City of Rockingham

Community Plan Strategy

Natural Area Conservation

Division:	Planning and Development Services
Department:	Strategic Planning and Environment
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Date:	September 2017
HPRM:	D17/73058

city of Rockingham

where the coast comes to life

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1. Executive Summary

With consideration for the variety, significance and scale of natural environments managed directly by the City, strategic direction is required to ensure conservation resources are managed in an effective and sustainable manner.

Currently, the City's environmental management is guided by three Specific Purpose Reports. According to this approach, the development of environmental management plans is not cost effective or pragmatic and there is no framework for environmental monitoring to inform decision making.

This Community Plan Strategy (CPS) aims to review and consolidate the Specific Purpose Reports into an overarching framework, as they all concerned with the long-term protection and enhancement of the City's natural resources. This includes rationalising environmental management plans according to ecosystem type and significant attributes, together with delivering environmental monitoring programs to determine the efficacy of the current ecosystem management practices.

The purpose of this CPS is to protect and enhance the City's natural capital through effective measurement and management of threatening processes. Actions apply to all reserves with a Management Order in favour of the City and will be undertaken progressively over the next ten years.

Furthermore, the City continues to advocate for effective management of natural areas within the municipality which are the responsibility of other agencies.

2. Strategic Objective

The purpose of this Community Plan Strategy is to protect and enhance the City's natural capital through effective measurement and management of threatening processes.

The specific objectives of this CPS are:

1. To review and rationalise the existing strategic framework relating to City managed natural areas
2. To provide for the development of targeted environmental management plans for the City's bushland, wetland, foreshore and urban environments
3. To ensure management decisions are informed by accurate and comprehensive monitoring
4. Advocate for effective management of natural areas within the municipality which are the responsibility of other agencies.

This CPS addresses the Community's Vision for the future and specifically the following Aspiration and Strategic Objective contained in the Community Plan 2015-2025:

Aspiration D: *Sustainable Environment*
Strategic Objective: *Climate Change – Planning systems, infrastructure standards and community awareness programs that acknowledge, mitigate and adapt to the impacts of climate change.*

Coastal and Bushland Reserves – Coastal and bushland reserves that are well used and sustainably managed preserving them for future generations to enjoy.

3. Background

The City of Rockingham is situated within the unique biogeographic region of south-western Australia, which is recognised as one of the thirty global biodiversity hotspots. These hotspots are identified on the basis of containing large numbers of endemic species that are found nowhere else on Earth, while also being vulnerable to significant threats (DotEE, 2017). Habitat loss, invasive flora and fauna, pathogens, climate change and a host of other factors are putting the unique diversity of plant and animal life in south-western Australia under increasing threat. In order to conserve our region's biodiversity and prevent further losses, it is critical that remnant natural areas are appropriately protected and managed.

The responsibility for management of natural areas varies according to their local or regional significance. Areas of regional significance are subject to formal national or state protection mechanisms including; State Conservation Estate, Bush Forever sites and Metropolitan Region Scheme (MRS) Parks and Reserves.

Approximately 3890ha of the City's natural areas are managed under State protection mechanisms. A large proportion of the City's natural capital forms part of the Rockingham Lakes Regional Park, managed primarily by the Parks and Wildlife Service of the Department of Biodiversity, Conservation and Attractions. Of the remaining 2913ha, an estimated 490ha of locally significant areas are managed directly by the City.

This CPS is concerned with providing strategic direction for the use and management of those natural areas under the City's management, as shown in Figure 1.

These reserves are a vital component of the City's natural capital, underpinning its identity, prosperity and lifestyle. They encompass a variety of landforms and ecosystems throughout the City's coastal, wetland and bushland environments and support a diverse assemblage of native flora and fauna. Many of these areas are recognised by the State and Commonwealth governments for their conservation significance for containing Threatened Ecological Communities, priority flora and fauna species or Conservation Category Wetlands.

Given the variety, significance and scale of natural environments managed directly by the City, strategic direction is required to ensure conservation resources are managed in an effective and sustainable manner.

