



Beachwatch

State of the beaches 2022–23

Illawarra Region

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Recreational water quality has been monitored in the Illawarra region since 1996 by Sydney Water, and by Wollongong City Council and Kiama Municipal Council under the Department of Planning and Environment's Beachwatch Partnership Program. This report summarises the performance of 21 swimming sites in the Illawarra region of New South Wales, providing a long-term assessment of how suitable a site is for swimming. Monitored sites include ocean beaches and a designated swimming site in Lake Illawarra.

In 2022–2023, 95% of swimming sites in the Illawarra region were graded as Good or Very Good. These sites were suitable for swimming for most or almost all of the time. While this is a slight decline in performance on previous years, it reflects a very wet winter and spring, and some significant rainfall events associated with storms during summer.

Illawarra region summary 2022–2023



North Wollongong Beach
Photo: Beachwatch/DPE

Monitoring water quality for swimming in New South Wales

The water quality of beaches and other swimming locations is monitored under the NSW Government’s Beachwatch programs to provide the community with accurate information on the cleanliness of the water and to enable individuals to make informed decisions about where and when to swim. Routine assessment also measures the impact of pollution sources, enables the effectiveness of stormwater and wastewater management practices to be assessed and highlights areas where further work is needed.

Swimming sites in New South Wales are graded as Very Good, Good, Fair, Poor or Very Poor in accordance with the National Health and Medical Research Council’s 2008 *Guidelines for Managing Risks in Recreational Waters*. These Beach Suitability Grades provide a long-term assessment of how suitable a beach is for swimming. The grades are determined from the most recent 100 water quality results (2–4 years’ worth of data depending on the sampling frequency) and a risk assessment of potential pollution sources.

See the section on **Quality assurance** in the Statewide Summary for results of the quality assurance program.

Recreational water quality has been monitored in the Illawarra region by Sydney Water since 1996, and Wollongong City Council and Kiama Municipal Council since 2011.

A **quality assurance** program ensures the information collected and reported by Beachwatch and its partners is accurate and reliable.

Rainfall impacts

During 2022–2023, 21 swimming sites were monitored including ocean beaches and a designated swimming site in Lake Illawarra.

Rainfall is the major driver of pollution to recreational waters, generating stormwater runoff and triggering untreated discharges from the wastewater treatment and transport systems. Changes in rainfall patterns are reflected in beach water quality over time due to variation in the frequency and extent of stormwater and wastewater inputs.

The Beach Suitability Grades for 2022–2023 are based on water quality data collected over the last 2–4 years.

Rainfall over this period has been diverse:

- 2019–2020: long dry periods, with some isolated wet weather events and a very wet February
- 2020–2021: variable rainfall with some wet months
- 2021–2022: a very wet summer and autumn, including significant wet weather and flooding events
- 2022–2023: a very wet winter and spring, and some significant rainfall events associated with storms during summer.

See the section on **How to read this report** on page 35 for an explanation of the graphs, tables and Beach Suitability Grades.

Rainfall on the Illawarra Coast was well above average for winter 2022. June was very dry, followed by July being the wettest on record. A significant wet weather event occurred from 2–7 July 2022. Record daily rainfall totals were recorded at Bellambi and Kiama on 3 July, with 183 mm and 163 mm of rainfall respectively.

Wet weather continued in spring 2022. Bellambi recorded more than triple the long-term monthly average rainfall for September, the highest September daily rainfall total on record with 74 mm on 9 September. Bellambi recorded its wettest October on record with 260 mm of rainfall for the month. Drier conditions returned in November with below average rainfall along the coast.

Rainfall during summer was variable on the Illawarra Coast with drier conditions during December 2022 with well below average rainfall, and average to above average rainfall during January and February 2023. Very heavy rainfall occurred on 9 February at Kiama and 10 February at Bellambi with daily totals of 127 mm and 116 mm respectively, when storms brought heavy rainfall to the region.

Rainfall totals for March 2023 were slightly below average, but with high daily rainfall totals recorded during a rain event from 13–15 March, with 58 mm recorded at Kiama on 13 March.

Wet conditions returned in April 2023 with above average monthly rainfall recorded in the Illawarra region.

Algal blooms



Marine algal bloom present in the water

Photo: Chad Weston/NPWS, DPE

WaterNSW reported the occurrence of marine algal blooms, *Trichodesmium* sp., in January, February and March 2023 at Wollongong and Shellharbour. Marine algae advisories were issued on the Beachwatch and Water NSW websites.

The appearance of **marine algae** is sometimes mistaken for **sewage contamination** or **oil slicks**, due to a strong odour and red or brown discolouration in the water caused by the blooms.

As a precaution, direct contact with algae should be avoided as it can cause skin and eye irritations. The marine algal blooms dissipated with changes in tide and wind conditions.

Beachwatch issues daily **beach pollution forecasts** to enable beach goers to make informed decisions about where and when to swim.

Pollution forecasts for the Illawarra beaches can be accessed via the Beachwatch website, email subscription, Twitter and Facebook.









Health risks

Contamination of recreational waters with faecal material from animal and human sources can pose significant health problems to beach users owing to the presence of pathogens (disease-causing micro-organisms) in the faecal material. The most common groups of pathogens found in recreational waters are bacteria, protozoans and viruses.

Exposure to contaminated water can cause gastroenteritis, with symptoms including vomiting, diarrhoea, stomach-ache, nausea, headache and fever. Eye, ear, skin and upper respiratory tract infections can also be contracted when pathogens come into contact with small breaks and tears in the skin or ruptures of the delicate membranes in the ear or nose.

Certain groups of users may be more vulnerable to microbial infection than others. Children, the elderly, people with compromised immune systems, tourists, and people from culturally and linguistically diverse backgrounds are generally most at risk.

Beach Suitability Grades for Illawarra region

Swimming site	Site type	Beach Suitability Grade	Change				
Wollongong City Council							
Stanwell Park Beach	Ocean beach	VG	○				
Coledale Beach	Ocean beach	VG	↑				
Austinmer Beach	Ocean beach	VG	○				
Thirroul Beach	Ocean beach	G	○				
Bulli Beach	Ocean beach	G	○				
Woonona Beach	Ocean beach	VG	○				
Bellambi Beach	Ocean beach	G	○				
Corrimal Beach	Ocean beach	G	○				
North Wollongong Beach	Ocean beach	G	○				
Wollongong City Beach	Ocean beach	VG	○				
Coniston Beach	Ocean beach	G	↓				
Fishermans Beach	Ocean beach	VG	○				
Port Kembla Beach	Ocean beach	G	○				
Shellharbour City Council							
Entrance Lagoon Beach	Lake/Lagoon	P	↓				
Warilla Beach	Ocean beach	G	○				
Shellharbour Beach	Ocean beach	VG	○				
Kiama Municipal Council							
Boyds Jones Beach	Ocean beach	G	○				
Bombo Beach	Ocean beach	G	○				
Surf Beach Kiama	Ocean beach	G	○				
Werri Beach	Ocean beach	G	↓				
Seven Mile Beach (Gerroa)	Ocean beach	G	○				
Beach Suitability Grade							
 Very Good	 Good	 Fair	 Poor	 Very Poor	 Improved	 Stable	 Declined

Wollongong City Council

Overall results



All 13 swimming sites were graded as Very Good or Good in 2022–2023. Excellent results have also been recorded in previous years.

