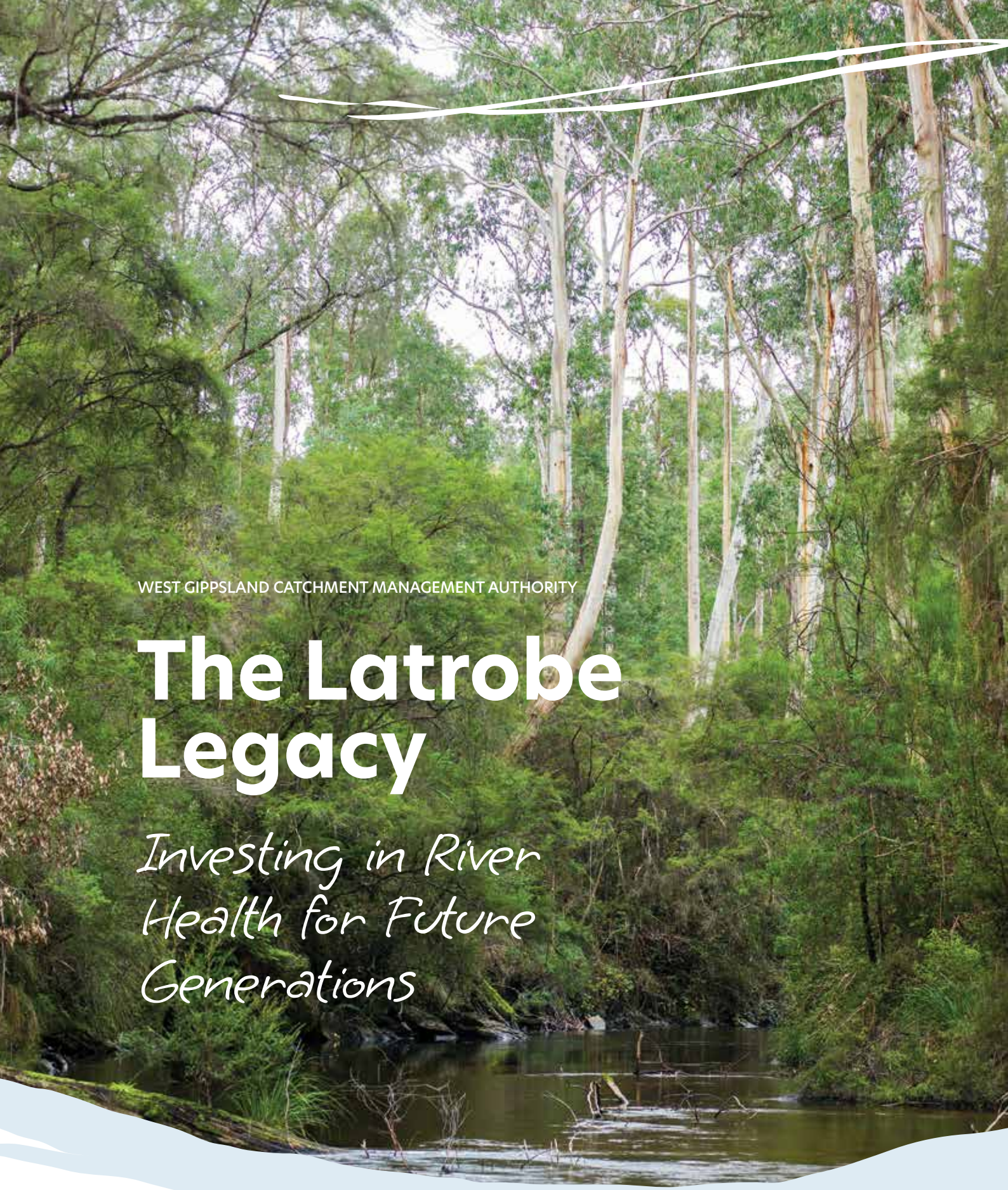


WEST GIPPSLAND CATCHMENT MANAGEMENT AUTHORITY

The Latrobe Legacy

Investing in River Health for Future Generations

West Gippsland
Catchment Management Authority

Acknowledgements

This Strategy was developed by West Gippsland Catchment Management Authority (WGCMA) under the guidance and support from a panel of leading experts in waterway health. The WGCMA thank the panel for the many hours spent writing, reviewing and refining the Strategy.

Expert panel

Jennifer Hale (Lead Author)	Jennifer is an aquatic ecologist with expertise in wetland, riverine and floodplain systems. She is qualified with a Bachelor of Science (Botany) and a Master of Business Administration and has over thirty years' experience in natural resource management.
Michelle Dickson (Blue Sense Consulting)	Michelle holds qualifications in evaluation, environmental science, river health and leadership (Master of Evaluation, B. App Sci., Grad. Cert. River Health, Certificate in Governance Practice). She is a graduate of the Cranlana Colloquium for ethical leadership and holds a Certificate of Governance Practice from the Governance Institute of Victoria.
Ian Rutherfurd (University of Melbourne)	Ian is a geographer and fluvial geomorphologist. He has worked for 30 years in the water sector as an academic, consultant and in policy. At present he is a Professorial Fellow in the School of Geography, Earth and Atmospheric Science at the University of Melbourne.
Nick Bond (La Trobe University)	Nick is the Director of the Centre for Freshwater Ecosystems at La Trobe University, and has more than 25 years' experience working on the ecology and hydrology of rivers and wetlands. His primary research focus is on understanding the effects of hydroclimate and catchment-scale processes on water dependent species and ecosystem processes to support river management and restoration.

Traditional Owner Acknowledgement

We acknowledge and pay our respects to the Traditional Owners of the region, the Gunaikurnai, the Bunurong, the Boonwurrung and the Wurundjeri Woi Wurrung Peoples, their rich culture and spiritual connection to Country.

The focus area, and the majority of the proposed management actions within this Strategy occur on Gunaikurnai Country. WGCMA has a longstanding partnership with Gunaikurnai Land and Waters Aboriginal Corporation (GLAWAC), which is based on trust, respect and a commitment to supporting self-determined outcomes.

Under our partnership agreement, WGCMA will continue to partner with GLAWAC to ensure that the voices, values and cultural Authority of the Gunaikurnai people are embedded in our ongoing projects and programs. Together we will identify opportunities for shared advocacy, two-way learning and shared implementation of the actions in this Strategy where our priorities align.

Message from the Independent Panel

As the Independent Panel established to guide, co-author and review the development of this Strategy, we are pleased to provide the following reflections on its significance and the actions needed to secure a resilient future for the Latrobe River system.

The Latrobe River is at a crossroads. For more than a century, it has supported coal-fired power generation for Victoria, a role that has drawn water from the river and contributed to the cumulative effects of degradation alongside land-use change, historical modification, river regulation, and other pressures associated with regional development. As coal fired power generation in the region winds down, decisions about mine rehabilitation, water allocation and river management will shape the future of the river, its wetlands, estuary and the Gippsland Lakes. At the same time, a warmer, drier and more variable climate will increase the risks of reduced freshwater inflows, rising salinity, declining connectivity, and further ecological stress.

This moment presents both risk and opportunity. Without deliberate intervention, the values that define the Latrobe system will come under increasing pressure. But the river still retains important strengths, such as relatively intact headwaters, ecologically significant unregulated flows, and high-value wetland and estuarine environments. These provide a foundation for recovery. The Independent Panel believes that recovering water for the environment, restoring connectivity, and improving the condition of rivers, floodplains and wetlands are essential to securing the future of the Latrobe system.

This Strategy outlines the actions needed to build a resilient river system for future generations. The Independent Panel strongly endorses the Strategy and its vision for the Latrobe River system.

Jennifer Hale
Michelle Dickson
Ian Rutherfurd
Nick Bond

Message from West Gippsland Catchment Management Authority

Water is the life source of Gippsland's landscapes, ecosystems, communities and economy. Nowhere is this more evident than in the Latrobe River system where decisions made over the coming decades will shape the future health of the river and the Gippsland Lakes for generations to come.

The Latrobe Valley sits at the centre of Australia's transition to a renewable energy future. The phased closure and rehabilitation of three large brown coal mines are fundamentally reshaping the region. But this is more than an energy transition, it is also a transition in how water moves through the landscape, how rivers function, and how communities, industries and ecosystems are sustained.

The decisions made during this transition will have lasting consequences for the Latrobe River system. The diversion of more than 2,200 GL of water to fill mine voids, together with changes to flow regimes and catchment processes, will affect the health of rivers, wetlands, floodplains, and ultimately the Gippsland Lakes. Waterways are not separate from the energy transition, they are central to it.

Beyond its environmental and cultural significance, the Latrobe River is a critical regional asset. It provides water for towns, agriculture and industry, supports recreation and tourism, and delivers ecosystem services that contribute to community wellbeing and regional prosperity.

Investing in river health is therefore not only an environmental imperative, but a sound economic investment. Strategic action now can help avoid future costs associated with declining waterway condition, reduced water security, biodiversity loss, water quality impacts, and the increasing expense of restoring degraded ecosystems.

For over 60,000 years the Latrobe River has been the life source for Gunaikurnai people. In more recent history the Latrobe River transitioned into a working river, a powerhouse for the economic benefit of the Nation. However, this has come at an enormous cost. The River system is under significant pressure and without strategic intervention its ecological, cultural, social and economic values are at risk.

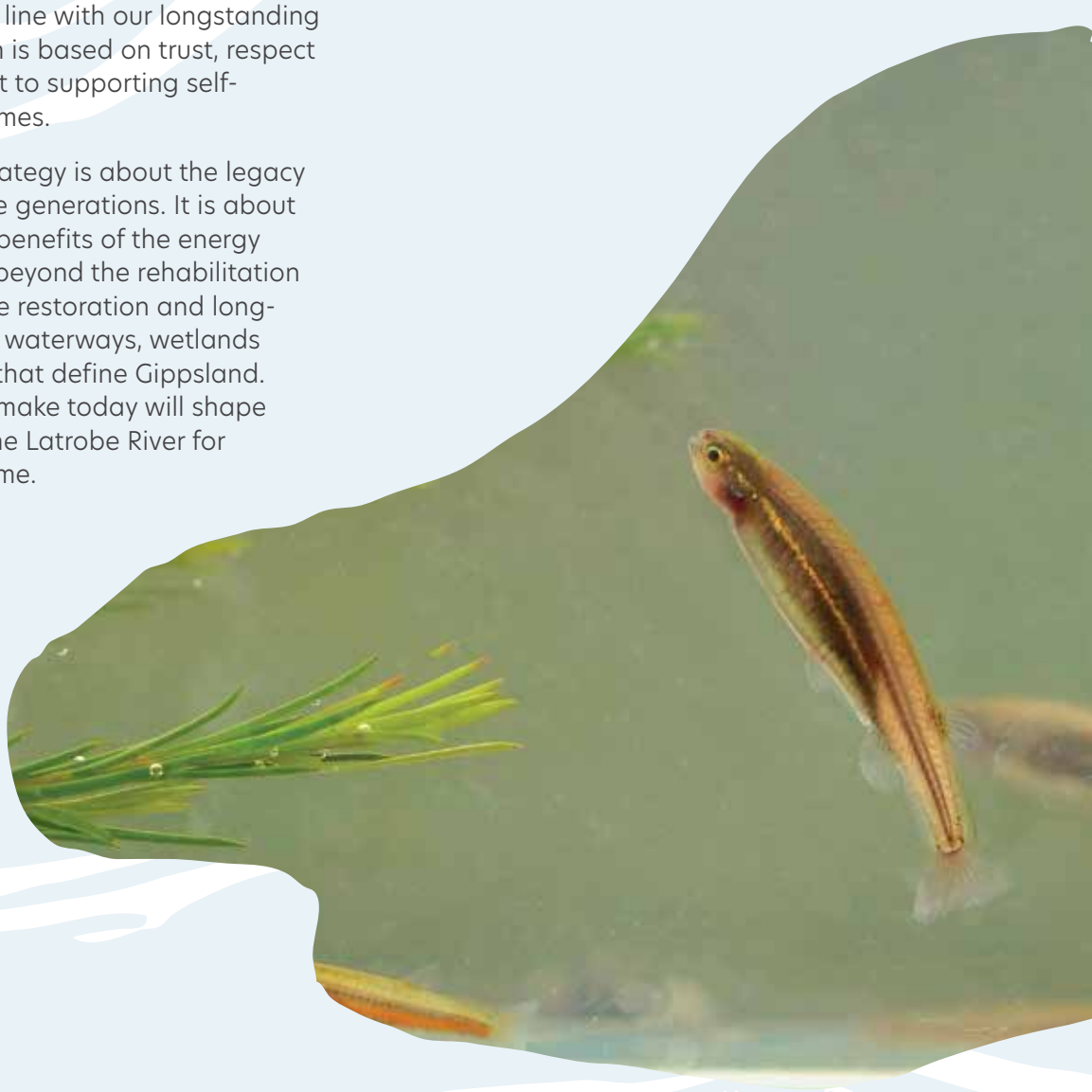
Whilst the energy transition process will present enormous challenges it also offers a once-in-a-lifetime opportunity. It is an opportunity to rethink how water is valued and managed, restore balance to the river system and invest in a healthier more resilient landscape. By harnessing the collective energy of communities, Traditional Owners, industry and government, we can ensure this transition not only reshapes the Gippsland economy but strengthens the waterways that sustain it.

As the transition gains momentum, we hope this Strategy will support and inspire the community, private sector and partner agencies to proactively advocate and invest in the River. We also acknowledge the important complementary work of the Gunaikurnai Land and Waters Aboriginal Corporation and look forward to walking alongside them in line with our longstanding partnership, which is based on trust, respect and a commitment to supporting self-determined outcomes.

Ultimately, this Strategy is about the legacy we leave for future generations. It is about ensuring that the benefits of the energy transition extend beyond the rehabilitation of mine sites to the restoration and long-term health of the waterways, wetlands and communities that define Gippsland. The decisions we make today will shape the condition of the Latrobe River for generations to come.

For now, the West Gippsland Catchment Management Authority, will continue to lead, advocate and act to improve outcomes for the Latrobe River, ensuring the energy transition leaves a positive and enduring legacy for its waterways.

Catchment Health - Gippsland's Wealth.



Strategy summary

The Latrobe River (Durt'Yowan) system is one of Gippsland's most critically important landscapes, supporting internationally significant wetlands, vital ecological processes, and the cultural identity and obligations of the Gunaikurnai People. Yet the system is under mounting pressure. Historically straightened, de-snagged, diverted and drained, and more recently stressed by water extraction, mine dewatering and a drying climate, the river which has been described as a "working river" is approaching a tipping point. Without strategic intervention, the environmental, cultural and social values of the River, its estuary and the Lower Latrobe Wetlands will continue to decline.

As caretakers of waterway health, the West Gippsland Catchment Management Authority (WGCMA) recognises its responsibility in managing these systems. It also acknowledges that natural ecosystems change over time and that these changes are often accelerated by human activities. This Strategy therefore focuses on guiding the transition of the Latrobe River system to ensure that a future Latrobe River system continues to support the critical ecological values that underpin Gippsland's unique landscape and future prosperity.

This Strategy sets a clear direction for restoring and safeguarding the River system through coordinated action, improved water management, investment in infrastructure, and deep partnership with Traditional Owners. It builds on major recent studies, best available science and the advice of a panel of leading experts in waterway health to build a comprehensive, long-term approach to securing the health of the Latrobe River.

Why action is needed now

Important gains have been made in the past 25 years, such as the establishment of the Latrobe Environmental Water Reserve and river and wetland restoration initiatives. However, the long-term outlook for the Latrobe River and its connected ecosystems, such as the Gippsland Lakes, is challenging. Without intervention, it is likely there will be:

- worsening salinity in Lake Wellington and the Latrobe Estuary putting at risk fundamental values of the Gippsland Lakes ecosystem;
- increased drying and vegetation loss in Sale Common, Heart Morass and Dowd Morass, wetlands of international significance, a biodiversity hotspot;
- reduced spawning and migration opportunities for native fish species like Australian grayling and Australian Bass (prized by recreational fishers);
- long-term loss of freshwater habitat and the fish, frogs and birds that rely on it;
- further decline of riparian vegetation and biodiversity including loss of habitat for native species including birds, platypus, rakali and turtles;
- increasing challenges relating to river bank erosion causing further loss of habitat and conflict with adjoining land uses;
- lower resilience to extreme events meaning events such as droughts have higher likelihood of hitting tipping points where ecosystem loss becomes irreversible.



These changes, if realised, are individually concerning, but collectively catastrophic as they fundamentally challenge the cultural, social, environment and economic fabric that make Gippsland unique; a landscape with over 60,000 years of cultural heritage, a vibrant region to live, work and play, an agricultural food bowl for the nation, an environment renowned and loved for its diverse landscapes and clean and green image.

The above challenges are alarming but not without cause. The River system faces several compounding threats including:

- **Water resource stress**
  Large volumes of water are extracted annually for consumptive uses, with power generation historically the largest user. Proposed rehabilitation of the three major coal mines will require more than 2,200 GL of river water over coming decades, equivalent to over 4.5 Sydney Harbours. Agricultural water use is increasing and new water intensive industries, such as data centres, are also predicted to enter the market. Consequently, we are now entering a prolonged phase of maximum water extraction from the system. Combined with climate change predictions, there is a significant risk of long-term loss of ecologically important flow cycles.



- **Altered salinity**
  Saltwater is moving further upstream into the Latrobe Estuary and Lower Latrobe Wetlands, especially during prolonged low flow periods. This intrusion now occurs more frequently than in the past, limiting opportunities to deliver freshwater into Sale Common, Heart Morass and Dowd Morass. This threatens the long-term viability of these key freshwater and brackish habitats. Without intervention, wetlands will shift to more saline states, reducing habitat for frogs, waterbirds and freshwater vegetation.
- **Altered hydrology and geomorphology**
  Historic straightening, de-snagging and levee construction have left the river deeper and less connected to its floodplain. Ecologically important flows, freshes, bankfull flows and wetland-connecting flows no longer occur often enough to sustain wetland vegetation, fish recruitment or in-channel habitat diversity.
- **Water quality decline**
  High nutrient, sediment and toxicant loads continue to impact on river health and drive algal blooms in the Gippsland Lakes. The Latrobe is the single largest nutrient source to the Gippsland Lakes, further threatening estuary and wetland condition and recreation on the Lakes.

A once-in-a-generation opportunity

The transition away from coal fired power generation presents significant risks but also a unique opportunity to change our trajectory from a working river - to a river that works again. Decisions made during mine rehabilitation, infrastructure planning, and water reallocation will shape the river's future for decades and define the future prosperity of the region. This once-in-a-generation transition provides an opportunity to address longstanding legacy impacts, restore river processes, recover water for the environment and secure enduring improvements in the health of the Latrobe River system. However, business as usual approaches and recurrent funding are insufficient to address the scale, complexity and interconnectedness of threats facing the River.

WGCMA is working to harness the energy and aspirations of agencies, Traditional Owners, industry and community groups to collectively respond to the moment. We are aiming for long-term transformational change at an unprecedented scale that combines water recovery, targeted infrastructure, geomorphic and ecological restoration initiatives.

Progress has been made, but there is much work to do. This Strategy provides the roadmap required to seize this opportunity – setting up a healthier, more resilient River system for future generations.



What this Strategy delivers

This Strategy provides a coordinated long-term path to restore ecological health. It builds on the success of past efforts and the commitment of key partners and is grounded by the following principles:

1. Management of the River system will contribute to environmental, cultural and social objectives, obligations and commitments.
2. Management of the River system will support the leadership, participation and empowerment of Traditional Owners.
3. The community will be actively engaged as partners in caring for the River for future generations.
4. Management of the River system will consider the whole laterally and longitudinally interconnected system (rivers, wetlands, lakes and floodplains).
5. An equitable share of water in the River system will be provided to meet Traditional Owner, environmental and social values.
6. Management of the River system will require that unavoidable impacts are offset by actions that that make the river system better overall.

Clear long-term goals, measurable objectives and a comprehensive suite of management options have been set based on best available science. Prioritisation of management actions highlighted three key learnings:

1. **The River system needs more water.** Without safeguarding existing flows and addressing the large environmental water deficit, the health of the system will decline over the long-term. This means locking in opportunities that will emerge throughout the transition and post-mine rehabilitation.

2. **Constraints to environmental water delivery, such as physical barriers, access issues or limits on how water can be released need to be addressed** to maximise the value of the environmental water reserve. Further work is being progressed by the WGCMA to identify and prioritise key constraints, mostly relating to the inundation of floodplains on private land.

3. There is an enormous backlog of **river, wetland and floodplain initiatives that require investment to be scaled up** over the short and long-term. The WGCMA has a 25-year history of successfully implementing river, wetland and floodplain restoration projects. But business as usual funding is inadequate to meet the scale of the challenge. Investment needs to be accelerated to build the system resilience required for the River to survive the impending challenges.



Implementation

Delivery of the strategy will require significant, sustained and well -coordinated investment over several decades. While existing programs provide an important foundation they are not sufficient on their own to address the scale of legacy impacts, emerging risks and transformational opportunities facing the Latrobe River system.

Funding will need to be progressively secured from a range of complementary sources, including government programs, environmental water and broader water sector investment, mine rehabilitation and transition-related funding opportunities, offsets, infrastructure investment and existing WGCMA programs. Bringing these sources together in a coordinated way will ensure investment is aligned, efficient and targeted toward the highest priorities over time.

The Strategy provides a framework for guiding future investment decisions and building the business cases needed to secure funding, demonstrating that early and strategic investment can deliver substantial environmental benefits while avoiding greater ecological, social and economic costs in the future.

The priority management actions identified in this strategy will provide the foundation for future investment. They will inform the development of funding proposals, business cases and program design, ensuring that resources are directed toward actions that deliver the most meaningful and enduring improvements to the Latrobe River system.

Implementation will occur across three broad phases that have been pragmatically aligned with proposed mine rehabilitation timeframes.

