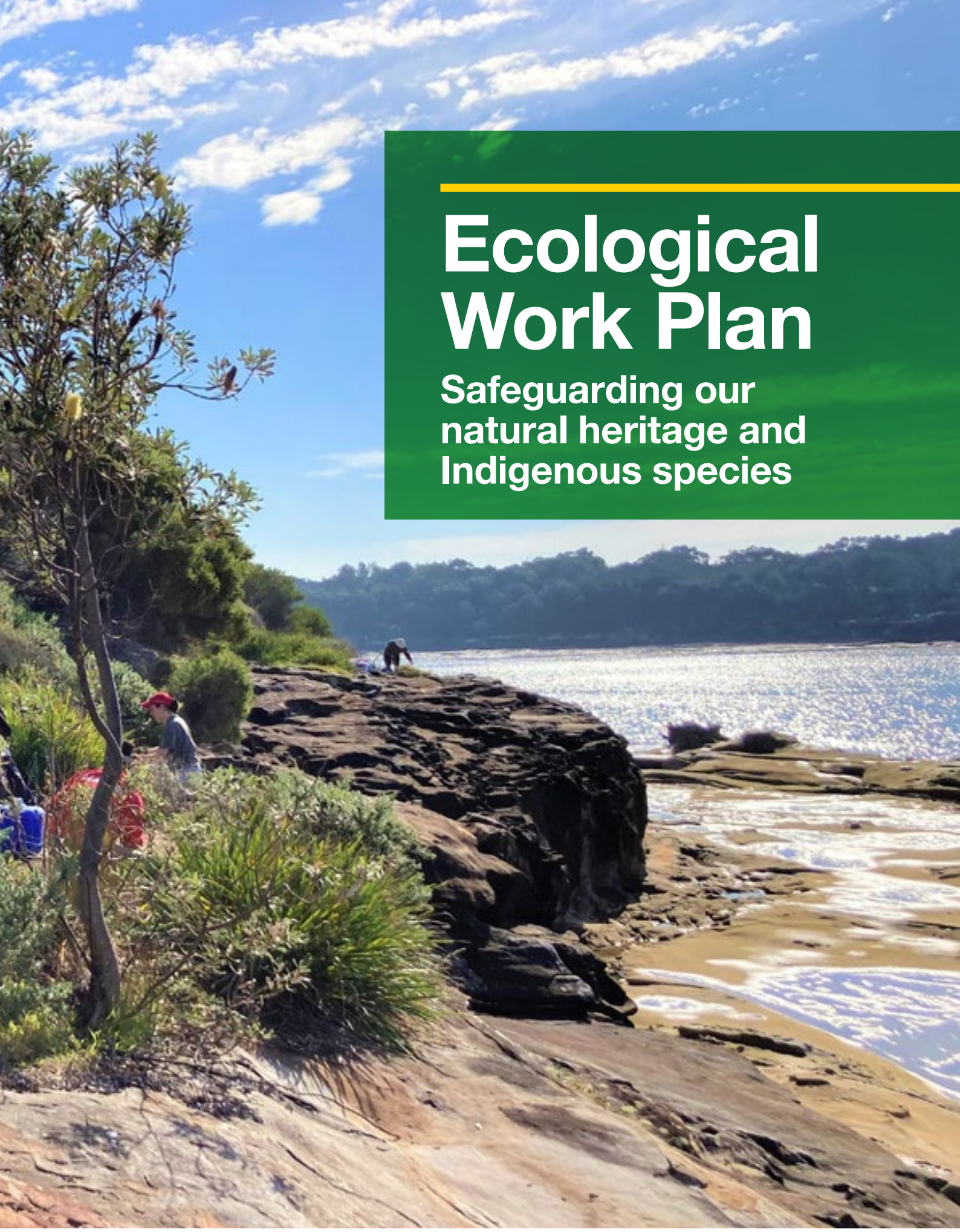


Ecological Work Plan

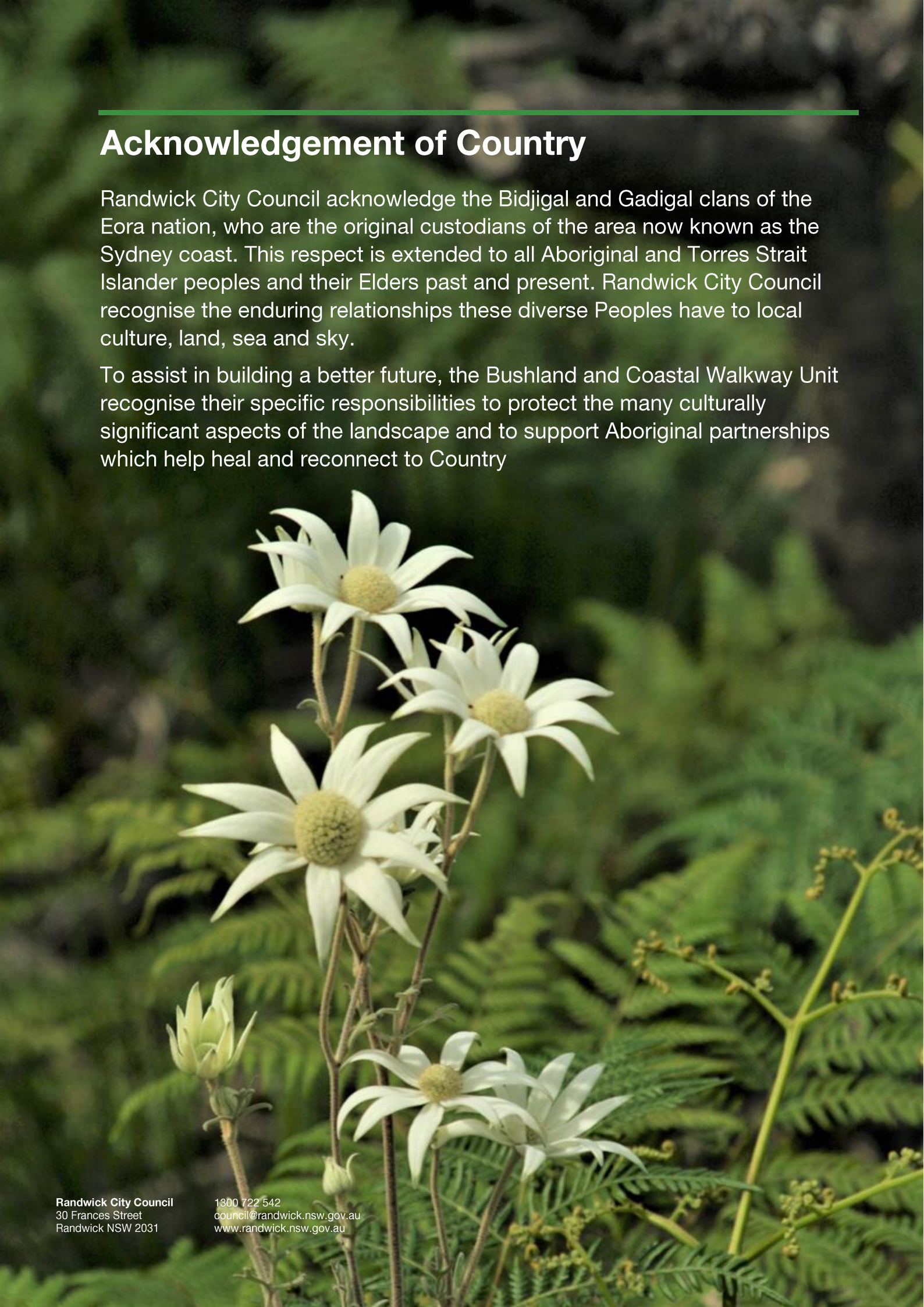
Safeguarding our natural heritage and Indigenous species

Randwick City Council
a sense of community

Acknowledgement of Country

Randwick City Council acknowledge the Bidjigal and Gadigal clans of the Eora nation, who are the original custodians of the area now known as the Sydney coast. This respect is extended to all Aboriginal and Torres Strait Islander peoples and their Elders past and present. Randwick City Council recognise the enduring relationships these diverse Peoples have to local culture, land, sea and sky.

To assist in building a better future, the Bushland and Coastal Walkway Unit recognise their specific responsibilities to protect the many culturally significant aspects of the landscape and to support Aboriginal partnerships which help heal and reconnect to Country



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1. Summary

Within Randwick City, our unique cultural identity is tied to the magnificent coastline, public parks, unique remnant bushland and the presence of many other species which also call this area home. These elements contribute significantly to the health and wellbeing of residents and visitors to our City.

Randwick City Council's 'Ecological Work Plan' explains the current state of natural heritage in the City and outlines existing and planned conservation actions. Within are detailed resources to action the relevant sections of the '*Environment Strategy'* making it an important tool for maintaining and enhancing the unique ecology of Randwick City.

Figure 1: Safeguarding the diversity of life in our City requires a long-term view.

Source: D. Hall

Key principles of the *Commonwealth Biodiversity Conservation Plan 2010-2030* are that: 1) biodiversity is best conserved by protecting existing natural habitats; and 2) effective conservation of biodiversity operates at the landscape and seascape scale across public and private tenures.

Local government is thus in a unique and important position to properly manage biodiversity, including by acting at the interface between public and private interest. Within Randwick City Council, it is the Bushland and Coastal Walkway Unit (BCWU) which is devoted to protecting and enhancing local biodiversity.

Unique remnant bushland and connecting pockets of vegetation provide biodiversity hotspots within Randwick and thus form the key focus of this Plan and works by Council. Yet, the Ecological Work Plan also takes into consideration marine organisms of the adjacent coast and marine waters as many land-based activities can affect marine biodiversity.

The Bushland and Coastal Walkway Unit developed this document to provide the necessary depth of ecological knowledge required to understand conservation processes and inform the community, Bushcare volunteers, other council departments, land managers and professional practitioners. It is the collective responsibility of everyone to contribute to the conservation our environment so that it can continue to be enjoyed by future generations.

The Ecological Work Plan identifies actions necessary to halt the decline of local species and ecosystems by:

- Mitigating threatening processes.
- Undertaking conservation and restoration actions.
- Encouraging the wider community to take responsibility for assisting in its recovery.
- Ensuring all council staff consider the impact of their decisions.
- Ensuring developments adequately address potentially negative ecological impacts and comply with their statutory responsibilities.

Glossary

Term	Definition
Adaptive management	Flexible management practices that are applied in a dynamic way enabling adjustment as conditions change, more knowledge or new data becomes available.
Abiotic	Non-living components of ecosystems such as underlying soil, rock and water.
Biotic	Living components of an ecosystem such as plants, animals, bacteria, insects, fungi etc.
Biodiversity	The variety of all life forms – the different plants, animals and micro-organisms, the genes they contain and the ecosystem of which they form a part' (Commonwealth of Australia 1996).
Buffer	A vegetated area created to protected conservation significant areas, such as remnant vegetation from degradation.
Bushland	An area containing native vegetation which reflects the natural structure/ form relevant to a specific place, inclusive of plants, animals, micro-organisms, bush rock, leaf litter and other organic debris, the seed stored in the soil, and the soil.
Connectivity	Elements of the landscape which, by linking otherwise isolated areas, permit movement of organisms or genetic flows across the landscape. These may be enhanced by addition of connecting areas of vegetation known as 'green corridors', or strips of habitat specifically designed to support the movement of fauna through the landscape such as 'wildlife corridors'.
Degradation	Loss or reduction of quality, condition, or functionality of an ecosystem eg. removal of vegetation, erosion, increased salinity, changes to water flow.
Disturbance	A phenomenon that alters an ecosystem and/ or its functioning. This may be temporary and may support renewal such as tree fall, animal diggings or fire. Each ecosystem has a varying capacity to rebound from disturbance, and the frequency of disruption can alter the outcome.
Ecological community	All the living parts of an ecosystem which are most easily recognized by a specific vegetation assemblage, shaped by the specifics of place such as climate and abiotic features such as soil, rock and water.
Ecological condition	The levels of biodiversity and functioning of ecological processes in an ecological community. Because of the complexity of measuring condition, an indicator may be used, such as the degree and extent to which a threatening process is operating, eg. weed invasion.
Ecological functions and processes	Include habitat provision, biotic accumulation, decomposition, pollination, dispersal, nutrient accumulation and cycling, disturbance regimes (fire, flooding and drying) and water cycling.
Ecosystem	An assemblage of organisms (including plants, animals and microorganisms) interacting with non-living components (including the soil,

Term	Definition
	water, air, fire, climate, topographic relief and aspect) to create complex food webs, nutrient cycles and energy flows.
Educate	To increase awareness of local conservation issues, promote behavior that has positive effects on the natural environment and alter behavior that has negative effects.
Fragmentation	The geographic separation of areas of habitat which restricts or reduces the movement of species and/ or prohibits genetic flow.
Habitat	Any natural or built form which may act as a permanent or temporary home for native fauna. This can be in the form of remnant bushland, a single tree, dense weed infestations, concrete tunnels, sheet of tin, car tyre etc.
Indigenous species	A species that occurs at a place within its historically known natural range and that forms part of the natural biodiversity of a place. [ANHC]
Involve	Provide opportunities for the community to be involved in regeneration and revegetation activities that create a sense of stewardship of the local environment. Education and involvement cover a variety of activities such as the Bushcare Volunteer Program or the provision of talks and guided walks in bushland areas.
Local Significance	Species, populations and ecological communities which contribute to the scientific, cultural, aesthetic, ecosystem functioning, or intrinsic value of Randwick local government area.
Mesic	An environment or habitat containing a moderate amount of moisture, generally associated with riparian areas and related plant species.
Monitor	The ongoing review, evaluation and assessment to detect changes in condition of the natural integrity of a place, with reference to a baseline condition in order to review conservation priorities, activities and resources. [ANHC modified]
Native species	Species which originates from a particular country or specified region.
National significance	Species, populations, ecological communities and places identified by the following legislation as requiring national or international agreements or action plans to secure their survival: Environment Protection and Biodiversity Conservation Act; Register of the National Estate; Rare or Threatened Australian Plants (ROTAP); Japan-Australia Migratory Bird Agreement (JAMBA); China-Australia Migratory Bird Agreement (CAMBA); Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA).
Natural area	As defined by the 'Local Government Act 1993' as open space, including but not limited to, one or more of the following elements: bushland (remnant or otherwise), wetlands and waterways (including riparian zones), dunes, cliffs and caves, planted vegetation, bare ground (mud and sand), rock outcrops and springs.
Population	Group of same species, commonly forming a breeding unit, sharing a particular habitat.

