

Beach Report and Yarra Watch results, 2021–22

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Executive summary

Beach Report and Yarra Watch programs help the community make informed decisions about swimming and other recreational water-based activities. The programs are conducted at 36 beaches in Victoria's Port Phillip Bay and four sites along the Yarra River. Beach Report is run by the Environment Protection Authority Victoria (EPA), while Yarra Watch is a partnership program with Melbourne Water. The focus of both programs is microbial water quality during the summer period (1 December 2021 to Labour Day (14 March 2022)) when recreational water use is highest.

Beach Report and Yarra Watch remain two key community-focused programs. EPA issues daily water quality forecasts and manages weekly water monitoring of microbial levels. Forecasting and monitoring over summer continues to provide a valuable service to the public, with over 15,000 subscribers to the Beach Report SMS service and over 13,000 Twitter followers receiving forecasts daily.

This report provides results for microbial sampling and water quality forecasting accuracy for the 2021-2022 summer season.

Microbial sampling results: Sampling results are compared to the Environment Reference Standard (ERS) short-term microbial objectives to assess if they are suitable for recreation. In 2021-22, Beach Report weekly sampling results showed that 93 per cent of samples had microbial levels that met ERS short-term microbial objectives. For Yarra Watch sampling results, 63 per cent of the samples had microbial levels that met the ERS short-term microbial objectives. This was slightly higher than last year, with the percentage of samples meeting objectives for Beach Report and Yarra Watch last year, being 90 and 60 per cent respectively. Most of the sampling results that exceeded the short-term objectives were due to stormwater pollution following rainfall.

Swim advisories are alerts issued when weekly sampling results do not meet ERS short-term microbial objectives during times of dry weather. There were seven advisories issued for Beach Report this summer and two advisories for Yarra Watch.

Forecasting: Forecasts predict 'Good', 'Fair' or 'Poor' water quality based on meteorological data; primarily rainfall. During the summer season of 2021-22, there was an increase in 'Good' forecasts compared with the 2020-21 summer.

Beach Report forecasting provided appropriate advice to the community for the recreational use of Port Phillip Bay beaches 96 per cent of the time. Missed and false alarms were infrequent and caused by dry weather pollution that cannot be predicted by the Beach Report forecast risk matrix.

The Yarra Watch model forecasts precautionary 'Poor' forecasts for Launching Place, Healesville and Kew throughout the summer. These sites are always forecast as 'Poor' as they have background *E. coli* levels which do not meet the long-term ERS objective level for primary contact recreation, making them unsuitable for swimming as per the current guidelines. Signage at these sites conveys this information to the public during summer. In contrast, The Yarra Watch site at Warrandyte has background *E. coli* levels which meet the long-term ERS objective level for primary contact recreation. This makes the Warrandyte site eligible for short-term (twice daily) forecasts of 'Good', 'Fair' or 'Poor', based on the output of the Yarra Watch forecasting model. Regardless of site or forecasting, the Yarra Watch website and signage at the sites also provide healthy swimming advice to river users if they want to swim in the river.

EPA is continually working to improve Beach Report and Yarra Watch. Improving forecasting models, conducting sanitary inspections and research into the sources of pollution at Yarra Watch sites, will all ensure that EPA continues to provide valued public health information to the community.

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1. Introduction and objectives

EPA's Beach Report and Yarra Watch programs provide community-focused water quality information about swimming and other recreational water-based activities. The Beach Report program monitors 36 beaches around Port Phillip Bay. Yarra Watch monitors four sites on the Yarra River. Both programs run over the summer period when recreational water use is highest, from 1 December 2021 to Labour Day (14 March 2022).

This report details the sampling and forecasting results for the 2021-22 summer season for Beach Report and Yarra Watch. This report is supported by the *Water Monitoring and Assessment Plan* (an Environment Protection Authority Victoria (EPA) internal document), which details more specific methods for how data is collected, and how results are derived. These methods can be accessed by contacting EPA on 1300 372 842.

2. Methods

This section summarises the sampling, analysis and forecasting methods used to generate results for the 2021-22 summer period, including:

- Microbial sampling, analysis, and data interpretation (for enterococci and *E. coli*)
- comparison of enterococci and *E. coli* concentrations to:
 - short-term objectives, used to assess recreation suitability and issue Swim advisories
 - long-term objectives, used to understand trends and contribute to understanding of recreational water condition (reported separately).
- Forecasting at 36 Port Phillip Bay sites and four Yarra River sites based on:
 - the Beach Report Forecasting Matrix (BRFM)
 - the Yarra Watch forecasting model
 - online water quality alerts.

2.1. Microbial sampling, analysis, and data interpretation

Water samples were collected weekly by contracted samplers from Australian Laboratory Services (ALS). Beach water samples for Port Phillip Bay were tested for enterococci, recognised as the best indicator in measuring faecal contamination of marine recreational waters (ERS, 2021). Water samples for the Yarra River were tested for *E. coli*, an indicator of faecal contamination in freshwaters (ERS, 2021). All samples typically have a 24 h turnaround time, meaning any response to pollution detected through sampling, occurs the day after the sample was taken.

2.1.1. Comparison of enterococci and *E. coli* concentrations to short-term objectives

Sample concentrations were compared with short-term microbial objectives from the ERS. The short-term objectives provide guidance on whether microbial levels in water are suitable for recreation. More information on comparisons to short term objectives are provided in the ERS.

2.1.2. Swim advisories

Swim advisories are issued when weekly microbial sampling results in Port Phillip Bay and/or the Yarra River do not meet short-term microbial objectives during dry weather (Glossary definition, **Section 7**). This is because these microbial levels indicate an increased risk of illness (ERS, 2021). Following or during wet weather, swim advisories are not issued. Stormwater pollution, including high microbial levels, is expected in wet weather. Forecasting protects human health in wet weather by predicting a deterioration in water quality during these weather conditions.

For Beach Report, swim advisories are issued when ERS short-term objective levels are exceeded during dry weather, which may be:

- a single sample of enterococci greater than 500 orgs/100 mL.
- two consecutive samples of enterococci which are each greater than 200 orgs/100 mL, determined by re-sampling in the same week.

For Yarra Watch, swim advisories are issued when ERS short-term objective levels are exceeded, which may be:

- a single sample of *E. coli* greater than 550 orgs/100 mL
- two consecutive samples of *E. coli* which are each greater than 260 orgs/100 mL, determined by re-sampling in the same week.

2.2. Forecasting

2.2.1. Producing forecasts

Forecasts provide a prediction of short-term microbial water quality and are issued daily so that the public can make informed decisions to limit their exposure. Forecasts are issued twice daily at 10:00 am and 3:00 pm (**Table 1**).

Table 1. Daily forecasts and the time period each forecast covers.

Forecast	Time forecast is issued	Time that forecast predicts water quality
Morning forecast	10:00 am	10:00 am to 3:00 pm
Afternoon forecast	3:00 pm	3:00 pm to midnight
Next day forecast	3:00 pm	Midnight to 10:00 am the following day

There are three forecast categories, shown in **Table 2**.

Table 2. Forecast categories.

Forecast	Colour	Description	Rationale
Good	Green	Suitable for swimming	Stormwater pollution unlikely due to no recent or forecast rainfall. Microbial levels are likely to be below the short-term microbial objective.
Fair	Orange	May not be suitable for swimming	Stormwater pollution possible from recent and/or forecast rainfall. Increased likelihood that microbial levels are above short-term microbial objective,
Poor	Red	Not suitable for swimming	Stormwater pollution likely from recent and/or forecast rainfall. Significant likelihood (or sampling results have confirmed) that microbial levels are above short-term microbial objective.

Beach Report forecasts are generated using the Beach Report Forecasting Matrix (BRFM) established in the early 2000s to predict poor water quality before it occurs. The BRFM generates forecasts based on historical microbial water quality data; observed and predicted rainfall; and cloud cover conditions. Historical microbial data is sourced from EPA. Weather condition data is sourced from Bureau of Meteorology (BoM). Further details on the Beach Report Forecasting Matrix can be found in the *Water Monitoring and Assessment Plan*.