PHASE 1

Accelerate

(2026-2030)

Focus on progressing priority actions, enabling works and build on existing momentum:

- Complete key infrastructure upgrades (Lower Latrobe Wetlands)
- Progress priority water recovery commitments
- Identify and address critical constraints to environmental flows
- Establish governance, partnerships and monitoring systems
- Develop detailed business cases for high-priority action



PHASE 2

Scale and integrate

(2030-2045)

Expand delivery and integrate actions across the system to achieve broader outcomes:

- Scale up riparian and floodplain restoration
- Implement priority geomorphic interventions
- Expand environmental water delivery and optimisation
- Integrate water recovery outcomes into operational regimes



PHASE 3

Consolidate & secure

(2045-2065)

Embed and maintain outcomes while adapting management to ensure long-term resilience of the system:

- Lock in post-mine rehabilitation water recovery opportunities
- Maintain the benefits and outcomes achieved
- Adapt management in response to changes in climate and hydrology
- Respond to emerging risks (e.g. salinity thresholds, new water users)
- Ensure long term resilience of the river system



Importantly implementation will require a collective partnership effort. WGCMA prides itself on its partnership work with Traditional Owners, community groups, landholders, industry and Government agencies and all of the proposed actions will be delivered in line with these partnership principles.



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1 Introduction

The Latrobe River, its tributaries, floodplains, wetlands and estuary support significant ecological values and are vital to cultural identify and community well-being. The system is being put under increasing pressure from water extraction (including for mine rehabilitation and emerging uses), land use change, declining water quality and climate change. This strategy establishes a long-term plan to protect and restore the system using evidence-based science to identify and prioritise the ecological needs of the River system. The strategy also recognises and supports Traditional Owner partnership and fairer water management.

1.1 Background

The Latrobe River, hereby referred to as 'the River' is located in Gippsland, Victoria, and is central to the region's environmental health, cultural identity and social wellbeing, making its enhancement essential to securing Gippsland's future. The catchment comprises an interconnected network of rivers, floodplains, wetlands and estuarine environments that collectively sustain vital ecological processes and community values. The river and its wetlands form a cultural landscape of profound significance to the Gunaikurnai People, the Traditional Owners of the land and waters, whose ongoing cultural connections are intrinsically tied to the health of the river system. The River and its associated wetlands, including the Ramsar-listed Gippsland Lakes, also support rich biodiversity and provide critical habitat for numerous threatened species.

However, the resilience of the River system has been progressively undermined. Decades of water extraction, mine dewatering, changing land use and intensifying climate impacts have placed the river under sustained pressure. Hydrological modelling and ecological assessments have revealed that continued or increased water extraction, coupled with a drier future climate, will likely accelerate declines in environmental condition and the biodiversity that depends on it. These changes not only jeopardise ecological health but also threaten cultural values and the social fabric of communities reliant on the river system.

The transition of water use from power generation to mine rehabilitation represents a critical turning point. The transition creates opportunity to improve long-term water outcomes; it also introduces significant risks if not guided by a coordinated and adaptive strategy. In particular the filling of mine voids with river water, when layered on top of existing stressors risks further constraining the ability to provide the water required to sustain critical ecological processes and the values dependent on them. These constraints are already evident in the lower reaches and wetlands, where salinity, habitat loss, and water quality issues are most acute.

In addition to flow-related concerns, the River system is impacted by ongoing water quality pressures. Elevated nutrient and sediment loads, toxicant influxes, and ongoing land use changes have contributed to water quality degradation, algal blooms, and shifts in wetland vegetation, further diminishing the resilience of ecosystems, particularly in the river reaches and wetlands below major storages and coal mines.

Collectively, this evidence underscores the need for strategic change. Existing strategies and actions are insufficient to address the scale, complexity and interconnectedness of threats facing the River system. Recognising these challenges, this strategy aims to provide a comprehensive framework for restoring and safeguarding the River system over the next 40 years (2025 – 2065).

It is informed by the latest scientific assessments, policy developments, and the aspirations of Traditional Owners and local communities. The strategy seeks to balance ecological restoration with cultural and social objectives, setting out clear principles, long-term goals, and measurable targets to guide management actions.

1.2 How this strategy was developed

The West Gippsland Catchment Management Authority has been working with partners to improve the River system over a number of years. An overview of that work (with links to relevant publications) is provided on a dedicated web page https://wgcma.vic.gov.au/durtyowan-latrobe-river/.

An expert panel was convened to guide the development of this strategy with consideration to prioritisation and sequencing of options for management of the River that are well grounded in best available science and knowledge.

1.3 Policy context

The Latrobe Legacy has been developed by the West Gippsland CMA in the context of their role as caretaker of waterway health. Whilst not a statutory plan, it is considered as a sub-strategy to the West Gippsland Regional Waterway Strategy.

Herein, this Strategy is intended to function as an informative and enabling Strategy that is designed to support a number of concurrent processes and strategies, specifically including those relating to mine rehabilitation and associated transitions occurring in the Latrobe Valley and Gippsland.

This strategy, which clarifies the CMA's investment priorities for the River system has been informed by (and is intended to support and influence future updates of) existing policy frameworks and key investigations, including but not limited to:

- Central and Gippsland Region Sustainable Water Strategy (2022)
- Latrobe Valley Regional Rehabilitation Strategy (2020 and amendment in 2023)
- Transformation of the Latrobe: Pathways for the Latrobe River System (2020)
- Latrobe Valley Regional Water Study – Ecological Effects Assessment (2023)
- Healing Wurruk After Coal Position Statement – Gunaikurnai Land and Waters Aboriginal Corporation (2025)
- Gunaikurnai Whole of Country Plan (2021)
- Water is Life: Traditional Owner Access to Water Roadmap (2025)

Building on this earlier work, the strategy brings together technical evidence and policy directions into a single long-term strategy. Through adaptive, evidence-based decision-making and strong collaboration with partners and stakeholders, The Latrobe Legacy seeks to secure a healthy and resilient river system for current and future generations.

1.4 Thematic scope & strategy focus

The Latrobe Legacy is focused on the environmental health of the Latrobe River system. The strategy uses the best available science to identify and prioritise the ecological needs of the River system taking into account the current, emerging and future risks to the River system and catchment.

This focus aligns with the vision of the West Gippsland Regional Catchment Strategy "*Catchment Health – Gippsland's Wealth*" which recognises that a healthy catchment and waterways underpin a broad range of cultural, social and economic benefits. Improvements in river health will contribute to these broader outcomes, however, the primary purpose of this Strategy is to identify and prioritise actions that support ecological health and resilience.

Cultural, social and economic values have been considered through the West Gippsland Regional Waterway Strategy and other complementary planning processes. This Strategy does not seek to replicate those assessments.

Similarly, Gunaikurnai aspirations for Country are being advanced through Gunaikurnai-led planning and decision-making processes, including GLaWAC's work to support the healing and restoration of Country in response to mine closure and rehabilitation. Rather than duplicating these processes, The Latrobe Legacy complements them by providing an evidence-based framework for improving the environmental condition of the river system.



1.5 Supporting Traditional Owner Self-determined priorities

The Latrobe River catchment (or Durt'Yowan as it is known by Gunaikurnai people) includes the traditional lands of the Bunurong, Gunaikurnai and Wurundjeri Peoples.

There are three formally recognised Registered Aboriginal Parties within the Latrobe Catchment. The recognised Registered Aboriginal Parties are:

- Gunaikurnai Land and Waters Aboriginal Corporation (GLAWAC)
- Bunurong Land Council Aboriginal Corporation (BLCAC)
- Wurundjeri Woi Wurrung Cultural Heritage Aboriginal Corporation (WWW).

GLAWAC covers 88.8% of the catchment, BLCAC 0.5%, WWW 2.3% and the remaining 8.4% presently does not currently have a RAP appointed (Figure 1). The focus area, and the majority of the proposed management actions within this Strategy occur on Gunaikurnai Country.

The West Gippsland Catchment Management Authority have a longstanding partnership with the GLAWAC, which is based on trust, respect and a commitment to supporting self-determined outcomes.

We recognise that ecological values and cultural values can share common goals – like sustainability and conservation – however they are fundamentally different:

- Ecological Values: Based on Western science. They focus on the biophysical health of an ecosystem, looking at matters including biodiversity, flora and fauna health, geomorphology and natural resources.
- Traditional Owner Cultural Values: Connection to Country – a deep, reciprocal, and spiritual bond between the land, animals, sky, waters, and the people. Traditional Owners view the environment as a living, breathing entity where human beings are an interconnected part of the ecosystem, not separate from it.

Under our best practice partnership agreement, the WGCMA will continue to partner with GLAWAC to ensure that the voices, Values and cultural Authority of the Gunaikurnai people are embedded in our ongoing projects and programs. Together we will identify opportunities for shared advocacy, two-way learning and shared implementation of the actions in this Strategy where our priorities align.

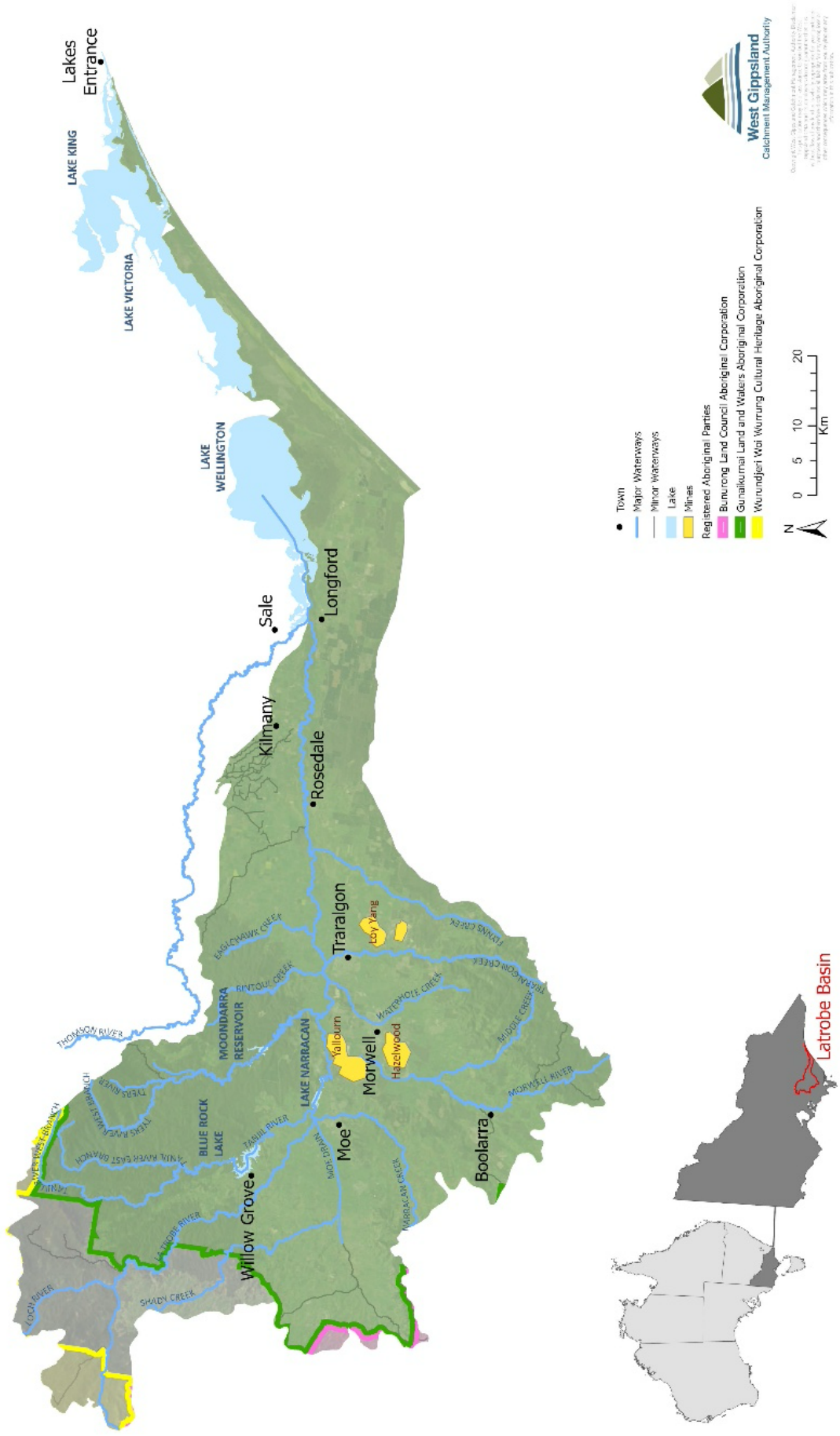
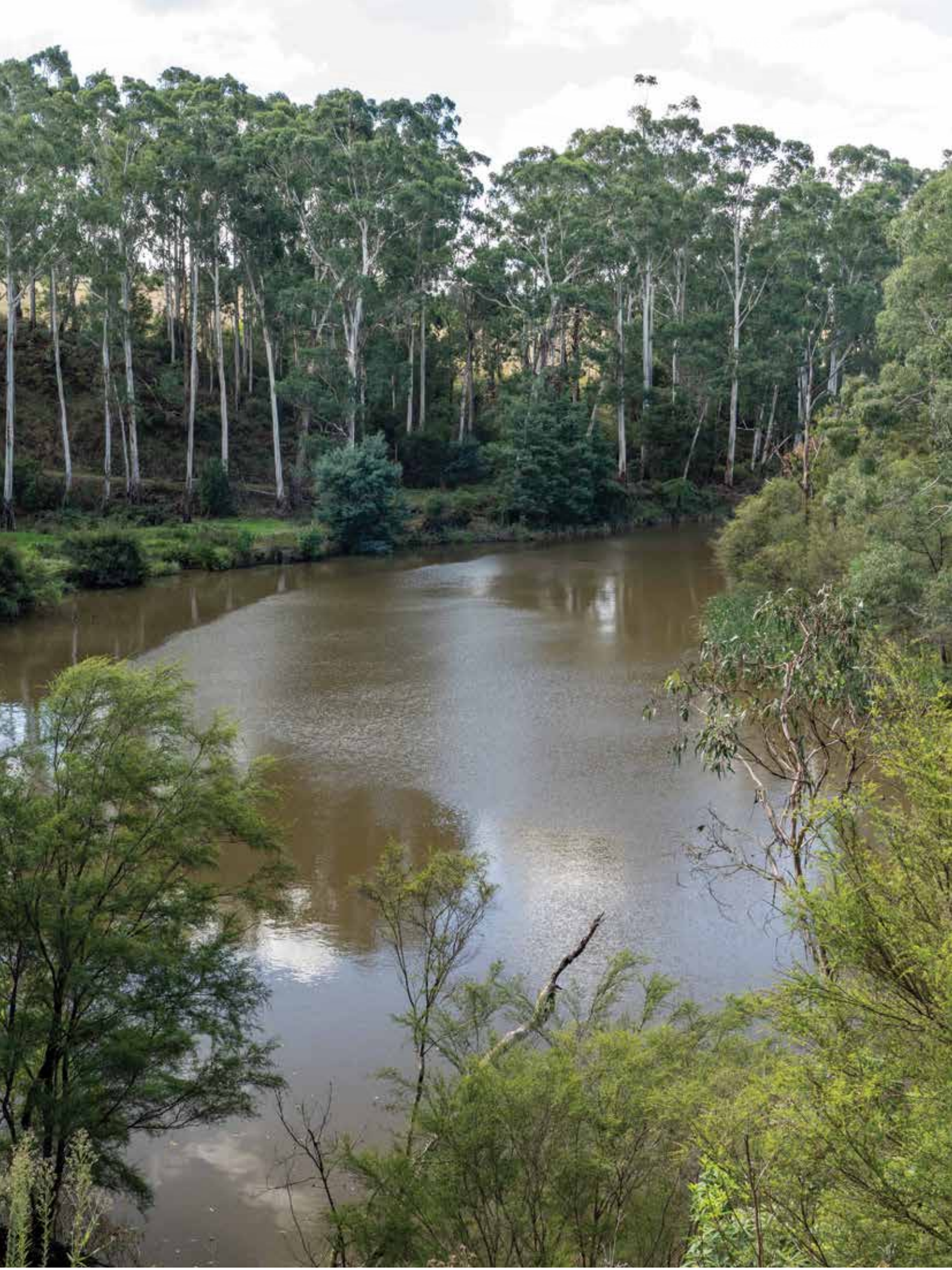


Figure 1. Map of the Latrobe basin overlayed with the three formally recognised Registered Aboriginal Parties that intersect the basin.

1.6 Principles of this strategy

The WGCMA, have adopted the following principles to guide the development and implementation of this strategy:

1. Management of the River system will contribute to environmental, cultural and social objectives, obligations and commitments.
2. Management of the River system will support the leadership, participation and empowerment of Traditional Owners.
3. The community will be actively engaged as partners in caring for the River for future generations.
4. Management of the River system will consider the whole laterally and longitudinally interconnected system (rivers, wetlands, lakes and floodplains).
5. An equitable share of water in the River system will be provided to meet Traditional Owner, environmental and social values.
6. Management of the River system will require that unavoidable impacts are offset by actions that that make the river system better overall.



2 The River system

The Latrobe River system stretches from upper forested headwaters to Lake Wellington. The main focus of this strategy is the mid to lower sections (below Lake Narracan) where the impacts of water extraction and mine rehabilitation are greatest. The River system supports a wealth of ecological values including Ramsar listed wetlands, threatened plants and animals, native fish, frogs, waterbirds and riparian and wetland vegetation. It is these ecological values that are the focus of this strategy, while recognising that there are important social, recreational and cultural values provided by a healthy river system.

2.1 Geographical scope

The River Basin, in West Gippsland, covers an area of approximately 4,700 square kilometres stretching from the southern slopes of the Yarra Ranges to Lake Wellington, representing around 23% of the total catchment of the Gippsland Lakes. The upper part of the catchment is largely forested through the Strzelecki Ranges and the Great Dividing Range where major tributaries such as the Tyers, Tanjil and Morwell Rivers and Traralgon Creek rise and flow into the River. Approximately 70 kilometres from its source, the River emerges from the foothills onto the broad floodplain before discharging through the Latrobe Estuary to Lake Wellington.

This strategy covers the entire Latrobe catchment from alpine streams to Lake Wellington (Figure 2) including the major tributaries, the smaller streams and floodplain wetlands. The focus, however, is on the mid to lower Latrobe system below major storages and under the influence of current and future mine rehabilitation.

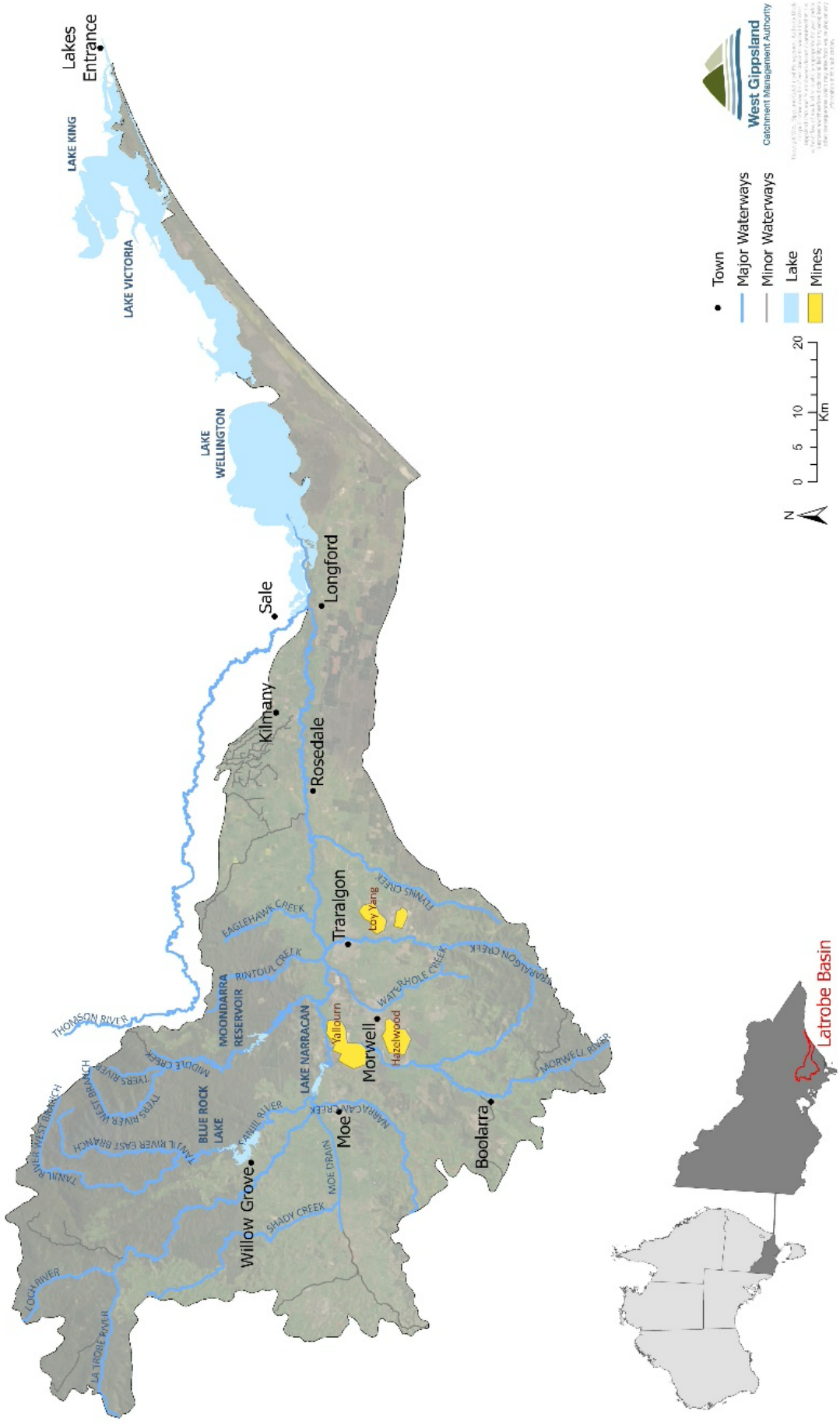


Figure 2. Map of the Latrobe basin (scope of this strategy is from headwaters to Lake Wellington).

