NSW GOVERNMENT

Draft New South Wales Biodiversity Strategy 2010–2015

Have your say

Written comments are requested by Friday 21 January 2011, addressed to:

Draft NSW Biodiversity Strategy 2010–2015 Comments
Department of Environment, Climate Change and Water NSW
PO Box A290,
Sydney South, NSW 1232

Or email to: biodiversity.strategy@environment.nsw.gov.au

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Draft New South Wales Biodiversity Strategy 2010–2015

Prepared by the Department of Environment, Climate Change and Water NSW and
Industry and Investment NSW for the NSW Government

Cover photographs (anticlockwise from main image):
Dunns Swamp in Wollemi National Park (You Shoot); brush-tailed rock-wallaby (M van Ewijk); biscuit starfish (D Harasti); soil in hand (B Rickwood/DECCW)

Photo credits in Part B

Alpine Complex	Alpine everlasting (S Cohen/DECCW)
Arid Acacia Shrublands	Booberoi (K Ross/DECCW)
Arid Chenopod Shrublands	Near Yathong (K Ross/ DECCW)
Dry Sclerophyll Forest	Sugarloaf Range (M van Ewijk)
Grasslands	A population of vulnerable Yass daisies (B Rickwood/DECCW)
Grassy Woodlands	Point Lookout (M van Ewijk)
Heathlands	Tomaree heath and islands (G Wood/DECCW)
Rainforests	Rainforest (P Green)
Semi-Arid Woodlands	Rosewood stand at Yathong (K Ross/DECCW)
Wet Sclerophyll Forest	Blue gum forest in Blue Mountains National Park (You Shoot)
Forested Wetlands	Murray River (M Dahlem)
Freshwater Wetlands	Nocoleche Nature Reserve Wetland (J Winter/DECCW)
Rivers	Confluence of the Darling and Murray rivers (S Cohen/DECCW)
Estuaries and Coastal Lakes	Port Hacking estuary, Amble (Wikimedia commons)
Marine Waters	Marine environment (M Cufer)
Threatened species	Oystercatchers at Wallaga Lake (S Cohen/DECCW)

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Ministers' foreword

The people of New South Wales place a high value on our state's unique natural environment – they enjoy our national parks, forests, rivers and coastline as well as the native plants and animals that are found across the state.

It is our great pleasure to present the draft NSW Biodiversity Strategy 2010–2015 which, with the support of private landholders, industry and the general community, can help protect our impressive variety of native plants and animals and ecosystems.

The state's first Biodiversity Strategy was released in 1999. It was an important initiative, advancing our knowledge and capacity, and leading to many conservation achievements.

Nevertheless, biodiversity in New South Wales continues to face significant challenges. As well as continuing to address the legacy of past land-use impacts on biodiversity, we need to tackle ongoing and emerging threats, such as invasive species and climate change.

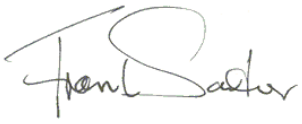
Climate change has the potential to exacerbate other threats to biodiversity and cause shifts in the distribution of plants and animals, particularly if they are impeded by the removal and fragmentation of habitat. There's little doubt that future landscapes will change, but biodiversity can be maintained if we work together with the best available information to keep nature's options open.

Recent reforms in New South Wales have strengthened our institutional capacity to tackle natural resource management more effectively. They have introduced market-based mechanisms to achieve biodiversity gains where previously there was only cumulative loss. New incentive mechanisms are encouraging landholders to make conservation commitments across the state.

This draft Strategy identifies actions that we will continue to implement with our partners to manage biodiversity and its threats. It breaks new ground by establishing mapped priorities to inform public and private investment in native vegetation conservation across the state. This signifies a substantial step towards safeguarding our biodiversity and our productive environment for the future.

As the draft Strategy identifies that more than 60% of these Priority Areas are managed by private landholders, including Western Lands Leases, partnerships with private landholders are essential in order to maximise biodiversity outcomes. The draft Strategy outlines actions to integrate biodiversity and production outcomes. Improving or maintaining these landscapes is essential for biodiversity and the ecosystems that they drive.

We wish to thank all of those who contribute to building healthier and more resilient ecosystems in New South Wales.



Frank Sartor

Minister for Climate Change and the Environment

Steve Whan

Minister for Primary Industries and
Minister for Rural Affairs

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Executive summary

Biodiversity is important both for its intrinsic value and the ecosystem services it provides to society. Healthy ecosystems are critical to the wellbeing of current and future generations.

Although significant achievements in biodiversity conservation have been made over the last 10 years, ongoing efforts are required to ensure the survival of our native flora and fauna. The introduction of a new NSW Biodiversity Strategy is a commitment in the NSW State Plan (NSW Government 2010a)

The draft *NSW Biodiversity Strategy 2010–2015* (the draft Strategy) outlines key objectives, actions and targets to direct investment in biodiversity conservation. This document includes:

- prioritisation of state-scale investment for terrestrial ecosystems across 6% of New South Wales to coordinate and target investment and effort in biodiversity
- an action to deliver transparent prioritisation of threatened species recovery programs between species and locations to maximise return for effort
- greater focus on biodiversity in urban settlement planning processes to minimise impacts on biodiversity and to offset unavoidable impacts using secure, well-targeted offsetting mechanisms
- support for existing efforts to build connections between Aboriginal people and Country, and for cultural biodiversity-related business, employment and training opportunities for Aboriginal people
- support for non-government, government and catchment management authorities (CMAs) conservation partnerships like the Great Eastern Ranges Initiative
- continued focus on existing programs such as reserve expansion and management, invasive pest and weed control and a range of programs underway to ensure the health and sustainability of our rivers and wetlands
- ongoing support for the range of sustainability programs currently implemented by rural landholders including sustainable grazing, rehabilitation and riparian management and soil erosion strategies.

The *Framework for action* is contained in Part A of this draft Strategy. Part B presents profiles on 15 ecosystems and identifies state-scale Priority Areas for native vegetation management in terrestrial ecosystems. A profile that outlines how threatened species will be prioritised under the NSW *Threatened Species Conservation Act 1995* (TSC Act) and *Fisheries Management Act 1994* (FM Act) is also presented.

The draft Strategy recognises that the complementary role of landholders, industry, government and the wider community in biodiversity investment is vital. The draft Strategy has been developed through the sound application of robust science and promotes collaborative effort to ensure that the best outcomes possible can be achieved.

The draft Strategy is on public exhibition for 30 days. Submissions can be made to biodiversity.strategy@environment.nsw.gov.au. Following the consultation period, submissions will be reviewed and a final Strategy will be released for implementation.

Abbreviations

AEW	Adaptive Environmental Water
BFT	Biodiversity Forecasting Toolkit
CA	Conservation Agreement
CAR	comprehensive, adequate and representative
CAP	Catchment Action Plan
CMA	catchment management authority
DECCW	Department of Environment, Climate Change and Water NSW
DSEWPC	Department of Sustainability, Environment, Water, Population and Communities (Commonwealth)
DoP	NSW Department of Planning
I&I NSW	Industry and Investment NSW
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)
EPI	environmental planning instrument
FM Act	*Fisheries Management Act 1994* (NSW)
GERI	Great Eastern Ranges Initiative
KTP	Key Threatening Process
LGSA	Local Government and Shires Associations of NSW
LHPA	Livestock Health and Pest Authority
LPMA	Land and Property Management Authority
MDB	Murray–Darling Basin
MDBA	Murray–Darling Basin Authority
MER	monitoring, evaluation and reporting
NCT	Nature Conservation Trust
NGO	non-government organisation
NPW Act	*National Parks and Wildlife Act 1972* (NSW)
NRAC	NSW Natural Resources Advisory Council
NRC	Natural Resources Commission
NRM	natural resource management
NRMMC	Natural Resource Management Ministerial Council
NSW	New South Wales
NV Act	*Native Vegetation Act 2003* (NSW)
PAS	Priorities Action Statement
PVP	Property Vegetation Plan
ROC	Regional Organisation of Councils
TAP	threat abatement plan
TSC Act	*Threatened Species Conservation Act 1995* (NSW)
TSR	travelling stock route
WWF	World Wildlife Fund Australia

Key concepts

In this draft Strategy, **state-scale investment priorities** have been established for 15 broad terrestrial and aquatic ecosystems in New South Wales.

State-scale investment priorities comprise:

- spatial (or mapped) Priority Areas for eight terrestrial ecosystems and one aquatic ecosystem – Alpine Complex, Dry Sclerophyll Forests, Grasslands, Grassy Woodlands, Heathlands, Rainforests, Semi-Arid Woodlands, Wet Sclerophyll Forest and Forested Wetlands, and
- non-spatial (unmapped) priorities for two terrestrial ecosystems – Arid Acacia Shrublands and Arid Chenopod Shrublands
- priority actions for four aquatic ecosystems – Freshwater Wetlands, Estuaries and Coastal Lakes, Rivers and Marine Waters.

The mapped Priority Areas are priorities for investment because they are generally: in moderate to good condition; well-connected with the surrounding landscape; part of a highly cleared, and/or degraded type of vegetation; and floristically distinct from other, well-conserved types of vegetation. In other words, the Priority Areas are the best remaining examples of native vegetation belonging to ecosystems that have experienced high rates of past clearing, degradation and/or fragmentation. The vegetation in these Priority Areas is likely to respond well to management. High conservation value assets in good condition are not identified as state-scale investment priorities to improve condition.

The 15 ecosystems are:

Terrestrial ecosystems

- Alpine Complex
- Arid Acacia Shrublands
- Arid Chenopod Shrublands
- Dry Sclerophyll Forests
- Grasslands
- Grassy Woodlands
- Heathlands
- Rainforests
- Semi-Arid Woodlands
- Wet Sclerophyll Forests

Aquatic ecosystems

- Forested Wetlands
- Freshwater Wetlands
- Estuaries and Coastal Lakes
- Rivers
- Marine Waters

An **ecosystem profile** for each of these ecosystems is presented in Part B.

Priority Area maps identify Priority Areas at a state scale for investment in terrestrial ecosystems as well as Forested Wetlands.

Priority Areas are represented by the areas coloured purple in the *Priority Area maps*. Maps can be downloaded from http://mapdata.environment.nsw.gov.au.

Purpose of this draft Strategy

Biodiversity is under increasing pressure from threats such as habitat loss, climate change and invasive species. While conserving biodiversity provides critical ecosystem services, the community has a broad range of other aspirations that need to be met through natural resources management. Smart investment in biodiversity conservation is more important than ever. Scarce funds must be targeted to areas where conservation efforts will achieve the greatest biodiversity benefit.

The majority of New South Wales is managed by private landholders. Effective implementation of the proposed actions can only be achieved through improved partnerships with landholders, non-government organisations, local government, Aboriginal communities and community groups at a regional and local level. Catchment management authorities (CMAs) and local government are critical regional delivery agencies and conduits for building partnerships with the community for biodiversity conservation at a local level. Sympathetic management of different types of land use can make a significant contribution to biodiversity conservation.

This draft Strategy identifies important new initiatives and a redirection of current efforts that will target investment in terrestrial, aquatic and marine programs for the next five years. It builds on the comments received on *A New Biodiversity Strategy for New South Wales: Discussion Paper* (DECC 2008a) as well as acknowledging the significant advances and continuing efforts since the first NSW Biodiversity Strategy (1999). This draft Strategy is also consistent with the requirements of s.140 of the TSC Act (see Appendix 1).

Alignment with Australia's Biodiversity Conservation Strategy 2010–2030

At a national level, Australia's biodiversity conservation strategy has been released, thereby fulfilling Australia's obligations to the *International Convention on Biological Diversity 1992* (CBD 1992). The draft NSW Biodiversity Strategy is consistent with the vision and directions contained in *Australia's Biodiversity Conservation Strategy 2010–2030* in that the biodiversity of New South Wales is recognised as '*healthy, resilient to climate change and valued for its essential contribution to our existence*' (Commonwealth of Australia 2010).

Australia's Biodiversity Strategy identifies three national priorities for action to achieve healthy and resilient biodiversity and provide a basis for living sustainably:

Priority 1: Engaging all Australians
Priority 2: Building ecosystem resilience in a changing climate
Priority 3: Getting measurable results

This draft Strategy is consistent with, and will contribute to, these national priorities (Appendix 5).

This draft Strategy is divided into two parts:

Part A: Framework for action – includes the overarching objectives, targets and actions

Part B: State ecosystem profiles and priorities – state-scale profiles and priorities for investment by ecosystem and threatened species profile

Part A: Framework for action

Biodiversity matters

Biodiversity includes all plants, animals, fungi, bacteria and other micro-organisms in the natural environment. It encompasses three components: genes, species and ecosystems, which comprise composition (species and genes), structure (vegetation and landscape structure) and function (ecosystem processes including nutrient and energy cycling).

Biodiversity contributes to providing the ecosystem services that form our natural capital: fresh water, clean air, soil fertility and biological pest control. It is fundamental to our physical, social, cultural and economic wellbeing as well as having its own intrinsic worth. Ecosystem services are produced by the functions that occur in healthy ecosystems. These can be divided into four groups:

1. provisioning services (e.g. food, fibre, fuel and fresh water)
2. cultural services (e.g. spiritual values, recreation and aesthetic values, knowledge systems)
3. supporting services (e.g. primary production, habitat provision, nutrient recycling, atmospheric oxygen production, soil formation and retention)
4. regulating services (e.g. pollination, seed dispersal, climate regulation, pest and disease regulation, water purification).

Contributors to biodiversity conservation in New South Wales

Biodiversity conservation and management is delivered by a large number of private and public land managers across New South Wales. The role of private land managers is critical as 73% of the state is managed for primary production purposes (ABS 2009). These land managers are further supported in managing biodiversity by the activities of a broad range of groups working across local, regional, state and national scales and include government agencies, non-government organisations (NGOs), statutory and non-statutory Aboriginal organisations, business and industry bodies, the scientific community and community groups. The roles and functions of these groups are outlined in Appendix 2.

The development of partnerships to deliver biodiversity is essential to ensure that appropriate, long-term outcomes are achieved and that the capacity of all parties is improved. This is implicit in the actions outlined below. CMAs play a key role in the regional delivery of natural resource management, along with local government. Large scale conservation projects, such as the Great Eastern Ranges Initiative and Habitat 141, provide an effective model for collaborative partnerships that achieve targeted local outcomes and contribute to broader biodiversity conservation outcomes.

Aboriginal people and the environment

The spiritual values of the natural environment have a special meaning to Aboriginal people. In the Aboriginal world view, people and Country (including traditional lands and seas) are an integral whole and the entire landscape has spiritual significance. This means that there is no separation of nature and culture, and the health of the natural environment and Aboriginal people are intimately connected. The wellbeing of Aboriginal people is therefore influenced both by the health of the environment and the degree to which they can be actively involved in caring for it. Reconnection with Country is an important part of Aboriginal culture and identity.

Current Australian Government and State Government policy directions support involvement of Aboriginal people in the management of their Country, across the whole landscape, regardless of tenure. Access to Country and its resources is essential so Aboriginal people can continue cultural practices, maintain links with the land and care for Country. Aboriginal communities obtain cultural, social and economic benefits through being involved in environmental management and conservation. The objectives in this draft Strategy integrate the involvement of Aboriginal people in the management of biodiversity on Country.

Achievements and ongoing programs

New South Wales has delivered significant conservation achievements since the first NSW Biodiversity Strategy was released in 1999. Some of the notable achievements and programs are outlined in Appendix 3 and include:

- significant expansion of the terrestrial and marine reserve system to protect biodiversity, complemented by negotiated Conservation Agreements with private landholders
- native vegetation management reform delivered through the *Native Vegetation Act 2003* which prevents broad-scale clearing of native vegetation unless it improves or maintains environmental outcomes
- establishment of 13 CMAs under the *Catchment Management Authorities Act 2003* to improve the involvement of regional communities in decision making to protect and enhance natural resources across the state
- introduction of the *Water Management Act 2000* which provides for secure water entitlements and the opportunity to use the market to buy water for the environment
- development of new markets, such as BioBanking, for protecting biodiversity and threatened species on private land
- prioritising actions required to ensure the recovery of threatened species, populations and ecological communities through the Priorities Action Statement under the *Threatened Species Conservation Act 1995* (TSC Act) and the *Fisheries Management Act 1994* (FM Act)
- development and implementation of threat abatement plans which provide a strategic, cross-tenure model for reducing the impact of widespread invasive species (through the NSW Invasive Species Plan) and other threats to threatened species and ecological communities
- development and implementation of sustainable fishery management strategies for the state's major commercial fisheries and fish stocking activities
- establishment of formal joint management arrangements with Aboriginal communities to manage national parks which now cover more than one-fifth of the NSW reserve system
- successful delivery of the 'start up' phase of the Great Eastern Ranges Initiative which provides a model for collaborative regional partnerships to enhance connectivity and improve habitat in targeted areas at all scales
- significant river and wetland conservation outcomes delivered through the recovery and management of environmental water and strategic investment in river and wetland rehabilitation
- release of regional strategies for all high growth areas of the state, that recognise important biodiversity corridors and areas of conservation value, as well as important areas of natural resources and cultural landscapes.

The NSW Government is committed to continuing the programs associated with these achievements.

Need for action

Despite these achievements in biodiversity conservation, much remains to be done to address the combined legacy of rapid population growth and the resultant consumption, agricultural impacts, urban development and past unsustainable natural resource management practices that have occurred since European settlement. Only 9% of the native vegetation cover is considered to be in a base-line or original condition state. Twenty-six per cent (26%) of the native vegetation cover is significantly degraded, while the remainder is either non-native (13%), or has been modified (52%) (DECCW in press a).The *NSW State of the Environment Report* (DECCW 2009a) indicates that most inland rivers are in poor ecosystem health and the condition of wetlands continues to decline, mainly due to the effects of drought, water extraction and altered flow regimes.

New South Wales has experienced declines and extinctions in a broad suite of native plants and animals since European settlement. Almost one-fifth of mammal species in the state (26 of 138 species) are now presumed extinct. In addition, 33 species of plants, 12 species or subspecies of birds, 2 species of fish and 1 species each of reptile and invertebrate are also now presumed extinct. Similarly, river regulation, degradation of riparian vegetation, over-fishing, introduction of exotic species and the removal of large woody debris (trees and

branches that have fallen into rivers that provide fish habitat) have impacted on the state's aquatic biodiversity.

The main threats to biodiversity in New South Wales are:

- loss, fragmentation and degradation of habitat
- competition, predation and infestation (e.g. by invasive species, disease and pathogens)
- unsustainable use of natural resources
- human-induced climate change.

Land-based impacts, marine biosecurity and marine pollution have been identified as additional threats to marine biodiversity and ecosystems (NRMMC 2008).

Human-induced climate change (from here on referred to as 'climate change') is a cross cutting issue that will affect most aspects of biodiversity management and conservation. The emerging threat of climate change will affect biodiversity directly through changes such as rising temperatures and sea levels, and changes in water availability and ocean chemistry. Climate change is likely to exacerbate many other existing threats to ecosystem function (e.g. habitat loss, changing fire regimes and invasive species). Reducing the impact of climate change on biodiversity requires a long-term approach and needs to incorporate implementation of effective mitigation and adaptation strategies.

Thinking beyond the local area

There is an increasing recognition that the level of threats to biodiversity will require thinking and action at much bigger scales and longer timeframes than before. Traditional approaches to regional planning and implementation of isolated local programs alone will not be sufficient to respond to issues such as climate change, widespread species decline and loss of critical landscape movement routes. Instead, identification of state-scale priorities and collaboration across regions will be needed to target action that can result in benefits beyond the local areas addressed.

Large-scale connectivity initiatives such as the Great Eastern Ranges Initiative and other 'iconic' landscape projects provide a common vision to link landscapes and target effort that will contribute to larger-scale biodiversity outcomes. They also optimise the skills, achievements and investment potential from the public and private sectors.

Importance of science

Information based on robust science is needed to ensure that policy development is evidence based. This draft Strategy has used science to explicitly identify state-scale priorities for investment that are easily interpreted by a range of users for action. Science underpins, and will continue to be essential to the development of programs to conserve biodiversity. This is undertaken through a range of partnerships with educational institutions and cooperative arrangements with research centres.

The Department of Environment, Climate Change and Water (DECCW) Knowledge Strategy 2010–2015, which is currently being developed, will set the strategic directions for science and research to support DECCW and the NSW Government to develop and implement effective policies and programs for addressing conservation and environment protection.

Industry and Investment NSW (I&I NSW) has produced several research plans to direct priorities, including the *Research for Action – fisheries and ecosystems (2009–2013)* (I&I NSW 2009a), *Research for Action – water (2009–2013)* (I&I NSW 2009b), *Research for Action – biosecurity (2009–2013)* (I&I NSW 2009c), *Research for Action – climate (2009–2013) (*I&I NSW 2009d) and *Research for Action – productivity and food production (2009–2013)* (I&I NSW 2009e), which integrate science and policy.

Themes, objectives, targets and actions

Building healthier and more resilient ecosystems is fundamental to biodiversity conservation. This draft Strategy identifies key themes that will contribute to building ecosystems that are healthy and resilient:

- Smarter biodiversity investment
- Whole of landscape planning
- Improved partnerships
- Effectively managing threats
- Sustainable production environments.

The objectives relate to these key themes and provide a context for the actions. The actions capture significant new priorities and major existing program areas but do not attempt to capture the entire range of efforts at different scales by all stakeholders. Greater explanation of existing programs is contained in Appendix 3.

In particular, there is an emphasis on using science to inform biodiversity priorities that can be integrated into a range of state and regional planning processes. This will improve the effectiveness of investments in biodiversity.

Fundamental to the delivery of programs is the encouragement of partnerships with communities and stakeholders. Partnerships have been successfully built into the delivery of significant reforms and initiatives such as the *Water Management Act 2000* (WM Act) and associated Rivers Environmental Restoration Program, the *Native Vegetation Act 2003* (NV Act) and associated natural resource management programs of CMAs, the establishment of demonstration river reaches for river rehabilitation and conservation partnerships such as the Great Eastern Ranges Initiative. The emphasis on sharing information and partnerships to deliver programs is implicit in the following themes in order to increase public awareness and participation in biodiversity and improve the delivery of outcomes.

Smarter biodiversity investment

Target 1:	**By 2015, state-scale priorities are incorporated into biodiversity and related planning processes including Catchment Action Plan updates and plans of management for reserves and other public lands.**
Target 2:	**By 2015, standard site-assessment tools have been taken up by public and private conservation organisations in New South Wales.**
Target 3:	**By 2015, recovery and threat abatement efforts will reflect the priorities set out in the Priorities Action Statements under the TSC Act and FM Act.**

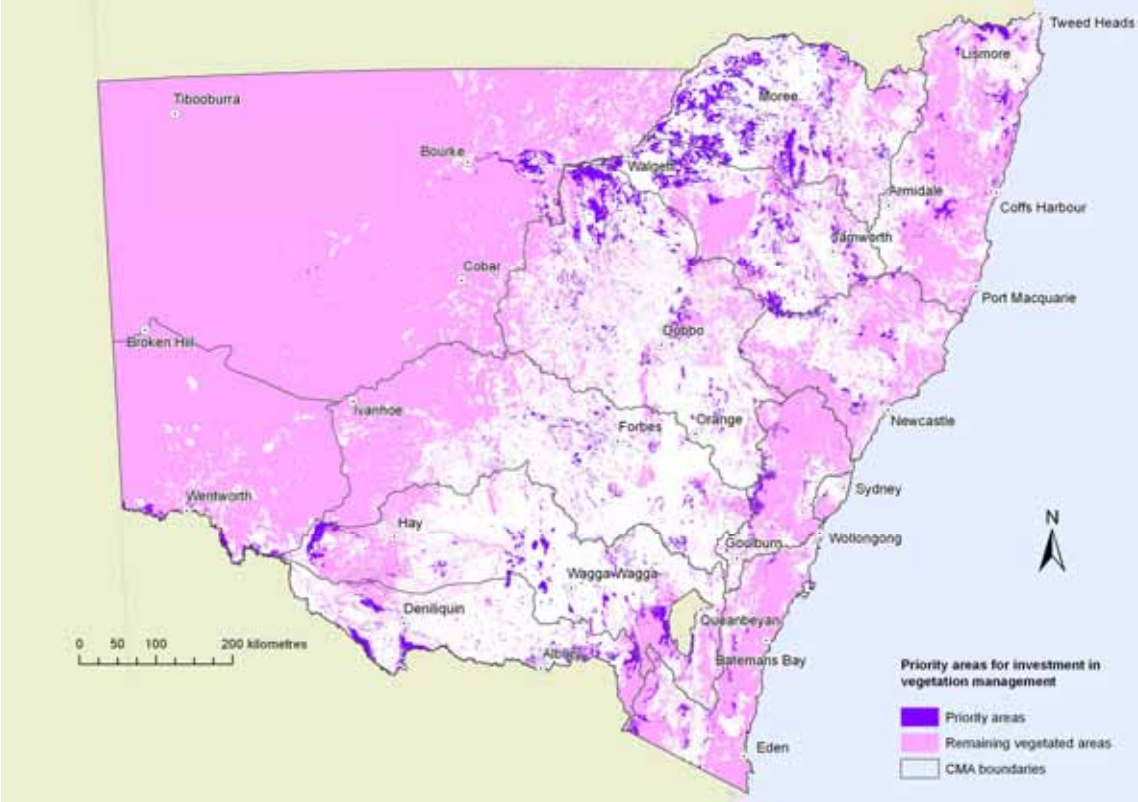
Objective 1: Direct public sector support for conservation efforts on private land towards state-scale priorities

This draft Strategy identifies high Priority Areas to focus investment in terrestrial vegetation management on private land (including forested wetlands). This is based on scientific assessment of the distribution, condition, diversity and configuration of remaining terrestrial vegetation in New South Wales[1]. These areas were identified using best available statewide data and will require interpretation and validation at local scales. Improvement in the condition of these areas is likely to benefit the greatest number of less well-conserved native species and so return the best biodiversity benefit for each conservation dollar invested. Map layers are available for download at http://mapdata.environment.nsw.gov.au.

Figure 1 identifies the state-scale Priority Areas for investment in native vegetation management. It does not identify well reserved ecosystems currently in good to pristine condition as an investment priority, as these areas do not require investment to improve their condition. However, these areas are of high conservation value and it is important that management continues to maintain their condition and that they be identified as important assets in any landscape assessments at catchment or regional scales.

[1] The analysis was not undertaken for Arid Shrublands due to data limitations. A target of 10% of remaining Arid Shrublands on private land was used.

Figure 1. NSW Priority Areas for investment in native vegetation management



Note: *Part B: State ecosystem profiles and priorities* provides information on the Priority Areas represented in this map. The map identifies areas that are generally: in moderate to good condition; well-connected with the surrounding landscape; part of a highly cleared, degraded and/or fragmented type of vegetation; and floristically distinct from other, well-conserved types of vegetation. In other words, Priority Areas are the best remaining examples of distinctive ecosystems that have been highly cleared and degraded across NSW. The map should be viewed at scale of 1:250,000. Site-assessment is required to confirm the map's values on the ground. In addition to the Priority Areas identified on this map, DECCW has other programs (such as threat abatement programs), which identify priority sites, and that also require investment.

Focused investment in private landholder vegetation management programs is important because a significant proportion of the state's Priority Areas exist on private land. Table 1 demonstrates that 62% of mapped priority terrestrial ecosystems exist on private land tenures or land managed by private landholders. For some ecosystems, such as Grasslands, this figure is as high as 82%. As Arid Shrubland priorities could not be mapped, 10% of the total Arid Shrubland area is the area over which investment in management could be beneficial. Specific locations are being identified through CMA programs. The total area of identified state-scale Priority Areas, mapped and unmapped, amounts to approximately 10% of the remaining native vegetation in the state, and 6% of the total land area of New South Wales.

The mapped and unmapped Priority Areas for terrestrial ecosystems comprise all the major terrestrial vegetation formations in New South Wales, including Grassy Woodlands, Grasslands, Forested Wetlands, Sclerophyll Forests and Rainforests. Part B describes the Priority Areas in each of these ecosystems and their derivation is explained in an associated technical report (DECCW 2010a).

It is proposed that this prioritisation be incorporated into Catchment Action Plans prepared by the 13 CMAs across New South Wales and that CMAs work with local landowners to improve vegetation management in these Priority Areas. CMAs and other partners are encouraged to invest in Priority Areas to achieve 'whole of landscape' outcomes by working across public and private tenures.

This draft Strategy proposes that a system of prioritisation for aquatic environments, including rivers, is initiated (see Objective 9.1).

Table 1: Extent of mapped Priority Areas within nine ecosystems on public and private land

Ecosystem	Total Priority Areas on public land (ha)[1] (% of total Priority Area for each ecosystem)	Total Priority Areas on private land (ha)[2] (% of total Priority Area for each ecosystem)	GRAND TOTAL
Grassy Woodlands	208,425 (29%)	512,250 (71%)	720,675
Grasslands	28,175 (18%)	130,600 (82%)	158,775
Semi-Arid Woodlands	355,050 (31%)	790,775 (69%)	1,145,825
Dry Sclerophyll Forests	209,750 (38%)	349,150 (62%)	558,900
Wet Sclerophyll Forests	183,650 (73%)	68,075 (27%)	251,725
Rainforests	63,000 (88%)	8,825 (12%)	71,825
Forested Wetlands[3]	166,400 (52%)	151,600 (48%)	318,000
Heathlands	4,050 (71%)	1,625 (29%)	5,675
Alpine Complex	6,850 (>99%)	25 (<1%)	6,875
Total[4]	**1,225,350 (38%)**	**2,012,925 (62%)**	**3,238,275**

1. Includes some Crown land that is managed by the private sector.
2. Includes Western Lands Leases which are Crown land managed by private leasehold title holders. Western Lands Leases are subject to regulatory controls through lease conditions administered by the Land and Property Management Authority.
3. Forested Wetlands is the only aquatic ecosystem that has spatial priorities in the draft Strategy. Mapped priorities for other aquatic ecosystems have not been identified (see Part B).
4. Arid Shrubland priorities could not be mapped so there is no information on the tenure. However, Arid Shrublands are largely managed by private leasehold title holders under the *Western Lands Act 1901.* Ten per cent (10%) of the total extent of Arid Shrublands is adopted as a priority for investment wherever native vegetation management would be beneficial. This amounts to 883,000 hectares of Arid Acacia Shrublands and 687,000 of Arid Chenopod Shrublands; Arid Shrublands which represent almost 2% of the area of New South Wales.

Objective 1: Actions	Responsibility
1.1 Incorporate state-scale priorities (identified in Part B) into state and regional biodiversity planning and investment programs such as the CAP updates	DECCW, I&I NSW, CMAs, local government, LPMA
1.2 Report on investment in Priority Areas in native vegetation management	CMAs, DECCW
1.3 Promote private land conservation, such as Conservation Agreements, incentive PVPs, GER and management contracts, in Priority Areas	DECCW, CMAs, local government, NGOs

Objective 2: Direct public land conservation efforts towards state-scale priorities

Alongside efforts to assist private landholders to manage Priority Areas, the draft Strategy also proposes to improve the management of biodiversity on public land. Public land managers are responsible for 38% of mapped Priority Areas in New South Wales including national parks (18%), state forests (5%), travelling stock routes (TSRs) (3%) and other Crown lands (12%) (DECCW 2010a).

As a first step, it is proposed that the national parks and nature reserves incorporate the state-scale priorities into their management planning processes (see Appendix 4 for a list of all relevant reserves). Other public land managers manage public land for a variety of uses including production forests, recreation and to support agricultural activities. Where possible, public land managers will adopt management approaches to improve the condition of the Priority Areas on public lands while maintaining the multiple-use objectives of these lands.

Objective 2: Actions	**Responsibility**
2.1 Integrate Priority Areas into biodiversity management planning on public lands, including the national parks and reserves listed in Appendix 4	DECCW
2.2 Develop mechanisms whereby other public land managers can invest in Priority Areas where possible	DECCW, LMPA, LHPA, I&I NSW

Objective 3: Improve the on-ground delivery of incentive schemes through the adoption of a common approach to site-assessment

This draft Strategy proposes to improve the delivery of private landholder incentive programs by supporting the roll-out of a common site-assessment tool. Significant progress has been made by CMAs and DECCW over the last five years in developing common site-assessment tools, and this work should be consolidated to support their adoption statewide.

These tools assist CMAs and other organisations interested in funding private land conservation works, as well as land managers interested in undertaking conservation works on their property, to:

- understand the natural values present
- determine the on-ground actions required to manage these values and the likely cost of these actions
- compare proposals to determine which offer the best value for money
- report on the effectiveness of the investment over time.

This work is important because it gives all parties involved, including landholders, CMAs and funding bodies, the confidence that the incentive process is cost-effective, transparent and properly targeted. The adoption of a common assessment tool for individual proposals combined with programs that target the state-scale Priority Areas identified by this Strategy (see Objective 1 and Part B) will provide a robust basis for the delivery of sound private land conservation programs in New South Wales. A common approach will also enable reporting on biodiversity outcomes for a range of purposes at different scales.

Objective 3: Actions	**Responsibility**
3.1 Make a standard site-based assessment and reporting tool widely available to CMAs and other organisations interested in investing in private land conservation programs	DECCW, CMAs
3.2 Trial the tool with a view to adoption by all CMAs in New South Wales, including processes to ensure review and amendment over time as required	CMAs, DECCW

Objective 4: Use a cost-effective approach to prioritise threatened species for recovery

This draft Strategy proposes to improve the way we invest in our threatened species. The aim of this work is to maximise the number of species recovered for the funds available and, in doing so, deliver efficient and effective recovery of threatened species (see the Threatened species profile in Part B for more information).

The draft Strategy proposes to achieve this by undertaking a comprehensive prioritisation of all threatened species listed under the TSC Act (with the exception of marine mammals). This prioritisation process will consider:

- the level of threat posed to threatened species
- the likelihood of recovery
- the cost of recovery.

This objective is an important complement to the first and second objectives. It recognises that some highly threatened species require targeted, site-level interventions such as exclusion fencing, habitat augmentation and captive breeding programs to maintain populations and prevent extinctions. This work will be achieved by revising the current Priorities Action Statements (PAS) maintained by DECCW, introducing transparent prioritisation between species.

For threatened fish and marine vegetation listed under the FM Act, priorities are currently identified within the draft PAS. I&I NSW proposes to work with the CMAs to develop a CMA report card approach within the final PAS to assist CMAs to target investment in, and report on, threatened species recovery and threat abatement in their regions.

Objective 4: Actions	**Responsibility**
4.1 Review, refine and implement the I&I NSW and DECCW PAS including the development of a supporting database and reporting on priority actions	DECCW, I&I NSW, CMAs, community
4.2 Work with CMAs on the development of report cards and implementation of priority actions for fish and marine vegetation conservation	I&I NSW, CMAs

Objective 5: Use market-based mechanisms to complement the range of private land conservation programs

This draft Strategy proposes to support the roll-out of market-based mechanisms as a way of improving the management of biodiversity in New South Wales. BioBanking is the principal market-based mechanism available for terrestrial biodiversity in areas where the NV Act does not apply. It provides a model to secure funding and biodiversity outcomes over time and uses a transparent metric to measure biodiversity values and potential improvement. BioBanking forms part of a broader spectrum of programs designed to encourage private land conservation through partnerships and agreements such as Conservation Agreements, incentive Property Vegetation Plans and management contracts.

BioBanking is a voluntary scheme whereby private landholders receive in perpetuity annual payments in exchange for undertaking management actions on their land. Biodiversity credits are created in BioBanking agreements that are designed to improve the capacity of land to provide habitat for native flora and fauna and, in particular, threatened species. BioBanking can be funded by developers who, in exchange for clearing vegetation as a consequence of development, pay for the equivalent improvement in biodiversity values by a private landholder elsewhere, by purchasing credits. Philanthropists and governments can also purchase credits to secure conservation outcomes. Funds generated from the sale of biodiversity credits are deposited into the BioBanking Trust fund. The funds plus investment earnings are used to make payments to the biobank site owner to help cover the cost of managing the site and its biodiversity values. BioBanking agreements offer a cost-effective, reliable and fully funded alternative that complements the protected area network.

The draft Strategy proposes to explore options to establish a similar market-based mechanism to include fish and marine vegetation under the FM Act.

Objective 5: Actions	Responsibility
5.1 Promote BioBanking agreements as the principal offset mechanisms in New South Wales where the NV Act does not apply and continue to refine the operation of the scheme in consultation with users	DECCW
5.2 Explore options to establish a market-based mechanism for fish and marine vegetation based on 'maintain or improve' principles	I&I NSW
5.3 Explore options to develop a sustainable funding base for private conservation programs, e.g. Conservation Agreements, incentive Property Vegetation Plans and management contracts	DECCW, I&I NSW

Whole of landscape planning

Target 4: By 2015, regional land-use planning processes are informed by landscape-scale biodiversity assessment and contain provisions that contribute to the protection of biodiversity.

Objective 6: Use strategic mechanisms to assess, conserve and improve biodiversity values in land-use planning

This draft Strategy proposes to strengthen the capacity of urban settlement planning processes to avoid, minimise and, if necessary, offset the impacts of new urban growth on biodiversity, including threatened species, and improve the efficiency and effectiveness of development assessment processes.

This will be achieved by supporting planning authorities to:

- undertake landscape-scale assessments to identify a region's biodiversity values. This way, the re-zoning of land for development can continue to avoid areas of high biodiversity value wherever possible and ensure that associated conservation actions contribute directly to the enhancement of regional corridors and significant areas of habitat
- biodiversity certify lands under the TSC Act. Rigorous landscape scale assessment and the delivery of properly targeted and managed offsets will enable future development to be exempt from site-based assessment.
- undertake strategic assessments under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) in an integrated manner alongside biodiversity certification processes.

Ensuring that urban settlement planning processes accommodate biodiversity values is essential. Once rezoned for an intensive use there are usually limited opportunities to avoid impacts at site scales or to manage the biodiversity values remaining within the urban matrix. Not only are site-based assessment processes inefficient and expensive, the outcomes often result in ongoing cumulative loss of biodiversity values.

This objective will be most relevant to new growth areas in New South Wales where population projections and changing demographics indicate continued high levels of urban growth.

DECCW will develop and support standard approaches to landscape-scale biodiversity assessment and the collection of the vegetation information required to support strategic land-use planning. This will include incorporation of the Commonwealth's requirements for assessment of nationally listed species and endangered ecological communities and implementation of the NSW Native Vegetation Mapping Strategy that is progressively improving the quality and availability of native vegetation mapping.

This strategic assessment work should also directly inform the development and refinement of Catchment Action Plans (CAPs). The signals provided by statutory planning instruments and strategies have significant and direct impacts on biodiversity outcomes and the linkages between these plans and CAPs is critical.

The state-scale Priority Areas in this draft Strategy represent priorities for investment. They do not represent all areas of high conservation value and they also include areas in a range of condition states. It is not necessary or always desirable to protect these areas in the course of undertaking land-use planning exercises. The Priority Areas should not be used in lieu of undertaking landscape-scale assessments of biodiversity values as part of land-use planning processes.

Alongside DECCW efforts to improve outcomes for terrestrial biodiversity, I&I NSW intends to facilitate aquatic biodiversity assessments by reviewing available data and decision support tools.

Objective 6: Actions	**Responsibility**
6.1 Support DoP's regional land-use planning processes including the development of regional planning strategies by undertaking landscape-scale assessments of biodiversity value and supporting councils to undertake these assessments at the local level	DECCW, CMAs
6.2 Work with the Commonwealth Department of Sustainability, Environment, Water, Populations and Communities to streamline strategic assessments under the EPBC Act	DECCW
6.3 Assist local government and DoP to biodiversity certify new growth areas of NSW where appropriate and requested	DECCW
6.4 Develop data and methodology to support landscape-scale assessments of aquatic biodiversity in land-use planning processes in partnership with relevant stakeholders	I&I NSW

Improved partnerships

Target 5: By 2015, there is a 25% increase in employment and participation of Aboriginal people in natural resource management, including biodiversity conservation.

