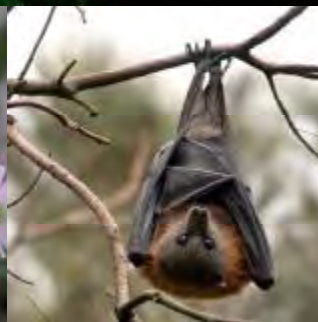


Illawarra Biodiversity Strategy

Vol. 1 Action Plan

An initiative of
Wollongong City Council,
Shellharbour City Council
and Kiama Municipal Council



Illawarra Biodiversity Strategy 2011

A joint project between Wollongong City Council, Shellharbour City Council and Kiama Municipal Council. Funded by the NSW Environmental Trust.

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1 PROJECT DESCRIPTION

1.1 BACKGROUND

The *Local Government Act 1993* charter specifies Council's responsibility to '... properly manage, develop, protect, restore, enhance and conserve the environment of the area for which it is responsible, in a manner that is consistent with and promotes the principles of ecologically sustainable development'. Biodiversity conservation and management is important for a number of reasons. Biodiversity is essential to the environmental services that provide us with clean water, clean air, food to eat, and a range of resources to use in our daily lives. Habitat destruction, alien species, habitat modification, pollution, over-consumption and the unsustainable use of resources, and climate change all mount significant threats to biodiversity and are the primary causes of its decline (Coutts-Smith *et al.* 2007). Management strategies are required to protect and enhance biodiversity in the face of these pressures.

Climate change brings new and significant pressures to biodiversity as a result of a range of physical changes to the environment, including changes to average temperatures, rainfall, rising sea levels, increased incidence of storm events, and bushfire. It is well recognised that areas of high biodiversity, with more resilient ecosystems are better able to adapt and respond to change and disturbance. The Australian and NSW Governments are already committed to various natural resource and biodiversity targets through a range of plans and policies. The aim of this Strategy is to outline how the Illawarra Councils will help meet national and state biodiversity targets and respond to regional issues by identifying key priorities for the next five years.

1.2 THE ILLAWARRA COUNCILS

The Illawarra Councils, as defined in this Strategy, refer to the coastal councils of Kiama Municipal Council, Shellharbour City Council and Wollongong City Council (Figure 1). Together, the Illawarra Councils are responsible for an area of approximately 109,000 hectares. The three Illawarra Councils form the Illawarra sub-region, which falls mostly within the Southern Rivers Catchment Management Authority (SRCMA) boundary. The northern part of the Wollongong LGA falls within Sydney Metropolitan Catchment Management Authority (SMCMA). The Illawarra Councils all share a similar geography; a narrow urban and rural coastal plain framed by the scenic Illawarra escarpment. This shared geography presents each of the Illawarra Councils with many shared biodiversity management issues.

Local government is on the frontline when it comes to managing biodiversity. They are responsible for land use planning and development control, management of community and Crown land, and also have the potential to support conservation on private land through provision of information and resources.

The resident population of the three Local Government Areas (LGAs) are significantly different, with Kiama's population estimated at 20,258, Shellharbour's estimated at 65,587 and Wollongong's estimated at 198,324, based on 2008 Census of Population and Housing data (Aust. Bureau of Statistics 2009). Given the population projections for the Illawarra of an additional 47,600 by 2031 (DoP 2007), careful planning is needed to safeguard the regions most valuable biodiversity assets.



Figure 1: The Illawarra Councils





1.3 WHY A REGIONAL STRATEGY?

It has long been recognised in the Illawarra that investment in natural resource management and environmental management is best managed at a regional level (NCC 1999). A regional strategic approach is more likely to improve co-ordination and management of biodiversity across the Illawarra. A regional approach also makes best use of knowledge and resources. This Strategy consolidates the Illawarra Councils' commitments to a range of higher order targets set at the national, state and regional level. Figure 2 outlines how this Strategy relates to those key documents. The preparation of this Strategy supports priority action 1.1.2 in Australia's Biodiversity Conservation Strategy 2010-2020 Draft, which is to prepare and implement biodiversity conservation plans (Commonwealth of Australia 2009a).

This Strategy was developed in consultation with the Illawarra Councils. It was overseen by a multi-agency reference group, and engaged key regional stakeholders to identify threats, values, regional corridors, and recommended actions.

The contribution of all those people is greatly acknowledged. The Strategy is divided into two parts:

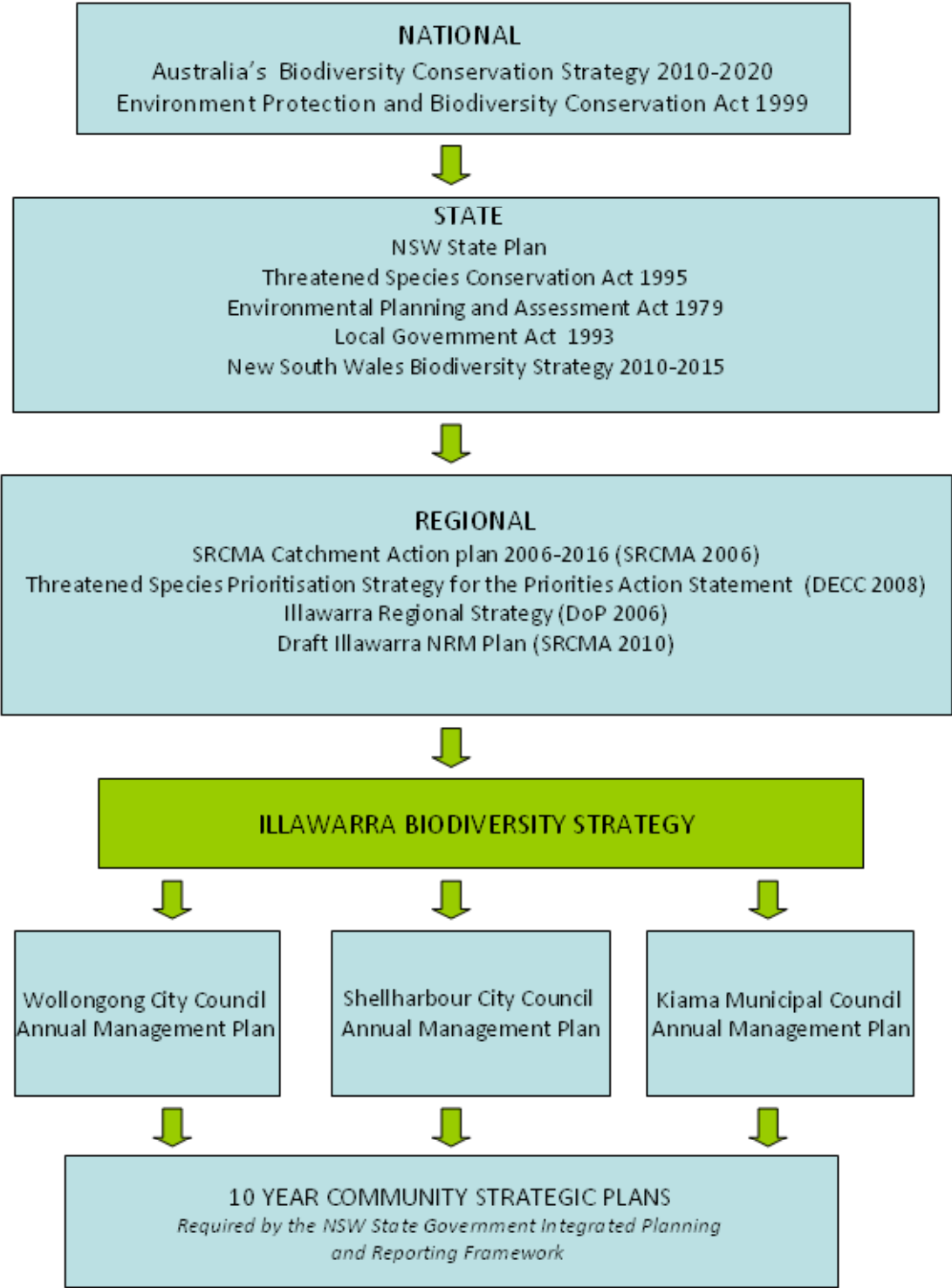
Volume One provides a brief overview of the key issues values and threats, and the details of the action plan.

Volume Two provides the detail on the values, threats and methods used to assess them.

The strategies and actions arising from this Biodiversity Strategy will be incorporated into the Integrated Planning Framework, which all Illawarra Councils are currently preparing.



Figure 2. Policy framework





1.4 SCOPE AND AIMS OF THE STRATEGY

The Strategy aims to guide a program for biodiversity management for the three Illawarra Councils over the next five years. It will be used to assist in developing policy, inform strategic planning and to define a program of 'onground' actions for the Illawarra Councils to work towards. We acknowledge that there are many other stakeholders with an influence on biodiversity outcomes in the Illawarra region. The Action Plan intends to enhance and support the work being undertaken by these other stakeholders; whilst providing a clear set of priority actions to be undertaken by the Illawarra Councils.

Biodiversity stakeholders in the Illawarra region include:

- Southern Rivers Catchment Management Authority;
- Department of Environment, Climate Change and Water;
- Illawarra District Noxious Weeds Authority;
- Landcare Illawarra;
- Bushcare;
- Conservation Volunteers Australia;
- Small Farms Network;
- Illawarra Bird Observers;
- University of Wollongong;
- Wollongong Climate Action Network; and
- Landholders and residents of the Wollongong, Shellharbour and Kiama Council areas.

The Strategy is focussed on terrestrial biodiversity. Aquatic diversity is not addressed due largely to the lack of data, but also to the limited control which Local Government has on aquatic habitats. Estuarine issues are dealt with more thoroughly under each Council's estuary management programs.

1.4.1 Objectives

The Strategy aims to address the following objectives:

1. Provide a co-ordinated and regional approach to biodiversity conservation so as to maximise knowledge sharing and efficient use of resources between the Illawarra Councils;
2. Identify biodiversity priorities to guide the Illawarra Councils and other land managers in future decisions and planning;
3. Encourage and promote the conservation of biodiversity across the Illawarra;
4. Identify and manage threats to biodiversity across the Illawarra;
5. Improve understanding of biodiversity values of the Illawarra;
6. Identify anticipated threats to biodiversity from climate change;
7. Improve community awareness, and encourage and support community participation in biodiversity conservation; and
8. Contribute to the achievement of targets defined by the Australian Biodiversity Conservation Strategy 2010-2020, NSW State Plan, NSW Biodiversity Strategy, Southern Rivers CMA Catchment Action Plan, Illawarra Regional Strategy, and the NSW Threatened Species Priorities Action Statements.



1.5 WHAT IS BIODIVERSITY AND WHY DOES IT MATTER?

Biodiversity has been described as the 'web of life', 'the variety of living things' or 'the different plants, animals and micro-organisms, their genes and ecosystems of which they are a part' (DEWHA 2009b). For the purpose of this Strategy, biological diversity is considered at three levels as shown below.

<i>Level of diversity</i>	<i>Description</i>	<i>Example</i>
Genetic diversity	The variety of genes or units of heredity in any population	The genetic diversity within one population of plants at a particular site. Low genetic diversity can lead to reproductive health problems such as poor recruitment in plants.
Species diversity	The variety of species	The number of plant or animals species in a remnant patch of vegetation.
Ecosystem diversity	The variety of communities or ecosystems	The number of vegetation communities in a region.

The conservation of biodiversity is one of the four main objectives of the principle of Ecologically Sustainable Development (ESD). The *Local Government Act 1993* charter specifies Council's responsibility to '... properly manage, develop, protect, restore, enhance and conserve the environment of the area for which it is responsible, in a manner that is consistent with and promotes the principles of ecologically sustainable development'.

We depend on biodiversity for our sustenance, health, well-being and enjoyment of life. We derive all of our food and many medicines and industrial products from the wild and domesticated components of biological diversity. Biodiversity is also the basis for much of our recreation and tourism, and includes the ecosystems which provide us with many services such as clean water.

Biodiversity provides a range of ecosystem services including protection of water resources, soil formation and protection, nutrient storage and cycling, pollution breakdown and absorption, contribution to climate stability, maintenance of ecosystems, and ecosystem resilience. It also provides a range of biological and economic resources including food, timber resources, medicinal and pharmaceutical drugs, ornamental plants, and future resources. A range of social benefits are also provided, including providing a place for research and education, recreation and tourism, and cultural values (DEWHA 2009b).

