, as just mentioned, is the most recent available State of the Parks monitoring effort:

- 'The number of parks where managers are reporting that most important natural heritage values are in excellent condition has almost tripled since 2004.'
- 'Impacts to threatened species are stable or better in the majority of the park system though further information is required in some parks.'
- 'Park managers report they are stopping weed impacts from increasing in almost 90 per cent of the park system.'
- 'Park managers report they are stopping the increase of pest animal impacts in over 94 per cent of the park system.'

These optimistic State of the Parks results, however, appear in direct contrast to the more troubling picture painted by the *New South Wales State of the Environment 2012* report (section 1.4). This discrepancy may be related to serious concerns about the reliability of the State of the Parks dataset. That it is a qualitative self-assessment leaves it prone to bias in both directions. Managers may be overly optimistic in order to paint a picture of success, or as a purpose of State of the Parks is to identify those areas requiring greater attention, they may be overly pessimistic in order to increase their chances of a greater funding allocation in the future.[129]

More concerns about the reliability of State of the Parks come from a ground-truthing of State of the Parks data undertaken as an independent research project by Dr Carly Cook, then at University of Queensland. Dr Cook found that when assessing vegetation condition, nearly half (43-47%) of managers' condition ratings were incorrect. She also found that four out of five managers who claimed to have evidence-based information to support their assessments did not actually have such data.[130] If managers overestimate their quality of information and are wrong half the time when responding to the survey, the capacity of State of the Parks to deliver reliable monitoring data to inform management is severely limited.

Contemporary best practice land management for resilience has monitoring, evaluation, and public reporting of progress at its core (section 1.2). At present, the only publicly available monitoring and evaluation undertaken by NPWS is a questionnaire given to park managers once every three years (but only twice in the last ten years) that takes them less than a day to fill out and they are incorrect when answering the questions nearly half the time. The 2013 audit confirms how State of the Parks has let down the Audit Office on its hopes for improving effectiveness measurement: 'While State of the Parks data is a source of qualitative information about park management and trends over time, it does not

[126] Hockings et al. (2009, p. 1018).
[127] Hockings et al. (2009, p. 1024).
[128] NSW Department of Environment, Climate Change and Water (2011)
[129] Hockings et al. (2009).
[130] Cook (2010).

provide a robust assessment of the efficiency of the agency's approach to historic heritage management' (p. 23).

While it is disappointing that the ambitious State of the Parks has been reduced to a questionnaire delivered once every three years (if it is even still being administered), the fact that staff consider less than one day of their time to be 'a major time commitment' shows how monitoring simply is not a priority for NPWS nor is it embedded into its culture. An initial goal of State of the Parks was to 'help build an organisational culture where staff are encouraged to plan, act, review, and adapt; that is, to mange adaptively. While this may sound intuitive, park management agencies have been slow to move towards an adaptive approach to management. This is in part because evaluation has not traditionally been a part of the culture of these organisations.'[131]

That State of the Parks has been stripped of its power before it even got going, and because all evidence points to it actually being discontinued, it appears NPWS is uninterested in the cultural change State of the Parks intended to bring about. The problem is, however, that this is the cultural change needed for effective landscape conservation according to best practice understanding.

Cultural change is difficult and cannot be imposed from the top down. Rather, what is needed is comprehensive reform that places responsibility for land management in the hands of those who have already developed the management culture required for building resilience through adaptive management. Furthermore, they must be held accountable for doing so.

The next chapter highlights developing features of land management in NSW that remain on the fringes yet resemble contemporary best practice land management (section 1.2). These include advocacy for building environmental accounts and delivery of land management by non-government organisations.

[131] Hockings et al. (2009, p. 1015).

3 Building blocks for a resilient future

Major features of *The Way Forward* include the building of environmental accounts on a regional and state basis, and delivery of all land management by non-government organisations. While these features are progress toward a high standard of land management, they remain underfunded and without mainstream support. Section 3.1 describes the importance of building environmental accounts, and section 3.2 highlights the rising profile of non-government organisations in delivering land management.

3.1 Progress on the fringe: environmental accounts

In recent years, researchers have made considerable progress in building environmental accounts to support land management decision-making. *The Way Forward* places the creation and standardisation of these environmental accounts at the core of land management, because it is only through building these accounts that decision-makers can have the information necessary to understand the condition of their landscapes and manage for change.[132]

Environmental degradation often goes ignored because the link between future prosperity and functioning natural systems remains an abstract concept, unreconciled with everyday living. The Wentworth Group argues that we have failed in our sustainability efforts because despite all the science and related work in recent decades, we still have not addressed the fundamental problem – we do not internalise environmental degradation into our everyday economic decision-making.

A system of environmental accounts that link the maintenance of our natural capital into everyday economic decisions has been proposed to address the lack of valuation of environmental assets. Environmental accounts allow us to value the services that nature provides us, such as clean water, healthy soils, and functional vegetation. The lack of an environmental accounting framework is a fundamental weakness of Australian environment policy. It cannot be fixed simply by restructuring the delivery of existing programs. It can only be fixed by building a regionally-based monitoring, data collection, evaluation and reporting system.

Building such a regionally-based monitoring, data collection, evaluation and reporting system has thus been suggested as the core business of regional agencies in *The Way Forward*. Aspects of the environmental accounts as proposed by the Wentworth Group will now be discussed such that the link can be made between building these accounts and landscape scale management for ecological integrity as discussed in *The Way Forward*.

3.1.1 Concepts and goals of environmental accounts

The proposed environmental accounts are built on three concepts:

1. It is not possible to manage environmental assets if you do not measure their condition;
2. The condition of environmental assets needs to be measured at a scale at which ecological processes operate;[133] and

[132] Unless noted otherwise, material in this section (3.1) borrows from and builds upon Wentworth Group of Concerned Scientists (2008) and Cosier & Sbrocchi (2013).

[133] In this way, the 'assets' of environmental accounting are different to 'assets' as defined by traditional conservation activity. Environmental accounting assets will be measured at the regional scale and be linked to the health of certain processes, whereas traditional conservation assets were measured at the scale of individual plots or species and rarely linked to broader regional processes.

3. Environmental accounts need a common unit or measure of condition – a common currency for the environment – so that we can compare the condition of different assets in different places at different scales with different indicators.

The Way Forward recognises it is not possible to manage environmental assets without measuring their condition, although such management has been attempted for decades. It thus proposes the first actions of new regional agencies will be to generate their environmental accounts rather than leaving the necessary monitoring and reporting to ad hoc afterthoughts. It also recognises that measurement should occur at the regional scale, rather than at the scale of individual properties or protected areas, as is now common practice.

The goals of the proposed environmental accounts are to:

1. Provide annual national, state/territory-wide and regional scale reports which measure the health and change in condition of our major environmental assets;
2. Underpin the long-term catchment management and land use planning decisions by Commonwealth, state/territory and local governments, and regional authorities; and
3. Improve the cost effectiveness of public and private investments in environmental management and repair.

The use of environmental accounts in *The Way Forward* aim to achieve all three goals. Although *The Way Forward* is centred on NSW, there is no reason why similar concepts cannot be applied to other states, which in turn would allow for the scaling up of environmental accounts to the national scale.

3.1.2 Structure of environmental accounts

A core role for regional agencies is to identify environmental assets in their regions. Environmental assets can be any biophysical feature in nature that society considers to be an asset. An environmental asset can be an ecosystem such as a forest or a river or an estuary, it can be an individual species of mammal or bird, or it can be any other feature in nature, such as a fishery, agricultural soils, or a groundwater resource. Assets are then categorised into asset classes of land, water, atmosphere, and marine.

