

BIODIVERSITY STRATEGY



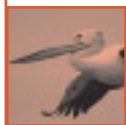


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01 / executive summary





In February 1999 the City of Greater Geelong officially adopted the Environmental Management Strategy (EMS). The adoption of this document required, as a priority action, that Council develop a series of detailed strategies to address specific environmental issues. One of these priorities was the conservation and protection of biodiversity. Council therefore funded, as a priority, the development of a detailed Biodiversity Strategy.

This document presents the outcomes of the Biodiversity Strategy to date. It includes the context, background and status of biodiversity in Geelong as well as reference to the specific biodiversity commitments that the City of Greater Geelong is bound to. The Strategy is supported by a plethora of research and comprehensive documentation produced over a two year period including draft material presented to the community for comment.

The strategy identifies the central role of partners and partnerships between the City of Greater Geelong and a wide range of organisations and individuals in enhancing and protecting Geelong's unique biodiversity. Partners and partnerships are central to each of the Strategic Objectives identified in the strategy. These Strategic Objectives have been identified in order to ensure the long term protection and enhancement of biodiversity in Geelong.

FACT

A very large proportion of the extant flora and fauna species have conservation significance at Regional, State and National levels. Approximately 72% of indigenous taxa are Regionally rare, vulnerable, endangered, extinct or poorly known. Many are listed under the Victorian Flora and Fauna Guarantee Act 1988 and the Commonwealth Environment Protection and Biodiversity Conservation Act 1999.

Strategic Objectives

Primary Biodiversity Conservation - protection of formal conservation areas and threatened indigenous vegetation and recognising the ecological importance of rivers, waterbodies, coastal areas and wetlands and the role they play as ecological corridors and links

Secondary Biodiversity Conservation - the role that general open space and protection of native and some exotic vegetation may play in the enhancement and protection of biodiversity

Weed (invasive alien vegetation) management – the need for appropriate management and resources to deal with one of the greatest threats to biodiversity

Biodiversity planning and legal protection - The need for appropriate planning controls, incentives, zoning and policies to safe-guard biodiversity

Biodiversity Mapping and Monitoring - The need for the most up-to-date and informed information to facilitate decision making

Biodiversity Education and Awareness - Knowledge is empowerment and assists community awareness

This document

This Strategy, adopted in 2003, details the context of biodiversity in Geelong, its importance, value and legislative obligations for its protection. The Biodiversity inventory is provided in summary whilst the Strategy itself details the Vision, Mission, Guiding Principles, Commitment and Targets to ensure Biodiversity protection and enhancement.

Implementation through monitoring, review and annual action is detailed together with a focus on maintaining the significant material and research used as a foundation for the strategic approach.

02 / background





To date there has not been a consolidated or coordinated approach to protecting and enhancing biodiversity within the City of Greater Geelong. The adoption of the Environmental Management Strategy (EMS) and its implementation strategy includes the commitment by the City to do just that.

This Biodiversity Strategy offers a unique opportunity to introduce a paradigm shift including:

- A coordinated and integrated approach to conservation and biodiversity from a whole of municipality perspective
- Biodiversity goals based on community goals and strategies and including a Net Gain* principle
- The equitable distribution of, and access to, our biological wealth now and in the future
- Participative, open and transparent approaches to the conservation of biodiversity including the use of incentives and enforcement methods
- Creative approaches to the protection and enhancement of our biodiversity
- Partnerships with external organisations, other levels of government, business and donor organisations

Context

The geographic region in which the City of Greater Geelong is located is physically diverse with considerable variation in geology, physiography, soils and climate. Geelong is located within an area of world class biodiversity and unique conservation value. This is a result of both the inland aquatic and terrestrial ecosystems and the diverse coastal and marine habitats. It is recognised as an area of International significance in terms of wetland values and as such is listed in the Ramsar Convention. The important river environments of the two major river systems, the Barwon and Moorabool.

Land use impacts, predominantly for agriculture and more recently industrialisation and urbanisation, have reduced the pre-European biodiversity of the region to a fraction of that which formerly existed. It is conservatively estimated that about only 5% of former pre-European indigenous vegetation exists in the City of Greater Geelong and that which remains is often severely degraded; a wide range of factors operate which continue to degrade biodiversity values.

Numerous plant and animal species are now extinct in the region, as are some Ecological Vegetation Classes and plant communities; many of these face imminent extinction. The full extent of these losses cannot be quantified, but the salient point is that decline is on-going.

Against this background all remnant indigenous vegetation and fauna in the City of Greater Geelong is important and without appropriate management, losses resulting from direct and indirect degradation processes, will inevitably mean the loss of most biodiversity. The time-scales at which this will occur vary according to the types and intensity of threats operating, the comparative resilience of some vegetation types or plant and animal species or populations, and their present conservation status and condition of vegetation and habitats.

In general the most extensive vegetation remnants and fauna habitats of highest quality in the City of Greater Geelong occur on public lands managed by the Department of Sustainability and Environment and Parks Victoria (e.g. Brisbane Ranges National Park, Lake Connewarre State Game Reserve and Murtcaim Flora and Fauna Reserve. These biodiversity resources include unique ecosystems of State, National and International conservation significance. These conservation reserves, as well as some managed by City of Greater Geelong (e.g. Buckley Falls Park), are of critical importance but these formal conservation reserves alone cannot cater for the conservation of what remains of Geelong's biodiversity.

Biodiversity resources on private lands include some of the rarest and most threatened flora and fauna populations and vegetation types within the region – resources which are often not represented or poorly represented on public lands. All biodiversity represents a precious and an irreplaceable resource.

Definition and Value of Biodiversity

Past, present and future losses of biodiversity are considered by many scientists and concerned citizens to be Australia's single greatest environmental problem

Biodiversity is the totality of the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur. It is the 'natural wealth' of the earth, which supplies all our food and much of our shelter and raw materials. The value of biodiversity can be measured in its:

- Intrinsic value through its mere existence
- Contribution to tourism and ecotourism particularly
- Consumptive use value (e.g. harvesting, food and fibre production)
- Educational and scientific value including medicinal uses
- Social value through recreation and open space
- Aesthetic value through beauty and scenic drives
- Spiritual and cultural value
- Economic value of functioning ecosystems providing clean water and clean air
- Bequest value – the value of retaining biodiversity for future generations

FACT

A total of 472 vertebrate fauna species (excluding marine fish) were recorded for the City of Greater Geelong of which 446 (94.5%) are indigenous fish, amphibians, reptiles, birds and mammals; 26 (5%) of vertebrate species are exotic.

Biodiversity (biological diversity) is defined as: “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. The status of biodiversity in a given area can therefore be analysed at the levels of genetic diversity, species diversity and ecosystem diversity.”



Policy Context, Legislation and International Obligations

The City of Greater Geelong Biodiversity Strategy is developed within relevant International, National and State legislation, agreements and policy context. This section briefly describes the main policy context relevant to biodiversity.

International Context

Australia is signatory to a number of specific international agreements, such as the *Biodiversity Convention* and *World Heritage Convention* and it is incumbent on local authorities to give local effect to such conventions by adopting appropriate management strategies. The 1992 *Convention on Biological Diversity (CBD)*, the core international agreement on biodiversity, one of the main agreements of the 1992 Rio Summit and adopted by over 180 countries established the three fundamental objectives for biodiversity: conservation of biodiversity; sustainable use of biological resources, and; equitable sharing of biodiversity benefits.

The Ramsar Convention on Wetlands of International Importance, initiated in 1971 in Iran, recognised the level of importance of the role of wetlands as habitats for birds. The Convention was ratified by Australia in 1975. The objective of the Ramsar Convention is to promote wetland conservation through:

- nomination of sites to the List of Wetlands of International Importance and thereafter monitoring and maintaining them in a way which retains their ecological characters
- promoting the training of personnel expert in wetland management
- encouraging the development of national policies and management frameworks for Ramsar and other wetlands
- co-operating with other countries with which wetland resources are shared

The habitats of birds that migrate annually between Australia and Japan or China are protected under the *Japan-Australia Migratory Bird Agreement* (1974) and the *China-Australia Migratory Bird Agreement* (1986).

National legislation, policies and programs

The *Environment Protection and Biodiversity Conservation Act* (1999) establishes processes for listing and protecting threatened species, and requires the assessment and approval of any proposed action that is likely to have a significant impact on a matter of national environmental significance. These matters include nationally threatened species and communities, and migratory species protected under international agreements.

