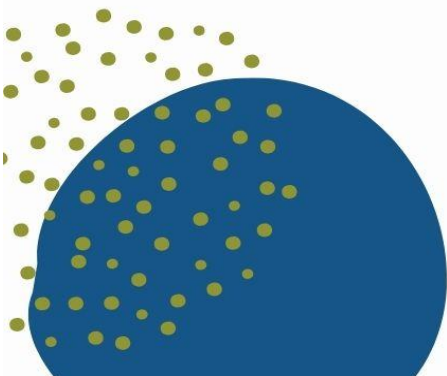
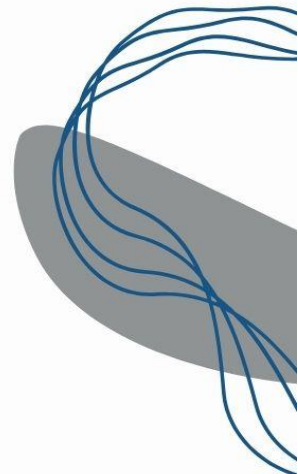


# Goulburn Wetlands Seasonal Watering Proposal

## 2024-2025



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## Document Control

STATUS	VERSION	AUTHOR	DATE	DESCRIPTION
Template	1.0	Ashley Macqueen	21/11/2023	Prepopulated content incorporated into template ready for issue to CMA.
Draft	1.1	Janice Taylor, Sue Kosch, Jo Geddes, Simon Casanelia	26/02/2025	Prepopulated content reviewed and edited. Additional content included for context and to inform planning.
Draft	1.2	Seema Karaki Parks Victoria	11/4/2024	Proofread draft, incorporated changes/ comments.
Final	1.3	Jo Geddes	15/4/2024	Final comments incorporated into report.

## 1 CONTEXT

This Seasonal Watering Proposal (SWP) outlines the Goulburn Broken Catchment Management Authority's (GB CMA) priorities for the use of environmental water for delivery to wetlands in the Goulburn catchment during 2024-2025 to protect and enhance their environmental values and health.

The purpose of this proposal is to:

- Identify the environmental water requirements of wetlands to adaptively manage their watering regime and enable water for the environment to be delivered under a range of climatic scenarios where applicable.
- Identify the drying requirements of wetlands to assist with the completion of the nutrient cycle, control pest species and the spread of some native or exotic vegetation within wetlands.
- Provide information for the development of the VEWH seasonal watering plan as per section 192A of the *Water Act 1989* (Vic).

The SWP is informed by scientific studies and reports that identify the watering regime required to meet the ecological objectives of the wetlands. It was prepared in consultation with key stakeholders and partners and was approved by the CEO of the GB CMA.

You may notice that the format of this Seasonal Watering Proposal is different to previous years. The Victorian Environmental Water Holder (VEWH) has amended the Seasonal Watering Proposal guidelines in 2024-25 and reduced the length of the document whilst still retaining the key information including:

- what environmental watering actions may be delivered during 2024-25;
- the rationale for delivering these environmental watering actions;
- a summary of the engagement undertaken; and
- risk management.

## 2 SYSTEM OVERVIEW

The Goulburn River Basin is Victoria's largest basin covering 1.6 million ha or 7.1 per cent of Victoria. The Goulburn River is 570 km long, flowing from the Great Dividing Range upstream of Woods Point to the Murray River east of Echuca. Stream flow along the Goulburn River has been modified by two major features: Eildon Reservoir and the Goulburn Weir. The Goulburn River downstream of the Goulburn Weir is listed in '*A Directory of Important Wetlands in Australia*' (EA 2001).

Within the catchment, several wetlands are formally recognised for their conservation significance. Four wetlands are listed in '*A Directory of Important Wetlands in Australia*' (EA, 2001) and three are listed as Bioregionally significant (Cth 2002). These wetlands have been prioritised due to their ecological values, significance to the community and traditional owners, but also because they have the infrastructure required to receive environmental water. As the wetland environmental program progresses, other wetlands of high ecological and cultural values will be considered for watering, provided they have the necessary infrastructure in place to deliver water and land manager approvals are met.

The six wetlands that can currently receive water in the Goulburn Catchment are Doctors Swamp, Gaynor Swamp, Horseshoe Lagoon, Kanyapella Basin, Loch Garry and Reedy Swamp (Figure 1).

Collectively known as the Goulburn wetlands, these sites with the exception of Horseshoe Lagoon can receive water for the environment through irrigation supply infrastructure. The volume of water

that can be delivered to each wetland depends on the physical capacity of the infrastructure and the seasonal allocation. Water for the environment can be delivered from the Goulburn River to Horseshoe Lagoon via a temporary pump.

## 2.1 Doctors Swamp

Doctors Swamp is a 200-hectare red gum swamp managed by Parks Victoria and is part of the Doctors Swamp Wildlife Reserve. It is listed as bioregionally significant in the *National Land and Water Resource Audit* (Cth 2002) and is considered one of the most intact red gum swamps in Victoria (Cook, Jolly et al. 2010).

Environmental water can be delivered to the swamp via an inlet on the Cattanach Canal when it is running at 3000 ML/day or above (GBCMA, 2010). Flow in the Cattanach Canal is influenced by the operation of Waranga Basin. During spring, flow can be inconsistent, which limits delivery opportunities. Flow is often more consistent during summer, autumn and winter providing greater delivery opportunities; however, this is dependent on water demand from the Waranga Basin. The surrounding catchment is largely unmodified, so the wetland receives a near natural flood regime. Consequently, the wetland may only require environmental water during dry periods where the optimal drying regime of six months has been exceeded or to enhance natural inundation events to ensure the success of bird breeding events or to provide optimal growth conditions for water dependent vegetation. Doctors Swamp meets several criteria outlined in *Schedule 8* of the Basin Plan – *Criteria for identifying an environmental asset*. This includes criteria 3a (i), 3a (iii) and 4c (refer to appendix 1 for criteria description).

Doctors Swamp provides habitat for 55 wetland dependent fauna species and 85 wetland dependent flora species. Eight fauna species and five flora species are listed as threatened (refer to appendix 2a and 2b).

## 2.2 Horseshoe Lagoon

Horseshoe Lagoon is a former channel of the Goulburn River and is located between Kerrisdale and Trawool, approximately 15 km south-east of Seymour. The 20-hectare lagoon lies largely within the Horseshoe Lagoon Flora and Fauna Reserve, managed by Parks Victoria. A small area of the lagoon is on private property. Horseshoe lagoon received environmental water for the first time in 2019.

Horseshoe Lagoon is a site of high cultural significance to Taungurung people, particularly Taungurung women as it is central to their creation story. An Aboriginal Waterways Assessment (AWA) was undertaken at Horseshoe Lagoon in 2017. The AWA is a tool developed to assist Traditional Owners in the Murray Darling Basin to effectively participate in water planning and management. Taungurung Land & Water Council were involved in the development of the Environmental Water Management Plan for Horseshoe Lagoon (Jacobs 2019).

Horseshoe Lagoon meets several criteria outlined in *Schedule 8* of the Basin Plan – *Criteria for identifying an environmental asset*. This includes criteria 3a (i and iii), 4a and 4c (refer to appendix 1 for criteria description).

Horseshoe Lagoon provides habitat for a wide range of wetland and terrestrial species (Figure 3). To date 34 water dependant fauna species and 47 wetland dependant flora species have been recorded at the site. Of these 12 are listed as rare or threatened (refer to appendix 2a and 2b). There is no permanent infrastructure to deliver Environmental water to Horseshoe Lagoon. A temporary pump is brought on site and water is pumped directly from the Goulburn River.

### 2.3 Gaynor Swamp

Gaynor Swamp is a 303-hectare cane grass dominated wetland located 7 km south-east of Corop. The swamp is part of the Gaynor Swamp Wildlife Reserve and is managed by Parks Victoria. The hydrology of the swamp changed during the 1940s & 1950s when irrigation was introduced to the area. This resulted in prolonged inundation causing the death of southern cane-grass and river red gums in the deepest part of the wetland.

Gaynor Swamp is listed under '*A Directory of Important Wetlands in Australia*' (EA 2001) under the Wallenjoie Wetlands. The wetland is valued for its rarity, species diversity and waterbird habitat (GBCMA 2012). When wet, it supports thousands of waterbirds, including international migratory species.

Gaynor Swamp is situated in a landscape that is dominated by paleo saline soils which results in increased surface water salinity at the site compared to other wetlands in the Goulburn Broken Catchment. Saline water can also enter the swamp via Lake Cooper during times of flood.

Because of these higher salt concentrations, different species of fauna can be found utilising the wetland. Species such as the Red-necked Avocet (*Recurvirostra novaehollandiae*) have been recorded at the swamp upon draw down when salinity levels are at their highest. Gaynor Swamp meets several criteria outlined in *Schedule 8* of the Basin Plan – *Criteria for identifying an environmental asset*. This includes criteria 1b, 3a (i and iii), 3b, 4c and 5a (refer to appendix 1 for criteria description).

To date 66 wetland dependent fauna species and 57 wetland dependent flora species have been recorded at Gaynor Swamp since 2012. Of these species 25 have been listed as threatened (refer to appendix 2a and 2b).

### 2.4 Kanyapella Basin

The Kanyapella basin, classified as a shallow freshwater marsh, is situated on the floodplain of the Lower Goulburn and Murray Rivers 11 kilometres east of Echuca. At 2,950 hectares, Kanyapella Basin is one of the largest wetlands in the Goulburn Broken Catchment and is listed under '*A Directory of Important Wetlands in Australia*' (EA, 2001) as part of the Lower Goulburn River Floodplain. Land management is shared between Goulburn Murray-Water (2,479 ha) and Parks Victoria - Kanyapella Wildlife Reserve (486 ha). The Kanyapella basin and the surrounding catchment have a long history of traditional owner occupation by the Yorta Yorta Nations and are an important part of their cultural and spiritual heritage (GBCMA 2012).

