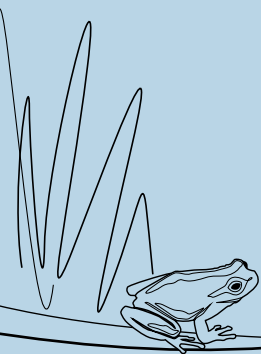




Seasonal Watering Plan

2018–19





Acknowledgement of Traditional Owners

The VEWB proudly acknowledges Victoria's Aboriginal community and their rich culture, and pays respect to their Elders past and present.

The VEWB acknowledges Aboriginal people as Australia's first peoples and as Traditional Owners and custodians of the land and water on which we rely.

The VEWB recognises and value the ongoing contribution of Aboriginal people and communities to Victorian life and how this enriches us. The VEWB embraces the spirit of reconciliation, working towards equality of outcomes and ensuring an equal voice.

For tens of thousands of years, Aboriginal people have occupied Australia. There have been very different clan and Nation boundaries to those that exist today, often embodying deep cultural relationships with the land and waterways. In this Seasonal Watering Plan, the VEWB has endeavoured, using the best available information, to name the Traditional Owner groups and their Nations that lived in the area we now call Victoria, and who continue to maintain and enhance long-standing culture and tradition. The groups and their association with particular areas are not definitive and the VEWB does not claim this information to be exact.





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Foreword

I am delighted to present Victoria's eighth seasonal watering plan for managing water for the environment for healthy waterways.

Each year, the Victorian Environmental Water Holder (VEWH) draws on a wealth of local and scientific knowledge to make informed decisions that will deliver water for the environment as efficiently and effectively as possible. Traditional Owners, the local community, government agencies and scientists have provided input into the development of regional proposals that inform this statewide seasonal watering plan.

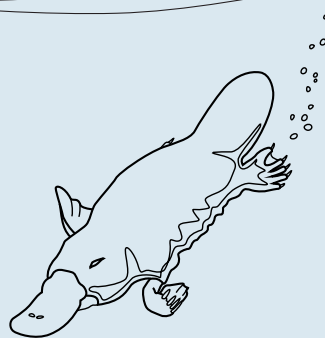
The VEWH invests in continually building the knowledge base about environmental flows through monitoring and community engagement programs, which complement research such as the Victorian Environmental Flows Monitoring and Assessment Program (VEFMAP) and the Wetlands Monitoring and Assessment Program (WetMAP). These knowledge-building investments and research continue to strengthen and improve the environmental watering program, to ensure watering is built on the best-available science and community input.

Variable rainfall and run-off conditions in a changing climate have highlighted the ongoing importance of being flexible in our water delivery and planning each year for all scenarios, from drought through to very wet. This variability was evident in 2017. Winter rainfall in 2017 was below average across most of the state, particularly across the central and south-eastern districts. Overall, it was Victoria's driest winter since 2006, a pattern that is often repeating. This dry winter was followed by a record wet start to summer, which ended with drier-than-average conditions in February.

Despite it being a very dry year in 2017–18, the VEWH and other environmental water holders held large allocations of water for the environment following the previous wet year. These allocations were used to deliver large flows to selected sites. This consolidated the positive environmental outcomes that were triggered by natural floods in 2016.

The internationally significant Hattah Lakes received over 110 GL of water for the environment in winter–spring 2017, providing the largest inundation of the floodplain lakes since the 1970s. Water was used effectively for environmental outcomes by capitalising on the flooding of the previous year. This was a boon for the environment, improving conditions for the growth and recovery of black box trees.

Looking towards the 2018–19 watering year, most systems still have good volumes of water for the environment available. This provides waterway managers with the opportunity to build on the gains made in the previous two years and increase resilience in the ecosystem so that plants and animals can withstand future dry years. If the year continues to be dry and inflows to storages low, then in some systems water carried over from last year will be critical to deliver outcomes in 2018–19, and water use may be more conservative to ensure we can provide minimum flows in the years ahead.



I am heartened to see improvements in the health of Victoria's waterways over the short time that we have been using water returned to the environment. We are seeing fish species returning to rivers, birds flocking to wetlands in numbers not seen for many years, threatened vegetation and tree species beginning to thrive and landscapes coming back to life. We want to work with communities to continue this momentum for the environment and for everyone to enjoy.

Improving waterway health in Victoria is a long-term plan to alleviate some of the damage to rivers, wetlands and catchments that has been prevalent over the last century. Water for the environment alone will not address the damage to waterways. To be fully effective, our seasonal watering plan requires complementary actions that address threats (such as barriers to fish migration, high nutrient loads and invasive species). We will continue to look for innovative ways to maximise environmental benefits in our rivers and wetlands, working closely with program partners.

The *Seasonal Watering Plan 2018–19* is an exemplary demonstration of the ongoing commitment of program partners — waterway managers, other environmental water holders, storage managers and land managers — to achieve the best-possible environmental watering outcomes for the health of Victoria's waterways and communities.

I commend those who have provided input and will be involved in the delivery of this plan over the coming year.



Denis Flett
Chairperson, Victorian Environmental Water Holder

Section 1

Introduction



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1.1 The Victorian environmental watering program

The Victorian environmental watering program is the ongoing collaborative management of water available for environmental purposes and used to improve the health of Victoria's rivers and wetlands and the native plants and animals that depend on them.

This seasonal watering plan previews the potential that may be delivered across Victoria under the program in 2018–19.

In this section ...

- ▶ **Why do we need an environmental watering program?**
- ▶ **How does water for the environment work?**
- ▶ **Who is involved in the Victorian environmental watering program?**
- ▶ **What is the role of the Victorian Environmental Water Holder?**
- ▶ **How does the Victorian environmental watering program fit within broader integrated catchment and waterway management?**
- ▶ **Where can I find more information about the Victorian environmental watering program?**

Water for the environment is set aside in storages and released into rivers and wetlands to support them, the plants that grow in them and the native animals that live, feed and breed in them.

The Victorian environmental watering program seeks to collaboratively manage water for the environment to improve the health of river and wetland systems including their biodiversity, ecological function, water quality and other uses that depend on environmental condition.

By improving the health of rivers, wetlands and floodplains, water for the environment also provides benefits to communities.

Healthy rivers and wetlands support vibrant and healthy communities. They sustain people by supplying water for towns, farms and businesses. They also contribute to local agriculture, fishing, real estate, recreation and tourism activity.

Healthy rivers and wetlands make cities and towns more liveable and support the physical and mental wellbeing of communities. Most of Victoria's towns are located near a river or lake that the community identify with, and many people travel to their favourite waterways for holidays and to pursue recreational activities. Rivers and wetlands provide places for people to play, relax and connect with nature, and they sustain healthy Country for Aboriginal communities.

1.1.1 Why do we need an environmental watering program?

As Victoria's population has grown, many of its rivers and wetlands have been significantly modified to provide water for communities to grow and thrive. In some rivers, up to half of the water that would have naturally flowed in them is removed each year to provide water for homes, farms and industry. As a result, these waterways are not able to function as they would naturally.

Reduced river flows and less-frequent wetland inundation have disrupted breeding cycles for native fish, frogs, waterbirds, platypus and other animals; restricted the growth and recruitment of native plants; and reduced the overall productivity of waterways. Our waterways still support a range of native species, but the total abundance of native plants and animals has substantially declined and the aesthetic value and environmental services those waterways provide have diminished.

Healthy waterways are essential for the plants and animals that live in them and for the people and industries that rely on clean water and the ecosystem services that waterways provide. Many rivers and wetlands with altered water regimes can no longer look after themselves. It is therefore necessary to actively manage how water flows through them. Water that is used to improve water regimes to achieve specific environmental outcomes is called 'water for the environment' or 'environmental flows'.

1.1.2 How does water for the environment work?

Water for the environment is released into rivers to mimic some of the flows that would have occurred naturally, before the construction of dams, weirs and channels. This is vital for maintaining the physical, chemical and biological health of rivers.

Managers of water for the environment generally focus on returning some of the small- and medium-sized river flows that are essential in the life cycles of native plants and animals. These flows can move sediment and nutrients through river systems, connect habitats and improve water quality.

The timing, duration and volume of water delivery is designed to support the plants and animals that rely on those flows. For example, fish such as the Australian grayling rely on an increase in river flow in autumn to signal them to migrate downstream for spawning (when fish release eggs). Breeding waterbirds require wetlands to retain water for long enough to allow their chicks to grow and fledge, and floodplain forests require inundation every few years to ensure the survival and recruitment of iconic tree species such as river red gums and black box.

