#### Department of Planning, Industry and Environment

https://www.planningportal.nsw.gov.au/draftplans/exhibition/draft-cumberland-plainconservation-plan

#### Draft Cumberland Plain Conservation Plan

In response to the encouragement to 'have your say' on the Draft Cumberland Plain Conservation Plan, I submit the following brief comments as a citizen resident in Sydney. In making these comments I draw on many years of experience\*\* advocating for a "work with nature" approach in government processes as the foundation for human wellbeing.

The draft now on public exhibition is the latest of many studies, reports and plans with fine words of intent that have fallen by the wayside due to lack of political will and process to deliver.

Meanwhile the landscape that constitutes the Cumberland Plain has been increasingly modified for intensive human use changing its character for ever to the extent that costly measures are now required to mitigate erosion, pollution and to maintain even a semblance of natural open space to sustain the shrinking, fragmented patches of habitat and the wildlife it supports.

In the light of this ongoing downhill trajectory, exacerbated by governments that fail to address the increasingly scary predictions on human influenced climate change along with the implications of increasing consumption by increasing numbers of people, it is hard to have trust that the good aspects of this draft Plan are achievable.

The vision of a Western Parkland City as "a liveable place where people can easily access and enjoy nature" is compromised from the start by excision of major infrastructure corridors.

The implementation of the Plan is also compromised by key steps postponed into the future; by inadequate resourcing; and by dependence on flawed bio-banking arrangements.

Many people have put a lot of work into pulling this draft Plan together, and many citizens like myself are making comment to seek the best outcome possible from this initiative and I do not wish to decry their efforts – but in truth I can only say "it was a good attempt, but this Plan is just not good enough".



10 October 2020

\*\*relevant initiatives include "Planning for People" charter with NCCNSW; "Enduring Landscapes" - attached (with NPANSW); Women and Planning Conference (with the SA Council for Women)

## Sarah Ng

From:	
Sent:	Friday, 9 October 2020 10:45 PM
То:	DPE PS Biodiversity Mailbox
Subject:	Draft Cumberland Plain Conservation Plan Submission
Attachments:	CumberlandPlainsub_20201010.docx; NPA-(2006)-Enduring-Landscapes-Report.pdf

Please accept submission and attachment





## **Enduring Landscapes**

Towards Co-existence with Nature through a Regional Protected Area Plan - Greater Sydney



# Contents

I: FOREWORD: THE CHALLENGE LAID OUT	4
II: SUMMARY RECOMMENDATIONS:	5
1.0 INTRODUCTION	7
2.0 FORMAL PROTECTED AREAS	8
2.1 Past Milestones	8
2.2 Shortcomings	9
<ul> <li>2.3 Formal Conservation Proposals - Ecological and Policy Overview</li></ul>	10 12 14 17 18
3.0 INFORMAL CONSERVATION	.19
3.1 Commonwealth Properties	. 20
3.2 State Agencies/Utilities	. 20
3.3 Land Capability Classes VII and VIII	. 21
3.4 Floodplains	. 22
3.5 Riparian Zones	. 22
4.0 PLANNING BASED CONSERVATION	.23
4.1 Greenbelts	. 23
4.2 Prescriptive Planning Controls for Conservation and Open Space	. 27
4.3 Recognition of Physicality in Conservation Planning	. 28
5.0 REVIEW SYNTHESIS AND CONSEQUENTIAL RECOMMENDATIONS	; .30
<ul> <li>5.1 Hawkesbury – Sydney's Northern Margins</li></ul>	. <b>32</b> . 32 . 32 . 32 . 32 . 32 . 33

5.2 Cumberland Plains - Sydney's Northwest and Southwest Margins	
5.2.1 Proposed Conservation Estate – Areas in Progress	
5.2.2 Informal Conservation Estate – Binding Covenant Required	
5.2.3 Proposed Conservation Estate – Major Freehold Blocks	39
5.2.4 Key Linkages	39
5.2.5 Landscapes of State Significance	
5.3 Woronora and Illawarra – Southern Margins	
5.3.1 Proposed Conservation Estate – Areas in Progress	
5.3.2 Informal Conservation Estate – Binding Covenant Required	
5.3.3 Proposed Conservation Estate – Major Freehold blocks	
5.3.4 Key Linkages	
5.3.5 Landscapes of State Significance	

## I: Foreword: The Challenge Laid out

National Parks Association of New South Wales (NPA) presents this report to decision makers, planners and the public with a clear challenge in mind. We aim to show, through past and present examples, the very important choices now before us for how Sydney's natural areas and open green space will fare into the future.

One of the possible pathways leads to parks and other natural areas persisting just as green satellites, dotted amid the vast areas of urban settlement. Such natural patches would remain as perhaps a pleasing outlook from the nearby suburbia, or as popular weekend outdoor destinations. They would however be permanently struggling, and in all likelihood failing, in providing for the continuing function and security of our native ecosystems.

NPA proposes an alternative way, where planning for the future of our great city sets targets and provides legal frameworks not only for major infrastructure and rollout of urban release and renewal, but equally for securing the present character of several iconic or highly vulnerable natural landscapes.

The challenge for the existing and planned protected areas of greater Sydney and the neighbouring Illawarra is to move policy and practice from achieving isolated green specs that resemble museum pieces, to articulating a strategy for enduring landscapes, capable of sustaining and building in ecological value over time.

This report sets out three basic principles to redress the ecological decline that Sydney has experienced for decades. Firstly, a focus on ecological recovery and viability; secondly, establish and plan new natural protected areas; and finally, recognise the need for firm and statutory protection for key landscapes of state significance.

All of these principles will need to be supported by a diversity of Government resource allocations which reflect the scale of the challenges being faced.

## **II: Summary Recommendations:**

- A. Creation of the following biodiversity conservation areas, and open space reserves:
  - 1. A linked web of nature reserves and habitat corridors through the Castlereagh woodlands and lower South Creek valley
  - 2. Orchard Hills Commonwealth land and surrounding woodlands.
  - 3. The moist shale woodland and related threatened ecosystems in the Razorback Range area
  - 4. Several new or expanded Nature Reserve areas within the Western Sydney Parklands
  - 5. New formal conservation areas within a Hawkesbury-Nepean open space corridor
  - 6. New formal conservation areas in the Hacking River headwaters and above the 50 metre contour of the Illawarra escarpment, buffering the urban interfaces of both Sydney and Wollongong.
  - 7. Viable natural corridors from the Illawarra Escarpment to the coast and consolidation with water catchment lands to the west
  - 8. Acquisition of environment protection zoned lands of the Kurnell Peninsula
  - 9. New formal conservation areas within a Mona Vale escarpment open space corridor.

B. Designate a footprint for essential development in the Sydney/Wollongong metropolitan region, outside of which there should be no assumed approval of clearing of vegetation communities, populations or species listed under State or Federal Threatened Species legislation, and definitely no use of trade-offs for rural oriented land clearing.

C. No development of highly significant remnants identified in major vegetation audits, including those outlined in the Western Sydney Urban Bushland Biodiversity Survey (1997) and Illawarra Biodiversity Strategy (2003). These remnants must be priorities for acquisition as future conservation reserves.

D. Land acquisitions should be prioritised to capture areas of Endangered Ecological Communities (EECs) more likely to ultimately contribute to coherent or networked conservation areas and recovery of clustered patches into viable habitat through active ecological management.

E. The State Government, having taken on greater planning and consent responsibility for matters of State significance, must also now reframe certain decision responsibilities for environmental protection issues where State conservation significance is clear. Specifically, the creation of a planning instrument for *Landscapes of State Significance* is required.

F. Landscapes of State significance must be identified now, and protected from development. Offsetting schemes could then fruitfully be implemented for fragmented and degraded areas, consolidating connections between core habitats and protected areas. Without this foundation of protected areas of high conservation value, efforts towards "offsetting" further loss from urban development will fail.

G. At least 85% of biodiversity offsets funding from the Sydney Metro Strategy's urban expansion throughout western Sydney must be used for the acquisition of high priority remnant vegetation as identified in the Western Sydney Urban Bushland study and subsequent Department of Environment and Conservation (DEC) assessments.

H. Destruction of remnants for urban development must be offset with either, and preferably both, a greater area of land acquired for conservation reserves and the securing of remnants of greater ecological integrity than those being affected.

I. Conservation reserve acquisitions must be prioritised and determined biogeographically, i.e. according to where the largest and most viable examples of each ecosystem occur across the ecological province.

J. Outside of the present urban expansion planning areas, any vegetation identified in past biodiversity surveys as a priority remnant will require an enforcement of "maintain or improve" policies by State and Local governments.

K. No privatisation of State and Commonwealth land containing remnant vegetation, and formalising of protection of these areas through permanent covenants and agreements over transfer to the NSW reserve system if the lands become surplus to the needs of the agency in question.

L. Off-reserve conservation by catchment management authorities is most valuable along major watercourses and their floodplains, being areas where urbanisation is excluded for flood liability reasons, and where regeneration methods have already been developed and progressed by Greening Australia. Such zones will form valuable future linkages between dedicated conservation lands.

## **1.0 Introduction**

Sydney is entering a new phase of planned growth and development, through the designing and implementation of a *Metropolitan Strategy* and related actions. National Parks Association (NPA) is concerned to ensure that attention to matters of natural heritage and biodiversity under this strategy extends to more than just proposing safeguards or mitigation measures for the roll out of major developments.

If the environment really matters in Sydney's future planning scheme, then we need to be laying out a vision of substantial new conservation outcomes, which can be counted on to flow from the next phase of the City's evolution. Importantly, this must not just be as a concession to development, but as an outstanding conservation achievement in its own right.

In other words, there needs to be a set of environmental protection goals for the coming five to twenty five years, which can be pinned down with the same degree of certainty that is available to planners of urban releases or transport infrastructure.

At present, this is anything but the case: Many longstanding conservation proposals sit in a limbo state, as future options for their protection are gradually eroded by competing emergent land use proposals.

The Sydney Metropolitan Strategy could easily offer a framework for new major conservation outcomes, which would then be implemented progressively with the underpinnings of strong planning powers and land use dedications. In order to see this happen, NPA has compiled this report as a review of conservation in the Sydney Region. The focus is on demonstrating the best ways forward to achievement of such outcomes, and on ensuring the right processes are in place so that the public can be confident of long term goals being attained. This focus could be condensed into the phrase *Achievable Believable Conservation* (ABC).

The past outcomes and present outlook are examined for:

- Formal conservation within dedicated protected areas such as National Parks, Nature Reserves and conservation agreements
- Informal conservation under natural resource stewardship, benign land uses and low-impact land capability designations; and
- Conservation by land use planning policies and instruments

## **2.0 Formal Protected Areas**

The history and patterns of protected area achievements around Sydney are as full of contrast as the city itself. National Parks and other conservation reserves may be found within ten kilometres of the city centre, and natural areas of substantial size within a forty kilometre radius.