Kanyapella Basin meets several criteria outlined in *Schedule 8* of the Basin Plan – *Criteria for identifying an environmental asset*. This includes criteria 1b, 3a (i and iii), 4a and 5b (refer to appendix 1 for criteria description).

Kanyapella Basin provides habitat for a wide variety of water dependent and terrestrial fauna species. Historic information from local sources suggest that Kanyapella Basin was a large Ibis and Spoonbill rookery in the 1950s & 1960s. Reports of hundreds of Ibis, herons and cormorants breeding in the wetland after a flood event in 1993 have also been made (DPI 2007). To date 59 wetland dependent fauna species and 114 wetland dependent flora species have been recorded at the swamp. Of these 21 species are listed as threatened (refer to appendix 2a and 2b).

Environmental water can be delivered to the Basin via adjoining irrigation drains and regulators at a rate of up to an estimated 20 ML/day.

## 2.5 Loch Garry

Loch Garry is a 680-hectare wetland on the lower Goulburn River floodplain approximately 20km North of Shepparton. The wetland incorporates a paleochannel of the Goulburn River surrounded by shallow wetland depressions, riverine forests and sand ridges. Loch Garry is listed in '*A Directory of Important Wetlands in Australia*' (EA 2001) under the Lower Goulburn River Floodplain wetlands. The wetland is a Wildlife Reserve managed by Parks Victoria. An Environmental water management plan was written for Loch Garry in 2019 (Jacobs 2019). The wetland lies within Yorta Yorta lands and has numerous values and cultural heritage sites important to the Yorta Yorta people.

Loch Garry meets several criteria outlined in *Schedule 8* of the Basin Plan – *Criteria for identifying an environmental asset*. This includes criteria 1b, 3a (i and iii), 4a and 5a (refer to appendix 1 for criteria description).

Due to its large size and diversity of habitat Loch Garry is an important waterbird feeding and roosting site and drought refuge. Twenty-two wetland dependent bird species and 52 wetland dependent flora species have been recorded at Loch Garry. Of these, six species are listed as threatened (refer to appendix 2a and 2b).

Environmental water can be delivered to Loch Garry via an irrigation drain outfall with a capacity of approximately 20 ML/day. Due to this delivery constraint, environmental water deliveries will only target a small proportion of the site including the paleochannel and connected shallow wetland depressions.

## 2.6 Reedy Swamp

Reedy Swamp is a 130-hectare palustrine, temporary freshwater swamp on the Goulburn River on the northern edge of Shepparton Township. The site is managed by Parks Victoria and is part of the Lower Goulburn National Park and is listed under '*A Directory of Important Wetlands in Australia*' (EA 2001) as part of the Lower Goulburn River Floodplain.

Reedy Swamp meets several criteria outlined in *Schedule 8* of the Basin Plan – *Criteria for identifying an environmental asset*. This includes criteria 1b, 3a (i), 4c and 5a (refer to appendix 1 for criteria description).

Reedy Swamp is an important colonial waterbird breeding site and drought refuge. It is also an important stopover site for migratory birds such as Sharp-tailed (*Calidris acuminata*) and Marsh Sandpipers (*Tringa stagnatilis*). Since monitoring began in 2008, 104 wetland dependent fauna species and 85 wetland dependent flora species have been recorded at the site of which 28 are listed as threatened (refer to appendix 2a and 2b).

Environmental water can be delivered to Reedy Swamp via East Goulburn Channel 12 (EG 12), which outfalls into Shepparton Drain 3. Shepparton Drain 3 can then be diverted into Reedy Swamp (GBCMA, 2011). The delivery of environmental water depends upon irrigation demands and can only occur when there is spare channel capacity.

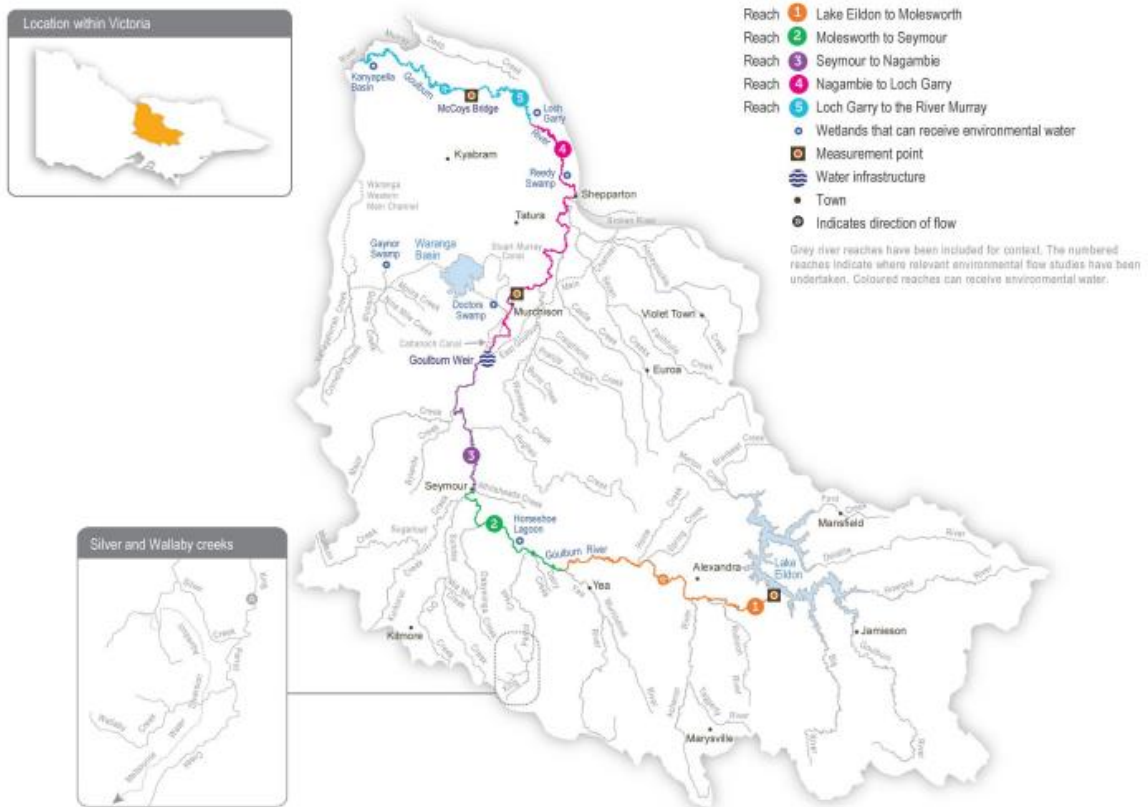


Figure 1: Map of Goulburn wetlands within the Goulburn catchment



### 3 TRADITIONAL OWNER CULTURAL VALUES AND USES

The Goulburn wetlands span across the lands of two Traditional Owner groups, represented by the Taungurung Land and Waters Council (TLaWC) and the Yorta Yorta Nation Aboriginal Corporation (YYNAC). Of these, Gaynor Swamp and Horseshoe Lagoon are on Taungurung Country. TLaWC have been involved in environmental water planning for both wetlands for several years and in delivering water for the environment at Horseshoe Lagoon since 2019. TLaWC have been working with Parks Victoria to reintroduce aquatic plant species that are either missing or in low numbers at Horseshoe Lagoon to boost their diversity and abundance as part of broader collaborative efforts to care for the site including terrestrial planting and weed management, and biocultural and ecological monitoring and assessment.

Doctors Swamp, Kanyapella Basin, Loch Garry and Reedy Swamp are located on Yorta Yorta Country. The YYSAC have been involved in planning for environmental flows at these wetlands for several years, including participating in the development of environmental water management plans.

In late 2023, the Goulburn Broken CMA discussed the proposed 2024-25 priorities for water for the environment in the Goulburn wetlands through the Goulburn Broken Environmental Water and Wetlands Advisory Group (GB EWWAG) forum. This was unable to be held online or in person and as such the proposed watering was disseminated via email for review and feedback.

The TLaWC have identified that water for the environment supports cultural values by protecting intangible cultural heritage and valued species, traditional food and medicine plants. Participation in environmental water planning by TLaWC and the Taungurung water knowledge group *Baan Ganalina* (Guardians of Water) makes an important contribution in enabling Taungurung Traditional Owners to fulfil their obligations to Care for Country. This includes working to restore a more natural watering regime to degraded significant sites and rehabilitating habitat for native species. This in turn contributes to reconnecting the Taungurung community to Country through supporting and securing access for Taungurung contemporary cultural practices and uses, teaching places, camping sites and other places of cultural importance.

The Taungurung people have a special interest in the rehabilitation of floodplain wetlands associated with *Waring* (Goulburn River - reaches 1 to 3), which are now largely disconnected from the main river channel due to the impacts of river flow regulation. The Taungurung Land and Waters Council is currently monitoring biocultural values and habitat conditions at six of the wetlands as part of the ongoing Reading Country program. This process and its findings will inform future seasonal watering proposals and planning for water for the environment. The council is working with partners to enhance habitat conditions for native species in the area, and healthy Country assessments will provide important information about cultural objectives and indicators.

