



Mid North Coast Regional Conservation Plan

Draft



Environment,
Climate Change
& Water

Mid North Coast Regional Conservation Plan

Draft

Have your say

This Mid North Coast Regional Conservation Plan is being released as a working draft. A review will be undertaken following a period of public exhibition and consultation.

Comments to assist in this review are welcome and should be forwarded in writing by the closing date for submissions **Friday 8 April 2011**.

Please send your comments to:

The Manager, Planning and Aboriginal Heritage
Environment Protection and Regulation Group – North East Branch
Department of Environment, Climate Change and Water
Locked Bag 914
Coffs Harbour NSW 2450

or email them to neb.rcp@environment.nsw.gov.au

This draft is also available from the DECCW website at
www.environment.nsw.gov.au/regconsplans.htm

Cover photos:

Main – John Lugg

Right, top to bottom – R Bennett DECCW; M. Van Ewijk; E. Slater

© 2010 State of NSW and Department of Environment, Climate Change and Water

This work is copyright. Apart from any use as permitted under the *Copyright Act 1968*, no part may be reproduced without prior permission from the Department of Environment, Climate Change and Water.

The material provided in the draft Mid North Coast Regional Conservation Plan is for information purposes only. It is not intended to be a substitute for legal advice in relation to any matter, whether particular or general.

This document should be cited as:

DECCW 2010, *Draft Mid North Coast Regional Conservation Plan*, Department of Environment, Climate Change and Water, Sydney

Published by:

Department of Environment, Climate Change and Water

59 Goulburn Street, Sydney

PO Box A290, Sydney South 1232

Ph: (02) 9995 5000

Ph: 131555 (information and publications requests)

1300 361 967 (national parks, climate change and energy efficiency information and publications requests)

Fax: (02) 9995 5999

TTY: (02) 9211 4723

Email: info@environment.nsw.gov.au

Web: www.environment.nsw.gov.au

Report pollution and environmental incidents

Environment Line: 131 555 (NSW only) or info@environment.nsw.gov.au

See also www.environment.nsw.gov.au/pollution

ISBN 978 1 74293 038 1

DECCW 2010/999

December 2010

Summary

The Mid North Coast Region stretches from Iluka near Yamba, south to Hawks Nest and west to Stroud and Dorrigo. The Region is biologically diverse supporting many irreplaceable biodiversity assets. The area also has important Aboriginal heritage values, reflecting past and present relationships with the landscape.

Historically, due to its distance from large metropolitan areas such as Brisbane or Sydney, there has not been a substantial demand for broad-scale residential development but, like many other areas of New South Wales, it has inherited a legacy of clearing and urban development since European settlement. More recently however, the region's biodiversity is increasingly subject to a variety of pressures including development associated with a burgeoning population and climate change.

The Mid North Coast Regional Strategy predicts a significant increase in urban development in the region by 2031 and seeks to guide that development in a planned and sustainable manner.

The regional conservation plan will be a partner document to the Regional Strategy that identifies and discusses the Mid North Coast Region's high conservation value biodiversity assets and predicts where these may be found. It includes an audit of these assets in the future urban development areas and employment lands identified in the Regional Strategy. The purpose of the regional conservation plan is to propose an overarching outcome of to 'improve or maintain' biodiversity values through avoiding, as far as is possible, impacts on existing flora and fauna.

It identifies areas where offsets, should they be required, may best be placed strategically in the landscape to facilitate this outcome, using the mechanisms discussed. A mix of delivery mechanisms are proposed in order to achieve an improve or maintain outcome.

The principle of avoiding impacts, as far as is possible, equally applies to Aboriginal cultural heritage. However, unlike biodiversity, where it may be possible to replace or restore degraded habitat over time and thus maintain biodiversity values, Aboriginal cultural heritage is irreplaceable. Where development and Aboriginal heritage values coincide, innovative and respectful solutions must be found.

The regional conservation plan will also provide more general advice on protection mechanisms for biodiversity and Aboriginal culture and heritage across the region through land-use planning. It will also identify areas where rehabilitation of the landscape should be targeted strategically to enhance biodiversity conservation, landscape connectivity and build resilience to climate change.

This draft regional conservation plan is being exhibited for public comment to ensure that adequate and appropriate information and guidance on conservation requirements and mechanisms is provided, particularly to local government and other stakeholders with interests in land-use planning and urban development. The document will be on exhibition for a minimum period of six weeks, before review, consideration and incorporation of public comments where appropriate. The plan will then be finalised and released.

Contents

1	Introduction	1
1.1	What is biodiversity?	1
1.2	What is Aboriginal cultural heritage?	2
1.3	Objectives of the Regional Conservation Plan	2
1.4	Outline of the Regional Conservation Plan	4
1.5	Where does the Regional Conservation Plan apply?	4
1.6	Who should use this Regional Conservation Plan?	4
1.7	Ongoing review of the Regional Conservation Plan	4
2	Planning and biodiversity conservation framework	6
2.1	Environmental Planning and Assessment Act 1979	6
2.2	National Parks and Wildlife Act 1974	6
2.3	Threatened Species Conservation Act 1995	7
2.4	Fisheries Management Act 1994	9
2.5	Native Vegetation Act 2003	10
2.6	Crown Lands Act 1989	11
2.7	Environment Protection and Biodiversity Conservation Act 1999	11
2.8	Biodiversity and natural resource policy	12
2.9	Biodiversity conservation criteria	15
2.10	Climate change	15
2.11	Aboriginal cultural heritage planning	17
3	Conservation assessment	20
3.1	Regional overview	20
3.2	Identification of high conservation value biodiversity assets	21
3.3	Overview of high conservation value biodiversity assets	22
3.4	Protected areas	30
3.5	Compilation of values	35
3.6	Matters of National Environmental Significance	35
3.7	Connectivity conservation and the role of corridors	37
3.8	Aboriginal cultural heritage values	42
4	Audit of biodiversity assets	45
4.1	Negotiation of future urban release and employment lands	45
4.2	Biodiversity assets in future urban release and employment lands	46
4.3	Existing zoning of high conservation value biodiversity assets	50
4.4	Additional potential development not assessed in the RCP	52
4.5	Potential implications for Aboriginal cultural heritage	53
5	Biodiversity conservation guide for the Mid North Coast Region	54
5.1	Priority areas for conservation, restoration and enhancement	54
5.2	Biodiversity conservation in the planning system	58
5.3	Mitigation measures for Aboriginal cultural heritage	64
6	Implementation mechanisms	66
6.1	Strategic planning	66
6.2	Council biodiversity strategies and conservation plans	68
6.3	Settlement planning guidelines	68
6.4	Planning agreements	69
6.5	Environmental impact considerations	70
6.6	Covenants	70
6.7	BioBanking	70
6.8	Property vegetation plans	71

6.9	Conservation agreements	71
6.10	Aboriginal property management plans and conservation	72
6.11	DECCW reserve establishment program	72
6.12	NSW Nature Conservation Trust.....	72
7	Conclusion.....	73
	References.....	74
Figures		
Figure 1	Local government, catchment management authority and biogeographic regions of the Mid North Coast planning area	5
Figure 2	Distribution of lands supporting high conservation value biodiversity assets	36
Figure 3	Corridors and habitat networks	39
Figure 4	Total proposed growth areas showing vegetated and cleared extent	47
Figure 5	Area of native vegetation on proposed future urban release and employment lands	47
Figure 6	Total area for each high conservation value biodiversity asset in growth areas.....	48
Figure 7	Predicted occurrence of EECs on future urban release and employment lands	50
Figure 8	Native vegetation within areas currently zoned for residential and employment lands, and within areas proposed under the MNCRS.....	52
Figure 9	Biodiversity Forecasting Tool priority 'conserve' and 'restore' areas	55
Figure 10	Priority lands in a regional context suitable for use for offsetting potential development impacts.....	63
Tables		
Table 1	Conservation planning principles	3
Table 2	Projected changes in climate and associated attributes for the Mid North Coast Region	16
Table 3	Verification rules for land predicted to contain high conservation value biodiversity assets	23
Table 4	Endangered ecological communities.....	24
Table 5	Overcleared Mitchell landscapes in the Mid North Coast Region	27
Table 6	Area of DECCW reserve types.....	31
Table 7	Aboriginal object sites recorded in AHIMS	42
Table 8	Aboriginal Places.....	43
Table 9	Area of land in proposed future urban release areas for each Mid North Coast subregion not constrained by native vegetation	45
Table 10	Area of land in future employment lands for each Mid North Coast subregion not constrained by native vegetation	46
Table 11	Intersection of proposed future urban release and employment lands with predicted high conservation values.....	49
Table 12	Areas of predicted high conservation value biodiversity assets by zoning	51
Boxes		
	National and State biodiversity strategies.....	13
	Importance of linkages in a time of climate change	38

Abbreviations

AHIMS	Aboriginal Heritage Information Management System
ANZECC	Australian and New Zealand Environment and Conservation Council
ARA	Aboriginal Regional Assessment
BCL	Biodiversity Conservation Lands
BFT	Biodiversity Forecasting Tool
BioBanking	biodiversity banking and offsets scheme
BMP	biodiversity management plan
CA	conservation agreement
CAMBA	Chinese Australia Migratory Bird Agreement
CAP	catchment action plan
CL Act	<i>Crown Lands Act 1989</i>
CMA	catchment management authority
DCP	development control plan
DECCW	Department of Environment, Climate Change and Water
EEC	endangered ecological community
EPA Act	<i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
EPI	environmental planning instrument
FM Act	<i>Fisheries Management Act 1994</i>
FMZ	Forest Management Zone (under the <i>Forestry Act 1916</i>)
IBRA	Interim Biogeographic Regionalisation for Australia
ICOLL	intermittently closed and open lake and lagoon
JAMBA	Japanese Australia Migratory Bird Agreement
JANIS	Joint ANZECC/MCFFA NFPS Implementation Sub-Committee
LEP	local environmental plan
LGA	local government area
MCFFA	Ministerial Council on Forestry, Fisheries and Aquaculture
MNCRS	Mid North Coast Regional Strategy
MNES	Matters of National Environmental Significance
NFPS	National Forest Policy Statement
NP	national park
NPW Act	<i>NSW National Parks and Wildlife Act 1974</i>
NR	nature reserve
NRM	natural resource management
NV Act	<i>NSW Native Vegetation Act 2003</i>
PNF	private native forestry
PVP	property vegetation plan
RCP	regional conservation plan
SEPP	State Environmental Planning Policy
SI-LEP	Standard Instrument – Principal Local Environmental Plan
TSC Act	<i>Threatened Species Conservation Act 1995</i>

1 Introduction

The Mid North Coast Region contains a variety of valuable biodiversity assets which deliver social, economic and environmental benefits for the communities it supports. In addition to their intrinsic values, these assets, deliver clean air and water for our communities, provide the natural resources which underpin industries and provide the foundation on which a significant tourism sector has been built.

Aboriginal settlement and use of the land has been traced back tens of thousands of years. Traditional practices, including use of fire, crafted a landscape in ecological equilibrium. Non-indigenous settlement from the 1820s introduced more intensive land-use practices. Clearing accelerated for timber-getting and agricultural pursuits such as grazing and cropping. These uses first targeted the relatively flat and fertile lands generally in river valleys and coastal plains (the Dorrigo and Comboyne plateaux being notable exceptions). Subsequently, timber production and grazing became more important industries on less fertile or steeper lands. Other uses such as resource extraction and urban development were also introduced.

Competing land-use demands have the potential to generate significant impacts on biodiversity and thereby threaten the social and economic benefits on which the community relies. The same pressures acting on biodiversity also have the potential to impact on a range of Aboriginal cultural heritage values.

It is therefore imperative to actively manage these competing demands to protect the Mid North Coast Region's biodiversity and secure its sustainable future. The Mid North Coast Regional Conservation Plan (RCP) focuses on protecting and managing biodiversity assets in view of the population growth foreshadowed in the Mid North Coast Regional Strategy (MNCRS) and the associated changes in land use (both residential and employment) required to accommodate this growth.

Although the primary focus of this RCP is on biodiversity, sound strategic conservation planning will also benefit Aboriginal cultural heritage in all its various forms.

1.1 What is biodiversity?

Biological diversity, or biodiversity, is defined as:

The variety of life forms, the different plants, animals and microorganisms, the genes they contain, and the ecosystems they form. It is usually considered at three levels: genetic diversity, species diversity and ecosystem diversity (Commonwealth of Australia 1996).

Genetic diversity refers to the variety of genetic information contained in all plants, animals and microorganisms.

Species diversity refers to the variety of species for a given area. and is usually a measure of the number of species (richness) and their relative abundance for a given area at a given time.

Ecosystem diversity refers to the variety of habitats, biotic communities and ecological processes (NPWS 1999).

Landscapes (including terrestrial and aquatic) add another level to the biodiversity hierarchy above ecosystems. They represent the variety and arrangement of landforms, communities and land uses (Peck 1998).

Biodiversity is a finite resource and it contributes to the maintenance of essential ecological processes (Fallding et al. 2001). Biodiversity underpins human wellbeing through the provision of ecological services, such as those that are essential for the maintenance of soil fertility and clean, fresh water and air. It also provides recreational opportunities and is a source of inspiration and cultural identity (Commonwealth of Australia 1996).

Although people tend to only recognise and value biodiversity they can relate to, such as at the ecosystem or landscape scale, the role and functions of biodiversity at one level of organisation confer resilience on the level above. Thus genetic or species diversity is essential for the health of ecosystems and landscapes, and for the maintenance of ecological services on which people depend (S. Ferrier 2009, pers. comm.).

1.2 What is Aboriginal cultural heritage?

Cultural heritage is the places, objects, customs and traditions that communities have inherited from the past and wish to preserve for current and future generations (NSW Heritage Office 1996). Aboriginal cultural heritage therefore comprises physical or tangible sites, places and objects as well as intangible values and cultural practices associated with those sites, places and objects.

Where natural elements of the landscape acquire meaning for individuals and communities, such as the role of headlands, prominent peaks and rivers in creation stories and traditional routes, these elements may also become cultural heritage. Aboriginal cultural heritage also includes traditional, historical and contemporary associations of people with heritage places.

1.3 Objectives of the Regional Conservation Plan

The RCP seeks to guide future land use in a manner which protects the Mid North Coast Region's biodiversity and Aboriginal cultural heritage assets in a sustainable manner. The RCP responds to the future changes in land use as foreshadowed in the MNCRS which mandates the need to prepare an RCP and provides a framework for the RCP with the following aims and actions (from DoP 2009a):

- Biodiversity aim – Protect high value environments, including significant coastal lakes, estuaries, aquifers, threatened species, vegetation communities and habitat corridors by ensuring that new urban development avoids these important areas and their catchments.
 - Action – Local environmental plans will protect and zone land with high environmental, vegetation, habitat, riparian, aquatic, coastal or corridor values for environmental protection.
 - Action – Local environmental plans will include provisions to encourage habitat and corridor establishment in future zoning of land with environmental and rural values.
- Cultural heritage aim (including Aboriginal) – Protect the cultural and Aboriginal heritage values and visual character of rural and coastal towns and villages and surrounding landscapes.
 - Action – Councils are to ensure that cultural and community values that are important to Aboriginal communities are considered and resolved in the future planning and management of the local government area.

In delivering on the actions and aims outlined above, the RCP is underpinned by three biodiversity planning principles, described in Table 1. The principles underpinning consideration of Aboriginal cultural heritage are discussed more fully in section 2.11.

Development certainty and conservation outcomes are best achieved by good regional strategic planning, rather than planning at the development application stage.

Table 1 Conservation planning principles

Planning principles	Outcomes
<p>Principle 1: Protect high value environments by avoiding direct impacts on the biodiversity of these areas</p>	<p>Reduces biodiversity loss and maintains important habitat</p> <p>Ensures greatest biodiversity benefit and reduces costs associated with providing offsets and/or rehabilitation</p> <p>Acknowledges that theoretically MNCRS yields can be accommodated without biodiversity loss</p>
<p>Principle 2: Mitigate indirect impacts (for example restricting access to conservation areas or weed control) or minimise direct impacts where Principle 1 cannot be achieved (for example refining subdivision layouts)</p>	<p>Achieving an ‘improve or maintain’ outcome requires minimisation and management of impacts, both direct and indirect, where some development may proceed which is anticipated to have limited impacts on biodiversity.</p>
<p>Principle 3: Provide offsets for unavoidable impacts on biodiversity</p>	<p>Achieving an ‘improve or maintain’ outcome requires offsets that adequately compensate for the biodiversity values lost due to the development.</p> <p>Some biodiversity values are so rare that it may not be possible to offset them (for example large areas of an endangered ecological community (EEC) in good condition).</p> <p>Offsetting is guided by 13 principles.</p> <p>Several mechanisms can be used to secure offsets.</p>

The goal of the RCP is to identify and conserve the Mid North Coast Region’s biodiversity assets in a sustainable manner and guide future land-use planning to protect high biodiversity and Aboriginal cultural heritage values.

Within this overriding goal, the specific objectives of the RCP include:

- to provide an overview of the region’s biodiversity values
- to identify strategic regional conservation areas, including regional corridor networks, and to prioritise them for protection, conservation and restoration
- to ensure that mitigation or offset strategies focus on achieving an improve or maintain outcome
- to identify local and regional conservation priorities in development areas and develop corresponding offset guides that will direct future mitigation and offsetting efforts
- to identify mechanisms to implement the mitigation and offsetting strategies detailed in the RCP
- to provide a framework to assist councils in protecting biodiversity early in the planning process through biodiversity certification of environmental planning instruments (EPIs) and implementation of the biodiversity banking and offsets scheme (BioBanking)
- to highlight the importance of Aboriginal cultural heritage in local government planning, identify issues and provide a framework for its incorporation into EPIs with the involvement of Aboriginal communities.

The RCP also seeks to contribute to the NSW State Plan's state-wide natural resource management (NRM) targets for an improvement in the extent and condition of native vegetation and to increase the number of sustainable native animal populations.

1.4 Outline of the Regional Conservation Plan

To address the above objectives, the RCP:

- describes the planning and legislative context (section 2)
- describes the Mid North Coast Region's biodiversity values (section 3)
- analyses the current status of biodiversity (section 3)
- audits the biodiversity values in the areas proposed for future development (section 4)
- identifies priority areas, at both a local and regional scale, for offsetting potential impacts of urban development, to improve or maintain biodiversity values (section 5)
- provides guidance on appropriate mechanisms for securing biodiversity assets or high conservation value lands (section 6)
- provides a framework to assist planning authorities which are considering applying to the Minister for Climate Change and the Environment for biodiversity certification of EPIs (all sections).

Options to improve the consideration of Aboriginal cultural heritage values in planning processes have also been included in the RCP (sections 2.11, 3.8, 4.5, 5.3 and 6.1). It is important that Aboriginal cultural heritage is considered at the broad strategic level. In relation to LEP preparation, it is essential that Aboriginal people are appropriately consulted and involved in strategic land-use planning and that Aboriginal cultural values are provided with an appropriate level of protection in EPIs. The main steps for LEPs are to conduct Aboriginal cultural heritage studies covering a shire or a cultural country area (DECC 2009a) in partnership with the local Aboriginal community, and implement these studies through the cultural heritage provisions of the standard LEP template.

1.5 Where does the Regional Conservation Plan apply?

The RCP applies to the same local government areas (LGAs) covered by the MNCRS: Clarence Valley, Coffs Harbour, Bellingen, Nambucca, Kempsey, Port Macquarie-Hastings, Greater Taree and Great Lakes LGAs (see Figure 1).

1.6 Who should use this Regional Conservation Plan?

The RCP is primarily intended for use by the eight councils included within the MNCRS area, the Northern Rivers and Hunter–Central Rivers catchment management authorities (CMAs), Department of Planning, other State agencies with land-use interests, and key interest groups including community and land development groups.

1.7 Ongoing review of the Regional Conservation Plan

As for the MNCRS, the RCP will be reviewed every five years. This is to ensure that progress toward the RCP's objectives is monitored and any necessary revisions are made to ensure that the objectives are met. A key focus of the reviews will be to assess the effectiveness of strategic planning and development approval processes to deliver the RCP's goal and objectives over time.

Changes to the RCP are likely to occur in response to issues such as improved biodiversity knowledge, improved biodiversity impact prediction skills, changing population trends and shifting development pressures.

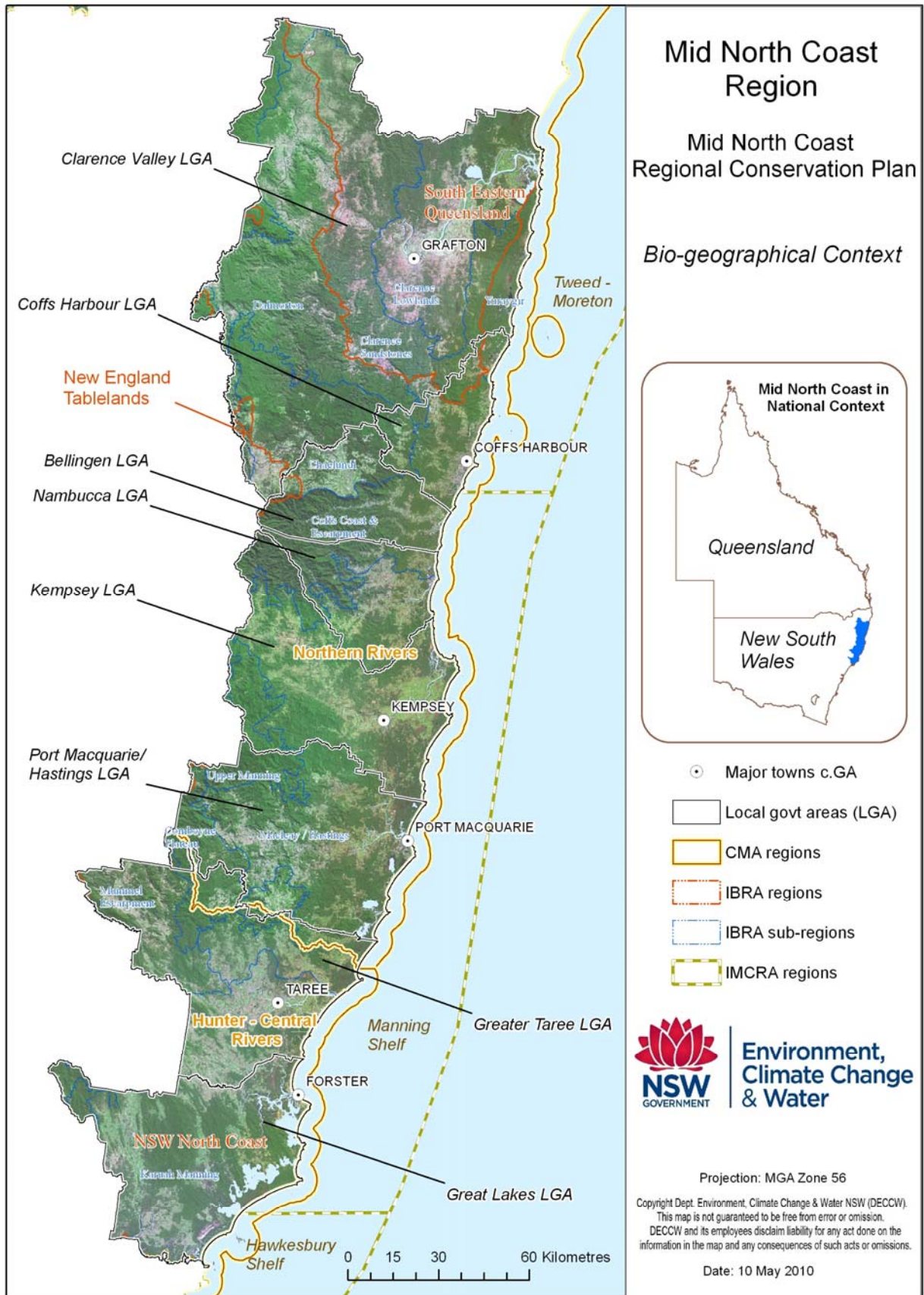


Figure 1 Local government, catchment management authority and biogeographic regions of the Mid North Coast planning area

2 Planning and biodiversity conservation framework

2.1 Environmental Planning and Assessment Act 1979

The primary legislation governing land use in New South Wales is the *Environmental Planning and Assessment Act 1979* (EPA Act). The objects of the EPA Act include to encourage:

- the proper management and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment
- the promotion and coordination of the orderly and economic use and development of land
- the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities and their habitats
- ecologically sustainable development.

The *Environmental Planning and Assessment Amendment Act 2005* facilitated the modernisation and standardisation of local environmental plans (LEPs) across NSW. Subsequently, on 31 March 2006, a standard instrument for LEPs was gazetted, prescribing a standard form and content of a principal LEP. All new LEPs are to be prepared in accordance with this standard.

The Department of Planning has developed a series of regional strategies, including the MNCRS, to guide residential and employment related development until 2031. The MNCRS is supported by an EPA Act Section 117 Direction, Direction 5.1 Implementation of Regional Strategies, which requires that a draft LEP shall be consistent with a regional strategy released by the Minister for Planning. The Direction also provides that an LEP may be inconsistent in limited circumstances. Section 117 enables the Minister for Planning to direct the content of an LEP, including an outline of matters of environmental planning significance, that councils must consider when preparing the local provisions of their LEPs.

2.1.1 Mid North Coast Regional Strategy

As noted, the MNCRS was prepared to guide sustainable development in the Mid North Coast planning region until 2031. In developing the MNCRS, the NSW Government committed to protecting high value environments, including significant coastal lakes, estuaries, aquifers, threatened species, vegetation communities and habitat corridors by ensuring that new development avoids these important areas and their catchments (DoP 2009a). As noted in section 1.3, the MNCRS mandates the preparation of an RCP and defines a framework for the RCP.

To achieve the aims of the MNCRS, it is necessary to identify suitably unconstrained and serviceable land for both residential and employment purposes. This is important so that communities can continue to enjoy a healthy, prosperous and sustainable lifestyle.

The RCP will assist councils in identifying and prioritising biodiversity assets and to identify high conservation value lands and modelled wildlife corridors. These lands can then be protected in the long term through appropriate zoning and local provisions in LEPs.

2.2 National Parks and Wildlife Act 1974

The objects of the *National Parks and Wildlife Act 1974* (NPW Act) include:

- the conservation of nature, including, but not limited to, the conservation of:
 - (i) habitat, ecosystems and ecosystem processes, and
 - (ii) biological diversity at the community, species and genetic levels, and
 - (iii) landforms of significance, including geological features and processes, and
 - (iv) landscapes and natural features of significance including wilderness and wild rivers.
- the conservation of objects, places or features (including biological diversity) of cultural value within the landscape, including, but not limited to:
 - (i) places, objects and features of significance to Aboriginal people, and
 - (ii) places of social value to the people of New South Wales, and
 - (iii) places of historic, architectural or scientific significance.

These are to be achieved by applying the principles of ecologically sustainable development.

These objectives are not restricted to those lands reserved under the NPW Act but throughout the landscape. Part 6 of the NPW Act addresses Aboriginal cultural heritage issues such as ownership and notification of Aboriginal objects to the Department of Environment, Climate Change and Water (DECCW) as well as requirements for permits for activities that may disturb or damage Aboriginal objects. Part 7 and Part 8 deal with fauna and flora, while Part 9 deals with licensing issues for flora and fauna.

