SECTION 2:
Gippsland region

2.1 Gippsland region overview

The systems in the Gippsland region that can receive water from the VEWH's environmental entitlements are *Durt-Yowan* (Latrobe River), lower Latrobe wetlands, *Carran Carran* (Thomson River), Heyfield wetlands and *Wirn wirndook Yeerung* (Macalister River). The Snowy River also receives an environmental flow, which the New South Wales Department of Climate Change, Energy, the Environment and Water manages.

Environmental values, objectives, and planned actions for delivering water for the environment for each system in the Gippsland region are presented in the system sections that follow.

Traditional Owners in the Gippsland region

Traditional Owners in the Gippsland region have a deep connection to Country that has endured for tens of thousands of years. This includes inherent rights and cultural obligations to Country and community.

The Gunaikurnai Land and Waters Aboriginal Corporation (GLaWAC), on behalf of the Gunaikurnai people, holds native title, has a Recognition and Settlement Agreement with the Victorian Government and is a Registered Aboriginal Party (RAP) (through the *Commonwealth Native Title Act 1993*, the *Victorian Traditional Owner Settlement Act 2010* and the *Victorian Aboriginal Heritage Act 2006*). Gunaikurnai Country extends over an area from Warragul in the west to the Snowy River in the east and from the Great Dividing Range in the north to the coast in the south. This area includes *Durt-Yowan* (Latrobe River), *Carran Carran* (Thomson River), *Wirn wirndook Yeerung* (Macalister River), the lower Latrobe wetlands and west of the Snowy River covered by this section of the seasonal watering plan

Other RAPs in the Gippsland region are the Bunurong Land Council Aboriginal Corporation and Wurundjeri Woi Wurrung Cultural Heritage Aboriginal Corporation. Their RAP boundaries do not extend to the waterways managed with water for the environment in the Gippsland region.

Traditional Owners with links to the Snowy River system include the Gunaikurnai, Monero Ngarigo and Bidawal peoples.

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

Engagement

Engagement with Traditional Owners, stakeholders, and local communities informs the environmental watering program. Program partners engage in extensive engagement at the local level to understand community priorities for the delivery of water for the environment in the coming year.

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

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

Table 2.1.1 Program partners and stakeholders that engaged with the West Gippsland CMA to develop seasonal watering proposals and key documents informing the proposals for the Latrobe, lower Latrobe wetlands, Thomson and Macalister systems and other key foundation documents that directly informed the proposals (in alphabetical order)

	Latrobe system	Lower Latrobe wetlands	Thomson system	Macalister system
Community groups and environment groups	• Friends of Latrobe Water • Friends of Tyers Park • Greening Australia • Trust for Nature	• Birdlife Australia • Latrobe Catchment Landcare Network • Latrobe Valley Field Naturalist Club Inc. • Trust for Nature • WaterWatch Volunteers	• Heyfield Wetlands Committee of Management	• EcoGipps • Friends of Bellbird Corner • Greening Australia • Native Fish Australia
Government agencies	• Gippsland Water • Southern Rural Water • Victorian Environmental Water Holder	• Department of Energy, Environment and Climate Action • East Gippsland CMA • Parks Victoria • Victorian Environmental Water Holder	• Gippsland Water • Melbourne Water • Southern Rural Water • Victorian Environmental Water Holder	• Gippsland Water • Southern Rural Water • Victorian Environmental Water Holder
Landholders/ farmers	• Individual landholders and irrigators • Latrobe River Irrigators	• Field & Game Australia (Heart Morass) • Individual landholders	• Individual irrigators • Individual landholders	• Individual landholders • Macalister Irrigation District irrigators/ diverters
Local businesses		• Frog Gully Cottages • Port of Sale Heritage River Cruises		

	Latrobe system	Lower Latrobe wetlands	Thomson system	Macalister system
Recreational users	• Recreational users • VRFish	• Field & Game Australia (Dowd Morass and Sale Common) • Recreational users	• Recreational fishing community • Recreational users • VRFish • Whitehorse Canoe Club	• Recreational users • VRFish
Technical experts	• Arthur Rylah Institute		• Arthur Rylah Institute	• Arthur Rylah Institute
Traditional Owners	• Gunaikurnai Land and Waters Aboriginal Corporation	• Gunaikurnai Land and Waters Aboriginal Corporation	• Gunaikurnai Land and Waters Aboriginal Corporation	• Gunaikurnai Land and Waters Aboriginal Corporation

Integrated catchment management

Altered water regimes are one of many threats to the health of Victoria's waterways. Many of the environmental objectives of water for the environment in the Gippsland region are complemented by simultaneously addressing issues such as barriers to fish movement, high nutrient loads, loss of streambank vegetation and invasive species.

Victorian and Commonwealth government agencies, Traditional Owner groups, community groups and private landholders implement programs to protect and improve the environmental condition and function of land, soils and waterways throughout Victoria's catchments.

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

- works to protect and enhance stream banks along priority reaches of rivers and their tributaries, including fencing to exclude stock, revegetation of riverbanks, willow removal and erosion control
- work with farmers along the Thomson and Macalister rivers on grazing and soil management and on nutrient and water-use efficiency projects that help to improve water quality and river health
- construction of a fishway on the Thomson River to improve fish passage near the heritage-listed Horseshoe Bend Tunnel, completed in August 2019. The fishway now allows Australian grayling (specifically targeted with releases of water for the environment) and other migratory fish to access over 200 km of river habitat from the upper reaches of the Aberfeldy River down to the Latrobe River
- construction of a fishway on the Macalister River to allow fish passage through the Maffra Weir, due to commence in 2024.

For more information about integrated catchment management programs in the Gippsland region, refer to the West Gippsland and East Gippsland regional catchment strategies and regional waterway strategies.

Risk management

When developing seasonal watering proposals for the Latrobe, Thomson and Macalister systems, environmental watering program partners assessed risks associated with the potential delivery of water for the environment in 2024-25 and identified appropriate mitigating strategies. Risks and mitigating actions are continually assessed by program partners throughout the year (see **subsection 1.2.7**).

In the Snowy system, when weather conditions increase the risk of flooding, the New South Wales Department of Climate Change, Energy, the Environment and Water works with the Bureau of Meteorology, the East Gippsland CMA, New South Wales State Emergency Service and the VEWH to inform the community about the management of planned releases. Releases may be cancelled or rescheduled to limit flood impacts on private land.

Seasonal outlook 2024-25

A fourth consecutive year of above-average rainfall across the west Gippsland region triggered floods throughout the Latrobe, Thomson and Macalister systems during 2023-24. The largest event occurred in early October 2023, when heavy rainfall over two days at Glenmaggie caused major flooding downstream of the weir. Parts of the catchment received more than twice their average rainfall during December 2023 and January 2024, and Thomson Dam spilled for the second consecutive year and only the second time since 1996. Rainfall in east Gippsland during 2023-24 was closer to the long-term average, with no significant floods. Temperatures throughout the Gippsland region were very much above average during 2023-24.

Delivery of water for the environment in rivers and wetlands within the West Gippsland CMA region was managed in line with the wet planning scenarios in 2023-24, and all planned watering actions were achieved. Natural flow from spilling reservoirs and local catchment run-off met most of the planned watering actions during the year. Water for the environment was used to supplement the winter/spring low flow and deliver a spring fresh in the Thomson River to help fish and other animals move freely between different habitats. Water for the environment was not needed in the Macalister River or the Latrobe River from July 2023 to early autumn 2024 because the natural flow met or exceeded flow recommendations. Still, drier conditions in late summer and autumn 2024 meant some water for the environment was used to supplement the low flow and deliver autumn freshes in the Macalister system. The three lower Latrobe wetlands (Sale Common, Dowd Morass and Heart Morass) were flushed by the natural flow for a third consecutive year, and salinity levels in Lake Wellington remain low. Water for the environment was used to partially fill Heyfield wetlands in September 2023, but those deliveries ceased at the start of October when natural inflows filled the site.

The Snowy River received high allocations of water for the environment for the third consecutive year. Releases from Lake Jindabyne were used to mimic seasonal snow melt patterns to enhance the river's environmental and physical conditions.

The Bureau of Meteorology has forecast average rainfall and above-average temperatures for the Gippsland region during winter 2024. High storage levels mean the risk of flooding remains for the Gippsland region in the first half of 2024-25. It also means there will be high allocations to environmental entitlements in the Gippsland systems. Forecast allocations and remaining carryover volumes should be sufficient to deliver planned watering actions in all climate scenarios during 2024-25.

The environmental watering program in the Gippsland region aims to maintain enough flow in dry times to minimise stresses on existing plant and animal populations and deliver greater flows in wetter conditions to enhance the condition of and increase recruitment in those populations. Over the last four years, wet conditions have resulted in strong native fish recruitment in all the Gippsland systems that receive water for the environment. While certain flows may be delivered at a lower magnitude in drier climate scenarios in 2024-25, the forecast high water availability means there should be sufficient supply in all planning scenarios to deliver the flows required to consolidate the last four years' environmental gains and support additional recruitment. Efforts to boost migratory fish populations in the Latrobe, Thomson and Macalister rivers are particularly important because the larvae and juveniles of these species spend time in the ocean and can subsequently colonise other coastal rivers. Increasing the total number of larvae and juveniles in waters along the Gippsland coast may help recover native fish populations in river systems that were affected by the 2019-20 bushfires.

Delivery of water for the environment in the lower Latrobe wetlands in 2024-25 will aim to consolidate and, where possible, improve the

environmental gains of the last four years. This will involve keeping Sale Common, Dowd Morass and Heart Morass at least partially full during winter and spring and allowing a natural partial drawdown during the warmer months in all climate scenarios.

The water year for the Snowy system starts in May and finishes in April the following year, which differs from how water is managed in the other Gippsland systems. In March 2024, the Snowy Advisory Committee endorsed the total volume for release and daily release targets for the Snowy River from May 2024 to April 2025. The agreed daily releases will not vary unless the flow increases the risk of flooding downstream or operational constraints prevent delivery.

2.2 Latrobe system

Waterway manager – West Gippsland Catchment Management Authority

Storage manager – Southern Rural Water

Environmental water holder – Victorian Environmental Water Holder

The Latrobe system includes *Durt-Yowan* (Latrobe River) and lower Latrobe wetlands: Sale Common, Heart Morass and Dowd Morass.

2.2.1 Latrobe River

System overview

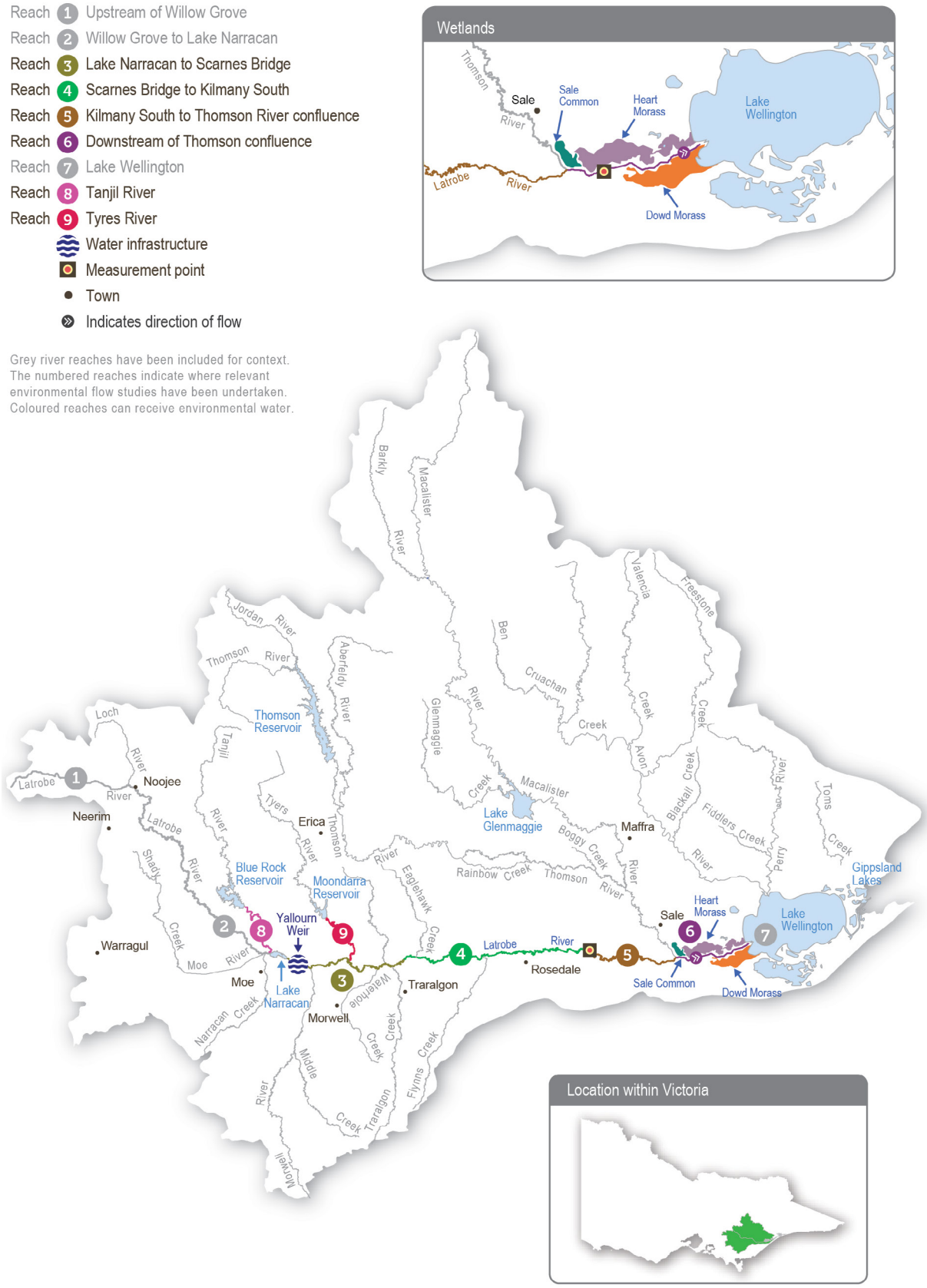
***Durt-Yowan* (Latrobe River) originates near the Baw Baw Plateau and passes through relatively flat to undulating plains, largely cleared for agriculture, before flowing into Lake Wellington (the westernmost point of the Gippsland Lakes) (Figure 2.2.1). Notable tributaries include the Tanjil River, Narracan Creek, Morwell River, Tyers River, Traralgon Creek and *Carran Carran* (Thomson River).**

Water for the environment is supplied to the Latrobe River from Blue Rock Reservoir on the Tanjil River. Blue Rock Reservoir also supplies water for irrigation, urban supply, electricity generators and a paper mill in the Latrobe Valley.