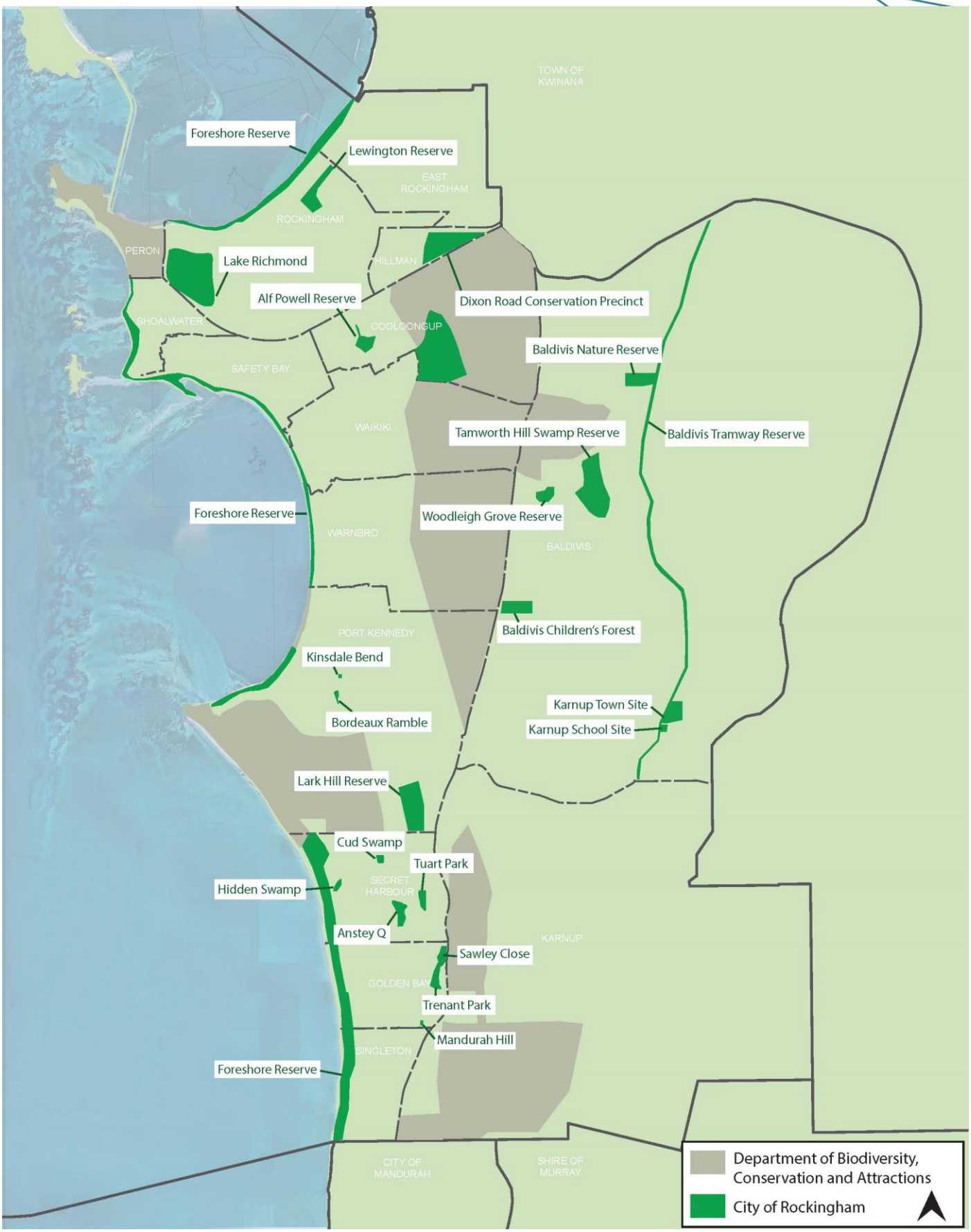

Figure 1 Reserves under the management of the City of Rockingham

3.1 Legislative framework

Effective management of the natural environment is reliant on the successful integration of a suite of legislation, policies and guidelines which are regulated at both a federal and state level.

3.1.1 *Environmental Protection and Biodiversity Conservation Act 1999*

The *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the Australian Government's central piece of environmental legislation. It provides a legal framework to protect and manage nationally and internally significant flora, fauna, ecological communities and heritage places, which are defined in the EPBC Act as Matters of National Environmental Significance (MNES).

The City's reserves are home to a number of Threatened Species and Ecological Communities that are defined as MNES under the EPBC Act and as such, appropriate management and preservation of these areas is a legislative requirement.

3.1.2 *Environmental Protection Act 1986*

The *Environmental Protection Act 1986* (EP Act) is the primary piece of environmental legislation in Western Australia. The EP Act provides for the prevention, control and abatement of environmental pollution and for the conservation, preservation, protection, enhancement and management of the environment.

3.1.3 *Biodiversity Conservation Act 2016*

The *Biodiversity Conservation Act 2016* (BC Act) ensures effective and ecologically sustainable governance of biodiversity conservation in Western Australia, including provisions relating to the identification and management of conservation significant flora, fauna and communities.

