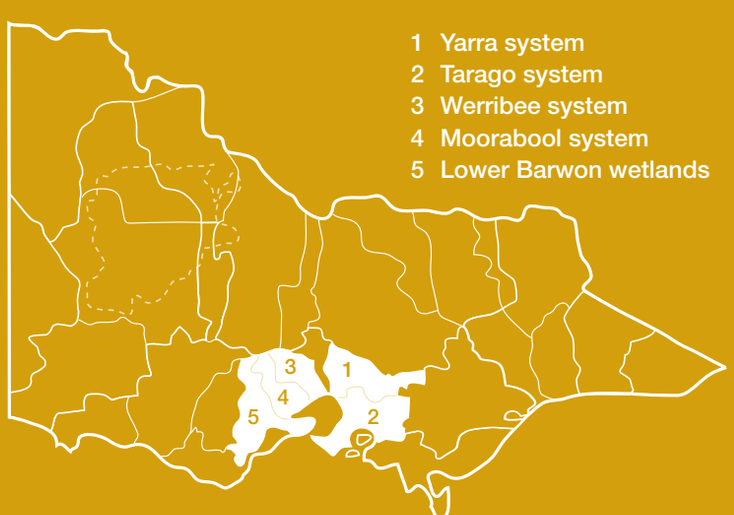
Section 3

Central Region



1 Yarra system
2 Tarago system
3 Werribee system
4 Moorabool system
5 Lower Barwon wetlands

3.1 Central Region overview

There are five systems that can receive environmental water in the Central Region of Victoria – the Yarra and Tarago systems in the east and the Werribee, Moorabool and Barwon (lower Barwon wetlands) systems in the west.

These waterways provide drinking water to Melbourne and surrounding towns and cities and support a range of activities including walking, cycling, fishing and camping, as well as areas of irrigated agriculture. Platypuses and fish are two examples of animals that attract community interest to the health of the waterways.

Environmental water is held in storage and delivered to support the plants and animals that live in and along the rivers. There is some interconnectedness between systems in the region, and there are therefore opportunities to move water between systems through trade or substitution. Although moving water between systems is possible, most environmental water in these systems is prioritised to provide benefits in the river below the storages in which the water is held. With the west of Melbourne generally drier than the east, quite different conditions can exist between river systems within the Central Region at the same time.

Seasonal outlook 2015–16

Some entitlements, such as in the Yarra system, are more reliable than others, providing greater certainty of water availability irrespective of catchment conditions. However, systems in the west (such as the Werribee and Moorabool) rely on inflows and dry conditions will result in a lower water availability in these systems. With most inflows into storages occurring in winter and spring, the likely water availability in these systems should be evident early in 2015–16.

If dry conditions prevail throughout 2015–16, carryover from 2014–15 will provide an important source of water to meet environmental demands, as allocations in some systems may be low. Under dry conditions, environmental water deliveries will focus on maintaining water quality and protecting habitat for fish and other water-dependent species, particularly during the summer/autumn period. If conditions improve, environmental releases will also seek to provide flows that help to trigger migration, and in some cases spawning, of native fish. Opportunities to optimise the use of environmental water within the region, and between regions, may be considered through trade.

Tarago River fresh, by Sarah Gaskill

3.2 Yarra system

Waterway manager – Melbourne Water

Storage manager – Melbourne Water

Environmental water holder – Victorian Environmental Water Holder

Environmental values

The Yarra River supports many important environmental values including terrestrial and aquatic vegetation, billabongs, birds, frogs, platypuses and several nationally significant native fish species (such as the Australian grayling and the Macquarie perch).

The upper system (reaches 1–3) provides habitat for a range of native fish species including river blackfish, spotted galaxias and common galaxias and contains good-quality riparian and aquatic vegetation. The lower system (reaches 4–6) contains Australian grayling, Macquarie perch and tupong.

There are several billabongs in the Yarra system which are an important feature of the Yarra River floodplain downstream of Millgrove. The billabongs support a variety of distinct vegetation communities, providing foraging and breeding habitat for waterbirds and frogs. Except in very high flows, the billabongs are disconnected from the Yarra River.

Social and economic values

The upper reaches of the Yarra River are an important water supply catchment, supplying up to 70 percent of Melbourne's drinking water. There are more than four million people who live in and travel to Greater Melbourne and the river provides social and recreational opportunities such as swimming and kayaking, as well as aesthetic appeal for walkers and cyclists. The waterways of the Yarra system (including the Yarra River) continue to hold significance for Traditional Owners and their Nations in the region.

Environmental watering objectives in the Yarra system

	Rebuild, strengthen and maintain plant life on the river bank and in the channel, as well as on the upper Yarra floodplains and in the river's billabongs
	Protect and boost populations of native fish including threatened species (such as Australian grayling and Macquarie perch)
	Maintain the form of the river bank and bed Scour silt build-up and clean cobbles in the river to ensure fish, platypuses and other water animals have healthy habitat pools and places to shelter
	Restore communities of waterbugs, which provide energy, break down dead organic matter and support the river's food chain
	Boost water quality in river pools, ensuring there is plenty of dissolved oxygen in the water to support water animals and bugs

System overview

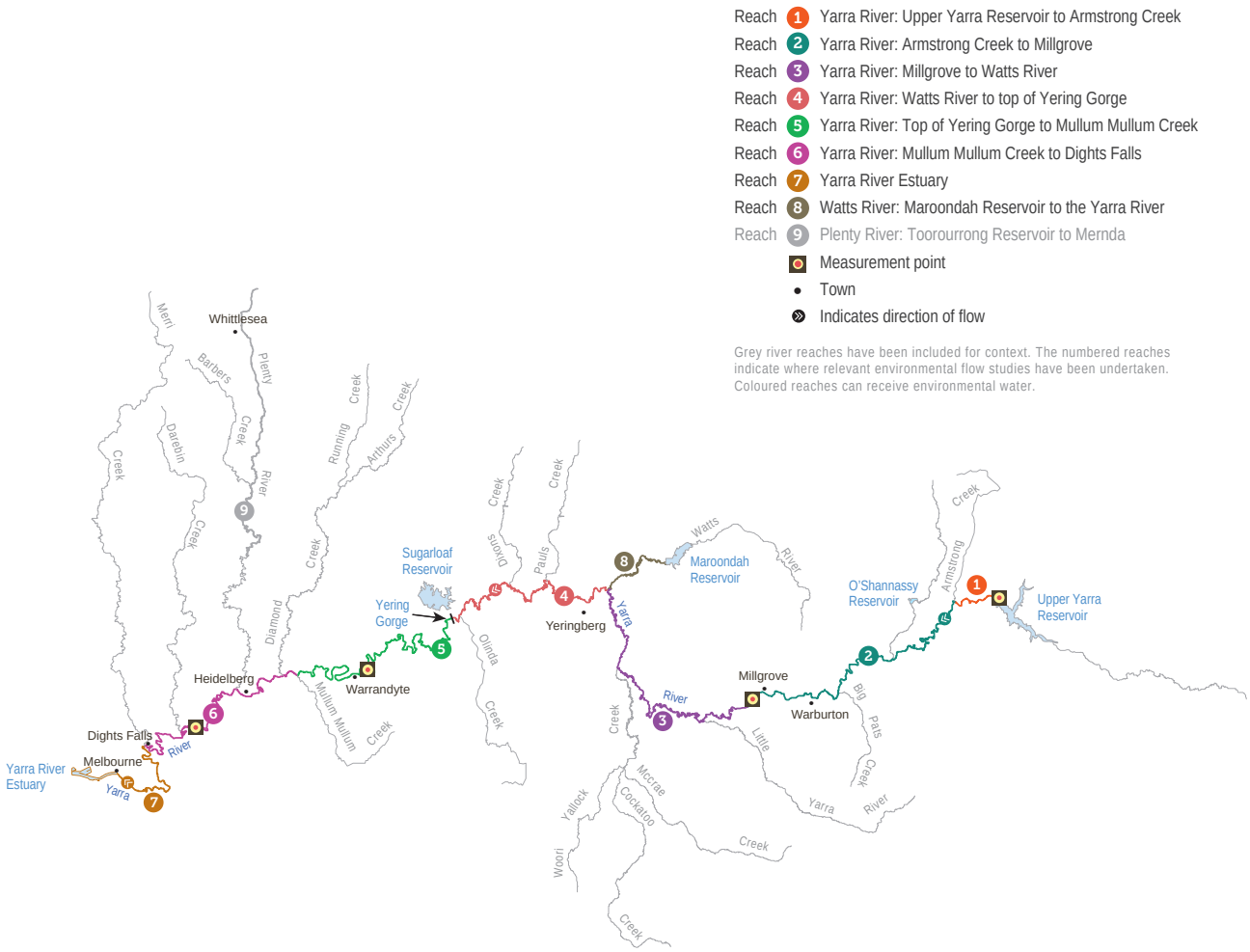
Flows through the Yarra system have become highly regulated due to the construction of water storages that capture natural runoff and allow the controlled release of water for consumptive uses. Over time, the lower Yarra River has been straightened, widened and cleared of natural debris as Melbourne grew around its banks, with the earliest alterations to its course occurring as far back as 1879. Environmental watering aims to reinstate flows that support ecological outcomes throughout the length of the system.

Environmental water can be released from the Upper Yarra, Maroondah and O'Shannassy reservoirs. Priority reaches for environmental watering are reaches 2 and 5, as delivery of water to these reaches is expected to achieve flow targets in neighbouring reaches. The environmental flow reaches in the Yarra system are shown in Figure 3.2.1. In the upper reaches, the system is influenced by tributaries such as the Woori Yallock Creek, Watts River and Little Yarra River. In the lower reaches, urbanised tributaries such as Diamond Creek, Plenty River and Merri Creek provide additional water to the Yarra River.

Recent conditions

2014–15 began with a wet winter that resulted in high storage volumes. This was followed by a very dry spring, with streamflows dropping to below-forecast levels expected under a dry scenario. The dry conditions persisted in the Yarra system into summer and early autumn.

Figure 3.2.1 The Yarra system



Year-round low flows were largely met by passing flows, except during spring in reach 2 where the lack of natural runoff resulted in flows fluctuating above and below the ideal minimum flow over the three months. Unregulated flows resulted in the natural achievement of winter/spring freshes, however the spring high-flow event that supports Macquarie perch spawning peaked below the target of 2,500 ML (reaching 2,074 ML). This was a result of the dry spring conditions and lack of forecast rain, meaning releases from storages alone were insufficient to meet the target. Despite this, preliminary monitoring has shown that Macquarie perch in the Yarra system did have a successful recruitment season in 2014.

Summer/autumn freshes were delivered to maintain water quality and fish habitat during the dry summer, with an autumn fresh for grayling spawning delivered in May 2015.

It is expected that the recent dry conditions in the Yarra system will continue into 2015-16, with average or below-average streamflows.