Term	Definition
Precautionary principle	Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing measures to prevent environmental degradation.
Protection	Managing active and potential threatening processes to ensure that natural significance is retained. [ANHC modified]
Provenance	Place of origin of seed or other plant propagation material. Choosing to utilize local provenance stock protects the genetic diversity which has evolved within that location.
(Locally) Rare	A species which is seldom seen, but not because of a specified threat. Some species are naturally uncommon either found in dense populations in highly restricted locations or widely distributed in low abundance. These species may be at greater risk of becoming threatened. Locally Rare in Randwick City is defined as species with between 1 and 3 very small populations recorded since 1990.
Regeneration	The recovery of natural integrity following disturbance. (ANHC) Natural regeneration means the recovery of natural integrity by natural processes without human intervention, such as occurs where an indigenous plant species seed bank exists in the soil. Assisted regeneration means the recovery of natural integrity by natural processes with human intervention.
Regional Significance	Species, populations and ecological communities which contribute to the scientific, cultural, aesthetic, ecosystem functioning, or intrinsic value of the area contained within Randwick, Botany, Waverley, Woollahra, Sydney, South Sydney local government areas.
Remnant Bushland	An area where the original (pre-1788) bushland still survives, or where some historic clearing has occurred, but vegetation has regenerated from the seedbank with minimal assistance.
Remnant vegetation	Where isolated original (pre-1788) vegetation survives outside of ecologically functional bushland areas, such as individual tree or smaller stand of shrubs or ground layer vegetation.
Resilience	The natural ability of a species or ecosystem to recover from damage or disturbance.
Restoration	Returning existing habitats to a known past state or to an approximation of the natural condition by repairing degradation, by removing introduced species or by reinstatement. [ANHC]
State Significance	Species, populations and ecological communities identified by the Biodiversity Conservation Act as threatened to the point that coordinated state-wide action is required.
Threatening processes	A phenomenon causing degradation which diminishes the capacity for a species or ecological community to regenerate via natural processes. A process which impedes or reduces natural resilience.

Term	Definition
Weed	Is a plant out of place. In the context of bushland this specifically refers to plants which are not indigenous or naturally associated with an ecological community.
ACROYNMS	**ANHC-** Australian National Heritage Charter; **ANBS-** Australian National Biodiversity Conservation Plan; **BCWU-** Randwick City Council Bushland and Coastal Walkway Unit; **CEEC-** Critically Endangered Ecological Community; **EEC-** Endangered Ecological Community; **ESBS-** Eastern Suburbs Banksia Scrub; **LGA-** Local Government Area; **OEH-** Office of Environment and Heritage; **NSW-** New South Wales; **RCC** – Randwick City Council.

2. The Plan

2.1. Aim

The purpose of the 'Ecological Work Plan' is to establish a positive understanding of biodiversity issues and identify processes by which Council will meet its statutory and other responsibilities to identify, protect, restore, maintain, enhance and monitor local bushland and the variety of species which occur within Randwick City.
The information contained in this document is pertinent to understanding the current and future context of Randwick City's natural environment and ability to achieve the outcomes of the 'Environment Strategy', as situated within the broader strategic planning framework as outlined in section **5.2 Council's Conservation Commitments**.

2.2. Vision

This Plan responds to our 20-year community strategic plan known as 'City Plan' which outlined a vision to build a 'sense of community' by 'working together to enhance our environment, to celebrate our heritage and to value and serve our diverse community'.
This vision will be achieved through a network of healthy 'natural areas' and green spaces encompassing public and private land. It is anticipated that by undertaking actions outlined in this *Ecological Work Plan*, Council and the community will work together to create and conserve habitat for our local flora and fauna for the enjoyment and benefit of current and future generations.

Figure 2: The Conservation Work Plan provides a clear vision with measurable goals that safeguards the unique species of Randwick City.

Source: L. Cain

2.3. Goals

Six priority activity areas or goals have been identified and form the focus of our implementation actions. They are:

A: To monitor and maintain baseline information and inventories of bushland and biodiversity in Randwick.
B: To provide accurate advice and reporting regarding bushland and biodiversity to Council staff, landholders, developers, Government agencies and the public.
C: To protect bushland in accordance with Council's strategic land-use roles and responsibilities.
D: To undertake on-ground work to protect, restore, maintain and enhance local bushland, including effective mitigation of threats.
E: To protect genetic biodiversity through a variety of industry approved methods, including the production of local provenance plants at Council's Indigenous Plant nursery.
F: To increase community awareness and appreciation of the importance of conserving bushland and to engage our community in biodiversity conservation initiatives.

The implementation of each of these goals in detailed in **Section: 6.4** Action and Evaluation.

Figure 3: Local biodiversity is part of why Randwick City is unique.

Source: M. Bond

3. Bushland and Biodiversity

3.1. What is Biodiversity?

Biodiversity represents the variety of all life forms, the different plants, animals and micro-organisms, the genes they contain, and the ecosystems of which they form a part. Biodiversity is intrinsically valuable, whilst also for its essential contribution to our existence (NRM Ministerial Council 2010).

Figure 4: Diversity of life supports ecosystem function and vice versa.

Source: E. Strautins

Biodiversity changes occur over short- and long-term timeframes in response to natural and human influences. Biodiversity is essential to human life. It allows for the continuing operation of natural processes which in turn provide food, medicine, improved air and water quality, climate regulation, soil and catchment protection, nutrient cycling and carbon storage, aesthetic natural landscapes and traditional links of indigenous Australians to the environment. The functioning and maintenance of all ecosystems, landscapes, human settlements, industry, and agriculture is dependent on biodiversity.

Biodiversity can be considered at three levels:

- Species Diversity – The variety of species on earth. It is the most common way people think about biodiversity.
- Genetic Diversity – The variety of genetic information contained in all the individual plants, animals and micro-organisms that inhabit the Earth. Genetic variation occurs between individuals of the same species, between populations of the same species and between different species. It explains, for example, why some people have brown eyes and others have blue eyes. Maintaining a range of genetic material within a population of individual species enables the population to better adapt to changes in the environment, i.e. genetic diversity enhances species survival through time.
- Ecosystem Diversity – The variety of habitats, biotic communities, and ecological processes.

There is still much to be learned about biodiversity, particularly the more primitive plants, fungi, invertebrate animals, micro-organisms, genetic variation and ecosystem functioning.

Figure 5: Each indigenous species has unique features which contribute to building resilient ecosystems.

Source: C. Rotolo

3.2. Relationship Between Bushland and Biodiversity

Whilst it is easy to identify individual species, ensuring their survival is rarely effectively achieved in isolation. Instead, the RCC BCWU focus on protecting and enhancing bushland, which in turn, provides habitat elements including the food resources, shelter, water and space which are necessary to sustain a diversity of life.

Bushland is found in a variety of forms within Randwick City, including '*natural areas*' such as remnant bushland, wetlands, the coastal foreshore, scattered vegetation and open spaces. Often these categories may overlap or have blurred boundaries.

'Remnant bushland' is a specific term used to denote the original habitat, that is characteristic of a location and has intact assemblages of locally indigenous species. These areas may be degraded or disturbed, but still represent (at least part of) the original vegetative structure, species composition and soils to support a degree of natural resilience.

Within remnant bushland, habitat value is high because of the rich network of plants, fungi, invertebrates and wildlife which together create a resilient environment. These communities are often relatively biodiverse, with many local remnants containing species which would otherwise be rare or even absent from our landscape. Remnant bushland areas are always given highest priority because they contain biodiversity at genetic, species and community level which are irreplaceable.

Areas where planting has occurred are known as revegetation sites and are distinct from remnant bushland. Revegetation may be useful in aiding connectivity between small and/ or isolated remnant bushland patches, or to provide a protective buffer around vulnerable remnant bushland. Areas of revegetation do not usually carry the same legislative protections as remnant bushland.

Figure 6: The diversity and size of bushland habitats is an important indicator of total biodiversity.

Source: L. Cain

3.3. Why Conserve Bushland and Biodiversity?

On a global and local scale, biodiversity provides all our food and raw materials for a wide range of products including clothing and medicinal goods, as well as the means to control pest plants, animals and diseases. Biodiversity plays a significant role in important environmental processes which affect human well-being, such as the breakdown of pollution in our water and atmosphere, halting soil salinity, supporting nutrient cycling and carbon absorption and climate stabilisation (Binning and Young, NPWS 1999). Clean and healthy marine environments also ensure marine flora and fauna are preserved and can continue to contribute to the complex functions of the Planet's oceans and climate.

Figure 7: Box-leaf Wax Flower (*Philotheca buxifolia*)

Source: M. Hooper

Some health and wellbeing benefits to human populations from local bushland and biodiversity include:

- Improved air and water quality
- Visual amenity
- Recreational space
- Plant pollination
- Temperature regulation
- Insect and other pest species control
- Coastal protection including flood and erosion control
- Preservation of cultural identity and sense of place.

At a local scale it is the natural environment, including the coastal foreshore and heath vegetation which give Randwick City it's unique character. The remnant bushland found within the City provides a link to the past, offering a historical record of environments which occurred more extensively prior to urbanisation.

Some of our bushland reserves contain species of national and state significance and it is Council's obligation to protect and improve the health of these species. Many other species have intrinsic, cultural, scientific, aesthetic or educational values. Intact bushland contributes to the health and wellbeing of our community, whilst providing a range of ecosystem services, including:

Figure 8: The coastal environment is a major appeal for people living in and visiting our City.

Source: M. Bond

- Air and water filtration
- Cooling our homes and urban spaces
- Groundwater recharge
- Carbon sinks and storage
- Soil stabilisation
- Native food sources
- Plant pollination

Protecting the natural assets of our region is also a commitment to protecting the rights of future generations to access and benefit from these elements which contribute to a liveable city.

4. Bushland and Biodiversity in Randwick City

4.1. Historical Context

The lands which are now called Randwick City were first inhabited by the Bidjigal and Gadigal of the Eora Nation. These diverse Aboriginal communities cared for and shaped the landscape which helped provide for a far richer array of species than persist in Randwick today. Careful application of fire, through mosaic burning promoted a dominance of Eastern Suburbs Banksia Scrub across most of the interior of the region, wherever soils were of sufficient depth.

Along the coastal fringe, heath on sandstone occurred – a related but distinct heathland community. The low-lying landscape included many swamps, creeklines, ephemeral wetlands and wet dune swales. These moist areas were characterised largely by sedgelands, but at times also contained wooded areas of *Casuarina glauca*, *Eucalyptus robusta* and possibly *Melaleuca* species.

Figure 9: Comprehensive ecosystem understanding requires multigenerational perspective.

Source: M. Hooper

The current state of our local environment reflects the changes seen across Australia, since the arrival of Europeans. The urbanisation of the Eastern Suburbs commenced in the early 1800s, resulting in the local extinction of many species, long before any systematic, written recording of biodiversity was considered.

The undulating landform and soft sands of the Eastern Suburbs made the clearing of bushland a relatively simple and easy task. Urbanisation from the north-east of Randwick, following the formation of the colony spread southwards from Coogee in the following decades. Despite a relatively long colonial occupation, many large areas of bushland were cleared as recently as during the 1960's and 70s. Successive and ongoing waves of urbanisation have left "only a tiny fraction of Randwick's original vegetation for future study and enjoyment" (Benson & Howell 1990 p. 97).

The more biodiverse areas currently occur as dozens of small patches of original vegetation that are scattered throughout the urban area. Approximately 240 hectares of remnant bushland remains, representing approximately 6.5% of Randwick's total area. These patches vary in size from 75 hectares to single plants. The remaining local populations of native animals rely on these bushland remnants, as well as on non-bushland habitats, such as private gardens and public parks.

4.2. Knowledge of Bushland and Biodiversity

Base-line data is necessary to understand local biodiversity and how it changes overtime. Records of which species have been observed, where, when, and in what numbers provides an indication of species diversity and abundance. Extensive works have contributed to a relatively solid understanding of the terrestrial environment of Randwick City.

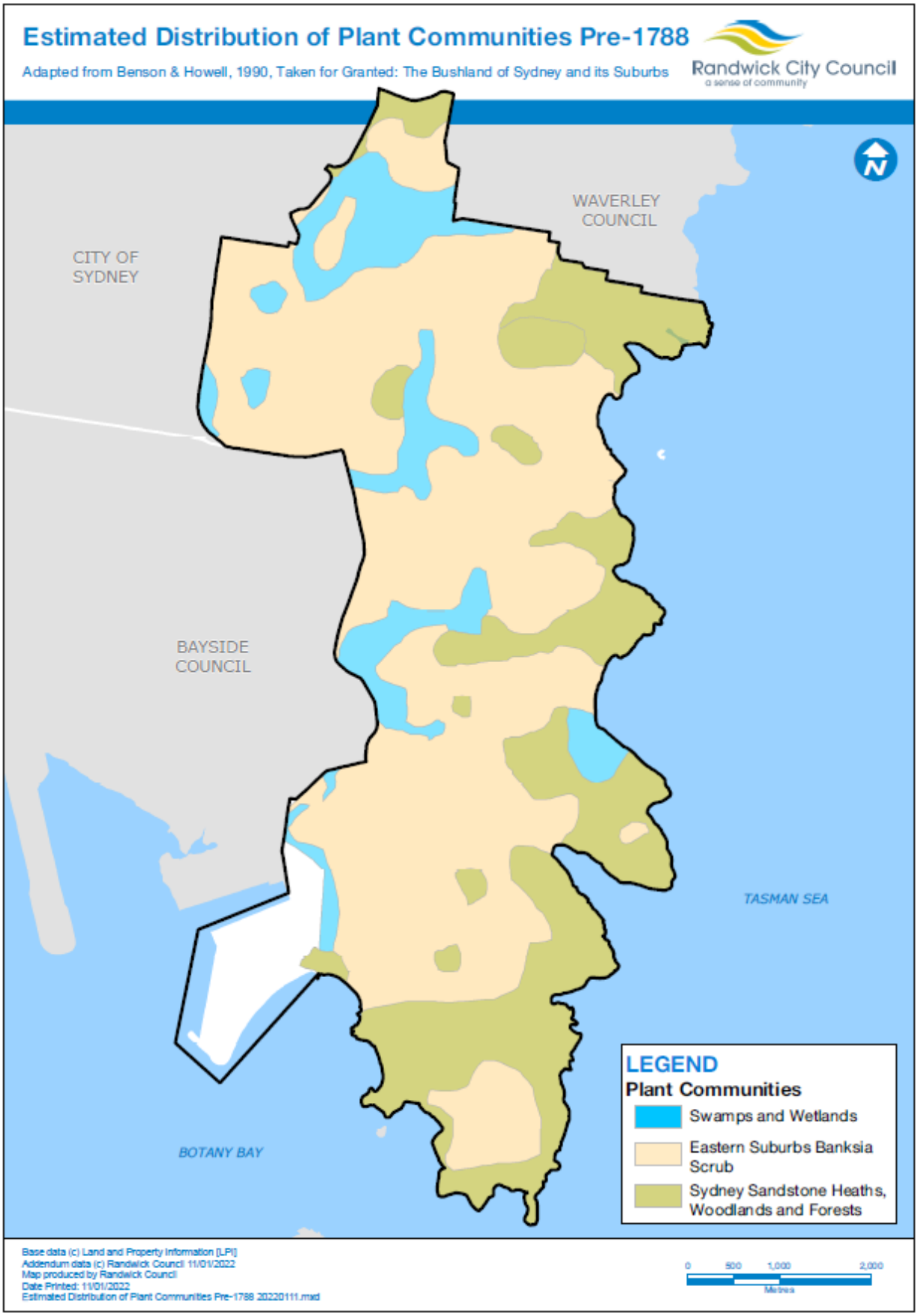
Gaps however exist in the species lists of fungi, lichen, bacteria and invertebrates, despite these elements being some of the most biodiverse taxonomic groupings. Knowledge of the local marine biodiversity is currently limited to around 362 fauna species and 27 marine flora species.

A well-established and ongoing program involving both formal and informal survey work contributes to the growing understanding of species, habitats and their interconnections within Randwick City.

Figure 10: All citizens today must act as responsible custodians to ensure future generation also enjoy the benefits of a clean and healthy coastal environment.

Source: L. Cain

Figure 11. Map of estimated distribution of plant communities pre-1788.



