NSW GOVERNMENT
Environment, Climate Change & Water

South Coast Regional Conservation Plan

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Summary

The South Coast Regional Conservation Plan (RCP) guides natural heritage conservation on lands on the South Coast excluding national parks and State forests. It provides direction to local government on planning and development decision-making so that the biodiversity of the South Coast can be maintained or improved. It seeks to align restoration activities on the South Coast and to ensure that such activities complement future development that will be guided by the State Government's South Coast Planning Strategy.

The RCP also guides implementation of the conservation objectives of the South Coast Regional Strategy through:

- identifying areas of high conservation value that will be protected as the Strategy directs new residential, rural residential, industrial and commercial zonings away from these areas
- verifying important wildlife corridors across the region and providing a consistent approach to their protection and enhancement across local government areas
- identifying coastal lakes and estuaries that the Strategy will protect by ensuring further residential or rural residential zonings are allowed only if a neutral or beneficial effect on water quality can be demonstrated.

The RCP also:

- identifies how BioBanking and biodiversity certification could be employed within the South Coast as mechanisms to maintain or improve biodiversity
- encourages cooperation with the Commonwealth Government with the aim of having NSW planning and assessment processes accredited as addressing matters of national environmental significance
- flags that a detailed analysis is required of areas that are zoned for development but which support high conservation values; the analysis will be undertaken by the State Government with the aim of providing landholders with information to assist them in their development planning.

The RCP sets out how local government should:

- protect lands of validated high conservation value in new local environmental plans (LEPs). A state-wide LEP Practice Note on Environment Protection Zones is to provide direction on what E-zones should apply in which circumstances
- identify important wildlife corridors and priority restoration areas in new LEPs and include clauses to protect these features
- utilise offset provisions to ensure that any loss of native vegetation from approved developments is offset, thus achieving an overall 'improve or maintain' biodiversity outcome.

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Maps

Abbreviations

CA	Conservation Agreement
CAP	catchment action plan
CL Act	*Crown Lands Act 1989*
CMA	catchment management authority
CRA	comprehensive regional assessment
CRZ	core riparian zone
DII	Department of Industry and Investment NSW
EEC	endangered ecological community
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cwlth)
EPI	environmental planning instrument
FM Act	*Fisheries Management Act 1994*
GIS	geographic information system
HRC	Healthy Rivers Commission
LEP	local environmental plan
LGA	local government area
LPMA	Land and Property Management Authority
MNES	matters of national environmental significance
NPW Act	*National Parks and Wildlife Act 1974*
NRC	Natural Resources Commission
NRM	natural resource management
NV Act	*Native Vegetation Act 2003*
PAS	priority action statement
PVP	property vegetation plan
RCMS	Riparian Corridor Management Study
RCP	regional conservation plan
SCRS	South Coast Regional Strategy
SEPP	state environmental planning policy
SRCMA	Southern Rivers Catchment Management Authority
TSC Act	*Threatened Species Conservation Act 1995*
VCA	Voluntary Conservation Agreement

1 Introduction

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

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

Species diversity refers to the variety of species in a given area. Species diversity is usually a measure of the number of species (richness) and their relative abundances in 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 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 regional conservation plan

The primary objective of the South Coast RCP is to guide South Coast councils in achieving biodiversity conservation outcomes, particularly through planning processes. It has greatest relevance for the production of new local environmental plans (LEPs) and biodiversity certification processes.

A key consideration is to deliver the aim of the South Coast Regional Strategy (SCRS) to:

> protect high value environments including pristine coastal lakes, estuaries, aquifers, threatened species, vegetation communities and habitat corridors by ensuring that new urban development avoids these important areas and their catchments.

The RCP aligns with the state-wide goals and targets of the Natural Resource Commission for an improvement in the extent and condition of native vegetation and to increase the number of sustainable native animal populations (NRC 2005).

The RCP seeks an overall improvement or maintenance of biodiversity values across the South Coast.

The RCP aims to:

- describe and map the biodiversity values of the South Coast Region
- provide rule sets for the on-ground verification of the mapped (modelled) high value assets
- identify and verify regionally significant corridors
- guide development away from areas of high conservation value onto largely cleared land or onto native vegetation that has low conservation value and is suited for the intended purpose
- identify areas that warrant biodiversity protection

- guide where restoration, BioBanking, offset or incentive efforts should be directed, including alignment of local government activities with catchment management authority (CMA) objectives
- guide what threatened entities should be assessed (by seven-part tests) under s.5A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) in particular areas, and provide information on key habitat considerations for particular species
- in agreement with local government, identify areas that are appropriate for biodiversity certification and provide guidance on what protection, offset and management actions are required to meet certification
- identify the matters of national environmental significance (MNES) listed under the Australian Government's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) in the South Coast Region, and provide a framework for the NSW Government to continue to work with the Australian Government, to ensure that opportunities for cooperative partnerships to reduce red tape can be pursued.

1.3 Where does the regional conservation plan apply?

The South Coast RCP applies to the same local government areas (LGAs) covered by the SCRS, namely Shoalhaven, Eurobodalla and Bega Valley.

1.4 Who should use this regional conservation plan?

This RCP is primarily intended for use by the three above-mentioned South Coast councils. The RCP is also likely to be an important resource for anyone who has an interest in the protection and management of biodiversity, including:

- State Government agencies
- the development industry
- landowners
- conservation groups
- scientists
- community members and groups.

1.5 Outline of the regional conservation plan

The RCP identifies the natural conservation assets and connectivity on the South Coast and indicates how the mapped presence of values can be verified. It then provides a guide for how to best protect these assets through the planning system and the development assessment process. It also gives details of where and how enhancement or recovery actions can best be directed.

Ways to consider Aboriginal cultural heritage values in planning have also been included in this RCP. It is important that protection of cultural heritage is considered at a broader strategic level. In relation to LEP-preparation it is essential that Aboriginal people are appropriately consulted, and that information from local government Aboriginal heritage studies is incorporated into environmental planning instruments. The main steps for LEPs are to conduct such studies – currently being done jointly by the Department of Environment, Climate Change and Water (DECCW), each South Coast council and local Aboriginal communities – and implement these through the cultural heritage provisions of the standard LEP template.

2 Planning framework

2.1 Overview of the South Coast Regional Strategy

The South Coast Region has a population of about 166,000, and most live in or near the major regional centres of Nowra, Batemans Bay and Bega, or the major towns of Ulladulla, Moruya, Narooma, Merimbula and Vincentia. An additional 60,000 people are expected to move into the region over the next 25 years, and at least 25,800 new jobs are estimated to be required to support the projected population growth. There is an immigration of retirees to the South Coast seeking a coastal lifestyle and an emigration of youth. The region's economic base is rapidly diversifying, shifting from a reliance on traditional primary industries to a wide range of service-oriented industries, including health care services for the aged, and tourism. The natural environment is the key tourism drawcard.

The SCRS will guide sustainable growth throughout the South Coast over the next 25 years. It aims to:

- protect high-value environments
- cater for a housing demand of up to 45,600 new dwellings by 2031 by defining the best areas for urban expansion to accommodate the additional 60,000 people expected in the region
- ensure an adequate supply of land to support economic growth and an additional 25,800 new jobs, particularly in the areas of finance, administration, business services, health, aged care and tourism
- consider additional development sites only if it can be demonstrated that they are consistent with sustainability criteria (DoP 2006a)
- limit development in places constrained by coastal processes, flooding, wetlands, important primary industry resources and significant scenic and cultural landscapes
- protect the cultural and Aboriginal heritage values and visual character of rural and coastal towns and villages and surrounding landscapes.

The SCRS also required an independent review of 5854 hectares of existing urban and other intensively zoned land in 17 isolated and sensitive locations to determine the suitability and scale of any land release. The review panel recommended that environmental conservation zoning was most suited to about 30% of the land examined (Independent Review Panel 2006).

2.2 Legislative framework

The *Threatened Species Legislation Amendment Act 2004* substantially amended a number of the provisions of the *Threatened Species Conservation Act 1995* (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 (EPIs), including LEPs or parts of LEPs. An EPI can receive certification if overall it improves or maintains the extent, condition, connectivity and security of areas of biodiversity value, and protects areas of high conservation value.

The legislative changes also enabled the development of a Priority Action Statement (PAS) for all threatened species and communities. The PAS has enabled DECCW and other land managers to plan more strategically and has assisted catchment management authorities (CMAs), local councils and research institutions to target funds or work towards identified priority actions.

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

The *Native Vegetation Act 2003* (NV Act) is the primary legislation for administering clearing on rural land, while delivering an overall 'improve or maintain' outcome for biodiversity.

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

The *Environmental Planning and Assessment Amendment Act 2005* facilitated the modernisation of LEPs across New South Wales. Subsequently, on 31 March 2006, a standard instrument for LEPs was gazetted, prescribing a standard form and content of a principal LEP.

The RCP will guide the development of LGA-wide LEPs, prepared in accordance with the Department of Planning's LEP standard template.

2.3 Biodiversity planning principles and priorities

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

The principles of biodiversity planning adopted in this 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
- to recognise Aboriginal knowledge of biodiversity value, the connection of Aboriginal communities to Country, and the right of Aboriginal people to be involved in decision-making.

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

- The first priority is to avoid losses to biodiversity and promote protection of biodiversity values in situ.
- The second priority, where the first priority is unachievable, is to mitigate against adverse impacts to biodiversity.
- The last resort is to compensate for unavoidable losses to biodiversity by applying offsets in the priority locations identified in this RCP.

2.4 The regional conservation plan's planning context

The SCRS, accompanied by this RCP, is intended to guide local-level strategic planning on the South Coast. It will provide the biodiversity conservation basis for new LEPs. All new LEPs will be prepared in accordance with a direction to be made under section 117 of the

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 three councils on the South Coast are currently preparing new LEPs. These LEPs will contain detailed zoning and development controls to guide development, and they must be consistent with both the SCRS and the RCP. The RCP will also provide a significant step towards 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 and protective covenants (see sections 7 and 8). The RCP may also be a useful guide for the investment of CMA funding.

The RCP is consistent with a number of federal and State biodiversity strategies, including the National Local Government Biodiversity Strategy, Australia's Biodiversity Conservation Strategy, the NSW Biodiversity Strategy, and the Southern Rivers Catchment Action Plan which contains a number of provisions specifically relating to biodiversity.

2.4.1 National Local Government Biodiversity Strategy

The National Local Government Biodiversity Strategy recognises that:

- conservation and sustainable use of our natural resources will be achieved only 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 issue—the loss of biodiversity
- a clear and cooperative partnership agreement is required between the three spheres of government (ALGA 1999).

2.4.2 Australia's Biodiversity Conservation Strategy

Australia's Biodiversity Conservation Strategy 2010–2030 is a guiding framework for conserving our nation's biodiversity over the coming decades. The vision of this Strategy is that Australia's biodiversity is healthy and resilient to threats, and valued both in its own right and for its essential contribution to our existence (NRMMC 2010).

2.4.3 NSW State Plan

Priority E4 of the NSW State Plan is for better outcomes for native vegetation, biodiversity, land, rivers and coastal waterways. The RCP commits the NSW Government to the achievement of the state-wide natural resource targets (section 3.2) and to delivering these through regional land-use planning strategies and local government planning.

2.4.4 NSW Biodiversity Strategy

The NSW Biodiversity Strategy proposes 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 give details of a balanced response for the integration of ecological, social and economic objectives (NPWS 1999) The Strategy is currently under review, and the draft NSW Biodiversity Strategy 2010–2015 was exhibited in November 2010 (NSW Government 2010).

2.4.5 Southern Rivers Catchment Management Authority and its catchment action plan

CMAs were established under the *NSW Catchment Management Authorities Act 2003* to manage natural resources at a catchment level in partnership with local communities.

CMAs are guided in their activities by catchment action plans (CAPs). These are 10-year plans that include discrete and realistic natural resource condition targets. The CAPs are designed to implement national and State natural resource management (NRM) objectives and incorporate the latest information and best practice from NRM agencies and community groups. Within this framework, three-year investment strategies 'lock in' funding for a suitable period for project development and implementation. The Southern Rivers Catchment Management Authority (SRCMA) incorporates the three LGAs that make up the RCP's study area.

The SRCMA CAP (SRCMA 2005) forms the basis of government–community partnerships to address the most important land and water management issues that drive the ecological health of the South Coast Region. The CAP is not legally binding or enforceable. Rather, the CAP forms a focal point for all environmental work in the region, being a primary source of funding for priority actions and a support base for NRM partnerships and collaborations.

In its CAP, the SRCMA considers that the main determinants of the quality of ecosystem services in the region come from the impact of human activities. These include settlement patterns, land-use practices, impacts of industrial and recreational use on natural resources, and the introduction of pest species. Human-induced climate change is seen as a major threat to the natural resource base of the South Coast Region. The SRCMA's long-term response to this is a commitment to improve landscape habitat connectivity and develop over time a regional habitat corridor system that may allow habitat change without drastic loss of biodiversity.

The SRCMA CAP is divided into five themes: biodiversity, water, soil and land capability, coastal and marine areas, and community. Below is a short summary of what the CAP aims to achieve within these themes:

- biodiversity:
  - protect and rehabilitate overcleared vegetation communities and communities not well represented in the reserve system
  - improve habitat connectivity across the region, and develop and implement recovery actions for key threatened species, such as those that have ranges restricted to the SRCMA area.
- water:
  - introduce mechanisms to reduce pressures and improve river, riparian and aquifer conditions in priority areas.
- soils and land capability:
  - target improvement programs to priority sites and landscapes affected by erosion, salinity, acid sulphate soils and weeds.
- coastal and marine areas:
  - improve the condition of coastlines through development and implementation of NRM plans focusing on reducing erosion, sedimentation, nitrification and problematic access and protecting heritage, estuaries, riparian vegetation, fish passage and marine habitat.
- community:
  - support and extend the NRM work being undertaken by individuals, networks and organisations, and build community capacity, confidence and participation in NRM.

2.5 Aboriginal cultural heritage

2.5.1 Background

The South Coast Region is rich in cultural heritage, particularly along the coastline, reflecting the attraction of the bountiful marine and estuarine ecosystems for traditional Aboriginal communities. Many thousands of sites, such as shell middens, rock art sites, scarred trees and artefact scatters, have been recorded, providing tangible evidence of the customs and way of life of the original habitants, which on the South Coast dates back some 20,000 years.

At the time of European contact, historical records suggest that the majority of the South Coast Region was occupied by people who called themselves the Yuin. This large group contained numerous smaller units identified along linguistic and kinships lines, which framed a complex system of land ownership underpinned by strong spiritual connections with, and responsibilities for, the natural environment.

The arrival of Europeans in the region brought activities such as timber-getting, agriculture, fishing and gold mining. The traditional system of land ownership was usurped and land-use changes since colonisation have substantially altered the landscape and resulted in dramatic and rapid change to Aboriginal lifestyles and settlement. The early period of contact history through to the 1967 referendum and introduction of policies of self-determination has also left a rich legacy of places, memories and landscapes for Aboriginal people. There are countless Aboriginal histories of working in sawmills, picking beans, teaching and nursing, but the contribution that Aboriginal people have made to the social and economic fabric of South Coast towns is neither well-documented nor recognised.

Contemporary Aboriginal society on the South Coast is represented largely through the Local Aboriginal Land Council system established under the *Aboriginal Land Rights Act 1983*, together with elders groups and other organisations set up for specific functions such as housing. Local Aboriginal people retain a strong sense of cultural identity and are ensuring the retention of cultural traditions through school language programs, by passing on customary knowledge and traditions to younger generations and being actively involved in management and protection of their cultural heritage.

2.5.2 Major issues

The major issues associated with implementing Aboriginal cultural heritage protection in a planning context are as follows.

- Because of the richness of Aboriginal heritage in the region, it is inevitable that urban growth and development will impact on existing and yet to be identified cultural heritage sites and places. The loss of cultural heritage can be distressing to Aboriginal people, particularly the loss of, or damage to, places of cultural significance. There is a need for effective mechanisms for Aboriginal people to be consulted in regard to their Aboriginal heritage consultation.
- The large number of places and sites also means that continued development will be impacting on cultural heritage values. There needs to be a strategic approach for deciding which places and sites must be protected, and which may be disturbed after proper identification, recording, assessment and consultation.
- The *National Parks and Wildlife Act 1974* (NPW Act) provides for the statuary protection of 'objects', including Aboriginal Places.[1] The objects generally protected by the NPW Act

[1] Aboriginal Places can be declared under the NPW Act to protect natural landscape features with spiritual value. This gives such features the status of 'object' and therefore they are protected under the Act.

are archaeological sites with tangible evidence of pre-contact presence. However, many places of significance to Aboriginal people are not objects within the meaning of the NPW Act and may not be adequately protected.

- There are many more sites than those already recorded and, to minimise damage to these unrecorded sites, DECCW and local councils provide advice to developers and have processes for ensuring that areas subject to development are adequately surveyed and assessed as part of the environmental assessment process. However, there are many, usually smaller, developments for which an individual cultural heritage assessment is not conducted. Councils and other agencies such as CMAs would benefit from the use of models which can predict the presence or absence of certain site-types to a reasonable level of accuracy.

2.6 Ongoing review of the regional conservation plan

Like the SCRS, the RCP will be 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 are realised. A key focus of the reviews will be to assess the effectiveness of strategic planning, and development approval processes, to deliver the RCP's objectives over time.

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

3 Biodiversity conservation objectives

3.1 Conservation objectives for the South Coast Region

In developing the SCRS, the NSW Government has made a commitment to maintaining and enhancing the region's biodiversity.

This is consistent with the overarching conservation goal for native vegetation in NSW. Under the NV Act, biodiversity and the other environmental values of soil, water quality and salinity must be improved or maintained. This means that the gains for biodiversity must be equal to, or greater than, any losses resulting from clearing or other forms of degradation of native vegetation. This goal is also reflected in the TSC Act with regard to biodiversity certification.

The RCP incorporates specific objectives for the South Coast that, if achieved, will contribute to the 'improve or maintain' goal. These draw from targets that have already been adopted by the NSW Government, especially those incorporated into the SRCMA CAP.

3.2 State-wide targets for natural resource management

As recommended by the Natural Resources Commission, the State Government has adopted state-wide targets for NRM in NSW (NRC 2005, 2006).

These targets include seven 'macro-environmental' targets which focus on the fundamental functions of the key natural resource assets of biodiversity, water, land and community.

For biodiversity and aquatic habitats, these targets are:

- By 2015 there is an increase in native vegetation extent and an improvement in native vegetation condition.
- By 2015 there is an increase in the number of sustainable populations of a range of native fauna species.
- By 2015 there is an improvement in the condition of riverine ecosystems, marine waters and ecosystems, and estuaries and coastal lake systems.
- By 2015 there is an improvement in the condition of important wetlands, and the extent of those wetlands is maintained.

There are also six 'specific priority' targets which encapsulate other, more specific State and community preferences. For biodiversity, these are:

- By 2015 there is an increase in the recovery of threatened species, populations and ecological communities.
- by 2015 there is a reduction in the impact of invasive species.

3.3 Regional targets for natural resource management

As part of its CAP, the SRCMA has translated the state-wide targets into regional biodiversity catchment targets. These targets are:

- By 2016, at least 40,000 additional hectares of the priority native vegetation communities in the catchment will be actively managed for biodiversity conservation.
- By 2016, the regional status of key ecological communities and species in the catchment will be improved or maintained.

Management targets have also been developed to guide progress towards the catchment targets, and a list and map of priority vegetation communities have been included in the draft CAP.

3.4 JANIS criteria

The following criteria, commonly referred to as the JANIS – Joint ANZECC/MCFFA NFPS Implementation Sub-committee – criteria, are a set of biodiversity targets for forested environments that have been agreed to by the Australian states and territories and federal government (Commonwealth of Australia 1997). The JANIS criteria were applied in both the Eden and Southern Forests assessments. The principal aim of the criteria was to establish a comprehensive, adequate and representative reserve network on public land. Some of the JANIS conservation targets could not be met solely on public land. These 'under target' conservation components are a focus of this RCP.

The criteria are as follows.

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

3.5 Summary of conservation objectives

The JANIS criteria set targets for the reservation of public land that has high conservation forest values. This RCP has a wider conservation focus across the South Coast, regardless of tenure.

The RCP is therefore focused on:

- reserving a subset of values within public parks and reserves
- maintaining and improving, rather than sampling, biodiversity, and protecting, enhancing and restoring high conservation value environmental assets.

4 The South Coast environment

4.1 Regional overview

The South Coast Region falls within two terrestrial biogeographic regions (Environment Australia 2000): the South-East Corner Bioregion, containing the Bega Valley, Eurobodalla and part of Shoalhaven City LGAs, and the Sydney Basin Bioregion, which includes the northern part of Shoalhaven City LGA. The region is characterised by dissected escarpment ranges and foothills, undulating hinterland terraces, and coastal alluvial plains, dunefields and inlets. Native vegetation ranges from high-elevation woodlands, wet and damp sclerophyll forests, heaths, wetlands and rainforests, to dry grass forests, coastal sclerophyll forests, grassy woodlands, dune scrub, floodplain and estuarine communities.

These various habitats support a high diversity of native fauna and flora. The region is of State conservation significance for many threatened fauna species, such as the eastern bristlebird, sooty oystercatcher, pied oystercatcher, southern brown bandicoot, long-footed potoroo, smoky mouse, little tern, white-footed dunnart and hooded plover.

Most (84%) of the South Coast Region retains native vegetation cover. Vegetation clearing in the region has until recently been largely driven by agricultural development, which has focused on flat, fertile land. Current key threats to biodiversity are urban expansion, and weed and feral animal invasion.

In general, vegetation types that occur outside agricultural areas are adequately represented in protected areas. In a national context, the South Coast Region has a relatively high proportion of land (44%) in protected areas, and it contains large expanses of old-growth forest and the largest area of coastal wilderness in NSW. These areas are important for the conservation of forest and coastal biodiversity and for the ongoing functioning of ecosystem processes on a broad scale. East–west vegetated linkages between coastal and hinterland areas contribute to landscape functionality and provide avenues for terrestrial flora and fauna to adapt to long-term climate change.

Vegetation types that are restricted to environments suitable for agriculture and settlement are poorly represented in reserves. This is reflected in the conservation status of the region's grassy woodland, dry rainforest, floodplain and riparian forests and most wetland communities, many of which are now listed as endangered ecological communities (EECs) under the TSC Act, as are many associated plants and animals.

The South Coast Region contains a diverse array of marine, estuarine and freshwater environments that are integral to the region's character and contribute significantly to its lifestyle, economy and attraction for visitors.

The region encompasses over 400 km of spectacular coastline. Aquatic habitats include coastal reefs and sandy beaches; estuarine areas include mangroves, mudflats, seagrass and saltmarsh; freshwater habitats include freshwater streams and rivers; and wetlands include coastal lagoons and floodplains, lakes, swamps and bogs. The South Coast Region contains 51 of the 91 coastal lakes and lagoons in NSW and has the State's only remaining 'pristine' coastal lake: Nadgee Lake in Nadgee Nature Reserve, Bega Valley Shire (HRC 2002).

Much of the region's coastal zone retains native vegetation cover and is within protected areas.

4.2 Vegetation mapping

The vegetation mapping of Tozer et al. (2006) has been used for vegetation analysis to develop the high conservation value area maps in this RCP (Maps 1–17). The mapping project of Tozer et al. (2006) provides a uniform classification and map coverage of native vegetation on the South Coast from Sydney to the Victorian border, and it covers all the Shoalhaven, Eurobodalla and Bega LGAs. Within the three shires 130 vascular plant assemblages were mapped, and these were derived from a classification of field survey data compiled from numerous sources, including the Eden and Southern comprehensive regional assessments (CRAs) and the NSW Native Vegetation Mapping Program Series 4 (P5MA, Tindall et al. 2005). The spatial distribution of plant assemblages was mapped at 1:100,000 scale. Identified assemblages include 13 rainforests, 27 wet sclerophyll forests, nine grassy woodlands, two grasslands, 40 dry sclerophyll forests, 11 heathlands, nine freshwater wetlands, eight forested wetlands and three saline wetlands.

It needs to be stressed that the vegetation map provided in P5MA is a model of vegetation distribution and presents only the probability of a particular vegetation community being present at a particular location. Hence the high conservation value area maps in this RCP are accurate at the regional scale. However, at the local scale the mapping needs to be ground-truthed and verified. Also, because of the broad scale of mapping, small patches of vegetation or isolated paddock trees have not been mapped. These features will require consideration during development approval, for they may provide important habitat (see section 8.5).

The NSW Department of Industry and Investment (DII) has produced aquatic habitat geographic information system (GIS) layers of the cover of estuarine macrophytes (seagrass, mangrove and saltmarsh) for all NSW estuaries outside the Greater Sydney Metropolitan Area. DII will supply these maps to councils for their use in identifying aquatic habitats of high conservation value during the preparation of their LEPs.

5 South Coast environmental assets of high conservation value

The following is a ‘compendium’ of those environmental assets of the South Coast that warrant special priority for additional conservation efforts. As part of the overall aim of maintaining and enhancing the region’s biodiversity, the RCP aims to ensure that sites with these values are protected.