The Latrobe River from Kilmany to the Thomson River confluence (reach 5) is a high-priority reach for delivering water for the environment because it contains endangered plant communities with good potential for rehabilitation. Capacity constraints within reach 5 mean that some of the larger freshes required to meet environmental objectives in reaches 4, 5 and 6 cannot be delivered without flooding private land. Until this can be resolved, environmental flows will be managed to within-channel levels. Where possible, flows in the Latrobe River are coordinated with freshes in the Thomson River to meet targets for the Latrobe River estuary.

Options to deliver water for the environment to the Latrobe River via the Tyers River may be investigated in 2024-25. These options include a physical transfer of water from Blue Rock Reservoir to Moondarra Reservoir via existing infrastructure operated by Gippsland Water or a temporary administrative transfer arrangement. Delivering water via the Tyers River would increase the proportion of the Latrobe catchment that could receive water for the environment without compromising outcomes in the main target reaches of the Latrobe River. If adopted, these options are expected to benefit native in-stream and streamside vegetation and non-migratory fish within the Tyers River.

Figure 2.2.1 The Latrobe system



Environmental values

The upper reaches of the Latrobe River flow through state forest and are relatively intact and ecologically healthy. They have continuous stands of river red gums and intact streamside vegetation, and they support native animals, including barred galaxias, river blackfish, Gippsland spiny crayfish and nankeen night herons.

Below Lake Narracan, the Latrobe River is regulated and highly degraded due to historic river management practices. Most large woody habitat has been removed from the river, and many sections have been artificially straightened. These practices have caused significant erosion and widened the channel, reducing the quality and quantity of habitat for aquatic plants and animals.

There is endangered and vulnerable vegetation in all but the most modified sections of the Latrobe River. The banks along the lower reaches support stands of swamp scrub, characterised by swamp paperbark and tea tree. Mature river red gums grow adjacent to the lower Latrobe wetlands and provide nesting habitat for sea eagles and other birds of prey that hunt in the wetlands. The Latrobe River supports native estuarine and freshwater fish, including black bream, Australian bass, Australian grayling and short- and long-finned eel. The river also provides habitat and supports feeding and breeding conditions for platypus, rakali (water rats) and freshwater turtles.

The Latrobe River and its tributaries provide an essential source of freshwater to the Gippsland Lakes system, of which the lower Latrobe wetlands are an important component.

Environmental objectives in the Latrobe River

	F1 – Increase the native fish (migratory, resident and estuary) population
	**G1** – Increase in-stream geomorphic diversity
	**MI1** – Increase the abundance of all macro- and micro-invertebrates
	**PR1** – Increase the extent of platypus and rakali (water rat) populations
	**T1** – Maintain the abundance of the freshwater turtle population
	**V1** – Improve the condition and increase the extent and diversity of submerged, emergent and streamside native vegetation **V2** – Reduce the extent and density of invasive plants
	WQ1 – Avoid adverse water quality conditions (such as high salinity) in the lower reaches of the Latrobe River and its estuary

Traditional Owner cultural values and uses

The Gunaikurnai have had a continued connection to Country for tens of thousands of years, including with the waterways in the Latrobe system. For the Gunaikurnai as Traditional Owners, there are immense challenges to heal, protect and manage Country, which has been drastically altered since colonisation.

> "As Gunaikurnai, we see our land (*Wurruk*), waters (*Yarnda*), air (*Watpootjan*) and every living thing as one. All things come from *Wurruk*, *Yarnda* and *Watpootjan*, and they are the spiritual life-giving resources, providing us with resources and forming the basis of our cultural practices. We have a cultural responsibility to ensure that all of it is looked after."
>
> – *Water is Life: Traditional Owner Access to Water Roadmap 2022 - Gunaikurnai Nation Statement*

This cultural landscape is dependent on culture and Aboriginal management.

The objective for the Latrobe system is to provide and maintain healthy Country. Healthy Country includes the importance of place and the health of the entire ecosystem, including maintaining water quality, controlling pest species and maintaining a natural, seasonal flow regime and overbank flood events.

Water is Life acknowledged that cultural water is not environmental water. Until Traditional Owners manage cultural water flows, environmental objectives for the delivery of water for the environment should take a cultural landscape approach. Environmental watering requirements should therefore consider the following points to support cultural values and uses:

- collaboration with Gunaikurnai Land and Waters Aboriginal Corporation (GLaWAC) regarding the timing of the delivery of water for the environment to support a seasonal flow regime and wet and dry periods that embody healthy Country
- maintain freshwater supply to the *Durt-Yowan* (Latrobe River) estuary, Dowd Morass, Sale Common, Heart Morass and associated freshwater habitats
- provide connectivity between reaches and onto floodplains and maintaining water quality to support cultural values and uses of significance to the Gunaikurnai.

The Latrobe system supports many keystone species important to the Gunaikurnai. *Borun* (pelican) and *Tuk* (musk duck) are the father and mother in the Gunaikurnai creation story. If *Borun* and *Tuk* are living and breeding within the Latrobe system, it is a sign that Country is healthy. If they are not, flows should be provided to promote required habitat and ecosystem services. *Yeerung* and *Djeetgun* (fairy-wren) are also a totem species. While they are not considered water-dependent and environmental flows may not directly support them, a diversity of flows supporting shrubs and streamside vegetation will provide habitat for fairy-wren. For example, when flooding inundates wetlands, bush birds (including *Yeerung* and *Djeetgun* and other species) are known to increase in abundance and diversity.

Other birds are important for *woorngan* (hunting) and food, including *nalbong* (water hens), *gidai* (black swans), *boyangs* (eggs) and *koortgan* (ducks except for *tuk*). *Gidai* require submerged and softer emergent vegetation to make nest mounds, placing them on a small island or floating them in deeper water. *Gidai* breed in late winter to early spring after the water level rises. Actions that fill the large wetlands and support the growth of *loombrak* (water ribbon) and submerged aquatic plants will support *gidai*. Ensuring that the lower wetlands and floodplain depressions (for example, billabongs) receive freshwater flows in winter/spring will provide the conditions for submerged and emergent aquatic plants to grow and provide food and nesting materials for the waterbirds.

GLaWAC is developing a strategic Water Plan that aligns with the Gunaikurnai Whole-of-Country Plan. The Water Plan will consider:

- **healthy Country:** reflecting the spiritual and cultural values of the Gunaikurnai custodians; healthy Country contributes to the wellbeing of the Gunaikurnai
- **water access:** access to water is crucial for many cultural values, including identity and relational values, future economic values and place values, among many others. Access to water, through ownership or management, means that water is made available to the Gunaikurnai on the Latrobe and Thomson systems to provide freshwater to the wetlands. Every effort should be made to maintain freshwater-dependent values, which in turn deliver cultural values

- **cultural and economic use:** returning to cultural practices and Gunaikurnai-informed management at the lower Latrobe wetlands is key to returning to a more freshwater habitat for cultural uses and cultural species. It will also provide for water-based tourism, cultural education and ecotourism (camping) experiences
- **connection:** GLaWAC takes its responsibility to work closely with the people it represents on management decisions concerning Country and the health of Country very seriously. Gunaikurnai cultural obligations reflect Gunaikurnai views on healthy Country and, in turn, help the Gunaikurnai continue their ongoing connection to the land and waters of Country
- **climate change:** the Gunaikurnai have cared for Country for thousands upon thousands of years through many cycles of climatic change, and they understand how to manage the landscape as it too changes. When cared for using traditional knowledge, Country can be healed. Mitigation of climate change impacts affecting the lakes, rivers and other waterways of the lower Latrobe wetlands can be effective with resources and empowerment provided to the Gunaikurnai.

GLaWAC's Water team and engagement with Community through the completion of Aboriginal Waterway Assessments have played a vital role in understanding cultural water values. These engagement sessions will continue in 2024-25 and contribute to the development of the Water Plan, due by the end of 2025.

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

Social, recreational and economic values and uses

In planning the potential environmental watering actions in **Table 2.2.1**, the West Gippsland CMA considered how environmental flows could support values and uses, including:

- water-based recreation (such as fishing and water skiing)
- riverside recreation and amenity (such as birdwatching and game hunting)
- socioeconomic benefits (such as commercial fishing, tourism and improved water quality for domestic, irrigation and stock use).

Planned environmental flows may be modified to align with a community benefit so long as environmental outcomes are not compromised. The West Gippsland CMA works with the storage operator to ensure releases of water for the environment do not affect Lake Narracan's water levels during water skiing events held between January and March. This is acknowledged in **Table 2.2.1** with an icon (as explained in **Figure 1.2.3**).

Watering planned to support water sports activities (e.g. water skiing)

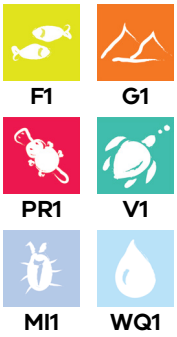
Scope of environmental watering

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

Table 2.2.1 describes the potential environmental watering actions in 2024-25, their expected watering effect (that is, the intended physical or biological effects of the watering action) and the longer-term environmental objectives they support. Each environmental objective relies on one or more potential environmental watering actions and their associated physical or biological effects.

Table 2.2.1 Latrobe River potential environmental watering actions, expected effects and environmental objectives

Potential environmental watering action	Expected watering effects	Environmental objectives
Latrobe River (targeting reach 5)		
Winter/spring low flow (620 ML/day during July to November 2024 and June 2025)	• Wet benches to maintain habitat, support the growth of emergent macrophyte vegetation and limit the encroachment of terrestrial vegetation • Maintain oxygen levels in pools and maintain sediment (sands and silts) in suspension to prevent pools from filling and depositing on substrates, helping to maintain habitat for waterbugs, turtles, aquatic mammals and breeding substrate for river blackfish • Maintain longitudinal connectivity to allow movement/dispersal of native fish, turtles, platypus and rakali (water rats)	F1, G1, PR1, T1, V1, V2, MI1, WQ1
Summer/autumn low flow (440 ML/day during December to May)	• Maintain an adequate depth in pool habitat to support native fish, turtles, platypus and rakali (water rats) and submerged vegetation • Limit encroachment by terrestrial vegetation and support the growth of emergent macrophyte vegetation • Mix pools to maintain oxygen levels suitable for aquatic animals	F1, PR1, T1, V1, V2, MI1, WQ1

Potential environmental watering action	Expected watering effects	Environmental objectives
Spring/summer/ autumn river freshes (five to nine freshes of 980 ML/day for one to five days during November to May)	Water-quality fresh (one-day duration): • freshen water quality in pools to support fish, waterbug and zooplankton communities • provide sufficient velocity to turn over and flush sediments (sands and silts) from pools, scour algae from hard surfaces and clean fine sediment from substrates, including river blackfish nesting habitats Fish and vegetation fresh (three to five days duration) • Objectives listed for the one-day fresh and additional objectives: – wet benches to support the growth of emergent macrophyte vegetation – provide longitudinal connectivity (including over benches for Australian grayling) for native fish, platypus and rakali (water rats)	
Latrobe River (targeting reach 6)		
Summer/autumn estuary fresh(es) (one to three freshes of 2,200 ML/day for seven to 10 days during December to May) Note: this is a combined magnitude with the Thomson River over the equivalent period; a contribution of at least 1,220 ML/day from the Thomson River is required	• Upper estuary: fully flush with freshwater to support submerged vegetation, provide adequate oxygen levels to support aquatic animals, transport silt, wet benches and deliver freshwater to connected wetlands • Mid-estuary: partially/fully flush the upper layer of the water column to improve water quality, support emergent macrophytes, provide freshwater habitat and associated food sources for freshwater fish and provide breeding opportunities for estuary fish • Lower estuary: partially flush the upper layer of the water column; a flow of this magnitude will also provide opportunities to fill the lower Latrobe wetlands	

Scenario planning

Table 2.2.2 outlines potential environmental watering and expected water use in a range of planning scenarios. Multiple flood events occurred in the Latrobe catchment during spring and summer 2023-24, which resulted in the flow exceeding 5,000 ML per day at Kilmany on at least four occasions and kept large parts of the Latrobe River floodplain inundated for many months. These floods, combined with three previous wet years, have meant the Latrobe River estuary and the lower Latrobe wetlands continue to be the freshest they have been for many years. This has improved the condition and extent of streamside and wetland vegetation across the system. Maintaining this level of freshness in the Latrobe River estuary on the back of four wet years to improve vegetation condition will again be a high priority in 2023-24. As seen over the past four years, natural tributary inflows are likely to achieve most of the planned watering actions in wetter planning scenarios, so all tier 1 actions proposed in the average and wet planning scenarios can be achieved with the available supply. High volumes of water carried over into 2024-25 also means that tier 1 actions proposed in the drought and dry planning scenarios can be achieved with the available supply.

