



# Barwon Basin

## Water Quality

2021-2024

### How healthy is the water quality of the Barwon Basin?

To address that question, Corangamite Catchment Management Authority (CMA) and citizen scientists worked together to collect long term water quality data from the upper catchments of the Moorabool, Yarrowee and Barwon Rivers through to the estuary at Barwon Heads. The citizen science data provides an insight into current water quality and observed changes at long term monitoring sites since last reported in 2020.

On ground works programs aim to improve waterway health, and for the Moorabool and Upper Barwon Flagship projects, enable delivery on environmental water entitlements. In doing so, the programs provide improved instream habitat for threatened native fish and provide benefits to the mid and lower Barwon River.

Higher than average rainfall over the last 3 years has influenced stream flow and water quality. With the removal of aquatic weeds such as willows and sweet-grass, establishment of native vegetation, exclusion of stock as well as the delivery of water for the environment, waterway condition can improve in the long term.



This report compares the Victorian Environmental Reference Standards (ERS) environmental quality objectives with WaterWatch and EstuaryWatch summary statistics from 2021 to 2024 accessed from the EstuaryWatch and WaterWatch data portals. Aquatic macroinvertebrate (waterbug) scores were obtained from National Water Bug Blitz survey data to evaluate waterway condition. To assess whether there has been recent change in water quality, the 2021-2024 summary statistics are compared with the 2005-2020 report titled '[Data Interpretation and Analysis of Citizen Science Data from the Barwon River](#)'.

Due to the large number of sites assessed in the Barwon catchment the results are divided into sub-catchments according to the Corangamite CMA landscape zones. The five zones are Upper Barwon (11 WaterWatch sites), Mid-Barwon (3 WaterWatch sites), Yarrowee-Leigh (9 WaterWatch sites), Moorabool (10 WaterWatch sites plus 1 from Hovells catchment), and Bellarine (17 WaterWatch and 3 EstuaryWatch sites).



### Legend

- Waterwatch monitoring site
- EstuaryWatch monitoring site
- Waterway
- Town

### Water Quality

- Excellent water quality
- Good water quality
- Marginal water quality
- Poor water quality
- No data available

- EC** Electrical Conductivity (µS/cm) is used as a measure of salinity in water
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- ↔↑↓** Change in condition from 2020 report

### Aquatic Macroinvertebrates

- ☀ Site is exceptional
- ☀ Site is healthy
- ☀ Site is probably mildly polluted
- ☀ Site is impacted
- ☀ Site is heavily impacted
- ☀ No data available

### Platypus eDNA Survey

- 🦘 Very strong signal
- 🦘 Good signal
- 🦘 Absent signal

The rating system is used to display the water quality of a site using indicators for each segment, as determined by Victorian Environmental Reference Standards (ERS). These ratings have been developed to align with ERS environmental quality objectives.

Aquatic macroinvertebrate surveys are conducted at many WaterWatch sites across the Corangamite region. The macroinvertebrate community of a site is assessed using a biotic index that uses the pollution tolerance levels of different macroinvertebrate types.



# Upper Barwon

As the Barwon River flows from the foothills of the upper catchment the water quality is very good, displaying low salinity, turbidity and nutrients such as phosphorus with healthy macroinvertebrate invertebrate surveys. Further down the catchment in the rural farmlands of the plains some decline in water quality are evident at several sites, this is further supported by the generally poor macroinvertebrate communities present at the sites surveyed. Changes in land use has greatly reduced native riparian vegetation and even complete removal of vegetation has happened in the past.

The water quality in the Barwon River varies as rainfall in the catchment transports sediments into the river, particularly from the small intermittent streams that flow from the Otway Ranges such as Mathews Creek. Increases in salinity also occur in these streams at times of no river flow and may be impacted by the ingress of saline ground water.

A notable increase in nutrients such as phosphorus is also evident and likely linked to farming practices and has the potential to increase the growth of aquatic plants and even stimulate algal blooms. This in effect alters the dissolved oxygen levels in the water. During daytime, as a product of photosynthesis, oxygen levels increase at times to supersaturation levels (> 110 % saturation). During the night when plants are not photosynthesising the dissolved oxygen levels can drop to extremely low levels.

Low pH levels had been recorded at Boundary Creek indicative of acid sulphate soils in the catchment. Boundary Creek flows into the Barwon River it is likely to have an impact on the receiving waters.

River systems are dynamic and respond to change. To make long term positive change, on ground works including weed removal and river bank revegetation has occurred in reaches of the East and West branches. The delivery of water for the environment to deliver baseflow during low flow periods (summer-autumn) freshens water quality improving waterbug habitat accessibility. Eight sites in the Upper Barwon have been monitored in spring and autumn to help evaluate the benefits of water for the environment.