Yarra Watch forecasts are generated from a site-specific model developed by EPA in 2013, based on historical microbial water quality data and rainfall data. Historical microbial data is sourced from EPA. Rainfall data is sourced from Melbourne Water gauges.

After the BRFM or Yarra Watch model produces a forecast output of 'Good', 'Fair' or 'Poor', these are assessed against:

- microbial sampling results from that week's sample (**sub-section 2.1**)
- extreme weather patterns, either observed or forecast, such as ≥ 25 mm rainfall in the last five days (Beach Report only)
- online water quality alerts (**sub-section 2.2.2**).

The assessment could result in downgrading a forecast from 'Good' to 'Fair' or 'Poor' based on a sample result exceeding short-term objectives, significant rainfall over the last five days, or where a sewage spill is known to have occurred. These events are not included as inputs to the forecast models but are used to manually adjust the preliminary forecast.

2.2.2. Online water quality alerts

EPA issues alerts online to provide the community with information on issues affecting Port Phillip Bay and its catchment waterways. Alerts can include suspected or confirmed reports of pollution, fish deaths or algal blooms. This information may be sourced from pollution reports to EPA from the public; inter-agency communication such as a water authority reporting a sewage spill; or from EPA Environment Protection Officers' observations in the field. If an alert is describing an event occurring at a Beach Report or Yarra Watch monitoring site, the forecast for that site may be downgraded (i.e., 'Fair' or 'Poor' instead of 'Good').

While alerts may not always relate to a deterioration in microbial water quality, they represent over-arching reduced water quality condition. The downgrading of forecasts based on alerts means that the water quality forecasting captures reported events at monitoring sites in Port Phillip Bay and/or Yarra River.

2.2.3. Forecasting accuracy

Weekly microbial sampling results provide an opportunity to assess how accurate forecasting outputs were, by comparing morning forecasts with microbial results from the same day. The accuracy of Beach Report and Yarra Watch forecasts is calculated using the methods described in the *Water Monitoring and Assessment Plan* (EPA internal document). Three different metrics are used: 'appropriate advice', 'missed alarms' and 'false alarms'.

3. Results and discussion

3.1. Microbial sampling

3.1.1. Beach Report: enterococci results

Full sampling results summarised by geographical region (Melbourne; Mornington Peninsula; and Geelong and Bellarine regions) are shown in

Appendix 1 – Beach Report microbial sampling results.

Port Phillip Bay had generally good water quality this season, with 38 per cent of all sample results below the limit of detection for enterococci (less than 10 orgs/100 mL). Ninety-three per cent of samples returned results ≤ 200 orgs/100 mL, below the ERS short-term consecutive objective. These results were slightly better than last year. In the 2020-2021 season, 30 per cent of samples were below the limit of detection, and 90 percent of samples returned results < 200 orgs/100 mL.

Most results above ERS objectives did not result in a swim advisory being issued. Program logic for issuing swim advisories was as follows.

- Consecutive sample objective > 200 orgs/100 mL:
 - Dry weather results between 200 orgs/100 mL and 500 orgs/100 mL were re-sampled to determine if the ERS short-term consecutive objective was exceeded, providing the re-

sample was also dry weather. All these repeat samples returned results below 200 orgs/100 mL and consequently no swim advisories were issued for these samples.

- Single sample objective >500 org/100mL:
 - Seven samples above 500 orgs/100 mL were detected. All of these were in dry weather. EPA issued swim advisories for these samples (sub-section [Error! Reference source not found.](#)).

3.1.2. Beach Report results leading to swim advisories

For Beach Report in 2021-22, there were seven samples that exceeded ERS short-term objectives during dry weather and resulted in swim advisories. Councils were contacted about these samples and signs were placed at affected beaches. Signs and online alerts were removed when re-sampling results indicated microbial levels for swimming were meeting objectives again.

Advisory 1: On 7 December 2021, the Portarlington Harbour Beach Report site had enterococci levels of 2300 orgs/100 mL. A swim advisory was issued on the 8 December 2021, when results became available.

- Although there had been rain since this unexpected initial sampling result, as a precaution a re-sample was collected 48 hrs after rain on 10 December to check that enterococci had returned to levels below objectives. In the re-sample, enterococci levels were still elevated at 2220 orgs/100 mL in the Harbour.
- The cause of the exceedance was due to beach re-nourishment and development of the Safe Boat Harbour being undertaken by Parks Victoria at the Portarlington Beach Report site.
- After consultation with Parks Victoria and Bellarine Bayside Foreshore Committee, a decision was made to permanently move the Beach Report site to the beach parallel to Pier Street. This move was due to:
 - Continued development of the safe harbour for boats, causing possible short-term high enterococci levels within the Harbour.
 - The Safe Boat Harbour no longer being the most appropriate beach for swimming as it transitions to a commercial precinct.
 - The Harbour beach already having lower use by swimmers when compared to the beach parallel to Pier Street.
- The swim advisory for the former Beach Report site in the Harbour was changed to an ongoing alert on the EPA website to notify the public of the shift in Beach Report site and the potential water quality risk at the Safe Harbour beach.
- To assess the public health risk from water within the Harbour, EPA worked with Parks Victoria to continue sampling the Harbour this season (Appendix A). Water quality has continued to fluctuate due to ongoing construction at the site. Parks Victoria have placed signs at the site which advise the public not to swim due to construction.

Advisory 2, 3 and 4: On 21 December 2021, Rye, Rosebud, and Sorrento beaches recorded enterococci results of 880 orgs/100 mL, 730 orgs/100 mL and 620 orgs/100 mL respectively. A water quality alert issuing swim advisories for all three beaches was posted on the EPA website when results became available (on 22 December).

- The swim advisories were removed after re-sample results collected on 22 December 2021 were 103 orgs/100 mL, 27 orgs/100 mL and 10 orgs/100mL, respectively.
- The cause of the exceedances at these sites could not be confirmed. Sources of high microbial levels may have been:

- Stormwater runoff, there was a small amount of localised rain in nearby areas on 20 December (as indicated by Melbourne Water rain gauges in Arthurs Seat (4.8mm) and Devils Bend Reservoir (4mm)).
- High tide washing seaweed and debris into the shallows at each beach. These conditions were observed by samplers at Sorrento, Rosebud, and Rye during sampling.
- Elevated microbial levels have been associated with seagrass and associated birdlife in past summers. Decomposing seagrass can attract bird life, with birds depositing faeces into the seagrass, which can then be re-suspended in the water by tides.
- Choppy sea conditions, observed by samplers, causing re-suspension of sediment containing bacteria.

Advisory 5 and 6: The Dell recorded two exceedances this summer, resulting in two swim advisories on 8 December and 19 January, respectively.

- On 7 December 2021, The Dell recorded a sampling result of 680 orgs/100 mL. The swim advisory was removed on 9 December after a re-sample from 8 December recorded results of 34 orgs/100 mL (<200 org/100 mL).
- On 18 January 2022, The Dell recorded a sampling result of 750 orgs/100 mL. The swim advisory was removed on 20 January, after a re-sample result from 19 January was <10 orgs/100 mL (<200 org/100 mL).
- The cause of the exceedances on both these occasions could not be confirmed, but after a site visit, it was determined that it was likely due to substantial amounts of decomposing seaweed and associated birdlife. Elevated microbial levels have been associated with seagrass and associated birdlife in past summers. Decomposing seagrass can attract bird life, with birds depositing faeces into the seagrass, which can then be re-suspended in the water by tides.

Advisory 7: On 1 February 2022, Beaumaris Beach recorded sampling results of 1000 orgs/100 mL, causing a swim advisory to be issued when results became available on 2 February.