Scope of environmental watering

Potential environmental watering actions and their environmental objectives are explained in Table 3.2.1 and illustrated in Figure 3.2.2.

Yarra River at Warburton, by Melbourne Water

Table 3.2.1 Potential environmental watering actions and objectives for the Yarra system

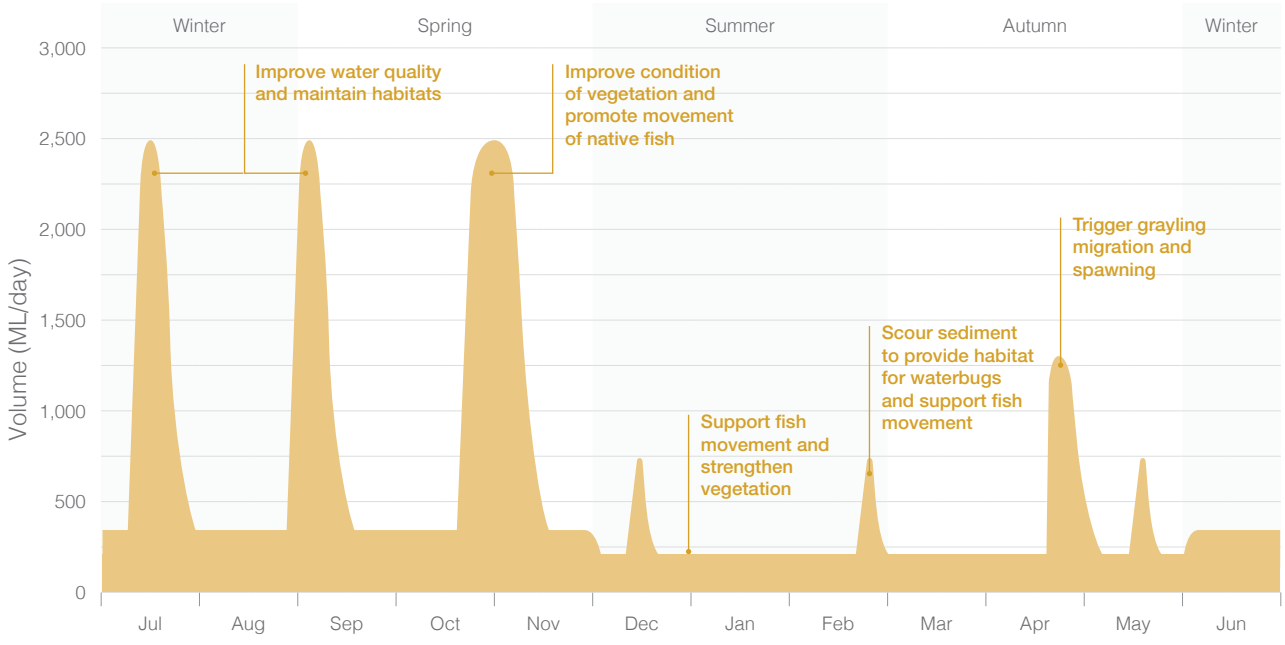
Potential environmental watering[1]	Environmental objectives
Year-round low flows[2] (varying rates from 10–>350 ML/day during December–May)	▸ Provide sufficient access to riffle habitat ▸ Allow river bank vegetation to dry ▸ Limit the growth of fringing/riparian/terrestrial vegetation into the stream channel ▸ Maintain and/or rehabilitate instream vegetation
Summer/autumn freshes (2–5 freshes of varying rates between 60–750 ML/day for 2–4 days each during December–May)	▸ Maintain habitat by scouring sediments and cleaning cobbles in faster-flowing areas ▸ Provide suitable habitat and migration opportunities for native fish ▸ Promote flood-tolerant vegetation ▸ Improve water quality in pools
Autumn high flows (1 high flow of varying rates between 560–1,300 ML/day for 7–14 days during April–May)	▸ Stimulate Australian grayling spawning
Targeted billabong watering	▸ Support native vegetation and improve habitat availability for wetland flora and fauna
Winter/spring freshes (2–3 [or more] freshes of varying rates between 100–2,500 ML/day for at least 2–7 days during June–November)	▸ Maintain habitat by scouring sediments and cleaning cobbles in faster-flowing areas ▸ Promote flood-tolerant vegetation ▸ Provide suitable habitat and migration opportunities for native fish ▸ Improve water quality in pools
Spring high flow (1 high flow of 700–2,500 ML/day for 14 days during October–November)[3]	▸ Maintain riffle habitat by scouring sediments and cleaning cobbles ▸ Promote flood tolerant vegetation growth ▸ Promote migration of native fish and spawning of Macquarie perch

1 The magnitude and duration of potential environmental watering depends on the reach being targeted, with the lower range generally occurring in the upper reaches (for example, reach 1), and higher range in the lower reaches (for example, reach 6).

2 Low flows are generally provided by passing flows under the environmental entitlement but during dry conditions it may be necessary to supplement low flows using environmental water.

3 A spring high flow will only be achieved with significant unregulated flow due to release constraints in the upper reaches of the system. However, ceasing harvesting at Yering during a natural high flow may assist in the desired flow being achieved.

Figure 3.2.2 Potential environmental watering in the Yarra River reach 5



Note: This figure is for illustrative purposes only. Scheduling and delivery of particular watering actions within the stated timeframes will vary.

Scenario planning

Table 3.2.2 outlines the potential watering and expected water usage under a range of planning scenarios.

Under a dry scenario, low flows and summer/autumn freshes are key watering actions that maintain habitat and water quality. Under average and wet conditions, autumn and spring high-flow events as well as targeted billabong watering may be delivered. These aim to improve conditions for Australian grayling (autumn high flow), support bank vegetation, scour sediment and promote Macquarie perch spawning (spring high flow) and growth of wetland plants in the billabongs.

The volumes of environmental water required to meet objectives under dry and average scenarios are similar, with a slightly reduced requirement under an average scenario due to unregulated flows, which are expected to assist in the delivery of additional watering actions. Under a wet scenario, the environmental water requirement reduces as a result of the increased contribution of unregulated flows.

A minimum of 8,000 ML carryover is required to deliver an autumn high-flow event to support Australian grayling in 2016–17, if not met in 2015–16.

Table 3.2.2 Potential environmental watering for the Yarra system under a range of planning scenarios

Planning scenario	Dry	Average	Wet
Expected river conditions	▸ Low streamflows year round	▸ High winter flows ▸ Unregulated flows may provide some freshes but duration and/or magnitude will likely be less than target flows	▸ High winter and spring flows with good variability ▸ Unregulated flows over summer/autumn will provide freshes and possibly high flows ▸ Some natural inundation of billabongs may occur
Expected availability of environmental water	▸ 14,000 ML carryover ▸ 17,000 ML allocation ▸ 31,000 ML total		
Potential environmental watering	▸ Summer/autumn low flows ▸ Summer/autumn freshes ▸ Winter/spring low flows ▸ Winter/spring freshes	▸ Summer/autumn low flows ▸ Summer/autumn freshes ▸ Winter/spring low flows ▸ Autumn high flow ▸ Targeted billabong watering ▸ Spring high flow ▸ Winter/spring freshes	
Possible volume of environmental water required to achieve objectives	▸ 23,000 ML	▸ 24,000 ML	▸ 14,000 ML
Critical carryover into 2016–17	▸ 8,000 ML		

Risk management

In preparing its seasonal watering proposal, Melbourne Water considered and assessed risks and identified mitigating strategies relating to implementing environmental watering. Risks and mitigating actions are continually reassessed by program partners throughout the water year (see section 1.4.4).

Engagement

Melbourne Water has engaged with key stakeholders and other relevant individuals in preparing the seasonal watering proposal for the Yarra system. These stakeholders are included in Table 3.2.3.

The seasonal watering proposals are informed by longer term plans such as regional waterway strategies and environmental water management plans. These longer term plans incorporate a range of environmental, cultural, social and economic perspectives.

Table 3.2.3 Key stakeholders engaged in the development of the Yarra system seasonal watering proposal for the Yarra system

Stakeholder engagement
▸ Yarra River Environmental Water Advisory Group including representatives of local governments, Native Fish Australia, VR Fish, Environment Victoria, Yarra Valley Water, Melbourne Water and Parks Victoria
▸ Melbourne Water (Water Supply Operations and Integrated Planning)
▸ Victorian Environmental Water Holder

3.3 Tarago system

Waterway manager – Melbourne Water

Storage manager – Melbourne Water

Environmental water holder – Victorian Environmental Water Holder

Environmental values

The Tarago system contains several significant and threatened native plant and animal species including populations of Australian grayling and vegetation species such as long pink-bells, tree geebung and swamp bush-pea. The upper catchment contains healthy riparian vegetation and instream habitat diversity, supporting native fish including river blackfish and mountain galaxias. While the lower catchment has been highly modified, it contains good patches of remnant vegetation, and healthy populations of Australian grayling and platypus.

Social and economic values

There are several reserves, picnic areas and designated fishing locations along the length of the Tarago system, as well as a popular caravan park and public land in the headwaters, which all contribute to the social and recreational value of the Bunyip and Tarago rivers. Many irrigators also rely on water from the Tarago system which is managed by Southern Rural Water. The waterways of this region have been, and continue to be, places of significance for Traditional Owners in the region.

Environmental watering objectives in the Tarago system

	Encourage healthy and diverse riverside vegetation
	Protect and boost native fish populations including threatened species (Australian grayling and river blackfish) by providing habitat and encouraging fish to migrate and spawn (release eggs)
	Provide habitat and nourishment for waterbugs which provide energy, break down dead organic matter and support the river's food chain
	Maintain and improve habitat for platypuses

System overview

The Tarago River is a major tributary of the Bunyip River, which rises in the Bunyip State Forest. The Tarago River headwaters are the Tarago State Forest and flow into the Tarago Reservoir at Neerim. Downstream of the reservoir, the Tarago flows through the town of Rokeby before meeting the Bunyip River at Longwarry North. The downstream reach towards Western Port Bay supplies many irrigators in the catchment.

Water available under the Tarago environmental entitlement is stored in and released from Tarago Reservoir and provides direct benefit to reaches 2 and 6. Reach 2 is the target reach for environmental watering as it has high ecological value, with a diversity of native fish and patches of native fringing vegetation. Deliveries to reach 2 often result in the desired flows also occurring downstream at reach 6.

Recent conditions

Tarago Reservoir started to spill in June 2014 and continued spilling into January 2015. The unregulated flows provided increased flow and variability in the river downstream of the reservoir, resulting in natural achievement of most of the target flows during winter, spring and early summer. Late-summer and autumn were drier-than-average, and once spills ceased, flows below the reservoir were reduced.

Environmental watering provided a summer fresh in January 2015, to improve habitat availability for animals and keep sand bars clear of encroaching vegetation. An autumn fresh was delivered in April 2015 and although the release was reduced due to forecast rainfall, the rainfall runoff combined with the released flow to produce a peak flow for the desired duration. Initial monitoring results indicate that the release was successful in triggering Australian grayling spawning.

