

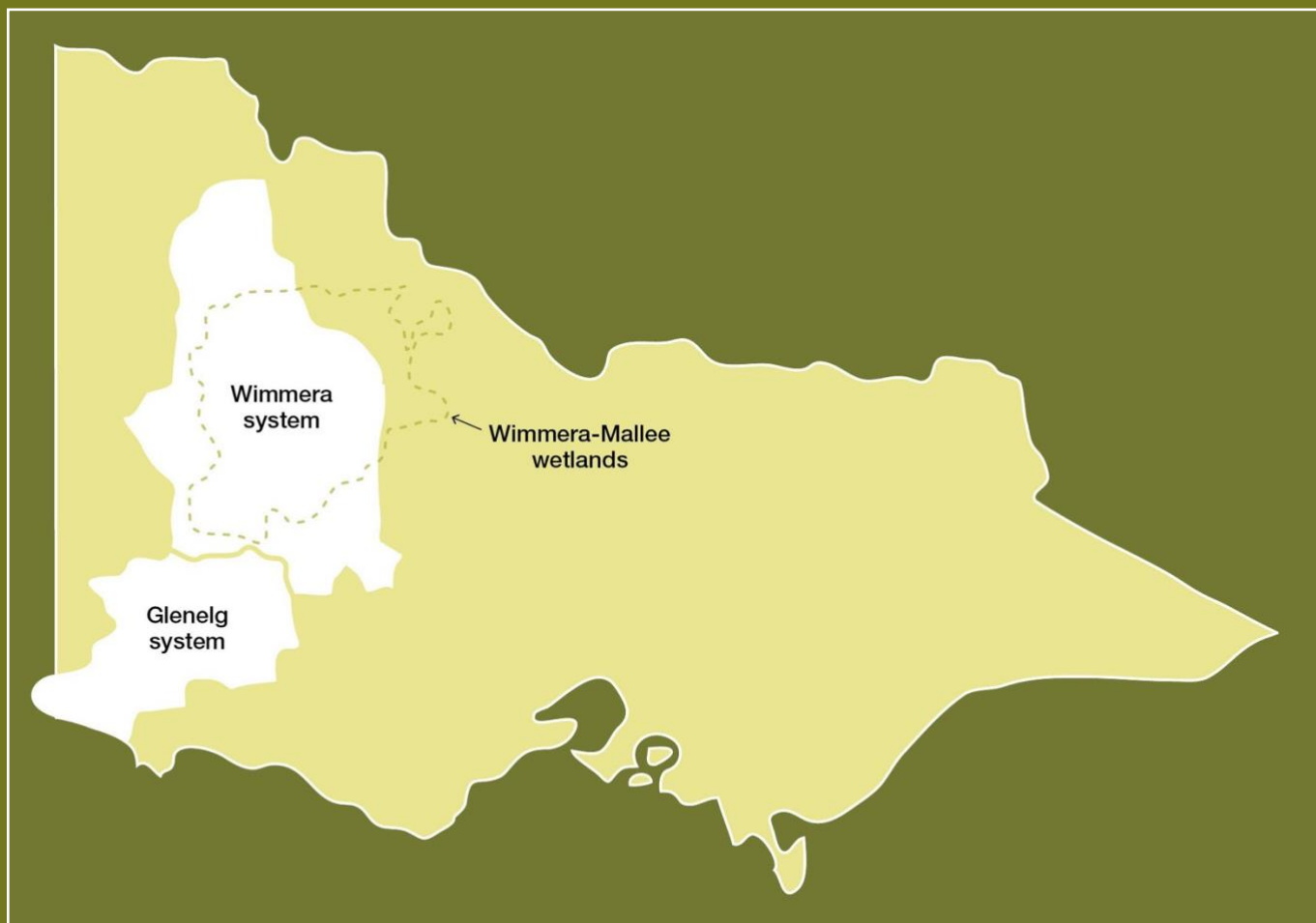
Seasonal Watering Plan 2023-24

Section 4



Section 4

Western region



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4.1 Western region overview

The systems in the western region that can receive water from the VEWH's environmental entitlements are *Bochara-Bogara-Pawur* (Glenelg River), the Wimmera River system and the Wimmera-Mallee wetlands. The Wimmera River system and Wimmera-Mallee wetlands are part of the Murray-Darling Basin, although *Barringgi Gadyin* (Wimmera River) ends in terminal lakes without directly flowing into the Murray River.

Water for the environment in the western region is supplied from the Wimmera-Mallee System Headworks, which is a series of on-stream reservoirs, off-stream storages and connecting channels that harvest water (mainly near the Grampians) and distribute it to entitlement holders throughout the Wimmera catchment and parts of the Avoca, Loddon, Glenelg and Mallee catchments.

The Wimmera and Glenelg systems share water available under the *Wimmera and Glenelg Rivers Environmental Entitlement 2010*, and the VEWH works with the Wimmera and Glenelg Hopkins CMAs to determine how available allocation will be used in each river in a given year. An additional volume of water is available to the Glenelg River as a compensation flow account. The Commonwealth Environmental Water Holder (CEWH) also holds entitlement in the Wimmera system that can be used to supply the Wimmera River and lower Mount William Creek systems. Water for the environment available to the Wimmera-Mallee wetlands is provided under the same entitlement but not shared with the Glenelg system. Instead, the water is available for use in small wetlands supplied by the Wimmera-Mallee Pipeline across the Wimmera, Mallee and North Central CMA areas.

Environmental values, objectives and planned actions for each system in the western region are presented in the following system sections.

Traditional Owners in the western region

Traditional Owners and their Nations in the western region have deep connections to Country that have endured for tens of thousands of years. These include inherent rights and cultural obligations to Country and community.

The Barengi Gadjin Land Council Aboriginal Corporation, Dja Dja Wurrung Clans Aboriginal Corporation and Gunditj Mirring Traditional Owners Aboriginal Corporation are the Registered Aboriginal Parties under the *Victorian Aboriginal Heritage Act 2006* for waterways covered by this section of the seasonal watering plan.

The Burrendies Aboriginal Corporation (based in South Australia) works in partnership with the South East Aboriginal Focus Group (SEAFG), which as First Nations from the South East of South Australia, have ancestral connections across Bunganditj/Boandik Country from the Limestone Coast region in South Australia to the western parts of the Glenelg River catchment in Victoria. The SEAFG ancestral connections include Tanganekald (Southern Clans), Tatiara/Ngarkat, Meintangk/Moandik/Mootatunga/Thangal, Potaruwutij/Pinejunga, Wichantunga/Wattunga and Bunganditj/Boandik.

The SEAFG has had some engagement around Victorian water initiatives, including the 2009 *Western Region Sustainable Water Strategy*, the 2013 *Wimmera Waterway Strategy* and increased engagement through Burrendies in the Glenelg Cultural Flows discussions starting around 2017.

In 2005, the Wotjobaluk, Jaadwa, Jadawadjali, Wergaia and Jupagalk peoples, who are often referred to collectively as the Wotjobaluk Peoples and who are represented by the Barengi Gadjin Land Council, were recognised in a Native Title

Consent Determination under the Commonwealth *Native Title Act 1993*. The Barengi Gadjin Land Council also entered into an Indigenous Land Use Agreement with the Victorian and Australian governments in 2005. In 2022, the Victorian Government Gazette published the Barengi Gadjin Land Council Natural Resource Agreement under the *Traditional Owner Settlement Act 2010*. It pays homage to the trailblazers of 2005.

In 2007, the Gunditjmara people were granted nonexclusive native title rights and interests over almost 140,000 ha of Crown land, national parks, reserves, rivers, creeks and sea in Victoria's western district, and the State of Victoria reached an Indigenous Land Use Agreement with the Gunditjmara People that establishes how they will exercise their rights and interests in the determination area, including the Glenelg River.

In 2013, the Dja Dja Wurrung Clans Aboriginal Corporation entered into a recognition and settlement agreement under the *Traditional Owner Settlement Act 2010* in Victoria. Under the agreement, Dja Dja Wurrung people have rights to access and use water for traditional purposes, providing the take of water does not affect other parties.

The Eastern Maar Aboriginal Corporation holds Native Title under the Commonwealth *Native Title Act 1993* and is also a Registered Aboriginal Party within the geographic area.

Some parts of the Wimmera-Mallee wetlands area are on Barapa Barapa Country.

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The Victorian Government is committed to self-determination for Traditional Owners through Treaty negotiations and policies such as *Water is Life: Traditional Owner Access to Water Roadmap 2022*. The VEWH and partners are working with Traditional Owners to embed the outcomes of government policy into the Victorian environmental watering program. Program partners in the environmental watering program are aware that structural changes (such as legislative, policy and governance changes) to how water is managed may be made in the future in recognition of Aboriginal water rights. Program partners have heard that Traditional Owners want empowerment and agency in water management, and in many cases, they want to manage water on Country on their own terms.

Engagement

The environmental watering program is informed by engagement with Traditional Owners, stakeholders and local communities. Program partners undertake extensive engagement at the local level to understand community priorities for the delivery of water for the environment in the coming year.

Program partners also seek to understand how cultural, social, economic and recreational values may be supported by delivering environmental flows. Opportunities to support these values are incorporated into watering decisions where possible and provided they do not compromise environmental outcomes. Cultural, social, economic and recreational values considered for each system in the western region are presented in the following system sections.

Environmental flows objectives are also informed by engagement undertaken through other strategies, plans and processes. These include regional catchment strategies, regional waterway strategies and technical studies (such as environmental flows studies and environmental water management plans). Traditional Owner cultural objectives for environmental water may refer to cultural flow studies, Aboriginal Waterway Assessments, Traditional Owner Country Plans and other tools to influence environmental water planning. These strategies, plans and technical reports collectively describe a range of environmental, economic, social and Traditional Owner perspectives and longer-term integrated catchment and waterway management objectives that influence environmental flows and priorities for water for the environment.

Table 4.1.1 Partners and stakeholders engaged by Glenelg Hopkins Catchment Management Authority in developing seasonal watering proposals for the Glenelg system and other key foundation documents that have directly informed the proposal (grouped in alphabetical order)

Partner/stakeholder	Glenelg system
Community groups and environment groups	<ul style="list-style-type: none"> • Friends of the Glenelg River Inc. • Glenelg River User Group
Government agencies	<ul style="list-style-type: none"> • Department of Energy, Environment and Climate Action • Grampians Wimmera Mallee Water • Limestone Coast Landscape Board • Natural Resources South East (South Australia) • Parks Victoria • Victorian Fisheries Authority • Wimmera CMA
Landholders/farmers	<ul style="list-style-type: none"> • Individual landholders
Local businesses	<ul style="list-style-type: none"> • Glenelg River Boat Cruises • Harrow Discovery Centre • Nelson Boat and Canoe Hire • Paestan Canoe Hire • Vickery Bros (sand extraction)
Recreational users	<ul style="list-style-type: none"> • Casterton Angling Society Inc. • Individual anglers • Kayakers • Southwest Victoria fishing reports • VRFish
Traditional Owners	<ul style="list-style-type: none"> • Barengi Gadjin Land Council • Burrendies Aboriginal Corporation • Gunditj Mirring Traditional Owners Aboriginal Corporation

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Table 4.1.2 Partners and stakeholders engaged by Wimmera Catchment Management Authority in developing the seasonal watering proposal for the Wimmera system and other key foundation documents that have directly informed the proposal (grouped in alphabetical order)

Partner/stakeholder	Wimmera system
Community groups and environment groups	<ul style="list-style-type: none"> • Friends of Bungalally and Burnt Creek Group • Lake Lonsdale Action Group • Yarriambiack Creek Advisory Committee
Government agencies	<ul style="list-style-type: none"> • Commonwealth Environmental Water Office • Department of Energy, Environment and Climate Action • Glenelg Hopkins CMA • Grampians Wimmera Mallee Water • Hindmarsh Shire Council • Horsham Rural City Council • Murray-Darling Basin Authority • Northern Grampians Shire Council • Parks Victoria • Victorian Fisheries Authority • Yarriambiack Shire Council
Landholders/farmers	<ul style="list-style-type: none"> • Wimmera community members, especially landholders and stock and domestic water users
Recreational users	<ul style="list-style-type: none"> • Dimboola Boat and Water Ski Club • Dimboola Fishing Classic • Dimboola Rowing Club • Field and Game • Hindmarsh Ski Club • Horsham Fishing Competition Inc. • Horsham Triathlon Committee • Jeparit Anglers Club • Murtoa Angling Club • Natimuk Lake water ski club • Paddle Victoria • Stawell and District Angling Club • VRFish • Warracknabeal Angling Club • Wimmera Anglers Association
Traditional Owners	<ul style="list-style-type: none"> • Barengi Gadjin Land Council

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Table 4.1.3 Partners and stakeholders engaged by Mallee Catchment Management Authority, North Central Catchment Management Authority and Wimmera Catchment Management Authority seasonal watering proposals for the Wimmera-Mallee wetlands and other key foundation documents that have directly informed the proposals (grouped in alphabetical order)

Partner/stakeholder	Wimmera-Mallee wetlands
Community groups and environment groups	<ul style="list-style-type: none"> • Berriwillock Landcare • Birchip Cropping Group • Birchip Landcare Group • Cokum community group • Community members on the Mallee CMA Land and Water Advisory Committee • Culgoa Landcare • Curyo-Watchupga Landcare • Donald and District Landcare Group • Green Lake Regional Park • Hopetoun Landcare • Lake Tuhum Committee • Lalbert Landcare • Millewa-Carwarp Landcare • Nullawil Landcare • Ouyen Lake Project • OzFish Unlimited • Sea Lake Landcare • Ultima Landcare • Waitche Landcare • Wimmera Bushwalking Club • Woomelang-Lascelles Landcare
Government agencies	<ul style="list-style-type: none"> • Buloke Shire Council • Commonwealth Environmental Water Office • Department of Energy, Environment and Climate Action • Grampians Wimmera Mallee Water • Mallee CMA • Mildura Rural City Council • North Central CMA • Parks Victoria • Wimmera CMA • Yarriambiack Shire Council
Landholders/farmers	<ul style="list-style-type: none"> • Private landholders • Wimmera-Mallee Pipeline Environmental Water Advisory Group (North Central CMA)
Local businesses	<ul style="list-style-type: none"> • Ouyen Lake Project • Wimmera Mallee Tourism
Recreational users	<ul style="list-style-type: none"> • Natimuk & District Field & Game Inc. • Recreational users in the local community
Traditional Owners	<ul style="list-style-type: none"> • Barapa Barapa Nation Aboriginal Corporation • Barengi Gadjin Land Council • Dja Dja Wurrung Clans Aboriginal Corporation

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Integrated catchment management

Altered water regimes are one of many threats to the health of Victoria's waterways. To be effective, environmental flows need to be part of an integrated approach to catchment management. Many of the environmental objectives of water for the environment in the western region will not be fully met without simultaneously addressing issues such as barriers to fish movement, high nutrient loads, loss of streambank vegetation and invasive species.

