Approved Recovery Plan

Cumberland Plain Recovery Plan

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NSW GOVERNMENT Environment, Climate Change & Water

Australian Government

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Cumberland Plain Recovery Plan

Foreword

The Cumberland Plain in western Sydney is Australia's fastest growing and most populous region. Many of its unique natural attributes need special effort to maintain their values and ensure their protection. Just 13% of western Sydney's native vegetation remains in highly fragmented patches of varying size and condition. This recovery plan has been designed to provide for the long-term survival and protection of the threatened biodiversity of the Cumberland Plain as the area develops. It constitutes the formal New South Wales recovery plan for 20 threatened species, populations and ecological communities that reside there.

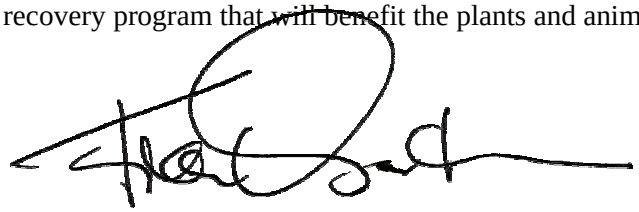
Preparing a multi-entity recovery plan is complex. Successful implementation of the plan will require active management and need co-operation at all levels. All land owners and managers can play an important role in conserving and managing the remaining biodiversity. By 2019 the Cumberland Plain will be home to 2.18 million people – or 44% of Sydney. This will place significant pressure on the region. We need to cater for the population's need for housing and jobs, while at the same time looking after a rapidly disappearing landscape and need for green space. The best way to do this is by taking a proactive and strategic approach by identifying and protecting the biggest, most viable remnants of native vegetation rather than considering it piece by piece and development by development.

The recovery plan takes a multi-pronged approach building on four recovery themes:

- Building the Cumberland Plain protected area network, including both public and private land and concentrating on the identified Priority Conservation Lands
- Delivering best management practices to prevent degradation of remaining bushland
- Enhancing the community's understanding and awareness of the values of the Cumberland Plain, and
- Improving our understanding of, and capacity to manage, the many threats to the biodiversity of the Cumberland Plain.

The recovery plan provides the foundation for future biodiversity protection in western Sydney. The plan is integrated with existing and pending planning, assessment and development initiatives including the Metropolitan Strategy and draft Metropolitan Plan, the Growth Centres Biodiversity Certification and the draft Commonwealth Strategic Assessment for Western Sydney. The $530 million Growth Centres Conservation Fund demonstrates strong investment for realising the building of the protected area network and implementing best-practice management.

We all need to work together to ensure the conservation of these unique species and communities. These actions draw on the expertise of local, state and Australian governments and encourage the participation of community groups and individuals, who are passionate about conserving their local environment, by drawing on their knowledge and enthusiasm. The plan provides guidance for those who are committed to conserving the entities covered by the plan in order to deliver a coordinated, strategic and targeted recovery program that will benefit the plants and animals of the Cumberland Plain for years to come.



FRANK SARTOR
Minister for Climate Change and the Environment

LISA CORBYN
Director General

Executive summary

The NSW Department of Environment Climate Change and Water (DECCW) has prepared this recovery plan to provide for the long-term survival and protection of seven threatened species, four endangered populations and nine threatened ecological communities listed on the NSW *Threatened Species Conservation Act 1995* that are found only on the Cumberland Plain. Seven of these are also listed as threatened under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Conservation of the rich variety of plants, animals and their habitats on the Cumberland Plain in western Sydney is challenging. The remaining native vegetation is highly fragmented and occurs largely on private land. Land values are high and competing land uses and strong population growth is placing extraordinary pressures on remaining bushland. For example, the population of the Cumberland Plain is expected to grow by 510,000 to be home to 2.18 million people by 2019, increasing western Sydney's share of the Metropolitan population to 44%.

Past and continuing land-use pressures have greatly affected the Cumberland Plain. Today only 13% of the region's native vegetation remains as intact bushland and this is scattered across the region in more than 2,400 individual remnants. Eight percent of what is left is protected within national parks and other conservation reserves. Significantly, the 81 largest remnants (over 50 ha) contain 51% of the remaining bushland and many of these large, intact patches occur on public land, including Commonwealth land.

Given the scale and nature of the issues, it is important that prioritisation and investment in the recovery program be guided by sound principles, based upon the best available evidence. Two of these principles are that the protection and management of large, intact remnants is more effective and efficient than for smaller, fragmented remnants, and that recovery efforts need to aim to ensure that a representative sample of all target threatened species, populations and communities is conserved. DECCW has completed an assessment of the remaining bushland based on these principles and other factors, including the distribution and zoning of remnant vegetation, which has resulted in the identification of the priority conservation lands (PCLs), shown in Figure 1.

The PCLs have been identified as the lands that represent the best remaining opportunities in the region to secure long-term biodiversity benefits for the lowest possible cost. They contain a total of 11,754 ha of the targeted threatened ecological communities, representing almost 40% of their combined remaining extent, along with 50–100% of the remaining populations of each threatened flora species and endangered population covered by the plan.

The identification of the PCLs as priorities should not be misinterpreted as underrating the significance of other remnant vegetation. While the plan promotes the PCLs as the regional priorities for the Cumberland Plain, areas of local significance (such as corridors and smaller council reserves) will complement and enhance these regional priorities. A comprehensive network of corridors on the Cumberland Plan is being developed and managed by a range of stakeholders, including riparian zones retained within the North West and South West Growth Centres, the establishment of the Western Sydney Parklands, open space corridors on South and Ropes Creek and regional biodiversity corridors within the Hawkesbury–Nepean Catchment Management Authority's Catchment Action Plan.

The third principle of the plan is that active management to best practice standards is needed to prevent the degradation of the remaining bushland in such a fragmented landscape. Without active management, weed invasion, frequent fire, stormwater flooding, grazing, mowing and recreational impacts such as illegal rubbish dumping will continue. This will be complemented by increasing the extent and condition of vegetation on the Cumberland Plain using assisted natural regeneration and revegetation techniques.

The fourth principle on which the plan is based is that where impacts on threatened species, populations and ecological communities cannot be avoided, they should be offset using appropriate means. The principle of offsetting loss of native vegetation that occurs as the result of development already underpins the NSW Government's approach to development of the Growth Centres in western Sydney. While most of the best remaining vegetation within the Growth Centres will be protected over time, some will be lost. To offset this, the Growth Centres Conservation Fund will provide $530 million over the next 30 years to secure the protection and management of high conservation bushland in western Sydney and surrounding areas. This provides unprecedented investment in recovery efforts in the region.

Actions are identified for implementation by local, State and Australian government authorities and are grouped under the following recovery objectives:

1. *To build a protected area network, comprising public and private lands, focused on the priority conservation lands*

Securing public and private land to be actively managed for conservation using a range of secure conservation options will underpin long-term recovery efforts on the Cumberland Plain. The identification of the PCLs is also intended to inform land-use planning decisions and to maximise conservation outcomes for threatened species, populations and ecological communities. This includes identifying where planning protection measures can most effectively be applied to protect the areas of greatest significance, and where buffers, corridors and other links are needed to support these areas.

2. *To deliver best practice management for threatened species, populations and ecological communities across the Cumberland Plain, with a specific focus on the priority conservation lands and public lands where the primary management objectives are compatible with conservation*

These actions seek to promote the adoption of best practice standards for bushland management on all tenures across the Cumberland Plain. Particular emphasis is given to the priority conservation lands and public lands where the primary management objectives are compatible with conservation.

3. *To develop an understanding and enhanced awareness in the community of the Cumberland Plain's threatened biodiversity, the best practice standards for its management, and the recovery program*

Actions under this objective seek to improve the capacity of land owners and managers to understand and effectively implement relevant parts of the recovery program. This will involve providing access to information, developing skills and knowledge, and providing support through advice, materials and funding.

4. *To increase knowledge of the threats to the survival of the Cumberland Plain's threatened species, populations and ecological communities, and thereby improve capacity to manage these in a strategic and effective manner*

The data on which the original regional vegetation mapping was based need to be reviewed and updated. This work is also needed to assist monitoring, compliance and enforcement programs to tackle unauthorised land clearing and degradation activities. DECCW will encourage and assist local government authorities to develop biodiversity strategies that are consistent with the priorities identified in the recovery plan.

In addition to the list of actions under the four themes of the recovery strategy, species-specific actions have also been identified for the recovery of two plants, the Sydney Plains Greenhood and the endangered population of *Pomaderris prunifolia*. These actions are required due to the very small number of known sites containing these species.

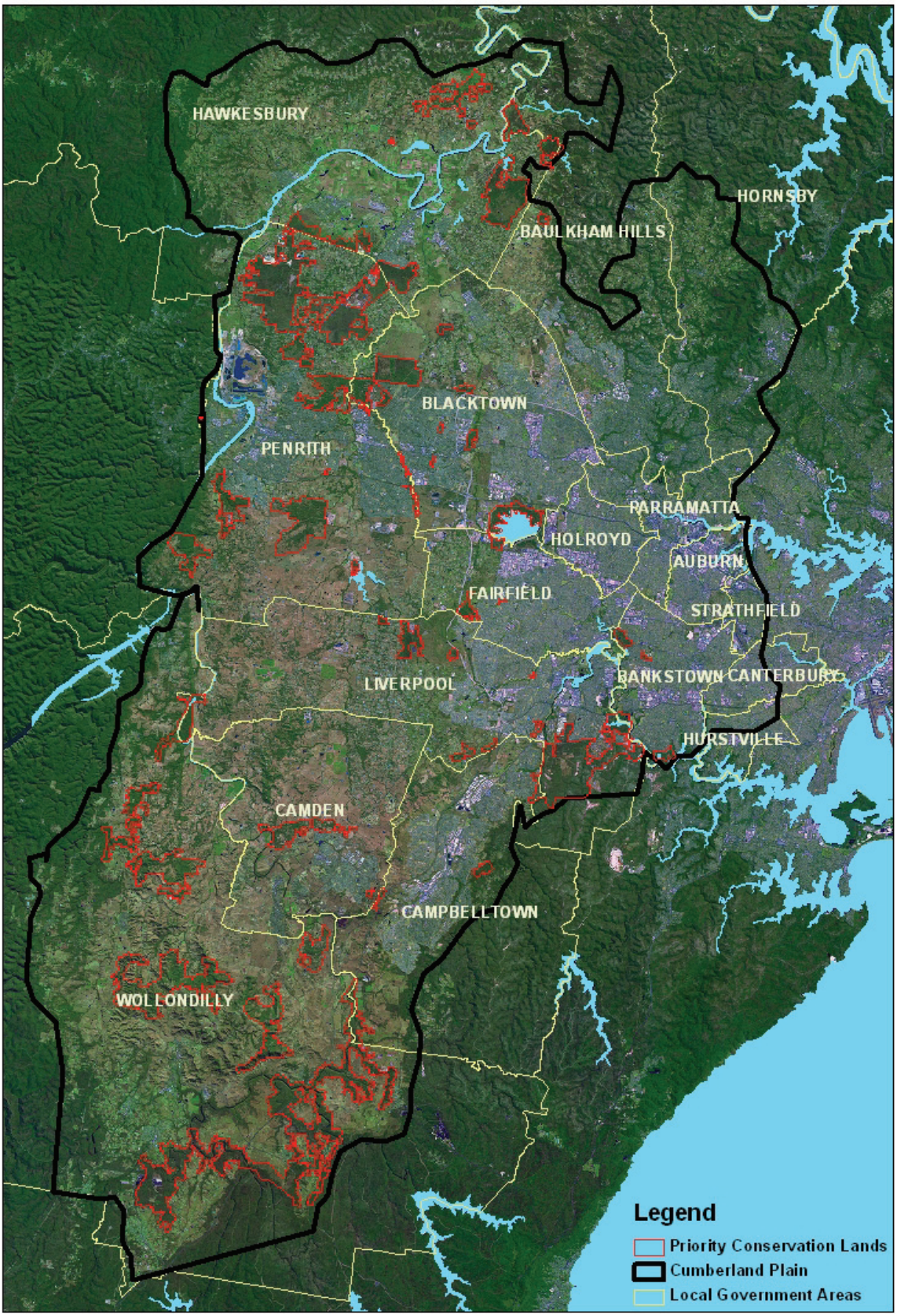


Figure 1. The Cumberland Plain and priority conservation lands[1]

[1] ArcGIS shapefiles of the priority conservation lands are available on the DECCW website at www.maps.environment.nsw.gov.au/.

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1 Introduction

Conservation of the rich biodiversity of the Cumberland Plain in western Sydney is one of the most challenging issues facing natural resource management in New South Wales (NSW). Extensive loss and fragmentation of vegetation has occurred, land values are high and competing land uses are placing extraordinary pressures on the remaining areas of bushland in the region.

This recovery plan has been prepared under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the NSW *Threatened Species Conservation Act 1995* (TSC Act) to promote the recovery of threatened species, populations and ecological communities on the Cumberland Plain. The plan has been prepared with reference and due consideration of the objects of the EPBC Act and the TSC Act and constitutes the NSW recovery plan for the threatened species, populations and ecological communities that are listed in Table 1. The plan also satisfies the provisions of Part 4 of the TSC Act and Part 13 of the EPBC Act, which specify matters to be included in a recovery plan.

The recovery plan will guide investment in the recovery of the threatened biodiversity of western Sydney, and to inform future urban planning decisions. The plan is an integrated conservation plan for western Sydney that informs and implements key initiatives, including the *NSW State Plan* (NSW Government 2010a), the *Metropolitan Strategy for Sydney* (Department of Planning 2005), the Biodiversity Certification of the North West and South West Growth Centres[2] and the accompanying Australian Government Strategic Assessment of the Sydney Region Growth Centres.

