Seasonal Watering Proposal

Photo: Little Mullaroo Crossing, Murray-Sunset National Park

2024-25

Lindsay-Mulcra-Wallpolla

mallee catchment management authority

Document Control

Status	Version	Author	Date	Description
Template	1.0	VEWH	20/11/2023	Prepopulated content incorporated into template ready for issue to CMA.
Draft	1.1	Mallee CMA	01/03/2024	Drafted content to be submitted to VEWH.
Draft 2	1.2	Mallee CMA	18/04/2024	Final Draft distributed to stakeholders for review and endorsement,
Final	1.3	Mallee CMA	19/04/2024	Final to be submitted to VEWH.

Citation

Please cite this document as:

Mallee CMA (2024) Seasonal Watering Proposal Lindsay-Mulcra-Wallpolla 2024-25, Mallee CMA, Irymple, Victoria

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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.

Cover image: Little Mullaroo Creek, Lindsay Island

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1 Context

Mallee Catchment Management Authority (CMA) is pleased to present the final 2024-25 Lindsay-Mulcra-Wallpolla Islands Seasonal Watering Proposal (SWP).

This SWP identifies the Mallee CMA's proposed priorities for use of managed environmental water for the Murray Wetland sites in 2024-25. Information from this document has informed development of the Seasonal Watering Plan 2024-25, available on the VEWH's website from 30 June 2024. 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 across Lindsay Mulcra Wallpolla Islands.

While the format of this SWP differs to previous years, it still retains the key information to outline what environmental flows may be delivered during 2024-25, the rationale for the planning of these and a summary of engagement that occurred, as well as the associated risk management.

The actions outlined in this proposal are informed by ecological objectives and management goals outlined in the site specific, Environmental Water Management Plan (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). Target flora and fauna include inundation dependent wetland vegetation species as well as waterbirds, fish, and frogs. Other factors such as habitat and food resources are also a focus.

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

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

Key areas of the proposal are detailed below:

- Scope of environmental watering – Describes the range of potential watering actions which may be delivered during 2024-25 (a summary of these actions is provided in Table 1.1)
- Scenario planning – Describes how the combination of actions may change depending on the climate scenario.
- Risk management – This is an important chapter of the proposal and will be based on the outcomes from the 2024 Shared Operational Risk Workshop – in particular the risk management table.

Table 1.1 Summary of the proposed watering sites in 2024-25 for the Lindsay Mulcra Wallpolla Islands.

Wetland	Delivery Method	Land/Asset Manager
Pumped sites requiring a water allocation		
Woodcutters	Pumped	Parks Victoria
Mulcra Horseshoe	Pumped/Regulator Operation	Parks Victoria/SA Water
Weir pool sites – no direct allocation required		
Mullaroo Creek	Regulator Operation	Parks Victoria/SA Water
Lindsay River North	Weir Pool Manipulation/Regulator Operation	Parks Victoria/SA Water
Potterwalkagee Creek via Stoney Crossing	Weir Pool Manipulation/Regulator Operation	Parks Victoria/SA Water
Potterwalkagee Creek via Upper Potterwalkagee Regulator	Weir Pool Manipulation/Regulator Operation	Parks Victoria/SA Water

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

2 System Overview

Lindsay, Mulcra and Wallpolla Islands cover over 26,100 ha of Victorian floodplain in the Murray-Sunset National Park (see Figure 5.2.6). They form part of the Chowilla Floodplain and Lindsay-Wallpolla Islands icon site that straddles the Victoria-South Australia-New South Wales border in the mid-Murray River system.

The Lindsay–Mulcra–Wallpolla Islands floodplain is characterised by a network of permanent waterways, small creeks and wetlands. Lindsay River, Potterwalkagee Creek and Wallpolla Creek form the southern boundaries of the site and create large floodplain islands with the Murray River to the north.

In their natural state, these waterways and wetlands would regularly flow and fill in response to high water levels in the Murray River. Large floods still occur, but major storages in the upper reaches of the Murray River system and extraction for consumptive use have reduced the frequency of small to moderate-sized floods.

Flows in the mid-Murray River system are regulated through a series of weir pools. The weir pools are named after the locks which form part of the infrastructure at the weirs that allow vessels to navigate from one weir pool to the next. The weir pools are primarily managed as small water storages to ensure adequate water levels for off-stream diversion via pumps and regulated channels.

Water is diverted from the Lock 9 weir pool in the Murray River to Lake Victoria, where it is stored for later use to meet South Australian water demands. The diversion causes water to bypass Murray River weir pools 7 and 8, and at times it can significantly impact flow in those reaches.

In recent years, water levels in weir pools 7 and 8 have been managed to achieve ecological benefits in the Murray River channel. For example, weir pool levels have been raised during winter and spring and then lowered during summer and autumn to mimic the seasonal river flow. The raising and lowering provide greater environmental benefits than a stable weir pool because it wets and dries off-channel habitats and creates more variable flow patterns in the Murray River and connected floodplain streams. Changes in water levels during appropriate seasons help establish fringing vegetation in shallow margins of the river channel and promote the cycling of nutrients and carbon as conditions fluctuate between wet and dry.

Static weir pool levels and reduced flow in the Murray River have a significant effect on the flows in the Lindsay River and Potterwalkagee Creek. When the natural flow increases and/or when water levels in weir pools 7 and 8 are raised above the full supply level, the upper Lindsay River starts flowing (Lock 7) and flow to Potterwalkagee Creek increases (Lock 8). When weir pools are lowered, flow to both the upper Lindsay River and Potterwalkagee Creek ceases. Mullaroo Creek on Lindsay Island is less affected by weir pool levels, and flow is controlled independently through the Mullaroo Creek regulator, which connects the creek and the Murray River. Moderate lowering of the Lock 7 weir pool level has little effect on Mullaroo Creek, but lowering more than 0.5 m below full supply level makes it difficult to deliver the recommended minimum flow of 600 ML per day that is required to maintain fast-flowing habitat for native fish, especially Murray cod.

Fluctuation of weir pool levels is a major consideration for jurisdictions managing flow in the Murray River and the anabranch waterways of Lindsay, Mulcra and Wallpolla islands. Environmental objectives and associated water regimes for the Murray River sometimes conflict with those for the Lindsay, Mulcra and Wallpolla anabranch systems. Responsible agencies in Victoria and NSW and the Murray-

Darling Basin Authority collaboratively plan how to effectively manage weir pools and flows to floodplain habitats.

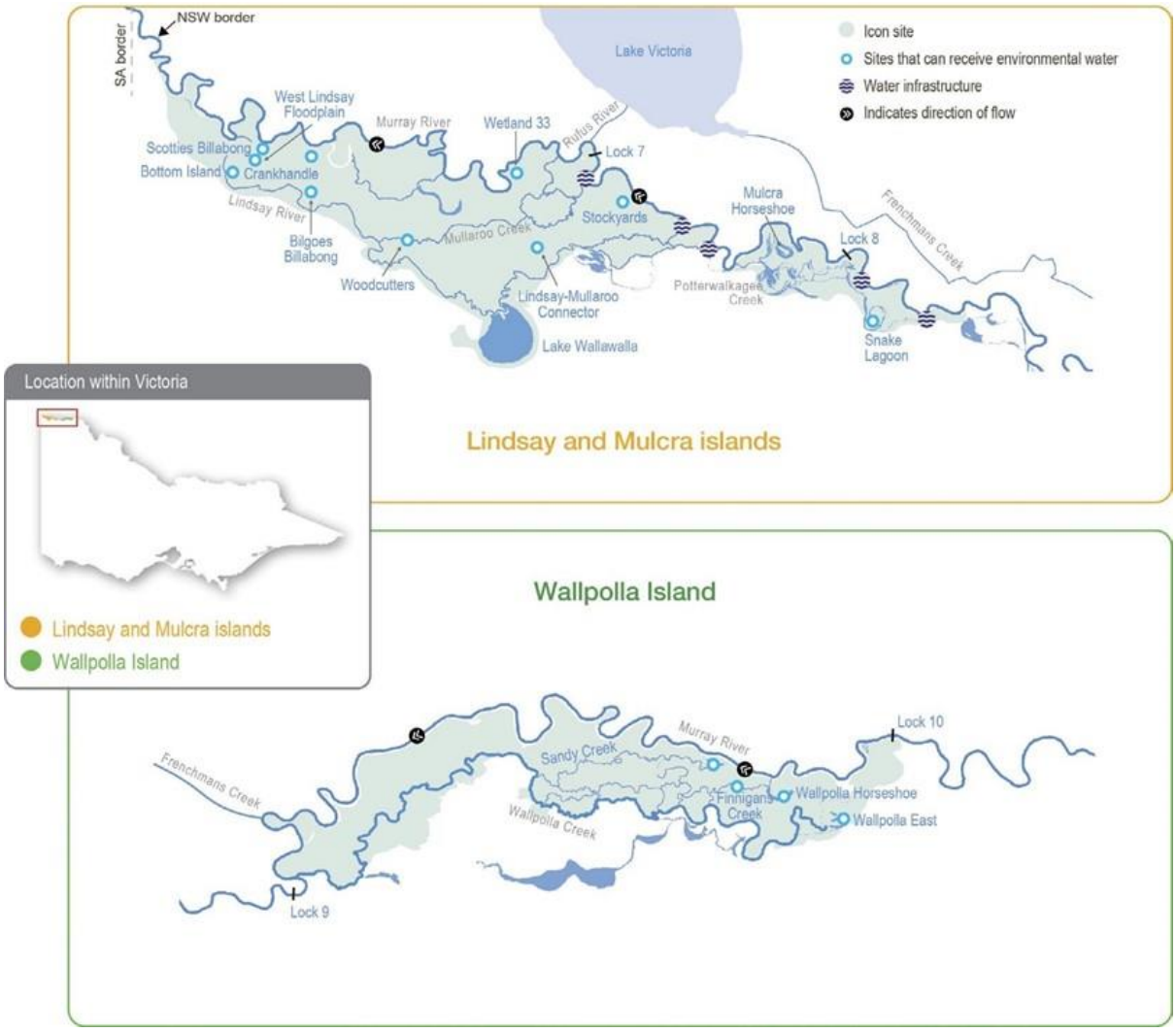

Figure 2.1 The Lindsay, Mulcra and Wallpolla Islands

3 Traditional Owner Cultural Values and Uses

Aboriginal ancestral occupation across the Lindsay-Mulcra-Wallpolla floodplain dates back tens of thousands of years, sustained by the rich productivity of the floodplain woodland and wetland systems. Historically, the islands would have been an abundant source of food and water for these communities. For Aboriginal communities, the floodplain is a vital part of community health and wellbeing.

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

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

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

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

This year Mallee CMA made a concerted effort to ensure we were engaging with traditional owners much earlier in the planning process than in previous years. This was in response to feedback we had received from a number of groups asking to be involved earlier in the process.

On 4 October 2023, Mallee CMA provided a presentation to First People of Millewa Mallee about environmental watering practices. The presentation highlighted how the Murray River is regulated and how environmental water benefits Mallee floodplains, in particular Lindsay, Mulcra and Wallpolla icon sites due to the very large floodplain area in the region. Mallee CMA also presented on how the 2022-23 floods impacted the area, including ecological benefits of the unregulated watering event.

A Talk Water event was held at Lake Wallawalla with Traditional Owners (18/10/23). Maps of Lake Wallawalla were displayed and discussions were held about the SWP for 2024-45. Overall feedback was, Traditional Owners would like to see water remain in Lake Wallawalla at all times. Traditional Owners feel this way as they regard water as essential to the health of trees and plants, birds and animals. If there is no water Traditional Owners response is this will have a decline in the health of trees and plants and the bird and animal population will decrease as there will be no water for these species to thrive and be attracted to the water.

Participants were asked to use pins on a map to help prioritise different sites and why people wanted to see water at various. Traditional Owners really enjoyed the maps which allowed for deep discussions about where they wanted water and cultural values and activities for the various sites. Lots of input provided by Traditional Owners. The outcomes of this exercise can be seen in the word clouds provided in Figures 3.1 and 3.2. The word clouds reflect the sites Traditional Owners would like to see water and also highlights the cultural activities they undertake and cultural importance of the sites in picture form.

FPMMAC SWP Statement:

"FPMMAC (The First People of Millewa Mallee) have stated the sites where engagement has occurred regarding SWPs, they are satisfied with the way the Mallee CMA has done business with FPMMAC. And in saying that, the FPMMAC see an opportunity to work more closely with Mallee CMA by working towards a joint partnership agreement on all Mallee CMA business they do on FPMMAC Rap area".

"The FPMMAC have concerns that other Aboriginal groups are speaking for the RAP area in the water sector. The FPPMAC fought hard for the rights and if other groups have interest in the RAP area there is a legal process for them to follow until then they don't speak for FPMMAC country".

"FPMMAC participation is as good as it can be given the low FPMMAC water program capacity. It would be great to have funded roles for each nation we have represented and build our program so we can be a joint manager in water".

"FPMMAC stated there is great work at Mallee CMA but we can always do better with more resources and better partnerships. A big emphasis needs to be that we don't have the resources to have a meaningful input into all SWP as we have a lot of waterways and not enough resources to know what's going on in detail".

