EPA VICTORIA

Report Card 2019–20

Publication number 1923

Environment Protection Authority Victoria
GPO Box 4395, Melbourne VIC 3001
1300 372 842 (1300 EPA VIC) www.epa.vic.gov.au

Interpreter

If you need interpreter assistance or want this document translated please call **131 450** and advise your preferred language.

If you are deaf, or have a hearing or speech impairment, contact us through the National Relay Service. For more information, visit **relayservice.gov.au**

Melbourne Water

VICTORIA State Government | Environment, Land, Water and Planning

Summary

The annual Report Card summarises the latest environmental water quality in Port Phillip Bay, Western Port and the Gippsland Lakes and their catchments (Figure 1). Environment Protection Authority Victoria (EPA), Melbourne Water and the Department of Environment, Land, Water & Planning (DELWP) monitor the water quality in these regions. The results are described in this report.

The Report Card uses key indicators of environmental water quality to calculate an overall annual score. The score generates a rating of 'Very Poor', 'Poor', 'Fair', 'Good' or 'Very Good'. This Report Card includes results from July 2019 to June 2020.

In 2019–20, water quality in the bays, lakes and waterways was similar to previous years, except in the East Gippsland catchment where water quality declined from Very Good to Good.

Water quality was mostly Very Good or Good for rivers in the elevated areas where most rivers originate. Water quality generally declined to Poor or Very Poor as the rivers moved through rural, agricultural and urbanised areas in the foothills and coastal plains of the lowlands. In the bays and lakes, water quality was mostly Very Good or Good for areas that are able to mix with the open ocean. Water quality was generally worse in or near rivers that transport pollution from urban and industrial areas.

Data from the Bureau of Meteorology shows that rainfall in central Victoria was above average, but below average in parts of Gippsland (Figure 2). The Western Port catchment had particularly high rainfall. Intense heatwaves across Victoria and extensive bushfires in East Gippsland were significant events during the summer of 2019–20. These climate conditions influenced the volume and pollution load of stormwater run-off entering waterways.

In East Gippsland, there was a decline in water quality at some sites along the upper Tambo and Mitchell Rivers. This has been attributed to a long-term reduction in rainfall. Sites in bushfire affected areas maintained Very Good water quality over 2019–2020. Monitoring results showed that bushfires temporarily affected water quality at some sites in East Gippsland.

The annual Report Card has been available on EPA's website since 2019. Prior to that, results were published on the Yarra and Bay website.

Contents

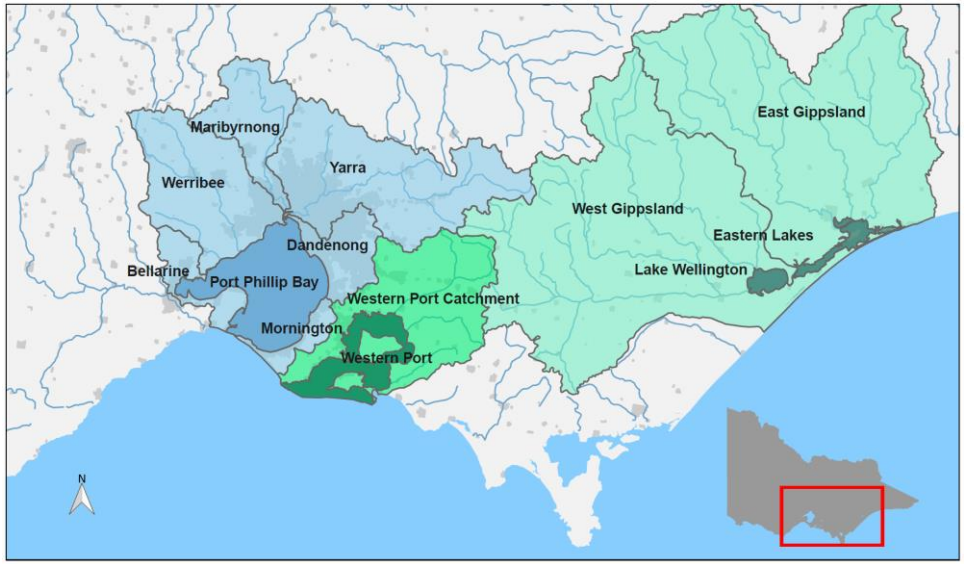

Figure 1: Location of Port Phillip Bay, Western Port, Gippsland Lakes (dark shading) and their catchments (light shading).

What is the Report Card?

This Report Card provides a snapshot of environmental water quality in Port Phillip Bay, Western Port, Gippsland Lakes and the waterways in their catchments for 2019–20. These bays and lakes are the largest coastal waterbodies in Victoria. The waterways are a complex network of rivers, wetlands and estuaries. They are of immense cultural, economic and environmental value. During summer, EPA forecasts recreational water quality based on microbiological indicators which are not reported here. For more information, see the Yarra Watch and Beach Report programs.

How are the scores calculated?

Key indicators of water quality are assessed against Victorian environmental quality objectives for relevant indicators in the State Environment Protection Policy (Waters). These are combined to calculate an overall water quality index score (WQI) out of 10, corresponding to a rating of Very Poor to Very Good (Table 1). For this Report Card, WQI scores are for the period from July 2019 to June 2020.

Table 1: Water quality index (WQI) scoring categories for Report Card.

