Australia's Biodiversity Conservation Strategy 2010–2030






Natural Resource Management Ministerial Council

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Prepared by the National Biodiversity Strategy Review Task Group convened under the Natural Resource Management Ministerial Council

For bibliographic purposes this publication may be cited as: Natural Resource Management Ministerial Council 2010, Australia's Biodiversity Conservation Strategy 2010-2030, Australian Government, Department of Sustainability, Environment, Water, Population and Communities, Canberra.

ISBN 978-0-9807427-2-5

The Department of Sustainability, Environment, Water, Population and Communities has prepared and edited this publication on behalf of the National Biodiversity Strategy Review Task Group convened under the Natural Resource Management Ministerial Council (NRMMC). The NRMMC consists of the Australian, state, territory and New Zealand government ministers responsible for primary industries, natural resources, environment and water policy.

Addresses of relevant government authorities may be found on the final page.

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Front cover images:

From top left to right: Yirralka Ranger, Dukpirri Marawili removing a ghost net at Yilpara Beach, Laynhapuy Indigenous Protected Area, Arnhem Land, NT (Photo: Jenifer Rahmoy, DSEWPaC 2006); View from Castle Hill in Townsville with burn off north of city (Photo: Mark Mohell and DSEWPaC); Orange-thighed frogs in the Wet Tropics of Queensland (Photo: Mike Trenerry); Bore site near Jimbour, Qld (Photo: Dragi Markovic and DSEWPaC); Rainforest hiker in the Wet Tropics of Queensland (Photo: Wet Tropics Management Authority – Qld)

Centre: Strzelecki National Park, Flinders Island, Tas (Photo: Nicole Middleton)

Bottom: Dampier Peninsula, WA (Photo: Nicole Middleton)

Back cover images:

From top left to right: Birds-nest ferns in the Wet Tropics of Queensland (Photo: Mike Trenerry); Yellow Water Lagoon, Kakadu National Park, NT (Photo: John Baker and DSEWPaC); Coral Gum near Murtho, SA (Photo: John Baker and DSEWPaC); Pelicans, Coorong National Park, SA (Photo: Bruce Gray and DSEWPaC); Wongarbon Nature Reserve, NSW (Photo: DSEWPaC)

Centre: Rainford's Butterfly fish, Qld (Photo: Robert Thorn and DSEWPaC)

Bottom: Multiple land use, Menglers Hill near Tanunda, Barossa Valley, SA
(Photo: John Baker and DSEWPaC)

Editing: Cullinan Communications Pty Ltd, Elanora Heights NSW 2101

Design: Design One Solutions, Hall ACT 2618

The publication was printed in Australia on recycled paper by Bluestar Print Group.

Ministerial Council foreword

In this year, the International Year of Biodiversity, it is worth remembering that our survival is critically dependent on looking after our natural environments and their biodiversity – the many different kinds of animals, plants and tiny microbes, and the ecosystems that support them.

This web of life represents our store of natural capital and from it we get the things we take for granted each day: the clean air we breathe, the fresh water we drink and the variety of foods and fibres that we consume.

We get artistic and spiritual inspiration from biodiversity, the sheer enjoyment of camping in the bush, snorkelling on the Great Barrier Reef and walking in our magnificent national parks.

But we also have a long legacy of loss of biodiversity and the services it provides, including from inappropriate land use, from the impact of introduced feral animals and weeds, and from altered fire regimes.

Much effort has gone into arresting the loss of biodiversity and conserving what is left; nevertheless, biodiversity continues to decline. Climate change is increasing the rate at which we are losing biodiversity by amplifying existing pressures and introducing new challenges. Loss of biodiversity will diminish the quality of our lives and the long-term prosperity of this nation, including the capacity to produce food and fibre. We need to take immediate and sustained action to conserve biodiversity.

Australia's Biodiversity Conservation Strategy 2010–2030 presents a long-term view of a future in which:

- the importance of biodiversity to our existence is recognised and, as a consequence, consumption patterns are balanced against the imperatives of the environment;
- all Australians including Indigenous peoples, farmers, land managers, industry, governments and community groups such as Landcare are working together to conserve biodiversity;
- we have reduced the impacts of existing threats such as invasive species so that their impact on biodiversity is negligible; and
- we have managed emerging threats such as changing fire regimes, reduction in water availability and the impacts of climate change to the extent that the threat to the environment is minimised and any damage is reversed.

The continued contribution from farmers (who manage over 60% of the Australian landscape), primary industries and community groups will be important in meeting this challenge. That is why one of the actions committed to is an increase in the use of markets and other incentives (such as environmental stewardship payments) for managing biodiversity and ecosystem services.

It is everyone's responsibility to conserve biodiversity. Governments will play a critical role, but unless the whole community works together to take up the challenge, then we are unlikely to stop the decline in biodiversity. This strategy is a call to action as well as a strategic document. It should be used to convey the urgency of the task and secure a future for Australia that maintains our quality of life and the long term health of our environment.

Border Ranges region, Kyogle, NSW (Photo: John Houldsworth and DSEWPaC)

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Emma Gorge, Kimberley, WA (Photo: Nicole Middleton)

Executive summary

Rainforest hikers in the Wet Tropics of Queensland

(Photo: Wet Tropics Management Authority - Qld)

Australia's Biodiversity Conservation Strategy 2010–2030 (referred to as 'the Strategy') is a guiding framework for conserving our nation's biodiversity over the coming decades.

The vision of this Strategy is that Australia's biodiversity is healthy and resilient to threats, and valued both in its own right and for its essential contribution to our existence.

Biodiversity, or *biological diversity*, is the variety of all life forms. There are three levels of biodiversity:

- genetic diversity—the variety of genetic information contained in individual plants, animals and micro-organisms
- species diversity—the variety of species
- ecosystem diversity—the variety of habitats, ecological communities and ecological processes.

Biodiversity occurs in all environments on Earth—terrestrial, aquatic and marine.

Biodiversity is not static; it is constantly changing. It can be increased by genetic change and evolutionary processes, and it can be reduced by threats which lead to population decline and extinction. Biodiversity in Australia is currently declining because of the impacts of a range of threats.

Conserving biodiversity is an essential part of safeguarding the biological life support systems on Earth. All living creatures, including humans, depend on these life support systems for the necessities of life. For example, we need oxygen to breathe, clean water to drink, fertile soil for food production and physical materials for shelter and fuel. These necessities can be described collectively as *ecosystem services*. They are fundamental to our physical, social, cultural and economic well-being.

Ecosystem services are produced by the functions that occur in healthy ecosystems. These functions are supported by biodiversity and its attributes, including the number of individuals and species, and their relative abundance, composition and interactions (see Figure 2, page 19). Ecosystem services can be divided into four groups:

- provisioning services (e.g. food, fibre, fuel, fresh water)
- cultural services (e.g. spiritual values, recreation and aesthetic values, knowledge systems)

Boardwalk construction, NT (Photo: Anindilyakwa Land and Sea Rangers and DSEWPaC)

- supporting services (e.g. primary production, habitat provision, nutrient cycling, atmospheric oxygen production, soil formation and retention)
- regulating services (e.g. pollination, seed dispersal, climate regulation, pest and disease regulation, water purification).

Ecosystem resilience is the capacity of an ecosystem to respond to changes and disturbances, yet retain its basic functions and structures. The resilience of ecosystems in Australia is currently being reduced by a number of threats, including:

- habitat loss, degradation and fragmentation
- invasive species
- unsustainable use and management of natural resources
- changes to the aquatic environment and water flows
- changing fire regimes
- climate change.

For ecosystems to be resilient to these and other threats, they need a healthy diversity of individuals, species and populations.

The Strategy is a guiding framework for biodiversity conservation over the coming decades for all sectors—government, business and the community. The Strategy sets out priorities which will direct our efforts to achieve healthy and resilient biodiversity and provide us with a basis for living sustainably.

This Strategy is divided into three sections:

» **Setting the context**

» **Priorities for action**

» **Implementation and action.**

The Setting the context section describes the crisis of biodiversity decline that we face, and outlines why we must change our current practices and adopt more sustainable economies and lifestyles. It also outlines developments from Australia's first biodiversity conservation strategy in 1996, *The National Strategy for the Conservation of Australia's Biological Diversity* (DEST 1996), to the present.

The Priorities for action section identifies three national priorities for action to help stop the decline in Australia's biodiversity. These priorities for action are:

1. Engaging all Australians in biodiversity conservation *through:*

- mainstreaming biodiversity
- increasing Indigenous engagement
- enhancing strategic investments and partnerships.

2. Building ecosystem resilience in a changing climate *by:*

- protecting diversity
- maintaining and re-establishing ecosystem functions
- reducing threats to biodiversity.

3. Getting measurable results *through:*

- improving and sharing knowledge
- delivering conservation initiatives efficiently
- implementing robust national monitoring, reporting and evaluation.

Revegetation work at Blacks Beach, Qld

(Photo: supplied courtesy Kerri Woodcock, Department of Environment and Resource Management, Queensland)

Each of the priorities for action is supported by subpriorities, outcomes, measurable targets and actions which collectively provide a strategic focus for our efforts.

The Implementation and action section provides detail on implementation and identifies a series of actions that will help to achieve our outcomes and targets. These actions will be variously carried out at national, state, regional and local levels. The actions are an indicative set, acknowledging that as we progress our biodiversity conservation efforts, we will need to adapt our approaches and develop new actions to help achieve our outcomes and targets. The section also sets out arrangements for monitoring and reporting on implementation of the Strategy, and evaluating the effectiveness of our efforts.

The Strategy functions as a policy 'umbrella' over other more specific national frameworks. These include:

- *National Framework for the Management and Monitoring of Australia's Native Vegetation* (NRMMC 1999)
- *The Australian Weeds Strategy* (NRMMC 2007a)
- *Australian Pest Animal Strategy* (NRMMC 2007b)
- *Australia's Strategy for the National Reserve System 2009–2030* (National Reserve System Task Group 2009).

It is also a guiding policy framework for the diverse mix of Australian, state, territory and local government and private sector approaches to biodiversity conservation.

Implementing this Strategy will involve updating existing programs and setting clear priorities for new investment to fill gaps and address emerging issues. Success will require increased integration of efforts within and between governments and between the public and private sectors. With this in mind, the first priority for action highlights the importance of engaging the private sector in conserving biodiversity and working with stakeholders who may be adversely affected by change.

The Natural Resource Management Ministerial Council (NRMMC) has overall responsibility for the Strategy and will monitor its implementation. The NRMMC will formally review the Strategy in 2015.

The Strategy contains 10 interim national targets for the first five years. All governments will continue to work in the early years of the Strategy to evaluate the suitability of these targets for progressing implementation to meet the three priorities for action.

In the 2015 review, NRMMC will assess progress in implementing the Strategy, including against the national targets. The review will also consider whether the targets or other elements of the Strategy should be amended.

The 10 national targets are as follows:

1. By 2015, achieve a 25% increase in the number of Australians and public and private organisations who participate in biodiversity conservation activities.
2. By 2015, achieve a 25% increase in employment and participation of Indigenous peoples in biodiversity conservation.
3. By 2015, achieve a doubling of the value of complementary markets for ecosystem services.
4. By 2015, achieve a national increase of 600,000 km^2 of native habitat managed primarily for biodiversity conservation across terrestrial, aquatic and marine environments.
5. By 2015, 1,000 km^2 of fragmented landscapes and aquatic systems are being restored to improve ecological connectivity.
6. By 2015, four collaborative continental-scale linkages are established and managed to improve ecological connectivity.
7. By 2015, reduce by at least 10% the impacts of invasive species on threatened species and ecological communities in terrestrial, aquatic and marine environments.
8. By 2015, nationally agreed science and knowledge priorities for biodiversity conservation are guiding research activities.
9. By 2015, all jurisdictions will review relevant legislation, policies and programs to maximise alignment with Australia's Biodiversity Conservation Strategy.
10. By 2015, establish a national long-term biodiversity monitoring and reporting system.

Introduction

The Strategy is a guiding framework for conserving our nation's biodiversity over the coming decades.

The vision of this Strategy is that Australia's biodiversity is healthy and resilient to threats, and valued both in its own right and for its essential contribution to our existence. The Strategy also contains a set of principles agreed by governments, which are listed on page 16.

This Introduction outlines the background to the Strategy and provides an overview of its contents.

Students checking on protected Blown Grass planted by their school at Spalding, SA

(Photo: Dragi Markovic and DSEWPaC)

What is biodiversity?

Biodiversity, or *biological diversity*, is the variety of all life forms. There are three levels of biodiversity:

- genetic diversity—the variety of genetic information contained in individual plants, animals and micro-organisms
- species diversity—the variety of species
- ecosystem diversity—the variety of habitats, ecological communities and ecological processes.

The three levels of biodiversity—genes, species and ecosystems—can also be described in terms of their *attributes* (see Figure 1). These are:

- *components*—the identity and variety of genes, species and ecosystems
- *patterns*—the spatial distribution of genes, species, habitats and other resources at a range of scales from small patches to landscapes. They include whether:
  - different forms of genes are distributed evenly throughout populations, landscapes and larger scales, or whether some groups of genes are becoming isolated
  - habitat is complex or simple in terms of the species, growth forms and non-living resources present
  - habitat is distributed evenly or unevenly, or is connected or disconnected throughout landscapes
- *processes*—ecological and evolutionary processes whereby genes, species and ecosystems interact with one another and with their environment.

Biodiversity occurs in all environments on Earth—terrestrial, aquatic and marine.

Biodiversity is not static; it is constantly changing. It can be increased by genetic change and evolutionary processes, and it can be reduced by threats which lead to population decline and extinction. Biodiversity in Australia is currently declining because of the impacts of a range of threats (Beeton et al. 2006).

Figure 1: The biodiversity hierarchy

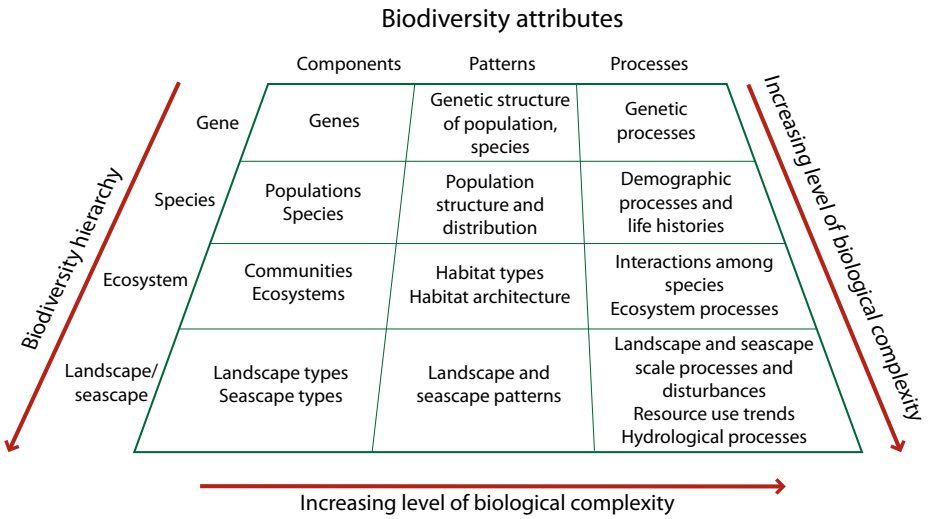

Figure 1 illustrates the attributes of the biodiversity hierarchy (adapted from Peck 1998).

Why is it important to conserve biodiversity?

Conserving biodiversity is an essential part of safeguarding the biological life support systems on Earth. All living creatures, including humans, depend on these systems for the necessities of life. For example, we need oxygen to breathe, clean water to drink, fertile soil for food production and physical materials for shelter and fuel. These necessities can be described collectively as *ecosystem services*. Figure 2 (see page 19), illustrates how biodiversity is linked, via ecosystem functions and services, to our physical, social and economic well-being.

If we continue to live unsustainably, we risk the degeneration of the ecological systems that support our life and our nation's productivity. We also risk eroding the legacy we leave future generations. Collectively we have a civic responsibility to help sustain our living planet. Conserving biodiversity is central to living sustainably.

Background to the Strategy

Biodiversity is under threat worldwide. Many scientists consider that the Earth has now entered a global biodiversity extinction crisis (UNEP 2007). That is, they believe that many of the species alive today are under threat of rapid extinction. In response to this crisis, as a nation we need to transform our management of biodiversity, by placing the conservation and sustainable use of Australia's biodiversity at the centre of our thoughts and actions.

A commitment to ecological sustainability is long entrenched in international and national policy and has been articulated extensively through the development of most of Australia's natural resource plans and legislation. Yet, to date these commitments have not succeeded in stopping the decline of biodiversity in Australia.

Structure of the Strategy

The Strategy applies across all sectors—government, business and the community. It sets out priorities which will direct our efforts to achieve healthy and resilient biodiversity and provide us with a basis for living sustainably.

This Strategy is divided into three sections:

» **Setting the context**

» **Priorities for action**

» **Implementation and action.**

The Setting the context section describes the crisis of biodiversity decline that we currently face, and outlines why we must change our current practices and adopt more sustainable economies and lifestyles. It also outlines developments from Australia's first biodiversity conservation strategy in 1996, *The National Strategy for the Conservation of Australia's Biological Diversity* (DEST 1996), to the present.

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Each of the priorities for action is supported by subpriorities, outcomes, measurable targets and actions which collectively provide a strategic focus for our efforts.

The Strategy contains 10 interim national targets for the first five years. All governments will continue to work in the early years of the Strategy to evaluate the suitability of these targets for progressing implementation to meet the three priorities for action.

