12. Environmental water
Part 12. Environmental water

The Basin Plan sets objectives and targets to guide the use of water for the environment. Victoria’s environmental water planning and management framework ensures these targets and objectives will be met. Victorian legislation and subordinate legislative instruments provide the Victorian Environmental Water Holder and catchment management authorities with the functions and powers to manage environmental water in Victoria. State and Commonwealth governments’ monitoring and evaluation programs are used to report progress towards meeting the Basin Plan environmental objectives.

12.1 Victoria’s environmental water management framework

Environmental water management in the Wimmera-Mallee water resource plan area is governed by Victorian and Commonwealth legislation. The Victorian Water Act established the Victorian water entitlement framework which provides the basis for management of Victoria’s water resources (see Part 6).

It also supports the environmental water planning and management framework which coordinates and defers responsibility for different tasks to different partners to bring about positive environmental results for waterways (rivers, wetlands and floodplains). A key element of the environmental water planning and management framework is effective monitoring and evaluation which allows for adaptive management of environmental water (see Figure 39).

The Victorian Water Act and the Commonwealth Water Act, including the Basin Plan, set out the objectives of environmental water in Victoria.

Although the Victorian Water Act pre-dates the Basin Plan, the powers and functions for managing environmental water entitlements in the Victorian Water Act closely align with Basin Plan requirements.

The Victorian Water Act establishes the Environmental Water Reserve (EWR in Victoria). The reserve comprises water that is set aside for the environment as an environmental entitlement or bulk entitlement, and through conditions on bulk entitlements, licences, permits or management plans. The objective of the Environmental Water Reserve is to preserve the environmental values and health of water ecosystems, including their biodiversity, ecological functioning, and quality of water and other uses that depend on environmental condition. Environmental entitlements or other environmental water holdings are protected under the entitlement management framework (see Part 6.8).

The Victorian water planning framework is supported by key policy documents which sit beneath the legislation. These documents, among other things, detail how water resources are shared,
provide guidance on integrated waterway health management, emphasise shared or multiple benefits of environmental water, and support resource management under climate change.

In the Murray-Darling Basin, environmental watering is further underpinned by the Basin-wide environmental watering strategy and the long-term watering plans developed in accordance with Basin Plan requirements.

Planning, delivery and monitoring are undertaken by a range of environmental water partners in Victoria and interstate. These are outlined in Part 12.4 and detailed in the long-term watering plan.

12.2 Water that achieves or contributes to environmental outcomes

Across all water resource plan areas, there are three key ways that Victorian water management meets environmental objectives:

1. Environmental water entitlements (bulk entitlements and environmental entitlements), water shares and supply-by agreements that are held or managed by the Victorian Environmental Water Holder, Murray-Darling Basin Authority (MDBA) or Commonwealth Environmental Water Holder (CEWH) and may only be used for environmental purposes (see Part 12.2.2.1). Water shares are not applicable in the Wimmera-Mallee water resource plan area.
2. Passing flow requirements specified for environmental purposes under bulk entitlements or water supply protection area water management plans (see Part 12.2.2.2)
3. Other water managed through water system management rules, including passing flows not specified as having an environmental purpose, and unregulated river diversion rules. This includes water which remains in the system after consumptive and environmental entitlements are taken out - referred to as ‘above cap’ water - and water used primarily for consumptive purposes, but which can also have a benefit for the environment (see Part 12.2.3)

12.2.1 How water is managed differently in regulated and unregulated systems and declared and undeclared systems

The management of environmental objectives in Victoria’s surface water systems depends on whether the water resources are unregulated or regulated and whether the system is declared or undeclared. For more information about water resource management in regulated and unregulated and declared and undeclared systems see Part 4.1.

In the Wimmera-Mallee water resource plan area there are no declared systems and the whole area is undeclared. The headworks systems are managed by Grampians Wimmera Mallee Water which regulates water supplies in the Wimmera and Glenelg supply systems and the East Grampians supply system and the Pyrenees supply system to supply water to the Wimmera-Mallee pipeline and towns.

Regulated systems contain structures such as dams or major diversion weirs which exert significant control over the flow of water in the river for consumptive users. The impact of regulation on the environment will depend upon the size and number of storages and weirs, the level of consumptive use, and the overall volume of flow the river receives.

Regulation of a river system has a significant impact on the environmental values of the system. Storages capture water during naturally high flow periods and can deliver unnaturally high flow down the river during summer for consumptive use, or divert water from the storages into pipes and channels. Storages create barriers to flow connectivity and biota migration. Environmental water is used to lessen the impact of regulation and consumptive uses of water.

In the Wimmera-Mallee water resource plan area, major unregulated systems include the Avon-Richardson system and the Avoca system. Environmental objectives in unregulated
systems are to protect the existing hydrology and conditions (habitat), rather than provide a specific flow to meet an environmental objective such as for fish, vegetation or connectivity.

In unregulated surface water systems, the impact on the environment is managed by specifying limitations on the timing and the rate of take in bulk entitlements and take and use licences. The volume of water which can be extracted by consumptive users can be further limited by restricting or banning take for take and use licence holders during times of low flow (see Part 6.7.1). Note that the domestic and stock take is still permitted even during bans which apply to use for irrigation and industry (see Part 6.2).

In undeclared systems, if it is deemed that the current sharing arrangements are not providing sufficient protection for the environment or the consumptive users, then the Minister may declare a water supply protection area for the protection of surface water or groundwater or both in a defined area.

Other water in the system also supports environmental water outcomes. This includes passing flows requirements that meet multiple objectives, and delivery of water from reservoirs to downstream users, or transfers from storages.

**12.2.2 Held and planned environmental water**

The Commonwealth Water Act provides for two types of environmental water: held and planned environmental water.

Held environmental water is defined under section 4 of the Commonwealth Water Act to mean water available under a water access right, water delivery right or irrigation right for the purposes of achieving environmental outcomes (including water that is specified in a water access right to be for environmental use).

Planned environmental water is defined by section 6 of the Commonwealth Water Act and has three key components:

- water committed or preserved by an instrument
- water committed or preserved for the purpose of achieving an environmental outcome or other environmental purposes as specified in an instrument
- water that cannot, to the extent it is committed or preserved, be taken for any other purpose.

**12.2.2.1 Held environmental water in Victoria**

In the Victorian context, held environmental water is any water held under an entitlement for an environmental purpose. This water includes:

- environmental entitlements (or in other areas bulk entitlements) issued to the VEWH to provide passing flows and water to be used for environmental purposes
- entitlements, such as take and use licences, supply by agreements or water shares held by the VEWH, MDBA or CEWH.

This water is considered held environmental water under the Commonwealth definition because it is water specifically committed to environmental purposes under a water access right.

Held environmental water is protected by Victoria’s water entitlement framework which provides security to all entitlement holders, regardless of use.

Held environmental water is protected by the Victorian entitlement framework (see Part 6) which provides for:

- secure and enduring entitlements
- the limits on take through sustainable diversion limits and permissible consumptive volumes
• the clear consultative process for changing entitlements
• the annual process to allocate water to entitlements
• the ability to trade
• Ministerial intervention only during extreme events to ensure supplies for critical human water needs
• a regime for compliance and enforcement.

All entitlements in Victoria are recorded on the Victorian Water Register (see Part 6.10). Information regarding who holds the entitlement, where the water may be taken and used and the volumes that are authorised by the entitlement are described in the Victorian Water Register.

Part 12.5 below outlines how environmental watering objectives are achieved through the use of held environmental water, supported by passing or minimum flows and releases from storages. Protection and rules for passing or minimum flow obligations are outlined in the respective entitlement instrument for each system. The use of held environmental water is often closely integrated with other types of water use. For example, the VEWH works closely with CMAs and storage managers and, where practical, will seek opportunities to adjust the timing and route for delivery of consumptive water to achieve environmental objectives efficiently. This may include ‘piggy-backing’ delivery of environmental water on consumptive water or passing or minimum flow obligations, in order to maximise ecological outcomes.

Table 50: Held environmental water in the Wimmera-Mallee water resource plan

<table>
<thead>
<tr>
<th>System</th>
<th>Entitlement</th>
<th>Volume (ML)</th>
<th>Holder</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wimmera and Glenelg Rivers</td>
<td>Commonwealth Environmental Water Holder</td>
<td>28,000</td>
<td>CEWH</td>
</tr>
<tr>
<td></td>
<td>Glenelg compensation flow *</td>
<td>3,300</td>
<td>VEWH</td>
</tr>
<tr>
<td></td>
<td>Wetlands</td>
<td>1,000</td>
<td>VEWH</td>
</tr>
<tr>
<td></td>
<td>Wimmera-Mallee Pipeline product**</td>
<td>40,560</td>
<td>VEWH</td>
</tr>
<tr>
<td></td>
<td>Passing flows***</td>
<td>NA</td>
<td>VEWH</td>
</tr>
</tbody>
</table>

* Can only be use in the Glenelg basin
** Is used in both the Wimmera and the Glenelg catchments
*** Passing flows are specified for rivers in the Glenelg and Wimmera basins

12.2.2.2 Planned environmental water

Section 10.09(1) of the Basin Plan requires the identification of planned environmental water. A review of Victoria’s bulk entitlements and statutory management plans in the Wimmera-Mallee water resource plan area was undertaken to determine planned environmental water in the area. The review looked for water which had the following conditions:

- water is committed or preserved
- the commitment or preservation is specifically set aside for achieving environmental outcomes either for a specific environmental purpose or environmental purposes more generally
- the water that is committed or preserved cannot be taken for another purpose because it is protected from other forms of take or use.

Is it difficult to align Victoria’s arrangements to the Commonwealth definition of planned environmental water with its exclusive preservation requirements because:

- minimum passing flows that appear in some bulk entitlements are generally not preserved exclusively for an environmental purpose or outcome as specified in section 6 of the Commonwealth Water Act. Passing flow requirements tend to serve a number of outcomes (shared benefits) and are rarely identified as being solely for an environmental purpose.
- there is no expressed purpose of water solely for environmental purpose in any instrument relevant to the Wimmera-Mallee water resource plan area, apart from the held environmental water, so no water can be identified as planned environmental water.
- in other parts of Victoria where water is committed or preserved (i.e. required to exist within the system such as a minimum passing flow) for a specified environmental purpose or to meet a specific environmental outcome, the Commonwealth definition deems that water cannot (to the extent it is committed or preserved) be taken for any other purpose. In Victoria, this requirement cannot be met where a person has a right to take water for domestic and stock purposes and it is not accounted for in measuring for passing flow.