Percentage of sites graded as Very Good or Good

	2020–2021	2021–2022	2022–2023	Trend
Ocean beaches (13 sites)	100%	100%	100%	—————

Eleven locations were monitored by Sydney Water. Samples were collected every sixth day throughout the year at 9 locations, and 2 locations were monitored every sixth day between October and April.

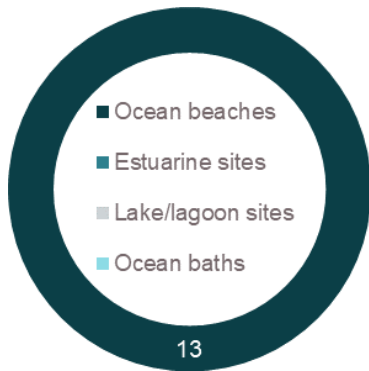
Two locations were monitored by Wollongong City Council. Samples were collected every sixth day (excluding weekends) between October and April and sampling and laboratory analysis was fully funded by the council.

See the section on **How to read this report** on page 35 for an explanation of the graphs, tables and Beach Suitability Grades.

Best beaches

Stanwell Park Beach, Coledale Beach, Austinmer Beach, Woonona Beach, Wollongong City Beach and Fishermans Beach.

These sites had excellent water quality and were suitable for swimming almost all of the time.



Site types in Wollongong City Council

Ocean beaches were the only site type monitored in the Wollongong region.

As a general precaution swimming should be avoided during and for at least one day after heavy rain at ocean beaches, or if there are signs of stormwater pollution such as discoloured water or floating debris.

Ocean beaches

All 13 ocean beaches continued to be graded as Very Good or Good in 2022–2023.



Beach Suitability Grades for Wollongong City Council ocean beaches

Six beaches were graded as Very Good: Stanwell Park Beach, Coledale Beach, Austinmer Beach, Woonona Beach, Wollongong City Beach and Fishermans Beach. Water quality at these beaches has been of a very high standard for many years and is suitable for swimming almost all of the time.

Thirroul Beach, Bulli Beach, Bellambi Beach, Corrimal Beach, North Wollongong Beach, Coniston Beach and Port Kembla Beach were graded as Good. Water quality at these sites was frequently suitable for swimming during dry weather conditions. Bacterial levels generally increased with increasing rainfall, regularly exceeding the safe swimming limit after heavy rainfall. Many of these sites have several, or more significant, potential sources of pollution such as stormwater or upstream sources discharged from creeks or lagoons. Discharges from storm sewage treatment plants (SSTPs) at Bellambi and Port Kembla may also affect the water quality at nearby beaches Bellambi, Corrimal and Port Kembla following heavy rainfall.

It is recommended that swimming be avoided at these beaches during and for up to one day following rainfall, or if there are signs of pollution such as discoloured water, flowing drains or floating debris.



Stanwell Park Beach

Beach grade:



The beach is 700 m long and is backed by dunes and a reserve. Lifeguards patrol the beach from September to April.

The Beach Suitability Grade of Very Good indicates microbial water quality is considered suitable for swimming almost all of the time, with few significant sources of faecal contamination.

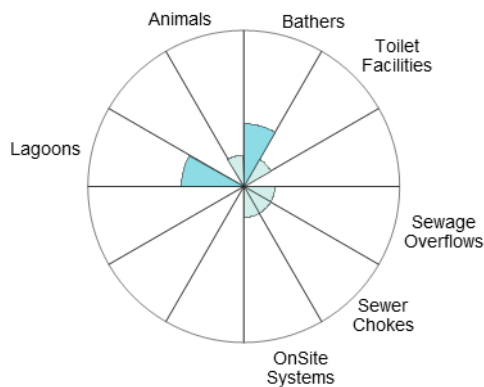
Enterococci levels generally increased with increasing rainfall, occasionally exceeding the safe swimming limit in response to 5 mm or more of rain, and often after 20 mm or more.

See 'How to read this report' for key to map.

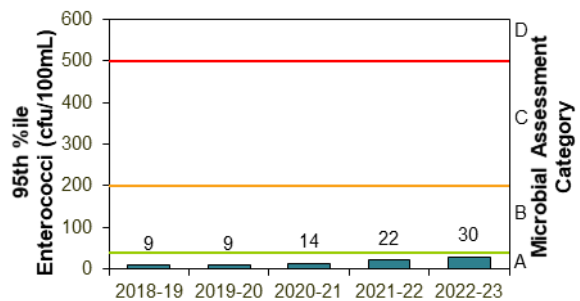
The site has been monitored since 2011.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Oct 2018 to Apr 2023	97%	100	Stable

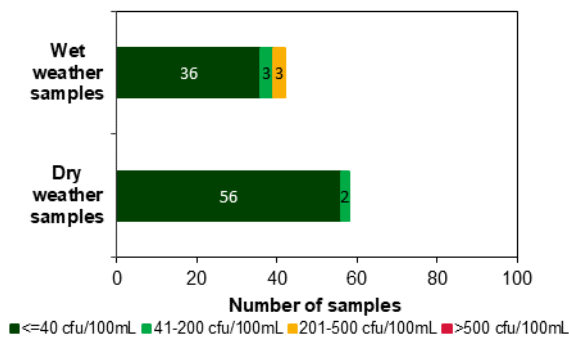
Sanitary inspection: Low



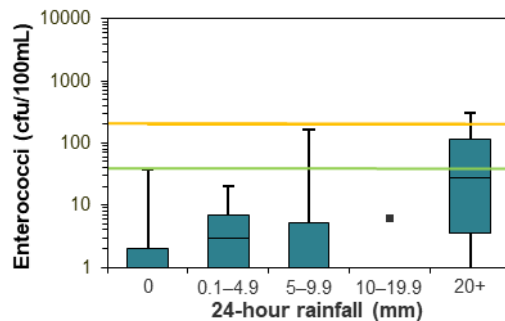
Microbial Assessment Category: A



Dry and wet weather water quality



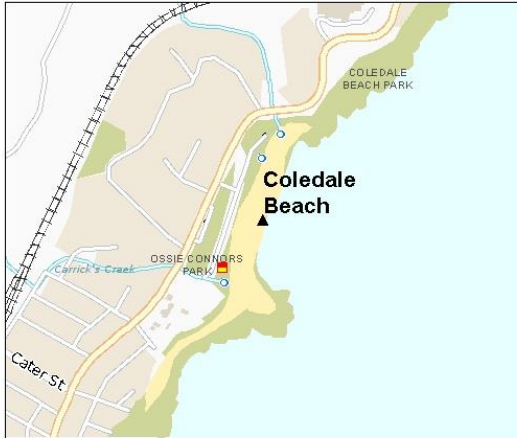
Water quality in response to rainfall



Coledale Beach



Beach grade:



Coledale Beach is 300 m long and is backed by a small grass reserve and campsite. Lifeguards patrol the beach from September to April.