Significant monitoring continues to be undertaken in the Tarago River, with the results aiming to show the influence of environmental watering on Australian grayling and platypus populations.

Scope of environmental watering

Potential environmental watering actions and their environmental objectives are explained in Table 3.3.1 and illustrated in Figure 3.3.2.

Figure 3.3.1 The Tarago system

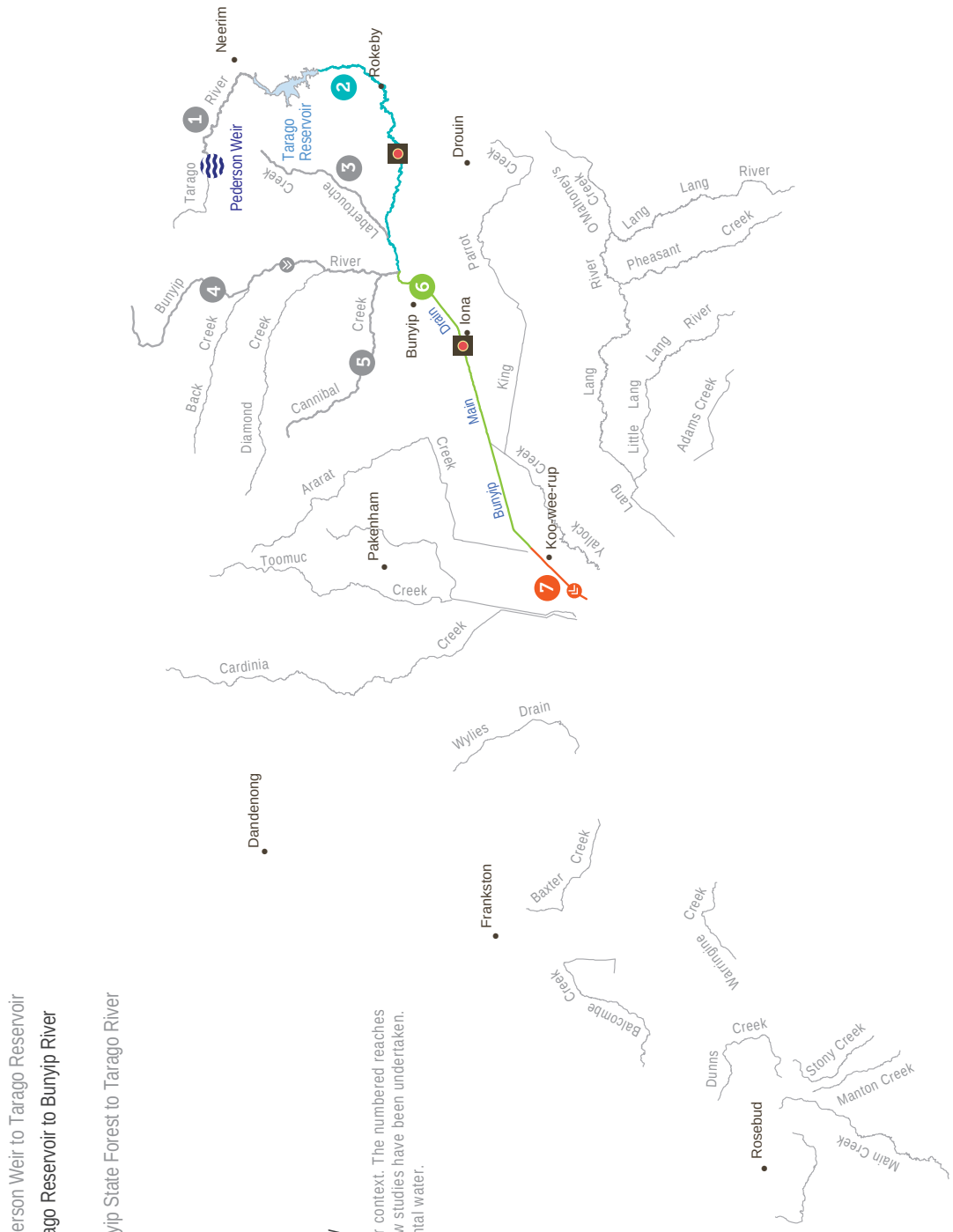
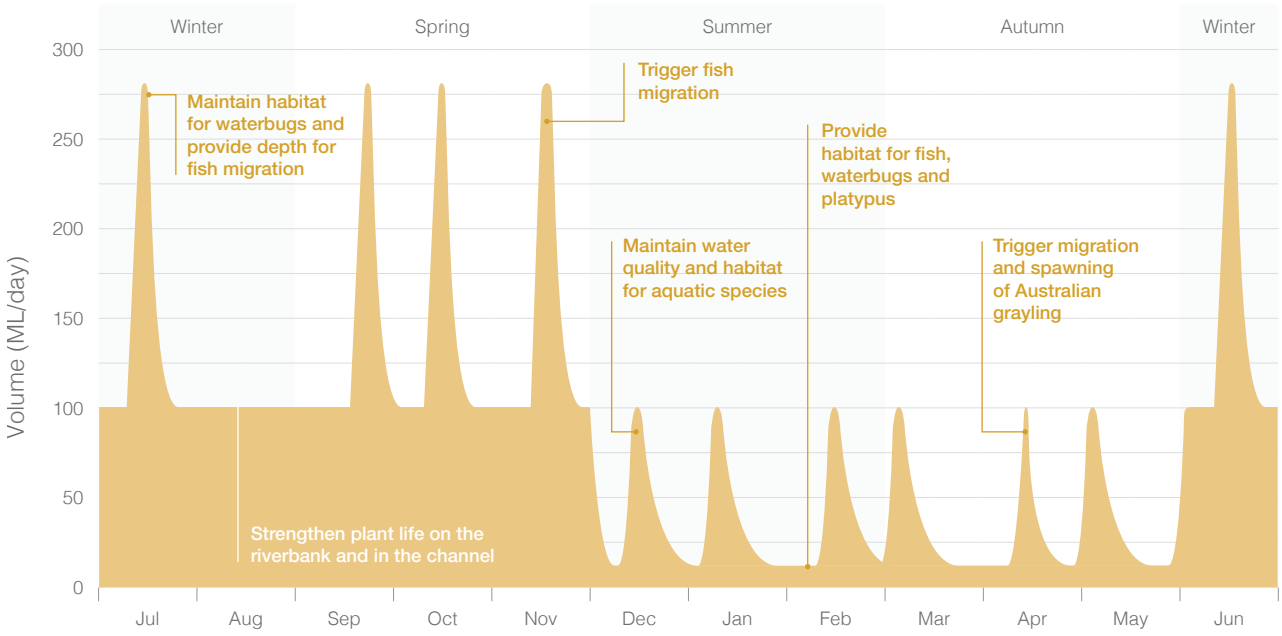


Table 3.3.1 Potential environmental watering actions and objectives for the Tarago River

Potential environmental watering	Environmental objectives
Summer/autumn freshes (5 freshes of 100 ML/day for 4 days each during December–May)	▸ Prevent vegetation growing on sand bars, encourage scour hole creation and improve water quality and maintain habitat for aquatic species, particularly fish
Autumn high flow (1 high flow of 100 ML/day for 2 days during April–May)	▸ Trigger downstream dispersal and spawning of Australian grayling
Spring/summer high flow (1 high flow of 280 ML/day for 4 days during October–December)	▸ Migration of Australian grayling and inundation of barriers, providing for fish passage
Winter/spring freshes (up to 4 freshes of 280 ML/day for 3 days during June–November)	▸ Generate habitat variability for macroinvertebrates, prevent sedimentation and provide sufficient depth for fish passage
Summer/autumn low flows (12 ML/day [or natural] during December–May)[1]	▸ Maintain water quality and provide habitat for river blackfish, Australian grayling, platypus and macroinvertebrates
Winter/spring low flows (100 ML/day [or natural] during June–November)[2]	▸ Inundate marginal habitats for juvenile fish ▸ Bed habitat availability for macroinvertebrates ▸ Promote establishment and recruitment of diverse riparian vegetation types and prevent terrestrial vegetation encroachment

1 Summer/autumn low flows are generally provided by passing flows under the environmental entitlement, but during dry conditions it may be necessary to supplement these flows using environmental water.
2 Winter/spring low flows are unlikely to be delivered as the volume required would severely affect the ability to provide other environmental flow events.

Figure 3.3.2 Potential environmental watering in the Tarago system



Note: This figure is for illustrative purposes only. Scheduling and delivery of particular watering actions within the stated timeframes will vary.

Scenario planning

Table 3.3.2 outlines the potential watering and expected water usage under a range of planning scenarios.

The highest priority releases in the Tarago system are summer/autumn freshes and autumn high flows, to provide habitat and migration cues for Australian grayling. An autumn high flow is important to ensure survival of the Australian grayling population in the system. Under drought conditions, there may not be sufficient water to deliver the event, however as this flow has been provided in four of the past five years, absence of the flow in 2015–16 does not pose a significant risk. Under wetter conditions, it is expected that in addition to summer/autumn releases, environmental water may contribute to delivery of some winter/spring flows, building on natural flows in the system.

The number of watering actions increases from a drought scenario to a wet scenario, consequently increasing the volume of environmental water required. Carrying water over into 2016–17 is important under all scenarios, to provide security in the ability to deliver summer and autumn freshes.

Table 3.3.2 Potential environmental watering for the Tarago system under a range of planning scenarios

Planning scenario	Drought	Dry	Average	Wet
Expected river conditions	▸ Very low streamflows ▸ Reduced passing flows ▸ Consumptive releases likely	▸ Low streamflows ▸ Some reduction to passing flows ▸ Consumptive releases likely	▸ Average streamflows ▸ Partial freshes naturally provided ▸ Some consumptive releases likely	▸ Above-average streamflow ▸ Partial-to-full freshes naturally provided ▸ Consumptive releases unlikely
Expected availability of environmental water	▸ 1,500 ML carryover ▸ 200 ML allocation ▸ 1,700 ML total	▸ 1,500 ML carryover ▸ 500–1,000 ML allocation ▸ 2,000–2,500 ML total	▸ 1,500 ML carryover ▸ 1,000–2,200 ML allocation ▸ 2,500–3,700 ML total	▸ 1,500 ML carryover ▸ 2,200–3,500 ML allocation ▸ 3,700–5,000 ML total
Potential environmental watering	▸ Summer/autumn freshes	▸ Summer/autumn freshes ▸ Autumn high flow	▸ Summer/autumn freshes ▸ Autumn high flow ▸ Spring high flow (partial achievement)	▸ Summer/autumn freshes ▸ Autumn high flow ▸ Spring high flow ▸ Winter/spring freshes
Possible volume of environmental water required to achieve objectives	▸ 1,000 ML	▸ 1,000–1,500 ML	▸ 1,500–2,700 ML	▸ Up to 3,500 ML
Critical carryover into 2016–17	▸ 1,000 ML			

Risk management

In preparing its seasonal watering proposal, Melbourne Water considered and assessed risks and identified mitigating strategies relating to implementing environmental watering. Risks and mitigating actions are continually reassessed by program partners throughout the water year (see section 1.4.4).

