

Beach Report and Yarra Watch results 2020-2021

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Executive summary

Environment Protection Authority Victoria's (EPA) Beach Report and Yarra Watch programs provide the community with water quality forecasts and advisories for Melbourne's popular swimming spots. These 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 on the Yarra River. Beach Report is run by EPA, while Yarra Watch is a partnership program between EPA and Melbourne Water. The focus of both programs is microbial water quality during the summer period (1 December to 8 March – Labour Day).

During summer, EPA issues daily water quality forecasts and manages weekly water monitoring of microbial levels for both programs. Forecasting and monitoring provides a valuable service to the public. There are over 10,000 subscribers to the Beach Report SMS service and over 13,000 Twitter followers receiving forecasts.

Every year, EPA releases a report of microbial sampling results for the summer season and an analysis of the accuracy of water quality forecasting. This provides context and a summary of seasonal events to the community and other stakeholders. The current report, *Beach Report and Yarra Watch Results 2020-21*, provides results for EPA's microbial sampling and water quality forecasting accuracy for the 2020–21 summer season.

Microbial sampling results: EPA compares water sampling results to the State Environment Protection Policy (Waters) 2018 (SEPP (Waters)) short-term microbial objectives. This is to assess if water quality is suitable for recreation. In 2020–21, Beach Report weekly sampling results showed 91 per cent of samples had microbial levels below SEPP (Waters) short-term microbial objectives. For Yarra Watch sampling results, 66 per cent of the samples had microbial levels below the SEPP (Waters) short-term microbial objectives. Most of the sampling results that exceeded the short-term objectives were due to stormwater pollution following rainfall.

EPA issues online swim advisories for the community when weekly sampling results do not meet SEPP (Waters) short-term microbial objectives during dry weather. In 2020–21, EPA issued three advisories for Beach Report and one advisory for Yarra Watch. In each of these cases, EPA could not confirm what caused the samples to exceed SEPP (Waters) objectives.

Forecasting: Forecasts predict 'Good', 'Fair' or 'Poor' water quality based on meteorological data, primarily rainfall. During the summer season of 2020–21, there was an increase in 'Good' forecasts for Beach Report compared with the 2019–20 summer. This was mostly due to lower rainfall during the summer of 2020–21.

Sampling results from 2020–21 confirmed that EPA's Beach Report forecasting provided appropriate advice to the community about water quality in Port Phillip Bay beaches 90 per cent of the time.

Since 2019–20, the Yarra Watch model has produced 'Poor' forecasts for Launching Place, Healesville and Kew. This is a precautionary forecast due to these sites having consistently high background microbial levels. At Warrandyte, the forecast has been 'Good', 'Fair' or 'Poor'. In summer 2020–21, Warrandyte received 'Good' forecasts 62 per cent of the time and 'Fair' forecasts eight per cent of the time. When sampling results were compared to forecasts for 2020–21, the model was conservative for protecting human health. Forecasting provided appropriate advice in 52 per cent of Yarra Watch forecasts.

EPA is continually working to improve Beach Report and Yarra Watch. EPA is updating forecasting models with relevant data, as well as including information from research and site inspections. This is to make sure EPA continues to provide appropriate public health information.

1. Introduction and objectives

EPA's Beach Report and Yarra Watch programs provide water quality information to the community about swimming and other recreational water-based activities at Melbourne's most popular swimming spots. The programs monitor 36 beaches around Port Phillip Bay and four sites on the Yarra River. Both programs run over the summer period when recreational water use is highest. This year they ran from 1 December 2020 to 8 March 2021 (Labour Day).

These programs consist of:

- twice daily forecasts which are published on [EPA's website \(https://www.epa.vic.gov.au/for-community/summer-water-quality/beach-report\)](https://www.epa.vic.gov.au/for-community/summer-water-quality/beach-report) and [Twitter account \(https://twitter.com/EPA_Victoria\)](https://twitter.com/EPA_Victoria), and sent to SMS subscribers
- weekly water sampling, which informs swim advisories when water quality is poor.

This report details the sampling and forecasting results for the 2020–21 summer season. This report is supported by EPA's internal *Water Monitoring and Assessment Plan*, which outlines EPA's detailed methodology for water data collection and analysis of results. You can access these methods by contacting EPA on 1300 372 842.

2. Methods

This section summarises the sampling, analysis and forecasting methods used to generate results for the 2020–21 summer period:

- **microbial sampling, analysis, and data interpretation** (testing water samples for levels of the bacteria enterococci and *E. coli*)
- comparison of enterococci and *E. coli* concentrations to short-term objectives used to assess water for recreation suitability and issue **swim advisories**, if required
- **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

Contracted samplers from Australian Laboratory Services (ALS) collected water samples weekly. Beach water samples for Port Phillip Bay were tested for enterococci, which is recognised as a good indicator of faecal contamination (animal or human poo) in marine recreational waters. Water samples for the Yarra River were tested for *E. coli*, an indicator of faecal contamination in freshwaters (State Environment Protection Policy (Waters), 2018).

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

Sample concentrations of enterococci and *E. coli* were compared with short-term microbial objectives from the State Environment Protection Policy (Waters), 2018 (SEPP (Waters)). The short-term objectives provide guidance on whether microbial levels in water are suitable for recreation. More information on short term objectives is provided in the *Water Monitoring and Assessment Plan*. You can access this by contacting EPA on 1300 372 842.

2.1.2. Swim advisories

Swim advisories are issued when weekly microbial sampling results in Port Phillip Bay and/or the Yarra River are above the short-term microbial objectives during [dry weather](#) (see **Glossary**). This is because these microbial levels indicate an increased risk of illness (SEPP (Waters)). Following or

during rainfall, swim advisories are not issued. This is because EPA’s forecasting always assumes water quality will be poor during wet weather due to high microbial levels in stormwater. Therefore, EPA’s forecasts are always protective of human health in wet weather, which is why swim advisories don’t need to be issued.

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

- a single sample of enterococci greater than 500 organisms per 100 mL (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 SEPP (Waters) short-term objective levels are exceeded during dry weather, 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. 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 will be above the 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 will be above the short-term microbial objective. |

Beach Report forecasts are generated using the Beach Report Forecasting Matrix (BRFM), which EPA established in the early 2000s. The BRFM generates forecasts based on historical microbial water quality data; observed and predicted rainfall; and cloud cover conditions. EPA uses its own historical microbial data. Weather conditions data are sourced from Bureau of Meteorology (BoM).

EPA generates Yarra Watch forecasts from a site-specific model developed by EPA in 2013. This is based on historical microbial water quality data and rainfall data. EPA uses its own historical microbial data. Rainfall data is sourced from Melbourne Water rainfall gauges. A site is forecast as 'Poor' if there is a greater than 20 per cent probability that an *E. coli* objective will be exceeded.