The National Strategy for the Conservation of Australia's Biological Diversity (1996) provides a framework for Commonwealth and State government biodiversity protection activities. The Commonwealth, State and Territory governments committed themselves in 1997, through the Natural Heritage Trust, to reversing the long-term decline in the quality and extent of Australia's native vegetation. The *National Framework for the Management and Monitoring of Australia's Native Vegetation* (1999), notes the role of local government.

Victorian State legislation, policies and programs

The primary overarching legislation for biodiversity conservation is the *Flora and Fauna Guarantee Act* (1988). This provides the main legal framework for the protection of Victoria's native plants and animals and ecological communities.

Victoria's Biodiversity Strategy (1997) has proposals for ensuring the survival, abundance and development in the wild of all taxa and communities of flora and fauna. While The Victorian Weed Strategy, (1999) prepared by the State Government, provides information on the management of all types of weeds including

declared and undeclared, agricultural and environmental, terrestrial and aquatic.

Victoria's Native Vegetation Management - A Framework for Action (2002) establishes the strategic direction for the protection, enhancement and revegetation of native vegetation across the State. The Framework includes a set of tools for estimating general vegetation and habitat quality, and a proposed accounting system to implement the concept of 'Net Gain'. Net Gain refers to a reversal, across the landscape, of the long-term decline in the extent and quality of native vegetation. Local government is responsible for applying the concept of Net Gain when considering development applications that may involve native vegetation clearance.

The Catchment and Land Protection Act (1994) sets up a framework for the integrated management and protection of water catchments within Victoria and encourages the participation of the community in such management. It also sets a system of controls on noxious weeds and pest animals. The Corangamite Catchment Management Authority has developed a Rabbit Action Plan, Salinity action Plan, Weed Action Plan, Native Vegetation Plan, together with a Regional Catchment Strategy. All these reflect upon the importance of biodiversity in the region.

Under the Act, landowners must take all reasonable steps to avoid land degradation, conserve soil, protect water resources and eradicate and prevent the spread of weeds and pest animals. The Act provides for the preparation of regional catchment strategies, declaration of special areas and preparation of special area plans, which must be considered by a Minister or public authority and can be incorporated into planning schemes and State Environment Planning Policies (SEPPs).

Local Government

In 1998, the National General Assembly of Local Government adopted the *National Local Government Biodiversity Strategy*. The Strategy assists Local Government in being a key partner in biodiversity conservation and encourages commitment to, and the development of, biodiversity policies by councils. The Strategy's central aim is for biodiversity management to be a core function of Local Governments, subject to adequate funding and resources.

Under the *Environment and Planning Act* (1987), local governments have the responsibility for the control of land use and planning within their municipalities. The State Planning Policy Framework requires planning authorities to have regard to Victoria's Biodiversity Strategy and other instruments made under the Flora and Fauna Guarantee Act (such as Action Statements for threatened species and communities, or potentially threatening processes), as well as approved regional vegetation plans, when reviewing *Municipal Strategic Statements* and amending planning schemes. There are various tools under the Planning Scheme that can be used to protect biodiversity.

Local Government has a number of core functions that have a direct impact on native vegetation and biodiversity, including land use planning, granting development approvals, managing land, and managing environmental risks. Local government leads by its action, and is also able to facilitate community involvement, establish local laws, operate grant and incentive programs, and provide financial and administrative support to encourage biodiversity conservation.



Ecological Vegetation Classes (EVCs)

Coastal Dune Scrub Mosaic
Limestone Woodland Complex
Bellarine Coastal Complex
Riparian Forest
Lignum Wetland
Plains Grassy Wetland
Plains Grassland
Mangrove Shrubland
Lowland Forest
Coastal Tussock Grassland
Grassy Woodland
Seasonally-inundated Sub-saline Herbland
Heathy Dry Forest
Shrubby Dry Forest
Berm Grassy Shrubland
Heathy Woodland
Coastal Saltmarsh Complex
Swamp Scrub
Plains Grassy Woodland
Floodplain Riparian Woodland
Granitic Hills Woodland

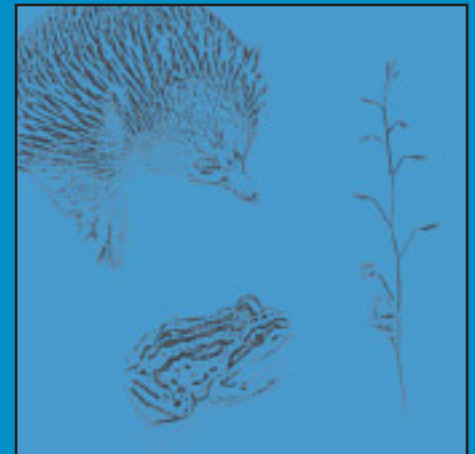
Wetland Formation
Calcarene Dune Woodland
Scoria Cone Woodland
Basalt Escarpment Shrubland
Alluvial Terraces Herb-rich Woodland
Creekline Herb-rich Woodland
Box Ironbark Forest
Sedge Wetland
Grassy Dry Forest
Plains Sedgey Wetland
Estuarine Wetland
Reed Swamp
Brackish Wetland
Freshwater Lignum Shrubland
Lignum Cane Grass Swamp
Stony Knoll Shrubland/Basalt Shrubby Woodland
Cane Grass Wetland
Grassy Forest
Red Gum Wetland
Rocky Chenopod Woodland
Permanent Open Freshwater

FACT

Forty two (42) Ecological Vegetation Classes (vegetation types) have been recorded for the highly fragmented landscapes of the study area. Of these at least four are extinct and many more are critically endangered.



03 / **biodiversity inventory**



03 / biodiversity inventory



This section of the strategy lists the Plant species and Ecological Vegetation classes, Conservation status of flora and vegetation, Fauna species and threatening processes found within the City and affecting biodiversity.

Plant Species and Ecological Vegetation Classes

A total of 1804 plant taxa – species, subspecies, hybrids, cultivars and unnamed (undescribed) species – was recorded in the City of Greater Geelong in 2001-02. Of these 685 (38%) are naturalised exotic or introduced species and 1119 (62%) are indigenous species. The indigenous flora in the City of Greater Geelong represents 32% of the entire Victorian flora and 60% of the exotic Victorian flora (Ross 2000). A very small number of exotic species are incipiently naturalised in the City of Greater Geelong, ie. populations are currently very small and localised.

Ecological Vegetation Classes (EVCs) comprise one or more floristic vegetation communities which exist under a common regime of ecological processes and which are linked to broad landscape feature. Each vegetation type is identified on the basis of its floristic composition (plant species present), vegetation structure (e.g. woodland, forest, grassland), landform (e.g. gully, foothill, plain) and environmental characteristics (e.g. soil type, climate).

Ecological Vegetation Classes (EVCs) generally relate to easily identifiable features on the ground, as distinct from more narrowly defined vegetation communities that rely on floristic composition for identification i.e. Floristic Vegetation Communities. Examples of EVCs in the City of Greater Geelong are Plains Grassy Woodland, Heathy Forest and Wetland Complex. The vegetation in the region has been so grossly depleted that land-use planning is hardly an issue: all vegetation in the City of Greater Geelong has conservation significance irrespective of whether the EVC is now rare, vulnerable or endangered at a larger bioregional scale.

Conservation status of flora and vegetation.

Of the 1119 indigenous plant species recorded in the highly diverse flora of the City of Greater Geelong, numerous species are now extinct, rare, vulnerable or endangered. In many cases this reflects the conservation status of species in a much wider bioregional, State or National context, particularly grasslands or grassy woodlands of the Victorian Volcanic Plain

At least 91 plant species (8% of total) are now extinct in City of Greater Geelong but the number is probably considerably higher – around 150 species. Many more are critically endangered being confined to one or few highly endangered populations, or they are regionally vulnerable, rare or poorly known. It is inevitable that many more species will become critically endangered, leading to extinction in the City of Greater Geelong over time.

The assessment of significance of the flora is usually evaluated at the Local, Regional, State and National scales. For this study it is recognised that all indigenous species are at least Locally significant given the massive regional depletion and degradation of vegetation. At higher conservation levels, numerous species are significant in a State and/or National context. For most of these species, populations are few (one or several only) and small or very small; at least 91 up to 150 plant species are now extinct in the City of Greater Geelong.