Objective 7: Engage communities and develop partnerships that deliver conservation priorities

This draft Strategy proposes to support existing efforts to build connections between Aboriginal communities and their Country. The draft Strategy also supports the creation of cultural biodiversity-related business, employment and training opportunities for Aboriginal people that contributes to their social, cultural and economic wellbeing and to protecting and improving biodiversity.

Examples on the north coast of New South Wales have included the establishment of the 'Cultural Connections Model'. The project demonstrated a practical approach to creating partnerships with Aboriginal people for the benefits of cultural renewal and natural resource management. The Many Rivers Regional Partnership Agreement (Tweed to Hawkesbury) is a major cross-sector initiative to increase Aboriginal employment in emerging 'green economies'.

This work is part of a broader NSW Government commitment to work with Aboriginal communities. *Two Ways Together* (NSW Government 2003) is the Government's 10-year plan (2003–2012) to improve the lives of Aboriginal people and their communities. One of the priority areas is culture and heritage which incorporates strategies to strengthen Aboriginal connection

with Country. The State Plan: Green State priority action 9 (NSW Government 2010a) seeks to provide greater opportunities for Aboriginal people to take part in management of Country, including joint management of national parks, state forests and Crown lands.

This draft Strategy also supports conservation partnerships such as those offered by government, non-government agencies and CMAs including the Great Eastern Ranges Initiative. These programs complement the existing reserve network by increasing the amount of land managed for biodiversity, enhancing connectivity of areas at a wider landscape scale and thereby improving the resilience of biodiversity to major large-scale threats such as climate change. Community partnerships can bring together the collective skills and capacities of a range of groups from government, industry, academic and other voluntary sectors. By working together, collaborative community partnerships are able to achieve far more than separate action has been able to in the past. Objective 11 also addresses the need for improved partnerships across the landscape.

Objective 7: Actions	**Responsibility**
7.1 Develop a Country, Culture and Heritage Action Plan to increase Aboriginal participation in management of Country for a range of outcomes, e.g. economic, cultural and environmental	DECCW, communities
7.2 Establish a partnership agreement between the NSW Government, Australian Government, CMAs and the NSW Aboriginal Land Council (NSWALC) to collaboratively develop programs that support Aboriginal communities to care for Country	DECCW, CMAs, NSWALC
7.3 Develop Aboriginal cultural pathways tourism and education enterprises based on traditional knowledge	DECCW, communities
7.4 Apply the processes and principles contained in *Indigenous Engagement and Cultural Use of Fisheries Resources in NSW Marine Parks* (NRMMC 2008)	I&I NSW, communities
7.5 Support conservation partners involved in cross regional programs such as the Great Eastern Ranges Initiative and other connectivity programs that facilitate investment in Priority Areas	DECCW, NGOs, communities

Effectively managing threats

Selected Statewide NRM targets will inform the evaluation of the effectiveness of actions for this theme (Appendix 5)

Objective 8: Actively and effectively manage the terrestrial reserve system and marine protected areas as part of a broader landscape

This draft Strategy aims to further strengthen existing efforts to manage the reserve system in a broader social and landscape context. This means that reserve management will:

- be undertaken on a partnership basis with surrounding landholders and the community, particularly in the critical areas of pest, weed and fire management
- provide a model for best practice management of natural areas for all public land managers
- acknowledge and strengthen the social, historical and cultural connections that exist between people and our system of national parks and reserves
- adapt to change and be based on a sound understanding of the natural values present in the landscape.

Achieving these goals will require collaboration between DECCW, CMAs, LPMA, Forests NSW, LHPA, councils and other private and public landholders to manage broad-scale threats to biodiversity and native vegetation. This includes minimising the impacts of pests and weeds on priority biodiversity values wherever they occur.

DECCW's Park Management Program aims to achieve excellence in reserve management and requires that reserve planning takes wider catchment issues and priorities into consideration, including the connection between the terrestrial reserve system and marine protected areas and other public lands. DECCW will be aiming to more extensively collaborate on conservation outcomes with other public and private land managers who typically have multiple land-use objectives.

Objective 8: Actions	**Responsibility**
8.1 Integrate the management of threats to biodiversity in the reserve system and marine protected areas with the biodiversity conservation work of other stakeholders including CMAs and adjoining landholders	DECCW
8.2 Review zoning plans for marine parks focusing on the conservation of marine biodiversity and support for the sustainable use of marine environments	DECCW, I&I NSW and Marine Parks Authority
8.3 Improve the alignment of monitoring, evaluation and reporting systems and requirements within the terrestrial and marine reserve system to support environmental data analysis and reporting	DECCW, DoP, local government

Objective 9: Protect and restore aquatic ecosystems

The draft Strategy aims to further strengthen efforts to protect and restore aquatic ecosystems. It will achieve this by:

- ongoing collaboration between relevant stakeholders to implement river demonstration reaches as part of the Murray–Darling Basin Native Fish Strategy
- ongoing collaboration between relevant stakeholder to undertake 'fish friendly' initiatives that improve the habitat values of rivers and other aquatic environments for native fish
- better prioritisation of riparian restoration activities through improved understanding of riparian condition and priorities for management
- continued roll-out of the water sharing planning process to protect water required for fundamental ecosystem health for all water sources in New South Wales
- improved floodplain management and prevention of growth of floodplain harvesting through implementation of the Floodplain Harvesting Policy and preparation of valley-wide floodplain management plans. This will improve the health of floodplain wetlands and improve the overall flow distribution across and within floodplains. Floodplain management plans will map floodplain networks to improve floodplain connectivity and allow unimpeded passage for floodwaters
- strategic and targeted use of planned environmental water and adaptive environmental water sourced through water sharing plans and programs such as RiverBank, the Rivers Environmental Restoration Program, the Living Murray Program, the Wetland Recovery Program and the Water for Rivers Project
- expanding the development of a consistent spatial index of river condition, recently piloted in the Hunter-Central Rivers CMA, to the rest of New South Wales. The index provides a measure of aquatic macro-invertebrate biodiversity (and will be expanded to incorporate fish biodiversity data), riparian vegetation condition and hydrological stress, and can be applied to estuarine as well as freshwater environments.

These activities are important because aquatic systems and associated riparian habitats are highly productive environments for native flora and fauna. Aquatic systems are under significant threat from past and current land uses and these threats are likely to be exacerbated by a changing climate.

Objective 9: Actions	Responsibility
9.1 Develop a consistent spatial index of river condition to assist CMAs and other agencies to prioritise investment and regulation	DECCW, I&I NSW
9.2 Provide decision support tools to optimise ecological responses from the delivery of environmental water to major inland wetland systems, including the potential impact of climate change	DECCW
9.3 Develop and implement the NSW Fish Habitat Action Plan in consultation with stakeholders to define and prioritise actions over the next 10 years	I&I NSW, CMAs, MDBA, community
9.4 Finalise the draft Floodplain Harvesting Policy and develop valley-wide floodplain management plans	DECCW
9.5 Address priority barriers to fish passage in each CMA	I&I NSW, CMAs, local government

Objective 10: Effectively manage and control threats through cooperative partnerships with key stakeholders

This draft Strategy strongly supports the continuation of existing efforts to manage threats including invasive species. Invasive species pose one of the greatest threats to biodiversity in New South Wales, after land clearing and disturbance of native vegetation, and affects 70% of listed threatened species (Coutts-Smith & Downey 2006, Coutts-Smith *et al.* 2007).

Efforts to address invasive species include:

- the implementation of the *NSW Invasive Species Plan* (NSW DPI 2008) which delivers coordinated invasive species management using a risk-based approach
- the implementation of the NSW fox threat abatement plan (Fox TAP) which establishes long-term, cross-tenure control programs in those areas of New South Wales where the impacts of foxes on threatened and other native fauna are greatest
- the development of a feral goat TAP and potentially a feral cat TAP and mapping the distribution of pest fish, cane toads and feral deer, horses, donkeys and camels as a first step in the threat abatement planning process
- working with 124 Local Control Authorities under the *Noxious Weeds Act 1993* to control the spread of noxious weeds that are a threat to primary production, the environment and human health
- implementing the Bitou TAP and ongoing work to extend this approach to cover all weeds that threaten biodiversity in 11 out of the 13 CMAs in New South Wales
- ongoing research into improved methods to control aquatic, riparian and wetland weeds to prevent their spread into new areas. Attention is currently focused on high impact species such as alligator weed, water hyacinth, lippia and willows.

Addressing the impacts of climate change on biodiversity will need a long-term effort and new ways of thinking. To understand and address the needs of species and ecosystems to cope with climate change, DECCW has developed *Priorities for Biodiversity Adaptation to Climate Change* (DECCW 2010b) which outlines priority measures that DECCW will undertake over the next five years.

In addition, a number of current programs are also important in addressing other threats that impact on native flora and fauna. These include:

- ongoing research into appropriate fire management strategies and the incorporation of research outcomes into fire management planning
- implementation of the NSW Diffuse Source Water Pollution Strategy and the NSW Cold Water Pollution Strategy
- ongoing research to identify priorities for biodiversity adaptation to climate change and the development of strategies to address these priorities.

Objective 10: Actions	Responsibility
10.1 Undertake targeted control of pests and trial new control approaches	DECCW, I&I NSW, LHPA, CMAs, communities
10.2 Adopt an integrated multi-weed approach to the management of weeds using the TAP approach across all CMAs	DECCW, I&I NSW, LHPA, CMAs, communities
10.3 Review the standards for the protection of biodiversity within the Model Bushfire Risk Management Plan and the Bushfire Environmental Assessment Code for NSW to incorporate climate change projections and minimise the impact on biodiversity	RFS, DECCW
10.4 Promote ongoing negotiation, regulation and use of innovative approaches such as economic instruments, to improve discharges from point sources	DECCW
10.5 Undertake further investigation to identify the priorities for biodiversity adaptation to climate change and implement *Priorities for Biodiversity Adaptation to Climate Change*	DECCW

Sustainable production environments

Selected Statewide NRM targets will inform the evaluation of the actions for this theme (Appendix 5)

Objective 11: Support private primary producers to sustainably manage their resource through collaborative partnerships

This draft Strategy supports primary producers to integrate biodiversity objectives into the sustainable management of their natural resources. A significant proportion of biodiversity in New South Wales occurs within privately owned production landscapes including riparian and other remnant vegetation, wetlands and waterways. Productive landscapes need to be sustainably managed by primary producers for a range of commercial and biodiversity outcomes.

Existing efforts include:

- sustainable harvesting of native fish stocks and minimising impacts on bycatch (non-retained species)
- sustainable management of total grazing pressure from feral herbivores, over-abundant native herbivores and domestic stock
- sustainable management of soils through a range of actions including rehabilitation efforts, minimum or no-till practices, maintaining and increasing perennial plants and the careful use of fertilisers.

There is now greater focus on agricultural production systems which encourage and enhance all aspects of native and commercial biodiversity. Practices that suit the local environment and increase landscape health by retaining functionally valued native species include (Lines-Kelly 2003):

- production systems that enhance soil health, break disease cycles and use water more efficiently
- restoration of native plant communities and expanded use of native grasses in grazing
- farming within the capabilities of the soil and topography.

Primary producers are likely to become more engaged if they have a good understanding of the values of biodiversity and how biodiversity might be of direct benefit to their own operations. Promoting opportunities, and giving primary producers the means to effectively integrate biodiversity management with primary production activities, both remain challenges. A further challenge is to provide assistance to primary producers to adapt and respond to the impacts of climate change on biodiversity and production. The following actions therefore specifically target increased engagement of private landholders in biodiversity management to achieve this.

Actions	Responsibility
11.1 Engage in the development and implementation of the national policy on Ecosystem Based Fisheries Management	I&I NSW, DECCW, CMAs
11.2 Utilise the knowledge of Aboriginal fishers with respect to aquatic biodiversity through a new Indigenous Fishing Advisory Council to be established under the FM Act	I&I NSW
11.3 Support the promotion and adoption of existing best practice guides for the integrated management of biodiversity in production landscapes, e.g. ProGraze, Tactical Grazing Management, Fish Friendly Farms	I&I NSW
11.4 Promote environmentally sustainable management of stock watering points in dry rangelands	DECCW, I&I NSW, LPMA
11.5 Develop and implement the NSW Soils Policy to achieve integrated soil, land management and biodiversity outcomes	LPMA, I&I NSW, DECCW
11.6 Support primary producers to access incentive and stewardship schemes for best practice management that contribute to biodiversity outcomes	CMA, I&I NSW, LPMA
11.7 Promote and disseminate research and case studies that demonstrate the successful integration of biodiversity management in primary production	CMA, I&I NSW, LPMA

Measuring success

Specific draft Strategy targets and measures

This draft Strategy proposes that success is measured by reporting on progress against identified targets using a range of new and existing reporting processes (Appendix 6).

There is a number of existing monitoring, evaluation and reporting (MER) programs with their own specific requirements and timeframes that are proposed to inform the reporting on the final Strategy. Data can be drawn from each of these reports to inform the targets. Table 2 outlines the reporting arrangements for the five draft Strategy targets, identifying if the reporting exists or if modification to the MER program is required to accommodate the Strategy target.

The success measures identified for each objective reflect specific progress against actions, and so contribute to this Strategy's targets.

Statewide targets for NRM and the NSW MER strategy

The NSW Government has adopted 13 statewide NRM targets to help focus NRM investment and provide a basis for tracking progress on NRM issues in New South Wales. Their overall purpose is to ensure that natural resources continue to support the community's environmental, economic and social/cultural values in the long term. NRM activities undertaken by NSW agencies and the CMAs are directed towards achieving these targets (Appendix 5). Progress towards the 13 targets provides the basis for evaluating the effectiveness of government, industry and community efforts to conserve biodiversity.

A new NSW MER Strategy has been developed to guide MER effort in New South Wales over the period 2010–15 (DECCW, in press b). The MER Strategy involves monitoring, evaluating and reporting progress towards the NRM targets at state and catchment scales. The MER

Strategy will provide information and an assessment on the changes in the state of, and trends in, the condition of natural assets (longer term) as well as monitor program performance in terms of delivery of shorter-term foundational activities, outputs and intermediate outcomes.

Reporting on the statewide NRM targets will inform progress on all the themes in the draft Strategy and is outlined in Appendix 5. In particular, the selected NRM targets will provide information on the themes relating to 'Effectively managing threats' and 'Sustainable production environments' and no additional targets for these themes have been proposed for this draft Strategy.

Table 2. Reporting on the Strategy targets

Target	Success measures	Reporting	Responsibility
Target 1: By 2015, state-scale priorities are incorporated into biodiversity and related planning processes including Catchment Action Plan updates and plans of management for reserves and other public lands	• Catchment Action Plans incorporate state-scale priorities	Part of CAP update process	CMAs
	• 50% of CMA investment in private landholder vegetation management programs will be directed toward state-scale priorities	State of the Catchment CMA Investment Strategy reporting	CMAs CMAs
	• A system of prioritisation for aquatic environments will be in place by 2015	2015 reporting on the Strategy	DECCW, I&I NSW
	• Plans of management for national parks listed in Appendix 4 incorporate state-scale priorities.	As part of ongoing Plan of Management, and via State of the Parks reporting	DECCW
	• State of the Parks reporting includes information on investment in state-scale priorities	State of the Parks reporting	DECCW
	• Implementation pathways are identified for other public land managers	2015 reporting on the Strategy	DECCW in consultation with relevant land managers
Target 2: By 2015, standard site-assessment tools have been taken up by public and private conservation organisations in New South Wales	• A standard assessment and reporting tool has been adopted by CMAs and organisations involved in investing in private land conservation programs	Part of CAP update process	CMAs
	• Offsets for a range of developments in New South Wales are secured using BioBanking agreements	Number of BioBanking agreements reported in DECCW annual report	DECCW
	• Options for extending market-based tools to cover fish and marine vegetation are explored	2015 reporting on the Strategy	I&I NSW

Target	Success measures	Reporting	Responsibility
Target 3: By 2015, recovery and threat abatement efforts will reflect the priorities set out in the Priorities Action Statements under the TSC Act and FM Act	• A revised prioritisation for all threatened species will be publicly available by 2012	Threatened species Priorities Action Statement. reviewed every 3 years	DECCW, I&I NSW
	• CMA report cards produced		I&I NSW
Target 4: By 2015, regional land-use planning processes are informed by landscape-scale biodiversity assessment and contain provisions that contribute to the protection of biodiversity	• Landscape-scale assessments identifying high conservation value areas along with the state-scale investment priorities are incorporated into Catchment Action Plans and considered in regional land-use planning processes	Part of CAP update process Reflected in regional strategies	CMAs DoP
	• EPBC Act strategic assessments are undertaken concurrently with biodiversity certification processes where matters of National Environmental Significance may be impacted on by proposed urban growth	DSEWPC annual report	DSEWPC
	• Increased adoption of biodiversity certification by DoP and local government	DECCW annual report	DECCW (CCPP)
	• A methodology is available to support landscape-scale assessments of aquatic biodiversity in land-use planning processes	2015 reporting on the Strategy	I&I NSW
Target 5: By 2015, there is a 25% increase in employment and participation of Aboriginal people in natural resource management, including biodiversity conservation	• Country, Culture and Heritage Action Plan developed and implemented	Two Ways Together will report directly on the target	DECCW (CHD)
	• Increased number of cooperative programs that support Aboriginal management of Country	NSW State Plan reporting ('Stronger Communities' and 'Green State' priority actions)	DECCW (CHD)
	• Information is available to non-Aboriginal communities, where appropriate, that explains the significance of Country to Aboriginal people and communities	2015 reporting on the Strategy	DECCW, Aboriginal communities

Part B: State ecosystem profiles and priorities

New South Wales covers a land area of more than 80 million hectares. To maximise outcomes for biodiversity over such a large area, decisions on where to invest need to be made carefully. In response to this, the NSW Government has developed a set of Priority Areas for investment in native vegetation management.

NSW priorities for investment are presented in the Priority Areas Map in Part A (Figure 1). This section (Part B) presents these Priority Areas by ecosystem in a series of ecosystem profiles. Objectives 1 and 2 of the draft Strategy's 'Framework for action' (Part A) sets out a process for achieving smarter investment in Priority Areas on both private and public land.

List of ecosystem profiles

The draft Strategy divides the ecosystems of New South Wales into 15 types:

Terrestrial ecosystems:

- Alpine Complex
- Arid Acacia Shrublands
- Arid Chenopod Shrublands
- Dry Sclerophyll Forests
- Grasslands
- Grassy Woodlands
- Heathlands
- Rainforests
- Semi-Arid Woodlands
- Wet Sclerophyll Forests

Aquatic ecosystems:

- Forested Wetlands
- Freshwater Wetlands
- Rivers
- Estuaries and Coastal Lakes
- Marine Waters

All 15 ecosystems have been mapped and classified by Keith (2004) with the exception of 'Rivers', 'Marine Waters', and 'Estuaries and Coastal Lakes'.

In reality, these ecosystems are not discrete, but grade into one another across the landscape. Nevertheless, they provide a useful biodiversity planning framework that can be used to interpret and understand statewide investment priorities.

The 15 ecosystems are used as a surrogate for biodiversity. In doing so, it is assumed that if we target investment in Priority Areas of the state's ecosystems, we improve the conservation of the majority of its biodiversity. Threatened plant and animal species are prioritised separately in the Strategy (see Threatened species profile).

The ecosystem profiles:

- describe the conservation status and biodiversity value of each ecosystem
- map Priority Areas for investment in each ecosystem
- identify those responsible for managing Priority Areas
- identify the proportion of public and private lands that are a priority for investment, including the proportion of those lands where biodiversity conservation is already the focus of management effort
- acknowledge some of the Aboriginal groups that have cultural associations with the ecosystem
- identify the objectives (from the 'Framework for action', Part A) that are most critical to maintaining biodiversity in the Priority Areas.

Identifying Priority Areas for smarter investment

The Priority Area map (Figure 1, Part A), and the model used to derive it, have been designed to identify areas with a combination of the following four attributes:

- sites in moderate to good condition
- sites that are well-connected with the surrounding landscape
- part of a highly cleared, degraded and/or fragmented type of vegetation
- floristically distinct from other, well-conserved types of vegetation.

The result is a map that identifies the best remaining examples of native vegetation belonging to ecosystems that have experienced high rates of past clearing, degradation and/or fragmentation.

More information about how Priority Areas were identified can be found in the technical report that accompanies the draft Strategy (DECCW 2010a).

Features of the Priority Area maps

Priority Areas are mapped on both the Statewide Priority Area map (Figure 1, Part A) and on maps in each of the ecosystem profiles (Part B). It is important to remember that Priority Areas were identified by modelling at a state scale and the maps are designed to be viewed at a 1:250,000 scale. Site-assessment is therefore required to confirm Priority Area status when allocating investment to sites 'on-the-ground'.

The NSW Priority Area map identifies 6% of New South Wales where appropriate investment in native vegetation management is expected to yield the best outcome. This represents a greater area than current resourcing would allow us to actively manage. Therefore not all high Priority Areas will be actively managed over the life of this Strategy. Rather, the map provides a range of options for agencies, CMAs, landholders and other biodiversity investors to choose from. It also provides a 'prospectus' of important areas for investment for funding bodies wishing to increase investment in new areas.

The Priority Areas identified in this draft Strategy do not replace, but rather complement, priority sites that have been identified by other NSW Government conservation programs such as threatened species recovery or threat abatement programs (see Part A, draft Strategy). Priority sites in these programs may occur in locations that are different to areas identified as Priority Areas on the Strategy map. Investment in priority sites for threat abatement and species recovery will continue to be an important component of ongoing biodiversity programs.

The Priority Area map is not a High Conservation Value (HCV) map. Many of the 'best' areas for biodiversity in New South Wales have not been identified on the Priority Areas map because they contain vegetation that is already well-conserved. The Priority Area map is also not a 'restoration' map. It does not identify high Priority Areas for revegetation or intensive restoration in sites with very low biodiversity value or in very degraded landscapes. Rather, it identifies areas that have existing value for biodiversity, where management actions will enhance or maintain those values.

Priorities for investment in aquatic biodiversity are not mapped in the draft Strategy document (apart from Forested Wetlands), but are described in the text. Aquatic Priority Areas are identified by experts, and are based on existing programs of work. Developing a spatial prioritisation for aquatic ecosystems is a key action in the draft Strategy (see Part A).

Priority Areas for Arid Shrublands could not be mapped using the standard modelling approach (see Section 6 of the technical report for more discussion). Instead, an estimated 10% of the Arid Shrublands has been given priority status for investment in management, wherever vegetation would significantly benefit from reduced total grazing pressure. Ten per cent (10%) is the average proportion of all formations that are a priority for investment. A number of important sites for Arid Shrublands were identified by an expert panel with local knowledge, and are presented in the draft Strategy.

Clusters of Priority Areas (called 'priority clusters', and shown on the ecosystem profile maps) were identified by an expert panel. The priority clusters provide the reader with geographically

familiar reference points to aid on-ground identification of the mapped Priority Areas. It is important to note that the clusters do not encompass all of the Priority Areas, and are not listed in any particular order. In some cases, important but restricted clusters are not easy to see at the scale at which the maps are printed. A summary list of the priority clusters is in Appendix 7.

The Priority Area maps are static for the life of this Strategy. As investment translates into improvements on-the-ground, the priorities will change. The priority map will be updated for the next Biodiversity Strategy, to reflect revised priorities and improved information.

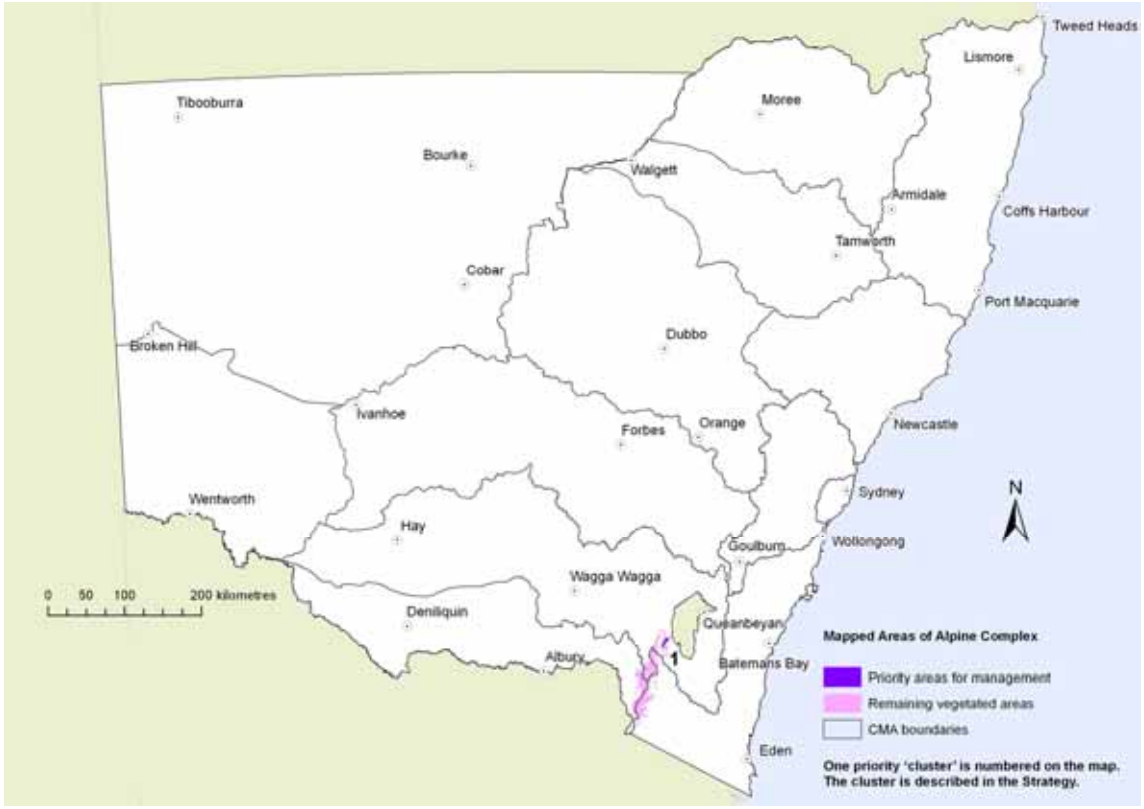
Alpine Complex

Perched on Australia's highest mountains, the alpine zone of New South Wales hosts a remarkable array of unique habitats, many of which are not found anywhere else in the world. Australia's alpine zone is lush and vegetated, unlike many of the icy, steep, rugged peaks of alpine areas elsewhere in the world. Small-leaved shrubs, herbs and tussock grasses dominate the vegetation, as the high altitude inhibits tree growth. The Alpine Complex supports approximately 50 species of plants and animals that are entirely restricted to the alpine zone of New South Wales.

The Alpine Complex of New South Wales is found above the tree-line on the Kosciuszko Plateau in the south of the state. Four distinct classes have been defined (Keith 2004; see also Appendix 8). The Alpine Complex occupies about 1500 square kilometres (<1% of the state). Less than 10% has been cleared over the past 200 years. Ninety per cent (90%) of the Alpine Complex occurs in remnants that are greater than 500 hectares.

The Alpine Complex is important to a number of Aboriginal groups, including Walgalu and Ngarigo.

Priority Areas for Alpine Complex management



Note: The map identifies areas that are a priority for investment in management because they are generally: in moderate to good condition; well-connected with the surrounding landscape; part of a highly cleared, and/or degraded type of vegetation; and floristically distinct from other, well-conserved types of vegetation. In other words, Priority Areas are the best remaining examples of distinctive ecosystems that have been highly cleared or degraded across NSW. The map should be viewed at scale of 1:250,000. Site-assessment is required to confirm the map's values on the ground. The number on the map refers to the identified priority cluster (Appendix 7).

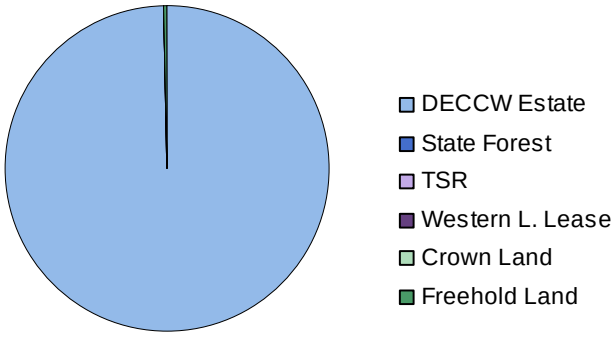
Where are the priority Alpine Complex ecosystems?

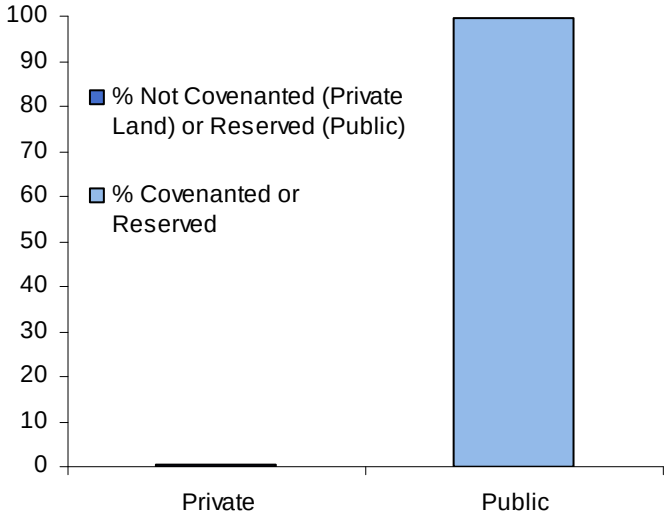
Seven thousand (7000) hectares of the Alpine Complex have been identified as a priority for management. This amounts to 5% of its total extent. Priority Areas of the Alpine Complex are the larger remnants, in moderate to good condition, located in well-connected landscapes. Only one cluster of Priority Areas has been identified, and is shown on the map:

1. Alpine vegetation around the Tantangara Reservoir in Kosciuszko National Park (part of the Great Eastern Ranges Initiative, 'Kosciuszko to Coast' priority partnership area).

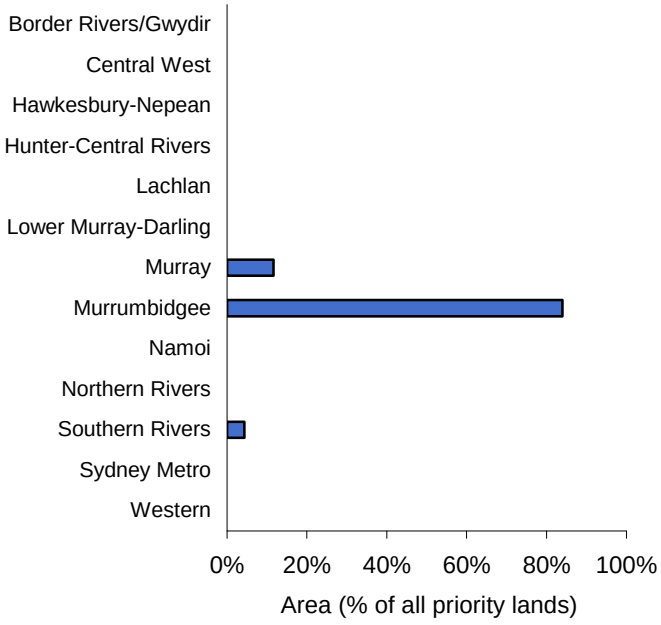
Who is managing the priority Alpine Complex ecosystems?

Almost 100% of the Priority Area within Alpine Complex is managed by DECCW in national parks and nature reserves.





The Alpine Complex spans the Murray, Murrumbidgee and Southern Rivers CMAs. The opportunities and imperatives for investment on private land in the Alpine Complex are minimal as only about 25 hectares of priority alpine vegetation occurs on private land.



Key objectives from Part A

Objective 8: Actively and effectively manage the terrestrial reserve system and marine protected areas as part of a broader landscape. Effective park management is important for ensuring a healthy future for Alpine Complex ecosystems given that 98% are managed by DECCW.

Objective 10: Effectively manage and control threats through cooperative partnerships with key stakeholders. The Alpine Complex is likely to be one of the ecosystems most heavily impacted by climate change. Introduced predators like foxes are also heavily impacting native alpine fauna.

Arid Acacia Shrublands

Arid Shrublands dominate the arid and semi-arid regions of far western New South Wales where the rainfall is too low to support a cover of trees. The low and unreliable water supply promotes an abundance of plants that are masters at water conservation. Arid Shrublands support an exceptionally rich diversity of reptiles, particularly in the more rocky habitats and those with plentiful spinifex hummocks. In some areas, dozens of lizard species co-exist in just a few square kilometres of desert. Mammals common to the Arid Shrublands include the red, western and grey kangaroos, which are often seen bounding across the landscape. Shyer mammals such as the fat-tailed dunnart and Mitchell's hopping mouse are common, and their tracks can be seen zigzagging across the sand. Emus, parrots, grass wrens, finches, pigeons and birds of prey all utilise the Arid Shrublands periodically when the fluctuating and unreliable resources of the desert become available.

Arid Shrublands can be low chenopod-dominated shrublands (<1.5 m) or tall acacia shrublands with shrubs large enough (>2 m) to be described as woodlands. There are four classes of Arid Acacia Shrublands in the arid and semi-arid regions of western New South Wales (Keith 2004; see also Appendix 8).

Arid Acacia Shrublands occupy about 90,000 square kilometres in inland New South Wales (11% of the state). Less than 10% of Arid Acacia Shrublands have been 'cleared' of vegetation; however, large areas have been overgrazed by domestic and feral animals. High total grazing pressure can be just as damaging to the biodiversity of the Arid Acacia Shrublands as clearing is to vegetation in the higher rainfall parts of the state. Overgrazing simplifies vegetation structure and destroys groundcover, thereby increasing erosion and reducing soil health, soil moisture and habitats for native fauna and flora. Arid Acacia Shrublands that have been overgrazed are generally less resilient to drought conditions.

Arid Acacia Shrublands are important to a number of Aboriginal groups, including Wangkamura, Barkindji, Ngemba, Budjiti, Ngiyampaa, Murra Warri, Euahlayi and Weilwan.

Where are the priority Arid Acacia Shrublands?

About 10% of Arid Acacia Shrublands (883,000 hectares) are a priority for investment wherever biodiversity would significantly benefit from management of total grazing pressure. These areas cannot be identified spatially, however, and need to be identified on the ground by individual site-assessments.

Despite this, an expert panel was able to identify a number of areas that are likely to be a priority for investment in Arid Acacia Shrublands. These are:

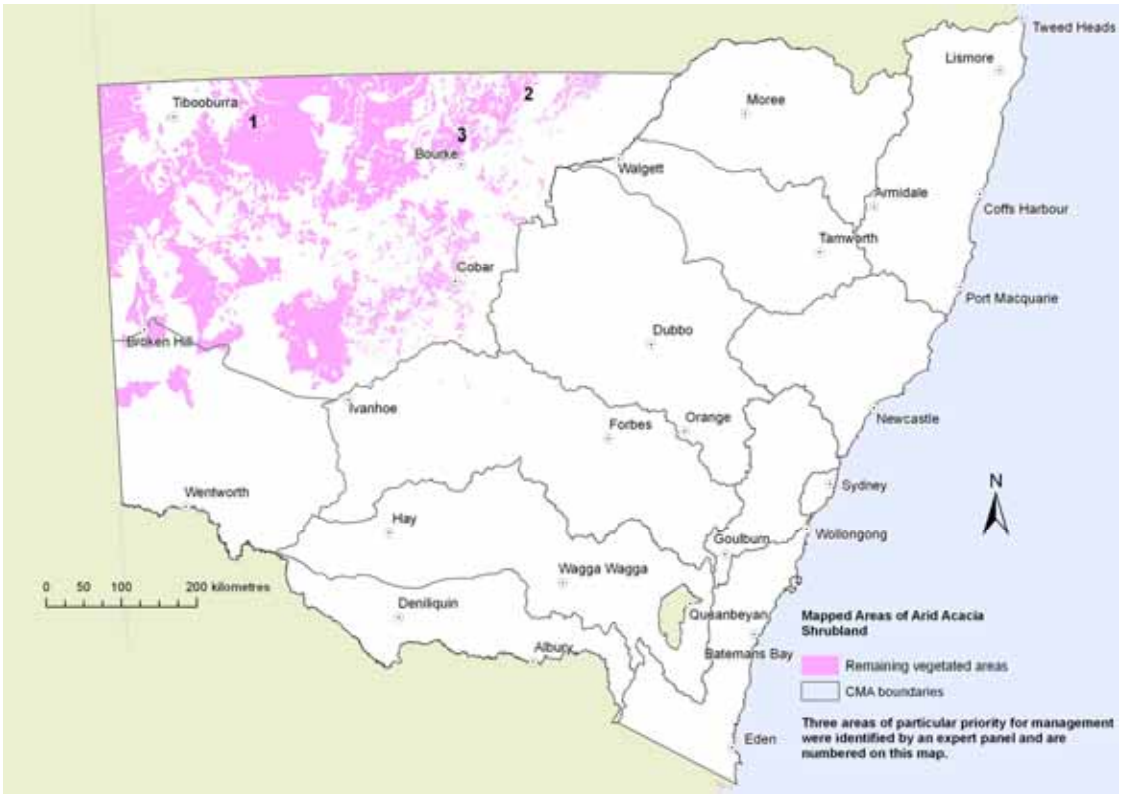
1. Purplewood Arid Shrublands in far north-western New South Wales
2. Ledknapper – Brigalow Acacia Shrublands
3. North Bourke Gidgee Acacia Shrubland.

Who is managing the Arid Acacia Shrublands?

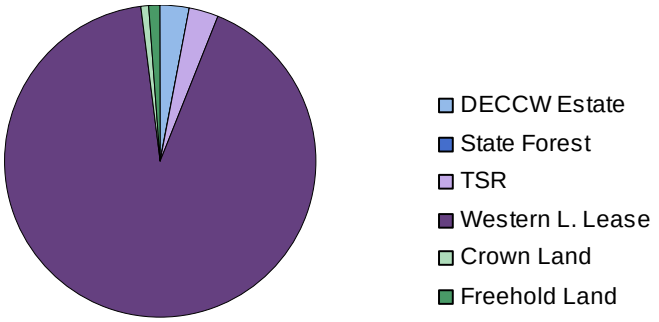
As Priority Areas could not be mapped for this ecosystem, the following section refers to the total extent of Arid Acacia Shrublands as mapped by Keith and Simpson (2010).

Almost all of the Arid Acacia Shrublands are on lands that are managed privately under Western Lands Leases (>90%). Only a small proportion of these properties have entered into a formal conservation management agreement.

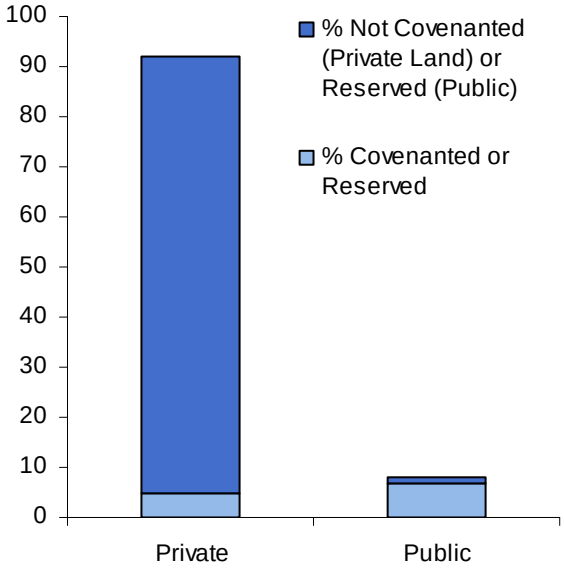
Extent of Arid Acacia Shrublands



Note: Priority Areas for Arid Shrublands could not be mapped with existing data. However, an estimated 10% of Arid Shrublands are a priority for investment in management wherever vegetation would significantly benefit from reduced total grazing pressure. Site-assessment is required to identify these areas. The numbers on the map refer to the identified priority clusters (Appendix 7).