The distribution of priority environmental assets on the maps is generally shown as deep red on private land and paler pink on DECCW and State forests estate. As conservation on these public lands has been subject to extensive assessment through the regional forest agreement processes (Commonwealth of Australia 1999, 2001), the purpose of showing the values on public land is purely to provide the context for the private land focus of this RCP.

Councils and the SRCMA will be provided with the detailed GIS data layers that the maps summarise.

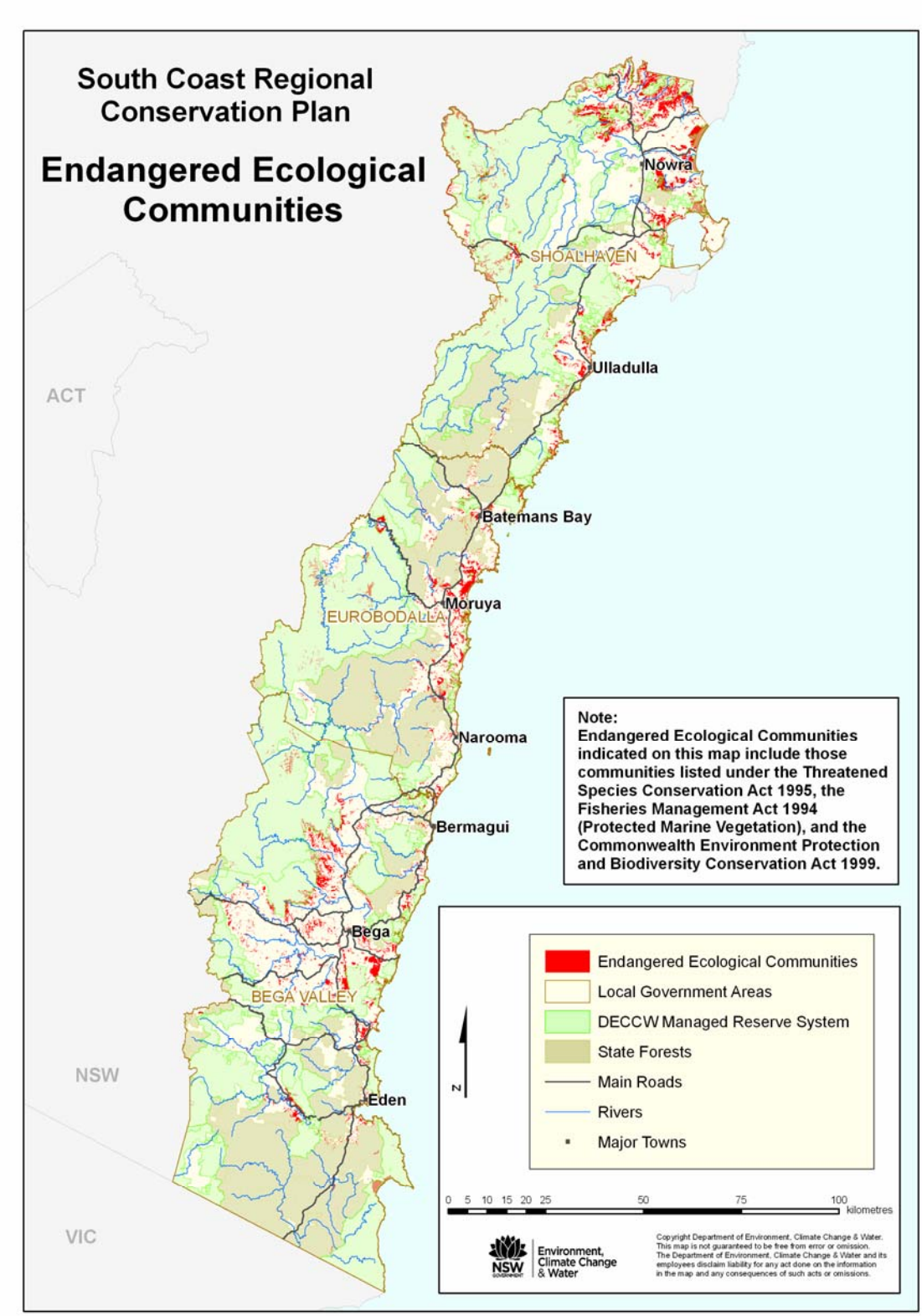
5.1 Endangered ecological communities

EECs are protected under both the NSW Government’s TSC Act and the Commonwealth EPBC Act. Saltmarsh is listed as an EEC under the TSC Act, whereas seagrass, mangroves and macroalgae (seaweeds) are protected under the NSW *Fisheries Management Act 1994* (FM Act).

As of May 2008, 25 EECs listed in the TSC Act and three ecological communities listed as endangered in the EPBC Act occurred in the RCP area. The relationships between vegetation map units and EECs listed under the TSC Act and the EPBC Act are shown in Appendix 1 and Appendix 2, respectively (Tozer et al. 2006). Note that these are indicative relationships only. The legal definitions of EECs are provided by the final determinations under the respective Acts. Decisions relating to whether any particular area of vegetation constitutes an EEC should be based on field inspections and comparisons with the final determination. It should be noted that the classification system in Tozer et al. (2006) may not provide an exact match to the classification and description of an EEC. Particular care needs to be taken with the following vegetation map units: Coastal Sand Forest, Shale–Basalt Sheltered Forest, Littoral Thicket, Basalt Hilltop Scrub, Southern Highlands Basalt Forest, Highland Range Sheltered Forest, Southern Highlands Basalt Forest, Coastal Freshwater Lagoon and Grey Myrtle Dry Rainforest. The distribution of EECs is shown in Map 1.

5.2 Rare vegetation types

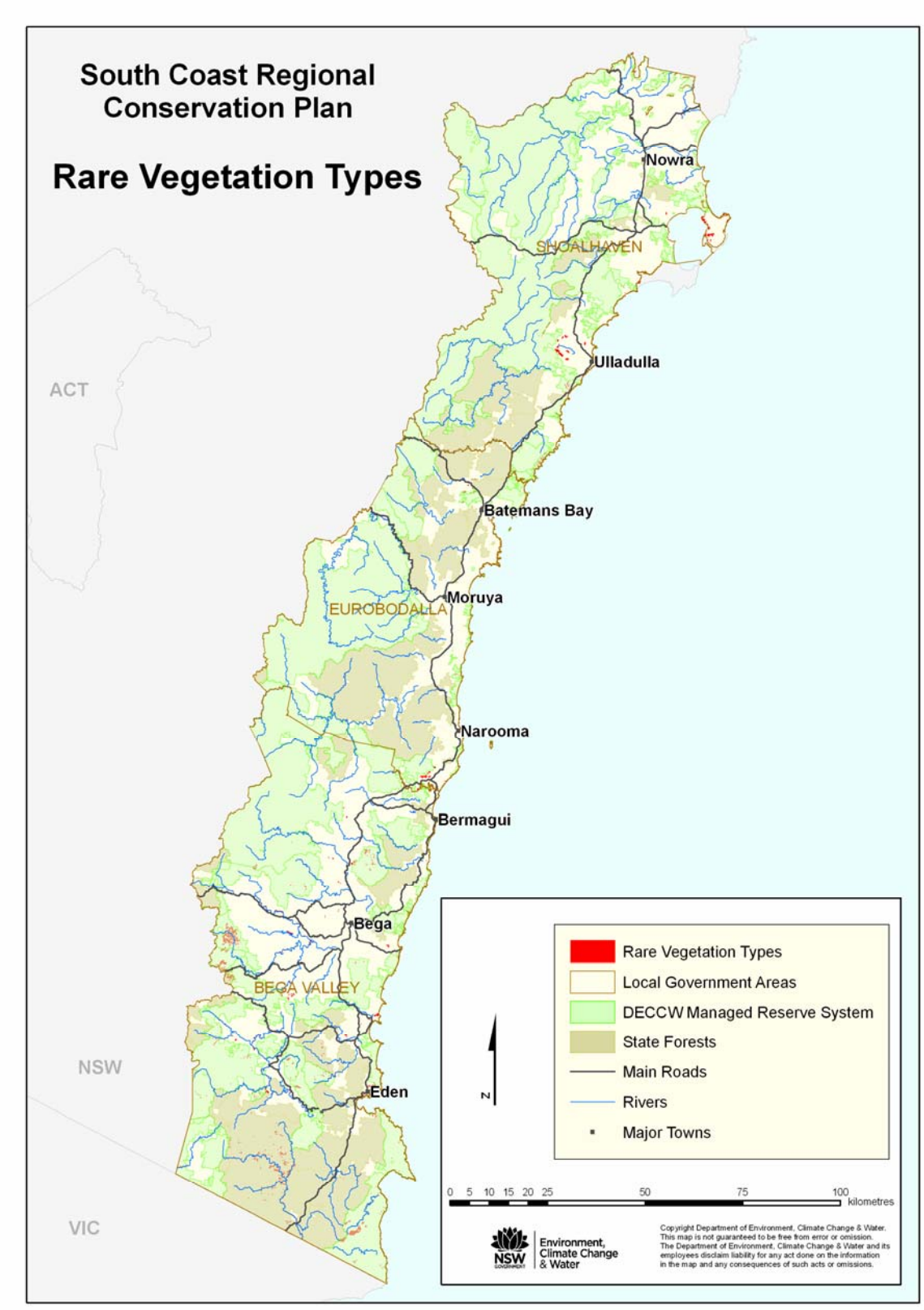
Several vegetation communities found within the South Coast area have a naturally rare distribution. They are generally restricted to geographic features of limited distribution, such as rock outcrops or riparian corridors. The Tozer et al. (2006) project work included a modelled pre-European clearance vegetation map. This model is likely to be inaccurate at a localised level but provides a reasonable estimation of past plant community extent at a regional scale. Communities with a total distribution of less than 1000 hectares are considered to be rare. These communities are shown in Map 2 and listed in Appendix 3.



Map 1: Distribution of extant EECs*

Note. Refer to section 5.1 and Appendices 1 and 2.

* Mapping based on vegetation model. Actual on-ground occurrences require verification.



Map 2: Rare vegetation types*

Note. Refer to section 5.2 and Appendix 3.

* Mapping based on vegetation model. Actual on-ground occurrences require verification.

5.3 Overcleared vegetation types

The goal of the Southern Rivers CAP is that by 2030 across the Southern Rivers landscape there will be a full range of functional ecological communities being actively managed to conserve native vegetation and biodiversity. The SRCMA considers that to achieve this goal over the long term there must be no net loss of native vegetation, and overcleared rare and threatened vegetation communities must achieve a cover of at least 30% of their original extent.

The Native Vegetation Advisory Council of NSW has also advised that once the area of original vegetation falls below 30% there will be an accelerated loss of native species from these systems (NVAC 2000). Partly in response to this likely loss of species, the NSW Government has signed agreements with the federal government that requires NSW to prevent further clearing of vegetation communities that are already more than 70% cleared. These agreements are the *National objectives and targets for biodiversity conservation 2001–2005* (Environment Australia 2001) and the *Bilateral agreement between the Commonwealth of Australia and New South Wales to deliver the extension of the Natural Heritage Trust* (NHT 2003).

Given the above, remnant vegetation comprising those communities with more than 70% of their original extent cleared is regarded as of high conservation value, unless the vegetation is in 'low condition'. Vegetation in low condition has a high likelihood of not being viable in the long term under current management, so an offset that improves the long-term viability of other vegetation is appropriate where approved activities will have an impact on the low condition areas. Low condition vegetation is defined below.

Definitions of native vegetation in low condition[2]

Native woody vegetation is in low condition if:

- the over-storey percentage of foliage cover is less than 25% of the lower value of the over-storey percentage foliage cover benchmark for that vegetation type[3]
- less than 50% of vegetation in the ground layer is native or more than 90% is ploughed or fallow.

Native grassland, shrubland or wetland is in low condition if less than 50% of vegetation in the ground layer is native or more than 90% is ploughed or fallow.

The Site Value (condition of the stand or patch) use the same attributes used to calculate Site Value in the BioMetric[4] assessment under the property vegetation plan (PVP) and the BioBanking Assessment Tool under the BioBanking regulations.

The distribution of overcleared vegetation is shown in Map 3.

5.4 Overcleared Mitchell landscapes

Following the same reasoning that at least 30% of vegetation types should be retained, recent changes to the NV Act restrict the clearing of native remnant vegetation if it occurs in landscapes that are more than 70% cleared and it is not in low condition. Mitchell (2002) has identified landscapes across NSW. On the South Coast, Mitchell identified about 30 distinct landscapes on the basis of geology, topography, lithology, landform and climate. Most of these landscapes retain much more than 30% vegetation cover. Only two landscapes, Milton Hills and Bega Coastal Alluvium, have been cleared to an extent of 70% or greater (see

[2] This definition is employed by regulation under the NSW *Native Vegetation Act 2003* and defined by Gibbons et al. (2005).
[3] For benchmarks see www.environment.nsw.gov.au/biobanking/VegBenchmarkDatabase.htm.
[4] www.environment.nsw.gov.au/projects/BiometricTool.htm

Map 4). Both these landscape units are about 5000 hectares in size, are low in the landscape, have fertile soils and are current or former dairy land. Any remaining remnant vegetation in these units has been mapped as being of high conservation value.

Map 4 also plots the Bega Granites and Bomaderry Plains landscapes, which have been cleared to between 65% and 69%. Although further clearance of vegetation in these landscapes would remain consistent with the NV Act and the CAP, these landscapes need planning consideration and some degree of protection. This is because it will not take much further vegetation loss for these landscapes to conform to the definition of overcleared landscape. The Bega Granites occupy a large (117,000-hectare) depression basin of rolling hills on a granite batholith, whereas the Bomaderry Plains (9400 hectares) are part of the Shoalhaven floodplain.

These four heavily cleared landscapes should be priority areas for ecological restoration projects.

5.5 Poorly conserved vegetation communities

The Southern Rivers CAP aims to have at least 30% of the original distribution of each native vegetation community managed for conservation. This is contained within Biodiversity Target 1 (SRCMA 2005). This management need not be in a formal reserve but at a minimum, vegetation types that have less than 30% of their original extent within a formal reserve system need close consideration in regional planning strategies. A list of poorly conserved vegetation communities is provided in Appendix 4.

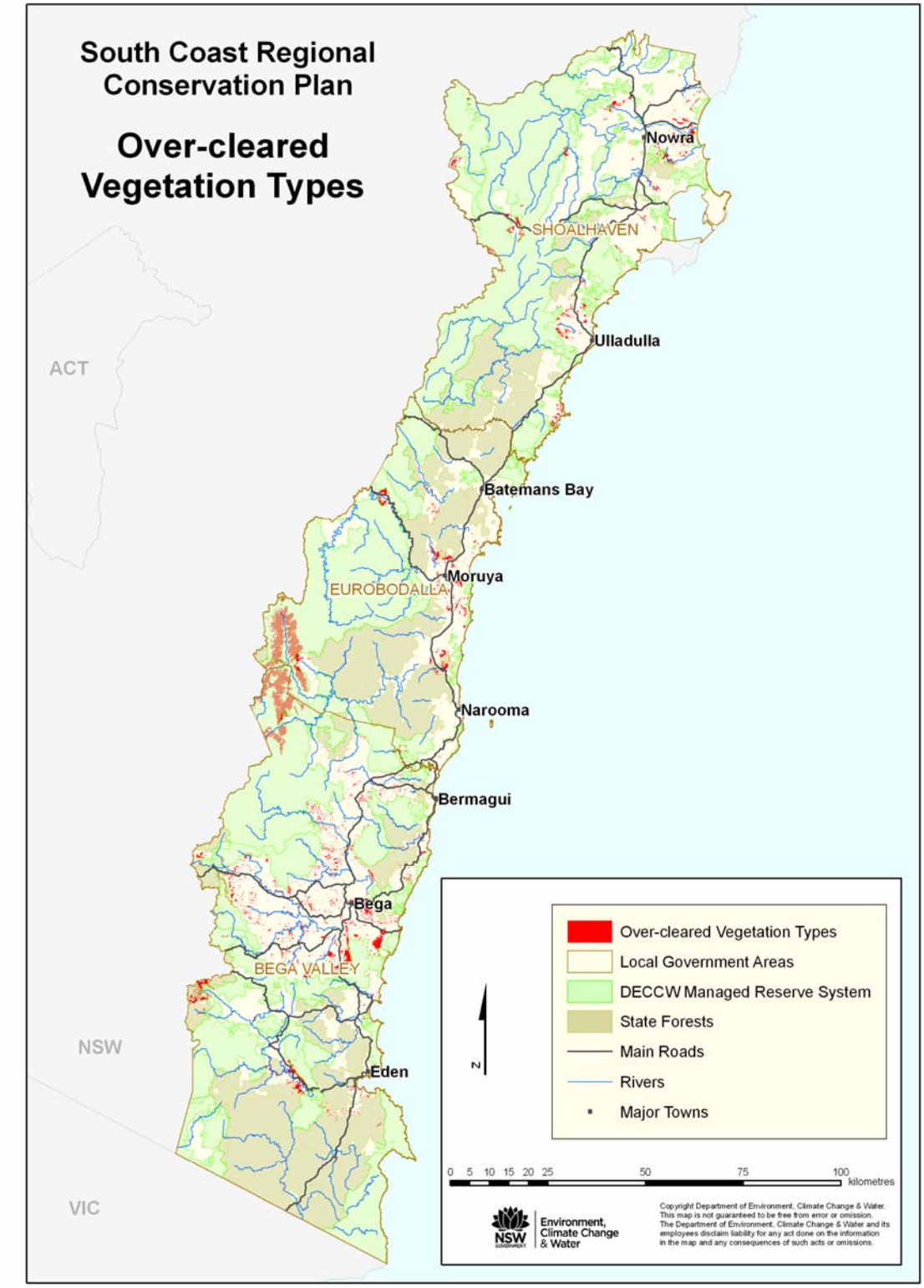
The distribution of poorly conserved vegetation is shown in Map 5.

5.6 Old-growth forests

Old-growth forests are ecologically mature forests where the effects of disturbance are negligible. Old-growth forests are of high conservation significance as they support a relatively high level of biodiversity, are relatively uncommon and quite fragmented, and certain native plants and animals, such as hollow nesters, may be restricted to or highly reliant on old-growth forest for their habitat requirements. Many of these species are threatened or declining across the State. In the South Coast Region, threatened species with a dependence on old-growth forest include threatened owls, cockatoos, bats, the broad-headed snake, gliders, the spotted-tailed quoll and the brush-tailed phascogale. Old-growth forest also has aesthetic and cultural values.

Old-growth forest and other old-growth vegetation were mapped across the study area as part of the Eden and Southern NSW CRAs (NPWS 1998), and much of the mapped old-growth forest occurs within protected areas. The CRA mapping was focused on public forests and is hence less reliable for private lands or other vegetation types. The CRAs identified old growth through the use of aerial photography, which is not always accurate. The assessments produced candidate old-growth forest layers, which have been used in the analysis in the RCP. It should also be noted that the mapping does not reflect disturbances that have occurred since the mid 1990s. Thus, Map 6 provides a guide as to where old-growth forest may occur rather than being definitive.

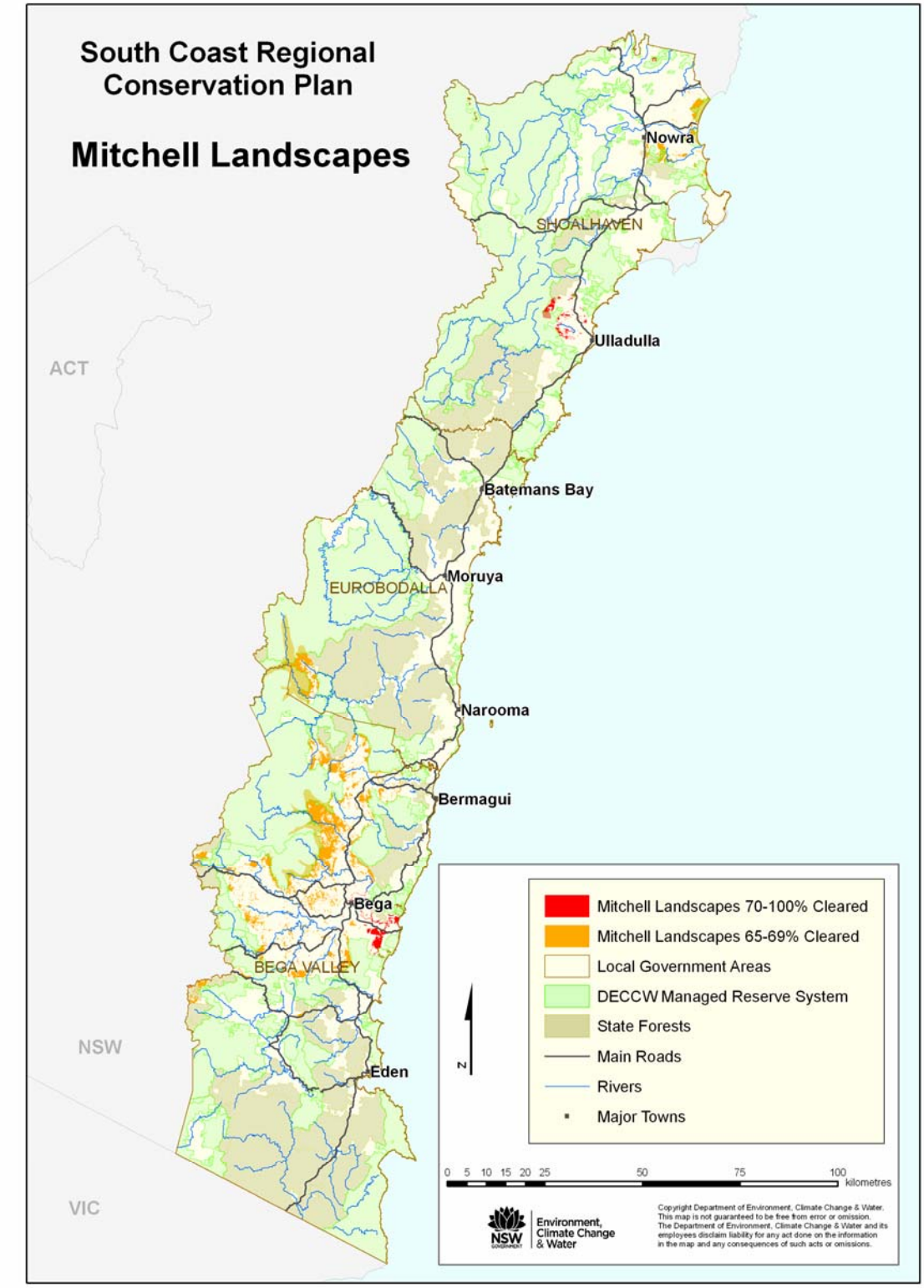
JANIS criteria include specific targets for old-growth forests. Where old-growth forest is rare or depleted (generally less than 10% of the extant distribution) within a forest ecosystem, all viable examples should be protected, wherever possible. For other vegetation communities, 60% of the old-growth forest would be protected. Targets were met for most vegetation assemblages, but not for the vegetation assemblages listed in Appendices 5 and 6. Conservation of old-growth patches of these vegetation types on private land is particularly important. DECCW has produced guidelines to help identify old-growth forests in the field associated with private native forestry.



Map 3: Distribution of extant overcleared vegetation*

Note: Refer to section 5.3.