By focusing on a group of threatened entities within a defined landscape or geographical area, the recovery plan will deliver a more coordinated and targeted recovery program than could be achieved through the implementation of a number of single species, population or community plans. This approach has also enabled regional conservation priorities to be clearly identified for the preferential investment of finite resources. Given the magnitude of the threats operating in the region, the successful implementation of the recovery plan will require a broad partnership, involving all levels of government (Australian, State and local), industry and the community.

2 Study area and scope

The area covered by the recovery plan is the broad shale basin of the Cumberland Plain in western Sydney. The parts of the Hornsby Plateau that were mapped in the *Native Vegetation of the Cumberland Plain Final Edition* (NPWS 2002) are intentionally excluded from the scope of this recovery plan. This is because the Hornsby Plateau is a geomorphologically distinct area from the Cumberland Plain and contains different assemblages of species and threats than the Cumberland Plain.

The native vegetation of the Cumberland Plain is diverse, reflecting variations in soil type, landform, and drainage, and differs markedly from that of the surrounding landscape. The Cumberland Plain covers all or part of the following local government areas (Figure 1):

- Auburn Council
- Blacktown City Council
- Campbelltown City Council
- Fairfield City Council
- Holroyd City Council
- Hurstville Council
- Parramatta City Council
- Strathfield Council
- Wollondilly Shire Council.
- Bankstown City Council
- Camden Council
- Canterbury City Council
- Hawkesbury City Council
- Hornsby Shire Council
- Liverpool City Council
- Penrith City Council
- The Hills Shire Council

[2] For more information see www.environment.nsw.gov.au/biocertification/notcert.htm

Ku-ring-gai and Ryde local government areas were excluded from the scope of the recovery plan as none of the threatened species, populations or ecological communities covered by the plan occur in these areas.

The recovery plan focuses on the threatened species, populations and ecological communities that are endemic to the Cumberland Plain or are primarily distributed on the Cumberland Plain (Table 1).

Table 1. Threatened biodiversity addressed in this recovery plan

Flora species	TSC Act status	EPBC Act status
Allocasuarina glareicola	Endangered	Endangered
Dillwynia tenuifolia	Vulnerable	Vulnerable
Juniper-leaved Grevillea (*Grevillea juniperina* subsp. *juniperina*)	Vulnerable	-
Micromyrtus minutiflora	Endangered	Vulnerable
Sydney Plains Greenhood (*Pterostylis saxicola*)	Endangered	Endangered
Pultenaea parviflora	Endangered	Vulnerable
Fauna species		
Cumberland Land Snail (*Meridolum corneovirens*)	Endangered	-
Populations		
Dillwynia tenuifolia population in the Baulkham Hills LGA	Endangered	-
Dillwynia tenuifolia population at Kemps Creek	Endangered	-
Marsdenia viridiflora R. Br subsp. *viridiflora* population in the Bankstown, Blacktown, Camden, Fairfield, Holroyd, Liverpool and Penrith LGAs	Endangered	-
Pomaderris prunifolia (a shrub) population in the Parramatta, Auburn, Strathfield and Bankstown LGAs	Endangered	-
Ecological communities		
Agnes Banks Woodland	Endangered	-
Castlereagh Swamp Woodland	Endangered	-
Cooks River/Castlereagh Ironbark Forest	Endangered	-
Cumberland Plain Woodland (listed on EPBC Act as Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest)	Critically Endangered	Critically Endangered
Moist Shale Woodland	Endangered	-
Shale Gravel Transition Forest (listed on EPBC Act as Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest)	Endangered	Critically Endangered
Shale Sandstone Transition Forest	Endangered	Endangered
River-flat Eucalypt Forest (previously Sydney Coastal River Flat Forest)	Endangered	-
Western Sydney Dry Rainforest	Endangered	-

The following threatened ecological communities are not specifically addressed in the recovery plan, as only a small proportion of their distribution occurs within the study area, or a recovery plan already exists:

- Blue Gum High Forest
- Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner Bioregions
- Freshwater Wetlands on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions
- Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner Bioregions
- Sydney Turpentine Ironbark Forest.

Elderslie Banksia Scrub Forest will also be excluded from consideration in this recovery plan as the future of the remaining area of this threatened ecological community at Spring Farm, Camden has already been determined through the land-use planning system.

The following threatened species and populations are not specifically addressed in this recovery plan, as only a small proportion of their distribution occurs within the study area or a recovery plan already exists:

- Downy Wattle (*Acacia pubescens*)
- *Hibbertia superans*
- Matted Bush-pea (*Pultenaea pedunculata*)
- Nodding Geebung (*Persoonia nutans*)
- *Pimelea curviflora* var. *curviflora*
- Spiked Rice-flower (*Pimelea spicata*).

The Tadgell's Bluebell (*Wahlenbergia multicaulis*) population in the Auburn, Bankstown, Baulkham Hills, Canterbury, Hornsby, Parramatta and Strathfield LGAs is not considered in this plan as a separate recovery plan for this endangered population has been sent to the relevant public authorities for statutory endorsement prior to public exhibition.

Threatened entities that are not covered by this plan are addressed in the Department of Environment, Climate Change and Water's (DECCW) Priorities Action Statement (PAS)[3]. Additionally, all threatened and native biodiversity is covered by existing legislation, including application of the NSW *National Parks and Wildlife Act 1974*, *Environmental Planning and Assessment Act 1979* (EP&A Act), and the TSC Act, as well as the Commonwealth EPBC Act.

Descriptive profiles for each of the threatened entities in Table 1 are available on the NSW Threatened Species Website at www.threatenedspecies.environment.nsw.gov.au and the Australian government Species Profile and Threats Database at http://environment.gov.au/cgi-bin/sprat/public/sprat.pl. Detailed descriptions of each of the threatened ecological communities (TECs) are also provided in NPWS (2002) and Tozer (2003). There are definitional differences between TSC Act and EPBC Act listed TECs. The main difference in descriptions relates to the use of condition classes under the EPBC Act (see Section 3).

Recovery actions identified within the recovery plan will also potentially benefit a number of other listed species under the TSC and EPBC Acts, such as the Barking Owl (*Ninox connivens*), Black-chinned Honeyeater (*Melithreptus gularis gularis*), Brown Treecreeper (*Climacteris picumnus victoriae*), Diamond Firetail (*Stagonopleura guttata*), Eastern Bent-wing Bbat (*Miniopterus schreibersii oceanensis*), Gang-gang Cockatoo (*Callocephalon fimbriatum*), Glossy Black-Cockatoo (*Calyptorhynchus lathami*), Green and Golden Bell Frog (*Litoria aurea*), Grey-headed Flying-fox (*Pteropus poliocephalus*), Koala (*Phascolarctos cinereus*), Large-footed Myotis (*Myotis macropus*), Masked Owl (*Tyto novaehollandiae*), Powerful Owl (*Ninox strenua*), Regent Honeyeater (*Anthochaera phyrgia*), Speckled Warbler (*Pyrrholaemus saggitatus*), Spotted-tailed Quoll (*Dasyurus maculatus*), Square-tailed Kite (*Lophoictinia isura*), Squirrel Glider (*Petaurus norfolcensis*), Swift Parrot (*Lathamus discolour*), Yellow-bellied Glider (*Petaurus australis*) and Yellow-bellied Sheath-tailed Bat (*Saccolaimus flaviventris*) (DEC 2005b).

At the time of publication of this recovery plan it is acknowledged that the NSW Scientific Committee has made a preliminary determination to list the Castlereagh Scribbly Gum Woodland in the Sydney

[3] For further information see www.threatenedspecies.environment.nsw.gov.au/tsprofile/home_PAS_new.aspx.

Basin Bioregion as a vulnerable ecological community under the TSC Act and that Sydney Sand Flats Dry Sclerophyll Forest has been nominated as a threatened community under the EPBC Act.

3 History of land use on the Cumberland Plain

The past – Aboriginal occupation, European settlement and land use

At the time of European settlement, the Cumberland Plain would have been immensely productive for Aboriginal people and would have supported abundant native fauna. Many hundreds of Aboriginal sites have been recorded across the Sydney region, indicating the significance of the whole landscape and its resources to Aboriginal people, in its material, social and spiritual dimensions.

Extensive grassy woodlands were present, as well as tall ironbark and turpentine forests, dry rainforests, and floodplain communities. Mammals such as echidnas, quolls, phascogales, bandicoots, koalas, possums, gliders, bettongs, wallabies and kangaroos would have all been common, along with emus and a vast array of woodland birds such as the Hooded Robin (*Melanodryas cucullata cucullata*), Brown Treecreeper, Speckled Warbler and Diamond Firetail.

The gentle slopes and fertile soils of the region made it an early focus for agriculture following European settlement. Agricultural development was underway as early as 1792 and by the middle of the 19th century most of the region was either being grazed or was cultivated (DEC 2005a). Clearing for agriculture was later supplemented by clearing for residential, commercial and industrial purposes.

The present – a legacy of past land-use pressures

Past and continuing land-use pressures have taken a major toll on the biodiversity of the Cumberland Plain. Only 13% of the pre-1750 extent of the region's vegetation remains as intact bushland, with an additional 12% occurring as scattered trees in disturbed areas (NPWS 2002). Consequently, much of the region's biodiversity is listed as threatened under State and/or Commonwealth legislation.

The vast majority (76%) of the Cumberland Plain's remaining bushland is privately owned, and only 8% is protected within the formal reserve system. The region's bushland is also highly fragmented, comprising 2,446 individual remnants (DECCW 2010). Significantly, however, the 81 largest remnants (i.e. >50 ha) contain 51% of the remaining bushland and many of these large, intact remnants occupy public land.

While some flora and fauna species will persist in small remnants with active management, evidence clearly suggests that larger remnants have a better prospect for long-term survival. Larger remnants are usually more diverse and resilient than smaller remnants, and are less susceptible to 'edge effects', catastrophic events, and the expected impacts of climate change. Research also suggests that biodiversity loss caused by habitat fragmentation significantly increases once clearing levels exceed 70% of the landscape (Freudenberger *et al.* 1997; WALGA 2004). This threshold has already been passed on the Cumberland Plain.

Clearing and fragmentation have had a profound effect on the fauna of the Cumberland Plain. Many mammal species declined to extinction in the decades after settlement. While many mammals persist in a small number of larger remnants, few exist in any number in western Sydney, such as the Eastern Grey Kangaroo (*Macropus giganteus*), Common Brushtail Possum (*Trichosurus vulpecular*), Grey-headed Flying-fox and a number of microchiropteran bat species such as the Lesser Long-eared Bat (*Nyctophilus geoffroyi*), Gould's Wattled Bat (*Chalinolobus gouldii*) and Gould's Long-eared Bat (*Nyctophilus gouldi*).

Many bird species were relatively common until the 1950s when declines commenced. They persisted longer than many mammal species but populations collapsed across most of western Sydney in the 1970s and are no longer commonly seen. However, not all bird species were equally affected. Clearing and under-scrubbing have created suitable habitat for a number of aggressive native species including the Sulphur-crested Cockatoo (*Cacatua galerita*), Australian Magpie (*Gymnorhina tibicen*) and Noisy Miner

(*Manorina melanocephala*). These species have all increased in western Sydney and now out-compete smaller woodland bird species in areas of fragmented vegetation.

While the general pattern has been one of fragmentation, habitat loss and species decline, some animals, including threatened woodland birds such as the Brown Treecreeper and Hooded Robin have persisted in the larger, better connected remnants. These remnants are not dominated by aggressive bird species and retain the characteristic habitat requirements for woodland bird fauna. Similarly, a number of mammal species have been recorded from the larger connected remnants. The vulnerable Squirrel Glider was feared to be extinct in western Sydney but was found in the Castlereagh area in the region's largest remaining patch of vegetation (DEC 2005b). This and other species such as wombats, echidnas and the Common Wallaroo (*Macropus robustus*) are not generally found in the smaller, degraded and isolated patches due to the severity of the threats and the absence of opportunities to recolonise areas of remnant vegetation after fire or other disturbance events.

The consequences for flora have been similar, although not as dramatic. While many flora species are now at risk of extinction, populations have persisted in small and sometimes degraded remnants. There is evidence to support the view that small remnants remain important for flora species at least in the short to medium term (Tozer 2003). The future of small remnants must be considered in the context of increasing urbanisation and the expected impacts of climate change, which will place additional stresses on these remnants, further reducing their habitat value and viability.

Table 2 shows the current and pre-1750 extent of the threatened ecological communities addressed in the recovery plan, and their current levels of formal protection. While some of these communities have fared slightly better than others, all have suffered a marked reduction in extent and condition. NPWS (2002) used condition classes for native vegetation on the Cumberland Plain to distinguish good and poor quality vegetation. The main condition classes include 'A', 'B', 'C', 'TX' and 'TXR'. Condition classes A, B and C contain areas with a relatively intact native tree canopy. These condition classes are most likely to contain high levels of floristic diversity (Tozer 2003). Condition classes TX and TXR contain areas of scattered native canopy (NPWS 2002) and may have either high or low levels of floristic diversity (Tozer 2003).

Only a small proportion of TX and TXR areas are likely meet the definition of a TSC Act listed community as defined in the NSW Scientific Committee determination (NSW Scientific Committee 2009). To be considered part of the EPBC Act listed Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest community, patches must be in an A, B or C condition class and meet other condition thresholds relating to patch size, understorey integrity and the presence of tree hollows.

Along with the loss of native vegetation, there has been significant loss of areas of Aboriginal cultural heritage significance. This includes many hundreds of archaeological sites. In spite of this, many areas of Aboriginal heritage values remain on the Cumberland Plain and there is often a clear overlap with areas of biodiversity conservation value. Many Aboriginal communities in western Sydney retain an interest in seeing the land and its biodiversity protected and managed.