4.3. Where are the Biodiversity Hotspots of Randwick City?

The majority of remnant bushland and therefore biodiversity remaining in Randwick City today occurs to the south and east of the LGA, existing in a combination of Council and non-Council managed areas. The largest and most intact remnant bushland are contained within Malabar Headland National Park and the Kamay Botany Bay National Park, which are managed by Commonwealth and State Government departments.

Other significant bushland remnants occur within Council-managed reserves in Chifley, Randwick Environment Park, and on the golf-courses extending between Malabar and La Perouse. Throughout these areas are scattered remnants of Eastern Suburbs Banksia Scrub, which once would have covered much of Randwick City.

Examples of good condition sandstone heath occur on the headlands of Clovelly and Coogee, while the associated coastal dune heath community occurs at Maroubra Beach, Yarra Bay and Frenchman's Beach. Two rare ecological communities in the form of a freshwater peat swamp at Trenerry Reserve and a moist gully forest at Fred Hollows Reserve are amongst the last examples of these found in the Eastern Suburbs.

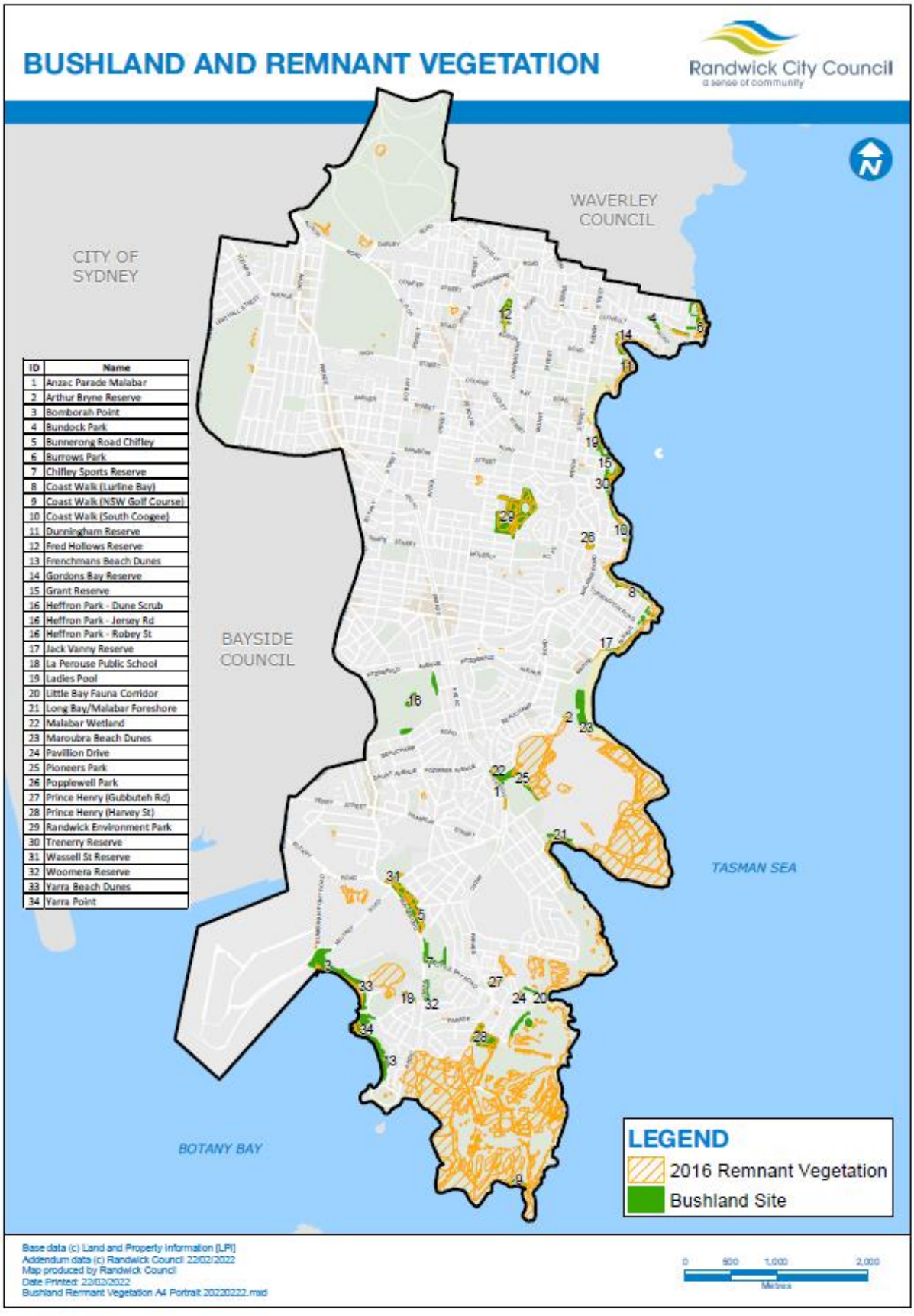
Inventories of all wetlands and bushland sites and/ or patches found within Randwick are provided within the **Appendix.**

Figure 12: Without available habitat, secretive species like the Buff-banded Rail would disappear from Randwick.

Source: L. Cain

Source: E. Strautins

Figure 13. Distribution of BCWU managed bushland sites in relation to remnant vegetation mapping.



ID	Name
1	Anzac Parade Malabar
2	Arthur Bryne Reserve
3	Bomborah Point
4	Bundock Park
5	Bunnerong Road Chifley
6	Burrows Park
7	Chifley Sports Reserve
8	Coast Walk (Lurline Bay)
9	Coast Walk (NSW Golf Course)
10	Coast Walk (South Coogee)
11	Dunningham Reserve
12	Fred Hollows Reserve
13	Frenchmans Beach Dunes
14	Gordons Bay Reserve
15	Grant Reserve
16	Heffron Park - Dune Scrub
16	Heffron Park - Jersey Rd
16	Heffron Park - Robey St
17	Jack Vanny Reserve
18	La Perouse Public School
19	Ladies Pool
20	Little Bay Fauna Corridor
21	Long Bay/Malabar Foreshore
22	Malabar Wetland
23	Maroubra Beach Dunes
24	Pavillion Drive
25	Pioneers Park
26	Popplewell Park
27	Prince Henry (Gubbuteh Rd)
28	Prince Henry (Harvey St)
29	Randwick Environment Park
30	Trenerry Reserve
31	Wassell St Reserve
32	Woomera Reserve
33	Yarra Beach Dunes
34	Yarra Point

4.4. Abiotic Landscape Features

Soil, water, rock and fire sustain Australian ecosystems, and all are influenced by climate. Exploration of these abiotic features of a landscape explain why certain kinds of life occur where they do, as well as defining some of the inherent environmental limitations. The Plan contains a broad overview of these elements. More information on the abiotic landscape can be found within Randwick's first State of the Environment Report (1996), NSW Governmental resources such as eSPADE or via various other literature and online sources.

Figure 14: Characteristic Hawkesbury sandstone found on Randwick's coastline

Source: E. Strautins

The temperate climate of Sydney's east is highly influenced by its coastal proximity which contributes to the milder year-round temperatures and generalised highest autumnal rainfall. Located on the edge of the Pacific Ocean, Randwick is affected by the El Niño/La Niña cycle, measured by the Southern Oscillation Index, which accounts for long wet and dry spells lasting anywhere between a season and a decade at a time. Climate change predictions forecast that over time local climatic conditions will tend hotter and drier, with more rainfall occurring later in the year and involving a greater frequency of severe storms.

The scenic coastline of Randwick consists of Hawkesbury Sandstone. This material is well-recognised in the yellowish stone frequently used within the City's historical architecture. In places, it weathers to sandy clay, but particularly near the coast it remains as solid exposed bedrock. In the north of the City, this coastal sandstone ridgeline is clearly defined, softening as it continues southward and combines with old dune systems. To the west the underlying material is dominated by Botany Sands, which produce a relatively flat sandy valley floor, with a remnant dune system creating low north-south ridges.

The soil formations of the area reflect the nature of the parent bedrock material and local climatic conditions. Rainfall promotes intense leaching and the removal of weathered and organic material contributing to very low nutrient levels. Old estuarine sands are aeolian, meaning they are shaped and sorted by wind and highly erodible. These nutrient-poor and highly mobile sediments limit vegetation to low-growing heath and scrub. Rare exceptions occur, where aspect and channelised waterways have concentrated richer sediments, such as within Fred Hollows Reserve.

Figure 15: Fire can be an essential element aiding renewal in certain remnant ecosystems.

Source: D. Hall

Figure 16: Pale aeolian sands are a diagnostic feature of eastern Suburbs Banksia Scrub.

Source: M. Leary

The low availability of soil nutrients mean that vegetation often relies on periodic fire to recycle what little nutrient is present. Over countless generations Aboriginal Peoples developed sophisticated, mosaic burning practices which supported ecosystem renewal. Fire frequency and intensity play an essential role in the life cycle of many heath and scrub species, shaping not just the structure but also the species diversity of these ecological communities.

Despite the poor water holding capacity of sandy soils this region was once dominated by swamps, creeks and moist swales which were often interconnected through networks of ephemeral wetlands. Over the last 200 years these waterways have been significantly altered, with most channelised into underground pipelines or otherwise drained and filled over.

Below ground however, the highly permeable nature of the Botany Sands allows water to continue to flow, supporting a massive groundwater system or aquifer. The '*Botany Sands Aquifer*' connects the surface water at Centennial Park and Botany Wetlands, underlays the wetland at Randwick Environment Park and eventually flows out into Botany Bay.

The topography of Randwick City reflects the movement of water which has shaped the underlying geology. Triassic age bedrock is overlain by tertiary/ quaternary aged coastal dunes and alluvial sands. These weather to produce the dramatic coastline which features sea cliffs, steep slopes, valleys, beaches and bays.

Figure 17: The sea-cliffs are a defining feature of our landscape and home to a surprising array of wild species.

Source: M. Bond

Figure 18. Topography of Randwick City.

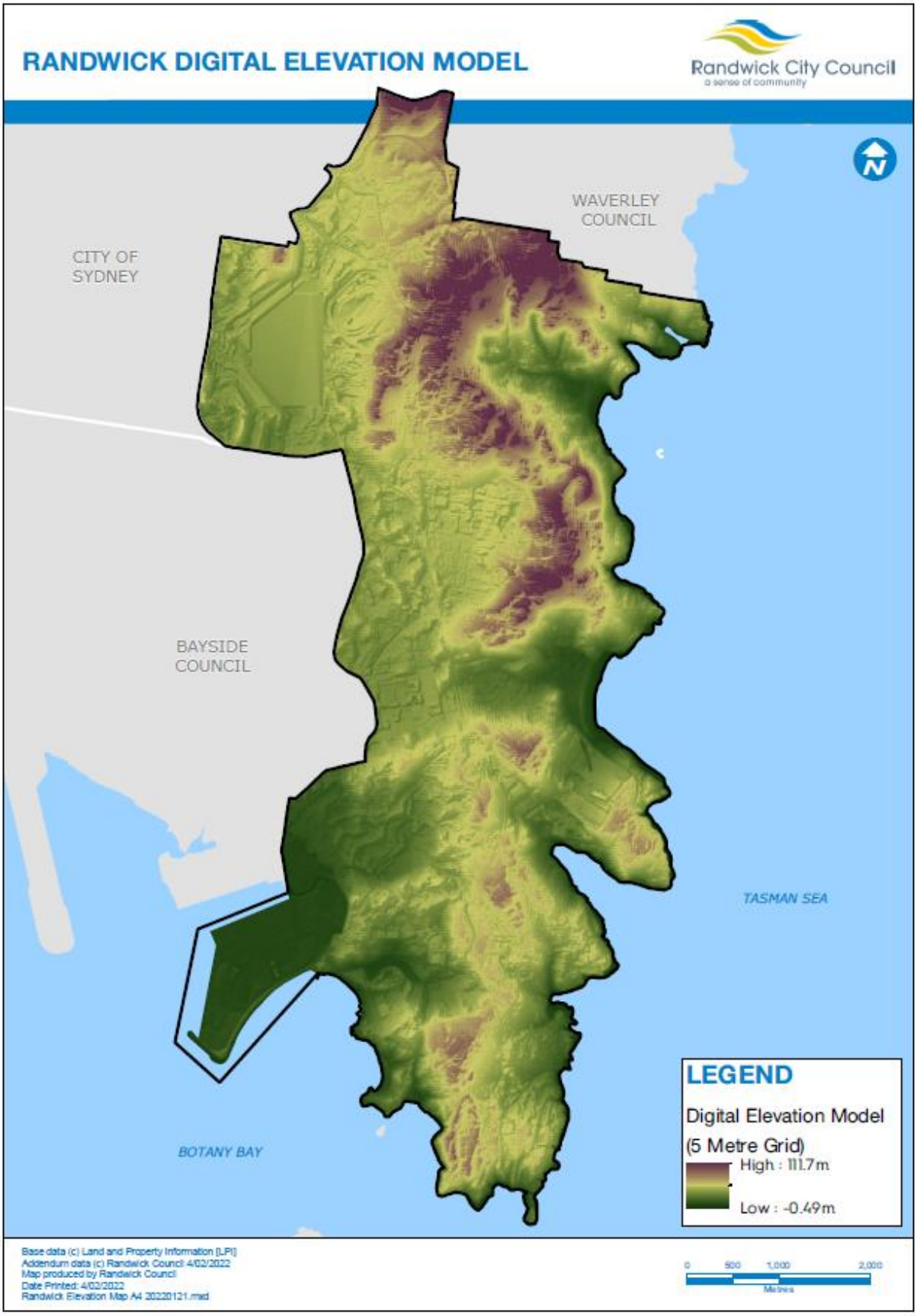
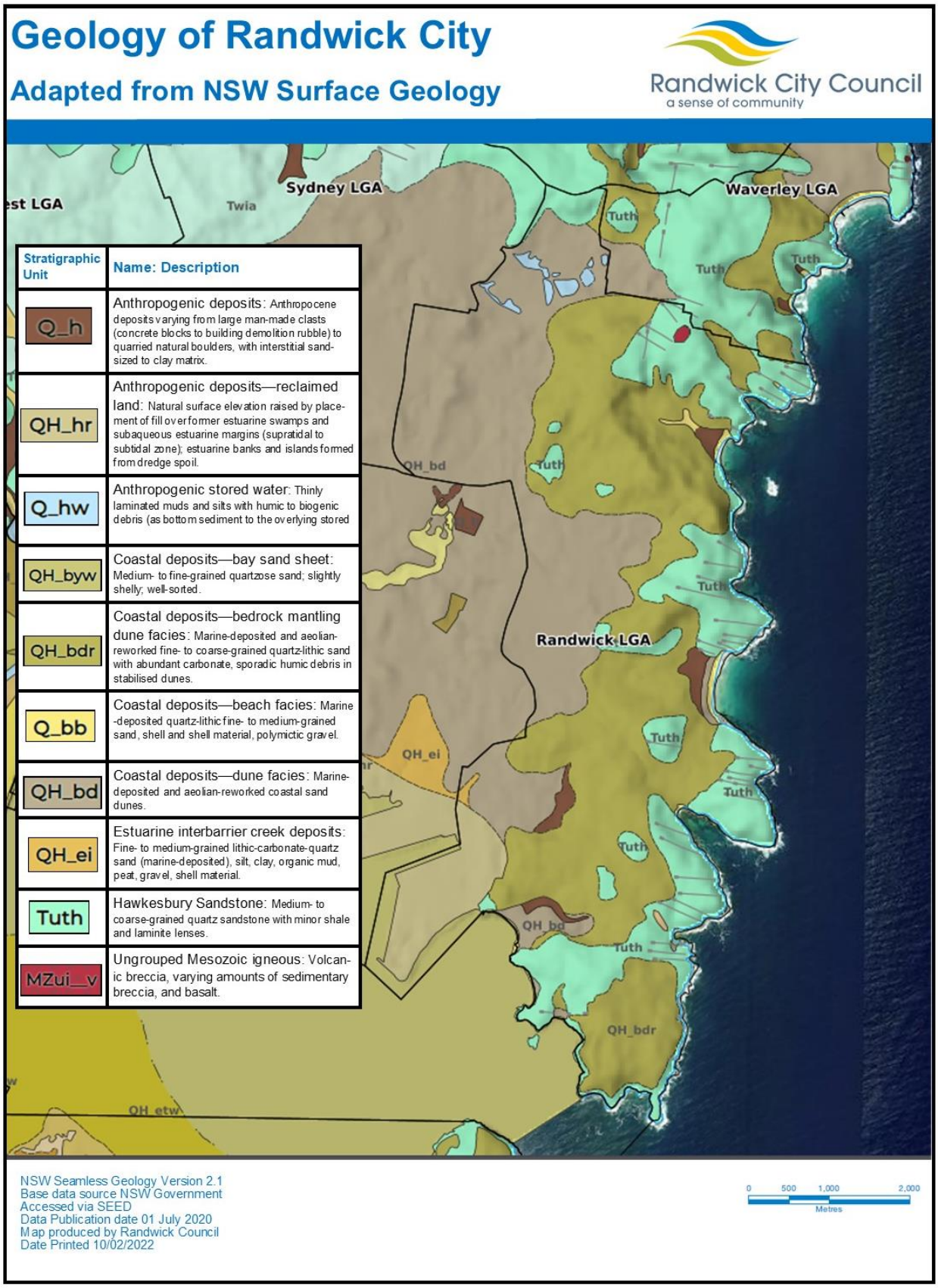


Figure 19. Surface geology of Randwick City.



