NSW GOVERNMENT | Environment, Climate Change & Water

Lower Hunter Regional Conservation Plan

Cover photos (main image, clockwise):
Hunter estuaries (DECC Estuaries Unit)
Mother and baby flying foxes (V. Jones, DECC)
Lower Hunter estuary, Hunter Wetlands National Park (G. Woods, DECC)
Sugarloaf Range (M. van Ewijk, DECC)

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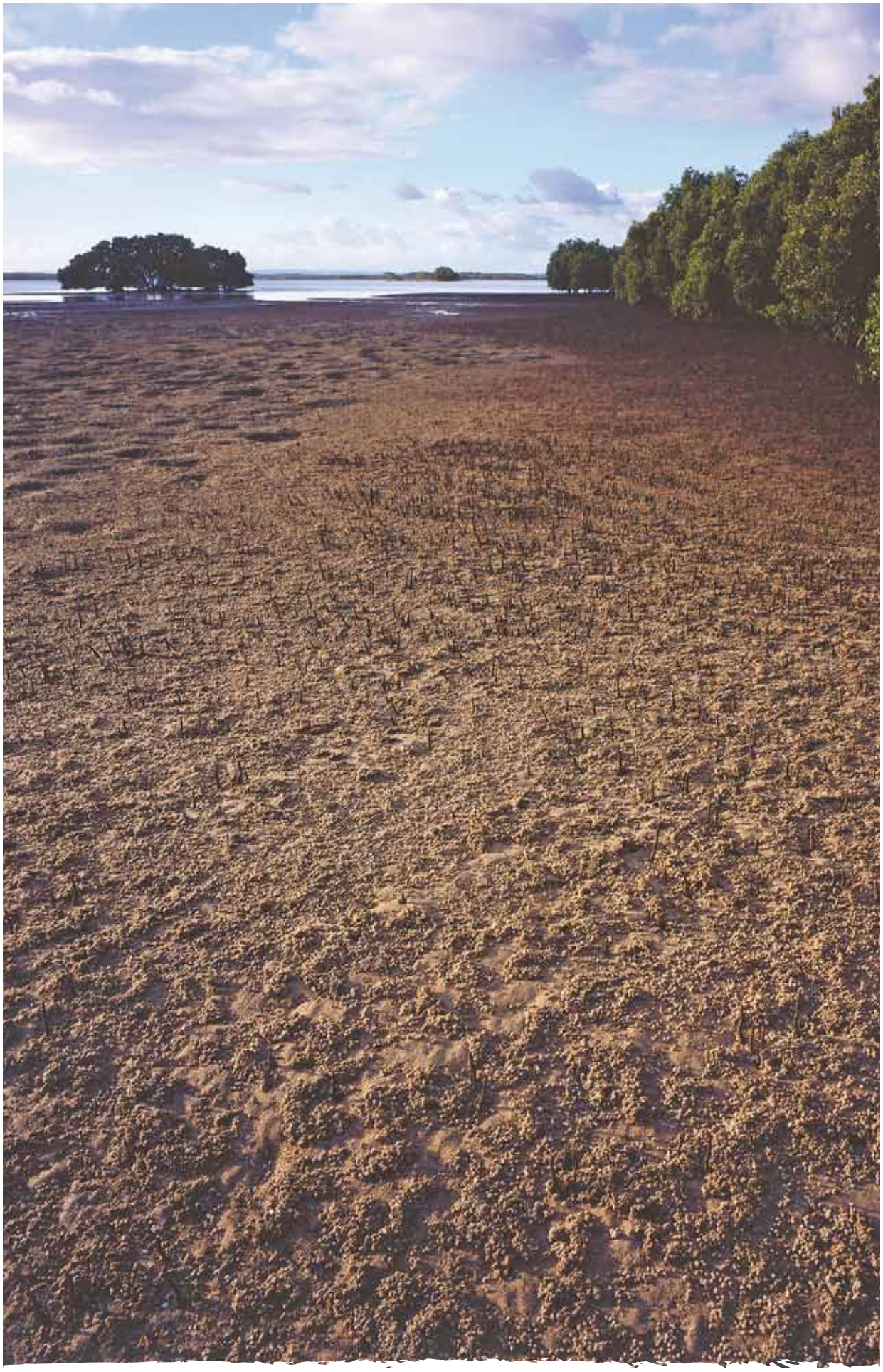
Addendum

In the *Gwandalan Summerland Point Action Group Inc v. Minister for Planning* (2009) NSWLEC 140 (Catherine Hill Bay decision), Justice Lloyd held that the decisions made by the Minister for Planning to approve a concept plan and project application, submitted by a developer who had entered into a Memorandum of Understanding (MOU) and Deed of Agreement with the Minister for Planning and the Minister for Climate Change and the Environment were invalid. His Honour found that the existence of commitments in the MOU and Deed gave rise to an apprehension of bias and the MOU and Deed were irrelevant considerations. It was also held that the provisions in the *Environmental Planning and Assessment Act 1979* relating to planning agreements were exhaustive.

As a result of this decision, the *Lower Hunter Regional Conservation Plan* has been amended to remove references to Deeds and MOUs. This Plan should be understood and implemented in light of the Catherine Hill Bay decision.

From 1 July 2009 the Department of Environment and Climate Change (DECC) referred to in this report, was renamed the Department of Environment, Climate Change and Water, with additional responsibilities for water.



Hunter River estuary and wetlands, Hunter Wetlands National Park (G. Woods, DECC)

Contents

Glossary

BFT – Biodiversity Forecasting Tool

BioBanking – BioBanking is a biodiversity banking and offsets scheme, which enables proponents to offset biodiversity impacts through a scheme of acquiring credits which can be traded.

Biodiversity Certification – if satisfied that an environmental planning instrument meets agreed criteria in relation to biodiversity values, the Minister for Climate Change and the Environment can grant certification to the instrument. This means that the instrument will not have a significant impact on threatened species and does not need to be assessed under s. 5A of the EP&A Act.

CAMBA – an agreement between the Government of Australia and the Peoples Republic of China for the protection of migratory birds in danger of extinction and their environment.

CAP – Catchment Action Plan

CMA – Catchment management authority

CRA – Comprehensive Regional Assessment

DECC – Department of Environment and Climate Change NSW

DECCW – Department of Environment, Climate Change and Water NSW

EEC – Endangered ecological communities

EIA – Environmental Impact Assessment

EP&A Act – *Environmental Planning and Assessment Act 1979*

EPBC Act – Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*

EPI – Environmental Planning Instruments

HCRCMA – Hunter Central Rivers Catchment Management Authority

JAMBA – an agreement between the Government of Australia and the Government of Japan for the protection of migratory birds in danger of extinction and their environment.

JANIS – A technical working group comprising conservation scientists and planners from all States, the Northern Territory, and the CSIRO. It was established in 1993 under the auspices of the Joint ANZECC/MCFFA NFPS Implementation Sub-Committee (JANIS) to draft criteria on which to base a comprehensive, adequate and representative reserve system for Australia's forests

LEP – Local Environmental Plan

LGA – Local Government Area

LHRS – Lower Hunter Regional Strategy

NPW Act – *National Parks and Wildlife Act 1974*

NRC – Natural Resources Commission

PAS – Priorities Action Statement

PVP – Property Vegetation Plan

Ramsar – an international treaty which identifies wetlands of international importance.

RCP – Lower Hunter Regional Conservation Plan

SEPP – State Environmental Planning Policy

TSC Act – *Threatened Species Conservation Act 1995*

VCA – Voluntary Conservation Agreement

Executive Summary

From 1 July 2009 the Department of Environment and Climate Change (DECC) referred to in this report, was renamed the Department of Environment, Climate Change and Water, with additional responsibilities for water.

This Regional Conservation Plan (RCP) sets out a 25-year program to direct and drive conservation planning and efforts in the Lower Hunter Valley. It is a partner document to the Government's *Lower Hunter Regional Strategy* (LHRS) that sets out the full range of Government planning priorities, and identifies the proposed areas of growth.

The RCP is focused on the next 25 years and seeks to establish a framework to guide conservation efforts in the Lower Hunter. Stage 1 of the RCP was announced in late 2006. This included the establishment of new conservation reserves to be managed by the then Department of Environment and Climate Change.

These new reserves comprise approximately 20,000 hectares of various high conservation value Government lands to form the backbone of major new conservation corridors including:

- a new 'Green Corridor' stretching from the Watagan Ranges, through Hexham Swamp to Port Stephens (approximately 14,600 hectares)
- important areas around Port Stephens in the Karuah area (3,000 hectares)
- a large addition to Werakata National Park near Cessnock (2,200 hectares).

These public land transfers are a significant step in creating the necessary conservation outcomes for the Lower Hunter, including important linkages for biodiversity. Future proposed developments in the Lower Hunter will be assessed against current legislation. Impacts to biodiversity, including threatened species, should be first avoided or mitigated. Where appropriate, the Government will consider offsetting future development by entering into planning agreements with the developer. Under these agreements the developer is required to dedicate free of cost land that has been identified as having conservation value. Where appropriate, such land could be incorporated into the reserve system. Offsets will be developed in accordance with government policy and guidelines.

Priority for offsets will be in areas that make the most significant conservation contribution in the Lower Hunter. Such freehold land will contribute to the creation of the three priority corridors within:

- the Watagan Ranges to Port Stephens
- the South Wallarah Peninsula
- Werakata National Park.

In addition, other areas which make sensible additions to existing conservation reserves or conserve features currently under-represented in the formal conservation reserve system will be considered.

This plan provides options for management of freehold land for conservation in perpetuity. The intended approach to facilitate the dedication of freehold biodiversity land offsets to the NSW Government is through the provisions of the *Environmental Planning and Assessment Act 1979* (EP&A Act), in particular, the current provisions relating to planning agreements.

The RCP also:

- canvasses tools and mechanisms that could be used in the medium to longer term to secure additional lands needed to offset the biodiversity impacts from development proposed in the LHRS and complete the corridors for optimal land management boundaries
- explains how development will be guided away from high conservation areas through the identification of a desired development footprint and the definition of other areas where the Government's sustainability criteria will or will not operate (if met, these criteria allow development to proceed outside the planned footprint)
- provides direction for local councils who are preparing new Local Environmental Plans, so that they may merit biodiversity certification (certification by the Minister for Climate Change and the Environment streamlines development assessment and approvals)
- identifies a further 65,000 hectares as 'other regional conservation priorities' that should be the focus for voluntary conservation initiatives, areas for future offsetting of development impacts and for government biodiversity investments (such as through the Hunter–Central Rivers Catchment Management Authority (CMA)).

1. Introduction

From 1 July 2009 the Department of Environment and Climate Change (DECC) referred to in this report, was renamed the Department of Environment, Climate Change and Water, with additional responsibilities for water.

1.1 What is biodiversity?

Biological diversity, or biodiversity, is defined for the purpose of this Regional Conservation Plan (RCP) as:

> *The variety of life forms, the different plants, animals and micro-organisms, 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 individual plants, animals and micro-organisms.

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

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

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).

1.2 Objectives of the RCP

The primary objectives of the RCP are to complement the Government's *Lower Hunter Regional Strategy* (LHRS) by:

- describing the conservation values of the Lower Hunter Region
- analysing the current status of biodiversity within the region, and assessing the likely impacts of development on biodiversity
- assessing the biodiversity values of the region, at a landscape scale, and identifying strategic areas for biodiversity protection, enhancement or restoration
- contributing to a practical framework that can secure, improve or maintain biodiversity values as the Hunter grows over the next 25 years
- guiding local level planning with respect to biodiversity, including the development of local biodiversity conservation strategies and the development of new Local Environmental Plans (LEP) that can merit biodiversity certification.

While the objectives of the RCP focus solely on biodiversity values, it is acknowledged that the LHRS had to consider social, economic and environmental objectives when identifying sites for future development. While the Department of Environment and Climate Change (DECC) has worked to focus development away from areas of biodiversity value, it acknowledges that, in some instances, the application of sound planning principles will result in unavoidable biodiversity impacts.

1.3 Where does the RCP apply?

This RCP applies to the same Local Government Areas (LGAs) covered by the LHRS; namely Maitland, Cessnock, Lake Macquarie, Port Stephens and Newcastle city councils. It also includes actions in the north east of Wyong Council area at Gwandalan and the Wallarah Peninsula.

1.4 Regional land use summary

1.4.1 Population trends

As outlined within the LHRS, the Lower Hunter had an estimated population of 505,000 in 2004 and is growing by approximately 4000–6000 persons each year.

The LHRS is based upon a population growth scenario which forecasts a population increase averaging up to 6000 persons per year. This would result in an additional 160,000 persons over the 25-year period between 2006 and 2031.

1.4.2 Existing and forecast settlement trends

The LHRS identifies that of all new housing within the Lower Hunter, 60% will be accommodated within greenfield development areas, with the remaining 40% located in existing urban land-use zones. The LHRS will also ensure an adequate supply of employment land within identified centres and other specialised/industrial lands to accommodate the projected 66,000 new jobs.

Although the development footprint has been located to maximise use of already cleared or degraded land, there will be losses of biodiversity values as the LHRS is implemented, including areas of high conservation value vegetation. The LHRS includes significant measures to offset these unavoidable losses.

1.5 Outline of the RCP

The RCP:

- analyses the impacts of the urban development scenarios in the LHRS
- presents a biodiversity investment guide that identifies areas that could be targeted for public or private land conservation or restoration
- identifies mechanisms for biodiversity conservation through investment in the Lower Hunter (at a landscape level)
- provides a guide for local government authorities to plan for biodiversity protection, conservation and management, and local environment planning instruments.

To support planning at a local scale, DECC has prepared or is preparing the following additional information:

- guidelines for biodiversity certification (under revision)
- survey and assessment guidelines for biodiversity (or wildlife/flora and fauna) (draft guidelines available at www.environment.nsw.gov.au/resources/TBSAGuidelinesDraft.pdf)
- guidelines for DECC's BioBanking Scheme
- guidelines for environmental impact assessment of biodiversity values in areas identified for development.

The RCP takes into account the significant amount of high conservation value vegetation likely to be impacted on in the new development footprint. This includes areas that are already zoned for development, such as for residential and industrial subdivisions, but that are as yet undeveloped.

The RCP does not assess the impacts of probable new essential infrastructure and State significant projects likely to be developed within the 25-year strategy time frame, as these could not be spatially identified in the LHRS. These are likely to include new coal mines, major roads, pipelines and powerlines.

The LHRS also acknowledges the potential for development of additional greenfield residential releases in some areas where these meet the Sustainability Criteria spelt out in the LHRS. As these areas also cannot be identified at this stage, this RCP cannot assess their potential impacts. It does, however, foreshadow mechanisms that will be available to offset unavoidable impacts where they arise.

Sugarloaf Range (M. van Ewijk, DECC)

2. Planning Framework

2.1 Why prepare an RCP?

The primary purpose of the LHRS is to ensure that adequate land is available and development is appropriately located to sustainably accommodate the projected housing, employment and environmental needs of the region's population over the next 25 years. This Regional Conservation Plan has been developed:

- to assess the extent of the biodiversity impacts of the LHRS and recommend priority areas for investment in biodiversity conservation and environmental repair and restoration to offset these impacts
- with the recognition that development certainty and conservation outcomes are best achieved by good strategic planning at a regional scale, rather than at the development application stage
- to assist with the implementation of the recent amendments to the *Threatened Species Conservation Act 1995* (TSC Act), including biodiversity certification of environmental planning instruments and BioBanking
- to be consistent with, and promote the principles of, Ecologically Sustainable Development.

An overview of the process for developing the RCP is shown in Figure 1.

In addition to the process outlined in Figure 1, it is highlighted that the biodiversity constraints mapping, which underpins the RCP, has been used to inform the process to identify the proposed development areas. The biodiversity constraints mapping was a key consideration in the process, which also addressed social and economic objectives for the proposed development areas. The constraints mapping then flowed into the RCP process where it was applied in the manner depicted in the flow chart (Figure 1).

2.2 Legislative framework

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 at a landscape scale.

One of the key mechanisms to give effect to this renewed focus on strategic planning is the opportunity for biodiversity certification to be granted to Environmental Planning Instruments (EPI), including LEPs. Essentially, the biodiversity certification process provides a structured way to ensure that biodiversity issues are considered in a comprehensive way, up-front and at the earliest possible stage of the planning process.

The broad advantages of biodiversity certification are that it provides:

- a basis for informed broad scale decision making
- a process to empower communities to plan for conservation
- a planning process to address cumulative effects of development on biodiversity
- a certified EPI that delivers more certainty and quicker decision-making for industry, and better outcomes for biodiversity and the broader community.