Figure 3.1 Sites of significant value to Traditional Owners across the Lindsay-Mulcra-Wallpolla Islands.

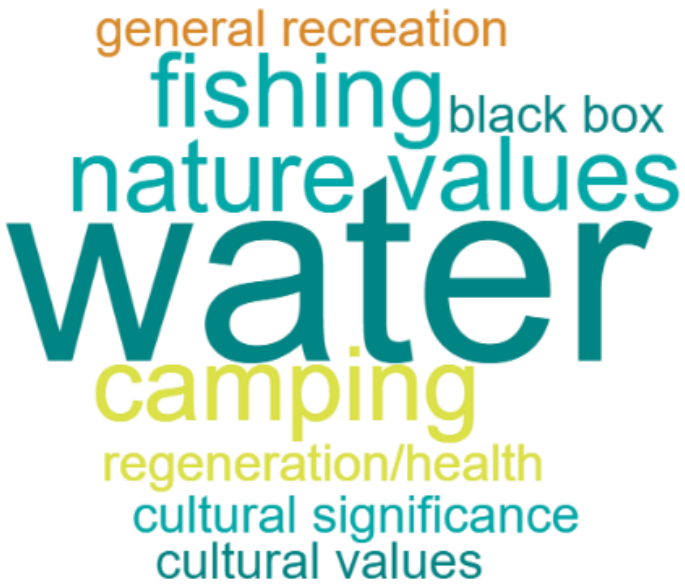

Figure 3.2 Values of the Lindsay-Mulcra-Wallpolla Islands provided by Traditional Owners

Throughout the 2023-24 year, FPMMAC, Mallee CMA and Parks Victoria have met on multiple occasions to discuss Lake Wallawalla. FPMMAC has aspirations to develop Lake Wallawalla in a way that promotes visitation to the site but restricts where people can go to protect cultural heritage values. Additional aspirations include building a site for cultural ceremonies, as well as further works in various spots to repair and protect specific cultural heritage sites. Mallee CMA will continue to work with the Traditional Owners to explore options to find funding for part or all of the project in the coming years.

Feedback regarding cultural input into the SWPs is also undertaken on an informal regular basis as the Mallee CMA regard this as the important way of maintaining respect and the conversations build and improve relationships with Traditional Owners. There are many meetings and discussions throughout the year with staff and leaders from FPMMAC, where these matters are raised and explored in more detail.

Table 3.1: Cultural objectives relevant to Lindsay Mulcra Wallpolla Islands.

	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 5.2.16, the Mallee CMA has also considered how environmental flows could support other values and uses, including:

- water-based recreation (such as canoeing, kayaking, fishing and yabbying)
- riverside recreation and amenity (such as bushwalking, camping, bird and wildlife watching, four-wheel driving and photography)
- community events and tourism (such as increased and longstanding repeat visitation, ecotourism and educational programs for school, TAFE and university students)
- socioeconomic benefits (such as for commercial beekeepers who rest bees around the floodplain away from crops and pesticides ready for the next season, local businesses providing accommodation and hospitality to tourists, researchers and local water delivery contractors).

The Lindsay-Mulcra-Wallpolla floodplain is a vast and isolated landscape. The remote nature of this landscape is a major drawcard, with people hoping to 'get away from it all' during trips to this area. Tourism is one of the largest industries in the Mildura/Mallee region and Murray-Sunset National Park is one of the major attractions. Visitors from the three adjacent states and around the country, are common to the Lindsay-Mulcra-Wallpolla Islands. Visitor numbers across the Lindsay-Mulcra-Wallpolla Islands can extend into the tens of thousands each year (Mallee CMA, 2021a). Shared benefit considerations for the 2024–25 season are presented in Table 4.1.

The permanent source of water in the Murray River and anabranches act as focal points of these visits and provide a multitude of recreational opportunities including camping, canoeing, bird and wildlife-watching, photography, fishing and four-wheel driving. On occasions when environmental water is delivered, the potential attractiveness of the region only increases, with short-term responses to watering offering increased opportunities such as yabbying and birdwatching. Many families and groups have long standing connections with the Lindsay-Mulcra-Wallpolla region and make regular trips to enjoy this diverse landscape.

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

The Lindsay, Mulcra and Wallpolla Islands are important for apiarists who use the area for their bee hives and collection of honey. The bees benefit from a natural environment and allow them to be rested away from commercial crops (nuts, fruit etc.) and insecticides used in their production. Delivery of environmental water improves the health of local vegetation, which can result in flower production and subsequently higher honey production.

There are direct local economic benefits of environmental watering across Lindsay-Mulcra-Wallpolla as many sites require water to be delivered via pumps. Mallee CMA sources generally suitable local contractors. The current market of available delivery contractors have previously been local to the Mallee region, employ local staff and use local goods and services to maintain their business.

Research is an important component of learning more about the natural environment and the response of flora, fauna, hydrological and geomorphological outcomes to inundation of wetlands, creeks, channels, floodplain, and rivers. Research can determine ways which result in improved recreational (e.g. improved breeding response to a recreational angling species) and cultural (e.g. higher instances of medicinal plants on the floodplain) outcomes with improvements to timing, magnitude and duration

of watering. Additionally, researchers may be sourced locally, or use local hospitality and accommodation providers.

Figure 4.1 Sites of significant value to members of the community across the Lindsay-Mulcra-Wallpolla Islands.

Figure 4.2 Values of the Lindsay-Mulcra-Wallpolla Islands provided by members of the community

Table 4.1 Shared benefit considerations for 2024-25

Beneficiary	Connection to the waterway	Values/ Uses/ Objectives/ Opportunities	How have these benefits been considered?
Local businesses	The local tourism industry benefits as a result of increased tourism. Previously, pumped water delivery has been undertaken by local suppliers.	Local employment opportunities Retaining money in local communities Support local industry/business	Environmental water delivery in the Mallee is highly dependent on pumped delivery. Contracts for delivery have generally been sourced locally and we encourage local suppliers to tender for this work. Without the support of these local suppliers the program would not be possible. Water attracts tourism and encourages locals to undertake recreation pursuits across these areas. This relates to increase patronage at near-by hospitality and accommodation facilities and directly relates to increased eco-tourism opportunities.
Apiarists	Watering supports flowering in native vegetation which is beneficial for bees.	Commercial enterprise	Water delivery benefits vegetation outcomes which support flower production providing abundant resources for bees.
Bird watching	Water provides important habitat for birds, which draws birds and twitches to the region.	Recreation opportunities	Water is regularly delivered to sites for the purpose of meeting waterbird and bird objectives.
Anglers	Increased opportunities for yabbying across the Murray Wetlands	Recreational Food for personal consumption	Delivering water to floodplain and large shallow wetlands regularly results in a boom in yabby abundance. This is utilised by anglers who catch yabbies for personal consumption.
Camping	Water draws people to sites. Increasing the quality and beauty of a region draws tourists to the area.	Recreation Fishing Birdwatching Photography	Water attracts people. Campers, given the option, will generally prefer setting up at a site which contains water, over a site which does not. This provides them with instant access to the water in which to undertake complementary recreational pursuits.
Tourists	Water draws people to sites. Increasing the quality and beauty of a region draws tourists to the area. The local tourism industry benefits as a result of increased tourism.	Recreation opportunities Tour operators	Community consultation and engagement is regularly undertaken as part of the environmental water delivery program.
Research	Studying the wetland, floodplain and rivers	Condition monitoring	Provision of water to sites, and working with researchers to target particular flora,

Beneficiary	Connection to the waterway	Values/ Uses/ Objectives/ Opportunities	How have these benefits been considered?
	during different stages (wet, dry, during drawdown) increased understanding of the natural environment and the requirements of the flora, fauna and processes that reside across these habitats.	Intervention based projects around watering Large-scale system investigations	fauna or hydrological outcomes allows them to undertake projects which will better inform future management of the region.
Schools and education centres	Local schools and other education centres such as TAFE and universities incorporate aspects of natural environment in their curriculum. A number of Murray Wetland sites are close to these centres and provide excellent examples of channel and wetland ecology.	Natural resources education (e.g. food webs, effects of flooding, water uses) Recreation/outdoor education (e.g. School camps) Connection with country and indigenous/cultural education.	A number of sites local to Mildura have been used previously by schools and TAFE (e.g. Koorlong Lake, Lake Hawthorn, Kings Billabong/Butlers Creek and Merbein Common). Through delivery of environmental water these education resources remain in school curriculum and assist with learning of the younger generation.

Table 4.2 Environmental objectives of Lindsay Mulcra Wallpolla

	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

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

Mullaroo Creek supports one of the most significant populations of Murray cod in the mid-Murray River system. Mullaroo Creek provides fast-flowing habitat that Murray cod favour, which contrasts with the artificially slow-flowing and still habitats in the nearby Murray River weir pools. Fish in Mullaroo Creek breed and produce juveniles that contribute to populations in adjacent parts of the Murray system (such as in the Darling River in NSW and the lower Murray River in South Australia). Waterways and wetlands throughout the icon site support several other fish species, including freshwater catfish, golden perch, silver perch, Murray-Darling rainbowfish and unspecked hardyhead.

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

Table 5.1 Environmental objectives relevant to the Lindsay-Mulcra-Wallpolla Islands.

Environmental objectives in Lindsay, Mulcra and Wallpolla islands	Environmental Water Management Plan Objectives (Mallee CMA, 2021a)
F1 - By 2030, increase the abundance of small-bodied native fish and the spread of age classes for long-lived native fish, compared to 2006 baseline levels	**LMW9** - By 2030, improve native fish populations (large- and small-bodied fish) across the Lindsay-Mulcra-Wallpolla Icon Site and their relative abundance and diversity; assessment to include comparison with 2006-2012 levels for short-lived species and the spread of age-classes for long-lived fish.
A1 - Maintain populations of frogs	**LMW5** - Improve or maintain the populations of threatened flora and fauna that are flow-dependent at the Lindsay-Mulcra-Wallpolla Icon Site by 2030.
CN1 - By 2030, improve the function of water-dependent ecosystems by improving productivity linkages between river and floodplain habitats	**LMW1** - By 2030, maintain diversity of freshwater ecosystem types at the Lindsay-Mulcra-Wallpolla Icon Site, including palustrine, riverine and floodplain ecosystems with temporary and permanent water regimes. **LMW7** - By 2030, improve ecosystem functions of water-dependent ecosystems by maintaining or improving productivity linkages between the river and floodplain habitats (on and off) at the Lindsay-Mulcra-Wallpolla Icon Site by achieving variable extents of lateral connectivity.

	V1 - Improve populations of flow-dependent threatened flora V2 - By 2030, maintain the extent and improve the condition of river red gum, black box and lignum compared to 2006 baseline levels V3 - By 2030, improve the species richness and abundance of native wetland and floodplain aquatic vegetation functional groups	LMW2 - Improve the species richness and abundance of native wetland and floodplain aquatic vegetation functional groups by 2030. LMW3 - Improve condition and maintain extent (ha) 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 Lindsay-Mulcra-Wallpolla Icon Site by 2030. LMW4 - By 2030, limit the spread of Typha and other invasive flora species. LMW5 - Improve or maintain the populations of threatened flora and fauna that are flow-dependent at the Lindsay-Mulcra-Wallpolla Icon Site by 2030.
	B1 - Maintain communities and the species diversity of colonial nesting waterbirds, waterfowl and waders that feed on fish B2 - By 2030, increase populations of colonial nesting waterbirds at Lake Wallawalla and non-colonial waterbirds at Mulcra Horseshoe and Wallpolla Horseshoe	LMW6 - By 2030, protect and restore vital feeding habitat that supports sustainable communities of colonial nesting waterbirds, waterfowl, waders and piscivores to maintain the current species diversity at the Lindsay-Mulcra-Wallpolla Icon Site. LMW8 - By 2030, protect and restore breeding habitat for colonial nesting waterbirds at Lake Wallawalla and non-colonial waterbird breeding at Mulcra Horseshoe and Wallpolla Horseshoe.

6 Engagement

Mallee CMA has engaged with a variety of different stakeholders and community members in the development of the SWP

Table 6.1). Engagement included face-to-face meetings with community members, formal meetings with program partners, attendance at pop ups sessions and community market events. These engagement events were also supported by communication activities such as newsletter articles, digital content through website and social media, distribution of a flyer and community values survey.

Various platforms have been utilised to provide engagement opportunities to the key stakeholders including Traditional Owners, Parks Victoria, Victorian Environmental Water Holder, Lower Murray Water, Goulburn Murray Water Authority, SA Water and landholders. Engagement with these key stakeholders was imperative to the prioritisation and planning process. Due to the interest in water management by communities, it is important proposed watering sites are supported by high quality justification and background information. All meetings between stakeholders and community and Mallee CMA staff provide opportunity for stakeholder feedback. Discussions around rational for site selection and gathering support for proposed watering were the main objectives of any communications activities with the community. In developing the 2024/25 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 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 as had previously been done. This new 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-November 2023, with all engagement mapped against the International Association for Public Participation (IAP2) Spectrum (

Table 6.1). This ensured all engagement recognised stakeholders' levels of concern in environmental water planning, and clearly stated the promise being made to stakeholders at each participation level.

