



Annual Report 2008-2009

Woollahra Municipal Council

Annexure 3

State of the
Environment Report



Woollahra State of the Environment Report 2008/2009



Version date: 30 November 2009

This report has been compiled by Justin Shupe, Sustainability Projects Officer, Woollahra Municipal Council. Council staff, Government agencies and members of the community are acknowledged for their invaluable contributions of information and assistance.

Woollahra apologises for any errors or exclusions and welcomes comments for future State of the Environment Reports undertaken.

The environmental indicator data included within in this report contains the most up-to-date result. Council is currently awaiting some data from external agencies and will update the report as soon as this information becomes available.

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November 2009

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1. Introduction

1.1 What is state of the environment reporting?

State of the Environment (SoE) reporting is a statutory requirement under the *Local Government Act 1993* (LG Act). Every council in New South Wales (NSW) is required to prepare a SoE report as a part of its annual reporting obligations. The SoE report provides information on the activities undertaken by council, State Authorities and the community to preserve and enhance the environment during the twelve month reporting period.

The *Local Government Act 1993* requires that a comprehensive SoE report is to be prepared the year following a full council election, with a supplementary report prepared for the years between. The 2008/2009 SoE report is a comprehensive report. Council's last comprehensive SoE report was prepared for the 2003/2004 reporting period. Council's next comprehensive report will be prepared in 2013 for the 2012/2013 reporting period. The *Local Government (General) Regulation 1999* requires that comprehensive SoE reports are to:

- include relevant background information
- apply relevant environmental indicators
- report on all major environmental impacts and related activities, and
- identify data gaps and actions required to obtain that information.

The response actions included in the past three supplementary reports have been incorporated into the 2008/2009 comprehensive report for each environmental sector.

SoE reporting enables councils to report on the state of the environment in their local area and the progress of environmental activities undertaken during the reporting period. The report contains a number of outcomes, some of which are quantifiable and may be attributed to council's activities over the reporting period. A summary of the outcomes for the 2008/2009 reporting period is presented in section 1.3 of this report. The outcomes are provided in greater detail in each chapter.

Woollahra council is one of the many stakeholders involved in the management of parts of the Woollahra environment. Other stakeholders include Commonwealth and State Government agencies¹, such as National Parks and Wildlife Service (NPWS) and Sydney Water, and the broader Woollahra community. Information from these stakeholders has been included in the report, where available. The council plays an important role in local environmental management. However, the quality of Woollahra's environment is also influenced by many actions and events outside municipal boundaries and beyond the council's jurisdiction.

Copies of the previous SoE reports, including the last comprehensive report (2003/2004) can be accessed from Woollahra Library or council's website www.woollahra.nsw.gov.au.

¹The NSW state government created the Department of Environment and Conservation (DEC) in September 2003. The DEC incorporates the Environment Protection Authority (EPA), National Parks and Wildlife Service (NPWS), Botanic Gardens Trust and Resource NSW. At present, each agency is represented separately in the DEC. This is reflected in Woollahra's SoE report. However, the DEC is referenced directly when the action has come from the department.

1.2 A guide to reading Woollahra's State of the Environment

This comprehensive SoE report describes the environment under eight sectors listed below. Each sector reports on the state and pressures affecting the environment within Woollahra and provides environmental response initiatives being undertaken by council and other organisations.

- Land and coastline
- Biodiversity
- Waste
- Heritage.
- Water
- Air quality
- Noise
- Sustainable Woollahra

The 'state' is referred to as the current condition of a sector, environmental indicators have been included within this component to allow readers to monitor a specific aspect of the environment over time, where information has been recorded for a number of years, trends can be established. 'Pressures' describe activities that currently influence the current state of the environmental sector. Actions being undertaken by the council and other organisations are listed under 'response'.

The 2008/2009 SoE report includes new additional indicators, which have been selected to assist the council to monitor environmental performance. Further indicators are likely to be identified in the future to assist with the monitoring of the state of the environment within Woollahra.

2. Land and coastline

The Woollahra Municipal Council Local Government Area (LGA) is bounded by harbour foreshore of Port Jackson, coastal cliffs and shares LGA boundaries with Waverley, Randwick and the City of Sydney Municipal Councils.

All types of human settlement have an impact on the environment and these are often more pronounced in larger urban centres (EPA, 2000). The majority of land degradation issues facing present day NSW are the result of land use changes carried out during the first 100 to 150 years of European settlement, in particular the changes brought about by the extensive clearing of native vegetation. These changes have altered the physical, chemical, biotic and hydrological balances in the landscape and have resulted in many of the major problems we are facing today (EPA, 2000).

Woollahra's land indicators have been selected to measure and monitor development, land clearing and re-vegetation which affect the condition of the land.



Fig 1: Woollahra LGA boundaries and suburbs.

2.1 State of the Land and Coastline

The total area of Woollahra is 1219 hectares or twelve square kilometres including sixteen kilometres of harbour foreshore and coastline, consisting of rocky headlands, coastal cliffs and beaches.

The population of the Woollahra LGA is 50,161 recorded for the 2006 census, up by 1% from 49,911 people recorded for the 2001 census. Woollahra's 50,161 people reside in 22,476 private dwellings, 10,135 of which are separate or semi-detached, terrace, townhouse type housing and 12,135 of which are unit or apartments (ABS, 2006).

Through the urbanisation of the Woollahra environment, much of the original vegetation has been completely removed or severely modified. As a result, urban residential land use is the most common in the Woollahra LGA.

During the reporting period, there was a decrease in the total number of development applications (DAs) approved, decreasing from 935 in 2007/2008 to 687 in 2008/2009. The decrease during the 2008/2009 reporting period was the first decrease in approved DAs over the last three years. A drop in the number of approved residential flat building DAs and alterations and additions to existing dwellings was also recorded. The impact of the global financial crisis over the reporting year, may have lowered the number of residents willing to spend available funds on housing improvements and in addition exempt development codes came into effect on 27 February 2009. Under the State codes certain types of minor developments are identified as exempt development or complying development. Where a proposed development is classified as exempt development, no planning approval is required.

Despite the increasing development pressures, council continues to maintain the total amount of open space in the LGA.

The total number of incidents reported to the DECCW's pollution line was recorded as relatively stable for the past two years, however the 2008/2009 reporting period saw an increase in complaints to match 2004/2005 results. Though there was an increase in the total number of incidents reported to the DECCW pollution line, the result for 2008/2009 is lower compared to reporting years before 2006/2007.

The new indicators marked in table two demonstrate that across the LGA, distribution of native flora for planting on public and private lands was significantly higher than approvals to remove trees on private land. As native flora data includes species other than trees, the two data sets are not easily comparable; however the data shows with higher number of native flora species being planted compared to tree removal there is a positive move towards revegetation of Woollahra. Revegetation results in improved soil quality, reduce erosion and provide larger and healthier habitat areas for fauna.

Table 2 presents the land data recorded each year, or when this data is available. Including this data into the SoE report provides quantifiable information to monitor a specific aspect of land (pressure, state response) over time. These specific aspects of the data (i.e. total number of DAs approved) are known as indicators. Where this information has been recorded for a number of years, trends can be established.

The indicators have been chosen because they provide the status of a specific aspect relating to the environment, and the information is regularly being monitored by council and other government authorities. It must be noted that the list of indicators is not representative of outcomes for all land sector pressures, activities and projects.

Table 2: Land indicators

Indicator	1999/ 2000	2000/ 2001	2001/ 2002	2002/ 2003	2003/ 2004	2004/ 2005	2005/ 2006	2006/ 2007	2007/ 2008	2008/ 2009	Trend
Total no. of DAs approved	965	996	999	1183	943	750	655	910	935	687	✓
No. of RFB	-	-	15	5	15	17	4	18	18	5	✓
No. A/A to existing building	-	-	510	852	653	622	499	398	719	557	✓
No. commercial DAs*	-	-	-	-	-	-	-	-	-	81	
No of complaints against DAs*	-	-	-	-	-	-	-	-	-	230^	
Total open space (public and private)	-	215 ha	215 ha	215.5 ha	215.5 ha	216 ha	216 ha	216 ha	216 ha	216 ha	~
Urban open space	-	101 ha	101 ha	101.5 ha	101.5 ha	102 ha	102 ha	102 ha	102 ha	102 ha	~
Total urban area (ha)*	-	-	-	-	-	-	-	-	1,219	1,219	~
Total residential area (ha)*	-	-	-	-	-	-	-	-	646.36	646.36	~
Total business area (ha)*	-	-	-	-	-	-	-	-	15.21	29	
Number of native trees planting by council (including grasses, shrubs and trees) including bushcare*	-	-	-	-	-	-	-	-	-	5,805	
Total number of local native plants supplied to volunteers, contractors and residents*	-	-	-	-	-	-	-	-	-	433	
Approvals to remove trees (private land)*	-	-	-	-	-	-	-	-	-	229	
No. of environment protection licences issued by the DECCW	-	4	3	2	-	2	2	2	1	1	✓
Total no. of incidents DECCW pollution line	61	65	33	50	47	32	41	19	20	32	*
Chemical	1	9	2	2	1	1	5	2	3	3	~
Pesticide	1	3	0	1	2	3	2	3	2	3	~
Contaminated land	0	0	0	0	0	0	0	0	0	1	~

Source: Woollahra council (GIS open space), Department of Environment, Climate Change and Water (DECCW).

Note: DA means development application, RFB means residential flat building, A/A means alterations and additions, and ha means hectare. The total number of DAs does not include amended DAs or Section 82A reviews.

Key: The following symbols represent improving (✓), worsening (*) or stable (~) trends in the monitored aspects of the environment. The trend column is left blank where there is not enough information to establish a trend. Where no information is available, the (-) symbol is used. (*) represents new environmental indicator selected during 2008/2009, previous years data provided if available.

^Objections started to be recorded in February 2009, figure does not represent the whole 2008/2009 reporting period.

Environmental protection licences:

Are issued by the DECCW to owners or operators of various industrial premises under the *Protection of the Environment Operations Act 1997* (POEO Act). Conditions of licences relate to pollution prevention, monitoring and cleaner production through best practices (including reuse and recycling). In 2009 the Act was refined, the *Protection of the Environment Operations (General) Regulation 2009* took effect from the 30 June 2009 and improves environmental objectives through administration of licences and other regulatory instruments (DECCW, 2009c).

Urban area: built-up areas where the predominate frontage is residential or business (which may be used for commercial or industrial purposes).

Residential area: includes all land within urban areas which conforms to the definition of residential in section 516 of the *Local Government Act, 1993*.

Business area: comprises all land within urban areas which conforms to the definition of business in section 518 of the *Local Government Act, 1993*, and may be used for commercial or industrial purposes.

Urban open space: comprises all land within urban areas held in public ownership for present and/or intended future use as open space including parks, playing fields, bushland reserves, vantage points, and neighbourhood and trunk floodways. Urban open space does not include golf courses, privately owned recreational facilities, sporting facilities and playgrounds within schools, water surfaces, and areas of verge association with roads.

Geology

Woollahra is an area predominantly characterised by sandstone slopes and gullies, with the exception being the belt of low land extending from Rose Bay to the sandhills of Bondi (Benson & Howell, 1990). The thick bedrock of hard weathering Hawkesbury Sandstone laid down in the Triassic Period some 230 million years ago has formed the spectacular ocean cliffs and steep-sided indented valleys of Trumper and Cooper Parks and the promontory headlands of Darling Point, Point Piper and Vaucluse. The Hawkesbury sandstone on the headland and bluffs is comprised of medium to coarse grained sandstone.

The relatively wide, sandy flats of Rose Bay were originally considered to have been the shallow entrance to Port Jackson. During the Quaternary Period (approximately 20 000 years ago), the shallow entrance was completely infilled with sand containing layers or lenses of marine and peat mud, especially with depth. Much of the geological landscape of Rose Bay has been modified for residential and open space land uses. The sandhills were once more extensive, extending to Bellevue Hill, but were in part removed for mortar for housing during the period 1910 to 1920 (Ashton, 1984).

Throughout the LGA, the wider valley floors have been infilled with silts and sands between the rocky headlands to produce a series of shallow bays: Rushcutters Bay, Double Bay, Rose Bay, Vaucluse and Parsley Bays (Northcote, 1978).

Soils

The geology of Woollahra is reflected in the soil landscapes present. The underlying Hawkesbury Sandstone and alluvial sands have created relatively poor, infertile soils.

The Soil Landscapes of Sydney 1:100,000 sheet (Chapman and Murphy, 1989), identifies ten soil landscapes within the LGA. Soil landscapes are areas of land that “have recognisable and specifiable topographies and soils, that are capable of presentation on maps, and can be described by concise statements” (Northcote, 1978). Figure 2.2 displays the soil landscapes within the LGA which are as follows:

Tuggerah - found mainly in the Rose Bay sandy flats, is represented by gently undulating to rolling coastal dunefields. The wind-blown sand is generally lacking shell fragments, and appears to be finer than sands found on foredunes and beaches.

Newport - is found either side of the Tuggerah landscape, particularly in Bellevue Hill. The landscape is described as gently undulating plains to rolling rises of Holocene sands (laid down in the last 11,000 years) mantling other soil materials or bedrock.

Hawkesbury - a prominent landscape found at The Gap, Vaucluse Point, Nielsen Park, Double Bay and Point Piper. The soil represents the underlying Hawkesbury Sandstone, with undulating to rolling rises and low hills with rocky outcrops.

GyMEA - found throughout Paddington towards Darling Point. This is typified by undulating to rolling rises and low hills on Hawkesbury Sandstone, but is less steep and contains fewer rocky outcrops than the Hawkesbury landscape.

Deep Creek - a level to gently undulating alluvial floodplain draining the surrounding Hawkesbury Sandstone. This can be found in Cooper Creek and adjacent beds towards Double Bay and is a mixture of deposited sands, silts and clays.

Lambert - undulating to rolling low hills on Hawkesbury Sandstone found predominantly throughout the inner areas of Vaucluse and Watsons Bay. It contrasts with the Hawkesbury landscape with broader ridges, gentler undulating slopes, and poorer drainage.

North Head - elevated gently undulating dunefields of wind blown sands on coastal headlands. A small landscape would be found around Vaucluse High School and shopping village. The dunes and swales have been reworked and are difficult to distinguish.

Warriewood - identified in Vaucluse and Parsley Bays, the landscape is described as level to undulating swales, depressions and infilled lagoons on Quaternary Sands (formed over the last one million years).

Woy Woy - level to gently undulating non-tidal beach ridges on marine sands. This landscape is isolated in Camp Cove.

Disturbed - mainly located on the foreshores of Double Bay and east of Darling Point, these are soils made up of fill and artificial materials due to reclamation. Many other less significant disturbed soils may occur within the LGA.

Further information regarding the soil profiles of these landscapes and development limitations may be found in Soil Landscapes of the Sydney 1:100 000 Sheet (Chapman and Murphy, 1989).

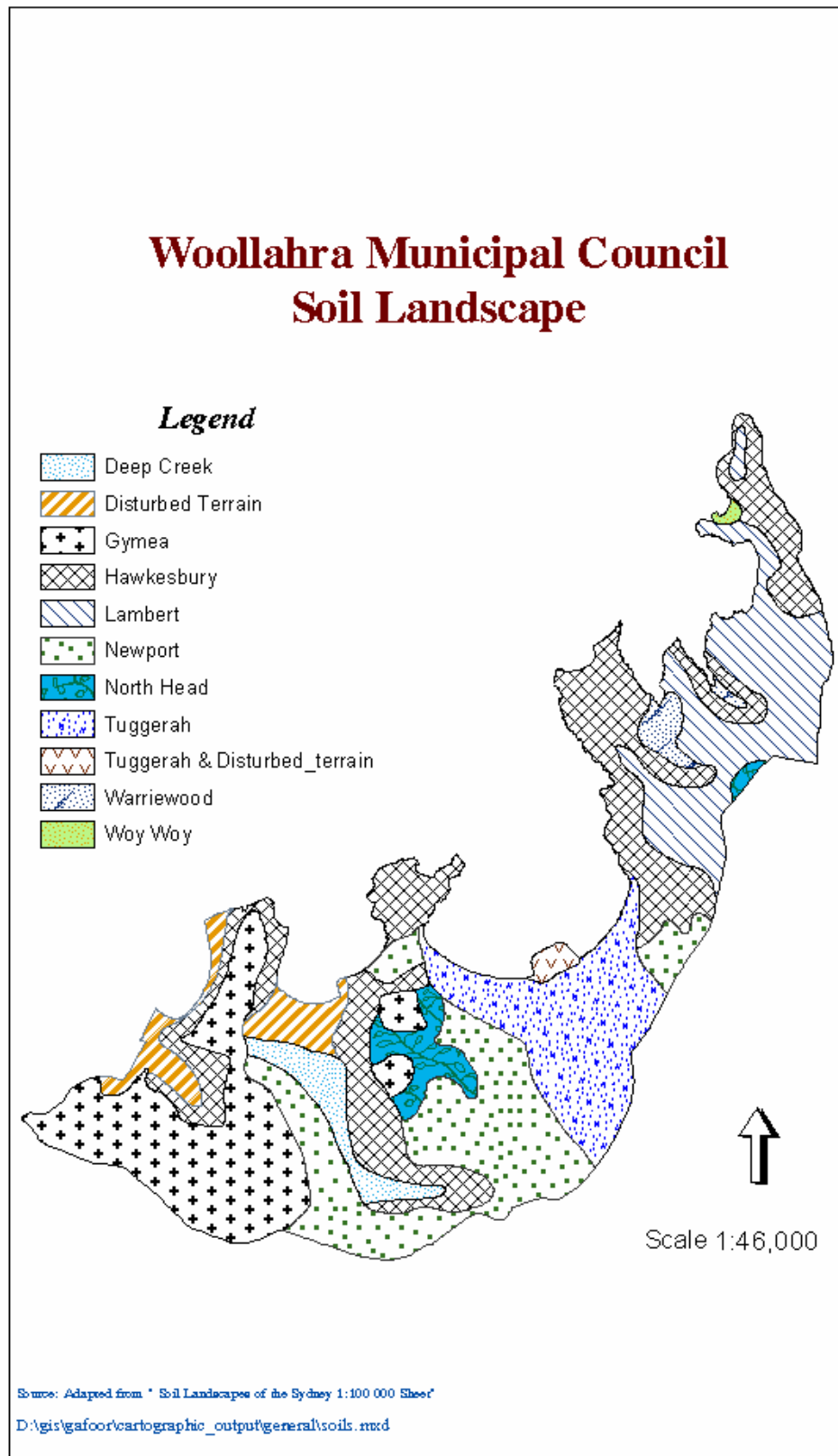


Figure 2: Soil Landscapes of Woollahra
Source: Adapted from 'Soil Landscapes of Sydney 1:100 000 Sheet'

Land use

Through the urbanisation of the Woollahra environment, much of the original vegetation has been completely removed or severely modified to accommodate for European land uses, urban residential and urban open space.

Urban Residential

The current residential zones within the Woollahra LGA are:

- Zone No.2 (a) (The Residential “A” Zone), allowing dwelling-houses and dual occupancies, and
- Zone No.2 (b) (The Residential “B” Zone) allowing dwelling-houses and residential flat buildings.

Residential, as part of a mixed development, is also allowed in the following business zones:

- Zone No.3 (a) (General Business “A” Zone),
- Zone No.3 (b) (Special Business “B” Zone), and
- Zone No.3 (c) (Neighbourhood Business “C” Zone).

The most common form of land use in the Woollahra area is urban – Residential (2a and 2b). This land use consumes approximately 651 hectares of the total Woollahra LGA approximately 1,219 hectares. Although the percentage of residential land use zones has not altered significantly in recent times, there has been an increase towards medium and high density housing through redevelopment or infill development.

Urban open space

Open space plays an important role in the character of Woollahra. Recreation activities in the open space focus on the foreshore and harbour with opportunities and facilities for both land and water based recreation. Woollahra is also recognised for the provision of high quality areas for outdoor sporting activities

The total area of open space for the Woollahra LGA is approximately 215.5 hectares. Of the area classified as open space, approximately 101 hectares is public open space.

There are 85 individual, public open space areas within the LGA. Of these spaces, 65% are administered by council (80 areas, approx. 100 ha), 33% by other Government authorities and the remaining 2% by private groups. Council owns 72% of the open space land it administers, while the remaining 28% is owned by the Crown, but managed and administered by council (Woollahra Municipal Council, 1992).

The majority of open spaces (75%) are under 0.5 hectares and 9% of spaces are between 1 and 2ha. Of the larger spaces, Woollahra Park comprises 21 hectares and Cooper Park covers 18ha.

Other government authorities providing open space in Woollahra council include:

- Department of Infrastructure, Planning and Natural Resources,
- NSW Waterways Authority,
- Historic Houses Trust,
- NSW National Parks and Wildlife Service (NPWS),
- NSW Government Property Services Group,
- Roads and Traffic Authority, and
- Royal Australian Navy.

Of the above authorities, the NPWS has the most significant role in the provision of open space in Woollahra. The NPWS administer the Sydney Harbour National Park, which includes Nielsen Park, the Hermitage Foreshore Reserve and South Head.

2.2 Pressures impacting on the Land and Coastline

The main pressures affecting land in the Woollahra LGA may be summarised under the following topics:

- I. Urban development & intensification
- II. Population growth
- III. Land degradation and clearance of native vegetation
- IV. Soil disturbance and erosion
- V. Contaminated lands
- VI. Acid sulphate soils

I. Urban Development and intensification

Although the percentage of residential zoned land has not altered significantly in recent times, the lifestyle choices for large houses often involving significant excavation and building footprints, which is accompanied by the trend for car dependant households, places increased pressure on our local environment. This places greater pressure on existing infrastructure (drainage, traffic & transport) and on the surrounding environment (soil disturbance, increase volume of water run-off and declining water quality, air quality and increased pressures on remnant vegetation).

a. Urban capability

Urban capability, as defined by Chapman and Murphy (1989), is the ability of a parcel of land to support a particular intensity of urban development without serious erosion and sedimentation occurring during construction, as well as possible instability and drainage problems in the long-term. Capability is ranked on the basis of the severity of the limitations, which are likely to affect urban land uses (Chapman and Murphy, 1989). Refer to Table 2.1 for the general urban capability rankings for the ten soil landscapes represented within the Woollahra Local Government Area (LGA).

Table 2.1 General Urban Land Capability for the Soil Landscapes present in Woollahra.

Soil Landscape	High Capability	Low to Moderate Capability	Not Capable
Hawkesbury			✓
Lambert		✓	
Gymea		✓	
Deep Creek			✓
North Head		✓	
Tuggerah		✓	
Newport		✓	
Woy Woy		✓	
Warriewood		✓	
Disturbed Terrain		✓	

Source: Adapted from Chapman and Murphy, 1989.

Capability statements presented here are intended for regional planning purposes. For detailed planning purposes more intensive capability assessments are necessary for specific sites.

As can be seen with the above table, none of the soil landscapes of the Woollahra LGA are classified as having a high capability for urban development. The majority of soil landscapes present in Woollahra (80%) fall into the *low to moderate capability* category, displaying a low to medium capability for urban development. The soil landscapes of Hawkesbury and Deep Creek, though not overly extensive in Woollahra, have been identified as being *not capable of urban development*. At present, a mix of residential development is the predominant land use of these soil landscapes, ie:

Double Bay and Point Piper. The Hawkesbury landscape has a large component of open space, remnant vegetation, land use ie: South Head, Gap Park.

II. Population growth

Woollahra recorded a population of 50,161 people for the 2006 census, an increase of 250 people since the 2001 census. The increase in Woollahra's population can be explained due to an increase in medium density housing.

III. Land degradation & clearance of native vegetation

Soil resources must be regarded as virtually non-renewable, as one centimetre of topsoil can take over 1,000 years to form. Many of the soil degradation processes occur naturally but are exacerbated by human land use practices (EPA, 1997b). Woollahra's soils are diverse and fragile in many areas. Particular emphasis should be undertaken for soil management particularly:

- during stages of construction when the topsoil is exposed, and
- with the over-use of water which can erode underlying soils and creek beds.

Clearance of native vegetation through human development results in fragmentation of bushland and exposes top soil increasing the effects of erosion on the land.

IV. Soil disturbance & erosion

The topsoils of Australia are shallow, fragile and naturally low in fertility. Natural processes erode soil and rocks through the actions of rain, wind, and water (freshwater streams and the sea). Artificial impacts, particularly urban and agricultural development, can rapidly increase erosion events, causing a loss of valuable topsoil.

Erosion is differentiated into three forms, sheet, rill and gully erosion. Sheet erosion is where a thin layer of topsoil is removed by raindrop splashes or water runoff. Rill erosion is the action of runoff gathered into small streams. Gully erosion occurs when small rill streams unite to create a stronger flow (EPA, 1993).

Some soil landscapes within the Woollahra LGA have been identified as having high erosion potential. These are:

- Tuggerah - wind erosion may occur when a vigorous ground cover is not maintained.
- Newport - minor sheet erosion is common where groundcover has been disturbed. Where stormwater runoff is not adequately controlled, significant gully erosion may occur. Slumping is common when cut and fill excavations do not include sufficient retaining walls.
- Hawkesbury, Lambert and Gynea - severe sheet erosion occurs commonly during storms and heavy rains after the vegetation is destroyed by bushfires. Minor gully erosion occurs along unpaved tracks and trails.
- North Head - extreme wind erosion and high water erosion hazard (channelised flows).
- Woy Woy - localised wind erosion potential.

The majority of soils in the LGA have considerable erosion potential. Construction of roads, footpaths and other impervious surfaces has sealed a high proportion of the fragile soil surface. Soil erosion dangers occur when the soil is disturbed and destabilised.

V. Contaminated land

Due to previous, and existing land uses, sites within the Woollahra Municipality may be contaminated. Thus posing a risk to human health or the environment.

Land contamination can arise from activities that took place on or adjacent to a site and be the result of improper chemical handling or disposal practices, or accidental spillages or leakages of chemicals during manufacturing or stage. The types of activities that may cause contamination include service stations, dry cleaning establishments and landfill sites. The Managing Land Contamination Planning SEPP 55 Remediation of Land Guidelines (1998), and the draft SEPP 55: Managing Land contamination guidelines (Nov 2008) include a table of activities that may cause contamination. The latest draft version of this table is referred to as Table 1 in the planning guidelines, a copy of which is included as Appendix A.

Activities not directly related to the site may also cause contamination; for example, from diffuse sources such as polluted groundwater migrating under a site or dust settling out from industrial emissions (Draft guidelines: NSW DoP & NSW DECCW 2008).

The failure to appropriately consider and manage contamination may result in negative impacts to the natural environment as well as increasing the risk to human health and safety.

The incorrect management of contaminated sites may result in negative impacts on the natural environment as well as increases in the risks to human health and safety.

VI. Acid sulfate soils

Acid sulfate soil (ASS) is the common name given to naturally occurring soils that contain iron sulfides. Problems arise when these naturally occurring sulfides are disturbed and exposed to air, creating sulfuric acid. The sulfuric acid can drain into waterways and cause severe environmental damage and socio-economic impacts, including damage to steel and concrete structures (Stone, Ahern and Blunden 1998). The specific conditions required for ASS development limit the occurrence of these soils to low lying parts of coastal floodplains, rivers and creeks.

The former NSW Department of Land and Water Conservation (DLWC) produced an acid sulfate soils risk map for NSW, including the Woollahra LGA. This map identifies five classes of land which have a probability of ASS (class one being the most likely and class five being the least likely). The majority of soils in the Woollahra LGA are categorised as class five soils, having a low risk probability for actual or potential ASS. The ASS potential is greatly increased for the lower lying bay areas of the LGA, including Rushcutters Bay, Double Bay, Rose Bay, Vaucluse Bay, Parsley Bay and Watsons Bay, where highly localised occurrences may be present.

2.3 Responding to Land and Coastline Pressures

The challenge facing local planning authorities is to develop long term strategies for the sustainable use of land, on which the environmental, economic and social wellbeing of the region depends. The following activities and projects aim to contribute to the sustainable use of land.

Draft Principal Local Environment Plan

In November 2007 council resolved to prepare a new local environmental plan, known as the Woollahra Principal Local Environmental Plan (Principal LEP). The Principal LEP will replace the current Woollahra LEP 1995 (WLEP 95).

The new LEP will be based on the State Government's *Standard Instrument (Local Environmental Plan) Order 2006* (standard instrument), which prescribes the standard form and content of a principal LEP, including standard zones, planning clauses and definitions for dictionary terms. The standard instrument must be used by all councils in NSW when preparing the new principal LEP. As determined by the NSW Government, Woollahra must have its new LEP gazetted by 2011.

Council has established a clear direction for preparing the draft Principal LEP which is to take a 'translation approach'¹ to preparing the new LEP, notwithstanding the need to—

- rationalise existing controls and address inconsistencies so that the controls are more practical and relevant to the built form, and
- meet the State Government's housing targets in the draft *East Subregional Strategy 2008*.