The Beach Suitability Grade of Very Good indicates microbial water quality is considered suitable for swimming almost all of the time, with few significant sources of faecal contamination.

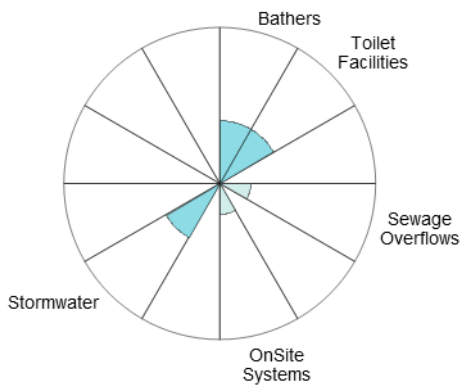
Enterococci levels generally increased with increasing rainfall, occasionally exceeding the safe swimming limit after 5 mm or more of rain, and often after 20 mm or more.

See 'How to read this report' for key to map.

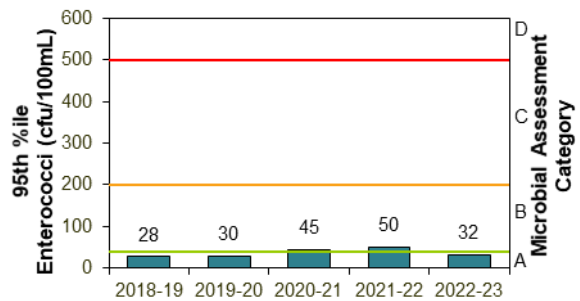
The site has been monitored since 2011.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Nov 2018 to Apr 2023	100%	100	Improved

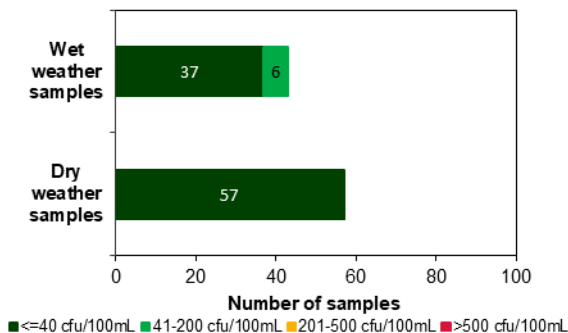
Sanitary inspection: Low



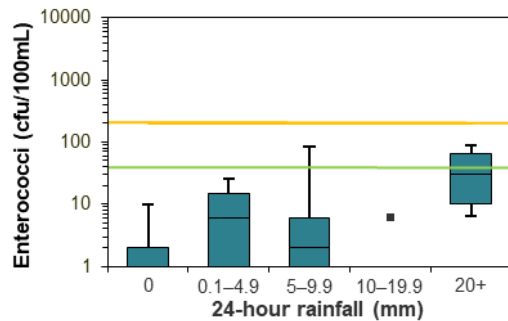
Microbial Assessment Category: A



Dry and wet weather water quality

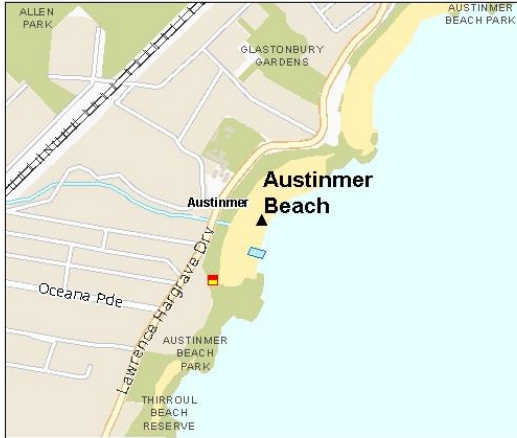


Water quality in response to rainfall



Austinmer Beach

Beach grade: **VG**



Austinmer is a small beach with ocean baths on the southern rock platform. Lifeguards patrol the beach from September to April.

The Beach Suitability Grade of Very Good indicates microbial water quality is considered suitable for swimming almost all of the time, with few significant sources of faecal contamination.

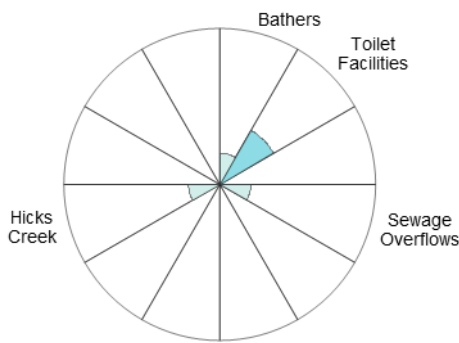
Enterococci levels increased slightly with increasing rainfall, occasionally exceeding the safe swimming limit in response to 10 mm or more of rain.

See 'How to read this report' for key to map.

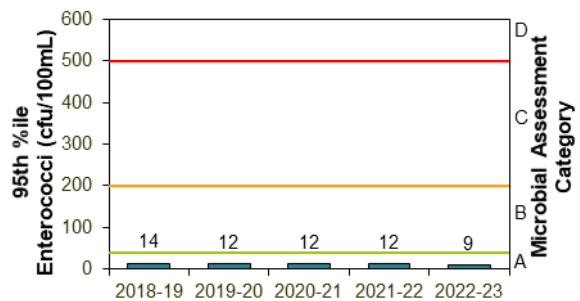
The site has been monitored since 2006.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Nov 2020 to Apr 2023	100%	100	Stable

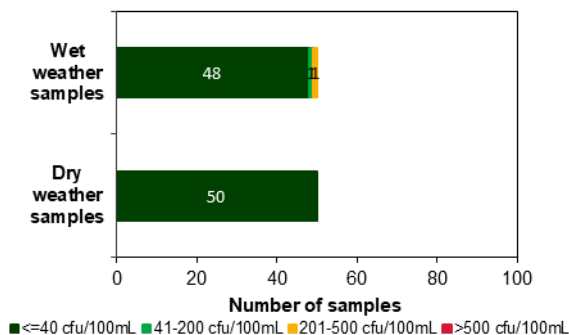
Sanitary inspection: Low



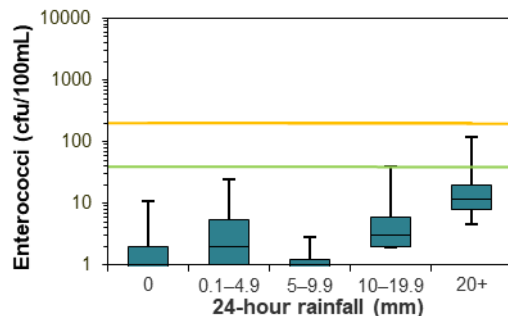
Microbial Assessment Category: A



Dry and wet weather water quality



Water quality in response to rainfall



Thirroul Beach

Beach grade:



Thirroul Beach is 1 km long and backed by a grassed reserve. Lifeguards patrol the beach from September to April.

The Beach Suitability Grade of Good indicates microbial water quality is considered suitable for swimming most of the time but can be susceptible to pollution after rain, from several potential sources of faecal contamination including stormwater and Flanagans Creek.