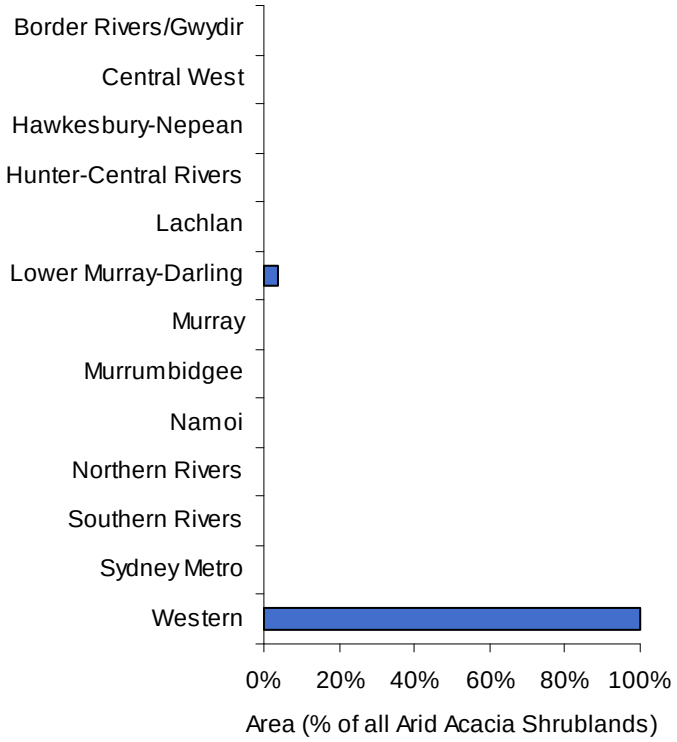


Note: Travelling stock routes (TSRs) are parcels of Crown land reserved under legislation for use by travelling stock. Livestock Health and Pest Authorities manage the land to strike a balance between the needs of travelling or grazing stock and the conservation of native species.



Note: Western Lands Leases are owned by the Crown and subject to regulatory controls through lease conditions administered by the Land and Property Management Authority; however, they are effectively privately managed.

Almost all (99%) of the Arid Acacia Shrublands are located within the Western CMA.



Key objectives from Part A

Objective 3: Improve the on-ground delivery of incentive schemes through the adoption of a common approach to site-assessment & Objective 11: Support private primary producers to sustainably manage their resource through collaborative partnerships. Incentive programs to manage total grazing pressure on leasehold and freehold land. Incentive programs to support and encourage sustainable grazing of livestock are already underway in the Western CMA.

Objective 8: Actively and effectively manage the terrestrial reserve system and marine protected areas as part of a broader landscape. Removing artificial watering points is one way to control total grazing pressure on reserves. The need for artificial watering points in the DECCW estate will be assessed as part of overall park management planning. The *NSW National Parks Establishment Plan 2008* identifies Arid Acacia Shrublands as a priority for additional protection within the public reserve system.

Objective 10: Effectively manage and control threats through cooperative partnerships with key stakeholders. Coordinated, cross-tenure management programs to control feral goat populations in key areas would make a tangible difference to biodiversity in the Arid Acacia Shrublands.

Arid Chenopod Shrublands

Arid Shrublands dominate the arid and semi-arid regions of far western New South Wales where the rainfall is too low to support a cover of trees. The low and unreliable water supply has promoted an abundance of plants that are masters of water conservation. Arid Shrublands support an exceptionally rich diversity of reptiles, particularly in the more rocky habitats and those with plentiful spinifex hummocks. In some areas, dozens of lizard species co-exist in just a few square kilometres of desert. Mammals common to the Arid Shrublands include the red, western and grey kangaroos, which are often seen bounding across the landscape. Shyer mammals such as the fat-tailed dunnart and Mitchell's hopping mouse are common, and their tracks can be seen zigzagging across the sand. Emus, parrots, grass wrens, finches, pigeons and birds of prey all utilise the Arid Shrublands periodically when the fluctuating and unreliable resources of the desert become available.

Arid Shrublands can be low chenopod-dominated shrublands (<1.5 m) or tall acacia shrublands with shrubs large enough (>2 m) to be described as woodlands.

Three unique classes of Arid Chenopod Shrublands are found throughout the arid and semi-arid regions of far western New South Wales (Keith 2004; see also Appendix 8).

Arid Chenopod Shrublands occupy about 70,000 square kilometres in inland New South Wales (about 8% of the state). Less than 30% of Arid Chenopod Shrublands have been 'cleared' of vegetation; however, some areas have been overgrazed by domestic and feral animals. High total grazing pressure can be just as damaging to the biodiversity of the Arid Chenopod Shrublands as clearing is to vegetation in the higher rainfall parts of the state. Overgrazing simplifies vegetation structure and destroys groundcover thereby increasing erosion and reducing soil health, soil moisture and habitats for native fauna and flora. Arid Chenopod Shrublands that have been overgrazed are generally less resilient to drought conditions.

Arid Chenopod Shrublands are important to a number of Aboriginal groups, including Wangkamura, Barkindji, Wiradjuri, Murhi Muthi, Ngiyampaa, Ngemba, Budjiti and Euahlayi.

Where are the priority Arid Chenopod Shrublands?

About 10% of Arid Chenopod Shrublands (687,000 hectares) are a priority for management. These areas cannot be identified spatially, and need to be identified on the ground by individual site-assessments.

Despite this, an expert panel was able to identify two areas that are likely to be a priority for investment in Arid Chenopod Shrublands. These are:

1. Lower Darling Mixed Chenopod Shrublands
2. Semi-arid Chenopod Shrubland/ Derived Grassland/ Semi-Arid Woodland mosaic on the Hay Plain.

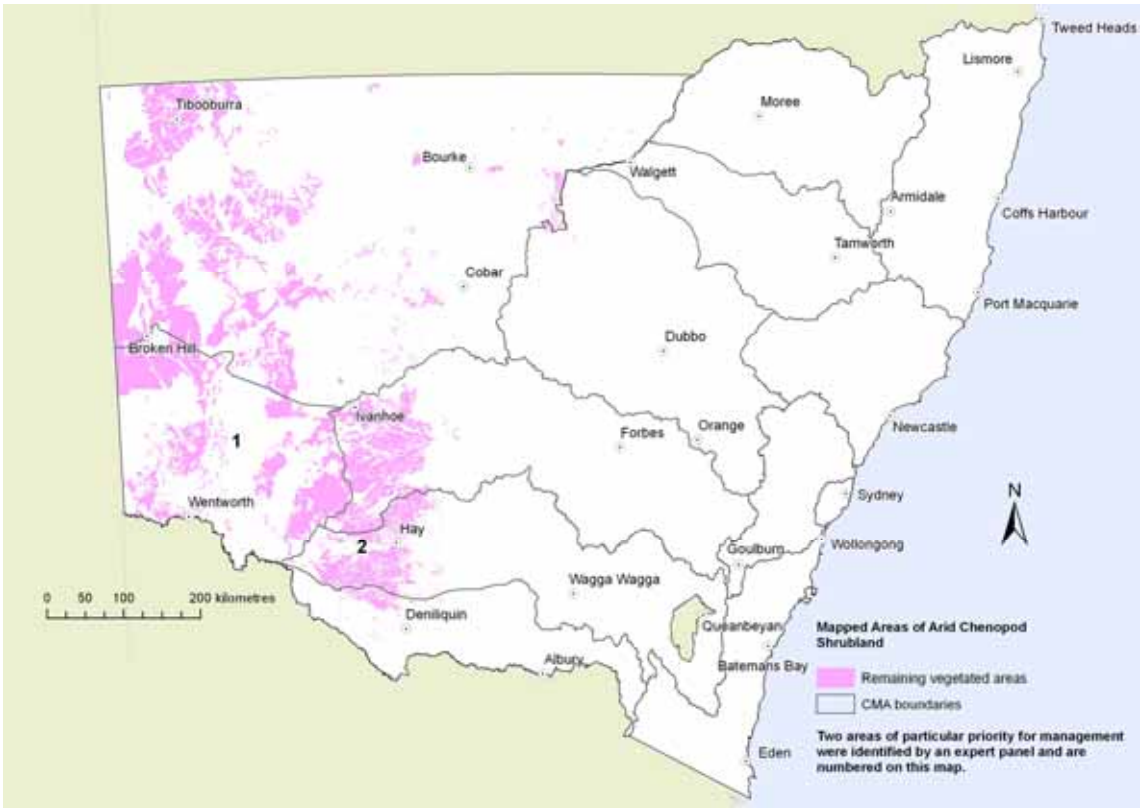
Who is managing the Arid Chenopod Shrublands?

As Priority Areas could not be mapped for this ecosystem, the following section refers to the total extent of Arid Chenopod Shrublands as mapped by Keith and Simpson (2010).

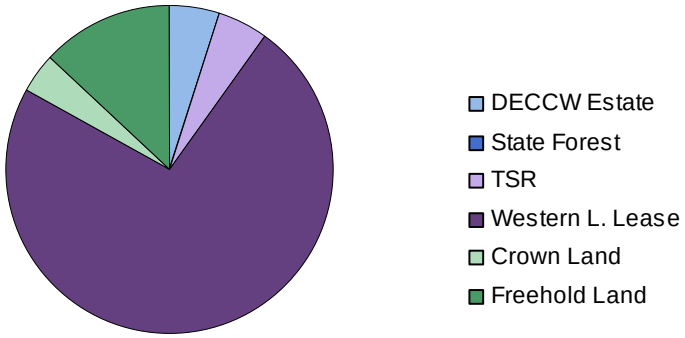
More than 80% of all Arid Chenopod Shrublands are on freehold or leasehold land. Very few of these properties are under a formal conservation agreement.

DECCW manages about 5% of Arid Chenopod Shrublands. Travelling stock routes (TSRs) and Crown lands account for a further 10%.

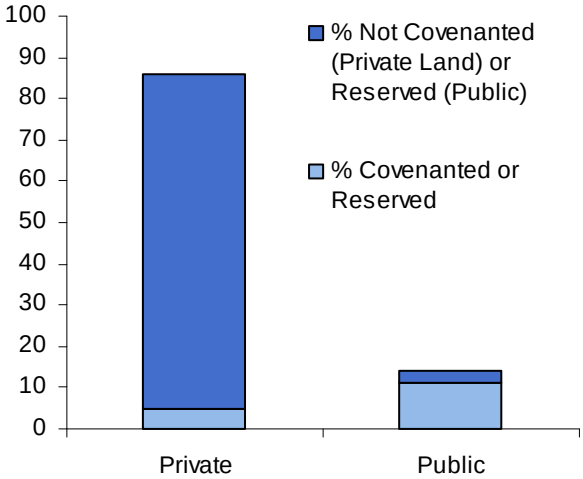
Extent of Arid Chenopod Shrublands



Note: Priority Areas for Arid Shrublands could not be mapped with existing data. However, an estimated 10% of Arid Shrublands are a priority for investment in management wherever vegetation would significantly benefit from reduced total grazing pressure. Site-assessment is required to identify these areas. The numbers on the map refer to the identified priority clusters (Appendix 7).

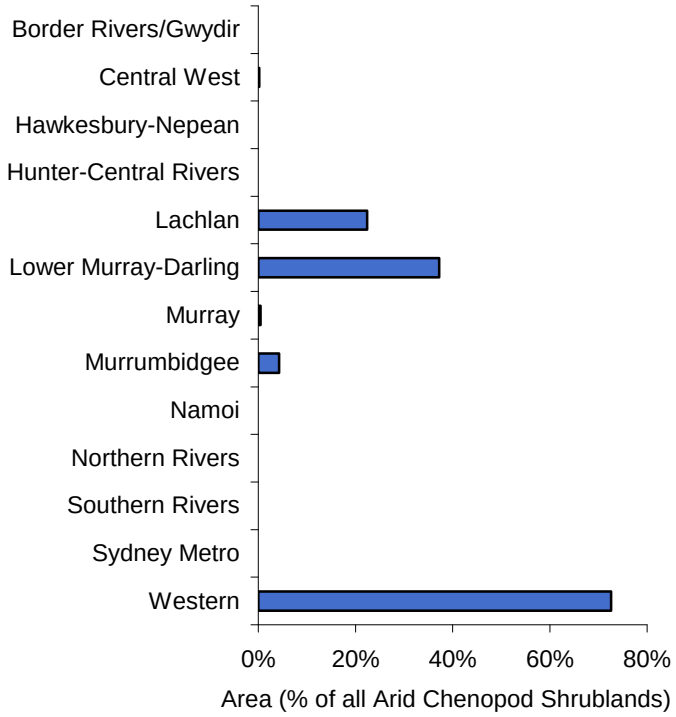


Note: Travelling stock routes (TSRs) are parcels of Crown land reserved under legislation for use by travelling stock. Livestock Health and Pest Authorities manage the land to strike a balance between the needs of travelling or grazing stock and the conservation of native species.



Note: Western Lands Leases are owned by the Crown and subject to regulatory controls through lease conditions administered by the Land and Property Management Authority; however, they are effectively privately managed.

Arid Chenopod Shrublands are distributed across five CMAs, with most occurring in the Western, Lower Murray-Darling and Lachlan CMAs.



Key objectives from Part A

Objective 3: Improve the on-ground delivery of incentive schemes through the adoption of a common approach to site-assessment & Objective 11: Support private primary producers to sustainably manage their resource through collaborative partnerships. Incentive programs to manage total grazing pressure on leasehold and freehold land. Incentive programs to support and encourage sustainable grazing of livestock are already underway in the Western CMA.

Objective 8: Actively and effectively manage the terrestrial reserve system and marine protected areas as part of a broader landscape. Managing access to artificial watering points at strategic sites can control total grazing pressure, with benefits for biodiversity. The need for artificial watering points within the DECCW estate will be assessed as part of overall park management planning. The *NSW National Parks Establishment Plan 2008* identifies Arid Chenopod Shrublands as a priority for additional protection within the public reserve system.

Objective 10: Effectively manage and control threats through cooperative partnerships with key stakeholders. Coordinated, cross-tenure management programs to control total grazing pressure from pigs, rabbits, goats, overabundant macropods and domestic livestock would make a tangible difference to biodiversity in the Arid Chenopod Shrublands.

Dry Sclerophyll Forests

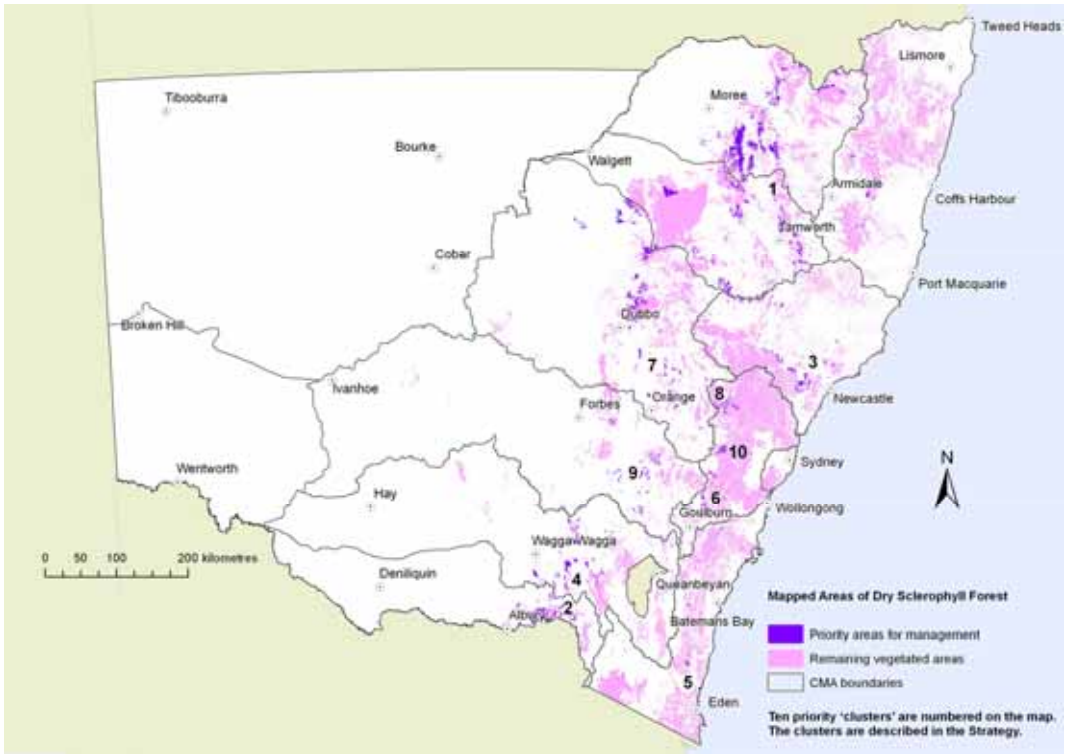
When we refer to the ‘bush’ in south-eastern Australia, we are often referring to Dry Sclerophyll Forests, which are loved by bushwalkers and celebrated by poets. The shrubby Dry Sclerophyll Forests are the stronghold of many familiar Australian wildflowers: waratahs, banksias, spider flowers, wattles and peas, gum trees, tea trees and boronias. Dry Sclerophyll Forests occupy soils of low fertility. The trees of the Dry Sclerophyll Forests (mostly eucalypts) form an open canopy that sits above shrubs and grasses. Often these have hard leaves. The fauna of these forests include many common and familiar Australian animals such as red wattlebirds, sulphur crested cockatoos, rainbow lorikeets, brushtail possums, sugar gliders and an abundance of reptiles.

Dry Sclerophyll Forests contain 24 different vegetation classes whose diversity reflects the highly variable topography, geology, climate and range they cover. Dry Sclerophyll Forests can be categorised as either Shrub/Grass or Shrubby (Keith 2004; see also Appendix 8).

The Dry Sclerophyll Forests of New South Wales occupy about 80,000 square kilometres (9% of the state). Dry Sclerophyll Forests have declined in extent by about 50% over the past 200 years. More than one-third (40%) of Dry Sclerophyll Forests are found within remnants that are greater than 500 hectares.

Dry Sclerophyll Forests are important to a number of Aboriginal groups, including Bundjalung, Githabul, Yaegl, Gundungurra, Dharawal, Dhurga, Gamilaraay, Guyambal, Gumbaynggirr, Dharug and Dharawal.

Priority Areas for Dry Sclerophyll Forest management



Note: The map identifies areas that are a priority for investment in management because they are generally: in moderate to good condition; well-connected with the surrounding landscape; part of a highly cleared, and/or degraded type of vegetation; and floristically distinct from other, well-conserved types of vegetation. In other words, Priority Areas are the best remaining examples of distinctive ecosystems that have been highly cleared or degraded across NSW. The map should be viewed at scale of 1:250,000. Site-assessment is required to confirm the map’s values on the ground. The numbers on the map refer to the identified priority clusters (Appendix 7).

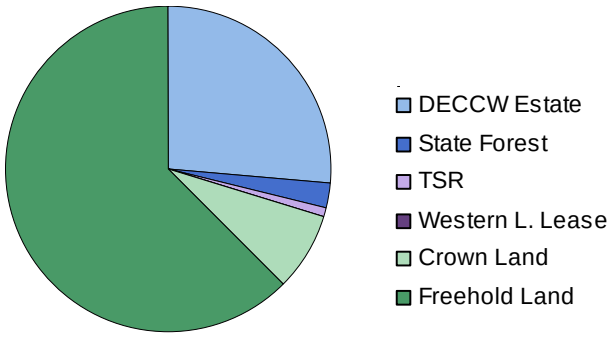
Where are the priority Dry Sclerophyll Forests?

About 559,000 hectares of Dry Sclerophyll Forests have been identified as a priority for biodiversity management. This amounts to 7% of their total extent. Priority Dry Sclerophyll Forests are in moderate to good condition, and are located in well-connected landscapes. All of the Priority Areas are within Shrubby/Grassy Dry Sclerophyll Forests. Ten priority clusters have been identified, and are shown on the map:

1. Nandewar Dry Sclerophyll Forest
2. Woomargarma Corridor Dry Sclerophyll Forest (part of the Great Eastern Ranges Initiative, 'Slopes to Summit' priority partnership area)
3. Hunter Ironbark Dry Sclerophyll Forest
4. Grassy Dry Sclerophyll Forests of the South West Slopes between Tumut and Wagga Wagga
5. Bega Valley Lowland Dry Sclerophyll Forest remnants
6. Upper Burragorang Dry Sclerophyll Forest (part of the Great Eastern Ranges Initiative, 'Southern Highlands Link' priority partnership area)
7. Dry Sclerophyll Forest/Grassy Woodland Mosaic in the Burrendong Catchment
8. Dry Sclerophyll Forest bordering national parks near Capertee
9. Grassy Dry Sclerophyll Forest/Grassy Woodland mosaic between Young and Cowra
10. Grassy Dry Sclerophyll Forest/Grassy Woodland mosaic along the Abercrombie River Corridor.

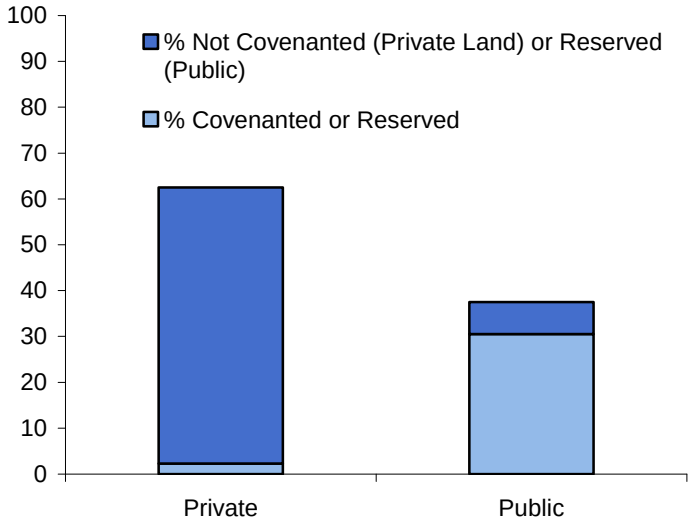
Who is managing the priority Dry Sclerophyll Forests?

The majority of Dry Sclerophyll Forests are managed privately (about 60%), and around one-quarter are reserved in the DECCW estate. Crown lands and TSRs together contain a little under 10% of priority Dry Sclerophyll Forests. Forests NSW manages about 2% of priority Dry Sclerophyll Forests.

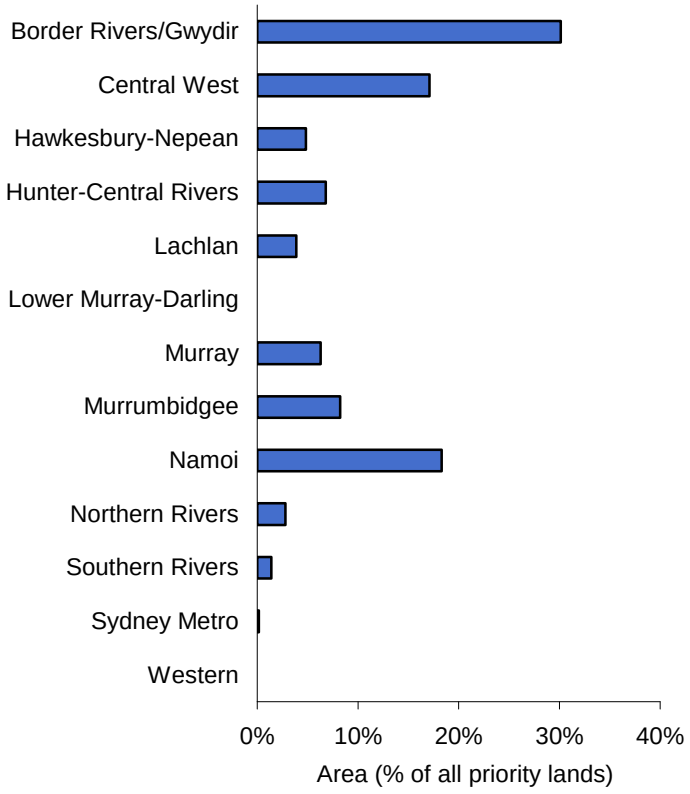


Note: Travelling stock routes (TSRs) are parcels of Crown land reserved under legislation for use by travelling stock. Livestock Health and Pest Authorities manage the land to strike a balance between the needs of travelling or grazing stock and the conservation of native species.

The Dry Sclerophyll Forests that are publicly reserved tend to be Shrubby Dry Sclerophyll Forests on more elevated, rugged terrain; however, Shrub/Grass Dry Sclerophyll Forests are a higher priority for biodiversity management. These Shrub/Grass forests are usually found on the lower slopes and are more likely to be located on private land.



Priority Dry Sclerophyll Forests are scattered across almost all CMAs (see below). The greater areas of priority Dry Sclerophyll Forest are in the Namoi and Border Rivers-Gwydir CMAs, which together house nearly half the area of all priority Dry Sclerophyll Forests.



Key objectives from Part A

Objectives 1 & 2: Direct conservation efforts towards state-scale priorities. Significant areas of priority Dry Sclerophyll Forest are managed on both private and public land.

Objective 3: Improve the on-ground delivery of incentive schemes through the adoption of a common approach to site-assessment. Enhance delivery of incentive schemes. Incentives to retain and manage biodiversity in high priority Dry Sclerophyll Forests on rural land are important for the 60% of Priority Areas that occur on private land.

Objective 6: Use strategic mechanisms to assess, conserve and improve biodiversity values in land-use planning & Objective 5: Use market-based mechanisms to complement the range of private land conservation programs. Rural residential encroachment around large population centres can adversely affect priority Dry Sclerophyll Forests.

Objective 8: Actively and effectively manage the terrestrial reserve system and marine protected areas as part of a broader landscape & Objective 10: Effectively manage and control threats through cooperative partnerships with key stakeholders. Ongoing and active on-park management for the one-quarter of priority Dry Sclerophyll Forests in the DECCW estate, combined with cross-tenure threat management programs, would generate significant biodiversity benefits for Dry Sclerophyll Forests.

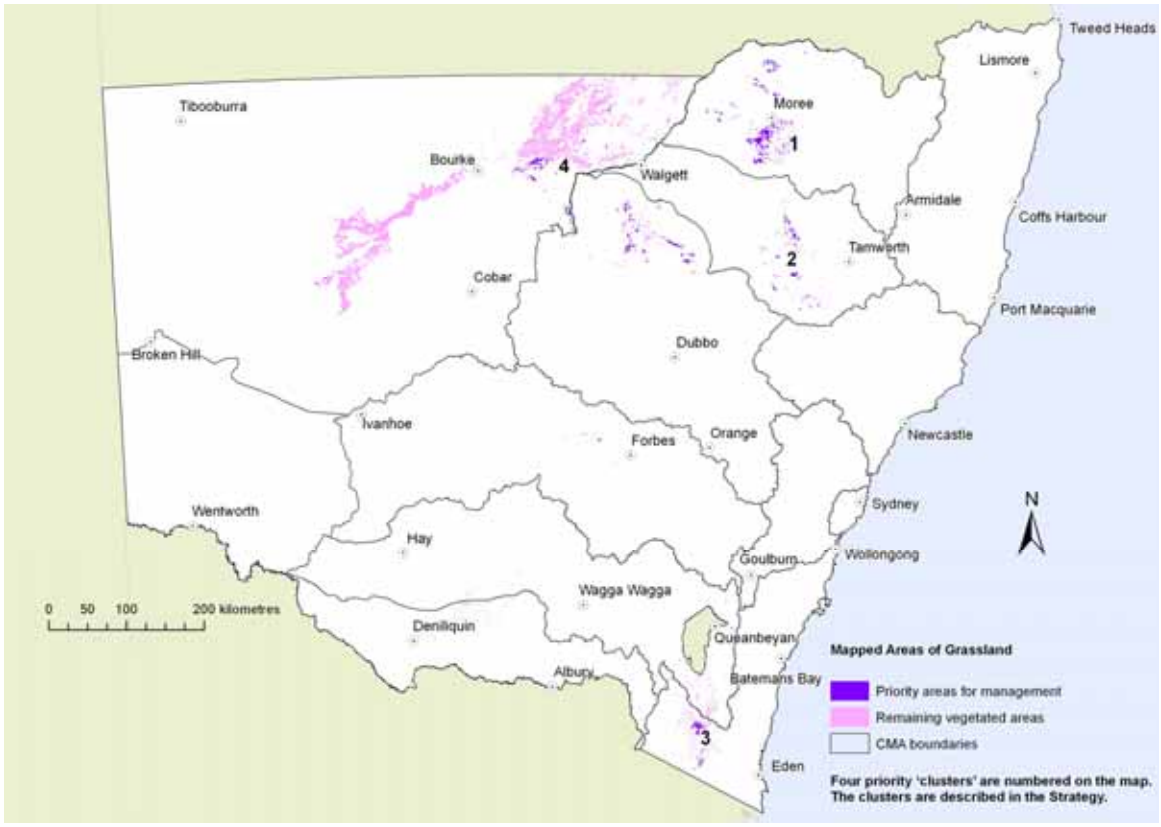
Note: The *NSW National Parks Establishment Plan 2008* points to the poorly reserved Dry Sclerophyll Forest ecosystems occurring in the lower parts of the landscape as priorities for addition to the public reserve system.

'With shimmering grass tops stretching as far as the eye can see, the grasslands, more than any other kind of vegetation, epitomise the "land of sweeping plains" described in Dorothea Mackellar's poem *I love a sunburnt country*' (Keith 2004). The Grasslands of New South Wales are dominated by large perennial tussock grasses interwoven with a myriad of diverse and often beautiful plants such as orchids, lilies, daisies and other forbs. Woody plants (shrubs and trees) are very sparse or absent. Grassland-dependent animals include the Australian bustard, plains wanderer, striped legless lizard, grassland earless dragon and the golden sun moth.

The Grasslands of New South Wales occupy about 12,000 square kilometres (1% of the state), usually on flat fertile clay soils, from the exposed coastline to the hot arid environments in the west of the state (Keith 2004). The best remaining examples of native Grasslands in central New South Wales are in cemeteries, churchyards and along roadsides and TSRs, where they have avoided agricultural development. Most Grasslands in New South Wales have drastically declined in extent over the past 200 years, with more than 90% cleared. Grasslands are highly fragmented. Half of all Grasslands are found within remnants that are less than 25 hectares, while only 30% are in remnants greater than 500 hectares.

Grasslands are important to a number of Aboriginal groups, including Barkindji, Murra Warri, Gamilaraay, Budjihi, Euahlayi and Ngarigo.

Priority Areas for Grassland management



Note: The map identifies areas that are a priority for investment in management because they are generally: in moderate to good condition; well-connected with the surrounding landscape; part of a highly cleared, and/or degraded type of vegetation; and floristically distinct from other, well-conserved types of vegetation. In other words, Priority Areas are the best remaining examples of distinctive ecosystems that have been highly cleared or degraded across NSW. The map should be viewed at scale of 1:250,000. Site-assessment is required to confirm the map's values on the ground. The numbers on the map refer to the identified priority clusters (Appendix 7).

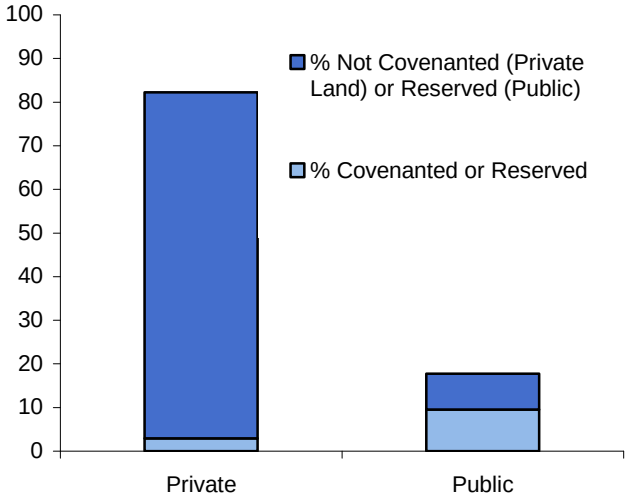
Where are the priority Grasslands?

All native Grasslands in New South Wales are important for biodiversity conservation. In particular, about 159,000 hectares of Grasslands have been identified as a priority for management. This amounts to around 13% of the total extent of Grasslands. Priority Grasslands are in moderate to good condition, and occur in well-connected landscapes. Four clusters of Priority Areas have been identified, and are shown on the map:

1. Moree Plains Open Grasslands
2. Liverpool Plains Open Grasslands
3. Grasslands of the Southern Tablelands
4. Brewarrina Open Plains Grasslands

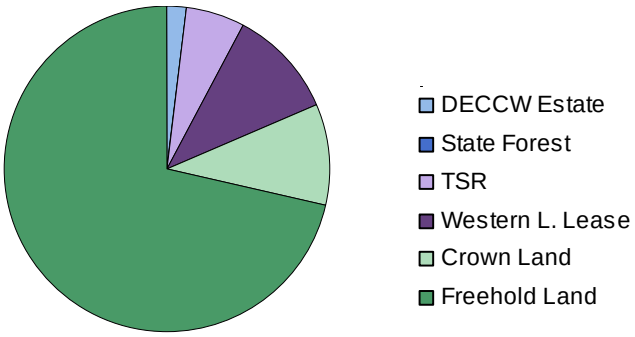
Who is managing the priority Grasslands?

The overwhelming majority (more than 80%) of priority Grasslands are on freehold and leasehold land. Very few of these areas are managed under any formal conservation agreement.



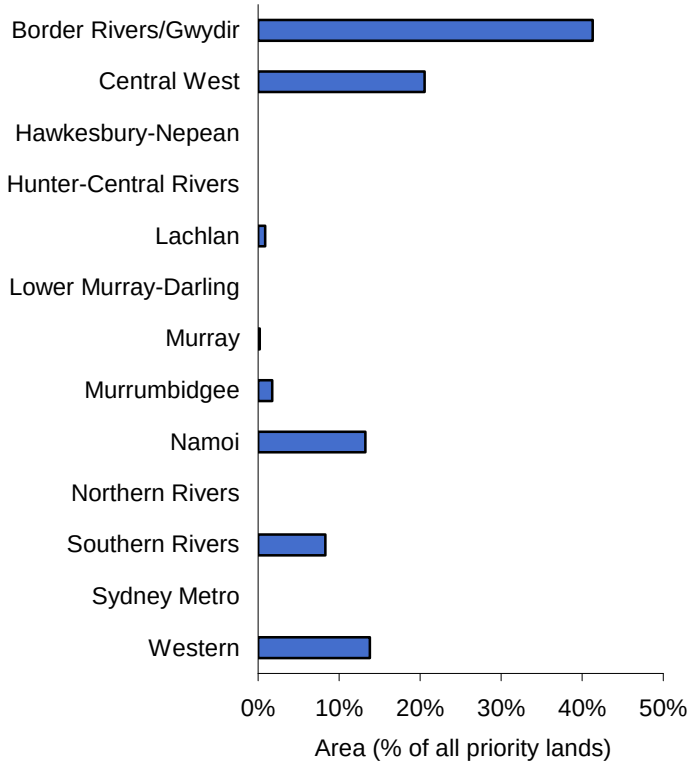
Note: Western Lands Leases are owned by the Crown and subject to regulatory controls through lease conditions administered by the Land and Property Management Authority; however, they are effectively privately managed.

About 10% of priority Grasslands are on Crown lands and TSRs. These areas often provide vital connections in landscapes that have been largely cleared of native Grasslands. Only 2% of priority Grasslands are in national parks or nature reserves.



Note: Travelling stock routes (TSRs) are parcels of Crown land reserved under legislation for use by travelling stock. Livestock Health and Pest Authorities manage the land to strike a balance between the needs of travelling or grazing stock and the conservation of native species.

Priority Grasslands are scattered across several CMAs. The greatest area of priority Grasslands is in the Border Rivers-Gwydir CMA, which houses more than 40% of the state's priority Grasslands, including the Moree Plains Open Grasslands cluster.



Key objectives from Part A

Objectives 1 & 2: Direct conservation efforts towards state-scale priorities.

Objective 3: Improve the on-ground delivery of incentive schemes through the adoption of a common approach to site-assessment & Objective 11: Support private primary producers to sustainably manage their resource through collaborative partnerships. The large majority of native Grasslands are on private and leasehold land. Incentive programs supporting sustainable grazing management are a key strategy for ensuring the future health of Grasslands. The Western CMA's Enterprise-based Conservation Scheme is a good model of a successful sustainable grazing incentive scheme.

Objective 6: Use strategic mechanisms to assess, conserve and improve biodiversity values in land-use planning. Improving the classification and mapping of grassland communities would improve our ability to monitor and manage native Grasslands across their range.

Objective 8: Actively and effectively manage the terrestrial reserve system and marine protected areas as part of a broader landscape. Many of our priority Grasslands of high conservation value are located on public lands such as Crown lands and travelling stock routes. Support for public grassland managers to continue to manage these sites for biodiversity is an important action. The *NSW National Parks Establishment Plan 2008* identifies native Grasslands as a priority for additional protection within the public reserve system.

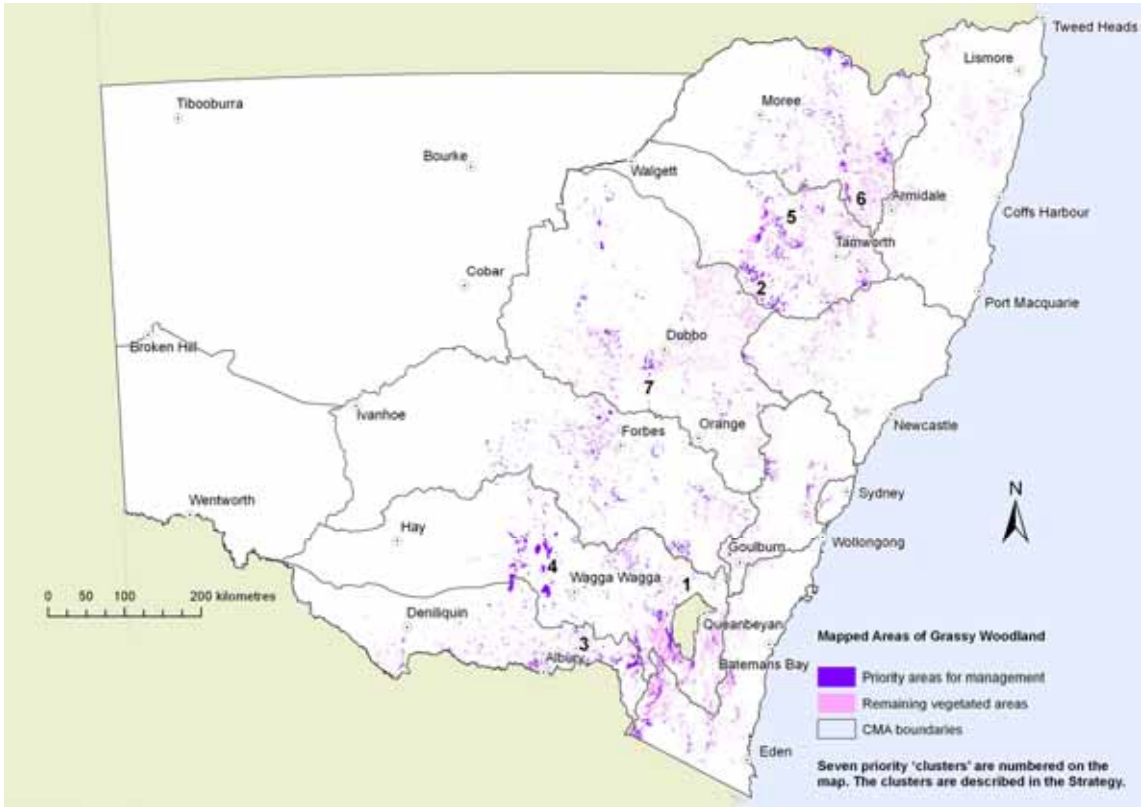
Grassy Woodlands

Grassy Woodlands are a familiar feature of rural New South Wales. They were the original vegetation of much of the state's wheat and sheep belt. Dominated by eucalypts, typically boxes and red gums, Grassy Woodlands have a relatively open canopy, spaced such that the crowns rarely touch. Grasses and herbs appear from seed banks following rain, while ground orchids and lilies emerge after fires or heavy rain to produce a spectacular floral display. When Europeans arrived, these fertile landscapes quickly became the mainstay of a productive rural economy based on grain and livestock.

Grassy Woodlands cover about 3% of the state (22,000 square kilometres). They are distributed from north to south, from the tablelands and western slopes to the coastal river valleys (Keith 2004). Grassy Woodlands are one of the most heavily cleared and modified ecosystems in New South Wales. Since European settlement, Grassy Woodlands have been cleared by about 70%, and much of the remaining Grassy Woodland is highly fragmented and degraded. The majority of Grassy Woodland remnants (85%) are less than 100 hectares in size.