3.1.4 *State Land Administration Act 1997*

Part 4 of the *Land Administration Act 1997* (LA Act) provides for the creation and administration of reserves in Crown land in Western Australia. Once created, a reserve is usually placed under the care, control and management of a State government department, local government or incorporated community group by way of a Management Order registered against the relevant Crown Land Title. A Management Order under the LAA does not convey ownership of the land, but rather, only as much control as is essential for the land's management.

This CPS provides for best practice environmental management for all reserves with a Management Order in favour of the City.

3.1.5 Biosecurity and Agriculture Management Act 2007

The *Biosecurity and Agriculture Management Act 2007* (BAM Act) provides for the prevention of animal and plant pests entering Western Australia, as well as managing the impact and spread of those pests already present in the state.

All public authorities, including local and state government, are responsible for managing declared pests on public land under their control, in accordance with the BAM Act. Public authorities may also render assistance to owners and occupiers of land, as the local government or other public authority considers necessary, for the control of declared pests.

Local governments are also able to make local laws for the control of pest plants on private land under section 193 of the BAM Act, subject to and in accordance with the *Local Government Act 1995.*

3.2 Threatening processes

The protection and enhancement of conservation values is fundamentally concerned with the management of threatening processes (Guo & Cui 2015). The threatening processes to biodiversity conservation vary according to the unique biophysical characteristics of the area and the City's Parks Services team is responsible for implementing on ground actions to manage these threats in all reserves with a Management Order in favour of the City.

The City also acknowledges that effective management of threatening processes is reliant upon coordination with adjoining land owners. As such, the City plays an important advocacy role where natural areas within the municipality are the responsibility of other agencies.

A summary of threatening processes and their key management objectives are detailed below.

3.2.1 Climate change

There is consensus amongst climate scientists that increasing levels of greenhouse gases attributable to human activities are likely to be contributing to global warming. Changes observed over the 20th century include increases in global average air and ocean temperature, widespread melting of snow and ice and rising global sea levels. The extra heat in the climate system also has other impacts such as affecting atmospheric and ocean circulation, which influences rainfall and wind patterns (Department of the Environment 2015).

Records show that the decade of 2001-2010 was the world's warmest decade on record and in Australia, each decade has been warmer than the previous decade since the 1950s (DoTE 2015).Scientists predict that as the unique biodiversity and ecosystems in south-western Australia are particularly sensitive to changes in temperature and rainfall, the capacity of these natural systems to adapt to climate change is limited. (DoTE 2015).

Tackling the impacts of climate change will ultimately require a global response, however, the City's management approach acknowledges the consensus that healthy ecosystems are likely to be more resilient in the face of climate change (DoEE 2017). It is also important that the City preserves and manages an interconnected network of natural areas across the landscape which will provide opportunities for species to move and adapt in response to changing climatic conditions.

<u>Key management objectives:</u>

- Manage threatening process
- Promote species diversity through revegetation
- Maintain network of reserves across the landscape
- Continue to monitor sensitive ecosystems in order to detect changes and take informed action as required.

3.2.2 Invasive Flora

Invasive species represent the biggest threat to biodiversity after habitat loss (DoTE 2014). Also known as weeds, invasive flora are plants that require some form of action to reduce negative impacts on the economy, environment, human health and amenity (DotE 2014). Weeds can impact on environmental values by:

- Out-competing native species for nutrients, water, space and sunlight
- Reducing the natural diversity by smothering native plants or preventing them from growing back
- Reducing habitat for native animals
- Altering fire regimes (DPaW 2014).

Introduced plants occur throughout all of the City's reserves but are most dominant in the modified or previously disturbed areas, particularly adjoining paths or parkland areas. Dynamic and sensitive environments should utilise an integrated approach to weed management, which involves a combination of mechanical and chemical systems coupled with revegetation to increase ecosystem resilience and long term viability.

Key management objectives:

- Prevent the introduction of additional weed species
- Reduce the extent of weed suite coverage and density
- Ensure weed control actions do not negatively impact flora and fauna
- Support weed management with revegetation and erosion control.

3.2.3 Invasive Fauna

Rabbits, foxes and feral cats are listed under the EPBC Act as key threatening processes to the conservation of biodiversity in Australia. There are a number of introduced fauna species that are likely to occur within the City and these animals can have potential impacts on native species including:

- Predation on native fauna species and grazing native plants
- Competition with native fauna for food and shelter
- Destroying habitat
- Spreading diseases
- Land degradation including dune erosion and destruction of vegetation.