Maintaining target low flows throughout the year to provide habitat for native fish, turtles, platypus and rakali (water rats) and support vegetation growth are high priorities in all planning scenarios. Delivering spring/summer/autumn freshes to reach 5 and the estuary is also a high priority in all planning scenarios to maintain water quality, provide specific opportunities for fish movement and consolidate environmental gains in the Latrobe River estuary associated with multiple years of wet conditions.

The freshes will be delivered at the recommended magnitude where possible, but four consecutive years of high overbank flows have changed the geomorphology of the lower reaches of the Latrobe River, and it is uncertain whether the recommended flow rates will still achieve their intended physical and biological effects. There is also a risk that some of the larger freshes may exceed the channel capacity in the lower reaches and inundate parts of the adjacent floodplain. The West Gippsland CMA is undertaking monitoring to assess the channel capacity of the lower reaches of the Latrobe River and will adjust the size of planned freshes if needed to avoid flooding private land.

Freshes with larger magnitudes and longer durations (up to 10 days) may be coordinated with the flow in the Thomson River in all planning scenarios to meet environmental flow objectives in the Latrobe River estuary (reach 6). Summer/autumn estuary freshes also achieve the objectives of river freshes in reach 5 and will likely be met naturally in the wet and possibly average planning scenarios. In the drier planning scenarios, estuary freshes are achieved by extending the duration of summer/autumn river freshes.

Most of the recommended flows are likely to be fully achieved through a combination of natural events, operational releases, passing flows and environmental deliveries in the average and wet planning scenarios. There will be less natural inflow and lower operational releases in the drought and dry planning scenarios, and available water for the environment will be used to deliver low flows and freshes at their lower recommended magnitude, duration and frequency to maintain rather than improve current environmental conditions in the Latrobe River. It is expected that even in the drought and dry planning scenarios, passing flows and natural inflows from unregulated tributaries will provide some flow through the system during winter and spring.

There are no true carryover provisions in the Latrobe system. Rather, the VEWH maintains an ongoing share of storage capacity in Blue Rock Reservoir. It will be important to ensure a minimum of 5,000 ML is maintained in storage at the end of 2024-25 in drought or dry conditions and 3,000 ML in average conditions to help deliver critical watering actions in early 2025-26.

Table 2.2.2 Latrobe River environmental watering planning scenarios

Planning scenario	Drought	Dry	Average	Wet
Expected conditions	• Small contributions to low flows from unregulated reaches and tributaries • Passing flows likely reduced over summer/ autumn	• Possible spills from storages in spring, minor flood levels may occur • Some natural flows contributing to low flows and freshes • Passing flows likely reduced over summer	• Regular spills from storages in spring and minor to moderate flood levels may occur • Natural flow and/or passing flows likely to meet low-flow requirements	• Large and frequent spills from storages and moderate to major flood levels may occur • Natural flow and/or passing flows likely to meet low-flow requirements
Expected availability of water for the environment	• 25,800 ML	• 28,400 ML	• 31,500 ML	• 36,200 ML
Latrobe River				
Potential environmental watering – tier 1 (high priorities)	**Tier 1a (can be achieved with predicted supply)**			
	• Winter/spring low flow • Summer/ autumn low flow • Summer/ autumn river freshes (four of lower duration and one of mid-duration [four days]) • Summer/ autumn estuary freshes (two of lower duration)	• Winter/spring low flow • Summer/ autumn low flow • Summer/ autumn river freshes (five of lower duration and two of mid-duration [three days]) • Summer/ autumn estuary freshes (two of upper duration)	• Winter/spring low flow • Summer/ autumn low flow • Summer/ autumn river freshes (six of lower duration and three of mid-duration [four days]) • Summer/ autumn estuary freshes (three of upper duration)	• Winter/spring low flow • Summer/ autumn low flow • Summer/ autumn river freshes (six of lower duration and three of upper duration [five days]) • Summer/ autumn estuary freshes (three of upper duration)
Possible magnitude of water for the environment required to achieve objectives	• 16,400-20,600 ML (tier 1a)	• 16,900-22,100 ML (tier 1a)	• 22,700-30,200 ML (tier 1a)	• 15,800-35,600 ML (tier 1a)
Priority carryover requirements for 2025-26	• 5,000 ML		• 3,000 ML	• 0 ML

2.2.2 Lower Latrobe wetlands

System overview

The lower Latrobe wetlands (Dowd Morass, Heart Morass and Sale Common) are an important component of the internationally recognised Gippsland Lakes Ramsar site and provide habitat for waterbirds of state, national and international conservation significance. The wetlands are located on the floodplain of *Durt-Yowan* (Latrobe River) between its confluence with *Carran Carran* (Thomson River), and they form part of the Gippsland Lakes system.

River regulation and water extraction from the Latrobe, Thomson and Macalister rivers have reduced the frequency of small and medium-sized floods that naturally wet the lower Latrobe wetlands. The construction of levees and drains and the filling of natural depressions have also altered water movement into and through the wetlands. The drainage and flooding regime in all three wetlands is now managed to some extent with regulators connected to the Latrobe River.

Environmental values

Sale Common is one of only two remaining freshwater wetlands in the Gippsland Lakes system. It provides sheltered feeding, breeding and resting habitat for various waterbird species, including the Australasian bittern.

Dowd Morass is a large, brackish wetland that regularly supports rookeries of colonial nesting waterbirds, including Australian white ibis, straw-necked ibis, little black and little pied cormorants, royal spoonbills and great egrets.

Heart Morass is also a large brackish wetland, with open expanses providing shallow feeding habitat for waterbirds, including black swans, Eurasian coots and various duck species. The lower Latrobe wetlands function as a diverse and complementary environmental system. Colonial nesting waterbirds breed among swamp paperbark trees at Dowd Morass in spring. Migratory shorebirds feed on the mudflats that are exposed as the wetlands draw down and dry over the summer. Waterfowl and fish-eating birds use open-water habitat at the wetlands year-round. The wetlands also support threatened vegetation communities, including swamp scrub, brackish herbland and aquatic herbland.

Environmental objectives in the lower Latrobe wetlands

	A1 – Maintain the abundance of the frog population
	**CN1** – Enable carbon and nutrient cycling between the wetland and river through connectivity
	**T1** – Maintain the abundance of the freshwater turtle population
	**V1** – Maintain the diversity, condition and/or extent of native streamside vegetation fringing wetlands and the variety of self-sustaining submerged and emergent aquatic vegetation types **V2** – Discourage the introduction and reduce the extent and density of undesirable/invasive plants (Sale Common)
	**B1** – Enhance waterbird breeding, recruitment, foraging and sheltering opportunities
	**MI1** – Maintain the abundance of all macro- and micro-invertebrates
	WQ1 – Provide suitable physio-chemical conditions to support aquatic life **WQ2** – Avoid catastrophic water quality conditions (i.e. avoid acid sulfate soil exposure [Heart Morass] or dilute salt concentrations [Dowd Morass])

Traditional Owner cultural values and uses

The lower Latrobe wetlands are a place of spiritual and cultural connection for the Gunaikurnai people. Over many thousands of years, customs and lore have been passed orally between generations about the cultural values and uses of the wetlands and their importance to all Gunaikurnai people. The wetlands are on the lands of the Brayakaulung clan of the Gunaikurnai.

For the Gunaikurnai, the overarching objective for the wetlands is to provide and maintain healthy Country. Healthy Country includes the importance of place and the health of the entire ecosystem, including maintaining water quality, controlling pest species and maintaining a natural, seasonal flow regime and overbank flood events.

Water is Life acknowledged that cultural water is not environmental water. Until Traditional Owners manage cultural water flows, environmental objectives for the delivery of water for the environment for the lower Latrobe wetlands should take a cultural landscape approach. Environmental watering requirements should therefore consider the following points to support cultural values and uses:

- collaboration with GLaWAC regarding the timing of the delivery of water for the environment to support a seasonal flow regime and wet and dry periods that embody healthy Country
- maintain freshwater supply to the *Durt-Yowan* (Latrobe River) estuary, Dowd Morass, Sale Common, Heart Morass and associated freshwater habitats
- provide connectivity between reaches and onto floodplains and maintaining water quality to support cultural values and uses of significance to the Gunaikurnai.

The lower Latrobe wetlands support many keystone species important to the Gunaikurnai. *Borun* (pelican) and *Tuk* (musk duck) are the father and mother in the Gunaikurnai creation story. If *Borun* and *Tuk* live and breed within the wetlands, it is a sign that Country is healthy. If they are not, flows should be provided to promote required habitat and ecosystem services. *Yeerung* and *Djeetgun* (fairy-wren) are also a totem species. While they are not considered water-dependent and environmental flows may not directly support them, a diversity of flows supporting shrubs and streamside vegetation will provide habitat for fairy-wren. For example, when flooding inundates wetlands, bush birds (including *Yeerung* and *Djeetgun* and other species) are known to increase in abundance and diversity.

Other birds are important for *woorngan* (hunting) and food, including *nalbong* (water hens), *gidai* (black swans), *boyangs* (eggs) and *koortgan* (ducks except for *tuk*). *Gidai* require submerged and softer emergent vegetation to make nest mounds, placing them on a small island or floating them in deeper water. *Gidai* breed in late winter to early spring after the water level rises. Actions that fill the large wetlands and support the growth of *loombrak* (water ribbon) and submerged aquatic plants will support *gidai*. Ensuring that the lower wetlands and floodplain depressions (for example, billabongs) receive freshwater flows in winter/spring will provide the conditions for submerged and emergent aquatic plants to grow and provide food and nesting materials for the waterbirds.

GLaWAC is developing a strategic Water Plan that will align with the Gunaikurnai Whole-of-Country Plan. The plan is due to be completed by the end of 2025. Until then, GLaWAC and the West Gippsland CMA will continue to explore opportunities to align environmental flows with Gunaikurnai outcomes in the lower Latrobe wetlands. A joint GLaWAC WGCMA hosted Community event is planned for the end of 2023-24. Additional on-Country Community events will occur in 2024-25, including an event to coincide with the delivery of water for the environment, and it will involve water quality and fish monitoring.

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

Social, recreational and economic values and uses

In planning the potential environmental watering actions in **Table 2.2.3**, the West Gippsland CMA considered how environmental flows could support values and uses, including:

- water-based recreation (such as canoeing and fishing)
- riverside recreation and amenity (such as birdwatching, bushwalking, camping and duck hunting)
- socioeconomic benefits (such as commercial eel and carp fishing and tourism).

Scope of environmental watering

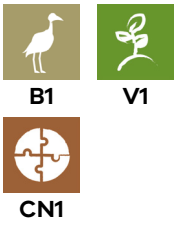
The term 'environmental watering' refers to the active delivery of held environmental water to support particular environmental objectives by altering the flow in a river or water level in a wetland. While other terms are sometimes used to describe the delivery of environmental water, 'environmental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

Table 2.2.3 describes the potential environmental watering actions in 2024-25, their expected watering effect (that is, the intended physical or biological effects of the watering action) and the longer-term environmental objectives they support. Each environmental objective relies on one or more potential environmental watering actions and their associated physical or biological effects.