Using the International Association for Public Participation's (IAP2) spectrum, key stakeholders were engaged at the higher end of the IAP2 spectrum, 'collaborate'. Face to face meetings, where practical, were conducted and online platforms were utilised where restrictions impeded in-person consultation. Joint planning and sharing of information are the key proponents of this type of engagement.

Agency consultation with the VEWH, Parks Victoria (PV), New South Wales Department of Climate Change, Energy, the Environment and Water (DCCEEW), SA Water and Goulburn Murray Water (GMW) occurred at the IAP2 level of 'collaborate'. This level of engagement was chosen to partner with these stakeholders in the development of the SWP. Mallee CMA has held meetings with these stakeholders to discuss environmental water planning across the Lindsay-Mulcra-Wallpolla Islands. Their advice and recommendations have been incorporated as much as possible in this document.

Agency consultation with the Department of Energy, Environment and Climate Action (DEECA), Victorian Murray Floodplain Restoration Project (VMFRP) and Mildura Rural City Council (MRCC) occurred at the IAP2 level of 'inform'. This level of engagement was chosen to provide these stakeholders with balanced and objective information regarding the SWP. Mallee CMA will continue keep these stakeholders informed.

One method used to engage Traditional Owners and community members was the 'Pins in Maps' activity. Participants were asked to place a coloured pin in a map to represent their values/uses at the various wetlands. The coloured pins corresponded to four categories: recreation, flora/fauna, water, and other. More than 300 responses were collected by undertaking this activity at a wide range of community engagement events including on-Country visits, drop-in sessions, citizen science activities, and local markets. Additionally, the 'Pins in Maps' activity proved to be an engaging method to initiate place-based conversations about environmental water.

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

The general public, local council, tourism organisations, recreational clubs and environmental groups were engaged at lower levels, such as 'consult' and 'inform' on the IAP2 spectrum. A visual representation of the feedback received from community during this mapping exercise is displayed in Error! Reference source not found.Error! Reference source not found.. Online surveys, fact sheets and social posts were also used to communicate with those that could not meet face-to-face. These methods of engagement provided an opportunity for the community to provide feedback and outline community values for the sites to better inform current and future water planning.

Traditional Owner consultation occurred at the IAP2 level of 'involve'. This level of engagement was chosen to work directly with Traditional Owners throughout the development of the Lindsay-Mulcra-Wallpolla Islands SWP. As part of this level of engagement, Mallee CMA ensure Traditional Owners concerns and aspirations are directly reflected in SWP. Furthermore, Mallee CMA will work directly with Traditional Owner groups to demonstrate how their input influenced decision making.

Community consultation occurred at the IAP2 level of 'consult'. This level of engagement was chosen to obtain public feedback regarding community values of wetlands they visit. As part of this level of engagement, Mallee CMA will provide feedback to the community regarding how their input influenced the planning of environmental water.

Following completion of this SWP, Mallee CMA will produce informative community flyers and website updates detailing what sites have been chosen to receive water for the environment water and why. Targeted consultation and engagement activities will be undertaken throughout the coming year with relevant community and stakeholders. This will offer the opportunity for further in-depth and detailed discussions and planning and will help to close the loop on engagement activities conducted earlier in the year which asked for feedback, by demonstrating how the feedback that was provided has been considered in writing this proposal.

Table 6.1 Engagement activities conducted for the purposes of developing this proposal.

Category	Stakeholder(s)	IAP2 level of engagement	Engagement Method	Engagement Purpose
Community groups and environment groups	Mallee CMA Land and Water Advisory Committee	Inform	• Presentation and discussion of proposed watering sites (14/03/2024)	Advise the Advisory Committee as to the extent and location of proposed watering sites for 2024-25 and answer any questions.
	OzFish Unlimited	Consult	• Presentation and discussion of proposed watering sites	Alignment of projects and early identification of opportunities and where potential actions may be conflicting.
	Wider community	Consult	• Online – web based and social media • Stalls at Sunraysia Farmers Market and Red Cliffs Market • Drop-in day at Lake Cullulleraine	Provide the community with the opportunity to provide feedback and important information about what they value about the sites.
Government agencies	Victorian Environmental Water Holder (VEWH)	Collaborate	• Discussion of SWP guidelines (24/01/2023) • Annual risk assessment workshop (20/2/2023). • Weir Pool Manipulation Operations Group (12/04/24) • Ongoing discussion as planning progresses	Ongoing planning and consultation with input from VEWH regarding water availability, current and forecast water condition conditions, risk planning and feasibility.
	Parks Victoria (PV)	Collaborate	• Discussion with key local Parks Victoria Staff regarding proposed sites and seek advice on what they would like to see across their areas of responsibility and any issues with practical logistics. • Presentation to key staff and discussion of timelines, risks and mitigation measures that are site specific (TBC). • Mallee CMA meets monthly with PV. • Presentation of proposed sites with main agencies through LMW Operational Group (14/03/2024)	Review and update the risk tables relevant to the proposed watering program for 2024-25. Ongoing planning and consultation with input from PV around on-ground management activities, risk planning and site feasibility.

Category	Stakeholder(s)	IAP2 level of engagement	Engagement Method	Engagement Purpose
	Department of Energy, Environment and Climate Action (DEECA)	Inform	• Bi-monthly meeting regarding EC5 contract. • Various progress reports throughout the years on watering milestones and outcomes.	Share planning and provide opportunity for feedback and comment regarding any operation and/or on-ground works being or planned to be undertaken over the coming year.
	New South Wales Department of Climate Change, Energy, the Environment and Water (DCCEEW)	Collaborate	• Multiple meetings; Face-to-face • Email and telephone.	Discussion around Weir pool manipulation to ensure Mallee CMA watering priorities can be met in conjunction with working with NSW requirements and priorities (Murray Wetlands information given to Mallee CMA representatives)
	Victorian Murray Floodplain Restoration Project (VMFRP) Project Team	Inform	• Various meetings and discussions to discuss scheduling of watering events.	Coordination of activities across the two programs. For the coming year, but also longer-term planning around potential construction and EWMP updates.
	Goulburn Murray Water (GMW)	Collaborate	• Various meetings and discussions to discuss scheduling of delivery.	Coordination of delivery
	South Australia Water (SA Water)	Collaborate	• Various meetings and discussions to discuss scheduling of delivery.	Coordination of delivery and operation of regulating structures
	Mildura Rural City Council	Inform	• Fact sheet and survey to capture community values for the site and better inform future watering plans.	Provide information about the planning and delivery of water for the environment and create opportunities for community to provide important information about site values and uses.
Neighbouring Landholders	Lindsay Point Irrigators	Inform	• Fact sheet / website information	To provide information to adjoining landowners and ensure any concerns are understood.
Recreational Groups	Mildura 4WD Club	Inform	• Fact sheet / survey	To provide information to community who value and utilise the sites and how they can obtain further information
	Mildura Birdlife Club	Inform		

Category	Stakeholder(s)	IAP2 level of engagement	Engagement Method	Engagement Purpose
	Sunraysia Bushwalking Club	Inform		Capture community values for the site and another feed back
Traditional Owners	First People of the Millewa Mallee Aboriginal Corporation (FPMMAC)	Collaborate	• Face-to-face meetings with individual Traditional Owners and community members across the catchment who have an interest in Lindsay Wallpolla Mulcra Islands • "Talk Water" at Lake Wallawalla with Traditional Owners (18/10/23). • On 4 October 2023, Mallee CMA provided a presentation to FPMMAC about environmental watering practices.	Allow Traditional Owners to speak for Country. Opportunity to guide watering operations to benefit items of cultural significances. Two-way sharing knowledge between cultural practices and floodplain management principles
	Aboriginal community members	Inform	• Face-to-face meetings with individual Traditional Owners	Provide opportunity for on-country discussions to inform 2024/2025 watering actions. Two-way sharing knowledge between cultural practices and needs and modern wetlands and floodplain management principles. Build and maintain relationships with Traditional Owners, ensuring conduits for two-way communication about watering and ensure operations are effective
Local businesses	Sunraysia Apiarist Association	Inform	• Fact sheet / letter / website tool	To provide information Apiarists about the planning underway for environmental watering and opportunities to ask questions as required.
	Lake Cullulleraine Store	Inform	• Fact sheet	To provide information for local business, visitors to the area and community about the upcoming watering events.
	Murray Offroad Adventures	Inform	• Fact sheet	To provide information for local business, visitors to the area and community about the upcoming watering events.

Category	Stakeholder(s)	IAP2 level of engagement	Engagement Method	Engagement Purpose
	Mallee Tours	Inform	• Fact sheet	To provide information for local business, visitors to the area and community about the upcoming watering events.
	Mildura Information Centre	Inform	• Fact sheet	To provide information for local business, visitors to the area and community about the upcoming watering events.
	Visit Mildura	Inform	• Media kit / fact sheet	To provide information for local business, visitors to the area and community about the upcoming watering events.
	Wildside Outdoors	Inform	• Fact sheet	To provide information for local business, visitors to the area and community about the upcoming watering events.

7 Scope of Environmental Watering

The prioritisation process for identified waterbodies in this SWP has considered a number of factors. Primary considerations were the current condition of the site, with respect to the ecological values present and the expected condition (under pre-regulation watering conditions), an assessment of the site's environmental objectives and a comparison of actual watering regimes to recommended optimal watering regimes at each site. Much of this required information is identified in the Environmental Water Management Plan (EWMP) for the LMW Islands (Mallee CMA, 2021a) and supporting documents; the Watering Guide (Mallee CMA, 2021b) and Operating Plan (Mallee CMA, 2022).

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

Special consideration was given for the Lindsay and Wallpolla Island sites, with respect to plans for construction of proposed water management infrastructure under the Victorian Murray Floodplain Restoration Project (VMFRP). These sites will potentially have construction of infrastructure commencing across the 2025-26 year so the ability to undertake environmental watering will be limited or restricted at some sites.

Actions proposed for 2024–25 either relate to operation of structures and/or incorporate aspects of weir pool manipulation or will require delivery of water through temporary pumping infrastructure. Hydrological compliance for all temporary pumping sites is measured using flow meters on the pumps which are compliant with industry requirements.

Waterbodies identified for Potential Watering Actions (PWA) for the 2024–25 year and a summary of the environmental objectives and flow recommendations are shown in Table 7.1 and Table 7.2.

The number of potential watering sites across LMW is greater than indicated in the list of Potential Watering Actions presented in Table 7.1 and 7.2. Sites listed in Table 7.3 have been actively managed in the past and were considered during the pre-planning stage but were not deemed suitable for delivery in 2024–25. This is due to a number of factors including previous watering history, current condition at the site, planned drawdown or a requirement for the site to remain dry to meet environmental and hydrological objectives, suggestions resulting from community and Aboriginal community consultation, logistical limitations and potential future impact on VMFRP planned operations/ construction.

Table 7.1 Potential watering actions and environmental objectives (weir pool connected) for sites across the Lindsay-Mulcra-Wallpolla Islands in 2024-25. These sites are typically managed via weir pool manipulations and/or regulating structures and are management actions which do not require a specific water allocation.

Wetland	Potential watering action	Climatic scenario (s)	Expected watering effects	Rationale	EWMP environmental objectives	VEWH Objectives
Mullaroo Creek	Summer (July-August, December-June) Maintain baseflows at a minimum of 600 ML/d.	All scenarios.	• Provide flows ≥ 600 ML/d to support the target of a minimum of 60% of the Mullaroo Creek will exhibit fast flowing habitat within a flow envelope of 0.2-0.5 m/s (mean cross-sectional velocity). • Maintain fast-flowing habitat for native fish (such as Murray Cod, Silver Perch and Golden Perch). • Maintain habitat for aquatic vegetation and maintain soil moisture to maintain the condition of streamside vegetation.	Mullaroo Creek provides critical habitat for several species which depend on flowing water habitat. Most important is the Murray cod, with the Mullaroo population of significance in the Lower Murray. It is the only reach across Lindsay-Mulcra-Wallpolla Islands (and at a larger regional perspective) which provides annual fast flowing habitat. In addition, the creek is littered with woody debris (i.e. snags) which provide structural habitat for the fauna found in the creek. The proposed flow regime is the same as previous years. This regime has proven to promote Murray cod breeding. A spring pulse targeting 1,200 ML/d results in favourable conditions to support movement, facilitate additional habitat and support breeding (Tonkin, et al., 2019). This flow regime will be pursued annually to support Mullaroo Creek's significant Murray cod population. In addition to Murray Cod, several other fish species, such as the listed Freshwater Catfish (*Tandanus tandanus*) and	LMW1 LMW4 LMW5 LMW9	F1 T CN1 V1,V2 G
	Spring (September-November) – Provide a pulse of approximately 1,200 ML/d	All scenarios.	• Provide flows ≥ 1,200 ML/d to support the target of a minimum of 75% of the Mullaroo Creek will exhibit fast flowing habitat within a flow envelope of 0.2-0.5 m/s (mean cross-sectional velocity). • Increase the extent of fast flowing water to provide cues for movement and spawning and improve recruitment opportunities for native fish. • Provide improved fish passage between Mullaroo Creek and the River Murray via the Mullaroo Creek regulator fishway.			