Armed with only a broad-scale map of the land tenure around greater Sydney, a lay person could understandably conclude that the process of setting up National Parks and other kinds of protected areas was either well advanced, or indeed complete in our region.

Closer inspection of the *range of environments* and *species habitats* occurring around Sydney reveals something nearer to the true picture - that our region holds a mixture of both measured successes and alarming losses in nature conservation. Similarly, the provision of open green space for recreation and sustaining the scenic integrity of Sydney's suburbs and rural/bushland surrounds has been very patchy compared with that aspired to by our forebears. Notably, we have lost key areas of once quarantined open space endorsed by planners and policy makers in previous urban planning strategies of the 1940s-1960s.

#### 2.1 Past Milestones

The Sydney sandstone flora is recognized as one of the Australian continent's centres of endemism - regions rich in species that only naturally occur within their boundaries (Crisp *et al.* 2001).

These sandstone-endemic environments have fortunately been spared, largely due to their unsuitability for farming and other land uses most prone to displacement of natural vegetation cover. Particularly in the valleys of steep watercourses, and to an extent on poorly-drained and nutrient-starved sandstone plateau tops, many areas had remained in their natural condition well into the 20<sup>th</sup> Century. This is reflected in such ecosytems' predominance within the current National Park and Crown Land estate.

As an example, Royal National Park - our oldest National Park - protects an immense diversity of vegetation associations, including freshwater dunal swamps, plateau heaths and several types of open forest and rainforest.

In the greater Blue Mountains, there remain vast areas of temperate eucalypt wilderness in reserves like Wollemi National Park. These areas have been recognised by the World Heritage convention for their protection of plant biodiversity.

Not all significant milestones have centred on such large components of the reserve system. Members of local communities, subsequently with the support of councils such as Gosford Shire, have done admirable work obtaining protection for their area's natural skyline under local government open space acquisition programs.

This in turn, through the establishment and progressive expansion of parks like Wambina Nature Reserve, has protected patches of high quality forest habitat, and vegetation types recognised as under-represented ecosystems in the reserves of the central coast hinterland.

Most recently in 2003, there has been announcement of State Government policy supporting the connection of many of Sydney's larger parks of the sandstone country, to create an unbroken chain of reserves linking from the southern forests of NSW/Victoria as far north as the Hunter Valley. This is a goal NPA has been working toward under various local and regional campaigns (NPA 2006).

#### 2.2 Shortcomings

In relation to areas of more traditional National Park and Nature Reserve establishment around Sydney's sandstone plateaus, there remain conservation values in need of formal permanent protection, whether through addition to the National Park system or via other comparable mechanisms. Sandstone ridge-top vegetation is less comprehensively sampled in reserves than gully vegetation, mostly due to the proliferation of urban development along ridge systems. In particular the drier, moderate altitude ridge-top communities occurring on Hawkesbury sandstone away from coastal influences are regionally important and support a number of endangered shrub species. Ridge-top development clearly also has impacts extending beyond the margins of the built up area, leaving sandstone bushland with altered stream hydrology, pollution risk and fractured habitat patches.

Amid many sandstone landscapes are pockets of less common communities such as woodland on lateritic (ironstone) soils, patches of shale or basalt influenced vegetation, sand-body shrublands and alluvial forests.

The retention of the above biodiversity values is best achieved through conservation within larger expanses of sandstone sclerophyll vegetation, to not only buffer rare ecosystems but also to maintain regional habitat values, integrity of forested sub-catchments, and examples of large scale vegetated landscapes as cornerstones of Sydney's heritage estate.

The profile of the typical Sydney sandstone environments described above focuses on the most intact examples of natural environments in our region. Lying adjacent to, or also nested within, these fairly robust sandstone environments, are a range of other soil-climatic associations that support quite distinct vegetation associations and habitats.

These ecosystems have had a disproportionately high area affected by expanding settlements, agriculture, infrastructure, and the fragmentation and losses associated with such activities. There has been a recognised decline toward extinction of entire vegetation communities, their habitat functions long since disrupted and becoming steadily less able to recover unassisted.

The focus of this decline is woodland and forest found on the relatively productive shale soil landscapes which occur within the Sydney Basin rock sequence both above and below the Hawkesbury sandstone (Benson and Howell 1990).

For similar reasons of higher soil fertility, ecosystems adapted to patches of basalt (volcanic) soil are almost as diminished as those on shale.

Also in decline under the development or resource extraction footprints is vegetation adapted to riverine, dune and estuarine depositional environments. Such environments range from the ancient Castlereagh gravels of the north western suburbs to the contemporary floodplains of the Hawkesbury-Nepean and Georges River systems, to the once extensive sand dunes, swamps and tidal marshlands of Sydney's southeastern suburbs (Benson and Howell 1990). These environments, if featured at all in National Park estate, are represented only by tiny remnant areas.

In 2006, the tip of the iceberg of long term damage is represented and documented in numerous individual endangered species listings, *four* listed endangered populations and *thirty five* listed endangered ecological communities found in these poorly-conserved landscape components (NSW Scientific Committee Determinations 1997-present). This critical ecological status is compounded by the very small area of land reserved for conservation within the shale soil ecological province known as the Cumberland Plains.

Even the widespread Sydney sandstone bushland is not immune to ecological damage however, with several listed endangered species and populations, distinct from those quantified above, occurring within its environments. Habitat isolation within the sandstone reserve system also exacerbates the impact of frequent, deliberately lit bushfires (Gill and Williams 1996), such as in areas like Royal National Park.

Virtually all of greater Sydney's ecological communities that are restricted to shale or depositional soil environments are now listed as endangered (along with most basalt soil communities), and if we are to achieve the recovery goals of New South Wales and Federal threatened species policies and laws, the impacts of past, present and future human activity will need to be repaired and controlled. An expanded reserve system forms a key component of these recovery goals, and is recognised as the best option to conserve ecosystem viability (Sattler and Glanznig 2006).

#### 2.3 Formal Conservation Proposals - Ecological and Policy Overview

NPA keeps stock of many reserve proposals throughout greater Sydney, and has outlined the majority of these in the report *Proposed National Park Additions in the Sydney Region* (Latham 1999). Table 2.1 shows a summary by ecological sub-regions of areas of highest interest. The sub-regions are based on a *biogeographic* approach, which divides the Sydney Basin bioregion into component ecological provinces relating to the main physical influences over local ecology - namely soil and geology, topography, humidity, altitude and seasonality.

In greater Sydney, excluding the Blue Mountains, Central Coast and Southern Highlands, this breakdown leads to a demarcation of seven main ecological provinces. The sandstone ridge/valley systems from Sydney Harbour to Broken Bay and the lower Hawkesbury estuary, including minor areas of coastal lowland along the northern beaches, are grouped together as the Hawkesbury Plateau. Immediately inland and still dominated by sandstone ridge/valley landscapes is the Macdonald Plateau province, which experiences higher seasonality and lower humidity due to its greater distance from coastal influences.

 Table 2.1 Protected Area Summary for Sydney's Ecological Provinces

 (Abbreviations: NP = National Park; NR = Nature Reserves; RP = Regional Park; SCA = State Conservation Area; HS = Historic Site; SF = State Forest)

110 111010110 0110, 01	2	1	r
Ecological	Existing Reserves	Key Proposals	Progress
Province			
Hawkesbury	Garigal NP	Additions to Sydney	1 Ku-Ring-Gai
Plateau	Lane Cove River NP	Harbour	addition recently
	Ku-Ring-Gai Chase NP	Additions to Lane Cove	occurred
	Brisbane Water ND	Additions to Garigal	occanea
	Popran NP	wheeler Creek valley	wheeler Creek
	Sydney Harbour NP (part)	Additions to Ku-Ring-Gai	Active
	Marramarra NP (part)	Chase	
	Yengo NP (part)	Additions to Muogamarra	Others static due to
	Muogamarra NR	Additions to Marramarra	land tenure or
	Dural NR	Additions to Brisbane	departmental issues
	Long Island ND	Water	departmentar issues
		w alci	
	Spectacle Island NR		
	Berowra Valley RP		
Macdonald	Marramarra NP (part)	Maroota	Yengo addition
Plateau	Dharug NP	Additions to Marramarra	active
	Yengo NP (part)	O' Haras Creek	
	Parr SCA	Calangara	Others static due to
	Cattai NB (part)	Dvorrabbin	topura and
	Cattal NF (part)		
	Wollemi NP (part)	Additions to Yengo	departmental issues
	Maroota Ridge SCA	(Mellong Swamps area)	
	Maroota HS	Additions to Wollemi	
	Wisemans Ferry HS	(Morans Rock; Comleroy	
		SF)	
Cumberland	Scheyville NP	Additions to Agnes	Prospect, Kemps
Plains	Cattai NP (part)	Banks	Creek and
1 millio	Agnes Banks NR	Shanes Park	Hinchinbrook active
	Windsor Downs ND	St Marya woodlanda	Thirdeninorook active
	Ditt Texur ND	(former ADL site)	Haytan Dark
	Pitt Town NK	(former ADI site)	Hoxton Park
	Castlereagh NR	Prospect reservoir	woodland is now
	Kemps Creek NR	Additions to Kemps	bisected by M7
	Mulgoa NR	Creek	motorway
	Wallamutta NR	Hoxton Park	
	Dalrymple Hay NR	Hinchinbrook	Others static due to
	Newington NR	Orchard Hills	tenure issues
	r to thington r the		
	Rouse Hill RP	Razorback Range	
	Rouse Hill RP Western Sydney PP	Razorback Range	
	Rouse Hill RP Western Sydney RP	Razorback Range Castlereagh woodlands	
	Rouse Hill RP Western Sydney RP Leacock RP	Razorback Range Castlereagh woodlands habitat links	
	Rouse Hill RP Western Sydney RP Leacock RP Mirambeena RP	Razorback Range Castlereagh woodlands habitat links South Creek habitat link	
	Rouse Hill RP Western Sydney RP Leacock RP Mirambeena RP William Howe RP	Razorback Range Castlereagh woodlands habitat links South Creek habitat link Cranebrook former Air	
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Woronora Plateau Nattai Plateau Illawarra Escarpment/	Rouse Hill RP Western Sydney RP Leacock RP Mirambeena RP William Howe RP Royal NP (part) Heathcote NP Botany Bay NP Sydney Harbour NP (part) Georges River NP Towra Point NR Dharawal NR & SCA Garrawarra SCA Wolli Creek RP Nattai NP (Part) Thirlmere Lakes NP Bargo SCA Royal NP (part) Illawarra Escarpment SCA	Razorback Range Castlereagh woodlands habitat links South Creek habitat link Cranebrook former Air Services land Additions to Georges River Additions to Botany Bay Additions to Botany Bay Additions to Botany Bay Additions to Towra Point Woronora Valley Holsworthy bushland Metropolitan Catchments Additions to Garrawarra Macarthur SCA Nepean SCA Bargo River	Metropolitan catchments part active Towra Point part active Others static due to tenure, mining and departmental issues Bargo River part active, part static due to mining issues Illawarra part active
Woronora Plateau Nattai Plateau Illawarra Escarpment/ Lowlands	Rouse Hill RP Western Sydney RP Leacock RP Mirambeena RP William Howe RP Royal NP (part) Heathcote NP Botany Bay NP Sydney Harbour NP (part) Georges River NP Towra Point NR Dharawal NR & SCA Garrawarra SCA Wolli Creek RP Nattai NP (Part) Thirlmere Lakes NP Bargo SCA Royal NP (part) Illawarra Escarpment SCA Macquarie Pase NP	Razorback Range Castlereagh woodlands habitat links South Creek habitat link Cranebrook former Air Services land Additions to Georges River Additions to Botany Bay Additions to Towra Point Woronora Valley Holsworthy bushland Metropolitan Catchments Additions to Garrawarra Macarthur SCA Nepean SCA Bargo River	Metropolitan catchments part active Towra Point part active Others static due to tenure, mining and departmental issues Bargo River part active, part static due to mining issues Illawarra part active