EPA recently updated the Yarra Watch forecasting model. The updates ensure the model is more protective of health and is based on the most relevant microbial water quality data:

- In 2019, the more conservative short-term objectives from SEPP (Waters) were incorporated into the model, leading to the following changes:
 - The short-term objective input to the forecasting model in 2019–20 and 2020–21 was a lower *E. coli* value than previous years (from 500 orgs/100 mL previously to 260 orgs/100 mL).
 - Background *E. coli* levels around Kew, Healesville and Launching Place are similar to the updated short-term objective level. This means there was always a greater than 20 per cent probability that *E. coli* levels would be >260 orgs/100 mL for these three sites in the 2020–21 summer.
- Following the 2019–20 season, the Yarra Watch forecasting model was updated to only include the last five years of sampling data. Previously it had included sampling data since 2005. This change means the forecasts are now more reflective of recent water quality. It also means the model aligns to National Health and Medical Research Council guidelines to use a five-year dataset to represent site condition.

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

- microbial sampling results from that week's sample (**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 manually downgrading a preliminary forecast from 'Good' to 'Fair' or 'Poor'. Scenarios when this could occur include if a sample result exceeds short-term objectives, significant rainfall occurred over the last five days, or if a sewage spill has occurred.

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 pollution, fish deaths or algal blooms. This information may be sourced from pollution reports to EPA from:

- the public
- communication from another agency, such as a water authority reporting a sewage spill
- EPA Environment Protection Officers' observations.

If an alert describes an event occurring at a Beach Report or Yarra Watch monitoring site, the forecast for that site may be downgraded (for example, from 'Good' to 'Poor').

While alerts may not always relate to a deterioration in microbial water quality, they represent a general reduction in water quality. Alerts help the community make informed decisions about swimming and other recreational water-based activities.

2.2.3. Forecasting accuracy

Weekly microbial sampling results provide an opportunity to assess how accurate forecasting outputs are, 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*. You can access this by contacting EPA on 1300 372 842.

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**.

Low microbial levels were generally recorded in Port Phillip Bay for the 2020-21 season, with 30 per cent of all sample results below the limit of detection for enterococci (less than 10 orgs/100 mL). Ninety-one per cent of samples returned results ≤ 200 orgs/100 mL, below SEPP (Waters) short-term consecutive objective.

Most results above SEPP (Waters) objectives did not result in a Beach Report swim advisory being issued. This is because:

- **consecutive samples were below the objective.** Dry weather results between 200 orgs/100 mL and 500 orgs/100 mL were re-sampled to determine if the SEPP (Waters) short-term consecutive objective (greater than 200 orgs/100 mL) was exceeded, providing the re-sample was also dry weather. In all cases, these repeat samples returned results below the objective of 200 orgs/100 mL. As such, no swim advisories were issued for these samples.
- **most samples exceeding the objectives occurred during wet weather.** Twenty-one samples above the single sample objective (greater than 500 orgs/100 mL) were detected, but most were during wet weather. EPA issued swim advisories for the three samples that occurred during dry weather (**sub-section 3.1.3**).

3.1.2. Yarra Watch: *E. coli* results

Full sampling results are shown in **Appendix 2**. Sixty-six per cent of samples (37 out of 56) returned results ≤ 260 orgs/100 mL, below the SEPP (Waters) short-term consecutive objective.

Most results above SEPP (Waters) objectives did not result in a Yarra Watch swim advisory being issued. This is because:

- **consecutive samples were below the objective.** Dry weather results between 260 orgs/100 mL and 550 orgs/100 mL were re-sampled to determine if the SEPP (Waters) short-term consecutive objective (greater than 260 orgs/100 mL) was exceeded, providing the re-sample was also dry weather. In all cases, these repeat samples returned results below 260 orgs/100 mL. Therefore, no swim advisories were issued for these samples.
- **most samples exceeding the objectives occurred during wet weather.** Seven samples above the single sample objective (greater than 550 orgs/100 mL) were detected, but most

were during wet weather. EPA issued a swim advisory for the one sample that occurred during dry weather (**sub-section 3.1.3**).

3.1.3. Swim advisories

Beach Report

For Beach Report in 2020–21, there were three samples that exceeded SEPP (Waters) short-term objectives during dry weather. EPA posted online alerts about these results. EPA contacted councils about these samples and council placed signs at affected beaches to inform the community. When re-sampling results showed microbial levels had returned to safe levels for swimming, EPA removed online alerts and council removed signs. These three incidents are detailed below.

Portarlington swim advisory

On 12 January 2021, a sampling result taken at Portarlington was 820 orgs/100 mL.

- Re-sample results collected on 13 January were less than 10 orgs/100 mL (the laboratory defined- limit of detection).
- EPA could not confirm the cause of the exceedance at Portarlington. Possible sources of high microbial levels may have been:
 - sediment re-suspension from wind and waves elevating microbial levels. Strong winds may have disturbed recently dredged areas in the small harbour
 - decomposing seagrass and/or associated bird faeces in seagrass. A large amount of seagrass and birds were observed on the beach by the contracted samplers. Seagrass could potentially re-enter the water during change of tides or strong wave conditions
 - boat waste discharge. Boats discharging waste were not observed, but there is a harbour close to the sampling location.
- Samples taken outside the Portarlington harbour on 13 January 2021 were also less than 10 orgs/100 mL. EPA is investigating the suitability of the Portarlington Beach site for sampling, due to its proximity to the harbour

Mentone swim advisory

On 2 February 2021, a sampling result taken at Mentone was 1,300 orgs/100 mL.

- Re-sample results collected on 3 February were 13 orgs/100 mL.
- EPA could not confirm the cause of the exceedance at Mentone. It was most likely caused by flow from Naples Road drain, with a sample taken from the drain on 3 February 2021 returning a result of greater than 24,000 org/100mL. EPA could not determine what caused the high microbial levels in the drain. EPA is currently working with Kingston City Council and South East Water to investigate flows from this drain.

Port Melbourne swim advisory

On 23 February 2021, a sampling result taken at Port Melbourne was 720 orgs/100 mL.

- Re-sample results collected on 24 February were 27 orgs/100 mL.
- EPA could not confirm the cause of the exceedance at Port Melbourne. Possible sources of high microbial levels may have been:

- stormwater runoff. There was a small amount of rain in nearby areas, as indicated by Melbourne Water rain gauges in Burnley (0.4mm) and Spotswood (3.2mm)
- sediment re-suspension from rough sea conditions observed by samplers.
- The sampling data at Port Melbourne on 23 February was supported by data from nearby Sandridge and Williamstown Beaches also recording elevated results of 200 and 170 orgs/100 mL respectively on 23 February.

Yarra Watch

For Yarra Watch sampling in 2020–21 there was only one sample exceeding SEPP (Waters) short-term objectives during dry weather (greater than 550 orgs/100 mL) that resulted in a swim advisory. This incident is detailed below.

Launching Place swim advisory

On 24 February 2021, a sampling result at Launching Place was 1,500 orgs/100 mL.