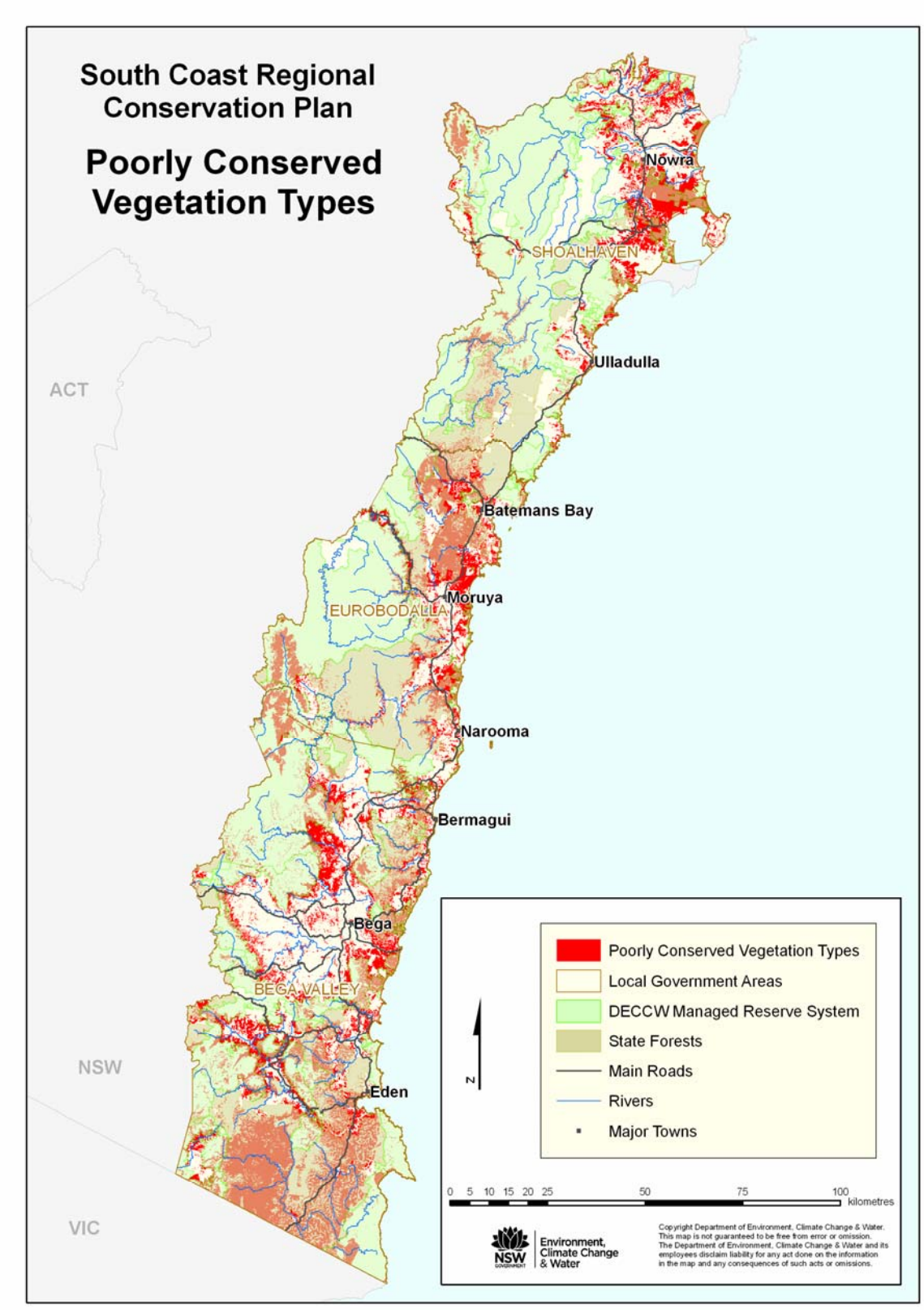
* Mapping based on vegetation model. Actual on-ground occurrences require verification.



Map 4: Extant vegetation in landscapes cleared 65% or more*

Note: Refer to section 5.4.

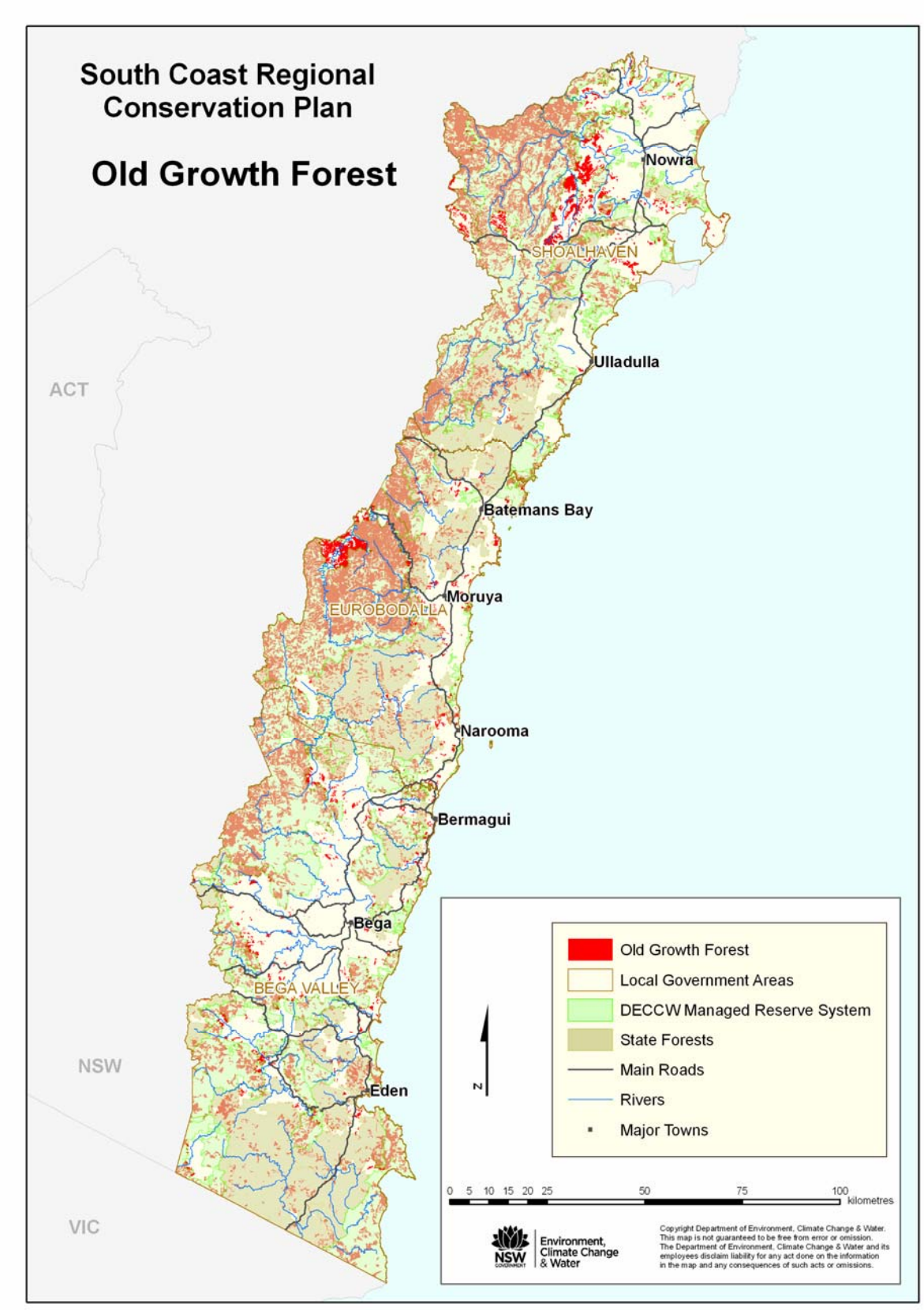
* Mapping based on vegetation model. Actual on-ground occurrences require verification.



Map 5: Poorly conserved extant vegetation*

Note: Refer to section 5.5 and Appendix 4.

* Mapping based on vegetation model. Actual on-ground occurrences require verification.



Map 6: Likely distribution of old growth forest

Note: Refer to section 5.6 and Appendices 5 and 6.

5.7 Threatened and significant species

Excluding marine and vagrant seabird species, 71 threatened plant species, 75 threatened animals, and one threatened population that are listed under either the TSC Act or FM Act have been recorded in the RCP area. A full list of threatened species is given in Appendix 7, together with an indication as to whether a particular species can be found in the DECCW estate, in State forests, or on private lands.

In addition to threatened species, the following rare or restricted plant species, largely found outside the DECCW estate, were also considered:

> *Acacia blayana*, *Acacia kydrensis*, *Acacia jonesii*, *Baeckea denticulata*, *Baeckea ramossissima* subsp. *prostrata*, *Bossiaea* sp. Brogo, *Bossiaea bracteosa* (sp. aff.), *Brachyscome cardiocarpa*, *Burnettia cuneata*, *Cuscuta tasmanica*, *Darwinia briggsiae*, *Darwinia taxifolia* subsp. *macrolaena*, *Daviesia wyattiana*, *Dryopoa dives*, *Eriostemon virgatus*, *Grevillea epicroca*, *Grevillea irrasa* subsp. *didymochiton*, *Grevillea irrasa* subsp. *irrasa*, *Grevillea macleayana*, *Grevillea rhyolitica* subsp. *semivestita*, *Halgania brachyrhyncha*, *Hibbertia* aff. *hermanniifolia*, *Leptospermum crassifolium*, *Leptospermum deuense*, *Leptospermum epacridoideum*, *Leucopogon pilifer*, *Marsilea mutica*, *Olearia rugosa*, *Pelargonium rodneyanum*, *Persoonia brevifolia*, *Persoonia juniperina*, *Phebalium carruthersii*, *Phebalium ellipticum*, *Pomaderris costata*, *Pomaderris gilmourii* var. *gilmourii*, *Pomaderris virgata*, *Prasophyllum sylvestre*, *Prostanthera* sp. E, *Prostanthera walteri*, *Pterostylis hians*, *Pterostylis vernalis*, *Pultenaea benthamii*, *Rumohra adiantiformis*, *Spyridium cinereum*, *Stackhousia spathulata*, *Styphelia adscendens*, *Westringia saxatilis*, *Wurmbea uniflora*, *Zieria arborescens* subsp. *decurrens*, and *Zieria* sp. aff. *tuberculata*.

Known habitat of threatened and significant species was identified through the following steps:

Step 1: Records of threatened and significant species within the boundaries of the Shoalhaven, Eurobodalla and Bega Valley local government areas were selected from the Atlas of NSW Wildlife[5] and other licensed datasets. A list was created of these species.

Step 2: The list was reviewed by a DECCW panel of threatened species officers and refined to only those species for which private lands were thought to be important habitat; other species were excluded from further analysis. DII fisheries conservation managers also advised on the distribution of aquatic threatened species in the South Coast Region.

Step 3: The records for the remaining species were reviewed by DECCW threatened species officers, and records suspected or known to be incorrect or of low spatial accuracy (more than 100-metres inaccuracy) were excluded from further analysis. Remaining records were considered valid.

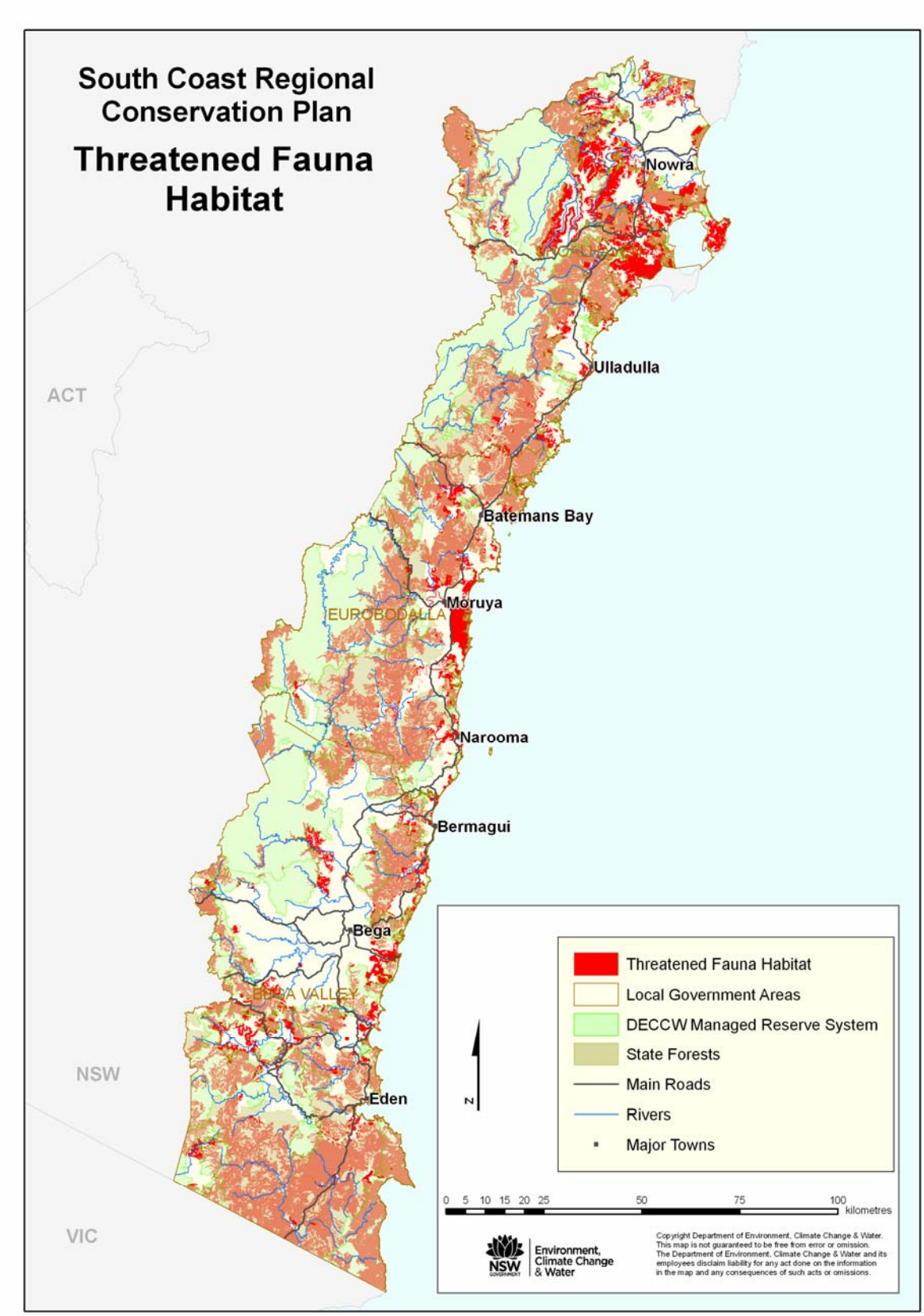
Step 4: Using the validated records from the previous two steps, habitat was then mapped for this subset of species using the methodology described in Appendix 8.

The methodology employed relied on validated records and excluded species for which the DECCW estate or State forests are the principal habitat. A problem in utilising records linked to the vegetation units in which they occur is that not all areas have been equally surveyed and identification of habitat will be biased towards areas where surveys have occurred.

The mapping provided can therefore be regarded only as verified habitat rather than the full extent of actual or potential habitat. As described in section 8.6, a website tool has been developed as an adjunct to the RCP. This tool helps users to identify potential habitat for a particular threatened species (Briggs 2005).

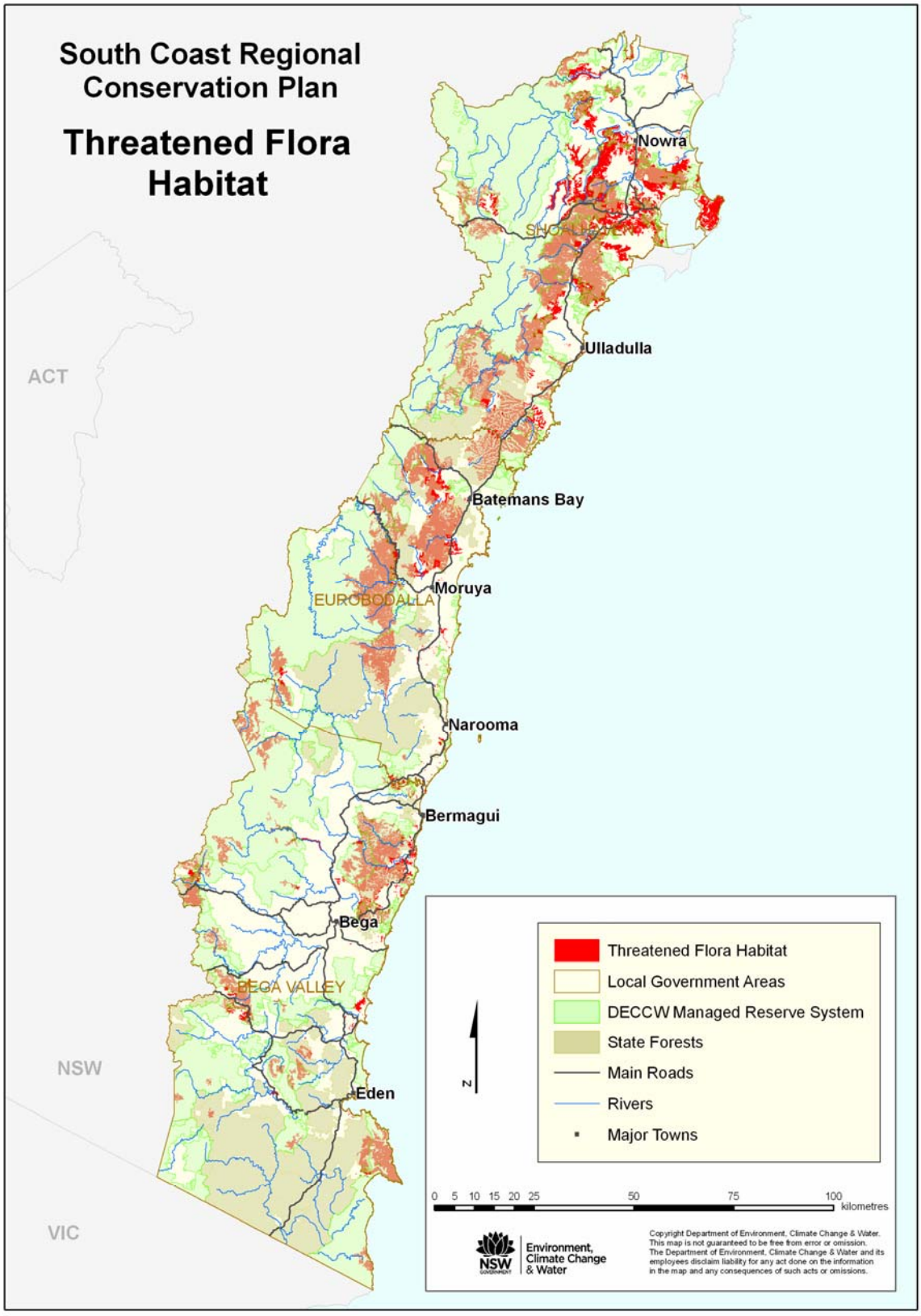
Threatened fauna habitat is shown in Map 7, and threatened plant habitat is shown in Map 8.

[5] http://wildlifeatlas.nationalparks.nsw.gov.au



Map 7: Distribution of habitat of threatened fauna for which private land is of importance

Note: Refer to section 5.7 and Appendices 7 and 8.



Map 8: Distribution of habitat of threatened flora for which private land is of importance

Note: Refer to section 5.7 and Appendices 7 and 8.

5.8 Significant aquatic habitats

The coastal strip falls within the Batemans Shelf marine bioregion (north from Turingal Head, near Tathra) and the Twofold Shelf marine bioregion (south from Turingal Head) and contains many unique marine features. These are partially protected within the Jervis Bay and Batemans marine parks. Local marine habitats include a range of exposed and sheltered sandy beaches, rocky shores, submerged reefs, offshore islands, estuaries, coastal creeks and lakes.

The intertidal zone is a significant interface between terrestrial and marine ecosystems and protection is warranted in many areas.

Estuaries, coastal lakes and wetlands are particularly important areas for aquatic biodiversity in view of their inherent biodiversity values, including habitat for aquatic plant species as well as critical fish breeding areas. Many of the activities that affect aquatic habitats are associated with development in the catchments of these areas. In many cases, these impacts come from developments located upstream from the aquatic habitat sites, so a whole-of-catchment approach to planning that also considers the downstream impacts of developments is required.

5.8.1 Nationally important wetlands

A Directory of Important Wetlands in Australia is a cooperative project involving the federal, state and territory governments. It is coordinated by the Commonwealth Department of the Environment, Water, Heritage and the Arts and was first published in 1993. The latest, third edition was published in 2001 (Australian Government 2001).

To be considered nationally important, a wetland must meet at least one of the six nationally agreed criteria. The criteria cover the following areas: biogeographic representativeness; important ecological or hydrological functions; provision of animal habitat during times of vulnerability or adverse conditions; support for more than 1% of the national population of any taxa; support for threatened taxa or communities; and historical or cultural significance.

The following Commonwealth listing of wetlands of national importance are located within the region and are considered to be of high conservation value:

Clyde River Estuary
Cullendulla Creek and Embayment
Merimbula Lake
Bega Swamp
Coomonderry Swamp
Jervis Bay
Shoalhaven / Crookhaven Estuary
St Georges Basin
Wollumboola Lake
Bondi Lake
Coila Creek Delta
Durras Lake
Moruya River Estuary Saltmarshes
Nargal Lake
Nelson Lagoon
Pambula Estuarine Wetlands
Tuross River Estuary
Twofold Bay
Waldrons Swamp
Wallaga Lake
Wallagoot Lagoon (Wallagoot Lake)
Jervis Bay Sea Cliffs
Swan Lagoon
Tabourie Lake
Cormorant Beach
Lagoon Head
Lake Termeil Wetland Complex
Meroo Lake Wetland Complex
Beecroft Peninsula
Nadgee Lake

The distribution of these wetlands is shown in Map 9. The catchments of the wetlands, as a group, have not been identified as having high conservation value, just the lakes themselves. However, land zoning and development within these catchments will need to consider the impact of proposals on the conservation values for which the wetlands have been recognised as important.

5.8.2 Significant coastal lakes and vulnerable estuaries

The Coastal Lakes Inquiry undertaken by the Healthy Rivers Commission (HRC) systematically assessed and classified NSW coastal lakes and lagoons and their catchments (HRC 2002). The Government has released a Statement of Intent which outlines its response to the inquiry's recommendations.

SCRS includes broad management actions for four classes of coastal lake. Coastal lakes in the comprehensive protection class remain in near-pristine condition. The scarcity and importance of such lakes warrants comprehensive protection. Coastal lakes in the significant protection class typically have catchments that are largely unmodified to modified and have slightly affected ecosystems and moderate to high conservation value. The recommended management for these two lake classes includes confining any new urban and rural residential development to within the existing boundaries of such developed areas, and any development should have only a minor impact on the lake ecosystem and conservation values, and preferably less.

The SCRS requires councils to demonstrate that any new residential or rural–residential zoning within the catchments of these coastal lakes would not adversely affect them.

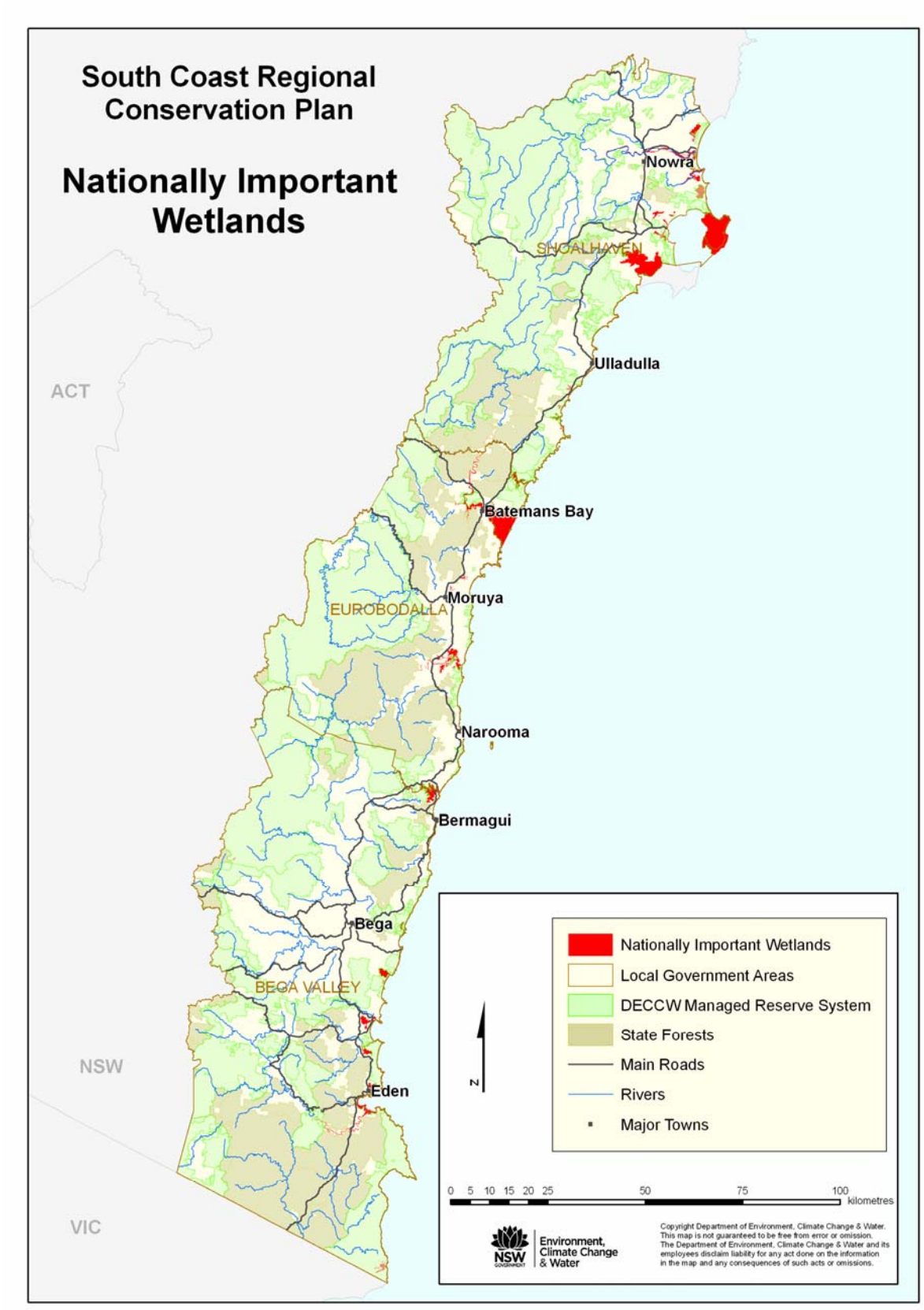
The other two categories, 'healthy modified condition' and 'targeted repair' have no specific recommendations in this RCP, but councils would be expected to adopt the recommendations set out in the report of the HRC regarding these lakes and their catchments (HRC 2002).

