Seasonal Watering Proposal

Hoary-headed grebes, Lake Powell

2025-26

Murray Wetlands

mallee
catchment management authority

Document Control

Status	Version	Author	Date	Description
Draft	1.1	Mallee CMA	28/02/2025	Drafted content submitted to VEWH.
Draft 2	1.2	Mallee CMA	17/03/2025	Final Draft distributed to stakeholders for review and endorsement,
Final	1.3	Mallee CMA	14/04/2025	Final submitted to VEWH.

Citation
Please cite this document as:

Mallee CMA (2025) Seasonal Watering Proposal Murray Wetlands 2025-26, Mallee CMA, Irymple, Victoria

Contact
For further information on any of the information contained within this document contact:

Nicole Wishart Executive Manager Waterways and Floodplains

Mallee Catchment Management Authority

Acknowledgement of Country

Mallee Catchment Management Authority (CMA) acknowledges and respects Traditional Owners, Aboriginal communities and organisations. We recognise the diversity of their cultures and the deep connections they have with Victoria's lands and waters.

We value partnerships with them for the health of people and country.

Mallee CMA Board, management and staff pay their respects to Elders past, present and emerging and recognise the primacy of Traditional Owners' obligations, rights and responsibilities to use and care for their traditional lands and waters.

Cover image: Lake Powell, Lakes Powell and Carpul Wildlife Reserve

Table of Contents

Figures

Tables

1 Context

Mallee Catchment Management Authority (CMA) is pleased to present the 2025-26 Murray Wetlands Seasonal Watering Proposal (SWP).

This SWP identifies the Mallee CMA's proposed priorities for use of managed environmental water for the Murray Wetland sites in 2025-26. Information from this document has informed development of the Seasonal Watering Plan 2025-26, available on the Victorian Environmental Water Holder (VEWH) website from 30 June 2025. The Seasonal Watering Plan is the state-wide plan outlining where, when, and why water for the environment can be delivered throughout Victorian waterways, including the Murray Wetlands.

This SWP retains the key information to outline what environmental flows may be delivered during 2025-26, the rationale for the planning of these and a summary of engagement that occurred, as well as the associated risk management.

The actions outlined in this proposal are informed by ecological objectives and management goals outlined in the site specific, Environmental Water Management Plan (EWMPs). Other environmental themes guiding site selection include providing and supporting refuge and habitat, maintaining site condition and creating resilience. This ensures the ability of sites to 'bounce back' and respond when conditions become more favourable (i.e. flooding/high river). Focus areas also include target flora and fauna such as inundation dependent wetland EVCs and terrestrial vertebrates, as well as the requirements of waterbirds and frogs, (e.g. habitat and food resources).

Planning for environmental watering actions incorporates information around required water regimes, current condition, plus the provision and maintenance of habitat for water dependent species that have critical needs.

In addition to providing water for environmental benefit, delivery of water to the wetlands also supports cultural, social and economic values. These are captured in feedback received from Aboriginal Community, industry and the local community.

Key areas of the proposal are detailed below:

- Scope of environmental watering – Describes the range of potential watering actions which may be delivered during 2025-26 (Summary provided in Table 1.1).

Table 1.1.: Summary of the proposed watering sites in 2025-26 for the Murray Wetlands.

Wetland	Delivery Method	Land Manager
Pumped sites requiring a water allocation		
Bottle Bend Wetlands	Pumped	Parks Victoria
Brickworks Billabong	Pumped	Parks Victoria
Burra North	Pumped	Parks Victoria
Burra South	Pumped	Parks Victoria
Burra South Proper	Pumped	Private Landowners
Catfish Billabong	Pumped	Parks Victoria
Koorlong Lake	Lower Murray Water Infrastructure	Parks Victoria
Lake Hawthorn	Lower Murray Water Infrastructure	Lower Murray Water and DEECA
Outlet Creek (Karadoc Swamp)	Pumped	Parks Victoria and Private Landowners
Musk Duck Wetland	Pumped	Trust for Nature/FPMMAC
J1 Creek	Pumped	Parks Victoria/Private landholders

- **Scenario planning –** Describes how the combination of actions may change depending on the climate scenario.
- **Risk management –** This is an important chapter of the proposal and is based on the outcomes from the 2025 Shared Operational Risk Workshop – in particular the risk management table.

This document has been developed in consultation with Parks Victoria, First Peoples of the Millewa Mallee Aboriginal Corporation (FPMMAC), Traditional Owners, the Department of Energy, Environment and Climate Action (DEECA), Goulburn Murray Water (GMW), Lower Murray Water, the Victorian Environmental Water Holder (VEWH) and the Commonwealth Environmental Water Holder (CEWH). We are grateful for their time and input.

2 System Overview

The Murray Wetlands are home to hundreds of wetlands, primarily concentrated along the Mallee CMA's 760 km stretch of Murray River frontage between Vinifera and the South Australian border. The system includes a myriad of interconnected creeks, wetlands and floodplains that are ecologically important and reflect the natural character and attributes of the floodplain. Wetland types are diverse and support a high abundance of water dependent species across a landscape, which require regular inundation as part of its natural cycle.

Regulation and diversion of the Murray River flows have substantially reduced the frequency and duration of the high river flow that would naturally inundate the Murray Wetlands. This change to the water regime has been exacerbated by climate change and has reduced the variety and condition of environmental values associated with billabongs and other floodplain habitats.

In the absence of natural flooding, water for the environment is used to maintain and improve the character of certain wetlands. Every year a selection of priority sites that can be actively managed and where ecological benefit can be achieved are selected to receive water.

Water for the environment can be delivered to some wetlands in the region through direct pumping from the Murray River and/ or the use of irrigation supply infrastructure. Most wetlands that receive environmental flows can be managed independently of each other.

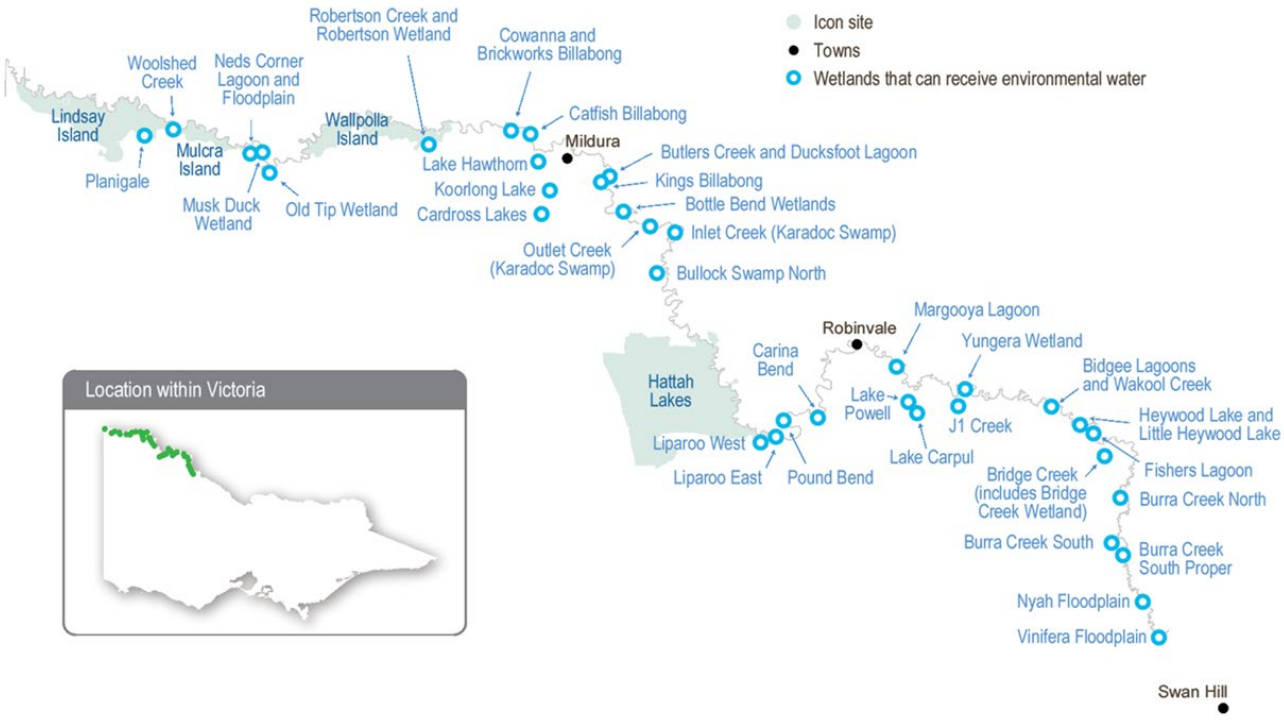


Figure 2.1: The Murray Wetlands system

3 Traditional Owner Cultural Values and Uses

Watering of the Murray Wetlands supports Traditional Owners' cultural values such as Traditional food sources, medicines and important species, and it provides opportunities for teaching, learning and storytelling.

The First People of the Millewa-Mallee Aboriginal Corporation (FPMMAC) is recognised as the Traditional Owner of Country in the north-west of Victoria that runs south of the Murray River to the Mallee Highway and west from the Calder Highway to the South Australian border, including the Murray-Sunset National Park. FPMMAC is a Registered Aboriginal Party.

There are many sites of cultural significance across the floodplain, including ceremonial grounds, earth oven remains, culturally modified trees, shell middens, song lines, ancestral resting places and story places.

The FPMMAC has maintained associations with the Murray River for thousands of generations. Indeed, the river and its surrounds are among the richest sources of Aboriginal archaeological and cultural heritage material in Australia. The floodplain provides vital resources, including food, water, shelter, medicine and tools. The Traditional Owners retain a strong connection to this Country.

Mallee CMA has a strong working relationship with the FPMMAC, which involves regular two-way communication, including planning, sharing of knowledge and on-going discussions. Water in the landscape is critical to the spirituality of the people of the FPMMAC, strengthening their connection to Country. The Mallee CMA and the FPMMAC have frequent discussions about water, including the planning and delivery of environmental water.

The area from Nyah to Red Cliffs is shared country by a number of groups, including: Njeri Njeri, Kilpara Mukwara, Culpra Milli, Gilbie Corporation, Munatunga Elders, Tati Tati Kaeijin, Tati Tati Land and Water, Wadi Wadi Land and Water, Dadi Dadi/Weki Weki and Wadi Wadi Nations. Each group has its own cultural identity, practices, beliefs and priorities. The Mallee CMA recognises all groups within this area and engages with each group to ensure their voices are heard and represented when planning for environmental water.

In the last two years Mallee CMA made a concerted effort to ensure it was engaging with Traditional Owners much earlier in the planning process than in previous years. This was in response to feedback Mallee CMA had received from a number of groups asking to be involved earlier in the process.

Mallee CMA discussed the proposed 2025-26 watering of the Murray Wetlands during several meetings and events with Traditional Owner groups including the FPMMAC, Njeri Njeri, Gilbie Corporation, Kilpara Mukwara (formerly Latje Latje Mumthelang), Tati Tati Land & Water, Wadi Wadi Land & Water, Dadi Dadi / Weki Weki, Culpra Millie, Munatunga Elders, and Wadi Wadi Nation. Discussions focused on where Traditional Owners would like to see environmental water delivered for 2025-2026 and what activities they undertake at each site (Figure 3.1). The discussions raised a lot of interest in cultural practices to help prioritise areas for environmental water delivery. A range of options for the delivery of environmental flows in 2025-2026 was discussed, and what the Traditional ecological needs are in the current climate. Feedback was positive, with groups supportive of the proposed environmental watering plan. Drawdown and drying were discussed in depth and there was a lot of knowledge sharing before agreement was reached.

Understanding the environmental responses to the 2022-23 Murray River flood and identifying and protecting Cultural heritage were key topics for discussion. A common foundation of all groups was the importance of water in wetlands for their Cultural spirituality and connection to Country.

Some of the other discussions and comments by the Traditional Owner groups included:

- the desire to see more native flora and fauna in the areas
- increased opportunities for Indigenous Landcare
- training opportunities such as Indigenous Ranger programs

- ways to protect and preserve Aboriginal Cultural Heritage in the landscape
- sharing information and knowledge with the broader community
- increased usage of Murray wetlands by bird watching groups.

Some other comments included:

- on-Country visits to scope out cultural areas of sensitivity prior to water delivery (especially important post floods due to water uncovering sites).

There was a common theme of Cultural priorities across different Traditional Owner groups, which included:

- Cultural Activities
- Native flora and fauna – birds, reptiles, frogs, kangaroos, possums, turtles, fish
- Fishing
- Bush foods
- Endangered plants and animals
- Carp eradication
- Scar trees
- Clay balls
- Plants of cultural significance
- Aquatic vegetation.

Table 3.1: Cultural objectives relevant to the Murray Wetlands.

	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 7.1 and Table 7.2, the Mallee CMA considered how environmental flows could support social, recreational and economic values and uses, including:

- Water-based recreation (such as canoeing, fishing and kayaking)
- Riverside recreation and amenity (such as bike riding, birdwatching, bushwalking, camping, Geocaching, photography and running)
- Community events and tourism (such as day trips and sightseeing; education programs for school, TAFE and university students; and citizen science projects about birds, frogs and plants)
- Socioeconomic benefits (such as economic benefits for businesses in the accommodation, beekeeping, food and beverage, ecotourism, hospitality and retail sectors; creating a focal point for socialising; and providing natural, green spaces for the local community).

Water for the environment plays a vital role in protecting the ecosystems, flora and fauna unique to the Murray wetlands. A secondary and equally important role this water plays is in providing natural green spaces for local community. In the Mallee's semi-arid environment, water is a major focal point for community and visitors alike. Therefore, it is important to preserve these landscapes and continue to understand how these spaces are used by the community and tourists to fully understand their value. Community currently use these wetlands for social and recreational pursuits such as kayaking, walking, bird watching, a focal point for socialising and for sporting events.