Condition accounts of each asset are to be built to measure the quality of an asset. When measuring quality for vegetation assets, for example, indicators need to measure:

- Extent – the area of the vegetation in question
- Composition – the structural integrity of the vegetation, such as species richness and weediness
- Configuration – where the remaining vegetation is located in the landscape, if possible.

As just described, in order to measure the health and change in condition of environmental assets in regions and the threats to these assets, environmental accounts must be based on scientific measurements of specific indicators. Indicators would be selected based on their cost effectiveness in measuring the health of the environmental asset in question.

Indicators may vary from region to region and the frequency of data collection may vary from indicator to indicator. Such variation, however, would be managed through adherence to Standards of Environmental Accounting. These standards are discussed further in section 4.1.2, but in short, they would:

- Set out the criteria for the selection of indicators most relevant to each region
- Define the method for determining a common single rating standard for what is considered 'healthy' for each asset type in each region. Such determinations would then relate to goals of ecological integrity described in regional ecological integrity plans.

- Guarantee the quality of data collection – fundamental to the success of environmental accounts as standards give confidence that the information being collected is scientifically accurate and reliable.

3.1.3 Reference benchmarking

Environmental accounts link to management objectives through reference benchmarking. The reference condition benchmark is a scientific estimate of the target condition of an ecosystem. The target condition will vary according to the function the asset provides – which is to be determined by regional agencies as they consult and engage communities and other stakeholders when developing their regional plans.

The condition of a river to provide safe drinking water may differ, for example, from the condition needed to flush salt out of inland river systems, or to provide habitat for a sustainable fishing industry, or to provide opportunities for recreation. Furthermore, the target condition for vegetation, for example, might vary not only depending on the service that it is providing but also where that service is located in the landscape. Required conditions will differ depending on whether vegetation protects water quality in rivers, controls dryland salinity, provides habitat for threatened species, or protects agricultural soil from wind and water erosion.

With environmental assets identified and reference benchmark conditions measured, regional agencies can assess the health of their assets relative to their target condition as an index between 0 and 100. Such an index is immensely valuable for environmental monitoring, reporting, and investment planning, as will now be discussed.

3.1.4 Accounts for improved monitoring and reporting

Australian governments spend billions on environmental protection and restoration, yet we do not know if these investments are improving or maintaining our natural capital. As mentioned earlier, audits of protected area management repeatedly find that NPWS cannot determine whether its management has been successful. Furthermore, audits of Australian Government programs that invest in public agencies to deliver land management across multiple tenures, such as the Natural Heritage Trust (and the Natural Heritage Trust Extension), find that they cannot make an informed judgement as to the progress of programs towards either long term or even intermediate outcomes.[134]

As mentioned earlier, a cultural orientation toward environmental management that rewards on-ground action for short-term gain and deprioritises monitoring is a major reason why public agencies have found it so difficult to determine their success. Where monitoring does occur, the money is spent in such an ad hoc manner that it removes any realistic change of detecting change.[135] Detecting change, however, is crucial to managing for resilience (section 1.1).

Making things harder, however, is the lack of an environmental accounting system in place. This missing component leaves us unable to evaluate if funding is being directed towards the most cost effective environmental outcomes. Building environmental accounts would generate a monitoring standard that cuts through the complexity of environmental management and allow for effective comparisons such that monitoring can actually feed back to inform investment planning. Monitoring for environmental accounts would feed into annual reports published by regional agencies that summarise the integrity of their environmental assets.

[134] Australian National Audit Office (2001, 2008).
[135] Cosier and McDonald (2010).

Given the importance of environmental accounts for both effective prioritisation of investment and measuring investment success, funding of on-ground work would be tied to the supply of required data, consistent with the Standards for Environmental Accounting, to the Ecological Integrity Commission (section 4.1.2). Although the initial level of detail will vary from region to region in the early years until regional capacity and adequate data collection systems are built, the Ecological Integrity Commission would recognise the need for capacity to be built up initially and oversee the building of accounts such that all regions are supported in their efforts.

3.1.5 Accounts for improved investment planning

Protected area management has muddled through the past couple decades without concrete, measurable objectives to guide investment (section 2.1.1). Regional natural resource management plans have also raised concerns regarding their objectives. Some regional agencies set objectives based around what is achievable with current funding or base investment on what was achieved the previous year, thus failing to take a long-term, landscape-scale approach to their investment.[136] Other times, such plans resemble wish lists whose potential projects are unable to be prioritised effectively.

These examples of ineffective objectives, as well as the absence of objectives altogether, are consequences of current ad hoc, haphazard approaches to monitoring and reporting that fails to effectively communicate the complexity of natural systems. When information is too complex, it makes effective decisions impossible. When complicated information is presented simply yet rigorously, it makes for improved decision-making.

Building environmental accounts as proposed by the Wentworth Group and as included in *The Way Forward*, would give decision-makers a tool that makes it possible to set targets and objectives for investment, and generally make better decisions. The regional reports that are the core business of regional agencies in *The Way Forward* would be the core input to local and regional investment planning. Their inclusion in state reports would scale up to inform state investment prioritisation as well.

3.1.6 A prototype: The South East Queensland Healthy Waterways Partnership

For over ten years, the Ecosystem Health Monitoring Program (EHMP) has produced an annual Ecosystem Health Report Card to help understand and communicate whether the health of local waterways is improving or declining.[137] The EHMP bases the report card on a regional assessment of ecosystem health for each of South East Queensland's 19 major catchments, 18 river estuaries, and nine zones in Moreton Bay.

A total of 135 freshwater sites are monitored biannually, and 254 estuarine and marine sites are monitored monthly across South East Queensland and Moreton Bay. Ecosystem health is assessed against water quality guidelines (which here serve as the reference condition benchmark), resulting in a single grade for each freshwater, estuarine, and marine system. The report card gives each catchment a grade (from A to F) based on data collected during the previous year (Figure 2).

[136] For example, see NSW Natural Resources Commission (2009). The Commission found that not only did the agency set targets that were achievable with current funding, but also that the targets were set so low that they were often exceeded by 1000% or more.
[137] Healthy Waterways (2013).