Introduced fauna species that pose a threat in the City's reserves include:

- European rabbit (*Oryctolagus cuniculus*): grazes on native vegetation, may impact on revegetation, may impact upon revegetation efforts as leading to dune erosion
- European red fox (*Vulpes vulpes*): preys on native fauna species, competes with native fauna for food, habitat and other resources
- Feral cat (*Felis catus*): preys on native fauna species, compete with native fauna for food, habitat and other resources
- European bee (*Apis melifera*): competes with native fauna species for tree habitat.

Key management objectives:

- Ensure feral animal control methods are suitable for use in close proximity to urban environments
- Optimise the use of limited resources by undertaking monitoring to prioritise areas of high feral animal activity
- Prioritise control in areas of high quality natural vegetation to prevent degradation of habitat value

- Prioritise areas of known fauna habitat, particularly to support Southern Brown Bandicoot populations.

3.2.4 Inappropriate Access

Inappropriate access, such as the use of undefined tracks through reserves, can result in habitat loss through trampling of vegetation. Trampling can damage vegetation, change plant composition, reduce plant cover and may result in the spread of weeds. This loss of vegetation can also lead to erosion, which is exacerbated by unauthorised access of 4WDs and motorbikes.

To manage these impacts, the City aims to fence sensitive reserve areas with access restricted to designated points for pedestrians, bicycles or authorised vehicles only.

Key management objectives:

- Reduce fragmentation by consolidating access tracks where appropriate
- Rehabilitate unauthorised tracks through weed control, revegetation and brushing
- Ensure all areas of natural areas are fenced to restrict unauthorised access
- Ensure areas of damaged or absent fencing are attended to in a timely manner, with old fencing upgraded to a rural style where appropriate
- Prohibit the use of unauthorised vehicles in the reserves and install signage warning of penalties, where appropriate.

3.2.5 Diseases and Pathogens

Diseases and pathogens of plants have the potential to cause death and decline of plant species. There are a number of diseases and pathogens, including rusts, cankers and Mundulla Yellows that may potentially occur in the City's reserves and affect vegetation health. The key threatening diseases and pathogens include:

- Tuart Borer (*Phoracantha impavida*): a beetle which can impact Tuart woodland
- Honey Fungus (*Armillaria luteobubalina*): a disease affecting coastal vegetation in the Quindalup and Spearwood dunes, which can result in root rot and changes to dune systems (Conservation Commission of WA 2010).
- Dieback (*Phythopthora cinnamomi*): a disease causing root rot in susceptible plants. The City's landforms are less vulnerable to the effects of P. *cinnamomi* on vegetation. However, the reserves in the east of the City, including Karnup Town Site and Karnup School Site have the potential to be impacted upon by P. *cinnamomi.* There are a number of other *Phytopthora* species that have the potential to occur within the City, including *P. humilis* and *P. littoralis.*

The primary objective for disease and pathogen management within the City is to prevent the spread of the pathogen. To minimise the risk of these diseases and pathogens entering reserves, appropriate hygiene standards should be maintained through the management objectives outlined below.

Key management objectives:

- Ensure revegetation tubestock are sourced from an accredited nursery;
- Ensure machinery, vehicles, equipment and footwear arrive at the site free from mud and soil
- Ensure machinery and equipment is not cleaned inside the reserve;
- Works involving the movement of soil should only be undertaken in dry soil conditions to minimise the risk of dieback being dispersed by machinery
- Disinfect footwear and equipment with undiluted methylated spirits or similar when entering bushland areas.

3.2.6 Vandalism

Vandalism can include destruction of property and facilities as well as damage to native vegetation, such as tree poisoning and illegal clearing. Generally, large scale rubbish dumping occurs where reserve access is not well controlled. This can result in the spread of weeds and diseases, can reduce the visual amenity of the reserves and can constitute a fire hazard.

Littering is also a common problem in reserves, particularly those of high use, such as the foreshore areas and reserves within residential areas. Littering is best managed through ensuring adequate provision of rubbish bins, litter removal and education.

Key management objectives:

- Restrict unauthorised access into reserves
- Provide controlled pedestrian access points for recreational users
- Maximise visual surveillance wherever possible
- Ensuring adequate provision and emptying of rubbish bins
- Undertake regular litter removal
- Provide educational signage in reserves
- Prohibit the dumping of rubbish within the reserves and install signage warning of penalties, where appropriate.

3.2.7 Fire

It is likely that the reduced rainfall and higher temperatures associated with climate change may result in increased frequency of fires. Occurrences of arson may also increase within natural areas as the urban footprint further encroaches upon areas of remnant vegetation.

Increased fire frequency threatens biodiversity, reduces the ability of native species to effectively reproduce and can encourage the growth of invasive weeds. Most importantly, fire also poses a threat to lives, infrastructure and properties.