Whilst social, recreational and economic drivers are not the deciding factors when selecting and prioritising sites to receive water, community support can be an important factor in the success of a watering event. Feedback from the community, while not always logistically possible, highlights the importance of these landscapes to the community and the additional benefits of delivering environmental water.

Face-to-face, online communication and community surveys indicate a high level of use of local wetlands and creeks, with a greater connection when water is present. Activities and values associated with watering that were commonly mentioned by local community include walking, water, camping, fishing, bird watching, frogs, kayaking and bike riding (Figure 4.1). Waterbodies which are frequently listed by community as 'favourites' include Kings Billabong, Bottle Bend, Lake Hawthorn, Catfish Billabong, Cardross Lakes and Bullock Swamp (Figure 4.1). All these sites have some connection with environmental watering, indicating the strong link between environmental and social values. However, the list isn't just limited to the sites that receive environmental water annually, sites watered less frequently receive great community support when environmental water is being proposed and delivered in these locations as the benefits of having environmental water present can be seen long after the watering has occurred.

Figure 4.1:Community values and uses collected through the 'Pins in Maps' engagement activity (left) and priority sites (right).

Local tourism also benefits from environmental watering activities at wetlands and floodplains across the Murray Wetlands sites. Many tourists who visit the Mildura Information Centre ask for recommendations on the best locations for bird watching. Destinations recommended include; Lake Hawthorn, Koorlong Lake, Brickworks Billabong, Cowanna Billabong and Butlers Creek, all sites which are managed with environmental flows.

Increased eco-tourism and visitation to the area also provides economic benefit to nearby businesses. This includes the accommodation and food and beverage sectors primarily, but also spanning across other sectors such as eco-tourism providers, tour operators and local retail including farmers markets.

Benefiting directly from the delivery of the water are local contractors who provide pumps, earthworks, knowledge and experience. This provides local jobs, retains money in local community and increases local knowledge. Other businesses also benefit from watering, such as apiarists who deploy hives across watered sites to utilise riparian trees which flower in response to water. The local horticultural industry sees a direct benefit with many hives utilised in the pollination process particularly in the almond industry.

A breakdown of shared benefits, generally across all sites, is provided in Table 4.1.

Table 4.1 Shared benefit considerations for 2025/26.

Beneficiary	Connection to the waterway	Values/ Uses/ Objectives/ Opportunities	How have these benefits been considered?
Local businesses	The local tourism industry benefits as a result of increased tourism. Previously, pumped water delivery has been undertaken by local suppliers.	Local employment opportunities Retaining money in local communities Support local industry/business	Environmental water delivery in the Mallee is highly dependent on pumped delivery. Contracts for delivery have generally been sourced locally and we encourage local suppliers to tender for this work. Without the support of these local suppliers the program would not be possible. Water attracts tourism and encourages locals to undertake recreation pursuits across these areas. This relates to increase patronage at near-by hospitality and accommodation facilities and

Beneficiary	Connection to the waterway	Values/ Uses/ Objectives/ Opportunities	How have these benefits been considered?
			directly relates to increased eco-tourism opportunities.
Apiarists	Watering supports flowering in native vegetation which is beneficial for bees.	Commercial enterprise	Water delivery benefits vegetation outcomes which support flower production providing abundant resources for bees.
Bird watching	Water provides important habitat for birds, which draws birds and twitches to the region.	Recreation opportunities	Water is regularly delivered to sites for the purpose of meeting waterbird and bird objectives.
Anglers	Increased opportunities for yabbying across the Murray Wetlands	Recreational Food for personal consumption	Delivering water to floodplain and large shallow wetlands regularly results in a boom in yabby abundance. This is utilised by anglers who catch yabbies for personal consumption.
Camping	Water draws people to sites. Increasing the quality and beauty of a region draws tourists to the area.	Recreation Fishing Birdwatching Photography	Water attracts people. Campers, given the option, will generally prefer setting up at a site which contains water, over a site which does not. This provides them with instant access to the water in which to undertake complementary recreational pursuits.
Tourists	Water draws people to sites. Increasing the quality and beauty of a region draws tourists to the area. The local tourism industry benefits as a result of increased tourism.	Recreation opportunities Tour operators	Community consultation and engagement is regularly undertaken as part of the environmental water delivery program.
Research	Studying the wetland, floodplain and rivers during different stages (wet, dry, during drawdown) increased understanding of the natural environment and the requirements of the flora, fauna and processes that reside across these habitats.	Condition monitoring Intervention based projects around watering Large-scale system investigations	Provision of water to sites, and working with researchers to target particular flora, fauna or hydrological outcomes allows them to undertake projects which will better inform future management of the region.
Schools and education centres	Local schools and other education centres such as TAFE and universities incorporate aspects of natural environment in their curriculum. A number of Murray Wetland sites are close to these centres and provide excellent examples of channel and wetland ecology.	Natural resources education (e.g. food webs, effects of flooding, water uses) Recreation/outdoor education (e.g. School camps) Connection with country and indigenous/cultural education.	A number of sites local to Mildura have been used previously by schools and TAFE (e.g. Koorlong Lake, Lake Hawthorn, Kings Billabong/Butlers Creek and Merbein Common). Through delivery of environmental water these education resources remain in school curriculum and assist with learning of the younger generation.

Table 4.2 Environmental objectives of Murray Wetlands

	Environmental watering will also support water sports activities (e.g. canoeing, kayaking, swimming and boating)
	Environmental watering will also support waterbird-related recreational activities (e.g., twitching, birdwatching)
	Environmental watering will also support angling activities
	Environmental watering will also support peaks in visitation (e.g., camping, or other public activities on long weekends or school holidays)

5 Environmental Values and Objectives

The Murray Wetlands contain various streams, billabongs, anabranches, wetlands and swamps. When flooded, waterways and wetlands within these systems provide habitat for native fish, frogs, turtles, waterbirds and water-dependent plants. Terrestrial animals (such as woodland birds) also benefit from improved productivity and food resources when anabranch systems are inundated. Large floodplain wetlands can retain water for several years after receiving inflows; they provide important refuges for wetland-dependent species and support terrestrial animals (such as small mammals and reptiles).

The reduced frequency and duration of floods in the Murray River have degraded the water-dependent vegetation communities throughout the Murray Wetlands, which has, in turn, reduced the diversity and abundance of animals that rely on healthy vegetation for habitat.

Table 5.1: Environmental objectives relevant to the Murray Wetlands.

Environmental objectives in the Murray Wetlands	Environmental Water Management Plan Objectives
 **F1:** Increase the populations of Murray hardyhead in permanent wetlands where they are known to persist.	**CK1, MC7:** By 2030, improve the population of Murray hardyhead (Craterocephalus fluviatilis) at Koorlong Lake and Brickworks Billabong
 **F2:** Maintain populations of other native fish in permanent wetlands.	**MC1a, BI6**: By 2030, protect and restore biodiversity by maintaining representative populations of large-bodied native fish, including Golden Perch (*Macquaria ambigua*), Silver Perch *(Bidyanus bidyanus)*, Murray Cod *(Maccullochella peeli)* and Bony Herring (*Nematalosa erebi).* **K3, MC1b, CB2a, KB5, WB5, MJ4, BI5**: By 2030, protect and restore biodiversity by maintaining representative populations of small-bodied native fish, Unspecked Hardyhead (*Craterocephalus stercusmuscarum fulvus*), Carp Gudgeon (*Hypseleotris spp.*), Murray-Darling Rainbowfish (*Melanotaenia fluviatilis*), Flat-headed Gudgeon (*Philypnodon grandiceps*), Fly-specked Hardyhead (*Craterocephalus stercusmuscarum*). And Australian Smelt (*Retropinna semoni*).

A1: Maintain populations of native frogs, including the endangered growling grass frog.	**BB3, K4, CB2b,:** By 2030, protect and restore biodiversity by maintaining representative populations of frogs.
CN1 : Promote carbon and nutrient cycling to enable wetland processes for food webs.	**SP5:** By 2030, protect and restore connectivity within and between water-dependent ecosystem, including by ensuring that: ecological processes dependent on hydrologic connectivity laterally between watercourses and their floodplains (and associated wetlands) are maintained.
V1: Increase the diversity, extent and abundance of wetland plants. **V2:** Improve the condition of river red gums, black box and lignum communities.	**AB2, BB2, BC2, MC4, MJ5, P2a, PB1, NC1, BI4, CB4a, KB1, NV1, SB6, TT2, WB2:** By 2030, improve vital habitat by increasing the diversity of aquatic macrophytes present across a range of Water Regime Indicators Groups. **CK2, LH1, MC8, PW2:** By 2030, maintain populations and extent of saline aquatic vegetation at Koorlong Lake, Lake Hawthorn and Brickworks Billabong including benthic herblands with Ruppia beds containing both R. polycarpa and R. megacarpa. . **BY1, BB4, AB3, BC1, K2, HeL1, K7, MJ1b, MJ3, P1, P2b, PB2, PB3, NC2, NC3, BI3, CB1, CB4b, JCB1, JCB2, ML1, PW4, SC2, SC3, SB1, Sb2, Sb3, TT1, TT3a, TT3b, WB1, WL4: B**y 2030, improve condition and maintain extent from baseline levels of Lignum (*Duma florulenta*), River red gum (*Eucalyptus camaldulensis*), and Black box (*E. largiflorens*) to sustain communities and processes typical of such communities.
B1: Provide feeding and breeding habitat for a range of waterbird species, including threatened and migratory species and colonial nesting species (such as egrets).	**BY5, BB1a, BB1b, K5b, BI7b CB3b, WL3:** By 2030, maintain nesting and recruitment of non-colonial waterbirds (N1, N2, N3 and N4, after Jaensch 2002), by maintaining a mixture of tree, low vegetation/shrubs, and ground/islet nesting habitat. **BB1a, CK3, K5a, MC2, WL2, LH2,**: By 2030, maintain representative populations of shallow-water and deep-water feeding guilds of waterbird (F2 and F3, respectively, after Jaensch 2002), by maintaining a mixture of shallow and deep-water habitats.

6 Engagement

A variety of stakeholders have been engaged to inform the development of this SWP. All engagement has been tailored to stakeholders' interests and mapped against the International Association for Public Participation's (IAP2) spectrum (Table 6-1).

In developing the 2025/26 SWP engagement plan, Mallee CMA seized the opportunity to review previous years' efforts, document the lessons learned and implement key changes. Among the changes delivered was the earlier engagement of Traditional Owners and community members in the annual environmental water planning process. This approach meant the values and perspectives of Traditional Owners and community members informed preliminary planning and discussions, rather than being incorporated later in the planning phase. This approach facilitated more meaningful engagement and has helped further build trust between Traditional Owners, community members and the Mallee CMA.

SWP engagement activities commenced in September 2024 and included:

- Face-to-face meetings with special interest groups and community members;
- Formal meetings with partner agencies;
- Attending community events to discuss planned wetting/drying actions;
- Distributing newsletter articles and publications with information about planned wetting/drying actions; and
- Releasing digital content (including social media).

One method used to engage Traditional Owners and community members was the 'Pins in Maps' activity. Participants were asked to place a coloured pin in a map to represent their values/uses at the various wetlands. The coloured pins corresponded to four categories: recreation, flora/fauna, water, and other. A high number of responses were collected by undertaking this activity at a wide range of community engagement events including on-Country visits, drop-in sessions, citizen science activities, and local markets. Additionally, the 'Pins in Maps' activity proved to be an engaging method to initiate place-based conversations about environmental water.

Figure 6.1: 'Pins in Maps' activity used to collect community values and uses.

Online surveys, fact sheets and social posts have also been effective methods of engaging the community in the SWP process. These methods of engagement provided an opportunity for the community to provide feedback and outline their values to better inform current and future water planning.

Following completion of this SWP, Mallee CMA will produce informative flyers and website updates to outline the environmental watering/drying actions to be undertaken across the catchment in 2025-26. Targeted consultation and engagement activities will be undertaken with relevant community and stakeholders to provide the opportunity for further in-depth and detailed discussions to help to "close the loop" and demonstrate how their feedback informed planning.

Table 6.1: Summary of stakeholder engagement that informed this SWP.

Category	Stakeholder(s)	IAP2 level of engagement	Engagement Method	Engagement Purpose
Traditional Owners, Aboriginal Community & Aboriginal organisations	Traditional Owners	Involve	• Face-to-face meetings with individual Traditional Owners and community members across the catchment who have an interest in Murray Wetlands. • Meeting with Traditional Owners to discuss SWP for 2025/26 (24/09/2024, 25/10/2024, 06/11/2024, 2/12/2024 and 08/12/2024), • Aboriginal Reference Group is a committee facilitated by the Mallee CMA represented by various Aboriginal community members. Mallee CMA presented the proposed watering actions for 2025/26. (05/02/2025).	Allow Traditional Owners to speak for Country. Opportunity to guide watering operations to benefit items of cultural significances. Two-way sharing knowledge between cultural practices and floodplain management principles.
Community groups and environment groups	Wider community	Inform Consult	• Online – web based and social media • Attendance at Red Cliffs Market (01/12/2024) to talk with community about SWPs, including the Murray Wetlands. • MCMA hosted a community event at Outlet Creek to talk about SWPs (08/12/2024).	To engage with local community about environmental watering at Murray Wetlands to gain an understanding of important wetland values and uses. Using 'pins in maps' to gather data on what activities community undertake at the Murray Wetlands or activity aspirations. All of which helped inform the preparation of the Murray Wetlands SWP.
	Mallee CMA Land and Water Advisory Committee	Consult	• Presentation and discussion of proposed actions (13/03/2025).	To provide information to community who value and utilise the site and capture community values for the site.
	Special interest groups	Inform	• Fact sheet • Social media and digital content • Merbein common quarterly community newsletter	To provide information to community who value and utilise the site and capture community values for the site.