Engagement

Melbourne Water has engaged with key stakeholders and other relevant individuals in preparing the seasonal watering proposal for the Tarago system. These stakeholders are included in Table 3.3.3.

The seasonal watering proposals are informed by longer term plans such as regional waterway strategies and environmental water management plans. These longer term plans incorporate a range of environmental, cultural, social and economic perspectives.

Table 3.3.3 Key stakeholders engaged in the development of the Tarago system seasonal watering proposal

Stakeholder engagement
▸ Tarago and Bunyip Rivers Environmental Flow Advisory Group including representatives of local councils, irrigators, landholders and Landcare groups
▸ Melbourne Water (Water Supply – Optimisation and Support)
▸ Southern Rural Water
▸ Victorian Environmental Water Holder

3.4 Werribee system

Waterway manager – Melbourne Water

Storage manager – Southern Rural Water

Environmental water holder – Victorian Environmental Water Holder

Environmental values

The Werribee system supports several native fish including large populations of black bream and other species such as river blackfish, flathead gudgeon, short-finned eels, tupong, Australian smelt and several species of galaxiids. A diverse community of frogs and macroinvertebrates inhabit the upper reaches and platypuses are present in the lower reaches. The freshwater-saltwater interface of the Werribee River estuary is a regionally significant ecosystem due to the high diversity of aquatic plants and animals it supports

Social, cultural and recreational values

The Werribee River provides a range of recreational activities including fishing, bird watching, passive boating and bushwalking. The system also provides irrigation water for agricultural industries throughout the Bacchus Marsh and Werribee areas and domestic water for the towns of Melton and Bacchus Marsh. Significant Indigenous cultural heritage sites have been found along the riverbank and escarpments including fish traps, artefacts and burial sites. The Werribee River continues to be a place of significance for Traditional Owners and their Nations in the region.

Environmental watering objectives in the Werribee system

	Maintain diverse macrophytes (large water plants) and shrubs to provide shade and food for organisms further up the food chain
	Protect and boost native fish populations including black bream, by providing pool habitat, flows for fish to move up and downstream and encouraging fish to spawn (release eggs)
	Maintain habitat for frogs, macroinvertebrates and platypuses
	Maintain pool water quality for fish and platypuses and inundate estuary salt marsh with brackish water
	Move built-up silt from riffles (shallower parts of the river)

System overview

The Werribee River flows south-east from the Wombat State Forest to the undulating plains north of Ballan before flowing into Port Phillip Bay at Werribee. The Lerderderg River is a major tributary that joins the river at Bacchus Marsh.

The priority river reaches for the Werribee system are the reach downstream of Lake Merrimu (reach 6) and the estuary as they support a diverse range of native fish species, macroinvertebrates and platypuses. Flows targeting the estuary are expected to provide some benefits to reaches 8 and 9, however water may also be delivered to target environmental objectives in these reaches under suitable conditions. Flows are measured downstream of Lake Merrimu (reach 6), downstream of Melton Reservoir (reach 8) and at the Werribee Diversion Weir for reach 9 and the estuary.

Recent conditions

Rainfall in the Werribee catchment has been lower-than-average since the wet years of 2010–2012. Melton Reservoir has not spilled since October 2012 and consequently there has been minimal natural outflow to the bay, with environmental watering making up a large portion of flows in reach 9 and the estuary. The dry conditions persisted in 2014–15 with environmental watering focused on the most critical objectives with the aim of protecting the health of the system under dry conditions.

Baseflows from July to December 2014, a spring fresh and spring high flow were provided to Pyrites Creek (reach 6) using both environmental water and through the manipulation of storage transfers being made by Southern Rural Water. Maintaining the baseflow was important in providing suitable frog habitat during winter/spring, while the freshes targeted outcomes for pygmy perch and macroinvertebrates. A persistent trickle flow occurred throughout summer in the upper parts of Pyrites Creek as a result of leakage from Lake Merrimu, with constant cease-to-flow conditions occurring in the lower section of the reach.

Natural baseflows and freshes were below target levels for most of the time through reaches 8 and 9 and in the estuary, although irrigation releases partially achieved some outcomes in reach 8. A fresh was delivered in November 2014, targeting the estuary (with benefits to the upstream reaches), to support black bream recruitment. A summer fresh occurred in January 2015 in response to a blue-green algae outbreak near Werribee Zoo (reach 9) which successfully flushed the river and improved water quality.

Scope of environmental watering

Potential environmental watering actions and their environmental objectives are explained in Table 3.4.1 and illustrated in figures 3.4.2 to 3.4.4.

Figure 3.4.1 The Werribee system

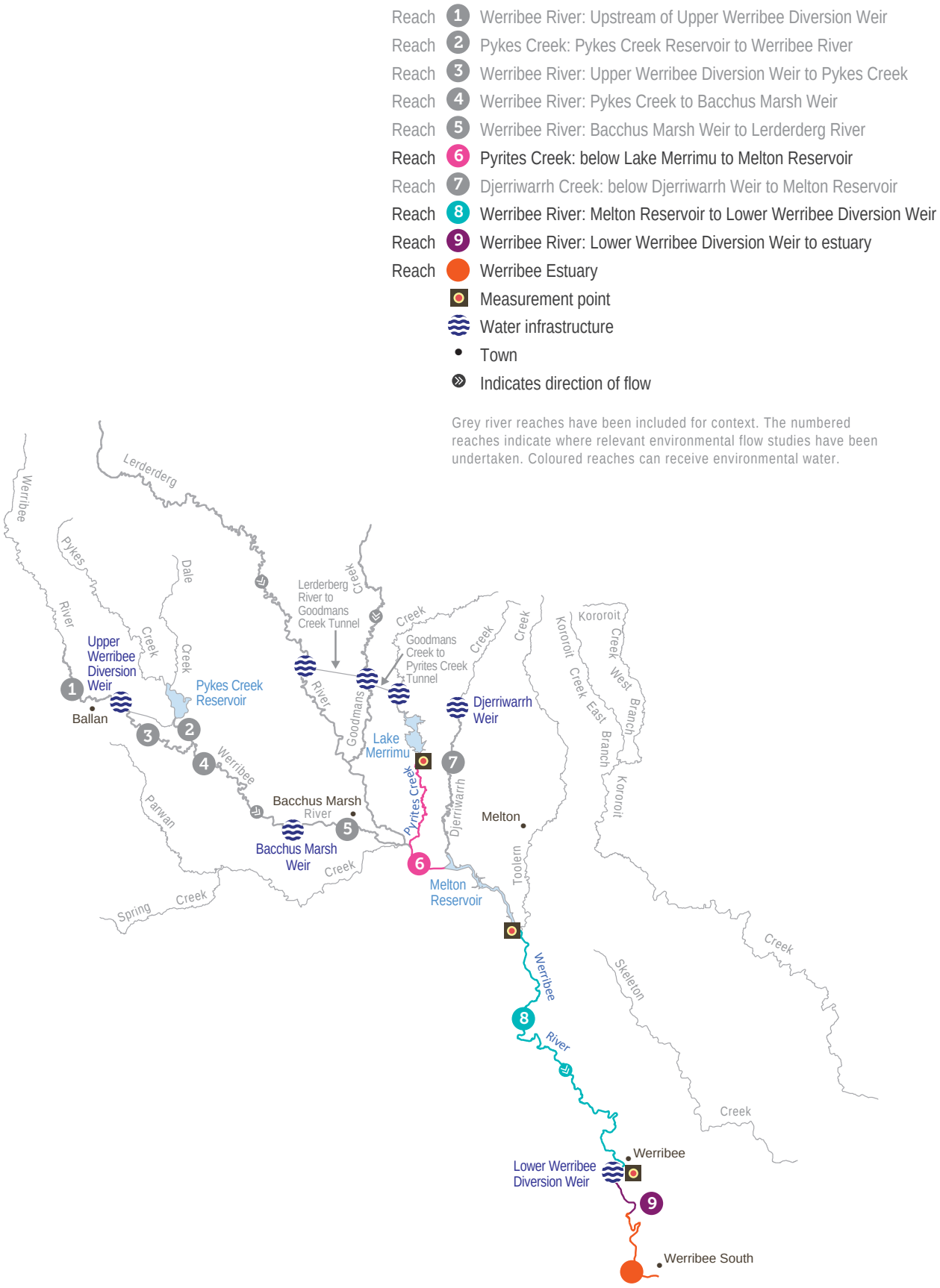


Table 3.4.1 Potential environmental watering actions and objectives for the Werribee system

Potential environmental watering	Environmental objectives
Pyrites Creek (reach 6)	
Spring/summer freshes (up to 3 freshes of 30 ML/day for 2 days during September–December)	▸ Scour silt and sand from riffles ▸ Promote vegetation growth
Spring/Summer high flow (130 ML/day for 2 days during September–December)	▸ Inundate fringing habitat for frogs and macroinvertebrates
Winter/spring/summer baseflow (2 ML/day [or natural][1] during July–December)	▸ Provide macroinvertebrate and frog habitat
Werribee River estuary	
Spring/summer freshes (2 freshes of between 50 and 80 ML/day for 2 days during November–January)	▸ Promote juvenile black bream recruitment
Winter/spring baseflows (15 ML/day continuously during June–November)	▸ Provide black bream habitat
Autumn freshes in the estuary (2–4 freshes of 89 ML/day[2] for 2 days during March–May)	▸ Provide fish passage between estuary and freshwater reaches
Winter/spring freshes (8 freshes of 100 ML/day for 1 day during June–November)	▸ Inundate salt marsh with brackish water to support aquatic vegetation
Werribee River reaches 8 and 9	
Summer/autumn freshes in reach 9 (3 freshes of 137 ML/day [or natural][1] for 1 day during January–April)	▸ Maintain pool water quality for fish and platypuses ▸ Allow for fry dispersal and mobilise silt from riffles
Winter/spring/summer baseflows (81 ML/day during June to December)	▸ Provide fish passage and spawning habitat ▸ Maintain macrophytic and shrub vegetation mosaic
Winter/spring/summer freshes (4 freshes of 350 ML/day for 3 days during June–December)[3]	▸ Mobilise sand from riffles ▸ Promote platypus habitat

1 The specification of 'or natural' means that in the absence of any upstream extraction or diversion the potential watering action may still be deemed to be met when the inflows are 'naturally' providing less than the recommended magnitude, duration or frequency of streamflow.

2 A trial delivering lower flows in 2014–15 will be monitored to determine its success supporting fish passage. If successful, this may reduce the flow rate required for this event in 2015–16

3 It is unlikely that sufficient environmental water will be available to achieve these flow events, but opportunistic watering may occur to supplement flows in the river to achieve these outcomes.