There is no planned environmental water in the Wimmera-Mallee water resource plan area.

No planned environmental water exists in the Wimmera-Mallee Water Resource Plan. As a result, no planned environmental water nor any related rules or arrangements associated with planned environmental water are identified.

12.2.3 Other water that contributes to the environment

Under the Basin Plan it was expected by the MDBA that a large portion of system water and/or above cap water would be identified as planned environmental water. Part 12.2.2.2 explains what planned environmental water is, and is not, and why not all above cap or system water can be identified as planned environmental water under Victoria’s framework. In Victoria this water is considered to have ‘shared benefits’ and can contribute to environmental objectives for priority environmental assets and ecosystem functions, and other environmental values in the Wimmera-Mallee water resource plan area. Water for Victoria outlines Victoria’s position on achieving shared benefits to meet a maximum amount of uses from limited water resources. Victoria aims to use water to maximise the benefit achieved from environmental water and to meet the objectives of key groups in the community, including Traditional Owners, recreational users, domestic and stock users, and the environment.

Therefore while there is no water that strictly meets the definition of planned environmental water, this does not mean that there is no water available to the environment beyond held environmental water.
Across all water resource plan areas, Victoria manages systems to meet environmental purposes and objectives in three key ways:

1. entitlement water that is held by the VEWH to be taken and used in the system for environmental purposes (held environmental water)
2. mandated passing flow requirements for specified environmental purposes under bulk entitlements, or minimum flows under a management plan that are specified for an environmental purpose (planned environmental water)
3. shared benefit water managed through water system management rules and water that is unallocated in the system. This may include passing flows (those not specified as having an environmental purpose), unregulated river diversion rules (local management plans or rules) that provide security for all users of the resource, or water remaining in the system after consumptive and environmental entitlements are taken out (referred to as ‘above cap’ water).

Due to the shared nature of this third type of water, including the existence of statutory rights to take water for domestic and stock purposes, there are no specified environmental objectives for such water to achieve an environmental outcome. This water may contribute to environmental outcomes and condition, but in the Wimmera-Mallee water resource plan area, it does not meet all three elements of the Commonwealth definition for planned environmental water.

Some further clarifications on shared benefits water:

- all Basin states allow water users to take water under a basic right, similar to Victoria’s section 8 right for domestic and stock purposes, and planned environmental water may still exist in these areas. The distinction for Victoria is that water is not specifically set aside or accounted for to ensure that a discrete quantity of water achieves environmental purposes or outcomes.
- water that remains in the system after consumptive use contributes to environmental outcomes and condition, and also contributes to other uses. Victoria promotes the use of water in the system for a range of uses.
- it is not sufficient to identify instruments that establish limits to consumptive use as rules that protect planned environmental water, given the need to identify the relevant water as having an environmental purpose or meeting environmental outcomes. The Environmental Water Reserve definition in the Victorian Water Act does not specifically identify the water left over after consumptive use as water for the environment. Water is captured in the Environmental Water Reserve only where it is set aside for an environmental purpose. Without specifically identifying the environmental purposes or outcomes to be achieved by water left over in the system, it cannot fall within the scope of section 6 of the Commonwealth Water Act.
- the only passing flows directly identified specifically for environmental purposes in the Wimmera-Mallee water resource plan area are contained in the VEWH’s environmental entitlement, which is held environmental water.
- as outlined in Water for Victoria, Victoria is focused on achieving shared benefits to meet a maximum amount of uses from limited water resources. Victoria aims to share the benefits of both unallocated and stored water (including system water) to meet the objectives of key groups in the community, including Traditional Owners and Aboriginal Victorians, recreational users, maintaining water fit for domestic and stock use, and meeting environmental outcomes.

12.2.3.1 Above cap water

Above cap water is described in Part 6.6.1. Environmental water managers will consider how much above cap water is in the system before requesting release of held environmental water from storage. This includes considering unregulated flows below the storage such as tributary inflows or spills, unregulated flows above the storage, and upcoming weather conditions.

Unregulated flows occur naturally in a waterway, particularly after heavy rainfall or when storages spill. Heavy rainfall resulting in unregulated flows may naturally meet an environmental objective, so delivery of held environmental water is not needed. Held environmental water may
also be used to extend the length of natural unregulated flow. Above cap water can contribute to environmental objectives for priority environmental assets (see Part 12.3.1) and priority ecosystem functions (see Part 12.3.2) by requiring the use of less held environmental water than would otherwise be needed if the above cap water was not present.

12.2.3.2 System water
System water is all the water that is described in the bulk entitlements which is not for environmental or consumptive use (see Part 6.6.2). It is managed through obligations on the instruments, in particular entitlement holders’ compliance with the conditions of their entitlements.

The Wimmera-Glenelg headworks system does not have a large amount of system water because the main distributors of water in the system are pipes and channels, as distinct from other areas where the rivers are often used to distribute water.

12.2.3.3 Consumptive water en route
Where possible, environmental water managers work with storage managers to seek environmental outcomes from the delivery of consumptive water. This includes timing delivery of consumptive water en route to provide an environmental benefit, or piggybacking held environmental water on consumptive water to increase the flow for an environmental benefit.

As described above there are not many opportunities in the Wimmera Glenelg system to get environmental benefit from consumptive water en route because the majority of the water used is taken straight from reservoirs and transferred in pipes and channels. However, the MacKenzie river can be used to transfer system water (including consumptive water) from Lake Wartook via Distribution Heads to Taylors Lakes. These deliveries run through reaches 1 and 2 of the MacKenzie River which are high priority reaches and environmental water managers work together with system operators to identify opportunities to use system water to achieve environmental outcomes.

12.2.4 Protection of water that contributes to environmental objectives

While above cap water and system water, including many passing flows in bulk entitlements, are not identified as planned environmental water for the purposes of the Basin Plan, these forms of water are protected under Victoria’s entitlement framework. See Part 6.8.

They are protected by:

- Limiting the volume of water that may be taken from the system through entitlements such as water access rights, and setting permissible consumptive volumes and the sustainable diversion limit to make sure decision makers do not authorise the take of water above a sustainable volume.
- Establishing clear rules about when a person can and cannot take water from the system, including the time, place and rate of take to ensure passing flows in the system are maintained. This is particularly important in unregulated systems.
- Passing flows being described in bulk and environmental entitlements.

In undeclared systems, if the existing water resource management rules offer insufficient protection, the Minister may declare a water supply protection area under section 27 of the Victorian Water Act to address local risks to a water resource or the environment. The declaration of a water supply protection area requires the development of a management plan to establish additional rules to manage the resources in the declared area to address the local risks.
12.2.5  Shared cultural and social benefits of environmental water

Environmental water can provide benefits beyond the ecological objectives for native fish, vegetation, waterbirds, amphibians and hydrological connectivity. The strategy *Water for Victoria* states that all water management agencies, including catchment management authorities and the Victorian Environmental Water Holder, will consider achieving shared benefits in environmental watering decisions, with the caveat that needs of the environment must not be compromised. Environmental watering in Victoria provides shared benefits through improving the condition of a waterway which benefits other uses of the waterway, for instance cultural outcomes, recreation and amenity. Through considering and planning for shared benefits, water management agencies are able to optimise a limited resource and help meet some objectives of key groups such as Traditional Owners and recreational users (see Part 11 and Part 13).

Traditional Owner values and uses of water and cultural knowledge are increasingly being recognised and included in Victoria’s water planning and management frameworks, including regional waterway strategies and sustainable water strategies. Most recently, Chapter 6 of *Water for Victoria* (DELWP, 2016) outlined actions to improve how the water sector recognises and manages for Aboriginal values and involves Traditional Owners in water management, including environmental watering. For details about how this is being done in Wimmera-Mallee, see Part 11.

Traditional Owner objectives for water may overlap with environmental water objectives at times, but not in all cases. Consideration of Aboriginal objectives are made in environmental water planning and delivery.

Traditional Owners are increasingly involved in the setting of environmental water objectives through the Victorian environmental water planning process, and through engagement with Victoria’s water resource plans, and are expressing a clear desire for stronger involvement in the future. Until now Traditional Owner involvement in environmental water planning has mainly been through consultation on the environmental objectives set in the planning documents: catchment management authorities have consulted on the watering objectives for priority environmental assets at long-term and annual scales (through Environmental Water Management Plans and Seasonal Watering Proposals respectively), and DELWP has consulted on the collated objectives and targets set for the water resource plan area in the long-term watering plan. Opportunities for greater involvement in the environmental watering objectives will continue to be developed for yearly and long-term planning by catchment management authorities, the Victorian Environmental Water Holder and DELWP by working with Traditional Owners.

12.3  Priority environmental assets and ecosystem functions

A wide range of aquatic plants, wildlife and ecosystem processes in the Wimmera-Mallee water resource plan area rely on wetlands and rivers. Ecosystem functions that support these ecological values include geomorphological condition and hydrological connectivity. For the purpose of Basin Plan, a set of priority ecosystem functions have also been identified in the long term watering plan.

The priority environmental assets and ecosystem functions to benefit from environmental water planning and management arrangements are detailed in the Wimmera-Mallee Long-term Watering Plan. This plan also sets out associated environmental watering requirements.


12.3.1 Priority environmental assets

The priority environmental assets for the Wimmera Mallee water resource plan area are water-dependent ecosystems (rivers, wetlands or floodplains) can be found in the table below. The priority environmental assets support ecological values that are significant at Commonwealth and state level, and meet criteria in Schedule 8 of Basin Plan, as outlined in the long-term watering plan. An asset may be a single wetland or waterbody, a wetland complex (e.g. Wimmera-Mallee Pipeline Wetlands), or a river at a geographic location (e.g. Mount William Creek).