4.5. Indigenous Flora and Fauna

For its size and urban population density, Randwick City contains a relatively high level of biodiversity. This is largely due to the protection of important bushland and coastal habitats which today are home to more than 500 species of terrestrial vascular plants and around 300 species of mammals, birds, reptiles and frogs, which spend part or all their lifecycle here. There are also many species of fungi, invertebrate and other biota which are present, critical to ecological functioning yet incompletely surveyed.

Although there are few formal records of the fauna species that were native to this area prior to European occupation, it can be assumed from historical records that the Randwick area was once home to many more species of mammals, such as wallabies and kangaroos, and a far greater variety of snakes, lizards, frogs and birds.

The ongoing pressures of urbanisation, such as reduced habitat availability, pollution, and predation by cats and foxes contribute to further declines as does the threats associated with climate change. It is anticipated that over time as climate change alters the distributions of some plants and animals, the abundance and diversity of species present within Randwick may shift.

Information on species diversity is updated each year in Council's 'State of the Environment Report' (SoE).

Figure 20: Species diverse ecosystems are the most resilient to change.

Source: M. Hooper

Table 1. Summary of species recorded within Randwick City (Based on Council and State Government records at the time of publication. Note: precise species lists are subject to fluctuations)

Animal / Plant Group	No. of species recorded in City of Randwick
Terrestrial	
Mammals	7
Birds (including shore birds)	171
Fish (freshwater)	1
Reptiles	29
Frogs	16
Plants (vascular)	510
Mosses	12
Lichens	3
Liverworts	5
Algae (freshwater)	10
Blue-green algae (freshwater)	6
Fungi	140
Marine	
Mammals	4
Birds	51
Turtles	1
Fish (saltwater)	162
Other sea animals	168
Plants	27
This includes all animal species recorded since 1990 and all plant species recorded since 1970.	

Figure 21: Despite its urban context Randwick City is home to a wide variety of life.

Source: C. Rotolo

4.6. Indigenous Ecological Communities

Assemblages of particular plants and animals occurring within specific locations (and thereby defined by specific abiotic conditions) are referred to as 'Ecological Communities'. Randwick City contains 17 ecological communities, many reflecting a marine or coastal influence. The variety and extent of ecological communities is therefore a key measure of ecosystem diversity. Only very small remnants of these communities remain today when compared with estimated 1788 distributions.

Table 2 provides an outline of all ecological communities which occur within Randwick City, including conservation status and associated rare or threatened plant species.

The protection and enhancement of these remnants are the core focus of the BCWU, through which a range of indigenous flora and fauna are supported. Detailed management actions and information are contained within relevant Plans of Managements (PoM) and site-specific bushland Conservation Work Plans.

Figure 22: Habitat loss is the greatest contributing factor for biodiversity decline.

Source: L. Cain

Table 2. Ecological communities which occur within Randwick City.

Habitat Type	Summary	Sydney Metro Classification	NSW PCT (PCT ID)	Conservation Status	Rare or Threatened Species	Locations
Seagrass Meadow	Seagrass meadows are marine ecosystems where a dominate cover of seagrass grows over sand in shallow waters. These are not within council managed lands, however, are delicate and therefore vulnerable to impacts associated with inappropriate coastal management.	Seagrass Meadows S_SW03	Seagrass Meadows (1913) - Decommissioned	*Posidonia australis* seagrass meadows found within Botany Bay are classified as an 'endangered population' under DPI *NSW Fisheries Management Act 1994.*	The Cauliflower Soft Coral (*Dendronephthya australis)* can occur within or adjacent to seagrass meadows and is listed as 'endangered' by DPI *NSW Fisheries Management Act 1994.*	• Botany Bay
Saltmarsh	A saltmarsh is a zone of vegetation which is influenced by tidal action, is generally flat and situated on deep fine sandy muds in a low-flow environment. A small patch of saltmarsh exists on the eastern boundary of Port Botany terminal. A stormwater drain empties into Botany Bay at the intersection of Botany Rd and Bumborah Point Rd. The fragment of saltmarsh is enveloped by concrete which means there is no room for expansion. The vegetation is constantly affected by storm water flows and contaminants.	Estuarine Saltmarsh S_SW02	Prickly Couch-Sea Rush Saltmarsh (4096) Coastal Headland Saltmarsh (4141)	State: Endangered Ecological Community; Federal: Vulnerable *occurrences of this community on coastal headlands are excluded from these listings.	Narrow-leafed Wilsonia *(Wilsonia backhousei*) is listed as 'vulnerable' under state legislation and occurs on isolated coastal headlands.	• Burrows Park, Clovelly • Jack Vanny, North Maroubra • Eastern boundary of Port Botany, Intersection of Botany Rd and Bumborah Point Rd

Habitat Type	Summary	Sydney Metro Classification	NSW PCT (PCT ID)	Conservation Status	Rare or Threatened Species	Locations
	Other bushland sites in the LGA however, contain saltmarsh species but without the geophysical requirements of this habitat. Areas which experience strong onshore winds and large swell action are likely to have saltmarsh species growing. The deposition of salt spray along the fringes of reserves like Jack Vanny and Burrows Park creates an environment suitable for saltmarsh species like *Selliera radicans, Wilsonia backhousei* and *Sarcocornia quinquefolia* subsp. *quinquefolia*.					
Beach Foredune	*Spinifex sericeus* - *Carpobrotus glaucescens* herb-land occurring as the first line of vegetation away from the shoreline on the incipient foredune (also known as the strandline vegetation).	Beach spinifex grassland S_GL01	Spinifex Strandline Grassland (3410)	Not Listed	Maroubra Woodland Snail *(Meridolum maryae)* listed as endangered under state legislation.	• Cromwell Park South and Long Bay Foreshore, Malabar • Frenchmans Bay Reserve, La Perouse • South Maroubra Beach Dunes • Yarra Beach Dunes, Phillip Bay • Congwong Beach, La Perouse
Beach Mid-dune	*Acacia sophorae* - *Leucopogon parviflora* low shrubland as the dominant vegetation between the	Coastal Foredune Wattle Scrub S_HL05	Coastal Foredune Wattle Scrub (3788)	Not Listed	None	• Cromwell Park South and Long Bay Foreshore, Malabar

Habitat Type	Summary	Sydney Metro Classification	NSW PCT (PCT ID)	Conservation Status	Rare or Threatened Species	Locations
	strandline vegetation and primary dune ridge. *Banksia integrifolia - Leptospermum laevigatum* scrub/forest - occurring on the leeward edge of the primary dune. Vegetation structure is dependent on the position in the dune profile and the available protection from onshore winds.					• Frenchmans Bay Reserve, La Perouse • Little Bay Beach, Little Bay • South Maroubra Beach Dunes, Maroubra • Yarra Beach Dunes, Phillip Bay
Beach Hind-dunes and Beach Ridges	Littoral heath forms where weathering of sandstone provides clay influence or within the leeward side of dunes provide greater sheltering and protection, enabling the growth of some mesic or eucalypt species that would not normally survive so close to the sea. Species characteristic of this community in Randwick include combinations of *Stephania japonica*, *Pteridium esculentum*, *Imperata cylindrica, Eucalyptus botryoides and denser stands of Banksia integrifolia*.	Coastal sand tea-tree-banksia scrub S_HL02	Coastal Sands Littoral Scrub-Forest (3546) Southern Sandplain Heath (3805)	Not Listed	None	• Frenchmans Bay Reserve, La Perouse • Malabar Headland National Park, Malabar • South Maroubra Beach Dunes & Arthur Byre Reserve • Yarra Beach Dunes, Phillip Bay • Yarra Bay - Aboriginal Land, Phillip Bay
Coastal headland grassland	Prostrate form of *Themeda australis* growing on sea cliffs and headlands, distinguished by the absence of shrub or	Coastal Headland Grassland S_GL02	Central Headland Grassland (3407)	Themeda grassland on sea cliffs and coastal	Prostrate form of *Themeda australis* is locally rare and may be at risk of hybridisation with the erect	• Bare Island, La Perouse • Cape Banks, La Perouse • Henry Head, La Perouse

Habitat Type	Summary	Sydney Metro Classification	NSW PCT (PCT ID)	Conservation Status	Rare or Threatened Species	Locations
	canopy layers. This may reflect historical clearing of the upper stratum; however, this openness supports the proliferation of dense grass and forb-land vegetation.			headlands in the Sydney Basin is listed as an EEC under state legislation.	form associated with inland vegetation communities.	• Jack Vanny, Maroubra • The Coast Golf Course, Little Bay • Randwick Golf Course, Malabar
Coastal cliffline scrub (low growing formation) **Coastal headland heath (medium height formation)**	Highly restricted to the frontline of coastal cliffs and headlands, this community is kept low by skeletal soils and constant wind-pruning by salt-laden sea breezes. Distance and/ or protection from immediate coastline forces and depth of soil determines vegetation height, creating two forms. Plants here are tough and small leaved such as the diagnostic species: *Banksia ericifolia, Allocasuarina distyla, Kunzea ambigua*, *Hakea teretifolia, Melaleuca armillaris*, interspersed by *Acacia longifolia*. *Baeckea imbricata* is particularly common within the undergrowth.	Coastal Headland Cliffline Scrub S_HL07 & Coastal Headland Banksia Heath S_HL06	Sydney Coastal Headland Cliff Scrub (3811) Sydney Coastal Sandstone Headland Heath (3812)	Not Listed	*Commersonia hermanniifolia* was considered locally rare but local populations have been bolstered by Council's nursery using indigenous stock.	• Bare Island, La Perouse • Bumborah Point, Port Botany • Burrows Park, Clovelly • Coastal Walkway, South Coogee to Lurline Bay • Clovelly Bay, Clovelly • Dunningham Reserve, Coogee • Gordons Bay Reserve, Coogee- Clovelly • Jack Vanny Reserve, North Maroubra • Long Bay Foreshore, Malabar • Lurline Bay, Maroubra • Malabar Headland National Park, Malabar • Kamay Botany Bay National Park – La Perouse • Randwick Golf Course, Malabar • The Coast Golf Course, Little Bay • Trenerry Reserve, South Coogee

Habitat Type	Summary	Sydney Metro Classification	NSW PCT (PCT ID)	Conservation Status	Rare or Threatened Species	Locations
						• Yarra Point, La Perouse
Coastal Headland Marsh	Where the soil profile narrows and ground water can no longer percolate through the sandstone of the coastal cliffs, it flows laterally through the skeletal soils or as overland flow. This creates permanently wet or boggy areas directly adjacent the ocean, which are heavily wind pruned limiting the growth of taller vegetation. Provides ideal conditions for sedge and rush species to grow, allowing the proliferation of species such as *Baumea juncea, B. acuta, Cyperus polystachyos, Juncus planifolius and Schoenus apogon*. Closely associated with previous habitat type.	Coastal Cliff-top Marsh S_HL14	Coastal Clifftop Shrubby Marsh (3920)	Not Listed	The peat swamp at Trenerry is considered one of the few remaining in the Eastern Suburbs.	• Burrows Park, Clovelly • Clovelly Bay, Clovelly • Coastal Walkway, South Coogee to Lurline Bay • Cape Banks, Kamay Botany Bay National Park – La Perouse • Long Bay Foreshore, Malabar • NSW Golf Course, La Perouse • Randwick Golf Course, Malabar • St Michaels Golf Course, Little Bay • The Coast Golf Course, Little Bay • Trenerry Reserve, South Coogee
Coastal Swamps	Associated with low, open swamplands on alluvial flats and sandy depressions, this community is often represented by a small handful of species including *Typha orientalis, Phragmites australis, and Ficinia nodosa* which when space allows is	Coastal Sand Swamp Scrub S_FrW13	Foredune Swale Marsh (3966) Sydney Coastal Sand Swamp Scrub (3922)	Sydney Freshwater Wetlands in the Sydney Basin Bioregion are listed as an EEC under state legislations	None	• Burrows Park, Clovelly (modified, pond) • Centennial Parklands • Gordons Bay Reserve, Coogee • Harvey Street, Prince Henry • Kamay Botany Bay National Park, La Perouse

Habitat Type	Summary	Sydney Metro Classification	NSW PCT (PCT ID)	Conservation Status	Rare or Threatened Species	Locations
	fringed by taller plants which may include *Casuarina glauca*.			*occurrences of this community if 'modified' are excluded from these listings.		• Little Bay Fauna Corridor, Little Bay (modified, watercourse) • Malabar Wetland, Malabar • Malabar Headland, Maroubra • NSW Golf Course, La Perouse • Randwick Environment Park, Randwick • St Michaels Golf Course, Little Bay • Woomera Reserve, Little Bay (modified, water course)
Coastal wetlands	A species diverse freshwater wetland community comprised of open to closed cover of low sclerophyllous woody shrubs and an abundance of sedges, ferns and forbs. The distinctive shrub layer is defined by species which prefer moist soil such as *Callistemon citrinus, Banksia robur* and *Melaluecas* in combination with common coastal shrubs such as *Monotocca elliptica, Banksia intergrifolia* and *Banksia ericifolia*.	Coastal Freshwater Wetland S_FrW03	Coastal Sydney Sand Saw-sedge Wet Shrubland (3921) Sydney Coastal Sandstone Creekline Swamp Heath (3923)	Sydney Freshwater Wetlands in the Sydney Basin Bioregion are listed as an EEC under state legislations.	None	• Centennial Park • Kamay Botany Bay National Park, La Perouse • Malabar Headland, Malabar • NSW Golf Course, La Perouse • Randwick Environment Park, Randwick • St Michaels Golf Course, Little Bay • Telstra Land, Little Bay •

