Cussen Park

Environmental Management Plan 2016

GREATER SHEPPARTON

A Park for People

Version History

Version	Date	Comments
1.0	22/08/14	Draft sent to CPAC for comment
1.1	13/11/14	Comments received from CPAC
1.2	18/11/14	Additional comments from Native Open Space
1.3	28/08/15	All comments incorporated (MO'H)
1.4	23/05/16	Public consultation comments incorporated (DM)

TRIM: M16/65061

Contents

1. Key Messages

Cussen Park Vision
The creation and maintenance of an Australian bushland-style park for people.

Philosophy of Park Operation
Cussen Park (hereafter referred to as “the Park”) and its associated wetlands cater for passive recreation, support educational and environmental values, and provide partial biological treatment for Tatura's stormwater.

The Park, one of Greater Shepparton City Council’s largest parks, contains a wide variety of environmental features and facilities for those wishing to visit the Park. The following document describes the broad management philosophy for the Park, as well as more detailed information including specific management actions.

Adaptive Management
The management regime recommended for the Park within this Environmental Management Plan has been developed based on current climatic conditions. However, as conditions in the Park change over time, the recommended management regime may need to be adapted to meet these changes.

On-going management guidelines for the Park are not able to be completely prescriptive, as the Park’s many natural assets respond differently to local climatic variability. Depending on the nature of this variability, some management actions may need to be undertaken more regularly than recommended in this Plan, while others may not be required as frequently as suggested.

Handle with Care
Many of the environmental assets contained within the Park are depleted on a local or even a regional scale. All management activities need to be undertaken with this in mind to ensure that they do not have a negative impact on the Park’s environmental values.

2. Introduction

Cussen Park is an Australian bushland-style park encompassing 33 ha of wetlands, woodlands and open space on the northern outskirts of the town of Tatura in northern Victoria (Figure 1). The land that forms the Park is owned by the Greater Shepparton City Council (Council), and is surrounded by freehold industrial, residential and irrigated farm land.

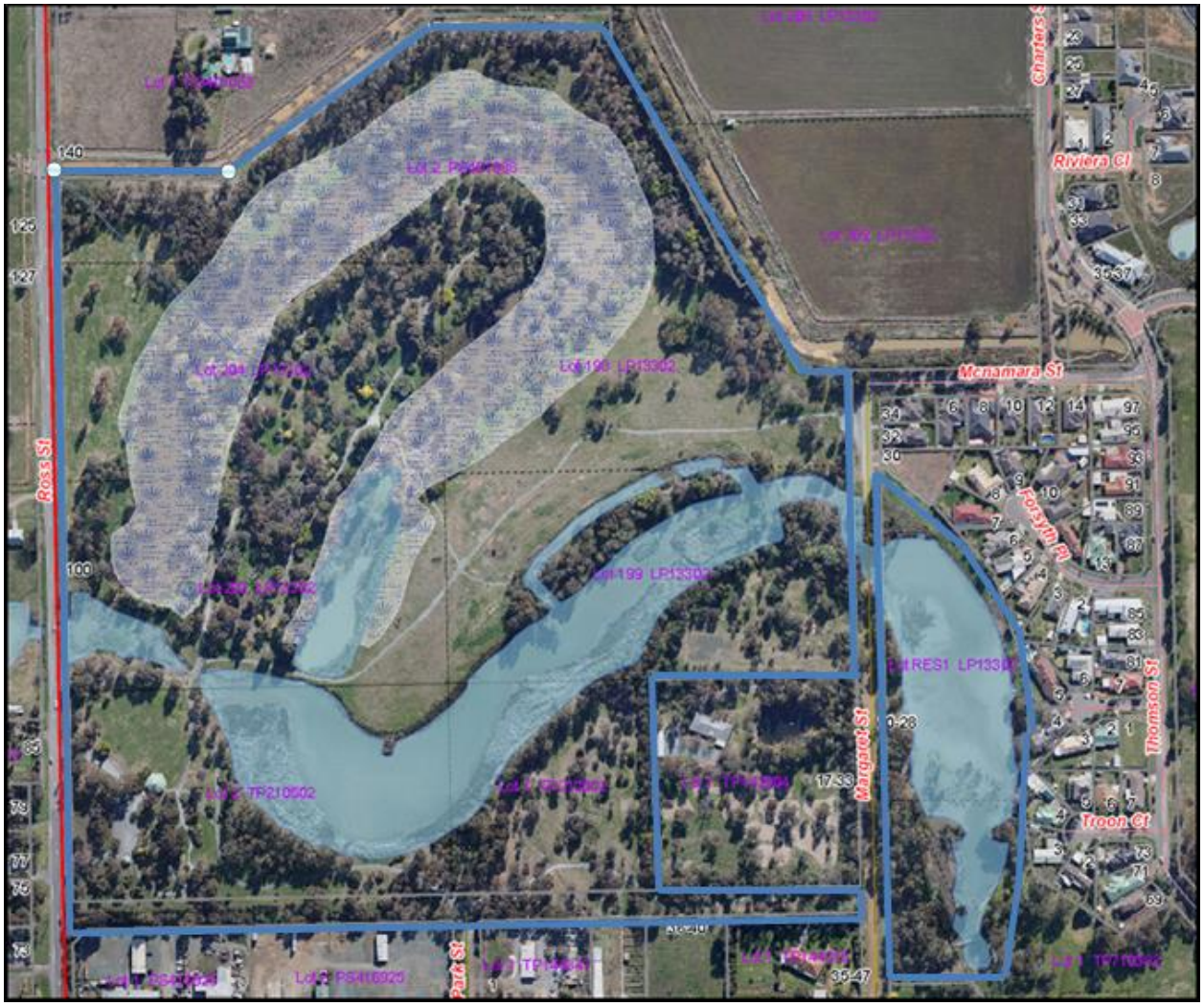


Figure 1. Aerial view of Cussen Park.

The Park was formed from reclaimed wastelands by the Tatura community working closely with Council, State and Federal Government agencies, and local sponsors. It now forms a valuable community asset for the township of Tatura, providing educational opportunities, passive recreation, and significant habitat for indigenous plants and animals. The Park is also used to partially biologically treat Tatura's urban stormwater, improving the quality of water flowing to wetlands and farms downstream.

Originally the land that now forms the Park was used for grazing, as an extension of surrounding farmland. In later years, uses included a Council rubbish tip, a BMX track and a gravel dump. This resulted in much of the Park being left as wasteland. In 1983, a small section was developed as parkland and the area was named Cussen Park in honour of the first Rodney Shire President Martin Cussen.

In 1993, the then Rodney Shire proposed to rezone the area that now forms the Park for residential development, to address visual amenity issues associated with the land and generate revenue for the Council. Numerous objections were received to the proposal from residents in Tatura. A public meeting was held and overwhelming support from the community was received for the development of a

bushland park on the site. A management committee, now known as the Cussen Park Advisory Committee (the Advisory Committee) was formed.

In 1994 a detailed plan for the Park was prepared with Council funding. The plan integrated a bushland park, open space, and a stormwater treatment facility, and was adopted by Council. The Plan, known as “Future Use and Development of Cussen Park” included a design for the Park and its features, and identified an area in the north west of the Park that could be set aside for residential subdivision.

In January 1995, works began on developing the Park based on the Plan. Works included working bees and large scale earthmoving to cover open tips, create islands, and place structures to allow water levels in the lakes to be manipulated. Considerable “in kind” contributions were made by community members, with help from sponsorship by service organisations, Council and other agencies. These contributions have continued every year since and an enormous effort has been made to establish, nurture and maintain the native vegetation and wetland habitats.

This Environmental Management Plan has been produced by Greater Shepparton City Council in conjunction with the Cussen Park Advisory Committee. The aim of this plan is to consolidate information relating to the current management of the Park, and to develop an integrated management approach for the future.

3. Management Roles and Responsibilities

A range of organisations and individuals have an interest in the Park. With these interests come a range of formal and informal responsibilities that need to be fulfilled in order to ensure that future management and development of the Park is consistent with its vision and purpose.

The key stakeholders of the Park are:

- Greater Shepparton City Council;
- Cussen Park Advisory Committee;
- Users of the Park; and
- Adjacent landowners.

The following sections outline the roles and responsibilities vested with these key stakeholders.

3.1 Greater Shepparton City Council

The Park is a Council owned asset and consequently Council has a range of roles and responsibilities with regard to the Park. Council will endeavour to achieve the annual maintenance requirements for the Park, using the resources and funding available in accordance with the Council's annual budgetary process. Maintenance activities will be scheduled with due consideration of Council's other maintenance commitments.

The roles and responsibilities of Council will include:

Native Open Space Team

- Weekly general site inspection of the Park
- Performance of routine maintenance within the Park, including mowing and slashing of designated areas
- The management (control) of a range of pest plant and animal species, having regard for seasonal conditions and available resources
- Tree pruning for risk purposes
- Track maintenance including resurfacing and weed spraying
- Routine collection of rubbish (twice per week) within key areas of the site, including the picnic shelter, car park and toilet block
- Regular inspection and cleaning (twice per week) of the toilet facilities
- The completion of regular safety audits to ensure that all infrastructure within the Park is safe
- The management of infrastructure/assets to ensure that it meets safety and other requirements of the Council
- The repair of any damaged infrastructure, having regard for public safety and subject to the Council's annual budgetary process
- Consideration of vehicle and equipment hygiene (e.g. minimise the risk of weed spread)
- The operation of water regulating structures
- Regular attendance of meetings (at least three times a year) with appropriate Advisory Committee representatives to ensure that there is sufficient cooperation and coordination of

management of Park management activities. These meetings will also discuss strategic and non-urgent maintenance issues.

- Where appropriate, consultation with the Advisory Committee regarding proposed activities
- Identification of two designated officers for all contact with the Council for urgent enquiries (see contacts section 3.5)
- Ensuring Council staff undertake appropriate training

Sustainability and Environment Team

- Offering advice and assistance to the Advisory Committee on environmental and management issues
- Assisting the Advisory Committee with grant applications
- Working with Council's Recreation & Parks Department to manage the Park in accordance with this Plan
- Attending regular meetings with the Advisory Committee
- Managing the allocated budget
- Managing the water monitoring program (Waterwatch)
- Undertaking infrastructure upgrades
- Overviewing stormwater management issues
- Providing and/or renewing signage

3.2 Cussen Park Advisory Committee

The Advisory Committee was formed in 2012. Prior to this a committee of management had been in place from 1994-2012.

The roles and responsibilities of the Advisory Committee will include:

- Monitor and advise Council on Park health
- Undertake and develop strategic planning with Council
- Identify a designated member for all contact with the Council for urgent works, risk and hazard identification e.g. tree over path (see Section 3.6 for definition of urgent works)
- Develop and provide a list of potential Park improvement projects to the appointed Council representative by November each year for review by the Council in line with budget timelines
- Inform Council on activities undertaken by the Advisory Committee within the Park
- Undertake appropriate public relations, promotional and educational activities to maintain and where possible, enhance the profile of the Park in consultation with Council
- Seek funding through available grants to enhance the Park or hold activities in the Park in consultation with Council

3.3 Park Users

Whilst the users of the Park do not have any formal roles and responsibilities, there are a set of values and behaviours that they are expected to display to ensure that they do not compromise the environmental and aesthetic values and purpose of the Park.