Other legislation applying to Aboriginal cultural heritage includes the *Aboriginal Land Rights Act 1983*. Under this Act, Local Aboriginal Land Councils have a statutory function under Section 52(4) to take action to protect culture and heritage of Aboriginal persons in that council's area, subject to any other law.

The RCP incorporates specific objectives that promote conservation across the landscape and assist councils in identifying and providing areas of high natural and cultural values with an appropriate level of protection in their EPIs.

2.3 Threatened Species Conservation Act 1995

The objects of the *Threatened Species Conservation Act 1995* (TSC Act) include:

- to conserve biological diversity and promote ecologically sustainable development, and
- to prevent the extinction and promote the recovery of threatened species, populations and ecological communities, and
- to protect the critical habitat of those threatened species, populations and ecological communities that are endangered, and
- to eliminate or manage certain processes that threaten the survival or evolutionary development of threatened species, populations and ecological communities, and
- to ensure that the impact of any action affecting threatened species, populations and ecological communities is properly assessed, and
- to encourage the conservation of threatened species, populations and ecological communities by the adoption of measures involving cooperative management.

The *Threatened Species Legislation Amendment Act 2004* substantially amended a number of the provisions of the TSC Act. A key theme of the reforms to the TSC Act has been to shift the focus of conservation efforts from individual development sites to protecting and restoring habitat on a landscape scale. Thus it now sets the framework for a number of biodiversity conservation planning initiatives, as follows.

2.3.1 Biodiversity certification

One of the key mechanisms to give effect to this renewed focus on landscape scale strategic planning is the opportunity for biodiversity certification to be conferred on an area of land. Under the provisions of Part 7AA of the TSC Act, the Minister for Climate Change and the Environment has the ability to confer biodiversity certification if the Minister is satisfied that the overall package of measures contained in a biodiversity certification strategy will lead to the overall improvement or maintenance of biodiversity values, including threatened species and communities. The primary effect of conferring certification is that any project under Part 3A, any development under Part 4 or any activity under Part 5 of the EPA Act is taken to be development that is not likely to significantly affect threatened species, populations, ecological communities or their habitats. Similarly the *Native Vegetation Act 2003* (NV Act) does not apply to biodiversity certified land. Applications for biodiversity certification are made by a planning authority.

Consideration of the RCP will be an important first step in the development of a biodiversity certification strategy. Proposals that are developed giving consideration to the RCP and particularly the 25-year conservation guide contained within the RCP (section 5) will achieve better biodiversity outcomes and provide more certainty for the development industry and consent authorities.

For those councils not actively seeking certification the RCP is still a critical tool. It will guide biodiversity investment for conservation restoration, repair and management, triggered by a variety of planning processes, such as local- and State-significant development, critical infrastructure projects and property vegetation planning.

2.3.2 Biodiversity banking

The *Threatened Species Conservation Amendment (Biodiversity Banking) Act 2006* inserted Part 7A into the TSC Act to enable the establishment of a biodiversity banking and offsets scheme (BioBanking) which has been designed primarily to address impacts of urban expansion on biodiversity values at the development application stage.

The RCP guides the use of BioBanking and other offsetting mechanisms to ensure that biodiversity investment funds are focused in areas that will provide maximum biodiversity outcomes.

2.3.3 Recovery planning: biodiversity management plans

Section 56 of the TSC Act provides for the preparation of recovery plans to promote the recovery of the species, population or ecological community to a position of viability in nature. Initially, NSW recovery plans were developed on a species-by-species basis, but this proved to be not the most effective approach. In 2007, the Priorities Action Statement¹ was developed to identify actions for State and local agencies and the community with respect to management of threatened species (DECC 2007e).

A further iteration of recovery planning has been the development of multispecies recovery plans, called biodiversity management plans (BMPs). Several are in preparation across NSW and other States. Three of these – the Lord Howe Island BMP (DECC 2007d), the Border Ranges Rainforest BMP (DECCW 2010a) and the Northern Rivers Regional BMP (DECCW 2010d) – have been approved under Commonwealth legislation and adopted by the State.

With respect to the Mid North Coast Region, the Northern Rivers Regional BMP is publicly available. This BMP covers the area of the Northern Rivers CMA but not the

¹ www.threatenedspecies.environment.nsw.gov.au/tsprofile/home_PAS_new.aspx

entire Mid North Coast planning region, excluding Greater Taree and Great Lakes local government areas (LGAs).

The Northern Rivers Regional BMP constitutes the formal national recovery plan for federally listed species and ecological communities that are endemic to the area covered by the plan, having been prepared in accordance with the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (section 2.7). It will also meet the partial requirements of NSW recovery planning for 273 threatened species, five populations and 20 endangered ecological communities listed in federal and State legislation.

While BMPs specifically address recovery of threatened species from threats and multiple stresses, this RCP focuses conservation efforts on offsetting urban development impacts. Although the RCP provides general guidance on protection of high value biodiversity assets, the BMP should also be considered in strategic biodiversity planning in developing biodiversity action plans at a local level, as targeting actions to address recovery of threatened species will often also address broader conservation goals. While the RCP targets urban land-use planning for delivery of conservation outcomes, threatened species recovery planning depends on active community engagement to deliver on-ground actions. Thus there is a stronger social dimension in the BMPs than in the RCP. Further discussion on the interaction of BMPs and RCPs is provided in section 5.1.1

2.4 Fisheries Management Act 1994

The objects of the *Fisheries Management Act 1994* (FM Act) are:

- to conserve, develop and share the fishery resources of NSW for the benefit of present and future generations.

In particular the objects of this Act include:

- to conserve fish stocks and protect key fish habitats, and
- to conserve threatened species, populations and ecological communities of fish and marine vegetation, and
- to promote ecologically sustainable development, including the conservation of biological diversity,

and consistent with those objects:

- to promote viable commercial fishing and aquaculture industries, and
- to promote quality recreational fishing opportunities, and
- to appropriately share fisheries resources between users of those resources, and
- to provide social and economic benefits for the wider community of NSW.

To meet these objectives, Part 7 of the FM Act outlines legislative provisions to protect fish habitat, and Part 7A outlines threatened aquatic species legislation. The Part 7 provisions are commonly triggered by the 'integrated development' process under the EPA Act. However, there are other activities that may not require development consent but may still require a permit from Industry and Investment NSW which administers the FM Act and associated Regulations.

Fish habitat conservation and management is a major component of the State Government's program to sustainably manage the State's fisheries. It also contributes to the State Government's commitment, via the NSW State Plan, to improve and maintain the State's natural resources. Industry and Investment NSW has jurisdiction over all fish and marine vegetation in State waters, which include permanent and intermittent freshwater areas and 'water land' below the highest astronomical tide in tidal areas, normally extending to three nautical miles offshore. In marine parks, the *Marine Parks Act 1997* also applies.

2.4.1 NSW Fisheries Policy and Guidelines – Aquatic Habitat Management and Fish Conservation

The *Policy and Guidelines – Aquatic Habitat Management and Fish Conservation* (NSW Fisheries 1999) is targeted at local and State Government authorities, proponents of developments and their advisers, and individuals or non-government organisations concerned with the planning and management of NSW's aquatic resources. It can be used to inform land-use and natural resource management planning, development planning and assessment processes, and is a valuable educational tool to improve awareness and understanding of the importance of fish habitats and how impacts can be mitigated or managed. The document focuses on ensuring compliance with NSW legislation and policies as they relate to fish habitat conservation and management.

This RCP incorporates information on threatened aquatic species listed under the FM Act. It promotes sound land-use planning and management, and protection of high conservation value terrestrial and aquatic habitats, consistent with the FM Act's requirements for habitat and species protection.

2.5 Native Vegetation Act 2003

The objects of the NV Act include:

- to provide for, encourage and promote the management of native vegetation on a regional basis in the social, economic and environmental interests of the State, and
- to prevent broadscale clearing unless it improves or maintains environmental outcomes, and
- to protect native vegetation of high conservation value having regard to its contribution to such matters as water quality, biodiversity, or the prevention of salinity or land degradation, and
- to improve the condition of existing native vegetation, particularly where it has high conservation value, and
- to encourage the revegetation of land, and the rehabilitation of land, with appropriate native vegetation,

in accordance with the principles of ecologically sustainable development.

The NV Act is primarily administered by CMAs, which were established by the *Catchment Management Authorities Act 2003*. The NV Act is the primary legislation relating to the clearing of rural land and does not apply to urban areas. Under the NV Act, biodiversity and other environmental values of soil, water quality and salinity must be improved or maintained (NSW Government 2005a). This means that the gains for biodiversity must be equal to or greater than any losses resulting from clearing or other forms of degradation. This goal is also reflected in the TSC Act with regard to biodiversity certification.

The CMAs are responsible for controlling widespread clearing on rural lands and developing property vegetation plans (PVPs) with landholders to ensure management actions deliver an improve or maintain outcome on individual properties. DECCW remains responsible for administering private native forestry (PNF) under the NV Act.

This RCP incorporates specific objectives for the Mid North Coast Region that, if achieved, will contribute to the improve or maintain outcome. These draw from NRM targets that have already been adopted by the NSW Government. The RCP can also assist CMAs in identifying appropriate areas for investment, as well as guide the development of LEPs with respect to identification of high conservation value lands and modelled wildlife corridors.

2.6 Crown Lands Act 1989

The *Crown Lands Act 1989* (CL Act) and its Regulation (2006) are the principal legislation in the management of Crown lands and provides important requirements and guidance for suitability assessment, including environmental values.

The objects of the CL Act are:

- to ensure that Crown land is managed for the benefit of the people of New South Wales and in particular to provide for:
 - a proper assessment of Crown land,
 - the management of Crown land having regard to the principles of Crown land management contained in this Act,
 - the proper development and conservation of Crown land having regard to those principles,
 - the regulation of the conditions under which Crown land is permitted to be occupied, used, sold, leased, licensed or otherwise dealt with,
 - the reservation or dedication of Crown land for public purposes and the management and use of the reserved or dedicated land, and
 - the collection, recording and dissemination of information in relation to Crown land.

The principles of Crown land management are provided in Section 11 of the CL Act and are:

- that environmental protection principles be observed in relation to the management and administration of Crown land,
- that the natural resources of Crown land (including water, soil, flora, fauna and scenic quality) be conserved wherever possible,
- that public use and enjoyment of appropriate Crown land be encouraged,
- that, where appropriate, multiple use of Crown land be encouraged,
- that, where appropriate, Crown land should be used and managed in such a way that both the land and its resources are sustained in perpetuity, and
- that Crown land be occupied, used, sold, leased, licensed or otherwise dealt with in the best interests of the State consistent with the above principles.

These objectives and the principles for Crown land management mean that biodiversity conservation considerations are directly incorporated into decision-making with respect to the use of Crown land, including use for broader community, social and economic purposes. It also means that Crown land can play an important role in overall biodiversity protection within a region, as part of the vegetation matrix for wildlife habitat and movement (section 3.7).

One aspect of Crown land management is the reservation, where required, of such land for multiple or particular purposes, including for the preservation of native flora and/or fauna. This is further discussed in section 3.4.2. In addition, other Crown reserves not specifically reserved for nature conservation purposes also include biodiversity values. Crown reserves are generally managed by a Reserve Trust.

2.7 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act is federal legislation with a particular focus on matters of national environmental significance (MNES). It establishes the national environmental assessment and approvals process, protects and conserves biodiversity, and integrates the management of important natural and cultural places.

Under the EPBC Act, an action will require approval from the federal government Minister for the Environment if the action has, will have, or is likely to have, a significant impact on an MNES, including:

- World Heritage properties

- National Heritage places
- wetlands of international importance (listed under the Ramsar Convention)
- threatened species and endangered ecological communities (EECs)
- migratory species protected under international agreements (for example JAMBA, CAMBA)
- the Commonwealth marine environment
- nuclear actions.

It also provides for the protection of the 'environment' of Commonwealth land and assessment of actions taken by Australian Government agencies.

The EPBC Act provides for recovery planning for federally listed threatened species and EECs of which the BMPs (section 2.3.3) constitute multispecies examples. Once adopted, the BMPs are statutory documents under this Act and must be considered when assessing impacts on MNES. It also provides for 'conservation advice', equivalent to the NSW Priorities Action Statement.

The RCP assists compliance with the EPBC Act by identifying high conservation areas where MNES may be found and focuses on avoiding impacts on these areas of high biodiversity values, so that a significant impact on such matters, the trigger for federal government review, should not occur.

2.8 Biodiversity and natural resource policy

The RCP is consistent with a number of federal and State biodiversity strategies, including the National Local Government Biodiversity Strategy, the National Strategy for the Conservation of Australia's Biological Diversity, the NSW Biodiversity Strategy, the NSW State Plan, the Natural Resources Commission standards and targets and the NSW Biodiversity and Climate Change Adaptation Framework (see box below). In particular, the State Plan strives for better outcomes for native vegetation, biodiversity, land, rivers and coastal waterways.

2.8.1 State-wide targets for natural resource management

As recommended by the Natural Resources Commission (NRC 2005, 2006), the State Government has adopted the state-wide targets for NRM in the revised State Plan. The following are particularly relevant to the RCP.

Macro-environmental priorities:

- By 2015 there is an increase in native vegetation extent and an improvement in native vegetation condition.
- By 2015 there is an increase in the number of sustainable populations of a range of native fauna species.
- By 2015 there is no decline in the condition of marine waters and ecosystems.

Specific priorities:

- By 2015 there is an increase in the recovery of threatened species, populations and ecological communities.
- By 2015 there is an improvement in the condition of important wetlands, and the extent of those wetlands is maintained.
- By 2015 there is an improvement in the condition of estuaries and coastal lake systems.

2.8.2 Regional targets for natural resource management

Regional implementation of the NRC's targets is undertaken by CMAs. The Mid North Coast Region spans two CMAs: Northern Rivers and Hunter–Central Rivers. Both have developed catchment action plans (CAPs) that discuss planning and biodiversity issues.

National and State biodiversity strategies

National Local Government Biodiversity Strategy

This Strategy recognises that (ALGA 1999):

- conservation and sustainable use of our natural resources will only be achieved through local area planning and management, along with community education and participation
- local government is willing to play a lead role in dealing with our most pressing and complex conservation issues – the loss of biodiversity
- a clear and cooperative partnership agreement is required between the three levels of government.

Australia's Biodiversity Conservation Strategy 2010–2030

This Strategy is a guiding framework for conserving the nation's biodiversity over the coming decades. The vision of this Strategy is that Australia's biodiversity is healthy and resilient to threats, and valued both in its own right and for its essential contribution to our existence (Natural Resource Management Ministerial Council 2010).

NSW Biodiversity Strategy

This Strategy proposes a collaborative approach to biodiversity conservation under a framework for coordinating and integrating government and community efforts, ensuring that available resources are efficiently applied. The actions in the Strategy detail a balanced response for the integration of ecological, social and economic objectives (NPWS 1999). This Strategy is currently under review. A discussion paper was exhibited late in 2008 (DECC 2008e) and the draft NSW Biodiversity Strategy 2010–2015 was exhibited late in 2010 (NSW Government 2010).

NSW State Plan

The *NSW State Plan: A New Direction for NSW*, released in November 2006 (NSW Government 2006), set out the priorities for Government action over the following 10 years for a broad range of Government responsibilities. The State Plan includes 34 priorities and 60 targets, designed to deliver better services and improve accountability for the NSW community. Chapter 6, Environment for Living, included eight priorities, of which Priority E4: Better outcomes for native vegetation, biodiversity, land, rivers and coastal waterways, noted that 'healthy and resilient natural resources and systems provide the basis for our primary industries, tourism and recreation activities as well as providing the habitat for our unique native flora and fauna'.

The State Plan was reviewed and a revised document, *NSW State Plan: Investing in a Better Future* (DPC 2010) was released. The new State Plan retains and updates about 75% of these priorities and targets. The revised priority, Protect our native vegetation, biodiversity and coastal waterways, still addresses the target of meeting the state-wide targets for NRM (NRC 2005). The RCP directly addresses these priorities and targets.

NSW Biodiversity and Climate Change Adaptation Framework

The Framework is the starting point for raising awareness, conducting research and monitoring, and implementing actions to help protect biodiversity, including threatened plants and animals. The Framework identifies six key action areas with respect to biodiversity and climate change. Although it focuses on biodiversity, much of the Framework also applies to broader NRM and land-use planning, and will complement the activities of agencies such as the Australian Greenhouse Office (DECC 2007b).

Northern Rivers Catchment Action Plan

The Northern Rivers CMA includes a planning theme in its CAP in response to the high and sustained population growth and urban expansion. This development is putting great pressure on the natural resources and Aboriginal cultural landscapes in the region. The Northern Rivers CAP recognises that the treatment of natural resources in the planning process and instruments is a major influence on the resource condition and the achievement of local, State and national targets (NRCMA 2005).

The main goal of the land use planning program is to incorporate the protection of environmental assets and Aboriginal cultural landscapes into local and regional planning instruments. It includes a number of land-use planning targets, including the following which relate to biodiversity and Aboriginal cultural heritage:

- By 2011, 100% of LEPs will include provisions to ensure environmental assets and their values are adequately protected in the development of areas designated for urban settlement (50% by 2009).
- By 2011, 100% of regional and local planning instruments and decision-making processes identify and adequately manage landscapes which have physical, cultural or spiritual significance to Aboriginal communities (60% by 2009).

In addition to the land-use planning theme, the Northern Rivers CMA's biodiversity program encompasses terrestrial and aquatic ecosystems and attempts to improve the condition of ecosystems in the Northern Rivers CMA region by:

- influencing the health, condition and connectivity of vegetation in the landscape
- reducing the impacts of introduced animals and plants on native vegetation and threatened flora and fauna species and addressing other threats
- fostering more biodiversity-friendly management within primary industries in the region.

See NRCMA (2005) for a complete list of targets.²

Hunter–Central Rivers Catchment Action Plan

Guiding principles set out in the Hunter–Central Rivers CAP (H–CRCMA 2007) revolve around land-use planning decisions considering current and future values of the land, and include the following:

- New release areas for residential and industrial development should be restricted to lands without significant natural resource constraints, including those areas already cleared of native vegetation (including significant native grassland), areas outside rural resource land, areas with less than 20% slope or those not comprising highly erodible soils (including acid sulfate soils). Where loss of vegetation is unavoidable, native vegetation offsets should be used.
- Regionally significant vegetation should be protected and all representative vegetation communities retained.
- The habitat of threatened species, communities and populations should be protected and, where possible, improved.

The Hunter–Central Rivers CAP has 31 management targets, of which the following are most relevant to land-use planning and biodiversity:

- By 2016, protect an additional 31,000 hectares of native vegetation and regenerate an additional 25,500 hectares of native vegetation.
- By 2016, implement priority recovery actions on 800 hectares of threatened species habitat.

² www.northern.cma.nsw.gov.au/programmes.php

- By 2016 protect an additional 4600 hectares of wetlands and enhance 2600 hectares of wetlands.
- By 2016 protect an additional 1100 kilometres of native riparian vegetation, regenerate 550 kilometres of native riparian vegetation, and improve habitat to 200 kilometres of stream channels.

See H-CRCMA (2007) for a complete list of targets.³

The RCP supports the State and regional targets by assisting councils to identify high conservation value biodiversity assets for protection and meet an improve or maintain biodiversity outcome with respect to land-use planning.

2.9 Biodiversity conservation criteria

In addition to the above, the criteria developed by the Joint ANZECC/MCFFA National Forest Policy Statement Implementation Sub-committee (JANIS) (Commonwealth of Australia 1997) have also informed the development of the RCP's biodiversity conservation guide and conservation objectives. The JANIS criteria are:

- A comprehensive, adequate and representative system of conservation reserves should be established on forested lands.
- Fifteen per cent of pre-1750 distribution of each forest ecosystem should be reserved.
- Where vegetation communities are recognised as vulnerable, at least 60% of their remaining extent should be reserved.
- All remaining occurrences of rare and endangered vegetation communities should be reserved or protected by other means as far as is practicable.
- The reserve system should seek to maximise the area of high quality habitat for all known elements of biodiversity wherever practicable.
- Where conservation goals cannot be met on public land through the formal reserve system, other mechanisms may be required; for example, in fragmented landscapes, remnants that contribute to sampling the full range of biodiversity are vital parts of a forest reserve system and these areas should be identified and protected as part of the development of integrated regional conservation strategies.
- Special features such as old-growth forest and wilderness warrant special protection.

Although these criteria were primarily developed to guide the selection of land for public reserves (DECC 2008a), they are applicable to landscape conservation and connectivity planning across all tenures (point 6 above). They will be particularly relevant in guiding conservation strategies to mitigate the impacts of human-induced climate change.

2.10 Climate change

It is now evident from observations of global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level, that the global climate system is warming (IPCC 2007). At a national level, modelled projections of temperature, precipitation, evapotranspiration and wind indicate that changes to more localised climate systems are probable, which will influence drought and fire weather systems.

Projected changes, by 2050, in climate and associated attributes for the Mid North Coast Region are summarised in Table 2 (DECC 2008b, 2009b; DECCW 2010c).

³ www.hcr.cma.nsw.gov.au/catchmentactionplan_download.php3

Table 2 Projected changes in climate and associated attributes for the Mid North Coast Region

Climatic attribute	Predicted impact
Temperature	Daytime maxima projected to rise in all seasons 1.0– 3.0°C, with the greatest increases in winter (2.0–3.0°C). Overnight minima projected to increase by 2.0– 3.0°C in all seasons. Increased air temperatures also result in higher ocean and freshwater temperatures.
Rainfall	Projected to increase in summer (5–20%) and autumn (5–10%) and decrease slightly in winter (5–10%). This leads to changes in runoff, including variations in freshwater flow to estuaries and in flood behaviour, including frequency and intensity.
Evaporation	Projected to increase 5–20%, and make all seasons drier, particularly winter and spring. Short-term droughts may be more severe.
Sea level	Projected rise of up to 0.4 metres above 1990 mean sea level by 2050, and 0.9 metres by 2100, although recent evidence suggests that this is a conservative projection. More extreme weather and storm surges are also predicted.

Higher temperatures, altered fire regimes and altered hydrology are likely to cause major changes to the region's ecosystems (DECCW 2010c). The ecosystems considered most at risk are those on the coastal lowlands, for example coastal wetlands, mangroves and saltmarsh, and fragmented forests and woodlands in the hinterland.

Specialised ecosystems which are naturally very limited, such as high altitude rainforests, are also likely to be at risk of degradation or loss. More widespread and fire-adapted forests are likely to be relatively resilient to climate change and undergo more subtle changes (DECCW 2010c). Possible increased fire frequency and severity remains a threat for rainforests and wet sclerophyll forests. Although predicted impacts are considered to be within the tolerance of climatic variation of most ecosystems, the increasing frequency and duration of hot days, for example, may be more significant.

The reduced net water balance may affect freshwater ecosystems, including further drying of aquatic habitats, higher water temperatures with diminished water flows that will produce lower oxygen levels, and increased conductivity (salinity). Freshwater communities of fish and invertebrates in rivers, wetlands and floodplains are likely to be adversely affected as these have specialised habitat and dietary requirements. Freshwater flows are also a stimulus for breeding in many freshwater fish species, and thus any changes in volume and timing of spring floods are predicted to adversely affect fish recruitment.

On the coast, rising sea levels, increased ocean acidity, increased water temperature, changes to salinity and invasive animal and plant species are likely to cause widespread changes in biodiversity along coastal fringes and in estuaries. While species will be able to adapt to direct impacts, they may still be detrimentally affected by cumulative effects of multiple stresses associated with the exacerbation of other threats (DECC 2009c). Sea level rise, flooding and erosion from increased rainfall are likely to result in loss or damage to coastal Aboriginal middens and other coastal Aboriginal sites (DECCW 2010c).

Mitigation to reduce the greenhouse gas emissions which are driving human-induced climate change is crucial to reduce the overall magnitude of warming. The NSW Government has committed to significant emissions reductions in the NSW Greenhouse Plan (NSW Government 2005b). Nevertheless, further climate change is inevitable because of time lags in the global carbon cycle and there is a growing awareness that adaptation to some degree of climate change is essential.

Adaptation seeks to facilitate natural adaptation to climate change and reduce the severity of its impact, in part by reducing other pressures on native species and

ecosystems to maintain or restore their viability and resilience. In response to this challenge, DECC (2007c) developed its *Adaptation Strategy for Climate Change Impacts on Biodiversity (2007–2008)* which outlines priority areas for action to be taken by DECCW over the following two years to buffer the State's natural and cultural heritage against climate change.

Two priority areas to which the RCP contributes are:

- **building the reserve system:** The RCP will complement the NSW National Park Establishment Program (DECC 2008a) by identifying key focus areas for investment to consolidate reserves across the landscape.
- **cross-tenure connectivity conservation planning:** A key focus of the RCP is to identify strategic wildlife habitats and corridors at a regional level, including climate change links between reserves and their surrounding landscapes, and prioritise these for future conservation. The RCP also identifies a range of mechanisms to conserve these areas across various tenures.

Climate change will affect land use, both function and productivity. Dunlop and Brown (2008) list a number of priorities for managing climate change with respect to changing land use, including to:

- anticipate changing patterns of land use (including agriculture and urban/peri-urban)
- consider the consequences of possible land use changes on biodiversity
- plan strategic responses to land use change and develop priorities for protected areas and the design of off-reserve conservation to ensure key ecosystems are protected.

The RCP's adoption of an 'improve or maintain' approach to biodiversity conservation and management assists in addressing impacts due to climate change by ensuring ecosystems are healthy and resilient. They are thus more able to adapt to, for example, the predicted changes in temperature and rainfall and consequential changes to flooding and fire regimes.

2.11 Aboriginal cultural heritage planning

Planning for Aboriginal cultural heritage requires a holistic approach to cultural heritage assessment and conservation. This approach involves managing heritage places and landscapes for their social (significance to Aboriginal people), scientific, archaeological and historical value (through linkage to documentary and oral history).

The identification and assessment of Aboriginal cultural heritage is based on a number of principles. Some of the key principles that have been broadly accepted in relation to Aboriginal heritage (DEC 2005) are listed below:

- Aboriginal people are the primary determinants of their heritage.
- Aboriginal cultural heritage includes both tangible and intangible elements and includes places and values relating to traditional, historic and contemporary time periods.
- All natural landscapes have Aboriginal cultural heritage values.
- Aboriginal people do not recognise a distinction between the natural and the cultural in relation to heritage.
- Aboriginal people are the custodians of Aboriginal cultural heritage places, landscapes, Country and cultural knowledge as part of their customary law, developing traditions, history and current practices.
- Aboriginal people are the primary sources of information on the value of their heritage.

- The intellectual property and moral rights of Aboriginal people with regard to Aboriginal cultural heritage information must be respected.
- Relevant Aboriginal communities must be active participants in the identification, assessment, interpretation and management of their cultural heritage and in any Aboriginal heritage planning process.
- Relevant Aboriginal communities must have a primary or collaborative decision-making role in any Aboriginal heritage planning process.
- Active Aboriginal community participation in Aboriginal cultural heritage makes for better planning outcomes.
- Social benefits flow to communities from participation in the management of their cultural heritage.