Habitat Type	Summary	Sydney Metro Classification	NSW PCT (PCT ID)	Conservation Status	Rare or Threatened Species	Locations
Deep Sand Mantle Heath	*Monotoca elliptica* - *Leptospermum laevigatum* - *Banksia aemula* heathland or scrub. Common understorey-species include *Lepidosperma laterale* and *Dianella revoluta*. Occurs on nutrient poor aeolian dune sands. A complete description is given in the EPBC scientific determination and/or the NSW Scientific Committee's final determination for the Endangered Ecological Community – Eastern Suburbs Banksia Scrub.	Coastal Sand Mantle Heath S_HL03 & Coastal Sandplain Heath S_HL04	Sydney Coastal Sand Mantle Heath (3806)	*Eastern Suburbs Banksia Scrub in the Sydney Basin Bioregion* is listed as Critically Endangered Ecological Community under state and federal legislation.	Sunshine Wattle (*Acacia terminalis* subsp. *Eastern Suburbs*) is listed as 'endangered' under both state and federal legislation. *Allocasuarina diminuta* is locally rare.	• Anzac Pde Median, Malabar • Arthur Byrne Reserve, Maroubra • Australian Golf Course, Kensignton • Bunnerong Rd, Chifley • Bunnerong Electricity substation, Chifley • Centennial Parklands • Kamay Botany Bay National Park, La Perouse • 11 Jennifer St, Little Bay • Malabar Headland National Park, Malabar • Malabar Headland (Lot 1 DP 1223218), Malabar • Maroubra Reservoir, Maroubra • Pioneers Park, Malabar • Prince Henry, Little Bay • Randwick Environment Park, Randwick • St Michaels Golf Course, Little Bay • Telstra Land, Little Bay • Wassell St, Matraville • Yarra Bay - Aboriginal Land, Phillip Bay

Habitat Type	Summary	Sydney Metro Classification	NSW PCT (PCT ID)	Conservation Status	Rare or Threatened Species	Locations
Sandstone Outcrop Heath	Sandstone Outcrop Heath species are highly adapted to growing in small depressions in the rock and on thin sheets of coarse sand. Depressions are often moist and ideal for sedge, rush and moss species. *Drosera* sp. are commonly seen fringing these depressions or in the cooler shady areas provided by the fringing *Kunzea ambigua, Banksia ericifoli*a and *Melaleuca nodosa*. Diverse communities of lichens are associated where this community has low disturbance rates.	Coastal Sandstone Rock Plate Heath S_HL09	Southern Sydney Rockplate Heath (3810)	Not Listed	The diverse lichens and moss species associated with this community are rare in Randwick	• Randwick Environment Park, Randwick • Bunnerong Rd, Chifley • Popplewell Park, South Coogee • Malabar Headland, Malabar
Moist Gully Forest	Identifiable by larger canopy species normally associated with rainforest such as *Syzygium smithii* – *Callicoma serratifolia* - *Ceratopetalum apetalum* forest overlying dense covers of fern and mesic mid-canopy. Restricted to moist gullies protected from prevailing salt-laden winds and fed by relatively nutrient rich sediments which accumulate through overland water flows.	Coastal Escarpment Littoral Forest S_RF07 & Coastal Sandstone Gallery Rainforest S_RF02	Sydney Coastal Sandstone Foreshore Forest (3594) May also contains elements similar to: Illawarra Escarpment Warm Temperate	This community is associated with the listed EEC: Littoral Rainforest in the NSW Sydney Basin, however local examples are not considered representative due to very high levels of disturbance which have caused the loss	One of a few remaining local habitats of the Gully Skink (*Saproscincus galli*). Locally rare plants: *Asplenium australasicum, Asplenium flabellifolium, Blechnum cartilaginium, Ceratopetalum apetalum, Cyathea australis, Cyperus tetraphyllus, Pandorea pandorana, Pellaea falcate, Platycerium sp. Sticherus flabellatus, Synoum glandulosum, Trochocarpa laurina*	• Fred Hollows Reserve, Randwick • Gordons Bay Reserve foreshore, Coogee • Kamay Botany Bay National Park, La Perouse • St Basil's Homes, Randwick

Habitat Type	Summary	Sydney Metro Classification	NSW PCT (PCT ID)	Conservation Status	Rare or Threatened Species	Locations
	Fred Hollows Reserve (former Glebe Gully), Randwick is one of the last remaining gully forests in the Eastern Suburbs. Smaller more isolated patches may occur elsewhere.		Rainforest (3028)	of any remnant seed profiles.		
Coastal Sand Forests	A low forest made up of *Angophora costata, Banksia serrata* and *Corymbia gummifera*, interspersed by the odd *Eucalyptus botryoides,* all supported by deeper areas of wind-blown sandy soils. This vegetation community is closely associated with ESBS, though distinct based on relative height of vegetation. Once have been found extensively across the centre of the LGA, however these larger trees have been extensively cleared and remain under threat.	Coastal Sand Apple-Bloodwood Forest S_DSF03	Coastal Sands Bloodwood Low Forest (3545)	Not Listed	This community is now rare in the LGA, due to targeted removal of Eucalypts since 1879. Remnants are often marked by a few remaining large trees, such as the single, mature *E. botryoides* at Woomera Reserve.	• Bunnerong Electricity Substation, Chifley • Kamay Botany Bay National Park • Malabar Headland National Park, Malabar • Woomera Reserve, Little Bay • St Michaels Golf Course, Little Bay • Yarra Beach (hind dunes), La Perouse, • The Coast Golf Course, La Perouse

*Disclaimer: High rates of disturbance and fragmentation have created highly modified areas of habitat across Randwick LGA, and this table was created as a best fit based on current knowledge at the time of writing. In any context, but particularly where disturbance has been high and ongoing, official designation of any given ecosystem classification can be subjective reflecting variation in site fidelity, the level of detail or scale of sampling and or temporal changes (such as further degradation or management activities). Classification systems are also subject to change. Therefore, this table should be taken as a guide only.

Figure 23: Coastal sand apple-bloodwood forest at St Michaels Golf Course.

Source: E. Strautins

Figure 24: Gully Forest at Fred Hollows Reserve

Source: L. Cain

Figure 25: Mid to hind-dune at Frenchman's Beach.

Source: E. Strautins

Figure 26: Coastal cliff-line marsh at Trenerry Reserve

Source: E. Strautins

Figure 27: Coastal headland heath at Dunningham Reserve

Source: L. Cain

Figure 28: Frenchman's Beach foredune vegetation

Source: E. Strautins

4.7. Threatened Species and Ecosystems

State and Commonwealth legislation determine threatened species, populations, and ecological communities. Under this legislation, species are classified as extinct, critically endangered, endangered or vulnerable at a population, state or federal level.

Figure 29: The endangered Sunshine Wattle (*Acacia terminalis* subsp. *Eastern Sydney*)

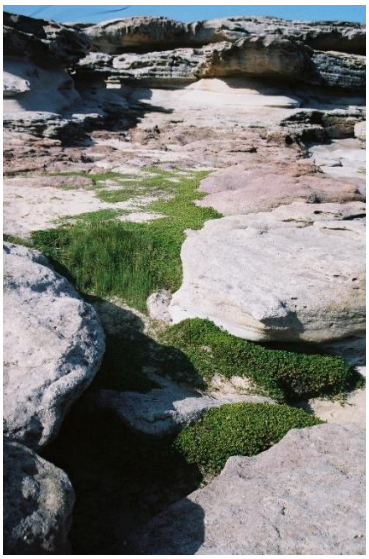
Source: D. Hall

In recent years, 92 species of plants and animals that have been recorded in Randwick have been declared threatened under State and/or Commonwealth legislation (Refer to **Section 5.1**). Many more are recognised as being locally rare, which in Randwick is defined as having between 1-3 very small populations recorded as present since 1990. Of the threatened fauna species, some of these rely on the local area all year round, while others are migratory or temporary visitors.

Occurring on the salt sprayed cliffline is the state listed vulnerable Narrow-leafed Wilsonia (*Wilsonia backhousei*). Scattered within a few remnant bushland sites is the endangered Sunshine Wattle (*Acacia terminalis subsp. Eastern Sydney*), these patches include some of the largest extant populations of this species remaining.

Three listed ecological communities are present in Randwick City. *Eastern Suburbs Banksia Scrub of the Sydney Region* (ESBS), of which approximately 2% remains, is listed as 'critically endangered' under state and federal legislation. *Sydney Freshwater Wetlands in the Sydney Basin Bioregion* and *Themeda grassland on seacliffs and coastal headlands in the NSW North Coast, Sydney Basin and South East Corner Bioregions* are each listed as 'endangered' under state legislation also occur.

Figure 30: The vulnerable Narrow-leafed Wilsonia (*Wilsonia backhousei*) found on isolated clifftops.



Source: M. Leary

Despite low availability of permanent roost or breeding sites Grey-headed Flying-foxes (*Pteropus poliocephalus*), Powerful Owl (*Ninox strenua*) and Large Bentwing-bat (*Miniopterus orianae oceanensis*) occur within Randwick City or regularly pass-through to access habitat in adjacent land. All these species are listed as vulnerable under state and/or federal legislation.

A variety of marine, intertidal and migratory birds are also infrequently recorded as temporary visitors to our coastline and are often protected under international agreements such as Ramsar, ROKAMBA, JAMBA or CAMBA.

In the local marine environment, the Grey Nurse Shark (*Carcharias taurus*), is the most prominent threatened species. Threatened marine ecosystems which occur within or at the periphery of Botany Bay include saltmarsh and endangered populations of seagrass (*Posidonia australis*) meadows. The Great White Shark (*Carcharadon carcharias*), the Black Rockcod (*Epinephelus daemelii*) and the Cauliflower Soft Coral (*Dendronephthya australis*) are threatened species which may also occur in the ocean east of Randwick City and in Botany Bay.

Randwick Council area has four marine protected areas within the LGA including two aquatic reserves located within the City Bronte-Coogee Aquatic Reserve, the other being Cape Banks located off Botany Bay National Park, an intertidal protection area at Long Bay and a Grey Nurse Shark critical habitat area off Magic Point at the southern end of Maroubra Beach.

Figure 322: Malabar Wetland is one example of an *Endangered Sydney Freshwater Wetland*, which occurs in Randwick.

Source: M. Leary

Figure 313: The Critically Endangered *Eastern Suburbs Banksia Scrub* is not a species, but a floristically diverse ecological community

Source: M. Leary

5. Statutory and Planning Framework

5.1. Our State and Commonwealth Responsibilities

Many actions identified under State and Commonwealth legislation are delegated to local government to implement and monitor. It is critical that Council exercises these responsibilities diligently, and with accuracy, to avoid loss of local biodiversity and possible prosecution.

This Plan has been prepared to be consistent with relevant international, national, state, regional and local laws, strategies, policies, and programs. It is also broadly consistent with the objectives and outcomes of the ***National Biodiversity Conservation Plan 2010-2030*** and ***NSW Biodiversity Conservation Plan 2010-15.***

The key pieces of legislation which applies to threatened species are the Federally applied: ***Environmental Protection and Biodiversity Conservation Act 1999*** (EPBC Act) (*Commonwealth*) and the NSW State based: ***Biodiversity Conservation Act 2016*** (BC Act). These pieces of legislation aim to protect biodiversity, with priority actions for threatened species, populations and ecological communities. To address impacts and threats on each item listed under these acts are 'Recovery Plans' and 'Priority Action Statements' (PAS). These are utilised to inform Council management actions of bushland and other threatened species habitats.

Figure 33: Educating our community on the role they play to conserve bushland is one responsibility of the BCWU.

Source: E. Strautins

The ***Environmental Planning and Assessment Act 1979*** is the principal planning legislation in NSW and is administered by the NSW Department of Planning. The most important sections of this act which affect Randwick's biodiversity are 5A, Significant effect on threatened species, populations and ecological communities and 79C, Evaluation - Matters for consideration. These two sections ensure that where developments may negatively affect biodiversity and its conservation, procedures are undertaken to modify the development to protect and conserve biodiversity. This act also makes provision for environmental planning instruments such as local environment plans (LEP's) and State Environmental Planning policies (SEPP's), the preparation and implementation of which, can have direct impacts on biodiversity conservation.

Aboriginal cultural heritage including objects and places, are protected under the ***Heritage Act 1977*** and ***National Parks and Wildlife Amendment (Aboriginal Ownership) Act 1996*** in NSW. Whilst many of these heritage items found within the City limits occur on non-council-managed lands, some heritage items exist within Council bushland reserves. Protection of these elements, including knowledge of their location, is managed in close consultation and under direct supervision by an authorised Aboriginal representative. Other government departments which may be included in the consultation process include the *Local Lands Service* (LLS) and the *Office of the Environment and Heritage* (OEH).

Figure 34: Fairy Orchid (*Caladenia alata)*

Source: A. Bamforth

State Environmental Planning Policies (SEPP) work together with the *Biodiversity Conservation Act 2016* and the *Local Land Services Act 2013* to create a framework for the regulation of clearing of native vegetation in NSW. During 2021 these policies were consolidated from 45 to 11 policies, so that now just one policy contains all details relevant to clearing vegetation in non-rural areas, managing bushland in urban areas, protection of heritage (including specifications for Aboriginal heritage) and wetland protection.

The ***Biodiversity and Conservation SEPP 2021*** will ensure the biodiversity offset scheme (established under the Land Management and Biodiversity reforms) will apply to all clearing of native vegetation that exceeds the offset thresholds in urban areas and environmental conservation zones that does not require development consent. It requires councils to prepare plans of management for bushland in open space areas. It must be applied by council in the assessment of developments on adjacent land that may affect local bushland. Further, its aims must be considered when council prepares local environmental plans (LEPs) and the retention of bushland must be given priority.

The ***Resilience and Hazards SEPP 2021*** contains planning provisions for land use planning within the coastal zone, in a manner consistent with the objects of the Coastal Management Act 2016, to manage hazardous and offensive development and which provides a state-wide planning framework for the remediation of contaminated land and to minimise the risk of harm. It provides further details regarding clearing of vegetation significant to the coastal fringe such as "coastal wetlands" or "littoral rainforest" as identified on the *Coastal Wetlands and Littoral Rainforests Area Map* and provides restrictions on developments which could impact on the ecological functioning or amenity of the NSW coast.

The ***Local Government Act 1993*** sets out the charter for local government. This Act provides definitions for 'natural areas', including bushland which are the basis for council management programs. The Sections pertinent to biodiversity conservation are *Section 36* to *36N*. These sections detail the management objectives and uses of community land with which council must comply.

The ***Biosecurity Act 2015*** defines and categorises the worst invasive plant species that pose a human health problem or a risk to native vegetation conservation and/or agriculture. Randwick Council is responsible for the implementation of the Act within the city boundaries on both public and private land.

Figure 35: The Bushland and Coastal Walkway Unit play an important role in guiding the community to protecting bushland and by extension, biodiversity.