South and southwest of these two major sandstone provinces is a large expanse of the youngest of the Sydney Basin geological sequence – the Wianamatta shales, within what is termed the Cumberland Plains province. Low rolling plains and river flats are the dominant environment of the province, but there are also areas of steeper topography or higher elevation around the margins such as the shale hills between Liverpool and Camden and the diffuse boundary into sandstone country along the northern suburbs ridges

Southeast of the Cumberland Plains, and extending as far north as Sydney's Eastern suburbs is the Sandstone dominated Woronora Plateau. Diversity in this province is enhanced by the large areas of coastal dune and estuary environments, although much of this was lost under the present day eastern and inner southern suburbs. The Nattai Plateau shares landscape and geologic characteristics with the Woronora Plateau, but experiences lower rainfall and greater seasonality in much the same way as occurs across the east-west succession of Hawkesbury/MacDonald Plateaus previously described.

The Illawarra Escarpment province is a linear elongate landscape along the abrupt eastern edge of the Woronora Plateau, and extending into the southern part of the Hacking River valley which exposes the same geology and similar topographic relief as the main coastal escarpment. The province is significant for the conduit role it can play for forest dependent fauna in surrounding bushland. The adjacent Illawarra lowlands is geologically diverse, comprising coastal plains and low ridge systems of both sedimentary and volcanic origin.

#### 2.3.1 Hawkesbury-MacDonald Plateaus

The province with the greatest area protected in National Park estate is the extensive Macdonald Plateau province, with around 278 000 hectares reserved. Most of this area however is north of the Hawkesbury River estuary within Wollemi, Yengo and Dharug National Parks. In contrast, most of NPA's outstanding conservation proposals within this province are south of the Hawkesbury, in the Baulkham Hills and Hornsby shires of Sydney. It is the bushland through this area which if lost or heavily degraded, would lead to long term isolation of our existing conserved habitat areas along the southern Hawkesbury River such as Ku-Ring-Gai Chase National Park, Berowra Valley Regional Park and Marramarra National Park on Sydney's margins.

Figure 2.1 is centered on the existing conservation proposals of the adjoining Hawkesbury and MacDonald Plateau provinces. There is an obvious cluster of existing parks and proposed new reserves or additions along the ridges flanking the valley of the Hawkesbury River and its tributaries. Ecologically, this chain of areas provides for persistence of genetic exchange from the coastal environments around Broken Bay to the vast temperate eucalypt forests of the Blue Mountains and surrounding plateau systems beyond Sydney's edges. A number of the proposals would also improve the representation of healthy vegetation communities of moderate-elevation sandstone ridge tops, and along small tributary streams. These communities are either under-represented or suffer varying levels of degradation in many of the existing reserved areas due to urban ridge top development. A direct relationship can also be shown between urbanisation effects and aquatic ecological health. This translates to a high conservation priority for any remaining streams with presently low land use impacts in their catchments.



The other obvious value of the proposals surrounding the Hawkesbury estuary is in maintenance of the scenic integrity of the region. Over 100 kilometres of bush-lined gorges occur along this estuary. Few cities the size of Sydney would have within easy reach such an extensive tidal waterway amid largely natural landscape surrounds.

Away from the Hawkesbury River, other priorities include some ecological strongholds for the Sydney and Deanes Blue Gums (*E. Saligna* and *E. Deanii*) within deep alluvial sands in the Calangara, Maroota and O'Haras Creek proposals. These form part of the suite of endangered ecological communities (EECs) adapted to river flat environments.

Within the more urban confines of the Sydney Harbour catchment and northern beaches, the opportunity exists for the improved tenure security offered by National Park gazettal for bushland adjoining Lane Cove River National Park in one of the wettest areas of the Hawkesbury Plateau, to Garigal National Park in the southern catchment of Narrabeen Lagoon, and to Sydney Harbour National Park in the local wildlife haven of North Head.

As summarised in Table 2.1, most of these proposals have been static for some time in terms of progress towards formal dedication as protected areas. Reasons for this are more commonly tenure related, with issues over Crown land being pivotal. Since the 1980s, vacant and reserved Crown land has been available to claim in legal ownership by registered Land Councils under the NSW Aboriginal Land Rights Act (1983), unless the area under claim was already identified as required for an essential public purpose on the date the claim was submitted. The process of determining these claims, which may also be overlapping from more than a single claimant group, requires often a long assessment and review period, as well as the possibility of due legal recourse. Some of NPA's proposals originally made over Crown land are now in freehold ownership via the land claims process. The case for their conservation remains strong, although the avenues for protection have likely evolved with the change of tenure.

Notably for unresolved land claims, the Sydney region has yet to follow the lead of examples in the north coast, where a mutually beneficial outcome of reserve establishment under indigenous ownership is in train for some areas of high conservation value.

NPA's Policy Number 21 outlines our preferred framework for the future beneficial linking of nature conservation and indigenous land rights in relation to naturally-vegetated present and former Crown land. A key issue for establishment of reserves under Aboriginal ownership in the Sydney region is the resolving of an appropriate formula for rent paid by the Government under each leaseback arrangement.

Policy 21 notes: "NPA considers that the mechanism for funding for Aboriginal owned National Parks could be improved. Currently, the rental for these parks is determined from adjacent land values. This is likely to be a sub-optimal and inequitable means of funding parks (i.e. parks throughout NSW are situated among lands of vastly different real estate value).

Adjacent soaring land values in an area like Sydney are likely to make any leaseback of National Parks unworkable under the existing formula. Hence this is probably the most urgent issue for the Government to rectify in their Aboriginal Ownership amendment to the National Parks and Wildlife Act (1974).

Another issue affecting the progress of these proposals is the positions of NSW Government bodies with an existing interest in an area. For some time minerals based objections to new conservation reserves have been imposed by the Department of Primary Industries and its predecessor mineral resources agency for most of the Macdonald Plateau province, due to the possible presence of deep fossil fuel reserves such as coal seam methane. It appears, with the recent gazettal of the Maroota Ridge State Conservation Area near Wisemans Ferry (not marked in Figure 2.1), that this objection may have become slightly less intractable.

Council or Trust managed Crown Reserves also form a part of the conservation proposals through these two provinces. Transfer to National Parks and Wildlife Service (NPWS) management of such areas is in some cases resisted by either the existing trustees or from within NPWS or both. As an advocate for the highest security of tenure and most transparent management regime for natural areas, NPA will continue to argue for transfer of these areas to National Park estate, *and* for adequate funding for their effective management.

#### 2.3.2 Cumberland Plains

For this area, the key message is one of convergence of threats and very limited conservation opportunities. The Cumberland Plain is an ecological province of 280 238 hectares, defined mostly by the extent of soils of the Wianamatta shales, from extensive plains and rolling hills in western Sydney through to outliers along major ridges of the northern suburbs.

The province currently has approximately 3800 hectares, or 1.4% of its area in the National Park estate. This figure includes a number of Regional Park precincts where nature conservation is not the primary purpose, and where remnant vegetation may be absent or highly degraded.

These figures indicate that this province has both the lowest absolute area and lowest percentage of formally protected (IUCN class I-IV) conservation reserves of the regions addressed in this report.

Figure 2.2 shows the small extent of existing reserves and the longer standing reserve proposals on mainly public land.



Also shown in Figure 2.2 is the proposed Western Sydney Parklands, which are to contain a mixture of natural open space and more developed recreation facilities. The NPA reserve proposals residing within these parklands can be considered under active progress towards dedication and include the Prospect and Hinchinbrook Nature Reserve proposals and additions to Kemps Creek Nature Reserve.

Part of the South Creek proposal on the former Australian Defense Industries (ADI) site at St Marys is also understood to be progressing toward formal protection, although it currently is under the freehold ownership of a property developer and appears set to be subject to urban development in parts of the park proposal.

It has not been possible to progress toward creation of new reserves in other displayed areas due to being either Commonwealth tenure, freehold or Crown land subject to Aboriginal land claim. One proposal over land at Hoxton Park was severely reduced in viability through the bisecting of the area by the new M7 Western Sydney motorway.

What should be most evident from Figure 2.2 is that even if all these proposals were given some form of conservation status, the vast majority of the province would still be without any protected areas. The evident need for new conservation initiatives in this province is one of the key reasons behind this report and is hence considered further here.

#### **Analysis of Cumberland Plains Ecosystems Status**

In summary, while all dominant and other environment types are poorly represented in reserves, there remain opportunities for improving representation of almost all of the EECs of the province, and for long term restoration of ecological integrity and habitat quality.

These ecosystems range from dry open grassy to shrubby woodlands on the hills and plains of the western areas, to open forest in wetter/more sheltered parts of the province. Other less widespread environment types include depauperate rainforest in fire-sheltered pockets of shale hills, ancient river terrace sediments, supporting dry shrubby woodland, drainage-impeded clay plain areas, supporting swamp shrub communities and loamy alluvial floodplain soils with open forest ecosystems.

The province has a long and growing list of species listed under NSW and Commonwealth Threatened Species legislation. Eleven endangered ecological community (EEC) listings also cover all bar one vegetation types of this province. The one non-EEC listed community is considered vulnerable due to 93% of its remaining extent being confined to one small area south of Windsor, where future land use remains uncertain.

In terms of risks, urbanisation is the most urgent pressure for this province, with new suburbs, infrastructure and thousands of dwellings scheduled for construction in the next 25 years in various parts of the Cumberland Plains.

Even in the absence of this burgeoning development, the biodiversity of the region has been highly impacted upon by clearing and fragmentation through two centuries of primary industries, notably crop agriculture and grazing, but also sand extraction in the Nepean Valley and historic timber removal from the shale forests of Sydney's inner west and north.

For ecological communities such as Blue Gum High Forest and Sydney Turpentine-Ironbark Forest, surviving small fragments are mostly long-since isolated within established suburbs. Very careful management of remnants and regeneration around small patches may sustain these remnants. However, adequate habitat capacity for their original suite of fauna is unlikely to be achieved in most cases.