Category	Stakeholder(s)	IAP2 level of engagement	Engagement Method	Engagement Purpose
Government agencies	Victorian Environmental Water Holder (VEWH)	Collaborate	• Discussion of SWP guidelines • Risk Workshop and discussion of proposed sites (13/02/2025) • Ongoing discussion as planning progresses.	Ongoing planning and consultation with input from VEWH regarding water availability, current and forecast water condition conditions, risk planning and feasibility.
	Parks Victoria (PV)	Collaborate	• Discussion with key local Parks Victoria Staff regarding proposed sites and seek advice on what they would like to see across their areas of responsibility and any issues with practical logistics. • Presentation to key staff and discussion of timelines, risks and mitigation measures that are site specific. • Mallee CMA meets monthly with PV.	Review and update the risk tables relevant to the proposed watering program for 2025-26. Ongoing planning and consultation with input from PV around on-ground management activities, risk planning and site feasibility.
	Department of Energy, Environment and Climate Action (DEECA)	Inform/consult	• Bi-monthly meeting regarding EC6 contract • Various progress reports throughout the years on watering milestones and outcomes.	Share planning and provide opportunity for feedback and comment regarding any operation and/or on-ground works being or planned to be undertaken over the coming year.
	Department of Climate Change, Energy, the Environment and Water (DCCEEW)	Collaborate	• Multiple meetings; Face-to-face • Email and telephone.	Discussion around Weir pool manipulation to ensure Mallee CMA watering priorities can be met in conjunction with working with NSW requirements and priorities (Murray Wetlands information given to Mallee CMA representatives)
	Victorian Murray Floodplain Restoration Project (VMFRP) Project Team	Involve	• Various meetings and discussions to discuss scheduling of watering events.	Coordination of activities across the two programs. For the coming year, but also longer-term planning around potential construction and EWMP updates.
	Lower Murray Water (LMW)	Collaborate	• Various meetings and discussions to discuss scheduling of delivery.	Coordination of delivery particularly for delivery to Lake Hawthorn and Koorlong Lake.

Category	Stakeholder(s)	IAP2 level of engagement	Engagement Method	Engagement Purpose
	Mildura Rural City Council	Inform	• Fact sheet to capture community values for the site and better inform future watering plans.	Provide information about the planning and delivery of water for the environment and create opportunities for community to provide important information about site values and uses.
	Swan Hill Rural City Council	Inform	• Fact sheet to capture community values for the site and better inform future watering plans.	Provide information about the planning and delivery of water for the environment and create opportunities for community to provide important information about site values and uses.
Landholders/farmers	J1 Creek	Collaborate	• Various meetings and discussions to discuss scheduling of delivery.	Coordination of delivery, timing, deeds of agreement and ensure any concerns are understood.
	Burra Creek South Proper			
	Burra Creek South			
	Burra Creek North			
	Outlet Creek			
	Neighbouring Landholders	Inform	• Fact sheet / website information	To provide information to adjoining landowners and ensure any concerns are understood.
Local businesses	Local businesses	Inform	• Fact sheet	To provide information for visitors to the area and local community about the and provide opportunity to provide feedback.
	Special interest NRM groups (e.g. apiarists)	Inform	• Fact sheet	To provide information about the planning underway for environmental watering and opportunities to ask questions as required.
	Tourism operators that utilise Murray Wetlands and the Mildura Visitor Information Centre.	Inform	• Fact sheet	To provide information for visitors to the area and local community about the drying phase required for Murray Wetlands and provide opportunity to provide feedback.

7 Scope of Environmental Watering

The prioritisation process for identifying wetlands in this 2025-26 SWP has considered a number of factors. Primary considerations were the current condition of the site, with respect to the current hydrological state, the ecological values present and the expected condition (under pre-regulation watering conditions), an assessment of the site's Environmental Objectives and a comparison of actual watering regimes to recommended optimal watering regimes at each site. Much of this required information is identified in Environmental Water Management Plans (EWMPs) appropriate to that asset. The Environmental Objectives from each site used for 2025/26 were updated late in 2020.

In addition to current environmental condition and long-term objectives, community and Aboriginal objectives are also considered. This information has been received from a wide range of community and stakeholders including landholders and land managers, recreational and special interest groups and Traditional Owners. The approach used to gather this information and outcomes from consultation and communication is detailed in Sections 3,4 and 6.

Special consideration was given to sites that form part of the Victorian Murray Floodplain Restoration Project (VMFRP). Some of these sites may potentially have construction of infrastructure commencing across the 2025-26 year so the ability to undertake environmental watering will be limited or restricted at some sites.

Actions proposed for 2025-26 require delivery of water through temporary pumping infrastructure. Hydrological compliance for all temporary pumping sites is measured using flow meters on the pumps which are compliant with industry requirements.

A summary of the environmental objectives and flow recommendations wetlands requiring a pumped allocation for the 2025-26 environmental watering year are in Table 7.1. Sites listed in Table 7.2 have been actively managed during the past five years and were considered during the pre-planning stage but were not deemed suitable for delivery in 2025-26. This may be due to reasons including previous watering history, current condition at the site, planned drawdown or a requirement for the site to remain dry to meet environmental and hydrological objectives, suggestions resulting from community and Aboriginal community consultation, logistical limitations and potential future impact on VMFRP planned operations/construction.

Table 7.1 Environmental objectives and flow components (disconnected from weir pool) for the Murray Wetlands site. These sites are typically managed via temporary pumping and require an environmental water allocation.

Wetland	Potential watering action	Climatic scenario (s)	Expected watering effects	Rationale	EWMP environmental objectives	VEWH Objectives
Catfish Billabong	Fill during spring to target 33.5 m AHD by pumping up to 900 ML.	Dry Average Wet	• Provide conditions to support growth of annual aquatic and emergent vegetation • Provide habitat for fish species. • Maintain shallow-water feeding guild of waterbirds	Catfish Billabong has a water regime of 5 years in 10, with inundation occurring every two years. Catfish Billabong previously received environmental water in winter/spring 2023 during the commissioning of the new regulator. Following the delivery in spring 2025, water will be released via the regulator in accordance with the regulator infrastructure operating plan. Failure to deliver this environmental water would have negative impact on river red gum populations and other native vegetation that support waterbird populations. The site is close to the Mildura and Merbein townships and as such also provide high levels of amenity, including opportunities for recreational activities including birdwatching, walking and photography, offering reprieve stressful lives.	MC1a, MC1b, MC2, MC4.	V1 B1 F2
Bottle Bend Wetlands	Fill wetland during spring to target 36.5 m AHD by pumping up to 350 ML.	Drought Dry Average	• Maintain and increase the health of adjacent black box • Provide conditions to support growth of annual aquatic and emergent vegetation • Provide feeding and breeding opportunities for frogs • Maintain feeding and nesting opportunities of non-colonial waterbirds.	Bottle Bend has a watering regime of 5 years in 10, which is currently not being met. Overbank flooding in spring 2022 and spring 2023 has prevented further decline in condition of riparian vegetation and potential improvements in condition. The wetlands have now dried out and require a delivery of environmental water. Delivery through spring 2025 will be critical to build on the positive effects of 2022 flooding through improved condition of riparian tree species, specifically black box and lignum. Inundation will also provide conditions to support growth of aquatic vegetation species, and waterbird and frog habitat. Failure to deliver this environmental water would have negative effects on these native species leading	BB1a, BB1b, BB2, BB3, BB4**.**	A1 V1 V2 B1

Wetland	Potential watering action	Climatic scenario (s)	Expected watering effects	Rationale	EWMP environmental objectives	VEWH Objectives
				to decline in condition of vegetation and subsequent impacts to waterbird and frog populations.		
Brickworks Billabong	Fill in spring/summer to 31.6 m AHD. Top up as required to maintain water level between 30.8 and 31.6 m AHD over Summer/Autumn. Up to 250 ML.	All scenarios.	• Maintain wetland habitat to support Murray hardyhead (*Craterocephalus fluviatilis)* populations • Maintain and improve extent and coverage of ruppia • Manage salinity within an acceptable range for Murray hardyhead and ruppia, and • Provide shallow water feeding habitat for water birds.	Brickworks Billabong has a watering regime of 10 years in 10. Past research indicates that the target water level to provide optimal condition for Murray hardyhead (*Craterocephalus fluviatilis)* at Brickworks Billabong is 30.8 – 31.6 m AHD. These actions will ensure the maintenance of aquatic productivity, reduction in pest fish numbers, the persistence of *Ruppia* sp. and appropriate salinity levels, all of which the fish require for survival. Additionally, water at these sites provides various shallow water and mudflat habitats for wading and feeding habitat by waterbirds birds, including Australian and international migratory birds. Failure to delivery environmental water to this wetland will have lasting impacts on the health of *ruppia* beds and habitat for these important waterbird populations. The site is close to the Mildura and Merbein townships and as such also provide high levels of amenity, including opportunities for recreational activities including birdwatching, walking and photography, offering reprieve stressful lives.	MC2, MC7, MC8:	 F1  B1  V1 

Wetland	Potential watering action	Climatic scenario (s)	Expected watering effects	Rationale	EWMP environmental objectives	VEWH Objectives
J1 Creek	Fill creek during spring to 46.5 m AHD by pumping up to 450 ML.	Dry Average Wet	• Provide soil moisture to maintain and improve condition of riparian and floodplain vegetation, specifically river red gum and black box • Provide shallow-water habitat to provide refuge and feeding habitat for wetland-dependant species including birds and frogs • Stimulate aquatic vegetation growth during inundation • Provide conditions for semi-aquatic lakebed herbland to establish during drawdown.	J1 Creek is fringed by river red gum and, on higher elevations, black box and Lignum. The creek has a watering regime of 10 in 10 years. High flows in the River Murray and large-scale overbank flooding in spring 2022 inundated the creek and floodplain, likely halting declining condition of riparian vegetation. Watering in spring 2025 will aim to build on the positive effects of flooding through improved condition of riparian tree species, promote the abundance and diversity in the understorey vegetation community, and support improved condition and seed fall and germination of black box. Additionally, delivering water during this time will aim to build resilience in the Creek for potential VMFRP construction. Failure to deliver environmental water to this creek will risk black box populations as well as riparian vegetation populations, including important lignum populations.	BY1, BY5	V2 B1
Burra Creek North	Fill during spring to inundate the main creek line by pumping up to 320 ML.	Average	• Maintain and increase the health of the adjacent red gum and black box • Provide habitat for birds and frogs	Burra Creek North and South have an optimal water regime of 3-9 years in ten. Burra Creek supports a high number of directly and indirectly water dependent species, including 25 fauna and four flora species of conservation significance. In addition, 11 microbat species have been recorded from the site – one of the richest mammal groups in the Mallee. Failure to deliver environmental water to this wetland would jeopardise these important native species populations and degrade creek line and floodplain habitat.	BC1, BC2.	V1, V2
Burra Creek South	Fill during spring to inundate the main creek line by pumping up to 1000 ML.	Average				
Burra Creek	Fill during spring to inundate the main creek line	Average				

Wetland	Potential watering action	Climatic scenario (s)	Expected watering effects	Rationale	EWMP environmental objectives	VEWH Objectives
South Proper	by pumping up to 75 ML.			The indigenous community and Traditional Owners for this region are very supportive of watering this creek. They see it as providing opportunity to utilise it as an education tool for younger generations.		
Koorlong Lake	Top up as required to maintain water level between 36.7 and 38.0 m AHD over spring–autumn). Up to 150 ML.	All scenarios.	• Support Murray hardyhead populations maintain • Improve extent and coverage of Ruppia • Manage salinity within an acceptable range for Murray hardyhead and ruppia.	Due to the presence of the EPBC Act (1999) listed (Endangered) Murray hardyhead at this site, maintenance of permanent water is a top priority. Provision of water will ensure the maintenance of aquatic productivity, the persistence of ruppia sp. and appropriate salinity levels, all of which the fish require for survival. Past research indicates that the target water level to provide optimal condition for Murray hardyhead (*Craterocephalus fluviatilis)* at Koorlong Lake is 36.7 –38.0 m AHD. Additionally, water at these sites provides deep, shallow water and mudflat habitats for wading and feeding habitat by waterbirds birds, including Australian and international migratory birds. An initial spring delivery provides a productivity pulse which is timed to support breeding of Murray hardyhead (*Craterocephalus fluviatilis)*. The variability in water level simultaneously supports waterbirds throughout the year. Failure to deliver environmental water to this site would result in loss of the federally listed Murray hardyhead population, which is the only current population of this species within the Mallee CMA area.	CK1, CK2.	
Lake Hawthorn	Top up as required to maintain water level between 33 and 33.3m AHD over spring–autumn)	All scenarios.	• Maintain and improve extent and coverage of ruppia • Provide shallow water feeding habitat for water birds.	Past research indicates that the target water level to provide optimal condition at Lake Hawthorn is 33.0 –33.3 m AHD. Provision of water will ensure the maintenance of aquatic productivity and the persistence of ruppia sp. This site is recognised as supporting high numbers of waterbirds. Water at this site provides various shallow water and mudflat habitat for wading birds. The Lake Hawthorn	LH1, LH2.	