Horseshoe Lagoon is of high cultural significance for Taungurung people, and particularly Taungurung women, as it is central to their Creation Story. In 2017, the TLaWC undertook an Aboriginal Waterways Assessment at Horseshoe Lagoon. In 2019, the council participated in the development of the Environmental Water Management Plan before the first delivery of water for the environment to Horseshoe Lagoon in winter 2019. In 2021 and 2022, council staff and the Taungurung water knowledge group Baan Ganalina coordinated the delivery of environmental flows to Horseshoe Lagoon by managing the pumping and delivery. This is planned again for autumn 2025, pending an adequate draw-down period (refer Table 5.4.3

For Yorta Yorta People, water for the environment supports many cultural values. At Doctors Swamp, it supports *nardoo* (a food source), native grasses, old man weed (which has medicinal uses), sedges

and rushes (for basket weaving), as well as a wide range of bird and animal species. At Loch Garry, water for the environment supports culturally important food, fibre and medicinal plants. A flow delivered to Loch Garry in April 2020 initiated a resurgence of these plants as well as giant rush, which provided nesting opportunities for important bird species. Loch Garry is rich in cultural values: stone scatters, marked trees and significant sand hills in the higher elevations.

Kanyapella Basin is important for the Yorta Yorta People's cultural and spiritual connections. It supports the health of cultural values in the landscape (such as the Creation Story and traditional food and medicine plants). Before the delivery of environmental flows in winter 2020, Yorta Yorta People conducted a cultural burn at the site, helping to enable direct delivery of the water and help the growth of old man weed. Increasing the involvement of Traditional Owners in environmental water management and progressing opportunities towards self-determination in the environmental watering program is a core commitment of the VEWH and its agency partners. This is reinforced by a range of legislation and policy commitments, including the *Water Act 1989*, the *Victorian Aboriginal Affairs Framework*, the 2016 *Water for Victoria*, the *Water is Life: Traditional Owner Access to Water Roadmap 2022*, and in some cases, agreements under the *Traditional Owner Settlement Act 2010*.

Where Traditional Owners are more deeply involved in the planning and/or delivery of environmental flows for a particular site, their contribution is acknowledged in Table 4 with an icon. The use of this icon is not intended to indicate that these activities are meeting all the needs of Traditional Owners but is incorporated in the spirit of valuing that contribution.



**Watering planned and/or delivered in partnership with Traditional Owners to support cultural values and uses**

## 4 SOCIAL RECREATIONAL AND ECONOMIC VALUES AND USES

In planning the potential environmental watering actions in Table 1, the Goulburn Broken CMA considered how environmental flows could support values and uses, including:

- water-based recreation (such as canoeing)
- riverside recreation and amenity (such as birdwatching, camping, cycling, hiking, photography and walking)
- community events and tourism (such as community birdwatching events, the Nature Scripts Initiative and outdoor classroom learning).

Environmental watering of wetlands increases opportunities and visitation of wetlands for naturalists and their activities including bird watching, photography, walking, camping, and hunting (previously State Game Reserves reclassified as Wildlife Reserves). Note: Environmental water is not delivered to wetlands to promote hunting activities. Wetlands provide resources for Traditional Owners for hunting, food, medicinal and traditional activities.

A summary of potential shared benefits of the 2024-2025 proposed environmental water deliveries in the Goulburn catchment are listed below.

*Table 1: Shared benefits of watering wetlands in the Goulburn Catchment in 2024-25*

Wetland	Beneficiary	Connection to wetland	Value	How have these benefits been considered?
Horseshoe Lagoon	Taungurung people Bird watchers Photographers Walkers Campers Local landholders	Connection to Country for Taungurung people.	Delivery of environmental water provides a connection to Country for Taungurung Traditional Owners.	Autumn watering of the site promotes growth of wetland plants that are beneficial for roosting and foraging for waterbirds. The provision of water and involvement in its delivery allows Traditional Owner to meet cultural obligations to heal and care for Country, visit the site to access food and medicinal plants, and practice culture.

## 5 ENVIRONMENTAL VALUES AND OBJECTIVES

Doctors Swamp, Gaynor Swamp, Kanyapella Basin, Loch Garry and Reedy Swamp, are formally recognised for their conservation significance in the Goulburn Catchment. The Goulburn wetlands support a variety of plant communities ranging from river red gum swamps to cane grass wetlands.

Doctors Swamp is considered one of the most intact red-gum swamps in Victoria, supporting over 80 wetland plant species.

Gaynor Swamp is a cane grass wetland situated on paleosaline soils: soils formed from historic oceans. The wetland supports thousands of waterbirds, including brolga and intermediate egrets, when wet. Gaynor Swamp has a greater salt concentration than other wetlands in the region when water levels are low, and it attracts a different suite of feeding waterbirds as it draws down. One of the most significant species that feed on exposed mudflats at Gaynor Swamp is the red-necked avocet.

Horseshoe Lagoon is a paleochannel of the Goulburn River that has tall marsh, floodway pond hermland and floodplain streamside woodland vegetation communities. The lagoon supports numerous waterbird species and is home to three species of turtle, including the Broad-shelled






Turtle.

Kanyapella Basin is a shallow freshwater marsh that provides habitat for numerous plant and animal species, including the critically endangered Plumed egret (*Ardea intermedia plumifera*). Historically, it has been a popular breeding site for ibis, herons and cormorants.

Loch Garry is a paleochannel of the Goulburn River that provides deep, open-water habitat. The channel is surrounded by shallow, vegetated wetland depressions, red gum forest and sand ridges. It is an important site for waterbird feeding and roosting, and it is a drought refuge for eastern great egrets, musk ducks, nankeen night herons and royal spoonbills.

Reedy Swamp contains a mosaic of vegetation types, including tall marsh, floodway pond herbland and rushy riverine swamp. It is an important drought refuge, nesting site for colonial waterbirds and stopover feeding site for migratory birds (such as sharp-tailed sandpiper and marsh sandpiper).

Table 2: Environmental objectives for Goulburn wetlands

Environmental objectives in the Goulburn wetlands	
	<b>A1 - Maintain existing frog populations</b>
	<b>T1 - Maintain freshwater turtle populations</b>
	<b>CN - Restore carbon and nutrient cycling within the wetlands to increase ecosystem productivity</b>
	<b>V1 - Increase the diversity and cover of native wetland plant species consistent with ecological vegetation class benchmarks</b>
	<b>V2 - Reduce the cover and diversity of exotic plants</b>
	<b>B1 - Provide breeding habitat for waterbirds</b>
	<b>B2 - Provide feeding and roosting habitat for waterbirds</b>

## 6 ENGAGEMENT

This proposal was prepared by the GB CMA with input and support from Taungurung Land & Waters Council, Yorta Yorta Nation Aboriginal Corporation, Goulburn Broken Wetland Technical Reference Group (GB WTRG) and the Goulburn Broken Environmental Water Wetlands Advisory Group (GB EWWAG).

The GB WTRG is made up of members from Wetland Revival Trust (WRT), Water’s Edge Consulting and Senior Scientists from Department of Energy, Environment and Climate Action (DEECA) and Arthur Rylah Institute (ARI) for Environmental Research. A meeting was unable to be held online with the GB WTRG to discuss and seek their advice on proposed watering or drying phases for the Goulburn wetland sites. Instead, the proposed watering and drying phases were emailed to the TRG for review (23 November 2023) and feedback to inform the GB EWWAG.

The GB EWWAG, established in 2012, is made up of delivery partners, Traditional Owner representatives, industry, community groups and community members. Current membership includes Parks Victoria, Taungurung Land & Waters Council, Yorta Yorta Nation Aboriginal

Corporation, Goulburn Murray Landcare Network, Goulburn-Murray Water, Moira Shire, City of Greater Shepparton, Victorian Environmental Water Holder and community members. The GB EWWAG meets at least three times a year (online and in person) and additionally if required to discuss the outcomes from previous waterings including findings from wetland monitoring, and review wetland condition, watering objectives and watering for the coming year. The group met via Microsoft™ Teams on the 29th of November 2023, and members were presented and provided in the minutes with a copy of the proposed actions for comment. Comments have been incorporated into this report.

The Goulburn Broken CMA has agreements with Yorta Yorta Nation Aboriginal Corporation and Taungurung Land & Waters Council which outline the legal requirements the GB CMA need to abide by when undertaking natural resource management works in areas covered by these agreements.

The Land Use Activity Agreement (LUAA) forms *Schedule 9* of the Recognition and Settlement Agreement between Taungurung Land & Waters Council and the State of Victoria and is used when works activities are required on crown land. No formal notification is currently required for delivery of environmental water on Taungurung Country apart from involvement in the development of the Seasonal Watering Proposals. Consultation of proposed watering and endorsement of environmental watering at these sites is undertaken. A letter of support from Traditional Owner groups is also required.

The Aboriginal Cultural Heritage Land Management Agreement (ACHLMA) is an agreement between the GB CMA and Yorta Yorta Nation Aboriginal Corporation which is legislated by the *Aboriginal Heritage Act 2006*. This includes the following activities that are permissible under the agreement:

- Environmental Monitoring Activities at wetlands.
- Environmental water – returning natural flows at wetlands across the catchment.

Reedy Swamp and Loch Garry wetlands are not included in this agreement as they are situated in the Lower Goulburn National Park.

The Goulburn Broken CMA will continue to build community understanding of how natural wetland wetting regimes have changed and how water for the environment is being used to protect and restore the wetlands. This will be achieved through reports, traditional and social media and direct contact with special interest groups and school groups.

The engagement process the Goulburn Broken CMA has undertaken during the development and implementation of this seasonal water proposal is outlined in Table 3. All communication activities will be undertaken in accordance with the communication and media protocols of the VEWH.