The behaviours expected of all Park users include:

- Disposing of any litter they generate into the bins provided, or removing any litter that they generate
- Using the paths that are provided for passive recreational purposes, and sharing with all users (e.g. walkers and cyclists). Private vehicles (cars and motorcycles) are not permitted in the Park unless authorised
- Keeping all domestic pets under control at all times. This means that dogs must be kept on a leash. Dogs should not disturb wildlife nor should they enter the wetland areas. Dog owners are also expected to pick up and remove any dog droppings, or dispose of droppings in the bins provided
- Not camping within the Park including the car parks
- An awareness that the Park is a 'bushland park', and that users need to be aware of a range of potential natural hazards such as falling tree limbs, the presence of snakes, etc.
- Not removing timber or digging for Bardi Grubs. These activities are prohibited.

3.4 Adjacent Landholders

The responsibility of landholders whose properties abut the Park is to ensure that any land management activity they undertake does not have an adverse impact on the value and purpose of the Park.

3.5 Landholders encroaching on Council land

Encroachment of council land is not permitted in the Park. This position is consistent with the Council's Local Law Number 1 which states:

"A *person must not, except with a permit:*

(i) Erect or construct any building, undertake any building work or deposit any rubbish, refuse or obstacle on or in any public place

(ii) Exclusively occupy or fence off any public place

(iii) Plant a tree, shrub, hedge or other vegetation (except for lawn on a naturestrip) in a public place

(iv) Remove anything from a public place

(v) Allow mud, clay, debris or material to be deposited on any part of a road or in any public place

(vi) Damage or interfere with anything in. on or under a public place

(vii) Remove forest produce or firewood from public land or a highway"

3.6 Contacts

The majority of management activities in the Park are undertaken either by Council or the Advisory Committee. To ensure interaction between these organisations is as effective and efficient as possible and that all issues are addressed by the relevant agency or individual, up-to-date contact information for these representatives needs to be maintained.

Council have identified one primary contact for all correspondence in relation to the Park. The primary contact is the officer nominated to attend Advisory Committee Meetings.

Two officers have also been identified for urgent maintenance. Urgent maintenance is defined as an incident that is a danger to the public. This may include fallen trees or damage to infrastructure that may put the public at risk, or may impact the operation of the Park.

All non-urgent issues are to be raised in the monthly Advisory Committee meetings.

Table 1 and Table 2 list key contacts from both Council and the Cussen Park Advisory Committee.

Table 1. Key Contacts – Greater Shepparton City Council

Name	Title	Phone Number	Mobile Phone Number	Email	Area of Responsibility
Greg McKenzie	Manager Environment	5832 9833	0418 599 924	greg.mckenzie@shepparton.vic.gov.au	Primary contact
Katie Wallace	Team Leader Landscaping and Native Open Space.	5832 9360	0409 257 560	katie.wallace@shepparton.vic.gov.au	Urgent Maintenance
Paul Dainton	Coordinator – Native Open Space	5832 9374	0409 732 376	paul.dainton@shepparton.vic.gov.au	Urgent Maintenance

Table 2. Key Contacts – Cussen Park Advisory Committee

Name	Title	Phone Number	Mobile Phone Number	Email
Simon Cowan	Chair	5826 3733	0427 301 732	Simon.cowan@gmwater.com.au
Terry Court	Deputy Chair	5824 2642	0407 344 912	terryct@bigpond.net.au
Yvette Williams	Secretary			
Greg Smith	Member			
Alfred Heuperman	Member			
Sean Trebley	Member			
Lydia Drake	Member			

4. Management Zones

Cussen Park contains several management zones (Figure 2). Each zone has slightly different environmental conditions, management requirements and management aims.

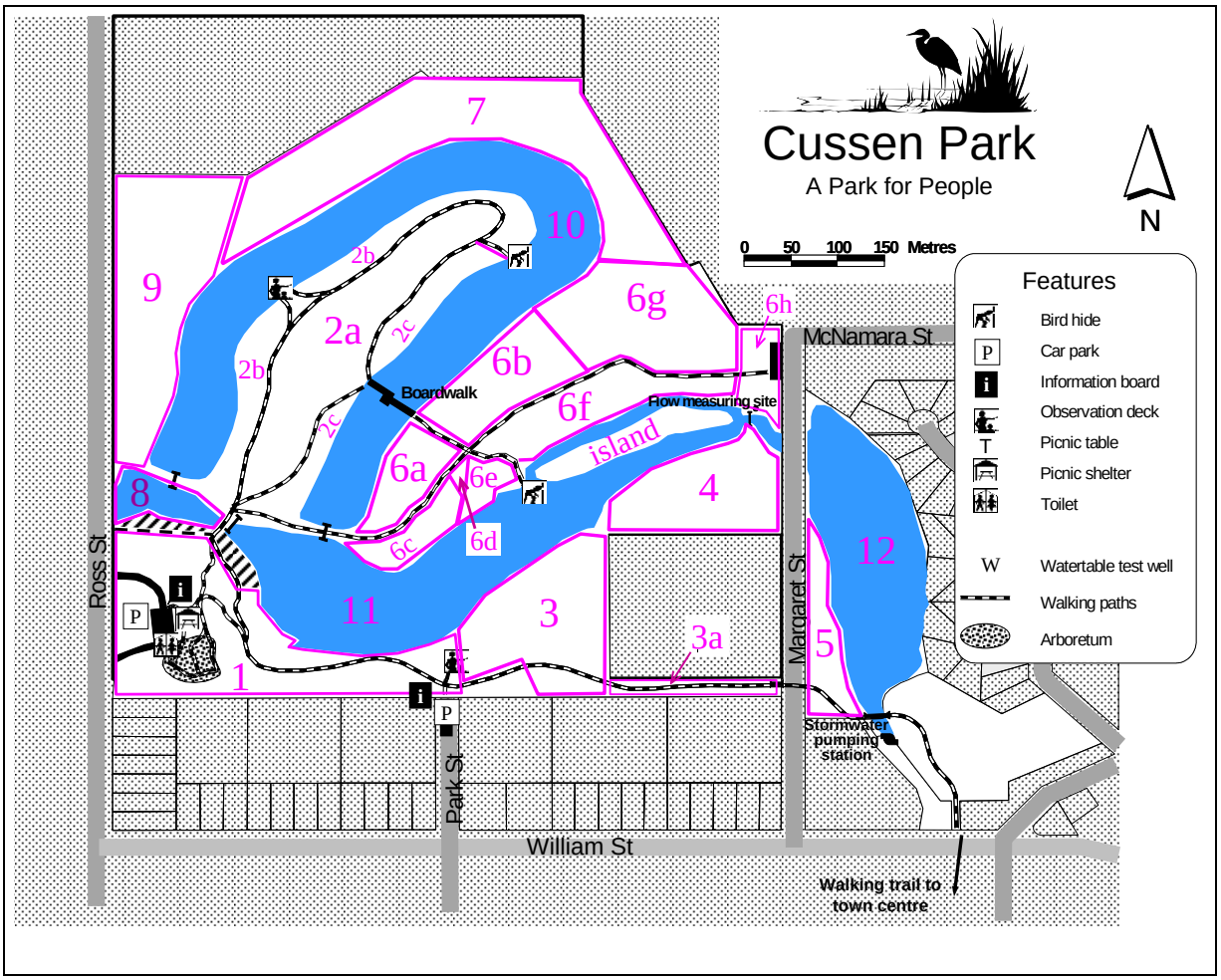


Figure 2. Cussen Park Management Zones.

Some management zones have a number of sub-zones. All of the sub-zones within a management zone have the same fundamental management aims and objectives, but each sub-zone has minor variations in either the current conditions or potential management actions to other parts of the zone. As a general rule, vegetation will be managed to encourage self-sustaining ecological conditions.

4.1 Zone 1

Zone 1 is the main activity area of the Park. It contains the main entrance to the Park, and has lower environmental values than other zones. Zone 1 contains several items of key infrastructure such as the picnic shelter, arboretum, toilet block and main observation area, along with a large area of open space for active recreation.

Maintenance of this zone is generally undertaken by the Council and consists of frequent mowing to promote conditions suitable for active recreation (e.g. kicking footballs or picnicking). It is not planned to promote the establishment of native grasses in this area, and it should continue to be mowed regularly to encourage visitors into this zone (refer to mowing schedule 6.5).

4.2 Zone 2

Zone 2 is a grassy woodland area with a high number of Australian native trees and shrubs. The aim of these historic plantings was to increase the level of habitat available for birds and other small fauna.

Management within this zone should be directed towards re-establishing native grasses, in particular Wallaby Grass (*Rytidosperma* spp. - formerly *Austrodanthonia*) which occurs in this zone, and to increase understorey diversity and habitat connectivity within this zone. Replacement mass plantings (mainly shrubs) around dead trees should occur to promote continual recruitment.

Maintenance activities in this zone will consist of mowing, targeted herbicide application, and the management of trees and fallen timber. Mowing up to a width of one metre on either side of all the walking tracks will be carried out at the same time and frequency as detailed in zone 1. Mowing off the walking tracks should be coordinated to promote native grass species, therefore mowing should occur after seed set where possible. Herbicide application needs to be undertaken with a high degree of care to ensure that any impact on non-target species (particularly native species) is minimised. Grass weeds including Wild Oats (*Avena fatua*), Prairie Grass (*Bromus catharticus*), and Couch (*Cynodon dactylon*) are present within this zone and are inhibiting the natural recruitment of Wallaby Grass.

4.3 Zone 3

Zone 3 is a grassy woodland with a groundcover layer that consists of a range of native grass species. The tree density in this zone will not be increased, although some of the zone may be re-vegetated with indigenous native shrubs.

Current maintenance consists of a regime of mowing and chemical weed control. Mowing a width of one - two metres either side of the walking tracks in this zone should be carried out as per the mowing schedule of zone 1.

The management of Water Couch (*Paspalum distichum*) is an issue in this zone and herbicide application at appropriate times along the margins of the wetland will need to be undertaken to manage this species.

4.3.1 Zone 3A

Zone 3A connects Margaret St to zone 3 via a walking path. This area is to be maintained with frequent mowing as per zone 1.

4.4 Zone 4

Zone 4 contains a diverse range of native shrubs to create conditions that in the long term will require very little or no maintenance.

4.5 Zone 5

Zone 5 is grassy woodland with high numbers of non-indigenous Australian native trees and shrubs and is very similar in character to zone 2. The long term aim of this zone is to increase the level of habitat for birds and small fauna.

This zone contains two significant areas of native grasses and groundcovers. These small sections are bounded by Margaret Street on the west and the wetland on the east. Species present in these areas include planted areas of Wallaby Grass (*Rytidosperma* spp.) and Blown Grass (*Lachnagrostis aemula*), remnant individual specimens of Knotty Spear grass (*Austrostipa nodosa*) and Spurred Spear-Grass (*Austrostipa gibbosa*), and locally occurring saltbushes (*Atriplex* spp.).