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Honey Possum, Stirling Range National Park, WA

(Photo: Lochman Transparencies and DSEWPaC)

state, regional and local levels. The actions are an indicative set, acknowledging that as we progress our biodiversity conservation efforts, we will need to adapt our approaches and develop new actions to help achieve the Strategy's outcomes and targets. The section also sets out arrangements for monitoring and reporting on implementation of the Strategy, and evaluating the effectiveness of our efforts.

Five year targets to be achieved through the Strategy

The 10 national targets are as follows:

1. By 2015, achieve a 25% increase in the number of Australians and public and private organisations who participate in biodiversity conservation activities.
2. By 2015, achieve a 25% increase in employment and participation of Indigenous peoples in biodiversity conservation.
3. By 2015, achieve a doubling of the value of complementary markets for ecosystem services.
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8. By 2015, nationally agreed science and knowledge priorities for biodiversity conservation are guiding research activities.
9. By 2015, all jurisdictions will review relevant legislation, policies and programs to maximise alignment with Australia's Biodiversity Conservation Strategy.
10. By 2015, establish a national long-term biodiversity monitoring and reporting system.

Points to note

- Some technical terms are used in this document, but these are explained in the Glossary on page 83.
- The Appendices form an integral part of the Strategy and contain important information, in particular, the summary tables of targets and actions in Appendix 2.

Setting the context




Our vision

Australia's biodiversity is healthy and resilient to threats, and valued both in its own right and for its essential contribution to our existence.

This Strategy sets out ways to turn this vision into a reality.

Principles underpinning the Strategy

- We share the Earth with many other life forms that have intrinsic value and warrant our respect, whether or not they are of benefit to us.
- Biodiversity is best conserved by protecting existing natural habitats.
- Effective conservation of biodiversity operates at the landscape and seascape scale across public and private tenures.
- Natural ecosystems are dynamic but have a finite capacity to recover from external threats, impacts and pressures.
- Building resilience recognises the critical links between ecological and social systems.
- All Australians benefit from biodiversity; all Australians can and should contribute to its well-being.
- Our efforts to conserve biodiversity must acknowledge and respect the culture, values, innovations, practices and knowledge of Indigenous peoples.
- Knowing that our knowledge is limited, we should apply the precautionary principle while employing adaptive management approaches using new science and practical experience. The precautionary principle is that lack of full scientific certainty should not be used as a reason for postponing a measure to prevent degradation of the environment where there are threats of serious or irreversible environmental damage.

Photos on previous page from left to right

1. Plate and staghorn corals on Kelso Reef, Qld (Photo: Great Barrier Reef Marine Park Authority)
2. El Questro Gorge, Kimberley, WA (Photo: Nicole Middleton)
3. Mitchell Plateau, Kimberley, WA (Photo: Nicole Middleton)
4. Lotus flower (*Nelumbo nucifera*), Fogg Dam, NT (Photo: Nicole Middleton)

Call to action

Black-necked stork, Kakadu National Park, NT (Photo: Nicole Middleton)

Australia's biodiversity—the variety of plants, animals, micro-organisms and ecosystems that constitute our living environment—is in decline. Conservation efforts over past decades have resulted in improvements in some areas. Overall, however, the extent and condition of many species and ecosystems continue to deteriorate.

The pressures affecting Australia's biodiversity are not unique. Many scientists consider that the Earth has now entered a global biodiversity extinction crisis (UNEP 2007). Unlike past mass extinctions, the current crisis is considered to be the culmination of human impacts on the environment over the last several thousand years.

Human beings have transformed the global environment, including by:

- modifying the landscape
- using species in an unsustainable manner
- extracting natural resources
- moving species between environments.

We now know that these actions, while supporting the economic and social structures of modern human societies, have had serious and lasting impacts on virtually every species and ecosystem across the planet. We have altered our environment to the extent that we can no longer take for granted a future in which nature supports our physical, economic and social needs.

There are some paths of change which we will not be able to avoid entirely, but changes in human activity have the capacity to reverse many aspects of ecological decline.

We must, as a society and as individuals, acknowledge the threat to our biodiversity and act collectively to reverse the decline. This will require making some difficult decisions and changing how we interact with our environment. We need to consider biodiversity in our everyday actions. Governments and the private sector will need to put in place frameworks to make biodiversity central to their decision-making processes. Individuals should act to reduce their ecological footprints.

This Strategy guides action to conserve our natural biological wealth for current and future generations. It is adopted by Australia's governments and is for all Australians. Individually and collectively we have the capacity, and responsibility, to find ways of living in Australian environments without destroying the diversity of living things which also depend on them.

Australia's biodiversity is distinct, irreplaceable and under immediate threat

Australia's biodiversity has developed largely in isolation over many millions of years, making this continent one of the most biologically diverse parts of the planet. It is estimated that Australia is home to as many as 560,000 species. Many of these species are found nowhere else on Earth – about 92% of higher plant species, 87% of mammal species, 93% of reptiles, 94% of frogs and 45% of bird species found in Australia occur only here (Chapman 2009).

We share the Earth with many other life forms that should be conserved for their own sake as well as for being, to varying degrees, essential for our own existence. No matter how technologically advanced we consider ourselves to be, food, fibre, materials and energy from nature are the foundation of our livelihoods. We rely on the life-supporting ecosystem services that nature provides. These services include:

- production of oxygen
- soil formation and retention
- water and nutrient cycling
- climate regulation.

Natural environments also enrich our culture, sport and recreation, as well as our artistic and spiritual lives.

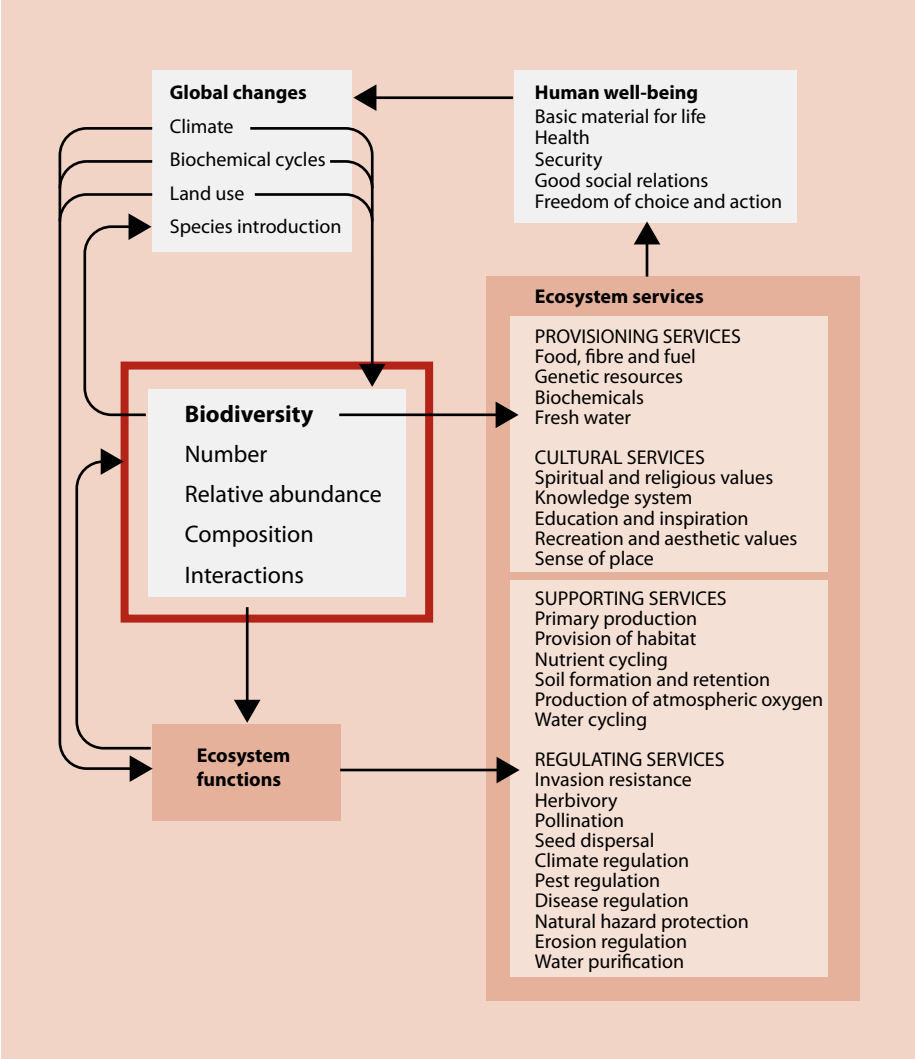
Figure 2 illustrates the many complex feedback loops operating between biodiversity and its components, ecosystem functions, ecosystem services and human well-being. Biodiversity plays a central role in the generation of ecosystem goods and services, which in turn support human well-being. Patterns of human activity in turn stimulate global changes (whether positive or negative), which impact on biodiversity and so on. Critically, however, biodiversity also drives global conditions, so biodiversity loss is likely, in time, to develop into a self-reinforcing pattern.

Society operates on the basis of a complex mix of values. One of the difficulties we face as a community is how to bring the value which we place on biodiversity and the environment into perspective alongside other values held by society, such as those which support economic growth.

Sustainable economic growth is a product of the wise use and management of natural and human resources, and we must promote actions to move our society to a sustainable basis, to conserve biodiversity and the productive capacity of Australian landscapes and seascapes.

In Australia, more than 1,700 species and ecological communities are known to be threatened and at risk of extinction (DSEWPaC 2010). These threatened species and communities are the tip of an ecological iceberg—for each species listed as threatened, there are many more affected by loss of habitat and other threats.

Figure 2: Overview of ecosystem services



Ecosystems and Human Well-being: Biodiversity Synthesis.
Source: Millennium Ecosystem Assessment 2005

The biodiversity which characterises Australia's environment is the product of environmental change including past climate change. Evolution, including loss of species and the emergence of new species, is the result of species and ecosystems responding, often over long time scales, to natural cycles and phenomena.

The inherent capacity of living things to continue to survive and adapt to a range of conditions (their *resilience*) depends on factors such as genetic diversity and opportunities for groups of species to form and re-form as conditions change. The way in which Australia manages its terrestrial, aquatic and marine ecosystems directly impacts on the underlying capacity of biodiversity to be resilient to threats.

Tasmanian Waratah
(Photo: Nicole Middleton)

Australia's biodiversity is vulnerable to climate change

The global climate is changing rapidly. Climate change magnifies existing threats, for example by potentially increasing the distribution and abundance of introduced plants and pest animals already present in Australia. It is also likely to bring with it new threats, including long-term changes in rainfall and temperature patterns, rising sea levels, and changes to the frequency and severity of extreme events like fires, floods and droughts. These changes bring a high risk of an accelerating wave of extinctions and disruptions to ecological processes throughout the 21st century and beyond.

Two major ways we can improve the chances of a reasonable future for biodiversity are by:

- rapidly and effectively reducing human-induced elements of climate change
- adapting the way we manage biodiversity to meet existing and new threats. This adaptation will need to include new approaches to maintain and restore the resilience of our terrestrial, aquatic and marine ecosystems.

Many of our most valued and iconic natural places are at risk as our climate changes (IPCC 2007). Without appropriate adaptive management to maintain and restore ecological processes, we may lose the biodiversity that underpins much of our economic wealth—including from agriculture, forestry and tourism—and our national identity.

We must accelerate action to address biodiversity decline

We live in a time of increasing change, with a future of unprecedented challenges for humanity and our environment. We understand, at a global and national level, that issues such as food, water and energy security, and human health and welfare are inextricably linked to biodiversity. Yet in many areas, degradation of our environment continues to the extent that many ecosystems are increasingly vulnerable to collapse.

Existing long-term pressures on biodiversity continue to be the main causes of biodiversity loss, but climate change will magnify the impact of these threats and directly threaten some species and ecological communities. It will be impossible to prevent species and ecosystems from responding to change and it is likely that we will lose some of the biodiversity that we value highly. To help species survive we need to reduce the impacts of existing threats now, and respond to new threats as they emerge. We need to ensure that species have large areas of linked habitat, in many different environments across all landscapes, along the coasts and in the oceans. Achieving landscape scale change will require working with the public and private sectors across a range of tenures.

This Strategy sets priorities for action to meet the challenge

The choices we make now will determine what opportunities we have available in the future. We must act on the understanding that the impacts of biodiversity decline need to be addressed at all levels, and must be at the very core of our policy agendas and public debates.

Action now can help our native species and ecosystems adapt to change, and position us to minimise the overall loss of genetic, species and ecosystem diversity. In the face of accelerating change, the efforts we invest now in ecological sustainability may be the key to our own survival as a species.

We need to take decisive actions that are focused on achieving our highest and most pressing priorities for the environment we want to leave to coming generations. We need to continue building partnerships with the private and primary industries' sectors, in particular farmers and land managers, to strengthen our existing efforts, and to continually look for new evidence-based approaches that can better integrate the importance of biodiversity into the day-to-day functioning of all sectors of society.

This Strategy sets national directions and targets for biodiversity conservation over the coming decades. It aims to guide us in living sustainably and nurturing the natural systems that support our lives and our nation's productivity.

Business as usual is no longer an option.

Waves, sand dunes and vegetation on the South Coast, NSW (Photo: Tony Karacsonyi and DSEWPaC)

Summit of Bluff Knoll, Stirling Range National Park, WA

(Photo: Lochman Transparencies and DSEWPaC)

Main threats to Australia's biodiversity

The main threats to Australia's biodiversity were identified in the following reports:

- *A National Approach to Biodiversity Decline* (Biodiversity Decline Working Group 2005)
- *Australia State of the Environment 2006* (Beeton et al. 2006)
- *A National Approach to Addressing Marine Biodiversity Decline* (Marine Biodiversity Decline Working Group 2008)
- *Australia's biodiversity and climate change: a strategic assessment of the vulnerability of Australia's biodiversity to climate change* (Steffen et al. 2009).

These threats are:

- habitat loss, degradation and fragmentation
- invasive species
- unsustainable use and management of natural resources
- changes to the aquatic environment and water flows
- changing fire regimes
- climate change.

Each of these threats to biodiversity is discussed in turn below.

The three priorities for action in this Strategy: Engaging all Australians; Building ecosystem resilience in a changing climate; and Getting measurable results are all aimed at addressing and reducing the impacts of the threats listed above.

Habitat loss, degradation and fragmentation

Plant and animal species are less resilient to external pressures when the ecological communities of which they are a part shrink, or when populations become isolated from each other. Habitat loss and fragmentation affect the well-being and survival of individual populations as well as entire species, and in time may affect the functioning of entire ecosystems.

Direct causes of habitat loss, degradation and fragmentation include clearing of native vegetation and pollution of waterways and marine areas. These activities are regulated by laws in all Australian jurisdictions.

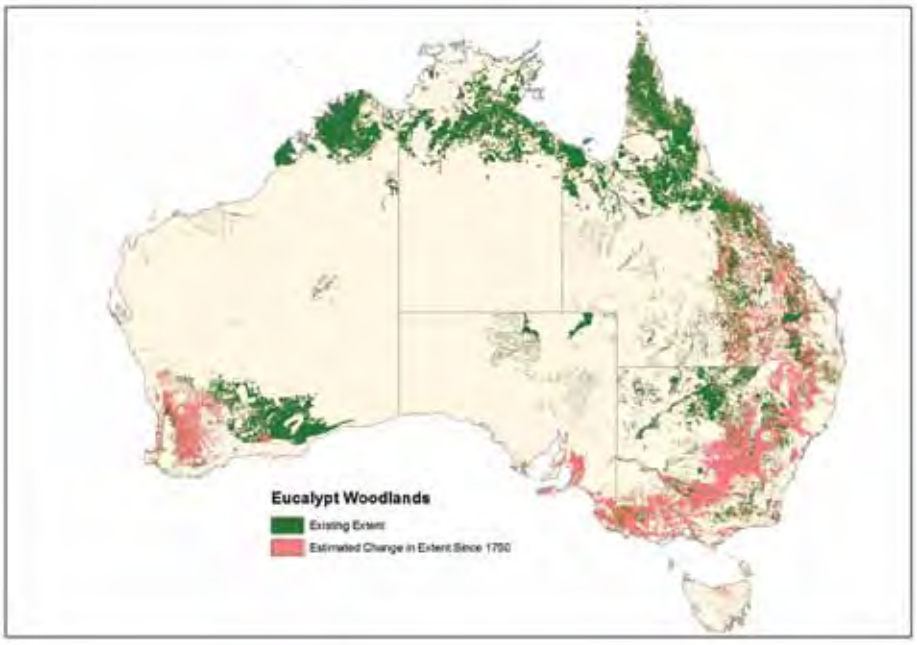
However, additional complementary approaches, emphasising ecosystem-scale planning and incentives to actively manage for habitat values, are also needed. These approaches can reduce the cumulative effects of human activities such as smaller-scale loss of vegetation, degradation of habitat remnants, nutrient runoff and marine debris.

The underlying drivers of habitat loss cut across all sectors of society and the economy. These include:

- lack of recognition of the value of biodiversity and ecosystem services
- lack of recognition of the cumulative and indirect effects of activities on biodiversity and ecosystem services
- the perceived cost of activities to maintain and restore habitat quality
- economic and social pressures and incentives to clear or degrade habitat areas.

Given the key importance of habitat protection to biodiversity conservation, most of the outcomes, targets and activities in this Strategy relate in some way to reducing the negative impacts of human activities on habitat areas. Figure 3 shows an overview of the impact of clearing on one major vegetation group since 1750. Eucalypt woodland is the most extensively cleared and modified vegetation type in Australia, particularly in the main eastern and south-western agricultural zones. In many areas, only small isolated fragments remain and it will be essential to promote conservation

Figure 3: Eucalypt woodlands showing estimated change since 1750



Source: National Vegetation Information System, 2005 update.

across land tenures to ensure the survival of these remnants, to maintain ecological connectivity in the landscape, and to protect the biodiversity they maintain (see Figure 4).