Table 51: Priority Environmental Assets in the Wimmera-Mallee water resource plan area

<table>
<thead>
<tr>
<th>MMCA</th>
<th>WCMA</th>
<th>NCCMA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yarriambiack Creek</td>
<td>Wimmera River</td>
<td>Davis Sam</td>
</tr>
<tr>
<td>Chiprick</td>
<td>Outlet Creek</td>
<td>Corack Lake</td>
</tr>
<tr>
<td>Cronomby Tanks</td>
<td>Lake Hindmarsh</td>
<td>Chirrup Swamp</td>
</tr>
<tr>
<td>Rikard Glenys Dam</td>
<td>Burnt Creek</td>
<td>Jeffcott Wildlife Reservoir</td>
</tr>
<tr>
<td>Coundons Wetland</td>
<td>Mount William Creek</td>
<td>Jesse Swamp</td>
</tr>
<tr>
<td>R Ferriers Dam</td>
<td>Lake Albacutya</td>
<td>Creswick Swamp</td>
</tr>
<tr>
<td>J Ferrier Wetland</td>
<td>MacKenzie River</td>
<td></td>
</tr>
<tr>
<td>Paul Barclay</td>
<td>Bungalally Creek</td>
<td></td>
</tr>
<tr>
<td>Round Swamp Bushland Reserve</td>
<td>Yarriambiack Creek.</td>
<td></td>
</tr>
<tr>
<td>Broom Tank</td>
<td>Krong Swamp</td>
<td></td>
</tr>
<tr>
<td>Towma (Lake Marlbed)</td>
<td>Crow Swamp</td>
<td></td>
</tr>
<tr>
<td>Lake Danaher Bushland Reserve</td>
<td>Pinedale</td>
<td></td>
</tr>
<tr>
<td>Bull Swamp</td>
<td>Carapugna</td>
<td></td>
</tr>
<tr>
<td>Clinton Shire Dam</td>
<td>Fieldings Dam</td>
<td></td>
</tr>
<tr>
<td>Goulds Reserve</td>
<td>Challamba Swamp</td>
<td></td>
</tr>
<tr>
<td>Barbers Swamp</td>
<td>Schultz/Koschitzke</td>
<td></td>
</tr>
<tr>
<td>Mahoods Corner</td>
<td>Opies Dam</td>
<td></td>
</tr>
<tr>
<td>D Smith</td>
<td>Sawpit Swamp</td>
<td></td>
</tr>
<tr>
<td>Kath Smith Dam</td>
<td>Mutton Swamp</td>
<td></td>
</tr>
<tr>
<td>Homelea</td>
<td>Tarkedia</td>
<td></td>
</tr>
<tr>
<td>Pam Juergens Dam</td>
<td>Harcoans Swamp</td>
<td></td>
</tr>
<tr>
<td>Sharrons Wayside</td>
<td>Wal Wal Swamp</td>
<td></td>
</tr>
<tr>
<td>Part of Gap Reserve</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roselyn Wetland /Reids Dam</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The long-term watering plan provides a more comprehensive description of the environmental assets in the Wimmera-Mallee water resource plan area and explains the priority ecosystem functions. Note that the priority environmental assets listed in the long-term watering plan have been corrected since the 2015 publication. The updated list is available in the DELWP website.

Due to its flat topography, there are several assets on the Murray floodplain that extend from the Victorian Murray water resource plan area into the Wimmera-Mallee water resource plan area. These assets are not connected to surface or groundwater within the Wimmera-Mallee water resource plan area, receiving all their source water from the River Murray. These assets are identified as priorities in the Victorian Murray Long-term Watering Plan and will be included under the Northern Victoria Water Resource Plan. The particular assets are:

- Lindsay, Mulcra, Walpolea Islands (The Living Murray Icon site)
- Lindsay-Walpolea Islands (proposed supply measure site10)
- Cardross Lakes
- Bottle Bend
- Hattah Lakes (The Living Murray Icon site)
- Hattah Lakes North (proposed supply measure site)
- Wemen Liparoo
- Pound Bend
- Carina Bend
- Belsar and Yungera Islands (proposed supply measure site)
- Belsar and Yungera floodplain
- Tata Creek and Boundary Bend
- Murrumbidgee Junction
- Piambie Water Management Unit (including Heywoods Lake)
- Nyah Forest (proposed supply measure site)
- Vinifera Forest (proposed supply measure site)
- Merbein Common
- Round Lake
- Burra Creek (proposed supply measure site)
- Poyner
- Cokum Bushlands Reserve
- Considines

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10 Supply measure sites are subject to approval and funding.
The priority assets and functions of the Wimmera-Mallee water resource plan area support ecological values\(^\text{11}\) that are significant at Commonwealth and state levels, and in accordance with Schedule 8 and 9 of the Basin Plan.

The Wimmera River and its tributaries (MacKenzie River, and Mount William, Burnt, Yarriambiack and Bungalally creeks) are home to many significant native fish populations including one of Victoria’s few self-sustaining populations of freshwater catfish. The MacKenzie River contains the only stable population of platypus in the Wimmera and also supports good populations of native fish, as well as macroinvertebrates and turtles. Given the diverse habitat and fish species found in the MacKenzie River it acts as a refuge for fish populations, particularly in dry times.

\(^{11}\) Ecological value is the worth attributed to an organism, ecosystem, product, resource or activity, in terms of benefits to the environment.
The lower Wimmera River from Polkemmet Bridge to Outlet Creek at the northern end of Lake Albacutya was declared a heritage river due to its significant social and environmental values (particularly areas with river red gum open forests and woodlands with an intact understorey and waterbird habitat). The Wimmera River has also been declared a wetland of national importance.

The two terminal lakes at the end of the Wimmera River (Lakes Hindmarsh and Albacutya) fill only rarely, during very high flows from upstream. This wet-dry cycle produces an environment where the beds of the lakes are often colonised by vegetation. Filling leads to replacement with aquatic species (such as water milfoil and emergent reeds). When inundated, the central areas of the lakes provide open water habitat for large fish, including Murray cod, freshwater catfish and golden perch, and large numbers of birds such as the Australian pelican, pied cormorant and black. Aquatic vegetation in the lakes provides habitat for smaller fish.

Lake Albacutya was declared a Ramsar wetland of international importance as a near-natural example of a seasonal intermittent freshwater lake supporting vulnerable, endangered or critically endangered species or threatened ecological communities and high numbers of waterbirds. Lake Hindmarsh and Lake Albacutya are wetlands of national importance.

The Wimmera-Mallee Wetlands include 51 dams and wetlands spread across the dry north-western area of Victoria on public and private land, and are sourced from the Wimmera-Mallee Pipeline. They vary widely in wetland types (such as freshwater meadows, open freshwater lakes and freshwater marshes), size and vegetation communities (such as lignum and black box-dominated ecological vegetation classes). As a group, they are home to native waterbird populations including brolga, egret, heron, blue-billed duck, freckled duck, Australian painted snipe and glossy ibis. Other biota present include the vulnerable growling grass frog, turtles and many other species.

Watered on a priority basis from the Wimmera-Mallee Pipeline system, these wetlands act as important refuges and drinking holes throughout dry times in the region.

In the future, however, the priority environmental assets could change to reflect the latest technical information and prioritisation by catchment management authorities with their communities, including Traditional Owners. Some existing assets that currently receive environmental water may not be deemed a priority in the future, or new assets may be identified if they have the potential to be connected to a water source and receive held environmental water. The priority environmental assets will be reviewed and potentially updated further when long-term watering plans are reviewed. The long-term watering plans are due for review in 2020, or when the Wimmera-Mallee Water Resource Plan is accredited or when the Basin Wide Environmental Watering Strategy is updated.

Victoria has identified priority environmental assets as those that can be managed for specific environmental water outcomes, i.e. to meet objectives and targets that are set in the long term watering plans. For this reason, other waterways in the Wimmera-Mallee water resource plan area, such as unregulated rivers that are not connected to regulated water supply systems and cannot receive held environmental water. For this reason, these environmental assets are not identified by Victoria as priority environmental assets for the purposes of Basin Plan. Instead, and as noted at Part 12.2.1 above, the environmental objectives in non-priority environmental assets, including unregulated systems, are to protect the existing hydrology and conditions (habitat), rather than provide a specific flow to meet an environmental objective or target. This also includes priority complementary actions that the catchment management authority identifies in the regional waterway strategy (refer Part 12.5.7 below).
12.3.2 Priority ecosystem functions

Ecosystem functions are the fundamental physical, chemical and biological processes that support environmental assets; for example, the transport of nutrients, organic matter and sediment in rivers, wetting and drying cycles, provision for migration and re-colonisation by plants and animals along rivers and across floodplains. Table 52 provides a more detailed description of ecosystem values and functions in the Wimmera-Mallee water resource plan area (DELWP, 2015a).

<table>
<thead>
<tr>
<th>Ecosystem function</th>
<th>Function characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Longitudinal hydrological connectivity (between river reaches for fish movement)</td>
<td>Supports the transportation and dilution of nutrients, organic matter and sediment</td>
</tr>
<tr>
<td>Provides connections along a watercourse (longitudinal connections)</td>
<td></td>
</tr>
<tr>
<td>Surface water salinity (for growth and reproduction of aquatic vegetation)</td>
<td>Supports the creation and maintenance of vital habitats</td>
</tr>
<tr>
<td>Refuges (for native fish species)</td>
<td>Supports the creation and maintenance of vital habitats and populations</td>
</tr>
<tr>
<td>Geomorphic habitat</td>
<td>Supports the creation and maintenance of vital habitats</td>
</tr>
</tbody>
</table>

Groundwater-dependent ecosystems (GDEs) are also important environmental features of the Wimmera-Mallee water resource plan area. GDEs rely on groundwater for all or part of their water needs, such as river reaches that gain or lose groundwater, wetlands that rely on shallow aquifers, or terrestrial vegetation that relies on shallow or deeper aquifers (further described in Part 12.7.2).