The weed Soursob (*Oxalis pes-caprae)* is now largely under control in this zone. Monitoring of soursob needs to continue, and strategic herbicide application should be used when required.

4.6 Zone 6

Zone 6 is a large grassland section of the Park, and the long term aim is for this zone to be dominated by a range of native grassland species. It is also proposed to encourage the establishment of a small number of Grey Box (*Eucalyptus mircocarpa*) and Yellow Box (*E. melliodora*) trees on the north and north/east boundaries of this zone.

A management strategy for this zone needs to be developed to increase the proportion of native grasses in this area. This area currently has introduced species such as couch (*Cynodon dactylon)* and rye grass (*Lolium sp.*), and compacted soil. Consideration will need to be given to weed control, ripping the soil and broadcasting of native seed to ensure optimum conditions for seed establishment.

Regular mowing of a one metre wide strip along the walking tracks in the vicinity of the Margaret Street car park, and an eight metre wide fire break along the north/east boundary should be undertaken. This zone also requires the spraying of Water Couch (*Paspalum distichum*) with herbicide application at appropriate times along the margins of the wetland.

4.7 Zone 7

Zone 7 is grassy woodland similar to zone 2. However, visitor usage of this zone will not be actively encouraged. It is intended that this zone remains a low-usage area that acts as a buffer from adjacent agricultural and urban areas and will become a habitat refuge for native fauna species.

Vegetation in this zone should be managed via both herbicide application and slashing to promote native grass cover.

4.8 Zone 8

Zone 8 is classified as a prolonged duration seasonal open wetland (Appendix A). Water levels in this wetland are controlled by the water level in the private wetland that is adjacent to zone 9 on the western side of Ross Street, and currently outside the control of Council. When inundated, this zone acts as a feeding area for a variety of species of aquatic birds that feed on small fish. Vegetation needs to be managed in this zone to allow drainage of water out of the wetland system.

4.9 Zone 9

Zone 9 is maintained as a mown grassland to provide an expansive view of Cussen Park from Ross Street. This zone is generally mown at the same time as zone 1.

4.10 Zone 10 – North Loop Wetland

Zone 10, the North Loop Wetland, is classified as a medium duration seasonal wetland (Appendix A) intended to be managed as an ephemeral wetland with an annual wetting and drying regime, providing there is sufficient inflow through zone 11 to enable water to be diverted into zone 10. Water levels are manipulated by council staff via the operation of the regulating structures within the depression. The wetland would normally be dried out over late spring, through summer and into early autumn. Early autumn manipulation of water levels should be undertaken to re-fill the wetland for the remainder of the year.

The management of water couch (*Paspalum distichum*) is a priority in this zone. Continued manipulation of water levels and an annual program of targeted herbicide use should assist in restricting the distribution of this species.

4.11 Zone 11 – Middle/Main Wetland Pool

This zone is classified as a semi-permanent open wetland (Appendix A) that provides an area of suitable habitat for a range of bird species that utilise the wading habitat. This is particularly important during dry

years as this zone can provide a drought refuge when the remaining wetland areas of the Park have dried up. Zone 11 is usually operated with a fixed sill level and has contained water under all but the driest of years, even if very shallow.

4.12 Zone 12 – Margaret Street Pond

The Margaret Street Pond is classified as a permanent open water wetland (Appendix A). It has been utilised as a water quality treatment wetland and is managed specifically for this purpose by the Council. Zone 12 generally operates at a fixed water level provided there is sufficient inflow to meet evaporative losses. There are adjoining landowners on the eastern and western side of the zone, and management practices need to be in consideration of potential impacts on these landholders in terms of visual aesthetics, odour and pest plants and animals. Management of water levels at the pond also needs to consider both the optimum treatment of stormwater and the functioning of the wetland.

The following management requirements for this zone that were initially detailed by SKM (2001) have been completed or integrated into an ongoing management regime:

- Deepening the shallow areas along the north-east margin that are prone to becoming exposed during low water levels. This will allow for the deposition of waterborne sediment;
- Removal of cumbungi from strategic places in the pond where it might be preventing effective circulation or present a particular aesthetic or visual problem;
- Replanting some fringes of the pond with other species of aquatic plants with increased aesthetic value, such as sedges and rushes;
- Creating a range of water depths to increase the diversity of habitat and suitable conditions for a wide range of animal and bird species; and
- Manipulating water levels such that they are maintained between 250-300 mm below the crest level of the downstream weir.

Some of the challenges for this zone have included build-up and decay of organic matter, interference with the water regulating structure (drop bars) and responding to stormwater pollution incidents.

4.13 Island (old tip)

This zone is the historic burnt rubbish tip and is unsuitable for visitor access. The primary aim is to create a low maintenance area because of the difficulty of gaining access. An annual herbicide application program is required to assist in the management of unwanted grasses and other exotic plants.

5. Wetland Management

5.1 Wetland areas

A variety of aquatic plants have been established within the wetland areas to enhance the capacity of the wetland to improve stormwater quality, and to encourage a wide range of fauna. This has largely been achieved through the manipulation of water levels and the chemical control of weed species, allowing native plants to regenerate.

In the long term it is planned to try to increase the diversity of aquatic plants to include a range of floating, submerged and emergent plants throughout the Park wetlands. This will enhance nutrient removal to improve the water quality both within and downstream of the Park. Further information on stormwater management can be obtained from the Greater Shepparton Stormwater Management Plan (2003).

In order to enhance the establishment of a range of aquatic plants, appropriate water levels need to be provided to promote suitable environmental conditions for plant germination. The provision of a suitable wetting and drying regime is critical to wetland management in the Park.

In addition to manipulation of water levels in the wetland areas, mechanical and chemical control of nuisance aquatic plants will likely be necessary.

5.1.1 Water Regulators

Four water regulators are located within the Park (Figure 3), which allow for the manipulation and distribution of water flows. Council are responsible for adjusting these regulators.

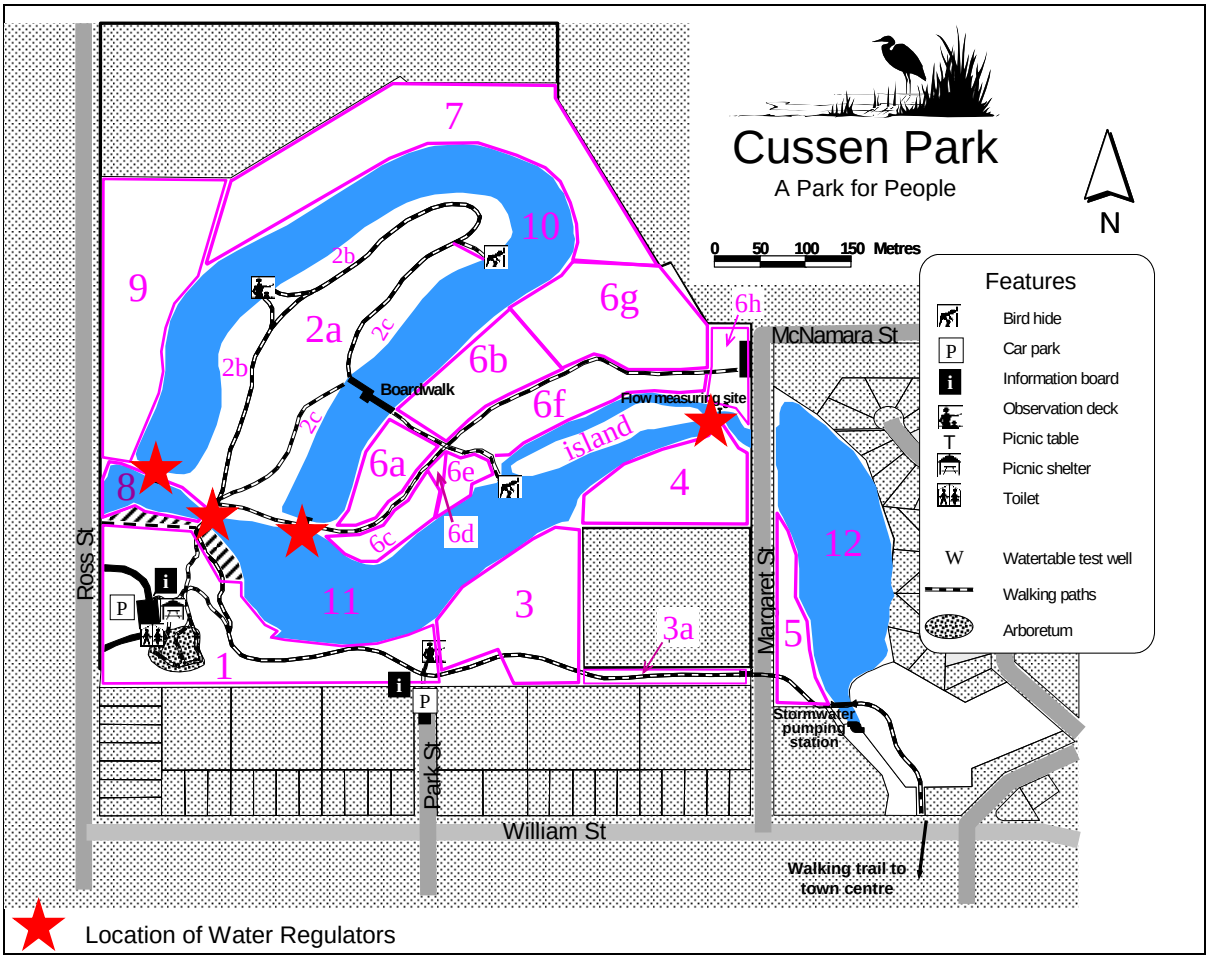


Figure 3. Location of Water Regulators in Cussen Park.

Specifically, these structures allow water to be excluded from zone 10, and enable the wetland area in zone 10 to be provided with an ephemeral wetting and drying regime that is consistent with the management aim for this zone.

5.1.2 Downstream Influences

Water levels in the wetland area of zone 8 are primarily influenced by the manner in which the downstream landholders (west of Ross Street) manage the water residing in the depression on their property. Downstream of Ross Street, the depression is managed as an irrigation re-use dam, and water levels fluctuate depending on whether water for irrigation has been diverted from the depression. When water levels are high, the water backs up under Ross Road to fill the depression area of zone 8. If water levels in the re-use dam are lowered, the depression in zone 8 is able to be dried out providing an opportunity to manage the aquatic plants present in this zone.

5.2 Aquatic Weed/Plant Control

The wetland areas of the Park contain a range of aquatic plants. Some of these species are beneficial such as Common Reed (*Phragmites australis*) and Cumbungi (*Typha* spp.), which provide habitat for

native fauna. The presence of these plants is encouraged but contained to provide a balanced environment. Some other species are considered to be weeds and specific management actions are being undertaken in order to reduce their distribution.

The stormwater drains that outfall into the Park must be kept clear of vegetation.