Consideration of this RCP will be an important step to securing biodiversity certification for new LEPs. The effect of biodiversity certification is that it largely 'switches off' the need for consideration of the test of significance, otherwise known as a Section 5A assessment (*Environmental Planning and Assessment Act 1979* (EP&A Act)) or seven-part test, at individual sites. This has important implications for the development industry and to consent and

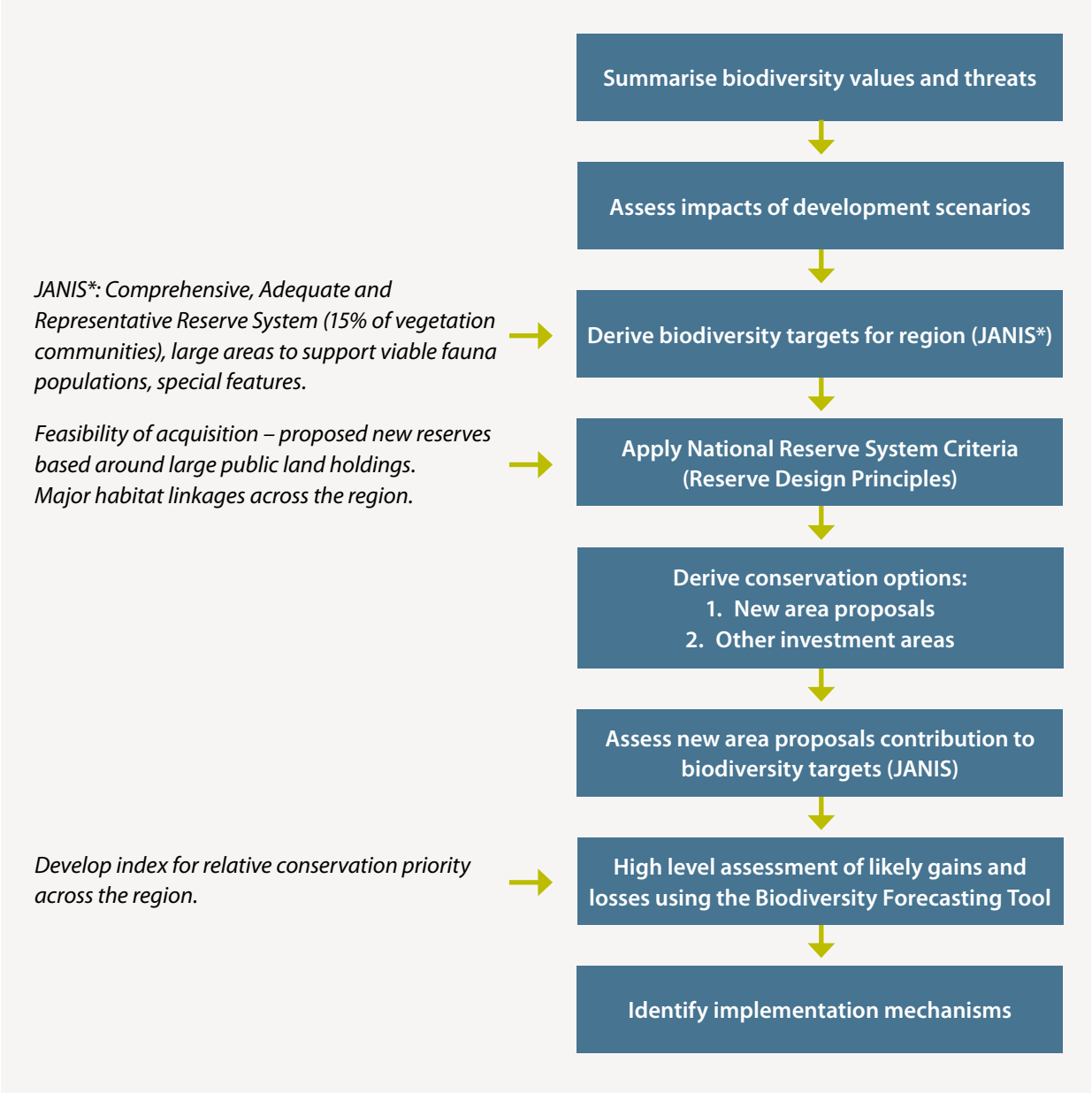


Figure 1: Development of the Lower Hunter Regional Conservation Plan

*JANIS is a technical working group comprising conservation scientists and planners from all States, the Northern Territory, and the CSIRO. It was established in 1993 under the auspices of the Joint ANZECC/MCFFA NFPS Implementation Sub-Committee (JANIS) to draft criteria on which to base a comprehensive, adequate and representative reserve system for Australia's forests.

determining authorities, as a certified LEP creates a high degree of certainty with respect to biodiversity management on a site-by-site basis.

To support this new process, DECC has introduced the BioBanking Scheme in NSW. This scheme provides a structure for offsetting biodiversity losses using a market-based mechanism. This RCP will guide BioBanking and other offsetting mechanisms in the Lower Hunter to ensure that biodiversity investment funds are focused in areas to provide maximum biodiversity returns.

2.3 Biodiversity planning principles and priorities

Effective ongoing biodiversity management and planning is necessary to ensure that the Lower Hunter Region can continue to grow in a sustainable way. It can enable appropriate development to proceed while preserving a finite and highly valuable environmental resource.

The principles of biodiversity planning adopted in the RCP are:

- to improve or maintain ecological processes and the dynamics of terrestrial ecosystems in their landscape context
- to improve or maintain viable examples of terrestrial ecosystems throughout their natural ranges
- to improve or maintain viable populations of the various biological organisms throughout their natural ranges
- to improve or maintain the genetic diversity of the living components of terrestrial ecosystems.

The key priorities for biodiversity planning in relation to improving or maintaining biodiversity values are:

- the first priority – to avoid losses to biodiversity and promote protection of biodiversity values *in situ*
- the second priority, where the first priority is unachievable – to mitigate adverse impacts to biodiversity
- as a last resort, compensate for unavoidable losses to biodiversity.

2.4 Who should use this RCP?

As this RCP is mainly focused on urban development, it is primarily intended for use by the five council areas included within the LHRS area. Councils play a key role in biodiversity management, particularly through decision making in relation to land-use planning and development assessment.

The RCP is also likely to provide an important resource for those with business or decision-making roles and for those otherwise involved in the protection and management of biodiversity, including:

- Commonwealth and State government agencies, including the Hunter Central Rivers Catchment Management Authority (HCRCMA)
- the development industry
- land owners
- conservation and community groups
- scientists and researchers.

2.5 Land-use planning system context

The LHRS, accompanied by this RCP, is intended to guide local level strategic planning within the Lower Hunter. All new LEPs will be prepared in accordance with a direction made under Section 117 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). 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.

All five councils in the Lower Hunter will be required to prepare new LEPs within the next three years. These LEPs will contain the detailed zoning and development controls to guide development, and must be consistent with both the LHRS and the RCP. As discussed, the RCP will also provide the first significant step to achieving biodiversity certification in accordance with the TSC Act.

The RCP is also intended to guide biodiversity investment for 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. Mechanisms may include BioBanking, property management plans and protective covenants (see Section 8). The RCP will also provide a useful guide to investment of Catchment Management Authority funding.

The RCP has been prepared to be consistent with a number of federal and state biodiversity management strategies, including the *National Local Government Biodiversity Strategy* (Australian Local Government Association 1999), *National Strategy for the Conservation of Australia's Biological Diversity* (Commonwealth of Australia 1996), NSW *State Plan* (NSW Government 2006) and the *NSW Biodiversity Strategy* (NPWS 1999).

Freshwater wetlands, Pambalong Nature Reserve (T. Karacsonyi, DECC)

National Local Government Biodiversity Strategy

The *National Local Government Biodiversity Strategy* (Australian Local Government Association 1999) recognises that:

- conservation and sustainable use of our natural resources will only be achieved through local area planning and management, along with community education and participation
- there is a willingness of local government across Australia 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 spheres of government.

National Strategy for the Conservation of Australia's Biological Diversity

The *National Strategy for the Conservation of Australia's Biological Diversity* (Commonwealth of Australia 1996) establishes goals, objectives and actions to ensure the effective conservation of Australia's biodiversity. It has been prepared in accordance with the requirements of the National Strategy for Ecologically Sustainable Development, and is intended to be implemented by Commonwealth, State and local governments.

NSW State Plan

The NSW State Plan contains several biodiversity targets, which focus on increasing the extent and condition of native vegetation, increasing the number of sustainable populations of a range of native fauna species and increasing the recovery of threatened species, populations and endangered ecological communities. The RCP is consistent with these targets and will contribute directly to their achievement, through a range of proposed conservation mechanisms, including the reservation of significant areas in the Lower Hunter.

Natural Resources Commission

The Natural Resources Commission has also developed various biodiversity targets, similar to those nominated in NSW *State Plan*. The RCP is consistent with these targets and will contribute to their achievement.

NSW Biodiversity Strategy

The *NSW Biodiversity Strategy* (NPWS 1999) established a collaborative approach to biodiversity conservation. The Strategy proposes 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.

2.6 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), is national legislation, administered by the federal Department of the Environment, Water, Heritage and the Arts. It protects Australian biodiversity and integrates management of important natural and cultural places.

The EPBC Act establishes assessment and approvals processes for actions that are likely to have a significant impact on matters of national environmental significance, Commonwealth land and actions undertaken by the Commonwealth. The Act also promotes the conservation of biodiversity by providing strong protection for threatened species and ecological communities, migratory, marine and other protected species.

The signing of the Bilateral Agreement between the Commonwealth and NSW, has certified that the state assessment process satisfies the Commonwealth's requirements under the EPBC Act. This Agreement further strengthens the linkages between the Commonwealth and NSW impact assessment processes.

The Act also nominates key threatening processes, which threaten or may threaten the abundance, survival or evolutionary development of native species or ecological communities. These threatening processes are defined in the Act (refer www.environment.gov.au/cgi-bin/sprat/public/publicgetkeythreats.pl) and have been considered in the process to develop the RCP's investment strategy.

2.7 Ongoing review of the RCP

Similar to the LHRS, the RCP is to be comprehensively reviewed every five years. This is to ensure that progress toward the objectives of the RCP is monitored and any necessary revisions are made to ensure that the outcomes sought are realised. The review should focus on the following issues:

- assess the extent of biodiversity loss and conservation gain, against that predicted in the RCP
- assess the extent to which the regional conservation priorities as identified in the *Biodiversity Investment Guide* (see Section 6) have been conserved
- consider the extent of other impacts on the region's biodiversity
- review the effectiveness of the offset mechanisms in conserving the areas identified for conservation
- determine the adequacy of progress toward the overall goal of 'improve or maintain'
- recommend revised implementation strategies as appropriate.

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

3. Conservation Framework

The overarching goal for conservation in NSW under the *Native Vegetation Act 2003* is that biodiversity and other environmental values of soil, water quality and salinity, must be 'improved or maintained'. This means that the gains for biodiversity must be greater than or equal to any losses resulting from clearing or other forms of degradation of biodiversity values. This goal is also reflected in the TSC Act with regard to biodiversity certification. The LHRS sets a goal of improving or maintaining biodiversity in the region. The RCP sets out the manner in which this may be achieved.

3.1 Conservation criteria

In establishing objectives for the Lower Hunter, targets that had already been agreed to by the NSW Government were taken into account. The following criteria (commonly referred to as the JANIS criteria) have been agreed by both the NSW and Australian governments (Commonwealth of Australia 1997).

These targets were used to guide significant land-use planning decisions, such as the government's forestry reforms. It is appropriate that the same targets are used to guide the development of a 25-year biodiversity investment strategy for the region.

JANIS Criteria

JANIS criteria are a set of biodiversity targets for forested environments agreed to by Australian states and territories and the Australian Government (Commonwealth of Australia 1997). These are:

(a) Establishing a comprehensive, adequate and representative system of conservation reserves within forested lands.

(b) Reserving 15% of the pre–1750 distribution of each forest ecosystem. Where vegetation communities are recognised as vulnerable, then at least 60% of their remaining extent should be reserved.

(c) All remaining occurrences of rare and endangered vegetation communities should be reserved or protected by other means as far as is practicable.

(d) The reserve system should seek to maximise the area of high quality habitat for all known elements of biodiversity wherever practicable.

(e) Where conservation goals cannot be met on public land through the formal reserve system, other mechanisms on private land 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. The areas should be identified and protected as part of the development of integrated regional conservation strategies.

(f) Special features such as old growth forest and wilderness warrant special protection.

3.2 Targets for vegetation communities

JANIS establishes targets for vegetation communities, which have been applied to the Lower Hunter as follows:

- A general principle of 15% reservation of the pre-1750 distribution of each forest ecosystem.
- Where forest ecosystems are recognised as vulnerable, then at least 60% of their remaining extent should be reserved.

  A vulnerable forest ecosystem is one which is:
  - approaching a reduction in areal extent of 70% within a bioregional context and which remains subject to threatening processes, or
  - not depleted but subject to continuing and significant threatening processes which may reduce its extent.
- All remaining occurrences of rare, endangered and vulnerable forest ecosystems should be reserved or protected by other means as far as is practicable. A rare ecosystem is one where its geographic distribution involves a total range of generally less than 10,000ha, a total area of generally less than 1000 hectares in the region or patch sizes of generally less than 100 hectares, where such patches do not aggregate to significant areas.

Lower Hunter Vegetation Communities listed as Endangered Ecological Communities under the *Threatened Species Conservation Act 1995* are classed under the JANIS definition of 'vulnerable' ecosystems and hence a reservation target has been set at 60% of their remaining extent within the region.

3.3 Features of special conservation significance

JANIS sets specific targets for old growth forests. Where old growth forest is rare or depleted (generally less than 10% of the extant distribution) within a forest ecosystem, all viable examples should be protected, wherever possible. For other vegetation communities, 60% of the old growth forest would be protected.

Other features have been identified as priorities for conservation in order to protect the full range of biodiversity in the region. Features of species conservation significance include old growth forest, identified wilderness, wetlands and landscapes which have undergone more than 70% clearing.

3.4 Fauna targets

One of the key biodiversity conservation objectives of JANIS is to *"… maintain viable populations of native forest species throughout their natural ranges"*. This is to be achieved partly by ensuring that reserves are *"… large enough to sustain the viability, quality and integrity of populations"*. These objectives are also reflected in the directions set for the National Reserve System (Commonwealth of Australia 2005), where *"… protected areas are selected and managed to maximise the probability of survival of their biota through … being of sufficient size and condition to ensure long-term sustainability …"*.

As part of the Lower North East NSW comprehensive regional assessment (CRA), the areas that are required to support viable populations of forest fauna species of conservation significance was estimated (Environment Australia 1999). Of the 82 threatened species that are known or expected to occur in the Lower Hunter, viable habitat areas were estimated for 52 forest species. At present, viable populations are contained within conservation reserves for only 15% of these species and it is clear that the persistence of most threatened forest

species cannot be guaranteed by the current reserve system alone. Furthermore, few areas outside the reserve system have any significant long-term protection and many are subject to ongoing degradation. A larger and more connected network of protected areas needs to be developed across the Lower Hunter.

3.5 Natural Resources Commission targets

The Natural Resources Commission (NRC) has developed a series of resource condition targets for NSW, which cover biodiversity, water, land and community. These targets have been developed under the NSW Government's State Plan. The targets will focus natural resource management investments and provide a means of tracking progress on natural resources issues in NSW.

The relevant NRC targets include:

- 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 and range of native fauna species.
- By 2015 there is an increase in the recovery of threatened species, populations and ecological communities.

The implementation of the RCP will make a significant contribution to achieving these targets in the Lower Hunter.

3.6 Assigning relative conservation value

In order to simplify the many different features of conservation significance, areas were assigned a value of regional, state or local significance. This enables the conservation significance of different areas to be easily compared.

Each conservation value (for example, old growth forest or under target ecosystems) was assigned the value of local, regional or state significance. Each area in the landscape was then classified as being of local, regional or state significance depending on the highest level of significance present in that area. For example, if an area contained features of local and state significance it would be classed as state significant.

3.7 Reserve design

While area targets provide a useful means of quantifying conservation goals, conservation efforts must have an overall aim to achieve the continued viability of biodiversity. Strategic reserve design is integral to sustaining biodiversity in the region.

DECC applied reserve design principles proposed by the Australian Government (Commonwealth of Australia 2005), in developing the RCP. These design principles recommend that reserves be:

- set in a landscape context with strong ecological integrity
- selected to ensure that a 'core' area is protected with an effective buffer and the provision of adequate connectivity (i.e. linkages/corridors) to other protected areas, or other areas which are managed sustainable for their natural resources
- of sufficient extent to ensure that ecological functioning and species composition will be maintained

- of a condition which will enable long-term sustainability and which will optimise opportunities for species dispersal.

3.8 Climate Change

The likely effects of climate change on the biodiversity of the Lower Hunter are acknowledged by the RCP. Although research into the likely implications of climate change is continuing, results to date indicate a high level of agreement on certain actions.

A report by the Rainforest Cooperative Research Centre (Krockenberger et al. 2003) puts forward a concise set of recommendations for actions that should constitute a strategy for mitigating the effects of climate change. These recommendations can be summarised as:

- effective global and local emission control
- minimising the impacts of climate change on biodiversity through cessation of broad-scale land clearing.