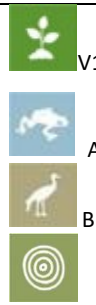
Wetland	Potential watering action	Climatic scenario (s)	Expected watering effects	Rationale	EWMP environmental objectives	VEWH Objectives
	Up to 1,500 ML.			EWMP lists 60 species of waterbirds recorded using the site, including 16 migratory species. It should be noted that water levels drop quickly over the summer period and considerations need to also include irrigation watering demands and up-coming hot weather. Failure to deliver water to this wetland would have profound detrimental impacts to important waterbird and migratory shorebird habitat as well as severe reputational impacts with the local community.		
Outlet Creek (Karadoc Swamp)	Fill during spring to inundate the main creek line and surrounding flood runners by pumping up to 850 ML.	Dry Average Wet	• Provide soil moisture to maintain and improve condition of riparian and floodplain vegetation, specifically river red gum, black box, and lignum • Provide suitable habitat for native frog species • Provide open-water habitat as refuge and feeding and breeding habitat for waterbirds. • Maintain significant moira grass	Outlet Creek has a watering regime of inundation every year, which is currently not being met. The creek had been dry for 5 years before being inundated by overbank flooding in spring 2022 and environmental water delivery in spring 2024. The creek will drawdown over winter and requires delivery of environmental water. Delivery through spring 2025 will aim to build on the positive effects of recent flooding and environmental water through improved condition of riparian tree species, specifically swamp sheoak, black box and lignum. Inundation will also provide conditions to support growth of aquatic vegetation species and waterbird habitat. The creek will have drawn down and require a delivery of environmental water to maintain the optimal water regime.	K2, K4, K5, K7.	
Musk Duck	Top up during winter by pumping up to 50 ML. Triggered by potential fish translocation.	All scenarios	• Provide water for silver and golden fish • Provide conditions for semi-aquatic lakebed herbland to establish during drawdown. • Attractant flow for fish translocation	Musk Duck has a target water regime of 6 in 10 years, which is currently on track to be met. A small top up for winter will reduce the rate of drawdown and act as an attractant flow for fish translocation. First Peoples Millewa Mallee Aboriginal Corporation (FPPMAC) are submitting a Seasonal Watering Proposal for Musk Duck Wetland as a Water is Life trial site which contains detailed rationale.	NC3	

Table 7.2: Sites which have been actively managed for environmental water delivery across the Murray Wetlands in the past but are not planned for receiving an allocation during 2025-26 across all climatic scenarios.

Waterbody	Potential Watering Action	Rationale
Bullock Swamp South	Drawdown	No water will be delivered through the environmental water program during 2025-26 to these sites, they will continue to drawdown, and some are likely to enter a dry phase. In combination with planned watering sites, drying these waterbodies will provide a mosaic of habitat types across the broader landscape. This mosaic provides favourable conditions and supports a wider range of species across the landscape. For example, aquatic and semi aquatic vegetation as well as vegetation which grows on exposed mudflats and piscivorous waterbird species which utilise deep water to feed, waders which use shallow water for feeding and exposed mud flats which are favoured by shorebirds. Drying the wetlands will also see the eradication of pest fish species, effectively re-setting the site which will be beneficial for future water delivery and avoid or limit intrusion of pest fish during delivery.
Callanders Swamp		
Cardross Lakes		
Carina Bend Wetlands		
Fishers Lagoon		
Heywood Lake		
Karadoc Swamp		
Little Heywood Lake		
Liparoo East		
Liparoo West		
Lock 9 Wetland		
Planigale		
Robertson Creek		
Robertson Wetland		
Tata North		
Tammit Wetlands		
Sandilong Billabong		
Spences Bend Billabong		
Wakool Creek		
Western Wetlands		
Woolshed Creek		
Woorlong Wetland		
Yungera Wetland		
Nyah Floodplain		
Vinifera Floodplain		

8 Scenario Planning

Scenario planning and prioritisation for 2025-26 for the Murray Wetlands is heavily influenced by a number of critical factors. Foremost is the consideration of the current environmental condition of the landscape. A concerted effort to water across the Murray Wetlands over the last several years, in conjunction with the recent high Murray River has seen improvement in condition, particularly given the 2022-23 floods inundated many wetlands and floodplains that had been dry since flooding in 2016.

The influence of local weather on water scenario planning and flow triggers is very low across the Murray Wetlands area. Local water availability is highly dependent on conditions experienced in the upper catchments, the resulting in-flow and flow in the adjacent Murray River. Local rainfall, with the exception of extreme rainfall events, has limited to no effect on flooding and inundation of local floodplain and wetlands across the Murray Wetlands. Temperature, particularly during the warmer months also has little bearing on scenario planning. Even during milder conditions, evaporation in the region is still high, thus not a strong factor influencing decision making.

Water availability is a strong consideration during scenario planning. As all water for the Murray Wetlands comes from upstream storages, there is some ability to predict water availability locally at the Murray Wetlands. Included in consideration is carryover water, forecasting and inflows. Carryover is particularly important to consider for early year demands (i.e., early spring). The availability of high river flows, and unregulated flows in the Murray River past the Murray Wetlands sites also ensures higher confidence in water availability and increases the likelihood of following a higher usage water scenario. System demands and shortfalls are most likely to impact on environmental water delivery during dry periods or when water availability is lower.

The nature of the Murray Wetlands system means that there is little need for consideration of high-priority carryover for the majority of the sites. The natural ephemeral nature of the landscape allows for periods with no water which are generally considered part of the natural cycle. However, there is an exception for the Critically Endangered Murray hardyhead (Craterocephalus fluviatilis) site (Koorlong Lake and Brickworks Billabong) and Lake Hawthorn. These sites are required to be kept within an operating range to either sustain a Murray hardyhead population or to maintain populations of saline aquatic vegetation.

Use of natural cues is also a strong consideration driving scenario planning. It is one of the foremost factors when undertaking weir pool manipulation planning. Naturally, low flows in the Murray River would see lower water level in the river and drying of anabranch creeks. This can be replicated by lowering the weir pools. Alternately, during high flows, water level is increased, and off-channel creeks receive flows (i.e. weir pool raising). Natural flows also influence some aspects of wetland, and more so, floodplain inundation planning.

8.1 Drought

A Drought scenario is enacted when the Probability Of Exceedance (POE) is 99%. This means that the inflows are the lowest on record. The main watering objective is to 'Avoid irretrievable loss of key environmental assets. The underlining management objectives are to:

- Avoid critical loss of species, communities and ecosystems
- Maintain key refuges
- Avoid irretrievable damage or catastrophic events.

The wetlands being planned for delivery under this scenario have reached a critical point in their cycle where inundation is now considered essential to avoid loss of environmental character.

At this point, we do not envisage a drought scenario in 2025-26 is feasible. For this to occur there needs to be a significant shift that indicates no in-flows are forecast for the system over a 12-month period.

8.2 Dry

A Dry scenario is enacted when the Probability Of Exceedance (POE) is 90%. This means that the inflows are in the bottom 10% of all years. The main watering objective is to 'Ensure priority river reaches and wetlands have maintained their basic functions'. The underlining management objectives are to:

- Maintain river functioning with reduced reproductive capacity
- Maintain key functions of high priority wetlands
- Manage within dry spell tolerances
- Support connectivity between sites.

As well as addressing sites deemed essential under a Drought scenario, sites under a Dry scenario look to continue to build resilience and maintain key functions of wetlands.

8.3 Average

An Average scenario is enacted when the Probability Of Exceedance (POE) is 50%. This means that the inflows are on average with most years. The main watering objective is to 'Ecological health of priority river reaches and wetlands have been protected or improved'. The underlining management objectives are to:

- Enable growth, reproduction and small-scale recruitment for a diverse range of flora and fauna
- Promote low lying floodplain river connectivity
- Support medium flow river and floodplain functional processes.

As well as addressing sites deemed essential under Drought and Dry scenarios, sites under an Average scenario look to promote floodplain connectivity and processes and look to enable recruitment and improve condition of flora and fauna.

Particular flow triggers used in the consideration for acceptance of this scenario are linked to modelled natural flows. Modelled natural flows in the River Murray, at Lock 15, ≥23,000 ML/d by early August, will facilitate decisions to trigger an Average scenario. Unregulated flows in the River Murray in the two months prior to August should also be a strong consideration for triggering an Average scenario. The reason for these considerations is to replicate natural conditions, which would start to see off-channel creeks to engage, which would generally lead to low level floodplain connectivity as time, and inflow increases.

8.4 Wet

A Wet scenario is enacted when the Probability Of Exceedance (POE) is 10%. This means that the inflows are in the top 10% of all years. The main watering objective is to 'Improve the health and resilience of aquatic ecosystems. The underlining Management objectives are to:

- Enable growth, reproduction and large-scale recruitment for a diverse range of flora and fauna
- Promote higher floodplain river connectivity
- Support high flow river and floodplain functional processes.

It is anticipated that under a Wet scenario, inundation of majority of low-lying wetlands will occur via overbank flooding. The occurrence of overbank flooding or "natural inundation" results in a lower requirement for delivery of environmental water via pumping. In some instances (i.e. Lake Hawthorn, Koorlong Lake), delivery may still be required as these sites are not on the river Murray floodplain and will not be inundated through natural flooding.

High flows in the Murray River, which result in the removal of the weirs between Swan Hill and the South Australian border, indicate conditions where a Wet scenario should be triggered. This occurred during the 2022-23 and 2023-24 seasons.

Table 8.1: Proposed environmental watering actions for the Murray Wetlands under each climatic scenario for 2025-26.

Climate Scenario	Drought		Dry		Average		Wet*	
Expected climatic conditions and water availability	POE 99%		POE 90%		POE 50%		POE 10%	
Expected river conditions (including unregulated water, consumptive water, etc.)	Base level river flows in line with minimum operational requirements resulting in regulated conditions.		Low River Murray flows with little to no inflows from storages or tributaries (other than operational releases) resulting in regulated conditions. River Murray flows unlikely to naturally inundate off-channel wetlands and anabranches.		High river flows resulting from controlled releases from storage or minor spills and/or high tributary inflows. River Murray flow may be operating under either regulated or unregulated conditions. Wetlands, anabranches may receive natural inundation.		Large spills from upstream storages and/or high tributary inflows resulting in unregulated conditions and removal of all weirs. Wetlands, anabranches and floodplain likely to received natural inundation	
Environmental objectives	Maintain critical wetland habitat		Maintain and protect critical habitat at key sites		Maintain condition of floodplains		Provide inundation of vegetation communities for growth and germination	
Priority watering actions/wetlands expected to be delivered 2025/26	Tier 1		Tier 1		Tier 1		Tier 1	
	Bottle Bend Wetlands	350	Bottle Bend Wetlands	350	Bottle Bend Wetlands*	350	Brickworks Billabong	400
	Brickworks Billabong	400	Brickworks Billabong	400	Brickworks Billabong	400	Catfish Billabong	900
	Koorlong Lake	150	Koorlong Lake	150	Koorlong Lake	150	Koorlong Lake	150
	Lake Hawthorn	1,500	Lake Hawthorn	1,500	Lake Hawthorn	1,500	Lake Hawthorn	1,500
	Musk Duck	50	Musk Duck	50	Musk Duck	50	Musk Duck	50
			Catfish Billabong	900	Catfish Billabong	900	J1 Creek	450
			J1 Creek	450	J1 Creek	450	Outlet Creek (Karadoc Swamp)	850
			Outlet Creek (Karadoc Swamp)	850	Outlet Creek (Karadoc Swamp)	850		
					Burra Creek South*	1000		
					Burra Creek North*	320		
					Burra Creek South Proper*	75		
Estimated environmental water requirement	2,450 ML		4,650 ML		6,045 ML		4,300 ML	

#*These sites will have been naturally inundated under a wet scenario and will not require delivery.

9 Risk Management

The risk management section is specifically targeted at the proposals for watering discussed earlier and should be reassessed if changes are made to the watering schedule.

Table 9.1: Risk assessment of watering the Murray Wetlands for 2025-26.

