

# Our living rivers of the Barwon

A discussion paper for the future



Barre Warre Yulluk





## Cover artwork – Billy-Jay O'Toole

### My Country

*My Country* tells a story of our waterways and our rivers; the rivers that have many resources for Aboriginal people. The blue section represents the waterways, the middle brown colour section represents the land and Country. The top section represents the dreamtime and the elders who have passed, but have given us what we have today. The bottom section represents all the evidence our old people have left behind on Country and the handprints represent coming together.

The sun in the middle is always shining bright when Country is healthy. In this painting Country is healthy, which is why I have incorporated the sun into this piece.

**Billy-Jay O'Toole** is a proud Wadawurrung boy, residing on Country in Torquay. Billy-Jay works for the Wathaurung Aboriginal Corporation, in the field of cultural heritage. He has a passion for art and says his biggest achievement was designing Geelong's AFL Indigenous jumper in 2014–2015.

## Illustrations – Stephanie Skinner

**Stephanie Skinner** is a Wadawurrung digital artist and illustrator. For the Wadawurrung people, the rivers of the Barwon and their tributaries are places of special cultural and spiritual significance. Stephanie's illustrations throughout the discussion paper represent this connection – the animals, birds and scar trees are found throughout these waterways.



# Our living rivers of the Barwon

A discussion paper for the future



Prepared by the Barwon River Ministerial Advisory Committee









## Purpose of this discussion paper

This paper has been developed by the Barwon River Ministerial Advisory Committee ('the MAC') to promote community discussion about opportunities to protect and improve the health and management of the rivers of the Barwon (which includes the Barwon, Moorabool, Yarrowee and Leigh rivers).

It has been developed in consultation with Traditional Owners, users of the rivers, adjacent landholders, the broader community, and key government and agency stakeholders with a focus on the most important issues and opportunities to be addressed.



# Acknowledgement

The Barwon River Ministerial Advisory Committee proudly acknowledges Victoria's Traditional Owners and Aboriginal communities and their rich culture, and pays respect to their Elders past, present and emerging.

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

We recognise the intrinsic and strong connection of the Traditional Owners, the Wadawurrung people to Barre Warre Yulluk and value their contribution to managing the land, water and natural landscape. We acknowledge the ongoing contribution this makes to the Barwon River catchment. We also recognise that the rivers of the Barwon are valued by other Aboriginal people.

We support the need for genuine and lasting partnerships with Aboriginal people and communities to understand their cultural connections to Country in the way we plan for and manage the Barwon River catchment as a connected system.

We embrace the spirit of reconciliation, working towards equality of outcomes and ensuring an equal voice for Australia's first people.





# Chair's message

The rivers of the Barwon (Barre Warre Yulluk) and their tributaries are valuable natural assets that need to be protected and enhanced for future generations. They will play a key role in supporting the liveability, amenity and recreational opportunities for a growing population, as well as support diverse agricultural and horticultural production and an expanding economy.



The Minister for Planning and Minister for Water established the Barwon River Ministerial Advisory Committee ('the MAC') earlier this year to seek community views on the threats to the Barwon catchment; how best to manage those threats from a planning, institutional and regulatory point of view and how to enhance and protect the river system for all users including the environment.

The waters of the Barwon catchment rise in the Otways, the Wombat Forest and country around Ballarat. They flow through a variety of landforms supporting towns and farming enterprises before joining together to flow through the parklands of Geelong and out into the Bass Strait, passing by the Ramsar wetlands of the Connemara system.

The Barwon catchment is a significant source of water for the second and third largest cities of Victoria, Geelong and Ballarat. Both cities are growing quickly. In recent years the natural flows of the Barwon and its major tributaries, the Moorabool and the Yarrowee/Leigh Rivers, have declined significantly. The Moorabool is the most stressed river in the state.

It is clear that a business as usual approach will not be sufficient. Unless the right management strategies are put in place it is likely that, by 2050, the region could have twice the current population and possibly half of the traditional sources of water for our towns, industries, farms and environment. The key water agencies, Barwon Water, Central Highlands Water, Southern Rural Water and the Corangamite Catchment Management Authority, have already taken major steps to address these challenges.

Much of the catchment is important to the Traditional Owners, the Wadawurrung people, as well as other Aboriginal people. Lal Lal Falls and Connemara and their connectivity are of special importance to the Traditional Owners.

The MAC has held workshops with communities up and down the catchment identifying the threats to the river system and seeking possible improvements to management arrangements. The MAC also sought the community's vision for the Barwon and its tributaries in fifty years. The MAC has also discussed the outcomes of the community discussions with relevant agencies and local government in the region.

This paper summarises the work of the past few months and outlines possible future directions for consideration. We need to work together to put in place appropriate governance arrangements to ensure that we protect and enhance the key values of the rivers of the Barwon. I encourage you to review the MAC's work so far and contribute to our deliberations on the directions for our final recommendations to our Ministers.

## **Christine Forster AM**

Chair

Barwon River Ministerial Advisory Committee







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# The rivers of the Barwon at a glance

13% urbanised

17% natural vegetation

70% agricultural



## Wadawurrung Traditional Owners

The Wadawurrung retain a strong connection to the Barwon/ Moorabool system. They see Barre Warre as a connected system, between rivers and the sea. Protecting Lal Lal to Connewarre is a Wadawurrung story.



## 300 species of birds

The rivers of the Barwon and its corridors support over 300 species of birds including the Secretive Nankeen Night Heron, the endangered Orange-bellied Parrot and the Great Egret.



## 17 reptile species

The rivers of the Barwon support over 17 reptile species, including skinks, snakes and turtles.



## Yulluk

Aboriginal people call the Barwon River Barre Warre Yulluk, meaning the great river (yulluk) that ran from the mountains (barre) to the ocean (warre). The name Barwon is derived from parwan meaning 'magpie' or 'great wide'.

## 50 mammal species

The rivers of the Barwon support over 50 mammal species including the Platypus and Swamp Wallabies.



## Over \$50 million

The Corangamite CMA, Barwon Water, Central Highlands Water and local government have collectively spent over \$50 million on waterway health improvements over the last ten years.



## 22 fish species

The rivers of the Barwon support over 22 native and recreational fish species, including Estuary Perch and Australian Grayling.

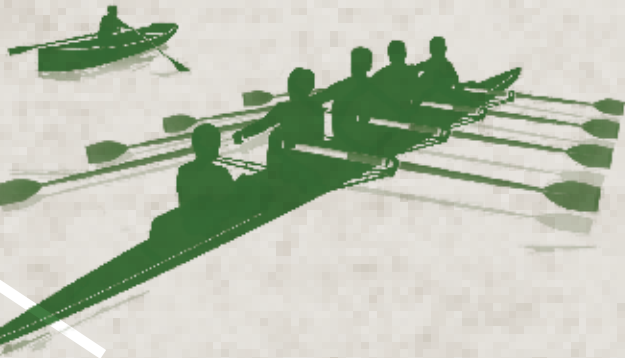


# 5,380 km<sup>2</sup>

The catchment area of the rivers of the Barwon (including 94 tributaries).

## Over 50 events

The Barwon River through Geelong supports over 50 events each year on its waters and along its river bank, including paddle sports and rowing regattas.



# 795 km

The length of rivers of the Barwon from major headwaters in the Otway Ranges and Central Highlands to the estuary at Barwon Heads.



## Drinking water

The upper Barwon, Leigh and Moorabool Rivers provide the majority of the drinking water for Geelong and Ballarat.



## 6,500 million litres

Over 6,500million litres of water have been secured for the environment since the release of the *Central Region Sustainable Water Strategy* in 2006.



## Connewarre wetland

The rivers of the Barwon pass through the internationally significant Connewarre wetland complex, which forms part of the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar Site.

## Over a million visitors

Each year over 1 million people use the Barwon River Parklands through Geelong and the Yarrowee corridor through Ballarat for cycling, walking and other recreational opportunities.



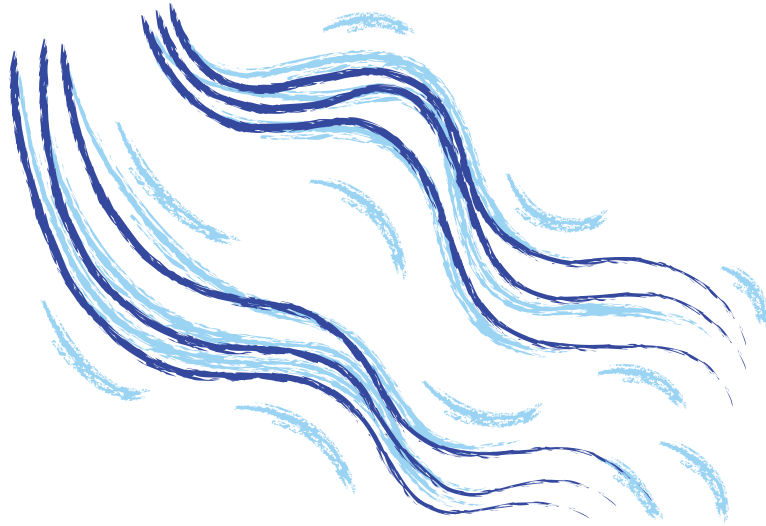
## Local government

The rivers of the Barwon and their tributaries traverse six local government areas: City of Ballarat, City of Greater Geelong, Colac Otway Shire, Golden Plains Shire, Moorabool Shire and Surf Coast Shire.









# 1 Introduction

“*The Victorian Government has established a Barwon River Ministerial Advisory Committee to ensure a community-led approach to the future management and protection of the Barwon River and its tributaries.*<sup>1</sup>”

The intent of this discussion paper is to capture the community vision for the rivers of the Barwon, collate current and emerging issues and identify opportunities to shape the way the catchment is managed into the future.

The rivers of the Barwon catchment include the Barwon, Moorabool, Yarrowee and Leigh rivers and their tributaries.

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1 Barwon River Ministerial Advisory Committee – Terms of Reference



# 1.1 The challenge ahead

The rivers of the Barwon are diverse and complex and hold special cultural significance for the region's Traditional Owners, the Wadawurrung people. They are also valued by other Aboriginal Victorians. The river system supports a range of natural values, from the headwaters in the Otway Ranges and Central Highlands to the estuary at Barwon Heads, including the Ramsar listed Connewarre wetland complex.

The Barwon catchment also supplies the majority of water to Victoria's largest regional cities, Geelong and Ballarat, and sustains a highly productive agricultural sector supported by a range of fertile soils (including rich volcanic soils) and a temperate climate.

The catchment's riverine corridors provide important areas of public open space and increasingly support recreational activities such as enjoyment of nature, walking, cycling, swimming, fishing, game hunting, rowing and paddle sports, as well as the community's broader liveability aspirations for the region.

While significant inroads have been achieved over recent decades in protecting the health of the catchment, the region faces increasing pressure from significant population growth and a changing climate.

Forecast population growth will place increasing stress on the rivers of the Barwon through:

- **Increased use of open spaces along waterways**
- **Higher demand for use of scarce water resources**
- **Intensification of land use close to waterway corridors**
- **More hard surfaces, which will increase stormwater run-off and localised flooding.**

The Barwon catchment already has some of the state's most stressed waterways, and climate change predictions for the region anticipate a warmer climate with less rainfall, further reducing water availability. More extreme weather events are also predicted under a changing climate, which can affect water run-off patterns and the riverine environment.

These pressures are expected to place increasing stress on the health of the catchment's waterways and its natural landscapes, requiring a long-term strategic response to meet these challenges and others that emerge.



*These pressures are expected to place increasing stress on the condition of the catchment's waterways and its natural landscapes, requiring a long-term strategic response to meet these challenges and others that emerge.*







## 1.2 The Barwon River Ministerial Advisory Committee

The Barwon River Ministerial Advisory Committee ('the MAC') has been established under Section 151 of the *Planning and Environment Act 1987* to ensure a community-led approach to protecting and managing the rivers of the Barwon for generations to come.

The Minister for Planning and Minister for Water have established the MAC to make recommendations to inform an Action Plan for future management and protection of the rivers of the Barwon catchment and their tributaries. Recommendations may include improvements to institutional, legislative and regulatory arrangements, land use planning controls, land and water management and better ways to involve the community.

The MAC will work in partnership with the catchment's Traditional Owners and local communities to understand the threats to the river, how to better manage these threats and how to enhance and protect the river system. Building on existing information and recent community engagement in the region, the MAC will look for opportunities to improve arrangements for management and protection of the region's waterways, and to address any gaps or emerging issues.

The MAC acknowledges the significant work underway by the Victorian Government, its agencies, Traditional Owners and community volunteers (such as Landcare and 'friends' groups) to protect and enhance the condition of the catchment, and address the importance of liveable cities and towns to community health and wellbeing. The intent of the MAC is to focus on the Barwon catchment and will not duplicate existing work. The MAC will seek guidance and make recommendations that consider, align and add value to natural resource management and land use planning policies and practices. Table 1.1 shows the key initiatives.



**The Barwon River Ministerial Advisory Committee**



The MAC members bring a range of skills and experience from the planning, environmental and cultural sectors.



**Christine Forster AM** has been appointed Chair, bringing her extensive experience in water management and planning to the MAC. Ms Forster is highly regarded in the field of water reform and this role will build on her experience and decades of work in the water sector. This includes leading water reform as a member of the reference group for the development of the Victorian Government's water plan, Water for Victoria, that also supports the protection of the Barwon River.



**Peter Greig** has vast experience in natural resource management and integrated catchment management. Peter is currently the interim chair of the Friends of the Barwon Incorporated, previous chair of the Corangamite Catchment Management Authority board and current president of the Upper Barwon Landcare Network.



**Chris Harty** is a specialist in town planning and environmental science and is a sessional member of Planning Panels Victoria. He has run his own consultancy for 33 years and is passionate about river, estuary and wetland ecology.



**Melinda Kennedy** is a Wadawurrung woman with extensive knowledge of traditional land and water practices and contemporary natural resource management. She engages with new and older residents in the urban growth communities on Wadawurrung Country to provide them with cultural awareness that connects them to place. Melinda is also a member of the Aboriginal Water Unit of DELWP.



**Kirsten Kilpatrick** is an experienced town planner and passionate about the Geelong region. She has played an influential role in the direction of planning and efforts to advance prosperity and community wellbeing in Geelong, and the wider Barwon region.



**Table 1.1: Relevant Victorian Government and regional initiatives**

THEME	INITIATIVE
Biodiversity	Protecting Victoria’s Environment – Biodiversity 2037
Climate change	New Victorian Climate Change Framework
Coasts and marine	Draft Marine and Coastal Policy
Environment	New Environment Protection Act 2017
Land use planning and regional development	Bellarine Peninsula Distinctive Areas and Landscapes Revitalising Central Geelong Action Plan Protecting and Supporting Peri-Urban Agricultural Land G21 Regional Growth Plan
Transport	Geelong Ring Road to Bellarine extension link Barwon Heads Road Duplication Bannockburn to Geelong Ring Road upgrades
Water, catchments and waterways	Water for Victoria Our Catchments, Our Communities Regional Riparian Action Plan Victorian Floodplain Strategy Corangamite Floodplain Management Strategy Corangamite Regional Catchment Strategy Review Long Term Water Resource Assessment Central Region Sustainable Water Strategy Review Corangamite Waterway Strategy Target One Million – More Victorians fishing, more often G21 Priority Project – Water for our Future Integrated Water Management Forums: – Barwon (centred on Geelong) – Central Highlands (centred on Ballarat).



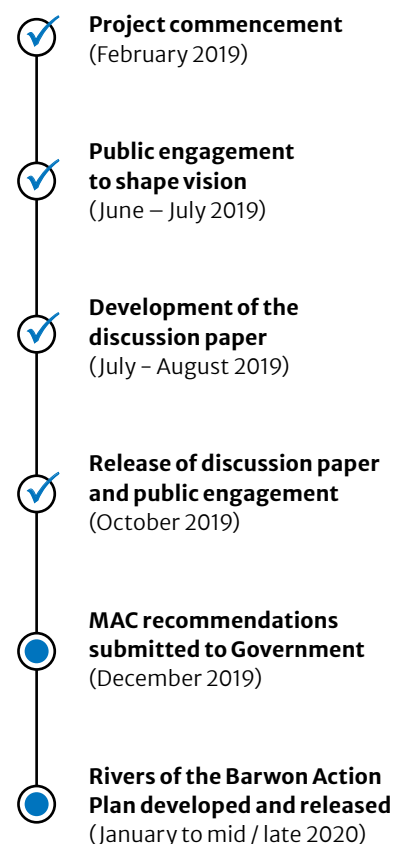
## 1.3 Have your say

The issues and opportunities outlined in this document have been developed in consultation with local community members who attended nine local discussions held across the Barwon catchment in June 2019. The feedback identified community perceptions of where management and planning of waterways and water need to be improved to meet future challenges. After these sessions, three ‘pressure-point’ workshops brought together agency staff and community members to discuss potential solutions or improvements. These sessions included organisations that have responsibilities for decision-making and management of the rivers of the Barwon, along with environmental advocacy groups. There was also an opportunity to provide feedback online via the Engage Victoria website and a Social Pinpoint interactive map.

The MAC highly values all contributions made towards this discussion paper and encourages the community to become familiar with its content. We would like to hear what the public thinks about the proposed future directions presented in section 5 of this discussion paper under the following six discussion themes:

1. A living cultural landscape
2. Water management for a secure future
3. Targeted and integrated management for a healthy catchment
4. Enhanced waterway corridors for community connection, access and use
5. Planning for sustainable growth and liveability
6. An effective governance model for the catchment.

The MAC welcomes any other ideas the public has about protecting and enhancing the rivers of the Barwon.



**Figure 1.1 Timeline of the Barwon River Ministerial Advisory Committee**

### **Please make your submission by Thursday 3 November 2019.**

We would like to hear your views on the themes and future directions proposed in this discussion paper and any other ideas you may have about improving the management and protection of the rivers of the Barwon. In particular, your feedback would be appreciated on the following questions:

- 1. What is most important to you in each of the themes?**
- 2. How much do you support each direction within the themes?**
- 3. Are there any directions that should be changed or removed?**
- 4. What do you think are the barriers / obstacles that might hinder these directions?**



### **Online**

At <https://engage.vic.gov.au/protecting-rivers-barwon-barre-warre-yulluk> you can view and download this discussion paper, background studies and other information, and also provide feedback through an online ideas-sharing tool. You can also make a written submission by completing the submission form on the website.

### **In person**

You can attend one of the community sessions being held in the region at Geelong, Ballarat and Colac during October 14, 15 and 16, 2019 to join the discussion. Details and timings of events are available at <https://engage.vic.gov.au/protecting-rivers-barwon-barre-warre-yulluk>

### **Written submission**

You can make a written submission on the discussion paper by:

- Completing an online submission form at <https://engage.vic.gov.au/protecting-rivers-barwon-barre-warre-yulluk>
- Emailing a written submission to [barwon.river.inbox@delwp.vic.gov.au](mailto:barwon.river.inbox@delwp.vic.gov.au)
- Posting a written submission to PO Box 500, Melbourne, Victoria 8002 (addressed to the Rivers of the Barwon Action Plan program)

Submissions will be made public unless you ask for yours to be confidential.

The MAC will consider all feedback and provide recommendations to the Victorian Government. A number of investigations have also been commissioned to inform the MAC's deliberations. The MAC will provide their advice on reforms to manage and protect the Barwon River system to the Minister for Planning, The Hon. Richard Wynne MP, and the Minister for Water, The Hon. Lisa Neville MP, by 31 December 2019. The Victorian Government will develop a Rivers of the Barwon Action Plan as a response to the MAC recommendations.

The timelines for the development of the discussion paper and the Rivers of the Barwon Action Plan are provided in Figure 1.1.