Water quality index score	Rating	Description
8–10	Very Good	High quality waterways generally not impacted by pollution
6–8	Good	Meets Victorian water quality objectives
4–6	Fair	Some evidence of stress
2–4	Poor	Under considerable stress
0–2	Very Poor	Under severe stress

The water quality indicators used for catchment waterway sites are:

- dissolved oxygen
- metals
- nutrients (total nitrogen and total phosphorous)
- pH
- salinity (not at estuarine sites)
- water clarity.

The indicators used for bay and lake sites are:

- algae (chlorophyll-a)
- dissolved oxygen
- metals (where data is available)
- nutrients (total nitrogen – Port Phillip Bay and Western Port; total phosphorous – Gippsland Lakes)
- salinity (not at the estuarine Eastern Lakes)
- water clarity.

Key indicators gauge the overall condition of aquatic ecosystems. The scores are summarised at the catchment and bay scale. This is done by considering the area of the sub-catchments and marine zones that each site(s) represents and calculating area-weighted average scores.

Weather in 2019–20

Weather fluctuations influence WQI scores. Long periods of dry weather can reduce river flows, decrease pollution run-off into waterways, increase salinity and cause more frequent or prolonged algal blooms. Conversely, wet conditions can increase the transport of pollutants (such as nutrients and sediment) via stormwater from the catchment into waterways and bays.

In 2019–20, the weather in Victoria was relatively wet in central Victoria, but dry in East Gippsland, compared with the long-term average (Figure 2). Rainfall in the Western Port catchment was particularly high, compared with very dry conditions further east in Gippsland.

The first six months of the year, from July to December 2019, were notably drier than the remainder of the year. Most of the annual rainfall occurred between January and June 2020. Intense heatwaves and extensive bushfires across Gippsland were significant events during the summer of 2019–20. In contrast, autumn and winter had above average rainfall, particularly in central parts of Victoria.

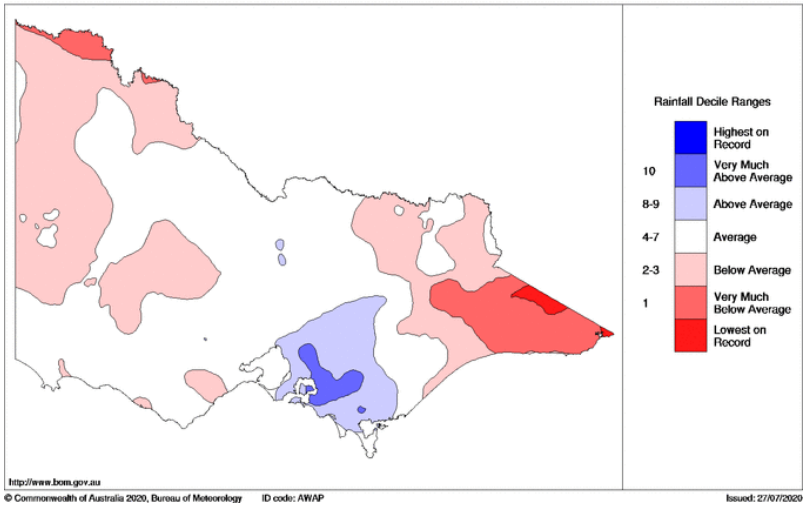

Figure 2: Victorian rainfall decile ranges from 1 July 2019 to 30 June 2020. (Source: © Commonwealth of Australia 2020, Bureau of Meteorology.)

Port Phillip Bay and catchment

Port Phillip Bay is a large, shallow embayment. It is surrounded by catchments that are mostly rural, but has large urban areas around its shoreline, including Victoria's two largest cities: Melbourne and Geelong. The Yarra, Maribyrnong and Werribee Rivers are major river systems that originate in the forested hills and mountains, then flow through rural properties, townships and urban areas to the bay. The bay is connected to Bass Strait by a narrow entrance. Waters in the south of the bay mix well with ocean waters, while riverine inputs highly influence the waters in the north and west. The bay is a popular location for boating, fishing and swimming, and supports Victoria's largest recreational fisheries.

The Report Card for Port Phillip Bay and catchment is calculated using data from Melbourne Water and EPA. Melbourne Water monitors water quality at more than 100 sites in the catchment. EPA monitors water quality at six sites in the bay. Only sites that have a minimum of six samples within the 12-month period are used to calculate the score. This is so the Report Card more accurately reflects the conditions of the year.

In 2019–20, water quality in Port Phillip Bay and its catchment varied from Very Good in areas of the bay and upper reaches of the catchment, to Very Poor in highly urbanised waterways. This was similar to previous years (Figure 3).