Lerderderg diversion weir, by Melbourne Water

Figure 3.4.2 Potential environmental watering in Pyrites Creek reach 6

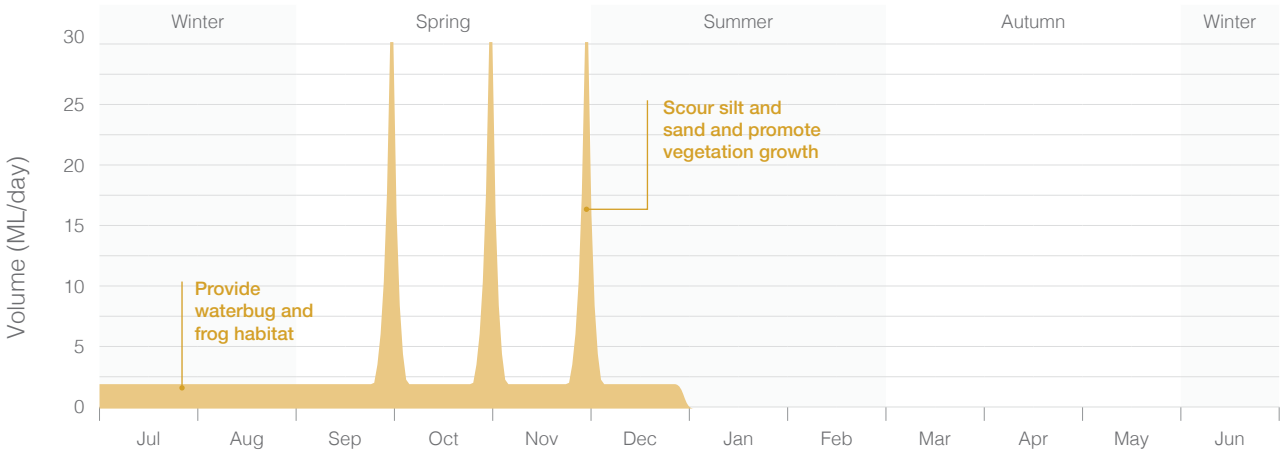


Figure 3.4.3 Potential environmental watering in the Werribee River reaches 8 and 9

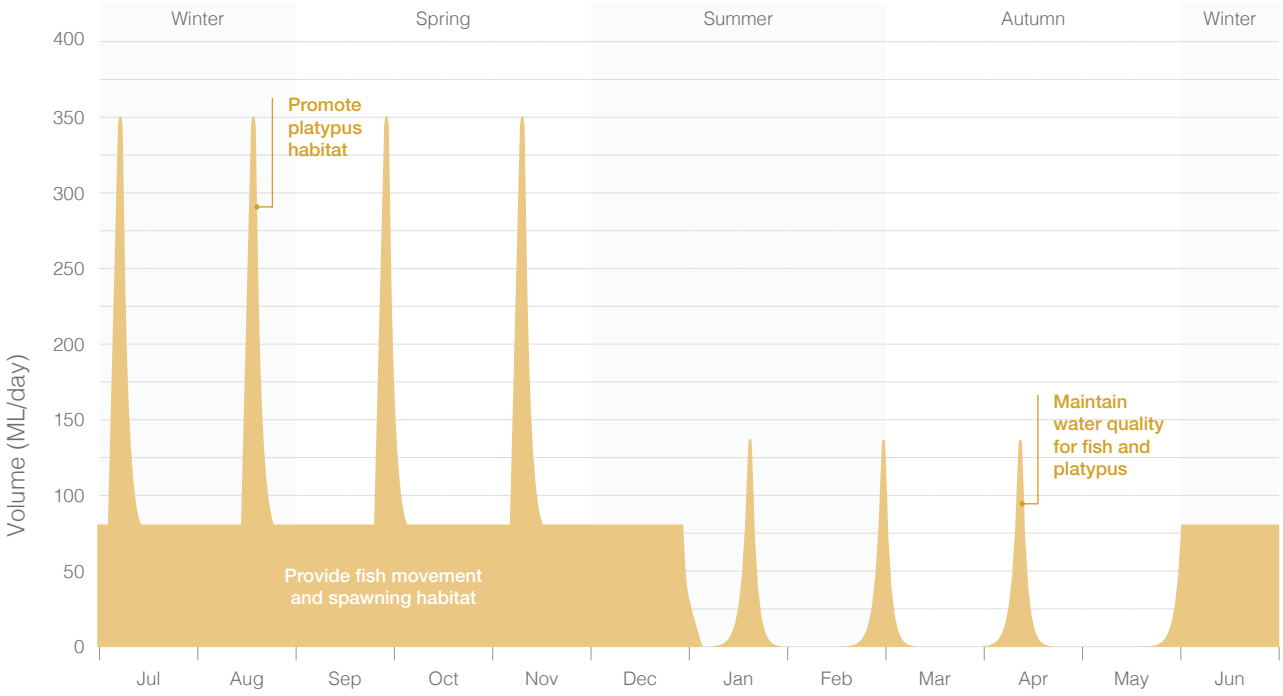
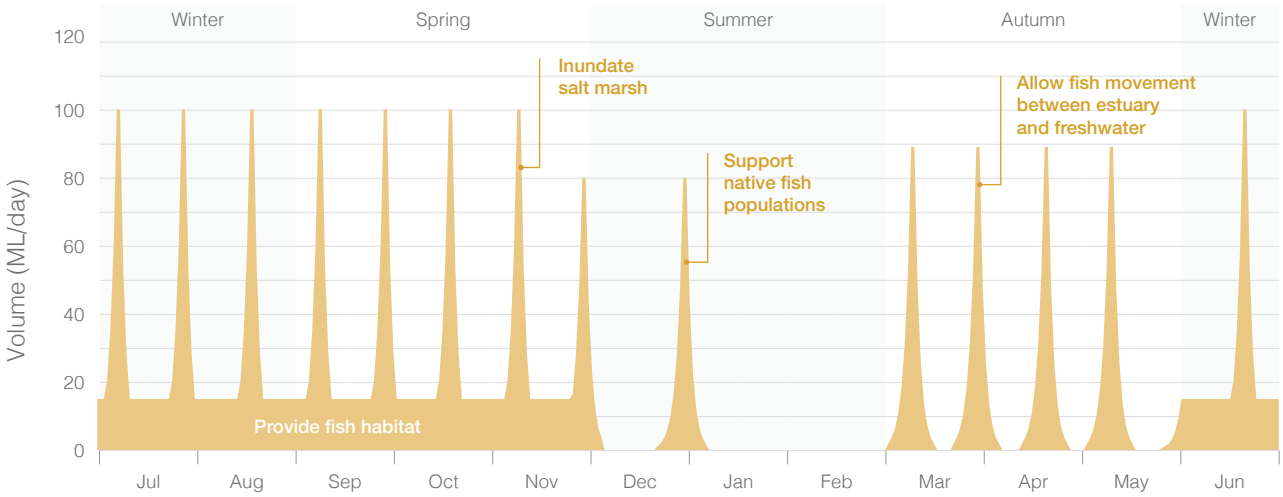


Figure 3.4.4 Potential environmental watering in the Werribee Estuary



Note: These figures are for illustrative purposes only. Scheduling and delivery of particular watering actions within the stated timeframes will vary.

Scenario planning

Table 3.4.2 outlines the potential watering and expected water usage under a range of planning scenarios.

As seasonal conditions improve across the planning scenarios from dry to wet, additional watering actions become a priority for environmental watering. The critical flows planned to be delivered under a drought and dry scenario focus on deliveries to Pyrites Creek (reach 6) and the Werribee River estuary, as well as freshes through reaches 8 and 9 to maintain water quality. However, the amount of water available may not be sufficient to meet all these demands, particularly under drought conditions. The expected volume of environmental water required to achieve the desired objectives is consistent across all scenarios. However the actual volumes delivered will vary depending on water availability and seasonal conditions, with the additional watering actions under average and wet scenarios only likely to be achieved by unregulated flows.

When possible, winter releases from Lake Merrimu targeting Pyrites Creek (reach 6) will be captured in Melton Reservoir, making the volume that reaches the reservoir available for releases downstream later in the water year. Under an average or wet scenario Melton Reservoir is likely to be spilling, meaning releases from upstream will spill through the reservoir and provide a small increase in unregulated flow downstream.

Carrying over some water into 2016–17 is considered important, in case of drought or dry conditions, when the focus will be on protecting or maintaining the health of the river system.

Table 3.4.2 Potential environmental watering for the Werribee system under a range of planning scenarios

Planning scenario	Drought	Dry	Average	Wet
Expected river conditions	▸ No unregulated flows ▸ Minimal consumptive releases out of storage into reach 8 in summer/ autumn ▸ Environmental water released from Lake Merrimu will be temporarily held in Melton Reservoir	▸ No unregulated flows ▸ Consumptive releases out of storage into reach 8 in summer/ autumn ▸ Environmental water released from Lake Merrimu will be temporarily held in Melton Reservoir	▸ Unregulated spills in winter/spring from Melton into reach 8, 9 and the estuary. ▸ Consumptive releases out of storage into reach 8 in summer/autumn ▸ Environmental water released from Lake Merrimu is likely to pass over the Melton Reservoir spillway	▸ Unregulated spills in winter/ spring from Melton into reach 8, 9 and the estuary; possible spills from Merrimu into reach 6 ▸ Consumptive releases out of storage into reach 8 in summer/autumn ▸ Environmental water released from Lake Merrimu is likely to pass over the Melton Reservoir spillway
Expected availability of environmental water	▸ 600 ML carryover ▸ 500 ML allocation ▸ 200 ML inflows ▸ 1,200 ML total	▸ 600 ML carryover ▸ 700 ML allocation ▸ 400 ML inflows ▸ 1,700 ML total	▸ 600 ML carryover ▸ 800 ML allocation ▸ 400–900 ML inflows ▸ 1,800–2,300 ML total	▸ 600 ML carryover ▸ >800 ML allocation ▸ >900 ML inflows ▸ >2,300 ML total
Potential environmental watering	▸ Pyrites Creek (reach 6): ▸ Winter/spring/summer low flows ▸ Spring/ summer fresh	▸ Pyrites Creek (reach 6): ▸ Winter/spring/summer low flows ▸ Spring/ summer fresh	▸ Pyrites Creek (reach 6): ▸ Winter/spring/summer low flows ▸ Spring/summer fresh	▸ Pyrites Creek (reach 6): ▸ Spring/ summer fresh ▸ Spring/summer high flow[1]
	▸ Reach 8 and 9: ▸ Summer/autumn fresh	▸ Reach 8 and 9: ▸ Summer/autumn fresh	▸ Reach 8 and 9: ▸ Summer/autumn fresh ▸ Winter/spring/ summer baseflows ▸ Winter/spring/ summer freshes	▸ Reach 8 and 9: ▸ Summer/autumn fresh ▸ Winter/spring/ summer baseflows ▸ Winter/spring/ summer freshes
	▸ Estuary: ▸ Spring/summer fresh ▸ Autumn fresh ▸ Winter/spring/summer baseflow	▸ Estuary: ▸ Spring/summer fresh ▸ Autumn fresh ▸ Winter/spring/summer baseflow	▸ Estuary: ▸ Spring/summer fresh ▸ Autumn fresh ▸ Winter/spring/summer fresh ▸ Winter/spring/summer baseflow	▸ Estuary: ▸ Spring/summer fresh ▸ Autumn fresh ▸ Winter/spring/summer fresh ▸ Winter/spring/summer baseflow
Possible volume of environmental water required to achieve objectives	▸ Up to 1,500 ML			
Critical carryover into 2016–17	▸ ~300 ML			

1 This watering action may be opportunistically delivered in other scenarios through consumptive water deliveries.

Risk management

In preparing its seasonal watering proposal, Melbourne Water considered and assessed risks and identified mitigating strategies relating to implementing environmental watering. Risks and mitigating actions are continually reassessed by program partners throughout the water year (see section 1.4.4).