- Re-sample results collected on 25 February were 470 orgs/100 mL. Although this is above the trigger levels, there was rainfall after the re-sample was collected. This means any further re-samples would have followed wet weather.
- The cause of Launching Place's dry weather exceedance could not be confirmed. A possible source of high microbial levels may have been nearby construction work causing a one-off impact, as high results were not recorded on other days of sampling.
- The Microbial Source Tracking investigations currently being conducted in partnership with Melbourne Water and Monash University will assist in the identification of key dry weather sources of pollution in this area. These investigations involve extensive examinations of possible pollution sources and sampling to assess what pathogens are present in the water. The information from source tracking, available later in 2021, will inform desktop investigations in future summers and could help refine forecasting for specific locations.

3.2. Forecasting

3.2.1. Beach Report forecasting results

Table 3 shows the breakdown of morning Beach Report forecasts for each month by forecast category. As a comparison, 2019–20 values are given in parenthesis (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 on in any given year.

The 2020–21 summer showed more 'Good' forecasts, with fewer 'Fair' and 'Poor' forecasts. This was due to reduced rainfall during the 2021-21 summer compared to last, especially during February and March.

Table 3. Number of forecasts issued for 2020–21 summer period for Beach Report by month and category. In parenthesis, number of forecasts for the 2019–20 summer period for comparison.

| Month | Forecast classification | | |
|--------------------|-------------------------|-----------|-----------|
| | Good | Fair | Poor |
| December | 714 (958) | 294 (119) | 108 (39) |
| January | 695 (509) | 173 (413) | 248 (194) |
| February | 748 (619) | 214 (230) | 46 (195) |
| March | 264 (159) | 24 (93) | 0 (72) |
| % of all forecasts | 69% (62%) | 20% (24%) | 11% (14%) |

Figure 1, Figure 2 and Figure 3 show rainfall for each Beach Report gauge for Melbourne, Geelong and Mornington regions, comparative to forecasts, and comparing 2019–20 summer to 2020–21 summer. Every region had overall reduced rainfall in 2020–21 compared with the previous summer.

Compared to December 2019, increased rainfall in December 2020 accounts for a higher number of 'Fair' and 'Poor' forecasts during this month (Figure 1, Figure 2 and Figure 3). The amount of rainfall in January 2021 was comparable to January 2020. However, the relationship between January 2021 forecasts and rainfall is skewed. Although there was more rainfall in January 2021 compared to January 2020, the forecasts for January 2021 are more affected by the number of days with rainfall. Most January 2021 rainfall occurred in the last three days of January, with between 34.8 mm to 48.8 mm at all relevant rain gauges. This means January 2021 had a high number of 'Good' forecasts despite high rainfall. In all other months, reduced rainfall across the bay in 2020–21 overall resulted in higher numbers of 'Good' forecasts.

There were some 'Fair' forecasts related to pollution and algal bloom incidents that resulted in manual change of forecast outputs. They are discussed in more detail in EPA water quality alerts (sub-section 3.2.5).

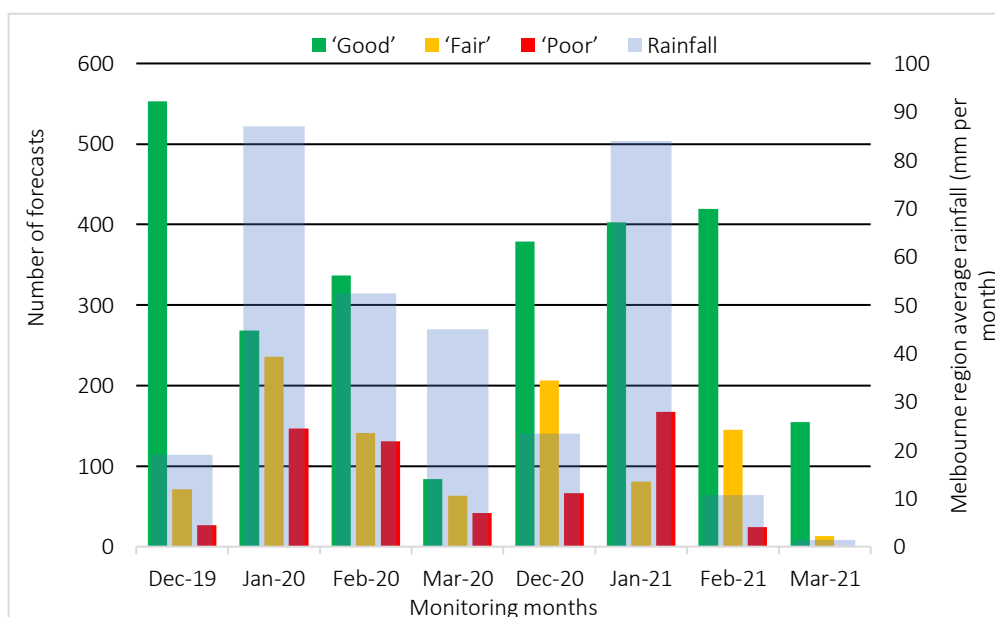


Figure 1. Rainfall from BoM rain gauges compared to forecasts at Melbourne region beaches between 1 December and Labour Day, 2019–20 to 2020–21 summers. Note: Rainfall value is an average of total monthly rainfall at Melbourne (Olympic Park), Moorabbin and Laverton gauges. These gauges cover all of Melbourne region beaches in BRFM

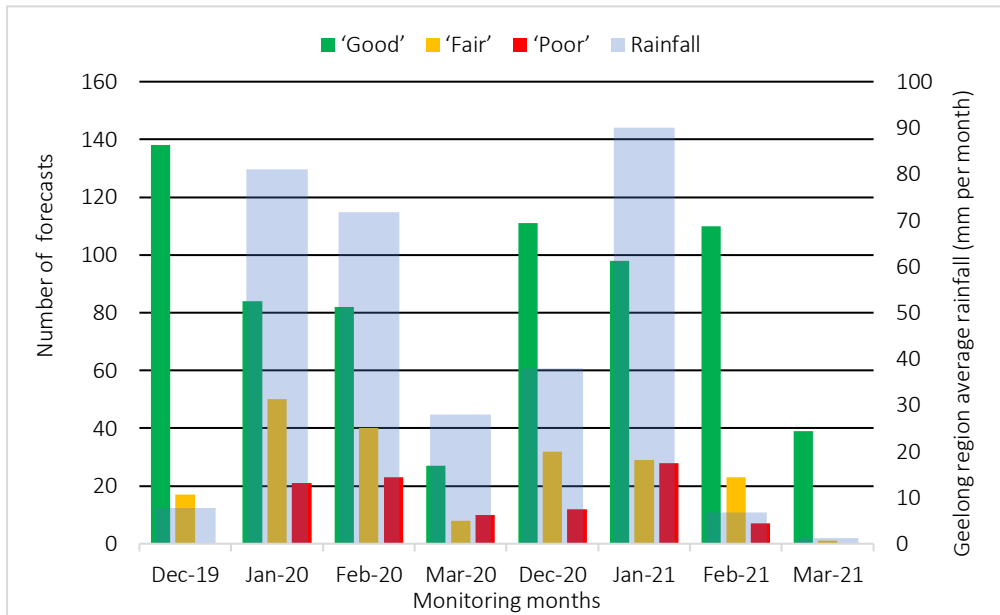


Figure 2. Rainfall from BoM rain gauges compared to forecasts at Geelong region beaches between 1 December and Labour Day, 2019–20 to 2020–21 summers. Note: Rainfall value is an average of total monthly rainfall at Avalon and Geelong Racecourse gauges. These gauges cover Geelong region beaches in BRFM.

