Seasonal Watering Proposal



2026-27

Hattah Lakes

mallee
catchment management authority

Document Control

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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.

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Cover image: Regent Parrot nesting near Messengers Regulator, Hattah-Kulkyne National Park

Table of Contents

Figures iii
Tables iii
1 Context 1
2 System Overview 2
3 Traditional Owner Cultural Values and Uses 4
4 Social Recreational and Economic Values and Uses 4
5 Environmental Values and Objectives 8
6 Engagement 10
7 Scope of Environmental Watering 15
8 Scenario Planning 20
9 Risk Management 23
10 Approval, Endorsement and Consent 38
11 References 39
12 Appendices 40
Appendix 1 - Site Map 40
Appendix 2 - Acronyms and abbreviations 42
Appendix 3 - Glossary 42
Appendix 4 - Guidance Material 45

Figures

Figure 2-1: Hattah Lakes 3
Figure 4-1 Word cloud of important community values gathered from engagement events 5
Figure 6-1. Maps at Red Cliffs used to collect community values and uses 11
Figure 7-1. Inundation extent to 42.5 m AHD planned for autumn 2027 17

Tables

Table 4-1 Shared benefit considerations for 2026–27. 6
Table 4.2 Recreational objectives of Hattah Lakes 8
Table 5-1 Environmental objectives of Hattah Lakes 9
Table 6-1 Summary of stakeholder engagement that informed this SWP. 12
Table 7-1: Potential Watering Actions in 2026-27 at Hattah Lakes 17

1 Context

Mallee Catchment Management Authority is pleased to present the final 2026-27 Hattah Lakes Seasonal Watering Proposal (SWP).

This SWP identifies the Mallee Catchment Management Authority's (CMA's) proposed priorities for use of managed environmental water for the Hattah Lakes in 2026-27. Information from this document has informed development of the Seasonal Watering Plan 2026-27, available on the Victorian Environmental Water Holder (VEWH) website from 30 June 2026. 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 Hattah Lakes.

The actions outlined in this proposal are informed by ecological objectives and management goals outlined in the Hattah Environmental Water Management Plan (EWMP). 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). Targeted flora and fauna include inundation-dependent wetland Ecological Vegetation Class (EVCs) and terrestrial vertebrates, as well as a focus on the requirements of waterbirds and frogs, such as 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 with critical needs.

The Hattah Lakes system has been undergoing a planned gradual draw down since the last environmental water delivery in spring 2024. This drying phase has allowed vegetation, particularly in the littoral zone, to grow and set seed. It is expected that all the lakes will be dry or near dry by the end of 2026.

Key areas of the proposal are detailed below:

- Scope of Environmental Watering – To deliver up to 25 GL to the semi-permanent lakes to a height of 42.5 m AHD in autumn 2027.
- Risk Management – This is an important chapter of the proposal and will be based on the outcomes from the 2026 Shared Operational Risk Workshop – in particular the risk management table.

This document has been developed in consultation with Traditional Owner groups, various community groups, Parks Victoria, Goulburn Murray Water (GMW), the Department of Energy, Environment and Climate Action (DEECA) and Victorian Environmental Water Holder (VEWH). We are grateful for their time and input.

2 System Overview

The Hattah-Kulkyne National Park is situated in north-west Victoria, adjacent to the Murray River (Figure 2.1). The national park contains a complex of more than 20 semi-permanent freshwater lakes known collectively as the Hattah Lakes.

The ecology of the Hattah Lakes and the surrounding floodplain is strongly influenced by the flooding regimes of the Murray River. The system fills when there is high flow in the Murray River, and some lakes hold water for several years after floods recede. Regulation of the Murray River has significantly reduced the frequency and duration of small to medium-sized natural floods in the Hattah Lakes system. Over time, this has degraded vegetation communities and reduced the diversity and abundance of animals that use the vegetation and wetlands for habitat and food.

The Hattah Lakes complex can be broadly divided into:

- the southern Hattah Lakes, which contain a variety of semi- permanent and persistent temporary lakes and wetlands, as well as the episodic Lake Kramen and
- the higher-elevation northern Hattah Lakes, which are mostly episodic wetlands and currently cannot receive environmental water via pumping.

The Messenger, Oateys and Cantala regulators allow water to flow between the Murray River and the Hattah Lakes. When the flow in the Murray River is about 26,000 ML per day, water begins to flow through Messengers regulator into Chalka Creek and through the Hattah Lakes complex. A permanent pump station can deliver up to 1,000 ML per day to the southern Hattah Lakes through Chalka Creek. The regulators and pump station are used in combination with several small, constructed levees to deliver a pattern of flooding to the lakes system that is recommended to improve environmental outcomes. Lake Kramen is in the south-east area of Hattah-Kulkyne National Park and is disconnected from the main Hattah Lakes complex. The Hattah Lakes pump station can deliver up to 145 ML per day to Lake Kramen. New infrastructure proposed under the Victorian Murray Floodplain Restoration Project (VMFRP) will allow water to reach additional wetlands and floodplain areas in the northern Hattah Lakes.