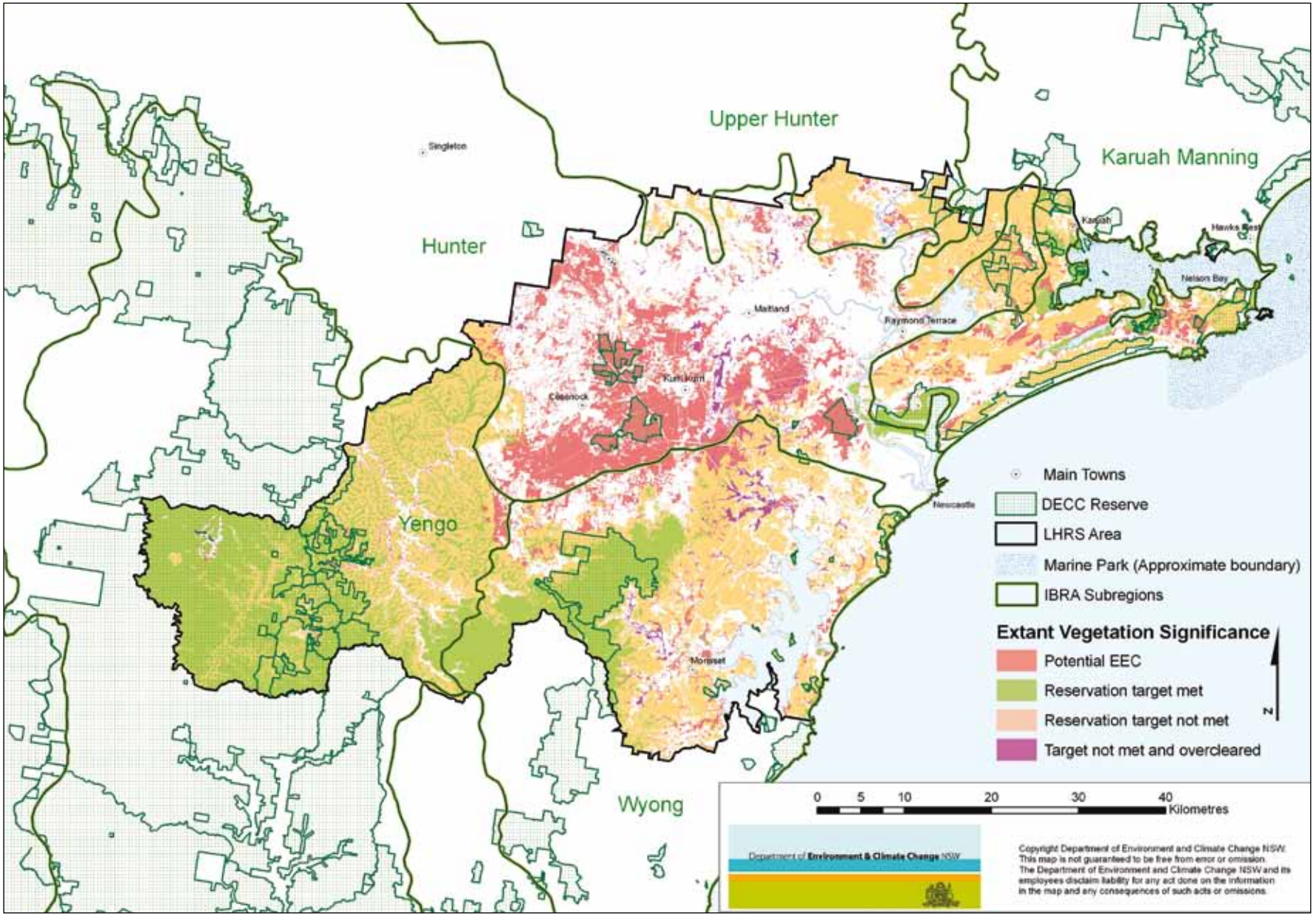
Additional actions recommended include:

- a strategic assessment of the effectiveness of the current protected area network in response to climate change, followed by strategic land acquisitions, which will increase the long-term comprehensiveness and resilience of the network
- an increased emphasis on off-reserve conservation to improve connectivity between reserves and improved movement of species and communities across the landscape in response to climate change
- the biodiversity value of regrowth should be recognised, especially in areas of high value for connectivity of habitat
- decisions on land, water and biodiversity allocation and use should become more precautionary
- consideration of climate change should be incorporated into all levels of community-based natural resource management and environmental planning
- recovery planning should include consideration of the effects of predicted climate change
- a review of the current and predicted distribution and impacts of weeds should be undertaken
- fire management strategies should be revised to incorporate predicted changes to risk and biodiversity movement
- water management should be reviewed and revised to ensure that environmental flows are maintained in waterways and wetlands.

The report also makes recommendations regarding public awareness, monitoring programs, strategic government investment programs (including subsidies to the farming sector) and an ongoing research program into management and impacts of climate change.

Several concepts have been employed in developing the RCP in relation to the effects of climate change on biodiversity. These concepts are consistent with the actions outlined above and will assist in mitigating against the impacts of climate change. These concepts include:

- recognition of the need to protect and consolidate existing areas of habitat
- recognition of the value of providing habitat connectivity, especially across environmental gradients and between existing protected areas
- recognising the importance of conserving areas 'off park' to improve habitat connectivity.



NPWS, 2000. Vegetation Survey, Classification and Mapping. Lower Hunter & Central Coast Region.
A project undertaken for the Lower Hunter Regional Environment Management Strategy.

Map 1: Conservation status of vegetation communities in the Lower Hunter Region

4. Conservation Assessment

4.1 Biodiversity values of the Lower Hunter

4.1.1 Regional overview

The Lower Hunter Region is dominated by valley floors which are fringed in the south-west and north-east by the ranges of Cessnock and Maitland LGAs. The coast contains the expansive lake system of Lake Macquarie, the mouth of the Hunter River at Newcastle and the extensive dune systems and estuary of Port Stephens.

This region covers approximately 430,000 hectares of which roughly 60% or 264,000 hectares is covered with native vegetation. The Lower Hunter Region contains significant wetland areas including estuaries that are of significance for migratory shorebirds, and one of the largest coastal saltwater lakes in the southern hemisphere. The Lake Macquarie system supports endangered marine species and shorebirds including a number of marine turtles. A 2003 study commissioned for the Lake Macquarie City Council investigated the presence and significance of Lake Macquarie for marine turtles (Mead, 2003). This study reinforced strong evidence for the continued, ongoing use of the lake by large numbers of turtles including Green Turtles, Flatback Turtles and Loggerhead Turtles.

Important habitats for these and other fauna include seagrass beds, saltmarsh, mangroves and wetlands (many protected under State Environmental Planning Policy no. 14 – Coastal Wetlands (SEPP 14)). Important species for the area include a number of species listed under the CAMBA and JAMBA international agreements and also species listed under the TSC Act. The lake has regional significance for a number of protected species including the Loggerhead Turtle, the Great Knot and the Little Tern.

This region supports one of the three largest river valley systems in eastern NSW and includes wetlands of international and national significance, including Ramsar-listed wetlands.

The region is of biogeographic and scientific significance as it supports a transition between the northern and southern ecological communities. The Lower Hunter, via the Liverpool Ranges and the extensive Wollemi National Park also provides a link to the drier fauna habitats of the western slopes. The area also forms an east-west migratory pathway and a drought refuge for inland species.

The native vegetation that remains within the Lower Hunter provides habitat for a great diversity of wildlife including many threatened species. The region contributes to a vegetated backdrop of considerable scenic amenity to the coastline and the city of Newcastle.

4.1.2 Vegetation

The majority of the Lower Hunter Region lies within the Hunter catchment. The catchment supports a unique mix of native vegetation including a rich assemblage of plant species that are characteristic of coasts, mountains, semi-arid areas and sandstone outcrops. Numerous plant species that occur in the Hunter Catchment are at the limit of their known distribution. This variety occurs, in part, because there is no abrupt escarpment separating the vegetation on the western slopes from that on the coastal fringe. This has resulted in a substantial mixing of coastal and inland flora. In contrast, other large coastal catchments in NSW are separated from the western slopes by escarpments and plateaux of the Great Dividing Range.

The Lower Hunter Region is part of a transition zone for many plant and animal species between the sub-tropical influences of the north and the cooler, less fertile conditions to the south. As a consequence, the vegetation is unique when compared to the neighbouring regions. The flora of the Hunter Valley floor is remarkably diverse, with approximately 2000 species of vascular plants.

Of the 61 vegetation communities that occur in the Lower Hunter, 19 communities are considered to be regionally significant including ten listed endangered ecological communities (EECs) (NPWS 2000). The Lower Hunter Region currently has 37 threatened plant species including 13 endangered and 24 vulnerable species.

4.1.3 Major ecosystems

Wetlands

The Lower Hunter contains some of the most significant wetlands in NSW. The wetland habitats of the Hunter River estuary, Lake Macquarie and Port Stephens, as well as the habitat corridor from the Watagans Range to Port Stephens, are of exceptional conservation significance.

The Hunter estuary wetlands are listed internationally under the Ramsar Convention due to their unique mix of wetland types, importance for maintaining biological diversity and conservation of migratory shorebirds (including regularly supporting part of the East Asian–Australasian Flyway population of Eastern Curlew). It supports a large number of species at a critical seasonal stage of their breeding cycle and provides a key refuge during inland drought for species such as Freckled Duck, Pink-eared Duck, Australian Pelican and Glossy Ibis.

The Hunter estuary provides important nursery habitat (spawning grounds) for marine organisms including commercial species of fish and prawns (DPI 2004). The Hunter estuary contains the second largest area of mangroves in NSW. Significant saltmarsh habitat also occurs in and around the shores of Lake Macquarie (mainly in the vicinity of Swansea, Teralba and Dora Creek).

These habitats are important as both a feeding and roosting site for a large seasonal population of shorebirds and as a waylay site for transient migrants. An estimated 4800 migratory shorebirds were recorded in the Hunter estuary in 2000 and the 38 species of migratory birds recorded at Hunter Wetlands National Park have been listed under JAMBA and CAMBA. It is important habitat for threatened waterbirds and amphibians, including the endangered Black-necked Stork and Green and Golden Bell Frog.

The Port Stephens estuary supports 22 migratory and ten breeding shorebird species. Approximately 2000 shorebirds and even higher numbers of other waterbirds occur in the estuary, with the area particularly important all year round for larger species of shorebirds. Two endangered and eight vulnerable shorebird species listed under the TSC Act have been recorded from Port Stephens. Lake Macquarie is one of the largest coastal saltwater lakes in the southern hemisphere.

Over 3500 hectares of wetlands either adjacent to or in the vicinity of the Port Stephens estuary are also listed under SEPP 14.

Dry forest and woodlands

The Lower Hunter contains significant areas of dry forest and woodland, comprised of a range of vegetation communities dominated by Blackbutt, Grey Gum, Forest Red Gum, Ironbark, Rough-barked Apple, Scribbly Gum, Smooth-barked Apple, Spotted Gum and Turpentine. The dry forest/woodland fauna have strong affinities with the fauna of the western slopes and the Lower Hunter is thought to act as a refuge during times of inland drought. The enhancement of east–west habitat linkages is important for these species. Indeed, most of the habitat linkages throughout the Lower Hunter lowlands are of greatest functional importance for the dry forest fauna owing to the widespread (although fragmented) occurrence of these species.

Lowland dry forest and woodland are very poorly conserved in the Lower Hunter and are under increasing threat. These habitats are important for the conservation of threatened woodland birds (e.g. Black-chinned Honeyeater, Brown Treecreeper, Speckled Warbler, Grey-crowned Babbler and Diamond Firetail), nocturnal birds (e.g. Powerful Owl, Barking Owl, Masked Owl), arboreal mammals (e.g. Brush-tailed Phascogale, Koala, Squirrel Glider) and bats (e.g. Grey-headed Flying-fox, Little Bentwing-bat, Eastern Freetail-bat, Greater Broad-nosed Bat). The Lower Hunter forests within the Cessnock-Kurri Kurri-Branxton area are of state significance for the nationally endangered Swift Parrot as well as supporting a suite of typically western avifauna. The Squirrel Glider population in the Lower Hunter is of state significance as the area supports extensive, high quality coastal habitat. The woodlands of the Tomago/Port Stephens area support an iconic population of the Koala.

Heath

The extensive heathlands of the Lower Hunter (such as the heaths on the Tomago Sandbeds and around Port Stephens) are among the most significant heath habitats in NSW. The heaths offer a number of important habitat resources. For example, they form a very significant nectar resource, important for a wide range of nectivorous species, including the threatened Grey-headed Flying-fox and Squirrel Glider (in heathy woodlands), as well as a significant number of avian honeyeaters. They also supply dense cover that is utilised by a number of species, including the threatened Spotted-tailed Quoll. The wet heaths are habitat for threatened species such as the Wallum Froglet.

Swamp forest

Swamp forests occur on the Lower Hunter lowlands. These swamp forests are important habitat, with Swamp Mahogany and Paperbark being important nectar sources at key times of the year for threatened species such as the Grey-headed Flying-fox and Swift Parrot, while Swamp Mahogany is a particularly important Koala food tree.

Moist forest/rainforest

The moist forests in the Lower Hunter are found predominantly in the Watagans Ranges and elsewhere in sheltered gullies. They range from rainforest to wet Blue Gum, Turpentine and Spotted Gum forests. An important group of fauna is dependent on this habitat, including threatened species such as the Giant Barred Frog, Stuttering Frog, Wompoo Pigeon, Sooty Owl and Stephen's Banded Snake. Remnants of important lowland and coastal (Littoral) rainforest communities have disjunct occurrences in the study area.

4.1.4 Fauna

The Lower Hunter contains fauna habitats of national and international significance. The Hunter Valley marks a transition zone for many fauna species between the sub-tropical influences of the north and the cooler, less fertile conditions to the south. There is a wide array of fauna habitats in the Lower Hunter that are known, or are likely, to support 80 threatened species, including 17 endangered species.

4.2 Conservation status of the Lower Hunter

4.2.1 Overview

Vegetation communities have been used within this RCP as an indicator, or surrogate, of species distribution and diversity across the Lower Hunter Region.

Two thirds of the Lower Hunter remains vegetated and while the large majority of this vegetation is restricted to the slopes and ranges, some large vegetated areas still remain on the valley floor where clearing has been most extensive. Historically, much of the uncleared land on the valley floor has been either Government owned (such as State Forest or Crown Lands managed by Hunter Water Corporation) or owned by mining companies for extractive purposes. Vegetation on the valley floor outside of these core areas is highly fragmented. Many of the wetland communities of the Lower Hunter are also highly fragmented (for example, saltmarsh).

These small remnants are highly vulnerable to edge effects such as increases in weeds and introduced predators, increase in levels of nutrients, grazing, altered fire regimes and altered drainage. Fauna may also be impacted by changes to the microclimate, an increase in extreme temperatures, an increase in wind and wind damage and genetic isolation. Many fragments are less than 10 hectares in area.

Of the 61 vegetation communities that occur in the Lower Hunter, over half have not met reservation targets in the current reserve system. Of these inadequately reserved vegetation communities, seven have negligible or no representation within formal reserves across the Lower Hunter. None of the EECs are adequately reserved (under JANIS targets).

Wetland vegetation communities are some of the most poorly conserved and at risk. For example, Swamp Mahogany – Paperbark Forest has only 3% of its pre-1750 distribution within reserves in the Lower Hunter.

The fauna of the Hunter Valley has suffered from the large-scale removal of native vegetation. Many forest and woodland dwelling species are now uncommon on the valley floor and are largely confined to the slopes and rugged areas where there have been fewer disturbances.

One of the most significant areas of remaining vegetation is the Mount Sugarloaf to Port Stephens corridor, which provides a vegetated link through the 'Tank Paddock' from the sandstone mountains down through the foothills to the coastal plain. This is one of only a few remaining vegetated links between the Great Dividing Range and the east coast. This corridor is highly significant and allows for fauna movement such as seasonal migration and juvenile dispersal.

4.2.2 Regional analysis

The Lower Hunter area can be divided into a number of regions and subregions, each with its own characteristics of climate, lithology/geology, landform, vegetation, flora and fauna. The *Interim Biogeographic Regionalisation for Australia* (IBRA) (Environment Australia 2000) provides an overview of landscape patterns across the Lower Hunter Region. IBRA subregions provide a useful set of boundaries for understanding patterns of clearing and other threats to biodiversity, and are used in this RCP to provide an overview of conservation status and to guide conservation efforts.

The Lower Hunter Region can be broadly broken into five land systems using the IBRA subregions classification: the Upper Hunter and Karuah-Manning are more characteristic of environments on the north coast while the Yengo, Hunter (lower) and Wyong subregions have greater similarities to other parts of the Sydney basin (refer to Map 1).

Environmental threats vary between subregions and include degradation of native vegetation and wetlands, development, extraction of natural resources, weeds and pests, extraction of river and ground water, barriers to fish migration, and recreation (Hunter–Central Rivers Catchment Management Authority 2007). The land systems in the Lower Hunter and the major threats in each are described below.

Yengo

This subregion is comprised of the Narrabeen and Hawkesbury sandstone ranges that occupy the south–western portion of the Lower Hunter. Yengo National Park, Corrabare State Forest and Pokolbin State Forest are major features of this subregion. This is the most intact of the subregions that occur in the Lower Hunter and only 9% of the area has been cleared. However, this region has a high proportion of State Forest and privately owned forested land that has been subjected to selective logging for timber production and management for pit prop production to support the local mining industry.

Hunter

This subregion occupies one third of the study area. This is a largely cleared, farmed and mined landscape of the Hunter Valley floor but also includes some forested areas to the west of Port Stephens (Medowie State Forest, Medowie State Conservation Area and Wallaroo State Forest) and Grahamstown Dam. Almost 80% of this subregion has been cleared and only 4% is within conservation reserves. Major threats include continued fragmentation and further degradation of vegetation remnants.

The Hunter Valley Lowlands have been subject to the greatest extent of clearing in the subregion and support a number of EECs. The River-Flat Eucalypt Forest on Coastal Floodplains in particular has undergone extensive clearing. Other EECs in this region include:

- Lower Hunter Spotted Gum – Ironbark Forest
- Kurri Sand Swamp Woodland
- River-Flat Eucalypt Forest on Coastal Floodplains
- Quorrobolong Scribbly Gum Woodland
- Hunter Lowland Redgum Forest in the Sydney Basin Bioregion.

The Hunter Valley lowlands continue to be subject to high levels of threat from clearing, logging and other forms of degradation. The fauna species found in lowland forests are therefore particularly vulnerable.

Wyong

The Wyong subregion incorporates the coast and hinterland south of the Hunter River including Lake Macquarie, the Watagan Ranges and coastal forests and heath. This subregion is relatively intact with less than 30% of its area cleared. Almost 12% of the subregion is within reserves. The vegetation of the Wyong subregion is under major threat from land clearing for new developments, degradation from fragmentation and isolation, and competition from weeds.

Karuah Manning

The Karuah Manning subregion is largely comprised of Coastal Barrier Sands, estuarine plains and alluvial deposits. This region supports large areas of significant wetlands, coastal sand heaths and woodland from Fullerton Cove north to Port Stephens. Over half of this subregion has been cleared. A number of EECs occur within the Wyong and Karuah-Manning sub-regions, which reflect the pressure placed on the remaining vegetation. These EECs include:

- Swamp Sclerophyll Forest on Coastal Floodplains
- Freshwater Wetlands on Coastal Floodplains
- River-Flat Eucalypt Forest on Coastal Floodplains
- Littoral Rainforest
- Swamp Oak Floodplain Forest
- Coastal Saltmarsh of the NSW North Coast, Sydney Basin and South East Corner Bioregions.

Upper Hunter

Although the Upper Hunter sub-region is largely cleared for agriculture and grazing, the relatively small intrusion of this sub-region into the LHRS area is in relatively good condition with Wallaroo National Park and Wallaroo State Forest occupying a large portion of the eastern occurrence. These are significant reserves for this subregion which has less than 1% reserved. The Williams River, the Allyn River and the Paterson River are major features of this sub-region, forming north-south valley systems.