The future – an enduring natural landscape amid urban development

There is no doubt that Sydney's natural environment is highly valued by the community. In the community forums that informed the preparation of the Metropolitan Strategy, people talked passionately about protecting Sydney's natural areas, and the natural environment was identified as Sydney's greatest asset (Department of Planning 2005). In western Sydney, many community groups have been working over a long period of time to identify and protect the biodiversity values of the Cumberland Plain.

The population of the Sydney Metropolitan Area is projected to increase from 4.3 million in 2006 to 6 million by 2036, passing the 5 million mark in 2019. The highest growth subregions are South West, North West and West Central (Department of Planning 2008a). The Cumberland Plain will be home to 2.18 million people by 2019 (i.e. an extra 510,000 people), increasing the region's share of the metropolitan population to 44% (WSROC 2005).

Table 2. Status of the threatened ecological communities addressed in the recovery plan

Extent[4]	Pre-1750 (ha)	Current area total (ha)			Current area total (% of pre-1750)	Current area on DECCW estate (ha)	Current area on DECCW estate (%)	Pre-1750 area on DECCW estate (%)
Condition classes[5]	n/a	A, B and C	TX and TXR	EBPC Act	A, B and C	A, B and C	A, B and C	A, B and C
Threatened Ecological Community								
Agnes Banks Woodland	627	88	86		14	38	43	7
Castlereagh Swamp Woodland	1,006	609	42		61	115	19	2
Cooks River/Castlereagh Ironbark Forest	12,211	976	407		8	336	34	<1
Cumberland Plain Woodland	125,449	10,612	13,918	10,726[6]	8	967	9	<1
Moist Shale Woodland	2,034	603	543		30	6	1	<1
River-flat Eucalypt Forest[7]	39,118	5,313	3,916		14	112	2	<1
Shale Gravel Transition Forest	5,427	1,670	1,242	10,726[6]	31	229	14	<1
Shale Sandstone Transition Forest	45,355	9,642	7,933	9,642	21	420	4	<1
Western Sydney Dry Rainforest	1,282	335	232		26	<1	<1	<1
Total	**232,509**	**29,848**	**28,319**	**20,368**	**13**	**2,242**	**8**	**<1**

The *Metropolitan Strategy for Sydney* (Department of Planning 2005) provides the key directions for managing Sydney's population growth until 2030. The strategy emphasises the need to minimise the urban footprint and concentrate future growth in identified centres and corridors, thereby minimising loss and disturbance to regionally and state-significant habitats. It contains environmental targets to 'maintain or improve regional biodiversity values across the region' and 'ensure 60–70% of future growth occurs within the existing urban footprint'[8]. It also requires that land release be focused in the North West and South West Growth Centres[9]. The *Metropolitan Strategy for Sydney* (Department of Planning 2005) provides strong support for addressing biodiversity issues at the strategic planning stage, linking to reforms of threatened species legislation such as biodiversity certification and Biobanking.

The NSW Government's five-year review of the *Metropolitan Strategy for Sydney* is due in late 2010. The new Metropolitan Plan will integrate infrastructure and planning into one document and will cover the next 25 years to 2036.

To secure the protection and management of high conservation value bushland in western Sydney and surrounding areas, the Growth Centres Conservation Fund, established by the Biodiversity Certification of the North West and South West Growth Centres, will provide $530 million over the next 30 years to

[4] Within the NPWS (2002) study area. Some communities extend beyond the study area and so have a greater total extent.
[5] As mapped by NPWS (2002) and Tozer (2003). Figures for 'A', 'B' and 'C' condition classes include mapping by the NSW Scientific Committee and Simpson (2008) for Cumberland Plain Woodland plus addition mapping performed for the other TECs.
[6] This figure includes both Cumberland Plain Woodland and Shale Gravel Transition Forest TECs, as these communities are listed as one entity (Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest) under the EPBC Act.
[7] The figures given may include small areas of the Swamp Oak Floodplain Forest TEC.
[8] E2.2 and E3.1 in Table 5 (Department of Planning 2005).
[9] E4.2 (Department of Planning 2005).

offset the impacts on biodiversity that will occur as the Growth Centres are developed. The fund will be used to voluntarily purchase land for addition to the public reserve system and to establish perpetual conservation agreements, including Biobanking agreements, both within and outside the Growth Centres. Consequently, it provides an unprecedented opportunity to support recovery efforts in the region by securing the long-term future of some the most significant remaining bushland areas in western Sydney and surrounding areas.

In response to the Biodiversity Certification of the North West and South West Growth Centres, a *Sydney Growth Centres Strategic Assessment Draft Program Report* (NSW Government 2010b) and the *Draft EPBC Act Strategic Assessment Report for the Sydney Growth Centres Program*[10] (NSW Government 2010c) have been developed to assesses the potential impacts of urban development on matters of National Environmental Significance protected under the EPBC Act. These draft documents were placed on public exhibition from the 24 May 2010 to 25 June 2010. If endorsed by the Commonwealth Minister for the Environment, the Strategic Assessment will ensure that matters of national environmental significance have been identified, considered and addressed early in the planning process. Commitments made for the protection of biodiversity assets under the Strategic Assessment will ensure that government, the development industry and the community have a clear understanding of how these key environmental issues will be managed in the Growth Centres.

4 Threatening processes

The principal threat to the biodiversity of the Cumberland Plain is the further loss and fragmentation of habitat. Clearing for rural and residential developments, industry, and agricultural land uses has led to increasingly isolated small remnants which are more susceptible to degradation, provide less habitat values and support fewer species.

The plant communities of the Cumberland Plain are particularly vulnerable to weed invasion due to their grassy understorey, relatively fertile soils and past agricultural uses. Weeds such as African Olive (*Olea europea* subsp. *cuspidata*), African Lovegrass (*Eragrostis curvula*) and Bridal Creeper (*Myrsiphyllum asparagoides*) have established themselves widely, displacing native plants and affecting the regeneration of communities (Benson 1992). *Invasion of Native Plant Communities by African Olive* was listed as a Key Threatening Process on the TSC Act on 1 October 2010 (NSW Scientific Committee 2010).

Due to its urban setting, frequent fire from arson is a major problem in the bushland remnants of western Sydney. This has resulted in a significant change to the bush, which has evolved over thousands of years to be dependant on a certain fire regime. Guidance on the appropriate fire regimes for Cumberland Plain vegetation is provided in Appendix 3.

Urban run-off from impermeable surfaces such as roads and house blocks can escape drainage systems and end up in bushland. This water often carries high nutrient and sediment loads, which can encourage weed invasion in addition to the soil erosion caused by the run-off. Other threats include recreational impacts, grazing and mowing, altered hydrology, sedimentation, erosion, salinity and the expected impacts of climate change. More detailed descriptions of these threats are provided in *Recovering bushland on the Cumberland Plain: Best practice guidelines for the management and restoration of bushland* (DEC 2005a). The actions contained in this recovery plan are aimed at addressing these threats in a strategic and cost-effective manner.

5 The recovery strategy – constraints, principles and themes

Given the extent of existing disturbance and the ongoing land-use pressures on the Cumberland Plain, a tailored approach is required to achieve the long-term survival of the threatened biodiversity of the region.

The main constraints to the effective implementation of recovery efforts on the Cumberland Plain are:

- highly fragmented, and in many cases, poor condition vegetation

[10] For more information see www.growthcentres.nsw.gov.au/strategicassessment-94.html.

- a lack of active management, which will result in many bushland remnants degrading through weed invasion, inappropriate use and other 'edge effects'
- the high proportion of privately owned bushland
- the largely voluntary participation of private landowners in the recovery program
- high land values
- limited funding and resources, which are nonetheless significant
- the unavoidable impact of urban growth on some bushland remnants.

It is important that prioritisation and investment in the recovery program be guided by sound principles. These principles, based upon the best available ecological evidence, are that:

- the protection and management of large, intact remnants is more effective and efficient than for smaller, fragmented remnants
- recovery efforts need to aim to ensure that a representative sample of biodiversity is conserved
- active management to best practice standards is needed to prevent the degradation of bushland in a fragmented landscape
- where impacts on biodiversity cannot be avoided, they should be offset using appropriate means.

This Cumberland Plain Recovery Plan seeks to focus recovery efforts on those lands which represent the best opportunities to secure viable, long-term conservation outcomes in the region. These lands, hereafter referred to as the priority conservation lands, have been identified by DECCW (2010) and are described in the following section.

Following these principles, a suite of recovery actions has been developed for implementation by Australian, State and local governments. The actions are grouped into the following themes:

- Building the protected area network
- Delivering best practice management
- Promoting awareness, education and engagement
- Enhancing information, monitoring and enforcement.

6 Priority conservation lands

An assessment has been undertaken using the best available information on biodiversity and threatening processes to identify the lands on the Cumberland Plain that can contribute most to the long-term recovery and maintenance of threatened biodiversity (DECCW 2010). The priority conservation lands (PCLs) (Figure 1) represent the best remaining opportunities in the region to maximise long-term biodiversity benefits for the lowest possible cost, including the least likelihood of restricting land supply. DECCW considers these lands, which cover approximately 25,566 ha, to be the highest priority for future efforts to conserve the threatened biodiversity of the region.

The method used in the identification of these lands is described in the *Report on the Methodology for Identifying Priority Conservation Lands* (DECCW 2010). Consistent with the principles outlined in Section 5, considerations included size, shape, condition, and the landscape context of individual vegetation remnants, as well as the presence of endemic threatened species, populations and communities. A target to include at least 15% of the remaining area of each of the threatened ecological communities addressed in this recovery plan was applied and exceeded for all communities (Table 3). This minimum target was in recognition of the region's high land values, fragmentation levels and land-use pressures. A total of 11,754 ha of the targeted threatened ecological communities are included in the priority conservation lands.

Table 3. Area of threatened ecological communities in the priority conservation lands

Threatened Ecological Community	Total extant area (ha)[11]		TEC in priority lands (ha)		% of extant TEC in priority lands
	TSC Act	EPBC Act	TSC Act	EPBC Act	TSC Act
Agnes Banks Woodland	88		73		83
Castlereagh Swamp Woodland	609		557		91
Cooks River/Castlereagh Ironbark Forest	976		708		73
Cumberland Plain Woodland	10,612	10,726[12]	4,171	5,045[14]	39
Moist Shale Woodland	603		478		79
River-flat Eucalypt Forest	5,313		1,339		25
Shale Gravel Transition Forest	1,670	10,726[14]	1,077	5,045[14]	64
Shale Sandstone Transition Forest	9,642	9,642	3,145	3,145	33
Western Sydney Dry Rainforest	335		206		61
Total	**29,848**	**20,368**	**11,754**	**8,190**	**39**

The threatened flora and endangered populations covered by the plan were given individual percentage targets (Table 4). All of the threatened flora and endangered populations met their representation targets within the PCLs, with the exception of the *Pomaderris prunifolia* endangered population. No specific target was applied for the Cumberland Land Snail as potential habitat for this species was included in the targets for Cumberland Plain Woodland, Castlereagh Swamp Woodland and River-flat Eucalypt Forest.

Table 4. Threatened flora species and endangered flora populations in the priority conservation lands

Threatened flora species	Populations on the Cumberland Plain	Populations within the priority lands	Actual proportion	Target proportion
Allocasuarina glairecola	5	5	100%	100%
Dillwynia tenuifolia	28	20	71%	60%
Juniper-leaved Grevillea (*Grevillea juniperina* subsp. *juniperina*)	27	17	63%	60%
Micromyrtus minutiflora	11	10	91%	80%
Sydney Plains Greenhood (*Pterostylis saxicola*)	6	6	100%	100%
Pultenaea parviflora	30	19	63%	60%
Endangered flora populations	**Populations on the Cumberland Plain**	**Populations within the priority lands**	**Actual proportion**	**Target proportion**
Dillwynia tenuifolia (Kemps Creek)	1	1	100%	100%
Dillwynia tenuifolia[13] (Baulkham Hills)	1	1	100%	100%
Marsdenia viridiflora	10	8	80%	80%
Pomaderris prunifolia[14]	2	1	50%	100%

[11] As mapped by NPWS (2002), Tozer (2003) and NSW Scientific Committee and Simpson (2008) for Cumberland Plain Woodland and addition mapping performed for the other TECs. Excludes all TX condition classes.
[12] This figure includes both Cumberland Plain Woodland and Shale Gravel Transition Forest TECs, as these communities are listed as one entity (Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest) under the EPBC Act.
[13] An additional site for this endangered population on Wisemans Ferry Rd occurs outside the study area and so was not included in this assessment.
[16] A translocation recipient site for this species in Rookwood Cemetery was not included in the assessment as it is not naturally occurring.

The priority conservation lands also contain 'other vegetation' and areas with no mapped vegetation. These non threatened vegetation types were included when they occurred at a site that was selected to meet a threatened flora target, or when they were part of a remnant that was selected to meet a threatened ecological community target. Also included were areas with no mapped vegetation. Roads, rivers, and scattered trees or derived native grasslands[15] were included in order to enhance the management viability of the PCLs. Non-vegetated areas were also included if they were part of the existing DECCW estate or were needed to establish practical management boundaries.

The priority conservation lands contain habitat for a far broader suite of threatened and regionally significant species and ecological communities than those addressed in the recovery plan. Additional threatened fauna species may include the Barking Owl, Black-chinned Honeyeater, Brown Treecreeper, Diamond Firetail, Eastern Bent-winged Bat, Gang-gang Cockatoo, Glossy Black-Cockatoo, Green and Golden Bell Frog, Grey-headed Flying-fox, Koala, Large-footed Myotis, Masked Owl, Powerful Owl, Regent Honeyeater, Speckled Warbler, Spotted-tailed Quoll, Square-tailed Kite, Squirrel Glider, Swift Parrot, Yellow-bellied Glider and Yellow-bellied Sheath-tailed Bat (DEC 2005b). Additional threatened flora species include those with distributions that extend beyond the Cumberland Plain, or for which a recovery plan has already been drafted. Conservation activities focused on the priority conservation lands will therefore have greater biodiversity benefits than just for the threatened biodiversity addressed in the recovery plan.