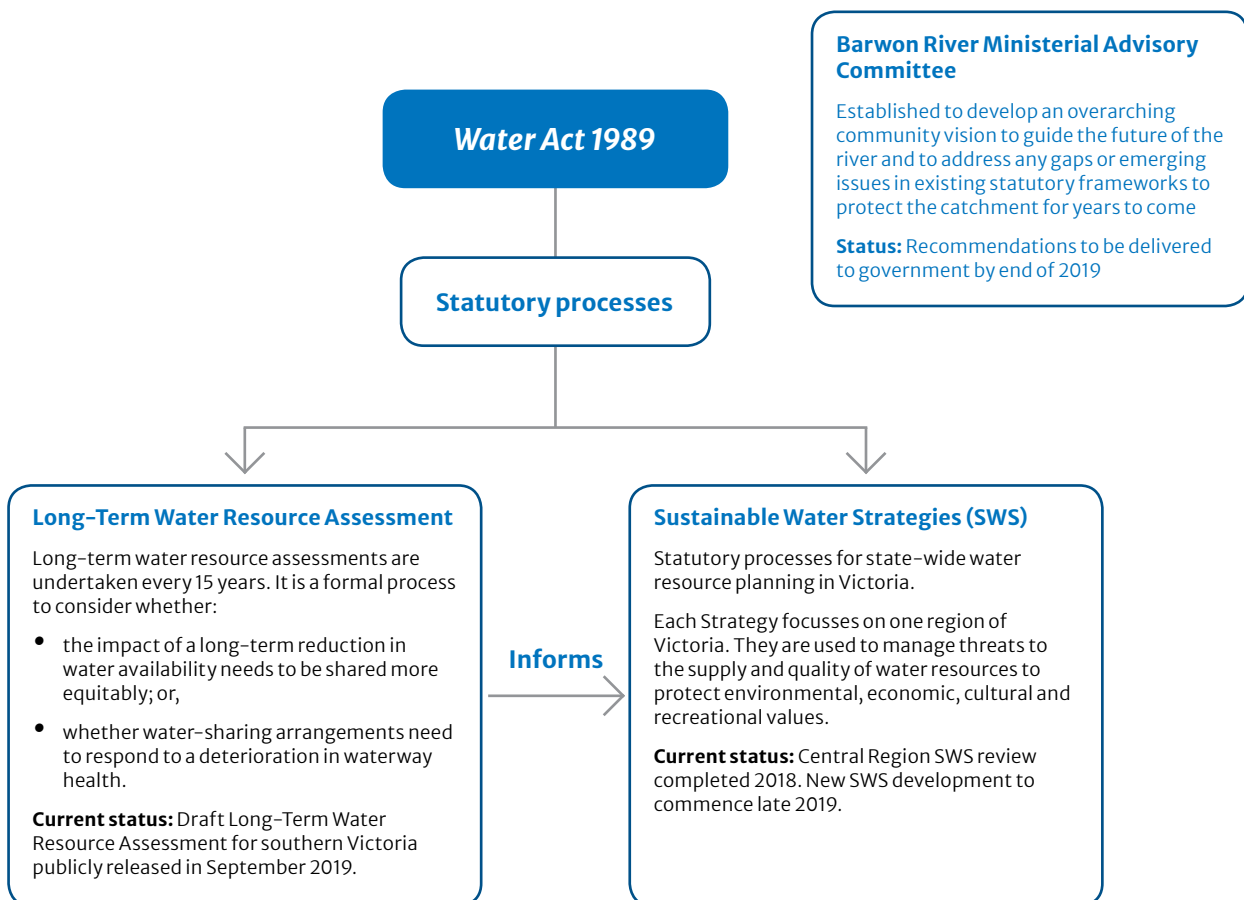
## Other engagement processes underway

The Victorian Government has also released the Long-Term Water Resource Assessment findings for southern Victoria.

This important assessment of southern Victoria’s water resources, undertaken every 15 years, will inform a new sustainable water strategy due to start in late 2019.

The public engagement phase for the MAC discussion paper, which will involve a series of six ‘open house’ sessions in Ballarat, Geelong and Colac, will be coordinated with the engagement process for the Long-Term Water Resource Assessment findings (see Figure 1.2).

During this period, Barwon Water is working with its community to design a new water future for its region. The *Water for our Future* program will draw on the insights, experiences and ideas of people from across the region to create a future that harnesses the value of water to support liveable and prosperous communities and a healthy environment for years to come. The public engagement phase for the MAC discussion paper will help to inform conversations about the region’s water future through this program.



**Figure 1.2 Government engagement processes currently underway in the Barwon catchment**



## 1.4 What we have heard

As detailed, nine local discussions were organised at locations across the Barwon catchment, including Armstrong Creek, Bannockburn, Barwon Heads, Birregurra, Forrest, Geelong, Meredith, Mt Clear and Winchelsea. These community discussions provided an opportunity for people to think about aspects of the rivers of the Barwon including what was important to them, what needed improving and what was getting better.

Three ‘pressure-point’ workshops were also held with agency staff and community members to discuss key issues facing the catchment and where better management could make a difference.

These community sessions and pressure-point workshops were accompanied by an online survey and a Social Pinpoint website (an interactive mapping platform) to collect community feedback on specific sites within the catchment.

Figure 1.3 provides a sample of the feedback received through this process.

Through the nine discussion sessions, the community was also asked to present their long-term vision for the rivers of the Barwon. The following 50-year vision statements are a reflection of this feedback. The first statement was provided directly by the region’s Traditional Owners, the Wadawurrung.



# What we've heard

## Mt Clear – Ballarat

*“The Yarrowee cycle and walking path! What a joy this is and a hidden gem in Ballarat’s crown. Appreciated by young and old, dogs, wildlife. Continue funding and maintaining this asset and take it out even further!”*

*“This area is important to me because of becoming involved with the local landcare group, and helping and watching the regeneration of this area has been both fascinating and satisfying (and hard work!) But proud to be part of it.”*

## Bannockburn and Inverleigh

*“My vision for the Barwon River is to maintain a healthy flow of water supporting viable aquatic life, and the river is supporting farming properties that border onto it.”*

*“The Barwon is messy where I live, the riparian zone in most places impenetrable, it is difficult and expensive to manage and to maintain fences after flooding ... but it is what it should be like ... natural and with such a diverse ecosystem.”*

## Birregurra

*“The Barwon River is a beautiful ecosystem full of many different species ranging from large to small, it’s also full of amazing plants to create homes for animals. More plants and trees should be planted here and they should clean up the sides of the river to make sure the river has lots of clean water flow and to make sure nothing is harming the river.”*

## Winchelsea

*“I want to see a flowing river and healthy tributaries, with wide riparian zones of native vegetation, weed free, alive with fish, birds, platypus and insects.”*

*“We want a river that is in the best possible condition to respond to a changing climate.”*

**Figure 1.3 What we have heard from the community**

## Meredith

*“Fauna surveys have found Brush Tailed Phascogales to occur within this area near the Moorabool river. The protection of native vegetation along the Moorabool river is important (especially of any large old trees) as these are important for habitat.”*

*(Regarding the Moorabool) “This section of the river is important for both recreational and environmental values. The river is used for paddling activities as well as environmental education projects. Powerful Owls, Phascogales, sugar gliders among others have been observed here along with numerous suspected platypus sightings.”*

## Geelong

*“I love going down to the Barwon river because it’s close to my house. I go down to the Barwon river twice a week to row. I’ve got a lot of friends down at the Barwon river, and I make friends when I’m rowing.”*

*“The Barwon river is a great place to ride my bike, walk my dogs and it’s a really peaceful place to go on runs.”*

*“I love the freeness of the bike trail along the Barwon river. I have ridden it lots of times and love it.”*

*“This place is such a great place to take your dog for a walk. It is also a great place to ride your bike or even go for a run. This place is filled with nice tall trees and a great walking track. I would really recommend going and visiting this great place.”*

## Barwon Heads

*“The estuary is a unique and diverse range of ecosystem services for both human enjoyment and biodiversity values. The species that are residents here rely on the system for part of their life cycle – which should be embraced and understood by all.”*

*“The Barwon river is clean, it’s running well and it has been maintained well with only a few sites of rubbish. It’s also a nice place to launch and drive a boat.”*

*“The riverbank in Barwon Heads is a great, nice and quiet place...for now. The growing population is a concern but at this point of time I can say that this place is a calm area to do your exercise, like riding bikes and walking. The river is a great place to go fishing although pollution is increasing a lot with a growing population.”*





## Welcome to Country smoking ceremony on the Moorabool

Source: Corangamite CMA

# 1.5 A new 50-year vision

### Traditional Owners retain a strong connection to the Barwon/Moorabool system<sup>2</sup>

- We see Barre Warre as a connected system, water is a living entity in our stories, our creations are held by the life of these rivers, our intangible connections received from our past live and protect our culture for our present and future
- The connection between rivers and sea is our lore
- Protecting Lal Lal to Connewarre is a Wadawurrung story
- We work to ensure a balanced ecological water system, this includes all living things. It is our duty to care for, nurture and replace Barre Warre with all it needs for a healthy life
- We will continue to share our culture through the blood of our mother earth. May we educate others to see Barre Warre through our Wadawurrung lens.

**Provided by Melinda Kennedy,**  
Wadawurrung Traditional Owner



<sup>2</sup> This statement is for the use of the Barwon River Ministerial Advisory Committee discussion paper, the author is to be notified for copies or prints

### **Our catchment's waterways are healthy**

- The condition of our catchment's creeks and rivers (and their floodplains and wetlands) are improving
- We see flow in our rivers all year to support their health and function, and wide areas of land adjoining riverbanks are fenced, have native vegetation and are free of weeds
- Our rivers are alive with fish, birds, platypus and insects, and migratory birds return each year to their breeding grounds in the internationally significant wetlands of the Bellarine
- From Ballarat to Geelong and from the Otways to the estuary at Barwon Heads, our waterways are connected, and in our cities and towns are providing healthy green corridors for habitat, recreational use and transport.

### **Our precious water resources are used wisely**

- Our water resources are sustainably managed to fit changing climatic conditions
- We value water as a precious resource and understand its availability, use and management
- We use water efficiently in our cities and for agriculture, and make better use of new technologies
- We maximise use of alternative water sources (such as recycled water and stormwater), and take advantage of our links to the Victorian water grid
- We learn rapidly from innovations in other catchments and integrated water management is central to planning for new development.

### **Our community understands, enjoys and cares for waterways**

- Stewardship of our waterways draws on Traditional Owners' understanding of rivers as living entities for which the whole community has responsibility
- As a community we understand water and where it comes from, we appreciate our rivers, their condition, and what is being done to keep them healthy
- We enjoy our rivers and catchment while limiting our footprint. In rural areas our landholders control weeds and limit stock access, while in our cities and towns streams are open, visible, valued and actively used
- We value the rivers of the Barwon and our advocacy for a healthy catchment remains strong.

### **Our management is integrated and focused on the future**

- Our agencies and community are aligned around the long-term goals for the health of the catchment
- Our planning for water and river management is integrated and considers both whole-of-catchment and local place-based needs
- Our planning for the growth of our cities and towns considers the long-term health of our waterways and the liveability of our growing community
- Adaptation to a changing climate is central to our future planning for the catchment, its rivers and communities.







## 2 Waterway and catchment management

The following background may be helpful to understanding the scope of waterway and catchment management and planning concepts captured in this discussion paper.

### 2.1 Waterways

This discussion paper focuses on the management of rivers, their associated estuaries and floodplains (including floodplain wetlands) within the Barwon catchment. The discussion paper refers collectively to these systems as ‘waterways’. The use of the term ‘waterways’ in the document does not replace other important definitions of the term (for example, the specific definition in the *Water Act 1989*).

The discussion paper applies to all rivers and their tributaries in the Barwon catchment, including the Moorabool and Leigh/ Yarrowee Rivers. The term ‘reach’ is used to describe a section of a river (generally 20–30 km section) and is the common planning unit for management.

Figure 2.1 shows the different types of waterways, their values and uses, all found in the Barwon catchment.



**Figure 2.1 Types of waterways depending on their values, condition and typical uses**

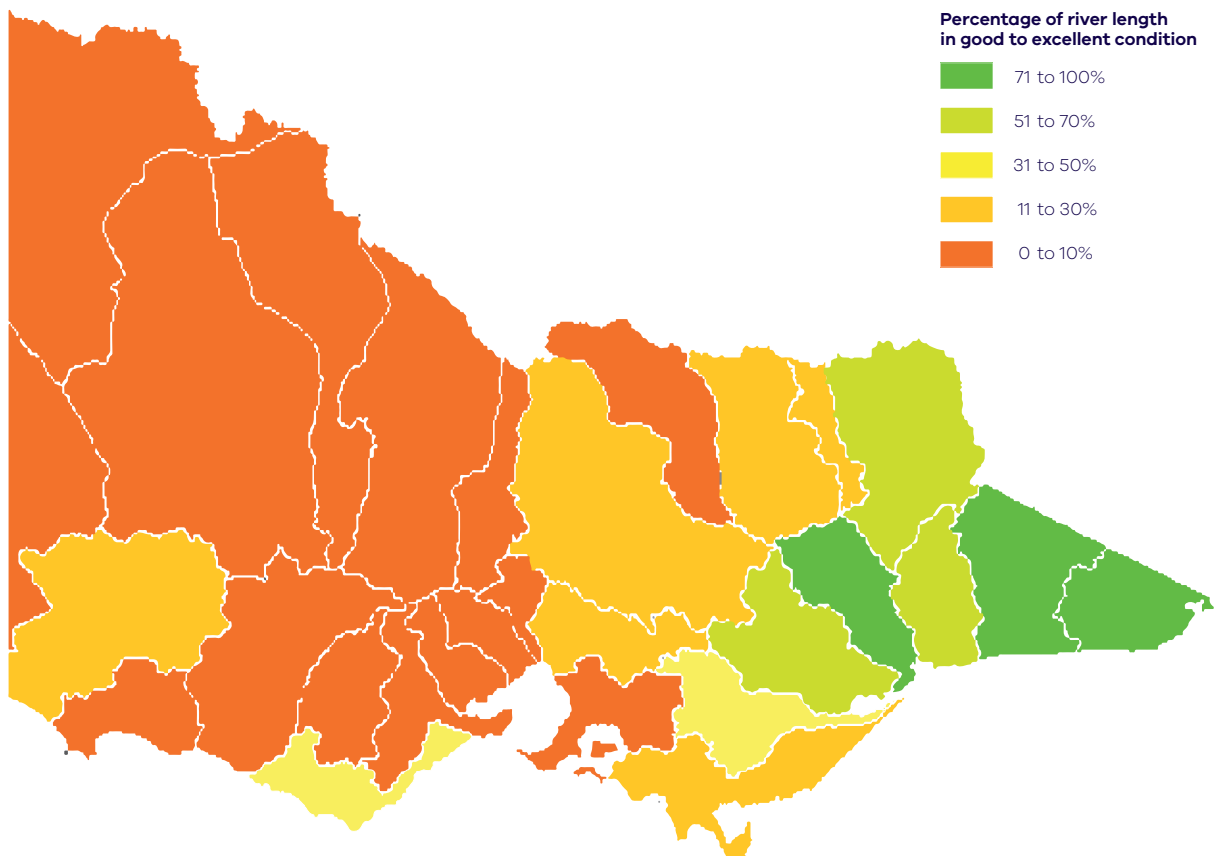
From left Yarra Ranges; Ovens River, Bruce Cumming; The High Country, Jon Nash, images courtesy Visions of Victoria; Merriman Creek; Yarra River.



## 2.2 Waterway condition

Waterway condition (or waterway health) is an umbrella term for the overall state of key features and processes that underpin functioning waterway ecosystems, such as species and communities, habitat, connectivity, water quality, riparian vegetation, physical form and ecosystem processes (including nutrient cycling and carbon storage). By maintaining or improving waterway condition the environmental, social, cultural and economic values that waterways provide can be preserved for both current and future generations. Waterway condition is measured by assessing a range of biological and physical factors.

Waterway condition is very strongly influenced by the characteristics, processes and actions in the surrounding landscape. For example, the type and extent of catchment and riparian vegetation, regional climate and land use, or landholder behaviour can all have a major influence on waterway condition. Estuaries are a critical link between catchments and the marine environment and poor health of catchments and waterways can affect these downstream environments. Figure 2.2 shows the percentage of Victoria's river length in good to excellent health from the latest index of stream condition report released in 2013. In the Barwon and Moorabool catchments, less than 10% of river length is in good to excellent condition.



**Figure 2.2 Waterway health in Victoria**

## 2.3 Catchment management and waterway condition

The task of managing waterways cannot be conducted in isolation from the broader management of catchments and land, because the condition of catchments and land is a key driver of waterway condition. Some activities occurring on the land surrounding waterways can affect water quality, aquatic plants and animals and riverbank vegetation. These linkages are recognised by the integrated catchment management framework that operates in Victoria. Waterway management and planning agencies are encouraged to undertake management activities throughout the catchment (in addition to activities in the channel of rivers and estuaries or within the boundary of wetlands) and consider broader issues such as connectivity, land use change and community participation, education and awareness raising.

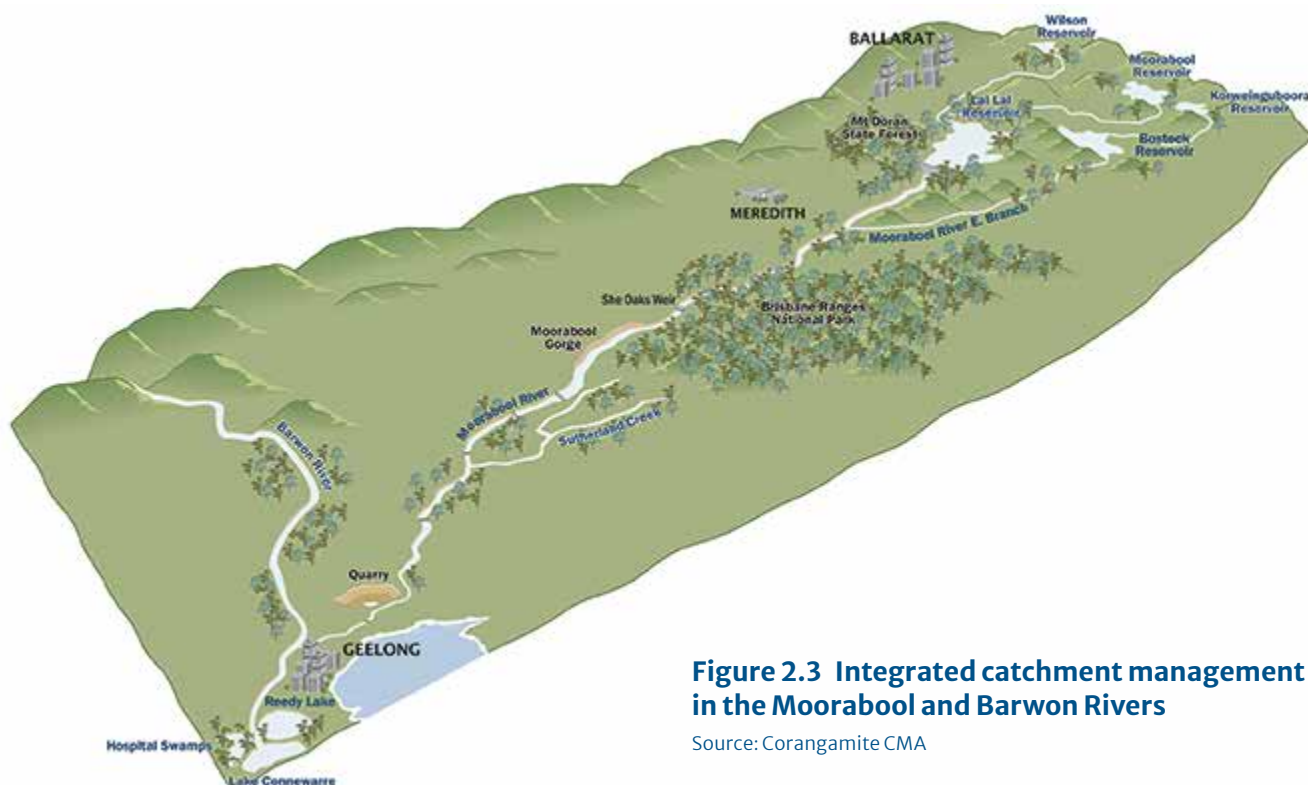
## 2.4 Integrated catchment management

Integrated catchment management is a holistic way of managing land, water and biodiversity from the top to the bottom of a catchment and recognises the intrinsic linkages between land use in catchments and subsequent impacts on land, water and biodiversity.

Integrated catchment management coordinates actions that deliver shared benefits and reduce perverse outcomes for communities, the environment and regional economies. It requires local coordination and collaboration between partners and long-term relationships to be successful.

The key components of integrated catchment management include the management of waterways, the protection of native forests and vegetation, pest management, restoration of riverbanks (or riparian land), sustainable agriculture and land management, sustainable irrigation, appropriate land use planning and development, integrated water management, and coastal management.

Figure 2.3, which focuses on the Moorabool and Barwon Rivers, demonstrates these components and their connections at a whole-of-catchment scale.



**Figure 2.3 Integrated catchment management in the Moorabool and Barwon Rivers**

Source: Corangamite CMA





## 3 Stewardship over time

### 3.1 Traditional Owner custodianship

To the Wadawurrung (Wathaurung) people, Barre Warre Yulluk (the Barwon River) was a life source and important meeting place. Its landscapes and biodiversity feature in their Dreamtime and creation stories.

The Wadawurrung ‘people of the water’ are the traditional custodians of the Barwon catchment. *Barre Warre Yulluk* means ‘the great river’ (*yulluk*) that runs from the ‘mountains’ (*barre*) to the ‘ocean’ (*warre*). The name Moorabool is derived from *moora* meaning ‘ghost’, as the Wadawurrung believed ghosts lived in a large lagoon on the river, and the eerie, high-pitched wailing call of the Bush Stone-curlew (*Cooloo*) night bird could only be heard and not seen.

For Traditional Owners, land and waterways – known as ‘Country’ – are a part of who they are. Traditionally, Aboriginal culture revolves around relationships with the land and water, which hold physical, social, environmental, spiritual and cultural significance. Today, the land and its waterways remain as important to Traditional Owners’ cultural identity and aspirations.