4.3 Threats to the biodiversity of the Lower Hunter

Australia has a record of having the highest rate of species extinction of any country in modern history, mainly due to land clearing, water harvesting, and the introduction of rabbits and foxes (Glaznig 1995).

The EPBC Act defines threats to biodiversity. These threats will need to be considered throughout the process to implement the RCP. Some of the relevant threats identified in the Act include competition and land degradation by feral rabbits, land clearance, loss of climatic habitat caused by anthropogenic emissions of greenhouse gases and predation by the European Red Fox.

The TSC Act also lists a range of 'key threatening processes', which have been considered in identifying the key threats to biodiversity in the Lower Hunter.

The primary cause of future biodiversity loss within the Lower Hunter is likely to be development and economic activity, and the consequential change in land use and form (Fallding 2004). The major contributing activities associated with this type of land use include:

- clearing of native vegetation
- land filling and earthworks
- weeds and feral animals
- roads and traffic
- bush fire management, such as the creation of asset protection zones, fire trails, and understorey thinning
- agricultural activities, such as cropping, viticulture and livestock grazing
- pollution and land contamination, including salinity
- changes to hydrological regimes
- soil erosion and sedimentation
- rubbish dumping.

Approximately 1500 hectares of vegetation has been cleared within the Lower Hunter in the past five years (based on Spot satellite imagery interrogation), with approximately 35% of the Lower Hunter being substantially cleared of native vegetation. Of the 65% of vegetation remaining, much has been affected by activities such as forestry, agriculture, weed encroachment and human settlement. The implications of historical land use practices on biodiversity within the Lower Hunter have been significant, and the effects of these practices are unlikely to be fully realised for many decades. For example, small isolated fragments of native vegetation may not be viable in the long term: having a greater boundary in proportion to their area makes these patches more vulnerable to stochastic events such as fire, and to edge effects such as weed invasion.

Map 1 illustrates vegetation communities in the Lower Hunter and their conservation status as measured by JANIS comprehensiveness targets.

5. Potential Impacts of the Lower Hunter Regional Strategy

5.1 Biodiversity impacts

A major role of the LHRS is to focus and constrain the development footprint across the landscape. The LHRS directs residential and employment development into selected areas to accommodate the projected growth of the region over the next 25 years.

Areas of high biodiversity value and other planning constraints were considered by the Department of Planning when identifying the proposed development areas for the LHRS. Biodiversity constraints mapping by DECC was taken into account in the process of identifying development areas for the LHRS. In most cases, high conservation areas will be protected and development will be located on low conservation value areas. However, in some areas, it was determined that social and economic considerations (for example, proximity to existing infrastructure or settlements) outweighed biodiversity considerations and, as a result, some of the proposed development areas include areas with conservation values. In addition, previous land use decisions have resulted in areas of high biodiversity value being zoned for development.

The analysis of biodiversity impacts in this RCP is limited to the development areas, which are able to be mapped at this time. These areas are the proposed development scenarios in the LHRS and the areas currently zoned for development but which are not currently developed.

The following categories of development are likely to result in biodiversity impacts but cannot be mapped with any accuracy. Therefore, no impact analysis has been undertaken for the following developments in this RCP:

- infrastructure requirements that emerge as a consequence of or in support of planned growth
- other major development projects that cannot be accommodated within planned employment lands, such as mining activities and associated infrastructure
- potential for development of additional greenfield release areas via the Sustainability Criteria.

The biodiversity impacts associated with the categories of development not considered in this RCP will need to be assessed and offset through other mechanisms, including BioBanking (see Section 8). This may be done on a case-by-case basis, often at the time of rezoning or at the development assessment stage.

It is highlighted that the data presented in this section assumes that 100% of the existing vegetation on the proposed development sites will be cleared. It is noted that some vegetation will be retained in various forms including riparian buffers and open space areas. However, it is difficult to estimate the level of vegetation that will be retained on these sites. In addition, it is noted that the biodiversity value of any residual vegetation will be significantly eroded through fragmentation effects including weed infestation, erosion and track formation.

It is noted that the Department of Planning has adopted slightly different assumptions in calculating the expected extent of vegetation loss. Both agencies acknowledge that at this stage it is not possible to accurately determine the exact extent of vegetation loss and that the figure and the associated offsets required will need to be reviewed throughout the implementation process.

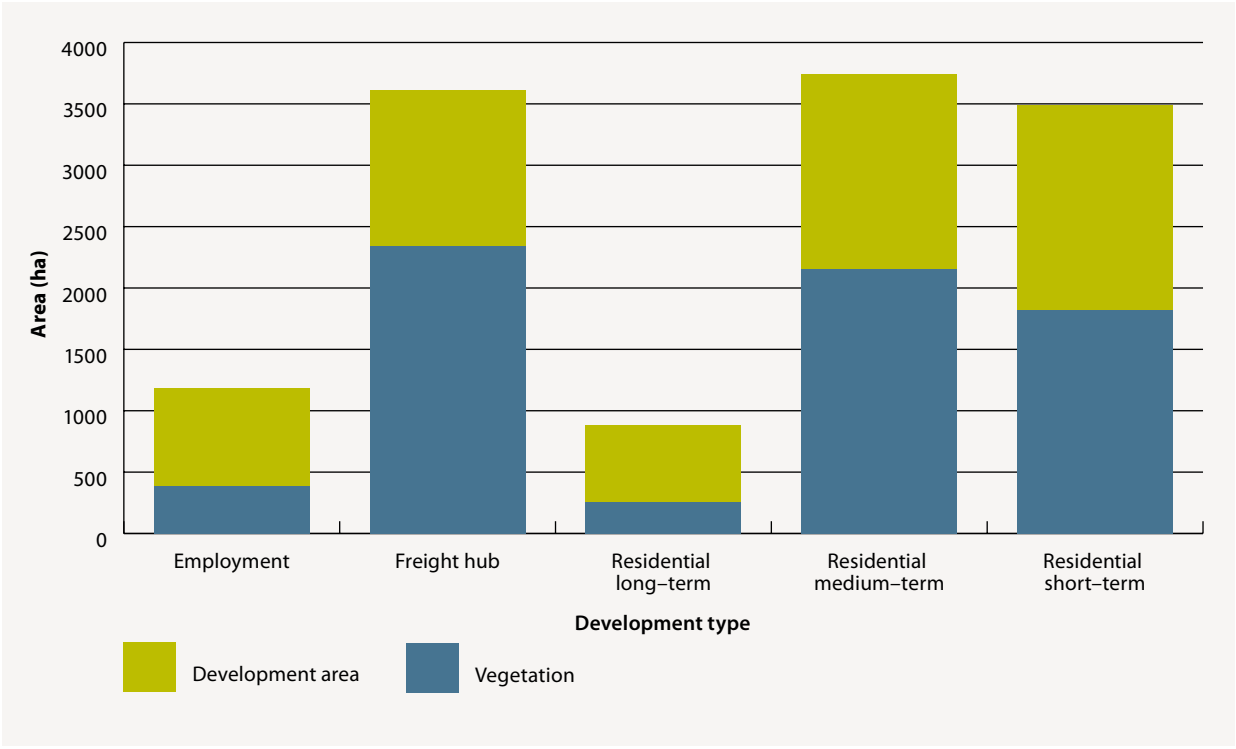
5.2 Biodiversity impact of development scenarios

The LHRS consists of 34 development scenarios covering approximately 12,900 hectares of land complemented by the identification of a Green Corridor plus land dedications/additions of approximately 32,000 hectares to the NSW conservation reserve system. The area of vegetation within each development type is described in Figure 2.

It is estimated that up to 4000 to 5000 hectares of native vegetation occurs within the future urban or future employment lands identified in the LHRS. As part of the LEP making and development assessment process efforts will be made to protect significant areas of vegetation from clearing through appropriate zoning and development conditions.

Similarly, it is noted that an additional 2300 hectares of vegetation occurs on the freight hub site and it is unclear at this point how much of this site will be cleared. However, the LHRS does require a structure planning process to occur that will maximise the employment and conservation outcomes for the precinct. The Department of Planning advises that the structure planning process and subsequent LEP making and development assessment processes will reduce the potential for clearing to a worst case scenario of 200 hectares, or less.

More than half of all vegetation within the development proposals occurs within proposed residential zoning.



Note: At this stage it is unclear how much clearing is likely to occur on the freight hub site. A structure planning process will be used to define development and conservation areas. Figures shown represent all vegetation onsite.

Figure 2: Native vegetation within the LHRS proposed development areas

The conservation values that occur within the development scenarios and which are therefore vulnerable to degradation and destruction are described in Figure 3. Note that a single area may have multiple conservation values; for example a regionally significant wetland may also be a key habitat. The features most affected in terms of total area within the development scenarios are EECs and vegetation communities not adequately represented in the reserve system (labelled as under-target vegetation communities (JANIS) in Figure 3). Once again the LEP making and development assessment process will seek to ensure that these significant areas of vegetation are protected from clearing through appropriate zoning and development conditions.

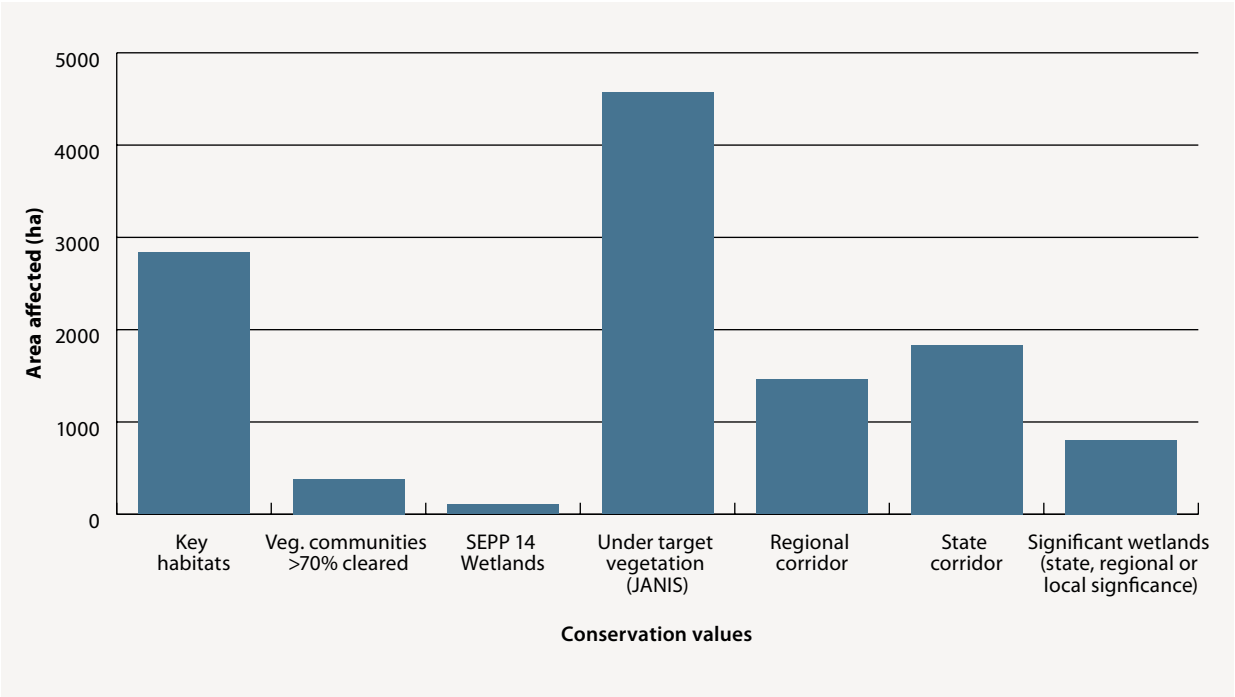


Figure 3: Area (ha) of each conservation value within proposed development areas

Figure 4, provides a breakdown of the impact of the development scenarios on total EECs. As noted previously, a structure planning process for the freight hub site will confirm the exact extent of clearing.

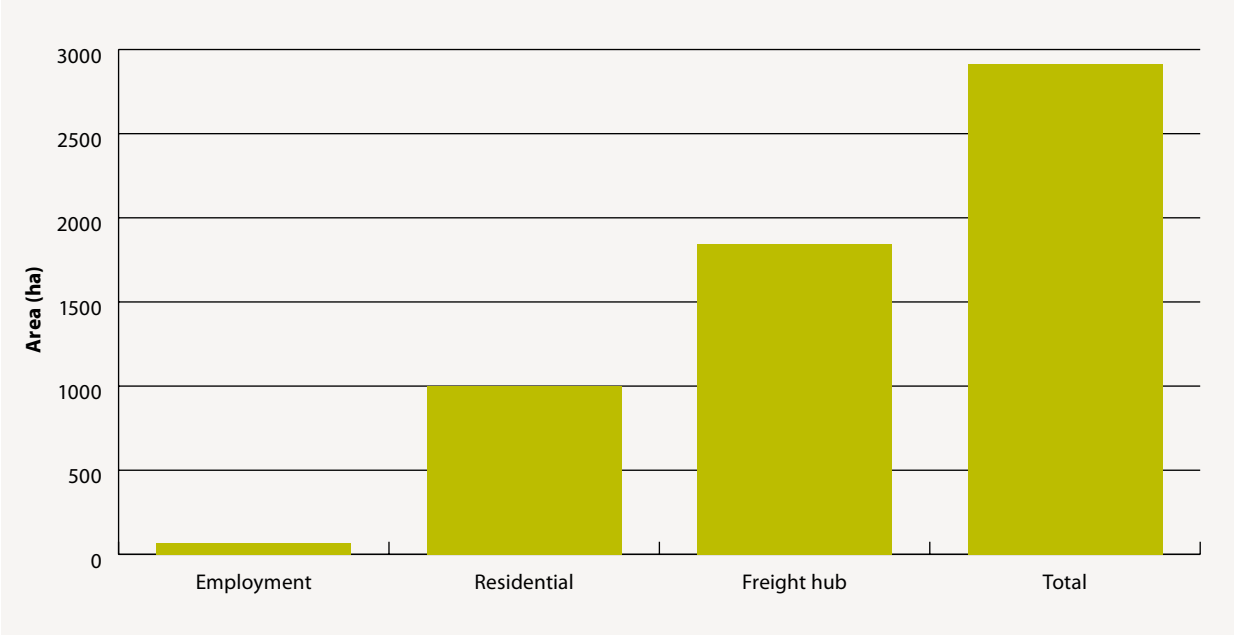


Figure 4: Impact of development proposals on endangered ecological communities

5.3 Biodiversity impacts in areas currently zoned for development

There are significant areas in the Lower Hunter which are currently zoned for development but which have not been identified as development lands in the LHRS. Figure 5 provides a summary of the zoning of these lands and the vegetation they contain. The areas fall into two categories:

1. Lands which are already zoned for development and for which development is expected but has not yet occurred (or occurred only in part). These lands would be the highest risk of all zoned land in terms of vegetation loss because of development (1960 ha).
2. Areas zoned for development and which have been developed but which retain some native vegetation (7080 ha).

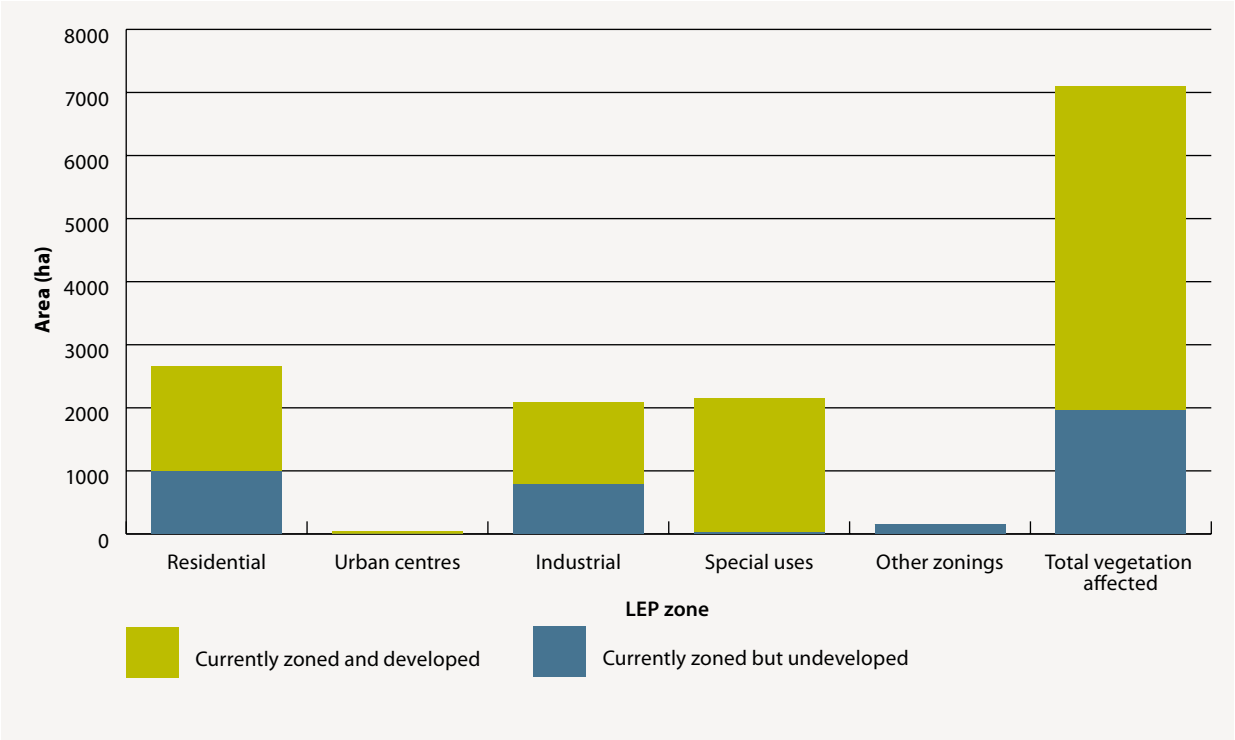
Note that within areas zoned for development but not yet developed, not all the native vegetation will necessarily be cleared: vegetation may be retained as part of landscape planning (such as roadside vegetation) and other areas may be subject to building constraints.