An estimated 5% of pre-European indigenous vegetation remains in the City of Greater Geelong and of this almost all is degraded to some extent, often severely so. The most intact vegetation is the suite of heathy or shrubby woodland, open forests and sedgey wetlands of the Brisbane Ranges mangrove shrublands and lower saltmarshes; and instream vegetation of the Barwon River system and many other wetlands.

Large and extremely important vegetation and fauna habitats, generally of high quality and of State, National and International significance are contained within reserves or public lands managed

by the Department of Sustainability and Environment and Parks Victoria, notably Brisbane Ranges National Park, Lake Connewarre State Game Reserve, Swan Bay, and Murtcaim Flora and Fauna Reserve. Outside these areas, mostly on City of Greater Geelong and private lands, remnant vegetation stands are fragmented, often highly degraded and usually under great threat from a wide range of degradation processes.

At the level of Ecological Vegetation Classes, of which 42 were recorded during this study, an assessment of their conservation status shows how rare/vulnerable or endangered most remnant vegetation is in the municipality. The City of Greater Geelong contains much remnant vegetation of very high conservation significance and some features which are unique or poorly represented elsewhere. Notable examples include the riparian and instream vegetation of the lower Barwon River (all parts of the river in the City of Greater Geelong), coastal saltmarshes and mangrove shrublands and the extremely rare Scoria Cone Woodland on Mt. Anakie. The latter had not been documented before this study and was considered to be extinct in the Regional Forest Agreement assessment process. The City of Greater Geelong has the largest area and widest range of coastal saltmarsh vegetation of any Victorian municipality and this resource has Regional, State, National and International significance for its flora and fauna values.

Fauna species

A total of 472 vertebrate species (446 indigenous and 26 exotic) is known from the City of Greater Geelong, comprising 23 fish, 10 amphibians, 31 reptiles, 356 birds and 52 mammals. Six of these, the Emu, Australian Bustard, King Quail, Rufous Bristlebird, Grey-crowned and Eastern Barred Bandicoot, are now extinct in the City of Greater Geelong.

Whereas others, such as the Southern Lined Earless Dragon, Striped Legless Lizard, Plains-wanderer, Bush Stone-curlew, Red-chested Button-quail and Barking Owl, have not been recorded for

several years. A few more, such as the Eastern Mourning Skink, which has been recorded at nearby Swan Island, may eventually be recorded from similar habitats in the City of Greater Geelong. It is also likely that other species, such as the Spot-tailed Quoll and the Eastern Quoll, have disappeared from the City of Greater Geelong, but due to a lack of historical faunal inventories, it is now impossible to provide a complete picture of local fauna extinctions.

Excluding the six extinct species, there are 466 species known from the City of Greater Geelong which may still occur there either as residents, migrants, nomads or vagrants; 203 of these are considered significant: 74 of National significance, 35 of State significance and 94 of Regional significance. Seventeen are listed as threatened species on the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). Fifty-four are listed under either the Japan-Australia Migratory Bird Agreement (JAMBA) or the China-Australia Migratory Bird Agreement (CAMBA) or both and are thus listed as “migratory species” on the EPBC Act. Thirty-four are listed as threatened species on the Flora and Fauna Guarantee Act 1988 (FFG Act) and Action Statements have been prepared for 15 of those; and a further nine species have been nominated for listing as threatened species on the FFG Act and await ministerial endorsement.

The 94 species of Regional significance comprise resident species which are considered to have small and isolated populations in the City of Greater Geelong (e.g. Climbing Galaxias, Eastern Smooth Froglet, Mountain Dragon, Southern Emu-wren and Swamp Rat Rattus resident species which have populations that are well separated from their main Victorian populations (e.g. Singing Honeyeater and Spiny-cheeked Honeyeater rare migratory species on the periphery of their range which are known or highly likely to breed in the City of Greater Geelong (e.g. Rainbow Bee-eater, Australian Owlet-nightjar and White-throated Nightjar), migratory species known to rely largely on habitats in the City of Greater Geelong (e.g. Double-banded Plover; and species listed on JAMBA and/or CAMBA (e.g. Red-necked Stint, Sharp-tailed Sandpiper and Curlew Sandpiper).



The massive clearance of vegetation / fauna habitat in the City of Greater Geelong has resulted in a predominantly altered landscape with relatively few major refuges containing natural habitats for vertebrate fauna. Those refuges include the Brisbane Ranges and adjacent areas, the Granite Road area, You Yangs and surrounds, Little River Earth Sanctuaries, Ford Proving Ground, some parts of the Werribee Sewage Farm, Limeburners Bay area, some parts of the Lara and Moolap Saltworks, Dog Rocks, Point Richards Flora and Fauna Reserve, Bellarine Basin area, Point Edwards Flora and Fauna Reserve, Reedy Lake, Lake Connewarre, Buckley Falls Park, Lake Victoria, Buckley Park Foreshore Reserve, Ocean Grove Nature Reserve, Murtnagurt Swamp, Thirteenth Beach Reserve, Breamlea Reserve area, some coastal strips and some riparian strips along the Barwon, Moorabool and Little Rivers and the larger creeks.

Although some of the refuges are under the jurisdiction of other authorities (e.g. Department of Sustainability and Environment), it is important to consider them in the context of the City of Greater Geelong as they contain relictual populations of fauna and could, in the future, be important areas facilitating faunal movements to remnants in the City of Greater Geelong. It is also important to note that although there has been a massive clearance of vegetation / fauna habitat, some generalist native species, such as the Australian Magpie, Magpie-lark, Willie Wagtail, Australian Pipit and Little Raven, have been able to thrive in the predominantly altered landscape. Other species, such as the Crested Pigeon, Long-billed Corella and Little Corella have progressively expanded their range into the City of Greater Geelong.

Threatening processes

The threatening processes affecting the biodiversity of the region include

- extensive habitat loss through clearance
- subdivision and development pressures
- habitat fragmentation and isolation
- habitat degradation
- Pollutants in urban stormwater runoff
- potential effects from mundalla yellows
- weed invasion
- attack by pest animal (foxes, rabbits etc)
- illegal collection of firewood
- loss of hollow-bearing trees
- predation by introduced carnivores
- grazing by introduced herbivores
- fires which may burn entire remnants
- climate change impacts
- deleterious genetic effects of small population size
- air pollution and pesticides.

General measures which could be undertaken to begin to redress the situation include fencing remnants; judiciously linking remnants to each other, through replanting programs; enlarging remnants over time through natural recruitment and replanting programs; and retaining isolated dead and live eucalypts, especially those bearing hollows, throughout the landscape. Programs to control or eliminate introduced predators in the major refuge areas would also enable fauna therein to have a greater chance of persisting.

04 / biodiversity strategy



04 | biodiversity strategy



Vision:

A natural environment that is rich in biodiversity and is managed and maintained to protect, both now and in the future, the ecological systems upon which life depends.

This means we need to be a City that leads by example in the protection and enhancement of biodiversity. A City within which biodiversity plays an important role, where the right of future generations to healthy, complete and vibrant biodiversity is entrenched, and to be a City that actively protects its biological wealth and prioritises long term responsibility over short-term gains.

Mission

- Address biodiversity proactively and effectively
- To ensure an integrated approach to biodiversity between City departments and actively pursue external partnerships
- To adopt a long-term approach with regards to biodiversity
- To ensure sustainability of our rich biodiversity
- To adopt a holistic and multifaceted approach to biodiversity
- To continually measure and monitor the City's performance in the protection and enhancement of biodiversity

Guiding Principles

The following guiding principles underpin the strategy:

- Conservation, enhancement and protection of biodiversity across the City
- Recognition of the unquestionable importance of all of Geelong 's biodiversity
- Recognise the social and economic benefit through the conservation and enhancement of biodiversity
- Open and transparent governance
- Participation and partnerships

- Integrated and coordinated planning and management
- Responsible stewardship of our unique biodiversity
- Commitment to biodiversity
- Commitment to the Precautionary Principle

Commitment

The City of Greater Geelong acknowledges its responsibility as a steward of the resources within its charge, but also recognises the importance of co-operative governance and partnerships in ensuring the long-term protection and enhancement of the unique biodiversity in Geelong. The strategic objectives that together make up the Biodiversity Strategy have been identified as:

- Primary Biodiversity Conservation areas
- Secondary Biodiversity Conservation areas
- Weed Management
- Biodiversity protection controls
- Biodiversity Mapping, Database and Monitoring
- Biodiversity Education and Awareness

The successful implementation of projects to meet the Strategic Objectives will require partnerships and funding from external organisations and programs. As such it is imperative as part of the planning around the Biodiversity Strategy that opportunities to establish these partnerships are sought. Considerable opportunities abound through the funding available from the Corangamite Catchment Management Authority (CCMA) under the National Action Plan and the Natural Heritage Trust. These opportunities recognise the importance of Biodiversity conservation and enhancement which are consistent with the aims and directions stated in the Corangamite Catchment Management Authority's Regional Catchment Strategy.