- The swim advisory was removed when the re-sample result on 2 February was 17 orgs/100mL (<200 org/ mL).
- The cause of the exceedance could not be confirmed. Possible sources of high microbial levels may have been:
 - A large rainfall event which occurred 4 days prior. On 29 January the BOM rainfall gauge for Melbourne (Olympic Park) recorded 38.6mm of rainfall. This rainfall event may have contributed to the elevated levels of enterococci observed at Beaumaris. This is supported by the nearby beaches of Hampton, Mentone, Elwood and St Kilda, returning elevated results of 490, 350, 320 and 420 orgs/100ml on the same day. However only Beaumaris met the criteria for a single sample swim advisory. In this case, enterococci levels may have stayed higher for longer than the 48 hours EPA advises that water quality can be impacted by stormwater pollution.
 - Large amounts of seaweed, debris and rubbish in the water were also observed by samplers during routine sampling. This may have contributed to the high results.

3.1.3. Yarra Watch: *E. Coli* results

Full sampling results are shown in

Appendix 2 – Yarra Watch microbial sampling results. Sixty-three per cent of samples (35 out of 56) returned results ≤260 orgs/100 mL, below the ERS short-term consecutive objective.

Most results above ERS objectives did not result in a swim advisory being issued:

- Consecutive sample objective >260 orgs/100 mL:
 - Dry weather results between 260 orgs/100 mL and 550 orgs/100 mL were re-sampled to determine if the ERS short-term consecutive objective was exceeded, providing the re-sample was also dry weather. Some samples did not return results below 260 orgs/100mL. Swim advisories were issued for these samples.
- Single sample objective >550 orgs/100mL:
 - Nine samples above 550 orgs/100 mL were detected. All were during wet weather so no swim advisory was issued.

3.1.4. Yarra Watch results leading to swim advisories

This season, multiple samples exceeded short-term consecutive objectives during dry weather (two consecutive samples greater than 260 orgs/100 mL). All samples were for Launching Place, which is always forecast as 'Poor' throughout the season, due to having background *E. coli* levels which are above the long-term guidelines for primary contact recreation, as outlined in the ERS. This resulted in two swim advisories for Launching Place this season.

Advisory 1: On 15 December 2021, Launching Place recorded a dry weather sampling result of 280 orgs/100 mL.

- The re-sample result collected on 16 December was still elevated, at 340 orgs/100 mL, causing a swim advisory to be issued when results were received on 17 December.
- The swim advisory was removed on 18 December, when the re-sample result from 17 December was 190 orgs/100 mL, below the >260 org/100 mL objective.

Advisory 2: On 22 December 2021, Launching Place recorded a dry weather sampling result of 420 orgs/100 mL.

- The re-sample result on 23 December was still elevated, at 290 orgs/100 mL, causing a swim advisory to be issued when results were received on 24 December.
- On 30 December, *E. coli* levels at Launching Place were still elevated at 400 orgs/100 mL.
- The swim advisory was extended until sampling on 5 January showed that *E. coli* levels at Launching Place had returned to below acceptable limits.
- Background *E. coli* levels at Launching Place are similar to the consecutive sample objective of <260 org/100 mL. Exceedances of the 260 orgs/100 mL objective this summer have not been significantly higher than this.
- The cause of weekly exceedances is difficult to determine, however assessment of Launching Place's long-term microbial water quality shows that elevated background levels of *E. coli* are part of its long-term water quality history. Exceedances this summer may have been a result of variable dry weather background levels due to non-point sources of dry weather pollution (e.g., agricultural run-off), or associated with rain observed near sampling times.
- No sample breached the single sample objective for *E. coli* in dry weather this season, which suggests that the high *E. coli* levels observed at Launching Place were not the result of single, one-off pollution events. This was supported by desktop investigations and:
 - Discussions with Yarra Valley Water that confirmed there were no known pollution events or sewage spills near Launching Place for the period of December.

- Discussions with Yarra Ranges Council that confirmed there were no known construction events, or changes to the site which may have caused the elevated results.
- Investigations of dry weather sources of pollution at Launching Place are currently on-going as part of a project being conducted in partnership with Melbourne Water and Monash University.

3.2. Forecasting

3.2.1. Beach Report forecasting results

Table 3 shows the breakdown of morning Beach Report forecasts for each month of the season by forecast category. As a comparison, 2020-2021 values are given in brackets. Each summer, forecasts are made over the same period from 1 December to Labour Day (second Monday in March). The difference in total number of forecasts issued each summer is due to the date that Labour Day falls upon in any particular year.

Overall, the 2021-2022 summer showed more 'Good' forecasts, and fewer 'Fair' and 'Poor' forecasts when compared to the 2020-2021 season. This was despite there being slightly more rainfall in the Melbourne and Geelong regions this season, when compared to last.

Table 3. Number of forecasts issued for 2021-2022 summer period by month and category. In brackets, number of forecasts for the 2020-21 summer period.

Month	Forecast classification		
	'Good'	'Fair'	'Poor'
December	864 (714)	177 (294)	75 (108)
January	608 (695)	348 (173)	160 (248)
February	889 (748)	117 (214)	2 (46)
March	258 (264)	152 (24)	94 (0)
% of all forecasts	70% (62%)	21% (24%)	9% (14%)

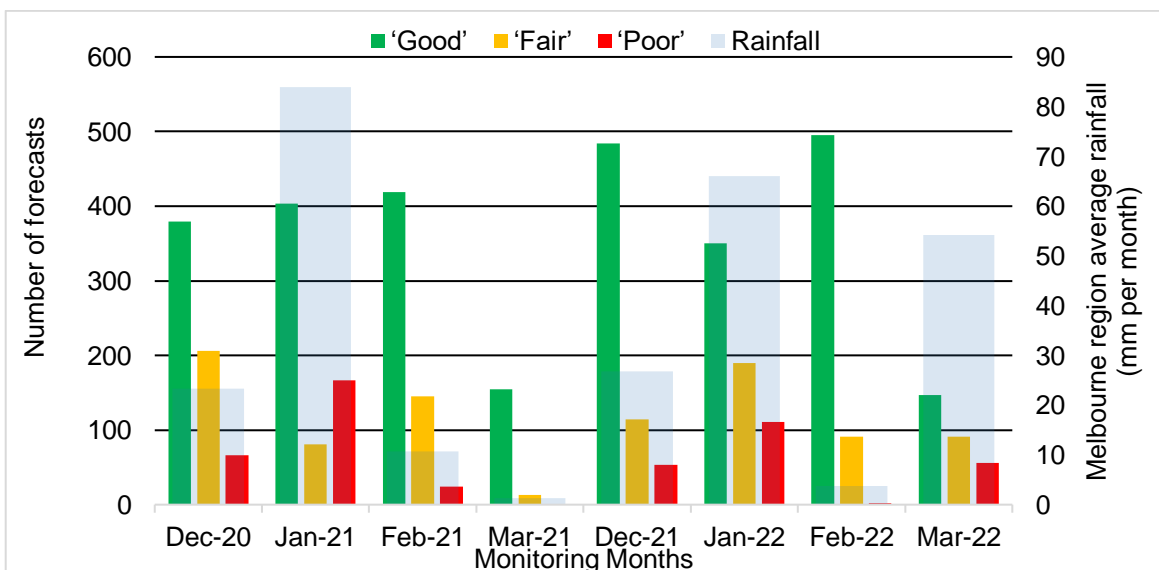


Figure 1. Rainfall from BoM rain gauges compared to forecasts at Melbourne region beaches between 1 December and Labour Day, 2020-2021 to 2021-2022 summers. Note: Rainfall value is an average of total monthly rainfall at Melbourne (Olympic Park), Moorabbin and Laverton gauges. These gauges are used to cover the Melbourne region

beaches in the BRFM., 2 and 3 show rainfall for each Beach Report gauge comparative to forecasts, comparing the 2020-21 summer and 2021-22 summer.