Table 2.2.3 Lower Latrobe wetlands potential environmental watering actions, expected effects and environmental objectives

Potential environmental watering action	Expected watering effects	Environmental objectives
Dowd Morass		
Top-up (any time, following bird breeding event if required)	• Prolong wetting of reed beds to maintain habitat and food resources for waterbirds and protect chicks from predators, following an observed breeding event	B1
Fill to control salinity (anytime)	• Dilute salt concentrations within the wetland that may be caused by king tides from Lake Wellington (likely occurring between March to May) or other sources • This watering action is likely to be triggered if electrical conductivity rises above 7,000 µS/cm	WQ2
Partial fill (with top-ups as required to maintain a water depth of 0.3 m AHD during July to December 2024 and April to June 2025)	• Provide seasonal variation in water depth throughout the wetland to encourage the growth and flowering of semi-aquatic plants. • Wet vegetation and soils at middle elevations within the wetland to increase the abundance of waterbugs and other food resources for frogs, turtles and waterbirds • Provide connectivity between the river and wetlands and between wetlands, increasing available habitat for frogs and turtles • Encourage bird breeding (when delivered in spring/early summer following earlier fill) by maintaining wetted habitat around reed beds	A1, MI1, V1, B1, T1

Potential environmental watering action	Expected watering effects	Environmental objectives
Fill (with top-ups as required to maintain a water depth of 0.6 m AHD during August to November)	• Wet reed beds and deep water next to reedbeds to provide waterbird nesting habitat and stimulate bird breeding • Wet high-elevation banks and the streamside zone to support the growth of vegetation, creating nesting habitat for waterbirds • Wet vegetation and soils at higher elevations to stimulate ecosystem productivity and increase the abundance of waterbugs and other food resources for frogs, turtles and waterbirds • Provide connectivity between the river and wetlands and between wetlands, increasing available habitat and food resources for frogs and turtles • Reduce the impact of saltwater incursion from Lake Wellington	A1  T1 WQ1  B1  V1
Partial drawdown (during January to March)	• Oxygenate sediments to enable aquatic vegetation to germinate and recruit • Provide water level fluctuations for emergent vegetation reproduction and expansion (particularly swamp scrub and tall marsh) • Break down organic matter and promote nutrient cycling • Expose mudflats and create shallows to facilitate waterbird foraging	 B1  V1  CN1
Heart Morass		
Top-up to permanently maintain water level above -0.3 m AHD (anytime)	• Minimise the risk of acid sulfate soils developing by keeping known high-risk areas wet • Respond to decreasing pH from the rewetting of exposed acid sulfate soils, most likely during high-wind events • Dilute salt concentrations within the wetland that king tides from Lake Wellington or other sources may cause. This watering action is likely to be triggered if wetland overtopping appears likely, based on rising water levels at Lake Wellington reaching or exceeding +0.5 m AHD	WQ2
Top-up (anytime up to 0.5 m AHD, following bird breeding event if required)	• Prolong wetting of reed beds to maintain habitat and food resources for waterbirds and protect chicks from predators, following an observed breeding event	 B1

Potential environmental watering action	Expected watering effects	Environmental objectives
Fill and partial flushing flow (during July to November)	• Wet high-elevation banks and streamsides to support the growth of vegetation, create nesting and foraging habitat for waterbirds and provide food resources for terrestrial birds • Provide connectivity between the river and wetlands and between wetlands, increasing available habitat and providing food resources for frogs and turtles • Export accumulated salts and sulfates and transport nutrients, dissolved organic carbon and seeds between the Latrobe River and Heart Morass	
Partial fill (with top-ups as required to maintain a minimum water depth of 0.3 m AHD during August to December)	• Support the growth and flowering of semi-aquatic plants • Provide appropriate wetland fringing habitat for frogs and turtles • Provide conditions that support waterbug communities and food resources for frogs, turtles and waterbirds	
Partial drawdown (during January to March)	• Oxygenate sediments to enable aquatic vegetation to germinate and recruit • Provide water level fluctuations for emergent vegetation reproduction and expansion (particularly swamp scrub and tall marsh) • Break down organic matter and promote nutrient cycling • Expose mudflats and create shallows to facilitate waterbird foraging	
Sale Common		
Top-up (anytime, following bird breeding event if required)	• Prolong the wetting of reed beds to maintain habitat and food resources for nesting waterbirds and protect chicks from predators	
Partial fill with top-ups as required to maintain a minimum water height of 0.3 AHD (July to December)	• Encourage the growth and flowering of semi-aquatic plants • Provide appropriate wetland habitat for frogs and turtles • Provide conditions that support waterbug communities and food resources for waterbirds	

Potential environmental watering action	Expected watering effects	Environmental objectives
Fill (with top-ups as required during August to November to maintain a water depth of 0.4 m AHD for two months)	• Wet the outer boundaries of the wetland to support the growth and flowering of streamside and fringing wetland plants, increasing foraging opportunities for waterbirds • Encourage bird and turtle breeding by providing nesting habitat • Provide connectivity between the river and wetlands and increase habitat and feeding opportunities for frogs and turtles	A1  T1  B1  V1
Trigger-based fill or top-up to 0.5 m AHD (during December to January) *Trigger: requirement to drown out invasive vegetation*	• Wet key habitats within the wetland for a sufficient duration to discourage invasive plants, particularly the excessive spread of giant rush	 V2
Partial drawdown (during January to March)	• Oxygenate sediments to enable aquatic vegetation germination and recruitment • Provide fluctuations in water levels so emergent vegetation (particularly swamp scrub and tall marsh) can reproduce and expand • Break down organic matter and promote nutrient cycling • Expose mudflats and create shallows to facilitate waterbird foraging	 B1  V1  CN1

Scenario planning

Table 2.2.4 outlines potential environmental watering and expected water use in various planning scenarios.

Wet conditions over the last four years have caused natural flooding and flushing flows through all of the lower Latrobe wetlands, which have improved the condition and extent of most native wetland vegetation and triggered significant waterbird breeding. The main environmental watering priorities in 2024-25 will be partially filling each wetland in winter/spring to prevent complete drying over summer and autumn. The proposed watering actions aim to consolidate environmental outcomes from the past four wet years and build ecosystem resilience ahead of future dry periods. The wetlands can only be filled when water levels and water quality in the lower reaches of the Latrobe River are suitable. Therefore, the timing and extent of water delivery will be influenced by natural climatic conditions and flow in the Latrobe River. Only partial fills will likely be possible in the drought planning scenario, and natural overbank floods are likely at any time of year in the wet planning scenario. Trigger-based inflows to address a potential acid sulfate soil risk, support a natural waterbird breeding event or control invasive vegetation will be delivered when needed and possible, even if the timing of these actions compromises other planned wetting or partial drawdown events. Specific watering plans for each wetland in different planning scenarios are described below.

Dowd Morass

The plan at Dowd Morass is to maintain the water level above 0.3 m AHD from July to December 2024 and April to June 2025 and allow the wetland to partially draw down (without completely drying) between January and March 2025. This proposed watering regime will provide sufficient variation in the water level to support the needs of a range of vegetation communities within and beside the wetland and provide habitat and food for native frogs, turtles and waterbirds. After several wet years, the partial drawdown over summer will be important to facilitate carbon and nutrient

cycling in drying soils and provide foraging habitat for wading shorebirds. It was previously thought that prolonged inundation was causing stress and dieback of the swamp paperbark trees, but investigations have shown that their poor condition is due to infestations of sawfly larvae on the plants. These natural infestations have likely been exacerbated by cooler-than-normal temperatures allowing the invertebrate to proliferate. Therefore, more extensive wetland drying is not considered necessary. Warmer temperatures, experienced in mid-to-late summer, caused extensive mortality of the larvae and defoliation was reduced. Recovery of the affected plants is highly probable without any management intervention.

The proposed watering regime described above may need to be modified if wet conditions naturally fill the wetlands or additional water is needed to support a large waterbird breeding event or dilute saline water from king tides. Completely filling Dowd Morass is a lower priority in 2024-25 because multiple natural floods have met the environmental objectives for this action in recent years.

Heart Morass

Acidity and salination represent a high risk to environmental values at Heart Morass,and maintaining water levels above -0.3 m AHD at all times is a high priority to avoid exposing potential acid sulfate soils. Heart Morass has filled and fully flushed in each of the last three years, removing accumulated salts and sulfides and reducing the immediate risk of acid sulfate soils. Filling and providing flushing flows through the wetland are a low priority in 2024-25 but may still be considered in all planning scenarios if they can be delivered in combination with a natural flood to lower the risk of acid sulfate soils occurring in subsequent years.

The preferred watering strategy in all planning scenarios involves partially filling the wetland from winter to early summer and maintaining the water level above -0.3 m AHD for the rest of the year. The partial fill in winter and spring will support established wetland plant communities and increase the available habitat and food for frogs, turtles and waterbirds. Allowing the wetland to partially draw down through summer and autumn is a high priority in all planning scenarios, although a partial drawdown may be compromised by natural inflows in the average-to-wet planning scenarios. The partial drawdown aims to expose shoreline habitat to increase the diversity of vegetation communities, allow nutrient cycling and provide foraging habitat for shorebirds.

Sale Common

The plan for Sale Common is to partially fill the wetland in winter and provide top-ups as needed to maintain the water level above 0.3 m AHD throughout the year, which will wet about half of Sale Common. Maintaining at least a partial fill is considered ecologically important to support wetland plant communities and provide habitat for frogs, turtles and waterbirds. Completely filling the wetland is a low priority in 2024-25 because it has filled naturally in each of the past four years.

Allowing the wetland to partially draw down naturally over the warmer months to promote the germination of emergent vegetation is a high priority in all planning scenarios, although there may be a limited drawdown in the average and wet planning scenarios. A managed drawdown (by opening regulator gates) of Sale Common is not proposed in 2024-25 because the risk and benefit assessment identified that while the risk to native fish is negligible (due to the proximity of the wetland, other refuge areas and the types of plants and animals that the wetland regularly supports), there is an increased risk of the expansion of giant rush in the wetland. Giant rush has established in the wetland and is difficult to control. There is a risk that if a prolonged wetland inundation does not immediately follow the managed drawdown, the giant rush will further expand. For these reasons, a natural drawdown was considered a lower risk than a managed drawdown, but it may be replaced by a top-up in December or January if monitoring indicates higher water levels are needed to prevent further expansion of the giant rush.

Table 2.2.4 Lower Latrobe wetlands environmental watering planning scenarios

Planning scenario	Drought	Dry	Average	Wet
Expected conditions	• No natural inflow from the Latrobe River, and wetlands are likely to be dry completely	• Minor natural inflow from the Latrobe River in winter/spring; expect moderate to substantial drying in summer	• Moderate winter/spring flow in the Latrobe River is likely to fill or partially fill the wetlands; expect minor drying in summer	• Major flow in the Latrobe River in winter/spring and possibly autumn/winter is likely to fill all wetlands with very little drying in summer
Dowd Morass				
Potential environmental watering – tier 1 (high priorities)	• Top-up (any time following bird breeding) • Fill (any time to control salinity) • Partial fill (with top-ups as required to 0.3 m AHD during July to December 2024 and April to June 2025) • Partial drawdown (during January to March)			
Potential environmental watering – tier 2 (additional priorities)	• Fill (with top-ups as required during August to November)			
Heart Morass				
Potential environmental watering – tier 1 (high priorities)	• Top-up (any time to permanently maintain water level above -0.3 m AHD) • Top-up to 0.5 m AHD (anytime following bird breeding) • Partial fill (with top-ups as required during August to December) • Partial drawdown (during January to March)			
Potential environmental watering – tier 2 (additional priorities)	• Fill and partial flushing flow (during July to November)			
Sale Common				
Potential environmental watering – tier 1 (high priorities)	• Top-up (anytime following bird breeding) • Partial fill (with top-ups as required during July to December) • Trigger-based fill or top-up to 0.5 m AHD (during December to January, if required) • Partial drawdown through evaporation (during December to March)			
Potential environmental watering – tier 2 (additional priorities)	• Fill (with top-ups as required during August to November)			

2.3 Thomson system

Waterway manager – West Gippsland Catchment Management Authority

Storage manager – Melbourne Water (Thomson Reservoir), Southern Rural Water (Cowwarr Weir)

Environmental water holder – Victorian Environmental Water Holder

System overview

***Carran Carran* (Thomson River) flows from the slopes of the Baw Baw Plateau to join *Durt-Yowan* (Latrobe River) south of Sale (Figure 2.3.1). The major tributaries of the Thomson River are the Aberfeldy and Jordan rivers in the upper reaches and *Wirn wirndook Yeerung* (Macalister River) in the lowest reach. Two major structures regulate flow in the Thomson River: Thomson Reservoir — the largest water supply storage for metropolitan Melbourne — and Cowwarr Weir — a regulating structure that supplies irrigation water to parts of the Macalister Irrigation District.**