Victorian and Australian government agencies, Traditional Owner groups, community groups and private landholders collectively implement a wide range of programs that aim to protect and improve the environmental condition and function of land, soils and waterways throughout Victoria's catchments.

Examples of complementary programs that support environmental flows outcomes in the western region include:

- fish passage works at Sandford Weir, Dergholm Gauge and Warrock are used in combination with the delivery of water for the environment to facilitate the movement of migratory fish from the estuary to the upstream reaches of the Glenelg and Wannon rivers
- installation of artificial wetland pontoons in the Dimboola weir pool and a regulating structure to reconnect Langlands Anabranch in the Horsham weir pool, as well as walking tracks to manage recreational access along the Wimmera River to reduce bank erosion
- weed and rabbit control to prevent bank erosion in the upper Wimmera catchment to improve water quality and stream form and increase native biodiversity
- stock-exclusion fencing along priority waterways throughout the Wimmera and Glenelg catchments to support the re-establishment of streamside and in-stream vegetation
- sand management, removal of excess bedload sand to improve the availability and quality of habitat for native fish, platypus and crayfish
- carp management activities in the Wimmera and Glenelg systems to reduce the number of carp and to better understand their behaviour in both rivers
- restoration of complex habitat for native fish by installing large wood in reach 2 of the Glenelg River using red gum trunks and root balls
- control of invasive species and stock-exclusion fencing in the Wimmera-Mallee wetlands.

For more information about integrated catchment management programs in the western region, refer to the Glenelg Hopkins, Mallee, North Central and Wimmera CMA's regional catchment strategies and regional waterway strategies.

Risk management

During the development of the seasonal watering proposals for the Glenelg, Wimmera and Wimmera-Mallee wetland systems, environmental watering program partners assessed risks associated with potential environmental flows for 2023-24 and identified appropriate mitigating strategies. Risks and mitigating actions are continually assessed by program partners throughout the year (see subsection 1.2.7).

Seasonal outlook 2023-24

Total rainfall in the Grampians-Wimmera-Mallee headworks catchment area during 2022-23 was above average and was particularly high in spring and early summer. Inflows to storage in October and November were 465 percent and 860 percent of the long-term average for each month, respectively.

All major rivers and creeks in the western region flooded during spring 2022. The Wimmera River at Horsham peaked at 11,628 ML per day on 19 October, the MacKenzie River at MacKenzie Creek peaked at 1,263 ML per day on 14 October, Mount William Creek at Lake Lonsdale peaked at 1,417 ML per day on 21 November, and the Glenelg River at Dergholm peaked at 5,598 ML per day on 2 November. The high flow from the Wimmera River filled Lake Hindmarsh to about 50 percent capacity, the highest lake level since 2011-12.

The wet conditions and associated run-off met or exceeded planned environmental watering actions in the Wimmera and Glenelg river systems and most Wimmera-Mallee wetlands from July 2022 to February 2023, triggering significant ecological responses. Fish surveys conducted in early 2023 detected large numbers of juvenile Tupong in the Glenelg River for the first time in several years, and Angler Report Card Fish Surveys indicated larger catches of golden and silver perch in the Wimmera River compared to recent years.

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Water storages across the Wimmera-Mallee System Headworks were collectively at 31 percent capacity at the start of 2022-23, peaked at 79.5 percent in late November and had dropped to 65 percent capacity at the start of April 2023. The *Wimmera and Glenelg Rivers Environmental Entitlement 2010* received a 100 percent allocation in November 2022. This allocation, combined with carryover from 2021-22, meant 66,722 ML of water for the environment was available in the VEWH's accounts in 2022-23. The CEWH also received a 100 percent allocation in the Wimmera system for the first time, boosting available water by 28,000 ML. Rules associated with the CEWH allocation mean it can only be used in the Wimmera River and lower Mount William creeks. The Wimmera-Mallee wetlands also received a 100 percent allocation in 2022-23, which is only the second time the entitlement has received a full allocation since it was established in 2010.

The Bureau of Meteorology has forecast below-average rainfall across the western region during autumn and winter 2023. GWMWater has indicated the VEWH can expect opening allocations on 1 July 2023 of roughly 30 percent for the combined *Wimmera and Glenelg Rivers Environmental Entitlement 2010* for 2023-24. Longer range outlooks for September 2023 have river allocations ranging from 30 to 96 percent and Wimmera-Mallee wetland allocations from zero to 84 percent in the planning scenarios. The CEWH is not likely to receive any allocation in 2023-24 unless storage inflows are significantly above the long-term average. The VEWH expects to carry over about 48,100 ML in the Wimmera and Glenelg rivers environmental entitlement and 970 ML for use in the Wimmera-Mallee wetlands on 1 July 2023. The CEWH is expecting to carry over about 21,300 ML. These combined carryover volumes will help support environmental watering actions in 2023-24 and subsequent years if dry conditions develop and persist.

Annual environmental water allocations in the western region in each of the four years before 2022-23 were less than the minimum volume needed to deliver planned watering actions to the Wimmera and Glenelg rivers and Wimmera-Mallee wetlands. Carryover requirements were a key consideration in each of those years and significantly influenced the range of environmental watering actions that were authorised and delivered. The relatively full storages and high allocations received in 2022-23 have significantly boosted environmental water supplies for the short to medium term. This means that additional environmental watering actions can potentially be delivered in 2023-24 to increase the size and condition of native plant and animal communities in rivers and wetlands across the western region to make them more resilient to the next dry period. The Glenelg Hopkins and Wimmera CMAs have planned potential environmental watering actions for 2023-24 to consolidate recent improvements in environmental condition without setting a target carryover volume for 2024-25. The VEWH will monitor allocations and forecast climatic conditions during winter and spring and work with the Glenelg Hopkins and Wimmera CMAs to set a carryover target for 2024-25 if necessary.

The Wimmera-Mallee Pipeline wetland portion of the environmental entitlement is only likely to receive an allocation in 2023-24 if storage inflows are close to or greater than the long-term average. The planned watering actions for the wetlands in 2023-24 are expected to use up to 400 ML of available carryover, which will leave about 575 ML to support watering actions in future years. The current supply for the Wimmera-Mallee wetlands may allow essential watering actions to the end of 2026-27 without new allocations.

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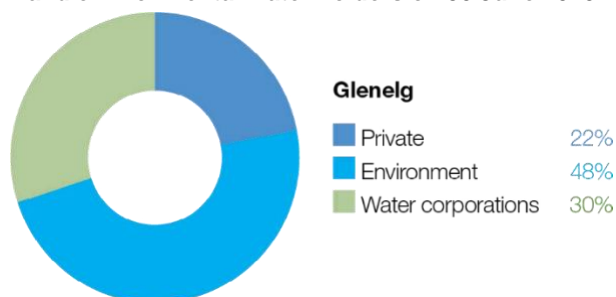
4.2 Glenelg system

Waterway manager – Glenelg Hopkins Catchment Management Authority

Storage manager – Grampians Wimmera Mallee Water

Environmental water holder – Victorian Environmental Water Holder

Proportions of water entitlements in the Wimmera-Mallee System Headworks held by private users, water corporations and environmental water holders on 30 June 2020



The Wimmera-Mallee System Headworks captures run-off from both the Wimmera and Glenelg catchments. Entitlements to water held in this system cannot be accounted for separately in the two river basins, so this figure shows the proportion of entitlements across both systems.

System overview

Bochara-Bogara-Pawur (Glenelg River) rises in Gariwerd (the Grampians National Park) and flows west through Harrow and then south to Casterton and Dartmoor (Figure 4.2.1). The Glenelg River estuary flows through South Australia for a short distance before returning to Victoria and flowing into the sea at Nelson. At over 500 km, the Glenelg River is one of the longest rivers in Victoria.

Moora Moora Reservoir and Rocklands Reservoir are Wimmera-Mallee System Headworks water storages in the Glenelg River system that contribute to the supply of water to towns and properties across the Wimmera, Mallee, Glenelg, Loddon and Avoca catchments. Water for the environment is actively managed in the Glenelg River below Rocklands Reservoir. There are passing flow rules for the Glenelg River and upper Wannon River.

The priority reaches of the Glenelg River for deliveries of water for the environment are:

- Rocklands Reservoir to 5-Mile Outlet (reach 1a),
- 5-Mile Outlet to the confluence with the Chetwynd River (reach 1b),
- Chetwynd River to the Wannon River (reach 2), and
- Wannon River to the tidal extent just below the confluence with Crawford River (reach 3).

Water for the environment in the Glenelg system is released from Rocklands Reservoir for reach 1a via the reservoir wall outlet and for reaches 1b, 2 and 3 via the 5-Mile and 12-Mile outlets.

The Glenelg River estuary benefits from releases of water for the environment to upstream reaches, but releases do not currently target the estuary. The Glenelg Hopkins CMA has investigated the importance of water for the environment in the Glenelg River estuary, listed as a heritage river reach and a site of international significance under the Ramsar Convention. Environmental flows provide landscape-scale benefits that support estuarine values.

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Figure 4.2.1 The Glenelg system



Grey river reaches have been included for context. The numbered reaches indicate where relevant environmental flow studies have been undertaken. Coloured reaches can receive environmental water.

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Environmental values

The Glenelg River starts in Gariwerd (the Grampians National Park) and flows to the sea through the Lower Glenelg National Park. The lower reaches of the Glenelg River are part of a landscape recognised as one of Australia's 15 national biodiversity hotspots, and the Glenelg Estuary and Discovery Bay site was listed under the Ramsar Convention as a site of international significance in February 2018.

The Glenelg River supports a range of rare and unique aquatic life, including the endangered Glenelg freshwater mussel, Glenelg spiny crayfish and a newly described species of river blackfish. It is also home to platypus and populations of native fish, including estuary perch, short-finned eel, tupong and three species of pygmy perch, including the threatened variegated pygmy perch and Yarra pygmy perch. Some of these fish species migrate long distances to and from the Glenelg River estuary to complete their life cycles. Sand extraction currently occurs around the Casterton to Dergholm reaches to provide deep pools, habitats and drought refuge areas, important to fish species and the macroinvertebrates that feed them.

Frasers Swamp is another important feature of the upper Glenelg system and is home to a healthy growling grass frog population. The swamp also meets the habitat requirements for the Australasian Bittern, and investigations are underway to determine if they use this habitat.

The Glenelg River supports a variety of streamside vegetation communities and species, including the endangered Wimmera bottlebrush. Streamside and floodplain vegetation comprises river red gum woodlands with paperbark, bottlebrush and tea tree understorey.

Environmental objectives in the Glenelg system



Protect, maintain, and, where possible, enhance populations of endemic fish, including threatened and diadromous species



Maintain deep pool habitats and connectivity along the river



Maintain the platypus population



Maintain healthy and diverse mosaics of water-dependent vegetation (such as river red gums and Wimmera River bottlebrush)



Maintain a wide range and large number of waterbugs to break down organic matter and support the river's food chain



Maintain water quality for native fish, waterbugs, aquatic vegetation and other water-dependent animals

Traditional Owner cultural values and uses

The Glenelg River, known as *Bochara* in Dhauwurd Wurrung, *Pawur* in Bunganditj and *Bogara* in Wergaia-Jadawadjali languages, is a significant feature in the cultural landscape of south-western Victoria. The river features in the region's creation stories. *Bochara-Bogara-Pawur* (Glenelg River) continues to be an important place for Traditional Owners, who have inhabited the area for thousands of years, using the rich resources available along the river and the associated habitats.

In planning for environmental flows in the Glenelg River, several on-Country meetings have been held to increase Traditional Owner involvement in environmental watering. There has also been an increase in communicating operational changes to water deliveries. When planning for the Glenelg River seasonal watering proposal, the Gunditj Mirring Traditional Owners Aboriginal Corporation, Barengi Gadjin Land Council, Burrendies Aboriginal Corporation and Glenelg Hopkins CMA have considered:

- supporting the health of cultural heritage sites (such as scar trees, ring trees, stone structures, middens and rock paintings) and native plants, which are sources of traditional foods and medicines
- that improving the health and abundance of totem species and their habitat by delivering water for the environment also benefits Traditional Owners' spiritual wellbeing
- supporting contemporary cultural events such as the Johnny Mullagh cricket match in March each year. A summer fresh is delivered to support environmental outcomes, but it also supports this event on the river.