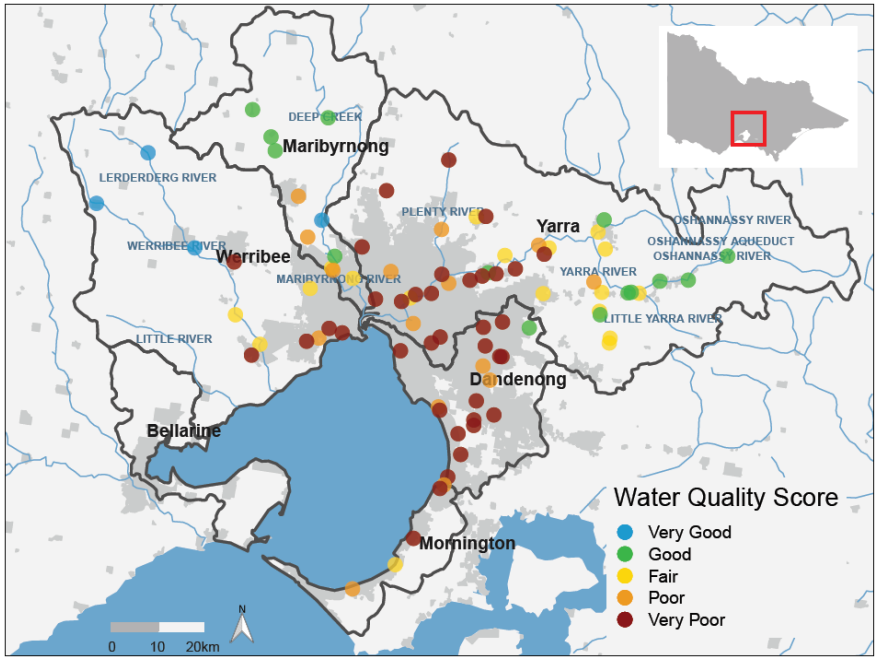

Figure 3: Location and WQI scores of Melbourne Water's monitoring sites in the Port Phillip catchment. Colour indicates WQI score for each site in 2019–20.

Catchment Report Card

Port Phillip Bay comprises six catchments: Yarra, Werribee, Maribyrnong, Dandenong, Mornington and Bellarine (Figure 3).

Werribee catchment

The Werribee catchment includes rivers and creeks such as Little River, Werribee River, Lerderderg River and Kororoit Creek. These all drain into the northwest area of Port Phillip Bay (Figure 3). About 20 per cent of the catchment retains its natural vegetation, but agriculture is the predominant land use.

Overall, water quality in the Werribee catchment was Fair in 2019–20, with conditions improving markedly since 2000 (Figure 4). Water quality was Very Good in the upper reaches of the Werribee catchment in forested areas, but declined to Fair, Poor and Very Poor as waterways flowed through the catchment's agricultural and urban areas.

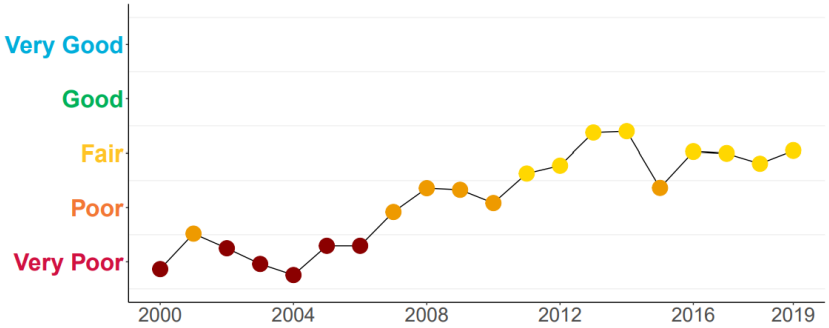

Figure 4: Historical WQI scores for the overall Werribee catchment. Colour indicates WQI score for each year.

Yarra, Maribyrnong, Dandenong and Mornington catchments

Water quality was Good in the forested upper Yarra and Maribyrnong catchments, but declined to Very Poor in urban areas. The highly urbanised areas of the Dandenong and Mornington catchments had Very Poor water quality (Figure 3).

Bellarine catchment

The Bellarine catchment is outside Melbourne Water's service area. Waterwatch data is available for the Bellarine. However, it is collected in a different way that's not consistent with how data is collected in the other catchments. Therefore, a WQI score cannot be calculated for Bellarine catchment.

Bay Report Card

Overall, water quality in Port Phillip Bay was Good in 2019–20. Reduced water clarity resulted in a Fair rating for this parameter (Figure 5). Rainfall data from the Bureau of Meteorology showed the 2019–20 period had above average rainfall in areas of the Port Phillip catchment (Figure 2). This rainfall increased the volume of surface and stormwater run-off, which can carry pollutants such as nutrients and sediment.

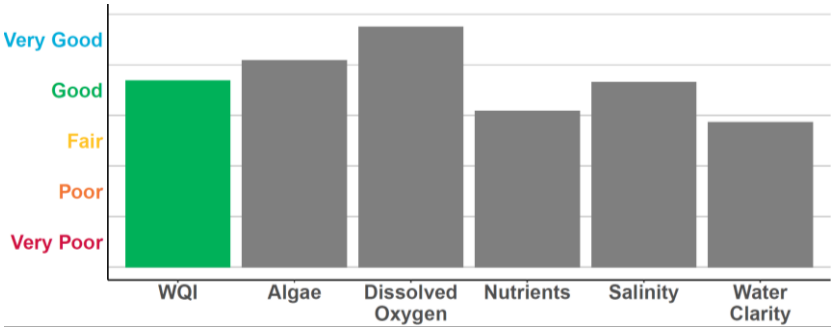

Figure 5: WQI scores for Port Phillip Bay in 2019–20. Coloured bar indicates the overall WQI score. Grey bars are the individual indicators used to calculate the overall WQI score.

