

City of Joondalup
Biodiversity Action Plan
2009 – 2019



ACRONYMS AND ABBREVIATIONS

City of Joondalup Business Units

APES	Approvals, Planning and Environmental Services
CDL	Community Development and Libraries
HR	Human Resources
IS	Infrastructure Services
IM	Information Management
LPP	Local Planning Policy
MG	Marketing and Governance
OS	Operation Services
SD	Strategic Development

Others

DEC	Department of Environment and Conservation
DoF	Department of Fisheries
GIS	Geographical Information System
ICLEI	International Council for Local Environment Initiatives
LAB	Local Action for Biodiversity
NIASA	Nursery Industry Accreditation Scheme Australia
PBP	Perth Biodiversity Project
UNEP	United Nations Environment Program
WSUD	Water Sensitive Urban Design
WALGA	Western Australian Local Government Association

Timelines

Ongoing	Actions that underpin the implementation process and are incorporated into annual planning and budget processes	
Short	1 - 3 years	Actions are to be planned or completion from 2009-2011
Med	4 - 6 years	Actions are to be planned for completion from 2012-2015
Long	7 - 10 years	Actions are to be planned for completion from 2016 - 2019

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INTRODUCTION

The City of Joondalup is situated on the Swan Coastal Plain of the Southwest Bioregion of Western Australia. The area that forms the City of Joondalup is a microcosm of the broader south west area containing coastal areas, wetlands and bushland, including several reserves with high conservational value. Nearly forty years of intense urbanisation has placed pressure on the ecological communities within the City.

The City of Joondalup has long recognised the value of its natural assets and regards retention and enhancement of biodiversity as a key priority. The City of Joondalup Biodiversity Action Plan 2009 – 2019, has been developed to ensure this recognition is continued and to provide direction for the City's biodiversity management activities over the next ten years. The Biodiversity Action Plan will assist the City to:

- Improve both the community's and the City's corporate knowledge of local biodiversity;
- Develop necessary resources for biodiversity management;
- Prioritise management of natural areas and operational activities;
- Protect key bushland areas;
- Identify and engage in projects that will maintain biodiversity;
- Establish institutional partnerships to enhance the scientific knowledge base; and
- Provide information and education to the community on the current extent and condition of local biodiversity.

KEY FOCUS AREAS

In developing this plan the City has identified six key focus areas for biodiversity management:

- Planning and Development;
- Catchment Management;
- Reserve Management;
- Corridors and Connectivity;
- Community Education and Awareness; and
- Community Engagement and Partnerships.

These key focus areas reflect areas of responsibility in which the City can make a significant difference in the management of biodiversity.

The overall aim of this Plan is:

“For the City of Joondalup’s rich biological diversity to be understood, maintained and protected”.

CITY OF JOONDALUP BIODIVERSITY

The City has recently produced a Biodiversity Report which documents the current knowledge and condition of biodiversity within the City. A summary of the City's biodiversity zones, identified threats, and biodiversity projects is provided below. For more detailed information on the City's biodiversity refer to the 2008 City of Joondalup Biodiversity Report.

Biodiversity Zones

The City of Joondalup's key biodiversity areas have been categorised as falling into four zones, Figure 1.

The Wetlands Zone

The wetlands zone covers a chain of lakes and wetlands that hug the City's eastern boundary. The wetlands incorporate Lake Goollelal, Beenyup and Wallaburnup swamps and Lake Joondalup. Together with surrounding parks and bushland these comprise the Yellagonga Regional Park. Yellagonga Regional Park contains some of the oldest and last remaining freshwater wetland systems on the Swan Coastal Plain. The Park is approximately 13 km long and varies in width from 1 – 1.5 km. The Park covers an area of 1400 ha and comprises rich and dynamic ecosystems ranging from upland forest, fringing wetland and aquatic vegetation to open water bodies. It provides habitats for a variety of local flora and fauna in addition to providing an important biodiversity link with Neerabup National Park and Yanchep National Park to the north.

The Coastal Zone

The coastal zone stretches from Marmion in the City's south to Burns Beach in the north and includes the coastal strip west of West Coast Drive. Most of the 17km foreshore has regional conservation value. The zone contains limestone cliffs, rocks and reefs with ancient corals, fossilised shells, coastal heathlands, high sand dunes and white sand beaches. The shore and offshore islands provide resting and breeding sites for many and varied species of seabirds. Gulls, terns and cormorants are common. There have been sightings of several migratory species, protected under international treaties such as the Japan-Australia Migratory Birds Agreement and the China-Australia Migratory Birds Agreement.

The Coastal Bush Zone

The Coastal Bushland Zone comprises the open space areas east of Padbury and Craigie including Craigie Open Space, Pinnaroo Valley, Hepburn Heights and Lilburne Reserve. Together they represent about 4km² of adjoining bushland reserves.

In addition, the City has a total of 103 sporadic natural areas with remnant vegetation. Several of the natural areas in the City of Joondalup contain significant and endangered flora and fauna species and communities. Flora species lists for 95 reserves have been completed. The total extent of native vegetation within the City of Joondalup has been estimated to be 329 ha which consists of 95 ha of local natural area and 234 ha of Bush Forever Sites.

The Marine Zone

The marine zone which runs parallel to the coast is also included, although it is outside of the City's jurisdiction. Marmion Marine Park lies within State waters and extends from the high water mark to approximately 5.5km offshore. It covers approximately 9500 ha and is the responsibility of the Department of Fisheries and Department of Environment and Conservation, Western Australia. It covers the entire coastline of the Joondalup Local Government boundary and is an

important area for aquatic recreation. The Park is an A class reserve and has outstanding conservation significance. It is an important habitat for a diverse range of marine life; seabird communities, marine mammals such as the bottlenose dolphin and Australian sealions, an array of fish species, colourful invertebrates, sea floor communities including seagrass meadows, algal limestone pavement communities and crevice animal associations. The Park waters are also known to be a migratory path for humpback whales.