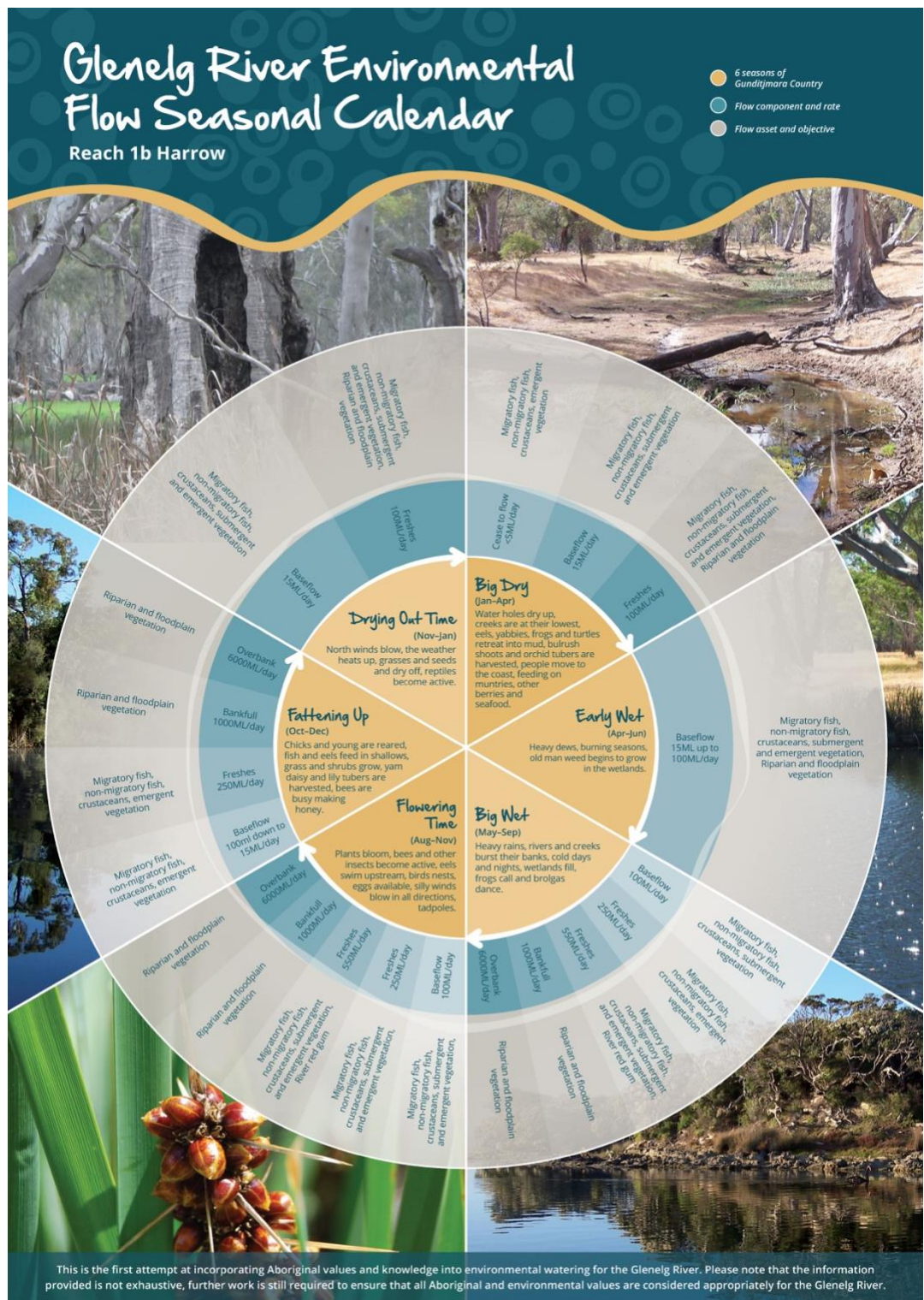
Aboriginal Peoples across the Glenelg catchment have retained a strong identity and connection to the traditional lands for which they have custodial rights and responsibilities. Cultural values in the *Bochara-Bogara-Pawur* (Glenelg River) system align strongly with environmental values. Cultural values are holistic and interrelated: they are bound up with the health of the river system overall and the Country of which the river is part. Traditional Owners' wellbeing is connected to the health of the river and of Country.

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Gunditjmara Traditional Owners have identified that it is a priority to spend time on the river and increase cultural practices and connection to Country. They have highlighted the importance of increasing ceremonial and on-Country gatherings along the river, including at Casterton and the Glenelg Estuary.

The Glenelg River Yarns [website](#) was launched in late 2021 as part of the Glenelg River Cultural Flows project. The website shares cultural values and stories on a virtual tour and welcomes all visitors to Country.

Figure 4.2.2 Glenelg River Environmental Flow Seasonal Calendar




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Figure 4.2.2 was produced by the Gunditj Mirring Traditional Owners Aboriginal Corporation and describes the six seasons of Gunditjmara Country. The northern part of the river upstream of the Harrow area is in Jadawadjali Country, and the south-western part of the system is in Boandik Country. The calendar describes the six seasons alongside flow components for reach 1b of the Glenelg River – from 5-Mile Outlet to Chetwynd River – and aligns them with corresponding watering effects and objectives. The calendar reflects the seasonal flow conditions that all Traditional Owner groups recognise.

The value of the calendar is in its clear visual depiction of Traditional Owners’ knowledge, developed over many generations, of how varying flows correspond to seasonal conditions and broader environmental patterns. The six seasons will eventually be embedded in environmental flow recommendations and scenario planning in future years.

Increasing the involvement of Traditional Owners in the planning and managing environmental flows and ultimately providing opportunities to progress towards self-determination within the environmental watering program is a core commitment of the VEWH and the Glenelg Hopkins CMA. This is reinforced by a range of legislative and policy commitments, including the *Water Act 1989*, the [Victorian Aboriginal Affairs Framework](#), the 2016 [Water for Victoria](#) and in some cases, agreements under the *Traditional Owner Settlement Act 2010*.

Where Traditional Owners are more deeply involved in the planning and/or delivery of environmental flows for a particular site, their contribution is acknowledged in Table 4.2.1 with an icon. The use of this icon is not intended to indicate that these activities are meeting all the needs of Traditional Owners, but is incorporated in the spirit of valuing their contribution and indicating progress towards deeper involvement.

	Watering planned and/or delivered in partnership with Traditional Owners to support cultural values and uses
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The timing of the summer/autumn fresh is planned to support the annual Johnny Mullagh Cup cricket match between Gunditj Mirring and Barengi Gadjin Traditional Owners.

Social, recreational and economic values and uses

In planning the potential environmental watering actions in Table 4.2.1, the Glenelg Hopkins CMA considered how environmental flows could support values and uses, including:

- water-based recreation (such as canoeing and fishing)
- community events and tourism (such as the Johnny Mullagh Cup and visitation)
- socioeconomic benefits (such as for diverters for stock needs and domestic use: water levels and water quality can rely on the delivery of water for the environment, particularly in summer).

If the timing or management of planned environmental flows may be modified to align with a community benefit, this is acknowledged in Table 4.2.1 with the following icons.

	Watering planned to support angling activities
	Watering planned to support water sports activities (e.g. canoeing)
	Watering planned to support peaks in visitation (e.g. camping or other public activities on long weekends or school holidays)

Environmental flow releases support the spawning and recruitment of popular angling species like estuary perch and bream. Local anglers continue to report increased fish activity associated with the delivery of freshes, improving fishing opportunities in the river. Releases also support numerous fishing competitions, including the Casterton angling club.

The planning of the summer fresh improves accessibility, water quality and amenity for canoeists planning trips on the Glenelg River over the summer holiday period.

Summer and spring freshes improve conditions at popular riverside campgrounds in the upper reaches of the Glenelg River, including Fulham Reserve near Balmoral and the Johnny Mullagh Reserve at Harrow.




Scope of environmental watering







The term ‘environmental watering’ refers to the active delivery of held environmental water to support particular environmental objectives by altering the flow in a river or the water level in a wetland. While other terms are sometimes used to describe the delivery of environmental water, ‘environmental watering’ is deliberately used here and in seasonal watering statements to ensure consistency in the legal instruments that authorise the use of water for the environment in Victoria.



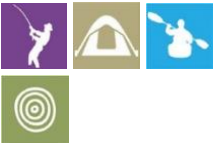
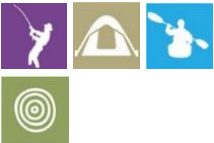
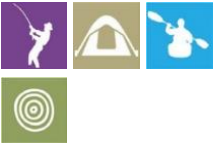
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Table 4.2.1 describes the potential environmental watering actions in 2023-24, their expected watering effect (that is, the intended physical or biological effects of the watering action) and the longer-term environmental objectives they support. Each environmental objective relies on one or more potential environmental watering actions and their associated physical or biological effects.

Table 4.2.1 Potential environmental watering actions, expected watering effects and associated environmental objectives for the Glenelg system

Potential environmental watering action	Expected watering effects	Environmental objectives
Winter/spring low flow in reach 1a (60 ML/day or natural during June to November)	<ul style="list-style-type: none"> Maintain water quality for fish and waterbugs Wet aquatic vegetation to maintain its condition and prevent encroachment by terrestrial species Maintain shallow-water habitat for fish, waterbugs and platypus 	
Winter/spring low flow in reach 1b (100 ML/day or natural during June to November)		
Winter/spring low flow in reach 2 (160 ML/day or natural during June to November)		
Winter/spring low flow in reach 3 (400 ML/day or natural during June to November)	<ul style="list-style-type: none"> Wet benches to increase habitat and allow widespread fish passage 	
Winter/spring fresh(es) in reach 1b (one to five freshes of 250 ML/day for one to five days during June to November/Big Wet to Fattening Up ¹)	<ul style="list-style-type: none"> Wet benches to improve the condition of emergent vegetation and vegetation on the riverbanks to support recruitment and growth and maintain habitat diversity Provide adequate depth for fish passage and cue fish movement Encourage female platypus to select a nesting burrow higher up the bank to reduce the risk of greater flow later in the year flooding the burrow when juveniles are present Scour sand from pools to improve the quality of fish habitat 	
Winter/spring fresh(es) in reach 2 (one to five freshes of 300 ML/day for one to five days during June to November)		

Potential environmental watering action	Expected watering effects	Environmental objectives
<p>Summer/autumn low flow in reach 1a (10 ML/day or natural during December to May)</p> 	<ul style="list-style-type: none"> • Protect against rapid water-quality decline over the low-flow period • Maintain edge habitats, pools and shallow-water habitats for fish, waterbugs and platypus • Maintain a near-permanent wetted stream channel to promote the growth of in-stream vegetation and prevent encroachment by terrestrial plants 	
<p>Summer/autumn low flow in reach 1b (15 ML/day or natural during December to May/Big Dry to Early Wet')</p> 		
<p>Summer/autumn low flow in reach 2 (25 ML/day or natural during December to May)</p> 		
<p>Summer/autumn low flow in reach 3 (80 ML/day or natural during December to May)</p> 		

Potential environmental watering action	Expected watering effects	Environmental objectives
Summer/autumn fresh(es) in reach 1a (one to two freshes of 60 ML/day for two to three days during December to May) 	<ul style="list-style-type: none"> • Flush fine silt from the stream bed and hard substrate to improve the quality of the fish and waterbug habitat • Wet emergent vegetation on the lower banks to improve its condition and prevent the encroachment of terrestrial species • Flush pools to improve water quality and lower temperatures • Provide sufficient flow to allow native fish and platypus to access habitat 	
Summer/autumn fresh(es) in reach 1b (one to two freshes of 100 ML/day for two to three days during December to May/ Big Dry to Early Wet ¹) 		
Summer/autumn fresh(es) in reach 2 (one to two freshes of 150 ML/day for two to three days during December to May) 		
Summer/autumn fresh(es) in reach 3 (one to two freshes of 150 ML/day for three days each or natural during December to May) 		

¹ See the Glenelg River Environmental Flow Seasonal Calendar in this section.

Scenario planning

Table 4.2.2 outlines potential environmental watering and expected water use in a range of planning scenarios.

2022-23 was a wet year, and above-average rainfall during spring resulted in all entitlements receiving 100 percent allocation. High storage inflows provided a large volume of held passing flow in Rocklands Reservoir for release into the Glenelg River. These factors contributed to reduced demand on the Wimmera-Glenelg environmental water entitlement during 2022-23, providing for a high carryover into 2023-24 and allowing for a wider range of possible watering actions during 2023-24.

Environmental watering actions in the Glenelg River typically target reaches 1b and 2 because that is where managed flows can have the greatest environmental effect. However, greater water availability during 2023-24 will allow water for the environment to be delivered to more reaches.

The priority ecological objectives for environmental flows in 2023-24 are to:

- maintain channel form and water quality
- maintain connectivity and provide migration opportunities for native fish
- support juvenile recruitment of native fish
- promote in-stream vegetation and edge habitat for macroinvertebrates, fish and platypus.