The draft East Subregional Strategy 2008 is a NSW Government initiative. The East Subregion comprises Botany Bay, Randwick, Waverley and Woollahra local government areas (LGAs), and establishes housing and employment targets for the subregion and also for each LGA.

The total target for the East Subregion is 20,000 new dwellings and 25,100 new jobs to 2031. Woollahra's share of the targets is—2,900 new dwellings and 300 new jobs. Council must demonstrate through the zoning and floor space ratio (FSR) framework in the new Principal LEP, a capacity to meet 75% of these housing and employment targets (being 2,175 and 225 respectively).

In preparing the draft Principal LEP a suitable balance must be found between protecting character and providing for increased housing opportunities. This is most effectively resolved by focusing the planning changes on the business centres and immediate surrounding areas, including particularly Edgecliff and the New South Head Road corridor to Rushcutters Bay.

This strategy of increasing development potential in and around the centres is consistent with good planning practice and promotes more sustainable and transport oriented development, but also importantly helps protect the character and amenity of Woollahra's low density residential areas by limiting the need for significant change to the planning controls in these areas.

A significant amount of work has been undertaken in the preparation of the draft Principal LEP. This work has largely been informed by planning staff's consultation with the Strategic Planning Working Party and State government agencies.

Over the next 6 to 9 months the community will be consulted on the key changes proposed to the draft LEP. This consultation is provided under section 62 of the *Environmental Planning and Assessment Act 1979* and will inform the final preparation of the draft Principal LEP, which is expected to be placed on public exhibition under section 66 of the EP&A Act in late 2010.

Exempt and complying development

As part of the reforms to improve the efficiency of the NSW planning system, the State Government published the *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008* (the Codes SEPP) on 27 February 2009.

The Codes SEPP establishes certain types of minor development or low impact development as 'exempt development' or 'complying development'.

Where a proposed development is classified as exempt development, no planning approval is required. Where the proposed development has minimal environmental impact and is complying development, a complying development certificate is required to be determined within 10 days.

The Codes SEPP, as amended, contains the following codes—

- Part 2—Exempt Development Codes
- Part 3—General Housing Code
- Part 4—Housing Internal Alterations Code
- Part 5—General Commercial and Industrial Code.

¹ Under the 'translation approach' the current zone, height and FSR controls in the WLEP 95 will be translated into similar controls under the Standard Instrument (SI) so that current land use planning controls and policy direction are broadly maintained, notwithstanding inevitable changes arising from the rigidity of applying the SI.

This means that both the State Government and council have policies that identify development as exempt development or as complying development. Council's Development Control Plan for Exempt and Complying Development 2000, continues to operate, but for many types of development is but overridden by the provisions in the Codes SEPP.

The implementation of the Codes SEPP is part of the State Government's ongoing planning reforms, including its commitment to support an increase in the uptake of complying development from 11 per cent to 50 per cent by 2012. The Department of Planning advises that additional complying development codes will be introduced for other development types in 2010.

Review of planning controls for Kiaora Lands, Double Bay

On 15 December 2008 the Council resolved to prepare a draft LEP and draft DCP for the Kiaora Lands² site in Double Bay. The Department of Planning was notified of Council's resolution and has approved the preparation of the draft plans. Detailed work on the draft LEP and particularly the DCP has commenced. The draft plans will facilitate redevelopment of the land, whilst also recognising the significance of the site within the Double Bay centre and ensuring that redevelopment has wide community benefit and makes substantial improvements to the quality of the built environment, public domain and economic viability of the Double Bay centre.

The draft LEP and draft DCP is expected to be placed on public exhibition under section 66 of the EP&A Act in early 2010.

Harbour Foreshore Cleaning

During the reporting period council undertook a review of its Harbour Foreshore Cleaning program. Based upon this review and the assessment of three quotations the Barber Surf Rake 400HD was considered the most suitable and cost efficient machine for use as part of Woollahra Municipality's Foreshore Cleaning Program.

Following the review, council purchased a new beach rake and tractor which has removed more litter from beaches than we were previously able to do by hand. This has included the collections of buried objects such as glass and syringes. It has also allowed us to clean more beaches in a shorter timeframe than was previously achieved with manual cleaning methods.

Council has now adopted a combination of hand cleaning and mechanical cleaning along the harbour foreshore to reduce the amount of pollution found on our coastline and reduce the amount of pollution entering the harbour.

Watercourse and Bushland Vegetation Treatment Program

The objectives of the Watercourse and Bushland Vegetation Treatment Program include:

- the prevention of uncontrolled run-off, erosion, nutrient transport and weed intrusion into remnant bushland,
- the protection, restoration and enhancement of indigenous bushland areas, and
- the rehabilitation of creek systems to prevent erosion, and to minimise sediment and nutrient transport to harbour waters.

Achievements in this program over the 2008/09 financial year include:

- Cooper Park Pond Upgrade – The Options Report, Detailed Designs, Review of Environmental Factors and Tender Documents were completed in September 2008. Construction works were completed in March 2009.
- Christison Park water efficient irrigation project was completed in March 2009. The water savings are currently being assessed.

² The Kiaora Lands site comprises the following properties: 423 – 451 New South Head Road, 1 – 7 Kiaora Road, 1 – 9 Kiaora Lane, 2 Patterson Street, 2 – 4 Anderson Street, 1 – 7 Anderson Street, and public roads including part Kiaora Lane, part Anderson Street and part Patterson Street.

- The Cresnet Vaocluse, Hopetoun Avenue stormwater augmentation project to protect Parsley Bay from uncontrolled run-off. The works contract was awarded to Eco Civil and works were completed in July 2009.

Contaminated Land

When carrying out planning functions, under the Environmental Planning & Assessment Act 1979 (the Act), Woollahra Council must consider the possibility that a previous land use has caused contamination of the site as well as the potential risk to health or the environment from that contamination. Decisions must then be made as to whether the land should be remediated, or its use of the land restricted, in order to reduce the risk. Woollahra Council officers act in accordance with the relevant legislation, in order to ensure that the possibility of contamination is considered at appropriate stages of the planning decision making process.

To supplement the Act and State Environmental Planning Policy 55 Council is encouraged to adopt a formal policy for managing land contamination to provide a local context for decision making. This policy should be consistent with the Act, SEPP and the relevant guidelines. Council is in the process of preparing this policy, and is also reviewing its land-use and planning records in order to create a comprehensive Contaminated Lands Map that identifies potentially contaminated lands throughout the LGA. It is expected that Council will develop and adopt a contaminated land policy in 2010.

Acid sulfate soils

The Woollahra LEP 1995 includes provisions for the assessment and management of development that may impact on acid sulfate soils and an Acid Sulfate Soils Planning Map that identifies potential acid sulfate soils areas throughout the LGA. This map was adapted from the NSW acid sulfate soils risk map produced by the former Department of Land and Water Conservation in 1998. The map identifies land that may contain potential acid sulfate soils. It shows 5 classes of land based on the probability of acid sulfate soils. Class 1 being the most likely and Class 5 being the least likely.

The LEP also contains a schedule of works which, if proposed on or under the classified lands, trigger special assessment and consideration requirements. Depending on the location of the proposed works and the type of development, applicants may need to carry out special site investigations and prepare acid sulfate soils reports, which are submitted with their development applications. To assist applicants in this process, council has prepared an information brochure that forms part of the DA Guide. The LEP can be access through the council website www.woollahra.nsw.gov.au.

Asbestos

The removal of asbestos on building sites remains a significant environmental issue. NSW Workcover is the regulatory authority that sets the controls for the removal process. Development consents issued by council make reference to the required standards and guidelines for asbestos removal. Despite this, council received complaints of non-compliance, which were referred to Workcover for investigation and enforcement.

Ecological footprint of the Eastern Suburbs – Urban Sustainability Program

In response to the large and growing ecological footprint calculated for residents of the Greater Sydney Metropolitan Region, Woollahra, Waverley and Randwick councils are collaborating on a project that will identify and implement actions to help reduce the ecological footprint of the Eastern Suburbs. The project titled the *3 councils Ecological Footprint Project* received over \$1.8 million in funding under the DECCW's Urban Sustainability Program, to undertake the three year project. Through this project, the three councils in the Eastern Suburbs of Sydney are cooperating across different issues relating to the ecological footprint of their populations. They and coordinate and target efforts capable of reducing water and energy consumption, generation of waste and conservation of biodiversity.

Neighbourhood Centres Strategy

Council prepared a Neighbourhood Centres Strategy applying to thirteen neighbourhood centres in the Woollahra LGA. The strategy addresses urban design and public domain issues and seeks to rejuvenate and maintain the retail health of the centres over the long term.

As part of the strategy, the Draft Woollahra Local Environmental Plan 1995 (Amendment No.60) and Draft Neighbourhood Centres Development Control Plan (DCP) for eleven centres were exhibited from May to June 2007. The package of Local Environment Plan (LEP) amendments and draft DCP controls provides opportunities for mixed use commercial/residential development, improvements to public places and streets and requirements for buildings to reduce reliance on non-renewable resources.

The strategy was broadened to include a review of retail and commercial activity in William and Elizabeth Streets Paddington in response to the use without consent of residential properties for various retail purposes. This area requires further investigation and has been excluded from the Draft Woollahra LEP (Amendment No. 60) and the draft DCP.

Double Bay Partnership Incorporated

In response to the studies to identify issues affecting retail trade in the Double Bay Commercial Centre, the Double Bay Partnership Incorporated was established in late 2008 as a partnership between Woollahra Council and local businesses. It was designed to provide the Double Bay business precinct with a coordinated central management that takes a long-term approach to planning, giving the area an advantage over other Sydney centres.

Its purpose is not to help individual businesses, but to promote the area's local businesses as a whole, through marketing, press management and business development, as well as by creating physical improvements to the area.

The Double Bay Partnership has designed and is now implementing a three-year strategic business plan, which focuses on brand development, including promotions and events and physical improvements to the area.

The Constitution for the Partnership was registered with the Department of Fair Trading and a Memorandum of Understanding between Council and the Double Bay Partnership has been signed.

For Oxford Street, Paddington, Council will continue to work with Sydney City Council and businesses to consider opportunities to improve the centre.

Plans of Management (PoM)

The *Local Government Act 1993* requires councils to prepare plans of management (PoM) for all community land. Plans of management are important management tools that:

- are prepared in consultation with the community,
- identify the important features of the land (i.e. natural significance, sports ground),
- clarify how council will manage the land, and
- indicate how the land may be used or developed (i.e. leasing).

During the reporting period a review was undertaken of Foreshore Parks, Cooper Park and Trumper Park PoMs. The revised PoMs will be publicly exhibited during the 2008/2009 reporting period.

Park, reserve and recreational improvements

Council has undertaken a number of improvements to the parks, reserves and recreational facilities in Woollahra, including the:

- installation of a new playground at Cooks Paddock, Paddington and shading to the existing playground in Spring Street, Paddington,
- installation of new sub surface irrigation system for Christison Park,

- DA was prepared and submitted for improved sports lighting at Christison Park, currently amending the DA after being rejected,
- preparation of a policy for the introduction and management of Community Gardens. The first community garden in Trumper Park has commenced construction in readiness for use early in 2009,
- DA for the upgrade of the Watsons Bay Baths was approved. The proposal was developed following community consultation and works on the baths are expected to commence in 2009. Project works are aimed to commence during April 2010 after going to tender,
- installation of new dinghy storage facilities at Rose Bay Park, Tingira Memorial Park, Gibbons Beach Reserve and Marine Parade, Watsons Bay. As part of these works, adjacent beaches were cleared of abandoned water craft and made available once again for public use,
- improvement of our beach cleaning services. A tractor and mechanical rake has been purchased and are now used to clean our Harbour beaches. This machine removes litter on top and below the sand surface making our beaches cleaner and safer to use,
- progressive replacement of the coastal cliff top fence which extends from Gap Park to Christison Park. All fencing is scheduled to be renewed by the end of 2008,
- completion of the Gap Park Masterplan. This plan was subject to extensive public consultation and specialist input from Police and mental health experts to address the need to prevent acts of self-harm. Tender documents are being prepared with the aim of commencing work early in 2009, subject to grant funding received from state and federal governments. Masterplan completed and adopted by council. Stage 1 works underway on self harm minimisation proposals.

2.4 Future actions

In preparing comprehensive SoE reports councils are to identify any gaps in available data and the actions required to obtain that information. The following actions have been identified:

- management plan addressing the impact of climate change and sea level rise on coastline, and
- further revegetation to reduce erosion and sediment runoff into the catchment.

Further actions have been identified in the *Woollahra Council Management Plan 2007 – 2010*.

3. Water

Water is one of the most important natural resources for which all life on earth depends. Two-thirds of the earth's surface is covered by water, of which 97% is salt water stored in the seas and oceans. Three percent of the earth's water is fresh water and only 1% of this is available to humans, plants and animals for use (Government of South Australia, 2007).

The amount of water on earth is always approximately the same, and is continuously being circulated from the earth's surface to the atmosphere in what is known as the water or hydrological cycle (EPA, 2000). Urbanisation of water catchments modifies the natural water cycle impacting the quantity and quality of water.

The 'water' section refers to the harbour beaches, aquatic habitats, creeks, stormwater, potable water and the activities that may impact upon them.

Woollahra's water assets are highly valued within the community, for both their recreational and aesthetics purposes, they also provide vital ecosystems for marine and freshwater biodiversity.

Water and waste water services in Woollahra are provided by Sydney Water.

3.1 State of water

South Eastern Australia has been experiencing severe drought conditions for the past few years. This is placing additional pressure on Sydney's drinking water supplies. The NSW Government released the *2006 Metropolitan Water Plan* (MWP). The plan is to ensure a sustainable and secure water supply for greater Sydney. The NSW Government is currently updating the plan for the longer term with the new plan to be released in 2010. Further details of the MWP are available at www.waterforlife.nsw.gov.au.

The Woollahra LGA drains into two water catchment areas, Port Jackson South Catchment (95% of the LGA) which includes the embayments of Rushcutters, Double and Rose Bay and the smaller bays including Vaucluse Bay, Parsley Bay, Watsons Bay and Camp Cove. The remainder flows into the Tasman Sea. There are three natural creeks in the LGA namely Parsley Bay, Cooper Park and Rose Bay Creeks.

Harbourwatch water quality of the receiving waters

The DECCW measures the recreational water quality of Sydney Harbour and the surrounding beaches through the Harbourwatch and Beachwatch programs. Water samples are collected from all swimming locations in the greater metropolitan region once every six days as a part of a long term monitoring program. The DECCW states that the sampling frequency is in accordance with the national health guidelines for recreational use of water. The samples are transported to a laboratory and analysed for the presence of two indicator organisms, faecal coliforms and enterococci, which may indicate the presence of sewage pollution in the water (DECCW, 2009).

To date samples have been compared to Beachwatch guidelines, which are based on the *Australian Guidelines for Recreational use of Water 1990*, National Health and Medical Research Council (NHMRC). The results are provided as a grouped percentage of compliance with the Beachwatch guideline levels for faecal coliforms and enterococci. From next year samples will be compared to the new NHMRC guidelines, which advocate enterococci as the single preferred indicator for the detection of faecal contamination in recreational waters. Enterococci found in the intestines of warm blooded animals is present in incredibly high numbers in raw sewage (millions of enterococci bacteria can be found in 100 milliliters of raw sewage). A strong relationship has been identified between illness rates in swimmers and elevated levels of the enterococci bacteria. It is important to note illness

is not caused by enterococci, it is a measure used to detect the presence of sewage, and the possible presence of pathogens which do cause illness (DECCW, 2009).

Faecal coliforms (also known as thermotolerant coliforms) have been used as a bacterial indicator in the monitoring program. Although faecal coliforms are present in very high numbers in raw sewage, it dies off rapidly compared to enterococci in marine waters and the link between illness rates in swimmers and this bacteria has been found to be poor. Therefore the NHMRC 2008 guidelines do not advocate using faecal coliforms as an indicator for recreational waters (DECCW, 2009).

The Harbourwatch monitoring program is more likely to detect aged sewage contamination than recent incidents because the samples are collected and analysed every six days (DECCW, 2009).

Five swimming locations in the Woollahra LGA are monitored through the Harbourwatch program:

- Redleaf Pool,
- Rose Bay Beach,
- Nielsen Park,
- Parsley Bay, and
- Watsons Bay.

Table 3 summarises the compliance results for the five swimming locations in Woollahra for over the last five financial years.

Table 3: Woollahra LGA Harbourwatch percentage compliance results

Swimming location	2004/2005				2005/2006				2006/2007				2007/2008				2008/2009				
	Summer		Winter		Summer		Winter		Summer		Winter		Summer		Winter		Summer		Winter		
	Fc	Ec	Fc	Ec	Fc	Ec	Fc	Ec	Fc	Ec	Fc	Ec	Fc	Ec	Fc	Ec	Fc	Ec	Fc	Ec	
Redleaf Pool	77	61	100	91	100	100	100	100	100	100	100	95	70	90	87	100	100	81	97	100	100
Rose Bay Beach	100	94	100	91	100	100	100	100	100	100	100	95	40	100	84	100	59	100	100	100	83
Nielsen Park	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Parsley Bay	100	90	100	100	100	100	100	100	100	100	100	100	85	100	94	100	100	100	100	100	100
Watsons Bay	100	90	100	100	100	100	100	100	100	100	100	100	90	100	84	100	100	100	100	100	83

Source: Department of Environment, Climate Change and Water (DECCW) 2009

Note: Fc = faecal coliforms and Ec = enterococci.

The DECCW allocates a ranking for all monitored harbour and ocean swimming beaches in the Hunter, Sydney and Illawarra regions on the basis of bacterial compliance during the summer swimming season. During the 2008/2009 reporting period Nielsen Park, Watsons Bay, Parsley Bay and Rose Bay Beach were all ranked first. Redleaf Pool was ranked eighth during the reporting period. During the 2007/2008 reporting period all of the swimming sites were ranked first.

Full compliance was recorded for both Nielsen Park and Parsley Bay, during summer and winter periods for 2008/2009. Compliance at both these sites has remained stable over the past five years.

During winter Redleaf Pool was the only site 100% compliant for both faecal coliforms and enterococci. Watsons Bay and Rose Bay Beach achieved 100% compliance for faecal coliforms, however results for enterococci for both sites fell short with 83% compliance.

For the exception of Redleaf Pool, all swimming sites in the Woollahra LGA all achieved 100% compliance for faecal coliforms and enterococci during the reporting period. The lower compliance results for Redleaf Pool correlates with the lower ranking by the DECCW.

The DECCW releases daily Beachwatch and Harbourwatch bulletins based primarily on rainfall data. These may also include reports of sewage treatment bypasses and other pollution incidents to provide information to the community on the potential risk of bacterial contamination in swimming areas. The daily bulletins are available on the Beachwatch website www.environment.nsw.gov.au/beach. Typically bacterial contamination often occurs during periods of high rainfall when the quantity of stormwater runoff is high and sewer overflows are likely.

Potable (drinking) water consumption

Residents and those who work in Woollahra used a total of 5,936,065 kilolitres (kL) of potable (drinking) water during the reporting period. This was an increase of 337,101 kL compared to 2007/2008 figures. This increase can be attributed to lifting of water restrictions, irrigation was increased to repair parks and bushland hit hard by lower rainfall.

To achieve a reduction in annual water use, council has implemented a number of water saving initiatives, including:

- retro fitting council's buildings and facilities with AAA rated fixtures,
- installation of rainwater tanks at depot and amenity buildings,
- investigating alternative water sources for council use,
- planting drought tolerant plant species in our public reserves,
- mulching of garden beds to retain soil moisture,
- using bore water instead of mains water to irrigate the majority of sporting fields,
- installation of water efficient irrigation systems, and
- incorporating stormwater treatment and reuse into council streetscape improvement works.

Rainwater tanks

Woollahra Council has installed a number of rainwater tanks over the past five years. The total storage of the twelve tanks is 142 kilolitres. Through the installation of rainwater tanks and other water efficient options council can reduce its water use, reduce stormwater run-off and save money on water bills.

Proposed locations for further rainwater tanks include:

- council chambers,
- annex building,
- Fletcher Street depot,
- Cooper Park Tennis & Café,
- Styne Park,
- Gaden Reserve,
- Robertson Park, and
- Rushcutters Bay Café.

Water pollution

Fourteen water pollution incidents were recorded by the DECCW pollution line during the reporting period, representing a small increase from the 2008/2009 reporting period. Although up two complaints from 2007/2008, this is still relatively low in comparison to previous years and reflects a continuing decline in the reported number of water pollution incidents over time. This trend is also reflected in the number of penalty infringement notices (PINs), which have decreased over the last five years. There were no prevention and clean up notices issued by council to regulate water pollution incidents during 2008/2009. Overall the number of notices issued and incidents reported to the DECCW in relation to water quality issues has improved.

Council continues to maintain the 232 pollution control devices (220 pit baskets and 12 GPTs) installed throughout the LGA. Council prevented 118 tonnes of vegetative matter, sediment and litter material from entering Sydney Harbour through cleaning drainage pits and gross pollutant traps (GPTs) over the LGA during the reporting period. 2008/2009 saw an increase of nine tonnes of matter caught by pits and traps. Pits and traps are cleaned after large rain events and frequently by council staff. Regular cleaning reduces the likelihood a pit / trap can become full, therefore the more a pit / trap is cleaned the more it can hold compared to those that are not regularly maintained. A combination of more pit baskets and gross pollutant traps and regular cleaning can further increase the amount of matter being diverted from entering Sydney Harbour.

Gross pollutants identified in and around Woollahra and its beaches, are a result of both the generation of pollution within the LGA as well as pollution transported by wave and wind action to the beaches of Woollahra. The water quality devices installed by council has stopped 227 tonnes from entering Sydney harbour in two years (2007 – 2009).

Hotspots for gross pollutants that have been identified through complaints to Council are focussed on the harbour beach areas of Watsons Bay and Rushcutters Bay. Specific community activism surrounding the state of Parsley Bay has focused a significant portion of Council resources to installing stormwater treatment elements in the catchment (2 figure below).

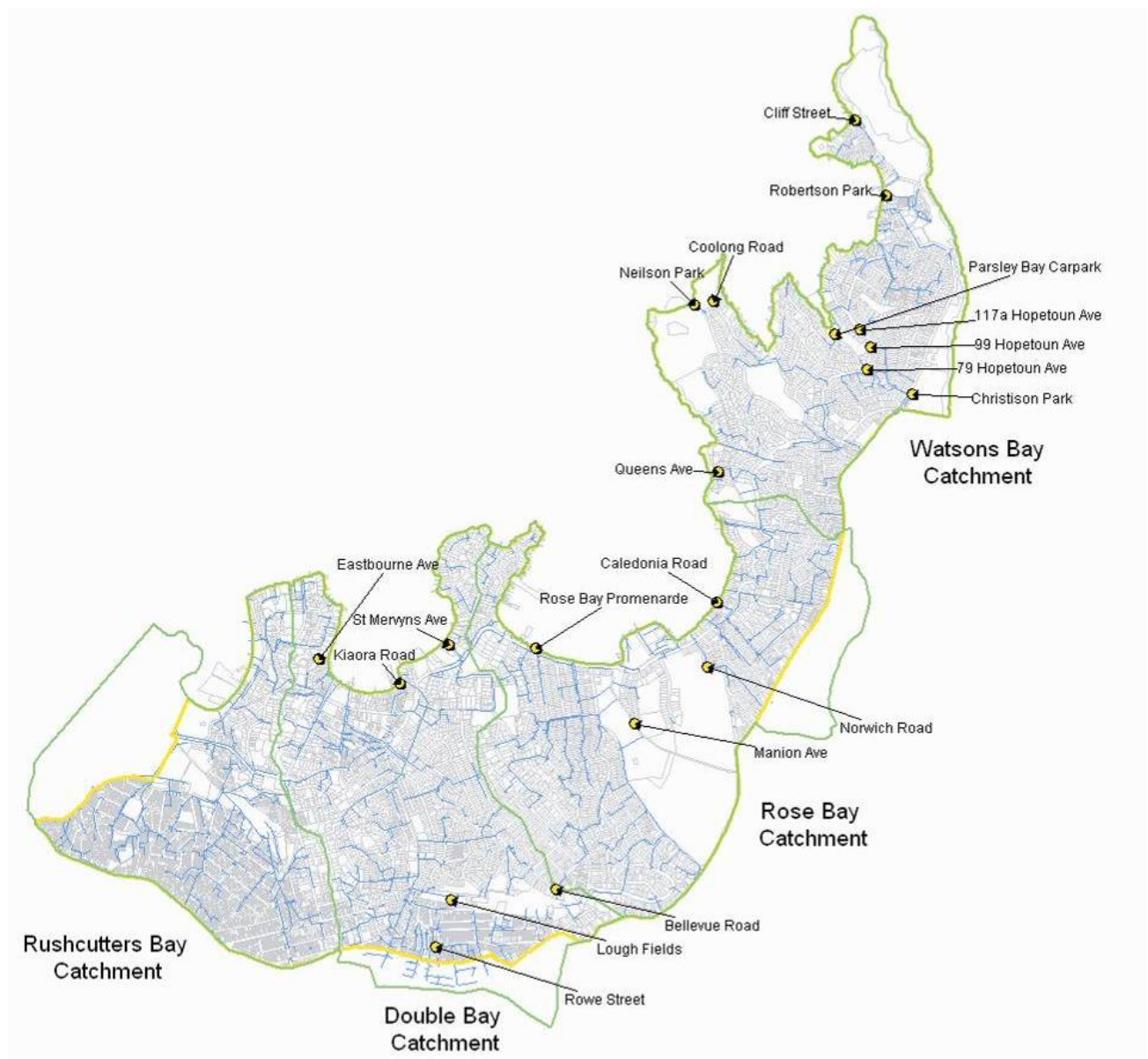


Figure 3: Location of Gross Pollutant Traps in Woollahra LGA, with GPTs referenced to Error! Reference source not found..

It is realistic to expect gross pollutants witnessed on the harbour beaches are a result of both generation within the Woollahra LGA as well as generated from the entire Sydney Harbour catchment. These pollutants including both anthropogenic and organic material accumulate at these beaches as a response to tidal and wind movement. Importantly the fine black material which is found at the waterline on beaches is typically a combination of both broken down organic matter and fine silts. These pollutants are generally not caught by gross pollutant traps due to their fine nature and the fact that organic matter such as leaves are distributed through the catchment including adjacent to beaches and waterways.

Table 4 presents the water data recorded each year, or when this data is available. Including this data into the SoE report provides quantifiable information to monitor a specific aspect of water (pressure, state, response) over time. These specific aspects of the data (i.e. water consumption LGA total) are known as indicators. Where this information has been recorded for a number of years, trends can be established.

The indicators have been chosen because they provide the status of a specific aspect relating to the environment, and the information is regularly being monitored by council and other government authorities. It must be noted that the list of indicators is not representative of outcomes for all water sector pressures, activities and projects.

Table 4: Water indicators

Indicator	1999/ 2000	2000/ 2001	2001/ 2002	2002/ 2003	2003/ 2004	2004/ 2005	2005/ 2006	2006/ 2007	2007/ 2008	2008/ 2009	Trend
Water consumption LGA total (kilolitres)	6,897,314	7,641,624	8,385,816	-	-	6,285,185	6,237,758	5,997,976	5,601,964	5,936,065	✓
Water consumption Woollahra council (kilolitres)	79,307	95,885	99,862	113,021	63,912	48,283	38,666	33,635	24,473	Awaiting data	
No. of council rainwater tanks*	-	-	-	-	-	-	-	8	8	12	✓
No. of pollution control devices installed	-	-	28	178	229	230 (10 GPTs and 220 pit baskets)	230 (10 GPTs and 220 pit baskets)	230 (10 GPTs and 220 pit baskets)	232 (12 GPTs and 220 pit baskets)	232 (12 GPTs and 220 pit baskets)	~
Total pollutants removed from pollution control devices (tonnes)*	-	-	-	-	-	-	-	-	109	118	✓
No. of stormwater discharge points into the harbour	118	-	-	-	-	110	-	-	110	110	~
No. of water pollution incidents (DECCW)	28	42	24	41	40	22	22	10	12	14	~
No. of clean up notices	5	-	2	6	9	9	0	0	2	0	✓
No. of prevention notices	-	-	4	3	6	0	0	0	0	0	✓
No. of penalty infringement notices issued	28	-	2	50	14	13	12	10	3	4	✓

Source: Sydney Water, Woollahra Municipal council, and Department of Environment, Climate Change and Water (DECCW).

Key: The following symbols represent improving (✓), worsening (✖) or stable (-) trends in the monitored aspects of the environment. The trend column is left blank where there is not enough information to establish a trend. Where no information is available, the (-) symbol is used. (*) represents new environmental indicator selected during 2008/2009, previous years data provided if available.

3.2 Pressures impacting on water

The waters of Woollahra are used for recreational purposes and also provide habitat for numerous flora and fauna. The impacts of urbanisation on these receiving environments include impairment of recreational water quality, high pollution loads and alterations to flora such as seagrasses and the habitats that they support.