Table 3: Summary of stakeholder engagement that informed this Seasonal Watering Proposal

Stakeholder(s)	Engagement method	Engagement purpose
<p><b>Government Agencies</b></p> <ul style="list-style-type: none"> <li>Goulburn-Murray Water (River Operations Planning, Diversions)</li> <li>VEWH</li> <li>Parks Victoria</li> <li>Council of Greater Shepparton</li> </ul>	<ul style="list-style-type: none"> <li>Goulburn Broken Environmental Water Wetlands Advisory Group (EWWAG) 29<sup>th</sup> February 2024</li> <li>Direct engagement (one-one-one) or via email</li> </ul>	<ul style="list-style-type: none"> <li>Seek input to the development of the proposal.</li> <li>Review previous environmental watering actions and seek feedback on any outcomes or observations.</li> <li>Ensure program partners understand the purpose and objectives of the environmental watering program in the Goulburn wetlands.</li> <li>Provide an opportunity to review and contribute to the proposed watering actions and intended outcomes.</li> <li>Identify opportunities to achieve shared benefits.</li> </ul>
<p><b>Traditional Owners</b></p> <ul style="list-style-type: none"> <li>Yorta Yorta Nation Aboriginal Corporation</li> <li>Taungurung Land &amp; Water Council</li> </ul>	<ul style="list-style-type: none"> <li>Goulburn Broken Environmental Water Wetlands Advisory Group (EWWAG) – YYNAC couldn't attend but received meeting minutes.</li> </ul>	<ul style="list-style-type: none"> <li>Seek input to the development of the proposal.</li> <li>Review previous environmental watering actions and seek feedback on any outcomes or observations.</li> <li>Ensure program partners understand the purpose and objectives of the environmental watering program in the Goulburn wetlands.</li> <li>Provide an opportunity to review and contribute to the proposed watering actions and intended outcomes.</li> <li>Identify opportunities to achieve shared benefits.</li> </ul>
<p><b>Environmental Groups</b></p> <ul style="list-style-type: none"> <li>Goulburn Valley Environment Group</li> <li>Turtles Australia</li> </ul>	<ul style="list-style-type: none"> <li>Goulburn Broken Environmental Water Wetlands Advisory Group (EWWAG) - Couldn't attend but received meeting minutes.</li> <li>Turtles Australia - Couldn't attend but received meeting minutes.</li> </ul>	<ul style="list-style-type: none"> <li>Seek input to the development of the proposal.</li> <li>Review previous environmental watering actions and seek feedback on any outcomes or observations.</li> <li>Ensure program partners understand the purpose and objectives of the environmental watering program in the Goulburn wetlands.</li> <li>Provide an opportunity to review and contribute to the proposed watering actions and intended outcomes.</li> <li>Identify opportunities to achieve shared benefits.</li> </ul>

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<p><b>Recreational users/ local community</b></p> <ul style="list-style-type: none"><li>• Trellys Fishing and Hunting</li></ul>	<ul style="list-style-type: none"><li>• Goulburn Broken Environmental Water Wetlands Advisory Group (EWWAG) – Couldn't attend but received meeting minutes.</li><li>• Direct engagement via phone call after meeting.</li></ul>	<ul style="list-style-type: none"><li>• Seek input to the development of the proposal.</li><li>• Review previous environmental watering actions and seek feedback on any outcomes or observations.</li></ul>
<p><b>Landholders</b></p> <ul style="list-style-type: none"><li>• Adjoining landowners</li></ul>	<ul style="list-style-type: none"><li>• Direct engagement (one-on-one) or via email/mail</li></ul>	<ul style="list-style-type: none"><li>• Ensure landowners understand the purpose and objectives of the environmental watering program in the Goulburn wetlands.</li><li>• Seek feedback through local knowledge.</li></ul>

## 7 SCOPE OF ENVIRONMENTAL WATERING

The GBCMA is planning that the Goulburn wetlands will now go into a drying phase (which we have attempted to do for the last 12 months). If Horseshoe Lagoon dries for six months an autumn watering in 2025 may occur.

### ***PWA for 2024-25 – Promote drying of Doctors Swamp to complete nutrient cycle.***

Doctors swamp received environmental water in Autumn (April) 2022 and ponded for 8 months before drawing down and becoming dry in Feb for 5 months. The swamp re-wetted in July 2023 and has remained wet for last 7 months. The frequency of the wetting/drying regime over the previous 10-year period is within the optimum range of 5-7 out of 10 years having experienced 7 in 10 years wet from both unregulated conditions and environmental watering. (Note: restricted by delivery constraints in winter – Cattanach canal needs to be running at 300ML/d to be able to deliver water to Doctors Swamp).

### ***PWA for 2024-25 – Promote drying of Gaynor swamp to complete nutrient cycle and assist with management of invasive plant species such as Cumbungi.***

Gaynor Swamp – Gaynor swamp received environmental water in Autumn (May) 2022 and ponded for approx. 9-10 months following unregulated inflows that maintained the wetting regime. Drawdown commenced in Autumn 2023 and the wetland dried for a month or so before further unregulated conditions led to re-wetting over winter 2023 and ponding for the last 5 months (as at Nov 2023). The frequency of the wetting/drying regime over the previous 10-year period is within the optimum range of 3-7 out of 10 years having experienced 5 in 10 years wet from both unregulated conditions and environmental watering. Previous discussions with TRG mentioned Cumbungi expansion and noting Damien Cook had suggested 4-year drying to assist with management.

### ***PWA for 2024-25 – Promote drying of Kanyapella Basin to complete nutrient cycle.***

Kanyapella basin – has previously received environmental water in the north-east corner in spring 2021 (1000ML) and in the north-west corner in winter 2020 (500ML). It has only otherwise been inundated four other occasions as a result of unregulated conditions. This meets the minimum frequency of watering events (3-7 in 10 years). The most recent flooding/wet conditions (2023/24) has meant that the basin has held water for between 20 months whilst filling and commencing drawing down.



***PWA for 2024-25 – Promote drying of Horseshoe Lagoon to complete nutrient cycle and assist with European Carp management.***

***Fill/top up in Autumn 2025 if site has dried for more than six months.***

Horseshoe Lagoon – has reached its optimum frequency of events having experienced 8 in 10 years wet with both unregulated inflows and environmental water deliveries in 2019-20, 2020-21, 2021-22, and 2022-23 and is still full as of February 2024. If the wetland has met its recommended dry period of approximately six months, a fill in autumn 2025 will be considered in consultation with TLaWC and the GB WTRG to promote the growth of wetland vegetation and provide habitat for turtles










***PWA for 2024-25 - Promote drying of Loch Garry to assist with managing European Carp populations and complete nutrient cycle.***

Loch Garry – has experienced 6 in 10 years wet due to unregulated inflows and environmental water. Loch Garry has most recently been wet for almost 40 months since October 2021, holding for 13 months initially within the channel only, then the spring flooding in October 2022 and 2023 and January 2024 saw complete inundation. This exceeds the optimal wetting regime of the site. European carp entered the Loch during these high flow events and require management to promote better water quality at the site.

***PWA for 2024-25 - Promote drying of Reedy Swamp to assist with managing European Carp populations and complete nutrient cycle.***

Reedy Swamp – is within the optimum frequency having experienced 6-7 in 10 years wet due to unregulated inflows and environmental water. Reedy Swamp has not been fully dry since the summer of 2021. Since then, it has held small amounts of water for 6months before re-wetting due to rainfall in winter 2021, it continued to hold water and was topped up further in winter 2022. By Spring 2022 with the flooding the entire forest was inundated over two months with minimal drawdown. European carp entered the swamp during these high flow events and require management to promote better water quality at the site. Reedy has remained wet since with top ups in October 2023 and January 2024.

Table 4: Potential Watering Actions in 2024-25

Potential environmental watering action	Expected watering effects	Environmental objectives
Doctors Swamp (promote drying)	<ul style="list-style-type: none"> <li>• Drawdown to dry to enable nutrient cycling.</li> </ul>	 CN
Gaynor Swamp (promote drying)	<ul style="list-style-type: none"> <li>• Drawdown to dry to enable nutrient cycling</li> <li>• Suppress the growth of weeds and expansion of invasive species such as Typha and Cumbungi.</li> </ul>	 CN  V2
Horseshoe Lagoon (fill in autumn 2025 if swamp has dried for last 6 months) 	<ul style="list-style-type: none"> <li>• Promote drying to manage pest fish species</li> <li>• Inundate the deeper section and wetland margin, if lagoon has been dry for approximately six months, to maintain naturally occurring wetland vegetation communities and help recently planted aquatic vegetation continue to establish</li> <li>• Suppress the growth of weeds</li> <li>• Provide food and breeding habitat for turtle populations</li> </ul>	 T1  V1 V2 V3
Kanyapella Basin (promote drying)	<ul style="list-style-type: none"> <li>• Drawdown to dry to enable nutrient cycling</li> </ul>	 CN
Loch Garry (promote drying)	<ul style="list-style-type: none"> <li>• Drawdown to dry to enable nutrient cycling</li> </ul>	 CN
Reedy Swamp (promote drying)	<ul style="list-style-type: none"> <li>• Drawdown to dry to enable nutrient cycling</li> </ul>	 CN

## 8 SCENARIO PLANNING

The demand and utilisation of environmental water will vary according to climatic conditions. In drier periods reduced natural inflows and restricted water resources may mean that environmental water is not available. However, in wetter periods the ecological and hydrological objectives of a wetland may be largely met by natural inflows and only small volumes of environmental water may be required. Currently, good inflows in 2023-2024 and allocations reaching 100% early in the season there are reserves in the Goulburn system that will provide for an opening allocation under all inflow conditions (Table 5 February 2025). There is also a large volume of environmental water carryover that will aid in delivering early season watering priorities.

*Table 5: Goulburn system outlook seasonal determination of high reliability shares*

Inflow Conditions	1 July 2024	15 August 2024	16 October 2024	17 February 2025
Wet	100%	100%	100%	100%
Average	80%	100%	100%	100%
Dry	68%	83%	100%	100%
Extreme Dry	64%	69%	75%	80%

Scenarios are based on receiving catchment inflows with a Probability of Exceedance (PoE) and the likely availability of environmental water, based on data from Goulburn-Murray Water. The scenarios are extreme dry/drought (99% PoE), dry (90% PoE), average (50% PoE) and wet (10% PoE). These scenarios depict representative seasonal conditions with different natural inflows to the wetlands and the volume of environmental water required.