On the plains, hills and stream sides of the western expanse of the province, fragmentation has also been rife, but enclosure by urban development for the enduring remnants is, up to now, less common a problem than the eastern areas described above. Nevertheless, historic decline in habitat quality can be observed. Keast (1995) and Egan *et al.* (1997) have documented a loss of woodland dwelling birds from suitable environments of the Cumberland Plains over the middle to latter 20th Century. Bird life persistance levels within an ecosystem is a telling indicator, since barriers to species influx, occupation and migration ought to be less compounding barriers than is the case for land or tree dwelling flightless species.

It seems that a decline of woodland birds is indicating a loss of critical mass of habitat, i.e. the ability to provide the natural feeding and dwelling ranges for individuals of these species.

For conservation effort in this province to achieve more than simply providing museum-like examples of its vegetation communities, a strong focus on networked protected areas and regeneration mosaics of neighbouring patches seems essential.

It can be concluded from this section that NPA's past conservation proposals for this province are merely the starting point for sustaining its range of threatened environments and species. Noting that several of these areas do not have an immediate prospect of gazettal under National Park or Nature Reserve tenure, analysis and policies for informal and planning-based conservation will be explored in some detail in following sections.

#### 2.3.3 Woronora and Nattai Plateaus

These sandstone provinces cover approximately 178 000 hectares for the Woronora Plateau and 105 000 hectares for the Nattai Plateau. Both contain extensive areas of native vegetation, set aside as water catchment areas, military reserve and formal protected areas (NPWS 2003).

Figure 2.3 shows existing and proposed protected areas in these provinces. The western extent of the Nattai Plateau province is not shown, but is essentially well protected in the Nattai reserves and Blue Mountains World Heritage area.



At the interface of the two provinces is the NPA Bargo River proposal. The significance of this area can be seen in its connectivity between the large adjacent habitats of the Nattai reserves and Metropolitan water catchments. This too forms a critical link in State scale connectivity along the Eastern Highlands between Victoria's Gippsland forests and the NSW Hunter Valley (NPA 2006). Bargo River itself is important as the only river in its province not to be affected by major dams, water extraction or flow regulation. For aquatic ecology this is of particular importance. The conservation proposals for the Woronora Plateau include most remaining non urban land, with a view to containing the spread of Sydney further into natural areas than has occurred historically.

As outlined in Table 2.1, part of the Bargo proposal, the western portion of the Metropolitan (upper Nepean) catchments and foreshore lands adjoining Towra Point Nature Reserve are presently active proposals in some form.

Parts of the Macarthur State Conservation Area proposal along the upper Georges River have been progressively acquired by the NSW Planning Department.

Other areas are affected by either Commonwealth tenure (Holsworthy), minerals objections (balance of the catchment lands), changes of tenure (Mill Creek), or lack of key agency support for transfer to National Park estate (eg lower Woronora Valley).

In ecological terms, for these sub-regions NPA places very high priority on conservation of upland swamps, the unregulated Bargo River catchment, and several endangered ecological communities of the Kurnell Peninsula.

#### 2.3.4 Illawarra Escarpment and Lowlands

The Illawarra Escarpment as an ecological province covers some 88 500 hectares, with the greater part of this occurring in the southern Illawarra region, inland of Nowra. At the northern end of the province the escarpment backs only a very narrow coastal lowland, giving the famous forested backdrop to the city of Wollongong and its suburbs. Around Stanwell Park and Bulli, the province touches the coast, encompassing a high diversity of environments in this confined topographic sequence (NPWS 2002).

Figure 2.4 shows the existing reserve system along the northern half of this province, along with additions proposed by NPA in the Eastern Links report (NPA 2006). As indicated in Figure 2.4, major connecting sections are sought along the escarpment to create a future contiguous reserve spanning the length of the Illawarra hinterland and into the upper gorge of the Hacking River. This would provide among the best habitat links for fauna of tall forest environments anywhere near Sydney.

In broader heritage terms, NPA's proposals go some way to protecting the integrity of the physical association between the City of Wollongong and its escarpment backdrop. There is a similar heritage relationship of people to landscape as the centre of Sydney expresses to its harbour, or the northern edges of Sydney to the Hawkesbury River and Broken Bay.

Additionally, the northern extent of the province is the locality at which a true green buffer between the suburban edges of Sydney and Wollongong can still be achieved, depending on future land use decisions by local and state Governments.



## **3.0 Informal Conservation**

This section focuses on the capacity of some non-urban lands to retain a biodiversity conservation role in tandem with their other land-use designations. Larger aggregate areas of natural vegetation have been noted in previous sections on land vested with Commonwealth or State agencies. Across freehold lands, some areas of native vegetation survive on terrain of particularly restricted land capability in soil conservation terms. Table 3.1 summarises the most common categories of informal conservation in the Sydney region.

Catchment action planning has begun to be implemented for the Hawkesbury-Nepean and Georges River catchments. Notable in the biodiversity targets for Hawkesbury-Nepean is the following:

By 2016, the extent of native terrestrial vegetation in all landscapes is maintained so that there is no net loss from the 2005 area of native vegetation coverage. Realistically however is the prognosis that urban development will reduce the remnant western Sydney vegetation by up to 4000 hectares in the next phase of land releases.

Clearly, for these two prognoses to not be in direct conflict, a strong focus on vegetation re-establishment and maintenance of priority areas seems essential. With the adoption of native vegetation and biodiversity targets under catchment management legislation, there should be dedicated resources for the ongoing improvement of conservation management within the land categories described in Table 3.1. A summary of the conservation outlook for each of these categories is provided below.

Category	Site Examples	Managing	Conservation
	-	Body	Future
Commonwealth Land	Orchard Hills (RAAF); Shanes Park (Air Services Australia); Holsworthy (Army)	Federal Agency	Adequate while land remains utilized; high risk of privatisation if land becomes surplus
State/other Utilities	University of Western Sydney Hawkesbury; Sydney water pipelines and canal; Patonga Headland (Sport and Recreation) Macarthur Agricultural Institute (DPI)	State Agency, Education institution or utility	Some risks of future incompatible land use, less so than with Commonwealth land
Land Capability Classes VII and VIII	Little Cattai Creek and other steep side-valleys of the Hawkesbury River; Razorback Range	Private land owners	Moderately secure unless within a premium real estate region
Flood Plains	South Creek	Private land owners	Sterilised from direct urbanisation, but prone to development for industrial and modified open space uses.
Riparian Zone	Eastern Creek	Planning NSW; Private land owners; Greening Western Sydney	A recent focus of regeneration works across all tenures in the creeks of the Cumberland Plains

 Table 3.1 Informal Conservation Within Greater Sydney

#### **3.1 Commonwealth Properties**

There has been a recent trend for disposal of Commonwealth Property of significant conservation value, including Air Service lands at Cranebrook and defence lands at St Marys and Nelson Bay. There was also an aborted attempt by the Department of Defence to privatise 'surplus land' along Sydney's Georges River. This reveals serious deficiencies in processes of heritage protection at a Commonwealth level.

The community needs to be satisfied that the protection of natural and cultural heritage on Commonwealth property adopts standards commensurate with Commonwealth biodiversity and heritage conservation policy.

NPA sees considerable scope for better accountability over areas of Commonwealth land that currently perform an informal conservation role. We still await the establishment of formal binding conservation covenants over lands like Orchard Hills, although there appears to be some willingness on the part of Federal agencies at least in this case.

#### **3.2 State Agencies/Utilities**

This includes Crown land vested with a departmental or educational body, as well as land classed as the freehold property of a public body. Persistence of native vegetation and habitat quality on such areas may be by deliberate management regime, as in the case of water supply catchment areas, or simply as a by product of benign uses over parts of a property, as in the case of the woodlands within University of Western Sydney's Hawkesbury campus.

In its 2005 report *The Unseen Conservation Estate*, NPA identified a need for some formalising of conservation management and accountabilities for various classes of State administered land. In summary, involvement and concurrence of the NSW Department of Environment and Conservation is sought for public land with nature conservation values (NPA 2005).

#### 3.3 Land Capability Classes VII and VIII

In soil conservation, these landscape classes are regarded as unsuited to most primary production uses, based on factors such as slope, low soil fertility, stony ground or position within a line of natural drainage such as wetlands and stream beds. In the Sydney region, steep slopes and infertile or rocky soils would be the dominant application of these capability classes.

Where the major surrounding land use is either rural, acreages or conservation, there is a probably good prospect of such lands retaining an informal conservation role.

The influence of urbanisation has the ability however to drastically change that projection, as soil conservation and primary productivity factors can be mostly ignored in urban land releases. Figure 3.1 shows an area fronting Pittwater in northern Sydney, where the majority of the suburbs of Bayview and Church Point are located on class VII land capability.





Even away from waterways, home building is known to encroach into steep terrain wherever there is a market for it. Thus land capability as an informal conservation tool is largely contingent on land use and such areas will need consideration as to their protection needs when any planned urban expansion encroaches.

#### **3.4 Floodplains**

Parts of Sydney, particularly in the north west, feature floodplains and other low lying areas which are known to be flood liable and therefore not well suited to urban development. The more extensive area in northwestern Sydney is a consequence of a 'ponding' effect when flooding on the main Hawkesbury-Nepean River is channeled into the confined gorges of the lower Hawkesbury estuary, leading to flood water backing up into surrounding low elevation areas (HNFAC 1997).

Hence many floodplains are to an extent sterilised from direct urbanisation. Figure 3.2 below shows a scenario where a floodplain has been retained in rural usage, with urban development in surrounding slopes.



Figure 3.2 Urban-Rural interface along the Albert River floodplain QLD

Such floodplains have generally long been cleared of much of their prior native vegetation cover, which may give urban planners reason to endorse the establishment of playgrounds, golf courses, light industry and other urban-related uses in place of rural uses.

This sort of conversion is likely to foreclose on the retention and improvement of whatever habitat values do remain in these floodplains. Greater consideration should be given to retention of some rural floodplains adjacent to urbanised areas. Among other heritage based reasons for doing so, these areas could serve a dual role as grazing land and habitat links for marsupials.

## 3.5 Riparian Zones

Considerable investment is occurring in conserving and regenerating streamside native vegetation in parts of the Sydney region. In terms of informal conservation, the activity in riparian zones of freehold rural lands is likely to be most significant. Along watercourses like South Creek and Ropes Creek, recovered riparian habitat will contribute to provision of species mobility between larger habitat patches. As outlined in the section above regarding floodplains, consideration of the long term land use *surrounding* these watercourses will be important in either aiding or reducing their effectiveness as conduits of biodiversity.

## 4.0 Planning Based Conservation

Urban growth invariably involves displacement of some form – Rural land and bushland absorbed into new or expanded suburbs, industrial or warehousing precincts completely replaced with medium to high density housing, and unit blocks taking over from single dwelling homes in urban centers.