To determine the inherent capability or ability of an estuary to sustain catchment development without undue environmental degradation, the Department of Land and Water Conservation (DLWC 2000) and the Department of Natural Resources carried out vulnerability assessments of the estuaries and coastal lakes of the South Coast.

The assessments used a range of factors that influence the water and nutrient balances of an estuary and therefore its biological productivity. To determine whether there are natural factors that make some estuaries more susceptible to the impacts of human activity, the assessments were undertaken initially assuming undisturbed, fully forested catchments. Current catchment land uses were than modelled to determine the degree of change in the controlling factors and to correlate predictions with field observations of estuary condition.

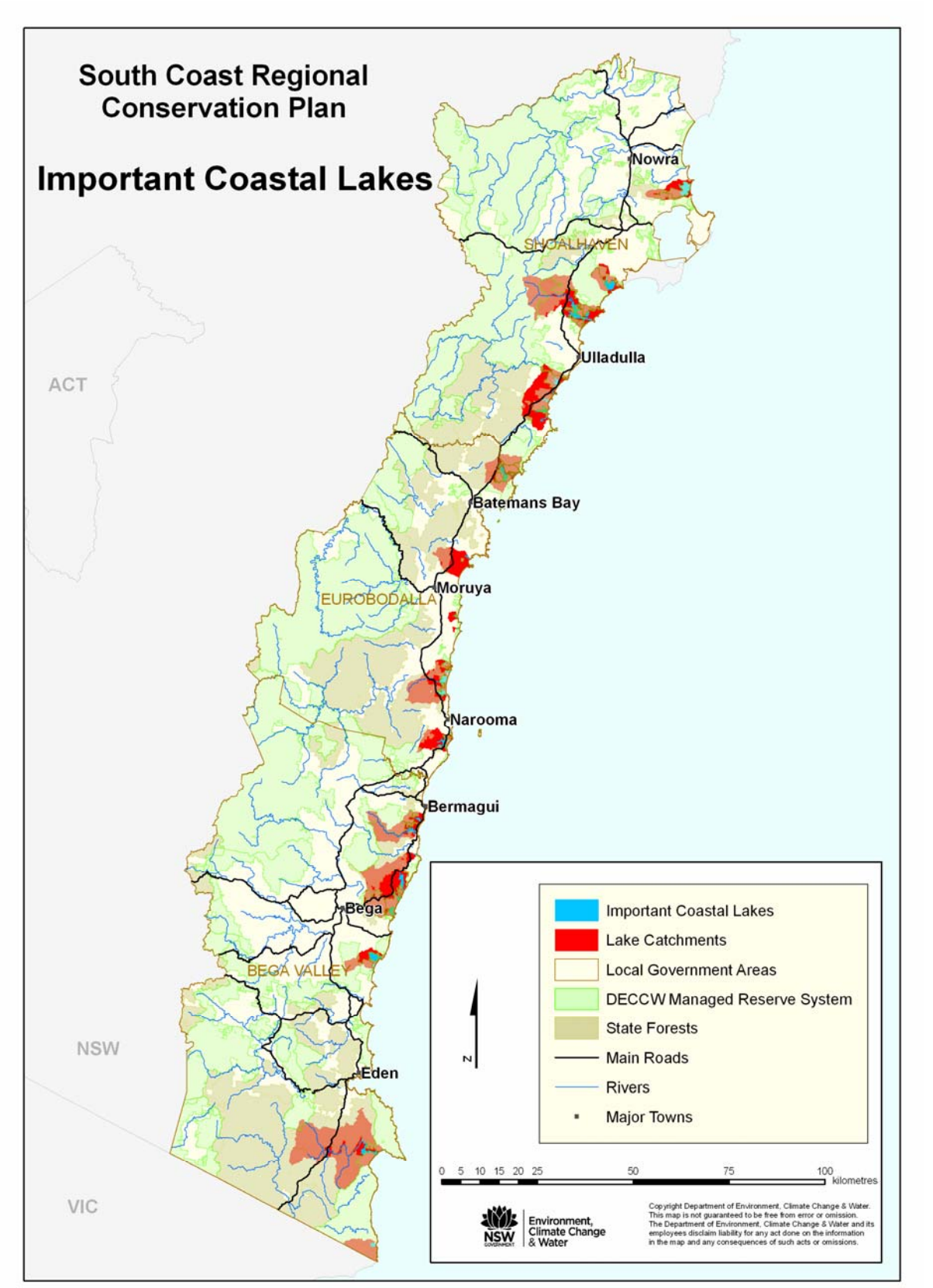
The assessments rank the estuaries of the South Coast into six classes from 'very high' to 'low' vulnerability. The three most vulnerable classes require careful planning and development consideration if water quality and habitat of these estuaries are to be maintained and improved. Map 10 indicates the locations of these waterways and their catchments.

Appendix 9 lists coastal lakes assigned comprehensive or significant protection classifications by the HRC. It also lists estuaries that have a very high, high or moderately high vulnerability rating.



Map 9: Wetlands of national importance

Note: Refer to section 5.8.



Map 10: Coastal lakes of high conservation value and vulnerable estuaries

Note: Refer to section 5.8 and Appendix 9.

5.8.3 Estuarine vegetation

Estuarine macrophytes (seagrass, mangroves and saltmarsh) are recognised nationally and internationally as aquatic habitats of very high conservation value. On the basis of the extent of seagrass, mangroves and saltmarsh present, DII (Fisheries Conservation) considers coastal water bodies on the South Coast to be particularly significant for aquatic biodiversity conservation. These are:Jervis Bay, St Georges Basin, Crookhaven River, Clyde River, Merimbula Lake, Wagonga Inlet, Moruya River, Wallaga Lake, Pambula Lake, Tuross Lake, Tabourie Lake, Coila Lake and Wapengo Lagoon. Planning and management of lands adjacent to, and in the catchments of, these areas need to minimise impacts on these significant areas. DII (Fisheries Conservation) has developed guidelines that recommend how these issues should be addressed by councils in the development of draft LEPs (see Appendix 10).

5.9 Wilderness

The *Wilderness Act 1987* provides for the identification, protection and management of wilderness areas in NSW. Wilderness is an important component of biodiversity conservation. These areas have been least modified by modern society, contain the most intact and undisturbed expanses of our remaining natural landscapes, and maintain natural ecosystem processes. As wilderness areas are large (usually over 8000 hectares) contiguous areas with minimal disturbance, they provide the most viable habitat for a number of species that have large natural ranges. Wilderness areas may also be important for evolutionary adaptation in the face of major climate change.

Under the Act, wilderness areas may be identified or declared. Generally, most development in declared wilderness is prohibited, and any activity must be compatible with wilderness management principles. All areas of declared wilderness in the South Coast Region are part of the DECCW estate (NPWS 2002b). Identified wilderness can apply to any land tenure, but has no effect on the management and use of the land unless the owner agrees to its declaration. However, the identification of an area as wilderness suggests that the area is unsuitable for intensive development, and development on identified wilderness lands should be controlled through appropriate zoning in LEPs. The main areas of identified wilderness in the South Coast Region that are outside the DECCW estate are in the northern Sassafras area, at Yalwal, and in the Deua area. All identified wilderness within State forests is part of a formal reservation area.

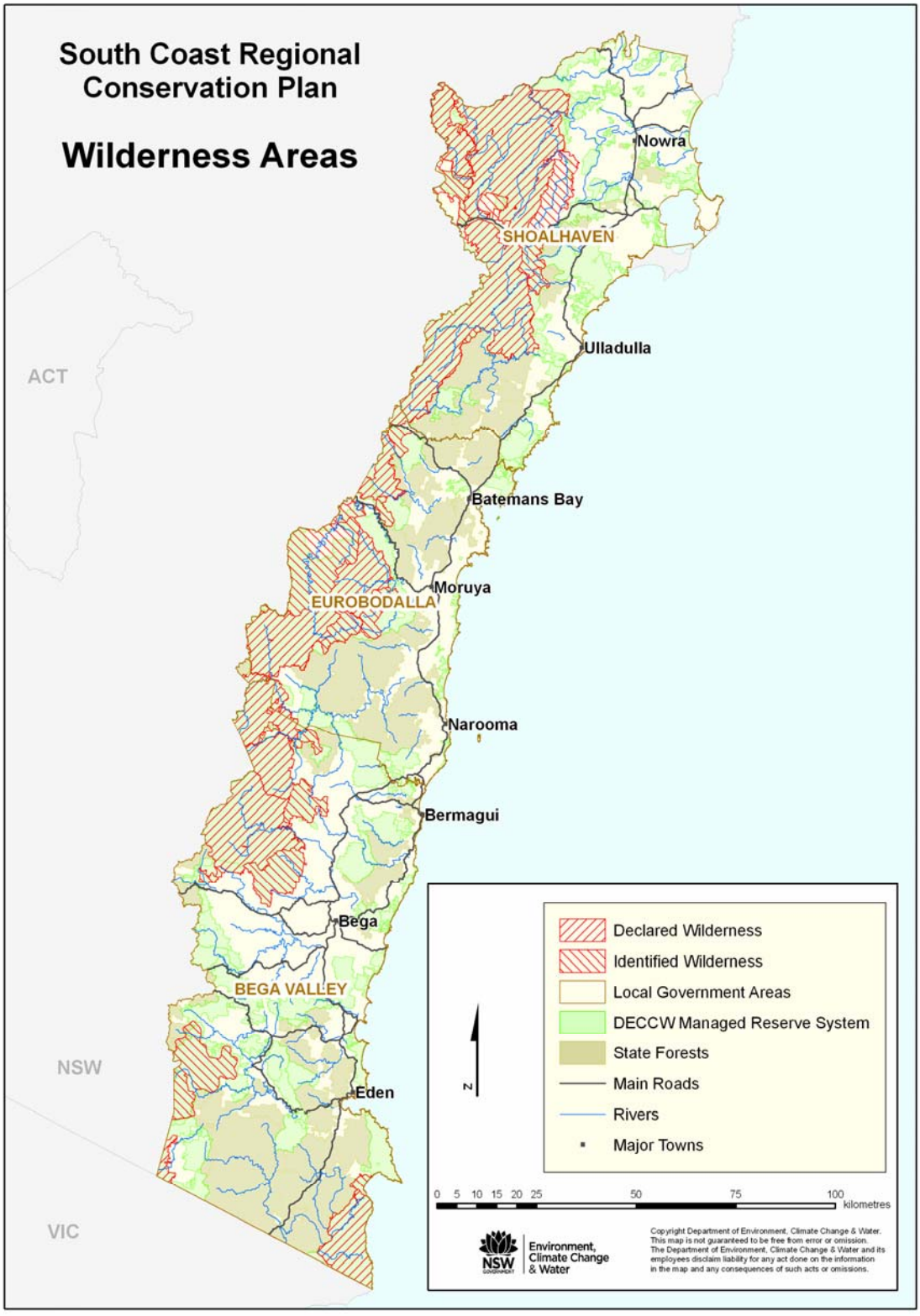
All areas of declared and identified wilderness are considered to have high conservation value (Map 11).

5.10 Statutory conservation protection on private lands

The statutory protection of conservation values on private lands, currently afforded by the following mechanisms, should be reflected in the outcomes of local environmental plan reviews.

5.10.1 Conservation Agreement

A Conservation Agreement (CA) gives a landholder the opportunity for their land to be permanently conserved—not just under their ownership, but under all future owners. CAs are binding joint agreements between a landholder and the Minister for the Environment. They provide permanent protection for conservation features of a property. Bega Valley Shire contains a large proportion of the CAs in NSW.



Map 11: Identified wilderness

Note: Refer to section 5.9.

5.10.2 SEPP 14 – Coastal wetlands and SEPP 26 – Littoral rainforest

These State environmental planning policies (SEPPs) apply to coastal wetlands and littoral rainforests that have been identified and mapped under each policy (Map 12). Development is not permitted within the mapped areas without development consent from the council and the concurrence of the Minister for Planning. In granting consent or concurrence, authorities must consider whether the proposed development could reasonably occur elsewhere, and they must also consider the significance of the impact of the proposed development.

About 9700 hectares of SEPP 14 coastal wetlands have been identified and mapped within the South Coast Region. They are distributed along the coast with concentrations on major floodplains, including those of the Shoalhaven, Clyde, Moruya and Bega rivers. The SCRS requires all LEPs to achieve environmental protection of SEPP 14 coastal wetlands through zones such as E2 conservation or W1 natural waterways. Future development in their catchments will need to demonstrate no net impact on the hydrology, water quality and ecology of these wetlands.

A total of 30 hectares of SEPP 26 littoral rainforest has been identified in the study area, mainly occurring on the Beecroft Peninsula, near Bannisters Point (Mollymook), and at Tuross Heads.

5.10.3 Registered Property Agreements under the Native Vegetation Conservation Act 1997

Although this Act has since been replaced by the NV Act, it provided for property agreements to protect and manage areas of native vegetation on private property. Agreements could be either registered or unregistered. Where they were registered, this meant that they were registered on the title of the land. The term of registration was variable, but in some cases agreements were registered in perpetuity.

Areas subject to Registered Property Agreements should be zoned appropriately to ensure ongoing protection and management of native vegetation.

5.10.4 Registered Property Agreements under the Native Vegetation Act 2003

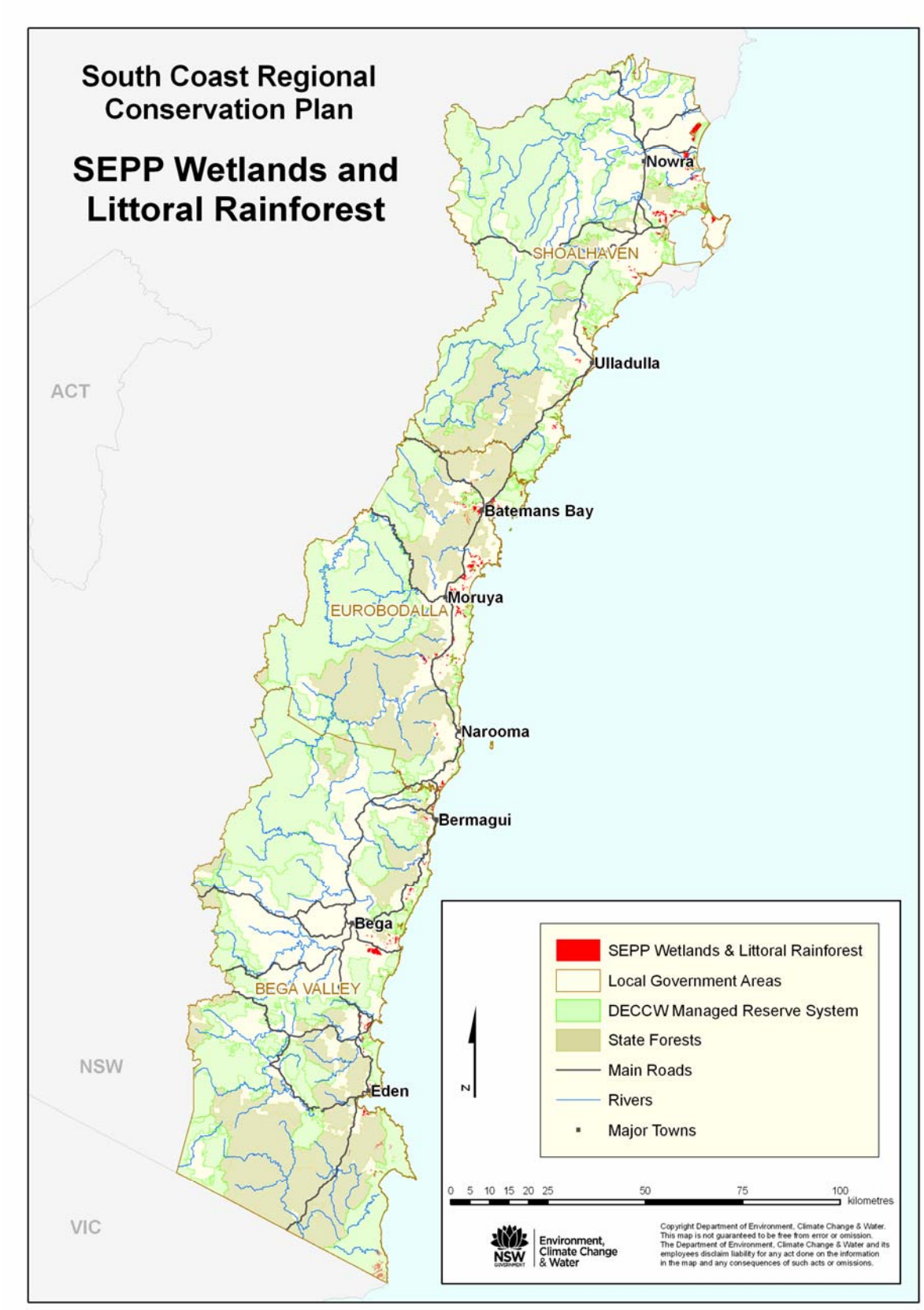
Clearing of native vegetation is now permitted under the NV Act only if it improves or maintains environmental outcomes. Clearing impact is assessed through the PVP tools. The BioMetric tool (Gibbons et al. 2005) assesses the value of native vegetation at the national, regional, landscape and site scales. The Threatened Species tool (Briggs 2005) assesses the value of a site as threatened species habitat. Clearing is permitted only if any biodiversity losses can at least be matched by gains in offset areas managed for conservation.

Applications for incentive funding under the NV Act are assessed using the same criteria as applications for clearing, with the addition of measures for the duration of management commitment.

A Public Register of Registered Property Agreements can be searched to find the location of clearance offsets.[6]

DECCW considers that, before LEPs are finalised, information on the distribution of registered agreement areas should be obtained from the SRCMA. It is likely that such areas will be priority nodes for future restoration work, and their distribution may help define the boundaries of environmental conservation zones.

[6] www.environment.nsw.gov.au/vegetation/publicregister.htm



Map 12: SEPP 14 and SEPP 26

Note: Refer to section 5.10.

5.11 Matters of national environmental significance—EPBC Act considerations

The EPBC Act is Commonwealth Government legislation aimed at protecting the environment. It has a particular focus on MNES. It streamlines the national environmental assessment and approvals process, protects Australian biodiversity, and integrates the management of important natural and cultural places.

Under the EPBC Act, an action will require approval from the Federal Environment Minister if the action has, will have, or is likely to have, a significant impact on a matter of national environmental significance which include:

- World Heritage properties
- National Heritage places
- wetlands of international importance (listed under the Ramsar convention)
- threatened species and EECs
- migratory species protected under international agreement
- the Commonwealth marine environment
- nuclear actions.

The EPBC Act also provides for the protection of the 'environment' of Commonwealth land and actions taken by Commonwealth agencies.

5.11.1 Matters of national environmental significance on the South Coast

MNES identified in the South Coast Region are:

- listed threatened species and EECs
  - three threatened communities (a woodland, grassland and swamp)
  - 17 threatened seabirds
  - four threatened terrestrial birds
  - threatened frogs
  - threatened marine species (three whales, two turtles and three sharks)
  - threatened terrestrial mammals
  - three threatened freshwater fish
  - the broad-headed snake
  - 43 threatened plants.
- migratory species protected under international agreement
  - six migratory terrestrial species
  - six migratory terrestrial wetland species
  - 20 migratory marine birds
  - 11 other marine migratory species.
- Ramsar wetlands of international importance
  - nomination currently being prepared by the NSW Government for the Ramsar listing of Lake Wollumboola.
- the Commonwealth marine environment
  - generally, the Commonwealth marine area stretches from three nautical miles to 200 nautical miles from the coast, but also includes parts of Jervis Bay.
- World Heritage properties and places of national significance
  - none currently listed in the South Coast Region.

A major purpose of the RCP is to protect and restore biodiversity at a landscape scale. Ideally the RCP should also guide protection of MNES (with the exception of the marine environment, which is beyond its scope). The RCP allows for a strategic approach to the protection of MNES by seeking to have important wetlands, endangered vegetation and listed threatened and migratory species habitats within the defined areas zoned for either sole, or predominantly, conservation use.

Policy statements on the EPBC Act are available from the Department of Environment and Heritage.[7] EPBC Act *Principal significant impact guidelines 1.1 – Matters of national environmental significance* and *1.2 – Actions on, or impacting upon, Commonwealth land, and actions by Commonwealth agencies* (DEH 2006a) provide general advice on the application of the Act and when actions should be referred to the federal government for consideration. They should be consulted by any landowner, council member or developer who is planning an action that may result in a significant impact on a matter protected by the EPBC Act.

The NSW Government will continue to work with the federal government with the objective of ensuring that relevant matters protected under the EPBC Act are appropriately considered in LEPs. Ideally, NSW planning processes would be accredited by the federal government as addressing MNES. There is already in place an agreement that covers State impact assessment processes.

5.11.2 Migratory wetland species

The *Wildlife conservation plan for migratory shorebirds* (DEH 2006b) includes an interim guide as to how shorebird habitat of international and national habitat can be recognised. Of relevance to the South Coast is the fact that the use of the Shoalhaven Estuary by shorebirds qualifies it to be considered as internationally significant habitat, and the following wetlands are considered to be of national significance: Clyde River Estuary, Coomonderry Swamp, Jervis Bay, Shoalhaven/Crookhaven Estuary, St Georges Basin, Lake Wollumboola, Coila Creek Delta, Nargal Lake, Pambula Estuarine Wetlands, Twofold Bay, Swan Lagoon, Tabourie Lake, Lake Termeil Wetland Complex, Meroo Lake Wetland Complex and Beecroft Peninsula.

Shorebird habitat of regional significance was identified by the estuary priority mapping of Breen et al. (2005).

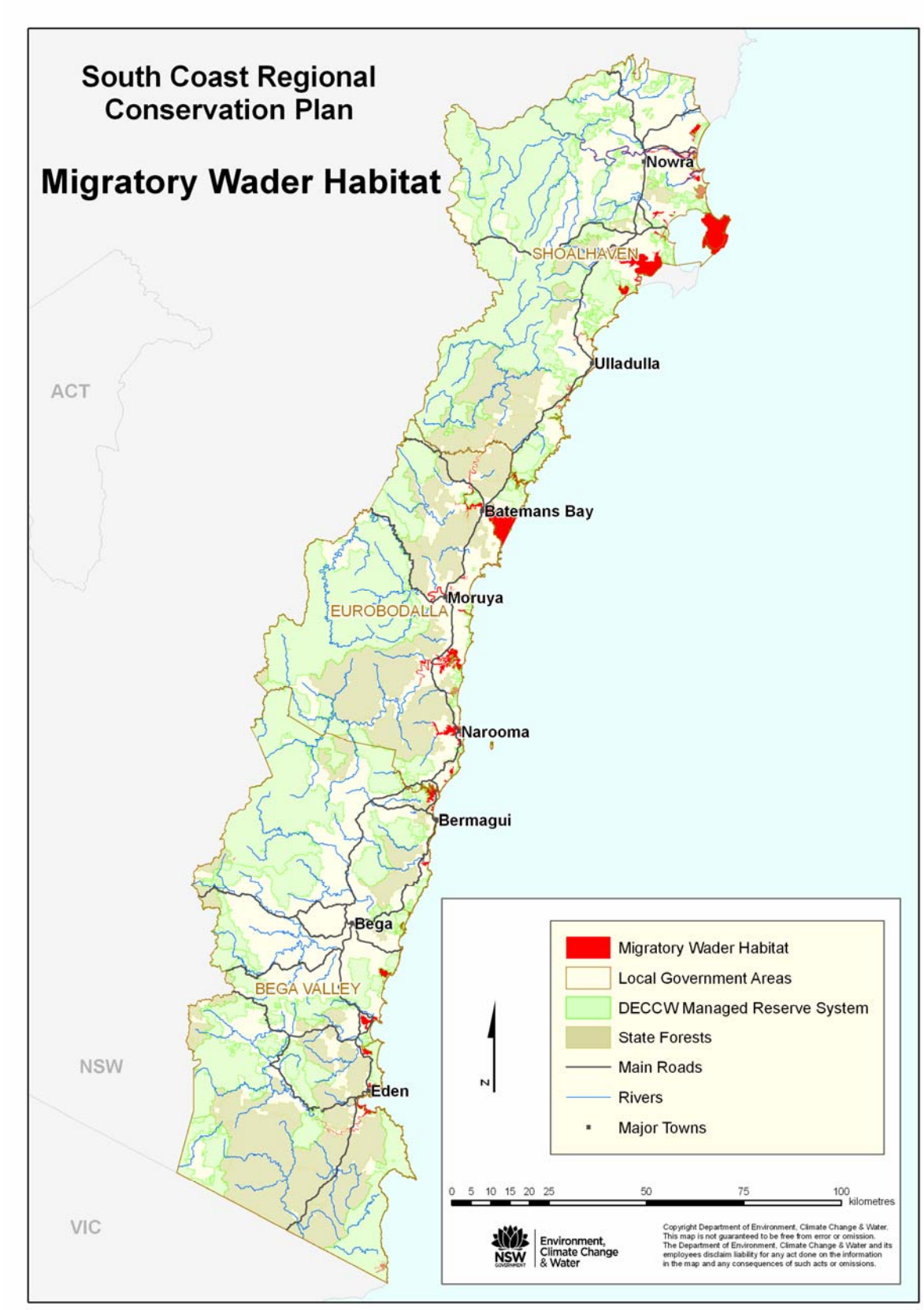
Map 13 is a compilation map of all significant shorebird habitat on the South Coast.