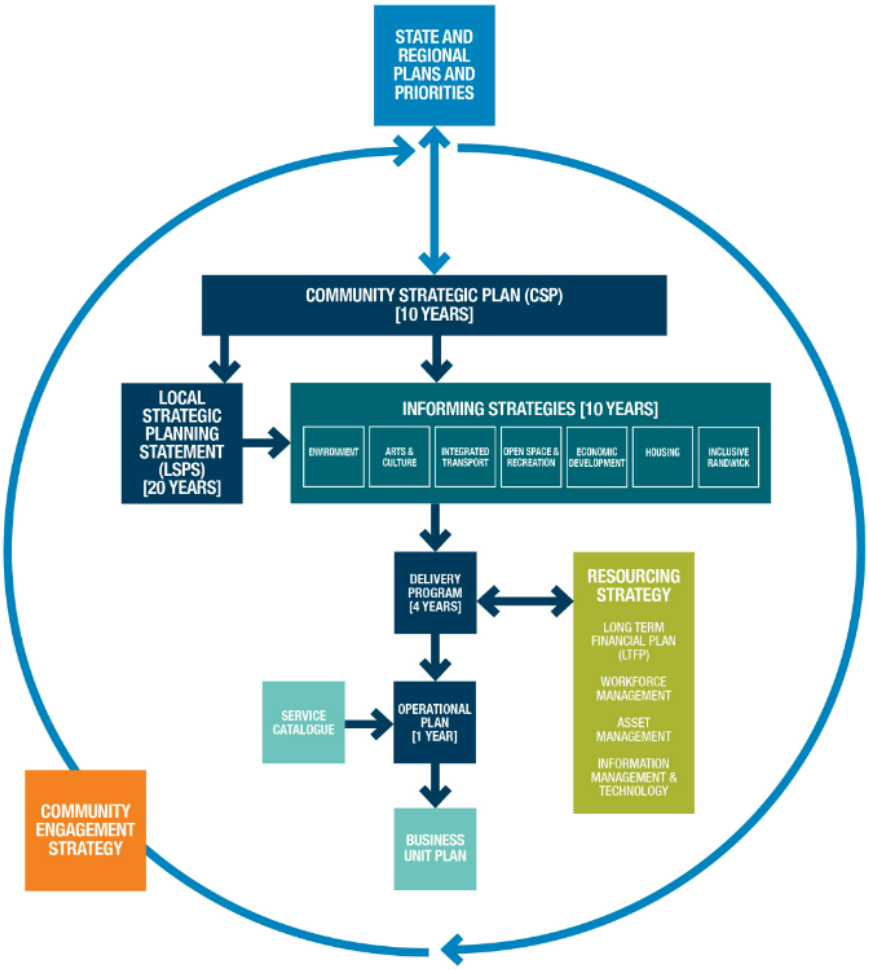
Source: M. Bond

The ***Coastal Management Act 2016*** outlines a strategic framework for managing coastal issues in NSW, by focusing on the protection and enhancement of sensitive coastal environments, habitats and natural processes which inbuild resilience to coastal hazards which may be amplified as a result of climate change. This Act also functions to protect and enhance the unique character of beaches and foreshores and their heritage, including Aboriginal cultural areas/ items. To respond to these requirements Council is required to complete a *Coastal Management Plan* (CMP).

The ***Marine Estate Management Act 2014*** provides for the integrated declaration and management of a comprehensive system of marine parks and aquatic reserves in the context of the whole marine estate. Under this Act, if there is development on land that is in the locality of the aquatic reserves and Council is of the opinion the development is likely to impact the plants or animals within the marine park or aquatic reserve and their habitat, Council is obliged to consult with the relevant Minister(s) before finally determining the application.

5.2. Council's Conservation Commitments

This section provides a broad overview of the intersection of Councils strategic planning framework and each documents relevance to the Ecological Work Plan. The interaction of some of these documents is summarised in the diagram below.



Council's commitment to environmental conservation for the next 20 years (2013-2033) has been captured in the **Randwick City Plan**. This Plan has been prepared to reflect the community's vision in conjunction with Council's long-term goals for the City. A key outcome in this Plan is *Outcome 10 - A Healthy Environment*: *bushland, open spaces and biodiversity are protected and enhanced for future generations*.

The ***2022-2032 Community Strategic Plan*** (CSP) gathered feedback directly from the community to understand their main priorities and aspirations for the future, plus how these outcomes will be achieved. The environmental aspirations identified within this document went on to generate the four outcome of Randwick's 'Environmental Strategy'.

The ***Randwick Local Environment Plan*** (LEP) is the statutory planning instrument that currently applies to Randwick City. The LEP designates the zoning, the development objectives and the permissible uses for every parcel of land within the Randwick City Area. The bushland areas within Randwick City are captured within either '*E2 - Environmental Conservation' and 'RE1-Public Recreation*' zoning.

The ***Randwick Development Control Plan*** (DCP) includes provisions to minimize the impacts on local habitat and biodiversity on-site and in adjacent areas, during construction, and promotes inclusion of fauna friendly plant species as part of landscaping plans following construction works.

The ***Local Strategic Planning Statement*** (LSPS) provides Randwick City Council with a Vision for 2040. Within this document '*Planning Priority 17: Protect areas of bushland and biodiversity*' details the value of our natural environment and mentions the '2015 Biodiversity Strategy' which this document supersedes.

The ***Randwick Environment Strategy*** was developed in 2021 to provide a broad vision of environmental sustainability across Randwick through the application of 5 Principles, from which four outcomes emerged (as follows) and is of immediate relevance to the information contained in this document which expands the background knowledge required to fulfil these outcomes.

- *Outcome 1 – Biodiversity Conservation: to restore and protect the diversity of ecosystems.*
- *Outcome 2 – Climate Change: A community more knowledgeable, proactive and responsive to Climate Change impacts.*
- *Outcome 3 – Conserve Resources: Our limited natural resources are protected and conserved.*
- *Outcome 4 – Coastal Protection: Coastal and marine environments are protected and conserved.*

Randwick City's ***Open Space and Recreation Strategy*** provides a strategic approach for the management and coordination of our public open spaces which include areas of bushland and coastline. These spaces are important for supporting the health and wellbeing of people within our community whilst also supporting a range of other species which inhabit our City.

Figure 36: Council's planning framework highlights the value of outdoor space and protects it to support the health and wellbeing of every generation.

Source: C. Rotolo

5.3. Risks and Threats

The bushland of Randwick has been greatly reduced over the past 200 years, with an estimation of only 6.5% of the original vegetation remaining. As a result, many species have become threatened or extinct at the local level, including small to medium sized mammals, frogs and increasingly small birds. As each species may play a role in ecosystem functioning, these losses increase the vulnerability of entire ecological communities making them susceptible to further species extinctions.

Many species continue to be at risk of extinction due to ongoing pressures, which are often exacerbated by human activities. These pressures are known as 'threatening processes', some of which are so great and widespread that they have been identified in State and Commonwealth Acts as 'Key Threatening Processes'. These require action to be taken by local land managers, including Council.

Legislated key threatening processes that are applicable to Randwick are:

- Aggressive exclusion of birds from woodland and forest habitat by abundant Noisy Miners (*Manorina melanocephala*).
- Clearing of native vegetation.
- Competition and grazing by the feral European Rabbit (*Oryctolagus cuniculus*).
- Competition from feral honeybees (*Apis mellifera*).
- Death or injury to marine species following capture in shark control programs on ocean beaches.
- Ecological consequences of inappropriate fire regimes.
- Entanglement in, or ingestion of, anthropogenic debris in marine and estuarine environments.
- Human-caused climate change.
- Infection of amphibians with chytrid fungus resulting in chytridiomycosis.
- Infection of native plants by *Phytophthora cinnamomic.*
- Introduction and establishment of Exotic Rust Fungi of the order *Pucciniales* pathogenic on plants of the family *Myrtaceae.*
- Invasion and establishment of exotic vines and scramblers.
- Invasion of native plant communities by *Chrysanthemoides monilifera*, *Lantana camara* or exotic perennial grasses.
- Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants.
- Predation of native fauna by introduced predators including Cats (*Felis catus)*, Red Foxes (*Vulpes vulpes)*, Mosquito Fish/ Plague Minnow (*Gambusia holbrooki*).
- Removal of dead wood and dead trees or bush rock.

Figure 37: Our coastlines are more fragile than they seem, but with the right care can be resilient, diverse environments.

Source: D. Hall

Many seemingly benign management actions by Council and private landholders can detrimentally affect existing native flora and fauna species and plant communities. Though not currently covered in state or federal legislation, additional major threats to biodiversity which affect the biodiversity (including threatened species) of Randwick include:

- Altered fire and hydrological regimes
- Dumping of garden waste
- Dumping household chemicals, furniture, and other rubbish
- Fragmentation of bushland remnants
- Irresponsible pet ownership (incl. nutrient loading from pet faeces, allowing pets unsupervised access to bushland and associated risk of predation on native wildlife)
- Nutrient enrichment of soils and waterways
- Marine heatwaves and sea level rise predicted with climate change
- Physical damage or removal of vegetation for views and/or access
- Riding bicycles, motor bikes or horses in bushland
- Soil erosion and loss of seed stored within soil
- Spread of invasive weeds and pests
- Stormwater pollution

Figure 38: The Bushcare volunteer program has been central to the restoration of Randwick City's bushland since 1993.

Source: BCWU

It is the responsibility of Council to ensure that all staff are aware of the impacts of their management decisions and that all environmental protection actions are implemented according to statutory requirements. Council staff should aim to design and implement the highest standard of management actions.

The impacts of land-based activities on coastal waters and organisms are a major consideration in the protection of marine biodiversity. Council has a responsibility to ensure its own management practices do not detrimentally affect the marine environment. A lack of understanding of impacts should not be an impediment to responsible design and management of council infrastructure, or to the enforcement of protective measures on private landholders.

A community which lacks interest, awareness and understanding of the values and importance of biodiversity can cause considerable damage. Council is responsible for fostering the understanding and respect of natural environments and encouraging residents to value and protect these precious areas.

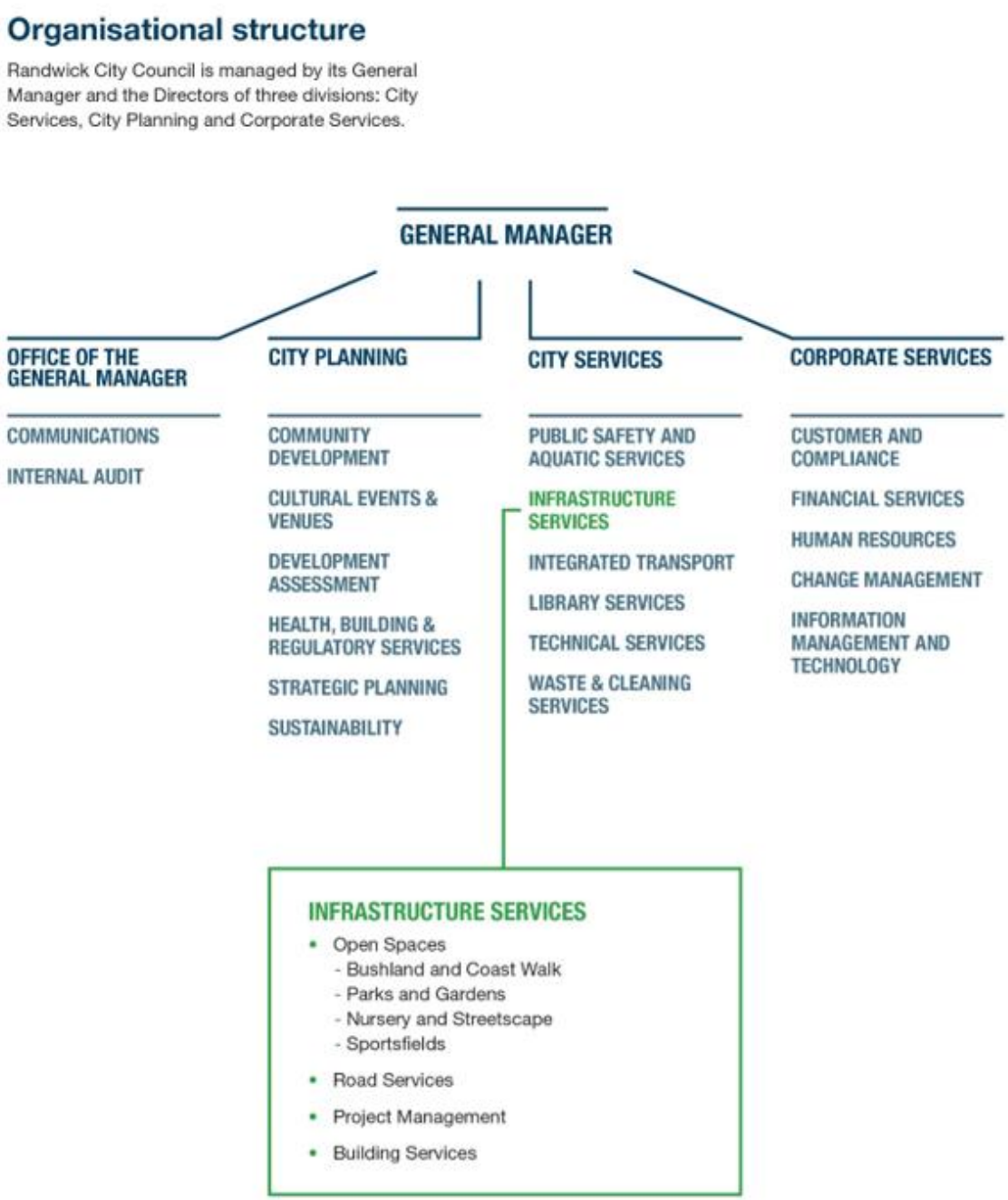
Figure 39: Volunteer working bees help connect community with our local environment bushland.

Source: UNSW Arc 'Good Deeds Day'

6. Implementation - Where to and how?

6.1. Organisational Structure

The BCWU is the section of council which is primarily focused on safeguarding biodiversity through the protection and enhancement of bushland throughout the LGA. This unit is part of Council's 'Infrastructure Services'.



6.2. Cross-cultural Partnerships

Randwick City Council recognise the significant and ongoing contributions to natural area management made by the Aboriginal peoples of this area, originally the Bidjigal and Gadigal of the Eora Nation. Reflecting a long history of custodianship over this land, these cultures have had a substantial influence in shaping the biodiversity of our region through the utilisation of diverse practices which include (but are not limited to) mosaic burning and sustainable harvest.

Figure 40: Remnant bushland supports species which may have cultural significance.

Source: D. Hall

Increasing evidence demonstrates that embracing these old ways, in combination with good science, to forge new, highly context driven land management practices is the most effective way to protect biodiversity. This however relies on relationships built on trust and respect and an understanding that not all knowledge is made to be shared.

In support of Indigenous re-awakening of local cultural land management practices, Randwick Council will continuously work to strengthen ties with local Indigenous communities through equal inclusion, natural resource management partnerships, access to Country (such as the annual Koojay Corroboree) and fire management programs.

This approach is reflected within the 'Open Space and Recreation Strategy' specifically *Strategic Approach 3.5: Work with the Local Aboriginal Land Council and Aboriginal Elders to develop and implement projects to increase knowledge and awareness of the local Aboriginal culture, traditions and connection to country through open space.*

Figure 41: Integrated management practices such as burning supports renewal of caring for Country opportunities.

Source: C. Rotolo

6.3. Ecological Restoration Principles

Emerging in the 1980's in Australia, ecological restoration (aka bush regeneration) is a relatively young industry which has rapidly evolved to incorporate the latest science particularly in areas of ecology and plant physiology, Indigenous ecological knowledge and elements of horticulture.