Vegetation remnants within areas which have already been developed include roadside vegetation, small patches within urban areas, streamside reserves and commercial and industrial buffer land. It is expected that the majority of this vegetation will persist but is likely to be degraded to some extent through adjacent development. Isolated patches of vegetation within urban landscapes are subject to degradation through physical disturbances, weed invasion and other edge effects as described in Section 4. The value of these areas for fauna is frequently reduced due to their size and isolation from larger patches of habitat, the presence of feral animals and loss or alteration of essential habitat components such as tree hollows or understorey. Therefore the biodiversity value of these residual areas is severely diminished.

There are a number of large and significant parcels of vegetated land zoned for development outside the LHRS which are worthy of note. They include the following:

- Residential-zoned land in Western Lake Macquarie (Booragul) and North Stockton Beach (Fern Bay).
- Undeveloped industrial-zoned land which includes two large mining areas (Eraring, Doyalson) and industrial lands at Kurri Kurri.
- Infrastructure land which includes roadside reserves, Williamtown Airport, Newcastle University grounds and waste treatment works.

Zones considered to be development zones are 2 (Residential), 3 (Urban centres), 4 (Industrial), 5 (Infrastructure) and Lake Macquarie 10a (Investigation for development). These figures exclude the Australian Defence Force (ADF) land to the north east of Medowie (Bombing Range) which is under no immediate proposal for development and is expected to remain in its current condition through this planning period. This ADF land is approximately 2600 hectares in size.



Note: The figures shown indicate total possible vegetation loss. While it is expected that these lands will be developed in the future, the actual area to be cleared will ultimately be subject to site-specific constraints and planning considerations.

Figure 5: Area of native vegetation within lands currently zoned for development but not included in the Lower Hunter Regional Strategy

6. Biodiversity Investment Guide

6.1 Purpose of the guide

The purpose of the biodiversity investment guide is to identify strategic regional conservation priorities to maximise the conservation of biodiversity in the Lower Hunter with the resources available. The intent is to focus on those areas most important for conservation, rather than passively reacting to development pressures.

DECC has identified two categories of priorities:

1. High priority regional conservation areas – which could provide a focus for BioBanking and having the potential as stand alone reserves.
2. Other regional conservation priorities – which could be protected via a range of conservation mechanisms by both private and public landholders, such as Voluntary Conservation Agreements.

Together, these priorities form the basis of the 25-year biodiversity investment guide for the Lower Hunter.

If the areas identified are conserved in accordance with the mechanisms outlined in Section 8, these offsets will make a significant contribution to achieving an improve or maintain outcome, in response to the development scenarios identified in the LHRS. In this context, 'reserve' means lands being actively managed for conservation by public or private land managers through a range of formally recognised schemes.

6.2 A 25-year investment strategy

Formal reservation of natural areas (such as the creation of national parks or nature reserves) is widely recognised as the most secure and effective means of protecting biodiversity (Rodrigues et al. 2004). This is reflected in NSW policy and legislation, and national and international policy.

In order to be effective, a reserve system needs to protect the range of biodiversity present in any given region. This usually requires an analysis of regional conservation values and strategic targeting of reserves: opportunistic creation of reserves as a result of unrelated land use decisions may result in a highly biased reserve system which over-represents some natural values and misses others altogether.

The 25-year investment strategy recognises formal reservation as one mechanism to achieve positive outcomes in the Lower Hunter. The strategy also recommends complementary conservation measures which provide for conservation of biodiversity across the region. These include BioBanking, voluntary conservation agreements and protective covenants.

The principles guiding the development of the 25-year investment strategy have been taken from State and Commonwealth government policies for building a comprehensive, adequate and representative reserve system, specifically the JANIS and National Reserve System principles. JANIS targets have been adopted to guide the selection of reserves so that, in the future, the reserve system may protect the range of biodiversity in the region. The National Reserve System principles have been applied to increase the chances of these reserves being viable in the long term.

The 25-year investment strategy focuses on the following conservation areas and mechanisms:

- **High priority regional conservation areas:** major contiguous areas of high conservation value vegetation. These areas would be suitable for a system of national parks, nature reserves and/or state conservation areas or could be the focus of BioBanking efforts that would add to the secure core or 'backbone' of the biodiversity investment strategy (including those that arose from Stage 1 implementation of the RCP in 2006). The proposed reserves are large, well connected and contain a range of ecological communities in moderate to high condition. Core areas on public land will provide a focus for the addition of conservation areas elsewhere in the region. The high priority regional conservation areas are shown on Map 2.
- **Other regional conservation priorities:** smaller or more dispersed areas of high conservation value elsewhere in the landscape. Conserving these 'other regional conservation priorities' will be critical, if an overall outcome that improves or maintains biodiversity is to be achieved. In these areas a range of conservation mechanisms may be appropriate, including conservation agreements, management of weeds and feral animals, enhancement of riparian vegetation or formal reservation. These investment areas are shown on Map 3.

6.3 High priority regional conservation areas

Within the Lower Hunter Valley there are two long-standing proposals for new conservation reserves and two more recent proposals, all of which have had strong community support for a number of years. DECC's analysis confirmed these areas as the regional conservation priorities, which have been incorporated in the 25-year strategy. Implementation of Stage 1 focused on securing key elements of these areas for conservation.

The most significant of these is the Watagan Ranges to Port Stephens proposal, which provides a highly significant link between southern sandstone ranges and the coastal heaths and wetlands of Port Stephens. Corridors are a major theme in the new reserve proposals, as they enable a range of benefits for biodiversity such as access to critical resources, genetic exchange between individuals of the same species and dispersal of juveniles.

The South Wallarah Peninsula is another long standing conservation priority. Opportunities will be pursued to build on and extend the existing conservation values of Wallarah National Park and provide protection for EECs and the threatened plant *Tetratheca juncea*, as well as protecting some of the foreshore of Lake Macquarie and the coastal shore. Protection of key areas on the Peninsula will also assist in creating a coastal corridor connection linking Wallarah National Park and Munmorah State Conservation Area and provide a green buffer between Newcastle and the Central Coast.

The Port Stephens reserve (additions to Karuah Nature Reserve and Worimi Nature Reserve) will protect important Paperbark Swamp forests, SEPP 14 wetlands, foreshores of Port Stephens and habitat for threatened species, including migratory species.

A Werakata extension (near Cessnock) significantly expanded the existing area of formal reserve and will conserve significant areas of endangered ecological communities.

The LHRS acknowledged that these regional conservation outcomes for the Lower Hunter would be established through the transfer of government and private lands. Future proposed developments in the Lower Hunter will be assessed against current legislation. Impacts to biodiversity, including threatened species, should be first avoided or mitigated. Where appropriate the Government will consider offsetting future development by entering into planning agreements with the developer under which the developer is required to dedicate

land identified as having conservation value free of cost. Where appropriate, such land could be incorporated into the reserve system. Offsets will be developed in accordance with government policy and guidelines.

As previously stated, the land identified as the basis for the new reserves was public land, which the Government committed to transferring as Stage 1 of implementing this Plan. Approximately 20,000 hectares was transferred under this new commitment. The majority was transferred to conservation reserves under the *National Parks and Wildlife Act 1974* (NPW Act), with a smaller balance reclassified from operational forest to flora reserve under the *Forestry Act 1916*.

It is noted that urban developments proposed under the LHRS may also generate the need for biodiversity offsets. These offsets may, in turn, form part of the formal reserve system where the proposed offsets contribute to the afore mentioned conservation corridors and priorities.

Over the life of the Plan, DECC will be looking at opportunities to add to these important new reserves, improving reservation targets and connectivity across the landscape. A final key priority is securing some viable areas of endangered and under-reserved valley floor ecosystems. These will be achieved by mechanisms such as BioBanking, planning agreements (S93F EP&A Act) voluntary conservation agreements and protective covenants.

6.3.1 Conservation values of the reserves

The creation of the reserves under the *National Parks Estate* (*Lower Hunter Region Reservations) Act 2006* and also the private landholder agreements will contribute towards most JANIS targets and will result in the reservation targets for some vegetation communities being met. The key factor in developing the new reserve proposals was conservation values.

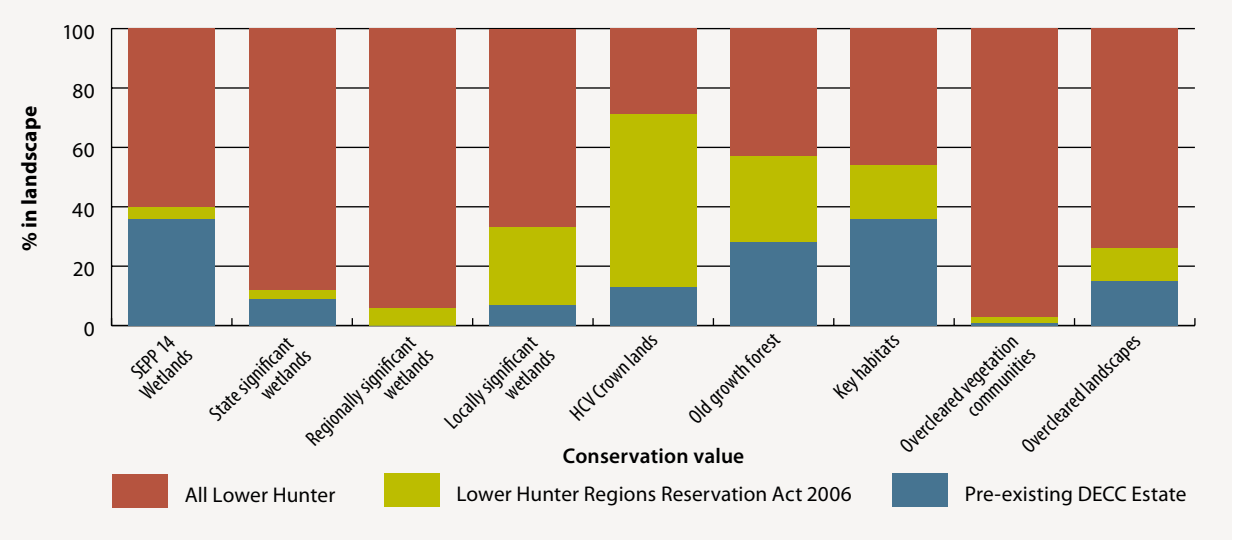
However, the level of existing threat, patch size, connectivity and the presence of public lands to form the core of reserves were also crucial considerations. Consequently, substantial areas of high conservation value lie outside the new reserve proposals. The proposed reserves will need to be complemented by protection of some of these additional areas before all JANIS targets can be met.

Major benefits of the new reserve proposals include:

- potential increase in the reservation of 59 of the 61 vegetation communities present in the region
- provision of habitat for 75 of the 104 priority fauna species known from the Lower Hunter
- reservation of a significant area of mapped EECs
- expansion of the nationally significant freshwater wetlands of Hexham Swamp Nature Reserve
- further reservation of the internationally significant and Ramsar-listed Kooragang wetlands
- protection of large areas of important estuarine wetlands around Port Stephens.

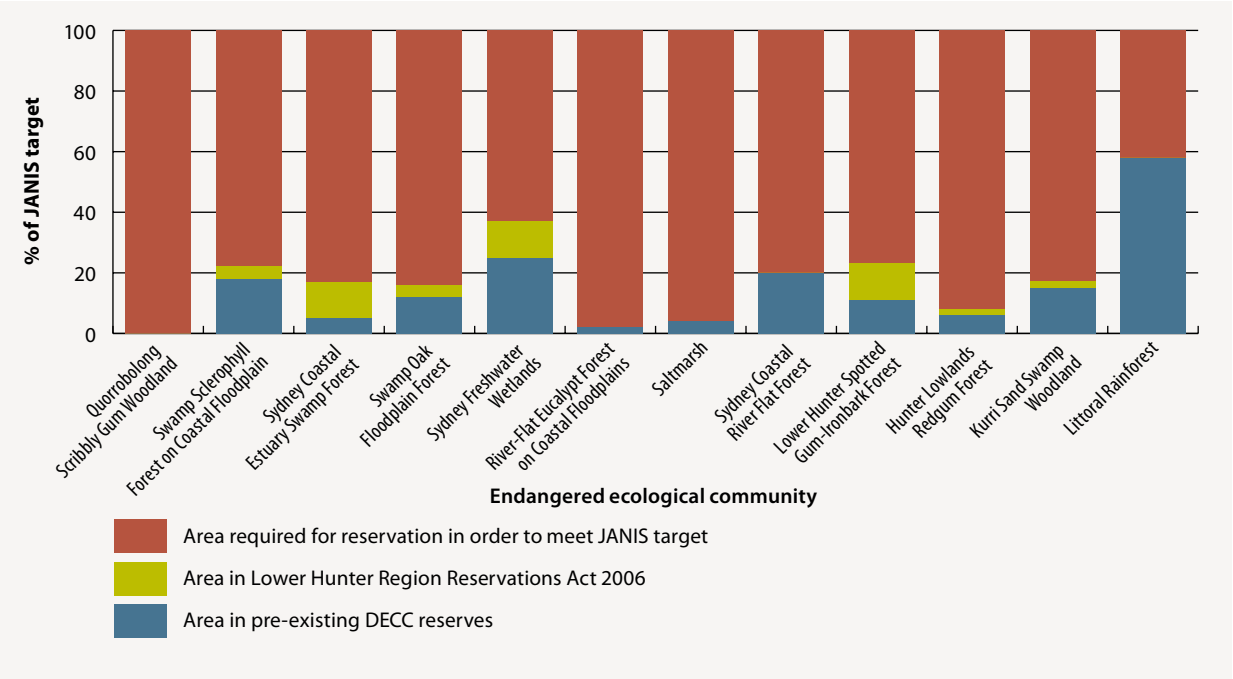
Figure 6 illustrates the extent to which conservation values are currently represented in the reserve system and the potential contribution that the new reserve proposals will make to their protection. Note that Figure 6 shows only the additional values protected under the *National Parks Estate (Lower Hunter Region Reservations) Act 2006* and does not take into account any additional areas that may be reserved through BioBanking, planning agreements or similar mechanisms.

Figure 7 provides an overview of the degree to which EECs are protected under existing reserves in the region and the degree to which the new reserves would contribute to their protection. As noted for figure 6 above, this figure only shows the benefit of the lands protected under the *National Parks Estate* (*Lower Hunter Region Reservations) Act 2006*.



Note: The full title of the Act is National Parks Estate (Lower Hunter Region Reservations) Act 2006

Figure 6: Percentage of the total area of conservation values (based on JANIS criteria) in LHR and their representation in existing and proposed reserves



Note: The target for EECs is 60% of the extant area remaining in the region.

Figure 7: Percentage contribution made to JANIS targets for EECs within existing and proposed reserves in the Lower Hunter

6.3.2 Community benefits of the reserves

The addition of new formal reserve areas will significantly enhance the recreational and tourism opportunities for communities in the Lower Hunter, particularly in the western areas where significant population growth is anticipated. For example, this may include additional visitor facilities on Ash Island, including walking and cycling trails and BBQ and camping areas.

Similarly, there is an opportunity for a regional cycleway through the Hexham Swamp. In addition, opportunities for short-term visitor accommodation (cabins) in the Watagans and Ash Island will be investigated. In the Watagans other visitor opportunities will be considered, including new walking tracks and remote cycling experiences.

The new reserves will provide important habitat protection for migrating bird species including those species listed on the CAMBA and JAMBA. This will help enhance opportunities for passive bird watching in the Lower Hunter area, which is a high profile activity by a number of local community groups and is a recognised tourism asset for the Hunter.

The reserve proposals will provide enhanced protection for Kooragang Island and the Upper Arm of the Hunter River, which are listed under the Ramsar international wetland protection treaty and which have internationally recognised values.

Other benefits accruing from the new reserves will include air and water quality improvements and retention and enhancement of carbon sinks. Carbon sinks are particularly important in the Lower Hunter, due to locally high greenhouse gas emissions, including gases sourced from electricity production plants and other high greenhouse gas emitting sectors.

6.4 Other regional conservation priorities

Other areas of high conservation value have been identified through the process of developing the RCP.

Those areas of high conservation value which have not been incorporated into the new formal reserves have been identified as suitable for protection using a suite of other conservation mechanisms. These include BioBanking, voluntary conservation agreements under the NPW Act, environment protection zonings or appropriate conservation management plans. These areas include lands under public and private ownership. Some of the key values and areas classified as other regional conservation priorities are shown in Map 3. Nonetheless, the inclusion of the lands in this category will not preclude their formal reservation at a later date should that be appropriate. Any such reservation proposal would be subject to normal reservation mechanisms.

Success in protecting these areas will depend on a range of factors such as the willingness of private landholders to be involved in conservation mechanisms and the availability of funding for acquisition or improved biodiversity management. There may also be opportunities to create future additions to national parks in some of these areas through voluntary acquisition or developer agreements.

These 'non-reservation' regional conservation priorities should be the focus for efforts to offset the biodiversity impacts of high impact projects identified under the LHRS, and those that arise subsequently. The mechanisms to be employed in offsetting these impacts are likely to include BioBanking, planning agreements or dedication of land for national parks or other conservation reserves.

DECC is currently working with the HCRCMA to define priority areas for conservation rehabilitation efforts. At this stage a pilot project is focusing on three Central Coast LGAs including the Lake Macquarie LGA and will more clearly define 'other priority' conservation investment areas for this LGA. It is hoped that this model will be applied to other council areas in the Lower Hunter and will provide a greater level of detail to guide future conservation investment.

West Lake Macquarie

The West Lake Macquarie area supports a diverse range of vegetation communities, most of which are not yet adequately represented in the reserve system. These include Swamp Sclerophyll Forest on Coastal Floodplain, which is an endangered ecological community. Threatened flora including *Tetratheca juncea* and *Acacia bynoeana* are also found in the area.