Risk category	Risk description	Pre-Mitigation Risk			Mitigation actions	Lead organisation for action	Residual Risk Rating	Risk type Static/ Dynamic
		Likelihood	Consequence	Risk Rating				
Environment	Extended periods of high demand could lead to system or delivery shortfalls which reduce access for environmental water deliveries, resulting in failure to complete planned actions. Risk requires inclusion and tailoring in DPs - (will only apply to some wetlands and likelihood and consequence could vary between sites)	Possible	Minor	Low	• Planned deliveries can be interrupted and rescheduled with minimal impact on outcomes • Weir pool manipulations may be curtailed in high demands periods • Consult MCMA to prioritise watering actions that will have outcomes severely affected if delivery is interrupted and liaise with DEECA and MDBA to plan avoidance of interruptions	MCMA MDBA VEWH	Low	Static
Environment	Maintenance activities by the storage operator or constructing authority affect the ability to deliver water to sites. Risk requires inclusion and tailoring in DPs - needs tailored consideration	Possible	Minor	Low	• Monitor maintenance activities and schedules to identify possible issues and reschedule deliveries actions if required to minimise any disruption. • Provision of early advice of planned maintenance actions. • Ensure consultation with storage operator on watering plan development	MCMA Storage Operator MCMA	Low	Static
Reputational	Access routes into public park areas may be inundated by delivery of environmental water, leading to potential impacts on recreational opportunities for park users. Risk requires inclusion and tailoring in DPs - needs tailored consideration	Possible	Minor	Low	• Watering proposals to identify potential impacts (e.g. flooding footprint overlaid with key land roads and recreational assets) and ensure proposed watering plans are communicated to land mgrs. • Land Managers implement the required management activities prior to and during environmental watering events. This includes: • identification of impacted assets • preparation of resources required (e.g. signage, maintenance of alternative recreational sites) to implement road, walking track and campsite closures and to direct users to alternative sites • communication of planned events, access closures and alternative recreational opportunities **Note that insufficient resources may limit the land manager's*	MCMA Parks Vic	Low	Static

Risk category	Risk description	Pre-Mitigation Risk			Mitigation actions	Lead organisation for action	Residual Risk Rating	Risk type Static/ Dynamic
		Likelihood	Consequence	Risk Rating				
					ability to implement management activities. Increased resources may reduce the likelihood of the risk description occurring.			
Business Costs	Park 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. Risk requires inclusion and tailoring in DPs - needs tailored consideration	Likely	Moderate	Medium	Land Managers: • implement management activities to prevent access to flooded roadways (e.g. close roads, communicate planned events, install signage) • repair damage during and after environmental watering events • consider rationalisation of road networks to remove unwanted access tracks and improve the standard of retained tracks. **Note that insufficient resources may limit the land manager's ability to implement management activities. Increased resources may reduce the likelihood of the risk description occurring.*	Land Manager	Low	Static
Legal	Access routes into public park areas may be inundated by delivery of environmental water, leading to potential economic impacts on commercial operators. Risk requires inclusion and tailoring in DPs - only relevant to some sites and nature of risk will differ between sites therefore need site specific mitigation.	Possible	Minor	Low	• Communication and advice to commercial operators to alert them of environmental watering, via Land Manager as licensing authority.	MCMA	Low	Static
Environment	Delivery of greater volumes than ordered may result in an overdraw of environmental water account, leading to water not being available as per approved watering statement to complete subsequent planned actions. Risk requires inclusion and tailoring in DPs - depends on the volume of the delivery (affects consequence rating). Treatment is likely to be similar however	Unlikely	Minor	Low	• Monitor ABA balances and undertake regular communications with CMA as part of usage monitoring and portfolio management activities. • Monitor deliveries in progress to ensure that they align with ordered/approved volumes. This may include consultation via the OAG to cover all sites	VEWH MCMA	Low	Static
Business Costs	Costs exceed approved VEWH funding for delivery actions at a site basis, leading to impacts on watering activities (including possibly cessation of deliveries). Risk does not require inclusion and tailoring in DPs - No this should be considered collectively during the SWP planning and so treatment is program-wide (may be covered in Risk ID #10)? Would only apply to DP if estimated delivery costs or volume for a particular site are grossly inaccurate and the error is only detected part way through the delivery. this would be result of poor planning so treatment is still at the planning stage and is a program wide risk and treatment.	Possible	Moderate	Medium	• Develop accurate costings including allowances for planned risk mitigation actions and tracking of actuals against estimates. • Reallocate funding, based on proposals developed by MCMA. • Ensure specifications for service providers include coverage of contingency measures	MCMA VEWH MCMA	Low	Static

Risk category	Risk description	Pre-Mitigation Risk			Mitigation actions	Lead organisation for action	Residual Risk Rating	Risk type Static/ Dynamic
		Likelihood	Consequence	Risk Rating				
Environment	Cost and/or time required to undertake cultural heritage assessments and implementation of any required actions may prevent watering actions being undertaken at a site leading to failure to achieve environmental benefits *Note: There are also reputational risks if effective engagement and management of cultural values issues in not undertaken with T.O's* *Time for undertaking assessments is biggest risk to implementing watering actions* Risk does not require inclusion and tailoring in DPs- this should be covered in the Cultural Heritage tick box in the DP rather than the risk assessment.	Possible	Minor	Low	• Develop accurate costings including allowances for planned risk mitigation actions, and tracking of actuals against estimates. • Undertake early assessments to identify potential cultural heritage issues and include in planning, with appropriate contingency allowances • Reallocate funding within the overall funding contract, based on proposals developed by MCMA. *Note: potential future recognition of joint management arrangements with TOs may see a need for provision of funding.*	MCMA MCMA VEWH	Low	Dynamic
Legal	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. Risk does not require inclusion and tailoring in DPs - this should be covered in the Cultural Heritage tick box in the DP rather than the risk assessment.	Likely	Moderate	Medium	• Undertake desktop reviews and site assessments of footprint of activities being undertaken with archaeologists, traditional owners and land managers, to identify approval needs and contingency measures - standard practice for all sites. • Obtain any necessary formal approvals/permits and implement required actions. • Monitor developments from VFMRP assessment process and adapt and apply procedures as required (noting that some of this information has not yet been entered into ACHRIS). • Apply MCMA cultural heritage site assessment process.	MCMA	Low	Dynamic
Environment	Total cost of proposed delivery actions exceeds the funding that can be provided by VEWH, limiting scope of the program and not achieved planned environmental outcomes Risk does not require inclusion and tailoring in DPs - generic wetlands risk/treated at program level.	Possible	Minor	Low	• Prioritise funding and site selection in line with available resources. • Undertake preliminary assessment of costs during development of proposals and scoping of the plan.	VEWH	Low	Static
Reputational	Reporting of water usage and updating of water register lags behind deliveries, leading to possible overuse of environmental entitlements and incorrect reporting of "water used/available" in the water market, with implications for efficient functioning of the water market.	Possible	Major	Medium	• Post estimated usage to water register during or immediately after delivery and adjust for actuals as soon as possible. •Review water accounting processes to identify any opportunities for improvement. • Regular reporting of delivery volumes and progress to VEWH	GMW Storage Operators MCMA	Low	Static

Risk category	Risk description	Pre-Mitigation Risk			Mitigation actions	Lead organisation for action	Residual Risk Rating	Risk type Static/ Dynamic
		Likelihood	Consequence	Risk Rating				
	Risk requires inclusion and tailoring in DPs - (consequence level likely to vary depending on volume and needs to be actively managed during delivery) Note: Likelihood is based on drier years with pressure on water market prices - potential for these conditions in 25-26							
Environment	Pumping of environmental deliveries into wetlands results in erosion downstream of pump discharge, leading to water quality impacts and the need to suspend watering actions and rectify the damage. Risk requires inclusion and tailoring in DPs - only relevant for some sites and needs to be actively managed during delivery.	Likely	Minor	Low	• Ensure delivery routes downstream of pump sites can withstand the proposed flow rates without unacceptable impacts. • Armouring and other protections may be installed if required. • Implement ramp up and ramp down phases for flows to reduce erosion risks	MCMA	Low	Dynamic
Environment	Failure of delivery infrastructure or water monitoring assets (including water meters) may result in interruptions to watering actions, leading to failure to achieve environmental objectives. (includes failure of temporary works) Risk requires inclusion and tailoring in DPs - only relevant for some sites and needs to be actively managed during delivery	Possible	Minor	Low	• Ensure asset ownership is clear and asset owners undertake pre-event inspections and maintain assets as required. * • Undertake operational monitoring during each event and respond as necessary to prevent failures. This may include float switches to prevent high water levels, and trail cameras for real time monitoring if risk level warrants. • Ensure levees designs are fit for purpose and address trafficability needs or control traffic access to levees etc. to ensure safety • Require inspections to ensure temporary levees are built according to specifications during construction, and prior to commencement of delivery • Site selection for pump and meter to minimise potential for damage, including protection of meter from falling tree limbs or other damage if required. • Develop agreed accounting process to estimate delivery volumes in the event of meter damage/data loss **Note that insufficient resources are likely to limit the asset owner's ability to perform maintenance and inspections. Increased resources may reduce the likelihood of the risk occurring.*	MCMA / Asset Owner VEWH/ GMW	Low	Dynamic

Risk category	Risk description	Pre-Mitigation Risk			Mitigation actions	Lead organisation for action	Residual Risk Rating	Risk type Static/ Dynamic
		Likelihood	Consequence	Risk Rating				
Safety	Failure of levees installed as part of delivery infrastructure or water monitoring assets may result in injury to the public or staff. (includes failure of temporary works and levees) *Note: these events could also lead to interruption/abandonment of watering actions leading to failure to achieve environmental objectives, however safety issues pose highest risk* Risk requires inclusion and tailoring in DPs - only applies to some sites and level of risk varies between sites depending on size of levee, volume of water and public access/use of levee. Risk needs to be actively managed as part of levee construction and monitoring during operation.	Possible	Major	Medium	• Ensure asset ownership is clear and asset owners undertake pre-event inspections and maintain assets as required. • Undertake operational monitoring during each event and respond as necessary to prevent failures. • Ensure levee designs are fit for purpose and address trafficability needs or control traffic access to temporary levees etc. to ensure safety • Adapt and apply levee design standards being developed as part of VMFRP program • Require inspections to ensure temporary levees are built according to specifications during construction, and prior to commencement of delivery **Note that insufficient resources are likely to limit the asset owner's ability to perform maintenance and inspections. Increased resources may reduce the likelihood of the risk occurring.*	MCMA / Asset Owner	Low	Dynamic
Reputational	Noise impacts from temporary pumping installations lead to complaints and adverse publicity, and potentially EPA noise pollution enforcement actions. Risk requires inclusion and tailoring in DPs - only applies to some sites and level of risk varies between sites depending on size of levee, volume of water and public access/use of levee. Risk needs to be actively managed as part of levee construction and monitoring during operation.	Unlikely	Minor	Low	• Site selection and pump placement to minimise noise impacts. • Selection of quiet pumping equipment and installation of noise suppression measures. • Ensure that pumping contractors check and maintain equipment • Consider curtailing pumping during peak camper visitation periods for public land sites.	MCMA	Low	Dynamic
Safety	Water delivery infrastructure (including temporary pumps etc.) creates safety risks for public. *Note: Water deliveries may also encourage increased visitation to particular sites.* *Risk requires inclusion and tailoring in DPs - only applicable to some sites and requires active management during delivery.*	Possible	Moderate	Medium	• Install safety barricades and implement suitable traffic control measures • Provide alert in the appropriate "changed conditions" sections of the PV website.	MCMA/asset owner PV	Low	Static

Risk category	Risk description	Pre-Mitigation Risk			Mitigation actions	Lead organisation for action	Residual Risk Rating	Risk type Static/ Dynamic
		Likelihood	Consequence	Risk Rating				
Environment	Changes in seasonal conditions (esp. from dry to wet) and moving to expanded watering action scenarios may lead to difficulties in planning and implementing necessary actions, limiting the potential scope of watering actions resulting in failure to achieve environmental benefits. Risk does not require inclusion and tailoring in DPs - considered prior to final SW Proposal	Unlikely	Minor	Low	• Monitoring climate forecasts and developing contingency plans for possible changes to actions. • Identify any potential changes to proposed actions arising through SCBEWC • Communicate potential for changes to watering actions to stakeholders and the wider community. • Review MCMA register of structures and ensure that structures are adjusted/operated as necessary in light of changed conditions. • Implement more responsive procurement processes to allow adaptation to changing conditions (e.g. ability to promptly engage pumping contractors)	MCMA VEWH MCMA MCMA MCMA	Low	Dynamic
Legal	Environmental deliveries cause unauthorised inundation of private land, resulting in impacts on farm activities and assets. Risk requires inclusion and tailoring in DPs - this will only apply to some sites and requires active mitigation during delivery to monitor water levels etc.	Unlikely	Moderate	Low	• Update and ensure currency of any applicable agreements covering inundation of private land. • Review previous watering events to identify any high-risk locations and develop specific actions as appropriate. • Undertake site inspections prior to commencement of deliveries to identify new risk areas for action (including consideration of risks to property access routes). • Inform landholders of intended watering actions and provide a contact number to call if they become aware of issues during the event.	MCMA	Low	Static
Environment	Other environmental water managers' competing priorities and objectives may limit the ability to achieve intended objectives. (e.g. weir pool lowering prevents deliveries to Lindsay/Wallpolla) Risk does not require inclusion and tailoring in DPs - this is just part of normal annual SWP planning	Possible	Minor	Low	• Early communication of priorities and objectives to other environmental water managers, and development of combined NSW/Vic watering proposals to SCBEWC • Participation and co-ordination through various forums including OAGs. • Studies to quantify relative benefits and impacts of competing actions. Note - mitigations may need to be reviewed and improved or expanded to addressed increased complexity arising from new SDLAM projects (in NSW and Vic) coming on-line.	MCMA	Low	Dynamic
Business Costs	Insufficient resources available (including staff, funding for maintenance of roads, regulators, pumping etc), across partner organisations to deliver all planned environmental watering actions, leading to cancellation or interruptions of deliveries and/or impacts to roads	Possible	Moderate	Medium	• Partners notify the CMA and VEWH of resourcing constraints in advance of deliveries and VEWH convenes OAG meetings to consider implications and potential solutions • Continue to actively prioritise actions to match available	MCMA MCMA MCMA	Medium	Dynamic

