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North Sydney Council

Natural Area Survey

Report prepared for North Sydney Council

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Summary

P & J Smith Ecological Consultants have been engaged by North Sydney Council to survey and review the native vegetation, flora and fauna of North Sydney local government area. A total of about 39.5 ha of bushland (as defined in *State Environmental Planning Policy No. 19 - Bushland in Urban Areas*) has been identified and mapped, representing less than 4% of the total land area of the LGA. About 70% of this bushland is in good condition, 22% is in fair condition, and 8% is in poor condition. Non-bushland vegetation mapped in and around the bushland areas includes 1.8 ha of remnant trees without a native understorey, 9.3 ha of vegetation in very poor condition (dominated by weeds, including native weeds, or by a mixture of weeds and plantings), 15.2 ha of vegetation dominated by native plantings, 7.3 ha of mixed native and exotic plantings, and 3 ha of exotic plantings.

Reserves with relatively large areas of bushland, most of which is in good or fair condition, are Smoothey Park/Gore Cove Reserve, Berry Island Reserve, Balls Head Reserve and Wonga Road Reserve. These are the reserves with the highest long-term resilience and viability. Other reserves with relatively large areas of bushland in good or fair condition, but also large areas of vegetation in poor or very poor condition that pose management problems, are Primrose Park and Tunks Park. Reserves with smaller areas of bushland in good or fair condition, but close to other reserves with larger bushland areas, are Brightmore Reserve and Mortlock Reserve. The reserves with the lowest long-term resilience and viability, having only small areas of bushland or being compromised by a high degree of fragmentation or isolation of the bushland, are Walumetta Park, Harry Howard Reserve, Waverton Park/former BP site, Forsyth Park, Cremorne Reserve and Folly Point Reserve.

Twelve native vegetation communities have been distinguished in North Sydney. Ten of these are primary communities that would have been present before European settlement. The other two are secondary communities that appear to have developed as a result of changed environmental conditions. They occur in sites that would originally have supported other communities. Three of the communities are listed as endangered ecological communities under NSW legislation: Coastal Saltmarsh, Swamp Oak Forest on Coastal Floodplains, and Sydney Turpentine-Ironbark Forest. The last community is also listed as critically endangered under Commonwealth legislation. It is represented in North Sydney by a rare and unusual variant, called here Forest Red Gum Foreshore Forest. The three endangered communities are concentrated in Gore Cove Reserve and Badangi Reserve at Wollstonecraft, except for a small, degraded stand of Swamp Oak Forest at Folly Point Reserve, Cammeray. Wollstonecraft is characterised generally by a high diversity of native vegetation communities and represents a local biodiversity 'hotspot'.

A total of 347 native vascular plant species and subspecies have been recorded in North Sydney that appear to be natural occurrences, not plantings. These include one threatened species, *Acacia terminalis* subspecies *terminalis*, which is listed as an endangered 'species' (even though it is a subspecies) under both NSW and Commonwealth legislation. Another threatened species, *Syzygium paniculatum*, has been recorded only as a planting, but may also occur naturally in North Sydney. Another 39 species are significant at regional level (Sydney Metropolitan Catchment Management Authority area). Most of the remaining species are significant at local level (North Sydney local government area), except for the few species that have adapted well to urban development and readily colonise disturbed sites away from native bushland.

A total of 190 native terrestrial vertebrate species have been recorded in North Sydney, including four frog species, 20 reptile species, 148 bird species and 18 mammal species.

However, only 114 of these species still occur consistently in the area. Eighteen species are listed as threatened species under NSW and/or Commonwealth legislation, but only three of these, the Powerful Owl, Grey-headed Flying-fox and Eastern Bent-wing Bat, occur regularly. Another 15 species are listed as migratory species under Commonwealth legislation. These are species listed on international migratory species agreements to which Australia is a signatory. A further 15 species are significant at regional level (Sydney Metropolitan Catchment Management Authority area), and 61 species are significant at local level (North Sydney local government area). A biodiversity 'hotspot' for fauna in North Sydney is Tunks Park, which supports the greatest local diversity of bird species, especially small bushland birds, a group that has largely disappeared from other North Sydney reserves.

Management issues in relation to North Sydney's flora and fauna include the following:

- Control of introduced weeds to promote bush regeneration. In this regard, controlling the causes of weed invasion, such as nutrient and moisture enrichment from urban runoff, is important wherever possible.
- Enhancement of wildlife corridors linking the bushland reserves with each other and with bushland reserves in neighbouring local government areas.
- Ecological burns to re-establish a more appropriate fire regime in the bushland reserves in order to maintain their ecological health.
- Control measures for native increaser species that have been favoured by the urban environment and are dominating stands of remnant bushland to the detriment of more sensitive species.
- Controlling the spread and impact of *Phytophthora cinnamomi*, an introduced water mould that causes root rot, resulting in plant dieback and death.
- Loss of genetic diversity in small plant populations in isolated reserves, resulting in inbreeding and poor reproductive capacity that threatens their long-term viability.

The long-term impacts of climate change on the flora and fauna of North Sydney are difficult to predict in any detail. Although impacts of climate change may appear to be beyond the scope of local management, it is important to manage existing biodiversity to facilitate the long-term adaptation of species and communities to climate change. In North Sydney, climate change will exacerbate existing pressures on biodiversity. Current management should aim to build ecological resilience in bushland reserves by reducing existing impacts such as invasive weeds and altered fire regimes. Opportunities to rehabilitate or re-establish native vegetation on currently degraded land and to enhance habitat for already vulnerable species should be identified and implemented. The capacity of local flora and fauna to adapt to climate change is likely to be constrained by small populations, and hence low genetic diversity, coupled with isolation. Linkages between bushland remnants need to be enhanced wherever possible.

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Maps

1. Introduction

In late 2007, North Sydney Council's Bushland Management Team recognised that effective future planning for rehabilitation of Council's bushland reserves and for recovering native wildlife populations would require a high resolution vegetation assessment that incorporated species diversity and the classification of vegetation communities. Council and the community supported this objective, endorsing it as a priority action under the North Sydney Council Bushland Plan of Management 2007.

P & J Smith Ecological Consultants have been engaged by Council to identify and map the native vegetation communities of North Sydney, to compile lists of the native flora and fauna species of North Sydney, and to identify the conservation value of the communities and species at national, state, regional and local levels. The project was to include the following aspects:

- a classification and description of vegetation communities at a scale appropriate for bushland in the context of North Sydney local government area,
- an assessment of the local and regional conservation value of each vegetation community (in the context of the northern Sydney region),
- an assessment of appropriate ecological burning intervals for each community mapped and priority areas for fire,
- identification and mapping of rare and threatened plant species/vegetation communities, as well as recommendations for their protection & restoration,
- assessment of 'bushland resilience' (based on reversibility of degradation and potential for rehabilitation) i.e. long-term sustainability,
- identification of existing natural vegetation linkages with potential to function as wildlife and/or recreation corridors,
- from a literature review and fieldwork for the above information, identification of important wildlife habitat areas or 'biodiversity hotpots',
- an indication of species/population genetic robustness and appropriate provenance for 'keystone' species.

North Sydney is a small, highly urbanised local government area of only 1048 ha. It extends from Port Jackson north to Long Bay and consists of the suburbs of North Sydney, Wollstonecraft, Waverton, McMahons Point, Lavender Bay, Milsons Point, Kirribilli, Neutral Bay, Cremorne Point, Cremorne, Cammeray, Crows Nest and part of St Leonards (Figure 1). This small area is home to some 62 320 people, which places considerable pressure on the few, fragmented patches of native bushland that remain.


Figure 1. North Sydney local government area

2. Methods

2.1 Vegetation Communities

The native vegetation of North Sydney was surveyed over 16 days (202 person-hours) between 19/3/10 and 4/7/10 (Table 1). A total of 34 sample plots were examined in detail. The plots were selected to sample the main vegetation communities in each bushland reserve, usually one plot per vegetation community per reserve. Each plot was 0.04 ha in area (dimensions either 20 m by 20 m or 40 m by 10 m, depending on the shape of the stand of vegetation being sampled), with the exception of one saltmarsh plot, which was only 0.016 ha, this being the total extent of the community. A list was compiled of all native and introduced plant species growing in or overhanging each plot. The cover/abundance of each species was recorded on a standard scale of 1 to 7 (1 = <5% cover and <4 plants, 2 = <5% cover and uncommon, 3 = <5% cover and common, 4 = 5-19% cover, 5 = 20-49% cover, 6 = 50-74% cover, 7 = 75-100% cover). Vegetation structure was recorded in terms of the height range, percentage foliage cover and main species of each vegetation layer. Notes were taken of the topography and other habitat and disturbance features, and a GPS reading was made at the centre of the plot. Details of each plot are provided in Appendix 3 and plant species data in Appendix 4.

In addition to the sample plots, general searches for extra plant species were made in each bushland reserve. Specimens were collected of any species that could not be readily identified in the field. These were subsequently identified using Pellow *et al*. (2009), Harden (1992-2002) and other field guides, and by comparison with our extensive specimen collection of the Sydney flora. Fauna species (frogs, reptiles, birds and mammals) were also recorded during the fieldwork, including records from sightings, calls and characteristic signs (droppings, nests, etc). An AnaBat bat detector was used one evening at Tunks Park (28/4/10) to record ultrasonic bat calls. The bat calls were subsequently identified from Pennay *et al*. (2004) and reference calls.

The native vegetation communities of North Sydney were distinguished from the plot data, relating these to the vegetation classifications of DECC (2009), Allen *et al.* (2007) and Benson and Howell (1994). The distribution of the communities was mapped by interpretation of colour satellite imagery on North Sydney Council's geographic information system (GIS). Images were available from 1997, 2001 and 2006, but it was mainly the 2006 images that were used. Image definition was poor, so better imagery available from http://www.whereis.com was also used. Images from that website were printed out and taken into the field, where they were marked up with the vegetation boundaries. Extensive field checking was carried out over seven days (47 person-hours, Table 1), covering all the bushland areas in North Sydney. The vegetation was then mapped on computer from Council's GIS imagery using a MapInfo Professional 8.0 GIS program, in conjunction with the marked-up images from the fieldwork. Twelve native vegetation communities were distinguished and mapped (section 3). Four condition classes were distinguished and mapped within the communities (section 3.13). Another five vegetation types, covering stands of vegetation dominated by weeds or plantings, were also distinguished and mapped (section 4), but only if they were within, adjacent to, or continuous with bushland areas. Occurrences away from bushland areas were not mapped.

DECC (2009) have mapped areas of seagrass meadows in North Sydney waters, most extensively in Balls Head Bay. The mapped areas in Balls Head Bay and Gore Cove were examined by canoe on 20/4/10. They turned out to consist of patches of brown algae (*Ecklonia radiata*, *Sargassum* sp. and Dictyotaceae sp. variously dominant), patches of seagrass (*Zostera capricorni*) and patches of mixed brown algae and seagrass. Because

the underwater vegetation is not just seagrass meadows but is a complex mixture of seagrasses and brown algae, we have not attempted to distinguish and map aquatic vegetation communities in North Sydney, only terrestrial ones.

Vegetation communities of special conservation significance were identified using the following criteria:

- **Threatened in Australia**. Listed as a threatened community under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.
- **Threatened in New South Wales**. Listed as a threatened community under the NSW *Threatened Species Conservation Act 1995*.
- **Threatened at regional level**. The Sydney Metropolitan Catchment Management Authority area is the most appropriate region, especially in view of the recent detailed vegetation study of the area by DECC (2009). Communities with a total extent in the region of less than 200 ha may be considered threatened at regional level.
- **Threatened at local level** (North Sydney local government area). Because of the scarcity of native bushland in North Sydney, and the absence of any Department of Environment, Climate Change and Water (DECCW) reserves, all native vegetation communities in North Sydney may be considered locally threatened.

Table 1. Field survey details

Date	Time (EST)	People	Main tasks	Conditions
19/3/10	0930-1750	P & J Smith	plots	Clear sky to ¼ cloud, light wind, no rain, Sydney max 29°
24/3/10	0925-1750	P & J Smith	plots	½ cloud to overcast, light to moderate wind, no rain, Sydney max 26°
5/4/10	1000-1830	P & J Smith	plots	¾ cloud to overcast, calm to light wind, no rain, Sydney max 23°
12/4/10	0945-1745	P & J Smith	plots	Clear sky to ¼ cloud, light to moderate wind, no rain, Sydney max 22°
13/4/10	1000-1750	P & J Smith	plots	Clear sky to ½ cloud, calm to light wind, no rain, Sydney max 25°
20/4/10	0730-1545	P, J & K Smith	canoe, plots	Clear sky to ½ cloud, calm, no rain, Sydney max 24°
22/4/10	0735-1525	P & J Smith	plots	Clear sky, calm to light wind, no rain, Sydney max 31°
26/4/10	0930-1645	P & J Smith	plots	Clear sky, light to moderate wind, no rain, Sydney max 20°
28/4/10	1000-1900	P & J Smith	plots	Clear sky, calm, no rain, Sydney max 25°
2/6/10	1015-1630	P Smith	mapping	¼ to ½ cloud, light wind, no rain, Sydney max 19°
7/6/10	1045-1600	P Smith	mapping	¾ cloud to overcast, light to moderate wind, no rain, Sydney max 19°
12/6/10	1015-1650	P & J Smith	mapping	Clear sky, moderate wind, no rain, Sydney max 18°
27/6/10	1020-1650	J Smith	mapping	Clear sky to ¾ cloud, calm to strong wind, no rain, Sydney max 16°
29/6/10	1045-1745	J Smith	mapping	Clear sky, calm to light wind, no rain, Sydney max 16°
3/7/10	1030-1500	J Smith	mapping	Clear sky, light to moderate wind, no rain, Sydney max 18°
4/7/10	1100-1530	J Smith	mapping	Clear sky to ¼ cloud, light wind, no rain, Sydney max 14°

2.2 Plant Species

The following sources were used to compile an annotated list of the native vascular plant species of the North Sydney local government area:

- Records from the present survey.
- Plant species lists from surveys undertaken in 1998 for the preparation of bushland rehabilitation plans (North Sydney Council 1999, 2001).
- Records from Waratah Eco Works (2009a-b), Total Earth Care (2000, 2009), Terra Australis Regeneration (2009), Australian Bushland Restoration (2007, 2008), Ambrose (2006), National Trust (1981, 1989, 1994, 1997, 2000) and Urban Bushland Management Consultants (1997).
- NSW Department of Environment, Climate Change and Water's 'Atlas of NSW Wildlife' database records to 3/3/2010.
- Australian herbaria joint 'Australia's Virtual Herbarium' database records to 29/3/2010.

We have not included species that appear to be plantings or derived from plantings, even though they have been included in some previous lists. Some of these species are unlikely to have ever occurred naturally in North Sydney (e.g. *Acacia elata*, *Corymbia maculata*, *Cyathea cooperi*). Others may have been part of the original flora, but all examples encountered during the fieldwork appeared to be plantings (e.g. *Acacia binervia*, *Eucalyptus saligna*, *Leptospermum laevigatum*, *Melaleuca armillaris*, *M. quinquenervia*, *M. styphelioides*, *Syzygium paniculatum*).

Plant species of special conservation significance were identified using the following criteria:

- **Threatened in Australia**. Listed as a threatened species under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.
- **Rare in Australia**. Listed as rare or poorly known on the Briggs and Leigh (1996) list of Rare or Threatened Australian Plants (ROTAP). These are not threatened species but ones that may become threatened. As it turned out, none of these species has been recorded in North Sydney.
- **Threatened in New South Wales**. Listed as a threatened species under the NSW *Threatened Species Conservation Act 1995*.
- **Threatened at regional level** (Sydney Metropolitan Catchment Management Authority area). These include species identified as regionally significant by Benson and Howell (1994), and other species that are rare and poorly represented in regional conservation reserves, being recorded from no more than two of the 19 DECCW reserves in the SMCMA area (Botany Bay, Garigal, Georges River, Heathcote, Lane Cove, Royal and Sydney Harbour National Parks; Dalrymple-Hay, Dharawal, Newington, Prospect, Towra Point and Wallumatta Nature Reserves; Leacock, Parramatta River and Wolli Creek Regional Parks; and Dharawal, Garawarra and Illawarra Escarpment State Conservation Areas). Species lists for the reserves were obtained from Benson and Howell (1994), and from the DECCW 'Atlas of NSW Wildlife' database (as at 10/7/2010). Species that occur in lawns and gardens were excluded from the assessments (such as *Carex inversa*, *Oxalis thompsoniae*, *Pteris tremula* and *Rumex brownii*).
- **Threatened at local level** (North Sydney local government area). Since native bushland is scarce in North Sydney (a total of 39.5 ha, less than 4% of the total land area of the LGA), and there are no DECCW reserves, all remaining native plant

species may be considered locally threatened, except for those that have adapted to urban development and readily colonise disturbed sites away from native bushland.

2.3 Fauna Species

The following sources were used to compile an annotated list of the native frog, reptile, bird and mammal species of the North Sydney local government area:

- Records from the present survey.
- Records from Waratah Eco Works (2009a-b), Smith and Smith (2008), Poynton (2008), Australian Bushland Restoration (2008), Ambrose (2006), Frew (2004), Nixon (2003), Bourne (2003), Ekert (2002, 2003), Burton (2000, 2003), Biosphere Environmental Consultants (2001, 2002), North Sydney Council (1999, 2001), Hoye (2000), Urban Bushland Management Consultants (1997), Keast (1995), National Trust (1989, 1994), Hoskin *et al*. (1991), Eades and Debus (1982) and Mann (1933).
- North Sydney Council's 'Wildlife Watch' database of local fauna records, covering the years 1995 to 2009, excluding some records that we considered dubious.
- NSW Department of Environment, Climate Change and Water's 'Atlas of NSW Wildlife' database records to 3/3/2010, excluding some records that we considered dubious.
- Museum specimen records from the Online Zoological Collections of Australian Museums (OZCAM) database (www.ozcam.gov.au).
- Annual NSW bird reports published in the journal *Australian Birds*, covering the years 1970 to 2004 (all available reports).
- Bird records published in the *NSW Field Ornithologists Club Newsletter*, from February 1989 to February 2010. .
- Bird records published in the *Cumberland Bird Observers Club Newsletter*, from May 1986 to February 2010.

Fauna species of special conservation significance were identified using the following criteria:

- **Threatened in Australia**. Listed as a threatened species under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.
- **Migratory species**. Listed as a migratory species under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. These are species listed on international migratory species agreements to which Australia is a signatory. The agreements impose an international obligation on Australia to protect the species.
- **Threatened in New South Wales**. Listed as a threatened species under the NSW *Threatened Species Conservation Act 1995*.
- **Threatened at regional level** (Sydney Metropolitan Catchment Management Authority area). Species that are rare and poorly represented in regional conservation reserves, being recorded from no more than two of the 19 DECCW reserves in the SMCMA area, not including marine species or species that are only rare, non-breeding visitors to the region. Species lists for the reserves were obtained from the DECCW 'Atlas of NSW Wildlife' database (as at 10/7/2010). Also included as regionally significant are species with endangered populations in the region that are listed under the NSW TSC Act, namely the Little Penguin (Manly Point population listed) and the Long-nosed Bandicoot (North Head and Inner Western Sydney populations listed).

- **Threatened at local level** (North Sydney local government area). In view of the scarcity of native bushland and natural habitats in North Sydney, and the absence of any DECCW reserves, all native fauna species may be considered locally threatened, except for those that are only rare, non-breeding visitors to North Sydney (or locally extinct), and those that have become well adapted to urban environments.

Table 2. Native vegetation communities of North Sydney

EPBC Act = Commonwealth Environment Protection and Biodiversity Conservation Act 1999, TSC Act = NSW Threatened Species Conservation Act 1995

North Sydney community	Significance	Equivalent communities in other vegetation classifications			Equivalent endangered communities	
		DECC (2009)	Allen *et al.* (2007)	Benson & Howell (1994)	EPBC Act	TSC Act
Forest Red Gum Foreshore Forest	National	Sydney Foreshores Shale Forest	Coastal Sandstone Gully Forest - Sandstone Shale Transition	No equivalent	Variant of Turpentine-Ironbark Forest of the Sydney Basin Bioregion*	Variant of Sydney Turpentine-Ironbark Forest*
Angophora Foreshore Forest	Local	Coastal Sandstone Foreshores Forest	Coastal Sandstone Gully Forest - Mesic Understorey	Sydney Sandstone Gully Forest (i), *Eucalyptus piperita-Angophora costata-Corymbia gummifera* Open-forest /Woodland		
			Coastal Sandstone Gully Forest - Foreshore Slopes			
Mixed Sandstone Gully Forest	Local	Coastal Enriched Sandstone Sheltered Forest	Coastal Sandstone Gully Forest - Alluvium/ Sandstone Transition			
Blackbutt Gully Forest	Local	Coastal Enriched Sandstone Moist Forest	Coastal Sandstone Gully Forest - Tall	Sydney Sandstone Gully Forest (ii), *Eucalyptus pilularis-Syncarpia glomulifera* Tall Open-forest		
Sandstone Gallery Rainforest	Regional	Coastal Sandstone Gallery Rainforest	Coastal Sandstone Gully Forest - Mesic Forest	Sydney Sandstone Gully Forest (iii), *Ceratopetalum apetalum-Tristaniopsis laurina* Closed-forest		
Disclimax Sandstone Scrub**	Local	No equivalent	Coastal Sandstone Open-forest (Disturbed) variant of Coastal Sandstone Gully Forest - Foreshore Slopes	No equivalent		
Allocasuarina Scrub**	Local	No equivalent	Coastal Sandstone Ridgetop Woodland - Scrub/Heath	No equivalent		
Sandstone Foreshore Scrub	Regional	Coastal Tea-tree-Banksia Scrub	Sandstone Headland Scrub	Coastal Dune Heath (ii), *Monotoca elliptica-Banksia integrifolia-Leptospermum laevigatum* Open-scrub		
Kunzea Scrub	Local	Coastal Headland Banksia Heath	Coastal Sandstone Plateau Heath	Coastal Sandstone Heath (iv), Rocky Outcrop Heath		

North Sydney community	Significance	Equivalent communities in other vegetation classifications			Equivalent endangered communities	
		DECC (2009)	Allen *et al*. (2007)	Benson & Howell (1994)	EPBC Act	TSC Act
Estuarine Swamp Oak Forest	State	Estuarine Swamp Oak Forest	Estuarine Fringe Forest - Swamp Oak Floodplain Forest	Estuarine Complex (iv), *Casuarina glauca-Baumea juncea* Low Open-forest		Swamp Oak Floodplain Forest
Estuarine Mangrove Forest	Local	Estuarine Mangrove Forest	Estuarine Mangrove	Estuarine Complex (i), *Avicennia marina-Aegiceras corniculatum* Open-scrub		
Estuarine Saltmarsh	State	Estuarine Saltmarsh	Estuarine Saltmarsh	Estuarine Complex (ii), *Sarcocornia quinqueflora-Suaeda australis* Herbland		Coastal Saltmarsh

* Listed as critically endangered under the EPBC Act but as endangered under the TSC Act

** Secondary communities that appear to have developed as a result of disturbance and changed environmental conditions at sites that originally supported Angophora Foreshore Forest or Blackbutt Gully Forest

3. Native Vegetation Communities

3.1 Overview

Twelve native vegetation communities were distinguished in the North Sydney bushland (Table 2). One of these, Forest Red Gum Foreshore Forest, is listed as an endangered/critically endangered community (since it represents a form of Sydney Turpentine-Ironbark Forest) under both Commonwealth and NSW legislation. Two other communities, Estuarine Swamp Oak Forest and Estuarine Saltmarsh, are listed as endangered ecological communities under NSW legislation but not Commonwealth legislation. Two further communities, Sandstone Gallery Rainforest and Sandstone Foreshore Scrub, are significant at regional level, with less than 200 ha of each community remaining in the entire Sydney Metropolitan Catchment Management Authority area. The remaining seven communities are locally significant. Two of the locally significant communities, Disclimax Sandstone Scrub and Allocasuarina Scrub, are secondary communities that appear to have developed as a result of disturbance and changed environmental conditions at sites that originally supported Angophora Foreshore Forest or Blackbutt Gully Forest (two of the other locally significant communities).

3.2 Forest Red Gum Foreshore Forest (RF)

Identification: Open-forest in which the dominant tree species is *Eucalyptus tereticornis* (Forest Red Gum).

Number of sample plots: 1

Structure: Open-forest

Number of native plant species per 0.04 ha plot: 28

Habitat and distribution in North Sydney: Restricted to one site at Badangi Reserve, Wollstonecraft, where it occurs on the sides and across the top of a small peninsula in Balls Head Bay. The geology is Hawkesbury Sandstone, with sandstone outcrops, but the dominance of *Eucalyptus tereticornis* suggests a shale lens. Total area 0.7 ha.

Comments: There is no equivalent community in the Royal Botanic Gardens Sydney vegetation classification (Benson and Howell 1994). However, in the Royal Botanic Gardens classification of Sydney foreshore vegetation (Allen *et al*. 2007), it corresponds to Coastal Sandstone Gully Forest - Sandstone Shale Transition. In the draft DECC (2009) vegetation classification for the Sydney Metropolitan Catchment Management Authority Area, it corresponds to community S_WSF08, Sydney Foreshores Shale Forest. This latter community has an estimated total extent of only 42 ha in the SMCMA area, of which 36 ha (85%) is in a formal conservation reserve (Royal National Park). The number of native plant species recorded in the one North Sydney sample plot (28) was much lower than the mean number recoded in the DECC (2009) study plots (39.4). The depauperate condition of the Badangi stand may reflect its history of disturbance. A photo from about 1928 shows buildings and extensive clearing at the site.

Conservation significance: Threatened at both state and national level. DECC (2009) suggest that this community may represent a form of Sydney Turpentine-Ironbark Forest, which is listed as a critically endangered ecological community under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, and as an endangered ecological community under the NSW *Threatened Species Conservation Act 1995*. It lacks the characteristic tree species of Sydney Turpentine-Ironbark Forest, but shares many understorey species. Of the 36 native plant species recorded in the Forest Red Gum Foreshore Forest stand at Badangi Reserve, 24 (67%) are listed by the NSW Scientific Committee (1998) as characteristic species of Sydney Turpentine-Ironbark Forest.

Photo 1. Forest Red Gum Foreshore Forest, Badangi Reserve

Layer	Height (m)	Foliage cover (%)	Main native species
Trees	8-23	40	*Eucalyptus tereticornis* (dominant) *Angophora costata*
Shrubs	1-7	50	*Myrsine variabile* *Notelaea longifolia* *Pittosporum undulatum*
Ground covers	0.1-0.8	50	*Entolasia marginata* *Lomandra longifolia* *Poa affinis*
Vines			*Eustrephus latifolius*

3.3 Angophora Foreshore Forest (AF)

Identification: Open-forest, occasionally tall open-forest, in which the dominant tree species is *Angophora costata* (Sydney Red Gum).

Number of 0.04 ha sample plots: 10

Structure: Open-forest (8 plots), sometimes tall open-forest (1 plot) or woodland (1 plot), the last as a result of dieback.

Number of native plant species per 0.04 ha plot: 33 to 47, mean 39.9

Habitat and distribution in North Sydney: Moderate to steep slopes on Hawkesbury Sandstone, with sandstone outcrops. Found both along the harbour foreshores and up to 1 km away. Exposure to salt-laden breezes may be a factor in the distribution of this community. The most extensive forest community remaining in North Sydney, occurring in Wollstonecraft (Smoothey Park, Gore Cove Reserve, Berry Island Reserve, Badangi Reserve and Harry Howard Reserve), Waverton (Balls Head Reserve, Waverton Park, HMAS Waterhen and the former coal loader and BP sites), Neutral Bay (Forsyth Park), Cremorne Point (Cremorne Reserve), Cremorne (Brightmore Reserve and Primrose Park) and Cammeray (Primrose Park, Mortlock Reserve, Tunks Park and as remnant trees in Green Park). Total bushland area 16.5 ha. Stands of remnant trees without a native understorey 1.4 ha.

Comments: Not distinguished as a separate community in the Royal Botanic Gardens Sydney vegetation classification (Benson and Howell 1994). It is a form of their map unit 10ag (Sydney Sandstone Gully Forest), subunit (i), *Eucalyptus piperita-Angophora costata-Corymbia gummifera* Open-forest/Woodland. In the Royal Botanic Gardens classification of Sydney foreshore vegetation (Allen *et al*. 2007), the community corresponds to a combination of Coastal Sandstone Gully Forest - Mesic Understorey, and Coastal Sandstone Gully Forest - Foreshore Slopes (the former is associated with sites sheltered from the north-western sun, while the latter is associated with northern and western aspects). In the draft DECC (2009) vegetation classification for the Sydney Metropolitan Catchment Management Authority Area, Angophora Foreshore Forest corresponds to community S_DSF06, Coastal Sandstone Foreshores Forest. This latter community has an estimated total extent of 521 ha in the SMCMA area, of which 125 ha (24%) is in formal conservation reserves (Lane Cove, Royal and Sydney Harbour National Parks). The mean number of native plant species recorded in the North Sydney plots (39.9) was lower than in the DECC (2009) study plots (43.9).

Conservation significance: Threatened at local level because of the scarcity of native bushland in the North Sydney local government area.

Photo 2. Angophora Foreshore Forest, Berry Island Reserve

Layer	Height (m)	Foliage cover (%)	Main native species
Tall trees	8-33	20-70	*Angophora costata* (dominant) *Allocasuarina littoralis* *Angophora floribunda* *Banksia integrifolia* *Eucalyptus pilularis* *Eucalyptus piperita* *Eucalyptus resinifera* *Ficus rubiginosa*
Low trees*	3-12	10-20	*Acacia longifolia* *Angophora costata* *Elaeocarpus reticulatus* *Glochidion ferdinandi ferdinandi* *Hakea dactyloides* *Homalanthus populifolius*

Layer	Height (m)	Foliage cover (%)	Main native species
			Pittosporum undulatum
Shrubs	0.7-9	10-60	*Acacia linifolia* *Acacia longifolia* *Acacia terminalis terminalis* *Allocasuarina littoralis* *Angophora costata* *Banksia integrifolia* *Dodonaea triquetra* *Elaeocarpus reticulatus* *Glochidion ferdinandi ferdinandi* *Grevillea linearifolia* *Hakea dactyloides* *Homalanthus populifolius* *Notelaea longifolia* *Ozothamnus diosmifolius* *Pittosporum revolutum* *Pittosporum undulatum* *Platylobium formosum* *Platysace lanceolata* *Polyscias sambucifolia* *Zieria smithii*
Ground covers	0.1-1	20-80	*Calochlaena dubia* *Commelina cyanea* *Dianella caerulea* *Entolasia marginata* *Entolasia stricta* *Hydrocotyle peduncularis* *Hypolepis muelleri* *Imperata cylindrica* *Lepidosperma laterale* *Lomandra longifolia* *Microlaena stipoides* *Oplismenus aemulus* *Poa affinis* *Pteridium esculentum* *Schoenus melanostachys*
Vines			*Eustrephus latifolius* *Pandorea pandorana* *Smilax glyciphylla* *Stephania japonica*

* This layer not always present

3.4 Mixed Sandstone Gully Forest (MF)

Identification: Open-forest of mixed tree species composition, including *Angophora costata* (Sydney Red Gum), *Corymbia gummifera* (Red Bloodwood), *Eucalyptus pilularis* (Blackbutt), *E. piperita* (Sydney Peppermint) and *E. sieberi* (Silvertop Ash).
Number of sample plots: 1
Structure: Open-forest
Number of native plant species per 0.04 ha plot: 54
Habitat and distribution in North Sydney: Restricted to Wonga Road Reserve and Tobruk Avenue Lookout, Cremorne, occurring on a steep slope beside Willoughby Bay. The geology is Hawkesbury Sandstone, with sandstone outcrops. Total bushland area 1.3 ha.

Comments: Not distinguished as a separate community in the Royal Botanic Gardens Sydney vegetation classification (Benson and Howell 1994). It is a form of their map unit 10ag (Sydney Sandstone Gully Forest), subunit (i), *Eucalyptus piperita-Angophora costata-Corymbia gummifera* Open-forest/Woodland. In the Royal Botanic Gardens classification of Sydney foreshore vegetation (Allen *et al*. 2007), the community corresponds to Coastal Sandstone Gully Forest - Alluvium/Sandstone Transition. In the draft DECC (2009) vegetation classification for the Sydney Metropolitan Catchment Management Authority Area, it corresponds to community S_DSF04, Coastal Enriched Sandstone Sheltered Forest. This latter community has an estimated total extent of 2617 ha in the SMCMA area, of which 941 ha (36%) is in formal conservation reserves (Garigal, Georges River and Lane Cove National Parks). The number of native plant species recorded in the one North Sydney sample plot (54) was higher than the mean number recorded in the DECC (2009) study plots (49.6). The plot had been burnt 8 months before and the regeneration was rich in plant species.