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In all planning scenarios, a summer/autumn low flow is the highest priority in reaches 1a, 1b and 2 to maintain a continuous flow through these reaches. Monitoring in recent years has demonstrated that maintaining continuous flow and thereby avoiding cease-to-flow events is the most effective way of preventing declines in the abundance and condition of native fish and platypus populations in the reaches of the Glenelg River. A summer/autumn low flow is recommended in reaches 1a, 1b and reach 2 in all planning scenarios and is the only environmental watering action proposed for reaches 1a and 2 in the drought planning scenario. In the drought planning scenario, other flows are not planned for reaches 1a and 2 because they cannot be delivered with the forecast available supply and are expected to have less environmental benefit than flows delivered in reach 1b. Water for the environment will not be used to deliver a low flow to reach 3 because small releases from Rocklands Reservoir are unlikely to have much effect that far downstream in the drought and dry planning scenarios, and low-flow objectives in that reach will be met by tributary inflows in the average and wet planning scenarios.

Summer/autumn freshes are the next-highest priority watering action in the Glenelg River and are needed to provide flow variation, support fish migration and improve water quality outcomes. In the drought planning scenario, summer/autumn freshes will only be delivered to reach 1b because environmental water can be efficiently delivered to that reach via the Five Mile and Twelve Mile outlets, and it supports some of the Glenelg River’s most flow-sensitive environmental values. A combination of increased availability of environmental water and increased natural inflows will allow summer/autumn freshes to be delivered to reaches 1a and 2 in the very dry planning scenario and to all reaches (including reach 3) under the dry-to-wet planning scenarios.

Environmental watering actions in reach 1a are significantly constrained by releases that can be made from the Rocklands Reservoir wall and the hydraulic interactions at Frasers Swamp. Reach 1a is immediately downstream of Rocklands Reservoir, meaning it has little natural inflow and relies heavily on mandated passing flow and managed environmental flows. However, large releases from Rocklands Reservoir can potentially flood private land adjacent to Frasers Swamp. A winter/spring low flow is proposed to be delivered to reach 1a under the dry-to-wet planning scenarios if sufficient water is available, and while a larger flow is expected to have an environmental benefit, it is not planned due to the potential risk of flooding private land.

Winter/spring freshes will be delivered in reach 1b where possible in the average and wet planning scenarios to trigger fish and platypus movement, wet vegetation higher up the bank and scour sand from some pool substrates to improve habitat quality for fish and macroinvertebrates. There is unlikely to be enough supply to deliver these flows in any reach under drier planning scenarios, and they are generally met in reach 2 and reach 3 by tributary inflows and local catchment run-off in the average and wet planning scenarios.

During the scenario planning process, the Glenelg Hopkins CMA used a flow delivery model to inform the volumes of environmental water required. The model cannot accurately predict the contribution of passing flow to proposed environmental watering actions. Those contributions are potentially significant in the average and wet planning scenarios, and therefore the demands presented in Table 4.2.2 are likely to be greater than needed in the average and wet planning scenarios.

Carryover will be vital to ensure sufficient water availability to deliver the highest-priority flows during summer and autumn 2024-25 if there are low allocations during the year. The VEWH will work with the Wimmera and Glenelg Hopkins CMAs to set a carryover target for 2024-25 once winter and spring storage inflows are known and the potential resource outlook for the following year is clearer.

Table 4.2.2 Potential environmental watering for the Glenelg River system in a range of planning scenarios

Planning scenario	Drought	Very dry	Dry	Average	Wet
Expected conditions	<ul style="list-style-type: none"> No passing flow and low volumes of compensation and natural flow 	<ul style="list-style-type: none"> Low volumes of passing, compensation and natural flow 	<ul style="list-style-type: none"> Some passing, compensation and natural flow 	<ul style="list-style-type: none"> Some passing, compensation and significant natural flow, particularly in winter/spring 	<ul style="list-style-type: none"> Passing, compensation and natural flow meet many watering requirements in winter/spring
Expected availability of water for the environment ¹	<ul style="list-style-type: none"> 53,374 ML 	<ul style="list-style-type: none"> 59,864 ML 	<ul style="list-style-type: none"> 71,221 ML 	<ul style="list-style-type: none"> 80,955 ML 	<ul style="list-style-type: none"> 88,661 ML

Planning scenario	Drought	Very dry	Dry	Average	Wet
Glenelg River (targeting reach 1a)					
Potential environmental watering – tier 1 (high priorities)	Tier 1a (can be achieved with predicted supply)				
	<ul style="list-style-type: none"> • Summer/autumn low flow 	<ul style="list-style-type: none"> • Summer/autumn low flow • Summer/autumn freshes (two freshes) 	<ul style="list-style-type: none"> • Winter/spring low flow • Summer/autumn low flow • Summer/autumn freshes (two freshes) 	<ul style="list-style-type: none"> • Winter/spring low flow • Summer/autumn low flow • Summer/autumn freshes (two freshes) 	<ul style="list-style-type: none"> • Winter/spring low flow • Summer/autumn low flow • Summer/autumn freshes (two freshes)
	Tier 1b (supply deficit)				
	<ul style="list-style-type: none"> • N/A 				
Potential environmental watering – tier 2 (Low priority)	<ul style="list-style-type: none"> • Winter/spring low flow • Summer/autumn freshes (two freshes) 	<ul style="list-style-type: none"> • Winter/spring low flow 	<ul style="list-style-type: none"> • N/A 		
Glenelg River (targeting reach 1b)					
Potential environmental watering – tier 1 (high priorities)	Tier 1a (can be achieved with predicted supply)				
	<ul style="list-style-type: none"> • Summer/autumn low flow • Summer/autumn fresh (one fresh) 	<ul style="list-style-type: none"> • Summer/autumn low flow • Summer/autumn freshes (two freshes) 	<ul style="list-style-type: none"> • Summer/autumn low flow • Summer/autumn freshes (two freshes) 	<ul style="list-style-type: none"> • Winter/spring freshes (three freshes) • Summer/autumn low flow • Summer/autumn freshes (two freshes) 	<ul style="list-style-type: none"> • Winter/spring low flow • Winter/spring freshes (five freshes) • Summer/autumn low flow • Summer/autumn freshes (two freshes)
	Tier 1b (supply deficit)				
	<ul style="list-style-type: none"> • N/A 				
Potential environmental watering – tier 2 (Low priority)	<ul style="list-style-type: none"> • Winter/spring low flow • Winter/spring fresh (one fresh) • Summer/autumn fresh (one additional fresh) 	<ul style="list-style-type: none"> • Winter/spring low flow • Winter/spring fresh (one fresh) 	<ul style="list-style-type: none"> • Winter/spring low flow • Winter/spring freshes (two freshes) 	<ul style="list-style-type: none"> • Winter/spring low flow 	
Glenelg River (targeting reach 2)					
Potential environmental watering – tier 1 (high priorities)	Tier 1a (can be achieved with predicted supply)				
	<ul style="list-style-type: none"> • Summer/autumn low flow 	<ul style="list-style-type: none"> • Summer/autumn low flow • Summer/autumn freshes (two freshes) 	<ul style="list-style-type: none"> • Summer/autumn low flow • Summer/autumn freshes (two freshes) 	<ul style="list-style-type: none"> • Summer/autumn low flow • Summer/autumn freshes (two freshes) 	<ul style="list-style-type: none"> • Summer/autumn low flow • Summer/autumn freshes (two freshes)
	Tier 1b (supply deficit)				
	<ul style="list-style-type: none"> • N/A 				

Planning scenario	Drought	Very dry	Dry	Average	Wet
Potential environmental watering – tier 2 (Low priority)	<ul style="list-style-type: none"> • Winter/spring low flow • Winter/spring fresh (one fresh) • Summer/autumn freshes (two freshes) 	<ul style="list-style-type: none"> • Winter/spring low flow • Winter/spring fresh (one fresh) 	<ul style="list-style-type: none"> • Winter/spring low flow • Winter/spring freshes (two freshes) 	<ul style="list-style-type: none"> • Winter/spring low flow • Winter/spring freshes (three freshes) 	<ul style="list-style-type: none"> • Winter/spring low flow • Winter/spring freshes (five freshes)
Glenelg River (targeting reach 3)					
Potential environmental watering – tier 1 (high priorities)	Tier 1a (can be achieved with predicted supply)				
	<ul style="list-style-type: none"> • N/A 		<ul style="list-style-type: none"> • Summer/autumn freshes (two freshes) 	<ul style="list-style-type: none"> • Summer/autumn freshes (two freshes) 	<ul style="list-style-type: none"> • Summer/autumn freshes (two freshes)
	Tier 1b (supply deficit)				
	<ul style="list-style-type: none"> • N/A 				
Potential environmental watering – tier 2 (Low priority)	<ul style="list-style-type: none"> • Winter/spring low flow • Summer/autumn low flow • Summer/autumn freshes (two freshes) 	<ul style="list-style-type: none"> • Winter/spring low flow • Summer/autumn low flow • Summer/autumn freshes (two freshes) 	<ul style="list-style-type: none"> • Winter/spring low flow • Summer/autumn low flow 	<ul style="list-style-type: none"> • Winter/spring low flow • Summer/autumn low flow 	<ul style="list-style-type: none"> • Winter/spring low flow • Summer/autumn low flow
Possible volume of water for the environment required to achieve objectives	<ul style="list-style-type: none"> • 10,115 ML 	<ul style="list-style-type: none"> • 14,669 ML 	<ul style="list-style-type: none"> • 15,595 ML 	<ul style="list-style-type: none"> • 25,343 ML 	<ul style="list-style-type: none"> • 36,867 ML
Priority carryover requirements for 2024-25 ²	<ul style="list-style-type: none"> • N/A² 				

1 Volume represents the available water for the Wimmera and Glenelg systems under the shared *Wimmera and Glenelg Rivers Environmental Entitlement 2010* and is the sum of carryover and estimated new allocations

2 The VEWH will monitor allocations and forecast climatic conditions during winter and spring and work with the Glenelg Hopkins and Wimmera CMAs to set a carryover target for 2024-25 if necessary

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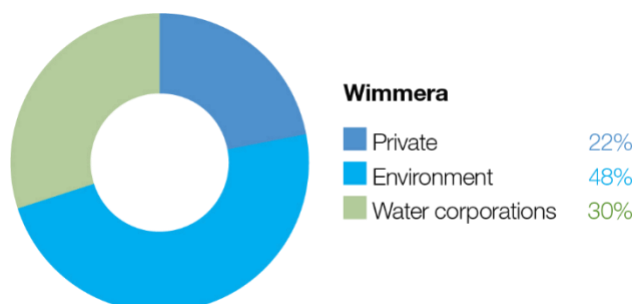
4.3 Wimmera system

Waterway manager – Wimmera Catchment Management Authority

Storage manager – Grampians Wimmera Mallee Water

Environmental water holders – Victorian Environmental Water Holder and Commonwealth Environmental Water Holder

Proportions of water entitlements in the Wimmera-Mallee System Headworks held by private users, water corporations and environmental water holders on 30 June 2020



The Wimmera-Mallee System Headworks capture run-off from the Wimmera and Glenelg catchments. Entitlements to water held in this system cannot be accounted for separately in the two river basins, so this figure shows the proportion of entitlements across both systems.

System overview

***Barringgi Gadyin* (Wimmera River) rises in the Pyrenees Ranges near Elmhurst and flows through Horsham, Dimboola and Jeparit before terminating at Lake Hindmarsh, which is Victoria's largest freshwater lake and the first of a series of terminal lakes. The Wimmera River receives flows from several regulated tributaries, including the MacKenzie River, Mount William Creek and Burnt Creek (Figure 4.3.1). These tributaries – Bungalally Creek and the Wimmera River below Mount William Creek – can receive water for the environment. In exceptionally wet periods, Lake Hindmarsh will overflow into Outlet Creek and then to Lake Albacutya, an internationally recognised Ramsar-listed wetland. There are numerous wetlands beyond Lake Albacutya that have not filled with water for decades.**

Water in the Wimmera system is stored in three on-stream reservoirs (Lake Wartook on the MacKenzie River, Lake Lonsdale on Mount William Creek and Lake Bellfield on Fyans Creek) and in several off-stream storages (Taylors Lake, Lake Fyans and Toolondo Reservoir). A channel system enables water to be moved between several storages. Water can also be transferred from Rocklands Reservoir in the Glenelg system to the Wimmera system via the Rocklands-Toolondo Channel and from Moora Moora Reservoir via the Moora Channel. The connected storages and channels are collectively called the Wimmera-Mallee System Headworks. Water harvested in the system headworks is used for town, stock and domestic supply throughout the Wimmera catchment and parts of the Avoca, Hopkins, Loddon, Glenelg and Mallee catchments. Passing flows are provided to the Wimmera River and lower Mount William and Fyans creeks.

Priority reaches in the Wimmera system that can receive water for the environment are Wimmera River reaches 3 and 4, MacKenzie River reaches 2 and 3, upper and lower Mount William Creek, upper and lower Burnt Creek and Bungalally Creek.

Yarriambiack Creek is a distributary of the upper Wimmera River that would have naturally received flow during high-flow events. Modifications to the Yarriambiack Creek offtake increase flow rates in Yarriambiack Creek compared to what would have naturally happened, but they reduce the flow rates to the high-priority reaches of the Wimmera River.