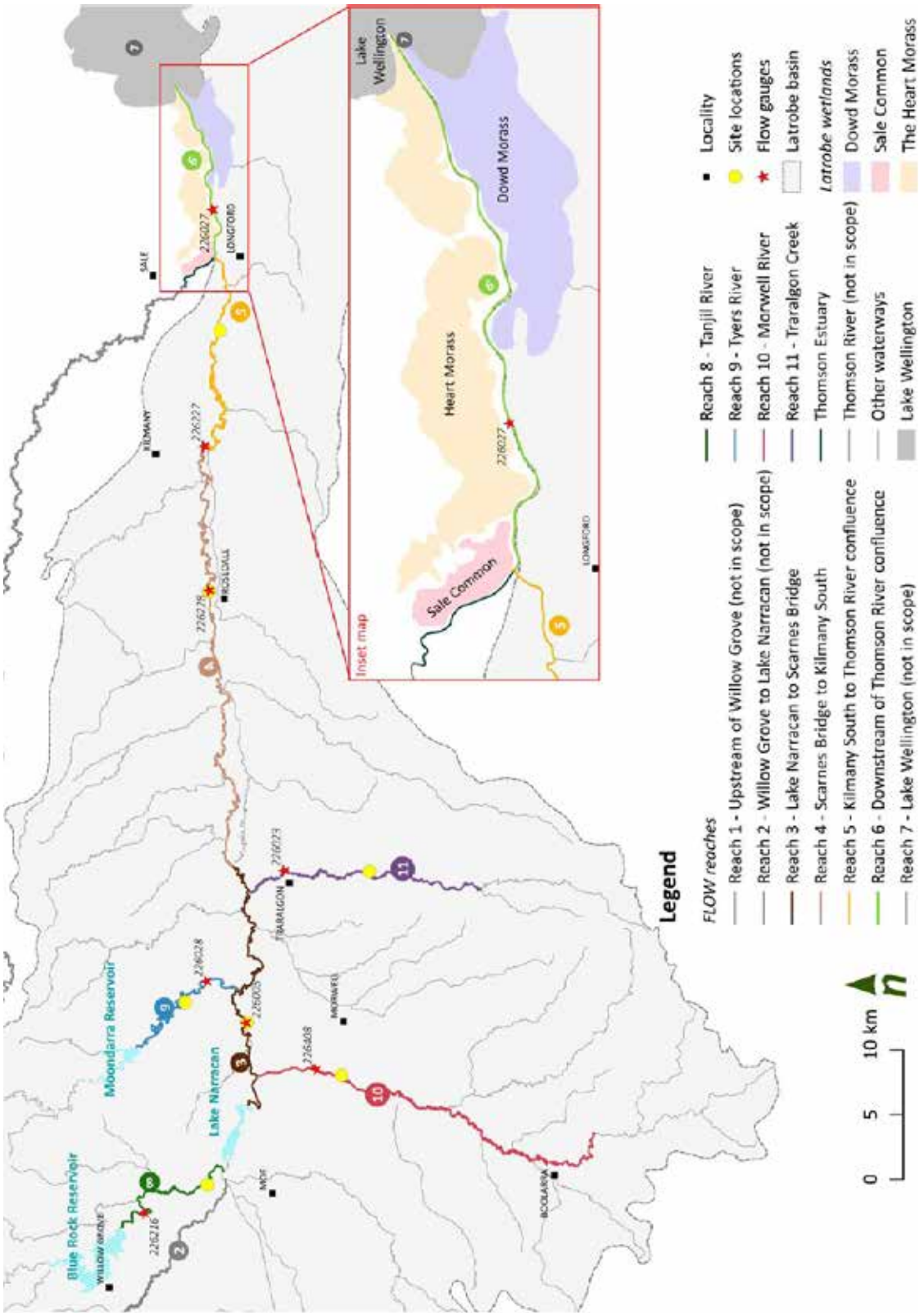


Figure 3. Map of the showing the reaches of Latrobe river and major tributaries (Source: Alluvium, 2021).

This strategy is focussed on the following broad aquatic ecosystems (as defined by the Latrobe Valley regional water study ecological effects assessment (LVEEA, Hale et al. 2020)):

Mainstem of the River downstream of Lake Narracan – a large alluvial river that has been highly modified in the past by straightening, clearing of large woody debris and water resource use. It supports a variety of native fish, macroinvertebrates and riparian vegetation communities.

Latrobe Estuary – defined here as the reach that extends from the Thomson confluence to Lake Wellington. This is a permanently open, salt-wedge estuary that supports a range of freshwater and estuarine fish, salt-tolerant vegetation communities, and is important for the passage of native diadromous fish (species that migrate between habitats for part of their lifecycle).

Major Tributaries

- **Tanjil and Tyers Rivers** downstream of Blue Rock and Moondarra Reservoirs, respectively – the confined reaches of the Tyers are in relatively good condition and support significant in-stream and streamside biodiversity. In contrast, the Tanjil, particularly below Blue Rock is characterised by low riparian vegetation cover, areas of erosion and poor water quality.
- **Morwell River and Traralgon Creek** which have upper reaches in the Strzelecki Ranges that are in good condition, but downstream of Yallourn and Loy Yang Power Stations respectively both are highly modified and in generally poor condition.
- **Waterhole Creek** also begins in the forested Strzelecki Ranges, where its upper reaches support high-value ecological communities and significant species. As it flows north through farmland and into Morwell, the creek becomes more modified but continues to provide important habitat, flood mitigation and recreational value. Despite its overall poor condition, the creek retains strong environmental, cultural and social significance along its entire length.
- **Narracan Creek** rises near Thorpdale South and flows through the Moe–Newborough area before joining the Latrobe River, providing an important waterway corridor through agricultural and urban landscapes. It is heavily modified in places, but plays a significant role in local drainage, flood behaviour, and ecological connectivity.



Fishing on the Tanjil River



Moe Drain near Trafalgar

- **Moe Drain** was constructed in the late 1880s to drain the former Moe Swamp. It is now a highly engineered channel with levees that direct flows across the Moe River flats, but its erodible banks make it a significant sediment source to downstream waterways. While it supports agricultural land use, the system remains flood prone due to its low lying topography and the drain's susceptibility to erosion and overtopping.
- Additional tributaries include Sheepwash Creek, Flynns Creek, Rintoul Creek, Eaglehawk Creek, amongst others.

Lake Wellington[1] – a large (13,800 hectare) shallow, brackish-water lagoon that accounts for a significant component of the 61,150 hectare Gippsland Lakes Ramsar Site. The lake itself supports a variety of waterfowl and other waterbirds and several fish species including black bream. Lake Wellington, however, is perhaps more environmentally significant for the role it plays in influencing the condition and values of the large expanses of diverse wetlands that fringe it and the Latrobe Estuary.

Lower Latrobe Wetlands

- **Sale Common** – the only remaining freshwater wetland in the Lower Latrobe Wetland complex and one of a few, large freshwater wetlands in the region. It is approximately 300 hectares and part of the Gippsland Lakes Ramsar Site. It supports significant biodiversity values.
- **Heart Morass and Dowd Morass** – representing two of the many brackish-water wetlands that fluctuate between fresh and saline conditions that fringe Lake Wellington. Both wetlands are located on the Lower River, the Heart Morass on the northern bank and Dowd Morass on the southern side. Parts of both wetlands are within the Gippsland Lakes Ramsar site.

Smaller streams and floodplain wetlands – there are a large number of small, unregulated streams in the Latrobe catchment and over 1100 floodplain wetlands covering around 11,000 hectares. The vast majority of these wetlands are small (< 1 hectare) and are on private property.

[1] *Noting that while Lakes Victoria and King are connected to Lake Wellington through McLennan Strait these are more heavily influenced by the eastern rivers and their proximity to the permanent ocean entrance, rather than the River and are not explicitly considered in this strategy.*

2.2 Values

The River system supports a wealth of water-dependent ecological, social and cultural values. These have been explored in a short film Durt'Yowan (Latrobe River): The Life Source.

2.2.1 Ecological values

The River supports significant ecological values along water courses and in wetlands. These include:

- **The Gippsland Lakes Ramsar site**, which includes parts of the lower Latrobe wetlands (Sale Common, Dowd and Heart Morass) as well as part of the Latrobe estuary. A wetland of international importance listed for its waterbird, fish and native vegetation values, many of which are directly supported by the River. The River plays a significant role in providing freshwater to the Gippsland Lakes. Over the past two decades, the River has contributed between 13 and 46 % of the total riverine inflow to the Gippsland Lakes as a whole, and on average provides nearly 60 % of the freshwater inflows to Lake Wellington.
- **Riparian vegetation communities**. With largely intact Damp Forest, Wet Forest and Riparian Forest in the upper reaches of the Latrobe and along many tributaries. The mid and lower reaches of the River support the endangered Floodplain Riparian Woodland, dominated by river red gum, Gippsland red gum and swamp gum.
- **Extensive areas of wetland vegetation**, particularly in the Lower Latrobe Wetlands, with a mosaic of open water, submerged and emergent vegetation.
- **Threatened wetland plant species** including: wavy swamp wallaby-grass, tall club-sedge, starwort, Eastern water ribbons and feather-leaf buttercup.
- **A diversity of native freshwater and estuarine fish species**, including several diadromous species that live most of their lives in freshwater, but migrate to estuaries or the sea to complete part of their lifecycle. This includes common species like short-finned eel as well as the nationally vulnerable Australian grayling.
- The river also supports a number of **freshwater resident threatened fish species** including: barred galaxias, dwarf galaxias and west Gippsland galaxias.
- **A diversity of frog species** occur within the Latrobe catchment and the wetlands of the system are known to support the nationally vulnerable growling grass frog and green and gold bell frog.
- **A diversity and abundance of waterbirds**, which occur along the rivers and estuaries, but are more numerous in the wetlands of the system including the Lower Latrobe Wetlands. In particular, the nationally critically endangered Australasian bittern, several species of waterbird listed as threatened in Victoria such as Australasian shoveler, hardhead, plumed egret and musk duck.
- The Lower Latrobe wetlands also support a number of **international migratory species**, listed under migratory bird treaties. This includes sharp-tailed sandpiper, and common greenshank, which are also listed threatened species.
- The Lower Latrobe wetlands are also important with respect to **breeding waterbirds**. Heart Morass supports waterbird breeding which previously included colonial nesting species such as royal spoonbill and eastern great egret (Borg and Savage 2005). Sale Common also supports breeding of several waterfowl species, including large numbers of black swans and a small colony of Australasian darters. Dowd Morass supports a breeding colony of colonial nesting waterbirds, mainly Australian white ibis and straw-necked ibis.

- All aquatic ecosystems in the study area support a **diversity and abundance of macroinvertebrates**. The River and tributaries support two Victorian endangered crustaceans: South Gippsland spiny crayfish and Strzelecki burrowing crayfish.
- The rivers of the Latrobe system also **support platypus and rakali as well as several species of freshwater turtle**.

2.2.2 Other values

- The River system provides **a wide range of social and recreational benefits**, offering opportunities for boating, fishing, walking and nature-based tourism that support the region's liveability and community wellbeing. Its rivers, creeks and wetlands also offer important amenity, providing places for people to relax, enjoy nature and spend time outdoors. These waterways are closely woven into the identity of nearby towns such as Traralgon, Morwell, Rosedale and Sale, where communities particularly appreciate the recreational opportunities associated with the region's rivers, lakes and wetlands.
- **Community interest in the health of the River and its wetland**s is strong. Local Landcare groups, volunteer networks and environmental organisations actively contribute to waterway monitoring, riparian restoration and citizen science projects. Their ongoing involvement reflects a deep community commitment to protecting rivers and wetlands for current and future generations. Wetland areas downstream near Lake Wellington are especially valued for their rich birdlife and unique natural experiences.
- As the **Latrobe Valley continues to transition away from coal-based industries**, the community's connection to natural places has further strengthened. Waterways are increasingly recognised as central to supporting a "cleaner and greener" future, enhancing wellbeing, attracting visitors and contributing to a more diverse and resilient local economy.
- This Strategy acknowledges the **many social, cultural and economic values** of the Latrobe River system. However, the scope of this strategy, and therefore the following sections, are focused on the ecological values.



Ecological values

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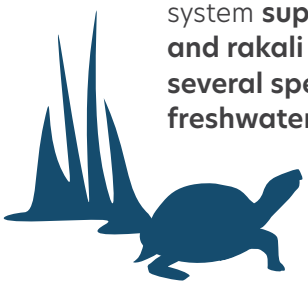
Riparian vegetation communities. With largely intact Damp Forest, Wet Forest and Riparian Forest in the upper reaches of the Latrobe and along many tributaries. The mid and lower reaches of the River support the endangered Floodplain Riparian Woodland, dominated by river red gum, Gippsland red gum and swamp gum.

A diversity of frog species occur within the Latrobe catchment and the wetlands of the system are known to support the nationally vulnerable growling grass frog and green and gold bell frog.





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Threatened wetland plant species including: wavy swamp wallaby-grass, tall club-sedge, starwort, Eastern water ribbons and feather-leaf buttercup.

The Lower Latrobe wetlands support a number of **international migratory species**, listed under migratory bird treaties. This includes sharp-tailed sandpiper, and common greenshank, which are also listed threatened species.





3 Why this strategy is needed

The Latrobe River system is being threatened by historical, current and future threats. Increasing populations bring land use change and increased water extraction, mine rehabilitation will result in significant declines in flows over the next three to five decades, the impacts of a changed and changing climate are already being experienced and there are potential future threats to water resources from emerging industries such as data centres. These are all acting to put further pressure on the aquatic ecosystems of the Latrobe resulting in declining ecological condition and loss of habitat and species. Without a strategic response, the river, estuary and Lower Latrobe Wetlands are expected to keep declining. Increased environmental water and improved environmental water management stronger restoration, and better long-term management are needed to protect ecological health and preserve values for future generations.

3.1 Threats to the River system

The River system has been heavily modified including river straightening, catchment land use modifications, on and off-stream dams/weirs and river flow diversions. These changes have interrupted many of the natural river and wetland processes needed by native plants and animals to survive, feed and breed (Figure 4).

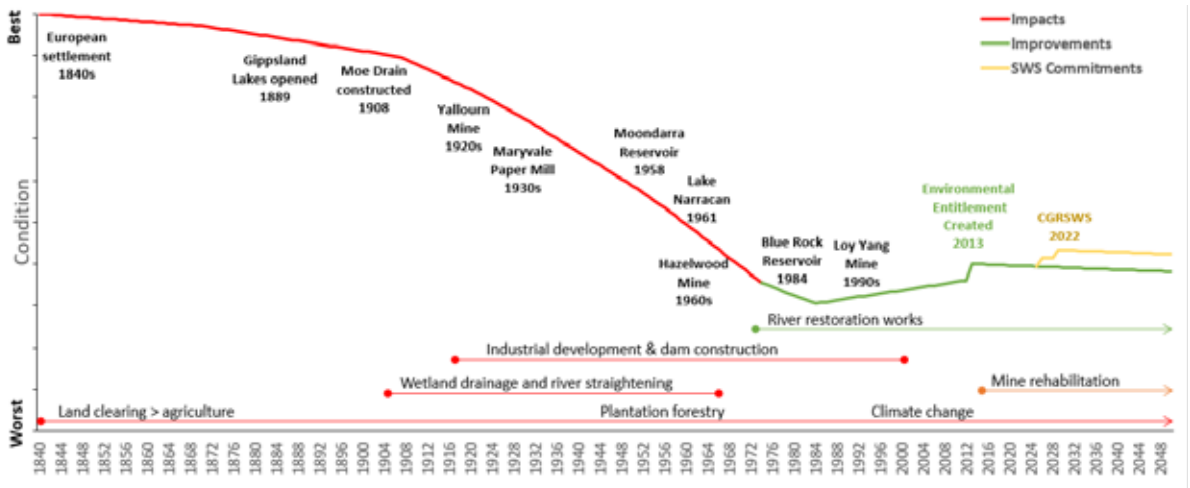


Figure 4. Timeline of major legacy modifications in the catchment overlayed on conceptual representation of river condition over time.

The Millennium Ecosystem Assessment identified human population growth and associated increases in resource use as the major driver of change for aquatic ecosystems systems on a global scale (Millennium Ecosystem Assessment Program 2005). More recently, climate change has been predicted to be the second most important driver of global biodiversity change in the 21st century (second only to land use change associated with population growth) (Elmhagen et al. 2015). While these two drivers of change result in a wide range of threats and stressors to the aquatic ecosystems of the region (e.g. land use change, increased nutrients and sediments), the most significant risks to the aquatic ecosystems of the Latrobe system are related to the potential effects of continued or increasing water resource use in the context of a changing climate.

3.1.1 Water resource use

Population in the Latrobe Valley has grown and is continuing to grow. The regional population in the Latrobe Valley has increased from around 100,000 in 1988 to almost 180,000 in 2024 (data from the Australian Bureau of Statistics). One of the consequences of increases in population has been an increase in the demand for and abstraction of water from the rivers of the Latrobe Basin. There are several major dams in the Latrobe system (Table 1).

Table 1: Major storages in the Latrobe Basin.

Basin	River	Dam	Capacity (ML)	Date
Latrobe	Latrobe	Lake Narracan	8,600	1961
	Tyers	Moondarra Reservoir	30,000	1962
	Tanjil	Blue Rock Reservoir	208,000	1984

Approximately a quarter of the total annual volume of flow in the River is extracted for consumptive use, for which power generation was and remains the single biggest use (Department of Sustainability and Environment 2011; Figure 5). Water extraction from the system varies annually and can be high in drought years, for example almost half the total flow was extracted in 2006/7, but a smaller proportion is extracted in wet years (e.g. 10% of the total flow in 2011/12). Total available entitlement across all Bulk Entitlements (excluding the environment) is approximately 235GL.

Licenced groundwater extraction from the surficial aquifers in the Latrobe Basin is very small compared to surface water extraction (Department of Environment, Land, Water and Planning 2019). However, groundwater is extracted by power stations to dewater mine pits and ensure safe operating conditions for coal mining. Mine dewatering has led to lowering of the water table in the shallow (upper) aquifer. While this is a minor source of water for wetlands and streams in the lower catchment, it does have a measurable effect on ecosystems in close proximity to mining operations (Alluvium 2020). Of note, however, is that during mine operation, a portion of the groundwater extracted is returned to the River (from around 33 – 50 GL/year when all three mines were operational).

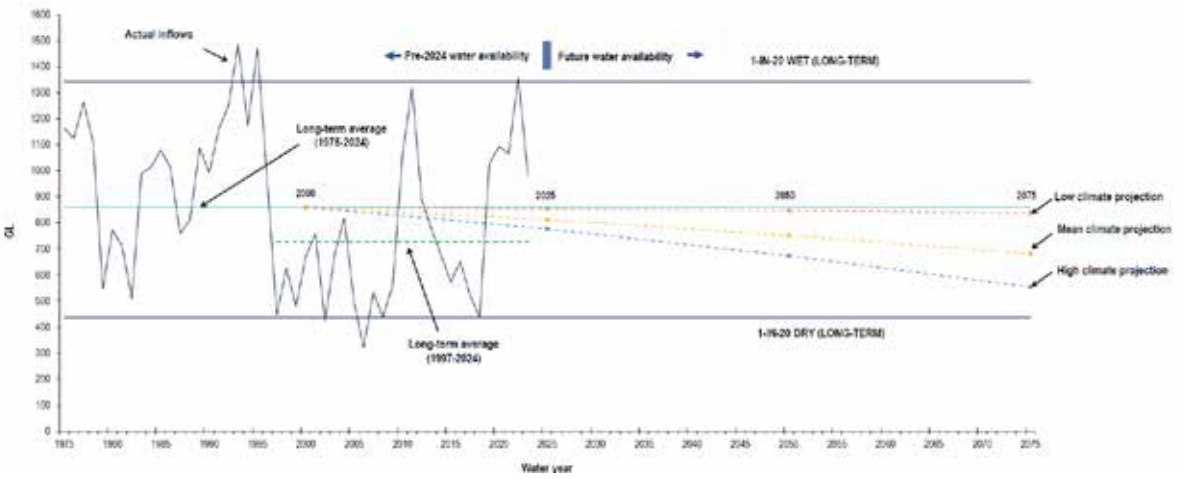


Figure 5. Historical water availability (total inflows upstream of the Latrobe River and Thomson River confluence) and future climate projections of average annual water availability in the Latrobe River system (after DJPR and DELWP 2020).

3.1.2 Climate change

High resolution climate change projections for the Latrobe Valley (Jacobs et al. 2017) projected the following aggregated changes in hydroclimate variables under emission scenario RCP8.5 relative to the baseline period of 1975 – 2014:

- Increase in average annual temperature of 1.530 C for dry (90th percentile) scenario and 1.210 C for median (50th percentile) scenario by 2040, with increases of 2.820 C and 2.210 C for respective scenarios by 2065.
- Increase in annual potential evapotranspiration (PET) of 5.84% for dry scenario and 4.51% for median scenario by 2040, with increases of 11.47% and 7.6% for respective scenarios by 2065.
- Decrease in annual rainfall of 14.23% for dry scenario and 4.17% for median scenario by 2040, with decreases of 20.9% and 4.45% for respective scenarios by 2065. Reduction in cool-season rainfall has been predicted for Victoria.
- Decrease in annual runoff of 35.46% for dry scenario and 10.0% for median scenario by 2040, with decreases of 49.21% and 17.86% for respective scenarios by 2065.

Although there is growing evidence for projected changes in surface water runoff in the future, there is also very strong evidence that many of these changes are already being realised currently. Recent assessments of water availability (i.e. the entire volume of water in the river system including rivers flows and consumptive use) in the Latrobe Basin indicate that there has already been a demonstrable decline in surface water due to warmer and drier conditions. The period 1975 to 2018, for example, saw a 5% decline in surface water in the Latrobe Basin, compared with the long-term historical record. There have been further declines in surface water after 1997 (around 27% compared to the historical record), but this period includes the decade long Millennium Drought, which may not be indicative of a continuing trend (DELWP 2020).