Conservation significance: Threatened at local level because of the scarcity of native bushland in the North Sydney local government area.

Photo 3. Mixed Sandstone Gully Forest, Wonga Road Reserve

Layer	Height (m)	Foliage cover (%)	Main native species
Trees	10-20	40	*Angophora costata* *Corymbia gummifera* *Eucalyptus pilularis* *Eucalyptus piperita* *Eucalyptus sieberi*
Tall shrubs	4-8	5 (much reduced by a fire in August 2009)	*Allocasuarina littoralis* (now dead) *Ceratopetalum gummiferum* *Elaeocarpus reticulatus* *Hakea dactyloides* (now dead) *Persoonia levis* young *Angophora*/*Corymbia*/*Eucalyptus*
Low shrubs	1-2	10 (much reduced by a fire in August 2009)	*Elaeocarpus reticulatus* *Glochidion ferdinandi ferdinandi* *Persoonia levis* *Polyscias sambucifolia*

Layer	Height (m)	Foliage cover (%)	Main native species
Ground covers	0.1-1	60	*Dianella caerulea* *Entolasia stricta* *Pteridium esculentum*
Vines			*Pandorea pandorana*

3.5 Blackbutt Gully Forest (BG)

Identification: Open-forest or tall open-forest, in which the dominant tree species is *Eucalyptus pilularis* (Blackbutt).

Number of 0.04 ha sample plots: 5

Structure: Open-forest (2 plots) or tall open-forest (3 plots).

Number of native plant species per 0.04 ha plot: 32 to 49, mean 39

Habitat and distribution in North Sydney: Steep slopes on Hawkesbury Sandstone, with sandstone outcrops. The height of the trees and the abundance of *Eucalyptus pilularis* suggests some enrichment of the soils from shale lenses or nearby Wianamatta Group shales. Occurs in Wollstonecraft (Smoothey Park, Gore Cove Reserve and Badangi Reserve), Cremorne (Brightmore Reserve and Primrose Park) and Cammeray (Primrose Park, Folly Point Reserve and Tunks Park,). Total bushland area 6.7 ha. Stands of remnant trees without a native understorey 0.4 ha.

Comments: Corresponds to map unit 10ag (Sydney Sandstone Gully Forest), subunit (ii), *Eucalyptus pilularis-Syncarpia glomulifera* Tall Open-forest, in the Royal Botanic Gardens Sydney vegetation classification (Benson and Howell 1994). In the Royal Botanic Gardens classification of Sydney foreshore vegetation (Allen *et al*. 2007), the community corresponds to Coastal Sandstone Gully Forest - Tall. In the draft DECC (2009) vegetation classification for the Sydney Metropolitan Catchment Management Authority Area, it corresponds to community S_WSF02, Coastal Enriched Sandstone Moist Forest. This latter community has an estimated total extent of 804 ha in the SMCMA area, of which only 122 ha (15%) is in formal conservation reserves (Lane Cove, Royal and Sydney Harbour National Parks). The mean number of native plant species recorded in the North Sydney plots (39) was lower than in the DECC (2009) study plots (43.6).

Conservation significance: Threatened at local level because of the scarcity of native bushland in the North Sydney local government area.

Layer	Height (m)	Foliage cover (%)	Main native species
Tall trees	10-40	40-70	*Eucalyptus pilularis* (dominant) *Angophora costata* *Corymbia gummifera* *Eucalyptus resinifera*
Low trees*	4-12	5-40	*Acacia parramattensis* *Allocasuarina littoralis* *Elaeocarpus reticulatus* *Glochidion ferdinandi ferdinandi* *Pittosporum undulatum* *Syncarpia glomulifera*
Shrubs	1-4	5-60	*Acacia longifolia* *Breynia oblongifolia* *Dodonaea triquetra* *Elaeocarpus reticulatus* *Leionema dentatum* *Notelaea longifolia* *Platysace lanceolata* *Polyscias sambucifolia*
Ground covers	0.1-1	20-60	*Calochlaena dubia*

Layer	Height (m)	Foliage cover (%)	Main native species
			Dianella caerulea *Entolasia stricta* *Lepidosperma laterale* *Lomandra longifolia* *Microlaena stipoides* *Oplismenus aemulus* *Panicum simile* *Phyllanthus hirtellus* *Poa affinis* *Pteridium esculentum* *Schoenus melanostachys*
Vines			*Clematis aristata* *Pandorea pandorana* *Smilax glyciphylla*

* This layer not always present

Photo 4. Blackbutt Gully Forest, Brightmore Reserve

3.6 Sandstone Gallery Rainforest (GR)

Identification: Closed-forest (rainforest) dominated by *Acmena smithii* (Lilly Pilly), *Ceratopetalum apetalum* (Coachwood) and *Pittosporum undulatum* (Pittosporum), in various combinations.
Number of 0.04 ha sample plots: 3
Structure: Closed-forest
Number of native plant species per 0.04 ha plot: 16 to 33, mean 25
Habitat and distribution in North Sydney: Steep, sheltered slopes beside rocky creeklines on Hawkesbury Sandstone. Occurs in Wollstonecraft (Smoothey Park, Gore Cove Reserve and Badangi Reserve) and Cremorne (Brightmore Reserve). Total bushland area 0.8 ha.
Comments: Corresponds to map unit 10ag (Sydney Sandstone Gully Forest), subunit (iii), *Ceratopetalum apetalum-Tristaniopsis laurina* Closed-forest, in the Royal Botanic Gardens Sydney vegetation classification (Benson and Howell 1994). In the Royal

Botanic Gardens classification of Sydney foreshore vegetation (Allen *et al*. 2007), the community corresponds to Coastal Sandstone Gully Forest - Mesic Forest. In the draft DECC (2009) vegetation classification for the Sydney Metropolitan Catchment Management Authority Area, it corresponds to community S_RF02, Coastal Sandstone Gallery Rainforest. This latter community has an estimated total extent of only 117 ha in the SMCMA area, of which 34 ha (29%) is in formal conservation reserves (Garigal, Georges River, Lane Cove, Royal and Sydney Harbour National Parks, and Dharawal Nature Reserve). The mean number of native plant species recorded in the North Sydney plots (25) was markedly higher than in the DECC (2009) study plots (16.9).

Conservation significance: Threatened at regional level in the Sydney Metropolitan Catchment Management Authority area because of its restricted extent (less than 200 ha) and its particular susceptibility to weed invasion and degradation.

Photo 5. Sandstone Gallery Rainforest, Badangi Reserve

Layer	Height (m)	Foliage cover (%)	Main native species
Tall trees*	14-35	3-20	*Eucalyptus pilularis* *Eucalyptus resinifera*
Low trees	6-22	70-90	*Acmena smithii* *Ceratopetalum apetalum* *Glochidion ferdinandi ferdinandi* *Pittosporum undulatum*
Shrubs	0.5-6	3-20	*Ceratopetalum apetalum* *Notelaea longifolia* *Pittosporum undulatum*
Ground covers	0.1-1	10-80	*Aslenium australasicum* *Calochlaena dubia* *Commelina cyanea* *Oplismenus imbecillis*
Vines			*Eustrephus latifolius* *Morinda jasminoides* *Smilax glyciphylla*

* This layer not always present - emergents or overhanging trees from adjacent communities

3.7 Disclimax Sandstone Scrub (DS)

Identification: Open to closed scrub or forest of mixed and variable composition. Common species in the tall shrub/tree layer include *Glochidion ferdinandi ferdinandi* (Cheese Tree), *Pittosporum undulatum* (Pittosporum), *Ficus rubiginosa* (Port Jackson Fig), *Elaeocarpus reticulatus* (Blueberry Ash) and *Banksia integrifolia* (Coast Banksia). A disclimax (secondary) community occurring on disturbed sites that would originally have supported eucalypt forest (often indicated by the presence of dead trees, stumps or saplings).

Number of 0.04 ha sample plots: 5

Structure: Open-scrub (2 plots), closed-scrub (1 plot), open-forest (1 plot) or closed-forest (1 plot).

Number of native plant species per 0.04 ha plot: 30 to 51, mean 38.6

Habitat and distribution in North Sydney: Ridgetops and gentle to steep slopes on Hawkesbury Sandstone, with sandstone outcrops. A 'disclimax' community is an altered community that has replaced the original vegetation community as a result of disturbance, especially human-related disturbance. Disclimax Sandstone Scrub develops in sites where the original eucalypt forest vegetation has been subject to clearing or dieback. Some of these sites appear to be gradually regenerating to eucalypt forest. Other sites, however, are likely to remain as Disclimax Sandstone Scrub because of the changed environmental conditions associated with urban development (increased moisture and nutrient levels from urban runoff, and prolonged absence of fires). Occurs in Wollstonecraft (Gore Cove Reserve, Badangi Reserve and Walumetta Park), Waverton (Balls Head Reserve, HMAS Waterhen, Waverton Park and the former BP site), Neutral Bay (Forsyth Park), Cremorne Point (Cremorne Reserve), Cremorne (Wonga Road Reserve, Brightmore Reserve and Primrose Park) and Cammeray (Primrose Park, Mortlock Reserve and Tunks Park). Total bushland area 9.3 ha.

Comments: There is no equivalent community in the Royal Botanic Gardens Sydney vegetation classification (Benson and Howell 1994) or the draft DECC (2009) vegetation classification for the Sydney Metropolitan Catchment Management Authority Area. However, in the Royal Botanic Gardens classification of Sydney foreshore vegetation (Allen *et al*. 2007), it corresponds to the Coastal Sandstone Open-forest (Disturbed) variant of Coastal Sandstone Gully Forest - Foreshore Slopes. The mean number of native plant species recorded in the Disclimax Sandstone Scrub plots (38.6) was similar to the mean for the 17 plots in eucalypt forest communities (39.8).

Conservation significance: Threatened at local level because of the scarcity of native bushland in the North Sydney local government area.

Layer	Height (m)	Foliage cover (%)	Main native species
Tall trees*	14-27	5-10	*Banksia integrifolia* *Eucalyptus piperita*
Low trees/tall shrubs	2-14	50-80	*Allocasuarina littoralis* *Angophora costata* saplings *Banksia integrifolia* *Banksia serrata* *Elaeocarpus reticulatus* *Ficus rubiginosa* *Glochidion ferdinandi ferdinandi* *Kunzea ambigua* *Leionema dentatum* *Notelaea longifolia* *Pittosporum undulatum*
Low shrubs	1-6	20-60	*Banksia integrifolia* *Callicoma serratifolia* *Crowea saligna* *Elaeocarpus reticulatus*

Layer	Height (m)	Foliage cover (%)	Main native species
			Glochidion ferdinandi ferdinandi *Monotoca elliptica* *Notelaea longifolia* *Pittosporum revolutum* *Pittosporum undulatum* *Xanthorrhoea arborea* *Zieria smithii*
Ground covers	0.1-1	60-80	*Calochlaena dubia* *Commelina cyanea* *Entolasia stricta* *Lomandra longifolia* *Microlaena stipoides* *Oplismenus aemulus* *Poa affinis* *Pteridium esculentum*
Vines			*Hibbertia dentata* *Pandorea pandorana* *Smilax glyciphylla* *Stephania japonica*

* This layer not always present

Photo 6. Disclimax Sandstone Scrub, Gore Cove Reserve

3.8 Allocasuarina Scrub (AS)

Identification: Open-scrub dominated by *Allocasuarina littoralis* (Black She-oak).
Number of 0.04 ha sample plots: 1
Structure: Currently tall shrubland as a result of a fire in May 2009, but would have been open-scrub before the fire.
Number of native plant species per 0.04 ha plot: 51
Habitat and distribution in North Sydney: Restricted to two sites in Tunks Park, Cammeray, where it occurs on steep slopes on Hawkesbury Sandstone, with sandstone outcrops. Total area 0.4 ha.

Comments: The dominance of *Allocasuarina littoralis* is likely to be an artefact of disturbance and changed environmental conditions, especially reduced fire frequency, and probably does not reflect the original vegetation of the sites where this community occurs. The original vegetation is likely to have been Angophora Foreshore Forest at one site and Blackbutt Gully Forest at the other. There is no equivalent community in the Royal Botanic Gardens Sydney vegetation classification (Benson and Howell 1994) or the draft DECC (2009) vegetation classification for the Sydney Metropolitan Catchment Management Authority Area. However, in the Royal Botanic Gardens classification of Sydney foreshore vegetation (Allen *et al*. 2007), the community corresponds to Coastal Sandstone Ridgetop Woodland - Scrub/Heath. The high number of native species recorded in the single sample plot (51) is a reflection of the diversity of the regeneration following an ecological burn 11 months previously.

Conservation significance: Threatened at local level because of the scarcity of native bushland in the North Sydney local government area.

Photo 7. Allocasuarina Scrub, Tunks Park, after a fire 11 months before

Layer	Height (m)	Foliage cover (%)	Main native species
Trees	14-17	5	*Allocasuarina littoralis* (dead) *Angophora costata* *Corymbia gummifera* (dead)
Shrubs	3-8	20 (mostly dead, <5% live foliage after May 2009 fire)	*Allocasuarina littoralis* (dominant, but now almost all dead after the fire) *Hakea dactyloides* (dead)
Ground covers	0.3-1.5	100 (post-fire regeneration)	*Entolasia stricta* *Gonocarpus teucrioides* *Lomandra longifolia* *Pteridium esculentum*

3.9 Sandstone Foreshore Scrub (FS)

Identification: Open-scrub or closed-scrub growing on steep sandstone slopes adjacent to the harbour. The shrub layer consists of a mixture of species, including *Elaeocarpus reticulatus* (Blueberry Ash), *Pittosporum undulatum* (Pittosporum), *Banksia integrifolia*

(Coast Banksia), *Ficus rubiginosa* (Port Jackson Fig), *Glochidion ferdinandi ferdinandi* (Cheese Tree) and *Monotoca elliptica* (Tree Broom-heath). Similar to Disclimax Sandstone Scrub, but appears to be a natural community (although probably somewhat altered from its original condition) rather than a disclimax community that has developed as a result of disturbance and changed environmental conditions.

Number of 0.04 ha sample plots: 2

Structure: Open-scrub (1 plot) or closed-scrub (1 plot).

Number of native plant species per 0.04 ha plot: 31 to 42, mean 36.5

Habitat and distribution in North Sydney: Steep slopes on Hawkesbury Sandstone adjacent to the harbour, with extensive sandstone outcrops and cliffs. Occurs in Wollstonecraft (Berry Island Reserve), Waverton (Balls Head Reserve and Sugarworks Reserve) and Cremorne Point (Cremorne Reserve). Total bushland area 2.9 ha.

Comments: Corresponds to map unit 21b (Coastal Dune Heath), subunit (ii), *Monotoca elliptica-Banksia integrifolia-Leptospermum laevigatum* Open-scrub, in the Royal Botanic Gardens Sydney vegetation classification (Benson and Howell 1994). In the Royal Botanic Gardens classification of Sydney foreshore vegetation (Allen *et al*. 2007), it corresponds to Sandstone Headland Scrub. In the draft DECC (2009) vegetation classification for the Sydney Metropolitan Catchment Management Authority Area, it corresponds to community S_HL02, Coastal Tea-tree-Banksia Scrub. This latter community has an estimated total extent of only 166 ha in the SMCMA area, of which 74 ha (45%) is in formal conservation reserves (Botany Bay and Royal National Parks, and Towra Point Nature Reserve). The mean number of native plant species recorded in the North Sydney plots (36.5) was markedly higher than in the DECC (2009) study plots (22.1).

Conservation significance: Threatened at regional level in the Sydney Metropolitan Catchment Management Authority area because of its restricted extent (less than 200 ha).

Photo 8. Sandstone Foreshore Scrub, Berry Island Reserve

Layer	Height (m)	Foliage cover (%)	Main native species
Trees*	7-15	10	*Banksia integrifolia* *Elaeocarpus reticulatus* *Ficus rubiginosa*

Layer	Height (m)	Foliage cover (%)	Main native species
			Glochidion ferdinandi ferdinandi *Pittosporum undulatum*
Tall shrubs	1.5-7	60-80	*Banksia integrifolia* *Elaeocarpus reticulatus* *Glochidion ferdinandi ferdinandi* *Monotoca elliptica* *Notelaea longifolia* *Pittosporum undulatum*
Low shrubs*	0.8-3	40	*Elaeocarpus reticulatus* *Monotoca elliptica* *Notelaea longifolia* *Pittosporum undulatum*
Ground covers	0.1-1	60-80	*Asplenium flabellifolium* *Calochlaena dubia* *Entolasia stricta* *Gleichenia rupestris* *Hydrocotyle peduncularis* *Lomandra longifolia* *Microlaena stipoides* *Poa affinis*
Vines			*Pandorea pandorana*

* These layers not always present

3.10 Kunzea Scrub (KS)

Identification: Open-scrub dominated by *Kunzea ambigua* (Tick Bush), growing on top of harbour headlands with extensive flat sandstone outcrops.

Number of 0.04 ha sample plots: 2

Structure: Open-scrub

Number of native plant species per 0.04 ha plot: 25 to 40, mean 32.5

Habitat and distribution in North Sydney: Ridgetops on Hawkesbury Sandstone harbour headlands, with extensive flat sandstone outcrops and shallow soils. Occurs in Wollstonecraft (Berry Island Reserve) and Waverton (Balls Head Reserve). Total bushland area 0.5 ha.

Comments: Corresponds to map unit 21g (Coastal Sandstone Heath), subunit (iv), Rocky Outcrop Heath, in the Royal Botanic Gardens Sydney vegetation classification (Benson and Howell 1994). In the Royal Botanic Gardens classification of Sydney foreshore vegetation (Allen *et al*. 2007), it corresponds to Coastal Sandstone Plateau Heath. In the draft DECC (2009) vegetation classification for the Sydney Metropolitan Catchment Management Authority Area, it corresponds to community S_HL06, Coastal Headland Banksia Heath. This latter community has an estimated total extent of 324 ha in the SMCMA area, of which 203 ha (63%) is in formal conservation reserves (Botany Bay, Royal and Sydney Harbour National Parks). The mean number of native plant species recorded in the North Sydney plots (32.5) was similar to the DECC (2009) study plots (31.6). The dominance of *Kunzea ambigua* in the North Sydney plots may be an artefact of disturbance and a reduced fire frequency, and may not reflect the original composition of the community.

Conservation significance: Threatened at local level because of the scarcity of native bushland in the North Sydney local government area.

Layer	Height (m)	Foliage cover (%)	Main native species
Trees*	8-9	5	*Angophora costata* *Eucalyptus punctata*

Layer	Height (m)	Foliage cover (%)	Main native species
Tall shrubs	1.5-6	20-70	*Kunzea ambigua* (dominant) *Acacia longifolia* *Casuarina glauca*
Low shrubs	0.5-2	10-20	*Acacia longifolia* *Grevillea linearifolia* *Kunzea ambigua* *Notelaea longifolia*
Ground covers	0.05-0.7	30-60	*Dianella revoluta* *Entolasia stricta* *Eragrostis brownii* *Lomandra longifolia* *Microlaena stipoides*
Vines			*Pandorea pandorana*

* This layer not always present

Photo 9. Kunzea Scrub, Balls Head Reserve

3.11 Estuarine Swamp Oak Forest (SO)

Identification: Open-forest dominated by *Casuarina glauca* (Swamp Oak), growing adjacent to the intertidal zone.
Number of 0.04 ha sample plots: 2
Structure: Open-forest
Number of native plant species per 0.04 ha plot: 12 to 31, mean 21.5
Habitat and distribution in North Sydney: Lower slopes on Hawkesbury Sandstone adjacent to the intertidal zone of the harbour. Occurs in Wollstonecraft (Gore Cove Reserve) and Cammeray (Folly Point Reserve). Total area 0.1 ha.
Comments: Corresponds to map unit 4a (Estuarine Complex), subunit (iv), *Casuarina glauca-Baumea juncea* Low Open-forest, in the Royal Botanic Gardens Sydney vegetation classification (Benson and Howell 1994). In the Royal Botanic Gardens classification of Sydney foreshore vegetation (Allen *et al*. 2007), it corresponds to Estuarine Fringe Forest - Swamp Oak Floodplain Forest. In the draft DECC (2009) vegetation classification for the Sydney Metropolitan Catchment Management Authority

Area, it corresponds to community S_FoW08, Estuarine Swamp Oak Forest. This latter community has an estimated total extent of 290 ha in the SMCMA area, of which 83 ha (31%) is in formal conservation reserves (Georges River and Lane Cove National Parks, and Towra Point Nature Reserve). The mean number of native plant species recorded in the North Sydney plots (21.5) was markedly higher than in the DECC (2009) study plots (11.2).

Conservation significance: Threatened in New South Wales. Listed as an endangered ecological community under the NSW *Threatened Species Conservation Act 1995*, under the name Swamp Oak Floodplain Forest. The community is not listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Photo 10. Estuarine Swamp Oak Forest, Gore Cove Reserve

Layer	Height (m)	Foliage cover (%)	Main native species
Tall trees*	16	5	*Angophora costata* *Eucalyptus pilularis*
Low trees	3-14	50	*Casuarina glauca* (dominant) *Glochidion ferdinandi ferdinandi*
Shrubs*	1-5	30	*Avicennia marina* *Casuarina glauca* *Glochidion ferdinandi ferdinandi*
Ground covers	0.05-0.8	20-30	*Microlaena stipoides* *Sarcocornia quinqueflora*

* These layers not always present

3.12 Estuarine Mangrove Forest (EM)

Identification: Low closed-forest of *Avicennia marina* (Grey Mangrove), growing on intertidal mudflats.

Number of 0.04 ha sample plots: 1

Structure: Low closed-forest

Number of native plant species per 0.04 ha plot: 1

Habitat and distribution in North Sydney: Restricted to Gore Cove Reserve, Wollstonecraft, where it grows on the intertidal mudflats at the mouth of Berry Creek. Total area 0.4 ha.

Comments: Corresponds to map unit 4a (Estuarine Complex), subunit (i), *Avicennia marina-Aegiceras corniculatum* Open-scrub, in the Royal Botanic Gardens Sydney vegetation classification (Benson and Howell 1994). In the Royal Botanic Gardens classification of Sydney foreshore vegetation (Allen *et al*. 2007), it corresponds to Estuarine Mangrove. In the draft DECC (2009) vegetation classification for the Sydney Metropolitan Catchment Management Authority Area, it corresponds to community S_SW01, Estuarine Mangrove Forest. This latter community has an estimated total extent of 870 ha in the SMCMA area, of which 228 ha (26%) is in formal conservation reserves (Georges River and Royal National Parks, and Newington Nature Reserve). The number of native plant species recorded in the one North Sydney plot (a single species) was lower than the mean number in the DECC (2009) study plots (2.4). This community has only recently colonised North Sydney. A 1997 air photo shows no Estuarine Mangrove Forest at the mouth of Berry Creek.

Conservation significance: Threatened at local level in North Sydney local government area. Mangroves are vital for maintaining the ecological health and productivity of estuaries, playing an important role as primary producers and as fish habitat.

Photo 11. Estuarine Mangrove Forest, Gore Cove Reserve

Layer	Height (m)	Foliage cover (%)	Main native species
Trees	4-8	80	*Avicennia marina*
Shrubs	0.2-1.5	5	*Avicennia marina*

3.13 Estuarine Saltmarsh (ES)

Identification: Herbland of *Sarcocornia quinqueflora* (Samphire) and *Suaeda australis* (Seablite), growing on intertidal muflats. The introduced species, *Atriplex prostrata* (Orache), is a co-dominant.

Number of sample plots: 1 (covering the entire 0.016 ha of the community)

Structure: Herbland

Number of native plant species per plot: 5 (entire community)

Habitat and distribution in North Sydney: Restricted to Gore Cove Reserve, Wollstonecraft, where it grows on the intertidal mudflats at the mouth of Berry Creek, on the landward side of the Estuarine Mangrove Forest. Total area 0.02 ha.

Comments: Corresponds to map unit 4a (Estuarine Complex), subunit (ii), *Sarcocornia quinqueflora-Suaeda australis* Herbland, in the Royal Botanic Gardens Sydney vegetation classification (Benson and Howell 1994). In the Royal Botanic Gardens classification of Sydney foreshore vegetation (Allen *et al*. 2007), it corresponds to Estuarine Saltmarsh. In the draft DECC (2009) vegetation classification for the Sydney Metropolitan Catchment Management Authority Area, it corresponds to community S_SW02, Estuarine Saltmarsh. This latter community has an estimated total extent of 222 ha in the SMCMA area, of which 170 ha (77%) is in formal conservation reserves (Georges River and Royal National Parks, and Towra Point Nature Reserve). The mean number of native plant species recorded in the one North Sydney plot (5) was the same as the mean number recorded in the DECC (2009) study plots (5).

Conservation significance: Threatened in New South Wales. Listed as an endangered ecological community under the NSW *Threatened Species Conservation Act 1995*, under the name Coastal Saltmarsh. The community is not listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Photo 12. Estuarine Saltmarsh, Gore Cove Reserve

Layer	Height (m)	Foliage cover (%)	Main native species
Shrubs	1-4	<5	*Avicennia marina*
Ground covers	0.1-0.3	40	*Sarcocornia quinqueflora* *Suaeda australis*

4. Vegetation Mapping

We have mapped the distribution of the 12 native vegetation communities in North Sydney. We have also mapped the following condition classes within each community.

Good (g): Indigenous foliage cover (all vegetation layers combined) >80% (making allowance for naturally bare areas such as rock outcrops); introduced foliage cover <11%; good indigenous species diversity; indigenous tree layer more or less intact.

Fair (f): Indigenous foliage cover >80%; introduced foliage cover 11-30%; good indigenous species diversity; stands with a thinned indigenous tree layer but good indigenous understorey vegetation fall into this category, even if introduced foliage cover is <11%.

Poor (p): Indigenous foliage cover typically <80%; introduced foliage cover typically >30%; vegetation community still recognisable, but obviously badly degraded and with noticeably reduced indigenous species diversity; areas with a good indigenous tree layer but badly degraded understorey vegetation fall into this category, even if indigenous foliage cover is >80%.

Remnant trees (r): A layer of indigenous trees present and sufficient to indicate the original vegetation community, but indigenous understorey vegetation is absent or virtually absent, replaced by lawns, gardens, paths, etc.

The first three condition classes represent 'bushland' as defined in *State Environmental Planning Policy No. 19 - Bushland in Urban Areas*, i.e. 'Land on which there is vegetation which is either a remainder of the natural vegetation or, if altered, is still representative of the structure and floristics of the natural vegetation'. For a stand of vegetation to be regarded as bushland for the purposes of the policy, it should exhibit all of the following characteristics (NSW Department of Environment and Planning 1986):

- The canopy (i.e. the topmost vegetation layer, whether trees or other plant forms) consists of indigenous native species.
- The understorey and ground cover consist of indigenous native species or, if disturbed, contain a component of indigenous native species sufficient to re-establish those vegetation layers should the disturbance be arrested or reversed by management.
- The structure of the vegetation is recognisably a remnant of a natural bushland type or is a regrowth which has achieved a near natural structure or a seral stage towards that structure.

The last condition class, remnant trees, since it lacks an understorey, does not represent bushland as defined above.

In addition to mapping the 12 native vegetation communities, we also mapped the following categories of non-bushland vegetation, but only if they were within, adjacent to, or more or less continuous with bushland areas. Occurrences of these units away from bushland areas were not mapped.

Very poor condition vegetation (VP): Vegetation consisting of weed thickets or a mixture of weeds and plantings (native or exotic). Native weed species such as *Pittosporum undulatum* and *Glochidion ferdinandi* may be present and may provide a moderate level of indigenous cover, but indigenous species diversity is very low, and the original vegetation community cannot be identified.

Native plantings (NP): Vegetation dominated by plantings of native Australian species, whether or not these species are indigenous to the Sydney area. Includes

both well established areas and areas that have just been planted out. Also includes both plantings for bushland restoration purposes and garden plantings.

Native wetland plantings (WP): Vegetation dominated by plantings of native Australian wetland species in constructed wetlands.

Exotic plantings (EP): Vegetation dominated by plantings of non-Australian species.

Native/exotic plantings (NE): Vegetation dominated by a mixture of native and exotic plantings.

The results of the mapping have been provided as a layer in North Sydney Council's geographic information system (GIS). An example of the mapping is shown in Figure 2, and the area of each bushland unit is shown in Table 3. The total area of bushland is only about 39.5 ha or less than 4% of the total land area of North Sydney local government area. Non-bushland vegetation mapped in and around the bushland areas includes 1.8 ha of remnant trees without a native understorey, 9.3 ha of vegetation in very poor condition, 15.2 ha of vegetation dominated by native plantings, 7.3 ha of mixed native and exotic plantings, and 3 ha of exotic plantings.

Table 3. Extent of bushland map units in North Sydney local government area

Bushland map unit	Area (ha)
Forest Red Gum Foreshore Forest (RF)	
Good condition (RFg)	0.696
Total	**0.696**
Angophora Foreshore Forest (AF)	
Good condition (AFg)	12.789
Fair condition (AFf)	3.173
Poor condition (AFp)	0.494
Total	**16.456**
Mixed Sandstone Gully Forest (MF)	
Good condition (MFg)	1.168
Poor condition (MFp)	0.088
Total	**1.255**
Blackbutt Gully Forest (BG)	
Good condition (BGg)	4.279
Fair condition (BGf)	1.431
Poor condition (BGp)	0.981
Total	**6.691**
Sandstone Gallery Rainforest (GR)	
Good condition (GRg)	0.180
Fair condition (GRf)	0.444
Poor condition (GRp)	0.206
Total	**0.829**
Disclimax Sandstone Scrub (DS)	
Good condition (DSg)	4.481
Fair condition (DSf)	3.499
Poor condition (DSp)	1.291
Total	**9.271**
Allocasuarina Scrub (AS)	
Good condition (ASg)	0.155
Fair condition (ASf)	0.228
Total	**0.383**
Sandstone Foreshore Scrub (FS)	
Good condition (FSg)	2.807
Fair condition (FSf)	0.052
Total	**2.859**

Bushland map unit	Area (ha)
Kunzea Scrub (KS)	
Good condition (KSg)	0.527
Total	**0.527**
Estuarine Swamp Oak Forest (SO)	
Good condition (SOg)	0.062
Poor condition (SOp)	0.041
Total	**0.104**
Estuarine Mangrove Forest (EM)	
Good condition (EMg)	0.371
Total	**0.371**
Estuarine Saltmarsh (ES)	
Poor condition (ESp)	0.016
Total	**0.016**
Total bushland	**39.459**

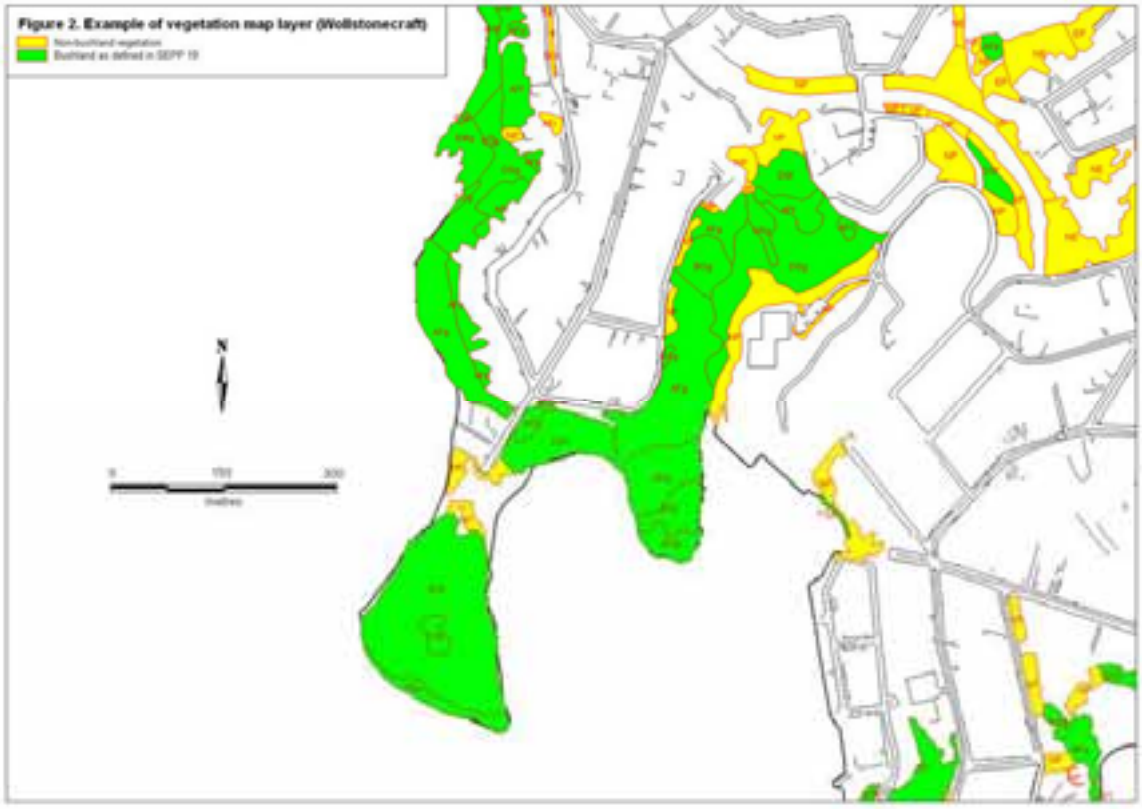
Figure 2. Example of vegetation map layer (Wollstonecraft)
Non-bushland vegetation
Bushland as defined in SEPP 19
N
0
150
300
metres

5. Plant Species

A total of 347 native vascular plant species and subspecies have been recorded in the North Sydney local government area that appear to be natural occurrences, i.e. remnants of the original vegetation, not plantings (Appendix 1). Fifteen of these have not been recorded for at least 25 years and may now be locally extinct. Many other, unrecorded species are also likely to have become extinct in North Sydney with urban development. Plant families that are particularly well represented in the North Sydney flora are the Fabaceae (wattles and peas, 33 species/subspecies), Myrtaceae (eucalypts, teatrees and allies, 25 species), Poaceae (grasses, 25 species), Proteaceae (banksias, grevilleas, geebungs and allies, 22 species) and Cyperaceae (sedges, 20 species).