Both the Northern Rivers CMA and Hunter-Central Rivers CMA CAPs contain management targets and actions to support Aboriginal cultural heritage. The Northern Rivers CMA CAP has as a management target:

- By 2012, natural resources and Aboriginal cultural landscapes are managed sustainably in relation to urban/rural residential development and management mechanisms are integrated within regional and local land use planning frameworks.

It further states:

- To achieve this management target, the Northern Rivers CMA will facilitate activities which will work with Aboriginal communities to develop locally workable and culturally appropriate structures and mechanisms to facilitate genuine consultation early in the planning process.

The Hunter–Central Rivers CMA CAP has as its relevant management target:

- By 2016, manage an additional 52,000 hectares of landscapes having physical, cultural or spiritual significance to Aboriginal people.

There are a number of major issues associated with implementing Aboriginal cultural heritage in a planning context. First, due to the richness of Aboriginal heritage in the Mid North Coast Region, it is likely that urban growth and development will impact on Aboriginal cultural values. The loss of cultural heritage can be distressing to Aboriginal people, particularly the loss of, or damage to, places of cultural significance. Once lost, cultural heritage is irreplaceable. There is a need for effective mechanisms to enable consultation and involvement of Aboriginal people in the planning process in order to deliver improved outcomes for Aboriginal cultural heritage.

Second, due to continued development impacting on cultural heritage values, a strategic approach needs to be developed for deciding which places and sites must be protected, and which may be disturbed after proper identification, recording, assessment and consultation.

Third, the NPW Act provides for the statutory protection of objects, sites and gazetted Aboriginal Places. The objects generally protected by the NPW Act are archaeological sites with tangible evidence of pre-contact presence. However, many places of significance to Aboriginal people are not objects within the meaning of the NPW Act and may not be adequately protected.

Finally, there are many more sites across the landscape than are currently recorded, and to minimise damage to these unrecorded sites DECCW and councils provide advice to developers and have processes for ensuring that areas subject to development are adequately surveyed and assessed as part of the environmental assessment process. However, there are many developments, usually small ones, for which an individual cultural heritage assessment is not undertaken. Councils and other agencies such as CMAs would benefit from the provision of models which could predict the presence or absence of certain site types to a reasonable

accuracy. As a minimum, applicants proposing small developments and councils determining them should check the Aboriginal Heritage Information Management System (AHIMS) register and involve the local Aboriginal community in an assessment of the site.

Not only are Aboriginal people the primary determinants of their heritage but, as noted in section 2.2, Local Aboriginal Land Councils have a statutory responsibility to take action to protect Aboriginal culture and heritage in their area and promote awareness in the community of Aboriginal culture and heritage. Accordingly, councils should engage in a partnership with the Aboriginal community to determine areas or sites of Aboriginal cultural heritage significance and develop appropriate management strategies for these areas.

If comprehensive strategic assessments have been undertaken and conservation outcomes achieved through a land-use plan, this would also assist in streamlining the assessment and approvals process at the development application stage. Development of a shire-wide Aboriginal cultural heritage study and management plan, underpinned by a consultation protocol, is the first step in sound planning for conservation of Aboriginal cultural heritage.

The RCP supports the incorporation of Aboriginal heritage in landscape planning by the identification of appropriate zoning and appropriate permissible land uses (discussed in section 6.1).

3 Conservation assessment

3.1 Regional overview

The Mid North Coast Region covers 28,943 square kilometres and includes parts of the South East Queensland, NSW North Coast and New England Tablelands biogeographic regions (DEH 2005), and the Tweed-Moreton, Manning Shelf and Hawkesbury Shelf marine, mesoscale bioregions (DEH 2006) (Figure 1).

The climate is generally subtropical, with warm humid summers and mild winters, and a marked summer and autumn rainfall. A major marine biodiversity influence is the warm, southward East Australian Current, enabling some corals and other marine life to exist further south than would normally be expected.

From west to east, the region is characterised by dissected escarpment ranges with steep foothills and narrow ridges, from undulating hinterland to coastal alluvial flood plains, dune fields, lakes and estuaries. There is a natural geographic division into north and south subregions at Coffs Harbour where the Great Dividing Range meets the coast, although subtropical influences of the Macleay–McPherson Overlap Zone (Burbidge 1960) are noted as far south as the Kempsey LGA.

Native vegetation ranges from high elevation forests, including rainforests along the Great Dividing Range escarpment, through wet and dry sclerophyll forests, coastal and floodplain forests, and littoral rainforests, dune scrubs and heaths, to wetlands and estuarine and aquatic vegetation. The diversity of habitats supports a high diversity of native flora and fauna, including numerous threatened species.

Seventy-one per cent of the Mid North Coast Region is covered with native vegetation in varying condition. Vegetation clearing has historically been driven by agricultural pursuits, including grazing and cropping, which targeted the flatter and more fertile lands generally associated with river valleys and coastal plains (the Dorrigo and Comboyne plateaux being notable exceptions). Timber production, including plantation forestry and PNF, is an important industry on less fertile or steeper lands. Impacts from the timber industry range from minimal short term modification to clearing for plantations. Urban development covers relatively small areas, although the significance of its impact on biodiversity is increased due to the general preference for development on the coastal strip, particularly regional centres. Human-induced climate change may exacerbate, or be exacerbated by, urban development impacts on biodiversity.

There are nine major river systems in the Mid North Coast Region. Of these, the Clarence River system is the largest coastal system in NSW and, in terms of catchment size and river flows, the largest in southeastern Australia. Not only are these rivers significant conservation and natural resource assets, they are also key recreational assets. All the major rivers are stressed to some degree due to interference with flow patterns, water extraction, riparian degradation and reduced water quality.

The Mid North Coast Region supports a diverse array of marine, estuarine and freshwater environments that are integral to the region's character and contribute significantly to its lifestyle, economy and attraction for residents and visitors. The region has 532 kilometres of varied coastline including islands and coastal reefs, cliffs and headlands, beaches, estuaries, coastal lagoons and wetlands, of which 45% (258 kilometres) is protected in DECCW reserves, including Yuraygir, Hat Head, Crowdy Bay and Myall Lakes national parks, the last of which protects the Myall Lakes wetland of international importance, listed under the Ramsar Convention on Wetlands.

The Mid North Coast Region contains 22 coastal and estuarine lakes, the largest of which are Wooloweyah Lake and Lagoon, Lake Hiawatha and Minnie Water, Wallis, Smiths and the Myall Lakes complex. Solitary Islands and Port Stephens–Great

Lakes marine parks protect marine and estuarine areas and their biodiversity values, using a range of management and restricted use zones.

3.2 Identification of high conservation value biodiversity assets

Numerous datasets have been used for vegetation analysis and the identification of high conservation values in the Mid North Coast Region. These include single-theme datasets such as vegetation types, DECCW reserves, old-growth forests, wetlands and aquatic habitat, and derived datasets such as DECCW's Biodiversity Conservation Lands (BCL) dataset. The BCL dataset was provided to the Department of Planning to support the development of the MNCRS, and has also been provided to councils to assist their land-use planning and development of LEPs.

Following is a list of the datasets contained in the BCL dataset:

State significance

- existing national parks, nature reserves, state conservation areas, Aboriginal Places and State forests
- high conservation value Crown lands identified in regional forest agreements for addition to the conservation reserve system
- areas identified for protection in State Environmental Planning Policy (SEPP) 14 (Coastal Wetlands) and SEPP 26 (Littoral Rainforest)
- EECs (TSC Act listed)
- wildlife corridors of Scotts (2003)
- wildlife habitats of Scotts (2003)
- old-growth forest
- JANIS rare and endangered forest ecosystems
- JANIS vulnerable forest ecosystems
- identified or declared wilderness areas or land of recognised high wilderness quality
- primary wetlands (forested and non-forested)
- rainforest
- centres of endemism
- primary koala habitat (adapted from Lismore City Council)
- important shorebird habitats (mangrove and saline estuarine vegetation)
- threatened flora buffers (50–100 metres)

Regional significance

- subregional wildlife corridors of Scotts (2003)
- Mitchell landscapes, >70% cleared
- under-target forest ecosystems (<15% of original distribution in reserves)
- 100-metre buffer on SEPP 26
- 50-metre buffer on all State-significant lands (except corridors, threatened flora buffers and patches <1 hectare in extent)
- additional forested and non-forested wetland vegetation
- secondary koala habitat (adapted from Lismore City Council)

Local significance

- environment protection zones in LEPs
- other wetlands
- all remaining patches of native vegetation.

The BCL dataset has been developed for use at a regional scale and, therefore, may require refinement and verification at a local precinct or site level scale. Its primary use is as a guide to the overall biodiversity significance of a landscape. The verification procedures in Table 3 are recommended for land where high conservation biodiversity values have been predicted by the BCL dataset.

3.3 Overview of high conservation value biodiversity assets

The MNCRS states that 'local environmental plans will protect and zone land with high environmental, vegetation, habitat, riparian, aquatic, coastal or corridor values for environmental protection'. Although it is important to protect and enhance all biodiversity, several categories of biodiversity values warrant priority for conservation through legislation or Government policy. Some of these are discussed below and mapped at a regional scale, using the DECCW datasets.

Vegetation types considered to be of high conservation value for their biodiversity and support of threatened species include the following:

- EECs
- threatened species habitat
- overcleared vegetation communities
- native vegetation in overcleared landscapes
- all types of rainforest
- old-growth forest
- riparian, wetland (including coastal wetlands) and estuarine vegetation
- JANIS rare, endangered and vulnerable forest ecosystems
- karst areas.

Only a sample of these biodiversity assets is already protected in DECCW reserves, marine parks and State forest flora reserves.

An overview of the high conservation value biodiversity assets of the Mid North Coast Region is provided below.

3.3.1 Endangered ecological communities

In the Mid North Coast Region, 13 vegetation communities have been listed as EECs under the TSC Act, with another subject to a preliminary determination. These communities are listed in Table 4, together with the LGAs where they have been recorded. Some of these have restricted ranges while others are widespread but fragmented. Many of these are floodplain or coastal lowland or wetland communities, the extent of which can be mapped or predicted. Approximately 185,000 hectares of the Mid North Coast Region is predicted to be covered by EECs. Note that the extent of three of the EECs are in patches too small or fragmented to map at a regional scale.

As a general rule, areas of EECs not in low condition⁴ are considered to be unable to be offset by positive actions elsewhere and should be retained wherever possible.

3.3.2 Threatened species, populations and their habitat including SEPP 44

Since 1788, 125 plant and animal taxa are known to have become extinct. Changing land use and other human-induced threatening processes have played a large part in rendering these species no longer able to live in altered ecosystems. In NSW more than 950 plants and animals are considered to be threatened with extinction if processes are not put in place to reverse their population decline.

⁴ See definition in Table 3.

Table 3 Verification rules for land predicted to contain high conservation value biodiversity assets

Value	Verification rules
Vegetation-related values (such as EECs, overcleared vegetation types, vegetation in overcleared landscapes, rare forest types, rainforest)	Vegetation is not of high conservation value if it is in low condition* as defined in the NV Act. The vegetation community descriptions and listing of diagnostic species and associated environmental parameters in the CMA vegetation types database ⁵ should be consulted for on-ground verification of vegetation type. Final determinations for EECs under the TSC Act and EPBC Act ⁶ are the key in deciding whether a patch of vegetation is an EEC.
Old-growth vegetation	Old growth ⁷ is largely defined by the current canopy structure, which should largely consist of senescing or mature trees. Regrowth should be less than 30% of the canopy. There should be negligible evidence of disturbances such as logging or catastrophic fires. The occurrence of mapped old growth should be confirmed by ground survey.
Rainforest	Rainforest is defined according to the PNF protocol. ⁸ Most rainforest types are an EEC. These are defined by the determination under the TSC Act and are either preliminary or final determinations. ⁶
Threatened fauna	The BCL dataset predicts threatened fauna through the wildlife habitats dataset and the koala habitat dataset. The Wildlife Atlas ⁹ can also be consulted to determine which threatened fauna records are involved. Until an appropriate survey demonstrates otherwise, the habitat-supporting records should be regarded as important habitat. The Threatened Species Tool in the BioBanking Credit Calculator will provide further assistance in habitat identification and advice on which other fauna species should be considered.
Threatened flora	The BCL dataset includes records of threatened flora, including a buffer. The Wildlife Atlas ⁹ can be consulted to determine which threatened flora records are involved. Until an appropriate survey demonstrates otherwise, the habitat supporting records should be regarded as important habitat. The Threatened Species Tool in the BioBanking Credit Calculator will provide further assistance in habitat identification and advice on which other flora species should be considered.
Significant aquatic habitats, including nationally important wetlands, habitat of migratory wetland species, ICOLLS** and their catchments	The BCL dataset includes significant wetlands and wader habitat. Assessment should include whether a planning or development decision is in, or affects, the catchment of the aquatic-related environmental assets, and whether this impact will have a neutral or beneficial effect.
Statutory conservation or protection, for example conservation and property agreements, SEPP 14 wetlands, SEPP 26 littoral rainforest	These assets have surveyed or described tenure boundaries. Verification is a matter of determining whether the planning or development decision occurs within the defined area.

* Native woody vegetation is in low condition if:

- the overstorey percentage of foliage cover is less than 25% of the lower value of the overstorey percentage foliage cover benchmark¹⁰ for that vegetation type, and
- less than 50% of vegetation in the ground layer is native or more than 90% is ploughed or fallow.
Native grassland, shrubland or wetland is in low condition if less than 50% of vegetation in the ground layer is native or more than 90% is ploughed or fallow.

** intermittently closed and open lake and lagoons

⁵ www.environment.nsw.gov.au/biobanking/VegTypeDatabase.htm

⁶ www.environment.nsw.gov.au/committee/ListofScientificCommitteeDeterminations.htm

⁷ www.environment.nsw.gov.au/resources/pnf/proldgrowth07370.pdf

⁸ www.environment.nsw.gov.au/resources/pnf/prrainforest07371.pdf

⁹ <http://wildlifeatlas.nationalparks.nsw.gov.au>

¹⁰ www.environment.nsw.gov.au/biobanking/VegBenchmarkDatabase.htm

About 153 vertebrate fauna species, four invertebrate species and 154 flora species listed on the Schedules of the TSC Act occur in the Mid North Coast Region. In addition, in the freshwater and estuarine areas (where development may impact on the species), one marine alga is listed as critically endangered, two fish species are listed as endangered, and one fish species is listed as vulnerable under the FM Act.

Four fauna species and one flora species historically recorded from the Mid North Coast Region are listed as presumed extinct (E4) under the TSC Act. However, two of these species, the fierce snake and the star finch were recorded in Clarence Valley LGA since 1998. More surveys may confirm the status of these species.

Of the above 314 species, 28 NSW recovery plans (two for fish) have been finalised, three draft and 26 final Commonwealth recovery plans have been written (not necessarily for the same species) and there are five draft NSW recovery plans. The Northern Rivers Regional BMP is a multispecies Commonwealth recovery plan which addresses, in a landscape context, recovery actions for 298 threatened species, most of which are also listed under the TSC Act and occur in the region. (See discussion on BMP in section 2.3.3. Note that the Northern Rivers Regional BMP does not cover the same area as the RCP.) Species profiles have been written for all listed terrestrial and aquatic species.

Table 4 Endangered ecological communities

EEC	LGA	Area cleared	Det*	Mapped
Coastal Saltmarsh	All	75%	F	Yes
Freshwater Wetlands on Coastal Floodplains	All	70–75%	F	Yes
Littoral Rainforest	All	90%	F	Yes
Lowland Rainforest	All	70–75%	F	Yes
Lowland Rainforest on Floodplain	All	70–75%	F	Yes
Subtropical Coastal Floodplain Forest	All	>70%	F	Yes
Swamp Oak Floodplain Forest	All	75–90%	F	Yes
Swamp Sclerophyll Forest on Coastal Floodplain	All	70–75%	F	Yes
White box – Yellow box – Blakely's Red Gum Woodland	Clarence Valley	80%	F	No – too small
Ribbon Gum – Mountain Gum – Snow Gum Grassy Forest and Woodland	Clarence Valley, Bellingen	75%	F	Yes
<i>Themeda</i> Grasslands on Seacliffs and Coastal Headlands	All but Bellingen	90%	F	No – too small
Montane peatlands and swamps	Bellingen	85%	F	No – too small
White Gum Moist Forest	Clarence Valley, Coffs Harbour, Bellingen	33–50% but restricted distribution	F	No – mapping too broad
Coastal Cypress Pine Forest	Clarence Valley	>75%	F	Yes
Brown Barrel – Ribbon Gum – Messmate Wet Grassy Forest	Clarence Valley	Up to 75%	P	No – mapping too broad

* Determination by the Scientific Committee under the TSC Act: F = final determination made, P = preliminary determination made

Four endangered flora populations and three endangered fauna populations are listed for the Mid North Coast Region. These are:

Flora species

- *Zieria smithii* (low growing form), Diggers Head (in Coffs Harbour LGA)
- *Glycine clandestina* (broad leaf form) in Nambucca LGA (Scotts Head and vicinity)
- *Eucalyptus seeana* population in Greater Taree LGA (Brimbin and other localities)
- *Rhizanthella slateri* (Rupp) MA Clem. & Cribb in Great Lakes LGA (an underground orchid).

Fauna species

- emu population in the NSW North Coast Bioregion and Port Stephens LGA
- tusked frog populations of the Nandewar and New England Tablelands bioregions (Clarence Valley, Bellingen, Greater Taree LGAs)
- koala Hawks Nest and Tea Gardens population, Great Lakes LGA.

All of these have very restricted geographical range except for the emu population which consists of three subpopulations: Bundjalung National Park (NP) and Iluka in the north, Yamba to Yuraygir NP in the south, and in the Main Camp area, near Grafton, in the west. There have been no recorded sightings in the Port Stephens LGA (outside the Mid North Coast Region) for several years and the species may be extinct there.

Thirty key threatening processes are currently listed under the TSC Act. Not all are directly relevant to the Mid North Coast Region and some are difficult to address in a land-use planning sense. Major threats that are relevant to the Mid North Coast planning process include clearing, dead wood and dead tree removal, bushrock removal, climate change, degradation of hill-topping sites and loss of hollow-bearing trees. An additional seven key threatening processes relevant to threatened fish species are listed under the FM Act, including degradation of native riparian vegetation along NSW watercourses, which is relevant to land-use planning.

The koala is the only threatened species to have its habitat protected by a State Environmental Planning Policy. SEPP 44 was developed to encourage the conservation and management of native vegetation that provides habitat for koalas to ensure that permanent free-living populations of this threatened species will be maintained over its present range. The policy applies to all LGAs in the Mid North Coast Region except for Coffs Harbour LGA which has a shire-wide Koala Plan of Management in place. Local governments cannot approve development on an area covered by the policy without an investigation to determine if potential and/or core koala habitat is present. Primary and secondary habitat included in the BCL dataset was based on land where at least 35% (primary) or 15% (secondary) of the total number of trees present were usually of a species that is known to be preferentially used by koalas. In addition, areas where detailed surveys had been undertaken and koala scats recorded within the tree cluster were mapped as primary habitat.

Threatened species habitat generally should be retained as many species cannot withstand further loss due to having few remaining populations, restricted distribution, naturally rare, poorly known habitat requirements or are endangered.

3.3.3 Overcleared vegetation communities

Nine out of 12 major NSW vegetation formations are recorded as occurring in the Mid North Coast Region as outlined below:

- **Rainforests** – Out of 21 rainforest vegetation types in the Mid North Coast Region, eight are considered overcleared.
- **Wet sclerophyll forests** (shrubby and grassy subformations) – Of 43 shrubby and 19 grassy wet sclerophyll forest types, one grassy subtype is considered overcleared.
- **Dry sclerophyll forests** (shrubby and shrub/grass subformations) – Of 30 shrubby and 41 shrub/grass subtypes, seven shrubby subtypes are considered overcleared.
- **Grassy woodlands** – Of 19 grassy woodland vegetation types, 12 are considered overcleared.
- **Grasslands** – Of the three types recorded for the region, two, *Themeda australis* sod tussock grasslands of the coastal areas of the North Coast and the wet tussock grasslands of cold drainage areas of the tablelands, are considered to have 90–95% of their pre-1750 extent cleared. (The latter type has a much more extensive occurrence outside the Mid North Coast Region.)
- **Heathlands** – Of five types of heathland, none are considered overcleared.
- **Forested wetlands** – Of seven categories of forested wetlands, five are considered to be overcleared.
- **Freshwater wetlands** – Of five categories of freshwater wetlands, two are considered to be overcleared.
- **Saline wetlands** – These consist of five mangrove vegetation types and one saltmarsh complex. All are considered overcleared (75% of their pre-1750 extent cleared).

Descriptions of these formations may be found in Keith (2004). Full descriptions of vegetation types in the Northern Rivers CMA and Hunter–Central Rivers CMA regions are available.¹¹

Overcleared vegetation communities are considered not able to be offset and are not allowed to be cleared under the NV Act in conjunction with a PVP. Areas of these vegetation types should also be retained in urban or peri-urban interfaces due to their significant reduction in areal extent. Where these are retained, appropriate conservation measures are required to ensure their continued persistence.

3.3.4 Native vegetation within overcleared landscapes

Following the same reasoning that 30% of the pre-1750 extent of a vegetation type should be retained, the NV Act also restricts the clearing of native remnant vegetation if it occurs in landscapes that are >70% cleared and is not in low condition. Mitchell (2002) identified 571 landscapes across NSW based on geology, topography, lithology, landform and climate.

Of the 45 Mitchell landscapes identified for the Mid North Coast Region, seven are considered overcleared (between 75% and 95% of their pre-1750 extent cleared). These generally comprise the alluvial flats of the major rivers and the fertile basalt-derived soils (Table 5). Remnant vegetation within these landscapes should have priority for protection or rehabilitation, and re-establishment of riparian and other connectivity networks.

In addition, one landscape, Myall River Channels and Floodplains, is recorded as 65% cleared. Although further clearance of this landscape is consistent with the provisions of the NV Act, care needs to be taken to ensure the clearing percentage is not exceeded.

¹¹ www.environment.nsw.gov.au/resources/nature/BioMetric_Vegetation_Type_CMA.xls

Table 5 Overcleared Mitchell landscapes in the Mid North Coast Region

CMA	Mitchell landscape	% cleared	LGA
NR	Clarence–Richmond alluvial plains	75	Clarence Valley
NR	Upper Clarence Channels and Floodplains	93	Clarence Valley
NR	Dorrigo Basalts	76	Bellingen
NR	Bellingen Channels and Floodplains	95	Bellingen
NR	Hastings Channels and Floodplains	91	Port Macquarie-Hastings
NR/HCR	Manning–Macleay Channels and Floodplains	89	Great Lakes, Greater Taree, Kempsey
CR	Scone–Gloucester foothills	76	Great Lakes

3.3.5 Rainforests

Rainforests are very productive and generally complex ecosystems characterised by a closed and continuous tree canopy composed of relatively soft, horizontally held leaves (Keith 2004). Six broad rainforest classes have been recorded in the Mid North Coast Region: subtropical, northern warm temperate, cool temperate, littoral, dry, and western vine thickets. Eight vegetation types spread over four classes are considered to be overcleared in the Mid North Coast Region; only cool temperate and northern warm temperate rainforests are estimated at less than 75% cleared in the region.

Three rainforest communities have been listed as EECs under the TSC Act due to the extent of historical clearing and timber getting. Due to their support of biodiversity and threatened species, DECCW advocates protection of all rainforests, which is also the policy of the PNF Code of Practice for private land (DECC 2008c). Rainforest is protected in State forests.

In NSW, only 1200 hectares of littoral rainforest remain, scattered as many small fragments behind coastal dunes and on headlands. In the Mid North Coast region, about 453 hectares of littoral rainforest in 70 remnants are protected by SEPP 26; most of these are scattered fragments. Many of these areas (and other littoral rainforest remnants not mapped for the purposes of SEPP 26) are now within coastal national parks or reserves. The largest remnants outside DECCW reserves occur in Greater Taree LGA (between Crowdy Head and Harrington, Manning Point and Old Bar, Diamond Beach and Hallidays Point) and Great Lakes LGA (Forster, south of Blueys Beach and Seal Rocks). In addition to the State listing, the ecological community 'littoral rainforest and coastal vine thickets of Eastern Australia' has recently been listed as critically endangered under the EPBC Act.

3.3.6 Old-growth forests

Old-growth forests are those where the overstorey or canopy trees are in the late mature to senescent stage. These are larger older trees, many with die-back in the crown and hollows in branches and the trunk. The forest also generally exhibits a diverse structure and composition of species in the subcanopy and understorey while dead standing stags and fallen trees may also be present. Additionally, there are very few younger, regrowth trees and little evidence of disturbance (DEC 2004). The accepted definition of old-growth forests is 'an ecologically mature forest where the effects of disturbances are now negligible' (Commonwealth of Australia 1997).

Old-growth forest was identified as irreplaceable by the Resource Assessment Commission – Forest and Timber Inquiry – Final Report (RAC 1992). It is recognised as having high aesthetic, cultural and nature conservation values. These forests are extremely important in the maintenance of biodiversity and ecological functions. More than 78 species of fauna, including many threatened species, are known to be dependent on tree hollows and other key resources found in old-growth forests.

Undisturbed old-growth forests have also been found to be the most effective forest type for storing carbon, significantly more than rainforests, which could prove important in climate change considerations.

In the Mid North Coast Region, old-growth forests are generally found in steep lands, escarpment or wilderness areas, but there are some areas scattered throughout the region and seven hectares has been predicted within urban growth areas (Table 11). Mapped old-growth forest is protected on private land under the PNF Code of Practice (DECC 2008c), subject to on-ground validation. Old-growth forest is also protected in State forests.

3.3.7 Riparian, wetlands, estuaries and intermittently closed and open lakes and lagoons

Riparian corridors

Riparian areas, as well as the various water bodies and wetlands throughout the landscape, are integral components of the catchment framework. They provide a host of values and functions that maintain and support the health of the natural environment. An improvement in waterway and aquatic ecosystem condition will not be achieved if land-use change or intensification of existing use does not protect riparian vegetation.

Riparian corridors provide a natural network of connectivity through the landscape, improve stream bed and bank stability, and enhance vegetation and ecosystem qualities, including enhanced water quality. As a general principle for planning purposes, DECCW advocates a 50-metre riparian zone on either side of a watercourse, protected from development or clearing. This cannot be satisfactorily mapped at regional scale, but councils are encouraged to develop overlays in their EPIs that establish protective mechanisms for these riparian zones.

Wetlands

The Mid North Coast Region includes the Myall Lakes, listed under the Convention on Wetlands of International Importance especially as waterfowl habitat (the Ramsar Convention). These wetlands are protected within the Myall Lakes NP.