Traditional Owners have a distinct cultural perspective on water that relates to their identity and attachment to place, environmental knowledge, resource security and custodial responsibilities for managing Country. Water is the lifeblood for Country and waterways are the basis of many creation stories.



The Wadawurrung's minimal impact on the river is reflective of the special and respectful relationship with Country. The Barwon was an important source of food, shelter and clothing. The river, estuary and connecting coastline was rich in food, such as eels and fish, and was a life source for the Wadawurrung people.

On a western branch of the Moorabool River near Buninyong is one of Victoria's most significant Indigenous cultural sites. Lal Lal Falls are believed to be the earthly home of *Bunjil*, the All Father or Creator to tribes of the Kulin nation. The name Lal Lal is thought to be Aboriginal for 'dashing of waters'. The Lal Lal Falls are listed on the Site Registry of Aboriginal Victoria as a spiritual place. The connection between Lal Lal Falls and Lake Connewarre (*Kunawarr* keeling, literally meaning 'Black Swan lake') is especially important.

Originally the Wadawurrung occupied land along the banks of the Barwon and Moorabool rivers. Many sites today bear names reflecting the Aboriginal heritage in the region including Balliang, 'a place of bulrushes'. The Barwon River's name is derived from the Aboriginal word *parwan*, meaning 'Magpie' or 'great wide'. Geelong was named in 1827, derived from the local Wadawurrung Aboriginal name for the region, *Jillong*, thought to

mean 'land' or 'cliffs'. Ballarat was also thought to have derived from a local Wadawurrung Aboriginal term for the area, *balla arat*, generally thought to mean 'resting place'.

The rivers of the Barwon are rich in Aboriginal cultural heritage with sites of significance registered with Aboriginal Victoria. As the riverine landscape changes over time additional sites worthy of protection are revealed.

### 3.2 Settlement post contact

European settlement had a devastating impact on the Wadawurrung people. After only 50 years of white settlement, the traditional system that supported the Wadawurrung no longer existed.

Europeans settled along the rivers of the Barwon in the 1830s. The settlers determined that the Barwon River was brackish and subject to the influence of tides, and unfit for drinking downstream of what is now Buckley Falls.

The 'Breakwater' was one of the first of many human interventions along the catchment and is located in the current Geelong suburb of the same name. Originally built to prevent saltwater moving upstream, it now keeps the river level through



Geelong constant. Built by convicts, construction on the weir was completed in 1840, failed in the flood of 1844 and was rebuilt by 1849. The weir was rebuilt again by the Country Roads Board for modern traffic in the mid-1960s. A second weir (tidal barrage) was built over the Barwon River further downstream near where the river enters Lake Connewarre, known as the Lower Breakwater.

Buckley Falls, located between Highton and Fyansford, had a weir and water race built above the falls in 1876 to provide power for the Fyansford Paper Mill. The falls were named by John Helder Wedge after escaped convict William Buckley, who lived in the area with the region's Traditional Owners, the Wadawurrung people, for 32 years from 1803.

An ovoid aqueduct was constructed in 1916 downstream of Breakwater to carry sewage from Geelong to an ocean outfall at Black Rock. Made from reinforced concrete, it is a structure of unusual design, with 14 cantilever spans covering more than 760 metres, and is listed on the Victorian Heritage Register. The aqueduct was decommissioned in 1993, with the land and river underneath fenced off from public access due to falling debris, the deterioration due to the loss of calcium from its concrete.

The West Barwon Dam, now owned and managed by Barwon Water, was constructed near Forrest in 1965 by the then Geelong Waterworks and Sewage Trust. The dam is now the major water supply for Geelong. Another major dam (Bungal Dam) was built in the 1970s on the West Moorabool River to safeguard the water supplies of Ballarat and Geelong.



**The Yarrowee River at Black Hill circa 1897**

Source: State Library of Victoria



### Eroded banks along the Barwon at Inverleigh in 1955

Source: State Rivers and Water Supply Commission

In the Ballarat region, the Yarrowee played a major role during the gold rush period of the mid-to-late 1800s as a source of major gold deposits that fuelled the wealth of the region and economy of the newly established Colony of Victoria. The gold rush and the process of goldmining also had a devastating impact on the health of the Moorabool, Yarrowee and Leigh rivers. The rivers were dredged, and the banks were left denuded and eroded as forests were felled for timber and fuel. Sediment was deposited along the riverbed, clogging up holes and riffles. Modern day evidence of this can be found at Sutherlands Creek, which flows from the Brisbane Ranges and has silted up mainly due to goldmining activities at Steiglitz in the 1890s.

During the 1860s, many minor tributaries around Ballarat and parts of the Yarrowee River were sealed as bluestone drains to help prevent erosion and mitigate flooding. In the 1960s, a section of the Yarrowee River that flowed through the Ballarat central business district was rediverted, concreted and built over and now runs under the city.

Figure 3.1 details the major events that have impacted on the system since European settlement; the droughts, floods, gold rush and growing communities that have shaped the Barwon catchment of today.

### 3.3 A step to recovery

Despite major impacts to the condition of the catchment since European settlement, in recent decades there have been significant policy and institutional changes, and efforts by a range of government agencies and the community to protect and restore the health of the rivers of the Barwon.

Through the development of a series of strategies aimed at waterway health outcomes, such as the Corangamite Regional Catchment Strategy and Corangamite Waterway Strategy, a range of activities have been undertaken to improve the health of the catchment's waterways, such as the removal of fish barriers, major erosion control works, stock exclusion fencing, pest and weed control, river bank revegetation, and the recovery and delivery of water for the environment.

The following case studies further highlight these outcomes.



## Case study 1 – Returning flows to the rivers of the Barwon

There has been significant progress to improve flows in the Barwon catchment over the last 10 years through the establishment of the following environmental water entitlements:

- The 2010 Moorabool River Environmental Entitlement enables 2,500 megalitres (ML, million litres) of water per year (depending on water availability) to be delivered down the Moorabool River from Lal Lal Reservoir.
- The 2011 Barwon Environmental Entitlement enables seasonal watering of the Ramsar listed wetlands of the lower Barwon.

- The 2018 Upper Barwon River Environmental Entitlement enables approximately 1,000 ML of water per year (depending on water availability) to be delivered down the Barwon River from the West Barwon Reservoir.

These entitlements are managed by Corangamite CMA on behalf of the Victorian Environmental Water Holder, and in the case of the Upper Barwon and Moorabool are delivered by Barwon Water and Central Highlands Water respectively. Water delivery is also informed by the community and stakeholders through community advisory groups and the preparation of an annual seasonal watering proposal for each system.

In addition to these entitlements, flows have been improved in the lower Moorabool when groundwater accumulating in the bottom of Batesford quarry was returned to the Moorabool River instead of being diverted to Corio Bay. This key action in the Central Region Sustainable Water Strategy has resulted in improved river flows of approximately 3,500 ML/year since 2011.

The 2006 Central Region Sustainable Water Strategy also secured 2,000 ML of treated waste water discharge from the South Ballarat Treatment Plant to improve flows in the Leigh and Barwon Rivers.

Recently completed studies<sup>3,4</sup> into flow requirements, have reinforced the importance of these water recovery actions to maintaining the environmental and cultural values of the rivers of the Barwon. However, these studies and the results of the recent Long-Term Water Resource Assessment (LTWRA) also underscore the importance of additional flows to maintain a healthy river system, and to maintain the landscape and recreational values through Geelong.



### Water releases from the West Barwon Reservoir

Source: Andrew Sharpe, Victorian Environmental Water Holder

<sup>3</sup> FLOWS study update, Alluvium 2019

<sup>4</sup> Moorabool River FLOWS Study Update, Jacobs 2015

## Case study 2 – Fish passage through the Barwon

In 2013, a vertical slot fishway was installed on the lower Barwon River tidal barrage at the Lower Breakwater to enable native fish, including Estuary Perch, Black Bream and numerous other species to freely access the river upstream, through Geelong and beyond. The first of its type to be installed in western Victoria, the fishway was built offsite to limit any construction impacts on the values of the adjoining Reedy Lake. Fish were observed moving upstream within one hour of

opening the control gates while machinery was still in operation.

The fishway has improved river connectivity for a range of native fish species. Upstream fish passage is an essential requirement for most native fish species and is particularly important at tidal barriers to enable young fish to move upstream and away from predators. The fishway's performance has been monitored using a custom-built trap and

electro-fishing techniques. Across 12 monitoring sessions, 18 species and 69,246 individual fish were caught in the fishway traps. Up to 10,000 fish have been trapped within just 90 minutes and it is estimated that up to 2 million fish use the fishway each year.

The project was managed by the Corangamite CMA with funding from the Victorian Government and Recreational Fishing Grants Program and support from the Victorian Fisheries Authority, VR Fish and Parks Victoria.



**Monitoring the performance of the lower Barwon fishway**

Source: Corangamite CMA



# History of the rivers of the Barwon

The Wadawarrung people lived harmoniously with the landscape for thousands of years. The timeline of management of the Barwon catchment reflects the major events that impacted on the system since European settlement. Droughts, floods, the gold rush and growing communities have shaped the Barwon of today.

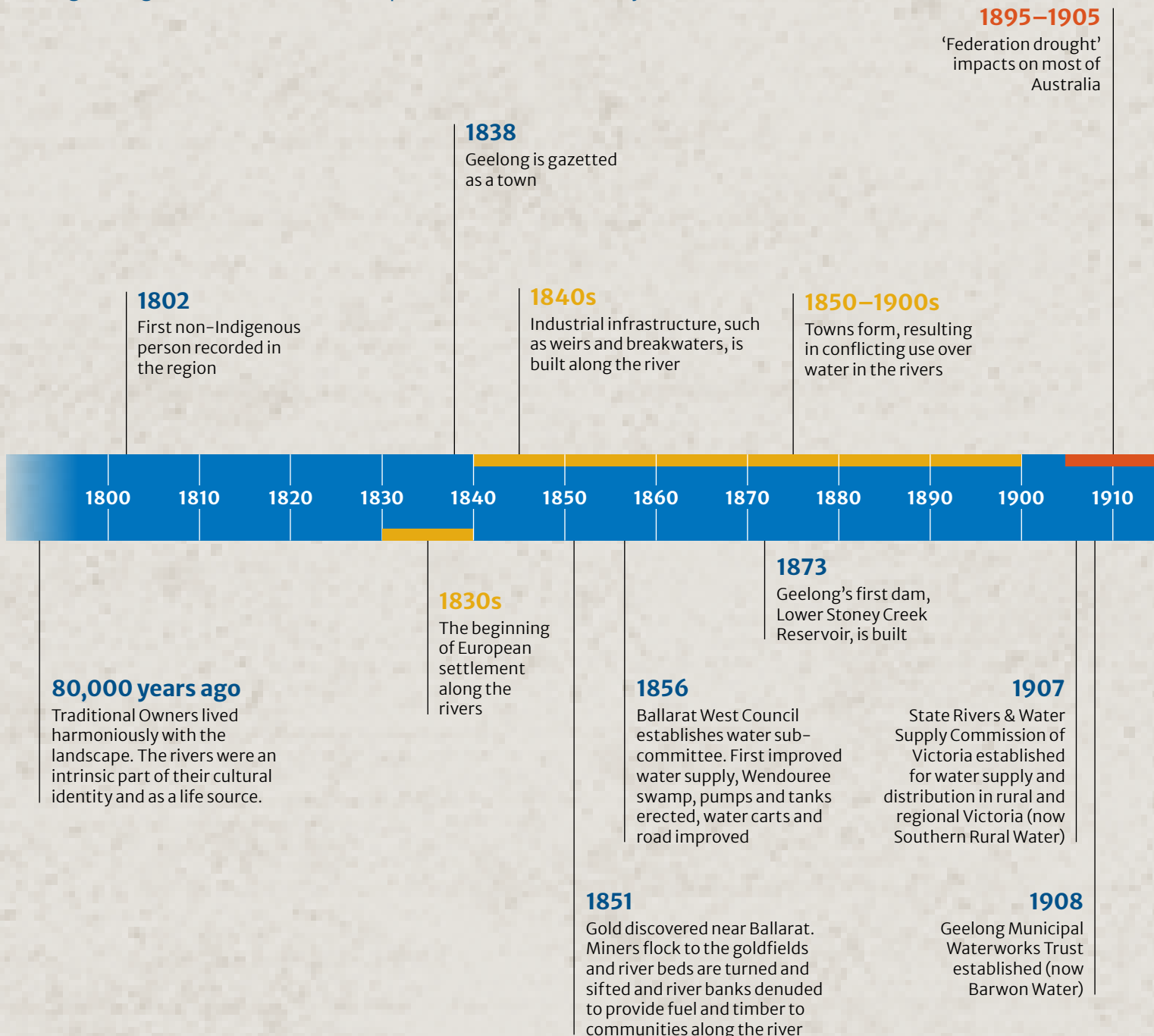
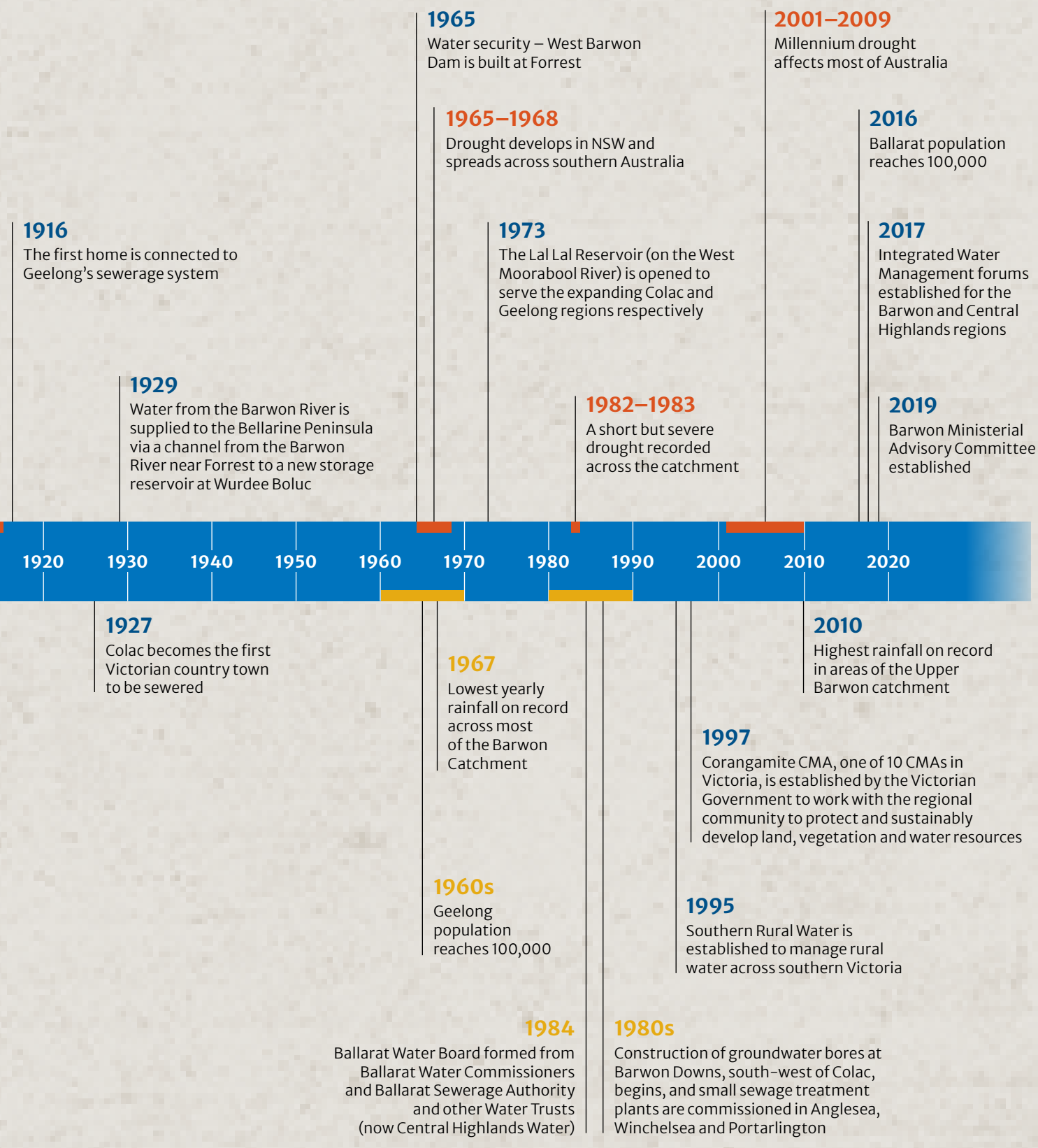


Figure 3.1 History of the Barwon catchment





### 3.4 Roles and responsibilities

The Victorian Government, statutory authorities and the community have varied levels of involvement in the planning, monitoring and management of the Barwon catchment.

Organisations with legislated management and planning responsibilities for the rivers of the Barwon include:

- Barwon Coast Committee of Management
- Barwon Water
- Corangamite Catchment Management Authority
- Central Highlands Water
- Department of Environment Land Water and Planning
- Environment Protection Authority Victoria
- Parks Victoria
- Six councils along the rivers of the Barwon: City of Ballarat, City of Greater Geelong, Moorabool Shire, Golden Plains Shire, Surf Coast Shire and Colac Otway Shire
- Southern Rural Water
- Wathaurung Traditional Owner Corporation
- Victorian Environmental Water Holder
- Victorian Fisheries Authority.

### 3.5 Community involvement and advocacy

A number of regional community groups, such as the People for a Living Moorabool and the Friends of the Barwon have been active in advocating for better care of the Moorabool and Barwon rivers. Other community groups such as the Bellarine Catchment Network, Geelong Field and Game, Geelong Landcare Network, Surf Coast and Inland Plains Network, Moorabool Catchment Landcare Group, Upper Barwon Landcare Network and Leigh Catchment Group have also worked actively over many years to restore and protect the Barwon, Moorabool, Leigh and Yarrowee Rivers, their wetlands and the broader catchment.

### 3.6 Management arrangements

Outlined here in Table 3.1 are the key agencies that manage the rivers of the Barwon. It is important to note that although their responsibilities vary, these agencies work collaboratively where there are opportunities to do so.