5.2.1 Aquatic Plant Maintenance

The main species of aquatic plants that are currently located in the wetland areas of the Park are Water Couch (*Paspalum distichum*), Common Reed (*Phragmites australis*) and Cumbungi (*Typha* spp.). The fringing vegetation is predominantly *Juncus* and *Persicaria spp.* with many other species yet to be identified.

The aim of the maintenance program for aquatic plants is to use a range of management tools to:

- Control Water Couch (*P. distichum*)
- Restrict the distribution of Cumbungi (*Typha* spp.) to agreed locations where it provides suitable habitat for a range of fauna species
- Monitor the distribution of Common Reed (*Phragmites australis*) which currently is only present in three locations, and in the future undertake works to restrict this species to agreed areas
- Reduce cover of weeds
- Increase cover of indigenous species

Tools that can be used to manage these aquatic species include the manipulation of water levels (the provision of a regular wetting and drying regime) and the selective application of appropriate herbicides.

At present the number of species of aquatic weeds located within the Park is quite small and typically consists of species that are relatively easy to control.

5.3 Aquatic Fauna

The wetland areas of the Park (Zones 8, 10, 11, 12) contain water for some or all of the year. Consequently, they provide habitat for a range of aquatic fauna such as fish (S Ridges, Cussen Park COM, pers. comm.) and amphibians (T Court, Cussen Park AC, pers. comm.). The presence of some of these aquatic species is considered to be beneficial and their presence is encouraged, while other species are considered to be noxious (see 5.3.1) and specific management actions are being undertaken in order to reduce their distribution.

5.3.1 Introduced Fish Species

European Carp (*Cyprinus carpio*) and Mosquito Fish (*Gambusia holbrookii*) have been identified (S Ridges, pers comm) within the wetland areas. The presence of these species is to be discouraged within the wetland areas and the following management actions are recommended in order to control their distribution:

1) Manipulate water levels: The presence and location of the water regulating structures throughout the Park provides some opportunity to manipulate water levels in certain zones. Specifically zone 10 can be dried out thereby removing suitable habitat for fish species. Unfortunately the water levels in the other aquatic zones are not usually able to be managed with the same level of control.
2) Physical removal of introduced fish: The physical removal of introduced fish species specifically European Carp (*Cyprinus carpio*) is undertaken by methods including electro fishing and netting.

While there are several methods available to remove unwanted fish species from the wetlands the total eradication of these species from the Park may not be achievable given that zones 11 and 12 are usually

permanent water bodies, except under very dry conditions. Removal of introduced fish from these areas would be very difficult particularly if any efforts to do so have a negative impact on populations of native fish within these areas.

5.3.2 Native Fish Species

Several native fish species including the Flat Headed Gudgeon (*Philypnodon grandiceps*) have historically been identified within the waterbodies contained within the Park and those upstream including Lake Bartlett (S Ridges, pers. comm.). The presence of these species should be encouraged.

5.4 Sediment Management

Sediment build-up will be monitored on an on-going basis. If removal and disposal is required advice will be sought from the appropriate authority. Sediment removal will be conducted as needed.

5.5 Margaret St Pumps

The Margaret St pumps are a set of five pumps (three small, two large) that pump approximately 90% of Tatura's stormwater. The pumps run on a float system that automatically activate at a predetermined water level. The pumps can also be operated manually, so that in the event of a spill, contaminated water can be prevented from entering the Margaret St pond. The penstocks draining into the pitwell can also be manually operated. Council's Drainage and Maintenance Department maintain the pumps and will respond to contain spill emergencies at any hour. Local industry has an ability to discharge to Council's stormwater system under an EPA licence.

5.6 Water quality sampling

Water quality at the Park is tested on a monthly basis through the Waterwatch program. Five sites are tested for: Dissolved Oxygen (% Saturation); Dissolved Oxygen (mg/L); Electrical Conductivity (µm/cm); pH; Reactive Phosphate (mg/L P); Water Temperature (ºC); and Turbidity (NTU). Additional measurements are taken at one site for: Reactive Phosphorus (mg/L P); Chemical Oxygen Demand (mg/L); E. coli (orgs/100 ml); Total coliforms (orgs/100ml); and Total Phosphorus (mg/L). Results are available at the Waterwatch website (http://www.vic.waterwatch.org.au).

Water at the Park is tested for blue-green algae (Cyanobacteria) each month between October and April by Council.

6. Terrestrial Management

6.1 Native Plants

A large range of native trees, shrubs, grasses and groundcovers are distributed throughout the Park (Appendix B). Every effort should be taken to retain these species and where possible to increase the distribution, abundance and natural recruitment of native plants.

6.2 Protection of native flora and fauna

It is important that all Park visitors (both humans and their pets) restrict their movements to specific designated areas to ensure native flora and fauna are protected. Visitors primarily utilise the network of walking tracks and do not cause any disturbance of the wetland areas.

6.3 Revegetation Activities

Revegetation activities undertaken by the Advisory Committee, Council and the community have resulted in a significant increase in native vegetation and habitat, and contributed to the current range of fauna that utilise the Park. Council currently provide plants, stakes and guards for revegetation activities. Revegetation activities will continue in consultation with the Advisory Committee to replace dead plants,

and target new areas for enhancement with indigenous species. Revegetation activities also provide an opportunity to involve the wider community in the development of the Park.

6.4 Management of Established Trees and Fallen Timber

Fallen timber from the range of established trees that are located within the Park provide a valuable habitat resource for a range of native species, but also needs to be managed to ensure public safety.

Fallen timber will be managed via the following actions:

- The Council is responsible for the management of trees or hanging limbs within the Park from a public liability perspective. If trees within the Park are deemed to be a danger to the public, Council will have these assessed by accredited Council staff or an external qualified arborist.
- Any fallen timber on or near tracks will be relocated away from the immediate area of the track to maintain pedestrian access.
- Council will assess whether the fallen timber is best used as either a landscape or terrestrial habitat, or within the wetlands. Where possible the visibility of saw cuts will be minimised.
- Smaller branches, twigs and leaves will be cleaned up by Council to maintain grassland areas for mowing.
- The Advisory committee will be consulted should a tree removal be required.
- Council will be responsible for undertaking the necessary actions.

6.5 Grassland Management

Grasslands form an important part of the Park ecosystem. The establishment and management of native grasslands is complex, and presents some challenges in terms of maintaining and improving native grass communities.

Introduced grass species tend to outcompete native species, particularly in disturbed areas, and weed control may need to be both chemical and mechanical. Management techniques such as slashing require machinery and staff, and the optimum time for slashing native grasses (dependent on grass height and seed development stage) often coincides with Council's roadside slashing requirements.

Given the importance of grasslands at the Park and the current challenges in establishment and maintenance, a strategy for increasing the amount of native grasses needs to be developed that will incorporate weed control, re-vegetation strategies and mowing regimes.

6.6 Mowing and Slashing

Currently the major technique used to manage the native grasslands in the Park is mowing or slashing. Specific mowing regimes have been devised for each zone, and zones will be maintained within the listed height range. To determine the appropriate heights for the different zones, Council staff must refer to the Cussen Park Operational Summary TRIM document M2015/088682. This document will be reviewed annually in consultation with the Advisory Committee.

Vehicles and equipment should be cleaned before entering the Park to prevent the spread of weeds and other undesirable plants. Where possible, vehicle movement should be restricted to designated paths. It is essential that vehicles used for mowing other public land areas are thoroughly cleaned of potential weed seed sources (especially Caltrop) before entering the Park. In addition, equipment should be used in non-infested zones before moving on to infested zones.

6.7 Fire

In some circumstances fire is able to be used as a management tool to modify the species composition of vegetated areas.

If fire is to be used for environmental purposes it must be undertaken in consultation with the Country Fire Authority (CFA), Municipal Fire Prevention Officer (MFPO) and local Tatura Fire Brigade, and have appropriate Council and/or CFA approval.

6.8 Types of weed and their control

A variety of introduced grasses and groundcover species are present within the Park (Appendix C). The presence of these species is symptomatic of the past land uses of the site, and its location in the landscape surrounded by agricultural and residential areas.

Appropriate herbicides and application rates will be used for the specific species being targeted. Care will be taken to ensure that any herbicide application does not impact on desirable native plants.

Caltrop (*Tribulus terrestris*) is a weed species that has the potential to become a significant problem due to its fruits developing into a hard, woody, spiny burr. The burrs are very robust and have the ability to be transported by attaching to shoes, tyres, etc. Seeds of this species germinate after summer rain and control should be undertaken soon afterwards to minimise the persistence of this species (Lamp and Collet, 1999). Several herbicide applications may be required together with an extensive removal program throughout the summer to ensure that the ecological and amenity values of the Park are maintained.

6.9 Fauna

A range of fauna species, both native and introduced, have been identified within the Park and these species utilise the wide range of habitats available. Most notable is the large range of birds that are present (Appendix A).

6.9.1 Native Fauna

Many species of native mammal, bird, reptile, amphibian and fish have been recorded within the Park. Notable species identified include Common Bent-Wing Bat (*Miniopterus schreibersii*), Eastern Long-Neck Tortoise (*Chelodina longicollis*), little red flying fox *(Pteropus scapulatus)* and the Sugar Glider (*Petaurus breviceps*). Most of the native species have the potential to enhance visitor experiences in the Park; however, visitors should exercise caution around some species. Several species of snake have been identified within the Park, particularly the Tiger Snake (*Notechis scutatus*) and the Eastern Brown Snake (*Pseudonaja textilis*). Both of these species are venomous, and while Park visitors should be vigilant for their presence, they should not take any action to harm these species because they are protected under the *Wildlife Act (1975).*

6.9.2 Pest Animals

Many introduced fauna species have been recorded in the Park. The Domestic Cat (*Felis catus*), European Red Fox (*Vulpes vulpes*), European Rabbit (*Oryctolagus cuniculus*) and European Hare (*Lepus capensis*) have all been identified within the Park, and each have a negative effect on the Park's environmental values. Foxes and feral and domestic cats are predators which directly impact on the variety of native birds and reptiles that utilise the Park. Rabbits and hares inhibit the regeneration and revegetation of native plants.

The location of the Park and its proximity to urban areas limits the control measures for these species. Control measures such as shooting or baiting are inappropriate and so have not been historically utilised. The ripping of rabbit warrens has been undertaken and the success of these activities should be monitored into the future. Trapping is also an option if numbers become high enough. Exotic birds such as the European Starling (*Sturnus vulgaris*) and Indian Myna (*Acridotheres tristis*) also have a negative

impact by out-competing native birds for nesting places, and consideration will be given to help manage these pests.

7. Infrastructure

A range of built infrastructure is located within the Park. This includes;

- Water regulating structures
- Bird hides
- Board walks
- Viewing platforms
- Picnic areas, tables and seats
- Bollards
- Signage
- Walking paths
- Fencing & gates
- Toilet facilities

All of these assets are regularly assessed for safety, and require specific maintenance regimes dependent on the structure classification. A general asset audit is conducted every 6 months.

7.1 Reactive maintenance

Along with a regular maintenance there will be circumstances where reactive maintenance is required to infrastructure as a result of storms, vandalism or other unexpected events.