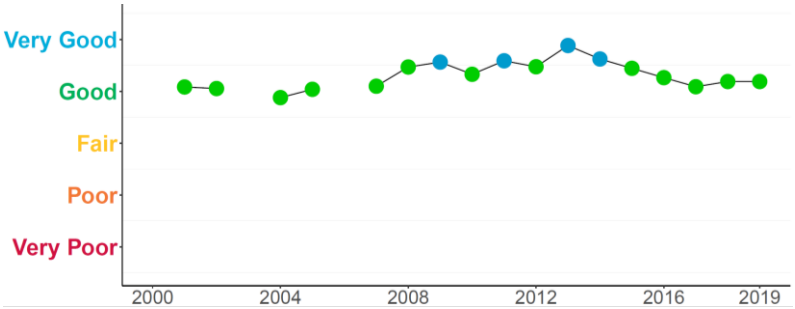

Figure 6: Historical WQI scores for Port Phillip Bay.

EPA has six monitoring locations in Port Phllip Bay (Figure 7). Conditions in Port Phillip Bay have remained relatively consistent since 2002, with overall water quality fluctuating between Good to Very Good (Figure 6). Riverine inputs, particularly nutrients such as nitrogen and phosphorus, highly influences water quality in the northern part of the bay. However, mixing with oceanic waters from Bass Strait and the natural recycling of nutrients in the sediments maintain good water quality (Figure 7).

Dromana

Dromana had Very Good water quality. This is because the southern area of Port Phillip Bay is well flushed with water from Bass Strait due to regular tidal exchange, and minimal impacts from rivers and urban run-off.

Central Bay and Patterson River

The Central Bay area, including Patterson River, had Good water quality. Water quality can decline during periods of very high rainfall. Following rain, increased flows from the Werribee and Yarra Rivers transports high levels of nutrients and sediments to the northern and eastern parts of the bay. This stimulates algal growth and reduces light clarity.

Corio Bay, Long Reef and Hobsons Bay

Corio Bay, Long Reef and Hobsons Bay had Good water quality, but the influence of river flows, run-off and stormwater that carry pollutants, such as nutrients, sediments and heavy metals, means they are not Very Good.

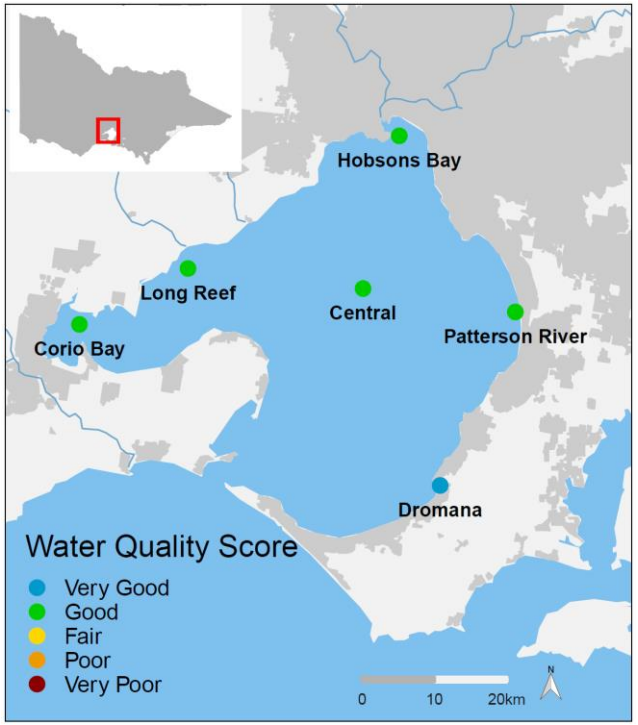

Figure 7: Locations and WQI scores of EPA long-term marine monitoring sites in Port Phillip Bay.

Western Port and catchment

Western Port is a well-flushed, semi-enclosed bay, with two large islands (Phillip Island and French Island) that constrain water flow. The catchment is largely rural (70 per cent), with state reserves (20 per cent) in the upper catchment, and a fast-growing urban growth corridor.

Waterways in the catchment flow through areas that have been highly modified to support rural and green wedge land use. They also support significant environmental values, including vegetated areas near the Bunyip State Park and Strzelecki Ranges. The northern and eastern areas of the bay are mostly intertidal mudflats dominated by catchment inflows from the Bunyip, Lang Lang and Bass Rivers. Tidal exchange with Bass Strait highly influences the western and southern areas.

The Report Card for Western Port and its catchment is calculated using data from Melbourne Water and EPA. In 2019–20, water quality varied from Good in areas of the upper catchment and the bay, to Very Poor in highly urbanised or intensive agricultural areas.

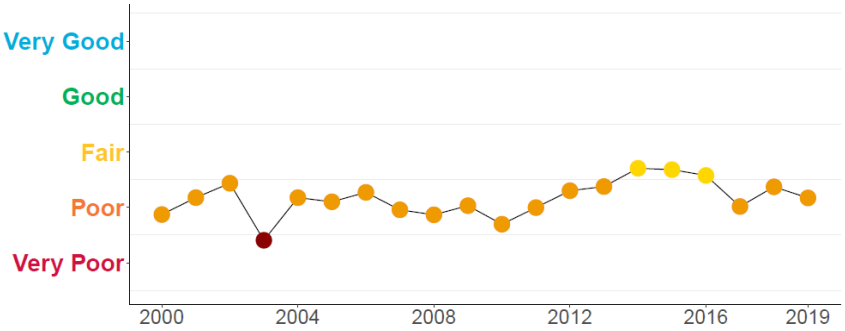

Figure 8: Historical WQI scores for the overall Western Port catchment.