Pressures affecting water in Woollahra include:

- increased stormwater run off due to high impervious surfaces. Impervious surfaces result in reduced water infiltration,
- altered flow rates of creeks and streams,
- loss of native vegetation and establishment of exotic species,
- pollution,
- nutrient run-off from gardens, recreational fields and animal waste,
- water pollution incidents, and
- aged sewer infrastructure resulting in sewer overflows.

The state of water NSW has been placed under additional pressure from the intensification of drought across the state. As a result of lower rainfall, pollutants are allowed to build up in catchment systems. During the next rain fall the build up of these pollutants are transported into creeks, streams, harbours and oceans significantly reducing water quality thereby directly affecting the health of aquatic flora and fauna.

3.3 Responding to water pressures

Woollahra Council has undertaken a range of initiatives on improving its management of the urban water cycle – potable mains water, stormwater and wastewater, over the past ten years. Significantly strategies inlaying the ground work for these works were the development of the Port Jackson South Stormwater Management Plan and the introduction of capital and environmental levies to fund works. Woollahra Council has also been successful in winning a series of grants and is in a good position to generate a new framework for water management within council.

Integrating the principles of total water cycle management into land management practices is vital to effectively address the pressures impacting on our water catchments. The following activities and projects aim to contribute to reducing potable water use, improving local water quality and overall water catchment health.

WaterFix Program – Sydney Water

All Sydney Water customers are able to participate in the WaterFix program, which is aimed at reducing household water usage. The program includes:

- do it yourself (DIY) water saving kit: consisting of self installation water saving devices,
- WaterFixing the home: for \$22 a certified plumber will visit your home and check for water leaks and install water saving devices,
- \$150 washing machine rebate,
- \$1,500 rainwater tank rebate, and
- the Love Your Garden program.

For further information on the WaterFix program visit www.sydneywater.com.au.

Participating in the WaterFix program provides Sydney Water customers an opportunity to:

- save an average of 20,900 litres of water a year,
- save up to \$83 a year on water and energy bills

- talk to a qualified plumber about other water reducing opportunities in your home, and
- update your showerhead at a very low price.

Community interest shown in the program represents growing awareness of water conservation and residents willingness to do their part to reduce water consumption across the LGA. Numbers of residents participating in the project are below.

Table 5: WaterFix participation

WaterFix Program	2008/2009	Total 1999 to 2008
DIY Kits	110	1,418
Love Your Garden	95	249
Rainwater Tank Rebate	19	241
Toilet	35	50
Washing Machine Rebate	676	2,692
WaterFix	44	3,544
Total LGA Participation	979	8,194

Port Jackson South Stormwater Management Plan

The Port Jackson South Stormwater Management Plan (SMP) was prepared by Patterson Britton and Partners (1999), to fulfil the s12 Direction issued by the then NSW Environment Protection Authority. The SMP catchment includes all areas draining Port Jackson South and extends eastwards from Iron Cove to Watsons Bay. The SMP includes the council areas of Leichhardt, Marrickville, City of Sydney, Waverly, and Woollahra. The SMP had a defined methodology, which identified a series of works for each of the councils, as well as Sydney Water and the Roads and Traffic Authority.

The SMP identified a series of works for Woollahra Council which has formed the basis of its Environmental Works Program for the past five years. Several of the specific projects undertaken through this project are outlined in sections below. While a key for the evolution of stormwater management, a few significant factors have hampered the implementation of SMPs. The SMPs were written nearly 10 years ago and based on a large catchment. The consultants preparing the plans generally recommended the installation of GPTs on all major outlets to receiving waters. Since that time the evolution of stormwater management has lead to a greater understanding of the relationship between stormwater quality and receiving water health, as well as greater research into the effectiveness of stormwater quality controls.

Water Quality At-Source Treatment Program

The objectives of the Water Quality At-Source Treatment Program are to prevent pollutants, litter, vegetation matter and sediment entering the Harbour. Education programs, and installation of water quality devices such as stormwater inlet pit baskets and WSUD rain-gardens are the types of management initiatives that meet this objective. Projects carried out over the financial year are summarised as follows:

Environmental Education

During the 2008 – 2009 reporting period, Woollahra’s Environmental Education Officer continued working on projects and events focused on our four target groups – residents, schools, business, and council staff. Woollahra’s Environmental Education Officer managed councils Sustainability Workshop Series and hosted eight community workshops.

Water savings action plan implementation

Council’s adopted Woollahra Water Savings Action Plan was approved by the Minister of Utilities in February 2007. The plan identifies how much water is being used at council’s top ten water using sites and identifies and prioritises actions to reduce potable water use. Through the adoption of the WSAP, council has adopted a 20% reduction target in potable water use across council’s operations from the base year (2004/2005) water use.

Council’s top ten water using sites are:

- Woollahra Council Chambers – 10 ML/yr,

- Yarranabbe Park + Olympic legacy berths and hardstand – 4.3 ML/yr,
- Christison Park – 4 ML/yr,
- O’Dea Depot – 2.7 ML/yr,
- Lyne Park – 2.7 ML/yr,
- Sherbrooke Hall – 2 ML/yr,
- Trumper Oval – 2 ML/yr,
- Watsons Bay Baths – 1.9 ML/yr,
- Woollahra Park building complex - 1.6 ML/yr, and
- Robertson Park – 1.5 ML/yr.

Council submitted the first annual WSAP progress report to the Department of Environment and Climate Change by 30 June 2008. The progress report was based on the latest available water data for 2006/2007, as provided by Sydney Water. The report showed that the majority of water conservation actions identified in the WSAP had been implemented, including the:

- reduction of flush volume and tap flow rates at the Woollahra Council Chambers,
- installation of time flow taps, tap locks and cistern valves in amenities at Christison Park,
- investigation alternative park irrigation water sources at Christison Park,
- installation of dual flush cisterns, flow restrictors, AAA shower heads and cistern valves at the O’Dea Depot site,
- installation of three rainwater tanks at O’Dea Depot,
- installation of time flow taps at Lyne Park,
- installation of tap flow restrictors and dual flush cisterns into Sherbrooke Hall,
- installation of urinal flush valve, time flow taps and tap locks at Trumper Oval, and
- installation of dual flush cisterns, time flow taps, urinal flush valve and tap locks at Watsons Bay Baths and amenities.

Rose Bay Promenade Upgrade - stormwater treatment and re-use

Council completed the upgrade of the Rose Bay Promenade in June 2008. An important component of the project is the treatment of stormwater and the storage and re-use of the treated stormwater for council uses. The parking bays located along the promenade are being constructed of a porous paving infiltration system. Stormwater runoff from New South Head Road will be treated as it flows through the porous paving and filtration material. The treated stormwater will then be diverted to underground tanks capable of storing up to 200,000 litres. The treated stormwater will be used by council for irrigation and maintenance purposes, saving precious litres of drinking and bore water.

The stormwater treatment and re-use component of the Rose Bay Promenade Upgrade is being partly funded through a grant from the NSW Government’s Urban Sustainability Grant Program.

A water quality monitoring program is currently underway to measure the quality and quantity of water running through the system. The results will be reported back to council, community and the Environmental Trust.

Water Quality ‘End of Line’ Treatment Program

The objective of Water Quality at ‘End of Line’ Treatment Program is to prevent pollutants, litter, vegetation matter and sediment entering the Harbour. Installation of larger water quality devices, such as Gross Pollutant Traps and Stormwater Booms, are constructed low in the catchments at the end of the stormwater network prior to discharging into the Harbour and are the types of management initiatives which meet this objective.

Holdsworth Community Centre water saving challenge

Woollahra Council has received \$79,427 from the NSW Government’s Climate Change Fund, retrofitting Holdsworth Community Centre, saving 700,000 litres of water annually and creating a demonstration site for residents to view latest sustainable technologies.

Local Flooding, Critical Pits and Overland Flow Program

The objective of this program is to reduce the incidence of local flooding to property and overland flows which can have a detrimental effect on stormwater quality through increased sediment erosion within the catchment.

Drainage and water quality project at The Crescent, Vaucluse

Properties along Hopetoun Ave and The Crescent, Vaucluse have been subject to flooding in the past. Extensive investigation has been completed and a combination drainage and water quality project recommended and adopted by council to reduce the flood risk and treat the storm water being discharged to the environmentally sensitive receiving waters of Parsley Bay.

The project includes:

- upgrading local drainage infrastructure and gross pollutant trap to increase stormwater capacity to transport flows and capture pollutants before they reach the harbour,
- flow diversion structures and energy dissipation to direct and reduce the velocity of increased flows, protecting the open channel through Parsley Bay Reserve from scouring and erosion and reducing the amount of sediment which is transported downstream to Parsley Bay, and
- installation of a WSUD bio-retention system to treat overland flows from Hopetoun Ave for typical road runoff contaminants.

This project was completed in July 2009.

Drainage Works at Fisher Ave, Vaucluse

New drainage infrastructure and a new GPT has been constructed for Fisher Ave, Vaucluse to direct overland flow to Rakes Gully and reduce the flow of water traveling down the Avenue causing local flooding to a number of residences. The new Gross Pollutant Trap will collect leaves and sediment from entering Rakes Gully which was restored by council in 2003. Works included the construction of new 600mm diameter concrete pipes and stormwater pits, as well as a gross pollutant trap.

This project was completed on the 21 November 2009.

Water Sensitive Urban Design Bellevue Road Streetscape Improvements

Council has commissioned consultants to design a series of WSUD features as part of the proposed streetscape improvement works on Bellevue Road. The improvements will include a bio retention system and rain gardens to reduce urban runoff and help filter pollutants from road runoff before it enters the stormwater system. The incorporation of WSUD elements into the streetscape improvements will improve the quality of water flowing into Cooper Park Creek. This project is under construction and is due for completion in April 2010.

Cooper Park Upper Pond Rehabilitation Project

Council has completed the Upper Pond Rehabilitation Project at Cooper Park, Bellevue Hill. The project was implemented to:

- reduce sediment loading on the pond and creek system downstream,
- reclaim the original pond size and shape, and
- remove non-native trees and regenerate the native vegetation along the creek banks.

The final project will incorporate Water Sensitive Urban Design (WSUD) principles to treat and remove gross pollutants and sediment, protecting the pond and creek downstream from future pollution. Sediment sampling has been undertaken as a part of the investigations, to classify the sediment found in the pond for removal and appropriate disposal.

Cigarette Butt Litter Reduction

Council had twenty-five cigarette butt disposal units installed within the Double Bay, Rose Bay and Edgecliff business districts on a twelve month rental contract. The disposal units capture an estimated 50,000 cigarette butts per week, preventing this litter from reaching the ground and ultimately Sydney Harbour through the stormwater system. Council purchased the units following the successful twelve month trial, and they will remain in operation in the commercial centres.

Sydney Harbour Week 7 – 15 March 2009

In 2009 the Sydney Harbour Foreshore Authority announced that Sydney Harbour Week in 2010 will be postponed. The decision was taken after a comprehensive review of the event by the key government agencies involved in the event since its inception. The review confirmed that after nine years its place in the Sydney events calendar had diminished along with participation. Feasibility of a revised format and scheduling is currently being undertaken.

To date the Sydney Harbour Week was held annually early March to celebrate Sydney Harbour. The event coordinated by the Sydney Harbour Foreshore Authority, aimed at providing an opportunity for the community to interact with and learn about Sydney Harbour through participation in organised activities. Activities ranged from Harbour discovery tours and educational forums to how-to-sail classes.

Sydney Coastal Councils Group Summer Activities Program (January 2009)

The Sydney Coastal councils Group Summer Activities Program was conducted during January 2009. The program aims to educate the community about Sydney's beautiful coastal environment through organised activities. The activities are organised by the individual councils, and coordinated by the Sydney Coastal Councils Group.

Woollahra council organised the following activities for the January 2009 program:

- *Walk on the Wild Side – children's nature walk,*
- *Parsley Bay Guided Bushwalk, and*
- *Rockpool Ramble.*

The Woollahra activities were very successful with approximately 130 people participating.

3.4 Future actions

In preparing comprehensive SoE reports councils are to identify any gaps in available data and the actions required to obtain that information. The following actions have been identified:

- undertaking and Estuary Management Plan covering bays in Woollahra, which will look at the health of the bays and ways to conserving these habitats for the future
- monitoring of stormwater outlets near recreational swimming sites to identify any water quality issues,
- rainwater harvesting and bioretention and
- further water reducing projects to further reduce water consumption across the LGA.

Further actions have been identified in the *Woollahra Council Management Plan 2007 – 2010*.

4. Biodiversity

Biological diversity or biodiversity is defined as the variety of all life forms (plants, animals and micro-organisms), the genes they contain and the ecosystems to which they form a part of (NPWS, 1999). Healthy, functioning ecosystems are necessary to maintain the quality of the atmosphere, climate, fresh water, soil formation, cycling of nutrients and the disposal of wastes. Indeed, the conservation of biodiversity is a cornerstone of ecologically sustainable development (EPA, 1997b).

Australia is recognised as one of the twelve most biologically diverse, or megadiverse, areas on earth. It is home to approximately half a million species, of which 80% are endemic (found only in Australia). Although much of this diversity is concentrated in 'hot spots' such as south-west Western Australia and the tip of North Queensland, many species are found in and around the Sydney region (EPA, 2000).

The vegetation of Australia is divided into distinct regions referred to as bioregions. The Woollahra LGA is located within the Sydney Basin bioregion, an area that extends from Batemans Bay in the south to Nelson Bay in the north and west to Mudgee. The Sydney bioregion is one of the most species diverse regions in Australia due to the variety of rock types, topography and climate. Almost 40% of the region is classified as conservation-oriented land use and is home to twenty-one endangered and 94 vulnerable fauna species (NPWS, 2003).

Indicators have been selected to measure local issues, activities and condition of biodiversity in the Woollahra LGA.

4.1 State of biodiversity

The Woollahra LGA has approximately seventy-five hectares of bushland located in nine bushland reserves. Three vegetation communities are present containing the 311 native plant species, including two threatened and one vulnerable plant species. Plants and animals are often referred to as flora and fauna respectively. A copy of the flora and fauna species lists (1995) for Woollahra are included as Appendix B.

The following information describes the original vegetation communities of Woollahra, where these communities were found historically, and where they exist today.

Remnant vegetation

South Head, Vaucluse and Bellevue Hill

Heath vegetation and low scrub (approximately two to five metres high) on the exposed rocky outcrops and shelves consisted of species such as *Acacia longifolia* (Sydney Coast Wattle), *Allocasuarina distyla* (Scrub She-oak), *Kunzea ambigua* (Tick Bush), *Banksia ericifolia* (Heath Banksia), *Westringia fruticosa* (Coast Rosemary), *Eucalyptus obtusiflora* (Port Jackson Mallee), and smaller wildflowers and ground covers. Remnant vegetation of this type is found growing at the Gap and Gap Bluff parks at South Head.

Vaucluse Point (Nielsen Park), Point Piper and Darling Point

Low forest and scrubland of mixed species to an optimum height of 14 metres. *Angophora costata* (smooth-barked Apple), *Eucalyptus botryoides* (Bangalay), *Banksia serrata* (Old Man Banksia) and *Banksia integrifolia* (Coast Banksia), *Ficus rubiginosa* (Port Jackson Fig), *Allocasuarina littoralis* (Black She-oak), *Casuarina glauca* (Swamp Oak), *Kunzea ambigua* (Tick Bush) and many smaller plant species. Remnant vegetation of this type exists at Nielsen Park and along the Hermitage Foreshore Reserve and 'The Crescent Area', Parsley Bay Reserve.

Valleys - Rushcutters Bay (to Trumper Park), Double Bay (to Cooper Park), Vaucluse Bay and Parsley Bay

Taller eucalypt forest (Tall Open Forest) gaining a height of 25 metres would be found here.

Typical species including *Eucalyptus piperita* ssp. *pipertia* (Sydney Peppermint), *E. Pilularis* (Blackbutt), *E. Punctata* (Grey Gum), *E. Botryoides* (Bangalay), *E. robusta* (Swamp Mahogany) and *Angophora costata* (Smooth-barked Apple). *E. Tereticornis* (Forest Red Gum) can also be found surrounding Vaucluse Bay.

According to Benson and Howell, (1990) the alluvial flats at the heads of bays such as Rushcutters Bay and Double Bay would have been forest with trees of *Eucalyptus tereticornis* (Forest Red Gum), *E. robusta* (Swamp Mahogany), *E. botryoides* (Bangalay) and small rainforest-type pockets of *Livistona australis* (Cabbage Tree Palm). The latter were used for constructing the huts for the first settlement. Benson and Howell, (1990) state that “this was probably the only vegetation approaching rainforest in the Eastern Suburbs”. Remnant vegetation of this type can be found at Cooper Park, Parsley Bay and Vaucluse Bay.

Cooper Park is roughly composed of two remnant vegetation areas:

- I. The north-facing valley side grows *Angophora costata*, *Eucalyptus punctata* and *Kunzea ambigua* scrub.
- II. The south-facing sandy slope retains open forest of *E. gummifera*, *E. piperita*, *E. pilularis*, and *E. botryoides*, with a mixture of rainforest species such as *Elaeocarpus reticulatus* (Blueberry Ash), *Glochidion ferdinandi* (Cheese Tree), *Acmena smithii* (Lillipilli) and *Callicoma serratifolia* (Black Wattle) on the lower valley sides.

However, it is difficult in Cooper Park to identify remnants against the proliferation of planted native species, which occurred in the 1930s and 1974-6. Over 500 native trees shrubs and grasses were planted in 1974-6 when a three-year revegetation and regeneration scheme was undertaken.

Rose Bay

This area apparently supported dune scrub vegetation with fragmented stands of Paper-bark swamp. The dominant species are assumed to be *Leptospermum laevigatum* (Coast Tea-tree), *Banksia serrata* (Old Man Banksia), *Banksia ericifolia* (Heath Banksia), *Casuarina* sp. (different species of She-oaks), and *Melaleuca quinquenervia* (Broad-leaved Paper-bark). Most of this vegetation type has been destroyed.

The Royal Sydney Golf Course contains small remnants of vegetation including the northeast corner of Paper-barks. However, many interesting species have been lost to development. Benson and Howell indicate that *Dodonaea falcata* (Thread-leaf Hop Bush), a species endemic to the Castlereagh Woodlands (near Penrith and Kenthurst), the northwest slopes and Queensland, was collected in this area. Further surveys need to be carried out to determine the extent of remnant vegetation on the golf course, especially to determine if species representative of the Eastern Suburbs Banksia Scrub vegetation community is present.

Endangered, threatened and vulnerable species and populations

Two endangered and one vulnerable threatened plant species are found in the Woollahra LGA.

- *Acacia terminalis* ssp. *terminalis*, the Sunshine Wattle, is a species listed as endangered on Schedule 1 of the *Threatened Species Conservation Act 1995*. The species has been formally identified within the Woollahra LGA at Gap Park, Parsley Bay, Cooper Park and Nielsen Park. The primary threat to the survival of this species has been habitat loss due to development (NPWS 2004a).
- *Allocasuarina portuences*, the Nielsen Park She Oak, is a species found only at Nielsen Park, Vaucluse. This species is listed as endangered on Schedule 1 of the *Threatened Species Conservation Act 1995*. The species has also been listed as nationally endangered under the

Environment Protection and Biodiversity Conservation Act 1999. The NPWS has prepared the *Allocasuarina portuences Recovery Plan 2000* to direct the future management of the species. This species is at risk due to low rates of reproductive success, an inappropriate fire regime, weed invasion, habitat degradation as a result of recreational use, and possible contamination by landfill (NPWS, 2009).

- *Callistemon linearifolius*, the Narrow-leaf Bottlebrush, is a species listed as vulnerable on Schedule 2 of the *Threatened Species Conservation Act 1995*. This species has been formally identified within Gap Park, Watsons Bay. This species is threatened by a continuing loss of habitat resulting from urban development, and has a high risk of extinction due to low population numbers (NPWS, 2009).

The total number of endangered and vulnerable flora species and remnant vegetation reserves has remained stable over the last ten years, despite growing pressure from population growth, domestic animals and urban development. Through hours spent by council staff and volunteers in regeneration programs, the number of weed species found in the LGA has also remained stable along with the number of native flora species. The stability of these indicators represent that these aspects of Woollahra's biodiversity are being managed in a way that is ensuring their future within the local area.

Threatened and priority fauna

Through the regeneration of bushland areas and improvement of water quality in Woollahra, both terrestrial and aquatic habitats can result in habitats with greater biodiversity. 'threatened and priority fauna' is referred to as fauna which:

- was once found in the LGA in recent times (within the past 50 years) but has not been recorded in recent fauna surveys,
- has never been identified in previous fauna surveys in the LGA,
- not expected to be found in the geographical region or climate,
- is a population that is now fragmented, isolated and likely to be vulnerable to extinction, and or
- is a declining population.

During the 2008/2009 reporting year, one 'threatened and priority fauna' was identified by council staff, a white-headed pigeon (*Columba leucomela*), native to Australia. This species of pigeon range from Cooktown in far north Queensland to the Illawarra district in NSW. In the south the pigeon is found in lowland rainforests. This species is not under threat however is very rare to be seen due to their secretive behaviour (Australia Zoo, 2009).

Threatened and priority fauna of interest for the Woollahra LGA include:

- Little Penguin – *Eudyptula minor*,
- Eastern Qualls – *Dasyurus viverrinus*,
- Grey-headed flying-fox – *Pteropus poliocephalus*, and
- Sharks and rays.

If you identify a 'threatened and priority fauna' contact Woollahra Council's Sustainability Projects Officer 02 9391 7000.

Recording 'threatened and priority fauna' can also be used to identify if new fauna population(s) are establishing in the LGA and if management actions are required for their protection and or control.

Little Penguin – Eudyptula minor

Are flightless birds which breed from south of Port Stephens in NSW and stretch down the coast along Victoria, South Australia, Tasmania and even Fremantle in Western Australia. Previously common on the mainland of Australia, populations are generally restricted to offshore islands. The

only known breeding population on the mainland in NSW is located within North Sydney Harbour and has been declared as an endangered population (DEC, 2009).

Eudyptula minor the smallest of the penguin species weighs between 1000 and 1200 grams and is approximately 30 centimetres tall. Their upper body is slate-black with a white underbelly, blue and black flippers with a trailing edge and white below, a black bill, silver grey eyes and pale feet with black soles (DEC,2009).

Colonies are usually established in sand-dune vegetation, but colonies have been found in rocky areas, sea caves and on headlands and usually nests in burrows. The little penguin has a diet that consists of small fish, squid and krill. Majority of the penguins feeding grounds are in shallow waters (15 to 20 kilometres of the coast), but have also dive to the sea floor (DECCW, 2009d).

Little penguins are routinely sighted by swimmers and sailors in eastern suburbs bays, and it is critical that habitat for this species is preserved and enhanced.

The greatest threats listed by the DECCW (2009d) to the little penguin on the Australian mainland are attacks from foxes, cats and dogs. Other pressures / threats affecting little penguins include:

- habitat destruction and disturbance through human activity (i.e. land clearing),
- construction pollution and run-off,
- irresponsible boat / jet ski behaviour,
- reduction in food supplies through over fishing, and
- introduction of exotic diseases / parasites.

A Penguin Safe Habitat Program could be considered which would aim to educate water users, residents and companion animal owners on protecting the Little Penguin from injury or death caused by discarded fishing tackle and plastics, boat collisions, and attacks by foxes, cats and dogs. The program could also consider habitat restoration and habitat-friendly designs during foreshore redevelopment projects.

Eastern quolls - *Dasyurus viverrinus*

Eastern quolls (*Dasyurus viverrinus*) are about the size of a very small domestic cat averaging 60 cm in length and 1.3 kg in weight; females are slightly smaller. They have soft fur that is coloured fawn, brown or black. Small white spots cover the body except for the white-tipped bushy tail. It hunts and scavenges, feeding largely on insects and spiders, but may also prey on rats and mice. Eastern quolls are nocturnal and only occasionally forage or bask during daylight. During the day they sleep in nests made under rocks in underground burrows or fallen logs. Woollahra was the last known mainland Australian location where Eastern quolls inhabited. The last quoll was found killed on Vaucluse Road, adjacent to Neilsen Park in 1963. They are now considered probably extinct on the mainland.

The species fortunately still survives in Tasmania, and mainland breeding programs and future reintroductions are anticipated for this species that is well suited to suburban locations that provide protected habitat which are free from predators including foxes, cats and dogs.

Grey-headed flying-fox – *Pteropus poliocephalus*

The most noticeable bat species seen within Woollahra is the Grey-headed flying-fox. This native species of bat feeds on nectar and fruit, and roosts during the day in treetop colonies, located outside of the Woollahra Municipality, where they remain busy with social activities, grooming or fanning themselves, caring for their babies, or sleeping. Flying-foxes are nomadic, and will only persist in an area whilst trees are in flower / fruiting.

The Grey-headed flying-fox is listed as a threatened (vulnerable to extinction) species at State, Federal, and International levels. The population of this bat is declining rapidly, from many millions in the 1930's to less than 450,000 in 2004, with an estimated 30% decline in population between 1990 and 2000. A recent population study (Divljam, 2008) suggests the Grey-headed flying-fox will be extinct in the wild in around 80-85 years.

The flying fox is vitally important part of the Sydney ecosystem, assisting with pollination and dispersal of seeds as well as playing an important role in the natural control of insect populations, and it is important that Woollahra pays a role in ensuring bat feeding sources are protected and enhanced. The Woollahra Council Tree Preservation Order is one method used to ensure habitat for flying foxes is preserved.

Ferral species programs

Ferral species control programs are aimed at reducing the impact of an introduced species on native biodiversity, presently there are no such programs active in the Woollahra LGA.

Feral animals can pose a significant threat to native biodiversity and pets through attacks and disease if not properly managed (DECCW, 2009b).

European Red Fox – *Vulpes vulpes*

After their introduction in 1871 in Victoria the European Red Fox (*Vulpes vulpes*) crossed over into New South Wales in 1893 (DECCW, 2009b). The fox has been identified as a serious threat to biodiversity and has been listed as a key threatening process under the Commonwealth's *Environment Protection and Biodiversity Conservation Act, 1999* (Northern Territory Government, 2009).

Medium to high density fox populations are present over NSW including Sydney suburbs, and are present where food is most available (DECCW, 2009e).

Foxes are a main carrier of diseases and parasites, including rabies, mange, distemper, hepatitis and hydatid worms. These pose a risk to humans, pets and native animals.

From preliminary results from research carried out in Western Australia, the density of the chuditch (*Dasyurus geoffroii*) increases following 1080 poisoning of foxes (Northern Territory Government, 2009).

Foxes have been spotted across the Woollahra LGA including Cooper Park and Cristinson Park.

Sea grass beds and sand banks

Seagrass beds occur along tidal shorelines that are inundated with marine seawater, and occur in estuaries and shallow coastal waters with sandy or muddy bottoms. Recent assessments of seagrass in Parramatta River and Sydney Harbour (NSW DPI, 2008), show that seagrasses are influenced by sea level, sediment type, bathymetry (gentle slopes), wave energy (limited) and tidal range.

Seagrasses are very efficient at photosynthesizing and are highly productive, and provide habitat for seaweeds and filter-feeding animals like bryozoans, sponges, and hydroids as well as the eggs of ascidians (sea squirts) and molluscs (EPA, 2003). They are valuable as nursery and shelter areas for many aquatic animals, including commercially and recreationally important fish, molluscs and crustaceans. Like other estuarine vegetation, seagrasses remove nutrients from the water and facilitate sedimentation. They also baffle water currents, preventing erosion and stabilizing sand and mud banks.

An example of the wide variation in cover that can occur is at Rose Bay (Figure 3 and Figure 4). The area shaded dark green in Figure 4 represents the core area that was covered with seagrass in each of the four survey years (1978, 1986, 2000 and 2003). Note that in 1986, the peak year of cover (blue-green), there was considerable expansion down slope (offshore) augmented with some upslope (onshore) increase.