Figure 42: A careful, yet systematic approach is best.

Source: M. Hooper

"Ecological restoration aims to recreate, initiate, or accelerate the recovery of an ecosystem that has been disturbed", where a 'disturbance' is defined as "environmental changes that alter ecosystem structure and function" (Vaughn *et al.* 2010).

As highlighted in the '*National standards for the practice of ecological restoration in Australia'* (SERA 2021), protecting ecosystems is vital, however without investing in active restoration work biodiversity will continue to decline.

In this field of work there is never a one size fits all methodology. Instead, bushland restoration works must be highly adaptive reflecting the specifics onsite including short- and long-term goals, climatic conditions including both seasonal variability and daily weather fluctuations, disturbance history and the species present. Despite this, certain key principles must always be applied.

These key principles have been broadly outlined within the '*National standards for the practice of ecological restoration in Australia* – Edition 2.2' (SERA 2021) as:

1. Ecological restoration practice is based on an appropriate local native reference ecosystem.
2. Restoration inputs will be dictated by levels of resilience and degradation.
3. Recovery of ecosystem attributes is facilitated by identifying clear targets, goals and objectives.
4. The goal of ecological restoration is full recovery, in-so-far as possible, even if outcomes take long timeframes or involve high inputs.
5. Restoration science and practice are synergistic.
6. Social aspects are critical to successful ecological restoration.

Figure 43: Floristically diverse indigenous plant stock aids in revegetation efforts.

Source: L. Cain

Further key resources which guide ecological restoration works include:

- ‘Bringing back the bush’ by Joan Bradley
- ‘Restoring natural areas in Australia’ by Robin A Buchanan
- The threat abatement plans for threatened species or ecological communities

Monitoring is essential for understanding changing ecological health, species population dynamics and to measure the success of restoration works. BCWU undertake a range of monitoring activities aimed at collating data on many key ecological indicators. These include continuous survey of flora and fauna species, annual survey of weed density, threatened species and vegetation condition; and regular LGA-wide dedicated surveys for targeted elements such as pest fauna or specific taxonomic groups such as birds, frogs or fungi.

Underpinning all work in bushland areas are strict hygiene protocols, designed to reduce the risk of introduction of plant diseases or new weed propagules. A key threat is the spread of *Phytopthora* sp. and/ or Myrtle Rust (*Uredo rangelii)* which once introduced are near impossible to eradicate and can have a devastating impact on native flora. Thus, prior to entering site all staff, volunteers and contractors *must* disinfect tools, footwear, machinery and equipment with a 70% solution of methylated spirits.

Workplace Health and Safety (WHS) is built into all facets of Council’s bushland conservation planning and activities. All staff, contractors and volunteers are WHS inducted upon commencement of work. Council employees have access to all WHS policies, forms and documents. It is expected that employees be familiar with current WHS legislation for the safe and proper implementation of day-to-day tasks and that they support a safe workplace for all.

Figure 44: Sometimes ecosystems need a helping hand.

Source: M. Bond.

6.4. Action and Evaluation

To realise the Ecological vision within Randwick City, six measurable goals have been identified. The actions involved in their implementation are laid out in the following table. These goals often involve strong input and involvement of staff from different Council areas and in partnership with the community.

Most of the actions required are ongoing and have been in place for many years. Others may be updating existing actions or identifying new ways forward in the management and conservation of our biodiversity responsibilities. Reviewal of this Plan will be in accordance with the processes for Council's other medium-term plans and strategies.

These actions are reflected in the position descriptions and daily Conservation Work Plans of relevant staff and must be integrated within existing budget and reporting mechanisms. This Plan is resourced through Council's '*Responsibility 4425 - Bushland and Coastal Walkway*' budget, in combination with intermittent project-based funds, such as external grants and council's environment levy.

In addition to these activities, the BCWU regularly seeks out new evidence based and innovative approaches or partnerships to continuously improve conservation outcomes for the biodiversity of our city and our region. Supporting adaptive management within biodiversity conservation is essential to building resilient ecological systems in the context of evolving ecological knowledge and the unpredictability of our changing climate.

Figure 45: The Council nursery supports biodiversity by producing plants of local provenance.

Source: L. Cain

Table 2. Achieving the six goals of this Ecological Work Plan.

Objective	Action	Key Issues	Indicators	Responsibility & Internal Partnerships
A: To monitor and maintain baseline information and inventories of bushland and biodiversity in Randwick.				
Collection and systematic storage of information relating to local biodiversity, which is useful, accurate, easy to locate and provides the basis for comparison over time or following different management actions.	1) Comprehensive record keeping via TRIM databases (stored in an easily searchable method following strict, standardised "WHO – WHAT – WHERE – WHEN" file naming conventions. 2) Regular informal and formal survey of flora, fauna and ecological community diversity. 3) Maintain up-to-date layers of information on Councils GIS for habitat of rare and threatened species and communities; wetlands; watercourses; bushfire events; fauna corridors; remnant bushland. 4) Enter detailed species records into the NSW Wildlife Atlas, as required to maintain Scientific License. 5) Herbarium maintained both physically and digitally containing examples of the total flora diversity observed within Randwick City.	Maintenance of accurate records. • Data storage is expensive and can be time consuming, thus consistent efforts to ensure data is recorded with accuracy and precision both by internal staff and when collected by contractors. • New flora records confirmed by the NSW herbarium before addition to formal species lists or herbarium. • Data storage to be maintained in a clear and consistent style which enables easy search and compilation. • Species occurrences change over time and will likely be impacted by climate change; therefore, survey effort needs to be consistent.	Well-maintained and comprehensive: • Herbarium (Digital and physical records). • Flora records compendium. • Fauna records compendium. • Maps of threatened species locations &/or habitats. • Up to date vegetation mapping, reflecting widely accepted naming conventions and condition ratings. • Consistent works reports (inc. herbicide records). • Planting inventories, particularly where revegetation occurs close to remnant bushland. • Replicated photo point monitoring. • Weed mapping	Bushland and Coastal Walkway
B: To provide accurate advice and reporting regarding bushland and biodiversity to Council staff, landholders, developers, Government agencies and the public.				

Objective	Action	Key Issues	Indicators	Responsibility & Internal Partnerships
To continue to act as a leader in biodiversity management by understanding both current trends in conservation and evidence based best practice management techniques informed by on-ground experience.	1) Liaise with adjoining land managers (e.g., National Parks and golf courses) on matters regarding bushland and biodiversity. 2) Assist State and Commonwealth agencies regarding biodiversity, including rare and threatened items, eg. comments on preliminary determinations and participating in Recovery Planning. 3) Support and facilitate increasing engagement with Indigenous Custodians on issues such as, but not limited to cultural burning and heritage protection. 4) Contribute data to the annual Randwick City State of the Environment Report. 5) Native Haven program provides advice and select resources to support residents to create habitat on private lands including schools and backyards. 6) Prepare and regularly update site scope of works for bushland areas and habitat for items of state and national significance on Council land. 7) Attend conferences and regional land-managers meetings to stay abreast of the latest science and strategies. 8) Provide advice to internal departments eg. Strategic Planning, Technical Services, Sustainability.	• Effective biodiversity conservation management relies on a combination of field experience and research. • Conservation management is an evolving field which requires adaptive management, this is often best achieved through collaboration.	• Native Havens & Bushcare Manual containing practicable information for volunteers to work safely to create habitat. • Responding to internal and external requests in a timely and respectful manner. • Relevant Council plans and documentation should reflect consultation through appropriate application of biodiversity protections or affirming actions.	Bushland and Coastal Walkway Strategic Planning Sustainability Communications Community Development
C: To protect bushland in accordance with Council's strategic land-use roles and responsibilities.				

Objective	Action	Key Issues	Indicators	Responsibility & Internal Partnerships
To protect the ongoing viability of indigenous genetic, species and ecosystem diversity reflecting both legal and moral obligations, ensuring that future generations have equal access to their cultural, scientific, spiritual and intrinsic values.	1) Ensure compliance with all relevant state, federal and local legislation, policy and plans. Specifically: - Ensure all SEPP 19 bushland, items and habitat of state and national significance are identified, protected and conserved through rezoning and development application processes. - Comply with threat abatement plans for any species known to occur within Randwick either permanently or temporality and provide consideration for preservation and enhancement of habitat components required by other threatened species which have potential to occur locally. 2) Achieving the elements laid out in the 'Strategic Approach' for Biodiversity Conservation within the 'Environment Strategy'.	• Land-usage often has many competing priorities and perspectives, particularly in the density of the urban environment, all of which must be balanced appropriately. • Once lost, restoration of genetic, species or ecosystem biodiversity can be expensive and take years to begin to replicate.	• Support ongoing viability (and expansion of range where possible) of threatened flora and ecological communities including Eastern Suburbs Banksia Scrub, Sunshine Wattle and Narrow-leafed Wilsonia. • Reduce or regulate potential threats or degradation of any habitat known or likely to support threatened species or ecosystems.	Bushland and Coastal Walkway Strategic Planning Open Spaces Compliance
D: To undertake on-ground work to protect, restore, maintain, and enhance local bushland, including effective mitigation of threats.				
Protection of biodiversity must translate into real, on-ground action which responds to day-to-day threat mitigation, seasonal prioritisation, and	1) Engagement of skilled and qualified bushland restoration contractors to assist with providing high standards of work across bushland sites. 2) Providing support and resources to contractors and volunteers to enable outcomes to be achieved, including sourcing of materials such as provenance plants, coir logs and providing clear communication of expectations.	• Threats to biodiversity rarely act in isolation, and with increasing urban population density and climate change new threats are likely to emerge, thus will require active management. • BCWU apply the precautionary principle.	• Suppress the presence of invasive animals such as foxes and rabbits wherever practicable. • 'Scopes of Work' created and regularly updated for council managed bushland sites. • Implement fire program to address cultural, risk and	Bushland and Coastal Walkway Communications Rangers

Objective	Action	Key Issues	Indicators	Responsibility & Internal Partnerships
long-term objectives.	3) Ensure all bushland restoration works fall within best practice methodologies, consistent with current leading evidence-based techniques and any relevant threat abatement plans and/ or priority management site actions (using the specific terminology). 4) Maintain strict hygiene protocols for anyone working within Randwick City's bushland, in accordance with Chytrid, Phytophthora and Myrtle Rust hygiene Protocols. 5) Community education regarding the protection of biodiversity including responsible pet ownership and the value of indigenous flora and fauna.		ecological management responsibilities.	
E: To protect genetic biodiversity through a variety of industry approved methods, including the production of local provenance plants at Council's Indigenous Plant nursery.				
The Council nursery supports biodiversity by producing plants of local provenance.	1) Collect locally sourced seed, including via establishment of stock plants. 2) Maintain a seedbank of locally collected seed for use in the local area and as reference for historical flora genetics. 3) Prioritise the production of local provenance stock, including less common or less attractive species relevant to bushland restoration. 4) Adhere to FloraBank Guidelines when collecting seed and other propagation material.	• Maintain access to local provenance stock plants, seed and propagation material. • Introducing non-indigenous stock that has potential to hybridise with indigenous flora, potentially reduce population resilience to stresses such as disease or climate change	• Clear and consistent labelling of stock as: indigenous, native and exotic. • Production of stock utilising local provenance propagule material. • Accurate records of remnant and revegetated vegetation.	Nursery Bushland and Coastal Walkway

Objective	Action	Key Issues	Indicators	Responsibility & Internal Partnerships
	5) Maintain strict hygiene protocols both within the nursery and when collecting propagation material. 6) Continue to provide horticultural advice regarding the establishment of native and indigenous residential gardens. 7) Continue to monitor species distributions across the LGA. 8) Careful consideration of species selection and location when undertaking revegetation works.	impacting long-term viability. • Isolation or further fragmentation of genetic populations can place them at greater risk of extinction.		
F: To increase community awareness and appreciation of the importance of conserving bushland and to engage our community in biodiversity conservation initiatives.				
Biodiversity benefits all of us by supporting a healthy, liveable and beautiful city, thus working together to conserve biodiversity can support an enhanced sense of community.	1) Continuation of the Bushcare program (which began in 1993 – one of the earlier councils to adopt such a program). 2) Continue Native Havens Program, providing advice and select resources to increase biodiversity and habitat creation in both schools and private residences. 3) Provide biodiversity management advice to local landholders to protect and conserve bushland, items and habitat of state and national significance. 4) Encourage responsible pet ownership by the community, by providing educational material outlining the potential threat of pets to native biodiversity. 5) Continue to invest in innovative ways to educate and communicate with the	• The protection and enhancement of biodiversity is a responsibility shared by all. Whilst Council plays a key role, unless the whole community are involved declines in diversity will be unavoidable. • The task of securing biodiversity is both urgent and ongoing, thus inspiring the next generation of custodians is a key element.	• Bushcare and Parkcare participation maintained with an average of 200+ volunteers contributing approx. 1,500 hrs of work per year. • Holding regular educational events which increase a sense of community amongst volunteers involved in the Bushcare program and interested residents e.g. - Annual Wildflower Walk - Bushcare Christmas Party	Bushland and Coastal Walkway Strategic Planning Sustainability Communications

Objective	Action	Key Issues	Indicators	Responsibility & Internal Partnerships
	community regarding local remnant vegetation and biodiversity conservation.		- Educational events and field trips e.g. 'roaming Bushcare' - Bushcare exchanges with other councils or land mangers such as National Parks. • Engage the wider community via events such as Eco-Living Fair as part of Sustaining Our City Program. • Creation and maintenance of educational signs, website, pamphlets, manuals, Bushland Newsletter and other materials.	

7. Conclusion

The BCWU is committed to ensuring ongoing protection and management of local bushland and biodiversity values within the City and adjacent areas, for the enjoyment of current and future residents and visitors experiencing our parks, foreshore reserves and streetscapes. With this commitment comes the need for greater understanding of biodiversity management and the responsibilities involved of all parties. It is intended that this Ecological Work Plan forms an important strategic tool for identifying and implementing improved management, protection, and restoration of our conservation responsibilities.

As new information, knowledge and practices come to light, there will be further opportunities, challenges, and tasks to ensure the ongoing protection of our City's biodiversity. This Ecological Work Plan, if applied in full, has the potential to guide the management and conservation of our City's natural resources and contribute to a 'nature coast' icon for Sydney's eastern suburbs.

Figure 46: With the right care our unique coastal environment and the species it contains will be safeguarded for generations to come.

Source: M. Hooper

8. Further Reading and References

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9. Relevant Legislation

This Conservation Work Plan has been prepared to be consistent with relevant international, national, state, regional and local laws, strategies, policies, etc. This appendix includes all legislation that applies to biodiversity conservation in Randwick City and that has been referred to in the preparation of the BCS.

International

United Nations Convention on Biological Diversity (ratified by Australia on 18 June, 1993) and Agenda 21.

Japan – Australia Migratory Bird Agreement (JAMBA).

China – Australia Migratory Bird Agreement (CAMBA).

National

Legislation relevant to Council's activities:

Environment Protection and Biodiversity Conservation Act 1999

Intergovernmental Agreement on the Environment (1992) Schedule 6.