**Table 3.1 Roles and responsibilities for the rivers of the Barwon**

WHO	ROLES AND RESPONSIBILITIES
<p><b>Barwon Coast Committee of Management</b></p>	<p>The Barwon Coast Committee of Management has been appointed by DELWP to manage coastal Crown land areas under the <i>Crown Land (Reserves) Act 1978</i>. This includes management of the land adjoining the Barwon estuary.</p>
<p><b>Barwon Water</b></p>	<p>Barwon Water is Victoria’s largest regional water corporation, providing drinking water, sewerage services, trade waste and recycled water services to urban and rural customers throughout the Barwon region centred on Geelong. Barwon Water manages an area over 8,100 km<sup>2</sup> including the local government areas of the Borough of Queenscliff, City of Greater Geelong, Colac Otway Shire, Golden Plains Shire and Surf Coast Shire.</p> <p>The main water sources for the Geelong region are from the forested catchments of the upper Barwon and Moorabool rivers. During dry conditions, additional water can be drawn from the Victorian water grid via the Melbourne to Geelong Pipeline and underground aquifers at Anglesea.</p> <p>Barwon Water is a statutory corporation under the <i>Water Act 1989</i> and operates under a statement of obligations issued by the Minister for Water.</p>
<p><b>Central Highlands Water</b></p>	<p>Central Highlands Water is a regional water corporation that provides drinking water, sewerage, trade waste and recycled water services to customers throughout the Central Highlands region of Victoria centred on Ballarat. Central Highlands Water services a large geographical region of 9,275 km<sup>2</sup>, 15 water supply catchments and the local government areas of Ballarat, Central Goldfields, Golden Plains, Hepburn, Pyrenees, Northern Grampians, Moorabool and Corangamite.</p> <p>The water supply for the Ballarat district is predominantly sourced from the upper West Moorabool and Yarrowee river catchments situated to the east of Ballarat.</p> <p>Central Highlands Water is a statutory corporation under the <i>Water Act 1989</i> and operates under a statement of obligations issued by the Minister for Water.</p>
<p><b>Corangamite Catchment Management Authority (CMA)</b></p>	<p>The Corangamite CMA has management responsibilities for waterways, rural drainage and floodplains and coordinates an integrated approach to the protection and enhancement of land, water and biodiversity in the region by engaging and supporting the community and its regional partners.</p> <p>The Corangamite CMA’s role is defined in accordance with the <i>Catchment and Land Protection Act 1994</i> and the <i>Water Act 1989</i> and corresponding statements of obligations. This includes facilitating the planning for a Regional Catchment Strategy and associated strategies that inform natural resource management investment priorities. The Corangamite CMA also provides services relating to the protection, maintenance and improvement of waterway health, including: development and implementation of the Corangamite Waterway Strategy; acting as the regional caretaker of waterway health; providing regional leadership on issues relating to river, wetland and estuary management; regulating works on waterways; and undertaking the operational management of the environmental water reserve. The Corangamite CMA is also responsible for managing a large stretch of the Barwon River and adjoining parkland through Geelong.</p>
<p><b>Department of Environment, Land, Water and Planning (DELWP)</b></p>	<p>DELWP provides oversight to the management of Victoria’s groundwater, catchments and waterways, infrastructure, water saving and re-use projects, flood management, governance and water policy and legislation, in partnership with a network of government agencies. DELWP develops and implements state policies and programs, and oversees the governance of organisations including CMAs and water corporations. DELWP also administers the state’s planning system and provides policy advice to local government on planning matters. DELWP’s other overarching role is to bring together Victoria’s climate change, energy, environment, water, forests, planning, local government and emergency management functions into a single department to maximise connections between the environment, community, industry and economy.</p>



**Table 3.1 Roles and responsibilities for the rivers of the Barwon (continued)**

WHO	ROLES AND RESPONSIBILITIES
<p><b>Environment Protection Authority Victoria</b></p>	<p>The Environment Protection Authority (EPA) Victoria is an independent statutory authority under the <i>Environment Protection Act 2017</i>. EPA Victoria helps protect the health of the Barwon with powers under the <i>Environment Protection Act 2017</i> to prevent pollution and protect the environment. The EPA licenses discharges to the environment, monitors water quality and enforces state environment protection policies for the protection of surface water and groundwater.</p>
<p><b>Local Government Authorities – City of Ballarat, City of Greater Geelong, Colac Otway Shire, Golden Plains Shire, Surf Coast Shire, Moorabool Shire</b></p>	<p>The principal legislation governing the establishment and operation of councils is the <i>Local Government Act 1989</i>. The six councils within the Barwon catchment are responsible for land use planning under the <i>Planning and Environment Act 1987</i>, and the planning and operation of some urban drainage assets and services, including management of stormwater and localised flooding, and promotion of water-sensitive urban design. They also provide a wide variety of other services to their municipalities and administer various federal, state and local laws for their communities.</p> <p>Councils have direct management for the planning and operation of stormwater assets and services and have a key role in planning for areas of new and infill urban development including open space, roads and streetscapes.</p>
<p><b>Parks Victoria</b></p>	<p>Parks Victoria is established under the <i>Parks Victoria Act 2018</i> as an independent statutory authority to protect, conserve and enhance land managed by Parks Victoria, including natural and cultural values, for the benefit of the environment and current and future generations. Parks Victoria manages parks and conservation reserves in which many waterways are located, including the Barwon estuary at Barwon Heads, Barwon Bluff Marine Sanctuary, located near the mouth of the Barwon River, large parts of the Lake Connewarre complex, including Reedy Lake, and sections of the Great Otway National Park in the upper Barwon.</p>
<p><b>Southern Rural Water (SRW)</b></p>	<p>The Minister for Water has delegated the powers to rural water corporations to issue and administer licences for the take and use of water and associated works including dams on waterways. Accordingly, SRW is responsible for dealing with applications to issue, amend or renew water licences for irrigation purposes, and works licences for private farm dams and bores in the Barwon catchment. It also manages the take of water from waterways in the catchment via conditions on licences based on flow conditions and the use of rosters and restrictions.</p> <p>Southern Rural Water is a statutory corporation under the <i>Water Act 1989</i> and operates under a statement of obligations issued by the Minister for Water.</p>
<p><b>Traditional Owner Corporations</b></p> <ul style="list-style-type: none"> <li>• <b>Registered Aboriginal Party – Wathaurung Aboriginal Corporation</b></li> </ul>	<p>Traditional Owner corporations hold significant rights to the land and have cultural obligations to manage traditional lands and waters. They are equal partners in ensuring catchment health. In many cases, Traditional Owners' rights over Crown land and waterways are recognised in settlement agreements and governance arrangements to ensure their perspectives, knowledge and interests are valued.</p> <p>The Wathaurung Aboriginal Corporation, trading as Wadawurrung, is the representative body for Wadawurrung Traditional Owners and is the only Registered Aboriginal Party (RAP) in the Barwon catchment. The traditional boundaries of the Wadawurrung people span from Painkalac Creek in Aireys Inlet to Beaufort and the Werribee River. The Corporation works to support their aspirations and protect Aboriginal Cultural Heritage in accordance with the Victorian <i>Aboriginal Heritage Act 2006</i>.</p>

**Table 3.1 Roles and responsibilities for the rivers of the Barwon (continued)**

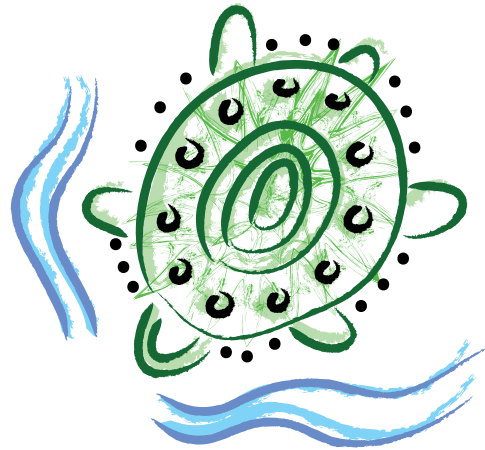
WHO	ROLES AND RESPONSIBILITIES
<p><b>Traditional Owner Corporations</b></p> <ul style="list-style-type: none"> <li>• <b>Eastern Maar Aboriginal Corporation</b></li> </ul>	<p>The Eastern Maar are a Traditional Owner Corporation. Traditional lands of the Eastern Maar people, which lies to the west of Warrnambool outside of the Barwon catchment, extend as far north as Ararat and encompass the Warrnambool, Port Fairy and Great Ocean Road areas, including 100 m out to sea from low tide and therefore include the iconic Twelve Apostles. The Eastern Maar are a RAP over their recognised native title area (shared with Gunditjmarra).</p> <p>Eastern Maar are proceeding with a lodged native title claim under the <i>Native Title Act 1993</i> (Cth) seeking a native title determination (i.e. recognition) over the area of their claim. This is in addition to also seeking a Recognition and Settlement Agreement (RSA) with the state under the <i>Traditional Owner Settlement Act 2010</i> (Vic). The processes under the native title claim and/or RSA settlement will determine and finalise the extent of their recognised Country (i.e. agreement area).</p>
<p><b>Victorian Environmental Water Holder</b></p>	<p>The Victorian Environmental Water Holder is an independent statutory body responsible for holding and managing Victoria’s environmental water entitlements. The Victorian Environmental Water Holder works with the CMA as the waterway manager, storage operators (e.g. Barwon Water and Central Highlands Water) and land managers (including Parks Victoria) to ensure environmental water entitlements are used to achieve the best environmental outcomes. This includes management of environmental entitlements in the lower Barwon wetlands, Moorabool River and upper Barwon River. The Victorian Environmental Water Holder was established in 2011 through an amendment to the <i>Water Act 1989</i>.</p>
<p><b>Victorian Fisheries Authority</b></p>	<p>The Victorian Fisheries Authority (VFA) is an independent statutory authority established to effectively manage Victoria’s fisheries resources, which includes native and recreational fish species in the rivers of the Barwon. The VFA is responsible for the management and regulation of fisheries including licensing, development of management plans and compliance and enforcement functions. The VFA also supports the development of recreational and commercial fishing and aquaculture in Victoria and provides advice to government on a range of fisheries management opportunities.</p>
<p><b>Other government agencies</b></p>	<p>Other agencies that have a role in the planning and management of the rivers of the Barwon include the Department of Transport, Regional Development Victoria, Sport and Recreation Victoria and Agriculture Victoria.</p>
<p><b>Australian Government</b></p>	<p>The Australian Government also has a direct role in the health of the Barwon catchment as the administrative authority within Australia for the Ramsar Convention on Wetlands of International Importance and implementation of the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act).</p> <p>The Australian Government also funds natural resource management programs in the Barwon catchment, such as the National Landcare Program (NLP). The NLP targets key national environment and sustainable agriculture priorities at the regional level such as the protection of Ramsar sites and nationally listed threatened species and ecological communities.</p>





**Native forest in the Otway Ranges**





## 4 The rivers of the Barwon

“ *It’s all the Barwon. We have a vision for a healthy, flowing, living, sustainable river.* ”

Community member, Birregurra pressure–point workshop.

### 4.1 The values of the catchment

The rivers of the Barwon hold special significance for the region’s Traditional Owners. They also provide open space and stunning vistas, rich bird life and diverse vegetation, from rainforest in the headwaters in the Otways to sweeping gums along the lower reaches, and support internationally significant wetlands in the estuary.

The Barwon River begins in the creeks of the inland slopes of the Otway Ranges, meanders north across the Volcanic Plains to meet the Leigh and Moorabool rivers, which emerge from the southern slopes of the Central Victorian Uplands. The river then turns southeast, flowing through Geelong and the Bellarine Peninsula to the sea at Barwon Heads. Rainfall across the region is closely related to elevation and latitude.

The average annual rainfall varies from 469 mm at Lovely Banks near Geelong to 1,892 mm along the ridge of the Otway Ranges. The majority of rain falls in winter and spring, with August the wettest month across the region.<sup>5</sup>

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<sup>5</sup> Victorian Resources Online – Agriculture Victoria ([www.vro.agriculture.vic.gov.au](http://www.vro.agriculture.vic.gov.au))



**Figure 4.1 Map of the Barwon catchment**

The waterways of the Barwon catchment are diverse and complex, supporting a range of natural values. The catchment also supplies water to Victoria’s largest regional cities, Geelong and Ballarat, supports forestry and highly productive agricultural industries (including grazing, cropping and irrigated horticulture), and is playing an increasing role in supporting the liveability and recreational opportunities of the region.

While they represent a connected catchment system, the rivers of the Barwon also comprise several distinct landscapes defined in the Corangamite Waterway Strategy 2014–2022.<sup>6</sup>

<sup>6</sup> Corangamite Waterway Strategy 2014–2022, Corangamite CMA



## 4.2 Upper Barwon

The Upper Barwon sub-catchment is located along the inland slopes and plains of the Otway Ranges to the north of Lorne and east of Colac. The Upper Barwon includes the upper reaches of the Barwon River and its tributaries, comprising 1,822 km of rivers and streams.

Parts of both the Great Otway National Park and Otway Forest Park are within this landscape; however, grazing for livestock (beef, sheep and dairy) and forestry dominate land use in the area, bringing significant economic benefits to the region.

Major towns in this area of the Barwon include Forrest, Deans Marsh and Birregurra in the Colac Otway and Surf Coast shires.

A key threat to the area's waterways is uncontrolled stock access to waterways that, if stock are not fenced out, can erode banks, damage riparian vegetation and reduce water quality through sedimentation and effluent contamination. Further threats include bed instability and degradation, changes in flow regimes and reduced riverine connectivity, degraded riverbank vegetation and loss of instream woody habitat. Willows (*Salix* spp.) and reed sweet-grass (*Glyceria maxima*) threaten a number of waterways in the upper section of the Barwon. For example, willows spread their roots into the bed of the watercourse, slowing the flow of water and reducing aeration. They also form thickets which divert water outside the main watercourse or channel, causing flooding and erosion where the creek banks are vulnerable. Willow leaves create a flush of organic matter when they drop in autumn, reducing water quality and available oxygen. This, together with the amount of water willows use, can significantly impact stream health.<sup>7</sup>

In sections along the Upper Barwon, water has ceased to flow at times of drought. The Upper Barwon also experienced a large-scale fish death event in June 2016, linked to an acid event that impacted water quality and the health of the river.

In 2019, the Corangamite CMA in partnership with Barwon Water coordinated the release of 485 ML of water from the West Barwon Reservoir as part of a new 1 gigalitre (GL, billion litres) entitlement of water for the environment recovered through the Central Region Sustainable Water Strategy. The aim has been to improve river health of the upper reaches by flushing sediment, wetting riparian vegetation and connecting habitat pools that provide a refuge for native fish and other fauna.

There are 53 wetlands in this sub-catchment. Significant water bodies include the West Barwon Dam, which provides drinking water for greater Geelong, and Thurrumbong and Ayrey lakes, which have important environmental values.



The catchment upstream of Deans Marsh

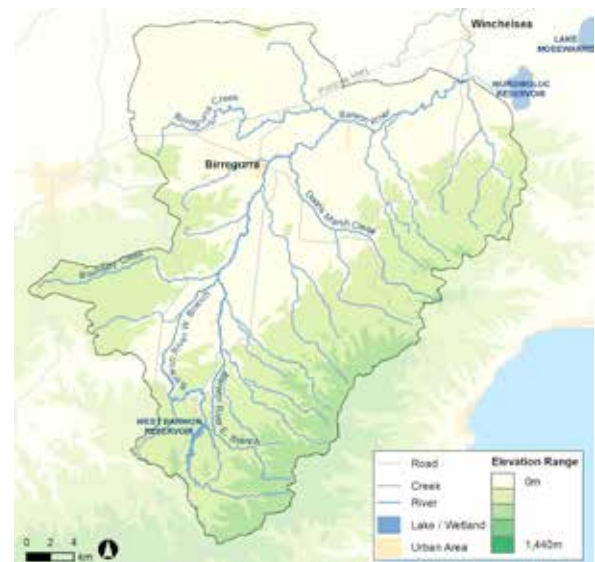


Figure 4.2 Map of the Upper Barwon

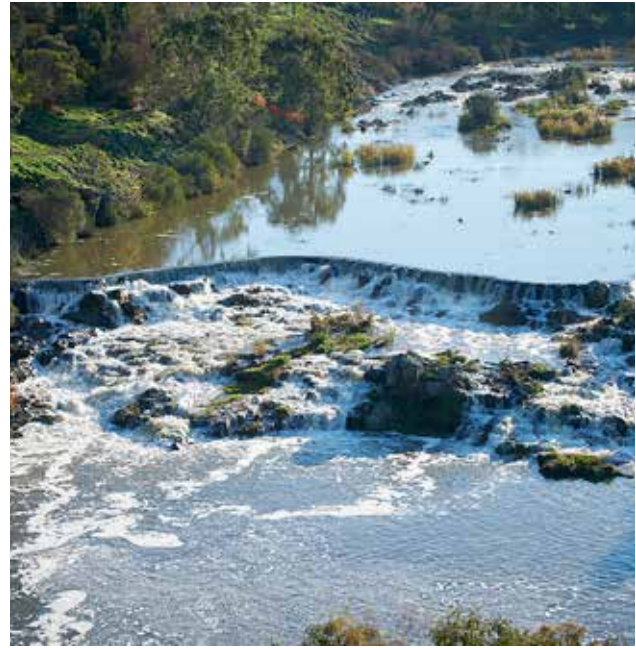
<sup>7</sup> Weeds of National Significance website (<https://weeds.ala.org.au/WoNS.html>)

### 4.3 Mid Barwon

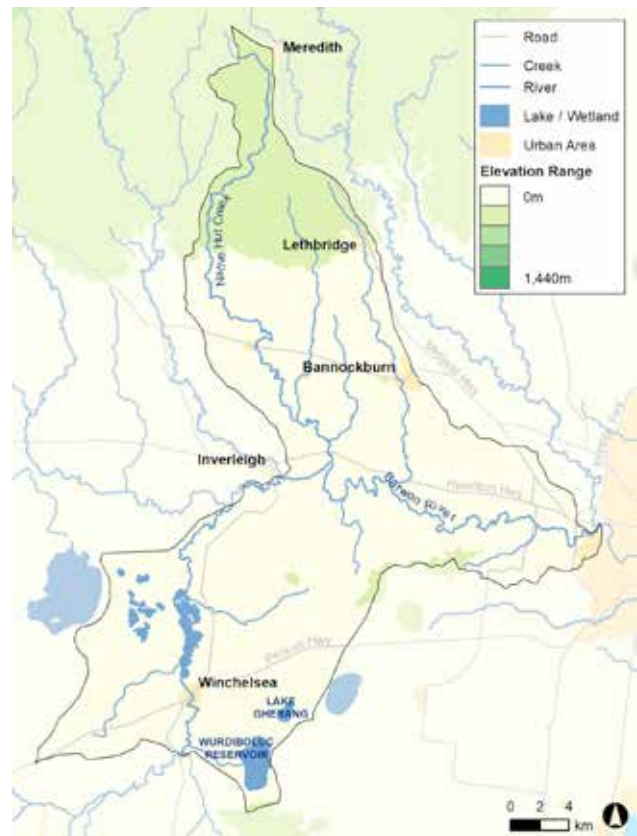
The Mid Barwon catchment is located to the west of Geelong and extends north along Native Hut Creek and west past Winchelsea and comprises 703 km of rivers and streams. Major towns include Winchelsea and Bannockburn; shires include Golden Plains, Surf Coast and the City of Greater Geelong.

This section of the Barwon includes part of the Victorian Volcanic Plain bioregion, which extends across southwest Victoria from Melbourne to Portland. Given the rich volcanic soil, this is a productive agricultural region and was one of the first areas settled for agriculture around Geelong. It also contains highly valuable grasslands, grassy woodlands and scattered wetlands. There are sections of the Mid Barwon River with good riverbank environments that support red gum woodlands and a number of threatened species. Land use in the area is predominantly grazing land, followed by cropping.

There are 104 wetlands in this sub-catchment. Significant water bodies include Lake Gherang and the Wurdiboluc Reservoir, which supply water to Geelong, Anglesea, Torquay and the Bellarine Peninsula. Threats include urban growth and associated stormwater run-off and degraded water quality, soil disturbance, bank erosion and degradation of native vegetation. Within the river channel there are a number of threats to the condition of the river including bed instability and degradation, changes in flow regime, reduced riparian connectivity, degraded river bank vegetation, barriers to fish passage, loss of instream woody habitat and uncontrolled stock access to waterways.



**Buckley Falls on the Mid Barwon**



**Figure 4.3 Map of the Mid Barwon**



## 4.4 Moorabool

The Moorabool River stretches from Fyansford on the outskirts of Geelong in the south to the top of the Moorabool River basin east of Ballarat in the north. Major towns include Meredith, Gordon and the western suburbs of Geelong; shires include Golden Plains, Moorabool and the City of Greater Geelong.

Land use in the catchment is dominated by grazing followed by forestry and irrigated horticulture, primarily viticulture and potatoes.

Of particular environmental and local significance are the gorges along parts of the Moorabool River. The steep escarpments within these gorges protect bands of remnant vegetation, providing important habitat corridors for wildlife.

The main source of water is the Moorabool River and its tributaries, which then flow into the Barwon River at Fyansford. The Moorabool River is highly regulated by water storages and weirs, the largest being Lal Lal Reservoir, which provides water for Ballarat as well as Geelong and Meredith. There are also several large water storages in the upper reaches of the catchment and nine private diversion weirs in the lower reaches between She Oaks and Batesford. Flow deviation through major upstream storages to supply urban water, land use, and licenced and unlicensed extraction have all impacted on quantity and quality of flows in the river. Sedimentation and sand accumulation brought about from these flow changes have also negatively impacted on the habitat of fish species, reducing flow and habitat diversity and posing a significant barrier to fish migration. They have also resulted in fewer recreational areas, such as swimming holes.

The Moorabool is identified as one of the most flow-stressed rivers in Victoria.<sup>8</sup> The amount of water that enters the river is also substantially reduced by the number of farm dams in the catchment, estimated at more than 4,000.<sup>9</sup> In recognition of this impact, a number of actions were delivered through the 2006 Central Region Sustainable Water Strategy to recover water for the environment, including the establishment of an environmental entitlement for the Moorabool River in 2010 (refer also to the case study under section 3.3).

The Moorabool River system is a major tributary of the Barwon River, and as such, improved river flows also benefit the health of the lower Barwon, including the Ramsar-listed Lake Connearre wetland complex.

Urban growth in the south of the catchment is also placing pressure on values in the lower section of the river.

*“Keep the full length of the river alive.”*

People for a Living Moorabool.



**The Moorabool Gorge**



**Figure 4.4 Map of the Moorabool**

<sup>8</sup> Moorabool River FLOWS Study Update, Jacobs 2015, 22.

<sup>9</sup> Ibid. 19.

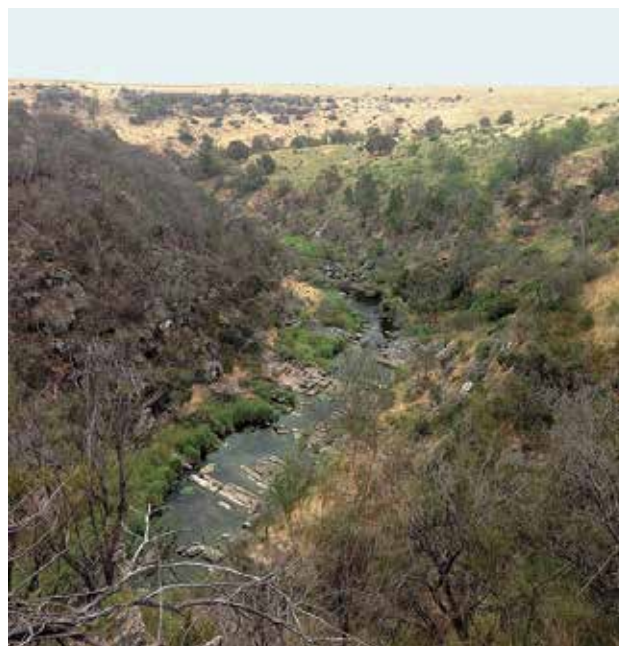
## 4.5 Yarrowee/Leigh

This major tributary of the Barwon River stretches from Ballarat in the north to Inverleigh in the south, comprising 1,689 km of rivers and streams. Major towns include Ballarat and Inverleigh; shires include Golden Plains and the City of Ballarat.