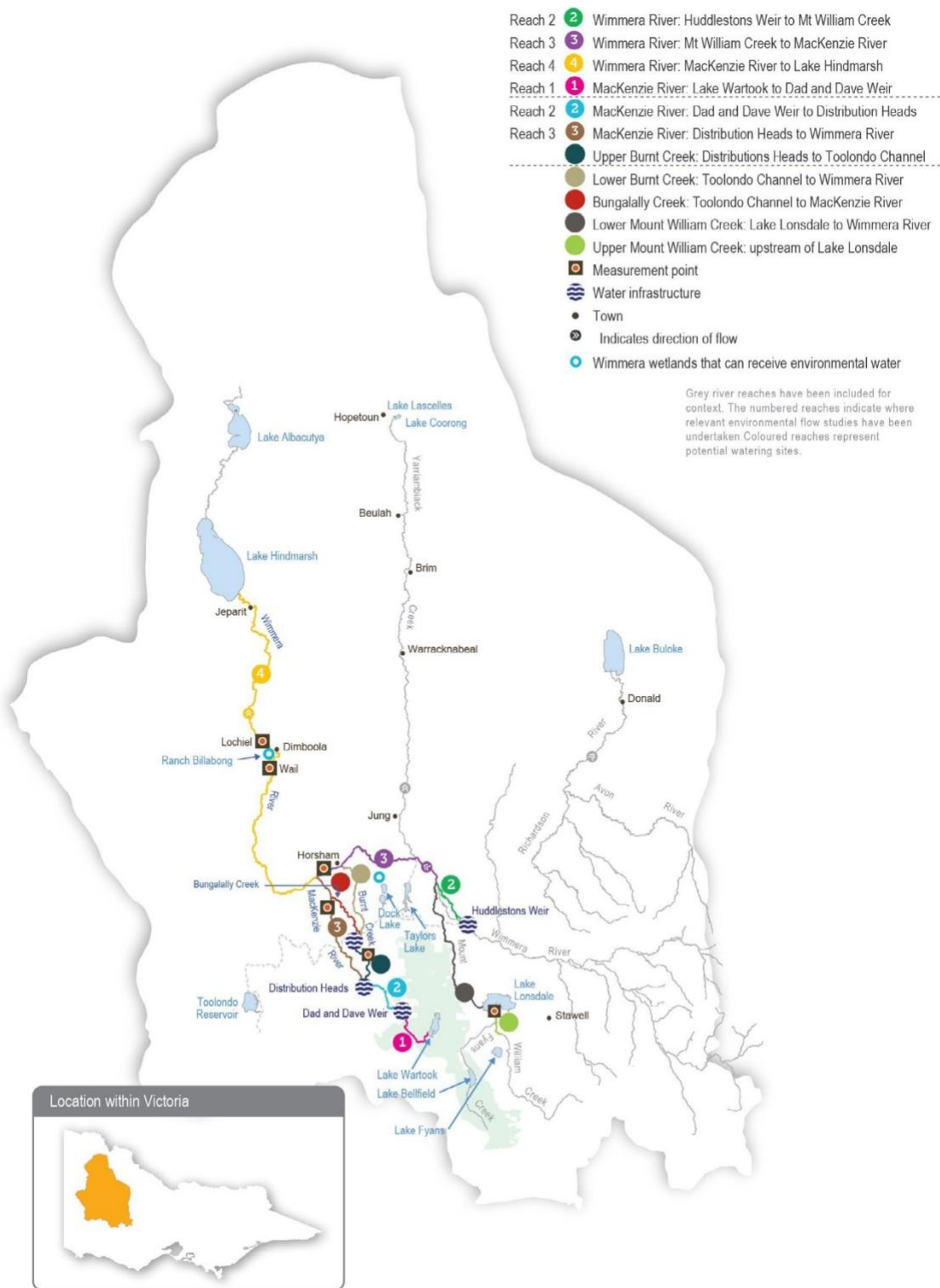
Two wetlands in the Wimmera system are also included in the environmental watering program.

Dock Lake, near Horsham, would have naturally filled via spills from nearby Green Lake when there was significant run-off from the northern edge of the Grampians. In the 1930s, Dock Lake was modified to allow it to be used as a water storage for irrigation supply in the Wimmera-Mallee system. Dock Lake was removed from the supply system after the Wimmera-Mallee Pipeline was completed in 2010. Water can be actively delivered to Dock Lake from Green Lake via a gravity-fed channel when there is sufficient water in Green Lake.

Ranch Billabong, near Dimboola, is located on land managed by the Barengi Gadjin Land Council Aboriginal Corporation. The billabong was disconnected from the Wimmera River by changes to a road that traverses land between the river and the billabong. Restoring elements of the natural water regime at Ranch Billabong aims to improve habitat for native animal and plant communities and is an important outcome for Traditional Owners and their Nations.

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Figure 4.3.1 The Wimmera system



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Environmental values











The Wimmera River supports abundant native fish populations, including one of Victoria’s few self-sustaining populations of freshwater catfish. The Wimmera River also supports native waterbird, turtle, frog and rakali (water rat) populations.

The MacKenzie River contains the only confirmed remaining platypus population in the Wimmera system and supports locally important populations of native fish, including river blackfish and southern pygmy perch. It also supports populations of threatened Glenelg spiny crayfish, western swamp crayfish and turtles, as well as the critically endangered Wimmera bottlebrush. Managed releases from Lake Wartook for urban supplies and environmental flows maintain regular flow in the middle and upper reaches of the MacKenzie River and provide important refuges for these regionally important populations during dry periods.

Vegetation along Burnt and Bungalally creeks provides habitat corridors for terrestrial wildlife. Upper Burnt Creek contains an important native fish community and a threatened western swamp crayfish population, which is also becoming established in lower Burnt Creek. Mount William Creek supports regionally important populations of obscure galaxias, southern pygmy perch and rakali (water rats).

Dock Lake is a natural wetland that was modified and used as part of the Wimmera-Mallee System Headworks until 2010. When wet, Dock Lake provides feeding and breeding habitat for large numbers of waterbirds and frogs.

Ranch Billabong is a small wetland near Dimboola that supports river red gums, a variety of aquatic plant species, waterbirds and frogs.

Environmental objectives in the Wimmera system	
	Protect and increase populations of native fish, including one of Victoria’s few self-sustaining populations of freshwater catfish
	Maintain the frog population by providing feeding and breeding habitat
	Maintain channel capacity and diversity and prevent the colonisation of waterways by terrestrial plant species
	Increase the abundance and distribution of platypus populations by providing places to breed and feed, as well as opportunities for juveniles to disperse
	Maintain the turtle population by providing feeding and breeding habitat
	Improve the condition, abundance and diversity of native aquatic, emergent and streamside vegetation
	Maintain the waterbird population by providing roosting, feeding and breeding habitat in floodplain wetlands.
	Increase the abundance and diversity of waterbugs to break down dead organic matter and support the waterway’s food web
	Maintain crayfish populations by providing feeding and breeding habitat
	Maintain water quality to provide suitable conditions for waterbugs, native fish and other water-dependent plants and animals

Traditional Owner cultural values and uses

The Wimmera’s waterways are important to the Wotjobaluk Nations, and there are significant cultural values throughout the landscape. Native title is held along much of the lower *Barringgi Gadyin* (Wimmera River). In planning for environmental flows in *Barringgi Gadyin* (Wimmera River), the Barengi Gadjin Land Council and Wimmera CMA work together to support Wotjobaluk cultural values, including supporting contemporary cultural events (such as the Wotjobaluk festival).

Increasing the involvement of Traditional Owners in environmental water management and progressing opportunities towards self-determination in the environmental watering program is a core commitment of the VEWH and its agency partners. This is reinforced by a range of legislation and policy commitments, including the *Water Act 1989*, the [Victorian Aboriginal Affairs Framework](#), the 2016 [Water for Victoria](#), the [Water is Life: Traditional Owner Access to Water Roadmap 2022](#), and in some cases, agreements under the *Traditional Owner Settlement Act 2010*.

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Where Traditional Owners are more deeply involved in the planning and/or delivery of environmental flows for a particular site, their contribution is acknowledged in Table 4.3.1 with an icon. The use of this icon is not intended to indicate that these activities are meeting all the needs of Traditional Owners, but is incorporated in the spirit of valuing that contribution.



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

In the Wimmera system, the Wimmera CMA and Barengi Gadjin Land Council work in partnership to support cultural values at Ranch Billabong. The delivery of water for the environment at Ranch Billabong aims to provide a more-natural flooding regime, restore indigenous plant species (such as old man weed and sneezeweed) and animal habitats, control selected weed species and improve amenity and suitability for gatherings and events (such as earth oven and bark canoe cultural activities).

Water for the environment was delivered to Ranch Billabong in 2018, 2019, 2020 and 2021. In 2022, Ranch Billabong was filled naturally by flooding. Watering over the last five years has improved water quality and vegetation condition, consistent with the cultural objectives of the Traditional Owners. The Barengi Gadjin Land Council manages the site and has controlled weed species and enhanced accessibility by building walking tracks and culvert crossings around the billabong. In 2022, jetty construction commenced but was interrupted due to flooding.

Social, recreational and economic values and uses

In planning the potential environmental watering actions in Table 4.3.1, the Wimmera CMA considered how environmental flows could support values and uses, including:

- water-based recreation (such as canoeing, fishing, rowing and water skiing)
- riverside recreation and amenity (such as birdwatching, cycling, running and walking)
- community events and tourism such as fishing competitions at Dimboola, Jeparit and Horsham; rowing at Dimboola; Kannamaroo Festival at Horsham, Wimmera River Duck Race; Wimmera River Park Run; Peter Taylor Memorial Barefoot Water Ski Tournament and Night Jump at Dimboola; and supporting small business, including chartered river cruises, pop-up food vendor caravans and general visitation
- socioeconomic benefits such as for diverters for irrigation, stock needs and domestic use: water levels and water quality, which can rely on the delivery of water for the environment, particularly in summer, and associated tourism events.

If the timing or management of planned environmental flows may be modified to align with a community benefit, this is acknowledged in Table 4.3.1 with the following icons.



Watering planned to support angling activities



Watering planned to support water sports activities (e.g. canoeing, kayaking, rowing, swimming and water skiing)

Water for the environment can be used to temporarily raise water levels in the Horsham, Dimboola and Jeparit weir pools to improve conditions for community events, including fishing competitions and water skiing and rowing events. Water for the environment held in the weir pools is released after the community events to support ecological objectives further downstream when required.










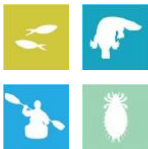

Scope of environmental watering



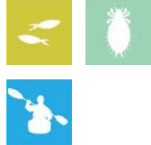
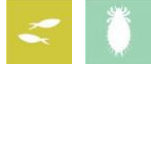






The term 'environmental watering' refers to the active delivery of held environmental water to support particular environmental objectives by altering the flow in a river or the water level in a wetland. While other terms are sometimes used to describe the delivery of environmental water, 'environmental watering' is deliberately used here and in seasonal watering statements to ensure consistency in the legal instruments that authorise the use of water for the environment in Victoria.






















Table 4.3.1 describes the potential environmental watering actions in 2023-24, their expected watering effect (that is, the intended physical or biological effects of the watering action) and the longer-term environmental objectives they support. Each environmental objective relies on one or more potential environmental watering actions and their associated physical or biological effects.

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Table 4.3.1 Potential environmental watering actions, expected watering effects and associated environmental objectives for the Wimmera system

Potential environmental watering action	Expected watering effects	Environmental objectives
Wimmera River (reach 4)		
<p>Winter/spring low flow (30 ML/day during June to November)</p> 	<ul style="list-style-type: none"> Maintain access to habitat for native fish, waterbugs and in-stream vegetation 	
<p>Small winter/spring fresh(es) (one to five freshes of 70 ML/day for one to four days during June to November)</p> 	<ul style="list-style-type: none"> Increase water depth to provide a stimulus for fish movement Provide flow variability to maintain water quality and diversity of fish habitats 	
<p>Medium winter/spring fresh(es) (one to three freshes of 200 ML/day for one to three days during June to November)</p>	<ul style="list-style-type: none"> Provide variable flow during the high-flow season for fish movement Provide flow variability to maintain water quality and diversity of fish habitats Wet lower benches to support native streamside vegetation, entrain organic debris and maintain habitat for waterbugs and fish 	
<p>Summer/autumn low flow (15 ML/day or natural during December to May)</p> 	<ul style="list-style-type: none"> Maintain edge habitats in deeper pools and in-stream habitat to support native fish populations and waterbugs Maintain soil moisture for streamside vegetation and near-permanent inundated stream channel for aquatic vegetation and prevent the growth of terrestrial plants in the stream bed 	
<p>Summer/autumn fresh(es) (one to three freshes of 70 ML/day for two to seven days during December to May)</p> 	<ul style="list-style-type: none"> Flush pools to prevent a decline in water quality and to maintain habitat for fish and waterbugs Provide fish passage to allow fish to move through the reach 	
MacKenzie River (reach 3)		
<p>Winter/spring low flow (10 ML/day or natural during June to November)</p>	<ul style="list-style-type: none"> Maintain edge habitats and deeper pools and runs for waterbugs and platypus Maintain soil moisture for streamside vegetation and near-permanent inundated stream channel for aquatic vegetation and prevent the growth of terrestrial plants in the stream bed Maintain pool habitat for native fish and crayfish populations 	
<p>Winter/spring freshes (five freshes of 35 ML/day for two to seven days during June to November)</p>	<ul style="list-style-type: none"> Stimulate fish movement by increasing flow rates and water depth and increase habitat availability for platypus and waterbugs Flush pools to prevent a decline in water quality Maintain soil moisture for streamside vegetation 	