Figure 4: Conceptual spatial planning for terrestrial connectivity conservation

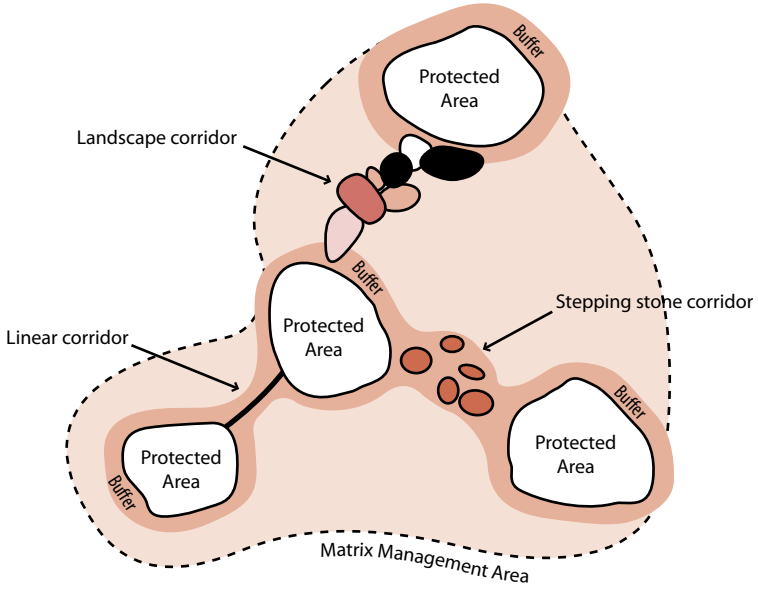


Figure 4 illustrates the way in which connectivity is not just about corridors. It includes both small patches and larger distinct areas, including core protected areas: areas managed for conservation, the broader landscape in which these areas exist, and remnant native vegetation outside reserves (which provides habitat and serves as stepping stones and linear corridors to aid the movement of species). It also involves the use of sustainable land management practices in areas adjacent to dedicated conservation areas, to create a 'landscape matrix'. Source: Mackey et al. 2009.

Invasive species

An invasive species is one occurring beyond its accepted normal distribution and which threatens valued environmental, agricultural, marine or social resources by the damage it causes.

Invasive species include weeds, pest animals, insects and other invertebrates, marine pests and disease-causing organisms. They cause biodiversity loss in many ways, including through:

- competition with native species for food and habitat
- predation
- disease impacts
- alteration of the physical environment in ways that exclude native species.

Potential threats are associated with the introduction of organisms resulting from biotechnology and other new techniques used in plant and animal breeding (e.g. genetically modified organisms). These also require ongoing, scientifically-based management.

Management of invasive species focuses on reducing their impacts as cost effectively as possible and on preventing new incursions. While Australia has good systems for managing pests and disease in primary production industries, there is potential to improve arrangements for managing invasive species that have environmental and social impacts.

The Australian, state and territory governments are developing a framework of common principles and guidelines to enable biosecurity arrangements to be applied consistently across Australia. The framework is being informed by *One Biosecurity: a working partnership, The Independent Review of Australia's Quarantine and Biosecurity Arrangements Report to the Australian Government* (Beale et al. 2008). The aim is to bring together all biosecurity activities being undertaken by the Australian Government, state and territory governments, industry, landholders and other key stakeholders in primary production and the environment. The framework will cover all invasive plants, animals and diseases of terrestrial, aquatic and marine environments that could be harmful to primary industries, the natural and built environments, and biodiversity.

Actions to control invasive species that have already entered the country are also dealt with in detail under *The Australian Weeds Strategy* (NRMMC 2007a) and the *Australian Pest Animal Strategy* (NRMMC 2007b).

This Strategy provides an overarching policy framework for these more detailed national approaches to the management of invasive species.

Mustering goats in the Flinders Ranges National Park, SA

(Photo: Peter Watkins, SA Department for Environment and Heritage)

Unsustainable use and management of natural resources

Australia's per capita ecological footprint (a measure of our individual impacts on the environment through our consumption of natural resources) is one of the largest in the world. Our key challenge is to manage and use resources in a sustainable way, particularly as our population is projected to continue to grow significantly over the coming decades (ABS 2008). In particular, the management of natural resources on agricultural land makes an important contribution to biodiversity conservation. Partnerships with farmers and land managers will be important in meeting this challenge as this sector is responsible for managing over 60% of the Australian landscape.

The state of biodiversity directly influences, and is influenced by, the mix and level of ecosystem services generated within a landscape (see Figure 2). Ecosystem services, including clean air, clean water and productive soils, depend on the condition of biodiversity and the health of ecosystems. Conversely, overuse or over-extraction of natural resources can lead directly to loss of biodiversity and a collapse in ecosystem services. The geographical distribution of threatened species in Australia largely coincides with the pattern of human settlement and resource use since Europeans arrived in Australia (Figure 5). Likewise, pressures on marine species are strongly associated with patterns of commercial and recreational resource use.

Figure 5: Geographical distribution of threatened species

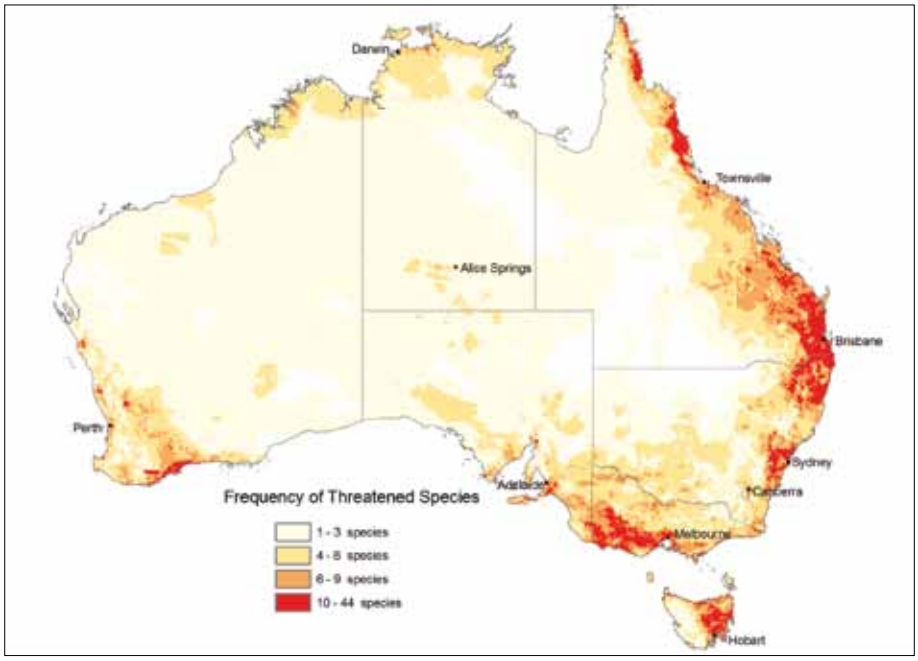


Figure 5 shows the distribution of species listed as threatened under the *Environment Protection and Biodiversity Conservation Act 1999.* Source: Species profile and threats (SPRAT) database, DEWHA, compiled 2010.

Human beings influence energy, water and nutrient cycles directly, for example when we consume fuel for transport and heating, and also indirectly, for example by using consumer goods, the production of which has used energy and physical materials. Ecologically sustainable living depends on finding new approaches to resource use and technology that will align our consumption patterns with the Earth's capacity to generate resources, and the Earth's capacity to assimilate the waste from our activities.

Changes to the aquatic environment and water flows

Waterways and wetlands are a critical part of our natural environment. They provide habitats for many species, reduce the impacts of floods, absorb pollutants and improve water quality. Biodiversity in aquatic ecosystems within Australia and in its surrounding marine areas is threatened by human activities which affect natural patterns of wetting and drying, the frequency and magnitude of floods, water quality, and the condition of habitats fringing rivers and streams.

In order to address many of the activities which have powerful cumulative impacts on aquatic ecosystems, we need to integrate approaches to natural resource management and develop landscape and seascape scale strategies. To do this effectively we must focus on improving the way we consider interrelationships between terrestrial, aquatic and marine ecosystems in our management and planning decisions.

Systematic approaches to conservation planning will be the key to managing impacts which are cumulative or dispersed. These impacts include pollution, including from sewage inflows, livestock grazing along watercourses, excessive applications of fertilisers and pesticides, vegetation clearance, gully and stream-bank erosion, major water-supply reservoirs and farm dams,

Black swans in the wetlands, Barilla Bay, Tas (Photo: Nick Rains and DSEWPaC)

alteration of flows by urban development, and regulation of waterways to control flooding or to provide water for irrigation. Water pollution also affects the marine environment where land-based discharges may impact on oceanic ecosystems, disrupting breeding cycles and poisoning habitats.

Aquatic habitats are also challenged by recent changes in the climate, such as the prolonged drought in south-east Australia. The decreasing availability of water also requires us to rethink the allocation of water between different uses. The provision of adequate water to maintain environmental flows in our creeks, rivers and wetlands is an ongoing challenge.

Changing fire regimes

Fire, or its absence, has directly influenced the evolution of the Australian landscape. Many native plant species, including eucalypts and acacias, have evolved in fire-prone environments and are dependent to various degrees on fire events to maintain ecological cycles. In contrast, rainforest ecosystems developed in the absence of fire and are highly vulnerable when changed conditions such as prolonged drought increase their susceptibility to fire. The effect of fire on the ecology of the landscape is mostly shaped by fire regimes—the pattern of fires, including their extent, seasonality, frequency, intensity, and patchiness—and, to a lesser extent, by individual fire events.

Humans have been using fire to manage the landscape for tens of thousands of years. Although fire is important to many ecosystems, poorly managed fire regimes can impact on biodiversity and ecosystem services through the destruction of native plant communities and animal populations, increased

Fire management in the Laynhapuy Indigenous Protected Area, NT
(Photo: Yirralka Rangers and DSEWPaC)

soil erosion, expansion of weed and feral animal populations, reduced water quality and increased soil salinity. Individual species and ecosystems are sensitive to different aspects of a fire regime.

Different land management goals such as improving pastoral productivity, protecting ecosystem health, and protecting human life and property from wildfire, may be best achieved under different fire regimes. Climate change will change the nature of fire risk and increase the need to have effective fire management regimes to protect people and property in a way that recognises the role of fire in biodiversity management. To address this threat, our understanding of fire regimes will need to increase and be incorporated into land management decisions, and biodiversity considerations will need to be incorporated into fire management plans.

Climate change

Australia's climate is changing. Average and extreme (high and low) temperatures across the continent are rising, patterns of precipitation are changing, and extreme weather events, including droughts, high fire-danger weather and tropical cyclones, are predicted to increase in frequency and intensity. Changes in climate are also expected to lead to ocean warming and sea level rise (CSIRO 2007).

Biodiversity is one of the sectors most vulnerable to climate change. The scale, rate and nature of projected climate change, and the unpredictable interactions between climate change and other factors that cause stress to ecosystems, have the potential to overwhelm the capacity of current ecosystems to adapt. Environments will change; groupings of species will

Banana plantation in Innisfail, Queensland decimated by Tropical Cyclone Larry, 2006
(Photo: Jim Davidson, Bureau of Metereology) Copyright: Commonwealth of Australia

Close-up of bleached Acropora corals on Keppel Island Reefs, Qld
(Photo: courtesy of Great Barrier Reef Marine Park Authority)

form and re-form in response to changed conditions; some species will be lost and others will not persist in their current locations. Changes in species' distributions and some ecosystems have already been detected (Steffen et al. 2009).

Traditional approaches to biodiversity conservation need to be rethought. Planning approaches that include managing for uncertainty will be critical, with greater emphasis on risk management and adaptive management approaches. These must be based on high-quality information, monitoring and experimentation.

Strategies that will both minimise the impact of and promote adaptation to change are needed. Efforts to prevent or reduce the release of greenhouse gases into the atmosphere will need to include protection of natural ecosystems—especially primary forests, wetlands and peatlands—and recovery of carbon stores through revegetation. Building resilience will be the key to ensuring that natural systems have the capacity to adapt to shifting climatic conditions. Addressing the full range of threats to biodiversity, securing critical intact habitats, restoring habitat connectivity through rehabilitation and revegetation on private land, and linking core terrestrial, aquatic and marine protected areas (MPAs), will all be critical to ensuring species' resilience and to maintaining ecological processes and systems.

Botanic gardens, zoos, seed banks and gene banks will have an increasing role to play in ex situ conservation strategies for species that may not be able to survive in the wild. Although it is a last resort, for some species ex situ conservation may be the only means of survival in the short to medium term.

Development of this Strategy—what we have learnt

Arid Recovery Reserve after rain

(Photo: H. McGregor)

Australia ratified the United Nations *Convention on Biological Diversity* (CBD) in 1993, the year in which it entered into force. In response to the CBD, Australian governments developed *The National Strategy for the Conservation of Australia's Biological Diversity* (1996 Strategy, DEST 1996). It was the first biodiversity strategy to be developed in Australia, providing a national approach to biodiversity conservation from 1996 to 2009.

Over the past 15 years, all Australian governments have invested considerably in the development and implementation of biodiversity conservation policies and programs. Many landholders, non-government organisations, businesses and individuals have also invested considerable time and effort to protect biodiversity. Many important lessons have been learnt from these conservation efforts, and there have also been significant advances in biodiversity conservation thinking and science since the first national biodiversity strategy was developed.

In 2001, the first five-year review of the 1996 Strategy found that advances had been made in biodiversity conservation in Australia. The review, however, found it difficult to objectively measure performance against the qualitative objectives in the strategy. The *National Objectives and Targets for Biodiversity Conservation 2001–2005* (National Objectives and Targets, DEH 2001) were produced in an effort to set time-bound objectives and targets for biodiversity conservation across the nation. They were not, however, agreed to by all jurisdictions.

The 1996 Strategy helped to drive the development of new policies, programs and legislation to regulate threats to biodiversity. The Australian, state and territory, and local governments, and public and private sector organisations subsequently developed a range of biodiversity policies and approaches for their own purposes. In parallel, the decade of Landcare encouraged greater awareness, understanding and action by land managers to improve environmental management in farming.

In 2006, the National Biodiversity Strategy Review Task Group was established by the NRMMC to review both the 1996 Strategy and the National Objectives and Targets. The review looked at alignment between the 1996 Strategy and relevant state, territory and industry strategies and identified the key lessons from the implementation of the 1996 Strategy and the National Objectives and Targets.

This 2006 review also found the following:

- Much of the 1996 Strategy is still relevant to the development of national biodiversity conservation policy.
- There was a high level of consistency between national biodiversity policy (the 1996 Strategy and the National Objectives and Targets) and state and territory biodiversity strategies, at the level of overarching goals. The National Objectives and Targets are a useful record of national biodiversity conservation priorities and policy directions in 2001 but they were not nationally implemented because of the lack of agreement to the specific targets.
- Public awareness of the 1996 Strategy and the National Objectives and Targets was low.
- The increasing focus on managing biodiversity within the landscape or regional context, and on whole-of-ecosystem management, was not captured by the 1996 Strategy or the National Objectives and Targets.
- The vulnerability of biodiversity to rapid climate change creates a need for new approaches.
- A revised strategy should contain measurable targets.

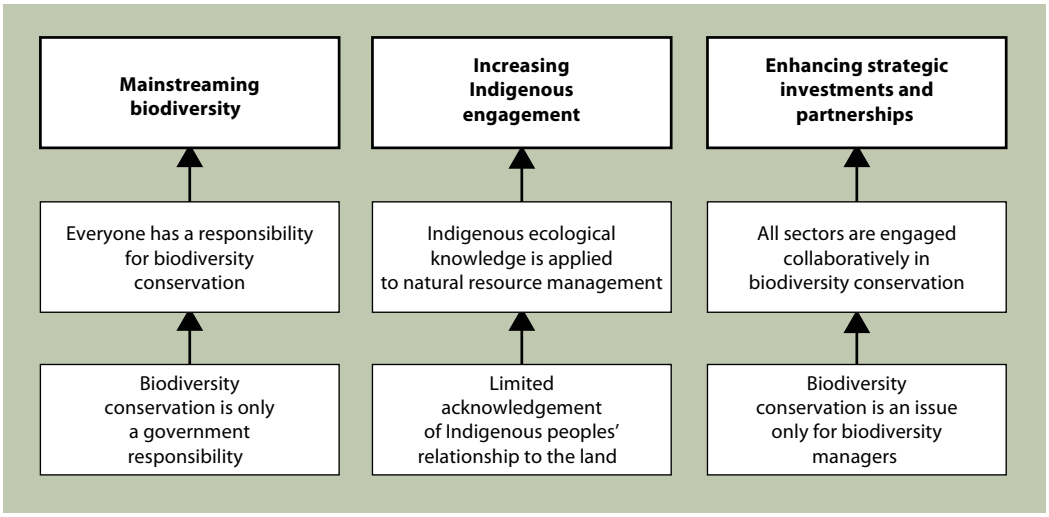
The NRMMC also initiated investigations into the underlying causes of terrestrial and marine biodiversity decline in Australia (Biodiversity Decline Working Group 2005; Marine Biodiversity Decline Working Group 2008). These investigations identified significant threats that drive biodiversity loss and analysed issues related to the design of policy and programs to address these threats. The findings, together with the most recent state of the environment report (Beeton et al. 2006), and the recent report on the vulnerability of Australia's biodiversity to climate change (Steffen et al. 2009) have informed the development of this Strategy.