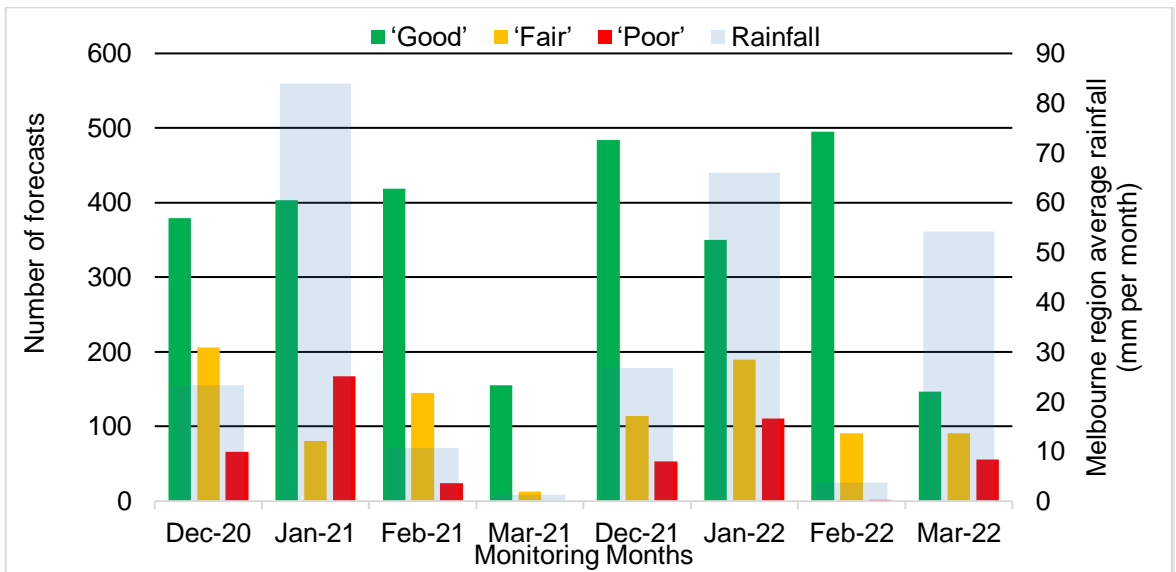


Figure 1. Rainfall from BoM rain gauges compared to forecasts at Melbourne region beaches between 1 December and Labour Day, 2020-2021 to 2021-2022 summers. Note: Rainfall value is an average of total monthly rainfall at Melbourne (Olympic Park), Moorabbin and Laverton gauges. These gauges are used to cover the Melbourne region beaches in the BRFM.

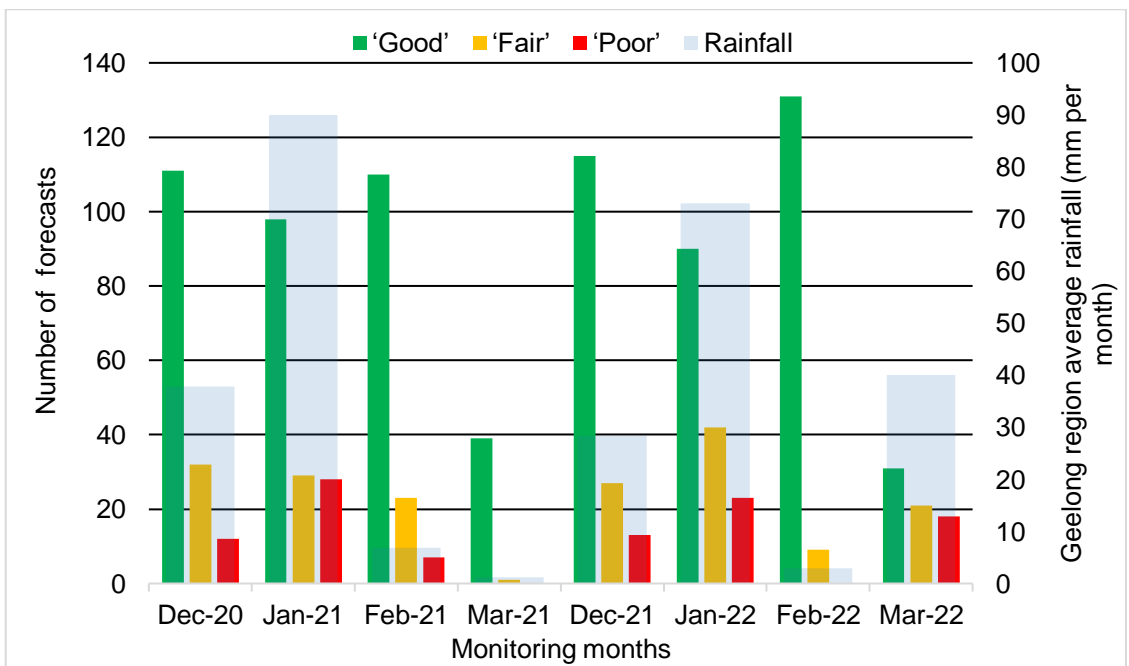


Figure 2. Rainfall from BoM rain gauges compared to forecasts at Geelong region beaches between 1 December and Labour Day, 2020-2021 to 2021-2022 summers. Note: Rainfall value is an average of total monthly rainfall at Avalon and Geelong Racecourse gauges. These gauges both cover Geelong region beaches in the BRFM.

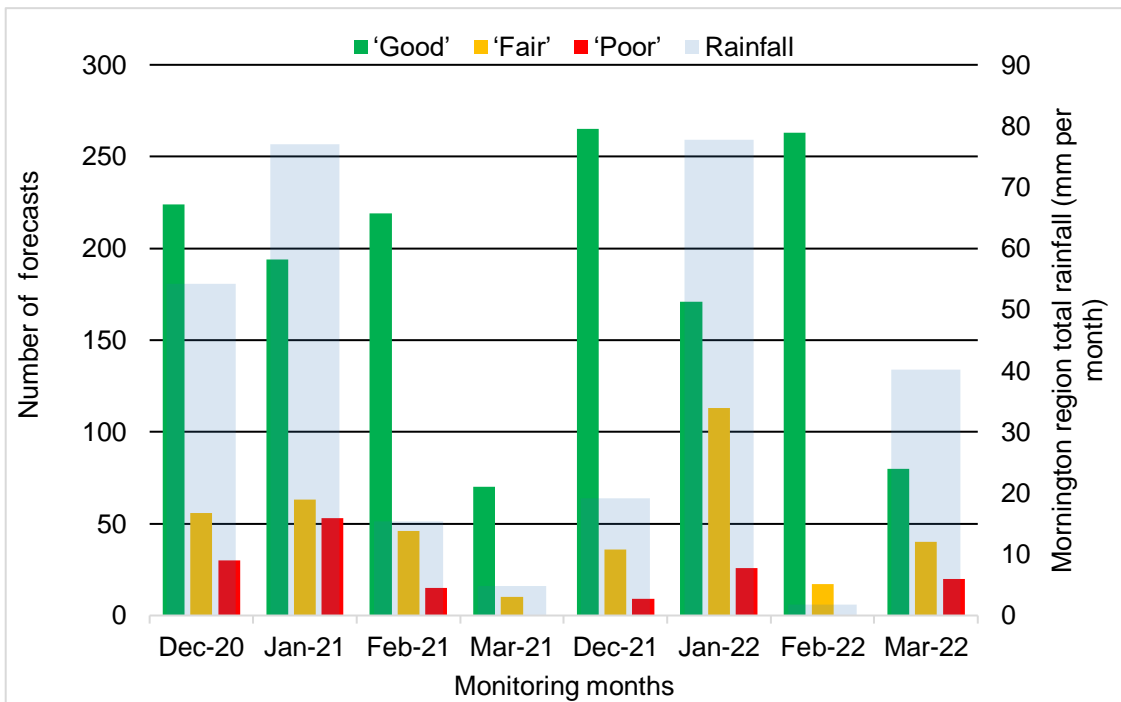


Figure 3. Rainfall from Cerberus BoM rain gauge compared to forecasts at Mornington region beaches between 1 December and Labour Day, 2020-2021 to 2021-2022 summers.

In total, the Melbourne and Geelong regions received slightly more rainfall this season when compared to last, while the Mornington region received slightly less. Similar to last year, most of the rain this summer fell in January, and all regions experienced several large rain events during this month. March also had a high rainfall total this year, which can be attributed to a large rainfall event occurring early in the month, and there being a later end to the Beach Report season when compared to last year (Labour Day fell on 6 March in 2021, and 14 March 2022).