Many wetlands are now either disconnected from the rivers that used to naturally fill them or are permanently connected to rivers or channels. This means that some wetlands do not get enough water, and others get too much.

In wetlands, managers of water for the environment focus on mimicking the natural wetland wetting and drying cycles that so many plants and animals depend on for survival, recruitment and long-term resilience. For example, where wetlands and floodplains have been cut off from natural river flows, water for the environment can be used to reconnect these areas, sometimes via irrigation infrastructure (such as pumps, channels and regulators).



Before and after the development of dams, weirs and channels

Rivers and wetlands provide water and land that is important to farms, towns and industry. As a result, many of Victoria's rivers and wetlands have been highly modified. For example, instead of water flowing across the landscape naturally, water is captured in storages by dams and weirs, diverted via pipelines, levees and constructed channels and used for towns, cities, industry and farming.

Some of our rivers give up more than a third, and sometimes half, of their water for farms, homes and businesses. Instead of flowing naturally, with high flows in winter and low flows in the hotter summer months, many rivers now run higher when water needs to be delivered for farming and urban use.

These changes have affected water quality and interrupted many of the natural river and wetland processes native plants and animals need to survive, feed and breed.

1.1.3 Who is involved in the Victorian environmental watering program?

The Victorian environmental watering program involves a range of groups and organisations. Relationships between local communities, waterway managers, storage managers, environmental water holders and land managers are the foundation of the program.

Many public authorities collaborate to deliver the program. These authorities are referred to as program partners.

Waterway managers (catchment management authorities [CMAs] and Melbourne Water) are the regional planning and delivery arm of the program. In consultation with local communities, waterway managers develop proposals for environmental watering in rivers and wetlands in their region. Waterway managers also order water for the environment from storage managers and monitor the outcomes.

Storage managers (largely water corporations) deliver water for all water users, including waterway managers and environmental water holders.

Environmental water holders (the Victorian Environmental Water Holder [VEWH], Commonwealth Environmental Water Holder [CEWH] and the Murray–Darling Basin Authority [MDBA]) commit water for the environment to different rivers and wetlands. They work together to ensure the coordinated delivery of water available under different environmental entitlements and must prioritise how water is used across northern Victoria and the Wimmera system.

Public land managers (such as Parks Victoria, Department of Environment, Land, Water and Planning [DELWP] and Traditional Owner land management boards) are closely involved in planning and delivering water for the environment for public land (such as state forests and national parks). Their responsibilities include controlling infrastructure (such as pumps, outlets, gates and channels) and public signage. Some environmental watering also occurs on private land, in partnership with landholders or corporations.

To effectively manage water for the environment, it is important to understand the environmental values of Victoria's rivers and wetlands. This understanding draws on the knowledge of local communities and scientists.

Local communities, including Traditional Owners, help identify the important environmental values in each region and help monitor the success of environmental watering. Local communities are often actively involved with local rivers and wetlands and bring important environmental, cultural, social and economic perspectives to the program.

Scientists provide indispensable advice about how water for the environment will support native plants and animals in the short and long term and work with waterway managers to monitor, evaluate and report on the outcomes of environmental watering.

Citizen scientists are increasingly monitoring the outcomes of environmental watering. In some regions, Birdlife Australia volunteers help monitor environmental watering outcomes at wetlands, and Waterwatch volunteers collect water-quality information to inform management decisions for some rivers. In the Western Region, Budj Bim and Barengi Gadjin Land Council Aboriginal Corporation rangers are monitoring environmental watering outcomes (including the presence of platypus) in the Glenelg River. Barapa Barapa Traditional Owners are monitoring environmental watering outcomes in Gunbower Forest and Dja Dja Wurrung will soon monitor environmental watering outcomes in Lake Boort.

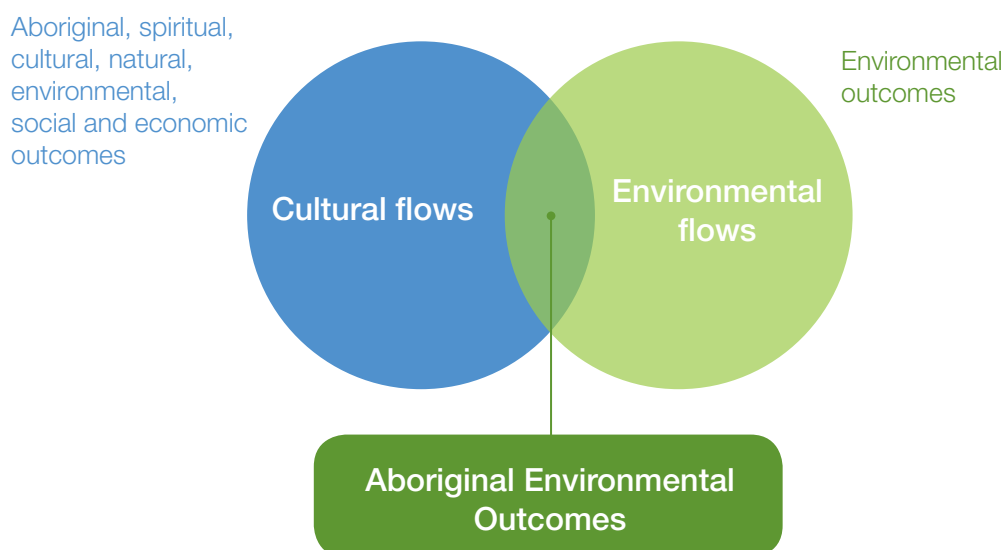
How are Traditional Owners engaged in the environmental watering program?

Traditional Owners and their Nations in Victoria have a deep and enduring connection to Victoria's rivers, wetlands and floodplains, spanning tens of thousands of years. The VEWH and environmental watering program partners recognise the intersection between environmental flows objectives and outcomes for Traditional Owners and Aboriginal Victorians, and acknowledge that genuine, enduring partnerships with Aboriginal people in planning and managing water for the environment adds value to the benefits it can provide. Figure 1.1.1 illustrates the intersection between the environmental watering program and Aboriginal cultural flows.

In many regions of Victoria, Traditional Owner Nations have strong relationships with environmental watering program partners, and they are working to better realise Aboriginal Victorians' aspirations and incorporate Traditional Owners' objectives into environmental flows management. These initiatives and ongoing contributions to the program are highlighted in the regional introductions in this seasonal watering plan.

The VEWH and program partners support the need to develop enduring partnerships with Traditional Owner Nations who wish to participate in the management of water for the environment. The VEWH is funding some projects to help waterway managers and Traditional Owners identify opportunities to better align environmental watering objectives and actions with Aboriginal objectives.

Figure 1.1.1 Illustration of intersection between the environmental watering program and Aboriginal cultural flows



1.1.4 What is the role of the Victorian Environmental Water Holder?

The VEWH is an independent body, established by the Victorian Government in 2011. It is responsible for managing Victoria's water for the environment. Set up under the *Water Act 1989*, the VEWH manages environmental entitlements — a legal right to access a share of water available at a location — to improve the environmental values and health of Victoria's rivers, wetlands and floodplains, and the plants and animals that rely on them.

The role of the VEWH is to:

- ▶ make decisions about the most effective use of the environmental entitlements, including for use, carryover and trade (see section 1.4.2)
- ▶ commit water and authorise waterway managers to implement watering decisions (see section 1.3.2)
- ▶ work with storage managers and other water holders to coordinate and optimise environmental outcomes from the delivery of all water (see section 1.4)
- ▶ commission projects to demonstrate the ecological outcomes of environmental flows at key sites and to help improve the management of water for the environment
- ▶ publicly communicate environmental watering decisions and outcomes.

The VEWH consists of four part-time commissioners, supported by a small team.

The commissioners are Denis Flett (Chairperson), Geoff Hocking (Deputy Chairperson) Chris Chesterfield (Commissioner) and Rueben Berg (Commissioner). Commissioners are appointed by the Governor in Council on the recommendation of the Minister for Water.

1.1.5 How does the Victorian environmental watering program fit within broader integrated catchment and waterway management?