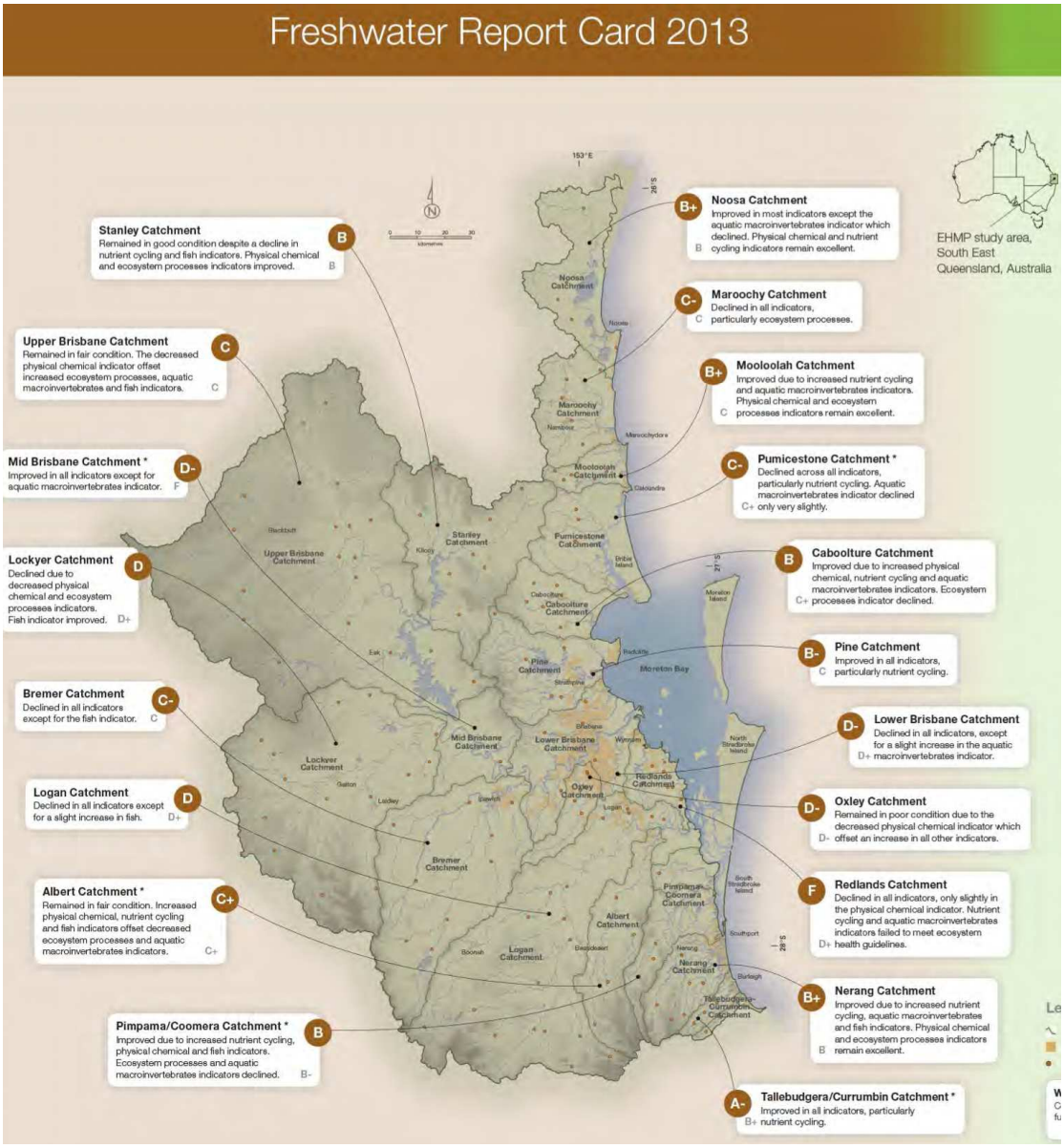

Figure 2. Freshwater Report Card 2013 produced by the Ecosystem Health Monitoring Program in South East Queensland.[138]

The report card results have been used by SEQ Catchments, a community-based, not-for-profit regional natural resource management organisation to evaluate the most cost-effective actions to achieve targets. Their infrastructure investment plan for maintaining the condition of freshwater assets was able to show that it is not nearly as difficult, nor nearly as expensive, as many might think to fix degraded rivers. As the Wentworth Group point out, they were able to demonstrate this because of the existence of a set of environmental accounts, based on scientific information, that could be used to identify cost-effective investment decisions.

Perhaps a more important point, however, is the fact that the sampling of 30 freshwater indicators at over 100 sites twice a year, and over 250 estuarine sites every month, is conducted with an annual budget of less than $3 million. Operating expenses for NSW National Parks & Wildlife Service for fiscal year 2011-12 were $344.5 million.[139] Such numbers call into question the excuse that monitoring is not

[138] Map sourced from Healthy Waterways (2013, p. 4).
[139] Calculated from the NSW Department of Premier and Cabinet annual report, expenses for the Parks and Wildlife Group of the Office of Environment and Heritage (NSW Department of Premier and Cabinet, 2012).

undertaken because of a lack of resources. Rather, they support the argument made earlier that it is simply not a priority.

Extrapolating the $3 million spent on the EHMP report cards across Australia, an investment of $200 million would be sufficient to build these environmental accounts and would represent less than three per cent of public environment funding. At the same time, by removing duplication of existing data gathering currently spread across government agencies and by reprioritising existing research and monitoring programs, building the environmental accounts may be revenue neutral.[140]

3.1.7 Environmental accounts can be built now

The Wentworth Group recently reviewed a 'proof of concept' trial of building environmental accounts in pilot regions across Australia.[141] They concluded:

Condition accounting using the Accounting for Nature model to create a common environmental currency has been tested and the results indicate it is an appropriate method for measuring degradation. It is useful in helping set measurable policy standards at a regional scale, and then informing the cost-effectiveness of investments aimed at meeting those policy targets.

The agreed accounting framework allowed for maps of ecosystem health as well as the extent of threats to be produced within days. If such maps were produced for all regions, a decision-maker would be able to see the relative condition of every asset in every region, across the state and potentially across the continent, in a single figure.

Perhaps most importantly, however, is that the trial was run without any additional funding from government, using existing data where possible, and then filling data gaps with the assistance of experts or by direct survey. They showed that even those with the least data, in the remotest locations, with the fewest resources, can create a set of accounts.

What the Wentworth Group has proven is not just that environmental accounts are useful in theory, but that they are useful in practice and can be generated now. In some cases accounts may require new collections, but mostly it is about extracting or standardising data collection from existing systems. Moreover, the trial showed that there is a vast amount of existing data about condition of environmental assets that goes back, in some cases for decades, and can be adapted for the accounts.

What is needed, however, is a framework for land management where building environmental accounts is core business and where monitoring and reporting are prioritised. Such a framework is provided by *The Way Forward*.

As described by the Wentworth Group's Peter Cosier, the ultimate function of environmental accounts supports the objective of *The Way Forward* of shifting the land management paradigm away from considering nature separate to society and that social wellbeing must come at the expense of the environment:

It is my great hope that environmental accounts will help us internalise environmental degradation into our everyday economic decision-making, and in doing so, blow away forever the nonsense that in a modern economy, economic progress must come at the cost of the environment.[142]

Operating expenses total $344,474,000 and includes 'employee related expenses' and 'other operating expenses'. Does not include 'depreciation and amortisation', 'grants and subsidies', or 'finance costs'.

[140] Wentworth Group of Concerned Scientists (2008, p. 18).

[141] Cosier & Sbrocchi (2013).

[142] Cosier & Sbrocchi (2013, pp. 22–23).

3.2 Progress on the fringe: land management by non-government organisations

New South Wales State of the Environment 2012 reported that the reserve system is increasingly being supplemented by off-reserve conservation across other land tenures. The report suggests off-reserve, nil-tenure conservation is vital for effective landscape conservation, as more than 90% of land in NSW is not in the public reserve system. Conservation on private and other (non-reserve) public lands complements the public reserve system by protecting a greater range of values.

A large proportion of off-reserve land management is undertaken by environmental non-government organisations (NGOs) that either own land and manage it for conservation outcomes (e.g. Australian Wildlife Conservancy and Bush Heritage Australia) or are contracted to deliver conservation outcomes on other non-reserve land (e.g. Greening Australia).