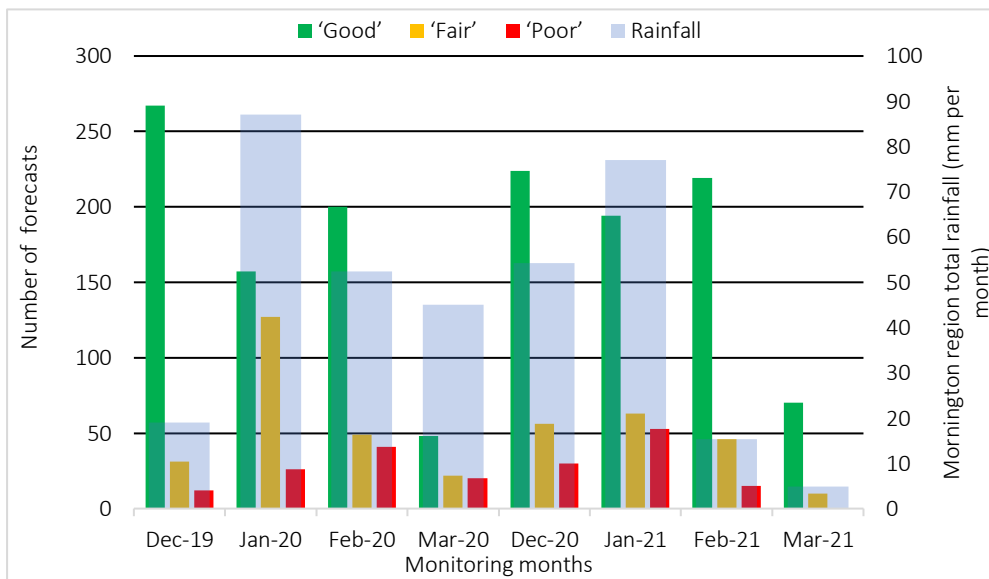


Figure 3. Rainfall from Cerberus BoM rain gauge compared to forecasts at Mornington region beaches between 1 December and Labour Day, 2019–20 to 2020–21 summers.

3.2.2. Beach Report forecasting accuracy

Accuracy metrics (comparing sample results to forecasts) for Beach Report are shown in **Table 4**. **Appendix 3** shows the full results set.

Table 4. Forecast accuracy metrics for 2020–21 summer period for Beach Report.

| Metric | Result |
|---------------------------|--|
| Appropriate advice | Appropriate advice was provided by 90 per cent of Beach Report forecasts. Of the 481 forecasts EPA delivered, 431 forecasts gave appropriate advice to protect human health. |
| Missed alarms | Missed alarms (when 'Poor' sampling result forecast as 'Good') accounted for one per cent of all forecasts and 11 per cent of 'Poor' sampling results. |

| | |
|---------------------|---|
| False alarms | False alarms (when 'Good' sampling result forecast as 'Poor') accounted for nine per cent of all forecasts and ten per cent of 'Good' sampling results. |
|---------------------|---|

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 2020–21 summer:

- Dry weather events cannot be predicted by the BRFM. Microbial water quality affected by pollution incidents not related to rain, or due to sediment re-suspension caused by rough sea conditions cannot be predicted.
- There were only five 'Missed alarms' in the 2020–21 summer. This means most 'Poor' sampling results 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 by forecast category: 'Good', 'Fair' and 'Poor'. There is no 2019–20 comparison for Yarra Watch forecasting. As mentioned above, the Yarra Watch forecasting model was recently updated to only include the last five years of sampling data. This means 2020–21 and 2019–20 forecast results have not been compared here as the model did not contain the same inputs between seasons.

Table 5. Number of forecasts issued for 2020–21 for Yarra Watch by month and category.

| Month | Forecast classification | | |
|---------------------------|-------------------------|------|------|
| | Good | Fair | Poor |
| December | 16 | 5 | 103 |
| January | 17 | 2 | 105 |
| February | 20 | 1 | 91 |
| March | 8 | 0 | 24 |
| % of all forecasts | 16% | 2% | 82% |

Kew, Healesville and Launching Place could only receive precautionary 'Poor' forecasts for the 2020–21 summer. This is due to the use of more conservative short-term objectives in the Yarra Watch forecast model based on the updated SEPP (Waters). The short-term objective used in the forecasting model was 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. There was always a greater than 20 per cent probability that *E. coli* levels would be >260 orgs/100 mL for Launching Place, Kew and Healesville in the 2020–21 summer.

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

Warrandyte was allocated 'Fair' and 'Good' forecasts during dry weather and would forecast as 'Poor' when there was rain. For summer 2020–21, Warrandyte received 'Good' forecasts 62 per cent of the time and 'Fair' forecasts eight 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** shows the calculations.

Table 6. Forecast accuracy metrics for 2020–21 summer period for Yarra Watch.

| Metric | Result |
|---------------------------|---|
| Appropriate advice | Appropriate advice was provided in 52 per cent of Yarra Watch forecasts (29 out of 56). |
| Missed alarms | There were no missed alarms (when 'Poor' sampling result forecast as 'Good'). |
| False alarms | False alarms (when 'Good' sampling result forecast as 'Poor') accounted for 48 per cent of all forecasts. |

Based on the accuracy metrics (**Table 6**), the model is conservative for protecting health. Most Yarra sites had 'Poor' forecasts all summer due to the inclusion of more conservative SEPP (Waters) objectives, as explained above. While Yarra Watch forecasting was precautionary, weekly results showed that microbial water quality could be suitable for swimming during dry weather.

EPA provides advice for healthy swimming on its website and signs at Kew, Healesville, and Launching Place sites, that tell people 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 their 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 (that is, identifying which pathogens are present in different sections of the Yarra River) and potentially be developing site-specific objectives. Site-specific objectives would replace the SEPP (Waters) *E. coli* value in the Yarra Watch forecasting model.

3.2.5. Online water quality alerts in 2020–21 summer

Most water quality alerts reported to EPA website were for smaller waterways in the catchment rather than for the Yarra River or Port Phillip Bay beaches. For this reason, most alerts did not affect forecasting. All alerts for the summer season 2020–21 are shown in **Appendix 5**.

Port Phillip Bay alerts

There were 12 pollution alerts that affected beaches in Port Phillip Bay.

- Six alerts related to dredging activities:
 - Parks Victoria undertook dredging to remove hazards and maintain shipping channels for safe navigation. Dredging can take a few days up to a fortnight to complete depending on the site and weather conditions.
 - Parks Victoria dredged at Werribee, Portarlington, Mordialloc (twice) and Carrum Beaches.
 - Martha Cove was also dredged, separate to Parks Victoria operations.