The list includes one threatened species, *Acacia terminalis* subspecies *terminalis* (Sunshine Wattle), which is listed as an endangered 'species' (even though it is a subspecies) under both the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and the NSW *Threatened Species Conservation Act 1995*. Subspecies *terminalis* is a shrub usually 1 to 3 m tall, with pale yellow flowers and divided leaves (Photo 13). It differs from other, more widespread, non-threatened subspecies of *Acacia terminalis* (including ssp. *angustifolia*, which also occurs in North Sydney) by being hairier and having thicker flower stalks and wider seed pods. The distribution of subspecies *terminalis* in North Sydney is shown in Figure 3. It occurs most frequently in Angophora Foreshore Forest, but also in Blackbutt Gully Forest, Forest Red Gum Foreshore Forest, Sandstone Foreshore Scrub and Disclimax Sandstone Scrub.

Photo 13. *Acacia terminalis* ssp. *terminalis*, Berry Island

Subspecies *terminalis* has a very restricted distribution from the northern suburbs of Sydney south to Botany Bay, with most records from the Port Jackson area and the eastern suburbs (DECCW 2010). The greatest threat is habitat loss and fragmentation due to urban development, but subspecies *terminalis* is also threatened by habitat degradation from inappropriate fire regimes, rubbish dumping and physical disturbance by people. As the plants often occur on the edges of walking tracks, there is potential for impacts from both reserve management activities and recreational usage. There is also potential for the

subspecies to hybridise with other subspecies or cultivars if they are planted into its habitat, resulting in genetic dilution of subspecies *terminalis*.

Another threatened species recorded was *Syzygium paniculatum* (Magenta Lillypilly), which is listed as an endangered species under the NSW legislation and as a vulnerable species under the Commonwealth legislation. This species was recorded in both Badangi Reserve and Balls Head Reserve, but in both cases as plantings (although threatened in the wild, the species is widely cultivated around Sydney). The species was also recorded in Smoothey Park in1981 by the National Trust (1981), but in a site where there are a number of old plantings, so it is doubtful whether this was a natural occurrence. Therefore the species has not been included in Appendix 1. Nevertheless, it is a species that may well occur naturally in North Sydney, and it is a species to look out for. The vegetation communities in which it is most likely to occur are Sandstone Foreshore Scrub and Sandstone Gallery Rainforest.

Another 39 species recorded in North Sydney are significant at regional level in the Sydney Metropolitan Catchment Management Authority area, being rare and poorly represented in the DECCW reserves in the region (Appendix 1). One of these is *Austrostipa ramosissima* (Stout Bamboo Grass), which forms dense, spreading thickets in Forsyth Park to the detriment of other native species. Measures have been taken to control this species in Forsyth Park, but it should be borne in mind that it is a significant species and should not be eliminated from the reserve.

Most of the remaining species in Appendix 1 are significant at local level in the North Sydney local government area because of the scarcity of native bushland and the absence of any DECCW reserves. Exceptions are the few species that have adapted well to urban development and readily colonise disturbed sites away from native bushland.


Figure 3. Distribution of Acacia terminalis ssp. terminalis
Ssp. terminalis records
Ssp. terminalis plants scattered through reserve
Ssp. terminalis/angustifolia intermediates scattered through reserve
N

6. Fauna Species

The native terrestrial vertebrate fauna recorded from the North Sydney local government area includes four frog species, 20 reptile species, 148 bird species and 18 mammal species, a total of 190 species (Appendix 2). However, six of these species now appear to be locally extinct, another 69 species are only very rare, non-breeding visitors to the area (i.e. occasional records of individuals that are probably just passing through), and one, the Red-crowned Toadlet, was recorded on only one occasion in an urban area well away from any bushland (Anderson Street, Neutral Bay), suggesting that it had escaped or been released from captivity. Thus, only 114 species still occur consistently in North Sydney (as permanent inhabitants, regular visitors or irregular but frequent visitors).

Eighteen species have been recorded that are listed as threatened species under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* or the NSW *Threatened Species Conservation Act 1995* or both. However, three of these are now locally extinct, 11 are only rare visitors to North Sydney, and one is the Red-crowned Toadlet discussed above. The other three species, the Powerful Owl, Grey-headed Flying-fox and Eastern Bent-wing Bat, occur more regularly in North Sydney and are the species of greatest conservation concern in the area.

Photo 14. Powerful Owl

The Powerful Owl (*Ninox strenua*) is listed as a vulnerable species under NSW legislation, but is not listed under Commonwealth legislation. It is a large owl species (Photo 14) that preys mainly on native arboreal mammals such as the Common Ringtail Possum, Common Brushtail Possum, Sugar Glider and Grey-headed Flying-fox, although the introduced Black Rat is also a prey item in urban areas (Fitzsimons and Rose 2010). It roosts during the day in trees or tall shrubs, usually ones with dense canopies. It nests in large tree hollows in large, old, live eucalypts, usually in or near densely timbered gullies. No nest sites are known in North Sydney, but the species is likely to breed locally, especially in Tunks Park, where there is a known regular roost site (Figure 4). Management emphasis for this species in North Sydney should be on identification and protection of nest sites and regular roost sites.

Photo 15. Grey-headed Flying-fox

The Grey-headed Flying-fox (*Pteropus poliocephalus*) is listed as a vulnerable species under both NSW and Commonwealth legislation. The species roosts during the day in large colonies, and disperses widely at night to feed on a variety of flowers and fruits, both native and introduced. There is no colony in North Sydney, and the flying-foxes seen there probably came from one or more of the colonies in the Royal Botanic Gardens, Gordon and Parramatta. Although Grey-headed Flying-foxes have suffered a serious decline as a species in the last few decades, they remain common around Sydney, where a variety of food sources are available in bushland, gardens, parks and orchards. The species is frequently and widely recorded in North Sydney in both bushland reserves and urban areas (Figure 5).

Photo 16. Eastern Bent-wing Bat

The Eastern Bent-wing Bat (*Miniopterus schreibersii*) is listed as a vulnerable species under NSW legislation, but not under Commonwealth legislation. Eastern Bent-wing Bats are strong fliers and range widely. They are aerial feeders in or over a variety of habitats, but are dependent for breeding on nursery caves with a specific microclimate. There are no known nursery caves around Sydney, and the bats move away from Sydney to breed. Another important habitat requirement is for daytime roosting sites, which may be in caves or in various artificial cave-like situations such as tunnels, culverts, stormwater pipes and buildings. Two active roosts are known in North Sydney (Hoye 2000): one of the tunnels at the old coal loader site, Waverton, where up to 500 bats roost; and a large stormwater drain behind the tennis courts in Primrose Park, Cremorne, where up to 150 bats roost (Figure 6). Another roost site in a disused railway tunnel at North Sydney, less than 1 km from the coal loader site, is known to have been used by several hundred bats up until 1993, but is no longer active (Hoye 2000).

Another 15 species recorded in North Sydney are listed as migratory species under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (Appendix 2). These are species listed on international migratory species agreements to which Australia is a signatory. The agreements impose an international obligation on Australia to protect these species. A further 15 species are significant at regional level in the Sydney Metropolitan Catchment Management Authority area, being rare and poorly represented in DECCW reserves in the region; and 61 species are significant at local level in the North Sydney local government area (Appendix 2). Because of the scarcity of native bushland and natural habitats in North Sydney, and the absence of any DECCW reserves, all native fauna may be considered locally threatened except for those that are now locally extinct or only very rare, non-breeding visitors to North Sydney, and those that have become well adapted to urban environments.


Figure 4. Powerful Owl records, 2000-2010
Powerful Owl records
Regular roost site


Figure 5. Grey-headed Flying-fox records, 2000-2010
Grey-headed Flying-fox records
N


Figure 6. Eastern Bent-wing Bat records, 2000-2010

7. Early North Sydney

Mann (1932) evokes a picture of North Sydney in the 1860's and 1870's which seems a world away from the highly urbanised municipality of North Sydney in 2010. In this earlier era 'we all loved our free and healthy life in this suburb [Neutral Bay] with its vast background of forest and bush and its winged inhabitants'.

Mann recounts that, in the 1860's and 1870's, there was 'nothing but wild bush from the shores of Neutral Bay to the shores of Middle Harbour'. Between the settlements hugging the shoreline at Neutral Bay and Middle Harbour there lay 'an almost impregnable forest, crossed, perhaps by a cattle track (now the site of Military Road) and abounding in wild flowers, the five corner, geebung, and native currant. Beautiful clear streams trickled down the slopes of the hilly background to the deeper ravines, falling before reaching the sea over fern-covered cliffs, making miniature waterfalls and even moistening the water-loving plants that grew and shaded the gullies, and made homes for the ring-tailed opossum, the bandicoot and curlew'.

In Neutral Bay 'snakes abounded in the thick ferns' and on a large dam 'Black Swans would congregate, and often wild duck would dodge in and out of the reeds. Honeysuckle trees [banksias] abounded near by, providing many a gill bird [wattlebird] as well as many magpies. Black snakes were troublesome, and no person went without a faithful waddy'.

At this time wildfires were frequent and flushed out a variety of fauna, 'many snakes, opossums, native cats, bandicoots, etc.', that have long since become rare or extinct in North Sydney.

Mann recalls fondly 'listening to the calls of the wonga-wonga, and bronzewing pigeons, magpies, curlews, etc., birds that have long left to seek some spot away from the abode of man'. He asks 'where have the flocks of redheads [Red-browed Firetail] and diamond sparrows [Diamond Firetail] gone?'

Today, the area of open space and bushland in North Sydney is much diminished. What remains was only conserved as a result of the foresight and determined struggles of past residents (Jones 1988).

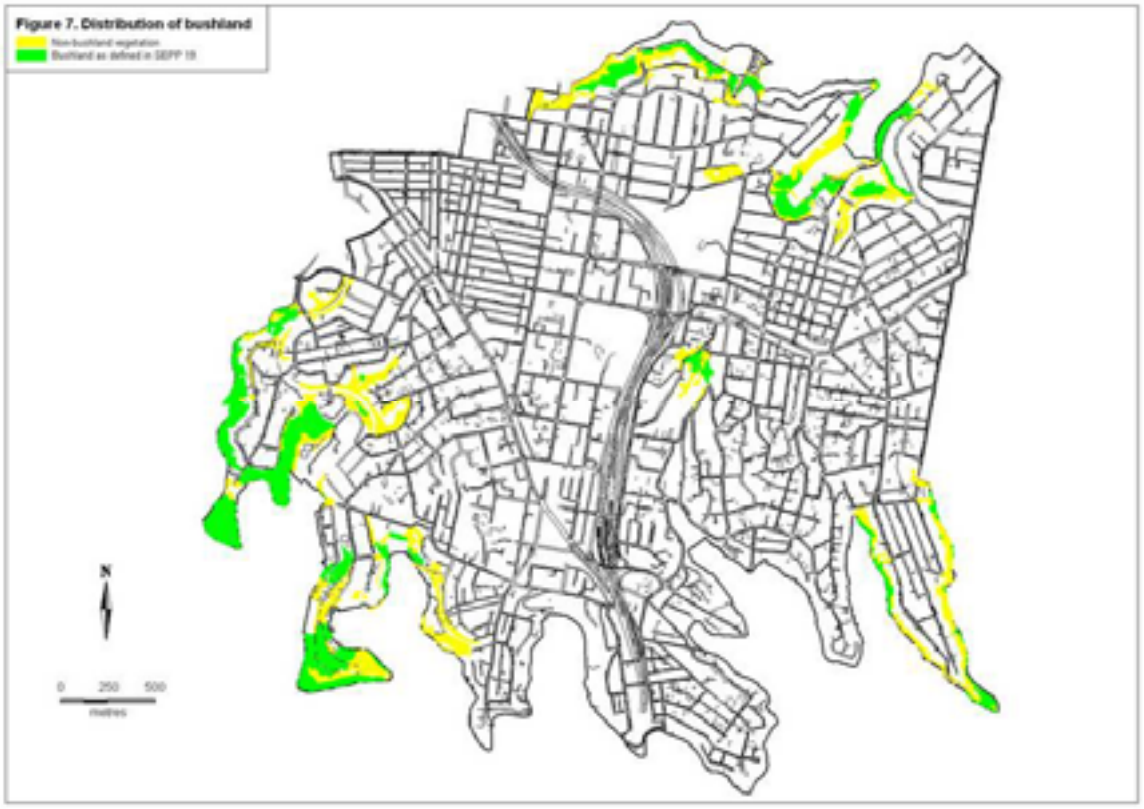
Figure 7. Distribution of bushland
Non-bushland vegetation
Bushland as defined in SEPP 19
N
0
250
500
metres


Figure 9. Bushland condition
N
0
250
500
metres


Figure 8. Biodiversity "hotspots"
N

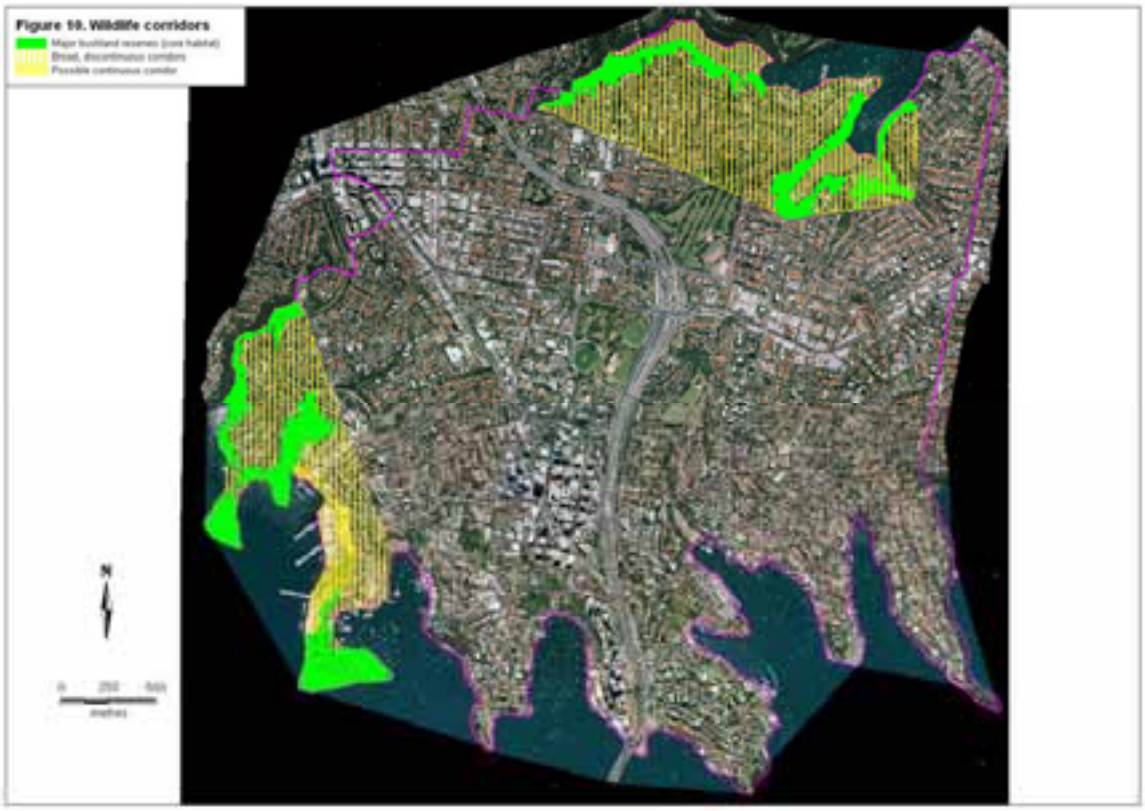
Figure 10. Wildlife corridors
Major bushland reserves (core habitat)
Broad, discontinuous corridors
Possible continuous corridor
N

8. Management Issues

8.1 Bushland Condition

North Sydney has a well established program of weed control and bush regeneration for its bushland reserves (Australian Bushland Restoration 2007, 2008, National Trust 1981, 1989, 1994, 1997, 2000, Terra Australis Regeneration 2009, Total Earth Care 2000, 2009, Waratah Eco Works 2009a-b). This program has resulted in a considerable improvement in the condition of the reserves over the last 30 years, although many weed problems remain. In this regard, controlling the causes of weed invasion, such as nutrient and moisture enrichment from urban runoff, is important wherever possible.

Restoration of bushland that has been degraded, damaged or destroyed by human activities may involve a number of approaches from minimal to extensive intervention. One of the main factors that determines what restoration measures are adopted is the resilience of the ecosystem. Resilience, also known as regeneration capacity, is the ability of the ecosystem to recover from damage. The concept of resilience and its relationship to vegetation management and rehabilitation methods are discussed in detail by Buchanan (2009).

The mapping of vegetation condition in the North Sydney Natural Area Survey has provided some general measures of bushland resilience. One such measure is illustrated in Figure 7, which shows the distribution of bushland as defined in *State Environmental Planning Policy No. 19 - Bushland in Urban Areas*, i.e. 'Land on which there is vegetation which is either a remainder of the natural vegetation or, if altered, is still representative of the structure and floristics of the natural vegetation'. For a stand of vegetation to be regarded as bushland for the purposes of the policy, it should exhibit all of the following characteristics (NSW Department of Environment and Planning 1986):

- The canopy (i.e. the topmost vegetation layer, whether trees or other plant forms) consists of indigenous native species.
- The understorey and ground cover consist of indigenous native species or, if disturbed, contain a component of indigenous native species sufficient to re-establish those vegetation layers should the disturbance be arrested or reversed by management.
- The structure of the vegetation is recognisably a remnant of a natural bushland type or is a regrowth which has achieved a near natural structure or a seral stage towards that structure.

The bushland areas shown in Figure 7 total about 39.5 ha. They are the first priority for the bush regeneration program. In addition, the program should seek to expand, link, reduce fragmentation and provide buffers to the bushland areas through restoration of bushland and planting of locally indigenous species in the surrounding and intervening areas. Plantings should be derived from material obtained within North Sydney or from nearby areas (to avoid introducing different genetic strains from distant areas). The plantings should also mirror the species composition of the likely original vegetation community.

Figure 8 provides a more detailed picture of vegetation condition (i.e. resilience) within the bushland areas and in the surrounding non-bushland vegetation. Further details are available from the vegetation mapping provided to Council as a GIS layer. The vegetation condition/resilience categories are explained in section 4 above and are based on indigenous foliage cover, weed cover and indigenous species diversity. Of the total 39.5 ha of bushland in North Sydney local government area, 27.5 ha (70%) is in good condition, 8.8

ha (22%) is in fair condition, and 3.1 ha (8%) is in poor condition.

Reserves with relatively large areas of bushland, most of which is in good or fair condition, are Smoothey Park/Gore Cove Reserve, Berry Island Reserve, Balls Head Reserve and Wonga Road Reserve. These are the reserves with the highest long-term resilience and viability. Balls Head Reserve also has an extensive area of old native plantings (mainly non locally indigenous species) that doesn't satisfy the above definition of bushland but nevertheless supports a good variety of locally indigenous understorey species. Other reserves with relatively large areas of bushland in good or fair condition, but also large areas of vegetation in poor or very poor condition that pose management problems, are Primrose Park and Tunks Park. Reserves with smaller areas of bushland in good or fair condition, but close to other reserves with larger bushland areas, are Brightmore Reserve and Mortlock Reserve. The reserves with the lowest long-term resilience and viability, having only small areas of bushland or being compromised by a high degree of fragmentation or isolation of the bushland, are Walumetta Park, Harry Howard Reserve, Waverton Park/former BP site, Forsyth Park, Cremorne Reserve and Folly Point Reserve.

8.2 Biodiversity 'Hotspots'

The results of the Natural Area Survey indicate two biodiversity 'hotspots' - areas of special importance for biodiversity conservation and management in North Sydney (Figure 9):

- **Berry Island/Badangi Reserve/Gore Cove Reserve/Smoothey Park**. This cluster of reserves has the highest diversity of native vegetation communities in North Sydney, with 10 of the 12 North Sydney communities represented, far more than any other reserve or cluster of reserves. In particular, all three of the communities that are listed as endangered or critically endangered under Commonwealth or NSW legislation occur in this area: Estuarine Swamp Oak Forest (listed as Swamp Oak Floodplain Forest), Estuarine Saltmarsh (Coastal Saltmarsh) and Forest Red Gum Foreshore Forest (a variant of Sydney Turpentine-Ironbark Forest). The only other reserve in which any of these three communities occurs is Folly Point Reserve, which has an area of degraded Estuarine Swamp Oak Forest.
- **Tunks Park**. This reserve was identified by Smith and Smith (2008) as the most important reserve for birds in North Sydney, and especially for small bushbirds, such as the Superb Fairy-wren, Variegated Fairy-wren, Brown Thornbill, Brown Gerygone, Spotted Pardalote, Eastern Spinebill, Eastern Yellow Robin, Red-browed Finch and Silvereye. Birds of this type have declined dramatically in North Sydney since 1970, while larger birds better adapted to the urban environment have increased (Smith and Smith 2008).

8.3 Wildlife Corridors

Since the 1980s there has been an increasing recognition that conservation efforts, which have traditionally been focused on acquisition and management of individual reserves, need to be broadened to take account of ecological patterns and processes that operate at a landscape scale. The effects of habitat fragmentation have received particular attention, and the opposite process, preserving and enhancing landscape connectivity, has become a conservation planning priority. Landscape patterns that promote connectivity for species, ecological communities and ecological processes are now seen as a key element in nature conservation. Consequently, protection or restoration of vegetation linkages between

reserves has been widely adopted as a conservation measure to counter the impacts of habitat reduction and fragmentation. Such linkages are often termed wildlife corridors.

Wildlife corridors are important for a number of reasons (Saunders and Hobbs 1991, Bennett 2003). The corridors are habitat areas themselves, and so increase the area of habitat available to native fauna and flora. However, by providing a linkage between larger habitat remnants, their value is much greater than just the additional habitat that they represent. They allow animals to move from one area of core habitat to another and thus enable outbreeding and genetic exchange between what would otherwise be small, isolated populations of doubtful long-term viability. Fauna populations may be able to persist in isolated areas of remnant bushland in the short term, but some movement of individuals between remnants is needed if the isolated populations are to survive over the longer term.

Wildlife corridors provide a means by which fauna species may recolonise areas of habitat where they have become locally extinct. Extinctions may occur as a result of specific events such as fires or disease outbreaks, or simply by chance (unusually poor breeding success or high mortality, or a combination of both). Small, isolated populations such as those in bushland remnants are particularly prone to local extinction and there is little likelihood of recolonisation in the absence of wildlife corridors.

Wildlife corridors provide a route for the dispersal of young animals, and for the movements of migratory or nomadic species. Birds and bats, because they can fly, are less dependent on wildlife corridors, especially those species that regularly travel long distances. Nevertheless, maintaining an obvious vegetation corridor across an area of alien habitat can be valuable as a guiding pathway, even for long-distance travellers.

By facilitating animal movements, wildlife corridors also have strong indirect effects on plant populations because they facilitate movement of animal-borne pollen and seeds between remnants. Just as they do for animal populations, wildlife corridors enable outbreeding of plant populations in isolated remnants, and recolonisation of areas of former habitat where plant populations have died out. Even for plant species that are not dependent on animals for pollen and seed dispersal, wildlife corridors, by providing intervening habitat where the plants can grow, provide a linkage between core habitats.

In North Sydney, the conservation value of individual bushland reserves can be strengthened by planting of trees and shrubs to provide vegetation linkages between reserves, especially planting of local indigenous species, and especially planting of thickets to provide shelter for fauna. The more continuous and wider the linkage, the more effective it will be as a wildlife corridor, but even a patchy, narrow, tenuous linkage has corridor value. The frequency of use of the corridor may be very low, but the movement of just one or two animals between populations can be crucial.

North Sydney Council can help provide wildlife corridor networks both by making plantings on public lands, and by encouraging residents and other landholders to make plantings on their lands. Two Council programs that can make a valuable contribution are the Native Havens program, which offers assistance to residents to use local indigenous plants in their gardens, and the Streets Alive program, which gives residents the opportunity to participate in creating and caring for gardens on public land.

There are two areas where wildlife corridor enhancement is particularly needed to link up the major bushland reserves (Figure 10):

- Linkages between Balls Head Reserve at Waverton, and Badangi Reserve, Berry Island Reserve, Gore Creek Reserve and Smoothey Park at Wollstonecraft, thus linking also with Holloway Park and Greendale Park in Lane Cove local government area, which adjoin Gore Cove Reserve and Smoothey Park.
- Linkages between Wonga Road Reserve, Brightmore Reserve and Primrose Park at Cremorne, and Mortlock Reserve and Tunks Park at Cammeray, thus linking also with Flat Rock Gully Reserve in Willoughby local government area, which adjoins Tunks Park.

The fauna species most likely to use the linkages are birds, bats and flying insects, which don't necessarily need a continuous vegetation linkage, but would benefit from a general increase in the numbers of native trees and shrubs across the broad corridor zone, especially where these occur in clusters that provide temporary shelter for animals moving between the larger bushland reserves - a series of 'stepping stones' across the urban area. Hence, we have mapped broad wildlife corridors for these species. The plantings should preferably be locally indigenous species. Material for the plantings should be obtained in or near North Sydney to avoid introducing different genetic strains to the local populations. Continuous or near-continuous vegetation linkages between reserves, catering for animals that are unable to fly, are more difficult to re-establish in the densely urbanised North Sydney suburbs. Perhaps the best opportunity for such a connection is from Balls Head Reserve through HMAS Waterhen, Sugarworks Reserve and the Wollstonecraft Bay foreshore to Badangi Reserve (Figure 10). One species that would benefit is the Brown Antechinus, a small terrestrial marsupial that has been recorded from both Balls Head Reserve and Gore Cove Reserve in recent years (Appendix 2). Although common around Sydney, it is unusual for this species to persist in urban bushland reserves. It was thought to be approaching extinction in the Lane Cove River valley in the 1970s (Stephens 1978), but has recently been rediscovered in Lane Cove National Park (DEC 2004a).

8.4 Fire Regimes

Fire has been an important factor in the evolution of the Australian vegetation, and many native plant species need fire for effective regeneration (Bradstock *et al*. 2002). However, the incidence of natural bushfires has been reduced or eliminated in North Sydney's small, isolated bushland reserves surrounded by urban areas. The re-introduction of appropriate fire regimes to improve and maintain the ecological health of the North Sydney vegetation communities is a management priority. Council has accordingly implemented a program of ecological burns to stimulate native regeneration and to control weeds. In this regard, it is noteworthy that the two sample plots during the present survey that had been burnt during the previous year, O1 and T2, had the highest numbers of indigenous plant species (54 and 51, respectively). By comparison, the mean number of indigenous species in the other plots (excluding the species-poor mangrove and saltmarsh plots, G1 and G2, and two particularly depauperate sites, L1 and R1) was only 37 (range 25 to 51).

To assist in the implementation of this program of ecological burns, we have assessed the desired minimum and maximum intervals between fires for maintenance of biodiversity in each native vegetation community in North Sydney (Table 4). The assessments are based on extrapolation from figures for the same or similar communities provided by DEC (2004b, 2006a-d), DECC (2008) and NSW Rural Fire Service (2006a-b). The underlying principle is that the species diversity of the vegetation, and its value as fauna habitat, will decline both if fires are too frequent and if fires are too infrequent. Ecological burns should be undertaken in each reserve in a mosaic pattern, only burning part of the reserve at a time. Variability in fire frequency, within the limits imposed by the minimum and maximum fire intervals, is also

desirable between the different parts of the reserve (Bradstock *et al*. 1995, Keith *et al*. 2002).

Table 4. Fire interval guidelines for North Sydney vegetation communities

Vegetation community	Minimum fire interval	Maximum fire interval
Forest Red Gum Foreshore Forest	10 years	30 years
Angophora Foreshore Forest	10 years	30 years
Mixed Sandstone Gully Forest	10 years	30 years
Blackbutt Gully Forest	15 years	30 years
Sandstone Gallery Rainforest	No fire	No fire
Disclimax Sandstone Scrub	10 years	30 years
Allocasuarina Scrub	10 years	30 years
Sandstone Foreshore Scrub	15 years	30 years
Kunzea Scrub	10 years	30 years
Estuarine Swamp Oak Forest	No fire	No fire
Estuarine Mangrove Forest	No fire	No fire
Estuarine Saltmarsh	No fire	No fire

Other aspects of the fire regime that need to be considered, in addition to fire frequency, are fire intensity, duration and season. For maintenance of plant and animal species diversity, a fire regime that contains fires of varying intensity, duration and season is likely to be the most favourable (Bradstock *et al*. 1995, Keith *et al*. 2002). Variation in fire intensity and duration can be achieved by pile burning. Piles of cut woody weeds, of varying sizes, are spaced throughout the proposed ecological burn area and left to dry. During the burn, the weed piles enable the fire to burn hotter and longer in these areas, while between the piles the fire is of lower intensity and duration. This heat variability encourages a diverse range of germination responses from the soil seedbank.

One plant species of particular concern in relation to fire regimes is the endangered *Acacia terminalis* subspecies *terminalis*. Individual plants resprout after low intensity fires, but are killed by high intensity fires and must regenerate from seeds in the soil seedbank. A minimum interval of seven years between fires is necessary to allow the plants to grow to maturity and replenish the soil seedbank, but if no fire occurs for 50 years or more the plants will senesce and die, and the seeds in the soil seedbank will decay (DEC 2004b, NSW Rural Fire Service 2006b). Therefore, the minimum and maximum fire intervals in Table 4 for the communities in which *A. terminalis terminalis* occurs (Angophora Foreshore Forest, Blackbutt Gully Forest, Forest Red Gum Foreshore Forest, Sandstone Foreshore Scrub and Disclimax Sandstone Scrub) are appropriate for this species.

A priority for implementation of an appropriate fire regime are the areas of Disclimax Sandstone Scrub. This secondary community has developed in sites where the original eucalypt forest has been subject to clearing or dieback. Some of these sites are gradually regenerating to eucalypt forest, but many others are likely to remain as Disclimax Sandstone Scrub in the absence of fire. Reintroduction of a fire regime approximating natural conditions may promote regeneration of the eucalypt tree layer and restoration of the original vegetation of these sites. However, where soil conditions have changed dramatically as a result of nutrient and moisture enrichment from urban runoff, Thomson and Leishman (2005) have found that fire alone does not promote germination and establishment of native species typical of low-nutrient Hawkesbury Sandstone communities. Instead, the post-fire regeneration consists of a mixture of exotic species and native species typical of higher soil nutrient conditions. Fire can be a useful tool for short-term removal of exotic plant biomass from nutrient-enriched areas, but additional post-fire removal of exotic plants is necessary for effective weed control. Also, it may have to be accepted that restoration of the original vegetation is no longer possible in nutrient-enriched sites, and

instead promote establishment of native species better adapted to such conditions, i.e. Disclimax Sandstone Scrub.

8.5 Changed Species Composition

The native species composition of the remnant native vegetation of North Sydney has changed as a result of reduced fire frequency in the isolated bushland remnants, and increased soil nutrient and moisture levels from urban runoff. One species that has been particularly favoured by these changes is *Pittosporum undulatum* (Pittosporum), which has increased dramatically in urban bushland around Sydney and has become a troublesome native weed (Rose 1997). Other native species identified by Rose and Fairweather (1997) as increasing in urban sandstone bushland in northern Sydney are listed in Table 5, together with species that are noticeably less abundant in urban bushland than in bushland well away from development. Observations during the present study suggest that Table 5 is applicable to the North Sydney bushland. The table provides a basis for assessing whether particular stands of remnant bushland are becoming dominated by increaser species to the detriment of overall native species diversity, and whether control measures are warranted, such as burning or thinning to reduce the density of overly dominant species.