These environmental NGOs have grown organically in response to a need – landscape-scale conservation. They have been able to deliver outcomes effectively across tenures and have been particularly innovative and successful in attaining conservation goals.[143] Moreover, as they are answerable to donors and contracts, they have developed strong procedures for setting objectives, monitoring, and reporting. Visionary projects undertaken by environmental NGOs in recent years showcase the successes of these organisations and provide sound evidence to argue for increasing their involvement in landscape-scale conservation.

3.2.1 The Great Eastern Ranges Initiative

The Great Eastern Ranges Initiative (GERI) aims to maintain, improve, and reconnect natural areas along a 3,200 kilometre corridor stretching from the Grampians in Victoria, through the ACT and NSW, to the Atherton Tablelands in north-eastern Queensland. The objective is to provide healthy, functioning landscapes that will enable species to survive and adapt to environmental threats. The NSW Government is providing more than $4.4 million up to 2015, through the NSW Environmental Trust, to implement the initiative in NSW.[144]

Although funded by the NSW Government, GERI is led by NGOs such as Greening Australia NSW, National Parks Association of NSW, Nature Conservation Trust of NSW, and OzGREEN, with a memorandum of understanding with the NSW Office of Environment and Heritage (which contains NPWS). Since its inception, other non-government partners have joined GERI, such as Conservation Volunteers, Land for Wildlife NSW, and Wildlife Land Trust, among others. The delivery of GERI by environmental NGOs has been described by IUCN as 'the ultimate innovation.' The IUCN felt that the community's readiness to accept big picture strategies supported the creation of a NGO-led program and continues to drive its expansion.[145]

Because GERI is delivered primarily by NGOs, it has:[146]

- Leveraged non-government contributions – In the first four years of GERI (2007-2011), participating organisations were able to leverage $15.9 million in cash and in-kind contributions from the $3.6 million in project grants from the NSW Government.
- Set nested objectives – The overarching vision of a connected Great Eastern Ranges gave rise to a goal of Connectivity Conservation – 'A connected NSW conservation corridor contributing to

[143] General Purpose Standing Committee No. 5 (2013, p. 312).
[144] NSW Environment Protection Authority (2012, p. 249).
[145] Dunn et al. (2012, p. 114).
[146] Outcomes listed here obtained are as described in Great Eastern Ranges Initiative (2011).

healthy ecosystems and healthy people.'[147] Supporting goals include Communicating With People, People Working Together, Effective Administration, and Applying Knowledge. Goals were implemented by selecting priority regions and by following a detailed record of key outputs, deliverables, and milestones.

- Displayed a commitment to monitoring and reporting – The project governance requirements established by the NSW Environmental Trust involved significant emphasis on records-keeping and reporting. Monitoring and reporting within GERI has included:
    - A major data collation and spatial analysis project in 2009-2010 that for the first time, collated data from a variety of disparate government agencies, catchment management authorities, and non-government partner organisations to depict the spread of effort over public and private lands.
    - Within two years of the inception of GERI, significant progress was made to establish a program for well-targeted and cost-efficient monitoring.
    - Use of remote sensed data, spatial analysis, and data sources from citizen scientists to inform demonstration of quantifiable improvements in species persistence in short time frames.
- A commitment to continuous improvement – Monitoring, evaluation, and reporting has led to GERI partners identifying opportunities for future improvement related to each goal. For example, under the Applying Knowledge goal, an opportunity for future improvement involves revisiting monitoring activities to make use of data available from long term monitoring and emerging tools from a collaboration with the Atlas of Living Australia.

Effective monitoring and reporting has been a feature of GERI since practically the outset because of project governance requirements and the delivery of on-ground work by environmental NGOs who must report on progress made with investment from both the NSW Government and other leveraged funds.

A similar commitment to monitoring and evaluation is expected from NGOs delivering land management in *The Way Forward*, as their management will prioritise the building of environmental accounts and will be undertaken on a contractual basis that will require comprehensive monitoring and reporting.

3.2.2 EcoFire

EcoFire is an ongoing project managed by the Australian Wildlife Conservancy (AWC) that aims to change the fire patterns in the central and north Kimberley. EcoFire delivers a strategic regional prescribed burning program coordinated across property boundaries and tenures. The effectiveness of the program was monitored from 2007-2009 using satellite imagery to describe fire patterns.[148]

The project includes thirteen properties of mixed tenure (conservation, pastoral, and Aboriginal pastoral properties) and two parcels of unallocated crown land. Although government agencies are usually responsible for fire management on unallocated crown land, Western Australia Department of Environment and Conservation recognised that fire in the Kimberley needs to be managed across large landscapes and in some circumstances the cost, engagement priorities and logistic constraints may mean that other stakeholders are better positioned to deliver prescribed burning on unallocated crown land.

The AWC, therefore, undertook prescribed burning across tenures, in accordance with government plans, and at times involved government agencies to facilitate cross-agency integration of fire management.

[147] Great Eastern Ranges Initiative (2011, p. 8).
[148] Outcomes of EcoFire described here are drawn from Legge et al. (2010).

Apart from managing issues such as fire across multiple tenures, other features of EcoFire that align with a high standard of land management include:

- Collaboration – EcoFire unified sectors of the regional community in a unique partnership. Pastoralists, indigenous communities, private sector conservation and government agency representatives collaborated to manage fire on a massive scale.
- Performance targets – the AWC defined four measurable targets for specific metrics to assess the outcomes of EcoFire fire management. These targets included changes to the seasonality of fires, size and variance of unburnt patches, distance between unburnt patches, and the amount of long-unburnt vegetation. Monitoring against these targets was completed and reported publicly.
- Community engagement – extensive stakeholder engagement informed the development and rollout of EcoFire. Moreover, EcoFire provided for substantial training and employment opportunities for indigenous communities within the project area and educational activities in community schools that explained the importance of fire management.

Perhaps of most importance when relating the work of NGOs to *The Way Forward*, however, is the commitment to monitoring shown by the AWC. Contractual obligations played part of the role in ensuring monitoring was undertaken, as noted by the performance targets mentioned above. Extra biodiversity monitoring undertaken by the AWC, however, shows how NGOs such as the AWC are culturally committed to monitoring returns on their investment.

Although biodiversity monitoring was not a funded component of the EcoFire project, the AWC understood that the response of sensitive species and communities to fire management should be integrated into any fire management program. Therefore, they sourced funds from elsewhere in order to measure change in a suite of biological indicators on its two properties within the EcoFire project area. They were able to define indicators that comprise a suite of measures that allowed for inference about ecological health of their properties. Indicators related to threats, species, and ecological processes, and targets relating to each indicator were set in order to gauge success. The AWC measured improvements in their biological indicators, and concluded that these improvements were related to the EcoFire project and could be extrapolated across the project area.

3.2.3 Greater Goorooyarroo

Greater Goorooyarroo is a region that straddles the northern border of the ACT and NSW. The area contains around 3800 hectares of critically endangered box gum woodlands amongst rural residential and urban areas.

Since 2012, Greening Australia has been funded by both the ACT and NSW to implement the 'Building restored resilient landscapes in the ACT and Greater Goorooyarroo project'. The project brings together local landholders, researchers, government agencies, and indigenous and urban communities, to protect and enhance the box gum woodlands through cooperative local action. The project will run for at least six years, and the project team has been developing a project vision and strategy in collaboration with agency stakeholders and the local community.[149]

The Greater Goorooyarroo Project is another example of innovative, nil-tenure, landscape-scale conservation undertaken by an environmental NGO (Greening Australia) on behalf of government. Other features of the project include:

- Cross-border management – The function of natural processes and the extent of ecological communities do not adhere to political boundaries. While public agencies must align their management with state boundaries, environmental NGOs such as Greening Australia are able to

[149] Greening Australia (2012).

effectively manage the Greater Goorooyarroo across the ACT/NSW border. Such NGOs are thus able to manage at an appropriate, ecologically-determined scale rather than an inappropriate, politically-determined scale.