The vegetation communities in West Lake Macquarie area provide significant habitat for a number of threatened species including forest bats, Squirrel Glider, Yellow Bellied Glider and Forest Owls (Sooty, Powerful and Masked). The area also supports a range of wetland dependent threatened birds, such as the Black Bittern, Australasian Bittern, Blue Billed Duck and Comb Crested Jacana, many of which are listed in international treaties. Threatened woodland birds such as the Brown Treecreeper are also present. The area provides critical corridors for these species between the Watagans and Lake Macquarie.

The ecological value of this area and public support for the stronger conservation of these values was highlighted in the draft conservation plan and in public submissions received. Of the 249 submissions received, 179 (72%) raised the issue of West Lake Macquarie and the need to improve the conservation status of this area. The absence of new reserves in this area dominated the consultation process and was the focus of significant media and community interest. Submissions highlighted the approximately 2500 hectares of Crown land near Awaba, which contains high conservation values.

The Government's decision to prohibit open cut coal mining in the Lake Macquarie City Council area has created an opportunity to investigate conservation options for suitable public lands. Given the major conservation gains already being put in place via the new reserves that the Government has legislated or is negotiating to put in place in other parts of the Lower Hunter plan area, additional conservation areas in West Lake Macquarie are clearly the next highest priority for the future. DECC will be actively working to improve conservation of priority lands in the West Lake Macquarie area by improved conservation practices on other crown tenures, through private land partnerships or as the sites for conservation offsets. DECC will also be working with Council and the Department of Planning to ensure appropriate protective land-use zonings apply in high conservation areas, as a basis for biodiversity certification of new LEPs.

Coastal Wetlands

There are several wetlands along the coast between Dudley and Swansea, which have significant conservation value. These wetlands are located between Lake Macquarie and the ocean and include over 300 hectares of SEPP 14 Wetlands and over 600 hectares of State and regionally significant wetland vegetation.

These wetlands provide habitat for a broad range of flora and fauna including a number of species listed under international agreements (CAMBA and JAMBA). Migratory species known to use this area include the Little Tern, Caspian Tern, Bar-tailed Godwit, Great Egret and Great Knot. Other threatened species including the Wallum Froglet are also known to occur in the area.

Important wetlands in this area include Jewells Swamp (near Redhead), Belmont Lagoon and swamp forest areas at Pelican Flat and north to Belmont South.

The importance of this area was emphasised by several submissions on the draft RCP, which recommended that this area be included in the new reserves. It is also noted that while the areas contain significant biodiversity values, there are several issues which compromise its suitability for reservation under the NPW Act.

It is noted that the majority of this area is currently zoned for environment protection and that SEPP 14 applies to some sections of the wetland. While these mechanisms will provide a level of protection for the wetlands, it is recommend that further consideration is given to options which will ensure that these important areas are conserved in perpetuity. DECC will actively promote the conservation of these areas through the appropriate land managers.

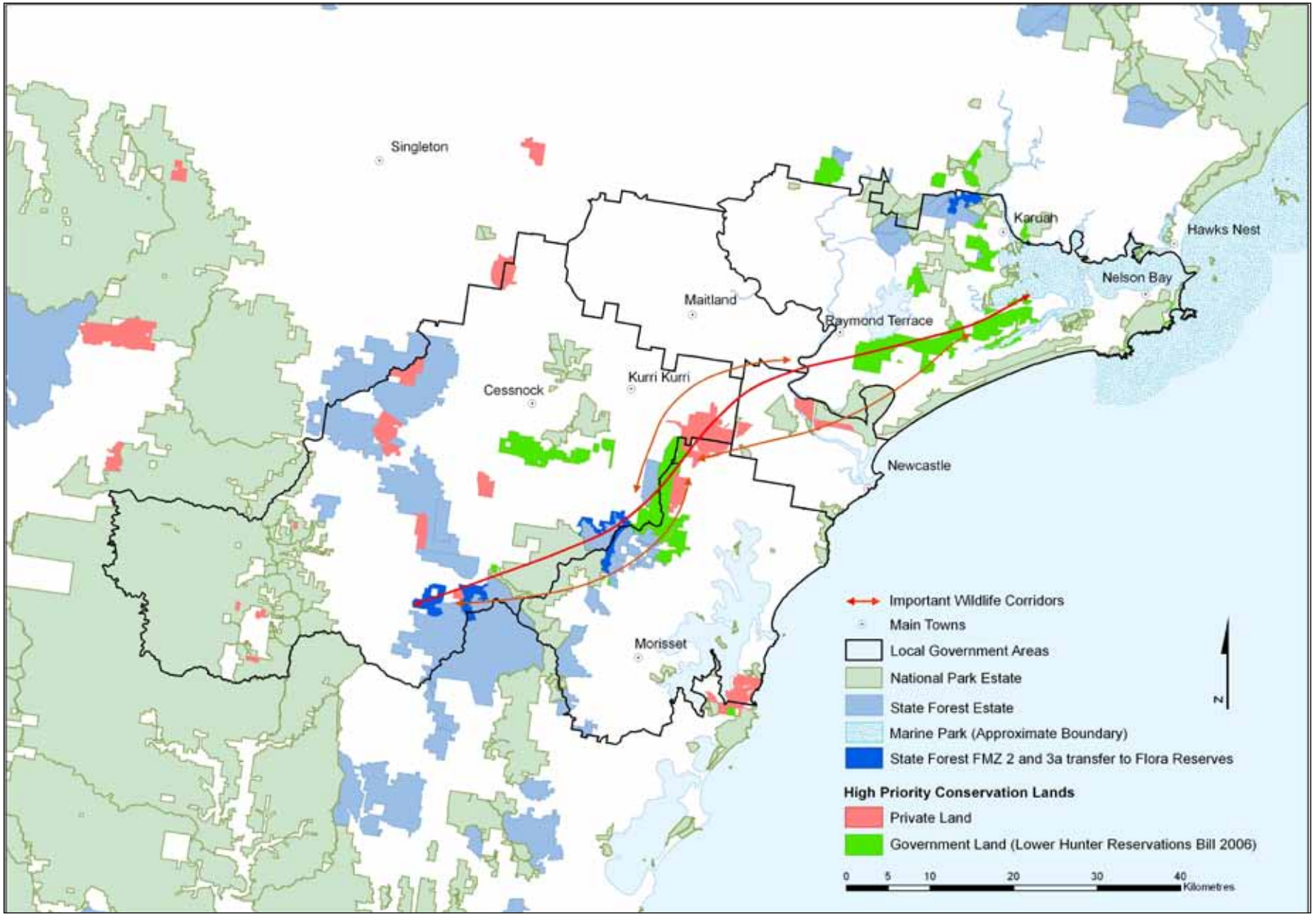
6.5 Ongoing refinement of the 25-year investment strategy

The 25-year investment strategy is to be reviewed every five years. The review will be to ascertain the success of the investment strategy in achieving its conservation goals. The review will include:

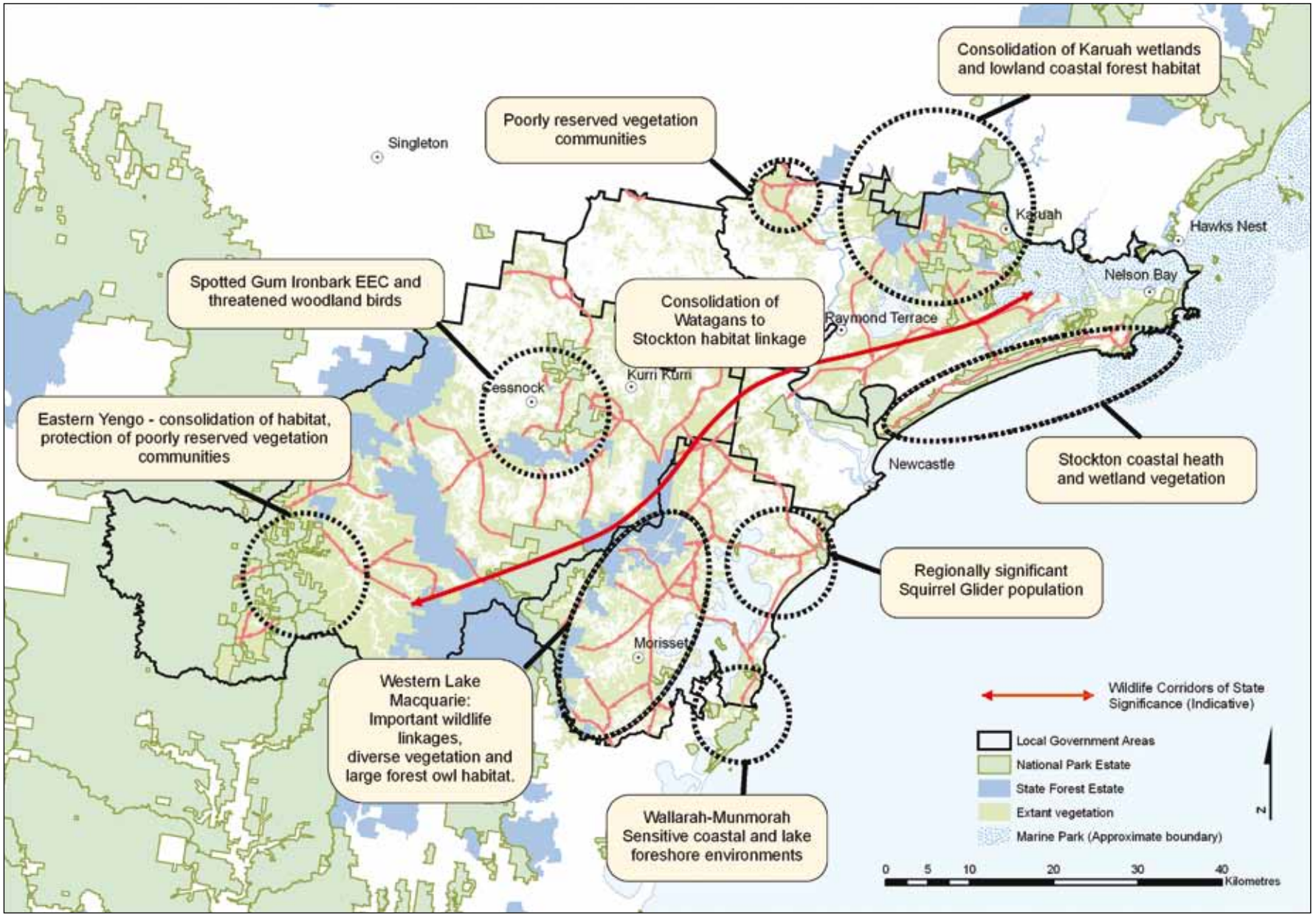
- an assessment of progress toward achieving a Comprehensive, Adequate and Representative Reserve System
- the effectiveness of conservation mechanisms other than formal reservation
- the role of the RCP in biodiversity certification
- the contribution made by BioBanking to RCP conservation goals in the Lower Hunter.

The review may also amend the priorities for conservation, if necessary, taking into account factors such as:

- amendments to development proposals, including extent of clearing within existing development zones
- additional data on features of high conservation significance
- clearing undertaken outside the areas identified in the LHRS
- successful or unfavourable rehabilitation responses.



Map 2: High priority regional conservation areas for the Lower Hunter Region – Stage 1 outputs



Map 3: Other regional investment priorities for the Lower Hunter Region

7. Assessing anticipated biodiversity gains and losses

The RCP identifies the extent of the biodiversity impacts likely to result from implementation of the development scenarios specified in the LHRS (Section 5). The RCP then identifies in the biodiversity investment guide (Section 6) the offsets required to address these impacts. This section focuses on assessing whether the scale of the proposed offset package is appropriate given the extent of the likely biodiversity impacts.

Two approaches have been employed. These are:

- the extent to which the new reserves and proposed future measures generate progress towards the JANIS reservation targets
- the extent to which the net result of anticipated gains and losses will achieve the Strategy's overall 'improve or maintain' goal for biodiversity, using the biometric tool developed by DECC.

The strategic application of these two approaches has resulted in the ability to significantly reduce potential impacts to biodiversity by guiding development away from avoidable impacts and focusing conservation investment into the most important areas. Further, the 'improve or maintain' principle has provided a practical benchmark for the assessment of impacts and offsets. The RCP seeks to deliver a balanced outcome based on the known or likely impacts arising from development in the Lower Hunter over the next 25 years.

In developing the RCP, it is recognised that it will not be possible to avoid or offset all impacts at a local scale. Accordingly, the RCP focuses on delivering a regionally focused offset package, which in the long term will contribute to an improve or maintain outcome. Therefore, with the best available tools, this section focuses on identifying whether the scale of the proposed offset package is appropriate given the extent of the likely biodiversity impacts.

7.1 What does 'improve or maintain biodiversity' mean?

In simple terms, improve or maintain biodiversity means **no net loss of biodiversity**. That is, biodiversity gains must be greater than, or equal to, any losses resulting from clearing or other forms of degradation of biodiversity values.

There are two key goals underpinning the achievement of an outcome that improves or maintains biodiversity:

- a short-term goal of slowing the current rate of biodiversity loss and starting to reverse the trend of decline
- a long-term goal of increasing the extent and diversity of areas of biodiversity value and ensuring they can persist in the long term.

Land use planning decisions will have a major influence on achievement of these goals. An EPI, including an LEP, will contribute to the achievement of these goals and would be considered to improve or maintain biodiversity values if it includes provisions and would deliver land-use planning outcomes that improve or maintain the extent, condition, connectivity, security and persistence of areas of biodiversity value.

DECC's key priorities for biodiversity planning in relation to improving or maintaining biodiversity values are:

- The first priority – to avoid losses to biodiversity, and protect biodiversity values *in situ*. Not only would this see the greatest biodiversity benefit, but also the avoidance of impacts would reduce the costs associated with providing offsets or rehabilitating other lands.
- The second priority, where the first priority is unachievable – to mitigate adverse impacts to biodiversity. Mitigation is aimed at minimising and managing impacts in situations where some development will proceed, but the development is anticipated to have only limited impacts on biodiversity.
- As a last resort, compensate for unavoidable losses to biodiversity by providing appropriate offsets. The proposed offset should adequately compensate for the loss of biodiversity on the development site, thereby ensuring that overall biodiversity values are improved or maintained.

7.2 What does 'offsetting' mean?

An offset is one or more appropriate actions that are put in place to counterbalance specific impacts on biodiversity. Appropriate actions are long-term management activities to improve biodiversity conservation. This can include legal protection of land to ensure security of management actions.

7.3 Offsetting principles

The following principles must be considered when negotiating/developing biodiversity offsets to achieve conservation outcomes in situations where there is a loss of biodiversity.

1. Impacts must be avoided first by using prevention and mitigation measures. Offsets are then used to address remaining impacts.
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 at least 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 like-for-like or better basis.
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.

The offsetting principles are discussed in further detail in Appendix 1.

7.4 Biodiversity Forecasting Tool

DECC used a combination of the offsetting principles (refer Section 7.3), conservation targets and reserve design criteria (Section 3), as well as references in the LHRS to derive the conservation proposals outlined in the Biodiversity Investment Guide (Section 6) in this report. The conservation proposals fundamentally include four new DECC reserve proposals (Stage 1 – Crown land components finalised) and the implementation of a range of investment mechanisms to provide offsets for the development strategy outlined in the LHRS (refer Section 8).

A computer-based analysis tool, the Biodiversity Forecasting Tool (BFT) was used to assist in assessing the biodiversity losses anticipated in the development scenarios and biodiversity benefits of the offsets. It is noted that the BFT was not used to develop the conservation proposals. These were based on the national reserve design principles.

While it would be preferable for offsetting to be undertaken on a like-for-like basis, wherever possible, attempting to model this at a regional scale was too complex to undertake with the existing data. As an alternative, DECC adopted a generalised measure of conservation value and applied the 'like value for like value' principle for calculating the gains and losses of the proposals. As a result, offsetting could occur between different community types, only if the offset community was of greater conservation significance than the community being impacted.

This analysis does not replace the need to consider offsets in terms of specific conservation features and JANIS targets. However, it does provide a coarse indication of the possible impacts of the development proposal to biodiversity in the region and the potential of the new reserve proposals to offset this cost.

It must be recognised that there are currently limitations to using the BFT for this purpose:

- While analyses have been undertaken using a different tool to test for improve or maintain outcomes on a site scale, DECC is not aware of any previous attempt to do this at the current scale.
- As the BFT is a regional scale analysis, it is currently limited by the best available data at this scale. Vegetation community mapping (Lower Hunter Regional Environmental Management Strategy) has been used as a surrogate for biodiversity.
- Consideration of species specific conservation objectives within the BFT tool are under development but were not available at the time of preparation of the RCP and could not be used.
- The BFT is still under development. It is intended that, when the tool is refined, it will be subject to peer scientific review.
- The outputs of the BFT are limited by the quality of data that is input.

7.4.1 Applying the BFT

The scope of the BFT assessment included greenfield residential development proposals and employment lands contained within the LHRS and areas currently zoned for development. The following activities, which are likely to result in impacts on biodiversity have not been assessed or offset by the RCP:

- areas required for the provision of infrastructure associated with new release areas;
- major development proposals (for example, mines); and
- additional areas not identified in the LHRS, which may be developed if they meet the sustainability criteria (page 15 of the LHRS).

There were four steps to the BFT analysis used in this RCP:

- **Step 1** – Analyse current condition of vegetation as a surrogate for biodiversity.
- **Step 2** – Analyse current threats to biodiversity and predict the future condition of biodiversity if there was no change in land use.
- **Step 3** – Modify the 'current condition' and 'threat' layers (derived in steps 1 and 2) to reflect changes in land use according to the new release developments proposed in the LHRS and the proposed reserve additions. This provides a model of future condition of biodiversity if these scenarios are implemented.
- **Step 4** – Compare the outputs of step 3 (future condition of biodiversity with development and conservation scenarios) with the outputs of step 2 (future condition of biodiversity without development and conservation scenarios). This provides an overall value of the cost to biodiversity from the development scenario and the benefit to biodiversity from the conservation scenario.