Local government is the key body in managing planning for this over short term periods and at the physical scale of individual suburbs. State Government traditionally acts at a different scale, managing larger land releases of new urban areas, with many infrastructure projects also arising as a consequence of urban planning decisions at this level. Traditionally, Sydney's major land use planning programs at State Government level have had a 15-25 year span of existence before the pace of development has necessitated a successor plan. The role and effectiveness of planning frameworks for conservation of nature and heritage values more generally must be assessed in relation to how good a *continuity of intent in protection strategies survives between each planning phase*.

In NSW, many legal frameworks have been established as attempts to implement the protection of nominated values or localities. This generally involves the defining of limits to the type of activities permissible, according to the values at stake and the land use pressures experienced.

#### 4.1 Greenbelts

The laudable concept of provision of open space and green buffers around urban environments is not at all new. Neither however, is the unfortunate trend for open space designations to be merely transient, prone to subsequent planning upheaval and removal whether by stealth or overt sudden decisions.

Taking as a first point of reference the Cumberland Planning Scheme of 1948, its key architect Dr Bradfield proposed green belts in rings or linear patterns around existing suburbs, taking in natural open space and farming land (Winston 1957). This is shown in a simplified form in Figure 4.1. In this scheme, an extensive concentric belt of nonurban land was designated through the local government areas of Sutherland, Bankstown, Liverpool, Fairfield, Holroyd, Blacktown, Parramatta, Baulkham Hills, Ryde, Hornsby, Kuringai and Pittwater, merging into protected bushland areas at its northeast and southeast ends.

Like many subsequent planning instruments, the green belt designation spanned multiple land tenures and numerous owners. Figure 4.2 shows approximately the mix of public and private lands which coincide with this green belt today. History has shown that this planning designation would not hold back the progressive urbanisation of farming-dominated that was land critical to the greenbelt. However, the more rugged components and patches of land vested with public agencies have more often been retained as scatterings of non-urban use, along with the large Royal and Ku-Ring-Gai Chase National Parks at the northern and southern ends of the greenbelt's axes.





Figure 4.2. Contemporary Tenure of Cumberland Scheme Green Belt



Particularly vulnerable was the offshoot to the main ring which followed the elevated shale soil farming and orchard areas of North Ryde in the catchment of the Lane Cove River.

A simple change of Government policy redesignated this area from greenbelt to a mixture of developed uses in the 1960s. Figure 4.3 shows the fate of the greenbelt land around Marsfield/North Ryde. The extent of development within the rural/natural greenbelt subsequent to the superseding of the Cumberland Scheme is shown below in Figure 4.4.



Figure 4.4



Shown also in Figure 4.4 is the proposed Western Sydney Parklands, which have been proposed since the time of the successor to the Cumberland Scheme – the Sydney Region Outline Plan of 1968. Under this scheme, in common with its predecessor, the need to provide contiguous tracts of open space alongside or between urban zones was recognised (State Planning Authority 1968), in spite of noted failures to sustain such areas where competing land uses emerged in the life of the previous scheme. It was at this time that work toward the establishment of what have since become known as the Western Sydney Parklands was properly initiated. This was to be one of several linear corridors of open space, intended for implementation as part of the urban expansion of Sydney between 1970 and 2000. Other significant green corridors were planned for the Georges and Hawkesbury-Nepean Rivers, and the wooded hills west of Campbelltown (in part giving impetus to the establishment of Mt Annan Botanic Gardens).

Several things are worth summarising in these two historic planning schemes from an open space and conservation perspective:

- Several tracts of the Cumberland scheme's former green belt had been designated for urban development by the time of the SROP. In the western suburbs, a new, much narrower belt of proposed open space (forerunner of Western Sydney Parklands) sits just to the west of what was to have been kept for open space 20 years prior, and shares it's easement with major infrastructure such as powerlines and the M7 motorway proposal
- The time frame for the SROP open space network to be acquired and established was seemingly intended as concurrent with the urban expansion plans of the SROP, ie 1970-2000, to meet the needs of *that phase* of urban growth
- The 1968 proposed open space network was to cover some twelve to fifteen thousand hectares
- Western Sydney Parklands as subsequently announced (including the long held public land of Prospect Reservoir and the Sydney water-supply canal) will be only 5,500 hectares and will only reach completion some time during the *next* 20 years of urban development

Sydney's new northwest and southwest growth centres (2005) represent a new phase of urban expansion, into areas that were still designated as rural in both previous plans. In other words, the open space network set out for establishment as part of the needs of past phases of urban development, and as a green enclosure to that development, has been leapfrogged by new urban sprawl, downsized and re-applied to the conservation and recreation needs identified for a *future* development agenda.

In light of what has been derived from this historic information, what is most direly needed in Sydney's current Metropolitan Strategy is a much expanded and more secure process of protecting green belts and other significant open space at the margins of the urban footprint. The first iteration of the Metropolitan Strategy for the growth centres was in fact encouraging in this regard, though its use of a 'Rural Lifestyle/natural landscape' planning overlay, enforceable in the long term through the proposed State environmental planning policy (SEPP) for the growth centres and surrounding areas.

It has subsequently been seen however for the Metro strategy, much like its predecessors, that once again the environmental protection agenda is particularly prone to major winding back when other interests are brought to bear. The revised open space and environmental proposals current as of November 2005, are only defined within growth centre boundaries, are now dominantly confined to flood-liable land or pre-existing public land and give no direction for what should or should not happen in surrounding rural areas in the face of probable increases in land use density.

It is concluded from this review that whilst rural land is strongly associated by the public with a contribution to the open space character of parts of Sydney, there is a poor track record at the Government planning level in ensuring the retention of such values beyond the life of a given planning scheme, and indeed within the formative stage of such schemes in the most recent example.

#### 4.2 Prescriptive Planning Controls for Conservation and Open Space

For comparison with the above study of the viability of rural land zonations to protect natural and other heritage values, brief consideration is given to planning powers used to specifically quarantine areas for a future conservation or natural open space purpose.

Figure 4.5 shows in simplified form, the application of such zoning controls in the Regional Environment Plan for Sydney's Kurnell Peninsula (Dept Planning 1989).



#### Figure 4.5

Shown in green and blue hatching is the present reserve system under National Park or council management respectively.

The yellow hatched areas cover land designated for future addition to the conservation or open space public estate. The retention of natural vegetation in these prescribed areas compares starkly to adjacent sandmining and landfill areas along the central axis of the peninsula between Bate Bay and the Towra Point wetlands. The current National Park areas do not represent the full biodiversity of the Kurnell Peninsula. Particularly, dune ecosystems are only represented in sand sheets perched upon the sandstone plateau of Botany Bay National Park. Among the areas designated for future reservation are examples of vegetated high dunes, obliterated from the rest of the peninsula by decades of sand extraction.

The impacted zone of former high dunes is highly likely to proceed to future rezoning for some form of urban, tourist or industrial development. It is therefore the prescriptively-zoned future conservation areas which stand some chance of persisting and linking between the otherwise isolated natural strongholds of the reserve system.

It is understood that additions to the Towra Point Nature Reserve from parts of the yellow hatched areas are close to realisation, indicating that this type of planning control does indeed offer a means of sustaining a conservation vision over a time period equal to that in which the numerous less prescriptive zonations discussed in the previous section were found to have been lifted in favour of intense development.

#### 4.3 Recognition of Physicality in Conservation Planning

The Sydney region has not only a distinctive flora, fauna and pre and post-European historic heritage to consider in terms of planning-based conservation. Much of our valued identity comes from the 'physicality' of the sandstone and shale landscapes which provide the backdrop to the region. No one doubts the impact and worth of Sydney Harbour in this regard. But at the regional planning level we are often overly slow at taking in the importance of many other highly significant physical backdrops.

The National Trust's *Sydney 2000* report (National Trust 1968) was much ahead of its time in raising these issues. Many of its landscape conservation visions are at now risk of being unattainable, specifically because conservation values have been considered at the scale of individual land parcels, with little contemplation of the cumulative effects across these larger and distinctive landscapes.

One such example is the iconic Illawarra Escarpment – surely a prime example of a feature where physicality could have provided paramount planning guidance in setting a natural edge between the City of Wollongong and the southern most suburbs of Sydney.

No one, it seems, seriously questions the natural and scenic values of the Illawarra Escarpment. The iconic view of the escarpment and the Illawarra Coastal Plains looking south from Lawrence Hargreaves Lookout at Stanwell Tops is imprinted on the minds of many Sydney and Illawarra residents and local and international tourists who have turned their cameras southward to record the sandstone cliff lines and slopes richly vegetated and nourished by the underlying Narrabeen Shales.

Frank Hurley, arguably Australia's most famous photographer, also snapped that image to share with tens of thousands of Australians, one of thirty in the NSW section of his book, *Australia, A Camera Study* (1955).

Contributors to this report recall accessing a kilometre or so up gently sloping rural lands to lookouts points at Ambush and Tomahawk Rocks below Corrinal Colliery (G. Schoer pers com). This land is now under a suburban spread, as elevated estates spread wherever ocean outlooks command a premium development opportunity. Private owners of lands even further up these slopes would welcome zonation changes that would allow even more intrusive, large scale, elevated developments that would further compromise the views, and even more fundamentally, threaten the integrity of the floral and faunal richness of the escarpment.

Commissioner Simpson found, following the Commission of Inquiry into Illawarra Escarpment and Management in 1998, that the "main objective of future planning and management should be conservation protection. In this regard, the escarpment and its foothills must be planned, conserved, protected and managed as a single entity." (Office of COI 1999).

The Commission of Inquiry (COI) criticised past land use planning of the escarpment. These findings reflected what Wollongong's citizens had expressed frequently, that heritage and scenic values of this unique escarpment must be preserved for future generations.

The example of the Illawarra Escarpment is one of several around the greater Sydney region, where there is a public concern for maintenance of character for particular examples of the region's physicality. The heritage elements of that character are likely to include important natural habitats, as well as low density rural or occasionally village settlements.

Commissions of Inquiry and gazettal periodically of planning instruments have scratched the surface of these issues. But until such time as there is a way for these values to *inform* future planning, rather than be hostage to it, conservation at this scale remains a weakness.

# **5.0 Review Synthesis and Consequential Recommendations**

The initial review of existing and proposed formal conservation areas (National Parks and the like) found various challenges across the different ecological provinces examined. No region was free of threat to the persistence and resilience of its native ecosystems, and further formal protection of surviving natural areas is the most proven means of addressing this in the first instance. In other words, core habitat areas which are managed for conservation primacy, with adequate connectivity, should remain central to the next phase of the protection of nature across these regions.

While ever progress toward formal protection of these key proposals is constrained by the various tenure and other issues discussed in section 2, informal conservation and the use of planning controls will be pivotal in preventing exposure to threatening processes. The review also outlined circumstances in which these conservation measures could reliably provide an off-reserve contribution to biodiversity and heritage protection over the long term. The review of these frameworks for conservation outside the existing reserve system pointed to urbanisation pressure as the agent most likely to impede or supplant environmental protection goals. This was a factor of intensification of use in the case of former farming land, and spreading and greater penetration of impact in cases where urbanisation reaches into unprotected natural lands such as steeper or low soil fertility vegetated country.