In the event of reactive maintenance being required, the persons identifying the maintenance requirement should contact the primary contact at Council.

7.2 Signage

A range of signage (interpretative, directional and regulatory) is present at different locations throughout the Park. These signs have an important role and will need to be retained in some form into the future. The current signage has been installed at various times and does not have a common standard. Signage will also need to be replaced or repainted as it ages.

It is recommended that a common format be developed for all new signage in consultation with both the Council and the Advisory Committee. Once this new standard format has been determined, opportunities should be identified for the rationalisation of existing signage to improve the overall aesthetics of the Park.

7.3 Gates and access

Gates have been constructed at several locations on the perimeter of the Park. These gates are to remain closed in order to restrict vehicle access to the Park; however Margaret Street and Park Street gates are not locked to enable emergency access.

7.4 Walking paths

There are four main entrances available to the Park. Defined walking tracks intersect the majority of the Park, and visitors are encouraged to utilise these paths. Visitors can also wander through the other nominated open spaces. Paths are currently covered in stonedust, which requires occasional topping up and is adequate for the current level of use. Council is responsible for path management.

7.5 Fencing

There are currently fences along the north and south boundaries of the Park, plus a short fence at the eastern end of the Elizabeth Street reserve at Margaret Street. Fencing and bollards have been installed in the vicinity of the Margaret Street carpark, at the northwest corner of zone 9, and the eastern side of zone 4 to be used in association with the closure of some gates to eliminate unauthorised vehicle access.

7.6 Carparks

The three carparks at Park Street, Ross Street and Margaret Street have a gravel surface, and are maintained on request to Council.

7.7 Tatura Bicycle Network

A section of The Tatura Bicycle Network passes through the Park from Margaret Street and Park Street. The Jodie Ridges Memorial Bike Path starts/ends at the Cussen Park Rotunda.

7.8 Margaret St

Council has agreed to maintain Margaret St as a gravel road, utilising appropriate dust suppressant techniques, to reduce traffic that may otherwise access the road due to the Northlinks development. Retaining the gravel road component and therefore lowering the number of cars will protect wildlife (particularly birds) that regularly cross Margaret St. The section of Margaret St between Section 3a and the carpark at zone 6 is also used by walkers at the park (there is no footpath linking these two sections of the Park).

8. Future Urban Development

8.1 Buffer zones

Cussen Park is an area of bushland that is surrounded by parcels of land that either are, or have the potential to become, developed for urban purposes. The areas to the south and east of the Park are already developed for residential or industrial purposes while the land to the north has been identified in the Greater Shepparton 2030 Strategy (Coombes, 2005) as an area suitable for the future expansion of the Tatura township.

As future development proceeds, suitable measures should be incorporated into these developments to ensure that any impact on the Park including visual impacts are minimised. Of particular concern are domestic cats which would negatively impact on native fauna at the Park if they are not confined to their properties. Measures such as inclusion of appropriate buffer zones between residential areas, industrial areas and the Park, appropriate fencing, education campaigns, and penalties for wandering cats should be considered further if development proceeds.

8.2 Elizabeth Street

Elizabeth Street is located on the southern boundary of the Park running between Ross Street and Margaret Street (Figure 4). Elizabeth Street is currently an unmade and undeveloped road reserve. There are several significant remnant Grey Box (*Eucalyptus mircocarpa*) trees, large numbers of planted native trees and shrubs and the main walking path and cycling path from Tatura town centre on the road reserve.

The Cussen Park Environmental Management Plan does not contemplate any alteration in the status of Elizabeth Street which remains a road reserve and therefore no change to the current park maintenance program is needed.

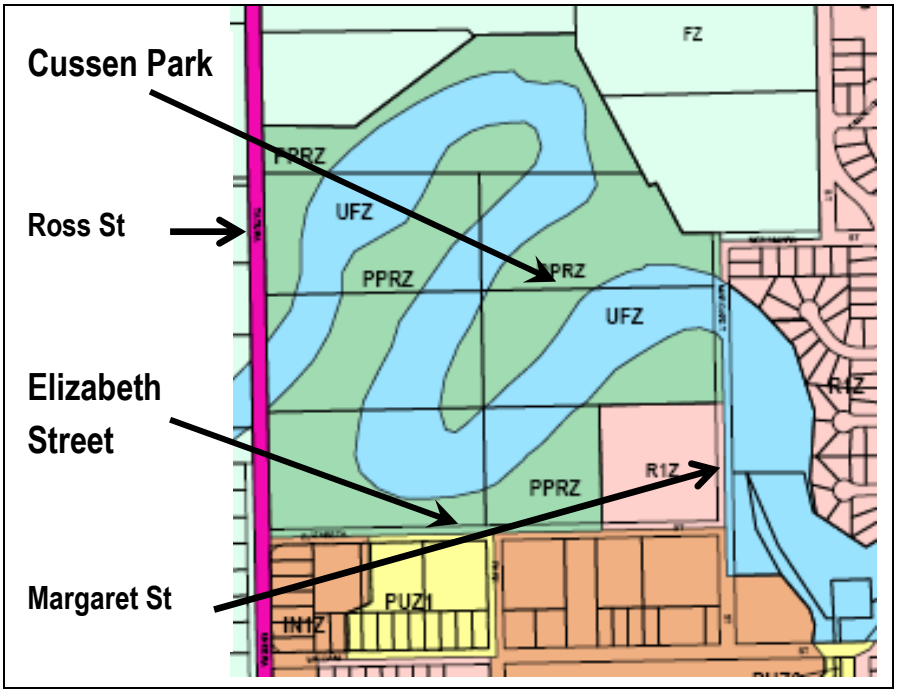


Figure 4. Location of Elizabeth Street relative to Cussen Park

9. Human Interaction

9.1 Bardi grubbing

The digging for Bardi Grubs is an activity that can cause substantial damage to the vegetation and soil in the Park, potentially leading to the death of native plants and the introduction of weeds. Because of its damaging nature, bardi grubbing is strictly prohibited in the Park, and appropriate signage informing visitors has been installed.

9.2 Rubbish Management

At present, litter and rubbish pose minor problems in the Park. This is partially due to park users disposing of their litter appropriately, and also due to the efforts of the Advisory Committee members who regularly undertake litter collection within the Park. The Park has a 'carry in, carry out' policy with limited rubbish bins provided.

This policy has worked with some success to date via a combination of signage and education of Park visitors. This approach should continue into the future with additional appropriate signage being developed to inform Park users of their responsibility with regard to their litter and rubbish.

9.3 Vehicle access

No vehicles, including motorbikes, are permitted in the Park. Exceptions are vehicles involved in maintenance or emergency activities and bicycles.

9.4 Domestic pets

Dogs are permitted within the Park, but should be restricted to the areas adjacent to walking tracks. The management of dogs is expected to comply with Greater Shepparton City Council Local Law No 1; '*A person who owns or is in charge of a dog on any highway or Council land must keep the dog under control by a leash, chain or cord connecting that person to the dog unless the highway or Council land has been designated by Council resolution and signage to be excluded from this requirement*' and the *Domestic Animal Act 1994*.

9.5 Dog Excrement

The management of dog excrement is expected to comply with Greater Shepparton City Council Local Law No 1; '*No person in charge of an animal shall allow any part of the animals excrement to remain in a highway or Council land*' and '*a person in charge of a domestic animal must carry a suitable receptacle for the removal of that animal's excrement from a highway or Council land*'.

Dog excrement is a specific waste related issue. There is currently one dog litter bin located within the Park for people to dispose of their dog droppings. An education regime specific to this issue developed with appropriate Council Officers could be considered to encourage dog owners to provide a plastic bag and pick up any deposits made by their dogs, and then dispose of them in the dog litter bin provided or away from the Park.

9.6 Education

The use of the Park as a venue for educational activities is encouraged and forms a key part of the vision for the Park. The Advisory Committee and the Council should promote the venue for educational purposes and identify opportunities for appropriate activities to be undertaken.

9.7 Functions

The Park is not specifically designated for use as a venue for outdoor functions such as weddings. However, if there are individuals or groups who wish to stage functions they should contact the Council (contact details in Table 1) to determine whether the proposal is appropriate and to notify staff of the

activity. Any functions held within the Park should be managed in such a way to ensure that they do not impact on the existing visitor base and values of the Park.

9.8 Camping

Overnight camping is not permitted in the Park and carparks, as the Park does not have the appropriate facilities to allow it to be used as a site for camping. This position is consistent with the Council's Local Law Number 1 which states '*A person must not, except with a permit, camp on any Council land or on any privately owned land within the municipality unless within a designated camping area.*'

9.9 Horse Riding

The riding of horses is prohibited as it is not compatible with the other uses and values of the Park. This policy is consistent with the Council's Local Law Number 1 which states '*A person must not without a permit ride or lead a horse or cause or authorise another person to ride or lead a horse on any land set aside by the Council for the purpose of recreation, whether active or passive, or a pleasure ground, or place of public resort, or playground being Council land unless such place has been signposted by the Council as being available for horses or horse riding*'.

10. Emergency Management

10.1 Pollution spillages via Stormwater system

The Park is located on the downstream end of Tatura's stormwater system and receives the vast majority of the stormwater generated throughout the town. As such, any spills that enter the stormwater system have the potential to impact the Park. Also, within Tatura's urban catchment, there are several large food processing operations that have the potential to generate large volumes of organic waste products. These wastes are required to be disposed of to the Tatura Wastewater Management System (sewerage system) that is operated by Goulburn Valley Water. However, on occasions there have been accidental spills of waste products into the stormwater system. These spills eventually are transported to the Park where they have the potential to have a significant and deleterious impact on the Park's ecology and values.

10.1.1 Response Procedure

The Environment Protection Authority (EPA) is the primary contact point for issues regarding the pollution of land and water in Victoria. The EPA has a series of endorsed emergency response protocols that will be enacted once they have become aware of a pollution incident. Council, as the asset manager of both the stormwater system and the Park, should be the first organisation contacted in the event of pollution.

In the event of an organic waste spillage which is causing, or has the potential to cause, an impact on the Park, the following procedure should be undertaken:

1) Contact Council – 24 hours (03) 5832 9700
2) Contact the EPA on:
   – General Enquiries – 1300 372 842 (24 hours)

   By reporting pollution incidents to EPA as soon as possible, action can be taken to limit the damage caused to the environment. Rapid response can also help EPA to identify the cause and source of the problem for further enforcement action against those that have created the pollution.

3) The EPA should also be contacted if there is:
   – Noticeable spill or slick in waterways

- Illegal dumping of waste

4) How to report

Both council and the EPA need as much information as possible about the incident including:

- **What is happening?** Is the problem a smell and if so how would you describe it? If the problem is a discharge to a waterway, what colour is it and what distance/area does it cover?
- **When was it first observed?** It is preferable to provide an exact time, for example 10.30am, rather than just "this morning". Also report if you have ever noticed the problem before and if it is still happening at the time of your report.
- **Where is it happening?** Give the detailed location of where the problem is happening with the nearest cross street. If the problem is a discharge to a waterway, provide details of where it is entering from.
- **Your contact details.** In case the EPA need clarification of the information you have provided, they need your name and address with a daytime phone number.