Traces of platypus DNA in the aquatic environment were surveyed in 2024 and positive results were found in the East and West branches of the Barwon River to Birregurra.

## Barwon River at Birregurra above Birregurra-Deans Marsh Rd

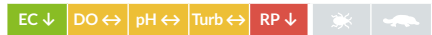
Site: CO\_BAR020



1

## Mathews Creek at Deepdene

Site: CO\_MAT065



4

## Barwon River East Branch at Dewings Bridge Rd

Site: CO\_BAE100



6

## Dewings Creek at Griffins Rd (US Offtake)

Site: CO\_DEW005



7

## Barwon River East Branch at Kents Rd

Site: CO\_BAE020



10

## East Barwon River at Lake Elizabeth Campground

Site: CO\_BAR005



11

Retreat  
Creek



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**Barwon River at McFarlanes Lane, Winchelsea** 2

Site: CO\_BAR062

EC ↔
DO
pH ↓
Turb
RP
🌞
🦘



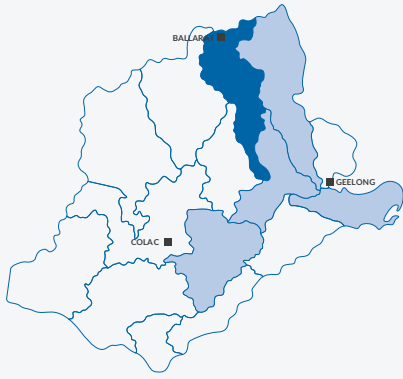
# Mid Barwon

The platypus eDNA survey conducted in the Upper Barwon extended to Winchelsea where a positive signal was measured. As the Barwon River flows from the upper catchment into the mid reaches from Winchelsea through the rural farmlands of the plains to Geelong decline in turbidity is evident.

There is a limited amount of WaterWatch data for the mid Barwon. Disruption caused by the COVID-19 pandemic and resulting restrictions caused a stop to WaterWatch and EstuaryWatch programs in 2020. It has taken time to reestablish volunteer groups and recommence monitoring activities.

Increases in salinity and phosphorus occur in a downstream direction and can be partially attributed to inflow from the Leigh River. As the Barwon River enters the city of Geelong the water quality is reasonably healthy for a lowland river with turbidity the only parameter in a poorer state than in 2020.





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# Leigh

Lake Wendouree is an urban constructed lake in the regional town of Ballarat that receives stormwater runoff from sources including the Northern wetlands. The Northern wetland has healthy salinity levels but the turbidity, pH, phosphorus and oxygen levels are in poorer condition because of stormwater input. The macroinvertebrate community of Lake Wendouree is mildly to heavily impacted. There was consistency with waterbug scores from the 2020 report for 3 out of 4 sampling sites around the perimeter of the waterbody indicating waterway health is mostly unchanged.

Yarrowee River was monitored at 2 sites downstream of Ballarat city centre. Salinity and pH at site CO\_YAR094 was healthy, however there was low dissolved oxygen, high phosphorus and turbidity. In addition, aquatic macroinvertebrates at the site were heavily impacted. The water quality of site CO\_YAR100 downstream of Ballarat's waste water treatment plant was healthy, however phosphorus levels were high. High phosphorus levels can stimulate excessive aquatic plant and algal growth.

The rainfall 2021-2024 in the Yarrowee Leigh catchment has been higher than average contributing to greater flow which has improved water quality. Williamsons Creek, a tributary of the Leigh River displayed relatively healthy water quality, and this is an improvement on reported water quality in 2020. This stream met most of the ERS water quality objectives however had elevated turbidity and phosphorus levels. The macroinvertebrate community indicate the site to be heavily impacted.

A wetland in the Williamson Creek sub catchment near Narmbool showed mostly good condition however salinity and dissolved oxygen were in poorer condition.