Targets for biodiversity

In any strategic approach performance measures or targets are important to ensure that the vision for biodiversity protection is being met and the actions implemented are appropriate and meaningful. The targets for biodiversity in the City of Greater Geelong include:

- No further species loss
- Application of net gain concept to areas undergoing redevelopment
- An increase of 20% cover of local indigenous vegetation from 2000 levels by 2010
- Increase in conservation reserves in the primary conservation network by 10% by 2010
- Increase in levels of specialised management and maintenance of conservation reserves
- A coordinated program of ecological burning for fuel reduction by 2005
- Reduction in environmental weeds on council managed conservation reserves by 50% by 2010
- Reduction of noxious weeds on all council reserves by 90% by 2010
- Implementation of other actions described in the strategy by 2005
- Offset greenhouse emissions by 10% from 2000-levels using revegetation projects
- Appropriate maintenance and increase of native vegetation on road reserves

The aim of this strategy is to generate awareness and appreciation of our unique biodiversity, commitment to its protection and to implement measures to ensure its conservation and integrity.

Strategic Objectives of the Biodiversity Strategy

A set of Strategic Objectives are the core of the Biodiversity Strategy. Unless each of the Strategic Objectives is met, Biodiversity in Geelong will remain under pressure and is likely to be lost in the long-term.

The City of Greater Geelong cannot achieve the Strategic Objectives alone - creating and working in partnerships with a wide range of organisations and individuals is the fundamental principle underpinning the strategy and each of the Strategic Objectives. The conservation of Geelong's unique Biodiversity is for the common good and as such is a global responsibility. A range of meaningful partnerships with a wide range of organisations and individuals must be developed, established, and maintained for all of the Strategic Objectives. Working together in partnerships with other organisations, institutions and individuals will enhance the City of Greater Geelong's ability to contribute to the protection and conservation of biodiversity in Geelong.

The role of the City of Greater Geelong's Biodiversity Strategy must be seen not only within a local and regional context but also in a national and international context. This co-operation and integration will avoid the duplication of efforts and inefficiency, ensure that common vision and purpose are shared, and share limited resources skills and capacity. More specifically the City, as an integral part of this Biodiversity Strategy, will actively seek help and partners for all of the following Strategic Objectives in:

- Project and program development and implementation
- Expertise and techniques
- Capacity building
- Information sharing
- Funding and resources
- Capacity and training
- Technology



Strategic Objectives

PRIMARY BIODIVERSITY CONSERVATION

Primary Biodiversity Conservation refers to the establishment and effective management of a network of conservation areas that are actively managed as biodiversity conservation areas. These include all council conservation reserves, State conservation reserves and any other area that is managed for the specific purpose of conserving and protecting biodiversity.

Primary Biodiversity Conservation also refers to effective biodiversity management of waterways, coastal areas and wetlands within Geelong. All rivers, waterways, coastal areas and wetlands within Geelong have been recognised for their importance as sensitive and rich biological systems, efficient drainage and filtering areas, and for their vital role as effective and essential biological linkages and corridors.

In Geelong this will include many road reserves, and the like, as these often contain the last vestiges of remnant indigenous vegetation. Primary Biodiversity Conservation also includes those species and communities that are listed as endangered, threatened, vulnerable and, even individual species as listed under the Flora and Fauna Guarantee Act, Environment Protection and Biodiversity Conservation Act 1999 etc. This applies to biodiversity found on private land as well as public land and recognised as sites of biodiversity significance.

Rivers, waterways, coastal areas and wetlands are potentially rich in biodiversity, but in order to sustain ecological processes within human settlements, the biodiversity conservation network needs to be sufficiently interconnected to enable faunal species to move from habitat to habitat and to connect remnant patches of indigenous habitat. This is a critical role that rivers and wetlands play, and in Geelong, road and rail reserves also serve this purpose.

In addition, rivers, waterways, coastal areas and wetlands provide a wide range of natural ecosystem services. These areas provide refuge and protect habitats, moderate floods, impacts of droughts, temperature extremes and forces of winds, purifying water and generate and renew soil fertility.

Goal

The goal of the Primary Biodiversity Conservation strategic objective is to establish a Biodiversity Conservation Network using existing protected areas and initiatives and by identifying appropriate new areas. This network must effectively conserve and protect an adequately representative and stable sample of all the unique biodiversity in the City for the benefit of current and future generations.

This network of conservation areas must conserve at a minimum, sufficient area and habitat to ensure the long-term sustainability of all of our biodiversity. Further, the goal of this strategic objective is to ensure, that appropriate, effective and efficient management plans and policies are developed and implemented at each of the identified significant biodiversity sites, including significant roadsides, and as new sites are identified included in Primary Biodiversity Conservation overlays.

The goal is also to ensure the conservation and protection of riverine habitats coastal areas and wetlands, and their associated biodiversity, by actively putting management plans and programs in place to enhance, and rehabilitate where necessary, all rivers, waterways, coastal areas and wetlands in Geelong. Further, to optimise the role rivers, waterways, coastal areas and wetlands and linear reserves play as effective corridors and links between patches of indigenous vegetation.

Principles

- Use the biological principles of no loss and net gain within these areas
- Use ecosystem approaches for the management of biodiversity areas
- Maximise conservation of habitat diversity
- Encourage open, transparent, effective, accountable, measurable, reportable management of the conserved areas
- Recognise rivers, waterways, coastal areas and wetlands as centres of biodiversity
- Recognise rivers, waterways, coastal areas and wetlands as highly significant biodiversity refuges and corridors
- Recognise rivers, waterways, coastal areas and wetlands as vital recreational and aesthetic corridors
- Recognise linear reserves as important remnant areas and wildlife corridors
- Leave systems in as natural a state as possible
- Rehabilitate rivers, waterways, coastal areas and wetlands to safe, functioning systems which are not a health or flooding risk
- Follow principles of integrated catchment management

Approach

Strategic Planning

- Using existing Council conservation reserves, road reserves, coastal areas and waterways reserves initiate a conservation planning exercise to establish areas and linkages to promote a Biodiversity Conservation Network
- Identification and inclusion of primary conservation areas into the Open Space Networks Strategy
- Undertake or review a mapping and ecological vegetation category (EVC) assessment of each identified area
- Identify areas of primary biodiversity significance on private

land and protect these areas through planning instruments, overlays, zoning, policy and other methods to protect those areas identified

- Initiate an investigation into the range of conservation management models that could be used to manage and protect these areas
- Match conservation management models to specific areas within the network
- Initiate a planning and costing program for the proposed Biodiversity Conservation Network
- Ensure integration with the City of Greater Geelong Planning Scheme
- Apply appropriate measures in the identified land use zones and overlays for the conservation of these areas
- Acquire land, through purchase and other mechanisms, to afford protection
- Support and implement the principles and objectives of biodiversity conservation
- Support the use of the Wathaurong Protocol as it applies to these areas

Management

- Develop consistent, effective and efficient on-the-ground management plans and policies for the management of Primary Conservation Areas. At a minimum this must include management plans and policies for: indigenous plant resource use; faunal management; aquatic management; co-operative and co-management agreements with local communities and Friends of groups; visitor management; signage and promotion; training and education
- Implement the actions and approaches of the Stormwater Quality Management Strategy
- Establish and maintain ecological buffers along rivers, waterbodies and around wetlands



- Establish appropriate planning scheme changes to protect these areas
- Determine and create no developments zones for ecological buffers rivers, waterways, coastal areas and wetlands
- Minimise hardening of surfaces in Geelong and thereby

enhance the capacity of the urban environment to absorb stormwater

- Ensure no more draining of wetlands or disturbance to saline wetlands
- Support the involvement of communities and other stakeholders in the management of natural areas