10.1.2 Northlinks Estate

Stormwater from the Northlinks Estate enters the Park's waterways via a pump station that is located near the corner of Brookwater Street and Thompson Street, and a pipeline that enters the Margaret Street Pond on the western side of Margaret Street. In most circumstances the pump within this pump station switches on automatically at a set level.

In the event of a pollutant spill into this stormwater system, the pump should be switched off by Council staff to isolate the spill. The system can be returned to normal operation once corrective action has been undertaken.

10.1.3 Access to Irrigation Water

The Park has access to irrigation water via a Goulburn-Murray Water channel. This water is able to be supplied to the North Loop Wetland (zone 10) via a small channel that runs through zone 7. Subject to approval from the Council, irrigation water may be utilised during the irrigation season from the Council's bulk allocation.

This water provides a degree of flexibility to manage water levels within the wetlands in the Park. Specifically it provides a potential source of clean flushing water that can be utilised if there is a pollution event which results in a quantity of poor quality water entering the wetlands (Zones 8, 10, 11 and 12).

10.2 Flooding

The Council commissioned WBM Oceanics Australia (WBM) to undertake a floodplain management study for the township of Tatura (WBM, 2005). The objectives of the study were to identify, analyse and document flooding and flood risk at Tatura, and assess potential floodplain management options. The Park is located on the main floodway through Tatura, the Mosquito Depression, and would be expected to facilitate transfer of flood water through the park and on to the culverts at Ross St.

10.2.1 Flood Mitigation

The preferred flood mitigation options derived from the Tatura Floodplain Management Strategy (WBM, 2005) have been implemented. These actions aim to improve the capacity of key structures within the floodplain, thereby reducing flood hazards in the town.

The major flood mitigation actions implemented for Tatura were:

1) Duplication of existing pipe culverts at Ross Street;

2) Lower elevation of terrain immediately east of Margaret Street Pumps;
3) Regrade floodway adjacent to Unilever Foods; and
4) Increase the capacity of the Rail Drain/Underpass reducing flood levels upstream.

These flood mitigation actions should reduce the flooding risk to the Tatura township, and as a receiving water body, inundation of areas of the Park would be expected.

Any large scale terrestrial planting at the Park should be conducted in staggered cluster arrangements at eight to ten metre spacing to allow conveyance of floodwater.

10.3 Wildfire Risk Management

Due to the proximity of the Park to housing and other built assets, it will be necessary to reduce the fire risk over the high fire danger period. This is typically over summer but may be longer, depending on seasonal conditions. There have been no significant incidences of fire to date (2015). However to address potential risks the following general strategies are suggested in consultation with the Municipal Fire Prevention Officer (MFPO).

- Maintenance of mown/slashed areas of at least 1 metre either side of designated pathways
- When conducive to native vegetation, maintain a frequent mowing regime for zone 1 through to zone 9 over summer
- Controlled burning of identified high risk areas during low risk periods (spring)
- Mosaic burning or slashing during low risk periods to establish cleared areas in accordance with the general vegetation strategy
- Planting with fire retardant indigenous plant species in strategic areas
- Where possible, maintain water in main lagoon zones (11 and 12) over higher risk summer period
- Allowing easy passage by fire vehicles into the Park, which in some cases will mean that when the gates are locked, fire vehicles are able to drive through by breaking the treated pine rail

10.4 Occupational Health and Safety and Risk Management

The Advisory Committee must demonstrate a strong commitment to workplace health and safety and public risk management, and take all reasonable care in the performance of their duties to prevent injury to themselves or others. The Advisory Committee is responsible for complying with the relevant OH&S legislation, the Council's Occupational Health and Safety Management System, and the Council's Risk Management Policy. The Advisory Committee must ensure that appropriate work practices and procedures are implemented, including the correct use of equipment and the identification and reporting of workplace incidents and hazards.

10.5 Insurance / Indemnity

The Greater Shepparton City Council agrees to indemnify and to keep indemnified the Cussen Park Advisory Committee, from and against all actions, costs, claims, charges, expenses, penalties, demands and damages whatsoever which may be brought or made against them, or any of them, in connection with the Greater Shepparton City Council's performance or purported performance of its obligations and be directly related to the negligent acts, errors or omission of the Greater Shepparton City Council.

The Greater Shepparton City Council's liability to indemnify the Cussen Park Advisory Committee shall be reduced proportionally to the extent that any act or omission of the Cussen Park Advisory Committee, contributed to the loss or liability.

11. Review

The Cussen Park Environmental Management Plan should be reviewed every three years by Council in consultation with the Advisory Committee.

11.1 This plan has been subject to a public consultation process and Council endorsement. ‘What you said’ document TRIM M16/43908

12. Cussen Park Action Plan

No.	Action	Responsibility	Timeline	Priority	Funding
1.	Develop a detailed design for the redevelopment of Cussen Park Margaret Street Pond • Obtain detailed understanding of the stormwater system composition (residential vs. industrial); and • Develop a MUSIC (Model for Urban Stormwater Improvement Conceptualisation) model, to inform the design of any redevelopment of the Margaret Street pond • Water level management – determine best operating level • Sediment management options	GSCC - Sustainability & Environment , Projects	2015/2016	High	$60,000
2.	Redevelopment of Cussen Park Margaret Street Pond (subject to funding)	GSCC - Sustainability & Environment	2017/2018	High	$500,000
3.	Water level management Installation of gauges through Margaret street pond	GSCC – Sustainability & Environment	2016/2017	High	$3000 (subject to advice from action 1)
4.	Water monitoring of 3 sites within the park monthly	GSCC – Sustainability & Environment, GVW	Ongoing	High	$1500
5.	Investigate the development of an Emergency Response Strategy for pollution spills in wetlands	GSCC	2017/2018	Medium	$5000
6.	Develop Native Grass Establishment and Management program • Identify areas for native grass establishment • Identify weed control options – chemical, burning, mechanical • Determine resources for optimum timing of sowing, slashing	GSCC Sustainability & Environment	2016/2017	High	$25000

7.	Routine environmental works, spraying	GSCC – Sustainability & Environment, Native Open Space	Ongoing	High	Annual Budget
8.	Routine maintenance of the Park including mowing, slashing	GSCC – Native Open Space	Ongoing	High	Annual Budget
9.	Update plant species plaques in Zone 2 (GPS locations, produce map)	CPAC & GSCC	2016/2017	Medium	NA
10.	Conduct weed assessment of Cussen Park	GSCC Sustainability & Environment, Native Open Space	2015/2016	High	Annual Budget
11.	Conduct Fauna Surveys (Native and Introduced) of Cussen Park	CPAC & GSCC	2017/2018	High	$500
12.	Conduct Bird Survey of Cussen Park	CPAC & GSCC	2017/2018	Medium	$150
13.	Development of pest animal trapping program	GSCC Sustainability & Environment	2016/2017	Medium	Annual Budget
14.	Review signage requirements: replacement and repainting; update signs to common standard; consider timber removal signage	CPAC & GSCC	2017/2018	Medium	$2500
15.	Regular Safety Audits of the Parks infrastructure	GSCC – Native Open Space	Ongoing	High	Annual Budget
16.	Renewal of Park Infrastructure (Bridges etc)	GSCC (Responsible department dependent on asset type)	Ongoing	Medium	Annual Budget
17.	Installation of viewing tower	CPAC			$90,000 (grant required)
18.	Develop education strategy for Cussen Park (print brochures, 4 x media releases per year)	CPAC & GSCC	2017/2018	Medium	$150

19.	Organising of Community Events	CPAC	Ongoing	High	Annual Budget
20.	Spotlighting events at Cussen Park	CPAC & GSCC	Ongoing	Medium	Grants - $500
21.	Catch a carp events	CPAC & GSCC	Ongoing	Medium	Annual budget
22.	Regular meetings of the Cussen Park Advisory Committee	CPAC, GSCC	Monthly	High	N/A
23.	Develop and provide a list of potential projects to the appointed Council representative by November each year for review by the Council in alignment with budget timelines, including any proposed re-vegetation activities	CPAC	Yearly	High	N/A
24.	Seek funding through available grants to enhance the Park, in consultation with Council	CPAC	Ongoing	Medium	N/A

CPAC- Cussen Park Advisory Committee

GSCC – Greater Shepparton City Council

GVW – Goulburn Valley Water

13. References

Coomes Consulting (2005). Greater Shepparton 2030 Strategy Plan. Report prepared for the Greater Shepparton City Council.

Greater Shepparton City Council (2008) Local Law 1 – Community Living.

Kellogg, Brown and Root Pty Ltd (2003). Greater Shepparton Stormwater Management Plan. Report prepared for the Greater Shepparton City Council.

Lamp, C and Collet, F (1999). Field Guide to Weeds in Australia. Inkata Press, Melbourne.

Sinclair Knight Merz (2009). Assessment of Cussen Park. Report Prepared for the Greater Shepparton City Council.

Sinclair Knight Merz (2002). Cussen Park Management Options Review. Report Prepared for the Greater Shepparton City Council.

Sinclair Knight Merz (2001). Development of Management Guidelines for Cussen Park. Report Prepared for the Greater Shepparton City Council.

Sinclair Knight Merz (2004). *Draft* Tatura Stormwater Precinct Plan. Report prepared for the Greater Shepparton City Council.

WBM Oceanics (2005). *Draft* Tatura Floodplain Management Strategy. Report prepared for the Greater Shepparton City Council.

Corrick and Norman (1980). The State of Victoria (2011). *Optional Environmental Watering Points for High Value Wetlands within the Shepparton Irrigation Region.* Technical Report, DPI, Victoria.