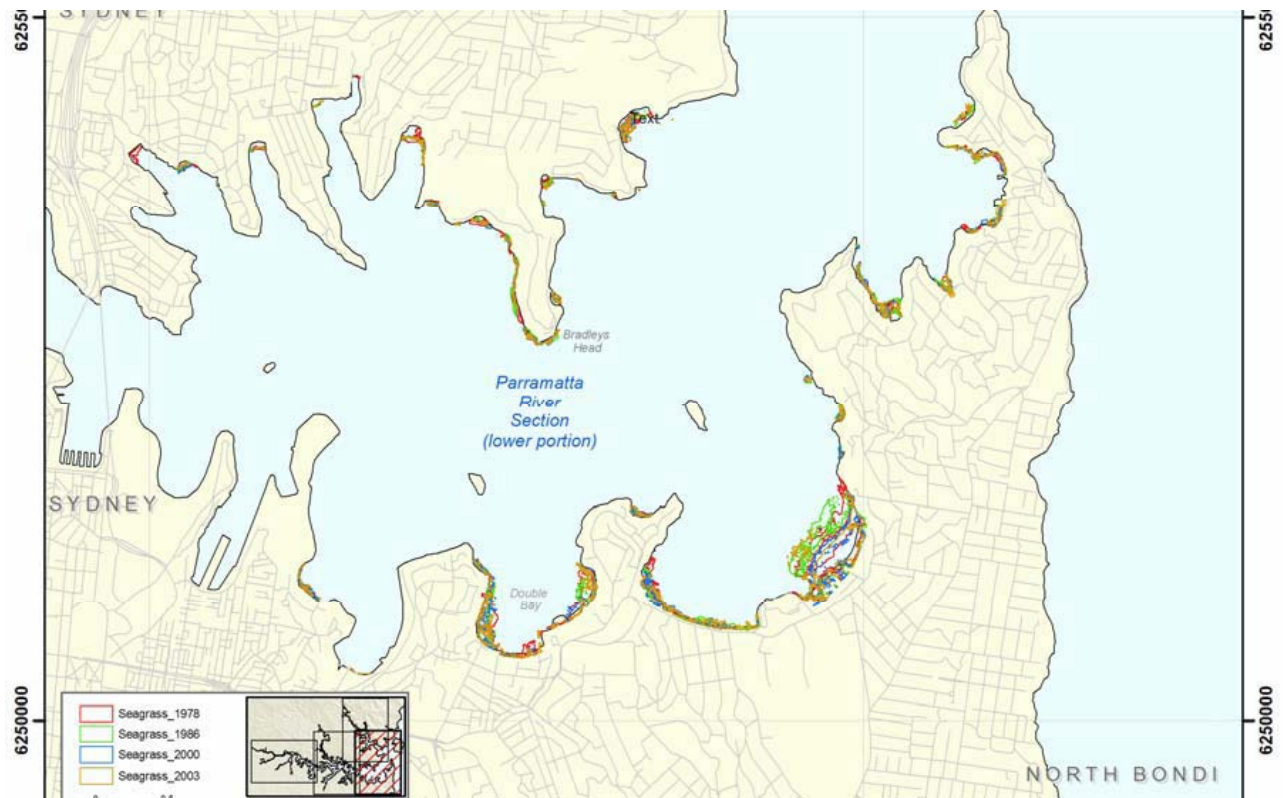


Figure 3: Historical distribution of seagrass in the Parramatta River, Harbour Entrance, 1978 – 2003 (NSW DPI 2008)

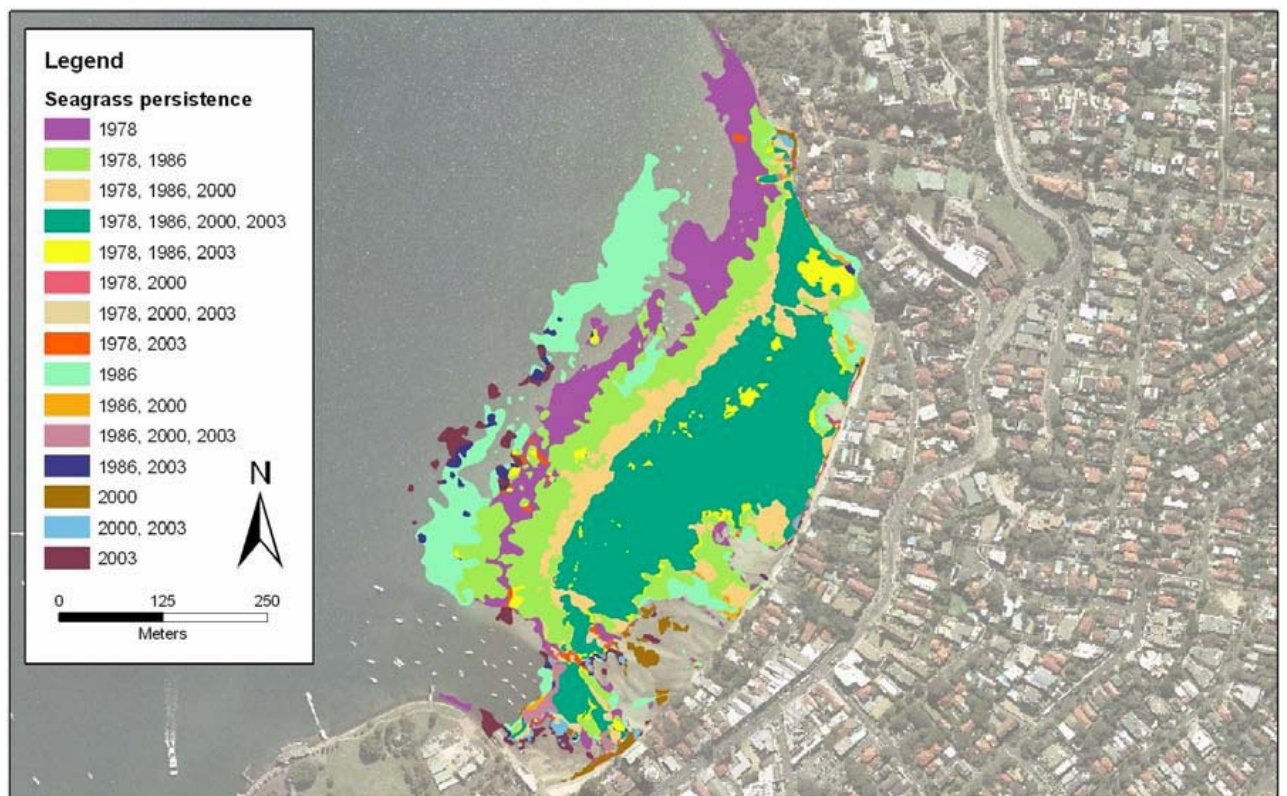


Figure 4: Persistence of seagrass at Rose Bay (dark green indicates seagrass that was in the same location for all time periods) (NSW DPI 2008).

Management issues related to sea grasses relate to:

- Nutrient enrichment and high level of suspended solids from urban runoff threaten seagrass beds. The nutrients facilitate algal blooms which reduce light availability. Suspended sediment also blocks light, which is essential for photosynthesis,
- The loss or reduction in the extent of seagrass beds is problematic for other species that rely on them for food and habitat, like dugongs for example,
- Seagrasses can be physically damaged by repeated trawling and outboard motors. As seagrass beds rely on mangroves for their supply of nutrients, the destruction of mangrove wetlands may disrupt seagrass bed systems as well, and
- The removal of sandbanks can expose the plants to sediment-stirring waves. With a higher fraction of suspended sediment, light availability will be reduced, and without the physical barrier of the sandbanks, the beds may drain and dry out at low tide.

The extent seagrasses and sandbanks, particularly those in Rose Bay as shown in Figure 5, are a response of tide, wave and wind energy. While the seagrasses in this area will be impacted by this movement as identified in the points above, their survival is also influenced by nutrients and sediments generated by the catchments in these areas.



Figure 5: Saltmarsh and sandbar extent – 1943 (Top left) (Department of Lands 2009); 2005 (top right) (Woollahra Council 2009a); 2006 (Bottom left) (Department of Lands 2009); 2008 (bottom right).

Table 6 presents the biodiversity data recorded each year, or when this data is available. Including this data into the SoE report provides quantifiable information to monitor a specific aspect of biodiversity (pressure, state, response) over time. These specific aspects of the data (i.e. number of remnant vegetation reserves) are known as indicators. Where this information has been recorded for a number of years, trends can be established.

The indicators have been chosen because they provide the status of a specific aspect relating to biodiversity, and the information is regularly being monitored by council and other government authorities. It must be noted that the list of indicators is not representative of outcomes for all biodiversity sector activities and projects.

Table 6: Biodiversity indicators

Indicator	1999/ 2000	2000/ 2001	2001/ 2002	2002/ 2003	2003/ 2004	2004/ 2005	2005/ 2006	2006/ 2007	2007/ 2008	2008/ 2009	Trend
No. of remnant vegetation reserves	9	9	9	9	9	9	9	9	9	9	~
Total area (ha) of bushland*	-	-	-	-	-	-	-	-	-	23.85	
No. of regeneration/ revegetation sites	7	8	8	8	8	8	8	8	8	8	~
Total area of bush under regeneration (ha)*	-	-	-	-	-	-	-	-	-	17.76	
Number of hours by bush regeneration volunteers*	-	-	-	-	-	-	-	-	-	2,053	
Number of endangered ecological communities*	-	-	-	-	-	-	-	-	-	0	
No. of flora species: Endangered	2	2	2	2	2	2	2	2	2	2	~
Threatened*	-	-	-	-	-	-	-	-	-	0	~
Vulnerable	1	1	1	1	1	1	1	1	1	1	~
Incident reports to DECCW environment line*	-	-	-	-	-	-	-	-	-	1	
No of native flora species in LGA	311	311	311	311	311	311	311	311	311	311	~
No. of weed flora species in LGA	180	180	180	180	180	180	180	180	180	180	~
No. of fauna species*: Endangered	-	-	-	-	-	-	-	-	-	1	
Threatened	-	-	-	-	-	-	-	-	-	0	
Vulnerable	-	-	-	-	-	-	-	-	-	7	
Number of endangered fauna populations*	-	-	-	-	-	-	-	-	-	0	
Number of feral species targeted through programs*	-	-	-	-	-	-	-	-	-	0	
No. recovery plans approved	1	1	1	1	1	1	1	1	1	1	~
Reports of 'threatened and priority fauna' (i.e. turtles, seals, bird species)*	-	-	-	-	-	-	-	-	-	1	

Source: Woollahra Municipal council, National Parks and Wildlife Service and Department of Environment, Climate Change and Water (DECCW).

Key: The following symbols represent improving (✓), worsening (✖) or stable (~) trends in the monitored aspects of the environment. The trend column is left blank where there is not enough information to establish a trend. Where no information is available, the (–) symbol is used. (*) represents new environmental indicator selected during 2008/2009, previous years data provided if available.

4.2 Pressures impacting biodiversity

The Department of Environment, Climate Change and Water (DECCW) reports that the loss of biodiversity and the overall decline of native species are two of NSW's greatest environmental challenges (DECCW, 2007). This loss and decline are largely due to the impacts of agriculture, urban development and unsustainable natural resource management practices carried out over the past 150 years. The resulting loss, fragmentation and degradation of native vegetation have been compounded by the introduction of threats such as pests and weeds, diseases, inappropriate fire and grazing regimes and pollution (DECCW, 2007).

The main pressures impacting on the health of Woollahra's bushland and biodiversity are:

- fragmentation of remnant bushland,
- introduced/weed species,
- urban runoff and stormwater,
- sewer overflows,
- altered fire regime (too infrequent and not hot enough),
- habitat degradation,
- companion animals,
- waste dumping,
- vandalism and disturbance, and
- climate change.

Fragmentation of remnant bushland - land clearing has resulted in fragmentation of continuous areas of vegetation resulting in small pockets or remnants of vegetation (EPA, 2000). The smaller the size and the more fragmented the state of a bushland remnant, the greater the pressures applied to it and the less resilient the remnant may be to these pressures. Fragmentation often leads to a reduction in species numbers and diversity, a decrease in the available seed source and an increase in the vulnerability of species and communities to weed competition and disaster events ie; bush fire, disease.

Introduced species - including introduced plants and animals, which compete with native species for resources within the ecosystem.

Urban runoff and stormwater - nutrient levels, pollutants and soil moisture levels are increased. Faeces, detergents and fertilisers are major sources of nutrient pollution in urban runoff. Other impacts include the introduction of weeds and the erosion and deposition of creek beds and embankments.

Sewer overflows - introducing elevated levels of nutrients, toxic compounds and pathogenic bacteria. Nutrients encourage the growth of exotic species more suited to a nutrient rich environment.

Altered fire regime - altered fire regimes can affect entire ecosystems to varying degrees. Frequent fires can reduce the diversity of native plants and animals, increase erosion potential through vegetation removal and encourage weed invasion. Hot fires that are rare or infrequent, typical of urban reserves, may also reduce species diversity, particularly with species such as *Banksia* sp. and *Hakea* sp., which are dependant on fire for germination. Areas left unburnt for a period of thirty or more years develop dense shrub layers or monocultures of dominant species. Mesic (moisture-loving) plant species such as *Pittosporum undulatum* and *Ficus* sp. are favoured in these areas, and the

proliferation of these species may inhibit the regeneration of light dependant species (Benson and Howell, 1990).

Habitat degradation - such as the depletion of hollow-bearing trees, snag eradication in aquatic ecosystems, and the removal or turning of bush rocks can reduce the availability of suitable sites for plants and animals to live and reproduce (EPA, 2000).

Companion animals – The impacts of companion animals on the environment, mainly dogs and cats, is diverse. Animal faeces is a potential source of water pollution and are considered to be a public health and nuisance issue. The loss of native animals from attacks by companion animals, damage or loss of plants from trampling, and noise nuisance created by companion animals can also be significant. Companion animals have an important role to play in the urban environment and if managed responsibly will have little or no impact on the natural environment.

Waste dumping - including the dumping of garden refuse and household rubbish in local parks and pollutants being dumped or spilled into the stormwater systems.

Vandalism and disturbance - plants, animals and park structures are often targeted by vandals. Indiscriminate walkers create new tracks, which result in trampled vegetation, increased erosion potential, weed invasion. Lower storey, germinating and groundcover species can be eradicated easily by trampling.

Climate change – land use changes including the clearance of vegetation, have reduced the ability of the land to absorb carbon dioxide. This combined with the burning of fossil fuels for power and transport, is enhancing the greenhouse effect and resulting in climate change. Increases in temperatures both regionally and globally may change the dynamics and composition of ecosystems (EPA, 2000).

4.3 Responding to biodiversity

Actions relating to biodiversity management aim to identify, maintain, enhance and protect biological diversity. The following activities and projects aim to contribute to improving the health of biodiversity in the Woollahra LGA and the Sydney region through conservation and management.

Puppies in the Park

In 2009 People and Pets Day was cancelled due to lack of interest. In replacement of People and Pets Day, council ran Puppies in the Park on Sunday 20 October 2009 from 8am to 10am in Rushcutters Bay Park.

Puppies in the park is a free community event organised by Woollahra Council that aims to promote responsible pet ownership and to engage the local residents who are pet owners with key messaging from council whilst providing a small fun breakfast. The event is to get back to basics and just meet and greet dog owners in the municipality and provide them with information and advice about responsible pet ownership.

Messages promoted by council to residents on the day were:

- leashed and unleashed parks in the LGA,
- importance of picking up dog waste,
- importance of registering dogs with council,
- importance of microchipping,
- dog nutrition,
- awareness of sharing parks with other users of the park.

Over the two hour event approximately 400 people attended.

Council's companion animal officer was present at the event scanning and checking registration details and providing advice on responsible dog ownership to residents. The events main sponsor IAMs provided a stall, free samples and a nutritionist to provide dog owners advice about pet nutrition. Kaye Browne from *Essential Pet and Pet Talk Radio* also provided a workshop on grooming.

Animal Advisory Committee

The Animal Advisory Committee has been established as an advisory body to assist with the refinement of general policies, programs, services and development of plans for the companion animals. The Committee reports to the Community and Environment Committee.

The Committee consists of councillors, council compliance staff, four local animal professionals and seven local residents. Minutes can be accessed from the Woollahra Council website www.woollahra.nsw.gov.au.

Bush regeneration and revegetation status of council reserves

Council continued its commitment to maintain and enhance our local biodiversity with the continued success of the bush regeneration activities being undertaken within Cooper Park, Parsley Bay Reserve and Gap Park, and the revegetation projects being undertaken in Trumper Park and Harbourview Park. **Table 7** illustrates the status of regeneration activities in council's bushland reserves.

Table 7: Regeneration status of council's bushland reserves

Parks/Reserves	Area of bushland (hectares)	Untreated bushland area (%) remaining	Area (%) regenerated and on maintenance
Cooper Park	12	35.5	64.5
Gap Park	3.4	9.5	90.5
Trumper Park	4.3	30	70
Parsley Bay Reserve	3.15	1	99
Harbourview Park	1	8	92

Source: Woollahra council Parks and Street Trees

The following actions were undertaken during the reporting period:

- primary weed removal at three sites in Gap Park totalling an area of 125m²,
- primary weed removal at ten sites in Cooper Park across an area totalling 1,800m², and
- continued to maintain 217 bushland regeneration sites.

Bush regeneration works were undertaken by a combination of council staff and bushcare volunteers. Planting undertaken as part of follow-up vegetation works is with tubestock of native plants of local origin (provenance) grown by council staff.

To control the spread of weeds council continues primary weed removal across the LGA and propagating and planting of tubestock.

Bushcare

Bushcare is a community-based program in which volunteers help regenerate and preserve Woollahra's bushland, with the assistance and support of council staff. The program provides an opportunity for volunteers to learn about the local environment, and to be actively involved in the management of bushland in Woollahra. Council currently has fifty-one volunteers working across the four bushcare sites in Woollahra.

The following bushcare activities were undertaken during the 2008/2009 reporting period:

- council staff and volunteers from the Scots College undertook a joint revegetation project around the pond in Trumper Park,
- council staff and community volunteers planted 500 native plants in Gap and Cooper Parks on National Tree Day on 30 July 2008,

- the bushcare program with the Miroma Rudolf Steiner Centre for Adults with disabilities, based in Vacluse. The program includes working with carers and students of Miroma at Christison Park every Wednesday, and has been extended to every second Monday, learning about the values of preserving urban bushland. Activities included weeding, planting, and mulching, and
- the Bushcare program is looking to begin a Streamwatch program in Cooper Park Creek, Cooper Park targeting introduced fish and aquatic weeds and measuring water quality. Trumper park has had two corporate Bushcare days within this period, involving weeding, mulching, and planting.

If you are interested or would like some more information on Bushcare, please contact council's Bushcare Liaison Officer on 0423 020 648 or by email on bushcare@woollahra.nsw.gov.au

Community education – bushland walks

Council staff continued the following guided bushwalks during the reporting period:

- Coastal cliffs Vacluse for council's Biodiversity month in September 2008,
- Parsley Bay Summer Activities coast walk in January 2009,
- Coastal cliffs Vacluse for Sydney Harbour Week in March 2009, and
- Lighthouse Reserve and Gap Park Vacluse for International Whale Day in June 2009.

Topics covered during the walks included the remnant vegetation of the area, bush regeneration, weed management and catchment management issues. The guided bushwalks continue to be very popular, with all walks being fully booked, averaging twenty participants. The International Whale Day walk attracted fifty participants.

4.4 Future actions

In preparing comprehensive SoE reports councils are to identify any gaps in available data and the actions required to obtain that information. The following actions have been identified:

- an updated survey identifying native and introduced flora and fauna is required to inform current management practices and may establish evidence base for proposed rezoning of land from an open space to an environmental conservation zone,
- annual or bi-annual macroinvertebrate assessment of the three natural creeks within the LGA to assess the state of the creeks and changes over time,
- higher output of tubestock from council nursery for revegetation of the LGA with native flora,
- feral species control programs,
- strengthen primary weed removal and implement new methods where appropriate.

Further actions have been identified in the *Woollahra Council Management Plan 2007 – 2010*.

5. Air

Air or the atmosphere is essential for all life on earth as it regulates global weather and climate. The atmosphere maintains an average air temperature of 15°C that is necessary to support life on earth. The atmosphere can be divided into three main regions: the mesosphere, stratosphere and the troposphere. Human activity, including the burning of fossil fuels, impact on the two atmospheric levels closest to the earth, the stratosphere and the troposphere (EPA, 2000).

Environmental air quality is considered at three levels (EPA, 1996):

- Global** - ozone layer depletion and climate change as a result of increased greenhouse gas levels.
- Regional** - photochemical smog, fine particle pollution and nitrogen dioxide.
- Local** - carbon monoxide, sulfur dioxide, lead (and other air borne toxins) and odour.

Pressures affecting local, regional and global air quality include the burning of fossil fuels for electricity and to operate vehicles and equipment, bushfires, agricultural practices and the disposal of waste. Air pollution can be dissipated or exasperated by local weather conditions.

Indicators have been selected to measure urban air quality and greenhouse gas emissions and monitor the activities that cause them.

5.1 State of air

The climate in the LGA is a temperate humid climate with summer maximum temperatures of 26°C and winter minimum temperatures of 8°C. Average annual rainfall is 1,212 mm per year at Rose Bay which is similar to Sydney Observatory Hill (1216mm), Randwick Bowling Club (1197mm) and Sydney Airport (1085mm) (Bureau of Meteorology, 2009)

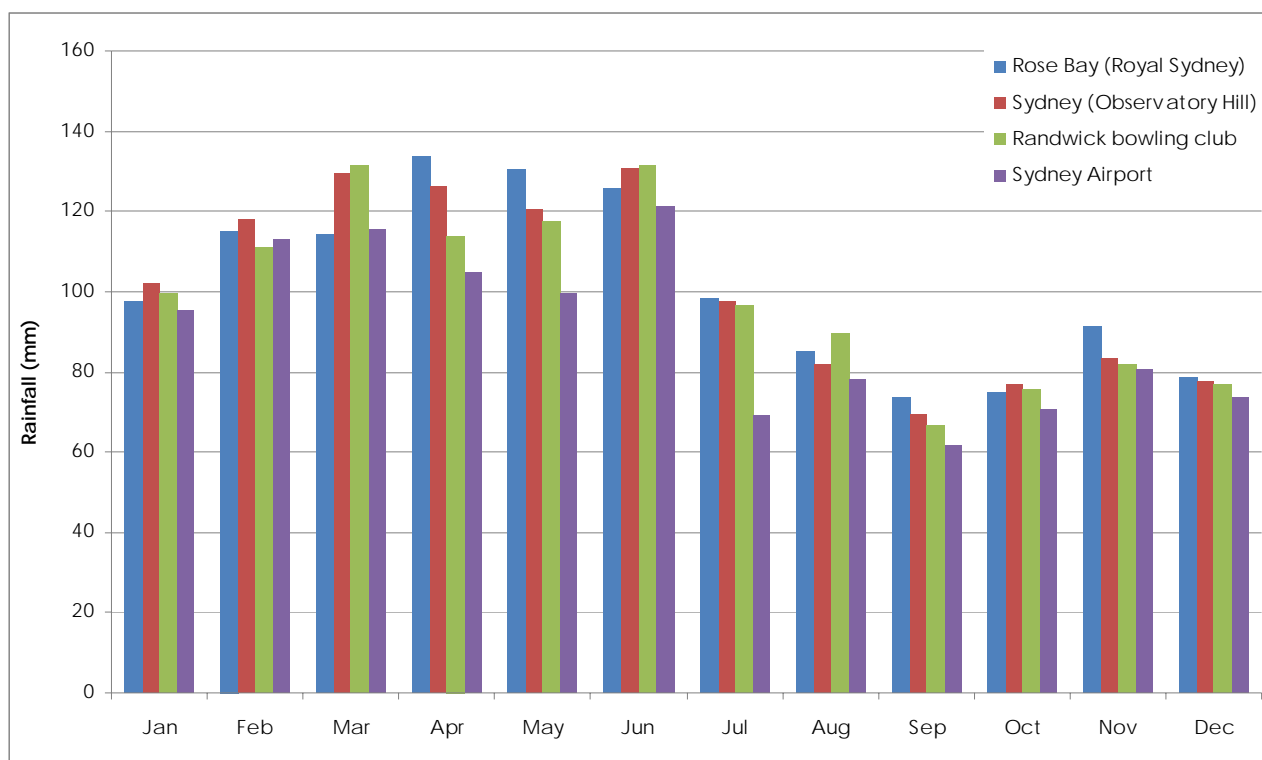


Figure 6: Mean rainfall statistics for rain gauges around the Woollahra LGA (Bureau of Meteorology, 2009).

Climate Change, Energy and Australia

Australia's Department of Climate Change (DCC) states that climate change is the result of weather patterns due to an increase in the Earth's average temperature, a result of an increase in greenhouse gases (GHG) in the Earth's atmosphere. The increase in greenhouse gases are preventing heat that is retained by these gases from leaving the Earth's atmosphere thereby making the Earth warmer (DCC, 2009).

Global warming is a term that is used for the gradual increase in the Earth's average surface temperatures as a result of greenhouse gases in the atmosphere. Climate change is a broad term that refers to changes in climate patterns including rainfall and average temperature (DCC, 2009).

Greenhouse gases have always occurred naturally in the Earth's atmosphere, they absorb and re-radiate heat energy from the sun which has maintained the Earth's temperature that supports life. As human activity increases across the globe, gases responsible for trapping heat increase as a result, enhancing the greenhouse effect and warming of the Earth's surface (DCC, 2009).

Human activity generates carbon dioxide (CO₂), methane and nitrous oxide, these gases are considered the main greenhouse gases. Manufactured gases include chlorofluorocarbons (CFCs), halocarbons and their replacements. Human activity producing these gases, listed by the DCC, 2009 include:

- burning of fossil fuels (oil, coal and gas),
- energy generation through burning fossil fuels,
- farming practices (raising cattle and sheep and use of fertilisers growing crops),
- logging and land clearing,
- decomposition of food and plant wastes and sewerage, and
- industrial processes (aluminium, cement production).

Seventy per cent of Australia's greenhouse gas emissions come from the energy sector, with electricity generation being the biggest culprit, as Australia relies heavily on the burning of coal for power. Road transport comes in second as the largest greenhouse gas emitter after electricity generation (DCC, 2009).

Australia's contribution to global greenhouse gas emissions is 1.5 per cent, although Australia cannot avert the worst consequences of climate change Australia is one of the world's biggest polluters on a per capita basis. Therefore Australia plays an important part in the global effort in reducing greenhouse gas emissions (DCC, 2009).

Sea Level Rise

Climate change over the next century may affect a range of climate related indicators including rainfall, evapotranspiration, temperature and sea levels in the Woollahra LGA. The projected climate change outcomes for the Sydney Coastal Region has been summarised by the Sydney Coastal Councils Group (SCCG, 2009) (Table 8). Climate change is expected to lead to increased temperature and sea level, coupled with a decrease in total rainfall and increase in rainfall intensity.

Table 8: Projected Climate Change in the Sydney Region (SCCG, 2009)

Factor	2030	2070
Temperature – average	+ 0.6 → + 1.30C	+ 1.1 → + 4.30C
Rainfall – average annual	- 3 → + 9%	- 25 → + 10%
Sea level rise	+ 3 → + 16cm	+ 7 → + 50cm

Climate change is also expected to lead to sea level rise, which will affect the LGA adjacent to the shore. While the effects on rainfall and evapotranspiration are difficult to predict at the local scale, anticipated sea level rise has been quantified and the NSW Department of Environment and Climate Change (DECCW, 2007) has provided guidance on the appropriate planning levels for 2090 – 2100:

- Low Level Ocean Impacts: +0.18m
- Mid Range Ocean Impacts: +0.55m

- High Level Ocean Impacts: +0.91m

The impacts of climate change will be both direct and indirect and felt by both the population and council's own activities. Potential impacts of climate change on human settlements have been identified by the DCC, 2009, and have been summarised to include:

- Potential impacts of projected climate change increases in temperature
 - Decrease in the longevity of exterior materials of buildings and infrastructure, leading to increased maintenance and replacement costs.
 - Increased cost of cooling buildings and/or retrofitting to increase energy efficiency of buildings.
 - Extreme temperatures, especially heat waves, will have both direct and indirect effects on the health of vulnerable members of society (the elderly, the sick, the young and the poor).
- Changes in annual rainfall patterns
 - Decreases in rainfall (combined with higher temperatures) is likely to reduce water quality through increased risk of algal blooms in water storage dams.
 - Decreases in rainfall (combined with higher temperatures) is likely to increase the cost of maintenance of public green spaces, parks and playing fields in settlements.
- Changes in intense rainfall events
 - Increases in rainfall may exceed the coping capacity of current stormwater and wastewater systems, leading to flooding and associated damage to infrastructure and property.
 - Heavy rainfall events and flooding could result in higher concentrations of accumulated pollutants being flushed into streams, lakes and the ocean from settlements.
- Altered frequency of extreme weather events
 - Insurance costs for extreme event damage are likely to increase.
- Sea level rise
 - Increased chance of damage to coastal buildings, infrastructure and recreational facilities through storm surges and flooding.
 - Increased risk of high salinity in some coastal areas resulting in reduced productivity of land, as well as damage buildings and infrastructure.
 - Increased risk of salination of surface and groundwater sources in coastal areas.

Greenhouse Gas Emissions (GHG)

Energy production through the use of fossil fuels results in the production of greenhouse gas emissions (GHG), Australia relies heavily on the burning of coal for energy. Through becoming energy efficient and using alternative technologies for energy generation (solar, wind and hot rock), Australia can lower its GHG emissions.

Energy efficiency has become a priority for council, increasing energy efficiency and using less energy achieves not only a reduction in energy costs but also in the amount of GHG's emitted through council activities.