Catchment Report Card

Overall, the water quality in Western Port catchment's waterways was Poor for 2019–20. Scores for the Western Port catchment have remained relatively consistent over time and have mostly shown Poor water quality (Figure 8).

Melbourne Water routinely collects water samples across waterways of the Western Port catchment to assess how water quality is changing over time. Not all monitored sites produce a WQI score every year due to insufficient or unsuitable data. In this Report Card, 21 sites in the Western Port catchment were used to calculate the WQI score (Figure 9).

Water quality was Good in the upper catchment of the Bunyip River, but Fair and Poor in the upper catchments of the Tarago River system and Cardinia Creek respectively. Water quality declined to Poor or Very Poor in waterways in the mid and lower catchment where the land use changes into rural, agricultural and urbanised areas. Water quality in the Bass River was Fair, which was an improvement on the previous year.

Vegetation clearing, draining of the Koo Wee Rup swamp and the progressive growth of agriculture and urban areas has altered the Western Port catchment significantly. The altered drainage regimes and intensive land uses present significant challenges for maintaining water quality in these rivers and streams.

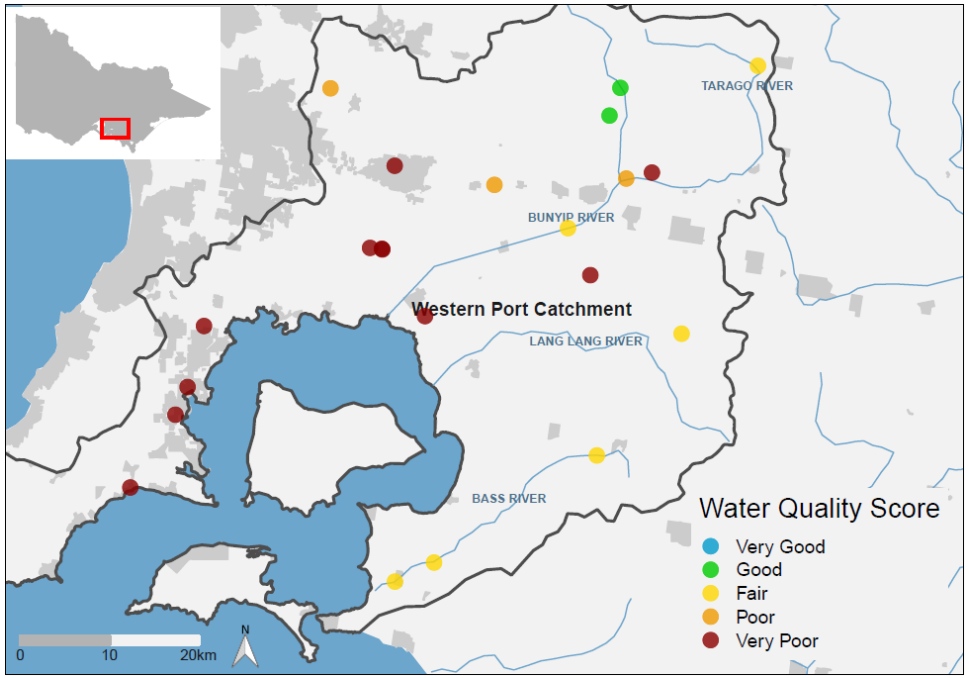

Figure 9: Location and WQI scores of Melbourne Water's monitoring sites in the Western Port catchment.

Western Port Bay Report Card

Overall, water quality was Good in Western Port for 2019–20. High nutrient levels resulted in a Fair rating for this parameter (Figure 10).

Rainfall data from the Bureau of Meteorology showed the Western Port catchment had above average rainfall in the 2019–20 period (Figure 2). This rainfall increased the volume of surface and stormwater run-off. River inputs are a source of nutrients and sediment from the northern and eastern catchments.

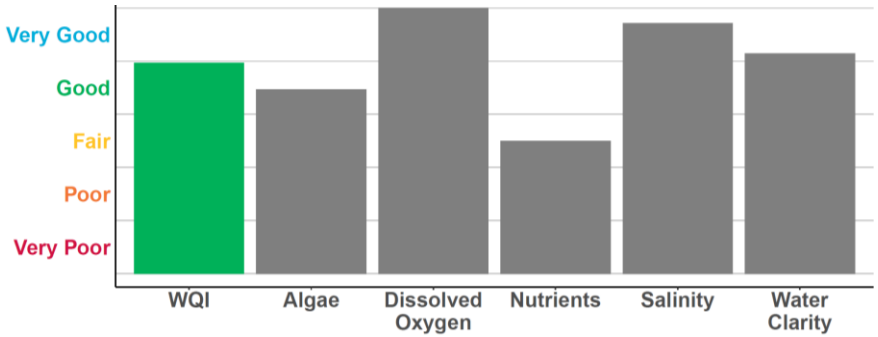

Figure 10: WQI scores for Western Port overall in 2019–20. Grey bars are the individual indicators used to calculate the overall WQI score.