Nationally important wetlands, listed in the *Directory of Important Wetlands in Australia* (EA 2001), include the Clarence River Estuary; Wooloweyah Lagoon, Everlasting Swamp and Upper Coldstream (all on the Clarence River floodplain); Lake Hiawatha and Minnie Water in Yuraygir NP; Clybucca Creek Estuary (part of the Macleay River system); Swan Pool and Belmore Swamp on the Macleay coastal plain; Limeburners Creek Nature Reserve (NR) (a large dunal wetland system north of the Hastings River); and Wallis Lake near Forster/Tuncurry. Other important wetlands include the Yarrahapinni wetlands on the lower Macleay estuary which are the subject of rehabilitation measures.

About 504,000 hectares in over 730 separate wetlands across the Mid North Coast Region have been identified and mapped as SEPP 14 coastal wetlands. They are concentrated on major floodplains including the Clarence, Macleay and Manning rivers. In general, all wetland areas should be protected due to their importance in ecosystem function and as threatened species habitat.

Estuaries and coastal lagoons

There are about 30 estuaries in the Northern Rivers CMA area and six in the Hunter–Central Rivers CMA section of the Mid North Coast planning region (Williams et al. 2006). The most important estuary for threatened migratory shorebirds is the Clarence River estuary.

Others of minor importance, and in decreasing order of importance, are the Hastings River, Manning River, Sandon River, Corindi River/Station Creek and Wallis Lake. Important migratory bird species for which these estuaries provide habitat include sanderlings, terek sandpipers, lesser sand plovers, greater sand plovers, black-tailed godwits and great knots (AR&S 2006). The Hastings River estuary habitat occurs mainly in the vicinity of the lower reaches of Limeburners Creek, while Pelican Island provides the main roost site. However, numbers of shorebirds appear to have seriously declined at this site after 1999.

Although the Manning River has some importance for migratory shorebirds, its major importance is for nesting little terns, an endangered species. This species also has significant breeding sites at Nambucca River, Bonville Creek and Corindi River estuaries (Keating and Jarman 2004). Pindimar Bay and Corrie Island, at the mouth of the Myall River on the northern side of Port Stephens, provide important feeding habitat and roost sites for large numbers of migratory shorebirds, as well as the largest site count in NSW for pied oystercatchers, a sedentary threatened shorebird species listed as endangered.

The Healthy Rivers Commission public inquiry into coastal lakes (HRC 2002) classified and assessed 22 coastal lakes in the Mid North Coast Region. It categorised 11 of these coastal lakes as 'extreme natural sensitivity'. Yet only three were assessed as having near pristine catchment condition and only two as having pristine lake condition (both in Yuraygir NP). A further 10 lakes exhibited high conservation values.

According to Williams et al. (2006), the largest areas of seagrass beds in the Mid North Coast Region are in Wallis Lakes (3320 hectares) and the Camden Haven estuary including Queens and Watsons Taylor lakes (1025 hectares). In these estuaries the extent of seagrass has increased by 61.8% and 7.85% respectively since 1986. There are small areas in several other estuaries, including the Clarence, where the extent of seagrass beds has decreased by 46%. Overall there has been a net increase of 15% in the area of seagrass in estuaries along the Mid North Coast Region.

Saline wetlands

The largest concentrations of mangroves are in the Clarence estuary (765 hectares), the Macleay River (566 hectares) and the Karuah River (455 hectares). The largest areas of saltmarsh are in the Lake Innes – Lake Cathie complex (589 hectares) and Wallis Lake complex (590 hectares), with the Macleay estuary, at 421 hectares, being a third major concentration. It is commonly stated that around 75% of the extent of mangrove and saltmarsh communities has been removed since settlement. However, between 1985 and 2005 there has been a net increase of over 36% in the extent of mangrove communities in Mid North Coast Region estuaries, albeit from a greatly reduced previous extent (derived from Williams et al. 2006).

There is evidence of the invasion of saltmarsh by mangroves across the whole of southeast Australia but the causes are unclear. Downslope incursion into saltmarsh by the reed *Phragmites* has been observed in some NSW locations and an important question for future management is whether *Phragmites* is invading saltmarsh, as has occurred elsewhere in the world. For this reason and for anthropogenic modification, coastal saltmarsh has been listed as an EEC. However, between 1985 and 2005, the net area of coastal saltmarsh in the Mid North Coast Region has increased by 22% (derived from Williams et al. 2006).

The predicted sea level rise due to human-induced climate change will have a significant impact on the distribution of plants that live around and in estuaries. Terrestrial vegetation, such as swamp she-oak and paperbark, is predicted to be forced further upstream and upslope by the rise in mean sea level. Intertidal vegetation, such as saltmarsh and mangroves, and submerged vegetation, such as seagrass, will also move further upslope of their present locations, as well as extend further up-river as a consequence of sea level rise. The expansion of saltmarsh and mangroves will be limited by topography and structures such as roads, buildings, seawalls, floodgates, levees and agricultural land, and saltmarsh communities in particular are predicted to decrease in extent as sea level rises.

Mangroves, saltmarsh and seagrass areas are protected under the FM Act.

3.3.8 Karst areas

Karst is a distinctive topography in which the landscape is largely shaped by the dissolving action of water on carbonate bedrock (usually limestone, dolomite or marble). This results in unusual surface and subsurface features ranging from sinkholes, vertical shafts, disappearing streams, and springs, to complex underground drainage systems and caves. Most of Australia's karst systems are concentrated in Western Australia and South Australia. In NSW, the most well-known karst areas are the Jenolan, Wombeyan and Abercrombie caves systems in southern NSW.

The Mid North Coast Region has both isolated outcrops (Gloucester and Hastings LGAs) and a system of karst areas in an arc through Kempsey LGA. Several of these are wholly or partly protected in DECCW reserves (for example Yessabah, Willi Willi Caves, The Castles and Limeburners Creek NRs and Myall Lakes NP) and managed according to international guidelines (Watson et al. 1997). DECCW advocates protection through LEP zones for other off-park areas where significant conservation values are identified.

Apart from the unique geological formations contained in this landscape, the caves associated with karst systems often have very high conservation values as maternity or roost sites for bats, unique cave-dwelling fauna such as stygobitic crustaceans and cave fish, and rare flora species assemblages. For land-use planning they also pose challenges in the form of unexpected building or road failure due to subsidence or sinkhole formation. Accordingly, it is important to identify karst areas and protect them from development.

3.4 Protected areas

Various types of protected area (or conservation reserves) can be established to protect natural and cultural heritage values. The standard adopted by the federal and NSW governments for identifying the most secure types of protection for areas set aside primarily for nature conservation are those areas which meet the definition of Protected Area set out by the International Union for the Conservation of Nature (IUCN). An IUCN Protected Area is defined as:

A clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values.

Protected areas which meet this standard in Australia are considered to be part of the National Reserve System. The key determinants for their inclusion are the purpose for which the area is set aside, the security of that protection both in terms of longevity and ease of extinguishment, and management effectiveness.

Three categories of public protected areas are discussed below. DECCW acknowledges that the establishment and management of public reserves alone cannot ensure the achievement of healthy and sustainable landscapes (DECC

2008a). This can only occur through a broad range of conservation activities across the whole landscape on both public and private land.

3.4.1 DECCW reserves

The State Government has adopted the NRC's state-wide improve or maintain targets for natural resource management, including an increase in extent and improvement in condition of native vegetation across the landscape (section 2.8.1). The selection of areas to provide a comprehensive, adequate and representative sample for the National Reserve System uses different criteria, including the JANIS (Commonwealth of Australia 1997) reserve targets adopted by the Government for forest ecosystems and others enunciated in the NSW National Parks Establishment Plan 2008 (DECC 2008a; section 2.9).

The NSW National Parks Establishment Plan lists priorities for building the DECCW reserve system until 2018. These priorities are ecosystems poorly represented in reserves, wetland systems, critical landscape corridors, important water catchments that protect aquatic ecosystems, culturally important places and areas, and areas important for effectively and efficiently managing existing reserves.

The DECCW reserve system has expanded significantly since 2000 and now protects approximately 615,000 hectares (21%) of the Mid North Coast Region (Table 6). However, further protection is needed to help build a comprehensive, adequate and representative reserve system. For example, JANIS targets have been met for 77 of a total of 165 forest ecosystems in the Mid North Coast Region.

DECCW reserves include a range of protection categories from minimal use in wilderness areas to multiple use in a 'regional park' environment.

DECCW reserves in the Mid North Coast Region are concentrated in the steep mountainous areas of the Great Escarpment or along ridgelines, but also protect large stretches of the coastline. The flat or lower relief areas are not well represented in DECCW reserves, as they are suitable for agricultural production, are wholly or partly cleared, and are largely in private ownership.

Forests are the major vegetation type protected in DECCW reserves but there are also large tracts of coastal heath and wetland types reserved. Grassland communities and some woodland and open forest types are not well represented in DECCW reserves in the Mid North Coast Region.

Table 6 Area of DECCW reserve types

DECCW reserve type	Area (hectares)
Nature reserve	93,300
National park	485,300
State conservation area	34,700
Regional park	200
Historic site	1000
Aboriginal area	100
Total DECCW reserve	614,600

Areas of DECCW reserves with higher protection include wilderness, wild rivers and world heritage areas.

Wilderness

In the Mid North Coast Region, all declared wilderness is in DECCW reserves, although there are some adjacent areas that have similar characteristics. Almost all of the wilderness areas are on steep escarpments in western parts of the region at the head of catchments, for example, areas of Washpool, Nymboida, Guy Fawkes, Chaelundi, New England, Werrikimbe and Willi Willi NPs. Three are on the coastal plain and ridges: Bunyabba (north of Grafton) and coastal areas at Bundjalung south of Evans Head and Limeburners Creek south of Crescent Head. There are two coastal nominations yet to be assessed.

Wild rivers

Three sections of rivers in the escarpment parks of the Mid North Coast Region have been declared wild rivers: Upper Hastings and Forbes rivers in Werrikimbe NP, and Washpool Creek in Washpool NP. Their catchments are also in these parks. The declarations highlight the near pristine sections of the rivers and their high conservation values, and that of the catchments directly influencing their condition. These rivers and their direct catchments provide benchmarks for environmental monitoring and scientific study.

Gondwana Rainforests of Australia World Heritage Area

Four groups of the Gondwana Rainforests of Australia World Heritage Area are in the Mid North Coast Region.

- The Coastal Group, protected within the 136 hectares of Iluka NR, contains the largest remaining stand of littoral rainforest in NSW.
- The Gibraltar Range Group includes Washpool and Gibraltar Range NPs, only small areas of the eastern-most parts of which are in Clarence Valley LGA (8417 hectares). The Willowie Scrub in Washpool NP covers 3000 hectares and is the largest remaining stand of *Ceratopetalum apetalum* dominated warm temperate rainforest in the world.
- The parts of the New England Group in the Coffs Harbour and Bellingen LGAs (41,277 hectares) are found in New England and Dorrigo NPs, on the edge of the Great Escarpment. A feature of Dorrigo NP is the grassland on the Killungundie Plains, interspersed with *Nothofagus* forest.
- The Hastings group includes The Castles area of The Castles NR, the Banda Banda area of Willi Willi NP, Mount Seaview NR, and the southern and north-eastern parts of Werrikimbe NP (21,887 hectares in Kempsey and Port Macquarie–Hastings LGAs). A good example of shatterwood (*Backhousia sciadophora*) dry rainforest type, a small area of lowland subtropical rainforest and a good example of unlogged blackbutt wet sclerophyll forest are in Mount Seaview NR.

3.4.2 Crown and State forest protected areas

Both the CL Act and the *Forestry Act 1916* have, as a primary objective, land and resource use for the benefit of the people of NSW. They include provisions for sustainable development and biodiversity conservation.

Crown reserves

As summarised in section 2.6, Crown land is an important asset in managing and protecting the State's resources for multiple uses, responding to the needs of the community. Part 5 of the CL Act deals with dedication and reservation of land for multiple or particular purposes. Crown reserves within the Mid North Coast Region include 726 hectares within 36 reserves where the primary purpose of dedication is preservation of native flora and/or fauna. A further 21 reserves protect 1416 hectares of coastal landscape. Eleven reserves include SEPP 14 wetlands and five

protect SEPP 26 littoral rainforest fragments, while also providing recreational opportunities.

Some of these reserves are small and thus management for biodiversity can be challenging. However, many adjoin larger tracts of remnant native vegetation, including DECCW reserve, and so can play an important role in overall biodiversity protection. The largest reserve is the Coffs Coast State Park (324 hectares).

Many of the individual reserves are aggregated into larger units for planning and management purposes. In the Mid North Coast Region these include the Clarence Coast Regional Crown Reserve (RCR), Coffs Coast RCR, Bellinger Coast RCR, Nambucca Coast RCR, The Rocks Coast RCR, Hastings Coast RCR, Manning Coast RCR and Great Lakes Coast RCR. All RCRs are gazetted for the purpose of public access and rural services, tourism, environment and heritage conservation, and other public requirements.

Flora reserves

The Forestry Act also provides for the preservation and enhancement of natural resources and ecologically sustainable use of State forests for the purpose of forestry and of flora reserves for promotion of recreation and the preservation of native flora and fauna. Section 25A of the Forestry Act provides for the dedication of flora reserves with the specific objective of the preservation of flora. The working plan for the area reflects that objective. More recently, under the Regional Forest Agreements for NSW, State forest is managed according to a classification system called Forest Management Zones (FMZs).

FMZ1 Special Protection areas are designed to meet the definition of JANIS dedicated reserves in the National Forest Policy Statement. This zone is applied to Flora Reserves, of which there are 17 in the Mid North Coast Region (2686 hectares). They are 14–431 hectares in area and are in and supported by State forest environment. This is the highest level of protection in State forests and allows only minimal uses, generally similar to those allowed in national parks.

FMZ2 is reserved for specific management and protection of natural and cultural conservation values where it is not possible or practical to include them in FMZ 1. Areas in this zone are designed to meet the definition of JANIS informal reserves in the National Forest Policy Statement. These are informal reserves that allow a minimum of disturbance, though more than in FMZ1. There are an additional 65,000 hectares protected in FMZ2 in the Mid North Coast Region.

3.4.3 Marine parks

The *Marine Parks Act 1997* establishes the legal basis for creating a system of marine parks in NSW. Principles set down by the Australian and New Zealand Environment and Conservation Council (ANZECC) are used to select areas that are comprehensive, adequate and representative in reflecting and supporting the biodiversity of the particular marine bioregion. Marine parks may encompass coastal waters, estuaries, coastal lakes and waterways, beaches, islands, headlands and reefs.

A zoning plan for each marine park is developed according to the particular needs of that park. The zones offer different levels of protection for marine life and allow different mixes of commercial and recreational activities as well as full protection, thus achieving protection by management rather than by tenure. There are four zones:

- sanctuary zone that provides the highest level of environmental protection, allowing neither recreational nor commercial fishing, but permitting recreational activities that do not harm animals (including fish) or plants (including marine algae)

- habitat protection zone that offers a high level of protection but allows recreational and some commercial fishing
- general use zone allowing sustainable recreational and commercial activities
- special use zone that is set aside for specific uses, for example oyster leases.

Two marine parks have been declared in the Mid North Coast Region:

- 1 Solitary Islands Marine Park was established on 2 January 1998 and was the first marine park gazetted in NSW. It stretches over 75 kilometres of coastline from Sandon River and Plover Island (south of Woolli) in the north to Muttonbird Island at Coffs Harbour in the south. The marine park incorporates estuaries to their tidal limit, foreshores to the mean high water mark and extends offshore to the three nautical mile State waters boundary. It protects an area of about 71,000 hectares. It is adjacent to the Commonwealth Solitary Islands Marine Reserve of 16,000 hectares, which is also managed by the Marine Parks Authority under an annual business agreement with the Australian Government. The marine park contains a diverse range of habitats including estuaries, sandy beaches, intertidal rocky shores, oceanic islands, subtidal reefs and open ocean. This marine park samples the biodiversity of the southern Tweed–Moreton marine bioregion.

Fifteen estuary systems, including all or parts of 16 rivers, creeks and their tributaries, are protected in the marine park as sanctuary or habitat zones, while five oceanic islands are totally surrounded and two oceanic islands are partly surrounded by sanctuary zones. These islands are nature reserves.

- 2 Port Stephens Great Lakes Marine Park was established in December 2005. It extends from the Cape Hawke Surf Club at the southeastern end of One Mile Beach to the northern end of Stockton Beach at Anna Bay and includes offshore waters to the three nautical mile limit. It includes Port Stephens and the Karuah River, the Myall River, Myall and Smiths lakes and all their creeks and tributaries to the tidal limit. The park covers approximately 98,000 hectares and protects diverse marine life, threatened species, migratory species, important oceanic islands, major estuarine wetland and lake systems through a system of zoning and management. The zoning plan for the marine park commenced on 21 April 2007. This marine park samples the biodiversity of the southern Manning Shelf and northern Hawkesbury Shelf marine bioregions.

Parts of the three estuary and river systems in the marine park (Smiths Lake, Myall Lakes and river system, and Port Stephens and Karuah River system) are protected in sanctuary or habitat zones. Four oceanic islands, two of which are nature reserves, and several oceanic rocks are fully or partly surrounded by sanctuary zones.

Both parks are multiple-use and protect marine habitats and species while catering for a wide range of sustainable activities, ranging from ecotourism to commercial fishing. Both parks recognise the significant Aboriginal cultural links with these waters.

Fishing is a major activity in NSW coastal parks and reserves. It is engaged in by different cultural groups, and is closely linked to other forms of park use, including camping and four-wheel driving. It is therefore an important management issue for land managers.

A new research project undertaken by DECCW's Country, Culture and Heritage Division aims to develop an Aboriginal fishing atlas. Working closely with Aboriginal communities in specified marine parks, the atlas will map Aboriginal fishing interests with a view to facilitating improved participation by Aboriginal communities in fisheries resource management. There is a focus in the project of providing capacity building opportunities for participating communities and individuals.

Through the fishing atlas DECCW will facilitate communities to improve their participation in fisheries resource management. The atlas will provide Aboriginal coastal communities with a tool for identifying and illustrating their fishing interests. It will map Aboriginal fishing practices and knowledge systems along NSW coastal and estuarine waters. It will identify histories of attachment to particular fishing locales, and the effect on Aboriginal fishing of land-use changes and loss of access.

3.5 Compilation of values

Figure 2 combines the distributions of all individual environmental assets of high conservation value. LEPs should direct development away from these high conservation value areas towards cleared or low conservation value areas. As previously noted, some of the areas should be verified by targeted surveys prior to making significant planning or development decisions.

3.6 Matters of National Environmental Significance

The EPBC Act aims to protect areas of national environmental significance which fall into seven categories (section 2.7). Matters of National Environmental Significance (MNES) identified in the Mid North Coast Region include:

- listed threatened species and ecological communities
 - two critically endangered ecological communities
 - one threatened invertebrate
 - five threatened amphibians
 - four threatened reptiles
 - five threatened fish
 - 16 threatened birds
 - three threatened marine mammals
 - eight threatened terrestrial mammals
 - 85 threatened plant species.
- migratory species protected under international agreement
 - five marine mammals, three reptiles (turtles)
 - two sharks
 - 56 terrestrial, wetland shore and sea birds (some vagrant).
- one Ramsar wetland (Myall Lakes in Great Lakes LGA)
- one World Heritage Area (Gondwana Rainforests of Australia World Heritage Area, spread across Clarence Valley, Coffs Harbour, Bellingen, Kempsey and Hastings LGAs).

If development proposals are likely to have a significant impact on an MNES, an approval under the EPBC Act may be required.

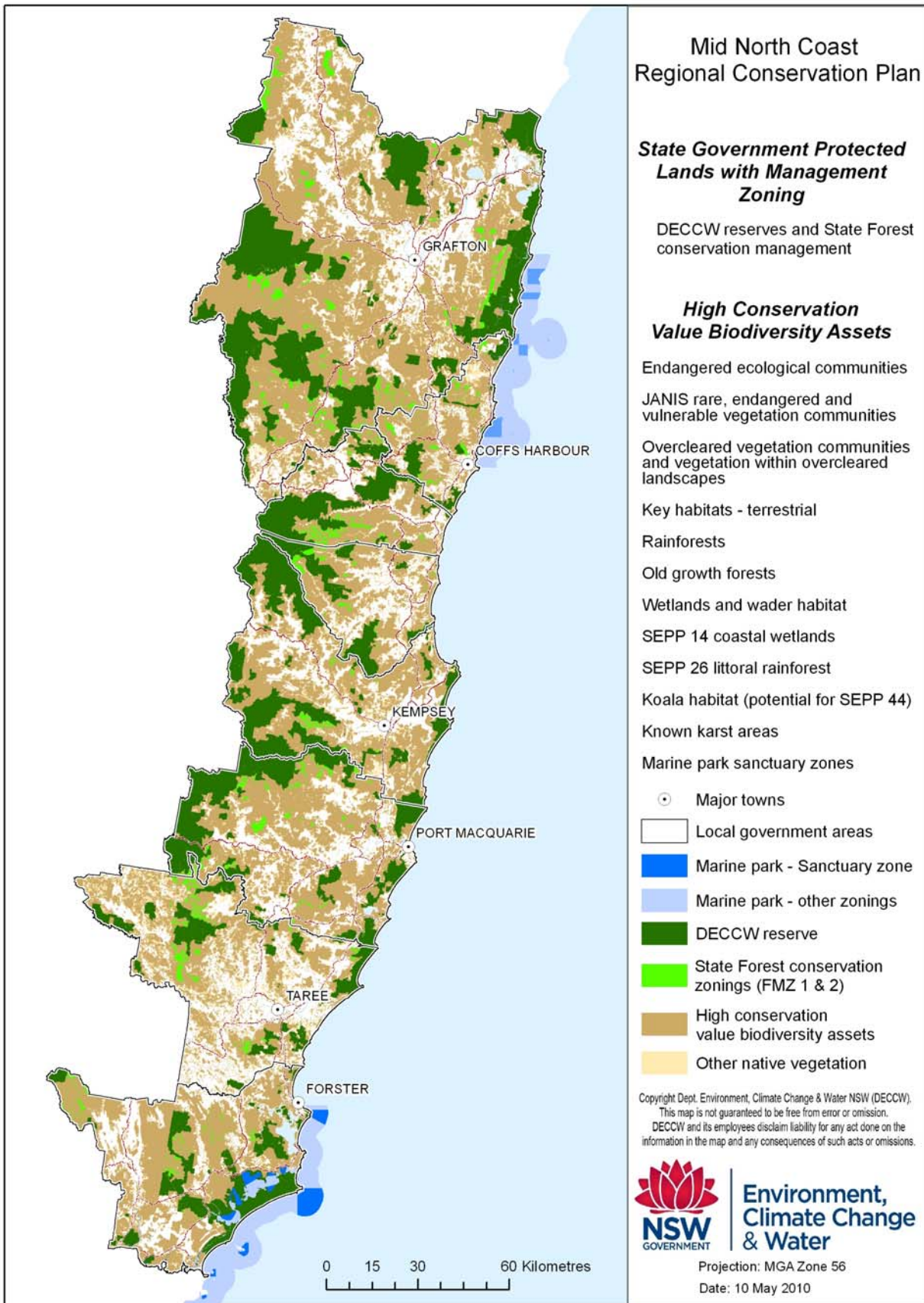


Figure 2 Distribution of lands supporting high conservation value biodiversity assets

3.7 Connectivity conservation and the role of corridors

Landscape connectivity has been defined as the degree to which the landscape facilitates or impedes movement of organisms between resource patches. This definition emphasises that the types, amounts and arrangement of habitat (for example vegetation patches) or land use in the landscape influences species' movement and, ultimately, population dynamics and community structure. Landscape connectivity combines both the physical structure of the landscape and the organism's response to it (Taylor et al. 2006).

Habitat fragmentation and connectivity is a fundamental concern in conservation biology as it affects species' vulnerability to extinction (Frankham 2006). Threatening processes arising from habitat fragmentation, such as habitat isolation, habitat degradation, edge effects, predator to prey ratios, are being compounded by the increased needs for adaptation by wildlife to the potential pressures and threats presented by climate change (see box below).

Landscape context is very important in evaluating how land-use change will affect landscape connectivity in key movement 'corridors' used by animals and some plant propagules. Each species' ability to traverse the landscape, and the degree to which habitat alteration limits their access to forage, shelter or nest sites (whether in remnant patches or scattered relicts) thus affects a population's long term viability. Managing the matrix of vegetation and habitat, with knowledge of species' movement patterns and behaviour and the size and arrangement of resource patches, can offer an effective means of managing permeability of the landscape to preserve or restore functional connectivity. However, a focus on landscape connectivity alone will not guarantee population persistence or maintenance of biodiversity (Taylor et al. 2006).

Connectivity can be regarded at various scales. Connectivity across the Far North Coast Region is mapped in Figure 3 at national and State scales. Corridors are thought to represent an important subset of overall connectivity and are part of the wider landscape matrix, where conservation efforts may be focused in order to maintain, or enhance, regional conservation potential.

One conceptual model for regional landscape conservation planning proposes corridors to link protected area networks, thus integrating large core areas, buffers and overall landscape connectivity (Scotts 2003). Due to the size of the Mid North Coast Region, it is not practical to display regional and subregional corridors on this map. An insert is provided to demonstrate the interconnection of State, regional and subregional corridors. The spatial layer for regional and subregional corridors is available from DECCW's website¹² or by direct request.

Although connectivity is mapped for the above range of scales, implementation occurs mainly at the local scale through local government land-use planning mechanisms and community engagement and support. The larger scales provide a context that helps to ensure that local connectivity is maintained between catchments and LGAs, and between regions and States. Thus the larger scale connectivity maps are conceptual only.

¹² <http://maps.nationalparks.nsw.gov.au/keyhabs/default.htm>

Importance of linkages in a time of climate change

DECC (2007c) considered that climate change is the most pressing environmental issue facing us. It is one of the major threats to biodiversity on a global scale, and is now listed as a key threatening process under the TSC Act.

The main threat from anthropogenic climate change is the magnitude and rate of change which exceeds the capacity of species and ecosystems to survive. Individual species have two possible survival mechanisms in response to changes in climate: adaptation or migration (Hinckley and Tierney 1992). However, evolutionary responses to environmental change are rare, as the speed at which environmental change is predicted to occur means that adequate response through adaptive evolution is unlikely for most species in the short term (Hughes 2003).

Ecosystems that have been identified as particularly vulnerable to the impacts of climate change are coastal ecosystems, alpine areas, fragmented terrestrial ecosystems (including forests), freshwater wetlands and areas vulnerable to high fire intensity and frequency, or low freshwater availability.

Furthermore, the likelihood that species will be able to shift their range may be compromised by extensive changes to the natural environment from the loss, fragmentation and isolation of habitat and reduced genetic diversity of species. These changes reduce the natural adaptive capacity of ecosystems and native species. In particular, habitat fragmentation impedes the growth rate and resilience of populations to large-scale disturbances. Fragmentation multiplies the impacts of climate change through several mechanisms, including:

- 1 the shifting of species' ranges inhibited in landscape zones in which the degree of habitat fragmentation allows persistent metapopulations, and blocked in areas where spatial connectivity of the habitat is below the critical threshold for metapopulation persistence
- 2 an increased frequency of large-scale disturbances caused by extreme weather will cause increasing gaps and an overall contraction in the distribution range, particularly in areas of relatively low levels of spatial cohesion.