5.12 Compilation of values

Map 14 combines the distributions of all individual environmental assets of high conservation value, with the exception of poorly conserved vegetation communities and heavily cleared Mitchell landscapes (65–70% cleared). These last two features are best considered in terms of targeting restoration or enhancement activities rather than requiring absolute protection measures.

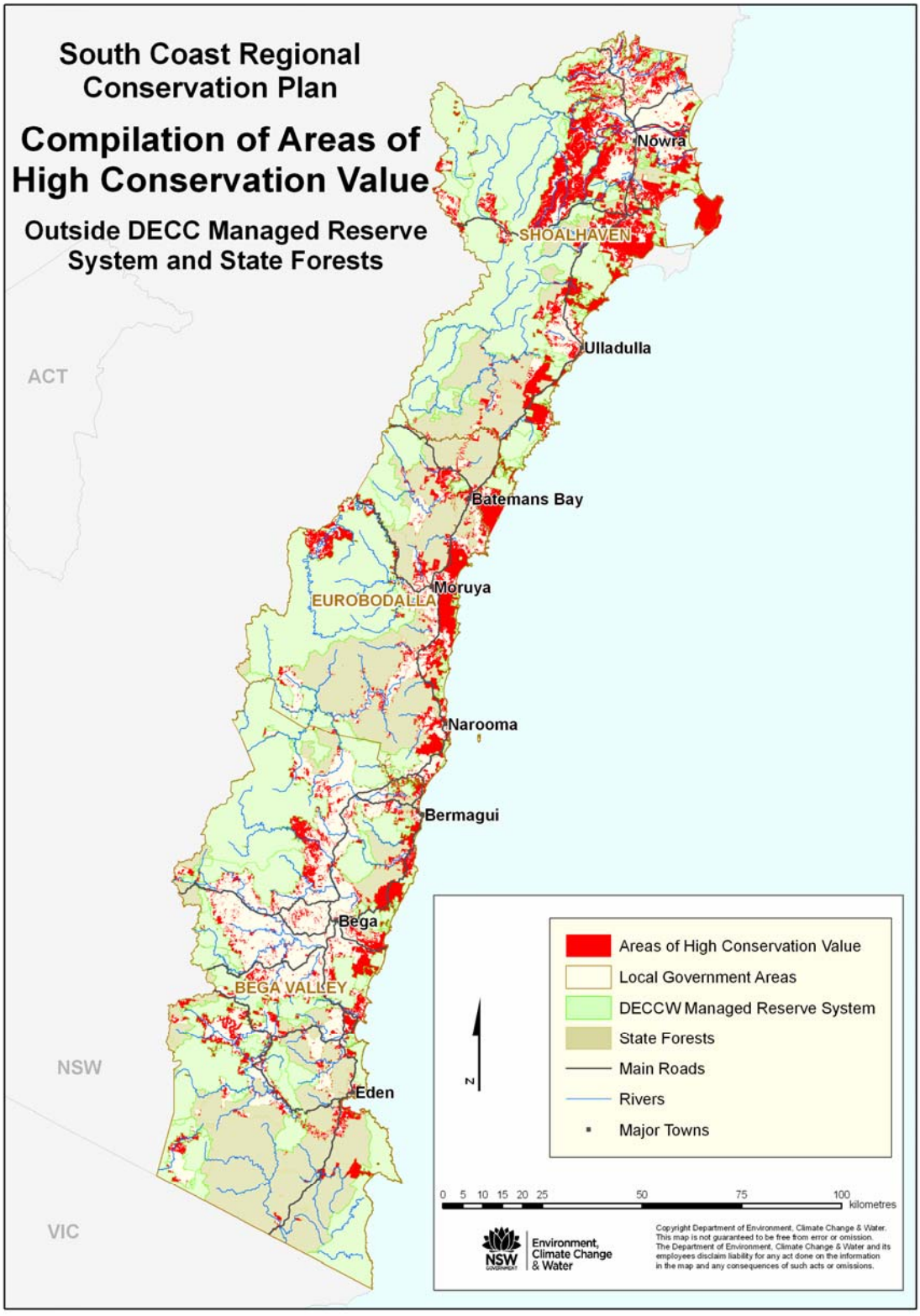
LEPs should direct development away from the high conservation value areas shown on Map 14 towards cleared or low vegetation value areas. As described in section 7.1, some of the mapped values should be verified on the ground before significant planning or development decisions are made.

[7] www.environment.gov.au/epbc



Map 13: Significant migratory wader habitat

Note: Refer to section 5.11.



Map 14: Compilation of areas of high conservation value outside the DECCW estate and State forests

Note: Refer to section 5.12.

6 Wildlife corridor analysis

6.1 Introduction

Connectivity is the degree to which the landscape allows species of native flora and fauna to move or disperse between patches. While connectivity requirements are different for each species, the aim of wildlife corridors is to integrate individual species' requirements to prevent the local extinction, and promote the recovery of, local populations of threatened species. They achieve this by enabling feeding, breeding, dispersal, colonisation or migration (whether seasonally or nomadically) of native fauna and flora, and by facilitating gene pool exchange between populations of native fauna and flora. Wildlife corridors improve the overall function of the landscape and help prevent the deterioration of environmental services. Achieving better connectivity and establishing corridors usually involves protecting and improving the size, shape and distribution of vegetation remnants left from past and current land-use practices.

The continued existence of most Australian plants and animals results from an ability to colonise and recolonise changing habitats in response to climate cycles. However, human-induced global warming threatens to alter our fragmented ecosystems at a rate that the vegetation communities and habitats within these ecosystems may not be able to keep pace with. The resulting 'simplification' (reduction in the complexity or structure of habitat, resulting in the disappearance of component organisms) makes bushland vulnerable to invasion by weeds and feral animals. Simplification also reduces the capacity of ecosystems to provide essential environmental services, such as the clean air, water and nutrient cycling, soil production and pest control on which human communities and systems depend (Walter 1995).

In landscapes where the natural vegetation is overcleared and connectivity is poor, programs need to be put in place to protect key remnants and restore the areas most critical for the re-establishment of landscape function. These programs need to be flexible and dynamic to relate to local circumstances—particularly landowner and community willingness to engage in restoration.

Scientific thought suggests that the model of connectivity that provides the most biodiversity benefit in an overcleared landscape is the 'stepping stone' model (Fisher et al. 2006). This is where large remnants form a protected chain between 'core vegetation' (such as that found in large reserves) and the remnants are large enough and close enough to serve as viable habitat for most of the species native to that area. Compared with alternative corridor models, the stepping stone model results in smaller edge effects and dispersal distances and larger niche diversities and territory sizes. It ensures that the greatest part of the natural ecological community can be sustained outside the core habitat areas.

In the riparian zone, unbroken vegetation corridors established along creeks and rivers are important for many reasons, such as to provide bed and bank stability, protect water quality, maintain aquatic and terrestrial fauna habitat and movement,[8] maintain the viability of riparian vegetation communities, protect floodplain processes, and manage edge effects at the riparian–agricultural–urban interface. The importance of riparian vegetation is highlighted by the listing of the degradation of native riparian vegetation and removal of large woody debris along NSW watercourses as Key Threatening Processes for aquatic threatened species under the FM Act.

[8] The physical passage of aquatic fauna in waterways is not addressed in this RCP.

6.2 Connectivity status of the South Coast environment

The South Coast Region fortunately contains large remnants of well-connected native vegetation in protected conservation reserves and State forests. However, these tracts of forest are concentrated in the hinterland and escarpment, meaning that biological connection up and down the coast, along waterways, and to and from the hinterland is not complete.

A number of programs and plans to correct this across all scales have been developed in recent times:

- Councils have, in the course of planning for development proposals and rezonings, identified fauna habitat corridors at the local and landscape scales.
- DECCW has identified 'verified regional corridors' important for particular fauna moving in and out of conservation reserves, and undertaken an analysis of the South Coast to identify priority areas for connection and conservation.
- The SRCMA has identified broad regional habitat corridors within which connectivity incentive programs and extension efforts are being focused to address landscape functionality and global warming.
- DECCW is currently working to establish a conservation corridor the length of the great eastern ranges (combining elements of the Great Dividing Range and the Great Escarpment) through voluntary, cooperative and collaborative partnerships with a wide range of groups and organisations, both government and private, that share and support this vision. Through this process DECCW is attempting to improve or maintain connectivity of natural lands for the 1200 kilometre section of the great eastern ranges in NSW. Formerly known as the Alps to Atherton Initiative it is currently referred to as the Great Eastern Ranges Corridor Initiative.

6.3 The conservation planning approach to connectivity on the South Coast

The RCP brings all available corridor plans together for the first time and interprets them geographically. The RCP also employed a least cost pathways analysis that considered the configuration of vegetation (patch size, condition and connectedness) and identified areas that are important for decreasing or at least maintaining the current level of habitat fragmentation on the South Coast.

The RCP ranks lands potentially valuable for improving natural landscape function into two classes, these being (a) 'environmental corridors', and (b) 'priority areas for restoration and enhancement'.

(a) Environmental corridors include three subgroups:

(i) corridors that are currently incorporated in statutory and other local plans. These narrow corridors are known to be used by threatened fauna, and they must be maintained if the local populations are to be sustained.
(ii) verified regional corridors that are additional areas identified by the DECCW analysis for the South Coast as the highest priority for maintaining or improving habitat connectivity.
(iii) riparian corridors.[9]

[9] The RCP includes second-order and above streams as corridors. However, it recommends the use of DIPNR's (2004) Category 1 + Category 2 or, where this is unavailable, all third-order and above streams, with an assessment made of which second-order streams should also be included in consultation with DII.

Corridors included in (i) and (ii) should be included in a biodiversity overlay, while riparian corridors (iii) should be included as a component of a water overlay (section 8.4).

Verified corridors will include remnant vegetation important to regional connectivity as well as cleared land between such remnants. DECCW is willing to work with the South Coast councils in relation to the location of corridor overlays. The minimum requirement is to protect the extant vegetation in these areas.

Map 15 is a compilation map of regional corridors.

(b) Priority areas for restoration and enhancement are broad zones in the region where connection between core vegetation is ecologically sensible in the long term but the means by which this is achieved is most strongly influenced by local circumstances. Local circumstances include tenure and critical land uses, the level of interest in a local community, and the presence of keystone species and their habitats. ‘Areas of interest’ are primarily made up of the lands identified in the SRCMA regional corridor study, which include an integral part of the Great Eastern Ranges Corridor Initiative.

The aim of this tiered approach to landscape connectivity is to allow councils, developers and other NRM operatives to work flexibly within known or predicted constraints to achieve social and development goals while also maintaining and improving the sustainability of the natural environment. Identification of the South Coast corridors does not devalue the need for the consideration of habitat connectivity outside these areas. The identified corridors provide a focus for future protection and landscape restoration.

Verified regional corridors (Map 15) need to be identified in LEPs by a regional corridor overlay and related protection clause and/or through a mixture of Environmental Zones (E1–E4).

A clause should be inserted in the LEP directing those approving development to consider whether restoration activities will be compromised by the proposed development.

6.4 Riparian corridors

Riparian areas are recognised as having high value for biodiversity (MacNally et al. 2000). Riparian Corridor Management Studies (RCMSs) involve setting management objectives and mapping riparian lands. An approach was developed for a riparian study (DIPNR 2004) prepared in response to the 1999 Commission of Inquiry into the long-term planning and management of the Illawarra escarpment in the Wollongong LGA. The principles of the RCMS have also been included in *Managing urban stormwater: Soils and construction* (Landcom 2004). The aim of an RCMS is to develop a strategic context or long-term vision for how a region’s waterways are valued and anticipated to function in the future.

RCMSs move away from a simple riparian classification based purely on stream order. All key aspects of a stream’s function and context are considered, and sections of the one stream may be classified differently. In this system, watercourses are assigned to one of three categories, each with different protection requirements and minimum core riparian zone (CRZ) widths. In order of importance, these categories are:

Category 1 – Environmental corridor: The overarching objective is to provide biodiversity linkages by maintaining connectivity for the movement of aquatic and terrestrial species along the riparian corridor and between key destinations (for example bottom and top of catchment, wetlands and large nodes of vegetation). The CRZ is 100 m (2 x 40 m fully vegetated, 2 x 10 m buffer).

Category 2 – Terrestrial and aquatic habitat: The overarching objective is to provide basic habitat and preserve or emulate as much as possible a naturally functioning stream (not

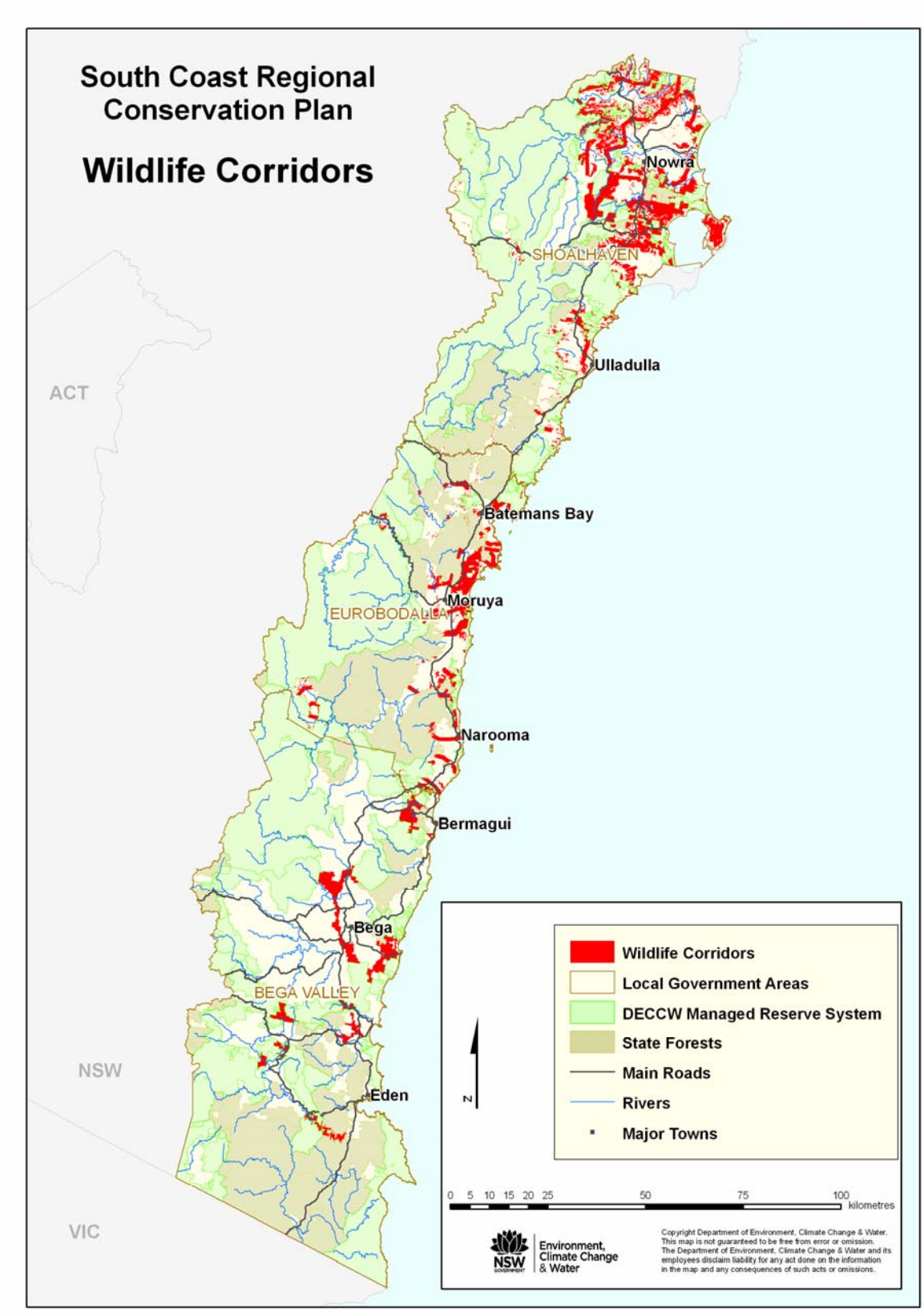
necessarily linking key destinations). Although accepting the width of the riparian corridor will not fully satisfy the requirements of a Category 1 – Environmental Corridor, the width must still be sufficient to provide long-term robust habitat and refuge for native fauna. The CRZ is 60 m (2 x 20 m fully vegetated, 2 x 10 m buffer).

Category 3 – Bank stability and water quality: As implied, the overarching objectives are to prevent accelerated rates of soil erosion and enhance water quality. This category may have limited habitat value but contributes to the overall basic health of a catchment. Although an open watercourse emulating some natural stream function is the preferred option, it is recognised, for example, that the practicality and economics of developing urban land may make this difficult. It is this category of watercourse where alternative solutions to deliver the category objectives can be considered. The CRZ is 20 m (2 x 10 m, no buffer).

DECCW recommends that the riparian corridors be included as a component of a water overlay attached to a clause. Where these waterways are major or tidal rivers, the waterway itself should be zoned W1 or W2. Generally, DECCW's RCMS mapping is available for most of the South Coast Region, and this should be used to determine the extent of the riparian component of the water overlay.

DII (Fisheries Conservation) recommends that the environmental values of all streams of third-order or above be recognised in all planning decisions (see Appendix 10).[10]

[10] The RCMS work is available on CD, and any queries can be directed to the DECCW Wollongong Office on (02) 4224 9600.



Map 15: Important wildlife corridors

Note: These areas need to be validated in accordance with section 6.3 before application in a statutory planning context.

7 Priority areas for restoration or enhancement

Large areas of the South Coast are already protected in reserves and resources for either land acquisition or restoration, and opportunities for the enhancement of areas of high conservation value on private land are limited. This section of the RCP assists in targeting expenditure to priority areas where biodiversity returns from investment will be greatest. The approach is not one of prescriptive land use, but flexibility that helps guide the landowner's, community's and Government's landscape-recovery effort while reducing the potential for conflicting development to negate this effort.

7.1 Restoration and enhancement activities already undertaken or underway on the South Coast

Restoration and vegetation enhancement activities on the South Coast have been undertaken by non-government and government bodies for many decades. Activities were most often focused on critical local issues. More recently, catchment boards, and now the SRCMA, have begun to focus activities on supporting State and federal government priorities. For example, since 1998 the SRCMA and its predecessor have had an incentive scheme running in the Bega Valley. In that time, 247 contracts have been signed covering 4800 hectares. The program has targeted ecological communities identified as under-represented in the public reserve system. In the Shoalhaven and Illawarra, the SRCMA's Southern Bush Incentive Scheme has focused on priority subcatchments, targeting overcleared vegetation types and fragmentation. Since 2004, 79 contracts protecting 4058 hectares have been signed. The works undertaken are consistent with the priority actions, and these achievements and the experience gained will strongly inform the development of future restoration and enhancement programs.

7.2 Priority actions

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

- protect
- enhance
- restore.

7.2.1 Protection

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

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

7.2.2 Enhancement

Even sites of high conservation value may not be in 'pristine' condition. The site may have been declining in condition over time due to weed infestations, populations of feral pests, inappropriate fire or grazing regimes preventing regeneration of some species, rubbish and litter, and inappropriate recreational use. (These are known as key threatening processes.) It is usually necessary to prepare a management plan that sets out how the site will be managed to ensure that its values are enhanced.

7.2.3 Restoration

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

- Sites that have some inherent 'resilience' (or capacity to recover) are appropriate sites for restoration; for example, a site with a predominantly native understorey will be easier and cheaper to restore than a site that is composed mainly of weeds or exotic (introduced) grasses.
- Sites for restoration should build on the existing network of vegetation in a district, either expanding an existing remnant, widening key linear habitats (for example roadside or streamside vegetation), or making a connection between two or more previously isolated remnants.
- In doing this there needs to be recognition of the wider benefits of retaining the most valuable agricultural lands in rural areas. These lands should not be targeted for restoration.

7.3 Priority actions for different environmental assets

Section 5 sets out the different types of environmental assets with high conservation values. Each of these may require a different emphasis and a different set of priority actions. Generally, each site will require a mix of the three types of actions (protection, enhancement and restoration), and these should be set out in a 10-year management plan.

The following is merely a guide—each site will be different, and management should follow a plan that recognises the unique characteristics of each site.

National parks and reserves: Emphasis is on protection, in accordance with the plan of management.

EECs: Identified sites should be protected, but other efforts are also needed to abate the threatening processes that have led the community to become endangered. The Priority Action Statement for an EEC includes a list of priority actions. These should guide the management of particular sites.

Sites with threatened flora and habitat for threatened fauna: As above. The PAS for these species includes a list of priority actions.[11] These should guide management of particular sites.

Vegetation (overcleared, or in overcleared landscape, or poorly reserved): Identified sites with such vegetation should be protected and enhanced, but in order to achieve the targets set out in the SRCMA CAP and to improve or maintain biodiversity it will be necessary to identify appropriate sites for restoration. Appendix 3 of the SRCMA CAP contains a list of priority vegetation types that sets out the targets for the extent of these vegetation types.

Old-growth forest: Emphasis is on protection.

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

Coastal lakes: Emphasis is on protection of existing habitats within the catchment, and enhancement and restoration of key habitats, particularly riparian vegetation.

Coastal wetlands: Emphasis is on protection of identified coastal wetlands, with enhancement and restoration of key habitats (for example saltmarsh).

Littoral rainforests: Emphasis is on protection of identified sites.

8 Biodiversity conservation in the planning system

8.1 Introduction

The protection, maintenance and improvement of biodiversity is incorporated within relevant NSW Government policies, strategies and legislation (see sections 2.2 to 2.4). Traditionally, the planning system has considered impacts to biodiversity in a reactive way—that is, in response to development applications.

Although development assessment will remain a critical tool in protecting biodiversity, ways are now being developed to consider biodiversity proactively—by identifying biodiversity assets early in the strategic planning process, it is possible to zone these areas appropriately. In so doing, it is possible to direct development away from these assets and onto more suitable lands. The new tools that assist in this process are biodiversity banking (BioBanking) and biodiversity certification.

The key requirement to improve or maintain biodiversity is that areas of high conservation value be retained. High conservation value areas are described in section 5, and it is expected that such areas will be zoned appropriately in LEPs to ensure that they are retained and protected. However, groundwork is required to check that the mapping of high conservation value areas is accurate and that the delineation of such areas is correct (section 4.2 explains the limitations of mapping and the need for on-ground verification).

It is recognised that in situ conservation is not always possible or practicable. In such cases, appropriate offsets may be appropriate.

8.1.1 Verification and rules for identification of high conservation value

The following are recommended verification procedures for ground-truthing of mapped high conservation values on the South Coast.

Value	Verification rules
Vegetation-related values • EECs • rare vegetation types • overcleared vegetation types • vegetation in overcleared landscapes.	Vegetation is not of high conservation value if it is in poor condition, as defined in section 5.3. The vegetation community descriptions and listing of diagnostic species and associated environmental parameters in Tozer et al. (2006) should be consulted for on-ground verification of vegetation type. The final determinations for EECs under the TSC Act and EPBC Act are the key documents in deciding whether a patch of vegetation is an EEC.
Old-growth vegetation	Old growth is largely defined by the current canopy structure, which should largely consist of senescing or mature trees. Regrowth should be less than 30% of the canopy. There should also be negligible evidence of disturbances such as logging or catastrophic fires. The old-growth layer in this RCP is probably the least accurate of all information provided. Thus it is suggested the occurrence of mapped old-growth features should be confirmed or checked on the ground.

[11] www.threatenedspecies.environment.nsw.gov.au

Value	Verification rules
Threatened fauna	The data provided by the RCP ties verified records to mapped vegetation polygons. The Atlas of NSW Wildlife can be consulted to determine what threatened fauna records are involved. Until an appropriate survey (DEC 2004) demonstrates otherwise, the mapped habitat should be regarded as important habitat. Important habitat contributes to the viability of local threatened fauna populations and can include, but is not limited to, essential breeding resources, foraging resources and connectivity corridors. The Threatened Species Web Tool will provide further assistance in habitat identification and advises what other fauna species should be considered.
Threatened flora	The data provided by the RCP ties verified records to mapped vegetation polygons. The Atlas of NSW Wildlife can be consulted to determine what threatened plant records are involved. Targeted surveys for the identified plant species should occur within the proposed development or planning area. The Threatened Species Web Tool advises what other plant species should be considered.
Significant aquatic habitats • nationally important wetlands • catchments of significant lakes and estuaries • habitat of migratory wetland species	The key question is whether a planning or development decision is within, or affects, the catchment of these environmental assets identified in the RCP, and (as required by the SCRS) whether this impact will have a neutral or beneficial effect.
Statutory conservation protection • conservation and property agreements • declared wilderness • SEPP 14 wetlands • SEPP 26 rainforest	These assets have surveyed or described tenure boundaries. Verification is a matter of determining whether the planning or development decision occurs within a defined area.