Table 5. Native increaser and decreaser species in Sydney's urban sandstone bushland (Rose and Fairweather 1997)

Increaser species	Decreaser species
Dianella caerulea	*Actinotus minor*
Elaeocarpus reticulatus	*Banksia serrata*
Eustrephus latifolius	*Cassinia denticulata*
Glochidion ferdinandi	*Caustis flexuosa*
Kunzea ambigua	*Dampiera stricta*
Lomandra longifolia	*Gahnia erythrocarpa*
Notelaea longifolia	*Grevillea buxifolia*
Pandorea pandorana	*Hakea dactyloides s.lat.*
Pittosporum revolutum	*Hibbertia bracteata*
Pittosporum undulatum	*Lambertia formosa*
	Leptospermum trinervium
	Lindsaea microphylla
	Lomandra glauca
	Lomandra gracilis
	Lomatia silaifolia
	Monotoca scoparia
	Patersonia sericea
	Persoonia levis
	Persoonia pinifolia
	Petrophile pulchella
	Pimelea linifolia
	Platysace linearifolia
	Stylidium productum
	Xanthorrhoea media
	Xanthosia pilosa
	Zieria pilosa

Another native species that colonises disturbed sites, regenerates in the absence of fire, and becomes dominant in areas unburnt for long periods is Black She-oak, *Allocasuarina littoralis* (Benson and McDougall 1995). Control measures such as ecological burns to reduce the abundance of this species in the stands of Allocasuarina Scrub in Tunks Park,

and thus promote greater native species diversity in these stands, are warranted. However, it should be noted that *A. littoralis* is a critical food plant of a threatened bird species, the Glossy Black-Cockatoo, which is a rare visitor to North Sydney. Control of *A. littoralis* numbers should be balanced against the desirability of maintaining the species, and especially female plants with good numbers of cones, as a potential cockatoo food source.

8.6 Dieback

Dieback of native vegetation has been observed around Sydney Harbour since the 1950s, and in 2000 a link was confirmed with *Phytophthora cinnamomi*, an introduced water mould that causes root rot, resulting in plant dieback and death (Suddaby 2008). Infection of native plants by *Phytophthora cinnamomi* has been listed as a key threatening process under both the NSW *Threatened Species Conservation Act 1995* and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Species noticeably affected by dieback believed to be associated with *Phytophthora* infection around Sydney Harbour are *Angophora costata*, *Corymbia gummifera*, *Eucalyptus botryoides*, *Eucalyptus piperita* and *Xanthorrhoea media* (Sydney Harbour Federation Trust 2004). In North Sydney, dieback is a particular problem in Cremorne Reserve, where many *Angophora costat*a trees are dead or in poor health. The presence of *Phytophthora cinnamomi* in this reserve has been confirmed (Suddaby 2008).

Best practice management guidelines have been developed for *Phytophthora* in bushland in the Sydney Metropolitan Catchment Management Authority area (Suddaby and Liew 2008). These cover surveying for *Phytophthora*, actions to be taken when *Phytophthora* is confirmed, hygiene protocols, application of phosphonate to protect susceptible species, and education and raising awareness. These guidelines should be applied wherever appropriate in North Sydney's bushland management program. Trials have been carried out in Cremorne Reserve involving injection of *Angophora costata* trees with phosphonate, but the results have been mixed..

8.7 Genetic Viability

The genetic and ecological viability of plant (and animal) populations in small, isolated bushland remnants may be threatened as much by loss of genetic diversity as by more obvious threats such as weed invasion, changed fire regimes and physical disturbance. Population size and isolation play important roles in determining the persistence of species in remnant vegetation. Small, isolated plant populations (less than 100-200 reproductive plants) are highly susceptible to loss of genetic diversity and increased inbreeding, leading to reduced seed production, poor germination and poor seedling vigour (Broadhurst 2007). Loss of genetic diversity also makes small populations less able to adapt to changing environmental conditions, such as long-term climate change. Furthermore, it decreases their value as seed sources for revegetation and restoration projects.

Wildlife corridors (section 8.3) are important for maintaining genetic diversity because they facilitate movement of animal-borne pollen and seeds between remnants, and thus enable interbreeding between fragmented plant populations. In more isolated remnants, however, it may be necessary to consider enhancing genetic diversity by introducing plants from other populations into the population growing within the remnant. If this were done, the material for the plantings should come from nearby populations, not distant ones, i.e. they should be different populations but not too different, so as to avoid introducing other genetic strains of

the species that may be poorly adapted to local conditions and that may be incompatible with the local strain or may compromise its genetic integrity.

One particular issue in relation to genetic viability is the endangered *Acacia terminalis* subspecies *terminalis*. It is important that no plantings of other A. terminalis subspecies be made in the vicinity of subspecies *terminalis* populations, as this may lead to hybridisation between the subspecies, compromising the genetic integrity of subspecies *terminalis*. Translocation of subspecies *terminalis* material between populations would also need careful assessment. Any proposal to enhance the genetic diversity of small subspecies *terminalis* populations in this way would require approval from the Department of Environment, Climate Change and Water.

Genetic viability is an important consideration when sourcing seed (or other plant material) for revegetation projects. To ensure that the revegetation projects have the best chance of success requires seed that is both genetically diverse and locally adapted. Identifying suitable seed sources can be particularly difficult where the local seed sources are small populations in isolated remnants, which can be severely inbred, producing poor quality seed of limited value for revegetation purposes (Young *et al*. 1996, Broadhurst *et al*. 2006). Sourcing seed that is both genetically diverse and locally adapted requires land managers to become more critical of their seed sources, including appraisal of seed performance, targeting of high quality seed sources, and the use of seed collection protocols such as the Florabank guidelines (http://www.florabank.org.au).

8.8 Climate Change

Anthropogenic climate change and its impacts are listed as key threatening processes in the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and the NSW *Threatened Species Conservation Act 1995*. While climate change has occurred throughout geological history, there is evidence that human-induced climate change is occurring at a faster rate than has previously occurred naturally. Furthermore, human-induced climate change is occurring in a highly modified landscape, which may limit the ability of organisms to survive climate change through dispersal (NSW Scientific Committee 2000). There is considerable evidence to suggest that the likely rate of climate change may be faster than the rate of natural adaptation. Substantial losses of biodiversity are thus likely (Howden *et al*. 2003).

Climate change is being caused by a build-up of carbon dioxide, methane and other ‘greenhouse’ gases in the earth’s atmosphere. Atmospheric carbon dioxide and methane levels have risen rapidly and at an ever increasing rate over the last century (Bureau of Meteorology and CSIRO 2010). There is clear evidence that concentrations of greenhouse gases will continue to rise for a substantial period even if emissions are stabilised or decreased (Bureau of Meteorology 2003).

It is not possible to predict future climate trends with absolute certainty. Models of climate change are being constantly refined as knowledge of the climate change process increases. Current climatic modelling (Bureau of Meteorology 2003, CSIRO 2007, Bureau of Meteorology and CSIRO 2010) indicates that in coming decades in eastern Australia, and hence North Sydney, average daily temperatures will rise, there will be more extreme hot days, and fewer cold days. Sea levels will rise as water temperatures rise, there will be increased storm and wave surges, and the shoreline will retreat inland. This may be exacerbated by changes in wind and wave direction. Decreases in rainfall are likely during spring. An increase in the number of dry days is expected, but it is likely that there will be an

increase in intense rainfall events, with associated increased flooding. The modelling predicts more frequent severe weather events. While the number of storm centres may decrease, their intensity is likely to increase. In the long term, average evaporation and evapotranspiration are likely to increase.

The projected rises in sea level would impact on low lying vegetation communities such as the Estuarine Mangrove Forest, Estuarine Saltmarsh and Estuarine Swamp Oak Forest at the mouth of Berry Creek. The areas currently occupied by these communities are likely to become permanently inundated. Other vegetation communities fringing Port Jackson and Middle Harbour in North Sydney's various waterside reserves are likely to be reduced in area as their lower fringes become permanently inundated or intertidal. More frequent intense rainfall events would result in more frequent high flow events in creeklines such as Berry Creek, Quarry Creek and Willoughby Creek, with associated flooding, erosion, scouring of the stream bed, and movement of sediment. With most of North Sydney's remaining bushland occurring on moderate to steep slopes, the risk of increased erosion away from creeklines is also high.

Our understanding of how the natural environment will respond to climate change is limited. There are significant uncertainties in regard to biological responses to climate change, but the impacts on biodiversity are likely to be varied. Changes in the distribution and abundance of species are likely as marginal and sensitive species become more restricted or disappear, while other species better able to adapt increase. The distribution of weeds, pests and diseases will change. Increased carbon dioxide concentrations in the atmosphere may lead to changes in plant growth and nutrient composition in ecosystems. Species are likely to respond differentially to probable carbon dioxide fertilisation (Natural Resource Management Ministerial Council 2004).

In North Sydney, the structure and composition of the vegetation communities and faunal assemblages are likely to change as the competitive abilities of component species change. Weed and pest species which adapt readily to change may become more problematic. The capacity of bushland to recover from burning is likely to be decreased. As a result, the 'look and feel' of bushland areas may well change (Howden *et al*. 2003).

The long-term survival of individual species in the face of climate change will be determined by the rate and extent of change. For some species, survival will be determined by their ability to change their distribution, which will be dependent on their ability to disperse and the existence of suitable alternative habitats. Maintenance of species in situ, and successful establishment of new populations and assemblages, will be constrained by the effects of land degradation and competition from invasive organisms (Natural Resource Ministerial Council 2004).

There is no doubt that the tasks of preserving biodiversity under climate change and facilitating adaptation will be more achievable and less costly if the magnitude of future climate change is reduced (Howden *et al*. 2003). While impacts of climate change may appear to be beyond the scope of local management, it is important to manage existing biodiversity to facilitate the long-term adaptation of species and communities to climate change. In North Sydney, climate change will exacerbate existing pressures on biodiversity. Current management should aim to build ecological resilience in bushland reserves by reducing existing impacts such as invasive weeds and altered fire regimes. Opportunities to rehabilitate or re-establish native vegetation on currently degraded land and to enhance habitat for already vulnerable species should be identified and implemented. The capacity of local flora and fauna to adapt to climate change is likely to be constrained by small populations, and hence low genetic diversity, coupled with isolation. Linkages between bushland remnants need to be enhanced wherever possible.

9. Conclusions

A total of about 39.5 ha of bushland (as defined in *State Environmental Planning Policy No. 19 - Bushland in Urban Areas*) has been identified and mapped in North Sydney local government area, representing less than 4% of the total land area. About 27.5 ha (70%) of this bushland is in good condition, 8.8 ha (22%) is in fair condition, and 3.1 ha (8%) is in poor condition. Non-bushland vegetation mapped in and around the bushland areas includes 1.8 ha of remnant trees without a native understorey, 9.3 ha of vegetation in very poor condition (dominated by weeds, including native weeds, or by a mixture of weeds and plantings), 15.2 ha of vegetation dominated by native plantings, 7.3 ha of mixed native and exotic plantings, and 3 ha of exotic plantings.

Reserves with relatively large areas of bushland, most of which is in good or fair condition, are Smoothey Park/Gore Cove Reserve, Berry Island Reserve, Balls Head Reserve and Wonga Road Reserve. These are the reserves with the highest long-term resilience and viability. Other reserves with relatively large areas of bushland in good or fair condition, but also large areas of vegetation in poor or very poor condition that pose management problems, are Primrose Park and Tunks Park. Reserves with smaller areas of bushland in good or fair condition, but close to other reserves with larger bushland areas, are Brightmore Reserve and Mortlock Reserve. The reserves with the lowest long-term resilience and viability, having only small areas of bushland or being compromised by a high degree of fragmentation or isolation of the bushland, are Walumetta Park, Harry Howard Reserve, Waverton Park/former BP site, Forsyth Park, Cremorne Reserve and Folly Point Reserve.

Twelve native vegetation communities have been distinguished in North Sydney. Ten of these are primary communities that would have been present before European settlement. The other two, Disclimax Sandstone Scrub and Allocasuarina Scrub, are secondary communities that appear to have developed as a result of changed environmental conditions. They occur in sites that would originally have supported other communities. The most extensive communities are Angophora Foreshore Forest (16.5 ha), Disclimax Sandstone Scrub (9.3 ha), Blackbutt Gully Forest (6.7 ha), Sandstone Foreshore Scrub (2.9 ha) and Mixed Sandstone Gully Forest (1.3 ha). The other seven communities are all less than 1 ha in area.

Three of the communities are listed as endangered ecological communities under NSW legislation: Coastal Saltmarsh, Swamp Oak Forest on Coastal Floodplains, and Sydney Turpentine-Ironbark Forest. The last community is also listed as critically endangered under Commonwealth legislation. It is represented in North Sydney by a rare and unusual variant, called here Forest Red Gum Foreshore Forest. The three endangered communities are concentrated in Gore Cove Reserve and Badangi Reserve at Wollstonecraft, except for a small, degraded stand of Swamp Oak Forest at Folly Point Reserve, Cammeray. Wollstonecraft is characterised generally by a high diversity of native vegetation communities and represents a local biodiversity 'hotspot'.

A total of 347 native vascular plant species and subspecies have been recorded in North Sydney that appear to be natural occurrences, not plantings. These include one threatened species, *Acacia terminalis* subspecies *terminalis*, which is listed as an endangered 'species' (even though it is a subspecies) under both NSW and Commonwealth legislation. Another threatened species, *Syzygium paniculatum*, has been recorded only as a planting, but may also occur naturally in North Sydney. Another 39 species are significant at regional level in the Sydney Metropolitan Catchment Management Authority area, being rare and poorly represented in the DECCW reserves in the region. Most of the remaining species are

significant at local level (North Sydney local government area) because of the scarcity of native bushland and the absence of any DECCW reserves. Exceptions are the few species that have adapted well to urban development and readily colonise disturbed sites away from native bushland.

A total of 190 native terrestrial vertebrate species have been recorded in North Sydney, including four frog species, 20 reptile species, 148 bird species and 18 mammal species. However, only 114 of these species still occur consistently in the area. Eighteen species are listed as threatened species under NSW and/or Commonwealth legislation. However, three of these are now locally extinct, 11 are only very rare, non-breeding visitors, and the single record of another species (Red-crowned Toadlet) was probably an escapee from captivity. The other three species, the Powerful Owl, Grey-headed Flying-fox and Eastern Bent-wing Bat, occur more regularly in North Sydney and are the species of greatest conservation concern in the area. Another 15 species are listed as migratory species under Commonwealth legislation. These are species listed on international migratory species agreements to which Australia is a signatory. A further 15 species are significant at regional level in the Sydney Metropolitan Catchment Management Authority area, being rare and poorly represented in the DECCW reserves in the region; and 61 species are significant at local level in the North Sydney local government area. A biodiversity 'hotspot' for fauna in North Sydney is Tunks Park, which supports the greatest local diversity of bird species, especially small bushland birds, a group that has largely disappeared from other North Sydney reserves.

Management issues in relation to North Sydney's flora and fauna include the following:

- Control of introduced weeds to promote bush regeneration. In this regard, controlling the causes of weed invasion, such as nutrient and moisture enrichment from urban runoff, is important wherever possible.
- Enhancement of wildlife corridors linking the bushland reserves with each other and with bushland reserves in neighbouring local government areas.
- Ecological burns to re-establish a more appropriate fire regime in the bushland reserves in order to maintain their ecological health.
- Control measures for native increaser species that have been favoured by the urban environment and are dominating stands of remnant bushland to the detriment of more sensitive species.
- Controlling the spread and impact of *Phytophthora cinnamomi*, an introduced water mould that causes root rot, resulting in plant dieback and death.
- Loss of genetic diversity in small plant populations in isolated reserves, resulting in inbreeding and poor reproductive capacity that threatens their long-term viability.

The long-term impacts of climate change on the flora and fauna of North Sydney are difficult to predict in any detail. Although impacts of climate change may appear to be beyond the scope of local management, it is important to manage existing biodiversity to facilitate the long-term adaptation of species and communities to climate change. In North Sydney, climate change will exacerbate existing pressures on biodiversity. Current management should aim to build ecological resilience in bushland reserves by reducing existing impacts such as invasive weeds and altered fire regimes. Opportunities to rehabilitate or re-establish native vegetation on currently degraded land and to enhance habitat for already vulnerable species should be identified and implemented. The capacity of local flora and fauna to adapt to climate change is likely to be constrained by small populations, and hence low genetic diversity, coupled with isolation. Linkages between bushland remnants need to be enhanced wherever possible.

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Appendix 1. Native plant species recorded in North Sydney local government area

Species believed to be plantings or derived from plantings not included. Species nomenclature follows Pellow *et al*. (2009).
Status: A = threatened in Australia (EPBC Act), N = threatened in NSW (TSC Act), R = threatened at regional level (Sydney Metropolitan Catchment Management Authority area), L = threatened at local level (North Sydney LGA), E = locally extinct? (no records for 25+ years)
Abundance: U = uncommon, M = moderately common, C = common, X = abundance not recorded
Vegetation communities: BG = Blackbutt Gully Forest, AF = Angophora Foreshore Forest, RF = Forest Red Gum Foreshore Forest, MF = Mixed Sandstone Gully Forest, GR = Sandstone Gallery Rainforest, DS = Disclimax Sandstone Scrub, FS = Sandstone Foreshore Scrub, KS = Kunzea Scrub, AS = Allocasuarina Scrub, SO = Estuarine Swamp Oak Forest, EM = Estuarine Mangrove Forest, ES = Estuarine Saltmarsh
Reserves: 1 = Smoothey Park/Gore Cove Reserve, 2 =Berry Island Reserve, 3 = Badangi Reserve, 4 = Walumetta Park, 5 = Balls Head Reserve, 6 = Waverton Park/former BP site, 7 = Forsyth Park, 8 = Cremorne Reserve, 9 = Wonga Road Reserve, 10 = Brightmore Reserve, 11 = Primrose Park/Folly Point Reserve, 12 = Mortlock Reserve, 13 = Tunks Park
Other sites: LGA = unknown site in North Sydney local government area, CP = Cremorne Point, Cr = Cremorne, Ki = Kirribilli, MP = McMahons Point, NB = Neutral Bay, NS = North Sydney, SL = St Leonards, SR = Shellbank Reserve, Wa = Waverton, Wo = Wollstonecraft
Records (maximum 4 per species): 1 = North Sydney Council (1999, 2001), 2 = recent bush regeneration reports (Waratah Eco Works 2009a-b, Total Earth Care 2009, Terra Australis Regeneration 2009, Australian Bushland Restoration 2007, 2008), 3 = early bush regeneration reports (Total Earth Care 2000, National Trust 1981, 1989, 1994, 1997, 2000), 4 = Ambrose (2006), 5 = Urban Bushland Management Consultants (1997), 6 = DECCW Atlas of NSW Wildlife database, 7 = Australia's Virtual Herbarium database, 8 = this survey

Scientific name	Common name	Status	Vegetation communities												Reserves												Other sites	Last date	Records
			BG	AF	RF	MF	GR	DS	FS	KS	AS	SO	EM	ES	1	2	3	4	5	6	7	8	9	10	11	12	13			
Phylum Monilophyta	**Ferns**																													
Family Adiantaceae																														
Adiantum aethiopicum	Common Maidenhair	L	U	U			U	U							U		U		U	U	U	U		U	U		U		2010	1,2,4,8
Adiantum hispidulum	Rough Maidenhair	L	U												U									U	U				2010	1,2,8
Family Aspleniaceae																														
Asplenium australasicum	Bird's Nest Fern	L		U			M	U							U		U		U		U			M	U		U		2010	1,2,8
Asplenium flabellifolium	Necklace Fern	L	U	U			U		M						U		U		M		U				U		U		2010	1,2,6,8
Family Blechnaceae																														
Blechnum ambiguum		L					U								U														2010	3,8
Blechnum cartilagineum	Gristle Fern	L																									U		2006	1,4
Doodia aspera	Prickly Rasp Fern	L													U						U			U	U				2009	1,2,3
Doodia caudata	Small Rasp Fern	L	U				U	U							U						U				U				2010	1,2,8
Family Cyatheaceae																														
Cyathea australis	Rough Treefern	L						U	U						U		U		U		U	U							2010	1,2,3,8
Family Davalliaceae																														
Davallia pyxidata	Hare's Foot Fern	R						U							U														2010	8
Family Dennstaedtiaceae																														
Dennstaedtia davallioides	Lacy Ground Fern	R																							U				2009	2
Histiopteris incisa	Bat's Wing Fern	L	U	U			U	U	U						U		U	X	U	U	U	U					U		2010	1,2,4,8
Hypolepis muelleri	Harsh Ground Fern	L	U	M			U	U	U						U		U		U		C			U					2010	2,8
Pteridium esculentum	Bracken	L	M	C	U	M		C	U	U	C	U			M	U	C	X	C	M	C	C	M	C	U	M	C		2010	1,2,4,8
Family Dicksoniaceae																														
Calochlaena dubia	Common Ground Fern	L	C	C		U	C	C	M						M	U	C	X	M		C	U	U	U	C		U		2010	1,2,4,8
Family Gleicheniaceae																														
Gleichenia dicarpa	Pouched Coral Fern	L		U			U								U					U	U			U	U		U		2010	1,2,4,8
Gleichenia rupestris	Rock Coral Fern	L							M						U				M										2010	1,2,3,8
Sticherus flabellatus	Umbrella Fern	L													U				U			U			U		U		2009	1,2
Family Lindsaeaceae																														
Lindsaea linearis	Screw Fern	L													U				U			U	U						2009	1,2
Lindsaea microphylla	Lacy Wedge Fern	L																X									U		1998	1,5
Family Osmundaceae																														
Todea barbara	King Fern	L	U				U		U						U				U	U				U	U		U		2010	1,2,3,8
Family Polypodiaceae																														
Platycerium bifurcatum	Elkhorn	L		U			U	U							U		U						U	U			U		2010	1,2,8
Pyrrosia rupestris	Rock Felt Fern	L																					U	U	U		U		2009	1,2
Family Psilotaceae																														
Psilotum nudum	Skeleton Fork Fern	L	U	U				U		U					U				U	U	U			U	U		U		2010	1,2,3,8
Family Pteridaceae																														
Pteris tremula	Tender Brake		U	U		U	U	U							U		U			U		U	U	U	U		U		2010	1,2,4,8

Scientific name	Common name	Status	Vegetation communities												Reserves											Other sites	Last date	Records
			BG	AF	RF	MF	GR	DS	FS	KS	AS	SO	EM	ES	1	2	3	4	5	6	7	8	9	10	11	12	13			
Pteris vittata	Chinese Brake	R																						U			U		2009	1,2
Family Schizaeaceae																														
Schizaea bifida s.lat.	Forked Comb Fern	L																						U					1998	1
Schizaea dichotoma	Branched Comb Fern	L	U																					U					2010	1,8
Family Sinopteridaceae																														
Cheilanthes sieberi	Poison Rock Fern	L								U					U	U							U				U		2010	1,3,8
Pellaea falcata	Sickle Fern	L																	U				U						1998	1
Pellaea paradoxa		R																							U				2009	2
Family Thelypteridaceae																														
Christella dentata		L	U	U			U	U							U		U			U		U		U	U		U		2010	1,8
Phylum Cycadophyta	**Cycads**																													
Family Zamiaceae																														
Macrozamia communis	Burrawang	L							U						U				U										2010	1,2,8
Phylum Pinophyta	**Conifers**																													
Family Cupressaceae																														
Callitris rhomboidea	Port Jackson Pine	L		U											U				U	U			U	U					2010	1,2,3,8
Family Podocarpaceae																														
Podocarpus spinulosus	Plum Pine	L		U				U							U		U		U			U			U	U			2010	1,2,6,8
Phylum Magnoliophyta	**Flowering plants**																													
Class Magnoliopsida	**Dicotyledons**																													
Family Acanthaceae																														
Avicennia marina	Grey Mangrove	L										C	C	U	C									U					2010	1,3,8
Pseuderanthemum variabile	Pastel Flower	L	U	M			U								U		U		M			U		U					2010	1,2,3,8
Family Aizoaceae																														
Carpobrotus glaucescens	Pigface	L																	U										1994	3
Tetragonia tetragonoides	New Zealand Spinach	L										U		M	M	U			U					U	U				2010	1,2,3,8
Family Apiaceae																														
Actinotus helianthi	Flannel Flower	L	U												U														2010	1,3,8
Actinotus minor	Lesser Flannel Flower	L									U														U		U		2010	1,2,3,8
Centella asiatica	Swamp Pennywort		U	U			U				U				U		U		U	U					U		U		2010	1,2,3,8
Hydrocotyle peduncularis		L		M	U		U		C						U		U		C		U	U		U	C				2010	1,2,3,8
Platysace lanceolata	Native Parsnip	L	C	C				U		U					C	C	U		U										2010	1,2,3,8
Trachymene incisa		L								U						U													2010	1,8
Xanthosia pilosa	Woolly Xanthosia	L	U	U		U		U	U	U					U	U	U		U			U	U	U			U		2010	1,2,3,8
Xanthosia tridentata	Rock Xanthosia	L		U							M					U							U				M		2010	1,8
Family Apocynaceae																														
Tylophora barbata	Bearded Tylophora	L																X											1997	5
Parsonsia straminea	Common Silkpod	L															U												2009	2
Family Araliaceae																														
Astrotricha floccosa	Flannel Leaf	L	U	U													U						U	M	U				2010	1,2,3,8
Astrotricha latifolia	Broad-leaf Star-hair	L															U							U					1998	1
Polyscias sambucifolia	Elderberry Panax	L	C	M	U	M		U	U	U	M	U			C	U	U	X	U	U	M	U	M	U	M		M		2010	1,2,3,8
Family Asteraceae																														
Cassinia aculeata	Dolly Bush	L													U	U	U		U					U					2007	1,2,3
Cassinia uncata	Bent Cassinia	R																									U		1997	3
Cotula australis	Common Cotula	L													U													Wa	2008	2,3
Euchiton involucratus	Star Cudweed																										U		2005	4
Leptinella longipes		L																	U			U			U				2009	1,2
Olearia microphylla	Small-leaved Daisy-Bush	L													U														1998	1
Olearia viscidula		R													U														1998	1
Ozothamnus diosmifolius	White Dogwood	L	U	U	U	U		U		U	U				U	U	U		U		U		U	U			U		2010	1,2,3,8
Pseudognaphalium luteoalbum	Jersey Cudweed																			U									2010	8

Scientific name	Common name	Status	Vegetation communities												Reserves											Other sites	Last date	Records
			BG	AF	RF	MF	GR	DS	FS	KS	AS	SO	EM	ES	1	2	3	4	5	6	7	8	9	10	11	12	13			
Sigesbeckia orientalis	Indian Weed	L		U															U								U		2010	1,3,8
Family Baueraceae																														
Bauera rubioides	River Rose	L													U				U		U								2008	1,2,3
Family Bignoniaceae																														
Pandorea pandorana	Wonga Wonga Vine	L	M	M	U	C	U	M	M	M		U			U	M	C	X	M	M	U	U	C	U	M	U	U		2010	1,2,5,8
Family Brassicaceae																														
Cardamine paucijuga		R																		U								Ki	2010	6,7,8
Family Campanulaceae																														
Wahlenbergia gracilis	Sprawling Bluebell		U	U						U					U	U			U	U	U	U	U	U	U		U		2010	1,2,6,8
Family Cannabaceae																														
Trema tomentosa	Native Peach	L		U							U				U				U				U				U		2010	1,8
Family Casuarinaceae																														
Allocasuarina distyla	Scrub She-oak	L						U							U		U		U			U							2010	1,2,3,8
Allocasuarina littoralis	Black She-oak	L	M	M		U		M	U	U	C				C	U	U		U	U		U	U	C	U	U	C		2010	1,2,4,8
Allocasuarina torulosa	Forest Oak	L	U	U				U							U	U			U		U	U							2010	1,2,8
Casuarina glauca	Swamp Oak	L		U					U	U		C			C	U			U			U	U	U	M	U	U		2010	1,2,4,8
Family Chenopodiaceae																														
Sarcocornia quinqueflora	Samphire	L										M		M	M										U					2010	1,3,8
Suaeda australis	Seablite	L										U	U	C	M															2010	1,8
Family Convolvulaceae																														
Calystegia marginata		R																							U		U		2009	1,2
Dichondra repens s.lat.	Kidney Weed		U	U				U	U						U	U	U		U	U		U		U	U		U		2010	1,2,6,8
Polymeria calycina		L		U												U													2010	8
Family Crassulaceae																														
Crassula sieberiana	Australian Stonecrop	L								U									U										2010	8
Family Cunoniaceae																														
Callicoma serratifolia	Black Wattle	L	U	U			U	M							U		U		U		C			U			U		2010	1,2,3,8
Ceratopetalum apetalum	Coachwood	L		U			C		U						C		U	X	U		U			C			U		2010	1,2,5,8
Ceratopetalum gummiferum	Christmas Bush	L	U	M		M		U							U		U	X				U	M	U	C				2010	1,2,5,8
Family Dilleniaceae																														
Hibbertia aspera	Rough Guinea Flower	L		U												U			U						U				2010	2,8
Hibbertia dentata	Twining Guinea Flower	L	U	U			U	M	U						M	U	U		U	U		U		U	U	U	U		2010	1,2,6,8
Hibbertia empetrifolia	Trailing Guinea Flower	L																									U		1998	1
Hibbertia linearis	Showy Guinea Flower	L						U									U										U		2010	1,8
Hibbertia scandens	Climbing Guinea Flower	L													U				U			U		U			U		2009	1,2,3
Family Droseraceae																														
Drosera spatulata	Common Sundew	L													U				U										2007	1,2
Family Elaeocarpaceae																														
Elaeocarpus reticulatus	Blueberry Ash	L	C	C	U	M	U	C	C	U	U				C	C	C	X	C		M	M	M	C	C	U	U		2010	1,2,4,8
Family Elatinaceae																														
Elatine gratioloides	Waterwort	RE																										LGA	1916	6,7
Family Ericaceae																														
Epacris longiflora	Fuchsia Heath	L		U				U	M						U	M	U	X	U			U					U		2010	1,2,5,8
Leucopogon ericoides	Bearded Heath	L																							U				2009	1,2,3
Leucopogon juniperinus	Prickly Beard-heath	L	U	U							U				U											U	U		2010	1,3,8
Leucopogon parviflorus	Coast Beard-heath	R													U	U			U										2007	1,2,3
Monotoca elliptica	Tree Broom-heath	L		U				M	C	M					U	C	U		U			C							2010	1,2,3,8
Woollsia pungens	Woollsia	L		U												U													2010	8
Family Euphorbiaceae																														
Breynia oblongifolia	Coffee Bush	L	U	U	U		U	U	M	U		U			U	U	U		M	U	U	U	U	U	U	U	U		2010	1,2,3,8
Glochidion ferdinandi			C	C	U	M	U	C	C	U	U	C			C	M	C	X	C	C	C	C	M	C	M	C	C		2010	1,2,4,8
var. *ferdinandi*	Cheese Tree		C	C	U	M	U	C	C	U	U	C			C	M	C	X	C	C	C	C	M	C	M	C	C		2010	1,2,4,8
var. *pubens*	Hairy Cheese Tree	L	U	U				U	U						U		U		U		U			U	U	U			2010	8
Homalanthus populifolius	Bleeding Hearts		U	M		U	U	U	U		U				U	U	U	X	U	C	U	U	U	U	U		U		2010	1,2,5,8
Micrantheum ericoides	Heath Micrantheum	L									U												U				U		2010	1,3,8