Potential environmental watering action	Expected watering effects	Environmental objectives
Summer/autumn low flow (10 ML/day or natural during December to May)	<ul style="list-style-type: none"> Maintain edge habitats and deeper pools and runs for waterbugs and platypus Maintain soil moisture for streamside vegetation and near-permanent inundated stream channel for aquatic vegetation and prevent the growth of terrestrial plants in the stream bed Maintain pool habitat for native fish and crayfish populations 	
Summer/autumn freshes (three to four freshes of 35 ML/day for two to seven days each during December to May)	<ul style="list-style-type: none"> Flush pools to prevent a decline in water quality and to increase habitat availability for waterbugs and native fish 	
Upper Burnt Creek		
Winter/spring low flow (1 ML/day or natural during June to November)	<ul style="list-style-type: none"> Maintain edge habitats and shallow-water habitat for waterbugs Maintain soil moisture for streamside vegetation and near-permanent inundated stream channel for aquatic vegetation and prevent the growth of terrestrial plants in the stream bed Maintain a sufficient area of pool habitat for native fish and crayfish populations 	
Winter/spring fresh(es) (one to five freshes of 55 ML/day for three to seven days during June to November)	<ul style="list-style-type: none"> Allow fish to move throughout the reach Flush sediments from hard substrates to increase biofilm production and food for waterbugs 	
Summer/autumn low flow (1 ML/day or natural during December to May)	<ul style="list-style-type: none"> Maintain edge habitats and shallow-water habitat for waterbugs Maintain soil moisture for streamside vegetation and near-permanent inundated stream channel for aquatic vegetation and prevent the growth of terrestrial plants in the stream bed Maintain a sufficient area of pool habitat for native fish and crayfish populations 	
Summer/autumn freshes (three freshes of 30 ML/day for two to seven days each during December to May)	<ul style="list-style-type: none"> Prevent a decline in water quality by flushing pools in the low-flow season Allow fish to move throughout the reach Flush sediments from hard substrates to increase biofilm production and food for waterbugs 	
Lower Burnt Creek		
Bankfull fresh (one fresh of 45 ML/day for two days at any time) 	<ul style="list-style-type: none"> Inundate streamside vegetation to maintain plant condition and facilitate recruitment Move organic debris in the channel to support waterbugs Maintain the structural integrity of the channel 	
Bungalally Creek		
Bankfull fresh (one fresh of 60 ML/day for two days at any time) 	<ul style="list-style-type: none"> Inundate the streamside zone to maintain its condition and facilitate the recruitment of streamside vegetation communities Maintain the structural integrity of the channel and prevent the loss of channel capacity 	

Potential environmental watering action	Expected watering effects	Environmental objectives
Lower Mount William Creek		
Year-round low flow (5 ML/day or natural) 	<ul style="list-style-type: none"> Maintain edge habitats and shallow-water habitat for waterbugs and endemic fish Maintain soil moisture for streamside vegetation and near-permanent inundated stream channel for aquatic vegetation and prevent the growth of terrestrial plants in the stream bed 	 
Winter/spring fresh(es) (one to five freshes of 100 ML/day for one to seven days during June to November)	<ul style="list-style-type: none"> Wet benches to entrain organic debris and allow native fish to move throughout the reach Flush surface sediments from hard substrates to support waterbugs Inundate the streamside zone to maintain its condition and facilitate the recruitment of streamside vegetation communities 	  
Summer/autumn freshes (three freshes of 20-30 ML/day for two to seven days during December to May)	<ul style="list-style-type: none"> Prevent a decline in water quality by flushing pools during low flow Provide a variable flow and allow the movement of fish and waterbugs throughout the reach during the low-flow season 	  
Upper Mount William Creek		
Top-up of pools (summer/autumn)	<ul style="list-style-type: none"> Maintain edge and shallow-water habitat for native fish and waterbugs Maintain water quality 	  
Dock Lake		
Winter/spring partial fill	<ul style="list-style-type: none"> Trigger the growth and germination of wet-phase wetland vegetation communities Support feeding and breeding habitat for waterbirds, frogs, waterbugs and turtles 	    
Ranch Billabong		
Top-ups (winter/spring and summer/autumn) 	<ul style="list-style-type: none"> Inundate wetland vegetation to maintain plant condition and facilitate recruitment Improve water quality for frogs and waterbirds 	  

Scenario planning

Table 4.3.2 outlines potential environmental watering and expected water use in a range of planning scenarios.

Wet conditions in 2022-23 caused widespread flooding across the Wimmera system and filled all storages. Flow in the Wimmera River peaked in October 2022 and filled Lake Hindmarsh to its highest level since 2011-12. This flow increased food supplies for fish, provided opportunities for fish and platypus movement and triggered the germination and growth of streamside vegetation. It also triggered a significant carp-breeding event. Most wetlands in the region (including Dock Lake and Ranch Billabong) filled and supported large numbers of breeding waterbirds and frogs. Lake Lonsdale filled and spilled, which diluted and flushed the saline water that had limited environmental releases into Mount William Creek in recent years.

The combined volume of water held in the Wimmera Headworks system reached its highest level since 2016-17, and the volume available for environmental watering in 2023-24 will be the highest on record. These factors will allow more of the recommended environmental flows to be delivered to the region's rivers and wetlands to achieve environmental objectives. In contrast to previous years, when low water availability severely restricted watering actions under the drought and extreme dry planning scenarios, the proposed watering actions for the three driest planning scenarios in 2023-24 are similar.

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Wimmera River

In all planning scenarios, the highest-priority potential watering actions in the Wimmera River are a winter/spring and summer/autumn low flow, which is needed to maintain aquatic habitat connectivity and water quality throughout the system. In the drought and very dry planning scenarios, a low flow may be delivered at the lower end of its recommended range to conserve water, but it will be increased at any time or supplemented with freshes if a greater flow is needed to manage potential water quality issues. In the average and wet planning scenarios, there should be enough water to deliver a low flow at its recommended magnitude and additional freshes to boost the river's ecological health.

The Wimmera CMA may temporarily restrict or cease flow during the spring low-flow period to encourage carp to congregate below the Horsham weir (and potentially other suitable locations) so they can be removed using electrofishing. Any cease-to-flow events would have a short duration and be followed by a fresh to avoid water quality problems and prevent harm to native fish and platypus. Restricting flow to manage carp will only be attempted in cooler seasons to avoid potential water quality impacts and may not be possible under wetter planning scenarios.

MacKenzie River/Burnt Creek/Bungalally Creek

In the MacKenzie River and upper Burnt Creek, water for the environment will be used to maintain low flows throughout the year to maintain habitat for native fish, platypus and crayfish that recruited or improved their condition during 2022-23. There will be a mix of freshes at various times throughout the year to improve water quality, transport organic material, support fish and platypus dispersal and water streamside vegetation. Under drought and dry planning scenarios, freshes will only be delivered as needed to prevent poor water quality and will likely be delivered at the lower end of their recommended magnitude and duration to conserve available supply. In the average and wet planning scenarios, freshes in the MacKenzie River will be delivered at their full recommended magnitude and duration to increase opportunities for native fish and platypus to disperse and to increase the quality and quantity of their food to improve their condition and provide potential breeding opportunities. Maintaining the connection between reach 3 of the MacKenzie River and the Wimmera River is a high priority in all planning scenarios to allow fish to move between the two systems, thereby growing the populations and increasing their genetic diversity. Watering actions for reach 3 of the MacKenzie River typically provide a suitable flow to meet objectives in reach 2.

A bankfull flow may be delivered to Bungalally Creek and lower Burnt Creek in the average and wet planning scenarios to improve the health of streamside vegetation. This flow can only be delivered during periods of high natural flow throughout the system, so it is not considered under drier planning scenarios.

Mount William Creek

Maintaining a year-round low flow in the reach downstream of Lake Lonsdale to provide habitat for small-bodied native fish is the highest priority for environmental watering in lower Mount William Creek in all planning scenarios and is the only flow planned under the drought-to-dry planning scenarios. Summer/autumn and winter/spring freshes are likely to occur naturally in the average and wet planning scenarios but may be actively delivered with water for the environment if needed to flush organic material through the system and/or provide opportunities for native fish dispersal. Water in Lake Lonsdale is often used to meet environmental flow targets in the Wimmera River in years when there is near-continuous flow in lower Mount William Creek. These conditions are likely to be met in 2023-24. Therefore, most of the proposed environmental watering actions for lower Mount William Creek will likely be met through deliveries from Lake Lonsdale that target the Wimmera River.

Water from Lake Fyans may be used in any planning scenario in 2023-24 to top up refuge pools in upper Mount William Creek to improve water quality and habitat availability for native fish populations.

Ranch Billabong and Dock Lake

Water for the environment will likely be used to top up water levels in Ranch Billabong in all planning scenarios to maintain water quality and support the ongoing recovery of the river red gum and associated understorey vegetation surrounding the billabong. Environmental flow objectives for Dock Lake require large volumes of water that can only be achieved with significant contributions from natural events and only when Green Lake is full. These conditions are only likely to be met in the average and wet planning scenarios in 2023-24.

Carryover will be vital to ensure sufficient water is available to deliver the highest-potential watering actions during summer and autumn 2024-25 if there are low allocations during the year. The VEWH will work with the Wimmera and Glenelg Hopkins CMAs to set a carryover target for 2024-25 once winter and spring storage inflows are known and the potential resource outlook for the following year is clearer.

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Table 4.3.2 Potential environmental watering for the Wimmera system in a range of planning scenarios

Planning scenario	Drought	Very dry	Dry	Average	Wet
Expected river conditions	<ul style="list-style-type: none"> • Infrequent, unregulated flow for reach 2 of the MacKenzie River, upper Burnt Creek and lower Mt William Creek • Regulated releases provide flow at other times and locations 	<ul style="list-style-type: none"> • Periodic, unregulated flow for reach 2 of the MacKenzie River, upper Burnt Creek and lower Mt William Creek • Regulated releases provide flow at other times and locations 	<ul style="list-style-type: none"> • Periodic, unregulated flow for reach 2 of the MacKenzie River, upper Burnt Creek and lower Mt William Creek • Regulated releases provide flow at other times and locations, apart from the modest passing flow 	<ul style="list-style-type: none"> • Regular, unregulated flow for reach 2 of the MacKenzie River, upper Burnt Creek and lower Mt William Creek • Reasonable passing flow and unregulated releases for the Wimmera River and lower Mt William Creek • Regulated releases provide flow at other times and locations 	<ul style="list-style-type: none"> • Regular, unregulated flow for reach 2 of the MacKenzie River, upper Burnt Creek and lower Mt William Creek • Frequent passing flow and unregulated releases for the Wimmera River and lower Mt William Creek • Regulated releases provide flow at other times and locations
Predicted supply of water for the environment under the Wimmera-Glenelg environmental entitlement ¹	• 53,374 ML	• 59,864 ML	• 71,221 ML	• 80,955 ML	• 88,661 ML
Predicted supply of water for the environment under the CEWH's entitlement ²	• 18,399 ML	• 18,399 ML	• 21,199 ML	• 25,399 ML	• 46,399 ML
Wimmera River (targeting reach 4)					
Potential environmental watering – tier 1 (high priorities)	<ul style="list-style-type: none"> • Winter/spring low flow • Small winter/spring fresh (one fresh) • Summer/autumn low flow • Summer/autumn freshes (three freshes, at three days duration) 	<ul style="list-style-type: none"> • Winter/spring low flow • Small winter/spring freshes (two freshes) • Summer/autumn low flow • Summer/autumn freshes (three freshes at five days duration) 	<ul style="list-style-type: none"> • Winter/spring low flow • Small winter/spring freshes (two freshes) • Summer/autumn low flow • Summer/autumn freshes (three freshes) 	<ul style="list-style-type: none"> • Winter/spring low flow • Small winter/spring freshes (two freshes) • Summer/autumn low flow • Summer/autumn freshes (three freshes) 	<ul style="list-style-type: none"> • Winter/spring low flow • Small winter/spring freshes (five freshes) • Summer/autumn low flow • Summer/autumn freshes (three freshes)
Potential environmental watering – tier 2 (additional priorities)	<ul style="list-style-type: none"> • Summer/autumn freshes (tier 1 actions at full duration) 	<ul style="list-style-type: none"> • Summer/autumn freshes (tier 1 actions at full duration) 	<ul style="list-style-type: none"> • Small winter/spring fresh (one fresh) • Medium winter/spring fresh (one fresh) 	<ul style="list-style-type: none"> • Medium winter/spring freshes (three freshes) 	<ul style="list-style-type: none"> • Medium winter/spring freshes (three freshes)