Grassy Woodlands are important to a number of Aboriginal groups, including Gamilaraay, Wiradjuri, Walgalu, Ngunnawal, Ngarigo and Gumbaynggirr.

Priority Areas for Grassy Woodland management



Note: The map identifies areas that are a priority for investment in management because they are generally: in moderate to good condition; well-connected with the surrounding landscape; part of a highly cleared, and/or degraded type of vegetation; and floristically distinct from other, well-conserved types of vegetation. In other words, Priority Areas are the best remaining examples of distinctive ecosystems that have been highly cleared or degraded across NSW. The map should be viewed at scale of 1:250,000. Site-assessment is required to confirm the map's values on the ground. The numbers on the map refer to the identified priority clusters (Appendix 7).

Where are the priority Grassy Woodlands?

About 721,000 hectares of Grassy Woodlands have been identified as a priority for biodiversity management (about 35% of the total extent of Grassy Woodlands in New South Wales). The vast majority of Grassy Woodland remnants are less than 100 hectares in size. Priority Grassy Woodlands are in moderate to good condition, and are found in well-connected landscapes. This should be taken into account when identifying Priority Areas for investment on-the-ground. Seven clusters of Priority Areas have been identified, and are shown on the map:

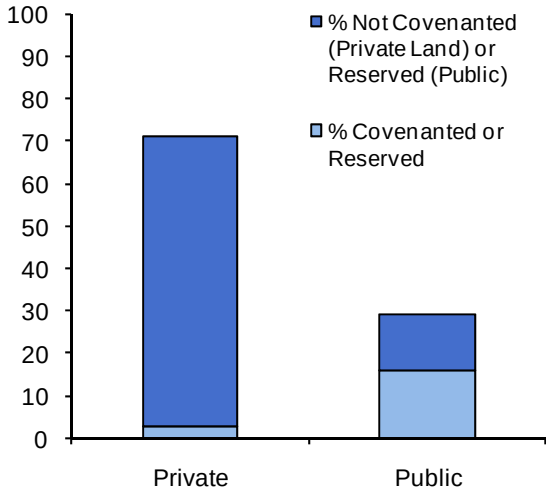
1. Grassy Woodlands of the Southern Tablelands (part of the Great Eastern Ranges Initiative, 'Kosciuszko to Coast' priority partnership area
2. Grassy Woodlands adjacent to Coolah Tops and the Liverpool Range (part of the Great Eastern Ranges Initiative, 'Upper Hunter – Barrington Tops' priority partnership area)
3. Woomargama Corridor Grassy Woodland (part of the Great Eastern Ranges Initiative, 'Slopes to Summit' priority partnership area)
4. Grassy Woodlands of the South West Slopes
5. Grassy Woodland remnants of the Nandewar Range
6. Grassy Woodlands of the New England Tablelands
7. Grassy Woodlands of the Central Western Slopes, including the Harvey Range.

Who is managing the priority Grassy Woodlands?

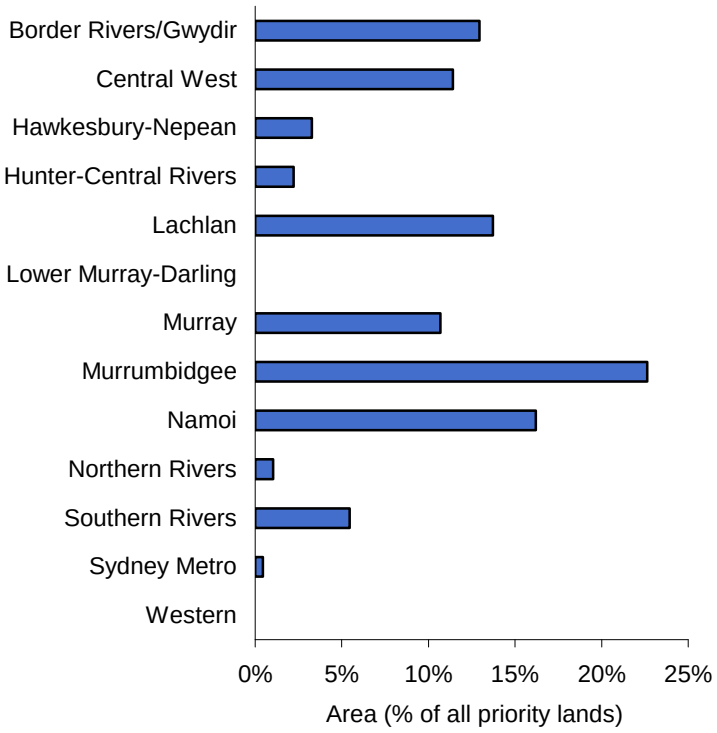
Almost one-third of priority Grassy Woodlands are on public land. DECCW is the largest public landholder (about 15%) of priority Grassy Woodlands. About 10% of priority Grassy Woodlands are also on travelling stock routes and Crown lands.

Note: Travelling stock routes (TSRs) are parcels of Crown land reserved under legislation for use by travelling stock. Livestock Health and Pest Authorities manage the land to strike a balance between the needs of travelling or grazing stock and the conservation of native species.

Over two-thirds of priority Grassy Woodlands are on freehold land. A small proportion of these private properties are managed under formal conservation agreements.



CMAs have an opportunity to contribute to biodiversity management on private land by directing incentive funding towards these priority Grassy Woodlands. Many such programs are already underway across the state. The largest area of high priority Grassy Woodland on private land is in the Murrumbidgee CMA, which contains almost one-quarter of the total area of priority Grassy Woodlands on private land. Almost all of the remaining priority Grassy Woodlands are in the other five CMAs in central New South Wales (Border Rivers-Gwydir, Namoi, Central West, Lachlan, and Murray).



Key objectives from Part A

Objectives 1 & 2: Direct conservation efforts towards state-scale priorities.

Objective 3: Improve the on-ground delivery of incentive schemes through the adoption of a common approach to site-assessment & Objective 11: Support private primary producers to sustainably manage their resource through collaborative partnerships. Grassy Woodlands generally occur on productive soils that are also highly valued for agriculture. Incentive programs that encourage sustainable grazing regimes in high priority Grassy Woodlands would make a substantial contribution to the biodiversity of this ecosystem type across its range. Incentives programs to encourage sustainable grazing in priority Grassy Woodlands are already being rolled out in many catchments.

Objective 6: Use strategic mechanisms to assess, conserve and improve biodiversity values in land-use planning. This is particularly important where high priority Grassy Woodlands overlap with urban growth centres.

Objective 8: Actively and effectively manage the terrestrial reserve system and marine protected areas as part of a broader landscape. Biodiversity management on public lands including TSRs and Crown reserves is vital in landscapes within the wheat–sheep belt that are otherwise highly cleared and fragmented. The *NSW National Parks Establishment Plan 2008* identifies Grassy Woodlands as a priority for additional protection within the public reserve system.

Heathlands

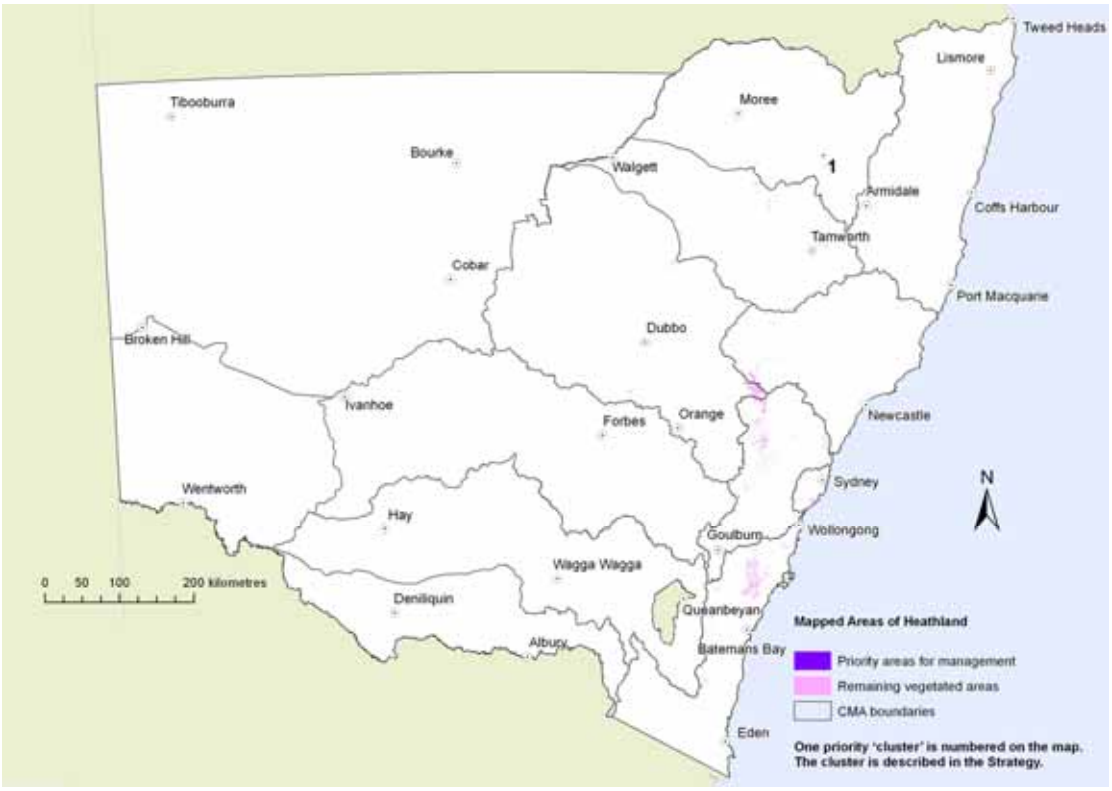
Heathlands are generally associated with coasts and mountains in New South Wales. A large variety of Heathland shrubs produce masses of nectar and pollen, attracting an abundance of birds and bats. Many Heathland plants have adaptations like specialised roots to cope with the extremely low soil-nutrient level.

Heathlands have a curious and complex dependency on fire. The fire regime (frequency, intensity and season of occurrence) has a large effect on composition and structure of habitat within these communities. Fire creates a mosaic of habitats with different vegetation heights, compositions and structures that suit different animal species.

Seven unique vegetation classes are found throughout the eastern part of New South Wales, generally in coastal areas or on exposed mountain features such as plateaus and ridges (Keith 2004; see also Appendix 8). The Heathlands of New South Wales have a restricted distribution and occupy only about 1600 square kilometres (<1% of the state). Heathlands have declined in extent by less than 30% over the past 200 years. They have generally been retained because of their poor soils, which are unsuitable for agriculture. Half of the Heathlands in New South Wales are distributed in remnants that are greater than 500 hectares.

Heathlands are important to a number of Aboriginal groups, including Dharawal, Dharug, Gamilaraay and Wiradjuri.

Priority Areas for Heathland management



Note: Some coastal Heathlands cannot be seen on the map due to the scale of the analysis. The map identifies areas that are a priority for investment in management because they are generally: in moderate to good condition; well-connected with the surrounding landscape; part of a highly cleared, and/or degraded type of vegetation; and floristically distinct from other, well-conserved types of vegetation. In other words, Priority Areas are the best remaining examples of distinctive ecosystems that have been highly cleared or degraded across NSW. The map should be viewed at scale of 1:250,000. Site-assessment is required to confirm the map's values on the ground. The number on the map refers to the identified priority cluster (Appendix 7).

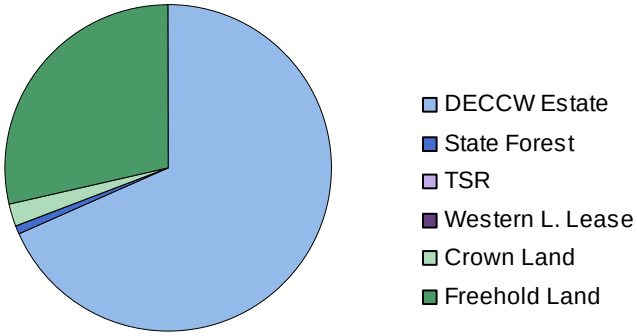
Where are the priority Heathlands?

About 5700 hectares of Heathlands have been identified as a priority for management. This represents around 4% of total Heathland extent. Priority Heathlands are in moderate to good condition, and are found in well-connected landscapes. Only one cluster of Priority Areas has been identified, and is shown on the map:

1. The Howell Heathlands.

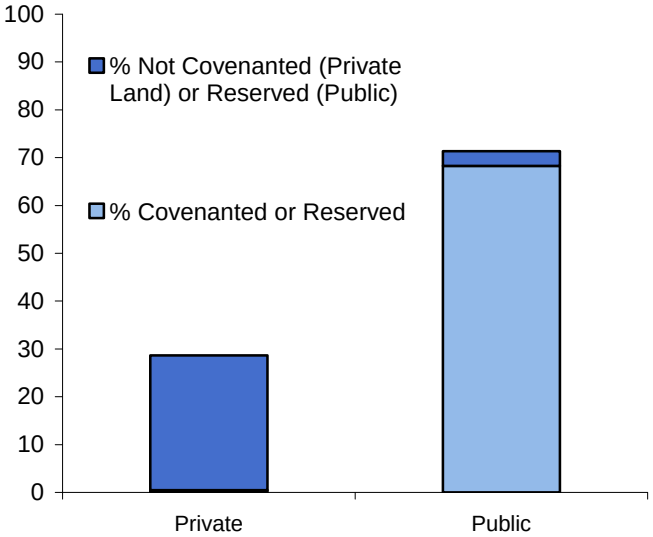
Who is managing the priority Heathlands?

Around two-thirds (68%) of priority Heathlands are managed for conservation on public land in the DECCW estate.



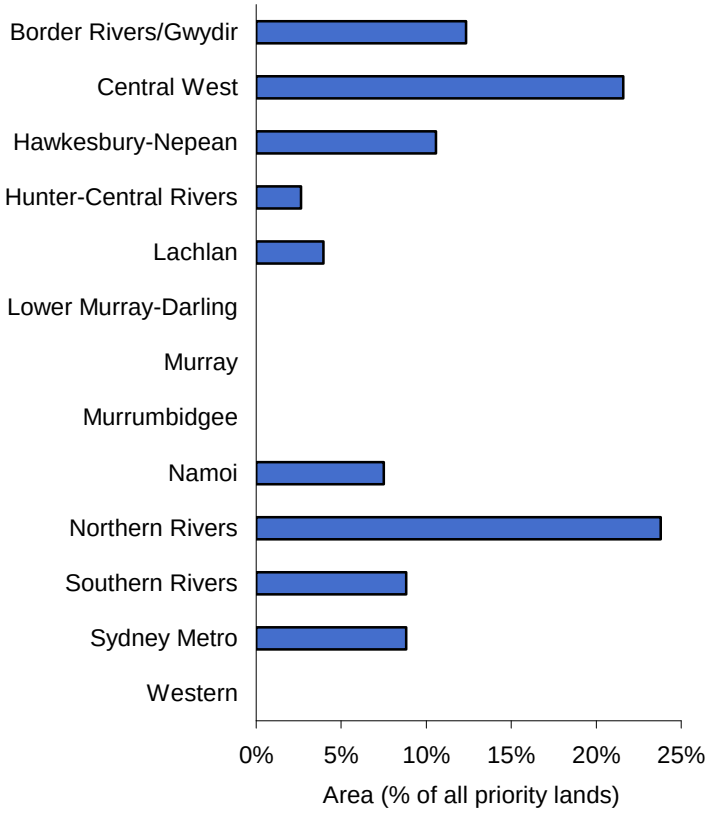
Note: Travelling stock routes (TSRs) are parcels of Crown land reserved under legislation for use by travelling stock. Livestock Health and Pest Authorities manage the land to strike a balance between the needs of travelling or grazing stock and the conservation of native species.

About one-third (29%) of all priority Heathlands are privately managed. A very small proportion of these private properties are managed under formal conservation agreements.



The Howell Heathlands are in the Border Rivers-Gwydir CMA. Incentives targeting vegetation on private land will help secure the distinctive biodiversity of this Priority Area.

Other small, restricted priority Heathlands are scattered throughout a large number of CMAs.



Key objectives from Part A

Objective 8: Actively and effectively manage the terrestrial reserve system and marine protected areas as part of a broader landscape. Almost two-thirds of priority Heathlands are located in the DECCW estate.

Objective 10: Effectively manage and control threats through cooperative partnerships with key stakeholders. Ensuring appropriate fire regimes is essential to maintaining biodiversity in all Heathland areas.

Note: The *NSW National Parks Establishment Plan 2008* points to the consolidation of existing parks and reserves as the primary focus of future reservation of already well-reserved ecosystems such as Heathlands. This is aimed at building up the size of existing reserves and fine-tuning their boundaries to increase their long-term viability and enhance their management, as well as strategic reservations to protect connectivity between these existing parks and reserves.

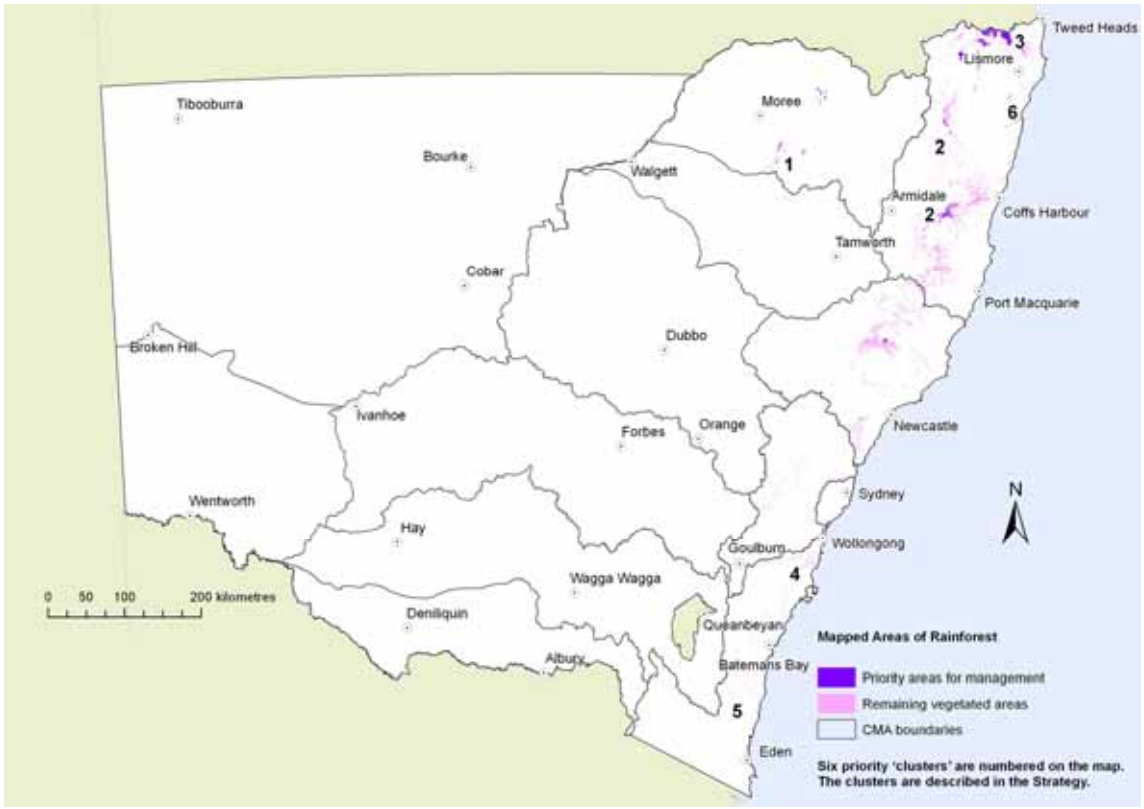
Rainforests have a closed tree canopy of soft, dark green leaves that filter the light over the mosses, ferns, vines, shrubs, herbs and grasses below. Fleshy fruits are abundant in Rainforests and support a diversity of birds, frogs and insects. Red-necked and red-legged pademelons feed on thick grass at the edges of Rainforests at dawn and dusk. Small mammals such as the fawn-footed melomys and dusky antechinus are also common in Rainforests. The Rainforests of New South Wales are rich in species and they support rare and unique plants and animals of evolutionary significance.

Nine different classes of Rainforest are found in New South Wales, from the lush Subtropical Rainforests of the eastern seaboard, with their tall canopies and masses of ferns and mosses, to the unusual, dry Western Vine Thickets of the semi-arid north-western slopes, where the canopy is rarely more than 4 metres high (Keith 2004; see also Appendix 8).

Rainforests occupy about 5000 square kilometres (<1% of NSW). Since European settlement, Rainforests have declined by less than 30%. Rainforests are a naturally fragmented ecosystem type, but 60% of remaining Rainforest is found in remnants that are greater than 500 hectares.

Rainforests are important to a number of Aboriginal groups, including Githawal, Bundjalung, Yaegl, Gumbaynggirr, Dhungutti, Worimi and Dharawal.

Priority Areas for Rainforest management



Note: The map identifies areas that are a priority for investment in management because they are generally: in moderate to good condition; well-connected with the surrounding landscape; part of a highly cleared, and/or degraded type of vegetation; and floristically distinct from other, well-conserved types of vegetation. In other words, Priority Areas are the best remaining examples of distinctive ecosystems that have been highly cleared or degraded across NSW. The map should be viewed at scale of 1:250,000. Site-assessment is required to confirm the map's values on the ground. The numbers on the map refer to the identified priority clusters (Appendix 7).

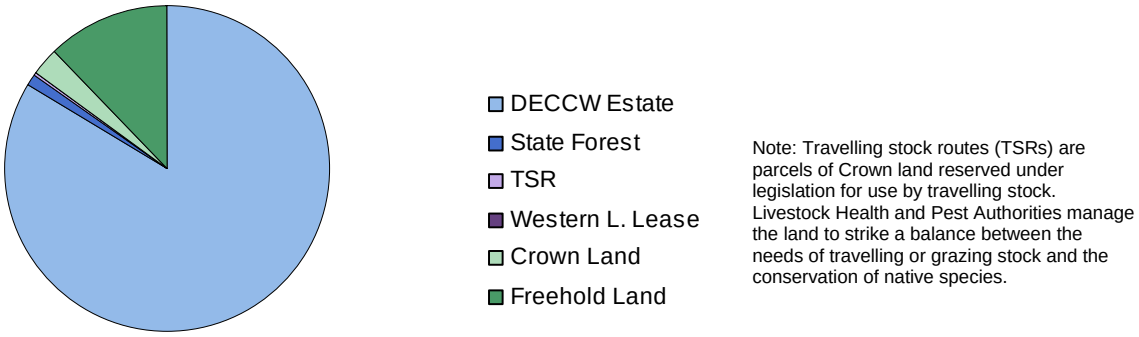
Where are the priority Rainforests?

Seventy-two thousand (72,000) hectares of Rainforest have been identified as a priority for management. This represents 15% of total Rainforest extent. Priority Rainforests are in moderate to good condition, and in well-connected landscapes. Six clusters of Priority Areas have been identified, and are shown on the map:

1. Western Dry Rainforests on the north-western slopes, north from Gunnedah
2. Rainforest in and around a number of national parks to the west and north-west of Coffs Harbour (including Oxley Wild Rivers, New England, Gibraltar Range and Washpool NPs)
3. The Big Scrub Subtropical Lowland Rainforest (part of the Great Eastern Ranges Initiative, 'Border Ranges' priority partnership area)
4. Illawarra Rainforest (part of the wider Great Eastern Ranges Initiative, 'Southern Highlands Link' priority partnership region)
5. South East Corner Rainforest Remnants
6. Littoral Rainforests of the Coast.

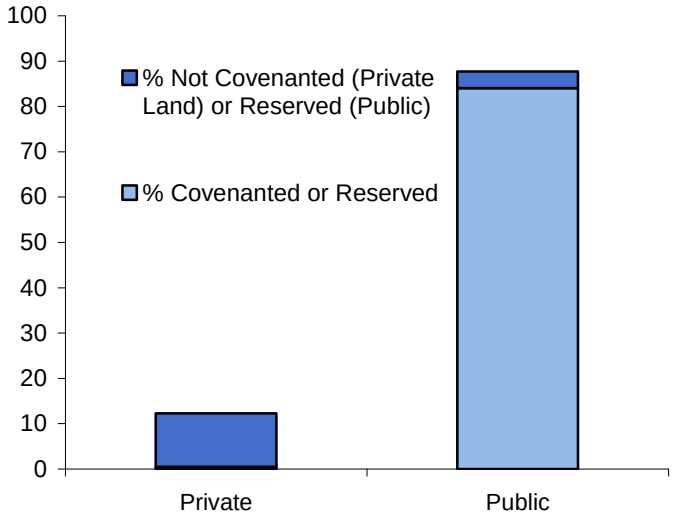
Who is managing the priority Rainforests?

Around 85% of priority Rainforests are managed for conservation on public land in the DECCW estate. Less than 5% are on other public lands (including Crown land and State Forest estate).

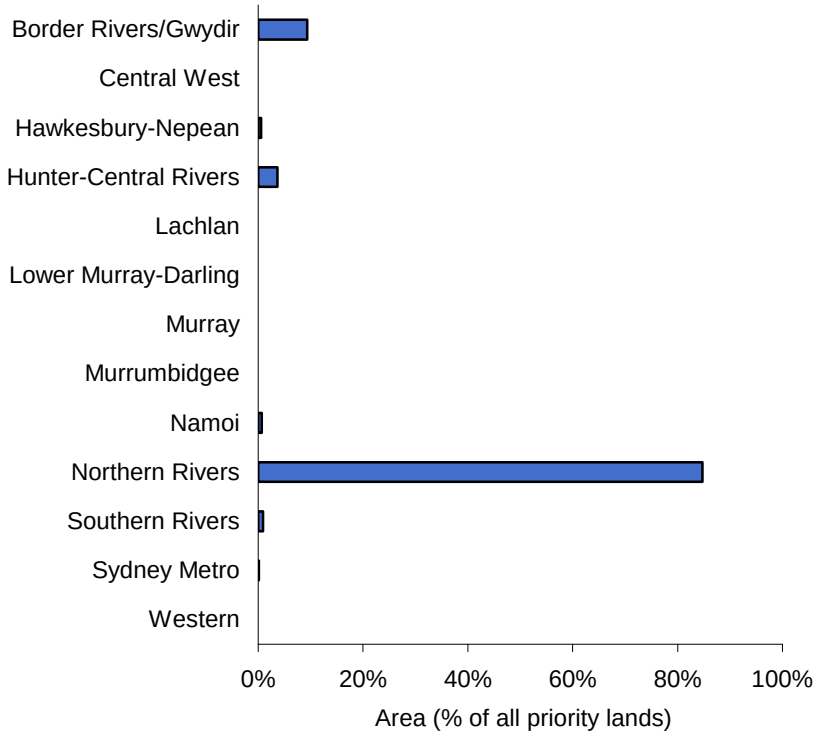


Note: Travelling stock routes (TSRs) are parcels of Crown land reserved under legislation for use by travelling stock. Livestock Health and Pest Authorities manage the land to strike a balance between the needs of travelling or grazing stock and the conservation of native species.

A little over 10% of priority Rainforests are privately managed. A small proportion of these private properties are managed under formal conservation agreements. Conservation Agreements provide landholders with access to government advice and support for biodiversity management.



Most priority Rainforest on private land is located in the Northern Rivers CMA, which contains about 85% of all priority Rainforest. Ten per cent (10%) of priority Rainforest is in Border Rivers-Gwydir CMA (which includes the Western Dry Rainforests). Southern Rivers contains only a small proportion of priority Rainforests, but two of the priority clusters (4 & 5).



Border Rivers-Gwydir and Namoi CMAs administer incentive programs in the unique and restricted Western Vine Thickets to the west of the Great Dividing Range (priority cluster 1). Most of these remnants are on private land.

Northern Rivers CMA is responsible for administering incentive programs in remnants of the Big Scrub (priority cluster 3) that remain on private land. Southern Rivers CMA administers incentive programs for remnants of Illawarra Rainforest (priority cluster 4).

Key objectives from Part A

Objective 8: Actively and effectively manage the terrestrial reserve system and marine protected areas as part of a broader landscape. Almost three-quarters of priority Rainforests are managed within the DECCW estate.

Objective 10: Effectively manage and control threats through cooperative partnerships with key stakeholders. Effective management of threats on public reserves and on adjacent private land is vital for ensuring the future health of NSW Rainforests. Coordinated programs to manage threats, particularly invasive species, across tenures will improve the success and cost-effectiveness of management activities. DECCW and CMAs can play an important role in facilitating this cross-tenure cooperation.

Note: The *NSW National Parks Establishment Plan 2008* points to the poorly reserved Rainforest ecosystems of the western slopes and coastal lowlands as priorities for addition to the public reserve system. In well-reserved areas where Rainforests are better protected, the plan identifies a program of building up the size of existing reserves to fine-tune and consolidate their boundaries. This will increase their long-term viability and enhance their management, as well as strategic reservations to protect connectivity between these parks and reserves.

Semi-Arid Woodlands

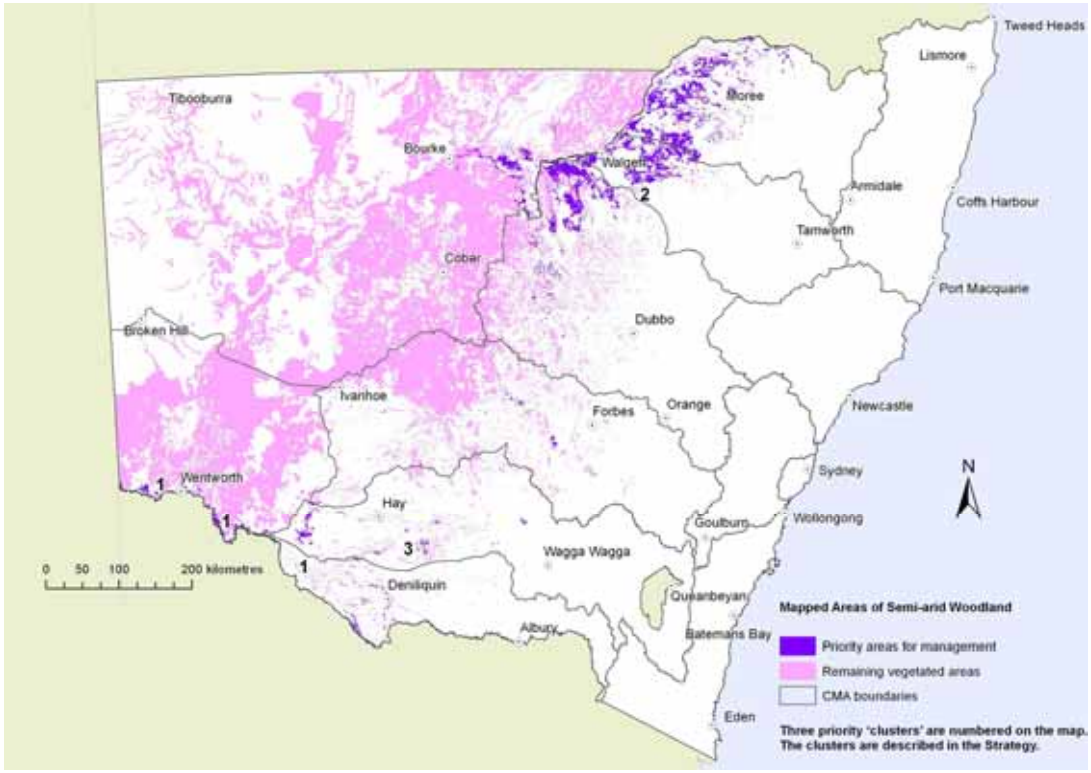
The semi-arid zone encircles the arid heart of New South Wales. Average annual rainfall is below 500 mm in the semi-arid zone, but above the maximum of 250 mm that defines the true arid zone. One-third of New South Wales is semi-arid, and although water is limiting in these areas in most seasons, there is enough to support tree-dominated vegetation and an understorey of drought-resistant shrubs and short-lived grasses and herbs. Parrots and cockatoos are diverse and conspicuous inhabitants of the Semi-Arid Woodlands, as is the charismatic, though reclusive, ground-dwelling mallee fowl.

Semi-Arid Woodlands can be categorised as either Grassy or Shrubby. Grassy Semi-Arid Woodlands contain larger trees and more grass compared with their Shrubby counterparts. Grassy Semi-Arid Woodlands occur on floodplains while the Shrubby Semi-Arid Woodlands occupy more elevated areas (Keith 2004).

The Semi-Arid Woodlands of New South Wales occupy about 161,000 square kilometres (20% of the state). Semi-Arid Woodlands have declined in extent by about 50% during the past 200 years, with higher and lower declines in some classes (Keith 2004). Semi-Arid Woodlands have also experienced a high level of fragmentation; about 20% are found in remnants of greater than 500 hectares, while almost 50% are in remnants of less than 25 hectares.

Semi-Arid Woodlands are important to a number of Aboriginal groups, including Wangkamura, Barkindji, Budjiti, Murra Warri, Euhlayi, Ngiyampaa, Ngemba, Muthi Muthi, Wadi Wadi and Wamba Wamba.

Priority Areas for Semi-Arid Woodland management



Note: The map identifies areas that are a priority for investment in management because they are generally: in moderate to good condition; well-connected with the surrounding landscape; part of a highly cleared, and/or degraded type of vegetation; and floristically distinct from other, well-conserved types of vegetation. In other words, Priority Areas are the best remaining examples of distinctive ecosystems that have been highly cleared or degraded across NSW. The map should be viewed at scale of 1:250,000. Site-assessment is required to confirm the map's values on the ground. The numbers on the map refer to the identified priority clusters (Appendix 7).

Where are the priority Semi-Arid Woodlands?

About 1,146,000 hectares of Semi-Arid Woodlands have been identified as a priority for management, 7% of their total extent. All of the Priority Areas for Semi-Arid Woodlands are Grassy Semi-Arid Woodlands, which have undergone a higher historical clearing rate than their Shrubby counterparts (Keith 2004). Priority Semi-Arid Woodlands are in moderate to good condition, and found in well-connected landscapes. Three clusters of Priority Areas have been identified, and are shown on the map:

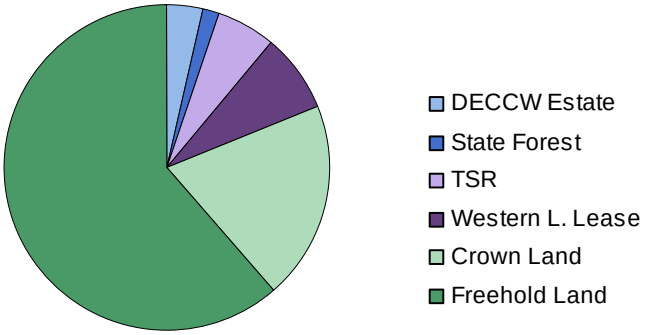
1. Semi-Arid (Grassy) Woodlands along the Murray and Murrumbidgee rivers
2. Semi-Arid Woodland/Grassland Mosaic of the Darling Riverine Plain Fan
3. Semi-Arid Chenopod Shrubland/ Derived Grassland/ Semi-Arid Woodland mosaic on the Hay Plain.

Some areas of Shrubby Semi-Arid Woodland have become invasive native scrub and require management to restore mosaic landscapes.

Who is managing the priority Semi-Arid Woodlands?

Around two-thirds of priority Semi-Arid Woodlands are managed by freehold and Western Lands Lease landholders. A small proportion of priority Semi-Arid Woodlands are managed by DECCW in national parks and nature reserves (<5%).

About one-quarter of priority Semi-Arid Woodlands are managed on Crown land and in travelling stock routes. Crown land managers and Livestock Health and Pest Authorities have an important role to play in managing priority Semi-Arid Woodlands.



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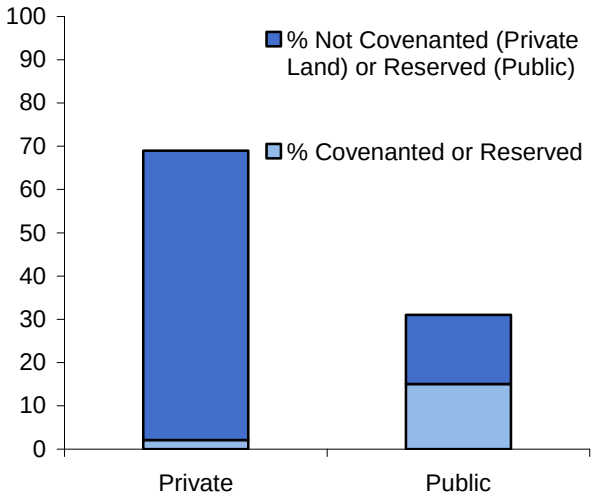
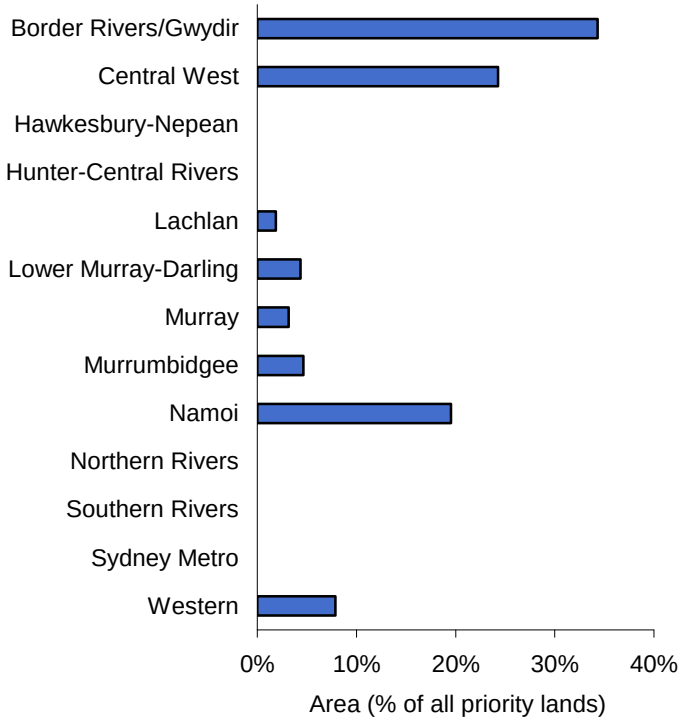


Note: Western Lands Leases are owned by the Crown and subject to regulatory controls through lease conditions administered by the Land and Property Management Authority; however they are effectively privately managed.

The larger areas of priority Semi-Arid Woodlands on Western Lands Lease and freehold land are in the Border Rivers-Gwydir, Central West and Namoi CMAs. Murray and Murrumbidgee CMAs also have priority clusters.



Key objectives from Part A

Objectives 1 & 2: Direct conservation efforts towards state-scale priorities.

Objective 3: Improve the on-ground delivery of incentive schemes through the adoption of a common approach to site-assessment & Objective 11: Support private primary producers to sustainably manage their resource through collaborative partnerships. Given that almost 75% of priority Semi-Arid Woodlands are managed privately on Western Lands Leasehold and freehold land, incentive programs would support landholders and help to improve biodiversity management in these areas.

Objective 9: Protect and restore aquatic ecosystems. Targeted improvements in water regimes would reduce dieback in Priority Areas.

Objective 10: Effectively manage and control threats through cooperative partnerships with key stakeholders. Activities such as sustainable grazing management, retaining fallen timber, managing regrowth (retention, ecological thinning where appropriate) are all important for biodiversity management in Semi-Arid Woodlands.

Note: The *NSW National Parks Establishment Plan 2008* identifies Semi-Arid Woodlands as a priority for additional protection within the public reserve system.