Scientific name	Common name	Status	Vegetation communities												Reserves												Other	Last	Records
			BG	AF	RF	MF	GR	DS	FS	KS	AS	SO	EM	ES	1	2	3	4	5	6	7	8	9	10	11	12	13	sites	date	
Phyllanthus gunnii s.lat.	Blunt Spurge	L																X											1997	5
Phyllanthus hirtellus	Thyme Spurge	L	M	M							U				M	U			M				U				U		2010	1,3,8
Poranthera microphylla	Small Poranthera	L													U				U										2000	3
Family Fabaceae																														
Acacia buxifolia	Box-leaf Wattle	R													U														1998	1
Acacia decurrens	Sydney Green Wattle	L									U						U				U	U			U		U		2010	1,2,8
Acacia echinula	Hooked Wattle	RE																										LGA	1962	6,7
Acacia falcata	Sickle Wattle	L	U														U								U				2010	2,8
Acacia fimbriata	Fringed Wattle	R																								U			1998	1
Acacia floribunda	Sally Wattle	L													U	U			U				U						2007	1,2
Acacia implexa	Hickory Wattle	L		U				U							U	U	U		U	U		U							2010	1,2,8
Acacia linifolia	Flax-leaved Wattle	L	U	U		U		U	U		U				U	U	U		U		U		U	U	U	U	U		2010	1,2,4,8
Acacia longifolia	Sydney Golden Wattle	L	C	C	U	U		U	U	U					U	U	C	X	U	U	U	U	U	U	U	C	U		2010	1,2,3,8
Acacia longissima		L													U	U	U												1998	1
Acacia parramattensis	Sydney Green Wattle	L	U	U											U		U		U			U					U		2010	1,2,8
Acacia schinoides		L		U															U										2010	8
Acacia suaveolens	Sweet Wattle	L	U	U		U		U	U	U					U	U	U	X	U		U	U	U		U		U		2010	1,2,4,8
Acacia terminalis	Sunshine Wattle		U	M	U			U	U		U				M	U	U	X	U	U	U	U	U	U	U		U		2010	1,2,5,8
ssp. *angustifolia*		L		U							U													U			U		2010	8
ssp. *terminalis*		AN	U	M	U			U	U						M	U	U		U	U		U						SR	2010	6,8
angustifolia / *terminalis* intermediate		AN	U	U				U									U				U								2010	8
Acacia ulicifolia	Prickly Moses	L	U	U				U		U	U				U	U	U		U	U		U		U	U		U		2010	1,2,3,8
Bossiaea heterophylla		L																									U		1998	1
Desmodium rhytidophyllum	Rusty Tick-trefoil	L	U	U			U	U							U		U		U	U									2010	1,2,8
Dillwynia retorta	Heathy Parrot Pea	L	U	M											U	M	U		U			U					U		2010	1,2,6,8
Glycine clandestina	Twining Glycine	L	U	U											U		U		U				U	U	U		U		2010	1,2,3,8
Glycine microphylla		L	U									U			U	U									U		U		2010	1,2,4,8
Glycine tabacina		L	U									U													U		U		2010	8
Gompholobium latifolium	Golden Glory Pea	L		U																				U	U				2010	2,8
Hardenbergia violacea	False Sarsaparilla	L	U	U				U			U				U	U	U	X	U	U		U			U		U		2010	1,2,5,8
Kennedia rubicunda	Red Kennedy Pea	L	U	U				U	U						U	U	U	X	U	U		U	U		U		U		2010	1,2,6,8
Platylobium formosum	Handsome Flat-pea	L	U	M				U			U	U			U	U	U		C		U	U	U	U	U		U		2010	1,2,3,8
Pultenaea daphnoides	Large-leaf Bush-pea	L		U				U	U						U		U		U			U	U	U	U		U		2010	1,2,3,8
Pultenaea flexilis	Graceful Bush-pea	L	U														U	X?									U		2010	1,5,8
Pultenaea hispidula		R																									U		1998	1
Pultenaea linophylla		LE																										Cr	1895	6,7
Pultenaea stipularis	Fine-leaf Bush-pea	L				U					U								U				U		U		U		2010	1,3,8
Pultenaea tuberculata	Wreath Bush-pea	L													U														2000	3
Viminaria juncea	Native Broom	LE																										NB	pre1970	7
Family Geraniaceae																														
Geranium homeanum	Northern Cranesbill	L																		U					U		U	Wo	2010	1,2,3,8
Pelargonium australe	Coastal Geranium	L																	U										1994	3
Family Goodeniaceae																														
Dampiera stricta	Blue Dampiera	L													U														2000	3
Goodenia heterophylla	Variable-leaved Goodenia	L				U																	U						2010	8
Goodenia paniculata	Swamp Goodenia	LE																										Ki	1896	6,7
Scaevola albida		R															U												1998	1
Family Haloragaceae																														
Gonocarpus tetragynus	Poverty Raspwort	L													U														2007	2
Gonocarpus teucrioides	Germander Raspwort	L	U	U		U					C				U	U	U	X	U		U	U	U	U	U	U	C		2010	1,2,4,8
Haloragis heterophylla		R																							U				2009	1,2
Family Lamiaceae																														
Plectranthus parviflorus	Cockspur Flower	L	U	U	U										U		U		U			U			U				2010	1,2,3,8
Prostanthera denticulata	Rough Mint-bush	R													U												U		1998	1
Westringia fruticosa	Coastal Rosemary	L						U							U							U							2010	1,2,3,8

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			BG	AF	RF	MF	GR	DS	FS	KS	AS	SO	EM	ES	1	2	3	4	5	6	7	8	9	10	11	12	13			
Family Lauraceae																														
Cassytha glabella	Slender Devil's Twine	L													U		U							U			U		2009	1,2
Cassytha pubescens	Common Devil's Twine	L	U	U	U	U		U	U		U	U			U	U	U		U		U		U	U	U	U	U		2010	1,2,8
Endiandra sieberi	Hard Corkwood	L													U														1998	1
Family Lobeliaceae																														
Lobelia anceps		L																		U							U		2010	8
Lobelia dentata		L																	U										1994	3
Lobelia gibbosa		R				U													U				U						2010	3,8
Lobelia gracilis	Trailing Lobelia	L						U							U														2010	8
Pratia purpurascens	Whiteroot	L	U	U											U	U	U		U						U		U		2010	1,2,3,8
Family Loranthaceae																														
Amyema congener		L																				U	U						2009	1,2,6
Family Lythraceae																														
Lythrum hyssopifolia	Hyssop Loosestrife	R													U														2007	2,6
Family Malvaceae																														
Hibiscus heterophyllus	Native Rosella	R													U				U										2007	1,2
Lasiopetalum ferrugineum	Rusty-petals	L	U	U		U					M				U			X					U	U	U		M		2010	1,3,5,8
Rulingia dasyphylla	Kerrawang	L																									U		1998	1
Family Meliaceae																														
Synoum glandulosum	Bastard Rosewood	L		U																		U							2010	8
Family Menispermaceae																														
Sarcopetalum harveyanum	Pearl Vine	L		U					U			U			U		U		U			U							2010	1,2,3,8
Stephania japonica	Stephania	L		M			U	M	U						U	U	M		X		U						C		2010	1,2,8
Family Moraceae																														
Ficus coronata	Sandpaper Fig	L					U								U														2010	8
Ficus rubiginosa	Port Jackson Fig	L	U	C		U	U	C	U	U	U				U	U	C	X	U		C	C	U	U	U	U	U		2010	1,2,4,8
Family Myrsinaceae																														
Myrsine variabilis	Muttonwood	L		U	M		U	U	U			U			U	U	M		U	U	U	U			U	U	U		2010	1,2,3,8
Family Myrtaceae																														
Acmena smithii	Lilly Pilly	L		U			C	U							C		C		U		U	U			U		U		2010	1,2,3,8
Angophora costata	Sydney Red Gum	L	C	C	C	C		C	U	U	C	U			C	C	C	X	C	C	C	M	C	C	C	C	C		2010	1,2,4,8
Angophora floribunda	Rough-barked Apple	L		U													U	X	U								U		2010	1,2,5,8
Backhousia myrtifolia	Grey Myrtle	L					U								U														2010	8
Baeckea linifolia	Swamp Baeckea	L																						U					2009	1,2
Callistemon linearis	Narrow-leaved Bottlebrush	L		U											U				U			U					U		2010	1,2,8
Callistemon salignus	Willow Bottlebrush	L													U				U										2008	1,2
Corymbia gummifera	Red Bloodwood	L	M	U		C					U				M	U	U		U			U	C	U	U		U		2010	1,2,3,8
Darwinia fascicularis	Clustered Scent-myrtle	L													U														1998	1
Eucalyptus botryoides	Bangalay	L		U					U						U		U	X	U			U							2010	1,2,5,8
Eucalyptus haemastoma	Broad-leaved Scribbly Gum	L	U												U							U							2010	1,2,8
Eucalyptus paniculata	Grey Ironbark	L		U												U			U										2010	1,8
Eucalyptus pilularis	Blackbutt	L	C	M		U	U	U				U			C	U	C		U				U	C	C		C		2010	1,2,4,8
Eucalyptus piperita	Sydney Peppermint	L	U	M		C		M							M	U	M					U	C	U	U	U	U		2010	1,2,4,8
Eucalyptus punctata	Grey Gum	L		U						U					U	U	U		U			U							2010	1,2,3,8
Eucalyptus resinifera	Red Mahogany	L	C	C			C	U							C	M	C		U	U							U		2010	1,2,8
Eucalyptus sieberi	Silvertop Ash	L				C																	C	U	U				2010	1,2,6,8
Eucalyptus tereticornis	Forest Red Gum	L			C												C												2010	1,2,8
Kunzea ambigua	Tick Bush	L	U	U		U		M	U	C					U	C	M	X	C	U	U	U	U	U	U	U	U		2010	1,2,6,8
Leptospermum polygalifolium	Yellow Teatree	L		U				U									U	X							U		U		2010	5,8
Leptospermum squarrosum	Pink Teatree	L																				U							2009	1,2
Leptospermum trinervium	Paperbark Teatree	L	U	U		U									U	U			U				U	U	U		U		2010	1,2,3,8
Melaleuca squamea	Swamp Honeymyrtle	LE																										CP	1983	6,7
Syncarpia glomulifera	Turpentine	L	M	U											U				U					U	M		U		2010	1,2,4,8
Tristaniopsis laurina	Water Gum	L	U				U								U						U			U					2010	1,8
Family Oleaceae																														

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Notelaea longifolia	Large Mock-olive	L	M	C	C	U	M	C	C	M	U	U			C	C	C	X	C	U		U	U	U	U	U	M		2010	1,2,4,8
Notelaea ovata		L													U	U			U			U							2009	1,2
Family Onagraceae																														
Epilobium pallidiflorum		RE																										LGA	1914	6,7
Family Oxalidaceae																														
Oxalis exilis			U					U				U			U										U			2010	8
Oxalis thompsoniae				U																							U		2010	8
Family Passifloraceae																														
Passiflora herbertiana	Native Passionfruit	L				U																	U						2010	8
Family Pittosporaceae																														
Billardiera scandens	Appleberry	L	U	U	U	U		U			U				U	U	U		U		U	U	U	U	U		U		2010	1,2,3,8
Pittosporum revolutum	Rough-fruit Pittosporum	L	U	C	U		U	M		U		U			U	M	U		C	U		M				U	M		2010	1,2,3,8
Pittosporum undulatum	Pittosporum		C	C	C		C	C	C	U		U			C	C	C	X	U	U	U	U	U	C	C	U	C		2010	1,2,4,8
Family Plantaginaceae																														
Plantago debilis	Slender Plantain	L																				U					U		2009	1,2
Family Polygonaceae																														
Persicaria decipiens	Slender Knotweed	L																									U		2010	8
Persicaria prostrata	Creeping Knotweed	RE																										LGA	1967	6,7
Rumex brownii	Swamp Dock		U																						U			Wo	2010	8
Family Proteaceae																														
Banksia ericifolia	Heath-leaved Banksia	L													U		U		U								U		2008	1,2,3,6
Banksia integrifolia	Coast Banksia	L		M		U		C	C	U	U				U	C	C	X	M	U		C	U	U	U	U	C		2010	1,2,6,8
Banksia marginata	Silver Banksia	L																				U							2009	1,2,6
Banksia oblongifolia	Rock Banksia	L														U													1998	1
Banksia serrata	Old Man Banksia	L	U	U		U		M							U	U	U	X	U			U	U	U	U		U		2010	1,2,6,8
Banksia spinulosa	Hairpin Banksia	L																					U	U	U		U		2009	1,2,3
Grevillea buxifolia	Grey Spider-flower	L									U												U				U		2010	1,3,8
Grevillea linearifolia	White Spider-flower	L	U	C		U		U	M	C	U				U	C	U	X	M	U		U	U	U	U	U	U		2010	1,2,6,8
Grevillea sericea	Pink Spider-flower	L													U		U		U								U		2009	1,2,3
Grevillea speciosa	Red Spider-flower	L													U		U					U							2009	1,2,3
Hakea dactyloides	Broad-leaved Hakea	L	U	C		U		U		U	C				U	U	U		C	M		U	U	U			C		2010	1,2,6,8
Hakea gibbosa		L	U												U								U				U		2010	1,8
Hakea sericea	Silky Hakea	L	U	U						U					U				U	U		U		U	U		U		2010	1,2,3,8
Lambertia formosa	Mountain Devil	L		U		U		U							U	U							U	U	U		U		2010	1,2,3,8
Lomatia silaifolia	Crinkle Bush	L	U	U		U		U							U	U	U		U				U	U	U		U		2010	1,2,3,8
Persoonia lanceolata	Lance-leaf Geebung	L																										NS	?	6
Persoonia laurina	Golden Geebung	L																						U					2009	2
Persoonia levis	Broad-leaved Geebung	L		U		U			U						U	U	U		U				U	U	U		U		2010	1,2,3,8
Persoonia linearis	Narrow-leaved Geebung	L	U	U				U			U				U	U	U		U				U	U	U		U		2010	1,2,8
Persoonia pinifolia	Pine-leaf Geebung	L													U		U	X						U	U		U		2000	1,3,5
Telopea speciosissima	Waratah	L																							U				2009	2
Xylomelum pyriforme	Woody Pear	L																	U					U			U		2009	1,2,3
Family Ranunculaceae																														
Clematis aristata	Old Man's Beard	L	M					U							U		U		U					U	M				2010	1,2,3,8
Clematis glycinoides	Old Man's Beard	L						U	U	U						U	U		U										2010	8
Family Rhamnaceae																														
Pomaderris discolor		L							U								U		U								U		2010	1,2,8
Pomaderris elliptica		L				U																	U						2010	8
Pomaderris ferruginea		L	U												U	U	U		U				U	U			U		2010	1,2,3,8
Pomaderris intermedia		L		U											U				U	U	U								2010	1,2,8
Pomaderris lanigera	Woolly Pomaderris	L										U			U														2010	8
Family Rubiaceae																														
Galium liratum		R																										NB	2005	6,7
Morinda jasminoides	Morinda	L					M								U		M												2009	2
Opercularia aspera	Coarse Stinkweed	L	U	U					U						U	U	U		U		U	U		U					2010	1,2,3,8
Opercularia varia		L									U																U		2010	8

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Pomax umbellata	Pomax	L	U	U		M		U		U					U	U						U	M		U		U		2010	1,2,4,8
Family Rutaceae																														
Correa reflexa	Common Correa	L	U	U	U				U						U	U	U		U										2010	1,2,3,8
Crowea exalata		R																									U		1998	1
Crowea saligna		L	U	U		U		M	U						U	U	U		U			M	U	U	U		U		2010	1,2,3,8
Leionema dentatum	Toothed Phebalium	L	M	U				C							U		C				U			M					2010	1,2,3,8
Phebalium squamulosum	Scaly Phebalium	R	U												U			X											2010	5,8
Philotheca myoporoides	Native Daphne	R																	U								U		1998	1
Zieria laevigata		L													U							U							2009	1,2,3
Zieria pilosa	Hairy Zieria	L	U	U		U					U				U	U							U	U	U		U		2010	1,2,3,8
Zieria smithii	Sandfly Zieria	L	U	M	U	U	U	M		U					M	U	M	X	M	U			U		U		U		2010	1,2,5,8
Family Santalaceae																														
Exocarpos cupressiformis	Native Cherry	L		U						U					U	U	U		U			U	U						2010	1,2,3,8
Family Sapindaceae																														
Cupaniopsis anacardioides	Tuckeroo	L													U				U		U								2008	1,2
Dodonaea triquetra	Common Hop Bush	L	C	C	U	U	U	U	U	U	U	U			C	M	C	X	M	U	U	U	U	U	U	M	C		2010	1,2,4,8
Family Scrophulariaceae																														
Veronica plebeia	Trailing Speedwell	L	U	U											U	U			U		U				U				2010	1,2,3,8
Family Solanaceae																														
Solanum americanum	Glossy Nightshade			U		U	U								U								U	U			U		2010	8
Solanum aviculare	Kangaroo Apple	R															U												1998	1
Family Thymelaeaceae																														
Pimelea linifolia	Slender Rice-flower	L							U						U	U													2010	1,8
Wikstroemia indica		R																									U		1998	1
Family Verbenaceae																														
Clerodendrum tomentosum	Hairy Clerodendrum	L		U	U							U			U		U		U				U			U	U		2010	1,2,4,8
Family Violaceae																														
Viola hederacea	Ivy-leaved Violet	L															U								U				2009	2
Family Vitaceae																														
Cissus antarctica	Kangaroo Grape	L					U								U		U	X						U	U		U		2010	1,2,5,8
Cissus hypoglauca	Giant Water Vine	L	U	U			U	U							U		U					U	U		U	U	U		2010	1,2,3,8
Class Liliopsida	**Monocotyledons**																													
Family Anthericaceae																														
Tricoryne simplex	Yellow Rush Lily	R													U	U			U				U						2007	1,2
Family Arecaceae																														
Livistona australis	Cabbage-tree Palm	L		U			U	U							U		U		U		U	U		U			U		2010	1,2,3,8
Family Colchicaceae																														
Schelhammera undulata	Lilac Lily	L													U		U								U				2009	1,2,3
Family Commelinaceae																														
Commelina cyanea	Scurvy Weed		M	C	U	U	M	M	M	U	U	U			U	U	U		M	C	U	M	U	M	C	U	U		2010	1,2,4,8
Family Cyperaceae																														
Baumea juncea	Bare Twig-rush	L										U			U												U		2010	1,8
Carex inversa																							U						1998	1,6
Caustis flexuosa	Curly Wig	L				U																	U				U		2010	1,8
Caustis recurvata		L																									U		1998	1
Cyathochaeta diandra	Sheath Rush	L	U	U		U					U				U	U							U				U		2010	8
Cyperus difformis	Dirty Dora	RE																										LGA	1974	6,7
Cyperus gracilis			U	U											U	U			U								U		2010	3,8
Cyperus laevis		R	U					U							U										U				2010	8
Cyperus polystachyos		LE																										LGA	1902	6,7
Eleocharis sphacelata	Tall Spike-rush	LE																										LGA	1975	6,7
Ficinia nodosa	Knobby Club-rush	L													U		U												2009	2,3,6
Gahnia aspera	Rough Saw-sedge	L		U											U						U						U		2010	1,8
Gahnia clarkei		L	U	U					U						U				U			U							2010	8

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Gahnia erythrocarpa		L				U																	U						2010	8
Gahnia melanocarpa	Black-fruited Saw-sedge	R		U				U	U								U		U					U	U		U		2010	1,2,8
Lepidosperma concavum		L		U					U							U			U										2010	8
Lepidosperma laterale	Variable Sword-sedge	L	M	M	U	M	U	U			U				U	U	M	X	M		U	U	M	M	U	M	U			2010	1,2,5,8
Ptilothrix deusta		L				U																	U							2010	6,7,8
Schoenus imberbis	Beardless Bog-rush	L																						U						1998	1
Schoenus melanostachys	Black Bog-rush	L	C	M		U					U												U	M	U		C			2010	1,2,8
Family Haemodoraceae																															
Haemodorum planifolium	Strap-leaf Bloodroot	L													U												U			1998	1
Family Iridaceae																															
Patersonia glabrata	Leafy Purple Flag	L																						U			U			2005	1,4
Patersonia sericea	Silky Purple Flag	L																									U			1997	3
Family Juncaceae																															
Juncus continuus		L		U						U						U				U								MP,SL	2010	6,8
Juncus kraussii	Sea Rush	L														U														1998	1
Juncus pallidus	Pale Rush	LE																										Ki		1974	6
Juncus usitatus	Common Rush	L		U				U							U				U		U	U		U	U					2010	1,2,6,8
Family Juncaginaceae																															
Triglochin striatum	Arrow Grass	L												U	U															2010	8
Family Lemnaceae																															
Landoltia punctata		R					U																	U						2010	8
Family Lomandraceae																															
Lomandra cylindrica	Needle Mat-rush	L	U	U											U	U			U						U					2010	1,2,8
Lomandra filiformis	Wattle Mat-rush		U	U											U	U	U		U						U	U	U			2010	1,2,3,8
ssp. *coriacea*		L																									U			1998	1
ssp. *filiformis*		L	U	U												U	U		U						U	U	U			2010	1,3,8
Lomandra glauca	Pale Mat-rush	L																									U			1998	1,3
Lomandra gracilis		L	U	U		U									U	U							U	U			U			2010	1,8
Lomandra longifolia	Spiny-headed Mat-rush	L	C	C	C	U	U	C	C	C	C	U			C	C	C	X	C	C	C	C	U	M	C	M	C			2010	1,2,4,8
Lomandra micrantha	Small-flowered Mat-rush	R														U														1998	1
Lomandra multiflora	Many-flowered Mat-rush	L	U	U											U	U							U		U	U	U			2010	1,2,3,8
Lomandra obliqua	Twisted Mat-rush	L	U	U		U		U							U	U	U		U				U	U			U			2010	1,2,3,8
Family Luzuriagaceae																															
Eustrephus latifolius	Wombat Berry	L	U	M	M	U	M	U	U	U		U			U	U	C		U	U		U	U	U	U	U	U			2010	1,2,3,8
Geitonoplesium cymosum	Scrambling Lily	L	U	U											U		U		U			U	U	U	U					2010	1,2,3,8
Family Orchidaceae																															
Acianthus fornicatus	Pixie Caps	L													U		U													2009	1,2,3
Calochilus campestris	Copper Beards	L													U															1998	1
Calochilus gracillimus	Late Beard Orchid	R													U				U					U						2008	1,2
Cryptostylis erecta	Tartan Tongue Orchid	L	U	U		M									U	U	U		U				M	U			U			2010	1,2,3,8
Cryptostylis subulata	Large Tongue Orchid	L	U	U		U		U									U						U	U						2010	8
Dipodium punctatum s.lat.	Hyacinth Orchid	L													U		U		U				U							2008	1,2,3
Genoplesium fimbriatum	Fringed Midge Orchid	LE																										NS		1916	6
Liparis reflexa	Yellow Rock Orchid	L													U				U											2008	1,2
Pterostylis longifolia	Tall Greenhood	L															U													2009	1,2
Pterostylis nutans	Nodding Greenhood	L													U		U		U											2007	1,2,3
Family Phormiaceae																															
Dianella caerulea	Blue Flax Lily	L	C	C	U	C	M	M	U	M	U	U			M	C	C	X	M	U	M	U	C	M	U	M	C			2010	1,2,4,8
Dianella revoluta	Spreading Flax Lily	L	U	M		U		U	U	M		U			M	U	U		M			U	U	U		U	U			2010	1,3,4,8
Family Poaceae																															
Anisopogon avenaceus	Oat Speargrass	L		U												U							U				U		2010	1,8
Aristida vagans	Threeawn Speargrass	L		U							U				U	U	U		U			U	U				U			2010	1,2,4,8
Austrodanthonia racemosa		L													U															1998	1
Austrodanthonia tenuior		L	U	U					U	U						U			U				U	U			U		2010	1,2,6,8
Austrostipa pubescens	Tall Spear Grass	L	U	U							U				U				U								U			2010	1,8

Scientific name	Common name	Status	Vegetation communities												Reserves												Other sites	Last date	Records
			BG	AF	RF	MF	GR	DS	FS	KS	AS	SO	EM	ES	1	2	3	4	5	6	7	8	9	10	11	12	13			
Austrostipa ramosissima	Stout Bamboo Grass	R		U			U								U						C								2010	1,8
Cymbopogon refractus	Barbed Wire Grass	L													U				U										2008	1,2
Dichelachne crinita	Longhair Plumegrass	L	U	U				U	U	U					U	U			U	U		U					U		2010	1,3,8
Dichelachne micrantha	Shorthair Plumegrass	L		U											U	U			U			U					U		2010	1,2,4,8
Digitaria parviflora	Small-flowered Finger Grass	L	U	M		U		U	U		M				U	U	U		M				U	U	U	U	M		2010	1,2,3,8
Echinopogon caespitosus	Tufted Hedgehog Grass	L	U	U				U	U	M	U				U	M	U		U					U			U		2010	1,2,4,8
Echinopogon ovatus	Forest Hedgehog Grass	L		U		U													U				U						2010	8
Entolasia marginata	Bordered Panic	L	U	M	M	U		U	U	U		U			U	U	M	X	U	C	U	U	U	U	U	U	U		2010	1,2,3,8
Entolasia stricta	Wiry Panic	L	C	C	U	C	U	C	C	C	C	U			C	C	C		C	U	C	U	C	C	C	U	C		2010	1,2,3,8
Eragrostis brownii	Brown's Lovegrass	L	U	U						C					U	M			M					U					2010	2,8
Imperata cylindrica	Blady Grass	L	U	M	U	U	U	U	U						U	U	U		U			U	U	U	U	C	U		2010	1,2,4,8
Microlaena stipoides	Weeping Grass		C	C	U	M	U	C	C	C	U	C			C	C	C		C	C	M	C	M	M	C	C	C		2010	1,2,4,8
Notodanthonia longifolia	Longleaf Wallaby Grass	L									U																U		2010	1,8
Oplismenus aemulus	Basket Grass		C	M	U	U	U	C	U	U	M	M			M	U	U		U	U	C	U	U	U	C	U	C		2010	1,2,4,8
Oplismenus imbecillis	Basket Grass		U	U	U	U	M	U	U		U				M	U	U	X	U		U	U	U	U	U		U		2010	1,2,5,8
Panicum simile	Two Colour Panic	L	M	U											M	U	U						U		U				2010	1,2,8
Paspalidium distans		L	U	M				U		M					M	M	U					U	U	U	U	U			2010	1,2,8
Poa affinis		L	M	C	C		U	C	C	U					U	C	C	X	C	U	U			U	U		U		2010	1,2,6,8
Sporobolus elongatus	Slender Rat's Tail Grass	R																					U						1998	1
Themeda australis	Kangaroo Grass	L	U	U					U		U				U	U	U		U				U	U	U		U		2010	1,2,3,8
Family Potamogetonaceae																														
Potamogeton pectinatus	Fennel Pondweed	RE																										LGA	1985	6,7
Family Smilacaceae																														
Smilax australis	Sarsaparilla	L																	U								U		1998	1,3
Smilax glyciphylla	Sweet Sarsaparilla	L	M	M		U	M	C	U		U	U			C	U	M	X	U		M	U	U	C	M	U	U		2010	1,2,4,8
Family Typhaceae																														
Typha orientalis	Broad-leaved Cumbungi	LE																										LGA	1926	6,7
Family Xanthorrhoeaceae																														
Xanthorrhoea arborea	Broad-leaf Grass-tree	L	U	U				M							M								U	U	U	U	U		2010	1,2,3,8
Xanthorrhoea media	Forest Grass-tree	L	U	U		U					U				U	U							U	U	U		U		2010	1,2,8
Family Zosteraceae																														
Zostera capricorni	Eel Grass	R														U													2010	8

Appendix 2. Native fauna species recorded in North Sydney local government area

Species believed to be aviary escapees not included. Species nomenclature follows Griffiths (2006), Christidis and Boles (2008) and Menkhorst and Knight (2004).
Status: A = threatened in Australia (EPBC Act), M = migratory species (EPBC Act), N = threatened in NSW (TSC Act), R = threatened at regional level (Sydney Metropolitan Catchment Management Authority area), L = threatened at local level (North Sydney LGA), E = locally extinct? (no records for 25+ years - not applied to species that are only rare visitors)
Occurrence: y = likely to be present all year, s = spring-summer visitor, w = autumn-winter visitor, i = irregular visitor, r = rare visitor, b = known or likely to breed in North Sydney, e = escapee from captivity, n = unlikely to breed now in North Sydney, ( ) = former occurrence of species not recorded for many years
Habitat: r = rainforest, e = eucalypt forest/woodland, h = heath/scrub, g = grassland/open vegetation, u = urban, w = wetlands/estuaries/watercourses, c = coast, m = marine, a = aerial, v = various
Reserves: 1 = Smoothey Park/Gore Cove Reserve, 2 =Berry Island Reserve, 3 = Badangi Reserve, 4 = Walumetta Park, 5 = Balls Head Reserve, 6 = Waverton Park/former BP site/coal loader site, 7 = Forsyth Park, 8 = Cremorne Reserve, 9 = Wonga Road Reserve, 10 = Brightmore Reserve, 11 = Primrose Park/Folly Point Reserve, 12 = Mortlock Reserve, 13 = Tunks Park
Records (maximum 4 per species): 1 = North Sydney Council's Wildlife Watch database (records to 18/1/10), 2 = Smith and Smith (2008), 3 = Ekert (2002, 2003), 4 = Biosphere Environmental Consultants (2001, 2002), 5 = Ambrose (2006), 6 = Hoye (2000), 7 = Nixon (2003), 8 = Frew (2004), 9 = Burton (2000, 2005), 10 = Keast (1995), 11 = Annual NSW Bird Reports, 12 = NSW Field Ornithologists Club Newsletter, 13 = Cumberland Bird Observers Club newsletter, 14 = Hoskin *et al*. (1991), 15 = Eades and Debus (1982), 16 = Poynton (2008), 17 = North Sydney Council (1999, 2001), 18 = recent bush regeneration reports (Waratah Eco Works 2009a-b, Australian Bushland Restoration 2008), 19 = National Trust (1994), 20 = Mann (1933), 21 = Australian Museum specimen records, 22 = DECCW Atlas of NSW Wildlife database, 23 = records from this survey (2010)

Scientific name	Common name	Status	Occurrence	Habitat	Cammeray	Cremorne	Cremorne Point	Crows Nest	Kirribilli	Lavender Bay	McMahons Point	Milsons Point	Neutral Bay	North Sydney	St Leonards	Waverton	Wollstonecraft	Reserves 1	2	3	4	5	6	7	8	9	10	11	12	13	Last date	Records
FROGS																																
Family Hylidae																																
Litoria fallax	Eastern Dwarf Tree Frog	L	yb	w	X																										2007	1,22
Family Myobatrachidae																																
Crinia signifera	Common Eastern Froglet		yb	v	X	X	X				X		X			X	X	X		X		X	X	X	X	X	X	X	X	X	2010	1,4,5,23
Limnodynastes peronii	Striped Marsh Frog		yb	wu	X	X							X			X	X	X				X	X	X				X		X	2009	1,4,5,6
Pseudophryne australis	Red-crowned Toadlet	N	e?	eh									X																		2005	1,22
REPTILES																																
Family Agamidae																																
Physignathus lesueurii	Eastern Water Dragon	L	yb	w	X	X	X										X	X							X	X	X	X	X	X	2010	1,4,5,23
Family Gekkonidae																																
Oedura lesueurii	Lesueur's Velvet Gecko	L	yb	eh												X						X									2001	4
Phyllurus platurus	Southern Leaf-tailed Gecko		yb	ehu	X	X	X									X	X	X		X		X			X			X	X	X	2009	1,4,5,18
Family Pygopodidae																																
Lialis burtonis	Burton's Legless Lizard	L	yb	v			X																		X						2009	1
Family Scincidae																																
Acritoscincus platynota	Red-throated Skink	L	yb	eh	X																										2005	5
Cryptoblepharus virgatus	Fence Skink		yb	eu	X		X									X	X	X				X			X					X	2010	1,22,23
Ctenotus robustus	Striped Skink	L	yb	eh													X	X													1998	22
Ctenotus taeniolatus	Copper-tailed Skink	L	yb	eh	X																									X	2005	5
Eulamprus quoyii	Eastern Water Skink	L	yb	w	X	X	X						X			X	X	X	X	X		X		X	X		X	X	X	X	2009	1,4,5,17
Eulamprus tenuis	Greater Bar-sided Skink	L	yb	e			X																		X						1992	22