The VEWH's operations fit within broader Victorian Government policies for integrated catchment and waterway management. Key policy documents influencing the VEWH from a Victorian context include *Water for Victoria*, *Victorian Waterway Management Strategy* and regional sustainable water strategies. Regional waterway strategies determine priority waterways, in consultation with local communities, and outline integrated waterway management actions.

Water for Victoria is a plan for a future with less water as Victoria responds to the impact of climate change and a growing population. The actions in the plan support a healthy environment, a prosperous economy with growing agricultural production and thriving communities. Implementing the actions in the plan will improve the operation of the water and catchment management industry, including the VEWH.

Water for Victoria recognises that protecting and improving waterway health is a long-term commitment needing coordinated action. Integrated catchment management is a holistic way of managing land, water and biodiversity

from the top to the bottom of a catchment. Although better integrated catchment management will greatly benefit Victoria's waterways, the full benefits of strategic, long-term investments in waterway health may not be realised for 30 years or more. *Water for Victoria* identifies 36 priority waterways for large-scale projects over this timeframe and many of these waterways are planned for environmental flows in this seasonal watering plan.

Complementary water management activities are often needed to achieve environmental watering outcomes. These include invasive species control, riparian (streamside) land management, sustainable agriculture, sustainable land use planning and development, integrated urban water management and other waterway management activities (such as providing fish passage and improved in-stream habitat, for example snags). A lack of fish passage due to dams and weirs continues to be a problem in some Victorian rivers where environmental flows aim to increase the breeding success and recruitment of native fish. Figure 1.1.2 shows examples of complementary waterway management activities in Victorian waterways that receive water for the environment.

In most systems, water for the environment is delivered using existing infrastructure (such as dam outlet gates and water supply channels) built for and still used for the supply of water for agriculture, industry and communities. Permanent and temporary pumps are also used in some cases to deliver water for the environment to wetlands. Capacity constraints with these types of infrastructure and the need to avoid flooding on private land restrict the size and timing of deliveries of water for the environment. In some systems, these constraints mean only a fraction of the required environmental flows can be delivered to waterways, which significantly reduces the environmental outcomes that can be achieved.

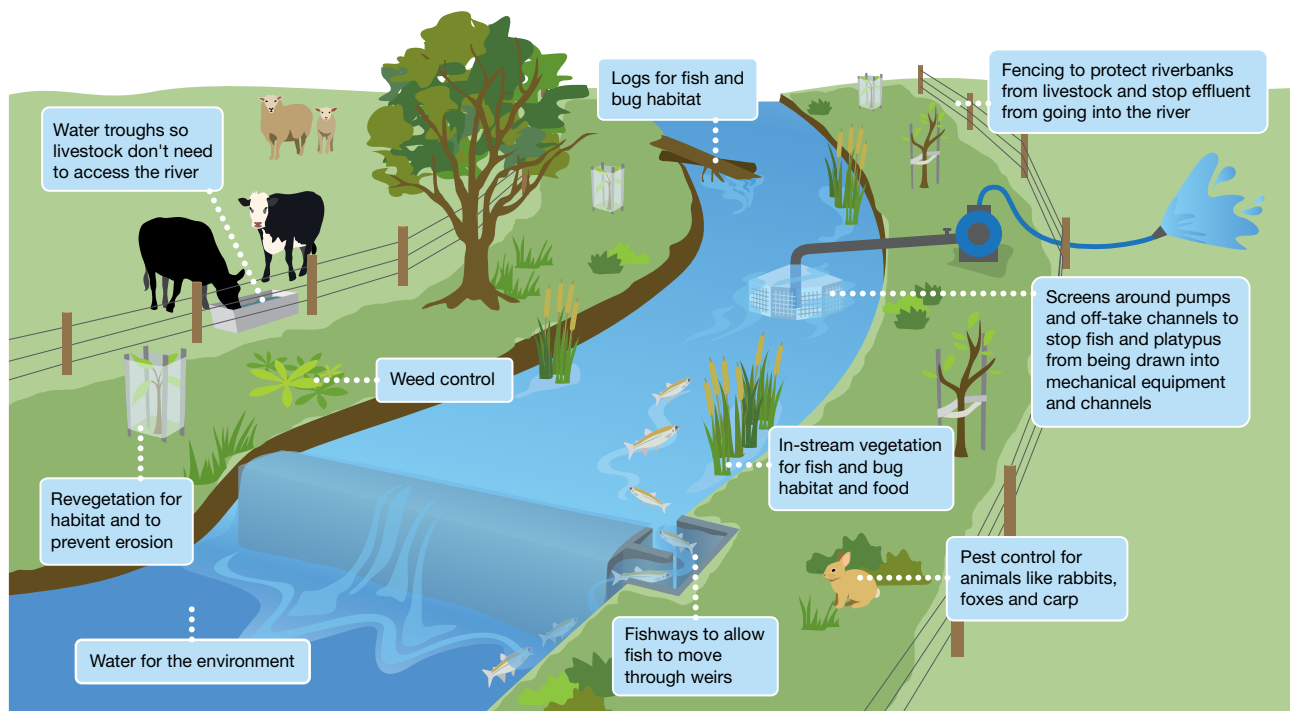
Victoria's environmental watering program is integral to the success of the following three strategies and plans.

Our Catchments, Our Communities is Victoria's first statewide strategy for integrated catchment management. Its aims are more effective community engagement, better connections between different levels of planning and stronger regional catchment strategies. The strategy also aims to clarify roles, strengthen accountabilities and coordination and improve monitoring, evaluation and reporting. CMAs will lead 10 new integrated catchment management projects across the state from 2016 to 2019 in collaboration with catchment management partners. The Caring for Campaspe and Living Moorabool projects involve environmental watering actions.

Protecting Victoria's Environment – Biodiversity 2037 aims to ensure Victoria has a modern and effective approach to protecting and managing Victoria's biodiversity. Providing water for the environment is essential to supporting Victoria's biodiversity. The plan will be implemented together with the outcomes of reviews of the *Flora and Fauna Guarantee Act 1988* and Victoria's native vegetation clearing regulations.

The *Basin Plan 2012* for the Murray–Darling Basin is another key reform influencing the VEWH's operations, particularly its planning and reporting framework in northern and western Victorian systems which form part of the basin. The VEWH continues to work closely with the Victorian Government and other agencies to implement the Basin Plan.

Figure 1.1.2 Examples of complementary management actions



1.1.6 Where can I find more information about the Victorian environmental watering program?

There is more information about the program on the VEWH website at vewh.vic.gov.au, or contact the VEWH on (03) 9637 8951 or by email to general.enquiries@vewh.vic.gov.au.

You can get more detailed information about water for the environment in your region by contacting your local waterway manager using the contact details in section 6.3.

Water for the environment fact sheets

The VEWH's fact sheets answer questions about water for the environment. They are:

- ▶ What is environmental water?
- ▶ Why is environmental watering important?
- ▶ What does environmental watering aim to achieve?
- ▶ What does environmental watering involve?
- ▶ How do we know if environmental watering is successful?
- ▶ What is environmental water trading?

The fact sheets are on the VEWH website, or you can get hard copies by emailing general.enquiries@vewh.vic.gov.au.

1.2 The seasonal watering plan

The seasonal watering plan is a statewide plan that guides environmental watering decisions in Victoria. It provides program partners, stakeholders and communities with a sense of what to expect during the water year.

In this section ...

- ▶ **What does ‘seasonal’ mean?**
- ▶ **How does the seasonal watering plan fit into the planning process?**
- ▶ **Who contributes to the seasonal watering plan?**
- ▶ **Can the seasonal watering plan be changed?**
- ▶ **When isn’t a formal variation required to the seasonal watering plan?**

The plan previews the potential environmental flows that could be implemented using water available under all environmental water entitlements held in Victoria. This includes water available under the VEWH’s environmental water entitlements and water held by other environmental water holders (see section 1.4.1).



The plan for the upcoming water year is released by 30 June each year. The 2018–19 plan and any variations are valid for this water year (1 July 2018 to 30 June 2019) or until the subsequent seasonal watering plan is released.

1.2.1 What does ‘seasonal’ mean?

‘Seasonal’ refers to the variability of climatic conditions in a given year. It includes normal differences between summer, autumn, winter and spring as well as an assessment of whether a particular year is drier or wetter than average. Environmental watering objectives and water availability may differ depending on seasonal conditions, so it is important that planning for water for the environment considers the range of potential seasonal condition or water availability scenarios that may unfold, ranging from drought to very wet (see Figure 1.2.1). This scenario planning provides a guide for the VEWH and waterway managers throughout the year when it comes to deciding what environmental flows to go ahead with.