8.2 Biodiversity banking and offsetting

8.2.1 Biodiversity banking

Biodiversity banking (BioBanking) is a market-based scheme which encourages development to move away from areas with high biodiversity value while providing incentives for landowners to protect and secure these areas. The scheme provides a transparent, consistent and robust framework for assessing biodiversity values and for the long-term management of biodiversity offsets (DEC 2006a, 2006b).

Biodiversity values are determined through the BioBanking assessment methodology. This calculates the number of biodiversity credits generated from a BioBanking site and the number of credits required as a consequence of biodiversity impacts of a development on a development site. The methodology also identifies areas that cannot be developed, because of their high biodiversity values.

Landholders who conserve, protect and enhance biodiversity on a BioBanking site will enter a BioBanking agreement**.** This will identify the number and type of credits that the landowner can sell. This generates funds for the conservation management of the site.

A landowner with an approved development may be issued with a BioBanking statement which will specify the number and type of credits required to offset the impact of the development. The credits can be sold not only to landowners with a BioBanking statement, but also to those seeking to invest in conservation outcomes, including philanthropic organisations and government.[12]

8.2.2 BioBanking for local government

The BioBanking assessment methodology is an alternative to the assessment of significance under s.5A of the EP&A Act. If a landowner obtains a BioBanking statement for their development, the development is taken as not to significantly affect threatened species, which means councils are not required to further consider the impact of the development on biodiversity values. A landowner with a BioBanking statement will attach this statement to a development application.

The BioBanking statement must be incorporated in the conditions of consent if requested by the proponent. Once this occurs council cannot impose conditions that are inconsistent with the BioBanking statement. If council imposes additional biodiversity conditions relating to matters already considered under the BioBanking statement, the developer can request a review of council's decision. However, the conditions in the BioBanking statement cannot be appealed.

BioBanking does not stop local councils from refusing consent for the development for other reasons, such as the area being important for recreation, urban amenity or character of the neighbourhood. As BioBanking participation is voluntary, landowners may choose to have their development proposals assessed under existing threatened species assessment processes.

Benefits of BioBanking

- Councils can also establish biobank sites on their own land and generate credits.
- The scheme provides a mechanism to manage and conserve areas as offsets against development. Land included in a BioBanking agreement is not exempt from council rates.

In some cases, the proposed development may have an impact on threatened species or ecological communities that cannot withstand loss. In these instances the development cannot improve or maintain biodiversity values.

Biobank sites that fulfil one or more of the following are the priority for the South Coast Region:

- have large (more than 10-hectare) patches of one or more EECs
- occur within verified regional wildlife corridors (including riparian areas)
- contain significant habitat of a threatened plant or animal for whose regional conservation private lands on the South Coast are important (see Appendix 8).

8.2.3 Biodiversity offsets

A biodiversity offset is one or more appropriate actions that are put in place to counterbalance specific impacts on biodiversity. BioBanking is one new mechanism for offsetting. Offsets can also be individually negotiated and put in place through planning agreements or conditions or consents. Appropriate offset actions are long-term management activities to improve biodiversity conservation. This would normally include:

[12] Further information on BioBanking is available at www.environment.nsw.gov.au/biobanking.

- protecting and enhancing an area of existing native vegetation or other habitat for threatened species (section 8.1)
- legally protecting this land to ensure security of management actions and to remove threats.

Maintaining the level of biodiversity on the South Coast requires all councils to include adequate environmental provisions within their LEPs. These could, if appropriate, include provisions relating to offsetting.

If offset provisions are included, they should encompass the following principles:

1 Impacts must be avoided first by using prevention and mitigation measures.

2 All regulatory requirements must be met.

3 Offsets must never reward ongoing poor performance.

4 Offsets will complement other government programs.

5 Offsets must be underpinned by sound ecological principles.

6 Offsets should aim to result in a net improvement in biodiversity over time.

7 Offsets must be enduring—they must offset the impact of the development for the period that the impact occurs.

8 Offsets should be agreed prior to the impact occurring.

9 Offsets must be quantifiable—the impacts and benefits must be reliably estimated.

10 Offsets must be targeted—they must offset impacts on a basis of like-for-like or better conservation outcome.

11 Offsets must be located appropriately—they must offset the impact in the same region.

12 Offsets must be supplementary—they must be beyond existing requirements and not already be funded under another scheme.

13 Offsets and their actions must be enforceable—through development consent conditions, licence conditions, conservation agreements or a contract.

8.3 Biodiversity certification

Under the provisions in Part 7AA of the TSC Act, the Minister for Climate Change and the Environment has the ability to confer biodiversity certification on an area of land if the Minister is satisfied that the package of measures contained in a biodiversity certification strategy will lead to the overall improvement or maintenance of biodiversity values, including threatened species and communities.

Applications for biodiversity certification are made by a planning authority. The primary effect of granting certification on an area of land is that any project under Part 3A, any development under Part 4, or any activity under Part 5 of the EP&A Act is taken to be a development that is not likely to significantly affect threatened species, populations or ecological communities or their habitats, and does not require an assessment of its impact on biodiversity values provided it is carried out, or proposed to be carried out, on land that has been biodiversity certified. Similarly, the NV Act does not apply to biodiversity certified land.

The application for biodiversity certification must include a biodiversity certification strategy that demonstrates that the proposed certification of land, and the package of conservation measures proposed (including conservation management of other lands), will improve or maintain biodiversity values.

Certification has many practical advantages. It allows upfront strategic assessment of conservation values, enables informed community participation in planning decisions, reduces the potential for land-use conflict, and creates greater certainty for planning outcomes and development projects. Most significantly, it offers opportunities to put in place planning strategies that will assist in reversing the long-term decline in the quality and extent of our biodiversity resources.

8.3.1 Identification of potential certification areas

Each of the three councils on the South Coast contains areas that are suitable for application of biodiversity certification legislation. Certification requires detailed knowledge of an area's vegetation, plants and animals and on-ground verification of high conservation values and habitat. There is currently insufficient information to be confident that planning outcomes across the whole South Coast could ensure that significant impacts on biodiversity, including threatened entities, are avoided. However, it is possible to have a high level of certainty about the future of biodiversity within discrete parts of the South Coast.

Indications are that future urban growth areas, where there is high development pressure and some areas of high conservation value, are where the benefits of certification will be greatest.

8.3.2 Certification requirements

Biodiversity certification areas will basically need to meet three key components:

- protection of areas of high conservation value, largely through conservation zoning (E1–E4)
- provision that any clearance outside protected areas is appropriately offset, as assessed by the biodiversity certification methodology
- linking the LEP to strategies, policies, plans and guidelines that define the ongoing management of protected and offset areas and provide for monitoring of biodiversity health. Examples could include location-specific management plans or agreements, local government polices (for example a cat control policy) or guidelines for infrastructure maintenance and development activities.

In the South Coast, predicted urban and industrial growth could be met by development away from areas of high conservation value. However, there are some areas that councils in the past have identified as potentially suitable for intensive developments that could not proceed and still meet certification requirements.

Provided appropriate offsetting occurs, there is little constraint to the clearing of vegetation in low condition (paddock trees and small isolated clumps). However, in areas of moderate to good quality vegetation, the presence of key fauna habitat components such as large hollow-bearing trees will limit or preclude clearing.

8.3.3 DII (Fisheries Conservation) requirements

Section 221ZK of the FM Act also allows for certification that would turn off the need to consider at the development stage the impact of a proposal on aquatic threatened species, populations, communities or their habitat as listed under the FM Act. DII (Fisheries Conservation) has produced draft guidelines for councils on certification requirements; these

guidelines have much in common with the more general LEP requirements provided in Appendix 10.

8.3.4 EPBC Act matters

One of the benefits of biodiversity certification is greater certainty in relation to development approval. This may be somewhat diminished if approval under the EPBC Act has to be obtained from the federal government. The RCP thus encourages cooperation with the Commonwealth with the aim of having NSW planning and assessment processes accredited as addressing MNES.

8.4 Using the new LEP template to protect biodiversity assets

8.4.1 Environmental zones

On 31 March 2006, the Standard Instrument – Local Environmental Plans was gazetted, prescribing a standard form and content for a principal LEP (DoP 2006b).

The LEP standard instrument sets out a range of standard environmental zones, E1 to E4. The Department of Planning has prepared an LEP Practice Note on Environment Protection Zones giving direction on what E-zones should apply in what circumstances. Planning authorities should refer to the current practice note for guidance.

8.4.2 Application of the environmental zones in the South Coast context

Environmental zones should be generally consistent across the three local government areas, taking into account the preservation of existing land-use rights and activities that may be permissible with consent. Proposed new E-zonings should be supported by field verification, as regional-level maps may indicate high conservation value features that are not found in some local circumstances and boundaries would need to be validated. As outlined in the SCRS, areas of validated high conservation value should be protected in new LEP provisions.

8.4.3 Additional local clauses

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

While an E-zone will set out the overall objective of land use and the land uses that are permitted with or without consent, or are prohibited, a local provision (with an accompanying map) will set out the matters that require consideration in development assessment and the required environmental outcomes of any approved development. They do not prohibit any activity permitted in a zone and do not trigger referral to any agency.

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

The range of environmental and NRM issues can be extensive, so DECCW recommends that planning authorities refer to the Department of Planning's NRM model clauses and practice notes.

These model clauses ensure that the consent authority will consider all potential adverse impacts of development proposals on these mapped environmental assets, and that

approved developments will avoid, minimise, and mitigate these adverse environmental impacts.

8.5 Specific planning issues

8.5.1 Sensitive Urban Lands Review Panel

The Sensitive Urban Lands Review Panel investigated the suitability for development of 17 proposed development sites on the South Coast. The SCRS outlines in full the recommendations and the Government response. At three of the sites (Culburra Urban Expansion Area, Comberton Grange and Badgee Lagoon) the panel recommended partial dedication for conservation in return for partial development. DECCW will work with the Department of Planning, the local council and the landholders at these sites and the other sites identified for conservation protection to determine the best management framework for areas dedicated for conservation, should partial dedication occur.

8.5.2 Existing zoned land

The work of the Sensitive Urban Lands Review Panel (Independent Review Panel 2006) has shown than many areas zoned for development retain significant values and include areas of high conservation value. Across the South Coast there is about 10,000 hectares of land that is zoned for intensive development, but which has yet to be cleared and which contains features of high conservation value. This includes land zoned for urban, rural residential, industrial and commercial uses. The land may be holdings that have been partly developed, but which still retain a large area of native vegetation or features of high conservation value, or they may be holdings that are completely undeveloped. Approximate areas of land involved in each LGA are provided below.

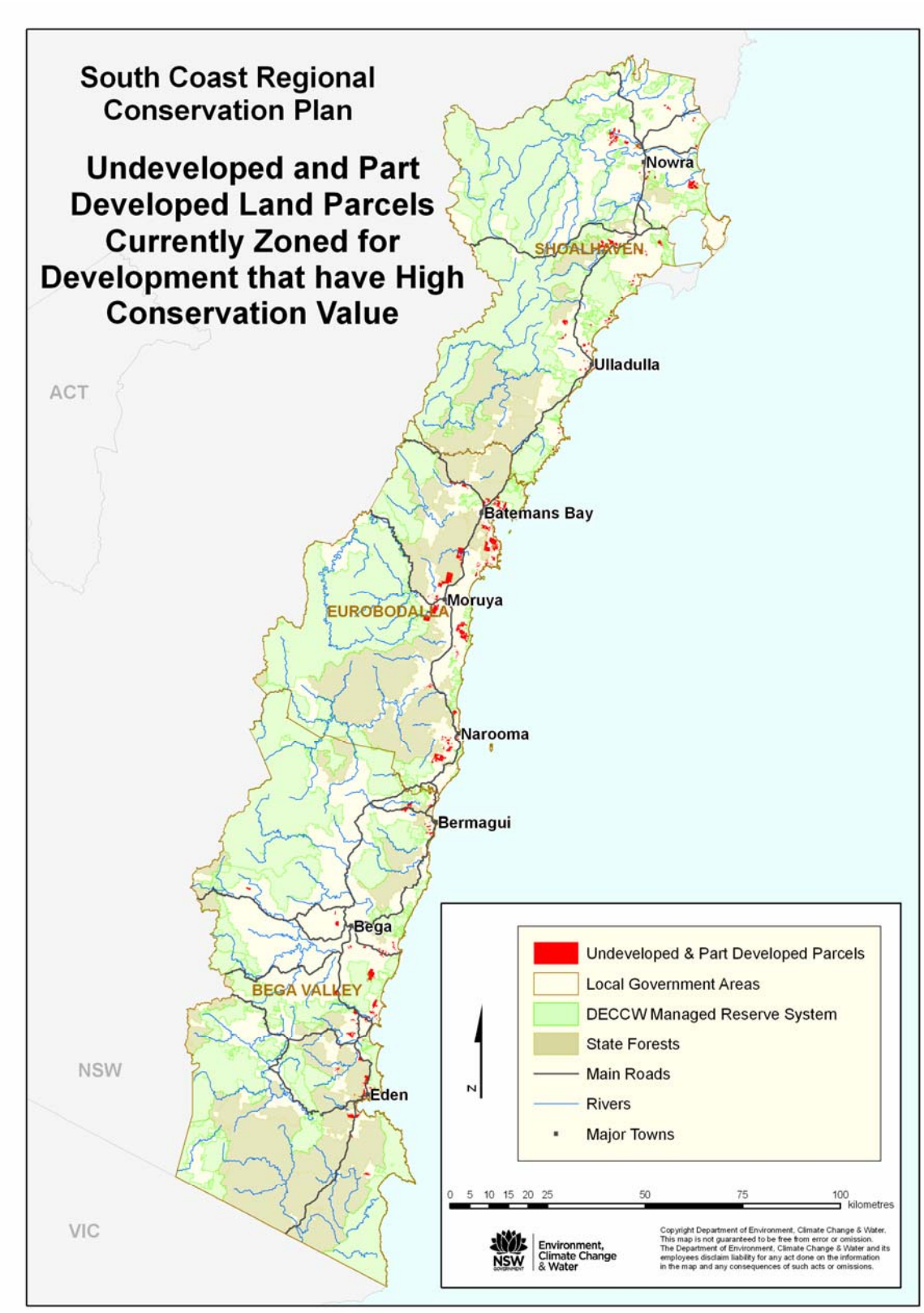
LGA	Level of development	Area of high conservation value (ha)
Shoalhaven	Part developed	1100
Shoalhaven	Undeveloped	1500
Eurobodalla	Part developed	3250
Eurobodalla	Undeveloped	1750
Bega	Part developed	1300
Bega	Undeveloped	1100

The distribution of these lands is shown on Map 16.

A more detailed analysis of these sites needs to be undertaken by DECCW in conjunction with the Department of Planning and the respective local governments, with the aim of providing landholders with information to assist them in their development planning. In this way the opportunity for resolution of these issues prior to the submission of development applications will be enhanced, maximising the opportunities for protection of high conservation value lands through avoidance or minimisation of impacts and increasing certainty for developers. The information from the review would also greatly assist consent authorities in their decision-making in relation to individual developments.

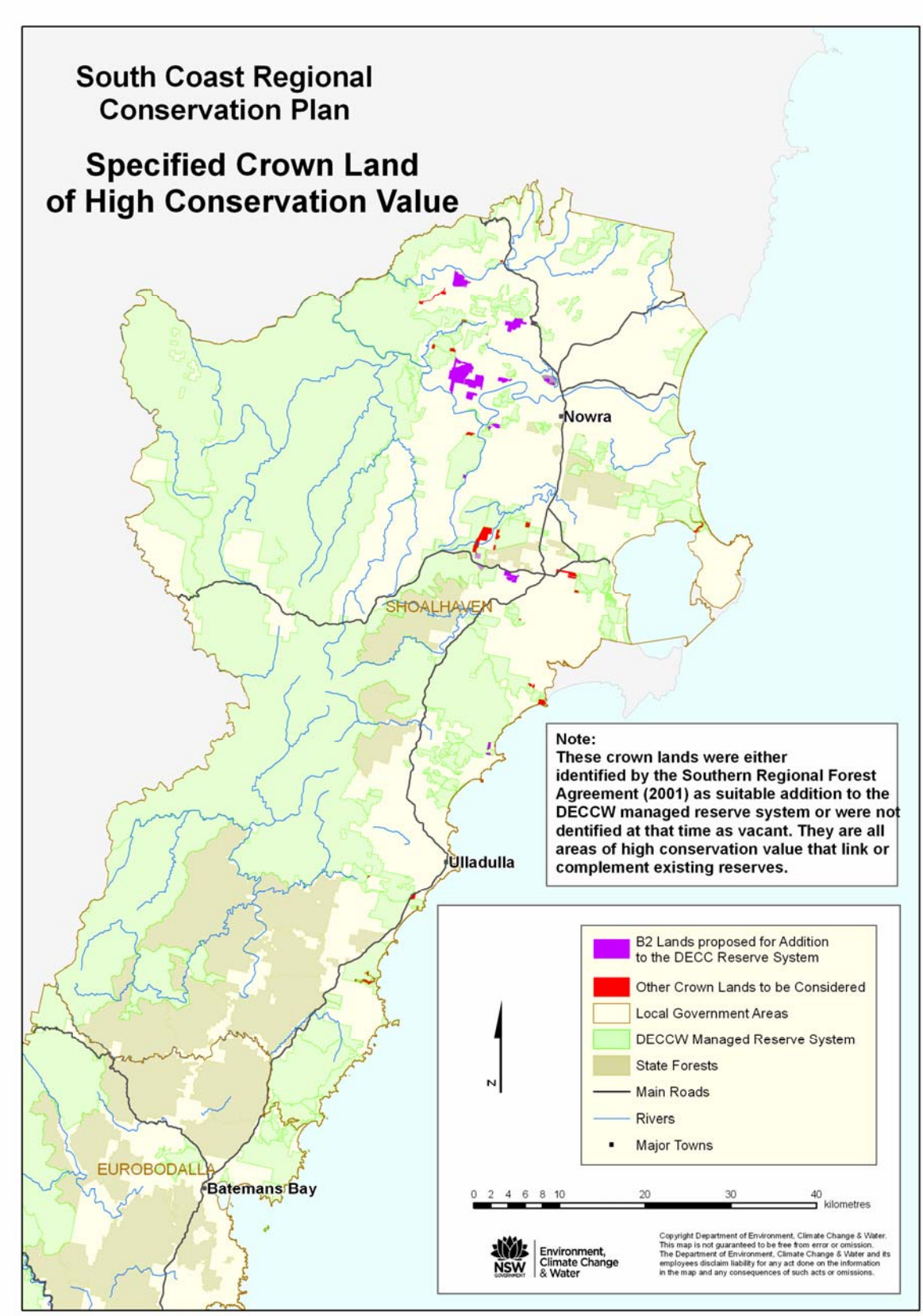
8.5.3 Crown lands

There are a number of parcels of Crown Land that DECCW considers to be of high conservation value. These Crown land parcels link to or complement existing reserves. Potential reservation of these areas within the DECCW estate will be dealt with through the normal reserve referral process. The distribution of these lands is shown on Map 17.



Map 16: Undeveloped and partly developed land, currently zoned for intensive land use, but containing features of high conservation value

Note: Refer to section 8.5.



Map 17: Specified Crown land of high conservation value

Note: Refer to section 8.5.

8.6 Threatened species considerations when undertaking impact assessments under the EP&A Act

DECCW is currently developing information resources for assisting in threatened species assessments on the South Coast. These will be web-based guides that will identify the threatened species that should be considered in particular vegetation types and subcatchments. They will also identify the status of these species on private land. They will form an adjunct to the existing species profiles and supporting threatened species information.[13]

8.7 Crown lands management under the Crown Lands Act 1989

Crown land is an important asset in managing and protecting the State's natural resources for multiple uses as part of the need to respond to the wide and varied current and future needs of the community. It is managed according to the objectives and principles in the *Crown Lands Act 1989* (CL Act). The Act and the Crown Lands Regulation 2006 provide important requirements and guidance for suitability assessment, including environmental values. Relevant objects of the Act (s.10) are 'to ensure that Crown land is managed for the benefit of the people of NSW, and in particular to provide for:

a) a proper assessment of Crown land,

b) the management of Crown land having regard to the principles of Crown land management contained in this Act,

c) the proper development and conservation of Crown land having regard to those principles,

…

e) the reservation or dedication of Crown land for public purposes ...'

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

The principles of Crown land management are, in summary, that:

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

One aspect of Crown land management is the 'reservation', where required, of such land for particular or multiple purposes, including for future public needs. Crown reserves within the South Coast Region include 799 hectares reserved for flora and fauna protection and study, 872 hectares for public recreation, 678 hectares for future public requirements, and numerous reserves for purposes such as museums, cemeteries, water supply, trig sites, rubbish tips and roads.

[13] www.threatenedspecies.environment.nsw.gov.au

9 Plan implementation mechanisms

9.1 Effective operation of the planning system

9.1.1 Strategic planning

It is critically important that the review of LEPs by the three local councils in the region results in appropriate zonings for environmental assets of high conservation value, as set out in this RCP. DECCW will work with these councils to assist in the achievement of these goals.

DECCW, LPMA and Shoalhaven City Council will review the status of lands for appropriate reservation status.

DECCW and LPMA will review the potential for a number of small parcels of Crown land to be added to the DECCW reserve system.

In conjunction with the Department of Planning and local government, DECCW will undertake a detailed analysis of areas that are zoned for development but support high conservation values, with the aim of giving landholders information to help them in their development planning.

9.1.2 BioBanking

The establishment of a BioBanking program in the region will help achieve the goals of the RCP and will also help ensure that planning instruments for growth areas can be achieved.

9.1.3 Voluntary 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 of development contributions. They are a means to enable the planning system to deliver sustainable development, through which the key economic, social and environmental objectives of State and local governments 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 or offsets are provided by the developer at the developer's expense. Planning agreements may be additional to, or replace, the relevant Section 94 Developer Contributions Scheme applying to a particular LGA.

Although planning agreements will largely be instigated 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, sustainable development outcomes, including biodiversity conservation.

9.2 Continued uptake of conservation agreements

A VCA is a negotiated contract between landholders and the Minister for Climate Change and the Environment that aims to conserve the natural, cultural and scientific values of a

property or portion of a property, restricting land uses likely to compromise these values. Landholders may be individuals, groups, corporations or local governments.

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 protect, restore and rehabilitate high conservation value areas.

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. VCAs can be established on both freehold and (with the consent of the lessees and the Minister for Lands) leasehold land.

The VCA program relies on the landholder actively managing the lands. To achieve this aim, DECCW consults with the landholder to develop a plan of management for the area covered by the VCA. The plan is intended primarily for the landholder's use and establishes clear methods for conservation.

9.3 Catchment management incentives

The SRCMA has developed a Biodiversity Program as part of its CAP. The program's activities aim to achieve the biodiversity catchment targets set out in the CAP.

A range of management targets for biodiversity are designed to guide progress towards the catchment targets and provide the basis for program activities and funding. The rolling three-year investment plan identifies priority programs and actions.

This RCP is consistent with the SRCAM CAP, and will inform future CAPs and associated investment strategies to ensure that key areas of high conservation value are targeted by these programs, and that these areas are highlighted for protection from development until planned NRM actions can be funded.

9.3.1 Bush Incentives Scheme

One of the key projects is the Bush Incentives Scheme to help landholders better manage sites of high conservation value. This is particularly important for areas of overcleared or under-reserved vegetation types.

9.4 Property vegetation planning

The RCP is also intended to be of use to the SRCMA in relation to the assessment of clearing applications made in accordance with the NV Act and in the PVP process.

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

A PVP is a voluntary but legally binding agreement between a landholder and the CMA. PVPs will allow specified clearing, but only following the implementation of an appropriate offset regime, to allow for the maintenance or improvement of specific environmental indicators such as biodiversity, salinity and water quality.

A PVP may also be agreed on as part of a voluntary conservation action that attracts incentive payments or cost–share arrangements.

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

9.5 Eurobodalla Biodiversity Program

The Eurobodalla Biodiversity Program is fully funded by the SRCMA and implemented by Eurobodalla Shire Council.

Landholders are offered a range of training and skill development opportunities, assistance in preparing property plans and funding applications and are encouraged to attend regular field days and workshops.

The overall aims of the program are to:

- protect and restore identified vulnerable ecosystems and core fauna habitat in the Eurobodalla Shire
- protect, enhance, enlarge and link patches of remnant vegetation, especially those of greater structure, quality and/or condition
- protect and enhance under-represented vegetation communities and EECs
- protect areas of known threatened species and encourage implementation of relevant recovery plans
- protect and enhance riparian areas
- contribute to regional biological diversity conservation
- rehabilitate strategic degraded systems on private and public lands
- increase community awareness of natural resource management issues
- establish, enhance or enlarge priority biolinks or corridors
- encourage neighbouring landholders to cooperatively develop land management programs.

Projects undertaken with the assistance of incentive funding through the Eurobodalla Biodiversity Program include fencing, revegetation and vegetation management, major erosion control and bed stabilisation works, the installation of off-creek watering points, remediation of acid sulphate soils and the re-establishment and protection of corridors linking remnant patches.