Management of fire hazards in City managed reserves requires careful consideration of the associated ecological, social and resourcing factors and must be consistent with the City's Bushfire Risk Mitigation Strategy (2017) and associated Bushfire Risk Management Plan (2017-2021).

3.2.8 Hydrological Changes

Reduction in groundwater levels, due to an increase in abstraction coupled with a decrease in annual rainfall, has been identified as a long term threat to ecosystems on the Swan Coastal Plain. The City encompasses a number of groundwater dependant ecosystems which are susceptible to impacts of groundwater drawdown (Canham *et al.* 2009; DoEE 2015). Extreme cases of excessive groundwater drawdown can lead to sudden and widespread vegetation death (Groom *et al*. 2000).

The Department of Water is responsible for regulating groundwater abstraction in Western Australia to ensure that ecosystems are not impacted in this way and the City is responsible for ensuring that groundwater usage does not exceed the licenced allocation.

3.4 Adaptive environmental management method

The management of natural areas is associated with varying degrees of uncertainty, including complex interactions with community and the surrounding urban environment.

Negative environmental impacts occur across different spatial and temporal scales and are often the consequence of multiple processes.

Adaptive environmental management is the notion that the development of purposeful and effective management actions should be based on up to date information in a way that enhances our capacity to learn from previous actions and continually improve in light of this complexity and uncertainty (Stankey and Allan 2009).

Environmental Management Plans are a widely accepted best practise method used to first identify the ecological values of an area and then outline specific actions to manage threatening processes.

In addition to management plans, targeted monitoring is typically employed to determine the efficacy of ecosystem management practices, which subsequently informs future actions.

3.5 Understanding the current situation

The review and development of management plans in response to threatening processes in City managed reserves is currently outlined in 3 respective Specific Purpose Reports:

1) Bushland Management Strategy;
2) Feral Cat/Fish Control Plan; and
3) Urban Wetlands Monitoring Plan.

Bushland Management Strategy

The Bushland Management Strategy is concerned with the City's management of native vegetation and aims to prioritise areas according to ecological viability and recommend mechanisms by which they are to be protected or rehabilitated. The Bushland Management Strategy involves a number of key elements:

- Ongoing review of existing management plans;
- Prioritisation of City reserves according to management end ecological viability criteria;
- Undertake a comprehensive groundwater monitoring program to determine water quality suitable for irrigation, in accordance with statutory requirements prescribed by the Department of Water; and
- Development of Environmental Management Plans (23 in total) with specific management objectives and actions, including:
    - Baldivis Tramway Masterplan;
    - Tamworth Hill Swamp Management Plan;
    - Foreshore Strategy;
    - Greening Plan;
    - Reserve Prioritisation Report;
    - Dixon Road Conservation Precinct Management plan; and
    - An additional 17 individual reserve management plans for areas such as Anstey Q Wetland, Cud Swamp, Baldivis Nature Reserve etc.

Feral Cat/Fish Control Plan

The Feral Cat/ Fish Control Plan aims to gauge the impacts of feral cats and feral fish on the local environment through population analysis and develop actions to manage and control these populations. The Feral Cat/Fish Control Plan involves a number of key elements:

- Assessment and quantification of feral cat and fish populations and impacts within the City;

- Raise community awareness and develop partnerships; and
- Develop management actions for the control of feral fauna and mitigation of associated impacts.

Urban Wetlands Monitoring Plan

The Urban Wetlands Monitoring plan guides the biannual monitoring and biennial reporting of the City's urban wetlands and aims to prescribe management. It involves:

- Biannual monitoring of the City's urban wetlands, with a report produced biennially;
- Assessment of results and observations; and
- Implementation of remedial actions.

3.5.1 Key issues and opportunities

Issue: While the above Specific Purpose Reports each address different aspects, ultimately, they are all concerned with the protection and enhancement of conservation values through the management of threatening processes. Having three Specific Purpose Reports with the same overarching purpose is considered a duplication of effort and results in a somewhat convoluted strategic framework. The opportunity exists to rationalise these Specific Purpose Reports into this CPS, which in effect will streamline the process while altogether achieving a better outcome.
Opportunity: Review and rationalise the three existing Specific Purpose Reports into this CPS

Issue: Based on the current framework, an Environmental Management Plan must be prepared for each reserve, 23 in total. Relative to available resources, only 9 of these plans have been completed to date. The development of Environmental Management Plans requires engaging suitably qualified consultants to undertake flora and fauna surveys; therefore it is believed that having an individual Environmental Management Plan for each reserve is not a cost effective approach.
Opportunity: Improve efficiencies and achievability by consolidating Environmental Management Plans