Conversely, regions with highly connected landscapes support on average the highest abundance levels of species and ecosystems. Spatial heterogeneity, that is, the variety of vegetation types and ecosystems, may dampen the effects of local ecological disturbance such as fire (Opdam and Wascher 2004).

The retention of large natural areas, prevention of further fragmentation and degradation and increased linkages across the landscapes are acknowledged to be effective measures for the conservation of biodiversity. These measures should be incorporated into natural resource planning.

Increasing habitat connectivity in planning for climate change is both an essential tool and a risk, due to the potential for increased competition and predation on less opportunistic or resilient species occupying discrete niches. Connectivity will not guarantee the survival of all species or ecosystems, but does greatly increase the chances that a large range of species will survive climate change, changing fire regimes, invasive species and altered rainfall patterns (DECC 2007f). An added complexity is the interaction between climate change and the availability of habitat in existing networks; if more vegetation types become suitable, spatial connectivity may increase allowing metapopulations to respond quicker to climate change (Opdam and Wascher 2004).

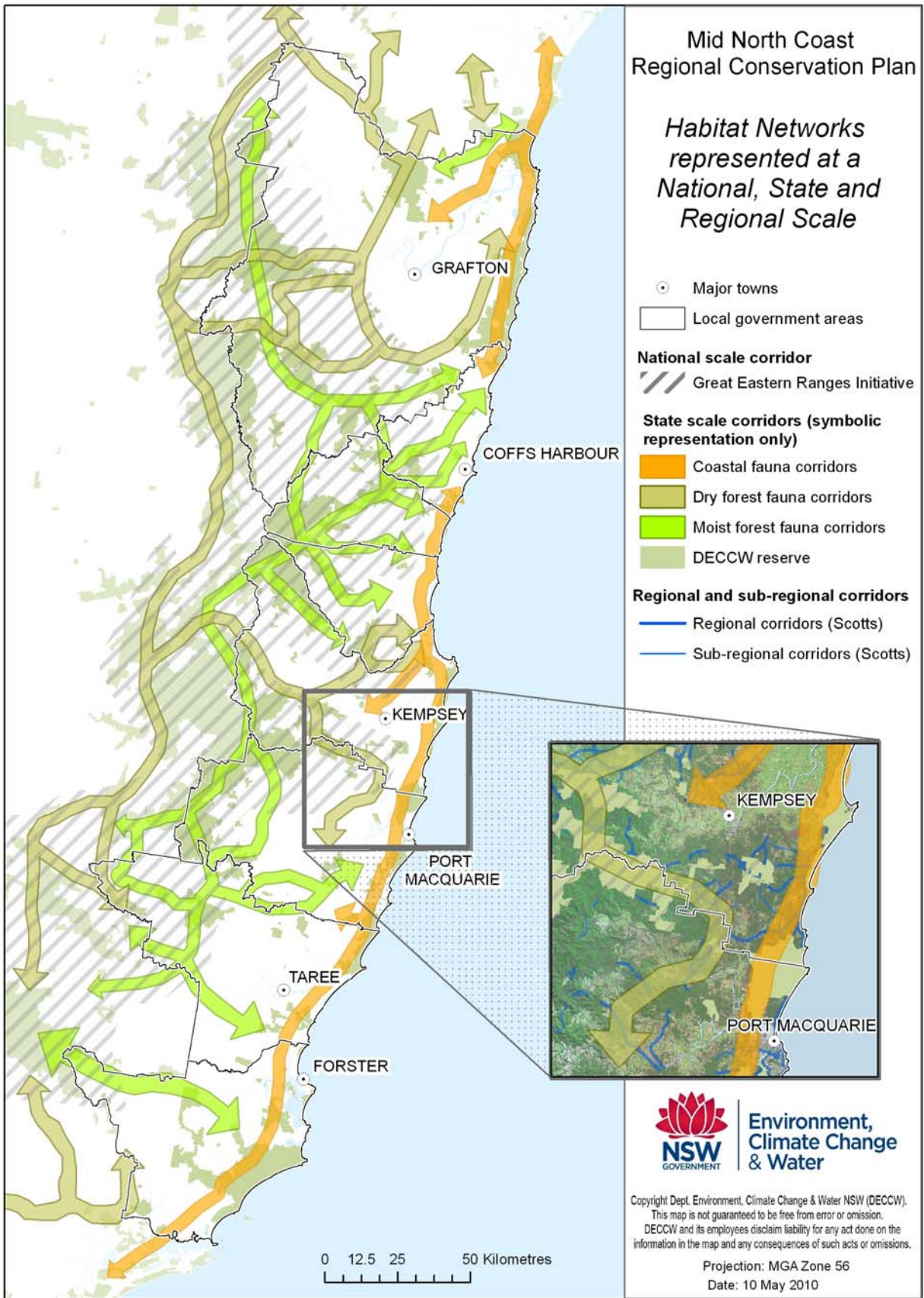


Figure 3 Corridors and habitat networks

3.7.1 National scale

In recent years the scientific community has increasingly recognised the importance of planning and acting at scales much larger than those adopted for previous catchment or regional conservation efforts. A range of ecological or other environmental processes operate at scales transcending regional and State (and in some cases continental) boundaries. Increasingly, emphasis is shifting towards planning for impacts of climate change on regional rainfall, temperature and fire patterns. Equally important is an understanding of migratory species movements, and the cumulative impacts of past land-use decisions on availability of habitat across regions.

In 2007, the Department of Environment and Climate Change (now DECCW) in conjunction with leading non-government conservation organisations established the Great Eastern Ranges Initiative (DECC 2008d, based on DECC 2007f). This continental scale initiative aims to connect and conserve ecosystems along more than 2800 kilometres of the great eastern ranges of Australia, from Walhalla in Victoria to Atherton in far north Queensland.

The Great Eastern Ranges Initiative resulted from a growing recognition of the strategic importance of the ranges as a refuge during periods of climate stress, a refuge for the highest concentrations of species in eastern Australia, a critical movement pathway for the many species that migrate on a seasonal basis, and a source of essential ecosystem services (Mackey et al 2010). Its mission is to engage the NSW community in an effective long-term partnership to conserve, connect, protect and rehabilitate plant and animal habitats and catchments of the great eastern ranges along the 1200 kilometres of the NSW section of the Australian Alps to Atherton conservation corridor.

3.7.2 State scale

To provide a linkage between the national scale and the regional scale corridor mapping, a data analysis was conducted for the Mid North Coast Region. It is based on Scotts (2003) and incorporates climatic gradients and habitat mosaics. This analysis delineates climate change corridors using three broad habitat assemblages: moist, dry and coastal (DECC 2007a).

Broad linkages derived in this way indicate priority corridor complexes extending from the coastal parks at Minnie Water, Moonee and Repton along altitudinal gradients to the wet escarpment country between Nymboida and New England national parks. These priority corridors link 34 national parks and reserves and include the Mid North Coast Escarpment corridor and the Port Macquarie – Bulga Plateau corridor.

A priority corridor in the Port Macquarie area forms a broad pathway from the warmer moist coastal habitats around Lake Innes Nature Reserve along climatic gradients to the cooler wet escarpment high altitude habitat areas around Cotton–Bimbang National Park. These priority areas link further to the north and south in the Great Eastern Ranges Initiative corridor as far as Barrington in the south and Richmond Range in the north.

In some of the escarpment areas, connectivity between reserves is already quite extensive. However, the key coastal areas and escarpment foothills lack such connectivity between formal reserves. In these areas, great opportunities exist for increasing connectivity via voluntary conservation and other measures.

3.7.3 Regional and subregional scale

The MNCRS (and the superseded North Coast Regional Environmental Plan) has, as one of its actions, that LEPs will include provisions to encourage habitat and corridor establishment in future zoning of land with environmental and rural values. Councils sought guidance on where such corridors could most effectively be placed in the landscape to meet this requirement.

Scotts (2003) drew on regional biodiversity datasets built over a decade of forest assessment in his key habitats and corridors project, which aimed to develop a conservation framework across the landscape at a regional scale to address this need. Both the key habitats and the corridors component have been included in the BCL dataset as lands having high conservation value, as habitat for key forest fauna assemblages and appropriate linkages for that habitat.

As a generalisation, the highest priority corridors are mapped along natural gradients (for example, altitudinal and latitudinal gradients) or as links between major areas of public land supporting native vegetation. These were intended to assist councils in identifying and placing appropriate local linkages in a landscape context.

Although unbroken linkages may be preferable for the movement of many species, Fischer et al. (2006) suggested that the 'stepping stone' or matrix model of connectivity can also provide biodiversity benefits in an overcleared landscape. Large remnants form a protected chain between 'core' vegetation (such as found in DECCW reserves) and the remnants are large enough and close enough to serve as habitat for most of the species native to the areas. This model may result in smaller edge effects and larger niche diversities and territory sizes.

In landscapes where native vegetation is overcleared and connectivity is poor, programs need to be put in place to protect key remnants and restore the areas most critical for the re-establishment of landscape function. Thus any conservation efforts will benefit connectivity.

Application of the mapped corridors at local scale should always be cognisant of the constraints and limitations imposed by a regional mapping exercise. Scotts (2003) sets out the decision rules pertaining to the key habitats and corridors project.

3.7.4 Local scale

Local connectivity is essential for the functioning of the landscape ecosystem. Council-identified and verified linkages, based on the regional model developed by Scotts (2003), will support and consolidate the broad linkages addressing climate change adaptation requirements.

Important local scale corridors can be established in the riparian zones of the Mid North Coast Region's many creek and river systems. Unbroken vegetation corridors established along creeks and rivers are important for many reasons, including:

- providing bed and bank stability
- protecting water quality
- maintaining aquatic and terrestrial fauna habitat and movement
- maintaining the viability of riparian communities
- protecting floodplain processes
- managing edge effects at the riparian/agricultural and riparian/urban interface.

The importance of riparian vegetation is highlighted by the listing under the FM Act of degradation of native riparian vegetation and removal of large woody debris along NSW watercourses as key threatening processes for aquatic threatened species. In addition, steep lands, or ridgelines protected for scenic amenity, can also provide habitat connectivity, particularly through urban areas, to link with hinterland or rural lands. Ridgelines were often travelling routes for Aboriginals and often have important cultural links.

In conserving biodiversity through management of the vegetation matrix, it is critical to not limit the opportunity for species interaction and any movement required for this. Where vegetated corridors are mapped across the landscape and their biodiversity values verified, there should not be an intensification of land use. Where modelled corridors pass over cleared rural land, these areas may, with landholder engagement and appropriate incentives, be restored over time where it is not detrimental to rural enterprise and is beneficial for land management to do so, for example on steep slopes or along watercourses. It is important also to retain connectivity through urban areas, and urban and ancillary development should not further encroach on open space, particularly along watercourses.

3.8 Aboriginal cultural heritage values

AHIMS is a database of recorded Aboriginal objects based on heritage surveys for environmental assessments and other surveys undertaken to identify and protect specific heritage values. Unfortunately, most areas are only systematically surveyed when urban development is imminent, thus the database does not reflect the broad distribution of Aboriginal cultural heritage across the Mid North Coast Region. Information held by the local Aboriginal community must be gathered and included if cultural knowledge is to be comprehensive and a piecemeal approach to cultural and heritage is to be avoided.

As at April 2010, 2899 Aboriginal object sites in the Mid North Coast Region were recorded in AHIMS (Table 7).

The much larger number of recorded object sites in the Clarence Valley LGA is considered not only to be proportional to the areal extent of the LGA, but also a reflection of the richness of past Aboriginal occupation in the valley. It may also be a reflection of the survey effort along the coast in conjunction with urban development. It would be expected that other major river valleys, such as the Manning, would support similarly rich heritage values.

In addition to Aboriginal objects being recorded, 11 Aboriginal Places have been gazetted (Table 8).

Table 7 Aboriginal object sites recorded in AHIMS

LGA	Number of AHIMS-recorded object sites
Clarence Valley	823
Coffs Harbour	438
Bellingen	49
Nambucca	210
Kempspey	431
Port Macquarie-Hastings	383
Greater Taree	198
Great Lakes	367

Table 8 Aboriginal Places

LGA	Aboriginal Place	Protected status
Clarence Valley	Nymboida	Not in DECCW reserve
Coffs Harbour	Mimiga Gaungan (St Marys Waterhole)	Yes – part Sherwood NR, part Wedding Bells State Forest
Kempsey	Burrel Bulai	Yes – New England NP
Kempsey	Long Gully	Not in DECCW reserve
Port Macquarie-Hastings	The Three (Biripi) Brothers Mountains – North	Yes – Dooragan NP
Port Macquarie – Hastings/Greater Taree	The Three (Biripi) Brothers Mountains – Middle	Yes – Middle Brother NP
Greater Taree	The Three (Biripi) Brothers Mountains – South	Not in DECCW reserve
Greater Taree	Farquar Park	Not in DECCW reserve
Greater Taree	Saltwater	Yes – Saltwater NP
Great Lakes	Dark Point	Yes – Myall Lakes NP
Great Lakes	Goorengi	Not in DECCW reserve

There are also well-known landscape features such as the Scotts Head headlands, Pickett Hill and Mount England in Nambucca LGA which are highly significant to Aboriginal people. However, there are many significant objects and places which are not formally recorded and, in an attempt to be more strategic about protection, a number of research studies have been undertaken.

As part of the Comprehensive Coastal Assessment, DEC (2005) undertook an Aboriginal cultural heritage data audit and wrote LGA profiles outlining the information available to councils to commence their Aboriginal cultural heritage planning. Also, as part of the Comprehensive Coastal Assessment, Andrews et al. (2006) attempted to map predicted Aboriginal cultural heritage landscapes of the coastal LGAs.

Both studies provided useful starting points for identifying Aboriginal cultural heritage values for the Mid North Coast Region. However, because there are both physical and spiritual connections to Aboriginal heritage, it has not been possible to rely on these alone for strategic local government planning. Only comprehensive cultural and archaeological studies undertaken at the local level, as recommended in section 2.11, will enable sound strategic planning to minimise impacts to important Aboriginal heritage values.

DECCW is developing an Aboriginal Regional Assessment (ARA), a new methodology. An ARA is a landscape-level, broad-scale approach to consideration of the range of Aboriginal cultural values in the environment. An ARA also considers the interests and priorities of Aboriginal people as they relate to these values. It therefore provides a framework and approach to identification and consideration of these values, interests and priorities. One of its principal objectives is to be more outcomes-focused and better aligned with other forms of broad-scale regional assessment that feeds into environmental and land-use decision-making.

Aboriginal cultural values is a term to describe the range of heritage, natural, spiritual, social and economic values that Aboriginal people might suitably prescribe to land and environment. These values are often seen as culturally indivisible and align with Aboriginal stewardship and belong to Country. Therefore, values are recognised and experienced through access to land and water to practise culture (a range of activities on Country), such as an ability to sustainably collect resources, manage and protect Country and share information about heritage and culture.

A guideline is under development to provide a policy framework and approach for ARA, primarily within DECCW. ARA is established as a landscape-level (regional) approach to assess and better understand Aboriginal cultural values within the environment as part of increasing role in engaging with Aboriginal people to better manage and protect the environment.

The guideline establishes four basic requirements in regard to its charter for protecting and managing the environment to provide direction on how to:

- 1 identify an Aboriginal context to any environmental issue that may require the use of ARA
- 2 appropriately assess Aboriginal cultural values in the environment when an Aboriginal context has been recognised
- 3 recognise and use ARA results to identify Aboriginal community interests that protect and conserve Aboriginal culture and heritage within the environment
- 4 incorporate agreed priorities (actions) into a range of environmental planning and management decision making mechanisms to ensure positive outcomes for Aboriginal culture and heritage, as part of its broader environmental responsibilities.

Comprehensive shire-wide studies undertaken by councils are likely to be compatible with this approach. The Aboriginal fishing atlas (section 3.4.3) could be extended to cover non-park areas as part of ARAs.

4 Audit of biodiversity assets

4.1 Negotiation of future urban release and employment lands

The MNCRS specified that councils are required to identify urban release and employment lands to address land supply needs until 2031. These lands typically include areas identified in local growth management strategies but not yet zoned for urban development. As a precursor to the RCP, DECCW prepared and distributed, the BCL dataset (section 3.2) to assist councils in identifying future urban release areas and proposed employment lands which avoid or minimise impacts on biodiversity.

DECCW's key recommendation to councils was that the proposed release areas should be refined to avoid areas of high conservation value biodiversity assets as identified in the BCL dataset. For areas currently zoned or approved in strategies, any biodiversity assets which cannot be offset should be protected in situ. Councils subsequently provided the Department of Planning with their preferred future release areas and proposed employment lands.

At Department of Planning's request, DECCW analysed these areas for their impacts on biodiversity and provided advice to the Department of Planning which considered submissions and finalised the proposed future urban release areas and employment lands, which were inserted into the final MNCRS (DoP 2009a).

The MNCRS states that:

The Strategy supports the maintenance and enhancement of the Region's biodiversity. Urban development will be directed away from areas of known or likely conservation importance, including corridors which allow wildlife to connect with or migrate to other habitat areas and climatic zones. Where development, including new land release, may impact on biodiversity it will be designed to minimise impacts or provide offsets by protecting and enhancing the long term viability of priority vegetation and habitat corridors, as well as rehabilitating degraded priority areas.

DECCW re-analysed the final proposed future urban release areas and employment lands and used aerial photography obtained in 2005–06 to identify the native vegetation remaining in these areas (Table 9). It is clear that the objective outlined above for the MNCRS can be achieved.

Table 9 Area of land in proposed future urban release areas for each Mid North Coast subregion not constrained by native vegetation

Subregion	Clarence	Coffs Coast	Hastings–Macleay Valley	Manning Valley–Great Lakes
Total area (hectares) of identified future urban release lands	856	1,598	2,956	3,849
Minimum number of dwellings required (MNCRS)	7,100	19,200	18,300	15,000
Area (hectares) not constrained by native vegetation	790	1,213	1564	2,492
Estimated hectares required for 12 dwellings per hectare	592	1,600	1,525	1,250
Net surplus or deficit of unconstrained land (hectares)	198	–387	39	1,242

Note that other constraints, for example flood-prone lands, may impact on development potential, but infill development in growth areas may counteract this discrepancy.

Using the same process, a similar result is evident for employment lands (Table 10). Compared with the minimum requirements listed in the MNCRS, there is likely to be adequate employment lands unconstrained by native vegetation to meet demands.

The degree of protection for biodiversity assets afforded by zoning and planning agreements cannot be ascertained until the rezoning and subdivision layouts are finalised. Where biodiversity impacts cannot be avoided, some guidance is provided in section 5 on where any required offsets and/or rehabilitation may best be placed to maximise long-term protection and viability of biodiversity assets.

4.2 Biodiversity assets in future urban release and employment lands

The extent of high conservation value biodiversity assets in future urban release areas and proposed employment lands in the MNCRS was estimated from the overlay of individual mapped future areas with the mapped distributions of lands predicted to support high conservation value biodiversity assets.

A number of analyses were undertaken. First, the quantity of native vegetation in the MNCRS future urban release areas and proposed employment lands was determined compared with their total area (Figure 4). Although a large proportion of the future urban release areas and proposed employment lands are substantially cleared and thus unconstrained by vegetation, there is a substantial area of native vegetation in them (also illustrated in Tables 9 and 10).

The area of native vegetation in future urban release areas and proposed employment lands for each LGA is shown in Figure 5.

Figure 6 and Table 11 provide a breakdown by LGA of the high conservation value biodiversity assets considered and the extent to which they occur in future urban release areas or on proposed employment lands.

Although rainforest, SEPP 14, SEPP 26 and old-growth forest categories are largely avoided, areas of other high conservation value biodiversity assets (EECs and overcleared vegetation types) occur in future urban release areas and proposed employment lands. It is noted (Figure 7) that the majority of predicted EECs are found in future urban release areas rather than on proposed employment lands. It is expected that these would be avoided in the rezoning process.

In addition, the surrogates for threatened species, such as key fauna habitat, koala habitat (SEPP 44), significant wetlands and wader habitat, also occur in planned release areas (Figure 6 and Table 11).

Table 10 Area of land in future employment lands for each Mid North Coast subregion not constrained by native vegetation

Subregion	Clarence Valley	Coffs Coast	Hastings – Macleay Valley	Manning Valley – Great Lakes
Total area (hectares) of employment lands identified in MNCRS	853	471	549	638
Area (hectares) of employment lands not constrained by native vegetation	600	316	200	554
Employment land requirement (hectares) (MNCRS)	23	86	84	39
Net surplus or deficit of unconstrained land (hectares)	577	230	116	515

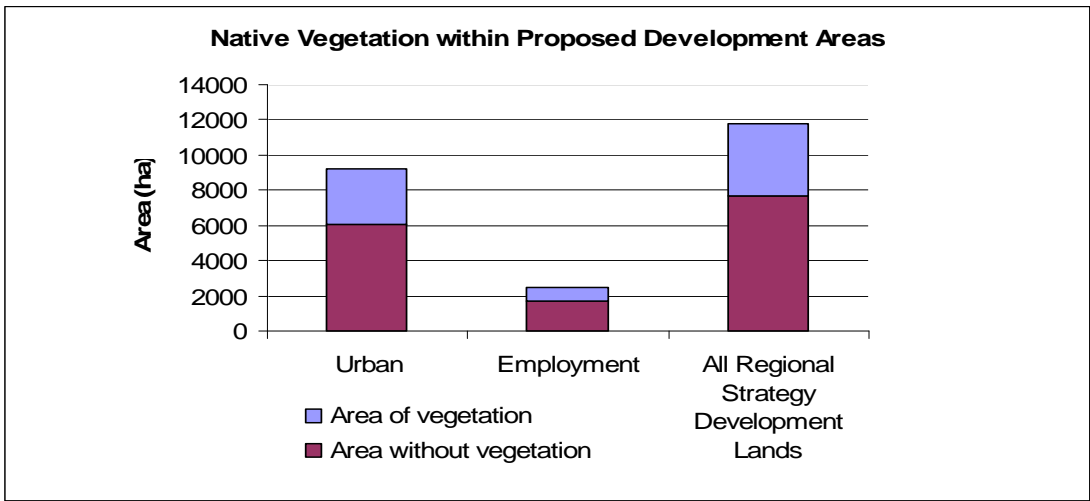


Figure 4 Total proposed growth areas showing vegetated and cleared extent

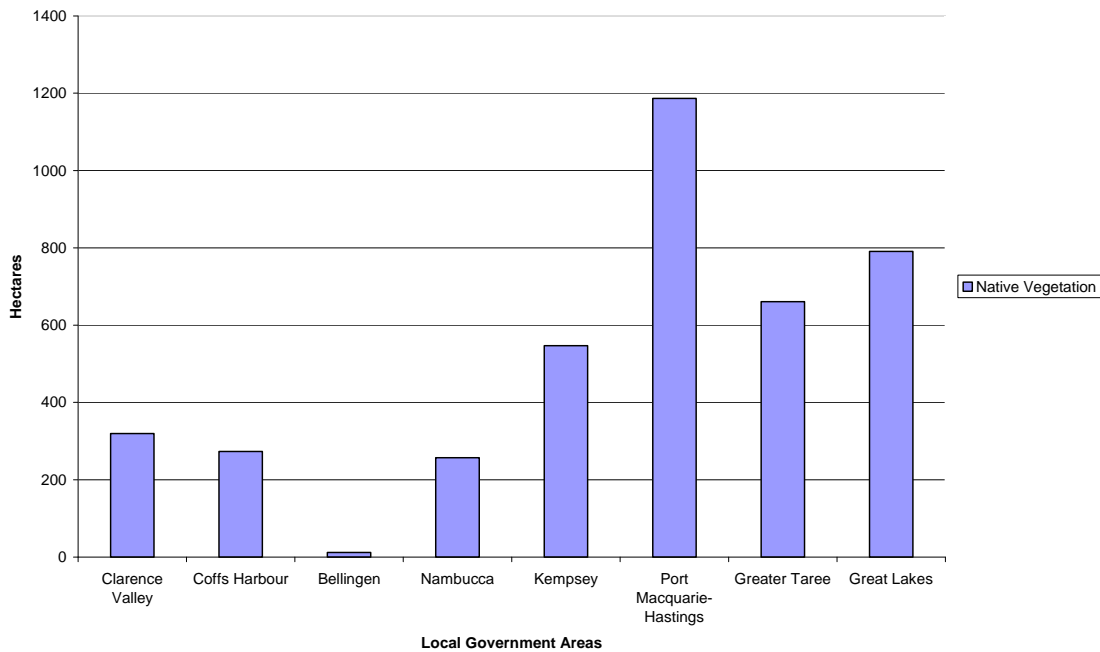


Figure 5 Area of native vegetation on proposed future urban release and employment lands

About 2300 hectares of wildlife corridor traverse future urban release areas and proposed employment lands, of which 1334 hectares is vegetated (Figure 6 and Table 11). These areas should be protected in the rezoning and subdivision process to ensure that movement between key habitats and reserves, and along climatic gradients, can continue in the long term. This approach is consistent with the MNCRS which states that urban development should be directed away from areas of known or likely conservation importance, including corridors which allow wildlife to connect with or migrate to other habitat areas and climatic zones.

The small area of SEPP 14 wetland in Greater Taree LGA is mapped but now appears to be highly modified, and the SEPP 14 boundary should be validated prior to any rezoning. The SEPP 26 littoral rainforest vegetation in Port Macquarie – Hastings LGA is cleared buffer lands only, but any development within these should be considered as discussed in SEPP 26.