Actions

- Establish a Bush Crew for the appropriate management of conservation areas and reserves throughout the municipality
- Create a Biodiversity Conservation Officer position within Council for the enforcement, education, implementation and ongoing monitoring of the biodiversity strategy
- Develop a Biodiversity Policy for Council
- Establish a code of practice for biodiversity conservation for works and construction
- Establish appropriate local Provisions in the Planning Scheme for Environmental Significance Overlays and Vegetation Protection Overlays
- Require a Planning permit to remove nominated native vegetation in primary conservation areas
- Map and investigate all the rivers, waterways, coastal areas and wetlands in the City of Greater Geelong
- Undertake an assessment of all wetlands and recommend actions
- Develop appropriate management plans for these identified rivers, waterways, coastal areas and wetlands areas.
- Continue monitoring of the rivers, waterways, coastal areas

and wetlands ecosystem and incorporate this into the Biodiversity Database

- Improve the existing monitoring programs like Waterwatch, Frogwatch and blue-green algae testing
- Implement and improve river maintenance to ensure the continued functioning of the river systems
- Develop and implement techniques of effective rivers, waterways, coastal areas and wetlands restoration
- Reduce polluted industrial and subdivision stormwater into rivers, waterways and drains by implementing and promoting the Stormwater Quality Management Plan
- Apply the principles of water sensitive urban design for new development
- Partner with the CCMA for the on ground improvement and care of rivers, waterways, coastal areas and wetlands

FACT

Many vegetation remnants have Regional, State and National conservation significance and large areas of habitat have International significance for fauna and are the subject of international covenants and agreements.

SECONDARY BIODIVERSITY CONSERVATION

The City of Greater Geelong recognises the urban, rural and significantly modified environmental context within which the conservation of biodiversity will take place. As such the importance of vegetation on private land and the role of open space, that although serving other primary functions, may play in the conservation of biodiversity is recognised. This type of open space includes linear trails, drainage reserves, parks, scenic drives, road reserves, transport routes and private allotments including residential lots.

These areas can facilitate the movement of species from one area to the next by acting as corridors and links. The Secondary Biodiversity Strategic Objective refers to all these areas that are not actively and specifically managed as nature conservation areas but which may increase the number of pockets, bushland islands, and wildlife corridors for the enhancement and protection of vibrant and healthy biodiversity. These recognise the importance of backyards and of non indigenous vegetation that provides valuable habitat value. Given the paucity of biodiversity in Geelong these areas can contain some of the last remnants of vegetation and a range of individual species providing valuable short term habitat functions.

Goal

The goal of the Secondary Biodiversity Strategic Objective is to promote the use of open space and appropriate indigenous vegetation such as on road reserves, along water courses, parks, recreational areas, private land, and any other relevant open space as patches, corridors and links to enhance biodiversity. To initiate a process whereby appropriate local indigenous vegetation is used for horticultural, landscape, gardening, water conservation and habitat improvement purposes.

Principles

- Creation of biological opportunity and corridors
- Promotion of the use of indigenous flora
- Instil a sense of pride in the unique flora of the City
- Creation of opportunity for access for people

Approach

Strategic Planning

- Identification and inclusion of secondary conservation areas into the Open Space Networks Strategy
- Identify areas of secondary biodiversity significance on private land and protect these areas through planning instruments, overlays, zoning, policy and other methods to protect those areas identified
- Apply Environmental Significance Overlays or Vegetation Protection Overlays to these areas
- Apply an appropriate land use status (zone) to these areas
- Apply appropriate measures in the identified land use zones and overlays for the conservation of these areas
- Establish ecological buffer zones along identified neighbouring areas

Management

The City of Geelong actively manages many of the road reserves and reserves by planting, maintaining, and watering the vegetation. In many cases, the use of indigenous vegetation would lower the level of management required (e.g. less watering, cutting etc). As such the following approach is advocated:

- Development of horticulture operational guidelines to facilitate the use of local indigenous vegetation where appropriate
- Development of operational guidelines for the management of indigenous vegetation on Council land



- The active promotion of the benefits of indigenous vegetation to private landowners
- Continue detailed assessments of remnant roadside vegetation and identify roadside areas of significance as wildlife corridors

Actions

- Make changes to the Municipal Strategic Statement to recognise the importance of biodiversity.
- Enhance the Local Planning Policies of the scheme to recognise biodiversity controls
- Establish appropriate local Provisions in the Planning scheme for the Environmental Significance Overlays and Vegetation Protection Overlays
- Establish a new Vegetation Protection Schedule in the Planning Scheme
- Establish a Biodiversity Policy for Council
- Require a Planning permit to remove native vegetation on all land
- Establish a code of practice for biodiversity conservation for works and construction
- Establish a Tree preservation and Vegetation protection order within the planning scheme
- Establish a significant tree register for individual exotic and native specimens
- Implement the Roadside Management Strategy
- Prepare a biodiversity Corridor Plan to link biodiversity areas
- Participate in Flora for Fauna and Sustainable Nurseries programs
- Investigate the establishment of a environment levy for protection of biodiversity
- Investigate the establishment of a bushland acquisition fund and revolving land program

- Investigate the establishment of a rate rebate and incentives program to landowners with conversation covenants on their properties
- Investigate the establishment of a grants scheme for biodiversity enhancement works on private properties

WEED (INVASIVE ALIEN VEGETATION) MANAGEMENT

Weeds (Invasive Alien Vegetation) pose one of the greatest threats to biodiversity. Alien invasive vegetation competes with indigenous vegetation for habitat, increases the intensity of fires and has a negative effect on water resources (both quantity and quality). This strategic objective of the strategy refers to the development and implementation of a City of Greater Geelong Weed Management Program.

Weed invasions constitute the single greatest threat to all terrestrial biodiversity in the City of Greater Geelong and on present trends will eliminate most natural biodiversity is the absence of appropriate management. Thus control of weeds in remnant vegetation and fauna habitat is the City's single most important management issue. Countless weed populations in City of Greater Geelong on public and private lands, particularly road reserves and coastal reserves, have escaped directly from nearby cultivation (e.g. residential gardens, farms, roadsides plantings).

Goal

The goal of this strategic objective is to develop and implement an effective and efficient city-wide weed management program thereby promoting a future weed free City. Through the active removal of alien invasive vegetation, this will maximise the biological opportunity for indigenous vegetation.

Principles

- Develop partnerships and learn from other initiatives
- Apply Zero tolerance for alien invasive vegetation
- Ensure compliance with relevant national, and state legislation
- As the local council, set the example for private landowners to follow

Approach

The following process is required for the development of a Weed Management Program:

- Map the geographical distribution and location of all areas invaded by invasive weed species using GIS
- For each area capture information on the species type and density
- Using this information, prioritise areas for clearing_Based on this prioritisation, develop and implement a weed program
- Evaluate and adopt the most successful clearing methodologies
- Monitor and report the results and promote widely
- Introduce local laws to govern cultivation of certain weedy horticultural species
- Introduce a zero tolerance for weeds on council managed land together with a habitat replacement program
- Ensure the removal of weeds with planning permit applications or scheme amendments

Actions

- Develop local law on cultivation and sale of weeds
- Establish a weed and vermin management program
- Implement a weed mapping program
- Introduce a zero tolerance for weeds on council reserves, roads and management areas
- Investigate the introduction of a local law to prevent nurseries and garden centres in Geelong from propagating and selling pest plants identified in Council's Pest Plant and Environmental Weed brochure and priority weed list



BIODIVERSITY PLANNING AND LEGAL PROTECTION

Although a biodiversity mapping program was undertaken for the City, there are parcels of land, habitats and species that might not be included in the network due to lack of data or knowledge, yet which are of biodiversity importance. This Strategic Objective refers to the need for relevant planning scheme changes to provide protection for species, habitat and ecologically sensitive areas, including those that are not currently accommodated within the Biodiversity Conservation Network or assessment.

Goal

To develop, promulgate and implement relevant laws, planning scheme amendments and approaches for the protection of threatened and rare biodiversity.