Planning scenario	Drought	Very dry	Dry	Average	Wet
MacKenzie River (targeting reach 3)³					
Potential environmental watering – tier 1 (high priorities)	<ul style="list-style-type: none"> • Winter/spring low flow • Winter/spring freshes (three freshes at two days duration) • Summer/autumn low flow • Summer/autumn freshes (four freshes at five days duration) 			<ul style="list-style-type: none"> • Winter/spring low flow • Winter/spring freshes (three freshes) • Summer/autumn low flow • Summer/autumn freshes (four freshes) 	<ul style="list-style-type: none"> • Winter/spring low flow • Winter/spring freshes (five freshes) • Summer/autumn low flow • Summer/autumn freshes (four freshes)
Potential environmental watering – tier 2 (additional priorities)	<ul style="list-style-type: none"> • Winter/spring freshes (tier 1 actions at full duration) 			<ul style="list-style-type: none"> • Winter/spring freshes (two freshes) 	
Upper Burnt Creek					
Potential environmental watering – tier 1 (high priorities)	<ul style="list-style-type: none"> • Year-round low flow • Winter/spring fresh (one fresh) • Summer/autumn freshes (three freshes at three days duration) 			<ul style="list-style-type: none"> • Year-round low flow • Winter/spring freshes (three freshes) • Summer/autumn freshes (three freshes at five days duration) 	<ul style="list-style-type: none"> • Year-round low flow • Winter/spring freshes (five freshes) • Summer/autumn freshes (three freshes)
Potential environmental watering – tier 2 (additional priorities)	<ul style="list-style-type: none"> • Summer/autumn freshes (tier 1 actions at full magnitude/duration) 			<ul style="list-style-type: none"> • Winter/spring freshes (two freshes) 	
Lower Burnt Creek					
Potential environmental watering – tier 1 (high priorities)	<ul style="list-style-type: none"> • N/A 			<ul style="list-style-type: none"> • Bankfull fresh 	
Bungalally Creek					
Potential environmental watering – tier 1 (high priorities)	<ul style="list-style-type: none"> • N/A 			<ul style="list-style-type: none"> • Bankfull fresh 	
Lower Mount William Creek⁴					
Potential environmental watering – tier 1 (high priorities)	<ul style="list-style-type: none"> • Year-round low flow 			<ul style="list-style-type: none"> • Year-round low flow • Summer/autumn freshes (three freshes) 	<ul style="list-style-type: none"> • Year-round low flow • Winter/spring fresh (one fresh) • Summer/autumn freshes (three freshes)

Planning scenario	Drought	Very dry	Dry	Average	Wet
Potential environmental watering – tier 2 (additional priorities)	<ul style="list-style-type: none"> • Summer/autumn freshes (three freshes) 	<ul style="list-style-type: none"> • Summer/autumn freshes (three freshes) 	<ul style="list-style-type: none"> • Summer/autumn freshes (three freshes) 		<ul style="list-style-type: none"> • Winter/spring freshes (four freshes)
Upper Mount William Creek					
Potential environmental watering – tier 1 (high priorities)	<ul style="list-style-type: none"> • Top-ups 				
Dock Lake					
Potential environmental watering – tier 1 (high priorities)	<ul style="list-style-type: none"> • N/A 			<ul style="list-style-type: none"> • Winter/spring partial fill 	
Ranch Billabong					
Potential environmental watering – tier 1 (high priorities)	<ul style="list-style-type: none"> • Top-ups (winter/spring and summer/autumn) (one winter and one autumn top-up after drawing down if needed) 				
Possible volume of water for the environment required to achieve objectives	<ul style="list-style-type: none"> • 23,552 ML 	<ul style="list-style-type: none"> • 24,032 ML 	<ul style="list-style-type: none"> • 26,946 ML 	<ul style="list-style-type: none"> • 21,723 ML 	<ul style="list-style-type: none"> • 18,909 ML
Priority carryover requirements for 2024-25	<ul style="list-style-type: none"> • N/A⁵ 				

1 Volumes represent the available water for the Wimmera and Glenelg systems under the shared *Wimmera and Glenelg Rivers Environmental Entitlement 2010* and is the total of carryover and estimated new allocations,

2 Volumes represent the available water for the Wimmera system held by the Commonwealth Environmental Water Holder under the *Bulk Entitlement (Wimmera and Glenelg Rivers – GWMWater) Order 2010* and is the total of carryover and estimated new allocations.

3 Potential watering actions targeting reach 3 of the MacKenzie River will also benefit reach 2.

4 All deliveries targeting Wimmera River reach 4 are expected to provide this flow. Demands for water for the environment for these actions are zero as a result.

5 The VEWH will monitor allocations, forecast climatic conditions during winter and spring and work with the Glenelg Hopkins and Wimmera CMAs to set a carryover target for 2024-25 if necessary.

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4.4 Wimmera-Mallee wetlands system

Waterway manager – Mallee, North Central and Wimmera catchment management authorities

Storage manager – Grampians Wimmera Mallee Water

Environmental water holder – Victorian Environmental Water Holder

System overview

The Wimmera-Mallee wetlands include 52 sites on public and private land spread across north-west Victoria (Figure 4.4.1). From the early 20th century until the construction of the Wimmera-Mallee Pipeline Project (WMPP) in 2010, the deeper areas of these wetlands received water most years from the open channels associated with the Wimmera Mallee Domestic and Stock Channel System.

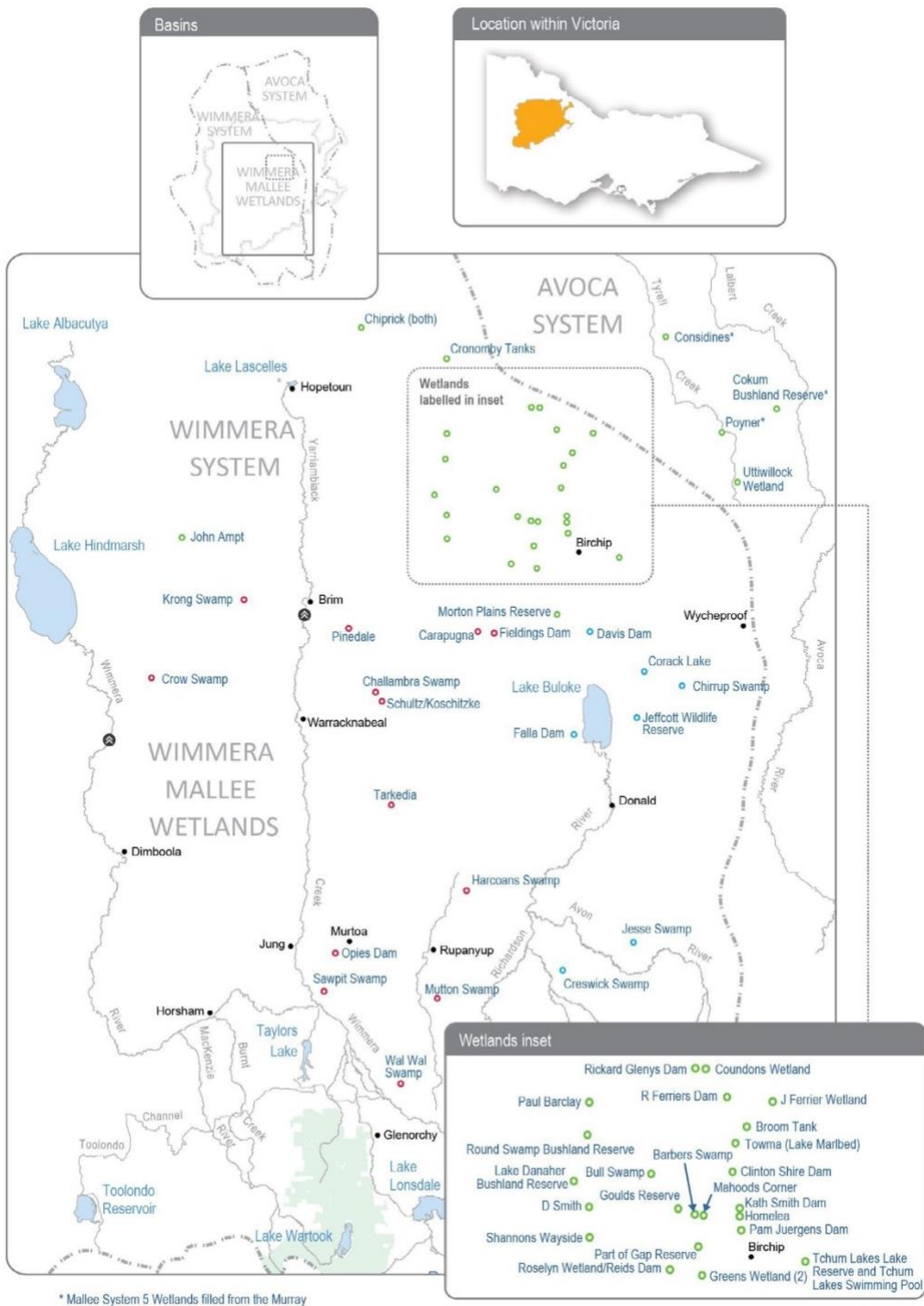
The WMPP replaced stock and domestic supply dams with tanks, and the open-channel distribution system with pipelines, to improve water efficiency. A portion of the water savings from the WMPP was converted to an environmental entitlement to improve the condition of the area's flow-stressed rivers, creeks and wetlands; the rest was used to create regional development opportunities and boost supply reliability for other users. The WMPP reduced the amount of open-water habitat in largely agricultural areas formerly supplied by the open-channel system, so a separate 1,000 ML environmental entitlement was created to water some of the wetlands that were previously supplied through the channel system. Fifty-two priority wetlands can receive water from this environmental entitlement.

Water for the environment can only be delivered to the wetlands when there is sufficient capacity in the Wimmera-Mallee Pipeline system, which can be affected by demand from other pipeline customers. The North Central, Mallee and Wimmera CMAs work closely with GWMWater and land managers (including Parks Victoria, the Department of Energy, Environment and Climate Action and private landowners) to take account of pipeline capacity constraints when ordering environmental deliveries to wetlands.

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Figure 4.4.1 The Wimmera-Mallee wetlands






- Mallee CMA wetlands that can receive environmental water
- North Central CMA wetlands that can receive environmental water
- Wimmera CMA wetlands that can receive environmental water
- Town
- ⊗ Indicates direction of flow



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Environmental values

There are many wetland types in the Wimmera-Mallee wetlands system, including freshwater meadows, open freshwater lakes and freshwater marshes. This diversity provides various wetland habitats for plants and animals across the Wimmera-Mallee region. The wetlands also vary in size and support different vegetation communities. Some support native waterbird populations, including brolgas, egrets, blue-billed ducks, freckled ducks, Australian painted snipes and glossy ibis. The vulnerable growling grass frog, turtles and many other native animals may use the wetlands as drought refuges and drinking holes. Rare and vulnerable vegetation species (such as spiny lignum, ridged water-milfoil, chariot wheels and cane grass) are also present in some wetlands.

Environmental objectives in the Wimmera-Mallee wetlands	
	Maintain populations of frogs
	Maintain populations of turtles
	Provide watering holes for native animals and terrestrial birds across the landscape
	Maintain the condition of aquatic and fringing plants, including lignum, river red gum and black box communities Improve the diversity of wetland vegetation communities
	Maintain populations of waterbirds and other native birds by providing resting, feeding and breeding habitat

Traditional Owner cultural values and uses

Spanning a broad geographic area, several Wimmera-Mallee wetlands show indications of the longstanding cultural heritage and importance of these sites to the Traditional Owners of the region, including but not limited to Barapa Barapa Traditional Owners and other Traditional Owner groups represented by the Barengi Gadjin Land Council and the Dja Dja Wurrung Clans Aboriginal Corporation (trading as Djaara). Some sites have artefacts and scar trees recorded in or adjacent to them, and further cultural surveys could better inform the management of water for the environment at those sites.

The Barengi Gadjin Land Council is the Registered Aboriginal Party for a significant land area of the Wimmera-Mallee wetlands. The Barengi Gadjin Land Council represents the Wotjobaluk, Jaadwa, Jadawadjali, Wergaia and Jupagalk peoples.

In recent years, the Barengi Gadjin Land Council Aboriginal Water Officers and the Wimmera CMA have undertaken monitoring at Sawpit Swamp Wildlife Reserve, Wal Wal Swamp Wildlife Reserve, Carapugna (Watchem Bushland Reserve) and Mutton Swamp Wildlife Reserve, helping to understand environmental flow deliveries and values at the sites.

The Barengi Gadjin Land Council and the North Central CMA have discussed opportunities for projects that facilitate reconnection with and healing of Country. Recent meetings have highlighted several areas where collaboration is possible including on-Country events and revegetation projects. In May 2022, the Barengi Gadjin Land Council and the North Central CMA undertook a cultural values assessment at Creswick Swamp. Cultural values identified at the site include river red gums and eastern grey kangaroos. Environmental water management at Creswick Swamp supports a local population of eastern grey kangaroos. Prints left in the mud nearby suggest regular visitation.

The Barengi Gadjin Land Council has discussed the significance of the wetlands and their aspiration to undertake work at these sites in future and provided the following statement to the Mallee CMA when discussing environmental watering:

“The Wimmera-Mallee is living cultural landscape and there is a lack of recorded data regarding the cultural values over many sections of the Wimmera-Mallee Pipeline. Several highly significant places are outlined through our Country Plan, but like all places across our Country, the rivers, creeks, lakes, wetlands and swamps, and all other landscape features in this area are of high cultural significance. We wish to care for Country again through our traditional land management practices and revive and share the ancient narrative of this area. Mapping the cultural values of places along the Wimmera-Mallee Pipeline will be essential in contributing to integrated catchment management.”

“We are unable to identify places of particular cultural values and uses confidently until Aboriginal Water Assessment/ Cultural Heritage Surveys are systematically undertaken across Wimmera-Mallee Pipeline sites. All the swamps, wetlands and soaks of this area are of high cultural significance as they are linked to Traditional trading routes that extend in all directions. It is essential that all of these places are managed correctly and water quality and biodiversity are improved.”

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Social, recreational and economic values and uses

In planning the potential environmental watering actions in Table 4.4.1, the Mallee, North Central and Wimmera CMAs considered how environmental flows could support values and uses, including:

- water-based recreation (such as fishing, swimming and yabbing)
- riverside recreation and amenity (such as birdwatching, duck and quail hunting, photography, camping, picnicking and walking)
- community events and tourism (such as orienteering and citizen science, including collecting data about bird species and abundance, frog species and microbat recordings).