- As a precaution, any 'Good' forecasts for Werribee, Portarlington, Mordialloc, and Carrum beaches were changed to 'Fair' for the duration of the dredging. This was to encourage people to avoid contact with discoloured water. Sampling results taken along beaches after dredging did not show increased microbial levels.
- When the dredging was completed, alerts were removed, and EPA resumed normal forecasting.
- On 16 February 2021, an alert was issued for Sorrento Beach for a vessel leaking fuel offshore:
 - The beach was forecast as 'Fair' as a precaution until possible water quality impacts could be confirmed by an EPA field officer.
 - The alert was removed the next day when it was confirmed water quality was not affected.
- On 21 February 2021, an alert was issued for Queenscliff Beach for a sewage spill:
 - Barwon Water responded to and cleaned up the incident. They also placed signs and fencing on the affected beach.
 - Santa Casa (in Queenscliff) was forecast as 'Poor' while the spill was active. This was changed to 'Fair' once the cleanup was complete and 'Good' the following day.
- Four alerts related to isolated pollution incidents in the Bay but not at Beach Report locations:
 - These alerts were for Williamstown Beach, Mornington Pier, Seaholme Beach and Martha Cove. The pollution sites were not close enough to Beach Report locations to affect forecasting.

One algal bloom occurred in Port Phillip Bay:

- On 7 December 2020, an algal bloom alert was issued for the northern part of Port Phillip Bay. This bloom was detected via EPA's monthly marine monitoring program.
 - *Heterosigma akashiwo* dominated a sample taken at Long Reef (the Geelong section of the Bay) on 24 November 2020. This species is associated with loss of aquatic life.
 - ALS samplers took additional samples at Altona, Kirk Point (near the mouth of Little River) and St Helens (in Geelong). This sampling confirmed several species of algae were present, including *Heterosigma akashiwo*.
 - The Department of Environment, Land, Water and Planning (DELWP) was informed of the bloom.
 - This bloom had an effect on forecasting, with forecasts downgraded to 'Fair' as a precautionary measure until sampling showed algal results were low.

Yarra River alerts

There were five water quality alerts for the Yarra River (**Appendix 5**). These Yarra River alerts did not affect forecasting, as forecasts were already 'Poor' or 'Fair', or the pollution was not close to sampling sites.

4. Conclusions

Most of the sampling results for the 2020-21 summer were below SEPP (Waters) short-term microbial water objectives. This means the water was generally suitable for recreation. High microbial levels were mostly associated with rainfall, with only five swim advisories issued for dry weather pollution during the summer (four for Beach Report and one for Yarra Watch).

Beach Report forecasting overall provided appropriate advice to protect community health this summer. Forecasts provided appropriate advice 90 per cent of the time. Missed and false alarms were infrequent and caused by dry weather pollution that cannot be predicted by the Beach Forecast Risk Matrix. EPA continues work to refine forecasting for beach recreational water quality. Specific sampling investigations at beaches (such as quantitative microbial risk assessments and the investigation at Mentone drain) allow EPA to better understand specific pollution sources at beaches. This can improve the accuracy of forecasting when considered alongside the forecasting matrix.

By contrast, the Yarra Watch model provided appropriate advice 52 per cent of the time. This lower accuracy for appropriate advice for Yarra Watch is mainly due to Launching Place, Kew, and Healesville having high background levels of *E.coli*. The probability of greater than 20 per cent exceedance of *E.coli* levels in the forecasting model means these sites can only receive 'Poor' forecasts. EPA, Melbourne Water, and Monash University are investigating possible sources of this background pollution, as well as investigating which pathogens are present in the Yarra River. With a comprehensive understanding of pollution sources and microbial water quality at each Yarra Watch site, the forecasting model may be able to include specific *E. coli* values for each site. This would ensure forecasting advice was as accurate as possible.

Pollution alerts can also affect forecasting. There were several dredging operations, two pollution incidents and an algal bloom that did result in downgrading of beach forecasts. These alerts ensured forecasting encompassed all relevant water quality information.

EPA will continue to refine forecasting and will work with partner agencies and organisations to ensure widespread communication of forecasting and sampling results. This includes working with local councils to place signage at sampling sites when needed, sharing of sampling data via the Data Victoria online platform, and partnering with Life Saving Victoria to show forecasts at lifesaving clubs around Port Phillip Bay.

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Acronyms and abbreviations

| | |
|---------------|--|
| ALS | Australian Laboratory Services |
| BoM | Bureau of Meteorology |
| BRFM | Beach Report Forecasting Matrix |
| EPA | Environment Protection Authority Victoria |
| orgs/100 mL | Organisms per 100 mL |
| SEPP (Waters) | State Environment Protection Policy (Waters), gazetted in 2018 |

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. 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 high winds creating rough waves).

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 2020–21 summer, Beach Report, Melbourne region.

| Beach | Weekly microbial sampling results (orgs/100 mL) | | | | | | | | | | | | | | Number of samples below or over the SEPP (Waters) short-term objectives | | |
|----------------------------|---|-----------|------------|------------|------------|-----------|------------|------------|------------|-----------|-----------|------------|------------|-----------|---|--|-------------------|
| | 1/12/2020 | 8/12/2020 | 15/12/2020 | 22/12/2020 | 29/12/2020 | 5/01/2021 | 12/01/2021 | 19/01/2021 | 27/01/2021 | 2/02/2021 | 9/02/2021 | 16/02/2021 | 23/02/2021 | 2/03/2021 | ≤200 orgs /100 mL | >200 orgs /100 mL and ≤500 orgs/100 mL | >500 orgs /100 mL |
| Port Melbourne | 31 | 670 | <10 | 2100 | 10 | 1400 | 20 | <10 | 680 | 31 | 10 | <10 | 720 | 20 | 9 | 0 | 5 |
| Hampton | <10 | 110 | 51 | | <10 | 110 | 52 | <10 | <10 | 10 | <10 | <10 | 31 | 170 | 13 | 0 | 0 |
| Half Moon Bay | 20 | 20 | 20 | 220 | 31 | 31 | 20 | <10 | <10 | 98 | <10 | 20 | 31 | 20 | 13 | 1 | 0 |
| Mentone | 74 | 41 | | 1600 | 31 | 540 | 200 | <10 | 130 | 1300 | 63 | | 98 | 20 | 9 | 0 | 3 |
| Seaford | <10 | 140 | 10 | 31 | 10 | 52 | 52 | <10 | 10 | <10 | <10 | <10 | 52 | 20 | 14 | 0 | 0 |
| Frankston Life Saving Club | <10 | 270 | <10 | 4600 | <10 | 270 | 20 | <10 | 31 | 110 | <10 | <10 | 41 | 20 | 11 | 2 | 1 |
| Frankston Coast Guard | <10 | 150 | <10 | 1800 | <10 | 31 | 20 | 31 | <10 | 52 | <10 | <10 | <10 | <10 | 13 | 0 | 1 |
| Mordialloc | <10 | | 20 | 96 | <10 | 250 | | 10 | 52 | 110 | 20 | <10 | 10 | 20 | 11 | 1 | 0 |
| Sandringham | <10 | 10 | 20 | | <10 | | | 20 | 10 | 20 | 10 | <10 | 10 | 20 | 11 | 0 | 0 |
| Elwood | <10 | 460 | 10 | 10 | 10 | 540 | | 10 | 74 | 52 | <10 | <10 | 10 | 10 | 11 | 1 | 1 |
| St Kilda | <10 | 860 | <10 | 4400 | 10 | 2700 | 110 | 10 | 130 | 300 | 20 | <10 | 41 | 130 | 10 | 1 | 3 |
| Sandridge | 31 | 20 | 31 | 63 | 10 | 2200 | 10 | 10 | 10 | 98 | <10 | <10 | 200 | <10 | 13 | 0 | 1 |
| Williamstown | <10 | 51 | 10 | 410 | <10 | 41 | 30 | 20 | <10 | 10 | <10 | <10 | 170 | 41 | 13 | 1 | 0 |
| Altona | <10 | 41 | <10 | 260 | <10 | 97 | <10 | 41 | 10 | 10 | 20 | <10 | 10 | 20 | 13 | 1 | 0 |
| Werribee South | 10 | | 52 | 320 | 10 | 430 | 52 | 10 | 10 | 85 | 10 | 31 | 63 | 41 | 11 | 2 | 0 |
| Beaumaris | 10 | 380 | 20 | 20 | 10 | 20 | 86 | 20 | 52 | 170 | 190 | <10 | <10 | 20 | 13 | 1 | 0 |
| Brighton | 10 | <10 | 10 | 41 | <10 | 160 | 130 | 30 | <10 | 20 | 10 | 86 | 10 | 10 | 14 | 0 | 0 |
| Carrum | <10 | 160 | <10 | 190 | <10 | <10 | 10 | 10 | <10 | 20 | <10 | <10 | <10 | 10 | 14 | 0 | 0 |
| Aspendale | <10 | 85 | 20 | 1700 | <10 | 10 | 31 | <10 | <10 | 10 | <10 | <10 | 31 | 10 | 13 | 0 | 1 |
| South Melbourne | <10 | 52 | <10 | 62 | <10 | 900 | 52 | <10 | 20 | 20 | 10 | 31 | <10 | 41 | 13 | 0 | 1 |
| Black Rock | <10 | 10 | <10 | | <10 | 180 | <10 | <10 | 10 | 10 | | 170 | 41 | 20 | 14 | 0 | 0 |
| Total: | | | | | | | | | | | | | | | 256 | 11 | 17 |