Horseshoe Lagoon will be the only Goulburn wetland to receive environmental water in 2024-2025, if it draws down and dries for at least six months. If this does not happen, environmental water delivery may not occur.

Table 6: Scenario Planning in 2024-25

Planning scenario	Drought	Dry	Average	Wet
Expected conditions	<ul style="list-style-type: none"> <li>Catchment run-off and natural flow into the wetlands are highly unlikely</li> </ul>	<ul style="list-style-type: none"> <li>Catchment run-off and natural flow into the wetlands are highly unlikely</li> </ul>	<ul style="list-style-type: none"> <li>Some catchment run-off and natural flow into some of the wetlands are likely, particularly in winter/spring</li> </ul>	<ul style="list-style-type: none"> <li>Catchment run-off and natural flow into the wetlands are likely to fill or partially fill the wetlands, particularly in winter/spring</li> </ul>
Potential environmental watering – tier 1 (high priorities)	<ul style="list-style-type: none"> <li>Horseshoe Lagoon</li> </ul>	<ul style="list-style-type: none"> <li>Horseshoe Lagoon</li> </ul>	<ul style="list-style-type: none"> <li>Horseshoe Lagoon</li> </ul>	<ul style="list-style-type: none"> <li>NA</li> </ul>
Potential environmental watering – tier 2 (additional priorities)	<ul style="list-style-type: none"> <li>NA</li> </ul>	<ul style="list-style-type: none"> <li>NA</li> </ul>	<ul style="list-style-type: none"> <li>NA</li> </ul>	<ul style="list-style-type: none"> <li>NA</li> </ul>
Possible volume of water for the environment required to achieve objectives	<ul style="list-style-type: none"> <li>120ML</li> </ul>	<ul style="list-style-type: none"> <li>120ML</li> </ul>	<ul style="list-style-type: none"> <li>80ML</li> </ul>	<ul style="list-style-type: none"> <li>NA</li> </ul>

Doctors Swamp received water for the environment in autumn 2022 and ponded for 8-9 months before drawing down and becoming dry in February 2023 for 5 months. The swamp re-wetted in July 2023 and has remained wet for the last six months, drawing down but holding water in the south-east deeper sections until filling again in January 2024.

Horseshoe Lagoon has reached its optimum frequency of events having experienced 8 in 10 years wet with both unregulated inflows and environmental water deliveries in 2019-20, 2020-21, 2021-22, and is still full as of February 2024. Provided the wetland has met its recommended dry period of six months, a fill in autumn 2025 will promote the growth of threatened plant species in the lower parts of the wetland. It will also support dry-phase ecosystem processes in more elevated parts of the wetland complex.

Doctors Swamp, Gaynor’s Swamp, Loch Garry Kanyapella Basin and Reedy Swamp will not receive water for the environment in 2024-25 to allow them to draw down or remain dry to support dry-phase ecosystem processes.

## 9 RISK MANAGEMENT

The risks associated with the proposed delivery of environmental water to the wetlands in the Goulburn Wetlands system are outlined in Table 7 below, along with their mitigation actions and the organisation responsible for their implementation. These will be reviewed and updated prior to the delivery of environmental water in site specific environmental water delivery plans.

Table 7: Risks associated with environmental water delivery to wetlands in the Goulburn system

Risk category	Risk description	Likelihood	Consequence	Risk Rating	Mitigation actions	Lead organisation for action	Likelihood	Consequence	Residual Risk Rating	Requires inclusion and tailoring in delivery plan
<b>Environment</b>	Specified flow rates are insufficient to achieve the intended extent of wetland inundation or magnitude and duration of river flows, resulting in a failure to achieve planned environmental outcomes.	Possible	Major	Medium	<ul style="list-style-type: none"> <li>• Include contingency allowance in estimated watering requirements, based on previous event data, and consider a contingency in the duration of the event to achieve desired wetland inundation.</li> <li>• Monitor event (especially for deliveries to new sites or for previously untested events) and adjust flows as necessary, or terminate event if it becomes clear that insufficient water is available.</li> <li>• Identify and address constraints that may limit the flow rates for environmental deliveries.</li> </ul>	CMA CMA CMA/GMW	Possible	Minor	Low	Yes - depends on the volume of the delivery (affects consequence rating). Treatment may be similar, however.
<b>Reputational</b>	Specified flow rates are insufficient to achieve the intended extent of wetland inundation or magnitude and duration of river flows, resulting in a failure to achieve planned environmental outcomes and loss of community support.	Possible	Major	Medium	<ul style="list-style-type: none"> <li>• Communications on the environmental benefits of watering actions.</li> <li>• Monitor event (especially for deliveries to new sites or for previously untested events) and adjust flows as necessary or terminate event if it becomes clear that insufficient water is available.</li> <li>• Communicate the need for complimentary measures to optimise the benefits of environmental watering actions.</li> </ul>	CMA	Unlikely	Minor	Low	Yes - depends on the volume of the delivery (affects consequence rating).
<b>Environment</b>	Overestimates of environmental water demand prevents planning for supplying demands at other locations <i>Notes: Planning watering actions also includes decisions around the carryover and trade of water as alternatives to current year water use decisions.</i>	Possible	Minor	Low	<ul style="list-style-type: none"> <li>• CMAs review demand estimates and targets met by unregulated flows throughout the delivery cycle and regularly advise VEWH of any changes so unused water can be reallocated.</li> <li>• CMAs review demand estimates at the conclusion of the watering year, prior to the development of the following seasonal watering proposal, so estimates of future requirements are more accurate.</li> <li>• River operators provide regular updates on flows, including through OAG meetings</li> <li>• Manage Water Holdings to maximise supply opportunities for all sites</li> </ul>	CMA CMA MDBA/GMW VEWH	Unlikely	Minor	Low	No- generic risk that is mitigated prior to delivery plan process
<b>Environment</b>	Inaccurate accounting and measurement or operational error results in target flows either not being achieved or being exceeded, leading to a failure to achieve planned environmental outcomes  Occurring in Upper Broken CK below Casey's weir offtake due to weed growth, which is also limiting flow capacity (likelihood for Broken is "possible")	Unlikely	Moderate	Low	<ul style="list-style-type: none"> <li>• Review accounting and measurement processes to be used to ensure that techniques are agreed, and monitoring/measurement sites are operational.</li> <li>- Apply agreed arrangements as documented in the Murray and Goulburn Systems Operating Arrangement documents</li> <li>- GMW to undertake additional gaugings</li> <li>- Weed control in Bkn Ck programmed for autumn (weather conditions permitting)</li> </ul>	GMW (MDBA in some waterways such as Barmah) GMW/VEWH GMW GMW/CMA	Unlikely	Minor	Low	Yes – consequence level likely to vary depending on volume and needs to be actively managed during delivery
<b>Business Costs</b>	Volumes of environmental water delivered or released exceed volumes approved for use in the event, leading to potential overdrawing of accounts or preventing other planned actions being undertaken. <i>Notes: Planning watering actions also includes decisions around the carryover and trade of water as alternatives to current year water use decisions.</i>	Unlikely	Major	Low	<ul style="list-style-type: none"> <li>• Ensure that deliveries are reported progressively throughout the event and are monitored against ordered volume.</li> <li>• Ensure ordering and delivery procedures are kept up-to-date and adhered to.</li> <li>• Ensure metering and reporting processes for temporary pump operations are suitable and effective</li> </ul>	CMA & GMW GMW/CMA/VEWH CMA	Unlikely	Minor	Low – based on 2024-25 water availability and value	Yes – consequence level likely to vary depending on volume and needs to be actively managed during delivery
<b>Environment</b>	Environmental water account is overdrawn, leading to water not being available as per approved watering statement to complete planned actions and environmental benefits not being achieved. <i>Notes: Planning watering actions also includes decisions around the carryover and trade of water as alternatives to current year water use decisions.</i>	Unlikely	Major	Low	<ul style="list-style-type: none"> <li>• Monitor ABA balances and undertake regular communications with CMA and RWC as part of portfolio management activities.</li> <li>• Ensure that deliveries are reported progressively throughout the event and are monitored against ordered volume.</li> </ul>	VEWH CMA & GMW	Unlikely	Minor	Low	Yes – depends on the volume of the delivery (affects consequences rating). Treatment may be similar however.