Management of GDEs in Victoria requires improved knowledge of the distribution, condition and environmental values of GDEs, including information about groundwater and surface water interactions. Actions in the Victorian Waterway Management Strategy are underway to gain further knowledge about high-priority, high-risk GDEs.

12.3.3 Ramsar-listed priority environmental assets

Ramsar sites are recognised for containing representative, rare or unique wetlands, or wetlands that are important for conserving biodiversity. A wetland must satisfy one or more of the criteria for identifying wetlands of international importance to be designated to this list.

The Wimmera-Mallee water resource plan areas supports one Ramsar site, Lake Albacutya. This is a terminal lake in the Wimmera system, and gets water only in exceptionally wet years when Lake Hindmarsh spills and overflows into Outlet Creek which then carries water in to Lake Albacutya.

National guidelines are being developed to provide clear guidance on how Ramsar sites must be managed, under both the Ramsar Convention and Commonwealth Environment Protection and Biodiversity Conservation Act. A key component includes monitoring of a site’s ecological character description, which is a baseline of wetland condition at the time of its listing as a wetland of international importance. The ecological character descriptions of all Australia’s Ramsar-listed wetlands are at http://www.environment.gov.au/water/wetlands/publications.
The Basin Plan requirements for states in regard to Ramsar sites are:

- declared Ramsar wetlands that depend on Basin water resources maintain their ecological character (section 8.05 (2a) of the Basin Plan)
- a declared Ramsar wetland is an environmental asset that requires environmental watering (Schedule 8 Criteria for identifying an environmental asset)
- declared Ramsar wetlands have sufficient water quality to maintain the ecological character of those wetlands (section 9.04 (1) of the Basin Plan)

There are also water quality targets for declared Ramsar wetlands under Schedule 11 to the Basin Plan – Target values for target application zones.

These requirements are fulfilled in Victoria’s water quality and salinity management plans (see Appendix A for the Wimmera-Mallee Water Quality Management Plan).

Implementation of the Basin Plan contributes to maintaining the ecological character of Ramsar wetlands. Section 5.02 of the Basin Plan is to give effect to international agreements such as the Ramsar Convention; and Section 8.05 further specifies Basin States to protect and restore environment assets by ensuring that declared Ramsar wetlands maintain their ecological character. There are various management interventions other than environmental water that contribute to the ecological character of Ramsar wetlands. It is the responsibility of jurisdictions to maintain the ecological character of Ramsar wetlands through various strategies, investment, partnerships and on-ground actions.

12.4 How does environmental watering happen?

Water for the environment is managed and delivered through the following partnership:

- DELWP oversees legislation, policy and investment for water resources and environmental water across the state
- the water holders – VEWH and CEWH – manage environmental water holdings
- catchment management authorities are designated waterway managers, and with their local communities, set priorities and objectives for waterway health, including environmental water
- water corporations manage storage and delivery of water to meet entitlements, manage licences, and set local management rules for take in unregulated systems
- the above Victorian agencies work with upstream and downstream states to plan and deliver coordinated environmental objectives across state borders.

As the principal managers of environmental water holdings in Victoria, the roles of the VEWH, CEWH, CMAs and water corporations are outlined below.

12.4.1 Department of Environment, Land, Water and Planning

The Department (DELWP) is responsible for overseeing waterway health and environmental water programs in Victoria, including legislation, policy and investment to ensure on-ground outcomes. DELWP secures the protection of held environmental water, planned environmental water and other forms of water that add environmental benefit, but are not exclusively committed to the environment, by ensuring there are caps on surface diversions and where required on groundwater allocations and local management rules to enable sustainable take in unregulated systems.

DELWP prepares long-term watering plans (see Part 12.5.8) in accordance with Basin Plan. These documents set out the ecological objectives and targets for priority environmental assets and priority ecosystem functions for each surface water resource plan area.
DELWP invests in staff and projects at CMAs to enable local management and delivery of waterway health and environmental water outcomes, including prioritisation of waterways and objective-setting with local communities. DELWP also invests in staff at the Victorian Environmental Water Holder to manage Victoria's held environmental water. DELWP, including the Arthur Rylah Institute also undertake long-term intervention monitoring of held environmental water in rivers and wetlands under the Victorian Environmental Flows Monitoring and Assessment Program and the Wetlands Monitoring and Assessment Program. This monitoring is vital for reporting on outcomes of environmental water use and will be used significantly for Victoria’s first Schedule 12 Matter 8 reporting on environmental outcomes at the asset scale (see Part 15).

12.4.2 Victorian Environmental Water Holder

The Victorian Water Act was amended to establish the VEWH on 1 July 2011 as a statutory body responsible for holding and managing water entitlements used for environmental purposes. Bulk entitlements, environmental entitlements and water shares have been assigned to the VEWH. Collectively, these entitlements are called the water holdings.

The objectives of the VEWH set out in the Victorian Water Act are to:

- manage the Water Holdings for the purposes of:
  a. maintaining the environmental water reserve in accordance with the environmental water reserve objective
  b. improving the environmental values of water ecosystems, including their biodiversity, ecological functioning and water quality, and other uses that depend on environmental condition.

The functions of the VEWH described in section 33DD of the Victorian Water Act are to:

- apply and use water in the Water Holdings and otherwise exercise rights in the Water Holdings in accordance with the Water Act
- acquire and purchase rights and entitlements for the Water Holdings and dispose of and otherwise deal in rights and entitlements in the Water Holdings in accordance with the Water Act
- plan for the purposes of paragraphs (a) and (b)
- enter into any agreements for the purposes of paragraphs (a) and (b)
- enter into any agreements for the purposes of the coordination of the exercise of rights under any water right or entitlement held by another person, including the Commonwealth Environmental Water Holder
- enter into any agreements with any person for the provision of works by that person to enable the efficient application or use of water in the Water Holdings.

The Victorian Water Act also describes the planning and reporting framework within which the VEWH is required to operate. This includes the requirement to develop:

- a four-year corporate plan
- an annual seasonal watering plan
- seasonal watering statements as required
- an annual report (required under the Financial Management Act 1994).

The government’s expectations of the VEWH are elaborated in the statutory Ministerial rules relating to the Victorian Environmental Water Resource Holder 2014, issued by the Minister for
the Environment. Clause 12.1(c) requires the VEWH to have regard to objectives and requirements of the Basin Plan and any instruments made under it, including this water resource plan.

12.4.3 Commonwealth Environmental Water Holder

The Commonwealth Environmental Water Holder (CEWH) was established under the Commonwealth Water Act. The CEWH must use the Commonwealth Holdings for protecting or restoring the environmental assets of the Murray-Darling Basin to give effect to relevant international agreements. The CEWH is obliged to manage holdings to deliver environmental water objectives set through the Basin Plan’s environmental watering plan.

The VEWH works closely with the CEWH in areas where Commonwealth water holdings may be used in Victoria. The VEWH and CEWH have an agreement to collaborate and coordinate their activities.

12.4.4 Catchment management authorities

CMAs are designated waterway managers, and have operational responsibility for delivering and managing environmental water allocations controlled and authorised by the VEWH. This includes development of seasonal watering proposals each year for priority environmental assets, and environmental water management plans, which are the basis of the long-term watering plans.

CMAs are statutory bodies established by the Catchment and Land Protection Act 1994 (Vic). They also have functions and powers under Part 10 of the Victorian Water Act (see Part 5.3).

12.4.5 Rural water corporations

Rural water corporations operate the major water storage and supply infrastructure to provide rural water services such as water supply, irrigation drainage and salinity mitigation, and environmental water.

Rural water corporations are regularly the storage manager or operator and/or resource manager for declared systems. This means they have additional responsibilities for managing the system for all entitlement holders, including water accounting, directing releases, reporting obligations and input/preparation of operating arrangements, metering programs and reviews of entitlements.

12.5 State environmental water planning

12.5.1 Overview

This part outlines how environmental water planning occurs in Victoria, and specifically provides context for section 10.26 of the Basin Plan.

Environmental watering is defined under the Commonwealth Water Act as the delivery or use of environmental water to achieve environmental watering outcomes. Environmental water under the Commonwealth Water Act is either held environmental water or planned environmental water. The effect of applying these definitions to Victoria’s framework for determining the content of the Wimmera-Mallee Water Resource Plan is:

- environmental watering obligations under the Wimmera-Mallee Water Resource Plan can only apply to held environmental water managed by the VEWH as no planned environmental water exists in the Wimmera-Mallee water resource plan area
- held environmental water only exists in regulated systems, therefore environmental watering is only relevant to those systems
• using other system management arrangements to support protection of the environment does not fall within the scope of environmental watering under the Commonwealth Water Act and therefore within the obligation under section 10.26 of the Basin Plan.

The discussion below identifies how Victoria manages meeting environmental watering objectives in addition to using system management and land management frameworks to provide protection and support to the environment.

12.5.2 Integration of state environmental water planning and Basin Plan requirements

The objectives and targets of the Basin Plan have been integrated into Victoria’s environmental water planning at the long-term and annual stages. This integration is committed to in the Victorian Waterway Management Strategy, and all environmental water managers in the Wimmera-Mallee water resource plan area must comply with Victorian and Basin Plan environmental water planning under state policy and investment.

Each year, Victoria must also demonstrate through annual Basin Plan reporting (Matter 19 of Schedule 12) how its environmental watering is consistent with the environmental watering plan and the Basin-wide environmental watering strategy, including contributing to the objectives in Part 2 of the environmental watering plan.