The goal of the 1996 Strategy—to protect biological diversity and maintain ecological processes and systems—is as relevant today as it was then. There have, however, been significant developments in the policy environment during the life of the 1996 Strategy. Figure 6 illustrates shifts in ways of thinking and approaches to environmental management that are needed for us to achieve biodiversity conservation goals.

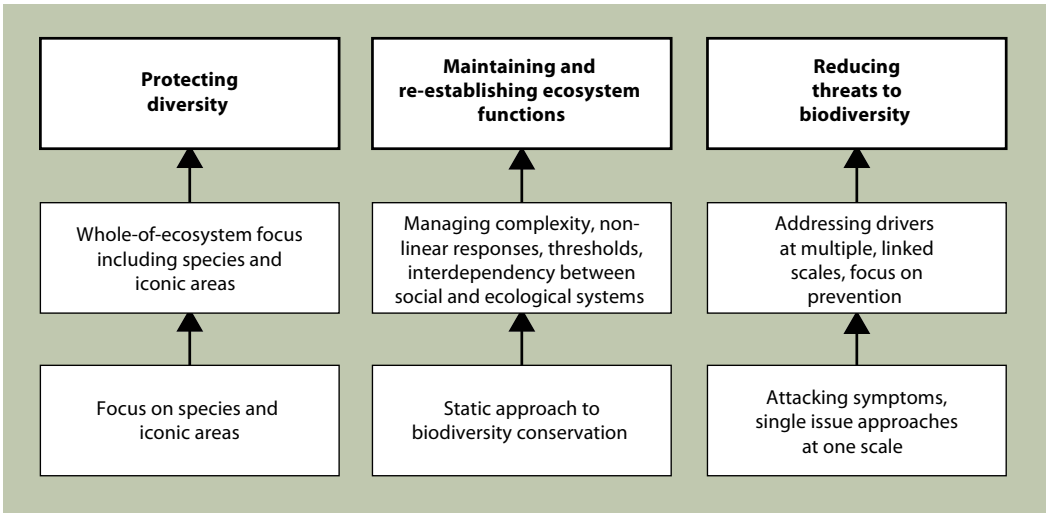
The new Strategy has been structured around three priorities for action and nine subpriorities, which mirror these shifts in approach. Experience and research since 1996 has highlighted the importance of these key aspects of the biodiversity conservation framework. To achieve the aims set out in this Strategy, however, shifts in behaviour need to be accelerated. This new Strategy also contains 10 measurable national targets for 2015.

Figure 6: Shifts in approaches to biodiversity conservation

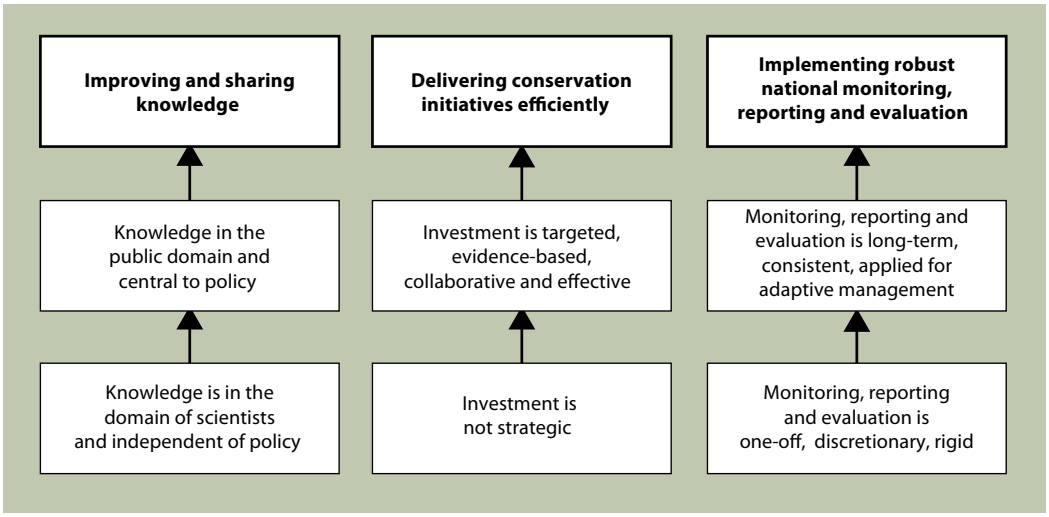
Area for change: Engaging all Australians (Priority for action 1)



Area for change: Building ecosystem resilience in a changing climate (Priority for action 2)



Area for change: Getting measurable results (Priority for action 3)



The practical lessons of fifteen years of biodiversity conservation activity have influenced this Strategy. As a result, it focuses on improving the effectiveness with which government and community activities target threats to biodiversity. For example, this Strategy emphasises:

- acting at the right scale
- aiming for complementary management within and outside protected areas
- using a mix of complementary legislative and incentive mechanisms to address specific behaviours
- developing management approaches that promote the sustainable use of biological resources
- the need for national measurable targets agreed to by all Australian, state and territory governments.

This Strategy also builds on the increased involvement of communities in biodiversity conservation. This has taken place as our thinking in relation to community engagement, engagement of Indigenous peoples, and partnerships in general has evolved.

The efforts of each jurisdiction, businesses and the community to date have injected biodiversity conservation into broader environmental management issues. They have also served to focus attention on the trade-offs commonly made between economic development and environmental protection.

This Strategy builds on the lessons learnt since 1996, but also recognises that there is scope to:

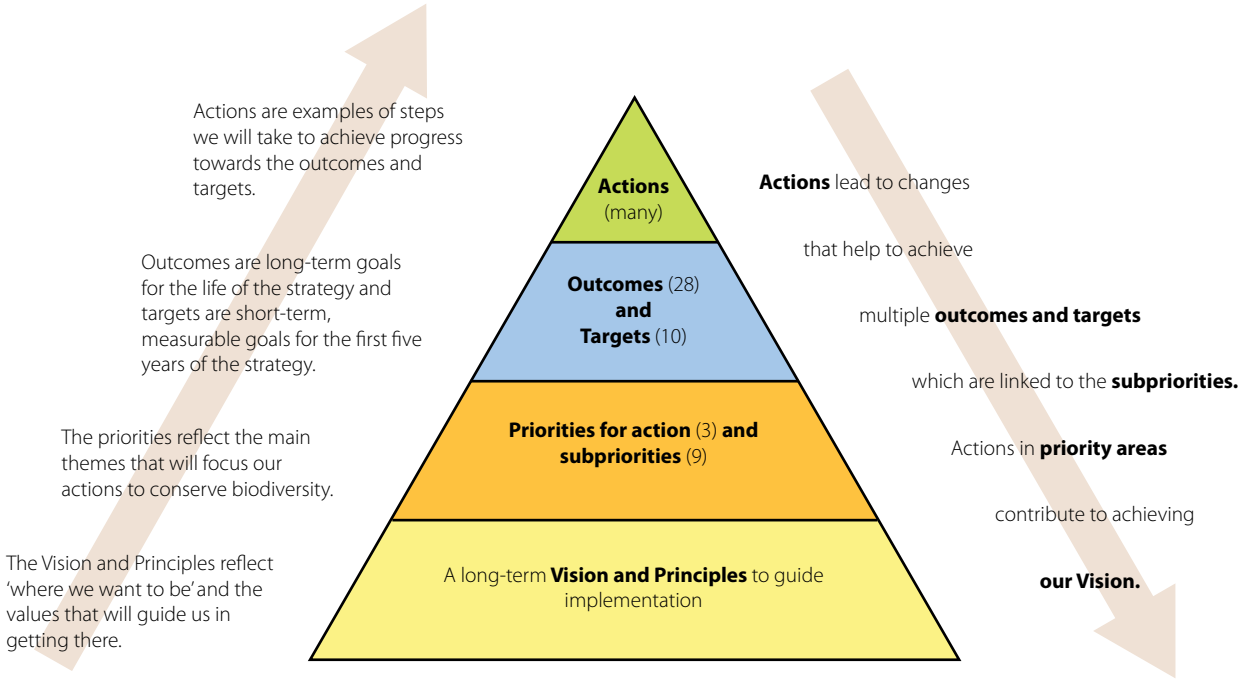
- improve coordination of efforts to prevent harm before degradation of biodiversity occurs
- strengthen our understanding of biodiversity, ecosystems and ecosystem services
- continue to address knowledge gaps in a strategic manner.

In short, this Strategy aims to better position us to restore and conserve Australia's wealth of biodiversity.

Priorities for action




Structure of *Australia's Biodiversity Conservation Strategy 2010–2030*



Photos on previous page from left to right

1. Arid Recovery staff and Green Corps volunteers building the reserve fence, SA (Photo: courtesy BHP Billiton Olympic Dam)
2. Discussing the importance of land management practices near Jimbour, Qld (Photo: Dragi Markovic and DSEWPaC)
3. Clearing of weeds by Nyambaga Indigenous Green Team, Congarinni, NSW (Photo: Dragi Markovic and DSEWPaC)
4. The Thrombolite (microbialite) community of Lake Clifton, WA (Photo: courtesy of westaust.net)

The Strategy's timeframe

Australia State of the Environment 2006 (Beeton et al. 2006) identified the need for 'reform in governance to move away from short-term and sectoral management towards a more systematic, integrated and planned approach to monitoring and managing' in all environmental sectors. The twenty-year timeframe of the Strategy addresses this need. It encourages long-term planning and investment in conservation and recovery of biodiversity. Twenty years is also a practical timeframe over which to record and evaluate the results of conservation efforts.

Within this long-term perspective, we need to ensure that we give urgent attention to the issues that are most pressing. We will review our progress against the targets in the Strategy every five years, and adapt our priorities and responses to reflect new information as our understanding and practical experience increases.

Priorities for action

This Strategy is designed to guide all Australian biodiversity strategies and policies, including those of the Australian, state and territory governments, and the private sector, that address specific aspects of biodiversity conservation. This section of the Strategy provides that guidance by defining three priorities for action. Each priority for action has three subpriorities.

Together, the nine subpriorities reflect the critical components of change needed in the way that Australians view, understand and approach biodiversity issues. They identify the key areas on which we must focus effort if we are to maintain the functioning of ecosystems and the many ecosystem services provided by our environment.

Victorian Environment Officer inspecting tree plantings in dry forest area, Anglesea

(Photo: John Baker and DSEWPaC)

Outcomes and national five-year targets are identified within each subpriority. These outcomes and targets will be the basis on which jurisdictions plan their conservation activities.

More detail on implementation arrangements is in the Implementation and action section, which details indicative actions directed at achieving the outcomes and national targets. It also outlines broad expectations for all levels of government and key industry and community sectors in the implementation of the Strategy. The specific mix of actions that will be needed to achieve progress towards the outcomes and targets will vary between regions, industries and jurisdictions depending on local circumstances, challenges and opportunities. The Strategy also recognises that, over time, new actions are likely to be identified to help achieve its aims. The set of indicative actions in the Strategy will be a guide to help align activity nationally. It is intended this process will facilitate innovation while not restricting jurisdictions to a 'one size fits all' approach. Where appropriate, the actions to implement this Strategy should be considered in conjunction with other relevant national, state and territory documents (listed in Appendix 4).

Outcomes, actions and targets are grouped by subpriority. Actions can help achieve progress towards a number of outcomes and targets and so are not mapped to specific outcomes or targets.

Appendix 2 lists the priorities for action, subpriorities, outcomes, targets and indicative actions.

Namadgi National Park, ACT (Photo: Nicole Middleton)

Priority for action 1: Engaging all Australians

Biodiversity is essential for our own existence and that of the other species with which we share our continent. Our actions impact on biodiversity every day. All Australians—the public, businesses, Indigenous peoples, private landholders, non-government organisations and all levels of government—must take responsibility for biodiversity conservation.

Engaging all Australians is fundamental if we are to succeed in building ecosystem resilience in a changing climate.

The three subpriorities under Engaging all Australians are explained in turn below.

Subpriorities

1.1 Mainstreaming biodiversity

1.2 Increasing Indigenous engagement

1.3 Enhancing strategic investments and partnerships

1.1 Mainstreaming biodiversity

Mainstreaming biodiversity means integrating biodiversity into decision making so that it becomes everyone's business and is part of every relevant transaction, cost and decision. Demonstrating the multiple benefits of biodiversity is fundamental to engaging all Australians in biodiversity conservation.

Industries that have direct impacts (both positive and negative) on biodiversity (e.g. the agriculture, fishing, forestry, mining and construction sectors) or indirect impacts (e.g. the financial services sector) need to incorporate consideration of biodiversity into their decision-making processes, management activities and reporting. Many industries already do.

Mainstreaming biodiversity requires a transformation in the way most Australians think about and value biodiversity. However, biodiversity is a term that is poorly understood and communicated. Improving public awareness and understanding of biodiversity and its multiple benefits is therefore an important and ongoing ingredient in making the subject mainstream.

To ensure that mainstreaming actually happens in practice, we need to build on current activities and boost effective participation. We need all sectors of primary industries and the community to engage in biodiversity conservation efforts that are relevant to their region.

Outcomes for mainstreaming biodiversity

1.1.1 An increase in public awareness of biodiversity

1.1.2 An increase in public participation in conservation activities

1.1.3 An increase in participation by the private and primary industries sector in biodiversity conservation

1.1.4 An increase in the cross-sectoral integration of biodiversity conservation in public and private sector planning and management

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Target 1: By 2015, achieve a 25% increase in the number of Australians and public and private organisations who participate in biodiversity conservation activities.

1.2 Increasing Indigenous engagement

Indigenous peoples play a significant role in biodiversity conservation in Australia. Increasing engagement through employment, partnership and participation and through the two-way transfer of knowledge will not only lead to improved opportunities for Indigenous peoples but also to improved outcomes for biodiversity.

Indigenous peoples hold title over a large and increasing proportion of Australia's lands and waters. Currently, 20% of the land area of Australia is under Indigenous management, including 23% of the National Reserve System (NRS).

Increasing Indigenous engagement means not only acknowledging Indigenous ecological knowledge but actively supporting its maintenance and use. It also means partnering with Indigenous peoples and supporting Indigenous employment and participation opportunities in biodiversity conservation wherever possible.

Indigenous peoples have a special connection and relationship with Australia's natural environments. Accordingly, the important role of Indigenous traditional ecological knowledge in conserving Australia's biodiversity needs to be more actively promoted to other biodiversity managers. This transfer of knowledge needs to be two-way—it is also important that Indigenous peoples have access to scientific knowledge and best practice for natural resource management. In addition, traditional ecological knowledge is continually evolving and Indigenous peoples need support for the recording, ongoing development and intergenerational transfer of Indigenous knowledge.

Many Indigenous communities remain socio-economically disadvantaged with few employment opportunities, especially in remote areas. Environmental management and biodiversity conservation can provide significant opportunities for employment, for maintaining culture and for raising living standards in Indigenous communities.

Outcomes for increasing Indigenous engagement

1.2.1 An increase in the employment and participation of Indigenous peoples in biodiversity conservation activities

1.2.2 An increase in the use of Indigenous knowledge in biodiversity conservation decision making

1.2.3 An increase in the extent of land managed by Indigenous peoples for biodiversity conservation

T

Target 2: By 2015, achieve a 25% increase in employment and participation of Indigenous peoples in biodiversity conservation.

Yirralka Ranger, Dukpirri Marawili removing a ghost net at Yilpara Beach, Laynhapuy Indigenous Protected Area, Arnhem Land, NT (Photo: Jenifer Rahmoy, DSEWPaC, 2006)

1.3 Enhancing strategic investments and partnerships

Cooperation between different parts of the community is essential to increase effective engagement in biodiversity conservation. More private expenditure on biodiversity conservation and partnerships between sectors are necessary for successful outcomes. Governments need to partner with other sectors and, importantly, with the primary industries sector.

Society as a whole benefits, and future generations will also benefit, from protecting biodiversity. However these benefits are not fully reflected in our economic system. To ensure that biodiversity's importance as a public good is fully valued, we need to ensure that there are financial incentives for actions that protect or enhance biodiversity and that the cost of damage to biodiversity is accounted for in economic planning. One way of moving towards such a system is to stimulate the development and expansion of markets for biodiversity and ecosystem services, including initiatives such as the Australian Government's Environmental Stewardship Program, the Victorian Government's BushTender program and the New South Wales Government's BioBanking program.

Markets provide a way to value biodiversity so that it can be considered alongside economic and social factors. Although putting a price on the value of biodiversity and ecosystem services is difficult, well-designed markets are one of the most effective policy instruments for attributing economic value to biodiversity and can be very effective in encouraging investment in biodiversity conservation. In using market-based approaches,

we must ensure that new markets, such as those for carbon and water, are designed and implemented to avoid unintended negative consequences for biodiversity. We should seek multiple beneficial environmental outcomes wherever possible.

Strategic investments and partnerships are an increasingly important way of identifying, prioritising and achieving conservation goals. For example, cooperation between governments and the private and non-government sectors has already resulted in major private land additions to the NRS which would not have been possible otherwise. Emerging markets for a number of ecosystem services are creating opportunities for long-term investments in biodiversity conservation. Market-based offset schemes are developing as a mechanism by which biodiversity conservation can be integrated into public and private land use decisions.

It is also important that we encourage increasing private investment in biodiversity conservation so that both the costs and the benefits of biodiversity use are distributed across relevant sectors. It is equally important that increased investment is prioritised and targeted for best effect.

Outcomes for enhancing strategic investments and partnerships

1.3.1 An increase in the use of markets and other incentives for managing biodiversity and ecosystem services

1.3.2 An increase in private expenditure on biodiversity conservation

1.3.3 An increase in public–private partnerships for biodiversity conservation

T

Target 3: By 2015, achieve a doubling of the value of complementary markets for ecosystem services.