Biodiversity in Australia is particularly significant as it supports 7-10% of all of the world's species, many of which occur nowhere else. Yet more than 14% of our vertebrate animals and 12% of our plants are threatened (Lindenmayer, 2007). Australia also has the unfortunate record of the highest per capita number of extinct species in the world. Half of Australia's marsupials have either become extinct or had their distributions drastically reduced in the last 220 years.

1.6 KEY TERMS USED IN THIS STRATEGY

Anthropogenic	Resulting from or produced by human activities, such as industry, agriculture, mining, transport and settlement.
Connectivity	Describes the possibility of movement of species between different areas of habitat which are not necessarily physically connected, and can be thought of as 'stepping stones' in the landscape. It has a wider meaning than wildlife corridors, which are continuous land links.
Conservation	The protection, maintenance, management, sustainable use and restoration of the natural environment (Commonwealth of Australia 2009a).
Climate Change	The statistically significant variation in the average state of the global or regional climate persisting for an extended period. The UNFCCC definition relates to changes in climate due to anthropogenic factors in addition to changes caused by natural processes (WHO, 2010).
DCP	A Development Control Plan (DCP) is a detailed guideline that includes procedures and development requirements to be followed when preparing and lodging development proposals.
DECCW	NSW Department of Environment, Climate Change and Water
DoP	NSW Department of Planning
EEC	Endangered Ecological Community as listed under the <i>Threatened Species Conservation Act 1995</i> .
Endemism	Ecological term to describe species or communities which are unique to a particular geographic location.
Illawarra Councils	Refers to Kiama Municipal Council, Shellharbour City Council and Wollongong City Council.
LEP	The Local Environmental Plan is the principal legal document for controlling development at the council level. The zoning provisions establish permissibility of uses and standards regulate the extent of development.
LGA	Local Government Area
NRM	Natural Resource Management. A broad term used to describe the various aspects to the management of the natural environment.
POM	Plan of Management
Precautionary principle	Careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment.
Recruitment	Recruitment refers to the natural regeneration of native vegetation from the soil seed bank.
Regeneration	Allowing natural processes to establish native vegetation, with or without assistance, without introducing plant propagules (AABR and National Trust 2005).
Resilience	An ecosystems capacity to adapt to changes and disturbances while maintaining the same basic function, structure, and interactions (DEWHA 2009a).
Revegetation	Planting, transplanting, seeding, brushmatting or other human introduction of plant propagules to establish native vegetation (AABR and National Trust 2005).
SRCMA	Southern Rivers Catchment Management Authority
Threatened Species	Threatened Species refers to either threatened flora, fauna, Endangered Populations or Endangered Ecological Communities listed under the <i>Threatened Species Conservation Act 1995</i> .
VMP	Vegetation Management Plan



2 STATUTORY FRAMEWORK FOR PROTECTING BIODIVERSITY

The legislative and policy framework for Biodiversity Conservation is vast, and includes statutes, policy, plans and agreements at the international, national, state and regional level.

Legislation that is most significant for Local Government in the management of biodiversity includes:

- The Environmental Planning and Assessment Act 1979 (EPA Act)
- The Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)
- Threatened Species Conservation Act 1995 (TSC Act)
- Native Vegetation Act 2003 (NV Act)
- Local Government Act 1993 (LG Act)

A number of State and Regional plans provide further guidance as to key biodiversity targets. These include:

- The NSW State Plan (2006)
- The Illawarra Regional Strategy (2006)
- Southern Rivers Catchment Action Plan (2006)

More detailed summaries of the above plans and legislation are provided in the background document, Volume Two.

3 DATA AUDIT

A review of available biodiversity data allowed for the collation of current biodiversity knowledge for the Illawarra, and an assessment of the data gaps and weaknesses. A list of the major datasets with a description of each is found in Volume Two.

The review pointed to a number of data gaps. The most significant are listed below.

- Vegetation mapping inaccuracies and omissions of some communities, mostly small patches of some EECs (refer to Volume Two).
- Incompatible vegetation mapping datasets between the Illawarra Councils.
- Vegetation condition mapping absent, or coarse.
- Paucity of threatened species data in Kiama and Shellharbour LGAs.
- Limited data on aquatic habitats, invertebrates and non vascular plants (e.g. algae, mosses).

It is recommended the Illawarra Councils work towards addressing those data gaps over time in order of priority, when funding and resources are available. It is also recommended the Illawarra Councils work together to share data management tools and information resources where possible.

4 THREATS TO BIODIVERSITY

There are a large number of threats to biodiversity in the Illawarra. Some of these are listed under state legislation as Key Threatening Processes (KTPs). Others are not formally listed, but are known to have adverse impacts upon biodiversity in the Illawarra. A more detailed discussion, and full list of identified threats is found in Volume Two. The most significant threats to biodiversity in the Illawarra are listed below in Table 1.



Table 1: Major threats to biodiversity in the Illawarra

Regional Threat	TSC Act	EPBC Act	FM Act
Clearing of native vegetation	*	*	
Human-caused climate change	*	*	*
Impacts associated with feral animals: rabbit, bees, deer, pigs, goats, exotic fish, cat, red fox, plague minnow* <i>Listed separately as Key Threatening Processes (KTPs)</i>	*	*	
Invasion of exotic garden plants, exotic grasses, vine and scramblers; invasion of Lantana, and Bitou Bush. <i>Listed separately as KTPs</i>	*		
The degradation of native riparian vegetation along NSW water courses		*	*
Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands	*		*
Ecological consequences of high frequency fires	*		
Infection of frogs by amphibian chytrid causing the disease chytridiomycosis	*	*	

Given the lack of spatial information available on the location of specific threats, a spatial analysis of threats was not undertaken. It is for this reason a values based approach has been taken for prioritising works and priority actions in the Strategy. That is, conservation works will be targeted towards areas of highest known biodiversity value.

4.1 CLIMATE CHANGE

Consideration of climate change is inextricably linked to the development of the Illawarra Biodiversity Strategy. The strategies within it are developed with a view to reducing the risk to biodiversity from climate change on the basis that actions are targeted towards maintaining ecological resilience, increasing connectivity, buffering important ecosystems against other threats, and protecting the most vulnerable species and communities where possible (DECC 2007b). Management of climate change impacts to biodiversity involves the integration of three key conservation approaches (Auld and Keith 2009):

- Eliminating or at least minimising further loss of remnant habitats;
- Management of existing threats in remnant habitats will enhance the capacity of species to persist *in situ* and form the base from which migration events may occur; and
- Improving the capacity of, and opportunity for species to move across the landscape.

5 BIODIVERSITY VALUES SUMMARY

Based on the vegetation mapping, there is approximately 65,000 hectares of vegetation within the three LGAs. Most of this vegetation is on the escarpment slopes and sandstone plateau within land managed by the Sydney Catchment Authority, National Parks and Wildlife Service and private land managers. Coastal plain vegetation is scarce and mostly in isolated remnants which face many threats. The biodiversity values section highlights the 'highest priority' species and communities in the Illawarra. For a more complete discussion on biodiversity values, refer to Volume Two.

5.1 ENDANGERED ECOLOGICAL COMMUNITIES

There are 19 Endangered Ecological Communities (EECs) listed as threatened under the *NSW Threatened Species Conservation Act 1995* (TSC Act) or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) in the Illawarra. Some are distributed across all three LGAs, others are restricted to particular LGAs. Most of the vegetation on the coastal plain is listed as an EEC. Other EECs also occur on the Illawarra Escarpment, the Woronora Plateau and Budderoo Plateau. It is important to manage and conserve remnants of all these EECs, however a number of them are critically important to the Illawarra as most of their distribution and therefore management responsibility occurs solely within this region. Table 2 shows the highest priority EECs. The prioritisation of vegetation types was developed from an assessment of endemism (distribution within the Illawarra compared to beyond), and reservation status. This method is further explained in Volume Two.

Volume Two provides descriptions and information on the distribution of the EECs.

Table 2: Highest priority EECs and vegetation types

<i>Endangered Ecological Community name</i>	<i>SCIVI vegetation community name (after Tozer et al. 2006)</i>	<i>TSC Act</i>	<i>EPBC Act</i>	<i>Woll</i>	<i>Shell</i>	<i>Kiama</i>
Illawarra Lowlands Grassy Woodland	Illawarra Lowland Swamp Woodland, South Coast Grassy	Yes		*	*	*
Illawarra Subtropical Rainforest	Subtropical Complex Rainforest, Subtropical Dry Rainforest	Yes		*	*	*
<i>Melaleuca armillaris</i> Tall Shrubland	Basalt Hilltop Scrub	Yes			*	*
O'Hares Creek Shale Forest		Yes		*		
Robertson Basalt Tall Open-Forest	Southern Highlands Basalt Forest	Yes		*	*	*
Robertson Rainforest	Yarrawarra Temperate Rainforest	Yes			*	*
Southern Sydney Sheltered Forest on Transitional Sandstone Soils		Yes		*		
Sydney Freshwater Wetlands	Coastal Freshwater Lagoon	Yes		*	*	*
Temperate Highlands Peat Swamps	Coastal Upland Swamp		Yes	*		*

5.2 ENDANGERED POPULATIONS

The NSW TSC Act 1995 allows for the listing of endangered populations. There are three endangered populations listed in the Illawarra.

- *Lespedeza juncea* subsp. *juncea* population in the Wollongong LGA
- *Chorizema parviflorum* in the Wollongong and Shellharbour LGAs
- *Callistris endlicheri* Woronora Plateau population in the Wollongong LGA



Volume Two provides information on the distribution of these populations. *Lespedeza juncea* and *Chorizema parviflorum* are most at threat due to future urban expansion of the West Dapto – Yallah Calderwood area.

5.3 THREATENED SPECIES

There are 69 threatened fauna species, and 31 threatened flora species which have been recorded within the study area under the TSC Act 1995, and the EPBC Act 1999. Of the threatened fauna, the majority are birds and mammals. A high proportion of the locally occurring frogs are also threatened, most likely due to *Chytrid* fungus. Several fauna species have also become extinct in the region.

Threatened species have been prioritised within this Strategy based on the level of threat to their habitat, and the importance of their distribution within the Illawarra region. Priorities were taken largely from recent work (DECC 2007c) for the metropolitan catchment, however they have been reviewed with an Illawarra focus using local expert knowledge. These species and priorities are fully detailed in Volume Two. The highest priority threatened flora and fauna for the Illawarra are listed respectively in Tables 3 and 4 below.

Where opportunities arise for targeted threatened species work through grant funding, selection of activities should be guided by the priority species lists in combination with the associated recommended actions defined in the Priority Actions Statements and Recovery Plans.

Table 3: Highest priority threatened flora for the Illawarra

<i>Scientific Name</i>	<i>Common Name</i>	<i>TSC ACT</i>	<i>EPBC Act</i>	<i>KIAMA</i>	<i>SHELL</i>	<i>WOLL</i>
<i>Daphnandra</i> sp. 'Illawarra'	Illawarra Socketwood	Endangered	Endangered	*	*	*
<i>Irenepharsus trypherus</i>	Illawarra Irene	Endangered	Endangered	*	*	*
<i>Lespedeza juncea</i>		Endangered population				*
<i>Pimelea spicata</i>	Spiked Rice-flower	Endangered	Endangered	*	*	
<i>Pomaderris adnata</i>	Sublime Point Pomaderris	Endangered				*
<i>Pterostylis gibbosa</i>	Illawarra Greenhood	Endangered	Endangered		*	*
<i>Senna acclinis</i>	Rainforest Cassia	Endangered				*
<i>Solanum celatum</i>		Endangered		*	*	*
<i>Zieria granulata</i>	Illawarra Zieria	Endangered	Endangered	*	*	*

* Indicates recorded presence within each LGA

Table 4: Highest priority threatened fauna for the Illawarra

Scientific Name	Common Name	TSC ACT	EPBC Act	KIAMA	SHELL	WOLL
<i>Dasyornis brachypterus</i>	Eastern Bristlebird	Endangered	Endangered	*		*
<i>Hoplocephalus bungaroides</i>	Broad-headed Snake	Endangered	Vulnerable			*
<i>Isodon obesulus obesulus</i>	Southern Brown Bandicoot (eastern)	Endangered	Endangered			*
<i>Lathamus discolor</i>	Swift Parrot	Endangered	Endangered		*	*
<i>Litoria aurea</i>	Green and Golden Bell Frog	Endangered	Vulnerable	*	*	*
<i>Mixophyes balbus</i>	Stuttering Frog	Endangered	Vulnerable		*	
<i>Pezoporus wallicus wallicus</i>	Eastern Ground Parrot	Vulnerable		*		
<i>Potorous tridactylus</i>	Long-nosed Potoroo	Vulnerable	Vulnerable	*		
<i>Sterna albifrons</i>	Little Tern	Endangered			*	*
<i>Xanthomyza phrygia</i>	Regent Honeyeater	Critically endangered	Endangered		*	*

* Indicates recorded presence within each LGA. Spotted-tailed Quoll, and Brush-tailed Bettong are suspected locally extinct. However, if they were to be found, they would be of very high conservation significance.