Figure 38 illustrates how planning works together at the Basin and state levels.
Commonwealth and Victorian environmental water planning

**Legislation**
- Commonwealth Water Act
- Basin Plan (relates to 10.26(1)(a)(ii) of Basin Plan)
- Victorian Water Act 1989
- Victoria Waterway Management Strategy (DELWP)
- Portfolio management plan (CEWH) (relates to 10.26(1)(a)(i) & (ii))
- Basin-wide Environmental Water Strategy (MDBA) (relates to 10.26(1)(a)(i) & (ii))
- Regional waterway management strategies (CMA)

**Multi-year planning**
- Environmental water management plans (CMA) (relates to 10.26(1)(a)(i) & (ii))
- Long-term watering plans (DELWP) (relates to 10.26(1)(a)(i) & (ii))
- Seasonal Watering Proposals (CMA)

**Annual planning**
- Seasonal watering plan (VEWH) (Sets annual environmental watering priorities) (relates to 10.26(1)(a)(i) & (ii))
- Seasonal watering statement (VEWH)
- Watering actions (CMA)

Figure 38: Environmental water planning and management framework in Victoria at Basin, state and regional scales.
12.5.3 Basin Plan environmental watering plan

Chapter 8 of the Basin Plan sets out the environmental watering plan for the Basin. The objectives of this framework are stated in section 8.11 of the Basin Plan:

a. coordinate the planning, prioritisation and use of environmental water on both a long-term and an annual basis; and

b. enable adaptive management to be applied to the planning, prioritisation and use of environmental water; and

c. facilitate consultation, coordination and cooperative arrangements between the Authority, the Commonwealth Environmental Water Holder and Basin states

Basin Plan section 8.04 provides that:

The overall environmental objectives for the water-dependent ecosystems of the Murray-Darling Basin are, within the context of a working Murray-Darling Basin:

a. to protect and restore water-dependent ecosystems of the Murray-Darling Basin; and

b. to protect and restore the ecosystem functions of water-dependent ecosystems; and

c. to ensure that water-dependent ecosystems are resilient to climate change and other risks and threats.

For water resource plans, the Basin Plan (section 10.26) requires that:

1. A water resource plan must provide for environmental watering to occur in a way that:

   a. is consistent with:

      i. the environmental watering plan; and

      ii. the Basin-wide environmental watering strategy; and

   c. contributes to the achievement of the objectives in Part 2 of Chapter 8.

12.5.4 Basin-wide environmental watering strategy

The MDBA has published the Basin-wide environmental watering strategy to achieve the environmental objectives of the environmental watering plan. These objectives also inform Victoria’s environmental water planning at an asset scale.

The strategy outlines key actions to achieve the objectives of environmental watering in the Basin including:

- harnessing local communities land and water knowledge
- managing all water to benefit the environment where possible, such as cooperating to divert consumptive water deliveries through a wetland en route
- managing in harmony with biological cues (including responses to flow) to restore elements of a more natural flow regime; for example, high river flows or flow release into a wetland at times when it would have occurred naturally (before river regulation), to trigger vegetation, fish or bird reproduction
- coordinating between stakeholders to achieve the best outcomes and target multiple sites with deliveries of water (in and between rivers) where possible
- managing any risks associated with the delivery of environmental water
- applying adaptive management (learning from doing) when planning and prioritising use of environmental water.
The strategy also sets out expected outcomes for native fish, vegetation, waterbirds and hydrological connectivity.

The strategy’s actions and expected outcomes are consistent with the requirements of the Victorian Water Act, key state policy, and Victoria’s environmental water planning, as detailed in the long-term watering plans.

12.5.5 Annual basin and state watering priorities

Basin states must identify annual priorities for use of environmental water for surface water in each water resource plan area.

Obligations for annual watering priorities are met by Victoria’s seasonal watering plan, which is consistent with the Basin Plan’s environmental watering plan, long-term watering plans, and the Basin-wide environmental watering strategy.

12.5.6 Victorian Waterway Management Strategy

The Victorian Waterway Management Strategy (DEPI, 2013b) describes the government’s statewide objectives and policies for managing waterways. It also outlines the government’s policies for maintaining and improving the condition of the state’s rivers, estuaries and wetlands to provide environmental, social, cultural and economic value for all Victorians.

The Minister is responsible for overseeing and funding the strategy with the support of DELWP, which issues guidance documents to ensure regional plans are consistent with the state’s framework and policies.

The strategy references and makes explicit links to the Basin Plan. Chapter 4 of the strategy sets out the state’s policies, principles and processes to be followed by CMAs when preparing regional waterway strategies, building Basin Plan considerations into Victoria’s regional waterway strategies.

Water for Victoria policy reiterates actions in the Victorian Waterway Management Strategy, and further emphasises Traditional Owner roles and engagement in waterway management.

The strategy outlines the key environmental water planning documents:
- regional waterway strategies
- long-term watering plans
- environmental water management plans
- seasonal watering proposals
- seasonal watering plans.

12.5.7 Regional waterway strategies

The CMAs use a risk-based approach to identify high-value waterways and priority management activities (DEPI, 2013b). The strategies are required to integrate on-ground works with environmental water management in regulated and unregulated systems, and ensure efficient and effective management of environmental water. For each management unit (i.e. river reach or wetland) these strategies:
- describe the environmental values of waterways
- identify threats to these values
- after consultation, establish management objectives for the waterways
- determine priorities for management
- establish targets – primarily for sub-components of the Index of Stream Condition (e.g. hydrology sub-index average score improves to 7)
• identify activities to achieve targets
• estimate the costs of the activities.

The Wimmera, Mallee and North Central waterway strategies apply to the Wimmera-Mallee water resource plan area.

Intervention actions are prioritised through the waterway strategies. To enable environmental watering outcomes, infrastructure can be used to improve the watering regime, enable the efficient use of the water holdings, and overcome barriers to flora and fauna migration. Other on-ground works, such as reinstating in-stream woody vegetation habitat or fencing out cattle, are also used to improve the biophysical condition. These works are considered ‘complementary measures’ to environmental watering, and are as vital to environmental outcomes and condition as flows.

12.5.8 Long-term watering plans

Long-term watering plans are a state responsibility under the environmental watering plan. They provide long-term watering objectives for a state’s priority environmental assets.

Basin states must prepare a plan for each water resource plan area that contains surface water, and be consistent with the Basin-wide environmental watering strategy.

The long-term watering plan for the Wimmera-Mallee water resource plan area (DELWP, 2015a) is available online.

Appendix 1 of the Wimmera-Mallee Long-term Watering Plan shows how it meets the requirements of the Basin Plan environmental watering plan, including:
• using methods specified for identifying priority environmental assets and ecosystem functions and their water requirements
• having regard to the Basin-wide environmental watering strategy
• not being inconsistent with relevant international agreements.

The Wimmera-Mallee long-term watering plan collated environmental water management plans environmental objectives for priority rivers, wetlands and ecosystem functions, and informs:
• Victoria’s annual watering priorities
• the Basin-wide environmental watering strategy and Basin annual watering priorities (Figure 38)
• the Wimmera-Mallee Water Resource Plan, particularly environmental watering requirements.

12.5.9 Environmental water management plans

Environmental water management plans (EWMPs) outline how waterway managers will meet long-term ecological objectives and required watering regimes.

Plans are prepared only for waterways that can be watered from environmental water holdings (i.e. can be specifically managed for environmental outcomes using held environmental water). The plans set out:
• long-term ecological flow objectives assets through the use of held environmental water
• water requirements to meet these objectives
• constraints on managing flows
• measures to use available water efficiently
• management arrangements and risks to meeting objectives.
For rivers, the plans draw on watering requirements detailed in environmental flow studies, which are prepared using the best available expert information. Flow studies have been prepared for regulated and some unregulated rivers throughout Victoria, and are periodically updated. The Wimmera-Glenelg Rivers and Dock Lake flow studies have recently been updated.

EWMPs are prepared by CMAs using the best available information. A collaborative process is used involving community members, water holders, Traditional Owners, DELWP, storage managers, subject experts and a scientific expert review panel.

EWMPs provide the detailed analysis used by CMAs to prepare seasonal watering proposals each year. An EWMP has been prepared for the Wimmera River system and the Wimmera-Mallee Pipeline Wetlands. EMWPs for these Wimmera-Mallee priority environmental assets have been collated in developing the Wimmera-Mallee Long-term Watering Plan.

### 12.5.10 Seasonal watering proposals

CMAs prepare seasonal watering proposals each year using the objectives and flow regimes identified in EWMPs and through annual community consultation, in accordance with guidelines issued by the VEWH. The proposals describe desired watering regimes for different climate-based scenarios and take into account:

- the objectives and flow regimes identified in EWMPs
- the actual watering regimes of waterways in recent years and their current condition
- the likely amount of water available at the start of the year
- scenarios for seasonal conditions and water availability over the coming year
- a risk assessment for any proposed watering events.

CMAs consult with key local stakeholders including storage managers, public land managers, Traditional Owners, and local interest groups such as Environment Victoria, Victorian Recreational Fishing and Field and Game Australia and representatives of the local community (through environmental water advisory groups) when preparing seasonal watering proposals. These proposals form the basis for the statewide seasonal watering plan prepared each year by the VEWH.

Seasonal watering proposals for the Wimmera River and Wimmera-Mallee Pipeline Wetlands are available on the Wimmera CMA website.

### 12.5.11 Seasonal watering plan

The seasonal watering plan is prepared by the VEWH and previews the potential environmental watering that could be implemented using water available under the water holdings and water held by other environmental water holders. The CMA seasonal watering proposals, together with the MDBA’s annual environmental watering priorities and the CEWH’s portfolio management priorities, inform the seasonal watering plans.

The objectives of the seasonal watering plan are set out in the Victorian Water Act. The plan aims to achieve the objectives by ensuring that decisions to use the water holdings are based on a systematic, science-based approach to identify environmental values and desired flow regimes. The plan also sets out the operational priorities for using environmental water allocations.

The VEWH’s seasonal watering plan is prepared for different water availability scenarios (drought, dry, average and wet). Environmental watering actions are developed for each scenario. The plan informs the real-time operational decisions that are made as the season progresses. Actions identified in the scenarios are converted to firm environmental watering.
commitments based on actual conditions and water allocations. The conditions that emerge over the year can be dynamic and are influenced by:

- weather conditions and forecasts
- catchment conditions
- water availability
- 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)
- risks associated with environmental watering actions (such as deteriorating water quality).

The VEWH engages with state stakeholder representatives when preparing the state seasonal watering plan.

The current seasonal watering plan is available online.