Figure 1. The Biodiversity Zones of the City of Joondalup



Biodiversity Threats

Several threats to the City's biodiversity have been identified, as listed below. Minimising these threats will be a central theme in this Biodiversity Action Plan.

Clearing

Clearing native vegetation is a key threat to biodiversity. It causes species loss, reduction of species abundance, habitat removal, change or degradation in vegetation structure, soil erosion, altered hydrology, displacement of native fauna and ecosystem fragmentation and genetic isolation.

Fragmentation

Fragmentation is a direct result of vegetation clearing and has the same negative effects on biodiversity. A major concern is the pressure on fauna species whose restricted movement reduces the area available for their habitat.

Uncontrolled access

Uncontrolled access into natural areas by humans and **pets** occurs where natural areas are in urban surroundings. This is a significant threat to biodiversity as it causes disturbance to ecosystems, soil compaction and introduces weeds and diseases into natural areas.

Environmental Weeds

Environmental weeds have many negative impacts: they out-compete the native plants for nutrients and space, thus reducing the native plant's ability to thrive and reproduce; they harbour pests and diseases which can threaten native plants; they choke natural open spaces used by fauna, e.g. reptiles, for breeding; and they may not provide adequate food and shelter to fauna compared with the native local flora they replace.

Fires

The all too frequent fires in urban bushlands kill some plants before they fully mature and produce seeds, thus reducing species diversity. Fires also provide an opportunity for fast growing weeds to establish themselves before the native vegetation can regenerate.

Rubbish dumping

Rubbish dumping can have several negative effects on natural areas. Among them, land contamination, introduction of weeds, pests and diseases and an increase of fire hazards.

Stormwater drainage

Discharge of stormwater into a body of water, such as the Yellagonga wetlands, has a direct effect on the water quality which can adversely impact on ecosystems and biodiversity. High nutrient levels of lake water and wetlands caused by industrial and urban run-offs can generate pollution and eutrophication. This can result in algal blooms and toxicity which affects the aquatic food chain and negatively impact on diversity of fish species and water bird population. Stormwater discharge can also be an important vector for the transmission and distribution of devastating bushland plant diseases such as dieback and armillaria.

Plant Diseases

Dieback is a fatal disease caused by soil-borne *Phytophthora* spp. particularly *P. cinnamomi*. It is known to attack at least 25% of all the identified flora species of the Southwest Botanical Province

and is considered a serious threat to the flora of Joondalup. Besides dieback, there are other disease threats to bushland areas, including armillaria, which will be considered in disease management strategies implemented under this Biodiversity Action Plan.

Vandalism

Acts of vandalism on native flora and fauna can cause damage and stress to native species.

Key Biodiversity Projects

The City is committed to two key biodiversity projects: the Western Australian Local Government Association (WALGA) Perth Biodiversity Project and the International Council for Local Environmental Initiatives (ICLEI) Local Action for Biodiversity Project.

WALGA Perth Biodiversity Project (PBP)

PBP is a State Government initiative to assist local governments and communities to better understand and strategically plan biodiversity conservation and management. In 2002, the City of Joondalup signed a Memorandum of Understanding (MOU) with the Western Australian Local Government Association for the protection of native vegetation. The City of Joondalup initiated a draft biodiversity project plan in 2003. Field assessments were contracted out to specialists within the community and were carried out in 2003-4. The City has progressed a number of the elements of the planning project and will now seek to integrate this work within this Action Plan and the LAB project.

The project involves the following components:

1. Research and review Federal, State, Regional and Local legislation, policies and relevant documents (completed).
2. Develop a biodiversity policy acknowledging the City's commitment to addressing biodiversity conservation in a staged and strategic approach.
3. Identify natural resource areas including mapping and describing natural areas in the City by vegetation complex, land zoning, land ownership and land tenure (completed)
4. Adopt standard local significance criteria (completed).
5. Undertake desktop assessment of local natural areas to identify those natural areas that **are** likely to be locally significant (completed).
6. Undertake field assessment of local natural areas (completed).
7. Identify and prioritise locally significant natural areas based on ecological value (completed).
8. Identify locally significant natural areas for protection based on opportunities and constraints (completed).
9. Plan for management of local government land including a strategic analysis of Local Government managed natural areas that are to be kept for conservation purposes (ongoing).
10. Determine incentives for private land biodiversity conservation.

11. Develop draft Action Plan for the protection of priority locally significant natural areas based on capacity of the City.
12. Undertake public review of the draft Biodiversity Action Plan.
13. Finalise Biodiversity Plan and publish and promote the Plan.

ICLEI Local Action for Biodiversity (LAB) Project

The LAB project is an ICLEI partnership project, involving 21 cities from around the world to enhance the profile, planning and management of biodiversity at a local level. The aim of the three year project is to develop a local government network for biodiversity action, broadly representative of ICLEI's region and continents, to promote greater understanding of local government biodiversity issues leading to the implementation of appropriate measures within the participating local governments.

The five steps in the LAB process are as follows:

Step 1: Development of a biodiversity report that documents the current state of biodiversity and its management within each City (completed).

The City of Joondalup has completed Step 1 with the production of its Local Action for Biodiversity Report which was showcased at the Local Action for Biodiversity Mayors Conference, May 2008 in Bonn, Germany.