For each river and wetland system, the potential environmental flows under each seasonal condition or water availability scenario is explained under ‘Scenario planning’ in the relevant section.

Figure 1.2.1 Examples of environmental watering objectives under different planning scenarios

			
Drought Main objective: PROTECT <ul style="list-style-type: none"> ▶ Avoid critical loss ▶ Maintain key refuges ▶ Avoid catastrophic events 	Dry Main objective: MAINTAIN <ul style="list-style-type: none"> ▶ Maintain river functioning with reduced reproductive capacity ▶ Maintain key functions of high-priority wetlands ▶ Manage within dry-spell tolerances 	Average Main objective: RECOVER <ul style="list-style-type: none"> ▶ Improve ecological health and resilience ▶ Improve recruitment opportunities for key animal and plant species 	Wet to very wet Main objective: ENHANCE <ul style="list-style-type: none"> ▶ Restore key floodplain and wetland linkages ▶ Enhance recruitment opportunities for key animal and plant species

1.2.2 How does the seasonal watering plan fit into the environmental water planning process?

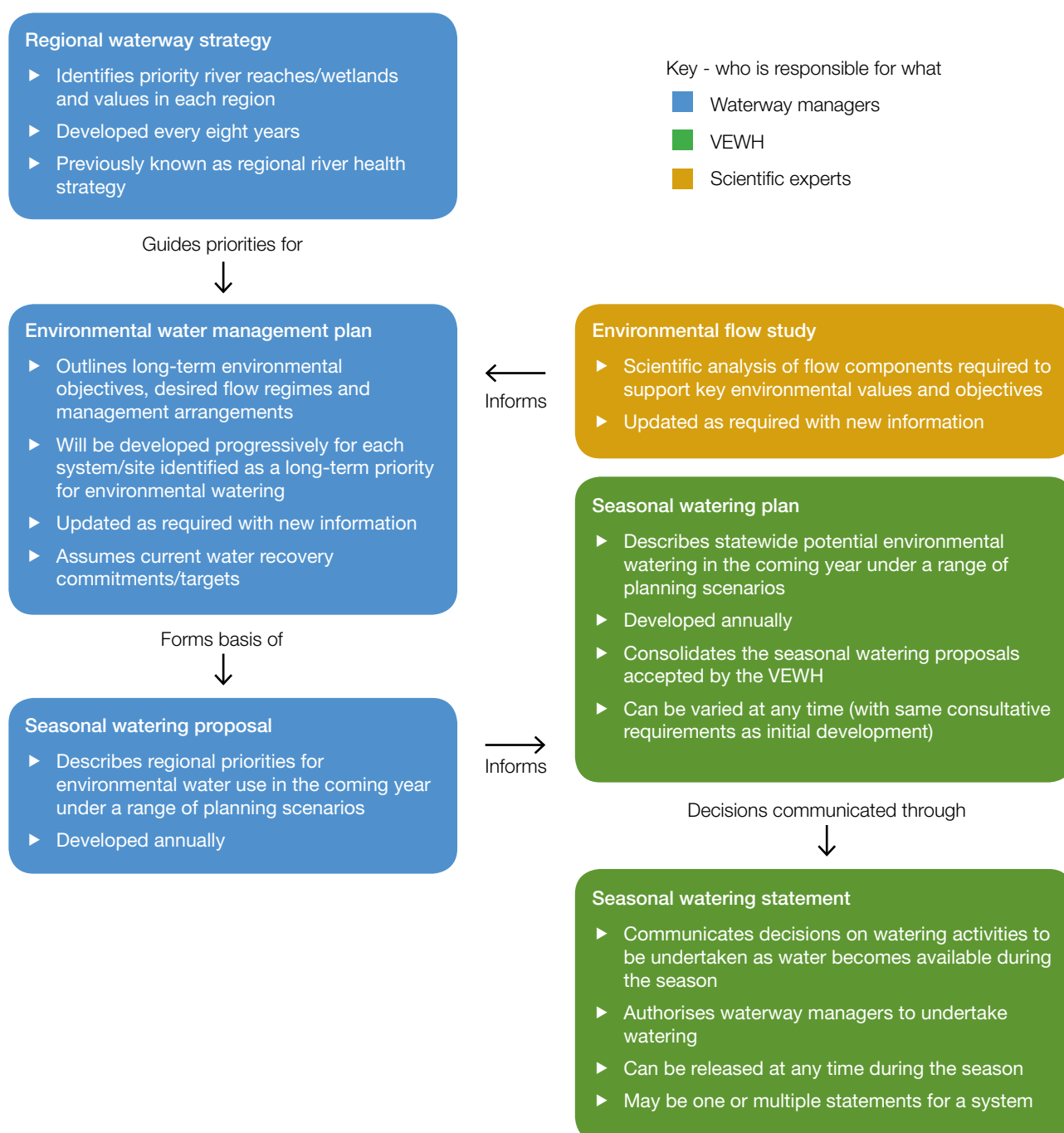
Each year, waterway managers scope the potential environmental watering actions for their regions for the coming year in seasonal watering proposals. The proposals draw on environmental flow studies and on longer-term plans (such as environmental water management plans, regional waterway strategies and regional catchment strategies). Environmental flow studies and environmental water management plans for Victorian waterways are available on the VEWH's website at vewh.vic.gov.au. Waterway strategies and regional catchment strategies are

published on the relevant CMA websites. The seasonal watering proposals incorporate information and advice from local communities and Traditional Owners.

The VEWH reviews the proposed watering actions in each seasonal watering proposal and works with waterway managers to identify the potential watering actions for each region and across the state. This seasonal watering plan is a collated summary of the agreed actions from all the seasonal watering proposals.

The different stages of environmental water planning, including the different strategies and plans, are shown in Figure 1.2.2. There is more information about each of these strategies and plans at vewh.vic.gov.au.

Figure 1.2.2 Victorian environmental watering program planning framework



1.2.3 Who contributes to the seasonal watering plan?

Stakeholder engagement on potential environmental watering actions occurs during the development of regional seasonal watering proposals. The level and method of engagement varies across the state, reflecting the differing systems, watering actions and stakeholders. In some regions, formal environmental water advisory groups provide the opportunity for waterway managers and interested community members to discuss potential environmental flows in their system or locality for the coming year. In other systems, engagement occurs one-on-one between waterway managers and interested stakeholders. The most interested stakeholders tend to be Traditional Owners, irrigators, farmers, members of the community living close to or with an interest in a specific waterway, members of recreational groups and members of local environmental groups.

Land managers and storage managers also consider and endorse the seasonal watering proposals to ensure planned watering aligns with land and storage management objectives and can feasibly be delivered through planned system operations.

For each system, there is a summary of the engagement activities waterway managers undertook when developing seasonal watering proposals (see sections 2 to 5).

1.2.4 Can the seasonal watering plan be changed?

Under the *Victorian Water Act 1989*, the VEWH can only authorise use of water for the environment where it is consistent with a seasonal watering plan. This is to ensure transparency about what environmental flows are planned and how they are managed.

To ensure flexibility to adapt to changing conditions, the Act allows the VEWH to vary any section of a seasonal watering plan. Variations may be needed to incorporate new knowledge or to address circumstances that were not identified before the start of the water year.

The VEWH makes all variations publicly available at vewh.vic.gov.au as separate attachments to the original seasonal watering plan. You can email general.enquiries@vewh.vic.gov.au for a hard copy.

1.2.5 When isn't a formal variation required to the seasonal watering plan?

In some instances, there may be unforeseen circumstances that will call for use of water for the environment that does not require a variation to the seasonal watering plan. These include:

- ▶ minor operational adjustments to specific environmental watering actions
- ▶ water for the environment being used for environmental emergency management situations
- ▶ small volumes of water for the environment being used for technical investigations or infrastructure maintenance
- ▶ facilitating the delivery of water for the environment held by other water holders for downstream objectives
- ▶ environmental watering actions that continue beyond the year of the plan (even if there are unforeseen delays releasing the following year's plan).

As the VEWH cannot anticipate the specifics of these circumstances, it cannot include further details about them in this plan.