3.1.3 Altered hydrology

The average annual flow of the River system is highly variable and ranges from more than 1000 GL/year in wet years to less than 350 GL/year in dry years. Seasonality is typical of rivers in south-eastern Australia, with peak volumes in winter and spring (due to seasonal rainfall and snow melt) and low flows in late summer and early autumn. Although there has been a decline in total annual flow in the River (Figure 6), particularly since 1997, seasonality of flow remains unaltered.

The Tyers and Tanjil Rivers have altered flow regimes due to water storages in their upper reaches (Moondarra Reservoir and Blue Rock Reservoir, respectively). The capture of streamflow in the two water storages has resulted in a reduction of over 50% in the average flow in the Tyers River and 20% in the Tanjil. In addition, there is an alteration to the seasonal pattern in the Tanjil River, with increased flows in summer as a result of dam releases to meet consumptive demands.

The Morwell River and Traralgon Creek both receive discharge water from power stations and as a consequence, average flow in these rivers is higher than would be under natural conditions (18 % more in Traralgon Creek and 11 % more in the Morwell River). The discharge from mine operations is constant year-round, as such, the seasonality of flow in these two rivers remains unchanged.

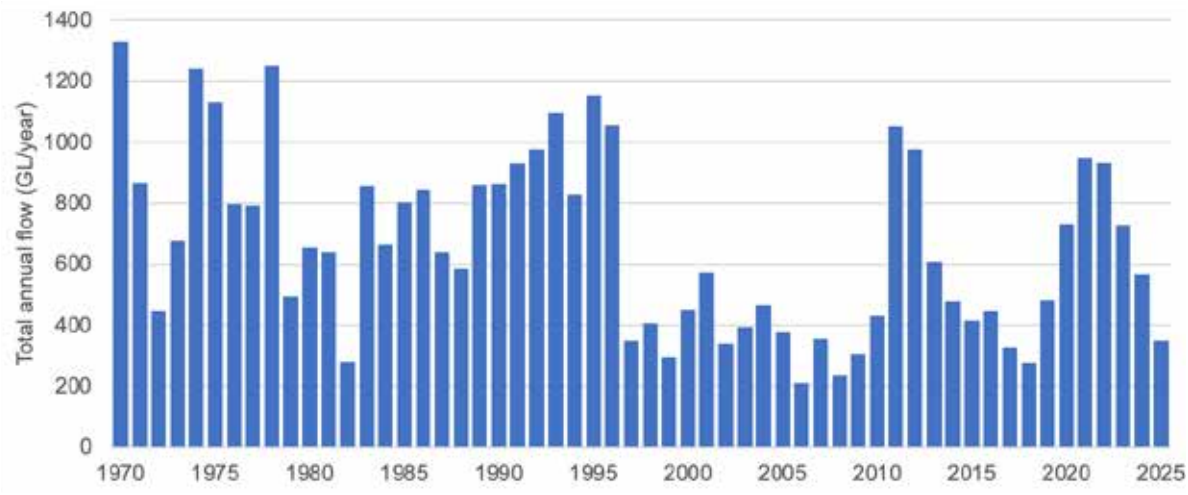


Figure 6. Annual flow in the lower River) at Rosedale (data from https://data.water.vic.gov.au).

The recent Victorian wetland condition assessment (Department of Energy, Environment and Climate Action 2025) indicates that over half the wetlands in the Latrobe Basin are in good or excellent condition with respect to hydrology. There are, however, many wetlands that have altered duration and frequency of inundation. The Lower Latrobe Wetlands, for example, have experienced increased periods of drying and reduced rates of flushing flows, the latter of which are reliant on large natural floods.

The influence of groundwater on the aquatic ecosystems of the River is not well characterised. It is thought that the majority of the streams in the system are "gaining", meaning that groundwater flows into the waterways. This, however, varies spatially and temporally, with water movement from the ground water to the river when surface water levels are low and movement from the rivers to groundwater during periods of high flow. There is some evidence to suggest, however, that the reach of the River immediately downstream of Lake Narracan (in the vicinity of the Hazelwood mine) is a losing stream. It is likely that mine depressurisation effects have lowered groundwater aquifers and resulted in a permanent movement of water from streams to aquifers (i.e. permanently "losing" streams; Alluvium 2020).

Water regimes in the Lower Latrobe Wetlands are complex and influenced by a variety of factors including:

- Flows upstream in the Latrobe and Thomson and Macalister Rivers, the latter of which is heavily impacted by water extraction for interbasin transfers to the city of Melbourne and irrigation supplies for the Macalister Irrigation District.
- Environmental water management (which is through a series of watering infrastructure).
- Movement of water (often saline) from Lake Wellington, into the wetlands (especially Dowd Morass) which is exacerbated by sea level rise. An important point to note here is that if freshwater flows down the Latrobe are sufficiently low, the movement of saline water up the Latrobe Estuary can limit water manager's abilities to get freshwater into the lower Latrobe wetlands.

The brown coal reserves of the Latrobe Valley are found near the surface and there are three open-cut mines in the region at Hazelwood, Loy Yang and Yallourn. These mines are all large, each extending over 12 square kilometres and with a combined void space of 2200 gigalitres (GL; million cubic metres). The Hazelwood mine closed in March 2017, and the Yallourn and Loy Yang mines are scheduled for closure in 2028 and 2035 respectively (Latrobe Valley Regional Rehabilitation Strategy (DEECA, 2023). It seems likely that pit lakes (filled with water from the Latrobe system) will be the rehabilitation strategy for each of these mines. This will result in upwards of 2200 GL of water extracted from the system over the next 30 to 60 years (plus ongoing water use to keep pit lakes full). The exact volumes of water required for filling and maintaining the three pit lakes are still not known and will be subject to individual environmental and regulatory assessment processes. What is certain is that there will be a substantial deficit in river flows that spans many decades. Added to this uncertainty is the potential future water demands from new technologies and water users. For example, the development of data centres or other water intensive industries concurrently with and in the post-mine rehabilitation phase.

3.1.4 Altered geomorphology

The headwaters of the Latrobe River are heavily forested and in good condition, as are the catchments of many of its tributaries. The major changes in the geomorphology of these rivers occurs where they leave their mountain tract and enter broad floodplains that have been developed for agriculture since the late 1800s. Major changes to the geomorphology of the River have occurred in the long, alluvial, meandering tract of the river downstream of Lake Narracan. This is dominantly a sand bed system that has been dramatically affected by at least 66 meander cut-offs in between Yallourn and Lake Wellington, over 80% of which were cut since 1938 (Reinfelds et al. 1995).). This has reduced channel length by 25% and subsequently will have increased slope and stream energy. It has also undergone major 'desnagging' or wood removal since the 1930s. The combination of desnagging and

straightening has resulted in up to 2 m of bed lowering (Reinfelds et al. 1995), leading in turn, to river bank failures, widening and a pulse of sand moving through the river. The consequences of these changes are a two-thirds increase in channel capacity, much larger bankfull flows, and a three-fold decrease in overbank flows and the period of floodplain inundation. The river is now disconnected from this floodplain by incision, flood levees and flood regulators. Overall there has been a sharp decline in channel complexity, e.g. in-channel benches (Alluvium 2009). River bank erosion in the lower Latrobe is now a major contributor to a 5-10 times increase in suspended sediment loads reaching Lake Wellington relative to pre-European loads (Hancock et.al. 2007).

The morphologies of the wetlands of the Lower Latrobe system have all been modified by levees, either within the bed of the wetland, or along the banks of the rivers. Sale Common, Heart and Dowd Morass in particular, have had a long history of clearing, drainage and grazing, with significant alterations to wetland beds. From the 1970s to the 1990s extensive levees were established which restrict the movement of water within the wetlands. Some of these, such as Boultons levee in Heart Morass have culverts to facilitate water movement. Sediment regimes and changes in sediments over time, however, remain unknown for all three wetlands (Arrowsmith and Duggan 2009).

3.1.5 Altered salinity

There is evidence of altered salinity in both the estuary and Lower Latrobe Wetlands. Salinity in the estuary is a function of river flow and water level in Lake Wellington. Under prolonged low flow conditions (flows < 650 ML/day at the Swing Bridge) saline water (water > 1 ppt) extends over 17 kilometres from Lake Wellington (Brizga et al. 2013). In channel freshes can flush salt from the upper layer of water and an increase in volume or duration can result in a fully flushed water column in the estuary. An assessment of salinity conditions in the estuary indicates that under "natural" (pre-water development) conditions, the water column in the lower estuary was fully fresh around 37% of the time, which has been reduced under current conditions to around 20% of the time (Figure 7).

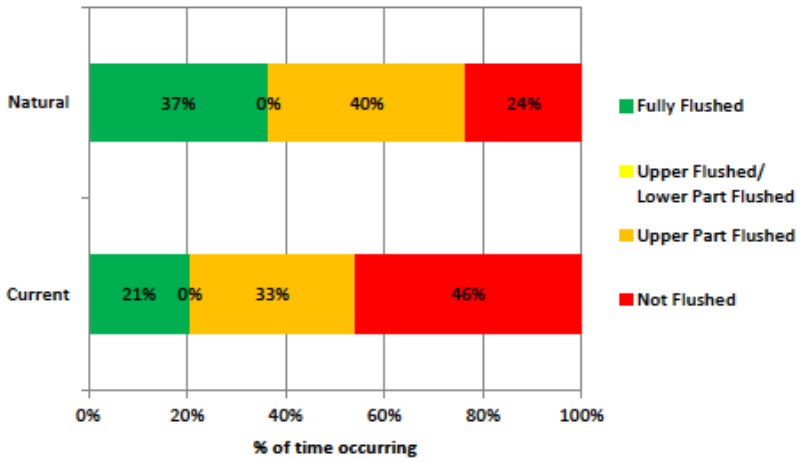


Figure 7: Salinity conditions in the Latrobe estuary (Brizga et al. 2013).

Water quality in the Lower Latrobe Wetlands is tightly coupled with water regime and the salinity in the river and estuary. There is evidence to suggest that salinity in Heart and Dowd Morass is increasing over time and that Dowd Morass is increasingly connected to Lake Wellington when salinity in the Lake is high, resulting in the movement of salts into the Morass. While Sale Common remains fresh, there are concerns that the salinity of the river water adjacent to wetland inflow points is increasingly brackish to saline increasing the likelihood of saline water intrusions to freshwater wetland systems.

3.1.6 Other threatening processes

In addition to water resource use and climate change, there are other issues that affect the Latrobe system and receiving waters. While some of these are derived from historical actions (e.g. straightening of the river and land clearing) others are a result of ongoing activities (e.g. pollutant loads).

Nutrients and sediments

A CSIRO study (Hancock et.al. 2007) estimated that the present nutrient and sediment inputs to Lake Wellington are 5 to 10 times the pre-European inputs. While annual nutrient and sediment loads to Lake Wellington are variable and largely related to rainfall, they are high, with an estimated annual load of (WGCMA 2018; Gippsland Lakes Environment Reports):

- Phosphorus 69 – 140 tonnes (43% - 90% from the River)
- Nitrogen 1770 – 2800 tonnes (56% to 93%) from the River)
- Sediment 110,000 – 190,000 tonnes (around 55% from the River)

These nutrients and sediments are a significant contributor to water quality issues in Lake Wellington and through to Lakes Victoria and King. Although the salinity gradient through McLennan Strait causes the majority of sediments (and associated particulate nutrients) to flocculate and fall to the sediments at the western end of Lake Victoria, during periods of stratification, large amounts of particulate phosphorus are released from the sediments and drive algal bloom dynamics.

Toxicants

Although data are limited, there is evidence that land uses in the Latrobe catchment contribute to toxicant loads in the system. There are times when the metal concentrations in the River at Rosedale exceed the Environmental Reference Stannard (ERS) objectives, most often coinciding with large flows, indicating movement of metals from the catchment. The metals of most concern are:

- Cadmium (guideline value of 0.2 µg/l) – maximum of 1.3 µg/l in April 2011
- Chromium (guideline value of 4.4 µg/l) – maximum of 6 µg/l in February 2013
- Lead (guideline value of 3.4 µg/l) – maximum of 9 µg/l in July 2016
- Zinc (guideline value of 8 µg/l) – maximum of 42 µg/l in July 2016
- Copper (guideline value 1.4 µg/l) – almost constantly exceeded with an average of 3 µg/l.

Land use change

The Victorian Land Cover Time series shows increases in some intensive land uses in the Latrobe catchment over the past two decades, including a doubling of the urban areas and a 30% increase in irrigated horticulture. While the upper catchment remains largely forested, the mid to lower reaches retain only around 25% of native vegetation extent (Figure 8).

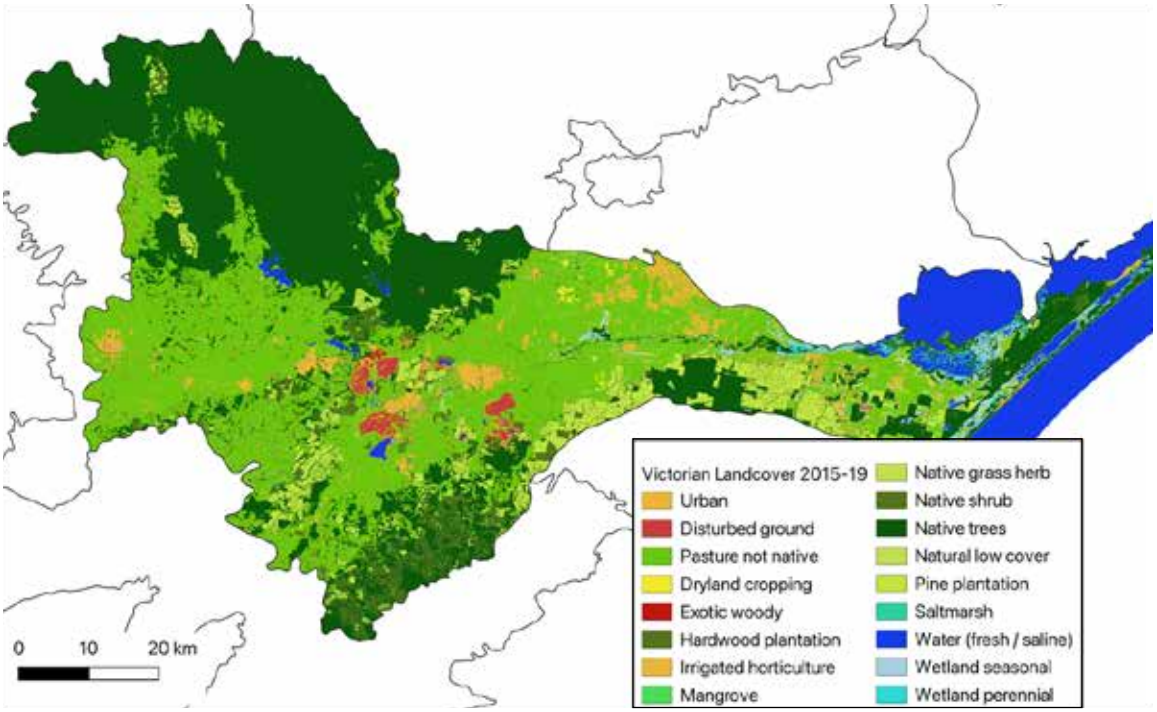


Figure 8. Land use in the Latrobe Catchment 2015-19 (Victorian Landcover Timeseries).

Instream barriers

All native fish in Australia need to move between habitats at some stage in their lifecycle. Movement is necessary for juvenile fish to find nursery habitats and for adult fish to forage and find mates. Movement also is important for maintain genetic diversity and reducing disease risk. For diadromous species that move between saline and freshwater habitats to breed and recruit, longitudinal connectivity is vital.

Structures such as dams and weirs prevent the movement of fish (and in some instances platypus) through a river system. The existing storages on the Latrobe River system, including Narracan, Moondarra and Blue Rock together with several smaller weirs including Wirilda Park weir on the Tyers River and weirs associated with the Morwell River Diversion, provide significant barriers to fish passage.

3.2 Current ecological condition

The ecological condition of the aquatic ecosystems of the River system has been described in detail in the LVEEA (Hale et al. 2020), the Latrobe environmental water requirements investigation (Alluvium 2020, 2021) and the Lake Wellington Scoping Study (Hale and Boon 2022). The following is a high-level summary of known ecological conditions.

3.2.1 Environmental water and additional water required to meet objectives

The Latrobe environmental water requirements investigation (Alluvium 2020, 2021) made recommendations for the flows required to maintain the ecological integrity of the Latrobe system, including tributaries and Lower Latrobe Wetlands. An examination of the current flow regime (including environmental water provisions) against the recommended flow requirements provides an indication of the ecological condition of the system at a broad scale.

The amount of water available for environmental outcomes in the Latrobe system is complex and is related to passing flows, expected climatic conditions, internal spills and carryover. Expected annual water availability for the Latrobe environmental entitlement ranges from 6 GL in drought years to 38 GL in wet years.

The current environmental entitlement does not meet the full flow recommendations for the river system. The deficits for delivering the full suite of environmental flow requirements to the system are highest for the Latrobe Estuary, followed by Reach 4 of the River. Deficits for Reach 5 are more modest. Step-change climate increases the amount of additional water required (Table 2). In addition, there are significant deficits in achieving environmental flow recommendations in the Tyers River (Table 3).

Deficits for the Lower Latrobe Wetlands are dependent on the installation of new infrastructure. The average deficit (current level of development, baseline climate) is 7680 ML/yr in the absence of new infrastructure and 1377 ML/yr with that infrastructure installed. Noting that these deficits do not take account of the flows in the Estuary required to ensure that the salt wedge occurs downstream of the inflow structures. The hydrodynamics of the Latrobe Estuary are complex and related to many factors including barometric pressure, tides, sea level and freshwater inflows (Brizga et al. 2013). There will be instances when significantly more water will be required to achieve freshwater at the inlets to these wetlands, than the volumes quoted here.

Table 2: Mean annual deficit (GL/yr) under each climate condition for the Latrobe Reaches 4, 5, and Estuary under the Full uptake, baseline climate and step change climate scenarios.

Location	Average annual deficits (GL/yr)							
	Baseline Climate				Step Change Climate			
	Drought	Dry	Average	Wet	Drought	Dry	Average	Wet
Reach 4	106	92	42	18	117	100	69	43
Reach 5	40	15	4.3	2.7	16	26	28	21
Estuary	383	399	158	65	430	469	255	146

Table 3: Mean annual deficit (ML/yr) under each climate condition for the Tyers River under the Full uptake, baseline climate and step change climate scenarios (adapted from Alluvium 2020).

Climate condition	Average annual deficits (Gl/yr)	
	Baseline Climate	Step Change Climate
Drought	49.4	45.6
Dry	43.0	43.2
Average	31.9	40
Wet	19.8	27.9

The use of environmental water in the Latrobe system is also impacted by a number of delivery constraints:

- *Available and total outlet capacity at Blue Rock and Moondarra* – most likely to impact freshes
- *Inundation of private land on the Tanjil* – limits the ability to release larger volumes of water from Blue Rock Reservoir
- *Inundation of private land on reach five of the Latrobe* – existing constraints to water delivery limit peak flows to less than approximately 980 ML/day. Water heights in the lower portion of this reach are influenced by tidal and backwater effects from Lake Wellington and the Thomson River. As a result, flows above approximately 1,100 ML/day have the potential to inundate private landholders (depending on river heights). This constraint leads to significant environmental water deficit for upper reaches of the regulated River) (reach 3 and reach 4) as well as the Latrobe Estuary.
- *Maintenance of water levels on Lake Narracan during the ski season (Jan-Mar)* – reduces capability to charge Lake Narracan with releases from Blue Rock to allow for larger releases into River).

The combined effects of environmental water shortfalls and the constraints on delivering environmental water can have profound effects on the ecological values of the system. Declines in bankfull and overbank flows have profound effects in the condition of riparian vegetation including declines in floristic diversity, increasing terrestrialisation and a loss of diversity in understorey communities. These high flows are also important for maintaining productivity and their loss effects the entire food web. Declines in freshes can remove important migration and breeding cues for native fish, impacting on breeding, recruitment and ultimately populations. Decreased baseflows leading to poor water quality (increased salinity, low dissolved oxygen) in residual pools, also affect the condition of native fish and survival of native fish species.

In floodplain wetlands (including the Lower Latrobe Wetlands) a decrease in inundation frequency and a loss of flushing flows can result in shifts in vegetation communities to more terrestrial and salt tolerant forms. Dry wetlands provide poor foraging habitat for waterbirds and no habitat for breeding frogs, impacting on diversity and populations. In addition, there is likely to be an increased risk of nest abandonment (or birds not beginning a breeding cycle) if duration of inundation cannot persist for sufficient periods to allow chicks to fledge.

3.2.2 Flora

On the main stem of the Latrobe the dominant riparian vegetation is EVC 56 Floodplain Riparian Woodland, which is present almost continuously downstream of Lake Narracan to the beginning of the Latrobe Estuary. The width of this zone tends to increase downstream, especially downstream of Rosedale and in the region near Kilmany South, where there can be areas of intact woody riverine vegetation and emergent reeds. Upstream (e.g. between Morwell and Rosedale) it can be non-existent or very narrow, perhaps only one tree wide.

Although there is little information on the condition of vegetation in the riparian zone, the Index of Stream Condition (ISC) assessment, covering the period 2004–2010, indicated generally poor condition along the River and much of the Morwell River streamside zone. In contrast, the condition of riparian vegetation in the Tanjil and Tyers River reaches was considered moderate (DELWP 2014).

The results of the formal assessments of riparian condition from two decades ago are consistent with the observations from site visits by Alluvium (2020) which indicated poor condition and high percentages of exotic species in the riparian zone, particularly in the understorey in the Latrobe River. While there is generally good vegetation condition in the Tyers River downstream of Moondarra Reservoir, there are high percentages of exotic species in the riparian zones of the other tributaries, which are generally poor condition

Vegetation extent and composition in the wetlands of the Latrobe system is dynamic in response to water regime and salinity. This is particularly evident at Sale Common where the extent of emergent wetland vegetation and open water varies on interannual time scales. For example, in wetter years, over 50% of the wetland can comprise open water, with the rest remaining as a mosaic of emergent and submerged wetland vegetation communities. During prolonged dry periods, emergent vegetation becomes more established and can cover almost 90 % of the wetland with a very small area of open water.