Scientific name	Common name	Status	Occurrence	Habitat	Cammeray	Cremorne	Cremorne Point	Crows Nest	Kirribilli	Lavender Bay	McMahons Point	Milsons Point	Neutral Bay	North Sydney	St Leonards	Waverton	Wollstonecraft	Reserves 1	2	3	4	5	6	7	8	9	10	11	12	13	Last date	Records
Lampropholis delicata	Delicate Garden Skink		yb	ehu	X	X	X						X			X	X	X	X	X		X		X	X	X	X	X	X	X	2010	4,5,22,23
Lampropholis guichenoti	Common Garden Skink		yb	eu	X	X							X			X	X	X		X		X		X		X	X		X	X	2010	4,5,18,23
Saiphos equalis	Three-toed Skink	L	yb	e			X						X				X							X	X						2009	1,18,22
Saproscincus mustelina	Weasel Skink		yb	eu		X																					X				2002	4
Tiliqua scincoides	Eastern Blue-tongued Skink	L	yb	eh	X	X	X						X	X		X	X	X	X	X		X			X		X	X	X	X	2009	1,5,17,18
Family Chelidae																																
Chelodina longicollis	Eastern Long-necked Turtle	L	yb	w													X	X		X											2008	1,18
Family Pythonidae																																
Morelia spilota	Diamond Python	L	yb	e	X																								X		2009	1,5
Family Colubridae																																
Dendrelaphis punctulata	Green Tree Snake	L	yb	eu	X												X											X	X		2008	1,17,22
Family Elapidae																																
Cacophis squamulosus	Golden-crowned Snake	L	yb	eh	X	X	X										X			X					X		X	X	X	X	2009	1,4,17,22
Pseudechis porphyriacus	Red-bellied Black Snake	L	yb	ehw	X	X							X				X			X							X			X	2008-9	1,5,17,18
BIRDS																																
Family Megapodiidae																																
Alectura lathami	Australian Brush-turkey	R	yb	re	X	X	X	X					X	X		X	X	X				X			X			X	X	X	2009	1,12,13,22
Family Phasianidae																																
Coturnix pectoralis	Stubble Quail	R	rn	g			X					X													X						2008	1,22
Coturnix ypsilophora	Brown Quail		rn	hg							X	X		X																	2007	1,12
Family Anatidae																																
Anas castanea	Chestnut Teal	L	yb	w	X				X							X	X	X	X			X								X	2007	1,2,7,22
Anas superciliosa	Pacific Black Duck	L	yb	w	X	X	X									X	X	X	X	X		X	X		X	X				X	2009	1,2,7,17
Chenonetta jubata	Australian Wood Duck	L	in	wg	X		X									X	X			X		X			X					X	2008	1,7,22
Cygnus atratus	Black Swan		rn	w	X												X													X	2006	1,7,22
Family Phaethontidae																																
Phaethon lepturus	White-tailed Tropicbird	M	rn	m			X																		X						2009	1
Family Columbidae																																
Columba leucomela	White-headed Pigeon		rn	re	X								X				X							X						X	2002-3	1,3,17,22
Geopelia striata	Peaceful Dove	R	rn	e		X											X			X							X				2002	1,4,22
Leucosarcia picata	Wonga Pigeon	E	(yb)	e									X																		1870s	20
Lopholaimus antarcticus	Topknot Pigeon		rn	re		X							X				X														2007	1,7,22
Ocyphaps lophotes	Crested Pigeon		yb	gu	X	X	X	X					X			X	X	X	X	X		X	X	X	X	X	X	X	X	X	2010	2,3,4,23
Ptilinopus superbus	Superb Fruit-Dove	N	rn	r				X																							1995	1,22
Family Podargidae																																
Podargus strigoides	Tawny Frogmouth		yb	eu	X	X	X	X	X		X		X	X		X	X	X	X	X		X	X	X	X	X	X	X	X	X	2009	2,4,7,9
Family Eurostopodidae																																
Eurostopodus mystacalis	White-throated Nightjar		rn	e									X																		1995	22
Family Apodidae																																

Scientific name	Common name	Status	Occurrence	Habitat	Reserves																							Last date	Records
					Cammeray	Cremorne	Cremorne Point	Crows Nest	Kirribilli	Lavender Bay	McMahons Point	Milsons Point	Neutral Bay	North Sydney	St Leonards	Waverton	Wollstonecraft	1	2	3	4	5	6	7	8	9	10	11	12	13		
Apus pacificus	Fork-tailed Swift	M	sn	a									X	X																1993	11
Hirundapus caudacutus	White-throated Needletail	M	sn	a			X						X			X						X			X					2009	1,11,13,19
Family Diomedeidae																															
Diomedea exulans	Wandering Albatross	ANM	rn	m					X																					1985	22
Family Procellariidae																															
Ardenna pacifica	Wedge-tailed Shearwater	M	rn	m			X																	X						2009	1
Puffinus gavia	Fluttering Shearwater		rn	m					X																					1985	22
Family Spheniscidae																															
Eudyptula minor	Little Penguin	R	wn	mwc		X	X				X		X			X	X	X	X			X	X		X						2008	1,7,11,12
Family Sulidae																															
Morus serrator	Australasian Gannet		rn	m	X		X										X								X				X	2009	1,22
Family Anhingidae																															
Anhinga novaehollandiae	Australasian Darter	L	yn	w		X	X									X	X	X	X			X			X					2008	1,3,4,7
Family Phalacrocoracidae																															
Microcarbo melanoleucos	Little Pied Cormorant	L	yn	wc	X	X	X		X							X	X	X	X	X		X			X	X		X	X	X	2010	2,3,4,23
Phalacrocorax carbo	Great Cormorant	L	yn	wc	X	X	X					X	X			X	X	X		X		X			X			X	X	X	2009	1,2,7,9
Phalacrocorax sulcirostris	Little Black Cormorant	L	yn	wc	X	X	X									X	X	X		X		X	X		X	X		X	X	X	2010	2,3,4,23
Phalacrocorax varius	Pied Cormorant	L	yn	wc		X	X		X		X					X	X	X	X	X		X	X		X						2010	1,2,7,23
Family Pelecanidae																															
Pelecanus conspicillatus	Australian Pelican	L	in	w	X	X	X	X					X			X	X	X	X			X			X			X		X	2010	2,7,8,23
Family Ardeidae																															
Ardea intermedia	Intermediate Egret	R	rn	w																										?	7
Ardea modesta	Eastern Great Egret	M	rn	w																										?	7
Ardea pacifica	White-necked Heron	R	rn	w			X						X				X	X						X						2009	1,11,22
Butorides striata	Striated Heron	L	yb	w	X											X	X	X	X	X		X				X				2010	1,2,7,23
Egretta garzetta	Little Egret		rn	w		X																			X		X			1999	1,17
Egretta novaehollandiae	White-faced Heron	L	yb	wc	X	X	X		X			X	X	X		X	X	X	X	X		X			X	X	X	X	X	X	2010	2,3,4,23
Ixobrychus flavicollis	Black Bittern	N	rn	w	X												X	X												X	2005	1,22
Nycticorax caledonicus	Nankeen Night-Heron		rn	w			X		X			X												X						2006	1,13,22
Family Threskiornithidae																															
Threskiornis molucca	Australian White Ibis		yn	gwu	X	X	X	X					X	X		X	X	X		X		X	X	X	X		X	X		X	2010	2,3,4,23
Family Accipitridae																															
Accipiter cirrocephalus	Collared Sparrowhawk		rn	e										X			X													1998	22
Accipiter fasciatus	Brown Goshawk	L	in	e	X	X	X										X	X	X					X			X		X	2010	1,2,7,23
Aquila audax	Wedge-tailed Eagle		rn	v													X													1996	22
Aviceda subcristata	Pacific Baza		rn	e	X	X											X	X								X			X	2008	1,12,13,22
Circus approximans	Swamp Harrier		rn	w																										?	7
Elanus axillaris	Black-shouldered Kite	L	in	g												X						X								2007	1,2,22
Haliaeetus leucogaster	White-bellied Sea-Eagle	M	in	wc	X		X		X				X			X	X	X	X	X		X			X				X	2008	1,7,9,22
Haliastur sphenurus	Whistling Kite		rn	wc		X	X										X			X				X		X				2009	1,9,18,22
Lophoictinia isura	Square-tailed Kite	N	rn	e	X																								X	2000	11
Milvus migrans	Black Kite		rn	g	X																								X	2000	11
Family Falconidae																															

Scientific name	Common name	Status	Occurrence	Habitat	Reserves																							Last date	Records
					Cammeray	Cremorne	Cremorne Point	Crows Nest	Kirribilli	Lavender Bay	McMahons Point	Milsons Point	Neutral Bay	North Sydney	St Leonards	Waverton	Wollstonecraft	1	2	3	4	5	6	7	8	9	10	11	12	13		
Falco berigora	Brown Falcon		rn	gh			X																	X						2002	1,11
Falco cenchroides	Nankeen Kestrel	L	in	gc	X		X									X	X			X		X		X					X	2008	1,3,16,18
Falco longipennis	Australian Hobby		rn	eg													X													1996	7,22
Falco peregrinus	Peregrine Falcon		yb	v	X		X		X			X		X			X			X					X					X	2008	2,7,9,11
Falco subniger	Black Falcon		rn	g							X																				2006	12
Family Rallidae																																
Gallinula tenebrosa	Dusky Moorhen		rn	w			X																	X						2001	22
Gallirallus philippensis	Buff-banded Rail		rn	wgh										X																2000	7
Porzana tabuensis	Spotless Crake	R	rn	w									X																	1991	11,22
Family Burhinidae																																
Burhinus grallarius	Bush Stone-curlew	NE	(yb)	e									X																		1870s	20
Family Charadriidae																																
Vanellus miles	Masked Lapwing		yb	gwu	X	X	X	X					X	X		X	X	X	X	X		X	X		X	X	X	X	X	X	2010	2,3,4,23
Vanellus tricolor	Banded Lapwing	R	rn	g		X																				X					2009	1
Family Scolopacidae																																
Actitis hypoleucos	Common Sandpiper	M	sn	w													X	X													2006	1,22
Family Turnicidae																																
Turnix varius	Painted Button-quail		rn	eh		X																									1996	11
Family Stercorariidae																																
Stercorarius pomarinus	Pomarine Jaeger	M	rn	m					X																						pre1987	22
Family Laridae																																
Anous stolidus	Common Noddy	M	rn	m												X															1974	11,14
Chroicocephalus novaehollandiae	Silver Gull		yn	wcu	X	X	X		X	X	X		X	X		X	X	X	X	X		X	X	X	X	X	X	X	X	X	2010	1,2,3,23
Leucophaeus pipixcan	Franklin's Gull		rn	wc			X									X						X			X						1981	9,15
Sterna hirundo	Common Tern	M	sn	wc			X		X		X														X						2002	7,9,11,12
Sterna striata	White-fronted Tern		rn	wc							X																				1999	11
Thalasseus bergii	Crested Tern	L	in	wc			X		X							X	X	X	X	X		X			X						2010	1,7,19,23
Family Cacatuidae																																
Cacatua galerita	Sulphur-crested Cockatoo		yb	egu	X	X	X	X					X	X		X	X	X		X		X		X	X	X	X	X	X	X	2010	2,3,4,23
Cacatua sanguinea	Little Corella		yb	gu	X	X								X		X	X	X		X										X	2008	1,2,7
Calyptorhynchus funereus	Yellow-tailed Black-Cockatoo	L	wn	eh	X	X	X	X	X				X	X		X	X	X		X		X			X		X	X	X	X	2009	1,7,9,11
Calyptorhynchus lathami	Glossy Black-Cockatoo	N	rn	eh													X														2004	1
Eolophus roseicapillus	Galah		yb	gu	X	X	X	X						X		X	X	X	X			X			X	X		X	X	X	2010	2,4,7,23
Family Psittacidae																																
Alisterus scapularis	Australian King-Parrot		yb	eu	X	X	X						X	X		X	X	X		X		X		X	X		X	X	X	X	2010	1,2,3,23
Glossopsitta concinna	Musk Lorikeet	L	in	e	X			X			X					X	X	X												X	2007	7,8,9,11
Glossopsitta pusilla	Little Lorikeet	N	rn	e																											?	7
Lathamus discolor	Swift Parrot	AN	rn	e				X																							2002	12
Platycercus elegans	Crimson Rosella		yb	ehu	X	X	X	X					X	X		X	X	X		X		X		X	X	X	X	X	X	X	2009	2,3,4,9
Platycercus eximius	Eastern Rosella		yb	egu	X	X	X	X					X	X		X	X	X	X	X		X			X	X	X	X	X	X	2010	2,7,8,23
Psephotus haematonotus	Red-rumped Parrot	R	rn	eg													X	X													2002	1
Trichoglossus chlorolepidotus	Scaly-breasted Lorikeet		rn	eh	X											X	X														2002	1,11,22
Trichoglossus haematodus	Rainbow Lorikeet		yb	ehu	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	2010	2,3,4,23

Scientific name	Common name	Status	Occurrence	Habitat	Cammeray	Cremorne	Cremorne Point	Crows Nest	Kirribilli	Lavender Bay	McMahons Point	Milsons Point	Neutral Bay	North Sydney	St Leonards	Waverton	Wollstonecraft	Reserves												Last date	Records
																		1	2	3	4	5	6	7	8	9	10	11	12	13		
Family Cuculidae																															
Cacomantis flabelliformis	Fan-tailed Cuckoo	L	ib	e	X											X	X					X								X	2002	1,7,9,22
Centropus phasianinus	Pheasant Coucal		rn	ehw													X														1986	11
Chalcites lucidus	Shining Bronze-Cuckoo		rn	e			X										X	X							X						2005	1,22
Eudynamys orientalis	Eastern Koel		sb	eu	X	X	X	X	X				X	X		X	X	X		X		X	X		X		X	X		X	2009	2,3,4,8
Scythrops novaehollandiae	Channel-billed Cuckoo		sb	eu	X	X	X	X		X			X	X		X	X	X	X	X		X	X	X	X		X	X	X	X	2009	2,3,8,9
Family Strigidae																															
Ninox connivens	Barking Owl	N	rn	e		X							X																		2006	1,22
Ninox novaeseelandiae	Southern Boobook	L	yb	e	X	X			X				X	X			X	X		X									X	X	2009	1,7,9,11
Ninox strenua	Powerful Owl	N	yb	e	X	X	X	X		X			X	X			X	X	X						X			X		X	2010	1,9,11,23
Family Tytonidae																															
Tyto javanica	Eastern Barn Owl		rn	g					X				X	X		X															2009	1,11,22
Family Alcedinidae																															
Ceyx azureus	Azure Kingfisher		rn	w													X	X													2002	1
Family Halcyonidae																															
Dacelo novaeguineae	Laughing Kookaburra		yb	eu	X	X	X		X		X		X			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	2010	2,3,4,23
Todiramphus sanctus	Sacred Kingfisher	L	sb	ew	X	X	X						X				X	X		X					X			X	X	X	2010	2,3,7,23
Family Coraciidae																															
Eurystomus orientalis	Dollarbird	L	sb	a	X									X		X	X	X				X								X	2007	1,2,3,9
Family Climacteridae																															
Cormobates leucophaea	White-throated Treecreeper		rn	e													X														1996	22
Family Ptilonorhynchidae																															
Ptilonorhynchus violaceus	Satin Bowerbird	L	in	e		X								X			X	X		X								X			2008	1,3,7,22
Family Maluridae																															
Malurus cyaneus	Superb Fairy-wren	L	yb	v	X	X	X						X			X	X	X	X	X		X	X	X	X	X	X	X	X	X	2010	2,3,4,23
Malurus lamberti	Variegated Fairy-wren	L	yb	eh	X	X	X										X			X					X			X		X	2008	1,2,22
Family Acanthizidae																															
Acanthiza lineata	Striated Thornbill	E	(yb)	e																											1936	10
Acanthiza nana	Yellow Thornbill		rn	eh													X	X		X											2005	1,22
Acanthiza pusilla	Brown Thornbill	L	yb	eh	X												X	X		X										X	2010	1,3,7,23
Gerygone albogularis	White-throated Gerygone	R	sn	e												X	X	X				X									1994	10,19
Gerygone mouki	Brown Gerygone	L	yb	re	X																									X	2008	2,3,9
Sericornis frontalis	White-browed Scrubwren	L	yb	eh	X	X	X			X			X			X	X	X	X	X	X	X	X	X	X	X		X	X	X	2010	2,3,7,23
Smicrornis brevirostris	Weebill	R	rn	e													X	X		X											2002	1,22
Family Pardalotidae																															
Pardalotus punctatus	Spotted Pardalote	L	yb	e	X	X										X	X	X	X	X		X						X		X	2010	2,3,4,23
Family Meliphagidae																															
Acanthorhynchus tenuirostris	Eastern Spinebill	L	yb	eh	X											X	X	X		X		X								X	2008	1,2,9,10
Anthochaera carunculata	Red Wattlebird		yb	ehu	X	X	X	X	X	X			X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	2010	2,3,4,23
Anthochaera chrysoptera	Little Wattlebird	L	in	eh	X	X										X	X	X		X		X						X		X	2009	1,3,7,18
Glyciphila melanops	Tawny-crowned Honeyeater		rn	h									X																		1995	11
Lichenostomus chrysops	Yellow-faced Honeyeater	L	wn	eh	X	X										X	X	X	X	X		X						X	X	X	2007	1,3,7,22
Lichenostomus melanops	Yellow-tufted Honeyeater		rn	eh	X																									X	2002	1

Scientific name	Common name	Status	Occurrence	Habitat	Reserves																								Last date	Records
					Cammeray	Cremorne	Cremorne Point	Crows Nest	Kirribilli	Lavender Bay	McMahons Point	Milsons Point	Neutral Bay	North Sydney	St Leonards	Waverton	Wollstonecraft	1	2	3	4	5	6	7	8	9	10	11	12	13		
Lichenostomus penicillatus	White-plumed Honeyeater		rb	eu					X					X		X	X					X								2001	1,7,14,22
Manorina melanocephala	Noisy Miner		yb	eu	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	2010	2,3,4,23
Melithreptus lunatus	White-naped Honeyeater		rn	e												X						X								1994	19
Philemon corniculatus	Noisy Friarbird		rn	eh																										?	7
Phylidonyris niger	White-cheeked Honeyeater		rn	eh																										2002	1
Phylidonyris novaehollandiae	New Holland Honeyeater		rn	eh			X									X	X	X				X			X					2002	1,19
Family Psophodidae																															
Psophodes olivaceus	Eastern Whipbird	L	yb	eh	X	X	X				X					X	X	X		X		X			X			X	X	X	2010	2,3,4,23
Family Campephagidae																															
Coracina novaehollandiae	Black-faced Cuckoo-shrike		yb	egu	X	X	X	X					X			X	X	X	X	X	X	X	X	X	X	X	X	X	X	2010	2,4,7,23
Coracina papuensis	White-bellied Cuckoo-shrike	R	rn	e										X																1995	11
Family Pachycephalidae																															
Pachycephala pectoralis	Golden Whistler	L	wn	re	X												X	X		X									X	2003	1,3,7,9
Pachycephala rufiventris	Rufous Whistler		rn	e	X												X	X											X	2008	9,10,16
Family Oriolidae																															
Oriolus sagittatus	Olive-backed Oriole		rn	e													X	X												2002	1,7
Sphecotheres vieilloti	Australasian Figbird		yb	ru	X		X	X						X		X	X			X		X							X	2009	4,7,8,9
Family Artamidae																															
Cracticus tibicen	Australian Magpie		yb	gu	X	X	X	X	X		X	X	X			X	X	X	X	X		X	X	X	X	X	X	X	X	2010	2,3,4,23
Cracticus torquatus	Grey Butcherbird		yb	eu	X	X	X	X		X			X	X		X	X	X	X	X		X	X	X	X	X	X	X	X	2010	2,3,4,23
Strepera graculina	Pied Currawong		yb	eu	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	2010	2,3,4,23
Family Dicruridae																															
Dicrurus bracteatus	Spangled Drongo	L	wn	re									X	X		X	X	X	X	X		X								2009	1,11,13,22
Family Rhipiduridae																															
Rhipidura albiscapa	Grey Fantail	L	in	e	X											X	X	X				X							X	2003	1,7,9,10
Rhipidura leucophrys	Willie Wagtail		yb	gu	X	X					X					X	X	X	X	X		X	X			X		X	X	X	2010	2,3,4,23
Rhipidura rufifrons	Rufous Fantail	M	sn	re										X		X	X	X		X		X								2009	1,2,7,11
Family Corvidae																															
Corvus coronoides	Australian Raven		yb	v	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	2010	2,3,4,23
Family Monarchidae																															
Grallina cyanoleuca	Magpie-lark		yb	gwu	X	X	X			X			X	X		X	X	X	X	X		X		X	X	X	X	X	X	2010	2,4,9,23
Monarcha melanopsis	Black-faced Monarch	M	sn	re			X						X				X	X							X					2006	1,7,13,22
Myiagra rubecula	Leaden Flycatcher	E	(sb)	e												X						X								1970	2
Symposiarchus trivirgatus	Spectacled Monarch	M	rn	re												X						X								1970	11,14
Family Petroicidae																															
Eopsaltria australis	Eastern Yellow Robin	L	yb	e	X	X										X	X	X				X					X	X	X	2010	2,4,5,23
Petroica rosea	Rose Robin	L	wn	re												X	X	X				X								2003	1,7,11
Family Megaluridae																															
Cincloramphus cruralis	Brown Songlark	R	rn	g	X																									1980	11
Family Timaliidae																															
Zosterops lateralis	Silvereye		yb	ehu	X	X	X						X			X	X	X		X		X		X	X	X	X	X	X	2010	2,3,4,23
Family Hirundinidae																															
Hirundo neoxena	Welcome Swallow		yb	au	X	X	X	X	X				X	X		X	X	X	X	X		X	X	X	X	X	X	X	X	2010	2,3,4,23

Scientific name	Common name	Status	Occurrence	Habitat	Cammeray	Cremorne	Cremorne Point	Crows Nest	Kirribilli	Lavender Bay	McMahons Point	Milsons Point	Neutral Bay	North Sydney	St Leonards	Waverton	Wollstonecraft	Reserves 1	2	3	4	5	6	7	8	9	10	11	12	13	Last date	Records
Petrochelidon ariel	Fairy Martin	R	rn	a												X	X	X				X	X							2007	1,3
Petrochelidon nigricans	Tree Martin	L	sn	a												X	X	X		X		X	X							2009	1,7,22
Family Nectariniidae																															
Dicaeum hirundinaceum	Mistletoebird		rn	e													X			X										2002-3	3,7,22
Family Estrildidae																															
Neochmia temporalis	Red-browed Finch	L	yb	ehg	X																								X	2008	1,2,9
Stagonopleura guttata	Diamond Firetail	NE	(yb)	e									X																	1870s	20
MAMMALS																															
Family Tachyglossidae																															
Tachyglossus aculeatus	Short-beaked Echidna	L	yb	eh	X											X						X								2003	17,21
Family Dasyuridae																															
Antechinus stuartii	Brown Antechinus	L	yb	eh												X	X	X				X								2006	1,4,22
Dasyurus viverrinus	Eastern Quoll	NE	(yb)	eh			X							X																1950s	17,21
Family Perameliidae																															
Perameles nasuta	Long-nosed Bandicoot	R	yb	ehu										X																?	21
Family Phalangeridae																															
Trichosurus vulpecula	Common Brushtail Possum		yb	eu	X	X	X						X	X		X	X	X	X	X		X		X	X	X	X	X		X	2010	1,4,5,23
Family Petauridae																															
Petaurus breviceps	Sugar Glider	L	yb	e	X								X																	X	2005	5,17
Family Pseudocheiridae																															
Pseudocheirus peregrinus	Common Ringtail Possum		yb	ehu	X	X	X	X					X	X		X	X	X	X	X		X	X	X	X	X	X	X	X	X	2010	1,4,5,23
Family Pteropodidae																															
Pteropus poliocephalus	Grey-headed Flying-fox	AN	yn	eu	X	X	X					X	X	X		X	X	X	X	X		X		X	X	X	X	X	X	X	2010	1,4,21,23
Family Vespertilionidae																															
Chalinolobus gouldii	Gould's Wattled Bat		yb	eu	X	X											X	X								X	X		X	2005	4,5
Chalinolobus morio	Chocolate Wattled Bat	L	yb	e	X																								X	2005	5
Miniopterus schreibersii	Eastern Bent-wing Bat	N	yn	a	X	X	X						X	X		X	X			X		X	X		X	X	X	X		X	2008	1,4,6,23
Nyctophilus gouldi	Greater Long-eared Bat	L	yb	e										X																?	21
Family Muridae																															
Hydromys chrysogaster	Water Rat	L	yb	w										X																?	21
Family Otariidae																															
Arctocephalus forsteri	New Zealand Fur Seal	N	rn	m					X																					1990	22
Family Phocidae																															
Hydrurga leptonyx	Leopard Seal		rn	m			X		X																					1987	17,22
Mirounga leonina	Southern Elephant Seal	A	rn	m			X																							1993	22
Family Delphinidae																															
Delphinus delphis	Common Dolphin		rn	m									X																	pre1995	21,22
Family Balaenidae																															
Eubalaena australis	Southern Right Whale	ANM	rn	m								X																		2002	22

Appendix 3. Sample plot details

Plot B1

Centrepoint (WGS 84): 56 332691E 6254340S
Dimensions: 20 m by 20 m, 0.04 ha
Location: Badangi Reserve, Wollstonecraft
Survey date: 19 March 2010
Surveyors: Peter Smith and Judy Smith
Topography: Ridgetop
Vegetation community: Forest Red Gum Foreshore Forest
Vegetation structure: Open-forest
Number of indigenous plant species: 28
Number of introduced plant species: 9
Indigenous foliage cover class: >80%
Introduced foliage cover class: <1%
Notes: Some sandstone outcrops. Minor walking track through plot. Old building foundations nearby - a photo from c.1928 shows this ridgetop as an industrial area with buildings, etc.

Vegetation layer	Height (m)	Foliage cover (%)	Main species
Trees	8-23	40	*Eucalyptus tereticornis* (mainly), *Angophora costata*
Shrubs	1-7	50	*Notelaea longifolia*, *Pittosporum undulatum*
Ground covers	0.1-0.8	50	*Lomandra longifolia*, *Poa affinis*
Vines			*Eustrephus latifolius*

Plot B2

Centrepoint (WGS 84): 56 332718E 6254441S
Dimensions: 20 m by 20 m, 0.04 ha
Location: Badangi Reserve, Wollstonecraft
Survey date: 19 March 2010
Surveyors: Peter Smith and Judy Smith
Topography: Gentle slope
Vegetation community: Angophora Foreshore Forest
Vegetation structure: Open-forest
Number of indigenous plant species: 35
Number of introduced plant species: 2
Indigenous foliage cover class: >80%
Introduced foliage cover class: <1%
Notes: Some sandstone outcrops. Minor walking track through plot.

Vegetation layer	Height (m)	Foliage cover (%)	Main species
Trees	18-22	60	*Angophora costata* (mainly), *Eucalyptus piperita*, *E. resinifera*
Shrubs	1-9	30	*Elaeocarpus reticulatus*, *Glochidion ferdinandi ferdinandi*, *Notelaea longifolia*, *Pittosporum undulatum*
Ground covers	0.1-1	70	*Calochlaena dubia*, *Lepidosperma laterale*, *Lomandra longifolia*, *Poa affinis*, *Pteridium esculentum*
Vines			*Eustrephus latifolius*, *Pandorea pandorana*, *Smilax glyciphylla*

Plot B3

Centrepoint (WGS 84): 56 332569E 6254406S
Dimensions: 20 m by 20 m, 0.04 ha
Location: Badangi Reserve, Wollstonecraft
Survey date: 19 March 2010
Surveyors: Peter Smith and Judy Smith
Topography: Moderate slope
Vegetation community: Disclimax Sandstone Scrub
Vegetation structure: Closed-scrub
Number of indigenous plant species: 35
Number of introduced plant species: 15
Indigenous foliage cover class: >80%
Introduced foliage cover class: 11-30%
Notes: Many sandstone outcrops. Drainage line through plot - subject to a reconstruction program in 2001, with sandstone boulders placed along the edges. Site was apparently originally dominated by weeds and has been rehabilitated since 2001. Several native species have been planted that are not endemic to the site. The site may originally have been Angophora Foreshore Forest.

Vegetation layer	Height (m)	Foliage cover (%)	Main species
Trees	14	10	*Banksia integrifolia*
Tall shrubs	6-10	80	*Pittosporum undulatum* (mainly), *Glochidion ferdinandi ferdinandi*
Low shrubs	1-5	20	**Cyathea cooperi*, *Notelaea longifolia*, *Pittosporum undulatum*
Ground covers	0.1-1	70	*Calochlaena dubia*, **Ehrharta erecta*, *Poa affinis*
Vines			*Pandorea pandorana*, *Stephania japonica*

Plot B4

Centrepoint (WGS 84): 56 332811E 6254689S
Dimensions: 20 m by 20 m, 0.04 ha
Location: Badangi Reserve, Wollstonecraft
Survey date: 24 March 2010
Surveyors: Peter Smith and Judy Smith
Topography: Minor, non-flowing creek and adjacent steep slope
Vegetation community: Sandstone Gallery Rainforest
Vegetation structure: Closed-forest
Number of indigenous plant species: 33
Number of introduced plant species: 16
Indigenous foliage cover class: >80%
Introduced foliage cover class: 1-10%
Notes: Sandstone outcrops. Minor walking track through plot. Tall, built-up rock embankment just above plot.

Vegetation layer	Height (m)	Foliage cover (%)	Main species
Tall trees	14	20	*Eucalyptus resinifera*
Low trees	6-11	80	*Acmena smithii*, *Pittosporum undulatum*
Shrubs	1-5	10	**Ligustrum sinense*, *Notelaea longifolia*, *Pittosporum undulatum*
Ground covers	0.2-1	80	*Calochlaena dubia*
Vines			*Eustrephus latifolius*, *Morinda jasminoides*,

Vegetation layer	Height (m)	Foliage cover (%)	Main species
			Smilax glyciphylla

Plot B5

Centrepoint (WGS 84): 56 332745E 6254610S
Dimensions: 20 m by 20 m, 0.04 ha
Location: Badangi Reserve, Wollstonecraft
Survey date: 20 April 2010
Surveyors: Peter Smith and Judy Smith
Topography: Steep slope
Vegetation community: Blackbutt Gully Forest
Vegetation structure: Open-forest
Number of indigenous plant species: 46
Number of introduced plant species: 4
Indigenous foliage cover class: >80%
Introduced foliage cover class: <1%
Notes: Sandstone outcrops.

Vegetation layer	Height (m)	Foliage cover (%)	Main species
Trees	16-21	60	*Angophora costata*, *Eucalyptus pilularis*
Shrubs	1-4	50	*Acacia longifolia*, *Dodonaea triquetra*, *Notelaea longifolia*
Ground covers	0.1-0.8	20	*Calochlaena dubia*, *Dianella caerulea*, *Entolasia stricta*, *Lomandra longifolia*, *Poa affinis*
Vines			*Pandorea pandorana*

Plot B6

Centrepoint (WGS 84): 56 332849E 6254681S
Dimensions: 20 m by 20 m, 0.04 ha
Location: Badangi Reserve, Wollstonecraft
Survey date: 20 April 2010
Surveyors: Peter Smith and Judy Smith
Topography: Gently sloping ridgetop, becoming steep upper slope towards the edge of the plot on one side
Vegetation community: Disclimax Sandstone Scrub
Vegetation structure: Open-scrub
Number of indigenous plant species: 51
Number of introduced plant species: 14
Indigenous foliage cover class: >80%
Introduced foliage cover class: 1-10%
Notes: Sandstone outcrops. Minor walking track through plot. Sewerline in plot. Appears to have originally been Angophora Foreshore Forest that has been cleared and is now regenerating. Several native species have been planted that are not endemic to the site.

Vegetation layer	Height (m)	Foliage cover (%)	Main species
Tall shrubs	2-7	70	*Angophora costata* (saplings), *Ficus rubiginosa*, *Kunzea ambigua*, *Leionema dentatum*, **Melaleuca armillaris*, *Notelaea longifolia*, *Pittosporum undulatum*
Low shrubs	1-2	30	*Notelaea longifolia*, *Pittosporum undulatum*
Ground covers	0.1-1	70	*Lomandra longifolia*, *Microlaena stipoides*,

Vegetation layer	Height (m)	Foliage cover (%)	Main species
			Poa affinis

Plot C1

Centrepoint (WGS 84): 56 336464E 6253282S
Dimensions: 40 m by 10 m, 0.04 ha
Location: Cremorne Reserve, Cremorne Point
Survey date: 28 April 2010
Surveyors: Peter Smith and Judy Smith
Topography: Ridgetop and steep upper slope
Vegetation community: Disclimax Sandstone Scrub
Vegetation structure: Open-scrub
Number of indigenous plant species: 33
Number of introduced plant species: 16
Indigenous foliage cover class: >80%
Introduced foliage cover class: 1-10%
Notes: Sandstone outcrops. Dead trees in plot, which was probably originally Angophora Foreshore Forest.

Vegetation layer	Height (m)	Foliage cover (%)	Main species
Tall shrubs	6-10	50	*Banksia integrifolia*, *Elaeocarpus reticulatus*, *Ficus rubiginosa*, *Glochidion ferdinandi ferdinandi*
Low shrubs	1-4	40	*Banksia integrifolia*, *Crowea saligna*, *Glochidion ferdinandi ferdinandi*, *Monotoca elliptica*, *Pittosporum revolutum*
Ground covers	0.1-1	80	*Commelina cyanea*, *Lomandra longifolia*, *Microlaena stipoides*, *Pteridium esculentum*

Plot F1

Centrepoint (WGS 84): 56 334927E 6254993S
Dimensions: 20 m by 20 m, 0.04 ha
Location: Forsyth Park, Neutral Bay
Survey date: 28 April 2010
Surveyors: Peter Smith and Judy Smith
Topography: Steep slope
Vegetation community: Disclimax Sandstone Scrub
Vegetation structure: Closed-forest
Number of indigenous plant species: 30
Number of introduced plant species: 14
Indigenous foliage cover class: >80%
Introduced foliage cover class: 11-30%
Notes: Sandstone outcrops. Suspect the site was originally Angophora Foreshore Forest.