Engagement

Melbourne Water consulted key stakeholders when preparing the seasonal watering proposal for the Werribee system. Table 3.4.3 shows these stakeholders.

Seasonal watering proposals are informed by longer-term regional waterway strategies, environmental water management plans and environmental flow studies, which incorporate environmental, cultural, social and economic considerations.

Table 3.4.3 Key stakeholders engaged in the development of the Werribee system seasonal watering proposal

Stakeholder engagement
▸ Werribee River Community Advisory Group including representatives of local governments, 'friends of' groups, Landcare groups, fishing clubs and Western Water
▸ Southern Rural Water and licensed diverters
▸ Victorian Environmental Water Holder

Upper Werribee estuary, by Melbourne Water

3.5 Moorabool system

Waterway manager – Corangamite Catchment Management Authority

Storage manager – Central Highlands Water

Environmental water holder – Victorian Environmental Water Holder

Environmental values

The Moorabool River is home to a number of native fish species including Australian grayling, river blackfish, Australian smelt, southern pygmy perch, short-finned eel and tupong. The system contains extensive areas of endangered remnant vegetation, including stream bank shrubland and riparian woodland ecological vegetation communities. Diverse populations of macroinvertebrates, platypuses and water rats are also present. The Moorabool River flows into the Barwon River, connecting it to the Ramsar-listed lower Barwon wetlands.

Social and economic values

The Moorabool River system is valued for its environmental values and supports a range of recreational activities with parks, picnic sites, lookouts, swimming holes, fishing and camping spots and historic bridges located along its length. Water is also delivered via the Moorabool River to supply urban users from She Oaks Weir. The Moorabool River continues to be place of importance for Traditional Owners and their Nations in the region.

Environmental watering objectives in the Moorabool system

- Maintain remnant vegetation communities including a range of macrophytes (large plants) within the river channel. These communities also provide shade and food for organisms further up the food chain
- Protect and boost native fish populations (including Australian grayling, southern pygmy perch, spotted galaxias, tupong and short-finned eel) by providing flows for fish to move upstream and downstream and encouraging fish to spawn (release eggs)
- Reshape the river bank and bed and ensure fish and other water animals have a range of habitat pools and places to shelter
- Maintain water quality during the year, particularly during summer
- Maintain a wide range of waterbugs to provide energy, break down dead organic matter and support the river's food chain

System overview

The Moorabool River is a highly regulated river that, despite substantial extraction and many years of drought, still retains significant environmental values. It flows southward from the Central Highlands between Ballarat and Ballan to join the Barwon River at Fyansford. The catchment is heavily farmed with about three-quarters of its catchment area used for agriculture.

Water allocated to the Moorabool River environmental entitlement is stored in Lal Lal Reservoir and includes passing flows that help maintain baseflows during winter. The Moorabool is also a water supply catchment for Barwon Water with releases from Lal Lal Reservoir being reharvested for urban water supply at She Oaks Weir. These releases contribute to environmental flow targets for reach 3 before being reharvested at the start of reach 4.

There are several large water storages in the upper reaches of the river including Lal Lal Reservoir. In the lower reach, between She Oaks and Batesford, there are nine private diversion weirs that are a significant barrier to fish. These barriers have increased the extent of slow-flowing habitat and reduced habitat diversity in the lower reach of the Moorabool.

Environmental water can be used to manage flows in reaches 3 and 4. The priority reach for environmental water management in the system is reach 3 from Lal Lal Reservoir to She Oaks diversion weir, as this is the reach where the small amount of environmental water in the system can have the most beneficial impact. At She Oaks diversion weir, environmental water continues into reach 4 then joins the Barwon River outside Geelong.

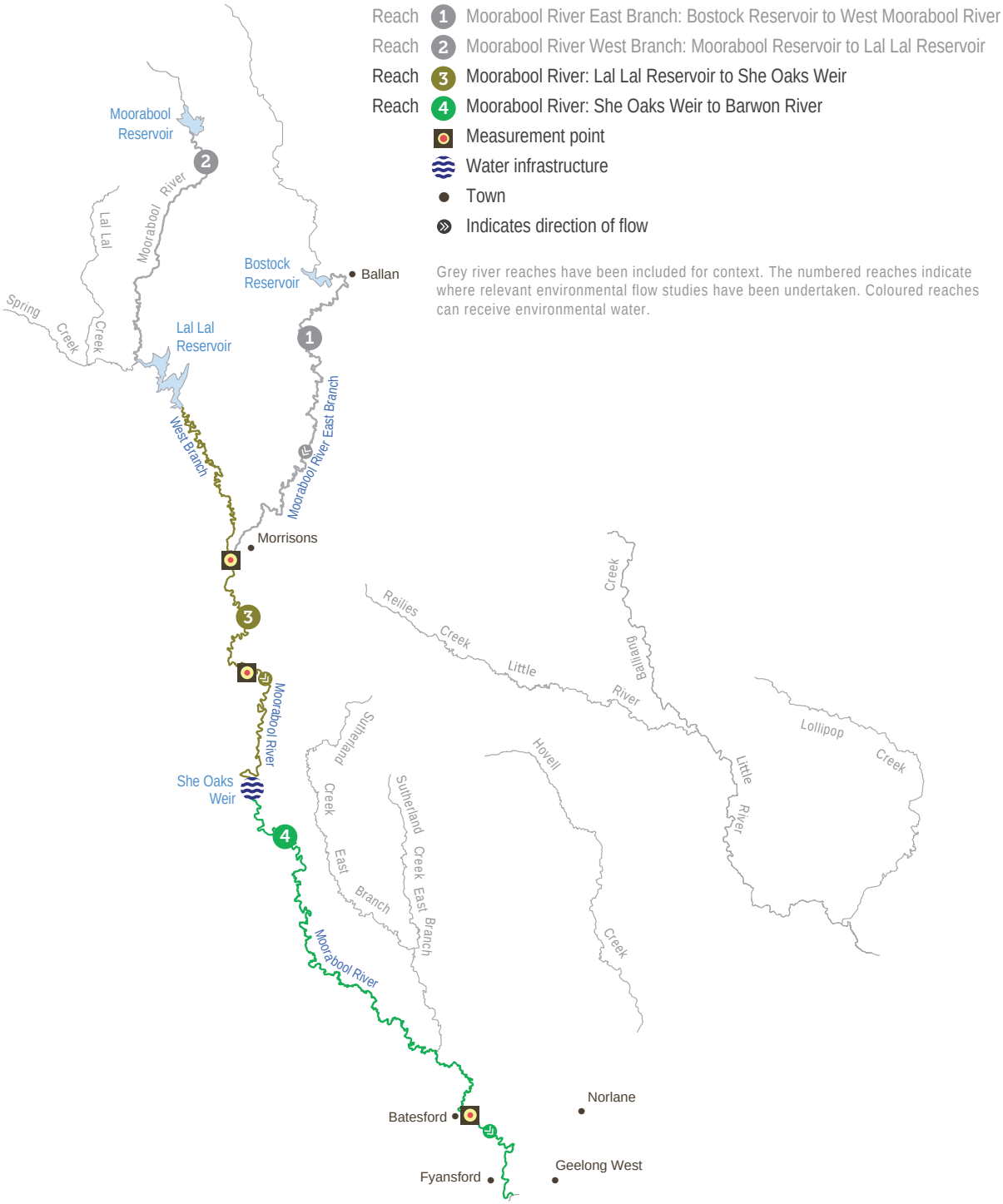
Recent conditions

Dry conditions continued in the Moorabool system over 2014–15 with lower-than-average rainfall in the latter part of 2014 and correspondingly low streamflows. As a result, there was a high reliance on environmental watering to meet objectives.

Summer flows were the priority for the Moorabool River in 2014–15 as it was a higher-risk period from a water quality perspective due to the small amount of water available in the system. Environmental watering supported summer low flows and freshes in reach 3; it commenced in December 2014 and continued until March 2015. Consumptive water releases from Lal Lal Reservoir also contributed to meeting low-flow targets during this period. A small winter fresh was delivered in June 2015.

Recent investigations undertaken in the Moorabool system have identified significant improvements in the diversity and abundance of native fish species in reaches 3 and 4 with a number of migratory small-bodied fish found that have not been previously recorded in the system.

Figure 3.5.1 The Moorabool system



The presence of these fish has been linked to environmental flows delivered since 2010 and the natural high-flow events that occurred in 2010–11 that provided connectivity for fish passage, enabling migratory and estuarine fish species to recolonise the system. This information helped to confirm the values present in the system and will help to inform future watering.