Beach Report and Yarra Watch results 2020–2021

Table 8. Enterococci sampling results for 2020–21 summer, Beach Report, Mornington Peninsula region.

| Weekly microbial sampling results (orgs/100 mL) | | | | | | | | | | | | | | | Number of samples below or over the SEPP (Waters) short-term objectives | | |
|---|-----------|-----------|------------|------------|------------|-----------|------------|------------|------------|-----------|-----------|------------|------------|-----------|---|--|-------------------|
| Beach | 1/12/2020 | 8/12/2020 | 15/12/2020 | 22/12/2020 | 29/12/2020 | 5/01/2021 | 12/01/2021 | 19/01/2021 | 27/01/2021 | 2/02/2021 | 9/02/2021 | 16/02/2021 | 23/02/2021 | 2/03/2021 | ≤200 orgs /100 mL | >200 orgs /100 mL and ≤500 orgs/100 mL | >500 orgs /100 mL |
| Safety Beach | <10 | 280 | 31 | 230 | 74 | 30 | 130 | 31 | <10 | 10 | <10 | <10 | <10 | 31 | 12 | 2 | 0 |
| Blairgowrie | 52 | 120 | 10 | 52 | 31 | 190 | 97 | 10 | 10 | 10 | 10 | 41 | 20 | 10 | 14 | 0 | 0 |
| Sorrento | 31 | 41 | 74 | 20 | 10 | 20 | 31 | <10 | 10 | 31 | 10 | 170 | 10 | <10 | 14 | 0 | 0 |
| Portsea | <10 | | <10 | | <10 | 31 | 20 | | 10 | <10 | | | | | 7 | 0 | 0 |
| Rye | 310 | 150 | 390 | 63 | <10 | <10 | 360 | 41 | <10 | 31 | 20 | 74 | 41 | 10 | 11 | 3 | 0 |
| Dromana | 10 | 41 | 30 | 860 | <10 | 130 | 110 | 10 | <10 | 20 | <10 | <10 | 20 | 10 | 13 | 0 | 1 |
| Canadian Bay | <10 | 52 | <10 | 320 | <10 | 10 | 85 | <10 | 10 | 52 | <10 | <10 | 20 | 10 | 13 | 1 | 0 |
| Mornington | 10 | 120 | | 2400 | <10 | 41 | 31 | <10 | 10 | 74 | 10 | <10 | 10 | <10 | 12 | 0 | 1 |
| Rosebud | <10 | 63 | 10 | 74 | <10 | 63 | 86 | 160 | <10 | <10 | <10 | 20 | 10 | 10 | 14 | 0 | 0 |
| Mount Martha | | | 20 | 960 | <10 | 20 | 41 | 10 | 10 | 20 | 31 | <10 | <10 | <10 | 11 | 0 | 1 |
| Total: | | | | | | | | | | | | | | | 121 | 6 | 3 |

Table 9. Enterococci sampling results for 2020–21 summer, Beach Report, Geelong and Bellarine region.

| Weekly microbial sampling results (orgs/100 mL) | | | | | | | | | | | | | | | Number of samples below or over the SEPP (Waters) short-term objectives | | |
|---|-----------|-----------|------------|------------|------------|-----------|------------|------------|------------|-----------|-----------|------------|------------|-----------|---|--|-------------------|
| Beach | 1/12/2020 | 8/12/2020 | 15/12/2020 | 22/12/2020 | 29/12/2020 | 5/01/2021 | 12/01/2021 | 19/01/2021 | 27/01/2021 | 2/02/2021 | 9/02/2021 | 16/02/2021 | 23/02/2021 | 2/03/2021 | ≤200 orgs /100 mL | >200 orgs /100 mL and ≤500 orgs/100 mL | >500 orgs /100 mL |
| The Dell | 52 | 30 | 74 | 220 | <10 | 30 | 41 | 10 | 10 | | 10 | <10 | <10 | 10 | 12 | 1 | 0 |
| Eastern | <10 | <10 | <10 | 74 | 31 | 230 | 120 | 10 | 86 | <10 | 10 | 20 | 10 | 20 | 13 | 1 | 0 |
| Portarlington | 41 | 300 | 31 | 230 | 10 | 520 | 820 | <10 | 20 | 52 | 52 | 10 | 10 | 86 | 10 | 2 | 2 |
| St Leonards | 63 | 30 | <10 | 200 | <10 | 410 | 63 | 240 | 41 | 20 | <10 | <10 | 190 | 10 | 12 | 2 | 0 |
| Santa Casa | 10 | 63 | 10 | <10 | <10 | <10 | <10 | <10 | 10 | <10 | 10 | <10 | <10 | <10 | 14 | 0 | 0 |
| Total: | | | | | | | | | | | | | | | 61 | 6 | 2 |