Step 2: Ensuring long-term commitment by City leadership to sustainable biodiversity management through LAB cities formally signing a local government biodiversity declaration (completed).

Step 2 was completed on the 19 February 2008 with Council endorsing the signing of the Durban Commitment: Local Government for Biodiversity Statement and the Countdown 2010 – Save Biodiversity Declaration. In September 2008, the Mayor of Joondalup, at the international LAB Workshop in Durban, South Africa, signed both the Durban Commitment and the Countdown 2010 Declaration. The City of Joondalup is the first Local Government in Australia to have signed these international documents, thus positioning the City as a leader within Australia. The two documents together provide broad strategic guiding principles in relation to saving biodiversity on a global scale.

Step 3: Development of a 10-year Biodiversity Action Plan and framework that will include commitments to biodiversity implementation plans and integration within broader City plans.

Step 4: LAB cities formal acceptance of their 10-year Biodiversity Action Plans and Framework.

The development of this Biodiversity Action Plan and its endorsement by Council will complete Steps 3 and 4 and provide direction for the City's biodiversity protection activities over the next ten years.

Step 5: Implementation of five new on-the-ground biodiversity interventions by the end of the three year project.

The City has selected five projects as its major actions within this plan. The following provides a brief overview of the five City of Joondalup on-the-ground LAB projects.

LAB On-the-Ground Project 1: Coastal Foreshore Biodiversity Signage Project

The purpose of this project is to design, construct and install educational signage that provides information on the biodiversity of the area along the City of Joondalup's coastal foreshore. This project will focus on developing signage at three key locations that experience high levels of visitation, being at Burns Beach, Tom Simpson Park, Mullaloo and the coastal dual-use path at Marmion.

The goals of this project are:

- To increase community awareness about the biodiversity of the area and its importance;
- To educate visitors to the area about how they can act appropriately to protect the biodiversity of the area;
- To provide visitors to the area with an environmental interpretive experience; and
- To act as an additional attraction to encourage people to visit the coastal foreshore area.

LAB On-the-Ground Project 2: Creating Native Gardens to Build Biodiversity Corridors

The City of Joondalup has developed a concept design that will be applied to the City's seven major arterial roads that connect the coastline in the west to the wetlands in the east. The concept design will incorporate water sensitive urban design and will replicate the progression of indigenous flora that exists within the different west-east biodiversity zones of the City.

The goals of this project are:

- To reduce water consumption through the creation of natural gardens from local native species;
- To introduce local endemic species so as to showcase the original species of the Swan Coastal Plain;
- To provide the community with a highly visible reference point for raising the awareness of local biodiversity and water wise garden design;
- To create biodiversity linkages between the western coastline and the eastern wetlands.

LAB On-the-Ground Project 3: Yellagonga Biodiversity and Cultural Heritage Research Project

This project will focus on gaining a greater understanding of the indigenous biodiversity, lifestyle and heritage that was experienced by the indigenous Noongar people who once inhabited the Yellagonga Regional Park.

The project will seek to undertake an on-the-ground assessment which will include identification, mapping and recording of indigenous sacred sites and significant indigenous plant species. This will assist to develop a synopsis of how the Noongar people used naturally occurring plant species as food sources, medicines and for other uses.

The Local Noongar Community considers there are many significant heritage sites in the Yellagonga Regional Park, of which only six are recorded and therefore protected. There is concern amongst Indigenous Elders that additional sites require protection but there is reluctance to make them known given the risk of vandalism and defacement.

It is hoped that undertaking a comprehensive survey of these sites and obtaining conservation status and other appropriate protection for any such sites identified will be sufficient to allay any concerns of the Elders.

Furthermore, the project will identify local Indigenous plant species that occur in this area and provide information on those that were used in traditional lifestyles of Indigenous people. Information produced in this project about native local plant species of particular significance to Indigenous culture will add richness to the existing biodiversity information that the City has compiled.

LAB On-the-Ground Project 4: Weed Control Trial

The City has commenced a project that aims to compare effectiveness of alternative weed control treatments options, and their associated costs. The types of methods being trialled include hydrothermal and chemical controls. The target areas for the trial will include roadside verges and footpaths within the City.

The goals of this project are:

- To produce a report that compares and contrasts different weed control methods and details costs and benefits with available options;
- To perform an on-ground assessment of the effectiveness of hydrothermal methods against chemical methods;
- To ascertain and document issues and problems associated with both types of methods;
- To provide recommendations of the best options for controlling weeds in different situations.

LAB On-the-Ground Project 5: Community Weed Education Project

One of the greatest threats to the City's local biodiversity is invasive weed species. Weeds are generally any plant species which grow in a place where they are not wanted. They may be native or exotic species. Weeds establish themselves fast, colonise large areas and become problematic. Weeds are a nuisance in our natural environment and the City of Joondalup believes that the best way to combat this threat is through a coordinated community response involving awareness-training and education.

The goals of this project are:

- To raise community awareness of environmental weeds as a key biodiversity threat;
- To identify existing environmental weeds and those species with potential to become weeds;
- To encourage community participation in weed control;
- To prioritise management strategies;
- To raise community appreciation of natural assets.

This Project plans to address a key objective of City's Environmental Plan by undertaking an awareness program to educate the public of the weeds that threaten the City's biodiversity.

Proposed actions may include:

- Producing an educational DVD;
- Initiating a weed program in selected schools;
- Promoting more Friends Groups;
- Providing a foundation for the weed management strategy.

The project will also endeavour to contribute to the regional weed management strategy by identifying opportunities for linking with other local governments and government agencies.