Scope of environmental watering

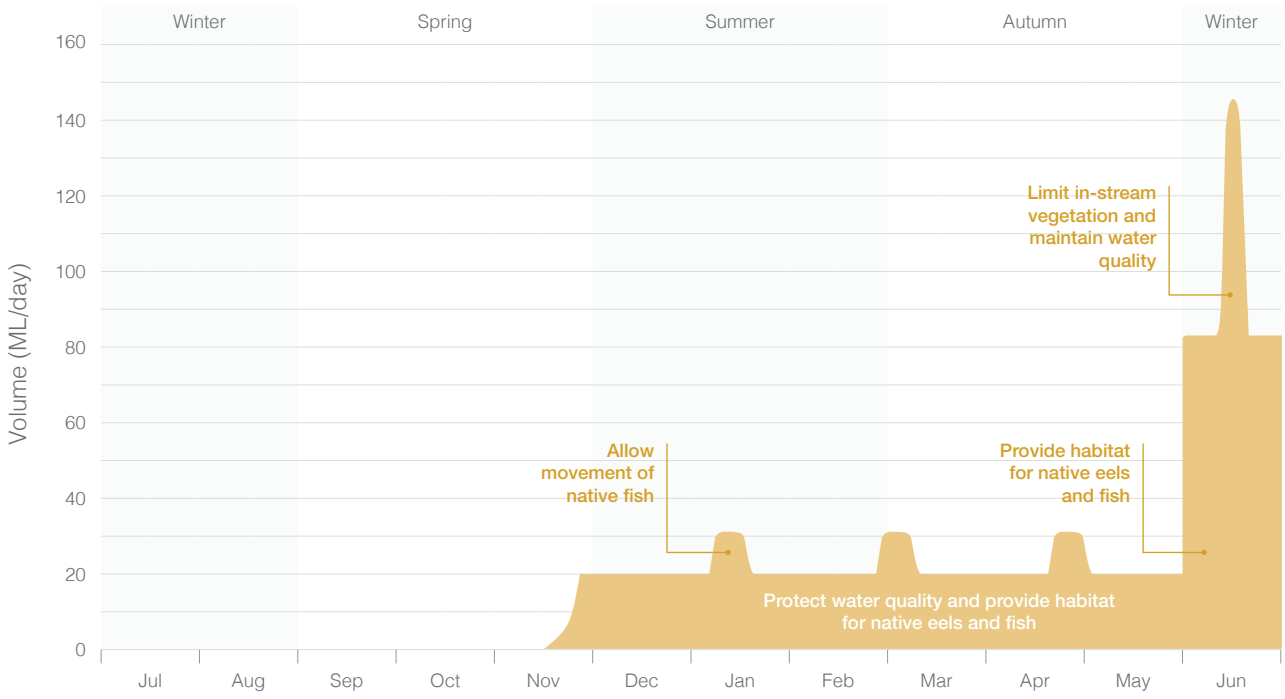
Potential environmental watering actions and associated environmental objectives are provided in Table 3.5.1 and illustrated in Figure 3.5.2.

Table 3.5.1 Potential environmental watering actions and objectives for the Moorabool system

Potential environmental watering[1]	Environmental objectives
Summer/autumn freshes (3 freshes targeting more than 31 ML/day for 10 days during December–May)	▸ Allow upstream movement of Australian smelt ▸ Reshape in-channel forms to maintain physical processes and physical habitat diversity and complexity
Summer/autumn low flows (average of 20 ML/day during December–May)[2]	▸ Provide adequate habitat for short-finned eel, southern pygmy perch and Australian smelt ▸ Maintain in-stream macrophyte species diversity and woody debris/snag habitat; rehabilitate water quality
Winter fresh (1 fresh targeting more than 146 ML/day for 5 days during June)[2]	▸ Maintain diverse macroinvertebrate community ▸ Limit encroachment of in-stream vegetation and species common to non-flowing water-bodies ▸ Rehabilitate water quality
Summer/autumn freshes in reach 4 (3 freshes targeting more than 32 ML/day for 10 days during December–May)[2]	▸ Maintain self-sustaining populations of Australian grayling (spawning) ▸ Movement of common/spotted galaxias ▸ Maintain diverse communities of macroinvertebrates ▸ Improve water quality
Winter low flows (83 ML/day during June)[2]	▸ Provide adequate habitat for short-finned eel, southern pygmy perch and Australian smelt ▸ Maintain in-stream macrophyte species diversity and woody debris/snag habitat

1 The target reach for environmental watering is reach 3 of the Moorabool system unless otherwise stated.
2 Delivery of this flow component will be subject to water availability.

Figure 3.5.2 Potential environmental watering in the Moorabool River reach 3



Note: This figure is for illustrative purposes only. Scheduling and delivery of particular watering actions within the stated timeframes will vary.

Scenario planning

Table 3.5.2 outlines the potential environmental watering and expected water usage under a range of planning scenarios.

Due to the limited volume of environmental water available in the Moorabool system, the priority is typically during the higher-risk summer/autumn period to protect water quality and fish. Over summer in a dry year, trigger levels for dissolved oxygen, electrical conductivity and water temperature are monitored and used to inform environmental watering. If a wetter scenario eventuates, unregulated flows may contribute more to the watering actions and winter freshes or low flows may become a priority.

Although environmental watering focuses on reach 3, some releases will benefit reach 4. Where possible, deliveries to reach 3 will be planned to maximise the benefit for reach 4, for instance by increasing summer fresh volumes when water availability allows.

Depending on the water available under each scenario, different watering actions will be prioritised. Under a drought scenario, the possible volume required from the Water Holdings is less than under a wet scenario to reflect the lower water availability and the use of smaller actions. Under a wet scenario it is likely that all available water would be delivered.

Table 3.5.2 Potential environmental watering for the Moorabool system under a range of planning scenarios

Planning scenario	Drought	Dry	Average	Wet
Expected river conditions	▸ Minimal catchment inflows ▸ Limited passing flows	▸ Low catchment inflows ▸ Passing flows	▸ Moderate catchment inflows ▸ Unregulated and passing flows	▸ High catchment inflows ▸ Unregulated and passing flows
Expected availability of environmental water	▸ 500–2,000 ML	▸ 2,000–3,500 ML	▸ 3,500–5,000 ML	▸ 5,000–7,000 ML
Potential environmental watering	▸ Trigger-based freshes ▸ Summer/autumn freshes ▸ Summer low flow (if sufficient water is available)	▸ Summer/autumn freshes ▸ Summer/autumn low flow ▸ Late winter fresh flow (if sufficient water is available)	▸ Summer/autumn freshes (reaches 3 and 4) ▸ Summer/autumn low flow ▸ Winter freshes (reaches 3 and 4) ▸ Winter low flow	
Possible volume of environmental water required to achieve objectives	▸ 250–1,000 ML	▸ 1,000–2,500 ML	▸ 2,500 ML	▸ 2,500 ML

Risk management

In preparing its seasonal watering proposal, Corangamite CMA considered and assessed risks and identified mitigating strategies relating to the implementation of environmental watering. Risks and mitigating actions are continually reassessed by program partners throughout the water year (see section 1.4.4).

Engagement

Corangamite CMA has consulted stakeholders in the preparation of the seasonal watering proposal for the Moorabool system. These stakeholders are shown in Table 3.5.3.

Seasonal watering proposals are informed by longer-term regional waterway strategies, environmental water management plans and environmental flow studies, which incorporate environmental, cultural, social and economic considerations.

Table 3.5.3 Key stakeholders engaged in the development of the Moorabool system seasonal watering proposal

Stakeholder engagement
▸ Australian Platypus Conservancy
▸ Barwon Water
▸ Central Highlands Water
▸ Department of Environment, Land, Water and Planning
▸ Moorabool Stakeholder Advisory Committee (with representatives of Geelong Landcare Network, Southern Rural Water, Central Highlands Water, Barwon Water, VEWH and the local community)
▸ People for a Living Moorabool (community group)
▸ Southern Rural Water
▸ Victorian Environmental Water Holder

3.6 Lower Barwon wetlands

Waterway manager – Corangamite Catchment Management Authority

Environmental water holder – Victorian Environmental Water Holder

Environmental values

Reedy Lake and Hospital Swamps support aquatic vegetation communities that provide important feeding and breeding habitat for native fish including Australian grayling, dwarf galaxias and other estuarine and freshwater species. They also support wetland-dependent bird species including the threatened Australian painted snipe, Latham's snipe, Caspian tern and whiskered tern. These wetlands form part of the internationally recognised Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar site.

Reedy Lake supports a diversity of vegetation communities including coastal saltmarsh, herbfields and reed beds, which provide important habitat for a variety of animal species. Maintaining the ecological character of the wetland requires a suitable watering regime to achieve a balance between these vegetation communities. At present, a number of these communities are in decline.

Hospital Swamps supports large areas of threatened coastal saltmarsh and many fish and waterbird populations. Vegetation communities in Hospital Swamps have remained largely unchanged over time, with the environmental values of the wetland being in good condition.

Social and economic values

Hospital Swamps and Reedy Lake are part of a wildlife reserve and highly valued for their recreational opportunities including recreational duck hunting and bird watching. The wetlands also support a commercial eel fishery. The waterways in the lower Barwon wetland system have been, and continue to be, significant for Traditional Owners and their Nations in the area.

Environmental watering objectives in the lower Barwon wetlands

	Provide suitable habitat including mud flats and shallow water for wading birds, and feeding opportunities and refuge for waterbirds and shorebirds
	Promote habitat for fish breeding and growth and improved conditions for migration and dispersal when wetlands are connected to the Barwon River
	Provide varying water levels and conditions to promote soil salinisation to support the persistence and growth of threatened saline-dependant ecological vegetation communities
	Maintain the high diversity of ecological vegetation communities in the wetlands Promote the growth of coastal saltmarsh, herbfields and lignum shrubland ecological vegetation communities