Issue: A key component of adaptive management is to monitor the effectiveness of operational procedures and adjust management actions in line with the findings of the monitoring reports. While the City undertakes environmental monitoring activities under the three Specific Purpose Reports, there is no overarching strategic framework which provides for a feedback loop between monitoring and management.
Opportunity: Establish one coherent framework for Environmental Monitoring Programs to inform management actions and evaluate efficacy

3.6 Key Elements

From the above, the following key elements have been established:

1. Environmental Management Plans
2. Environmental Monitoring Programs

4. The Way Forward

The three previous Specific Purpose Reports have been incorporated into this one CPS, which will focus on two major components; Environmental Management Plans and Environmental Monitoring Programs (Figure 2).

Collectively, the development of these plans and programs provide a framework for successful ecosystem improvement by allowing the City to assemble, describe and evaluate best practise environmental management.

4.1 Element 1 – Environmental Management Plans

Objective: **To provide for the development of targeted Environmental Management Plans for the City's bushland, wetland, foreshore and urban environments**

This would be achieved by:

- Replacing the current model which requires delivery of a management plan for each reserve (a total of 23), with four key Environmental Management Plans as detailed below:

Table 1 Four key ecosystem based management plans

Document	Focus
Bushland Management Plan	Management of all bushland reserves (i.e. Baldivis Nature Reserve, Lewington Nature Reserve)
Wetland Management Plan	Management of all wetland reserves (i.e. Woodleigh Grove, Anstey Q Wetland)
Foreshore Management Plan	Management of all foreshore reserves (i.e. Shoalwater Foreshore, Secret Harbour Foreshore)
Greening Plan	Urban greening and establishing vegetated corridors through parkland areas and streetscapes.

- Preparing individual Environmental Management Plans only where reserves have very unique conservation and recreation values or are subject to associated state or federal conditions, to ensure appropriate consideration of these significant aspects. Such reserves include:

Table 2 Individual reserve based plans

Reserve	Unique attributes
Baldivis Tramway	Need to provide strategic direction for the use and management of this 12km long reserve with respect to multiple adjacent developer landholdings.
Lake Richmond	Contains two federally listed Threatened Ecological Communities, is an important Indigenous and European Heritage Site, forms part of the Rockingham Lakes Regional Park and requires communication between multiple stakeholders.
Tamworth Hill Swamp	Part of an environmental offset agreement and has been recently revegetated with over 12 hectares of Black Cockatoo feeding habitat. Contains significant recreation and conservation values due to reserve size and proximity to urban centre.
Dixon Road Conservation	Environmental offset site, forms part of the Rockingham

Precinct	Lakes Regional Park, is an important ecological linkage and contains significant recreation and conservation values.
Karnup Nature Reserve	Connection to Indigenous and European heritage, forms the future southern trail head of the Baldivis Tramway reserve and contains significant recreation and conservation values.

Justification:

The four key management plans will collectively address site specific actions relative to the City's foreshore, wetland, bushland and urban environments and the management considerations unique to these ecosystems. This approach is based on the principle that similar ecosystems require similar considerations for management and therefore, resources can be allocated accordingly to maximise conservation outcomes (Soranno *et al.* 2010; MacNally *et al.* 2002).

Together, the four key management plans will ensure the appropriate protection and management of the City's foreshore, bushland and wetland ecosystems in addition to improving the ecological value of the urban greening and parkland environments.

Although dominant threatening processes and management considerations can typically be determined according to broad ecosystems, best practise environmental management approaches still stress the importance of distinguishing the need for finer scale management plans to ensure specialised focus where complex ecological attributes and significant values are concerned (Soranno *et al.* 2010).

As such, the individual reserve management plans provide scope to address site specific management at a finer scale, where required. It is possible that reserves may be added or removed from Table 2 in the future should management demands and priorities change, which will be informed by the Environmental Monitoring Programs.

Economic efficiencies:

The table below provides a comparison of financial implications for the development of Environmental Management Plans in accordance with the current and proposed models. This comparison highlights a significant reduction in capital expenditure under the proposed model which is achieved by consolidating plans of a similar nature, therefore representing a more cost effective outcome to the City.

Table 3 Financial Implications for the development of Environmental Management Plans

Current model	**Cost**
23 x management plans required	$1,220,000
Proposed model	**Cost**
9 x management plans required	$760,000

4.2 Element 2: Environmental Monitoring Programs

Objective: To ensure management decisions are informed by accurate and comprehensive monitoring programs.

This would be achieved by:

- Undertaking the Environmental Monitoring Programs detailed below.