12.6 How are Basin Plan environmental watering outcomes achieved?

12.6.1 Overview

As already explained the objectives and targets of the Basin Plan have been integrated into Victoria’s environmental water planning at the long-term and annual stages. This means the delivery of held environmental water combined with other water such as consumptive, above cap, passing flows and system water meets Basin Plan objectives and targets. Monitoring of environmental watering outcomes informs adaptive management and potential revision of watering objectives in the planning stage. Complementing this are critical complementary measures, also known as complementary measures, that are necessary to achieve an environmental outcomes alongside water delivery.

This integration is committed to in the Victorian Waterway Management Strategy, and all environmental water managers in the Wimmera-Mallee water resource plan area must comply with Victorian and Basin Plan environmental water planning under state policy and investment.

Each year, Victoria must also demonstrate through annual Basin Plan reporting (Matter 19 of Schedule 12) how its environmental watering is consistent with the environmental watering plan and the Basin-wide environmental watering strategy, including contributing to the objectives in Part 2 of the environmental watering plan.

Figure 38 illustrates how planning works together at the Basin and state levels.

The delivery of environmental water outcomes is managed through the state environmental water planning framework outlined in Part 12.5. Environmental watering in the Wimmera-Mallee water resource plan area is linked to the Basin Plan long-term environmental objectives to:

- protect and restore water-dependent ecosystems of the Murray-Darling Basin
- protect and restore the ecosystem functions of water-dependent ecosystems
- ensure that water-dependent ecosystems are resilient to climate change and other risks and threats
- ensure that environmental watering is coordinated between managers of planned environmental water, owners and managers of environmental assets and holders of held environmental water.

When the VEWH is preparing the seasonal watering plan (see Part 12.5.11) to ensure it can achieve Basin Plan objectives for connectivity, native vegetation, waterbirds and native fish, it is guided by the CMA’s seasonal watering proposals (Part 12.5.10). These are directed by the
long-term objectives in environmental water management plans and long-term watering plans and influenced by the Basin Annual Environmental Watering Priorities developed by the MDBA.

The VEWH uses trade and carryover to support environmental outcomes (see Part 12.6.6) and where possible will aim to piggyback on system water to get the most efficient and effective use from held environmental water, in line with Victorian policy (see Part 12.6.5).

**12.6.2 Monitoring, evaluation, reporting and adaptive management**

Victoria has two main environmental water monitoring programs, the Victorian Environmental Flows Monitoring and Assessment Program, and the Wetland Monitoring and Assessment Program for environmental water. Both programs include monitoring that relates to the objectives and targets outlined in Victoria’s long-term watering plans, which have direct links to objectives outlined in Victoria’s asset-scale environmental water management plans prepared by Victoria’s CMAs, as well as the objectives listed in both the Basin-wide environmental water strategy and in the Murray-Darling Basin Plan in Chapters 5 and 8, Schedules 7 and 8.

Other programs with monitoring relevant to Basin Plan outcomes include the Living Murray program, Victoria’s Native Fish Report Card, and Commonwealth Long-Term Intervention Monitoring sites. A range of these monitoring results will be used by Victoria to report on Schedule 12 Matter 8, ‘achievement of environmental outcomes at the asset scale’. DELWP will draft a monitoring, evaluation and reporting strategy to outline how Victoria will report on Matter 8.

The Victorian Environmental Flows Monitoring and Assessment Program was established by the Victorian Government in 2005 to monitor and assess ecosystem responses to environmental watering in priority rivers across Victoria. Results from the program help inform decisions for environmental watering by catchment management authorities and Melbourne Water. Over the past 13 years, the information collected through the assessment program has provided valuable data and informed significant changes to the program. The Victorian Environmental Flows Monitoring and Assessment Program is now in its sixth stage of delivery and includes a strong focus on ‘intervention’ or ‘flow event’ questions for vegetation and fish. The current stage is funded to 2020.

The Wetland Monitoring and Assessment Program for environmental water is a state-wide monitoring program designed to assess ecological responses of vegetation, waterbirds, frogs and fish to water for the environment delivered in Victorian wetlands. Monitoring for this program started in 2017 and the current stage is funded to 2020.

The broad objectives for both monitoring and assessment programs are to:

- build on current knowledge and conceptual models to improve our understanding of the relationship between the delivery of environmental water and ecological responses in Victorian rivers and wetlands
- determine whether current ecological objectives for environmental watering are being met
- inform the management of environmental water
- communicate the ecological outcomes of environmental water delivery to stakeholders
- contribute to Victoria’s reporting requirements for the Basin Plan.

The results and learning from the Victorian Environmental Flows Monitoring and Assessment Program and Wetland Monitoring and Assessment Program for environmental water are fed into decisions and management of Victoria’s waterways. Results from monitoring at each site are communicated immediately after surveys to the CMAs’ environmental water reserve managers. Managers can then adjust their planning for the delivery of environmental water as necessary. This cycle is shown in Figure 39.
12.6.3 Critical complementary measures - also known as complementary measures

Environmental water is only one component of the activities necessary to achieve the long-term watering plan’s ecological objectives and targets. Critical complementary measures, are vital to support priority environmental assets and priority ecological functions and meet environmental watering objectives. These measures include among other things invasive species management and enhancing fish passage through instream obstructions. Victoria is currently developing a Critical Measures (Complementary Measures) Business Case to prioritise activities based on cost, critical waterway management actions and risks to meeting environmental watering objectives.

12.6.4 Coordination

Coordination of environmental watering in the surface water system in the Wimmera-Mallee water resource plan area is done through cooperative arrangements between the VEWH, CEWH and the storage manager.
The Victorian Environmental Water Holder leads environmental water planning and coordination for Victorian waterways at a water resource plan area scale, in close consultation with catchment management authorities as the local site managers. The Victorian environmental watering program involves a range of people and organisations. Relationships between local communities, waterway managers, storage managers, environmental water holders and land managers form the foundation of the program. Many public authorities collaborate to deliver the program. These authorities are referred to as program partners.

Delivery of the Commonwealth's water is undertaken in by the Commonwealth Environmental Water Holder in line with their supply-by-agreement. The Commonwealth collaborate with the VEWH and storage manager and catchment management authorities to ensure it is used in line with regional priorities.

12.6.5 Operational arrangements

The planning outlined in Part 12.5 supports the on-ground delivery of held environmental water.

The VEWH issues seasonal watering statements to the catchment management authorities which authorises the use of environmental water holdings. The CMAs have operational management responsibilities for providing the watering regimes determined by the planning processes. Seasonal watering statements issued to the Wimmera, Mallee and Glenelg Hopkins CMAs are available online at [http://www.vewh.vic.gov.au/news-and-publications/seasonal-watering-statements](http://www.vewh.vic.gov.au/news-and-publications/seasonal-watering-statements).

Catchment management authorities coordinate with storage and land managers to deliver the proposed watering regimes over the year. In practice, local watering decisions are made jointly because the environmental water holder, the storage manager and the land manager, work together to identify opportunities to use system water to support the delivery of environmental objectives.

The VEWH monitors changes to the operational context over the year and revises or issue new seasonal watering statements to maximise environmental outcomes. Management arrangements need to be tailored to the institutional boundaries of the CMAs and the physical boundaries of waterways to be supplied by particular water holdings because these determine basic accountabilities.

The complexity of decisions increases with the number of:

- governments involved in the decision
- water holders involved in the decision
- waterways that can be watered
- waterway managers

Management actions through the year may vary from the seasonal watering plan for unexpected reasons, like changes to water availability. Every effort is made to inform people that may be affected, including the local community.

12.6.6 Tools for managing environmental water

Environmental water managers use trade and carryover to efficiently and effectively manage environmental water. This is in line with Victorian policy for use of environmental water in the Victorian Waterway Management Strategy (DEPI, 2013) and Water for Victoria.

There is not a large amount of trade which occurs in the western region, however allocation trades can occur between entitlement holders in the Wimmera–Glenelg supply system with the permission of the Minister for Water or their delegate. Applications to trade by environmental water holders are subject to the same rules as all other allocation trades. The VEWH’s framework
for deciding whether to carry over water is also published in its water allocation trading strategy (VEWH, 2018a).

The delivery of environmental water requires either a bulk entitlement, environmental entitlement or water-use registration, and in Victoria these are held by the Victorian Environmental Water Holder. The Commonwealth Environmental Water Holder holds a supply-by-agreement and water is delivered under the Grampians Wimmera Mallee Water’s bulk entitlement.

The VEWH’s environmental entitlements provides it with a right to a share of water in storage and enables it to:

- Divert water from a waterway, channel or pipeline – e.g. to water an off-stream wetland
- Use water in-stream – i.e. to deliver in-river and approved overbank environmental benefits

Environmental water managers’ carryover decisions are made to maximise benefit to the environment:

- to build a reserve for priority watering actions in future years, for example to meet critical environmental needs if conditions are dry or to deliver a large watering
- to enable early season watering the following year, before the full seasonal allocations for that year are available
- because there is more than enough water available for high-priority watering actions in the current year

Carryover and trade provide greater flexibility to manage water availability between seasons, for example, by trading water when better outcomes can be achieved from the funds generated by trade compared with outcomes then could be achieved from surplus water.

10.26(1)

a. The Victorian Environmental Water Holder (VEWH) must, in the performance of its functions and the exercise of its powers, ensure that environmental watering occurs in a way that is consistent with the environmental watering plan and the Basin-wide environmental watering strategy and contributes to the achievement of the objectives in Part 2 of Chapter 8 of the Basin Plan. This does not prevent the VEWH from causing additional environmental watering to occur to meet local and Basin Plan environmental watering objectives.

b. In performance of its functions and the exercise of its powers, the VEWH must consider the relevant Long-Term Watering Plan for the water resource plan area.

c. The Department must develop the Long-Term Watering Plan for the relevant surface water plan area in accordance with the Basin Plan and consider both regulated and unregulated surface water systems.

12.6.7 Managing risks to environmental water delivery

Effective management of environmental water requires identification and management of any risks. The Victorian Waterway Management Strategy outlines state principles for managing risk associated with environmental watering.

These include that:

- risks involved with environmental watering will be identified and managed commensurate with the level of risk and environmental outcome sought
- risk management in environmental watering will consider the range of scenarios in which there may be risks
• the role of each relevant body involved in planning, delivery and facilitating delivery of environmental water will be clearly specified and verified to make sure there is due diligence and the best available information is used to manage any risks to third parties.