Landholders participating in the biodiversity program enter into 10-year management agreements with council, which are also co-signed by SRCMA. The agreement details the obligations of all parties for the term of the agreement in addition to specifying the project financial contributions and other commitments.

9.6 Bega–Eden Voluntary Biodiversity Conservation Strategy

As part of the Council of Australian Governments reforms, the federal and NSW governments negotiated the regional forest agreement for the Eden Forest Management Area in 1999. This also identified the fact that most of the remaining under-protected ecological communities existed on privately-owned land.

Therefore, in 1999 the NSW Government committed $2 million to a Voluntary Biological Diversity Conservation Strategy. This is a cooperative project between the SRCMA, DECCW, Bega Valley Shire Council, Far South Coast Landcare Association, DII and the South East Livestock Health and Pest Authority. The program subsequently attracted

funding from the Natural Heritage Trust and the NSW Native Vegetation Management Fund, as well as partner contributions.

The strategy is coordinated by the local management team, a subcommittee of SRCMA, and aims to meet the 10-year CAP biodiversity target by encouraging and supporting landholders to actively protect those ecological communities identified in the regional forest agreement as poorly represented.

Achievements to date include:

- 209 vegetation management contracts with landholders, covering 3810 hectares (42% of the 10-year CAP target and 17% of the JANIS reserve target). There is a multiplier effect in that the 209 landholders' increased understanding of vegetation management principles is often applied to the native vegetation on their properties, outside the contract sites.
- 40 km of improvement in biodiversity through the control of willows on 55 properties
- 25 hectares of farm forestry on eight properties
- building community capacity through 26 workshops/training events on vegetation management, and provision of vegetation management guidelines and weed brochures and calendars
- provision of advice to landholders.

9.7 NSW Nature Conservation Trust activities

The NSW Nature Conservation Trust was established under the NSW *Nature Conservation Trust Act 2001*. In addition to covenanting land with high conservation value, the Nature Conservation Trust operates a revolving fund through which properties of high conservation value are bought, covenanted and resold.

This RCP can inform the activities of the Trust, particularly with respect to identification of properties that may be suitable for purchase through the revolving fund.

9.8 Estuary management planning

The three shires in the South Coast Region are actively involved in estuary management planning processes. This involves study of the existing biological and physical condition of estuaries, including areas of high conservation value, to prepare a plan of management that protects and restores these features.

It is important to note that the beds of the waterways and estuaries are, unless reserved as national park, Crown land managed by LPMA for multiple purposes, including biodiversity conservation under the CL Act.

9.9 Actions for inclusion of Aboriginal cultural heritage matters in environmental planning instruments

It is important that protection of Aboriginal cultural heritage is considered at a broader strategic level. In relation to LEP preparation it is essential that Aboriginal people are appropriately consulted and that information from local government Aboriginal heritage studies (currently underway jointly by DECCW, each South Coast council and local Aboriginal communities) is incorporated and implemented through the cultural heritage provisions of the standard LEP template.

Associated actions are:

1 DECCW's interim guidelines for Aboriginal consultation are currently being improved to ensure more effective consultation and participation by Aboriginal people in management of their cultural heritage. Many shire councils have developed codes of practice, memoranda of understanding and protocols for consulting with and employing Aboriginal people in relation to cultural heritage surveys and the like. These mechanisms need to be updated and amended on a regular basis.

2 For some years, the concept of 'cultural mapping' has been seen as an effective mechanisms for gaining a greater appreciation of the way contemporary Aboriginal society connects with and values the landscape. Cultural mapping is a participatory research, multistage, multibenefit process which uses oral history, historical records and archaeological evidence to identify significant places and landscapes. Cultural mapping projects have been commenced but not completed for a number of LGAs. The recently completed Aboriginal heritage study for the Eurobodalla Shire has, through a comprehensive mapping and consultation process, collaboratively with Aboriginal people, identified more than 300 significant places and landscapes. The final stage of the study identified a raft of mechanisms for the long-term protection and recognition of these places, including through the LEP. It also provided a more strategic basis on which DECCW can continue its program of Aboriginal Place declaration. In addition to the protection of significant places through the LEP that may otherwise not be protected by the NPW Act, there are many benefits and spin-offs to this type of project, including an improved partnership between local councils and Aboriginal people, and publication of material that showcases the presence and value of Aboriginal people and their heritage. All councils in the South Coast Region are therefore encouraged to complete their cultural mapping projects.

3 DECCW will continue to develop GIS-based predictive models to assist councils, developers and Local Aboriginal Land Councils in determining the likelihood of certain site types being present. Cultural protocols for use of this information will also be developed to ensure confidentiality of any sensitive or restricted cultural information.

4 DECCW will work with councils and CMAs in preparing targeted 'regional archaeologies' of specific areas subject to high levels of development and/or containing particularly rich Aboriginal heritage.

5 DECCW will work with Local Aboriginal Land Councils to build their capacity in the application and interpretation of cultural heritage information held on DECCW's Aboriginal heritage database. This will enable Local Aboriginal Land Councils to provide timely and specific advice to shire councils in relation to the impact of proposed developments on Aboriginal heritage.

9.10 NSW National Parks Establishment Plan 2008

The *NSW National Parks Establishment Plan 2008* provides direction for building a diverse and resilient system of parks and reserves under the NPW Act (DECC 2008). Expanding the reserve system on the South Coast as with elsewhere in the State is seen as an important action to assist biodiversity to adapt to the impacts of climate change and achieve conservation goals.

9.11 Other programs and funding sources

There are a range of other programs that provide funding and resources for environmental protection and management. These include:

- Caring for our Country (Commonwealth Government)
- Envirofund
- Coastcare
- private and philanthropic fund sources.

Appendix 1: Endangered ecological communities within or overlapping the South Coast Region and their relationship to map units

After Tozer et al. (2006)

EECs listed under the TSC Act	Corresponding map unit name	Relationship between EEC and corresponding map unit/s
Bangalay Sand Forest	Coastal Sand Forest	EEC is included within the broader Coastal Sand Forest unit
Blue Mountains Shale Cap Forest in the Sydney Basin Bioregion	Shale–Basalt Sheltered Forest	EEC is included within the broader Shale-Basalt Sheltered Forest unit
Brogo Wet Vine Forest	Brogo Wet Vine Forest	EEC is equivalent to map unit
Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner bioregions	Estuarine Saltmarsh	Estuarine Saltmarsh unit is included within this broader EEC
Dry Rainforest of the South East Forests in the South East Corner Bioregion	Subtropical Dry Rainforest and Far South Coast Fig Dry Rainforest	EEC is equivalent to map units
Freshwater Wetlands on Coastal Floodplains of the NSW North Coast, Sydney Basin and Southeast Corner bioregions	Coastal Freshwater Lagoon (part) and Southern Floodplain Wetlands	EEC includes Coastal Freshwater Lagoons on floodplains and occurrences of Floodplain Wetlands that are not dominated by eucalypts or *Angophora*
Illawarra Lowlands Grassy Woodland in the Sydney Basin Bioregion	Illawarra Lowland Swamp Woodland and South Coast Grassy Woodland	EEC is included within two broader map units.
Illawarra Subtropical Rainforest in the Sydney Basin Bioregion	Subtropical Dry Rainforest (part) and Subtropical Complex Rainforest (part)	EEC is included within two broader map units.
Littoral Rainforest in the NSW North Coast, Sydney Basin and South East Corner bioregions	Temperate Littoral Rainforest and Littoral Thicket (part)	Temperate Littoral Thicket is included within this broader EEC. Littoral Thicket occurring in sheltered locations with high rainfall may be included in the EEC, particularly when fire has been excluded for long periods.
Lowland Grassy Woodland in the South-east Corner Bioregion	Far South Coast Grassy Woodland	EEC is equivalent to map unit
Melaleuca armillaris Tall Shrubland in the Sydney Basin Bioregion	Basalt Hilltop Scrub	EEC is included within map unit
Milton Ulladulla Subtropical Rainforest in the Sydney Basin Bioregion	Subtropical Dry Rainforest (part) and Subtropical Complex Rainforest (part)	EEC is included within two broader map units

EECs listed under the TSC Act	Corresponding map unit name	Relationship between EEC and corresponding map unit/s
Montane Peatland and Swamp of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps bioregions	Tableland Swamp Meadow and Sub-Alpine Bog	EEC includes both map units
Mount Gibraltar Forest in the Sydney Basin Bioregion	Southern Highlands Basalt Forest (part) and Highland Range Sheltered Forest (part)	EEC is included within the broader map units
River Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions	Floodplain Swamp Forest and South Coast River Flat Forest	EEC includes map units
Robertson Basalt Tall Open-forest in the Sydney Basin Bioregion	Southern Highlands Basalt Forest (part)	EEC is included within the broader map unit
Robertson Rainforest in the Sydney Basin Bioregion	Yarrawarra Temperate Rainforest	EEC is equivalent to map unit
Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner bioregions	Floodplain Swamp Forest and Estuarine Fringe Forest and Estuarine Creekflat Scrub	EEC includes all map units
Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions (incorporating the formerly listed Sydney Coastal Estuary Swamp Forest Complex in the Sydney Basin Bioregion)	Coastal Sand Swamp Forest	EEC includes map unit
Sydney Freshwater Wetlands in the Sydney Basin Bioregion	Coastal Freshwater Lagoon (part)	EEC includes occurrences of Freshwater Lagoons on sandplains
Tableland Basalt Forest in the Sydney Basin and South Eastern Highlands Bioregions	Tableland Basalt Forest	EEC is equivalent to map unit
Themeda Grassland on Seacliffs and Coastal Headlands	Headland Grassland	Map unit included within this broader EEC
Western Sydney Dry Rainforest in the Sydney Basin Bioregion	Grey Myrtle Dry Rainforest	EEC is included within the broader map unit
White Box Yellow Box Blakely's Red Gum Woodland	Tableland Grassy Box-Gum Woodland and Wollondilly – Cox – Shoalhaven Gorge Woodland and Tableland Granite Grassy Woodland	All three units are included within this EEC

Appendix 2: Endangered Ecological Communities (EPBC Act) within or overlapping the South Coast Region and their relationship to map units

After Tozer et al. (2006)

EECs listed under the EPBC Act	Corresponding map unit name	Relationship between EEC and corresponding map unit
White Box – Yellow Box – Blakely's Red Gum grassy woodlands and derived native grasslands.	Tableland Grassy Box – Gum Woodland and Wollondilly – Cox – Shoalhaven Gorge Woodland and Tableland Granite Grassy Woodland	All three units are included within this EEC
Natural Temperate Grasslands of the Southern Tablelands of NSW and the ACT	Tableland Grassy Box – Gum Woodland	This map unit includes areas of low tree density that match the description of this EEC
Temperate Highland Peat Swamps on Sandstone	Southeast Sub-Alpine Bog and Tableland Bog and Tableland Swamp Meadow and Blue Mountains – Shoalhaven Hanging Swamps	Map units form part of this EEC

Appendix 3: Naturally rare vegetation types of the South Coast Region

Basalt Hilltop Scrub

Bega–Towamba Riparian Scrub

Budderoo Temperate Rainforest

Coastal Rock Plate Heath

Coastal Sandplain Heath

Eden Shrubby Swamp Woodland

Far South-East Riparian Scrub

Headland Grassland

Mt Nadgee Heath

River Mangrove

Sandstone Headland Scrub

Seagrass Meadow (*Ruppia*)

South Coast Headland Scrub

South-East Dry Rainforest

South-East Hinterland Heath

South-East Mountain Rock Scrub

South-East Rhyolite Rock Shrub

South-East Tablelands Grassy Wetlands

Tantawangalo Wet Shrub Forest

Temperate Littoral Rainforest

Appendix 4: Poorly conserved vegetation communities in Shoalhaven, Eurobodalla and Bega Valley LGAs

46A Timbillica Dry Shrub Forest	Littoral Thicket
Araluen Scarp Grassy Forest	Murramarang–Bega Lowlands Forest
Basalt Hilltop Scrub	Nalbaugh Dry Grass Forest
Batemans Bay Cycad Forest	River Mangrove
Bega Riparian Scrub	Seagrass Meadow
Bega Wet Shrub Forest	Seagrass Meadow (*Halophila*)
Braidwood Dry Forest	Seagrass Meadow (*Posidonia*)
Brogo Wet Vine Forest	Seagrass Meadow (*Ruppia*)
Coastal Freshwater Lagoon	Seagrass Meadow (*Zostera*)
Coastal Gully Shrub Forest	Shale–Basalt Sheltered Forest
Coastal Rock Plate Heath	Shoalhaven Riparian Scrub
Coastal Sand Forest	South Coast Grassy Woodland
Coastal Sand Swamp Forest	South Coast River Flat Forest
Coastal Sandplain Heath	Southern Floodplain Wetlands
Coastal Scrub and Beach Strand	Southern Highlands Basalt Forest
Coastal Upland Swamp	Southern Tableland Flats Forest
Currambene–Batemans Lowlands Forest	Sub-Alpine Bog
East Monaro Subalpine Dry Shrub Forest	Subtropical Complex Rainforest
Eastern Tablelands Dry Forest	Subtropical Dry Rainforest
Eden Inland Intermediate Shrub Forest	Tableland Basalt Forest
Escarpment Dry Grass Forest	Tableland Dry Shrub Forest
Estuarine Creekflat Scrub	Tableland Grassy Box-Gum Woodland
Estuarine Fringe Forest	Tableland Hills Grassy Woodland
Estuarine Mangrove Forest	Tableland Low Woodland
Estuarine Saltmarsh	Tableland Swamp Flats Forest
Far South Coast Grassy Woodland	Tableland Swamp Meadow
Far South Coastal Dry Shrub Forest	Tablelands Grassy Wetlands Complex (*Poa labillardierei*-sedges)
Floodplain Swamp Forest	Waalimma Dry Grass Forest
Headland Grassland	Wallagaraugh Dry Grass Forest
Hinterland Heath	Warm Temperate Layered Forest
Illawarra Gully Wet Forest	Wollondilly – Cox – Shoalhaven Gorge Woodland
Illawarra Lowland Swamp Woodland	Yarrawarra Temperate Rainforest

Appendix 5: Old-growth forest types under-represented in reserves in Bega Valley Shire

Name of forest type under Eden CRA mapping	Name of forest type (Tozer et al. 2006)
17 Flats Wet Herb Forest	e17 Southeast Flats Swamp Forest
18 Brogo Wet Vine Forest	e18 Brogo Wet Vine Forest
19 Bega Wet Shrub Forest	e19 Bega Wet Shrub Forest
20 Bega Dry Grass Forest	e20 Bega Dry Grass Forest
23b Monaro Basalt Grass Woodland	p22 Frost Hollow Grassy Woodland and p220 Southern Tableland Flats Forest
24 Subalpine Dry Shrub Forest	e24 Southeast Subalpine Dry Shrub Forest
26 Tableland Dry Shrub Forest	e26 Southeast Tableland Dry Shrub Forest
27 Waalimma Dry Grass Forest	e27 Waalimma Dry Grass Forest
28 Wog Wog Dry Grass Forest	e28 Wog Wog Dry Grass Forest
29 Nalbaugh Dry Grass Forest	e29 Nalbaugh Dry Grass Forest
30 Wallagaraugh Dry Grass Forest	e30 Wallagaraugh Dry Grass Forest
32 Coastal Dry Shrub Forest	e32a Deua–Brogo Foothills Dry Shrub Forest and e32b Far South Coastal Foothills Dry Shrub Forest
34 Brogo Dry Shrub Forest	e34 Southeast Gully Shrub Forest
36 Dune Dry Shrub Forest	p64 Coastal Sand Forest
37 Coastal Dry Shrub Forest	e37 Southeast Lowland Gully Shrub Forest
42 Coastal Dry Shrub Forest	e42 Southeast Inland Intermediate Shrub Forest
79 Timbillica Dry Shrub Forest	p89 Batemans Bay Foothills Dry Forest

Appendix 6: Old-growth forest types under-represented in reserves within Eurobodalla and Shoalhaven LGAs

Name of forest type under Southern CRA mapping	Name of forest type (Tozer et al. 2006)
8 Far Southern Coastal Shrub Dry Forest	p98 Clyde–Deua Open Forest
9 Coastal Lowlands Cycad/Shrub Dry Forest	p90 Batemans Bay Cycad Forest
10 Southern Coastal Lowlands Shrub/Grass Dry Forest	p86 Murramarang Lowlands Forest
21 Northern Coastal Hinterland Moist Shrub Forest	p104 Southern Lowland Wet Forest + p110 Warm Temperate Layered Forest
48 Coastal Lowlands Riparian Herb/Grass Forest	p30 South Coast River Flat Forest
50 Southern Escarpment Foothills Herb/Grass Dry Forest	p34 South Coast Grassy Woodland
55 Eastern Tableland Fern/Herb/Grass Moist Forest	p20 Tableland Basalt Forest
56 Tableland and Escarpment Moist Herb/Fern Grass Forest	p20 Tableland Basalt Forest
113 North East Tablelands Dry Shrub/Grass Forest	p15 Braidwood Dry Forest
137 Coastal Escarpment Moist Shrub/Fern Forest	p73 Cool Montane Wet Forest
175 Northern Coastal Lowlands Swamp Forest	p45 Coastal Sand Swamp Forest
176 Morton Plateau Mallee Swamp Low Forest	p141 Budderoo – Morton Plateau Forest

Appendix 7: List of threatened species in Southern Rivers CMA

General type	Scientific name	Common name	Private land of importance to species conservation
Amphibians	*Heleioporus australiacus*	Giant burrowing frog	Y
Amphibians	*Litoria aurea*	Green and golden bell frog	Y
Amphibians	*Litoria littlejohni*	Littlejohn's tree frog	Y
Amphibians	*Litoria raniformis*	Southern bell frog	Y
Amphibians	*Litoria verreauxii alpina*	Alpine tree frog	Y
Amphibians	*Mixophyes balbus*	Stuttering barred frog	N
Amphibians	*Pseudophryne australis*	Red-crowned toadlet	Y
Amphibians	*Pseudophryne corroboree*	Southern corroboree frog	N
Aquatic invertebrates	*Archaeophya adamsi*	Adam's emerald dragonfly	
Aquatic plants	*Aldrovanda vesiculosa*	Waterwheel plant	Y
Bats	*Chalinolobus dwyeri*	Large-eared pied bat	Y
Bats	*Falsistrellus tasmaniensis*	Eastern false pipistrelle	Y
Bats	*Kerivoula papuensis*	Golden-tipped bat	Y
Bats	*Miniopterus schreibersii oceanensis*	Eastern bentwing-bat	Y
Bats	*Mormopterus norfolkensis*	Eastern freetail-bat	Y
Bats	*Myotis adversus*	Large-footed myotis	Y
Bats	*Pteropus poliocephalus*	Grey-headed flying-fox	Y
Bats	*Saccolaimus flaviventris*	Yellow-bellied sheathtail-bat	Y
Bats	*Scoteanax rueppellii*	Greater broad-nosed bat	Y
Birds	*Botaurus poiciloptilus*	Australasian bittern	Y
Birds	*Burhinus grallarius*	Bush stone-curlew	Y
Birds	*Calamanthus fuliginosus*	Striated fieldwren	Y
Birds	*Calidris alba*	Sanderling	Y
Birds	*Calidris tenuirostris*	Great knot	Y
Birds	*Calyptorhynchus lathami*	Glossy black-cockatoo	Y
Birds	*Charadrius leschenaultii*	Greater sand-plover	Y
Birds	*Charadrius mongolus*	Lesser sand-plover	Y
Birds	*Climacteris picumnus victoriae*	Brown treecreeper (eastern subspecies)	Y
Birds	*Dasyornis brachypterus*	Eastern bristlebird	Y
Birds	*Ephippiorhynchus asiaticus*	Black-necked stork	Y
Birds	*Esacus neglectus*	Beach stone-curlew	Y
Birds	*Glossopsitta porphyrocephala*	Purple-crowned lorikeet	Y
Birds	*Gygis alba*	White tern	Y
Birds	*Haematopus fuliginosus*	Sooty oystercatcher	Y
Birds	*Haematopus longirostris*	Pied oystercatcher	Y
Birds	*Irediparra gallinacea*	Comb-crested jacana	Y
Birds	*Ixobrychus flavicollis*	Black bittern	Y
Birds	*Lathamus discolor*	Swift parrot	Y
Birds	*Limicola falcinellus*	Broad-billed sandpiper	
Birds	*Limosa limosa*	Black-tailed godwit	
Birds	*Lophoictinia isura*	Square-tailed kite	Y
Birds	*Melanodryas cucullata cucullata*	Hooded robin (south-eastern form)	Y
Birds	*Melithreptus gularis gularis*	Black-chinned honeyeater (eastern subspecies)	Y
Birds	*Neophema chrysogaster*	Orange-bellied parrot	Y

General type	Scientific name	Common name	Private land of importance to species conservation
Birds	*Neophema pulchella*	Turquoise parrot	Y
Birds	*Ninox connivens*	Barking owl	Y
Birds	*Ninox strenua*	Powerful owl	Y
Birds	*Oxyura australis*	Blue-billed duck	Y
Birds	*Pachycephala olivacea*	Olive whistler	Y
Birds	*Pandion haliaetus*	Osprey	Y
Birds	*Petroica rodinogaster*	Pink robin	Y
Birds	*Pezoporus wallicus wallicus*	Eastern ground parrot	Y
Birds	*Ptilinopus superbus*	Superb fruit-dove	Y
Birds	*Pyrrholaemus sagittatus*	Speckled warbler	Y
Birds	*Rostratula benghalensis*	Painted snipe	Y
Birds	*Stagonopleura guttata*	Diamond firetail	Y
Birds	*Sterna albifrons*	Little tern	Y
Birds	*Sterna fuscata*	Sooty tern	N
Birds	*Stictonetta naevosa*	Freckled duck	
Birds	*Thinornis rubricollis*	Hooded plover	Y
Birds	*Tyto novaehollandiae*	Masked owl	Y
Birds	*Tyto tenebricosa*	Sooty owl	Y
Birds	*Xanthomyza phrygia*	Regent honeyeater	Y
Birds	*Xenus cinereus*	Terek sandpiper	
Birds	*Fregetta grallaria*	White-bellied storm-petrel	N
Birds	*Pterodroma neglecta*	Kermadec petrel	N
Birds	*Pterodroma nigripennis*	Black-winged petrel	N
Birds	*Puffinus assimilis*	Little shearwater	N
Birds	*Puffinus carneipes*	Flesh-footed shearwater	N
Birds	*Diomedea antipodensis*	Antipodean albatross	N
Birds	*Diomedea exulans*	Wandering albatross	N
Birds	*Diomedea gibsoni*	Gibson's albatross	N
Birds	*Macronectes giganteus*	Southern giant-petrel	N
Birds	*Macronectes halli*	Northern giant-petrel	N
Birds	*Phoebetria fusca*	Sooty albatross	N
Birds	*Pterodroma leucoptera leucoptera*	Gould's petrel	N
Birds	*Thalassarche cauta*	Shy albatross	N
Birds	*Callocephalon fimbriatum*	Gang-gang cockatoo	Y
Endangered populations	*Chorizema parviflorum* – endangered population	*Chorizema parviflorum* Benth. population, Wollongong and Shellharbour LGAs	Y
Endangered populations	*Lespedeza juncea* subsp. *sericea* – endangered population	*Lespedeza juncea* subsp. *sericea* population, Wollongong LGA	Y
Epiphytes and climbers	*Cynanchum elegans*	White-flowered wax plant	Y
Ferns and cycads	*Arthropteris palisotii*	Lesser creeping fern	Y
Fish	*Carcharius taurus*	Grey nurse shark	N
Fish	*Maccullochella macquariensis*	Trout cod	
Fish	*Pristis zijsron*	Green sawfish	N
Fish	*Thunnus maccoyii*	Southern bluefin tuna	N
Fish	*Carcharadon carcharias*	Great white shark	N
Fish	*Epinephelus daemelii*	Black cod	