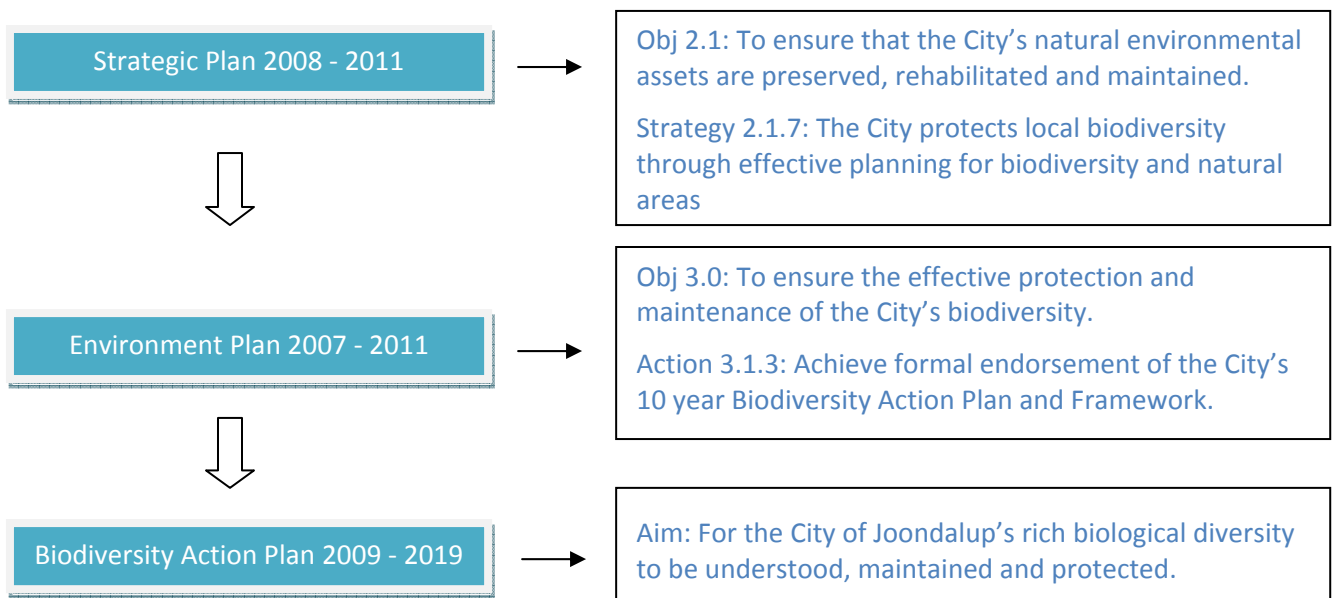
STRATEGIC POSITION

At a strategic level, the City of Joondalup formally recognises the value of its natural assets and affirms the high priority that the City places on the retention and maintenance of biodiversity.

One of the 5 key focus areas in the City's Strategic Plan of 2008 – 2011 is protecting the natural environment. Objective 2.1 is *"To ensure that the City's natural environmental assets are preserved, rehabilitated and maintained"*. This objective is to be achieved through Strategy 2.1.7 *"The City protects local biodiversity through effective planning for biodiversity and natural areas"*.

Biodiversity is also identified as one of the key focus areas in the City's Environment Plan 2007 – 2011 with the objective *"To ensure the effective protection and maintenance of the City's biodiversity"*. Nine key actions are identified to achieve this objective one of which relates to the development of a ten-year Biodiversity Action Plan.

Strategic Framework for Biodiversity Action Planning



GUIDING PRINCIPLES

In the course of developing this Biodiversity Action Plan, Council endorsed five key principles to guide the development and implementation of biodiversity management within the City of Joondalup.

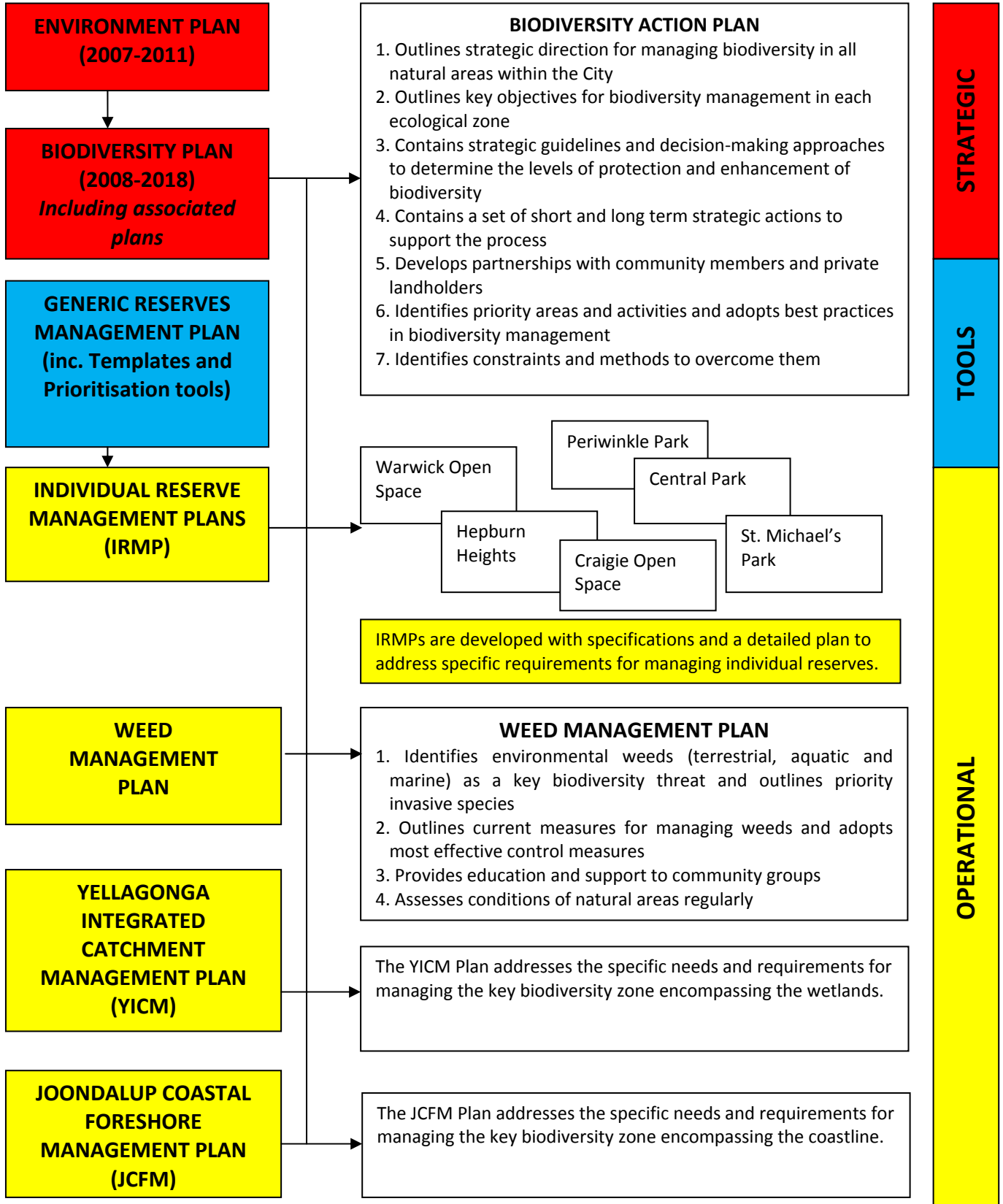
These Guiding Principles will underpin all future biodiversity management undertaken by the City.