Lastly in relation to the role of planning powers in conservation, it was suggested that there are key significant landscapes that form part of the region's physicality and should hold a paramount place in the drawing up of planning for future land use.

The recommendations arising from this review do not make a direct challenge to the green-fields urban expansion proposals of the Sydney Metropolitan and Illawarra Strategies. They do however seek to bring conservation goals to the forefront of land use decision making for areas *beyond* the proposed new margins of suburban Sydney and Wollongong as defined in these planning strategies. In other words, in contrast to the situation today where environmental concessions to development are being contemplated only as the roll out of suburbs commences, by the time that the successor plans to the Sydney Metro and Illawarra Regional strategies come to be drawn up in around two decade's time, there must already be a clearly defined and adequate network of established conservation lands in the areas subject to possible green-fields development.

The following recommendations therefore, are outlined for areas around the margins of greater Sydney and the northern Illawarra in terms of:

a) Proposed conservation estate - areas in progress

b) Informal conservation estate - binding covenant required in the short-medium term

- c) Proposed conservation estate major freehold blocks
- d) Key linkages
- e) Landscapes of State Significance, as a planning foundation

Figure 5.1 shows a regional-perspective key map, depicting the subregions outlined in the following sections.



#### 5.1 Hawkesbury – Sydney's Northern Margins

The focal point of conservation through this area is the ridge and valley systems of the Hawkesbury estuary, which encompasses key parts of the Hawkesbury and McDonald Plateau ecological provinces.

#### 5.1.1 Proposed Conservation Estate – Areas in Progress

Under the current tenure related constraints through this area, the main proposals which could be rapidly progressed by a decision of the NSW Government are in Crown lands of the Narrabeen catchment and the inter-tidal lands adjoining the reserves of the Hawkesbury estuary.

For other substantial bushland areas identified as part of a succession of connected sclerophyll forest habitats from the lower Colo River in the west to Ku-Ring-Gai Chase in the east, NPA endorses the use of a more prescriptive environmental zoning over current informal conservation areas, which mostly fall under a ubiquitous rural zoning at present.

#### 5.1.2 Informal Conservation Estate – Binding Covenant Required

Bushland managed by the Department of Sport and Recreation is adjacent to Brisbane Water National Park and in close proximity to Garigal National Park. These areas should be the subject of an inter-agency conservation covenant which remains with the land in perpetuity and sets ecological management frameworks.

#### 5.1.3 Proposed Conservation Estate – Major Freehold Blocks

The former Maroota State Forest is a large area of sandstone bushland with significant river flat vegetation and creek systems of very high catchment integrity. Subsequent to the area's revocation as a State Forest, a claim over the then vacant Crown land was made under the Aboriginal Lands Rights Act (1983), which was granted some years later. At around 4500 hectares, this is among the largest and most ecologically intact individual freehold parcels in the greater Sydney region.

Development of urban or acreage residential areas would affect the present high catchment integrity of this bushland, and the character of the surrounding settlements which are dominantly orchards or small settlements along the main thoroughfares.

NPA proposes a planning framework over this area which is dominantly environmental protection zoning and otherwise a rural zonation along certain margins. Establishment of a formal reserve with the cooperation of the land owner should be explored once this zoning takes effect, including options for establishment of an indigenous land use agreement or Aboriginal owned National Park.

#### 5.1.4 Key Linkages

For this region, there is a priority for east-west connectivity from Narrabeen Lagoon on the northern beaches to the bushland of the Hawkesbury River/lower Colo area along the south of the Hawkesbury estuary. A similar succession of habitats extends from the Gosford hinterland to the Yengo Wilderness along the northern side of the estuary.



## 5.1.5 Landscapes of State Significance

As outlined in section 2.3.1, the extensively bush-lined Hawkesbury River and its tidal estuary system is an unsung natural heritage asset of greater Sydney, with remarkably few instances of fully developed urban settlements along the waterways or their flanking ridges. This is in stark contrast to Sydney's other estuaries such as Port Jackson, Georges River and Port Hacking, which are to varying extents urbanised or otherwise developed.





As part of a designation along the Hawkesbury-Nepean system designed to reinforce natural and rural landscape edges to existing or potential settlements, in this subregion the planning overlay is proposed to apply to the entire tidal estuary west of Pittwater and Patonga. The tributary Little Cattai Creek is also proposed as part of this protected landscape due to being representative of a large creek system of the McDonald Plateau province with distinctive tall blue gum and swamp mahogany forests along sandy alluvial fills of its valley. These forests are of an ecological integrity rarely found in other examples of this ecosystem in the Sydney region.

A designation of state significance is also proposed over the bushland of the escarpments surrounding Narrabeen Lagoon in the northern beaches. This is the only opportunity anywhere along the NSW coast between Hawkes Nest in the north and Culburra, some 300 kilometres to the south, where a coastal lagoon of substantive size (over 200 hectares) could be sustained with a dominantly forested hinterland.

#### 5.2 Cumberland Plains – Sydney's Northwest and Southwest Margins

Throughout this sub-region, all surviving native ecosystems are threatened or vulnerable owing to historic clearing of habitats. A new wave of threats is emergent with the expansion of Sydney into many parts of the Cumberland Plains. As was outlined in section 4.1, there can be little reliance on planning measures which take merely a 20 year forecast period as their framework and designate rural zonations at the margins of new development areas as a quasi green space initiative. Such zonings were shown to succumb eventually to new urbanisation proposals in many cases. In the shale ridges of northern Sydney, this diminishing of rural open space contributed directly to the present day fragmentation of the Sydney Turpentine-Ironbark Forest and Blue Gum High Forest associations, with under 5% of these ecosystems now remaining. Decisions taken at the present time will now determine whether the shale and alluvial ecosystems of the Cumberland Plains will suffer the same loss and fragmentation, as urbanisation reaches their core habitats in coming years.

Table 5.1 shows the current and forecast threat situation for four endangered ecological communities of western Sydney that are likely to be affected by major urban expansion. The figures of the last column attempt to quantify the future effect on endangered communities from urban and associated infrastructure development. They are based on the current mapped extent of remnant vegetation within Sydney's two growth centre boundaries, but excluding areas planned as regional open space, non urban use and creek floodplains. For the purposes of this analysis, destruction or critical degradation includes situations where scattered native trees may be retained within street nature strips or urban lots. Retention of such vegetation is of course preferable in new housing developments. But in ecological terms, this is not considered to equate to adequate preservation of the remnant ecosystem, merely a fragment of its vegetation.

Based on the information in table 5.1, there is cause for considerable concern with the projected impact on these ecosystems. It is also relevant to note that losses were forecast for a number of other endangered ecosystems, together with loss to the urban footprint of sites of regeneration potential for particularly rare communities such as Moist Shale Woodland and Western Sydney Dry Rainforest.

Vegetation Community	Pre-European Extent	Remaning Extent (Ha	Extend likely to be
	(Ha)	and percent)	destroyed or critically
			degraded by forecast
			urbanisation (ha)
Cumberland Plain	125446	11054 (9 %)	3500-4200
Woodland			
Shale Gravel Transition	5427	1721 (32 %)	600-800
Forest			
Castlereagh Ironbark	12185	1012 (8 %)	100-130
Forest			

Table 5.1. Threat Status for Three Western Sydney Ecosystem Types

NPA is seeking to advance a policy in reserve establishment for peri-urban and greenfields release areas that recognises the limitations of integrating open space and biodiversity protection, and provides for both in complementary but *distinct* locations. Underlining the need for this approach also, are the prospects for effective management of endangered ecosystems within new conservation areas, with a view to recovery of ecological integrity and habitat quality for fauna. A conservation reserve system nested entirely within a matrix of suburbs is the most difficult to manage for such recovery, due to factors such as maximum edge impacts, convoluted and/or isolated habitat patches and competition or predation by urban adapted native species and non-native animals (Bennett 2003).

In response to the high level of threat and low current level of representation in conservation reserves, bold yet achievable conservation targets are needed for this province. National benchmarks relating to conservation at the ecosystem level were developed some time ago for use firstly in the largely public land-based forest assessments, namely the JANIS criteria (the Joint Australian and New Zealand Environment and Conservation Council (ANZECC) / Ministerial Council on Forestry, Fisheries and Aquaculture (MCFFA) NFPS Implementation Sub Committee) (Commonwealth of Australia 1992).

This criteria gives increasing weighting to conservation priority based on the current extent and protection status of ecosystems relative to their pre-European extent. An accepted minimum target is 15% of the pre-European extent of each ecosystem to be sought for inclusion in secure conservation reserves, with a 60% target for vulnerable ecosystems and 100% for rare and endangered ecosystems. For vegetation of conservation significance on private land, the NSW Government has signed an agreement with the Federal Government, under the Natural Heritage Trust, committing NSW to "no net loss" of native vegetation.

Best case scenario conservation outcomes for the Cumberland Plains province will, unfortunately, achieve neither JANIS criteria nor "no net loss" targets, due to other conflicting land use decisions and market forces making the price of land untenable for large scale purchases for conservation.

In recognition of these limitations, NPA considers a targets approach remains essential nonetheless. The following should be reflected in such targets:

• The use of at least 85% of locally targeted land acquisition funding from the northwest and southwest growth centres for the acquisition of high priority remnant vegetation as identified in the Western Sydney Urban Bushland study and subsequent DEC assessments.

- Destruction of remnants for urban development must be offset with either, and preferably both, a greater area of land acquired for conservation reserves and the securing of remnants of greater ecological integrity than those being impacted.
- No privatisation of State and Commonwealth land containing remnant vegetation, and formalising of protection of these areas through permanent covenants and agreements over transfer to the NSW reserve system if the lands become surplus to the needs of the agency in question.
- The siting of conservation reserves must be determined biogeographically, that is according to where the largest and most viable examples of each ecosystem occur across the ecological province. Planning with reference to urban design should only be a secondary factor.
- Outside of the present growth centre boundaries, any area identified in past biodiversity surveys as a priority remnant will require an enforcement of "maintain or improve" policies by state and local governments.
- Off-reserve conservation by catchment management authorities would be most valuable along major watercourses and their floodplains, being areas where urbanisation is excluded for flood liability reasons, and where regeneration methods have already been developed and progressed by Greening Australia. Such zones will form valuable future linkages between dedicated conservation lands.

#### 5.2.1 Proposed Conservation Estate – Areas in Progress

A. *Castlereagh-South Creek network*. Bordering the northwest growth centre is the remnants of a 10,000 hectare expanse of woodland at the interface of the shale plains and ancient and modern river deposits of the Hawkesbury-Nepean and its tributaries South Creek and Rickabys Creek. Several existing reserves are contained within this area, namely Agnes Banks, Windsor Downs and Castlereagh Nature Reserves. Also in the area are NPA's longstanding proposals for nature reserves at the former ADI site at St Marys and Agnes Banks crown lands. The proposal is shown in context in Figure 5.4.