**Yarrowee River at Humffray St South footbridge, d/s of Prest St bridge, Mount Pleasant** 6  
Site: CO\_YAR094

EC	DO	pH	Turb	RP	🐛
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**Yarrowee River at Docwra Rd bridge, Magpie** 7  
Site: CO\_YAR100

EC	DO	pH	Turb	RP	🐛
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**Williamsons Creek** 9  
Site: CO\_WIL010

EC ↑	DO ↑	pH ↑	Turb ↔	RP ↑	🐛 ↔
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**Tributary of Williamson Creek at Narmbool (Dam 2)** 8  
Site: CO\_WIL006

EC	DO	pH	Turb	RP	🐛
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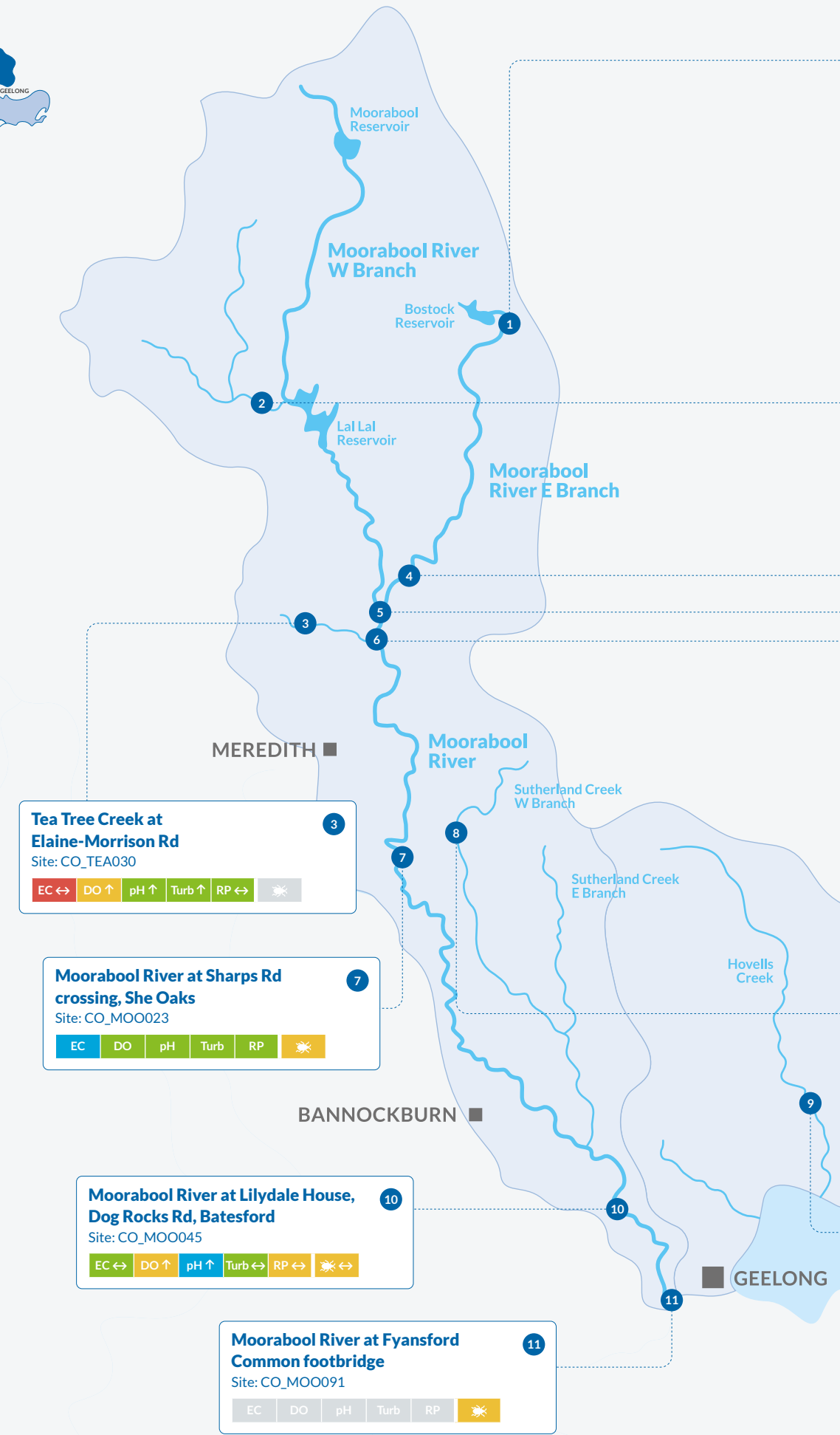
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# Moorabool

Electrical conductivity levels were higher in the Moorabool River East Branch Ballan Mineral Springs than monitoring sites in the main channel below the confluence of the East and West branches. Macroinvertebrates at the Springs site were heavily impacted by salt levels and greatly reduced flow caused by the reservoir upstream.

From the confluence of the East and West Branch down to the confluence with the Barwon, the water quality is maintained at relatively healthy levels. While there is an increase in salinity occurring downstream, likely influenced by seasonal flow from the tributaries such as Teatree and Sutherland Creeks, the electrical conductivity does not exceed ERS therefore protecting environmental values. Many of the monitoring sites on these waterways have good riparian vegetation and aquatic habitat, however the macroinvertebrate community structure remains impacted.