Minor operational adjustments

Minor operational adjustments to environmental watering actions may occur from time to time. For example, the targeted river reaches, flow rates, timing and durations detailed in sections 2 to 5 may need to be adjusted slightly due to changes in predicted rainfall or other water orders, delivery infrastructure constraints, emerging ecological knowledge or the timing of specific ecological triggers (such as a bird-breeding event). In all cases, environmental watering actions will still aim to optimise the environmental outcomes achieved, in line with the objectives set out in the seasonal watering plan.

Environmental emergency management situations

Water for the environment may be needed for an environmental emergency management situation. This may include reducing the impact of natural blackwater or bushfire events, preventing fish deaths or mitigating the effects of blue-green algae blooms. It could also include smoothing the transition to or from a high-natural-flow event (for example, supplementing natural flows with water for the environment to provide a more gradual rise and fall to minimise the threat of riverbanks slumping).

Small technical investigations and maintenance

There may be instances where a small volume of water for the environment may be used for research and development purposes, or small-scale infrastructure testing or maintenance. Such instances are considered on a case-by-case basis and must aim to enhance knowledge and improve environmental watering management. It must not compromise the potential to achieve the environmental objectives in the seasonal watering plan.



Facilitating the delivery of water held by other water holders for downstream objectives

Some water held by other water holders is stored in Victorian storages and is sometimes called on to meet downstream demands beyond the scope of this plan (such as for the Coorong, Lower Lakes and Murray Mouth area in SA). Delivery of this water is sometimes needed at a time and flow rate that was not scoped in the seasonal watering plan. The VEWH facilitates and authorises such deliveries, provided the risk of adverse impacts on Victoria's rivers, wetlands and floodplains and other risks are appropriately managed.

Environmental watering actions that continue beyond the year of the plan

Nature doesn't keep to strict timelines, so some potential environmental flows scoped in a seasonal watering plan may begin before, or continue beyond, the year of the plan. This means environmental watering actions that start either before July 2018 or continue after June 2019 are still consistent with the plan, especially if there are unforeseen delays releasing the *Seasonal Watering Plan 2019–20*.



Hattah Lakes at Bitterang Crossing, by Mallee CMA

1.3 Implementing the seasonal watering plan

The seasonal watering plan scopes potential environmental watering for the coming year, but many factors influence decisions about what water for the environment is actually committed and delivered.

In this section ...

- ▶ **How are watering decisions made throughout the year?**
- ▶ **When does the VEWH commit and authorise use of water for the environment?**
- ▶ **How does the VEWH prioritise different watering actions when there is not enough water for the environment available?**
- ▶ **Do seasonal conditions affect how water for the environment is used?**
- ▶ **How are shared social, recreational, Traditional Owner, cultural and economic benefits considered in environmental watering decisions?**
- ▶ **How are risks managed?**

Some factors that influence decisions about committing and delivering water for the environment are:

- ▶ seasonal conditions, weather forecasts and catchment conditions
- ▶ river and system operations (such as unregulated flows, catchment inflows, storage levels, other water users' needs and potential delivery constraints)
- ▶ ecological or biological factors and triggers (such as plant and animal responses to natural flows or temperature)
- ▶ water availability
- ▶ risks associated with an environmental watering action
- ▶ the opportunity to deliver shared benefits.

It is important there is flexibility to respond to these different factors, as they can significantly influence the environmental outcomes and shared benefits that can be achieved.

1.3.1 How are watering decisions made throughout the year?

As the season unfolds, many of the uncertainties associated with seasonal conditions, water availability and operational context become clearer and this clarity informs decisions about what environmental flows should proceed. Many on-ground factors do not become clear until very close to the anticipated time of delivering the water.

To guide environmental watering decisions, a flexible and adaptive approach is adopted that involves the environmental water management stakeholders. This process of review and adjustment ensures that water for

the environment is used in an efficient and seasonally appropriate manner to optimise ecological outcomes across the state.

Waterway managers, storage managers and land managers provide advice about which watering actions are needed and can be delivered in each region during the year. Environmental water holders use that information to decide which watering actions to authorise. All program partners have a role in identifying potential watering actions and enabling the delivery of water for the environment (as explained in section 1.3.3).

If planned watering actions need to be significantly changed during the season to respond to unforeseen circumstances, further scientific or community input may be sought to inform decision-makers.

The VEWH regularly publishes updated information about current and anticipated environmental watering actions on its website at vewh.vic.gov.au.

1.3.2 When does the VEWH commit and authorise use of water for the environment?

The VEWH aims to commit as much water as is sensibly possible, as early as possible, to provide waterway managers with certainty to proceed with the planned environmental watering actions.

The VEWH (like other environmental water holders) can commit its water at any point before or during the water year. The VEWH commits water via seasonal watering statements, which authorise waterway managers to use water for the environment. The VEWH publishes seasonal watering statements on its website at vewh.vic.gov.au.

The VEWH can make a seasonal watering statement at any time of the year. Depending on the nature of the system and the entitlement being used, it may make one or multiple statements for a system during the water year. Before issuing a seasonal watering statement, the VEWH must be sure the required delivery arrangements (including any risk management measures) are in place and any costs it must meet are acceptable.

Where many environmental watering actions across different systems require access to the same environmental water entitlement, decisions to commit water to particular actions may require more thorough consideration. This may require prioritisation of one river or wetland over another, or prioritisation of one flow component over another. Section 1.3.3 has further information about how prioritisation decisions are made.

In some instances, the VEWH may commit water very close to the anticipated delivery time. This may be necessary because the water demand arises at short notice due to environmental, operational or weather conditions. For example, a colonial waterbird nesting event in Barmah Forest may trigger a need for water for the environment to maintain shallow flooding long enough for the birds to fledge.

There may also be instances where planned environmental flows are not delivered to a particular site. For example, an ecological trigger or seasonal conditions could nullify the potential benefit of the planned delivery, or a lack of catchment inflows may mean there is not enough water for the planned watering action.

The CEWH and MDBA (through the Living Murray program) commit water for use in Victoria with similar logic to that outlined above. The VEWH then formally authorises the use of that water through seasonal watering statements.

Can environmental water holders change their minds after a seasonal watering statement has been issued?

The VEWH may withdraw a seasonal watering statement at any point during the year, in consultation with the waterway manager and storage manager for that river or wetland system. It might do so, for example, to address emerging risks or changes in operating conditions or water availability.

Similarly, a waterway manager or storage manager may decide, in consultation with the VEWH, not to proceed with an environmental watering action after a seasonal watering statement has been issued. This could occur as a result of environmental triggers indicating the water was no longer required, resourcing constraints or new information that the potential environmental or public risk of watering is too high.

1.3.3 How does the VEWH prioritise different watering actions when there is not enough water for the environment available?

The VEWH makes decisions about why, where, when and how its available water and funds for the environment are used, carried over or traded to get maximum benefit for the state's waterways — our rivers, wetlands, estuaries and floodplains — and the wildlife that depend on them.

In implementing this program, it is important to recognise the dynamic nature of the VEWH's work. Seasonal conditions can vary considerably between years, which affects both the requirements of particular sites for water for the environment (the demand) and the availability of water for the environment (the supply).

A shortfall in supply might arise because of:

- ▶ significant, high-value demands for water for the environment
- ▶ drought or low water availability.

To meet a shortfall, the VEWH may look to use tools such as carryover and trade (as explained in section 1.4.2). If there is still a shortfall of water, the VEWH, in collaboration with waterway managers and other water holders if relevant, must prioritise environmental watering actions.

Many factors influence prioritisation decisions (such as the likely environmental outcomes, the previous watering history in that river or wetland, environmental or public risk considerations and seasonal conditions in the region). Trade-offs may need to be made about watering actions undertaken in one year or at one site, and water may need to be provided at the expense of watering actions in the next year or at another site. Trade-offs may also need to be made about foregoing watering actions to sell water allocation and use the resulting revenue for complementary works and measures; it may also be used to improve knowledge and capability to deliver better environmental outcomes in the short or longer term.

In deciding to prioritise one environmental watering action or site over another, the VEWH always seeks to optimise environmental outcomes across the state.

What criteria are used to guide prioritisation decisions?

In deciding how to use the available Water Holdings in any given year, the VEWH considers:

- ▶ decisions by other water holders about the use of their water for the environment
- ▶ State and Commonwealth government decisions about water resource policy
- ▶ the resources, knowledge and capability of the VEWH and its program partners
- ▶ storage managers meeting their obligations to the environment associated with the right to harvest and distribute water sustainably
- ▶ complementary works and measures being undertaken
- ▶ the availability of funds
- ▶ services associated with management of the Water Holdings and delivery of water for the environment.