Risk category	Risk description	Pre-Mitigation Risk			Mitigation actions	Lead organisation for action	Residual Risk Rating	Risk type Static/ Dynamic
		Likelihood	Consequence	Risk Rating				
	and infrastructure etc (esp. in PV areas). *Note:* *- This risk relates to unplanned resource shortfalls, for example where Parks staff are diverted to bushfire duties with no advance warning.* *- Causes of risk may also include shortage of service providers, rather than just staff shortages.* *Assessment relates to 2025-26 conditions.* *Risk may require inclusion and tailoring in DPs - generic wetlands risk (Exceptions may exist if known blackspot areas?)* *PICK UP IN DELIVERY PLAN*				resources and ensure key actions are delivered. • Reallocation of tasks and available funding.			
Environment	The time required to for planning, approvals, procurement and implementation of watering actions may delay or prevent timely commencement of spring watering actions, limiting achievement of environmental objectives. *Note: This issue may affect multiple locations - moderate consequence. Construction activities associated with the VMFRP are also likely to shorten the available window for deliveries.* *For 2024-25, additional cultural heritage risk assessments will need to be undertaken to assess flood impacts.* *For 2024-25, additional cultural heritage risk assessments will need to be undertaken to assess flood impacts.* *Risk does not require inclusion and tailoring in DPs - this is just part of normal annual SWP planning*	Likely	Moderate	Medium	• Early planning and prioritisation of actions. • Providing advice and early warning to each organisation of the actions proposed to understand the approvals expected to be required from each organisation. • Land managers to provide confirmation of approval requirements. • Streamlining annual watering plan approvals process. • Ensuring minimum water levels are maintained in critical wetlands prior to the end of the water year to provide a buffer against delays. *Note: Especially relevant for PV environmental and cultural access approvals.*	MCMA MCMA Land Managers VEWH MCMA	Low	Dynamic
Service Delivery	Environmental water deliveries may impact adversely on infrastructure or land management works (e.g. fire mgmt. works, kangaroo census and culls etc.) that are being undertaken by other stakeholders. Risk requires inclusion and tailoring in DPs - important to ask this question in the DP at the site level	Likely	Moderate	Medium	• Early planning and communications of proposed actions with land managers and other stakeholders to minimise likelihood of impacts, and scheduling of proposed works outside of planned delivery periods.	MCMA	Low	Static

Risk category	Risk description	Pre-Mitigation Risk			Mitigation actions	Lead organisation for action	Residual Risk Rating	Risk type Static/ Dynamic
		Likelihood	Consequence	Risk Rating				
Environment	Environmental deliveries create improved conditions for existing non-native species (e.g. carp, invasive species, feral animals) and over-abundant native species (e.g. kangaroos, Red Gum encroachment) leading to adverse environmental impacts. Note: The likelihood of this risk increases when a sequence of dry years concentrate pest animal on environmental watering sites. For 2024-25, additional cultural heritage risk assessments will need to be undertaken to assess flood impacts. Risk does not require inclusion and tailoring in DPs - this is just part of normal annual SWP planning.	Likely	Moderate	Medium	• Study/understand life history of species and develop high level management strategies. • 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) in high risk locations. This mitigation may also require collaborative effort from private landholders and could offer opportunities for community participation but may be limited by availability of resources by partners. • Implement pest reduction efforts prior to delivery of water, to ensure increases in populations remain within "tolerable" levels *(Note: This risk is still rated as **medium** after mitigation actions.)*	DELWP MCMA or Land Manager	Medium	Static
Environment	Introduction of pest plants through works (including importation of fill) to establish pump sites and levees results in environmental impacts. Risk requires inclusion and tailoring in DPs - this will only apply to some sites; risks will differ between those sites and will need to be actively managed during delivery works.	Possible	Major	Medium	• Ensure machinery is cleaned in accordance with PV plant hygiene protocols. • Use weed free or appropriately treated fill that complies with PV specifications. • Where possible, stockpile temporary levee fill on site and reuse to avoid importing weeds • Provide advice to PV of intended works and ensure their inclusion in the PV environmental access agreement.	MCMA	Low	Static
Environment	Under either wet or dry conditions, access to temporary pumping sites in parks will deteriorate, reducing access and limiting watering actions. Risk requires inclusion and tailoring in DPs where these scenarios expected	Possible	Moderate	Medium	• Coordination and advice PV on proposed delivery sites. • Repair track damage, including targeted fixes	MCMA PV	Low	Static
Reputational	Failure to demonstrate the benefits of environmental watering and/or community concerns over environmental watering actions reduce community support for environmental watering. Risk does not require inclusion and tailoring in DPs - currently worded as a program level risk (and treatment).	Likely	Moderate	Medium	• Communicate the key objectives and benefits of environmental watering to the community through a range of channels. • Publicise watering activities undertaken or in progress, and ensure LMW has information on watering actions in a form that can be provided to their customers. • Install explanatory signage on environmental watering at key sites. • Share communications materials and key messages between partners.	MCMA MCMA Land mgr. or MCMA All	Low	Static

Risk category	Risk description	Pre-Mitigation Risk			Mitigation actions	Lead organisation for action	Residual Risk Rating	Risk type Static/ Dynamic
		Likelihood	Consequence	Risk Rating				
					• Tailor messaging for 24-25 to explain why watering after floods is positive			
Cultural Heritage	Environmental water deliveries and/or associated operational and monitoring actions result in damage to unknown cultural heritage sites.	Possible	Moderate	Medium	• Apply MCMA standard cultural heritage operational assessment procedures to proposed watering sites. • Targeted site inspections with TOs, with regard to potential erosion and flood impacts from 22-23 • PV assessment of cultural heritage aspects of watering proposals	MCMA	Low	Static
Safety	A failure to share information regarding potential site-specific safety concerns in relation to negative community sentiment in relation to government decisions/actions creates a safety risk for staff involved in environmental watering actions *This is state wide risk, but may not apply in all systems - the risk rating will reflect local risk levels Risk does not require inclusion and tailoring in DPs - generic wetlands risk/treatment (unless a known issue at a particular site)	Possible	Moderate	Medium	- Share intelligence around any known instances of risky or aggressive behaviour at watering sites between partners. Note: Accountability for individual staff safety lies with the employing agency via implementation of their own OHS safe work requirements and other associated policy and procedures. This risk is therefore not addressed within this assessment.	All	Low	Dynamic
Safety	Access routes into public park areas may be inundated by delivery of environmental water, leading to potential safety risks for park users and Parks Vic staff (e.g. by driving through flooded waterways). Risk requires inclusion and tailoring in DPs - will vary considerably between sites so needs to be addressed individually for each DP.	Unlikely	Moderate	Low	• Erect warning signage and implement road closures supported by public advice on changed conditions. • Consider installation of track closure gates and gauge boards at high-risk sites • Undertake information programs to warn the public not to drive through flood water. • Identify non-flooded alternative sites for public use.	Parks Vic	Low	Static

Risk category	Risk description	Pre-Mitigation Risk			Mitigation actions	Lead organisation for action	Residual Risk Rating	Risk type Static/ Dynamic
		Likelihood	Consequence	Risk Rating				
Safety	People camping on floodplains may be displaced by environmental water deliveries and may be aggressive towards e-water staff as a result Note: Where English is not a first language, individuals may be concerned and feel frightened or threatened, and react accordingly	Possible	Moderate	Medium	• Timely sharing of information on known aggressive individuals or groups amongst all partners. • Share incident reports promptly to all partners • Ensure operational staff are informed of issues/risks and appropriate responses • Ensure safe operational procedures for staff are followed • Providing information on watering actions in multiple languages	All	Low	Static
Environment	Volumes delivered are insufficient to meet hydrologic targets due to multiple factors, for example high losses at very dry sites, hot weather causing excessive evaporation, antecedent conditions and inflow rates.	Possible	Moderate	Medium	• Review historic deliveries and incorporate learning from those to accurately estimate demands. • Monitor deliveries and Seek approval from VEWH for reallocation of water between sites and/or watering statements as required.	MCMA	Low	Dynamic
Environment	Surface or groundwater discharge from saline sites exceeds the targets in the BSM2030 leading to impact on the environment or consumptive users locally	Unlikely	Minor	Low	• Revise watering options and/or implement monitoring and operational actions to prevent and limit impacts • Monitor salinity impacts due to 23-24 flooding and adjust plans accordingly	MCMA	Low	Static

10. Approval

WATERWAY MANAGER APPROVAL OF THE SEASONAL WATERING PROPOSAL
I, the authorised representative of the agency shown below approve the Seasonal Watering Proposal for the Wimmera Mallee Wetlands Pipepline system in 2025-26 and declare that: • the information provided in this proposal is true and correct, • all required approvals and endorsements from storage managers, land managers, Traditional Owners or other relevant party have been granted, and • unless otherwise stated, any consent/s required to use or reproduce Traditional Owner language and knowledge has been obtained for the purpose of Seasonal Water Planning. SIGNED FOR AND ON BEHALF OF MALLEE CATCHMENT MANAGEMENT AUTHORITY Signature of authorised representative:  Name of authorised representative: Jenny Collins Position of authorised representative: Chief Executive Officer Date: 14/04/2025

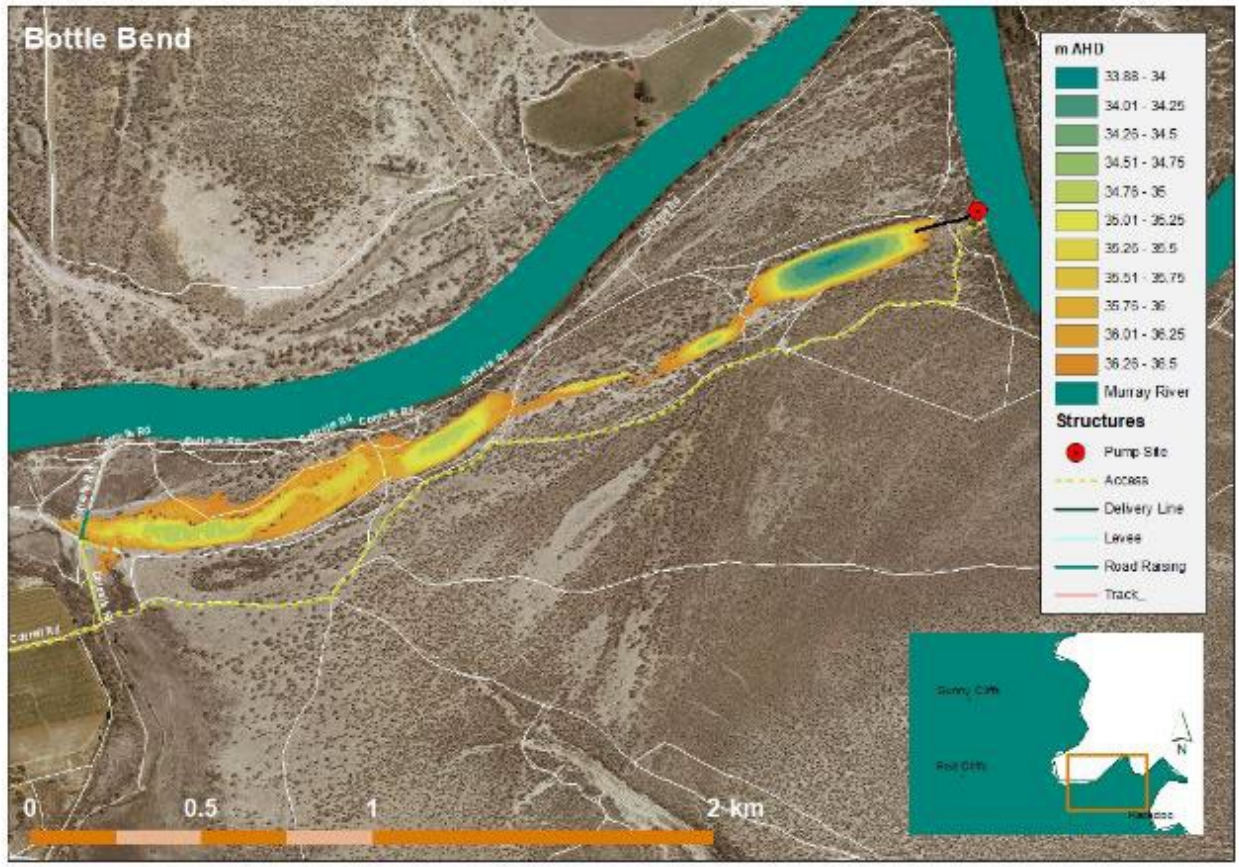
10 References

Mallee CMA Environmental Water Management Plans

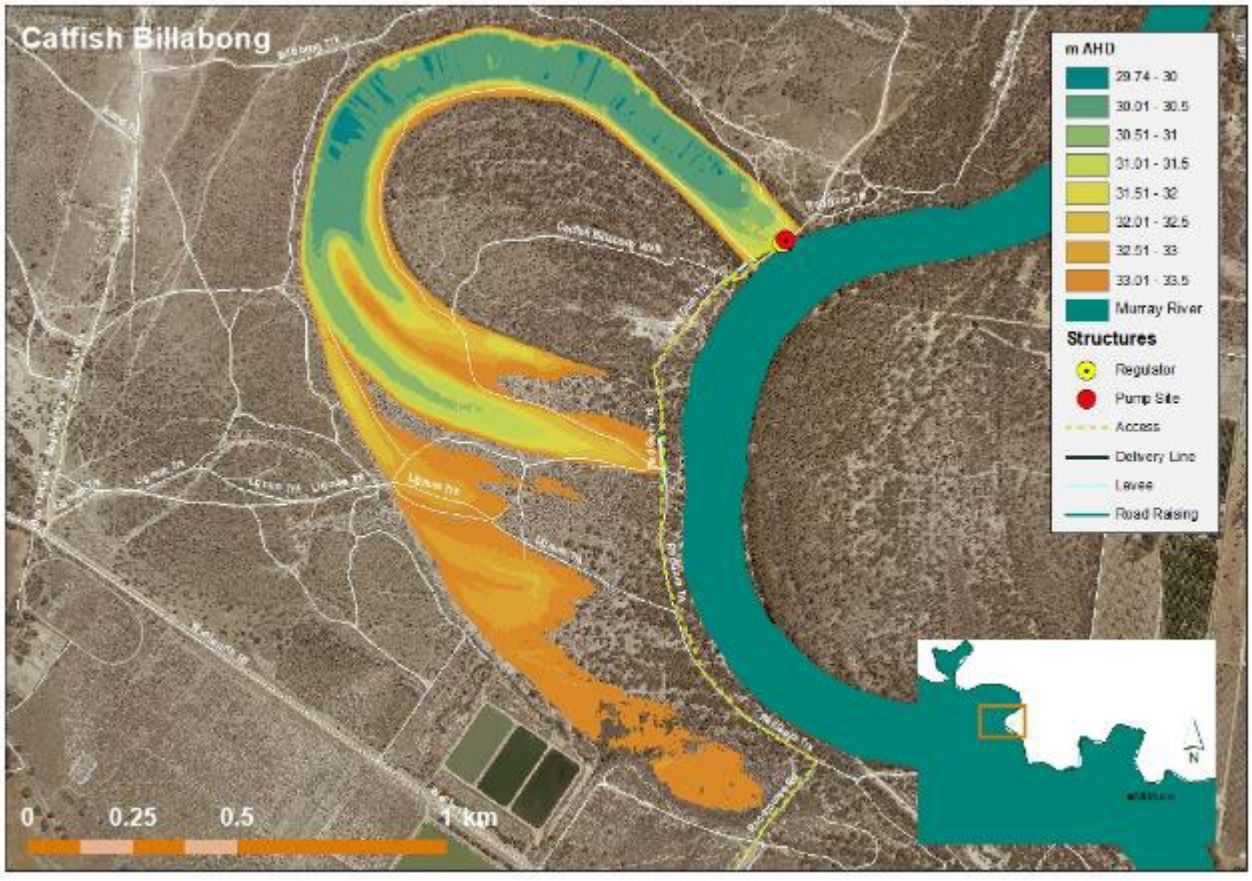
VEWH (2021). *Victorian Environmental Watering Program Risk Management Framework.* Victorian Environmental Water Holder.