At Ballarat, the Yarrowee River provides an important area of natural public open space and is actively used as a recreational corridor through the city. Further downstream, at its junction with Williamson Creek the Yarrowee changes its name to the Leigh. Along the mid sections of the Leigh River, are extensive gorges similar to the Moorabool River, that are of environmental and local significance. The steep escarpments of these gorges protect bands of remnant vegetation and provide important habitat corridors for wildlife.

The Yarrowee–Leigh River system, which feeds into the Barwon at Inverleigh, is a highly modified and regulated waterway, with impacts dating back to the gold rush. Parts of its upper reaches traverse urban landscapes through Ballarat and contain water storages for urban use, such as White Swan Reservoir, both of which have altered flows in the river.

Central Highlands Water also releases part of its treated wastewater discharge from the South Ballarat Treatment Plant into the Yarrowee–Leigh River system. This licensed discharge (approximately 2,000 ML per annum) provides important flow to the Leigh and Barwon rivers, particularly during dry conditions. While the maintenance of this volume for downstream values was recognised through the 2006 Central Region Sustainable Water Strategy, it has removed a lot of the flow variability (particularly low flows and periods of no flows) that would have occurred under natural conditions.<sup>10</sup>



The Leigh Gorge



Figure 4.5 Map of the Yarrowee/ Leigh

10 Upper Barwon, Yarrowee and Leigh rivers FLOWS study update, Alluvium 2019



## 4.6 Bellarine (Lower Barwon from Geelong to Barwon Heads)

The Bellarine catchment area encompasses the southern suburbs of Geelong, the Bellarine Peninsula and the lower Barwon River to Barwon Heads. The beautiful coastline and wineries of the Bellarine attract large numbers of tourists annually with the population more than doubling in coastal towns during the summer months. The Barwon and Moorabool rivers, which meet at Fyansford, flow through Geelong then into Bass Strait at Barwon Heads. There are also several smaller waterways including Armstrong Creek and Waurin Ponds Creek that drain into the Barwon River.

Much of the Barwon River and its adjoining parkland through the urban areas of Geelong is highly valued and actively used by residents, visitors and a range of recreational user groups for rowing, paddle sports, water skiing, angling, cycling and walking, as well as major on-water events such as the annual Head of the School Girls regatta.

The area also contains a number of internationally significant wetlands and lakes that are listed under the Ramsar Convention, including Lake Connewarre, Reedy Lake and Hospital Swamps. The Ramsar convention is an international treaty that aims to halt the worldwide loss of wetlands and to conserve, through wise use and management, those that remain. These wetlands also form part of the Lake Connewarre State Game Reserve, which supports a range of recreational values including game hunting.

Key threats to the Bellarine include urban growth that, if not managed appropriately, could result in increased stormwater run-off, degraded water quality, soil disturbance, bank erosion and degradation of native riparian and estuarine vegetation. The natural water flows within the system have been significantly altered since settlement, particularly at Reedy Lake and Hospital Swamps. The construction of the weir at the Lower Breakwater in 1898, where the Barwon River discharges to Lake Connewarre, has also raised the river level upstream and prevents the incursion of saline estuary water upstream. Parts of the Lower Barwon River and associated tributaries and wetlands have historically been subjected to livestock pressure causing eroded banks and damaged riparian vegetation. *Spartina* (or Cordgrass), a highly invasive grass, threatens a number of the wetlands in this lower section of the Barwon, as it invades and alters plant communities, notably saltmarsh – a preferred habitat for a range of water birds and the nationally listed and critically endangered Orange-bellied Parrot. Climate change (and associated sea level rise and potential increase in the groundwater table) is also an emerging threat that has the potential to significantly impact on the Barwon's low-lying estuarine vegetation communities, including saltmarsh and mangroves.



Orange-bellied Parrot

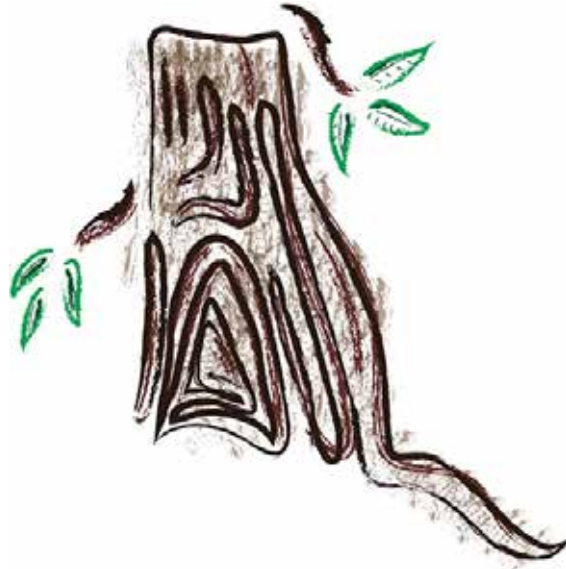


Figure 4.6 Map of the Bellarine









## 5 The challenges facing the rivers of the Barwon

The cities of Geelong and Ballarat are undergoing substantial population growth not seen since the gold rush in the mid-19th century and the long boom after the Second World War. Together with Bendigo, Greater Geelong and Ballarat are expected to account for approximately half of all the population increase outside metropolitan Melbourne to 2036.<sup>11</sup>

Given that the Barwon is still a largely rural catchment, this new phase of growth is creating a range of challenges not witnessed before in the catchment. A more coordinated response is therefore needed to protect and manage the rivers of the Barwon, and ensure they continue to support and enhance the liveability of the region.

Due to these development and land use pressures, a new approach to planning is needed to protect and activate the values of the rivers of the Barwon.

This planning may include urban parklands, open space and trails, green wedges and development corridors. As an example of this new planning approach, the Yarra River is viewed as fundamental to Melbourne's liveability and prosperity, providing 2,450 ha of parklands and green open spaces for its community. This planning has included a large connected network of urban parklands and open space and trails, as well as green wedges that values and preserves the natural values of its major river corridors.

There is much to be learnt from this approach. Unlike the riverine corridors of Melbourne, there has only been minor investment in developing or enhancing the open space corridors of the Barwon, such as the G21-led Barwon River Parklands and similar initiatives for the Yarrowee.

Similarly, there has been no overall vision and strategy at a whole-of-catchment scale for the long-term development and use of the corridors of the Barwon to provide a wide range of community benefits, to develop sites for more intensive uses, and to protect sensitive areas of high ecological, cultural and/or landscape value. The potential to activate these corridors to promote and accommodate greater use and enjoyment by the community, including recreation and tourism, is still largely unexplored.

<sup>11</sup> Victoria in Future 2019, p 9.

## 5.1 Population growth

The Barwon catchment is the most populated area outside metropolitan Melbourne. Population growth in the Barwon catchment will continue to put pressure on the health and landscape of the rivers of the Barwon and their corridors. Current population forecasts project that Geelong will almost double to approximately 569,400 people by 2056. Similarly, the projected growth of Ballarat is 62% to approximately 259,500 people.<sup>12</sup>

As the population grows there will be pressure for more intensive development in the catchment and greater recreational use of the river and its surrounding area. While the demand for water supplies per capita in the region is markedly less than it was in the 1980s,<sup>13</sup> it will also place greater pressure on already scarce water supplies that will be further impacted by climate change.

The Barwon River through Geelong is already subjected to algal blooms, a result of increased nutrient loads from agricultural run-off combined with less water availability. This can impact on enjoyment and use of the river for weeks to months in hot and dry summers, as well as pose risks to human and aquatic health. The projected increase in urban development in Geelong and Ballarat and the broader catchment will result in increased stormwater and agricultural run-off that if not properly managed could exacerbate these outbreaks. Additionally, the change from rural open space to residential housing means a more extensive built environment with hard surfaces causing more run-off. This can lead to increased stormwater flows into waterways, exacerbate the effects of localised flooding, increase river bank scouring and affect valuable river habitat. Improved management of stormwater through early and well-established integrated water management principles will be essential to maintain the amenity and health of lower Barwon River through Geelong, the Yarrowee through Ballarat and other towns throughout the catchment.

A growing population will also put more pressure on the use of the river, its parklands and public open spaces. Increasing low-density greenfield development and infill development of existing urban areas will also put additional stress on the region's riverine corridors and environment. Protection and conservation of the natural landscape along the rivers of the Barwon is therefore paramount to prepare the region's major corridors for this added pressure.



Rowing on the Barwon River

<sup>12</sup> Ibid, p 11.

<sup>13</sup> Water for our Future (<https://www.waterfuture.barwonwater.vic.gov.au>)



## 5.2 Climate change and water availability

The changing climate also poses a significant threat to the long-term management of the rivers of the Barwon as overall there will be less water in the system. Declining rainfall, higher temperatures and longer droughts are predicted as well as more frequent and severe storm events.

There has been significant progress to secure water for the environment over recent decades with the establishment of an environmental water reserve, and specific environmental water entitlements for the Moorabool and Barwon rivers.<sup>14</sup> However, these actions have aimed to protect current environmental values under historic climate patterns. As the region experiences further effects of climate change, the current arrangements may not be sufficient to sustain the health of these rivers and the many plant and animal species that depend on them.

The Central Region Sustainable Water Strategy water recovery commitments for the Barwon River have been largely met; however, these were less than the environmental flow shortfalls (flows needed to maintain and improve environmental values in the river). When these figures are re-examined under a drier climate, the environmental flow needs are even higher, highlighting the need to secure additional water for the environment.

Expected sea level rise in the Barwon estuary is also an emerging threat that could significantly affect the river's low-lying vegetation communities, including important areas of mangroves and coastal saltmarsh. Coastal saltmarsh is a threatened ecological community under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) and provides essential habitat to a number of migratory bird species, including the Orange-bellied Parrot. Rising sea levels and increased coastal inundation and erosion will present major future planning challenges for the Barwon estuary and the Connewarre wetland complex, including the provision of public open space and room for habitats to move as low-lying land retreats.

The urban sections of the Barwon and Yarrowee rivers will have an increasingly important role in hot weather, particularly as they are some of the last remaining natural areas in these urban environments. Their tree canopy cover, vegetated surfaces and soil moisture can reduce urban heat through both shading and evapotranspiration. These cooling benefits can be felt in the immediate vicinity and downwind of green areas. Temperature decreases of even 1–2°C can measurably reduce heat-related morbidity and mortality.



**Lake Connewarre at Leopold**

<sup>14</sup> Central Region Sustainable Water Strategy, Victorian Government, 2006

## 5.3 Rural land management

Private land holdings used for farming continue to make up the largest proportion of land use in the Barwon catchment.<sup>15</sup>

The scale, nature and intensity of farming in the Barwon catchment is also changing.<sup>16</sup> Farmers are changing their practices to remain competitive in domestic and export markets, achieve sustainable returns on investment and achieve natural resource management objectives. In some locations within the catchment, there is an increasing trend to smaller holdings, as productive farms are subdivided to create peri-urban and lifestyle properties, reducing the land available for primary production. At other locations, farms are becoming larger with ownership transferring to large corporations.



**Farm dam in the East Moorabool catchment**

If not managed properly, intensified farming practices can lead to increased soil erosion and degradation along river banks, impact downstream water quality, through increased sediment and nutrient run-off, and place greater pressure on the region's scarce water resources, such as through the establishment of new dams in peri-urban areas.

Recent studies<sup>17</sup> demonstrate many land managers in the Barwon catchment are aware of the value of protecting and enhancing natural resources, and the benefits that some practices can provide both in lifting farm productivity and contributing to broader catchment health, such as revegetation activities and weed and pest animal control. Key agencies, industry groups and community groups, (such as Landcare), are partnering to assist land managers to adopt and implement improved land management practices in the region. This is being supported by better coordination of effort and investment; ongoing research and improved sharing of knowledge and information, including that held by landholders; and innovative incentive programs that engage new participants.

A key challenge to supporting the long-term productivity of the region is to encourage and support participation and changes in land management practices that will continue to protect the health of the catchment.

15 Corangamite Waterway Management Strategy (2014–2022), Corangamite CMA

16 Corangamite Regional Catchment Strategy (2013–2019), Corangamite CMA

17 Rural Community and Land Use Profiling Project – Rural Community and Land Use Profile, 2013, RMCG



## 5.4 Governance challenges

As detailed in section 3.6, a range of organisations are responsible for managing the Barwon catchment. Despite the commitment of these agencies to collaborate through a range of forums, management of the catchment and its river corridors can appear overly complex. This has been reflected in the strong community feedback calling for ‘improved public awareness on the roles and responsibilities of the managing and planning agencies’, and is particularly the case regarding the integration of land use planning and water management.

There are opportunities to better integrate and communicate the efforts, roles and responsibilities of these agencies.

Another strong direction from the broader community is that a more unifying vision is needed for the rivers of the Barwon and its corridors.

While a range of agencies have an overarching vision for the region, there is no shared and integrated vision for the Barwon catchment. A stronger shared vision would facilitate greater coordination and alignment of localised efforts in working towards longer-term goals for

the catchment and its river corridors. This is particularly important for addressing catchment-wide issues such as reductions in river flows and habitat connectivity, as the rivers of the Barwon pass through six local government areas.

In addition to the broader governance challenge of working across management and planning sectors and between organisations, the following governance issues have also been identified:

- The opportunity for Traditional Owners and Aboriginal communities to play a greater role in managing the rivers of the Barwon
- Clearer responsibility for developing and maintaining the amenity and recreational values along the rivers, including public open space
- Improved strategic and integrated planning for land use and development along the river corridors
- Sustainable funding arrangements to support improved governance.

**These issues are discussed further below.**



### Partnership with Traditional Owners as custodians of the river

The Victorian Government has expressed a renewed commitment to recognising Aboriginal values. Its commitment is enshrined in a range of policy instruments (such as the National Water Initiative, Aboriginal Partnerships Action Plan, the Victorian Aboriginal Affairs Framework and Munganin Gadhaba ‘Achieve Together’: DELWP Aboriginal Inclusion Plan 2016–2020). Additionally, the Commonwealth *Native Title Act 1993* and Victorian *Traditional Owner Settlement Act 2010* formally recognise the rights and interests Victoria’s Traditional Owners hold in land and water.

The Victorian Government’s water plan, *Water for Victoria*, states that, ‘Victorian water planning and management frameworks will recognise the cultural value that water has for Aboriginal people. Our existing water planning and management processes will have regard to the rights and interests of Victoria’s Traditional Owners. This will be achieved through Aboriginal participation in water management.’

Aboriginal water values were enshrined into law with the *Water and Catchment Legislation Amendment Bill 2019*. The Bill provides greater recognition and involvement of Traditional Owners and Aboriginal Victorians in the management and planning of waterways and catchments. This legislation will support Aboriginal cultural uses of water and underpins opportunities to use water for economic development for Traditional Owners and Aboriginal Victorians. It will also support the self-determination of Traditional Owners by providing opportunities that best meet their water management needs.

The Wathaurung Aboriginal Corporation, trading as Wadawurrung, is the representative body for the Wadawurrung Traditional Owners. The Wathaurung Aboriginal Corporation has a long history of managing and protecting cultural heritage in the river corridors of the Barwon on behalf of the Wadawurrung people. The Wadawurrung hold significant rights to the land and have cultural obligations to manage traditional lands and waters and are equal partners in ensuring catchment health. Notwithstanding this acknowledgement of equal partnership in decision-making, overall there remains a lack of a defined role for Traditional Owners within the governance arrangements for the rivers of the Barwon.

A partnership model for the rivers of the Barwon needs to be developed that captures the views of the Wadawurrung and a productive long-term partnership with the region's Aboriginal custodians.

### Responsibility for amenity and recreational values

Amenity includes the character of the landscape and the vistas and views from and to the rivers, as well as the many benefits that parklands and open spaces provide along them. The cultural values attached to the rivers and their recreational uses and facilities are also related to this amenity role. Consideration of the amenity values is often absent or ill-defined in the responsibilities of organisations involved in managing the rivers of the Barwon, their corridors and their links to the broader catchment. While local governments have played a lead role in the provision of amenity services in their municipalities, they are generally only responsible for the part of the river corridor that is within their jurisdiction.

While there are some good examples of multi-agency initiatives designed to promote the open space corridors and amenity values of the Barwon (such as the Barwon River Parklands), and similar initiatives for the Yarrowee (such as the 'Breathing Life in to the Yarrowee' project), there is still no overarching approach across the catchment that considers use by the community and visitors to the region.





## Improved strategic and integrated planning for land use and development along the river corridors



While there have been attempts to build stronger strategic links between waterway management and land use planning in the region, there is significant opportunity for improvement. There are inconsistencies within the catchment, and the planning scheme provides limited controls, unless specific mechanisms have been established.

With increasing urban and non-urban land use and development growth pressures (e.g. urban growth in greenfield and infill areas and the intensification of agricultural production), there is a need to strengthen the strategic links between land use planning and waterway management, both along the river corridors and across municipal boundaries. This includes the adoption of a community vision in the planning system for the rivers of the Barwon, with consistent use of planning controls.

Without consistent and integrated waterway management and planning approaches (such as waterway buffers) to prepare for this growth and intensification of land use, there is risk of further degrading the condition, resilience and productivity of the region, as well as missing opportunities for improved liveability for the community.

Strengthened strategic land use planning will also create greater certainty for all involved and avoid the need for repeated planning challenges as new development proposals are presented.

## Funding arrangements

Every four years the Corangamite CMA is provided with grant funding to manage the Barwon River through Geelong, other Water Act statutory functions, and its broader waterway health and environmental water management programs. This funding is provided through the Environmental Contribution levy, which water corporations collect on behalf of the Victorian Government. Barwon Water and Central Highlands Water also fund catchment works in their water supply catchment areas, and local governments fund a range of stormwater management functions through council rates and developer contribution charges.



While there has been increased waterway investment in the region in recent years, there has been no review of the magnitude of resources and funding required to deliver whole-of-river corridor strategic priorities over the long term. Where funding is available, there can also be a mismatch between the strategic importance of the work and the levels of investment provided. This is particularly the case with local government authorities, which currently provide public amenity services but have limited access to funds for projects that may be of strategic importance beyond their local area.

With the urban growth and development challenges confronting the rivers of the Barwon, there is need to consider a review of sustainable funding models. This is critical to allow managing and planning agencies to implement a sustained program of works and activities to protect and enhance the health of the rivers of the Barwon into the future.









## 6 Future directions

The MAC is proposing a new direction is needed to secure the long-term health of the rivers of the Barwon. This has been informed by an examination of the current management and planning frameworks, a review of the current state of the rivers, what has been heard from the region’s communities, the work underway by the region’s agencies, and what is planned in the near future.

**The following six themes provide the focus for this future direction:**

- **A living cultural landscape**
- **Water management for a secure future**
- **Targeted and integrated management for a healthy catchment**
- **Enhanced waterway corridors for community connection, access and use**
- **Planning for sustainable growth and liveability**
- **An effective governance model for the catchment.**

Under each of the themes, key emerging issues and directions have been identified for the purpose of more targeted discussion. Given the complexity of the system there is much overlap between these themes and directions, and as such they should be considered collectively.

Future consultation on the issues and directions presented in this discussion paper will enable the MAC to consider what is important and what should be prioritised in the subsequent Rivers of the Barwon Action Plan.



### **Bunjil's lookout on the Moorabool River at Maude**

Source: Corangamite CMA

## **6.1 A living cultural landscape**

*“We see Barre Warre as a connected system, water is a living entity in our stories, our creations are held by the life of these rivers, our intangible connections received from our past live and protect our culture for our present and future. The connection between rivers and sea is our lore. Protecting Lal Lal to Connewarre is a Wadawurrung story.”*

### **Melinda Kennedy**

Wadawurrung Traditional Owner



The Wadawurrung are the Traditional Owners of Barre Warre Yulluk and have a strong and intrinsic connection to the Barwon catchment and place high cultural value on the Barwon River as a connected and living system. Ensuring there are opportunities for Traditional Owners to meaningfully and actively be involved and contribute to the management of the rivers of the Barwon is essential to maintain healthy rivers now and into the future. It is equally essential that waterways are healthy and flowing to maintain cultural heritage traditions.

Aboriginal relationships with water are holistic, combining land, water, culture, society and economy. A historical barrier to understanding and recognising Traditional Owner rights in management of water and catchments is that Indigenous and non-Indigenous perspectives of water and its management differ greatly. There is a clear need therefore to create space in modern river system management for the protection of Aboriginal cultural and spiritual values.

Appreciation of cultural values underpinned by long-term relationships of trust, respect and honesty are required to create opportunities for a living cultural landscape for Barre Warre Yulluk, to build capacity and increase Traditional Owner participation, and to increase cultural awareness and understanding within the broader community.