Table 5.2 lists the presence of intact vegetation outside of existing reserves in the area. NPA is seeking the achievement of all significant core vegetation patches and some linkages in the formal reserve system. Non-urban floodplain areas would also contribute to linkages for species migration, as well as buffering the area from the major urban centres around Rouse Hill and Schofields.

Table 5.2. Chipi deceed vegetation within the area		
Ecological Community	Unprotected Extent	
Cumberland Plains Woodland	1125 ha	
Alluvial Woodland	282 ha	
Shale Gravel Transition Forest	1798 ha	
Castlereagh Ironbark Forest	532 ha	
Castleregh Swamp Woodland	180 ha	
Castlereagh Scribbly Gum	3433 ha	
Woodland		
Agnes Banks Woodland	79 ha	

 Table 5.2. Unprotected vegetation within the area

The figures for Castlereagh Ironbark and Swamp Woodland are known to be underestimates, as recent botanical surveys for the upper catchment of Rickabys Creek on the former Air Services Australia property have confirmed the presence of these two communities where they had not previously been mapped.

Progress towards dedication of reserves covering the above ecosystem strongholds requires:

- i. Lifting of the present Castlereagh Freeway corridor between Riverstone and the Nepean River
- Dedication of vegetated Crown Lands of the Castlereagh area as Nature Reserve additions, with a schedule of existing activities permitted for a designated period including the Defence Force leases around Londonderry.
- iii. Future National Park zoning over most of the Castlereagh woodlands surrounding Rickabys Creek
- iv. Acquisitions or land swaps to facilitate addition of large freehold blocks to the reserve system

#### B. Western Sydney Parklands

As described in some detail in Section 4 of this report, the Western Sydney Parklands are an open space and conservation proposal that has existed in some form within urban planning frameworks for many decades. By the time the currently outlined parklands are fully established, it will have been the better part of sixty years since they were drawn up as part of an enclosing green edge for the growing western suburbs. In fact many new suburbs will have emerged westward of this green strip by the time they reach completion.

Within the parklands are existing and proposed Nature Reserves and Regional Parks under the National Parks and Wildlife Act (1974), notably at Kemps Creek, Prospect Reservoir, Hinchinbrook Creek and the Western Sydney Regional Park near Cecil Hills. With the exception of present Regional Parks, NPA opposes the absorption of any NPWS reserves into a generic parklands tenure as provided for under recent legislation. If these parklands are to be managed as a single entity, there is already a precedent for inclusion of Nature Reserve areas in a larger open space framework at Sydney Olympic Park.

Currently the precincts layout for the parklands provides for conservation of any patches of mapped core woodland plus most recovering patches where adjacent to intact remnants. Additionally there is a 760 hectare linear 'biodiversity corridor' along major creeks and in some cases ridge lines.

The corridor proposal, which appears to involve native replanting, will be of benefit for native fauna moving between native habitat patches, notwithstanding the fact that the M7 Motorway also shares part of the same alignment to the immediate west. What must be cautioned against however, is confusing replanting of tree and shrub species with full ecological recovery. In these woodland environments, most species diversity is in the ground layer of vegetation, fungi and invertebrates. This diversity does not automatically return as a by-product of replanting canopy species. As a general policy position therefore, NPA supports the provision of linking vegetation between existing habitats for native fauna, while seeking a priority for future open space acquisitions to have the highest possible ratio of ecologically intact to degraded ecosystems as a stronger starting point for conservation management. Figures 5.4 and 5.5 show the proposed parklands and their existing component NPWS estate.

C. *Georges River Bushland*. All land held by the Department of Planning along the Georges River south of St Helens Park as far as Appin should be given a formal reserve status that is secure from future watering down, particularly since this is part of the fruits of a prior scheme of open space designation. Landcom periodically comes up with proposals for subdivisions in present natural open space on the margins of this valley, including within potential koala habitat.

From St Helens Park to Glenfield, bushland along the western edge of the Georges River needs to be consolidated into a more substantial conservation reserve. NPA believes that consideration should be given to incorporating some of the Commonwealth land on the eastern side of the river, currently used as buffer to the army firing range. This would make a logical management unit for the NPWS. At Glenfield, immediately adjoining the low level bridge, army land is currently used as a scout camp. This is a reasonable use, but noting the propensity in the long term for sale of surplus defence lands, consideration should be given to eventually incorporating it into a consolidated and enlarged Georges River National Park.

Should at any time in the future, the Australian Army relinquish its considerable holdings east and south of the Georges River, then this land must definitely be reserved for nature conservation. Figure 5.5 shows the proposal in context of surrounding natural areas.

#### 5.2.2 Informal Conservation Estate – Binding Covenant Required

Commonwealth, State and tertiary institution lands contribute significantly to the Castlereagh/South Creek network described in the section 5.2.1 and are critical to its success as a cluster of protected habitats.

The Air Services Australia lands at Shanes Park have been specifically quarantined from urban development in the northwest growth centre SEPP and must now proceed to protection via a binding conservation agreement between the Commonwealth and environment agencies.

This is equally a priority for the Orchard Hills defence lands, which contain part of the most structurally intact shale woodland in all of western Sydney, within an overall remnant vegetation patch of more than 700 hectares extent.

The Hawkesbury campus of University of Western Sydney (UWS) contains the northern most extent of the proposed Castlereagh conservation network. A covenant over this area is particularly important in the face of possible development aspirations in the future, along the lines already being pursued on the Kingswood campus of UWS. The three areas described above are indicated on Figure 5.4.

The Macarthur Agricultural institute north of Camden contains considerable remnant shale hills and riparian vegetation of very high conservation value. A voluntary conservation agreement or other perpetual covenant over these lands should be pursued as a matter of urgency, noting the spread of urbanisation into the region. This area is shown on Figure 5.5.

#### 5.2.3 Proposed Conservation Estate – Major Freehold Blocks

A. *Former Castlereagh Crown Lands* (Fig 5.4). In 2006 around 75% of the Crown land of the Castlereagh woodlands was granted in freehold title to the Deerubbin Local Aboriginal Land Council. A substantial portion of this area lies below the adopted flood planning level for urban development. The area forms the nucleus of the potential conservation network for the Castlereagh woodlands, representing much of the vegetation extent classified in table 5.2 above.

A proactive period of ensuring suitable zoning and negotiation of conservation outcomes is now a priority for this region. The possibility of land exchanges for previously sand quarried lands at the margins of the woodlands could also be factored in to these negotiations. The establishment of an indigenous owned protected area would be among the optimal possible outcomes as an alternative to urban development of these lands.

B. *Former Air Services Australia Cranebrook Site* (Fig 5.4). All 180 hectares of this site is critical to the linked network of conservation lands, as it is the most direct conduit between the woodlands of the former ADI site and the Castlereagh area. The site also forms the head of Rickabys Creek and contains previously unmapped endangered vegetation associations and prime habitat for several rare shrubs.

C. *Orchard Hills* (Fig 5.4). Adjoining the Commonwealth property outlined in the previous section is private farm land containing part of the extensive shale and river flat woodlands that contribute to the very high conservation values of the area.

D. *Razorback Range* (Fig 5.5). There is presently next to no representation of the endangered communities of Moist Shale Woodland and Western Sydney Dry Rainforest in the formal reserve system. The best surviving habitat for these associations is the upper slopes of the Razorback Range between Camden and Picton in the southwest of the Cumberland Plains. The entire area is in freehold tenure, with steep terrain providing some degree of informal protection traditionally. Land subdivision pressures are likely to escalate in this area, and NPA considers that securing of some of this range in a formal reserve or under perpetual covenants must be a key conservation aim for the coming years.

#### 5.2.4 Key Linkages

A. *Castlereagh to Windsor Downs* – This skirts the east of waste disposal lands, following a progressively widening belt of native vegetation northward from Castlereagh Nature Reserve. (See Fig 5.4).

B. *Castlereagh to Shanes Park* – A resuscitated corridor across non urban floodplain lands surrounding South Creek should be pursued as a NRM revegetation project in due course. (See Fig 5.4).



C. *Shanes Park to Eastern Creek* – This link would preferably be a direct west to east corridor following vegetation patches and an unused freeway easement. Alternatively, the floodplains of South and Eastern Creek, which converge in the northwest growth centre could house a less direct connection, but would also require more active and longer term revegetation. (See Fig 5.4).

D. Former ADI site to Orchard Hills and Mulgoa – This corridor follows the riparian zone of South Creek to provide a habitat link between the two most substantive shale woodland areas of the Cumberland Plains. Links westward to Mulgoa and the sandstone woodlands beyond would require careful retention and enhancement of remnant patches on defence and farming land. (See Fig 5.4).

E. *Kemps Creek Corridor* – Extending from Kemps Creek Nature Reserve northwest to the confluence of South Creek and encompassing remnant vegetation patches along this alignment. (See Fig 5.5).

F. *Georges River to Nepean River* - Connectivity between the natural areas of the two river systems is feasible south of Campbelltown, particularly along Mallaty and Beulah Woodhouse Creeks, west of the Campbelltown to Appin road. These vegetated links support shale/sandstone transition forest, an endangered association. (See Fig 5.5).

#### 5.2.5 Landscapes of State Significance

As a continuation of the designation discussed in Section 5.1.5, the Hawkesbury-Nepean River and two of its distinctive tributaries are proposed as Landscapes of State Significance in this sub-region. In all three cases there is a considerable mix of natural and rural character to these river-scapes. In the face of accelerating development agendas, NPA sees a need to revive the long term planning goal of a designation along the Hawkesbury-Nepean River that preserves its character for natural and rural open space.

In the ACT, a Murrumbidgee River corridor was set up across a number of tenures, with existing agency structures used to provide the necessary management (ACT Government 1997). This is essentially the model NPA favours for the Hawkesbury-Nepean.

Along with the main Hawkesbury-Nepean River, NPA has identified South Creek and Rickabys Creek as valuable components of a river corridor, being the major watercourses of the Cumberland Plains and Castlereagh Terraces respectively.

A planning instrument to assign state significance to these riverine landscapes allows existing development to remain, while providing some certainty for the rural and natural areas that survive to the present. The Penrith Lakes scheme for example, is generally compatible as a modified open space component within a presently highly degraded reach of the Nepean River. The designation would however, be expected to circumvent this scale of extractive industry within a river corridor of such heritage value in the future, in-keeping with the purpose of maintenance of natural and rural character under a designation of this type. Figures 5.4 and 5.5 show the approximate outline of suitable riverine zones, which would require ground truth surveys and other reconnaissance to further refine the optimal boundaries.



#### 5.3 Woronora and Illawarra – Southern Margins

The Woronora Plateau contains the largest contiguous naturally vegetated area outside of the formal reserve system in the entire greater Sydney region. There have been Government undertakings to increase the dedicated reserve system in this area, which need to be implemented as we approach four years since these were announced.