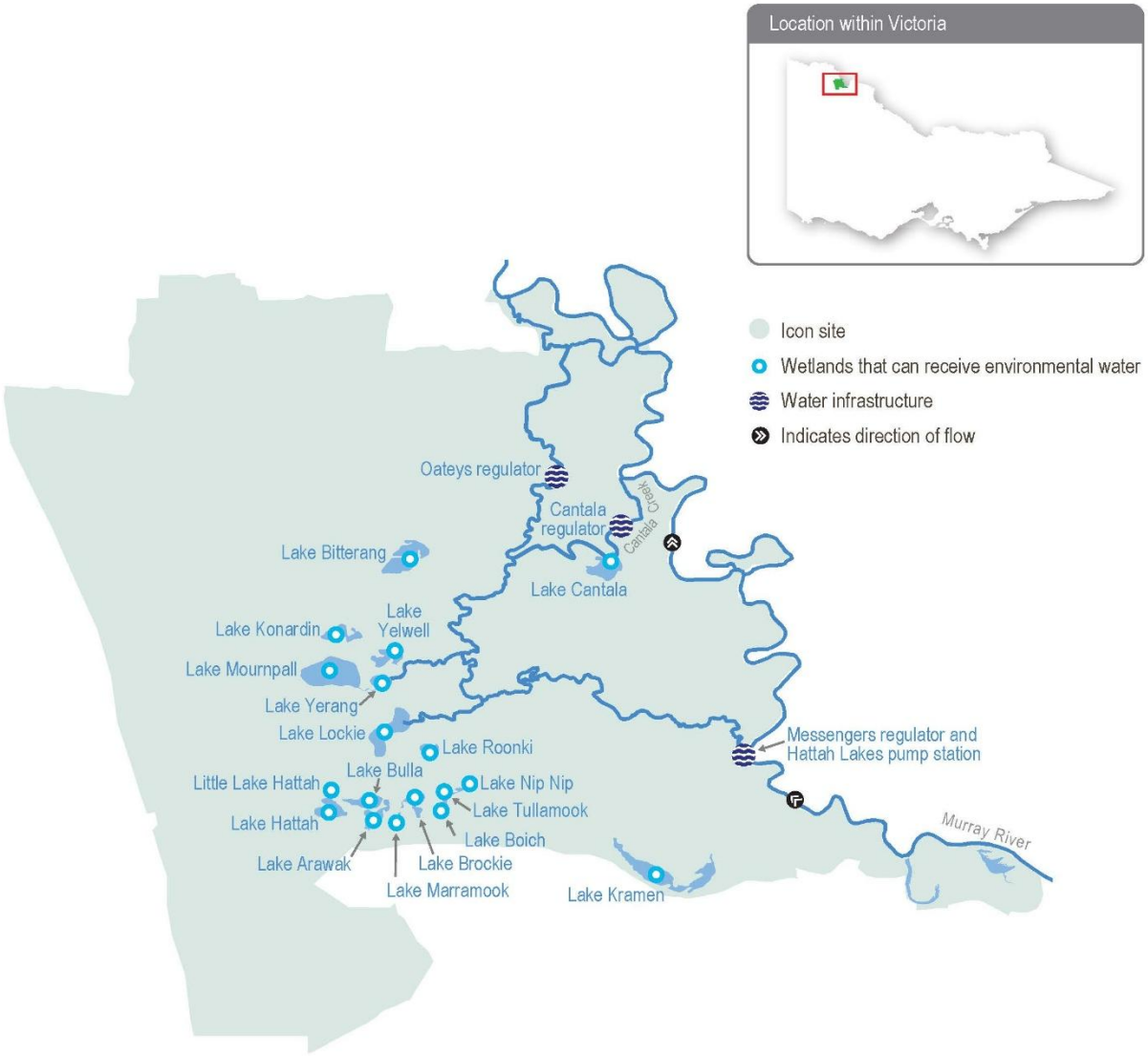


Figure 2-1: Southern Hattah Lakes

3 Traditional Owner Cultural Values and Uses

Located on the border of two documented language groups, Latji Latji and Jari Jari, the Hattah Lakes system is highly significant in terms of Aboriginal cultural values. Key stakeholders with an interest in Hattah Lakes include: Latji Latji, Latji Latji Mumthelang, Tati Tati Kaiejin, Tati Tati Land and Water, Wadi Wadi Land and Water, Murray Valley Aboriginal Corporation, Gilbie Corporation, Dadi Dadi Weki Weki, Culpra Milli, Nyeri Nyeri and Munatunga Elders.

More than 1,000 archaeological sites at Hattah Lakes are registered on the Aboriginal Cultural Heritage Register and Information System. Freshwater lakes and wetlands provide focal points for trade and cultural exchanges among the region's Traditional Owners. Local Aboriginal communities maintain strong connections to the land and its resources, including the use of native species for food and medicinal purposes.

Mallee CMA held environmental water planning sessions with Traditional Owners from September 2025 to February 2026. Engagement events were held with Pearce Family, Munatunga Elders, Gilbie Corporation and Latji Latji. At each event, Mallee CMA staff were able to express the immense value Traditional Owner input brought to the 2025-26 environmental water program.

During September/October, an overview of the spring environmental water plan was provided to Traditional Owners, along with a proposal to allow the lakes to draw down throughout 2025-26 to benefit various grasses, herbs, birds and animals, whilst removing carp.

Table 3-1: Cultural objectives relevant to the Hattah Lakes.

	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, Mallee CMA considered how environmental flows could support values and uses, including:

- water-based recreation (such as fishing, kayaking and swimming)
- riverside recreation and amenity (such as birdwatching, camping, photography and walking)
- community events and tourism (educational opportunities, including bushwalking, birdwatching and bug hunting; school educational excursions; and tours involving kayaking, bike riding and camping)
- socioeconomic benefits (such as commercial beekeepers who rest bees away from horticultural orchards in native flowering trees around the lakes, multiple ecotourism operators who benefit directly when the lakes contain water, social gatherings and wellbeing outcomes generated by connecting with nature).

The Hattah Lakes system is a high-profile tourism destination, providing important recreation, amenity and cultural opportunities for tourists and local community members. It is a destination that is both recommended and promoted at the Mildura Information Centre, on the 'Visit Mildura' website and through Parks Victoria, the land manager. Shared benefit considerations for the 2026-

27 season are presented in Table 4.1.

The condition of the Hattah Lakes directly affects social and economic outcomes for businesses, residents and visitors alike. When environmental conditions deteriorate, as they did during the millennium drought, the values for community deteriorated. Recreation and tourism-based industries suffer as visitor numbers drop, while amenity and other social and cultural values derived from the Hattah Lakes decline. The improvement in environmental conditions, through delivery of environmental water outside times of natural flooding, has a positive relationship on improved social and economic outcomes. Specifically, this creates improved amenity and recreational opportunities, as well as job and income growth in the tourism sector.

Feedback regarding the social and recreational values of Hattah Lakes clearly indicates it is valued by community members as a site where they can connect with nature and, as such, is important to health and wellbeing. Through conversations with Mallee CMA staff members and via formal surveys, it is evident community members appreciate and seek opportunities to be closer to nature through activities at Hattah Lakes such as kayaking, walking, bird watching, fishing and social gatherings. These values are illustrated below in word clouds, where the higher frequency words are larger in size than those less used (Figure 4-1). These word clouds provide an "at-a-glance" insight into community values of the site. Additional evidence of the recreational values of Hattah Lakes can be found on social media posts from local special interest clubs including Mildura Birdlife, Sunraysia Bushwalkers, and Sunraysia Inspired Photographers.

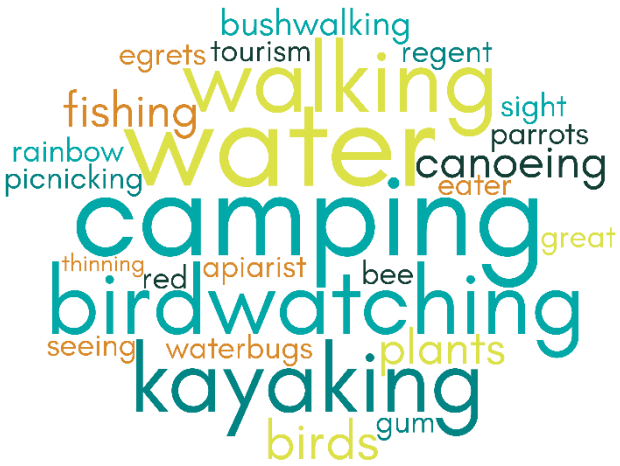


Figure 4-1 Word cloud of important community values gathered from engagement events

From an economic point of view, Hattah Lakes is also valued by many businesses and organisations.