With the recent passing of the Water and Catchments Bill in parliament, there is a legal requirement for greater recognition and involvement of Traditional Owners and Aboriginal Victorians in the management and planning of waterways and catchments.

The MAC acknowledges that all management agencies in the Barwon catchment are committed to advancing Traditional Owner involvement and are actively recognising cultural connections to land and water in the management of the region's rivers. There are a number of examples of agencies working closely with the Wadawurrung Traditional Owners to achieve cultural outcomes within the catchment, such as:

- **Porronggitj Karrong (Aqueduct Park) and Wadawurrung Partnership with Barwon Water.** The 66-ha Porronggitj Karrong (Brolga Place) parkland site project is a partnership between Barwon Water and Wadawurrung to explore Traditional Owner approaches to land and water management and achieve tangible outcomes around Aboriginal values and traditional land and water management practices.
- **Aboriginal Cultural values desktop review by Wadawurrung and consideration of the Kulin Nation Seasonal Calendar for the Corangamite CMA Upper Barwon, Yarrowee and Leigh Flow study update.** In the absence of a fully developed Aboriginal Waterways Assessment Tool or Cultural Values Mapping methodology for Wadawurrung Country, a combination of desktop research on historical documents and site inspections on areas identified as having cultural significance was conducted by the Wadawurrung Traditional Owners. The study also identified the Wadawurrung language name and cultural value of culturally significant species within the study area.

To continue this progression towards integration of land and water management and Traditional Owners' connections with the landscape, the following opportunities have been identified to ensure that the cultural significance of the region's Traditional Owners is promoted and the participation of Traditional Owners in the decisions surrounding the management of the Barwon catchment continues to thrive.

# DIRECTIONS:

To enhance the involvement of Traditional Owners in the management and stewardship of the rivers of the Barwon the following directions are being considered:

**1. Traditional Owners have the capacity and resources to contribute effectively to the management of water for cultural purposes.**

Ensure Traditional Owner objectives are considered in the planning and delivery of water for environmental and Aboriginal values to support healthy, thriving, culturally significant species. Where possible, agency leaders should continue to provide capacity-building opportunities within the water and catchment management industry, and may include two-way professional mentoring and shadowing opportunities.

**2. 'Country' plans are developed for the key rivers of the Barwon to ensure consideration of cultural values in future planning.**

The development of a Country Plan that includes both water and land within the catchment will ensure that cultural values are acknowledged, better understood, documented and can guide future local and state planning for the rivers of the Barwon. This plan could potentially be developed via a traditional master plan approach whereby the key issues, priorities and aspirations for the future management of the catchment are identified and the values, guiding principles and key directions are captured.

Led by the Wadawurrung and through consultation with government and key partner agencies, this planning document can also include cultural features and values that are not usually considered in planning, the use of appropriate Wadawurrung language for places of cultural importance that are not formally recognised in existing planning tools (i.e. Cultural Heritage Sensitivity Overlays), the identification of clan boundaries, and the cultural and spiritual significance of sites throughout the landscape.

**3. Cultural indicators are identified to measure the cultural health of the rivers.**

The Wadawurrung people believe that waterways under the greatest threat are more significant and therefore are where management efforts should focus.<sup>18</sup> To understand the success of future investment outcomes, key cultural indicators can tell the story of any improvement to condition, the impact of investment or as a baseline for future monitoring of stream and catchment health. This can also provide more opportunities for Traditional Owners to lead river health monitoring and evaluation activities on Wadawurrung Country.

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<sup>18</sup> Corangamite Waterway Strategy 2014–2022, Corangamite CMA



## 6.2 Water management for a secure future

The Barwon catchment's traditional water sources and the health of its rivers are facing a number of challenges from a growing population and the impacts of climate change.

### Population growth

A growing population will require more water, which may not be readily available from traditional sources, such as the region's rivers and water supply catchments. The challenge is to protect the health of the catchment's waterways, while still supplying the needs of an increasing population. This is particularly important considering the continued growth of Geelong and Ballarat. Industry and agriculture (including forestry, food production and processing) will also increase the demand for water in the Barwon catchment. This includes water for stock and domestic purposes and for irrigated

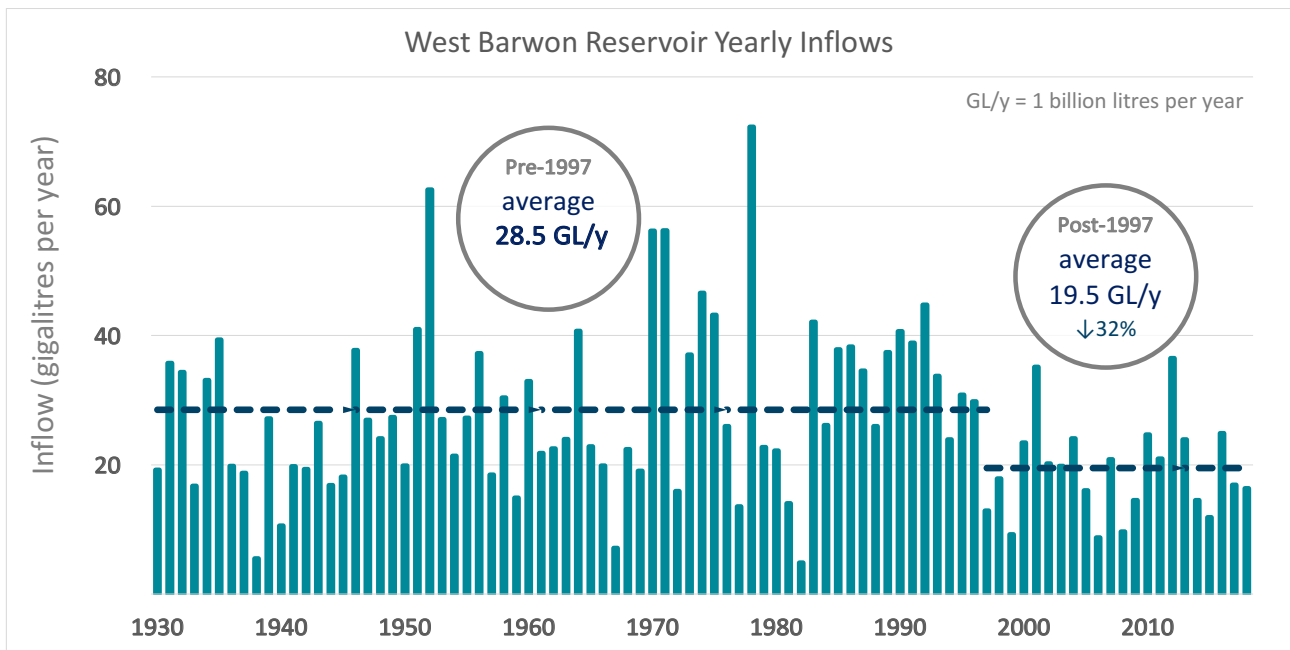
agriculture. Sourcing reliable and fit-for-purpose water supplies will be crucial to attract and retain industry and support a growing population.

### Climate change

There is now strong scientific evidence that human-induced climate change is underway.<sup>19</sup> As a result of this change, the Barwon catchment is expected to become warmer and drier, with more frequent and extended drought periods and more extreme storms.

Rainfall and stream flow records from recent decades, including the period of the Millennium drought, have already shown that catchments have had less available water (refer Figures 6.1 and Figure 6.2) and temperatures have increased. It is predicted that for some of the catchment's streams, such as the Moorabool, annual stream flows could reduce by 50% by 2065.

There is a high degree of uncertainty associated with climate predictions, which includes the



**Figure 6.1 Annual average inflows to the West Barwon Reservoir**

Source: Barwon Water

19 2016 Corangamite Natural Resource Management Plan for Climate Change, Corangamite CMA 2016, p 30.

impacts of climate change on water resources. To manage this uncertainty, an adaptive management approach that includes monitoring and review of changing conditions will be required.

### Protecting water for the environment

Before the 2000s, there were few legal rights for the environment’s share of water, except for bulk entitlement conversion provisions. These provide minimum passing flows from storages, which is an obligation on the water corporation due to their right to harvest water for consumptive use, and to mitigate some of the impact of these storages on waterways. These flows provide environmental and water quality benefits, as well as water for downstream stock and domestic users.

These rights were expanded during the Millennium drought, with the creation of the environmental water reserve, water held in environmental entitlements, along with other water that can contribute to environmental outcomes, such as passing flows, and ‘above cap’ water (or water above sustainable diversion limits). Through this process, water has been set aside to protect the environmental values of waterways across Victoria.

For the rivers of the Barwon, environmental water entitlements have been created in the

Lower Barwon wetlands, Moorabool River and Upper Barwon River. In 2006, the Victorian Government’s Central Region Sustainable Water Strategy process secured 6,500 ML of water for the ongoing protection of the Barwon and Moorabool catchments. This included the transfer of approximately 3,500 ML of water from the Batesford Quarry (previously discharged to Corio Bay) to the Lower Moorabool, the establishment of 2,500 ML entitlement at Lal Lal Reservoir and a 1,000 ML entitlement at West Barwon Reservoir. In addition to this recovered water, the Central Region Sustainable Water Strategy also recommended that Central Highlands Water continue to release part of the treated wastewater discharge from the South Ballarat Treatment Plant (approximately 2,000 ML per annum) for environmental flows in the Leigh and Barwon rivers.

Recent flow studies<sup>20,21</sup> undertaken for the Moorabool, Barwon and Leigh rivers have identified the need to secure additional water for these systems to support their long-term health under a changing climate, particularly through summer and dry years. In addition to general water recovery for the environment, it has been identified that greater security is needed around future entitlements. This is particularly important given the relatively small volumes involved, and for dry years where

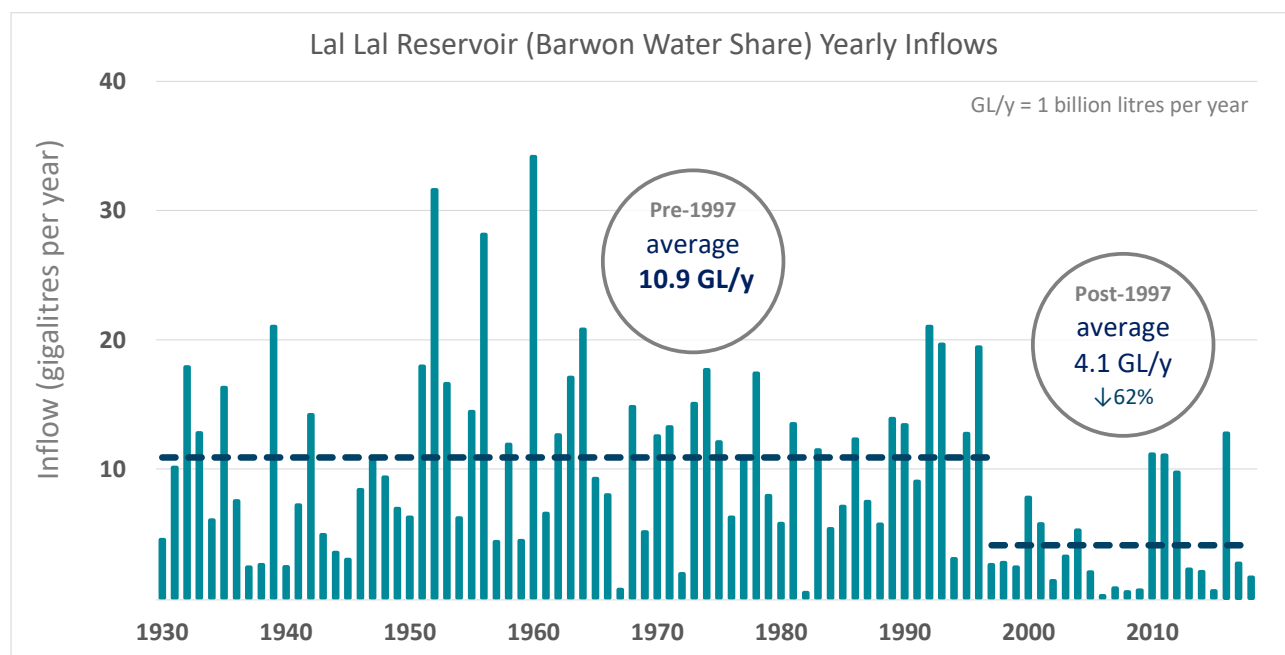


Figure 6.2 Annual average inflows to the Lal Lal Reservoir

Source: Barwon Water

20 Upper Barwon, Yarrowee and Leigh rivers FLOWS study update, Alluvium 2019

21 Moorabool River FLOWS Study Update, Jacobs 2015



it would have the greatest benefit for the health of the environment. This has been overwhelmingly supported by agency stakeholders and the broader catchment community from feedback received through the initial engagement phase for this discussion paper.

In the case of the Moorabool, despite receiving less than half its annual natural flow, and even less in drought years, the river still retains important environmental values, particularly in the mid to lower reaches around She Oaks Weir. These values include native fish of high conservation value, such as Blackfish, and areas of significant remnant native vegetation.

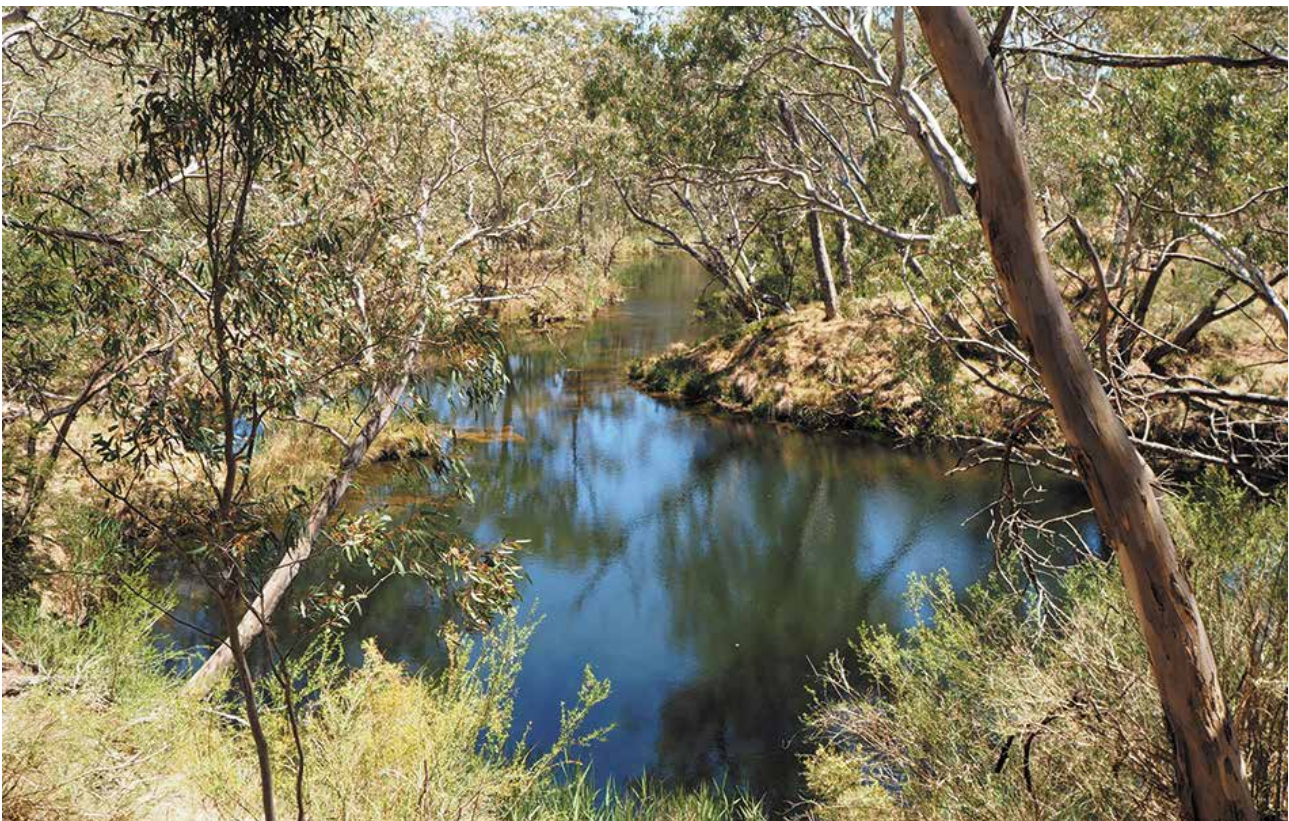
Other key areas for improvement identified by stakeholders and the community include:

- The need to reduce water loss and impacts on stream flows caused by existing and future private dams particularly in peri-urban growth areas (on average, these dams retain about 22% of available water in the catchment with 50% of this lost to evaporation)

- The introduction of a more natural flow regime for the Yarrowee/Leigh River by examining water storage options at the Ballarat South Wastewater Treatment Plant
- The need to review any changed operating arrangements that might impact on stream health, such as planned changes to water supply releases from Lal Lal downstream to She Oaks.

There is an opportunity to capture the extensive work undertaken by the CMA and its partners in examining water shortfalls for the Barwon, Leigh and Moorabool rivers in conjunction with the findings from the current Long-Term Water Resource Assessment to inform the direction and scope for the development of the next regional sustainable water strategy, soon to commence.

With Ballarat connected to the Goulburn system through the Goldfields Superpipe, and Geelong connected to Melbourne's water supply network through the Melbourne to Geelong Pipeline, there is the potential to use the water grid to open up greater exchange in water for cultural and environmental flows. This was recently trialled for the Moorabool, with the Victorian Environmental



**The Moorabool River at She Oaks**

Water Holder, in partnership with the Wathaurung Aboriginal Corporation and Corangamite CMA, securing a one-off exchange of 500 ML of water for the Moorabool River.

While flow studies<sup>22,23</sup> have identified the need for water recovery in the Moorabool and Barwon rivers, channel constraints in these waterways have reduced the daily volumes that can be released from the environmental water entitlements that already exist. For more water to be recovered, these flow constraints would need to be addressed. This is particularly the case for the branches of the Upper Barwon, where willows, *Glyceria*, past land clearing, reduced river flows and stock access cause flows to flood adjoining land. Likewise, it is important that complementary works and activities such as riverbank restoration, fishways and erosion control works are delivered in tandem with water releases to ensure the benefits from flows can be fully realised.

*Refer also to the directions under the ‘Targeted and Integrated Management for a Healthy Catchment’ theme 6.3.*

### **Exploring ways to balance water supply and demand**

Water resource management in the Barwon catchment is underpinned by Victoria’s robust water entitlements and licencing framework. Despite the major growth projections for Geelong, Ballarat and the region, Barwon Water, Central Highlands Water and Southern Rural Water are confident they can maintain secure water supplies in the foreseeable future given the region’s diverse sources. However, for this to be the case they recognise the need to continue to transform the Barwon catchment region into a more resilient and liveable area through effective integrated water management solutions and by maximising the use of Victoria’s water grid, particularly during dry years. A key focus in this area will be maintaining water efficiency programs, making the most of investment in wastewater programs and improved stormwater management.

This direction is captured in *Central Highlands Water’s Urban Water Strategy (2017)* and will be part of Barwon Water’s Water for our Future program, which is inviting the community to be part of the design of a new water future for the region. Contributions to this process will inform Barwon Water’s 2022 Urban Water Strategy, its 50-year water plan to deliver a secure water future that supports a healthy and prosperous region.

Feedback from the community consultation conducted for this discussion paper also revealed that water resource planning processes, roles and responsibilities and the criteria for decisions, how water for the environment is used and its benefits measured, are not well understood. There are opportunities to better inform the community on water management processes that build greater community trust and ownership of decisions and long-term outcomes.

In addition, a continued strong regional focus on integrated water management will lead to a number of other benefits. This includes safer and more secure water supplies, less reliance on a centralised system, increased diversification of sources, use of alternative water, passive irrigation, infiltration and green-blue infrastructure for improved urban liveability. It will also help reduce excessive volumes and pollutants from entering the rivers of the Barwon and affecting their water quality and downstream wetlands.

The Barwon and Central Highlands Integrated Water Management Forums, a collaboration of agencies working towards ‘whole-of-water cycle’ management outcomes, will provide important drivers for this work and need to be actively supported to deliver lasting improvements for the Barwon catchment. This is particularly the case for new developments, where the region’s planning schemes need to be stronger to ensure integrated water management opportunities are considered at the planning stage, when they can be more efficiently adopted.

*Refer also to the directions under the theme 6.5: ‘Planning for Sustainable Growth and Liveability’.*

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22 Upper Barwon, Yarrowee and Leigh rivers FLOWS study update, Alluvium 2019

23 Moorabool River FLOWS Study Update, Jacobs 2015



# DIRECTIONS:

To meet the challenges of managing water in the region for a secure future, the following directions are being considered:

## 1. Consider the protection of stream flows and future water recovery for the environment in the new Sustainable Water Strategy.