Appendix A List of Bird Species Identified in Cussen Park

Common Name	Scientific Name	Native Species
Australian Darter	*Anhinga melanogaster*	
Australian Grebe	*Tachybaptus novaehollandiae*	
Australian Hobby	*Falco longipennis*	
Australian Pelican	*Pelecanus conspicillatus*	
Australia Raven	*Corvus coronoides*	
Australian Shelduck	*Ocyphaps lophotes*	
Australian Shoveler	*Anas rhynchotis*	
Australian Spotted Crake	*Porzana fluminea*	
Black Bird	*Turdus merula*	
Black-faced Cuckoo-shrike	*Coracina novaehollandiae*	
Black- fronted Dotterel	*Elseyornis melanops*	
Black Pacific Duck	*Anas superciliosa*	
Blue Faced Honeyeater	*Entomyzon cyanotis*	
Black-shouldered Kite	*Elanus notatus*	
Ballions Crake	*Porzana pusilla*	
Black Honeyeater	*Certhionyx niger*	
Black Swan	*Cygnus atratus*	
Black-tailed Native Hen	*Tribonyx ventralis*	
Black-winged Stilt	*Himantopus himantopus*	
Brown Falcon	*Falco berigora*	
Brown Goshawk	*Accipiter fasciatus*	
Budgerigar	*Melopsittacus undulates*	
Buff-banded Rail	*Gallirallus philippensis*	
Caspian Tern	*Hydroprogne caspia*	
Common Greenshank	*Tringa nebularia*	
Common Sandpiper	*Actitis hypoleucos*	
Cattle Egret	*Adrea ibis*	
Chestnut Teal	*Anas castanea*	
Clamorous Reed-warbler	*Acrocephalus stentoreus*	
Cockateil	*Nymphicus hollandicus*	
Crested Pigeon	*Ocyphaps lophotes*	
Dusky Moorhen	*Gallinula tenebrosa*	
Eastern Rosella	*Platycercus eximius*	
Eurasian Coot	*Fulica atra*	
European Goldfinch	*Carduelis carduelis*	
Fairy Martin	*Hirundo ariel*	
Flame Robin	*Petroica phoenicea*	
Freckled Duck	*Stictonetta naevosa*	
Galah	*Cacatua roseicapilla*	
Glossy Ibis	*Plegadis falcinellus*	
Great Cormorant	*Phalacrocorax carbo*	
Great Egret	*Ardea alba*	
Grey Fantail	*Rhipidura fuliginosa*	
Grey Teal	*Anas gracilis*	

Common Name	Scientific Name	Native Species
Hard Head	*Aythya australis*	
Hoary-headed Grebe	*Polwcephalus polwcephalus*	
Indian Myna	*Acridotheres tristis*	
Intermediate Egret	*Ardea intermedia*	
Lathams Snipe	*Gallinago hardwickii*	
Laughing Kookaburra	*Dacelo novaeguineae*	
Little Eagle	*Hieraaetus morphnoides*	
Little Egret	*Egretta garzetta*	
Little Friarbird	*Philemon citreogularis*	
Little Grassbird	*Megalurus gramineus*	
Little Lorikeet	*Loriidae Glossopsitta pusilla*	
Little Pied Cormorant	*Phalacorcorax melanoleucos*	
Little Raven	*Corvus tasmanicus*	
Magpie	*Gymnorhina tibicen*	
Magpie Goose	*Anseranas semipalmata*	
Magpie Lark	*Grallina cyanoleuca*	
Marsh Sandpiper	*Tringa stagnatilis*	
Masked Lapwing	*Vanellus miles*	
Masked Woodswallow	*Artamus personatus*	
Mistletoe bird	*Dicaeum hirundinaceum*	
Musk Lorikeet	*Glossopsitta concinna*	
Nankeen Night Heron	*Nycticorax caledonicus*	
Noisy Friarbird	*Philemon corniculatus*	
Noisy Miner	*Manorina melanocephala*	
Peregrine Falcon	*Falco peregrinus*	
Pied Butcherbird	*Cracticus nigrogularis*	
Pied Currawong	*Strepera graculina*	
Pied Honeyeater	*Certhionyx variegatus*	
Pink Eared Duck	*Malacorhynchus membranaceus*	
Purple- Crowned Lorikeet	*Glossopsitta porphyrocephala*	
Purple Swamp Hen	*Porphyrio porphyrio*	
Red-Kneed Dotterel	*Erythrogonys cinctus*	
Red-Necked Avocet	*Recurvirostra novaehollandiae*	
Red-Rumped Parrot	*Psephotus haematonotus*	
Red Wattle Bird	*Anthochaera carunculata*	
Royal Spoonbill	*Platalea regia*	
Rufous Songlark	*Cincloramphus mathewsi*	
Rufous Whistler	*Pachycephala rufiventris*	
Sacred Kingfisher	*Todiramphus sanctus*	
Scarlet Robin	*Petroica multicolor*	
Sharp-Tailed Sandpiper	*Calidris acuminata*	
Silver Gull	*Larus novaehollandiae*	
Shining Bronze Cuckoo	*Chalcites (Chrysococcyx) lucidus*	
Sparrow	*Passer domesticus*	

Common Name	Scientific Name	Native Species
Spotless Crake	*Porzana tabuensis*	
Spotted Turtle-Dove	*Streptopelia chinensis*	
Starling	*Sturnus vulgaris*	
Straw-Necked Ibis	*Threskiornis spinicollis*	
Striated Pardalote	*Pardalotus striatus*	
Sulfur-crested Cockatoo	*Cacatua galerita*	
Superb Fairy-wren	*Malurus cyaneus*	
Swamp Harrier	*Circus approximans*	
Tree Martin	*Hirundo nigricans*	
Weebill	*Smicrornis brevirostris*	
Welcome Swallow	*Hirundo neoxena*	
Whiskered Tern	*Chlidonias hybridus*	
Whistling Kite	*Haliastur sphenurus*	
White-Faced Heron	*Ardea Novaehollandiae*	
White Ibis	*Threskiornis molucca*	
White-Breasted Woodswallow	*Artamus superciliosis*	
White-browed woodswallow	*Artamus superciliosus*	
White -necked Heron	*Ardea pacifica*	
White-Plumed Honey eater	*Lichenostomus penicillatus*	
White-Winged Triller	*Lalage sueurii*	
Willy Wagtail	*Rhipidura leucophrys*	
Wood Duck	*Chenonetta jubata*	
Wood Sandpiper	*Tringa glareola*	
Yellow-Billed Spoonbill	*Platalea flavipes*	
Yellow-Rumped Thornbill	*Acanthiza chrysorrhoa*	
Zebra Finch	*Taeniopygia guttata*	

Appendix B List of Flora Species Identified in Cussen Park

Scientific Name	Common Name
Acacia acinacea	Gold-dust Wattle
Acacia baileyana	Cootamundra Wattle
Acacia dealbata	Silver Wattle
Acacia genistifolia	Early Wattle
Acacia implexa	Lightwood Wattle
Acacia montana	Mallee Wattle
Acacia pycnantha	Golden Wattle
Acacia spectabilis	Mudgee Wattle
Allocasuarina torulosa	Forest Oak
Angophera costata	Smoothbark Apple
Austrodanthonia caespitosa	Wallaby Grass
Brachyscome basaltica	Swamp Daisy
Bracteantha viscosa	Sticky Everlasting
Bursaria spinosa	Sweet Bursaria
Callistemon sieberi	River Bottlebrush
Carex appressa	Tall Sedge
Carex tereticaulis	Common Sedge
Corymbia. maculata	Spotted Gum
Crassula helmsii	Swamp Stonecrop
Dianella revoluta	Black anther Flax lily
Dodonaea viscosa	Wedge-leaf Hopbush
Eucalyptus camaldulensis	River Red Gum
Eucalyptus citriodora	Lemon-scented Gum
Eucalyptus cladocalyx	Sugar Gum
Eucalyptus ficifolia	Red flowering Gum
Eucalyptus forrestiana	Fuscia Gum
Eucalyptus lehmannii	Bushy Yate
Eucalyptus leucoxylon	Yellow Gum
Eucalyptus melliodora	Yellow Box
Eucalyptus microcarpa	Grey Box
Eucalyptus ovata	Swamp Gum
Eucalyptus polyanthemos	Red Box
Eucalyptus robusta	Swamp Mahogany
Eucalyptus sideroxylon	Red Ironbark
Eucalyptus socialis	Red Mallee
Eucalyptus viridis	Green Mallee
Hakea tephrosperma	Hooked Needlewood
Leptospermum obovatum	River Teatree
Marsilea drummondii	Common Nardoo
Microlaena stipoides	Weeping Grass
Myoporum acuminatum	Waterbush
Poa labillardieri	Common Tussock Grass
Poa sieberiana	Fine-leaf Tussock Grass
Pittosporum phylliraeoides	Weeping Pittosporum
Pycnosorus chrysanthus	Golden Billy-buttons
Themeda triandra	Kangaroo Grass
Wahlenbergia fluminalis	River Bluebell

Appendix C List of Weed Species identified in Cussen Park

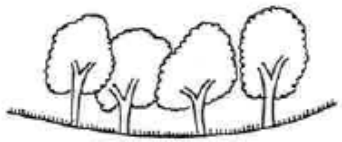
Scientific Name	Common Name
Polypogon monspeliensis	Annual Beard Grass
Ehrharta longiflora	Annual Veldgrass
Aster subulatus	Aster Weed
Hordem leporinum	Barley Grass
Echinochloa crus-galli	Barnyard Grass
Xanthium spinosum	Bathurst Burr
Solanum nigrum	Black Night Shade
Passiflora caerulea	Blue Passion Flower
Rosa rubiginosa	Briar Rose
Asparagus asparagoides	Bridal Creeper
Genista spp.	Broom
Tribulus terrestris	Caltrop, Bindii
Phalaris aquatica	Canary Grass
Arctotheca calendula	Capeweed
Hypochaeris radicata	Cats Ear
Ranunculus sceleratus	Celery Leaf Buttercup
Chicorium intybus	Chicory
Nassella Neesiana	Chilean Needle-grass
Sonchus oleraceus	Common Sow Thistle
Cynodon dactylum	Couch
Salix fragilis	Crack Willow
Taraxacum officinale	Dandelion
Fraxinus angustifolia	Desert Ash
Rumex spp.	Dock
Chenopodium album	Fat Hen
Conyza bonariensis	Fleabane
Polycarpon tetraphyllum	Four-leaved Allseed
Fumaria officinalis	Fumitory
Bromus diandrus	Great Brome
Leontodon taraxacoides	Hairy Hawk-bit
Heliotropium europaeum	Heliotrope
Cardaria draba	Hoary Cress
Marrubium vulgare	Horehound
Pennisetum clandestinum	Kikuyu
Solanum psuedocapsicum	Madeira Winter Cherry
Malva spp.	Mallow
Medicago spp.	Medic
Trifolium angustifolium	Narrow leaf Clover
Cyperus eragrostis	Nut Grass
Romulea rosea	Onion Grass
Salpichroa organifolia	Pampas Lily-of-the-valley
Ehrharta erecta	Panic Veldgrass
Sporobolis africanus	Parramatta Grass

Paspalum dilatatum	Paspalum
Echium plantagineum	Patterson's Curse
Phalaris aquatica	Phalaris
Setaria spp.	Pigeon Grass
Bromus catharticus	Prairie Grass
Physalis viscosa	Prairie Ground-cherry
Lactuca serriola	Prickly Lettuce
Sonchus asper	Prickly Sow-thistle
Prunus spp.	Prunus
Vulpia myuros	Rats Tail Fescue
Modiola caroliniana	Red Flowered Mallow
Plantago lanceolata	Ribwort
Cynosurus echinatus	Rough Dogs Tail
Lolium spp.	Ryegrass
Anagallis arvensis	Scarlet Pimpernel
Capsella bursa-pastoris	Shepherd's Purse
Oxalis pes-caprae	Soursob
Cirsium vulgare	Spear Thistle
Juncus acutus	Spiny Rush
Vulpia bromoides	Squirrel Tail Fescue
Kickxia elatine	Twining Toad-flax
Vicia sativa	Vetch
Trifolium repens	White Clover
Reseda luteola	Wild Mignionette
Avena fatua	Wild Oats
Poa annua	Winter Grass
Polygonum aviculare	Wire Weed
Panicum capillare	Witch Grass
Holcus lanatus	Yorkshire Fog

Appendix D Wetland Classifications

Bioregionally Classified wetland types within the Shepparton Irrigation Region (DPI 2005)

WETLAND TYPE 1 - INTERMITTENT WETLAND

NATURAL	CLEARED
	

General Character:-

Seasonal saturation, intermittent, short duration and shallow flooding.
Supports Grey Box, Yellow Box and Black Box open forest - woodland with grass/herb understorey.