Hattah Lakes is located close to significant almond plantings along the Murray River in Sunraysia, Victoria. More than half of all almonds grown in Australia each year are grown in Sunraysia, with almonds now Australia's most valuable horticultural export, bringing in more than $750 million worth of export revenue in 2022-23 alone (Hort Innovation, 2023). Each year, almond producers rely on bees to pollinate their orchards, with hundreds of hives moved into the region during August/September. Almond trees are not wind-pollinated easily, so bees are required to pollinate and produce nuts efficiently. Prior to the bees commencing their pollination services, apiarists

often choose to "rest" their bees at Hattah Lakes (subject to agreement with Parks Victoria), where water and food sources are readily available. Delivery of environmental water to the site promotes flowering of floodplain trees and supports growth of understorey vegetation, which helps maintain and improve the health of bees, ensuring they are in top condition for pollinating local horticultural orchards.

Hattah Lakes is also important to local businesses that benefit from national and international tourism (e.g. local accommodation providers and hospitality venues in nearby towns). After delivery of environmental water to the lakes in 2021 following a drying event, Parks Victoria recorded a noticeable increase in visitors using the park. Similarly, the nearby general store experienced a significant increase in business during periods of water delivery and when the lakes contain water. Additionally, local ecotourism operators, such as Mallee Tours, Wildside Adventure and Murray Off-road Adventures benefit from water within the Hattah Lakes, with operators reporting an increase in bookings when water is in the lakes.

Hattah Lakes is also highly patronised by schools; providing an opportunity for students to immerse themselves in wetland topics, develop field assessment skills and grow an appreciation of the importance of wetlands and environmental watering. Schools from as far away as metropolitan Melbourne frequent the Hattah Lakes to support various components of their curriculum. The Mallee CMA regularly receives positive feedback from local schools relating to the value that students gain as a result of these educational excursions to the Hattah Lakes.

Table 4-1 Shared benefit considerations for 2026-27.

Beneficiary	Connection to the waterway	Values/ Uses/ Objectives/ Opportunities	How have these benefits been considered?
Apiarists	Local apiarists have a licence to use Hattah-Kulkyne National Park for their bee hives. The availability of water in the lakes and flowering floodplain trees and vegetation helps to improve the health of bees prior to pollination of almond trees and other horticultural crops.	Commercial enterprise	Simulating the natural water cycle of the lakes and implementing a drawdown benefits vegetation outcomes, which support flower production providing abundant resources for bees.
Bird observers	Hattah Lakes is a popular location for both local community and visitors to undertake bird watching. A search on social media will show numerous posts from bird watchers visiting the Hattah Lakes.	Recreation opportunities	Delivering environmental water to the semi-permanent lakes will provide a mosaic of habitat for waterbirds which will provide opportunities for people to undertake bird watching.
Campers	Water draws people to sites. Increasing the quality and beauty of a region draws tourists to the area.	Recreation Fishing Birdwatching Photography Bushwalking	Water attracts people. Campers, given the option, will generally prefer setting up at a site close to water. Delivering water in autumn 2027 will provide water at popular campgrounds.
Traditional Owners and Aboriginal	Water improves the environment and attracts bird life and animals. It is also	Culturally significant plants	Water is spiritual to Aboriginal people and important for the land. Traditional Owners and

Beneficiary	Connection to the waterway	Values/ Uses/ Objectives/ Opportunities	How have these benefits been considered?
community members	spiritual and gives Aboriginal people a sense of belonging to be on country.	Water is spiritual and important for the land Meeting place for Traditional Owners, Elders and Aboriginal community	Elders have been involved in the seasonal watering proposal planning and understand the importance of implementing a drawdown cycle. Traditional Owners and Aboriginal community members enjoy coming out on Country and experiencing the benefits of water and drawdown such as attracting birdlife and animals
Local business operators	Businesses such as retail and hospitality benefit from increased tourism. Local ecotourism companies take visitors and community on tours through the Hattah-Kulkyne National Park and participate in a range of recreational activities.	Local employment opportunities Retaining money in local communities Support local industry/business	The delivery of environmental water attracts tourism and encourages locals to undertake recreation pursuits across these areas. This relates to increased patronage at near-by hospitality and accommodation facilities and directly relates to increased eco-tourism opportunities.
Researchers	Studying the wetland, floodplain and rivers during different stages (wet, dry, during drawdown), increases understanding of the natural environment and the requirements of the flora, fauna and processes that reside across these habitats.	Condition monitoring and 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 is supported by projects which will better inform future management of the region. Condition and Intervention Monitoring projects through The Living Murray program are conducted at the site annually.
School students	Schools from across Victoria use the Hattah Lakes as a focus for components of their curriculum. This includes hiking/camping trips and studies.	Natural resource education (e.g. food webs, effects of flooding, water uses). Recreation/outdoor education (e.g. School camps). Connection with country and indigenous/cultural education.	Through planned water delivery, the environmental benefits and values of the site is maintained, making it an appealing site for school trips and education-based activities. The 'Hattah Lakes Wildlife Detective Book' was developed by Mallee CMA as a tool for primary school students to learn about the ecosystem and cultural values of the site.

Beneficiary	Connection to the waterway	Values/ Uses/ Objectives/ Opportunities	How have these benefits been considered?
Tourists	Increasing the quality and beauty of a water dependant (Floodplain/wetlands) region through application of water draws tourists to the area. The local tourism industry and businesses such as accommodation and hospitality benefits as a result of increased tourism. Hattah Lakes is a popular location as it provides a high value site for camping, fishing, swimming, photography and bush walking.	Recreation opportunities Tour operators	Community consultation and engagement is regularly undertaken as part of the environmental water delivery program. Community members and visitors are considered in water delivery planning with site access being maintained where possible and information being communicated.

Table 4.2 Recreational objectives of Hattah Lakes

	Environmental watering will also support water sports activities (e.g. canoeing, kayaking, rowing, swimming, water skiing)
	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

Hattah Lakes is home to a diverse range of flood-dependent vegetation that changes with the topography of the landscape. Vegetation types range from wetland communities in low-lying areas that require almost annual flooding to lignum and black box communities situated higher on the floodplain that only need flooding once every four to five years (on average).

A combination of natural flooding and the delivery of environmental flows since 2010 has improved tree canopy health and recruitment of black box and river red gum communities throughout the Hattah Lakes. Woodland birds, including the endangered regent parrot, have benefitted from improved tree health. Maintaining an ecologically diverse and healthy littoral zone requires variation in wetland water depth. Receding lakes allow germination of seed and improves resilience of plant communities in this zone. The littoral zone also provides feeding opportunities for birds including mudflat habitat for shorebirds.

Hattah Lakes also provides important waterbird breeding sites in an arid landscape. A total of 34 species of waterbird are known to breed at the lakes when conditions are suitable. Another six species of waterbird breed in the surrounding floodplain.

Wetland drought refuge sites are limited in the region, making the Hattah Lakes critically important for water-dependent flora, waterbirds and terrestrial animals during dry periods.

The Hattah Lakes support large-bodied native fish species (such as golden perch) and small-bodied

wetland species (such as carp gudgeon). Fish move between the lakes and the Murray River when the flow is suitable. They also persist in wetlands that retain water in the Hattah Lakes during dry years before re-dispersing during floods. Table 5-1 details the environmental objectives as outlined in the Hattah Lakes Environmental Water Management Plan.