The water quality in the Moorabool River has changed over time. Pre 2011 high salinity was common due to water extraction and reduced flows associated with the Millennium drought. Post 2011 and the introduction of environmental flows particularly over summer to autumn helped lower salinity and improve dissolved oxygen levels. When compared with 2020 results for both water quality (salinity, dissolved oxygen, pH and turbidity) and waterbug measurements, waterway values in 2024 have been maintained or improved. Factors influencing this outcome include higher than average rainfall and the implementation of environmental flows to improve the overall water quality in the Moorabool River.

Hovells Creek, part of the Moorabool basin, has been monitored in Lara where there are landuse impacts including urban development. Many of the measured parameters have declined in condition.

**Ballan Mineral Springs Shaws Rd, Ballan** 1  
Site: CO\_MOO048

EC	DO	pH	Turb	RP	
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**Lal Lal Ck at Falls Picnic Ground, Lal Lal** 2  
Site: CO\_LAL080

EC	DO	pH	Turb	RP	
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**Moorabool River East branch at Egerton-Ballark Rd** 4  
Site: CO\_MOE070

EC ↑	DO ↑	pH ↓	Turb ↔	RP ↔	
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**Moorabool River confluence east and west branches, Dolly Creek Rd, Morrisons** 5  
Site: CO\_MOO001

EC ↑	DO ↔	pH ↔	Turb ↑	RP ↔	
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**Moorabool River at ford, Dolly Creek Rd bridge crossing** 6  
Site: CO\_MOO004

EC ↑	DO ↔	pH ↔	Turb ↔	RP ↔	
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**Sutherland Creek at gorge, Steiglitz** 8  
Site: CO\_SUT015

EC	DO	pH	Turb	RP	
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**Hovells Creek upstream of Flinders Avenue Bridge** 9  
Site: CO\_HOV020

EC ↓	DO ↑	pH ↓	Turb ↓	RP ↓	
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# Bellarine

As the Barwon River makes its way through Geelong below the confluence with the Moorabool River the water quality is marginally degraded. The water is more turbid as a result of sediment transport and condition has declined since 2020. The wetlands on the banks of the Barwon River receive urban stormwater runoff. High phosphorus levels are common and may encourage macrophyte and algal growth which potentially creates oxygen troughs over the summer to autumn seasons and raises pH levels. A blue green algal bloom was observed by Barwon WaterWatch volunteers in 2024.

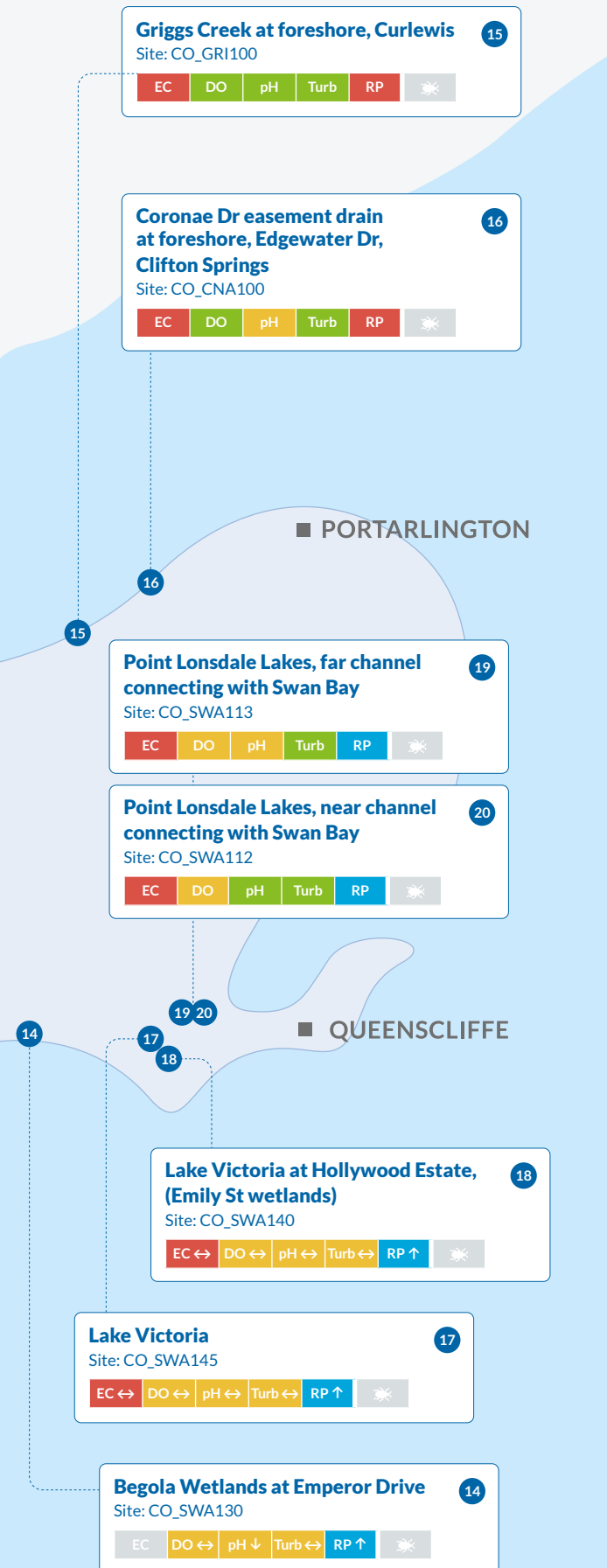
Waurm Ponds Creek, adjacent to Deakin University campus, displays poor salinity and oxygen levels. In the lower reaches it is stormwater fed and macroinvertebrates indicate the creek is heavily impacted. At Deakin University Waurm Ponds campus a series of recently constructed wetlands have been monitored by students who found the macroinvertebrate communities to be heavily impacted. Future surveys monitoring change will help inform management of the campus wetlands.