Step 1: Analysing current condition of vegetation

DECC adopted a single measure of biodiversity value, the 'Biodiversity Index', which could be applied consistently across the region. This enabled the relative conservation value of different parts of the landscape to be directly compared. The Biodiversity Index is developed using data on vegetation communities, the extent to which these have been cleared over their range, their condition and the spatial configuration of vegetation patches in the landscape.

Step 2: Analysing current threats to biodiversity and predicting future condition if there is no change in land use

A map of the threats to biodiversity in the Lower Hunter was developed using LEP zonings, relevant SEPPs and agricultural land capability mapping. Areas where high impact development was permissible (for example under a LEP) or likely (in agricultural lands of high productivity) were mapped as being under high threat. Areas provided with special protection such as SEPP 14 were mapped as being under low threat.

The threat operating at any given point in the landscape was taken to be the major determinant of future condition. For instance, where the threat of clearing was high, the future condition was assumed to be cleared. In national parks, where the threat was taken as zero, the future condition would be equal to the current condition.

The result was a map of predicted future condition of biodiversity in the Lower Hunter if current land practices continue unchanged, without the development proposed in the LHRS or the creation of new reserves.

Step 3: Predicting the future condition of biodiversity if the development and new reserve proposals proceed

A new 'threats' map was developed by modifying the current threats map to take into account the new release development and new reserves proposals. This was applied to current condition mapping to develop a predicted future condition layer.

Step 4: Estimating the biodiversity costs and benefits of the proposal

The costs and benefits of the conservation and development proposals were estimated by comparing the predicted future condition under the *status quo* (from step 2) with the predicted future condition under the new proposals (from step 3).

7.4.2 BFT estimate of anticipated gains and losses

The RCP proposes a range of investment mechanisms, including BioBanking, developer agreements, government investments and voluntary measures to be implemented to offset the unavoidable future losses over the 25-year life of the LHRS. The necessary quantum and types of mechanisms will be further investigated as new LEPs are developed, in partnership with local councils. The biodiversity investment mechanisms should target the values that need to be offset, but could also be used to consolidate the biodiversity functioning of the new reserves (for example, strategic linkages or infilling) (refer Map 3).

While the BFT did provide an indication of the gains and losses and assisted in guiding decisions on the quantum of offsets required, it is not currently feasible or appropriate to draw any definitive conclusions on whether the planned offsets will achieve an improve or maintain outcome over the next 25 years. This reflects both technical and data limitations, and the inherent level of uncertainty that exists about the nature and effects of future decisions and actions.

The work does, however, provide a strong basis on which to begin implementation and to guide future action.

8. Implementation Mechanisms

8.1 Stage 1 – Immediate implementation

In releasing this Plan, the Government is making a set of significant commitments to offsetting biodiversity impacts in the Lower Hunter. Stage 1 involved public land being protected as new perpetual conservation reserves under public ownership.

The public land transfers involved approximately 20,000 hectares of high conservation value lands, which were reserved to form the backbone of major new conservation corridors. These areas are shown on the Map 2 and came into effect on 1 July 2007.

While the majority of the lands became conservation reserves under the NPW Act, approximately 2900 hectares of State Forest were reclassified as flora reserves under the Forestry Act, thus securing their conservation values. The State Conservation Area category under the NPW Act was used in areas that retained the potential for underground mining (or for current operations). This category permits underground mining and recognises that mining may generate some surface impacts (mainly of a temporary nature) including subsidence and where ventilation or access infrastructure is required. The Government's intent has been to ensure that the new reserves do not sterilise economic mineral and coal resources that can be extracted through underground methods.

The public land transfers represent a significant conservation commitment by the Government, and significantly expanded the reserve system in the Lower Hunter. As a result, critical areas of biodiversity are now protected in perpetuity, whilst also providing the communities of the Lower Hunter with significantly improved access for recreation and enjoyment.

It is acknowledged that some of the areas which were reserved are also the focus of efforts to locate corridors for a freight rail bypass and a new route for the F3 freeway. While efforts will be made to minimise the impacts of these corridors on the new reserves, DECC acknowledges the likelihood that these corridors may need to be accommodated within the new reserves. DECC also notes that, in the event that this infrastructure is located within the new reserves, additional offsets will not be required for any resultant impacts to biodiversity from these developments.

The new reserves created through these public land transfers include:

- a new 'Green Corridor' stretching from the Watagan Ranges, through Hexham Swamp to Port Stephens (approximately 14,600 hectares)
- important areas around Port Stephens in the Karuah area (3000 hectares)
- a large addition to Werakata National Park near Cessnock (2200 hectares).

While the public land transfers have secured a critical backbone of new reserves in the Lower Hunter, it is not proposed to use public land to selectively offset the impacts of private development. The development proposed in the regional strategy will be considered against current legislation and may require biodiversity offsets if it is to achieve an 'improve or maintain' outcome for biodiversity in the Lower Hunter over the next 25 years. Mechanisms to assist in delivering these offsets are the focus of Section 8.2.

8.2 Stage 2 – Mechanisms

Mechanisms that will contribute to offsetting the anticipated biodiversity impacts resulting from development in the Lower Hunter, including development of the employment lands identified in the LHRS and areas currently zoned for development, are discussed in the following sections.

To summarise:

- The majority of the public land identified in the biodiversity investment guide as new DECC reserve proposals have been transferred to conservation reserves under the NPW Act, with the remaining areas converted to flora reserves under the Forestry Act. This was achieved through Stage 1 of the Plan.
- Conservation of high conservation value private land will be secured through future planning agreements, voluntary conservation agreements, BioBanking or through other market based mechanisms.
- Other identified high priority conservation areas identified in the 25-year investment strategy will be protected from any intensification of the current land uses through the appropriate application of the sustainability criteria as set out in the LHRS.
- Employment lands identified in the LHRS and lands currently zoned for development, but not currently developed, can potentially offset their biodiversity impacts through the mechanisms identified in Sections 8.2.2–8.2.10. It is recommended that BioBanking and planning agreements provide the focus of efforts to offset these impacts, although it is acknowledged that the mechanisms to be adopted will be determined at the discretion of the relevant consent/determining authority and in the context of any future State Contributions Scheme.

These mechanisms, if implemented, will deliver a balanced and significant conservation outcome based on a mix or public and private conservation land management.

8.2.1 Biodiversity Banking and Offsets Scheme

Biodiversity Banking and Offsets Scheme (BioBanking) mechanisms are currently being implemented by DECC. BioBanking 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 with greater long-term security than conventional approaches to environmental management.

Biodiversity offsets (secured in-perpetuity through conservation agreements or covenants) might include:

- enhancing habitat on private land to improve its biodiversity value
- reconstructing habitat in strategic areas to link areas of high conservation value or increase buffer zones around areas of high conservation value
- providing secure conservation tenure for land that contains very high conservation value.

On-ground conservation management actions might include:

- removing or reducing grazing pressure (controlled grazing) to allow for natural regeneration of native plants
- controlling exotic plant species, particularly weeds, that compete with native species
- leaving fallen timber on the ground (i.e. not collecting fire wood) to provide shelter for wildlife
- strategic and targeted burning regimes (often less frequent burning)
- controlling feral animals (foxes, cats) that pose a threat to wildlife populations
- planting or regenerating locally indigenous trees, shrubs and grasses.

A rule-based biodiversity assessment tool has been developed by DECC. This is based on the tools that have been developed for the property vegetation planning process under the *Native Vegetation Act 2003* (BioMetric tool and the threatened species tool). The tool will be used to determine the amount and significance of biodiversity loss that a development will cause and the improvement in biodiversity value provided by the conservation management actions on the offset site(s).

There will be two main types of participants in the scheme. These are developers that require credits and offset providers (private conservation stewards) whose projects would generate credits.

Conservation brokers might also play a role in the scheme to assist private conservation stewards to put together and market their projects. Conservation brokers might include catchment management authorities, not-for-profit organisations, non-government organisations or members of the private sector.

For more information on BioBanking, please refer to DECC's website www.environment.nsw.gov.au/biobanking/index.htm.

8.2.2 Planning agreements

Recent amendments to the EP&A Act introduced a statutory system of planning agreements. Planning agreements provide a voluntary facility for planning authorities and developers to negotiate flexible outcomes in respect to development contributions. These agreements are a means to enable the planning system to deliver sustainable development, through which key economic, social and environmental objectives of the 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 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, and one that has statutory links with the development application process. This, in effect, is anticipated to achieve far better outcomes in terms of achieving sustainable development outcomes, including biodiversity conservation.

It is understood that Lake Macquarie Council is currently developing a policy to guide the development of planning agreements. This policy will cover the dedication of lands and contribution of funding for the management of these lands. The proposed policy offers the potential to streamline the process to develop planning agreements and ensure the long-term viability of the areas conserved and should therefore be supported. The policy should integrate with the state BioBanking Scheme as it is developed.

8.2.3 Voluntary conservation agreements

A Voluntary Conservation Agreement (VCA) is a negotiated contract between landholders and the Minister administering the NPW Act which aims to conserve the natural, cultural and/or scientific values of a property or portion of a property, restricting land uses likely to compromise these values. Landholders may be individuals, groups, corporations, local governments or government departments. In the case of government departments, either the department or the Minister responsible for that department may enter into the VCA with the Minister administering the NPW Act.

The aim of a VCA 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 cultural heritage, aid the movement of wildlife in the landscape and to protect, restore and rehabilitate areas of biodiversity value.

Once signed by both the Minister and the landholder, the VCA is registered on the land title, binding all 'successors in title' (future landholders) to its terms.

The VCA program relies upon the active management of the lands by the landholder. Toward this aim, DECC consults with the landholder to develop a Plan of Management for the area covered by the VCA. The RCP is intended primarily for the landholder's use and establishes practical methods for conservation managed at each site.

8.2.4 Covenants

Legal restrictions on use of land are able to be developed and implemented under the *Conveyancing Act 1919*. Restrictions on the uses 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).

8.2.5 Management agreements

Management agreements are legal agreements or contracts to manage specific land parcels or restrict land use or activities. These agreements may also be linked to covenants, development rights, consent conditions or financial incentives and may be registered on land title and be binding on subsequent owners or, be a contract for a certain number of years (Fallding 2004).

8.2.6 LEP making and certification

LEP – Standard instruments

The new LEP standard instrument contains a range of standard Environmental Zones, including *E1 National Parks and Nature Reserves*, *E2 Environmental Conservation*, *E3 Environmental Management* and *E4 Environmental Living*. The Department of Planning has required all councils in NSW to prepare new comprehensive LEPs consistent with a Standard Instrument (SI). In the Lower Hunter area the various councils have the following deadlines: Cessnock – currently being finalised, Port Stephens, Maitland, Lake Macquarie and Newcastle – March 2011.

To assist councils in applying the SI, DECC is working with the Department of Planning and other natural resources agencies to develop guidance, which clarifies the various State agencies' expectations as to how the new zonings should be applied. As this guidance is still being drafted, DECC has been providing detailed advice to individual councils in response to Section 62 consultation requests under the EP&A Act.

The LHRS commits the Department of Planning to issuing a s.117 direction to ensure that LEPs are consistent with the regional strategy. This s.117 direction has now been issued by the Minister for Planning. DECC will be liaising with the Department of Planning to explore options to implement the final LHRCP in a similar manner.

LEP certification

DECC is currently reviewing the process for biodiversity certification of environmental planning instruments. Guidelines will be developed which will define the factors to be considered in granting certification, data requirements, the effect of certification, as well as range of other guidance on the operations of certification.

It is proposed that these Guidelines will include a requirement that EPIs must be consistent with the objectives of the RCP and contribute to the conservation of priority areas as identified in the RCP if they are to merit certification.

When councils are preparing new LEPs, for which they intend to seek certification, it is recommended that they:

(a) demonstrate that the EPI is consistent with the objectives of the RCP

(b) provide a high level of environmental protection to those areas identified as regional conservation priorities in the biodiversity investment guide (refer Section 6)

(c) recognise and provide an appropriate level of protection to areas of state and regional biodiversity significance[2].

This approach is recommended until such time as the funding becomes available to protect and manage the regional conservation priorities in perpetuity. Such an approach will also assist in moderating the pressures that might otherwise compromise the lands' biodiversity values.

Further detailed guidance on the biodiversity values and areas, will need to be provided to councils seeking certification, prior to any decision being made on whether the proposed LEP complies with the criteria detailed above.

8.2.7 Environmental impact considerations

A number of legislative provisions currently exist that help to manage biodiversity. One such mechanism is the Environmental Impact Assessment (EIA) provisions contained within the EP&A Act.

An EIA cannot usually achieve the same degree of biodiversity protection as broad area or strategic planning (because it normally operates within a local context where land is already zoned for a purpose). Nonetheless, an EIA will continue to provide an essential adjunct to strategic planning mechanisms in the protection, management, enhancement and restoration of biodiversity, such as through the application of conditions of consent. Furthermore, it is anticipated that the information collated as part of the EIA process will provide important site level guidance to developing appropriate management actions, including offsetting of biodiversity losses.

This RCP and its investment priorities should also be used to guide offsetting efforts for the full range of development assessments under Parts 3A, 4 and 5 of the EP&A Act.

DECC's state and regional biodiversity constraints mapping (DEC 2006) should also be a key consideration in any EIA process. These constraints should be applied in any concept design/ master planning/strategic planning process, including Part 3A projects and impacts on areas of state and regional biodiversity significance should be avoided wherever possible.

8.2.8 Property vegetation planning

The Biodiversity Investment Guide is also intended to be of use to the Hunter Central Rivers Catchment Management Authority, in relation to the assessment of clearing applications made in accordance with the *Native Vegetation Act 2003* and in the Property Vegetation Plan (PVP) process.

The Native Vegetation 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 Catchment Management Authority. PVPs have the effect of allowing specified clearing, but only following the implementation of an appropriate offset regime, so as to achieve overall improvement or maintenance of environmental outcomes.

The investment strategy is intended to complement on-site planning for PVPs by providing information on biodiversity values at the regional and state scale. It should be noted that due to data and mapping limitations, there are some features of high conservation value discussed in this RCP that have not been mapped. Due 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 that will need to be addressed at the site scale. These types of features are already incorporated in property vegetation planning assessment tools.

The RCP's investment strategy does, however, provide a framework to guide these site scale conservation efforts, to ensure that they effectively contribute to a regional framework and thereby maximise the conservation outcome.

8.2.9 Catchment management

The area covered by the LHRS and this RCP comprises a relatively small part (approximately 11.5%) of the area covered by the HCRCMA's Catchment Action Plan (CAP). The bulk of the development planned in the Strategy will be on urban land, where the CMA's statutory approval roles are not triggered.

However, the role of the CMA, as set out in the *Catchment Management Authorities Act 2003*, is to coordinate the management of the natural resources in its region. The CMA is responsible for involving communities in managing the natural resource issues facing the region through partnerships and collaborations. The CMA is also the primary means for delivering natural resource funding from the NSW and Australian governments (Hunter Central Rivers Catchment Management Authority 2007).

The CMA has released the Hunter Central Rivers CAP. The vision for the Hunter Central Rivers CMA, as defined in the CAP, is for healthy and productive catchments through the ecologically sustainable management of natural resources and the environment for the benefit of present and future generations.

2. As defined by DECC (2006).

The CAP also outlines the most important natural resource issues in the region. Although the CAP is not a legally binding document, it guides how improvements in natural resources will be achieved over the next ten years. It defines where effort and funding should be focused to get the best protection and improvement in natural resources and the most benefits for the community (Hunter Central Rivers Catchment Management Authority 2007).

The CAP also provides a coordinated plan for all natural resource work in the region through partnerships and collaborations with government, industry, community groups and individuals. By listing the most important natural resource issues in the region, the CAP can guide rehabilitation effort where it is most needed (Hunter Central Rivers Catchment Management Authority 2007).

CAP – Guiding principles

The CAP includes a series of 'guiding principles', which are statements that outline the processes for natural resource management in the CMA area. The guiding principles have been developed in consultation with local communities and reflect their vision for natural resource management. In turn, these principles have been endorsed by the CMA Board.

The RCP is consistent with a range of the guiding principles, including those contained within the following sections in the CAP (www.hcr.cma.nsw.gov.au/pubs/cap/hcrcma_cap.pdf):

- Terrestrial Biodiversity – maintain or improve terrestrial biodiversity (refer Minimising habitat destruction and improving the condition of habitat).
- Rivers and Freshwater wetlands – maintain or improve the condition of rivers and freshwater wetlands (refer Maintaining or improving riparian vegetation).
- Estuary and Marine – maintain or improve the condition of estuary and marine areas (refer Maintain or improve aquatic habitat; Manage estuary and marine shorelines; Manage coastal and foreshore development).
- Land-use Planning – Land-use planning decisions should consider current and future values of the land (refer Biodiversity).
- Economic Tools – Support the development and use of innovative economic tools to provide natural resource benefits (refer Offset Schemes).

CAP – Management targets

The CAP also specifies management targets, which are specific outputs that the CMA will fund over the next ten years. These management targets identify the level of on-ground work that will comprise the CMA's contribution to achieving the resource condition targets. The management targets can be classified as protecting or enhancing, regenerating and rehabilitating, with the CAP's priority to protect good condition ecosystems and secondly to rehabilitate degraded sites.

The RCP makes a significant contribution to a number of key management targets contained in the CAP, as summarised below:

Management target	Comment
MT 01 – by 2016, protect an additional 31,000 ha of native vegetation.	The RCP transferred approximately 20,000 ha of Government land into DECC or Forestry reserves, with an additional 12,000 ha to be added to these reserves. Offsets to be pursued during the implementation of the RCP (Stage 2) will reinforce the RCP's contribution to this target.
MT 02 – by 2016, regenerate 25,500 ha of native vegetation.	The RCP has assisted in the process by identifying areas of regional conservation priority, which will be key areas to be targeted in rehabilitation programs.
MT 04 – by 2016, implement priority recovery actions on 800 ha of threatened species habitat.	As noted above, the RCP has formally reserved significant areas, including large areas of threatened species habitat.
MT 06 – by 2016, protect an additional 4600 ha of wetlands.	The areas formally reserved through the RCP process, include approximately 2364 ha of wetlands.
MT 17 – protect an additional 1100 km of native riparian vegetation.	The areas formally reserved through the RCP process, include approximately 50 km of riparian corridors.