Vegetation layer	Height (m)	Foliage cover (%)	Main species
Trees	8-14	80	*Glochidion ferdinandi ferdinandi* (mainly), *Angophora costata*, *Ficus rubiginosa*
Shrubs	1-6	50	*Callicoma serratifolia*, *Elaeocarpus reticulatus*, *Glochidion ferdinandi ferdinandi*, **Lantana camara*
Ground covers	0.1-1	60	*Calochlaena dubia*, *Entolasia stricta*, *Oplismenus aemulus*, **Tradescantia*

Vegetation layer	Height (m)	Foliage cover (%)	Main species
			fluminensis
Vines			**Ipomoea indica*, *Smilax glyciphylla*

Plot F2

Centrepoint (WGS 84): 56 334897E 6255042S
Dimensions: 20 m by 20 m, 0.04 ha
Location: Forsyth Park, Neutral Bay
Survey date: 28 April 2010
Surveyors: Peter Smith and Judy Smith
Topography: Steep slope
Vegetation community: Angophora Foreshore Forest
Vegetation structure: Open-forest
Number of indigenous plant species: 33
Number of introduced plant species: 10
Indigenous foliage cover class: >80%
Introduced foliage cover class: 1-10%
Notes: Sandstone outcrops.

Vegetation layer	Height (m)	Foliage cover (%)	Main species
Trees	12-22	40	*Angophora costata*, *Ficus rubiginosa*
Shrubs	1-8	10	*Angophora costata*, *Elaeocarpus reticulatus*, *Leionema dentatum*, *Ozothamnus diosmifolius*, *Polyscias sambucifolia*
Ground covers	0.1-1	80	*Dianella caerulea*, *Hypolepis muelleri*, *Lomandra longifolia*, *Microlaena stipoides*, *Pteridium esculentum*, **Tradescantia fluminensis*

Plot G1

Centrepoint (WGS 84): 56 332419E 6254814S
Dimensions: 0.016 ha, 17 m by 9.5 m at widest point - entire extent of this vegetation community
Location: Gore Cove Reserve, Wollstonecraft
Survey date: 5 April 2010
Surveyors: Peter Smith and Judy Smith
Topography: Estuarine mudflat
Vegetation community: Estuarine Saltmarsh
Vegetation structure: Herbland
Number of indigenous plant species: 5
Number of introduced plant species: 1
Indigenous foliage cover class: 10-40%
Introduced foliage cover class: 1-10%
Notes: Intertidal zone. Rock wall adjacent to plot. Many sandstone rocks and other material scattered over mudflat.

Vegetation layer	Height (m)	Foliage cover (%)	Main species
Shrubs	1-4	<5	*Avicennia marina*
Ground covers	0.1-0.3	40	**Atriplex prostrata*, *Sarcocornia quinqueflora*, *Suaeda australis*

Plot G2

Centrepoint (WGS 84): 56 332410E 6254798S
Dimensions: 20 m by 20 m, 0.04 ha
Location: Gore Cove Reserve, Wollstonecraft
Survey date: 5 April 2010
Surveyors: Peter Smith and Judy Smith
Topography: Estuarine mudflat
Vegetation community: Estuarine Mangrove Forest
Vegetation structure: Low closed-forest
Number of indigenous plant species: 1
Number of introduced plant species: 0
Indigenous foliage cover class: >80%
Introduced foliage cover class: 0
Notes: Intertidal zone.

Vegetation layer	Height (m)	Foliage cover (%)	Main species
Trees	4-8	80	*Avicennia marina*
Shrubs	0.2-1.5	5	*Avicennia marina*

Plot G3

Centrepoint (WGS 84): 56 332415E 6254701S
Dimensions: 40 m by 10 m, 0.04 ha
Location: Gore Cove Reserve, Wollstonecraft
Survey date: 5 April 2010
Surveyors: Peter Smith and Judy Smith
Topography: Steep lower slope and adjacent edge of intertidal zone
Vegetation community: Estuarine Swamp Oak Forest
Vegetation structure: Open-forest
Number of indigenous plant species: 31
Number of introduced plant species: 14
Indigenous foliage cover class: >80%
Introduced foliage cover class: 1-10%
Notes: Intertidal section of plot consists of both mudflats and sandstone outcrops.

Vegetation layer	Height (m)	Foliage cover (%)	Main species
Trees	9-14	50	*Casuarina glauca*, *Glochidion ferdinandi ferdinandi*
Shrubs	1-5	30	*Avicennia marina*, *Casuarina glauca*, *Glochidion ferdinandi ferdinandi*, **Ochna serrulata*
Ground covers	0.05-0.8	30	**Asparagus aethiopicus*, *Microlaena stipoides*, *Sarcocornia quinqueflora*

Plot G4

Centrepoint (WGS 84): 56 332381E 6254620S
Dimensions: 20 m by 20 m, 0.04 ha
Location: Gore Cove Reserve, Wollstonecraft
Survey date: 5 April 2010
Surveyors: Peter Smith and Judy Smith
Topography: Moderate to steep slope

Vegetation community: Angophora Foreshore Forest
Vegetation structure: Open-forest
Number of indigenous plant species: 45
Number of introduced plant species: 9
Indigenous foliage cover class: >80%
Introduced foliage cover class: 1-10%
Notes: Large, extensive sandstone outcrops. Minor walking track through corner of plot.

Vegetation layer	Height (m)	Foliage cover (%)	Main species
Trees	10-21	60	*Angophora costata*, *Eucalyptus resinifera*
Shrubs	1-8	40	**Acacia prominens*, *A. terminalis terminalis*, *Dodonaea triquetra*, *Elaeocarpus reticulatus*, *Glochidion ferdinandi ferdinandi*, *Notelaea longifolia*
Ground covers	0.1-0.5	20	*Dianella caerulea*, *Entolasia stricta*, *Lomandra longifolia*, *Microlaena stipoides*, *Pteridium esculentum*

Plot G5

Centrepoint (WGS 84): 56 332449E 6254947S
Dimensions: 40 m by 10 m, 0.04 ha
Location: Gore Cove Reserve, Wollstonecraft
Survey date: 5 April 2010
Surveyors: Peter Smith and Judy Smith
Topography: Steep lower slope adjoining rocky, flowing creek
Vegetation community: Sandstone Gallery Rainforest
Vegetation structure: Closed-forest
Number of indigenous plant species: 26
Number of introduced plant species: 23
Indigenous foliage cover class: >80%
Introduced foliage cover class: 11-30%
Notes: Very extensive sandstone outcrops, including a cliffline along the top edge of the plot. Minor walking track through plot. Concreted area (stormwater outlet?) in plot.

Vegetation layer	Height (m)	Foliage cover (%)	Main species
Trees	7-17	90	*Acmena smithii*, *Ceratopetalum apetalum*, *Pittosporum undulatum*
Shrubs	0.5-6	20	*Ceratopetalum apetalum*, **Cyathea cooperi*, *Notelaea longifolia*
Ground covers	0.1-0.5	10	**Tradescantia fluminensis* (mainly), **Ehrharta erecta*, *Oplismenus imbecillis*

Plot G6

Centrepoint (WGS 84): 56 332458E 6254811S
Dimensions: 40 m by 10 m, 0.04 ha
Location: Gore Cove Reserve, Wollstonecraft
Survey date: 26 April 2010
Surveyors: Peter Smith and Judy Smith
Topography: Steep slope
Vegetation community: Disclimax Sandstone Scrub
Vegetation structure: Open-forest
Number of indigenous plant species: 44

Number of introduced plant species: 12
Indigenous foliage cover class: >80%
Introduced foliage cover class: <1%
Notes: Sandstone outcrops. Minor walking track through plot. A number of dead trees in the plot, indicating that the site was originally Angophora Foreshore Forest.

Vegetation layer	Height (m)	Foliage cover (%)	Main species
Tall trees	27	5	*Eucalyptus piperita*
Low trees	4-13	70	*Allocasuarina littoralis*, *Banksia serrata*, *Elaeocarpus reticulatus*, *Glochidion ferdinandi ferdinandi*, *Pittosporum undulatum*
Shrubs	1-3	60	*Elaeocarpus reticulatus*, *Glochidion ferdinandi ferdinandi*, *Notelaea longifolia*, *Pittosporum undulatum*, *Xanthorrhoea arborea*, *Zieria smithii*
Ground covers	0.1-1	60	*Calochlaena dubia*, *Lomandra longifolia*, *Microlaena stipoides*, *Pteridium esculentum*
Vines			*Hibbertia dentata*, *Smilax glyciphylla*

Plot H1

Centrepoint (WGS 84): 56 332965E 6253411S
Dimensions: 20 m by 20 m, 0.04 ha
Location: Balls Head Reserve, Waverton
Survey date: 12 April 2010
Surveyors: Peter Smith and Judy Smith
Topography: Moderate upper slope
Vegetation community: Angophora Foreshore Forest
Vegetation structure: Open-forest
Number of indigenous plant species: 47
Number of introduced plant species: 7
Indigenous foliage cover class: >80%
Introduced foliage cover class: 1-10%
Notes: Sandstone outcrops. Minor walking track through plot.

Vegetation layer	Height (m)	Foliage cover (%)	Main species
Tall trees	14-21	50	*Angophora costata*
Low trees	3-10	20	*Elaeocarpus reticulatus*, *Hakea dactyloides*
Shrubs	1-2	40	*Dodonaea triquetra*, *Notelaea longifolia*, *Pittosporum revolutum*, *Platylobium formosum*, *Zieria smithii*
Ground covers	0.1-1	40	*Dianella caerulea*, *Entolasia stricta*, *Lepidosperma laterale*, *Lomandra longifolia*, *Microlaena stipoides*, *Pteridium esculentum*

Plot H2

Centrepoint (WGS 84): 56 333122E 6253313S
Dimensions: 40 m by 10 m, 0.04 ha
Location: Balls Head Reserve, Waverton
Survey date: 12 April 2010
Surveyors: Peter Smith and Judy Smith
Topography: Steep lower slope
Vegetation community: Sandstone Foreshore Scrub

Vegetation structure: Closed-scrub
Number of indigenous plant species: 42
Number of introduced plant species: 5
Indigenous foliage cover class: >80%
Introduced foliage cover class: <1%
Notes: Sandstone outcrops and cliffs. Minor walking track through plot.

Vegetation layer	Height (m)	Foliage cover (%)	Main species
Trees	7-15	10	*Elaeocarpus reticulatus* (mainly), *Banksia integrifolia*, *Ficus rubiginosa*, *Glochidion ferdinandi ferdinandi*, *Pittosporum undulatum*
Shrubs	1.5-6	80	*Elaeocarpus reticulatus*, *Glochidion ferdinandi ferdinandi*, *Notelaea longifolia*
Ground covers	0.1-1	60	*Asplenium flabellifolium*, *Calochlaena dubia*, *Entolasia stricta*, *Gleichenia rupestris*, *Hydrocotyle peduncularis*, *Microlaena stipoides*, *Poa affinis*
Vines			*Pandorea pandorana*

Plot H3

Centrepoint (WGS 84): 56 332883E 6253299S
Dimensions: 20 m by 20 m, 0.04 ha
Location: Balls Head Reserve, Waverton
Survey date: 12 April 2010
Surveyors: Peter Smith and Judy Smith
Topography: Flat ridgetop
Vegetation community: Kunzea Scrub
Vegetation structure: Open-scrub
Number of indigenous plant species: 25
Number of introduced plant species: 7
Indigenous foliage cover class: 41-80%
Introduced foliage cover class: 1-10%
Notes: Very extensive, flat sandstone outcrops.

Vegetation layer	Height (m)	Foliage cover (%)	Main species
Tall shrubs	3-6	20	*Kunzea ambigua* (mainly), *Casuarina glauca*
Low shrubs	1-2	20	*Kunzea ambigua* (mainly), *Acacia longifolia*, *Grevillea linearifolia*
Ground covers	0.05-0.7	30	*Dianella revoluta*, **Digitaria didactyla*, *Eragrostis brownii*, *Lomandra longifolia*

Plot I1

Centrepoint (WGS 84): 56 332394E 6254041S
Dimensions: 40 m by 10 m, 0.04 ha
Location: Berry Island Reserve, Wollstonecraft
Survey date: 24 March 2010
Surveyors: Peter Smith and Judy Smith
Topography: Steep slope just above intertidal zone
Vegetation community: Sandstone Foreshore Scrub
Vegetation structure: Open-scrub
Number of indigenous plant species: 31
Number of introduced plant species: 4

Indigenous foliage cover class: >80%
Introduced foliage cover class: <1%
Notes: Many sandstone outcrops. Sandstone cliff just behind plot, which has drillholes, indicating that the site has been a quarry in the past.

Vegetation layer	Height (m)	Foliage cover (%)	Main species
Tall shrubs	4-7	60	*Pittosporum undulatum* (mainly), *Banksia integrifolia*, *Elaeocarpus reticulatus*, *Monotoca elliptica*
Low shrubs	0.8-3	40	*Elaeocarpus reticulatus*, *Monotoca elliptica*, *Notelaea longifolia, Pittosporum undulatum*
Ground covers	0.1-0.6	80	*Entolasia stricta*, *Lomandra longifolia*, *Poa affinis*

Plot I2

Centrepoint (WGS 84): 56 332372E 6254199S
Dimensions: 20 m by 20 m, 0.04 ha
Location: Berry Island Reserve, Wollstonecraft
Survey date: 24 March 2010
Surveyors: Peter Smith and Judy Smith
Topography: Moderate slope
Vegetation community: Angophora Foreshore Forest
Vegetation structure: Open-forest
Number of indigenous plant species: 44
Number of introduced plant species: 1
Indigenous foliage cover class: >80%
Introduced foliage cover class: <1%
Notes: Sandstone outcrops forming a low escarpment through plot.

Vegetation layer	Height (m)	Foliage cover (%)	Main species
Trees	8-16	50	*Angophora costata*, *Eucalyptus resinifera*
Shrubs	0.7-3	60	*Dodonaea triquetra*, *Grevillea linearifolia*, *Notelaea longifolia, Pittosporum revolutum*, *Platysace lanceolata*
Ground covers	0.1-0.7	30	*Entolasia stricta*, *Lomandra longifolia*

Plot I3

Centrepoint (WGS 84): 56 332391E 6254132S
Dimensions: 20 m by 20 m, 0.04 ha
Location: Berry Island Reserve, Wollstonecraft
Survey date: 24 March 2010
Surveyors: Peter Smith and Judy Smith
Topography: Flat hilltop
Vegetation community: Kunzea Scrub
Vegetation structure: Open-scrub
Number of indigenous plant species: 40
Number of introduced plant species: 7
Indigenous foliage cover class: >80%
Introduced foliage cover class: 1-10%
Notes: Flat sandstone outcrops around edges of plot.

Vegetation layer	Height (m)	Foliage cover (%)	Main species
Trees	8-9	5	*Angophora costata*, *Eucalyptus punctata*
Tall shrubs	1.5-5	70	*Kunzea ambigua* (mainly), *Acacia longifolia*
Low shrubs	0.5-1.5	10	*Grevillea linearifolia*, *Notelaea longifolia*
Ground covers	0.1-0.5	60	**Digitaria didactyla*, *Entolasia stricta*, *Eragrostis brownii*, *Microlaena stipoides*
Vines			*Pandorea pandorana*

Plot L1

Centrepoint (WGS 84): 56 335808E 6256545S
Dimensions: 40 m by 10 m, 0.04 ha
Location: Folly Point Reserve, Cremorne
Survey date: 13 April 2010
Surveyors: Peter Smith and Judy Smith
Topography: Steep lower slope adjacent to water's edge
Vegetation community: Estuarine Swamp Oak Forest
Vegetation structure: Open-forest
Number of indigenous plant species: 12
Number of introduced plant species: 16
Indigenous foliage cover class: 41-80%
Introduced foliage cover class: 11-30%
Notes: Sandstone outcrops. Many dinghies pulled up in plot for storage. Steps and minor walking tracks in plot. Ground layer mown.

Vegetation layer	Height (m)	Foliage cover (%)	Main species
Tall trees	16	5	*Angophora costata*, *Eucalyptus pilularis*
Low trees	3-12	50	*Casuarina glauca*
Ground covers	0.05-0.4	20 (reduced by dinghy storage)	**Asparagus aethiopicus*, **Cynodon dactylon*, **Ehrharta erecta*

Plot M1

Centrepoint (WGS 84): 56 335173E 6256528S
Dimensions: 20 m by 20 m, 0.04 ha
Location: Mortlock Reserve, Cammeray
Survey date: 22 April 2010
Surveyors: Peter Smith and Judy Smith
Topography: Steep slope
Vegetation community: Angophora Foreshore Forest
Vegetation structure: Woodland
Number of indigenous plant species: 42
Number of introduced plant species: 12
Indigenous foliage cover class: >80%
Introduced foliage cover class: 1-10%
Notes: Sandstone outcrops. Tree death in the top half of the plot is responsible for the sparse canopy cover (i.e. woodland density rather than open-forest).

Vegetation layer	Height (m)	Foliage cover (%)	Main species
Tall trees	17	20	*Angophora costata* (mainly), *Eucalyptus piperita*
Low trees	4-9	10	*Acacia longifolia*, *Angophora costata*, *Glochidion ferdinandi ferdinandi*, *Pittosporum undulatum*

Vegetation layer	Height (m)	Foliage cover (%)	Main species
Shrubs	1-3	30	*Acacia longifolia*, *A. linifolia*, *Dodonaea triquetra*, *Glochidion ferdinandi ferdinandi*
Ground covers	0.1-1	60	*Dianella caerulea*, *Imperata cylindrica*, *Lepidosperma laterale*, *Lomandra longifolia*, *Microlaena stipoides*, *Pteridium esculentum*

Plot O1

Centrepoint (WGS 84): 56 335824E 6256227S
Dimensions: 40 m by 10 m, 0.04 ha
Location: Wonga Road Reserve, Cremorne
Survey date: 13 April 2010
Surveyors: Peter Smith and Judy Smith
Topography: Steep lower slope
Vegetation community: Mixed Sandstone Gully Forest
Vegetation structure: Open-forest
Number of indigenous plant species: 54
Number of introduced plant species: 4
Indigenous foliage cover class: >80%
Introduced foliage cover class: <1%
Notes: Sandstone rocks and other material have been dumped in the plot. There are also natural sandstone outcrops. Sewerline upslope of plot. Area burnt 10 August 2009 (ecological burn).

Vegetation layer	Height (m)	Foliage cover (%)	Main species
Trees	10-20	40	*Angophora costata*, *Corymbia gummifera*, *Eucalyptus piperita*, *E. sieberi*
Tall shrubs	4-8	5 (much reduced by the fire)	*Allocasuarina littoralis* (now dead), *Ceratopetalum gummiferum*, *Elaeocarpus reticulatus*, *Hakea dactyloides* (now dead), *Persoonia levis*, young eucalypts
Low shrubs	1-2	10 (much reduced by the fire)	*Elaeocarpus reticulatus*, *Glochidion ferdinandi ferdinandi*, *Persoonia levis*, *Polyscias sambucifolia*
Ground covers	0.1-1	60	*Dianella caerulea*, *Entolasia stricta*, *Pteridium esculentum*
Vines			*Pandorea pandorana*

Plot P1

Centrepoint (WGS 84): 56 335700E 6256391S
Dimensions: 20 m by 20 m, 0.04 ha
Location: Primrose Park, Cremorne
Survey date: 13 April 2010
Surveyors: Peter Smith and Judy Smith
Topography: Steep lower slope
Vegetation community: Angophora Foreshore Forest
Vegetation structure: Tall open-forest
Number of indigenous plant species: 38
Number of introduced plant species: 9
Indigenous foliage cover class: >80%
Introduced foliage cover class: <1%
Notes: Sandstone outcrops.

Vegetation layer	Height (m)	Foliage cover (%)	Main species
Trees	10-33	60	*Angophora costata*, *Eucalyptus pilularis*
Shrubs	1-6	30	*Ceratopetalum gummiferum*, *Elaeocarpus reticulatus*, *Glochidion ferdinandi ferdinandi*, *Pittosporum undulatum*, *Polyscias sambucifolia*, young eucalypts
Ground covers	0.1-1	70	*Commelina cyanea*, *Hydrocotyle peduncularis*, *Lomandra longifolia*, *Microlaena stipoides*, *Oplismenus aemulus*
Vines			*Pandorea pandorana*, *Smilax glyciphylla*

Plot P2

Centrepoint (WGS 84): 56 335340E 6255881S
Dimensions: 20 m by 20 m, 0.04 ha
Location: Primrose Park, Cremorne
Survey date: 13 April 2010
Surveyors: Peter Smith and Judy Smith
Topography: Steep slope
Vegetation community: Blackbutt Gully Forest
Vegetation structure: Tall open-forest
Number of indigenous plant species: 32
Number of introduced plant species: 12
Indigenous foliage cover class: >80%
Introduced foliage cover class: 1-10%
Notes: Some small sandstone outcrops. Minor walking track zigzags through plot, with some rock work on the edges.

Vegetation layer	Height (m)	Foliage cover (%)	Main species
Tall trees	c.40	70	*Eucalyptus pilularis*
Low trees	4-12	40	*Elaeocarpus reticulatus*, *Pittosporum undulatum*, *Syncarpia glomulifera*
Shrubs	1-2	5	*Breynia oblongifolia*, *Elaeocarpus reticulatus*
Ground covers	0.1-1	60	*Calochlaena dubia*, *Entolasia stricta*, *Lomandra longifolia*, *Microlaena stipoides*, *Oplismenus aemulus*
Vines			*Clematis aristata*

Plot R1

Centrepoint (WGS 84): 56 335725E 6255974S
Dimensions: 40 m by 10 m, 0.04 ha
Location: Brightmore Reserve, Cremorne
Survey date: 13 April 2010
Surveyors: Peter Smith and Judy Smith
Topography: Rocky, flowing creekline and adjacent steep banks
Vegetation community: Sandstone Gallery Rainforest
Vegetation structure: Closed-forest
Number of indigenous plant species: 16
Number of introduced plant species: 18
Indigenous foliage cover class: 10-40%
Introduced foliage cover class: 51-70%

Notes: Creek full of sandstone boulders, also blocks of concrete and other material, a lot of rubbish. The banks of the creek are mainly fill. Concrete wall across creek at downstream end of plot. A large *Eucalyptus pilularis* tree has fallen across the creek.

Vegetation layer	Height (m)	Foliage cover (%)	Main species
Tall trees	35	<5	*Eucalyptus pilularis*
Low trees	10-22	70 (denser before tree fell across plot)	*Ceratopetalum apetalum*, **Ligustrum lucidum*, some *Glochidion ferdinandi ferdinandi*
Shrubs	2-4	<5	**Ligustrum lucidum*
Ground covers	0.1-0.5	10	*Asplenium australasicum*, *Commelina cyanea*, **Tradescantia fluminensis*
Vines			**Cardiospermum grandiflorum*, **Ipomoea indica*

Plot R2

Centrepoint (WGS 84): 56 335831E 6255974S
Dimensions: 20 m by 20 m, 0.04 ha
Location: Brightmore Reserve, Cremorne
Survey date: 26 April 2010
Surveyors: Peter Smith and Judy Smith
Topography: Steep slope
Vegetation community: Angophora Foreshore Forest
Vegetation structure: Open-forest
Number of indigenous plant species: 41
Number of introduced plant species: 14
Indigenous foliage cover class: >80%
Introduced foliage cover class: 11-30%
Notes: Extensive sandstone outcrops.

Vegetation layer	Height (m)	Foliage cover (%)	Main species
Tall trees	16-29	70	*Angophora costata* (mainly), *Allocasuarina littoralis*
Low trees	8-12	10	**Cinnamomum camphora*, *Glochidion ferdinandi ferdinandi*
Shrubs	1-5	20	*Allocasuarina littoralis*, *Astrotricha floccosa*, *Elaeocarpus reticulatus*
Ground covers	0.1-1	70	*Entolasia stricta*, *Lomandra longifolia*, *Microlaena stipoides*, *Pteridium esculentum*, *Schoenus melonostachys*
Vines			*Smilax glyciphylla*

Plot R3

Centrepoint (WGS 84): 56 335798E 6255997S
Dimensions: 20 m by 20 m, 0.04 ha
Location: Brightmore Reserve, Cremorne
Survey date: 26 April 2010
Surveyors: Peter Smith and Judy Smith
Topography: Steep slope
Vegetation community: Blackbutt Gully Forest
Vegetation structure: Tall open-forest
Number of indigenous plant species: 32

Number of introduced plant species: 7
Indigenous foliage cover class: >80%
Introduced foliage cover class: 1-10%
Notes: Extensive sandstone outcrops.

Vegetation layer	Height (m)	Foliage cover (%)	Main species
Tall trees	18-38	60	*Eucalyptus pilularis*
Low trees	4-12	40	*Elaeocarpus reticulatus*, *Glochidion ferdinandi ferdinandi*, *Pittosporum undulatum*
Shrubs	1-3	10	**Cinnamomum camphora*, *Elaeocarpus reticulatus*, *Leionema dentatum*
Ground covers	0.1-1	20	*Calochlaena dubia*, *Dianella caerulea*, *Entolasia stricta*, *Lepidosperma laterale*, *Lomandra longifolia*, *Pteridium esculentum*
Vines			*Smilax glyciphylla*

Plot S1

Centrepoint (WGS 84): 56 332732E 6255251S
Dimensions: 20 m by 20 m, 0.04 ha
Location: Smoothey Park, Wollstonecraft
Survey date: 5 April 2010
Surveyors: Peter Smith and Judy Smith
Topography: Steep upper slope just below top of ridge
Vegetation community: Blackbutt Gully Forest
Vegetation structure: Open-forest
Number of indigenous plant species: 49
Number of introduced plant species: 6
Indigenous foliage cover class: >80%
Introduced foliage cover class: <1%
Notes: Many sandstone outcrops. Bitumen walking track through corner of plot.

Vegetation layer	Height (m)	Foliage cover (%)	Main species
Trees	10-22	70	*Angophora costata*, *Corymbia gummifera*, *Eucalyptus pilularis*, *E. resinifera*
Shrubs	0.8-2.5	40	*Dodonaea triquetra*, *Platysace lanceolata*, *Polyscias sambucifolia*
Ground covers	0.1-0.6	30	*Dianella caerulea*, *Entolasia stricta*, *Lomandra longifolia*, *Microlaena stipoides*, *Panicum simile*, *Phyllanthus hirtellus*
Vines			*Smilax glyciphylla*

Plot T1

Centrepoint (WGS 84): 56 334962E 6256590S
Dimensions: 20 m by 20 m, 0.04 ha
Location: Tunks Park, Cammeray
Survey date: 22 April 2010
Surveyors: Peter Smith and Judy Smith
Topography: Moderate slope, becoming steep in lower half of plot
Vegetation community: Angophora Foreshore Forest
Vegetation structure: Open-forest
Number of indigenous plant species: 39

Number of introduced plant species: 14
Indigenous foliage cover class: >80%
Introduced foliage cover class: 1-10%
Notes: Sandstone outcrops. Minor walking track through plot.

Vegetation layer	Height (m)	Foliage cover (%)	Main species
Tall trees	16-25	50	*Angophora costata* (mainly), *A. floribunda*, **Acacia elata*, *Banksia integrifolia*, **Eucalyptus microcorys*
Low trees	8	10	*Glochidion ferdinandi ferdinandi*, *Pittosporum undulatum*
Shrubs	1-4	10	*Allocasuarina littoralis*, *Dodonaea triquetra*, *Grevillea linearifolia*, *Notelaea longifolia*, *Pittosporum revolutum*
Ground covers	0.1-1	70	*Dianella caerulea*, *Entolasia stricta*, *Lomandra longifolia*, *Microlaena stipoides*, *Oplismenus aemulus*, *Pteridium esculentum*
Vines			*Stephania japonica*

Plot T2

Centrepoint (WGS 84): 56 334794E 6256709S
Dimensions: 20 m by 20 m, 0.04 ha
Location: Tunks Park, Cammeray
Survey date: 22 April 2010
Surveyors: Peter Smith and Judy Smith
Topography: Steep slope
Vegetation community: Allocasuarina Scrub
Vegetation structure: Currently tall shrubland, probably open-scrub before being opened out by the fire
Number of indigenous plant species: 51
Number of introduced plant species: 6
Indigenous foliage cover class: >80%
Introduced foliage cover class: <1%
Notes: Sandstone outcrops. Area burnt 18 May 2009. Most of the *Allocasuarina* trees and shrubs have been killed by the fire. One dead *Corymbia gummifera* tree in the plot not killed by the fire. Shrub layer would have been denser before the fire.

Vegetation layer	Height (m)	Foliage cover (%)	Main species
Trees	14-17	5	*Allocasuarina littoralis* (dead), *Angophora costata*, *Corymbia gummifera* (dead)
Shrubs	3-8	20 (mostly dead, <5% live cover)	*Allocasuarina littoralis* (almost all dead), *Hakea dactyloides* (dead), mainly *Allocasuarina*
Ground covers	0.3-1.5	100 (post-fire regeneration)	*Entolasia stricta*, *Gonocarpus teucrioides*, *Lomandra longifolia*, *Pteridium esculentum*

Plot T3

Centrepoint (WGS 84): 56 334503E 6256607S
Dimensions: 20 m by 20 m, 0.04 ha
Location: Tunks Park, Cammeray
Survey date: 28 April 2010
Surveyors: Peter Smith and Judy Smith

Topography: Steep slope
Vegetation community: Blackbutt Gully Forest
Vegetation structure: Tall open-forest
Number of indigenous plant species: 36
Number of introduced plant species: 18
Indigenous foliage cover class: >80%
Introduced foliage cover class: 31-50%
Notes: Sandstone outcrops.

Vegetation layer	Height (m)	Foliage cover (%)	Main species
Tall trees	27-34	40	*Eucalyptus pilularis*
Low trees	6-8	5	*Acacia parramattensis*, *Allocasuarina littoralis*
Shrubs	1-3	60	*Dodonaea triquetra*, **Lantana camara*
Ground covers	0.1-1	40	*Dianella caerulea*, *Entolasia stricta*, *Lomandra longifolia*, *Microlaena stipoides*, *Schoenus melanostachys*

Plot W1

Centrepoint (WGS 84): 56 333260E 6254005S
Dimensions: 20 m by 20 m, 0.04 ha
Location: Waverton Park, Waverton
Survey date: 12 April 2010
Surveyors: Peter Smith and Judy Smith
Topography: Steep slope
Vegetation community: Angophora Foreshore Forest
Vegetation structure: Open-forest
Number of indigenous plant species: 35
Number of introduced plant species: 7
Indigenous foliage cover class: >80%
Introduced foliage cover class: 1-10%
Notes: Sandstone outcrops. Concrete walking track through plot.