Appendix 2 – Yarra Watch microbial sampling results

 Table 10. *E. coli* sampling results for 2020–21 summer, Yarra Watch.

| Site | Weekly microbial sampling results (orgs/100 mL) | | | | | | | | | | | | | | Number of samples below or over the SEPP (Waters) short-term objectives | | |
|------------------------|---|---------|----------|----------|----------|---------|---------|----------|----------|----------|----------|----------|----------|---------|---|--|-------------------|
| | 2/12/20 | 9/12/20 | 16/12/20 | 23/12/20 | 30/12/20 | 3/01/21 | 6/01/21 | 13/01/21 | 20/01/21 | 28/01/21 | 10/02/21 | 17/02/21 | 24/02/21 | 3/03/21 | ≤260 orgs /100 mL | >260 orgs /100 mL and ≤550 orgs/100 mL | >550 orgs /100 mL |
| Kew | 500 | 130 | 20 | 2900 | 52 | 260 | 62 | 120 | 210 | 350 | 170 | 120 | 130 | 400 | 10 | 3 | 1 |
| Warrandyte | 31 | 41 | 85 | 160 | 74 | 280 | 31 | 63 | 230 | 52 | 98 | 63 | 73 | 10 | 13 | 1 | 0 |
| Healesville | 110 | 1300 | 120 | 330 | 140 | 160 | 350 | 220 | 150 | 360 | 220 | 140 | 370 | 160 | 9 | 4 | 1 |
| Launching Place | 400 | 310 | 640 | 220 | 1200 | 200 | 720 | 160 | 170 | 580 | 510 | 410 | 1500 | 260 | 5 | 4 | 5 |
| Total: | | | | | | | | | | | | | | | 37 | 12 | 7 |

Appendix 3 – Beach Report forecast accuracy results

Appropriate advice

Light blue highlighted cells in **Table 11** indicate 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 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 | 276 | 5 |
| | Fair | 115 | 6 |
| | Poor | 45 | 34 |
| | Total | 436 | 45 |

Missed alarms

The light blue highlighted cell in **Table 12** indicated 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 | 276 | 5 |
| | Fair | 115 | 6 |
| | Poor | 45 | 34 |

False alarms

The light blue highlighted cell in **Table 13** indicated 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 | 276 | 5 |
| | Fair | 115 | 6 |
| | Poor | 45 | 34 |

Appendix 4 – Yarra Watch forecast accuracy results

Appropriate advice

Light blue highlighted cells in **Table 14** indicated 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 | 10 | 0 |
| | Fair | 0 | 0 |
| | Poor | 27 | 19 |
| | Total | 37 | 19 |

Missed alarms

The light blue highlighted cell in **Table 15** indicated there were no 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) | |
|----------------------------|------|--|-------------------------|
| | | ≤200 orgs/100 mL (Good) | >200 orgs/100 mL (Poor) |
| Wednesday morning forecast | | | |
| | Good | 10 | 0 |
| | Fair | 0 | 0 |
| | Poor | 27 | 19 |

False alarms

The light blue highlighted cell in **Table 16** indicated 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 | 10 | 0 |
| | Fair | 0 | 0 |
| | Poor | 27 | 19 |

Appendix 5 – Online water quality alerts for 2020–21 summer

Table 17. Pollution alerts posted on the EPA website between 1 December 2020 and 8 March 2021.

| Date | Location | Text on website |
|------------|--------------------------------|--|
| 10/11/2020 | Werribee Beach | Parks Victoria is undertaking dredging until mid-December at the entrance of Werribee River at Werribee Beach. Avoid contact with the water or sand if it looks discoloured. |
| 23/11/2020 | Portarlington Beach | Parks Victoria are undertaking dredging for three to four weeks at Portarlington Harbour at Portarlington Beach. Avoid contact with the water or sand if it looks discoloured. |
| 2/12/2020 | Merri Creek | EPA officers are investigating a report of a white paint-like substance in Merri Creek, adjacent to Brunswick Velodrome. Avoid contact with the water until further notice. |
| 2/12/2020 | Unnamed waterway, Hampton Park | EPA officers are investigating a report of a red-coloured discharge from a stormwater drain into a waterway in Hampton Park, near Coral Drive. Avoid contact with the water until further notice. |
| 3/12/2020 | Kananook Creek | EPA officers are investigating a report of a white cloudy substance, discharging from an outlet near Playne Street, into Kananook Creek in Frankston. Avoid contact with the water until further notice. |
| 7/12/2020 | Port Phillip Bay | EPA is investigating elevated levels of an algal species that may be harmful to aquatic life in the northern part of Port Phillip Bay. Avoid contact with discoloured water or dead fish. Report discoloured water or fish deaths to EPA on 1300 372 842. |
| 7/12/2020 | Jells Lake | EPA officers are investigating fish deaths at Jells Lake located in Jells Park, Wheelers Hill. Avoid contact with the water until further notice. |
| 12/12/2020 | Stony Creek | EPA officers are investigating a report of a murky discoloration in Stony Creek near Francis Street, Yarraville. Avoid contact with the water until further notice. |
| 15/12/2020 | Williamstown Beach | EPA officers are investigating a report of a murky substance discharging from a drain into Williamstown Beach, at the end of Victoria St. Avoid contact with the water until further notice. |
| 15/12/2020 | Werribee River/Pyrites Creek | Melbourne Water are currently undertaking a 'Summer High Flow' freshening release for the Werribee River along Pyrites Creek from Tues 15 to Wed 16 December. Peak flows are expected to reach 80 ML/day. Slight increases in the water level are expected. Avoid contact with water until further notice. |
| 15/12/2020 | Lower Werribee River | Melbourne Water is currently undertaking a 'Summer Fresh' release along the Lower Werribee River from Wed 16 to Thurs 17 December. Peak flows are expected to reach 80 ML/day. Slight increases in the water level are expected. Avoid contact with water until further notice. |
| 17/12/2020 | Darebin Creek | EPA is investigating reports of a clay-coloured substance in Darebin Creek. Avoid contact with water until further notice. |
| 18/12/2020 | Mordialloc Creek and Beach | Parks Victoria is undertaking dredging over the next week at Mordialloc Creek near Mordialloc Beach. Avoid contact with the water or sand if it looks discoloured. |
| 19/12/2020 | Merri Creek, Unknown | EPA has confirmed two reports from members of the public earlier this morning advising of the presence of an orange/brown substance seen discharging from a stormwater outlet into Merri Creek, Abbotsford. Avoid contact with water until further notice. |
| 20/12/2020 | Yarra River | EPA Victoria has confirmed reports from members of the public earlier this morning advising of clay coloured discharging from a stormwater outlet into the Yarra River, South Yarra. Avoid contact with water until further notice. |
| 21/12/2020 | Maribyrnong River | EPA Victoria is investigating a discharge of waste into Dynon Road Tidal Canal, West Melbourne. Water near the canal in the Maribyrnong River, Footscray may also be affected. Avoid contact with water until further notice. |
| 31/12/2020 | Mornington Pier | EPA has confirmed reports of the presence of oil, near Fisherman's Wharf and Mornington Pier. Avoid contact until further notice. |
| 31/12/2020 | Yarra River | EPA is investigating reports of an oil slick, in the Yarra River, near Flinders St Station, Southbank. Avoid contact until further notice. |