Bilby tracks on sand dunes inside the Arid Recovery Reserve, SA

(Photo: courtesy BHP Billiton Olympic Dam)

Priority for action 2: Building ecosystem resilience in a changing climate

Building resilience in our ecosystems means enhancing their capacity to adapt to, survive and recover from changes and disturbances. Australia's biodiversity is at risk from many threatening processes (as discussed under subpriority 2.3). Building resilience will help Australia's biodiversity to persist under existing threats and as our climate changes.

The three subpriorities under Building ecosystem resilience in a changing climate are explained in turn below.

Subpriorities

2.1 Protecting diversity

Protecting diversity means making sure that representatives of terrestrial, aquatic and marine ecosystems and their component species and genes are conserved into the future. Protecting the diversity of ecosystems, species and genes provides a core focus for our conservation efforts. Protection of this diversity can occur through a number of mechanisms and approaches including:

- maintaining the extent of habitat
- creating nature reserves or conservation management agreements on public and private land
- organising complementary land and sea management practices
- implementing targeted species-specific conservation.

These approaches can be used to complement each other. Different approaches may be best suited to a particular scale, resource use or context. However, all have a role in helping us to protect diversity. Maintaining and improving habitat for native species is a key element in building resilience, especially in the face of climate change. Ensuring land is managed effectively to prevent the spread of invasives (weeds and pest animals) is also important.

A variety of conservation tenure arrangements can be used on public and private land to protect diversity in perpetuity, including (but not limited to) additions to the NRS and the Australian system of MPAs. Governments are also creating new mechanisms to support the establishment and long-term management of conservation areas in partnership with landholders, non-profit conservation organisations and Indigenous communities. Support is also being provided for maintaining or improving biodiversity conservation on private land in order to complement other land uses.

Protecting diversity will require whole-of-ecosystem efforts across landscapes and seascapes, in both public and private ownership. Governments need to work closely with and support private land managers and users to build landscape and seascape-scale approaches to conservation.

Freshwater sawfish, QLD (Photo: courtesy David Morgan)

These efforts should include managing multiple-use landscapes and seascapes in ways that integrate biodiversity and production outcomes through complementary management practices.

Some species, such as those that are threatened with extinction, will require targeted species-specific efforts to complement those at the ecosystem level. These should focus on improving the conservation status of threatened species and ecological communities. In many situations, protecting gene stocks and genetic diversity will also be a priority, particularly as species and ecosystems shift in response to climate change. Protecting and enhancing genetic diversity will be an increasingly important consideration in management decisions for long-term ecological resilience and adaptation. Ex situ conservation mechanisms, including botanic gardens, zoos, seed banks and gene banks, will be increasingly important as a way of conserving diversity when species are at high risk of extinction in the wild.

Outcomes for protecting diversity

2.1.1 An increase in the number, extent and condition of ecosystems protected under secure conservation tenure

2.1.2 An increase in the extent of private land managed for biodiversity conservation

2.1.3 An improvement in the conservation status of listed threatened species and ecological communities

2.1.4 A net national increase in the extent and condition of native habitat across tenures

T

Target 4: By 2015, achieve a national increase of 600,000 km^2 of native habitat managed primarily for biodiversity conservation across terrestrial, aquatic and marine environments.

2.2 Maintaining and re-establishing ecosystem functions

Biodiversity is critical to ecosystem functions that provide supporting, provisioning, regulating and cultural services, for example oxygen production, soil formation and retention, water and nutrient cycling, and carbon storage (see Figure 2). We need to focus on maintaining and re-establishing ecosystem functions, acknowledging that ecosystem structure is likely to change as species move in response to climate change and other pressures.

Well-functioning ecosystems help form the basis of ecological resilience (Steffen et al. 2009). Maintaining and re-establishing ecosystem functions is part of a whole-of-ecosystem approach to biodiversity conservation. A whole-of-ecosystem approach considers all levels of biological organisation including the essential structures, processes, functions of, and interactions between, living things and their environment. This approach expands on

and complements species-specific management actions, which remain fundamental for biodiversity conservation.

We need to recognise the importance of protecting and restoring the natural ecological processes that shape our environment, including water flows and fire regimes, and acknowledge that we have much more to learn about the role of ecological processes in supporting the resilience of our landscapes and seascapes.

Building structural and functional connectivity at multiple scales will be an important consideration in many landscapes and seascapes to create opportunities for species to move and find resources as the climate changes and to facilitate the protection of migratory species (see Figure 4). Connectivity is also likely to play an important role in retaining genetic diversity. Our knowledge can be enhanced by identifying the scales at which connections are most needed and by understanding what mix of protective climate change refugia, areas connected by continuous habitat corridors, stepping-stone links and complementary land uses will be required in each system.

Landcare volunteer workers removing weeds from mulched site near Swansea, NSW

(Photo: John Baker and DSEWPaC)

Outcomes for maintaining and re-establishing ecosystem functions

2.2.1 An increase in the connectivity of fragmented landscapes and seascapes

2.2.2 An improvement in the provision of environmental water allocations

2.2.3 An improvement in the use of ecological fire regimes to conserve biodiversity and protect the public

T **Target 5:** By 2015, 1,000 km^2 of fragmented landscapes and aquatic systems are being restored to improve ecological connectivity.

T **Target 6:** By 2015, four collaborative continental-scale linkages are established and managed to improve ecological connectivity.

2.3 Reducing threats to biodiversity

Threat management and reduction strategies will complement whole-of-ecosystem approaches to building resilience. Despite our efforts to date, most of the drivers of biodiversity decline have yet to be adequately addressed. Managing and reducing threats will require us to be conscious of the interaction between social, economic and ecological systems. Success in implementing this priority for action will be closely linked to our progress on priority for action 1: Engaging all Australians, as building ecosystem resilience will require people to change their behaviour.

The main threats to Australia's biodiversity continue to be many of the existing stressors and disturbances such as habitat loss, degradation and fragmentation; invasive species; unsustainable use and management of natural resources; changes to the aquatic environment and water flows; and changing fire regimes. Although we have invested efforts in threat management, most threats remain a considerable challenge.

Climate change is a threat in its own right and will also magnify the impacts of many existing threats. This increases the urgency of our task and the need to accelerate our efforts to reduce the impacts of existing threats. Climate change will affect biodiversity in different ways and at different spatial and temporal scales. Some of the impacts will be gradual, such as progressive changes in average temperature or rainfall patterns. Others will be episodic, for example, changes in the frequency and intensity of climate-driven events such as cyclones, fires and floods. In addition, climate change impacts on biodiversity can be direct, for example through influencing the ecological requirements for a particular species and its habitat, or indirect, as might be the case when climate change influences patterns of resource use that have consequential impacts on biodiversity. Efforts to manage the direct and indirect impacts of climate change on biodiversity therefore need to be integrated with efforts to reduce other threatening processes at multiple scales.

Reducing the impacts and extent of significant threats to biodiversity will help improve the condition of ecosystems and help us to prevent species from becoming threatened. A major challenge is to shift our interventions to prevention of harm to biodiversity, in preference to resource-intensive efforts that attempt to repair degradation after it has occurred. This will include the progressive development of current approaches such as the use of offsets.

Landholders and organisations such as Landcare and other natural resource management groups are likely to play a vital role in delivering these outcomes.

Outcomes for reducing threats to biodiversity

2.3.1 A reduction in the impacts of priority threatening processes, including habitat loss and climate change

2.3.2 A reduction in the impacts of significant invasive species on biodiversity

2.3.3 An increase in the use of strategic and early interventions to manage threats to biodiversity including climate change

T

Target 7: By 2015, reduce by at least 10% the impacts of invasive species on threatened species and ecological communities in terrestrial, aquatic and marine environments.

Priority for action 3: Getting measurable results

Subpriorities

3.1 Improving and sharing knowledge

3.2 Delivering conservation initiatives efficiently

3.3 Implementing robust national monitoring, reporting and evaluation

Resources available for biodiversity conservation efforts—human and financial, government and non-government—are limited. It is therefore essential that we measure, evaluate and understand the effectiveness of our biodiversity conservation efforts. This knowledge will help to ensure that our efforts are correctly prioritised and targeted, so that we are investing in efficient actions that will produce the greatest long-term benefits for biodiversity.

In order to get measurable results, we need to improve and share our knowledge of biodiversity. This involves improving the accessibility, communication and application of knowledge as well as ensuring our priorities are evidence-based.

To achieve that, we need to implement robust national monitoring, reporting and evaluation measures, so that we can identify what is working—and not working—and why, and adjust our efforts accordingly.

The three subpriorities under Getting measurable results are explained in turn below.

3.1 Improving and sharing knowledge

There are significant gaps in our current knowledge of biodiversity and incomplete data coverage for many parts of Australia. For example, we have relatively little information on marine biodiversity and on the many invertebrate species and micro-organisms that live in terrestrial and aquatic habitats. There is much we still need to understand about how the many animals, plants and micro-organisms contribute to broader ecological functions and to the health of our environment.

Moreover, what we do know is often not readily usable beyond the scientific community. Knowledge needs to be interpreted for a wide audience and communicated clearly so it can inform action across the community and in turn drive greater communication between researchers, policy makers and on-ground biodiversity managers.

In filling knowledge gaps, we need to improve the alignment of research with priorities for biodiversity conservation, so that new knowledge informs the adaptive management cycle (as discussed under subpriority 3.3).

Placing the correct information, based on robust science, at the fingertips of all those whose actions impact on biodiversity can help to ensure that policy development is evidence-based, that everyone at all levels of society understands how their actions impact on biodiversity, and all are empowered to make choices that conserve biodiversity. Improved information access can also contribute to ensuring that policy implementation produces measurable results and better prioritisation of investment in biodiversity conservation.

Outcomes for improving and sharing knowledge

3.1.1 An increase in the accessibility of science and knowledge for biodiversity conservation

3.1.2 An improvement in the alignment of research with biodiversity conservation priorities

3.1.3 An increase in the application of knowledge of biodiversity conservation by all sectors and communities

T

Target 8: By 2015, nationally agreed science and knowledge priorities for biodiversity conservation are guiding research activities.

3.2 Delivering conservation initiatives efficiently

Delivering conservation initiatives efficiently is vital to ensure that our efforts and investments produce the greatest long-term benefits for biodiversity.

To achieve that, we need to align relevant activities across Australia with this Strategy. This will allow us to ensure that all such activities are consistently prioritised, targeted and will deliver measurable results. Achieving an appropriate level of consistency in approaches to biodiversity conservation, including how we determine priority species and ecological communities, will also improve collaboration and complementary effort for better biodiversity outcomes. Finally, we can ensure that in planning biodiversity conservation measures we are conscious of the need to act at different spatial scales and to plan actions for the short, medium and long term.

Outcomes for delivering conservation initiatives efficiently

3.2.1 An improvement in the alignment of sectoral, regional and jurisdictional biodiversity conservation approaches with Australia's Biodiversity Conservation Strategy

3.2.2 An improvement in the effectiveness and efficiency of biodiversity programs and investments

T

Target 9: By 2015, all jurisdictions will review relevant legislation, policies and programs to maximise alignment with Australia's Biodiversity Conservation Strategy.

3.3 Implementing robust national monitoring, reporting and evaluation

Implementing robust national monitoring, reporting and evaluation of the state of biodiversity and the success of conservation actions is crucial to ensure that we are delivering conservation initiatives efficiently.

We need to be sure that our efforts are really making a difference to biodiversity outcomes across Australia. We must regularly reprioritise our limited resources towards actions that evidence tells us are delivering the best possible long-term outcomes, most efficiently. Monitoring how biodiversity changes over time will also help us to understand what is driving that change, and decide whether and how to intervene to influence that change.

National biodiversity accounting has the capacity to play an important role in showing how much biodiversity we have and how it is faring. Such accounts could support public policy and evaluation, as well as public awareness of and support for biodiversity conservation. They would also help ensure that the value of biodiversity is realistically reflected alongside our national economic and social indicators, as a more complete reflection of the state of our nation.

Adaptive management needs to underpin all our initiatives. Adaptive management involves:

- closely tracking the outcomes of different management methods, and analysing what works best and why
- actively communicating and learning from successes and failures, and continually modifying future approaches accordingly

Sturt National Park near Tibooburra, NSW (Photo: Rosemary Purdie and DSEWPaC)

- where appropriate, trialling different approaches in parallel, to identify the most successful
- the ability to respond quickly to new information and circumstances
- the establishment of consultative forums involving key stakeholders responsible for the management of biodiversity.

Adaptive management is particularly important in working out how to facilitate adaptation to climate change, as the precise impacts on and consequences for biodiversity are progressively understood.

Outcomes for implementing robust national monitoring, reporting and evaluation

3.3.1 An increased representation of biodiversity and ecosystem services and goods within national accounts

3.3.2 An increased use of monitoring and reporting in the evaluation and improvement of biodiversity conservation projects, programs and strategies

3.3.3 An increase in the use of information from both the private and public sector in the adaptive management of biodiversity conservation

T

Target 10: By 2015, establish a national long-term biodiversity monitoring and reporting system.

The critically endangered Thrombolites ('living rocks') of Lake Clifton, WA. Microbes found in these formations are believed to be responsible for oxygen production which allows life to exist on the planet (Photo: courtesy of westaust.net)

Implementation and action




Spotted Gum trunks in area cleared of large Lantana infestation at Smiths Lake, NSW
(Photo: John Baker and DSEWPaC)

Photos on previous page from left to right

1. NSW SeaNet Extension Officer and the Turtle-Smart Crab Pot (Photo: courtesy OceanWatch Australia)
2. Community meeting, Paruku Indigenous Protected Area, WA (Photo: Bruce Rose and DSEWPaC)
3. Checking the weed for identification and GPS recording, Longreach, Qld (Photo Dragi Markovic and DSEWPaC)
4. Water quality monitoring on the Brid River near Scottsdale, Tas (Photo:Dragi Markovic and DSEWPaC)

Implementing action to achieve our outcomes and targets

All of us in Australia have a job to do if we are to succeed in avoiding the foreseeable catastrophic loss of genes, species and ecosystems. Our tasks will be at various scales, from backyards to landscapes and from weeks to decades.

The choices we make in purchasing goods and services for our individual, family and household needs can make a difference. Individuals can also contribute by volunteering as part of a local community or catchment action group or by increasing the adoption of sustainable management practices.

Local government and natural resource management (NRM) regional programs will be the critical scale for progress towards some outcomes and targets. Action to achieve other outcomes and targets will be defined in Australian Government, state or territory based plans or industry sector action plans. All are important.

Actions

Progress towards the outcomes and targets in this Strategy will require specific actions. Some will involve continuation of 'tried and true' programs and practices based on the considerable experience of biodiversity conservation managers across Australia. Some will be new initiatives based on changing circumstances and emerging science. Indeed, we need to continue developing new measures as new science and practical experience become available and as more and more organisations and individuals contribute to biodiversity conservation.

For many outcomes and targets, there are a number of different and equally valid pathways and mechanisms that could be used to meet them. For many, there is no right or wrong way to approach them. The particular action taken will depend on the state, territory, regional or local situation, including existing priorities, availability of funding and opportunities to build on local experience and capacity.

Actions currently identified as priorities at a national level cover all areas of biodiversity conservation management policy and practice. These key actions are listed under their most relevant priority for action, noting that some actions may contribute to the achievement of multiple outcomes and targets.

Case studies are included to illustrate current action being taken in various sectors and jurisdictions. These case studies highlight the varying approaches and pathways that can be taken to meet specific outcomes and targets. What remains important is that all actions and pathways ultimately contribute to the achievement of biodiversity outcomes and targets.

Case study: Environmental Stewardship (Australian Government)

Environmental Stewardship is an element of the Australian Government's Caring for our Country initiative. It uses market approaches to maintain and improve the condition and extent of high value environmental assets listed as matters of national environment significance under the *Environment Protection and Biodiversity Conservation Act 1999*.

The first asset targeted is the critically endangered White Box, Yellow Box and Blakely's Red Gum and derived grasslands ecological community (Box Gum Grassy Woodland). This community extends from Queensland to Victoria predominantly within the wheat-sheep belt. Box Gum Grassy Woodland is an important ecological community which provides habitat for at least 19 threatened species, including the Superb Parrot, Swift Parrot and the Tiger Quoll, as well as many other native plants and animals.

Environmental Stewardship differs from other Caring for our Country elements by providing long-term payments (up to 15 years) to land managers to protect high value environmental assets on private land. The Australian Government recognises that using market-based incentives such as those under Environmental Stewardship can be an effective way of engaging land managers to protect and maintain environmental assets on private land. There is strong support amongst key stakeholder groups in the Australian community for stewardship payments as a means of protecting biodiversity.

Environmental Stewardship has helped establish a way of delivering environmental outcomes in Australia through market-based mechanisms working with land managers, scientists and the private sector. The program has also helped build the capacity of the private sector to deliver environmental outcomes.