In identifying the priority conservation lands, the largest intact bushland remnants were targeted in the first instance. Many of these 'jewels in the crown' for conservation management are public landholdings. Key examples include the Department of Defence sites at Orchard Hills and Holsworthy, and the Air Services Australia site at Shanes Park.

The priority conservation lands are integrated with existing land-use planning strategies. About 58% of the priority conservation lands are freehold, and these are primarily rural-zoned lands on Sydney's fringes (Table 5). Areas that are zoned for residential and industrial purposes were excluded from consideration in the assessment, as were areas that have been identified for future urban growth (i.e. the certified areas of the North West and South West Growth Centres). Residential and industrial zones attract higher land values and stronger development pressures than other zones. Historically, rezoning residential and industrial zones has been a very difficult outcome to achieve for remnant vegetation and land owners may require compensation if their land is rezoned, which would disallow certain developments to proceed.

The vast majority of the priority conservation lands are located within the first preference investment areas for the Growth Centres Biodiversity Offset Program. The program will receive ¾ of the $530 million (in 2005–06 dollar values) Growth Centres conservation fund to voluntarily acquire lands for reservation or establish conservation agreements in priority areas outside the Growth Centres. The remaining ¼ of the Growth Centres conservation fund will be spent by the Department of Planning in acquiring identified conservation lands within the Growth Centres. The majority of the priority conservation lands are also mapped as Regional Biodiversity Corridors in the Hawkesbury–Nepean Catchment Action Plan (HNCMA 2006).

The priority conservation lands have been identified as regional priorities for the implementation of recovery actions. The mapping does not, in itself, imply or guarantee conservation outcomes. Such outcomes are dependent on the primary purpose of the land, future land-use planning decisions and the ability and desire of land managers to implement recovery actions. As a result, Figure 1 cannot be static through time, but must be able to be reviewed and amended in response to the effects of existing or emerging threats, the development of more up-to-date mapping of vegetation extent and condition, or changes in legislative listing or the definition of biodiversity. An action has been identified in this plan for DECCW to review the methodology and the identified areas of priority conservation lands within 5 years of the approval of this plan.

[15] Derived native grasslands are grasslands that were once grassy woodlands where the tree or shrub cover has been removed.

Table 5. Summary statistics for the priority conservation lands

Tenure	Estimated area (ha)	Percentage of total (%)
Freehold	14,887	58
National Park	3,973	16
Commonwealth land	3,602	14
Australian government land (reserve, leased, licensed, other)	1,732	7
State government land (non-Crown)	1,130	4
Council	242	<1
Zoning		
Rural	11,715	46
Special Uses	4,627	18
National Park	3,474	14
Environmental Protection	2,333	9
Open Space	2,060	8
Subject to condition 12 of GCBCO[16]	1,089	4
Other[17]	268	<1
Total	**25,566**	

The local government areas that contain priority conservation lands include:

- Bankstown City Council
- Camden Council
- Fairfield City Council
- Liverpool City Council
- The Hills Shire Council
- Blacktown City Council
- Campbelltown City Council
- Hawkesbury City Council
- Penrith City Council
- Wollondilly Shire Council.

While the priority conservation lands are considered to represent the regional conservation priorities for the Cumberland Plain, it is recognised that areas of local conservation significance (such as council reserves) complement and enhance these regional conservation priorities. Areas of local conservation significance will include buffers, corridors and ecological linkages for the priority conservation lands. The implementation of best practice management on these and other areas of local conservation significance will contribute to the long-term viability of biodiversity on the Cumberland Plain.

The targets applied in the identification of the PCLs do not represent thresholds which, if passed, indicate 'recovery' of the threatened entities. The targets were applied to assist in identifying the best remaining opportunities to secure long-term biodiversity benefits in the region and, in doing so, provide a practical and realistic focus for recovery efforts.

7 The importance of corridors and small remnants

The PCLs were chosen based on the reserve design principles of size, condition and representativeness. The PCLs are the largest, most intact remnants and are the highest priority for future recovery efforts for the threatened biodiversity of the Cumberland Plain. They represent the full suite of threatened entities in Table 1 and are arguably more viable than smaller, more fragmented remnants. DECCW recognises that smaller remnants and corridors outside the PCLs are important and may play a role in linking the PCLs

[16] Land marked with red hatching on the maps accompanying the Growth Centres Biodiversity Certification Order (GCBCO) where the native vegetation will be retained pursuant to condition 12 of the order.
[17] Includes rivers, roads and other unzoned areas, as well as proposed roads and lands reserved for other purposes, including open space.

and/or supporting biodiversity in the priority conservation lands. They may also contain biodiversity that is otherwise significant and play a role in assisting species' movement in the face of climate change.

The identification of regional conservation priorities within this Plan should not be misinterpreted as underrating the significance of remnant vegetation outside the priority conservation lands. This plan simply attempts to provide a practical, realistic conservation focus for DECCW and others. While resources at a regional level should be strategically focused on the PCLs, implementation of best-practice management on areas of local conservation significance will contribute to the long-term viability of biodiversity and will continue to be encouraged by DECCW. Important work is being undertaken by other agencies, local governments and communities to protect and restore land outside the PCLs that is of local conservation significance. This work, in coordination with appropriate planning controls, will provide a valuable complement to the PCLs and will assist in conserving biodiversity more generally.

A comprehensive network of corridors on the Cumberland Plan is being developed and managed by a range of stakeholders. Within the North West and South West Growth Centres, many riparian zones have been identified as protected land in the Biodiversity Certification Order for the Growth Centres State Environmental Planning Policy (NSW Government 2007). These flood-prone lands are important creek and riparian corridors and have been afforded special protection in the Certification Order. The zoning of these lands will not change but development controls protect existing native vegetation within these areas. This will provide protection of approximately 4,050 ha of land, of which almost 760 ha are classified as high-quality vegetation (Growth Centres Commission 2007), and these areas may act as wildlife corridors.

The establishment of the Western Sydney Parklands is another example of a regional scale habitat corridor being established in western Sydney. The parklands link the protected lands of the North West Growth Centre with those of the South West Growth Centre. They also contain five areas that are identified as priority conservation lands. A biodiversity restoration strategy for the parklands has been prepared and is being implemented by the Western Sydney Parklands Trust (Department of Planning 2008b).

A biodiversity strategy for the regional open space corridors on South and Ropes Creek, which also contain identified priority conservation lands, has been prepared by the Department of Planning (Department of Planning 2008c).

The Hawkesbury–Nepean Catchment Management Authority's Catchment Action Plan (HNCMA 2006) also supports conservation corridors and linkages and has identified regional biodiversity corridors within and outside of western Sydney. The corridors aim to provide for contiguous native vegetation at a regional scale and connect major landscape features.

It is beyond the scope of this recovery plan to identify areas that are of local conservation significance as this is more effectively done at the local government scale. An action has been identified in this plan for DECCW to encourage local government authorities to develop biodiversity strategies that are consistent with the recovery plan and that guide protection, management and strategic investment in biodiversity, both within and outside the PCLs.

8 Species-specific actions

The overall objective of the recovery plan is to provide for the long-term survival of the threatened biodiversity of the Cumberland Plain. The actions listed under the four recovery themes of the recovery program have been tailored for the management and protection all the threatened species, populations and ecological communities listed in Table 1 (with the exception the Sydney Plains Greenhood (*Pterostylis saxicola*) and the endangered population of *Pomaderris prunifolia*). All of the TECs, threatened flora and endangered populations covered under the four recovery themes have met their representation targets within the PCLs and will be equally targeted for management.

Species-specific actions were identified as necessary for the recovery of two plant species, the Sydney Plains Greenhood and the endangered population of *Pomaderris prunifolia*, following a targeted

threatened flora survey in late 2007. These actions (5.1 through to 5.7) are required due to the very small number of known sites containing these species.

9 Previous recovery actions

Programs undertaken by a number of public authorities, organisations and individuals over many years have contributed significantly to the conservation of threatened biodiversity on the Cumberland Plain. Examples of these programs include:

- *Council projects and council reserves*: Local councils have developed management plans and carry out restoration and rehabilitation works in many council reserves containing threatened biodiversity. Similarly, many councils have developed education campaigns for specific threatened entities that occur in their council reserves.
- *Cumberland Plain best practice management demonstration sites*: Four demonstration sites have been developed to provide land managers with practical on-ground examples of many of the restoration techniques outlined in the best practice management guidelines (DEC 2005a), www.environment.nsw.gov.au/threatenedspecies/CumberlandPlainManagementGuidelines.htm.
- *Conservation Incentives Program:* A project involving the Department of Environment and Climate Change and Hawkesbury–Nepean and Sydney Metropolitan Catchment Management Authorities (CMAs) targeted the on-ground implementation of priority actions for threatened entities on private property on the Cumberland Plain (DECC 2009).
- *Threatened Species Demonstration Sites Project:* The Department of Environment and Climate Change and Sydney Metropolitan CMA developed the Threatened Species Demonstration Sites Project to provide guidance to community volunteers and land managers by demonstrating best practice management of threatened species and ecological communities. One of the sites dealt with protecting and restoring the Cumberland Plain Woodland community at Campbell Hill West Reserve, Chester Hill, www.environment.nsw.gov.au/resources/threatenedspecies/08639cumbplnwl.pdf.
- *Catchment Action Plans*: Targets and programs which focus on a number of the issues affecting Cumberland Plain vegetation are included in the Catchment Action Plans of both the Hawkesbury–Nepean and Sydney Metropolitan CMAs.
- *Greening Western Sydney:* Since 1992, the Department of Planning has been involved in Sydney's largest ongoing vegetation restoration project, *Greening Western Sydney*. In association with project partners Greening Australia, the project has seen 800,000 trees and shrubs established in Western Sydney, 700,000 of which are planted within the Western Sydney Parklands area, www.greeningaustralia.org.au/index.php?nodeId=86.
- *NSW Seedbank collection of the Sydney Plains Greenhood:* From 2004 to 2006, Mount Annan Botanic Garden obtained Sydney Plains Greenhood seed by hand-pollinating potted specimens. This seed was used to isolate the mycorrhizal fungus required for germination, conduct experimental work on encapsulation of the seed and fungus (Sommerville et al. 2008), test the feasibility of storing soil samples for later fungal isolation (Sommerville et al. 2009), and generate a larger collection of adult plants. As a result, Mount Annan Botanic Garden now holds collections of seed and mycorrhizal fungi for the Sydney Plains Greenhood and also maintains a collection of potted plants.

10 Proposed recovery objectives, actions and performance criteria

The overall objective of this recovery plan is to provide for the long-term survival and protection of the threatened biodiversity of the Cumberland Plain. The specific recovery objectives are:

1. To build a protected area network, comprising public and private lands, focused on the priority conservation lands
2. To deliver best practice management for threatened biodiversity across the Cumberland Plain, with a specific focus on the priority conservation lands and public lands where the primary management objectives are compatible with biodiversity conservation
3. To develop an understanding and enhanced awareness in the community of the Cumberland Plain's threatened biodiversity, the best practice standards for its management, and the recovery program

4. To increase knowledge of the threats to the survival of the Cumberland Plain's threatened biodiversity, and thereby improve capacity to manage these in a strategic and effective manner.

Under Section 59 of the TSC Act, a recovery plan must state the actions that are to be carried out and identify the public authorities that are responsible for implementing recovery actions. A measure must not be included in a recovery plan for implementation by a public authority unless the Chief Executive Officer responsible for the public authority approves of the inclusion of that measure. Public authorities that endorsed the actions in this recovery plan before it was published are listed as responsible for their implementation under 'responsibility'. DECCW will continue to liaise with and promote the recovery plan to all relevant government authorities and organisations involved in the Cumberland Plain. The 'responsibility' lists below should not limit the implementation of actions by community groups, private individuals or public authorities not listed at the time of publication.

Recovery Objective 1: To build a protected area network, comprising public and private lands, focused on the priority conservation lands

Securing land to be actively managed for conservation purposes will underpin long-term recovery efforts on the Cumberland Plain. Actions under this objective seek to build a protected area network, focused on the priority conservation lands, that is viable and sustainable into the future.

A protected area network can include both public and private lands, provided that secure agreements are in place to achieve biodiversity conservation. The acquisition of land for the formal reserve system provides the highest level of security but can also involve high costs for purchase and significant ongoing management costs. In recognition of this, and the fact that not all landholders will be willing to enter perpetual agreements, the recovery plan will seek to use a range of mechanisms to secure biodiversity outcomes within the priority lands (Table 6).

The voluntary acquisition of private land and the establishment of conservation covenants in the PCLs will be strongly supported by the investment of the Growth Centres conservation fund, in accordance with the biodiversity certification order. The recovery plan also establishes the priority lands as being 'first preference' locations for proponents seeking to offset unavoidable biodiversity impacts in the region for other developments which are not associated with the Growth Centres.

Table 6. Potential mechanisms for including land within the protected area network

Type of land	Conservation mechanism	
	Preferred	**Other**
Freehold	• Voluntary acquisition (reservation) • Biobanking agreements • Conservation covenants	• Voluntary acquisition (open space) • Environmental protection zoning • Property vegetation plan under the *Native Vegetation Act 2003* (Wollondilly LGA only)
Australian government land	• Reservation • Biobanking agreements • Conservation covenants	• Environmental protection zoning • Memorandum of Understanding
Local government land	• Biobanking agreements • Conservation covenants	• Local open space classified as 'natural area' • Environmental protection zoning • Joint Management Agreement • Memorandum of Understanding
Other public land	• Biobanking agreements • Conservation covenants • Crown reserves dedicated for environmental protection	• Environmental protection zoning • Joint Management Agreement • Memorandum of Understanding

Future planning decisions concerning the scale and location of urban development in western Sydney, and the identification of environmental protection and open space areas, will influence the success of efforts

to build the protected area network. The identification of priority conservation lands in this recovery plan is intended to inform land-use planning decisions and to maximise conservation outcomes for threatened biodiversity. Specifically, the spatial identification of regional conservation priorities will assist strategic planners in determining:

- Where planning protection measures can most effectively be applied to conserve the areas that are of greatest significance for threatened biodiversity in the region
- Where buffers, corridors and other ecological linkages (such as stepping-stone reserves) are needed to support these areas[18].