Table 4 Environmental Monitoring Programs

Program	Focus	Outcome
Urban Water Monitoring Program	Collate and analyse data relative to surface water, monitoring bores and production bores.	To inform decision making regarding matters concerned with water quality.
Frog Population Monitoring Program	Collate and analyse data relative to frog species occupancy, breeding and environmental site conditions.	To provide a leading indicator of climate change impacts and overall wetland health.
Feral Animal Control and Population Monitoring Program	Undertake annual Feral Animal Control Program, while collating data relative to density and distribution of feral fauna populations.	To inform feral animal control measures and evaluate efficacy of the annual control program.
Vegetation Condition and Viability Assessments	Collate and analyse data relative to vegetation condition and ecological viability in all reserves.	To evaluate efficacy of environmental management measures and inform prioritisation of reserves.
Little Penguin Monitoring	Support the Little Penguin Research Program in collaboration with Murdoch University to better understand the health, ecology and resilience of Little Penguins and the coastal marine habitats they occupy.	To provide a leading indicator of climate change, anthropogenic impacts and overall marine health.

- Advising adjoining land managers prior to undertaking monitoring and discussing results to coordinate management actions as required.

Justification:

The City's reserves encompass dynamic natural systems which are subject to a range of external pressures. As the pressures continue to change, so too do the dominant threating processes. In response to this ecological uncertainty, monitoring enables the City to form a better understanding of overall environmental condition and emerging threats (Poiani *et al.* 2000).

It is critical that the development of purposeful and effective management plans and associated actions are informed by up to date data in a way as to enhance learning and enable continual improvement. Conversely, management plans guide monitoring by establishing a focus and it is in this way that the two key components of this CPS can evolve as new information emerges and management demands change.

In summary, the monitoring programs will enable:

- The creation of a long term and reliable dataset

- The efficient review and development of Environmental Management Plans
- The establishment of trends to identify the impacts of climate change or other threatening processes on the City's natural capital
- The development and implementation of effective management and potential mitigation strategies
- The prioritisation of natural areas for management.

The ultimate goal of these programs is to ensure decisions are well informed and based on accurate, ongoing and comprehensive measurement.