Strategies relevant to Council's activities:

Australia's Biodiversity Conservation Plan 2010-2030

National Local Government Biodiversity Conservation Plan (1998)

National Weeds Plan: A national Plan for weed management in Australia (2007)

National Plan – Bitou bush management manual (2008)

National recovery plan for Sunshine Wattle (Acacia terminalis subsp. terminalis) (2010)

Eastern Suburbs Banksia Scrub Endangered Ecological Community Recovery Plan (2004)

State

Legislation relevant to Council's activities:

Biodiversity Conservation Act 2016.

Coastal Management Act 2016.

Local Government Act 1993.

Local Government Amendment Act 2021.

Local Government Amendment (Ecological Sustainable Development) Act 1997 (section 8).

Environmental Planning and Assessment Amendment Act 2017.

State Environmental Planning Policy (Biodiversity and Conservation) 2021

State Environmental Planning Policy (Resilience and Hazards) 2021

Noxious Weeds Act 1993 (Repealed).

State Environmental Planning Policy No 19—Bushland in Urban Areas (SEPP 19). (Repealed)

State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017 'Vegetation SEPP' (Repealed).

State Environmental Planning Policy Coastal Management (Repealed).

Rural Fires Act 1997.

Protection of the Environment Operations Act 1997.

National Parks & Wildlife Act 1974.

Marine Estate Management Act 2014.

Companion Animals Act 1998.

Strategies relevant to Council's activities:

NSW Biodiversity and Climate Change Adaptation Framework 2007-2008.

NSW Biodiversity Conservation Plan 2010–2015

NSW Threat abatement Plan: Invasion of native plant communities by Chrysanthemoides monilifera (2006)

Regional and Local

Greater Sydney Local Land Service Transition Catchment Action Plan 2013-23

Randwick City Council Open Space and Recreation Strategy 2021

Randwick City Council State of the Environment Report 2017

Randwick City Council Tree Preservation Order 2001

Randwick City Council's annual State of the Environment Report

Randwick City Environment Plan 2021

Randwick City Plan 2017

Randwick City Significant Tree Register

Randwick Council's Annual Management Plan

Randwick Development Control Plan 2013

Randwick Local Environmental Plan 2012

Randwick Street Tree Master Plan 2002

Randwick City Council Plans of Management

Generic Plan of Management (PoM)

Remnant Bushland Generic Plan of Management

Beach and Coastal Reserves Generic Plan of Management

Roadside Reserves Generic Plan of Management

Pocket Parks Generic Plan of Management

Neighborhood Parks Generic Plan of Management

Civil Parks Generic Plan of Management

District Parks Generic Plan of Management

Regional Parks Generic Plan of Management

DRAFT Open Space PoM

Site Specific Documents (Historic and Current)

Chifley Sports Reserve Plan of Management 2010

Clovelly Bay Plan of Management 2002

Coogee Beach Foreshore Plan of Management 1997

Coogee Oval Draft Plan of Management 1998

Frenchmans Bay Plan of Management 2002

Glebe Gully Plan of Management 1986

Gordons Bay Reserve Plan of Management 1994

Heffron Park Plan of Management 2021

Historic La Perouse Management Plan March 2000

Malabar Beach and Foreshore Plan of Management 1994

Malabar Headland Draft Plan of Management1990

Maroubra Beach Plan of Management Overview, Hassell, September 1996

Latham Park – South Coogee Plan of Management

Pioneers Park – Malabar Plan of Management 1990

Prince Henry at Little Bay – Bushland Management Plan 2004

Restoration of Indigenous Vegetation at Gordon's Bay 1994

Trenerry Reserve Regeneration and Revegetation Plan.

Randwick Environment Park Plan of Management 2015

Development Control Plan - Prince Henry Hospital

Development Control Plan –Bundock Street Defence Site Randwick 2003

10. Appendix

10.1. Wetlands in Randwick City

No.	Wetland name	Suburb	No. of wet-land bodies	Classification	Size (ha)
244	Lachlan Swamps	Centennial Pk	10	Dune swale swamp	23.4
245	RAN Depot - Bundock St	Randwick	1	Dune swale swamp	3.1
246	Lake Malabar	Malabar	1	Dune swale swamp	0.2
247	UNSW	Little Bay	2	Artificial	0.7
248	La Perouse Dune	La Perouse	1	Dune swale swamp	0.2
249	Historic Cemetery	Little Bay	1	Dune swale swamp	0.1
250	Trenerry Reserve	Coogee	1	Cliff-top marsh	0.2
251	Jennifer St	Little Bay	1	Dune swale swamp	0.1
-	Malabar Headland	Malabar	5	Dune swale swamp and artificial	0.5
-	Prince Henry Hospital	Little Bay	1	Dune swale swamp	0.1
-	Coast Golf Course	Little Bay	6	Artificial	0.6
-	St Michaels Golf Course	Little Bay	2	Dune swale swamp	0.6
-	Lake Perrie - NSW Golf Course	La Perouse	1	Artificial	1.3
-	Australian Golf Course	Kensington	6	Dune swale swamp	1.4
-	Randwick Racecourse	Randwick	3	Artificial	0.7
-	Burrows Park	Clovelly	1	Artificial	0.1
-	Gordons Bay	Clovelly	1	Freshwater wetland	0.1
TOTALS			44		33.4

NOTE:

Number Wetlands are as listed in Appendix 4 of the DRAFT report "Protecting Wetlands in Sydney's Coastal Councils" By Sainty and Associates P/L, February 2000. Un-numbered wetlands have been identified by D. Hirschfeld, Randwick City Council, 1999

Numerous small, coastal, cliff-line wetlands have not been included in this table.

10.2. Organisation of Bushland within Randwick City

10.2.1. BCWU managed bushland sites (Table 3)

Remnant Name	Sector [Council Code]	Land Tenure	Zoning	Threatened Ecological Items	Rare Indigenous flora [in the Randwick LGA]	Habitats Types	Remnant area [m^2]
Anzac Parade, Malabar	M18	RMS	SP2	ESBS	-	Dune-field (ESBS)	3,840
Arthur Byrne Reserve	M6	Crown Land	RE1	ESBS	-	Secondary Dune (ESBS)	1,760
Bumborah Point	Y5a-b	Crown Land	RE1	-	-	Low Coastal Cliff, Beach Dune	1000
Bundock Park	V8-V13	RCC	RE1	-	-	Coastal Cliff	700
Bunnerong Rd, Chifley	C1, C2, C4-C12	NSW Transport, RCC	E2 & RE1	ESBS and *Acacia terminalis* subsp. *Eastern Sydney*	*Platysace stephensonii, Banksia aemula,*	Dune-field (ESBS), Sandstone Outcrop	25,024
Burrows Park	V1-V7	Crown Land	RE1	*Wilsonia backhousei*	*Paspalum vaginatum, Wilsonia backhousei, Azolla pinnata*	Coastal Cliff and Headland, Coastal Swamp	22,600
Coastal Walkway – Lurline Bay	U1-U15	RCC	RE1	-	*Banksia marginata, Bacopa monnieri, Samolus valerandi*	Coastal Cliff	4,000
Coastal Walkway – South Coogee	T8-T15	Department of Lands	RE1	-	*Cyperus sanguinolentus , Sonchus hydrophyllus, Samolus valerandi*	Coastal Cliff	2,250
Coogee Beach Cliff	Z30	Crown Land	RE1	-	-	Coastal Cliff	70
Cromwell Park South – Long Bay Foreshores	M25a-d, M28, M29,	NSW Dept. of Lands	RE1	-	-	Coastal Cliff, Beach Dune	7,500

Remnant Name	Sector [Council Code]	Land Tenure	Zoning	Threatened Ecological Items	Rare Indigenous flora [in the Randwick LGA]	Habitats Types	Remnant area [m^2]
	M30a-d, M60						
Dunningham Reserve	D1-D4	Crown Land	RE1	-	*Bauera rubioides, Guringalia dimorpha (formerly Restio dimorphus)*	Coastal Cliff and Headland	12,300
Fred Hollows Reserve	G1	RCC	RE1	-	*Asplenium australasicum, Asplenium flabellifolium, Blechnum cartilaginium, Ceratopetalum apetalum, Cyathea australis, Cyperus tetraphyllus, Pandorea pandorana, Pellaea falcate, Platycerium sp. Sticherus flabellatus, Synoum glandulosum, Trochocarpa laurina*	Moist Gully, Creek, Riparian, Ridge-top Woodland	13,000
Frenchmans Beach Dunes	-	Crown Land	RE1	-	-	Beach Dune	890
Gordons Bay	A1-A5	Council, UNSW	RE1	-	*Bauera rubioides, Pandorea pandorana, Calystegia sepium, Einadia hastata*	Coastal Cliff, Coastal Swamp, Gully Forest	5,100
Grant Reserve	T7	Crown Land	RE1	-	*Bacopa monnieri*	Coastal Cliff	1,200

Remnant Name	Sector [Council Code]	Land Tenure	Zoning	Threatened Ecological Items	Rare Indigenous flora [in the Randwick LGA]	Habitats Types	Remnant area [m^2]
Jack Vanny Reserve	W1-W3	Crown Land	RE1	-	*Mimulus repens, Sarcocornia quinquiflora*	Coastal Cliff and Headland	7,950
Lake Malabar	M33	Crown Land	RE1	Freshwater Wetland	-	Freshwater Wetland	2,080
Maroubra Beach Dunes	Part M7	Crown Land	RE1	-	-	Beach Dune	-
Pioneers Park	M60	Crown Land	RE1	ESBS	-	Dune-field (ESBS) and Low Sandstone Escarpment	9,120
Popplewell Park	P1-P4	Crown Land, RCC, The State of NSW	RE1	-	*Allocasuarina littoralis* (hybrid), *Banksia marginata, Cryptostylis erecta, Eucalyptus sieberi, Phyllantus hirtellus, Thelymitra carnea*	Sandstone escarpment (easterly aspect)	2,830
Randwick Environment Park	B: 1-4, 6-7, 10-11.	RCC	E2	ESBS, Freshwater Wetland & *Acacia terminalis* subsp. *Eastern Sydney*	Lichen and moss species	Dune-field (ESBS), Freshwater Wetland	72,785
Randwick Golf Course	M30e-m	Crown Land	RE1	-	-	Coastal Cliff and Headland	6,000
Trenerry Reserve	T1-T3, T5-T6	Crown Land	RE1	-	*Bacopa monnieri, Baumea acuta, Caustis recurvata, Ludwigia peploides, Paspalum*	Coastal Swamp (remnant peat bog), Coastal Cliff	10,100

Remnant Name	Sector [Council Code]	Land Tenure	Zoning	Threatened Ecological Items	Rare Indigenous flora [in the Randwick LGA]	Habitats Types	Remnant area [m^2]
					distichum, paspalum vaginatum, Schoenus apogon, Schoenus maschalinus, Spirodella sp.		
Wassell St	C3	NSW Dept. of Lands	E2 & RE1	ESBS	*Eucalyptus piperita, Ricinocarpus pinifolius, Banksia aemula,*	Dune-field (ESBS)	8,900
Woomera Reserve Creek	Z10	RMS	RE1	-	*Eucalyptus robusta*	Creek, Riparian	<50
Yarra Beach Dunes	Y6	Crown Land	RE1			Beach Dune	-
Yarra Point	Y2	Crown Land	RE1	-	-	Low Coastal Cliff, Beach Dune	1,500

10.2.2. BCWU managed bushland patches (Table 4)

Remnant name	Sector [Council Code]	Indigenous flora species [No.,Species]	Indigenous flora – threatened	Indigenous flora – rare [in the Randwick LGA]	Habitat Types	Remnant area [m^2]
Blenheim Park	Z16	1	-	-	Dune-field	<50
Anzac Parade, Kingsford	Z4	3	-	*Allocasuarina diminuta*	Dune-field	100
Quarry Reserve	Z13	12	-	-	Sandstone Escarpment	<50
Storey St Depot, Maroubra	Z8a-b	13	*Acacia terminalis* subsp. *Eastern Sydney*	-	Sandstone Escarpment	110
Mons Ave, Maroubra	Z26	3	ESBS	-	Dune-field	<50
Beatty St, Maroubra	Z25	1	ESBS	-	Dune-field	<50
Heffron Park	Z11	5	ESBS	-	Dune-field	4,534
Finucane Reserve	Z21	4	-	-	Dune-field	<50
Australia Ave, Matraville	Z15	8	-	-	Dune-field	<50
Yarra Rd, Phillip Bay	Z32	1	-	-	Sandstone Bench	<50
Anzac Pde, Little Bay	Z27	6	-	-	Dune-field	<50

10.2.3. Non-Council managed remnant bushland (Table 5)

Remnant name	Land manager	Sector [Council code]	Threatened Items	Remnant area [m2]
Malabar Headland	Federal Gov., NP&WS	M: 1, 1f, 2ae, 2as, 3b, 4f, 5, 6, 7, 8, 11a, 12, 13, 23, 22, 24, 27, 28, 34, 36, 38, 39,42, 43, 44, 45, 50, 55, 58 63.	ESBS, Large Bentwing-bat	815,885
University of NSW	Federal Gov.	N: 7-12		16,700
Telstra	Federal Gov.	J:8-11, 15-16.	ESBS	41,860
Burryburry Park, Little Bay	Private	N: 2-3, 5-6	-	9,190
Coast GC	State Gov.	R: 1, 6, 41, 60		56,040
Prince Henry Hospital	State Gov.	H..	ESBS	53,970
Quadriplegic Association	State Gov.	J5b		6,400??
Cullens Driving Range	State Gov.	J14		6,000
St Michaels GC	State Gov.	S	ESBS	142,220
NSW GC	State Gov.	F	ESBS	213,160
Kamay Botany Bay National Park	State Gov.	L: 1- 11, 16, 17, 25, 26, 28, 29, 52 F: 2- 8, 10, 15, 18 J: 1c, 1f, 1k, 2, 4, 13, 14, 15 S: 2b, 10, 11, 12, 16, 17, 18, 19, 20a, 20b, 20c, 20d, 20e, 21, 27, 28, 29, 37 R: 16	ESBS	715,260
Marconi Pl	State Gov.	Z19		142
Bunnerong - Energy Aust.	State Gov.	K: 1, 5-7	ESBS	13,818
Bunnerong - Sydney Ports Corp	State Gov.	K11		4824
Centennial Park	State Gov.	Q1-3	ESBS, Powerful Owls, Grey-headed Flying Fox	12,700
Maroubra Reservoir	State Gov.	Z5	ESBS	300
Coogee Bay Rd, Coogee	Private	?		100
11 Jennifer St	Private	J1b	ESBS	8,267
Yarra Bay - Aboriginal Land	Private	Y: 3a-c.		73,838
Raleigh Park Estate	Private	Z2		<50

Remnant name	Land manager	Sector [Council code]	Threatened Items	Remnant area [m2]
2-4 Military Rd - Lot 100	Private	K2a	ESBS	1,851
Coryule Gardens, Randwick	Private			400
Vanny Place, Maroubra	Private			<50
St Judes Cemetery	Private	Z14		<50
Australian Paper, Matraville	Private			<50
Australian Golf Course	Private	Z: 2, 18a, 18b.	ESBS	2,625
St Marks Rd, Randwick	Private			<50
Botany Cemetery	Private			<50
Port Botany	Private	Y: 5a, 7.		
South Coogee Coast	Private	T: 14,15		XX
Lurline Bay	Private	U: 2,3,7,8,9,15		2081
Popplewell Park	Private	Parts P1,2		230
Randwick Racecourse	Private	Z: 3a, 3e.		100

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