Recovery actions: Building the protected area network

Action 1.1 DECCW will negotiate with the relevant Australian Government authorities to seek the highest level of protection for priority conservation lands managed by the Australian government, via options such as conservation agreements or the transfer of lands into the formal reserve system

Responsibility: **DECCW**

Action 1.2 DECCW will seek and encourage investment for the protection of the threatened biodiversity in Table 1, including via voluntary acquisition or conservation agreements, to be preferentially targeted to the priority conservation lands

Responsibility: **DECCW**

Action 1.3 DECCW will negotiate with other public authorities regarding the options for including the priority conservation lands that are under their care, control and management in the protected area network

Responsibility: **DECCW**

Action 1.4 Local councils will have regard to the priority conservation lands in identifying areas for inclusion in environment protection and regional open space zones

Responsibility: **Bankstown City Council, Blacktown City Council, Camden Council, Campbelltown City Council, Hawkesbury City Council, The Hills Shire Council, Liverpool City Council, Penrith City Council, Wollondilly Shire Council**

Action 1.5 In circumstances where impacts on the threatened biodiversity listed in Table 1 are unavoidable, as part of any consent, approval or license that is issued, ensure that offset measures are undertaken within the priority conservation lands where practicable (Note that offsets for impacts within the Growth Centres will continue to be provided in accordance with the Growth Centres Biodiversity Certification Order.)

Responsibility: **DECCW, Department of Planning, The Hills Shire Council, Liverpool City Council, RailCorp, NSW Roads and Traffic Authority, Sydney Water, TransGrid**

Action 1.6 DECCW will review the priority conservation lands and assessment methodology within five years of the date of approval of the plan

Responsibility: **DECCW**

Key performance targets: Building the protected area network

Five years from the date of approval of the recovery plan:

Target 1.1 The area of the priority conservation lands that is the subject to conservation mechanisms (see Table 6) will have increased

Target 1.2 The priority conservation lands and assessment methodology will have been reviewed

[18] ArcGIS shapefiles of the priority conservation lands are available on the DECCW website at www.maps.environment.nsw.gov.au/.

Recovery Objective 2: To deliver best practice management for threatened biodiversity across the Cumberland Plain, with a specific focus on the priority conservation lands and public lands where the primary management objectives are compatible with biodiversity conservation

Efforts to improve the extent and condition of native vegetation on the Cumberland Plain using assisted natural regeneration and revegetation techniques have been progressing for many years. These efforts have focused on individual sites, as well as identified local and regional corridors. Significant public funding has been invested in this work, as well as related programs including those identified in Section 8.

Actions under this objective seek to promote the adoption of best practice standards for bushland management (Appendix 2) on all tenures across the Cumberland Plain. However, particular emphasis is given to the priority conservation lands and public lands where the primary management objectives are compatible with biodiversity conservation.

These actions also seek to ensure that public funding for activities associated with the management of the threatened biodiversity addressed in this recovery plan is preferentially invested in the priority conservation lands. Having been identified as the 'regional priorities' for recovery efforts, it is appropriate that these lands be afforded the highest priority when allocating finite resources.

The funding and the implementation of best practice management may not be limited to the priority conservation lands. The importance of efforts to improve the extent and condition of native vegetation outside these areas, or to establish buffers, corridors and other ecological linkages between these is also recognised. Such work will potentially provide a valuable complement to the priority conservation lands and assist in conserving biodiversity more generally.

Recovery actions: Delivering best practice management

Action 2.1 Preferentially target any future investment associated with the management of the threatened biodiversity listed in Table 1 to the priority conservation lands where practicable

Responsibility: **Bankstown City Council, Campbelltown City Council, DECCW, Hawkesbury–Nepean CMA, The Hills Shire Council, Liverpool City Council, Sydney Metropolitan CMA**

Action 2.2 Support and promote the adoption of best practice standards for bushland management and restoration (as specified in Appendix 2) on public and private lands within the Cumberland Plain

Responsibility: **Bankstown City Council, Campbelltown City Council, City of Canterbury, DECCW, Fairfield City Council, Hawkesbury–Nepean CMA, The Hills Shire Council, Hornsby Shire Council, Liverpool City Council, Penrith City Council, Strathfield Council, Sydney Metropolitan CMA**

Action 2.3 State and Australian Government agencies will manage, to best practice standards (as specified in Appendix 2), any lands which are under their ownership or for which they have care control and management, which:

- contain any of the threatened biodiversity listed in Table 1
- are located within the priority conservation lands or, if located outside these lands, have conservation as a primary management objective

Responsibility: **DECCW, Department of Industry and Investment, RailCorp, NSW Roads and Traffic Authority, Sydney Catchment Authority, Sydney Water, TransGrid, University of Western Sydney, Western Sydney Parklands Trust**

Action 2.4 Promote the inclusion of measures to protect and restore remnant vegetation, consistent with the best practice management guidelines, in the environmental management plans for schools in the study area

Responsibility: **Department of Education and Training**

Action 2.5 Local government will manage to best practice standards (as specified in Appendix 2) any lands which are under their ownership or for which they have care, control and management, which:

- contain any of the threatened biodiversity listed in Table 1
- are located within the priority conservation lands or, if located outside these lands, have conservation as a primary management objective

Responsibility: **Bankstown City Council, Blacktown City Council, Camden Council, City of Canterbury, Fairfield City Council, Hawkesbury City Council, The Hills Shire Council, Holroyd City Council, Hornsby Shire Council, Parramatta City Council, Penrith City Council, Strathfield Council, Wollondilly Shire Council**

Action 2.6 DECCW will develop and promote a landscape-scale response to African Olive invasion on public and private lands within the Cumberland Plain

Responsibility: **DECCW**

Action 2.7 DECCW will coordinate a Cumberland Plain land managers technical group to refine and promote best practice standards for bushland management and restoration on public and private lands within the Cumberland Plain

Responsibility: **DECCW**

Key performance targets: Delivering best practice management

From the date of approval of the recovery plan:

Target 2.1 Investment in conservation activities associated with the threatened biodiversity listed in Table 1 will be preferentially directed towards the priority conservation lands, and will be reported on through the Priorities Action Statement

Target 2.2 Relevant funding agreements and consent, approval and licence conditions will include reference to the best practice bushland management standards endorsed in the recovery plan

Five years from the date of approval of the recovery plan:

Target 2.3 Public authorities endorsing the actions in this plan will have adopted management plans or management approaches for the priority conservation lands consistent with the best practice standards for bushland management described in Appendix 2

Target 2.4 Public authorities endorsing the actions in this plan will have adopted management plans or management approaches consistent with best practice standards for bushland management described in Appendix 2 for lands outside the priority conservation lands that are under their care, control and management and for which conservation is compatible with the primary management objective

Target 2.5 A landscape-scale response to African Olive invasion on public and private lands within the Cumberland Plain will have been developed and promoted

Target 2.6 A land managers technical group will have been formed to refine and promote best practice standards on public lands within the Cumberland Plain

Recovery Objective 3: To develop an understanding and enhanced awareness in the community of the Cumberland Plain's threatened biodiversity, the best practice standards for its management, and the recovery program

Actions under this objective seek to improve the capacity of stakeholders to understand and effectively implement relevant parts of the recovery program. This will involve providing access to information, developing skills and knowledge, and providing support through advice, materials and funding.

DECCW will contact private landholders within the priority conservation lands who may be interested in voluntarily selling their land or entering into a conservation agreement. Other initiatives that will be developed or supported through the recovery program within and outside the priority conservation lands include:

- ongoing provision of information on threatened biodiversity through the DECCW website (e.g. recovery plans, threatened species, populations and community profiles, management guidelines, vegetation maps etc)
- guidance on urban stormwater management
- establishment and promotion of best practice demonstration sites, showcasing both rehabilitation projects and reference sites
- development of interpretive programs for key reserves
- promotion of key events in the implementation of the recovery plan.

DECCW will also work collaboratively with local government authorities to communicate the recovery plan's messages to local communities.

Recovery actions: Promoting awareness, education and engagement

Action 3.1 DECCW will work with state and local government authorities on implementation of the NSW Diffuse Water Pollution Strategy and other programs to promote actions that reduce the impacts of stormwater on sensitive receiving environments, such as remnant bushland.

Responsibility: **DECCW**

Action 3.2 DECCW will provide access to information resources associated with the recovery program (such as the recovery plan, vegetation maps, best practice management guidelines, threatened species, populations and community profiles) through the DECCW website

Responsibility: **DECCW**

Action 3.3 DECCW will negotiate with willing landholders within the priority conservation lands to achieve improved conservation arrangements, including through the establishment of conservation agreements or the voluntary acquisition of land for reservation where cost effective

Responsibility: **DECCW**

Action 3.4 Work collaboratively with local government authorities and other organisations to inform communities about the value and role of remnant vegetation on the Cumberland Plain, the best practice standards for its management, and any opportunities to participate in the recovery program

Responsibility: **Bankstown City Council, Blacktown City Council, Camden Council, Campbelltown City Council, City of Canterbury, DECCW, Fairfield City Council, Hawkesbury City Council, The Hills Shire Council, Holroyd City Council, Hornsby Shire Council, Liverpool City Council, Parramatta City Council, Penrith City Council, Strathfield Council, Wollondilly Shire Council**

Action 3.5 Work with Aboriginal communities, landowners, community groups, and students to deliver best practice management in the priority conservation lands, and to identify other opportunities for involvement in the recovery program

Responsibility: **Bankstown City Council, Blacktown City Council, Camden Council, Campbelltown City Council, City of Canterbury, DECCW, Hawkesbury City Council, Hawkesbury–Nepean CMA, The Hills Shire Council, Holroyd City Council, Hornsby Shire Council, Liverpool City Council, Parramatta City Council, Penrith City Council, Strathfield Council, Sydney Metropolitan CMA, Wollondilly Shire Council**

Action 3.6 Establish and promote best practice management demonstration sites for the threatened biodiversity listed in Table 1

Responsibility: **City of Canterbury, DECCW, Hawkesbury–Nepean CMA, The Hills Shire Council, Hornsby Shire Council, Liverpool City Council, Strathfield Council, Sydney Metropolitan CMA**

Action 3.7 Develop interpretive programs for key local reserves that contain examples of the threatened biodiversity addressed in the recovery plan

Responsibility: **Bankstown City Council, Blacktown City Council, Camden Council, Campbelltown City Council, City of Canterbury, DECCW, Hawkesbury City Council, The Hills Shire Council, Holroyd City Council, Hornsby Shire Council, Liverpool City Council, Parramatta City Council, Penrith City Council, Strathfield Council, Wollondilly Shire Council**

Key performance targets: Promoting awareness, education and engagement

Five years from the date of approval of the recovery plan:

Target 3.1 Urban stormwater management guidelines will have been promoted to key stakeholders in the region

Target 3.2 Key information resources associated with the recovery program will be accessible on the DECCW website

Target 3.3 A strategy for improving conservation arrangements for land within the priority conservation lands will be developed and implemented with willing landholders

Target 3.4 Local government authorities will be implementing communication strategies associated with the recovery plan

Target 3.5 Demonstration sites for threatened biodiversity will be established and promoted

Recovery Objective 4: To increase knowledge of the threats to the survival of the Cumberland Plain's threatened biodiversity, and thereby improve capacity to manage these in a strategic and effective manner

The biodiversity of the Cumberland Plain has been the focus of considerable research and survey effort. The existing information on the region's biodiversity, particularly regional native vegetation mapping, has served its purpose well by providing clear evidence of the extent of vegetation loss, the level of fragmentation, and by highlighting conservation significance. This information has had a major influence on decision-making processes and has provided a common basis for directing community action and on-ground restoration programs.

The data on which much of the original regional vegetation mapping was based are now over ten years old. To remain relevant to future decision-making, this mapping needs to be reviewed and updated. In general, updates can largely be completed remotely with the use of contemporary, high quality aerial photography, although some site survey may be required, for example, at sites that were affected by fire during previous surveys or whose vegetation remains 'unclassified'.

Verification and updating of the regional vegetation maps are also needed to enhance monitoring, as well as compliance and enforcement programs to tackle unauthorised land clearing and degradation activities.

DECCW will encourage and assist local government authorities to develop biodiversity strategies that are consistent with the priorities identified in the recovery plan. This would involve the identification of buffers, corridors and ecological linkages that would support the priority conservation lands and identification of other areas of local conservation significance.

The actions under this objective also promote research and monitoring priorities that are relevant to the management of the threatened biodiversity of the Cumberland Plain.