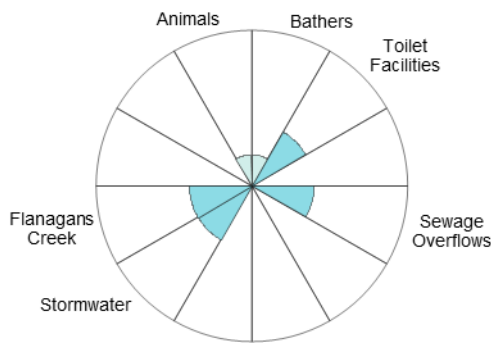
Enterococci levels generally increased with increasing rainfall, occasionally exceeding the safe swimming limit after light rain, and often after 20 mm or more.

See 'How to read this report' for key to map.

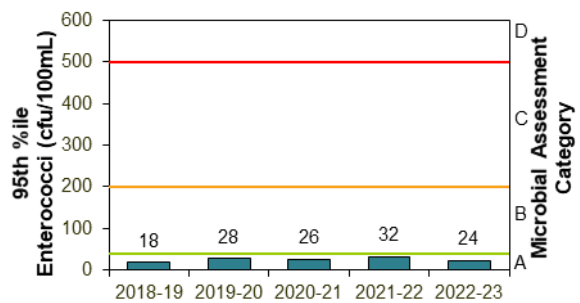
The site has been monitored since 2006.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Nov 2020 to Apr 2023	98%	100	Stable

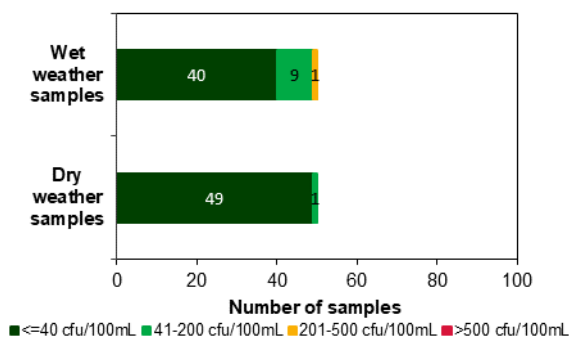
Sanitary inspection: Moderate



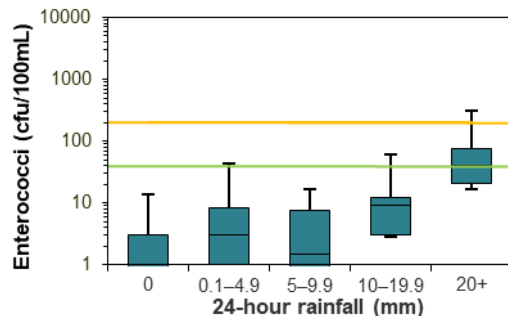
Microbial Assessment Category: A



Dry and wet weather water quality

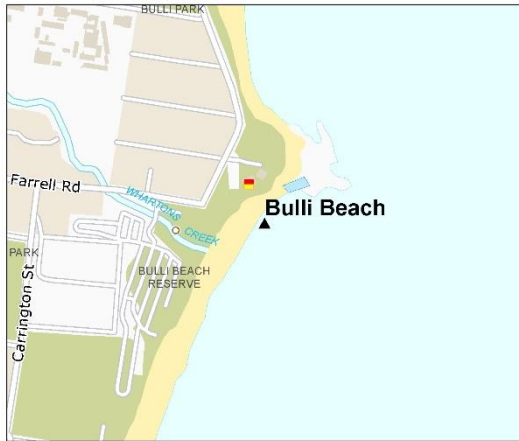


Water quality in response to rainfall



Bulli Beach

Beach grade: G



Bulli beach is at the northern end of a 900 m long beach. The beach is patrolled from September to April.

The Beach Suitability Grade of Good indicates microbial water quality is considered suitable for swimming most of the time but may be susceptible to pollution after rain, with several potential sources of faecal contamination, including discharge from Whartons Creek.

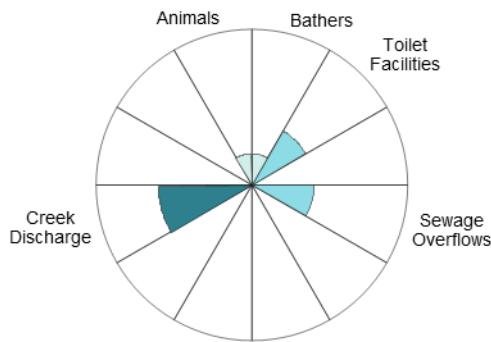
Enterococci levels generally increased with increasing rainfall, occasionally exceeding the safe swimming limit after light rain, and often after 20 mm or more.

See 'How to read this report' for key to map.

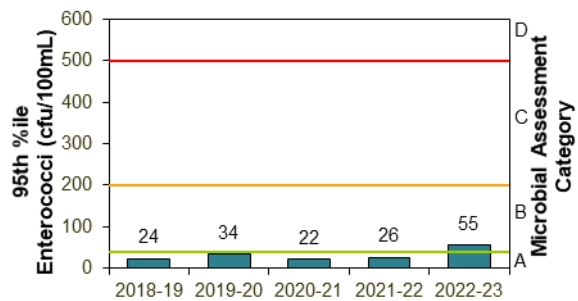
The site has been monitored since 1996.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Sep 2021 to Apr 2023	98%	100	Stable

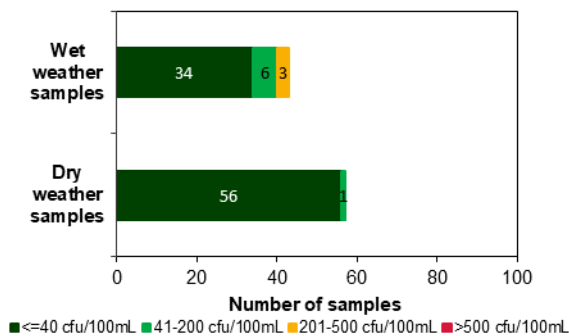
Sanitary inspection: Moderate



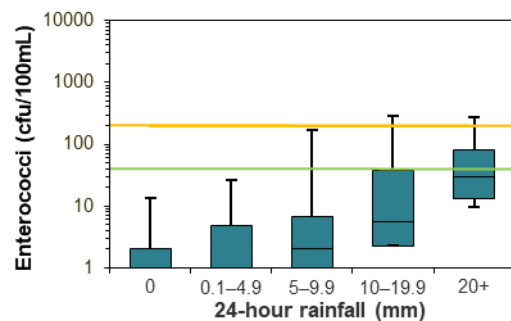
Microbial Assessment Category: B



Dry and wet weather water quality

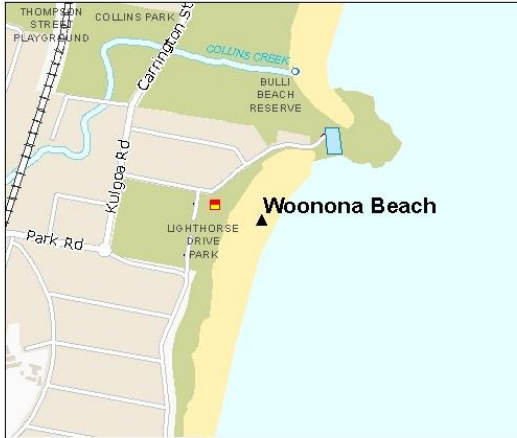


Water quality in response to rainfall



Woonona Beach

Beach grade: VG



Woonona Beach is at the northern end of a 2 km stretch of beach. Lifeguards patrol the beach from September to April.