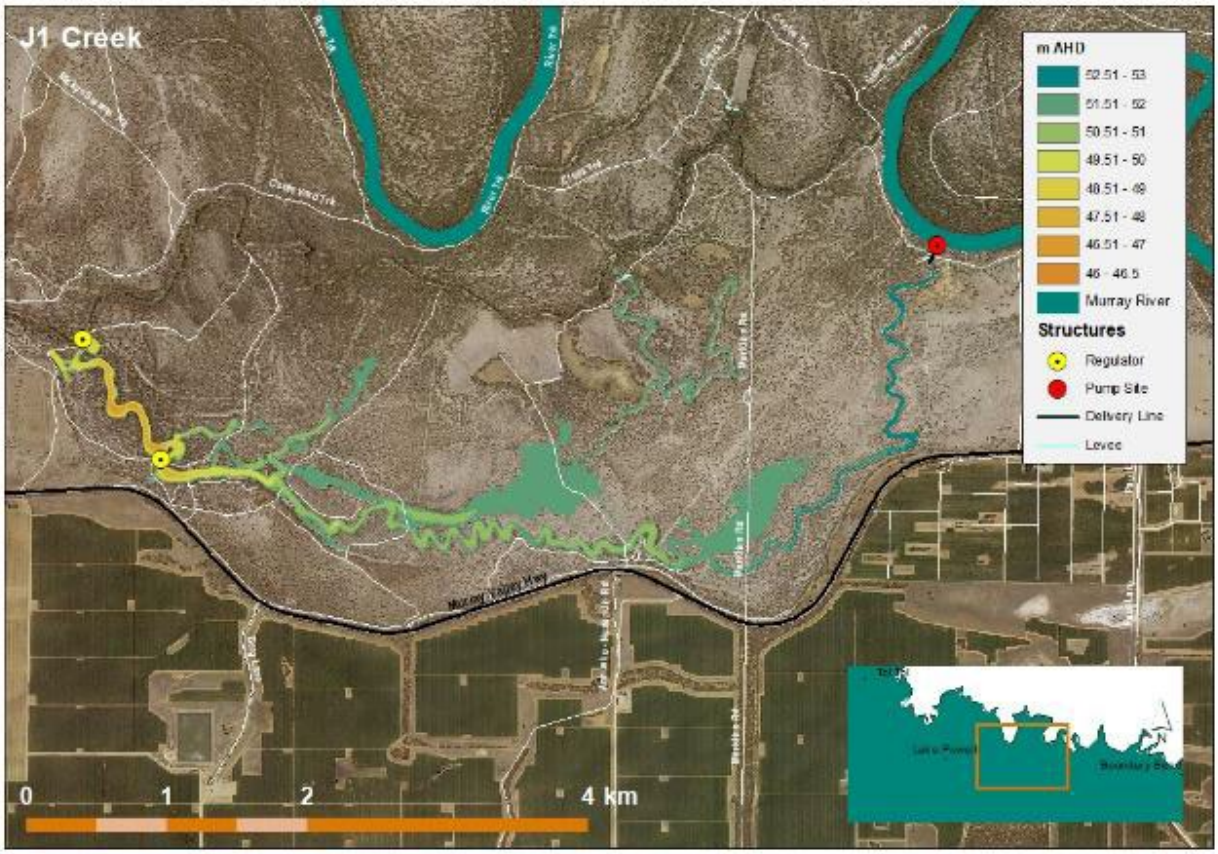
11 Appendices

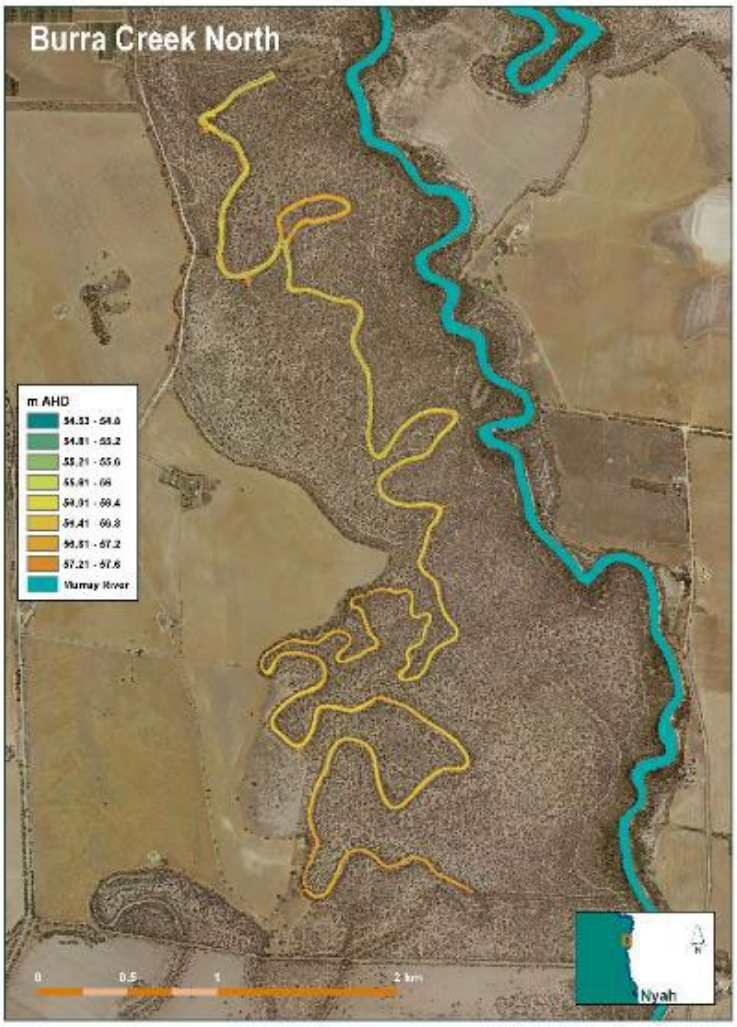
Appendix 1 - Maps

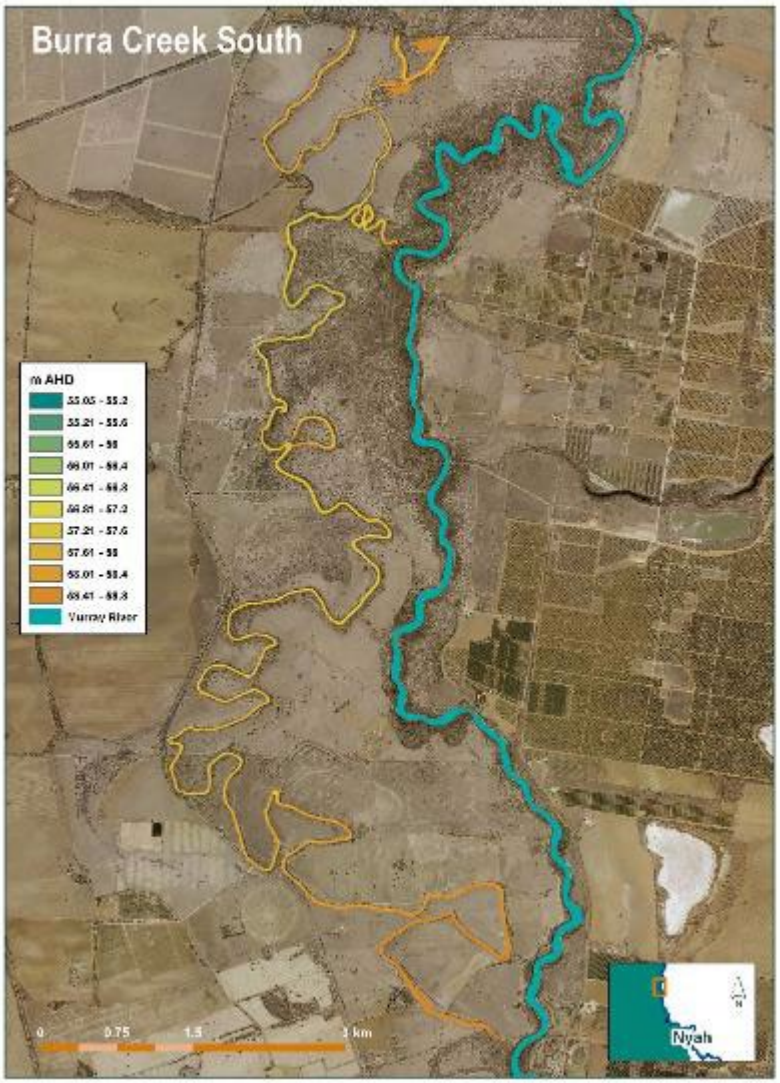



Brickworks Billabong
m AHD
Murray River
Structures
Regulator
Pump Site
0
0.25
0.5
1 km


Catfish Billabong
m AHD
29.74 - 30
30.01 - 30.5
30.51 - 31
31.01 - 31.5
31.51 - 32
32.01 - 32.5
32.51 - 33
33.01 - 33.5
Murray River
Structures
Regulator
Pump Site
Access
Delivery Line
Levee
Road Raising
0
0.25
0.5
1 km


J1 Creek
m AHD
52.51 - 53
51.51 - 52
50.51 - 51
49.51 - 50
48.51 - 49
47.51 - 48
46.51 - 47
46 - 46.5
Murray River
Structures
Regulator
Pump Site
Delivery Line
Levee
0
1
2
4 km

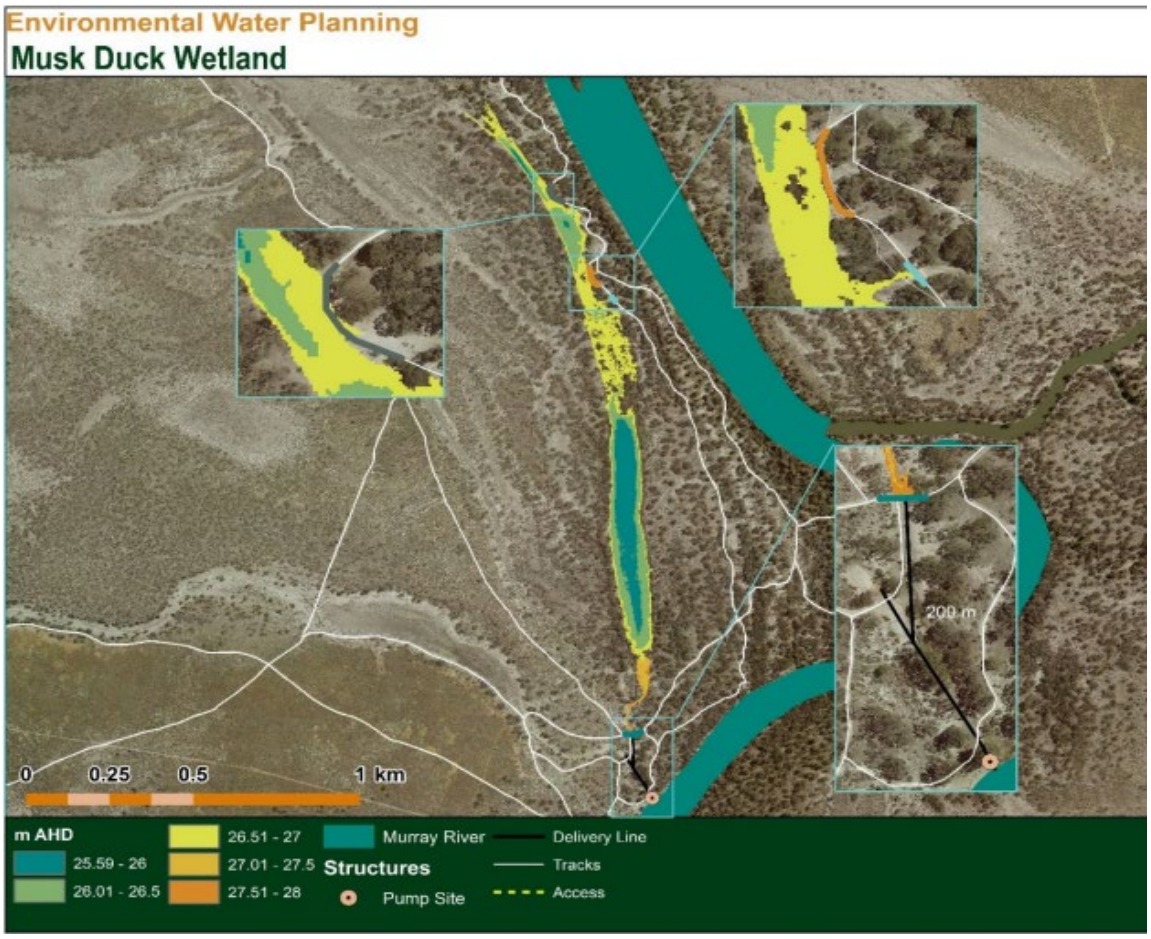

Burra Creek North
m AHD
54.53 - 54.8
54.81 - 55.2
55.21 - 55.6
55.61 - 56
56.01 - 56.4
56.41 - 56.8
56.81 - 57.2
57.21 - 57.6
Murray River
0
0.5
1
2 km
N
Nyah