Table 5-1 Environmental objectives of Hattah Lakes

Seasonal Watering Plan Environmental objectives in the Hattah Lakes	Environmental Water Management Plan Objectives
A1 - Maintain populations of frogs	
F1 - Maintain populations of small-bodied and large-bodied native fish at the Hattah Lakes	HL9 - Maintain recruitment of populations of small-bodied native fish and presence of large-bodied native fish at Hattah Lakes by 2030.
 CN1 - By 2030, improve the function of water-dependent ecosystems by improving productivity linkages between the river and floodplain/wetland habitats	HL1 - By 2030, maintain a diversity of freshwater ecosystem types within the Hattah Lakes Icon Site, including semi-permanent lakes, persistent temporary wetlands, floodplain woodlands, shrublands, and episodic wetlands (Lake Kramen). HL2 - By 2030, maintain the ecological character of the Hattah-Kulkyne Lakes Ramsar site.
 V1 - By 2030, improve the richness of species and the abundance of native water-dependent floodplain and wetland aquatic vegetation V2 - By 2030, maintain the extent and improve the condition of river red gum, black box and lignum, compared to 2006 baseline levels	HL3 - Improve species richness and abundance of native water-dependent floodplain and wetland aquatic vegetation at the Hattah Lakes Icon Site by 2030. HL4 - Improve condition and maintain extent from baseline (2006) levels of river red gum (*Eucalyptus camaldulensis*), black box (*E. largiflorens*) and lignum (*Duma florulenta*) to sustain communities and processes typical of such communities at the Hattah Lakes Icon Site by 2030.
 B1 - Maintain the regional waterbird population by providing conditions for breeding and fledging at least three times every 10 years B2 - Maintain the regional waterbird population by providing refuge during droughts	HL7 – By 2030, maintain or improve biodiversity at Hattah Lakes by ensuring that feeding habitat for the dominant guilds of waterbirds, most notably waterfowl, herbivores and piscivores, are supported. HL8 – By 2030, protect and restore ecosystem functions of water-dependent ecosystems that support successful colonial nesting waterbird species at Hattah Lakes by providing conditions for breeding and fledging at least three times every 10 years. HL6 - Provide refugia to support the long-term survival and resilience of waterbirds, including during drought, to allow for subsequent re-colonisation beyond Hattah Lakes by 2030.

G1 - Maintain a variety of freshwater ecosystem types within the Hattah Lakes icon site, including semi-permanent lakes, persistent temporary wetlands, floodplain woodlands, shrublands and episodic wetlands	HL1 - By 2030, maintain a diversity of freshwater ecosystem types within the Hattah Lakes Icon Site, including semi-permanent lakes, persistent temporary wetlands, floodplain woodlands, shrublands, and episodic wetlands (Lake Kramen).

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 2026/27 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 2025 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 a variation of the previous year's 'Pins in Maps' activity. Participants were asked to point out places on a map to represent their values/uses at the various wetlands. A Mallee CMA staff member would then write on the maps. 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 map activity proved to be an engaging tool to initiate place-based conversations about environmental water.



Figure 6-1. Maps at Red Cliffs monthly market 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 2026-27. 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 Hattah • Meeting with Traditional Owners to discuss SWP for 2026/27 (11/2/2026, 13/2/2026 and 18/2/2026.),	Allow Traditional Owners, Elders and Aboriginal community members 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	Mallee CMA Aboriginal Reference Group	Consult	• Presentation and discussion of proposed watering sites 04/02/2026)	Discussion with the Committee as to the extent and location of proposed watering sites for the coming year and answer any questions.
	Wider community	Inform Consult	• Online – web based and social media • Attendance at Red Cliffs Market (01/2/2026) and Robinvale Market (8/2/2026) to talk with community about SWPs, including the Hattah Lakes.	To engage with local community about environmental watering at Hattah to gain an understanding of important wetland values and uses. Using 'pins in maps' to gather data on what activities community undertake at the Hattah Lakes or activity aspirations. All of which helped inform the preparation of the Hattah SWP.
	Mallee CMA Land and Water Advisory Committee	Consult	• Presentation and discussion of proposed actions (12/03/2026)	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	

Government agencies	Parks Victoria (PV)	Collaborate	• Mallee CMA meets monthly with PV • Annual risk assessment workshop, including discussion of proposed sites (4/02/2026) • Presentation of proposed drying phase for Hattah at Hattah Ramsar group meeting	Discussion with key local Parks Victoria (PV) Staff regarding the planned drying phase for Hattah Lakes; advice regarding park usage and practical logistics.
	Victorian Environmental Water Holder (VEWH)	Collaborate	• Discussion of SWP guidelines (15/1/2026) • Annual risk assessment workshop, including discussion of proposed sites (4/2/2026). • Ongoing discussion as planning progresses.	Ongoing planning and consultation with input from VEWH regarding water availability, current and forecast water conditions, risk planning and feasibility.
	Murray-Darling Basin Authority (MDBA)	Inform	• Presentation of sites at TLM icon site Managers Forum (10/2/2026)	Share planning and provide opportunity for feedback and comment regarding any operation and/or on-ground works currently or planned to be undertaken over the coming year. Opportunities to coordinate with adjacent icon site managers.
	Goulburn Murray Water	Consult	• Annual risk assessment workshop, including discussion of proposed sites (4/2/2026).	Share planning and provide opportunity for feedback and comment regarding any operation and/or on-ground works currently or planned to be undertaken over the coming year.
	Commonwealth Environmental Water Holder (CEWH)	Inform	• Annual risk assessment workshop (4/2/2026)	
	Department of Energy, Environment and Climate Action (DEECA)	Inform	• Presentation of sites at TLM icon site Managers Forum (10/2/2026)	
	Mildura Rural City Council	Inform	• Regular formal and informal conversations through various meetings and face-to-face	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.

			interactions.	
Landholders/farmers	Neighbouring Landholders	Inform	• Fact sheet / website information	To inform the community of the development of the plan and how input can be provided to Mallee CMA.
Local businesses and tourism operators	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 Hattah Lakes 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 Hattah Lakes and provide opportunity to provide feedback.

7 Scope of Environmental Watering

The process for the extent of watering of the Hattah Lakes in this 2026-27 SWP has considered a number of factors. Primary considerations were:

- the current condition of the site, with respect to the current hydrological state of individual wetlands within the Hattah Lakes,
- the ecological values present and
- the expected condition (under pre-regulation watering conditions).

The process also included an assessment of the site's Environmental Objectives and a comparison of actual watering regimes to recommended optimal watering regimes at each wetland within the system. Much of this required information is identified in Hattah Lakes Environmental Water Management Plans (EWMP). The Environmental Objectives used for 2026/27 were updated late in 2020.