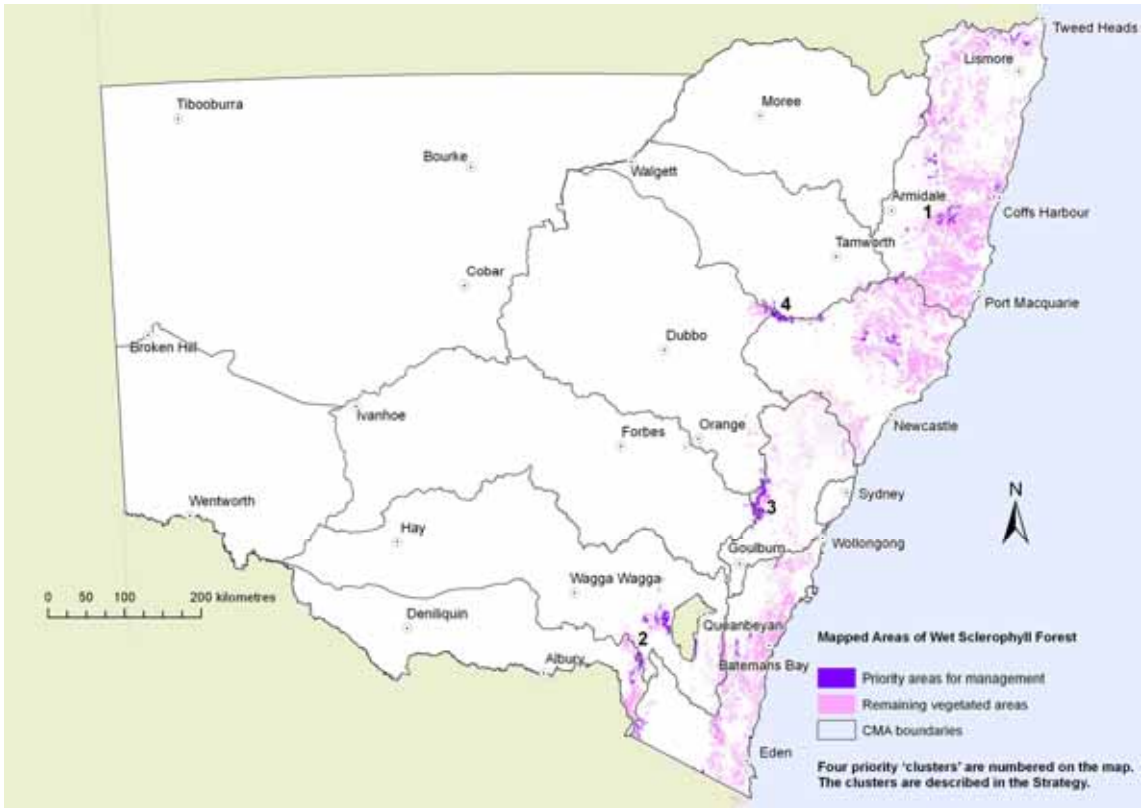
Wet Sclerophyll Forest

Wet Sclerophyll Forests are characterised by tall straight-trunked eucalypt trees such as blue gums, mahoganies, peppermints and green-leaved ashes. 'The giants of the Australian bush are the towering eucalypts of the wet sclerophyll forests. In New South Wales, the tallest of these may reach an awesome 70 m or more' (Keith 2004). Underneath the canopy, there is a luxuriant understorey of soft-leaved shrubs, ferns and herbs, many of which are rainforest species or have close rainforest relatives. Rainforests may be embedded within Wet Sclerophyll Forest and the two often blend together as intermediate forms. Wet Sclerophyll Forests are alive with the sounds of insects, reptiles, amphibians, birds and mammals. The forests are generally home to large populations of possums and gliders, as well as less well-known conspicuous mammals such as the long-nosed potoroo, parma wallaby and red-necked and red-legged pademelons.

The Wet Sclerophyll Forests of New South Wales occupy about 30,000 square kilometres (4% of the state) of the wet, moderately fertile soils along the coastal ranges and eastern side of the escarpment. These forests can be categorised as either Shrubby or Grassy (Keith 2004). Wet Sclerophyll Forests have generally declined in extent by about 30% over the past 200 years. About 50% of what remains is found in remnants that are greater than 500 hectares.

Wet Sclerophyll Forests are important to many Aboriginal groups, including Bundjalung, Yaegl, Gumbaynggirr, Dhungutti, Birpai, Githabul Worimi, Ngarrigo, Walgalu, Dhurga and Dharawal.

Priority Areas for Wet Sclerophyll Forest management



Note: The map identifies areas that are a priority for investment in management because they are generally: in moderate to good condition; well-connected with the surrounding landscape; part of a highly cleared, and/or degraded type of vegetation; and floristically distinct from other, well-conserved types of vegetation. In other words, Priority Areas are the best remaining examples of distinctive ecosystems that have been highly cleared or degraded across NSW. The map should be viewed at scale of 1:250,000. Site-assessment is required to confirm the map's values on the ground. The numbers on the map refer to the identified priority clusters (Appendix 7).

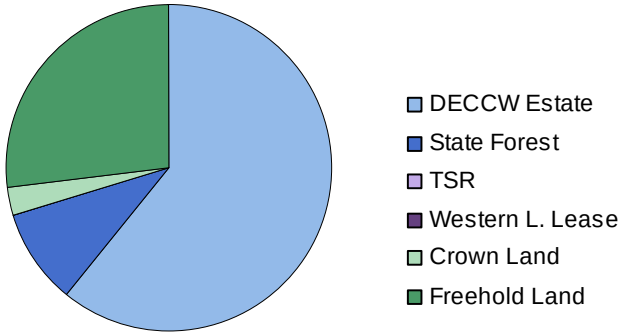
Where are the priority Wet Sclerophyll Forests?

About 252,000 hectares of Wet Sclerophyll Forest have been identified as a priority for management. This amounts to around 8% of the total extent of Wet Sclerophyll Forests. Priority Wet Sclerophyll Forests are in moderate to good condition, and are found in well-connected landscapes. All of the Priority Areas for Wet Sclerophyll Forests are Grassy Wet Sclerophyll Forests. Four clusters of Priority Areas have been identified, and are shown on the map:

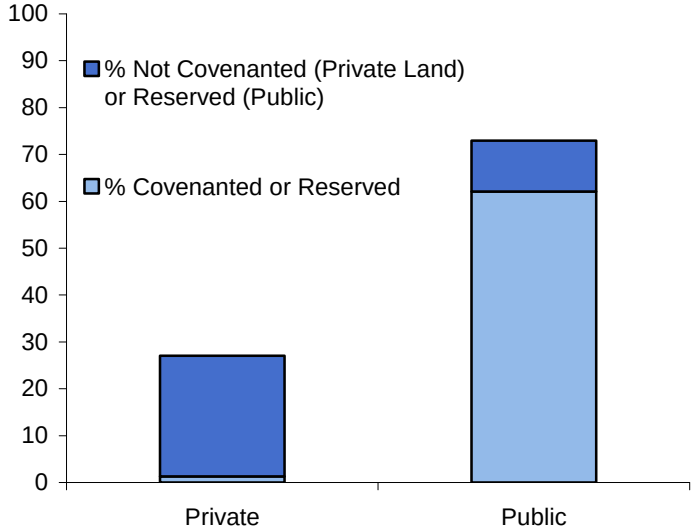
1. Wet Sclerophyll Grassy Forests between Dorrigo and Walcha, east of Armidale
2. Wet Sclerophyll Grassy Forests to the south and east of Tumut
3. Wet Sclerophyll Grassy Forests in and around the Kanangra Boyd and Tarlo River national parks
4. Liverpool Range Wet Sclerophyll Grassy Forests/Dry Sclerophyll Forest/Grassy Woodland Mosaic (part of the Great Eastern Ranges Initiative, 'Upper Hunter – Barrington Tops' priority partnership area).

Who is managing the priority Wet Sclerophyll Forests?

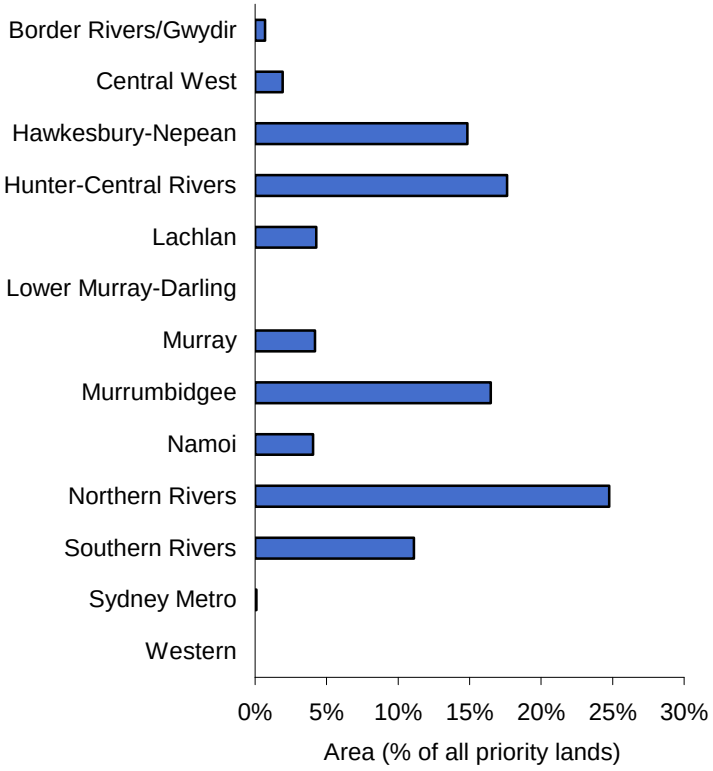
Around 60% of priority Wet Sclerophyll Forests are managed for conservation on public land in the DECCW estate. A significant proportion of priority Wet Sclerophyll Forests (10%) are managed by Forests NSW.



About one-quarter of the area of priority Wet Sclerophyll Forests is privately managed. A small proportion of Wet Sclerophyll Forests on these private properties are managed under formal conservation agreements. Conservation agreements provide landholders with access to advice and support for biodiversity management.



Priority Wet Sclerophyll Forests are scattered across many CMAs. The greatest opportunity for investment in priority Wet Sclerophyll Forests on private land is in the Northern Rivers and Hunter-Central Rivers CMAs, which together contain more than half of the priority Wet Sclerophyll Forests.



Key objectives from Part A

Objectives 1 & 2: Direct conservation efforts towards state-scale priorities. Significant areas of priority Wet Sclerophyll Forest are managed on both private and public land. On public land, Forests NSW manages about 10% of priority Wet Sclerophyll Forests.

Objective 6: Use strategic mechanisms to assess, conserve and improve biodiversity values in land-use planning & Objective 5: Use market-based mechanisms to complement the range of private land conservation programs. Rural residential encroachment around large population centres can adversely affect priority Wet Sclerophyll Forests.

Objective 8: Actively and effectively manage the terrestrial reserve system and marine protected areas as part of a broader landscape & Objective 10: Effectively manage and control threats through cooperative partnerships with key stakeholders. Ongoing and active on-park management for the 61% of priority Wet Sclerophyll Forests that occur in the DECCW estate, combined with cross-tenure threat management programs, would generate significant biodiversity benefits for Wet Sclerophyll Forests.

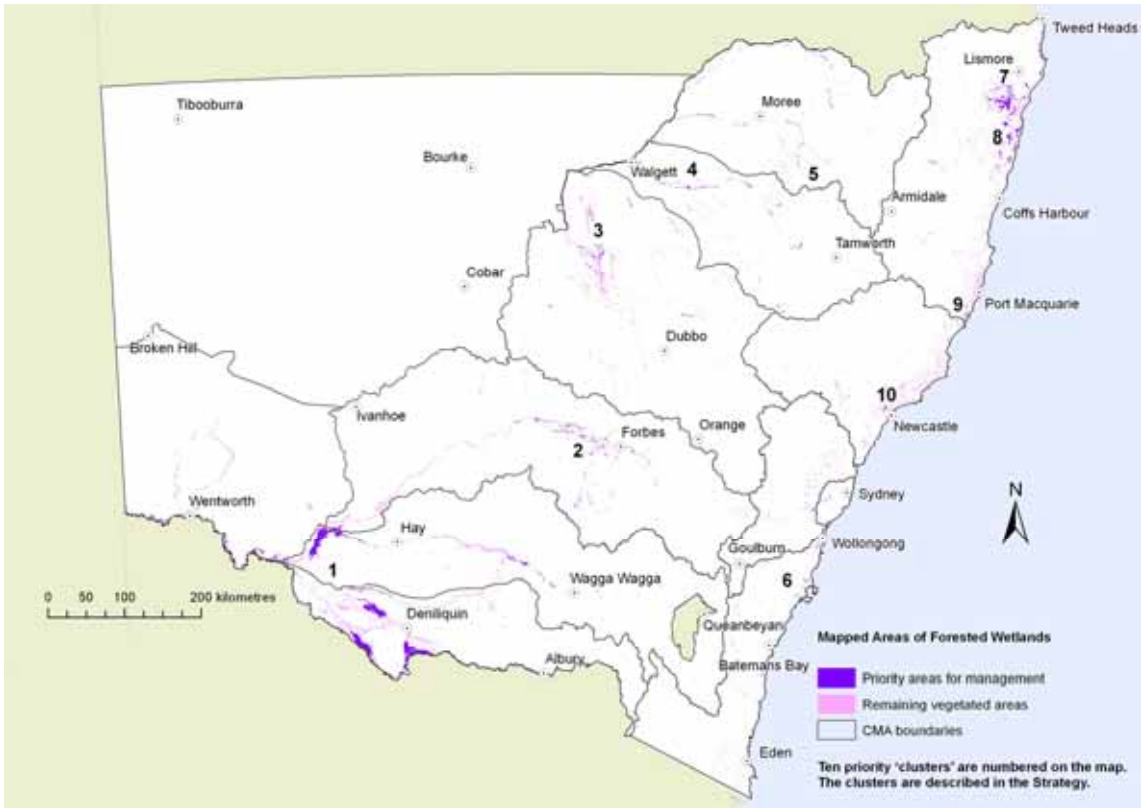
Wet Sclerophyll Forests require active management to minimise the impacts of weeds, pests, fire, disease and dieback on biodiversity on all tenures. Cross-tenure cooperation between DECCW, Forests NSW and private landholders will be important for improving the success and efficiency of threat management programs. CMAs can play a key role in facilitating cross-tenure coordination.

The Keith (2004) vegetation classification does not include all types of wetland vegetation. Wetlands are a complex mosaic of vegetation communities not easily categorised, including permanently wet communities such as coastal lakes and lagoons, alpine bogs and fens, and communities adapted to wetting and drying cycles such as mangroves and saltmarshes, inland lakes, inland floodplain swamps and inland floodplain shrublands. Communities classified as Freshwater Wetlands and Forested Wetlands by Keith (2004) often occur in association with each other and for this reason some wetland areas, like the Macquarie Marshes, have been identified as a priority in both the Freshwater and Forested Wetlands profiles.

Forested Wetlands occur throughout New South Wales along riverine corridors and on floodplains. They are dominated by trees and occur on fertile soils at low altitude. The vegetation is adapted to periodic inundation by floodwaters. The trees provide important habitat for birds, reptiles and frogs when flooded and when the wetlands are dry. They are a source of large woody debris in rivers (snags), which provides important habitat for fish.

Forested Wetlands often occur in association with Freshwater Wetland communities. Four distinct ecosystem classes have been defined (Keith 2004; see also Appendix 8). The Forested Wetlands of New South Wales cover about 9,500 square kilometres throughout the state. Wetlands are important to all Aboriginal groups.

Priority Areas for Forested Wetland management



Note: The map identifies areas that are a priority for investment in management because they are generally: in moderate to good condition; well-connected with the surrounding landscape; part of a highly cleared, and/or degraded type of vegetation; and floristically distinct from other, well-conserved types of vegetation. In other words, Priority Areas are the best remaining examples of distinctive ecosystems that have been highly cleared or degraded across NSW. It is important to note that the map does not identify individual sites 'on-the-ground' and site-assessment is required to confirm site values. The map should be viewed at a scale of 1:250,000. The numbers on the map refer to the identified priority clusters (Appendix 7).

Where are the priority Forested Wetlands?

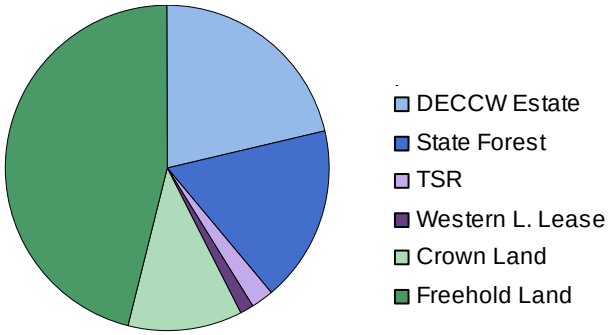
About 318,000 hectares of Forested Wetlands have been identified as a priority for management. This represents over one-third of the total area of Forested Wetland in New South Wales. Priority Forested Wetlands are in moderate to good condition, and in well-connected landscapes. Ten clusters of Priority Areas have been identified, and are shown on the map:

1. River Red Gum forests along the Murray and Murrumbidgee riparian corridors
2. Lachlan River Red Gum Forests
3. River Red Gum Forests of the Lower Macquarie riparian corridor and Macquarie Marshes*
4. Namoi Valley riparian corridor Forested Wetlands
5. North West Slopes Forested Wetlands
6. Shoalhaven Forested Wetlands
7. Richmond River Floodplain Forested Wetlands
8. Clarence Floodplain Forested Wetlands
9. Mid-North Coast Forested Wetlands
10. Tomago Sandbeds Forested Wetlands.

* The Macquarie Marshes, like many other priority clusters listed above, exists as a mosaic of both Freshwater and Forested Wetlands. This site has also been identified as a priority under the Freshwater Wetlands profile.

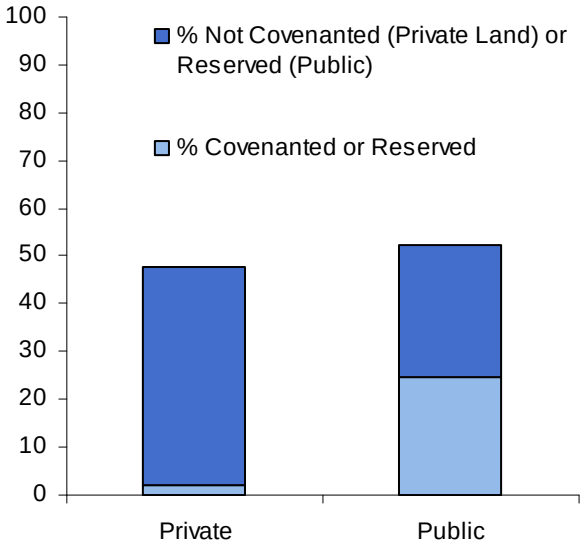
Who is managing the priority Forested Wetlands?

Around 20% of priority Forested Wetlands occur in national parks and reserves managed by DECCW (this includes approximately 100,000 hectares that were protected under the 2010 River Red Gum decision). Forests NSW manages almost one-fifth of priority Forested Wetlands.



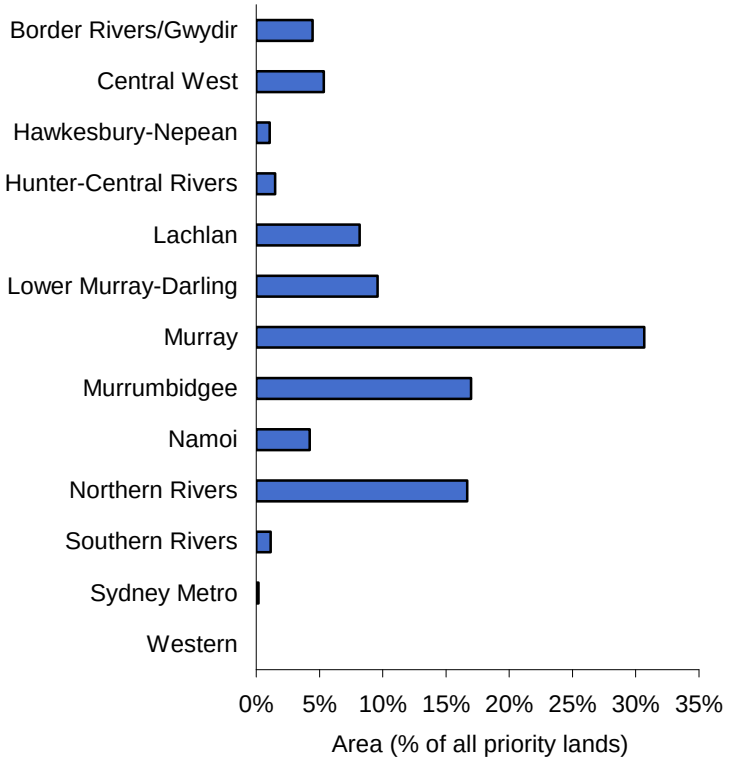
Note: Travelling stock routes (TSRs) are parcels of Crown land reserved under legislation for use by travelling stock. Livestock Health and Pest Authorities manage the land to strike a balance between the needs of travelling or grazing stock and the conservation of native species.

Almost half of the total extent of priority Forested Wetlands occurs on freehold land that is not covered under any conservation agreement or covenant.



Note: Western Lands Leases are owned by the Crown and subject to regulatory controls through lease conditions administered by the Land and Property Management Authority; however, they are effectively privately managed.

Priority Forested Wetlands are spread across a large number of CMAs. Almost one-third (31%) occur in the Murray CMA region. Additional large portions of Priority Area occur in Murrumbidgee (17%) and Northern Rivers (17%) CMAs.



What are the threats to Forested Wetlands?

Forested Wetlands are suffering from threats including:

- river regulation and alterations to flooding regimes which reduce the frequency, duration and extent of flooding events

- exposure of acid sulphate soils resulting from over-drainage of coastal wetlands, altered flow regimes and severe drought in the Murray–Darling Basin
- clearing of native vegetation
- unsustainable land and stock management practices resulting in degradation of wetland values
- climate change via reductions in annual rainfall in some inland areas and sea level rise in coastal wetlands
- poor land management of coastal floodplain wetlands resulting in over-drainage of wetlands and reduction in native species.

There are a number of existing state initiatives for improving the health and condition of wetlands. These include:

- the NSW Rivers and Environmental Restoration Program that aims to restore the ecological health of the Gwydir Wetlands, the Macquarie Marshes, the Lowbidgee floodplain wetland and Lachlan wetlands
- the Living Murray initiative and the Riverbank program, which aim to restore and improve wetland sites through water recovery and delivery of environmental water
- coastal floodplain wetland rehabilitation initiatives undertaken in partnership by local government, CMAs, state agencies and others.

Key objectives from Part A

Objectives 1 & 2: Direct conservation efforts towards state-scale priorities.

Objective 3: Improve the on-ground delivery of incentive schemes through the adoption of a common approach to site-assessment & Objective 11: Support private primary producers to sustainably manage their resource through collaborative partnerships. Promote and run scientifically-based, transparent and adequately funded incentive schemes for land managers to improve biodiversity. Support landholders to implement sustainable land and stock management practices including grazing, pests and weeds management at priority wetlands.

Objective 9: Protect and restore aquatic ecosystems. Ensure adequate environmental flows to priority Forested Wetlands.

Objective 10: Effectively manage and control threats through cooperative partnerships with key stakeholders. Employ adaptive management principles to manage the impacts of climate change and manage total grazing pressure.

Freshwater Wetlands

Freshwater Wetlands occur in inland, upland and coastal areas of New South Wales. They provide essential habitat for aquatic invertebrates, fish, waterbirds and other animals, and they moderate flooding and improve catchment water quality. Freshwater Wetlands can be permanent, semi-permanent or intermittent. Their soils often crack when dry, providing habitat for invertebrates, reptiles and small mammals that are adapted to living in the cracks in the heavy clay soils. The key drivers of Freshwater Wetlands are water regime and geomorphology. Freshwater Wetlands often form a complex with Forested Wetlands.

Freshwater Wetlands are highly diverse and include coastal heath swamps, montane bogs and fens, coastal freshwater lagoons, montane lakes, inland floodplain swamps and inland floodplain shrublands. They also include inland lakes. The Inland Saline Lakes (Keith 2004) vegetation class is included as part of this profile because they are fed by freshwater. These lakes are usually ephemeral. They are important for fish, aquatic invertebrates and waterbirds and sometimes support submerged macrophyte beds when water clarity is suitable. Typically the surrounding vegetation is Semi-Arid Woodland or Semi-Arid Shrubland.

Wetlands are important to all Aboriginal groups.

Where are the priority Freshwater Wetlands?

Developing priorities for Freshwater Wetlands is a difficult task due to an absence of comprehensive statewide mapping of all wetland communities. Priorities indicated here reflect those identified in existing programs.

Inland wetlands

Priorities for inland wetlands are based on those identified in the NSW Riverbank program and the Living Murray initiative, and include:

1. Macquarie Marshes
2. Gwydir wetlands
3. Narran Lakes
4. Lachlan River wetlands
5. Lowbidgee floodplain wetlands
6. Millewa Forest
7. Koondrook–Perricoota Forest
8. Paroo river wetlands*.

* Paroo is included as a priority because it is the last free-flowing river in the west of New South Wales and remains in good condition.

Upland wetlands

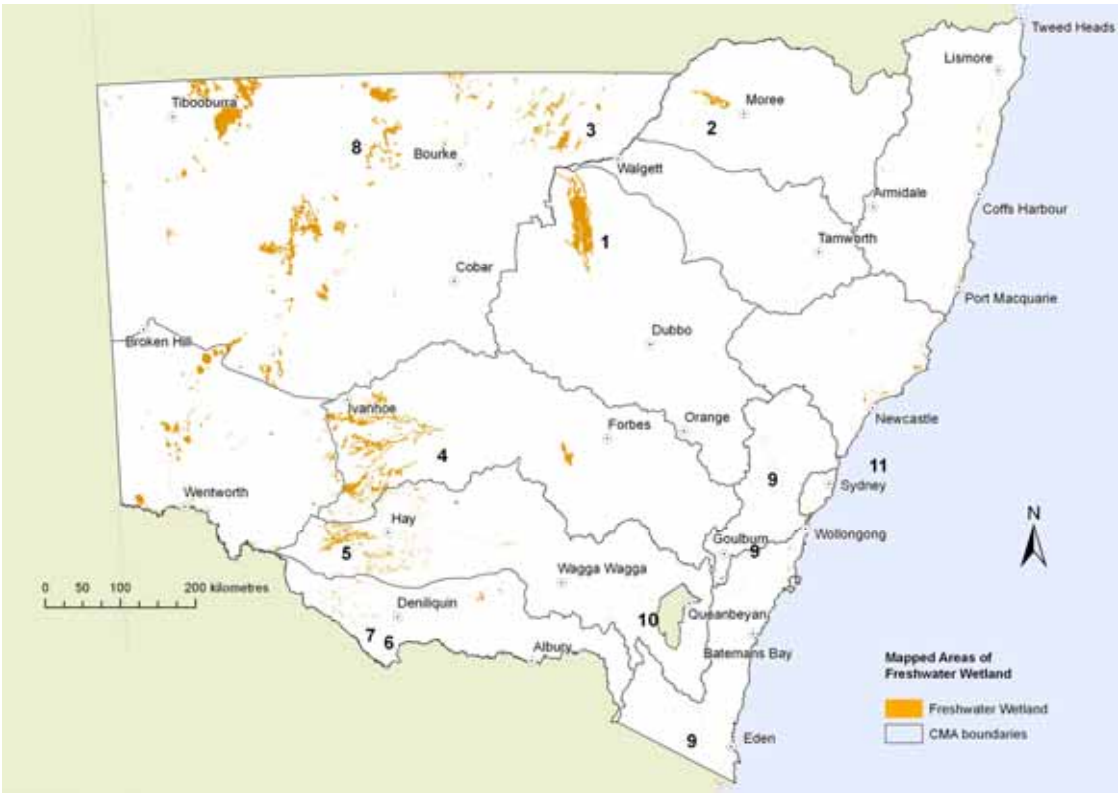
Two nationally listed endangered ecological communities:

9. Temperate Highland Peat Swamps on Sandstone
10. Alpine Sphagnum Bogs and Associated Fens.

Coastal wetlands

11. All coastal freshwater floodplain wetlands (due to the previous history of clearing and drainage).

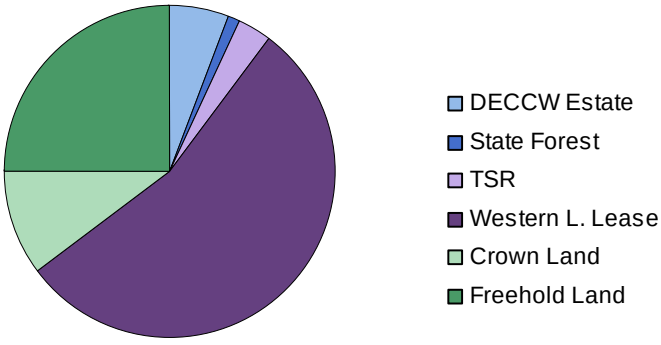
Extent of Freshwater Wetlands



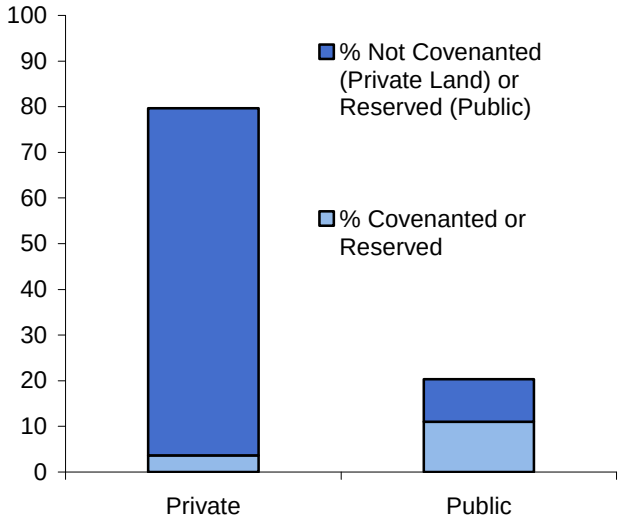
Note: Priority Areas for Freshwater Wetlands could not be mapped. However, a number of Freshwater Wetlands have been identified as a priority for management under existing programs. These priority wetlands are numbered on this map and identified in the Strategy. Not all wetlands are evident on this map due to the scale at which it is displayed. Small wetlands, such as coastal and upland wetlands, are not shown. Map drawn from Keith and Simpson (2010) and Kingsford *et al.* (2003).

Who is managing the Freshwater Wetlands?

More than half of all Freshwater Wetlands (not just those listed above) occur on Western Lands Leases (55%). One-quarter occur on freehold land and 6% occur in national parks and reserves managed by DECCW.

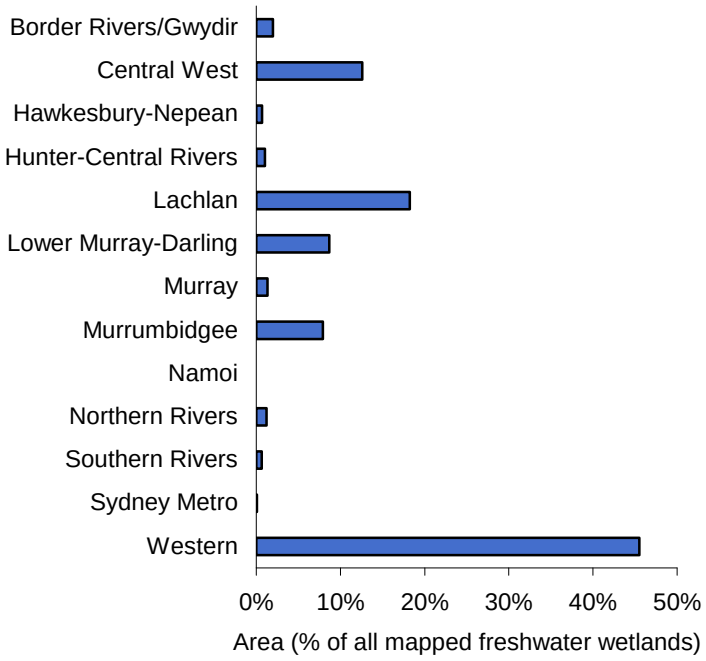


Note: Travelling stock routes (TSRs) are parcels of Crown land reserved under legislation for use by travelling stock. Livestock Health and Pest Authorities manage the land to strike a balance between the needs of travelling or grazing stock and the conservation of native species.



Note: This tenure information is based on incomplete Freshwater Wetland mapping which is sourced from Keith (2004) and Kingsford *et al.* (2003).

Almost half the Freshwater Wetlands in New South Wales occur in Western CMA region. Large proportions of Freshwater Wetlands occur in Lachlan (18%) and Central West (13%) CMA regions.



What are the threats to Freshwater Wetlands?

The major causes of decline in Freshwater Wetlands are:

1. river regulation and water diversion works that alter the timing and volumes of water to wetlands, including floodplain drainage
2. catchment scale disturbance that affects the quality of water and ecosystem functioning
3. altered native vegetation composition and structure resulting from reductions in annual rainfall in some inland areas and sea level rise in coastal wetlands
4. pests and weeds that out-compete native wetland species and habitats.

Human-induced climate change is predicted to reduce flood frequency and water availability for inland wetlands. Sea level rise will threaten coastal Freshwater Wetlands.

There are a number of existing state initiatives for improving the health and condition of wetlands. These include:

1. the NSW Rivers Environmental Restoration Program that aims to restore the ecological health of the Gwydir Wetlands, the Macquarie Marshes, Lowbidgee floodplain wetland and Lachlan wetlands
2. the Living Murray initiative and the Riverbank program which aim to restore and improve wetland sites through the recovery (purchase and infrastructure efficiencies) and delivery of environmental water
3. preparation and implementation of water sharing plans
4. the Wetlands on Farms project which encourages farmers to protect and restore wetlands on private land in western New South Wales
5. coastal floodplain wetland rehabilitation initiatives undertaken in partnership by local government, CMAs, state agencies and others.

Key objectives from Part A

Objective 9: Protect and restore aquatic ecosystems. Ensure adequate environmental flows to priority Freshwater Wetlands.

Objective 10: Manage and control threats through cooperative partnerships with key stakeholders. Ensure wetland management strategies are integrated with pest and weed management strategies to limit their spread via environmental flow delivery. Manage total grazing pressure on lake beds when they are dry.

Healthy riverine ecosystems, comprising rivers and their riparian zones, floodplains and wetlands, are vital for the maintenance of aquatic and terrestrial biodiversity. However, while aquatic ecosystems have their own intrinsic value, healthy rivers are also critical for maintaining good water quality and providing ecosystem services that support the beneficial use of water by humans and activities such as agriculture, aquaculture, fishing, recreation, tourism and swimming. Rivers play an important role in connecting aquatic ecosystems and terrestrial environments.

New South Wales has approximately 58,000 kilometres of rivers and major streams. The flow of these rivers is highly variable and often unpredictable. Streams and creeks may flow permanently or only intermittently after heavy rainfall and floods. About 97% of river length in New South Wales has been substantially modified (NLWRA 2002). Typical changes include the removal of riverine vegetation, the alteration of natural river flows, barriers to fish passage, sedimentation from erosion of land and riverbanks, and the introduction of exotic species.

Rivers are important to all Aboriginal groups.

What is the current condition of our Rivers?

Despite significant progress in protecting rivers via the amendments to the Fisheries Management Act in 1994, introduction of the Water Management Act in 2000 and a number of valuable restoration initiatives listed previously, the scale of poor land and river management and development practices has left a legacy from which our rivers are still suffering.

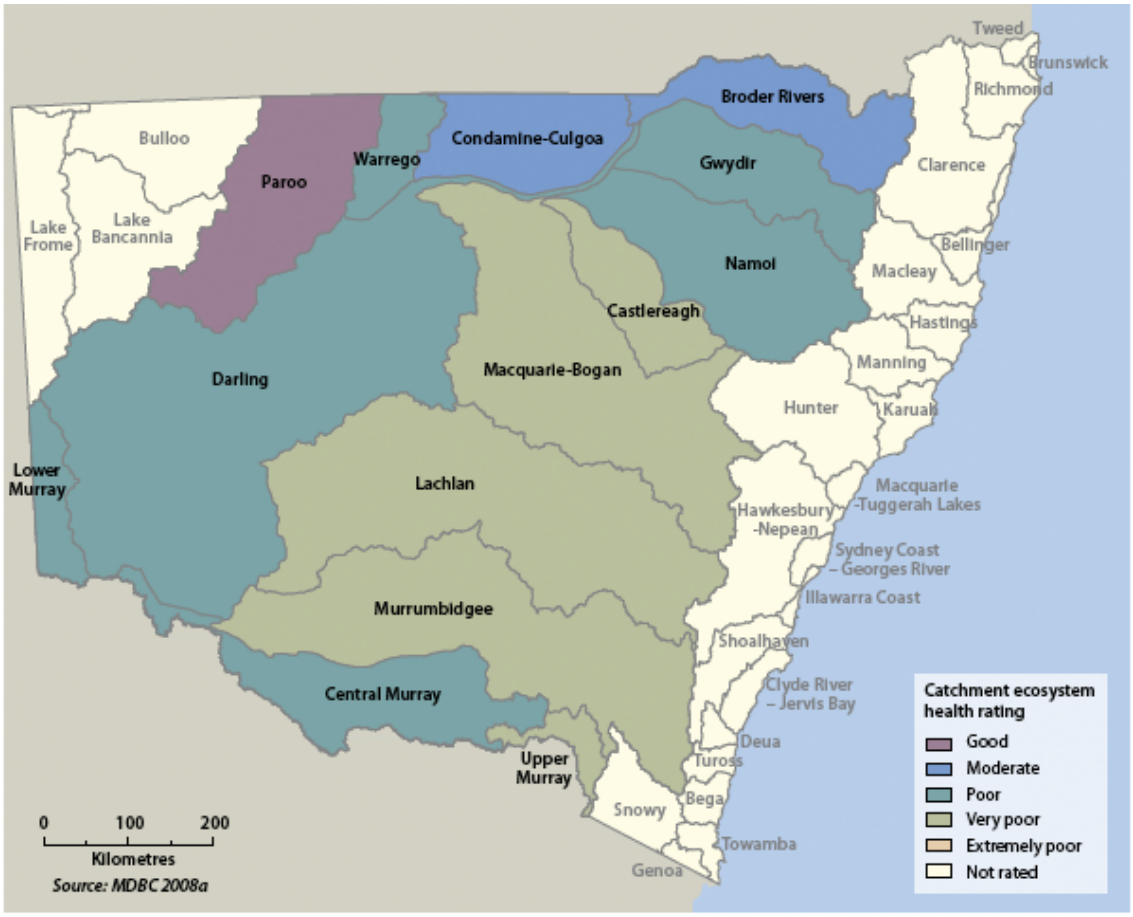
The Sustainable Rivers Audit (SRA) has developed a methodology to assess the health of rivers in the Murray–Darling Basin based on indices for hydrology, fish and macro-invertebrates. A set of expert rules is used to combine the three to determine an overall rating of river valley health (MDBC 2008). Overall results for basin systems are summarised below.

Overall, the Paroo was the only river found to be in good ecosystem health, while the border rivers were in moderate health. Most other rivers received river health ratings of poor or worse.

This work has only recently been extended to coastal rivers and overall health descriptors are not available. However, statewide data on macro-invertebrate and fish diversity (Eren Turak pers. comm. and Dean Gilligan pers. comm.) is available and is consistent with the SRA data.

The status of macro-invertebrate populations suggests only the Paroo River, the border rivers, the Upper Murray River and some of the eastern uplands and eastern lowlands rivers are not in poor or extremely poor macro-invertebrate condition (with large variation among different sections of some river systems). Information on fish status in rivers also suggests that most rivers in New South Wales are in poor condition. Only the Paroo River, the border rivers and small areas of the eastern uplands and eastern lowlands rivers have other than poor, very poor or extremely poor fish condition (with variation within some river systems).

Condition of Rivers in New South Wales (names refer to catchments)



What are the threats to Rivers?

Rivers and the aquatic biodiversity contained within them are suffering from a range of threats including:

1. water extraction and water diversion resulting in changes to water quality (thermal pollution) and natural flow regimes
2. barriers to fish passage from a range of in-stream structures including dams, weirs and waterway crossings
3. historical loss and continuing removal or degradation of riparian vegetation and large woody debris
4. introduction of pest fish, and native fish outside their natural range
5. hook and line fishing in areas important to threatened native fish survival.