This pattern of rainfall is reflected in the proportion of 'Good', 'Fair' and 'Poor' forecasts this year - the proportion of Good forecasts was lower in January and March, when compared to December and February, across all three regions.

Other 'Fair' or 'Poor' forecasts this season were related to incidents that resulted in the manual change of forecast outputs. They are discussed in more detail in EPA water quality alerts (**sub-section 3.2.5**).

3.2.2. Beach Report forecasting accuracy

Accuracy metrics (comparing sample results to forecasts) for Beach Report are shown in

Table 4. Appendix 3 – Beach Report forecast accuracy results shows the full results set.

Table 4. Forecast accuracy metrics for 2021-22 summer period, Beach Report.

Metric	Result
Appropriate advice	Appropriate advice was provided by 96 per cent of Beach Report forecasts. Of the 487 forecasts, 469 forecasts gave appropriate advice to protect human health. This means if microbial water quality was good, Beach Report issued a 'Good' or 'Fair' forecast. If microbial water quality was poor, Beach Report issued a 'Poor' or 'Fair'
Missed alarms	Missed alarms accounted for three per cent of all forecasts. This means they were forecast as 'Good' when the sampled water quality was 'Poor'.
False alarms	False alarms accounted for one per cent of all forecasts. This means they were forecast as 'Poor' when the sampled water quality was 'Good'.

The BRFM generally provided appropriate advice to the community during times of good water quality. Missed and false alarms were infrequent.

To put the ‘Appropriate advice’ and ‘Missed alarms’ into context for the 2021-2022 summer:

- Dry weather events cannot be predicted by the BRFM. For example, microbial water quality elevated by pollution incidents not related to rain, or due to sediment re-suspension caused by rough sea conditions cannot be predicted.
- There were only thirteen ‘Missed alarms’ in the 2021-22 summer. This means most ‘Poor’ sampling events were correctly forecast to protect human health.

3.2.3. Yarra Watch forecasting results

Table 5 shows the breakdown of morning Yarra Watch forecasts for each month this season by forecast category: As a comparison, 2020-2021 values are given in brackets. Please note that the Kew, Healesville and Launching Place sites only received precautionary ‘Poor’ forecasts this season. This is reflected in the high numbers of ‘Poor’ forecasts in the table below.

Table 5. Number of forecasts issued for 2021-2022 by month and category for Yarra Watch.

Month	Forecast classification		
	Good	Fair	Poor
December	25 (16)	3 (5)	96 (103)
January	16 (17)	8 (2)	100 (105)
February	24 (20)	4 (1)	84 (91)
March	8 (8)	3 (0)	45 (24)
% of all forecasts	18% (16%)	4% (2%)	78% (82%)

Kew, Healesville and Launching Place can only receive precautionary ‘Poor’ forecasts all summer. This is due to the use of updated ERS short-term- objectives in the Yarra Watch forecast model. The short-term objective used in the forecasting model is a lower *E. coli* value than previous years (from 500 orgs/100 mL previously to 260 orgs/100 mL).

A site is forecast as ‘Poor’ if there is a greater than 20 per cent probability that the 260 orgs/100 mL objective will be exceeded. Background *E. coli* levels in some sections of the Yarra River are similar to the updated objective level. This means there is nearly always a greater than 20 per cent probability that *E. coli* levels will be >260 orgs/100 mL.

EPA has worked with local council and Parks Victoria (who are responsible for land management at Yarra Watch sites) to have signs placed at recreational sites to advise recreational users of the potential for poor water quality.

Warrandyte was allocated ‘Good’ forecasts during dry weather and was forecast as ‘Fair’ or ‘Poor’ when there was rain. For summer 2021-2022, Warrandyte received ‘Good’ forecasts 70 per cent of the time and ‘Fair’ forecasts 17 per cent of the time.

3.2.4. Forecast accuracy for Yarra Watch

Accuracy metrics (comparing sample results to forecasts) for Yarra Watch are displayed in **Table 6**.

Appendix 4 – Yarra Watch forecast accuracy results shows the calculations.

Table 6. Forecast accuracy metrics for Yarra Watch, 2021-2022.

Metric	Result
Appropriate advice	Appropriate advice was provided in 57 per cent of Yarra Watch forecasts (32 out of 56).
Missed alarms	There were two missed alarms (i.e., 'Poor' water quality forecast as 'Good').
False alarms	False alarms accounted for 43 per cent of all forecasts. (i.e., 'Good' water quality forecast as 'Poor').

Based on the accuracy measures (**Table 6**), the model is conservative for protecting health. Most Yarra Watch sites had 'Poor' forecasts all summer. While Yarra Watch forecasting was precautionary, weekly results showed that microbial water quality could be suitable for swimming during dry weather at some sites.

EPA provides advice for healthy swimming on its website and signs at Kew, Healesville, and Launching Place (and other sites their water quality represents.), stating to:

- Avoid swimming near stormwater drains
- Avoid swimming for 48 hours after rain
- Try not to swallow water during recreation
- Cover cuts and scratches with waterproof bandages
- Wash your skin with soap after touching the water and shower after swimming

EPA is working with Melbourne Water and Monash University to improve Yarra Watch forecast models by better understanding health risk from swimming and determining if site-specific objectives can be developed for the Yarra.

3.2.5. Online water quality alerts in 2021-22 summer

Most alerts reported to EPA website were not for the Yarra River or Port Phillip Bay beaches, rather, they were for smaller waterways in the catchment. For this reason, alerts did not always affect forecasting.

All alerts for the summer season are shown in **Appendix 5** – Online water quality alerts for 2021-22 summer

There were four pollution alerts that affected beaches in Port Phillip Bay.

- One alert was related to dredging activities at the mouth of Patterson River.
 - Parks Victoria undertakes dredging to remove hazards and maintain channels for safe navigation.
 - This season, the mouth of Patterson River was targeted for dredging.
 - As a precaution, any 'Good' forecasts for Carrum beach were changed to 'Fair' for the duration of the dredging. The forecasts were changed to encourage recreational users to avoid contact with discoloured water. Sampling results after dredging at this site met short-term objectives for microbial water quality.
 - When the dredging was completed, alerts were removed and forecasts resumed to 'Good', 'Fair' or 'Poor'.

Three algal blooms occurred in Port Phillip Bay.

- On 1 December 2021, an algal bloom alert was issued for Sandringham Beach. This bloom was reported by a member of the public.

- As confirmed by laboratory analysis, *Noctiluca scintillans* dominated a sample taken at the beach (near Sandringham Yacht Club) on 30 November 2021. Dead Jellyfish were also reported, but this species is not known to cause loss of aquatic life.
- When the algal bloom was confirmed, it was handed over to the lead agency for algal blooms, Department of Environment, Land, Water and Planning (DELWP).
- This bloom only had a short-term effect on forecasting, with forecasts downgraded to 'Fair' as a precautionary measure. The alert was removed after it was confirmed that the bloom had dispersed.
- On 17 December 2021, an algal bloom alert was issued for St Kilda Beach. This bloom was detected via pollution reports from the community, and EPA staff.
 - The bloom was identified by laboratory analysis as a *Noctiluca scintillans* species. The algal bloom was handed over to the lead agency for algal blooms, Department of Environment, Land, Water and Planning (DELWP).
 - This bloom only had a short-term effect on forecasting, with forecasts downgraded to 'Fair' as a precautionary measure. The alert was removed after it was confirmed that the bloom had dispersed.
- On 9 January 2022, an algal bloom alert was issued for water near Beaumaris Yacht Club. This bloom was detected via pollution reports from the community, and EPA staff.
 - The bloom was identified as a *Noctiluca* species. The algal bloom was handed over to the lead agency for algal blooms, Department of Environment, Land, Water and Planning (DELWP).
 - This bloom only had a short-term effect on forecasting, with forecasts downgraded to 'Fair' as a precautionary measure. The alert was removed after it was confirmed that the bloom had dispersed.