Wetland	Potential watering action	Climatic scenario (s)	Expected watering effects	Rationale	EWMP environmental objectives	VEWH Objectives
				Murray-Darling Rainbowfish (*Melanotaenia fluviatilis*), benefit from the habitat provided within the Mullaroo Creek The compliance point for the Mullaroo Creek is taken from the flow gauging station approximately 700 m upstream from Brokenback Bridge and is monitored by SA Water.		
Lindsay River North*	Spring (September-November) Provide flows of approximately 45 ML/d.	Dry Average	Provide Low flow by raising the Lock 7 weir pool to a maximum of 22.50 m AHD to: • Provide temporary flowing water to reconnect pools and support dispersal, spawning and recruitment opportunities for native fish. • Improve seasonal flow through the upper Lindsay River to improve connectivity between the River Murray and Lindsay River. • Provide soil moisture to improve condition of riparian vegetation. • Inundate the littoral zone to improve productivity.	Lindsay River would have naturally flowed via the Northern Inlet in most years, for at least 6 months. In drier years, this flow would have been shortened to periods around late winter/spring when River Murray flows were highest. Providing water to Lindsay River North supports aquatic and riparian vegetation along this reach, as well as providing temporary habitat for flow-dependant species and providing an alternate means for aquatic fauna passage. System scale longitudinal connectivity will also benefit, with transmission of carbon and nutrients along the creek line and back to the River Murray. Coordination of manipulation actions in Lock 7 with Lock 8 (and to some extent Lock 6 where possible) are also	LMW1 LMW2 LMW3 LMW4 LMW5 LMW7 LMW9	F1 A1 T CN1 V1,V2,V3

Wetland	Potential watering action	Climatic scenario (s)	Expected watering effects	Rationale	EWMP environmental objectives	VEWH Objectives
				an important consideration. As well as maintaining consistent actions and conditions at a landscape scale, coordinated action can also reduce the impact on fishway effectiveness concerns.		
Potterwalkagee Creek * (via Stoney Crossing)	Spring (September-November) Provide flows of approximately 100 ML/d.	Drought Dry Average	Provide Low flow by Maintaining the Lock 8 weir pool at Full Supply Level (24.8 m AHD) to: • Provide temporary flowing water to reconnect pools and support dispersal, spawning and recruitment opportunities for native fish. • Provide seasonal flowing water habitat and improve connectivity between the River Murray and Potterwalkagee Creek. • Maintain soil moisture to improve condition of riparian vegetation. • Provide a productivity pulse through return of carbon and nutrients to the water column from the channel.	Potterwalkagee Creek would have naturally flowed in most years. As such the water regime is for inundation 9 years in 10, which is currently being met. As part of this, around half the time, higher than base flows should be targeted (which also engages Upper Potterwalkagee). This supports aquatic and riparian vegetation along this reach, as well as providing temporary habitat for flow-dependant species and providing an alternate means for aquatic fauna passage. Coordination of manipulation actions in Lock 8 with Lock 7 (and to some extent Lock 9 where possible) are also an important consideration. As well as maintaining consistent actions and conditions at a landscape scale, coordinated action can also reduce the impact on fishway effectiveness concerns.	LMW1 LMW2 LMW3 LMW4 LMW5 LMW7 LMW9	F1 A1 T CN1 V1,V2,V3
Potterwalkagee Creek * (via Upper Potterwalkagee)	Spring (September-November) Provide flows of approximately 15 ML/d.	Dry Average				

* Lindsay River and Potterwalkagee Creek flows are calculated using a model. Exact flow is dependent on flow in the Murray River at the time and weir pool height. Please see weir pool hydrographs

Appendix 2 - Proposed two-year hydrographs for proposed weir pool heights under the various scenarios for Lock 7 and Lock 8). There are no compliance points for measurement of flows.

Table 7.2 Potential watering actions and environmental objectives (disconnected from weir pool) for the Lindsay-Mulcra-Wallpolla Islands in 2024-25. These sites are typically managed via temporary pumping and/or regulating structures and require an environmental water allocation.

Wetland	Potential watering action	Climatic scenario (s)	Expected watering effects	Rationale	EWMP environmental objectives	VEWH Objectives
Woodcutters Creek	Fill anabranch during spring to maximum (22 m AHD) by pumping up to 70 ML.	Drought Dry Average	• Provide soil moisture to maintain and improve condition of riparian vegetation, specifically River Red Gum. • Provide shallow-water habitat to provide refuge and feeding habitat for wetland dependant species such as frogs.	Woodcutters is an ephemeral anabranch off of Mullaroo Creek on Lindsay Island. It has a watering regime of 8 in 10 years, which is not currently being met. It has received water only two times in the previous 10 years. This wetland had been dry for 6 years after being inundated during the 2016 floods, with only partial inundation in 2021. Overbank flooding in spring 2022 caused connection between the anabranch and creek and likely maintained condition of riparian trees. Watering in spring 2023 will aim to build on the positive effects of recent flooding through improved condition of riparian tree species, specifically river red gum.	LMW1 LMW2 LMW3 LMW5	A1 T CN1 V1,V2,V3
Mulcra Horseshoe	Fill wetland during spring to maximum (24.8 m AHD) by pumping up to 1,000 ML.	Drought Dry Average	• Provide shallow-water and open-water habitat to create foraging and breeding opportunities for waterbirds. • Provide shallow-water habitat and open water habitat to provide feeding	The watering regime for this wetland is to provide open water 9 in 10 years. This is not being met, with the horseshoe only having open water in 7 of the previous 10 years. Prior to inundation during spring 2021 the wetland had been dry for the three years previous. Inundation during 2021 halted decline in condition of fringing vegetation.	LMW1 LMW2 LMW3 LMW5 LMW6 LMW8	A1 CN1

Wetland	Potential watering action	Climatic scenario (s)	Expected watering effects	Rationale	EWMP environmental objectives	VEWH Objectives
			and breeding habitat to support wetland-dependant species including frogs and waterbirds. • Stimulate aquatic vegetation growth during inundation. • Provide soil moisture to improve condition of riparian vegetation, specifically River Red Gum. • Provide conditions for semi-aquatic lakebed herbland to establish during drawdown.	Natural inundation during spring 2022 helped to improve condition of riparian species and proposed watering for 2023 will continue to promote abundance and diversity in the understorey vegetation community as well as working toward achieving the target water regime for this site. Mulcra Horseshoe provides a variety of productivity benefits, as well as drought refuge for floodplain dependant species. Mulcra Horseshoe supports both riparian and aquatic vegetation communities including a number of vegetation species listed under the Victorian Rare or Threatened species list such as the rare Mallee Cucumber, and Branching Groundsel (*Senecio cunninghamii var. cunninghamii*) and the poorly known Native Couch (*Cynodon dactylon var. pulchellus*) (Kershaw, Kett, Stevenson, Brook, & Schmidt, 2019). It provides important habitat for waterbirds and seasonal inundation promotes productivity and nutrient mineralisation.		V1,V2,V3 B1,B2

Table 7.3 Sites which have been actively managed using environmental water delivery across the Lindsay-Mulcra-Wallpolla Islands in the past, but are not planned to receive an allocation during 2024-25 across any climatic scenario.

Waterbody	Potential Watering Action	Rationale
Bottom Island	Drawdown	All of these sites received inundation during 2023–24. As no water will be delivered to these sites through the environmental water program during 2024–25, they will continue to drawdown and some are likely to enter a dry phase. In combination with planned watering sites, drying these waterbodies will provide a mosaic of habitat types across the broader landscape. This mosaic provides favourable conditions and supports a wider range of species across the landscape. For example, aquatic and semi aquatic vegetation as well as vegetation which grows of exposed mudflats and piscivorous water bird species which utilise deep water to feed, waders which use shallow water for feeding and exposed mud flats which are favoured by shorebirds. Drying the wetlands will also see pest fish species die, effectively re-setting the site which will be beneficial for future water delivery and avoiding or limiting intrusion of pest fish during delivery.
Scotties Billabong		
Crankhandle		
Bilgoes		
Websters Lagoon		
Wetland 33		
Stockyards		
Lindsay-Mullaroo Connector		
Lindsay River South		
Snake Lagoon Extension		
Mulcra Island Floodplain		
Wallpolla Horseshoe Lagoon		
Sandy Creek		
Finnigans Creek		
Wallpolla Creek East		

8 Scenario Planning

Scenario planning and prioritisation for 2024–25 for the Lindsay-Mulcra-Wallpolla Islands is being heavily influenced by a number of critical factors. Foremost is the consideration of the current environmental condition of the landscape. A concerted effort across the site has seen localised improvement in condition, however, prior to floods in 2022, much of the rest of the site had been dry since 2016 and this is reflected through condition monitoring and associated reporting at the icon site level. This is potentially exacerbated through many individual sites not meeting their required watering regimes over 10+ years. Sites chosen for 2024-25 focus on sites that are behind their watering regimes and a consecutive inundation, following natural flooding in 2022, and continued high river conditions throughout 2023-24, will promote germination and aid in the process of restoring their ecological character.

From a long-term planning perspective, the influence of the Victorian Murray Floodplain Restoration Project (VMFRP) applies significant weight to planning and prioritisation for this year. Proposed start of construction will likely limit our ability to undertake watering across the construction footprint for approximately 1.5 years. This means there will be a period where the landscape may be without water. With this in mind, planning has focused on building resilience into the environment across the icon site where possible.

The influence of local weather on water scenario planning and flow triggers is very low across the Lindsay-Mulcra-Wallpolla region. 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 Lindsay-Mulcra-Wallpolla. Included in consideration is carryover water, forecasting and inflows. Carryover is particularly important to consider for early year demands (i.e. early spring). The availability of high river flow, and unregulated flows in the River Murray passing the LMW site also ensures higher confidence in water availability for delivery, and increases the likelihood of following a higher usage water scenario.

The nature of the Lindsay-Mulcra-Wallpolla system means that there is little need for consideration of high-priority carryover. Weir pools and thus backwaters, are maintained through operational requirements. Some anabranch systems are naturally engaged at Full Supply Level (FSL), and hence will receive water under operation conditions. There are no wetlands across the region which have a requirement for essential annual watering. The naturally ephemeral nature of the landscape means drying of sites (predominantly wetlands) is generally considered part of the natural cycle in this region. Mullaroo Creek, a regulator-controlled anabranch, may be the closest for consideration of high-priority carryover across Lindsay-Mulcra-Wallpolla for the following year. The anabranch maintains a significant population of Murray cod, and cessation of flow will significantly impact this site. Flows to this site are closely associated with water level of the Lock 7 weir pool, hence operations, and management of the Mullaroo Regulator. Water use for this site is quite small across the year (majority of water flows along this anabranch, before re-joining with the River Murray downstream via Lindsay River) and generally not accounted separately (but as part of the Lock 7-9 and 15 annual Unders and Overs modelling).

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

8.1 Drought

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

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

The wetlands being planned for delivery under this scenario have reached a critical point in their cycle where inundation is now considered essential to avoid loss of environmental character. Mulcra Horseshoe has been inundated the past three years after being dry for three. A fourth consecutive inundation will help to restore the wetlands ecological character and in achieving the long-term water regime of this site. Watering of these sites will maintain refuge sites across the broader landscape to provide key refuge for fauna and flora as other wetlands undergo drawdown.

At this point, we do not envisage a drought scenario in 2024–25 is feasible. For this to occur there needs to be a significant shift that indicates no in-flows are forecast for the system over a 12-month period.

8.2 Dry

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

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

As well as addressing sites deemed essential under a Drought scenario, sites under a Dry scenario look to continue to build resilience and maintain key functions of wetlands. In addition to the Drought scenario sites, Woodcutters will be watered through this scenario. Planning for this site is now aiming for improvements in condition, not just looking to maintain condition. It also has consideration for long-term (5-10 year) water planning.

Current indications have the 2023–24 water year starting with this scenario. With full storages, high expected carry over and average rainfall forecast, a rapid shift to an Average scenario is likely through even minor catchments in-flows.

8.3 Average

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

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

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

Particular flow triggers used in the consideration for acceptance of this scenario are linked to modelled natural flows. Modelled natural flows in the River Murray, at Lock 9, ≥23,000 ML/d by early August, will facilitate decisions to trigger an Average scenario. Unregulated flows in the River Murray in the two months prior to August should also be a strong consideration for triggering an Average scenario. The reason for these considerations is to replicate natural conditions, which would start to see off-channel creeks to engage, which would generally lead to low level floodplain connectivity as time, and inflow increases.

8.4 Wet

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

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

It is anticipated that under a Wet scenario, inundation of majority of low-lying wetlands will occur via overbank flooding. This results in a lower requirement for delivery of environmental water via pumping. In some instances (i.e. Snake Lagoon Extension) pumping may still be required as these sites have higher commence-to-flow requirements than flows which trigger removal of weirs from the River Murray. Whilst, Bottom Island has a high commence-to-flow requirement, the site will become inaccessible due to increased heights through the Little Mullaroo Creek.

High flows in the River Murray, which result in the removal of all weirs between Wentworth and the South Australian border, will be used to trigger proposed actions under a Wet scenario.