They are:

1. **Publicise and Promote Biodiversity-**
To regularly publicise and promote the work the City is doing in managing its Biodiversity.
2. **Effective Implementation-**
To ensure that City plans, strategies and actions relating to biodiversity are being achieved and include the ongoing restoration and rehabilitation of degraded areas and control of invasive species.
3. **Raising Awareness-**
To increase the community's understanding and awareness of biodiversity issues that affect the City and can impact on the lifestyles of residents.
4. **Community Participation-**
To encourage the community to actively engage in biodiversity projects.
5. **Partnerships and Collaboration-**
To build partnerships, where appropriate, that will assist in achieving effective resource utilisation and share information and ideas.

BIODIVERSITY IMPLEMENTATION FRAMEWORK

The implementation framework below provides an overview of the how the Biodiversity Action Plan relates to other documents at a strategic level and how it will be implemented at an operational level.



Overarching Actions

There are a number of key actions that relate to each of the key focus areas identified in this plan and are critical to the successful implementation of this Plan.

- 1) The City must lead by example in all its activities that have the potential to impact on biodiversity.
- 2) The City provides sufficient budget and staffing resources to ensure all the actions in the Plan can be effectively implemented.
- 3) The City should undertake a review of all its policies, guidelines and plans to ensure they reflect and support the objectives identified in this Plan.
- 4) Ongoing monitoring and review of this Plan should be undertaken to ensure continuing progress, and the Plan remains relevant.

Ongoing Review and Monitoring

As a ten year action plan it is important that the Biodiversity Action Plan is reviewed on a periodical basis to ensure its relevancy and that adequate progress is being achieved.

Minor reviews will be conducted every 2 years.

A major review will be conducted after five years, including the identification of new actions for inclusion.

The Biodiversity Action Plan will be monitored annually to determine progress against the Plan and this information will be incorporated and reported in the City's annual State of the Environment Report.

KEY FOCUS AREAS

1.0 PLANNING AND DEVELOPMENT

Objective: *To ensure major land approval and planning processes protect and enhance the City's biodiversity assets.*

Urbanisation and land clearing have been regarded as key contributors to the decline of many native species. The City recognises that rapid development over the past 20 years has placed its natural environment under considerable pressure. The current extent of the remaining vegetation in the City of Joondalup includes Local Natural Areas, Bush Forever Sites and Regional Parks totalling 1579 ha, just 15% of the Pre-European extent.

As a local government the City has the ability to control the clearing rate of its remnant vegetation. It can do this through land use planning and policy development, denying or placing conditions on development approvals and using the District Planning Scheme to provide protection to local natural areas.

There is also the opportunity to strengthen the City's commitment to biodiversity protection through its strategic and financial planning processes. Recognition of biodiversity at a strategic level is vital to ensuring biodiversity is implemented across the City's entire operations. It is also important the City ensures adequate and appropriate budgeting for biodiversity in the Capital Works Budget.