There was one water quality alert for the Yarra River, related to the 'Summer Fresh' Environmental Water Release being undertaken by Melbourne Water (**Appendix 5** – Online water quality alerts for 2021-22 summer). This alert did not affect forecasting, as forecasts were already 'Poor' or 'Fair'.

4. Conclusions

This report summarises the forecasting and sampling results for Beach Report and Yarra Watch in the 2021-2022 summer season.

Most of the sampling results this summer were below the ERS short-term microbial water quality objectives, which means that water quality was suitable for recreation. Beaches remain the safest place to swim in the Port Phillip Bay catchment. Warrandyte remained the safest place to swim on the Yarra River, with good forecasts issued 70% of the time. Background *E. coli* levels at Launching place were close to ERS objectives, meaning samples at this site frequently came close to, or exceeded, short-term objectives for microbial water quality. For both Beach Report and Yarra Watch sites, high microbial levels were mostly associated with rainfall, with nine swim advisories issued for dry weather pollution during the summer (seven for Beach Report and two for Yarra Watch). Most pollution alerts did not affect forecasting over the summer, however there were dredging operations, and three algal blooms that resulted in downgrading of beach forecasts 4 times. The Yarra Watch model provided precautionary 'Poor' forecasts for Launching Place, Healesville, and Kew throughout the summer, based on long-term water quality standards outlined in the ERS. This means that based on the last 5 years of data, in general, water quality at these sites is deemed too poor to be suitable for primary contact recreation. This does not mean that water quality is always unsuitable for primary contact recreation at these sites, and weekly results showed that Healesville and Kew did have microbial water quality which met short-term objectives for primary contact on some occasions this summer. This meant that the Yarra Watch program was conservative for protecting public health.

Slightly more 'Good' forecasts were issued this summer compared to last summer. Furthermore, for both Beach Report and Yarra Watch, a higher percentage of samples met objectives this year when compared to last, and there were more samples this year which were below the detection limit for bacterial contamination. Forecast accuracy for the program this year was similar to last, with forecast data showing that Beach Report forecasting provided appropriate advice 96 per cent of the time. Missed alarms and false alarms were infrequent and caused by dry weather pollution that cannot be predicted by the BFRM.

Beach Report and Yarra Watch remain two key community-focused programs for EPA. Forecasting and sampling over the summer period continues to provide a valuable service to the public, with over 15,000 subscribers to the Beach Report SMS service and over 13,000 Twitter followers receiving forecasts daily. Improvements to, and continuation of the programs will ensure water quality advice remains available to protect public health over peak use times during the summer period.

EPA is continually working to improve Beach Report and Yarra Watch. EPA is working with Melbourne Water and Monash University to improve Yarra Watch forecast models by better understanding health risk from swimming and determining if site-specific objectives can be developed. Additionally, EPA will continue to work with partner agencies and organisations to ensure widespread communication of forecasting and swim advisories.

References

ERS (2021) Environmental Reference Standard,
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Historical Beach Report data

<https://discover.data.vic.gov.au/dataset/beach-report-enterococci-data>

Historical Yarra Watch data

<https://discover.data.vic.gov.au/dataset/yarra-watch-e-coli-data>

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Figure 2. Rainfall from BoM rain gauges compared to forecasts at Geelong region beaches between 1 December and Labour Day, 2021-21 to 2020-22 summers. Note: Rainfall value is an average of total monthly rainfall at Avalon and Geelong Racecourse gauges. These gauges both cover Geelong region beaches in BRFM.....

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Figure 3. Rainfall from Cerberus BoM rain gauge compared to forecasts at Mornington region beaches between 1 December and Labour Day, 2021-21 to 2020-22 summers.....

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6. Acronyms and abbreviations

ALS	Australian Laboratory Services
BRFM	Beach Report Forecasting Matrix
EPA	Environment Protection Authority Victoria
orgs/100 mL	Organisms per 100 mL
ERS	Environment Reference Standard, gazetted in 2021

7. Glossary

Dry weather (Beach Report)	≤1 mm rain at the specific gauge for a beach site in the 48 hours before sampling. All other times are considered wet weather .
Dry weather (Yarra Watch)	0 mm at the relevant gauge for a Yarra River site in the 48 hours before sampling. Any rainfall is considered wet weather .
Primary contact recreation	An activity (such as swimming) in which the whole human body or face and trunk are frequently immersed, or the face is frequently wet by spray, and where it is likely that some water will be swallowed or inhaled, or come into contact with ears, nasal passages, mucous membranes or cuts in the skin.
Secondary contact recreation	An activity (such as boating, fishing or wading) where the human limbs are regularly wet and in which greater contact (including swallowing water) is unusual, and includes occasional and inadvertent immersion through slipping or being swept into the water by a wave.

Appendix 1 – Beach Report microbial sampling results

Greyed out cells indicate samples were not taken at that site. A lower number of sampling results for a single week indicates the water was unsafe for sampling (for example due to rough tide).

Werribee South is sampled alongside Geelong and Bellarine due to being on the western arm of Port Phillip Bay.

Table 7. Enterococci sampling results for 2021-2022 summer, Beach Report, Mornington Peninsula region.

Weekly microbial sampling results (orgs/100 mL)															Number of samples below or over the ERS short-term objectives		
Beach	7/12/2021	14/12/2021	21/12/2021	29/12/2021	4/01/2022	11/01/2022	18/01/2022	24/01/2022	1/02/2022	8/02/2022	15/02/2022	22/02/2022	1/03/2022	8/03/2022	≤200 orgs /100 mL	>200 orgs /100 mL and ≤500 orgs/100 mL	>500 orgs /100 mL
Safety Beach	=63	=10	=10	<10	=10	=10	<10	<10	=63	<10	<10	<10	<10	=31	14	0	0
Blairgowrie	=20	<10	=130	<10	=31	=10	=120	<10	=41	<10	<10	<10	=20		13	0	0
Sorrento	=10	<10	=620	=10	=31	=10	=280	=31	=10	=20	<10	<10	=130	=10	12	1	1
Portsea	=20	<10	=10	<10	=150	<10	<10	=20	<10	=10	<10	<10	<10		13	0	0
Rye	=52	=20	=880	<10	=230	<10	=20	=10	<10	=10	=20	=10	=20	=31	12	1	1
Dromana	=63	=10	=74	<10	=74	=10	<10	=41	=10	<10	<10	<10	<10	<10	14	0	0
Canadian Bay	=85	=41	=96	<10	<10	=52	<10	=52	=63	=31	=220	<10	=10	<10	13	1	0
Mornington	=96	<10	=31	=20	<10	=10	=20	=10	=74	<10	<10	<10	<10	=30	14	0	0
Rosebud	=41	<10	=730	<10	<10	=10	<10	<10	=120	=20	<10	<10	<10	=10	13	0	1
Mount Martha	=31	<10	<10	<10	=10	<10	<10	<10	<10	<10	=10	<10	<10	<10	14	0	0
Total:															132	3	3

Table 8. Enterococci sampling results for 2021-2022 summer, Beach Report, Melbourne region.