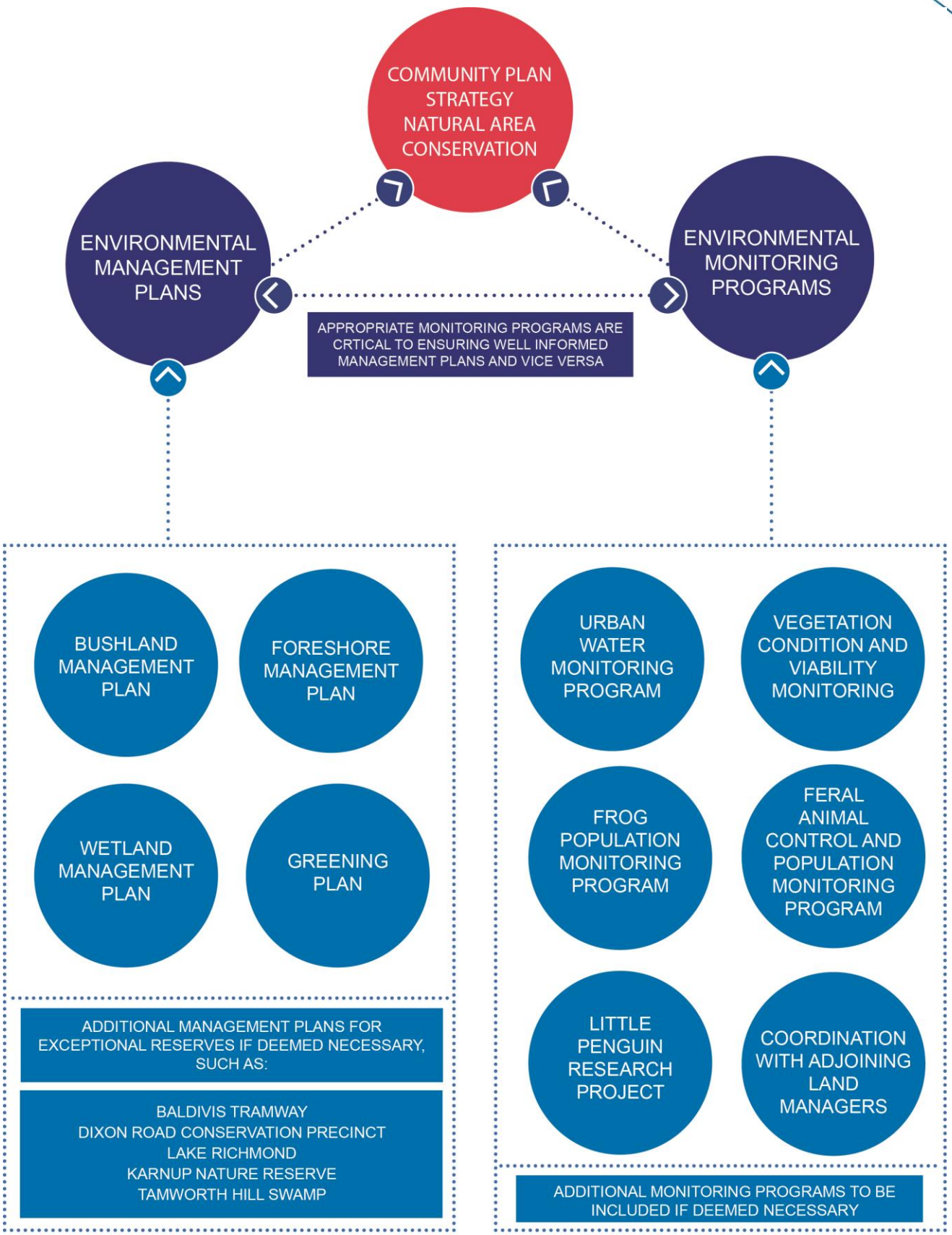

Figure 2 Structure of Community Plan Strategy - Natural Area Conservation

5. Measuring success

5.1. Element 1 - Environmental Management Plans

What will be measured?	Completion of Environmental Management Plans
When will it be measured?	End of financial year
How will it be reported to Council?	Council Bulletin

5.2. Element 2 - Environmental Monitoring Programs

What will be measured?	Implementation of Environmental Monitoring Programs
When will it be measured?	Periodically, upon completion of each program
How will it be reported to Council?	Council Bulletin

6. Risk Management

Risk description	*Risk rating*	*Action required*
Risk of poorly managed natural areas resulting in loss of significant environmental, social and economic values.	*Medium*	*Implementation of Community Plan Strategy – Natural Area Conservation to protect and enhance the City's natural capital through effective measurement and management of threatening processes.*

7. Actions

New Actions

Table 4: New Actions.

Task	*Cost*	*Team*	*Commence*	*Complete*
Element 1: Environmental Management Plans				
Ecosystem based plans				
(a) Foreshore Management Plan (complete)	*$120,000*	*Strategic Planning and Environment*	*2015/16*	*2015/16*
(b) Greening Plan (currently under development)	*$90,000*	*Strategic Planning and Environment*	*2016/17*	*2016/17*
(c) Wetland Management Plan	*$120,000*	*Strategic Planning and Environment*	*2017/18*	*2017/18*
(d) Bushland Management Plan	*$120,000*	*Strategic Planning and Environment*	*2018/19*	*2018/19*
Individual reserve plans				
(e) Lake Richmond Management Plan	*$60,000*	*Strategic Planning and Environment*	*2017/18*	*2017/18*

(f) Tamworth Hill Swamp Management Plan	$60,000	Strategic Planning and Environment	2018/19	2018/19
(g) Dixon Road Conservation Precinct Management Plan	$60,000	Strategic Planning and Environment	2019/20	2019/20
(h) Karnup Nature Reserve Management Plan	$60,000	Strategic Planning and Environment	2019/20	2019/20
(i) Baldivis Tramway Master Plan	$70,000	Strategic Planning and Environment	2023/24	2023/24
Element 2: Environmental Monitoring Programs				
(a) Vegetation condition and viability assessments	$80,000	Strategic Planning and Environment	2020/21	2020/21

Ongoing actions

Table 5: Ongoing Actions.

Task	Cost	Frequency	Team
Element 2: Environmental Monitoring Programs			
a) Urban Water Monitoring Program	$200,000	Varies according statutory reporting requirements (annual, biennial, triennial)	Parks Services
b) Frog Population Monitoring Program	$20,000	Biennial	Strategic Planning and Environment
c) Feral Animal Control and Population Monitoring Program	$40,000	Annual	Parks Services
d) Little Penguin Research Project	$20,000	Annual (current agreement to 2018/19)	Strategic Planning and Environment
e) Communication and coordination with adjoining land managers	N/A	Prior to undertaking monitoring, prior to undertaking management actions where a collective approach is required	Strategic Planning and Environment Parks Services

8. Stakeholder Engagement

Key Stakeholders invited to participate	Contributed? (Yes/No)	Engagement method used
Parks Services	Yes	Internal discussions, email
Department of Parks and Wildlife	Yes	Email

9. References

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