Heart and Dowd Morass are characterised by more variable salinity regimes and are fresh to brackish in response to inundation frequency and extent. They both are characterised by highly diverse wetland vegetation that is largely in moderate to good condition (Frood et al. 2015).

Recent assessments of floodplain wetland vegetation in areas upstream of the Lower Latrobe Wetlands indicate that vegetation is largely in moderate to good condition (Frood 2024), although these assessments were undertaken immediately following periods of above average rainfall, which would have positively influenced the results.

3.2.3 Fauna

There is little information on the current condition of the fauna of the River. There are few studies of fish and other aquatic fauna from the system. Recent environmental DNA sampling indicates a range of fish species are present in the River and tributaries spanning multiple life history strategies. This includes freshwater species such as river blackfish, estuarine species such as estuary perch, black bream and Australian bass as well as several diadromous species such as tupong and long and short-fin eels. The nationally threatened Australian grayling was also detected in the upper Tyers River. There is evidence of exotic fish species presence including goldfish, common carp, eastern gambusia, redfin and trout. The proportion of native versus exotic fish species is not known, but there have been periodic large accumulations of carp in the lower River, wetlands and Lake Wellington.

The Lower Latrobe Wetlands continue to support a diversity and abundance of waterbirds, including the nationally endangered Australasian bittern. Heart Morass in particular regularly supports several international migratory species, protected by international treaties including common greenshank, Latham's snipe, red-necked stint and sharp-tailed sandpiper. These wetlands continue to support waterbird bereding including colonial nesting species such as royal spoonbill and eastern great egret, straw-necked ibis and Australasian darter, as well as several waterfowl species, including large numbers of black swans.

The floodplain wetlands of the system also support several species of frog including two nationally vulnerable species (growling grass frog and green and golden bell frog). Recent monitoring indicates healthy populations of both species as well as evidence of breeding and recruitment.

3.3 Expected trajectory of change without a strategic approach

There can be no doubt that the current condition of the River, as described above, is impacted by a number of significant threats, many of which are expected to exert additional pressures on the system into the future. The two most significant threats to the waterways of the Latrobe system are the combined effects of mine rehabilitation[2] and climate change on hydrology.

The following is largely a summary from the Latrobe Valley Regional Water Study: Ecological Effects Assessment (LVEEA) augmented with some more recent information. This project sought to answer the question:

"If surface water from the River system currently permitted to be used for power generation was permitted to be used for mine rehabilitation once power generation ceases, what would be the likely effects of these ongoing extractions on the aquatic ecosystems of the River system?"

The hydrological modelling for the project did not account for several factors that would further decrease water in the Latrobe system:

- The loss of mine dewatering, which accounts for around 22 GL/annum on average that historically was returned to the river.
- The use of flood flows from the Morwell River (volumes to be considered in the Environmental Effects Statement, but likely higher in high rainfall years)
- Changes to bulk entitlements or consumptive use (in the Latrobe or the Thomson systems).
- More recent climate change modelling and predictions. The Department of Energy, Environment and Climate Action (DEECA) defined the climate scenarios for the LVEEA as:
  - Historical climate (1957 – 2016)
  - Current climate (post 1975)
  - Future climate (post 1997) – Given that we are currently in the post 1997 era and that the climate is continuing to change, it would be more correct to call current climate post-1997 and set a more realistic future climate that accounts for further warming.

[2] *Noting that there is potential for future large water users to enter the market and become of increasing concern.*

3.3.1 Hydrology

Hydrology was modelled by DEECA in 2020 under five scenarios (it did not include the Tyers or Morwell Rivers:

1. Natural (current climate) – what the system would look like under current climatic conditions but with no extraction from the River.
2. Current conditions (current climate) – what the system is experiencing now, with current water use and current climatic conditions.
3. Current conditions (future climate) – what if the amount of water extracted remained the same as today but the climate continues to dry.
4. Full uptake (current climate) – what would happen if we had full uptake of industrial demands for water and current climatic conditions.
5. Full uptake (future climate) – what would happen if we had full uptake of industrial demands for water and the climate continues to dry.

The assessment used the environmental flow recommendations (Alluvium 2021), but took a novel approach to try and tease out the effects of water resource use. Many of the flow recommendations were not met under natural (no extraction), historical climate conditions. The binary nature of assessing against flow recommendations meant that all scenarios looked similar (i.e. flow recommendations were rarely met). So, to enable a meaningful comparison of the provision of ecologically important flows under the different scenarios, achievement of recommended flows was assessed relevant to the natural (unimpacted) historical climate model outputs (1957 to 2016). That is, the conditions that the ecosystems of the Latrobe Valley would have experienced in the absence of extraction and climate change. For example, if a flow component would naturally have occurred, on average, in half of the modelled years, and under scenario 3 (current extraction, future climate) it occurs in a quarter of years, this was assessed as 50% achievement of the flow component.

Key messages from the hydrological analysis:

- Water resource use and climate change act together to significantly reduce ecologically important flows in the system.
- The most pronounced effects are felt in the reach below Lake Narracan, the estuary and the Lower Latrobe wetlands.
- The release of mine dewatering flows to the river provides baseflows and freshes in the middle reaches of the Latrobe. A further 15% reduction in baseflows can be expected when mine dewatering ceases (in addition to the reductions predicted from the LVEEA modelling).
- Even with the use of infrastructure to allow environmental water into the Lower Latrobe Wetlands, it is likely that there will be consecutive years when this cannot occur under future climatic conditions.

Table 4: Flow statistics for wetland flows under the different water use and climate scenarios.

Flow component	Natural current climate	Current water use current climate	Current water use future climate	Full water use current climate	Full water use future climate
130GL/month in the Latrobe Estuary, to flush Lake Wellington					
Percentage of months flow occurs	46	31	20	28	18
Percentage of years flow not met	5	20	32	20	35
3200 ML/day in the Latrobe Estuary to allow freshwater inflows to wetlands through infrastructure					
Percentage of days flow threshold is exceeded	44	27	19	25	17
Maximum interval flow threshold is not achieved (days)	249	613	626	614	630
15,000 ML/day in the Latrobe Estuary to flush wetlands					
Percentage of years flow is met	25	15	2.5	15	2.5

Although the Tyers River was not included in the modelling for the LVEEA, the Independent Expert Scientific Committee on Unconventional Gas Development and Large Coal Mining Development (the IESC) identified significant risks to the Tyers River from Hazelwood Mine Rehabilitation (IESC 2025). They identified reduced ecologically important flows in the Tyers River downstream of Moondarra Reservoir due to increased water take from the reservoir, particularly reduced summer and winter baseflows and summer freshes.

3.3.2 Ecological effects

A range of ecological effects were predicted from continued current level of extraction and full uptake under a future climate (Figure 9). While effects to river reaches were identified, the greatest risks were considered to be in the Lower Latrobe Wetlands. This was due not just to the predicted hydrological changes, but also to the greater biodiversity and related ecological values attributed to the lower end of the system. A stressor model was developed to illustrate the ecological impacts.

The ecological effects of altered water regimes are exacerbated by other non-flow related pressures. Pest plants and animals, land use change, intensive agricultural practices, stormwater and sewage discharges, industrial activities and mining all put additional stress on the aquatic ecosystems of the River.

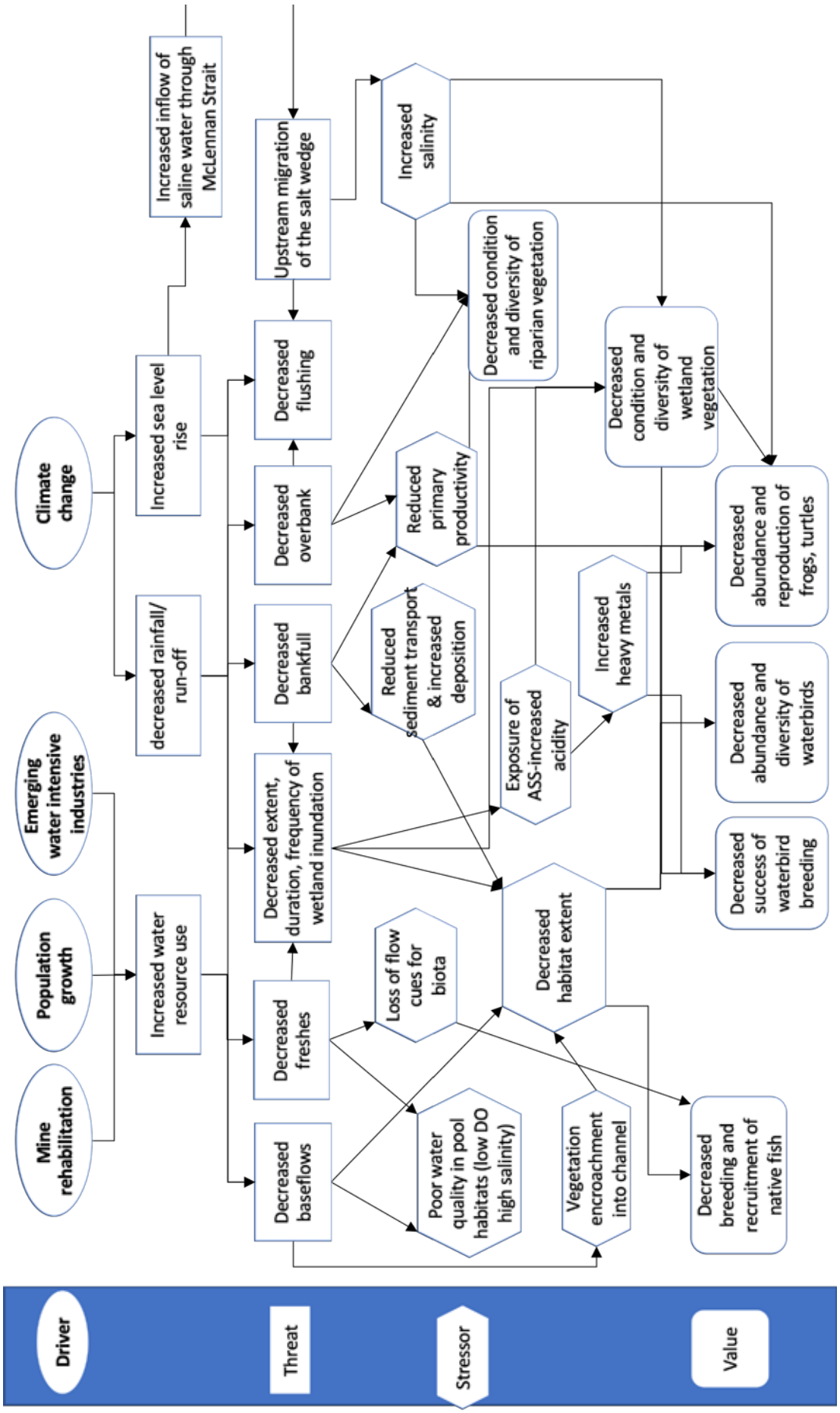


Figure 9: Stressor model of the impacts of altered flow regimes on the ecological values of the aquatic ecosystems in the study area

Effects on riverine environments

- Decreased dissolved oxygen (from reduced baseflows) – although the models did not predict cease to flow in the main stem of the Latrobe, this may be possible if the mine dewatering ceases.
- Reduced channel and bed diversity (through loss of bankfull and fresh flows), although the main stem of the Latrobe is already compromised with respect to channel morphology.
- Riparian and floodplain vegetation in most parts of the River system is already in poor condition, especially along the mainstem of the River. A further decline in bankfull and overbank flows will result in continued decline in condition, extent and floristic diversity, increasing terrestrialisation and a loss of diversity in understorey communities.
- Reduced fish reproduction through reduced carbon inputs and a loss of flow cues. The Australian grayling was recorded spawning in the Latrobe for the first time in 2015/16 on the back of environmental water delivery. Continued ability to meet the flow requirements of grayling and other diadromous fish is uncertain under future climate and water use conditions.

Effects on the estuary and lower Latrobe wetlands

Salinity is a key issue - the salinity in Lake Wellington and the Latrobe Estuary is a product of freshwater inflows pushing salt out of these systems and the incursion of marine water from the Southern Ocean, through McLennan Strait into Lake Wellington (and potentially up the Latrobe Estuary). There is no doubt that a further decline in periods where flows exceed 130 GL/month, especially if coupled with continued rising sea levels and storm surges, will result in continued salinisation of Lake Wellington, the Latrobe Estuary and several of the fringing wetlands. Dowd Morass is the most at risk as it sits low in the landscape and is hydrologically connected to Lake Wellington at around 0.35 m AHD. In the past Water in Lake Wellington only exceeded 0.35 AHD following large freshwater inflows and so connection to fringing wetlands such as Dowd Morass resulted in freshwater inflows. However, since around 2007, there have been increasing incidences of higher water levels associated with low river flows and the connection of Lake Wellington to fringing wetlands occurs more often with brackish to saline water.

In many respects the history of the eastern portion of the Gippsland Lakes following the opening of a permanent connection to the sea in 1889 at Lakes Entrance provides an indication of likely future changes in Lake Wellington and the fringing wetlands. The wetlands in the area closest to Lakes Entrance were modified by increasing salinity and lower water levels, which resulted in a die back of paperbark and common reed and their replacement with saltmarsh communities dominated by sea rush and beaded glasswort (Bird 1966, 1978). A similar transition can be predicted in the littoral zone of Lake Wellington and eventually in the Lower Latrobe Wetlands, with widespread death of native trees such as eucalypts and swamp paperbarks, and their replacement by halophytic plant taxa including saltmarshes.

Increased salinity and upstream movement of the salt wedge in the Latrobe Estuary limits water managers ability to move freshwater into the lower Latrobe wetlands. This means either filling the wetlands with saline / brackish water or allowing them to remain dry. A risk assessment (Hale and Boon 2019) recommended that:

- For Sale Common, it is far better to allow the wetland to dry than to put water in it with a salinity of > 5000 µS/cm. There is some risk to the site at the upper end of this range.
- For Dowd Morass, there is only a small risk if water up to 15,000 µS/cm is used to fill the wetland. When it comes to allowing the wetland to dry, however, while a dry cycle would be beneficial, this is unlikely to be achievable. It is more likely that if there is no (or little) water in Dowd Morass, then saline water will flow in from Lake Wellington, and this is a considerable risk, particularly if the site is not able to be flushed and there is a continued build-up of salts.
- For Heart Morass, the situation is more difficult to interpret. Certainly, there is low risk in filling the wetland with water in the 5000 – 10,000 µS/cm range. There is a great deal of uncertainty surrounding the potential effects of **activation of ASS** and using more saline water to fill the wetland. While the empirical evidence would suggest that low pH and high salinity both represent a risk to values, there is historical evidence that the site is resilient to both these conditions. The question remains about how long this resilience can be expected to continue (in the absence of a flushing flow) and if we are approaching a critical threshold with respect to the duration, frequency or severity of low pH and / or high salinity at this site.

Allowing Sale Common to partially dry also comes with a risk of giant rush (Juncus ingens) incursions. This plant forms dense monocultural stands reducing habitat for most native species (even reed loving birds such as Australasian bittern). In recognition of the importance of habitat diversity in Sale Common, management of the Gippsland lakes Ramsar site requires maintaining a habitat diversity of open water, emergent reeds and woody vegetation. In 2009, dense stands of the native plant giant rush colonised large areas of previously open water in Sale Common. This vegetation change occurred during a prolonged dry period that extended from the summer of 2009 to spring 2010. The WGCMA, in collaboration with Parks Victoria, responded to the vegetation change by developing a management strategy aimed at reducing the extent and density of giant rush by instigating a prolonged inundation event. This proved successful and is a continuing objective of environmental water management at the site and is included in the environmental water requirements. Prolonged dry / damp conditions in Sale Common will likely result in another expansion of giant rush and a potential change in the ecological character of the Ramsar site.

Changes to water regimes and habitat will also affect wetland biota. The vast majority of the waterbirds that are regularly supported by the Lower Latrobe Wetlands occur in both fresh and saline environments. Most waterbirds, however, do have specific water depth requirements for foraging. While there may be periods of adequate shallow water habitat for shallow water foragers such as shorebirds and large bodied waders in drying wetlands under decreased frequency of inundation, this habitat is likely to be transitory. Once wetlands are completely dry, there will be little suitable habitat for foraging or breeding.

There is likely to be an increased risk of nest abandonment (or birds not beginning a breeding cycle) if duration of inundation cannot persist for sufficient periods to allow chicks to fledge. In addition, any loss of vegetation that is used as nesting habitat (emergent macrophytes, shrubs; inundated trees) will reduce waterbird use of the site.

The combined effects of reduced frequency and duration of inundation and likely deterioration of water quality in the Lower Latrobe wetlands will have major adverse impacts on frog populations, including the two threatened species, green and golden bell frog and growling grass frog. Although the green and golden bell frog have some capacity of survival in brackish water, amphibians as a whole are very poorly adapted to saline conditions and they are not tolerant of high salinities. Frogs are also particularly susceptible to changes in pH, and the acidic conditions and heavy metals that may occur following the activation of acid sulfate soils are likely to present additional stresses.

The key conclusions of the LV EEA were that:

- If water from the Latrobe River (Durt'Yowan) system continues to be taken and used at current rates, under a drier future climate this would lead to a decline in the environmental values of the Latrobe system and a loss of biodiversity.
- These declines would be exacerbated if there was an increase in the amount of water extracted from the system.
- Decreases in water availability in the Latrobe River (Durt'Yowan) system from increased extraction and/or reduction in return flows from power stations would lead to the emergence of multiple and interconnected threats, resulting in loss of the environmental, Aboriginal cultural and social values of the Latrobe River (Durt'Yowan), its estuary and the Ramsar-listed Gippsland Lakes.

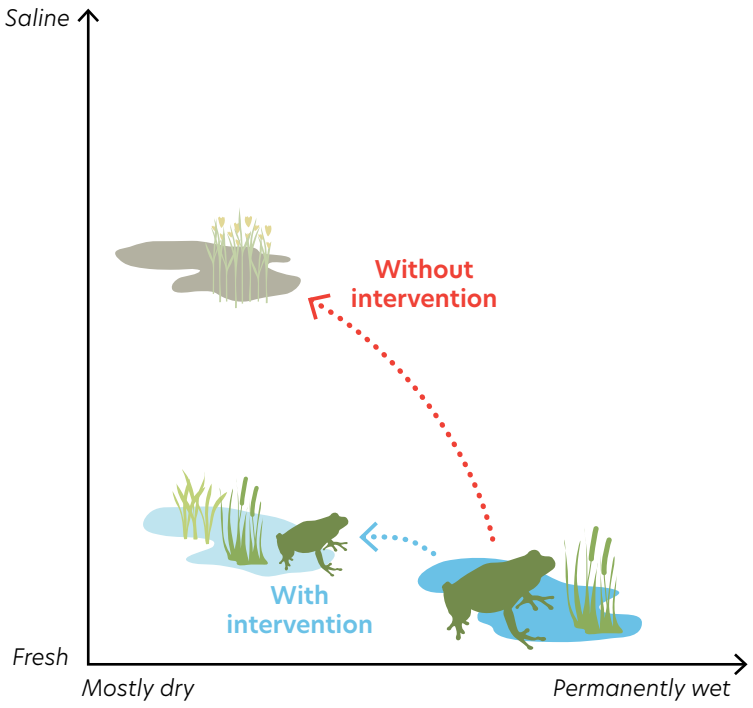
The Latrobe Valley Regional Rehabilitation Strategy stated *"...the maximum annual supply of water for mine rehabilitation would need to be no more than the power stations' current annual usage and may need to be limited to a volume smaller than this".*

Sale Common

Current condition – fresh, periodically dry, supporting high biodiversity values.

Future trajectory in the absence of management interventions – increased salinity (brackish) and longer periods of dry. Potential incursion of giant rush and loss of open water habitat.

Management levers – additional inlet on the Thomson River to enable filling with fresh water when salt wedge extends up past current inlet on River), environmental water recovery, weed control. Adaptive water management.

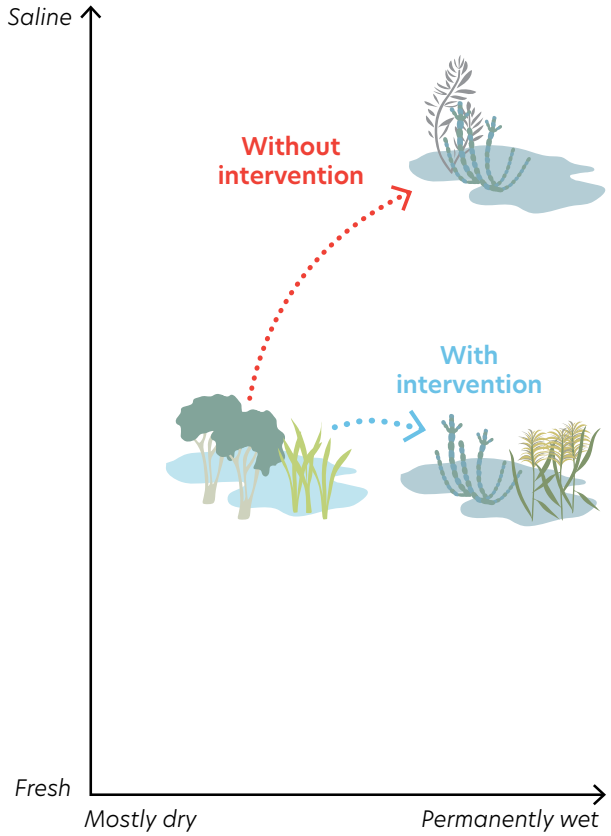


Dowd Morass

Current condition – brackish, but variable, periodically dry, supporting high biodiversity values.

Future trajectory in the absence of management interventions – increased salinity (meso-saline) and longer periods of inundation tending to permanent as sea levels rise and connectivity with Lake Wellington becomes more frequent.