Scope of environmental watering

The term 'environmental watering' refers to the active delivery of held environmental water to support particular environmental objectives by altering the flow in a river or the water level in a wetland. While other terms are sometimes used to describe the delivery of environmental water, 'environmental watering' is deliberately used here and in seasonal watering statements to ensure consistency in the legal instruments that authorise the use of water for the environment in Victoria.




Table 4.4.1 describes the potential environmental watering actions in 2023-24, their expected watering effect (that is, the intended physical or biological effects of the watering action) and the longer-term environmental objectives they support. Each environmental objective relies on one or more potential environmental watering actions and their associated physical or biological effects.


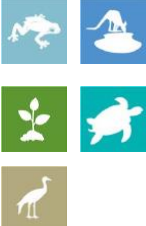
Delivery of water for the environment to the Wimmera-Mallee wetlands is impacted by a range of different constraints associated with delivery infrastructure, surrounding private land and competing demands on pipeline capacity. This means most sites don't have a target wetting and drying cycle which shapes planning for most other wetlands in this plan. Instead, the expected watering effects outlined here describe the overall outcomes expected from watering multiple wetlands across each CMA region during 2023-24.

Some sites have a deep central dam that can provide a near-permanent water source for aquatic vegetation, frogs, waterbirds and turtles, as well as shallow marsh or floodplain woodland areas that are inundated when the dam overtops. In some circumstances, water for the environment may be used to overtop the central dams to support wetland vegetation and create additional foraging opportunities in the surrounding wetland/floodplain habitats.

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Table 4.4.1 Potential environmental watering actions, expected watering effects and associated environmental objectives for the Wimmera-Mallee wetlands

Potential environmental watering action	Expected watering effects	Environmental objectives
Mallee wetlands		
Barbers Swamp	<ul style="list-style-type: none"> Stimulate the growth of aquatic and fringing vegetation and allow the plants, including ridged water-milfoil, black box and spiny lignum, to complete their life cycles 	
Broom Tank		
Bull Swamp	<ul style="list-style-type: none"> Provide a permanent water source for refuge and to support feeding and breeding opportunities for frogs, turtles, waterbirds and terrestrial species 	
Chiprick		
Clinton Shire Dam		
Cokum Bushland Reserve		
Considines		
Coundons Wetland		
Cronomby Tanks		
D Smith Wetland		
Goulds Reserve		
Greens Wetland		
Homelea		
J Ferrier Wetland		
John Ampt		
Kath Smith Dam		
Lake Danaher Bushland Reserve		
Mahoods Corner		
Morton Plains Reserve		
Newer Swamp		
Pam Juergens Dam		
Part of Gap Reserve		
Paul Barclay		
Poyner		
R Ferriers Dam		
Rickard Glenys Dam		
Roselyn Wetland		
Shannons Wayside		
Tchum Lake – dam (Tcham Lakes Lake Reserve)		
Tchum Lake – wetland (Tcham Lakes Lake Reserve)		
Uttiwillock Wetland		

Potential environmental watering action	Expected watering effects	Environmental objectives
North Central wetlands		
Chirrup Swamp	<ul style="list-style-type: none"> Provide a permanent water source for refuge and to support feeding and breeding opportunities for frogs, waterbirds and turtles Maintain varying depths of water to support aquatic and fringing plants' life cycles Maintain varying depths of water to support a variety of feeding habitats for waterbirds Maintain water levels to prolong wetting and ensure successful waterbird breeding events, if they start Wet black box and rare cane grass to allow plants to complete their life cycles and support juvenile plants Maintain varying depths of water to support the life cycles of aquatic and fringing plants 	
Corack Lake		
Creswick Swamp		
Davis Dam		
Falla Dam		
Jeffcott Wildlife Reserve		
Jesse Swamp		
Wimmera wetlands		
Carapugna	<ul style="list-style-type: none"> Provide a permanent water source for refuge and to support feeding and breeding opportunities for frogs, turtles, waterbirds and terrestrial species Stimulate the growth of aquatic and fringing vegetation and allow the plants, including chariot wheels, sneezeweed, ridged water-milfoil and spiny lignum, to complete their life cycles 	
Challambra Swamp		
Crow Swamp		
Fieldings Dam		
Harcoans Swamp		
Krong Swamp		
Mutton Swamp		
Opies Dam		
Pinedale		
Sawpit Swamp		
Schultz/Koschitzke		
Tarkedia Dam		
Wal Wal Swamp		

Scenario planning

Table 4.4.2 outlines potential environmental watering and expected water use in a range of planning scenarios.

Wet conditions in 2022-23 meant many of the Wimmera-Mallee wetlands filled from local catchment run-off. Wetlands that did not reach their target level were topped up with environmental water in autumn 2023, so most of the Wimmera-Mallee wetlands are expected to start 2023-24 with moderate-to-high water levels.

The wetlands proposed to be watered under each planning scenario in 2023-24 were determined according to the following principles. Under drought conditions, the highest priority is to maintain permanent water in the deeper sections of the wetlands to provide drought refuge for waterbirds, frogs, turtles and terrestrial animals and to support the growth and life cycles of wetland plants. Under wetter planning scenarios, water for the environment may be delivered, depending on pipeline system capacity, to water larger areas of a wetland. Large rainfall events and catchment inflows may partially or completely fill some wetlands in the average and wet planning scenarios, and water for the environment may be used in those cases to top up, fill or overtop wetlands to improve fringing wetland plant communities and provide additional habitat for waterbirds, frogs and turtles.

Goulds Reserve, Homelea, part of Gap Reserve (Stephen Smith Dam), Round Swamp Bushland Reserve (Marlbed Lake Swamp/Newer Swamp), Shannons Wayside and Towma (Lake Marlbed) all received significant inflow during 2022-23, and most spilled into surrounding wetland areas. These sites are all expected to hold water through winter/spring 2023-24 and will not be actively watered in any planning scenario to allow them to draw down and dry through the remainder of the year.

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Chiprick Bushland Reserve, Tchum Lake – dam (Tcham Lakes Lake Reserve) and Tchum Lake – Wetland (Tcham Lakes Lake Reserve) will potentially be topped up under the dry-to-wet planning scenarios but are a low priority for watering in the drought planning scenario because they generally dry up quickly under very hot and dry conditions and are not considered important drought refuges. Krong Swamp is also considered a poor drought refuge and will only potentially be watered in the wet planning scenario.

The high water levels in many wetlands at the start of the year and high environmental water allocations will provide an opportunity to overtop some of the Wimmera-Mallee wetlands to improve the condition of surrounding wetland vegetation communities and provide additional feeding and breeding opportunities for frogs and possibly waterbirds. Overtopping flows may be provided at 12 wetlands in all planning scenarios to consolidate the environmental benefits of recent wet conditions. If sufficient environmental water is available, another 12 wetlands will be overtopped in the average and wet planning scenarios.

Allocations to the environmental entitlement that supplies the wetlands in the Wimmera-Mallee wetland system are highly variable, and the ability to carry over unused water from one year to another allows waterway managers and the VEWH to effectively manage the system in dry periods. Experience shows that high allocations in wet years (such as 2022-23) are needed to support watering actions for multiple years if there is a return to dry conditions. The forecast carryover volume at the end of 2022-23 will help to meet expected demands across the Wimmera-Mallee wetlands for at least the next two to three years in all planning scenarios. The North Central, Mallee and Wimmera CMAs and the VEWH will monitor climatic conditions and seasonal allocation outlooks during 2023-24 to inform a carryover target in the Wimmera-Mallee wetland system for 2024-25.

Table 4.4.2 Potential environmental watering for the Wimmera-Mallee wetland system in a range of planning scenarios

Planning scenario	Drought	Dry	Average	Wet
Predicted supply of water for the environment	• 1,145 ML	• 1,145 ML	• 1,395 ML	• 2,145 ML
Potential environmental watering – tier 1 (high priorities)	<ul style="list-style-type: none"> • Barbers Swamp • Bull Swamp • Broom Tank • Carapugna (Watchem Bushland Reserve) • Challambra Swamp* • Chirrup Dam* • Clinton Shire Dam • Cokum Bushland Reserve • Considines • Corack Lake • Coundons Wetland • Creswick Swamp • Cronomby Tanks • Crow Swamp* • D Smith Wetland • Davis Dam* • Falla Dam • Fieldings Dam • Greens Wetland • Harcoans Swamp (Burrereo Bushland Reserve)* • J Ferrier Wetland • Jeffcott Wildlife Reserve 	<ul style="list-style-type: none"> • Barbers Swamp • Bull Swamp • Broom Tank • Carapugna (Watchem Bushland Reserve) • Challambra Swamp* • Chirrup Dam* • Chiprick Bushland Reserve • Clinton Shire Dam • Cokum Bushland Reserve • Considines • Corack Lake • Coundons Wetland • Creswick Swamp • Cronomby Tanks • Crow Swamp* • D Smith Wetland • Davis Dam* • Falla Dam • Fieldings Dam • Greens Wetland • Harcoans Swamp (Burrereo Bushland Reserve)* • J Ferrier Wetland 	<ul style="list-style-type: none"> • Barbers Swamp* • Bull Swamp* • Broom Tank • Carapugna (Watchem Bushland Reserve) • Challambra Swamp* • Chirrup Dam* • Chiprick Bushland Reserve* • Clinton Shire Dam • Cokum Bushland Reserve* • Considines • Corack Lake • Coundons Wetland* • Creswick Swamp • Cronomby Tanks • Crow Swamp* • D Smith Wetland • Davis Dam* • Falla Dam • Fieldings Dam • Greens Wetland • Harcoans Swamp (Burrereo Bushland Reserve)* • J Ferrier Wetland* 	<ul style="list-style-type: none"> • Barbers Swamp* • Bull Swamp* • Broom Tank • Carapugna (Watchem Bushland Reserve) • Challambra Swamp* • Chirrup Dam* • Chiprick Bushland Reserve* • Clinton Shire Dam* • Cokum Bushland Reserve* • Considines • Corack Lake • Coundons Wetland* • Creswick Swamp • Cronomby Tanks • Crow Swamp* • D Smith Wetland • Davis Dam* • Falla Dam • Fieldings Dam • Greens Wetland* • Harcoans Swamp (Burrereo Bushland Reserve)* • J Ferrier Wetland*

Planning scenario	Drought	Dry	Average	Wet
Potential environmental watering – tier 1 (high priorities)	<ul style="list-style-type: none"> Jesse Swamp* John Ampt (House Dam) Kath Smith Dam Lake Danaher Bushland Reserve Mahoods Corner Morton Plains Reserve Mutton Swamp* Opies Dam Pam Juergens Dam Paul Barclay Pinedale* Poyner R Ferriers Dam Rickard Glenys Dam Roselyn Wetland/ Reids Dam Sawpit Swamp* Schultz/Koschitzke* Tarkedia Dam* Uttiwillock Wetland Wal Wal Swamp* 	<ul style="list-style-type: none"> Jeffcott Wildlife Reserve Jesse Swamp* John Ampt (House Dam) Kath Smith Dam Lake Danaher Bushland Reserve Mahoods Corner Morton Plains Reserve Mutton Swamp* Opies Dam Pam Juergens Dam Paul Barclay Pinedale* Poyner R Ferriers Dam Rickard Glenys Dam Roselyn Wetland/ Reids Dam Sawpit Swamp* Schultz/Koschitzke* Tarkedia Dam* Tchum Lake – dam (Tcham Lakes Lake Reserve) Tchum Lake – wetland (Tcham Lakes Lake Reserve) Uttiwillock Wetland Wal Wal Swamp* 	<ul style="list-style-type: none"> Jeffcott Wildlife Reserve Jesse Swamp* John Ampt (House Dam) Kath Smith Dam Lake Danaher Bushland Reserve Mahoods Corner Morton Plains Reserve* Mutton Swamp* Opies Dam Pam Juergens Dam Paul Barclay Pinedale* Poyner R Ferriers Dam Rickard Glenys Dam Roselyn Wetland/ Reids Dam* Sawpit Swamp* Schultz/Koschitzke* Tarkedia Dam* Tchum Lake – dam (Tcham Lakes Lake Reserve) Tchum Lake – wetland (Tcham Lakes Lake Reserve)* Uttiwillock Wetland* Wal Wal Swamp* 	<ul style="list-style-type: none"> Jeffcott Wildlife Reserve Jesse Swamp* John Ampt (House Dam) Kath Smith Dam Krong Swamp* Lake Danaher Bushland Reserve Mahoods Corner Morton Plains Reserve* Mutton Swamp* Opies Dam Pam Juergens Dam Paul Barclay* Pinedale* Poyner* R Ferriers Dam* Rickard Glenys Dam Roselyn Wetland/ Reids Dam* Sawpit Swamp* Schultz/Koschitzke* Tarkedia Dam* Tchum Lake – dam (Tcham Lakes Lake Reserve)* Tchum Lake – wetland (Tcham Lakes Lake Reserve)* Uttiwillock Wetland* Wal Wal Swamp*
Possible volume of water for the environment required to achieve objectives	<ul style="list-style-type: none"> 159 ML 	<ul style="list-style-type: none"> 235 ML 	<ul style="list-style-type: none"> 301 ML 	<ul style="list-style-type: none"> 399 ML

* Delivery to the site is expected to provide temporary, shallow inundation of at least part of the surrounding wetland or floodplain.

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