Principles

- Committed governance
- Adoption of a "no nonsense" approach to biodiversity
- Secure and protect our natural assets

Approach

- Develop local laws and planning scheme amendments for biodiversity protection
- Develop a local policy on biodiversity and incorporate into the planning scheme
- Incorporate local objectives for biodiversity in the MSS
- Develop local laws for weed management
- Develop local law on cultivation and sale of weeds
- Implement actions in the Biodiversity and Stormwater management strategies

- Investigate the introduction of incentives for owners who actively retain and manage areas with significant flora and fauna values on private land
- Promote the use of Conservation Covenants and the Land for Wildlife Program on private property where significant flora and fauna habitat exists
- Investigate the introduction of and environmental levy, charged to each rateable property, to fund the implementation of a range of environmental initiatives

BIODIVERSITY MAPPING AND MONITORING

The City of Greater Geelong has recognised the unique asset that it has in its biodiversity. As such, the most up-to-date and detailed information is needed on this asset. This Strategic Objective refers to the need to establish a Biodiversity Mapping and Monitoring program. This Biodiversity Mapping and Monitoring program is part of a central database where high quality information about the City's biodiversity is stored and made available to policy and decision-makers at all levels, in support of biodiversity conservation and sustainable development. In addition, the database will act as the foundation for detailed and accurate monitoring of the State of the City's Biodiversity.

Goal

The goal of the Biodiversity Mapping and Monitoring objective is to establish a database to collect, store and disseminate the most accurate and up-to-date biodiversity information available, in order to increase the knowledge about biodiversity and to monitor the state of biodiversity in the City of Greater Geelong.

Principles

- Measurement and monitoring
- Information is knowledge
- Informed decision-making
- Access to information
- Building knowledge for environmental stewardship

Approach

- Identify biodiversity data and compile a resource database
- Identify and fill gaps in biodiversity information through dedicated research projects

- Negotiate and maintain networks and partnerships with academic and other institutions and organisations to access and share biodiversity data
- Capture institutional knowledge on biodiversity in an electronic format
- To develop biodiversity indicators to measure the state of biodiversity in the City's State of the Environment report
- To disseminate biodiversity data to internal and external users using the Intranet and Internet and related technologies
- Maintain and update the database components

Actions

- Produce Planning Scheme Overlays of all conservation areas
- Development of a web based plant identification tool
- Undertake regular mapping assessments

Land use history and a large suite of current threatening processes compromise the severely reduced indigenous flora, fauna and vegetation and habitat remnants. An estimated 5% of the municipality now supports remnant indigenous vegetation of which a large proportion is moderately to severely degraded.



BIODIVERSITY EDUCATION AND AWARENESS

The strategic objective of the Biodiversity strategy refers to the empowerment of the citizens of Geelong with regard to biodiversity issues in order to effectively share, own and take collective responsibility for the City's unique biodiversity resources. The strategy relies on buy-in and ownership of the people of Geelong and sharing responsibilities between local government and environmentally educated residents. This further includes assisting the City's own staff (staff, contractors and Councillors) understand and honour the City's biodiversity responsibilities. Education, training and awareness are pivotal to every environmental issue.

Further, where programs and policies have been successful and to facilitate the replication of best practice, the establishment of education and awareness material will enhance the long-term success of the Biodiversity Strategy.

Goal

- Promote and generate public awareness around biodiversity highlighting the role that society needs to play to ensure the long-term survival of our unique resource
- Generating awareness and raising the profile of Geelong's biodiversity among politicians, councillors, community leaders, council management and the public generally
- Increasing the profile and understanding of the unique biodiversity of the City and its value
- Capturing success stories, programs and policies that may be used as examples of best practice, in an education and awareness program

Principles

- Education equals empowerment
- Collective responsibility works best

- Awareness and appreciation of our natural assets
- Replication of best practice
- Knowledge sharing