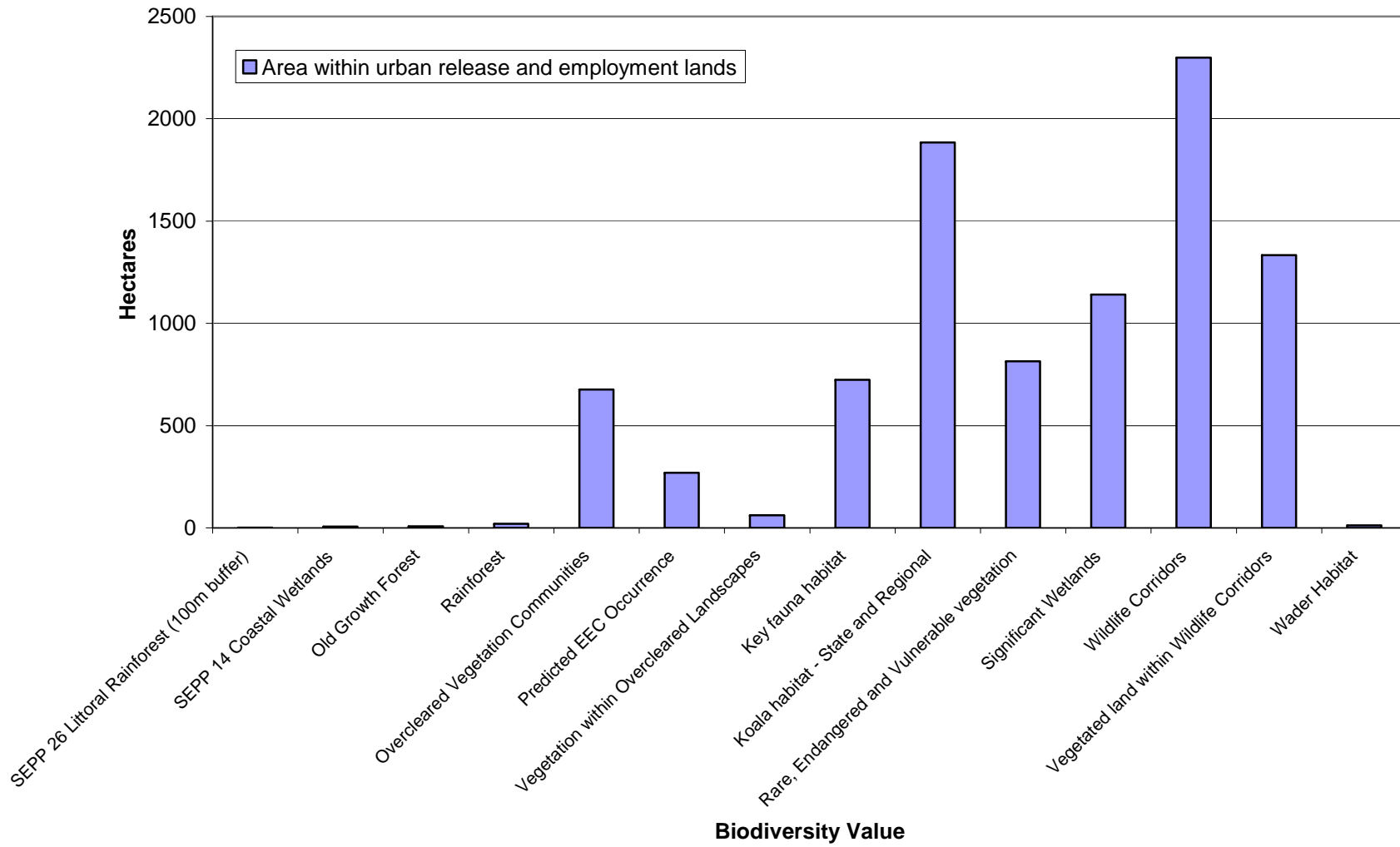


Figure 6 Total area for each high conservation value biodiversity asset in growth areas

Table 11 Intersection of proposed future urban release and employment lands with predicted high conservation values

Biodiversity category	LGA								Totals by category
	Clarence Valley	Coffs Harbour	Bellingen	Nambucca	Kempsey	Port Macquarie – Hastings	Greater Taree	Great Lakes	
SEPP 26 littoral rainforest (including 100-metre buffer)						1			1
SEPP 14 coastal wetlands							7		7
Old-growth forest							2	5	7
Rainforest				11				10	21
Overcleared vegetation communities (mapped forest ecosystem surrogate)	13	37		28	81	405	24	88	676
Environmental protection zones		186		1	4	10	20	8	229
Predicted EEC occurrence	9	17		11	84	116	17	16	270
Vegetation in overcleared landscapes	3					58			61
Key fauna habitat	2			5	133	124	1	458	724
Koala habitat – State and regional	123	292	2	154	237	621	152	301	1,884
JANIS rare, endangered and vulnerable vegetation communities	10	36		38	80	84	133	433	815
Wetlands of State and regional significance	40	58		43	194	271	122	412	1,140
Regional and subregional wildlife corridors	111	276		44	228	808	164	668	2,299
Vegetated land in wildlife corridors	12	104		32	160	418	102	506	1,334
Wader habitat				1		3	6	3	13
Total native vegetation in future growth areas	320	273	12	257	547	1,187	661	791	4,048

Note that the sum of the individual vegetation areas does not equal the total vegetation area in the future growth areas as (1) the biodiversity categories are not mutually exclusive and (2) the total vegetation area may include vegetation not considered to be of high conservation value. Although the areas of native vegetation have been derived from aerial photography, the areas of biodiversity values within the growth areas are predictions only, as the maps of the high conservation value lands are in themselves modelled or derived layers, limited by their completeness, age, resolution and accuracy of information, and so vary in their accuracy. While the best available information at the regional scale has been used in this RCP, the predicted biodiversity values will require ground-truthing for developments on a case by case basis. See Table 3 in section 3.2 for recommended verification rules to guide this more detailed assessment.

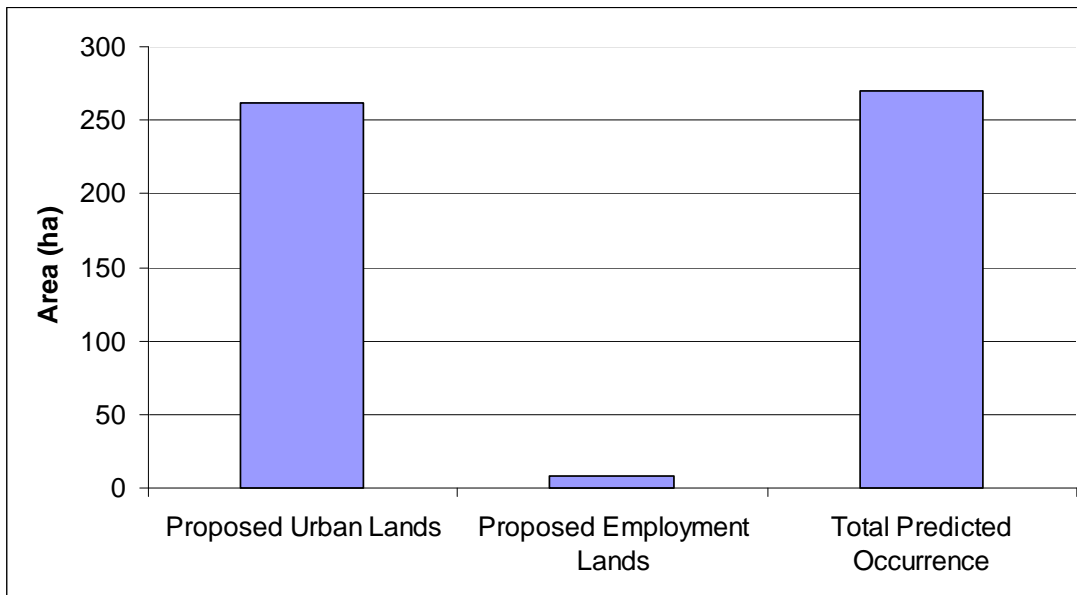


Figure 7 Predicted occurrence of EECs on future urban release and employment lands

A large proportion of the area constrained in each LGA in Figure 5 is contained in a few highly constrained future growth areas, rather than scattered over all of the sites. These include future growth areas requiring significant issues to be resolved which are shown as hatched areas in, and listed in Appendix 2 of, the MNCRS. These include West Yamba, North Boambee Valley, South West Rocks, Brimbin, Bulahdelah and North Tuncurry, all of which are significantly constrained by high conservation value biodiversity assets and/or environmental constraints. Other future growth areas are stippled in the MNCRS, indicating significant biodiversity constraints, such as west of Valla, west of Port Macquarie, the southern part of North Tuncurry, South Forster and North Hawks Nest. Biodiversity values within these areas include numerous threatened species, EECs, significant wetlands and old-growth forest with hollow-bearing trees. Significant Aboriginal cultural heritage issues also occur.

Appendix 2 of the MNCRS sets out the issues to be addressed for the hatched lands, and comprehensive assessments will be required to inform the planning process for any proposals on stippled areas. Unconstrained or slightly constrained growth areas should be developed first, and development should avoid highly constrained lands to minimise biodiversity impacts. Note that no analysis has been undertaken on existing zoned but undeveloped areas, of which several are also highly constrained.

4.3 Existing zoning of high conservation value biodiversity assets

The MNCRS states that LEPs are to protect lands with high environmental, vegetation (including wetlands and littoral rainforests), habitat, corridor, riparian, aquatic or coastal values, and zone these lands for environmental protection. Under both existing LEPs and the new standard template there is the opportunity to use environmental protection zones for lands with high biodiversity values. However, of the area of land outside DECCW reserves predicted to contain high conservation values, currently very little is zoned for environmental protection (Table 12).

Table 12 Areas of predicted high conservation value biodiversity assets by zoning

Zone*	EEC	Old-growth (PNF map)	Rainforest (PNF map)	Overcleared veg. (PVP)	Wetlands (HCV, VHCV)**
DECCW reserve	35,792	84,836	56,406	34,148	17,120
Environmental protection ('7' zones)	13,435	29,782	10,133	15,863	6,778
All other	134,886	217,010	155,369	81,486	23,451
Total area	184,114	331,627	221,909	131,494	46,714
% HCV land in EP '7' zone of not protected	9.5	7.8	5.2	25.1	29

* Area is given in hectares

** HCV – high conservation value; VHCV – very high conservation value

Note that the environmental protection zone percentages include all 'environmental protection' zoned lands, including land zoned for scenic protection, coastal hazard and wetlands, as well as for biodiversity values.

Excluding EECs already protected in DECCW reserves, an average of 9.5% of land predicted to support EECs (range from 2–15%) is currently zoned for environmental protection. For mapped old-growth forest and rainforest not in DECCW reserves, the percentages are 7.8% (range 0.05–15.5%) and 9.5% (range 0.03–20.4%) respectively.

The vast majority of these lands, which contain these significant biodiversity values, are zoned rural. Of all Mid North Coast lands predicted to support high conservation value biodiversity assets, 108,552 hectares were zoned for environmental protection, whereas 1,331,831 hectares were zoned rural.

With respect to wetlands, Burns et al. (2006a, 2006b) identified 113,000 hectares of wetlands, of which 42% or approximately 47,000 hectares were considered of high or very high conservation value. Of those high or very high conservation value wetlands not protected in DECCW reserves, 14% or about 6700 hectares were zoned for environmental protection (range 7–54%). Again the vast majority, 48% or about 23,000 hectares, was zoned rural. A further 38% or 17,000 hectares was protected in DECCW reserves.

Department of Planning has provided guidance on appropriate land uses for environmental protection zones (DoP 2009b). The preparation of LEPs consistent with the Standard Instrument – Principal Local Environmental Plan (SI-LEP) provides an opportunity to address this issue, consistent with the objectives of the MNCRS. DECCW's BCL dataset can assist in informing this process to identify lands which should be zoned for environmental protection.

Local governments have discretion in deciding on permissible uses and thus the level of protection afforded by the zones. Many councils currently permit a high level of modification within environmentally sensitive areas, and there is a lack of consistency in permissible uses between LGAs. The SI-LEP is designed to improve consistency in application of zones and permitted uses between LGAs and the BCL dataset provides a regional context to assist this process across LGA boundaries.

Within the MNCRS's growth areas large areas of already zoned but currently undeveloped land are also constrained by predicted biodiversity assets (Figure 8). It should also be noted that there is more vegetation in future urban release areas and proposed employment lands than in currently zoned but undeveloped areas within the growth area boundary. All councils should aim to avoid any clearing in connection with urban development.

Avoidance of biodiversity impacts should be possible with careful land-use planning. Where this is not possible, or where indirect impacts are predicted (for example, edge effects, incursion of weeds and pests, light, sound and odour, changed hydrology) then offsets may be appropriate. Section 5 provides guidance for where offsets may be found for these areas, as well as future urban release areas and employment lands.

4.4 Additional potential development not assessed in the RCP

The MNCRS identifies areas for development (urban release and employment lands) until 2031. These have been endorsed by the State government. Future development should therefore be located in these areas.

The MNCRS does, however, provide a mechanism to consider rezoning land to urban purposes outside of these areas via Sustainability Criteria (section 6.3.1). Due to the sensitivity of the coastal area (defined in the MNCRS) these Sustainability Criteria are not applicable in the area east of the new alignment of the Pacific Highway. Any intensification of land use beyond that provided for in the FNCRS will be limited to west of the realigned Pacific Highway.

Such proposals have not been spatially defined and thus a biodiversity audit could not be undertaken. It is important that intensification of land use avoids the areas identified in the biodiversity conservation guide (section 5) and any area identified as supporting high conservation value biodiversity or cultural heritage assets.

Other categories of development likely to result in pressures on biodiversity, but as yet unidentified, include the following types of ancillary development:

- any infrastructure requirements located outside the town and village growth boundaries as a result of the FNCRS, for example, sewage treatment plants or electricity substations
- State-significant projects that may be developed within the 25-year timeframe, for example the upgrade of the Pacific Highway

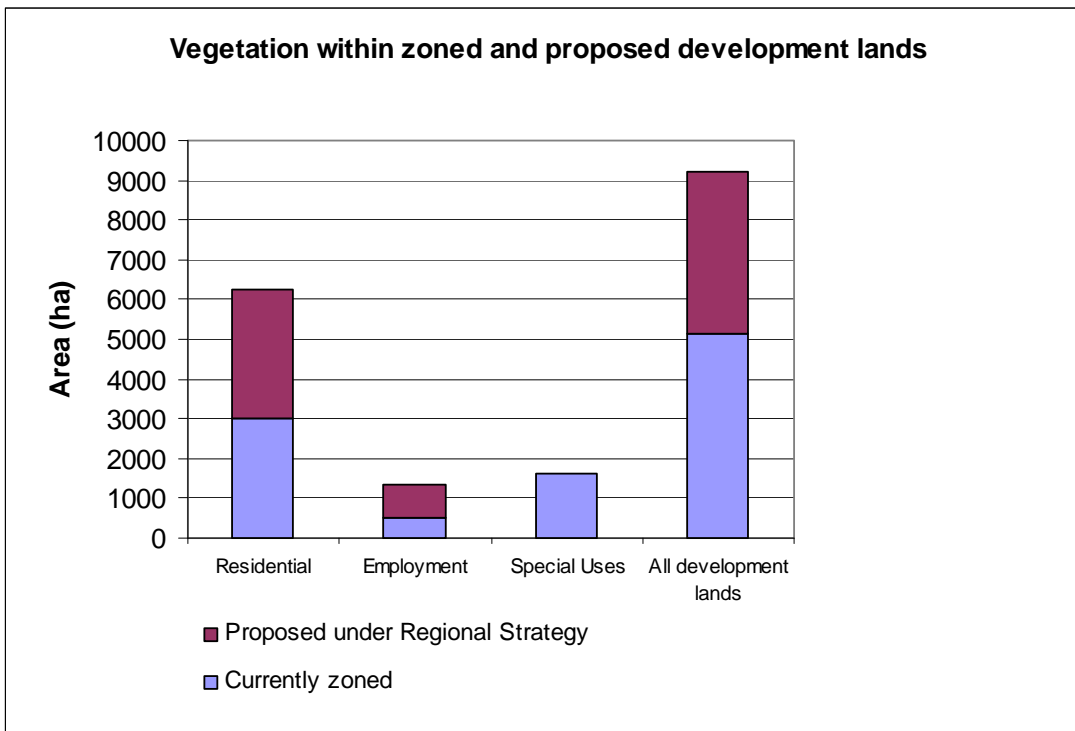


Figure 8 Native vegetation within areas currently zoned for residential and employment lands, and within areas proposed under the MNCRS

Any future development or Part 3A applications must address threatened species and Aboriginal cultural heritage issues prior to determination. Any lands proposed for development under the Department of Planning's Sustainability Criteria must address the environment protection criterion discussed in section 6.3.1.

In addition, the development of more rural residential lands may have implications for biodiversity values, through fragmentation of native vegetation patches and disruption of connectivity. Again, as the MNCRS does not specifically identify areas for future rural residential development, a preliminary analysis has not been undertaken. Although some future rural residential subdivisions may be subject to the NV Act, depending on the zones applied, others may be classed as large-lot residential, with potential implications on biodiversity values.

4.5 Potential implications for Aboriginal cultural heritage

As stated in sections 2.11 and 3.8, due to the richness of Aboriginal heritage in the Mid North Coast Region it is inevitable that urban growth and development will impact on existing and yet to be identified cultural heritage sites and places. An analysis of Aboriginal site records in AHIMS was undertaken for the Mid North Coast Region in April 2010. Within those areas identified for future development (that is, those areas currently zoned for urban purposes, as well as those areas proposed to be rezoned for urban purposes, excluding rural residential areas) approximately 418 Aboriginal sites have been recorded.

LGAs experiencing substantial growth, such as Coffs Harbour, recorded larger numbers of object sites. This is due, in part, to the detailed surveys that have been undertaken to inform development and rezoning proposals. Thus the numbers provided are indicative only. Furthermore, these records only represent physical elements of Aboriginal cultural heritage, which form a small part of the significance of the Mid North Coast Region to Aboriginal people.

Prior to any rezoning or development proposal being determined, a detailed Aboriginal cultural heritage assessment should be undertaken in an attempt to determine the Aboriginal values assigned to these areas by Aboriginal people. In turn, the information collected should be used to develop appropriate planning and management actions for implementation. These actions must be guided by the recommendations of the Aboriginal community.

A strategic approach needs to be developed for deciding which places and sites must be protected, and which may be disturbed after proper identification, recording, assessment and consultation. Until then, DECCW and councils will provide advice to developers and have processes for ensuring that areas subject to development are adequately surveyed and assessed as part of the environmental assessment process.

For those areas that will require rezoning, councils should ensure that the Aboriginal community participates in decisions regarding the protection and culturally appropriate management of areas of Aboriginal cultural significance. Although directly applicable to the assessment of Aboriginal cultural heritage permits under Part 6 of the NPW Act, *Aboriginal consultation requirements for proponents* provides guidance on appropriate consultation with Aboriginal communities (DECCW 2010b).¹³

¹³ www.environment.nsw.gov.au/resources/cultureheritage/commconsultation/09781ACHconsultreq.pdf

5 Biodiversity conservation guide for the Mid North Coast Region

5.1 Priority areas for conservation, restoration and enhancement

Large areas of the Mid North Coast Region are already protected in reserves. However, biodiversity cannot be protected through formal reservation alone, as the primary purpose of formal reservation is to develop a comprehensive, adequate and representative *sample* of ecosystems and biodiversity values, rather than protect all biodiversity. There is a general need across LGAs to provide for landscape protection, enhancement and repair of biodiversity assets for long-term sustainability.

Resources for either land acquisition or restoration, and opportunities for the enhancement of lands supporting high conservation values on private lands, are limited. As such, conservation efforts must be targeted to ensure the most cost-effective results.

5.1.1 Biodiversity Forecasting Tool

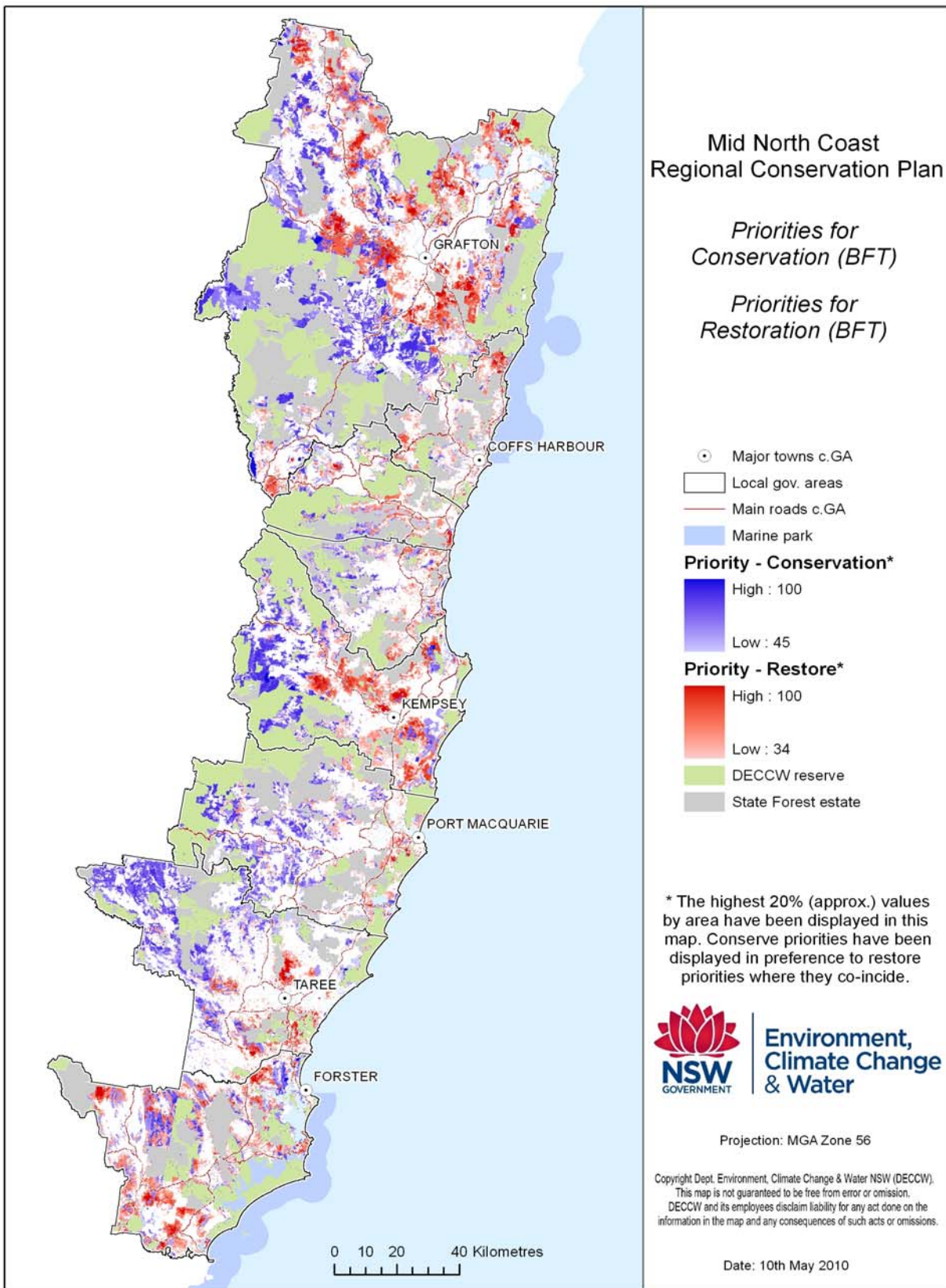
The DECCW Biodiversity Forecasting Tool (BFT) was used to define and map priority 'conserve' and 'restore' areas across the Mid North Coast Region to identify where general conservation works could be undertaken most usefully for landscape conservation. The BFT provides a landscape analytical-based approach to regional conservation assessment. The tool uses information on the extent, condition and connectivity (serving as broad surrogates for biodiversity), coupled with available data and expert knowledge on various ecological processes and threats (for example, clearing, grazing, timber harvesting, current and proposed zoning).

This information was used to model the 'regional persistence' of biodiversity in the region and subsequently propose priority areas for conservation and restoration of biodiversity.

- BFT 'conserve' areas identify those priority areas that, if lost, would have the greatest impact on the region's biodiversity. These priority areas generally contain high conservation value vegetation in good condition.
- BFT 'restore' areas identify those priority areas that, if restored, would contribute the greatest biodiversity gains to the region. These priority areas generally contain overcleared or poorly conserved vegetation communities.

Figure 9 illustrates the results of this analysis, using only the most significant (top 20%) of the priority areas modelled by the BFT. There are limitations in the applicability of the BFT due to incomplete knowledge of patterns in the spatial distribution of biodiversity across the landscape, and processes that are likely to affect biodiversity over time. However, it provides an initial assessment of where, and which type of, conservation efforts may best be applied for the greatest benefit to biodiversity conservation. This will be useful for general guidance for council biodiversity conservation plans and for CMAs in identifying appropriate areas for investment, as well as to guide the development of LEPs with respect to identification of high conservation value lands and predicted wildlife corridors.

Note that an analysis was undertaken using the BFT for the Northern Rivers Regional BMP (section 2.3.3) which specifically addresses recovery of threatened species. This analysis resulted in slightly different areas and priorities being derived, mainly due to the BMP analysis being undertaken for the entire Northern Rivers CMA area (including the New England Tablelands, but excluding the Great Lakes and Greater Taree LGAs) but also because the outputs were condition and multiple-threat based, rather than a primary threat of urban development. The maps and actions contained in the BMP are recommended for prioritisation of on-ground works and localities for general as well as specific threatened species conservation.



Note: DECCW reserves and State forest have been omitted from this analysis as the primary land use and management regimes for these lands have already been determined. To focus and simplify interpretation, regional conservation areas were identified from the top 20% of conserve and restore areas (an arbitrarily chosen threshold).

Figure 9 Biodiversity Forecasting Tool priority 'conserve' and 'restore' areas

5.1.2 Priority actions – principles

The actions needed to achieve the maintenance and improvement of biodiversity within priority areas will vary according to the category and condition of the environmental asset. In general, there are three broad types of action that are needed to achieve the environmental outcomes sought by the RCP: protect, enhance, restore.

Protection

The most important action is to protect identified areas of high conservation value from threats and from further degradation. This requires both:

- legal or regulatory protection, such as appropriate zoning in an LEP and, where possible, an appropriate agreement such as a voluntary conservation agreement or planning agreement, or through purchase or acquisition by a public or private conservation organisation
- physical protection of the site, as appropriate – this could include fencing, signage, and changes to access points, roads or track networks.

Enhancement

Even sites of high conservation value may not be in 'pristine' condition. The site may have been declining in condition over time due to various threatening processes such as weed infestations, populations of feral pests, inappropriate fire or grazing regimes preventing regeneration of some species, rubbish and litter, and inappropriate recreational use. It is usually necessary to prepare a management plan that sets out the management actions that need to be implemented to ensure that the site's values are enhanced. Various funding sources can then be approached to assist implementation, such as 'Caring for our Country' funding, or funding through the CMAs.

Restoration

Restoration refers to the reinstatement of environmental values that may have previously existed on a site. Revegetation of a site is one example of a restoration activity. Principles for restoration sites include:

- Sites that have some inherent 'resilience' (or capacity to recover) are appropriate sites for restoration. For example, a site with a predominantly native understorey will be easier and cheaper to restore than a site that is composed mainly of weeds or exotic (introduced) grasses.
- Sites for restoration should build on the existing network of vegetation in a district, either expanding an existing remnant, widening key linear habitats and corridors (for example roadside or streamside vegetation), or making a connection between two or more previously isolated remnants.

Generally, it is more cost-effective, in terms of both financial resources and time scale, to protect and enhance existing biodiversity assets, than to attempt to restore them.

5.1.3 Priority actions for high conservation value biodiversity assets

Section 3 discusses different types of biodiversity assets with high conservation values. Each of these may require a different emphasis and a different set of priority actions. Generally, each site will require a mix of the three types of actions (protection, enhancement and restoration), and these should be set out in a management plan.

The following summary of the preferred strategy for addressing land use planning issues for each of these high conservation value biodiversity assets discussed is provided below. This is a guide only; each site will be different, and management

should follow a plan that recognises the unique characteristics of each site. Further guidance will also be available from the BMPs when finalised.

Endangered ecological communities

Identified sites should be protected, but other efforts are also needed to abate the threatening processes that have led the community to become endangered. The Priorities Action Statement¹⁴ for an endangered community includes a list of priority actions (DECC 2007e)

These should guide the management of particular sites.

Sites with threatened flora and habitat for threatened fauna

As above. The BMPs and the Priorities Action Statement include a list of priority actions for these species. These should guide management of particular sites.