Yellow Box, NSW (Photo: DSEWPaC)

Actions

Priority for action 1: Engaging all Australians

Action	Responsibility
Subpriority 1.1 Mainstreaming biodiversity	
A1 Develop and implement information and communication programs to raise awareness of biodiversity and its values.	All governments, non-government organisations, businesses, public
A2 Expand biodiversity coverage in school curricula.	All governments, education sector
A3 Incorporate information and approaches to meeting biodiversity responsibilities into corporate planning and annual reporting guidelines.	All governments, businesses
Subpriority 1.2 Increasing Indigenous engagement	
A4 Extend opportunities for employing Indigenous peoples in biodiversity conservation, including through the Indigenous Protected Areas program.	All governments in partnership with Indigenous peoples
A5 Support long-term, two-way knowledge transfer and capacity building to enhance the role of traditional ecological knowledge in biodiversity conservation.	All governments in partnership with Indigenous peoples
A6 Support training programs that strengthen biodiversity outcomes in Indigenous land and sea management.	All governments in partnership with Indigenous peoples
Subpriority 1.3 Enhancing strategic investments and partnerships	
A7 Develop and align, where appropriate, emerging markets for biodiversity with markets for other ecosystem services.	All governments, businesses
A8 Develop innovative mechanisms to encourage private investment and interest in biodiversity conservation.	All governments, businesses, non-government organisations

Case study: Indigenous fire management in Northern Australia

The Indigenous Fire Management in Northern Australia Project is facilitated by the North Australian Indigenous Land and Sea Management Alliance (NAILSMA) and run by Indigenous land management groups. It focuses on implementing traditional, mosaic-style fire management practices in northern Australia. This Australian Government Caring for our Country investment will help prevent intense wildfires that regularly burn 40% of some savanna regions in a single fire season and cause significant biodiversity loss. Better fire management practices are also likely to deliver greenhouse gas emissions abatement and opportunities to enter carbon markets, creating enterprise opportunities for Indigenous people and supporting ongoing land management activities.

As part of this project, further research is under way to determine actual emissions outcomes from altered fire management practices. This includes the establishment of up to four large-scale fire management project areas in the savanna regions of northern Australia. A number of Indigenous ranger groups, funded through the Working on Country element of Caring for our Country, provide support to the project by undertaking fire management and monitoring activities in the four project areas. NAILSMA seeks specialist advice and works with the participating groups to facilitate market participation, including the development of emissions accounting capabilities, capacity building, and legal and governance frameworks for Indigenous entry into potential carbon markets.

There are substantial social, economic and cultural benefits associated with this Indigenous project through job creation, capacity building and the transfer of traditional ecological knowledge through fire and land management activities.

Controlled burn in west Arnhem Land, July 2009 (Photo: David Hancock, courtesy of NAILSMA)

Actions

Priority for action 2: Building ecosystem resilience in a changing climate

Action	Responsibility
Subpriority 2.1 Protecting diversity	
A9 Enhance and expand the National Reserve System and the national system of Marine Protected Areas.	All governments, private landholders
A10 Develop a national approach for off-reserve and multiple-use reserve conservation in priority areas.	All governments, private landholders, non-government organisations
A11 Maintain and enhance in situ and ex situ conservation measures as part of an integrated approach to conserve species and genetic diversity.	All governments, science sector, Indigenous peoples, private landholders
Subpriority 2.2 Maintaining and re-establishing ecosystem functions	
A12 Increase understanding and use of a whole-of-ecosystem approach in biodiversity management.	All governments, businesses, private landholders, science sector
A13 Identify landscapes and seascapes in which habitat linkages are important for biodiversity conservation and secure these areas through mechanisms such as complementary land uses and partnerships between governments and private landholders.	All governments, businesses, private landholders, science sector
A14 Identify and protect climate change refugia to strengthen opportunities for genetic and ecological adaptation.	All governments, science sector, private landholders
A15 Improve the management of aquatic habitats including by reducing key threats to aquatic biodiversity.	All governments, businesses, private landholders and tourists
A16 Incorporate biodiversity conservation into land and fire management planning.	All governments, Indigenous peoples, businesses, private landholders
Subpriority 2.3 Reducing threats to biodiversity	
A17 Develop tools to help guide and support priority setting for threat management at different scales.	All governments, businesses, science sector
A18 Integrate biodiversity conservation into planning instruments including by implementing a decision-making hierarchy for biodiversity management: the first aim is to avoid loss; if that is not possible, then aim to minimise loss; if biodiversity loss is unavoidable, impacts should be managed to maintain ecosystem functions, including, where feasible, through the use of offsets.	All governments, businesses, private landholders

Case study: Back on Track

The Back on Track species prioritisation framework increases the capacity of the Queensland Government, natural resource management (NRM) bodies and communities to prioritise decisions about where to focus action and investment to protect and recover Queensland's threatened biodiversity. The framework enables limited conservation resources for threatened species to be strategically targeted to achieve multi-species and landscape-level outcomes.

This framework prioritises species using multiple criteria to identify the species that are in trouble and which have the greatest chance of recovery. The framework has been used to assess 4,265 plant and animal species from marine, aquatic and terrestrial habitats. The process has identified threats and developed management actions for 383 priority species and these priority actions have been translated into tangible conservation outcomes via landscape-level conservation projects across multiple NRM regions in Queensland.

Preference is given to landscape-level actions that will benefit multiple species. Actions are detailed, prioritised and focussed to ensure the best allocation of resources over the following five years. The resulting lists of priority species, threats and actions have been compiled into 'Actions for Biodiversity' for each NRM region to guide investment in on-ground action, plans and strategies, community capacity building, and research and monitoring. This data will be made available to all NRM practitioners via the online Recovery Actions Database. The Back on Track species prioritisation framework is funded by the Queensland Department of Environment and Resource Management, and the Australian Government.

Yellow-footed rock-wallaby

(Photo: Supplied by Department of Environment and Resource Management, Queensland)

Case study: Arid Recovery—protecting Australia's threatened animals and ecosystems

Arid Recovery is a unique partnership between industry, government, education and the community.

Located near BHP Billiton's Olympic Dam mine in northern South Australia, Arid Recovery is an ecosystem restoration initiative based around one of Australia's largest fenced reserves, from which all feral cats, foxes and rabbits have been removed. The reserve straddles the BHP Billiton special mine lease and sections of five pastoral properties, and covers a total area of 123 square kilometres. Four locally-extinct mammal species have been successfully reintroduced and native animals and plants are now thriving within the feral-proof fenced reserve. It has become both a centre for ecological research and the site of a nationally significant conservation program.

Arid Recovery was initiated in 1997 by a partnership comprising BHP Billiton, the South Australian Department for Environment and Heritage, The University of Adelaide and a community group, Friends of Arid Recovery. The partnership's mission is to facilitate restoration of arid zone ecosystems through on-ground works, applied research, and industry, community and government partnerships.

Together with other Arid Recovery partners and collaborators, BHP Billiton is committed to ensuring the maintenance of the existing reserve and the sustainability of research and public education programs. A key future objective is to improve broad-scale benefits to the environment and the perception of resource industries by re-establishing threatened species outside the reserve, on both the Olympic Dam mine lease and surrounding pastoral properties.

A burrowing bettong, one of the four threatened species successfully reintroduced into the reserve (Photo: S. Lyon)

Case study: Integrating natural resource management into local government operations

The Local Government and Shires Associations of New South Wales (LGSA) have initiated a range of programs designed to increase the capacity of local government in New South Wales (NSW) and to better integrate NRM into the core functions of councils. The LGSA commissioned the production of a set of guidelines which aims to build capacities in a number of areas through the integration of NRM into council corporate planning and reporting, and land use planning.

The guidelines are designed for local government professionals, managers and councillors but they will also be useful for NRM, corporate and land-use planning consultants, catchment management authorities (CMAs) and other NSW and Australian Government agencies involved in supporting and influencing NRM in local government.

The guidelines were developed with the assistance of Sydney Metro CMA, Southern Rivers CMA, state government agencies and numerous councils around NSW. Financial assistance was provided by the Australian Government.

Broken Hill City Council Living Desert Ranger inspecting a patch of Sturt's Desert Pea within a council managed reserve (Photo: courtesy Broken Hill City Council)

Actions

Priority for action 3: Getting measurable results

Action	Responsibility
Subpriority 3.1 Improving and sharing knowledge	
A19 Complete assessments at national, state and regional levels to identify knowledge needs and gaps and to set research priorities for biodiversity conservation at all levels.	All governments, science sector, businesses, non-government organisations
A20 Develop a national biodiversity account, in conjunction with broader national environmental accounting and reporting systems.	Australian Government to lead collaborative efforts
A21 Undertake systematic time-series surveys through the Australian Bureau of Statistics to measure community awareness of the need for biodiversity conservation, associated behavioural change and engagement in biodiversity conservation.	Australian Government
Subpriority 3.2 Delivering conservation initiatives efficiently	
A22 Harmonise approaches to listing threatened species and ecological communities across jurisdictions.	All governments
A23 Implement and enhance biodiversity conservation models that apply a whole-of-ecosystem approach at landscape and seascape scales.	All governments, regional NRM bodies
Subpriority 3.3 Implementing robust national monitoring, reporting and evaluation	
A24 Develop in consultation with the private and primary industries sectors a nationally representative set of biodiversity indicators and monitoring protocols.	All governments, science sector and industry sectors
A25 Progressively align and integrate reporting products across governments for effective biodiversity planning.	Australian Government in collaboration with state and territory governments
A26 Develop in consultation with community and industry stakeholders national guidelines for incorporating adaptive management into biodiversity conservation.	All governments, science sector

Case study: SeaNet Program

OceanWatch Australia established SeaNet in 1999. It is a unique Australian network of fisheries conservation experts providing an environmental extension service to the Australian fishing industry. SeaNet provides information and advice on reducing environmental impacts and works directly with industry, managers and researchers to develop and implement improved fishing gear, technology and methods. It aims to minimise the catch of non-target species (by-catch) and encourage environmental best practice for industry.

Successes include the reduction of accidental capture of seals and sea-lions, seasnakes, seabirds, dugongs, marine turtles, whales, dolphins and sharks, whilst assisting industry to remain internationally competitive. This project currently operates in all states and territories with commercial fisheries.

SeaNet is managed by OceanWatch Australia, a national environmental, not-for-profit company that works to advance sustainability in the Australian seafood industry. OceanWatch's key activities involve protecting and enhancing fish habitats; improving water quality in estuaries and coastal environments; working with industry and local communities to minimise environmental impacts; and introducing industry and communities to sustainable technologies and behaviours.

Stakeholders on deck of trawler watching fisherman release the codend, and empty the catch into fish tubs (Photo: courtesy OceanWatch Australia)

Case study: Australia's Farming Future

Australia's Farming Future (AFF) is an Australian Government program. It aims to equip primary producers and their industries with the research, tools and information to minimise their emissions, adapt and adjust to the impacts of climate change and maintain productivity.

Australian agriculture is particularly vulnerable to climate change with increased temperatures and reduced rainfall projected to affect the yield and quality of commodities produced in Australia's agricultural systems. The variable nature of Australia's climate is expected to increase, with projections indicating more frequent and severe extreme events such as drought and bushfire.

Support for primary producers is provided through the following elements of AFF: research and development through the Climate Change Research Program; training through the FarmReady program; building community networks and capacity to manage climate change; adjustment advice; and assistance for those who choose to leave farming.

AFF is about providing primary producers and their industries with the information they need to make informed decisions. It is also about creating opportunities to reduce emissions, manage climate change and increase productivity.

Agriculture, Kununurra, WA (Photo: Nicole Middleton)

Shared commitment and responsibility

All Australian governments have collaborated to develop this Strategy, in consultation with community, Indigenous and industry representatives. Extensive public input across a diverse array of sectors, interest groups and individuals has been used to refine this Strategy and to help it reflect community perspectives.

For this Strategy to succeed, the community, including Indigenous peoples, governments and businesses, must agree to share responsibility and work together to implement it.

Monitoring and reporting on our progress

For the Strategy to make a real difference, progress needs to be tracked through robust, integrated and regular monitoring, and changes need to be implemented when evidence suggests current approaches are ineffective.

The following approaches will be used to monitor and guide implementation of this Strategy:

- The NRMMC will monitor the implementation of the Strategy and formally review it every five years with the advice of an independent panel.
- All jurisdictions will report to the NRMMC on progress in the second year and on actions, outcomes and targets in the fourth year of the five-year review cycle.
- The NRMMC may, in considering progress in the implementation of the Strategy, request interim independent reviews to identify and address obstacles to implementation.
- Consolidated reports will be published, so the whole community can follow our national progress. This ongoing reporting will be managed centrally by the Australian Government on behalf of the NRMMC.
- The Strategy will also be monitored for its effectiveness in changing the way the community, including Indigenous peoples, governments and businesses, understand and address biodiversity conservation issues.

Although it is important to focus on the short- to medium-term aims of the Strategy as set out in the outcomes, targets and actions, it is the longer-term impacts on Australia's biodiversity that will ultimately determine its effectiveness. Thus, implementation of the Strategy will include the development of a long-term monitoring and evaluation framework, where possible based on existing well-established systems. The information gained from this long-term monitoring framework will be used to track trends in the condition and extent of Australia's biodiversity. This analysis will inform future reviews of the Strategy.

Appendices




Egret, Cooinda, Kakadu National Park, NT (Photo: Nicole Middleton)

Photos on previous page from left to right

1. Bracket fungi in the Otway Ranges, VIC (Photo: John Baker and DSEWPaC)
2. Water lily (*Nymphaea macrosperma*), NT (Photo: Nicole Middleton)
3. Gorgonians on the Great Barrier Reef, Qld (Photo: Great Barrier Reef Marine Park Authority)
4. Fruit bat, Marlborough Qld (Photo: Arthur Mostead, Department of Climate Change and Energy Efficiency)

Appendix 1: Roles and responsibilities for implementing the Strategy

The Strategy is designed to provide a road map for all groups involved in conserving biodiversity.

The broad roles and responsibilities of these groups in implementing the Strategy are outlined below.

A1.1 Indigenous peoples

About 20% of Australia's land is managed by Indigenous communities, and we need these communities to be central and active partners in the long-term conservation of biodiversity. The potential for applying Indigenous ecological knowledge in biodiversity management needs to be more actively explored by other biodiversity managers. It is equally important that Indigenous peoples have access to scientific knowledge and best management practice for natural resource management.

A1.2 General community

For this Strategy to be effective, all Australians need to contribute personally to biodiversity conservation. This could involve learning more about how to live sustainably—for example, by supporting, joining or forming groups concerned with issues such as conserving particular species or areas or reducing their ecological footprint.

A1.3 Natural resource management regional bodies

Bodies managing the 56 NRM regions that cover all of Australia need to participate in planning, coordinating and monitoring biodiversity as part of broader NRM programs. (For a full list of the NRM regions, see the website at www.nrm.gov.au). Some regional bodies already implement programs associated with biodiversity conservation.

This Strategy provides regional bodies with clear guidance on agreed national priorities. It can be used to develop and implement strategic plans and to identify new investment opportunities and partnership arrangements for biodiversity conservation.

A1.4 Non-government organisations

Non-government organisations, such as environmental, Indigenous, Landcare and industry groups, have considerable local knowledge and expertise in conservation management. They also have effective formal and informal information networks that offer an important mechanism for improving and communicating Australia's biodiversity knowledge.

A1.5 Private sector

The private sector includes the fisheries, forestry, agriculture, mining, tourism, financial services, and land and urban development industries. Of these sectors, farmers and graziers manage significant areas, approximately 60%, of Australia. The private sector has a fundamental role in making most of the development and investment decisions that affect private lands and the ocean. The formation of enduring partnerships with the private sector will help to ensure that the priorities of this strategy inform their decision making and investments. The foundation to sound partnerships is open communication, information sharing and consultation on actions.

A1.6 Research and education communities

Implementing the Strategy will require the best available scientific expertise and knowledge. Governments have well-established links with the research community and this Strategy provides an opportunity to strengthen these partnerships in specific scientific and technical areas that will be required for the Strategy's effective implementation. Establishing practical partnerships with educators and communicators will also be valuable in increasing the community's awareness and understanding of Australia's biodiversity and its role in our society.

A1.7 International and national

Australia is party to various international treaties and bilateral agreements dealing with the different components of biodiversity conservation (Appendix 3). These agreements impose particular obligations and require a range of actions to be undertaken to address particular matters of concern to the international community. This Strategy meets one of Australia's specific obligations under the United Nations *Convention on Biological Diversity*, and supports the clear alignment of national priorities and outcomes with ongoing international efforts to conserve biodiversity.

A1.8 Australian Government

The Australian Government is responsible for managing Australia's international border. This includes regulating the import and export of animals and plants, and substances and items made from them. The Australian Government also manages Commonwealth lands, such as defence establishments and Commonwealth national parks, and administers the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The EPBC Act, among other things, protects matters of national environmental significance, including listed threatened species and ecological communities and wetlands of international importance.

The Australian Government is also responsible for the oceans between the limit of state and territory managed waters (within three nautical miles of their coasts) and the 200 nautical mile boundary of Australia's exclusive economic zone. The long-term protection of biodiversity in these waters is being secured through the establishment and management of MPAs.

A1.9 State and territory governments

The state and territory governments have primary constitutional and legal responsibility for the management of land, water and biodiversity within their jurisdictions. All states and territories have established legislation, policies, strategic planning frameworks and management approaches for managing and protecting biodiversity (Appendix 4).

One of the primary purposes of this Strategy is to agree on a set of priorities for action and clear outcomes and targets that will support state and territory governments to align their specific priorities and investments within a broader national context.

A1.10 Local government

Local initiatives are important for achieving ecologically sustainable development. Local government is a valuable and ongoing contributor to efforts to conserve biodiversity through its role in local and regional planning and, increasingly, through its role in environmental management, monitoring and reporting. Local government engagement in the Strategy will, in general, be managed through the relevant state and territory government mechanisms.