Management levers – additional inlet at the western end of the wetland to allow for filling with freshwater from the Latrobe, mitigating the increases in salinity when water flows from Lake Wellington through the Dardanelles (in the entire wetland in the short-medium term, and the western part of the wetland beyond this). Connectivity of the eastern morass to Lake Wellington cannot, however, be directly addressed. Environmental water recovery. Adaptive water management.

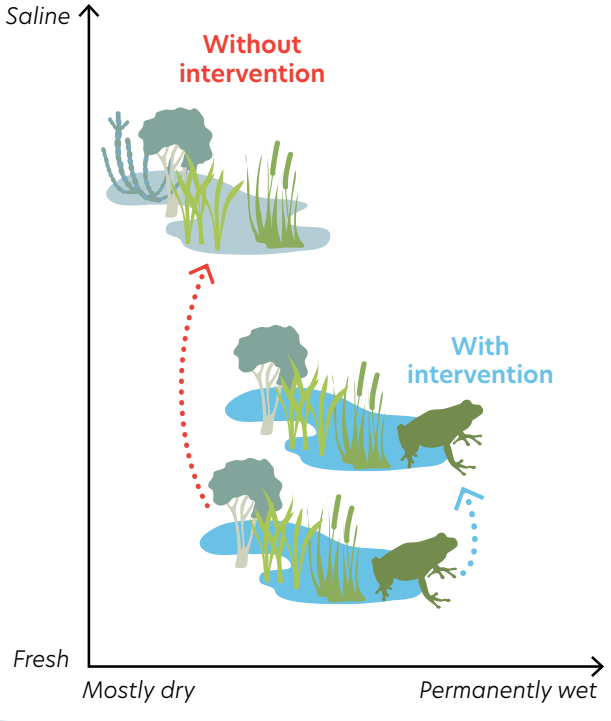


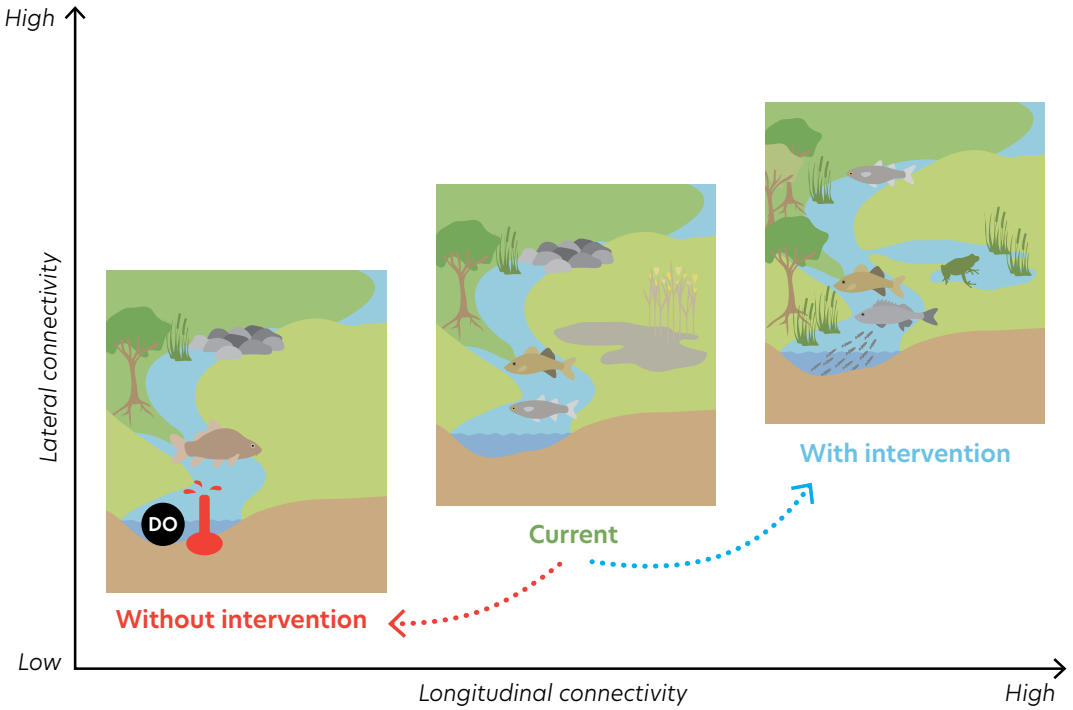
Heart Morass

Currently condition – brackish, but variable, periodically dry, supporting high biodiversity values.

Future trajectory in the absence of management interventions – increased salinity (meso-saline) and longer periods of dry. Heart Morass is less connected to Lake Wellington and so it is less likely it will become permanently inundated.

Management levers – additional inlet at the western end of the wetland will allow for environmental water recommendations to be achieved (fill, flushing flow and drawdown). Environmental water recovery. Adaptive water management.





Latrobe River (Downstream of Lake Narracan)

Current condition – high to moderate nutrient and sediment loads, low provision of freshes, moderate longitudinal connectivity, with barriers at Lake Narracan and Yallourn Weir, disconnected floodplain wetlands in poor condition, with low to moderate lateral connectivity.

Future trajectory in the absence of management interventions – decreased provision of ecologically important flows, increased nutrient and sediment loads, poor water quality, loss of biodiversity in channel, loss of floodplain wetlands.

Management levers – water recovery and improved environmental flows, removal of barriers, water quality improvement, riparian and floodplain wetland restoration.



4 Goals and objectives

This section outlines the long term goals and measurable objectives of the River Rehabilitation Strategy. The goals describe the desired future condition of the River system, while the objectives translate these into specific and measurable targets to guide implementation and assess progress.

The goals and objectives have been developed using the best available evidence and existing policy commitments. Their relationship to management actions and outcomes is illustrated through the program logic (Appendix B), and they will inform monitoring, evaluation, reporting and improvement (MERI) to support adaptive management over time.

4.1 Goals

Long-term goals:

1. By 2065, there will be an improvement in the condition of rivers, wetlands, floodplains and the estuary.
2. Water recovery targets for the River, tributaries and wetlands will be secured and appropriate environmental watering implemented.
3. Sediment and nutrient loads from the River will be reduced and result in measurable improvements in the water quality of the River and Lake Wellington.
4. The extent and diversity of aquatic habitats will be maintained within the Latrobe catchment.
5. The River system will continue to support diverse and resilient populations of native flora and fauna species including threatened species.
6. The ecological and hydrological connections between the river channel, floodplain, wetland and estuarine environment of the River system will be restored in strategic locations.
7. There will be continued and increased involvement of relevant community, stakeholders and partners in decision making processes, stewardship and management activity

4.2 Objectives

A set of measurable objectives have been developed that describe the desired state of the system. They have been designed to be as "SMART" (specific, measurable, achievable, relevant and time-bound) as possible. They will be used to evaluate the implementation of this strategy (see section 7). The objectives of the River have been developed with existing targets and objectives in mind and based on the best available evidence. More information on the development of these objectives can be found in Appendix A and their relationship to long-term goals and management actions is illustrated in the program logic (Appendix B).

Objectives:

1. **Nutrient and sediment loads from the River system will be reduced** by 20% by 2065 (that is five-year annual average load will be 87 tonnes of TP, 670 tonnes of TN and 28,000 tonnes of sediment).

2. **Freshwater wetlands:**
   a. Sale Common will remain a freshwater wetland and within defined Limits of Acceptable Change.
   b. Freshwater wetland habitat in the Latrobe catchment below Lake Narracan will remain > 1300 hectares

3. **Variably saline wetlands:**
   a. Heart and Dowd Morass will remain variably saline wetland systems and within defined Limits of Acceptable Change.
   b. Variably saline wetland habitat in the Latrobe catchment below Lake Narracan will remain > 2700 hectares.

4. The following **indicator fish species continue to be supported** in the Latrobe system:
   - River blackfish in the tributaries of the Latrobe River (Tanjil, Tyers, Morwell Rivers and Traralgon Creek)
   - Australian grayling (throughout the system)
   - Estuary perch (estuary).

5. **Maintain geomorphic channel complexity** including low flow benches, high flow benches, pool and riffle habitats.

6. **Platypus continue to be supported** in the Tyers and Latrobe Rivers and there is an increase in their distribution.

7. **Successful breeding of green and golden bell frog and growling grass frog** is recorded at least once every three years at a minimum of five wetlands including the Lower Latrobe Wetlands.

8. **Waterbirds:**
   a. Australasian bittern detected at least once every two years at Sale Common, Dowd and Heart Morass.
   b. Successful breeding of Australasian darters, pied cormorants, little black cormorants, straw-necked ibis, Australian white ibis and royal spoonbills at least once every two years.
   c. Annual presence of sharp-tailed sandpiper in Heart Morass.

9. **Maintain "good" (as indicated as a biota score of > 16 according to the Index of Wetland Condition) vegetation condition** in variably saline and freshwater wetlands at 80% of representative sites.

10. **The condition of the Latrobe Estuary is improved** to moderate or better in the 2046 Index of Estuary Condition.

11. **Riparian vegetation:**
    a. Increase the area of riparian frontage that is protected to > 70% by 2065.
    b. Condition of riparian vegetation is improved from 2025 baseline (as indicated by cover, extent and continuity).


Victorian Fisheries

5 Management actions

5.1 Context

A total of 23 high-level management options were identified by West Gippsland CMA and the expert panel. The relationship between actions, objectives and goals is illustrated in a program logic (Appendix B). The management options are grouped into the following themes:

- Infrastructure
- Optimising environmental water
- Water recovery
- Geomorphic restoration
- Ecological restoration
- Improving water quality

5.2 Infrastructure

There are several ways in which the construction or upgrading of infrastructure can improve the health of the Latrobe River. These can improve lateral connectivity (between the river and wetlands and floodplains, for example inlet and outlet structures on wetlands that allow for better management of water regimes and delivery of environmental water. There are also structures that improve longitudinal connectivity such as fish passage engineering solutions that facilitate the movement of fish up and downstream.

CASE STUDY

Lower Latrobe Wetlands watering infrastructure

The ecological character and long term function of the Ramsar listed Gippsland Lakes lower Latrobe wetlands (namely Heart Morass and Dowd Morass) are under increasing pressure from reduced freshwater inflows, rising salinity levels, and climate driven changes such as decreased flooding, prolonged dry periods, and sea level rise. While environmental water entitlements help to offset some of these impacts, the existing infrastructure no longer provides reliable access to the volumes or timing of freshwater needed. New watering structures are being constructed upstream of the current offtakes to secure access to fresher water more often. With greater capacity and improved operational flexibility, these structures enable managers to deliver environmental flows aligned with the Gippsland Lakes Ramsar Site Management Plan and West Gippsland Waterway Strategy, supporting wetland health and reducing the risk of exceeding limits of acceptable ecological change.

A key threat being addressed is the continued salinisation of Lake Wellington and the upstream migration of saltwater under climate change scenarios. Detailed 3D hydrodynamic modelling of the Latrobe estuary demonstrates that the new infrastructure locations maintain access to freshwater more frequently, even under projected sea level rise. This enhanced reliability strengthens the ability to meet Seasonal Watering Plan targets and maintain wetland resilience.



Table 5. Management options identified for the infrastructure theme.

#	Management Option	Description	Objectives Supported	Dependencies and sequencing considerations	Status
A.	Upgrades to Heart and Dowd Morass inlets and Sale Common outlet	Environmental water management in the Lower Latrobe Wetlands is facilitated through several existing structures on the Latrobe River. Upgrades to these existing structures will provide environmental water managers with the ability to reduce saline water intrusion into the wetlands.	3, 7, 8, 9.	Immediate implementation. Some benefits can be realised without additional water recovery, benefits are improved with water recovery.	CGRSWS Action 8-16 commits the Victorian Government to work with the West Gippsland CMA to upgrade watering infrastructure at the lower Latrobe wetlands to deliver freshwater flows into the wetlands more efficiently. Funding has been provided to complete the upgrades at Heart Morass and Dowd Morass which are expected to be completed by 2026 and 2027 respectively.
B.	New inlet structure at McArdle's Gap on the Thomson River for Sale Common	The existing inlet structure for Sale Common is located on the Latrobe River, a few hundred metres below the Swing Bridge. The combined effects of reduced freshwater flows down the Latrobe River, together with sea level rise have reduced the time that freshwater can be directed into Sale Common. A new structure on the Thomson would increase water manager's ability to inundate Sale Common with fresh water.	2, 4, 7, 8, 9	Immediate implementation. Not dependent on water recovery or relaxation of constraints as water will come from the Thomson. An amendment to the Latrobe Bulk Entitlement will also be required to allow environmental watering from this new location.	Funding is still being sought for Sale Common including the proposed new inlet structure at McArdle's Gap on the Thomson River.
C.	Upgrade to Moondarra & Blue Rock outlet capacity	The outlet from Moondarra and Blue Rock Reservoirs has a limited flow capacity. Increasing the capacity of the outlet structure would allow higher environmental flows to be delivered to the Tyers, particularly in low rainfall years.	4, 5, 6, 7, 8, 10, 11	No dependencies but dealing with fish barriers would enhance outcomes. Longer term implementation.	Feasibility assessment required.
D.	Improving fish passage in the mid-Latrobe River	Lake Narracan and Yallourn Weir currently act as barriers to fish migration (including of the nationally threatened Australian grayling) from Lake Wellington (and the Southern Ocean) and the upper reaches of the Latrobe River. Decommissioning of the infrastructure or construction of fish ladders would allow the movement of native fish along the Latrobe River. This will become increasingly important if the Morwell River flows through the Hazelwood and / or the Yallourn pit lakes, effectively cutting off migration routes between estuarine / marine environments and headwater streams.	4, 5	Narracan and Yallourn both need to be addressed to achieve benefits.	Feasibility assessment required
E.	Improving fish passage in the Tyers River	There are currently two major barriers on the Tyers River below Moondarra, a disused weir just below Moondarra and further downstream at the pump station. The decommissioning of these barriers or the installation of fish ladders would facilitate longitudinal connectivity and allow the passage of fish along the Tyers River.	4, 5	No dependencies.	Design due to commence in 2027

5.3 Optimising environmental water

The full benefit of environmental water in the Latrobe system is currently limited by a number of constraining factors, which restrict the delivery of freshes and higher flows in parts of the river system or at certain times of the year. While some of these can be addressed through engineering solutions and changes to infrastructure (see section 5.1.1), others require policy changes and landholder engagement.

CASE STUDY

Coordinated environmental flows support the Latrobe estuary and wetlands

Environmental water managers in West Gippsland coordinate water releases across the Thomson, Macalister and Latrobe Rivers to deliver targeted flow outcomes for the Latrobe Estuary and Lower Latrobe Wetlands. These interconnected systems rely on sufficient freshwater inflows to maintain water levels, limit salinity intrusion and support ecological processes, yet are highly influenced by upstream regulation and variable climatic conditions.

Coordinated releases from Thomson Reservoir and Lake Glenmaggie are timed and combined with flows in the Latrobe River to maximise downstream benefits. By aggregating water from multiple sources and aligning delivery with key periods of ecological need, managers can push freshwater through the system, reaching the estuary and wetlands when it matters most. These decisions are guided by up-to-date monitoring data and a better understanding of how salt and water move through the Latrobe estuary and wetlands.

This approach has helped reduce salinity risks in wetlands such as Dowd Morass, maintain suitable water levels, and improve habitat conditions for fish, waterbirds and wetland vegetation. It demonstrates how coordinated timing of environmental water can deliver system-scale benefits that are not possible when rivers are managed separately.



Table 6. Management options identified for the optimising environmental water theme.

#	Management Option	Description	Objectives Supported	Dependencies and sequencing considerations	Status
F.	Address operating constraints to allow the delivery of environmental flows	Inundation of private property via overbank flows would occur in the downstream sections of the Latrobe River (below Kilmany South) if environmental flow recommendations were delivered in upstream reaches. This management action aims to investigate a number of options (landholder agreements, incentives, policy instruments) and remove high priority constraints to improve water managers abilities to deliver ecologically significant flows in the Latrobe River.	2, 3, 4, 5, 6, 7, 8, 9, 10, 11	Immediate implementation. Is required to see the benefit of water recovery within Reach 4 (freshes) and all reaches (bankfull / overbank).	CGRSWS Action 8-18 provides for the investigation of options to remove constraints to the delivery of environmental water in the Latrobe. The WGCMA have commenced this work and it is expected to be completed in 2026. Following this work the CMA will seek funding to address high priority constraints.
G.	Update operating arrangements to enable storage and release of environmental allocation at Lake Narracan	The reallocation of the 3/4 bench has provided the Victorian Environmental Water Holder (VEWH) with a small share of Lake Narracan storage capacity and inflows. Realising the benefits of this for improved environmental water delivery in the Latrobe River requires changes to Lake Narracan operating rules, which requires negotiations and agreements with Southern Rural Water (SRW), Latrobe City Council and lake users.	2, 3, 4, 5, 6, 7, 8, 9, 10	3-4 Bench reallocation allows for this now but there is a Cap on what can be released. Operating arrangements are yet to be formally updated. Can't deliver high volume flows until this is done.	Lake Narracan operating arrangements between WGCMA, VEWH and SRW are due to be updated in 2026 and this process will help clarify and optimise usage of the 3-4 Bench bulk entitlement.
H.	Review and alter (if required) passing flow rules for reservoirs and unregulated rivers to better meet environmental needs	Passing flows are flows that an irrigator or a water corporation must let pass by a weir or reservoir before it can take water for other uses. Passing flow rules were not originally designed to address environmental water needs, but to ensure sufficient flows for downstream consumptive users. A review of the passing flow requirements could potentially complement, and in some instances augment, the effectiveness of environmental watering without impacting on consumptive water uses.	4, 5, 6, 7, 8, 11	Can be done as stand alone - could be complementary to other options.	Not commenced

5.4 Water recovery

Current environmental water entitlements in the Latrobe River system are insufficient to deliver all of the ecologically important flows as defined in the Latrobe environmental flows study (Alluvium 2021). In addition, under a drying climate and with projected increases in water use (including for mine rehabilitation) the flow stress of the Latrobe system is likely to get worse. The Central and Gippsland Sustainable Water Strategy (DELWP 2022) contains commitments for increased water for the environment through water recovery targets. This includes 7.3 GL/year in the Latrobe by 2027, a further 7.7 GL/year by 2029 and 58 GL/year in the long-term; and 13 GL/year in the Tyers River by 2032. Further water recovery is also required in the Thomson and Macalister system, both of which are essential for the long-term health of the Lower Latrobe estuary and Gippsland Lakes.

CASE STUDY

Reallocated water now flowing across Gippsland

More water is now flowing in West Gippsland's rivers following the reallocation of 16 gigalitres of water for the environment, Traditional Owners and farming. The water was previously set aside for power generation (known as the Latrobe 3/4 Bench Bulk Entitlement) but is currently unused and has now been reallocated to be equally shared between Traditional Owners, the environment and agriculture.

Additional water for environment flows will improve the health of the River as well as the Gippsland Lakes system downstream by increasing the ability to mimic natural flow regimes that support important ecological processes like native fish migration and breeding. These water for the environment deliveries become increasingly important during dry cycles as they increasingly become the life support for important riverine processes such as maintaining and flushing pools (aquatic habitats) and allow for the watering of riparian vegetation and fringing wetlands.

As part of the reallocation, Gunaikurnai Land and Waters Aboriginal Corporation (GLaWAC) will have access to additional water for self-determined cultural uses. Southern Rural Water have also made additional water available to farmers.

The decision to reallocate 16 of the total 25 gigalitre water entitlement was made through the Central and Gippsland Region Sustainable Water Strategy. The remaining nine gigalitres will be retained by government to provide continued flexibility to respond to emerging needs in Gippsland. The reallocation provides a case study for the potential opportunities that will come up as mine rehabilitation progresses and water entitlements, currently used for power generation, become available for reallocation.



Table 7. Management options identified for the water recovery theme.

#	Management Option	Description	Objectives Supported	Dependencies and sequencing considerations	Status
I.	Latrobe Reserve reallocation	For as long as coal-fired electricity generation continues in the Latrobe Valley, the Latrobe Reserve will remain an important safeguard to protect electricity generation and industry. As the region transitions away from coal-fired electricity, there is an opportunity to consider how this reserve could be used in the future.	2 – 10	All water recovery options require operating constraints to be addressed to see the full benefits. Refer to section 6.1.2.	Action 4-14 of the CGRSWS commits to a review of the Latrobe Reserve by 2028.
J.	Reallocation of mine rehabilitation BEs when they become available - advocacy for equitable share for the environment	As water previously used for mine rehabilitation is reallocated across water users (including the environmental and cultural water), WGCMA will play a role in advocating for an equitable share for the environment.	2 - 10	As above	See note above relating to return of 5.3 GL to the environment from the reallocation of the 3-4 Bench. CGRSWS Policies 8-12, 8-13 and 8-14 provide the policy drivers for water recovery in the short, medium and long term. However no specific pathway has been identified for these targets to be achieved.
K.	Securing the gap between power generation net water use and their entitlement amount for the environment	Historically the combined actions of power generation and coal mine operations resulted in a net use of water that was on average 30 – 40 GL/year less than their gross usage (due to return of mine dewatering discharge to the Latrobe River). This option entails advocating for an equitable share of this water for the environment.	2 – 10	As above	In December 2025, the Minister for Water initiated a process to reduce the Latrobe River Basin Permissible Consumptive Volume (PCV or "cap") by the difference between entitlement volumes for power generation and new bulk entitlements issued for mine rehabilitation. Whilst this process will not provide more water for the environmental water reserve, this amendment will safeguard the benefits (of the historic gap between allocation and usage) resulting from the conditions on AGL's new bulk entitlement for mine rehabilitation, by ensuring the cap reflects the more sustainable levels of water take and ensuring water use does not exceed what has been taken by power generators on average in recent decades.

Table 7. Management options identified for the water recovery theme contined...