- Vision and strategy – The project established a shared vision and shared, easy to read and accessible strategy. The project recognises that local engagement and continuing prosperity is what will largely underpin a truly sustainable and resilient future for the area.
- Mosaic of land uses – Various goals are relevant to various areas of the landscape, with production land integrated with conservation land and integrated with urban areas. Goals include increasing biodiversity as well as the capacity for carbon storage.
- Collaboration – While Greening Australia oversees the restoration work and community engagement, specific activities may be devolved to other groups where they are better placed to deliver outcomes. These other groups may include local landcare groups, indigenous groups, and urban communities.

3.2.4 Environmental NGOs and best practice landscape conservation

Such nil-tenure, landscape-scale, visionary conservation and natural resource management projects delivered by environmental NGOs are popping up all across Australia as governments and communities alike recognise the value for a coordinated, NGO-led approach to tackling the complexities of environmental management. Other important projects not mentioned already include Habitat 141 Ocean to Outback, which seeks to restore the links between major national parks and nature reserves over an area of 18 million hectares and across parts of South Australia, NSW, and Victoria.[150] Another is GondwanaLink, which aims to reconnect biodiversity hotspots in southwest Western Australia. GondwanaLink aims to have landscapes that support human communities, but within nature-friendly landscapes that include large vegetated areas and linkages that give all species and communities a better chance to survive.[151] Both of these projects were spearheaded by environmental NGOs and involve vast collaborative efforts with other NGOs, government agencies, and local communities.

Resilience and adaptive management

Although most of these projects have only originated in the past decade, they have responded to the evolving science of land management and climate change by implementing best practice land management for resilience. They have done this by:

- Placing all on-ground action within a strategy and vision with concrete objectives.
- Prioritising monitoring and evaluation in order to learn from their investment and prove their effectiveness to investors (i.e. government, private donors).
- Collaborating with other NGOs and government agencies in order to ensure that on-ground action is delivered by the party best equipped to deliver the desired outcome.
- Involving the community to deliver sustainability outcomes to non-conservation lands, to deliver employment opportunities to indigenous and other groups, and to promote wider awareness of conservation and sustainable production, among other topics.

Some environmental NGOs even have an explicit commitment to applying adaptive management. Bush Heritage Australia (BHA), for example, has adopted the *Open Standards for the Practice of Conservation* (reviewed in section 1.2.2 of this report) and is part of the working group committed to the continuous improvement of the standards.[152] This commitment ensures they apply adaptive management while also allowing them to learn from others across the world who are applying the standards.

Transparency and accountability

[150] Habitat 141˚ (2013).
[151] Gondwana Link (2013).
[152] Bush Heritage Australia (2013b)

Environmental NGOs also have a strong culture of transparency in reporting and ensuring effective value for money with the investment made in their work by private donors or government environment schemes. Table 1 compares publicly available data from AWC, BHA, and NPWS, who all manage their own land for conservation outcomes.

Table 1. Comparison of conservation budgets and total budgets of private conservancies and NPWS.

Organisation	Area owned (hectares)[153]	Total expenditure	Conservation only expenditure
AWC[154]	3 000 000	$14 171 846	$10 065 856
BHA[155]	960 300	$11 650 000	$6 352 000
NPWS[156]	7 080 934	$421 498 000	N/A

Where NPWS failed to report expenditure on conservation activities,[157] reporting by AWC and BHA makes such expenditure explicit. When combined with the performance outcomes reported by AWC and BHA, such transparency allows for effective evaluation of success and areas for future improvement. Such transparency in public reporting should be expected of a public agency spending public money such as NPWS. However, as mentioned in section 2.2, NPWS not only lacks an effective level of transparency with its financial reporting, it also fails to evaluate its performance such that it is impossible to determine whether financial resources are sufficient or effective.

3.2.5 Non-government organisation service delivery elsewhere

The last decade or so has seen services traditionally borne by governments contracted out by government to NGOs, which in many cases operate on a not-for-profit basis. In many cases, the NGOs have been able to deliver the services more effectively and efficiently than had been experienced with government service delivery. Allowing for NGOs to compete for contracts to deliver such services offers an opportunity for governments to buy the implementation of its programs from the most efficient providers. Furthermore, a focus on paying for outcomes can drive innovation in the manner in which services are delivered.[158] Such a market is regulated by conditions established in public policy and regulated by public authorities (section 4).

This shift to NGO delivery has been most pronounced in human services such as social housing, social services, and disability care. In these cases, NGO involvement is longstanding and NGOs have played an important role in improving access and addressing gaps in available services.[159] In such cases, NGOs have proven to be the most cost-effective means of service delivery, as such organisations often have a thorough understanding of local conditions and can flexibly deliver services across metropolitan, rural and remote locations and in a wide range of service delivery environments.

[153] Only includes lands owned by AWC, BHA, or NSW Government. The reach of AWC and BHA is actually greater than these numbers because of partnerships where they invest in or work on other lands for conservation outcomes. EcoFire, mentioned in section 3.2.2, is such an example.
[154] Financial data for year end 28 February 2013 from Australian Wildlife Conservancy (2013)
[155] Financial data for year end 31 March 2013 from Bush Heritage Australia (2013a).
[156] Financial data for year end 31 June 2012 from NSW Department of Premier and Cabinet (2012).
[157] Annual reporting did not separate out expenses on conservation-related activity. A similar investigation by Fanning (2012) found 'many national parks services were reluctant to supply the figures or simply didn't know, saying that to tease the conservation component out from funds spent on tourist facilities, educational and cultural programs was impossible.'
[158] Shergold (2009).
[159] Productivity Commission (2010, p. 299).

Such developments are not unique to Australia but have occurred in a number of other countries including the United Kingdom, the United States, Canada, and New Zealand.[160]

Case study: Delivering social housing via community housing providers

Australian governments over the last decade have enacted policies to expand the community housing sector (characterised by small not-for-profit organisations) and encourage it to play a larger role in social housing. The reasons for this are:

- To introduce competition to public housing, which is dominated in each state jurisdiction by one large state or territory housing authority
- To provide greater choice for tenants for social housing
- The ability of community housing organisations to provide other services to tenants, given their greater links with the local community
- The ability to integrate public and private housing for a better social mix
- To mobilise resources from the private sector.[161]

Increased delivery of social housing through community housing providers has, in many cases, been an improvement on traditional delivery. Especially since the recent policy shift that prioritised social housing allocation to those of the highest needs, community housing providers have been able to better meet the complex needs of social housing tenants. Such complexity requires housing providers to coordinate much more than simply putting a roof over a tenant's head. Community housing providers have been able to draw on close relationships with support agencies and volunteers within local communities, allowing for them to better coordinate tenant access to a range of support services.[162]

Delivering landscape conservation via non-government organisations

When describing the rationale for divesting social housing to community housing providers, the then Australian Minister for Housing, Tanya Plibersek, stated:

There is still one large provider in each state that plans, owns, develops, manages, and allocates social housing … we are left with the problem that we are often not delivering opportunities for public housing tenants, ninety per cent of stock is held by eight government providers; and our system is not transparent or accountable.[163]

Similarly, there is still one manager of protected areas in NSW, with the problem that it cannot determine whether it is delivering outcomes for the people of NSW and is neither transparent nor accountable. Furthermore, it results in an artificial split between management of public and private land despite the well-established fact that environmental assets and their threats do not respect tenure boundaries.