A re-inventory of Council's greenhouse gas (GHG) emissions was undertaken for 2003/2004. The re-inventory found that Council's GHG emissions had increased by 7.8% or 428 CO₂-e tonnes from 1999/2000 emissions, increasing from 5,475 CO₂-e tonnes to 5,903 CO₂-e tonnes. The streetlighting sub-sector remained the greatest contributor to Council's greenhouse gas emissions, contributing 58.6% of the total emissions. Building emissions contributed 26.3%, and the vehicle fleet emission (14.2%). Water/sewage contributes less than one per cent.

The largest increases in council's emissions is from the streetlighting sub-sector, which has increased by 5.2% since the base year. This increase can be attributed to an expansion in streetlighting and infrastructure upgrades in response to improved lighting and safety standards. Emissions from council's buildings and waste/sewage sub-sectors have also increased as a result of the expansion of council services and improved data collection.

Despite council's overall increase in greenhouse gas emissions, significant decreases have been recorded in our vehicle fleet emissions. The vehicle fleet sub-sector has decreased emissions by 30.9% on 1999/2000 levels through the implementation of abatement actions including vehicle downsizing and fuel conversions.

CCP Program also looked at community emissions calculated through ABS data and Council's waste data. The community base year was 1996 with the re-inventory year being 2001. The re-inventory found that community GHG emissions have increased by 12.5% or 53,881 CO₂-e tonnes in 2001 from 1996 emissions, increasing from 432,618 CO₂-e tonnes to 486,499 CO₂-e tonnes. The largest increase is from the industrial sub-sector, which has increased emissions by 140.3% since 1996. The commercial sub-sector decreased emissions by 7,411 CO₂-e tonnes or by 5.8%. Waste sub-sector greenhouse gas emissions increased by 1.8% and the transport sub-sector emissions increased by 1.5%.

Through the CCP program Council has:

- calculated base year GHG emissions for Council and the Woollahra LGA.
- adopted of GHG reduction goals for Council and the Woollahra LGA.
- prepared the Woollahra Greenhouse Action Plan.
- conducted a re-inventory of Council and Woollahra LGA emissions to assess progress towards reduction goals and to highlight areas that require action.
- prepared annual progress reports for the implementation of GHG reduction actions.

Air quality

Council receives the majority of air pollution complaints recorded for the Woollahra LGA, with seventeen complaints recorded during the reporting period. Over several years the number of air pollution complaints council received each year has decreased.

Regional Air Quality Index (RAQI)

Previously the DECCW monitored air quality and present results as the Regional Pollution Index (RPI), categorising results as either low, medium or high. A high pollution index reading corresponded to pollution levels that exceed health or visibility standards.

The new RAQI air quality monitoring is based on the five pollution criteria of the National Standards (Ozone, Nitrogen Dioxide, Carbon Monoxide, Sulphur Dioxide, particles) as well as visibility, a NSW standard.

Woollahra falls within the Central Eastern Sydney airshed. The Randwick monitoring station is the closest station to Woollahra. This station records ozone, visibility and particles

The DECCW has updated the RPI and has created a new index, the Regional Air Quality Index (RAQI). Historical air quality data has been converted into the new reporting index.

Particulate matter exceedences although low are slowly increasing, after three years of no exceedences two were reported in 2006/2007. This figure then doubled to four in 2008/2009. Visibility recorded five exceedences 2008/2009, although significantly lower than the twenty eight recorded in 2002/2003, this year's figure was the second highest reading over the last five years.

Ozone has not recorded any exceedences since the 2004/2005 reporting period.

Ozone – O₃

Ozone near ground level is a colourless secondary gaseous pollutant formed in the presence of sunlight as a result of chemical reactions between reactive organic gases and oxides of nitrogen. Ozone formed in the stratosphere (upper levels of the atmosphere) is created under a different natural process and is not considered as a pollutant like ground level ozone. Ozone in the stratosphere is important in absorbing and preventing harmful radiation reaching earth (DECCW, 2009f).

Strongly oxidising ozone can cause eye and respiratory irritation, if too much ozone is inhaled it can affect lung function, worsen asthma, coughing, throat irritation and can cause difficulty breathing (DECCW, 2009f).

Visibility – NEPH

Visibility is an indicator used by the DECCW (2009f), to measure the presence of fine particles in the air originating from vehicles, wood fires and industry. Visibility is measured through a technique called nephelometry (NEPH) by shining a light through a sample of air and determining how much light is dispersed by fine particles. A high fine particle concentration, results in greater light scattering. Presence of high particles represents low visibility.

Particles – PM₁₀

Besides gaseous pollutants, solid and liquid particles can be suspended in the air, their presence can cause reduced visual amenity and harmfully impact health. PM₁₀ are those particles less than 10 micrometers in diameter, including dust, smoke, plant spores, bacteria and salt (DECCW, 2009f).

Particulate matter can be formed through human activities include mining, burning of fossil fuels, transportation, agricultural and hazard reduction burning, incinerator use and solid fuel use for cooking and heating (DECCW, 2009f).

Classified by size, large particles settle out of the air the fastest while smaller particles remain suspended for up to months. During rainfall events suspended particles are removed from the air. The sizes of suspended particles also determine their potential to affect human health. Larger particles are commonly trapped in the nose and throat then swallowed, smaller particles can reach deep into the lungs and irritate respiratory systems. Suspended particles can exacerbate existing medical conditions with people with heart disease experiencing chest pain and shortness of breath. Those with respiratory diseases (asthma and chronic bronchitis) can have their condition aggravated (DECCW, 2009f).

Transportation

The way that we chose to travel impacts our air quality. Every year over the past five years the total number of registered vehicles has increased in the Woollahra LGA. With the additional registered vehicles in the LGA comes greater local traffic congestion, greenhouse gas emissions and suspended particulate matter in the air.

The Travel Population and Data Centre (TPDC, 2007) latest survey for the Woollahra LGA reported the top three modes for Woollahra residents in order are: car – as a driver (10,406 residents), walk (2,098) and bus (2,096).

Due to the area's inadequate public transport, service times and with poor linkages to other hub transport areas for efficient travel around the Sydney area, private car use remains the preferred method of transport for residents and visitors. As registered vehicles continue to increase, further pressure is placed on local roads, impacting on public bus services increasing travel time making public transport less attractive. Air quality is also further reduced by the increasing amount of private vehicle use.

Table 9 presents the air data recorded each year, or when this data is available. Including this data into the SoE report provides quantifiable information to monitor a specific aspect of air quality (pressure, state, response) over time. These specific aspects of the data (i.e. corporate greenhouse gas emissions) are known as indicators. Where this information has been recorded for a number of years, trends can be established.

The indicators have been chosen because they provide the status of a specific aspect relating to the environment, and the information is regularly being monitored by council and other government

authorities. It must be noted that the list of indicators is not representative of outcomes for all air quality sector activities and projects.

Table 9: Air quality indicators

Indicators	1999/ 2000	2000/ 2001	2001/ 2002	2002/ 2003	2003/ 2004	2004/ 2005	2005/ 2006	2006/ 2007	2007/ 2008	2008/ 2009	Trends
Corporate (council) greenhouse gas emissions.	5,475 CO ₂ ^e tonnes	-	-	-	5,903 CO ₂ ^e tonnes	-	-	-	-	?	~
Number of registered vehicles in the LGA* RTA	-	-	-	-	-	29,419	30,031	30,455	30,991	31,553	*
RPI High – a.m. High – p.m.	4 1	13 13	10 13	14 14	9 4	6 0	9 3	5 7	No longer reported this way		
RAQI*											
Ozone (1hr)		0	1	6	1	0	0	0	0	0	✓
Ozone (4hr)	-	0	0	6	0	0	0	0	0	0	✓
Particulate matter – PM ₁₀		0	0	11	0	0	0	2	0	4	*
Visibility - NEPH		12	24	28	7	0	3	9	0	5	✓
No. of council air pollution complaints	-	-	-	56	45	26	24	42	27	17	✓
No. of air incidents DECCW pollution line	5	3	3	2	1	0	0	0	0	0	✓

Note: RPI means regional pollution index. CO₂^e is the conversion of all greenhouse gas emissions to units of carbon dioxide equivalent (CO₂^e) so that gases of different strengths can be compared and added together.

Source: Department of Environment, Climate Change and Water (DECCW). Woollahra Municipal council. Roads and Traffic Authority.

Key: The following symbols represent improving (✓), worsening (✖) or stable (~) trends in the monitored aspects of the environment. The trend column is left blank where there is not enough information to establish a trend. Where no information is available, the (-) symbol is used. (*) represents new environmental indicator selected during 2008/2009, previous years data provided if available.

5.2 Pressures on the air

Pressures affecting the air in Woollahra include pollutants from:

- motor vehicles, and
- energy use (including residential and business).

Although public transport contributes to the air pollution of the area, utilisation of public transport reduces private car use, thereby reducing pollution from cars and pressure on air quality. Though catching public transport can reduce pressure on air quality and contribution to global warming, the area is serviced by inadequate public transport and service times and private car use is preferred.

5.3 Responding to air pressures

Climate Change, energy and Australia

The United Nations Framework Convention on Climate Change (UNFCCC) linked Kyoto Protocol, is an international agreement that sets binding targets for 37 industrialised countries and the European community for reducing greenhouse gas emissions by 5.2 per cent from 1990 levels over a 5 year period 2008 – 2012 (UNFCCC, 2009). Australia ratified the Kyoto Protocol on 3 December 2007,

and came into effect at the end of March 2009. In December 2009, the world's nations will meet in Copenhagen to decide upon a new agreement once the Kyoto Protocol expires in 2012.

The Australian Government has set a target of 25 per cent reduction on 2000 greenhouse gas emissions by 2020, if there is a strong global action to reduce emission. If a global agreement cannot be agreed upon, Australia will reduce its emissions between 5 – 15 per cent below 2000 levels by 2020. In order to achieve these targets the Australian Government will introduce the Carbon Pollution Reduction Scheme (CPRS) in 2011. The CPRS is an emissions trading scheme using a cap and trade mechanism. The cap is an upper limit on Australia's carbon pollution that is then gradually reduced, lowering the carbon pollution Australia produces each year. Companies that emit carbon will have to purchase permits (which represent specific amount of carbon pollution). The total amount of permits do not exceed the cap set each year, as the cap is lowered businesses need to reduce their emissions (occurring at least cost) or buy and trade permits (occurring at a cost higher than reducing their emissions) (DCC, 2009).

The Department of Climate Change provides what individuals and businesses can do to combat climate change at www.climatechange.gov.au.

Climate Change adaptation and mitigation responses

Council has largely focused on mitigation when addressing climate change. The following provides a brief summary of the programs and outcomes Council has participated in.

Sustainable Energy Development Authority (SEDA)

Council has been involved in energy efficiency programs focusing on council buildings and facilities since 1997, when council joined the SEDA Energy Smart Business Program. Council successfully completed the program in June 2003, reducing energy use from Council's operations by approximately 28% on 1998 levels and achieving the program target of a 15% reduction.

Council was also involved in the SEDA Energy Smart Homes Program that involved the incorporation of energy efficiency provisions in the Woollahra Residential Development Control Plan 2003 (now superseded by BASIX).

Cities for Climate Protection Program

In 2001 Council joined the Cities for Climate Protection Program that aims to help local government and their communities to reduce GHG emissions.

Through the CCP program council has adopted 30% reduction target from base year (1999/2000). Council has established base year greenhouse gas emissions (equivalent) covering our emissions from four sectors:

- Street lighting (electricity),
- Buildings (electricity and gas),
- Fleet (fuel consumption), and
- Water (electricity for bore water pumps).

Energy Savings Action Plan (ESAP)

Council prepared and submitted the draft Woollahra Energy Savings Action Plan to the Minister for Utilities for approval in April 2008. The introduction of the *Energy Administration Amendment (Water and Energy Savings) Act 2005* not only required council to prepare a Water Savings Action Plan but also required large councils to prepare an Energy Savings Action Plan (ESAP).

An ESAP determines how much energy is being used at council's top ten energy using sites and identifies and prioritises actions to reduce energy usage. To assist with the preparation of the ESAP, council commenced the process of entering into an energy performance contract (EPC) with a specialist energy conservation contractor. EPCs are a form of contracting that provides businesses (including councils) with a low risk way to implement energy and water efficiency improvements. The chosen energy conservation contractor guarantees both the performance of the technology and the

delivery of energy and greenhouse gas emissions savings. EPC can be used in any facility in which energy is used.

The investigations undertaken for the EPC provided council with the technical aspects of the ESAP, specifically the audits of council's sites, the identification of energy conservation actions and the calculation of energy and cost savings. Council signed the EPC in May 2008 and has commenced the implementation of the energy savings actions identified.

Council, through the endorsement of the ESAP, has adopted a 20% reduction target in energy use at council's buildings from the base year (2003/2004). Implementation of all of the actions undertaken as a part of the EPC will reduce energy use by approximately 20% at those sites and meet this target.

The energy saving estimates through conservation actions are shown in the table below. An assessment of energy use over the reporting year is being taken to determine if council has achieved the savings estimated with each conservation action.

Table 10: Energy conservation action estimates

	Site	Saving Area	Conservation Action	M&V Option*	Savings kWh p.a.	CO2 saved tonnes p.a.
1	Woollahra Council Admin Centre	Electricity	Lighting refurbishment	A	64,542	60.7
			Managed lighting systems and occupancy detectors			
			Installation of timers on water boiler/coolers			
2	Cross Street Carpark	Electricity	Light sensors	C	139,465	131.1
			Managed lighting systems and occupancy detectors			
			Light replacements			
			Installation of timers on water boiler/coolers			
3	O'Dea Avenue Works Depot	Electricity	Managed lighting systems and occupancy detectors	A	14,002	13.2
			Installation of timers on water boilers/coolers			
4	Grafton Street Carpark	Electricity	Managed lighting systems and occupancy detectors	C	25,734	24.2
5	Fletcher Street Depot	Electricity	Light saved fixed dimming	C	15,665	14.7
			Managed lighting systems and occupancy detectors			
			Lighting refurbishment			
			Air-conditioning modification			
			Installation of timers on water boiler/coolers			
Total savings					259,409	234.8

*Measurement and verification (M&V) options:

A: Savings are determined by engineering calculations using pre and post-retrofit measures as well as accepted stipulations regarding the operation of the system. Option A is advantages in that it focuses savings verifications on the individual Energy Conservation measures and reduces the complexity, length and cost of the M&V process.

B: Savings are determined by short term or continuous measurements only. Stipulation is not involved. Measurements are concentrated on particular areas in order to examine the direct effects of individual Energy Conservation Measures and reduce the potential interference between other site conditions and the actual effect of Energy Conservation Measures.

C: Savings are determined by analysing the entire consumption of the site, generally through energy bills, carrying out regressions between energy use and different variables (such as weather and occupancy), and continuous monitoring and recording by the client of any changes occurring on site which may affect energy consumption.

Woollahra Carbon Strategy & Action Plan

Woollahra Municipal Council has commissioned sustainability consultants Kinesis to measure its Greenhouse Gas (GHG) emissions and to develop a strategy and action plan to reduce and manage these emissions.

This project will build on the CCP program, Planet Footprint Reporting and councils GHG action plan and include the following work:

- Review and summarize all internal and external policies and programs as well as industry best practice,
- Refine and restate greenhouse gas emissions data and develop a carbon reduction strategy and action plan with new targets, and
- Produce a set of tools and materials that allows council to work to a clear action plan and report on emissions annually.

The project commenced in May 2009 and will be completed by December 2009.

Climate change adaptation

Adaptation to the affects of climate change is fairly new area for Council. Council is a member Council the Sydney Coastal Councils Group (SCCG) and as such was involved the 'Systems Approach to Regional Climate Change Adaptation Strategies in Metroplises' project. This project was undertaken in collaboration with the CSIRO and University of Sunshine Coast. The project involved vulnerability assessments/mapping focusing on five climate change risks, sea level rise, bush fire, rainfall, storm surge, heat.

Workshops were conducted at each of the SCCG member councils whereby the results of the climate change vulnerability mapping were presented and workshopped with Council staff from across all divisions. Three key issues were identified through this process for the Woollahra LGA:

- public assets and aging infrastructure,
- development pressures, and
- flooding.

The barriers and opportunities for action were also identified.

Two reports have been generated from this project to date:

- Regional Workshops Synthesis Report: Sydney Coastal Councils' Vulnerability to Climate Change PART 1, August 2008, and
- Workshop Summary Woollahra Council, October 2008.

The SCCG are currently finalising a report that investigates the three key regional (SCCG region) cross-cutting barriers identified through the regional workshops (communities, infrastructure and planning and decision making). Through understanding the key cross-cutting regional barriers to adapting to climate change in Sydney, Local Governments will be better placed to scale up their individual efforts in order to more effectively respond to climate change at the regional scale.

Community action

A residential energy savings program is being piloted through the Three Councils Ecological Footprint Project being undertaken by Woollahra, Waverley and Randwick Councils. The program involves an investigation of individual household energy consumption and provides a report that details the energy savings measures to help reduce energy consumption. Residents are supported and encouraged to implement energy saving measures and monitor consumption through their energy accounts. To date over 30 residential audits have been undertaken in Paddington, with the aim of conducting 200 as a part of the trial.

Planning framework

Woollahra Council will continue to identify opportunities for encouraging sustainable building design for buildings types not currently covered by BASIX (such as larger scale commercial and retail

development). For example, the proposed redevelopment of the Kiaora Lands site at Double Bay will seek Green Star certification.

Climate change is being addressed through the floodplain risk management process. Flood studies have been prepared for each of our flood catchments. The next step in the process is the preparation of the Flood Risk Management Studies and the Flood Risk Management Plans for each of our flood catchments. An outcome of this process will be recommended flooding planning clauses and controls for Council planning documents that factor in the impacts of climate change.

Carbon reporting also incorporates water. Council has been actively reducing water use through the implementation of water conservation actions since 2002/2003. Since that time Council has reduced its annual water use by nearly 80%.

Council has prepared a Water Savings Action Plan (WSAP) that identifies how much water is being used at Council's top ten water using sites and identifies and prioritises actions to reduce potable water use. Through the adoption of the WSAP, Council has adopted a 20% reduction target in potable water use across Council's operations from the base year (2004/2005) water use. Council has already achieved this target.

Council joined Sydney Water's Every Drop Counts Business (EDCB) Program in April 2005. Council initially joined the program to formalise the water conservation initiatives being undertaken in a number of departments. Participation in the program also assisted with the technical reviews of Council's facilities and the preparation of Council's draft WSAP.

Through the EDCB Program Council has access to water consumption data for all of our properties. There are also annual reporting requirements for the WSAP, but this focuses only on water use at Council's top ten sites.

Through the EDCB program and the WSAP Council has:

- Access to water consumption data for all accounts, and
- Prepared annual progress reports for the implementation of water conservation actions.

Street lighting improvement program

Woollahra council is one of twenty-nine councils within the Energy Australia distribution area that have joined together for the Street Lighting Improvement (SLI) Program to improve street lighting throughout the region. The combined LGAs of the twenty-nine councils represent 87% of all the lights in Energy Australia's distribution area and more than 40% of all street lights in NSW.

The primary objective of the program is to seek street lighting improvements through negotiations with government, Energy Australia, industry regulators, technology suppliers and other key parties.

Trials of new residential road lights (T5 and Compact Fluorescent Luminaires (CFL)) conducted through the SLI program have led to the adoption of CFLs as the standard luminaire used by Energy Australia in the replacement of existing and installation of new lamps. Staff from the SLI program are negotiating with Energy Australia regarding the cost of supplying and maintaining CFLs.

The SLI program was successful in receiving \$4.2 million in funding through the NSW Government's Energy Savings Fund, to accelerate the installation of energy efficient street lighting technologies over the next four years. However, implementation of the grant has stalled due to the negotiations with Energy Australia regarding supply and maintenance costs.

Green power

Council currently purchases 6% of accredited Green Power for the supply of energy for council's four highest energy using sites (street lighting for the LGA, Woollahra council Chambers, Cross Street Car Park and Community Centre and the Woollahra Library). Green Power is clean energy produced from renewable energy sources such as wind, solar and hydro-power.

By purchasing 6% Green Power for council's four highest energy using sites, council abated over 268 tonnes of CO₂e in 2008/2009.

Council is currently negotiating a contract to supply energy to council's small sites (those other than the four listed above) that will include the supply of 25% accredited Green Power.

Private use vehicle fleet policy

Council has carried out a review of the Vehicle Fleet Policy in relation to private use, with the aim to achieve the following objectives:

- to reduce fuel consumption, greenhouse gas emissions and air pollution from council vehicles,
- to encourage staff to select vehicles with reduced fuel consumption, greenhouse gas emissions and air pollution ratings while allowing choice from a range of vehicles to suit individuals' family needs and preferences,
- to maintain council's competitiveness in attracting and retaining staff while reducing the net costs to council of the private use fleet, and
- to align private use fees more directly to the cost to council.

As a result of the review, council's new private use fleet policy encourages staff to select more environmentally sustainable vehicles by relating the fee payable to environmental and cost parameters. Therefore, vehicles that have a lower environmental impact and are less costly to operate and maintain are leased to council staff at a lower rate than a car that has higher environmental impacts and running costs. This creates a cost incentive to staff for selecting more environmentally sustainable vehicles. Since the new policy came into effect in January 2008, council has replaced 28 6 cylinder vehicles with 4 cylinders vehicles.

Community Transport Forum

Council continued to hold the Community Transport Forum during the reporting period. The aim of the forum is to provide a public forum for discussion on major transport issues within the LGA including bus and ferry services, disability access to transport nodes (i.e. Edgecliff Centre), light rail opportunities and general maintenance and improvements to transport services. The forum includes representatives from State Government authorities (NSW Police, Roads and Traffic Authority, State Transit Authority, Sydney Ferries and State Rail Authority), State Members, Federal Members, councilors, council staff, neighboring council staff, and community representatives. Meetings are scheduled two to three times a year, or as required. Representative participation in the forum is based on relevance of the topics being discussed at each meeting.

Inner City council Transport Forum

Council continued to facilitate the Inner City council Transport Forum involving traffic staff from neighboring councils (Waverley, Randwick and Sydney City) to discuss mutual traffic and transportation matters. Matters considered include the Oxford Street bus lane, light rail, car share, walking and cycling facilities and other relevant issues.

Pedestrian and Access Mobility Plan for Paddington (PAMP)

The Paddington Pedestrian and Access Mobility Plan (PAMP) was adopted by council in 2006/2007 as a three stage program. Council has implemented most of stage one and is currently implementing stages two and three of the plan. Works to be completed during the reporting period include, including pedestrian facilities in West Street, Cascade Street/Glenmore Road, Liverpool Street, Neild Avenue/Brown Street and Jersey Road.

Woollahra Bicycle Plan implementation

Council has undertaken a review of the 2000 Bike Plan and has developed the Woollahra Bicycle Strategy that outlines the Bike route capability throughout the Woollahra Municipal local government area. Early community consultation was instigated through the distribution of questionnaires, Bicycle

Working Party meetings and liaison with BIKEast the association representing cyclists in Sydney's eastern suburbs.

The Woollahra Bicycle Strategy identifies the regional, local and recreational routes which consist of off-road, on-road, inter- connecting bike routes with neighbouring local government areas - City of Sydney, Waverley and Randwick plus cycle facilities at/to public transport interchanges and local area urban villages.

The Woollahra Bicycle Strategy provides a comprehensive cycling facility which will have benefits for the environment, for the health and fitness of Woollahra residents, and for better transport mobility for all cyclists and non-cyclists.

Woollahra Council adopted the Woollahra Bicycle Strategy in November 2009.

Local traffic management

Council has implemented local traffic management measures in Greenoaks Avenue, Village Lower Road, Queen Street, Neild Avenue and Cascade Street. Projects to be completed in the reporting year include MacDonald Street, Hargrave Street, Darling Point Road, Mona Road, New Beach Road and Pine Hill Avenue.

Sustainable Transport Pilot Project

Through council's involvement in the Cities for Climate Protection (CCP^P) Program and progression to the CCP Plus Program, council has joined the Sustainable Transport Pilot Project with the following aims:

- reducing greenhouse gas emissions. SSROC Household Energy Survey (2005) identified transport as the largest source of residential emissions in Woollahra,
- improving unsatisfactory public transport in the LGA, particularly the north-south direction, and
- reducing car ownership within the LGA.

The Sustainable Transport Pilot Program involves the completion of the following five strategic milestones:

1. gap analysis - to determine the current status of sustainable transport within council and to identify areas of possible action,
2. goal and direction setting – to direct council action,
3. preparation of an action plan – identifies and prioritises sustainable transport action (to be approved by council),
4. implementation – of the approved action plan, and
5. review.

Council has been working towards milestone three during the reporting period.

5.4 Future actions

In preparing comprehensive SoE reports councils are to identify any gaps in available data and the actions required to obtain that information. The following actions have been identified:

- undertake studies that assess the impacts of climate change on the local infrastructure, terrestrial and aquatic habitat and ecology, and
- increase efficiency and service of public transport options to improve local air quality,
- increase the percentage of green power purchased,
- regular greenhouse gas emission monitoring,
- lower councils energy use and greenhouse gas emissions further through implementing energy efficient projects.

Further actions have been identified in the *Woollahra Council Management Plan 2007 – 2010*.

6. Noise

Noise is an environmental issue often identified as a nuisance but it is equally a pollutant. Noise pollution can be defined as unwanted or offensive sounds that unreasonably intrude into our daily activities (EPA, 2000). Noise in built up areas has many sources, most of which are associated with urban development. Generally residential areas are more sensitive to immediate changes in noise levels. Increases in mixed residential/commercial developments in the LGA are providing sources of noise with competing land uses.

Common neighbourhood noise complaints relate to building sites, air conditioning systems, mechanical ventilation, freezer and cool room condensers, pool filters, barking dogs and loud music. Road traffic noise is a wide spread noise source in Woollahra. Increasing vehicular traffic levels and extended peak hours are causing a major intrusion into residential areas, particularly for people living near main transport routes.

Noise indicators have been chosen to monitor the level of noise related issues in Woollahra.

6.1 State of noise

Noise complaints can be registered with either council or the DECCW's Pollution Line. The DECCW acknowledges that local councils receive the majority of noise complaints (DEC, 2003). This is demonstrated by the number of complaints received by both organisations. During the reporting year council received 259 noise complaints and the DECCW's Pollution Line received ten noise complaints within the Woollahra LGA. The noise complaints registered with council represent a decrease in the number of complaints from the 2007/2008 reporting period, decreasing from 302 to 259. The DECCW's Pollution Line noise complaints however did increase from two to ten. Although there was an increase in the complaints registered with the DECCW's Pollution line compared to the 2007/2008 and previous reporting periods, overall the state of noise has improved shown by a decrease in the number of noise complaints in the Woollahra area.

The majority of the noise complaints (126) registered with council related to barking dogs. Noise from garbage and recycling collections received twenty eight and noise from development sites was the next highest source with twenty five. Twenty-nine noise complaints were registered with council regarding noise from air conditioning units.

The remaining noise complaints related to mostly domestic sources, including the operation of machinery, general domestic, pool pumps and alarms and vehicles.

Table 11 presents the noise data recorded each year, or when this data is available. Including this data into the SoE report provides quantifiable information to monitor a specific aspect of noise (pressure, state, response) over time. These specific aspects of the data (i.e. number of council noise complaints) are known as indicators. Where this information has been recorded for a number of years, trends can be established.

The indicators have been chosen because they provide the status of a specific aspect relating to the environment, and the information is regularly being monitored by council and other government authorities. It must be noted that the list of indicators is not representative of outcomes for all noise sector activities and projects.

Table 11: Noise indicators

Indicator	1998/ 1999	1999/ 2000	2000/ 2001	2001/ 2002	2002/ 2003	2003/ 2004	2004/ 2005	2005/ 2006	2006/ 2007	2007/ 2008	2008/ 2009	Trend
No. of council noise complaints	-	452	36	-	284	379	281	331	310	302	259	✓
No. of noise incidents DECCW pollution line	13	26	8	4	4	3	6	12	4	2	10	✓
No. of noise abatement directions	-	2	1	7	11	29	20	0	0	3	1	✓
No. of noise control notices	-	0	-	5	4	8	4	0	1	1	0	✓

Source: Woollahra Municipal council, Department of Environment, Climate Change and Water (DECCW).

Key: The following symbols represent improving (✓), worsening (✗) or stable (~) trends in the monitored aspects of the environment. The trend column is left blank where there is not enough information to establish a trend. Where no information is available, the (-) symbol is used.

Note: The dramatic increase in council recorded complaints may be related to the introduction of the Customer Request Management System (CRMS) which enables council to record customer requests more accurately.

6.2 Pressures of noise

The main pressures for the Woollahra LGA include:

- Neighbourhood and recreation noise
- Traffic noise

Neighbourhood and recreation noise

Common neighbourhood noise complaints relate to building sites, air conditioning systems, mechanical ventilation, freezer and cool room condensers, pool filters, barking dogs and loud music.