Who is managing the Rivers?

A number of authorities are responsible for maintaining river health and function.

The NSW Office of Water (part of the Department of Environment, Climate Change and Water) is responsible for managing the state's surface and groundwater resources and administers the *Water Management Act 2000*. The Act controls the extraction of water, how water can be used, the construction of works such as dams and weirs, and the carrying out of activities on or near water sources in New South Wales.

CMAs provide incentives and technical support for landholders to undertake activities to improve or maintain riparian vegetation, including weed control and fencing to manage grazing by domestic stock and promote revegetation.

Industry and Investment NSW has an important role in maintaining aquatic biodiversity via the sustainable management of fisheries and aquaculture, by protecting and rehabilitating aquatic habitats and conserving threatened fish species.

The Department of Environment, Climate Change and Water administers water recovery programs that include water purchase as well as investment in water recovery through such things as infrastructure efficiency projects.

Other key managers of NSW rivers include Sydney Catchment Authority, Land and Property Management Authority (LPMA), Hunter Water and State Water Corporation and non-government bodies. A growing list of recreational fishing groups and other recreational users are important partners in river management and health. These organisations have prepared a number of plans and policies to guide their activities associated with rivers.

What are our priorities for managing the Rivers?

The poor status of the biological assemblages in parts of most rivers indicate the need for restoration actions aimed at repairing damaged tributaries and river reaches. The highest priority actions for rivers are those that will make the most significant contribution to regional freshwater biodiversity if restoration is successful. There is currently no systematic approach available in New South Wales to assess and prioritise rivers or sections of rivers for biodiversity conservation and management. Rivers or sections of rivers that are a priority for management need to be identified systematically using a combination of their natural features and their current condition (see Turak *et al.* 2010 for methods and examples).

Key objectives from Part A

Objective 9: Protect and restore aquatic ecosystems. Water sharing plans, the Fish Habitat Action Plan, Floodplain Harvesting policy will play an important role in the protection of rivers.

Objective 10: Manage and control threats through cooperative partnerships with key stakeholders. Threats include climate change and pollution.

Objective 11: Support private primary producers to sustainably manage their resource through collaborative partnerships.

Estuaries and Coastal Lakes

Estuaries and Coastal Lakes link marine environments with freshwater catchments. In New South Wales they vary in nature and size, from the long, mangrove-fringed river estuaries of the north to the many small coastal lakes in the south.

Estuaries and Coastal Lakes provide a range of habitats including seagrass, mangroves and saltmarsh, sand shoals, intertidal mud flats and rocky reefs. Saltmarshes are complex mosaics of closed sedgelands, grasslands and open herbfields distributed along the NSW coast.

Seagrass meadows are submerged communities occupying the sandy bottoms of coastal estuaries and bays. Mangrove swamps grow around the margins of coastal estuaries on mudflats that are exposed to tidal inundation.

These key habitats are particularly important nurseries for many fish, molluscs and crustaceans.

Estuaries and Coastal Lakes are important to a number of Aboriginal groups, particularly those that border the coast from Bundjalung in the north to Dhurga in the south**.**

What is the current condition of our Estuaries and Coastal Lakes?

Establishing the current condition of our Estuaries and Coastal Lakes is the first step towards prioritising investment in either maintaining or improving their condition. The overall condition will be determined by the pressures and stressors present, their magnitude and the estuary's ability to adapt to any changes caused by them.

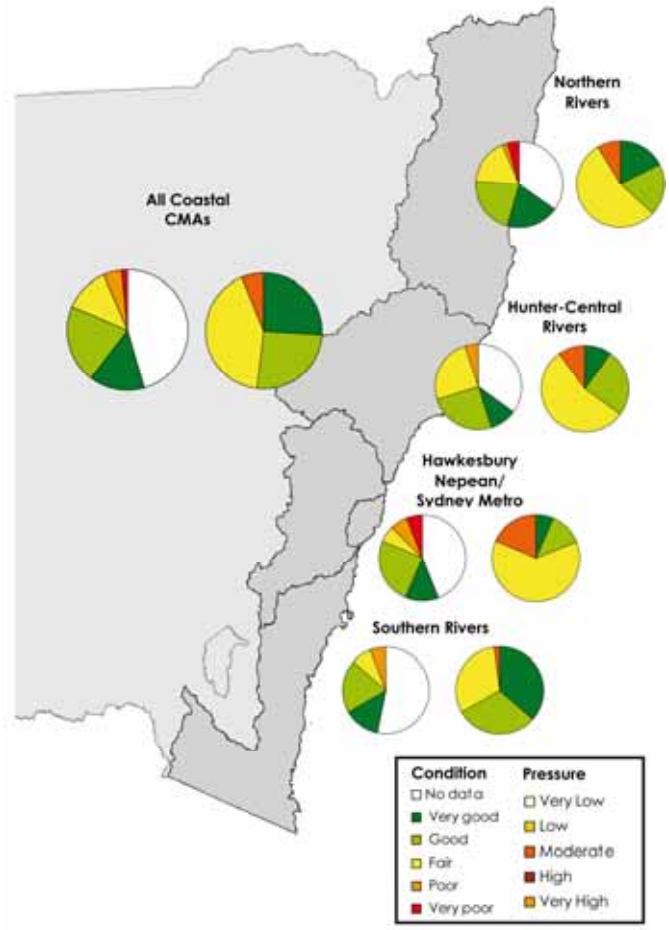
The NSW Monitoring, Evaluation and Reporting (MER) program (Roper *et al.* 2010), has established a pressure index using eight indicators which influence condition and thus biodiversity values: cleared land, population, sediment and nutrients (increase over natural), freshwater flow, tidal flow, disturbed habitat and fishing. Pressure index scores were calculated for all 184 estuaries in the state.

Nearly half of NSW estuaries are under high to moderate pressure, the remainder are considered to be under low to very low pressure. The Southern Rivers region has the highest proportion of estuaries under low to very low pressure while the Sydney Metropolitan region has the highest proportion under high to moderate pressure.

A condition index was calculated using seven indicators that represent elements of the structure, function and composition of estuarine ecosystems: chlorophyll-a, macro-algae, turbidity, seagrasses, mangroves, saltmarsh and fish communities.

Over half of NSW Estuaries and Coastal Lakes have been assessed to determine their condition. Of those, almost 70% are in either very good or good condition, approximately 10% are in poor condition and 3% are in very poor condition. Data collection to improve understanding of estuary condition is ongoing.

Condition of and pressure on Estuaries and Coastal Lakes in NSW



Data from Roper *et al.* (2010)

What are the threats to Estuaries and Coastal Lakes?

The biodiversity of Estuaries and Coastal Lakes is under threat from a number of activities including:

1. climate change and associated sea level rise
2. changing land-use resulting in habitat loss, degradation of remaining habitat and reduced water quality
3. poor land management practices contributing to problems such as diffuse water pollution and acid sulphate soil exposure
4. direct impacts from boats, moorings and infrastructure on seagrass beds
5. water extraction resulting in reductions in natural flow regimes and associated impacts on estuarine ecosystem production and health
6. introduction of aquatic pests that affect native biodiversity.

Who is managing our Estuaries and Coastal Lakes?

The Estuaries and Coastal Lakes of New South Wales are largely publicly owned areas managed by a range of state government agencies (including the LPMA) and local councils. The *Coastal Protection Act 1979* and the *NSW Coastal Policy 1997* provide the strategic direction and legislative framework for management of the coastal zone.

The NSW Estuary Management Program assists local councils and communities to develop and implement coastal zone and estuary management plans. The plans aim to maintain or improve the condition of estuaries. Over 90 plans are currently being implemented or developed.

The maintenance and management of freshwater inflows to Estuaries and Coastal Lakes is also an important consideration. Water sharing plans are being implemented by the NSW Office of Water for all coastal waterways, which aim to balance the catchments' freshwater extraction with that of the freshwater inflow needs of the downstream estuary and coastal lake systems.

A range of other programs contribute to maintaining or improving the biodiversity values of Estuaries and Coastal Lakes, including threatened species recovery planning, CMA biodiversity and land management programs, and aquatic habitat protection and rehabilitation programs (including invasive species management, modifying or removing barriers to fish passage).

What are our priorities for managing Estuaries and Coastal Lakes?

The MER program assessments (Roper *et al.* 2010) can be used to determine management directions for Estuaries and Coastal Lakes:

- Estuaries that are currently in good condition and under low pressure are a priority for protection. This may include conservation assessments.
- Estuaries that are currently in a poor condition and are under high pressure are a priority for protection of key ecosystem elements and targeted management of pressures to prevent further decline.
- Estuaries that are currently in good condition but under high pressure are a priority for targeted management of pressures and ongoing monitoring to ensure condition is maintained or improved.
- Estuaries that are currently in poor condition but are under low pressure are a priority for research so as to better understand estuarine processes and responses.

For those Estuaries and Coastal Lakes without full condition assessments, pressure assessments can be utilised together with an understanding of an estuary's vulnerability to degradation, to better guide the direction of management.

Key objectives from Part A

Objective 6: Use strategic mechanisms to assess, conserve and improve biodiversity values in land-use planning.

Objective 8: Actively and effectively manage the terrestrial reserve system and marine protected areas as part of a broader landscape. This includes sympathetic management of broader catchment health as integral to the condition of both terrestrial and marine environments.

Objective 9: Protect and restore aquatic ecosystems.

Objective 10: Manage and control threats through cooperative partnerships with key stakeholders. This includes developing adaptation strategies for estuarine macrophytes under sea level rise scenarios to inform land-use planning and management.

Marine Waters

The marine environment of New South Wales extends from the intertidal zone to the surrounding oceans out to the limit of state coastal waters (three nautical miles off the coast or offshore islands). Habitats include the water column, intertidal and subtidal rocky reefs, subtidal soft sediments and beaches. These habitats support a rich diversity of pelagic life from plankton, which forms the base of the food chain, to fish, turtles, penguins, seabirds, seals and whales, and a wide range of benthic marine plants and animals, including corals, algae, sponges, molluscs and fish.

Two broad seabed habitats have been mapped within the Marine Waters of New South Wales (DECCW 2009b), with each broad habitat divided into depth zones:

1. **marine reef habitat (intertidal, shallow, intermediate, deep)**. Marine reefs are found where rocks occur within the intertidal or subtidal zone
2. **marine soft sediment habitat (intertidal, shallow, intermediate, deep)**. In most marine areas soft sediments are the dominant habitat type and include areas with gravel, sand or silt substrates with or without vegetation.

Seabed habitats act as a surrogate for biodiversity and can guide regional conservation planning.

These environments provide ecosystem services, including preventing coastal and seabed erosion, maintaining coastal water quality, acting as recreational and tourism resources and providing habitat for fish, marine mammals and other marine life. Oceans and the plant and animal life they support also play a critical role in mitigating climate change by sequestering carbon from the atmosphere.

Marine Waters are important to a number of Aboriginal groups, particularly those that border the coast line from Bundjalung in the north to Dhurga in the south.

What are the threats to Marine Waters?

Marine biodiversity is under pressure from many uses of the marine environment such as fishing, shipping, petroleum and mineral extraction, tourism and recreation. Pressures from changing land-use, including agricultural and urban run-off, stormwater and sewage discharge and coastal development, also continue. Marine debris from littering and lost fishing gear can also have impacts on biodiversity in Marine Waters via animal entanglement or ingestion. Biodiversity loss caused by climate change is an increasing concern globally.

Who is managing Marine Waters?

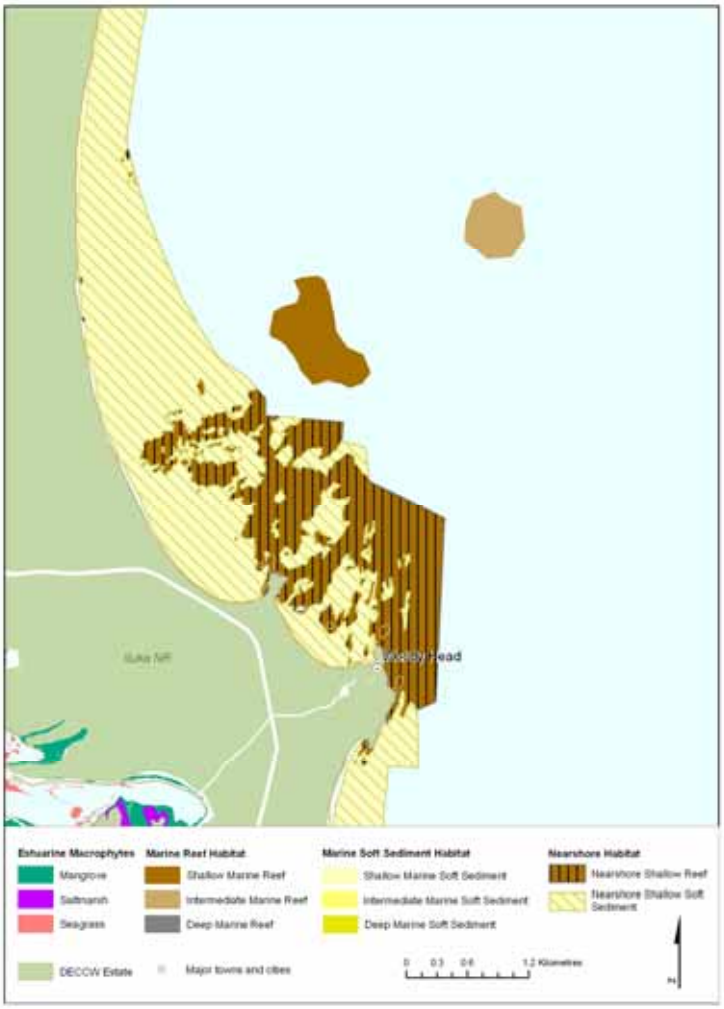
An ecosystem-based approach to marine management is being implemented through the development of marine bioregional plans in Commonwealth waters and complementary marine planning processes in New South Wales.

The NSW marine parks system is managed by the Marine Parks Authority. Marine parks have zoning plans which protect sensitive areas and designate where sustainable activities can occur.

Industry and Investment NSW has responsibility for ensuring the conservation of fish stocks, key fish habitats, threatened species, populations and ecological communities of fish and marine vegetation, and promoting ecologically sustainable development, including the conservation of biological diversity. This is done via the implementation of Fishery Management and Sustainable Aquaculture Strategies, education and enforcement activities, development and implementation of recovery and threat abatement plans and strategies, and implementation of habitat protection legislation and policy and restoration works.

Improving land management practices can deliver flow-on benefits to marine ecosystems. CMAs and other authorities including the LPMA, councils and private landholders have an important role in land management activities (including controlling pollution and nutrient/sediment inputs), which have a significant influence on the condition of our oceans. Comprehensive seabed habitat mapping is being used by CMAs to improve their estuarine and marine activities. For example, the mapping is informing the replacement of 'dump weight and chain' moorings with moorings that prevent damage to seagrass meadows.

Example of marine seabed habitat map displaying habitats near Woody Head



Where are the priority Marine Waters?

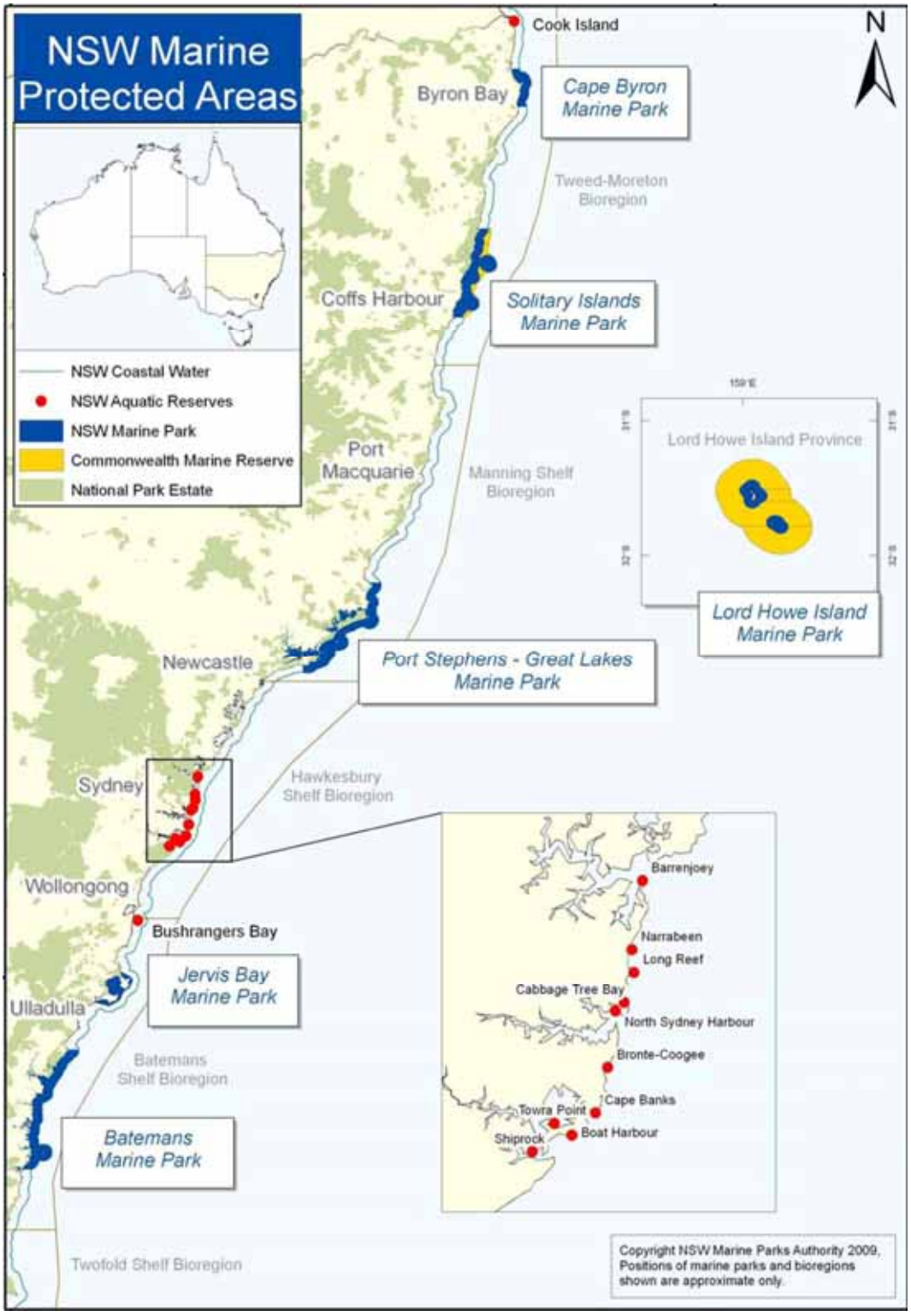
Marine protected areas conserve marine biodiversity, maintain valuable ecosystems and support sustainable uses of the marine environment. A comprehensive, adequate and representative (CAR) marine protected areas system protects important habitat, nursery areas and vulnerable and threatened species in our oceans. A commitment to CAR requires ongoing management of all marine protected areas.

The six marine parks in New South Wales cover 345,000 hectares or about 34% of NSW coastal waters. Marine parks are located in three of the five marine bioregions on the NSW coast and in the Lord Howe Island marine province. In the Hawkesbury Shelf bioregion a number of aquatic reserves which specify limits on activities which can be undertaken in them help protect marine biodiversity.

Marine park zoning plans are a key tool for managing marine parks. They identify the different activities that are allowed in parts of the marine park and are designed to provide protection for sensitive areas and for ongoing sustainable use such as fishing and tourism.

Progressing the eight key directions in the report*, A National Approach to Addressing Marine Biodiversity Decline* (NRMMC 2008) will minimise the threats to marine biodiversity in New South Wales.

NSW marine protected areas



Key objectives from Part A

Objective 8: Actively and effectively manage the terrestrial reserve system and marine protected areas as part of a broader landscape. This includes revising zoning plans for marine parks and sympathetic management of broader catchment health as integral to the condition of both terrestrial and marine environments.

Objective 10: Effectively manage and control threats through cooperative partnerships with key stakeholders.

Objective 11: Support private primary producers to sustainably manage their resource through collaborative partnerships.

Threatened species

Multiple threats to biodiversity over many generations have placed a growing number of native species under threat of extinction or decline. The recovery of these threatened species is an important part of conserving biodiversity.

In New South Wales there are 951 species (including 72 that are presumed to be extinct) that are listed as threatened in New South Wales under the *Threatened Species Conservation Act 1995* (TSC Act), as at 12 February 2010. Ninety-four threatened ecological communities and 42 endangered populations have also been listed under the Act. A list of threatened ecological communities associated with each of the ecosystem profiles is provided in Appendix 9.

Nineteen aquatic animals (mostly fish), three fish populations and three fish communities are listed as threatened with extinction under the *Fisheries Management Act 1994* (FM Act). Three species are presumed to be extinct.

What are the threats to threatened species?

Developing strategies to tackle biodiversity loss requires the identification and understanding of the threatening processes that lead to the decline and extinction of species, populations and ecological communities.

Threats to biodiversity in New South Wales include:

- habitat loss or change.
- pest animals
- weeds
- diseases

Thirty-four specific Key Threatening Processes have been identified as posing a threat to threatened species, populations or ecological communities under the TSC Act. Threat abatement plans have been prepared for three Key Threatening Processes: the invasion of native plant communities by *Chrysanthemoides monilifera* (bitou bush and boneseed), predation by the red fox (*Vulpes vulpes*), and predation by *Gambusia holbrooki*, the plague minnow.

Seven Key Threatening Processes have been identified as posing a threat to threatened species, populations or ecological communities under the FM Act by adversely affecting aquatic threatened species. One threat abatement plan has been prepared, for the removal of large woody debris.

Who manages threatened species?

The Department of Environment, Climate Change and Water (DECCW) is responsible for administering the TSC Act, which aims to protect terrestrial threatened species, populations and ecological communities. The protection of threatened fish and marine vegetation listed under the FM Act is the responsibility of Industry and Investment NSW.

The Priorities Action Statements (PAS) (DECC 2007) outline recovery and threat abatement strategies to be undertaken in New South Wales to promote the recovery of threatened species, populations and ecological communities, and to manage key threatening processes.

The PAS is designed to involve stakeholders, including managers and decision makers at all levels, in working together to implement the priority actions. There is a range of organisations that contribute to threatened species recovery across the state, including CMAs, local councils, non-government organisations, Landcare, Coastcare and other community groups.

Prioritising threatened species under the Threatened Species Conservation Act

The Priorities Action Statement (PAS) is under review and DECCW is considering options to ensure all recovery and threat abatement actions are well targeted and cost-effective. DECCW will aim to ensure that the maximum number of species is recovered through threat abatement for the funds available, by considering factors including the risk of extinction, ability to recover, and cost of recovery actions.

The benefits of this approach include:

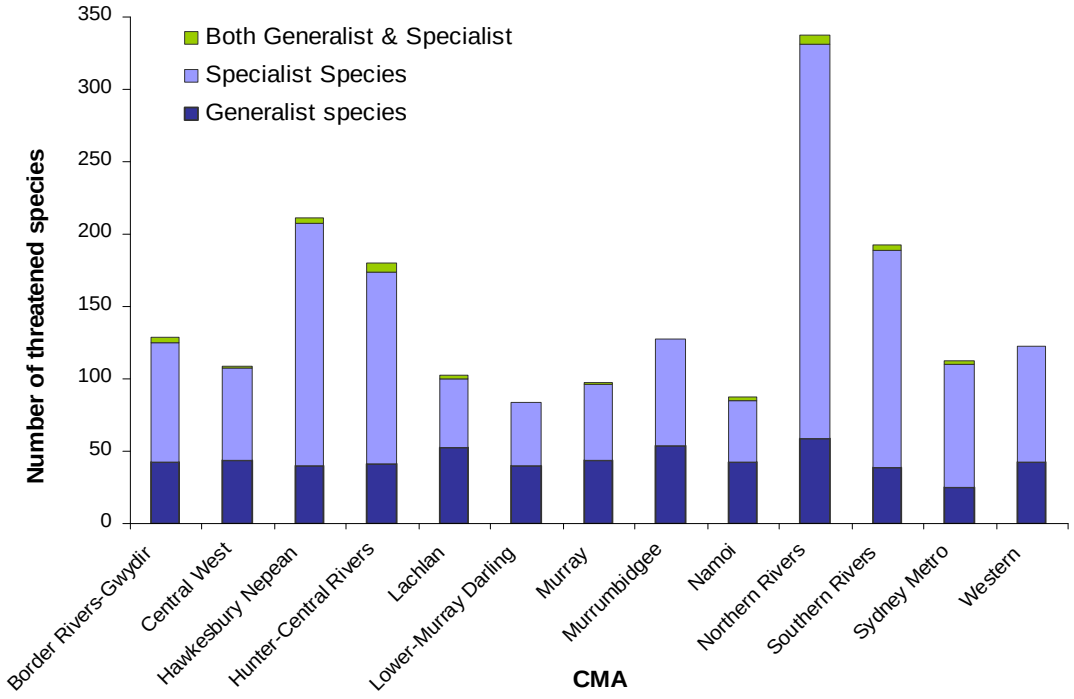
- most threatened species recovered for the funds available
- transparent and credible decision making and efficient allocation of resources
- clearly identified actions to recover species.

In order to focus recovery efforts on species that require targeted, site-level intervention, the threatened species schedules have been split into two groups:

1. **Specialist threatened species** require site-based management actions to abate threats, improve habitats and recover the species. About 50% of threatened fauna and all threatened flora are specialists.
2. **Generalist threatened species** require landscape-scale management actions and strategies to abate threats, improve habitats and recover the species.

Figure 2 gives an indication of the relative proportions of threatened species, including specialist threatened species, in each CMA. For example the Northern Rivers CMA has the highest number of threatened species, including 39% of the total threatened species. It would be expected that this CMA and supporting agencies and organisations would continue to focus a high proportion of investment in recovery and threat abatement programs. Once the revised PAS are available, recovery programs should be directed towards those species that are the highest priority for recovery action.

Figure 2. Number of TSC Act specialist and generalist threatened species in CMAs in New South Wales



Specialist threatened species are species whose habitat cannot be predicted from vegetation characteristics. They are usually sedentary, have specific habitat needs and use habitat at site scales, have a narrow distribution, low numbers, small local populations, are impacted by site-scale threats (e.g. fox predation) and so are best managed at the site scale. They are usually plants and sedentary fauna such as flightless birds or invertebrates.

Generalist threatened species are species whose habitat can be predicted from vegetation characteristics. They use habitat at landscape and regional scales, and are usually mobile, either nomadic or migratory. They have large and/or a widespread distribution, are impacted by landscape-scale threats (e.g. habitat loss) and are best managed at the landscape scale, and are usually mammals, birds and fish. Generalists occur in and can be assigned to one or more broad types of vegetation.

Specialist threatened species will be prioritised using the following factors:

- benefit of recovery
- likelihood of recovery
- cost of recovery actions.

Recovery of high priority specialist threatened species is implemented primarily through CMA and DECCW threatened species programs. Local councils, non-government organisations, Landcare and Coastcare groups and other community groups also play a critical role in protecting threatened species habitat.

Generalist threatened species will be prioritised according to the conservation status of the vegetation communities they occur in and their requirements in relation to vegetation cover and condition. Recovery of this group of species will be implemented as part of CMA and DECCW biodiversity incentive programs. The effectiveness of the recovery investment will be monitored via reporting on areas of their habitat managed for biodiversity through incentive schemes.

The outcomes of the prioritisation process will be made publicly available.

Prioritising threatened species under the Fisheries Management Act

The I&I NSW PAS identifies 15 priority recovery strategies and 9 priority threat abatement strategies (I&I NSW 2010a). The strategies aim to recover threatened species, populations and ecological communities and to abate key threatening processes listed under the FM Act. The PAS also provides a summary of the priority recovery and threat abatement plans to be developed by 2011.

The PAS will be reviewed every three years and amendments may be adopted following the review. As part of the review process the Director-General is to report on achievements in implementing the strategies established by the PAS.

State agencies, CMAs, community groups, non-government organisations, and members of the public are encouraged to use the PAS as a source of information about the status of threatened species, populations and ecological communities of fish and marine vegetation, and the key threatening processes affecting them. Furthermore, the PAS may be used to identify priority recovery and threat abatement strategies and to guide action at a range of scales and jurisdictions.

Similar to DECCW, I&I NSW is currently reviewing the PAS, and future versions are planned to contain more information on species distribution, mapping and identification of priority recovery and threat abatement strategies per CMA region. I&I NSW also intends to work with the CMAs to modify the PAS to improve its use as a reporting system to track implementation of recovery and threat abatement strategies at a state and regional level.

Key objectives from Part A

Objective 4: Use a cost-effective approach to prioritise threatened species for recovery.

Objective 10: Effectively manage and control threats through cooperative partnerships with key stakeholders.

Appendices

Appendix 1: *Threatened Species Conservation Act 1995* (TSC Act)

Section 140, TSC Act outlines the requirements for the preparation of a Biological Diversity Strategy (Biodiversity Strategy) for New South Wales. The first NSW Biodiversity Strategy was released in 1999 and met the requirements of the Act.

Threatened Species Conservation Act 1995

s.140 The Strategy

(1) The Director-General is to prepare a Biological Diversity Strategy within 9 months after the commencement of this Part setting out how the objects of this Act are to be achieved.

(2) The Strategy is to include proposals for:

- (a) ensuring the survival and evolutionary development in nature of all species, populations and communities, including appropriate protection under the *Wilderness Act 1987* or the *National Parks and Wildlife Act 1974* or under the *Fisheries Management Act 1994,* and
- (b) preparing or contributing to the preparation of strategies for ecologically sustainable development in New South Wales, including the integration of biological diversity conservation and natural resource management, and
- (c) an education program targeted at the community and public authorities, and
- (d) a biological diversity research program, and
- (e) encouraging greater community involvement in decision making affecting biological diversity.

(3) The Strategy must also include:

- (a) the objectives and performance targets of the Strategy, and
- (b) a statement of the means by which these objectives and performance targets are to be achieved, and
- (c) a statement of the manner in which the National Parks and Wildlife Service constituted by the *National Parks and Wildlife Act 1974* and NSW Fisheries propose to assess their performance with respect to attainment of the objectives and performance targets of the Strategy.

(4) The Director-General may amend the Strategy.

(5) The Strategy is to be amended within 12 months after the commencement of the amendments to this section made by the *Fisheries Management Amendment Act 1997* so as to extend the Strategy to fish and marine vegetation.

This draft Strategy is an amendment and update of the 1999 NSW Biodiversity Strategy. Each aspect of the TSC Act is addressed as follows:

- Identification of state-scale priorities for investment in vegetation management will contribute to 2(a) and 2(b). It is anticipated that these priorities will be incorporated into a range of existing planning and investment programs with a view to building a healthy and resilient landscape that integrates biodiversity and natural resource management into planning and delivery of programs. Investment in native vegetation management in these areas is expected to yield the best outcome.

- Biodiversity education (2(c)) will continue to be delivered in a number of ways by a range of providers including National Parks and Wildlife Discovery programs, through CMAs in partnership with agencies such as I&I NSW, Livestock Health and Pest Authorities (LHPAs) and private organisations, through the delivery of partnership programs such as the Great Eastern Ranges Initiative (GER) and other connectivity conservation programs and direct programs through DECCW and I&I NSW regional offices and local government.
- Research and community involvement (2(d) and 2(e)) are implicit in the delivery of programs at a state and regional level. The draft Strategy acknowledges the critical importance of best available science and partnership to deliver biodiversity outcomes at different scales. DECCW relies on regional delivery of programs and engagement through CMAs and NGOs particularly for private land conservation programs. DECCW science will be guided by a Science Knowledge Strategy and reliance on a range of private organisations and educational institutions to support relevant and robust science.
- The draft Strategy outlines key themes, objectives, performance targets and actions including an outline of how performance will be measured (3(a), 3(b) and 3(c)). There is an acknowledgement of the significant achievements since the first NSW Biodiversity Strategy (1999) and the importance of the continuation of a number of important programs that contribute to the health and resilience of biodiversity in New South Wales.

Appendix 2: Contributors to biodiversity conservation in New South Wales

Private sector/business and educational communities

Private landholders manage and have stewardship of more than 70% of the land and catchment areas in New South Wales. Private sector investment, development and management decisions critically affect natural resources – land, water and ocean. Partnerships with landholders and private sector businesses are essential to deliver biodiversity outcomes in a productive landscape to meet our socio-economic needs and the needs of the environment.

Organisations such as Australian Wildlife Conservancy (AWC 2010) and the NSW Nature Conservation Trust (NCT 2010) provide additional avenues for biodiversity conservation through direct land purchase and management.

Research and educational institutions provide scientific expertise that is essential for ensuring the best available scientific and technical knowledge is available at a range of levels.

Community/local

Non-government organisations play a critical role at all levels of biodiversity conservation from utilising informal information networks and local expertise through to their specific contributions on ground. Examples of key NGOs involved in biodiversity conservation include the Nature Conservation Council, representing 120 community environment groups across New South Wales, and the NSW Farmers Association, which represents a significant body of private land managers. World Wildlife Fund Australia (WWF), Nature Conservation Volunteers and other organisations are undertaking significant biodiversity conservation programs. WWF has undertaken significant works with communities, for example, through the Threatened Species Network. Landcare NSW coordinates some 1800 Landcare groups and 200 Coastcare groups. Community members also play a significant role as trust board members responsible for managing Crown reserves.

Aboriginal Land Councils are significant landowners and managers in New South Wales. Native title holders and claimants, traditional owner groups and other Aboriginal organisations also play significant roles in land management. These communities are all active in connecting Aboriginal people with Country, and applying their knowledge to biodiversity conservation and management.

Local Aboriginal Land Councils and regional Land Councils also play a significant role in land rights claims for Aboriginal people and the ongoing management of these lands.

Local government

Local councils are responsible for land-use planning and, increasingly, are responsible for environmental management, monitoring and reporting. Local councils are also Trust managers on behalf of the Minister for Lands for large areas of Crown land that are managed for multiple purposes – environmental, social and economic. Regional Organisations of Councils (ROCs) play an important role in coordinating councils' programs.

Catchment Management Authorities

The 13 CMAs established in New South Wales under the *Catchment Management Authorities Act 2003* (CMA Act) plan for, and work with, their local communities to deliver natural resource management at a regional level. CMAs facilitate significant partnership arrangements and implement programs that contribute towards state and national NRM (natural resource management) priorities.

The CMA Act requires each CMA to prepare a Catchment Action Plan (CAP) in partnership with its community and government agencies. CAPs are whole of government integrating plans that recognise relevant legislation, State Plan priorities, agency developed NRM policies, activities and regional NRM priorities. CAPs direct the priorities for government investment in catchment activities in the CMA area.

State Government and state advisory bodies

The State Government has primary constitutional and legal responsibility for the management of land, water and biodiversity in New South Wales. There are established legislation, policies, strategic planning frameworks and management approaches for managing and protecting biodiversity across a range of agencies including DECCW, I&I NSW, Forests NSW, Land and Property Management Authority (LPMA), Livestock Health and Pest Authorities (LHPAs), Sydney and Hunter Catchment Authorities, and Department of Planning (DoP).

The Natural Resources Commission (NRC) is an independent body reporting to the Premier on managing the state's natural resources in an integrated manner. In 2005, the NRC developed and recommended a Standard for Quality Natural Resource Management (the Standard) and statewide targets for NRM. The Government adopted the Standard and targets, and the targets are now part of the 'Green State' Priorities and targets of the NSW State Plan. The NRC contributes to achieving the targets of the NSW State Plan 2010 by advising the Government on:

- the natural resource policy and management settings required to improve the resilience of landscapes, and
- how to improve performance towards the statewide targets and the effective implementation of Catchment Action Plans.

The NSW Natural Resources Advisory Council (NRAC) is an independent body responsible to the Minister for Climate Change and the Environment. NRAC was established by the NSW Government in 2004 as a single source of integrated stakeholder advice on high level NRM and land-use issues. The 27 Council members represent key NRM stakeholders, including forestry, fishing, farming and mining industries; rural women, environmental, Aboriginal and NRM science interest groups; Unions NSW; key NSW Government departments and CMAs; and local government.

The NSW Scientific Committees are established under the TSC Act and the FM Act (www.legislation.nsw.gov.au). These independent committees of scientists are appointed by the Minister for Climate Change and the Environment (under the TSC Act) and the Minister for Primary Industries (under the FM Act).

The Committees' main functions include:

- deciding which species should be listed as critically endangered, endangered, vulnerable or presumed extinct in New South Wales
- deciding which populations should be listed as endangered in New South Wales
- deciding which ecological communities should be listed as critically endangered, endangered or vulnerable
- deciding which threats to native plants and animals should be declared Key Threatening Processes (KTPs) under the Act
- reviewing and updating the lists of threatened species, populations and communities and Key Threatening Processes in the schedules of the Act
- advising on the development of the NSW Biodiversity Strategy and any amendments.

Australian Government

The Australian Government manages Commonwealth lands, such as defence establishments and Commonwealth national parks, and administers the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The Australian Government invests in environmental management of natural resources through its Caring for our Country initiative. Caring for our Country supports communities, farmers and other land managers to protect Australia's natural environment and sustainably produce food and fibre.

Appendix 3: Achievements and ongoing programs

The first NSW Biodiversity Strategy was released in 1999 and funded a number of significant research and education programs. While this current Strategy focuses on new initiatives, it is important to recognise the range of programs that have made and continue to make significant contributions to biodiversity conservation in New South Wales.

Significant legislative reforms

Maintain and improve native vegetation

In 2003, the NSW Government introduced the *Native Vegetation Act 2003* (NV Act) as the primary vehicle for protecting and improving the condition of native vegetation. The NV Act started operation with the Regulation on 1 December 2005 and for Private Native Forestry on 1 August 2007. Other legislation that formed part of the package includes the *Catchment Management Authorities Act 2003* (CMA Act) and the *Natural Resources Commission Act 2003.*

The reforms delivered:

- an end to broad-scale clearing unless approved actions improve or maintain environmental outcomes
- Property Vegetation Plans (PVPs), voluntary agreements between landholders and CMAs which allow the landholder to negotiate appropriate management actions that can offset the negative impacts of proposed clearing
- voluntary PVPs between landholders and DECCW for Private Native Forestry (PNF) that ensure all forestry activities comply with a code of practice ensuring the sustainability of forestry and environmental outcomes
- greater autonomy for farmers including flexibility and incentives to manage vegetation sustainably
- standardised, consistent and validated methodology to assess clearing proposals.

From 1 December 2005 – 31 December 2009, 1677 PVPs have been agreed between farmers and CMAs of which 1159 have involved incentives. More than 380,000 hectares have been protected, conserved or improved to achieve biodiversity, land restoration, salinity and water quality outcomes. A total of 7243 hectares have been approved for clearing subject to a PVP to improve or maintain the environmental outcomes. Clearing offsets totalling 25,623 hectares have been secured for clearing.

Since the implementation of the NV Act in December 2005, there has been an overall reduction in the area of land approved for clearing in New South Wales. For example, in 1999 more than 160,000 hectares of land were approved for clearing compared to less than 2000 hectares of approved clearing in each of 2008 and 2009 under the NV Act.

In relation to Private Native Forestry, at December 2009 there were 1073 PNF PVPs bringing the highest standard of environmental management to forestry across more than 265,000 hectares. Under the NV Act, all old-growth, rainforest, steep and riparian areas are excluded from logging. In addition, a range of ecological prescriptions protect specific threatened species and their habitat.

Regional model for natural resource management partnerships and delivery

Thirteen CMAs were established under the CMA Act. These form the basis of a regional model for natural resource management delivery. A key role of CMAs is to engage with their communities, as the stewards of the natural resource assets on their land, to achieve the 13 state-wide targets for the condition of key natural resources, including biodiversity.

Sustainable basis for water management

The *Water Management Act 2000* (WM Act) was passed by the NSW Parliament in December 2000 and established a complete new statutory framework for managing water in New South Wales. For the first time, the state had comprehensive water legislation to guide its water management activities.