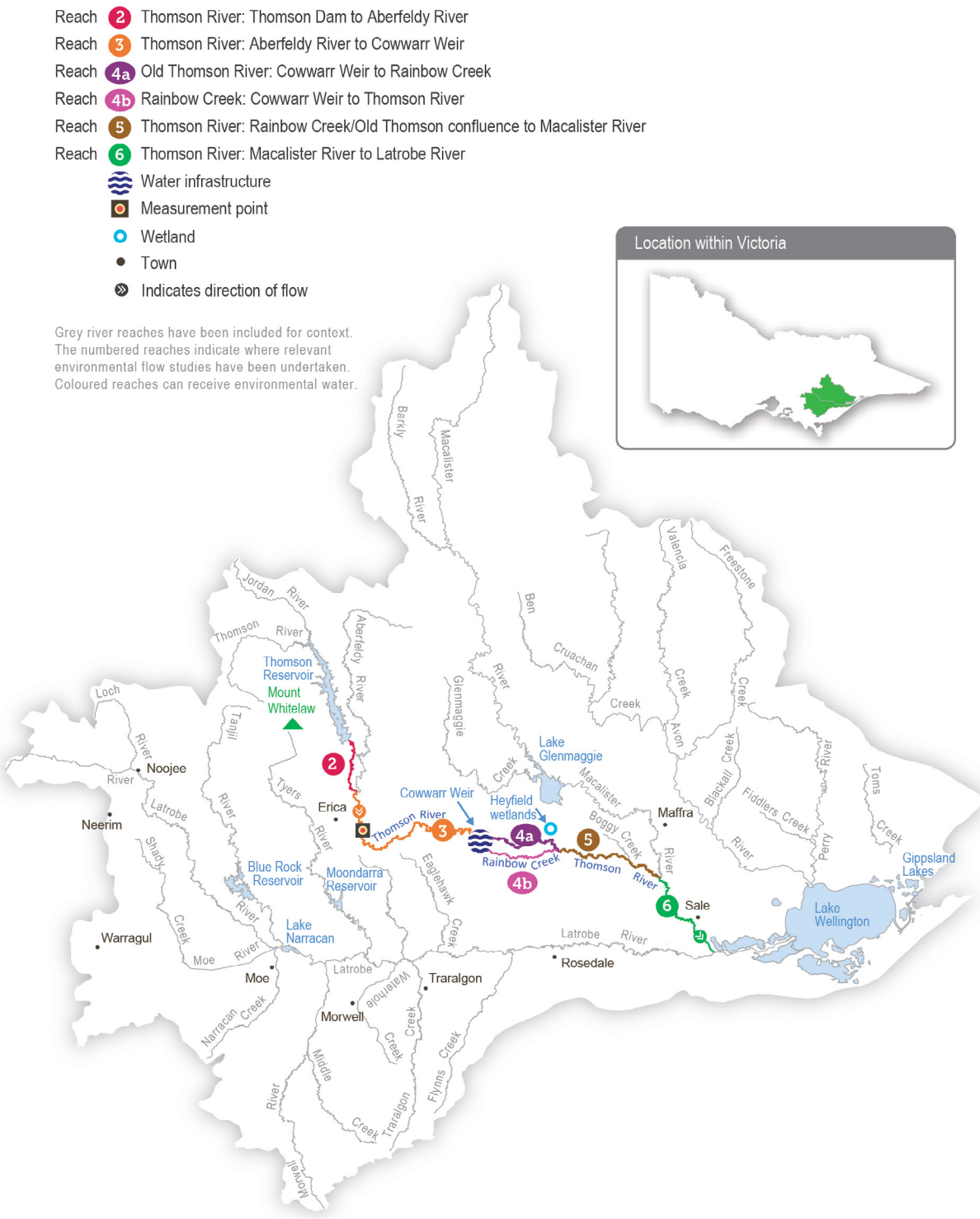
Thomson Reservoir harvests most of the flow from the upper catchment of Thomson River and significantly affects the flow in all downstream reaches. The Aberfeldy River now provides most of the natural flow variation to the Thomson River below Thomson Reservoir and is essential for providing natural freshes and a high flow.

Water for the environment is held in the Thomson Reservoir and released into the river as required. Reach 3 of the Thomson River (from the Aberfeldy River confluence to Cowwarr Weir) is the highest priority for delivery of water for the environment due to its heritage river status, high-value native streamside vegetation, high-quality in-stream habitat and low abundance of exotic fish species.

At Cowwarr Weir, the Thomson River splits into the old Thomson River course (reach 4a) and Rainbow Creek (reach 4b) (see **Figure 2.3.1**). Passing flows throughout the year are split two-thirds down reach 4a and one-third down reach 4b to avoid impacts to irrigators located on Rainbow Creek. Water for the environment is primarily delivered to the old Thomson River course (reach 4a) to support fish migration, as Cowwarr Weir impedes fish movement through Rainbow Creek.

The Heyfield wetlands is a cluster of pools located between Thomson River and the township of Heyfield. The construction of levees and weirs along Thomson River means that river water rarely enters the wetlands, and while the largest pool receives stormwater from the Heyfield township, smaller ponds rely on rainfall or pumped water for the environment to maintain environmental values. These values include wetland plant communities planted in recent years as part of a comprehensive revegetation program.

Figure 2.3.1 The Thomson system



Environmental values

The Thomson River supports native species of migratory fish that need to move between the sea and freshwater environments to complete their life cycles, including Australian grayling, tupong, short- and long-finned eel, Australian bass and pouched and short-headed lamprey. A focus for environmental flows management is the Australian grayling, which is a threatened species in Victoria. Australian graylings spawn in response to autumn freshes, and the larvae and juveniles spend time at sea before returning to the freshwater sections of coastal rivers. A flow that supports key migration periods for Australian grayling also provides spawning and recruitment opportunities that benefit the broader native fish assemblage.

The composition and condition of streamside vegetation varies throughout the Thomson River catchment. The vegetation is intact and in near-natural condition above Thomson Reservoir in the Baw Baw National Park. Streamside vegetation between Thomson Reservoir and Cowwarr Weir is mostly in good condition but is affected by exotic weeds, including blackberry and gorse. Below the Cowwarr Weir, the vegetation is degraded due to stock access and widespread weed invasion.

The Heyfield wetlands are one of the few remaining freshwater wetland sites in the Gippsland Plains landscape. They provide habitat for aquatic and terrestrial animals, including threatened migratory birds that prefer shallow, slow-moving water bodies.

Environmental objectives in the Thomson system

A1 – Maintain the existing frog population and provide suitable habitat for it

B1 – Provide freshwater habitat for migratory and non-migratory wetland birds within the Gippsland Plains landscape

CN1 – Restore carbon and nutrient cycling within Heyfield wetlands to increase ecosystem productivity

F1 – Increase the distribution, recruitment and abundance of all native fish, and increase opportunities for the spawning and recruitment of native migratory fish (such as Australian grayling)

G1 – Maintain the physical form of the channel to provide a variety of channel features and habitats for aquatic animals

G2 – Enhance river function by maintaining substrate condition and enabling carbon cycling

MI1 – Maintain the natural invertebrate community

PR1 – Increase the abundance of platypus

V1 – Maintain the structural diversity and appropriate distribution (zonation) of streamside vegetation along the riverbank and reduce terrestrial encroachment and invasion in the Thomson River

V2 – Increase the recruitment and growth of native in-stream, fringing and streamside vegetation in the Thomson River

V3 – Maintain the existing vegetation and promote the growth, establishment and resilience of semi-aquatic species in the Heyfield wetlands

WQ1 – Improve water quality in the Thomson River estuary

Traditional Owner cultural values and uses

The Gunaikurnai have had a continued connection to Gunaikurnai Country for many thousands of years, including with the waterways in the Latrobe system, into which *Carran Carran* (Thomson River) feeds. For the Gunaikurnai as Traditional Owners, there are immense challenges to heal, protect and manage Country, which has been drastically altered since colonisation.

> "As Gunaikurnai, we see our land (*Wurruk*), waters (*Yarnda*), air (*Watpootjan*) and every living thing as one. All things come from *Wurruk*, *Yarnda* and *Watpootjan,* and they are the spiritual life-giving resources, providing us with resources and forming the basis of our cultural practices. We have a cultural responsibility to ensure that all of it is looked after."
>
> – *Water is Life: Traditional Owner Access to Water Roadmap 2022 - Gunaikurnai Nation Statement*

This cultural landscape is dependent on culture and Aboriginal management.

The Gunaikurnai Land and Waters Aboriginal Corporation (GLaWAC) is working with the West Gippsland CMA to determine how to express Gunaikurnai objectives for water in a way that contributes to seasonal watering proposals from the perspective of traditional custodians with traditional knowledge.

GLaWAC Cultural Water Officers have completed Aboriginal Waterways Assessments on *Carran Carran* and are assessing how to protect and further the river's cultural values and uses. Traditionally, *Carran Carran* was an important meeting place and a place to camp. Today, most of *Carran Carran* is inaccessible to the Gunaikurnai, making it difficult to meet and yarn along the river.

Assessments for watering requirements of *Carran Carran* for the Gunaikurnai have been based on cultural indicators, including:

- the condition of the lower Latrobe wetlands (which *Carran Carran* helps supply)
- the condition and prevalence of plants and animals with cultural values and uses
- species known to be indicators of water quality, water regimes and healthy Country.

GLaWAC is working with the West Gippsland CMA to share traditional knowledge of plant and animal species of cultural significance in and around the waterways of the Latrobe Valley and the importance of specific watering decisions to support them.

Watering requirements to support cultural values and uses include:

- timing of deliveries of water for the environment planned in partnership with GLaWAC to support a seasonal flow regime and wet and dry periods that contribute to healthy Country
- maintaining freshwater supply to the *Durt-Yowan* (Latrobe River) estuary, Dowd Morass, Sale Common and Heart Morass and associated freshwater habitats; the lower Latrobe wetlands are an important resource for the Gunaikurnai
- providing connectivity between reaches and onto floodplains to support dependent plants and animals with cultural values and uses of significance to the Gunaikurnai
- maintaining water quality to support the health of native plants and animals with cultural values and uses of significance to the Gunaikurnai.

GLaWAC is developing a Strategic Water Plan which is due for completion by the end of 2025.

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

Social, recreational and economic values and uses

In planning the potential environmental watering actions in **Table 2.3.1**, the West Gippsland CMA considered how environmental flows could also support values and uses, including:

- water-based recreation (such as kayaking, canoeing, fishing and swimming)
- riverside recreation and amenity (such as birdwatching, camping, hiking and duck hunting)
- community events and tourism (such as community education, events at the Heyfield wetlands and visitation by locals and non-locals)
- socioeconomic benefits (such as maintaining bankside vegetation and preventing erosion and the potential loss of private and public land).

Planned environmental flows may be modified to align with a community benefit so long as environmental outcomes are not compromised. Autumn, winter and spring freshes in the Thomson River create ideal conditions for whitewater rafting, kayaking and canoeing. The timing of environmental flows may be adjusted to optimise opportunities to support these recreation activities, where it does not compromise environmental outcomes. For example, a fresh that aims to cue the migration of Australian grayling and other native fish may be timed to coincide with recreation events or holiday periods when people take advantage of favourable rafting or kayaking conditions.

In addition, kayaking and rafting activities have inherent risks, and large environmental flows are ramped up and down over several days to avoid sudden changes in water levels that may affect river users. This is acknowledged in **Table 2.3.1** with an icon (as explained in **Figure 1.2.3**).

	Watering planned to support water sports activities (e.g. canoeing and kayaking)
	Watering planned to support peaks in visitation

The West Gippsland CMA notifies the public of planned large releases of water for the environment to alert river users about potential increases in the water's level and velocity. People can register on the **West Gippsland CMA website** to be notified of upcoming watering events.

Scope of environmental watering

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

Table 2.3.1 describes the potential environmental watering actions in 2024-25, their expected watering effect (that is, the intended physical or biological effects of the watering action) and the longer-term environmental objectives they support. Each environmental objective relies on one or more potential environmental watering actions and their associated physical or biological effects.

Table 2.3.1 Thomson system potential environmental watering actions, expected effects and environmental objectives

Potential environmental watering action	Expected watering effects	Environmental objectives
Thomson River (targeting reach 3)		
Year-round low flow (125-350 ML/day)	• Maintain a minimum level of habitat and maintain water quality in pools and riffles for waterbugs and fish • Provide greater longitudinal connectivity to support the movement of native fish during autumn/spring (when delivered at the upper magnitude) • Regulate the water temperature and wet large woody debris to provide food and shelter for waterbugs and fish • Maintain sufficient water depth to facilitate platypus and fish movement between localised habitats and increase foraging opportunities (further enhanced when delivered at greater magnitudes) • Wet low-lying benches (when delivered at a greater magnitude) to prevent encroachment by invasive plants and permit seed dispersal • Additional benefits to the Thomson River estuary (reach 6) are expected when provided at 350 ML/day: – partially flush the upper water column, helping to sustain waterbug communities and fish by maintaining oxygen levels – prevent high salinity levels, helping to maintain emergent macrophyte vegetation – provide freshwater to the Latrobe system	F1  PR1  V1  MI1 WQ1

Potential environmental watering action	Expected watering effects	Environmental objectives
Spring fresh (800-900 ML/day for five to seven days during September to November)	• Trigger the migration of adult and juvenile native fish (in particular, the upstream migration of juvenile Australian grayling and Australian bass from marine/estuarine habitats) • Improve and maintain streamside vegetation by inundating the benches and providing variable water levels for plant zonation • Carry plant seeds from the upper catchment for deposition downstream • Prevent infilling of pools by mobilising fine sediments and depositing them on existing bars and benches to provide a substrate for vegetation • Scour substrates to remove accumulated fine sediment and biofilms to improve habitat and food for waterbugs • Additional benefits to Thomson River and its estuary (reach 6) are expected when provided at 900 ML/day: – wet vegetation on higher benches – partially flush the upper water column in the Thomson River estuary, helping to sustain waterbug communities and fish by maintaining oxygen levels – prevent high salinity levels, helping to maintain emergent macrophyte vegetation – provide freshwater to the Latrobe system	F1, G1, G2, V1, V2, MI1, WQ1
Summer/autumn fresh(es) (one to two freshes of 230-350 ML/day for seven days during December to March)	• Wet aquatic and fringing vegetation to maintain its condition and support its growth • Wet low-lying benches to prevent encroachment by invasive plants and enable vegetation zonation • Provide velocity and depth diversity and prevent sediment from smothering hard substrates • When delivered in February-March (at 230 ML/day), the fresh also aligns with and supports native fish movement: – trigger downstream migration of adult short- and long-finned eel and upstream movement of juvenile Australian bass – increase the water depth over riffles to facilitate local movement between habitats for large-bodied native fish	F1, G2, V1, V2

Potential environmental watering action	Expected watering effects	Environmental objectives
Autumn fresh (800 ML/day for five to seven days during April to May)	• Trigger the migration of adult and juvenile native fish, in particular: – the downstream migration and spawning of adult Australian grayling (April) – the downstream migration of adult tupong and upstream migration of adult and juvenile Australian bass (May) • Carry plant seeds and propagules from the upper catchment for deposition downstream and help maintain the zonation of vegetation • Prevent infilling of pools by mobilising fine sediments and depositing them on existing bars and benches to provide substrate for vegetation • Scour substrates to remove accumulated fine sediment	F1  G1, G2  V1, V2
Heyfield wetlands		
Fill (during August to September)	• Wet ponds to capacity to stabilise the banks and support the spring growth of semi-aquatic vegetation • Provide freshwater habitat for waterbirds and frogs (such as growling grass frogs and golden bell frogs)	A1  B1  CN1  V3
Top-ups as required to maintain water level (during October to May)	• Top up ponds before summer to maintain vegetation and enhance recruitment by triggering the release of seeds • Top up ponds in late summer to ensure the survival of newly planted wetland vegetation • Maintain habitat for waterbirds and frogs (such as growling grass frogs and golden bell frogs) • Note: when delivered in April to May, top-ups provide drought refuge habitat for waterbirds and frogs following prolonged dry conditions	
Partial drawdown (during April to May)	• Oxygenate surface soils, break down accumulated organic matter and cycle nutrients • Enhance waterbird food availability by exposing the mudflats and providing access to burrowing invertebrates	

Scenario planning

Table 2.3.2 outlines potential environmental watering and expected water use in various planning scenarios.