NPWS was imposed from the top-down as a bureaucratic structure in the image of scientific management when environmental concerns became prominent on government agendas. Bureaucracies such as NPWS are best suited to the provision of standardised services in response to clearly defined problems, but are incapable of meeting the needs of diverse groups, and insufficiently accountable to them.[164] Of concern is that managing for resilient landscapes requires varied practice that responds to diverse and dynamic landscapes and is accountable to communities that live within and depend upon the landscapes themselves.

[160] Productivity Commission (2010, p. 303).
[161] Productivity Commission (2010, p. I.1).
[162] McCann (2011, p. 62).
[163] Plibersek (2009).
[164] Darcy (1999, pp. 15–16).

Despite the best intentions of NPWS, several performance audits and other research suggest that NPWS cannot deliver best practice land management and is especially resistant to the cultural change required. Simply making further recommendations for change would be a waste of time.

As described, the visionary landscape-scale projects created in recent decades have been a bottom-up response to land management concerns led by NGOs. The collaborations they have developed allow for issue-based management across tenures. Their exclusive focus on land management allows them to put more staff on the ground and focus on applying the latest science. Their commitment to effective monitoring and reporting means that they are the most suitable practitioners for delivering the standard of land management required for resilience. These projects not only manage landscapes, they learn about them, thus allowing for effective stewardship into the future as climates and societies change.

These visionary projects and the NGOs that lead them, however, remain on the fringes of land management. It is time to make them the norm. *The Way Forward* suggests relieving NPWS of its land management responsibilities in protected areas. Rather, values of protected areas and their management will be incorporated into regional Ecological Integrity Plans. NGOs would then bid for the opportunity to manage issues on a nil-tenure basis, including within protected areas.

3.2.6 Other NGOs that will benefit from this framework

Although existing environmental NGOs are well-placed to deliver landscape resilience as described in *The Way Forward*, the opportunity to deliver land management outcomes specified in regional plans would be open to any non-government entity, for example community groups or even individuals. If pest animals were listed as a threat to ecological integrity, if a landowner believes he or she is best-placed to manage such pests in an adjacent protected area, he or she would be able to bid for the opportunity to do so. If salinity is listed as a threat to ecological integrity, should a group of farmers wish to come together and manage salinity across their properties and vacant Crown land, they too could bid for the opportunity to do so.

Indigenous groups would greatly benefit from the opportunity to deliver land management across tenures. They would benefit from increased employment opportunities, particularly given the likelihood they would be better placed to deliver conservation outcomes in remote areas. Significant Indigenous capacity exists for land management, as evidenced by the Yarkuwa Indigenous Knowledge Aboriginal Corporation and Deniliquin Local Aboriginal Land Council working with Forests NSW towards greater Indigenous involvement in managing the Werai forests.[165] Allowing for the delivery of protected area management by NGOs as envisioned here thus has the potential to promote the access of Indigenous Australians to public land and potentially deliver significant benefits to Indigenous communities.

[165] General Purpose Standing Committee No. 5 (2013, p. 167).

4 A new role for government

Seven years on and I still see the creation of a competitive market to deliver public services as a good thing. It offers an opportunity for governments to buy the implementation of its programs from the most efficient providers – under conditions established in policy and oversighted by public servants. Better still, a focus on paying for outcomes can drive innovation in the manner in which services are delivered.[166]

Could this quotation be applicable to land management in 2021? The potential for NGOs to deliver best practice nil-tenure land management at the appropriate scale, including protected area management was demonstrated in the previous chapter. When such services are delivered by NGOs via a competitive market, the role of government shifts to policy and oversight, as described in the above quotation.

In *The Way Forward*, these policy and oversight roles are shared between small regional agencies and the state Ecological Integrity Commission. The Ecological Integrity Commission would be a statutory authority with limited Ministerial control, modeled off the present-day NSW Natural Resources Commission.

Regional agencies would develop Ecological Integrity Plans for their regions (Step Two) and report on regional environmental accounts (section 3.1).

At the state level, the Ecological Integrity Commission would be responsible for:

- Setting standards for land management, which include:
    - Standards of Land Management for Resilience
    - Standards for Environmental Accounting
- Accrediting NGO land management providers dependent upon a commitment to and continued adherence to the Standards of Land Management for Resilience and the Standards for Environmental Accounting
- Accrediting regional ecological integrity plans as to their adherence to planning components of the Standards of Land Management for Resilience
- Consolidating regional environmental accounts into state-wide environmental accounts, and enforcing adherence to the Standards for Environmental Accounting
- Housing a knowledge base of land management practice designed to facilitate regional agencies and land management providers to learn from each other
- Sponsoring independent, third-party audits of land management providers as to their compliance with requirements of accreditation, including continued application of the Standards for Landscape Resilience Management.

4.1.1 Standards of Land Management for Resilience

The Standards of Land Management for Resilience would include elements of the adaptive management framework of the *Open Standards* (section 1.2.2) and would replace the existing *Standard for Quality Natural Resource Management*,[167] published by the NSW Natural Resources Commission (NRC). Elements of both the *Open Standards* as well as the *Standard for Quality Natural Resource Management* would be suitable for inclusion in the Standards of Land Management for Resilience. In fact, the existing

[166] Shergold (2009, p. 28).
[167] NRC (2012b). Like the *Open Standards*, the *Standard for Quality Natural Resource Management* has been subject to review and adjustment over time. The first edition was published in 2005 (NRC, 2005).

Standard for Quality Natural Resource Management is a strong standard that deserves to have an increased presence in NSW land management.

The *Standard for Quality Natural Resource Management* is designed to apply to natural resource management at all scales including at the state, regional or catchment, local and property levels and importantly, to assist in identifying and delivering economic, social and environmental outcomes. This multi-scalar, multi-disciplinary reach of the *Standard for Quality Natural Resource Management* allows it to provide a solid foundation for standards in *The Way Forward*.

The *Standard for Quality Natural Resource Management* also has a commitment to accountability. The purpose of the *Standard for Quality Natural Resource Management* is to give confidence to the public, government, other interested parties and to natural resource managers themselves that investment in natural resource management is cost effective, protects and improves high value natural resource assets and maximises benefits through actions which contribute to integrated outcomes at all scales. Its aim is to support flexible and innovating regional planning, investment and decision-making while ensuring consistency, rigor, and accountability in natural resource management.

The *Standard for Quality Natural Resource Management* has eight interrelated components, each with a mandatory required outcome, which defines the quality of a natural resource management practice that must be achieved. The eight components and their required outcomes are given in Table 2.

Table 2. The eight components of the *Standard for Quality Natural Resource Management*.