The WM Act was driven by the need for New South Wales to secure a sustainable basis for water management, for several reasons:

- New South Wales was at the limits of its available water resources – new licences for commercial purposes could no longer be issued across most of the state and a limit had been placed on the total volume of water that can be extracted across the inland of New South Wales under the Murray–Darling Basin Cap.
- The decline in the health of our rivers, groundwater, floodplains and estuaries was reflected in increasing water quality problems, loss of species, wetland decline and habitat loss.

The WM Act provides for secure water entitlements and the opportunity to use the market to buy water for the environment. Water sharing plans have now been implemented for 87% of water extraction in New South Wales. These plans aim to provide water in river systems at different levels of flow to achieve environmentally sustainable levels. Within unregulated and regulated water sharing plans, there are two categories of environmental water, planned and adaptive environmental water. These two categories of water will differ from plan to plan.

Strategic management of threatened species

The *Threatened Species Conservation Act 1995* (TSC Act) was amended in 2004 to adopt 'improve or maintain' principles supported by a systematic assessment methodology. The amendments facilitated the biodiversity certification of the Western Sydney growth centres. This has delivered the in situ protection of high value bushlands within the growth centres, and the establishment of a $395 million offset package to secure high conservation bushland outside of the growth centres. It also resulted in the removal of all site-assessment obligations on individual developers, which has greatly streamlined land release processes and timeframes.

The TSC Act amendments also established the Priorities Action Statement (PAS) to guide recovery and threat abatement strategies and actions. The PAS is currently being reviewed to provide a more focused and cost-effective prioritisation of threatened species programs.

Streamlined biodiversity assessment processes and a credible offsetting scheme

Following the TSC Act amendments, the Biodiversity Banking and Offsets Scheme (or BioBanking) was introduced to help address the loss of biodiversity values, including threatened species. BioBanking is a market-based scheme that provides a streamlined biodiversity assessment process for development, a rigorous and credible offsetting scheme, and an opportunity for rural landowners to generate income by managing land for conservation.

The BioBanking scheme does not currently extend to threatened species of fish or marine vegetation.

The protected area system as a cornerstone for biodiversity conservation

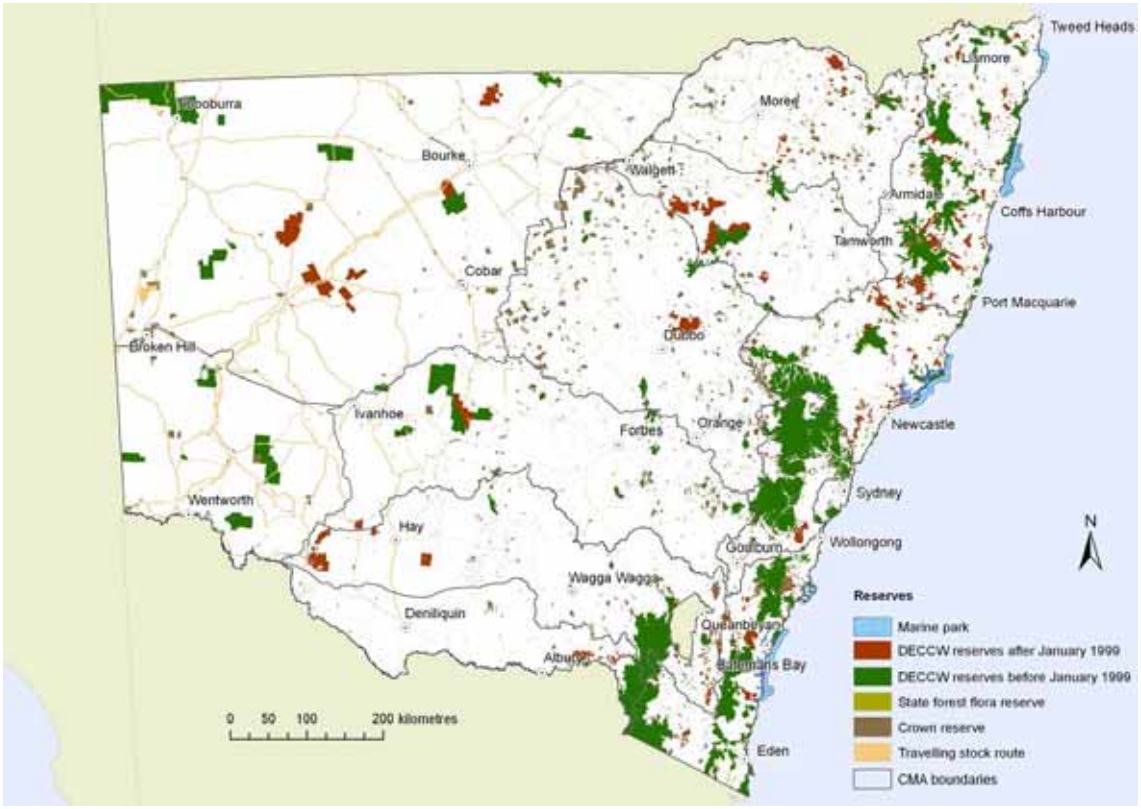
Extensive terrestrial protected areas

DECCW is responsible for managing 8.5% of the state in national parks and reserves. The establishment and management of a robust public conservation reserve system is a key to mitigating many threats to biodiversity. Current literature highlights the important role that large, unmodified protected areas will play in allowing biodiversity to adapt to climate change (CSIRO 2008).

The NSW Government remains committed to building a comprehensive, adequate and representative (CAR) terrestrial reserve system. The *NSW National Parks Establishment Plan 2008* (DECC 2008c) provides directions for the building of the reserve system over the next 10 years. The priorities for further development of the terrestrial reserve system are under-represented ecosystems and habitats, rivers and wetlands in western New South Wales, critical landscape corridors, lands within important water catchments, and culturally significant places. This established program will continue.

More than 6.5 million hectares or 8.5% of the state is formally reserved for conservation under the *National Parks and Wildlife Act 1974* (NPW Act) (Figure 3). This is an increase from 4 million hectares in 1995. Of this, 1.5 million hectares of new national parks resulted from the NSW forest agreement process. The gains in formal reserves include more than 1 million hectares of coastal forests, 1.3 million hectares on the poorly reserved far west and sheep–wheat belt western bioregions, such as the Riverina and Cobar Peneplain. In 2010, 100,000 hectares of river red gums were protected as national and regional parks and Indigenous Protected Areas. This agreement secured the biggest river red gum forest in the world. Reserve system management is supported by regional fire, pest and weed management plans.

Figure 3. National parks and forest reserves, crown reserves, travelling stock routes and marine parks in New South Wales (as at January 2010)



The national parks reserve system is supported by:

- 250 Conservation Agreements (CAs) and 650 wildlife refuges (1,986,762 hectares) under the NPW Act
- 479,000 hectares of state forests managed for conservation
- a range of multiple-use Crown reserves managed by the Land and Property Management Authority (LPMA)
- travelling stock routes (TSRs) managed by the Livestock Health and Pest Authority (LHPA)
- public land managed by the Sydney and Hunter Catchment Authorities.

These areas contain significant conservation values, provide connectivity and complement the formal reserve system.

DECCW has implemented a Park Management Program to promote continuous improvement in management of fire, pests and weeds in parks. This program includes a comprehensive monitoring and evaluation program known as *State of the Parks*.

Complementary public land conservation

Conservation on other public land plays an important role in complementing the public reserve system. It expands the range of natural values and provides buffers and corridors. Public lands are managed under a range of legislative frameworks. The different legislation governing other public lands contains principles for the management of biodiversity and threatened species within a multiple-use framework. For example, Forests NSW manages 479,000 hectares of state forests (24% of the forests estate) for conservation. In addition, approximately the same amount is excluded from harvesting for various silviculture and biodiversity reasons (DECCW 2009a). Forests NSW has Regional Ecologically Sustainable Forest Management Plans that are prepared in accordance with internationally accredited Ecologically Sustainable Forests Management principles and are reported on annually through the *Seeing Report* (Forests NSW 2008).

The LPMA has responsibility for Crown land, including Crown reserves. These reserves are managed according to principles contained in the *Crown Lands Act 1989* which emphasise environmental protection, natural resource conservation and sustainable management, as well as multiple use and public enjoyment. The LPMA also manages the majority of the beds of rivers, estuaries, coastal lakes and the sea bed in NSW state waters. The LHPA manages a network of more than 600,000 hectares of TSRs in the Central and Eastern Division of New South Wales on behalf of the LPMA. In poorly reserved agricultural landscapes, TSRs contain some of the best remaining examples of native vegetation and habitat. The Sydney Catchment Authority and Hunter Water both manage large water catchment areas.

Establishing marine parks and aquatic reserves

Marine parks and aquatic reserves extend biodiversity protection to aquatic ecosystems. Since 1999, six marine parks have been declared (approximately 345,000 hectares or about 34% of NSW state waters), including two in 2006 centred in the Port Stephens–Great Lakes and Batemans–Narooma areas. DECCW and I&I NSW, as part of the Marine Parks Authority, ensure biodiversity conservation objectives are achieved and management practices are efficient and effective. The NSW Government remains committed to establishing a representative system of marine protected areas and contributing to the implementation of the National Representative System of Marine Protected Areas.

Zoning plans provide for multiple-use management of marine parks to enable a range of sustainable uses alongside biodiversity conservation. The commencement of zoning plans for the Batemans (MPA 2010a) and Port Stephens–Great Lakes (MPA 2010b) marine parks has substantially enhanced the management of the system of marine protected areas. The current focus of improvement is to refine the day-to-day management of the existing marine parks. Five-yearly reviews of the current zoning plans for Jervis Bay and Solitary Islands marine parks commenced in 2008 to determine whether the plans remain appropriate for meeting the objects of the *Marine Parks Act 1997*.

In addition, I&I NSW administers a range of fisheries controls and closures that are aimed at protecting fish stocks and key fish habitats as well as providing protection for threatened species such as the grey nurse shark.

Management of threats

Guided threatened species recovery efforts and threat abatement

The NSW bitou bush and boneseed threat abatement plan (Bitou TAP; DEC 2006) and the NSW fox threat abatement plan (Fox TAP; NPWS 2001) provide a model for strategic management of widespread invasive species. They establish long-term cross-tenure control programs in areas where the impacts on threatened species, populations and communities are greatest.

The Fox TAP identifies the threatened species that will benefit most from a reduction in fox predation and establishes monitoring programs to measure the effectiveness of control programs at priority sites. One of the most successful programs protects 22 important breeding sites for little terns, pied oystercatchers, beach stone curlews and hooded plovers.

The Bitou TAP uses a triage model to assess the level of current impact of weeds and the ability to deliver a conservation outcome at specific sites (based on the urgency for control and ability to achieve effective control as well as a biodiversity response), independent of land tenure. After four years, control programs are being implemented at 110 priority sites along the coast of New South Wales. These programs are helping to protect approximately 90% of the high priority biodiversity identified in the Bitou TAP as being at risk. This collaborative effort involves more than 30 different agencies and numerous community groups and is supported by grants from the Australian Government and the five coastal CMAs.

Sustainable grazing management

Total grazing pressure refers to the combined impact on the landscape of feral herbivores (primarily goats, and also rabbits and pigs), over-abundant native herbivores (principally kangaroos) and domestic stock (such as sheep and cattle). Managing total grazing pressure to ensure regeneration of the overstorey, an adequate groundcover of grasses and forbs (and shrubs in some vegetation communities) and to maintain healthy riparian vegetation in freshwater and estuarine aquatic ecosystems, is essential to protect and improve biodiversity. This applies particularly on rangelands.

A number of established programs will continue to address this issue, including:

- promotion of environmentally sustainable management of stock watering points in dry rangelands
- promotion and implementation of integrated management of pest herbivores including shooting, poisoning and trapping
- promotion of sustainable grazing management practices including through training programs, e.g. ProGraze Grazing for Profit, Tactical Grazing Management (I&I NSW 2010b)
- monitoring of grazing pressure on Western Lands Leases through property inspections by Rangeland Management Officers and the establishment of photo reference points on leases.

Regional strategies

The Department of Planning (DoP) plays a key role in protecting the state's natural resources and environment, including biodiversity. The objects of the EP&A Act include the protection of the environment and ecologically sustainable development.

Under provisions of the EP&A Act, a number of State Environmental Planning Policies (SEPPs) have been developed to provide protection for various aspects of biodiversity including SEPP 14 Coastal Wetlands, SEPP 19 Urban Bushland, SEPP 26 Littoral Rainforests, SEPP 44 Koala Habitat, SEPP 50 Canal Estates, SEPP 71 Coastal Protection and the Rural Lands SEPP 2008.

DoP has also developed regional strategies for all high growth areas of the state which recognise important biodiversity corridors and areas of conservation value, as well as important areas of natural resources and cultural landscapes. The strategies locate future development areas in those places most suited to development by avoiding areas of significant environmental and resource values and building on existing settlements as far as possible, to take advantage of services, employment and infrastructure. The strategies are whole of government documents supported by regional conservation plans or other conservation strategies.

At the local level, councils are required to prepare local environmental plans (LEPs) through a Standard Instrument template. The Standard Instrument for LEPs provides a number of zones (E1, E2, E3, E4, RE1, RE2) for councils to provide for environmental, including biodiversity, conservation objectives of varying degrees, whilst allowing land uses that would be compatible with those objectives. The Department of Planning has prepared practice notes to guide councils in the use of such zones and compatible land uses.

In consultation with DECCW and other natural resource agencies, as well as councils and CMAs, the DoP has developed a set of model provisions for specific natural resource outcomes that councils can use with localised maps of various natural resource values and natural hazards. The model provisions provide heads of consideration for councils when assessing development proposals in such areas to ensure that land uses do not compromise those natural values.

Strategic management of widespread invasive species

Invasive species pose one of the greatest threats to biodiversity in New South Wales, after land clearing and disturbance of native vegetation. Invasive species affect 70% of the listed threatened species (Coutts-Smith & Downey 2006, Coutts-Smith *et al*. 2007). The NSW Invasive Species Plan (NSW DPI 2008) outlines a coordinated response by stakeholders to minimise the impacts of invasive species in New South Wales using a risk-based approach. It complements a range of other existing state strategies.

The plan includes weeds, vertebrate and invertebrate pests in terrestrial, freshwater and marine environments. Research on the impact of climate change on the range and distribution of invasive species is also being undertaken.

The NSW Invasive Species Plan has four goals:

- Exclude – prevent the establishment of new invasive species
- Eradicate or contain – eliminate or prevent the spread of new invasive species
- Effectively manage – reduce the impacts of widespread invasive species
- Capacity – ensure New South Wales has the ability and commitment to manage invasive species.

The *Noxious Weeds Act 1993* provides the legislative framework to manage weeds that are threats to primary production, the environment and human health. I&I NSW works in partnership with 124 Local Control Authorities and stakeholders to ensure the management of all weeds declared under the Act, not just those impacting on the environment.

Improving fire management for conservation outcomes

Fire has positive and negative impacts on Australian animals and plants. These impacts occur after intense bushfires, and as a result of recurrent fire patterns (i.e. fire regimes) across the landscape. The impacts of fire on biodiversity differ greatly depending on the frequency, intensity, duration, extent and timing of each fire.

Inappropriate fire regimes are those that differ from regimes which species and communities are adapted to, and are a serious threat to biodiversity. Improving fire management and conservation outcomes for native vegetation and biodiversity requires both improved management policies and processes, and improved understanding of the effects of fire regimes.

Fire management is currently addressed through a number of established programs:

- adaptive management, including a monitoring framework, for biodiversity and fire on DECCW reserves
- review of the implementation of asset protection to minimise adverse impacts on biodiversity. The NSW Bushfire Coordination Committee reviews the standards for protection of biodiversity within the Model Bushfire Risk Management Plan and the Bushfire Environmental Assessment Code for New South Wales.

Management of land within capability

Maintenance of soil condition requires the management of land within its capability. Land management practices to increase soil organic matter levels and soil biodiversity need to be encouraged. Management practices include:

- managing grazing pressure to retain and improve plant cover
- using minimum tillage or no-till practices to maintain groundcover and improve soil structure
- maintaining and increasing perennial plants (including pasture cropping)
- careful use of fertilisers
- rehabilitation of soil through targeted earthworks, water management and seeding.

The *NSW Soils Framework: Looking forward, acting now* (NSW SSPWG 2008) details existing policies and programs for soil management in New South Wales and how they integrate into catchment and government administration approaches. The framework suggests new directions in NSW soil management in the areas of institutional arrangements, research and development,

marketing and awareness, information exchange and capacity building, funding and incentives, policy tools, regulations and natural resources management legislation in general. A draft NSW Soils Policy based on the framework is being developed.

Public land management agencies, CMAs and community groups will continue to promote the management of land according to its capability including the use of sustainable soil management practices.

Targeted conservation of rivers, wetlands and estuaries

In addition to the legislative water reforms, a number of significant programs have been established to help conserve aquatic and estuarine ecosystems in New South Wales that have declined in health due to extensive river regulation and water extraction. NSW RiverBank, the NSW Wetland Recovery Program, the NSW Rivers Environmental Restoration Program, and The Living Murray purchase water entitlements from willing sellers that result in increased water volumes directed to priority wetlands across the state.

The NSW Wetland Recovery Program (NSW Government 2010b) delivers targeted wetland conservation outcomes in the Gwydir wetlands and Macquarie Marshes. Water recovery, weed control, grazing management and research are under way to reduce the ecological stresses on these wetlands. A number of significant assessment and infrastructure management initiatives have been undertaken to manage outbreaks of algae and mitigate the impact of cold water release from high level dams to gradually restore fish and other aquatic biota.

The NSW Rivers Environmental Restoration Program (RERP) (DECC 2008d) worked to arrest the decline of the most stressed and iconic rivers and wetlands in New South Wales. It builds on work undertaken through the NSW Wetland Recovery Program in the Macquarie Marshes and Gwydir River system and is focused on important wetlands in the Lachlan and Murrumbidgee rivers, such as those in Yanga National Park. The RERP is improving environmental water management by acquiring and managing the delivery of environmental water, building partnerships with private landholders and acquiring properties to protect high conservation value wetlands.

The Murray–Darling Basin Plan (MDBA 2010) identifies 18 environmental assets in the Basin and places limits on the amount of water (both surface and groundwater) that can be taken from Basin water resources on a sustainable basis.

The statewide Estuary Management Program was developed in response to concerns about the condition and health of NSW estuaries. Estuary management plans have been prepared for 65 estuaries in order to achieve integrated, balanced and ecologically sustainable management. They are being implemented by local councils. Further development of the prioritisation process to identify key threats and activities affecting estuaries and coastal lakes will help determine priority protection and rehabilitation tasks.

Remediation of priority fish habitats

Several thousand weirs, dams, floodgates and poorly designed road crossings occur on waterways with the majority impeding water flow and fish passage. I&I NSW in consultation with stakeholders, has prioritised different barrier types per CMA area and developed remediation options for the highest priority barriers. Since 2005, I&I NSW and partner organisations have remediated more than 200 weirs and road crossings, restoring fish passage to more than 2000 kilometres of waterways. On the coast, local councils, CMAs and I&I NSW have improved fish passage to waterways behind more than 150 tidal floodgates.

The removal of large woody debris (snags) from NSW waterways has been identified as a Key Threatening Process (KTP) under the *Fisheries Management Act 1994* (FM Act). I&I NSW, the Murray Darling Basin Authority (MDBA) and a number of CMAs are undertaking snag assessments to prioritise snag placement and have returned 5000 snags to rivers across New South Wales.

I&I NSW has partnered with local communities, local councils, industries, CMAs and the MDBA to establish three large scale ‘demonstration reaches’ – Barwon–Darling River system (more than 200 km), Namoi River (over 120 km) and the upper Murrumbidgee River (approximately

80 km). Demonstration reaches show, for example, river and floodplain rehabilitation through integrated multiple management actions resulting in greater interest and stewardship for native fish in the Murray–Darling Basin (MDB).

A collaborative project between LPMA and I&I NSW, *Improving Management of Key Fish Habitat on Crown Land*, has addressed stock management and weed control on riparian land in key fish habitat areas. This has also led to the development of revised tenure condition on Crown land in key fish habitat areas.

A statewide approach to managing pollution from point and diffuse sources

Point source (e.g. sewage outfalls) and diffuse source (e.g. erosion) water pollution can lead to poor water quality and negatively impact biodiversity. Discharge of cold water from dams (cold water pollution) adversely affects the growth rates, spawning and survival of native fish and other aquatic life.

Point source discharges are generally regulated and improvements to water quality have been achieved through measures such as upgrades to sewage treatment plants and wastewater recycling. Management of diffuse water pollution can be more difficult and complex as discharges are generally dispersed and unobservable. In many NSW waterways diffuse sources now contribute the greatest load of pollutants.

The NSW Diffuse Source Water Pollution Strategy provides the strategic state-wide approach to coordinate and guide action on managing diffuse sources of water pollution. The Strategy identifies priority diffuse pollutants including sediments, nutrients and pathogens, their sources, and actions to reduce or mitigate impacts. A wide range of management approaches, often acting in combination, are required to address this complex issue.

Community engagement and partnerships

Partnerships targeting catchment priorities

Over the past five years, 13 CMAs in New South Wales, together with their local communities, have made significant achievements in protecting and improving natural landscapes across the state. These regional organisations have motivated, supported and funded local communities to deliver more than 13,000 projects, large and small.

Since 2004, NSW CMAs have delivered $2.11 billion of investment (CMA-delivered funds and partner contributions) in practical environmental works, building on the $659.8 million contributed by the Australian and NSW governments for on-ground projects. These funds were delivered through partnerships with individual landholders, Landcare and community groups, Aboriginal networks, industry groups, businesses, contractors, local councils and other agencies to target catchment priorities.

In total, almost five million hectares of land, equivalent to 6% of the area of New South Wales, has been protected, repaired, enhanced, treated and/or rehabilitated by NSW CMAs and their communities since 2004. This includes more than 2 million hectares of terrestrial vegetation, 80,000 hectares of wetlands, nearly 140,000 hectares of riparian vegetation and more than 9000 hectares of coastal vegetation.

A critical first step in the NSW CMA success story was to earn the support of private landholders to undertake practical works on their land. In just five years, NSW CMAs have negotiated 13,206 voluntary management agreements where private landholders committed to activities that address local environmental issues. In addition, 1064 conservation covenants were negotiated with landholders committed to managing at least part of their property for the protection and conservation of native flora and fauna.

CMAs represent an important interface with the community, offering expertise to landholders and providing a coordination point from which communities can tackle natural resource issues together. Since their inception, NSW CMAs have organised almost 9000 events to increase the capacity of communities to manage their natural resources sustainably. These events have involved more than 140,000 participants.

A report outlining the full achievements of the CMAs over the past five years is available online at: www.cma.nsw.gov.au/celebrating-5-year-achievements/.

Great Eastern Ranges Initiative

The Great Eastern Ranges Initiative (GER; GER 2010) is a concept bringing together people and organisations to focus efforts on establishing a conservation corridor along the 1200 kilometre NSW section of the Great Eastern Ranges.

GER is built on a foundation of partnerships, drawing together the efforts of the community, industry, government and non-government groups already living and working in the area. It aims to raise community awareness and support, and connect landholders with on-ground delivery programs using a variety of conservation mechanisms. Six partnership organisations have taken on leadership of the Great Eastern Ranges Initiative:

- Bush Heritage Australia
- Greening Australia
- National Parks Association of NSW
- Nature Conservation Trust of NSW
- NSW Department of Environment, Climate Change and Water
- OzGREEN.

These organisations are working to improve connectivity conservation as well as fostering community support, awareness and involvement and linking with a large range of other partner organisations and stakeholder groups.

Aboriginal cultural heritage

Efforts should continue to incorporate the knowledge and connections of community organisations, including Aboriginal people, to the landscape when undertaking biodiversity management. This can only occur by government at all levels developing collaborative partnerships with communities.

Creating cultural biodiversity-related business, employment and training opportunities for Aboriginal people contributes to social, cultural and economic wellbeing, in addition to benefits for protecting and improving biodiversity. Examples on the north coast of New South Wales have included the establishment of the 'Cultural Connections Model' as a practical and proven approach to creating Indigenous partnerships for the benefits of cultural renewal and natural resource management.

Two Ways Together is the NSW Government's 10-year plan (2003–12) (NSW Government 2003) to improve the lives of Aboriginal people and their communities. One of the priority areas is culture and heritage which incorporates strategies to strengthen Aboriginal connection with Country. The State Plan NRM Priority target 9 seeks to provide greater opportunities for Aboriginal people to take part in management of Country, including joint management of national parks, state forests and Crown lands.

Aboriginal joint management of parks and partnership programs

Since 1995, the NSW Department of Environment, Climate Change and Water (DECCW) has entered into 16 formal joint management arrangements with Aboriginal communities covering 99 parks across more than 1.5 million hectares (or 23%) of the NSW reserve system. DECCW entered into 42 partnership projects with Aboriginal communities for parks in 2008–09 and 2009–10. These included interpretation, tourism and education programs, assessments and oral history projects and cultural camps.

Land Alive builds capacity

Land Alive (DECCW 2009c) is an Aboriginal land management project funded by the NSW Environmental Trust for four years to 2011 to build the capacity of Aboriginal landowners to participate in the BioBanking scheme. The project funds 30 Aboriginal Conservation Land Management traineeships, funds plans of management and undertakes biodiversity assessments on Aboriginal-owned land.

Cross-tenure projects facilitate engagement

The Many Rivers Regional Partnership Agreement (Tweed to Hawkesbury) is promoting Aboriginal green teams to be employed in land management across tenures through the Green Teams Alliance (GTA 2010).

Science guides decisions

Rigorous science and sound decision-making tools have underpinned, and will continue to underpin, major advances in biodiversity conservation. Decision support tools and science outputs developed by the NSW Government are now routinely used by a range of industry and community users and decision makers. New South Wales currently undertakes research programs in a number of areas that support the development of management policies and strategies. Collaboration is an essential part of many of these programs. Some of the key areas of scientific work currently undertaken are outlined below.

Native Vegetation Type Mapping Strategy 2009–13

Native vegetation mapping is an important information resource for a range of applications including informing investment programs, land-use planning, environmental impact assessment, selecting new reserves and monitoring changes in the extent and condition of native vegetation. The long-term objective of the Native Vegetation Type Mapping Strategy is to develop a seamless and full floristic native vegetation map of New South Wales with the information stored in an accessible native vegetation database.

The strategy sets priorities and actions for the next five years (2009–13) to work towards this long-term objective. Key actions include the development of a native vegetation mapping standard, the completion of the NSW Native Vegetation Classification and Assessment (NSW VCA; Benson 2008) to provide a single NSW plant community list to be used consistently across New South Wales, and the development of the NSW Vegetation Information System (NSW VIS) to store the plant community list and mapping products. The strategy identifies five mapping product classes which range in quality and scale of mapping. Priorities for different classes of map products are identified, including class 5, the highest quality product required to support planning in priority growth areas of the state.

Decision support tools

A number of analytical tools are being developed to support the integration of the best available science into the development and implementation of policies and programs. These include:

- the Biodiversity Forecasting Toolkit (BFT), a decision support system developed by NSW DEC for mapping biodiversity management priorities. The BFT has been applied during the development of regional, multi-species biodiversity management plans and in the identification of Priority Areas identified in this draft Strategy
- a decision support system (IBIS) based on hydrodynamic and ecological modelling to enable better use of environmental water.

Scientific research

Significant funds have been directed to examining the impacts of climate change on biodiversity through the Climate Change Impacts and Adaptation Research Program. This includes an examination of the impact of climate change on invasive species, fire, threatened species and aquatic ecosystems.

- The NSW Government is researching ways in which native flora and fauna respond to fire, and how to minimise the extinction risks of species sensitive to particular patterns of fire, while balancing this with the protection of life and property.
- Marine research is being supported by the development of high-resolution maps of seabed characteristics which provide a better estimate of seabed habitat distribution and structure in marine parks. State-of-the-art acoustic tracking devices have been used to assess the movement patterns of fish while the latest infrared cameras and sonar devices are used to automatically identify and count fish species underwater.

- The Integrated Marine Observing System (IMOS) is being implemented nationwide to gain a better understanding of the East Australian Current.
- Some research is centred on the sustainable management of aquatic species, habitats and ecosystems.
- Research and monitoring programs are being carried out in national parks and reserves, many with the assistance of volunteers. These programs inform the development of park management and threat management.

Appendix 4: Reserves under the *National Parks and Wildlife Act 1979* containing significant biodiversity priority areas

The reserves listed under the *National Parks and Wildlife Act 1974* containing significant biodiversity priority areas fall into two categories. Note that some reserves fall into both categories:

1. reserves where at least 80% of the reserve is priority area and the priority area is at least 100 hectares, or
2. reserves where the priority area is at least 100 hectares.

National parks
Abercrombie River
Barool
Barrington Tops
Belford
Benambra
Blue Mountains
Border Ranges
Brindabella
Budderoo
Bundjalung
Bungawalbin
Butterleaf
Capoompeta
Cathedral Rock
Coolah Tops
Crowdy Bay
Culgoa
Cunnawarra
Deua
Dharug
Gardens of Stone
Garigal
Gibraltar Range
Goobang
Goulburn River
Gourock
Gulaga
Gumbaynggirr
Guy Fawkes River
Hunter Wetlands
Kalyarr
Kanangra-Boyd
Keverstone
Koreelah
Kosciuszko
Livingstone
Macquarie Pass
Marrangaroo
Mebbin
Minjary
Monga
Morton
Mount Clunie
Mount Jerusalem
Mount Kaputar
Mummel Gulf
Myall Lakes
Nangar
New England
Nightcap
Nowendoc
Nymboi-Binderay
Nymboida
Oolambeyan
Oxley Wild Rivers
Ramornie
Richmond Range
Scheyville
South East Forest
Sydney Harbour
Tallaganda
Tarlo River
Tooloom
Toonumbar
Towarri
Wadbilliga
Warra
Warrumbungle
Washpool
Watagans
Weddin Mountains
Werakata
Willandra
Wollemi
Wollumbin
Woomargama
Yabbra
Yanga
Yuraygir

Nature reserves
Arakoola
Avisford
Ballina
Barton
Billinudgel
Bimberi
Black Andrew
Bogandyera
Bondi Gulf
Buddigower
Bungawalbin
Burral Yurrul
Burrinjuck
Camerons Gorge
Captains Creek
Careunga
Castlereagh
Cedar Brush
Clarkes Hill
Coolbaggie
Coolumbooka
Copperhannia
Cudgen
Cuumbeun
Dapper
Downfall
Dthinna Dthinnawan
Ellerslie
Gamilaroi
Illunie
Ingalba
Jingellic
Joadja
Karuah
Kemendok
Kirramingly
Koorawatha
Lake Urana
Limpinwood
Macquarie Marshes
Merriangaah
Monkerai
Mudjarn
Mulgoa
Munghorn Gap
Narran Lake
Nest Hill
Ngulin
Nimmo
Planchonella
Prospect
Queens Lake
Razorback
Saltwater Swamp
Scabby Range
Taringa
Tinderry
Tuckean
Tuggolo Creek
Tyagarah
Ulandra
Winburndale
Windsor Downs
Wingen Maid
Yanga
Yaouk
Yarringully

State conservation areas
Berlang
Black Bulga
Brindabella
Bundjalung
Bungawalbin
Camerons Gorge
Gundabooka
Illawarra Escarpment
Jackywalbin
Livingstone
Medowie
Mount Canobolas
Paroo-Darling
Torrington
Tumblong
Werakata
Wollumbin
Woomargama
Yanga
Yanununbeyan
Yarringully

Community conservation area zone 1 national parks
Barayamal
Breelong
Burral Yurrul
Dthinna Dthinnawan
Goonoo
Gwydir River
Mogriguy
Pilliga
Warialda

Community conservation area zone 2 Aboriginal areas
Kelvin
Terry Hie Hie

Community conservation area zone 3 state conservation areas
Beni
Biddon
Bingara
Bobbiwaa
Goonoo
Gwydir River
Pilliga
Pilliga West
Trinkey
Warialda
Wondoba

Karst conservation reserves
Jenolan

Regional parks
Worimi RP

Appendix 5: Draft NSW Biodiversity Strategy targets, State Plan targets including statewide NRM targets and Australia's Biodiversity Strategy Priorities

NSW Biodiversity Strategy targets

Target 1: **By 2015, state-scale priorities are incorporated into biodiversity and related planning processes including Catchment Action Plan updates and plans of management for reserves and other public lands.**

Target 2: **By 2015, standard site-assessment tools have been taken up by public and private conservation organisations in New South Wales.**

Target 3: **By 2015, recovery and threat abatement efforts will reflect the priorities set out in the Priorities Action Statements under the TSC Act and FM Act.**

Target 4: **By 2015, regional land-use planning processes are informed by landscape-scale biodiversity assessment and contain provisions that contribute to the protection of biodiversity.**

Target 5: **By 2015, there is a 25% increase in employment and participation of Aboriginal people in natural resource management, including biodiversity conservation.**

NSW State Plan 2010: Green State targets and priority actions

The State Plan sets the priorities for the NSW Government over the next two years. It establishes targets for measuring the Government's progress in implementing the Plan.

One of the priority areas in the Plan is: 'Protect our native vegetation, biodiversity, land, rivers and coastal waterways'.

Performance will be measured by meeting the NSW State-wide targets for natural resource management (NRM targets) to improve biodiversity and native vegetation, sensitive riverine and coastal ecosystems, soil condition and socio-economic wellbeing.

Thirteen state-wide targets for NRM

Biodiversity

1. By 2015 there is an increase in native vegetation extent and an improvement in native vegetation condition.
2. By 2015 there is an increase in the number of sustainable populations of a range of native fauna species.
3. By 2015 there is an increase in the recovery of threatened species, populations and ecological communities.
4. By 2015 there is a reduction in the impact of invasive species.

Water

5. By 2015 there is an improvement in the condition of riverine ecosystems.
6. By 2015 there is an improvement in the ability of groundwater systems to support groundwater-dependent ecosystems and designated beneficial uses.
7. By 2015 there is no decline in the condition of marine waters and ecosystems.
8. By 2015 there is an improvement in the condition of important wetlands, and the extent of those wetlands is maintained.

9. By 2015 there is an improvement in the condition of estuaries and coastal lake ecosystems.

Land

10. By 2015 there is an improvement in soil condition.
11. By 2015 there is an increase in the area of land managed within its capability.

Community

12. Natural resource decisions contribute to improving or maintaining economic sustainability and social wellbeing.
13. There is an increase in the capacity of natural resource managers to contribute to regionally relevant natural resource management.

Two-year NRM priority actions

1. Increase the extent and improve the condition of native vegetation and habitats.
2. Continue to build a comprehensive, adequate and representative reserve system, based on national parks and reserves as the core biodiversity conservation mechanism, as well as other public and private land conservation.
3. Develop incentives to help farmers be both sustainable stewards of their land and successful producers.
4. Establish measures to conserve our marine and estuarine environments.
5. Secure water entitlements to protect iconic wetlands in the Gwydir, Macquarie, Lachlan, Murrumbidgee and Murray valleys and sustain river ecosystems.
6. Manage fires, weeds and pest species, through sustainable fire management, improved fire ecology science and tackling priority threats such as introduced weeds and pests.
7. Introduce a new NSW Biodiversity Strategy to protect threatened native species and ecosystems and address the impacts of climate change.
8. Increase community awareness of the importance of soil health and share best practice land management techniques.
9. Provide greater opportunities for Aboriginal people to take part in management of Country, including joint management of national parks.

Table 3: Relationship between draft NSW Biodiversity Strategy objectives and targets, State Plan targets and priority actions (including State-wide NRM targets) and Australia's Biodiversity Strategy Priorities

Draft NSW Biodiversity Strategy 2010–15		Relevant State-wide NRM targets and priority actions, and Australia's Biodiversity Strategy priorities
Smarter biodiversity investment		
Objective 1 Direct public sector support for conservation efforts on private land towards state-scale priorities **Objective 2** Direct public land conservation efforts towards state-scale priorities **Objective 3** Improve the on-ground delivery of incentive schemes through the adoption of a common approach to site-assessment **Objective 4** Use a cost-effective approach to prioritise threatened species for recovery **Objective 5** Use market-based mechanisms to complement the range of private land conservation programs	**Target 1** By 2015, state-scale priorities are incorporated into biodiversity and related planning processes including Catchment Action Plan updates and plans of management for reserves and other public lands **Target 2** By 2015, standard site-assessment tools have been taken up by public and private conservation organisations in New South Wales **Target 3** By 2015, recovery and threat abatement efforts will reflect the priorities set out in the Priorities Action Statements under the TSC Act and FM Act	NRM targets: 1, 2, 3, 5, 8, 9 **NRM priority actions** Increase the extent and improve the condition of native vegetation and habitats Develop incentives to help farmers be both sustainable stewards of their land and successful producers Establish measures to conserve our marine and estuarine environments **Australia's Biodiversity Strategy Priorities** Subpriority 2.2 – Maintaining and re-establishing ecosystems functions Subpriority 3.1 – Improving and sharing knowledge Subpriority 3.2 – Delivering conservation initiatives efficiently
Whole of landscape planning		
Objective 6 Use strategic mechanisms to assess, conserve and improve biodiversity values in land-use planning	**Target 4** By 2015, regional land-use planning processes are informed by landscape-scale biodiversity assessment and contain provisions that contribute to the protection of biodiversity	NRM targets: 1, 3, 12 **Australia's Biodiversity Strategy Priorities** Subpriority 2.2 – Maintaining and re-establishing ecosystems functions Subpriority 3.1 – Improving and sharing knowledge
Improved partnerships		
Objective 7 Engage communities and develop partnerships that deliver conservation priorities	**Target 5** By 2015, there is a 25% increase in employment and participation of Aboriginal people in natural resource management, including biodiversity conservation	(State Plan target: Stronger Communities): Halve the gap in Aboriginal employment outcomes within a decade Increase partnerships with Aboriginal communities by 2011

Draft NSW Biodiversity Strategy 2010–15		Relevant State-wide NRM targets and priority actions, and Australia's Biodiversity Strategy priorities
		NRM priority actions Provide greater opportunities for Aboriginal people to take part in management of Country, including joint management of national parks **Australia's Biodiversity Strategy Priorities** Subpriority 1.1 – Mainstreaming biodiversity Subpriority 1.2 – Increasing Indigenous engagement Subpriority 1.3 – Enhancing strategic investments and partnerships
Effectively managing threats		
Objective 8 Actively and effectively manage the terrestrial reserve system and marine protected areas as part of a broader landscape **Objective 9** Protect and restore aquatic ecosystems **Objective 10** Effectively manage and control threats through cooperative partnerships with key stakeholders	Selected State Plan NRM targets	State Plan NRM targets: 1, 2, 4, 5, 7, 8, 9 **NRM priority actions** Increase the extent and improve the condition of native vegetation and habitats Establish measures to conserve our marine and estuarine environments Continue to build a comprehensive, adequate and representative reserve system, based on national parks and reserves as the core biodiversity conservation mechanism, as well as other public and private land conservation Secure water entitlements to protect iconic wetlands in the Gwydir, Macquarie, Lachlan, Murrumbidgee and Murray valleys and sustain river ecosystems Manage fires, weeds and pest species, through sustainable fire management, improved fire ecology science and tackling priority threats such as introduced weeds and pests **Australia's Biodiversity Strategy Priorities** Subpriority 2.1 – Protecting diversity Subpriority 2.2 – Maintaining and re-establishing ecosystems functions Subpriority 2.3 – Reducing threats to biodiversity
Sustainable production environments		
Objective 11 Support private primary producers to sustainably manage their resource through collaborative partnerships	Selected State plan NRM targets	State Plan NRM targets: 1,7,10,11,13 **NRM priority actions** Develop incentives to help farmers be both sustainable stewards of their land and successful producers Increase community awareness of the importance of soil health and share best practice management techniques **Australia's Biodiversity Strategy Priorities** Subpriority 1.1 – Mainstreaming biodiversity Subpriority 2.3 – Reducing threats to biodiversity

Appendix 6: Existing NRM monitoring, evaluation and reporting

NSW State of the Environment (SoE)

The NSW SoE report is a general environmental report card for New South Wales, assembled by DECCW. Thirty environmental issues are reported on within specified themes, including biodiversity and water, with data and information addressing 86 environmental indicators. The report is published every three years. The next report is due in 2012 and then in 2015.