Overstorey Vegetation:-	***Understorey Vegetation:-***
Grey Box (*E. microcarpa*) on seasonally saturated clay soils. Yellow Box (*E. melliodora*) on seasonally flooded, free draining silty-sandy soils. Black Box (*E. longiflorens*) on higher floodplain areas in the north-western section of the Region with clay-loamy soils. Generally cleared or semi-cleared, often drained, generally declining due to excessive flooding/saturation and high water tables.	drier - Pasture species or crops (if inundated <10 days). - Native grasses, rushes and forbs:- - *Danthonia spp./Stipa spp./Agrostis sp.* etc. - *Juncus spp./Marsilea spp.* etc. - *Muehlenbeckia cunninghamii* (Lignum). - *Eragrostic infecunda* (Cane Grass). wetter
Wildlife:- Dryland Species. Opportunistic water bird species whilst flooded - feeding, shelter.	***Natural Occurrence:-*** Dryland areas. Shallow overland floodways. Free draining prior stream depressions. Shallow pot holes with local catchments.

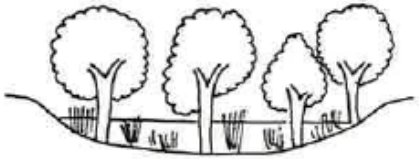
Approximate Water requirements:-

Flooding frequency -	Seasonal saturation, flooding < 1 in 2 years.
Flooding period -	Winter-early spring.
Flooding duration -	< 1 month (30 days).
Flooding depth -	< 0.1 m (deeper if free draining).
Drying frequency -	Annual.
Dry period -	Late spring-summer-autumn.
Other -	Watertable > 2 m deep.

Utilisation:-

Moderate grazing value.
Low grazing value with rushes, lignum and cane grass.
Timber.

WETLAND TYPE 2 - SHORT DURATION SEASONAL WETLAND

NATURAL	CLEARED
	

General Character:-

Regular, short to medium duration and shallow flooding.
Free draining floodplain with little ponding.
Supports River Red Gum.

Overstorey Vegetation:-	***Understorey Vegetation:-***
River Red Gum (*E. camaldulensis*) open to closed forest. Often cleared or semi-cleared, often resulting from drainage of ponding wetlands.	Drier - Native grasses, rushes and forbs:- - *Danthonia spp./Stipa spp./Agrostis sp.* etc. - *Poa labillardieri* (Tussock Grass). - *Juncus spp./Carex spp.* (Rushes/Sedges). Wetter
Wildlife:- Dryland species. Opportunistic water bird species whilst flooded - feeding, shelter. Occasional breeding by ducks.	***Natural Occurrence:-*** Free draining floodplains of rivers and streams. Shallow pot holes and prior stream depressions. Riparian fringes.

Approximate Water requirements:-

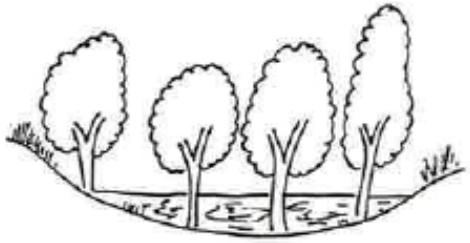
Flooding frequency -	Annual (most years).
Flooding period -	Winter-spring.
Flooding duration -	1-4 months (30-120 days).
Flooding depth -	< 0.3 m (deeper if free draining).
Drying frequency -	Annual.
Dry period -	Summer-autumn.
Other -	Watertable > 2 m deep.

Utilisation:-

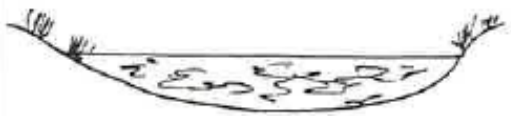
Moderate grazing value.
Low grazing value with Juncus and Carex.
Timber.

WETLAND TYPE 3 - MEDIUM DURATION SEASONAL WETLAND

NATURAL



CLEARED



General Character:-

Regular winter-spring flooding.

Shallow ponding.

Supports River Red Gum.

Overstorey Vegetation:-

River Red Gum (*E. camaldulensis*) open to closed forest.

Understorey Vegetation:-

Drier

- *Eleocharis acuta (Spike Rush)/ Myriophyllum spp. (Milfoil)/ Triglochin procera* (Water Ribbons).
- *Eragrostis infecunda/Amphibromus neesii/ Paspalidium jubiflorum/Cynodon dactylon/Paspalam distichum.*
- *Potamogeton tricarinatus* (Floating Pondweed).
- *Pseudoraphis spinescens* (Moira Grass).

Wetter

Wildlife:-

Dryland species.

Opportunistic waterbird species whilst flooded - feeding, shelter.

Breeding by ducks, ibis, herons, etc.

Natural Occurrence:-

Shallow depressions on floodplains.

Pot holes.

Fringes of open wetlands.

Approximate Water requirements:-

Flooding frequency -	Annual (most years).
Flooding period -	Winter-spring.
Flooding duration -	4-6 months (120-180 days).
Flooding depth -	0.4-1.0 m.
Drying frequency -	Annual (most years).
Dry period -	Summer-autumn.
Other -	Watertable > 2 m deep.

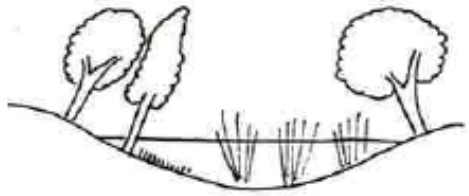
Utilisation:-

Moderate grazing value.

Timber.

WETLAND TYPE 4 - PROLONGED DURATION SEASONAL OPEN WETLAND

NATURAL



CLEARED

General Character:-

Regular, prolonged flooding.

Deeper ponding.

Supports herbaceous aquatic vegetation (beyond limits for River Red Gum).

Aquatic Vegetation:-

Drier

- *Eragrostis infecunda* (Cane Grass) - tolerates prolonged flooding if irregular.
- *Paspalum distichum* (Water Couch) - can dominate in disturbed situations.
- *Eleocharis acuta* (Common Spike Rush)/Myriophyllum sp. (Milfoil)/Triglochin procera (Water Ribbons).
- *Potamogeton tricarinatus* (Floating Pondweed).
- *Pseudoraphis spinescens* (Moira Grass).
- *Juncus ingens* (Giant Rush).

Wetter

Wildlife:-

Most waterbird species - feeding, shelter, breeding.

Breeding habitat for brolga, ibis, ducks, swans, etc.

Natural Occurrence:-

Moderately deep depressions on floodplains.

Deeper pot holes.

Stream floodouts.

Fringes of semi-permanent open wetlands.

Approximate Water Requirements:-

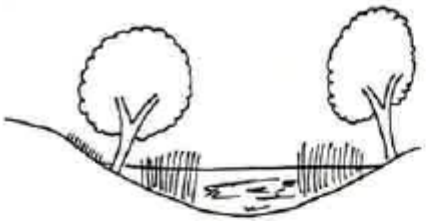
Flooding frequency -	Annual (most years).
Flooding period -	Winter-spring-summer.
Flooding duration -	6-10 months (180-300 days).
Flooding depth -	0.6-1.5 m.
Drying frequency -	3-5 years in 5.
Dry period -	Summer-autumn.
Other -	

Utilisation:-

Moderate summer-autumn grazing value.

WETLAND TYPE 5 - SEMI PERMANENT OPEN WETLAND

NATURAL



CLEARED

General Character:-

Semi-permanent flooding or saturation with occasional drying.

Supports herbaceous aquatic vegetation (beyond limits for River Red Gum).

Aquatic Vegetation:-

Herbaccous (prolonged saturation/shallow flooding):

Paspalum distichum (Water Couch)

Alisma plantago-aquatica (Water Plantain)

Polygonium spp. (Knotweeds).

Emergent:

Eleocharis sphacelata (Tall Spike Rush).

Juncus ingens (Giant Rush).

Phragmites australis (Common Reed).

Typha domingensis/Typha orientalis (Cumbungi).

Rooted Floating-leaf Aquatic Species:

Triglochin procera (Water Ribbons).

Ludwigia peploides (Clovestrip).

Ottelia ovalifolia (Swamp Lilly).

Nymphoides crenata (Wavy Marshwort).

Submerged Aquatic Species:

Myriophyllum spp.

Potamogeton spp.

Free Floating Aquatic Species:

Azolla spp.

Lemna spp.

Wildlife:-

Many waterbird species (ducks, coots, moorhens, swamphens, crakes, rails, bitterns, etc.), particularly if associated open water areas present - feeding, shelter, breeding.

Natural Occurrence:-

Deeper depressions on riverine floodplains.

Shallow palaeosalines.

Fringes of permanent open water.

Most occurrences in the region (other than on the riverine floodplains) are artifical due to summer – autumn irrigation run-off.

Approximate Water Requirements:-

Flooding frequency -	Annual.
Flooding period -	Winter-spring-summer-(autumn).
Flooding duration -	Semi-permanent (> 300 days).
Flooding depth -	< 1.5 m.
Drying frequency -	1-2 years in 5.
Dry period -	Occasional summer-autumn.
Other -	Freshwater (< 1500 EC max.).
	Summer-autumn draw down by evaporation.

Utilisation:-

Water storage.

WETLAND TYPE 6 - PERMANENT OPEN WATER WETLAND

NATURAL

CLEARED

General Character:-

Permanent flooding with rare drying.

Supports aquatic vegetation.

Aquatic Vegetation:-

Rooted Floating-leaf Aquatic Species:

Triglochin procera (Water Ribbons).

Ludwigia peploides (Clovestrip).

Ottelia ovalifolia (Swamp Lily).

Submerged Aquatic Species:

Potamogeton spp.

Vallisneria spiralis.

Free-floating Aquatic Species:

Azolla spp.

Lemna spp.

Wolffia spp.

Potential for algal blooms in conditions of high nutrient levels and high turbidity levels, where other aquatic plant growth is limited.

Wildlife:-

Open water zone of low productivity and relatively low habitat value.

Many waterbird species (ducks, grebes, coots, swans, cormorants, pelicans, etc.), if seasonally flooded vegetated fringe present.

Natural Occurrence:-

Deep riverine floodplain billabongs & backwaters.

River & stream channels.

Deeper palaeosalines.

Approximate Water Requirements:-

Flooding frequency -	Annual.
Flooding period -	Winter-spring-summer-(autumn).
Flooding duration -	Almost permanent.
Flooding depth -	> 1.5 m.
Drying frequency -	< 1 year in 5.
Dry period -	Rarely summer-autumn.
Other -	Freshwater (< 1500 EC max).
	Summer-autumn drawdown by evaporation.

Utilisation:-

Water storage.