Recovery actions: Enhancing information, monitoring and enforcement

Action 4.1 Review the adequacy of the existing regional vegetation mapping, including information on the extent, condition and classification of the vegetation, to determine what requires updating and identify the gaps where further information is required

Responsibility: **DECCW**

Action 4.2 DECCW will seek resources to update the existing vegetation maps for the Cumberland Plain, and to provide for more ongoing monitoring and updates every 5 to 10 years

Responsibility: **DECCW**

Action 4.3 DECCW will encourage local councils to prepare or review biodiversity strategies to be consistent with the recovery plan that guide protection, management and strategic investment in threatened biodiversity, both within and outside of the priority conservation lands

Responsibility: **Bankstown City Council, Blacktown City Council, Camden Council, Campbelltown City Council, City of Canterbury, DECCW, Fairfield City Council, Hawkesbury City Council, The Hills Shire Council, Holroyd City Council, Hornsby Shire Council, Liverpool City Council, Parramatta City Council, Penrith City Council, Strathfield Council, Wollondilly Shire Council**

Action 4.4 DECCW will work collaboratively with local councils to enhance the compliance and enforcement program with regard to the unauthorised clearing of bushland on the Cumberland Plain

Responsibility: **Bankstown City Council, Blacktown City Council, Camden Council, Campbelltown City Council, City of Canterbury, DECCW, Fairfield City Council, Hawkesbury City Council, The Hills Shire Council, Holroyd City Council, Hornsby Shire Council, Liverpool City Council, Parramatta City Council, Penrith City Council, Strathfield Council, Wollondilly Shire Council**

Action 4.5 DECCW will work with the Department of Planning to establish a statutory framework that enables DECCW to be notified when development activity under the EP&A Act occurs within and adjacent to priority conservation lands

Responsibility: **DECCW, Department of Planning**

Action 4.6 DECCW will support, promote and, where feasible, undertake research and monitoring that will assist future management decisions regarding the threatened biodiversity listed in Table 1, in accordance with the research priorities detailed in Appendix 4

Responsibility: **DECCW**

Key performance targets: Enhancing information, monitoring and enforcement

Five years from the date of approval of the recovery plan:

Target 4.1 The regional native vegetation mapping will have been updated using recent aerial photography

Target 4.2 Local government authorities will be actively implementing biodiversity strategies which adopt an approach consistent with that of the recovery plan

Target 4.3 Enhanced compliance and enforcement programs will be established utilising updated vegetation mapping and remote sensing technologies where feasible

Target 4.4 Collaborative research and monitoring programs on the threatened biodiversity of the Cumberland Plain will be established to inform on-ground management decisions

Additional species-specific actions for the endangered population of *Pomaderris prunifolia* and Sydney Plains Greenhood

The overall strategy of the recovery plan is to provide for the long-term survival of the threatened biodiversity of the Cumberland Plain, including the threatened species, populations and ecological communities listed in Table 1. In addition to the list of actions under the four themes of the recovery strategy, species-specific actions have also been identified for the recovery of two plants, the Sydney Plains Greenhood and the endangered population of *Pomaderris prunifolia*. These actions are required due to the very small number of known sites containing these species.

Recovery actions: Species-specific actions

Pomaderris prunifolia (a shrub) population in the Parramatta, Auburn, Strathfield and Bankstown LGAs

Action 5.1 Using propagative material sourced from the Rydalmere site, seek to establish a viable self sustaining population of *Pomaderris prunifolia* in nearby habitat that is under secure tenure

Responsibility: **Parramatta City Council**

Action 5.2 Prepare a translocation proposal for the *Pomaderris prunifolia* at the Rydalmere site to guide the implementation of these works and the long-term monitoring outcomes

Responsibility: **Parramatta City Council**

Action 5.3 Ensure that the Rydalmere *Pomaderris prunifolia* work is consistent with the *Guidelines for Translocation of Threatened Plants in Australia* (Vallee et al. 2004)

Responsibility: **Parramatta City Council**

Action 5.4 Implement an ecological burn of the *Pomaderris prunifolia* population at the Bankstown Crest Reserve site within 2 years of approval of the recovery plan to encourage seedling recruitment of this species

Responsibility: **Bankstown City Council**

Sydney Plains Greenhood

Action 5.5 Coordinate the implementation of a monitoring program for the Sydney Plains Greenhood in consultation with landholders to monitor population dynamics and response to management

Responsibility: **DECCW**

Action 5.6 Conduct additional targeted surveys for the Sydney Plains Greenhood in the Holsworthy and Wilton areas

Responsibility: **DECCW**

Action 5.7 Investigate flasking or seed banking of existing populations of the Sydney Plains Greenhood

Responsibility: **DECCW**

Key performance targets: Species-specific actions

Five years from the date of approval of the recovery plan:

Target 5.1 Propagative material sourced from the Rydalmere site will have been used to establish a population of *Pomaderris prunifolia* in nearby habitat under secure tenure

Target 5.2 A translocation proposal for the *Pomaderris prunifolia* at the Rydalmere site will have been prepared

Target 5.3 Works at the Rydalmere *Pomaderris prunifolia* site will be consistent with the *Guidelines for Translocation of Threatened Plants in Australia* (Vallee et al. 2004)

Target 5.4 An ecological burn will have been implemented at the Bankstown Crest Reserve site within 2 years of approval of the recovery plan to encourage seedling recruitment of this species

Target 5.5 Implementation of monitoring program for the Sydney Plains Greenhood will be coordinated in consultation with landholders

Target 5.6 Targeted surveys will have been completed for the Sydney Plains Greenhood in Holsworthy and Wilton areas

Target 5.7 Symbiotic culture and seed banking for existing collections of the Sydney Plains Greenhood will have been investigated, and seed collected and stored from wild populations

11 Consideration of Aboriginal interests

With over 30,000 people, the greater Sydney region contains one of the largest Aboriginal populations in Australia (Attenbrow 2002). Local Aboriginal Land Councils (LALCs) are significant landowners of native vegetation on the Cumberland Plain. They are required to protect the interests of Aboriginal persons in this area in relation to the acquisition, management, use, control and disposal of its land. There are three LALC with responsibility for areas in the Cumberland Plain: Deerubbin, Gandangara and Tharawal. LALCs and other groups representing Aboriginal people from the Cumberland Plain have been contacted during the writing of this recovery plan, and consultation with these groups is ongoing.

DECCW recognises that the LALCs have social, cultural and economic interests for their lands that both compete and complement the biodiversity values. DECCW proposes to work closely with LALCs to identify opportunities for multiple outcomes across these areas. Opportunities may exist through DECCW's *Land Alive* program to engage with LALCs regarding biodiversity issues. *Land Alive* gives Aboriginal landowners a chance to balance economic objectives with land stewardship responsibilities through managing land for conservation under the Biobanking scheme[19].

Biobanking enables land owners to derive an annual income to manage land for biodiversity conservation and provides a streamlined offset mechanism for development impacts on biodiversity. In this regard the scheme has benefits for Aboriginal land owners in both conservation and development contexts, which is highly relevant for Aboriginal land owners in a metropolitan setting. *Land Alive* assists Aboriginal land owners to participate successfully in the Biobanking scheme by developing knowledge of biodiversity values on Aboriginal owned land, increasing the skills of Aboriginal land owners to manage land for conservation and providing support to Aboriginal land owners to test the Biobanking scheme.

Land Alive has engaged with two of the three LALCs in the Cumberland Plain area and has an on-going relationship with the NSW Aboriginal Land Council (NSWALC) to develop strategies to identify and address policy and legislative concerns from the Land Council perspective.

12 Critical habitat

Critical habitat has not been declared for any of the threatened entities addressed by this recovery plan under the TSC Act. The declaration of critical habitat under the TSC Act is not considered to be a priority, as other measures will be employed through the implementation of this plan that will seek to increase the security of the regional conservation priorities.

Under the EPBC Act, a recovery plan must identify the habitats that are critical to the survival of the species or communities covered by the plan. 'Habitat critical to the survival' differs from 'critical habitat' under the EPBC Act, which has not been declared for any of the threatened entities addressed in this plan. For the threatened entities in Table 1 that are listed under the EBPC Act, the Priority Conservation Lands are considered to contain the habitats critical to their survival. It should be noted that the Priority Conservation Lands will be reviewed within 5 years of the approval of this plan, in accordance with Action 1.6.

13 Social and economic consequences of taking action

Implementation of the recovery plan will deliver a range of socio-economic benefits including:

- the long-term survival of viable areas of conservation value for threatened biodiversity that are also the most cost effective for ongoing management
- the most effective and efficient use of available resources, ensuring that each available conservation dollar delivers the maximum investment return
- the delivery of ecological and human services, such as air and water quality, regulation of local climatic conditions, noise abatement, amenity and recreation

[19] For more information visit the DECCW website at www.environment.nsw.gov.au/landalive/index.htm.

- meeting community expectations for the protection of biodiversity
- supporting provision of a safety net for the biodiversity impacts of climate change
- streamlined planning processes and potential economic gains for private landowners protecting and managing biodiversity under new schemes such as Biobanking.

The recovery program has been designed to align with existing programs and commitments where possible. These include:

- the Growth Centres conservation fund which will strongly support actions to build the protected area network on the Cumberland Plain, consistent with the biodiversity certification order (NSW Government 2007)
- land-use planning commitments under the *Metropolitan Strategy for* Sydney (Department of Planning 2005) and standard local planning practice requirements
- current land-use zoning (i.e. avoiding areas that are zoned for urban development)
- existing requirements for the preparation of management plans, either by State or local government authorities responsible for land management
- existing programs to manage and control environmental weed and pest animal species
- restoration and rehabilitation projects being delivered through the Hawkesbury–Nepean and Sydney Metropolitan CMAs, the Greening Western Sydney program, and local Landcare and Bushcare groups
- existing programs to establish best practice demonstration sites and develop educational and promotional material
- existing corridors identified in western Sydney.

New or supplementary resources are required in some action areas, including:

- verification and updating of the native vegetation maps of the Cumberland Plain and ongoing monitoring of the extent and condition of native vegetation
- the enhancement of compliance and enforcement programs targeting unauthorised clearing
- reviewing *Recovering bushland on the Cumberland Plain: Best practice guidelines for the management and restoration of bushland* (DEC 2005a)
- developing a landscape-scale response to African Olive invasion on the Cumberland Plain (as per completion of action 2.6).

This recovery plan does not require that additional planning protections be placed over the priority conservation lands. What the recovery plan does do is inform land-use planning decisions by clearly identifying the priority conservation lands as being regional priorities for the conservation of threatened biodiversity. The socio-economic implications of future rezoning or development proposals in the priority conservation lands will be addressed via the existing assessment processes of the EP&A Act.

Similarly, the actions in the *Metropolitan Strategy for* Sydney (Department of Planning 2005) provide clear direction regarding the NSW Government's commitment to the protection of Sydney's biodiversity values. The recovery program directly reflects these commitments and in that context does not in itself generate any new socio-economic impacts that have not already been contemplated by the NSW Government.

14 Preparation details and review date

This recovery plan has been prepared by the NSW Department of Environment, Climate Change and Water with financial assistance from the Australian Government. It has been developed in consultation with the NSW Scientific Committee (Appendix 5) and other technical and scientific experts both within and external to DECCW. The information in this recovery plan was accurate to the best available knowledge on the date it was approved.

This recovery plan will be reviewed five years from the date of its approval by the Minister for Climate Change and the Environment.

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Appendix 1: Cost and implementation details

Action no	Action title	Priority [22]	Cost estimate ($/year)					Total cost ($)	Funding sources[23]	Responsible party[24]
			Year 1	Year 2	Year 3	Year 4	Year 5			
Building the protected area network										
1.1	DECCW will negotiate with the relevant Australian government authorities to seek the highest level of protection for priority conservation lands managed by the Australian government, via options such as conservation agreements or the transfer of lands into the formal reserve system	1	2,000	2,000	2,000	1,000	1,000	8,000	In kind	DECCW
1.2	DECCW will seek and encourage investment for the protection of the threatened biodiversity in Table 1, including via voluntary acquisition or conservation agreements, to be preferentially targeted to the priority conservation lands	1	2,000	2,000	2,000	2,000	2,000	10,000	In kind	DECCW
1.3	DECCW will negotiate with other public authorities regarding the options for including the priority conservation lands that are under their care, control and management in the protected area network	1	2,000	2,000	2,000	2,000	2,000	10,000	In kind	DECCW
1.4	Local councils will have regard to the priority conservation lands in identifying areas for inclusion in environment protection and regional open space zones	1						Not costed	In kind	BnksCC, BlaCC, CC, CCC, HillsSC, LCC, PCC, WSC
1.5	In circumstances where impacts on the threatened biodiversity listed in Table 1 are unavoidable, as part of any consent, approval or license that is issued, ensure that offset measures are undertaken within the priority conservation lands where practicable (Note that offsets for impacts within the Growth Centres will continue to be provided in accordance with the Growth Centres Biodiversity Certification Order)	1						Not costed	Unsecured	DECCW, DoP, HillsSC, LCC, RailCorp, RTA, SW, TransGrid
1.6	DECCW will review the priority conservation lands and assessment methodology within five years of the date of approval of the plan	3				5,000	5,000	10,000	Unsecured and in kind	DECCW
Delivering best practice management										
2.1	Preferentially target any future investment associated with the management of the threatened biodiversity listed in Table 1 to the priority conservation land where practicable	1						Not costed	Unsecured	BnksCC, CCC, DECCW, HNCMA, HillsSC, LCC
2.2	Support and promote the adoption of best practice standards for bushland management and restoration (as specified in Appendix 2) on public and private lands within the Cumberland Plain	2						Not costed	Unsecured	BnksCC, CCC, CoC, DECCW, FCC, HNCMA, HillsSC, HbySC, LCC,