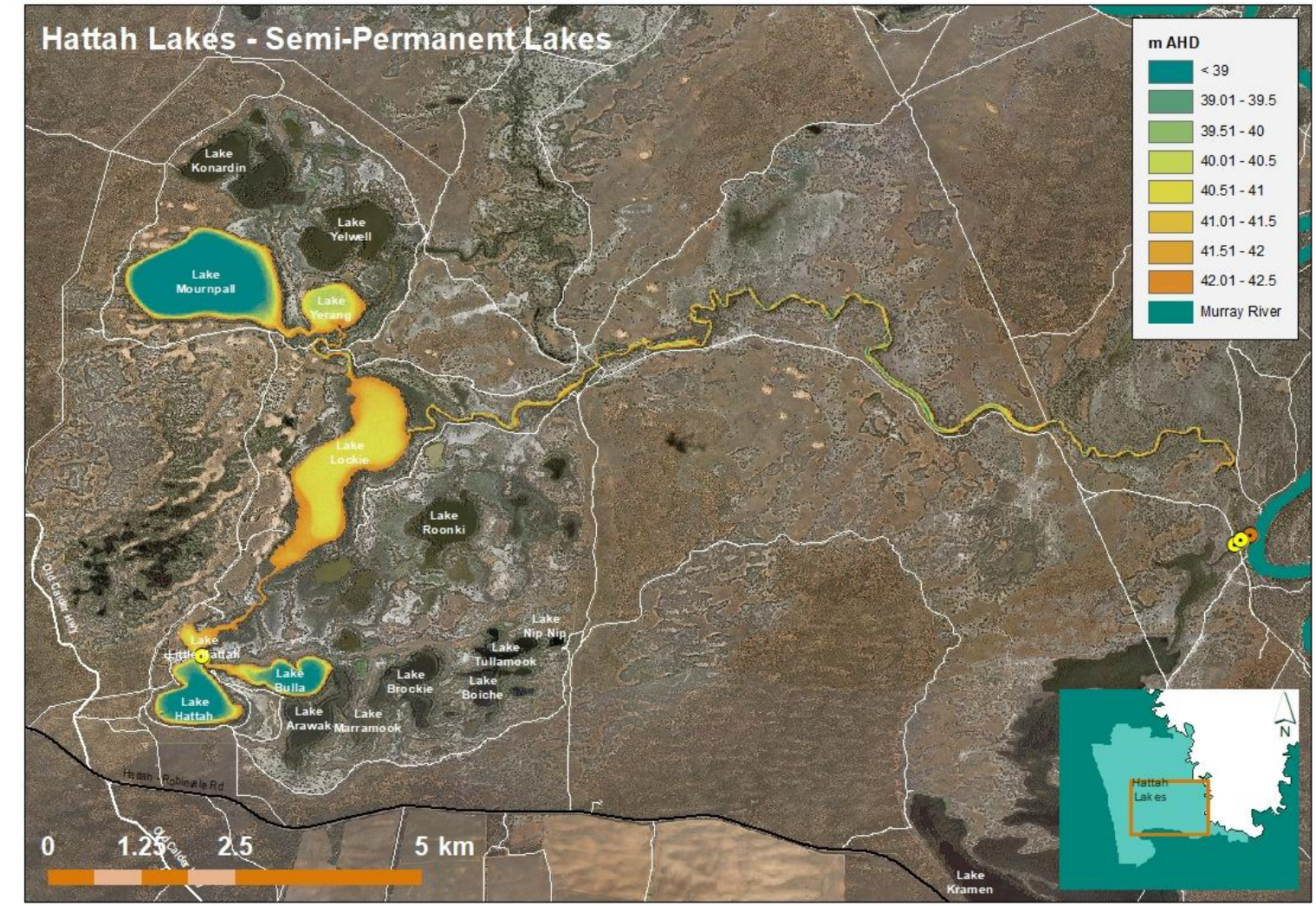
From 2020-2024, the Hattah Lakes have received inundation by either natural high river flows or environmental water via pumping infrastructure. During 2025-26 the Hattah Lakes entered into a drying phase to support plants on the lower terraces which may not have the opportunity to germinate and grow, or had been drowned by the inundation prior to setting seed. The drying phase allows vegetation, particularly on the littoral zone to grow and set seed, assisting in establishing lakebed herbland. In addition, any plants that require drier soil conditions will have the opportunity to germinate.

Continuing to dry the lakes during spring 2026 also assists in the management of non-native species of fish, particularly carp. Restoration of the wetlands and floodplain involves managing processes that minimise threats on the floodplain. In the Hattah Lakes, carp have been identified an important contributor to slowing the recovery process in wetlands. Delivering in late autumn will allow aquatic macrophytes to establish in the base of the lakes with a reduced grazing pressure from carp, as they are less active over the autumn/winter periods, and less likely to be dispersed in large numbers into the lakes via pumping.

Reduced temperatures during the initial filling also minimises the risk of hypoxic blackwater forming due to allochthonous carbon accumulation which will have occurred in the lakes which have now been dry for some years, due to lower microbial respiration rates when the temperatures are lower.

In most scenarios, environmental water is planned to be delivered to the semi-permanent lakes including Lakes Lockie, Little Hattah, Hattah, Bulla, Yerang and Mournpall in autumn 2027 and will target a height of 42.5 m AHD. Figure 7.1 details the proposed inundation extent for environmental water delivery.

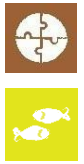
In addition to current environmental condition and long-term objectives, community and Aboriginal objectives are also considered. This information has been received from a wide range of community and stakeholders including landholders and land managers, recreational and special interest groups and Traditional Owners. Actions proposed for 2026-27 will require the operation of the permanent pumping infrastructure located at Messengers regulator at the Chalka creek inlet. The planned watering event will prime the semi-permanent lakes for a potential larger delivery targeting up to 43.5 m AHD, which will require up to 46 GL in 2027-28.

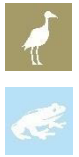


7-1 Figure Inundation extent to 42.5 m AHD planned for autumn 2027

Table 7-1: Potential Watering Actions in 2026-27 at Hattah Lakes

Wetlands	Potential environmental watering action	Climatic scenario/s	Expected watering effects	Rationale	Environmental objectives	VEWH objectives
Hattah Semi-Permanent Lakes (Lockie, Little Hattah, Hattah, Bulla, Yerang and Mournpall).	Fill southern lakes to 42.5 m AHD during late autumn-winter through delivery of up to 25,000 ML.	Dry Average Wet	• Maintain water in semi-permanent wetlands (Lakes Lockie, Hattah, Little Hattah, Bulla, Yerang and Mournpall). • Provide soil moisture to improve condition of riparian vegetation, specifically river red gum. • Provide shallow-water habitat to provide refuge and feeding habitat for wetland-dependant species including frogs and water birds. • Stimulate the release of carbon and nutrients to increase productivity of the floodplain food webs. • Increase wetland productivity. • Stimulate new growth of aquatic vegetation • Provide a diversity of habitat across the Hattah lakes system through provision of a variety of water levels across the lakes.	This delivery, after allowing over a year of drawdown, will build on positive environmental gains achieved following delivery and flood in the previous years, particularly for the southern lakes. Filling the southern lakes will result in a mosaic of habitats across the Hattah system as the northern lakes continue to drawdown and dry. This will support a much more diverse range of flora and fauna species across the icon site. It also supports and aligns with our long-term goals of wide scale condition improvement across the site for vegetation actioned through larger deliveries that would be less feasible without smaller scale deliveries. An autumn delivery will help improve the productivity of wetlands through the inundation of dried sediments and the activation of carbon and nutrients into the water column to support food webs of fish, frogs and waterbirds that have been in high numbers post-flooding. The shallower lakes that will have dried by spring will have time to establish presence of flora and fauna prior to spring. Seasonal spring cues rely on plants and animals being present in the system to be able to respond to the new spring flush entering the system. Small-bodied fish populations will be supported through spring watering in the	HL1, HL2, HL4, HL3, HL6, HL8,	