In the Illawarra, land use pressures mirror those of suburban Sydney. A fundamental challenge in this area is to see that the fruits of extensive studies and high level inquiries into the key heritage and natural resource values of the Illawarra are not only recognised in planning strategies for the region, but actually underpin such strategies.

The Illawarra is topographically and climatically very distinct from its neighbouring regions. While greater Sydney is dominated by either sandstone ridge and valley systems or rolling hills and plains of its shale heartland, the Illawarra occupies a confined strip of coastal lowland and escarpment foothills. Watercourses progress from steep headwater streams to coastal floodplains across distances of only a few kilometres. The European settlers of the area deemed none to be of sufficient size to be called rivers, using the terms Creek or Rivulet instead. However, this has seemingly fostered a pattern of underestimating both the ecological importance and natural hazard potential of these watercourses, because the region is periodically prone to exceptionally intense rainfall, and is also wetter on average than the Sydney region by several hundred millimetres per year. Thus seemingly minor watercourses are occasionally conduits for significant flood waters. The protection proposals sought by conservation groups for these creeks are in fact also underpinned by a realistic approach to development in terms of minimising future exposure to flood hazards.

#### 5.3.1 Proposed Conservation Estate – Areas in Progress

A. *Bargo River* - The substantially intact catchment of the Bargo River, a tributary of the Nepean, is particularly important both for the natural values present and for its significance in the context of the reserve system of greater Sydney. This area, once gazetted as National Park estate would link up the water catchment lands to the immediate east and the Nattai reserves to the west. In so doing it would finally realise the long sought goal of a virtually continuous protected belt of reserved land around Sydney's sandstone plateau system, stretching in an arc shape from Broken Bay around to the Hacking catchment. The NSW Government has undertaken to add the upper catchment of the Bargo River to the adjoining Bargo State Conservation Area, a pledge made in early 2003. Figure 5.6 shows this area.

B. *Upper Nepean Catchment Areas* – The western portion of the Sydney Metropolitan water supply catchments has been promised by the NSW Government as a State Conservation Area since early 2003. The prevalence of active long wall coal mining in the eastern half of these catchment areas, much of it shown to lead to disastrous impacts on streams and rivers, has so far precluded consideration of NPAs proposal for reservation of the entire area as a Nature Reserve. NPA believes however, that in addition to the announced western area reservation, it would be possible to immediately gazette a number of areas of moist forest associations along the eastern margins of these catchments and adjoining the Illawarra Escarpment State Conservation Area. Figure 5.6 shows this area.



Key to Features         Existing Urban         Urban Expansion Areas         Urban Expansion Areas         Landscapes of State Significance         National Park Estate         Conservation Proposals         Water Bodies         Major Rivers         Watercourses
------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------



C. *Helensburgh Crown Land* – Several parcels of land have been identified by NPA Southern Sydney Branch as a significant first step in protecting the headwaters of the Hacking River. Together with proposals outlined in section 5.3.3, these land parcels would extend the formal conservation estate southward of Royal National Park to preserve and enhance long term connectivity with the reserves of the Illawarra and Woronora Plateau. Figure 5.6 shows this area.

D. *Kurnell Peninsula* – Longstanding proposed additions of foreshore land to Towra Point Nature Reserve, and vegetated dune remnants to Botany Bay National Park should be a priority for realisation by the NSW Government. The intertidal environment of Merries Reef at Boat Harbour is also proposed for inclusion in Botany Bay National Park, as is the entire intertidal zone contiguous with the two reserves. Figure 5.7 shows this area.

#### 5.3.2 Informal Conservation Estate – Binding Covenant Required

The lower gorge of the Bargo River and adjoining Crown lands along the Nepean Gorge require long term security for their scenic and natural values and the riparian connectivity they provide between larger expanses of natural habitat. A covenant over these areas would provide such a degree of security and is recommended as a priority for this area.

#### 5.3.3 Proposed Conservation Estate – Major Freehold blocks

A. Illawarra Escarpment and Upper Hacking – Land holdings of collieries and farming land to the south of Wollongong each contain mid-slope and foot slope environments that are presently poorly represented in conservation reserves. Figure 5.6 shows NPA's assessment of the extent of potential viable additions to the Illawarra Escarpment State Conservation Area and Royal National Park over the mid to long term. To achieve this, and deliver on the aspirations contained in past recommendations of commissions of inquiry, planning controls must be strengthened and a majority of these contiguous lands placed under a future National Park zoning, particularly where they are zoned presently rural but are dominantly of soil conservation land classes VII and VIII and therefore already defined as suited to native vegetation cover according to good rural land management principles.

B. *Botany Bay additions* – Land which has to date proven surplus to industrial needs abuts the western boundary of Botany Bay National Park and also provides the most coherent trans-peninsula link to the protected foreshores of Quibray Bay. Within these blocks are contiguous patches of the endangered communities Kurnell Dune Forest and Sydney Coastal Estuary Swamp Forest Complex, together with patches of freshwater wetland. Noting the passage of state and commonwealth Threatened Species legislation since the time of the last Regional Environment Plan (1989), NPA proposes a review of zoning of these lands, with conservation as a priority for future land use. Figure 5.7 shows this area.



#### 5.3.4 Key Linkages

A. *The Calderwood-Yallah corridor* – A green corridor identified in the 2003 NPWS Biodiversity study of the Illawarra, is highlighted as a "Indicative DEC Regional Habitat Corridor" in the latest Draft Regional Environment Plan. NPA is concerned that state planners and Wollongong City Council may still consider compromising this important corridor by acceding to requests for zonation changes that would permit further urban development. This is particularly seen as a risk due to the corridor crossing the proposed next major green fields urban release of the Illawarra – the West Dapto growth area. Figure 5.6 shows this area.

B. *Riparian Links below Illawarra Escarpment* – As outlined in the opening to section 5.3, there are both strong ecological and sound urban planning reasons for properly embedding conservation goals on creek systems into any regional planning for the Illawarra. It is disappointing that the 2004 Riparian Corridor Management Study (DIPNR 2004) has seemingly not been used as any basis for shaping environmental constraints in the current urban strategy. NPA recommends that this be reviewed as a priority, with a view to implementing past Commission of Inquiry recommendations that creeks should act as protected green linkages between the escarpment and remnant coastal conservation lands.

#### 5.3.5 Landscapes of State Significance

A. *Illawarra Escarpment* – As depicted in general terms in Figure 5.6, NPA proposes the designation as Landscape of State Significance extending from the uppermost gorge of the Hacking River to the eastern rim of the Kangaroo Valley in the southern Illawarra region. Housed within this landscape is one of the state's major corridors of moist forest habitat, including a stronghold of temperate rainforest. When significant

(modelled) habitat for 50 threatened or regionally important faunal species are overlaid, it is evident that all vegetated lands of the Illawarra Escarpment, slopes and plains need to be conserved if corridors that sustain these species are to be sustainably maintained.

In scenic conservation terms there is also an obvious heritage attached to this landscape, forming as it does the backdrop to Wollongong and a defining edge to the region. Generally, the designation would extend from the plateau terminus to the 50 metre contour, or lower where significant vegetation and/or open space values persist.

B. *Hawkesbury-Nepean River* – Continuing the designation outlined in previous sections, this covers the Nepean River upstream to Nepean Dam, and the Bargo River to its headwaters. The Bargo is included as a significant tributary because it is the only unregulated river of its size in draining from the Woronora Plateau to the Hawkesbury Nepean. The absence of dams or major water extraction makes this river a keystone for the aquatic ecology of the catchment.

## References

Australian Capital Territory (1997) *Murrumbidgee River Corridor Plan of Management Instrument of Approval*. Accessed at <u>http://www.legislation.act.gov.au/di/1997-</u> <u>268/default.asp</u> May 2006

Bennett, A.F. (2003) 'Habitat fragmentation'. in Attiwell, P. and Wilson, B. (eds) *Ecology: an Australian perspective*, Oxford University Press, South Melbourne pp440-456

Benson, D.H and Howell, J. (1990) *Taken for Granted - the bushland of Sydney and its suburbs*. Kangaroo Press, Kenthurst

Commonwealth of Australia (1992) National Forest Policy Statement. Commonwealth of Australia, Canberra.

Crisp, M. D., Laffan, S., Linder, H. P. and Monro, A. (2001) 'Endemism in the Australian Flora'. *Journal of Biogeography* **28**: 183-198

Egan, K.H., Farrell, J.R. and Pepper-Edwards, D.L. (1997) 'Historical and seasonal changes in the community of forest birds at Longneck Lagoon Nature Reserve, Scheyville, New South Wales'. *Corella* **21**: 1-16.

Gill A.M. and Williams J. (1996) Fire regimes and biodiversity: the effects of fragmentation of south eastern Australian eucalypt forests by urbanisation, agriculture and pine plantations *Forest Ecology and Management* 85: 261-278

Hawkesbury-Nepean Flood Management Advisory Committee (1997) Achieving a Hawkesbury-Nepean Floodplain Management Strategy. Department of Planning. Sydney

Keast, A. (1995). 'Habitat loss and species loss: the birds of Sydney 50 years ago and now'. *Australian Zoologist* **30**: 3-25.

Latham, H. (1999) Proposed National Park Additions in the Sydney Region. NPA, Sydney

National Parks Association of NSW (2005) The Unseen Conservation Estate -Tenure Security and Conservation Management of Crown Lands in NSW. NPA. Sydney

National Parks Association of NSW (2006) Connect to Protect - Eastern Links. NPA. Sydney

National Trust of Australia (1968) Sydney 2000 : requirements for conservation of natural areas, scenic preservation and recreation. National Trust of Australia, Sydney

NSW Department of Planning (1989) Sydney Regional Environmental Plan No 17– Kurnell Peninsula. Dept Planning, Sydney.

NSW Department of Planning, Infrastructure and Natural Resources (2004) *Riparian Corridor Management Study : Covering all of the Wollongong Local Government Area and Calderwood Valley in the Shellharbour Local Government Area*. DIPNR, Sydney

NSW NPWS (1997) Urban Bushland Biodiversity Survey of Western Sydney. NPWS, Hurstville

NSW NPWS (2002) Illawarra Escarpment and Coastal Plain - bioregional assessment. NPWS Hurstville.

NSW NPWS (2003) Native Vegetation of the Woronora, O'Hares and Meropolitan Catchments. NPWS. Hurstville.

Office of the Commissioners of Inquiry for Environment and Planning (1999) *The long term* planning and management of the Illawarra escarpment, Wollongong Local Government Area: report to the Honourable Dr Andrew Refshauge by Commissioner William Simpson. OCOI, Sydney.

Sattler, P.S. and Glanznig, A. (2006) *Building Nature's Safety Net: A review of Australia's terrestrial protected areas system*, 1991-2004. WWF-Australia Report, WWF-Australia, Sydney

State Planning Authority of New South Wales (1968) *Sydney region: Outline plan* 1970-2000 A.D : a strategy for development. SPA, Sydney.

Winston, D. (1957) Sydney's Great Experiment: The Progress of the Cumberland County Plan. Angus and Robertson, Sydney.