Victoria has existing annual and longer-term processes in place for managing risks. The system operators also assess risk prior to delivering an environmental water event.

• Annual: Specific risks related to environmental watering are identified and assessed in site-based seasonal watering proposals developed annually by catchment management authorities and documented in the VEWH Seasonal Watering Plan. These proposals draw upon the risks outlined in individual environmental water management plans and identify specific actions to mitigate these risks. The categories of risk covered include reputation, compliance, environmental, human, costs, time and non-achievement of objectives. These risks may be specific to that year or require ongoing or long-term management.

• Long term: CMAs across Victoria collaborating with communities and agencies identify key risks that may impact on the ability to achieve environmental watering objectives or that may arise in environmental water management plans. Management measures are also identified.

The long-term watering plan outlines the types of long-term risks and strategies for management. For more detail see Chapter 9 of the long-term watering plans.

12.7 Sustainable use and management for priority environmental watering

Part 4 of Chapter 10 of the Basin Plan requires that consideration be given as to whether the Wimmera-Mallee Water Resource Plan should include rules to ensure that:

• operation of the water resource plan does not compromise the meeting of environmental watering requirements of priority environmental assets and priority ecosystem functions (10.17 of the Basin Plan)
• operation of the water resource plan does not compromise the meeting of environmental watering requirements of priority environmental assets and priority ecosystem functions that depend on groundwater (10.18 of the Basin Plan)
• operation of the water resource plan does not compromise the meeting of environmental watering requirements for groundwater that has a significant hydrological connection to surface water (10.19 of the Basin Plan)
• there is no structural damage to an aquifer arising from take within the SDL and hydraulic relationships and properties between groundwater systems and within groundwater systems are maintained (10.20 of the Basin Plan)
• elevated levels of salinity and other types of water quality degradation within a groundwater SDL resource unit are prevented (10.21 of the Basin Plan).

In responding to Basin Plan requirements, the MDBA has asked Victoria to consider whether the water resource plan operates in any way to compromise the environmental watering of priority environmental assets or priority ecosystem functions. Victoria’s approach to developing water resource plans was to ensure that the plans complement the existing framework for water resource management under the Victorian Water Act.

In this case, when considering whether rules are necessary to support environmental watering, the following matters were considered:

• environmental watering primarily occurs through held environmental water (as outlined above)
• the VEWH holds water to meet environmental watering requirements regarding priority environmental assets and priority ecosystem functions
• the VEWH is treated the same way as all other entitlement holders in the system.
• water is managed to ensure, as far as practicable, equitable access to the resource in accordance with the terms and conditions of the particular right or entitlement a person has to access that water
• nothing in the water resource plan impacts on the operation of a right or entitlement (water access right) that exists in Victoria.

In Victoria, all take and use licences are subject to various standard terms and conditions. Included in the standard conditions are rules relating to the time, place and rate of take under that licence. These rules are applied to all individual entitlements (except bulk entitlements that contain rules for the management of the system) at the point of issuing the licence. They are imposed to support reliability of all entitlements in the system (including those held by VEWH).

Further, section 40 of the Victorian Water Act lists the matters that the Minister must have regard to when considering an application for a bulk water entitlement or take and use licence, including:

40 Matters to be taken into account

1. In considering an application under section 36(1), the Minister must have regard to the following matters:
   a. ...
   b. the existing and projected availability of water in the area; (ba) the permissible consumptive volume, if any, for the area;
   c. the existing and projected quality of water in the area;
   d. any adverse effect that the allocation or use of water under the entitlement is likely to have on –
      i. existing authorised uses of water; or
      ii. a waterway or an aquifer; or
      iii. the drainage regime within the meaning of section 12(1); or
      iv. the maintenance of the environmental water reserve in accordance with the environmental water reserve objective;
   g. the need to protect the environment, including the riverine and riparian environment;
   k. if appropriate, the proper management of the waterway and its surrounds or of the aquifer;

2. In considering an application under section 36(1), the Minister must give effect to an approved management plan for any relevant water supply protection area.

Part 6 describes how these requirements are applied within the Victorian water entitlement framework.

It should be noted that Victoria will not duplicate in the water resource plan the resource management arrangements that exist in take and use licences, bulk entitlements and storage management rules.

Therefore, in considering whether rules should be implemented through the Wimmera-Mallee Water Resource Plan it was considered appropriate to apply rules only in the following circumstances:
• to address risks of not meeting the relevant environmental watering requirements (as per sections 10.17, 10.18. and 10.19); if the risk was low, no rules will be applied.
• to address risks of structural damage to an aquifer; if the risk is low, no rules will be applied (as per section 10.20)
• to address risks of elevated salinity; if the risk is low, no rules will be applied (as per section 10.21). Assessments for these areas are presented below.

Further information regarding entitlements can be found at Part 6 of this report.

12.7.1 Surface water

As identified above, the use of held environmental water by the VEWH to meet environmental watering requirements is supported by system management arrangements (see Part 6) and conditions placed on all entitlement holders.

Bulk and environmental entitlements and take and use licences may include provisions that:
• require passing flows to be provided at harvesting points
• regulate the rate that water can be taken
• determine how much water is available to be allocated at any time.

These provisions enable the Minister to ensure the volume of water taken under the SDLs meets the need for sustainable management of water resources and control the negative impacts on the environmentally sustainable level of take.

On the basis of the information outlined above, Victoria does not consider it necessary to include rules in the Wimmera-Mallee Water Resource Plan to ensure that environmental watering requirements of priority environmental assets and priority ecosystem functions are met under section 10.17 of the Basin Plan.

12.7.2 Groundwater

The Basin Plan requires that water resource plans be prepared having regard to whether rules are required to ensure that environmental watering requirements are met for groundwater-dependent priority environmental assets and ecosystem functions and where there is a hydraulic connection between groundwater and surface water.

There are water features in the Wimmera and Avoca parts of the Wimmera-Mallee water resource plan area which receive groundwater discharge from the water table (which is explained below) however due to the high salinity of the groundwater these resources are highly unlikely to be developed and therefore there is no likely threat to surface water features from development of these resources which would require rules in the water resource plan.

Groundwater dependent ecosystems in the Wimmera-Mallee water resource plan area occur where the water table in the Parilla Sands aquifer is shallow. The Parilla Sands aquifer is typically of high natural salinity, in places exceeding 35,000 mg/L TDS and for this reason groundwater dependent ecosystems are generally saline. Due to its salinity, development of groundwater resources in the Parilla Sand aquifer is low and risks from development are is managed within Victoria’s water entitlement framework (see Part 6) and no additional rules are required.

The Wimmera Wetlands Asset Strategy (2011) identified potential groundwater dependent ecosystems in the Wimmera section of the Wimmera-Mallee water resource plan area as the Wimmera River and shallow lakes west of the river. The primary groundwater-dependent wetland assets in the Wimmera River floodplain are deep pools where saline groundwater from the Parilla Sands aquifer enters during low flow conditions, which may result in anoxic or toxic environments. The semi-permanent Natimuk–Douglas saline wetland system is mainly in the West Wimmera GMA, however it extends into the Wimmera-Mallee water resource plan area where the Douglas depression extends north of Natimuk. As the name suggests, groundwater discharge to these lakes is saline.
The major aquifer for extraction is the Murray Group Limestone aquifer, which underlies and is separated from the shallow Parilla Sands aquifer by the Bookpurnong Clay aquitard layer approximately 10 or more metres thick composed of mainly clay with some silt and coal. The Murray Group Limestone aquifer is isolated from the adjoining and underlying Renmark formation by the Geera Clay aquitard and Ettrick formations. The regional groundwater flow in the Murray Group Limestone aquifer is also to the west and north-west, away from the Wimmera River. For these reasons the groundwater–surface water connectivity of the Wimmera River is classified as very low, manifesting over long time scales (i.e. more than 50 years) (SKM, 2012).

In the Mallee area of the Wimmera-Mallee water resource plan area, there are no major rivers or significant surface water features that receive groundwater discharge from the water table aquifer, so there is a low risk of impacts on key ecosystem function. The Mallee Wetland Strategy (Mallee CMA, 2006) identified saline lakes such as Lake Tyrrell and riverine wetlands at risk from rising saline groundwater levels. However, these have not been identified as priority environmental assets for the purpose of the Basin Plan. Furthermore, given the low level of surface water regulation and development in the unregulated areas where these saline wetlands are located and the low potential to develop groundwater resources due to the salinity of the aquifer, there is no feasible way to manage this risk.

Terminal lakes of the Wimmera River are a series of large lakes and connecting creeks including Lake Hindmarsh, Lake Albacutya, Outlet Creek and Ross Lakes that are primarily filled by flooding flows from the Wimmera River during exceptionally wet conditions. The lakes have significant social, economic and environmental qualities. Lake Albacutya is recognised as a Ramsar site as it is a wetland of international significance. Lake Hindmarsh is recognised as a nationally important wetland and is Victoria’s largest freshwater lake. Rare and threatened bird and vegetation species thrive in periods when these waterways contain water. Fish and yabby populations also boom during these times. The lakes are home to significant Indigenous and non-Indigenous cultural heritage and provide major recreational values.

Determination of the Wimmera River Terminal Wetlands’ site-specific flow indicators focused on the two terminal lakes, Hindmarsh and Albacutya. The Lake Albacutya ecological character description identifies the hydrological cycle as arguably the most important process defining the ecological character of Lake Albacutya, with floods of both short and long duration playing a role in supporting flora and fauna (Cibilic & White 2010). Hydrology plays a crucial role in a number of ecological processes, including: maintaining health and stimulating recruitment of river red gums; stimulating waterbird arrival and breeding; replenishing groundwater and diluting saline groundwater; resetting succession of terrestrial lakebed vegetation; and contributing to nutrient cycling by driving successional phases (Cibilic & White 2010). The hydrological cycle is likely to be equally important to environmental values of Lake Hindmarsh.

The CSIRO and SKM (2010) report states there are no key environmental assets identified as groundwater-dependent and sensitive to groundwater extraction that are associated with the Wimmera-Mallee Highlands SDL resource unit.