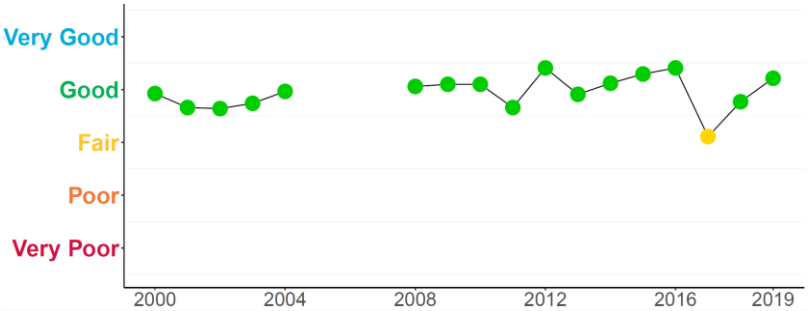

Figure 11: Historical WQI scores for Western Port. Due to limited monitoring, no scores were calculated from 2005–08.

While rainfall can temporarily decrease water quality, conditions in Western Port have generally remained consistent since 2000 (Figure 11). The small catchment inflow volumes and mixing with Bass Strait helps to maintain good water quality in Western Port.

EPA has two monitoring locations in Western Port (Figure 12).

Hastings

The Hastings monitoring site had Very Good water quality, which has improved from the previous year when it was Good. This area is regularly flushed and mixed with oceanic waters from Bass Strait.

Corinella

The Corinella monitoring site was Fair due to high levels of sediment pollution. This is the same rating as the previous year.

The high levels of suspended sediment are caused by a combination of high coastal erosion in the north-east of the bay, deposition of fine sediments from the catchment, and the re-suspension of sediment within Western Port.

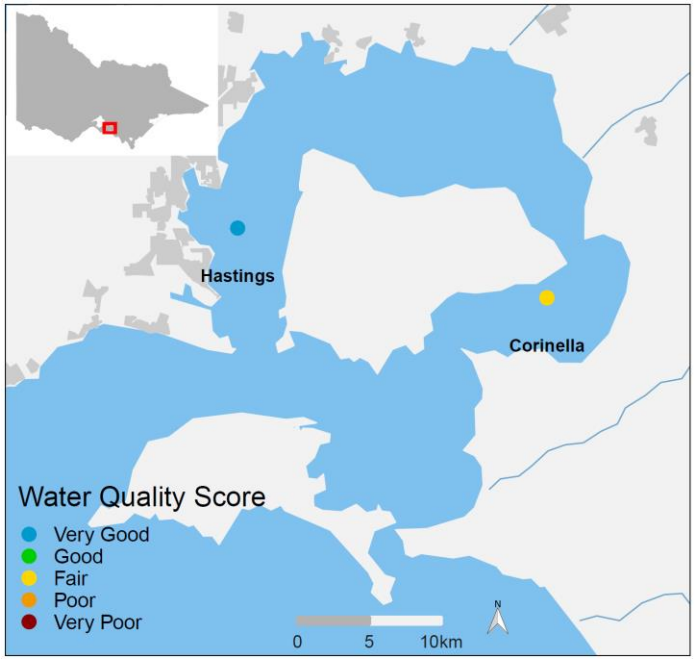

Figure 12: Locations and WQI scores of long-term EPA marine monitoring sites in Western Port.

Gippsland Lakes and catchment

The Gippsland Lakes are a 70 km-long series of large, shallow coastal lagoons. A narrow, artificially maintained channel at Lakes Entrance connects the lakes to Bass Strait. The catchment consists of mostly state reserves, forests and national parks (60 per cent) and rural land (39 per cent). Five major river systems drain directly into the lakes: the Mitchell, Nicholson and Tambo flow into Lake King, while the Latrobe and Avon Rivers flow into Lake Wellington.

The Report Card for Gippsland Lakes and its catchment is calculated using monitoring data from DELWP (25 sites) and EPA (five sites). Scores are only calculated for rivers and streams in the catchment that drain into the Gippsland Lakes. In 2019–20, water quality varied from Very Good and Good in the majority of the catchments. The lower reaches of major rivers and Lake Wellington and Lake Victoria had Fair or Poor water quality (Figure 13 and 18).