Protected migratory birds are also listed in Volume Two.

5.4 CRITICAL HABITAT

There is currently no listed critical habitat in the *Threatened Species Conservation Act 1995* for the Illawarra.

5.5 RARE FLORA AND FAUNA

Lists of regionally rare flora and fauna occurring in the region have been compiled in Volume Two. A number of datasets were sourced to compile these lists (Chafer *et al.* 1999, DECC 2007a, Fairley 2004, Mills and Associates 2000 and 2006, NCC 1999, NPWS 2002). From this, a total of 94 flora and 147 fauna species have been identified as regionally rare.

5.6 FAUNA HABITATS

Each threatened fauna species recorded for the region has been assigned to its predominant broad habitat type based on knowledge of their distributions described in existing literature (DECC 2007a, DECC 2007c, NPWS 2003, Mills 2006). The full list of species by habitat can be seen in Volume Two.

Species specific fauna modelling is also available for many fauna species. However, this modelling only covers Wollongong, and the northern part of the Shellharbour LGA (DECC 2007c). More detailed modelling was not possible due to the paucity of fauna records in Shellharbour and Kiama LGAs. Table 5 summarises the number of threatened fauna as defined by their prioritisation, assigned to each habitat type. It should also be noted that fauna species may have different habitat requirements during different stages of their lifecycle.



Table 5: Distribution of threatened fauna across broad vegetation classes of the Illawarra

Priority	Coastal heath and grasslands	Estuaries, dunes and saltmarsh	Coastal wetlands and mangroves	Upland swamps	Coastal valley grassy woodlands	Escarpment rainforests and wet sclerophyll forests	Riparian forests	Sandstone heath, forests and woodlands
Highest	1	1	2	3	2	3	2	5
High		2	2	1	7	6	9	6
Med	1	2	2	4	7	9	2	10
Low	2	9	4	2	1	6	2	6
Total	4	14	10	10	17	24	15	27

*Locally extinct species excluded

Table 5 highlights the high number of threatened fauna occurring on the escarpment and sandstone plateau. This illustrates the value of large, continuous habitat corridors.

5.7 VEGETATION TARGETS

Vegetation targets have been classified into three levels of priority. Using the South Coast – Illawarra Vegetation Integration (SCIVI) vegetation mapping (Tozer *et al.* 2006), an assessment has been made of the endemism and reservation status of each vegetation community in the Illawarra compared with the rest of the Southern Rivers CMA. Table 6 outlines the thresholds used to define the priority classes.

Table 6: Vegetation priority classification

Priority	Endemism % of distribution within the Illawarra	Proportion of community reserved in NPWS reserves in the Illawarra
1	>60%	<15% reserved
2	<60%	<30% reserved or listed as an EEC
3	<60%	>30% reserved

Volume Two of the Strategy lists each vegetation community with the priority class it has been assigned to. The highest priority vegetation communities include Illawarra Lowland Grassy Woodland, Illawarra Subtropical Rainforest, Bracelet Honey Myrtle (*Melaleuca armillaris*) Scrub and Coastal Upland Swamps. The first three of these communities are all very poorly protected in reserves, and are mostly endemic to the Illawarra. Coastal Upland Swamps are well protected within water catchment lands, however they are under threat from longwall mining and the associated impacts of subsidence resulting in cracking of valley floors and creeklines leading to altered surface hydrologies (NSW Scientific Committee 2005).

Vegetation targets provide guidance to conservation priorities on land outside of the regional corridors.

5.8 REGIONAL BIODIVERSITY CORRIDORS

A network of regional biodiversity corridors has been mapped as part of the Strategy. Most of these areas, in parts, have already been flagged as core conservation areas or corridors in previous studies. They have been flagged as core conservation areas as they are large, biologically diverse, contain a diversity of



habitats and vegetation communities, habitats for threatened species and vegetation communities that are significant to New South Wales and the Illawarra region (Mills and Associates 2000).

The value of landscape connectivity is well recognised, and there is a clear mandate for corridors as shown by the various state, regional and local policies and plans promoting them including Australia's Biodiversity Conservation Strategy-draft (Commonwealth of Australia 2009a), The Southern Rivers Catchment Action Plan (SRCMA 2006), draft Illawarra NRM Plan (SRCMA 2010), and the Illawarra Regional Strategy (DoP 2006). Maintaining connectivity is also one of the three recommended approaches to managing biodiversity in the face of climate change (Auld and Keith 2009).

The identification of regional corridors is to highlight those highest priority areas where Councils and other lead agencies should direct scarce resources, and support private land managers to participate in conservation and restoration efforts where resources allow. The identification of regional corridors sits alongside the next most important step of restoring other priority lands which are not part of an identified corridor.

The map of regional corridors is shown in Appendix 1. Descriptions of the corridors and methods used to define them are detailed in Volume Two.

5.9 ESTUARINE AND WETLAND HABITATS

Wetlands and estuaries in the Illawarra provide important habitats for a range of resident and migratory bird species and unique plant assemblages. More than 1,500 hectares of wetland have been reclaimed in the Illawarra since European settlement for industrial, urban, sporting and agricultural purposes (Chafer 1997). In 1997, the area of wetland remaining was 1,044 hectares (Chafer 1997), and has possibly further been reduced since this time. The large majority of wetlands in the Strategy area occur in the Lake Illawarra and Minnamurra catchments.

Four wetlands in the Illawarra region are recognised as nationally important in the Directory of Important Wetlands in Australia (Environment Australia 2001). These are shown in Table 7.

Table 7: Nationally important wetlands of the Illawarra

<i>Wetland</i>	<i>LGA</i>
Lake Illawarra	Wollongong, Shellharbour
Killalea Lagoon	Shellharbour
Minnamurra River Estuary (including Dunmore Swamp)	Shellharbour, Kiama
Coomaditchie Lagoon	Wollongong

Volume Two outlines further key wetlands and estuaries of the Illawarra.

6 PRIORITISING RESTORATION WORKS ON PUBLIC LAND

An assessment of the biodiversity values of public lands under Council care and control (community and Crown land) was undertaken to strategically identify priority sites for undertaking bush restoration.

A number of variables were used to develop a ranking of sites and their relative biodiversity values. The ranking was based on a combination of variables including vegetation type, connectivity (presence within a regional corridor), patch size, and type of existing management. Maps were produced which classify parcels of Community and Crown land as Highest, High, Moderate and Low priority. The maps will be used by the



Illawarra Councils to guide the allocation of grant and internal funding to priority sites. Details of the methods used and the mapped outputs are contained within Volume Two.

Table 8 outlines the highest priority sites for investment. There are many other sites listed as High priority.

Table 8: Highest priority sites for investment

Reserve	LGA
Minnamurra River Estuary, Kiama Downs	Kiama
Crooked River Estuary, Gerroa	Kiama
Jerrara Dam, Jerrara	Kiama
Bass Point Reserve, Shellcove	Shellharbour
Blackbutt Reserve, Blackbutt	Shellharbour
Croom Reserve, Albion Park Rail	Shellharbour
Bellambi Lagoon Recreation Area, Bellambi	Wollongong
Integral Energy Park - Darkes Road, Horsley	Wollongong
Mt Brown Reserve, Dapto	Wollongong
Perkins Beach, Primbee - Windang	Wollongong
Puckeys Estate, North Wollongong	Wollongong
Purrungully Woodland, Horsley	Wollongong
Bardess Crescent Reserve, Farmborough Heights	Wollongong

7 BUSHFIRE MANAGEMENT

Bushfire Hazard Reduction works under the *Rural Fires Act 1997* are authorised by the NSW Rural Fire Service in the case of private land, and public land managers such as Councils on public land. All fire-prone lands are classified as being an Asset Protection Zone (APZ), Strategic Fire Advantage Zone (SFAZ) or a Land Management Zone (LMZ) under the Act. Within each of these zones there are standards for the protection of biodiversity as outlined under the Bush Fire Environmental Assessment Code for New South Wales (NSW RFS 2006). The code defines standards for the protection of riparian buffers, weed management, native vegetation and biodiversity. This includes assessment of the presence of threatened species.

To ensure further fragmentation and deterioration of Biodiversity corridors does not occur, Illawarra Councils, through the development assessment process for private land, and through planning for bushfire on public land, should ensure that activities are designed to avoid impacts to the regional biodiversity corridors. This should include siting infrastructure or development so APZ's are contained within existing cleared land.

8 GUIDING PRINCIPLES FOR THE MANAGEMENT OF NATURAL AREAS

The management of natural areas should be guided by a clear set of management principles. The primary principle is that the biodiversity benefits of protecting and enhancing existing remnant vegetation far outweigh those of 'compensatory' planting in cleared areas (AABR 2005). It is important to be mindful that clearing and planting in existing natural areas can irreversibly damage the integrity of natural areas and undermine their own natural recovery potential. In an effort to minimise this threat, it is proposed the Illawarra Councils adopt the 3R principles as defined by AABR (2005) in Table 9.



Table 9: The 3Rs

Retain first	Conserving existing natural areas is the first priority. Efforts should be directed to protecting these areas from threatening processes such as weeds, grazing, stormwater, mowing etc.
Regenerate second	Where bushland is degraded by threats such as weed invasion, grazing, or other disturbances, regeneration is the primary goal. This involves mitigating threats such as weed invasion to encourage natural regeneration.
Replant last	Planting should only be considered after a site's natural ability to regenerate has been assessed as very poor.

Common barriers to this approach are the time pressures associated with grant funding and budget cycles. Grant funding is often an annual program, where insufficient time is allowed to monitor natural recruitment. Where possible, longer management contracts should be negotiated so recruitment can be monitored and a planting schedule developed accordingly.

Further information on management strategies and provenance are provided in Volume Two.

9 BIODIVERSITY ACTIONS AND STRATEGIES FOR THE ILLAWARRA

The actions and strategies in this section outline a biodiversity program for the Illawarra Councils for the next five years to 2016. It lists the actions that could be undertaken, where the priorities are, approximately when and by whom. The *strategies* define the intent, and the *actions* describe the specific activities. The actions program was identified through stakeholder engagement, and review and refinement with each of the partner Councils. Overall, the program aims to improve our knowledge, maintain and improve priority natural areas under Council care and control, improve the integration of biodiversity conservation into planning instruments, and improve information resources and support available to volunteers and residents.

9.1 CONSTRAINTS

The primary limitation to implementing the Strategy is availability of resources; funding and staffing. These constraints are more prominent among the smaller of the Illawarra Councils, Kiama and Shellharbour, due to the limited number of staff. The commitments in the actions tables have been based on current levels of resources and anticipated external funding. Given the limited resources, implementation of the strategy will focus on the identified regional priorities.

9.2 METHODS USED TO IDENTIFY PRIORITY ACTIONS

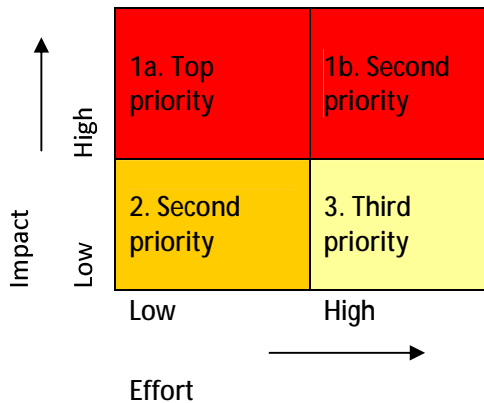
Key biodiversity stakeholders from the region were invited to attend a one day workshop to identify the preliminary list of priority actions. A range of people were invited who together held expertise in weed management, pest management, flora, fauna, threatened species and NRM planning. Each participant was given a scoping paper prior to the workshop to update them on the information collated prior to the workshop. This included known threats and values based on existing literature and expert knowledge. Participant's workshopped the four different themes:

- Theme 1: Natural Areas;
- Theme 2: Land Use Planning;
- Theme 3: Knowledge and Data; and
- Theme 4: Community Participation.