Table 8.1: Proposed environmental watering actions for the Lindsay-Mulcra-Wallpolla Islands under each climatic scenario for 2024-25.

Climate Scenario	Drought		Dry		Average
Expected climatic conditions and water availability	POE 99%		POE 90%		POE 50%
Expected river conditions (including unregulated water, consumptive water, etc.)	Base level river flows in line with minimum operational requirements resulting in regulated conditions.		Low River Murray flows with little to no inflows from storages or tributaries (other than operational releases) resulting in regulated conditions. River Murray flows unlikely to naturally inundate off-channel wetlands and anabranches.		High river flows resulting from releases from storage or minor high tributary inflows. River Mu be operating under either regul unregulated conditions. Wetlar anabranches may receive natur
Environmental objectives	Maintain critical wetland habitat		Maintain and protect critical habitat at key sites		Maintain condition of floodplai
Priority watering actions/wetlands expected to be delivered 2020/21 **Tier 1:** Critical actions, expect to be able to deliver given the expected water availability and operational restraints.	**Tier 1**		**Tier 1**		**Tier 1**
	Mulcra Horseshoe#	1,000	Mulcra Horseshoe#	1,000	Mulcra Horseshoe#
	Woodcutters	70	Woodcutters	70	Woodcutters
Estimated environmental water requirement	**1,070 ML**		**1,070 ML**		

Table 8.2 Proposed management of wetlands and off-channel systems connected to the weir pool, prioritised under each climatic scenario (See

Appendix 2 - Proposed two-year hydrographs)

Climate Scenario	Drought		Dry		Average		Wet*	
Wetlands managed via weir pool manipulation R – Connected during weir pool raising F – Connected at full supply level O – Regulator operation D – Drying phase N – Natural flooding	Websters Lagoon	D	Websters Lagoon	D	Websters Lagoon	D/N	Websters Lagoon	N
	Mullaroo Creek	O	Mullaroo Creek	O	Mullaroo Creek	O	Mullaroo Creek	N
	Potterwalkagee via Stoney Crossing	F	Potterwalkagee via Stoney Crossing	R	Potterwalkagee via Stoney Crossing	R	Potterwalkagee via Stoney Crossing	N
	Upper Potterwalkagee Creek	D	Upper Potterwalkagee Creek	R	Upper Potterwalkagee Creek	R	Upper Potterwalkagee Creek	N
	Lindsay River North	R	Lindsay River North	R	Lindsay River North	R	Lindsay River North	N
	Lindsay River South	D	Lindsay River South	D	Lindsay River South	D	Lindsay River South	N

* Under a wet scenario the relevant weirs will be stripped, and unregulated flows will have already achieved desired inundation and ecological outcomes for all weir pool managed sites. All regulating structures will be open under this scenario.

NOTE: Water use for wetlands and off-channel systems connected to the weir pool is undertaken through a model incorporating water use, or savings relating to weir pool heights. As an example, in 2017-18 the total environmental water use across locks 7, 8, 9 and 15 was 3,274 ML.

9 Risk Management

The risk management section is specifically targeted for this proposal and should be reassessed if changes are made to the watering schedule.

Table 9.1 Risk assessment of watering of sites across the Lindsay-Mulcra-Wallpolla for 2024-25

Risk category	Risk description	Pre-Mitigation Risk			Mitigation actions	Lead organisn. for action	Residual Risk Rating	Risk type Static or 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.	Possible	Minor	Low	• Planned deliveries can be interrupted and rescheduled with minimal impact on outcomes • Weir pool manipulations may be curtailed in high demands periods • Consult MCMA to prioritise watering actions that will have outcomes severely affected if delivery is interrupted and liaise with DEECA and MDBA to plan avoidance of interruptions	MCMA MDBA VEWH	Low	Static
Environment	Maintenance activities by the storage operator or constructing authority affect the ability to deliver water to sites.	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.	Possible	Minor	Low	• Watering proposals to identify potential impacts (e.g. flooding footprint overlaid with key land roads and recreational assets) and ensure proposed watering plans are communicated to land mgrs. • Land Managers implement the required management activities prior to and during environmental watering events. This includes: • identification of impacted assets • preparation of resources required (e.g. signage, maintenance of alternative recreational sites) to implement road, walking track and campsite closures and to direct users to alternative sites • communication of planned events, access closures and alternative recreational opportunities ** Note that insufficient resources may limit the land manager's ability to implement management activities. Increased resources may reduce the likelihood of the risk description occurring.*	MCMA Parks Vic	Low	Static
Business Costs	Park visitor vehicles cause damage to tracks, or to other assets in the surrounding landscape, due to off-road activity (by users going off track to avoid floodwaters) during and after environmental watering	Likely	Moderate	Medium	Land Managers: • implement management activities to prevent access to flooded roadways (e.g. close roads, communicate planned events, install signage) • repair damage during and after environmental watering events • Consider rationalisation of road networks to remove unwanted access tracks and improve the standard of retained tracks. ** Note that insufficient resources may limit the land manager's ability to implement management activities. Increased resources may reduce the likelihood of the risk description occurring.*	Land Manager	Low	Static
Legal	Access routes into public park areas may be inundated by delivery of environmental water, leading to potential economic impacts on commercial operators.	Possible	Minor	Low	• Communication and advice to commercial operators to alert them of environmental watering, via Land Manager as licensing authority.	MCMA	Low	Static

Environment	Delivery of greater volumes than ordered may result in an overdraw of environmental water account, leading to water not being available as per approved watering statement to complete subsequent planned actions	Unlikely	Minor	Low	• Monitor ABA balances and undertake regular communications with CMA as part of usage monitoring and portfolio management activities. • Monitor deliveries in progress to ensure that they align with ordered/approved volumes. This may include consultation via the OAG to cover all sites	VEWH MCMA	Low	Static
Business Costs	Costs exceed approved VEWH funding for delivery actions at a site basis, leading to impacts on watering activities (including possibly cessation of deliveries).	Possible	Moderate	Medium	• Develop accurate costings including allowances for planned risk mitigation actions and tracking of actuals against estimates. • Reallocate funding, based on proposals developed by MCMA. • Ensure specifications for service providers include coverage of contingency measures	MCMA VEWH MCMA	Low	Static
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 TOs* *Time for undertaking assessments is biggest risk to implementing watering actions*	Possible	Minor	Low	• Develop accurate costings including allowances for planned risk mitigation actions, and tracking of actuals against estimates. • Undertake early assessments to identify potential cultural heritage issues and include in planning, with appropriate contingency allowances • Reallocate funding within the overall funding contract, based on proposals developed by MCMA. *Note: potential future recognition of joint management arrangements with TOs may see a need for provision of funding.*	MCMA MCMA VEWH	Low	Dynamic

Legal	Failure to recognise cultural heritage issues at a site targeted for watering may result in necessary permits and approvals not being obtained, leading to prosecution and fines.	Likely	Moderate	Medium	• Undertake desktop reviews and site assessments of footprint of activities being undertaken with archaeologists, traditional owners and land managers, to identify approval needs and contingency measures - standard practice for all sites. • Obtain any necessary formal approvals/permits and implement required actions. • Monitor developments from VFMRP assessment process and adapt and apply procedures as required (noting that some of this information has not yet been entered into ACRIS) • Apply MCMA cultural heritage site assessment processes	MCMA	Low	Dynamic
Environment	Total cost of proposed delivery actions exceeds the funding that can be provided by VEWH, limiting scope of the program and not achieved planned environmental outcomes	Possible	Minor	Low	• Prioritise funding and site selection in line with available resources. • Undertake preliminary assessment of costs during development of proposals and scoping of the plan.	VEWH	Low	Static
Reputational	Reporting of water usage and updating of water register lags behind deliveries, leading to possible overuse of environmental entitlements and incorrect reporting of "water used/available" in the water market, with implications for efficient functioning of the water market.	Possible	Major	Medium	• Post estimated usage to water register during or immediately after delivery and adjust for actuals as soon as possible. •Review water accounting processes to identify any opportunities for improvement. • Regular reporting of delivery volumes and progress to VEWH	GMW Storage Operators MCMA	Low	Static
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.	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 *- residual risk not rated, to be addressed in relevant delivery plan*	MCMA		Dynamic

Environment	Failure of delivery infrastructure or water monitoring assets (including water meters) may result in interruptions to watering actions, leading to failure to achieve environmental objectives. (includes failure of temporary works)	Possible	Minor	Low	• Ensure asset ownership is clear and asset owners undertake pre-event inspections and maintain assets as required*. (including electrical supply to Hattah pumps). • Undertake operational monitoring during each event and respond as necessary to prevent failures. This may include float switches to prevent high water levels, and trail cameras for real time monitoring if risk level warrants. • Ensure levees designs are fit for purpose and address trafficability needs or control traffic access to levees etc. to ensure safety •Require inspections to ensure temporary levees are built according to specifications during construction, and prior to commencement of delivery • Site selection for pump and meter to minimise potential for damage, including protection of meter from falling tree limbs or other damage if required. • Develop agreed accounting process to estimate delivery volumes in the event of meter damage/data loss **Note that insufficient resources are likely to limit the asset owner's ability to perform maintenance and inspections. Increased resources may reduce the likelihood of the risk occurring.*	MCMA / Asset Owner VEWH/ GMW	Low	Dynamic
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

Reputational	Noise impacts from temporary pumping installations lead to complaints and adverse publicity, and potentially EPA noise pollution enforcement actions	Unlikely	Minor	Low	• Site selection and pump placement to minimise noise impacts. • Selection of quiet pumping equipment and installation of noise suppression measures. •Ensure that pumping contractors check and maintain equipment • Consider curtailing pumping during peak camper visitation periods for public land sites.	MCMA	Low	Dynamic
Safety	Water delivery infrastructure (including temporary pumps etc.) creates safety risks for public. *Note: Water deliveries may also encourage increased visitation to particular sites.*	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	Unlikely	Minor	Low	• Monitoring climate forecasts and developing contingency plans for possible changes to actions. • Identify any potential changes to proposed actions arising through SCBEWC • Communicate potential for changes to watering actions to stakeholders and the wider community. • Review MCMA register of structures and ensure that structures are adjusted/operated as necessary in light of changed conditions. • Implement more responsive procurement processes to allow adaptation to changing conditions (e.g. ability to promptly engage pumping contractors)	MCMA VEWH MCMA MCMA MCMA	Low	Dynamic
Legal	Environmental deliveries cause unauthorised inundation of private land, resulting in impacts on farm activities and assets.	Unlikely	Moderate	Low	• Update and ensure currency of any applicable agreements covering inundation of private land. • Review previous watering events to identify any high-risk locations and develop specific actions as appropriate. • Undertake site inspections prior to commencement of deliveries to identify new risk areas for action (including consideration of risks to property access routes). • Inform landholders of intended watering actions and provide a contact number to call if they become aware of issues during the event.	MCMA	Low	Static

Environment	Other environmental water managers' competing priorities and objectives may limit the ability to achieve intended objectives. (E.g. weir pool lowering prevents deliveries to Lindsay/Wallpolla)	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.	MCMA	Low	Dynamic
Business Costs	Insufficient resources available (including staff, funding for maintenance of roads, regulators, pumping etc), across partner organisations to deliver all planned environmental watering actions, leading to cancellation or interruptions of deliveries and/or impacts to roads and infrastructure etc (esp. in PV areas). *Note:* *- This risk relates to unplanned resource shortfalls, for example where Parks staff are diverted to bushfire duties with no advance warning.* *- Causes of risk may also include shortage of service providers, rather than just staff shortages.* *Assessment relates to 2024-25 conditions*	Possible	Minor	Low	• 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. *Note: also requires site specific assessments*	MCMA MCMA MCMA	Low	Dynamic

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. • Undertake on-ground inspections to assess changes to landform due to flood related erosion that may impact e-water delivery routes. Consider need for LIDAR survey in some locations significantly impacted. *Note: Especially relevant for PV environmental and cultural access approvals.*	MCMA MCMA Land Managers VEWH MCMA MCMA	Low	Dynamic
Service Delivery	Environmental water deliveries may impact adversely on infrastructure or land management works (e.g. fire mgmt. works, kangaroo census and culls etc.) that are being undertaken by other stakeholders.	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. *- residual risk not rated, to be addressed in relevant delivery plan*	MCMA		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. Note: The likelihood of this risk increases when a sequence of dry years concentrate pest animal on environmental watering sites.	Likely	Moderate	Medium	• Study/understand life history of species and develop high level management strategies. • Develop and implement site specific management strategies aimed at eradication/control of existing populations (e.g. carp management strategy, willow removal program, water-lily spraying program, feral animal programs) in high risk locations. This mitigation may also require collaborative effort from private landholders and could offer opportunities for community participation but may be limited by availability of resources by partners. •Implement pest reduction efforts prior to delivery of water, to ensure increases in populations remain within "tolerable" levels	DELWP MCMA or Land Manager	Low	Static

Environment	Introduction of pest plants through works (including importation of fill) to establish pump sites and levees results in environmental impacts.	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
Reputational	Failure to demonstrate the benefits of environmental watering and/or community concerns over environmental watering actions reduce community support for environmental watering.	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 TOs, with regard to potential erosion and flood impacts from 22-23 • PV assessment of cultural heritage aspects of watering proposals	MCMA MCMA PV	Low	Static