Component	Required outcome
Governance	Processes and behaviours establish governance excellence and ensure achievement of intended purposes, compliance with all relevant laws, codes and directions and satisfaction of community expectations of accountability, transparency and integrity.
Collection and use of knowledge	Use of the best available knowledge to inform decisions in a structured and transparent manner.
Determination of scale	Management of natural resource issues at the optimal spatial, temporal and institutional scale to maximise effective contribution to broader goals, deliver integrated outcomes and prevent or minimise adverse consequences.
Opportunities for collaboration	Collaboration with other parties to maximise gains, share or minimise costs or deliver multiple benefits is explored and pursued wherever possible.
Community engagement	Implementation of strategies sufficient to meaningfully engage the participation of the community in the planning, implementation and review of natural resource management strategies and the achievement of identified goals and targets.
Risk management	Consideration and management of all identifiable risks and impacts to maximise efficiency and effectiveness, ensure success and avoid, minimise or control adverse impacts.
Monitoring and evaluation	Quantification and demonstration of progress towards goals and targets by means of regular monitoring, measuring, evaluation and reporting of organisational and project performance and the use of

	the results to guide improved practice.
Information management	Management of information in a manner that meets user needs and satisfies formal security, accountability and transparency requirements.

These eight components form part of an adaptive management cycle advocated by the *Standard for Quality Natural Resource Management* (Figure 3).

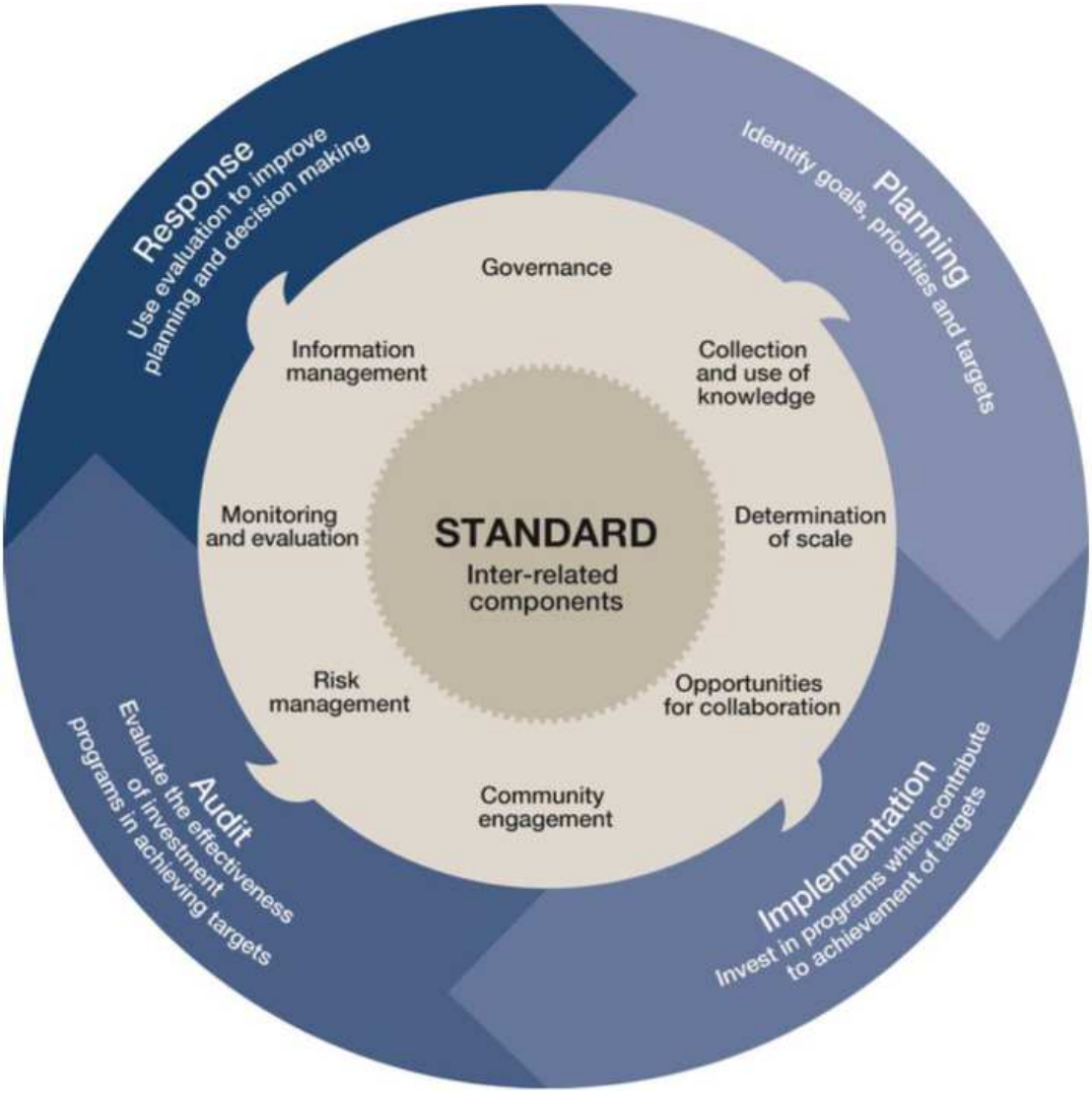

Figure 3. Adaptive management cycle advocated by the existing *Standard for Quality Natural Resource Management*. Figure from NRC (2012b, p. 3).

Although the *Standard for Quality Natural Resource Management* was designed to apply at all scales, in practice its effectiveness has been greatest with regard to natural resource management planning by catchment management authorities (CMAs). This is because by law, catchment action plans developed by CMAs must apply the *Standard for Quality Natural Resource Management* and then be accredited by the NRC. From time to time, the NRC also audits CMA adherence to the *Standard for Quality Natural Resource Management*, promoting a culture of continuous improvement in natural resource management planning and operations.

Despite its ambitions to apply at all scales of land management and across all levels of government, the effectiveness of the *Standard for Quality Natural Resource Management* in developing a culture of

adaptive management has been limited to CMAs rather than all land managers, and to only the planning phase of the land management cycle, because:

- On-ground action funded by CMAs is accountable to the Australian or NSW Governments, through schemes such as *Caring for Our Country* and *Catchment Action NSW*. Therefore, CMAs must invest in accordance with the preferences of these schemes, which often do not prioritise the type of investment and monitoring required for building resilience. For decades, these schemes have prioritised delivery of short-term outputs such as fencing and number of trees planted at the expense of comprehensive monitoring to measure long-term outcomes and build environmental accounts.[168] As a result, adaptive management has suffered and audits of such schemes are unable to determine whether they have delivered any outcomes for the millions they have invested.[169]
- Although accreditation of catchment action plans is dependent on adherence to the *Standard for Quality Natural Resource Management*, recurrent funding to CMAs for on-ground action occurs regardless of how well CMAs are applying the standard. This gives CMAs no incentive to ensure activities other than catchment action planning adhere to the *Standard for Quality Natural Resource Management*.
- Other agencies that partake in land management have not adopted the *Standard for Quality Natural Resource Management*. CMAs are a very minor player in the grand scheme of land management across NSW. Other agencies, in particular NPWS, have resisted being bound by the *Standard for Quality Natural Resource Management* and as a result have no binding commitment to its components, adaptive management, and continuous improvement.

The Standards of Land Management for Resilience will adopt the eight components of the *Standard for Quality Natural Resource Management*, while also providing for:

- Other details relevant to accreditation of land management providers, such as quality assurance processes, training of staff, sound financial management, and the like.
- Guidance as to how to apply resilience thinking when developing Ecological Integrity Plans. Such guidance would include:
    - Standards for community and stakeholder engagement
    - Advice on building conceptual models of social-ecological systems within regions
    - Advice on building state-and-transition models that describe how these social-ecological systems respond to change and how they may lose or retain function
    - Advice on using the conceptual models and state-and-transition models to develop indicators of ecological integrity.[170]

4.1.2 Standards for Environmental Accounting

The core function of regional agencies in *The Way Forward* is to develop Ecological Integrity Plans that identify indicators of ecological integrity in their region, to measure these indicators as they are managed over time, and to report on these indicators as a means of reporting on ecological integrity. Reports of the condition of these indicators form the environmental accounts for the region. Statutory environmental accounting standards are required to guarantee the quality of data collection.