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<b>Environment</b>	Planned maintenance of water delivery infrastructure results in planned/specified flows not being achieved, leading to a failure to achieve planned environmental outcomes.	Likely	Minor	Low	<ul style="list-style-type: none"> <li>Undertake early planning and communications between the CMA and storage operator to minimise likelihood of constraints, enable scheduling of maintenance outside of high demand periods or identify alternative environmental water delivery windows to avoid scheduled maintenance activities.</li> <li>Consider adding time contingencies to planned maintenance schedules to ensure works are completed prior to commencement of watering actions.</li> </ul>	CMA and GMW  CMA	Unlikely	Minor	Low	No, managed prior to delivery plan development
<b>Environment</b>	<p>Failure of poorly maintained environmental delivery infrastructure results in planned/specified flows not being achieved, reducing the ability to achieve planned environmental outcomes. (Including failure or damage due to vandalism)</p> <p>Requires site specific risk assessment - relevant to wetlands, not rivers and streams, apart from perhaps Warrigal Creek (not targeted with e-water). Risk only relevant to wetlands sites - residual risk rating to be assessed at Delivery Plan/Event Plan phase</p>	Likely	Moderate	Medium	<ul style="list-style-type: none"> <li>Asset ownership is clarified, and the asset owners perform regular maintenance, and pre-event asset inspections, on delivery infrastructure. <i>*Note that insufficient resources are likely to limit the asset owner's ability to regularly inspect and maintain infrastructure. Increased resources for these activities may further reduce the likelihood and risk ratings.</i></li> <li>Report vandalism to police.</li> <li>Review asset design to minimise opportunities for interference or damage.</li> <li>For privately owned assets, arrange approvals to use/operate assets and undertake pre-delivery inspections</li> <li>Communicate failures to the CMA</li> <li>Initiate documentation of asset ownership and management arrangements in national parks.</li> </ul> <p>Consider monitoring options to detect vandalism, interference, or failure of assets at individual sites with elevated risks.</p>	Asset Owner  Asset Owner Asset Owner CMA Asset Owner PV				Yes, requires consideration, if possible, for the site during delivery plan process (i.e.: where site is known to have poorly maintained infrastructure)
<b>Environment</b>	<p>Poor condition of delivery infrastructure results in the asset owner being unable to operate the structure due to OH&amp;S risks, leading to failure to deliver environmental flows and to achieve environmental objectives.</p> <p>Note: This issue may affect multiple sites</p> <p><i>GMW to confirm OH&amp;S status and likelihood rating</i></p>	Likely	Moderate	Medium	<ul style="list-style-type: none"> <li>Asset owner to undertake regular maintenance and pre-event asset inspections on delivery infrastructure.</li> <li><i>*Note that insufficient resources are likely to limit the asset owner's ability to regularly inspect and maintain infrastructure. Increased resources for these activities may further reduce the likelihood and risk ratings.</i></li> <li>Communicate failures to the CMA</li> <li>Develop design for new regulating structure and seek funding to implement necessary upgrades in conjunction with asset owner.</li> <li><i>Note: PV proposing to issue operating licences for BMF regulators</i></li> </ul>	Asset Owner  Asset Owner CMA (MDBA in Barmah Forest)	Unlikely	Minor	Low	Yes, requires consideration, if possible, for the site during delivery plan process (i.e.: where site is known to have poorly maintained infrastructure)
<b>Environment</b>	<p>High operational and consumptive water demands lead to reduced access for environmental deliveries, with the result that target flows/volumes cannot be achieved, impacting on environmental outcomes</p> <p>Note: Goulburn R is a particular risk - see new separate Goulburn risk added</p>	Likely	Minor	Low	<ul style="list-style-type: none"> <li>Event planning will seek to avoid peak demand periods, and events will be monitored and adjusted as necessary.</li> <li>System operators to provide longer term forecasts for future consumptive demands as an input to planning watering proposals</li> <li>Develop longer term agreements on river capacity access for environmental deliveries.</li> <li>Investigate opportunities to undertake deliveries outside the irrigation season with consideration of appropriate delivery costs</li> </ul>	CMA and GMW  GMW/MDBA  VEWH CMA and VEWH	Possible	Minor	Low	Yes
<b>Legal</b>	<p>Environmental releases, either on their own or potentially in combination with unexpected tributary inflows, cause unauthorised inundation of private land, resulting in impacts on landowner activities and assets.</p> <p>Note that 2022 floods have caused erosion or damage to the riverbanks which may result in Environmental releases (at previously acceptable flow rates) causing unauthorised inundation of private land, resulting in impacts on landowner activities and assets.</p>	Possible	Major	Medium	<ul style="list-style-type: none"> <li>Ensure currency of any landholder agreements for inundation of private land.</li> <li>Release plans designed to avoid exceeding operational thresholds or unauthorised flooding.</li> <li>Monitor events and adjust releases to avoid overbank flows. This may include limiting deliveries to daylight hours only, where feasible and consistent with watering requirements.</li> <li>Monitor forecast rainfall and tributary inflows and adjust releases to avoid overbank flows.</li> <li>Monitor deliveries to new locations to build an understanding of flow patterns and inundation thresholds and adjust releases accordingly.</li> <li>Investigate post flood to determine commence to flow of major erosion in the Mid Goulburn (and other systems as required).</li> <li>Seek advice from storage operator of any known changes in bank levels and commence to flow levels.</li> </ul>	CMA CMA GMW/MDBA  GMW/MDBA CMA  CMA/Storage operator	Unlikely	Moderate	Low	Yes, where relevant

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<b>Reputational</b>	Public land and/or access routes into public land areas may be inundated by delivery of environmental water, leading to potential impacts on recreational opportunities for park users (e.g. access to boat ramps, fishing spots, firewood collection etc.). Applies to Lower Goulburn	Almost certain	Moderate	High	<ul style="list-style-type: none"> <li>Watering proposals to identify potential impacts, communication of planned events, access closures, alternative recreational opportunities and alternative access routes</li> </ul>	CMA Land Manager	Almost certain	Minor	Medium	Yes
<b>Business Costs</b>	Public land visitor vehicles cause damage to tracks, or to other assets in the surrounding landscape, due to off-road activity (by users going off track to avoid floodwaters) during and after environmental watering. Risks only relevant to wetland sites – residual risk rating to be assessed at delivery plan phase.	Likely	Moderate	Medium	Land Managers: <ul style="list-style-type: none"> <li>implement management activities to prevent access to flooded roadways (e.g. close roads, communicate planned events, install signage)</li> <li>repair damage during and after environmental watering events</li> <li>maintain key higher ground tracks to enable alternative access routes during environmental watering.</li> </ul> <i>*Note that insufficient resources may limit the land manager's ability to implement management activities and hence ability to effectively mitigate the described risk.</i>	Land Manager				Yes
<b>Service Delivery</b>	Access routes into public land areas may be inundated by delivery of environmental water, leading to potential impacts on land management and maintenance activities (e.g. fire mgmt. works) Risks only relevant to wetland sites – residual risk rating to be assessed at delivery plan phase.	Almost certain	Moderate	High	Early planning and communications of proposed actions with land manager to minimise likelihood of impacts, and scheduling of maintenance works outside of planned delivery periods.	CMA				Yes
<b>Reputational</b>	Environmental water deliveries result in low DO levels, with adverse environmental impacts.	Unlikely	Major	Low	<ul style="list-style-type: none"> <li>Communicate benefits of environmental water management to the broader community and engage with recreational user peak bodies and management agencies.</li> <li>Communicate the benefits of environmental water management and inform the local community of environmental water management activities and the underlying rationale, including black water mitigations.</li> <li>Inform communities of black water vs hypoxic black water issues, to build understanding and support</li> </ul>	VEWH CMA - VEW/CWEO	Unlikely	Moderate	Low	No- generic risk with treatment at program level
<b>Environment</b>	Environmental water deliveries may generate or mobilise BGA blooms, with adverse water quality and/or health impacts (including to people, livestock and pets), resulting in cessation of releases and environmental impacts	Possible	Major	Medium	<ul style="list-style-type: none"> <li>Consider likelihood of initiating BGA blooms in event planning and amend as required to manage risk.</li> <li>Land managers or water corporation implement a risk-based monitoring program during environmental watering events, and where issues are identified, activate BGA response processes.</li> </ul> <i>*Notes: Parks Victoria are currently writing a BGA risk management plan for Northern Victoria Region that considers the potential risk of environmental water events. This plan will outline proactive and reactive monitoring and management responsibilities that Parks Victoria commits to as a Local Waterway Manager for BGA. Adequate BGA resourcing is being considering as part of this plan.</i> <ul style="list-style-type: none"> <li>Regional monitoring and advice on BGA status.</li> </ul>	CMA / GMW Land Manager GMW  GMW	Unlikely	Minor	Low	Possible inclusion in delivery plan. Site level consideration and mitigation.
<b>Reputational</b>	Environmental water management activities may conflict with or not complement water based recreational objectives, leading to loss of community support for activities.	Almost certain	Moderate	High	<ul style="list-style-type: none"> <li>Communicate benefits of environmental water management to the broader community and engage with recreational user peak bodies.</li> <li>Engage with local recreational user groups to inform them of environmental water management activities and the underlying rationale.</li> <li>Adjust events or actions to reduce/avoid impact where practical without reducing environmental outcomes.</li> <li>Communicate alternate recreational opportunities.</li> <li>Enhance community understanding of water system operations and entitlement frameworks (water literacy).</li> </ul> <ul style="list-style-type: none"> <li>Implement earlier planning of events to provide more time for partners to consider and flag any potential issues for include in event plans</li> </ul>	VEWH CMA CMA Land Manager VEWH	Possible	Minor	Low	Yes if known issues at site and specific actions required
<b>Business Costs</b>	Insufficient resources available (including staff, funding for maintenance of roads, regulators etc.) across partner organisations to deliver all planned environmental watering actions, leading to cancellation or interruptions of deliveries. Risk only relevant to wetlands sites - residual risk rating to be assessed at Delivery Plan phase (e.g. Gaynor Swamp + NE sites - rely on others to	Possible	Major	Medium	<ul style="list-style-type: none"> <li>Partners notify the CMA and VEW of resource constraints in advance of deliveries and VEWH convene OAG meetings to consider implications and potential solutions.</li> <li>Continue to actively prioritise actions to match available resources and ensure key actions are delivered.</li> <li>Reallocate tasks and available funds to ensure highest priority watering actions are delivered.</li> </ul>	VEWH CMA CMA				Possible inclusion in delivery plan. Site level consideration and mitigation.