Styx Valley, Strathgordon, Tas (Photo: Mark Mohell and DSEWPaC)

Appendix 2: Targets and actions

Table A2.1 Table of priorities for action, subpriorities, outcomes, and national targets for 2015

Priority for action 1 Engaging all Australians		
Subpriorities	**Outcomes**	**2015 National targets**
1.1 Mainstreaming biodiversity	1.1.1 An increase in public awareness of biodiversity	1. By 2015, achieve a 25% increase in the number of Australians and public and private organisations who participate in biodiversity conservation activities.
	1.1.2 An increase in public participation in conservation activities	
	1.1.3 An increase in participation by the private and primary industries sector in biodiversity conservation	
	1.1.4 An increase in the cross-sectoral integration of biodiversity conservation in public and private sector planning and management	
1.2 Increasing Indigenous engagement	1.2.1 An increase in the employment and participation of Indigenous peoples in biodiversity conservation acitivities	2. By 2015, achieve a 25% increase in employment and participation of Indigenous peoples in biodiversity conservation.
	1.2.2 An increase in the use of Indigenous knowledge in biodiversity conservation decision making	
	1.2.3 An increase in the extent of land managed by Indigenous peoples for biodiversity conservation	
1.3 Enhancing strategic investments and partnerships	1.3.1 An increase in the use of markets and other incentives for managing biodiversity and ecosystem services	3. By 2015, achieve a doubling of the value of complementary markets for ecosystem services.
	1.3.2 An increase in private expenditure on biodiversity conservation	
	1.3.3 An increase in public–private partnerships for biodiversity conservation	
Priority for action 2 Building ecosystem resilience in a changing climate		
Subpriorities	**Outcomes**	**2015 National targets**
2.1 Protecting diversity	2.1.1 An increase in the number, extent and condition of ecosystems protected under secure conservation tenure	4. By 2015, achieve a national increase of 600,000 km^2 of native habitat managed primarily for biodiversity conservation across terrestrial, aquatic and marine environments.
	2.1.2 An increase in the extent of private land managed for biodiversity conservation	
	2.1.3 An improvement in the conservation status of listed threatened species and ecological communities	
	2.1.4 A net national increase in the extent and condition of native habitat across tenures	
2.2 Maintaining and re-establishing ecosystem functions	2.2.1 An increase in the connectivity of fragmented landscapes and seascapes	5. By 2015, 1,000 km^2 of fragmented landscapes and aquatic systems are being restored to improve ecological connectivity. 6. By 2015, four collaborative continental-scale linkages are established and managed to improve ecological connectivity.
	2.2.2 An improvement in the provision of environmental water allocations	
	2.2.3 An improvement in the use of ecological fire regimes to conserve biodiversity and protect the public	

2.3 Reducing threats to biodiversity	2.3.1 A reduction in the impacts of priority threatening processes, including habitat loss and climate change	7. By 2015, reduce by at least 10% the impacts of invasive species on threatened species and ecological communities in terrestrial, aquatic and marine environments.
	2.3.2 A reduction in the impacts of significant invasive species on biodiversity	
	2.3.3 An increase in the use of strategic and early interventions to manage threats to biodiversity including climate change	
Priority for action 3 Getting measurable results		
Subpriorities	**Outcomes**	**2015 National targets**
3.1 Improving and sharing knowledge	3.1.1 An increase in the accessibility of science and knowledge for biodiversity conservation	8. By 2015, nationally agreed science and knowledge priorities for biodiversity conservation are guiding research activities.
	3.1.2 An improvement in the alignment of research with biodiversity conservation priorities	
	3.1.3 An increase in the application of knowledge of biodiversity conservation by all sectors and communities	
3.2 Delivering conservation initiatives efficiently	3.2.1 An improvement in the alignment of sectoral, regional and jurisdictional biodiversity conservation approaches with Australia's Biodiversity Conservation Strategy	9. By 2015, all jurisdictions will review relevant legislation, policies and programs to maximise alignment with Australia's Biodiversity Conservation Strategy.
	3.2.2 An improvement in the effectiveness and efficiency of biodiversity conservation programs and investments	
3.3 Implementing robust national monitoring, reporting and evaluation	3.3.1 An increased representation of biodiversity and ecosystems services and goods within national accounts	10. By 2015, establish a national long-term biodiversity monitoring and reporting system.
	3.3.2 An increased use of monitoring and reporting in the evaluation and improvement of biodiversity conservation projects, programs and strategies	
	3.3.3 An increase in the use of information from both the private and public sector in the adaptive management of biodiversity conservation	

Table A2.2 Table of priorities for action, subpriorities, outcomes and actions

Priority for action 1 Engaging all Australians		
Subpriorities	**Outcomes**	**Actions**
1.1 Mainstreaming biodiversity	1.1.1 An increase in public awareness of biodiversity	A1 Develop and implement information and communication programs to raise awareness of biodiversity and its values. A2 Expand biodiversity coverage in school curricula. A3 Incorporate information and approaches to meeting biodiversity responsibilities into corporate planning and annual reporting guidelines. A4 Extend opportunities for employing Indigenous peoples in biodiversity conservation, including through the Indigenous Protected Areas program. A5 Support long-term, two-way knowledge transfer and capacity building to enhance the role of traditional ecological knowledge in biodiversity conservation. A6 Support training programs that strengthen biodiversity outcomes in Indigenous land and sea management. A7 Develop and align, where appropriate, emerging markets for biodiversity with markets for other ecosystem services. A8 Develop innovative mechanisms to encourage private investment and interest in biodiversity conservation.
	1.1.2 An increase in public participation in conservation activities	
	1.1.3 An increase in participation by the private and primary industries sector in biodiversity conservation	
	1.1.4 An increase in the cross-sectoral integration of biodiversity conservation in public and private sector planning and management	
1.2 Increasing Indigenous engagement	1.2.1 An increase in the employment and participation of Indigenous peoples in biodiversity conservation activities	
	1.2.2 An increase in the use of Indigenous knowledge in biodiversity conservation decision making	
	1.2.3 An increase in the extent of land managed by Indigenous peoples for biodiversity conservation	
1.3 Enhancing strategic investments and partnerships	1.3.1 An increase in the use of markets and other incentives for managing biodiversity and ecosystem services	
	1.3.2 An increase in private expenditure on biodiversity conservation	
	1.3.3 An increase in public–private partnerships for biodiversity conservation	

Priority for action 2 Building ecosystem resilience in a changing climate		
Subpriorities	**Outcomes**	**Actions**
2.1 Protecting diversity	2.1.1 An increase in the number, extent and condition of ecosystems protected under secure conservation tenure	A9 Enhance and expand the National Reserve System and the national system of Marine Protected Areas. A10 Develop a national approach for off-reserve and multiple-use reserve conservation in priority areas. A11 Maintain and enhance in situ and ex situ conservation measures as part of an integrated approach to conserve species and genetic diversity. A12 Increase understanding and use of a whole-of-ecosystem approach in biodiversity management. A13 Identify landscapes and seascapes in which habitat linkages are important for biodiversity conservation and secure these areas through mechanisms such as complementary land-uses and partnerships between governments and private landholders. A14 Identify and protect climate change refugia to strengthen opportunities for genetic and ecological adaptation. A15 Improve the management of aquatic habitats, including by reducing key threats to aquatic biodiversity. A16 Incorporate biodiversity conservation into land and fire management planning. A17 Develop tools to help guide and support priority setting for threat management at different scales. A18 Integrate biodiversity conservation into planning instruments including by implementing a decision making hierarchy for biodiversity management: the first aim is to avoid loss; if that is not possible, then aim to minimise loss; if biodiversity loss is unavoidable, impacts should be managed to maintain ecosystem functions, including, where feasible, through the use of offsets.
	2.1.2 An increase in the extent of private land managed for biodiversity conservation	
	2.1.3 An improvement in the conservation status of listed threatened species and ecological communities	
	2.1.4 A net national increase in the extent and condition of native habitat across tenures	
2.2 Maintaining and re-establishing ecosystem functions	2.2.1 An increase in the connectivity of fragmented landscapes and seascapes	
	2.2.2 An improvement in the provision of environmental water allocations	
	2.2.3 An improvement in the use of ecological fire regimes to conserve biodiversity and protect the public	
2.3 Reducing threats to biodiversity	2.3.1 A reduction in the impacts of priority threatening processes, including habitat loss and climate change	
	2.3.2 A reduction in the impacts of significant invasive species on biodiversity	
	2.3.3 An increase in the use of strategic and early interventions to manage threats to biodiversity including climate change	

Priority for action 3 Getting measurable results		
Subpriorities	**Outcomes**	**Actions**
3.1 Improving and sharing knowledge	3.1.1 An increase in the accessibility of science and knowledge for biodiversity conservation	A19 Complete assessments at national, state and regional levels to identify knowledge needs and gaps and to set research priorities for biodiversity conservation at all levels. A20 Develop a national biodiversity account, in conjunction with broader national environmental accounting and reporting systems. A21 Undertake systematic time-series surveys through the Australian Bureau of Statistics to measure community awareness of the need for biodiversity conservation, associated behavioural change and engagement in biodiversity conservation. A22 Harmonise approaches to listing threatened species and ecological communities across jurisdictions. A23 Implement and enhance biodiversity conservation models that apply a whole-of-ecosystem approach at landscape and seascape scales. A24 Develop in consultation with the private and primary industries sectors a nationally representative set of biodiversity indicators and monitoring protocols. A25 Progressively align and integrate reporting products across governments for effective biodiversity planning. A26 Develop in consultation with community and industry stakeholders national guidelines for incorporating adaptive management into biodiversity conservation.
	3.1.2 An improvement in the alignment of research with biodiversity conservation priorities	
	3.1.3 An increase in the application of knowledge of biodiversity conservation by all sectors and communities	
3.2 Delivering conservation initiatives efficiently	3.2.1 An improvement in the alignment of sectoral, regional and jurisdictional biodiversity conservation approaches with Australia's Biodiversity Conservation Strategy	
	3.2.2 An improvement in the effectiveness and efficiency of biodiversity conservation programs and investments	
3.3 Implementing robust national monitoring, reporting and evaluation	3.3.1 An increased representation of biodiversity and ecosystem services and goods within national accounts	
	3.3.2 An increased use of monitoring and reporting in the evaluation and improvement of biodiversity conservation projects, programs and strategies	
	3.3.3 An increase in the use of information from both the private and public sector in the adaptive management of biodiversity conservation	

Stevens Reef on the Great Barrier Reef, Qld (Photo: Great Barrier Reef Marine Park Authority)

Appendix 3: International context

Conservation of biodiversity is a global concern and national action is needed to support international cooperation. Australia can do much to conserve its own biodiversity, and at the same time contribute to the conservation and ecologically sustainable use of biodiversity at the domestic and global levels. Australia participates in the development and implementation of a large number of international agreements—bilateral and multilateral—related to environmental management and conservation.

The National Strategy for the Conservation of Australia's Biological Diversity (1996 Strategy, DEST 1996) was developed to fulfil Australia's international obligations under the 1993 United Nations *Convention on Biological Diversity* (CBD), which seeks to sustain the diversity of life on Earth. The CBD represents an international recognition that biodiversity is globally important, intrinsically valuable and vital to human activity and the well-being of present and future generations.

The CBD has three main objectives:

1. the conservation of biological diversity
2. the sustainable use of its components
3. the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources.

The CBD was formalised at the Earth Summit in Rio de Janeiro in June 1992, a major international gathering of nations and non-government organisations. The summit focused on the environment, conservation, sustainable development and wise use of biodiversity, with the aim of gaining international agreement on how to act on these important issues.

There are 193 parties to the CBD, including Australia. Article 6 of the CBD reads:

Each Contracting Party shall, in accordance with its particular conditions and capabilities:

(a) Develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity or adapt for this purpose existing strategies, plans or programmes which shall reflect, inter alia, the measures set out in this Convention relevant to the Contracting Party concerned; and

(b) Integrate, as far as possible and as appropriate, the conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programmes and policies.

In 2002, parties to the CBD made an additional commitment

> *'… to achieve by 2010 a significant reduction of the current rate of biodiversity loss at the global, regional and national level as a contribution to poverty alleviation and to the benefit of all life on Earth.'*

The international multilateral instruments relating to biodiversity to which Australia is a party or otherwise supports are at Table A3.1.

Table A3.1 International policies, multilateral agreements, bilateral agreements and memoranda of understanding to which Australia is a party or otherwise supports

Year	Policies, multilateral agreements, bilateral agreements and memoranda of understanding
1946	International Convention for the Regulation of Whaling
1959	The Antarctic Treaty
1971	Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention)
1972	Convention for the Conservation of Antarctic Seals
1973	International Convention for the Prevention of Pollution from Ships (MARPOL 73/78)
1973	Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
1975	Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention)
1976	Convention on Conservation of Nature in the South Pacific (Apia Convention)
1979	Convention on the Conservation of Migratory Species of Wild Animals (CMS/Bonn Convention)
1981	Japan–Australia Migratory Bird Agreement (JAMBA)
1982	United Nations Convention on the Law of the Sea (UNCLOS)
1982	Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR)
1986	Convention for the Protection of the Natural Resources and Environment of the South Pacific (SPREP)
1988	China–Australia Migratory Bird Agreement (CAMBA)
1991	Protocol on Environmental Protection to the Antarctic Treaty (Madrid Protocol)
1992	Rio Declaration on Environment and Development
1992	United Nations Framework Convention on Climate Change (UNFCCC)
1992	United Nations Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa
1993	Convention on Biological Diversity (CBD)
1994	Convention on the Conservation of Southern Blue Fin Tuna
1997	International Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries
1998	Kyoto Protocol to the UNFCCC
1999	International Plan of Action for the Conservation and Management of Sharks
1999	International Plan of Action for the Management of Fishing Capacity
2001	Agreement on the Conservation of Albatrosses and Petrels
2001	International Convention on the Control of Harmful Anti-Fouling Systems on Ships
2001	Indian Ocean–Southeast Asian Marine Turtle Memorandum of Understanding
2003	Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean
2004	Convention for the Control and Management of Ships' Ballast Water and Sediments
2006	The Partnership for the Conservation of Migratory Waterbirds and the Sustainable Use of their Habitats in the East Asian–Australasian Flyway (Flyway Partnership)
2007	Republic of Korea–Australia Migratory Bird Agreement (ROKAMBA)
2007	United Nations International Forestry Agreement
2009	United Nations Declaration on the Rights of Indigenous Peoples (2007)

Appendix 4: Australian frameworks, policies, legislation and reports

Table A4.1 National frameworks, policies, legislation and reports

Year	Framework/policy
1908	*Quarantine Act 1908*
1975	*Great Barrier Reef Marine Park Act 1975*
1980	*Antarctic Treaty (Environment Protection) Act 1980*
1981	*Environment Protection (Sea Dumping) Act 1981*
1981	*Antarctic Marine Living Resources Conservation Act 1981*
1984	*National Conservation Strategy for Australia*
1987	*Sea Installations Act 1987*
1991	*Fisheries Management Act 1991*
1992	*National Forest Policy Statement*
1992	*National Strategy for Ecologically Sustainable Development*
1992	*Intergovernmental Agreement on the Environment*
1993	*Native Title Act 1993*
1994	*Wet Tropics of Queensland World Heritage Area Conservation Act 1994*
1994	*Council of Australian Governments Water Reform Framework*
1995	*Commonwealth Coastal Policy*
1996	*National Strategy for the Conservation of Australia's Biological Diversity*
1996	*Australia: State of the Environment report*
1996 (onwards)	Threat abatement plans (various)
1997	*Nationally Agreed Criteria for the Establishment of a Comprehensive, Adequate and Representative Reserve System for Forests in Australia (JANIS criteria)*
1997	*Wetlands Policy of the Commonwealth Government of Australia*
1997	*Natural Heritage Trust of Australia Act 1997*
1997	*National Weeds Strategy*
1998	*Quarantine Proclamation 1998*
1998	*National Water Quality Management Strategy*
1998	*National Oceans Policy*
1998	*National Greenhouse Strategy*
1998	*Guidelines for Establishing the National Representative System of Marine Protected Areas*
1998	*National Koala Conservation Strategy*
1999	*National Local Government Biodiversity Strategy*
1999	*National Framework for the Management and Monitoring of Australia's Native Vegetation*
1999	*National Principles and Guidelines for Rangeland Management*
1999	*Environment Protection and Biodiversity Conservation Act 1999*
2001	*National Objectives and Targets for Biodiversity Conservation 2001–2005*

Year	Framework/policy
2001	*Coastal Catchments Initiative*
2001	*National Approach to Firewood Collection and Use in Australia*
2001	*Australia State of the Environment report*
2001	*Biodiversity Conservation Research: Australia's Priorities*
2002	*Regional Forest Agreements Act 2002*
2002	*National Framework for Environmental Management Systems in Australian Agriculture*
2002	*National Framework for NRM Standards and Targets*
2003	*Framework for a National Cooperative Approach to Integrated Coastal Zone Management*
2003	*Native Fish Strategy for the Murray-Darling Basin 2003–2013*
2004	*National Water Initiative*
2004	*National Biodiversity and Climate Change Action Plan 2004–2007*
2004	*Great Barrier Reef Marine Park Zoning Plan*
2005	*Farm Forestry National Action Statement*
2005	*Directions for the National Reserve System—a Partnership Approach*
2006	*Australia State of the Environment report*
2007	*Australian Weeds Strategy*
2007	*Australian Pest Animal Strategy*
2007	*Water Act 2007*
2009	*Australia's Strategy for the National Reserve System 2009–2030*
2010	*Principles for Sustainable Resource Management in the Rangelands*