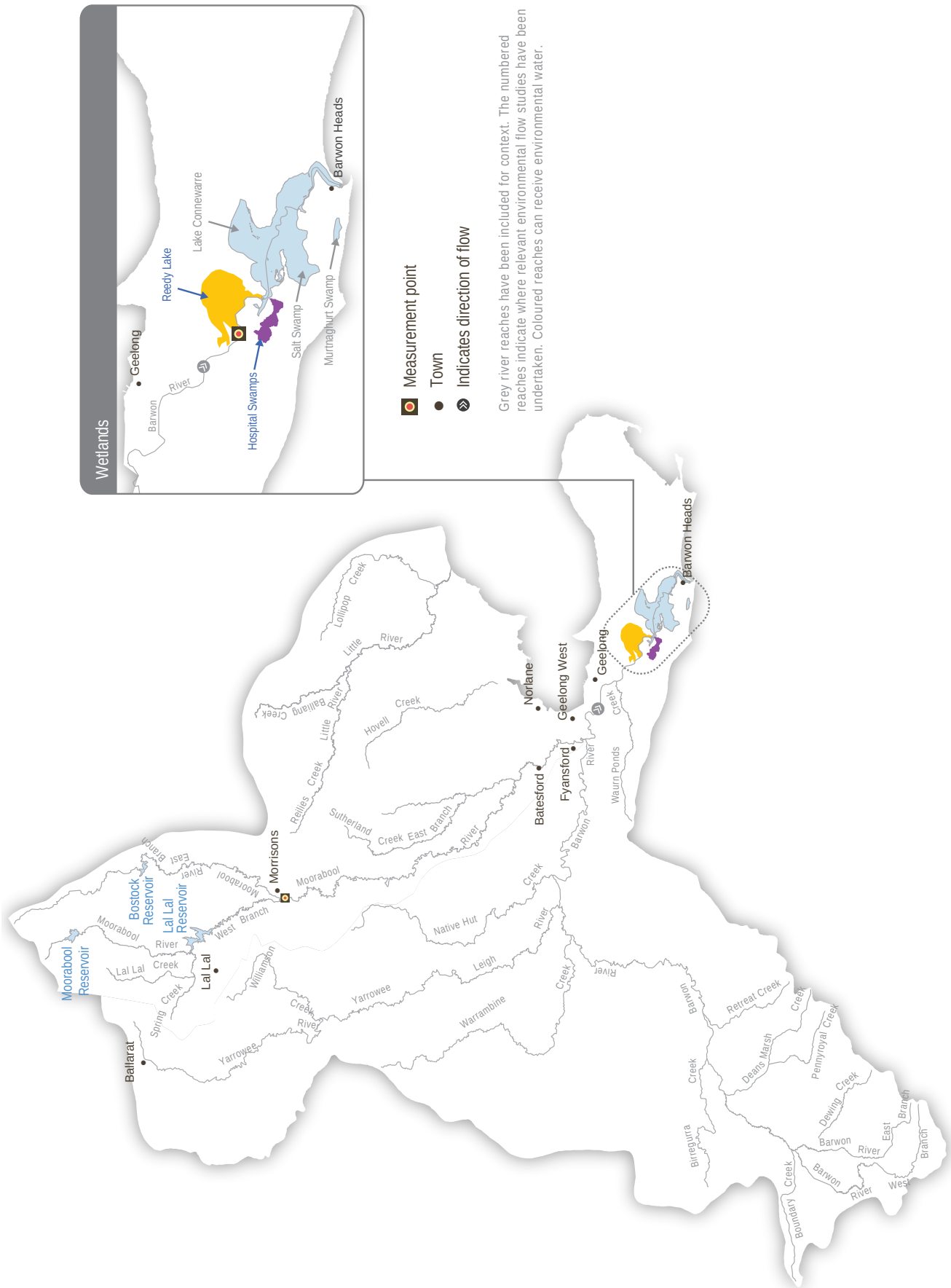
System overview

The estuarine reach of the Barwon River incorporates a system of wetlands and lakes including Lake Connewarre, Reedy Lake, Hospital Swamps, Salt Swamp and Murtnaghurt Lagoon (Figure 3.6.1). Environmental water can be actively managed at Reedy Lake and Hospital Swamps.

Unlike many other systems, the environmental entitlement does not provide access to water held in storage. Instead, it allows water to be diverted via regulators from the Barwon River into Reedy Lake and Hospital Swamps when river levels are above 0.7 m Australian height datum.

Outflows from Reedy Lake can be managed by manipulating the outlet regulator. There is limited ability to manage outflows from Hospital Swamps due to the small capacity of the outlet regulator. High rainfall and floods in the Barwon River can cause overbank flows allowing water into the wetlands in an uncontrolled manner, regardless of how the regulators are manipulated.

Figure 3.6.1 Lower Barwon wetlands



Recent conditions

Despite lower water levels in the Barwon River and low rainfall in the catchment throughout 2014–15, Reedy Lake remained full throughout the year and Hospital Swamps remained close to full over winter.

In December 2014, the inlet regulator to Hospital Swamps was shut to facilitate a natural drying regime over summer. While there were no further inflows until the regulator was opened again in April 2015, there was only a small reduction in the water level in Hospital Swamps due to mild temperatures and rainfall over summer.

Despite this, the lower level in the wetlands contributed to soil salinisation, an important process in estuarine wetlands, supporting the coastal saltmarsh ecological vegetation community and providing feeding and breeding habitat for waterbirds and the threatened orange-bellied parrot.

Reedy Lake was connected to the Barwon River throughout the year, with the level remaining full and largely static. The establishment of channel works, culvert installation and levees has resulted in Reedy Lake remaining full most years in the recent past. This has changed the natural wetting and drying cycle of the wetland and reduced its habitat diversity.

Scope of environmental watering in 2015–16

Potential environmental watering actions and associated environmental objectives are provided in Table 3.6.1.

Based on investigations and stakeholder consultation, a trial lowering of water levels at Reedy Lake and corresponding partial drying of the wetland is proposed for the 2015–16 year. Given the site has not been dried for 10 years, a monitoring program will be undertaken to monitor acid sulphate soils during the trial event. This monitoring program will also collect information about surface water, groundwater and contaminant levels, and ecological baseline data to inform future watering actions.

Concerns have been expressed about the impact that lowering water levels in Reedy Lake may have on commercial eel fishing interests. The Corangamite CMA is continuing to work with relevant government stakeholders and the affected eel fisher on this matter in relation to future watering activities for the site. This issue needs to be resolved before fully implementing the *Seasonal Watering Plan 2015–16*.

Coastal saltmarsh, Hospital Swamps, by Saul Vermeeren

Table 3.6.1 Potential environmental watering actions and objectives for the lower Barwon wetlands

Potential environmental watering[1]	Environmental objectives
Reedy Lake	
Autumn/winter/spring filling flows (during March/April–October)	▸ Maintain connectivity with the Barwon River ▸ Provide spring feeding for waterbirds in flooded vegetation and the wetland fringe ▸ Promote fish reproduction
Trial spring/early summer drawdown (during October–January) and continued low water levels throughout summer/autumn (January–March/April)[2,3]	▸ Provide wading bird habitat during summer ▸ Allow recruitment of aquatic macrophytes at wetland fringes ▸ Provide summer waterbird refuge and foraging habitat ▸ Improve lake shore salinity and promote soil salinisation ▸ Promote suitable conditions for threatened vegetation communities (such as coastal saltmarsh, herbfields and lignum shrubland) ▸ Provide increased habitat diversity (including salt pans, mudflats and shallow water) ▸ Reduce the threat of tall reeds in the system by increasing the salt content of the water and soil ▸ Reduce the threat of carp and associated impacts on flora and fauna ▸ Decay organic matter on wetland bed, to increase lake productivity when it is re-flooded ▸ Improve soil health and allow weathering of heavy metals in lake fringe soils
Hospital Swamps	
Autumn/winter filling flows (during May–November) Hospital Swamps will be connected to the Barwon River as much as possible by keeping the inlet and outlet open	▸ Create habitat and support macroinvertebrate populations ▸ Stimulate fish and waterbird breeding ▸ Allow fish to colonise the wetland from the river ▸ Allow soil and surface water salts to be diluted over winter ▸ Promote and sustain growth of important wetland vegetation communities
Summer/autumn drawdown (during December–March/April) The inlet to Hospital Swamps will be closed to allow water levels to drop through evaporation. During this period, the outlet will be opened for short periods of time if a summer storm increases water levels above 0.85 m Australian height datum	▸ Allow soil and surface water salts to accumulate over summer ▸ Initiate decomposition of organic matter on the wetland bed ▸ Promote suitable conditions for threatened vegetation communities such as coastal saltmarsh, herbfields and lignum shrubland ▸ Provide summer waterbird refuge and foraging habitat

1 Inflows to the wetlands will cease when levels in the Barwon River reach 0.7m Australian height datum, in line with provisions for accessing water under the environmental entitlement.

2 Concerns have been expressed about the impact that lowering water levels in Reedy Lake may have on commercial eel fishing interests. The Corangamite CMA is continuing to work with relevant government stakeholders and the affected eel fisher on this matter in relation to future watering activities for the site. This issue needs to be resolved before fully implementing the Seasonal Watering Plan 2015–16.

3 Water levels in the Big Hole area of the wetland will be maintained at a minimum of 0.4 m Australian height datum to provide summer refuge and ensure contaminants are not released from the soil.

Scenario planning

Table 3.6.2 outlines the potential environmental watering and expected water usage under a range of planning scenarios.

The priority watering actions in the lower Barwon wetlands remain consistent under all scenarios, with a winter fill and summer drawdown planned. However, catchment conditions and unregulated flows will influence the extent to which the desired water levels can be achieved. For example, in a wet scenario it is unlikely that a substantial drawdown in Reedy Lake or Hospital Swamps will be achievable. As a result, the wetlands will be managed adaptively throughout the year based on the prevailing climatic conditions.

Corangamite CMA has undertaken a number of studies to determine the best way to manage the water regime at the wetlands, and particularly at Reedy Lake, in consultation with stakeholders. These studies have recommended more regular low water levels in Reedy Lake as the best approach to protect and improve the ecological values of the wetland. However, it is important to note that concerns have been expressed through continuing stakeholder consultation of the impact lowering water levels in Reedy Lake may have on commercial eel fishing interests. The Corangamite CMA is continuing to work with relevant government stakeholders and the affected eel fisher on this matter in relation to future watering activities for the site. This significant issue needs to be resolved prior to fully implementing the *Seasonal Watering Plan 2015–16*.

Table 3.6.2 Potential environmental watering for the lower Barwon wetlands under a range of planning scenarios

Planning scenario	Dry	Average	Wet
Expected river conditions	▸ Some natural inflows from the Barwon River in winter/spring ▸ Mild conditions over summer may assist in facilitating some drawdown of the wetland water levels	▸ Some natural inflows from the Barwon River in winter/spring ▸ Mild conditions over summer may assist in facilitating some drawdown of the wetland water levels	▸ Overbank flows likely to inundate the wetlands as a result of higher river flows, stormwater inflows and local rain/runoff ▸ Extensive drawdown of wetlands is unlikely
Reedy Lake			
Potential environmental watering	▸ Autumn/winter/spring filling flows (March/April–October) ▸ Trial spring/early summer/autumn drawdown (January–March/April)		
Hospital Swamps			
Potential environmental watering	▸ Autumn/winter/spring filling flows (May–November) ▸ Summer/autumn drawdown (December–March/April)		

Risk management

In preparing its seasonal watering proposal, Corangamite CMA considered and assessed risks and identified mitigating strategies relating to the implementation of environmental watering. Risks and mitigating actions are continually reassessed by program partners throughout the water year (see section 1.4.4).

Engagement

The Corangamite CMA has engaged with key internal and external stakeholders and other relevant individuals in preparing the seasonal watering proposal for the Lower Barwon wetlands. These stakeholders are listed in Table 3.6.3.

Seasonal watering proposals are informed by longer-term regional waterway strategies, environmental water management plans and environmental flow studies, which incorporate environmental, cultural, social and economic considerations.

Table 3.6.3 Key stakeholders engaged in the development of the Lower Barwon wetlands seasonal watering proposal

Stakeholder engagement
▸ Commercial eel fishers ▸ Department of Economic Development, Jobs, Transport and Resources (formerly DEPI Fisheries) ▸ Department of Environment, Land, Water and Planning ▸ Local landowners ▸ Lower Barwon Community Advisory Committee (with representatives of Field and Game Geelong Branch, Geelong Environment Council, Geelong Field Naturalists Club, Geelong Gun and Rod Association, Federation University, RMIT University, local landowners, community members, local commercial eel fishing licence holders, Parks Victoria, DELWP and VEWH plus additional invitees from the Department of Economic Development, Jobs, Transport and Resources and Environment Victoria ▸ Minister for Environment, Climate Change and Water, members for South Barwon and Bellarine, members for Western Victoria Region ▸ Parks Victoria ▸ Scientific and engineering consultants ▸ Victorian Environmental Water Holder

Reedy Lake, by the VEWH

Hospital Swamps, by Corangamite CMA