The RCP has therefore made a significant contribution to several of the key management targets contained within the CAP. These contributions will be reinforced through the implementation of the RCP (Stage 2).

8.2.10 Priority actions for threatened species recovery

Part 5A of the TSC Act requires DECC to prepare a Priorities Action Statement (PAS). The PAS sets out the recovery and threat abatement strategies to be adopted for promoting the recovery of each threatened species, population and ecological community to a position of viability in nature. The PAS also establishes relative priorities for implementation of these strategies and establishes performance indicators to enable reporting on the achievements and their effectiveness. The PAS is available on DECC's website.

The PAS also contains a status report on each threatened species, where information is available, and set out timetables for recovery and threat abatement planning. The PAS works in conjunction with recovery plans and programs already approved and in progress. It will not supersede or replace existing programs, rather provide a broader context for the actions of those programs.

The actions listed in the PAS should be taken into account by councils when preparing new LEPs, strategic plans and plans of management for open space. It is noted that many of the actions contained in the PAS are site/species specific and will need to be considered in processes which operate at a similar scale. The PAS will also contain a range of actions relevant to the recovery planning process, which should also be considered.

To guide councils in this process, the threatened species website contains a wealth of information, including species profiles, habitat preferences, actual and predicted occurrences of various species and recovery actions. The address of the website is www.threatenedspecies.environment.nsw.gov.au/tsprofile/home_species.aspx

8.3 Protection of biodiversity values via the sustainability criteria

The LHRS plans for population and employment growth over the next 25 years. It seeks to focus the development required to accommodate this growth into those areas identified as most suited for the purpose, while at the same time, ensuring that consideration is given to the implications of new development on biodiversity.

In order to focus development in the most suitable areas, the LHRS includes supplementary sustainability criteria, which will be used to assess any rezoning proposals brought forward for outside these areas. Considerations under the sustainability criteria include:

- consistency with government approved regional conservation plans (if available)
- will maintain or improve areas of state and regionally significant terrestrial and aquatic biodiversity (as mapped and agreed by DECC). This will include:
  - regionally significant vegetation communities (including JANIS rare, endangered and vulnerable communities)
  - critical habitat as listed under the TSC Act
  - threatened species, populations and ecological communities (and their habitats).
- maintain or improve existing environmental condition for air quality
- maintain or improve existing environmental condition for water quality:
  - consistent with community water quality objectives for recreational water use and river health (DECC and CMA)
  - consistent with catchment and stormwater management planning (CMA and council)
- protect areas of Aboriginal cultural heritage value (as agreed by DECC).

The LHRS recommends that the criteria will not be applied in large areas within the 'green corridor' as defined in the LHRS, which will protect this area from any intensification of land-use. This corridor runs from the Watagans to Port Stephens and encompasses all of the areas east of the highway north of Hexham not already proposed for future development.

In other areas where the sustainability criteria will operate, the proposal will need to demonstrate that it is consistent with the RCP and achieves an improve or maintain outcome for the environment. In effect this means that the proposal will need to demonstrate that it has minimised the extent of impacts on areas of state, regional and local biodiversity significance, that it can offset any unavoidable impacts on a like for like basis and that it avoids any of the areas identified in DECC's investment strategy.

8.4 Optimising urban development through design

The LHRS includes a commitment to develop an 'Urban Development Program'. This program will be established and administered by the Department of Planning to monitor total dwelling supply and uptake and to co-ordinate the planning, servicing and development of new release areas.

Whilst it is acknowledged that the primary objective for the development areas identified in the LHRS is that they will be developed, fundamental planning principles will still be applied in these areas in order to create liveable communities. This will include providing active and passive recreation opportunities for residents, protecting water courses from development and providing buffers between incompatible land-uses. Application of these principles also presents opportunities to conserve biodiversity values in these areas.

The 'improve or maintain' principle should be applied to guide this process and provide a bench mark for considering the adequacy of the conservation outcome.

DECC will therefore be working with the Department of Planning to ensure that the proposed Hunter Urban Development Program includes mechanisms which focus councils on protecting key biodiversity values *in situ* within these development footprints wherever possible [for example, in open space areas and riparian corridors]. These key outcomes include the protection of:

- the ecological integrity of lands dedicated under the NPW Act (the guidelines will recommend appropriate controls on any development adjacent to these areas)
- riparian corridors
- any declared critical habitat, threatened species and threatened species habitat, as defined by the TSC Act, *Environment Protection and Biodiversity Conservation Act 1999* and International Migratory Agreements
- any endangered populations and endangered ecological communities listed under the TSC Act
- core Koala habitat as defined under SEPP 44 – Koala Habitat Protection or as defined in a local government Koala Plan of Management
- areas identified as SEPP 14 Coastal Wetlands and SEPP 26 Littoral Rainforests.

The program should also include criteria to protect objects and areas of Aboriginal cultural heritage significance as well as environment protection criteria. The environment protection criteria will focus on sustainably managing potential impacts from development in terms of air and water quality, stormwater management as well as managing potential land-use conflict particularly in regard to noise and odour.

8.5 Datasets and their interpretation and application

Underpinning biodiversity assessments undertaken in the RCP is the Biodiversity Conservation Lands dataset (DECC 2006), which identifies areas of biodiversity value and their relative significance at the regional level. As an aid to applying this data in the planning process, this mapping has been presented as biodiversity constraints. These constraints have been classified into three levels of significance.

State Significance: Areas identified as state biodiversity significance in a state or federal conservation policy or program.

Regional Significance: Areas identified as regional biodiversity significance in a state policy or program or as providing buffers to state significant lands.

Local Significance: Areas recognised through local conservation zoning and including all remnant vegetation.

A list of the datasets which have been included in the State, regional and local constraints is provided in Appendix 2.

This mapping is an important resource in identifying biodiversity values across the landscape and, based on these values, areas which should be conserved. Although the mapping represents the best available regional scale biodiversity data, limited time and resources were available for the compilation of this data. There is a recognition that for certain features, particularly vegetation communities, the baseline dataset used was designed for regional scale significance assessments.

While these data may provide an indication of relative biodiversity significance at the local level, users should be aware that this data has limitations including those of scale (mainly 1:25,000 aerial photography) and age (extant updated to 2002). Finer scale data may be available for any given area; however, undertaking assessments of regional relative biodiversity value using this finer scale information may require further analysis.

It should be noted that the primary information source relied on for vegetation mapping is the Lower Hunter and Central Coast Regional Environment Management Strategy (LHCCREMS) vegetation mapping which has recognised accuracy limitations. This data was modelled using existing plot data and vegetation mapping (NPWS, 2000) and subsequently updated for clearing events in 2002 (Eco Logical Australia, 2003). Prior to the use of this dataset for the RCP, a check was made for gross clearing events using recent SPOT 5 imagery (captured in 2005).

8.6 Refining and validating RCP data

Data employed in the RCP has largely been mapped and collated from regional mapping programs (refer to Section 8.5). Documentation accompanying this data details the limitations of scale for each component significance layer and an indication of the reliability of the source data.

DECC is currently considering options to review and refine the RCP data using fine scale local datasets where available. The intent of this process is to ensure that local planning utilises the best available data for all applications at the property level. To ensure that the significance of this local scale information is adequately represented at the regional level, DECC seeks a cooperative approach. Councils that wish to obtain a copy of the RCP data should contact the DECC Northern GIS Support Officer for licence agreement details.

Verification of regional scale data components at the site scale may involve a number of assessments including:

- verification of site location (for biodiversity features which have a fixed geographic extent such as SEPP 14 and SEPP 26)
- verification of floristic composition to determine community status (Rare, Endangered and Vulnerable ecosystems as well as endangered ecological communities)
- verification of structural and disturbance information. Assessment of Old Growth was only undertaken for areas north of the Hunter River using CRA growth stage and disturbance information.

Some biodiversity features have been derived from assessments involving analysis of values in a regional landscape context. Features of this type (including Key Habitats, Corridors and Overcleared landscapes) cannot be validated wholly by site assessment.

For validation of features involving structural and floristic assessments, DECC will undertake to provide direction on site assessment methods.

8.7 Additional support to be provided

DECC will work with councils and other stakeholders to help implement this RCP. DECC will provide support in the form of advice, guidance documents and practical action partnerships. The support documents available are listed below:

- guidelines for biodiversity certification (under review)
- survey and assessment guidelines for biodiversity (or wildlife/flora and fauna). Refer to the draft guidelines available at www.environment.nsw.gov.au/resources/TBSAGuidelinesDraft.pdf
- documentation and training to support the BioBanking Scheme
- guidelines for environmental impact assessment of biodiversity values in areas identified for development
- summary of the Priorities Action Statement relevant to each region/LGA.

DECC welcomes feedback on these priorities and information on potential partnerships or additional support that it may be able to provide.

8.8 Conclusions

The Lower Hunter region is a highly diverse area. It contains a range of important biodiversity values, including wetlands, and is home to a number of threatened species. The area also has important Aboriginal heritage values, reflecting past and present relationships with the landscape.

The area is subject to increasing development pressure and, like many other areas, has inherited a legacy of clearing, industrialisation and intensive development since post-Aboriginal settlement. The LHRS outlines a significant increase in development over the next 25 years and the LHRS seeks to guide that development in a planned and sustainable manner.

The RCP proposes a number of mechanisms to ensure that high conservation value lands in the Lower Hunter region are identified, protected and managed for their biodiversity values into the future. The commitment to protect these lands is essential in delivering sustainable development in this region and to offsetting the unavoidable impacts from development.

The LHRS and RCP together form an integrated package to inform and guide strategic planning in the region over the next 25 years. The mechanisms to identify and manage high conservation value lands, as summarised in the RCP, provide options to local government, developers and land managers.

Stage 1 of the RCP was implemented in late 2006. This saw the transfer of approximately 20,000 hectares of high conservation value public land into conservation reserves. This land forms the backbone for further conservation measures. The RCP also foreshadows the transfer of an additional 12,000 hectares of high conservation value private lands to the reserve system over the next few years. This is in response to certain agreed developments proceeding.

As other developments are approved, any impacts to biodiversity will need to be offset. The RCP supports an 'improve or maintain' outcome for offsetting. The RCP now focuses on mechanisms other than formal reservation, to ensure ongoing management of high conservation lands. While the addition of lands to the DECC reserve system is not ruled out, it is not viewed as the principal delivery mechanism to achieve an 'improve or maintain' outcome.

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Appendix 1: Offsetting Principles

1. **Impacts must be avoided first by using prevention and mitigation measures. Offsets are then used to address remaining impacts.** This may include modifying the proposal to avoid areas of biodiversity value or putting in place measures to prevent offsite impacts.
   - Clearing or development can only proceed where offsets (and conservation actions) improve or maintain biodiversity.
2. **All regulatory requirements must be met.** Offsets cannot be used to satisfy approvals or assessments under other legislation, for example, assessment requirements for Aboriginal heritage sites, polluting activities or other environmental impacts unless specifically provided for by legislation, or additional approvals.
3. **Offsets must never reward ongoing poor performance**. Offset schemes will not reward landholders who deliberately degrade or mismanage land in order to provide an offset. Offsets must not reward poorly designed developments.
4. **Offsets will complement other government programs**. A range of tools are required to achieve the NSW Government's conservation objectives, including the establishment and management of new conservation areas, regional parks and incentives for private landholders to manage for conservation purposes.
5. **Offsets must be underpinned by sound ecological principles.**
   - They must include the consideration of structure, function and compositional elements of biodiversity, including threatened species.
   - They must enhance biodiversity at a range of scales, that is, at the genetic, species and ecosystem levels.
   - They must consider conservation status of ecological communities.
   - They must ensure the long-term viability and functionality of biodiversity.

   Biodiversity management actions, such as enhancement of existing habitat and securing and managing land of conservation value for biodiversity, can be suitable offsets. Reconstruction of ecological communities involves high risks and uncertainties and time delays for biodiversity outcomes. It is generally less preferable than other management strategies such as enhancing existing habitat.
6. **Offsets should aim to result in a net improvement in biodiversity over time.**
   - Enhancement of biodiversity in offset areas should be equal to or greater than the loss in biodiversity from the impact site.
   - Setting aside areas for biodiversity conservation without additional management or increased security is generally not sufficient to offset against the loss of biodiversity. Factors to consider include protection of existing biodiversity, time-lag effects, and the uncertainties and risks associated with actions such as revegetation.
   - Offsets may include enhancing habitat, reconstructing habitat in strategic areas to link areas of conservation value, or increasing buffer zones around areas of conservation value.
7. **Offsets must be enduring – they must offset the impact of the development for at least the period that the impact occurs**. All offsets must be secured by an appropriate legal mechanism. As impacts on biodiversity are likely to be permanent, the offset must also be permanent (secured by a conservation agreement or reservation and management for biodiversity). Wherever possible, offsets should be secured by a conservation agreement attached in perpetuity to the title of the land (eg. under s69 *National Parks & Wildlife Act 1974*). Where land is donated to a public authority or a private conservation organisation and managed as a biodiversity offset, it should be accompanied by resources for its management. If an appropriate legal mechanism to secure the offset is not possible, then the value of the offset will be reduced.

Alternative mechanisms, such as land use planning zones, may be appropriate where they complement conservation agreements. However, such mechanisms alone do not necessarily provide long-term security. The security of the management agreement will be factored into the value of the offset.

8. **Offsets should be agreed prior to the impact occurring.** Offsets should minimise ecological risks from time-lags. Offset negotiations and actions should occur prior to the approval of the impact. For example, prior to the grant of a development consent. Where the offset involves rehabilitation or revegetation works it may be necessary to conduct this work well in advance of the development.
9. **Offsets must be quantifiable – the impacts and benefits must be reliably estimated**. Offsets should be based on quantitative assessment of the loss in biodiversity from the clearing or other development and the gain in biodiversity from the offset. The methodology for calculating the biodiversity loss and gain must be based on the best available science, be reliable and used for calculating both the loss from the development and the gain from the offset (Note that a state-wide computer based tool will be developed for BioBanking based on the tools developed for the *Native Vegetation Act 2003*). The best available information/data should be used when assessing impacts of biodiversity loss and gains from offsets. Offsets will be of greater value where they protect land with high conservation values, where management actions have greater benefits for biodiversity, where the offset areas are not isolated or fragmented, and the management for biodiversity is in perpetuity (eg. secured through a conservation agreement). Management actions must be deliverable and enforceable.
10. **Offsets must be targeted – they must offset impacts on a like-for-like or better basis**. Offsets should be targeted according to biodiversity priorities in the area, based on conservation status of ecological communities, presence of threatened species or their habitat, connectivity, and potential to enhance condition from management actions. Only ecological communities that are equal or greater in conservation significance to the type of ecological community lost should be used for offsets. One type of environmental benefit cannot be traded for another. For example, biodiversity offsets may also result in improvements in water quality or salinity but these benefits do not reduce the biodiversity offset requirements. However at a regional level it maybe ecologically of greater benefit to consolidate offsets by linking high conservation values across the landscape. This may involve offsets, which are spatially removed from the offset, or compromise different vegetation communities.
11. **Offsets must be located appropriately – they must offset the impact in the same region.** Wherever possible, offsets should be located in areas that have the same or similar ecological characteristics as the area affected by the development, in reasonable proximity to the region impacted.
12. **Offsets must be supplementary – they must be beyond existing requirements and not already be funded under another scheme.** An offset used in the past for another project cannot be used again to offset a new project. Areas that have received incentive funds from another process cannot be used for offsets. Existing protected areas on private land cannot be used for offsets unless additional security or management actions are implemented. Areas already managed by the government, for example national parks, flora reserves, nature reserves, karst conservation areas and crown reserves, cannot be used as offsets. In some cases, new management works on public lands could be used as an offset.
13. **Offsets and their actions must be enforceable – through development consent conditions, licence conditions, conservation agreements or a contract**. Offsets must be audited to ensure that the actions have been carried out, and monitored to determine that the actions are leading to positive biodiversity outcomes.

Appendix 2: Biodiversity Conservation Lands – Constraints Dataset

Criteria included in the RCP analyses

State significance

All DECC and Forest NSW estate

High conservation value vacant Crown land

Old-growth forest (Port Stephens LGA)

Areas identified for protection in State Environmental Planning Policy No. 26 (Littoral Rainforest)

Areas identified for protection in State Environmental Planning Policy No. 14 (Coastal Wetlands)

Identified Wilderness or land of recognised high wilderness quality (Yengo only)

Areas required for the reserve system over the next 30 years

Wildlife habitats of state significance

Endangered Ecological Communities

Highly depleted vegetation communities (less 30% remaining) (in substantially unmodified condition) – based on PVP

Other wetlands of State Significance (not listed as EECs or SEPP14) (mangroves and Wyong paperbark swamp forests)

Lower Hunter Spotted Gum-Ironbark EEC, in patches >10ha and condition class substantially unmodified

Wildlife corridors of state significance

Regional significance

Mitchells landscapes, greater than 70% cleared

Wildlife corridors of regional significance

100 m buffer around areas Littoral Rainforest in SEPP 26

Lower Hunter Spotted Gum-Ironbark EEC, in fragments <10 ha or condition class modified or substantially modified

Wetland vegetation of Regional Significance (not listed as EEC)

Highly depleted vegetation communities (less 30% remaining) (in substantially modified or modified condition) – based on PVP

Under target vegetation – based on JANIS communities with <15% of pre-1750 extent in formal reserves in patches >40 ha

Rare vegetation (<1000 ha remaining) within patches >40 ha

50 metre buffer to all State significant lands (except corridors)

Local significance

Environment protection zones in Local Environment Plans

Wetlands of Local Significance (not listed as EECs)

All remaining patches of native vegetation

www.environment.nsw.gov.au