Action No	Action	Timeframe	Responsibility
1.1	Assess all development proposals to ensure they comply with the Local Planning Policy.	Ongoing	APES
1.2	Routinely inspect all new developments and impose penalties on developers who damage or destroy local biodiversity contrary to agreed and approved development plans.	Ongoing	APES, IS
1.3	Ensure protection of the City's reserves by placing relevant reserves within Schedule 5 of the City's District Planning Scheme No.2	Ongoing	APES, IS
1.4	Work with WALGA and other Local Governments in lobbying the State Government to include concessions to biodiversity in planning legislation (giving Local Government greater authority in planning decisions).	Ongoing	APES
1.5	Ensure that the City follow the same policies and guidelines it imposes on developers so that the City leads by example in reducing risks to biodiversity	Ongoing	APES, IS
1.6	Encourage developers to utilise existing biodiversity (instead of removing then re-planting)	Ongoing	APES, IS
1.7	Develop a Local Planning Strategy for the City that includes biodiversity protection.	Short	APES

Action No	Action	Timeframe	Responsibility
1.8	Include biodiversity information for individual reserves such as flora and fauna lists in the City's GIS system so it can be accessed by all staff.	Short	SD, IM
1.9	Develop planning policies that include a requirement for development applications which will result in clearing of native vegetation to submit a comprehensive biodiversity survey.	Short	APES
1.10	Develop policies and guidelines that consider risks to biodiversity, specifically with respect to land use planning, mobility planning, economic development planning and conservation planning.	Medium	APES, SD
1.11	Develop policies making it compulsory to use a proportion of local native plant species in all new developments (preferably utilising existing bushland).	Medium	APES
1.12	Ensure that local native species are preferentially used in City landscaping wherever practicable.	Medium	IS, OS
1.13	Identify significant biodiversity assets on land owned by organisations such as the Water Corporation, Department of Education and Department of Recreation.	Long	IS, OS
1.14	Undertake a review of planning policies with a view to incorporating biodiversity protection into statements.	Long	APES, SD
1.15	Develop Local Planning Policy to include assessing the impact of development proposals on natural areas.	Long	APES, SD
1.16	Ensure an adequate amount of funding is provided in the City's Capital Works Budget for biodiversity protection and management including the implementation of actions in this Plan.	Ongoing	IS, OS
1.17	Incorporate biodiversity protection and maintenance principles into other relevant City Plans (such as the ICLEI Water Action Plan and the Landscape Master Plan and associated Individual Park Management Plans).	Short	SD
1.18	Investigate and recommend on how a moratorium to cease the planting of invasive weed species could be introduced.	Medium	IS, OS
1.19	Provide incentives for developers who retain significant proportions of bushland, or who produce designs that enhance and protect biodiversity	Medium	APES, IS
1.20	Investigate the potential for an incentives scheme to discourage private landholders clearing land.	Long	SD, APES
1.21	Investigate methodologies for valuing natural assets and create and maintain a Natural Assets Register that records the value and extent of the City's natural assets.	Long	AM, SD, IS

2.0 CATCHMENT MANAGEMENT

Objective: *To undertake appropriate management at a catchment scale in order to reduce negative impacts on the City's natural areas.*

A catchment is an area of land that drains to a low lying area. The catchment can be defined by natural high points such as hills and ridges or man made features such as storm water drains. The low lying area can be a river, wetland or marine environment. A catchment includes all soil, water, habitat and biodiversity in that area. Undertaking environmental management at a catchment scale is important as change or impact in one part of the catchment can impact on all areas of the catchment. Through the water cycle, particularly surface, groundwater and stormwater flow, all parts of a catchment are integrated.

The most significant catchment in the City is that surrounding the Yellagonga Wetlands. Management of the catchment is shared between the City of Joondalup, City of Wanneroo and the Department of Environment and Conservation. Water flows from a catchment of over 1400ha into the Yellagonga Wetlands and, as such, practices within the catchment have a significant impact on the wetlands. The City also needs to be mindful of the catchment area along the coastline which drains into the marine environment and stormwater draining into bushland.

Action No	Action	Timeframe	Responsibility
2.1	Develop and implement a Water Conservation Plan to reduce the level of groundwater extraction by the City and improve groundwater levels.	Ongoing	SD, OS
2.2	Develop a long term capital works improvement plan for enhancing stormwater outfalls and sumps across the City to protect both environmentally sensitive areas and public health.	Short	IS, SD
2.3	Develop and implement a Yellagonga Integrated Catchment Management Plan to ensure the effective overall management of the water body, in partnership with the City of Wanneroo, Department of Environment and Conservation and Perth Region NRM Inc.	Short	SD
2.4	Develop Water Sensitive Urban Design (WSUD) guidelines that are suitable for the community as well as the City to ensure WSUD concepts are incorporated into future urban planning and development.	Short	APES, IS
2.5	Identify, map and prioritise the City's catchment areas and store this information with the GIS system.	Short	IS, OS
2.6	Develop a standardised method of testing the City's freshwater bodies through partnerships with key government agencies and universities to monitor changes in the quality of freshwater areas.	Medium	SD, APES

Action No	Action	Timeframe	Responsibility
2.7	Develop a standardised method of testing the City's ocean bodies through partnerships with key government agencies and universities to monitor changes in the quality of seawater; changes in shoreline erosion and accretion; and changes in water flows due to groynes and marinas.	Medium	SD, APES
2.8	Audit and monitor the City's fertilising practices, especially around wetlands.	Medium	APES, OS
2.9	Audit and monitor existing stormwater management systems to see where improvements could be made.	Medium	IS, OS, APES
2.10	Audit and monitor the City's street-sweeping practices to ensure that they are effectively keeping street waste out of drains.	Medium	IS, OS
2.11	Investigate and develop a program for converting all public facilities from septic systems to deep sewage within the coastal foreshore reserve.	Long	AM
2.12	Develop a program of planting in sumps with nutrient stripping plants to ensure nutrients are removed before they enter the groundwater.	Long	IS, OS
2.13	Investigate and make recommendation on how the City could provide incentives for residents to use slow release non-phosphorous fertilisers and soil wetting agents.	Long	SD, CE
2.14	Conduct research into existing modelling predictions for sea-level rises due to climate change with respect to beach and dune loss and develop strategic responses.	Long	SD

3.0 RESERVE MANAGEMENT

Objective: *To undertake effective ongoing management practices in the City's reserves to protect and enhance the biodiversity of those reserves*

Bushland reserves in urban areas come under direct impact from neighbouring land uses, damaging human behaviour such as littering, fire, weeds and disease. The smaller the bushland reserve is the more susceptible it is to these impacts. As such, urban bushland reserves need to be managed and protected to ensure they remain healthy and viable despite these impacts. Day to day bushland management is about minimising these threats and rehabilitating the bushland.