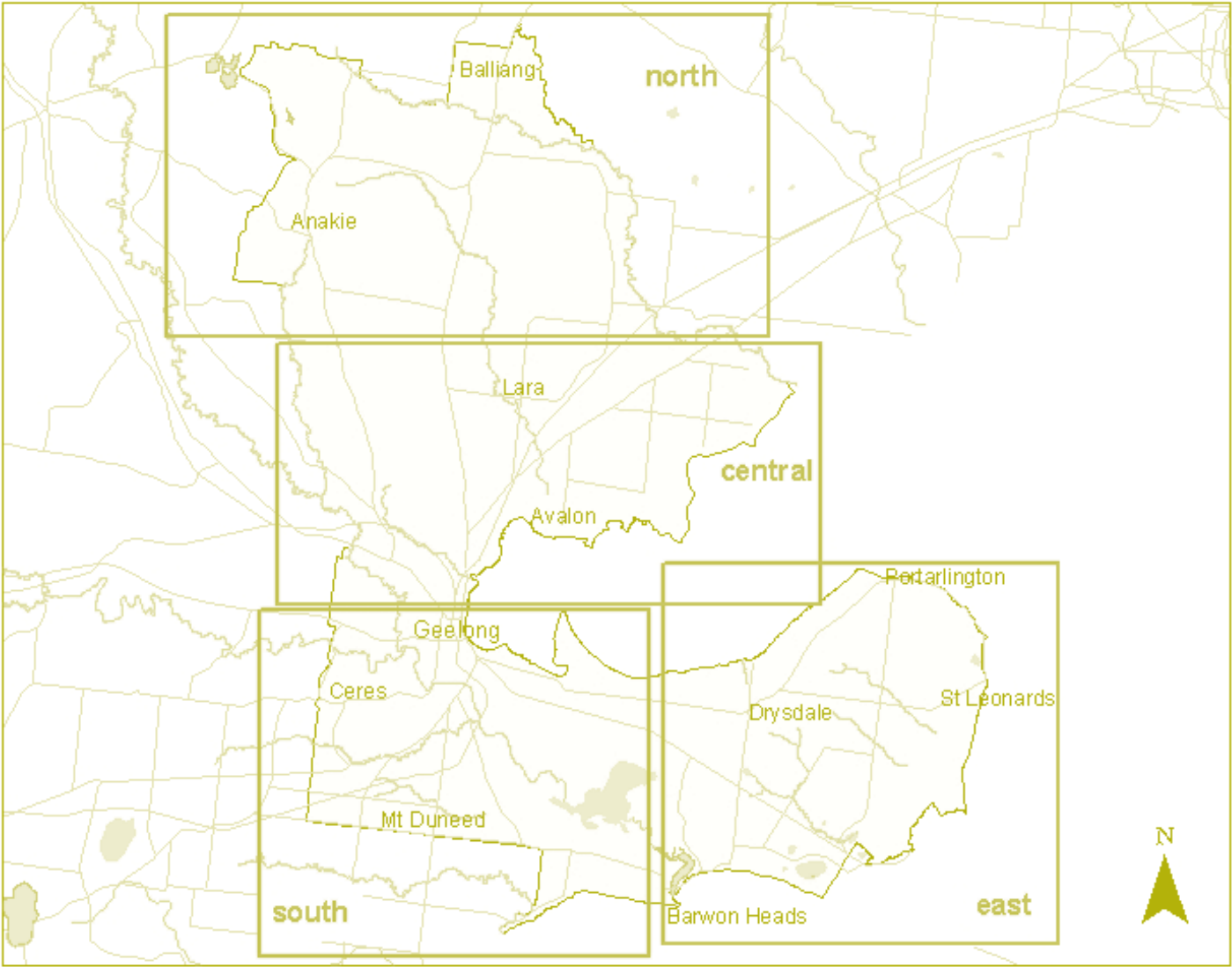
Approach

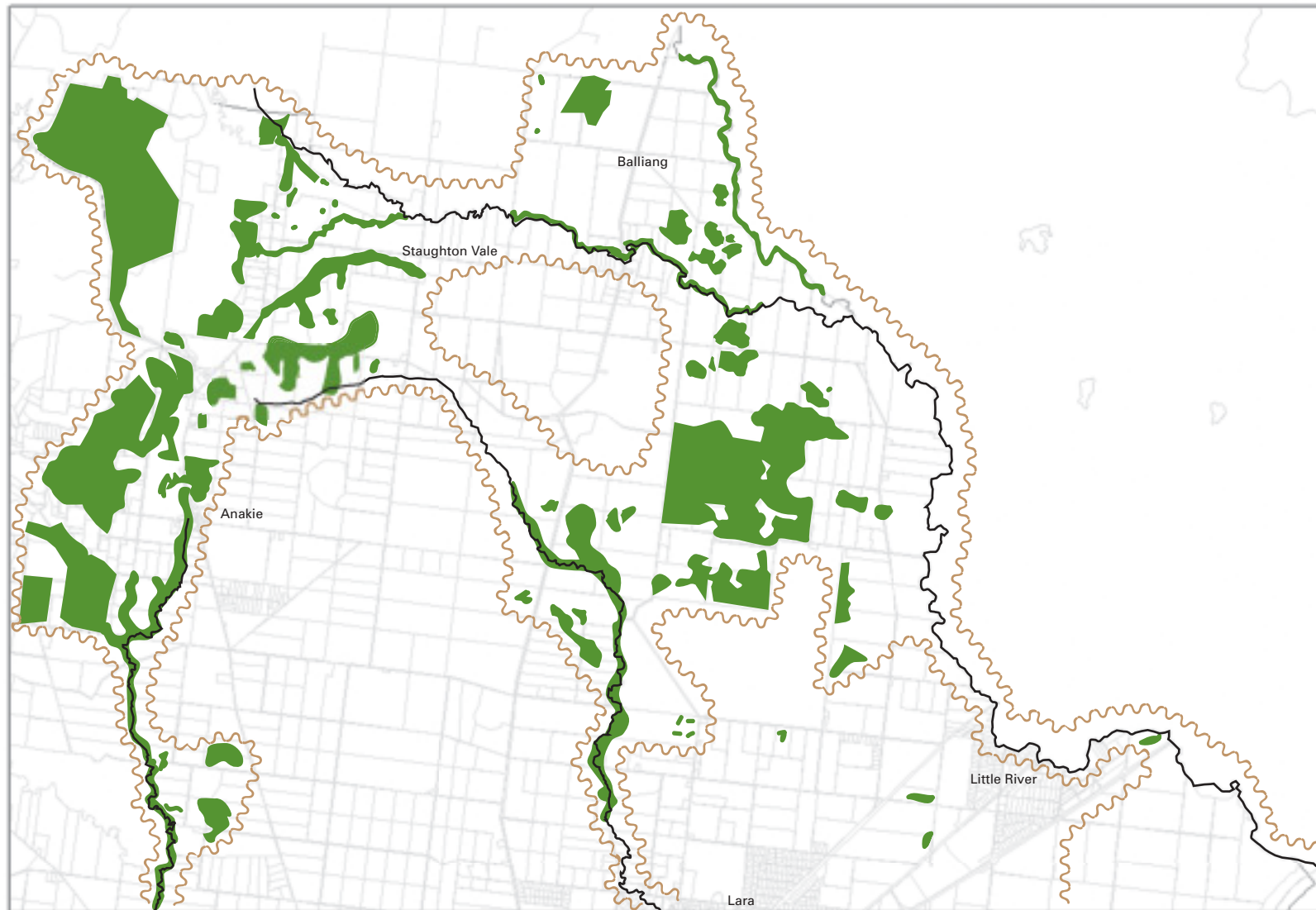
- Education and awareness forms a central component to the EMS Strategy and Biodiversity Strategy. The successful approaches used to promote and educate people about issues like waste management and water conservation should be used as the frameworks for this strategic objective.
- Use of Biodiversity conservation areas and the Botanic Gardens as key implementation sites for environmental education
- The development of a city-wide education and awareness program that identifies successful approaches and best practice for the purpose of replication and the education of councillors and staff should be undertaken. This resource will target Councillors, executive management/department/units and describe the goal, approach and methodology lessons learned and successes and failures.
- Develop appropriate interpretive signage and information brochures on biodiversity for conservation reserves and the general community
- Support Friends of groups and stewardship of conservation areas
- Encourage local nurseries to supply indigenous plant stock propagated from local areas and seed sources
- Increase policing of owners who allow dogs/cats to roam unsupervised and implement appropriate curfews
- Prepare and distribute guidelines for the appropriate management of flora and fauna values on private land
- Implement an education program to increase awareness of the impacts of everyday activities on biodiversity
- Establish a Centre for Regional Biodiversity as part of the Botanic Gardens development