Burra Creek South
m AHD
55.03 - 55.2
55.21 - 55.4
55.41 - 55.6
55.61 - 55.8
55.81 - 56
56.01 - 56.2
56.21 - 56.4
56.41 - 56.6
56.61 - 56.8
56.81 - 57
57.01 - 57.2
57.21 - 57.4
57.41 - 57.6
57.61 - 57.8
57.81 - 58
58.01 - 58.2
58.21 - 58.4
58.41 - 58.6
Murray River
0
0.75
1.5
3 km
Nyah


Burra Creek South Proper
m AHD
59.05 - 59.2
59.21 - 59.4
59.41 - 59.6
59.61 - 59.8
59.81 - 60
60.01 - 60.2
60.21 - 60.4
60.41 - 60.6
60.61 - 60.8
Murray River
0
0.125
0.25
0.5 km
N
Plangil


Koorlong Lake
m AHD
36.7
38.0
0
0.075
0.15
0.3 km
N
Mildura


Lake Hawthorn
m AHD
33.0m
33.3m
0
0.375
0.75
1.5 km
Mildura
N


Environmental Water Planning
Musk Duck Wetland
200 m
0
0.25
0.5
1 km
m AHD
25.59 - 26
26.01 - 26.5
26.51 - 27
27.01 - 27.5
27.51 - 28
Structures
Pump Site
Murray River
Delivery Line
Tracks
Access


Outlet Creek
m AHD
34.25 - 34.5
34.51 - 34.75
34.76 - 35
35.01 - 35.25
35.26 - 35.5
35.51 - 35.75
35.76 - 36
36.01 - 36.25
Murray River
Structures
Pump Site
Access
Delivery Line
Levee
Road Raising
0
0.5
1
2 km

Appendix 2 - Acronyms and abbreviations

Abbreviation	Description
AHD	Australian Height Datum
DEECA	Department of Energy, Environment and Climate Action
EPBC	*Environment Protection and Biodiversity Conservation Act 1999*
EVC	Ecological Vegetation Class
FFG	*Flora and Fauna Guarantee Act 1988*
LMW	Lower Murray Water
LTWP	Long-term Watering Plan
MCMA	Mallee Catchment Management Authority
MDB	Murray-Darling Basin
MDBA	Murray-Darling Basin Authority
MDBC	Murray-Darling Basin Commission
ML	Megalitres
ML/d	Megalitres per day
POE	Probability of Exceedance
VEWH	Victorian Environmental Water Holder
VMFRP	Victorian Murray Floodplain Restoration Project

Appendix 3 - Glossary

Term	Description
Australian Height Datum (AHD)	Height above sea level
Blackwater	A natural occurrence caused by the breakdown of plant matter causing the water to discolour. The water turns black and can have very low levels of dissolved oxygen, which can stress or kill fish and other animals that breathe underwater.
Carryover	Unused water of which entitlement holders are allowed to retain ownership into the following season, according to specified rules.
Consumptive water	Water owned by water corporations or private entitlement holders held in storages and actively released to meet domestic, stock, town and irrigation needs.
Drawdown	Water released from a dam or reservoir at the end of the irrigation season for the purposes of its operation and/or maintenance.
Environmental objectives	Measurable target outcomes for each environmental value in the system, to be achieved by ongoing implementation of one or more watering actions as well as complementary actions (such as controlling invasive species or installing fishways). Target outcomes may take years or several decades to achieve.
Environmental water management plan	A plan developed by a waterway manager setting long-term environmental objectives and based on consultation with key stakeholders, local community and advisory groups to inform the seasonal watering proposal for the particular system.
Expected watering effect	The physical, chemical, biological or behavioural effect expected from a potential environmental watering action. Each potential environmental watering action will have one or more expected watering effects.
Land manager	An agency or authority responsible for conserving natural and cultural heritage on public land including parks and reserves (such as Parks Victoria and DELWP).
Low flow	A relatively stable, sustained and low flow in a river, generally being its minimum natural level.
Megalitre	One million (1,000,000) litres.
Operational release	A release made from a major storage to enable the water distribution system to operate or to make water available to consumptive water users
Potential environmental watering action	An environmental flow component that has been identified for a particular system in a particular year.
Program partners	Are those organisations with a responsibility for delivering some part of the environmental watering program. It includes waterway managers, storage managers, land managers, environmental water holders. In some areas, Traditional Owners, scientists and community members may also be program partners.
Recruitment	The increase in plants or animals when they survive to the settlement or maturity stage.
Seasonal watering plan	The VEWH's annual operational document, that outlines potential environmental watering across the state in the forthcoming water year.

Term	Description
Seasonal watering proposal	This document. An annual proposal outlining the regional priorities for the use of water for the environment in each water year that is submitted by waterway managers to the VEWH for consideration in its seasonal watering plan.
Seasonal watering statement	A statement by the VEWH authorising a CMA to apply or use water from its water for the environment entitlements consistently with the seasonal watering plan.
Shared benefits	The many cultural, economic, recreational, social and Traditional Owner benefits of environmental watering.
Stakeholders	Are those organisations or individuals with a keen interest in the environmental watering program, who are engaged by one of the program partners during planning, delivery or reporting.
Storage manager	An organisation appointed by the Minister for Water to operate major water storages in a particular river basin, to deliver water to entitlement holders
Tier 1	Potential environmental watering actions that are required this year to achieve intended environmental objectives, given current environmental conditions and the planned environmental watering strategies under each climate scenario.
Unregulated or Natural flow	A natural streamflow that cannot be captured in a major reservoir or storage.
Victorian Environmental Water Holder (VEWH)	The independent statutory body responsible for holding and managing Victorian water for the environment entitlements and allocations.
Water Act 1989	The legislation that governs water entitlements and establishes the mechanisms for managing Victoria's water resources.
Water entitlement	The right to a volume of water that can (usually) be stored in reservoirs and taken and used under specific conditions.
Water for the environment	Water available for environmental purposes including entitlements held by the VEWH, passing flows and unregulated flows.
Water year	The same as a financial year: from 1 July to 30 June the next year.
Waterway manager	The agency or authority (such as a CMA or Melbourne Water) responsible for the environmental management of a catchment or waterway.
Waterway or Wetland	A river, wetland, creek, floodplain, estuary or other body of water.

Appendix 4 - Guidance Material

Table 2 Risk likelihood rating table adapted from (DELWP, 2019)

Likelihood		Description	Probability
Almost certain	1	• The event is expected to occur in most circumstances and/or • Risk will occur within the next 6 months/or several times a year and/or • Controls associated with the risk are extremely weak and/or non-existent and without control improvement the risk will eventuate.	75-100
Likely	2	• The event is likely to occur in most circumstances and/or • Risk will occur in the next 12 months/or once or twice a year and/or • The majority of the controls associated with the risk are weak and without control improvement it is likely the risk will eventuate.	50-74
Possible	3	The event might occur and/or • Risk will occur in the next 24 months/or once in two years and/or • Some controls need improvement and if there is no improvement it is possible the risk will eventuate.	25-49
Unlikely	4	• The event could occur at some time and/or • Risk will occur in the next 60 months/or once in five years and/or • Controls environment is strong with few control gaps and requires assurance check to maintain control effectiveness.	0-24

Table 3 Risk Rating matrix (DELWP 2019).

Likelihood		Consequence			
		Minor	Moderate	Major	Extreme
		1	2	3	4
Almost certain	1	Medium (4)	High (8)	Extreme (12)	Extreme (16)
Likely	2	Low (3)	Medium (6)	High (9)	Extreme (12)
Possible	3	Low (2)	Medium (4)	Medium (6)	High (8)
Unlikely	4	Low (1)	Low (2)	Low (3)	Medium (4)

Table 4 Risk consequence (DELWP, 2019)

Rating Risk		Environment	Business Costs	People		Political/ Reputational	Legal	Service Delivery	Cultural Heritage
				Safety and Wellbeing	People and Culture				
Minor	1	• Limited effect on the natural and/or built environment and/or the environment suffers harm for up to 5 years. • Environmental recovery on a minor scale up to 5 years. • Mostly impacts environmental values at a single location in an individual system.	Cost impact on total budget of up to 5%.	• Minor injuries or illness (physical/ mental) requiring first aid or medical attention of staff, visitor, contractor, or member of the public.	• Staff complaints, passively upset, and uncooperative. • 10-15% staff turnover with minor loss of skills, knowledge, and expertise.	• Adverse localised public and political interest. • Limited attention on a single issue in local media over a short period.	Non-compliance with legislation or breach of duty of care, identified externally and either: • resolved internally with no further escalation; or • resulting in minor compensation, and/or negative precedent.	• Minor short-term impact on business unit's delivery of services/functions. • Customers/stakeholders/ communities slightly inconvenienced. • Up to 1 day impact on business unit's critical activities. • Minor impact (up to 10% delay) on project or program milestones.	• Limited potential impact on heritage sites/artefacts • Exposure of previously unknown cultural heritage items
Moderate	2	• Moderate effect on the natural and/or built environment and/or environment suffers harm for 5-10 years. • Environmental recovery on a small scale and/or over a period 5-10 years. • Impacts environmental values at multiple locations in an individual system.	• Cost impact on total budget between 5-10%.	• Significant injury or illness (physical/ mental) requiring inpatient hospitalisation of staff member, visitor, contractor, or member of the public.	• Low morale, disengagement, increased absenteeism, and workplace conflict. • 15-25% staff turnover with loss with resignations of some key staff.	• Adverse localised negative public and political attention. • Short term negative local media attention. • Local community concern on a single issue over a sustained period.	Non-compliance with legislation or breach of duty of care resulting in: • external investigation or report to responsible authority; and/or • prosecution or civil action, with one of moderate level of compensation or moderate level of negative precedent.	• Moderate impact on business unit's delivery of services/functions. • Customers/stakeholders/ communities inconvenienced. • Up to 3 days impact on business unit's critical activities. • Significant impact (10-20% delay) on project or program milestones.	• Moderate potential impact on heritage sites/artefacts • Damage to previously unknown cultural heritage items or values
Major	3	• Major effect on the natural and/or built environment and/or environment suffers harm for 10-20 years. • Environmental recovery on a large scale and/or over a period of 10-20 years. • Impacts regional environmental values or affects connected systems.	• Cost impact on total budget between 10-20%.	• Extensive and/or permanent injury or illness (physical/ mental) of staff member, visitor, contractor, or member of the public.	• Major morale issues, high absenteeism. • 25-50% staff turnover with resignations of key staff. • Staff are not skilled to meet priorities.	• Serious adverse public attention at State/National level. • Negative State/National media on one or more issues over a prolonged period. • Repeated displeasure by the Minister. • Medium-term negative public interest (correspondence and phone calls) and political interest (in Parliament).	Non-compliance with legislation or breach of duty of care resulting in: • external investigation or report to responsible authority; • public inquiry (i.e. Royal Commission/ Parliamentary Committee); • prosecution or civil action with high level compensation and high-level negative precedent; and/or • sanctions imposed by external regulator.	• Ongoing difficulties in delivering the business unit's services/functions. • Major impact on customers/ stakeholders/ communities • Up to 10 days impact on business unit's critical activities • Major impact (20-50% delay) on project or program milestones	• Major potential impact on heritage sites/artefacts • Damage to known cultural heritage items or values

Extreme	4	• Very serious effect on the natural and/or built environment and/or environment suffers long term harm (20+ years). • Environmental recovery on a very large scale and/or over a long period (20+ years). • Impacts environmental values state-wide.	• Cost impact on total budget between >20%.	• Single or multiple deaths or severe permanent disability or illness (physical/mental) of staff, visitor, contractor, or member of the public.	• Organisation wide morale issues and absenteeism. • >50% staff turnover. • Staff are not skilled to meet core corporate outputs.	• Very serious public outcry at State/National level. • Negative State/National media over a prolonged period. • Breakdown of public confidence in the Government / department / Minister or key project/program. • On-going or prolonged negative public interest (correspondence and phone calls) and political interest (in Parliament).	Non-compliance with legislation or breach of duty of care resulting in: • prosecution or civil action leading to imprisonment of an officer; • public inquiry (i.e. Royal Commission/ Parliamentary Committee) • uninsured compensation payments • negative precedent requiring very serious impact and major reform to the department; and/or • severe sanctions imposed by external regulator.	• Long term and severe impact on delivery of services/functions • Severe impact on customers /stakeholders/communities • More than 10 days impact on business unit's critical activities • Vital or very serious delays (>50% delay) to program/project delivery or project/program objective is not met	• Very serious potential impact on heritage sites/artefacts • Destruction of cultural heritage items or values

mallee
catchment management authority

Cnr Koorlong Ave & Eleventh St, Irymple
03 5001 8600 | info@malleecma.com.au
www.malleecma.com.au