The City has 97 reserves containing remnant bushland and it is the City's responsibility to ensure these areas are maintained and cared for. This includes fencing; signage; removal of weeds, litter and rubbish; and planting and documenting flora and fauna species. This work is conducted by the City in accordance with the priority management of the different reserves and the maintenance budget. This work is essential for the management and protection of biodiversity. If bushland areas become too degraded they can become too difficult and costly to rehabilitate. Ongoing effective management is the best way to ensure the survival of these bushland areas. The City has also developed Bushland Management Plans and Dieback Management Plans for high priority reserves.

Action No	Action	Timeframe	Responsibility
3.1	Implement the City's existing Dieback Management Plans and determine whether further Plans need to be developed.	Ongoing	IS, OS
3.2	Investigate, develop and implement strategies for fauna control, particularly for feral animals, (eg: fences; culling etc).	Ongoing	IS, OS
3.3	Undertake a feasibility study for the development of a native animal sanctuary in Craigie Bushland.	Short	IS, SD
3.4	Reassess the City's bushland reserves using the Perth Biodiversity Project tools and amend their priority accordingly.	Short	OS
3.5	Undertake Thermal Weed control trial.	Short	OS
3.6	Incorporate an annual budget in the Capital Works Program for fencing of remnant bushland on a priority basis.	Short	IS, OS
3.7	Develop a generic reserve management plan template that includes generic weed management approaches, public access issues, feral animals control etc, which overarches and guides the creation of Individual Reserve Management Plans.	Short	SD, IS, OS
3.8	Review the Perth Biodiversity Survey (2004) and list priorities and new biodiversity areas with the intent of adding further to the 32 sites that the City already has listed under schedule 5 of DPS2,	Short	SD, IS
3.9	Update the biodiversity maps developed as part of the Perth Biodiversity Project and ensure the information is included in the City's GIS system.	Med	IS, IM
3.10	Undertake a review of the City's weed control activities with a view to reducing them or changing them.	Med	IS, OS
3.11	Develop a list of priority environmental weeds for control and ensure that isolated and new infestations are targeted for control. Train relevant staff in the identification of weeds.	Med	OS
3.12	Develop Individual Reserve Management Plans for each natural area, (including fire management strategies, significant tree register etc), and link budgets to management plans.	Medium	SD, IS, OS
3.13	Create a policy addressing the acquisition of landscaping plant stock and other at-risk landscaping materials for the City which reduces the risk of transmitting diseases, (eg: only using nurseries accredited by the Nursery Industry	Medium	SD, IS

Action No	Action	Timeframe	Responsibility
	Accreditation Scheme Australia (NIASA), or alternative in-house pathogen testing program).		
3.14	Develop a significant tree and plant register for the City.	Med	SD, IS
3.15	Investigate training programs for staff to encourage biodiversity conservation and to enhance appropriate vegetation management skills.	Long	SD, OS
3.16	Develop a Weed Management Plan and consider expanding this initiative in partnership with neighbouring Cities.	Long	SD, IS, OS
3.17	Control access to natural areas to reduce the level of human-instigated biodiversity destruction, (eg: fencing; paths; boardwalks etc).	Long	IS, OS

4.0 CORRIDORS AND CONNECTIVITY

Objective: *To provide and protect biodiversity corridors and linkages to improve the viability and facilitate movement of local flora and fauna.*

Ecological linkages facilitate wildlife movement and connect significant vegetation and habitats. Without linkages between natural areas fauna can become isolated in one bushland area making them more susceptible to disease, fire and predators as well as reducing their food supply and restricting their breeding populations. The City has several significant regional ecological linkages, particularly from the south to the north, and the protection of the viability of these linkages is critical. It is also important to identify additional areas that have the potential to form parts of linkages.

Action No	Action	Timeframe	Responsibility
4.1	Ensure that verges along major arterial roads are planted with appropriate local native flora, (as per Master Landscaping Plan).	Ongoing	IS, OS
4.2	Identify indigenous tree and shrub species suitable for planting along verges and medians to create biodiversity linkages.	Short	IS
4.3	Modify road construction practices to ensure that road-base is not installed under the median or is boxed out after construction.	Short	APES, IS
4.4	Identify existing wildlife linkages and the actions needed to protect and enhance these corridors.	Short	IS, SD, OS
4.5	Provide safe animal passages along biodiversity corridors, (such as those recently installed at Carine Lake) and provide means to direct animals to them.	Long	IS, OS
4.6	Ensure biodiversity linkages are protected through effective infrastructure and community awareness raising.	Medium	APES, SD

Action No	Action	Timeframe	Responsibility
4.7	Develop management guidelines for biodiversity linkages that integrate residential gardens. Encourage residential gardeners to plant species which complement the City's biodiversity linkages.	Medium	SD, IS, OS
4.8	Undertake works to establish biodiversity corridors, as per the Landscape Master Plan.	Long	IS
4.9	Convert reticulated and grassed median strips to local native species where possible.	Long	IS, OS

5.0 COMMUNITY EDUCATION AND AWARENESS

Objective: *To improve awareness and understanding in the local community about biodiversity and its importance.*

Human behaviour can have a significant impact on natural bushland areas and biodiversity. Simple everyday behaviours can impact on biodiversity without the individual or community realising it. These behaviours include planting of exotic species, use of certain washing powders and detergents, allowing contaminants to enter drains, littering, illegal dumping, taking shortcuts through bushland areas or not walking on designated trails, and allowing **pets** to run free in bushland areas.