Based on these themes, a list of actions were determined to best conserve the values and minimise the threats. Each action was then prioritised using a modified impact versus effort scale (Robinson and Glanznig 2003) as shown in Figure 3.

Figure 3 Priority matrix



This list of actions was then reviewed by each Council, and classified as either;

- Supported;
- Not supported (usually due to lack of funds, or other constraints);
- Already doing; or
- Possible (dependent on commitment from other councils).

This review highlighted the different Councils have distinct needs and resources in some activity areas. It was therefore agreed a subset of activities be undertaken regionally, whilst maintaining additional actions to be progressed as part of the individual council's management plans. Both the regional and individual council commitments are shown in the actions tables in Section 9.

It is envisaged that regional actions are priorities for completion under the Illawarra Biodiversity and Food Strategy for Climate Change project. Individual council actions will be progressed individually by each council. There are a number of actions that could be considered as regional priorities, but they have been listed for individual councils as they have specific needs, and need to tailor the action accordingly. There is also acknowledgement that other unforeseen actions may become priorities within the five year period.



9.3 THEME 1: ACTIONS AND STRATEGIES FOR MANAGING NATURAL AREAS

9.3.1 Strategies

- Maintain and improve priority natural areas on land under Council care and control;
- Minimise threats to biodiversity; and
- Maximise contribution to national, state and regional targets by focussing implementation of actions at priority conservation areas and values.

9.3.2 Background

Councils have a responsibility to manage natural areas in their 'care and control'. This includes Crown lands and Council owned lands zoned as 'community' land. Volunteers also contribute a very significant amount of effort to the management of public natural areas. There are approximately 85 volunteer groups currently operating in the Illawarra within the Landcare, Bushcare and Parkcare networks. The Illawarra Councils also allocate operational budget and grant funds to continue restoration works at priority natural area sites.

Knowledge of the priority conservation areas as determined by the regional corridor networks, vegetation targets, pest management priorities, and priority threatened species can also be used to guide priorities for acquisition of private land or support for landholders wishing to engage in improved biodiversity management.

9.3.3 Related Targets

Biodiversity targets have been set at national, state and regional levels which relate to Local Government are listed in Table 10.

Table 10: Targets for natural areas management

Source	Target
ABCS	Action 1.1.2: Prepare and implement plans for biodiversity conservation at all levels (local, regional, state and continental) that maintain ecosystem health and protect threatened and endangered species.
NSW State Plan	By 2015, there is an increase in native vegetation extent and an improvement in native vegetation condition.
NSW State Plan	By 2015, there is an increase in the number of sustainable populations of a range of native fauna species.
NSW State Plan	By 2015, there is an increase in the recovery of threatened species, populations and ecological communities.
NSW State Plan	By 2015, there is a reduction in the impact of invasive species.
SRCMA CAP (06-16)	B4: By 2016, the priority recovery actions identified in the Southern Rivers threatened species strategy will have been implemented.
SRCMA CAP (06-16)	B5: By 2016, vertebrate pest species will be controlled in key locations.
SRCMA CAP (06-16)	By 2016, priority weed species will be controlled in key locations.
SRCMA CAP (06-16)	Manage for conservation, at least 30% of the original distribution of each native vegetation type, or if already cleared below 30%, manage the remaining for conservation.
SRCMA CAP	W5(a) By 2016, an additional 2,000 ha of riparian vegetation will be actively



(06-16)	managed for improved riverine ecosystem.
SRCMA CAP (06-16)	W5(c) By 2016, in-stream habitat will be progressively improved by appropriate in-stream works, such as re-instatement of large woody debris, sandy riverbed reconfiguration and removal of a minimum of 15 barriers to fish passage in priority reaches.
SRCMA CAP (06-16)	W5(d) By 2016, priority actions and works will be implemented to protect and enhance 40 wetlands of national and regional importance identified as priorities.
SRCMA CAP (06-16)	CM2 By 2016, the condition of estuaries will be maintained or improved through development and implementation of natural resource management plans (including estuary management plans).

**ABCS = Australia's Biodiversity Conservation Strategy 2010 - 2020 Consultation Draft (Commonwealth of Australia 2009)*
SRCMA CAP = Southern Rivers Catchment Management Authority Catchment Action Plan

9.3.4 Biodiversity Strategies and Actions for Natural Areas

Regional Priorities

<i>Strategy</i>	<i>#</i>	<i>Action</i>	<i>Priority</i>	<i>Time frame</i>	<i>Who is responsible</i>	<i>Funding</i>	<i>Council</i>
Maintain and improve priority natural areas	1	Invest grant and internal funding where available into Highest and High priority community and Crown lands (as defined in Volume 2, Appendix 13) for bush restoration based on the mapping in the Biodiversity Strategy.	1b High impact, high effort	Ongoing	EPT	Illawarra Biodiversity & Food Grant	Illawarra Councils
Maintain and improve priority natural areas	2	Investigate opportunities for funding revegetation works through sponsorship opportunities, and carbon trading schemes.	1b High impact, high effort	Short term - within 2 years	EPT	Illawarra Biodiversity & Food Grant	Illawarra Councils
Maintain and improve priority natural areas	3	Provide capacity building opportunities through events and workshops to support land managers and volunteers in managing priority conservation areas in public and private land.	1b High impact, high effort	Short term - within 2 years	EPT	Illawarra Biodiversity & Food Grant	Illawarra Councils

Wollongong City Council Priorities

<i>Strategy</i>	<i>#</i>	<i>Action</i>	<i>Priority</i>	<i>Time frame</i>	<i>Who is responsible</i>	<i>Funding</i>	<i>Council</i>
Minimise threats to biodiversity	4	Continue current partnership with state agencies to co-ordinate pest control efforts across the region (current priority is deer).	1b High impact, high effort	Ongoing	EPT in partnership with CLHPA, Game Council NSW, DECCW, Sutherland Council	Operational funding, Staff time	Wollongong
Minimise threats to biodiversity	5	Improve the integration (timing) of pest control with bush regeneration works at priority sites (as defined in Volume Two, Appendix 13).	1b High impact, high effort	Ongoing	EPT	Operational funding, Staff time	Wollongong

Minimise threats to biodiversity	6	Develop strategies to manage dune vegetation in view of climate change risks and coastal management issues.	1b High impact, low effort	Long term - within 5 years	EPT	Staff time	Wollongong
Minimise threats to biodiversity	7	Work with regulation services to ensure complaints relating to unauthorised vegetation clearing have a quick response with the relevant expertise.	1a High impact, low effort	Ongoing	EPT/ RE, in partnership with DECCW	Staff time	Wollongong
Maintain and improve priority natural areas	8	Review Bushfire Risk Management Plan and ensure it makes appropriate recommendations for management at high priority sites (as defined in Volume Two, Appendix 13).	1b High impact, high effort	Long term - within 5 years	EPT/ ECS	Staff time	Wollongong
Maintain and improve priority natural areas	9	Work to increase the use of local indigenous species in landscaping. Review landscape DCPs to exclude potentially invasive species.	1b High impact, high effort	Ongoing	EPT / Infrastructure	Staff time	Wollongong
Maintain and improve priority natural areas	10	Continue to fulfill weed control obligations under the Noxious Weeds Act, prioritising actions identified under relevant Threat Abatement Plans, and high priority natural areas.	1a High impact, low effort	Ongoing	IDNWA	Operational, grant funding	Wollongong
Maintain and improve priority natural areas	11	Ensure plant stock for natural area planting is collected from genetically diverse stock.	2 Low impact, low effort	Long term - within 5 years	Botanic Garden	Staff time	Wollongong
Maintain and improve priority natural areas	12	Ensure actions recommended in Plans of Management (PoMs) / Ecological Assessments/Vegetation Management Plans /Biodiversity Strategy become incorporated into Council's Management/Business Plan.	1b High impact, high effort	Ongoing	EPT	Staff time	Wollongong
Maintain and improve priority natural areas	13	Work with Infrastructure Division to ensure targeted riparian works (flood mitigation and civil) are accompanied by bush restoration and maintenance works in high priority sites (as defined in Volume Two, Appendix 13).	1b High impact, high effort	Ongoing	EPT	Operational	Wollongong
Maintain and improve priority natural areas	14	Seek and invest grant and internal funding where available into Highest and High priority community and Crown lands based on Biodiversity Strategy mapping.	1b High impact, high effort	Ongoing	EPT	Operational, Grant funding	Wollongong

Maintain and improve priority natural areas	15	Maintain the priority sites list based on effort spent there and other emerging priorities.	2 Low impact, low effort	Ongoing	EPT	Staff time	Wollongong
Maintain and improve priority natural areas	16	Implement biodiversity actions from Estuary Management Plans.	1b High impact, high effort	Ongoing	EPT	Operational funding, Staff time	Wollongong
Maintain and improve priority natural areas	17	Establish 'no mow' zones with signage or low fencing on Council's lands with significant vegetation such as saltmarsh which are mistakenly mown.	1b High impact, high effort	Long term - within 5 years	EPT/ Infrastructure	Capital budget	Wollongong

EPT - Environment Planning Team; ECS - Environment Conservation Services; ER - Regulation and Enforcement; CP - City Planning; IDNWA - Illawarra District Noxious Weeds Authority; CLHPA - Cumberland Livestock Health and Pest Authority

Shellharbour City Council Priorities

Strategy	#	Action	Priority	Time frame	Who is responsible	Funding	Council
Minimise threats to biodiversity	18	Continue current partnership with state agencies to co-ordinate pest control efforts at Highest and High priority sites across the region (as defined in Volume Two, Appendix 13).	1b High impact, high effort	Ongoing	ER, WS	Staff time	Shellharbour
Minimise threats to biodiversity	19	Work with regulation services to ensure complaints relating to unauthorised vegetation clearing have a quick response with the relevant expertise, and are referred to DECCW where required.	1a High impact, low effort	Ongoing	ER, DTS	Staff time	Shellharbour
Minimise threats to biodiversity	20	Work to increase the use of local indigenous species in landscaping. Review landscape DCPs to exclude potentially invasive species.	1b High impact, high effort	Ongoing	ER, DTS, PS, WS	Staff time	Shellharbour
Maintain and improve priority natural areas	21	Ensure actions recommended in POMs/Ecological Assessments/VMPs/ Illawarra Biodiversity Strategy become incorporated into the Annual Management Plan.	1b High impact, high effort	Ongoing	ER, WS	Staff time, Grant funding	Shellharbour
Maintain and improve priority natural areas	22	Continue to fulfill weed control obligations under the Noxious Weeds Act, prioritising actions identified under relevant Threat Abatement Plans, and high priority natural areas.	1a High impact, low effort	Ongoing	IDNWA	Operational, grant funding	Shellharbour

Maintain and improve priority natural areas	23	Seek and invest grant and internal funding where available into Highest and High priority community and Crown lands based on Biodiversity Strategy mapping (as defined in Volume Two, Appendix 13).	1b High impact, high effort	Ongoing	ER, WS	Staff time, Grant funding	Shellharbour
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ER - Environment and Recreation; WS - Works and Services; DTS - Development and Technical Services; PS - Planning Services

Kiama Municipal Council Priorities

Strategy	#	Action	Priority	Time frame	Who is responsible	Funding	Council
Minimise threats to biodiversity	24	Continue to implement rabbit control in high priority key natural areas.	1b High impact, high effort	Ongoing	Environment Services Department	Staff time	Kiama
Minimise threats to biodiversity	25	Work with regulation services to ensure complaints relating to unauthorised vegetation clearing have a quick response with the relevant expertise.	1a High impact, low effort	Ongoing	Environment Services Department	Staff time	Kiama
Maintain and improve priority natural areas	26	Ensure actions recommended in Plans of Management/Ecological Assessments/ Vegetation Management Plans become incorporated into the Management/ Business Plan.	1b High impact, high effort	Ongoing	Environment & Health	Staff time	Kiama
Maintain and improve priority natural areas	27	Seek and invest grant and internal funding where available into Highest and High priority community and Crown lands based on mapping in Biodiversity Strategy.	1b High impact, high effort	Ongoing	P/T Natural Resource Officer, Environment & Health	Grant funding / operational	Kiama
Maintain and improve priority natural areas	28	Continue to fulfill weed control obligations under the Noxious Weeds Act.	1a High impact, low effort	Ongoing	Illawarra District Noxious Weeds Authority	Staff time / Grant funding	Kiama
Maintain and improve priority natural areas	29	Implement biodiversity actions from the Climate Change Adaptation program.	1b High impact, high effort	Long term - within 5 years	Environment & Health	Grant funding / operational	Kiama

Maintain and improve priority natural areas	30	Continue to implement the biodiversity actions identified in the Spring Creek PoM, Jerrara Dam PoM, Minnamurra Estuary Management Plan, Crooked River Estuary Management Plan.	1b High impact, high effort	Ongoing	Environment & Health, Environment Services Department	Grant funding / operational	Kiama
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9.4 THEME 2: ACTIONS AND STRATEGIES FOR LAND USE PLANNING

9.4.1 Strategies

- Improve the integration of biodiversity conservation priorities into planning instruments (LEPs and DCPs);
- Improve development assessment of biodiversity;
- Develop a regional landscape connectivity framework; and
- Maximise contribution to national, state and regional targets by focussing implementation of actions at priority conservation areas and values.