The Ministerial Guidelines for Groundwater Licensing and the Protection of Groundwater-dependent Ecosystems (Minister for Water, 2015a) requires the licensing authority to assess the risks to groundwater-dependent ecosystems associated with the issue or transfer of licences. Risks identified through this process need to be managed through licensing conditions.

The following outlines how the use of groundwater will not compromise the environmental watering requirements of the regulated surface water systems:

- **Wimmera-Mallee: Sedimentary Plains SDL resource unit** – no significant usable groundwater resources in this system are connected to the regulated surface water system.
- **Wimmera-Mallee: deep SDL resource unit** – there is no connection between groundwater and the regulated surface water system.
Wimmera-Mallee: Highlands SDL resource unit – there may be limited local connection between groundwater and surface water but given the small volume available for use and the large area it could be taken from, it is not expected to have a significant effect on environmental watering requirements.

In the Murrayville GMA area, groundwater levels in the areas of pumping have historically been 10–50m below natural surface, which is similar to the depth of the water table in the overlying Parilla Sands aquifer. Development of the confined Murray Group Limestone aquifer has led to some long-term decline which has been considered in developing the local management plan for this area and in the considerations under the South Australian-Victorian Border Groundwaters Agreement. The agreement and the local management plan set management limits to declining levels of 0.65m/year. Groundwater level trends in the Murray Group Limestone aquifer are declining less than this trend rate (BARGC, 2017).

In Victoria the mechanisms for structural damage due to declining groundwater levels was considered in the development of the Yarram Water Supply Protection Area Groundwater Management plan, where declines of one metre a year have been observed due to off-shore gas and oil production since the 1970s (see http://www.srw.com.au/files/Technical_reports/Yarram_Groundwater_Management_Plan.pdf).

The most significant risk from structural damage identified in this study is related to the potential for subsidence at the coast due to dewatering and resultant inelastic deformation of clay layers.

From long-term monitoring of groundwater levels in the overlying Parilla Sands aquifer and underlying Renmark group aquifer, water levels in these aquifers are stable on either side of the border (Barnett, 2006) and more recent review of observation bores in the Murrayville GMA remain consistent with these observations. The latest data can be accessed from the Victorian Water Information Management System. With the Parilla water levels remaining stable, saturation of the Bookpurnong Clay layers is considered stable, ensuring the Bookpurnong Clay aquitard remains saturated. Regardless the potential change due to any elastic or inelastic subsidence in layers greater than 50m below the surface would tend to be small at the regional scale in the Murrayville area, difficult to detect, and the risk of structural damage is considered low.

In considering this evidence, the risk to the productive base and impact on the structural integrity of the aquifer, and the overlying and underlying aquifers and aquitards in the Murrayville GMA is considered low and is managed under the existing arrangements in the Victorian Groundwater management framework and the South Australian-Victorian Border Groundwaters Agreement.

Except for this development in the Murrayville GMA, there is no significant development of groundwater and while water levels outside of this GMA may fluctuate by small amounts, predominantly in response to climate and recharge, there are no regional scale impacts on water levels from groundwater use.

On this basis, Victoria considers there are no structural risks to the aquifers because the amount of take under the SDLs will not cause significant aquifer drawdown and therefore structural risk to the aquifers. There are considered to be no risks of structural damage in the fractured rock aquifers of the Highlands’ groundwater system due to the very small licensed volumes primarily in shallow unconfined alluvial aquifers.

On the basis of the above, it was not considered necessary to include additional rules under sections 10.18, 10.19 and 10.20 of the Basin Plan.
12.7.3 Salinity and other types of water quality degradation

Much of the Wimmera-Mallee water resource plan area contains saline shallow groundwater. The saline wetlands in the north of the water resource plan area are caused by the presence of shallow saline groundwater, no rainfall recharge and high evapotranspiration rate. Additionally, both groundwater and surface water quality is very poor. For these, the Ministerial Guidelines are also sufficient; however, the demand is non-existent.

The excised area is part of the West Wimmera GMA (see Part 2.2 for information about the groundwater boundaries) and is managed by Grampians Wimmera Mallee Water to a local management plan, which sets a permissible consumptive volume of 55,659 ML. About 95 per cent of this volume has been allocated. Most development is around Neuarpur, which is outside the Basin.

The Murrayville Local Management Plan considers the potential for impacts on water quality and notes that the considerable depth of the aquifer, the upward pressure of the aquifer and the overlying aquitard mean that the Murray group limestone aquifer (also known as the tertiary limestone aquifer is relatively protected from most vertical processes that could have the potential to affect groundwater quality in the area.

Downward leakage from the saline Parilla Sands aquifer via rusted or collapsed bore casings to the relatively fresh limestone aquifer remains a potential threat and the groundwater resource may be threatened by the presence of failed or failing groundwater bores, particularly where the Murray Group Limestone is overlain by the saline Upper Tertiary Parilla Sands aquifer. The older bores drilled into the limestone aquifer area are likely to deteriorate as the steel casing corrodes, allowing water from the saline Parilla Sands aquifer to enter the fresher Limestone aquifer and cause contamination. Proper capping and decommissioning of old bores is important to protect water quality of the Murray Group Limestone aquifer. While decommissioning of failed and redundant bores is the responsibility of landholders, GWMWater will assist where possible.

It is not considered necessary to include rules relating to the establishment and maintenance of a register of bores because this is already part of the Victorian framework. DELWP administers a bore registration network and the Victorian Water Register maintains records of all works licences including those relevant to the construction of a bore.

12.7.4 Addressing risks

Section 10.22 of the Basin Plan requires consideration as to whether rules are necessary in the Wimmera-Mallee Water Resource Plan to address risks identified in the Risk Assessment. Part 7 sets out the current and future risks to the condition and continued availability of water resources. The full Risk Assessment Report is contained at Appendix B.

The risk assessment examined risks for matters identified under Chapter 10, Part 4 of the Basin Plan.

Priority environmental assets and ecosystem functions are identified in Victoria’s long-term watering plans and were assessed under the separate risk category—“structural form of surface water resources based on categories that reflect priority assets, namely wetlands and rivers”.

The risks to the assets and the ecosystem function that underpins them was assessed in terms of loss or decline in:

- longitudinal connectivity – barriers to fish passage and other barriers such as vegetation connectivity
- lateral connectivity – in-stream physical habitat such as sedimentation, erosion, loss of large wood.
Causes of risk identified to priority environmental assets and priority ecosystems functions dependent on surface water were:

- climate change
- extreme drought
- failure to continue to invest in best practice land use initiatives
- pests and weeds.

### 12.7.5 Groundwater-related risks

The following groundwater-related risks were assessed:

- groundwater requirements for priority environmental assets and ecosystem functions (section 10.18 of the Basin Plan)
- groundwater and surface water connections (section 10.19 of the Basin Plan)
- productive base of groundwater and its management (section 10.20 of the Basin Plan)
- environmental outcomes related to groundwater (sections 10.21 and 10.22(b) of the Basin Plan).

Risks to the productive base of groundwater systems (section 10.20 of the Basin Plan) were assessed in terms of the ability of the aquifer to provide water for environmental and consumptive purposes in the context of damage to the structural form of the aquifer arising from take across environmental or consumptive users. No medium or high-level risks were associated with changes to the structural form.

In respect to the matters relevant to sections 10.18, 10.19 and 10.21 of the Basin Plan, these assets were assessed under risk categories in terms of the availability of groundwater for environmental purposes from the following aquifers:

- Basin Margin Deep
- Basin Margin Shallow
- Upland Layered Valley
- Uplands.

Climate change was identified as a potential medium or higher-level risk to meeting environmental watering requirements.

Mitigation measures and strategies have been identified in the Risk Assessment for all medium and high risks. It is not considered appropriate to impose rules to address risks in the Wimmera-Mallee relating to climate change. Instead, the appropriate approach to managing climate change risks is through Victoria’s water resource management framework that includes:

- the periodic review of regional catchment strategies required by the *Catchment and Land Protection Act 1994*
- regional sustainable water strategies required by the *Victorian Water Act*
- long-term water resource assessments required by the *Victorian Water Act*
- regional waterway strategies required by the *Victorian Water Act*
- planning duties of the VEWH required by the *Victorian Water Act*.
To comply with this Part, each section of Part 4 of Chapter 10 of the Basin Plan was considered in the context of Victorian water resource management arrangements. Consideration was given to the following:

a. environmental watering requirements and objectives in regulated surface water systems

b. the location of connections between surface water and groundwater in relation to priority environmental assets and priority ecosystem functions in regulated surface water systems

c. the impact of groundwater use on priority environment assets and priority ecosystem functions

d. existing water resource management arrangements underpinning Victoria’s entitlement regime.

Analysis of the above identified that no rules were necessary in response to the matters identified in sections 10.17 to 10.21 of the Basin Plan.

There is nothing in the Wimmera-Mallee Water Resource Plan that will compromise the meeting of environmental watering objectives in the Wimmera-Mallee water resource plan area.

Note: The above response is informed by the explanatory material outlined in Column 5 for Part 4 of the Wimmera-Mallee Index Table. Material in Column 5 of the Wimmera-Mallee Index Table does not form part of the accredit text.

No rules have been identified to address climate change risks identified in response to section 10.41(1) of the Basin Plan. No other medium to high risks were identified relevant to Part 4 of Chapter 10 of the Basin Plan. Strategies to address climate change risks have been identified in the Wimmera-Mallee Risk Assessment Report at Appendix B to the Wimmera-Mallee Comprehensive Report. Rules have not been included in the Wimmera-Mallee Water Resource Plan as there are no rules considered relevant to address the risks identified as the strategies identified in the Wimmera-Mallee Risk Assessment Report at Appendix B to the Wimmera-Mallee Comprehensive Report are considered most appropriate.

All risks identified in the risk assessment are set out in Table 11 for the Wimmera-Mallee (surface water) water resource plan area and Table 13 for the Wimmera-Mallee (groundwater) water resource plan area. No rules were considered necessary to address any low risks identified in the risk assessment.