Vegetation layer	Height (m)	Foliage cover (%)	Main species
Tall trees	26	70	*Angophora costata*
Low trees	5-10	20	*Glochidion ferdinandi ferdinandi*, *Homalanthus populifolius*
Shrubs	1-4	30	*Banksia integrifolia*, *Glochidion ferdinandi ferdinandi*, *Hakea dactyloides*, *Homalanthus populifolius*, *Pittosporum revolutum*
Ground covers	0.1-1	60	*Commelina cyanea*, *Entolasia marginata*, *Lomandra longifolia*, *Microlaena stipoides*
Vines			*Pandorea pandorana*

Appendix 4. Plant species recorded in sample plots

All plots 0.04 ha except G1, which was 0.016 ha (entire extent of community). * = introduced species (weeds and plantings), ? = tentative identification
Survey sites: B = Badangi Reserve, C = Cremorne Reserve, F = Forsyth Park, G = Gore Cove Reserve, H = Balls Head Reserve, I = Berry Island Reserve, L = Folly Point Reserve, M = Mortlock Reserve, O = Wonga Road Reserve, P = Primrose Park, R = Brightmore Reserve, S = Smoothey Park, T = Tunks Park, W = Waverton Park
Vegetation communities: AF = Angophora Foreshore Forest, AS = Allocasuarina Scrub, BG = Blackbutt Gully Forest, DS = Disclimax Sandstone Scrub, EM = Estuarine Mangrove Forest, ES = Estuarine Saltmarsh, FS = Sandstone Foreshore Scrub, GR = Sandstone Gallery Rainforest, KS = Kunzea Scrub, MF = Mixed Sandstone Gully Forest, RF = Forest Red Gum Foreshore Forest, SO = Estuarine Swamp Oak Forest
Abundance: 1 = <5% cover and <4 plants, 2 = <5% cover and uncommon, 3 = <5% cover and common, 4 = 5-19% cover, 5 = 20-49% cover, 6 = 50-74% cover, 7 = 75-100% cover, + = additional native species outside survey plot

Scientific name	Common name	B1	B2	B3	B4	B5	B6	C1	F1	F2	G1	G2	G3	G4	G5	G6	H1	H2	H3	I1	I2	I3	L1	M1	O1	P1	P2	R1	R2	R3	S1	T1	T2	T3	W1
Vegetation community		RF	AF	DS	GR	BG	DS	DS	DS	AF	ES	EM	SO	AF	GR	DS	AF	FS	KS	FS	AF	KS	SO	AF	MF	AF	BG	GR	AF	BG	BG	AF	AS	BG	AF
Phylum Monilophyta	**Ferns**																																		
Family Adiantaceae																																			
Adiantum aethiopicum s.str.	Common Maidenhair			2	2				2					+	2												+	1				+			
Adiantum hispidulum	Rough Maidenhair																										+								
Family Aspleniaceae																																			
Asplenium australasicum	Bird's Nest Fern			+	1					1					2											+		3	1						
Asplenium flabellifolium	Necklace Fern									2				1	2			3								+	2								
Family Blechnaceae																																			
Blechnum ambiguum															2																				
**Blechnum indicum*	Swamp Water Fern																																		2
Doodia caudata	Small Rasp Fern								1						2												2								
Family Cyatheaceae																																			
Cyathea australis	Rough Treefern								2							+		2																	
**Cyathea cooperi*	Straw Treefern			4	2										4																			1	
Family Davalliaceae																+																			
Davallia pyxidata	Hare's Foot Fern																																		
**Nephrolepis cordifolia*	Fishbone Fern														2											1				1				2	
Family Dennstaedtiaceae																																			
Histiopteris incisa	Bat's Wing Fern				+				1					+	1			2																+	
Hypolepis muelleri	Harsh Ground Fern			2			1			6					2			2														+			
Pteridium esculentum	Bracken	1	4				2	4		4			2	3		3	4		1	1	+			3	3	+	+		4	3	2	4	5		3
Family Dicksoniaceae																																			
Calochlaena dubia	Common Ground Fern		5	5	7	3	2		4						+	4		3							2	+	5		2	2		+			
Family Gleicheniaceae																																			
Gleichenia dicarpa	Pouched Coral Fern													+	+																				
Gleichenia rupestris	Rock Coral Fern																	3																	
Family Osmundaceae																																			
Todea barbara	King Fern														1			2																+	
Family Polypodiaceae																																			
Platycerium bifurcatum	Elkhorn				1										1	+												1	1					
Family Psilotaceae																																			
Psilotum nudum	Skeleton Fork Fern								1					+					1															2	
Family Pteridaceae																																			
Pteris tremula	Tender Brake		+												+	1									+	+	1	2							2
Family Schizaeaceae																																			
Schizaea dichotoma	Branched Comb Fern																													+					
Family Sinopteridaceae																																			
Cheilanthes sieberi	Poison Rock Fern																					2													
**Pellaea viridis*	Green Cliffbrake																									1									
Family Thelypteridaceae																																			
Christella dentata				1										+	2												+	2							
Phylum Cycadophyta	**Cycads**																																		
Family Zamiaceae																																			
Macrozamia communis	Burrawang																	1																	
Phylum Pinophyta	**Conifers**																																		
Family Araucariaceae																																			
**Araucaria cunninghamii*	Hoop Pine																	1																	

Scientific name	Common name	B1	B2	B3	B4	B5	B6	C1	F1	F2	G1	G2	G3	G4	G5	G6	H1	H2	H3	I1	I2	I3	L1	M1	O1	P1	P2	R1	R2	R3	S1	T1	T2	T3	W1
Vegetation community		RF	AF	DS	GR	BG	DS	DS	DS	AF	ES	EM	SO	AF	GR	DS	AF	FS	KS	FS	AF	KS	SO	AF	MF	AF	BG	GR	AF	BG	BG	AF	AS	BG	AF
Family Cupressaceae																																			
Callitris rhomboidea	Port Jackson Pine																+																		+
Family Podocarpaceae																																			
Podocarpus spinulosus	Plum Pine															2								2		1									
Unidentified conifer 1 (introduced)								1																											
Unidentified conifer 2 (introduced)								1																											
Phylum Magnoliophyta	**Flowering plants**																																		
Class Magnoliopsida	**Dicotyledons**																																		
Family Acanthaceae																																			
Avicennia marina	Grey Mangrove										2	7	4																						
Pseuderanthemum variabile	Pastel Flower					2									2		3									2					+				
Family Aizoaceae																																			
Tetragonia tetragonioides	New Zealand Spinach										3		2										1												
Family Amaranthaceae																																			
**Alternanthera pungens*	Khaki Weed																						2												
Family Anacardiaceae																																			
**Toxicodendron succedaneum*	Rhus Tree	1			1																					1			1	1					
Family Apiaceae																																			
Actinotus helianthi	Flannel Flower																														+				
Actinotus minor	Lesser Flannel Flower																																2		
Centella asiatica	Swamp Pennywort													+	+																	2	2		+
Hydrocotyle peduncularis		+			1					1					+			4								4									
Platysace lanceolata	Native Parsnip		2			2	2							2		1	2				4	1									4				
Trachymene incisa																						2													
Xanthosia pilosa s.str.	Woolly Xanthosia					1	1							1			+		1	+		2			1						1				
Xanthosia tridentata	Rock Xanthosia																				1												3		
Family Araliaceae																																			
Astrotricha floccosa	Flannel Leaf					2																							3						
Polyscias sambucifolia ssp. A	Elderberry Panax	2	2	1		2	2	2	2	3			1	2		2	2	1		2	2	2			3	3	+		2		4	2	3	2	1
Family Asteraceae																																			
**Ageratina riparia*	Mist Flower														2																				
**Bidens pilosa*	Cobbler's Pegs							1		2			2			1						2						1				1		2	
**Chrysanthemoides monilifera* ssp. *monilifera*	Boneseed																																	1	
**Crassocephalum crepidioides*	Thickhead									1					2												1	2							
**Conyza* sp.					1								2		1			1	1				1	1											
**Erigeron karvinskianus*	Bony-tip Fleabane				2																														
**Galinsoga parviflora*	Potato Weed									1																		2							
**Gamochaeta* sp.										1																									
**Hypochaeris radicata*	Catsear																							1											
Ozothamnus diosmifolius	White Dogwood	+					2			2							1		2		+				+								2	+	
**Senecio madagascariensis*	Fireweed															1																	1		
Sigesbeckia orientalis	Indian Weed																+															1			
**Soliva sessilis*	Bindyi																						1												
**Sonchus oleraceus*	Common Sowthistle									1													1		1			1					1		
**Taraxacum officinale*	Dandelion																						1												
Family Basselaceae																																			
**Anredera cordifolia*	Madiera Vine														1													2							
Family Berberidaceae																																			
**Nandina domestica*	Heavenly Bamboo				1																														
Family Bignoniaceae																																			
**Jacaranda mimosifolia*	Jacaranda						1																									1			
**Macfadyena unguis-cati*	Cat's Claw Creeper																										2								
Pandorea pandorana	Wonga Wonga Vine	2	3	3	2	3	2			1			1	2	+	2	2	3	2	2	2	3		1	4	3	2				1		2	3
Family Campanulaceae																																			
Wahlenbergia gracilis	Sprawling Bluebell									+							+		1		+										+				
Family Cannabaceae																																			

Scientific name	Common name	B1	B2	B3	B4	B5	B6	C1	F1	F2	G1	G2	G3	G4	G5	G6	H1	H2	H3	I1	I2	I3	L1	M1	O1	P1	P2	R1	R2	R3	S1	T1	T2	T3	W1
Vegetation community		RF	AF	DS	GR	BG	DS	DS	DS	AF	ES	EM	SO	AF	GR	DS	AF	FS	KS	FS	AF	KS	SO	AF	MF	AF	BG	GR	AF	BG	BG	AF	AS	BG	AF
**Celtis occidentalis*	Hackberry	1		2	1	1			1				1		1	1		1					1						1						
Trema tomentosa	Native Peach																+																1		
Family Caprifoliaceae																																			
**Lonicera japonica*	Japanese Honeysuckle								1																										
Family Casuarinaceae																																			
Allocasuarina distyla	Scrub She-oak							1																											
Allocasuarina littoralis	Black She-oak		+					1						2		4	+			1		1		1	1	+	+		4		+	2	4	4	+
Allocasuarina torulosa	Forest Oak								+								+				+											1				
Casuarina glauca	Swamp Oak												5				+		2	+			6	+											
Family Chenopodiaceae																																			
**Atriplex prostrata*	Orache										4		2										2												
Sarcocornia quinqueflora	Samphire										3		3																						
Suaeda australis	Seablite										5	+	1																						
Family Convolvulaceae																																			
Dichondra repens s.str.	Kidney Weed			+													+	+													+			2
Dichondra sp. A																					+														
**Ipomoea cairica*	Coastal Morning Glory												2														1								
**Ipomoea indica*	Blue Morning Glory								3				2		2	1												3	1						
Polymeria calycina																					+														
Family Crassulaceae																																			
**Bryophyllum daigremontianum X delagoense*	Hybrid Mother-of-millions																																	2	
**Bryophyllum delagoense*	Mother-of-millions																																	2	
Crassula sieberiana	Australian Stonecrop																		2																
Family Cunoniaceae																																			
Callicoma serratifolia	Black Wattle				+				4	+						1													1	2			+	
Ceratopetalum apetalum	Coachwood									+					7			+										4							
Ceratopetalum gummiferum	Christmas Bush						1																		3	4	1								
Family Dilleniaceae																																			
Hibbertia aspera	Rough Guinea Flower																+				+														
Hibbertia dentata	Twining Guinea Flower		2	2	+	1	1							+		3	2	1						1		2	1				+				2
Hibbertia linearis	Showy Guinea Flower						+																												
Family Elaeocarpaceae																																			
Elaeocarpus reticulatus	Blueberry Ash	1	4	1	1	3	1	3	3	2				4	+	5	4	6	+	4	2			+	3	4	3		4	4	+	1	2	2	
Family Ericaceae																																			
Epacris longiflora	Fuchsia Heath						1							+				+		3	+														
Leucopogon juniperinus	Prickly Beard-heath																							1							+	1	1	2	
Monotoca elliptica	Tree Broom-heath							4						+			1	1	2	4	2	3													
Woollsia pungens	Woollsia																				+														
Family Euphorbiaceae																																			
Breynia oblongifolia	Coffee Bush	2	2	2	1	2	2	2		1			2	2	+	1	1	3	1		1	1		2		1	2			2	+	1		1	2
Glochidion ferdinandi var. *ferdinandi*	Cheese Tree	2	3	4	2	2	2	4	6				4	4		5	2	4	2	3	2	2		4	3	3	2	1	4	5	2	4	2	2	5
Glochidion ferdinandi var. *pubens*	Hairy Cheese Tree						1		1	2								1						2		1	1		2	1	2				
Homalanthus populifolius	Bleeding Hearts			2	2	1	1		1	2					2	+	2	1							2	2	1		2	1	1	2	2	1	4
Micrantheum ericoides	Heath Micrantheum																																1		
Phyllanthus hirtellus	Thyme Spurge													1			3				2										3		2		
**Phyllanthus tenellus*																																	1		
**Ricinus communis*	Castor Oil Plant																											1							
Family Fabaceae																																			
Acacia decurrens	Sydney Green Wattle																																1		
**Acacia elata*	Mountain Cedar Wattle																2															1			
Acacia falcata	Sickle Wattle																										+								
Acacia implexa	Hickory Wattle			1				1						+			+				2														1
Acacia linifolia	Flax-leaved Wattle					1	1			1								1			2			2	2	2					2		+	1	
Acacia longifolia ssp. *longifolia*	Sydney Golden Wattle	1	2			4	2	2	+								2	2	2	+	2	2		4	1	1	+				+				1
**Acacia mearnsii*	Black Wattle							1																											
Acacia parramattensis	Sydney Green Wattle		+														+																1		1
**Acacia podalyriifolia*	Queensland Silver Wattle																1															1			
**Acacia prominens*	Gosford Wattle													4																					

Scientific name	Common name	B1	B2	B3	B4	B5	B6	C1	F1	F2	G1	G2	G3	G4	G5	G6	H1	H2	H3	I1	I2	I3	L1	M1	O1	P1	P2	R1	R2	R3	S1	T1	T2	T3	W1
Vegetation community		RF	AF	DS	GR	BG	DS	DS	DS	AF	ES	EM	SO	AF	GR	DS	AF	FS	KS	FS	AF	KS	SO	AF	MF	AF	BG	GR	AF	BG	BG	AF	AS	BG	AF
**Acacia saligna*	Golden Wreath Wattle																																	1	
Acacia schinoides																	2																		
Acacia suaveolens	Sweet Wattle		1			+		1		2				2			+	1		1	1	1			+						2				
Acacia terminalis ssp. *angustifolia*	Sunshine Wattle																												+				1		
Acacia terminalis ssp. *terminalis*	Sunshine Wattle	+	+				1							3		1	+	+			+										2				1
Acacia t. angustifolia / terminalis intermediate	Sunshine Wattle					1			1	1																									
Acacia ulicifolia	Prickly Moses		+			2	1	1						1			2		+		2								1		2		2		1
Desmodium rhytidophyllum	Rusty Tick-trefoil					1	2							+	+																				1
Dillwynia retorta	Heathy Parrot Pea		1											1							3										+				
**Erythrina X sykesii*	Coral Tree							1																											
Glycine clandestina	Twining Glycine																									1					1				
Glycine microphylla													2														+				+				
Glycine tabacina																							1											1	
Gompholobium latifolium	Golden Glory Pea																									1									
Hardenbergia violacea	False Sarsaparilla		+	+		2								+							+										2		1		1
Kennedia rubicunda	Red Kennedy Pea		+	+		2		1						+			1	1			2										1				+
Platylobium formosum ssp. *formosum*	Handsome Flat-pea					2							1			2	4				1					+			2	1	+		2		
Pultenaea daphnoides	Large-leaf Bush-pea															+		1								2									
Pultenaea flexilis	Graceful Bush-pea					1																													
Pultenaea stipularis	Fine-leaf Bush-pea																								2								2		
**Senna pendula*	Easter Cassia							1	2				1		1												1	1						2	
Family Goodeniaceae																																			
Goodenia heterophylla	Variable-leaved Goodenia																								1										
Family Haloragaceae																																			
Gonocarpus teucrioides	Germander Raspwort					2								+			2				+			+	2				+			5		
Family Lamiaceae																																			
Plectranthus parviflorus	Cockspur Flower	+															+														+				
Westringia fruticosa	Coast Westringia							1																											
Family Lauraceae																																			
Cassytha pubescens	Common Devil's Twine	1	2			2	+		+	1			2	+		2		1		1	+			1	+	2	+		2	1		1		
**Cinnamomum camphora*	Camphor Laurel			2	2				2	1						1					1			1					4	3	2			
Family Lobeliaceae																																			
Lobelia gibbosa																									1										
Lobelia gracilis	Trailing Lobelia															2																			
Pratia purpurascens	Whiteroot																+														2				
Family Malvaceae																																			
**Brachychiton acerifolius*	Flame Tree								1																										
Lasiopetalum ferrugineum var. *ferrugineum*	Rusty-petals																								1	+							3	1	
**Pavonia hastata*	Pink Pavonia																															2			
**Sida rhombifolia*	Paddy's Lucerne						1																2				2					1			
Family Menispermaceae																																			
Sarcopetalum harveyanum	Pearl Vine		+										2					+																	
Stephania japonica	Stephania		+	3										+	+					+	+											4			
Family Moraceae																																			
Ficus coronata	Sandpaper Fig														+																				
Ficus rubiginosa	Port Jackson Fig		+	1	1		4	5	4	4				1	1	1	1	1	1		+	1		1	+	1	1			1	1	1	2	1	
**Morus alba*	White Mulberry														1																				
Family Myrsinaceae																																			
Myrsine variabilis	Muttonwood	3	2		2		+									2	1	+		+	+		1	2							2			1
Family Myrtaceae																																			
Acmena smithii	Lilly Pilly		1		7		+								4																				
Angophora costata	Sydney Red Gum	4	6	1		5	4		4	5			2	5			5		1	1	5	2	1	5	4	6	+		6		5	5	4		6
Angophora floribunda	Rough-barked Apple		+																													4			
Backhousia myrtifolia	Grey Myrtle														1																				
Callistemon linearis	Narrow-leaved Bottlebrush													+			+																		
**Callistemon* sp.				2																															
**Corymbia eximia*	Yellow Bloodwood																1																		
Corymbia gummifera	Red Bloodwood													1			+				+				4	1				+	4		1		

Scientific name	Common name	B1	B2	B3	B4	B5	B6	C1	F1	F2	G1	G2	G3	G4	G5	G6	H1	H2	H3	I1	I2	I3	L1	M1	O1	P1	P2	R1	R2	R3	S1	T1	T2	T3	W1
Vegetation community		RF	AF	DS	GR	BG	DS	DS	DS	AF	ES	EM	SO	AF	GR	DS	AF	FS	KS	FS	AF	KS	SO	AF	MF	AF	BG	GR	AF	BG	BG	AF	AS	BG	AF
**Corymbia maculata*	Spotted Gum																1																		
Eucalyptus botryoides	Bangalay																+	+																	
Eucalyptus haemastoma	Broad-leaved Scribbly Gum																														1				
**Eucalyptus microcorys*	Tallow Wood																												1			4			
Eucalyptus paniculata	Grey Ironbark																+				+														
Eucalyptus pilularis	Blackbutt					5										+	+				+		1		1	4	6	1		6	5		5	
Eucalyptus piperita	Sydney Peppermint		4											+		4					+			1	4					+		+			
Eucalyptus punctata	Grey Gum													+			+				+	1													
Eucalyptus resinifera	Red Mahogany		4		5		+							4			+				4										5				1
Eucalyptus sieberi	Silvertop Ash																								4										
Eucalyptus tereticornis	Forest Red Gum	5																																	
Kunzea ambigua	Tick Bush		+	1			3	1		1				1			+		5	2	+	6		1	+	+	+				+				+
**Leptospermum laevigatum*	Coast Teatree						1																												
**Leptospermum petersonii*	Lemon-scented Teatree																															1			
Leptospermum polygalifolium	Yellow Teatree						1																			+						+			
Leptospermum trinervium	Paperbark Teatree																1				1				1						+				
**Lophostemon confertus*	Brush Box						1	1																											
**Melaleuca armillaris*	Giant Honeymyrtle						4																												
**Melaleuca* sp.																								1											
Syncarpia glomulifera	Turpentine																									1	4				+				
**Syzygium paniculatum*	Magenta Lillypilly			1														+?																	
Tristaniopsis laurina	Water Gum														+																+				
Family Ochnaceae																																			
**Ochna serrulata*	Ochna	1	2	2	2	2	2	2	2				3	2	3	2	1			2		1		2	1	2	1	1	2	2	1	1		3	1
Family Oleaceae																																			
**Ligustrum lucidum*	Large-leaved Privet	2		2	2		1		3				2		3	1										1		5	2			1		2	1
**Ligustrum sinense*	Small-leaved Privet			2	3		1		2				2		2		1							1			1		1	1				2	
Notelaea longifolia	Large Mock-olive	4	4	3	3	3	5	1					2	4	2	3	4	4		3	3	3	1	2	+	+			1	1		3	1	1	2
**Olea europaea* ssp. *cuspidata*	African Olive	1						2		1			1		2	1		1	1			1	1	2		1	1		1		2			1	
Family Oxalidaceae																																			
**Oxalis corniculata*	Yellow Wood Sorrel									1															1		2					2			
**Oxalis debilis*	Pink Wood Sorrel																																1		
Oxalis exilis																1							2								1				
**Oxalis latifolia*	Fishtail Oxalis																																	1	2
Oxalis thompsoniae																																2			
Family Passifloraceae																																			
**Passiflora edulis*	Common Passionfruit																																	1	
Passiflora herbertiana	Native Passionfruit																								+										
Family Pittosporaceae																																			
Billardiera scandens	Appleberry	+	2			2	2			1						2	2				1				2				1	1	1		2		
Pittosporum revolutum	Rough-fruit Pittosporum	2	2	1	1	2		3					1	2		1	4				3	2		1							1	3			2
Pittosporum undulatum	Pittosporum	5	3	7	4	1	5	2	2				2		4	4	2	2	2	6	2	2		2		3	5	+	1	4	2	4		2	2
Family Plantaginaceae																																			
**Plantago lanceolata*	Ribwort																						2												
Family Polygonaceae																																			
**Persicaria capitata*	Pink-head Knotweed														2																				
Rumex brownii	Swamp Dock																										+								
Family Proteaceae																																			
**Banksia ericifolia*	Heath-leaved Banksia																																		1
Banksia integrifolia	Coast Banksia		1	4			2	4						1		1	+	3	2	4	+	1		1	+	+			+			4	1		2
Banksia serrata	Old Man Banksia						1									4	+								+									+	
Grevillea buxifolia	Grey Spider-flower																																2		
Grevillea linearifolia s.str.	White Spider-flower		1			1	1	1						2		1	+		3	3	5	4		2	+		+		2	2	2	2	2	1	+
**Grevillea robusta*	Silky Oak			1																															
Hakea dactyloides s.str.	Broad-leaved Hakea		2					1									4		1		+				2					1			4		3
Hakea gibbosa																															+				
Hakea sericea	Silky Hakea																		1								+				+	+			+
Lambertia formosa	Mountain Devil													1		1									1										

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Vegetation community		RF	AF	DS	GR	BG	DS	DS	DS	AF	ES	EM	SO	AF	GR	DS	AF	FS	KS	FS	AF	KS	SO	AF	MF	AF	BG	GR	AF	BG	BG	AF	AS	BG	AF
Lomatia silaifolia	Crinkle Bush			1										2			+				+				1		1		2					1	
Persoonia levis	Broad-leaved Geebung																1			+	1				2										
Persoonia linearis	Narrow-leaved Geebung						2							1			+				1					2			1		1		1		
Family Ranunculaceae																																			
Clematis aristata	Old Man's Beard			2																							3								
Clematis glycinoides	Old Man's Beard			+														1				1														
Family Rhamnaceae																																			
Pomaderris discolor																		1																	
Pomaderris elliptica																									+										
Pomaderris ferruginea						2																								1	2				
Pomaderris intermedia																																			+
Pomaderris lanigera	Woolly Pomaderris												1																						
Family Rosaceae																																			
**Cotoneaster glaucophyllus*	Large-leaf Cotoneaster							1																											
**Eriobotrya japonica*	Loquat																											1							
**Pyracantha angustifolia*	Orange Firethorn																							1											
**Rhaphiolepis indica*	Indian Hawthorn					1								1																1					
Family Rubiaceae																																			
Morinda jasminoides	Morinda				3										1																				
Opercularia aspera	Coarse Stinkweed					+				2								1		+															
Opercularia varia																																	2		
Pomax umbellata	Pomax							2													2	2			3						+				
Family Rutaceae																																			
Correa reflexa	Common Correa	+				+														1	+													
Crowea saligna								3									+			2	2				2					+					
Leionema dentatum							5		1	2																				3					
Phebalium squamulosum ssp. *squamulosum*	Scaly Phebalium																														+				
Zieria pilosa	Hairy Zieria													1							+				+		+						1		
Zieria smithii	Sandfly Zieria	2	3	2	2	2	2							2	+	3	3				+	2			1										2
Family Santalaceae																																			
Exocarpos cupressiformis	Native Cherry																+				+	1													
Family Sapindaceae																																			
**Cardiospermum grandiflorum*	Balloon Vine								1																			3							
Dodonaea triquetra	Common Hop Bush	+	2	1	2	4	2	1	1	2			2	3			3			2	3	1	1	3	2	2	1		1		5	3	2	4	1
Family Scrophulariaceae																																			
Veronica plebeia	Trailing Speedwell									1																1					+				
Family Solanaceae																																			
Solanum americanum	Glossy Nightshade														1										1			1	1			1			
**Solanum mauritianum*	Wild Tobacco Bush														2														1				1		
**Solanum nigrum*	Black-berry Nightshade																											1				1	1		
Family Thymelaeaceae																																			
Pimelea linifolia	Slender Rice-flower																			1															
Family Urticaceae																																			
**Parietaria judaica*	Pellitory																											3							
Family Verbenaceae																																			
Clerodendrum tomentosum	Hairy Clerodendrum	+											1				+							2											
**Lantana camara*	Lantana	1		2	2		2		4					2	1				1	1				2					1				5		
Family Violaceae																																			
**Viola odorata*	Sweet Violet			1																															
Family Vitaceae																																			
Cissus antarctica	Kangaroo Grape														+																				
Cissus hypoglauca	Giant Water Vine				2	1	1									1								2								1			
Unidentified dicot 1 (introduced)																												1							
Unidentified dicot 2 (introduced?)															1																				
Class Liliopsida	**Monocotyledons**																																		
Family Agavaceae																																			

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Vegetation community		RF	AF	DS	GR	BG	DS	DS	DS	AF	ES	EM	SO	AF	GR	DS	AF	FS	KS	FS	AF	KS	SO	AF	MF	AF	BG	GR	AF	BG	BG	AF	AS	BG	AF
**Agave americana*	Century Plant								1																										
Family Anthericaceae																																			
**Chlorophytum comosum*	Spider Plant						1																												
Family Araceae																																			
**Colocasia esculenta*	Taro				2																														
Family Arecaceae																																			
Livistona australis	Cabbage-tree Palm			1	1				2	+						+												1	+			1			
**Phoenix canariensis*	Canary Island Date Palm	1			1			1																											
Unidentified palm 1 (introduced)																															1				
Unidentified palm 2 (introduced)									2																										
Family Asparagaceae																																			
**Asparagus aethiopicus*	Asparagus Fern	2	1	2		1	1	2	2	2			3	2	2	2	1			1		1	4	2		2			2	2		1		2	
**Asparagus plumosus*	Climbing Asparagus Fern														2																				
Family Commelinaceae																																			
**Commelina africana*																						2													
Commelina cyanea	Scurvy Weed	2	2	2				3	2	2			2	1	2		+	3	2				1	2	+	4	3	3		+	+	2	2	2	4
**Tradescantia fluminensis*	Wandering Jew			2	2				4	4					4												2	4							
Family Cyperaceae																																			
Baumea juncea													+																						
Caustis flexuosa	Curly Wig																							1											
Cyathochaeta diandra	Sheath Rush																				1			2							1		2		
Cyperus gracilis																					+										+			1	
Cyperus laevis																+										2									
Gahnia aspera	Rough Saw-sedge																															+			
Gahnia clarkei																		+													+			
Gahnia erythrocarpa																								1											
Gahnia melanocarpa	Black-fruited Saw-sedge			+														+							+				+					
Gahnia sp. (one of the above)									1																								1		
Lepidosperma concavum																	+			2	2														
Lepidosperma laterale	Variable Sword-sedge	1	3	2	2	2	2							1		2	3							3	3	2	1		3	3	1	2	2	2	
Ptilothrix deusta																									2										
Schoenus melanostachys	Black Bog-rush																								2				3	1		+	+	4	
Family Juncaceae																																			
Juncus continuus																						1													1
Juncus usitatus	Common Rush															+										+									
Family Juncaginaceae																																			
Triglochin striatum	Arrow Grass										2																								
Family Lemnaceae																																			
Landoltia punctata																											2								
Family Liliaceae																																			
**Lilium formosanum*	Taiwan Lily													1																					
Family Lomandraceae																																			
Lomandra cylindrica	Needle Mat-rush													2			1				+										2				
Lomandra filiformis ssp. *filiformis*	Wattle Mat-rush					1															+			1			2								
Lomandra gracilis																					+				2				1		2		2		
**Lomandra hystrix*				2																															
Lomandra longifolia	Spiny-headed Mat-rush	5	4	2	2	3	5	6	2	4			2	3		4	4	3	4	5	4	2	1	3	2	4	3	1	3	3	3	4	4	3	5
Lomandra multiflora	Many-flowered Mat-rush																				2			1			1				2				
Lomandra obliqua	Twisted Mat-rush						2							2							2				2				1		2				
Family Luzuriagaceae																																			
Eustrephus latifolius	Wombat Berry	3	3	2	3	2							1		2		1	+			+	1		1	1	2			2			2			2
Geitonoplesium cymosum	Scrambling Lily					1											2									2									
Family Orchidaceae																																			
Acianthus sp.						2										2																			
Cryptostylis erecta	Tartan Tongue Orchid		+																					3					2						
Cryptostylis subulata	Large Tongue Orchid						2																	2					2	2					
**Epidendrum ibaguense*	Crucifix Orchid													2																					
Pterostylis sp.		2																																	

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Vegetation community		RF	AF	DS	GR	BG	DS	DS	DS	AF	ES	EM	SO	AF	GR	DS	AF	FS	KS	FS	AF	KS	SO	AF	MF	AF	BG	GR	AF	BG	BG	AF	AS	BG	AF
Family Phormiaceae																																			
Dianella caerulea var. *producta*	Blue Flax Lily	2	2	2	3	3	3	1	2	3			2	3	1	2	3	2	2	2	3	3		3	4	2	2	2	2	3	3	4	2	3	2
Dianella revoluta	Spreading Flax Lily						1	2					2	3			2		3	1	2	2		2	2					2	2	1		2	
Family Poaceae																																			
**Andropogon virginicus*	Whisky Grass													1								1													
Anisopogon avenaceus	Oat Speargrass																				+														
Aristida vagans	Threeawn Speargrass													+			2				2											1			
Austrodanthonia tenuior																	+			2	+	1												1	
Austrostipa pubescens	Tall Spear Grass																2														+		2	2	
Austrostipa ramosissima	Stout Bamboo Grass									2					+																				
**Cynodon dactylon*	Common Couch																						3												
Dichelachne crinita	Long-hair Plume Grass							+										1			+	2									+				
Dichelachne micrantha	Short-hair Plumegrass																+																		
**Digitaria ciliaris*	Summer Grass																											2							
**Digitaria didactyla*	Queensland Blue Couch							1						2					4			4									2				
Digitaria parviflora	Small-flowered Finger Grass		+				1										3	+			+			2	+				1		2	2	3	2	
**Digitaria violascens*								1																											
Echinopogon caespitosus	Tufted Hedgehog Grass													2		1	+	1		1	+	3									+		+		
Echinopogon ovatus	Forest Hedgehog Grass																+								+										
**Ehrharta erecta*	Panic Veldtgrass			4			2	2	2				3		3			1		2			4	2	2	3	3	2	3			2		2	2
**Eleusine indica*	Crowsfoot Grass																															1			
Entolasia marginata	Bordered Panic	3	+			2	2			+			2					2		2	+	2		2	2		+		2		+			2	4
Entolasia stricta	Wiry Panic	2	3		2	4	2	2	4	2			2	3		2	4	4	2	4	4	4		2	5	2	4		4	3	4	4	4	3	2
Eragrostis brownii	Brown's Lovegrass																		3		+	4									+				
Imperata cylindrica	Blady Grass	2			2	+										2	2	+		+	2			4	+		2		2		+			
Microlaena stipoides	Weeping Grass	2		2	2		4	4	2	3			4	3	+	4	4	4	2		1	4	2	4	3	5	4	2	3	2	3	5	2	3	5
Notodanthonia longifolia	Longleaf Wallaby Grass																																+		
Oplismenus aemulus	Basket Grass	2		2	2	2	2	2	4	2			3	2	2	+		2			+	2		2	2	3	4	2			2	3	3	2	2
Oplismenus imbecillis	Basket Grass	2		2	2		2		2						3	2				2					2		1		2	2		2	2		
Panicum simile	Two Colour Panic																				+										3				
Paspalidium distans							2	1						3		2					2	3		2					2	2	1				
**Paspalum dilatatum*	Paspalum						2							1									2												
**Pennisetum clandestinum*	Kikuyu Grass																						1												
**Pennisetum setaceum*	Fountain Grass																																		1
Poa affinis		5	4	4	2	3	4			2				2		2	2	4	2	6	+					2			+		+				2
**Setaria palmifolia*	Palm Grass	1											1		2											1									
**Setaria parviflora*	Slender Pigeon Grass						3																											2	
**Sporobolus africanus*	Parramatta Grass							1								1							2												
Themeda australis	Kangaroo Grass																2	+		+	2										2		2		
Family Smilacaceae																																			
Smilax glyciphylla	Sweet Sarsaparilla		3	2	3	2	2		3	2			2	2		4	2	2		2	2			2	2	3	2		3	3	3	1	2	2	
Family Xanthorrhoeaceae																																			
Xanthorrhoea arborea	Broad-leaf Grass-tree															4								1		+			1	2					
Xanthorrhoea media	Forest Grass-tree													1											2						1		+		
Family Zingiberaceae																																			
**Hedychium gardnerianum*	Ginger Lily				2										2	1													1						
Unidentified monocot 1 (introduced)					1																														
Unidentified monocot 2 (introduced)																								2											