9.4.2 Background

The three Illawarra Councils are currently revising or have recently finalised new draft Local Environmental Plans (LEPs) which define land use zonings for approximately the next five year period. Wollongong LEP 2009, and Wollongong LEP (West Dapto) 2010 are in force, along with Wollongong DCP 2009. Kiama LEP has been publicly exhibited and submitted to the Department of Planning for approval. Shellharbour LEP is near public exhibition. New Development Control Plans (DCPs) will be developed alongside these, and are continually reviewed. The biodiversity values identified in the Strategy will help guide the review of these new planning instruments. Any review of planning instruments, should identify opportunities for appropriate zoning of high conservation value areas including regional biodiversity corridors.

Opportunities for acquisition of lands or rezoning should be guided by the values identified within this Strategy. Information that can be used to this end includes the mapping of regional biodiversity corridors, identification of vegetation priorities, and priority threatened species.

9.4.3 Related Targets

Biodiversity targets that have been set at national, state and regional levels which relate to Local Government have been included in Table 11 below.

Table 11: Targets for land use planning

Source	Target
ABCS	Action 1.1.2: Prepare and implement plans for biodiversity conservation at all levels (local, regional, state and continental) that maintain ecosystem health and protect threatened and endangered species.
ABCS	Action 1.1.3: Establish conservation linkages that provide connectivity across bioregions, including at a continental scale.
ABCS	Action 2.3.3: Ensure arrangements for emerging markets for carbon and water take account of biodiversity risks and benefits.
ABCS	Action 4.3.2: Review and reform legislation to improve biodiversity conservation outcomes across all sectors.
NSW State Plan	By 2015 there is an increase in native vegetation extent and an improvement in native vegetation condition.
NSW State Plan	By 2015 there is an increase in the recovery of threatened species, populations and ecological communities.
NSW State Plan	By 2015 there is a reduction in the impact of invasive species.
Illawarra Regional Strategy	Opportunities for the long term survival of <i>Melaleuca armillaris</i> shrubland EECs will be considered through the planning review of the Shellharbour/Kiama hard rock resource and implemented in the Shellharbour and Kiama LEPs.



Illawarra Regional Strategy	LEPs are to maximise protection of 'Significant Native Vegetation', 'Indicative DEC Regional Habitat Corridor' and 'Other Indicative Habitat Corridors' (refer map 2).
Illawarra Regional Strategy	DPI to identify regionally significant aquatic habitats and associated riparian buffers to inform preparation of LEPs and consideration of development.
Illawarra Regional Strategy	Councils will manage the impact of land use change and development in the catchments of high value coastal lakes, estuaries and wetlands. Council will consider the NSW Government - endorsed Estuary Management and Coastal Zone Management Plans in undertaking this task.
Illawarra Regional Strategy	All future development, particularly within the catchment of high value estuaries, is to apply water sensitive urban design principles and meet stormwater management targets that support the environmental values of the catchment.
Illawarra Regional Strategy	When planning new urban areas, the Strategic Assessment of Riparian Corridors methodology developed by the Department of Natural Resources (now DECCW) in conjunction with the Department of Planning will be used by: <ul style="list-style-type: none"> - incorporating the assessments into structure plans; - appropriate zoning; and - appropriate management through a development control plan.
Illawarra Regional Strategy	Require LEPs to zone all SEPP14 Wetlands and SEPP26 Littoral Rainforest to achieve environmental protection through zones such as E2 or W1.
Illawarra Regional Strategy	Council to consult with SRCMA to ensure the appropriate integration of CAP and LEPs.
SRCMA CAP (06-16)	Manage for conservation at least 30% of the original distribution of each native vegetation type, or if already cleared below 30%, manage the remaining for conservation.
SRCMA CAP (06-16)	W5(e) By 2011, local environment plans (LEPs) will incorporate minimum vegetated buffer distances to protect waterways from impacts of development.

*ABCS = Australia's Biodiversity Conservation Strategy 2010-2020 - Consultation Draft (Commonwealth of Australia 2009)
SRCMA CAP = Southern Rivers Catchment Management Authority Catchment Action Plan

9.4.4 Biodiversity Strategies and Actions for Land Use Planning

Regional Priorities

<i>Strategy</i>	<i>#</i>	<i>Action</i>	<i>Priority</i>	<i>Time frame</i>	<i>Who is responsible</i>	<i>Funding</i>	<i>Council</i>
Improving development assessment of biodiversity	31	Develop model regional development consent conditions that address protection, maintenance and enhancement of biodiversity values.	1b High impact, high effort	Short term - within 2 years	EPT	Illawarra Biodiversity & Food Grant	Illawarra Councils
Improve the integration of biodiversity conservation priorities into planning instruments	32	Provide support and advice to Illawarra councils when preparing or reviewing their Comprehensive LEPs with planning controls to ensure priority biodiversity values are improved and maintained.	1b High impact, low effort	Short term - within 2 years	EPT	Illawarra Biodiversity & Food Grant	Illawarra Councils
Improve the integration of biodiversity conservation priorities into planning instruments	33	Work with NSW Department of Planning to incorporate the mapped biodiversity corridors and identified high priority biodiversity values into the revision of the Illawarra Regional Strategy.	1b High impact, low effort	Short term - within 2 years	EPT	Illawarra Biodiversity & Food Grant	Illawarra Councils

Wollongong City Council Priorities

<i>Strategy</i>	<i>#</i>	<i>Action</i>	<i>Priority</i>	<i>Time frame</i>	<i>Who is responsible</i>	<i>Funding</i>	<i>Council</i>
Developing a regional landscape connectivity framework	34	Work with DoP and Wollongong Strategic Planners to identify Yallah - Calderwood biodiversity constraints and participate in the urban design process, for the West Dapto LEP - Stage 5.	1b High impact, high effort	Short term - within 2 years	EPT	Staff time	Wollongong
Improve the integration of biodiversity conservation priorities into planning instruments	35	Seek amendments to Wollongong LEP to include the additional sub clause (9) to '5.9 Preservation of Trees and other vegetation' to allow Council to have a dual consent role alongside the Native Vegetation Act. (Planning Circular PS11- 011)	1a High impact, low effort	Short term - within 2 years	EPT	Staff time	Wollongong
Improve the integration of biodiversity conservation priorities into planning instruments	36	Seek amendment to Wollongong LEP (West Dapto) 2010 to include mapping of 'Environmentally sensitive land' for integration in the Exempt and Complying development SEPP.	1a High impact, low effort	Short term - within 2 years	EPT	Staff time	Wollongong

Developing a regional landscape connectivity framework	37	Identify and map 'local' biodiversity corridors to focus efforts for volunteer programs and landholder incentives around areas of highest biodiversity value.	1b High impact, high effort	Long term - within 5 years	EPT/ECS	Staff time	Wollongong
Improve the integration of biodiversity conservation priorities into planning instruments	38	Seek opportunities to improve the LEP using the NRM clauses to be released by NSW Department of Planning in 2011.	1b High impact, high effort	Short term - within 2 years	EPT/ECS	Staff time	Wollongong
Improving development assessment of biodiversity	39	Work with planning teams to ensure biodiversity values are identified early in the development assessment process. Review referral checklists and processes.	1a High impact, low effort	Short term - within 2 years	EPT	Staff time	Wollongong
Improve the integration of biodiversity conservation priorities into planning instruments	40	Investigate offsetting policy options.	1b High impact, high effort	Long term - within 5 years	EPT, CP	Staff time	Wollongong
Improving development assessment of biodiversity	41	Develop and implement a process to improve compliance with DA consent conditions.	1b High impact, high effort	Long term - within 5 years	EPT, CP	Staff time	Wollongong
Improving development assessment of biodiversity	42	Engage indoor council development assessment staff in training on biodiversity and EIA.	1b High impact, high effort	Long term - within 5 years	EPT	Staff time	Wollongong
Improve the integration of biodiversity conservation priorities into planning instruments	43	Review zoning of operational land with a focus on high value biodiversity areas.	1b High impact, high effort	Short term - within 2 years	EPT	Staff time	Wollongong
Improve the integration of biodiversity conservation priorities into planning instruments	44	Work with Regulation and Enforcement to ensure that requirements of weed clearing notices for hazard reduction do not adversely impact on high value vegetation. Develop guidelines for rangers.	1a High impact, low effort	Long term - within 5 years	EPT	Staff time	Wollongong
Improving development assessment of biodiversity	45	Develop a Coastal Management Plan.	1b High impact, high effort	Short term - within 2 years	EPT	Staff time, Grant funding	Wollongong

Improve the integration of biodiversity conservation priorities into planning instruments	46	Ensure that developments and activities requiring bushfire protection measures are designed to avoid impacts on Highest and High priority biodiversity assets identified in the strategy, including EECs, threatened species and biodiversity corridors.	1b High impact, high effort	Ongoing	EPT, ECS	Staff time	Wollongong
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EPT - Environment Planning Team; ECS - Environment Conservation Services; ER - Regulation and Enforcement; CP - City Planning

Shellharbour City Council priorities

Strategy	#	Action	Priority	Time frame	Who is responsible	Funding	Council
Improve development assessment of biodiversity	47	Investigate the development of an auditing process to improve compliance with DA conditions and/or order requirements.	1b High impact, high effort	Long term - within 5 years	ER, DTS	Staff time	Shellharbour
Improve development assessment of biodiversity	48	Capacity build council development assessment staff in biodiversity assessment and areas of high biodiversity value.	1b High impact, high effort	Long term - within 5 years	ER, DTS	Staff time	Shellharbour
Improve the integration of biodiversity conservation priorities into planning instruments	49	Work with NSW DoP to incorporate the identification of High and Very High Conservation value vegetation and regional corridors into the LEP, DCPs where possible.	1b High impact, high effort	Long term - within 5 years	ER, PS	Staff time	Shellharbour
Improving the integration of biodiversity management into planning instruments	50	Develop a Coastal Management Plan to ensure protection of high priority coastal environments.	1b High impact, high effort	Short term - within 2 years	PS, ER	Grant funding	Shellharbour
Developing a regional landscape connectivity framework	51	Identify and map 'local' biodiversity corridors to focus efforts for volunteer programs and landholder incentives around areas of highest biodiversity value.	1b High impact, high effort	Long term - within 5 years	ER	Staff time, Grant funding	Shellharbour

ER - Environment and Recreation; WS - Works and Services; DTS - Development and Technical Services; PS - Planning Services

Kiama Municipal Council priorities

<i>Strategy</i>	<i>#</i>	<i>Action</i>	<i>Priority</i>	<i>Time frame</i>	<i>Who is responsible</i>	<i>Funding</i>	<i>Council</i>
Improve the integration of biodiversity conservation priorities into planning instruments	52	Work with NSW DoP to incorporate the identification of High Conservation value vegetation, and regional corridors into appropriate zones in the LEP.	1b High impact, high effort	Short term - within 2 years	Environment & Health	Staff time	Kiama
Improve development assessment of biodiversity	53	Develop a preferred consultants list for peer review of biodiversity assessments.	1a High impact, low effort	Long term - within 5 years	Environment & Health	Staff time	Kiama
Improve the integration of biodiversity conservation priorities into planning instruments	54	Develop a Coastal Management Plan to ensure protection of high priority coastal environments.	1b High impact, high effort	Long term - within 5 years	Environment & Health	Grant funding / operational	Kiama
Improve the integration of biodiversity conservation priorities into planning instruments	55	Ensure that developments and activities requiring bushfire protection measures are designed to avoid impacts on Highest and High priority biodiversity assets identified in the strategy, including EECs, threatened species and biodiversity corridors.	1b High impact, high effort	Ongoing	Environment & Health	Staff time	Kiama



9.5 THEME 3: ACTIONS AND STRATEGIES FOR KNOWLEDGE, DATA AND MONITORING

9.5.1 Strategies

- Continue to improve biodiversity knowledge;
- Improve the monitoring of biodiversity;
- Improve biodiversity information management; and
- Maximise contribution to national, state and regional targets by focussing implementation of actions to improve capacity to protect priority conservation areas and values.