Safety	People camping on floodplains may be displaced by environmental water deliveries and may be aggressive towards e-water staff as a result N*ote: 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. - *residual risk not rated, to be addressed in relevant delivery plans based on individual site conditions*	MCMA		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 - *residual risk not rated, to be addressed in relevant delivery plan based on relevant salinity status of sites*	MCMA		Static
Environment	Pest fish species (esp. carp) may breed in improved conditions after water is delivered to Murray Hardyhead sites, impacting on native fish populations.	Unlikely	Major	Low	• Delivery plans will include actions to manage salinity in key sites at >25,000 EC outside breeding periods to control carp numbers, and at <5,000 EC during breeding in Spring/Autumn.	MCMA	Low	Dynamic
Environment	Volumes delivered are insufficient to meet hydrologic targets, due to high losses at very dry sites. (e.g. Wallpolla East)	Unlikely	Minor	Low	• Review delivery plans to allow for higher losses, which will be managed within the total volumes available for all Murray system sites. • If losses exceed maximum pumping rates, consider cessation of deliveries • Seek approval from VEWH for reallocation of water between sites and/or watering statements as required	MCMA	Low	Dynamic

Legal	Inappropriate operation of Mullaroo Ck. regulator may result in lower flows compared to previous watering events and lead to elevated salinity levels, with potential impacts on irrigation users in Lindsay River	Unlikely	Moderate	Low	• Ensure agree operating rules for river system and regulators are being implemented. • Undertake planning and communications to co-ordinate regulator operations with other river management activities (e.g. weir pool level manipulations) • Monitoring of event and provision of advice to river operators if adverse water quality conditions are developing. • Adjust flows to dilute high salinity water. • Adjust river operations to minimise impacts on other users.	MCMA MCMA MCMA MDBA MDBA	Low	Static
Environment	A failure to effectively co-ordinate watering actions in the Lindsay, Wallpolla and Mulcra area may lead to Lock 7-9 weir pools being below the levels needed to deliver planned watering actions, resulting in a failure to achieve planned environmental outcomes. *Note: Coordination will sometimes mean not all desired actions can be undertaken when balancing competing demands.*	Possible	Minor	Low	• Coordination of watering actions through OAG meetings and also through SCBEWC as necessary *Note: This risk is also likely to have reputational consequences. The overall rating for reputational risk is also Medium, and the mitigation identified above is applicable for addressing both the environmental and reputational risks.*	MCMA (& VEWH)	Low	Static
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

Safety	A failure to share information regarding potential site-specific safety concerns in relation to negative community sentiment in relation to government decisions/actions creates a safety risk for staff involved in environmental watering actions **This is state wide risk, but may not apply in all systems - the risk rating will reflect local risk levels*	Possible	Moderate	Medium	• Share intelligence around any known instances of risky or aggressive behaviour at watering sites between partners. Note: Accountability for individual staff safety lies with the employing agency via implementation of their own OHS safe work requirements and other associated policy and procedures. This risk is therefore not addressed within this assessment.	All	Low	Static

10 Approval, Endorsement and Consent

WATERWAY MANAGER APPROVAL OF THE SEASONAL WATERING PROPOSAL
I, the authorised representative of the agency shown below, approve the Seasonal Watering Proposal for the Lindsay, Mulcra and Wallpolla islands system in 2024-25. SIGNED FOR AND ON BEHALF OF MALLEE CATCHMENT MANAGEMENT AUTHORITY Signature of authorised representative: Name of authorised representative: James Kellerman Position of authorised representative: General Manager Operations and Community Date: 19/4/2024

ENDORSEMENT OF THE SEASONAL WATERING PROPOSAL				
I, the authorised representative of the agency shown below, approve the Seasonal Watering Proposal for the Lindsay, Mulcra and Wallpolla islands system in 2024-25.				
Role	**Endorsing partner**	**Representative Role**	**Status Date**	**Notes/Comments**
Storage Manager	Goulburn Murray Water	Andrew Shields *River Operations Manager*	☒ Endorsed. Date: 18/04/2024	*Endorsement via letter.*
Water Corporation	Lower Murray Water	Vijay Ignatius *Manager Water Quality and Environment Title*	☒ Endorsed. Date: 12/04/2024	*Endorsement via letter.*
Water Infrastructure Manager	SA Water	Garry Fyfe *Senior Manager – River Murray Operations*	☒ Endorsed. Date: 19/04/2024	*Endorsement via letter.*
Land Manager	Parks Victoria	Don Arnold *District Manager North West*	☒ Endorsed. Date: 19/04/2024	*Endorsement via email.*
Traditional Owner	First People of the Millewa Mallee Aboriginal Corporation	Ken Knight *Interim Chief Executive Officer*	☒ Endorsed. Date: 19/04/2024	*Endorsement via letter.*

11 References

DELWP. (2019). *Risk Management Guidelines by the Victorian Managed Insurance Authority (VMIA).* Department of Environment, Land, Water and Planning.

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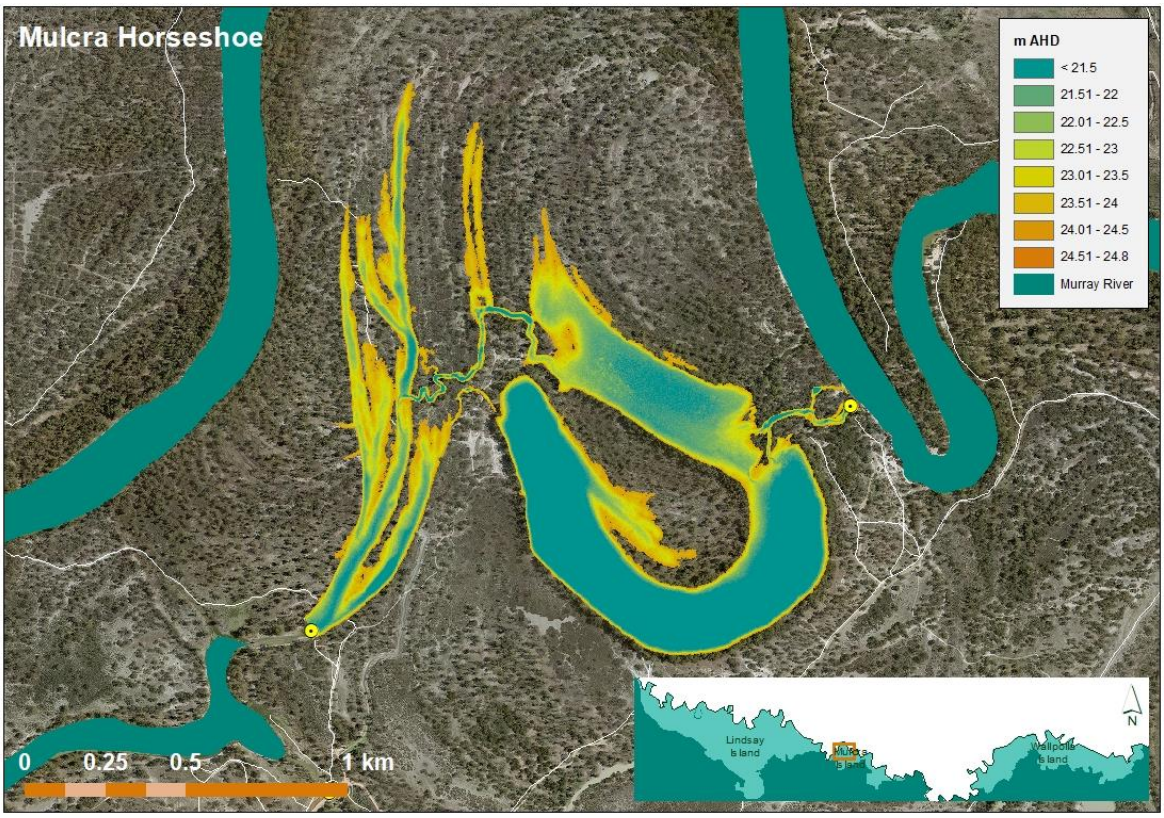
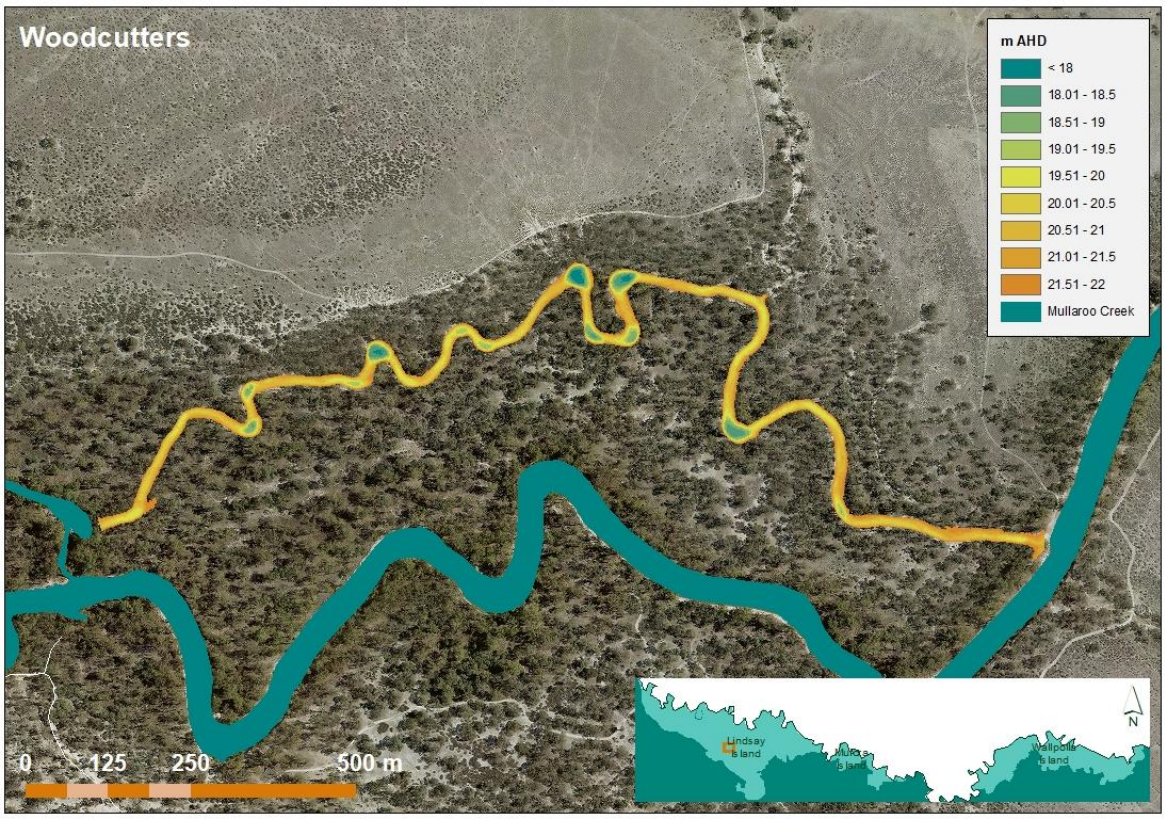
Tonkin, Z., Kitchingman, A., Moloney, P., Hackett, G., O'Mahony, J., & Lyon, J. (2019). *Murray cod movement and population structure inthe Lindsay Island anabranch system.* Heidelberg, Victoria: Arthur Rylah Institute for Environmental Research.