The Ecological Integrity Commission would create Standards for Environmental Accounting that set out the criteria for selection of indicators most relevant to each region, and define the method for determining a common single rating standard for what is considered healthy for each asset type in each

[168] Robins and Kanowski (2011).
[169] Australian National Audit Office (2001, 2008).
[170] Recent revisions of CMA catchment action plans have made solid attempts at applying resilience thinking. Recent changes to natural resource management governance in NSW, however, mean that implementation and continued revision of these plans is in doubt. Nonetheless, the document used to guide the formation of these plans, *Framework for assessing and recommending upgraded catchment action plans* (NRC, 2012a), provides a useful starting point for the planning guidance mentioned here.

region. In this way, regions can set new baselines and ambitious targets for future ecosystem health rather than trying to recover bits and pieces of a pre-European past where it is most cost-effective.

It is expected that these standards will represent broad guidelines that allow for the necessary variation of indicators from region to region and the frequency of data collection from region to region.

As a means of ensuring environmental accounts are a core business of land management, state funding to on-ground projects will be tied to the contractor supplying required data to the relevant regional agency or agencies consistent with the Standards for Environmental Accounting. Accreditation of land management providers will also be dependent on a commitment to adherence to these Standards (section 4.1.1). These incentives will ensure the prioritisation of monitoring and reporting by land management providers.

Plenty of resources and potential exist for generating these Standards for Environmental Accounting today.[171] The Ecological Integrity Commission will aggregate and optimise existing schemes, and the requirement for all regions in NSW to generate environmental accounts will move such accounting from being a fringe activity to being the core role of land management.

The Standard for Environmental Accounts would also include a scaling standard to allow for the aggregation of regional data at the state level. This would allow for regional accounts to contribute to NSW environmental accounts, and perhaps a set of national environmental accounts. The eventual development of a set of national environmental accounts would finally allow us to track changes in our natural capital over time, just as financial balance sheets measure financial positions.[172]

4.1.3 A land management knowledge base

One of the many benefits of devolving management responsibility to NGOs is that many of them have their roots at the local level, allowing for a bottom-up approach to management, learning, and planning. The issues facing ecosystem management will be different in different areas, a fact that makes top-down planning and management inappropriate. There is no 'best practice' that will suit all circumstances. Rather, a diversity of practice is needed, supported by a learning approach to management. Knowledge generated by on-ground action may reduce uncertainties surrounding management practice, pertinent issues, and landscape function (the spirit and value of adaptive management; section 1.2.1).

A land management knowledge base would be set up within the Ecological Integrity Commission, such that knowledge generated from the bottom-up is consolidated in a central location available for uptake on a voluntary basis elsewhere. The land management knowledge base would serve as a:

- Practice repository – where land management practices are evaluated as to their effectiveness in delivering expected outcomes,
- Issues register – where issues and threats to ecological integrity are collated to allow for NGOs to assess where they may be able to deliver best value land management, and
- Think tank for conceptual models of landscape function – where models produced by regional agencies are compared and collaboratively revised over time.

Practice repository

The land management knowledge base will be responsible for collating lessons learned regarding effectiveness of management practice, including potential emerging or innovative practice. Project

[171] e.g. Australian Bureau of Statistics (2012), Bureau of Meteorology (2013).
[172] Further description of the benefits of environmental accounts and potential standards is given in Wentworth Group of Concerned Scientists (2008) and section 3.1 of this report.

proponents may consult the knowledge base when designing a project such that they can learn from other projects and capitalise on opportunities for innovation. Land management providers would be rewarded for submitting lessons learnt about practices that did not deliver stated outcomes such that other providers do not repeat a project unlikely to deliver results. Failure is thus a learning opportunity, rather than something shameful to be buried and forgotten.

Issues register

The land management knowledge base will also maintain an issues register to help project proponents identify local concerns and consider how their projects may be able to remedy multiple concerns across a landscape. It will also allow for insight as to how community concerns change over time and whether certain issues have resisted resolution by management and thus require alternative strategies.

Conceptual models of landscape function

As management is encouraged to focus on mitigating threats to desirable landscape functions, the land management knowledge base will maintain a register of working models of landscape function. Simple vector diagrams will suffice in many cases to help managers identify desired functions in their landscape, key determinants of these functions, threats to maintaining those determinants, and those actions most likely to be effective in mitigating these threats. Ongoing monitoring of management action will improve the understanding of the working model and allow for its revision over time, as well as indication of the validity of the model across landscapes

4.1.4 Independent, third-party audits

As discussed, all investment in protected areas and a large proportion of investment in off-reserve land flows to public agencies to deliver on-ground action on a recurring basis each year, regardless of effectiveness. While their performance has been audited on occasion, the audits have been ineffectual in bringing about improved performance. The reality is that funding continues to flow to these agencies regardless of audit findings.

In the proposed framework, non-government entities receiving land management contracts will be subjected to independent, third-party audits paid for by part of the public land management budget. Auditors will be looking for:

- Performance in achieving long-term outcomes,
- Evidence that land management providers are contributing to regional environmental accounts,
- Evidence that projects contribute to the land management knowledge base, regardless of whether or not long-term outcomes were achieved (this ensures contractors apply adaptive management and learn from investment regardless of success or failure in delivering expected outcomes),
- Evidence that the land management provider is addressing issues sourced from regional ecological integrity plans,
- Compliance with other conditions of accreditation, such as adherence to regulations, legislation, financial management, quality assurance, and so forth.

Audits will occur on a regular basis, and will be randomly allocated to an accredited auditor. Audit findings will be reported to the Ecological Integrity Commission, which will incorporate relevant information into the land management knowledge base and take the findings into account when awarding subsequent contracts. Independent third-party auditing is thus another way operators are held accountable for project outcomes, for contributing to environmental accounts. It also creates incentives for continually improving efficiency and effectiveness of their management.

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Terms of Reference of this report

1. To evaluate the current framework for land management in NSW. Relevant material includes, but is not limited to, legislation, official strategies, protected area management plans, and independent research out of academia or other research organisations. (Topic 1)
2. To analyse drivers of change that threaten conservation of ecological process and function, and discuss which are most relevant for NSW. This will include an analysis of drivers of change, and a discussion of what it means to conserve ecological process and function as opposed to natural assets. It will also include a discussion of WildCountry and its focus on ecological processes. The report will focus on management of these drivers of change (i.e. managing issues at the source) rather than on recovery of threatened species. (Topic 2)
3. To investigate alternative frameworks for land management. Private land management agencies such as Australian Wildlife Conservancy, Bush Heritage Australia, and Greening Australia will be consulted and profiles. Case studies from overseas may also be relevant, and a discussion of possible best practice may be appropriate. (Topic 3)
4. To consolidate the research into a vision for land management in NSW, with an investigation of how the vision may be expanded into a national framework. Discussions with TWS throughout the process of writing the report will determine whether the vision includes directions for potential campaigns. (Topic 4)
5. To include a reference list of all material consulted.