This would include:

- Consideration of recent studies on environmental and cultural flow requirements for the Barwon, Yarrowee/Leigh and Moorabool rivers and the Long-Term Water Resource Assessment findings
- Greater security for any future environmental entitlements, considering the need for flows in dry years
- Greater flexibility in managing water resources to respond and adjust to changing climatic conditions, including the use of water trade
- Greater security for flows in the Barwon River through Geelong to support major events, social and recreational opportunities and liveability of the Geelong region
- Opportunities to better manage private dams to reduce their impact on stream flows, particularly in peri-urban areas.

## 2. Prioritise essential waterway restoration works to minimise flow constraints and maximise the benefits from environmental water entitlements.

By improving waterway condition and removing obstructions and other threats to the river channel through restoration activities, environmental flows will be able to continue further downstream. This will be important to achieve the full benefits of existing and future environmental entitlements.

## 3. Maximise the region's links to the Victorian water grid to realise regional economic and environmental outcomes from the use of scarce water resources.

Opportunities would be explored to utilise the Victorian water grid through the Melbourne to Geelong Pipeline and the Goldfields Superpipe to boost regional water supplies in times of drought or low rainfall, and to maximise trade opportunities for the delivery of additional water for the environment.

## 4. Investigate the introduction of a more natural flow regime for the Yarrowee/Leigh River.

A more natural flow regime for the Yarrowee/Leigh River would be explored by examining water storage options at the Ballarat South Wastewater Treatment Plant.

## **5. Maximise the use of alternative water supplies.**

- More efficient use of water in urban areas and for agriculture would be explored, with greater use of recycled water and stormwater and the uptake of new technologies
- The role of the Barwon and Central Highlands integrated water management forums and initiatives would be promoted, such as Barwon Water's *Water for our Future* program to maximise the use of alternative water supplies through innovative integrated water management solutions
- Growth area planning processes would be reviewed to ensure integrated water management is central to planning for new developments, including the adoption of targets and specified uses for alternative water sources.

## **6. Make the water resource planning process more visible to the public.**

This would include clarifying roles and responsibilities and how water resource management decisions are made.

## **7. Increase the focus by all agencies on regional climate adaptation planning and adoption.**

This includes a renewed focus on the most current and available climate science being applied to water management and planning for the region, including climate change adaptation.



## 6.3 Targeted and integrated management for a healthy catchment

Many land use decisions and practices since European settlement such as gold mining and widespread land clearing have damaged the region's natural resources. In some cases, the impact has been so great that critical natural resources such as soil and water have been compromised, and native species have become extinct or threatened.

A lot of work has been done to identify opportunities for protecting the values that still remain, and restoring those lost. The Corangamite Regional Catchment Strategy 2013–19, which will soon be renewed, provides an integrated framework for managing the catchment's health, including the rivers of the Barwon.

Importantly, the Regional Catchment Strategy recognises the strong connection between the health of the catchment and the wellbeing of the community, and encourages greater participation and investment in the protection, enhancement and restoration of land, water and biodiversity resources in the region. There are many outstanding examples of this participation and long-standing community stewardship in the Barwon catchment through groups such as regional Landcare and 'friends' groups.

The MAC acknowledges the years of hard work and commitment by the Corangamite CMA, partner agencies, Landcare groups and other local landholder volunteers and public land managers working together to deliver catchment management outcomes for the region.

Despite this work, there is still significant effort required to address a number of land management legacy issues that directly inhibit



**The Barwon River upstream of Geelong**

Source: Corangamite CMA



and impact on water flows and quality, and will require complex problem-solving, persistence and committed investment.

The Barwon River system and its catchment area are also at the centre of a rapidly changing landscape, with the river and its tributaries flowing through and providing water supply to the growing cities of Geelong and Ballarat. The rural catchment is also experiencing major change, such as shifting demographics, land size, land use and management practices.

There is strong community enthusiasm to undertake improved land management practices and do more for the health of the rivers in rural areas of the catchment – connecting and enhancing the riparian zone, facilitating flows and maintaining wildlife corridors for native fauna. The MAC applauds this sentiment, but notes that long-lasting improvements in the environmental condition of the waterways of the Barwon will take decades, continued long-term investment, large-scale projects and ongoing monitoring, and will continue to rely on the collaboration and participation of all agencies, landholders and communities in the catchment.



**Lawson's Tree at Inverleigh**



# DIRECTIONS:

To promote more effective and lasting integrated catchment management outcomes for the health of the rivers of the Barwon, the following directions are being considered.

## 1. Undertake 'place-based' scale planning and management to maximise engagement and impact, but within a catchment context and narrative.

For long-term integrated catchment management to be effective, it needs to be aspirational at the whole-of-catchment scale but delivered at a place-based scale that connects with the local community. There are a number of existing examples of integrated catchment management approaches within the region that consider the inter-relationship between the natural systems and communities that can be effective at a smaller scale within a broader catchment context. Examples include the existing 'Living Moorabool' flagship waterway project, and the Corangamite CMA's Connected Landscapes project being delivered by the Bunanyung Landscape Alliance.

## 2. Focus management and investment on upper catchments to maximise benefits.

While management actions are currently underway within the upper catchments of the Barwon, Leigh/Yarrowee and Moorabool rivers, there are opportunities to gain broader benefits through a more integrated approach to the management of specific issues identified by the community and agencies at targeted 'place-based' locations. An example involves the east and west branches of the Upper Barwon, where invasive willows and *Glyceria* are inhibiting water flow further down the system and causing localised flooding.

A renewed targeted approach is needed to bring lasting solutions, which could include better compliance with existing Crown frontage management agreements or performance-based incentives that facilitate gradual or staged improvements over time based on levels of public benefit.

## 3. Strengthen the planning and measurement of waterway health outcomes, including greater opportunities for community-based citizen science monitoring.

To better understand the current state of the catchment's waterways, and to inform planning and develop targets for improvement, a renewed focus on defining and measuring waterway health outcomes should be developed.

To capture the community's wish for greater knowledge and participation in waterway management, there should be a greater role for citizen science and landholder engagement in monitoring key indicators for the health of the catchment.

*See also cultural indicators under theme 6.1 'A Living Cultural Landscape'.*

## 4. Prioritise the Barwon as the next targeted large-scale waterway project – as a new 'Living Barwon' flagship waterway.

Addressing the directions above, the focus for a new flagship waterway would include a greater emphasis on progressing integrated 'place-based' outcomes, a new narrative that captures the history and management of the Barwon within a catchment context, and greater alignment of effort based on a shared vision from community, government and stakeholders.

It would also build on lessons learned through the development and implementation of the 'Living Moorabool' flagship waterway project.

## 6.4 Enhanced waterway corridors for community connection, access and use

Community feedback revealed the residents and communities of the Barwon catchment love their parklands and open spaces.

With an increasing population and use of open spaces, a renewed focus is needed on how to provide better access to urban waterways while protecting key values.

This is particularly relevant within the urban settings of Geelong and Ballarat, where the riverine corridors of the Barwon and Yarrowee rivers provide the only large and continuous areas of green public open space.

To support community health and wellbeing, it is important to maintain opportunities for physical activities such as recreation and commuting in natural settings.

As Ballarat and Geelong expand, it will be important to protect the values of these important corridors and promote development that is not only sympathetic to the character of these natural areas

but also promotes a sense of community ownership, connection and stewardship into the future. This will be critically important for the protection of environmentally sensitive areas such as the Connewarre wetland complex.

### Enhancing the Barwon River Parklands

The 'Barwon Rivers Parkland Project' was conceived in 2006 to create a continuous active pathway along the Barwon River from Geelong to Barwon Heads. The project, which is yet to be fully realised, aims to build on the popular existing trail network through Geelong to create an iconic walking and cycling route along the river.

In line with Geelong's growing population, there has been a renewed focus by all management agencies to progress the project through a new master plan. There are several key opportunities that a new Parklands Master Plan could address, such as an extension of the parklands to the lower Moorabool (Fyansford to Batesford) and opportunities through the Western Geelong Growth Area.

Complementary work already underway includes Barwon Water's Aqueduct Park (Porronggitj



**Development that is sensitive to the natural landscape can improve the value of the riverine corridor – the Barwon in 1952 (looking southwest to Highton) and (right) the same area today**



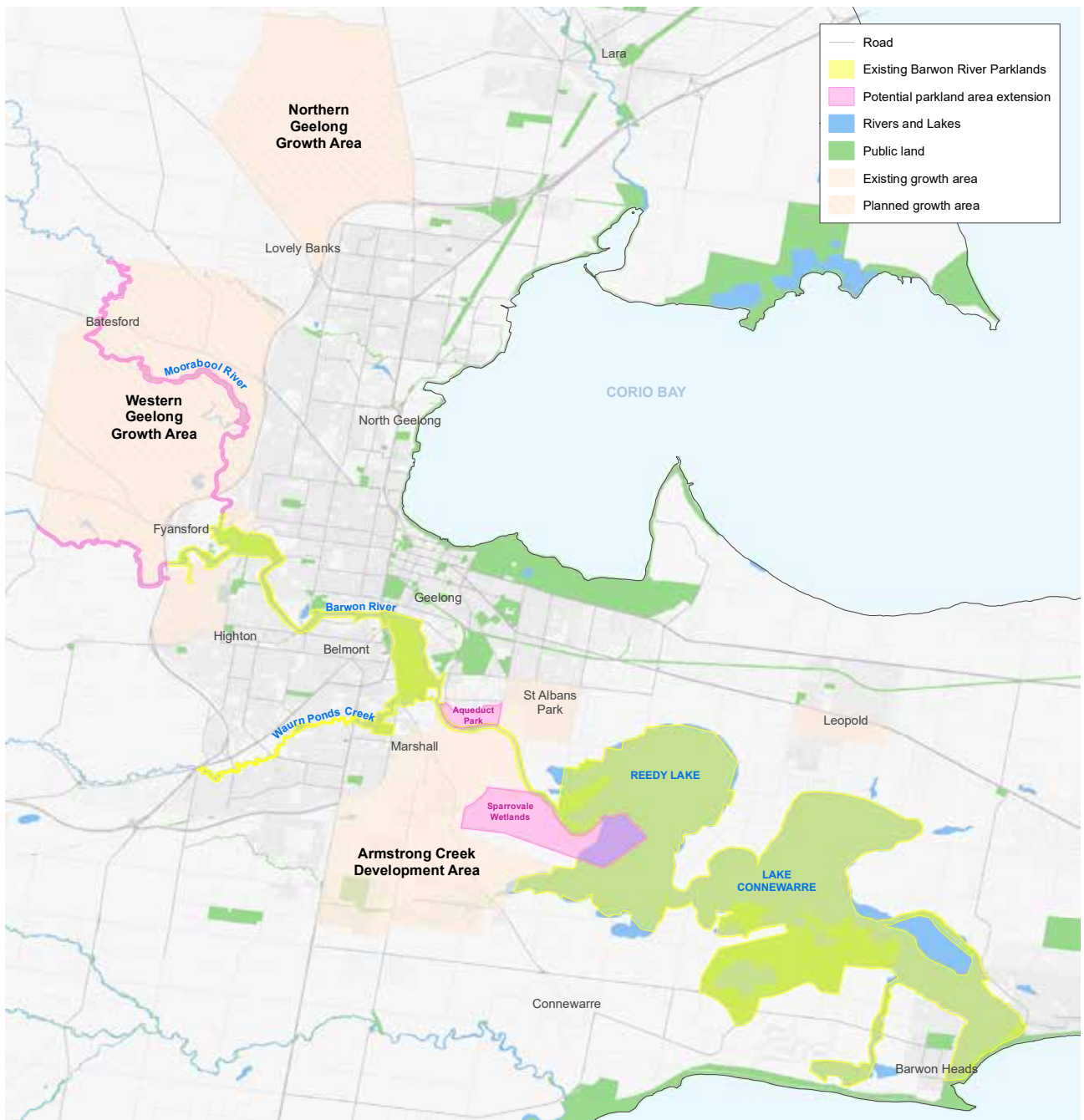
Karrong), the Sparrovale Stormwater Master Plan and the City of Greater Geelong’s Shared Trails Masterplan.

While the partnership for managing the various public land tenures of the parklands is strong, management and administration is currently delivered by six agencies and funding is varied (from council rates to grant funding). These arrangements need to be reviewed for more effective and consolidated long-term funding and

consistent management under one or a smaller number of agencies.

*This is further explored in the directions under Theme 6.6 ‘Governance: Managing for future challenges’.*

Key agencies that have committed to participating in this important regional project include the Corangamite CMA, City of Greater Geelong, Barwon Water, Parks Victoria and Barwon Coast Committee of Management, DELWP, Wadawurrung Traditional



**Figure 6.3 The Barwon River Parklands and planned extensions associated with growth areas**

Owners, Sport and Recreation, and the Department of Health and Human Services. The project is supported by G21, the Corangamite Catchment Partnership Agreement and the Barwon Integrated Water Management Forum.

As residential development expands along the Barwon, public open space will become increasingly important for community health and well-being. The map in Figure 6.3 shows the extent of the existing Barwon River Parklands area and the new areas planned for its expansion, including the new growth areas.

## Parklands for the Yarrowee

The Yarrowee River corridor runs the length of Ballarat from its headwaters near the Ballarat Ring Road south to Magpie on the outskirts of Ballarat. Although narrow and highly degraded in parts, including modified sections of bluestone-lined channel through the urban centre of Ballarat, the river is highly valued as public open space for the community of Ballarat.

Between 2013 and 2016, the government invested \$1 million in a restoration plan for the Yarrowee River. This 'Breathing the Life into the Yarrowee' initiative was delivered as a partnership project between the City of Ballarat, Corangamite CMA and the Leigh Catchment Group, and provided the first step to returning the health of this important urban waterway. Community support for the project has been strong, with the project stimulating interest in the benefits of improving the Yarrowee corridor for multiple user groups.

Developing a Yarrowee parklands concept for Ballarat would consolidate this initial work. It would also provide the community of Ballarat with greater scope for restoring the health of the Yarrowee corridor, realising its potential for better recreational usage well into the future.

In line with this concept, the City of Ballarat and its project partners are pursuing the development of a new master plan for public land along the Yarrowee corridor between the Gong Gong Reservoir and the Mount Mercer – Buninyong Road (see Figure 6.4).



**The Leigh Catchment Group restoring the Yarrowee**

Source: City of Ballarat



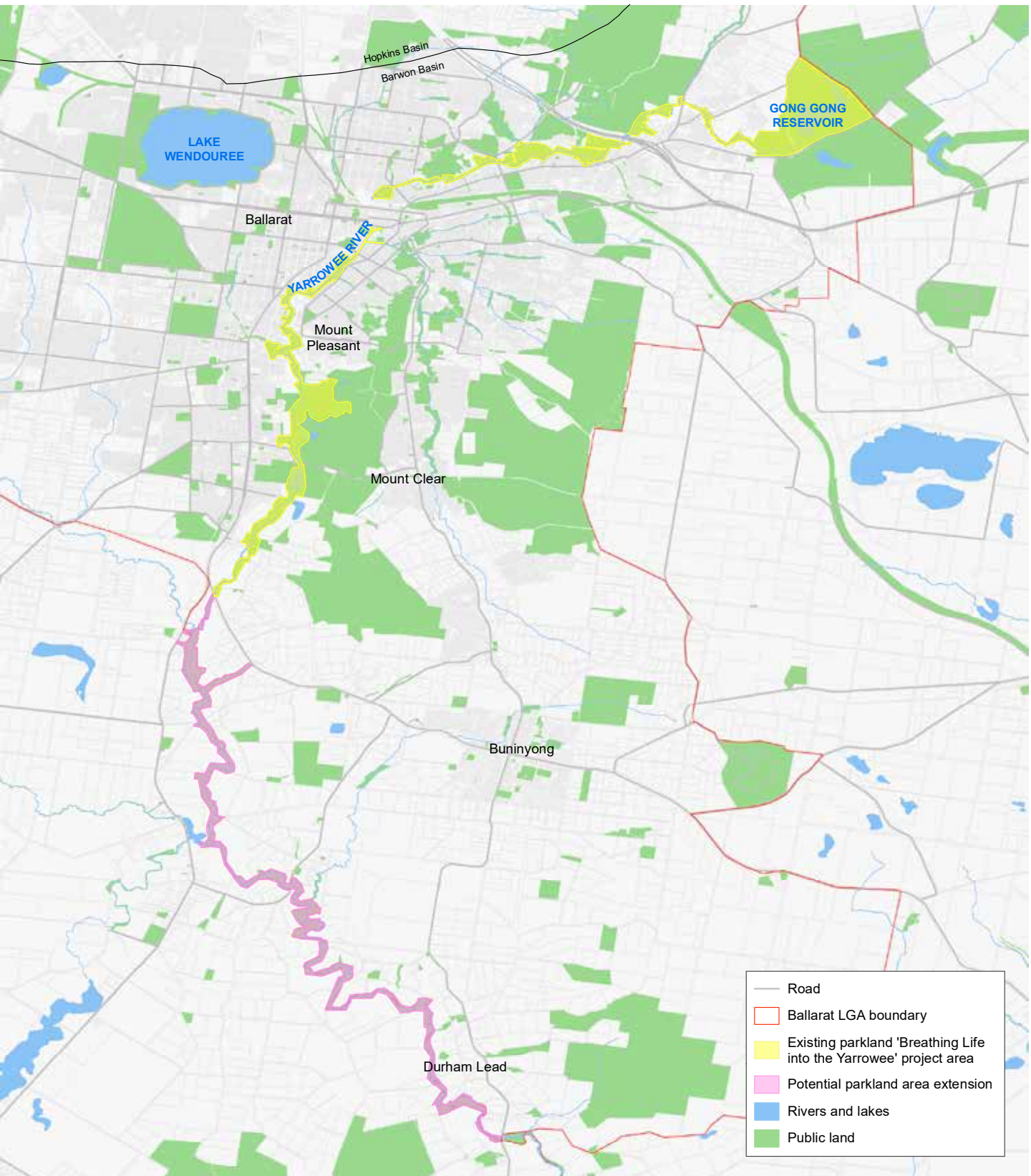


Figure 6.4 Extent of the public land within the planned Yarrowee Parklands Master Plan

The new master plan would update the original 1991 Linear Network of Communal Spaces (LINCS) masterplan, with a focus on:

1. Improved amenity, particularly in areas key to recreation, tourism and city identity
2. Public access to the waterway through new pathways and connections to the road and footpath networks

3. Reduced stormwater impacts on the river through targeted erosion control works
4. Increased tree canopy cover in line with Ballarat's Urban Forest Strategy.

## Broader catchment access and connection

Historic farming and the pattern of subdivisions throughout the region have resulted in the limitation of public access to the catchment's riverine corridors outside of major cities. The extent of Crown land reservations along the length of the corridors are also highly fragmented, and in many sections the Crown land reservation is extremely narrow, or even non-existent.

Providing greater public access to the region's waterways is critical to community groups, such as recreational anglers, and is a missed opportunity to create greater community connection with the catchment and its landscape, essential for community health and well-being.

This could be supported by a regional paths and trails strategy for rivers of the Barwon that would:

- maximise community connection and access to the river while protecting environmentally sensitive areas such as the Lake Connewarre complex;

- provide off road pathways for expanded cycling and walking; and
- integrate with other transport options for the region (e.g. Bellarine Link and Barwon Heads Road duplication).

A regional paths and trails strategy would consider all existing trail networks in the region, such as the new City of Greater Geelong Shared Trails Masterplan under development, and could provide recommendations for additional riparian trails and links, as well as gaps in existing trail networks.

Long-term options to consolidate and expand existing parkland and natural areas of the river corridors to improve access could include planning controls, voluntary agreements, stewardship agreements, land exchange or development offsets.



**Accessing the Barwon River trail through Geelong**



**The Yarrowee River Trail**



# DIRECTIONS:

To ensure community access to the river corridors for use and enjoyment by people of all ages and abilities, the following directions are being considered:

## 1. Enhance the Barwon River Parklands.

- A new master plan would be developed for the Barwon River Parklands.

The development and implementation of a long-term master plan for the Parklands precinct would provide connection between existing and planned development, social settings and the surrounding natural environment. The master plan process would be used to engage the broader community in the future of the Barwon River Parklands and ensure stronger recognition of Traditional Owner and Aboriginal community opportunities.

Through the existing partnerships represented on the Barwon River Parklands, the plan would also provide opportunities to build on other regional programs (including Geelong City Deal and UNESCO Geelong City of Design).

- New additions to the parklands would be explored, including an extension to the Lower Moorabool.

As new areas of public open space along the Barwon River and Lower Moorabool corridors become available, they will be incorporated in the broader Barwon River Parklands. This includes the new stormwater wetland at Sparrovale and extending the boundary of the Parklands to the Lower Moorabool between Fyansford and Batesford.

- Administrative arrangements would be examined for more consistent, effective and sustainable management of public land in the Barwon River Parklands.

The existing management and administration arrangements for public land within the parklands would be reviewed, with a focus on more effective long-term funding and consolidated and consistent management under one or a smaller number of agencies.

- A long-term outcome for the Ovoid Aqueduct over the Barwon would be supported, that considers the structure's heritage values, safe access along the Barwon River and the cultural values of the site.