Traffic noise

Road traffic noise is the most wide-spread noise source in Woollahra. Increasing vehicular traffic levels and extended peak hours are causing a major intrusion into residential areas, particularly for people living near main transport routes.

6.3 Responding of noise pressures

Action undertaken relating to noise involves the management and resolution of noise complaints. Council resolves most noise complaints through negotiation and consultation. However, for some incidences the issuing of a notice or order is necessary.

Council investigates and regulates noise related incidences through the issuing of notices under the *Protection of the Environment Operations Act 1997* and can issue notices and orders through provisions in the *Companion Animals Act 1998*.

During the reporting period, council issued zero Noise Control Notices and one Noise Abatement Directions.

6.4 Future actions

In preparing comprehensive SoE reports councils are to identify any gaps in available data and the actions required to obtain that information. The following actions have been identified:

- Council lacks background noise data for the area. A full survey of ambient noise levels of residential and commercial areas within the LGA is required, and
- Council's noise control equipment is appropriate for making spot environmental assessment. However, equipment with the ability to log data over time is required.

Further actions have been identified in the *Woollahra Council Management Plan 2007 – 2010*.

7. Waste

The generation, management and disposal of waste are serious issues that affect the whole community. Potential environmental and public health impacts may arise at the different stages of the waste life cycle (product generation, transport and disposal). Impacts include air and water pollution, generation of greenhouse gases and the contamination of land (EPA, 2000).

The generation of waste is a reflection of the standard of living and consumption patterns of a society, consuming more as standards of living improve (Resource NSW, 2003). The DEC (EPA, 2000) reports that Australia has the second highest domestic waste production per capita among Organisation for Economic Cooperation and Development (OECD) member nations.

Waste indicators have been selected to measure and monitor waste produced across the Woollahra LGA.

7.1 State of waste

Total waste is made up of three distinct streams; municipal, building and demolition and commercial and industrial (EPA, 2000). Council manages the majority of waste generated in the municipal waste stream.

Domestic waste is the largest contributor to the waste stream in the Woollahra LGA, with 11,513 tonnes disposed to landfill during the 2008/2009 reporting period. This equates to each person living in Woollahra throwing away 230 kg of waste to landfill during 2007/2008. The total household recycled materials (kerbside plastics, paper/cardboard and green waste) equated to 10,960 tonnes, or 218kg of materials recycled per person. These figures are consistent with the previous years figures and illustrate the general trend of increasing volumes of household recycling and decreasing volumes of household waste disposed to landfill. Council's extensive waste education program and increased recycling services are contributing to this trend.

Table 12 presents the waste data recorded each year, or when this data is available. Including this data into the SoE report provides quantifiable information to monitor a specific aspect of waste (pressure, state, response) over time. These specific aspects of the data (i.e. household waste to landfill) are known as indicators. Where this information has been recorded for a number of years, trends can be established.

The indicators have been chosen because they provide the status of a specific aspect relating to the environment, and the information is regularly being monitored by council and other government authorities. It must be noted that the list of indicators is not representative of outcomes for all waste sector activities and projects.

Table 12: Waste indicators

Indicator	1999/ 2000	2000/ 2001	2001/ 2002	2002/ 2003	2003 /2004	2004/ 2005	2005/ 2006	2006/ 2007	2007/ 2008	2008/ 2009	Trend
Household waste to landfill (tonnes)	14,285	13,958	12,802	11,893	11,799	12,111	12,147	11,893	11,877	11,512	✓
Total general cleanup sent to landfill (tonnes)*	.	.	.	.	.	.	.	.	.	1,038	
Total household recycling (tonnes)	6,890	7,079	9,317	10,086	9,977	9,995	10,303	10,845	10,676	10,960	✓

Household waste sent to landfill per capita (kgs)	281	274	252	234	236	242	243	237	236	230	✓
General clean-up sent to landfill per capita (tonnes)*	-	-	-	-	-	-	-	-	-	21	
Household recycling per capita (kgs)	135	139	189	198	199	199	206	216	213	218	✓
Civil construction and maintenance material recycled (tonnes)	-	2,145	1,406	3,554	3,352	4,805	-	4,300	-	227	✓

Source: Woollahra Municipal Council.

Key: The following symbols represent improving (✓), worsening (✖) or stable (~) trends in the monitored aspects of the environment. The trend column is left blank where there is not enough information to establish a trend. Where no information is available, the (-) symbol is used. (*) represents new environmental indicator selected during 2008/2009, previous years data provided if available.

7.2 Pressures on waste

There are a number of reasons why waste minimisation, management and disposal to landfill have become critical issues, including:

- limited capacity of landfill sites,
- environmental impacts associated with waste disposal including demand on raw materials and energy use,
- generation of greenhouse gases (methane) and other gases that impact on the environment;
- contamination of land and water, and
- dumping of waste materials and litter that cause health and safety hazards.

Resource NSW state that the challenge for those involved in the area of waste management is to prevent waste and to turn the unavoidable waste into one of the most important and sought after raw materials of the twenty-first century (Resource NSW, 2003).

Pressures facing the Woollahra LGA for waste include:

- increasing population and associated increase in waste,
- community education and co-operation of community to start and continue to recycle materials,
- costs associated with disposing waste coming from limited capacity of landfill sites, and
- littering and illegal dumping.

7.3 Responding to waste pressures

Actions relating to waste aim to reduce the amount of waste disposed to landfill. Key responses to minimise waste rely on avoidance, reuse, recycle and reprocessing of waste material, with disposal as the final option (EPA, 2000). The following activities and projects aim to contribute to reducing the amount of waste disposed to landfill.

Food organics recycling

Following a successful twelve month trial of a residential food organic collection service completed in September 2007, council launched the program during November's National Recycling Week during 2008. Food organics are collected in the green garden bin along with garden refuse for composting. This will help to achieve waste reduction targets as well as reducing greenhouse emissions created from waste in landfills. Council is aiming for a waste diversion and recycling targets in accordance with State Government's *Waste Avoidance and Resource Recovery Act, 2001*. Our main target includes a 66% waste diversion rate from landfill by the year 2014.

The twelve month trial involved residents from 2,400 households in the suburbs of Vaucluse and Watsons Bay, placing their food scraps, including meat, into their garden refuse bins for recycling. The organic material was collected by council's weekly kerbside collection service and taken to a waste facility in Chullora for shredding into smaller pieces. The shredded material was then taken to a composting facility in Castlereagh for composting and reuse. The resulting compost was then used to rehabilitate contaminated land and to replace top soil from development sites. The initial stages of the trial were run with the assistance of the Southern Sydney Regional Organisation of councils (SSROC).

Council won two awards for this initiative in 2007:

- Division B Winner for waste management in the Local Shires and Government Association Excellence in Environment Awards, and
- Highly Commended award for waste minimisation from the Keep Australia Beautiful NSW Sustainable Cities Awards.

Second hand Sunday

Council held three Second Hand Sunday community events in Paddington during the reporting period. The aim behind Second Hand Sunday is to provide a social setting for residents to get together to exchange and sell household items that would have otherwise been disposed to landfill. Second Hand Sunday is held with the assistance of the Paddington Society.

This is the fourth year that council has held Second Hand Sunday events. The numbers of participating households has grown from twenty to thirty in 2006/2007 to approximately 50 in 2008/2009.

Waste education

Council carries out an active waste education program that aims to reduce the amount of waste disposed to landfill by Woollahra residents and businesses. The following is a summary of the education actions undertaken during the reporting year.

Schools Waste Workshops and Talks program

Council conducted the School's Waste Workshops and Talks program, whereby council's Waste Project Officer conducted recycling, composting and worm farming workshops at the following schools:

- Sydney Grammar,
- Scots College,
- Kincoppal-Rose Bay School,
- Woollahra Public School,
- Holy Cross, and
- Immanuel Pre-school.

The aim of the school's workshop and talk program is to educate students about alternative waste management practices that they can participate in at school and at home.

Council has also implemented a trial bottle recycling collection service at the Scots College to see whether or not such a service can be successfully managed by the students and staff to recycle all the school's glass, plastic and cans. Students in Year 8 were responsible for the changes at their school and were also involved in waste audits and recycling talks that provided the background and motivation for their decision to avoid, reduce and recycle as much waste as possible.

National Recycling Week November 2008

National Recycling Week is held each year in November to raise public awareness on the growing importance of recycling domestic and commercial waste. National Recycling Week was held during the 12 – 18 November 2007, during which council held several composting workshops for residents.

Illegal dumping prevention program

The DECCW has developed an illegal dumping prevention campaign titled *Dumping its dumb*. Through the program the DECCW has developed resource materials to be used by councils to promote key messages targeting illegal dumping in unit blocks. Woollahra, Randwick and Botany councils were successful in gaining funding under the Multi Unit Dwelling Illegal Dumping Prevention Campaign for a regional anti dumping project using the DECCW resource materials. The campaign involved broad, large scale promotions to reach the target audience, including advertising in local papers, on buses and in cinema (Bondi Junction and Eastgardens) as well as the development of a strata managers kit containing information about council services for distribution to new tenants moving into unit blocks.

The program was launched across the three councils in August 2007 and ran for three months. An independent company carried out a follow up evaluation of the campaign by telephone survey. They found that approximately 35% of respondents had seen or heard of the campaign via the various communications mediums used and 24% said they would make changes when disposing of larger waste items instead of dumping as a result of hearing the campaigns messages.

Council's Waste Compliance Officer continues to use the resource materials from the campaign, including postcards and posters, to educate residents about illegal dumping and the effects on the environment and local community.

Council also participated in:

- stalls and support provided for council events, including People and Pets day and the Bellevue Bonanza, and
- Clean-Up Australia Day with fifteen clean up sites in the LGA.

The Bower Reuse Referral Service

The Bower Reuse Referral Service (RSS) is a not-for-profit cooperative, registered charity and retail store which strives to provide reuse, repair and recycling alternatives for customers' unwanted goods. The SSROC group of councils, including Woollahra, has supported the Bower service to develop, maintain and manage a comprehensive database of over 1000 organisations including charities, second-hand shops, community organisations and recycling services that can take unwanted items for re-use and recycling instead these items being disposed to landfill.

The referral service has received over 200 calls per month during 2007/2008 and has experienced a 29% growth in comparison with the previous financial year. The growth in calls since the service began is largely due to council's promotion and means that more household waste is being diverted from landfill through the operation. During 2008/2009 7,947 callers were recorded, the frequency has risen by 24 calls per month bringing the monthly average call rate to 241.

During the 2007/2008 reporting period Woollahra residents made sixty-four calls to the service resulting in 118.75 m³ of materials being diverted from landfill. The 2008/2009 reporting period Woollahra residents made 116 calls to the service resulting in 229.73m³ of materials being diverted from landfill.

7.4 Future actions

In preparing comprehensive SoE reports councils are to identify any gaps in available data and the actions required to obtain that information. The following actions have been identified:

- illegal dumping monitoring programs developed with waste collection services to gauge the state of illegal dumping in the LGA, and
- review of waste programs in schools are monitored to determine success.

Further actions have been identified in the *Woollahra Council Management Plan 2007 – 2010*.

8. Heritage

Heritage is defined as places, values, traditions, events and experiences that capture where we've come from, our present and provides background to where the community is headed. Through identifying, protecting and managing our heritage assets, future generations will be able to experience and enjoy those places (DEWHA, 2009).

The Woollahra LGA has a diverse mix of significant built and natural areas. It is an area that is rich in both Aboriginal and non-Aboriginal heritage that is identified on local, State and National registers. Protection of Woollahra's heritage is contained in a range of statutory and policy documents administered by council and by various government departments and authorities.

Community attitudes and values relating to heritage issues change over time. Council and other levels of government have a role and statutory obligation to identify and conserve heritage. Aboriginal and non-Aboriginal heritage sites are consistently under threat by development and vandalism.

Heritage indicators have been chosen to measure both Aboriginal and Non-Aboriginal heritage within the Woollahra LGA.

8.1 State of heritage

Within the Woollahra LGA there are numerous sites that are recognised and listed on local, State and National heritage registers.

Seven hundred and fifty-four heritage items are protected under Woollahra Local Environmental Plan 1995 (WLEP, 1995) and there are fourteen Heritage Conservation Areas (HCA) within the Woollahra LGA. There are twenty-seven places of heritage significance within the Woollahra LGA included on the NSW State Heritage Register. In addition Draft Woollahra Local Environment Plan (Amendment 66) is proposed which will seek to amend the Woollahra Local Environmental Plan by adding 30 heritage items and some heritage item groups.

The Australian Heritage Database includes items listed on the World Heritage List, the National Heritage List, the Commonwealth Heritage List, the Register of the National Estate, the Overseas Places of Historic Significance to Australia and items under consideration, or that may have been considered for any one of these lists. The *Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act)* established the National Heritage List, which includes natural, Indigenous and historic places that are of outstanding heritage value to the nation. There are currently no places within the Woollahra LGA included on the National Heritage List. The *EPBC Act* also establishes the Commonwealth Heritage List, which comprises natural, Indigenous and historic places on Commonwealth lands and waters or under Australian Government control that are of outstanding heritage value to the nation. There are eleven places within the Woollahra LGA included on the Commonwealth Heritage List. The Register of the National Estate was frozen in February 2007, however, it remains a statutory register until 2012. There are 155 places within the Woollahra LGA included on the Register of the National Estate.

The National Parks and Wildlife Service (NPWS) maintains the Aboriginal Heritage Information Management System (AHIMS). The AHIMS is a database for all Aboriginal objects, Aboriginal places and other Aboriginal heritage values in NSW that have been reported to the NPWS. The AHIMS replaced the previous NSW Aboriginal Sites Register. There are forty-nine known Aboriginal sites currently recorded in the Woollahra LGA, with 80 site features within these sites, including shell middens, art and artefacts.

The number of heritage items listed on State and National registers has remained constant over the last nine years, whilst the number of locally protected sites and heritage conservation areas has gradually increased.

Table 13 presents the heritage data recorded each year, or when this data is available. Including this data into the SoE report provides quantifiable information to monitor a specific aspect of heritage (pressure, state, response) over time. These specific aspects of the data (i.e. number of Aboriginal heritage sites) are known as indicators. Where this information has been recorded for a number of years, trends can be established.

The indicators have been chosen because they provide the status of a specific aspect relating to heritage, and the information is regularly being monitored by council and other government authorities. It must be noted that the list of indicators is not representative of outcomes for all heritage sector activities and projects.

Table 13: Heritage indicators

Indicator	2000/ 2001	2001/ 2002	2002/ 2003	2003/ 2004	2004/ 2005	2005/ 2006	2006/ 2007	2007/ 2008	2008/ 2009	Trend
No. of Aboriginal heritage sites - AHIMS	-	75	75	75	75	75	75	49 sites ¹ 80 site features	49 sites ¹ 80 site features	
No. of sites – National Heritage List	-	-	-	-	-	-	0	0	0	
No. of sites – Commonwealth Heritage List	-	-	-	-	-	11	11	11	11	~
No. of sites – Register of the National Estate	153	153	129	129	129	129	155	155 ²	155 ²	~
No. of sites - National Trust Register	264	265	266	266	266	278	278	278	278	~
No. of sites - Woollahra LEP	620	622	624	616	656	682	682	682	682	~
No. of sites – State Heritage Register NSW	26	27	27	27	27	27	27	27	27	~
Heritage Conservation Area	6	6	6	12	13	14	14	14	14	~

Note: ¹The Aboriginal Heritage Information Management System (AHIMS) replaced the NSW Aboriginal Site Register in 2008.

²The Register of the National Estate was frozen in February 2007 and will remain statutory until 2012.

Sources: Woollahra Municipal council, NSW Heritage Branch, NSW Department of Planning, NSW Department of Environment and Climate Change, National Trust of Australia (NSW).

Key: The following symbols represent improving (✓), worsening (✖) or stable (~) trends in the monitored aspects of the environment. The trend column is left blank where there is not enough information to establish a trend. Where no information is available, the (-) symbol is used.

8.2 Pressures on heritage

Pressures on heritage sites include:

- threat of inappropriate development,
- threat of demolition,
- vandalism,
- tourism,
- low awareness of sites,
- limited funding for restoration and maintenance of sites, and
- effects of weather (including wind, water, fire and storms).

It is difficult to fully gauge the effects of development on heritage sites as some may be present that have not been recovered and policing of sites is limited by resource constraints.

The longevity of sites is determined primarily by the attitudes of the general community toward indigenous and non-indigenous heritage. However, council and National Parks and Wildlife Service officers constantly monitor sites for wear and abuse, and implement maintenance procedures where necessary.

Redevelopment pressures continue within the residential areas of the LGA, particularly within the Residential 2(b) zone where multi-unit housing is permissible.

8.3 Responding to heritage pressures

Council and NPWS officers regulate and monitor sites in relation to development and use pressures. The following activities and projects aim to contribute to the identification and protection of Aboriginal and non-Aboriginal heritage and culture in the Woollahra LGA.

Paddington development control plan

Following an extensive review of the controls for Paddington in May 2008, which included input from community groups and various professional groups, council approved a new set of development controls called the Paddington Heritage Conservation Area Development Control Plan 2008 (DCP).

The DCP covers all public and private lands in the Paddington Heritage Conservation Area. It applies to residential buildings, commercial buildings, shops and other types of non-residential buildings and public areas including roads, footpaths and parks. The DCP includes controls for the front and rear of buildings, roofs, excavation, open space, doors and windows, verandahs and balconies, fences, car parking, materials, exterior colours and trees. The DCP also deals with infill and intrusive development. There is an emphasis in the DCP on retaining and protecting significant features, reconstructing missing elements and reversing unsympathetic alterations. The DCP also acknowledges that modern design that respects the heritage context and amenity of the area has a place in Paddington.

Council has considered controls for lofts over garages in the Paddington Heritage Conservation Area DCP. Draft controls have been prepared and approved by Council and will be publicly exhibited and reported to Council during 2010.

Council has investigated land use and zoning in William Street Paddington. These investigations responded to the use, without consent, of residential properties for various retail purposes. Council has considered the various options and has resolved to prepare a Draft LEP that limits the use of the ground floor of the properties to fashion shops, shoe shops, jewellery shops, health and beauty shops and artists studios. The upper floor of these buildings may be used for associated storage and offices or residential purposes. The Draft Local Environment Plans (LEP) for William Street will be exhibited in early 2010. An amendment to the Paddington Heritage Conservation Area DCP relating to William Street will be exhibited at the same time.

Potential heritage items in Watsons Bay and Woollahra Heritage Conservation Areas

Council conducted research into potential heritage items in the Watsons Bay and Woollahra HCAs. The results of the research were presented to Council during 2008, including the nomination of potential heritage items and the consideration of submissions from owners. Council decided to list the Temple Emanuel Synagogue in Ocean Street, Woollahra and the cobble stone road archaeology in Cliff Street, Watsons Bay as heritage items. A draft LEP has been prepared, which proposes to add 30 heritage items and heritage item groups to schedule 3 Woollahra LEP and is currently being exhibited.

Reconciliation statement

Following the adoption of council's Reconciliation Statement in October 2006, a Reconciliation Action Plan (RAP) was developed. The RAP identifies strategies and delivery programs that contribute towards implementing council's commitment to reconciliation. During the reporting period, Council:

- continued membership of the Eastern Region Local Government and Torres Strait Islander Forum,
- programmed and promoted Reconciliation Week and NAIDOC Week activities, and
- carried out community education including the bush tucker walks and provision of information to local schools and promotion of council's indigenous heritage webpages.
(www.woollahra.nsw.gov.au/local_information_and_activities/indigenous/indigenous_heritage)

A full copy of the Woollahra Municipal council Reconciliation Statement can be found on council's website: www.woollahra.nsw.gov.au/local_information_and_activities/reconciliation

Aboriginal and Torres Strait Islander education

In conjunction with the Eastern Suburbs Organisation for Reconciling Australia (ESORA), Woollahra Council supported bush tucker walks in the local area. John Lennis is a local Aborigine who has been permitted by the area's Elders to conduct bushwalks around the foreshore of Nielsen Park, which incorporates Aboriginal culture and education. Four bush tucker walks were conducted during the reporting period, with participants enjoying a 'bush tucker' tasting. The increasing popular walks were free for participants from the local community. A 'Bush Tucker Brunch' was also conducted at council's community venue, The Gonyah, located in Watsons Bay. This activity was provided free to the local community.

Reconciliation week

Each year National Reconciliation Week celebrates the rich culture and history of the first Australians. It's the ideal time for all of us to join the reconciliation conversation and to think about how we can help turn around the disadvantage experienced by many Aboriginal and Torres Strait Islander people (Reconciliation Australia 2009). The 2009 event, *Learning to see the person not the stereotype*, was the 13th annual National Reconciliation Week.

For 2009 Reconciliation Week, the Eastern Region Local Government Aboriginal and Torres Strait Islander Forum (ERLGATSIF), of which Woollahra Council is a member, developed and hosted its sixth Pauline McLeod Award for Reconciliation. Awards were presented in the categories of The Pauline McLeod Award for Reconciliation (Individual), The Pauline McLeod Award for Reconciliation (Organisation), The Pauline McLeod Youth Award for Reconciliation (Individual) and the The Pauline McLeod Youth Award for Reconciliation (Organisation) with the ceremony taking place at Eastlakes Community Hall during Reconciliation Week.

National Aboriginal and Torres Strait Islander Day of Celebration (NAIDOC) week

2008 National Aboriginal and Torres Strait Islander Day of Celebration (NAIDOC) Week was held between 6 and 12 July with the theme *Advance Australia Fair?*

NAIDOC celebrates the survival of Indigenous culture and the Indigenous contribution to modern Australia. (NAIDOC, 2008).

Council celebrated 2008 NAIDOC Week with Indigenous story time at the Double Bay Childrens Library and the Paddington Branch Library. Woollahra Council flew both the Aboriginal and Torres Strait Islander flags on Council flagpoles in recognition of NAIDOC Week.

8.4 Future actions

In preparing comprehensive SoE reports councils are to identify any gaps in available data and the actions required to obtain that information. The following actions have been identified:

- On 31 March 2006, The NSW Government gazetted a standard instrument for preparing new LEPs, known as the standard instrument LEP program. Local plans across NSW will now use the same planning language and Councils are able to use localised planning objectives and provisions specific to their area. Woollahra Council is currently preparing the model LEP and local provisions. This will include reconfiguring Woollahra LEP 1995 schedule 3 to form the new schedule 5 to the standard instrument. Many of Woollahra's local heritage items do not have completed heritage inventory sheets and it is the intention of Council to complete this work and review the list.
- The Paddington Hotels study will be completed in 2010 and as part of this study, the heritage inventory sheets will be prepared for the 13 hotels.

Further actions have been identified in the *Woollahra Council Management Plan 2007 – 2010*.

9. Sustainable Woollahra

Sustainability has many definitions, essentially sustainability can be defined as a means of existing within the limits of what the environment can provide. Planning for a sustainable future requires a framework in which economic, environmental and social decision-making is integrated into natural resource management.

Sustainability is used to reflect an obligation that people living today have to future generations to protect the health, genetic diversity and productivity of the environment. A healthy environment underpins a productive economy and healthy society. The presence of unsustainable practices in the future will have a negative impact and reduce future opportunities and degrade environmental conditions.

Awareness and involvement of both the residential and business community is critical in achieving sustainable outcomes. Council has adopted a facilitation role evident in the environmental programs and actions that have been mentioned in previous sections. This section will further highlight how Woollahra is moving towards sustainability.

9.1 Community values

Several studies have been undertaken on the views of the local community with there being a clear identification with the value of the receiving waters. The Woollahra Sustainability Plan (ISF, 2005), identified that the clearest convergence of community views relate to the Harbour and Beaches which are valued extremely highly, and “people often expressed a desire for them to be protected or kept clean” (ISF, 2005). Woollahra Social and Cultural Plan undertook a range of consultations with residents and community groups highlighted what is most important to the Woollahra community. There is also a high pride in local parks, beaches, and public facilities.

9.2 Funding Sustainability

Through the introduction of an Environmental Levy in 2002, council has been able to fund a range of specific improvement projects called the Environmental Works Program (EWP).

The EWP has and will continue to deliver excellent water quality, improved bushland, environmental education, reduced pollution and flooding benefits to our community.

We have a responsibility as a community to protect and enhance our environment. We value your contribution to ensuring a sustainable future for the Woollahra Municipality.

Environmental & Infrastructure Levy

The Minister for Local Government has approved council’s application for a combined Environmental and Infrastructure Levy, which will fund not only the EWP, but also an Infrastructure Renewal Program (IRP) for the next five years (2007 – 2012). The IRP aims to restore ageing infrastructure and protect our local environment, so it makes sense that the EWP (\$440k) and IRP (\$2.66M) be integrated and funded by a combined \$3.1M annual levy.

General Revenue & Stormwater management service Charge

In addition to the Environmental & Infrastructure Levy, \$450,000 from the Stormwater Management Service Charge will assist council to fund stormwater infrastructure projects. The charge, recently introduced in accordance with new State legislation, recognises local council’s key role in stormwater management, and their need for ongoing funding to support them in carrying out this role.

External Funding Sources

Council's commitment to seeking external grant funding to further the objectives of the EWP and supplement ratepayer's funds will continue over the next five years. We have recently been successful in applications for funding two innovative water treatment and re-use projects at Christison Park and Rose Bay Promenade.

Environmental Works Program

Through the introduction of an Environmental Levy in 2002, council has been able to fund a range of specific improvement projects called the Environmental Works Program (EWP).

The EWP has and will continue to; deliver excellent water quality, improved bushland, environmental education, water and energy savings, reduced pollution and flooding benefits to our local community.

The EWP was originally divided into five categories being Administration and Auditing, Water Quality 'at source', Water Quality 'end of line', Watercourse and Bushland Vegetation Restoration, and Local Flooding. In addition to these categories council has recently been developing new projects in the areas of Water Sensitive Urban Design, Sustainability and Climate Change.

In addition to projects that have been listed in previous sections, below are initiatives the council has implemented to move Woollahra towards sustainability.

Administration and Auditing

The objectives of administering the EWP include:

- Managing the environmental works program in an efficient and transparent manner,
- Increasing the overall funding to council at no additional cost to the Woollahra ratepayers, and
- Keeping the community informed on the progress of works, expenditure of funds and outcomes achieved.

Grant applicants

Grant applications and project plans are continually being developed to implement the EWP. Successful grant applicants in 2008/2009

Table 14: Successful grant applications

GRANT	PROJECT
Environmental Trust	Cooper Park Sustainable Water Project
DECCW - Public Facilities Program	Holdsworth Community Centre Water Savings Challenge
DECCW - Estuary Management Program	Port Jackson South Estuary Strategic Review

Achievements over the year include a number of successful grant applicants, the ongoing implementation of an environmental education program and a communication strategy by workshops and various media releases in the Wentworth Courier, community information brochures and reporting to council on the progress of the EWP.

A new brochure and website updating information on the EWP is currently being developed and will be released in December 2009.

Environmental Monitoring

Council is developing an environmental monitoring database and related collection systems for environmental data, including stormwater treatment devices (pit cleaning and gross pollutant traps), water quality measures, street sweeping and beach cleaning activities to quantify the amount of pollution council is preventing from reaching the harbour. The database will also include the baseline water quality data gathered for Parsley Creek, Cooper Park Creek and Rose Bay Creek.

Future development of the system will ideally provide access to either online or offline data tables using council's GIS mapping system EView as an interface, allowing the user to navigate graphically to the specific area or device in question and view related results.

9.3 Environmental Education

Sustainability Workshops

Council expanded the Sustainability Workshops Program Series in 2008, increasing both the regularity of workshops and the range of topics offered. Workshops included composting and the introduction of the 'EcoChoices' workshop. These workshops were well attended and feedback was positive.

Workshops are free and hold monthly topics. Workshop topics over the reporting period included:

- birds in your Backyard (field session),
- paddington Community Garden: Worm farming and composting workshop, and
- harvesting rainwater at your home, rainwater tank information session.

National Water Week

National Water Week is held each year in October to assist the community to understand and take action to protect and conserve our precious water resources and habitats. National Water Week was held from the 21 to 27 October 2008. For National Water Week, council distributed free shower timers to residents from our customer service counter.

World Environment Day

The United Nations hold World Environment Day on 5 June every year as one of the primary ways to promote environmental awareness and enhance political attention and action on the environment (United Nations Environment Programme 2008). The theme for World Environment Day 2009 recognises that climate change is the responsibility of everyone. The slogan for World Environment Day 2009 is *Your Planet Needs You- Unite to Combat Climate Change*. It reflects the urgency for nations to agree on a new deal at the crucial climate convention in Copenhagen some 180 days later in the year, and the links with overcoming poverty and improved management of forests.