Figure 1.3.1 shows the criteria considered when making the trade-off decisions and prioritising specific watering actions. Waterway managers provide information about how different watering actions meet these criteria, and about opportunities for shared benefits, in their seasonal watering proposals.

Prioritisation has historically occurred on a site-by-site basis, but many of the ecological processes that underpin waterway health operate at a landscape scale. The prioritisation process is currently evolving to consider the combination of watering actions that are needed across multiple waterways in a region to achieve the best environmental outcomes. The prioritisation criteria shown in Figure 1.3.1 can be equally applied at individual sites or at the broader landscape scale.

Figure 1.3.1 Criteria for prioritising environmental watering actions

Prioritisation criteria	Types of factors considered
Extent and significance of environmental benefit	<ul style="list-style-type: none"> ▶ Size of the area being watered ▶ Expected ecological outcomes ▶ Expected scale of response ▶ Conservation status of the species or community that will benefit
Likelihood of success	<ul style="list-style-type: none"> ▶ Evidence to support the desired outcomes will be achieved ▶ External threats that may affect getting the desired results
Longer-term benefits	<ul style="list-style-type: none"> ▶ Value added to previous watering investment at the site ▶ Longer-term environmental benefits expected ▶ Ability to sustain these values into the future
Urgency of watering needs	<ul style="list-style-type: none"> ▶ History of watering at the site ▶ Potential for irreversible damage if the watering does not occur ▶ Risks associated with not delivering the water
Feasibility of the action	<ul style="list-style-type: none"> ▶ Capacity of infrastructure to meet the delivery requirements ▶ System or operational constraints ▶ Flexibility in the timing of delivery ▶ Feasibility of management actions in mitigating external threats
Environmental or third party risks	<ul style="list-style-type: none"> ▶ Adverse environmental outcomes that may arise ▶ Third-party risks associated with the event ▶ Effectiveness of actions to manage third-party and environmental risks
Costs of the watering action	<ul style="list-style-type: none"> ▶ Costs to deliver and manage water ▶ Costs of interventions for managing external threats and risks
Efficiency of water use	<ul style="list-style-type: none"> ▶ Volume of water needed to achieve the desired outcomes ▶ Volume and timing of return flows that may be used at downstream sites (see section 1.4.2) ▶ Alternative supply options such as use of consumptive water en route or augmenting natural flows ▶ Risks of spills from storages in the upcoming water year and any carryover water (see section 1.4.2) that may be available
After consideration of above criteria	
Cultural, social and economic benefits	<ul style="list-style-type: none"> ▶ Recreation, community events and activities ▶ Traditional Owner values and aspirations ▶ Economic benefits

Who is involved in the prioritisation process?

Waterway managers, environmental water holders, storage managers and communities (recreational user groups, environmental groups, Traditional Owners and farming groups) all have a role in prioritising environmental watering actions, depending on the nature and scale of the decision being made. There is a list of partners and stakeholders engaged in developing the seasonal watering proposal for each system in this plan.

Waterway managers are best placed to advise about the extent and significance of an environmental watering action and about the highest priorities in their region.

The VEWH and other environmental water holders determine the highest watering priorities across regions. The VEWH's decisions are intended to provide the best-possible environmental outcomes for the state. The VEWH makes these decisions in consultation with waterway managers and other program partners as relevant.

Advice from storage managers is generally the key to understanding the feasibility of delivering a watering action, including the flexibility of delivery timing and operational constraints.

Land managers provide consent to deliver environmental flows on their land and will advise on the feasibility of delivery after considering land management activities, public access and the risks and benefits of the environmental watering action.

The annual prioritisation process is informed by longer-term site prioritisation by waterway managers in consultation with their communities. This prioritisation is detailed in plans such as regional catchment strategies, regional waterway strategies and environmental water management plans. These plans draw on community and scientific knowledge and prioritise sites for water for the environment (and other river health activities) that have high environmental, cultural, social and economic value to the community.

Additional input from the community about prioritising water for the environment is provided annually where needed.

1.3.4 Do seasonal conditions affect how water for the environment is used?

In the same way that rainfall patterns influence how people water their gardens or paddocks, different climatic conditions influence how water for the environment is managed.

Seasonal conditions drive what water will be available during the water year and the environmental watering objectives to be pursued (as explained in section 1.2.1). Waterway managers take seasonal conditions into account when prioritising the water for the environment needed at each site. Seasonal planning scenarios describe the range of watering actions that may occur under drought to very wet climatic conditions.

Waterway managers work with the program partners to decide how to optimise the ecological outcomes they can achieve using water for the environment by considering factors including:

- ▶ the environmental objectives under each climatic scenario including consideration of any essential water for the environment needs
- ▶ how rainfall, natural flooding or the delivery of water for consumptive use may contribute to the achievement of the environmental objectives
- ▶ how water for the environment may be used to build on natural flows or irrigation deliveries to meet the environment's needs
- ▶ natural climatic cues that might increase the likelihood of achieving an ecological outcome.

Planning scenarios are presented in the seasonal watering plan and provide the basis for the adaptive management of water for the environment as the season unfolds. They also provide an early indication of the amount of water that may be used at different sites and whether the VEWH may need to trade water during the season to meet identified environmental needs (as explained in section 1.4).

Figure 1.3.2 provides an example of how different planning scenarios may influence decisions about how water for the environment is managed in a year.



Figure 1.3.2 Example planning scenarios for a river system under a range of climatic conditions

Planning scenario	Drought	Dry	Average	Wet to very wet
Expected Catchment Conditions	No unregulated flows	One or two brief unregulated flow peaks in winter/spring	One to three unregulated flow peaks plus extended low flows in winter/spring	Extended unregulated high flows with some overbank flooding in winter/spring
Environmental Objectives	Protect critical refuge habitat for native fish	Maintain native fish habitat	Encourage fish movement and spawning Improve habitat for waterbugs Support the establishment and maintenance of bank vegetation	Encourage movement and spawning of native fish Enhance condition and extent of bank vegetation Where possible, provide opportunities for the exchange of nutrients and carbon between the river and floodplain
Potential Environmental Watering	Provide low flows and trigger-based freshes to maintain water quality in deep refuge pools	Provide summer/autumn low flows to manage water quality and maintain connectivity Extend the duration of flow peaks to freshen water quality in deep pools	Provide year-round baseflows to maintain habitat connectivity and support fish movement Extend the duration and/or magnitude of peaks to provide spawning cues for fish Provide seasonal freshes to support the establishment of bank vegetation	Maintain year-round low flows and seasonal freshes to encourage the recovery of in-stream and bank vegetation and trigger the spawning and movement of native fish Where possible, maintain connectivity and the exchange of nutrients between the river and floodplain Slow the recession of natural peaks to avoid bank slumping and erosion Top up natural flows if needed, to meet targets for winter base flows and spring peaks

1.3.5 How are shared social, recreational, Traditional Owner, cultural and economic benefits considered in environmental watering decisions?

Environmental flows are essential for maintaining and improving the health of rivers, wetlands and floodplains. The plants, animals and broader health of these waterways provide shared benefits for recreation, cultures and economies. Community benefits may be direct (for example, water for the environment can increase populations of popular angling fish species, sustain healthy Country and totem species for Aboriginal communities and improve water quality to the benefit of irrigators) or opportunistic (for example, timing the delivery of an environmental flow to increase opportunities for kayakers and telling the public about the flow so they can take advantage of it).

In planning for environmental flows, the primary purpose is to optimise environmental benefits. Year by year and case by case, the VEWH and its partners consider opportunities raised by communities to use water for the environment to provide additional social, Traditional Owner, cultural and recreational benefits. Where possible, these opportunities are incorporated into watering decisions, if they do not compromise environmental outcomes.

Shared benefits of water for the environment can sometimes be actively optimised by making decisions around the storage, delivery and use of water for the environment to support community events (such as local fishing, waterskiing or rowing competitions).

When planning for and delivering water for the environment, the VEWH and program partners look for opportunities to achieve shared benefits in both the short and long-term, where environmental outcomes are not compromised. Longer-term community benefits may sometimes require short-term community inconvenience. For example, floodplain watering in Gunbower Forest may limit access and therefore inconvenience campers in one year, but the environmental benefits of the watering will likely improve tourism and recreational opportunities in the forest over the longer-term.