Support would be provided to Barwon Water's efforts to find a solution that addresses the site's heritage requirements, removes public risk, opens up access to the Barwon River and enables the Wadawurrung to use traditional practices to manage Aqueduct Park, named Porronggitj Karrong.

## 2 Adopt a parklands concept for the Yarrowee corridor through Ballarat.

A Yarrowee parklands concept for Ballarat would be adopted through the development and implementation of a new master plan for the Yarrowee corridor that combines the initial planning work developed through the Breathing the Life into the Yarrowee initiative.

### **3 Explore opportunities to enhance broader access and connectivity to the rivers of the Barwon.**

Broader access and recreational use of the rivers of the Barwon by the public and community-based clubs, such as recreational anglers, would be explored and supported where it:

- Minimises risks to public safety
- Can be managed with conflicting uses
- Protects the riverine environment, its landscape and sensitive areas (e.g. Lake Connewarre).

To address the lack of public access to riparian corridors, existing areas of public open space and natural areas would also be consolidated along key corridors between Geelong and Ballarat and between the Otways and the Central Highlands.

### **4 Consider a regional paths and trails strategy for the catchment's river corridors.**

A new regional paths and trails strategy would be developed for the catchment's river corridors to maximise community connection and access to the river, while protecting environmentally sensitive areas.

This could include off-road shared pathways for expanded cycling and walking between Geelong and Barwon Heads, linking to the transport planning underway for the Bellarine Link and Barwon Heads Road duplication.

Likewise, a broader catchment-wide trail network could also be explored between Ballarat and Geelong along its two riverine corridors (Moorabool and Leigh/Yarrowee rivers) and from the Otways through Winchelsea to Geelong along the Barwon River.



## 6.5 Planning for sustainable growth and liveability

Consultation found that the residents of Geelong and Ballarat and the broader Barwon catchment value sound planning for waterways in urban areas and would like to see better controls in place to manage the impact of new developments along waterways.

The Barwon catchment region is experiencing ongoing and significant development pressure. Much of this growth is occurring or planned to occur in the vicinity of the major river corridors of the Barwon, Moorabool in Geelong and the Yarrowee in Ballarat.

This is the case with the Armstrong Creek Growth Area, situated to the south of the Geelong city, which is close to the Lake Connewarre complex. On completion of the development, Armstrong Creek will provide housing for between 55,000 and 65,000 people and provide approximately 22,000 residential homes. In addition to this growth, the planning for the northern and western Geelong growth areas is considerably underway and the development will be situated on the Moorabool and Barwon river floodplains. The northern and western Geelong growth areas constitute the largest greenfield planning project in regional Victoria with a combined future population of approximately 110,000<sup>24</sup> new Geelong residents (with potential for up to 175,000 new residents) and approximately 44,000 new lots. Ballarat is also experiencing significant growth in its Ballarat



**Urban growth along the Barwon River**

<sup>24</sup> Northern and Western Geelong Growth Areas Framework Plan, City of Greater Geelong 2019

west urban growth zone, which will accommodate approximately 20,000 more people by 2036.

With this population growth along the region's riverine corridors, it is critical that:

- Effective long-term strategic planning approaches are adopted to protect the values of the Barwon River corridor
- An integrated and transparent planning approach is adopted for major new developments that incorporates integrated water management principles, and involves key agencies and key stakeholders early in the planning process

- New value capture mechanisms<sup>25</sup> are explored to contribute to the cost of new integrated water management infrastructure and enhanced public open space.

There are a number of strategic planning options that could be applied in both the interim and longer term to provide better development outcomes for waterway health and liveability of the region. These are detailed in the directions provided here.

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25 Value Capture – Options, Challenges and Opportunities for Victoria – Policy Paper, Infrastructure Victoria 2016

## DIRECTIONS:

To promote connected communities and protect riverine landscapes from increasing urban and non-urban land use and development growth pressures, the following directions are being considered:

### 1. **Identify the rivers of the Barwon as significant rivers in Clause 12.03-1S (River Corridors, Waterways, Lakes and Wetlands) of the Victoria Planning Provisions (VPP).**

The MAC's contribution to the river's protection could be recognised through this policy by acknowledging the significance of the rivers of the Barwon. While this is a state-wide provision, the Minister for Planning has appointed the MAC to specifically review the protection of the Barwon River.

### 2. **Introduce a regional-level planning policy for the rivers of the Barwon.**

This regional policy would apply to the municipalities and their planning schemes that are within the catchment area and would mirror a similar approach undertaken for the Yarra River. The new regional policy would acknowledge all the rivers that form the Barwon catchment (Barwon, Moorabool, Leigh/Yarrowee). A regional policy would provide a coordinated strategic vision and direction for the river.



**3. Develop master plans to outline the vision and strategic directions to guide future land use and development along and adjoining the river corridor.**

The preparation of integrated master plans for the rivers of the Barwon would provide the strategic directions to guide future land use and development along and adjoining the river corridor, including options to consolidate existing parkland and natural areas of the river – see also 6.4 Enhanced waterway corridors for community connection, access and use. It would also support new planning policies (refer to Directions 1 and 2) and development of new planning provisions (refer to Direction 6).

**4. Strengthen methods for better implementation of integrated water management principles through planning systems for new growth areas (including through precinct structure planning).**

The Victoria Planning Provisions, Precinct Structure Planning Guidelines and local strategies provide strategic and/ or statutory direction for the development of new urban areas, including waterway amenity outcomes, recreational land and water use and integrated water management. The Precinct Structure Planning Guidelines are currently being reviewed and should provide greater direction for integrated water management, and to reflect the agencies and catchment issues relevant to growth areas outside metropolitan Melbourne.

**5. Use development contribution plans and value capture options to fund integrated water management infrastructure for new growth areas.**

There could be greater financial contribution from large-scale residential developers to subsidise the additional water infrastructure for riverine improvements needed to meet the integrated water management aims of local government and water corporations. This could contribute to a sustainable funding model.

**6. Create interim and consistent overlay controls for the rivers of the Barwon.**

A review of planning controls along riverine corridors has revealed that in some locations planning scheme overlays (such as environmental significance or significant landscape overlays) have been inconsistently applied. Integrated regional approaches to applying overlays along riverine corridors are also lacking, particularly where they cross different municipality boundaries. There is an opportunity to explore options for developing and applying consistent planning provisions along the entire river system to align with the new regional-level planning policy (refer to Direction 2).

## 6.6 An effective governance model for the catchment

A range of organisations are responsible for the Barwon catchment across a range of regulatory functions (see section 3.6 Management arrangements).

Despite agencies being committed to collaboration, day-to-day management of the river corridor can seem disjointed to the broader public, and has led to a perception that better coordination is needed.

Community feedback from the consultation sessions strongly reflected that ‘improved public awareness of the roles and responsibilities of the managing and planning agencies’ and a more unifying vision for the rivers of the Barwon are needed. The community also suggested that resourcing may be a major challenge for the future.

This situation is not unique to the Barwon River system, with many other waterways in Australia subject to complex and confusing governance structures. Two recent examples where waterway governance arrangements have been revised include:

- the Yarra River where, in 2017, the *Yarra River Act* was established to achieve more integrated and long-term management of the Yarra River corridor; and
- the Parramatta River where a collaborative governance framework was established to provide clarity on the roles of each stakeholder and a process for accountability and reporting to other agencies and the community.

Principles and approaches adopted for these waterway systems could be applied to the Barwon.

Likewise, changes to the *Water Act* and its statement of obligations for the region’s water agencies, or updates to the Victorian Planning Provisions, could also be explored as a means of strengthening coordinated management of the Barwon catchment.

There are existing regional structures and relationships that are currently in place that, with additional support and resourcing, could also improve the management of the Barwon River. They include:

- G21 – Geelong Region Alliance (G21): a formal alliance of government, business and community organisations working together to improve the lives of people within the Geelong region across five municipalities – Colac Otway, Golden Plains, Greater Geelong, Queenscliff and Surf Coast. G21 is also the official Strategic Planning Committee for the G21 region and is responsible for leading the development and implementation of the region’s strategic plan.
- The Catchment Partnership Agreement: an agreement between 18 government agencies, local government and Traditional Owners that aims to strengthen coordination, collaboration and accountability, reduce duplication, and provide clarity on roles and responsibilities. Partners work together on priority projects that address management priorities across the region.
- Integrated Water Management Forums for both Barwon and Central Highlands regions: these two forums cover the Barwon, Leigh and Moorabool and aim to improve the management of the urban water cycle in Geelong, Ballarat and smaller regional centres.

While these existing forums should be strengthened to support improved management of the Barwon catchment over the long term, there is still need for a governance arrangement that could ensure greater accountability for the implementation of priority actions to improve planning and water management outcomes. Ideally this would:

- Create a unifying vision for the entire river system
- Oversee implementation and accountability for key actions of the Rivers of the Barwon Action Plan



- Be independently chaired with direct line of sight to the Ministers for Water and Planning
- Have senior representation from key planning and water agencies responsible for managing the Barwon, including the Corangamite CMA, Traditional Owners, water corporations and local government
- Ensure high-level integration of water management and planning considerations.

In addition to reviewing governance arrangements, there should be a corresponding review of funding to enable agencies to undertake activities to protect and enhance the long-term health of the rivers of the Barwon.

## DIRECTIONS:

To provide leadership and a long-term commitment to delivering the MAC vision and its goals, the following directions are being considered:

**1. Develop a set of key principles to provide improved governance for the Barwon catchment that includes integration of water management and land use planning and a framework of shared accountability.**

To embed these principles, a range of legislation or policy reforms could be considered.

**2. Establish an interim taskforce to facilitate the implementation of the MAC's recommendations and drive delivery of the planned Rivers of the Barwon Action Plan in line with the agreed principles.**

The taskforce would:

- Develop and champion a unifying vision and agreed set of goals for the entire river system
- Advocate for resourcing implementation of the plan
- Oversee implementation and accountability for key actions of the Rivers of the Barwon Action Plan
- Be independently chaired with direct line of sight to the Ministers for Water and Planning
- Have senior representation from the key planning and water agencies responsible for management of the Barwon (including Corangamite CMA, water corporations, Traditional Owners and councils), as well as nominated community representatives
- Ensure high-level integration of water management and planning considerations
- Utilise existing management processes and forums to harness and integrate the efforts and decisions of the responsible agencies and stakeholders.

*Note: the interim taskforce would not duplicate existing forums but rather strengthen accountabilities to better utilise existing forums.*

### **3 Review funding arrangements to ensure ongoing improvements to the rivers of the Barwon.**

With the urban growth and development challenges confronting the rivers of the Barwon there is a need to review existing funding arrangements. This is critical to ensure the managing and planning agencies can implement the activities needed to protect and enhance the long-term health of the Barwon.

### **4 Strengthen existing partnership forums and governance arrangements to support the role of the interim taskforce.**

Examples include:

- Catchment Partnership Agreement
- Barwon and Central Highlands Integrated Water Management Forums
- Barwon River Parklands Steering Committee.

It would be envisaged that once the key actions of the interim taskforce have been implemented, longer-term management would transition to the responsible agencies and these existing forums.

### **5 Make management decisions and the roles and responsibilities of government agencies more visible to the public.**

The community has called for more transparency in decision-making and there is a role for the agencies to better communicate how water management and planning decisions are made.

# Appendix 1

## Glossary

**Above cap water:** The water available above limits on consumptive volumes of surface water and groundwater. It includes unregulated flows which cannot be kept in storage.

**Algal bloom:** A rapid increase in the population of algae that can occur in waterways, often caused by excess nutrients (particularly phosphorus and nitrogen).

**Amenity:** Amenity includes the character of the landscape and the vistas and views from and rivers, as well as the many benefits that parklands and open spaces provide along them.

**Barriers:** Artificial instream structures, such as dams, weirs, causeways and culverts, that restrict the migration and movement of fish or other biota and can interrupt transport of organic material and sediment.

**Blue-green infrastructure:** Green-blue infrastructure refers to the use of vegetation, soils and natural processes in an urban context to simultaneously deliver landscape and water management benefits.

**Biodiversity:** The numbers and variety of plants, animals and other living beings, including micro-organisms. It includes the diversity of their genetic information, the habitats and ecosystems in which they live and their connections with other life forms.

**Bulk Entitlement:** The right to water held by water and other authorities defined in the *Water Act 1989*. It defines the amount of water that an authority is entitled to from a river or storage, and may include the rate at which it may be taken and the reliability of the entitlement.

**Cap:** An upper limit for the diversion of water from a waterway, catchment or basin.

**Catchment:** An area of land where run-off from rainfall goes into one river system.

**Catchment management authorities:** Government authorities established to manage river health, regional and catchment planning, and waterway, floodplain, salinity and water quality management.

**Connectivity:** Refers to the links between different habitats and species within a landscape.

**Consumptive use:** Water that is provided for all human uses (i.e. non- environmental uses, use for people, agriculture or industry).

**Community:** Includes individuals, public and private landholders, community groups and business owners.

**Country:** Traditional Aboriginal culture revolves around relationships with the land and water. For Traditional Owners, Country is a part of who they are, just as they are a part of it.

**Crown land:** Land that is owned by the State. Also often referred to as public land (although not all public land is actually Crown land).

**Ecosystem:** A dynamic complex of plant, animal, fungal and micro-organism communities and the associated non-living environment interacting as an ecological unit.

**Environmental Contribution (EC):** Funds collected by urban and rural water corporations under the *Water Industry Act 1994* to promote the sustainable management of water or address adverse water-related environmental impacts.

**Environmental flow studies:** The study of the flow requirements of particular basin's river and wetland systems used to inform policy decisions on the management and allocation of water resources.

**Environmental water entitlement:** A legally recognised, secure share of the water resources to be taken from a water system to maintain the environmental values of a water system.

**Environmental Water Reserve (EWR):** The share of water resources set aside to maintain the environmental values of a water system.

**Fishway:** Fishways (or fish ladders) are simple structures that allow fish to move past physical barriers in rivers and creek, commonly used in Victoria to provide fish passage past man-made structures such as weirs, dams, floodgates and roads.



**Floodplain:** Land subject to overflow during floods and that is often valued for its ecological assets.

**Gigalitre (GL):** One billion (1,000,000,000) litres.

**Megalitre (ML):** One million (1,000,000) litres.

**Overlay:** An overlay is a map in a council planning scheme for areas that have special planning controls, such as areas of significant vegetation or special heritage significance. These controls are in addition to the zone controls and ensure that important aspects of the land are recognised.

**Planning Scheme:** A planning scheme is a statutory document which sets out objectives, policies and provisions for the use, development and protection of land in the area to which it applies. A planning scheme regulates the use and development of land through planning provisions to achieve those objectives and policies.

**Ramsar Site:** Wetlands of international importance, designated under the Ramsar Convention.

**Reach:** A length of stream, typically 20 to 30 km long, which is relatively homogenous with regard to the hydrology, physical form, water quality and aquatic life.

**Riparian:** Land or vegetation that adjoins a river, creek, estuary, wetland or lake.

**River corridor:** The river and the strips of land adjacent to it.

**Sewage:** Wastewater produced from household and industry.

**Sewerage:** The pipes and plant that collect, remove, treat and dispose of liquid urban waste.

**Stormwater:** Run-off from urban areas. The net increase in run-off and decrease in groundwater recharge resulting from the introduction of hard surfaces such as roofs and roads within urban development.

**Sustainable diversion limit:** The maximum amount of water that can be taken from an unregulated sub-catchment for consumptive use during the winter-fill period to avoid unacceptable risk to the environment. It also prevents the issuing of new summer water extraction licences.

**Sustainable water strategies:** Sustainable water strategies are statutory processes for state-wide water resource planning in Victoria. They are used to manage threats to the supply and quality of water resources to protect environmental, economic, cultural and recreational values.

**Traditional Owners:** People who, through membership of a descent group or clan, are responsible for caring for particular Country. A Traditional Owner is authorised to speak for Country and its heritage as a senior Traditional Owner, an Elder or, in more recent times, a registered native title claimant.

**Victoria Planning Provisions:** The Victoria Planning Provisions is a comprehensive set of planning provisions for Victoria. It is not a planning scheme and does not apply to any land. It is a statewide reference, used as required, to construct planning schemes.

**Wastewater:** Water that has had its quality affected by human influence, deriving from industrial, domestic, agricultural or commercial activities.

**Water for the environment:** Water to support environmental values and ecological processes.

**Waterway condition/waterway health:** An umbrella term for the overall state of key features and processes that underpin functioning waterway ecosystems (such as species and communities, habitat, connectivity, water quality, riparian vegetation, physical form, and ecosystem processes such as nutrient cycling and carbon storage).

**Waterways:** Rivers and streams, their associated estuaries and floodplains (including floodplain wetlands) and non-riverine wetlands.

## Appendix 2

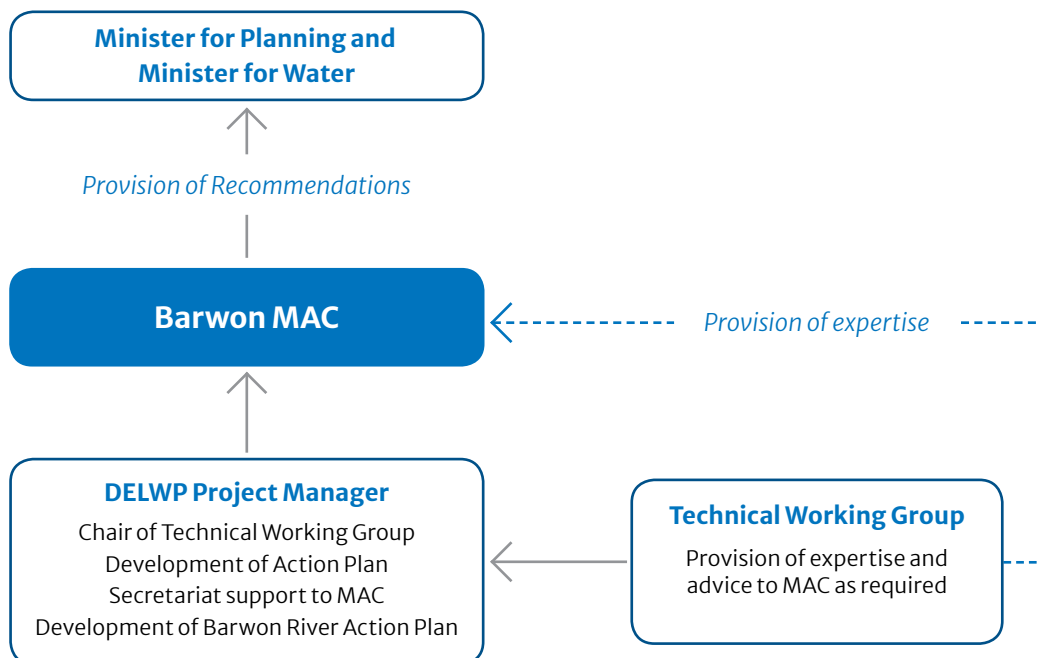
# The rivers of the Barwon Technical Working Group

A Technical Working Group will be established to help the MAC and government better understand the key issues, opportunities and reform options for protecting the rivers of the Barwon.

The Barwon Technical Working Group will provide the MAC with the subject matter knowledge, expertise and advice it requires to deliver its recommendations to the Victorian Government in line with the MAC Terms of Reference.

The Barwon Technical Working Group will comprise representatives of the organisations with direct oversight and management responsibilities for the rivers of the Barwon and its environs:

- Barwon Water
- Southern Rural Water
- Central Highlands Water
- Corangamite CMA
- Parks Victoria
- Local Government Authorities
- DELWP Planning
- DELWP Water and Catchment Group.



### Legend

- Formal reporting structure
- Flow of information

**Figure A.1 Barwon River Ministerial Advisory Committee Governance Structure**

## Appendix 3

# MAC Terms of Reference

### **Institutional and Regulatory Arrangements**

In relation to the statutory bodies with powers or functions affecting or relevant to the Barwon River catchment:

- What are the existing powers and functions of these statutory bodies?
- Are they being used effectively to promote, protect and enhance the Barwon River catchment?
- What opportunities are there to improve these powers and functions to address the issues for Barwon River catchment?

What are the optimal institutional, legislative and regulatory arrangements to contribute to the management, promotion and protection of the Barwon River catchment?

Are additional arrangements needed to ensure that Traditional Owners and the community are able to participate in management decisions?

### **Land use planning and development**

In relation to the referral of planning applications and strategic planning policy:

- Are the current functions and powers of referral authorities sufficient to address development pressures that affect the Barwon River catchment, including consideration of land development controls, planning controls, building regulations and standards?
- Are there other matters of concern or other statutory bodies that should be included in the referral process?
- What other changes to land development or planning controls and standards would mitigate risk to the Barwon River catchment and provide net benefits for the communities of the region?

Are there any interim planning arrangements that could be put in place?

### **General**

Are there additional opportunities to manage current and emerging issues for the Barwon River catchment that are impacting on its environmental, cultural, social and economic values?

What opportunities are there to improve connection to the Barwon River catchment?



## Appendix 4

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