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	monitor pumps). Not as much of an issue for rivers/creeks post-COVID.									
<b>Environment</b>	Insufficient information and knowledge available to inform environmental water deliveries	Unlikely	Moderate	Low	<ul style="list-style-type: none"> <li>Identify important knowledge gaps and secure funding to improve scientific understanding.</li> <li>Consider deferring deliveries until sufficient information is available to mitigate unacceptable risks.</li> <li>Implement adaptive management processes and undertake trials to collect data.</li> <li>Seek necessary resources to undertake approvals and assessments.</li> </ul>	CMA	Unlikely	Minor	Low	Possible – mitigated through other processes at existing sites, however, could be included at a new site where watering is being undertaken as a trial to collect this information.
<b>Legal</b>	Failure to recognise cultural heritage issues at a site targeted for watering may result in necessary permits and approvals not being obtained, leading to prosecution and fines.	Possible	Moderate	Medium	<ul style="list-style-type: none"> <li>Undertake desktop reviews and site assessments with archaeologists, traditional owners and land managers, to identify approval needs and contingency measures.</li> <li>Obtain any necessary formal approvals/permits and implement required actions.</li> </ul>	CMA				No
<b>Cultural heritage</b>	Environmental watering causes harm to identified cultural heritage  <i>Note: difficult to assess consequence under cultural heritage category - needs further testing with TOs. Hard for non-TOs to try and assess, so doesn't really fit within a traditional risk assessment process</i>	Unlikely	Moderate	Low	<ul style="list-style-type: none"> <li>Work with Traditional Owners to ensure that the potential impact of environmental water deliveries on cultural heritage is understood and agreed, minimised or avoided.</li> <li>Consider opportunities for additional resourcing for TO groups to engage in risk assessments</li> <li>Seek necessary resources to undertake approvals and assessments</li> </ul>	CMA DEECA/VEWH	Unlikely	Moderate	Low	Possible
<b>Reputational</b>	Inability to demonstrate outcomes achieved through environmental watering activities may lead to a loss of public/political support for activities	Possible	Major	Medium	<ul style="list-style-type: none"> <li>Rationalise and refocus current monitoring programs (e.g. Wetmap) to better identifying outcomes.</li> <li>Seek additional funds to address gaps in monitoring programs and knowledge.</li> <li>Communicate the benefits of environmental watering and monitoring results (Note: It may not be possible/affordable to address all monitoring gaps, so this risk may still be rated as medium after mitigation actions.)</li> </ul>	DEECA VEWH CMA	Possible	Minor	Low - Residual risk for 24-25 reflects recent high flows experience - some community nervousness, general acceptance of e-water benefits	No
<b>Environment</b>	Environmental deliveries improve conditions for non-native species (e.g. carp, invasive species, feral horses) and over-abundant native species (e.g. kangaroos, Red Gum encroachment) leading to adverse environmental impacts.	Likely	Moderate	Medium	<ul style="list-style-type: none"> <li>Study/understand life history of species and develop high level management strategies.</li> <li>Develop and implement site specific management strategies aimed at eradication/control of existing populations (e.g. carp management strategy, willow removal program, water-lily spraying program, feral animal programs).</li> <li>Implement pest reduction efforts prior to delivery of water, to ensure increases in populations remain within "tolerable" levels</li> </ul> <p><i>(Note: This risk is still rated as medium after mitigation actions.)</i></p>	DEECA CMA/Land Manager	Possible	Minor	Low - Note: Residual risk based on 2024-25 conditions - as a result of widespread natural flooding, incremental impact of e-water on pest species breeding is reduced )	Yes
<b>Environment</b>	Environmental watering actions trigger non-targeted environmental responses (e.g., bird breeding) causing unintended consequences (or lost opportunities) for other environmental values. For 24-25, wetlands that are high from natural inflows may need top up flows to support bird	Likely	Moderate	Medium	<ul style="list-style-type: none"> <li>Undertake monitoring and communicate these issues as they arise and apply adaptive management and review of delivery plans.</li> <li>Consider including contingency allowance in delivery plan water volumes to complete breeding events.</li> </ul>	CMA	Possible	Minor	Low	Yes – risk to be assessed for delivery

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	breeding if initiated, resulting in changes to e-water plans									
<b>Environment</b>	Ineffective planning and/or uncoordinated water ordering results in administrative obstacles that prevent watering opportunities.	Unlikely	Moderate	Low	<ul style="list-style-type: none"> <li>• Enable the full range of watering actions possible in seasonal watering proposals and the seasonal watering plan (as per SWP guidelines)</li> <li>- Review and update the Murray system environmental watering ordering template</li> </ul>	CMA/VEWH VEWH/MDBA	Unlikely	Minor	Low	No
<b>Reputational</b>	Community concern over environmental releases under dry seasonal conditions may lead to a loss of support for environmental watering actions.	Unlikely	Moderate	Low	<ul style="list-style-type: none"> <li>• Communicate benefits of environmental watering to the community, especially in relation to strategic watering in dry periods.</li> <li>• Enhance community understanding of water system operations and entitlement frameworks (water literacy).</li> </ul>	CMA VEWH	Unlikely	Minor	Low	No
<b>Reputational</b>	Under dry conditions, community expectations of the extent of environmental watering that can be achieved are not met, leading to a loss of support for environmental watering actions. Note - e-water deliveries may be constrained in 22-23 due to high consumptive avail.	Possible	Moderate	Medium	<ul style="list-style-type: none"> <li>• Communications to inform the community on the limits of environmental water holdings and the extent of actions possible under dry conditions.</li> </ul> <p><i>Note that public concern in this regard may be heightened as a result of the Menindee 2019 fish death events.</i></p>	CMA	Unlikely	Minor	Low	No
<b>Environment</b>	Limited environmental deliveries may reduce opportunities to test ecological responses to environmental flows, impacting on effectiveness of research projects.	Unlikely	Minor	Low	<ul style="list-style-type: none"> <li>• Review monitoring program and adjust if possible. Reprioritise future flow targets.</li> </ul>	CMA	Unlikely	Minor	Low	No
<b>Reputational</b>	Watering wetlands in wetter conditions leads to community concern over incr. flood risk resulting in loss of support for environmental watering program. Note: especially for Loch Garry flood protection district	Possible	Moderate	Medium	<ul style="list-style-type: none"> <li>- communicate results of modelling to d/s landholders demonstrating low impacts</li> <li>- notification of planned delivery events to landholders</li> <li>- staged trial flows with increasing flows over several years to enable monitoring and assessment of outcomes</li> </ul>	CMA				Yes

## 10 APPROVAL, ENDORSEMENT AND CONSENT

WATERWAY MANAGER APPROVAL OF THE SEASONAL WATERING PROPOSAL
<p>I, the authorised representative of the agency shown below, approve the Seasonal Watering Proposal for the Goulburn Wetlands in 2024-25.</p> <p>SIGNED FOR AND ON BEHALF OF Goulburn Broken Catchment Management Authority</p> <p>Signature of authorised representative: </p> <p>Name of authorised representative: Chris Cumming</p> <p>Position of authorised representative: Chief Executive Officer</p> <p>Date: 19/04/2024</p>

ENDORSEMENT OF THE SEASONAL WATERING PROPOSAL				
I, the authorised representative of the agency shown below, approve the Seasonal Watering Proposal for the Goulburn system in 2024-25.				
Role	Endorsing partner	Representative Role	Status Date	Notes/Comments
Water Corporation	Goulburn Murray Water	Andrew Shields River Operations Manager	<input checked="" type="checkbox"/> Endorsed. Date: 08/04/2024	NA
Land Manager	Parks Victoria	Kane Weeks Regional Leader	<input checked="" type="checkbox"/> Endorsed. Date: 17/04/2024	Provided in endorsement letter
Traditional Owner	Yorta Yorta Nation Aboriginal Corporation	Jay Whittaker Whole of Country Manager	<input checked="" type="checkbox"/> Endorsed. Date: 16/04/2024	NA
Traditional Owner	Taungurung Land and Water Council	Voytek Lapinski Water Program Manager	<input checked="" type="checkbox"/> Endorsed. Date: 19/04/2024	NA

CONSENT TO USE OF CONTENT						
Role	Endorsing partner	Delegate Role	Content	For use in the		Notes
				Seasonal Watering Proposal	Seasonal Watering Plan	
Traditional Owner	Yorta Yorta Nation Aboriginal Corporation	Jay Whittaker Whole of Country Manager	Chapter 3	<input checked="" type="checkbox"/> Consent provided. Date: 16/04/2024	<input checked="" type="checkbox"/> Consent provided. Date: 16/04/2024	NA
Traditional Owner	Taungurung Land and Water Council	Voytek Lapinski Water Program Manager	Chapter 3	<input checked="" type="checkbox"/> Consent provided. Date: 19/04/2024	<input checked="" type="checkbox"/> Consent provided. Date: 19/04/2024	NA

## 11 REFERENCES

- Cook, D., K. Jolly and D. Osler (2010). Monitoring Ecological Response to Flooding. A study of Black, Doctors, Reedy, Kinnairds Swamps in the Goulburn Broken Catchment. Patterson Lakes, Australian Ecosystems.
- Cth (2002). National Land and Water Resource Audit. Australian Terrestrial Biodiversity Assessment. Canberra, Land and Water.
- DPI (2007). Kanyapella Basin Environmental Management Plan. Tatura, Department of Primary Industries.
- EA (2001). A Directory of Important Wetlands. Canberra, Environment Australia.
- GBCMA (2012). Gaynor Swamp Environmental Water Management Plan. Shepparton, Goulburn Broken Catchment Management Authority.
- GBCMA (2012). Kanyapella Environmental Water Management Plan. Shepparton, Goulburn Broken Catchment Management Authority.
- Jacobs (2019). Horseshoe Lagoon Environmental Water Management Plan. Melbourne, Jacobs Consulting.
- Jacobs (2019). Loch Garry Environmental Water Management Plan. Melbourne, Jacobs Consulting.