Beach	Weekly microbial sampling results (orgs/100 mL)														Number of samples below or over the ERS short-term objectives		
	7/12/2021	14/12/2021	21/12/2021	29/12/2021	4/01/2022	11/01/2022	18/01/2022	24/01/2022	1/02/2022	8/02/2022	15/02/2022	22/02/2022	1/03/2022	8/03/2022	≤200 orgs /100 mL	>200 orgs /100 mL and ≤500 orgs/100 mL	>500 orgs /100 mL
Port Melbourne	=52	<10	=10	=10	<10	=340	=63	=10	=130	<10	=10	=20	=20	=63	13	1	0
Hampton	<10	<10	=20	<10	<10	=10	<10	=260	=490	<10	=260	<10	=10	=20	11	3	0
Half Moon Bay	=10	=20	=31	<10	<10	=41	=120	=10	=170	=20	<10	<10	<10	=96	14	0	0
Mentone	=20	=20	=130	=41	=31	=20	=74	<10	=350	=20	<10	=52	<10	=63	13	1	0
Seaford	=290	=20	=74	=10	=10	=150	<10	=20	=110	<10	<10	<10	=340	<10	12	2	0
Frankston Life Saving Club	=450	<10	=98	=31	=31	=74	=20	=290	=290	=31	<10	<10	<10	<10	11	3	0
Frankston Coast Guard	=150	<10	=41	=41	<10	=52	=41	=97	=74	=10	<10	=20	=20	=20	14	0	0
Mordialloc	<10	<10	=20	=10	=10	=41	=31	=20	=110	=10	<10	=20	<10	=160	14	0	0
Sandringham	=20	<10	<10	<10	=10	=10	=10	=52	=98	=20	<10	<10	=41	=20	14	0	0
Elwood	=320	<10	=31	<10	=30	=63	=30	=85	=320	<10	<10	=10	<10	=160	12	2	0
St Kilda	=180	=10	=63	<10	=130	=63	=150	<10	=420	=52	=220	=10	=200	=110	11	3	0
Sandridge	=170	=98	=31	=20	=52	=20	=31	=52	=20	<10	<10	<10	=41	=31	14	0	0
Williamstown	=63	<10	=31	<10	<10	=20	=10	=10	=120	<10	=41	<10	<10	=10	14	0	0
Altona	=300	<10	=52	<10	=10	=10	=10	=10	=150	<10	<10	<10	<10	<10	13	1	0
Werribee South	=10	=10	<10	=10	=10	=97	=240	=220	=500	=10	=31	=41	=41	=300	10	4	0
Beaumaris	=210	<10	<10	<10	<10	<10	=31	<10	=1000	<10	=30	=20	<10	=41	12	1	1
Carrum	=10	=210	=20	=10	=41	=31	=10	=110	=41	=20	<10	<10	<10	=10	14	0	0
Aspendale	<10	<10	<10	<10	=95	=10	<10	=20	=200	<10	=110	=10	=86	<10	14	0	0
South Melbourne	=140	<10	=10	<10	=10	=10	=30	=20	<10	<10	=20	<10	=10	<10	14	0	0
Black Rock	=10	=10	<10	<10	<10	=10	=20	<10	=110	=10	=10	<10	<10	<10	14	0	0
															258	21	1

Table 9. Enterococci sampling results for 2021-2022 summer, Beach Report, Geelong and Bellarine region.

Beach	Weekly microbial sampling results (orgs/100 mL)														Number of samples below or over the ERS short-term objectives		
	7/12/2021	14/12/2021	21/12/2021	29/12/2021	4/01/2022	11/01/2022	18/01/2022	24/01/2022	1/02/2022	8/02/2022	15/02/2022	22/02/2022	1/03/2022	7/03/2022	≤200 orgs /100 mL	>200 orgs /100 mL and ≤500 orgs/100 mL	>500 orgs /100 mL
The Dell	=680	=10	=30	=41	=10	=74	=750	=30	=62	<10	<10	=10	=41	=41	12	0	2
Eastern	=41	=20	=41	<10	<10	=190	=10	=41	=86	<10	=31	=10	<10	=63	14	0	0
Portarlington (new site)	*	=10	=20	=52	=20	=63	=20	=10	<10	<10	=10	<10	<10	<10	14	0	0
St Leonards	=31	<10	=97	<10	<10	=180	=160	<10	=10	<10	=10	=10	<10	<10	14	0	0
Santa Casa	=84	<10	<10	<10	<10	=10	<10	<10	=51	<10	<10	<10	<10	<10	14	0	0
Total:															67	0	2

*Beach Report issued a swim advisory for a high result (2300 orgs/100 mL) at the old Beach Report site in the safe harbour in the first week of summer. This location was still the Beach Report site at the time, but was replaced in the second week of the summer.

Table 9a. Enterococci sampling results for 2021-2022 summer, Beach Report, Historical Site at Portarlington Harbour. This site was replaced with the new site in the second week of summer.

Beach	Weekly microbial sampling results (orgs/100 mL)														7/03/2022
	7/12/2021	14/12/2021	21/12/2021	29/12/2021	4/01/2022	11/01/2022	18/01/2022	24/01/2022	1/02/2022	8/02/2022	15/02/2022	22/02/2022	1/03/2022		
Portarlington Harbour (old site)	=2300	=3900	=20	=52	=20	=260	=150	=10	<10	10	10	63	41	1800	

Appendix 2 – Yarra Watch microbial sampling results

Table 10. *E. coli* sampling results for 2021-2022 summer, Yarra Watch.

Weekly microbial sampling results (orgs/100 mL)															Number of samples below or over the SEPP (Waters) short-term objectives		
Site	1/12/2021	8/12/2021	15/12/2021	22/12/2021	30/12/2021	5/01/2022	12/01/2022	19/01/2022	27/01/2022	2/02/2022	9/02/2022	16/02/2022	23/02/2022	2/03/2022	≤260 orgs /100 mL	>260 orgs /100 mL and ≤550 orgs/100 mL	>550 orgs /100 mL
Kew	98	170	41	130	63	140	180	41	910	320	130	72	74	4600	11	1	2
Warrandyte	30	340	130	20	<10	31	74	63	1100	2300	110	86	230	180	11	1	2
Healesville	160	2100	190	170	160	52	220	130	640	220	220	130	74	2100	11	0	3
Launching Place	680	350	280	420	400	110	170	320	290	370	350	430	300	770	2	10	2
Total:															35	12	9

Appendix 3 – Beach Report forecast accuracy results

Appropriate advice

Light blue highlighted cells in **Table 11**. Enterococci sampling data with corresponding forecast, Appropriate advice highlighted. indicate appropriate advice (i.e., when actual water quality was 'Good', EPA issued either 'Good' or 'Fair' forecasts; and when water quality was 'Poor', EPA issued either 'Poor' or 'Fair' forecasts).

Table 11. Enterococci sampling data with corresponding forecast, Appropriate advice highlighted.

		Weekly enterococci sample result (orgs/100 mL)	
		≤200 orgs/100 mL (Good)	>200 orgs/100 mL (Poor)
Tuesday morning forecast			
	Good	312	13
	Fair	140	17
	Poor	5	0
	Total	457	30

Missed alarms

The light blue highlighted cell in 2 indicates missed alarms forecasts – when the forecast was 'Good', but actual water quality was found to be 'Poor'.

Table 12. Enterococci sampling data with corresponding forecast, missed alarms highlighted.

		Weekly enterococci sample result (orgs/100 mL)	
		≤200 orgs/100 mL (Good)	>200 orgs/100 mL (Poor)
Tuesday morning forecast			
	Good	312	13
	Fair	140	17
	Poor	5	0

False alarms

The light blue highlighted cell in 3 indicates false alarms forecasts – when the forecast was 'Poor', but actual water quality was found to be 'Good'.

Table 13. Enterococci sampling data with corresponding forecast, false alarms highlighted.

		Weekly enterococci sample result (orgs/100 mL)	
		≤200 orgs/100 mL (Good)	>200 orgs/100 mL (Poor)
Tuesday morning forecast			
	Good	312	13
	Fair	140	17
	Poor	5	0

Appendix 4 – Yarra Watch forecast accuracy results

Appropriate advice

Light blue highlighted cells in 4 indicates appropriate advice – when actual water quality was ‘Good’, EPA issued either ‘Good’ or ‘Fair’ forecasts; and when water quality was ‘Poor’, EPA issued either ‘Poor’ or ‘Fair’ forecasts.

Table 14. *E. coli* sampling data with corresponding forecast, Appropriate advice highlighted.

		Weekly enterococci sample result (orgs/100 mL)	
		≤260 orgs/100 mL (Good)	>260 orgs/100 mL (Poor)
Wednesday morning forecast			
	Good	9	2
	Fair	2	0
	Poor	24	19
	Total	35	21

Missed alarms

The light blue highlighted cell in 5 indicates missed alarms forecasts – when the forecast was ‘Good’, but actual water quality was found to be ‘Poor’.

Table 15. *E. coli* sampling data with corresponding forecast, missed alarms highlighted.