Vegetation (overcleared or in overcleared landscape, or JANIS rare, endangered and vulnerable ecosystems)

Identified sites with such vegetation should be protected and enhanced, but in order to achieve the targets set out in the Northern Rivers CMA and Hunter-Central Rivers CMA CAPs to improve or maintain biodiversity it will be necessary to identify appropriate sites for restoration. The highest priority areas have been identified by the BFT.

Rainforests

The emphasis is on protection of identified areas and management to maintain landscape processes. Actions are provided in the BMP to address management issues.

Old-growth forest

The emphasis is on protection and management of identified areas to maintain landscape processes. Guidance can be obtained from the BMPs.

Riparian, wetlands and coastal lakes

The emphasis is on protection of existing habitats within the catchment, and enhancement and restoration of key habitats, particularly riparian and wetland vegetation. There is also an emphasis on protection of identified coastal wetlands, with enhancement and restoration of key habitats (for example saltmarsh). Protection of catchments of coastal lakes through protection of existing vegetation and treatment of stormwater runoff from urban areas within the catchment is also required. Minimal interference with natural processes with respect to ICOLLs, consistent with estuary management plans, is emphasised. In particular, artificial opening of ICOLLs is discouraged outside of a formulated entrance management plan.

Karst areas

The emphasis is on protection through appropriate zoning.

Wildlife corridors

Most existing vegetation and habitat within identified regional wildlife corridors, including riparian areas, should be protected and enhanced, but it will also be necessary to restore certain areas to improve connectivity and to enable movement and dispersal of flora and fauna populations.

National parks and reserves

The emphasis is on protection, in accordance with the plan of management.

¹⁴ www.threatenedspecies.environment.nsw.gov.au/tsprofile/home_PAS_new.aspx

5.2 Biodiversity conservation in the planning system

The protection, maintenance and improvement of biodiversity are incorporated in relevant NSW Government policies, strategies and legislation (section 2). Traditionally, the planning system has considered impacts on biodiversity in a reactive way – that is, in response to development applications – and has accepted that loss is inevitable. The regional strategies are one approach to guide strategic land-use planning at a regional scale.

Although development assessment will remain a critical tool in protecting biodiversity, ways are now being developed to consider biodiversity proactively. By identifying biodiversity assets early in the strategic planning process, it is possible to zone these areas appropriately. In so doing, it is possible to direct development away from these assets and onto less constrained lands.

DECCW has reviewed and contributed to the development of the proposed urban growth areas in the MNCRS. As discussed in section 4.1, the MNCRS foreshadows that projected urban development proposed for the Mid North Coast Region can be accommodated without significant impact on vegetation and biodiversity assets in almost all LGAs. Where appropriate infrastructure and services are available, development should be directed towards those LGAs with larger areas of unconstrained lands.

Notwithstanding, where sound planning and socio-economic objectives justify it, development may be approved in vegetated areas and thus may impact on biodiversity assets. This biodiversity conservation guide then applies to the mitigation of impacts and identification of appropriate offsets to achieve an ‘improve or maintain’ outcome for biodiversity assets for the Mid North Coast Region.

The key requirement to ‘improve or maintain’ biodiversity is that areas of high conservation value are retained. ‘High conservation value’ areas are those set out in section 3, and it is expected that such areas will be zoned appropriately within LEPs to ensure that they are retained and protected, as proposed by the MNCRS.

However, local surveys are required to validate that the mapping and delineation of high conservation value areas is accurate and correct (see section 3.2 which explains the limitations of mapping and the need for on-ground verification).

5.2.1 Priority areas where urban development offsets may be found

Where it can be demonstrated that opportunities to avoid impacts on biodiversity have been exhausted and mitigation and offsetting are required, biodiversity offsets may be proposed. A biodiversity offset is one or more appropriate actions that are put in place to counterbalance specific impacts on biodiversity. BioBanking is one new mechanism for offsetting. Offsets can also be individually negotiated and put in place through planning agreements or conditions or consents. Appropriate offset actions are long-term management activities to improve biodiversity conservation. This would normally include:

- protecting and enhancing an area of existing native vegetation or other habitat for threatened species
- legally protecting this land to ensure security of management actions and to remove threats.

Maintaining the level of biodiversity in the Mid North Coast Region will require offsetting to become standard practice in land use planning and development. To enable a strategic, shire-wide approach to be taken, councils should investigate opportunities to include offset provisions within their LEPs. These provisions will need to ensure that any loss of native vegetation from an approved development is offset to the extent that the State government’s target of an improvement in the extent and condition of native vegetation is met across the local government area as a whole.

Offset provisions should be guided by and encompass the following principles:

- 1 Impacts must be avoided first by using prevention and mitigation measures.
- 2 All regulatory requirements must be met.
- 3 Offsets must never reward ongoing poor performance.
- 4 Offsets will complement other government programs.
- 5 Offsets must be underpinned by sound ecological principles.
- 6 Offsets should aim to result in a net improvement in biodiversity over time.
- 7 Offsets must be enduring—they must offset the impact of the development for the period that the impact occurs.
- 8 Offsets should be agreed prior to the impact occurring.
- 9 Offsets must be quantifiable – the impacts and benefits must be reliably estimated.
- 10 Offsets must be targeted – they must offset impacts on a basis of like-for-like or better conservation outcome.
- 11 Offsets must be located appropriately – they must offset the impact in the same region.
- 12 Offsets must be supplementary – they must be beyond existing requirements and not already be funded under another scheme.
- 13 Offsets and their actions must be enforceable – through development consent conditions, licence conditions, conservation agreements or a contract.

DECCW's website has more detail on these principles.¹⁵

5.2.2 A 25-year conservation strategy

The principles guiding the development of a 25-year conservation strategy for the Mid North Coast Region were taken from the State and Australian Government policies for building a comprehensive, adequate and representative reserve system (Commonwealth of Australia 1997) discussed in section 2.9. The conservation strategy focuses on identifying high priority regional conservation areas, which are major contiguous areas of high conservation value vegetation. These areas would be suitable for incorporation into the DECCW reserve system or conserved by a range of other appropriate mechanisms, such as those discussed in section 6.

To inform the 25-year conservation strategy, the BCL dataset, a spatial dataset of high conservation value lands mapped across the Mid North Coast Region, was manually derived using a variety of biodiversity surrogate data and guided by satellite imagery captured in 2005. This dataset has been used to inform the development of the regional offsets analysis discussed below and shown in Figure 10.

The following two subsections define areas where offsets should be focused in a local or regional context. The preference is for offsets to be sourced locally wherever practicable, but it is acknowledged that there may be better long-term security for offsets, or better conservation outcomes, when located further from urban or intensive rural development pressures. Thus in some cases a regional approach may result in a better conservation outcome. Note that the priority offset areas identified in the 25-year conservation strategy are not intended to coincide with any proposed future release areas or future employment lands.

There is also a preference for protection and enhancement of high conservation value biodiversity assets, rather than restoration, in the first instance. This is because it is generally more cost-effective to conserve biodiversity assets in good condition than repair cleared or highly modified areas. However, there are occasions where critical linkages for landscape connectivity may be highly degraded and repair

¹⁵ www.environment.nsw.gov.au/biocertification/offsets.htm

or restoration of these linkages will yield the greatest landscape benefit for conservation.

It should be noted that these conservation value assessments were underpinned by predictions of high conservation value irrespective of tenure. They are intended to guide consideration of where councils or developers may look for offsets and do not imply any compulsory acquisition or fettering of existing land use rights. DECCW does not have compulsory acquisition powers and any offset negotiations would be subject to normal market processes.

Although areas where offsets may be usefully targeted are proposed in this RCP, there is no guarantee that the lands will be available for this purpose. Thus efforts should primarily be directed at avoiding biodiversity impacts in the first place.

5.2.3 Local offsets

Offsets can be located locally or further afield. It is common practice for developers to identify appropriate offsets within a few kilometres of a development area, in accordance with principles 10 (offsets must be targeted) and 11 (offsets must be located appropriately).

DECCW undertook an analysis of the proposed urban and employment growth areas to assess the potential for offsets within a two, five and ten kilometres radius of the growth area. The assessment focused on identifying offsets for the biodiversity values predicted within the proposed future urban release and employment lands, other than those considered non-offsettable. Values generally considered non-offsettable include EECs, overcleared vegetation types, rainforest and old-growth forest, although low condition examples of these values may be cleared. Because condition cannot be predicted it has not been taken into account in this analysis.

It was found that offset lands could generally be found within a distance of two kilometres from most proposed future urban release and employment lands. A small number of these areas with significant biodiversity assets, such as South West Rocks (Kempsey LGA) and 'Area 13' Thrumster (Port Macquarie-Hastings LGA), require offsets that may be found within 10-20 kilometres. The increased difficulty of finding local offsets for these proposed urban release areas is a reflection of the high biodiversity values on the sites (even after the non-offsettable values mentioned above are retained onsite). The assessment focused generally on vegetation-based features and did not address threatened species populations or habitat values. Maps for other proposed future urban release and employment lands can be supplied to councils on request.

The analysis identified broad strategic areas and did not focus on identifying individual offset lots, or whether they were available for offsetting. A key consideration in determining whether local or regional offsets should be applied is future local land use, particularly with regard to cumulative impacts. Continued expansion of a development footprint and the development of peri-urban lands for large lot or rural residential uses can jeopardise the long term security of offsets too close to urban areas. Offset principle 7 (offsets must be enduring) must also be addressed.

5.2.4 Regional offsets

While it is preferable to locate offsets in close proximity to a development impact, it may be more strategic to search further afield, and locate the desired offsets in a regional context. Offset principle 11 allows for offsetting in a regional context, provided that the same values are protected.

Accordingly, DECCW undertook a second analysis to identify priority offset areas containing the same or similar biodiversity values as those predicted within

proposed future urban release areas and employment lands. The regional analysis used the following range of datasets:

- proposed future urban release areas and proposed employment lands for the Mid North Coast Region
- biodiversity forecasting tool (BFT) 'priority for conserve' and 'priority for restore' analyses (section 5.1.1)
- forest ecosystems (as a biodiversity surrogate)
- EECs (landscape context)
- 25-year conservation strategy as discussed above (landscape context).

The contributing datasets were used to focus offsets both in areas of relevant biodiversity values and also in a landscape context suitable for long-term conservation management. These regional priority offset areas are considered to have a higher potential for long-term conservation management and also contain vegetation values the same as or similar to those within the proposed future urban release areas and employment lands identified in the MNCRS.

Not only is the conservation in perpetuity of land supporting high biodiversity important, but also, as discussed in offset principle 6, management actions addressing restoration of vegetation communities is fundamental to obtaining an improve or maintain outcome for biodiversity values across the Mid North Coast Region. Thus the BFT has been used to inform not only conservation priorities but also restore priorities, as discussed above.

The regional priority areas for offsets are identified in Figure 10. A summary of each is provided below. The areas are not in order of priority, and it is expected that offsets would be sought in the priority areas closest to the development impacts.

Clarence LGA - Shark Creek

The Shark Creek priority area extends from Lake Wooloweyah in the north to Boundary Flat in the south, east of the Clarence South Arm. It includes some wetland areas and also some lands adjacent to Yaegl NR. This priority area is generally of high importance for repair with the exception of some lands which support high conservation value biodiversity assets. It contains nine key vegetation communities and four EECs.

Bellingen/Nambucca LGAs – Baaligin

The Baaligin priority area lies generally to the east of New England NP (including the headwaters of the Bellinger River, Nambucca River and Taylor's Arm) and provides important habitat linkages between conservation reserves as well as opportunities for rehabilitation of areas with a high potential for long term conservation management. This priority area is generally of high priority for conservation although some areas predicted to be high priority for repair also occur. The priority area contains six key vegetation communities and one EEC.

Nambucca/Kempsey LGAs – Nambucca – South West Rocks

The Nambucca – South West Rocks priority area ranges from the Yarrahapinni wetlands in the south to Warrell Point in the north. The area is dominated by wetlands and lowland swamp forest, much of which is EEC. The area has a mix of high priority conserve and high priority repair areas. It contains 11 key vegetation communities and four EECs.

Kempsey LGA – Crescent Head

The Crescent Head priority area lies largely to the west of Hat Head NP and generally occurs from north-west of Hat Head south to Limeburners Creek NR. The area is dominated by wetland and wet forest communities, largely paperbark forest and coastal forest complex with some dry foothills blackbutt in the western margins.

The area has a mix of high priority conserve and high priority repair areas and supports seven key vegetation communities and two EECs.

Port Macquarie-Hastings LGA – Port Macquarie

The Port Macquarie priority area lies largely east of the Pacific Highway, stretching from Limeburners Creek NR in the north to Crowdy Bay NP in the south. The area contains a variety of vegetation features ranging from low relief sclerophyll forest, swamp forest through to wetlands and coastal heaths. The priority area is generally of high importance for repair with the exception of some crown lands which support high conservation value biodiversity assets. It contains 14 key vegetation communities and three EECs.

Greater Taree LGA – Bulga

The Bulga priority area has an important role in connectivity and habitat consolidation as it provides a rangeland linkage from Coorabakh NP in the east to Tapin Tops NP in the south-west and Biriwal-Bulga NP in the north-west. The area also hosts a variety of hinterland vegetation communities dominated by wet eucalypt forests, rainforest and some dry sclerophyll forests. The wildlife corridor function of this tract of land is critical. It provides the largest and most intact coast to escarpment connection between Kempsey (Kumbatine NP) in the north to Forster – Tuncurry (Myall Lakes NP – Barrington Tops NP) in the south. This priority area contains ten key vegetation communities and one EEC.

Greater Taree LGA – Taree

The Taree priority area is composed of a series of linking habitat areas to the north and east of the city of Taree. Within this area, major wildlife corridor linkages exist between the Yarratt and Lansdowne state forests and then east to Crowdy Bay NP. The area also includes lands south along the coast to Khappinghat NR. The area includes a variety of vegetation systems including low swamp forests, foothill dry sclerophyll forests, scrublands and rainforest. The area is generally of high importance for repair. This priority area contains 11 key vegetation communities.

Great Lakes LGA – Forster

The Forster priority area ranges from Khappinghat NR in the north to Wallingat NP in the south and largely bounded by the Pacific Highway in the west. The Forster priority area contains mostly lands of high repair value with some notable examples of high conserve habitat as evaluated by the BFT. This area contains 16 key vegetation communities and one EEC.

Great Lakes LGA – Hawks Nest

The Hawks Nest priority area forms a major habitat network along the north shore of Port Stephens as well as contributing to linkages north along the Karuah River to Myall Lakes NP. The area is diverse in habitat value, including lowland swamps and swamp forest as well as extensive areas of upland dry forest communities of grey gum, tallowwood, spotted gum and smooth-barked apple. It is generally of high importance for repair although isolated areas of high priority for conservation occur generally on the coast south of Myall Lakes NP and adjacent to Port Stephens. The priority area contains 18 key vegetation communities and one EEC.

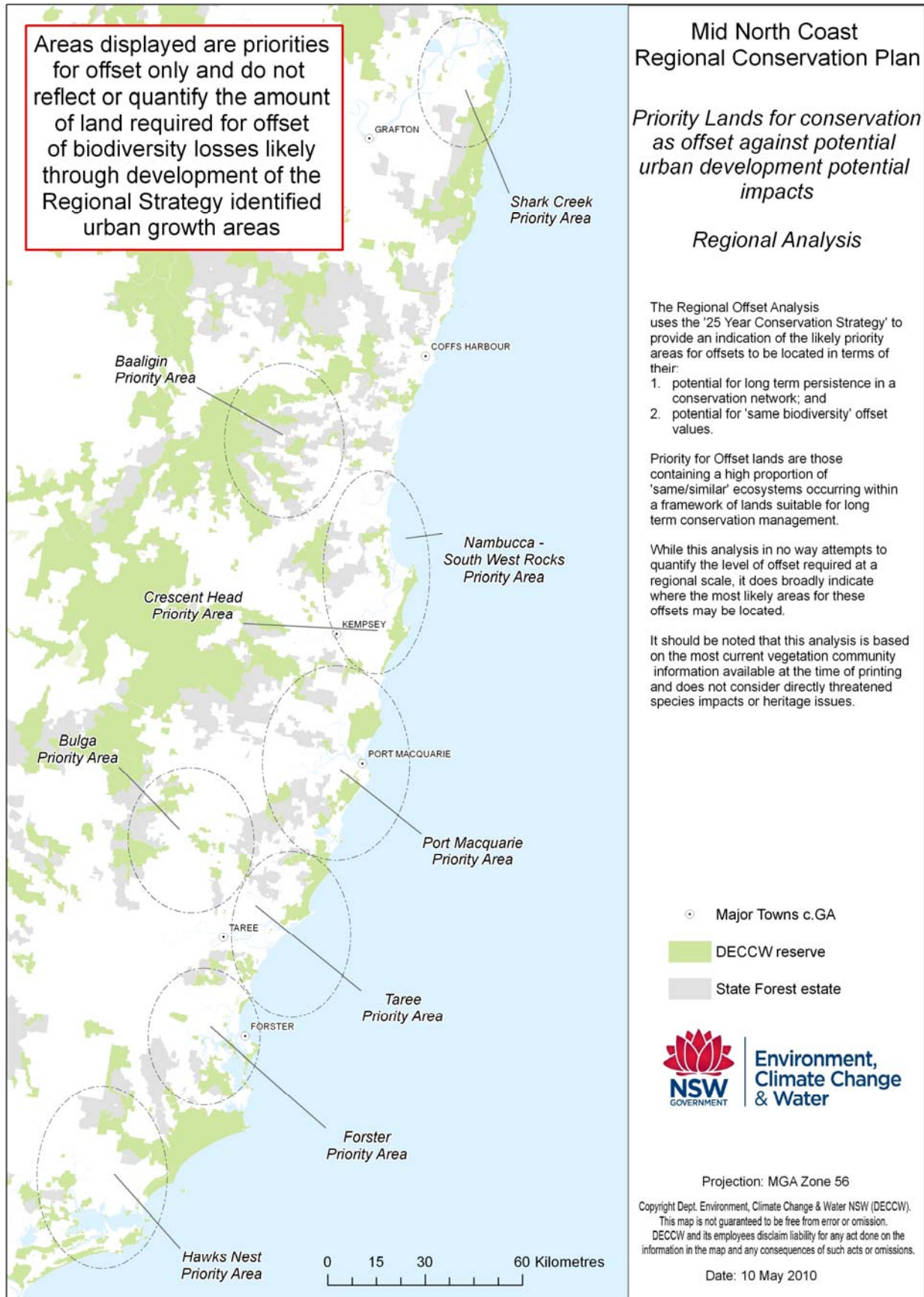


Figure 10 Priority lands in a regional context suitable for use for offsetting potential development impacts

5.3 Mitigation measures for Aboriginal cultural heritage

As previously stated in section 2.11, once destroyed, Aboriginal cultural heritage cannot be replaced; hence the importance of avoiding impacts to significant Aboriginal heritage objects and places. Where some loss of less significant areas is unavoidable, the Aboriginal community may be open to discussion of ways to mitigate some of the losses. It is important to be innovative about meeting the needs of individual communities, as each community has a unique appreciation of the cultural values in its area. The community places a value on the significance of the loss, based on its appreciation and connection with the site. Thus any decisions regarding loss and mitigation must be made in partnership with the community.

Examples of mitigation activities could include the following:

- Appropriate areas within (for example where items and places of Aboriginal cultural significance have been located), or adjacent to, a development footprint could be set aside so that Aboriginal people can continue their cultural practices and connection with that Country. Uses could include repatriation of objects from the development area to a safe 'keeping area' within the protected area, or areas set aside for 'cultural camps', including an appropriate curtilage around such areas as ceremonial rings or scarred trees to ensure the cultural context is maintained and privacy is also respected. Such areas must be protected in perpetuity with agreements in place for long term conservation and management. In some cases it may be necessary to enhance the site; for example, revegetation with culturally appropriate species to restore an area to its former appearance, to retain its significance.
- The community should be involved in planning for the site, to avoid as far as is possible, impacts on Aboriginal objects. For example, the Aboriginal community may prefer a development footprint to be filled, so as objects can be left in situ, rather than levelled or excavated which would lead to destruction of the archaeological deposit.
- Prior to any works commencing the local community should be given, and supported in, the opportunity to record their connection with the site, both orally and visually. Such recording and filming of the historical connection to a site assists in ensuring that the culture 'stays alive' even though the site is no longer in its original form. The provision of small parks or access points corresponding to areas filmed and spoken about may also be able to be used in future, in education or cultural tourism activities, supported by this archival record.
- Site awareness training for all workers on a development site should be provided. This is essential to ensure that unrecorded objects are not inadvertently destroyed during construction activities. Generally the local Aboriginal community is best placed to speak about culture and connection with the site and the land, and should be approached to participate in or deliver this training. Any examples of Aboriginal objects and stories used during induction should be approved by the Aboriginal community as appropriate for this use. The provision and frequency of induction and awareness training should also be documented, to ensure that all workers receive it.
- A region-wide or shire-wide 'sinking' fund to pay for shire-wide cultural heritage studies (not development site specific) and to fund activities supporting Aboriginal people in practising their culture could be established as has been done in the Upper Hunter Valley.
- There could be recognition within the development of the significance of the area to Aboriginal people, in parks, interpretive trails, street names in local languages, approved by and developed with the local Aboriginal community. Each community will have their own individual preferences for recognition and thus what is developed in one setting may not be appropriate in another.

- Formal offsite 'keeping places', meeting places or museums with ongoing funds for maintenance and management, to provide a sense of place to the local Aboriginal community could be established. Broader benefits and opportunities to the Aboriginal community through support for their activities, traineeships and business opportunities may also be appropriate depending on circumstances (section 6.10).

6 Implementation mechanisms

The biodiversity conservation guide identifies local offset options and strategic regional conservation priorities for the Mid North Coast Region. If these priorities are addressed they will make a significant contribution to offsetting biodiversity loss that may be experienced as a result of urban growth or of land-use change in response to future social and economic imperatives, for example climate change.

There are numerous mechanisms which can be used to improve the level of protection afforded to biodiversity assets in order to deliver an 'improve or maintain' outcome for biodiversity. These can be used singly or in combination. Several of the more commonly used mechanisms are discussed below.

6.1 Strategic planning

The MNCRS contains actions including the following:

- LEPs will protect and zone land with high environmental, vegetation, habitat, riparian, aquatic, coastal or corridor values for environmental protection.
- LEPs will include provisions to encourage habitat and corridor establishment in future zoning of land with environmental and rural values.
- New development adjoining or adjacent to farmland, extractive industry, wetlands and areas with high value biodiversity will incorporate buffers to avoid land-use conflict.
- Councils are to ensure that cultural and community values that are important to Aboriginal communities are considered and resolved in the future planning and management of the local government area.

In order to achieve the actions prescribed by the MNCRS, it is critically important that the review of LEPs by the Mid North Coast Region's councils results in appropriate zonings and land use for environmental assets, as set out below.

6.1.1 Environmental protection zones

On 31 March 2006, the Standard Instrument – Principal Local Environmental Plan (SI-LEP) was gazetted, prescribing a standard form and content for a principal LEP. The SI-LEP sets out a range of standard environmental zones, E1 to E4. The Department of Planning has prepared an LEP Practice Note on Environmental Protection Zones giving the direction on what E-zones should apply in what circumstances (DoP 2009b). Planning authorities should refer to the current Practice Note for guidance.

Environmental protection zones should be generally consistent across all LGAs in the Mid North Coast Region, taking into account the preservation of existing use rights and activities that may be permissible with consent.

Proposed new areas of E-zonings should be supported by field verification, as regional-scale maps may indicate high conservation value features that are not found in some local circumstances and boundaries would need to be validated. As outlined in this RCP and in the MNCRS, areas of validated high conservation value land should be protected in new LEP provisions.

Environmental protection zones also allow for the protection of Aboriginal cultural heritage. Significant Aboriginal places and cultural landscapes identified in local or regional studies should also be zoned for environmental protection, with a limited number of appropriate permissible uses. Wherever possible, Aboriginal cultural heritage values should be protected in situ and managed in culturally appropriate ways in consultation with the local Aboriginal community.

6.1.2 Additional local clauses

While the focus of strategic planning should be assigning an appropriate zone to an area of land, Clause 5 of the SI-LEP allows for the use of local provisions that are consistent with both the instrument and other directions in the LEP. These may include provisions, with an accompanying map, addressing major biodiversity issues covered by this RCP as well as the range of NRM issues as they occur in or are relevant to particular LGAs.

A land-use table will set out the overall objective of land use, and establish the overall permissibility of land uses. A local provision with an accompanying map will set out the matters that require consideration in development assessment and the required environmental outcomes of any approved development. They do not prohibit any activity permitted in a zone and do not trigger referral to any agency.

It is intended that provisions will be linked with other planning mechanisms, such as development controls, to achieve desired development and conservation outcomes.

The range of environmental and NRM issues can be extensive. Planning authorities should refer to the Department of Planning's NRM model clauses and Practice Notes. These model clauses ensure that the consent authority will consider all potential adverse impacts of development proposals on these mapped environmental assets and that approved developments will avoid, minimise and mitigate these environmental impacts.

DECCW supports the use of clauses that protect lands with high conservation value biodiversity assets. DECCW will continue to work with councils and Department of Planning to achieve appropriate zones and protective mechanisms for land supporting high conservation values.

In regard to Aboriginal cultural heritage, Clause 5.10 of the SI-LEP provides additional requirements for heritage, including Aboriginal cultural heritage. Heritage items, heritage conservation areas and archaeological sites (if any) should be shown on the Heritage Map. The location and nature of any such item, area or site can be described in Schedule 5. This provides the opportunity for councils to identify areas or sites of Aboriginal cultural heritage significance and bring them under the provisions of the LEP, rather than rely on consideration at development assessment stage under the provisions of Section 79C of the EPA Act, or under Part 6 of the NPW Act, after a consent has been granted. This is the only clause which instructs councils to notify and take into account the opinions of the Aboriginal community. Although some councils are developing Aboriginal cultural heritage protocols, they are not statutory requirements.

Aboriginal communities have been reluctant to adopt this protection mechanism, as they are concerned that if the location of sites is made public they may be damaged or destroyed. There are also strong cultural reasons for not revealing the location and nature of some sites. However, if a comprehensive Aboriginal cultural heritage management plan is developed in partnership with the Aboriginal community, a way forward may be negotiated to sensitively address this issue. Some councils have already managed, in collaboration with the Aboriginal community, to both zone a buffered area around an object of significance and separately identify it for the purposes of Clause 5.10 in a non-revealing manner, thus bringing it into the LEP and under the consideration of both the land-use tables and Clause 5.10.

6.1.3 Development control plans

Local environmental plans guide planning decisions for local government areas. Through zoning and development controls, they allow councils to supervise the ways in which land is used. Development control plans (DCPs), prepared in accordance with Part 3 Division 6 of the EPA Act, are also used to help achieve the objectives of the local plan by providing specific, comprehensive requirements for certain types of development or locations, for example for urban design, and

heritage precincts and properties. DCPs may also be prepared to specify environmental outcomes for a planning precinct.