9.5.2 Background

Biodiversity data and knowledge are used to support a range of Council functions including land use planning, natural area management, development assessment, regulatory activities, and education activities.

Key data that Councils rely on include vegetation mapping, threatened species survey data, corridor mapping and identification of conservation priorities. Weaknesses in the data across the Illawarra include inconsistencies between vegetation classifications and EECs, lack of systematic threatened species survey data, poor vegetation condition data, and poor knowledge on aquatic systems and invertebrates and non vascular plants (mosses, liverworts, algae).

The benefits of improving our biodiversity knowledge and data include improving our capacity to manage biodiversity values into the future and improving our ability to implement responsibilities under the key statutes. Future work on improving our biodiversity knowledge should focus on identified biodiversity priorities and the data gaps identified in Section 3.

9.5.3 Related Targets

Biodiversity targets that have been set at national, state and regional levels which relate to Local Government have been included in Table 12.

Table 12: Targets for knowledge and data

Source	Target
ABCS	Action 3.1.1: Assess knowledge needs, identify gaps and set priorities at national, state and regional levels.
ABCS	Action 6.1.1: Build baseline datasets, including key indicators, to measure biodiversity condition and trends over time.

**ABCS = Australia's Biodiversity Conservation Strategy 2010-2020 - Consultation Draft. (Commonwealth of Australia 2009a)*

9.5.4 Biodiversity Strategies and Actions for Knowledge, Data and Monitoring

Regional Priorities

<i>Strategy</i>	<i>#</i>	<i>Action</i>	<i>Priority</i>	<i>Time frame</i>	<i>Who is responsible</i>	<i>Funding</i>	<i>Council</i>
Continue to improve biodiversity knowledge	56	Develop guidelines for appropriate plant species to be used in revegetation works and landscaping for the Illawarra.	1a High impact, low effort	Short term - within 2 years	EPT	Illawarra Biodiversity & Food Grant	Illawarra Councils
Continue to improve biodiversity knowledge	57	Revise and update the Illawarra Remnant Bushland database with available vegetation survey datasets from the past 10 years.	1b High impact, high effort	Short term - within 2 years	EPT	Illawarra Biodiversity & Food Grant	Illawarra Councils
Improve the monitoring of biodiversity	58	Develop standard vegetation condition assessment methods for baseline data/monitoring of bush restoration work at high priority sites.	1b High impact, high effort	Short term - within 2 years	EPT	Illawarra Biodiversity & Food Grant	Illawarra Councils
Continue to improve biodiversity knowledge	59	Work with DECCW to prioritise PAS and Recovery Plan actions for priority threatened species.	1a High impact, low effort	Short term - within 2 years	EPT	Illawarra Biodiversity & Food Grant	Illawarra Councils

Wollongong City Council Priorities

<i>Strategy</i>	<i>#</i>	<i>Action</i>	<i>Priority</i>	<i>Time frame</i>	<i>Who is responsible</i>	<i>Funding</i>	<i>Council</i>
Continue to improve biodiversity knowledge	60	Nominate research projects for UOW students in areas of research need; identified datagaps and areas of high biodiversity value.	1a High impact, low effort	Ongoing	EPT	Staff time	Wollongong
Continue to improve biodiversity knowledge	61	Ground truth vegetation mapping, prioritising EECs as first priority, and areas classified as Asset Protection category 1, 2 and 3.	1b High impact, high effort	Long term - within 5 years	EPT	Staff time	Wollongong
Continue to improve biodiversity knowledge	62	Update mapping of Endangered Ecological Communities as new and improved mapping becomes available.	1a High impact, low effort	Ongoing	EPT	Staff time	Wollongong

Continue to improve biodiversity knowledge	63	Improve knowledge on aquatic species and habitats through partnership opportunities with the University of Wollongong, and other state agencies.	1b High impact, high effort	Ongoing	EPT	Staff time, Grant funding	Wollongong
Continue to improve biodiversity knowledge	64	Promote the use of standardised vegetation survey format 20 x 20 m quadrants that are compatible with the largest flora datasets in the region and with the Native Vegetation Type Standard (DECCW, unpublished).	1a High impact, low effort	Short term - within 2 years	EPT	Staff time	Wollongong
Continue to improve biodiversity knowledge	65	Work towards filling data gaps outlined in Volume Two of the Strategy where possible and resources are available.	1b High impact, high effort	Ongoing	EPT	Staff time, Grant funding	Wollongong
Improve biodiversity information management	66	Develop a database to centrally identify major biodiversity studies on a spatial basis.	1a High impact, low effort	Long term - within 5 years	EPT	Staff time	Wollongong
Improve biodiversity information management	67	Utilise the LIS system to capture geographic location information on key emerging pest animal complaints, to capture geographic locations for complaints.	1b High impact, high effort	Long term - within 5 years	EPT	Staff time	Wollongong
Improve biodiversity information management	68	Develop flora and fauna database from major survey and assessment datasets.	1b High impact, high effort	Long term - within 5 years	EPT	Staff time	Wollongong
Continue to improve biodiversity knowledge	69	Where possible undertake fauna assessment for more habitat mapping.	1b High impact, high effort	Long term - within 5 years	EPT - funding dependent.	Grant funding	Wollongong
Improve biodiversity information management	70	Maintain spatial records of areas managed under bush regeneration contracts on Councils GIS system.	1b High impact, high effort	Ongoing	EPT	Staff time	Wollongong

EPT - Environment Planning Team; ECS - Environment Conservation Services; ER - Regulation and Enforcement; CP - City Planning

Shellharbour City Council Priorities

<i>Strategy</i>	<i>#</i>	<i>Action</i>	<i>Priority</i>	<i>Time frame</i>	<i>Who is responsible</i>	<i>Funding</i>	<i>Council</i>
Continue to improve biodiversity knowledge	71	Nominate research projects for UOW students in areas of research need; identified data gaps and areas of high biodiversity value.	1a High impact, low effort	Ongoing	ER	Staff time/ grant Funding	Shellharbour
Continue to improve biodiversity knowledge	72	Ground truth vegetation mapping, prioritising EECs and areas of highest biodiversity value.	1b High impact, high effort	Long term - within 5 years	ER, SP	Grant Funding	Shellharbour
Improve biodiversity information management	73	Ensure vegetation map updates (from consultants / internal reports) are incorporated into Council mapping systems.	1b High impact, high effort	Ongoing	ER	Staff time	Shellharbour
Continue to improve biodiversity knowledge	74	Where possible, undertake or contract fauna assessment for more detailed habitat mapping.	1b High impact, high effort	Long term - within 5 years	ER	Grant Funding	Shellharbour
Continue to improve biodiversity knowledge	75	Update mapping of EECs as new and improved mapping becomes available.	1a High impact, low effort	Short term - within 2 years	ER	Staff time	Shellharbour
Continue to improve biodiversity knowledge	76	Promote the use of standardised vegetation survey format 20 x 20 m quadrants that are compatible with the largest flora datasets in the region and with the Native Vegetation Type Standard (DECCW, unpublished).	1a High impact, low effort	Short term - within 2 years	EPT	Staff time	Shellharbour
Continue to improve biodiversity knowledge	77	Work towards filling data gaps outlined in Volume Two of the Strategy where possible and resources are available.	1b High impact, high effort	Ongoing	ER	Grant funding	

ER - Environment and Recreation; SP - Strategic Planning

Kiama Municipal Council Priorities

<i>Strategy</i>	<i>#</i>	<i>Action</i>	<i>Priority</i>	<i>Time frame</i>	<i>Who is responsible</i>	<i>Funding</i>	<i>Council</i>
Continue to improve biodiversity knowledge	78	Nominate research projects for UOW students in areas of research need; identified data gaps and areas of high biodiversity value including; The impact of climate change on Kiama's estuaries, fauna habitat mapping.	1a High impact, low effort	Ongoing	Environment & Health	Grant funding , UOW	Kiama
Continue to improve biodiversity knowledge	79	Review and update vegetation mapping to include small communities that have not been mapped, including Freshwater wetlands, and Coastal Headland grasslands.	1b High impact, high effort	Long term - within 5 years	Environment & Health	DECCW, UOW, grant funding	Kiama
Continue to improve biodiversity knowledge	80	Where possible undertake or contract fauna surveys and assessment for more detailed fauna habitat mapping.	1b High impact, high effort	Long term - within 5 years	Environment & Health	DECCW, UOW, grant funding	Kiama



9.6 THEME 4: ACTIONS AND STRATEGIES FOR COMMUNITY PARTICIPATION

9.6.1 Strategies

- Improve community access to biodiversity information;
- Supporting volunteers and residents in biodiversity conservation; and
- Maximise contribution to national, state and regional targets by focussing implementation of actions to improve capacity of residents, and volunteers to protect priority conservation areas and values.

9.6.2 Background

There are a large number of volunteers engaged in bushland management through various networks including Bushcare, Landcare and Parkcare in the Illawarra. Council's actively co-ordinate the Bushcare and Parkcare programs.

Councils can support conservation on private land, and work by volunteers on public land, through:

- Provision of information and capacity building opportunities to assist landowners to better manage land of high biodiversity value;
- Advising residents of grant opportunities and conservation programs eg Bush Incentives, Voluntary Conservation Agreements (VCAs), Property Vegetation Plans (PVPs); and
- Supporting volunteers and residents with access to resources, information, and skill building opportunities and programs such as Bushcare and Landcare.

9.6.3 Related Targets

Biodiversity related targets that have been set at national, state and regional levels which relate to Local Government have been included in Table 13.

Table 13: Targets for community participation

Source	Target
ABCS	Action 5.1.2: Wherever possible and appropriate, recognise traditional Indigenous knowledge and environmental management expertise, and apply or extend such management for biodiversity conservation.
SRCMA CAP (06-16)	B1: By 2016 there will be an increase in the number of land managers who adopt management practices that conserve biodiversity and promote sustainable production.
SRCMA CAP (06-16)	B2: By 2016 through voluntary participation by land managers, the area of land actively managed to conserve priority vegetation types will increase from 11,000 hectares to at least 41,000 hectares.
SRCMA CAP (06-16)	B3: By 2016 through voluntary participation by land managers, an additional 10,000 hectares of native vegetation will be actively managed to build a resilient landscape with good connectivity that conserves biodiversity.

**ABCS = Australia's Biodiversity Conservation Strategy 2010-2020 - Consultation Draft (Commonwealth of Australia 2009a)*
SRCMA CAP = Southern Rivers Catchment Management Authority Catchment Action Plan

9.6.4 Biodiversity Strategies and actions

Regional Priorities

<i>Strategy</i>	<i>#</i>	<i>Action</i>	<i>Priority</i>	<i>Time frame</i>	<i>Who is responsible</i>	<i>Funding</i>	<i>Council</i>
Improving access to biodiversity information	81	Promote successful bush regeneration sites and techniques through open field days. One site per LGA.	1a High impact, low effort	Short term - within 2 years	EPT	Illawarra Biodiversity & Food Grant	Illawarra Councils
Improving access to biodiversity information	82	Develop Council web resources to improve access to information on vegetation mapping, volunteer and council bush regeneration sites, biodiversity resources and how to improve backyard biodiversity.	1a High impact, low effort	Short term - within 2 years	EPT	Illawarra Biodiversity & Food Grant	Illawarra Councils
Improving access to biodiversity information	83	Promote biodiversity issues and training activities through community newspapers (Advertiser, Lake Times, Kiama Independent) on a monthly basis.	1a High impact, low effort	Short term - within 2 years	EPT	Illawarra Biodiversity & Food Grant	Illawarra Councils
Improving access to biodiversity information	84	Develop an indigenous planting landscape guide for the Illawarra.	1a High impact, low effort	Short term - within 2 years	EPT	Illawarra Biodiversity & Food Grant	Illawarra Councils
Improving access to biodiversity information	85	Provide capacity building opportunities to landholder and volunteers, through workshops and events to improve biodiversity knowledge and management of high priority areas.	1a High impact, low effort	Short term - within 2 years	EPT	Illawarra Biodiversity & Food Grant	Illawarra Councils