## 12 APPENDICES

### Appendix 1 - Schedule 8 – Criteria for identifying an environmental asset.

Taken from the Basin Plan <https://www.legislation.gov.au/Details/F2012L02240>

Item	Criteria
<b>Criterion 1: The water-dependent ecosystem is formally recognised in international agreements or, with environmental watering, is capable of supporting species listed in those agreements</b>	
1	<p>Assessment indicator: A water-dependent ecosystem is an environmental asset that requires environmental watering if it is:</p> <p>(a) a declared Ramsar wetland; or</p> <p>(b) with environmental watering, capable of supporting a species listed in or under the JAMBA, CAMBA, ROKAMBA or the Bonn Convention.</p>
<b>Criterion 2: The water-dependent ecosystem is natural or near-natural, rare or unique</b>	
2	<p>Assessment indicator: A water-dependent ecosystem is an environmental asset that requires environmental watering if it:</p> <p>(a) represents a natural or near-natural example of a particular type of water-dependent ecosystem as evidenced by a relative lack of post-1788 human induced hydrologic disturbance or adverse impacts on ecological character; or</p> <p>(b) represents the only example of a particular type of water-dependent ecosystem in the Murray-Darling Basin; or</p> <p>(c) represents a rare example of a particular type of water-dependent ecosystem in the Murray-Darling Basin.</p>
<b>Criterion 3: The water-dependent ecosystem provides vital habitat</b>	
3	<p>Assessment indicator: A water-dependent ecosystem is an environmental asset that requires environmental watering if it:</p> <p>(a) provides vital habitat, including:</p> <p style="margin-left: 40px;">(i) a refugium for native water-dependent biota during dry spells and drought; or</p> <p style="margin-left: 40px;">(ii) pathways for the dispersal, migration and movements of native water-dependent biota; or</p> <p style="margin-left: 40px;">(iii) important feeding, breeding and nursery sites for native water-dependent biota; or</p> <p>(b) is essential for maintaining, and preventing declines of, native water-dependent biota.</p>
<b>Criterion 4: Water-dependent ecosystems that support Commonwealth, State or Territory listed threatened species or communities</b>	
4	<p>Assessment indicator: A water-dependent ecosystem is an environmental asset that requires environmental watering if it:</p> <p>(a) supports a listed threatened ecological community or listed threatened species; or</p> <p style="margin-left: 40px;">Note: See the definitions of <i>listed threatened ecological community</i> and <i>listed threatened species</i> in section 1.07.</p> <p>(b) supports water-dependent ecosystems treated as threatened or endangered (however described) under State or Territory law; or</p> <p>(c) supports one or more native water-dependent species treated as threatened or endangered (however described) under State or Territory law.</p>
<b>Criterion 5: The water-dependent ecosystem supports, or with environmental watering is capable of supporting, significant biodiversity</b>	
5	<p>Assessment indicator: A water-dependent ecosystem is an environmental asset that requires environmental watering if it supports, or with environmental watering is capable of supporting, significant biological diversity. This includes a water-dependent ecosystem that:</p> <p>(a) supports, or with environmental watering is capable of supporting, significant numbers of individuals of native water-dependent species; or</p> <p>(b) supports, or with environmental watering is capable of supporting, significant levels of native biodiversity at the genus or family taxonomic level, or at the ecological community level.</p>

## Appendix 2a – threatened fauna species recorded at Goulburn Wetlands.

Common Name	Scientific Name	Doctors Swamp	Gaynor Swamp	Horseshoe Lagoon	Kanyapella Basin	Loch Garry	Reedy Swamp	EPBC	FFG	VROT
Australasian Bittern	<i>Botaurus poiciloptilus</i>	Y	Y					Endangered	Listed	Endangered
Australasian Shoveler	<i>Anas rhynchotis</i>		Y	Y	Y	Y	Y			Vulnerable
Australian Little Bittern	<i>Ixobrychus dubius</i>		Y				Y		Listed	Endangered
Australian Painted Snipe	<i>Rostratula australis</i>		Y		Y			Endangered		
Azure Kingfisher	<i>Alcedo azurea</i>			Y		Y				Near Threatened
Baillon's Crake	<i>Porzana pusilla</i>						Y		Listed	Vulnerable
Blue-billed Duck	<i>Oxyura australis</i>	Y	Y				Y		Listed	Endangered
Broad-shelled turtle	<i>Macrochelodina expansa</i>			Y						Endangered
Brolga	<i>Antigone rubicunda</i>	Y	Y		Y		Y		Listed	Vulnerable
Brown Quail	<i>Coturnix ypsilophora australis</i>		Y				Y			Near Threatened
Caspian Tern	<i>Hydroprogne caspia</i>		Y				Y		Listed	Near Threatened
Eastern Great Egret	<i>Ardea modesta</i>	Y	Y	Y	Y	Y	Y		Listed	Vulnerable
Eastern Long-necked Turtle	<i>Chelodina longicollis</i>	Y		Y	Y	Y	Y			Data deficient
Freckled Duck	<i>Stictonetta naevosa</i>		Y				Y			Endangered
Glossy Ibis	<i>Plegadis falcinellus</i>		Y				Y			Near Threatened
Hardhead	<i>Aythya australis</i>		Y	Y	Y	Y	Y			Vulnerable
Intermediate Egret	<i>Ardea intermedia</i>		Y		Y	Y	Y			Endangered
Latham's Snipe	<i>Gallinago hardwickii</i>		Y				Y			Near Threatened
Lewins Rail	<i>Rallus pectoralis pectoralis</i>		Y				Y			Vulnerable
Little Egret	<i>Egretta garzetta nigripes</i>		Y		Y				Listed	Endangered
Magpie Goose	<i>Anseranas semipalmata</i>	Y								Near Threatened
Murray River Turtle	<i>Emydura macquarii</i>			Y	Y		Y			Vulnerable
Musk Duck	<i>Bizura labata</i>	Y	Y		Y	Y	Y			Vulnerable
Nankeen Night Heron	<i>Nycticorax caledonicus</i>	Y			Y	Y	Y			Near Threatened
Pied Cormorant	<i>Phalacrocorax varius</i>				Y		Y			Near Threatened
Royal Spoonbill	<i>Platalea regia</i>	Y	Y		Y	Y	Y			Near Threatened
Sloane's Froglet	<i>Crinia sloanei</i>	Y						Endangered		
Whiskered Tern	<i>Chlidonias hybridus javanicus</i>		Y		Y	Y	Y			Near Threatened
White-bellied Sea Eagle	<i>Haliaeetus leucogaster</i>		Y		Y	Y	Y		Listed	Vulnerable

## Appendix 2b – Threatened flora recorded in Goulburn wetlands.

Common Name	Scientific Name	Doctors Swamp	Gaynor Swamp	Horseshoe Lagoon	Kanyapella Basin	Loch Garry	Reedy Swamp	EPBC	FFG	VROT
Annual Bitter- cress	<i>Cardamine paucijuga</i> <i>s.s (type form)</i>				Y		Y			Rare
Annual Bitter- cress	<i>Cardamine paucijuga</i> <i>s.l</i>						Y			Vulnerable
Annual Buttercup	<i>Ranunculus</i> <i>sessiliflorus</i>				Y					Vulnerable
Bluish Raspwort	<i>Haloragis glauca</i> f. <i>glauca</i>		Y							Poorly known
Branching Groundsel	<i>Senecio cunninghamii</i> var. <i>cunninghamii</i>		Y							Rare
Dwarf Brooklime	<i>Gratiola pumilo</i>				Y					Rare
Floodplain Fireweed	<i>Senecio</i> <i>campylocarpus</i>				Y	Y				Rare
Green-top Sedge	<i>Carex chlorantha</i>			Y						Poorly known
Grey Spike Sedge	<i>Eleocharis</i> <i>macbarroni</i>	Y								Poorly known
Groundsel	<i>Senecio</i> <i>campylocarpus</i>						Y			Rare
Hypsela	<i>Hypsela tridens</i>			Y						Poorly known
Long Eryngium	<i>Eryngium paludosum</i>	Y			Y					Vulnerable
Narrow-fruited Water- starwort	<i>Callitriche palustris</i>	Y								Poorly known
Open Marshwort	<i>Nymphoides</i> <i>geminata</i>	Y								Rare
Pale Spike- sedge	<i>Eleocharis pallens</i>				Y					Poorly known
Red Swainson- pea	<i>Swainsona</i> <i>plagiotropis</i>				Y			Vulnerable	Listed	Endangered
Rigid Water- milfoil	<i>Myriophyllum</i> <i>parcatum</i>				Y			Vulnerable	Listed	Vulnerable
River Swamp Wallaby-grass	<i>Amphibromus fluitans</i>			Y	Y	Y		Vulnerable		Poorly known
Riverine Bitter- cress	<i>Cardamine moirensis</i>	Y			Y					Rare
Salt Paperbark	<i>Melaleuca</i> <i>halmaturorum</i> subsp. <i>halmaturorum</i>		Y						Listed	Vulnerable
Sand Rush	<i>Juncus</i> <i>psammophilus</i>						Y			Rare
Slender Darling-pea	<i>Swainsona murrayana</i>				Y			Vulnerable	Listed	Endangered
Slender Water- ribbons	<i>Triglochin dubia</i>	Y	Y							Rare
Small Scurf Pea	<i>Cullen parvum</i>						Y		Listed	Endangered
Smooth Nardoo	<i>Marsilea mutica</i>	Y								Poorly known
Spiny Lignum	<i>Duma horrida</i> subsp. <i>horrida</i>		Y							Rare
Swamp Buttercup	<i>Ranunculus undosus</i>				Y					Vulnerable
Swamp Early Nancy	<i>Wurmbea dioica</i> subsp. <i>lacunaria</i>				Y					Poorly known
Veiled Fringe- sedge	<i>Fimbristylis velata</i>			Y						Rare
Western Bitter-cress	<i>Cardamine</i> <i>lineariloba</i>		Y							Vulnerable
Winged Water- starwort	<i>Callitriche umbonata</i>		Y		Y					Rare
Woolly Knotweed	<i>Persicaria laphifolia</i> ( <i>floccose</i> form)						Y			Poorly known
Yarra Burgan	<i>Kunzea</i> <i>leptospermaoides</i>			Y						Poorly known