The Thomson River has experienced wet conditions for the last four years, and Thomson Dam spilled in 2022-23 and 2023-24, the only spills since 1996. These natural flows, combined with water for the environment, have created ideal conditions for native fish to breed and disperse throughout the system. Planned environmental flows for the Thomson River in 2024-25 will focus on supporting the migration, spawning and recruitment of native fish to boost their populations.

It is important to deliver a mix of a low flows and freshes throughout the year in the Thomson River, but the magnitude, duration and frequency of these events will generally be lower in the drought and dry planning scenarios than in the average and wet planning scenarios. More events with higher magnitude and longer duration may be delivered in all planning scenarios if enough water is available, noting that recent spills from Thomson Dam reduced carryover for a second consecutive year. As seen in recent years, natural tributary inflows will likely achieve many of the planned watering actions in the wetter climate scenarios. Therefore, most or all tier 1a actions proposed for the Thomson River in the wet and possibly average planning scenarios should be achievable with available supply.

In all planning scenarios, the highest-priority watering actions for the Thomson River are 800 ML per day freshes in autumn (in April/May) and spring (in September/November) to support migratory fish to move into or out of the system. These events are essential to cue the spawning and recruitment of the threatened Australian grayling population and other native migratory fish species, which have had high recruitment in recent years. These events are necessary every year in the average and wet climate scenarios to ensure regular recruitment and to align with environmental cues in the broader landscape. They are generally less important in the dry or drought planning scenarios, but they are considered important to deliver even in drier conditions in 2024-25 to consolidate recent population growth. Where possible, the spring and autumn freshes may be timed to coincide with long weekends to provide additional recreational benefits for river users. Delivering summer/autumn freshes in all planning scenarios will be important to clear fine silt and biofilms from in-stream habitat and facilitate the movement of native fish and platypus. The number and magnitudes of these freshes will vary depending on climate conditions.

Delivery of a low flow throughout the year is expected to change depending on the planning scenario. A 125 ML per day flow in reach 3 is the target magnitude from December to April, which is expected to be delivered with the operational passing flows in all planning scenarios.

Increasing the low-flow magnitude to at least 230 ML per day between May and July and 350 ML per day in November (following a spring fresh) is recommended in all planning scenarios to improve water quality in the Thomson estuary. The upper magnitude of 350 ML per day during May to July is preferred in all planning scenarios to improve outcomes for fringing and streamside vegetation. However, it will only be possible if enough water for the environment is available. The magnitude of the low flow throughout these months is reduced to 230 ML per day in the drought planning scenario and 300 ML per day in the dry and average planning scenarios, which is still at a rate that allows fish and platypus to move throughout the reach at critical breeding and dispersal times.

The recommended water regime for the Heyfield wetlands is the same in the dry and average planning scenarios because the wetlands are expected to hold water for most of the year in these planning scenarios. Filling the wetlands in late winter or early spring and providing top-ups through summer and early autumn aims to help recently planted semi-aquatic and terrestrial fringing plants become established and promote the natural recruitment of native wetland species. A partial drawdown in mid-to-late autumn in the dry and average planning scenarios will replicate a natural drying event and allow the breakdown of accumulated organic matter, promote nutrient cycling and provide mudflat habitats for waterbirds to feed. Natural inflow is expected to keep the wetlands near-full in the wet planning scenario, so a partial drawdown will not be possible. The planned autumn drawdown will be replaced by ongoing top-ups in the drought planning scenario to maintain some aquatic habitat for frogs and waterbirds in the local area. In the average and wet climate scenarios, natural run-off will likely meet some or all of the recommended watering actions at the Heyfield wetlands.

There are no carryover targets in the Thomson system for 2024-25. Spills from storage and natural inflows are again expected to meet many of the planned watering actions in the Thomson River in 2024-25, meaning enough water for the environment will likely be available to meet early-season demands in 2025-26.

Table 2.3.2 Thomson system environmental watering planning scenarios

Planning scenario	Drought	Dry	Average	Wet
Expected conditions	• Spill from Thomson Reservoir unlikely • Passing flow and limited natural flow from Aberfeldy River and other tributaries contribute to low flow • A large magnitude of consumptive water is released from storage	• Spill from Thomson Reservoir unlikely • Passing flow and natural flow from Aberfeldy River and other tributaries contribute to low flow and some freshes • A moderate magnitude of consumptive water is released from storage	• Spill from Thomson Reservoir possible • Passing flow and natural flow from Aberfeldy River and other tributaries contribute to low flow and periods of high flow and freshes • A small magnitude of consumptive water is released from storage	• Spill from Thomson Reservoir likely • Natural flow from Aberfeldy River and other tributaries is expected to meet most low-flow requirements, provide large freshes and sustain high flow • Minimal magnitude of consumptive water released from storage
Expected availability of water for the environment	• 18,600 ML	• 20,700 ML	• 21,900 ML	• 28,000 ML
Thomson River (targeting reach 3)				
Potential environmental watering – tier 1 (high priorities)	**Tier 1a (can be achieved with predicted supply)**			
	• Year-round low flow (230 ML/day continuous during May-July) • Spring fresh • Summer/autumn freshes • Autumn fresh	• Year-round low flow (300 ML/day continuous during May-July) • Spring fresh • Summer/autumn freshes • Autumn fresh	• Year-round low flow (300-350 ML/day continuous during May-July) • Spring fresh • Summer/autumn freshes • Autumn fresh	• Year-round low flow (350 ML/day continuous during May-July) • Spring fresh • Summer/autumn freshes • Autumn fresh
	Tier 1b (supply deficit)			
	• Year-round low flow (350 ML/day continuous during May to July)	• Year-round low flow (350 ML/day continuous during May to July)	• Year-round low flow (350 ML/day continuous during May to July)	• N/A

Planning scenario	Drought	Dry	Average	Wet
Heyfield wetlands				
Potential environmental watering – tier 1 (high priorities)	**Tier 1a (can be achieved with predicted supply)**			
	• Fill • Top-ups as required to maintain water level	• Fill • Top-ups as required to maintain water level • Partial drawdown		• Fill • Top-ups as required to maintain water level
Possible magnitude of water for the environment required to achieve objectives	• 18,100 ML (tier 1a) • 11,200 ML (tier 1b)	• 20,700 ML (tier 1a) • 4,600 ML (tier 1b)	• 21,100 ML (tier 1a) • 1,600 ML (tier 1b)	• 28,000 ML (tier 1a) • N/A (tier 1b)
Priority carryover requirements for 2025-26	• 0 ML			

2.4 Macalister system

Waterway manager – West Gippsland Catchment Management Authority

Storage manager – Southern Rural Water

Environmental water holder – Victorian Environmental Water Holder

System overview

***Wirn wirndook Yeerung* (Macalister River) flows from Mt Howitt in the Alpine National Park and joins *Carran Carran* (Thomson River) south of Maffra (Figure 2.4.1). The river winds its way to the southeast through mostly forested, confined valleys and narrow floodplains above Lake Glenmaggie. The downstream reaches flow through wide alluvial floodplains that have been cleared for agriculture. The Wellington River and Glenmaggie Creek are the main tributaries of the Macalister River.**

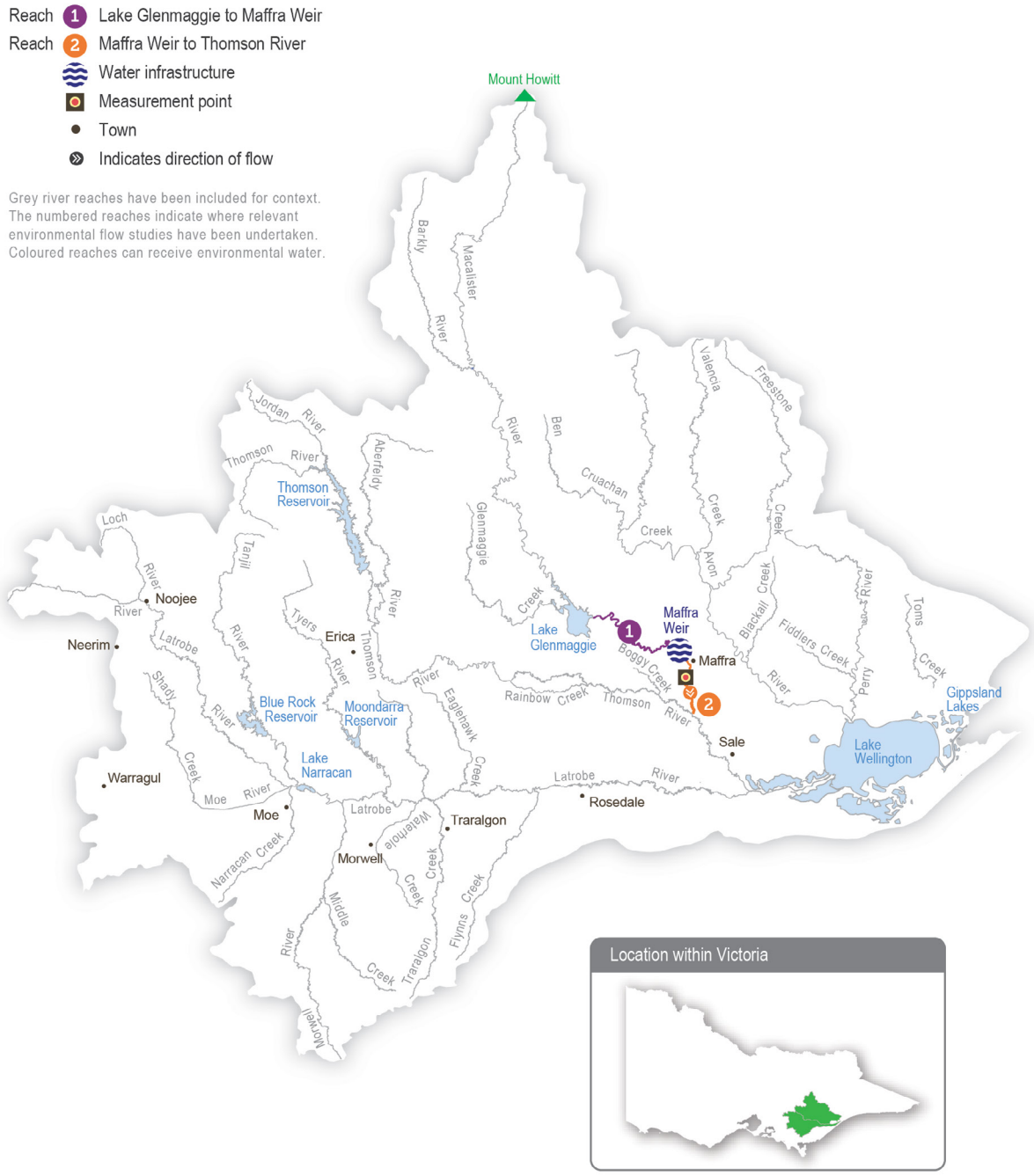
Lake Glenmaggie is the major water harvesting storage regulating the Macalister River. Maffra Weir is a small diversion weir located further downstream in Maffra.

Before the construction of Lake Glenmaggie, the Macalister River would regularly receive high and medium flows in winter and spring. Although Lake Glenmaggie regularly spills, a high flow is less frequent than natural because the storage captures much of the water. A notable impact of irrigation and water harvesting is the reversed seasonality of the flow between Lake Glenmaggie and Maffra Weir. The summer flow through this reach is much greater than natural due to the delivery of irrigation water. Winter flow in this reach is lower than natural because a large proportion of the inflows are captured, and there are no irrigation demands over winter. Most irrigation water is diverted at Maffra Weir, and the flow downstream of the weir is lower than natural year-round. The changed hydrology restricts fish migration, limits the growth and recruitment of in-stream and streamside plants and reduces the quality of in-stream habitat.