The City has an important environmental leadership role in educating and raising community awareness of biodiversity and its importance and in demonstrating to the community how their behaviour can protect biodiversity rather than damage it.

Action No	Action	Timeframe	Responsibility
5.1	Install interpretive signs describing and illustrating indigenous plants , animals and habitats in selected City reserves where there is identified community involvement.	Ongoing	IS, MG
5.2	Publicise the City's biodiversity monitoring, protection and enhancement activities via the City's website, other communications and events and programs(eg: Green Frog; Coastal Foreshore; Biodiversity DVD; Adopt-a-Coastline; New Resident Packs; Living Smart)..	Ongoing	MG
5.3	Develop a set of biodiversity performance indicators and measure and report on them as part of the annual State of the Environment Report.	Ongoing	SD
5.4	Develop a program of community workshops demonstrating best-practice gardening and biodiversity management for residents/businesses, (eg: Great Gardens Workshop).	Ongoing	SD, IS
5.5	Develop an awareness campaign that informs the Community about the effects of contaminants entering	Short	SD, IS, MG

Action No	Action	Timeframe	Responsibility
	the City's water bodies and groundwater.		
5.6	Undertake an awareness program to educate the public of the weeds that threaten the City's biodiversity and potential fence jumpers or sleeper weeds.	Short	SD, IS, MG
5.7	Undertake Yellagonga Biodiversity and Cultural Heritage project to document biodiversity as it relates to indigenous culture and history.	Short	SD
5.8	Develop a project to erect education signs along the coastal foreshore reserves to improve the community's understanding of coastal biodiversity.	Short	IS, SD
5.9	Review and update all information related to biodiversity on the City's website so that interested residents/ businesses are able to easily locate information and assistance.	Short	SD, MG
5.10	Investigate means to promote the public's patronage of local nurseries which are NIASA-accredited.	Short	SD
5.11	Encourage residents/businesses to plant local native flora in their gardens and verges by introducing a voucher scheme which can be exchanged for local native plants at a local commercial nursery. Investigate the opportunity of growing such stock at the City's nursery.	Medium	SD
5.12	Offer landscaping treatments to residents through a verge enhancement program.	Long	SD, IS
5.13	Establish a biodiversity conservation award for an individual / group to recognise the community's contribution to biodiversity conservation.	Medium	SD, MG
5.14	Erect signage to inform the community of the presence of hatchling animals during breeding seasons.	Medium	SD, IS
5.15	Create and implement programs for local primary schools that promote biodiversity awareness (e.g. Adopt-A-Coastline).	Medium	SD, IS, CE
5.16	Conduct frequent community walks within the City of Joondalup to educate residents about local natural areas and to highlight the biodiversity in their local community.	Medium	SD, IS, CE
5.17	Create example gardens and verges that advertise the use of local native plants.	Long	SD, IS, OS
5.18	Develop a Native Highlights Trail throughout Joondalup with a series of brochures describing and mapping the features and information boards along the route.	Long	SD, IS, MG

6.0 COMMUNITY ENGAGEMENT AND PARTNERSHIPS

Objective: *To improve outcomes by undertaking meaningful engagement and working in partnership with the community, key stakeholders and relevant agencies.*

As a local government the City has an important role to play in biodiversity protection. However it is important to recognise that the City is not the only organisation or group with a responsibility or ability to protect biodiversity. Effective biodiversity protection depends on all stakeholders working together with their different expertise, knowledge and resources to create a positive outcome. The City has shown and will continue to show leadership in establishing partnerships with many stakeholders. Key stakeholders include State Government agencies, adjoining Local Governments, local schools and universities, local Friends Groups, and Environment Groups.

Action No	Action	Timeframe	Responsibility
6.1	Develop a strategic approach to providing in-kind support, plants and materials, technical advice and loan of equipment to community groups working on projects to maintain local biodiversity.	Ongoing	OS
6.2	Continue to engage the community on biodiversity issues through relevant committees.	Ongoing	IS, SD
6.3	Foster relationships with local environmental groups, (eg: Joondalup Community Coast Care Forum; Yellagonga Community Advisory Group etc).	Ongoing	SD, IS, OS
6.4	Through the City's Community Funding Environmental Program, support projects that enhance and protect biodiversity.	Ongoing	SD
6.5	Encourage and promote the ICLEI LAB program to other Local Governments.	Short	SD
6.6	Establish long-term supply agreements with local nurseries to ensure a quality supply of local provenance native plants for the City's landscaping requirements.	Short	IS
6.7	Develop partnerships with local nurseries and industry bodies to promote the cultivation of local native plant species, stop the cultivation of potential weeds, and promote effective monitoring of diseases.	Short	IS, OS
6.8	Develop biodiversity partnership programs such as the Green Frog stencilling project that utilises local high-school students on the 20-hour Community Service Program.	Medium	SD, CE, IS, OS
6.9	Develop a strategic approach to providing support to Friends Groups which focuses on biodiversity issues.	Long	IS, SD
6.10	Work with academic institutions and State Government agencies to encourage development of biodiversity related research projects that the City can contribute to.	Long	SD

Action No	Action	Timeframe	Responsibility
6.11	Establish a work experience program for TAFE students to work with the City's staff.	Long	SD, OS
6.12	Develop partnerships with WALGA, Perth Regional NRM Inc., and neighbouring local governments to address wider biodiversity issues, (eg: disease; waste; groundwater etc).	Long	SD, IS