For World Environment Day 2008 celebrations council:

- held a World Environment Day environmental information and education stall in the Edgecliff Centre,
- conducted a short essay competition for local schools. The theme of the essay was *Caring for our planet starts locally*. council received over 300 entries with the winner being Liam Cottrell from Woollahra Public School who won a \$100 book voucher for his efforts.
- held the World Environmental Day Drawing Competition for local primary schools with the theme *Reduce, Reuse, Recycle*. council received over 570 entries. The winning artworks from Juliette Swain (McAuley Primary School) and Lily Beckhurst (Glenmore Road Public School) are now displayed on council's recycling truck. Both winners also received a \$50 book voucher. Kambala Girls School won \$200 worth of locally propagated native plants for submitting the most entries.

Schools Network

The Eastern Suburbs Schools Sustainability Network (ESSSN) was established in collaboration by Woollahra and Waverley councils, to support local schools to implement school-based sustainability initiatives. ESSSN meetings are held once per school term and are attended by local teachers as well as interested parents and representatives from council and other relevant organisations e.g. Centennial Parklands. An email network also operates to facilitate communication between ESSSN members.

2008 Woollahra Small Sculpture Prize and the Environmental Schools Sculpture Prize

The Environmental Schools Sculpture Prize ran in tandem with the Woollahra Small Sculpture Prize for the second succession in the reporting period. The Environmental Schools Sculpture Prize aims to provide a creative opportunity for students to participate in real-life design tasks about the importance of conserving the natural environment. Participating students researched the theme of *Keep the Sea Plastic Free* and generated imaginative works of art that highlighted the issue to the broader community. Students' artwork was judged by Woollahra Small Sculpture Prize judges Edmund Capon, AM, Director of the Art Gallery of NSW and Deborah Edwards, Senior Curator of Contemporary Australian Art at the Art Gallery of NSW. Students artwork was displayed at Woollahra Council Chambers during the Woollahra Small Sculpture Prize Exhibition.

Bijanka Bacis from Kincoppal-Rose Bay was judged as the winner of the 2008 Environmental Schools Sculpture Prize

Public Art

Council adopted the Public Art Policy in October 2006, that:

*Supports and encourages the development of public art and public art opportunities that preserve, emphasise and enhance distinctive local identity and the **natural** and built assets of the Municipality in both public spaces or on private sites which impact on the public domain.*

Furthermore, the Public Art Policy lists amongst its values that the development of public art and public art opportunities shall endeavour to:

- enhance local identity, enrich residents lives and create a sense of place,
- honour the unique heritage of the area including Aboriginal and Torres Strait Islander culture, and
- reflect the principles of Ecologically Sustainable Development (ESD).

A full copy of the Woollahra Municipal council's Public Art Policy can be viewed at:

www.woollahra.nsw.gov.au/local_information_and_activities/arts_and_culture/public_art

In the reporting period, members of Council's Public Art Advisory Committee participated in provided input into the project brief for a public art opportunity at the eastern gateway of the Double Bay Business Centre. One of the concept considerations indicated in the brief was that ESD principles should be applied if the art work was to rely on power or water.

Forty nine expressions of interested were received nationally and internationally for the proposed eastern gateway artwork. In the reporting period, the Public Art Advisory Committee assessed expressions of interest and made a recommendation of the work to be commissioned.. In August 2008, Council adopted the recommendation and entered into a commission agreement with artist Bronwyn Berman to produce her artwork that signifies the former wetlands environment of Double Bay.

Community Services Events

During the reporting period. Christopher Wilson, undertaking an environmental auditing unit as part of the Master of Environmental Management at the University of New South Wales, audited key Community Services Division events and provided recommendations on how to achieve more environmentally aware events.

Environmental Grants

Council offered Community Environmental Grants, as a sub-category of council's Community Grants Program, to community groups and local schools to implement local environmental projects. This is the third year that council has run the Community Environmental Grants program.

The grants were funded by the Environmental and Infrastructure Levy, with a total amount of \$11,000 allocated for individual grant projects of up to \$1,000 in value.

Fourteen projects received funding under the program, for projects that ranged from a Community Clean-Up Day to native gardens and recycling initiatives. The successful applications were for projects that:

- provided direct environmental benefit, and
- aimed to develop knowledge, skills and awareness in participants and others to encourage environmental activities in the future.

Recipients included:

- The Scots College – Vegetable Garden,
- Cranbrook Junior School – Litter Free School,
- Double Bay Public School – Vegetable Garden,
- Glenmore Road Public School – Native Garden,
- Kincoppal Rose Bay Junior School – Native bird, frog and lizard habitat area,
- Kincoppal Rose Bay Senior College – Native garden,
- McAuley Primary School – Reconciliation native garden,
- Paddington Church of Christ kindergarten – Install six dual flush toilets,
- Reddam House School – Bird attracting garden,
- SDN Paddington Child and Family Learning centre – Rainwater tank,
- St Stephens Childcare Centre – Environmental mural,
- Vaucluse Public School – Vegetable garden.

9.4 Sustainable schools

Council recognises schools within the Woollahra LGA are doing their part in environmental education. In acknowledgement of this, local schools are invited each year to report on their environmental projects in council's State of the Environment Report. Below are programs schools in the LGA have implemented to promote sustainability over the last reporting period.

Woollahra Public School

In 2007, Woollahra Public School (WPS), with a submission by a teacher, Ms Liat Giffard, won a Woollahra Council Environmental Community Grant to rejuvenate the WPS garden areas. The idea was to use the Environmental Grant money, to begin a funding program, to improve and make educational use of garden areas scattered throughout the school playground. It was seen as a long term project for the school and along with the initial Woollahra Council funding of \$250.00, Woollahra P&C, have generously raised and allocated funding, over a three year period, to make sure The Environmental Garden is established.

The Environmental Garden is the development of existing small garden areas within Woollahra Public School to allow the study, by the teachers and children, of the environment, the principles of sustainability and the Australian Aboriginal's relationship to the land. The existing Woollahra School garden spaces are quite small in area, approximately 100 -150 square metres. Permanent fencing was required, to surround the garden beds and protect new planting from trampling by students. The proposal, to enhance the existing native shrub and Eucalypt garden areas, recognised the gardens as a valuable resource in the school playground. These garden areas provide shade, screen toilet blocks, soften building walls and enclose quiet areas in the playground.

This project has provided a chance for a deeper understanding of such concepts as:

- The way the Aboriginal people have survived for thousands of years on native foods and medicines,
- Children growing, harvesting, preparing and sharing their own food with the planting of native 'Bush Tucker' plant species,

- An understating of the delicate balance between soils/water /microorganisms and plants with the influence of the sun and rain for growing,
- The evolving/changing character of the environment and the need to protect it.

Stage 1, completed in 2008, was the installation of replacement fencing and access gates to surround the existing garden areas.

Stage 2, completed in 2009, was the removal of some existing exotic and diseased plant species and replacement with a variety of endemic and native 'Bush Tucker' tree, shrub and groundcover plant species, soil improvement and mulch and a planting establishment maintenance and watering program. Work has included:

- the use of endemic and native plant species,
- the principles of water conservation and recycling. WPS have rainwater tanks installed and the water is used for establishment hand watering,
- creating habitats for mini-beasts/birdlife by including decomposing mulches, rocks and logs,
- the principles of fertilizing and mulching by using existing leaf litter, compost material for fertilizing and ongoing soil testing to understand soil nutrient requirements,
- an artwork by Aboriginal elder Roger Shannon, to be located on external wall adjacent to the garden areas.

It has been a collaborative approach between the teaching staff, the Aboriginal community, Woollahra School parents and a specialist horticultural consultant. Woollahra Public School is recognised for the school's Indigenous Education program, through the work of the Deputy Principal (Acting) Margaret Nay. Liat Giffard, has undertaken a number of educational environmental initiatives at the school. The artwork by Aboriginal elder Roger Shannon, created another 'layer' to the project and Roger's involvement allowed for liaison with the Aboriginal community. Consultation with an expert botanical/horticultural professional Dave Rose, from Sydney Wildflower Nursery, provided a planting design of suitable 'Bush Tucker' native species. A school parent, Susan Miles, a Landscape Architect, documented the garden design and Manna Landscapes constructed the garden. Susan, as part of the Woollahra School P & C, is also involved in funding submissions. School parents Tony and Sophie Green donated plant species from their wholesale nursery, with some of the special 'Bush Tucker' plant species, sourced by Dave Rose, Sydney Wildflower Nursery.

It is envisaged this project will be completed in 2010 – 2011 and further works may include:

- installation of rain gauges,
- solar lighting for possible low light observation of habitats,
- worm farming and composting using composting bins,
- signage to help teach students about the uses of plants for bush tucker, medicinal purposes or as manufacturing material,
- replicas of native animal tracks,
- outdoor seating for teacher and student study,
- creating a frog pond habitat.

The project, as an educational tool will be ongoing. There is an opportunity for the existing garden beds fronting Edgecliff Road to provide space for an extension to the environmental garden activities in future years.

[Source: Margaret Nay – Deputy Principal (Acting) and Susan Miles (WPS Parent), 2009]

Kincoppal Rose Bay

Kincoppal-Rose Bay Junior School has been involved in a number of environmental initiatives over the past twelve months. The Year 6 Environment Committee and teacher environmental representative have instigated many of the changes and projects and continue to sustain these projects. Kincoppal's programs are outlined below.

Implementation of Garden Club for Kindergarten and Year 1

The garden club continues to involve parents volunteers, school gardeners, environment teacher and students. It happens once a week and as well as planting, garden care and harvesting it also involves environmental awareness talks and education. The children offer ideas on how to beautify and protect their environment as well as learning about how plants grow, what care is needed and the changes that occur. During the 2008/2009 reporting year Kincoppal also started a Garden Club Shop where produce from the garden and worm wee fertiliser from the school's worm farms are sold. Flora planted and harvested include; beans, spring bulbs, lettuce, flower baskets, tomatoes, herb pots, potatoes, pumpkins, beetroots, cucumbers, eggplants, spring onions, carrots, strawberries and corn.

Implementation of recycling system including compost and worm farm

With the help of Woollahra council Kincoppal have set up and continue to use a recycling system throughout the Junior School. Every child has access to a blue and black recycling box and compost bucket. Each grade takes responsibility for the emptying of each bin into appropriate larger bins and compost. Kincoppal has 3 compost bins at present and 5 worm farms. Each of these is providing composted soil and organic matter for our gardens and potted plants. The Environment Committee has placed signs on every bin saying "STOP Can your rubbish be recycled?" There are also paper recycling boxes in every classroom which are emptied in conjunction with our school cleaners. The staffroom has compost buckets and recycling boxes for staff to recycle as well.

Planting of Native Plants

Kincoppal has participated in planting a number of native trees in different areas around the school grounds, including some in pots on the playground, along the perimeter fence and also in the bush area below our playground. During the reporting period year two and three participated in National Tree Day for School planting over 200 native plants on the school grounds. A barren, rocky area previously overgrown with weeds was cleared and prepared then planted with native flora.

Establishment of a Native Garden

The school established a native tree garden near their Bush Tucker Walk to encourage native birds to the area. This is part of a beautification of the schools working vegetable garden as well as encouraging teachers and children to use the area as an outdoor learning environment.

Establishment of a Frog and Lizard Habitat Area

Using grants from Green Schools Connect and Woollahra Municipal Council a frog and lizard habitat garden was established, with students naming it The Environment Garden. The project involved clearing weeds, establishing two frog ponds, mulching the entire area and planting over 100 native frog attracting flora.

General Awareness and Environmental Education

Kincoppal has continued to encourage awareness in environmental education through participation in environment based competitions, participation in World Environment Day and National Recycling Week and applying for grants to implement initiatives. A weekly Environment Awards are given to students who are recycling or showing an awareness and consideration of their environment. The Environment Committee also plan and run at least four *No Rubbish Days* a year where bins are tapped shut and students try hard not to bring rubbish to school that cannot be recycled that day. The school also has an Environment Board which is regularly updated with children's participation in environmental projects or competitions or suggestions.

[Source: Nicole Johnson – Environmental Coordinator, Kincoppal Rose Bay 2009]

Ascham School

Through the concern of two year six students Freya Johnson and Alex Raine, Ascham School investigated excess water use in the bathrooms. The two students conducted an investigation to determine the average amount of water used per hand wash, astonished that approximately 10 litres of water was being used per hand wash.

With the assistance of Headmistress, Mrs Elizabeth Neil, the students researched water efficient taps and obtained quotes. To cover the cost of the new water efficient fixture installation, Freya and Alex organised a fundraiser and raised just over \$700. To meet the \$8000 cost for installation the students decided to apply for an environmental grant from Woollahra Municipal Council who agreed to provide Ascham half the money required. Ascham recognising their initiative and positive environmental impact Ascham School contributed the rest of the fund.

During Easter 2009 the water efficient fixtures were installed, since the time of installation all students and staff can proudly say that with every hand wash they are conserving water and the environment.

[Source: Michelle Baddams – Teacher, Ascham School 2009]

McAuley Catholic Primary School – Green Group

The McAuley Environment Green Group was established in Term 1 2009. The group is made up of members and teachers who meet every Monday at lunchtime.

The aim of the group is to enable and empower students to identify, plan and implement environmentally focused initiatives in the classrooms, on the playground, in the community and other parts of the world as stewards of creation.

There have been many achievements since the beginning of the year, including:

- a 2-minute ‘Green Update’ at weekly assembly,
- school wide ‘Rubbish Free Lunch’ held every Wednesday,
- ‘Switch Off’ signs located in classrooms and around the school,
- established and maintain worm farm,
- recipient of Woollahra Council’s Environmental Grant, and
- ‘Get Green’ mufti day to raise funds for Sisters of Mercy Farm Project in Papua New Guinea.

Cranbrook School

Cranbrook School has, for a number of years, promoted an awareness of environmental issues in the school through various initiatives including water usage and recycling, cardboard and paper recycling, as well as better management of energy usage.

In 2006, a trial grey water recycling unit was tested on the site. The approved unit now recycles approximately 1500 litres per day of grey water from one of the School’s boarding houses. This recycled water is used to irrigate the lawn and garden areas nearby.

This year the School has been successful in gaining Commonwealth Government funding through the Community Water Grants to install four water tanks on the school grounds. DA approval was granted recently which will allow the tanks to be completed during the September holiday period.

Other strategies that the school has employed to minimise water usage are:

- utilising bore water to irrigate the School’s ovals,
- installation of water saving devices to plumbing fixtures throughout all school buildings,
- drought tolerant native plants have replaced other varieties,
- installation of drip irrigation in many of the gardens, and
- the addition of mulch to the garden beds.

As well as water conservation, the School community is now focusing on recycling all cardboard and plastics through a program established by the boys themselves during 2008. This has proven to be very successful with over 40 bins collected each month. Woollahra Municipal council, as the School’s new waste collection contractor has been instrumental in the success of this project.

Energy usage at Cranbrook has increasingly come under the microscope leading to the installation of Power Factor Correction to the main plantroom earlier this year. This unit has reduced electricity consumption by 10% already with greater improvements expected over the summer months.

Following close scrutiny of our gas bill for heating the pool an insulation blanket was installed in 2007 to reduce heat loss from the pool overnight. The resulting improvement has seen an average 30% reduction in gas usage.

With the current global focus on sustainability and the reduction of energy consumption and carbon footprints, Cranbrook School is striving to become a leading example to its students and the community by providing innovative solutions in a practical and educational manner. The School will continue to seek ways to improve the environment with a number of projects already being planned for 2009.

[Source: Mark O'Hara Cranbrook School 2008]

9.5 Future actions

In preparing comprehensive SoE reports councils are to identify any gaps in available data and the actions required to obtain that information. The following actions have been identified:

- Develop environmental education programs aimed at increasing the awareness of the local biodiversity and pressures affecting their populations and habitat,
- Monitor outcomes of school environmental programs to gauge success, and
- Promote schools / community groups to apply for grants available to undertake environmental initiatives.

Further actions have been identified in the *Woollahra Council Management Plan 2007 – 2010*.

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11. Appendix A - Some activities that may cause contamination

- acid/alkali plant and formulation
- agricultural / horticultural activities
- airports
- asbestos production and disposal
- chemicals manufacture and formulation
- defence works
- drum reconditioning works
- dry cleaning establishments
- electrical manufacturing (transformers)
- electroplating and heat treatment premises
- engine works
- explosive industry
- gas works
- iron and steel works
- landfill sites
- metal treatment
- mining and extractive industries
- oil production and storage
- paint formulation and manufacture
- pesticide manufacture and formulation
- power stations
- railway yards
- scrap yards
- service stations
- sheep and cattle dips
- smelting and refining
- tanning and associated trades
- waste storage and treatment
- wood preservation

12. Appendix B - Flora and fauna lists

Location key:

C: Cooper Park; G: Gap Park; Gp: Gap Bluff; N: Nielsen Park; P: Parsley Bay Reserve and V: Vacluse House.

Note: The information presented in appendix B are the results of a flora and fauna survey undertaken in 1995.

Flora Total: 311

Common Name	Botanical Name	Location	Local Status
FERNS (Pteridophytes)			
Maidenhair Fern	<i>Adiantum aethiopicum</i>	C : G : P : V :	common
Rough Maidenhair	<i>Adiantum hispidulum</i>	P :	rare
Giant Maidenhair Fern	<i>Adiantum formosum</i>	Gb :	rare
Birds nest Fern	<i>Asplenium australasicum</i>	C : P :	uncommon
Necklace Fern	<i>Asplenium flabellifolium</i>	C : G : P :	rare
Gristle Fern	<i>Blechnum cartilagineum</i>	C :	rare
	<i>Blechnum sp.</i>	V :	rare
Mulga Fern	<i>Cheilanthes sieberi</i>	G : P :	rare
Rock Fern	<i>Cheilanthes tenuifolia</i>	G :	rare
Binung	<i>Christella dentata</i>	C : P :	rare
Soft Bracken Fern	<i>Culcita dubia</i> - Now <i>Calochlaena dubia</i>	C : P : V :	common
Rough Tree Fern	<i>Cyathea australis</i>	C : Gb : P :	common
Scaly Tree Fern	<i>Cyathea cooperi</i>	C : P : V :	uncommon
Hares Foot Fern	<i>Davallia pyxidata</i>	P :	rare
	<i>Dicksonia antarctica</i>	C :	rare
Small Rasp Fern	<i>Doodia caudata</i>	C : P :	rare
Coral Fern	<i>Gleichenia dicarpa</i>	C : Gb :	uncommon
Rusty Coral Fern	<i>Gleichenia rupestris</i>	G :	uncommon
Bats Wing Fern	<i>Histiopteris incisa</i>	C : G : Gb : P : V :	uncommon
Harsh Ground Fern	<i>Hypolepis muelleri</i>	C : G : P :	uncommon
Downy Ground Fern	<i>Hypolepis punctata</i>	C : P :	uncommon
Shield Fern	<i>Lastreopsis sp.</i>	P :	rare
Kangaroo Fern	<i>Microsorium diversifolium</i>	P :	rare
Adders Tongue	<i>Ophioglossum lusitanicum ssp coriaceum</i>	G : P :	rare
Sickle Fern	<i>Pellaea falcata</i>	G ? : Gb :	rare
Small Sickle Fern	<i>Pellaea falcata nana</i>	G :	rare
Elkhorn	<i>Platycterium bifurcatum</i>	C : G : Gb : P :	uncommon
Skeleton Fork Fern	<i>Psilotum nudum</i>	G : P :	rare
Hard Bracken	<i>Pteridium esculentum</i>	C : G : Gb : N : P :	common

Common Name	Botanical Name	Location	Local Status
Tender Brake	<i>Pteris tremula</i>	C : Gb : P :	common
Jungle Brake	<i>Pteris umbrosa</i>	P :	uncommon
Chinese Brake	<i>Pteris vittata</i>	C : P :	common
Rock Felt Fern	<i>Pyrosia rupestris</i>	C : P :	rare
Swamp Selaginella	<i>Selaginella uliginosa</i>	C ? : G :	rare
Umbrella Fern	<i>Sticherus sp.</i>	C : P :	rare
King Fern	<i>Todea barbara</i>	C : Gb : P :	region rare
Total : 36			
RUSHES AND SEDGS (Centrolepidaceae)			
- B18annual	<i>Centrolepis stigosa</i>	P :	rare
	(<i>Cyperaceae</i>)		
Slender Sedge	<i>Cyperus gracilus</i>	C : P :	rare
	<i>Cyperus imbecillus</i>	P :	rare
	<i>Cyperus polystachyos</i>	C : G : P :	uncommon
	<i>Cyperus sanguinolentus</i>	P :	rare
	<i>Cyperus sesquiflorus - could be weed</i>	C : P :	uncommon
	<i>Gahnia clarkei</i>	C : P :	rare
	<i>Gahnia melanocarpa</i>	P :	rare
	<i>Gahnia seiberana</i>	C : Gb :	rare
	<i>Isolepis cernua</i>	P :	rare
Swamp Club-rush	<i>Isolepis inundata</i>	C : P :	rare
Knobby Club-rush	<i>Isolepis nodosus</i>	G : Gb : P :	common
	<i>Isolepis prolifer - could be weed</i>	P :	uncommon
Variable Sword-sedge	<i>Lepidosperma laterale</i>	C : C18G : Gb : P :	rare
	<i>Lepidosperma squamatum</i>	P : G :	rare
	<i>Schoenus maschalinus</i>	P :	rare
Black Bog-rush	<i>Schoenus melanostachys</i>	P - 1 plant	region rare
	(<i>Juncaceae</i>)		
(annual)	<i>Juncus bufonius</i>	C : G : P :	uncommon
	<i>Juncus cognatus</i>	C : G :	uncommon
	<i>Juncus continuus</i>	C : G : Gb : P :	uncommon
	<i>Juncus homalocaulis</i>	P :	uncommon
Sea Rush	<i>Juncus kraussii</i>	P :	uncommon
Broad Rush	<i>Juncus planifolius</i>	C : G : Gb : P :	uncommon
Common/Tussock Rush	<i>Juncus usitatus</i>	C : G : Gb : P :	uncommon
	(<i>Restionaceae</i>)		
Scrambling Sedge	<i>Restio dimorphus</i>	G : Gb :	uncommon

Common Name	Botanical Name	Location	Local Status
	<i>(Xanthorrhoeaceae)</i>		
	<i>Lomandra filiformis</i>	P :	rare
Pale Mat Rush	<i>Lomandra glauca ssp. glauca</i>	G :	rare
Spiny-headed Mat Rush	<i>Lomandra longifolia</i>	C : Gb : N : P : V :	common
	<i>Lomandra longifolia ssp. longifolia</i>	G :	common
	<i>Lomandra multiflora</i>	C : G :	rare
Grass Tree	<i>Xanthorrhoea arborea</i>	C :	rare
Total : 31			
	GRASSES (Poaceae)		
Blown Grass	<i>Agrostis avenacea var. avenacea</i>	P :	uncommon
	<i>Aristida vagans</i>	C :	rare
	<i>Anisopogon avenaceus</i>	Gb :	rare
Wallaby Grass	<i>Danthonia linkii</i>	C :	rare
Wallaby Grass	<i>Danthonia longifolia</i>	C :	rare
Wallaby Grass	<i>Danthonia setacea</i>	Cc : P :	rare
Wallaby Grass	<i>Danthonia tenuior</i>	G :	rare
Bent Grass	<i>Deyeuxia quadreseta</i>	G :	rare
Long-hair Plume Grass	<i>Dichelachne crinata</i>	C : G : Gb : P :	uncommon
Short-hair Plume Grass	<i>Dichelachne micrantha</i>	G : P :	uncommon
Native Summer Grass	<i>Digitaria parviflora</i>	C : P :	rare
Hedgehog Grass	<i>Echinopogon sp.</i>	P :	rare
Hedgehog Grass	<i>Echinopogon caespitosus</i>	C : G :	rare
	<i>Entolasia marginata</i>	C : G : P :	uncommon
Wiry Panic Grass	<i>Entolasia stricta</i>	C : G : Gb : P :	uncommon
Brown's Love Grass	<i>Eragrostis brownii</i>	C : G : P :	uncommon
Love Grass	<i>Eragrostis molybdea</i>	G :	rare
	<i>Eragrostis philippica</i>	G : Gb : P :	rare
Blady Grass	<i>Imperata cylindrica</i>	C : Gb : N : P : V :	common
Weeping Meadow Grass	<i>Microlaena stipiodes</i>	C : G : P :	common
Basket Grass	<i>Oplismenus aemulus var. aemulus</i>	C : G : Gb : P : V :	common
	<i>Oplismenus imbecillus</i>	C : G : Gb : P : V :	common
Two Colour Panic	<i>Panicum simile</i>	G :	rare
	<i>Paspilidium distans</i>	C :	rare
	<i>Paspilidium radiatum</i>	G ? : P :	rare
Fountain Grass	<i>Pennisetum alopecuroides - probably weed</i>	Gb :	uncommon
	<i>Poa affinis</i>	C : G : P :	rare
	<i>Poa queenslandica (in '88 list)</i>	P :	rare

Common Name	Botanical Name	Location	Local Status
Sand Couch	<i>Sporobolus virginicus</i>	G :	rare
Kangaroo Grass	<i>Themeda triandra</i>	C : Cc : G : Gb : P :	uncommon
Prickly Couch	<i>Zoysia macrantha</i>	G :	rare
Total : 31			
ORCHIDS (Orchidaceae)			
Pixie Orchid	<i>Aciathus fornicatus</i>	C :	region rare
	<i>Caladenia alba</i> ('92)	G : P :	region rare
Tartan Tongue-orchid	<i>Cryptostylis erecta</i>	G : P :	region rare
Tongue-orchid	<i>Dendrobium linguiforme</i>	P :	region rare
Onion Orchid	<i>Microtis sp.</i>	G :	region rare
Leek Orchid	<i>Prasophyllum sp.</i>	G :	region rare
	<i>Pterostylis sp.</i>	C :	region rare
	<i>Pterostylis concinna</i>	P :	region rare
Blunt Greenhood	<i>Pterostylis curta</i>	G : P :	region rare
Nodding Greenhood	<i>Pterostylis nutans</i>	G :	region rare
Little Red Riding Hood	<i>Pterostylis pedunculata</i>	P :	region rare
Total : 11			
CLIMBERS AND CREEPERS (Asclepiadaceae)			
Scented Marsdenia	<i>Marsdenia suaveolens</i>	N :	rare
	(<i>Bignoniaceae</i>)		
Wonga Wonga Vine	<i>Pandorea pandorana</i>	C :	rare
	(<i>Dilleniaceae</i>)		
	<i>Hibbertia dentata</i>	Cc : P :	rare
Climbing Guinea Flower	<i>Hibbertia scandens</i>	C : G : Gb : P :	common
	(<i>Cassythaceae</i>)		
	<i>Cassytha sp.</i>	N :	uncommon
Devil's Twine	<i>Cassytha glabella</i>	C : G : Gb :	uncommon
	(<i>Fabaceae</i>)		
Love Creeper	<i>Glycine clandestina</i>	G : Gb : N : P :	uncommon
Purple Twining-pea	<i>Hardenbergia violaceae</i>	C : G : N : P : V :	common
Dusky Coral Pea	<i>Kennedia rubicunda</i>	C : Cc : G : Gb : N : P : V :	common
	(<i>Menispermaceae</i>)		
Pearl Vine	<i>Sarcopetalum harveyanum</i>	N : P :	rare
Snake Vine	<i>Stephania japonica</i> var. <i>discolour</i>	C : G : N : P :	uncommon
	(<i>Philesiaceae</i>)		
Wombat Berry	<i>Eustrephus latifolius</i>	C : G : N : P : V :	common
Scrambling Lily	<i>Geitonoplesium cymosum</i>	C : G : P : V :	uncommon

Common Name	Botanical Name	Location	Local Status
	<i>(Pittosporaceae)</i>		
Dumplings, Apple Berry	<i>Billardiera scandens</i>	C : G : N : P :	uncommon
	<i>(Polygonaceae)</i>		
	<i>Muehlenbeckia sp.</i>	P :	?
	<i>(Rubiaceae)</i>		
Morinda	<i>Morinda jasminoides</i>	P :	rare
(Smilacaceae)			
Thornless/Sweet Sarsaparilla	<i>Smilax glycyphylla</i>	C : G : Gb : P :	common
(Vitaceae)			
Slender Grape	<i>Cayratia clematidea</i>	P :	rare
Kangaroo Vine	<i>Cissus antarctica</i>	Introduced to C : G :	uncommon
Five-leaved Water Vine	<i>Cissus hypoglauca</i>	C : G : N : P :	uncommon
Total : 20			
CANOPY PLANTS (Casuarinaceae)			
Black She-oak	<i>Allocasuarina littoralis</i>	C : G : N : P	uncommon
Discovered in late 1980's	<i>Allocasuarina portuensis</i>	N : Not in healthy state	2 only, rare
Forest Oak	<i>Allocasuarina torulosa</i>	P :	uncommon
River Oak	<i>Casuarina cunninghamiana</i>	C :	uncommon
Swamp Oak	<i>Casuarina glauca</i>	C : G : P : V :	uncommon
	<i>(Cupressaceae)</i>		
Port Jackson Cypress	<i>Callitris rhomboidea</i>	Gb : N :	rare
	<i>(Elaeocarpaceae)</i>		
Blueberry Ash	<i>Elaeocarpus reticulatus</i>	C : G : Gb : N : P :	common
	<i>(Euphorbiaceae)</i>		
Cheese Tree	<i>Glochidion ferdinandi</i>	C : G : Gb : N : P : V :	common
(Lauraceae)			
Corkwood	<i>Endiandra sieberi</i>	C : P :	uncommon
CANOPY PLANTS (Loranthaceae)			
Mistletoe	<i>Amyema sp.</i>	C :	uncommon
Mistletoe		P :	uncommon
(Meliaceae)			
Bastard Rosewood	<i>Synoum glandulosum</i>	C : G : P : V :	uncommon
(Mimosaceae)			
	<i>Acacia binervia</i>	C : P :	rare
Black/Green Wattle	<i>Acacia decurrens</i>	C :	common
Cedar Wattle	<i>Acacia elata</i>	C :- could be planted	rare
Hickory	<i>Acacia implexa</i>	P :	uncommon