		Weekly enterococci sample result (orgs/100 mL)	
		≤260 orgs/100 mL (Good)	>260 orgs/100 mL (Poor)
Wednesday morning forecast			
	Good	9	2
	Fair	2	0
	Poor	24	19

False alarms

The light blue highlighted cell in **Table 16.** *E. coli* sampling data with corresponding forecast, false alarms highlighted. indicates false alarms forecasts – when the forecast was ‘Poor’, but actual water quality was found to be ‘Good’. False alarms were the most frequent type of forecast this season.

Table 16. *E. coli* sampling data with corresponding forecast, false alarms highlighted.

		Weekly enterococci sample result (orgs/100 mL)	
		≤260 orgs/100 mL (Good)	>260 orgs/100 mL (Poor)
Wednesday morning forecast			
	Good	9	2
	Fair	2	0
	Poor	24	19

Appendix 5 – Online water quality alerts for 2021-22 summer

Table 17. Pollution alerts posted on the EPA website between 1 December 2021 and 14 March 2022.

Date	Location	Text on website
1/12/2021	Patterson River	There is planned dredging at the mouth of Patterson River for the next 4 to 8 days depending on the weather, the dredged sand will be deposited on the beach north of the river. Avoid water near the mouth of Patterson River, Carrum.
1/12/2021	Sandringham Beach	A small algal bloom is affecting Sandringham Beach south of Sandringham Yacht Club, just off Jelly Road. If the water looks murky or discoloured, people are advised to avoid contact as it may cause skin irritation. If contact does occur, wash with clean water. For more information visit www.delwp.vic.gov.au
2/12/2021	Gardener Creek	Black discoloured water was observed coming from Back Creek into Gardener Creek adjacent 20 Great Valley Road, Glen Iris. EPA officers are investigating, avoid the water until further notice.
3/12/2021	Salt Creek	Fluorescent green substance was observed in Salt Creek, Heidelberg. EPA officers are investigating, avoid the water until further notice.
3/12/2021	Moonee Ponds Creek	Orange substance was found discharging from a storm water drain into Moonee Ponds Creek near Hope St, Brunswick. EPA officers are investigating, avoid the water until further notice.
6/12/2021	Bungalook Creek	Firewater may have entered Bungalook Creek near Bayview Rise, Bayswater North. EPA Officers are investigating. Avoid contact with the water until further notice.
8/12/2021	The Dell Beach	EPA testing has confirmed unacceptable water quality at The Dell Beach, Clifton Springs. Avoid swimming until further notice by EPA.
8/12/2021	Portarlington Harbour	Parks Victoria are undertaking beach renourishment and construction works at Portarlington Harbour. This may affect water quality at Portarlington Harbour beach. Water quality at the main swimming beach West of the Harbour, may also be affected. Avoid swimming until further notice by EPA.
8/12/2021	Portarlington Beach	EPA testing has confirmed unacceptable water quality at Portarlington Beach. Avoid swimming until further notice by EPA.
11/12/2021	Barwon River	Sewer spill reported leaking into BARWON RIVER opposite 1-3 Ozone Rd BH. Barwon Water investigating and installing signage along riverbank beaches either side of BARWON RIVER advising to avoid contact. Avoid swimming until further notice by EPA.
15/12/2021	Portarlington Harbour	EPA Victoria have moved the Beach Report site at Portarlington Harbour, due to there being higher beach use outside of the harbour area. The new site is now at the main swimming beach, West of the Harbour. The new location can be viewed here: Beach Report site map . EPA advises against swimming at the old Portarlington Harbour Beach site, until further notice.
17/12/2021	Yarra River	EPA testing has confirmed unacceptable water quality at Launching Place, Yarra River. Avoid swimming until further notice by EPA, or please follow advice on signs at Launching Place.
17/12/2021	St Kilda Beach	EPA Victoria has received a report of an unconfirmed algal bloom at St Kilda Pier and south of Shakespeare Grove drain. Algal blooms can move around with tides and currents. EPA Officers are investigating. Avoid contact until further notice by EPA.
19/12/2021	Royal Park Wetlands	EPA Victoria received a report of a fluorescent green chemical spill in wetlands at Royal Park, near Oak Street, Parkville. Containment booms are in place to manage the clean-up. Avoid contact with water until further notice.

Date	Location	Text on website
22/12/2021	Rosebud, Rye and Sorrento Beaches	EPA testing has confirmed unacceptable water quality at Rosebud, Rye and Sorrento beaches in Port Phillip Bay. Avoid swimming until further notice by EPA.
22/12/2021	Tirhatuan Wetlands	EPA Victoria received a report of a discharge of milk into Tirhatuan wetlands near Wellington Rd, Rowville. EPA officers are investigating. Avoid contact with water until further notice.
24/12/2021	Yarra River	EPA testing has confirmed unacceptable water quality at Launching Place, Yarra River. Avoid swimming until further notice by EPA, or please follow advice on signs at Launching Place.
24/12/2021	Werribee River	Firewater from an industrial fire at Lock Avenue, Werribee has runoff into the Werribee River just upstream of the Princes Freeway. The firewater runoff from the site has been contained and is no longer entering the river. Avoid all contact with the water, including recreational activities such as fishing and canoeing until further notice.
9/01/2022	Beaumaris Beach	EPA has received reports of an algal bloom in the area of the Beaumaris Yacht Club, near Bodley Street, Beaumaris, The relevant authorities are not investigating. EPA advises against swimming in the area until further notice.
11/01/2022	Werribee River	Melbourne Water are currently undertaking a 'Summer Fresh' release along the Lower Werribee River from the 11th to the 13th of January. Peak flows are expected to reach 80 ML/day Slight increases in the water level are expected. Avoid contact with water until further notice.
13/01/2022	Watsons Creek	A spill of diesel from a truck accident has entered Watsons Creek, Christmas Hills. EPA and Melbourne Water are supporting the clean up. Avoid contact with water until further notice.
18/01/2022	Edgars Creek	Grey / blue coloured water, with an odour of sewage, was observed coming from a drain into Edgars Creek wetland, Reservoir.
19/01/2022	The Dell Beach	EPA testing has confirmed unacceptable water quality at The Dell beach in Port Phillip Bay. Avoid swimming until further notice by EPA.
23/01/2022	Darebin Creek	A discharge from a stormwater drain has been observed entering Darebin Creek near Bell Street bridge, Preston. EPA officers are investigating, avoid the water until further notice.
2/02/2022	Beaumaris Beach	EPA testing has confirmed unacceptable water quality at the Beaumaris Beach Report site, outside of the Beaumaris Life Saving Club. Avoid swimming until further notice by EPA Victoria.____
3/02/2022	Police Road Retarding Basin	EPA Victoria received a report of a discharge of milk into Police Road Retarding Basin near Corhanwarrbul Creek, Wellington Rd, Rowville. EPA officers are investigating. Avoid contact with water until further notice.
7/02/2022	Patterson Lakes	EPA Victoria received a report of fish deaths at Patterson Lakes near Palm Island Court. EPA officers are investigating. Melbourne Water will conduct a clean-up. Avoid contact with water and dead fish until further notice.
9/02/2022	Merri Creek	EPA Victoria have confirmed reports of a brown substance entering the Merri Creek from a stormwater drain near Booth Street, Coburg. EPA officers are investigating. Avoid contact with water until further notice.
24/02/2022	Yarra River	Melbourne Water are currently undertaking a 'Summer Fresh' release along the Birrarung (Yarra) river from the 24th of February to the 4th of March. Peak flows are expected to reach 750 MI per dday at Warrandyte. Slight increases in water level are expected.
8/03/2022	Cherry Creek	Firewater from a recent factory fire has entered Cherry Creek and potentially Cherry Lake in Altona. Fish deaths have been observed in Cherry Creek. EPA Officers are investigating. Avoid water until further notice.

Date	Location	Text on website
10/03/2022	Cherry Creek	EPA is investigating a dark substance leaking from a stormwater drain into Cherry Creek at Doherty Road, Laverton North. Avoid contact with water until further notice.