State of the Catchment (SoC)

The Natural Resource Management MER (monitoring, evaluating and reporting) program reports on the condition of and pressures on the biodiversity, water, land and community assets of each natural resource management region in the state. Condition information is collated in the State of Catchment (SoC) reports collated by DECCW with input from the 13 CMAs and other state agencies, and provides information for State of the Environment reporting.

State of the Parks (SoP)

The DECCW SoP report provides a snapshot of the condition and management of the NSW parks system in a publicly accessible way. This information is used to better understand the effectiveness of management actions and improve management where necessary. The last SoP was published in 2004 and the next report is currently being prepared and will provide useful baseline information on management.

Catchment Action Plan updates

The CMA Act requires each CMA to prepare a Catchment Action Plan (CAP) in partnership with its community and government agencies. The CAP sets clear targets and a timetable for the CMA's action and investment and is designed to be responsive to the changing needs of the catchment and the community.

CMAs are required to undertake periodic reviews of their CAPs at intervals of not more than five years. CAP updates include reporting on progress towards CAP targets. The updated CAPs are required to be consistent with relevant NRM plans, policies and strategies including this Strategy.

Threatened Species Priorities Action Statement

The DECCW Threatened Species Priorities Action Statement (PAS) outlines the broad strategies and detailed priority actions to be undertaken in New South Wales to promote the recovery of threatened species, populations and ecological communities, and to manage KTPs.

The PAS will be reviewed every three years from its inception in 2007. The reviews will report on the progress of PAS actions with input from key stakeholders including DECCW, local councils and CMAs.

Similar to DECCW, I&I NSW is currently reviewing the PAS, and future versions are planned to contain more information on species distribution, mapping and identification of priority areas for action. I&I NSW is also currently modifying the PAS to improve its use as a reporting system to track implementation of recovery and threat abatement strategies at a state and regional level.

Two Ways Together

The overall objectives of the DECCW Two Ways Plan are to develop committed partnerships between Aboriginal people and the NSW Government, and to improve the social, economic, cultural and emotional wellbeing of Aboriginal people in New South Wales.

Two Ways Together is the mechanism through which the 'Strengthening Aboriginal Communities' priorities under the State Plan are being advanced. Other actions have been undertaken under the Council of Australian Government's 'Closing the Gap' commitments. The Partnership Community program is the local level implementation of *Two Ways Together*.

NSW State Plan 2010

The NSW State Plan 2010 establishes priorities, targets and actions in eight areas. Those relevant to this Strategy include *Green State* and *Stronger Communities*. The State Plan Annual Report outlines progress towards the targets and priorities in the State Plan. Table 3 in Appendix 4 details the linkages between the State Plan targets and priority actions and the objectives in this Strategy.

Annual Native Vegetation Report Card

The Native Vegetation Report Card provides the latest information on the conservation, restoration, management and approvals for clearing, of native vegetation, and is included in the *NSW Annual Report on Native Vegetation*. The native vegetation statistics for the 2008 report card were gathered through a collaborative effort between NSW natural resource agencies such as DECCW, CMAs, the (former) Department of Primary Industries (DPI), the Land and Property Management Authority (LPMA) and Forests NSW (DECC 2008b).

Monitoring, evaluation, reporting and improvement for Caring for Our Country

Caring for our Country is an Australian Government initiative that seeks to achieve an environment that is healthy, better protected, well-managed, resilient, and provides essential ecosystem services in a changing climate (*Caring for our Country Outcomes 2008–2013*) in accordance with six national priority areas**.**

The Caring for Our Country Monitoring, Evaluation, Reporting and Improvement (MERI) Strategy enables reporting on progress towards the five-year Caring for our Country outcomes. It also enables the collection and assessment of information to inform all stages of the initiative's business cycle and to facilitate improvement.

Appendix 7: Clusters of Priority Areas in each ecosystem

Ecosystem	Investment priority clusters
Alpine Complex	1. Alpine vegetation around the Tantangara Reservoir in Kosciuszko National Park (part of the Great Eastern Ranges Initiative, 'Kosciuszko to Coast' priority partnership area)
Arid Acacia Shrublands	1. Purplewood Arid Shrublands in far north-western NSW 2. Ledknapper – Brigalow Acacia Shrublands 3. North Bourke Gidgee Acacia Shrubland
Arid Chenopod Shrublands	1. Lower Darling Mixed Chenopod Shrublands 2. Semi-Arid Chenopod Shrubland / Derived Grassland / Semi-Arid Woodland Mosaic on the Hay Plain
Dry Sclerophyll Forests	1. Nandewar Dry Sclerophyll Forest 2. Woomargarma Corridor Dry Sclerophyll Forest (part of the Great Eastern Ranges Initiative, 'Slopes to Summit' priority partnership area) 3. Hunter Ironbark Dry Sclerophyll Forest 4. Grassy Dry Sclerophyll Forests of the South West Slopes between Tumut and Wagga Wagga 5. Bega Valley Lowland Dry Sclerophyll Forest Remnants 6. Upper Burragorang Dry Sclerophyll Forest (part of the Great Eastern Ranges Initiative, 'Southern Highlands Link' priority partnership area) 7. Dry Sclerophyll Forest / Grassy Woodland Mosaic in the Burrendong Catchment 8. Dry Sclerophyll Forest bordering national parks near Capertee 9. Grassy Dry Sclerophyll Forest/Grassy Woodland Mosaic between Young and Cowra 10. Grassy Dry Sclerophyll Forest/ Grassy Woodland Mosaic along the Abercrombie River Corridor
Grasslands	1. Moree Plains Open Grasslands 2. Liverpool Plains Open Grasslands 3. Grasslands of the Southern Tablelands 4. Brewarrina Open Plains Grasslands
Grassy Woodlands	1. Grassy Woodlands of the Southern Tablelands (part of the Great Eastern Ranges Initiative, 'Kosciuszko to Coast' priority partnership area) 2. Grassy Woodlands adjacent to Coolah Tops and the Liverpool Range (part of the Great Eastern Ranges Initiative, 'Upper Hunter – Barrington Tops' priority partnership area) 3. Woomargama Corridor Grassy Woodland (part of the Great Eastern Ranges Initiative, 'Slopes to Summit' priority partnership area) 4. Grassy Woodlands of the South West Slopes 5. Grassy Woodland Remnants of the Nandewar Range 6. Grassy Woodlands of the New England Tablelands 7. Grassy Woodlands of the Central Western Slopes, including the Harvey Range
Heathlands	1. The Howell Heathlands

Ecosystem	Investment priority clusters
Rainforests	1. Western Dry Rainforests on the north-western slopes, north from Gunnedah 2. Rainforest in and around a number of national parks to the west and north-west of Coffs Harbour (including Oxley Wild Rivers, New England, Gibraltar Range and Washpool NPs). 3. The Big Scrub Subtropical Lowland Rainforest (part of the Great Eastern Ranges Initiative, 'Border Ranges' priority partnership area) 4. Illawarra Rainforest (part of the wider Great Eastern Ranges Initiative, 'Southern Highlands Link' priority partnership region) 5. South East Corner Rainforest Remnants 6. Littoral Rainforests of the Coast
Semi-Arid Woodlands	1. Semi-Arid (Grassy) Woodlands along the Murray and Murrumbidgee 2. Semi-Arid Woodland/Grassland Mosaic of the Darling Riverine Plain Fan 3. Semi-Arid Chenopod Shrubland / Derived Grassland / Semi-Arid Woodland Mosaic on the Hay Plain
Wet Sclerophyll Forests	1. Wet Sclerophyll Grassy Forests between Dorrigo and Walcha, east of Armidale 2. Wet Sclerophyll Grassy Forests to the south and east of Tumut 3. Wet Sclerophyll Grassy Forests in and around the Kanangra Boyd and Tarlo River national parks 4. Liverpool Range Wet Sclerophyll Grassy Forests/Dry Sclerophyll Forest/Grassy Woodland Mosaic (part of the Great Eastern Ranges Initiative, 'Upper Hunter – Barrington Tops' priority partnership area)
Forested Wetlands	1. River Red Gum forests along the Murray and Murrumbidgee riparian corridors 2. Lachlan River Red Gum Forests 3. River Red Gum Forests of the Lower Macquarie riparian corridor and Macquarie Marshes 4. Namoi Valley riparian corridor Forested Wetlands 5. North West Slopes Forested Wetlands 6. Shoalhaven Forested Wetlands 7. Richmond River Floodplain Forested Wetlands 8. Clarence Floodplain Forested Wetlands 9. Mid-North Coast Forested Wetlands 10. Tomago Sandbeds Forested Wetlands

Appendix 8: Description of Keith vegetation classes

Vegetation classes as outlined in the Keith native vegetation classification for New South Wales (Keith 2004)

Alpine Complex

Alpine Bogs and Fens (extent: 260–320 sq km; <10% cleared) are found in boggy soils in hollows and drainage lines.

Alpine Herbfields (extent: 350–450 sq km; <10% cleared) are almost continuously covered with forbs (mostly daisies) and tussock grasses in both low rocky sites (low herbfields) and on hills and slopes on the alpine plateau occurring above 1500 metres (tall herbfields).

Alpine Fjaeldmarks (extent: 1–3 sq km; <10% cleared) are a highly distinctive and restricted assemblage. They occur in the most severe of alpine habitats that are exposed either to cold, desiccating winds, or to constant seepage of near-freezing water emanating from semi-permanent snow drifts. They are restricted to the most exposed parts of the Kosciuszko plateau.

The shrubs, grasses and emergent eucalypts of the **Alpine Heaths** (extent: 400–550 sq km; <10% cleared) are found on exposed rocky sites on shallow soils.

Arid Chenopod Shrublands

Riverine Chenopod Shrublands (extent: 16,000–27,000 sq km; <30% cleared) are extensive, treeless shrublands found on flat alluvial plains and dry lake beds in far western New South Wales. They are most widespread on the vast riverine plains where the Lachlan and Murrumbidgee rivers converge with the Murray, and between Hay, Ivanhoe and Balranald they cover thousands of square kilometres.

Aeolian Chenopod Shrublands (extent: 16,000–26,000 sq km; <10% cleared) occupy the extensive wind-formed sand plains and lunettes of far south-western New South Wales. They are widespread on sand sheets west from Ivanhoe and Balranald and are scattered north as far as White Cliffs.

Gibber Chenopod Shrublands (extent: 18,000–30,000 sq km; <10% cleared) occupy the undulating gibber plains and stony ranges of far western New South Wales. These shrublands receive less than 250 mm of rain per year.

Arid Acacia Shrublands

North-west Plain Shrublands (extent: 10,000–20,000 sq km; <10% cleared) are a diverse and variable group of communities that occur on the flat to undulating plains of north-western New South Wales.

Gibber Transition Shrublands (extent: 5000–9000 sq km; <10% cleared) are a widespread group of assemblages grading into North-west Plains Semi-arid Shrublands and Stony Desert Mulga Shrublands on more elevated terrain.

Stony Desert Mulga Shrublands (extent: 12,000–24,000 sq km; <10% cleared) occur in the stony ranges, downs and gibber plains of the far west of the state where annual rainfall averages just 200–300 mm. This area is one of the most hostile environments for plant and animal life in New South Wales.

Sand Plain Mulga Shrublands (extent: 40,000–65,000 sq km; <10% cleared) are to be found in the red sandy deserts of the far west.

Dry Sclerophyll Forests (Grassy)

Clarence Dry Sclerophyll Forests (extent: 4000–6500 sq km; 30–70% cleared) occupy the undulating lowlands and foothills of the Clarence River valley in the far north-east.

Hunter-Macleay Dry Sclerophyll Forests (extent: 1300–2200 sq km; 60–90% cleared) occupy foothills and undulating terrain below 400 metres on well-drained loamy soils derived from shales. They are open canopy forests up to 30 metres tall.

Cumberland Dry Sclerophyll Forests (extent: 20–40 sq km; >70% cleared) occur on islands of tertiary alluvial gravels, sands and clays within the shales of the central Sydney Basin.

Southern Hinterland Dry Sclerophyll Forests (extent: 650–950 sq km; <30% cleared) are tucked away in the hinterland and escarpment foothills of the far south coast south from Narooma.

Northern Gorge Dry Sclerophyll Forests (extent: 4500–7000 sq km; 10–40% cleared) are rugged, hot, dry gorges and escarpment slopes found in rainshadow areas of the north coast hinterland. They include some of the finest wilderness landscapes in New South Wales.

Central Gorge Dry Sclerophyll Forests (extent: 1300–1800 sq km; <30% cleared) are steep, highly dissected gorges with clay-loams derived from metamorphosed mudstones and localised outcrops of limestone.

New England Dry Sclerophyll Forests (extent: 900–1500 sq km; 30–70% cleared) are found in north-eastern New South Wales at high elevations on granite soils where the annual rainfall is between 850 and 1000 mm.

Upper Riverina Dry Sclerophyll Forests (extent: 2000–2900 sq km; 30–70% cleared) are mainly distributed between Burrinjuck and Albury on dry sites in undulating terrain or steep rocky slopes.

North-west Slopes Dry Sclerophyll Woodlands (extent: 4500–8000 sq km; 30–70% cleared) occupy hilly terrain on the western fall of the Great Dividing Range (GDR). One of the most spectacular examples occurs in the Warrumbungle Mountains.

Pilliga Outwash Dry Sclerophyll Forests (extent: 3800–5200 sq km; 30–70% cleared) occur on the north-western slopes of New South Wales and provide one of the best examples of a transition from the dry sclerophyll forests in the east to the semi-arid woodlands in the dry interior.

Dry Sclerophyll Forests (Shrubby)

Coastal Dune Dry Sclerophyll Forests (extent: 400–600 sq km; 30–70% cleared) occupy well-drained dune ridges and slopes north from Jervis Bay.

North Coast Dry Sclerophyll Forests (extent: 1000–1800 sq km; <30% cleared) are found on impoverished soils on either the coastal sand plains or the sandstones of the coastal hills and plateaux in the north-east corner of New South Wales.

Sydney Coastal Dry Sclerophyll Forests (extent: 3800–4800 sq km; <30% cleared) are unique to the Sydney Basin, grow below 700 m in areas of moderate rainfall (1000–1300 mm) and are the most diverse of the three classes of Dry Sclerophyll Forest that grow on Sydney sandstones.

Sydney Hinterland Dry Sclerophyll Forests (extent: 6000–8500 sq km; <30% cleared) occur throughout the Sydney sandstone basin below 600 metres elevation in areas of lower rainfall (650–950 mm). Extensive tracts occur in Yengo and Wollemi national parks.

Sydney Sand Flats Dry Sclerophyll Forests (extent: 100–130 sq km; 30–70% cleared) are unique to the Sydney and Newcastle regions, and occur on flat to gently undulating terrain on the valley floor. They are associated with old alluvial deposits.

South Coast Sands Dry Sclerophyll Forests (extent: 70–100 sq km; 10–40% cleared) are scattered on relatively young coastal dunes south from Sydney.

South East Dry Sclerophyll Forests (extent: 70–100 sq km; <30% cleared) dominate the coastal ranges, lowlands and escarpment from sea level to 1300 metres elevation in southern New South Wales.

Southern Wattle Dry Sclerophyll Forests (extent: 65–85 sq km; <10% cleared) are the only class of vegetation east of the GDR where wattles are the dominant tree species. These forests grow in small patches on steep, rocky slopes and gorges among eucalypt-dominated dry sclerophyll forests.

Northern Escarpment Dry Sclerophyll Forests (extent: 600–900 sq km; <30% cleared) are found on low-nutrient, sandy soils in areas with high rainfall on the high mountain plateaux on the northern escarpment of New South Wales.

Sydney Montane Dry Sclerophyll Forests (extent: 1800–2400 sq km; <30% cleared) occur on elevated sandstone plateaux (750–1200 metres above sea level) to the west of Sydney.

Northern Tableland Dry Sclerophyll Forests (extent: 2300–3800 sq km; 30–70% cleared) occur on infertile soils in low rainfall areas on the northern tablelands.

Southern Tableland Dry Sclerophyll Forests (extent: 6500–12,500 sq km; 30–70% cleared) occupy extensive areas on stony ridges, gorges and rugged ranges in the drier parts of the GDR south from Mudgee.

Western Slopes Dry Sclerophyll Forests (extent: 8000–15,000 sq km; 30–70% cleared) occur on shallow, sandy infertile soils at the fringe of the semi-arid zone where rainfall is less than 500 mm.

Yetman Dry Sclerophyll Forests (extent: 800–1400 sq km; 30–70% cleared) occupy hilly sandstone terrain and adjacent flats in far northern New South Wales, extending to the north from Terry Hie Hie into Queensland.

Freshwater Wetlands

Coastal Heath Swamps (extent: 220–3000 sq km; <30% cleared) are species rich and variable assemblages of communities scattered along most of the state's coast. They typically occur on poorly drained depressions on coastal sandstone plateaux up to 600 metres elevation.

Montane Bogs and Fens (extent: 160–250 sq km; 30–70% cleared) occupy montane plateaux 600–1500 metres above sea level along the GDR.

Coastal Freshwater Lagoons (extent: 90–160 sq km; 10–40% cleared) are mosaics of sedgeland, aquatic herbfields and open water found on floodplains and sand plains along the entire NSW coast.

Montane Lakes (extent: 25–40 sq km; >70% cleared) are aquatic herbfields in standing freshwater. Lake George is the largest Montane Lake on mainland Australia.

Inland Floodplain Swamps (extent: 900–1500 sq km; 30–70% cleared) are scattered on the active floodplains of the Murray–Darling catchment. The most iconic example occurs at Macquarie Marshes.

Inland Floodplain Shrublands (extent: 7000–12,000 sq km; <30%) are the most extensive class of freshwater wetlands in New South Wales. With closed to open shrublands up to 2 metres tall, they are scattered throughout the semi-arid floodplains in depressions near active water courses.

Note: The Freshwater Wetlands map in the profile has been generated from multiple sources (see the profile in Part B for more detail). The Inland Saline Lakes vegetation class from the Saline Wetlands Keith vegetation formation was included in the Freshwater Wetlands profile.

Forested Wetlands

Coastal Swamp Forests (extent: 300–500 sq km; 10–40% cleared) are restricted to the low-lying swales, flats and lakeshores of coastal sand sheets along the northern two-thirds of the NSW coast.

Coastal Floodplain Wetlands (extent: 800–1400 sq km; >70% cleared) are the most highly cleared of the forested wetland classes. In New South Wales the major rivers to the east of the GDR dump their sediment loads on these Coastal Floodplain Wetlands that were once a mosaic of forests, woodlands and reedlands. Remaining remnants are generally highly degraded although a number of high quality patches can still be found.

Eastern Riverine Forests (extent: 450–750 sq km; 30–70% cleared) are dominated by a single tree species throughout their range: river oak (*Casuarina cunninghamiana*). These forests occur along the moist and dynamic substrates of the riparian corridors.

Inland Riverine Forests (extent: 5000–8000 sq km; 30–70% cleared) occur west of the GDR on the sandy banks of major rivers and intermittent streams and billabongs. These forests are dominated by river red gums (*Eucalyptus camaldulensis*).

Grasslands

Maritime Grasslands (extent: 4–8 sq km; <10% cleared) are a unique group that occur on coastal headlands, beach dunes and oceanic islands on either rocks or sands.

Temperate Montane Grasslands (extent: 120–240 sq km; >90% cleared) are beautiful, colourful and diverse. They occur on undulating tablelands on fertile soils from the Australian Capital Territory and southwards to the border with Victoria. The grasslands are highly fragmented and reduced in range.

Western Slopes Grasslands (extent: 1500–3000 sq km; >70% cleared) occupy alluvial plains and deeply weathered basalt slopes on the western slopes and can be distinguished by the presence of plains grass (*Austrostipa aristiglumis*) which grows in dense tussocks up to 1.5 metres high. These grasslands have been highly reduced in extent and generally occur in small isolated remnants.

Riverine Plain Grasslands (extent: 1000–2500 sq km; N/A) occur throughout the extensive, flat riverine plains between the Murray and Murrumbidgee rivers. It is thought that these grasslands were created by grazing of livestock by early settlers, where once semi-arid woodland and shrublands occurred.

Semi-arid Floodplain Grasslands (extent: 7500–12,000 sq km; 10–40% cleared) occur on the black soil floodplains extending along the Darling River and its tributaries from Wilcannia to Moree and Nyngan.

Grassy Woodlands

Coastal Valley Grassy Woodlands (extent: 1500–2500 sq km; 60–90% cleared) contain a highly diverse suite of plant communities isolated in dry coastal valleys.

Tableland Clay Grassy Woodlands (extent: 1600–2500 sq km; 60–90% cleared) are encountered on the gently undulating northern and southern tablelands of the GDR.

New England Grassy Woodlands (extent: 3500–5500 sq km; 60–90% cleared) occur on the gently undulating New England Tableland.

Southern Tableland Grassy Woodlands (extent: 1400–2300 sq km; >70% cleared) occur over a wide area of the southern tablelands above 600 metres elevation in the rainshadow of the escarpment.

Subalpine Woodlands (extent: 3500–5700 sq km; 30–70% cleared) occur at the highest elevations of any woodlands in Australia, from 1000–1800 metres above sea level. They occur in frost-hollows on tablelands as well as on mountain slopes and summits exposed to cold winds.

Floodplain Transition Woodlands (extent: 4000–6000 sq km; >70% cleared) occur on the edge of the semi-arid zone where annual rainfall is low and the western slopes merge into the vast plains of the Murray–Darling river system.

Western Slopes Grassy Woodlands (extent: 5000–9000 sq km; >70% cleared) were once ubiquitous on fertile soils throughout the western slopes of the GDR.

Heathlands

Coastal Headland Heaths (extent: 35–55 sq km; <30% cleared) occur on exposed headlands and areas of coastal plateaux within the sea spray zone.

Wallum Sand Heaths (extent: 250–400 sq km; 10–40% cleared) are scattered along the coast north from Sydney on some of the poorest soils in the world.

Sydney Coastal Heaths (extent: 280–320 sq km; <30% cleared) occupy exposed coastal sandstone plateaux between Gosford and Jervis Bay. They are unique to New South Wales.

South Coast Heaths (extent: 25–35 sq km; <30% cleared) are restricted to a coastal strip from Bournda (near Bega) to the Victorian border.

Northern Montane Heaths (extent: 40–70 sq km; <10% cleared) are scattered across the New England tableland and adjacent mountainous areas. The most spectacular example in New South Wales is at Bald Rock, a massive granite monolith north of Tenterfield.

Sydney Montane Heaths (extent 600–1000 sq km; <10% cleared) are the most extensive class of heathland vegetation in New South Wales, spanning altitudes from 600–1200 metres on sandstone cliffs, ridges and upper slopes of the greater Blue Mountains and Morton Plateau.

Southern Montane Heaths (extent: 75–92 sq km; <30% cleared) are found on high, wind-swept ridges at altitudes of 600–1200 metres on the southern ranges of the state. Dense stands of dwarf she-oak (*Allocasuarina nana*) dominate escarpment forms.

Rainforests

Cool Temperate Rainforests (extent: 300–600 sq km; <10% cleared) are found in the upper gullies, slopes and summits of wet, misty mountains and plateaux.

Dry Rainforests (extent: 550–800 sq km; <30% cleared) are a fascinating community that, unlike other rainforest types, occur in remarkably dry areas.

Littoral Rainforests (extent: only 12–20 sq km; 60–90% cleared) occur where rainforest meets the sea, on coastal sand plains and headlands.

Northern Warm Temperate Rainforests (extent: 1500–2500 sq km; <30% cleared) are a large class, occupying sheltered gullies and slopes in hilly to steep terrain on the coast and escarpment.

Southern Warm Temperate Rainforests (extent: 180–250 sq km; <30% cleared) occur in small pockets within the deep, moist, sheltered gullies of the coastal ranges and foothills of south-eastern New South Wales.

Subtropical Rainforests (extent: 1500–2500 sq km; 30–70% cleared) occur in moist coastal lowlands in valleys, riparian corridors and foothill gullies.

Oceanic Cloud Forests (extent: 1–3 sq km; <10% cleared) only occur on Lord Howe Island and are restricted to less than 300 hectares across their range, making them the most restricted of all the vegetation classes described for New South Wales.

Oceanic Rainforests (extent: 7–10 sq km; 10–40% cleared) are restricted to Lord Howe Island, principally in the undulating lowlands, hills and mountain slopes.

Western Vine Thickets (extent: 50–100 sq km; >70% cleared) are the driest forms of rainforest in New South Wales and are found on the flat to rolling terrain of the north-western slopes. This is a highly cleared, fragmented class of rainforest.

Semi-arid Woodlands (Grassy)

Inland Floodplain Woodlands (extent: 23,000–35,000 sq km; 10–40% cleared) occur throughout the middle and lower Murray–Darling system occupying the slightly higher parts of the floodplain that are only occasionally inundated. The canopy grows up to 25 metres and is typically dominated by black box (*Eucalyptus largiflorens*).

North-West Floodplain Woodlands (extent: 14,000–28,000 sq km; 30–70% cleared) occur on heavy clay soils of extensive flood plains where the annual rainfall is up to 500 mm per year.

Riverine Plain Woodlands (extent: 1000–2000 sq km; >70%) are one of only two semi-arid woodland classes dominated by wattles rather than eucalypts. The silvery weeping foliage of *Acacia pendula* gives these woodlands a distinctive character.

Brigalow Clay Plain Woodlands (extent: 500–1000 sq km; 60–90% cleared) occur in two disjunct locations on the east and west of the upper Darling River floodplains in northern New South Wales. They are dominated by *Acacia harpophylla* (Brigalow).

Semi-arid Woodlands (Shrubby)

North-west Alluvial Sand Woodlands (extent: 120–190 sq km; 30–70% cleared) are known locally as sand monkeys and occupy deposits left in ancient stream channels and river bends.

Riverine Sandhill Woodlands (extent: 600–1500 sq km; 30–70% cleared) are dominated by Cypress pine (*Callitris glaucophylla*). These open woodlands are scattered around the Hay Plain and south of Nymagee and west of Cobar.

Inland Rocky Hill Woodlands (extent 5000–7000 sq km; <30% cleared) are located in the central west of the state occupying hills and ranges up to 200 metres above the surrounding floodplain.

Subtropical Semi-arid Woodlands (extent: 600–1000 sq km; <10% cleared) are restricted to the far north of the semi-arid zone and are dominated by silver ironbark (*Eucalyptus melanophloia*).

Western Peneplain Woodlands (extent: 25,000–50,000 sq km; 30–70% cleared) are one of the most extensive and varied vegetation classes in the semi-arid zone. They are found on red-brown loams and sandy loams on flat to undulating terrain receiving 350–500 mm annual rainfall.

Dune Mallee Woodlands (extent: 10,000–20,000 sq km; <30% cleared) are mallee (multi-stemmed) eucalypt woodlands found on deep red sands of dunefield formations.

Sand Plain Mallee Woodlands (extent: 6000–12,000 sq km; 10–40% cleared) are also dominated by mallees but found on soils with a slightly heavier texture and more nutrients than the dunes.

Semi-Arid Sand Plain Woodlands (30,000–50,000 sq km; <30% cleared) are a widespread group of assemblages closely associated with alkaline soils and dominated by belah (*Casuarina pauper*).

Desert Woodlands (extent: 1000–1500 sq km; <10% cleared) occur on low open woodlands in the driest environments that eucalypts can tolerate, with 200–250 mm average annual rainfall.

Wet Sclerophyll Forests (Shrubby)

North Coast Wet Sclerophyll Forests (extent: 6500–12,000 sq km; 10–40% cleared) grow in high rainfall areas on the relatively fertile rocky coastal ranges and foothills or in sheltered creek flats. Vines are a conspicuous feature of this vegetation class.

South Coast Wet Sclerophyll Forests (extent: 1200–1600 sq km; <10% cleared) occur as small pockets within dry sclerophyll forest in steeper areas where gullies and sheltered slopes create moist conditions.

Northern Escarpment Wet Sclerophyll Forests (extent: 1400–2800 sq km; <30% cleared) occur along the escarpment in northern New South Wales.

Southern Escarpment Wet Sclerophyll Forests (extent: 1900–2800 sq km; <30% cleared) can be found along the southern escarpment on open slopes of the summit ridges and mountain plateaux through to moist gullies at lower elevations.

Wet Sclerophyll Forests (Grassy)

Northern Hinterland Wet Sclerophyll Forests (extent: 5000–9000 sq km; 30–70% cleared) cover extensive areas of the low ranges, foothills and plateaux throughout the coastal hinterland of northern New South Wales.

Southern Lowland Wet Sclerophyll Forests (extent: 1400–2200 sq km; <30% cleared) are a strikingly beautiful group of forest communities occurring on the coastal hills and lowlands of south-eastern New South Wales.

Northern Tableland Wet Sclerophyll Forests (extent: 3000–4500 sq km; <30% cleared) are tall, open eucalypt forests occupying on the tablelands of northern New South Wales.

Southern Tableland Wet Sclerophyll Forests (extent: 2200–3400 sq km; 30–70% cleared) occur on the central and southern tablelands of New South Wales in a band between the wetter sclerophyll forests of the escarpment and the drier grassy woodlands.

Montane Wet Sclerophyll Forests (extent: 650–850 sq km; <10% cleared) cling to the steep moist slopes of the higher parts of the southern mountain ranges of New South Wales.

Appendix 9: Threatened ecological communities in major ecosystem types

Threatened ecological communities are those listed as either vulnerable, endangered or critically endangered under the *Threatened Species Conservation Act 1995.*

Ecosystem	Threatened ecological community (common name)
Alpine Complex	Montane Peatlands and Swamps
Arid Shrublands (Acacia sub-formation)	Nelia Shrublands
Arid Shrublands (Chenopod sub-formation)	None
Dry Sclerophyll Forests (shrub/grass sub-formation)	Box Gum Woodland
	Castlereagh Swamp Woodland Community
	Cooks River/Castlereagh Ironbark Forest in the Sydney Basin Bioregion
	Hunter Lowland Redgum Forest in the Sydney Basin and NSW North Coast Bioregions
	Lower Hunter Spotted Gum – Ironbark Forest
	Semi-evergreen Vine Thicket
	Shale Gravel Transition Forest in the Sydney Basin Bioregion
	Shale Sandstone Transition Forest in the Sydney Basin Bioregion
	Sydney Turpentine-Ironbark Forest
Dry Sclerophyll Forests (shrubby sub-formation)	Agnes Banks Woodland in the Sydney Basin
	Box Gum Woodland
	Castlereagh Swamp Woodland Community
	Elderslie Banksia Scrub Forest
	Kincumber Scribbly Gum Forest
	Kurnell Dune Forest in the Sutherland Shire and City of Rockdale
	Kurri Sand Swamp Woodland in the Sydney Basin Bioregion
	McKies Stringybark/Blackbutt Open Forest
	Quorrobolong Scribbly Gum Woodland in the Sydney Basin Bioregion
	Umina Coastal Sandplain Woodland in the Sydney Basin Bioregion
	Warkworth Sands Woodland in the Sydney Basin Bioregion
Forested Wetlands	Artesian Springs Ecological Community
	Hunter Lowland Redgum Forest in the Sydney Basin and NSW North Coast Bioregions
	Maroota Sands Swamp Forest
	River-Flat Eucalypt Forest on Coastal Floodplains
	Subtropical Coastal Floodplain Forest
	Swamp Oak Floodplain Forest
	Swamp Sclerophyll Forest on Coastal Floodplains

Ecosystem	Threatened ecological community (common name)
Freshwater Wetlands	Artesian Springs Ecological Community
	Freshwater Wetlands on Coastal Floodplains
	Montane Peatlands and Swamps
	Sydney Freshwater Wetlands in the Sydney Basin Bioregion
	Upland Wetlands of the Drainage Divide of the New England Tablelands
Grasslands	Native Vegetation on Cracking Clay Soils of the Liverpool Plains
	Themeda Grassland on Seacliffs and Coastal Headlands in the NSW North Coast, Sydney Basin and South East Corner Bioregions
Grassy Woodlands	Bega Dry Grass Forest
	Brogo Wet Vine Forest
	Candelo Dry Grass Forest
	Carbeen Open Forest Community in the Darling Riverine Plains and Brigalow Belt South Bioregions
	Cumberland Plain Woodland
	Fuzzy Box on Alluvials of South Western Slopes, Darling Riverine Plains and the Brigalow Belt South
	Hunter Lowland Redgum Forest in the Sydney Basin and NSW North Coast Bioregions
	Hunter Valley Weeping Myall Woodland
	Illawarra Lowlands Grassy Woodland in the Sydney Basin Bioregion
	Inland Grey Box Woodland
	Moist Shale Woodland in the Sydney Basin Bioregion
	Native Vegetation on Cracking Clay Soils of the Liverpool Plains
	New England Peppermint (*Eucalyptus nova-anglica*) Woodland on Basalts and Sediments in the New England Tableland Bioregion
	Ribbon Gum, Mountain Gum, Snow Gum Grassy Forest/Woodland of the New England Tableland Bioregion
	Shale Sandstone Transition Forest in the Sydney Basin Bioregion
	White Box Yellow Box Blakely's Red Gum Woodland
Heathlands	Byron Bay Dwarf Graminoid Clay Heath
	Eastern Suburbs Banksia Scrub in the Sydney Basin Bioregion
	Genowlan Point *Allocasuarina nana* Heathland
	Howell Shrublands
	Low woodland with heathland on indurated sand at Norah Head
	Melaleuca armillaris Tall Shrubland in the Sydney Basin Bioregion
Rainforests	Ben Halls Gap Sphagnum Moss Cool Temperate Rainforest
	Brigalow Community
	Dry Rainforest of the South East Forests
	Illawarra Subtropical Rainforest in the Sydney Basin Bioregion

Ecosystem	Threatened ecological community (common name)
Rainforests, continued	Littoral Rainforest in the NSW North Coast, Sydney Basin and South East Corner Bioregions
	Lowland Rainforest on Floodplain
	Lowland Rainforest in NSW North Coast and Sydney Basin Bioregions
	Milton Ulladulla Subtropical Rainforest in the Sydney Basin Bioregion
	Ooline Community
	Robertson Rainforest in the Sydney Basin Bioregion
	Sallywood Swamp Forest
	Semi-evergreen Vine Thicket
	Western Sydney Dry Rainforest in the Sydney Basin Bioregion
Rivers	Aquatic Ecological Community in the Natural Drainage System of the Lowland Catchment of the Darling River
	Aquatic Ecological Community in the Natural Drainage System of the Lower Murray River Catchment
	Aquatic Ecological Community in the Natural Drainage System of the Lowland Catchment of the Lachlan River
Semi-arid Woodlands (grassy sub-formation)	Brigalow Community
	Brigalow-Gidgee Woodland/Shrubland in the Mulga Lands and Darling Riverine Plains Bioregions
	Coolibah-Black Box Woodland of the Northern Riverine Plains in the Darling Riverine Plains and Brigalow Belt South Bioregions
	Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray–Darling Depression, Riverina and NSW South Western Slopes Bioregions
Semi-arid Woodlands (shrubby sub-formation)	*Acacia melvillei* Shrubland in the Riverina and Murray–Darling Depression Bioregions
	Buloke Woodland
	Carbeen Open Forest Community in the Darling Riverine Plains and Brigalow Belt South Bioregions
	Sandhill Pine Woodland in the Riverina, Murray–Darling Depression and NSW South Western Slopes Bioregions
Wet Sclerophyll Forests (grassy sub-formation)	Blue Mountains Shale Cap Forest in the Sydney Basin Bioregion
	Duffys Forest Ecological Community in the Sydney Basin Bioregion
	Mount Gibraltar Forest in the Sydney Basin Bioregion
	O'Hare's Creek Shale Forest
	Pittwater Spotted Gum Forest
	Southern Highlands Shale Woodlands in the Sydney Basin Bioregion
	Sun Valley Cabbage Gum Forest in the Sydney Basin Bioregion
	Sydney Turpentine-Ironbark Forest
Wet Sclerophyll Forests (shrubby sub-formation)	Blue Gum High Forest
	Robertson Basalt Tall Open Forest in the Sydney Basin Bioregion
	White Gum Moist Forest in the NSW North Coast Bioregion

Glossary

Adaptation: Responses that decrease the negative effects of change and capitalise on positive opportunities associated with impacts. In relation to biodiversity: responses, whether natural or assisted by humans, which enable species and ecological processes to adjust and evolve in response to a changed environment.

Adaptive management: Involves learning from management actions, and using those lessons to improve future management. It requires the development of an adequate monitoring framework that yields results that can be fed back into the management process. Adaptive management is an approach that allows us to 'embrace' uncertainty in ecological systems. Understanding uncertainty as information, rather than avoiding or ignoring it, will help us respond to threats associated with climate change.

Biodiversity (biological diversity): Variability among living organisms from all sources (including terrestrial, aquatic, marine and other ecosystems and ecological complexes of which they are part), which includes genetic diversity, species diversity and ecosystem diversity.

Biodiversity certification (Biocertification): Certification that an environmental planning instrument (EPI) established under the *Environmental Planning and Assessment Act 1979* (EP&A Act), such as a Local Environmental Plan, will have an 'improve or maintain' outcome for biodiversity values. Certification can be conferred on an EPI by the Minister for Climate Change and the Environment (in relation to the TSC Act) or the Minister for Primary Industries (in relation to the *Fisheries Management Act 1994*).

Connectivity: The extent of interconnectedness between habitat units and subpopulations in a landscape.

Biodiversity values: Include the composition, structure and function of ecosystems, and (but not limited to) threatened species, populations and ecological communities, and their habitats. This does not include fish or marine vegetation within the meaning of Part 7A of the *Fisheries Management Act 1994* unless that fish or marine vegetation has been the subject of an order under s.5A of the TSC Act.

CMA area: The area of operation of a Catchment Management Authority, as described in Schedule 2 of the *Catchment Management Authorities Act 2003*.

CMA: Catchment Management Authority established under the *Catchment Management Authorities Act 2003* and reporting to the NSW Minister for Climate Change and the Environment.

Climate change: Change in the climate attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is, in addition to natural climate variability, observed over comparable time periods.

The Intergovernmental Panel on Climate Change 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). Climate change 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.

Connectivity: A measure of the degree to which an area of native vegetation is linked with other areas of vegetation.

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 generally refers to the safekeeping or preservation of the existing state of a heritage resource from destruction or change.

Ecosystem: A naturally occurring assemblage of interacting species adapted to particular conditions of soil, topography, water availability and climate.

Ecosystem resilience: The capacity of an ecosystem to adapt to changes and disturbances yet retain its basic functions and structures. A resilient ecosystem can adapt to changes and rebuild itself when damaged. Resilient systems are more open to multiple uses and are more able to recover from management mistakes.

Ecosystem services: The full suite of benefits that human populations gain from a particular type of ecosystem, such as maintenance of climates; provision of clean water and air; soil stabilisation; pollination of crops and native vegetation; fulfilment of people's cultural, recreational, spiritual, intellectual needs; and provision of options for the future, for example though maintaining biodiversity.

Habitat: An area or areas occupied, or periodically or occasionally occupied, by a species, population or ecological community, including any biotic or abiotic component.

Key Threatening Process: A threatening process specified in Schedule 3 of the *Threatened Species Conservation Act 1995* that adversely affects threatened species, populations or ecological communities, or could cause those that are not threatened to become so.

Invasive species: A species occurring beyond its accepted normal distribution as a result of human activities, which threatens valued environmental, agricultural or personal resources by the damage it causes.

Landscape: A heterogeneous area of local ecosystems and land uses that is of sufficient size to achieve long-term outcomes in the maintenance and recovery of species or ecological communities, or in the protection and enhancement of ecological and evolutionary processes.

Natural resource management: Sustainable management of natural resources (land, soil, geological features, water, vegetation, animals, other organisms and ecosystems, the cultural heritage or amenity of an area) that incorporates economic, social and environmental values and involves the community, industries and governments in planning and decision-making. Integrated natural resource management includes coordinating policies, programs, plans and projects, and coordination in the exercise and performance of administrative and statutory powers and functions by government agencies, statutory authorities, local government bodies, and the broader community, relevant to the management of the state’s natural resources.

Resilience: See Ecosystem resilience.

Species: A taxon comprising one or more populations of individuals capable of interbreeding to produce fertile offspring.

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