The Beach Suitability Grade of Very Good indicates microbial water quality is considered suitable for swimming almost all of the time, with few potential sources of faecal contamination.

Enterococci levels generally increased with increasing rainfall, often exceeding the safe swimming limit in response to 20 mm or more of rain.

See 'How to read this report' for key to map.

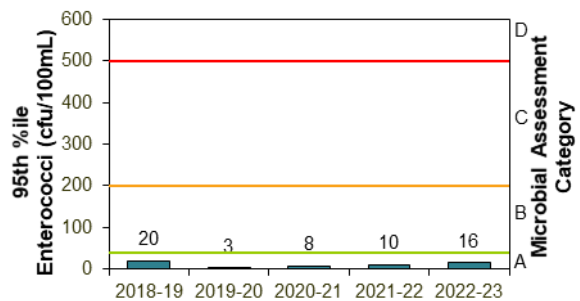
The site has been monitored since 1996.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Sep 2021 to Apr 2023	100%	100	Stable

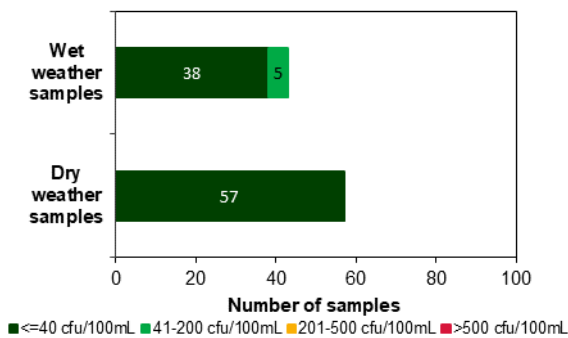
Sanitary inspection: Low



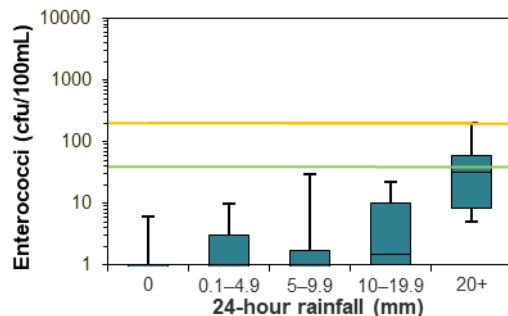
Microbial Assessment Category: A



Dry and wet weather water quality

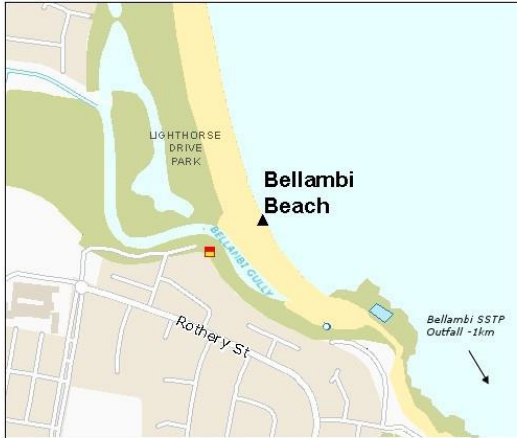


Water quality in response to rainfall



Bellambi Beach

Beach grade: G



Bellambi Beach is at the southern end of a 2 km stretch of beach. Lifeguards patrol the beach from September to April.

The Beach Suitability Grade of Good indicates microbial water quality is considered suitable for swimming most of the time but may be susceptible to pollution after rain, with several potential sources of faecal contamination, including discharge from Bellambi Gully.

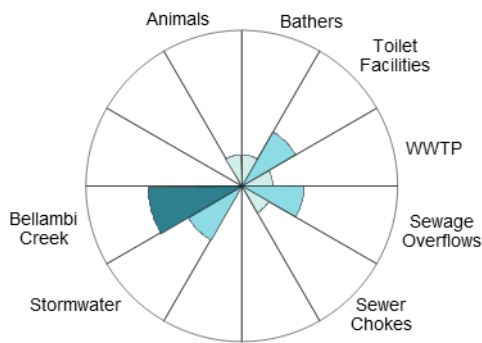
Enterococci levels increased with increasing rainfall, occasionally exceeding the safe swimming limit after light rain, and often after 5 mm or more.

See 'How to read this report' for key to map.

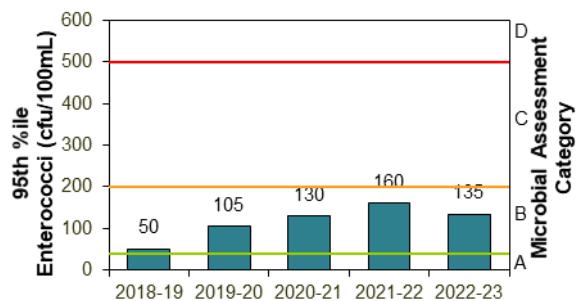
The site has been monitored since 1996.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Sep 2021 to Apr 2023	96%	100	Stable

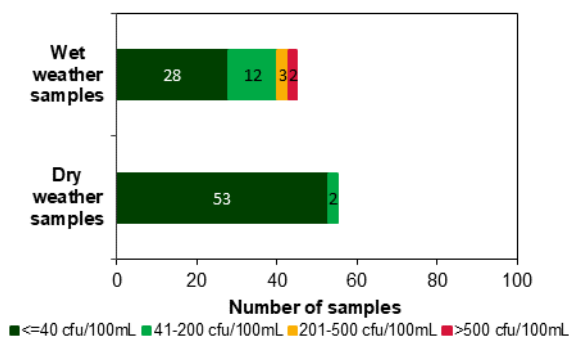
Sanitary inspection: Moderate



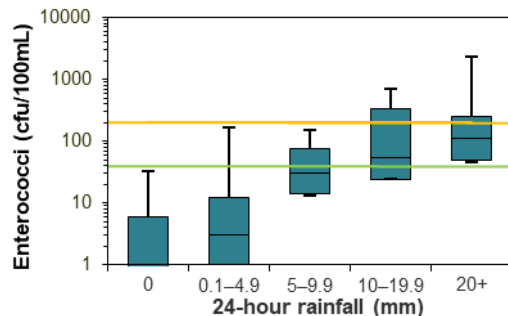
Microbial Assessment Category: B



Dry and wet weather water quality



Water quality in response to rainfall



Corrimal Beach

Beach grade: G



The beach is 1.4 km long and is backed by a reserve and caravan park. Lifeguards patrol the beach from September to April.

The Beach Suitability Grade of Good indicates microbial water quality is considered suitable for swimming most of the time but may be susceptible to pollution after rain, with several potential sources of faecal contamination, including Towradgi Creek.