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| | | |
|-------------------|-----------------------------|--|
| 31/12/2020 | Stony Creek | EPA is investigating a milky-white substance discharging from a stormwater outlet into Stony Creek, in Cruickshank Park, Yarraville. Avoid contact until further notice. |
| 7/01/2021 | Edgars Creek | EPA is investigating water pollution discharging from Merrilands Drain into Edgars Creek, near Mcfadzean Ave and Oconnor Court, Reservoir. This may impact Edgars Creek Wetlands. Avoid contact until further notice. |
| 8/01/2021 | Stony Creek | EPA is investigating a red substance in Stony Creek, near Francis Street, Spotswood. Avoid contact until further notice. |
| 13/01/2021 | Unnamed waterway, Malmsbury | EPA officers are investigating a potential diesel spill into an unnamed creek close to the Calder Hwy near Malmsbury East Rd, Malmsbury. Avoid contact with the water until further notice. |
| 13/01/2021 | Gardiners Creek | EPA is investigating white foam discharging from a stormwater outlet into Gardiners Creek, near Morgans Walk, Burwood. Avoid contact until further notice. |
| 13/01/2021 | Gardiners Creek | EPA officers are investigating an oil spill that entered stormwater drains at 209 Darling Road, Malvern East. Gardiners Creek may be affected near Dorothy Laver Reserve, Ashburton. Avoid contact with the water until further notice. |
| 13/01/2021 | Portarlington Beach | EPA testing has confirmed unacceptable water quality at Portarlington Beach. Avoid swimming until further notice by EPA. |
| 15/01/2021 | Jones Creek | Firewater may have entered Jones Creek near Ballarat Road, Adeer. EPA officers are investigating. Avoid contact with the water until further notice. |
| 17/01/2021 | Stony Creek | EPA officers are investigating discoloured water in Stony Creek near Somerville Road, Yarraville. Avoid contact with the water until further notice. |
| 18/01/2021 | Kororoit Creek | EPA officers are investigating oil from a stormwater drain in Kororoit Creek near Anderson Road, Sunshine. Avoid contact with the water until further notice. |
| 19/01/2021 | Skeleton Creek | EPA and City West Water are investigating a sewage spill in Skeleton Creek near Distinction Crescent, Truganina. Avoid contact with the water until further notice. |
| 20/01/2021 | Seaholme beach | EPA is investigating a milky substance, possibly paint, discharging near Altona Boat Ramp, Seaholme. Avoid contact with the water until further notice. |
| 22/01/2021 | Mordialloc Creek | EPA are investigating reports of a diesel spill affecting Lower Dandenong Road, Boundary Road, and Woodlands Drive, Braeside. Diesel has entered stormwater drains and may affect Mordialloc Creek. Avoid contact if water has a sheen or an odour. |
| 22/01/2021 | Yarra River | EPA officers are investigating a white substance discharging from a stormwater drain in Yarra River, next to Flinders Street Station, Melbourne CBD. Avoid contact with the water until further notice. |
| 25/01/2021 | Koonung Koonung Creek | EPA officers have confirmed firewater has entered Koonung Koonung Creek near Jackson Avenue, Mont Albert North. The creek is affected alongside the Eastern Freeway towards Doncaster Road. The creek water may look black and have a strong odour. Avoid contact with the water until further notice. |
| 27/01/2021 | Dandenong Creek | EPA officers are investigating reports of a red substance discharging from a stormwater drain into Dandenong Creek, in the vicinity of Marrie Wallace Reserve, Bayswater. Avoid contact with the water until further notice. |
| 1/02/2021 | Gunyong Creek | EPA officers are investigating a sewer spill at Beluga St, Mount Eliza. Gunyong Creek may be affected. Avoid contact with the water until further notice. |
| 2/02/2021 | Steele Creek | EPA officers are investigating a yellow substance discharging from a stormwater drain into Steele Creek, near Keilor Road, Niddrie. Avoid contact with the water until further notice. |
| 3/02/2021 | Mentone Beach | A swim advisory has been issued for Mentone Beach at Mentone Life Saving Club, based on high microbial levels detected by Beach Report weekly sampling. Avoid contact with the water until further notice. |

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| | | |
|-------------------|--------------------------------|---|
| 4/02/2021 | Mentone Beach drain | The swim advisory for Mentone Beach at Mentone Life Saving Club has been lifted but avoid contact with the water near Naples Road drain 100m south of the life saving club until further notice. |
| 4/02/2021 | Mordialloc Creek and Beach | Parks Victoria maintenance dredging is being conducted at the mouth of Mordialloc Creek, with sand deposited on the beach immediately south of the mouth. Avoid contact with the water until further notice. |
| 5/02/2021 | Anderson Creek and Yarra River | There has been a sewer spill reported in Andersons Creek at Taroon Avenue, Warrandyte. The spill may have entered the Yarra River downstream of Stiggant Street. Avoid contact with water until further notice. |
| 5/02/2021 | Patterson River | Parks Victoria dredging will start at the mouth of Patterson River on 8 February, with sand deposited on the beach immediately north of the mouth. Avoid contact with the water until further notice. |
| 9/02/2021 | Martha Cove Beach | Dredging is being conducted at the mouth of Martha Cove, with sand deposited on the beach immediately south of the mouth. Avoid contact with the water until further notice. |
| 9/02/2021 | Edwards Creek | EPA is investigating a report of a yellow substance discharging from an outlet pipe into Edwards Creek, near Broadhurst Avenue, Reservoir. Avoid contact with the water until further notice. |
| 11/02/2021 | Stony Creek | EPA Officers are responding to a report about the presence of a murky substance in Stony Creek near Waratah Street, West Footscray. Avoid contact with the water until further notice. |
| 16/02/2021 | Sorrento Front Beach | EPA officers are investigating reports of fuel leaking from a vessel at Sorrento Front Beach, near the corner of Point Nepean and St Pauls Roads. Avoid contact with the water until further notice. |
| 21/02/2021 | Queenscliff Beach | EPA is investigating a sewage spill at the Queenscliff foreshore near south end of Hesse Street, Queenscliff. Avoid contact with the water until further notice. |
| 23/02/2021 | Yarra River | Melbourne Water is currently undertaking a 'Summer Fresh' water release along the Upper Yarra River from 23 February to 2 March. Peak flows are expected to reach 750 ML/day. Increases in the river levels are expected. |
| 23/02/2021 | Edgars Creek | EPA is investigating an orange substance discharging from a stormwater outlet into Edgars Creek near Spectrum Way, Coburg North. Avoid contact with the water until further notice. |
| 24/02/2021 | Port Melbourne Beach | EPA testing has confirmed unacceptable water quality at Port Melbourne Beach. Avoid swimming until further notice by EPA. |
| 25/02/2021 | Yarra River | EPA testing has confirmed unacceptable water quality in Yarra River at Launching Place. Avoid swimming until further notice by EPA. |