Wollongong City Council Priorities

<i>Strategy</i>	<i>#</i>	<i>Action</i>	<i>Priority</i>	<i>Time frame</i>	<i>Who is responsible</i>	<i>Funding</i>	<i>Council</i>
Supporting volunteers and residents in biodiversity conservation	86	Work with the Botanic Gardens to label local native and non-native plants at Greenplan sales so that residents can make informed decisions.	1a High impact, low effort	Short term - within 2 years	EPT	Staff time	Wollongong

Improving access to biodiversity information	87	Make archived reports, VMPs, ecological assessments accessible to the public via web sites. Reference them to catchment so they can be geographically searched.	1a High impact, low effort	Ongoing	EPT	Staff time	Wollongong
Supporting volunteers and residents in biodiversity conservation	88	Investigate incentives to encourage landholders and volunteers to engage in biodiversity programs and conservation on private land.	1b High impact, high effort	Long term - within 5 years	EPT	Staff time	Wollongong
Supporting volunteers and residents in biodiversity conservation	89	Increase partnerships with schools. Focus on improving skills on protecting and enhancing natural areas.	2 Low impact, low effort	Long term - within 5 years	Grant funding	Staff time	Wollongong
Supporting volunteers and residents in biodiversity conservation	90	Continue to deliver support for community volunteers through Bushcare.	1a High impact, low effort	Ongoing	EPT / ECS	Staff time	Wollongong

EPT - Environment Planning Team; ECS - Environment Conservation Services; ER - Regulation and Enforcement; CP - City Planning

Shellharbour City Council Priorities

Strategy	#	Action	Priority	Time frame	Who is responsible	Funding	Council
Improving access to biodiversity information	91	Work with Council's Nursery to label and/or install signage to identify locally indigenous species so that residents can make an informed decision.	1a High impact, low effort	Short term - within 2 years	ER	Staff time	Shellharbour
Improving access to biodiversity information	92	Improve public access to archived reports e.g. VMPs, ecological assessments, POMs, on Council's website.	1a High impact, low effort	Ongoing	ER	Staff time	Shellharbour
Supporting volunteers and residents in biodiversity conservation	93	Provide information to the community via the Council website on how to promote biodiversity in backyards.	1a High impact, low effort	Short term - within 2 years	ER	Grant funding	Shellharbour
Supporting volunteers and residents in biodiversity conservation	94	Continue to deliver support and opportunities for community volunteers and organisations through Bushcare, Parkcare and Landcare.	1a High impact, low effort	Ongoing	WS	Staff time	Shellharbour

Supporting volunteers and residents in biodiversity conservation	95	Provide capacity building opportunities for landholders, volunteers and residents to improve knowledge and biodiversity in backyards.	1a High impact, low effort	Ongoing	ER	Grant funding	Shellharbour
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ER - Environment and Recreation; WS - Works and Services; DTS - Development and Technical Services; PS - Planning Services

Kiama Municipal Council Priorities

<i>Strategy</i>	<i>#</i>	<i>Action</i>	<i>Priority</i>	<i>Time frame</i>	<i>Who is responsible</i>	<i>Funding</i>	<i>Council</i>
Improving access to biodiversity information	96	Make archived reports, VMPs, ecological assessments accessible to the public via websites. Reference them to catchments so they can be geographically searched.	1a High impact, low effort	Ongoing	Environment & Health.	Staff time	Kiama
Improving access to biodiversity information	97	Promote biodiversity issues through the quarterly Council community newsletters and the website 'Kiamasphere'.	1a High impact, low effort	Ongoing	Environment & Health.	Staff time	Kiama



10 IMPLEMENTING THE STRATEGY

The Action tables in Section 9 outline the various activities, estimated timelines and teams responsible for implementation at each Council. Some of the key regional priorities will be progressed under the continuation of the current Illawarra Biodiversity and Food Security NSW Environmental Trust grant. Other actions will be funded from existing staff salaries, and operational budgets, whilst others may be dependent on seeking additional grant funds. Given the limited resources, partnerships between the Illawarra Councils, other agencies, and volunteers will be vital to obtain funds and complete many of the actions.

Implementation of the Strategy will support other conservation work being undertaken in the Illawarra including:

- Implementation of the Special Areas Strategic Plan of Management (2007) by the Sydney Catchment Authority (SCA) and DECCW, and
- Implementation of the Illawarra NRM Plan, Southern Rivers Catchment Action Plan (CAP) and Escarpment to Sea program by the Southern Rivers CMA.

It is recommended each Council, in the preparation of their annual Management Plans will review the Biodiversity Action Plan to assess which actions should be incorporated into the business plan. High priority actions which have not commenced should take first priority. Progress against the actions will be reported annually in the Annual Report, or in the State of Environment Report (SOE). The commitments in the Biodiversity Strategy will also be incorporated into the ten year Community Strategic Plans, and four year Delivery Programs being developed by each of the Illawarra Councils in the period 2011-2012 as part of the Integrated Planning Framework.


10.1 MONITORING, EVALUATION, REPORTING AND IMPROVEMENT

Taking guidance from the Monitoring, Evaluation, Reporting and Improvement (MERI) framework (Commonwealth of Australia 2009b), the objectives of monitoring and reporting include improving capacity to review and report on NRM program performance; provide a structure to evaluate the effectiveness of NRM policies and programs, and improve our understanding of progress towards longer term NRM goals. Local Government, along with other NRM agencies, have a role and responsibility in evaluating, improving and reporting on program performance and asset condition (Commonwealth of Australia 2009b). The purpose of MERI is to monitor and evaluate programs and services to ensure they are achieving the desired outcomes, and to maximise the use of resources.

Reporting on the completion and progress of actions in the actions tables will be the responsibility of each Council in their annual Council and SOE report. The status of each action should be tabled in each year's report. Once the SOE framework is replaced by the Integrated Planning Framework, reporting should continue in the equivalent format. In addition to reporting on the progress of specific actions, a set of performance criteria will also be reported against. Reporting on the performance indicators will also provide an opportunity to evaluate progress toward these broader outcomes.

The Strategy proposes to use the following set of performance criteria to assess the implementation of the Strategy actions. It is proposed that progress towards achieving these indicators will be reported on in each Council's annual SOE reports, as a subcomponent of the Integrated Planning Framework.

- Bush restoration works have been undertaken in high priority areas across the region;
- Regional corridors are supported through appropriate land use zoning and policy initiatives;
- Improved regional co-ordination of biodiversity conservation and planning;
- Improved access to information and resources about Illawarra biodiversity values;

- 
- Improved land use planning – increased integration of NRM into policies and practices;
 - Information resources developed to support conservation efforts by volunteers and private landholders;
 - Policy and investment in biodiversity will aim to maintain and improve regional corridors and priority 1 and 2 vegetation types;
 - Estuary management plans are implemented throughout the life of the Strategy; and
 - Climate change adaptation plans are implemented through the life of the Strategy.

10.2 COUNCIL COMMITMENT

The Strategy will be adopted by the three Illawarra Councils. The Strategy will require review in five years from its adoption.

11 REFERENCES

AABR and National Trust (2005) Planting in Bushland? (factsheet).

Australian Bureau of Statistics (updated 22 April 2009) Regional Population Growth, Australia 2007-08. Retrieved from <http://www.abs.gov.au/ausstats/abs@.nsf/Products/3218.0~2007-08~Main+Features~New+South+Wales?OpenDocument#LOCALGOVERNMENTAREAPOPOPULATIONS>

Auld, T.D. and Keith D.A. (2009) Dealing with threats: Integrating science and management. *Ecological Management and Restoration* Vol 10 (1), 79-87.

Chafer, C.J, Brandis, C.C.P. & Wright, D. (1999) Handbook of Birds found in the Illawarra, Shoalhaven and Adjacent Tablelands. Illawarra Bird Observers Club, Wollongong.

Coutts-Smith, A.J., Mahon, P.S., Letnic, M. and Downey, P.O. (2007) The threat posed by pest animals to biodiversity in New South Wales. Invasive Animals Cooperative Research Centre, Canberra.

Commonwealth of Australia (2009a) Australia's Biodiversity Conservation Strategy 2010-2020. Consultation draft. Prepared by the National Biodiversity Strategy Review Task Group.

Commonwealth of Australia (2009b) NRM MERI Framework. Australian Government Natural Resource Management Monitoring, Evaluation, Reporting and Improvement Framework.

DECC (2007a) Terrestrial Vertebrate Fauna of the Greater Southern Sydney Region. Volume 2: Fauna of Conservation Concern and Priority Pest Species. A joint project between the Sydney Catchment Authority and the Department of Environment and Climate Change (NSW).

DECC (2007b) Adaptation Strategy for Climate Change Impacts on Biodiversity. Actions to implement the National Biodiversity and Climate Change Action Plan and the NSW Biodiversity and Climate Change and Adaptation Framework. Published by DECC, Sydney, NSW.

DECC (2007c) Terrestrial Vertebrate Fauna of the Greater Southern Sydney Region. Volume 4: The Fauna of Metropolitan, O'Hares Creek and Woronora Special Areas. A joint project between the Sydney Catchment Authority and the Department of Environment and Climate Change (NSW).



DEWHA (2009a) (updated 22 Jan 2009) Bilateral Migratory Bird Agreements. Department of Environment Heritage, Water and the Arts. Retrieved 9/11/09 from <http://www.environment.gov.au/biodiversity/migratory/waterbirds/bilateral.html#rokamba>

DEWHA (2009b) (updated 19 January 2009) Why is biological diversity important? Department of Environment Heritage, Water and the Arts. Retrieved 9/11/09 from <http://www.environment.gov.au/biodiversity/publications/series/paper1/why.html>

DoP (2006) Illawarra Regional Strategy 2006-2031. New South Wales Department of Planning.

Environment Australia (2001) A Directory of Important Wetlands in Australia. Retrieved on 13/8/09 from <http://www.environment.gov.au/water/publications/environmental/wetlands/directory.html>

Hobbs, R.J. and Yates, C. J. (2003) Turner Review No. 7. Impacts of ecosystem fragmentation on plant populations: generalising the idiosyncratic. *Australian Journal of Botany*. Vol. 51 (5) 471-488.

Lindenmayer, D. (2007) On Borrowed Time. CSIRO Publishing.

Mills, K. and Associates (2000) Nature Conservation Study Rural lands Study Area, City of Shellharbour. Unpublished report for Shellharbour City Council.

Mills, K. and Associates (2006) The Fauna of Kiama. Unpublished Report for Kiama Municipal Council.

NCC (1999) Toward an Illawarra Regional Vegetation Management Plan. Unpublished report prepared by Robinson, M.V., Robinson, A.G, Bofeldt, A.T., Corby, R., Clegg, M., Asquith, J. and Kravchenko, P. Nature Conservation Council of NSW, Sydney. Volumes 1 & 2.

NPWS (2002) Bioregional Assessment Study Part II. Fauna of the Illawarra Escarpment, Coastal Plain and Plateau.

NPWS (2003) Bioregional Assessment Study Part III. Conservation Assessment identifying areas of National, State and bioregional significance for biodiversity within Wollongong LGA.

NSW Government (2006) State Plan. A New Direction for NSW. Retrieved from <http://www.nsw.gov.au/stateplan/>

NSW Government (2010) Draft New South Wales Biodiversity Strategy 2010-2015. Prepared by the Department of Environment, Climate Change and Water NSW, and Industry and Investment NSW for the NSW Government.

NSW Rural Fire Service (2006) Bushfire Environmental Assessment Code for New South Wales.

NSW Scientific Committee (2005) Final Determination: Alteration of habitat following subsidence due to longwall mining.

Robinson, L. and Glanznig, A. (2003) Enabling EcoAction: A handbook for anyone working with the public on conservation. Humane Society International, WWF Australia. World Conservation Union.

SRCMA (2006) Catchment Action Plan. Southern Rivers Catchment Management Authority, Wollongong, NSW.