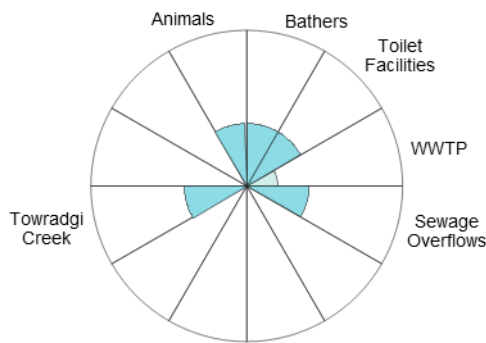
Enterococci levels generally increased with increasing rainfall, occasionally exceeding the safe swimming limit after light rain, and regularly after 20 mm or more.

See 'How to read this report' for key to map.

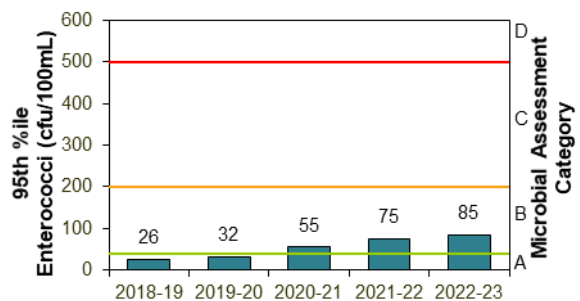
The site has been monitored since 1996.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Sep 2021 to Apr 2023	91%	100	Stable

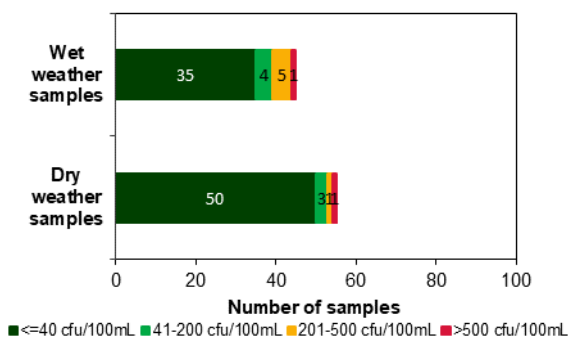
Sanitary inspection: Moderate



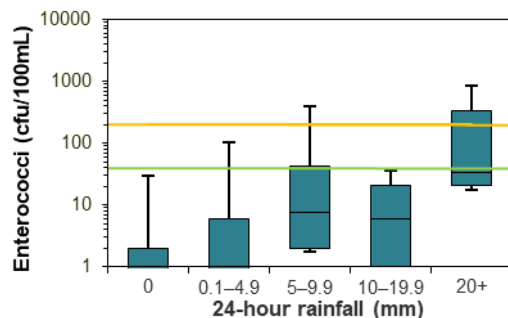
Microbial Assessment Category: B



Dry and wet weather water quality

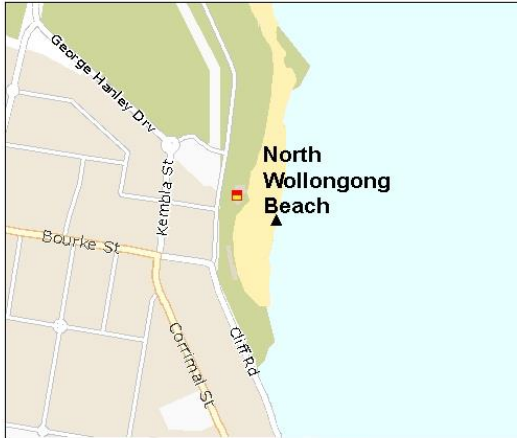


Water quality in response to rainfall



North Wollongong Beach

Beach grade: G



North Wollongong Beach is 500 m long and is backed by steep bluffs, a reserve and a picnic area. Lifeguards patrol the beach all year round.

The Beach Suitability Grade of Good indicates microbial water quality is considered suitable for swimming most of the time but may be susceptible to pollution after heavy rain, with several potential sources of faecal contamination.

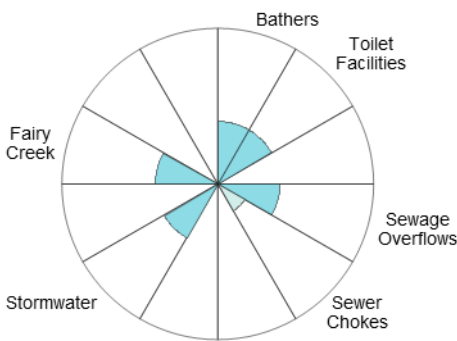
Enterococci levels generally increased with increasing rainfall, often exceeding the safe swimming limit after 20 mm or more of rain.

See 'How to read this report' for key to map.

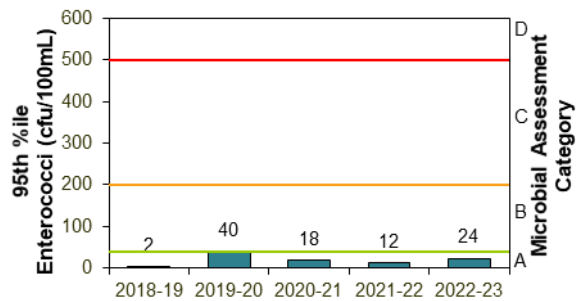
The site has been monitored since 1996, excluding 1997–1998.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Sep 2021 to Apr 2023	97%	100	Stable

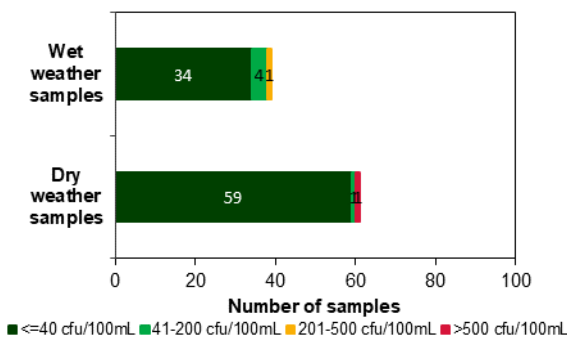
Sanitary inspection: Moderate



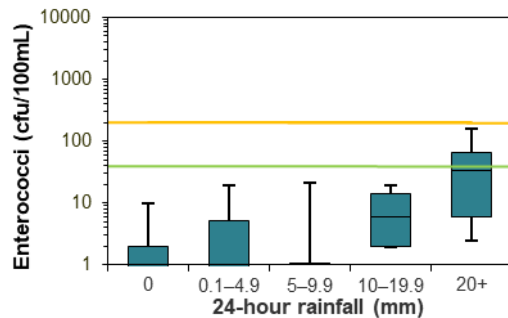
Microbial Assessment Category: A



Dry and wet weather water quality

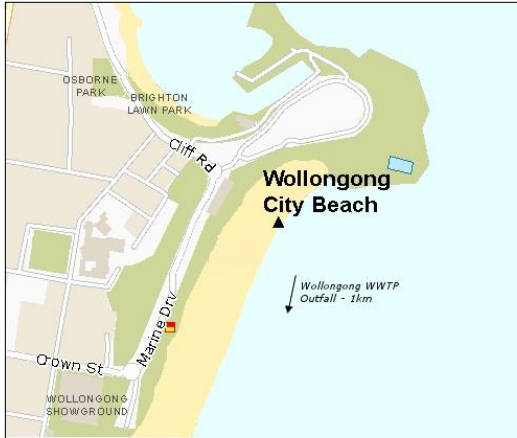


Water quality in response to rainfall



Wollongong City Beach

Beach grade: VG



Wollongong City Beach is at the northern end of a 4 km stretch of beach. Lifeguards patrol the beach from September to April.