Waterway managers work with communities to identify the environmental, social, cultural and economic values of waterways through regional catchment strategies, regional waterway strategies, environmental water management plans and seasonal watering proposals. The values for each system are summarised in sections 2 to 5. Program partners will continue to work with stakeholders to look for opportunities to achieve shared benefits from water for the environment.

1.3.6 How are risks managed?

Risk management is an integral part of managing water for the environment. Program partners consider it throughout management of water for the environment (that is, during long-term and annual planning, implementation and review).

The VEWH, in collaboration with its program partners, has developed a risk management framework that addresses interagency risk, respects the risk management practices of each partner, documents roles and responsibilities in operating arrangements and is applied as part of program management. The key elements of the framework are described below.

The seasonal watering proposals on which this seasonal watering plan is based identify potential risks associated with the specific watering actions proposed for the coming water year. As part of developing the proposals, partners jointly assess risks and identify and commit to mitigation actions. A collaborative approach is the best way to manage the shared environmental watering risks.

Table 1.3.1 shows the main shared risks with water for the environment. Program partners consider and reassess these and other potential risks as the season unfolds and planned watering actions are due to commence.

Some risks may only eventuate at the time of delivery. For example, forecast heavy rain at the time of a planned delivery of water for the environment could increase the risk of nuisance flooding. Program partners review risks immediately before a planned delivery of water for the environment and implement measures or actions required to mitigate the risks as agreed with all relevant program partners. Watering actions will not be implemented if unacceptable risks to the public or the environment cannot be mitigated.

Even with best-practice risk management controls, there may be unintended impacts from environmental flows or situations where environmental flows cannot be delivered as planned. In those situations, program partners work together to respond to incidents and then learn and adapt their management of risks. The VEWH has developed an agreed approach to incident management to help program partners report, investigate and respond to risks.

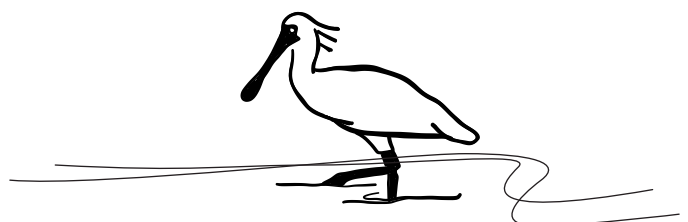


Table 1.3.1 Main shared risks of environmental watering

Type of risk	Example mitigating actions
Environmental watering contributes to third-party impacts	<ul style="list-style-type: none"> Identify and understand water system capacities and monitor water levels at key locations to inform daily water release decisions and ensure impacts do not eventuate. Consider potential catchment run-off from forecast rainfall before deciding on the timing of releases of water for the environment. Implement a communication strategy which may include media releases, public notices and signage before environmental flows, to ensure people are informed of significant deliveries of water for the environment and can adjust their behaviour accordingly. This includes early liaison with potentially affected stakeholders. Restrict access by closing gates and tracks.
Inability to achieve or demonstrate ecological outcomes from environmental watering	<ul style="list-style-type: none"> Undertake intervention monitoring within available resources to identify the ecological response. Conduct research to better understand responses to water for the environment. Communicate the outcomes of monitoring and incorporate learnings into future environmental flows. Consider the need for complementary works to help achieve environmental watering outcomes as part of integrated catchment management, and the likely timeframe for ecological responses to all management actions.
Environmental watering has negative effects on the environment (for example blackwater, bank erosion and the spread of weeds)	<ul style="list-style-type: none"> Monitor environmental watering outcomes and reassess future deliveries and/or scientific recommendations if necessary. Plan the timing, frequency, duration and variability of environmental flows to limit conditions that are favourable to non-native plants and animals or which have negative effects.

*Ovens River at Gapsted, by Natalie Ord*

1.4 Managing available water for the environment

Environmental entitlements are held in 15 water supply systems across Victoria. Sections 2 to 5 detail where water made available under these entitlements may be delivered in 2018–19.

In this section ...

- **How much water is available to use as part of the Victorian environmental watering program?**
- **What options are available to effectively and efficiently manage water for the environment?**

To the extent possible, the VEWH and other environmental water holders try to avoid water supply shortfalls by efficiently using water for the environment and by using tools such as carryover and trade. If there is still a shortfall of water, the VEWH in collaboration with waterway managers (and other water holders if relevant) will prioritise environmental watering actions.

1.4.1 How much water is available to use as part of the Victorian environmental watering program?

VEWH environmental entitlements

Water for the environment is made available under the environmental entitlements held by the VEWH. Table 1.4.1 shows the entitlements held by the VEWH as at 30 June 2018, including those held in trust for the Living Murray program. The VEWH's environmental entitlements can be viewed at waterregister.vic.gov.au/water-entitlements/bulk-entitlements.

The water available to use under these entitlements varies from year to year depending on entitlement rules, seasonal conditions (including rainfall and run-off in the catchments) and the water already available in storages.

Table 1.4.1 Environmental entitlements held by the VEWH (as at 30 June 2018)¹

System	Entitlement	Volume (ML)	Class of entitlement
Central Region			
Barwon	Barwon River Environmental Entitlement 2011	N/A ²	Unregulated
	Upper Barwon River Environmental Entitlement 2018	2,000 ³	Share of inflow
Moorabool	Moorabool River Environmental Entitlement 2010 ⁴	7,086 ³	Share of inflow
Tarago	Tarago and Bunyip Rivers Environmental Entitlement 2009	3,000 ³	Share of inflow
Werribee	Werribee River Environmental Entitlement 2011	N/A ³	Share of inflow
Yarra	Yarra Environmental Entitlement 2006 ⁴	17,000 55	High Unregulated
Gippsland Region			
Latrobe	Latrobe River Environmental Entitlement 2011	N/A ²	Unregulated
	Blue Rock Environmental Entitlement 2013	18,737 ³	Share of inflow
Macalister	Macalister River Environmental Entitlement 2010	12,461 6,230	High Low
Thomson	Bulk Entitlement (Thomson River – Environment) Order 2005 ⁴	10,000 8,000 ³	High Share of inflow

Table 1.4.1 Environmental entitlements held by the VEWH (as at 30 June 2018)¹ continued

System	Entitlement	Volume (ML)	Class of entitlement
Northern Region			
Campaspe	Environmental Entitlement (Campaspe River – Living Murray Initiative) 2007	126 5,048	High Low
	Campaspe River Environmental Entitlement 2013	20,652 2,966	High Low
Goulburn	Goulburn River Environmental Entitlement 2010	8,851 3,140	High Low
	Environmental Entitlement (Goulburn System – Living Murray) 2007	39,625 156,980	High Low
	Environmental Entitlement (Goulburn System – NVIRP Stage 1) 2012	34,2556	High
	Bulk Entitlement (Goulburn System – Snowy Environmental Reserve) Order 2004	30,252 8,156	High Low
	Water Shares – Snowy River Environmental Reserve	8,321 17,852	High Low
	Silver and Wallaby Creeks Environmental Entitlement 2006 ⁴	N/A	Passing flow only
Loddon	Bulk Entitlement (Loddon River – Environmental Reserve) Order 2005 ⁴	10,970 2,024	High Low
	Environmental Entitlement (Birch Creek – Bullarook System) 2009 ⁴	100	N/A ⁷
	Water Shares – Snowy River Environmental Reserve	470	High
Murray	Bulk Entitlement (River Murray – Flora and Fauna) Conversion Order 1999	29,782 3,894 40,000	High Low Unregulated
	Bulk Entitlement (River Murray – Flora and Fauna) Conversion Order 1999 – Barmah-Millewa Forest Environmental Water Allocation	50,000 25,000	High Low
	Bulk Entitlement (River Murray – Flora and Fauna) Conversion Order 1999 – Living Murray	9,589 101,850 34,300	High Low Unregulated
	Environmental Entitlement (River Murray – NVIRP Stage 1) 2012	26,230 ⁶	High
	Bulk Entitlement (River Murray – Snowy Environmental Reserve) Conversion Order 2004	29,794	High
	Water shares – Snowy Environmental Reserve	14,671 6,423	High Low
Western Region			
Wimmera and Glenelg	Wimmera and Glenelg Rivers Environmental Entitlement 2010 ^{4,5}	40,560 1,000	Pipeline product Wetland product

¹ While the VEWH does not hold any entitlements in the Maribymong system, water allocation was purchased in this system together with Melbourne Water in 2013–14, 2014–15, 2015–16, 2016–17 and 2017–18.