				southern lakes though provision of increased and improved access to habitat. This will support continuation of successful annual breeding and development of a strong fish community following two years of flooding.		
All Hattah Lakes (except Lake Kramen)	Open all structures to allow natural flow to enter lakes.	Wet	As above plus: • Provide natural connection between Hattah Lakes wetlands and floodplain to allow the exchange of nutrients, carbon, fish and propagules between the floodplain and the Murray River system. • Stimulate the growth and improve the condition of river red gums that fringe wetlands • Stimulate new growth of aquatic vegetation • Inundate dry areas of wetlands to release carbon and nutrients to increase food web productivity • Inundate a variety of types of wetlands at different elevations across the Hattah Lakes to increase habitat diversity	In addition to the above rational, natural connection is the pinnacle of wetland management. Where possible, disruption of natural flow should be avoided. Under natural conditions, cues for native flora and fauna are much stronger and greater environmental benefits can be achieved on a much broader scale. Where natural connection does not achieve the maximum desired hydrological and environmental outcome (as per an Average scenario), Hattah regulators are to be shut, and additional water delivered through the Messengers pumps. Delivery should target 42.5 m AHD in the southern lakes as planned under the Average and Dry scenarios.	HL1, HL2, HL4, HL3, HL6, HL8, HL9	
Hattah Lakes	Drawdown	Drought	• Provide conditions for lakebed herbland to establish during drawdown.	Drawdown will see a progression of water dependant vegetation species establish on the exposed mud and as the exposed soil	HL1, HL2, HL3, HL6	

			• Provide shallow-water habitat to provide refuge and feeding habitat for wetland-dependant species including frogs and water birds.	dries. This will allow for seeds to set and replenish the soil seedbank ready for future inundation and drawdown events. Shallower water levels across a number of lakes will see the composition of waterbird shift, providing more favourable conditions for wading and shorebird species		

8 Scenario Planning

Scenario planning and prioritisation for 2026-27 for the Hattah Lakes is being heavily influenced by a number of critical factors. Foremost is the consideration of the current environmental condition of the landscape. The decision to dry down the lakes in 2025-26 followed five consecutive years of receiving inundation. This now provides opportunity to allow plants to germinate, grow and set seed for assisting to establish lakebed herbland. The regular connection and disconnection of creeks, wetland and floodplains allows for essential nutrient cycling and exchange of minerals and sediments.

The influence of local weather on water scenario planning and flow triggers is very low across the Hattah Lakes. Local water availability is highly dependent on conditions experienced in the upper catchments, the resulting in-flow and flow in the adjacent River Murray. 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 Islands. 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 region comes from upstream storages, there is some ability to predict water availability locally at the Hattah Lakes. Included in consideration is carryover water, forecasting and inflows. Carryover is particularly important to consider for early year demands (i.e. early spring) which will be required for planned delivery in 2027-28. The availability of high river flow, and unregulated flows in the River Murray passing the Hattah Lakes site also ensures higher confidence in water availability for delivery and increases the likelihood of following a higher usage water scenario.

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.

Under a Drought scenario, no water will be delivered to the Hattah Lakes. The lakes will continue to draw down, with a number of shallow lakes drying during the year. The flooding in Summer 2022/23 and August 2023 and ability of many of the lakes to retain water over a number of years means that critical habitat will be maintained for 2026-27.

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

Under a Dry scenario, environmental water delivery will look to continue to build resilience and maintain key functions of wetlands across Hattah Lakes. This will be achieved through delivery of up to 25,000 ML of water during autumn to top up the southern semi-permanent lakes (Lakes Lockie, Hattah, Little

Hattah, Bulla, Yerang and Mournpall), targeting a retention level of 42.5 m AHD. This will build on positive environmental gains achieved following natural inundation in the previous couple of years and help create a mosaic of diverse habitats across the landscape.

Lake Kramen will remain dry in 2026-27 following natural flooding in summer 2022-23 and in line with long-term planning.

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 '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
- Support connectivity between sites

Actions under an average scenario will be the same as under a dry scenario. Delivery of up to 25,000 ML of water targeting a retention level of 42.5m AHD in the southern semi-permanent lakes.

Lake Kramen will continue to draw down in 2026-27 following natural flooding in summer 2022-23 and in line with long-term planning.

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

During a Wet scenario, all regulating structures will be open to allow unimpeded flow of the high river. This will be enacted in the event where water level on the Murray River side of regulating structures exceeds that of the water level on the lakes side (if any).

Table 8-1: Proposed draw down actions for the Hattah Lakes under each climatic scenario for 2025-26

Planning scenario	Drought	Dry	Average	Wet
Expected conditions	• Year-round low flow in the Murray River and no natural inflow to the Hattah Lakes; substantial wetland drying will occur	• Rare high-flow events in the Murray River and no natural inflow to the Hattah Lakes	• Short periods of high flow in the Murray River with minor spills from storages, most likely in late winter/ spring, providing minor natural inflow to the Hattah Lakes	• Lengthy periods of high flow in the Murray River with major spills from storages resulting in widespread inundation of the Hattah Lakes and floodplain
Hattah Lakes				
Potential environmental watering – tier 1 (high priorities)	Tier 1a (can be achieved with predicted supply)			
	No action	Deliver up to 25 GL. Provide water to maintain critical wetlands habitat. This will include Lake Hattah, Lake Little Hattah, Lake Mournpall and Lake Lockie.	Deliver up to 25 GL. Provide water to maintain critical wetlands habitat. This will include Lake Hattah, Lake Little Hattah, Lake Mournpall and Lake Lockie.	All structures will be opened to allow natural flow to enter. Deliver up to 25 GL Provide water to maintain critical wetlands habitat if target height of 42.5 m AHD is not met with natural flows. This will include Lake Hattah, Lake Little Hattah, Lake Mournpall and Lake Lockie.
Possible volume of water for the environment required to achieve objectives	No delivery	• 25 GL	• 25 GL	• 25 GL
Priority carryover requirements for 2025-26	• Depending upon seasonal conditions, up to 46 GL of water could be required to fill the semi-permanent Hattah Lakes in spring 2027.			