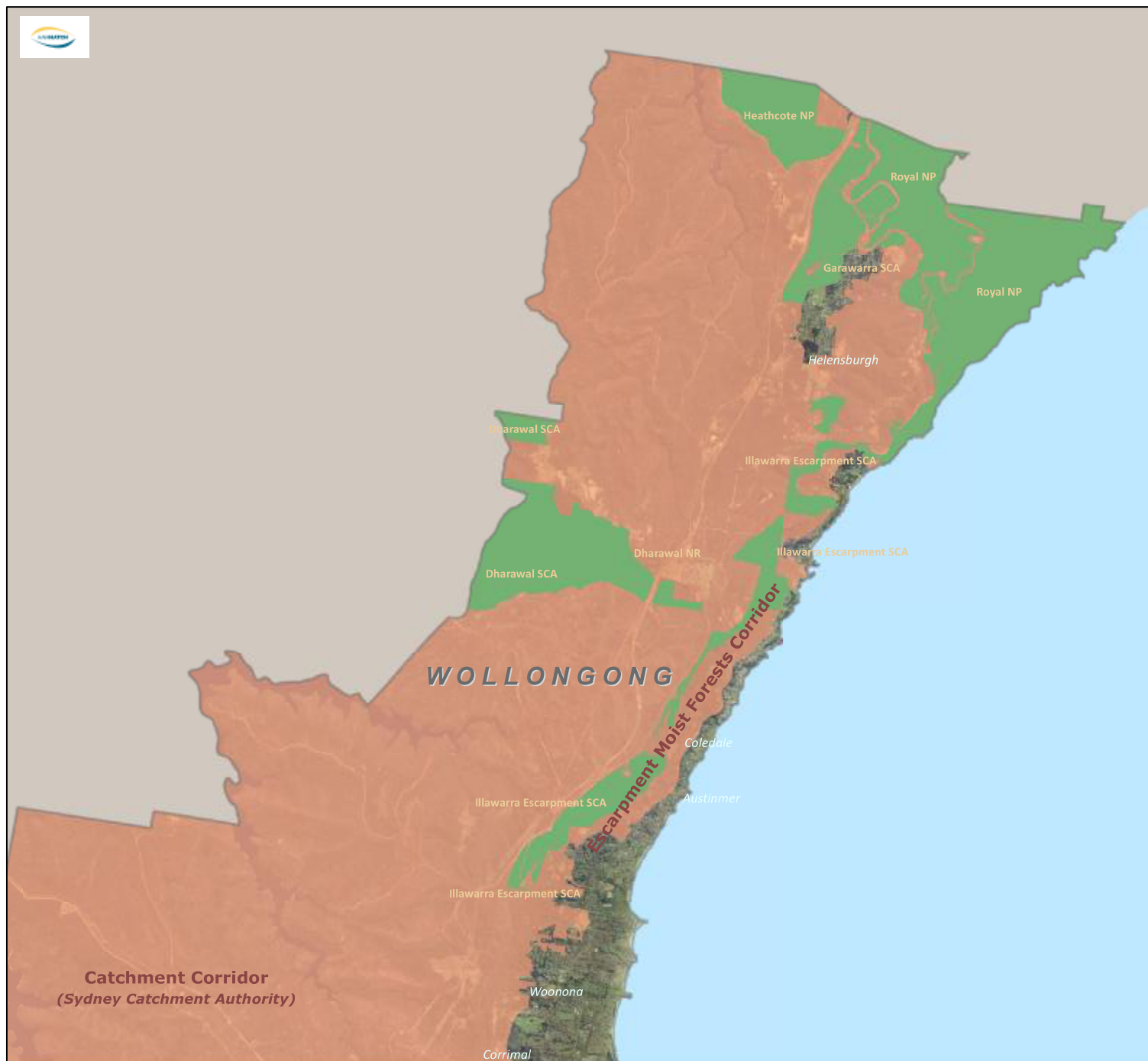


SRCMA (2010) Draft Illawarra NRM Action Plan. Southern Rivers Catchment Management Authority, Wollongong, NSW.

Tozer M.G., Turner, K., Simspon, C., Keith, D.A., Beukers, P., Mackenzie, B., Tindall, D., and Pennay, C. (2006) Native Vegetation of southeast NSW: a revised classification and map for the coast and eastern tablelands. NSW Department of Environment and Conservation and NSW Department of Infrastructure, Planning and Natural Resources, Sydney.

WHO (2010) Climate Change and Human Health. Retrieved from <http://www.who.int/globalchange/summary/en/index13.html>




12 APPENDIX 1 BIODIVERSITY CORRIDOR MAPS



Illawarra Biodiversity Strategy Illawarra Regional Biodiversity Corridors

Map 1

Legend

-  Local Government Area
-  National Park Estate
-  Biodiversity Corridor



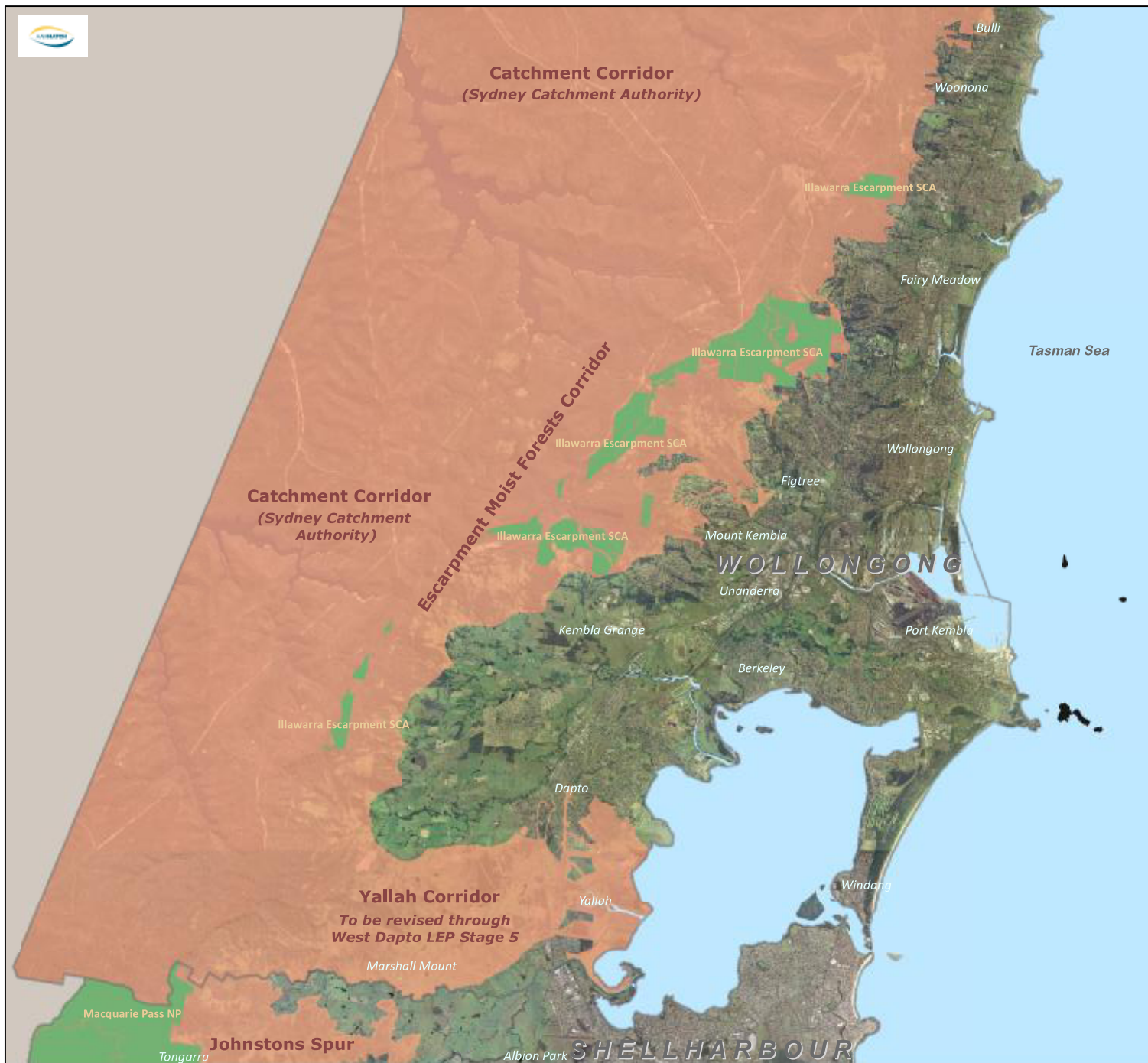
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Printed: 19/05/2011

Aerial Photography:

Scale 1:100,000

840 0 840 1,680 2,520 3,360
Meters



Illawarra Biodiversity Strategy Illawarra Regional Biodiversity Corridors

Map 2

Legend

- Local Government Area
- National Park Estate
- Biodiversity Corridor



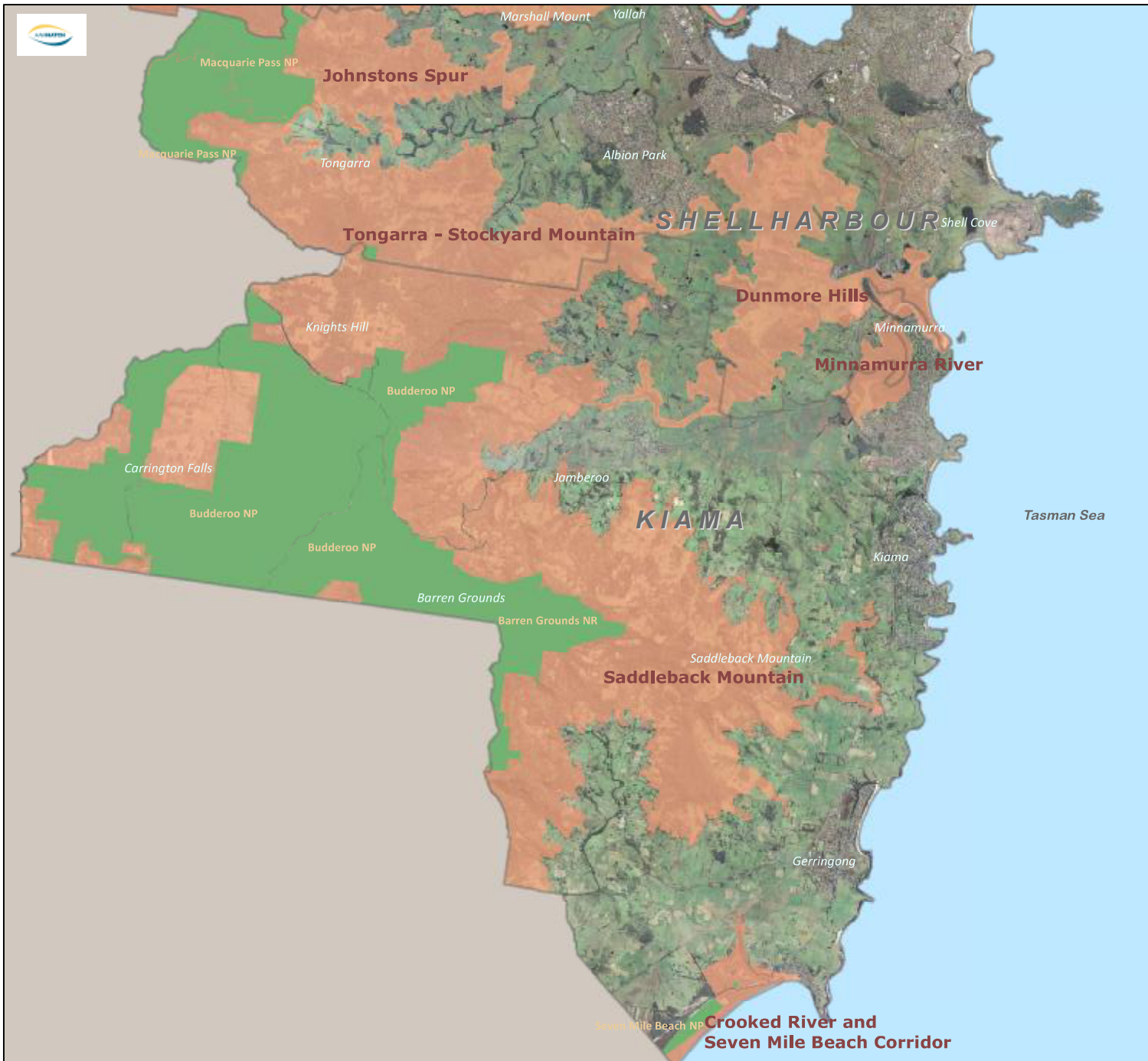
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Printed: 7/06/2011

Aerial Photography:

Scale 1:100,000

840 0 840 1,680 2,520 3,360
Meters






Illawarra Biodiversity Strategy

Illawarra Regional Biodiversity Corridors

Map 3

Legend

-  Local Government Area
-  National Park Estate
-  Biodiversity Corridor



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Printed: 7/06/2011

Aerial Photography:

Scale 1:100,000

840 0 840 1,680 2,520 3,360
Meters