² Use of these entitlements depends on suitable river heights, as specified in both the Latrobe and Barwon environmental entitlements (rather than a permitted volume).

³ Water is accumulated continuously according to a share of inflows (Blue Rock Reservoir 9.5 percent, Tarago Reservoir 10.3 percent, Werribee system 10.0 percent, Moorabool system 11.9 percent, Thomson Reservoir 3.9 percent, West Barwon Reservoir 3.8 percent) and this volume represents the maximum that can be stored at any time. The actual volume available in any year varies according to inflows.

⁴ In addition to volumetric entitlement, the entitlement also includes passing flows.

⁵ In addition to volumetric entitlement, the entitlement also includes unregulated water.

⁶ This entitlement volume is equal to one-third of the total water savings from the Goulburn-Murray Water Connections Project Stage 1, as verified in the latest audit (including mitigation water).

⁷ Allocation against this entitlement is made subject to specific triggers, as specified in the entitlement.

Water donations

The VEWH may receive water donations from individuals, community groups and other organisations. This water could be used for environmental watering in the water year it was donated (including for actions identified in the seasonal watering plan), or it could be carried over for use in the future (see section 1.4.2 for more information about carryover). Some donors may identify a specific use for the water they donate (such as environmental watering in a specific wetland or to protect a certain tree species). In these instances, the VEWH would consider the costs and benefits of each donor proposal before agreeing to accepting a donation.

Water available from other environmental water holders

In northern and western Victoria, the VEWH coordinates with other environmental water holders to deliver environmental outcomes at the broader Murray–Darling Basin scale. One of the VEWH's important roles is to coordinate with Murray–Darling Basin environmental water holders (the CEWH, MDBA and program partners in NSW and SA) to optimise the benefits of all water for the environment in Victorian waterways. The seasonal watering plan considers the use of all water for the environment held in Victorian river systems.

Usually, when Commonwealth or MDBA water is to be delivered in Victoria, the CEWH and MDBA transfer the agreed amount of water to the VEWH. That amount then becomes part of the Victorian Environmental Water Holdings until used or transferred back.

Table 1.4.2 shows the environmental water entitlements held by the CEWH and MDBA in Victoria. The CEWH and MDBA also hold water in NSW and SA, which could potentially be made available for environmental watering in Victoria.

Table 1.4.2 Environmental water entitlements held in Victoria by other water holders (as at 31 March 2018)

System	Volume (ML)	Class of entitlement
MDBA environmental water entitlements		
Murray	12,267	High-reliability water share
Goulburn	5,559	High-reliability water share
Commonwealth environmental water entitlements (held by CEWH)		
Ovens	123	High-reliability water share
Murray	324,116 25,489	High-reliability water share Low-reliability water share
Broken	534 4	High-reliability water share Low-reliability water share
Goulburn	279,881 29,435	High-reliability water share Low-reliability water share
Campaspe	6,624 395	High-reliability water share Low-reliability water share
Loddon	3,356 527	High-reliability water share Low-reliability water share
Wimmera-Mallee	28,000	Low-reliability product

Water for the environment and non-government agencies

In 2007, the Murray Darling Wetlands Working Group (MDWWG) and the Nature Conservancy (both non-government organisations) partnered to own and manage the Environmental Water Trust. To date, the MDWWG has been very active in wetland protection and management in NSW through partnerships with state and federal governments. In 2017–18, the MDWWG partnered with Goulburn Broken CMA to deliver water for the environment to wetlands in Victoria for the first time. The MDWWG is currently focusing its efforts on wetlands that are on private land, and given the deliveries are outside the Victorian Water Holdings, they are not specifically covered by this seasonal watering plan.

For more information about the MDWWG and the Environmental Water Trust, see www.murraydarlingwetlands.com.au and environmentalwatertrust.org.au.



1.4.2 What options are available to effectively and efficiently manage water for the environment?

Other water sources

Water for the environment is not the only type of water that can support river, wetland and floodplain health. Waterway managers and environmental water holders in consultation with storage managers consider the potential for environmental watering objectives to be met by other types of water. The timing of environmental releases can be coordinated with other sources of water to achieve greater benefits than an environmental release alone could produce. Other sources of water can include:

- ▶ **system operating water** (including passing flows) which maintains a baseflow in many rivers to which water for the environment can be added
- ▶ **heavy rainfall** (resulting in unregulated flows) which can naturally meet an environmental objective, so water available under environmental water entitlements is not needed
- ▶ **alterations to the timing and route for delivery of consumptive water** which can achieve environmental objectives without detriment to consumptive water users: in some cases, water for the environment may be used to reimburse consumptive water entitlements for losses associated with the altered delivery of consumptive water.

These types of water are considered in the development and implementation of the seasonal watering plan to ensure effective system operations and efficient use of water for the environment, and to achieve the greatest benefit to the environment.

Return flows

In some systems, water for the environment delivered through upstream sites can be used again downstream. This helps to ensure water for the environment is used efficiently and effectively to achieve the greatest environmental benefits.

This reuse policy, known as return flows, is available in many systems across northern Victoria. It makes use of water for the environment more efficient, and it helps reduce the volume of water that needs to be recovered for the environment from consumptive water users.

The VEWH's access to return flows is enabled through rules in its environmental water entitlements. Reuse of return flows is also available to the CEWH and MDBA when the VEWH delivers water on their behalf.

Where possible, return flows are reused to provide benefits at Victorian environmental sites. If not needed in Victoria, the VEWH, Living Murray and CEWH return flows will continue to flow across the border to SA where they will be used to provide environmental benefits at sites such as the Coorong, Lower Lakes and Murray Mouth area.

Carryover

Some entitlements allow the VEWH to carry over unused water to the following water year. This means that water allocated in one year can be kept in storages for use in the following year, subject to certain conditions.

Carryover provides flexibility and enables water for the environment to be delivered when it is of the greatest value to the environment. For example, carryover can help ensure environmental water holders can meet high winter and spring demands when there is a risk there will be little water available under entitlements at the beginning of the water year.

Carryover can also be used to set water aside to maintain key refuge areas and avoid catastrophic events in drought periods.

Water trading

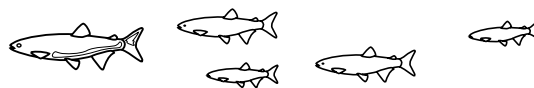
Water trading allows the VEWH to smooth out some of the variability in water availability across systems and across years. Under certain circumstances, it can enable the VEWH to move water to the systems where it is most needed. The VEWH can trade water allocated to its entitlements by:

- ▶ administrative water transfers between the VEWH's entitlements
- ▶ administrative water transfers with other environmental water holders
- ▶ purchasing water allocation
- ▶ selling water allocation.

Administrative water transfers are the most common trades the VEWH undertakes. These occur between the VEWH's entitlements (or accounts) to move water to where it is most needed. Other environmental water holders also transfer their water to the VEWH for delivery in Victoria. These types of water trades are often referred to as administrative water transfers as there is no financial consideration associated with the trade.

The VEWH can also buy or sell water allocation where it is in line with its statutory objectives: that is, if it benefits the environment. The VEWH has bought or sold a small amount of water allocation each year since it was established in 2011.

Water has been purchased to enhance environmental outcomes in systems where insufficient water for the environment was available, and it has been sold where foreseeable environmental demands could be met. The VEWH may also decide to sell water to invest in complementary works and measures, technical studies or other priorities to improve waterway health and the performance of Victoria's environmental watering program.



The VEWH can use revenue raised from the sale of a water allocation to:

- ▶ purchase water to meet shortfalls in any Victorian system
- ▶ invest in monitoring or technical studies that will improve future management of water for the environment
- ▶ invest in structural works and other on-ground activities that will improve the performance of Victoria's environmental watering program.

Subject to the approval of the Minister for Water, the VEWH can also trade its water entitlements (referred to as a permanent trade). However, it has not undertaken permanent trades to date.

Figure 1.4.1 shows the key considerations that guide the VEWH's use, carryover and trade decisions.

There is more information about the VEWH's trading activity, including its annual trading strategy, on its website at vewh.vic.gov.au.

Figure 1.4.1 Key considerations guiding use, carryover and trade decisions