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 Hattah Lakes for 2026-27

Risk category	Risk description	Pre-Mitigation Risk			Mitigation actions	Lead organisn. 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	Other environmental water managers' competing priorities and objectives may limit the ability to achieve intended objectives. 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

Risk category	Risk description	Pre-Mitigation Risk			Mitigation actions	Lead organisn. for action	Residual Risk Rating	Risk type Static/ Dynamic
		Likelihood	Consequence	Risk Rating				
Environment	Maintenance activities by the storage operator or constructing authority affect the ability to deliver water to sites. - Hattah assessment - flood damages have been addressed to enable 2024 -25 planned actions	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 GMW MCMA	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 including coordinating on ground implementation with partners where appropriate and communication of planned events, access closures and alternative recreational opportunities *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.	MCMA Parks Vic MCMA	Low	Static

Risk category	Risk description	Pre-Mitigation Risk			Mitigation actions	Lead organisn. for action	Residual Risk Rating	Risk type Static/ Dynamic
		Likelihood	Consequence	Risk Rating				
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).	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
Business Costs	Park visitor vehicles or environmental watering operational staff 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) including coordinating on ground implementation with partners where appropriate • 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. • Ensure watering operators only access areas when tracks are dry and accessible to minimise damage • Land managers to advise CMA if access issues arise, to allow adjustments to watering action planning **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 MCMA Land manager Land manager MCMA 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, resulting in claims for damages.	Possible	Minor	Low	• Communication and advice to commercial operators to alert them of environmental watering, via Land Manager as licensing authority.	MCMA	Low	Static

Risk category	Risk description	Pre-Mitigation Risk			Mitigation actions	Lead organisn. for action	Residual Risk Rating	Risk type Static/ Dynamic
		Likelihood	Consequence	Risk Rating				
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 •Post estimated usage to water register during or immediately after delivery and adjust for actuals as soon as possible.	VEWH MCMA GMW	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	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 • Investigate and implement permanent infrastructure to avoid pumping costs where feasible Prioritise funding and site selection in line with available resources. Undertake preliminary assessment of costs during development of proposals and scoping of the plan.	MCMA VEWH MCMA	Low	Static

Risk category	Risk description	Pre-Mitigation Risk			Mitigation actions	Lead organisn. for action	Residual Risk Rating	Risk type Static/ Dynamic
		Likelihood	Consequence	Risk Rating				
	would be result of poor planning so treatment is still at the planning stage and is a program wide risk and treatment.							
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 Traditional Owner'sTime 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. • Seek support from DEECA and FPSR (in DPC) to expedite approvals process. *Note: potential future recognition of joint management arrangements with Traditional Owners may see a need for provision of funding.*	MCMA MCMA VEWH	Low	Dynamic

Risk category	Risk description	Pre-Mitigation Risk			Mitigation actions	Lead organisn. for action	Residual Risk Rating	Risk type Static/ Dynamic
		Likelihood	Consequence	Risk Rating				
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. • Share latest site survey information on cultural heritage information with CMA to assist with planning water 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	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	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.	MCMA / Asset Owner	Low	Dynamic

Risk category	Risk description	Pre-Mitigation Risk			Mitigation actions	Lead organisn. for action	Residual Risk Rating	Risk type Static/ Dynamic
		Likelihood	Consequence	Risk Rating				
	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				• 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.*	VEWH/ GMW		
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*	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

Risk category	Risk description	Pre-Mitigation Risk			Mitigation actions	Lead organisn. for action	Residual Risk Rating	Risk type Static/ Dynamic
		Likelihood	Consequence	Risk Rating				
	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.							
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

Risk category	Risk description	Pre-Mitigation Risk			Mitigation actions	Lead organisn. for action	Residual Risk Rating	Risk type Static/ Dynamic
		Likelihood	Consequence	Risk Rating				
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
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

Risk category	Risk description	Pre-Mitigation Risk			Mitigation actions	Lead organisn. for action	Residual Risk Rating	Risk type Static/ Dynamic
		Likelihood	Consequence	Risk Rating				
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
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 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*	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 resources and ensure key actions are delivered. • Reallocation of tasks and available funding.	MCMA MCMA MCMA	Medium	Dynamic

Risk category	Risk description	Pre-Mitigation Risk			Mitigation actions	Lead organisn. for action	Residual Risk Rating	Risk type Static/ Dynamic
		Likelihood	Consequence	Risk Rating				
	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*							
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.*	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

Risk category	Risk description	Pre-Mitigation Risk			Mitigation actions	Lead organisn. for action	Residual Risk Rating	Risk type Static/ Dynamic
		Likelihood	Consequence	Risk Rating				
	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*							
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
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.	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	DEECA MCMA or Land Manager	Low	Static

Risk category	Risk description	Pre-Mitigation Risk			Mitigation actions	Lead organisn. for action	Residual Risk Rating	Risk type Static/ Dynamic
		Likelihood	Consequence	Risk Rating				
	Note: The likelihood of this risk increases when a sequence of dry years concentrate pest animal on environmental watering sites. Risk requires inclusion and tailoring in DPs - but only where active management required at individual site (specific site based mitigation actions need to be specified in DP)				partners. • Implement pest reduction efforts prior to delivery of water, to ensure increases in populations remain within "tolerable" levels *Note that insufficient resources are likely to limit the land manager's ability to perform these actions. Increased resources may reduce the likelihood of the risk occurring. - effectiveness of these mitigation may be limited in these circumstances* *Note: residual risk based on expected incremental contribution of env. water deliveries in 26-27 conditions. Watering decisions need to balance impacts of not watering assets vs potential pest plant/animal risks*			
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.	Possible	Moderate	Medium	• Coordination and advice PV on proposed delivery sites. • Repair track damage, including targeted fixes	MCMA PV	Low	Static

Risk category	Risk description	Pre-Mitigation Risk			Mitigation actions	Lead organisn. for action	Residual Risk Rating	Risk type Static/ Dynamic
		Likelihood	Consequence	Risk Rating				
	Risk requires inclusion and tailoring in DPs where these scenarios expected							
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. • Tailor messaging for 24-25 to explain why watering after floods is positive	MCMA MCMA Land mgr or MCMA All	Low	Static
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 Traditional Owners, with regard to potential erosion and flood impacts from 22-23 • PV assessment of cultural heritage aspects of watering proposals	MCMA	Low	Static
Safety	Negative community sentiment in relation to government decisions/actions creates a safety risk for staff involved in environmental watering actions	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	All	Low	Dynamic

Risk category	Risk description	Pre-Mitigation Risk			Mitigation actions	Lead organisn. 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 Hattah Lakes system in 2026-27 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: 28/04/2026