Action no	Action title	Priority [22]	Cost estimate ($/year)					Total cost ($)	Funding sources[23]	Responsible party[24]
			Year 1	Year 2	Year 3	Year 4	Year 5			
										PenCC, SC, SMCMA
2.3	State and Australian government agencies will manage, to best practice standards (as specified in Appendix 2), any lands which are under their ownership or for which they have care, control and management and: - contain any of the threatened biodiversity listed in Table 1 - are located within the priority conservation lands or, if located outside these lands, have conservation as a primary management objective	1						Not costed	Unsecured	DECCW, I&I, RailCorp, RTA, SCA, SW, TransGrid, UoWS, WSPT
2.4	Promote the inclusion of measures to protect and restore remnant vegetation, consistent with the best practice management guidelines in the environmental management plans for schools in the study area	3							Not costed	DET
2.5	Local government will manage to best practice standards (as specified in Appendix 2), any lands which are under their ownership or for which they have care control and management, which: - contain any of the threatened biodiversity listed in Table 1 - are located within the priority conservation lands or, if located outside these lands, have conservation as a primary management objective	1							Not costed	BnksCC, BlaCC, CC, CoC, FCC, HillsSC, HolCC, HbySC, ParaCC, PenCC, SC, WSC
2.6	DECCW will develop and promote a landscape-scale response to African Olive invasion on public and private lands within the Cumberland Plain	2	1,600	1,600	1,600	1,600	1,600	8,000	In kind	DECCW
2.7	DECCW will coordinate a Cumberland Plain land managers technical group to refine and promote best practice standards for bushland management and restoration on public lands within the Cumberland Plain	3	1,600	1,600	1,600	1,600	1,600	8,000	In kind	DECCW
Promoting awareness, education and engagement										
3.1	DECCW will work with state and local government authorities on implementation of the NSW Diffuse Water Pollution Strategy and other programs to promote actions that reduce the impacts of stormwater on sensitive receiving environments, such as remnant bushland.	2	2,000	2,000	1,000	1,000	1,000	7,000	In kind	DECCW
3.2	DECCW will provide access to information resources associated with the recovery program (such as the recovery plan, vegetation maps, best practice guidelines, threatened species, populations and community profiles) through the DECCW website	2	500	500	500	500	500	2,500	In kind	DECCW
3.3	DECCW will negotiate with willing landholders within the priority conservation lands to achieve improved conservation arrangements, including through the establishment of conservation agreements or the voluntary acquisition of land for reservation where cost effective	2	220,000	140,000	70,000	70,000	70,000	570,000	Secured[25]	DECCW
3.4	Work collaboratively with local government authorities and other organisations to inform communities about the value and role of remnant vegetation on the	2						Not costed	In kind	BnksCC, BlaCC, CC,

Action no	Action title	Priority [22]	Cost estimate ($/year)					Total cost ($)	Funding sources[23]	Responsible party[24]
			Year 1	Year 2	Year 3	Year 4	Year 5			
	Cumberland Plain, the best practice standards for its management, and any opportunities to participate in the recovery program									CCC, CoC, DECCW, FCC, HillsSC, HolCC, HbySC, LCC, ParaCC, PenCC, SC, WSC
3.5	Work with Aboriginal communities, landowners, community groups, and students to deliver best practice management in the priority conservation lands, and to identify other opportunities for involvement in the recovery program	2						Not costed	Unsecured	BnksCC, BlaCC, CC, CCC, CoC, DECCW, FCC, HNCMA, HillsSC, HolCC, HbySC, LCC, ParaCC, PenCC, SC, SMCMA, WSC
3.6	Establish and promote best practice demonstration sites for the biodiversity listed in Table 1	2	30,000	30,000	30,000	10,000	10,000	110,000	Unsecured and in kind	CoC, DECCW, HNCMA, HillsSC, HbySC, LCC, SC, SMCMA
3.7	Develop interpretive programs for key local reserves that contain examples of the threatened biodiversity addressed in the recovery plan	2	3,000	3,000	3,000	3,000	3,000	15,000	Unsecured and in kind	BnksCC, BlaCC, CC, CCC, CoC, DECCW, HillsSC, HolCC, HbySC, LCC, ParaCC, PenCC, SC, WSC
Enhancing information, monitoring and enforcement										
4.1	Review the adequacy of the existing regional vegetation mapping, including information on the extent, condition and classification of the vegetation, to determine what requires updating and identify the gaps where further	2	1,600	1,600	1,600	1,600	1,600	8,000	In kind	DECCW

Action no	Action title	Priority [22]	Cost estimate ($/year)					Total cost ($)	Funding sources[23]	Responsible party[24]
			Year 1	Year 2	Year 3	Year 4	Year 5			
	information is required									
4.2	DECCW will seek resources to update the existing vegetation maps for the Cumberland Plain, and to provide for more regular ongoing monitoring and updates	3						Subject to action 4.1, not costed	Unsecured	DECCW
4.3	DECCW will encourage local councils to prepare or review biodiversity strategies to be consistent with the recovery plan and that guide protection, management and strategic investment in threatened biodiversity, both within and outside of the priority conservation lands	1						Not costed	Unsecured and in kind	BnksCC, BlaCC, CC, CCC, CoC, DECCW, FCC, HillsSC, HolCC, HbySC, LCC, ParaCC, PenCC, SC, WSC
4.4	DECCW will work collaboratively with local councils to enhance the compliance and enforcement program with regard to the unauthorised clearing of bushland on the Cumberland Plain	2						Not costed	Unsecured and in kind	BnksCC, BlaCC, CC, CCC, CoC, DECCW, FCC, HillsSC, HolCC, HbySC, LCC, ParaCC, PenCC, SC, WSC
4.5	DECCW will work with the Department of Planning to establish a statutory framework that enables DECCW to be notified when development activity under the EP&A Act occurs within and adjacent to priority conservation lands	1	2,000	2,000	2,000	2,000	2,000	10,000	In kind	DECCW, DoP
4.6	DECCW will support, promote and, where feasible, undertake research and monitoring that will assist future management decisions regarding the threatened biodiversity listed in Table 1, in accordance with the research and monitoring priorities detailed in Appendix 4	3						Not costed	Unsecured and in kind	DECCW
Additional species-specific actions are proposed for the *Pomaderris prunifolia* endangered population and Sydney Plains Greenhood (*Pterostylis saxicola*)										
***Pomaderris prunifolia* endangered population**										
5.1	Using propagative material sourced from the Rydalmere site, seek to establish a viable self sustaining population of *Pomaderris prunifolia* in nearby habitat that is under secure tenure	2							Unsecured	ParraCC
5.2	Prepare a translocation proposal for the *Pomaderris prunifolia* population at the	2	2,000	2,000	2,000	2,000	2,000	10,000	Unsecured	ParraCC

Action no	Action title	Priority [22]	Cost estimate ($/year)					Total cost ($)	Funding sources[23]	Responsible party[24]
			Year 1	Year 2	Year 3	Year 4	Year 5			
	Rydalmere site to guide the implementation of these works and the long-term monitoring outcomes									
5.3	Ensure that the Rydalmere *Pomaderris prunifolia* work is consistent with the *Guidelines for Translocation of Threatened Plants in Australia* (Vallee et al. 2004)	2	1,600	1,600					Unsecured and in kind	DECCW, ParraCC
5.4	Implement an ecological burn of the *Pomaderris prunifolia* population at the Bankstown Crest Reserve site within 2 years of approval of the recovery plan to encourage seedling recruitment of this species.	2							Unsecured	BnksCC
Sydney Plains Greenhood										
5.5	Coordinate the implementation of a monitoring program for the Sydney Plains Greenhood in consultation with landholders to monitor population dynamics and response to management	3	4,000	4,000	4,000	4,000	4,000	20,000	Unsecured and in kind	DECCW
5.6	Conduct additional targeted surveys for the Sydney Plains Greenhood in the Holsworthy and Wilton areas	3	4,000	4,000	4,000	4,000	4,000	20,000	Unsecured and in kind	DECCW
5.7	Investigate flasking or seed banking of existing populations of the Sydney Plains Greenhood	3	4,000	4,000	4,000	4,000	4,000	20,000	Unsecured	DECCW

[22] Priority ratings are: 1 - action critical to meeting plan objectives, 2 - action contributing to meeting plan objectives, 3 - desirable but not essential action.
[23] 'In kind' funds represent a salary component of permanent staff and current resources.
[24] Abbreviations: BnksCC = Bankstown City Council, BlaCC = Blacktown City Council, CC = Camden Council, CoC = City of Canterbury, CCC = Campbelltown City Council, DECCW = Department of Environment, Climate Change and Water, DET = Department of Education and Training, I&I = Department of Industry and Investment, DoP = Department of Planning, FCC = Fairfield City Council, HNCMA = Hawkesbury–Nepean Catchment Management Authority, HillsSC = The Hills Shire Council, HolCC = Holroyd City Council, HbySC = Hornsby Shire Council, LCC = Liverpool City Council, ParraCC = Parramatta City Council, PCC = Penrith City Council, RTA = NSW Roads and Traffic Authority, SC = Strathfield Council, SCA = Sydney Catchment Authority, SMCMA = Sydney Metro Catchment Management Authority, SW = Sydney Water, UoWS = University of Western Sydney, WSPT = Western Sydney Parklands Trust, WSC = Wollondilly Shire Council.
[25] These funds are dependent on the certification order for the Growth Centres being maintained in its current form.

Appendix 2: Best practice standards for bushland management

For the purposes of this recovery plan, DECCW has defined best practice standards for bushland with various management objectives. Below are the requirements for lands to meet best practice standards for management.

1. Bushland on **public lands within or outside the priority conservation lands which have conservation as a primary management objective** requires:
   - an adopted plan of management, management system or biodiversity strategy (or similar planning document), which addresses management of threatened biodiversity and is consistent with the recovery plan
   - the implementation of the plan, system or strategy is funded such that its objectives are met
   - details of the implementation of the plan, system or strategy are publicly reported
   - monitoring to be undertaken periodically to determine the status of threatened entities, or to assess the effectiveness of threat abatement measures being implemented (for guidance see the *Monitoring manual for bitou bush control and native plant recovery* (Hughes et al. 2009) at www.environment.nsw.gov.au/bitouTAP/monitoring.htm)
   - management to be consistent with the following documents, and any additional best practice documents that DECCW may promote at a later date:
     - *Recovering bushland on the Cumberland Plain – Best practice guidelines for the management and restoration of bushland* (DEC 2005a)
     - the recommended fire regimes in the Appendix 3
     - a landscape-scale response to African Olive invasion on the Cumberland Plain (as per completion of action 2.6)

2. Bushland on **public lands outside the priority conservation lands where conservation is not a primary management objective but is compatible with the primary management objective** requires:
   - an adopted management system or policy (or similar planning document) which addresses management of threatened biodiversity and is consistent with the recovery plan
   - the land to be managed such that the objectives of the management system or policy are met
   - monitoring to be undertaken periodically to determine the status of threatened entities, or to assess the effectiveness of threat abatement measures being implemented (for guidance see the *Monitoring manual for bitou bush control and native plant recovery* (Hughes et al. 2009) at www.environment.nsw.gov.au/bitouTAP/monitoring.htm)
   - management is consistent with the following documents, and any additional best practice documents that DECCW may promote at a later date:
     - *Recovering bushland on the Cumberland Plain – Best practice guidelines for the management and restoration of bushland* (DEC 2005a)
     - the recommended fire regimes in the Appendix 3
     - a landscape-scale response to African Olive invasion on the Cumberland Plain (as per completion of action 2.6)

3. Bushland on **private lands** requires:
   - a site action or management plan to be prepared which addresses the management of threatened biodiversity and is consistent with the recovery plan
   - the land to be managed in accordance with the site action or management plan
   - management to be consistent with the following documents, and any other best practice documents that DECCW may promote at a later date:
     - *Recovering bushland on the Cumberland Plain – Best practice guidelines for the management and restoration of bushland* (DEC 2005a)
     - the recommended fire regimes in Appendix 3

Appendix 3: Recommended fire regimes for threatened biodiversity of the Cumberland Plain

Inappropriate fire regimes can alter the species composition and the structure of ecological communities. The key factors in fire regimes are the fire's frequency, intensity and season of occurrence. High fire frequency leads to a reduction in shrub diversity and abundance, particularly legumes (e.g. *Dillwynia* and *Pultenaea* species). However, low fire frequency often leads to dominance of one shrub species, such as Blackthorn (*Bursaria spinosa*) or Prickly Leaved Paperbark (*Melaleuca nodosa*). Given the fragmented nature of Cumberland Plain remnants, an inappropriate fire regime can lead to local extinctions of species because recolonisation or perpetuation of the population elsewhere in the landscape may not be possible.

The recommended fire intervals (i.e. fire frequencies) for Cumberland Plain ecological communities will vary depending on their structure, with the grassy woodlands requiring a higher fire frequency than the shrubby woodlands to maintain their structure. There is need for further investigation of fire intervals for the Cumberland Plain to determine more conclusively the required fire regimes for various ecological communities (Appendix 4).

The current recommended fire intervals (Table 7 and 8) are largely based upon fire interval guidelines for broad vegetation types (NPWS 2003) and the NSW Rural Fire Service's Threatened Species Hazard Reduction List[26], amended to include information based upon studies carried out specifically within Cumberland Plain ecological communities (Watson 2005).

It is important to note that when applying inter-fire intervals in planning, actual intervals, seasonality and fire intensity experienced at a site should be variable to ensure the greatest species diversity.

The figures in Table 7 and 8 are indicative and their implementation should be accompanied by ongoing monitoring of the effects on species richness and community structure. Site-specific plans should be adopted that take into consideration the overall management aims and the use of fire in the local context.

Table 7. General fire regimes for threatened ecological communities of the Cumberland Plain[27]

Threatened Ecological Community	Suggested min fire interval (years)	Suggested max fire interval (years)
Agnes Banks Woodland	7	30
Castlereagh Swamp Woodland	7	30
Cooks River/Castlereagh Ironbark Forest	5	18
Cumberland Plain Woodland	5	12
Elderslie Banksia Scrub Forest	7	30
Moist Shale Woodland	Burning not recommended	Burning not recommended
Shale Gravel Transition Forest	5	15
Shale Sandstone Transition Forest	7	30
Sydney Coastal River-flat Forest	7	35
Western Sydney Dry Rainforest	Burning not recommended	Burning not recommended

[26] For more information see www.rfs.nsw.gov.au/dsp_content.cfm?CAT_ID=536.

[27] Fire intervals are based upon fire interval guidelines for broad vegetation types (NPWS 2003) and the NSW Rural Fire Service's Threatened Species Hazard Reduction List, amended to include information from Watson (2005). Fire intensity and season of occurrence should also be considered when undertaking ecological burns.