Water for the environment is stored in Lake Glenmaggie and released to the Macalister River. The river is divided into two reaches for the purposes of managing environmental flows: Lake Glenmaggie to Maffra Weir (reach 1) and Maffra Weir to the Thomson River (reach 2).

Maffra Weir is a major barrier to fish movement along the river, so delivery of water for the environment for migratory fish objectives mainly focuses on reach 2. All other objectives apply to reaches 1 and 2. Construction of a new fish ladder on Maffra Weir to improve fish passage is scheduled to commence in the next few years, and it is not expected to affect deliveries of water for the environment in 2024-25.

Figure 2.4.1 The Macalister system



Environmental values

Seven migratory native fish species move between the Macalister River, the estuary and the sea to complete their life cycle. These species include the Australian grayling, short-finned eel, long-finned eel, tupong, Australian bass, short-headed lamprey and common galaxias. Yellow-eye mullet, an estuarine species, has been recorded in the river. Platypus and rakali (water rats) are widely distributed through the Macalister River and its tributaries.

The streamside vegetation corridor along the regulated reaches of the Macalister River is fragmented. Immediately below Lake Glenmaggie, the vegetation is in good condition. It includes remnant river red gums and good-quality stands of shrubs, particularly in areas where revegetation has occurred in combination with stock exclusion. Further downstream, the vegetation is degraded. In recent years, the cover of in-stream vegetation has declined, possibly due to increased water turbidity, erosion and a lack of an appropriate water regime to encourage plant growth. The cover of non-woody plants (such as reeds, sedges and rushes) along the river's fringes is patchy.

Environmental objectives in the Macalister system

	F1 – Increase the distribution, recruitment and abundance of all native fish, and increase opportunities for the spawning and recruitment of native migratory fish (such as Australian grayling)
	**G1** – Maintain the form of the riverbank and bed to provide physical habitat for aquatic animals and plants
	**PR1** – Increase the abundance of platypus and rakali (water rats)
	**V1** – Maintain emergent (non-woody) and fringing (woody) vegetation in the streamside zone **V2** – Reinstate submerged aquatic vegetation
	**MI1** – Increase the abundance and number of functional groups of waterbugs
	WQ1 – Improve water quality during periods of reduced or no passing flow from Lake Glenmaggie **WQ2** – Improve water quality in the Thomson River estuary

Traditional Owner cultural values and uses

Wirn wirndook Yeerung (Macalister River) is a very important river to the Gunaikurnai people. It is a pathway that connects the Snow Country to the heart of Gippsland, and to ceremonial grounds and to a known special men's place to Elders. Its traditional name is *Wirn wirndook Yeerung*, which translates to '*song of the male fairy-wren*'.

Yeerung is the men's totem. This river has many cultural resources and extensive important sites along the whole system.

The Gunaikurnai have had a continued connection to Gunaikurnai Country for over 50,000 years, including with the waterways in the Latrobe system into which *Wirn wirndook Yeerung* feeds. For the Gunaikurnai as Traditional Owners, there are immense challenges to heal, protect and manage Country, which has been drastically altered since colonisation.

> "As Gunaikurnai, we see our land (*Wurruk*), waters (*Yarnda*), air (*Watpootjan*) and every living thing as one. All things come from *Wurruk*, *Yarnda* and *Watpootjan,* and they are the spiritual life-giving resources, providing us with resources and forming the basis of our cultural practices. We have a cultural responsibility to ensure that all of it is looked after."
>
> – *Water is Life: Traditional Owner Access to Water Roadmap 2022 - Gunaikurnai Nation Statement*

This cultural landscape is dependent on culture and Aboriginal management.

The Gunaikurnai Land and Waters Aboriginal Corporation (GLaWAC) is working with the West Gippsland CMA to determine how to express Gunaikurnai objectives for water in a way that contributes to seasonal watering proposals from the perspective of traditional custodians with traditional knowledge. GLaWAC has membership on the Macalister Environmental Water Advisory Group.

GLaWAC has expressed that more water needs to go down *Wirn wirndook Yeerung* between Lake Glenmaggie and Lake Wellington to improve water quality, including to address the threat of salinity and to support plants and animals that have cultural values and uses.

GLaWAC has also questioned the timing of watering events and expressed a desire to provide increased water depth to promote downstream fish migration and spawning, deeper water pools to prevent water quality degradation and more variation in water levels to mimic natural conditions better.

Traditionally, the landscape, which includes *Wirn wirndook Yeerung* and branches and associated floodplains, has been a rich source of food, medicine and resources for the Gunaikurnai people. In the area, there are many sites of cultural significance near the river and around Lake Glenmaggie. The Gunaikurnai have moved through the landscape along the waterways for thousands of years, sourcing food and plants along the way.

From the perspective of the Gunaikurnai, the land and waterways flowing to the Gippsland Lakes are interconnected and cannot be considered separately where decisions can impact downstream areas. The lower Latrobe wetlands and the rivers that feed them, including *Wirn wirndook Yeerung*, have important cultural significance to the Gunaikurnai.

Watering requirements to support cultural values and uses include:

- timing the delivery of water for the environment planned in partnership with GLaWAC to support a seasonal flow regime and wet and dry periods that embody healthy Country
- maintaining freshwater supply to the *Durt-Yowan* (Latrobe River) estuary, Dowd Morass, Sale Common and Heart Morass, and associated freshwater habitats. The lower Latrobe wetlands are an important resource for the Gunaikurnai
- providing connectivity between reaches and onto floodplains to support dependent plants and animals with cultural values and uses of significance to the Gunaikurnai
- maintaining water quality to support the health of native plants and animals with cultural values and uses of significance to the Gunaikurnai.

GLaWAC is developing a Strategic Water Plan which is due for completion by the end of 2025.

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

Social, recreational and economic values and uses

In planning the potential environmental watering actions in **Table 2.4.1**, the West Gippsland CMA considered how environmental flows could support values and uses, including:

- water-based recreation (such as canoeing, kayaking and swimming)
- riverside recreation and amenity (such as fishing)
- socioeconomic benefits (such as preventing erosion and potentially losing private and public land).

Watering actions, particularly over summer, may improve the water quality in waterholes and improve swimming conditions. Freshes throughout the year also increase the longitudinal connectivity of the river, improving conditions for canoeing and kayaking.

Winter and spring freshes encourage the spawning and recruitment of fish species (such as Australian bass, a popular recreational fishing species).

The West Gippsland CMA notifies the public of planned large releases of water for the environment to alert river users about potential increases in the water's level and velocity. People can register on the **West Gippsland CMA website** to be notified of upcoming watering events.

Scope of environmental watering

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

Table 2.4.1 describes the potential environmental watering actions in 2024-25, their expected watering effect (that is, the intended physical or biological effects of the watering action) and the longer-term environmental objectives they support. Each environmental objective relies on one or more potential environmental watering actions and their associated physical or biological effects.

Table 2.4.1 Macalister system potential environmental watering actions, expected effects and environmental objectives

Potential environmental watering action	Expected watering effects	Environmental objectives
Macalister River (targeting reach 2)[1]		
Year-round low flow (60-90 ML/day)	• Maintain pool and riffle habitat for waterbugs and a minimum depth over riffles to allow fish to move throughout the reach • Provide connectivity throughout the river for the local movement of platypus and rakali (water rats), as well as protection from predation and access to food • Provide low-velocity flow and clear water to enable the establishment of submerged vegetation • Note: At 90 ML/day, expected watering effects are met in reach 1 and 2. At 60 ML/day, expected watering effects are met in reach 2 only • Maintain a minimum depth in pools in the event of reduced passing flows to allow for turnover of water and to slow degradation of water quality to support aquatic life	F1  PR1  V2  MI1 WQ1

Potential environmental watering action	Expected watering effects	Environmental objectives
Winter/spring low flow (300 ML/day for at least 120 days during July to November 2024 and June 2025)	• Provide permanent wetted habitat for waterbugs and maintain water depth over riffles to enable fish passage between local habitats • Provide sustained wetting of low-level benches to limit the encroachment of terrestrial vegetation	F1  V1  MI1
Spring fresh (one fresh of 700 ML/day for five days during September to November)	• Cue the upstream migration of adult fish (e.g. short-headed lamprey) and the recruitment of juveniles (e.g. Australian grayling, tupong, common galaxias, Australian bass and short- and long-finned eels) from marine/estuarine environments • Wet mid-level benches to water woody vegetation, limit the encroachment of terrestrial vegetation and facilitate the dispersal of emergent and fringing vegetation seeds and propagules throughout the reach	F1  V1
Spring/summer fresh following spill (one fresh peaking at 1,500-1,800 ML/day for three to 10 days during September to December)	• Extend the duration and slow the recession of spills above 1,500 ML/day to: – inundate emergent and woody vegetation on mid and high-level benches, move organic matter into the channel and transport food resources downstream – provide a flow with sufficient shear stress to scour biofilms and flush fine sediment from pools and small gaps in the substrate to improve geomorphic habitat and food resources for waterbugs – cue the upstream migration of adult fish (e.g. short-headed lamprey) and the recruitment of juveniles (e.g. Australian grayling, tupong, common galaxias, Australian bass and short- and long-finned eels) from marine/estuarine environments	F1  G1  V1  MI1
Summer/autumn fresh(es) (one to three freshes of 140 ML/day for three days during December to March)	• Increase water depth to allow fish to move throughout the reach • Provide a flow with sufficient shear stress to flush fine sediment from small gaps to improve geomorphic habitat • Flush substrates and improve the quality of existing waterbug habitat and food supply • Wet low benches to facilitate the dispersal of seeds and propagules from emergent vegetation throughout the reach • Flush pools to maintain water quality for aquatic animals	F1  G1  V1  MI1 WQ1
Autumn fresh (one fresh of 350 ML/day for five days during April to May)	• Cue the downstream migration of Australian grayling towards the estuary for spawning • When delivered for more than three days and combined with freshes in the Thomson River, fully flush the upper Thomson River estuary and contribute freshwater to the lower reaches of the Latrobe River and wetlands	F1 WQ2

Potential environmental watering action	Expected watering effects	Environmental objectives
Autumn/winter fresh (one fresh of 700 ML/day for five days during July to August 2024 or May to June 2025)	• Cue the downstream migration of Australian bass and tupong towards the estuary for spawning/breeding • Increase the wetted area and improve water quality by flushing pools, providing habitat and conditions for waterbugs • Wet low and mid-level benches to facilitate the dispersal of emergent and fringing vegetation seeds and propagules throughout the reach	F1  V1  MI1

1 All freshes target reach 2 specifically. A low flow targets both reach 1 and 2, but the targeted volumes apply to both reaches.

Scenario planning

Table 2.4.2 outlines potential environmental watering and expected water use in various planning scenarios.

The Macalister River has experienced wet conditions for the fourth consecutive year, with the natural flow and storage spills from Lake Glenmaggie meeting or exceeding environmental flow recommendations throughout winter and spring 2023. Planned environmental watering actions in 2024-25 will continue to focus on supporting the migration, spawning and recruitment of native fish within the system. They are generally the same in all planning scenarios, but the duration and magnitude may vary depending on water availability throughout the year.

Providing a year-round low flow to maintain critical habitat, habitat connectivity and food for native fish and platypus in the Macalister River is the highest-priority watering action in all planning scenarios. Year-round operational passing flows of 60 ML per day will meet the minimum low-flow objectives for reach 2. Increasing the flow to 90 ML per day will meet the minimum low-flow objectives for reaches 1 (which has a wider channel) and 2 and will provide more habitat and food to help grow waterbugs, fish and platypus populations and exclude terrestrial vegetation from the main channel. A higher-magnitude low flow is therefore preferred and may be partly met by operational releases and natural inflows at certain times. Water for the environment will be used where possible to deliver a higher-magnitude low flow but will be prioritised in November in all planning scenarios when operational and consumptive water deliveries are expected to be low. In the wet planning scenario, the low flow may be increased to 300 ML per day during winter and spring to wet the lower benches over a sustained period to discourage the encroachment of terrestrial vegetation.

Summer/autumn freshes to maintain the quality of pool habitats that will serve as important refuges for native fish and platypus will be delivered in all planning scenarios. They are especially important to deliver in the drier planning scenarios when poor water quality could be an issue. The West Gippsland CMA will monitor water quality during dry and drought scenarios and adapt the flow as necessary to limit stress on aquatic animals.

Delivering at least one fresh of 350 ML per day in autumn and 700 ML per day in spring (both for five days) is a high priority in all planning scenarios to provide a migration trigger for native fish to move into or out of the system to complete their life cycles. The higher-magnitude spring fresh will inundate vegetation higher up the bank, improving the condition of flood-tolerant species. The autumn fresh will likely improve water quality in the Thomson and the Latrobe estuary, which can deteriorate at the end of summer. These events are necessary yearly in the average and wet climate scenarios to ensure regular recruitment and align with environmental cues in the broader landscape. They are generally a lower priority in dry or drought planning scenarios when environmental allocations are low, but they are important to deliver even in drier conditions in 2024-25 to consolidate recent population growth following four previous wet years. An additional 700 ML per day fresh may be delivered in late autumn or winter in the dry-to-wet planning scenarios to increase fish migration

and boost fish recruitment when climatic conditions are favourable. However, this event may be difficult to deliver in the drought planning scenario with the expected availability of water for the environment. Several other large freshes are recommended to slow the recession following spills from Lake Glenmaggie in the wet planning scenario, but they are a lower priority and will likely be at least partly met by operational releases if the reservoir spills.