#	Management Option	Description	Objectives Supported	Dependencies and sequencing considerations	Status
L.	Blue Rock to Moondarra environmental water transfer (concept)	Explore the feasibility of transferring environmental water held in Blue Rock Reservoir to Moondarra Reservoir, either through administrative transfers or, if practical, physical movement of water, to deliver environmental flow recommendations to the Tyers River and mid-Latrobe system. This option would aim to consolidate water where outlet capacity and operating arrangements may better support ecological objectives, while noting that further technical assessment is required.	2 - 10	As above	CGRSWS policy 8-15 provides for 13.3GL/yr recovery from Tyers by 2032. However the method of achieving this is yet to be determined.
M.	Address sleeper and / or underutilised licences	There are a number of water entitlements in the Latrobe system for consumptive use that are either underutilised (i.e. the full entitlement is not used) or considered "sleeper" licences, where water has not been extracted for consumptive use. Currently this results in more water in the river providing some environmental benefit. This option is about exploring mechanisms to secure unused water entitlements for continued environmental benefits.	2 – 10	As above	Requires feasibility assessment
N.	Decommissioning farm dams	Farms dams in the Latrobe catchment have the potential to hold over 31 GL of water (Victorian water accounts), reducing flows to the river. Not all water in farm dams is used consumptively, and evaporation losses are likely high. There may be opportunities in the future for incentives to decommission some farm dams, returning water to the river system for environmental benefits.	2 – 10	As above	Requires feasibility assessment
O.	Conversion of year-round licences to winter fill licences	The majority of water entitlements in the Latrobe Catchment allow for extract of water (within defined rules) from any time of the year. For most users, dry periods such as during summer / autumn are likely to be the times when water extraction is highest. Conversion to winter fill licences, where water can only be extracted during the winter period (when flows in the river are higher) may have the potential for environmental benefit during times of severe environmental water stress.	2 - 10	As above	Requires feasibility assessment

5.5 Geomorphic restoration

Channel form and function in the Latrobe River system has been impacted by historical meander removal (river straightening), artificial levees, draining of swamplands, riverbank clearing and de-snagging (removal of large woody debris). This has resulted in faster flowing rivers, increased erosion, the deepening and widening of the river channels, simplified geomorphology and habitat, decreased hydrological connection to the floodplain, elevated levels of deposition of sand and sediment in lower reaches, and a large increase in suspended sediment loads entering Lake Wellington. These geomorphic changes have implications for the ecological restoration of the river channel itself (e.g. fish and invertebrates), but also for the ecological condition of floodplain wetlands, terminal wetlands, and Lake Wellington itself.

Several objectives (see Section 4 above) are progressed by managing the geomorphology of the Latrobe and its tributaries.

CASE STUDY

Water reconnection brings grayling back to the Latrobe

In 2015, Australian grayling were recorded spawning in the Latrobe River for the first time. This nationally vulnerable species relies on precise flow cues and clean gravel bed; conditions that had been largely absent due to historic river straightening, habitat loss and accelerated erosion.

Targeted environmental water releases delivered in autumn 2015 provided the spawning trigger the species needed, while the recent reconnection of a 1.2 kilometre meander restored slower-flowing habitat and exposed gravel beds essential for egg deposition. This moment was the culmination of more than a decade of river rehabilitation guided by the West Gippsland CMA, including bank stabilisation, revegetation, and meander reinstatement.

The discovery of grayling eggs confirmed that environmental flows and physical habitat restoration work together to rebuild ecological function. It demonstrated that vulnerable native fish can return when flow cues, habitat complexity and connectivity are restored. The outcome stands as a landmark example of environmental water driving measurable, high value ecological recovery in the Latrobe system.



Table 8. Management options identified for the geomorphic restoration theme.

#	Management Option	Description	Objectives Supported	Dependencies and sequencing considerations	Status
P.	Meander reinstatement	This involves realigning of channels with original flow paths, reconnecting cut-off meanders and increasing river sinuosity.	4, 5, 11	Many meander cut-offs remain, however the 'easy wins' have been completed and further investigation is required to identify and prioritise opportunities. Landholder motivation is a considerable barrier.	The CMA has worked with landholders to reinstate meanders along the Latrobe River, slowing the flow and (with the assistance of complementary riparian and floodplain enhancement works) restoring natural riparian and floodplain habitat and improving the geomorphic trajectory of the river. To date 10 meanders have been reinstated with implementation and outcomes being improved with experience and learnings over time.
Q.	Addressing sediment movement in the Latrobe River	Riverbank erosion (dominated by meander migration) is a major source of sediment and nutrients. General rates will be reduced through comprehensive riparian revegetation and stock-exclusion programs, but there are high-priority bends that produce a large proportion of the sediment that need to be identified and treated directly.	1, 4, 5, 11	No dependencies but reliant on landholder willingness	The WGCMA have commenced a project to better understand the current geomorphic trajectory of the river system downstream of Lake Narracan. This project will help identify priority sites for intervention.
R.	Improve geomorphic channel complexity	This can be achieved with meander reinstatement, and by encouraging general revegetation of benches and instream deposits by restricting stock access. Also achieved by encouraging the return of fallen wood into the channel.	4, 5, 11	No dependencies but reliant on landholder willingness. Environmental flows also support geomorphic objectives.	The WGCMA continues to implement riparian improvement programs throughout the catchment but funding is an ongoing constraint.

5.6 Ecological restoration

Historical clearing of floodplain and riparian zones across the Latrobe catchment and their use for agricultural purposes has negatively impacted the ecological and physical functioning of the river system. Reduced plant and animal diversity, reduced bank stability, increased nutrient loads, altered productivity and reduced habitat quality are all consequences of cleared landscapes adjacent to river channels. While the majority of management actions proposed are aimed at improving or restoring aquatic habitat conditions and functions for the biota in the Latrobe system, there are a number of options that directly target the condition of ecological communities and fish populations of the river system.

CASE STUDY

Restoring rivers locals love: Sandbanks Reserve

Sandbanks Reserve is an urban recreation space on the banks of the mid-section of Durt'Yowan on Gunaikurnai Country. Adjoining what were once floodplain woodlands, this section of the river can often be thought of as highly modified and more of a working river than a place to relax. But with a little TLC and recent restoration works it has become a hidden gem where the river reveals its true character.

Along the river's northern banks, West Gippsland CMA has worked with Latrobe City Council to rehabilitate the riparian corridor. The CMA managed the removal of mature willows along a 600 metre section of the Latrobe River within the Reserve and the Council followed to manage revegetation of the riverbanks.

Gunaikurnai Land and Waters Aboriginal Corporation completed weed control and revegetation with members of the Latrobe Landcare Network also contributing. Upgrading walking tracks and facilities complemented the habitat restoration with remnant gums standing sentinel to the mighty habitat that was once there and is being brought back again.

Restoring the river has brought the local community back to enjoy picnics, fishing, canoeing, bike riding and walking. Other curious locals have also made an appearance with West Gippsland CMA;s environmental water team recording evidence of platypus through environmental DNA testing.



CASE STUDY

Wetland restoration: Heart Morass

Over nearly 20 years, a community project led by Field and Game Australia and partners has transformed a heavily grazed, denuded landscape into a restored wetland thriving with wildlife.

Heart Morass on Gunaikurnai Country sits at the confluence of the Carran Carran (Thomson) and Durt'Yowan (Latrobe) rivers near Sale.

Covering over 1,800 hectares, the wetland was suffering from large changes to the landscape, acid sulphate soils and salinity.

A community project was developed to purchase over 1,000 hectares of the wetland area and undertake one of the largest wetland restoration projects in Australia on private land.

The project aimed to enhance biodiversity, water quality and recreational and social values within the Heart Morass with the benefits flowing into contributing to the health of the Gippsland Lakes.

Fast forward 20 years and the wetland is thriving. Thousands of trees have been planted, water quality restored and wildlife returning. In a milestone achievement, a new watering infrastructure was installed in 2026 to be able to deliver water to the wetland when it needs it – mimicking the natural wetting and drying cycles.

Monitoring by WaterWatch volunteers, the 'Heart Monitors', ongoing weed control and planting and fauna surveys continue at the morass. Notable species including Glossy Ibis, Freckled Duck, Intermediate Egret, White-bellied Sea Eagle and Plumed Whistling Duck have returned and a population of the threatened Green and Golden Bell Frog has also been recorded.



Table 9. Management options identified for the ecological restoration theme.

#	Management Option	Description	Objectives Supported	Dependencies and sequencing considerations	Status
S.	Riparian restoration	Riparian restoration is most successful on sites that are in moderate condition and have good landholder engagement. The first phase therefore requires careful identification of suitable restoration sites (i.e. those that have the capacity to respond to restoration works and maintain improved condition into the future). Exact works will be site dependent but may include: site preparation and fencing, revegetation and ongoing maintenance, monitoring and evaluation.	1, 4, 5, 6, 11	The maximum benefits in regulated reaches is predicated on constraints relaxation and sufficient water recovery for bankfull events - could be achieved in Reach 5 with 15GL/yr water recovery, for which there is a SWS commitment by 2029. Achievement in reaches 3 and 4 require significantly more water. Reach 5 is the short to medium term priority and that it is scheduled after the relaxing of constraints and the 2029 water recovery target. Effort in unregulated reaches will be driven by priorities established through the regional waterway strategy.	Riparian restoration and enhancement remains a foundational tool for the CMA in its quest for waterway health. Recent mapping for the Regional Waterway Strategy (in prep) has estimated that 58% of the river (including named tributaries) is now considered protected, mostly within reserves and parks, but also including 173km of river frontage that has now been fenced off from stock access and where necessary rehabilitated. Business as usual funding through traditional sources allows for approximately 1-3km of river frontage to be protected per year. However, hundreds of kilometres of river and tributaries remain unprotected and therefore there is a need for significant increase in funding to support this management option for implementation throughout the duration of this strategy.
T.	Floodplain wetland restoration	There are a number of floodplain wetlands downstream of Rosedale that have been the subject to historical clearing and altered hydrology (i.e. permanent inundation as dams, or reduced inundation for terrestrial land uses). This option seeks to restore, to the extent possible, the natural ecological functioning and biodiversity values of floodplains and wetlands downstream of Rosedale. Activities may include: fencing, revegetation, restored water regimes, on-going maintenance, monitoring and evaluation.	2, 3, 7, 8, 9	Immediate implementation possible as the mechanisms are about restoration, pumping, structural works and agreements. Dependent on landholder willingness.	The WGCMA have and will continue to opportunistically protect and restore small floodplain wetlands throughout the catchment. Funding is the primary barrier to scaling these programs.
U.	Common carp harvesting	Common carp are a major invasive pest species impacting the freshwater ecology of the Latrobe River System. Increased carp populations in Lake Wellington catchments have seen a reduction in diversity and abundance of native fish and other aquatic flora and fauna, an increase in turbidity and altered fringing vegetation. A pilot commercial carp harvesting program is proposed that partially compensates carp harvesters to increase the commercial viability of carp removal.	4	The maximum benefits in regulated reaches is predicated on constraints relaxation and sufficient water recovery.	Feasibility assessment required
V.	Native fish stocking	This option will include breeding key predatory native fish species such as Australian bass and Estuary perch and restocking the Latrobe with fingerlings to boost fish abundance and diversity, and to increase predation of juvenile carp. A monitoring and evaluation program assessing the effectiveness and recruitment to the adult population will inform adaptive management of the program.	4	The maximum benefits in regulated reaches is predicated on constraints relaxation, sufficient water recovery and habitat restoration.	Managed by Victorian Recreational Fishing. Recent releases of native Bass have proved successful (refer to case study).

CASE STUDY

Boost for native Bass

West Gippsland Catchment Management Authority (CMA) along with Victorian Fisheries Authority (VFA) have been working together to restock the Latrobe with Australian Bass. In 2023, the WGCMA and VFA released 10,000 native migratory Bass into Traralgon Creek.

Over the past two decades, the CMA has been working with Traditional Owners, landholders, partners and community to improve the health of the catchment to allow these fish to thrive. This Bass stocking is only made possible by this work to secure environmental flows and improve river health.

Bass were recently listed as 'rare' in Victoria and the VFA's stocking program, along with water for the environment, mean they are now off the Threatened Species list.

Over their life, the young fish will make they're into the River where the CMA has fenced off stock, planted native vegetation and, for over a decade, has delivered water for the environment to provide conditions native fish need.

Water for the environment is set aside in major reservoirs and carefully released down rivers to support their health. The water can also be diverted into the lower Latrobe wetlands.

Bass are native migratory fish that need specific large water flows in late winter and early spring to cue spawning and migration. Over time, changes to the river for irrigation, water supply and other needs mean that these conditions now happen very rarely – so we give them a hand with deliveries of environmental water that mimic what would happen naturally. Floods in 2021 produced the most recent spawning event since the 1980s and it is hoped that this next event will also give the Bass population a boost.

While water for the environment can't replace natural breeding cues, it can provide the right conditions to help these young Bass to grow and survive. It will also support the health of adult fish and promote breeding when conditions are right.



5.7 Improving water quality

The history of land use change in the Latrobe Valley, particularly mining, industry, agricultural and urban development, have contributed to degradation in river water quality, mainly in the form of elevated nutrient and sediment loads and turbidity. The Latrobe system is the largest source of nutrient and sediment loads to the Gippsland Lakes Ramsar site, contributing to periodic algal blooms.

CASE STUDY

Celebrating a 25-year pivot towards sustainable farming future

In 2025 the West Gippsland Catchment Management Authority (CMA) celebrated 25 years of its sustainable irrigation program marking a quarter of a century of innovation and partnerships across central Gippsland.

What began in 2000 as a joint initiative between the CMA, Agriculture Victoria and local farmers has grown into a transformational program that has reshaped irrigation practices across the Macalister Irrigation District and the broader Lake Wellington Catchment, including the Latrobe, Thomson, Macalister and Avon rivers.

Over this time more than 1,200 irrigation improvement projects have been delivered by the irrigation community in partnership with Agriculture Victoria, Southern Rural Water, Gippsland Water, Wellington Shire, the Environment Protection Authority Victoria, GippsDairy, Food and Fibre Gippsland.

These collective efforts now save 47 gigalitres of water every year, with an approximate value of $85m dollars, a major financial boost for irrigators and a significant win for water security for the region's agricultural industry.

The environmental benefits are equally impressive. More than 46 gigalitres of nutrient rich water carrying an estimated 23 tonnes of phosphorus is now being retained on farm every year for the benefit of soil health and pasture productivity instead of eutrophication of waterways.

Following the success of the last 25 years, the program is now looking into opportunities to expand beyond the MID and provide support to farmers and growers along the River and right up to the producers in the Thorpdale area and upper reaches of the Lake Wellington catchment.



Table 10. Management options identified for the water quality theme.

#	Management Option	Description	Objectives Supported	Dependencies and sequencing considerations	Status
W.	Agricultural Best Management Practices (BMPs)	This option is targeted at horticulture and agricultural farmers and will seek to offer incentives to implement on-farm practices that reduce the movement of nutrients and sediments off-farm and into waterways. Specific management options for the irrigated agriculture sector are contained within the Lake Wellington Land and Water Management Plan, however, many of these are also relevant for dryland agriculture.	1	No dependencies	There has been a sustained effort over the past 25 years to improve water quality running off the Macalister Irrigation District (Thomson/Macalister catchment) with substantial reductions in Phosphorous loads entering Lake Wellington (estimated to be equivalent to 23 tonnes per year). Refer also to case study. Nutrient and dairy effluent management programs including 'Fert$mart' and 'Core4' have also proved successful at engaging the diary sector to reduce nutrient loads from the catchment.
X.	Riparian and gully fencing and revegetation	This option aims to identify locations that are high sources of nutrients and sediments and implement restoration works (fencing and revegetation) specifically designed to reduce run-off to waterways.	1, 11	No dependencies	Within the Latrobe catchment water quality actions have been more sporadic based on funding opportunities at the time. However, multiple programs have been run including: 'Reducing the Loads' which primarily supported actions to identify and manage soil, riparian and gully erosion. 'Dealing with Dirty Rivers' which targeted in-stream erosion hot-spots within the catchment
Y.	Constructed wetland on the Moe Drain	Historical land use change (clearing and urbanisation) has resulted in poor water quality in the Moe River/Drain with phosphorus and sediments identified as key issues. This option will investigate the potential for a constructed wetland at the bottom of the Moe River to act as a sediment trap, reducing nutrients, sediments (and other contaminants) from entering the Latrobe River.	1	No dependencies	Requires feasibility assessment

5.8 Prioritisation of management actions

The management actions described in Section 6.2 through to 6.7 were developed through discussions using a "big thinking" approach where river health was considered as a priority, but without necessarily considering the feasibility or potential negative consequences of each action. Resource constraints and socio-political factors will always influence the ability to implement management actions. A prioritisation approach was used to guide implementation and resourcing.

5.8.1 Prioritisation approach

A small number of targeted criteria for identifying priority management strategies for the River system were developed with the WGCMA.

Prioritisation criteria:

1. Impact of management option on objective(s) – to what extent will the implementation of the management option result in achievement (or progress towards) an objective?
2. Feasibility – how likely is it that the management option will be able to be implemented given technical or socio-political constraints?
3. Risks of implementation – is implementation of the management option likely to have negative environmental consequences?
4. Future climate ready – to what extent in the management option robust for likely future climatic conditions?
5. Dependences and sequencing – are other management options dependent on this management option being implemented? See also Section 6.8.2.

The above criteria were applied by WGCMA staff to the list of 23 management options to identify the highest priorities. Each management option was evaluated against the first four criteria on a five-point scale (low to high), with criterion 5 assessed by commentary. The results were converted to numerical values (1 (low) to 5 (high) and summed across criteria.

Costs were not included in this assessment. To evaluate the relative cost-effectiveness of different actions, high-level strategies will need to be developed into more detailed actions or projects. Detailed projects are expected to be developed for the highest-priority management strategies as part of implementation.

A summary of the outcomes of the prioritisation is provided Appendix C with the highest rated options provided in (Table 11).

Table 11. Summary of priority management options.

Priority rank	Simplified management option	Summary justification	Relevant objectives
Very High	**Infrastructure:** Upgrades and installation of Heart and Dowd Morass and Sale Common watering infrastructure.	Certain to have a high impact on wetland condition, with low environmental risk. Full benefits **partially dependent on water recovery.**	3, 7, 8, 9
Very High	**Optimising environmental water:** Address operating constraints to allow the delivery of environmental flow recommendations.	Water recovery underpins the impact of many of the other management options. Constraints currently limit the use of environmental water, **and this option is required to realise the full benefit of all other e-water related management options.** Current policy settings may limit implementation.	2, 3, 4, 5, 6, 7, 8, 9, 10, 11
Very High	**Water recovery:** Latrobe Reserve reallocation (when it becomes available advocacy for equitable share for the environment)	**Water recovery underpins the impact of many of the other management options.** This could be potentially return a large volume of water for the environment. Reliant on relaxation of constraints to see full impact.	2, 3, 4, 5, 6, 7, 8, 9, 10, 11
Very High	**Water recovery:** Securing the gap between power generation net water use and their entitlement amount for the environment.	**Water recovery underpins the impact of many of the other management options.** This could essentially increase the current environmental water entitlement by > 100%. Reliant on relaxation of constraints to see full impact.	2, 3, 4, 5, 6, 7, 8, 9, 10, 11
Very High	**Ecological restoration:** Floodplain wetland restoration of sites that might be isolated.	Impact is highly dependent on area of floodplain restored. Some risks associated with landholder willingness. No significant dependencies.	2, 3, 7, 8, 9
High	**Ecological restoration:** Riparian restoration of priority sites along the Latrobe River and tributaries.	Impact is highly dependent on area of riparian zone targeted. Some risks associated with landholder willingness. Full benefit in some areas is reliant on water recovery and relaxing of constraints.	4, 6, 11
Medium – 12 options	Management options related to, ecological and geomorphic restoration.	Mostly rated lower due to scale issues, localised benefits, low to moderate feasibility and no dependencies (none of these management options need to be sequenced to realise the benefit of other options).	2 - 11
Low – 12 options	Water quality measures, changes to flow rules and water licences, major changes to existing dams and infrastructure, meander reinstatement.	Mostly rated lower due to scale and feasibility issues and, in some instances, higher environmental risks associated with implementation.	All

5.8.2 Dependencies and sequencing

Specific dependencies and sequencing relating to each of the management options are mentioned in the tables in Section 6.2 through 6.7.

Realising the benefit of several management options will require other management options being implemented first. The key dependencies can be summarised as:

- **Addressing operating constraints** to allow the delivery of environmental flow recommendations is crucial to realising the benefits of all the management options related to other environmental water outcomes in the Latrobe River downstream of Lake Narracan. This includes the full benefits of water recovery, infrastructure upgrades in the Lower Latrobe Wetlands and being able to support riparian restoration in these reaches by allowing for watering of rehabilitated riparian zones.
- **Water recovery options** are crucial for realising the full benefit of most ecological actions. For example, riparian restoration initiatives will be less effective in some reaches if bankfull flows cannot be delivered to water riparian vegetation. As described in section 4.2.1, there is currently insufficient environmental water to deliver all the ecologically important flow recommendations without additional environmental water.
- Actions related to **fish passage** are important for realising the benefits of environmental water and other actions related to improving diadromous fish populations. In particular, ensuring passage of fish to upstream reaches of the Tyers and Latrobe River will become increasingly important if a flow-through design for mine rehabilitation is implemented, which would prevent migration of fish through the Morwell River.

These dependencies not only informed the identification of priority management actions, but also influenced the sequencing of implementation (refer to Appendix B).



6 Implementation

The Latrobe Legacy will be implemented over a 40 year period (2025–2065) under the leadership of the West Gippsland Catchment Management Authority (WGCMA).

Implementation will take a staged and adaptive approach, recognising the changing nature of the river system, future water availability, and the uncertainties associated with climate change and mine rehabilitation.

The strategy will be implemented:

- In alignment with relevant regional, state and national strategies and plans.
- Through WGCMA programs and investment priorities.
- In collaboration with key stakeholders where required to achieve outcomes.

WGCMA will also continue to work with GLaWAC on areas of shared interest, recognising that GLaWAC is undertaking its own work to define priorities for the River and its broader cultural landscape in line with its cultural responsibilities (refer Section 2.5).