06 / biodiversity maps



06 | biodiversity maps



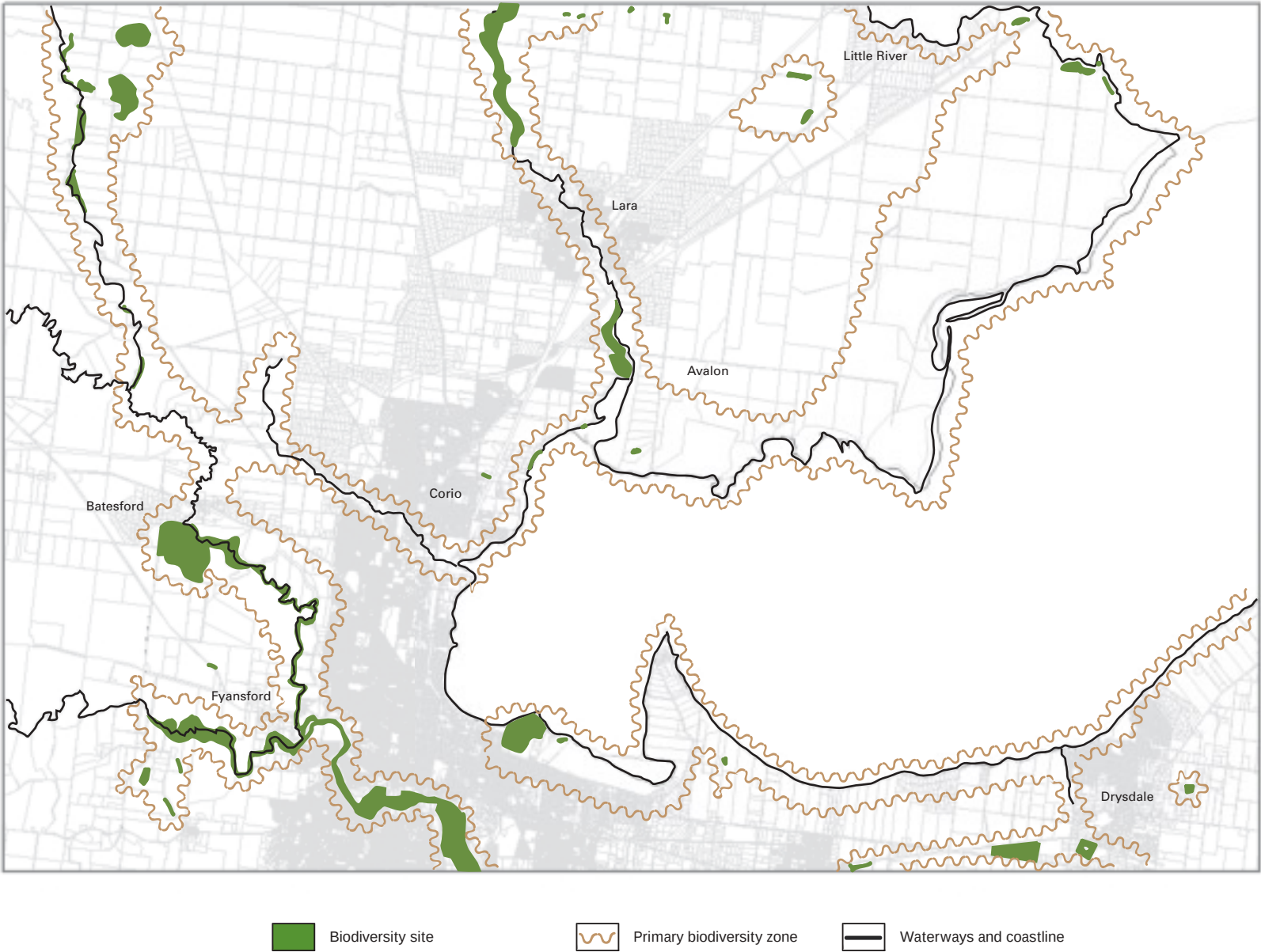


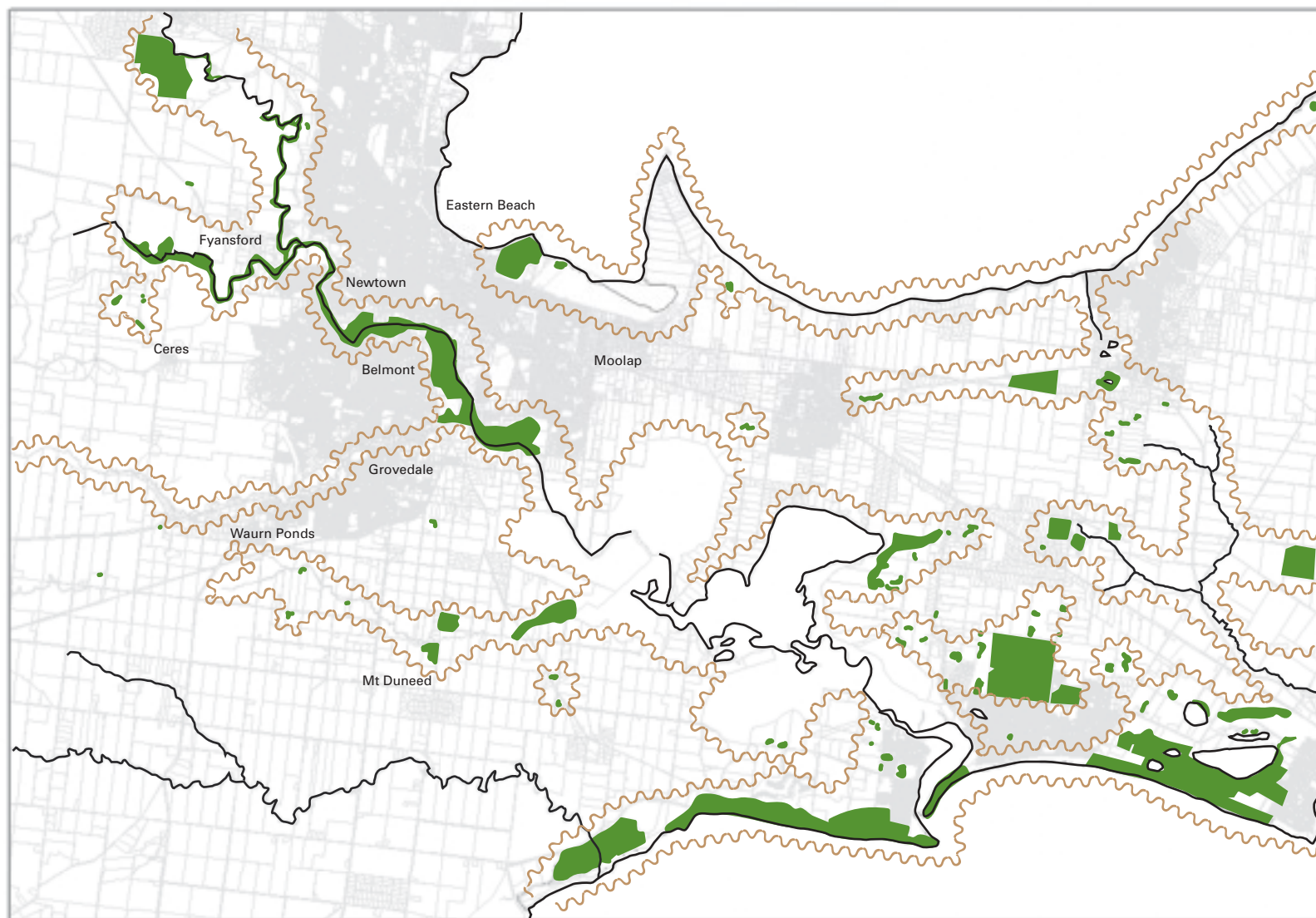
 Biodiversity site

 Primary biodiversity zone

 Waterways and coastline

biodiversity map — central





 Biodiversity site

 Primary biodiversity zone

 Waterways and coastline

biodiversity map — east



Biodiversity site



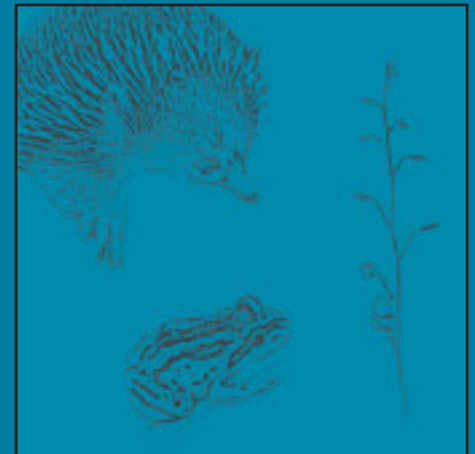
Primary biodiversity zone



Waterways and coastline



07 / **implementation, monitoring and review**





Implementation of the Strategy

A number of projects, initiatives and programs are currently underway that will support or contribute to the strategy. The implementation of the strategy is a long-term initiative and implementation and success must therefore be measured over years rather than months.

Monitoring of the Strategy

The success and implementation of the strategy must be reported on to, in a progress report every two years. For each Strategic Objective indicators will be identified as part of the action plans and programs to measure and monitor the state of biodiversity as well as the success of the various management programs implemented.

Monitoring and measuring the implementation and success of the Biodiversity Strategy in its entirety, will be measured using key performance indicators like number of policies, programs and action plans undertaken, developed and implemented and annual capacity, expenditure and resources committed to biodiversity management.

These key performance indicators will be reported to Council in the annual progress report and publicly in the State of the Environment Report (SoE).

Review of the overall Strategy

The Biodiversity Strategy (this document) will be reviewed every two years. Revisions and changes to the strategy will be done as needed so as to ensure a cycle of, and commitment to, continued improvement by the City in its conservation and enhancement of biodiversity.

Implementation Plan

An annual implementation Strategy will be presented to Council each year for endorsement. This plan will be based upon allocation of overall resources, funded partnerships and programs, ongoing review, prioritisation and prior successes. The plan will be presented after the adoption of the annual budget reflecting the intentions of council to implement biodiversity priorities for each individual year.

The Biodiversity Action Plan will detail the action, the strategic objective to which it refers, the resources required and nominated responsibility.

The completion of achievements will be reported back to council after its first year of operation as a section within the Biodiversity Action Plan

FACT

A total of 1804 plant species (or taxa) have been recorded for the City of Greater Geelong of which 1119 (62%) are indigenous and 685 (38%) are exotic or introduced.

CONCLUSION

The realisation and completion of each of the Strategic Objectives of the Biodiversity Strategy will ensure the long-term survival of the City's biodiversity for the benefit of current and future generations. In addition, the enhancement and protection of the region's biodiversity has the ability to play a significant role in the social fulfilment and economic development of this community.

In conclusion the following points remain central to the success of the Biodiversity Strategy:

- Adequate resources and capacity must be made available to meet the goals and targets of the strategy
- Partnerships between the City and organisations are central to the success of the strategy
- The strategy must undergo regular review to ensure continued improvement
- The City of Greater Geelong must remain committed to its role in protecting and enhancing biodiversity
- The implementation of the strategy through the Strategic Objectives is a long-term process
- The adoption of the implementation plan is crucial to achieving the strategic objectives

Supporting Documents and Resources

The original assessment and mapping work formed the Draft Biodiversity Management Plan. This Management Plan detailed the Flora and fauna of the study area, strategic directions for biodiversity management, identification of threatening processes and management needs. A two volume inventory of Sites of Biological Significance in the City of Greater Geelong was included together with Assessment Summary Sheets of all sites documented during the study, including roadsides. A Roadside Management Plan documenting higher-quality roadside biodiversity values and their management was presented.

Sites mapped during this study have been incorporated into layers for Council's PLACES Geographic Information System (GIS) and sites are also given on hard-copy maps at the scale of 1:10,000. An incomplete CD entitled Wild Geelong produced by Viridians Pty. Ltd. Biological Databases to aid staff in plant identification was also produced.

These products were the result of work by Ecology Australia under contract to the City of Greater Geelong comprising authors G.W. Carr, S.E. McMillan, M.H. Trengove, M.D. White, A.R.G. McMahon and C.E. Silveira

After review of this material a Draft Biodiversity Strategy was released for public comment in March 2002. This included a Summary and Detailed Report and feedback survey.

The Biodiversity Strategy is the culmination of the collected works that make up the original Biodiversity Management Plan, comments from the community, further research and borrowings from other local government biodiversity plans, strategies and approaches. Pulling together this work to form the City of Greater Geelong Biodiversity Strategy has been undertaken by the Environment and Natural Resources Unit of the City of Greater Geelong under the authorship and editing of Bernie Cotter and Rob Giddings.

Products completed or currently underway to support the Strategy include a web based plant identification database, planting guidelines and brochures on environmental weeds.

Acknowledgment also goes to the many local government environmental management plans, conservation, native vegetation and biodiversity strategies. Particularly useful were those from the City of Cape Town, City of Bundoora, Shire of Nillumbik and Corangamite Catchment Management Authority's Native Vegetation Plan.