11 References

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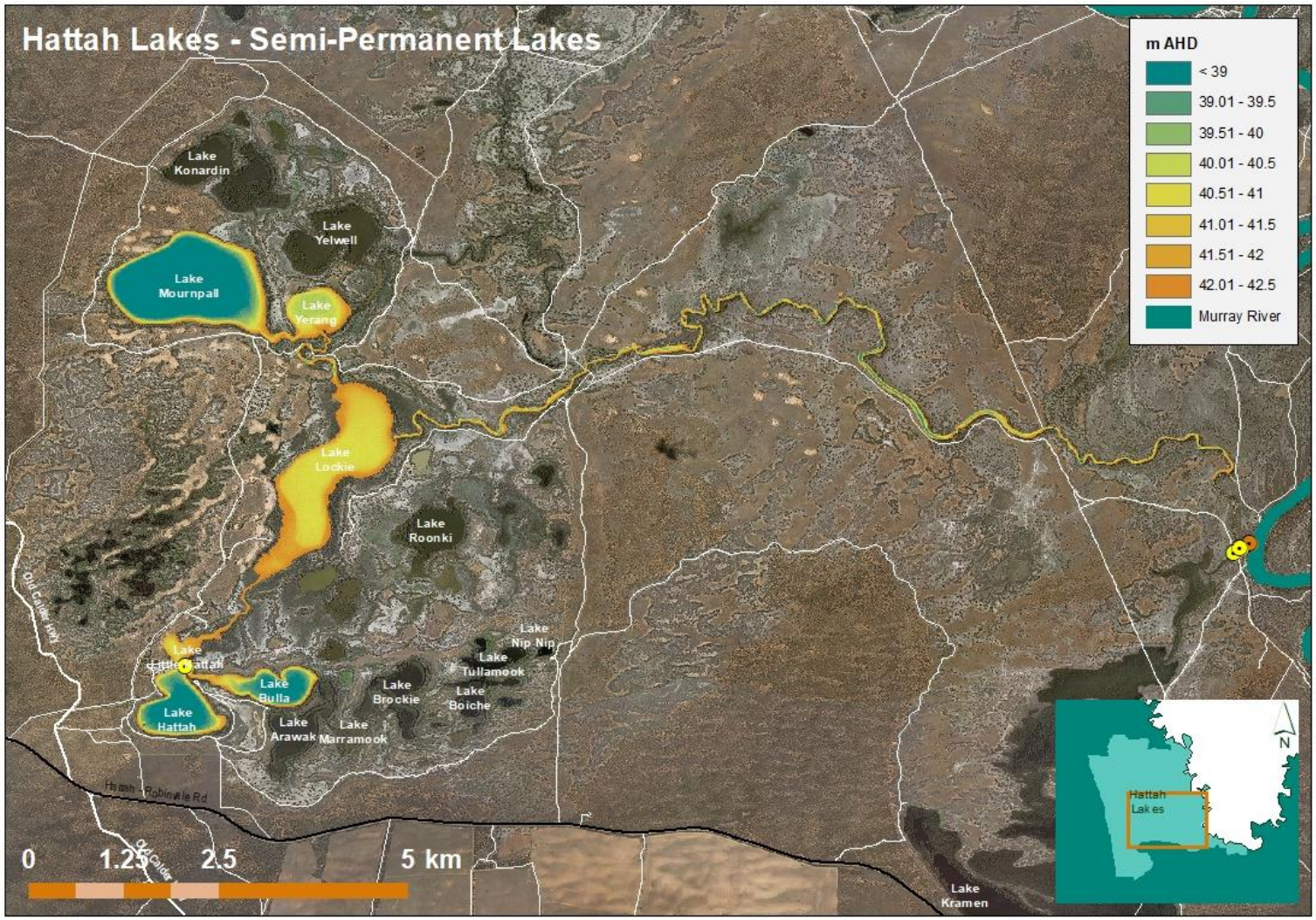
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12 Appendices

Appendix 1 - Site Map



Appendix 2 – Current satellite image

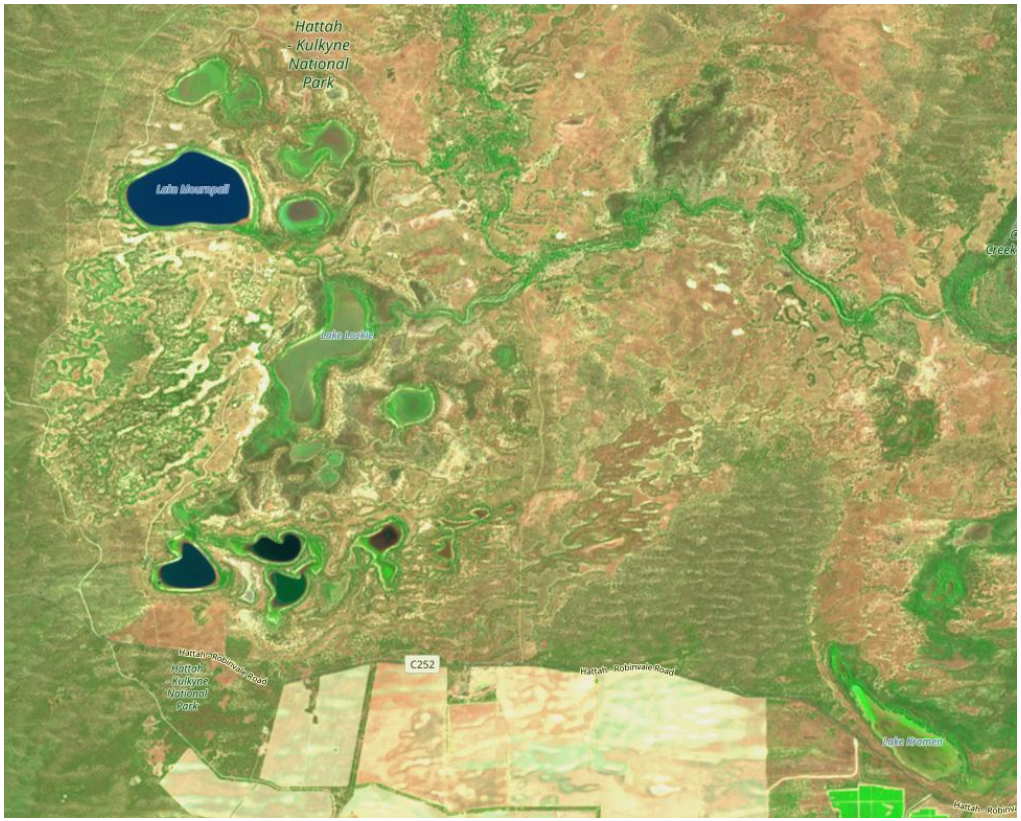


Image taken 21/2/2026 (Copernicus Sentinel Hub, 2026) - Drawdown currently progressing

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 a 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.

Term	Description
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 DEECA).
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.
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.
Tier 2	Potential watering actions that are generally not required every year to achieve intended environmental objectives but are needed over the long-term. At the time of developing a seasonal watering plan, tier 2 potential watering actions are not considered necessary to deliver in the current year under specific climate scenarios, but they are likely to be needed in coming years and may be delivered in the current year if environmental conditions change or to take advantage of operational circumstances.

Term	Description
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