Common Name	Botanical Name	Location	Local Status
Sydney Golden Wattle	<i>Acacia longifolia</i>	C : G : Gb : N : P : V :	common
Golden Coastal Wattle	<i>Acacia sopharae</i>	C : G : Gb : P :	common
	<i>Acacia parramattensis</i>	C : P : V :	uncommon
(Moraceae)			
Moreton Bay Fig	<i>Ficus macrophylla</i>	C : Cc : G :	uncommon
Port Jackson Fig	<i>Ficus rubiginosa</i>	C : G : N : P : V :	common
Sea Fig	<i>Ficus superba</i>	C :	rare
	<i>(Myrtaceae)</i>		
Lilly Pilly	<i>Acmena smithii</i> - white form/pink form	C : G : N : P : V :	uncommon
Narrow-leaved Apple	<i>Angophora bakeri</i>	P : Not found now	rare
Sydney Red Gum	<i>Angophora costata</i>	C : G : Gb : N : P : V :	common
Rough Barked Apple	<i>Angophora floribunda</i>	G :	rare
	<i>Backhousia myrtifolia</i>	C :	rare
Bangalay	<i>Eucalyptus botryoides</i>	C:G: P - Only 1 specimen	rare
Brown Stringybark	<i>Eucalyptus capitellata</i>	C :	rare
	<i>Eucalyptus globoidea</i>	C :	rare
Red Bloodwood	<i>Eucalyptus gummifera</i>	C : N : P : V :	uncommon
Scribbly Gum	<i>Eucalyptus haemostoma</i>	Gb : N : P : V :	uncommon
Blackbutt	<i>Eucalyptus pilularis</i>	C : G :	rare
Sydney Peppermint	<i>Eucalyptus piperita</i>	C : N : P - 3 specimens	uncommon
Grey Gum	<i>Eucalyptus punctata</i>	C :	rare
Swamp Mahogany	<i>Eucalyptus robusta</i>	C:Gb:N:P:V: not healthy	uncommon
	<i>Eucalyptus robusta</i> - hybrid form	N :	uncommon
Sydney Blue Gum	<i>Eucalyptus saligna</i>	C :	rare
Forest Red Gum	<i>Eucalyptus tereticornis</i>	C : P : V :	uncommon
Tick Bush	<i>Kunzea ambigua</i>	C : G : Gb : N : P : V :	common
Coast Tea Tree	<i>Leptospermum laevigatum</i>	G : Gb : N : P :	common
Bracelet Honey Myrtle	<i>Melaleuca armillaris</i>	G : Gb : V :	common
Ball Honey Myrtle	<i>Melaleuca nodosa</i>	C : G : Gb : N : P :	common
	<i>Melaleuca quinquinerva</i>	G:V:Rose Bay Gf Course	uncommon
	<i>Melaleuca stypheloides</i>	C :	rare
Turpentine	<i>Syncarpia glomulifera</i>	C : P : V :	rare
	<i>(Oleaceae)</i>		
Large Mock Olive	<i>Notelaea longifolia</i>	C : P : V :	uncommon
Native Olive	<i>Notelaea ovata</i>	N :	uncommon
			Uncommon
Smooth Mock Olive	<i>Notelaea venosa</i>	P :	

Common Name	Botanical Name	Location	Local Status
CANOPY PLANTS			
(Palmae)			
Cabbage Tree Palm	<i>Livistona australis</i>	C : Gb : V :	rare
	(<i>Pittosporaceae</i>)		
Sweet Pittosporum	<i>Pittosporum undulatum</i>	C : G : Gb : N : P : V :	common
	(<i>Plumbagonaceae</i>)		
Muttonwood	<i>Rapanea variabilis</i>	C : P : V :	rare
	(<i>Proteaceae</i>)		
	<i>Banksia oblongifolia</i>	G : Gb : N :	rare
	<i>Banksia ericifolia</i>	C : G : Gb : N :	common
Coast Banksia	<i>Banksia integrifolia</i>	C : G : Gb : N : P : V :	common
Silver Banksia	<i>Banksia marginata</i>	Gb :	rare
Old Man Banksia	<i>Banksia serrata</i>	C : G : N : V :	uncommon
	(<i>Sapindaceae</i>)		
Tuckeroo	<i>Cupaniopsis anacardioides</i>	C : G : N : P : V :	common
	(<i>Sterculiaceae</i>)		
Illawarra Flame Tree	<i>Brachychiton acerifolium</i>	C :	common
Total : 50			
MIDSTOREY PLANTS (Agavaceae)			
	<i>Cordyline stricta</i>	C : V :	rare
Gynea Lily	<i>Doryanthes excelsa</i>	C :	rare
	(<i>Apiaceae</i>)		
Flannel Flower	<i>Actinotus helianthi</i>	Gb : N :	rare
Lance-leaf platysace	<i>Platysace lanceolata</i>	G : Gb : N : P :	uncommon
Woolly Xanthosia	<i>Xanthosia pilosa</i>	C : G : Gb : N : P :	uncommon
Rock Xanthosia	<i>Xanthosia tridentata</i>		rare
(Araceae)			
Cunjevoi	<i>Alocasia macrorrhizos</i>	P :	rare
	(<i>Araliaceae</i>)		
Native Tobacco	<i>Astrotricha sp.</i>	P : 8 seedlings	rare
	<i>Astrotricha floccosa</i>	C :	rare
Elderberry Panax	<i>Polyscias sambucifolia</i>	C : N : P : V :	uncommon
	(<i>Asteraceae</i>)		
Three-veined Cassinia	<i>Cassinia trinervia</i>	G : - 1 plant	rare
Sticky Cassinia	<i>Cassinia uncata</i>	N :	rare
	<i>Helichrysum diosmifolium</i>	C : V :	rare
Daisy Bush	<i>Olearia tomentosa</i>	G : Gb :	rare

Common Name	Botanical Name	Location	Local Status
	<i>(Baueraceae)</i>		
Dog Rose	<i>Bauera rubioides var. rubioides</i>	G : 3 plants	rare
	<i>(Casuarinaceae)</i>		
Scrub She-oak	<i>Allocasuarina distyla</i>	G : Gb : N : P :	common
	<i>Allocasuana nana</i>	G :	rare
	<i>(Chenopodiaceae)</i>		
Saloop	<i>Einadia trigonos</i>	G :	rare
	<i>(Cunoniaceae)</i>		
Black Wattle	<i>Callicoma serratifolia</i>	C : N : P :	rare
NSW Christmas Bush	<i>Ceratopetalum gummiferum</i>	C : P :	rare
MIDSTOREY PLANTS (Dilleniaceae)			
Small Hibbertia	<i>Hibbertia linearis</i>	Gb :	rare
	<i>Hibbertia pedunculata</i>	N :	rare
Twiggy Hibbertia	<i>Hibbertia virgata</i>	Gb :	rare
	<i>(Epacridaceae)</i>		
	<i>Epacris crassifolia</i>	G : Gb :	rare
Native Fuchsia	<i>Epacris longiflora</i>	C : G : Gb : N : P - It Died	uncommon
	<i>Epacris microphylla</i>	G : N :	rare
	<i>Leucopogon lanceolata</i>	C :	rare
Straggling Beard Heath	<i>Leucopogon microphyllus</i>	G : N :	rare
Broom-heath	<i>Monotoca elliptica</i>	C : Gb : N : P :	uncommon
Snow Wreath	<i>Woolisia pungens</i>	Gb :	rare
	<i>(Euphorbiaceae)</i>		
Dwarfs Apples	<i>Breynia oblongifolia</i>	C : G : N : P : V :	common
Heath Micranthemum	<i>Micranthemum ericoides</i>	G : Gb :	rare
Bleeding Heart	<i>Omalthus populifolius</i>	C : G : Gb : N : P : V :	common
	<i>(Eupomatiaceae)</i>		
	<i>Eupomatia laurina</i>	C - introduced :	rare
	<i>(Fabaceae)</i>		
	<i>Daviesia corymbosa</i>	N :	rare
Bitter Pea	<i>Daviesia sp.</i>	N :	rare
Eggs and Bacon	<i>Dillwynia retorta ssp. retorta</i>	G : Gb : N :	rare
	<i>Oxylobium cordifolium</i>	N :	rare
Handsome Flat Pea	<i>Platylobium formosum ssp. formosum</i>	C :	rare
	<i>Pultanea daphnoides</i>	Cc : Gb :	rare
	<i>Pultanea linophylla</i>	C :	rare
	<i>Pultanea rosmarinifolia</i>	C :	rare

Common Name	Botanical Name	Location	Local Status
Fine-leaf Bush Pea	<i>Pultanea stipularis</i>	N :	rare
Native Broom	<i>Viminaria juncea</i>	Cc :	rare
	(<i>Haloragraceae</i>)		
Raspwort	<i>Gonocarpus teucreoides</i>	C : G : Gb : N : P :	uncommon
	(<i>Lamiaceae</i>)		
Cockspur flower	<i>Plectranthus parvifolius</i>	C : G : P :	uncommon
Coastal Rosemary	<i>Westringia fruticosa</i>	C : Cc : G : Gb : N : P : S	common
	(<i>Lauraceae</i>)		
	<i>Neolitsia dealbata</i>	C :	rare
	(<i>Liliaceae</i>)		
	<i>Caesia parviflora var. vittata</i>	G :	rare
Blue grass lily	<i>Caesia vittata</i>	P :	rare
Paroo lily	<i>Dianella caerulea</i>	C : G : Gb : N : P : V :	common
Black anther flax-lily	<i>Dianella revoluta</i>	N : P :	common
	(<i>Malvaceae</i>)		
Native Rosella	<i>Hibiscus heterophyllus</i>	P : 6 plants	rare
MIDSTOREY PLANTS (Mimosaceae)			
	<i>Acacia dealbata</i>	C :	rare
	<i>Acacia floribunda</i>	C : P :	rare
	<i>Acacia stricta</i>	C :	rare
Sweet-scented Wattle	<i>Acacia suaveolens</i>	C : G : Gb : N : P :	common
Sunshine Wattle	<i>Acacia terminalis - Hairy form</i>	C : G : Gb : N : P :	common
Prickly Moses	<i>Acacia ulicifolia</i>	C : G : Gb : N : P :	uncommon
	(<i>Myrtaceae</i>)		
Dwarf Apple	<i>Angophora hispida</i>	G : N :	rare
Heath Myrtle	<i>Baeckea imbricata</i>	C : G : Gb : N :	uncommon
	<i>Baeckia microphylla</i>	Gb :	rare
	<i>Callistemon citrinus</i>	C :	uncommon
Narrow-leaved Bottlebrush	<i>Callistemon linearis</i>	C : G : Gb : N :	uncommon
	<i>Callistemon linearis x pinifolius</i>	P :	rare
	<i>Callistemon rigidus</i>	C :	rare
Fringe Myrtle	<i>Calytrix tetragona</i>	G :	rare
	<i>Darwinia fascicularis ssp. fascicularis</i>	Gb :	rare
	<i>Leptospermum flavescens</i>	C : N :	rare
	<i>Leptospermum scoparium</i>	C :	rare
	<i>Melaleuca hypericifolia</i>	G : Gb :	rare
Fringed Heath Myrtle	<i>Micromyrtus ciliata</i>	G : Gb :	rare

Common Name	Botanical Name	Location	Local Status
	<i>Micromyrtus microphylla</i>	C :	rare
	(<i>Onograceae</i>)		
	<i>Epilobium billardierianum</i>	P :	rare
	(<i>Pittosporaceae</i>)		
Hairy pittosporum	<i>Pittosporum revolutum</i>	C : G : N : P : V :	common
	(<i>Podalyriaceae</i>)		
	<i>Mirbelia rubifolia</i>	P :	rare
	(<i>Polygonaceae</i>)		
	<i>Persicaria decipiens</i>	C : Gb : P :	uncommon
	(<i>Proteaceae</i>)		
	<i>Banksia spinulosa</i>	G :	rare
Grey Spider-flower	<i>Grevillea buxifolia</i>	N :	rare
Pink Spider-flower	<i>Grevillea sericea</i>	C : Gb :	rare
Broad-leaved Hakea	<i>Hakea dactyloides</i>	C :	rare
Needle Bush	<i>Hakea sericea</i>	Gb :	rare
Dagger Heath	<i>Hakea teretifolia</i>	G : Gb :	rare
Mountain Devil	<i>Lambertia formosa</i>	C : G :	rare
Crinkle Bush	<i>Lomatia silaifolia</i>	C : N :	rare
Lance-leaved Geebung	<i>Persoonia lanceolata</i>	C : G : Gb : N :	rare
Broad-leaf Geebung	<i>Persoonia levis</i>	C : N :	rare
Narrow-leaf Geebung	<i>Persoonia linearis</i>	N :	rare
Woody Pear	<i>Xylomelum pyriforme</i>	C :	rare
	(<i>Podocarpaceae</i>)		
	<i>Podocarpus spinulosus</i>	P : G :	rare
MIDSTOREY PLANTS (Rhamnaceae)			
	<i>Alphitonia excelsa</i>	C :	rare
	<i>Pomaderris discolor</i>	C :	rare
Rusty Pomaderris	<i>Pomaderris ferragineae</i>	P :	rare
	<i>Pomaderris sp.</i>	P : V :	rare
	(<i>Rubiaceae</i>)		
Pomax	<i>Pomax umbellata</i>	C : G : N : P :	uncommon
Stinkweed	<i>Opercularia aspera</i>	C : G : Gb : N : P :	uncommon
	(<i>Rutaceae</i>)		
	<i>Crowea saligna</i>	C : Gb : N : P :	uncommon
	<i>Eriostemon buxifolius</i>	G :	1 Plant, rare
	<i>Eriostemon sp.</i>	C :	rare
	<i>Phebalium dentatum</i>	C :	rare

Common Name	Botanical Name	Location	Local Status
	<i>Zieria laevigata</i>	G :	rare
	<i>Ziera pilosa</i>	C :	rare
Sandfly Ziera	<i>Ziera smithii</i>	C : P -1988 list	rare
	(<i>Santalaceae</i>)		
Native Cherry	<i>Exocarpos cupressiformis</i>	N :	rare
	(<i>Sapindaceae</i>)		
Hop bush	<i>Dodonaea triquetra</i>	C : G : N : P :	common
	<i>Guioa semiglauca</i>	C - introduced :	rare
	(<i>Sterculiaceae</i>)		
Rusty Velvet Bush	<i>Lasiopetalum ferrugineum</i>	C : G : Gb : P-1 plant :	uncommon
	<i>Lasiopetalum ferrugineum var. cordatum</i>	G :	rare
	(<i>Thymelaeaceae</i>)		
	<i>Pimilea thymifolia</i>	N :	rare
	(<i>Ulmaceae</i>)		
	(<i>Verbenaceae</i>)		
	<i>Clerodendron tomentosum</i>	P : V :	rare
	(<i>Winteraceae</i>)		
	<i>Tasmania insipida</i>	C :	rare
Total : 92			
GROUNDCOVERS (Acanthaceae)			
	<i>Pseuderanthemum variable</i>	C :	rare
	(<i>Aizoaceae</i>)		
Native Pigface	<i>Carpobrotus glaucescens</i>	G : Gb :	rare
Native /NZ spinach	<i>Tetragonia tetragonioides</i>	G : P :	uncommon
	(<i>Apiaceae</i>)		
	<i>Centella asiatica</i>	G : Gb : P :	uncommon
Stinking pennywort	<i>Hydrocotyle laxiflora</i>	P :	uncommon
	<i>Hydrocotyle peduncularis</i>	G :	uncommon
	<i>Hydrocotyle sp.</i>	C :	uncommon
	(<i>Asteraceae</i>)		
Common cotula	<i>Cotula australis</i>	C : G : N : P :	common
Waterbuttons	<i>Cotula coronopifolia</i>	N :	rare
	<i>Epaltes australis</i>	G : P :	rare
	<i>Pseudognaphalium luteoalbum</i>	G :	rare
GROUNDCOVERS (Campanulaceae)			
Slender bluebell	<i>Wahlenbergia gracilis</i>	C : G-rare : P :	common
	(<i>Commelinaceae</i>)		

Common Name	Botanical Name	Location	Local Status
Native wandering Jew	<i>Commelina cyanea</i>	C : G : Gb : N : P :	common
	(<i>Convulvulaceae</i>)		
Kidney Weed	<i>Dichondra repens</i>	C : G : P :	uncommon
	(<i>Crassulaceae</i>)		
Aust. stonecrop	<i>Crassula sieberiana</i>	G : Gb : P :	uncommon
	(<i>Droseraceae</i>)		
Sundew	<i>Drosera sp.</i>	C :	region rare
Sundew	<i>Drosera spp.</i>	N :	region rare
	(<i>Euphorbiaceae</i>)		
Small poranthera	<i>Poranthera microphylla</i>	C : P :	rare
	(<i>Geraniaceae</i>)		
	<i>Geranium homeanum</i>	P :	rare
	<i>Pelargonium australe</i>	Gb : P :	rare
	(<i>Goodeniaceae</i>)		
Blue Dampiera	<i>Dampiera stricta</i>	N :	rare
	<i>Goodenia bellidifolia</i>	N :	rare
	<i>Goodenia paniculata</i>	P :	rare
Fan Flower	<i>Scaevola caledulaceae</i>	Gb :	rare
	<i>Selliera radicans</i>	G : Gb : P - in 1988 list	rare
	<i>Velleia sp</i>	P - in 1988 list	rare
	(<i>Haloragaceae</i>)		
	<i>Gonocarpus micranthus ssp micranthus</i>	N : P :	rare
	(<i>Hypericaceae</i>)		
	<i>Hypericum gramineum</i>	P :	rare
	(<i>Liliaceae</i>)		
Lilac lily	<i>Schelhammera undulata</i>	C : Gb : P :	uncommon
Lilac Lily	<i>Thelionema umbellata</i>	Gb :	rare
	(<i>Lobeliaceae</i>)		
	<i>Lobelia alata</i>	C : G : Gb : P :	common
White root	<i>Pratia purpurascens</i>	P :	uncommon
	(<i>Loganiaceae</i>)		
Mitre Weed	<i>Mitrasacme polymorpha</i>	N :	rare
	(<i>Lythraceae</i>)		
Lesser Loosestrife	<i>Lythrum hyssopifolia</i>	Gb :	rare
	(<i>Oxalidaceae</i>)		
Yellow wood sorrel	<i>Oxalis corniculatum</i>	C : G : Gb : N : P :	common
	(<i>Plantaginaceae</i>)		
Native Plantain	<i>Plantago hispida</i>	Gb :	uncommon

Common Name	Botanical Name	Location	Local Status
	<i>(Portulacaceae)</i>		
Pink purslane	<i>Calandrinia pickeringii</i>	G : P :	rare
Common Purslane	<i>Portulaca oleracea</i>	G : P :	common
	<i>(Scrophulariaceae)</i>		
Speedwell	<i>Veronica sp.</i>	P :	rare
	<i>(Violaceae)</i>		
Native Violet	<i>Viola hederaceae</i>	Gb :	rare
Total : 40			

Fauna List

Common Name	Scientific Name	Location
MAMMALS		
Marsupials		
Brush Tail Possum	<i>Trichosurus vulpecula</i>	C : G : N : P :
Ring Tail Possum	<i>Pseudocheirus peregrinus</i>	rare
Placentals		
Bush Rat	<i>Rattus fuscipes</i>	Could be here
Common Bentwing bat- insectivorous	<i>Miniopterus schreibersii</i>	P :
Other Insectivorous Bats Unidentified	<i>(Microchiroptera)</i>	P :
Eastern Quoll	<i>till 1963, now extinct on mainland</i>	
Grey-headed Flying Fox	<i>Pteropus poliocephalus</i>	C : G : N : P :
Water Rat (white-tip tail)	<i>Hydromys chrysogaster.</i>	N : P- uncommon
Aquatic Mammals		
Australian Fur Seal	<i>Arctocephalus pusillus</i>	N :
Australian Sea-lion	<i>Neophoca cinerea</i>	N :
Bottlenose Dolphin	<i>Turpsiops truncatus</i>	N :
Common Dolphin	<i>Delphinus delphis</i>	G : C60N :
Humpback Whale	<i>Megaptera novaengliae</i>	N :
Leopard Seal	<i>Hydrurga leptonyx</i>	N :
Minke Whale	<i>Balaenoptera acutorostrata</i>	N :
New Zealand Fur Seal	<i>Arctocephalus forsteri</i>	N :
Southern Elephant Seal	<i>Mirounga leonina</i>	N :
Southern Right Whale		G : N :
Introduced Mammals		
Black Rat	<i>Rattus rattus</i>	C : G : P :
Brown Rat	<i>Rattus norvegicus</i>	C : G : P :

Common Name	Scientific Name	Location
Feral/domestic Cat	<i>Felis catus</i>	C : G : P :
Feral/domestic Dog	<i>Canis domesticus</i>	C G : P :
House Mouse	<i>Mus musculus</i>	C : G : C10P :
REPTILES		
Lizards		
(Agamidae)		
Eastern Water Dragon	<i>Physignathus leseurii</i>	P :
(Gekkonidae)		
Lesueur's Velvet Gecko	<i>Oedura lesueurii</i>	G : N :
Southern leaf-tailed Gecko	<i>Phyllurus platurus</i>	C : N : P :
(Scincidae)		
Copper - tailed skink	<i>Ctenotus taenoides</i>	C : G : N : P :
Eastern Blue - tongued lizard	<i>Tiliqua scindoides</i>	C : G : N : P :
Eastern Water Skink	<i>Eulamprus quoyii</i>	C : P :
Fence Skink	<i>Cryptoblepharus virgatus</i>	P :
Garden Skink	<i>Lamprologis guichenoti</i>	G : N : P :
Lamprologis	<i>Lamprologis delicata</i>	G : N : P :
Saproscincus	<i>Saproscincus sp.</i>	C : G : N : P :
	<i>Saiphos equalis</i>	C : G : P :
Striped Skink	<i>Ctenotus robustus</i>	G : N : P :
Three-toed skink		C : G : P :
Weasel skink	<i>Saproscincus mustelinus</i>	P :
Snakes (Elapidae)		
Swamp /Marsh Snake	<i>Hemiaspis signata</i>	C :
TURTLES (Chelidae)		
Long - necked Tortoise	<i>Chelodina longicollis</i>	C : P :
CREEK FAUNA		
FISHES		
Long-finned Eel	<i>Anguilla reinhardtii</i>	P :
Spotted Minnows	<i>Gallaxias maculatus</i>	P :
Short-finned Eel	<i>Anguilla australis</i>	P :
Introduced Fishes		
Eel		C :
Mosquito Fish	<i>Gambusia affinis</i>	P :
Molluscs		
Freshwater snails		P :

Common Name	Scientific Name	Location
FROGS (Myobatrachidae)		
Brown - Striped Marsh Frog	<i>Limnodynastes peronii</i>	C : G : P :
Common Eastern Froglet	<i>Crinia signifera</i>	C : P :
Dwarf Green Tree Frog	<i>Litoria fallax</i>	C :
Red Crowned Toadlet	<i>Pseudophryne australis</i>	N :
Tusked Frog	<i>Adelotus brevis</i>	C : P :
(Arthropods)		
ACARINA (Mites)		
Predatory Mites		C : G : P :
Red Spider Mite		C : G : P :
Two Spotted mite		C : G : P :
(Amphipoda)		
Springtails		C : G : P :
(Araneae)		
Sydney Funnel Web	<i>Atrex robustus</i>	C : G : P :
Stick Spiders		C : G : P :
St. Andrews Cross	<i>Argiope antheraea</i>	C : G : P :
Red Back Spider	<i>Latrodectus hasselti</i>	C : G : P :
Leaf-curling Spider	<i>Phonognatha sp.</i>	C : G : P :
Jumping Spiders	<i>(Salticidae) Oxyopes sp.</i>	C : G : P :
Huntsmen	<i>Isopoda sp.</i>	C : G : P :
Green Flower Spiders	<i>(Thomisidae)</i>	C : G : P :
Garden Orb Weaving Spider	<i>Eriophora sp.</i>	C : G : P :
(Araneae)		
Daddy Long-legs	<i>Pholcus phalangiodes</i>	C : G : P :
Bird Dropping Spiders	<i>Celaenia excavata</i>	C : G : P :
(Blattodea)		
Cockroaches		C : G : P :
(Chilopodea)		
Centipedes		C : G : P :
(Coleoptera) (Beetles)		
28 Spotted Lady bird	<i>(Coccinellidae)</i>	C : G : P :
Black Beetles	<i>Sericesthis geninata</i>	C : G : P :
Christmas Beetles	<i>Anoplogathus sp.</i>	C : G : P :

Common Name	Scientific Name	Location
Click Beetles	<i>(Elateridae)</i>	C : G : P :
Longicorn Beetles	<i>(Cerambycidae)</i>	C : G : P :
Orange Ladybird	<i>(Coccinellidae)</i>	C : G : P :
Weevils	<i>(Curculionidae)</i>	C : G : P :
Yellow Ladybird	<i>(Coccinellidae)</i>	C : G : P :
(Collembola)		
Springtails		C : G : P :
(Diplopoda)		
Millepedes		C : G : P :
(Diptera)		
Blow Fly		C : G : P :
Crane Fly		C : G : P :
Greenbottle Fly		C : G : P :
Horse Fly		C : G : P :
House Fly		C : G : P :
Hover Fly		C : G : P :
Mosquitoes		C : G : P :
Sand Fly		C : G : P :
(Hemiptera)		
Homoptera		
Aphids		C : G : P :
Cicadas		C : G : P :
Leaf Hoppers		C : G : P :
Lerps		C : G : P :
Psyllids		C : G : P :
Heteroptera		
Asassin Bug		C : G : P :
Bronze Orange Bug		C : G : P :
Crusader Bug		C : G : P :
Harlequin Bug		C : G : P :
Spined Citrus Bug		C : G : P :
(Hymenoptera)		
Bees		
*Honey Bees - introduced		C : G : P :
Bumble Bees		C : G : P :
Native Bees		C : G : P :

Common Name	Scientific Name	Location
Wasps		
*European Wasp		
Native Wasps		C : G : P :
Ants		C : G : P :
Black Ants		P :
Jumping Ants		P :
Meat Ants		P :
Sugar Ants		P :
(Isopoda)		
Slaters		C : G : P :
(Lepidoptera)		
Aust. Painted Lady	<i>Vanessa kershawi</i>	C : G : P :
Aust. Privet Hawk	<i>Psilogamma menephron</i>	C : G : P :
Blue Triangle	<i>Graphium sarpedon</i>	C : G : P :
Bogong Moth	<i>Agrostis infusa</i>	C : G : P :
Cabbage White	<i>Pieris rapae</i>	C : G : P :
Common Grass Blue	<i>Zizina labradus</i>	C : G : P :
Cup Moth	<i>Doratifera sp.</i>	C : G : P :
Dinghy Swallowtail	<i>Papilio anactus</i>	C : G : P :
Large Citrus- Orchard Butterfly	<i>Papilio aegeu aegeus</i>	C : G : P :
Northern Jezebel	<i>Delias argenthona</i>	C : G : P :
Oleandar/Common Aust. Crow	<i>Euploea core corinna</i>	C : G : P :
Palm Dart		C : G : P :
Saunders Case Moth	<i>Oiketicus elongatus</i>	C : G : P :
Skipper		C : G : P :
Vine moth		C : G : P :
Wanderer/ Monarch Butterfly	<i>Danus plexippus</i>	C : G : P :
(Mantodea)		
Praying Mantis		C : G : P :
(Neuroptera)		
Lacewings - Ant lions		C : G : P :
(Orthoptera)		
Crickets		C : G : P :
Grasshoppers		C : G : P :
Katydids		C : G : P :

Common Name	Scientific Name	Location
Locusts		C : G : P :
(Phasmida)		
Stick insects		C : G : P :
(Thysanoptera)		
Thrips		C : G : P :