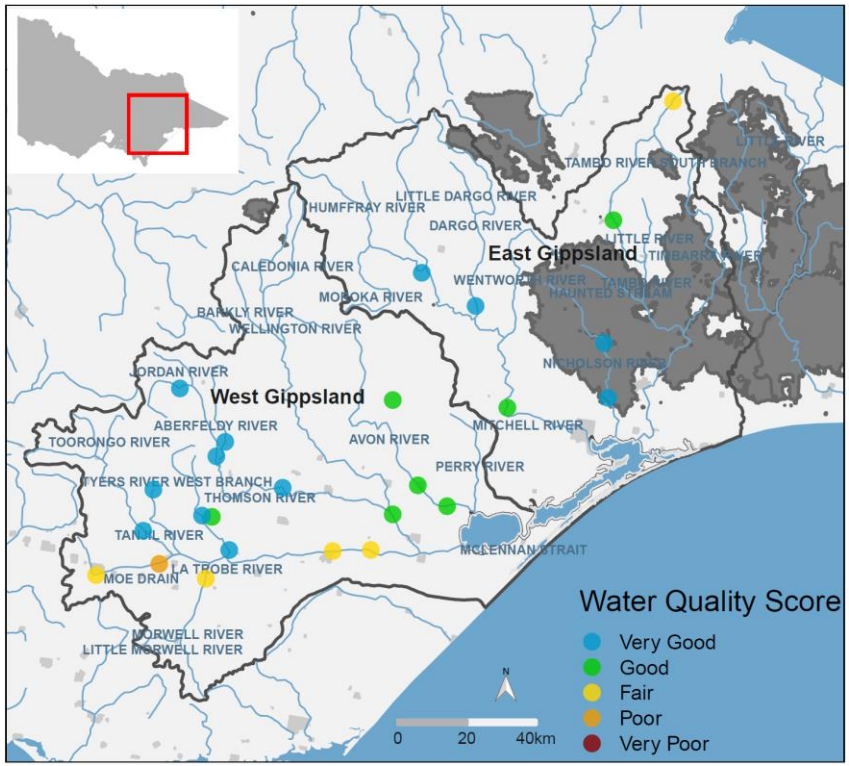

Figure 13: Location and WQI scores of DELWP's monitoring sites in the Gippsland Lakes catchment. Dark grey shaded areas show the extent of the 2019–2020 bushfires in Gippsland (Source: Fire history overlay of most recent fires from data.vic.gov.au)

Catchment Report Card

Water quality in the East Gippsland catchment declined for the first time since 2006, in a year characterised by extremely low rainfall, severe bushfires and increased rainfall in some areas in late summer. Overall, the water quality was Good, but worse than the long-term trend of Very Good. In West Gippsland, water quality was Good and has remained relatively consistent over time (Figure 14).

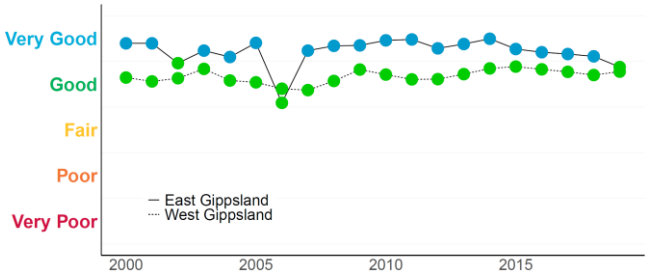

Figure 14: Historical WQI scores for the Gippsland catchments.

Declines in the East Gippsland catchment were associated with poorer nutrient levels, pH and water clarity than usual (Figure 15). While East Gippsland experienced severe bushfires over spring/summer, impacts on water quality appear to have been short lived. For example, monitoring sites located in heavily bushfire-affected areas along the Nicholson River recorded Very Good water quality for the year. Water quality declined at monitoring sites on the upper Tambo and Mitchell Rivers. These declines are due to very low rainfall and reduced river flow in the upper Tambo, and elevated nutrients and turbidity after rainfall in the Mitchell.

In West Gippsland, water quality followed a similar pattern to previous years. The forested areas on the slopes of the Great Dividing Range maintained Very Good to Good water quality. Water quality declined along the mid and lower reaches of the main rivers where cleared land and urbanisation have impacted water quality.

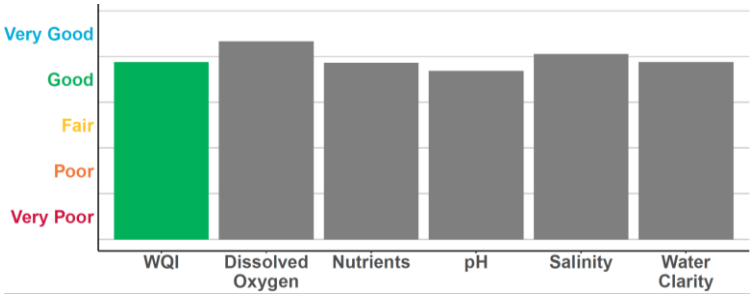

Figure 15: WQI scores for East Gippsland overall in 2019–20. Grey bars are the individual indicators used to calculate the overall WQI score.

Lakes Report Card

EPA has five monitoring locations in the Gippsland Lakes (Figure 18). Monitoring locations closer to the entrance to Bass Strait (Shaving Point, Lake King) had better water quality due to greater tidal exchange. Polluted water discharging from rivers impacted inland monitoring locations (Lake Wellington and Lake Victoria).

Overall, water quality was Poor in Lake Wellington and Good in the eastern lakes (Lake King and Lake Victoria) during 2019–20 (Figures 16 and 17). While scores were good for the eastern lakes overall, water quality declined from Good to Fair between Lake King and Lake Victoria. This was due to the reduced influence of clean water from Bass Strait.

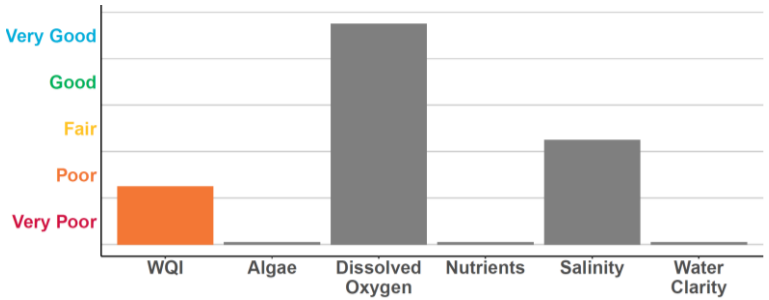

Figure 16: WQI scores for Lake Wellington in 2019–20. Grey bars are the individual indicators used to calculate the overall WQI score.