DCPs can apply to a site, precinct or the entire LGA, or councils may develop a number of site-specific DCPs as well as a single DCP that contains generic, issues-based controls. DCPs most commonly specify building and landscape controls, but also may include specific directions for vegetation management or a tree preservation order, or may specify riparian buffer widths and rehabilitation requirements in an issues-based approach.

6.1.4 Biodiversity certification

As discussed in section 2.3.1, planning authorities may apply for biodiversity certification to streamline development consent and approval processes for an area of land with respect to threatened species issues. A proposal for biodiversity certification will include at least three elements:

- protection of areas of high conservation value, generally through environmental protection zoning and conservation agreements
- provision that any clearing outside protected areas is appropriately offset consistent with an improve or maintain outcome
- links between the LEP and strategies, policies, plans and guidelines that define the ongoing management of protected and offset areas and that provide for monitoring of biodiversity condition.

DECCW is preparing a biodiversity certification methodology that will prescribe the requirements and methods for assessment and development of a biodiversity certification proposal.

6.2 Council biodiversity strategies and conservation plans

National and State biodiversity strategies and management plans were discussed in section 2.8, with multispecies recovery plans discussed in section 2.3.3. Councils may also develop shire-wide biodiversity strategies to adapt these overarching documents to the circumstances of their LGA. Implementation of biodiversity strategies and action plans can be simplified and more targeted when applied to the smaller area and councils can allocate resources more cost-effectively.

These strategies can involve detailed vegetation, flora and fauna survey and assessment to inform zoning in the LEP, specific requirements for DCPs in relation to tree protection and vegetation management, and also conserve and restore actions across the LGA. Examples include the Clarence Valley Council's Riparian Action Strategy and its Biodiversity Management Plan, and Bellingen Council's Coastal Vegetation Mapping project.

6.3 Settlement planning guidelines

The MNCRS is supported by the Department of Planning's Settlement Planning Guidelines (DoP 2007). These guidelines assist councils preparing Local Growth Management Strategies. Each council needs to prepare a Local Growth Management Strategy for its LGA prior to rezoning land for residential, commercial or industrial uses.

The Settlement Planning Guidelines also provide further detail for councils, developers and the community on the character and design standards contained in the MNCRS. For example, these guidelines provide explicit requirements on where development should not occur, due to the presence of particular high conservation value biodiversity assets or areas of Aboriginal cultural heritage significance.

The Settlement Planning Guidelines reflect DECCW's policy to clearly specify the need for any development to be guided to areas away from those identified as having high biodiversity significance or Aboriginal cultural heritage significance.

6.3.1 Sustainability criteria

As discussed in section 4.4, new urban development may be proposed via the Department of Planning's Sustainability Criteria. The relevant criterion which must be met for environmental protection is as follows:

Environment Protection – Protect and enhance biodiversity, air quality, heritage and waterway health.

Measurable explanation of criteria:

- a) consistent with Government approved Regional Conservation Plan, and
- b) maintains or improves area's regionally significant terrestrial and aquatic biodiversity (as mapped and agreed by [former] DECC). This includes regionally significant vegetation communities; critical habitat; threatened species; populations; ecological communities and their habitats

To demonstrate consistency with the RCP, a rezoning proposal using the Sustainability Criteria must recognise the biodiversity value of the areas identified above and avoid these values. A proponent will be required to demonstrate that all reasonable steps have been taken to avoid impacting on areas identified as having high conservation value biodiversity and cultural heritage assets to demonstrate an improve or maintain outcome.

The improve or maintain outcome must be applied to all proposals being considered under the Sustainability Criteria. This may affect any area of biodiversity value, in particular those areas identified as conservation priorities outside the DECCW reserve system or areas identified as having State or regional biodiversity significance (section 3). For any area where a proponent is addressing the Sustainability Criteria in support of a rezoning proposal, the proposal must demonstrate that it will result in an improve or maintain outcome in a manner consistent with DECCW's principles for biodiversity planning (section 1).

6.4 Planning agreements

Recent amendments to the EPA Act introduced a statutory system of planning agreements (Section 93F). Planning agreements provide a voluntary facility for planning authorities and developers to negotiate flexible outcomes in respect to development contributions. They are a means to enable the planning system to deliver sustainable development through which key economic, social and environmental objectives of State and local government can be achieved.

Planning agreements aim to provide essential public services, including infrastructure, as well as the conservation or enhancement of the natural environment. As such, planning agreements are currently being viewed as one of a series of methods to be utilised to ensure that the environmental impacts of a development are taken into account, and that appropriate impact mitigation, site amelioration and/or offsets are provided by the developer. Planning agreements may be additional to, or replace, the relevant EPA Act Section 94 Developer Contributions Scheme applying to a particular LGA.

While planning agreements will be instigated largely at the rezoning stage, the provisions of these agreements will be written in such a way that they will carry through to the development application phase. As such, planning agreements can be viewed as having a strategic planning basis which has statutory links with the development application process. This is anticipated to achieve far better results in terms of sustainable development outcomes, including biodiversity conservation.

Planning agreements are a mechanism which potentially could be used as an initial agreement, for example, to deliver land dedications by developers in relation to new reserve proposals (Section 93F(7)). DECCW is open to proposals to transfer appropriate offsets into the DECCW reserve system to deliver a secure conservation outcome in perpetuity. Alternatively, to protect conservation priorities outside the

DECCW reserve system, councils may be amenable to undertaking management of transferred land provided the issue of management funding can be addressed.

6.5 Environmental impact considerations

The primary objective of the RCP is to guide strategic planning processes under Part 3 of the EPA Act. However, it is also applicable to development assessment processes under Parts 3A, 4 and 5.

The environmental impact assessment process is used to ascertain the impacts on biodiversity, as part of determining whether or not consent should be granted for an application. As for Part 3, Part 3A, 4 and 5 processes should focus on avoiding impacts on biodiversity. Only after all reasonable efforts to avoid impacts have been undertaken, including minimisation and mitigation, should the focus turn to offsetting in accordance with the principles in section 5.

Typically, projects being assessed under the EPA Act involve a degree of biodiversity impact and, quite often, particularly in relation to larger developments, efforts are made to offset these impacts. In these instances, where it has been demonstrated that biodiversity offsetting is appropriate, section 5 should be used to guide where offsets should be targeted. Consent conditions can also provide for the protection, management, enhancement and restoration of biodiversity.

DECCW will continue to assist councils in identifying and assessing offset requirements, should loss of biodiversity assets be unavoidable.

6.6 Covenants

Legal restrictions on use of land are able to be developed and implemented under the *Conveyancing Act 1919*. Restrictions on the use of land can be applied as a condition of consent at the subdivision stage of a development. Covenants can restrict land use and may be linked to management plans and other agreements (Fallding 2004).

Although some use is made of covenants protecting specific plants or areas of habitat within privately owned lots, their long-term effectiveness for protection has proved questionable, due to ownership changes and landowner expectations of residential land use.

6.7 BioBanking

BioBanking¹⁶ is being implemented by DECCW. It is a market-based instrument that provides a means of ensuring that biodiversity offsets are implemented consistently and strategically in advance of the impacts of development. This can generate better environmental outcomes at lower cost more quickly than conventional approaches to environmental management.

A rule-based biodiversity assessment tool has been developed by DECCW. It is based on the tools that have been developed for the property vegetation planning process under the NV Act (BioMetric tool and the threatened species tool). The tool is used to determine:

- the amount and significance of biodiversity loss that a development will cause
- the improvement in biodiversity value provided by the conservation management actions on the offset site(s).

Using the BioBanking assessment methodology is a voluntary alternative to the threatened species assessment of significance under Section 5A of the EPA Act, for species listed under the TSC Act. If a landholder obtains a BioBanking statement for their development, the development is regarded as not significantly affecting

¹⁶ www.environment.nsw.gov.au/biobanking

threatened species. Thus councils are not required to consider further the impact of the development on TSC Act-listed species. However, assessment is still required for species listed under the FM Act.

BioBanking has the potential to play an important role in conserving areas outside the DECCW reserve system identified as conservation priorities in the biodiversity offset guide. Due to the predominance of private land in these areas the BioBanking scheme is one of the few mechanisms which can improve the conservation status of these areas, while providing the landholder with an economic incentive.

DECCW's Land Alive program provides an opportunity for Aboriginal landholders to receive ongoing funding to manage their land for biodiversity conservation through BioBanking. It also provides an opportunity for Aboriginal ecological knowledge to be recognised alongside contemporary scientific approaches to land management.

6.8 Property vegetation plans

The NV Act regulates broad-scale clearing (clearing of native vegetation or protected regrowth) on all land in NSW, except for State forest, urban land, national parks and other conservation reserves.

A PVP is a voluntary but legally binding agreement between a landholder and the CMA. PVPs will allow specified clearing, but only following the implementation of an appropriate offset regime, to allow for the maintenance or improvement of specific environmental indicators such as biodiversity, salinity and water quality. A PVP may also be agreed on as part of a voluntary conservation action that attracts incentive payments or cost-share arrangements.

The RCP complements on-site planning for PVPs by providing information on biodiversity values at the regional and State scales. Because of data and mapping limitations, there are features of high conservation value discussed in this RCP (such as some patches of EECs) that have not been mapped. Owing to mapping constraints, there will be many features of high conservation value at the site scale, such as habitat trees, that are not taken into account in the RCP.

6.9 Conservation agreements

A conservation agreement (CA), which is a negotiated contract between landholders and the Minister for Climate Change and the Environment under Section 69B of the NPW Act, aims to conserve the natural, cultural and/or scientific values of a property or portion of a property, promoting land uses likely to maintain these values. Landholders may be individuals, groups, corporations or local governments.

The aim of a CA is to facilitate conservation on private and public land by working with people and communities in conservation management. This approach seeks to complement the formal reserve system, support recovery of threatened species, populations and communities, conserve Aboriginal cultural heritage, aid the movement of wildlife in the landscape and protect, restore and rehabilitate high conservation value areas.

Once signed by both the Minister and the landholder, the CA is registered on the land title, binding all 'successors in title' (future landholders) to its terms. CAs can be established on both freehold and, with the consent of the lessees and the Minister for Lands, leasehold land.

The CA program relies on the active management of the lands by the landholder. DECCW consults with the landholder to develop a plan of management for the area covered by the CA. The plan is intended primarily for the landholder's use and establishes clear methods for conservation.

6.10 Aboriginal property management plans and conservation

Under the *Aboriginal Land Rights Act 1983*, Local Aboriginal Land Councils can claim, and have successfully claimed, Crown lands and thus own lands outright. Some of these lands support significant biodiversity and cultural values.

Historically there has been a forced disconnection between some Aboriginal communities and their opportunities to engage in natural resource, biodiversity and cultural heritage management. The return of claimed land to Aboriginal communities has provided a focus for the development of a range of practical mechanisms to support Aboriginal communities in ongoing land management, where the community wishes to manage its lands for biodiversity and cultural values.

These practical mechanisms have been resulted in a 'Cultural Connections' model designed to provide information and promote opportunities to access NRM funding, employment, training, education and business opportunities through the conservation and management of biodiversity and cultural values (L. Baker et al., in preparation). DECCW (2010a) further discusses how partnerships have been established with a number of Local Aboriginal Land Councils in the Far North Coast Region (describing the process as an 'Indigenous Engagement Strategy').

For example, in the Far North Coast Region, the Ngulingah Local Aboriginal Land Council used property management plans to access funding to protect and manage the biodiversity assets on their Nimbin Rocks property and potentially engage in cultural tourism while protecting their assets.

6.11 DECCW reserve establishment program

DECCW has a national park establishment program which voluntarily acquires high conservation value lands on the open market for incorporation into the reserve system (DECC 2008a). This program has a limited budget which must be prioritised across the State. The Mid North Coast Region priority focus areas for offsetting urban development are only one criterion for consideration within overall regional conservation priorities, and will be assessed within that context.

These priority focus areas include a mix of public and privately owned land and implementation mechanisms will vary depending on the ownership of the land. The focus areas are generally suitable for incorporation in the DECCW reserve system, but this will be subject to the normal reserve acquisition program.

6.12 NSW Nature Conservation Trust

The NSW Nature Conservation Trust was established under the *NSW Nature Conservation Trust Act 2001*. In addition to covenanting land with high conservation value, the Trust operates a revolving fund through which properties of high conservation value are bought, covenanted and resold. This RCP can inform the activities of the Trust, particularly with respect to identification of properties which may be suitable for purchase through the revolving fund.

7 Conclusion

The Mid North Coast is an area of high biodiversity, important Aboriginal cultural heritage values and extensive natural resources. These values will be subject to increased development pressure until 2035.

The State Government's MNCRS sets the framework for sustainable development over this period. It identifies areas where urban and employment development will be focused.

The potential for loss of biodiversity due to urban development in the proposed future release areas and employment lands has been recognised and audited in the RCP. However, until these lands and existing zoned lands are subject to development and subdivision it will not be possible to ascertain how much biodiversity will be lost, and how much can be avoided or will require offsetting. The situation is similar for Aboriginal heritage values across the landscape.

The success or otherwise in meeting the State Government's natural resource (including biodiversity) targets, and thus the improve or maintain outcome, will be monitored through the CMAs' CAPs and reporting systems and DECCW's review of urban development avoidance and offset negotiations.

While there are several mechanisms to enhance the protection of biodiversity assets, DECCW's preference is for those that deliver the highest level of conservation security and management in perpetuity for the conservation outcome. Security and management, such as provided by inclusion in DECCW reserves or binding conservation agreements under a variety of legislation, may offer the greatest security for high conservation value biodiversity assets.

Areas with less certainty may require a greater level of management action to ensure the same improve or maintain outcome. Achieving an improve or maintain outcome in these circumstances becomes more complex and costly, due to the need to identify appropriate offsets and management actions, and to develop appropriate mechanisms to protect these offsets in perpetuity. However, if the principles of the MNCRS relating to avoiding high conservation value biodiversity assets are adhered to, then an improve or maintain outcome may be achieved cost effectively in the region while still enabling population increase, economic development and a healthier environment.

Our knowledge of the occurrence and significance of Aboriginal cultural heritage values is not as well documented. General principles for Aboriginal cultural heritage assessment and protection are provided, but until comprehensive Aboriginal cultural heritage management plans and consultation protocols are prepared and adopted in all LGAs, a region-wide analysis and plan cannot be developed. The principle of avoiding impacts, as far as possible, equally applies to Aboriginal cultural heritage. However, unlike biodiversity, where it may be possible to replace or restore degraded habitat over time and thus maintain biodiversity values, Aboriginal cultural heritage is irreplaceable. The loss of such an ancient culture impoverishes the whole of our society and it is critical that we value and protect the significant components of those values and sites that still remain.

The long-term strategic protection and conservation of important Aboriginal heritage values will require careful planning and innovative approaches. Often, high biodiversity and important Aboriginal heritage values coincide on the landscape. Conservation through sound strategic planning for one will offer a level of protection for the other. Nonetheless, inclusion of the Aboriginal community in strategic planning at the LGA and local levels will be critical.

References

- ALGA 1999, *National Local Government Biodiversity Strategy*, Australian Local Government Association, in conjunction with Biological Diversity Advisory Council.
- Andrews, G, Daylight, C and Hunt, J 2006, *Aboriginal Cultural Heritage Landscape Mapping of Coastal NSW*, Prepared for the Comprehensive Coastal Assessment (Department of Planning) by the Department of Natural Resources, Sydney.
- AR&S 2006, *Threatened migratory shorebird habitat mapping project*, Internal report prepared by Avifauna Research & Services for the Department of Environment and Conservation, Sydney.
- Burbidge NT 1960, 'The phytogeography of the Australian Region', *Australian Journal of Botany* 8:75-212.
- Burns, C, Cibilic, A, Hogan, K and Smith, B 2006a, *Sustainable Wetlands on NSW Coastal Landscapes: Component 1 Report (HCRCMA)*, Report to the Hunter–Central Rivers Catchment Management Authority, WetlandCare Australia, Ballina.
- Burns, C, Cibilic, A and Smith, B 2006b, *NRCMA Wetland Mapping, Classification & Prioritisation Report*, Report to the Northern Rivers Catchment Management Authority, WetlandCare Australia, Ballina.
- Commonwealth of Australia 1996, *National strategy for the conservation of Australia's biological diversity*, Department of Education, Science and Training, Canberra.
- Commonwealth of Australia 1997, *Nationally Agreed Criteria for the Establishment of a Comprehensive, Adequate and Comprehensive Reserve System for Forests in Australia*. A report by the Joint Australian and New Zealand Environment and Conservation Council/Ministerial Council of Forestry, Fisheries and Aquaculture National Forest Policy Statement Implementation Sub-committee (JANIS), Canberra.
- DEC 2004, *Old Growth Forests*, Natural Resource Information Notes North East New South Wales, Department of Environment and Conservation, Sydney.
- DEC 2005, *Comprehensive Coastal Assessment Aboriginal Cultural Heritage Data Audit*, Prepared for the Comprehensive Coastal Assessment (DoP) by the Department of Environment and Conservation, Hurstville.
- DECC 2007a, *Fauna corridors for climate change*, Unpublished Report by Department of Environment and Climate Change.
- DECC 2007b, *NSW Biodiversity and Climate Change Adaptation framework 2007–2008*, Prepared by the Inter-agency Biodiversity and Climate Change Impacts and Adaptation Working Group, Department of Environment and Climate Change, Sydney.
www.environment.nsw.gov.au/resources/threatenedspecies/0762biodivccadapt.pdf
- DECC 2007c, *Adaptation Strategy for Climate Change Impacts on Biodiversity (2007–2008)*, Department of Environment and Climate Change, Sydney.
- DECC 2007d, *Lord Howe Island Biodiversity Management Plan*, Department of Environment and Climate Change, Sydney.
- DECC 2007e, *NSW Threatened Species Priorities Action Statement Database*, Department of Environment and Climate Change, Sydney.
www.threatenedspecies.environment.nsw.gov.au/tsprofile/home_PAS_new.aspx
- DECC 2007f, *Alps to Atherton Initiative: A continental-scale lifeline to engage people with nature, NSW Business Plan 2007-2010*, Department of Environment and Climate Change, Sydney. www.environment.nsw.gov.au/resources/a2a/alpstoathbuspl07408.pdf
- DECC 2008a, *New South Wales National Parks Establishment Plan 2008*, Department of Environment and Climate Change, Sydney.

- DECC 2008b, *Summary of Climate Change Impacts: North Coast Region*, Department of Environment and Climate Change, Sydney.
www.environment.nsw.gov.au/climatechange/regionsummary.htm
- DECC 2008c, *Private Native Forestry Code of Practice for Northern NSW*, Department of Environment and Climate Change, Sydney.
- DECC 2008d, *Great Eastern Ranges Initiative*, Department of Environment and Climate Change, Sydney. www.environment.nsw.gov.au/ger/index.htm
- DECC 2008e, *A New Biodiversity Strategy for New South Wales: Discussion Paper*, Department of Environment and Climate Change, Sydney.
- DECC 2009a, *Aboriginal New South Wales – 2009*, (Poster), Department of Environment and Climate Change, Sydney.
- DECC 2009b, *Derivation of the NSW Government's sea level rise planning benchmarks, technical note*, Department of Environment and Climate Change, Sydney.
- DECCW 2010a, *Border Ranges Rainforest Biodiversity Management Plan – NSW & Qld*, Department of Environment, Climate Change and Water, Sydney.
- DECCW 2010b, *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*, Department of Environment, Climate Change and Water, Sydney. www.environment.nsw.gov.au/resources/cultureheritage/commconsultation/09781ACHconsultreq.pdf
- DECCW 2010c, *NSW Climate Impact Profile: The impacts of climate change on the biophysical environment of New South Wales*, Department of Environment, Climate Change and Water, Sydney.
- DECCW 2010d, *Northern Rivers Regional Biodiversity Management Plan*, National Recovery Plan for the Northern Rivers Region, Department of Environment, Climate Change and Water, Sydney.
- DEH 2005, *Interim Biogeographic Regionalisation of Australia – Version 6.1*, Department of the Environment and Heritage, Canberra.
www.environment.gov.au/parks/nrs/science/bioregion-framework/ibra/index.html; www.environment.gov.au/biodiversity/abrs/online-resources/fauna/afd/resources/images/maps/ibra61_reg_colour.pdf
- DEH 2006, *A Guide to the Integrated Marine and Coastal Regionalisation of Australia – Version 4.0*, Department of Environment and Heritage, Canberra.
www.environment.gov.au/coasts/mbp/publications/imcra/pubs/imcra4.pdf
- DoP 2007, *Settlement planning guidelines: Mid and Far North Coast regional strategies*, State of New South Wales through the Department of Planning, Sydney.
- DoP 2009a, *Mid North Coast Regional Strategy*, State of New South Wales through the Department of Planning, Sydney.
- DoP 2009b, *Environment Protection Zones*, LEP Practice Note PN 09-002, Department of Planning, Sydney. www.planning.nsw.gov.au/planningsystem/pdf/pn09_002_envt_protection_zones.pdf
- DPC 2010, *NSW State Plan: Investing in a Better Future*, Department of Premier and Cabinet, Sydney.
- Dunlop, M and Brown, PR 2008, *Implications of climate change for Australia's National Reserve System: a preliminary assessment*, Report by CSIRO Sustainable Ecosystems to the Department of Climate Change, and Department of the Environment, Water, Heritage and the Arts, Department of Climate Change, Canberra.
- EA 2001, *A Directory of Important Wetlands in Australia*, Third Edition, Environment Australia, Canberra. www.environment.gov.au/water/publications/environmental/wetlands/directory.html
- Fallding, M, Kelly, AHH, Bateson, P and Donovan, I 2001, *Biodiversity planning guide for local government*, Edition 1, Prepared by Land & Environment Planning and Environs Australia for the NSW National Parks and Wildlife Service, Sydney.
- Fallding, M 2004, 'Planning for Biodiversity', in *Australian Planner* 41(4): 45–50.

- Fischer, J, Lindenmeyer, DB and Manning, AD 2006, 'Biodiversity, ecosystem function, and resilience: ten guiding principles for commodity production landscapes', *Frontiers in Ecology and the Environment* 4(2):80–86.
- Frankham, R 2006, 'Genetics and landscape connectivity', in KR Crooks and MA Sanjayan (eds), *Connectivity conservation*, Cambridge University Press, Cambridge.
- Hinckley, D and Tierney, G 1992, 'Ecological effects of rapid climate change', in SK Majumdar, LS Kalkstein, B Yarnal, EW Miller and LM Rosenfield (eds), *Global climate change: implications, challenges and mitigation measures*, The Pennsylvania Academy of Science, pp. 291–301.
- HRC 2002, *Independent Public Inquiry into Coastal Lakes: Final Report*, Healthy Rivers Commission.
- Hughes, L 2003, 'Climate change and biodiversity in Australia', in *Climate impacts on Australia's natural resources: current and future challenges* conference workbook, Proceedings of a conference held 25–27 November 2003, Surfers Paradise, p.28–9.
- H–CRCMA 2007, *Hunter–Central Rivers Catchment Action Plan*, Hunter–Central Rivers Catchment Management Authority, Paterson.
www.hcr.cma.nsw.gov.au/catchmentactionplan_download.php3
- IPCC 2007, *Climate Change 2007: The Physical Science Basis. Summary for Policy Makers*, Intergovernmental Panel on Climate Change WGI Fourth Assessment Report.
- Keating, J and Jarman, MR 2004, *Little Terns in New South Wales: a six year review; breeding seasons 1998/99 to 2003/04*, Internal report prepared for the Department of Environment and Conservation.
- Keith, D 2004, *Ocean Shores to Desert Dunes: The Native Vegetation of New South Wales and the ACT*, Department of Environment and Conservation, Hurstville.
- Mackey B, Watson J and Worboys GL of ANU Enterprises Pty Ltd 2010, *Connectivity conservation and the Great Eastern Ranges corridor*, an independent report to the Interstate Agency Working Group (Alps to Atherton Connectivity Conservation Working Group) convened under the Environment Heritage and Protection Council/Natural Resource Management Ministerial Council, Sydney.
- Mitchell, P 2002, *New South Wales Ecosystems Database Mapping Unit Descriptions*, report prepared for NSW National Parks and Wildlife Service, Hurstville.
- Natural Resource Management Ministerial Council 2010, *Australia's Biodiversity Conservation Strategy 2010-2030*, Australian Government, Department of Sustainability, Environment, Water, Population and Communities, Canberra.
- NPWS 1999, *NSW Biodiversity Strategy*, NSW National Parks and Wildlife Service, Sydney.
- NRC 2005, *Recommendations of State-wide standards and targets*, Document No DO5/4894, Natural Resources Commission. www.nrc.nsw.gov.au/content/documents/Recommendations%20-%20State-wide%20s%20and%20targets%20September%202005.pdf
- NRC 2006, *State-wide targets for natural resource management*, Fact Sheet February 2006, Natural Resources Commission, Sydney.
- NRCMA 2005, *Northern Rivers Catchment Action Plan*, Northern Rivers Catchment Management Authority, Grafton. www.northern.cma.nsw.gov.au/programmes.php
- NSW Fisheries 1999, *Policy and Guidelines – Aquatic Habitat Management and Fish Conservation*, A.K. Smith and D.A. Pollard (eds), NSW Fisheries, Port Stephens Research Centre. www.dpi.nsw.gov.au/fisheries/habitat/publications/policies,-guidelines-and-manuals
- NSW Government 2005a, *What clearing needs approval?* Native Vegetation Management in NSW Info Sheet 5, NSW Government, Sydney.
- NSW Government 2005b, *NSW Greenhouse Plan*, NSW Government, Sydney.

- NSW Government 2006, *State Plan: A new direction for NSW*, NSW Government, Sydney.
- NSW Government 2010, *Draft New South Wales Biodiversity Strategy 2010–2015*, prepared by the Department of Environment, Climate Change and Water and Industry and Investment NSW for the NSW Government, Sydney.
- NSW Heritage Office 1996, *A Guide to the Heritage System*, 2005 revised edition, NSW Heritage Office, Sydney.
- Opdam, P and Wascher, D 2004, 'Climate change meets habitat fragmentation: linking landscape and biogeographical scale levels in research and conservation', in *Biological Conservation* 117(3), May.
- Peck, S 1998, *Planning for biodiversity: issues and examples*, Island Press, Washington DC.
- RAC 1992, *Forest and Timber Inquiry*, Final Report, Volume 2B, Resource Assessment Commission, AGPS, Canberra.
- Scotts, D 2003, *Key habitats and corridors for forest fauna: a landscape framework for conservation in north-east New South Wales*, Occasional Paper 32, NSW National Parks and Wildlife Service, Sydney.
- Taylor, PD, Fahrig, L and With, KA 2006, 'Landscape connectivity: a return to basics', in KR Crooks and MA Sanjayan (eds), *Connectivity conservation*, Cambridge University Press, Cambridge.
- Watson, J, Hamilton-Smith, E, Gillieson, D and Kieman, K (eds) 1997, *Guidelines for Cave and Karst Protection*, IUCN.
- Williams, RJ, West, G, Morrison, D and Creese, RG 2006, *Estuarine Resources of New South Wales*, Prepared for the Comprehensive Coastal Assessment, Department of Planning, by the Department of Primary Industries, Port Stephens, Department of Planning, Sydney.