Table A4.2 State and territory frameworks, policies, legislation and reports

Jurisdiction	Framework/policy	Legislation
Australian Capital Territory	ACT Nature Conservation Strategy (1997)	*Nature Conservation Act 1980* *Environmental Protection Act 1997*
New South Wales	NSW Biodiversity Strategy (1999) Policy and Guidelines for Aquatic Habitat Management and Fish Conservation (1999) Eden Regional Forest Agreement (1999) North East Regional Forest Agreement (2000) Southern Regional Forest Agreement (2001) NSW Ramsar Plan 2006-2009 2007–2008 NSW Biodiversity and Climate Change Adaptation Framework NSW National Parks Establishment Plan 2008 NSW Invasive Species Plan 2008-2015	*Western Lands Act 1902* *Forestry Act 1916* *National Parks and Wildlife Act 1974* *Coastal Protection Act 1979* *Environmental Planning and Assessment Act 1979* *Crown Lands Act 1989* *Noxious Weeds Act 1993* *Fisheries Management Act 1994* *Threatened Species Conservation Act 1995* *Wilderness Act 1997* *Marine Parks Act 1997* *Forestry and National Parks Estate Act 1998* *Water Management Act 2000* *Native Vegetation Act 2003*
Northern Territory	Northern Territory Parks and Conservation Masterplan (draft)	*Territory Parks and Wildlife Conservation Act 1977* *Territory Parks and Wildlife Conservation Amendment Act 2009* *Fisheries Act 2009*
Queensland	Strategy for the Conservation and Management of Queensland's Wetlands 1999 South-East Queensland Regional Forests Agreement (1999) Queensland Weed Strategy 2002–2006 Queensland Pest Animal Strategy 2002–2006 Queensland Biodiversity Policy Framework (2003)	*Nature Conservation Act 1992* *Wet Tropics World Heritage Protection and Management Act 1993* *Environmental Protection Act 1994* *Fisheries Act 1994* *Land Act 1994* *Coastal Protection and Management Act 1995* *Environmental Protection (Water) Policy 2009* *Vegetation Management Act 1999* *Water Act 2000* *Land Protection (Pest and Stock Route Management) Act 2002* *Marine Parks Act 2004* *Wild Rivers Act 2005* *Cape York Peninsula Heritage Act 2007* *Vegetation Management (Regrowth Clearing Moratorium) Act 2009*

Jurisdiction	Framework/policy	Legislation
South Australia	No Species Loss—A Nature Conservation Strategy for South Australia 2007–2017	*National Parks and Wildlife Act 1972* *Native Vegetation Act 1991* *Wilderness Protection Act 1992* *Natural Resources Management Act 2004*
Tasmania	Tasmanian Regional Forest Agreement (1997) Threatened Species Strategy for Tasmania (2000) Tasmania's Nature Conservation Strategy (2002–2006) Tasmanian Community Forest Agreement (2005)	*Forest Practices Act 1985* *Threatened Species Protection Act 1995* *Living Marine Resources Management Act 1995* *Environmental Management and Pollution Control Act 1994* *Weed Management Act 1999* *Nature Conservation Act 2002* *Natural Resource Management Act 2002* *National Parks and Reserves Management Act 2002*
Victoria	Victoria's Biodiversity Strategy (1997) East Gippsland Regional Forest Agreement (1997) Central Highlands Regional Forest Agreement (1998) North East Regional Forest Agreement (1999) West Victoria Regional Forest Agreement (2000) Gippsland Regional Forest Agreement (2000) Our Forests, Our Future policy statement (2002) Victoria's Native Vegetation Management—a Framework for Action (2002)	*Environment Protection Act 1970* *Wildlife Act 1975* *Environment Effects Act 1978* *Planning and Environment Act 1987* *Flora and Fauna Guarantee Act 1988*
Western Australia	South West WA Regional Forest Agreement (1999) A 100-year Biodiversity Conservation Strategy for Western Australia: Blueprint to the Bicentenary in 2029 (draft)	*Wildlife Conservation Act 1950* *Conservation and Land Management Act 1984* *Environmental Protection Act 1986* *Fish Resources Management Act 1994*

Glossary

The following explanations relate to how these terms are used in this Strategy.

Adaptation—In its ordinary sense, adaptation refers to both human responses and responses of natural systems or species to change. In the context of climate change adaptation, this Strategy refers to human actions designed to minimise the negative effects of anticipated climate change and capitalise on positive opportunities associated with impacts, as well as the changes that will occur in natural systems as climatic conditions change.

Adaptive management—Adaptive management is environmental management practice that accommodates uncertainty and responds to events as they unfold. It involves taking a structured, iterative approach to finding the best options for action in the face of uncertainty and risk. It includes monitoring change over time, so that the results of management choices can be assessed and changes made if needed to improve future management. Adaptive management is often characterised as 'learning by doing'.

Aquatic ecosystems—Ecosystems are classed as aquatic where water determines ecosystem functioning or character, whether the water is flowing or standing, persistent or intermittent. Aquatic ecosystems include fresh, brackish and saltwater ecosystems, and terrestrial, subterranean and marine ecosystems.

Biodiversity (biological diversity)—Biodiversity is the variability among living organisms from all sources (including terrestrial, aquatic, marine and other ecosystems and the ecological complexes of which they are part), at all levels of organisation, including genetic diversity, species diversity and ecosystem diversity.

Biodiversity accounts—Used here as a general term for biological/ecological measures included in *environmental accounts*. Environmental accounts are any systematic compilation of stock, flow or state data relating to the environment or natural resources, measured in physical and/or monetary units.

Biological diversity—See *biodiversity*.

Clearing—Removal of any native vegetation or protected regrowth.

Climate change—Any long-term significant change in the average weather that a given region, or the Earth as a whole, experiences. In recent usage, the term climate change often refers to changes in the contemporary climate due to human activities, primarily the emission of greenhouse gases to the atmosphere (this is sometimes called anthropogenic climate change, or global warming).

The Intergovernmental Panel on Climate Change (IPCC) definition refers to a statistically significant variation in either the mean state of the climate or in its variability, persisting for an extended period (typically decades or longer). It can be due to natural internal processes or external forces, or to persistent anthropogenic changes in the composition of the atmosphere or in land use. The IPCC, an intergovernmental scientific body set up by the World Meteorological Organization and by the United Nations Environment Programme, was established to provide decision makers and others interested in climate change with an objective source of scientific information about climate change.

Climate change refugia (plural of refugium)—A refugium is an area that has escaped or will escape changes occurring elsewhere and continues to provide a suitable habitat for a species which would not be able to survive under prevailing conditions. Climate change refugia is used in reference to areas that may provide habitat for species displaced as the climate changes.

Conservation—In relation to biodiversity, conservation is the protection, maintenance, management, sustainable use, restoration and improvement of the natural environment; in relation to natural and cultural heritage, conservation is, generally, keeping in safety or preserving the existing state of a heritage resource from destruction or change.

Connectivity conservation—A management approach that focuses on the maintenance and restoration of functioning natural ecosystems across landscapes and marine areas, and requires systematic conservation planning that:

- identifies management responses at multiple scales
- uses whole-of-landscape or whole-of-seascape approaches
- takes into account the dynamics of climate change.

Connectivity is built around core habitats (also known as refugia), some of which are protected in reserves, which are linked and buffered across different land uses and marine and coastal zones in ways that maintain critical ecological and evolutionary processes and thereby strengthen the resilience of biodiversity.

Connectivity corridors—Connectivity corridors are elements of the landscape which, by linking otherwise isolated areas, permit movement of organisms or genetic flows across the landscape. This is a more general term than wildlife corridors, which are strips of habitat that permit movement of animals between otherwise isolated patches of habitat.

Critical ecosystems—Ecosystems that are crucial to the survival of particular threatened species, populations or ecological communities.

Degradation—In the context of environmental values, degradation refers to a loss of quality or functionality. It is used in various ways, e.g. forms of land degradation include salinity, wind erosion, water erosion, soil acidity and

waterlogging; degradation of vegetation may refer to loss of extent, condition or capacity to self-regenerate.

Drivers of biodiversity decline (direct and indirect)—Changes in biodiversity are almost always caused by multiple, interacting influences that work over time (such as population and income growth interacting with technological advances that lead to climate change). The term drivers is used in this Strategy to indicate natural or human-induced factors that directly or indirectly cause change in an ecosystem. Important direct drivers of biodiversity decline are habitat loss, fragmentation and degradation, invasive species, unsustainable use and management of natural resources, changes to the aquatic environment and water flows, changing fire regimes and climate change. These, however, are caused by indirect drivers which can be classified into the following broad categories: economic activity; demographic change; socio-political factors; cultural and religious factors; and scientific and technological change.

Ecological communities—Ecological communities are naturally occurring groups of plants and animals. Their species composition can be determined by factors such as soil type, position in the landscape, climate and water availability.

Ecological footprint—Our ecological footprint is a measure of our impact on the environment based on consumption of natural resources. There are different ways of calculating a community's footprint, but calculations generally take into account how much energy and natural resources a human community uses, expressed as a measure of how much land and water are needed to produce these resources.

Ecological processes—Actions and events that shape ecosystems. Understanding ecological processes—both continuous processes like nutrient cycling and carbon sequestration, and periodic or irregular disturbances like fire—is the key to the development and implementation of ecologically sustainable management.

Ecologically sustainable use—The use of a species or ecosystem within its capacity for renewal or regeneration.

Ecological sustainability— Ecological sustainability (often used in the context of ecologically sustainable development or use) describes a state in which biological systems will remain diverse and productive over time, even though change will occur. The idea of ecological sustainability recognises that human use or development of biological systems must be consistent with protection of biological diversity and maintenance of essential ecological processes and life-support systems.

Ecosystem—An ecosystem is a dynamic combination of plant, animal and micro-organism communities and their non-living environment (e.g. soil, water and the climatic regime) interacting as a functional unit. Examples of types of ecosystems include forests, wetlands, grasslands and tundra.

Ecosystem approach—see *whole-of-ecosystem approach*

Ecosystem diversity—Ecosystem diversity refers to the variety of habitats, ecological communities and ecological processes.

Ecosystem functions—As used in this Strategy, ecosystem functions are the mechanisms by which ecosystems generate supporting, providing, regulating and cultural services. For example, soil formation is a supporting service generated (in part) through microbial processing of organic and non-organic matter. Biodiversity plays a fundamental role in—and depends on—these complex, interlinked functions.

Ecosystem resilience—Resilience is used in this Strategy to refer to the capacity of an ecosystem to adapt to changes and disturbances, yet retain its basic functions and structures. A resilient ecosystem can adapt to shocks and surprises, and rebuild itself when damaged. Resilient ecosystems are more open to multiple uses and are more able to recover from management mistakes.

Ecosystem services—The functioning of natural ecosystems provides services essential to human survival and well-being. Natural ecosystems maintain the atmosphere; provide clean water; control soil erosion, pollution and pests; pollinate plants; and provide many other essential processes. The language of ecosystem services has emerged in recent decades as a way of representing the significance of the benefits humans derive from natural systems.

Environment—Includes ecosystems and their constituent parts, including people and communities; natural and physical resources; the qualities and characteristics of locations, places and areas; and their social, economic and cultural aspects.

Evolution—In biology, evolution is the process of change in the genetic material of a population of organisms through successive generations. The accumulation of these differences over time can cause substantial changes in a population, a process that can result in the emergence of new species.

Evolution is the product of two opposing forces: genetic processes that constantly introduce genetic variation; and mechanisms that determine if these variations will become more common or rarer in a population. One mechanism is natural selection, a process whereby traits that increase the chance of survival and reproduction become more common in a population while harmful traits become increasingly rare. Adaptations occur over many generations through successive, small, random changes in traits combined with natural selection of those variants best-suited for their environment. The other major mechanism driving evolution is genetic drift, an independent process that produces random changes in the frequency of traits in a population. Genetic drift results from the role that chance plays in whether a given trait will be passed on as individuals survive and reproduce.

Ex situ conservation—Conservation of species outside their natural habitat; for example, in zoos, botanic gardens and seed banks (compare with *in situ conservation*).

Fragmentation—Fragmentation is used in this Strategy to describe the result of removal (usually by clearing) of large parts of a natural area, resulting in the retention of only small parts (fragments or remnants) of habitat. Fragmentation is an issue for marine and other aquatic environments as well as terrestrial environments.

Genetic diversity—Genetic diversity refers to the variety of genetic information contained in individual plants, animals and micro-organisms.

Global biodiversity extinction crisis—see *mass extinction*.

Habitat—The locality or natural home in which a plant, an animal or a group of closely associated organisms live.

Habitat linkages—see *connectivity conservation*.

In situ conservation—Conserving species within their natural habitat (compare with *ex situ conservation*).

Indigenous Protected Areas program—The Indigenous Protected Areas program supports Indigenous Australians in caring for country. Information about Indigenous Protected Areas can be found at www.environment.gov.au/indigenous/ipa/index.html.

Invasive species—A species occurring beyond its accepted normal distribution and which threatens valued environmental, agricultural, marine or social resources by the damage it causes.

Landscape—All the natural features of land or territory encompassed in a single view (e.g. fields, hills, forests and water), which distinguish one part of the Earth's surface from another.

Market-based instruments and trading-based schemes—Market-based instruments are government interventions that encourage desired behaviour through market signals rather than through explicit directives. They include cap and trade schemes, auctions and information disclosure. Trading-based schemes are a subset of market-based instruments that focus on instruments involving trading.

Marine debris—Marine debris is one of the world's major marine pollutants. In Australia, plastic waste including plastic bags and derelict fishing gear (nets, lines and ropes) is one of the most harmful types of debris to marine wildlife. Plastics pose a particular threat due to their durability. Cigarette butts are another type of debris commonly found in Australian waters. Taking up to five years to break down in seawater, cigarette butts leach toxic chemicals and can be mistaken for food items, posing a direct threat to marine wildlife.

Mass extinction (also known as an extinction event or extinction-level event)—Mass extinction is a sharp decrease in the number of species in a relatively short period of time. Over 97% of species that ever lived are now extinct. Since life began on Earth, several major mass extinctions (most commonly numbered as five, but by some authorities up to twenty) have significantly exceeded the background extinction rate. The most recent mass extinction, known as the Cretaceous–Tertiary extinction event, occurred 65 million years ago.

National Reserve System (NRS)—Australia's network of protected areas, conserving examples of our unique landscapes, native plants and animals for future generations. The reserve system includes more than 9000 protected areas and is made up of national parks, Indigenous Protected Areas, reserves run by non-profit conservation organisations, and areas protected by landholders on private properties.

Nutrient runoff—Nutrients such as nitrogen and phosphorus play an important role in plant growth and the productivity of aquatic ecosystems. In excessive quantities, nutrients entering aquatic ecosystems can cause algal blooms which prevent light and oxygen from reaching other biota and may also be directly toxic. This can lead to high mortality among aquatic fauna. The major contributors of phosphorus to aquatic ecosystems are land clearing and erosion. Nitrogen comes primarily from fertiliser use, animal wastes and sewage discharges.

Offset—The term offsets is a general term used in this Strategy to mean measures that are taken, usually as a requirement under planning or conservation law, to compensate for the environmental impacts of a development or other land use action. For example, approval of a new residential development may depend on the developer setting aside an area of land for conservation to offset unavoidable loss of vegetation on the development site.

Precautionary principle—A principle of ecologically sustainable development whereby if 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.

Refugia (plural of refugium)—See *climate change refugia*.

Resilience—See *ecosystem resilience*.

Revegetation—The re-establishment of vegetation in areas that have been cleared or highly modified. The mix of plant species may not be the same as that of the original vegetation.

Species—A level of biological classification comprising one or more populations of individuals capable of interbreeding to produce fertile offspring.

Species diversity—Species diversity refers to the variety of species on the Earth.

State of the environment reporting—In Australia, regular state of the environment reporting occurs at both the national and state/territory level. Some regional-scale reporting also occurs in many areas throughout Australia. Generally, these reports provide a scientific assessment of environmental conditions, focusing on the effects of human activities, their significance for the environment and societal responses to the identified trends.

Sustainable—See *ecological sustainability*.

Sustainable use—See *ecologically sustainable use*.

Terrestrial—This literally means 'of the earth'; in this Strategy, terrestrial refers to environments other than aquatic or marine environments. It includes subterranean environments.

Threatened (in reference to species or ecological communities)—Threatened species or threatened ecological communities are those threatened with extinction or destruction. In the International Union for the Conservation of Nature Red List of Threatened Species the term 'threatened' encompasses, from most to least likely to become extinct: critically endangered; endangered; and vulnerable. This terminology is widely used in Australia, including in legislation relating to biodiversity conservation and protection.

Whole-of-ecosystem approach—The Conference of the Parties to the Convention on Biological Diversity (United Nations 1992, COP 5 Decision V/6) has described the ecosystem approach as 'a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way'. While this description is useful, its focus on equity is beyond the scope of this Strategy. This document therefore uses the term 'whole-of-ecosystem approach' to encompass the ecological (as opposed to social and economic) elements of this concept.

A whole-of-ecosystem approach takes into account the essential structure, processes, functions and interactions among organisms and their environment at multiple levels of biological organisation, recognising that humans, with their cultural diversity, are an integral component of many ecosystems. The main goals of such an approach are to:

- maintain viable populations of all native species in situ
- represent, within protected areas, all native ecosystem types across their natural range of variation
- maintain evolutionary and ecological processes
- manage over periods of time long enough to maintain the evolutionary potential of species
- accommodate human use and occupancy within these constraints.

Acronyms and abbreviations

CBD	Convention on Biological Diversity
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DEH	Department of the Environment and Heritage
DEST	Department of the Environment, Sport and Territories
DEWHA	Department of the Environment, Water, Heritage and the Arts
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
LGSA	Local Government and Shires Associations of New South Wales
IPCC	Intergovernmental Panel on Climate Change
MPA	Marine Protected Area
NAILSMA	North Australian Indigenous Land and Sea Management Alliance
NRM	natural resource management
NRMMC	Natural Resource Management Ministerial Council
NRS	National Reserve System
UNEP	United Nations Environment Programme

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Figure 2: Eucalypt woodlands showing estimated change since 1750

National Vegetation Information System Stage 1, Version 3, compiled with data supplied by state and territory custodians as detailed in data licence agreements for the 2005 update.

Figure 5: Geographical distribution of threatened species

Known and likely occurrence of threatened species from Species profile and threats (SPRAT) database, DEWHA compiled 2010.

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