The focus of implementation is on:

- Delivering priority management actions
- Sequencing actions to maximise effectiveness
- Responding to emerging risks and opportunities over time

Achieving the goals of this Strategy will require significant, sustained and coordinated investment over several decades. While many actions can be progressed through existing programs, the scale of change facing the Latrobe River system means that additional investment will be required to address legacy impacts, respond to emerging threats and secure long-term environmental outcomes.

Funding is expected to be drawn from a range of complementary sources, including government programs, environmental water and broader water sector investment, mine rehabilitation and transition-related funding opportunities, offsets, infrastructure investment and existing WGCMA programs. Securing and aligning these investments will be critical to successful implementation.

Robust economic analysis will play an important role in guiding investment decisions and building the case for funding. This will include the preparation of business cases, cost-benefit assessments and other economic evaluations to demonstrate the environmental, social and economic value of proposed actions, identify cost-effective investment pathways and quantify the costs of inaction where appropriate.

Investment decisions will be guided by a clear set of considerations. Priority will be given to actions that are expected to deliver the greatest environmental outcomes and co-benefits, while also taking into account feasibility, readiness for implementation, and the dependencies between actions. In particular, investment will focus on activities that address key system risks, such as salinity intrusion and reduced flows, and those that enable or unlock the benefits of other actions.

The priority management actions identified in this Strategy will provide the foundation for future investment. They will inform the development of funding proposals, business cases and program design, ensuring that resources are directed toward actions that deliver the most meaningful and enduring improvements to the River system.

6.1 Staged delivery

Implementation will occur across three broad phases:

PHASE 1
Accelerate
(2026-2030)

Focus on progressing priority actions, enabling works and build on existing momentum:

- Complete key infrastructure upgrades (Lower Latrobe Wetlands)
- Progress priority water recovery commitments
- Identify and address critical constraints to environmental flows
- Establish governance, partnerships and monitoring systems
- Develop detailed business cases for high-priority action
- Maintain existing environmental watering, infrastructure, riparian and wetland restoration assets.

PHASE 2
Scale and integrate
(2030-2045)

Expand delivery and integrate actions across the system to achieve broader outcomes:

- Scale up riparian and floodplain restoration
- Implement priority geomorphic interventions
- Expand environmental water delivery and optimisation
- Integrate water recovery outcomes into operational regimes
- Maintain and enhance existing environmental works, infrastructure and restoration outcomes.

PHASE 3
Consolidate and secure
(2045-2065)

Embed and maintain outcomes while adapting management to ensure long-term resilience of the system:

- Lock in post-mine rehabilitation water recovery opportunities
- Maintain the benefits and outcomes achieved
- Adapt management in response to changes in climate and hydrology
- Respond to emerging risks (e.g. salinity thresholds, new water users)
- Ensure long term resilience of the river system

Importantly implementation will require a collective partnership effort. The WGCMA prides itself on its partnership work with Traditional Owners, community groups, landholders , industry and Government agencies and all of the proposed actions will be delivered in line with these partnership principles.

6.2 Roles and responsibilities

WGCMA will lead the coordination, prioritisation and delivery of the strategy.

Key responsibilities of WGCMA include:

- Program planning and delivery coordination
- Investment prioritisation
- Monitoring and reporting on progress
- Engagement with stakeholders and the community

Other organisations, landholders and stakeholders will contribute to delivery where relevant, particularly where:

- Actions align with priorities (i.e. Traditional Owner priorities)
- Actions require regulatory approval or policy change
- Works occur on private land
- Broader water management or infrastructure decisions are involved

6.3 Monitoring, Evaluation, Reporting and Improvement (MERI)

A Monitoring, Evaluation, Reporting and Improvement (MERI) framework will support implementation of this strategy by tracking progress, assessing effectiveness, and guiding continuous improvement.

Monitoring and evaluation will be integrated with existing programs, with targeted activities delivered at the project or initiative level where required.

Monitoring will be aligned with the strategy's objectives, using defined indicators to ensure a clear link between what is measured and what the strategy aims to achieve. It will build on existing programs and be used to track change over time, identify emerging risks, and assess the effectiveness of management actions.

Evaluation will assess progress toward objectives, the effectiveness of priority actions, and the overall trajectory of the river system. It will occur at both a strategy and project level, with periodic reviews informing updates to the strategy.

Monitoring and evaluation findings will be used to refine actions, adjust priorities, and improve investment effectiveness over time, ensuring the strategy remains responsive to changing conditions and new information.

6.4 Financial considerations

Detailed business cases and costing of management options will be developed as required and as funding opportunities arise. As a starting point, indicative costings have been prepared for management options, based on best available estimates (2026 pricing) (Appendix B). Actual project costs will vary depending on site conditions, project scope, approvals requirements and delivery approaches.

Project-level costs represent only part of the investment required. At a program scale, costs must also account for the full lifecycle of implementation, including research and design, planning, policy development, project management, approvals, monitoring, evaluation, maintenance and adaptive management.

To support long-term planning, an indicative budget has been developed for a 40-year program (to 2065) using the 3 implementation phases as a guide. Within each implementation phase the budget includes:

1. Priority projects typically comprising one of projects such as infrastructure projects.
2. Ongoing catchment initiatives such as riparian and wetland restoration projects that need to occur throughout the catchment over a considerable period of time to address the large legacy impacts throughout the catchment.
3. Foundational activities including research to infill knowledge gaps, planning and detailed project development, policy input/development, monitoring and evaluation, etc.

Indicative costs should not be interpreted as investment-ready estimates. Further economic assessment, detailed design and business case development will be undertaken as required to confirm costs, evaluate benefits, assess value for money and support funding and implementation decisions.

6.4.1 Indicative program budget

NB: All costings are in 2026 dollars, do not count for inflation and are on-top-of standard operating budgets for the WGCMA (or relevant delivery partners). All projects are subject to individual site assessment, feasibility, design and costings at the time of implementation.

As a rule of thumb, costings for Phase 1 will be more accurate than Phase 2 and 3, i.e. uncertainty increases with time.

Within the above context, this indicative budget is provided as an indication of the scale of investment required over the long-term and should not be used to determine specific project budgets. This budget should be treated as a starting point for priority investment needs. The full scale and cost of action required is far greater than the priorities listed here. Multiple large scale projects are yet to be costed and no costs have been attributed to water recovery for the environment. Priorities and associated costs will continue to be updated and refined as information improves over time.

Table 12. Indicative program budget for each implementation phase (all costs are in 2026 dollars).

Theme	Project	Estimate $
Phase 1 - Accelerate (2026-2030)		
Priority Projects	McArdle's Gap inlet structure for Sale Common	$2m
	Improving fish passage in the Tyers River	$4m
	Addressing constraints to environmental water delivery	$15m[1]
Ongoing catchment initiatives	Ecological restoration - eg. riparian, floodplain and wetland restoration projects	$1m/yr
	Geomorphic restoration - eg. meanders, bank erosion projects	$0.5m/yr
	Water quality improvement - eg. agricultural BMPS	$0.5m/yr
Foundational Activities	Eg. Policy, R&D, MERI	$0.5m/yr
SUB-TOTAL		**$33.5m**
Phase 2 - Scale and integrate (2030-2045)		
Ongoing catchment initiatives	Ecological restoration - eg. riparian, floodplain and wetland restoration projects	$2m/yr
	Geomorphic restoration - eg. meanders, bank erosion projects	$1m/yr
	Water quality improvement - eg. agricultural BMPS	$1m/yr
Foundational Activities	Eg. Policy, R&D, MERI	$0.5m/yr
SUB-TOTAL		**$67.5m**
Phase 3 - Consolidate and secure (2045-2065)		
Priority Projects	Improving fish passage in the mid-Latrobe (Yallourn and Narracan)	Uncosted
	Addressing constraints to environmental water delivery (Moodarra & Blue Rock)	Uncosted
	Moe Drain water quality improvement project	Uncosted
Ongoing catchment initiatives	Ecological restoration - eg. riparian, floodplain and wetland restoration projects	$1m/yr
	Geomorphic restoration - eg. meanders, bank erosion projects	$0.5m/yr
	Water quality improvement - eg. agricultural BMPS	$0.5m/yr
Foundational Activities	Eg. Policy, R&D, MERI	$0.5m/yr
SUB-TOTAL		**$50m**
GRAND TOTAL		**$151m**

[1] *Estimate for 'addressing constraints to environmental water delivery' is the subject of a current study due to be completed in late 2026.*



7 Knowledge gaps

While there is a strong evidence base to support this strategy, a number of key knowledge gaps remain. Addressing these gaps will improve understanding of system behaviour, reduce uncertainty, and support more effective management over time.

Key knowledge gaps fall into four broad themes:

Hydrology and system processes

- Estuary hydrodynamics and salt wedge behaviour under changing flow and sea level conditions
- Interactions between groundwater and surface water
- Cumulative impacts of climate change, reduced flows and mine rehabilitation on hydrology

Geomorphology and sediments

- Current geomorphic condition of the river and tributaries
- Identification and contribution of priority sediment sources
- Sediment processes and condition within the Lower Latrobe Wetlands

Ecology and ecosystem response

- Condition, distribution and recruitment of native fish populations
- Extent and condition of riparian vegetation
- Relationships between water regimes, wetland vegetation and waterbird breeding
- Ecological risks associated with salinity change and acid sulphate soils

Management effectiveness

- Long-term effectiveness of key interventions (e.g. environmental watering, restoration works, carp control)
- Influence of small-scale water storages and farm dams on streamflow and outcomes

Targeted investigations and monitoring will be used to progressively address these gaps and inform adaptive management.



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Appendix A: Evidence base for objectives

Objectives	Evidence	Relevant goals
Nutrient and sediment loads from the Latrobe River will be reduced by 20% by 2065 (that is five-year annual average load will be 87 tonnes of TP, 670 tonnes of TN and 28,000 tonnes of sediment).	Annual average loads from the Latrobe River (2009 - 2023) were 83 tonnes of TP, 830 tonnes of TN and 35,000 tonnes of sediment, which around 70 – 80% of the total load to Lake Wellington. Studies have indicated that it is phosphorus that drives algal blooms, particularly in Lakes Victoria and King. But within the river itself all three parameters are above environmental reference standards and indicate that lower concentrations would benefit river health and loads would benefit receiving waters.	3
Freshwater wetlands: c. Sale Common will remain a freshwater wetland and within defined Limits of Acceptable Change. d. Freshwater wetland habitat in the Latrobe catchment below Lake Narracan will remain > 1,300 hectares.	The Victorian Wetland Inventory has 1,300 hectares of "freshwater" wetland in the Latrobe catchment below Lake Narracan, 80% of which is on private land.	1 and 4
Variably saline wetlands: a. Heart and Dowd Morass will remain variably saline wetland systems and within defined Limits of Acceptable Change. b. Variably saline wetland habitat in the Latrobe catchment below Lake Narracan will remain > 2,700 hectares.	The Victorian Wetland Inventory has 2,700 hectares of wetlands not labelled "freshwater" in the Latrobe catchment below Lake Narracan (excluding those fringing Lake Wellington).	1 and 4
The following indicator fish species continue to be supported in the Latrobe system: • River blackfish in the tributaries of the River (Tanjil, Tyers, Morwell Rivers and Traralgon Creek). • Australian grayling (throughout the system). • Estuary perch (estuary).	Data on fish in the Latrobe system is very limited and probably insufficient to make a quantitative target. Australian bass are regularly stocked and so not a good indicator species. The Resource Condition Target from the Ramsar plan is "Maintain fish diversity for species within each of the following life history strategy: estuarine dependent, estuarine opportunists, marine migrants, diadromous, and obligate freshwater species." Objective is based on presence of indicator species in different life history categories.	5

Objectives	Evidence	Relevant goals
Maintain geomorphic channel complexity including low flow benches, high flow benches, pool and riffle habitats.	Data is limited, objective is based on expert opinion.	6
Platypus continue to be supported in the Tyers and Latrobe Rivers and there is an increase in their distribution.	Limited eDNA data suggest presence in the Latrobe and Tyers Rivers, but insufficient to derive a quantitative objective. Objective based on presence and distribution.	5
Successful breeding of green and golden bell frog and growling grass frog is recorded at least once every three years at a minimum of five wetlands including the Lower Latrobe Wetlands.	Adopted the Resource Condition Target from the Gippsland Lakes Ramsar Site Management Plan. Insufficient data to develop an objective for other locations to make an objective for anywhere else.	5
Waterbirds: a. Australasian bittern detected at least once every two years at Sale Common, Dowd and Heart Morass. b. Successful breeding of Australasian darters, pied cormorants, little black cormorants, straw-necked ibis, Australian white ibis and royal spoonbills at least once every two years. c. Annual presence of sharp-tailed sandpiper in Heart Morass.	Adapted from the Resource Condition Targets from the Gippsland Lakes Ramsar Site Management Plan. There is insufficient data to make quantitative objectives from elsewhere in the Latrobe system.	5
Maintain "good" (as indicated as a biota score of > 16 according to the Index of Wetland Condition) vegetation condition in variably saline and freshwater wetlands at 80% of representative sites.	Adapted from the Resource Condition Targets from the Gippsland Lakes Ramsar Site Management Plan.	1 and 2
The condition of the Latrobe Estuary is improved to moderate or better in the 2046 Index of Estuary Condition.	DEECA aims to complete Statewide assessments of condition of streams, wetlands and estuaries every 12 years. The most recent assessment of estuary condition (2022) indicated that the Latrobe Estuary was rated as being in poor condition. The objective gives the system 24 years to improve.	1 and 2
Riparian vegetation: a. Increase the area of riparian frontage that is protected to > 70% by 2065. b. Condition of riparian vegetation is improved from 2025 baseline (as indicated by cover, extent and continuity).	Current data indicates that 58% of the Latrobe River system is "protected" (fenced or reserved). This represents a 7% increase since 2014. The Index of Stream Condition will be completed in 2026, so a quantitative objective for condition could be drawn from that.	4 and 6

Appendix B: Program logic

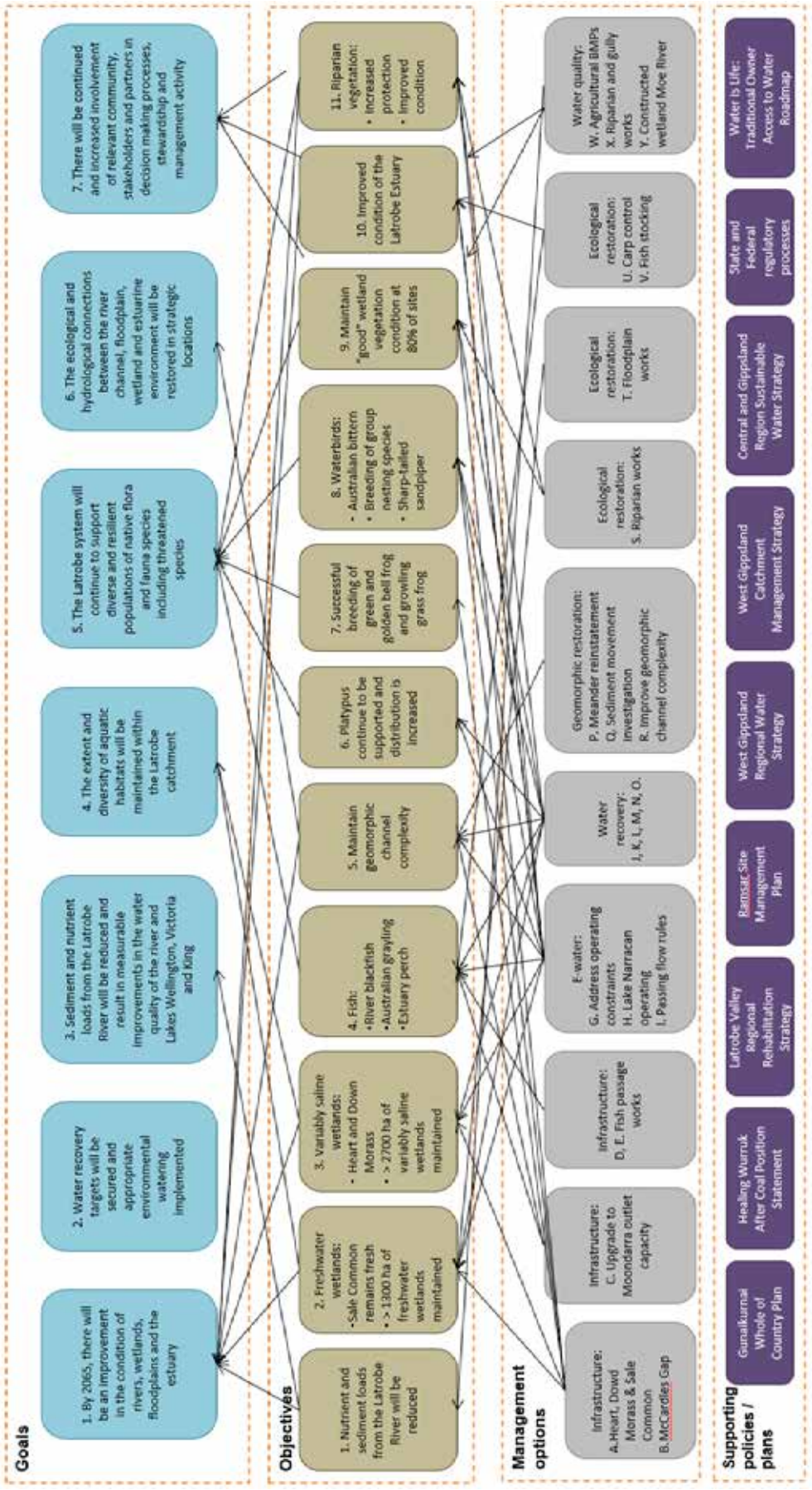


Figure 10: Relationship between goals, objectives and management options of this strategy.

Appendix C: Management options with prioritisation, indicative costings and scheduling

NB: The indicative costings provided are best available estimates based on recent experiences of project delivery by WGCMA staff as at 2026 pricing. Individual circumstances and site requirements will significantly impact individual project costings. Costs are on-ground only and are not inclusive of standard business operating costs.

Theme	Management Option	Priority	Indicative Costings*	Immediate	Years 1 - 2 (2027-2028)	Years 3-4 (2029-2030)	Years 5-6 (2031 - 2032)	Years 7-8 (2033-2034)	Years 9-10 (2035-2036)	>10 years
1. Infrastructure	Upgrades to Heart and Dowd Morass inlets and Sale Common outlet.	20	Funding already committed via the CGRSWS							
	New inlet structure at McArdle's Gap on the Thomson River for Sale Common	18	~$2m							
	Improving fish passage in the Tyers River	16	~$4m (subject to feasibility assessment & design)							
	Upgrade to Moondarra outlet capacity	14	Uncosted (likely > $10m)							
	Improving fish passage in the mid-Latrobe River	7	Uncosted (likely > $10m)							Post mine rehab

Theme	Management Option	Priority	Indicative Costings*	Immediate	Years 1 - 2 (2027-2028)	Years 3-4 (2029-2030)	Years 5-6 (2031 - 2032)	Years 7-8 (2033-2034)	Years 9-10 (2035-2036)	>10 years
2. Optimise environmental flow	Address operating constraints to allow the delivery of environmental flows	18	Subject of current study - to be updated in 2027. Est. $10-15m.							
	Update operating arrangements to enable storage and release of environmental allocation at Lake Narracan	18	Policy change - no on-ground							
	Review and alter (if required) passing flow rules for reservoirs and unregulated rivers to better meet environmental needs	9	Policy change - no on-ground							
3. Water recovery	Latrobe Reserve reallocation	18	Policy change - no on-ground							
	Reallocation of mine rehabilitation BEs when they become available - post mine rehabilitation	18	Policy change - no on-ground							Post mine rehab

Theme	Management Option	Priority	Indicative Costings*	Immediate	Years 1 - 2 (2027-2028)	Years 3-4 (2029-2030)	Years 5-6 (2031 - 2032)	Years 7-8 (2033-2034)	Years 9-10 (2035-2036)	>10 years
3. Water recovery	Securing the gap between power generation net water use and their entitlement amount for the environment	18	Policy change - no on-ground			Yallourn			Loy Yang	
	Blue Rock to Moondarra environmental water transfer (concept)	15	Policy change - no on-ground							
	Address sleeper and / or underutilised licences, decommissioning farm dams, conversion of year-round licences to winter fill licences	9	Policy change - no on-ground		Opportunistic					
4. Geomorphic restoration	Meander reinstatement	13	~$250k per site, current estimates suggest 10 additional sites are feasible over 10-20 yr timeframe		Opportunistic					
	Addressing sediment movement in the Latrobe River (river bank erosion)	17	~$50k per km of waterway. Total demand ~$1m per/yr	Commence			Accelerate & Scale			

Theme	Management Option	Priority	Indicative Costings*	Immediate	Years 1 - 2 (2027-2028)	Years 3-4 (2029-2030)	Years 5-6 (2031 - 2032)	Years 7-8 (2033-2034)	Years 9-10 (2035-2036)	>10 years
4. Geomorphic restoration	Improve geomorphic channel complexity	15	Achieved via meander reinstatement, riparian restoration, and river bank erosion initiatives.	Commence			Accelerate & Scale			
5. Ecological restoration	Floodplain wetland restoration	18	~$50-100k per site. Total demand ~$0.5m/yr	Commence			Accelerate & Scale			
	Common carp harvesting	16	Uncosted							
	Native fish stocking	15	Uncosted	Ongoing						
	Riparian restoration	17	~$50k per km of waterway. Total demand ~$1m per/yr	Commence			Accelerate & Scale			
6. Improving water quality	Agricultural Best Management Practices (BMPs)	14	~$20-30k per site. Total demand ~$1m/yr	Commence			Accelerate & Scale			
	Riparian and gully fencing and revegetation	14	As per riparian restoration	Commence			Accelerate & Scale			
	Constructed wetland on the Moe Drain	9	Uncosted (likely > $2m)							









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We acknowledge and pay our respects to the Traditional Owners of this Country, the Gunaikurnai and to their rich culture and spiritual connection to Country.