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

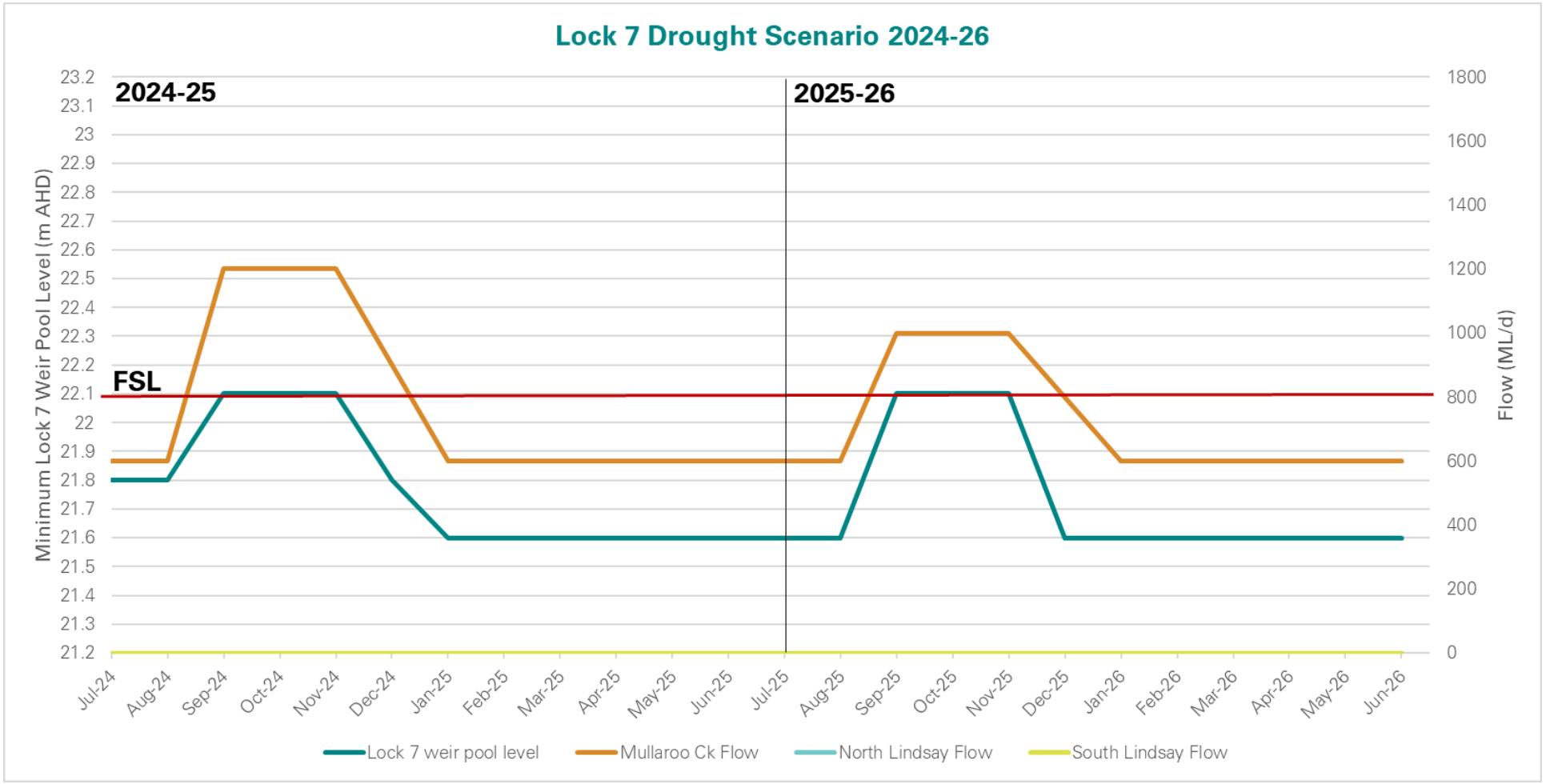
12 Appendices

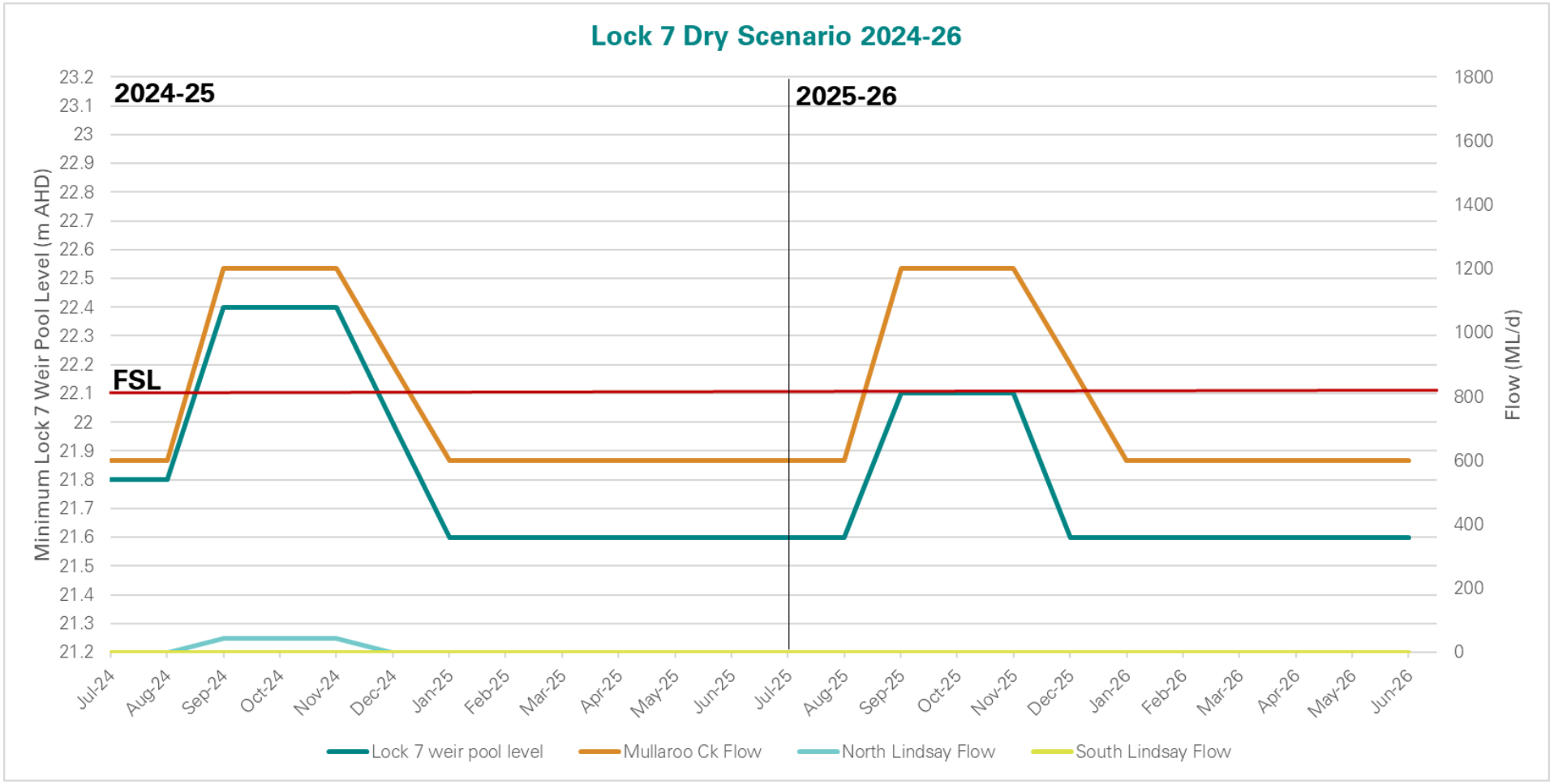
Appendix 1 - Site Maps





Appendix 2 - Proposed two-year hydrographs




Lock 7 Dry Scenario 2024-26
2024-25
2025-26
FSL
Minimum Lock 7 Weir Pool Level (m AHD)
Flow (ML/d)
23.2
23.1
23
22.9
22.8
22.7
22.6
22.5
22.4
22.3
22.2
22.1
22
21.9
21.8
21.7
21.6
21.5
21.4
21.3
21.2
1800
1600
1400
1200
1000
800
600
400
200
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Jul-24
Aug-24
Sep-24
Oct-24
Nov-24
Dec-24
Jan-25
Feb-25
Mar-25
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May-25
Jun-25
Jul-25
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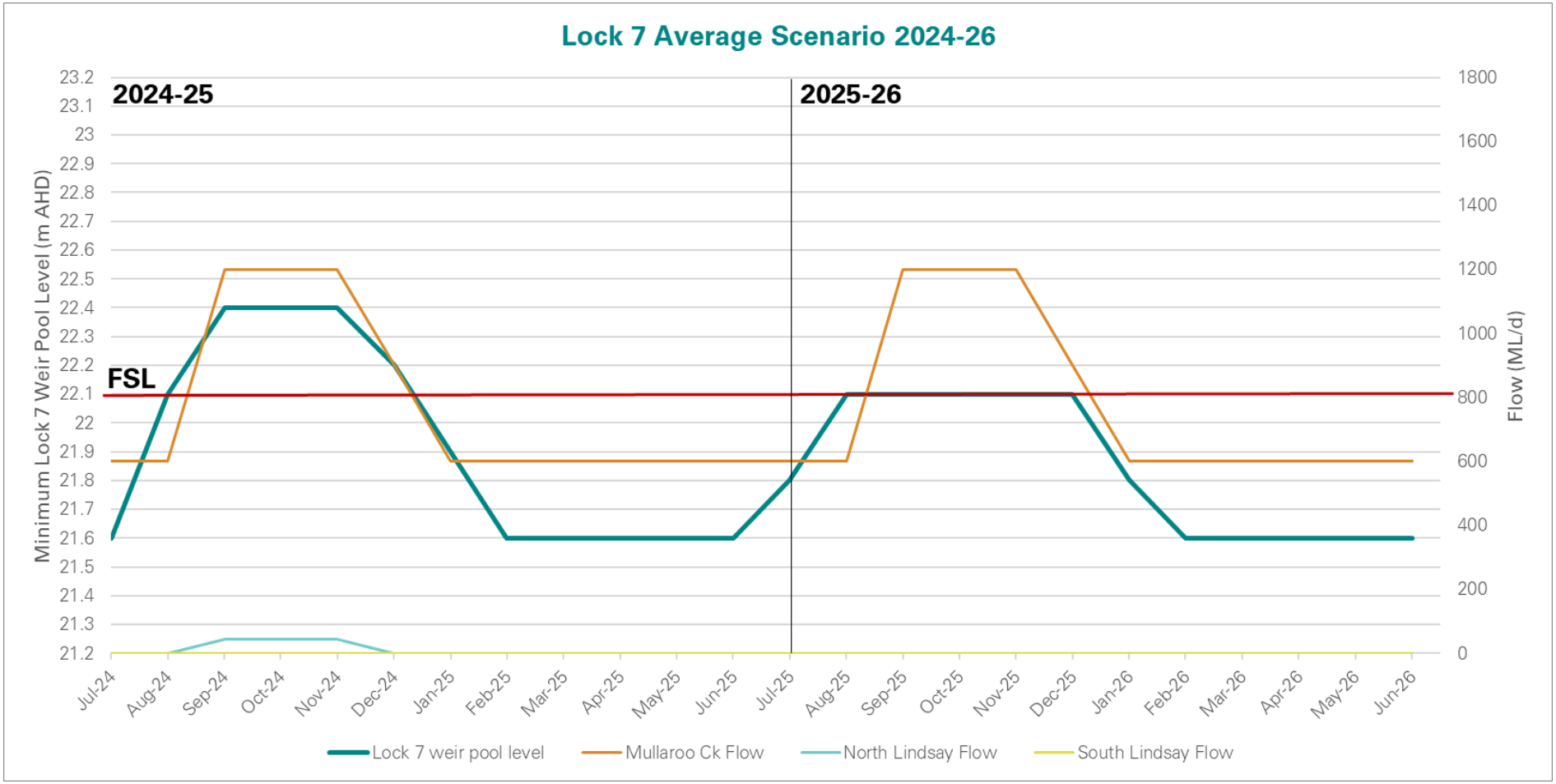
Dec-25
Jan-26
Feb-26
Mar-26
Apr-26
May-26
Jun-26
Lock 7 weir pool level
Mullaroo Ck Flow
North Lindsay Flow
South Lindsay Flow


Lock 7 Average Scenario 2024-26
2024-25
2025-26
FSL
Minimum Lock 7 Weir Pool Level (m AHD)
Flow (ML/d)
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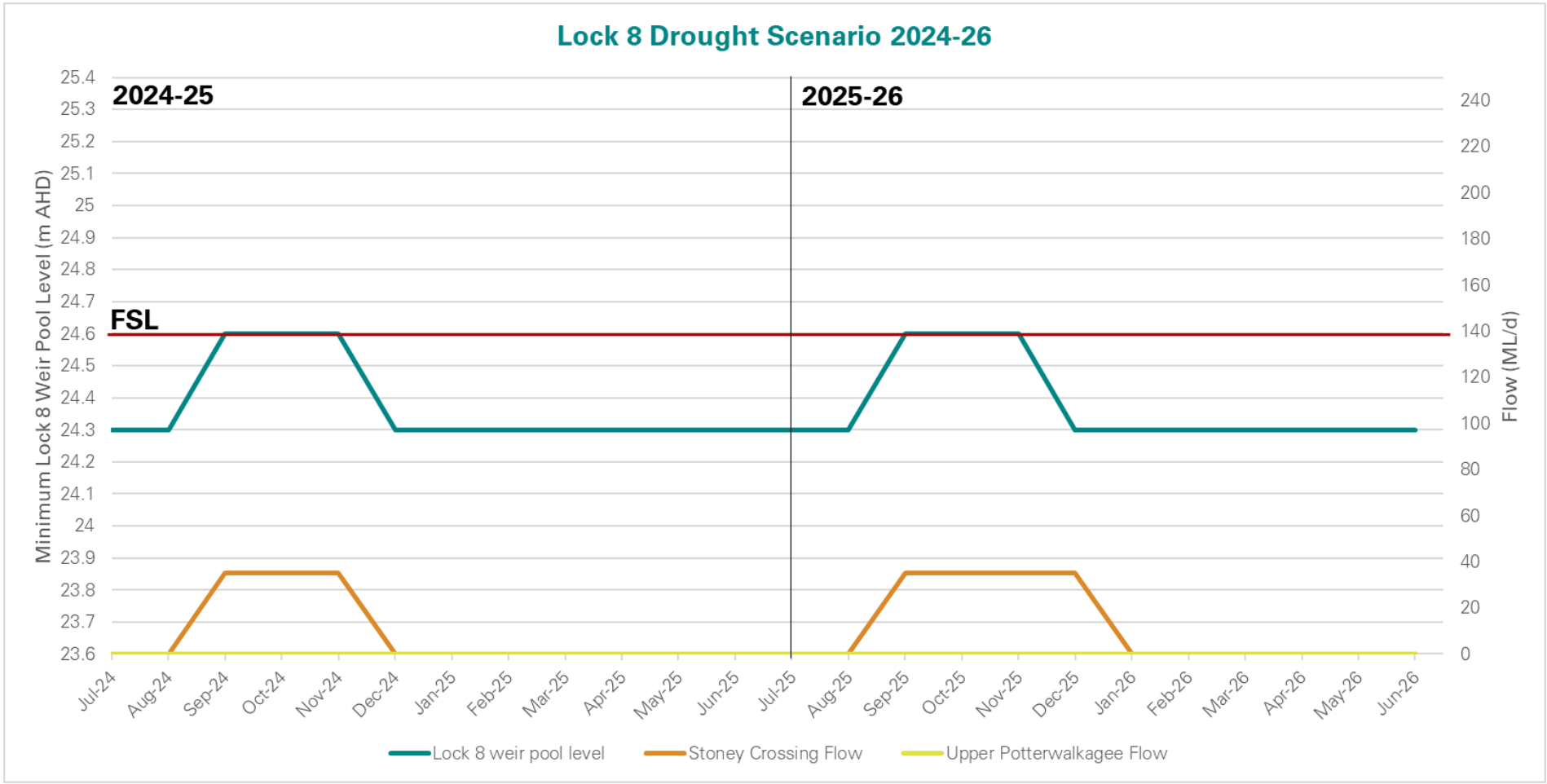
Lock 7 weir pool level
Mullaroo Ck Flow
North Lindsay Flow
South Lindsay Flow