As the Barwon River enters the estuary at Lake Connewarre the water quality is marginal. During flood events flows in the catchment completely flush the estuary of saltwater and becomes freshwater dominated, high turbidity occurs at this time however is only short lived as the tidal salt wedge pushes back up the estuary. Over summer as river flow declines saltwater dominates with evidence of salt wedge development. There can be an increase in algal growth in the surface waters and on the bottom substrate, particularly in shallow Lake Connewarre. At times the bottom waters become super saturated with dissolved oxygen likely due to benthic algal mats photosynthesising. A blue green algal bloom was observed at B2 by Barwon EstuaryWatch volunteers in 2022.

As the river nears the estuary mouth to Bass Strait the water quality is very good although turbidity levels remain elevated. During seasonal high river flows the water represents that of freshwater for a brief period, most of the time the water representing that of seawater due to the strong tidal influence.

Freshwater wetlands at the top of the Swan Bay catchment are stormwater fed and have maintained marginal water quality. The saline wetlands at Point Lonsdale and Lake Victoria have also maintained marginal water quality, however have low phosphorus levels. With the exception of dissolved oxygen, the quality of the saline water circulating at The Point showed good condition.

Sampling sites at Clifton Springs are stormwater fed and showed high phosphorus levels. Their proximity to the bay has resulted in high salt levels in otherwise good quality water.





The Corangamite CMA works with land managers, communities, other organisations and government to protect and improve the health of the region's natural resources. Supporting local communities to get involved and increase their knowledge of their local catchment is a key objective for the Corangamite CMA. The Citizen Science Program manages data, and supports and trains volunteers participating in programs within the region. The purpose of this report is to interpret the information collected and share it with citizen scientists and the broader community to improve understanding of waterway health. Data from a total of 51 WaterWatch and 3 EstuaryWatch sites collected by 45 volunteers contributed this report.

Citizen scientists from the WaterWatch and EstuaryWatch programs have been monitoring waterway condition within the Corangamite region for the past 31 years and 18 years respectively. These citizen science programs deliver an extensive range of waterways education experiences to the community and work in partnership with local governments, friends groups and other stakeholders to promote the conservation and protection of local waterways.

There have also been many additional programs conducted with the support of citizen scientists collecting monitoring data, several of which were instigated by the local communities to gain a better understanding of potential threats to their local environment eg Barwon Estuary Monitoring Program Phase 2 (BEMP2), eDNA platypus survey with Upper Barwon Landcare Network (UBLN), National Waterbug Blitz, and the Fluker Post Project. In addition, schools have been engaged with the freshwater education program River Detectives.

To become  
involved in a citizen  
scientist project  
contact:

**Corangamite Catchment  
Management Authority**

Telephone 03 5232 9100

Email [info@ccma.vic.gov.au](mailto:info@ccma.vic.gov.au)

Website [www.ccma.vic.gov.au](http://www.ccma.vic.gov.au)

For more information visit:

[www.vic.waterwatch.org.au](http://www.vic.waterwatch.org.au)

| [www.estuarywatch.org.au](http://www.estuarywatch.org.au)

| [www.waterbugblitz.org.au](http://www.waterbugblitz.org.au)