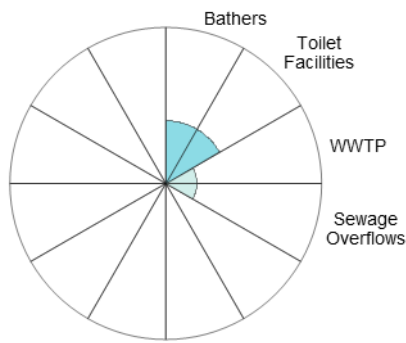
The Beach Suitability Grade of Very Good indicates microbial water quality is considered suitable for swimming almost all of the time, with few potential sources of faecal contamination.

Enterococci levels increased slightly with increasing rainfall, occasionally exceeding the safe swimming limit after 20 mm or more of rain.

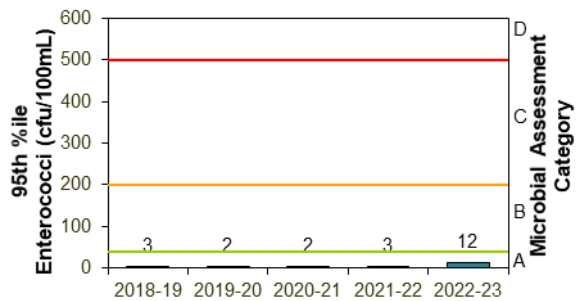
See 'How to read this report' for key to map. The site has been monitored since 1996.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Sep 2021 to Apr 2023	98%	100	Stable

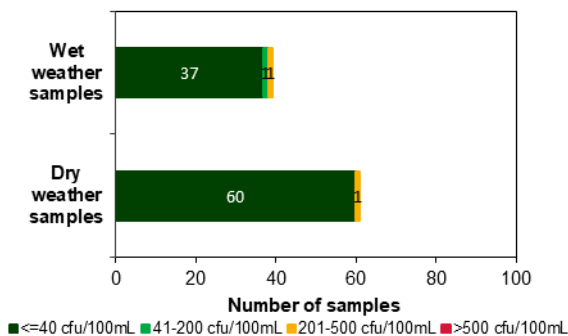
Sanitary inspection: Low



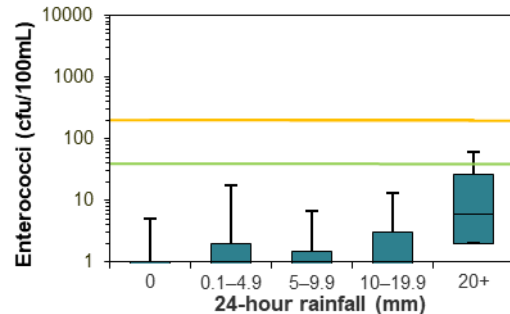
Microbial Assessment Category: A



Dry and wet weather water quality

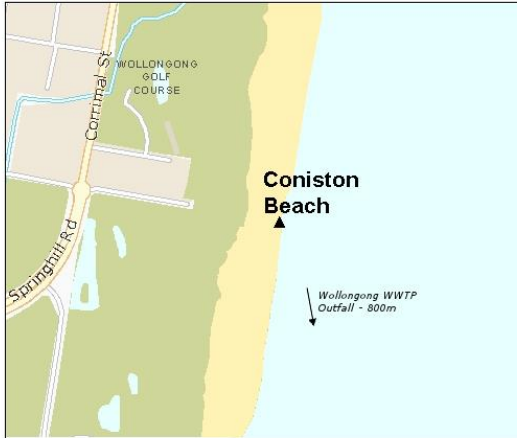


Water quality in response to rainfall



Coniston Beach

Beach grade:



Coniston Beach is in the middle of a 4 km stretch of sand, to the north of Port Kembla, and backed by a golf course.

The Beach Suitability Grade of Good indicates microbial water quality is considered suitable for swimming most of the time but may be susceptible to pollution after heavy rain, with several potential sources of faecal contamination.

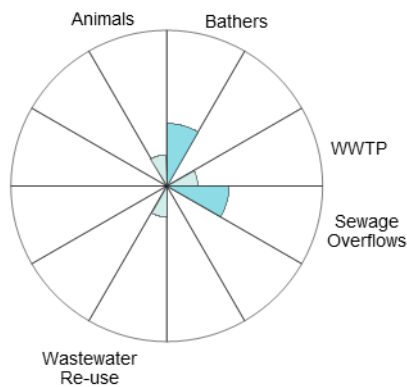
Enterococci levels increased slightly with increasing rainfall, occasionally exceeding the safe swimming limit in response to 20 mm or more of rain.

See 'How to read this report' for key to map.

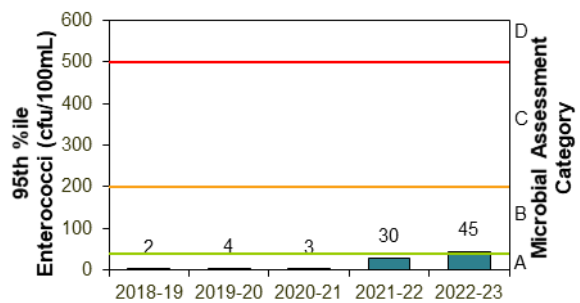
The site has been monitored since 1996.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Sep 2021 to Apr 2023	90%	100	Declined

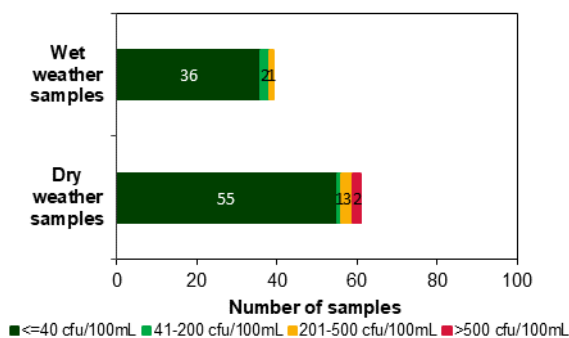
Sanitary inspection: Low



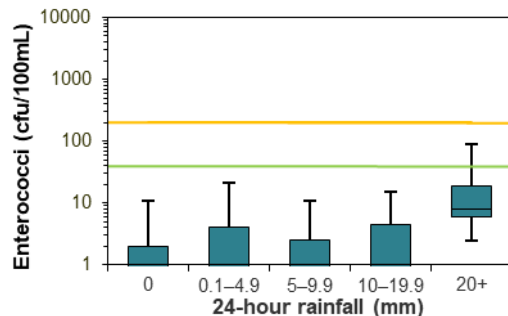
Microbial Assessment Category: B



Dry and wet weather water quality

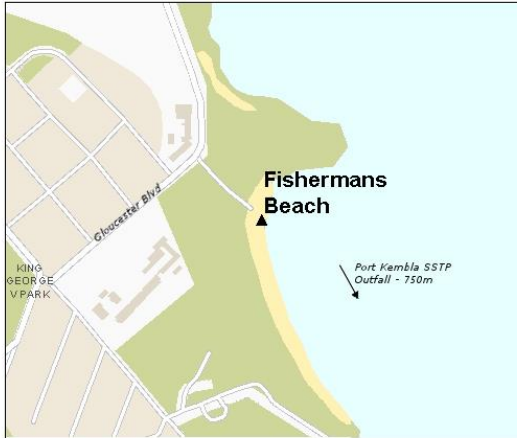


Water quality in response to rainfall



Fishermans Beach

Beach grade:



Fishermans Beach is a small, north-east facing beach backed by high cliffs.