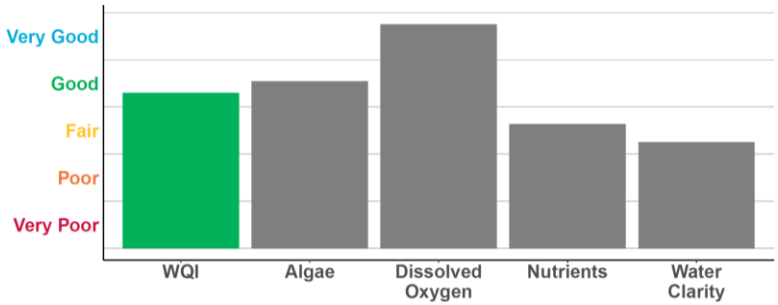

Figure 17: Overall WQI scores for eastern lakes in 2019–20. Grey bars are the individual indicators used to calculate the overall WQI score.

Lake Wellington is a sink for sediments, nutrients and contaminants. Wind and waves within the shallow waters of the lake can re-suspend sediments and nutrients. Algal blooms often develop because of the high availability of nutrients. These processes are reflected in the 'Poor' WQI score in 2019–20 (Figure 16). Historically, water quality in Lake Wellington has been rated as Poor or Very Poor (Figure 19). This year, salinity has been included as an indicator for Lake Wellington in all WQI calculations. This has resulted in an improvement in scores compared with previous Report Cards, because salinity in Lake Wellington typically ranges between Fair and Good. Therefore, in this case, a better score doesn't necessarily mean that water quality itself has improved from last year.

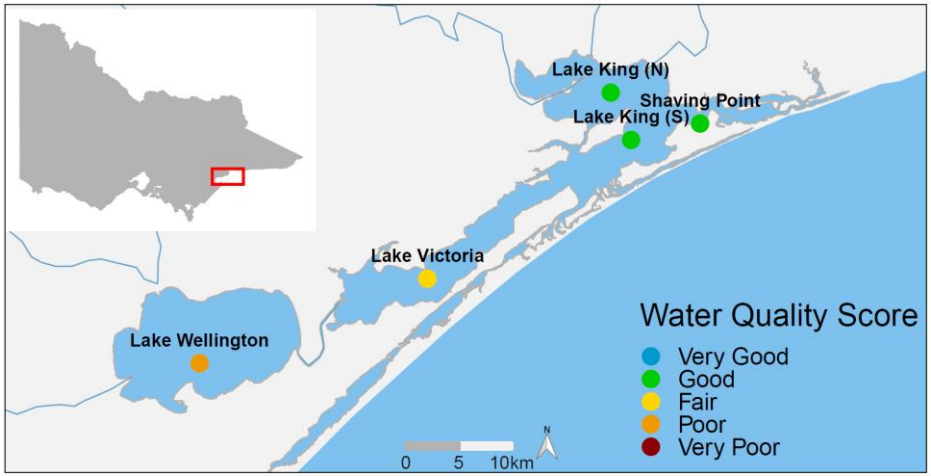

Figure 18: Locations and WQI scores of EPA's long-term marine monitoring sites in Gippsland Lakes.

In 2019–20, the Gippsland region experienced drought and severe bushfires. Though bushfires temporarily impacted the water quality of major rivers in the East Gippsland catchment that flows into the lakes, this did not cause significant changes to the overall water quality of the Gippsland Lakes.

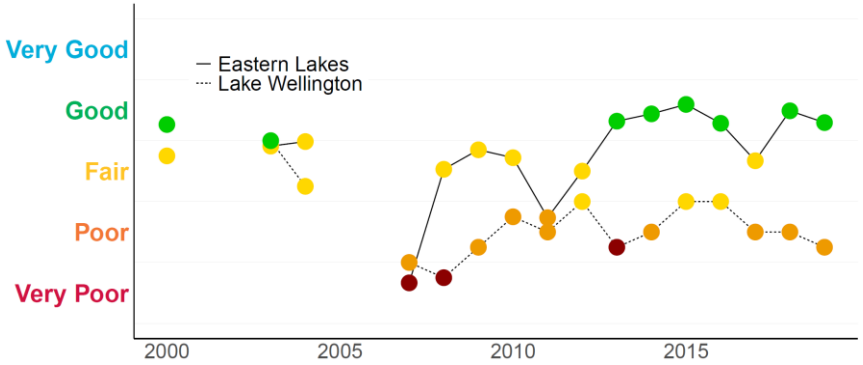

Figure 19: Historical WQI scores for Lake Wellington. Due to limited monitoring, no scores were calculated for some years between 2001 and 2006.

Further information

For further information or to request water quality data, please contact:

- DELWP (Gippsland catchments): water.data@delwp.vic.gov.au
- EPA Victoria (Port Phillip Bay, Western Port and the Gippsland Lakes): contact@epa.vic.gov.au
- Melbourne Water (Port Phillip and Western Port catchments): enquiry@melbournewater.com.au

EPA acknowledges Victoria's First Nations peoples as the Traditional Owners of the land and water on which we live and work. We pay our respect to their Elders past and present.