General type	Scientific name	Common name	Private land of importance to species conservation
Fish	*Macquaria australasica*	Macquarie perch	Y
Herbs and forbs	*Baloskion longipes*	Dense cord-rush	Y
Herbs and forbs	*Calotis glandulosa*	Mauve burr-daisy	Y
Herbs and forbs	*Calotis pubescens*	Max Mueller's burr-daisy	Y
Herbs and forbs	*Carex archeri*	Archer's carex	N
Herbs and forbs	*Carex raleighii*	Raleigh sedge	Y
Herbs and forbs	*Chamaesyce psammogeton*	Sand spurge	
Herbs and forbs	*Distichlis distichophylla*	Australian salt-grass	Y
Herbs and forbs	*Euchiton nitidulus*	Shining cudweed	N
Herbs and forbs	*Euphrasia scabra*	Rough eyebright	Y
Herbs and forbs	*Galium australe*	Tangled bedstraw	Y
Herbs and forbs	*Gentiana baeuerlenii*	Baeuerlen's gentian	Y
Herbs and forbs	*Irenepharsus trypherus*	Illawarra irene	Y
Herbs and forbs	*Lysimachia vulgaris* var. *davurica*	Yellow loosestrife	Y
Herbs and forbs	*Monotaxis macrophylla*	Large-leafed *Monotaxis*	Y
Herbs and forbs	*Persicaria elatior*	Tall knotweed	Y
Herbs and forbs	*Plinthanthesis rodwayi*	Budawangs wallaby grass	N
Herbs and forbs	*Ranunculus anemoneus*	Anenome buttercup	N
Herbs and forbs	*Rutidosis leiolepis*	Monaro golden daisy	Y
Herbs and forbs	*Rytidosperma pumilum*	Feldmark grass	N
Herbs and forbs	*Senecio spathulatus*	Coast groundsel	N
Herbs and forbs	*Swainsona sericea*	Silky swainson-pea	Y
Herbs and forbs	*Thesium australe*	Austral toadflax	Y
Herbs and forbs	*Viola cleistogamoides*	Hidden violet	Y
Herbs and forbs	*Xerochrysum palustre*	Swamp everlasting	Y
Invertebrates	*Petalura gigantea*	Giant dragonfly	
Mallees	*Eucalyptus imlayensis*	Imlay mallee	N
Mallees	*Eucalyptus langleyi*	Albatross mallee	Y
Mallees	*Eucalyptus parvula*	Small-leaved gum	Y
Mallees	*Eucalyptus pulverulenta*	Silver-leafed gum	Y
Mallees	*Eucalyptus recurve*	Mongarlowe mallee	Y
Mallees	*Eucalyptus saxatilis*	Suggan Buggan mallee	N
Mallees	*Eucalyptus sturgissiana*	Ettrema mallee	Y
Marine mammals	*Arctocephalus forsteri*	New Zealand fur-seal	N
Marine mammals	*Arctocephalus pusillus doriferus*	Australian fur-seal	N
Marine mammals	*Balaenoptera musculus*	Blue whale	N
Marine mammals	*Dugong dugon*	Dugong	N
Marine mammals	*Eubalaena australis*	Southern right whale	N
Marine mammals	*Megaptera novaeangliae*	Humpback whale	N
Marine mammals	*Physeter macrocephalus*	Sperm whale	N
Marsupials	*Burramys parvus*	Mountain pygmy-possum	N
Marsupials	*Cercartetus nanus*	Eastern pygmy-possum	Y
Marsupials	*Dasyurus maculatus*	Spotted-tailed quoll	Y
Marsupials	*Isoodon obesulus obesulus*	Southern brown bandicoot (eastern)	Y
Marsupials	*Petaurus australis*	Yellow-bellied glider	Y
Marsupials	*Petaurus norfolcensis*	Squirrel glider	Y
Marsupials	*Petrogale penicillata*	Brush-tailed rock-wallaby	Y
Marsupials	*Phascogale tapoatafa*	Brush-tailed phascogale	Y

General type	Scientific name	Common name	Private land of importance to species conservation
Marsupials	*Phascolarctos cinereus*	Koala	Y
Marsupials	*Potorous longipes*	Long-footed potoroo	N
Marsupials	*Potorous tridactylus*	Long-nosed potoroo	Y
Marsupials	*Sminthopsis leucopus*	White-footed dunnart	Y
Orchids	*Caladenia tessellata*	Tessellated spider orchid	Y
Orchids	*Cryptostylis hunteriana*	Leafless tongue orchid	Y
Orchids	*Diuris aequalis*	Doubletail buttercup	Y
Orchids	*Diuris pedunculata*	Small snake orchid	Y
Orchids	*Genoplesium plumosum*	Tallong midge orchid	Y
Orchids	*Genoplesium rhyoliticum*	Rhyolite midge orchid	N
Orchids	*Genoplesium vernale*	East Lynne midge orchid	Y
Orchids	*Prasophyllum affine*	Jervis Bay leek orchid	Y
Orchids	*Prasophyllum* sp. Majors Creek	Majors Creek leek orchid	Y
Orchids	*Pterostylis gibbosa*	Illawarra greenhood	Y
Orchids	*Pterostylis pulchella*	Waterfall greenhood	Y
Orchids	*Rhizanthella slateri*	Eastern Australian underground orchid	Y
Orchids	*Genoplesium baueri* R.Br.	Bauer's midge orchid	Y
Orchids	*Diuris ochroma*	Pale golden moths	Y
Orchids	*Genoplesium superbum*		N
Reptiles	*Aprasia parapulchella*	Pink-tailed worm-lizard	Y
Reptiles	*Delma impar*	Striped legless lizard	Y
Reptiles	*Hoplocephalus bungaroides*	Broad-headed snake	Y
Reptiles	*Suta flagellum*	Little whip snake	Y
Reptiles	*Tympanocryptis pinguicolla*	Grassland earless dragon	
Reptiles	*Varanus rosenbergi*	Rosenberg's goanna	Y
Reptiles	*Chelonia mydas*	Green turtle	N
Rodents	*Mastacomys fuscus*	Broad-toothed rat	N
Rodents	*Pseudomys fumeus*	Smoky mouse	N
Rodents	*Pseudomys gracilicaudatus*	Eastern chestnut mouse	Y
Shrubs	*Acacia baueri* subsp. *aspera*		Y
Shrubs	*Acacia bynoeana*	Bynoe's wattle	Y
Shrubs	*Acacia constablei*	Narrabarba wattle	N
Shrubs	*Astrotricha* sp. *Wallagaraugh*	Merimbula star-hair	Y
Shrubs	*Boronia deanei*	Deane's boronia	Y
Shrubs	*Bossiaea oligosperma*	Few-seeded bossiaea	Y
Shrubs	*Budawangia gnidioides*	Budawangs cliff-heath	N
Shrubs	*Callistemon linearifolius*	Netted bottle brush	Y
Shrubs	*Callitris oblonga*	Pygmy cypress pine	Y
Shrubs	*Correa baeuerlenii*	Chef's cap correa	Y
Shrubs	*Correa lawrenciana* var. *genoensis*	Genoa River correa	N
Shrubs	*Dillwynia glaucula*	Michelago parrot-pea	Y
Shrubs	*Discaria nitida*	Leafy anchor plant	Y
Shrubs	*Dodonaea procumbens*	Creeping hop-bush	Y
Shrubs	*Grevillea acanthifolia* subsp. *paludosa*	Bog grevillea	N
Shrubs	*Grevillea molyneuxii*	Wingello grevillea	Y
Shrubs	*Grevillea renwickiana*	Nerriga grevillea	Y
Shrubs	*Grevillea rivularis*	Carrington Falls grevillea	Y

General type	Scientific name	Common name	Private land of importance to species conservation
Shrubs	*Haloragis exalata* subsp. *exalata*	Square raspwort	Y
Shrubs	*Leptospermum thompsonii*	Monga teatree	N
Shrubs	*Melaleuca deanei*	Deane's paperbark	Y
Shrubs	*Monotoca rotundifolia*	Trailing *Monotoca*	Y
Shrubs	*Nematolepis rhytidophylla*	Nalbaugh *Nematolepis*	N
Shrubs	*Persoonia glaucescens*	Mittagong geebung	Y
Shrubs	*Pimelea spicata*	Spiked rice-flower	Y
Shrubs	*Pomaderris adnata*	Sublime Point *Pomaderris*	Y
Shrubs	*Pomaderris cotoneaster*	Cotoneaster *Pomaderris*	Y
Shrubs	*Pomaderris delicata*	Delicate *Pomaderris*	Y
Shrubs	*Pomaderris elachophylla*	Lacy *Pomaderris*	Y
Shrubs	*Pomaderris gilmourii* var. *cana*	Grey Deua *Pomaderris*	N
Shrubs	*Pomaderris pallida*	Pale *Pomoderris*	Y
Shrubs	*Pomaderris parrisiae*	Parris' *Pomaderris*	N
Shrubs	*Pomaderris sericea*	Silky *Pomaderris*	Y
Shrubs	*Prostanthera densa*	Villous mint-bush	Y
Shrubs	*Pseudanthus ovalifolius*	Oval-leafed *Pseudanthus*	Y
Shrubs	*Pultenaea aristata*	Prickly bush-pea	Y
Shrubs	*Pultenaea baeuerlenii*	Budawangs bush-pea	N
Shrubs	*Pultenaea parrisiae* subsp. *elusa*	Elusive bush-pea	Y
Shrubs	*Pultenaea parrisiae* subsp. *parrisiae*	Parris' bush-pea	N
Shrubs	*Pultenaea pedunculata*	Matted bush-pea	Y
Shrubs	*Rulingia prostrata*	Dwarf kerrawang	Y
Shrubs	*Senna acclinis*	Rainforest cassia	Y
Shrubs	*Solanum celatum*		Y
Shrubs	*Triplarina nowraensis*	Nowra heath myrtle	Y
Shrubs	*Westringia davidii*	David's *Westringia*	N
Shrubs	*Westringia kydrensis*	Kydra *Westringia*	Y
Shrubs	*Wilsonia backhousei*	Narrow-leafed *Wilsonia*	Y
Shrubs	*Wilsonia rotundifolia*	Round-leafed *Wilsonia*	Y
Shrubs	*Zieria adenophora*	Araluen *Zieria*	Y
Shrubs	*Zieria baeuerlenii*	Bomaderry *Zieria*	Y
Shrubs	*Zieria buxijugum*	Box Range *Zieria*	Y
Shrubs	*Zieria formosa*	Shapely *Zieria*	Y
Shrubs	*Zieria granulata*	Illawarra *Zieria*	Y
Shrubs	*Zieria murphyi*	Velvet *Zieria*	N
Shrubs	*Zieria parrisiae*	Parris' *Zieria*	Y
Shrubs	*Zieria tuberculata*	Warty *Zieria*	Y
Shrubs	*Leionema ralstonii*	Ralston's *Leionema*	N
Shrubs	*Pomaderris bodalla*	Bodalla *Pomaderris*	Y
Trees	*Acacia georgensis*	Bega wattle	Y
Trees	*Daphnandra* sp. C	Illawarra socketwood	Y
Trees	*Eucalyptus kartzoffiana*	Araluen gum	Y
Trees	*Melaleuca biconvexa*	Biconvex paperbark	Y
Trees	*Syzygium paniculatum*	Magenta lilly pilly	Y
Rare but unlisted	*Acacia aculeatissima*		N
Rare but unlisted	*Acacia blayana*		Y
Rare but unlisted	*Acacia kydrensis*		Y
Rare but unlisted	*Acacia olsenii*		N

General type	Scientific name	Common name	Private land of importance to species conservation
Rare but unlisted	*Astrotricha* sp. Nadgee		N
Prelim. Determination	*Astrotricha* sp. Wallagaraugh		Y
Nominated	*Bossiaea* sp. Bombay		Y
Rare but unlisted	*Bossiaea* sp. Brogo		Y
Rare but unlisted	*Burnettia cuneata*		Y
Listed in EPBC Act	*Callistemon forresterae*		N
Rare but unlisted	*Cuscuta tasmanica*		Y
Rare but unlisted	*Daviesia wyattiana*		N
Rare but unlisted	*Diuris corymbose*		N
Rare but unlisted	*Dryopoa dives*		N
Rare but unlisted	*Eriostemon virgatus*		N
Rare but unlisted	*Eucalyptus conspicua*		N
Rare but unlisted	*Eucalyptus deuaensis*		N
Rare but unlisted	*Eucalyptus ignorabilis*		N
Rare but unlisted	*Eucalyptus olsenii*		N
Rare but unlisted	*Eucalyptus paliformis*		N
Rare but unlisted	*Eucalyptus pseudoglobulus*		N
Rare but unlisted	*Goodenia humilis*		Y
Rare but unlisted	*Grevillea epicroca*		Y
Rare but unlisted	*Grevillea irrasa* subsp. *didymochiton*		N
Rare but unlisted	*Grevillea irrasa* subsp. *irrasa*		N
Rare but unlisted	*Grevillea macleayana*		Y
Rare but unlisted	*Grevillea rhyolitica* subsp. *rhyolitica*		N
Rare but unlisted	*Grevillea rhyolitica* subsp. *Semivestita*		N
Rare but unlisted	*Hibbertia* aff. *hermanniifolia*		N
Rare but unlisted	*Leptospermum deuense*		N
Rare but unlisted	*Leucopogon pilifer*		N
Rare but unlisted	*Olearia rugosa*		N
Rare but unlisted	*Ozothamnus turbinatus*		Y
Rare but unlisted	*Persoonia brevifolia*		N
Rare but unlisted	*Persoonia juniperina*		N
Rare but unlisted	*Phebalium carruthersii*		N
Prelim. Determination	*Pimelea axiflora* subsp. *pubescens*		N
Rare but unlisted	*Pomaderris costata*		Y
Rare but unlisted	*Pomaderris gilmourii* var. *gilmourii*		N
Rare but unlisted	*Pomaderris virgata*		N
Prelim. Determination	*Pomaderris walshii*		Y
Prelim. Determination	*Prasophyllum canaliculatum*		Y
Rare but unlisted	*Prasophyllum sylvestre*		Y
Rare but unlisted	*Prostanthera walteri*		N
Rare but unlisted	*Pultenaea benthamii*		N
To be nominated	*Rytidosperma vickeryae*		N
Rare but unlisted	*Spyridium cinereum*		N
Rare but unlisted	*Styphelia adscendens*		Y
Rare but unlisted	*Westringia saxatilis*		N
Rare but unlisted	*Wurmbea uniflora*		Y

Appendix 8: Methodology for mapping habitat of threatened and significant plant and animal species on the South Coast

Habitat was mapped according to one of four methods:

1 Vegetation polygon: Valid point data of individual species were matched against the individual polygons of the South Coast vegetation map. The map consists of 95,666 individual polygons with a mean area of 12.45 hectares. All polygons that were within 100 m of a record of a specific threatened species were combined to form the habitat map of that species. Fauna species where this method was applied are*: Botaurus poiciloptilus*, *Buhrinus grallarius*, *Calamanthus fuliginosus*, *Chalinolobus dwyeri* (captures only, Anabat records excluded due to low identification accuracy), *Calyptorhynchus lathami*, *Cercatetus nanus*, *Dasyornis brachypterus*, *Helioporus australiacus*, *Hoplocephalus bungaroides*, *Isoodon obesulus*, *Kerivoula papuensis*, *Lathamus discolor*, *Melanodryas cucullata*, *Neophema pulchella*, *Ninox strenua*, *Petarus australia*, *Pezoporus wallicus*, *Phascolarctos cinereus*, *Pyrrholaemus sagittatus*, *Sminthopsis leucopus* and *Stagonopleura guttata.*

For some species, a combination of this method to select general habitat and the buffer method detailed below to identify specific roost/nest sites was used. Observation records for *Ninox connivens* (heard call records excluded due to low spatial accuracy) and *Miniopterus schreibersii* (Anabat calls excluded due to low identification accuracy) were mapped using this method and then merged with buffers around known roost/nest sites.

Flora species to which the vegetation polygon method was applied are: *Caladenia tessellata*, *Correa baeuerlenii*, *Cryptostylis hunteriana*, *Daphnandra* sp. C, *Eucalyptus langleyi*, *Galium australe*, *Genoplesium baueri*, *Genoplesium vernale*, *Haloragis exalata* subsp. *exalata*, *Irenepharsus trypherus*, *Lysimachia vulgaris* var. *davurica*, *Melaleuca biconvexa*, *Monotaxis macrophylla*, *Persicaria elatior*, *Prasophyllum affine*, *Prostanthera densa*, *Pterostylis gibbosa*, *Pultenaea pedunculata*, *Rhizanthella slateri*, *Thesium australe*, *Triplarina nowraensis*, *Wilsonia backhousei*, *Wilsonia rotundifolia*, *Halgania brachyrhyncha* and all but *Cuscuta tasmanica* and *Bossiaea* sp. Brogo of the significant plant species listed in section 5.7.

2 Area buffers: The following specified buffers were employed around key habitat points:

- 500-m buffers around known colony sites for *Pteropus poliocephalus*, *Miniopterus schreibersii* roost sites and *Ninox connivens* nest sites.
- A 200-m buffer was applied around known habitats for *Litoria aurea*, as the species habitat is known to be less related to vegetation type features than to particular water points with suitable features such as absence of *Gambusia holbrooki*.
- A 100-m buffer was placed around Brogo Dam and for 5 km downstream on the Brogo River to delimit the habitat of *Bossiaea* sp. Brogo.
- The Kangaroo River and second-order tributaries were selected as habitat of the Macquarie perch. Habitat of the Australian grayling (EPBC listed only) includes the Clyde, Tuross, Towamba, Murrah, Minnamurra and Upper Deua rivers, and Wandanian Creek and Shoalhaven River (downstream of Tallowa Dam), including Broughton Creek and Broughton Mill Creek.
- Habitat of the endangered population of the greater glider (*Petauroides volans*) was mapped according to the description of habitat area provided in the final determination of 7 September 2007.

Zieria species are also known to have restricted distribution in the study region, and the boundaries of known stands *of Z. baeuerlenii*, *Z. tuberculata*, *Z. formosa*, *Z. buxijugum* and

Z. parrisae were digitised using distribution maps in Briggs and Leigh (1990) and NPWS (2002a).

3 Collective mapping: Some species were grouped and mapped collectively. Records of threatened waders (*Charadrius leschenaultii*, *C. mongolus*, *Calidris alba*, *C. tenuirostris*, *Limicola falcinellus*, *Limosa limosa*, *Xenus cinereus*) were grouped together, and significant wader habitat was mapped using the estuary priority mapping in Breen et al. (2005).

Threatened shore birds were also mapped collectively using a 500-m buffer (clipped by the low tide mark) around recorded breeding sites over the last two years of survey data held by the South Branch Biodiversity Conservation Section (J Dawson 25 October 2006, pers. comm.)

4 Specific known vegetation community: Australian salt-grass (*Distichlis distichophylla*) and golden dodder (*Cuscuta tasmanica)* are saltmarsh-dependent species. Areas of saltmarsh vegetation within SCIVI (see Tozer et al. 2006) were mapped as potential habitat for this species.

Appendix 9: Significant lakes and estuaries

Estuary/coastal lake catchment	HRC coastal lake	Vulnerable estuary
Lake Wollumboola	✓	✓
Currarong Creek		✓
Currambene Creek		✓
Swan Lake	✓	
Berrara Creek		✓
Nerindillah Creek		✓
Lake Conjola	✓	
Millards Creek		✓
Tabourie Lake	✓	✓
Termeil Lake	✓	✓
Meroo Lake	✓	✓
Willinga Lake	✓	✓
Kioloa Lagoon		✓
Durras Lake	✓	
Candlagan Creek	✓	✓
Congo Creek		✓
Meringo Creek	✓	✓
Bingie Lagoon	✓	
Lake Brunderee	✓	✓
Lake Tarourga	✓	✓
Brou Lake	✓	
Mummuga (Dalmeny) Lake	✓	
Kianga Lake		✓
Nangudga Lake		✓
Nargal Lake	✓	
Corunna Lake	✓	✓
Tilba Tilba Lake		✓
Little Lake		✓
Baragoot Lake	✓	✓
Cuttagee Lake	✓	✓
Murrah Lagoon		✓
Bunga Lagoon	✓	✓
Wapengo Lake	✓	
Middle Lagoon	✓	✓
Nelson Lake	✓	
Wallagoot Lake	✓	
Bournda Lagoon	✓	✓
Back Lake	✓	✓
Lake Curalo		✓
Nullica River		✓
Wonboyn Lake	✓	
Merrica River		✓
Nadgee River		✓
Nadgee Lake	✓	

Appendix 10: Fisheries guidelines for use in LEP and local environmental studies production

1 Identification of high conservation value aquatic habitats

Both the local environmental study and LEP need to clearly identify (delineate and show on a suitably detailed topographic map) high conservation value areas. It is important to include aquatic habitats within this category. Although these areas may not be 'zoned' as such, it is important that they be clearly identified on the LEP map (for example as an overlay over the top of broad-scale land-use zones) so that there is little, if any, doubt as to where higher performance criteria and standards apply.

In general, high conservation value aquatic habitats will include:

- semi-permanently and permanently flowing creeks, streams and rivers (generally third-order and above) including adjacent riparian zones
- semi-permanently and permanently inundated estuaries, lakes, lagoons, billabongs and wetlands, including adjacent riparian zones.

DII has mapped key fish habitat in most LGAs on the South Coast and provided this mapping to councils as shape files for incorporation into GIS systems.

Riparian zones need to be explicitly included and protected since decline of riparian vegetation is listed as a key threatening process under the provisions of the FM Act.

All these areas are valuable from both the biodiversity conservation and recreational fishing perspectives and need to be conserved and protected from the adverse impacts of development. They are also important in terms of protecting water quality for downstream users.

The LEP should prohibit most types of developments in these areas to ensure that their inherent values are not destroyed or degraded. The only types of development that should be allowed in these areas are those that have *no alternatives* for being sited elsewhere (for example roads and other public utilities inevitably have to cross streams).

High performance criteria and standards with respect to:

1 maintaining streambank and riparian zone stability
2 erosion and sediment control
3 maintenance of vegetative cover
4 minimisation of disturbance to in-stream habitats such as gravel beds, snags and aquatic macrophytes
5 water quality protection
6 rehabilitation and restoration following disturbance

should be applied to activities or developments proposed within or adjacent to the Aquatic Habitat Protection Zone.

The LEP should also ensure that adequate buffers are put in place around these areas to limit the off-site impact of adjacent and neighbouring developments (for example from turbid run-off).

Fisheries Conservation managers can assist council planners to identify and map these areas if requested.

To help avoid inadvertent breaches of legislation, the LEP should also include a note (non-legal clause or section) to remind council planners and developers and their advisors that works within streams and water bodies may require a permit from DII even though they may or may not require development consent from the council**.**

2 Fish movement corridors

Many species of fish and other aquatic animals are migratory within freshwater habitats. The LEP should recognise that estuaries and the middle and lower reaches of freshwater rivers, creeks and streams are just as much 'wildlife corridors' as are linear strips of terrestrial vegetation.

The main threats to fish movement along these corridors are dams, weirs and vehicular crossings. LEPs should therefore require development approval for all such structures wherever they are to be constructed on or over third-order or above streams (Strahler method of stream ordering using the most detailed topographic map available for the area in question).

The LEP should require all such vehicular crossings to comply with the NSW Fisheries' *Fish passage requirements for waterway crossings*[14] to obtain development consent.

There is little risk of harm to migration and movement patterns when structures are constructed over first- and second-order streams, as these are generally intermittent and beyond the range of most species. As a consequence it is not necessary (at least from a fish passage perspective), to require development consent for such structures over first- and second-order streams.

To help avoid inadvertent breaches of legislation, the LEP should include a note to remind council planners and developers that construction of weirs, dams, causeways and culverts within streams and water bodies may require a permit from DII, even though it may not require development consent from the council.

3 Water quality

Nearly all developments have an impact on downstream aquatic habitats via effects on water quality, particularly during rainfall events. These impacts can be ameliorated to some extent by careful site selection and implementation of various safeguards.

The suitability of a site for development is influenced by various constraints, including slope, erodibility of the soil and flooding potential. The LEP should clearly identify lands that are constrained by these factors (both the number of factors involved and the severity of each factor) and impose strict limitations upon their development to protect downstream water quality. Lands that are severely constrained by one or more factors should be appropriately zoned to prevent any development. Lands that are moderately constrained should be zoned to ensure that developments are designed, sited and constructed in a way that causes negligible impact on downstream water quality during both the construction and operational phases. Regardless of site constraints, all developments should be required to implement currently accepted best management practice with regard to erosion and sediment control to protect downstream water quality and thus gain development consent.

4 Water quantity

Subdivision of land with frontage to streams or other water bodies results in the proliferation of Basic Landholder Rights (formerly known as Riparian Rights) under the *Water Management Act 2000*. The resultant increased extraction of water from streams by landholders has the potential to severely affect downstream aquatic habitats. The LEP should contain provisions to prevent the proliferation of Basic Landholder Rights when land with stream frontage is rezoned. Such provisions may include:

- creating only one allotment with streamside frontage
- transferring a streamside allotment to public or council ownership for use as parkland or environmental protection land.

[14] www.DII.nsw.gov.au/__data/assets/pdf_file/0004/202693/Why-do-fish-need-to-cross-the-road_booklet.pdf

Proliferation of ‘farm dams’ within rural residential areas also has the potential to intercept a large proportion of run-off and reduce stream flows. The LEP should *not* require the mandatory construction of dams for water supply and fire fighting purposes on individual allotments in such circumstances. Instead, the use of tanks or a ‘community dam’ should be considered.

5 Critical habitat and habitat for threatened species

If the high conservation value mapping mentioned at point 1 is carried out thoroughly, most aquatic threatened species habitat will be captured. However, it may be appropriate to specifically identify aquatic habitat areas that are known to be inhabited by threatened aquatic species, populations or ecological communities, because there are severe penalties for damaging these habitats. DII staff can assist with the identification of these areas.

To help avoid inadvertent breaches of legislation, the LEP should include a note to remind council planners and developers that before works are approved or commenced, proposed development or activities within identified threatened species habitat may require the completion of a 7-part test under s. 5A of the EP&A Act and/or a species impact statement to verify that impacts are not likely to be significant.

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