Lock 8 Drought Scenario 2024-26
2024-25
2025-26
FSL
Minimum Lock 8 Weir Pool Level (m AHD)
Flow (ML/d)
25.4
25.3
25.2
25.1
25
24.9
24.8
24.7
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23.8
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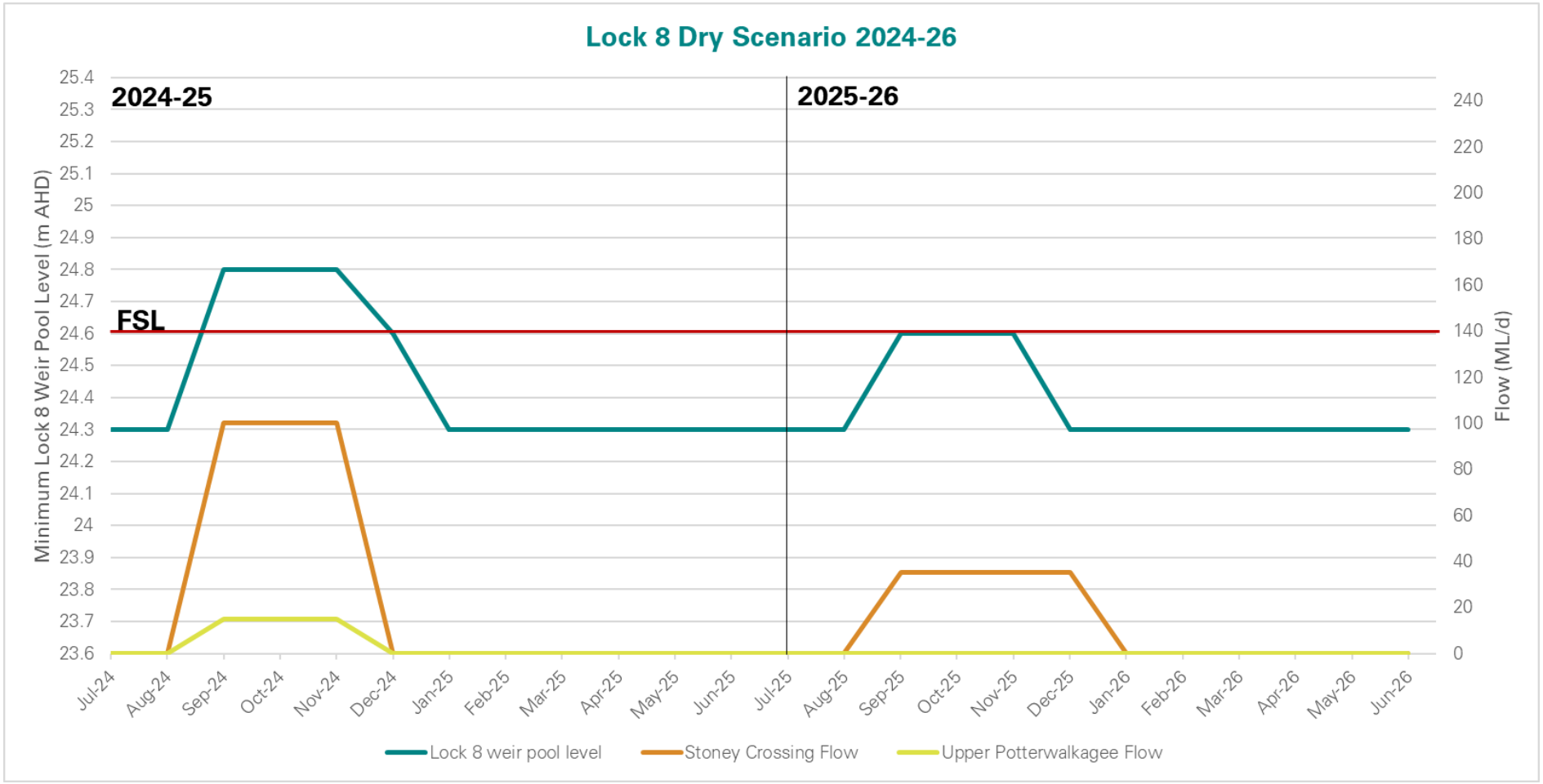
Lock 8 weir pool level
Stoney Crossing Flow
Upper Potterwalkagee Flow


Lock 8 Dry Scenario 2024-26
2024-25
2025-26
FSL
Minimum Lock 8 Weir Pool Level (m AHD)
Flow (ML/d)
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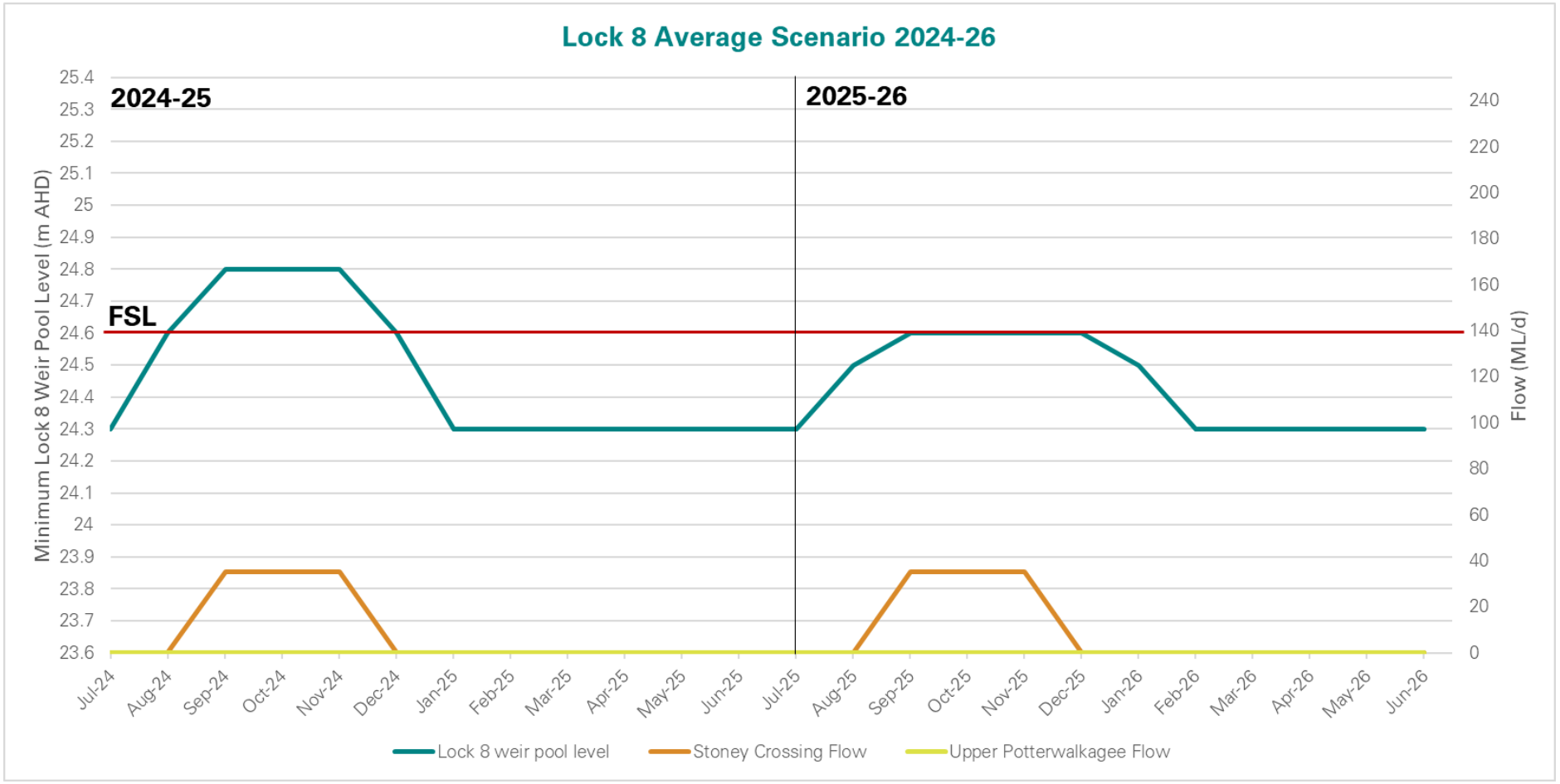
May-26
Jun-26
Lock 8 weir pool level
Stoney Crossing Flow
Upper Potterwalkagee Flow


Lock 8 Average Scenario 2024-26
2024-25
2025-26
FSL
Minimum Lock 8 Weir Pool Level (m AHD)
Flow (ML/d)
25.4
25.3
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Dec-25
Jan-26
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Mar-26
Apr-26
May-26
Jun-26
Lock 8 weir pool level
Stoney Crossing Flow
Upper Potterwalkagee Flow

Appendix 3 - Acronyms, Abbreviations and Glossary

Acronyms and abbreviations

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

Glossary

Term	Description
Australian Height Datum (AHD)	The Australian Height Datum is the official national vertical height datum in Australia. It refers to a number of previously used height datums and passes through the approximate mean sea level.
Blackwater	A natural occurrence caused by the breakdown of plant matter causing the water to discolour. The water appears black and in some instances may 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.

Term	Description
Drawdown	Water released from a dam or reservoir at the end of the irrigation season for the purposes of its operation and/or maintenance.
Environmental objectives	Measurable target outcomes for each environmental value in the system, to be achieved by ongoing implementation of one or more watering actions as well as complementary actions (such as controlling invasive species or installing fishways). Target outcomes may take years or several decades to achieve.
Environmental Water Management Plan	A plan developed by a waterway manager setting long-term environmental objectives and based on consultation with key stakeholders, local community, and advisory groups to inform the seasonal watering proposal for the particular system.
Expected watering effect	The physical, chemical, biological, or behavioural effect expected from a potential environmental watering action. Each potential environmental watering action will have one or more expected watering effects.
Land manager	An agency or authority responsible for conserving natural and cultural heritage on public land including parks and reserves (such as Parks Victoria and DELWP).
Low flow	A relatively stable, sustained, and low flow in a river, generally being its minimum natural level.
Megalitre	One million (1,000,000) litres.
Operational release	A release made from a major storage to enable the water distribution system to operate or to make water available to consumptive water users
Potential environmental watering action	An environmental flow component that has been identified for a particular system in a particular year.
Program partners	Are those organisations with a responsibility for delivering some part of the environmental watering program. It includes waterway managers, storage managers, land managers, environmental water holders. In some areas, Traditional Owners, scientists, and community members may also be program partners.
Recruitment	The increase in plants or animals when they survive to the settlement or maturity stage.
Seasonal watering plan	The VEWH's annual operational document, that outlines potential environmental watering across the state in the forthcoming water year.
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.

Term	Description
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.
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 12.1 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 12.2 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 12.3 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).	Cost impact on total budget between >20%.	• Single or multiple deaths or severe permanent disability or illness (physical/mental) of staff, visitor, contractor, or	• Organisation wide morale issues and absenteeism. • >50% staff turnover. • Staff are not skilled to meet	• 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.	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	• 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	• Very serious potential impact on heritage sites/artefacts • Destruction of cultural heritage items or values

		• Impacts environmental values state-wide.		member of the public.	core corporate outputs.	• On-going or prolonged negative public interest (correspondence and phone calls) and political interest (in Parliament).	• negative precedent requiring very serious impact and major reform to the department; and/or • severe sanctions imposed by external regulator.	delivery or project/program objective is not met	

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