Table 8. General fire regimes for threatened species and populations of the Cumberland Plain[28]

Species	Suggested min fire interval (years)	Suggested max fire interval (years)
Allocasuarina glairecola	7	25
Dillwynia tenuifolia	7	15
Juniper-leaved Grevillea (*Grevillea juniperina*)	7	25
Marsdenia viridiflora endangered population	7	25
Micromyrtus minutiflora	7	15
Pomaderris prunifolia endangered population	7	15
Sydney Plains Greenhood (*Pterostylis saxicola*)	7	15
Pultenaea parviflora	7	15

[28] Fire intervals are based upon fire interval guidelines for broad vegetation types (NPWS 2003) and the NSW Rural Fire Service's Threatened Species Hazard Reduction List, amended to include information from Watson (2005). Fire intensity and season of occurrence should also be considered when undertaking ecological burns.

Appendix 4: Research priorities for the threatened biodiversity of the Cumberland Plain

DECCW will liaise with research institutions to facilitate research relevant to the recovery of Cumberland Plain threatened biodiversity. Research priorities include:

Identifying impacts and management responses

Investigating impacts on the threatened species, populations and communities and management responses required to manage:

- invasive weed species, especially African Olive
- climate change
- salinity
- elevated soil nutrient levels
- fire regimes.

Investigating ecological restoration

- developing and refining revegetation techniques appropriate to Cumberland Plain threatened ecological communities that re-establish understorey diversity and structure
- determining the role of pollination vectors in habitat restoration
- undertaking trials to establish the propagation requirements for key Cumberland Plain species (including threatened species, populations and communities) to assist with restoration
- researching the seed storage requirements of key Cumberland Plain species (including threatened species, populations and communities)
- researching ecosystem dynamics, particularly in response to disturbance and the role of soil seed banks
- identifying key species with tolerance to salinity for revegetation in riparian areas and affected areas
- investigating the benefits or otherwise of introducing new genetic material into fragmented remnants through enhancement plantings.

Increasing our understanding of threatened species, populations and communities

- gathering information on the distribution and ecology of threatened species and regionally rare species on the Cumberland Plain to improve management
- establishing the relationship between remnant size and ecological value
- understanding habitat requirements for sustainable fauna populations in the Cumberland Plain, including the bushland corridor requirements necessary to facilitate movement of fauna
- developing a system of target species/bioindicators to assess vegetation condition and ecological resilience of Cumberland Plain threatened ecological communities and remnants
- investigating the impact of fire on the fauna values
  - For example, determining an appropriate fire frequency for Cumberland Land Snail
- establishing long-term monitoring sites to assess the long-term change in vegetation structure and required management regimes
  - for example, impact of dense, large shrub regrowth upon the long-term viability of specific threatened species within the Cumberland Plain (e.g. *Dillwynia tenuifolia* and *Pultenaea parvilflora*).

Improving management practices and responses

- developing and refining revegetation techniques appropriate to Cumberland Plain threatened ecological communities that re-establish understorey diversity and structure
- identifying domestic grazing management practices that allow the regeneration of threatened ecological communities and maintenance of biodiversity values
- further refining appropriate fire management regimes to maintain ecological integrity of Cumberland Plain threatened ecological community remnants
- investigating the relationship between fire frequency and exotic weeds in Cumberland Plain.

Appendix 5: Summary of advice from the NSW Scientific Committee

Under Section 66A of the *Threatened Species Conservation Act 1995*, recovery plans must include a summary of any advice given by the NSW Scientific Committee, details of any amendments made to the plan to take account of that advice and a statement of reasons for any departure from that advice. The NSW Scientific Committee's comments on the *Draft Cumberland Plain Recovery Plan* and details of the amendments made are tabled below.

Section of draft	Comment	DECCW response
General comment	The plan must prioritise all remaining pockets of remnant vegetation on the Cumberland Plain and provide a plan for their restoration.	Recovery Objective 1 of the plan aims to build a protected area network focused on the priority conservation lands. The significant funding and resources available for implementation of conservation efforts on the Cumberland Plain are only a fraction of that required to protect and restore all remnants. Therefore the scope of the *Report on the Methodology for Identifying Priority Conservation Lands* (DECCW 2010) was to identify the lands that are most suitable for investment in conservation activities, rather than the identification of all lands in the region with conservation value. The identification of priority areas for future conservation management within the plan should not be misinterpreted as underrating the significance of remnant vegetation outside the identified priority areas. The plan attempts to provide a practical, realistic conservation focus for DECCW and others, but agrees that there are additional areas of conservation value outside the PCLs, including smaller remnants. The plan includes many actions that aim to support and promote protection, management and restoration across the wider Cumberland Plain on lands that contain the threatened entities covered by the plan. These actions are to be implemented within and outside the PCLs. For example, under Recovery Objective 2, which aims to deliver best-practice management, Actions 2.2, 2.3, 2.4 and 2.5 relate to lands within and outside of the PCLs, including small remnants. Similarly, Actions 3.4, 3.5 and 3.7 can all be implemented on, or in relation to, small remnants. Finally, Actions 4.4, 4.5 and 4.7 all encourage protection, management, compliance and research for threatened biodiversity both within and outside of the PCLs regardless of the size of remnants. DECCW has amended the plan to emphasise the importance of small remnants and corridors at a local scale.
General comment	There should be more funded actions that are focused on on-ground actions, not secondary actions like public awareness campaigns or consultation or liaison activities.	The plan clearly states that the aim of building a protected area network is to secure land to be *actively managed* for conservation purposes (page 11) through the implementation of Actions 1.1, 1.2, 1.3 and 1.5. Funds for this are provided through the Growth Centres Conservation Fund (up to $530 million over 30 years). The preferred mechanisms listed in Table 5 of the plan all require long-term, detailed plans of management to be developed and implemented, which identify conservation values and on-ground management actions required to improve or maintain values in perpetuity. Furthermore, Actions 2.2, 2.3, 2.4 and 2.5 under Recovery Objective 2, on pages 12 and 13 of the plan, seek the implementation of best practice standards for bushland management on all tenures across the study area. These actions aim to improve the extent and condition of native vegetation on the Cumberland Plain using assisted natural regeneration and revegetation techniques. Public awareness campaigns and community consultation and liaison activities play a hugely important role in the conservation of biodiversity. Without an understanding of the remaining biodiversity values and the threats they face, the potential for the large human populations of western Sydney to engage with active on-ground management through Bushcare or other initiatives will be curtailed. These activities are especially relevant for the Cumberland Plain as 76% of all bushland on the Cumberland Plain occurs on private land (DEC 2005) and the threatened species, populations and communities listed in Table 1 of the plan occur on both public and private land. No change.

9	The first Specific Recovery Objective mixes objective and mechanism. The objective should not be constrained by the mechanism.	The reference to the PCLs in the objective is warranted as it clearly identifies the priorities of the plan. No change.
9	Specific Recovery Objective 3 for management of private land should be strengthened to facilitate active management.	This objective is targeted wholly towards education. Active management is the focus of Specific Recovery Objective 2. No change.
9	An additional Specific Recovery Objective should be included: "To prevent further clearing of threatened ecological communities", and this should be accompanied by a corresponding action.	The recovery plan is integrated with existing land-use planning strategies to provide the highest possible degree of awareness, acceptance and uptake by planning authorities. However, the unavoidable impact of urban growth on some bushland remnants is a real constraint. DECCW does not have a statutory role in making environmental planning instruments or approving or determining developments or activities, providing advice only to consent and determining authorities. It must also be noted that under Section 60 of the TSC Act, a measure must not be included for implementation by a public authority unless the chief executive officer of the public authority approves of the inclusion of the measure. The plan also acknowledges that there is not unlimited funding available in the context of that required to comprehensively protect and restore all patches of threatened remnant vegetation. The Growth Centres Conservation Fund provides an unprecedented opportunity to support recovery efforts in the region with up to $530 million to be spent in western Sydney and surrounding areas over the next 30 years. As a result, the plan advocates the prioritisation of investment in the PCLs, which represent the best remaining opportunities in the region to maximise long-term biodiversity benefits for the lowest possible cost. No change.
1	The plan should recognise the relationship between recovery plans and the *Threatened Species Conservation Act 1995.*	Amended
2	Table 1 needs updating to reflect recent changes to the conservation status of TECs	Amended
2	The map should include all remnant native vegetation and overlay the PCLs. Identify remnants and include tenure and other details in a table	Map amended. Summary statistics of tenure of PCLs shown in Table 5.
3	Bat species should be mentioned by name	Amended
3	Wording and examples of aggressive native species needs clarificaton.	Amended
3	Examples of remnants that support threatened vertebrates would be helpful, to enable populations to be monitored.	Monitoring threatened fauna populations will be a component of site management plans developed and implemented in accordance with Actions 2.2, 2.3 and 2.5 and the *Best Practice Standards for Bushland Management* (Appendix 2). Action 4.7 also aims to support stakeholders in monitoring threatened entities covered by the plan. No change.
3	The Plan understates the importance of small remnants.	Recovery Objective 1 of the plan aims to build a protected area network focused on the priority conservation lands. The draft refers to the assessment methodology used to identify these lands, which is described in the *Report on the Methodology for Identifying Priority Conservation Lands* (DECCW 2010). The significant funding and resources available for implementation of conservation efforts on the Cumberland Plain are only a fraction of that required to protect and restore all remnants. Therefore the scope of the methodology report was to identify the lands that are most suitable for investment in conservation activities, rather than the identification of all lands in the region with conservation value. The identification of priority areas for future conservation management within the plan should not be misinterpreted as underrating the significance of remnant vegetation outside the identified priority areas. The plan attempts to provide a practical, realistic conservation focus for DECCW and others,

		but agrees that there are additional areas of conservation value outside the PCLs, including smaller remnants. The plan has been amended to strengthen this with a new section: Section 7 *The important role of corridors and small remnants.*
3	The figures of current extent of TECs in Table 2 need updating.	Amended
6	The minimum target of 15% protection of remaining extent of TECs is too small.	The principles on which the PCLs were defined (comprehensive, adequate, representative) were modified for western Sydney in recognition of the region's high land values, fragmentation levels and land-use pressures. The identification of the PCLs as the basis for a protected area network in western Sydney significantly exceeds this target. Between 25 and 91% of the extant distribution of the threatened ecological communities are represented in the PCLs, and six of the nine communities have greater than 60% of their remaining area within the PCLs. No change.
6	It is misleading to include land (e.g. rivers and roads) that is not part of a TEC in the summary statistics of the PCLs.	The draft plan states on page 8 that: "The priority conservation lands also contain 'other vegetation' and areas with no mapped vegetation. These vegetation types were included when they occurred at a site that was selected to meet a threatened flora target, or when they were part of a larger remnant that was selected to meet a threatened ecological community target. Also included were areas with no mapped vegetation. These include roads, rivers and derived native grasslands. Non-vegetated areas were also included if they were part of the existing DECCW estate or were needed to establish practical management boundaries." No change.
6	More information is required on reasons why particular vegetation patches were selected for inclusion in the PCLs.	DECCW will release the *Report on the Methodology for Identifying Priority Conservation Lands* (DECCW 2010), which provides information on reasons for including land within the PCLs. No change.
6	The plan is flawed by exclusion from assessment as PCLs of all lands zoned residential, commercial or for the NW and SW Growth Centres.	The *Report on the Methodology for Identifying the Priority Conservation Lands* (2010), which will be released along with the final plan, excluded these lands on the basis of capability. The capability assessment focussed on identifying lands with the greatest potential to deliver long-term conservation outcomes for threatened biodiversity. Conservation outcomes for lands zoned for residential and industrial purposes are much harder to achieve in the context of a recovery program as they attract higher land values and stronger development pressures than other zones. Historically, rezoning from residential to environmental protection has been a very difficult outcome to achieve for remnant vegetation and land owners may require compensation if their land is rezoned. As a result these are too expensive to purchase or reserve under other conservation mechanisms. No change.
6	The Plan needs actions for protecting biodiversity in non-PCLs. There should be some discussion of compliance	The plan includes many actions that aim to support and promote protection, management and restoration across the wider Cumberland Plain., Actions 2.2, 2.3, 2.4 and 2.5 aim to deliver best-practice management to lands within and outside of the PCLs, including small remnants. Similarly, Actions 3.4, 3.5 and 3.7 can all be implemented on, or in relation to, small remnants. Finally, Actions 4.4, 4.5 and 4.7 all encourage protection, management, compliance and research for threatened biodiversity both within and outside of the PCLs. DECCW believes that the implementation of Actions 4.3 and 4.5 will effectively address compliance issues. No change.
7	Inadequate attention has been given to threatened species with specific actions for only 2 species.	The presence of individual threatened species and populations played a core role in the identification of the PCLs. Additional targets were applied for the inclusion of the recovery plan's threatened flora species and endangered populations and areas of 'other vegetation' were included when they occurred at a site that was selected to meet a threatened flora target. The plan has been amended to include the targets for individual threatened flora species and populations that were used to derive the PCLs.
Recovery	Key performance targets are too	The operating context of western Sydney is influenced by many factors

objective 1	vague to be useful.	and is exceedingly complex. The high and extremely variable land values between zonings and across the broad geographic area of the Cumberland Plain preclude any reasonable or realistic area-based targets for inclusion of lands in the protected area network. In light of these issues the timeframes for achieving targets of any magnitude are far too uncertain to predict. No change.
Recovery objective 4	Education, monitoring and compliance actions should be extended to landholders and neighbours of all TECs, not just those within or adjacent to PCLs.	All of the actions under recovery objective 4 (except 4.6) relate to the wider Cumberland Plain, not just the PCLs. No change.
Appendix 1	Cost details are missing and some are incorrect.	Amended

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