As in recent years, natural inflows and operational releases to manage storage levels may fully or partially achieve many of the planned watering actions in the wetter planning scenarios. Therefore, some tier 1b actions proposed for the Macalister River in the wet planning scenario may be achievable with the available supply.

A minimum carryover target of 1,900 ML has been prioritised in the dry and average planning scenarios to support early-season low-flow requirements in the Macalister River in 2025-26. There is no carryover target in the drought planning scenario as water for the environment will be prioritised for use to meet critical watering events in 2024-25 in this planning scenario. In the wet planning scenario, opening allocations in 2025-26 are expected to be high enough to meet early-season low-flow requirements.

Table 2.4.2 Macalister system environmental watering planning scenarios

Planning scenario	Drought	Dry	Average	Wet
Expected conditions	• Limited natural flow; freshes or high flow are unlikely • Passing flows at Maffra Weir may be reduced	• Possible spills from Lake Glenmaggie in spring, minor flood levels may occur • Passing flows at Maffra Weir may be reduced	• Regular spills from Lake Glenmaggie in spring, minor to moderate flood levels may occur	• Large and frequent spills from Lake Glenmaggie, moderate to major flood levels may occur
Expected availability of water for the environment	• 13,600 ML	• 16,400 ML[1]	• 17,300 ML[1]	• 21,700 ML[1]

Planning scenario	Drought	Dry	Average	Wet
Potential environmental watering – tier 1 (high priorities)	**Tier 1a (can be achieved with predicted supply)**			
	• Year-round low flow (delivered at upper magnitude in November following fresh and April to mid-June; lower volume at other times) • Spring fresh (one fresh) • Summer/ autumn freshes (three freshes) • Autumn fresh (one fresh)	• Year-round low flow (delivered at upper magnitude in November following fresh and April to mid-June; lower volume at other times) • Spring fresh (one fresh) • Summer/ autumn freshes (three freshes) • Autumn fresh (one fresh) • Autumn/winter fresh (one fresh)	• Year-round low flow (delivered at upper magnitude in November following fresh and April to mid-June; lower volume at other times) • Spring fresh (one fresh) • Summer/ autumn freshes (three freshes) • Autumn fresh (one fresh) • Autumn/winter fresh (one fresh)	• Year-round low flow (delivered at upper magnitude in November following fresh and April to June; lower volume at other times) • Spring fresh (one fresh) • Summer/ autumn freshes (three freshes) • Autumn fresh (one fresh) • Autumn/winter fresh (one fresh)
	Tier 1b (supply deficit)			
	• Year-round low flow (upper magnitude continuous) • Autumn/winter fresh (one fresh)	• Year-round low flow (upper magnitude continuous)	• Year-round low flow (upper magnitude continuous)	• Winter/spring low flow • Year-round low flow (upper magnitude continuous)
Potential environmental watering – tier 2 (additional priorities)	• N/A			• Spring/summer fresh following spill (one fresh)
Possible volume of water for the environment required to achieve objectives	• 11,900 ML (tier 1a) • 11,000 ML (tier 1b)	• 16,700 ML (tier 1a) • 6,300 ML (tier 1b)	• 17,300 ML (tier 1a) • 6,000 ML (tier 1b)	• 17,500 ML (tier 1a) • 30,200 ML (tier 1b) • 6,500 ML (tier 2)
Priority carryover requirements for 2025-26	• 0 ML	• 1,900 ML		• 0 ML

1 Carryover from 2023-24 may be forfeited in the event of spill releases from Lake Glenmaggie.

2.5 Snowy system

Waterway manager – East Gippsland Catchment Management Authority and New South Wales Department of Climate Change, Energy, the Environment and Water

Storage manager – Snowy Hydro Limited

Environmental water holders – Victorian Environmental Water Holder and New South Wales Department of Climate Change, Energy, the Environment and Water

System overview

The Snowy River originates on the slopes of Mount Kosciuszko. It flows from its headwaters on the eastern slopes of the Snowy Mountains in New South Wales through the Snowy River National Park in Victoria and into Bass Strait (Figure 2.5.1).

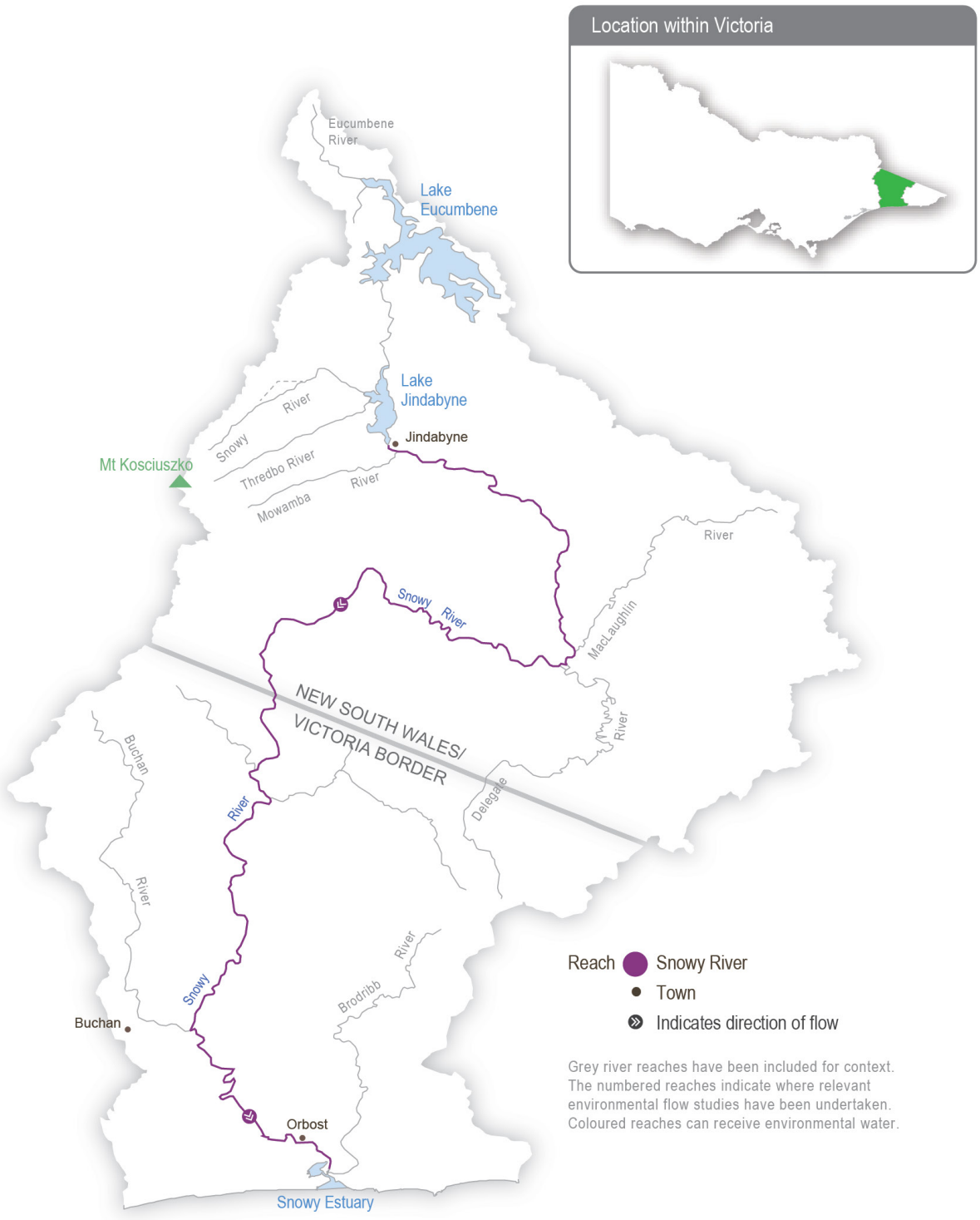
Four major dams and multiple diversion weirs in the upper Snowy River catchment capture and divert water to the Murrumbidgee and Murray River valleys. The hydrological effects of the Snowy Mountains Scheme are substantial, but they are partly alleviated by the contribution of flows from tributaries (such as the Delegate River in NSW and the Buchan and Brodribb rivers in Victoria).

The construction and operation of the Snowy Mountains Hydro-electric Scheme previously diverted 99 per cent of the Snowy River's mean annual natural flow at Jindabyne. The loss of flow changed the structure and function of the river, reduced the opening of the Snowy River entrance to Bass Strait and resulted in a decline in environmental values.

The Victorian, NSW and Commonwealth governments agreed to recover some water and, in 2002, delivered the first environmental flow to the Snowy River below Jindabyne Dam to help restore the damage done by decades of limited flow. The Victorian share of water for the environment available for use in the Snowy system is held in the Victorian Murray, Goulburn and Loddon systems. The NSW share of water for the environment available for use in the Snowy system is held in the NSW Murray and Murrumbidgee systems. Collectively, the water is made available for environmental flows in the Snowy River via a substitution method, whereby water for the environment allocated in Victoria and NSW replaces water earmarked for transfer from the Snowy to Victoria and NSW to support irrigation demands. The NSW Department of Climate Change, Energy, the Environment and Water plans environmental flows in the Snowy River in consultation with the Snowy Advisory Committee. The committee includes representatives of the Aboriginal community, the local community, the Victorian Government, the NSW Government and environmental experts. The committee brings together local knowledge and expert advice to help inform the management and delivery of water for environmental outcomes.

The water year in the Snowy system runs from 1 May to 30 April, and the daily flow regime is planned in advance by the Snowy Advisory Committee. Water for the environment is released daily from Jindabyne Dam into the Snowy River. The annual allocation of water for the environment varies based on water availability, rainfall and inflows. Environmental releases aim to deliver an average of 212,000 ML per year, the equivalent of 21 per cent of the average annual natural flow before the construction of the Jindabyne Dam.

Figure 2.5.1 The Snowy system



Environmental values

The upper reaches and tributaries of the Snowy River support water-dependent plants and animals, including freshwater native fish (such as river blackfish and Australian grayling), platypus and frogs. The lower reaches support estuary perch and Australian bass that move between saltwater and freshwater systems. The estuary contains estuarine and saltwater species (such as flathead and black bream). The floodplain wetlands of the Snowy River near Marlo provide feeding and breeding areas for wetland and migratory birds.

Traditional Owner cultural values and uses

Traditional Owners with links to the Snowy River system include the Ngarigo, Bidawal and Gunaikurnai peoples.

The river and its associated systems and lands have significant cultural values including as a functional and spiritual connective pathway. The Snowy River has enduring cultural importance as a place for the gathering of different Nations, ceremonies, access to food, fibre and other resources, stories, spirituality and songlines.

The Gunaikurnai Land and Waters Aboriginal Corporation (GLaWAC) holds Native Title, a recognition and settlement agreement under the *Traditional Owner Settlement Act 2010* and Registered Aboriginal Party status under the *Aboriginal Heritage Act 2006* in East Gippsland, including the lower Snowy River, associated with the Krauatungalung clan. This landscape was largely a transitionary landscape, with people migrating seasonally from the high country to the coast and back, depending on the availability of different food sources throughout the year. Many trade routes travel through freshwater river systems (such as the Snowy River system).

GLaWAC provided input to the draft Snowy River Estuary Flow Study.

GLaWAC will continue to take Gunaikurnai community members on Country around the Snowy River system to complete Aboriginal Waterway Assessments, building knowledge of what is important for the future and stories from the past.

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

Scope of environmental watering

The total volume available for release to the Snowy River in 2024-25 is 204,963 ML. Due to operating rules in the system, the daily flow regime that will be delivered in 2024-25 is pre-planned. The storage manager will make daily releases of varying volumes from Lake Jindabyne between May 2024 and April 2025 to mimic the typical flow patterns of a mixed snowmelt/rainfall river system characteristic of the Snowy Mountains. A 'natural flow scaling' approach is applied, and the continuous daily releases aim to support environmental processes in the Snowy River below Jindabyne Dam and maintain a healthy river that is much smaller than the natural channel that existed before the river was regulated.

The past four consecutive wet years mean there will be high water availability, which will allow for many high-flow releases in 2024-25. These freshes will help improve environmental conditions and build additional resilience into the system. The flow pattern is similar to previous years and mimics a snowmelt river, with greater flow during winter and spring. Five high-flow events exceeding 2,500 ML per day are scheduled between June and November 2024 to move sediment and improve in-stream habitat for native fish, platypus, frogs and waterbugs. The largest release, known as a 'flushing flow', will occur in October 2024 if Lake Jindabyne is high enough to enable delivery through the required infrastructure. It has a target peak flow rate of at least 5,000 ML per day, which will be held for about eight hours to flush fine sediment and wet high benches and backwaters. Other peaks in the flow will mimic winter rainfall and spring snowmelt events. Moderate-to-high flow rates will be sustained from the end of May to December 2024 to mix water in the estuary to benefit plants and fish (such as Australian bass). Based on the recently completed Snowy River Estuary Flow Study recommendations, a trial of different flow rates will be conducted from January to April 2025, with planned releases of 150-200 ML per day aiming to prevent the estuary entrance from closing. Where possible, a flow with peaks exceeding 1,000 ML per day will also be provided between January to April 2025.

For further information, visit the **Snowy and montane rivers | NSW Environment and Heritage** website.