The Beach Suitability Grade of Very Good indicates microbial water quality is considered suitable for swimming almost all of the time, with few potential sources of faecal contamination.

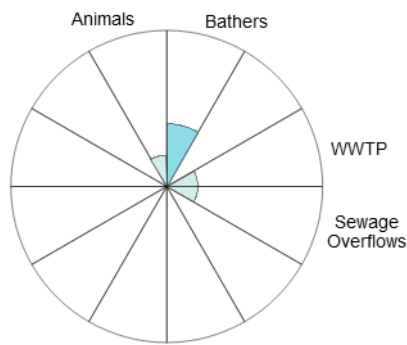
Enterococci levels increased slightly with increasing rainfall, occasionally exceeding the safe swimming limit in response to 20 mm or more of rain.

The site has been monitored since 1996.

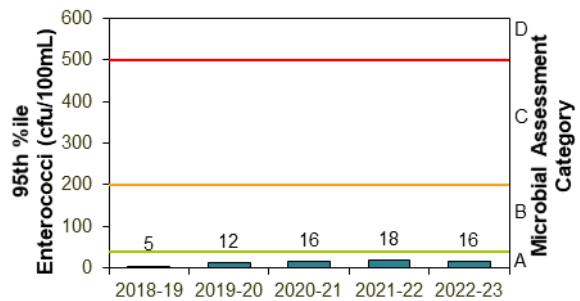
See 'How to read this report' for key to map.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Sep 2021 to Apr 2023	98%	100	Stable

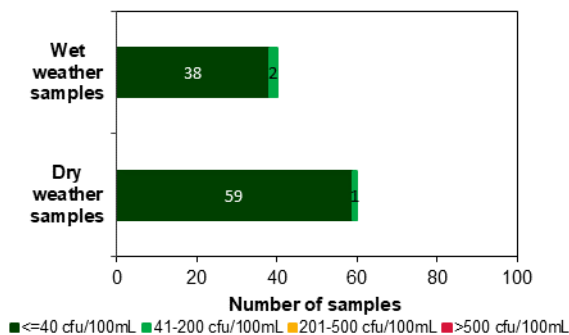
Sanitary inspection: Low



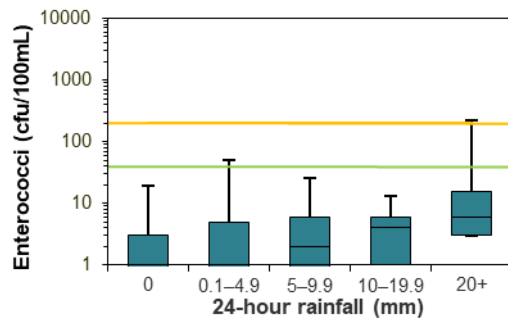
Microbial Assessment Category: A



Dry and wet weather water quality



Water quality in response to rainfall



Port Kembla Beach

Beach grade: G



Port Kembla Beach is in the northern corner of a long stretch of beach. Lifeguards patrol the beach from September to April.

The Beach Suitability Grade of Good indicates microbial water quality is considered suitable for swimming most of the time but may be susceptible to pollution after rain, with several potential sources of faecal contamination including stormwater.

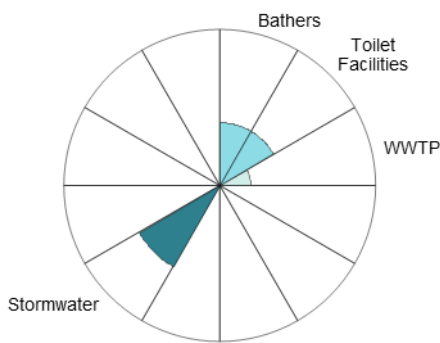
Enterococci levels generally increased with increasing rainfall, occasionally exceeding the safe swimming limit after light rain, and often after 20 mm or more.

See 'How to read this report' for key to map.

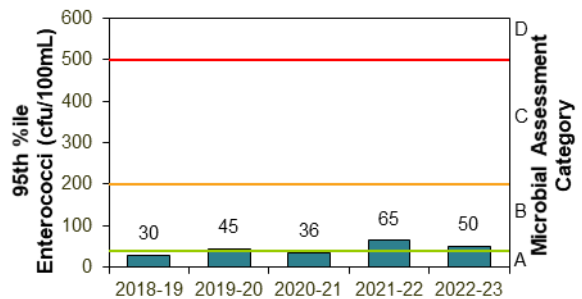
The site has been monitored since 1996.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Sep 2021 to Apr 2023	100%	100	Stable

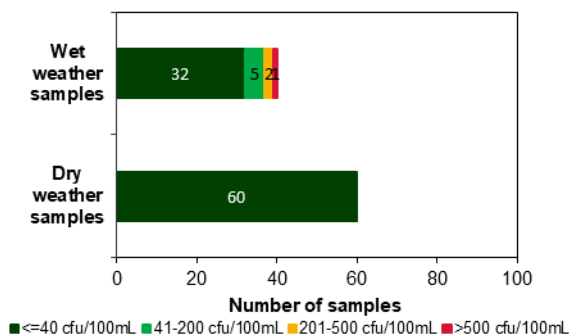
Sanitary inspection: Moderate



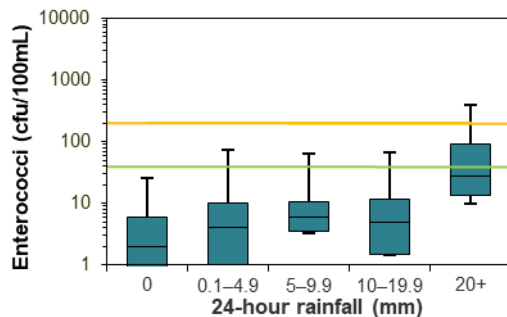
Microbial Assessment Category: B



Dry and wet weather water quality



Water quality in response to rainfall



Shellharbour City Council

Overall results



Two of 3 swimming sites were graded as Very Good or Good in 2022–2023. This is a decline from the previous year.

Percentage of sites graded as Very Good or Good

	2020–2021	2021–2022	2022–2023	Trend
Ocean beaches (2 sites)	100%	100%	100%	—
Lake/lagoon sites (1 sites)	100%	100%	0%	↘

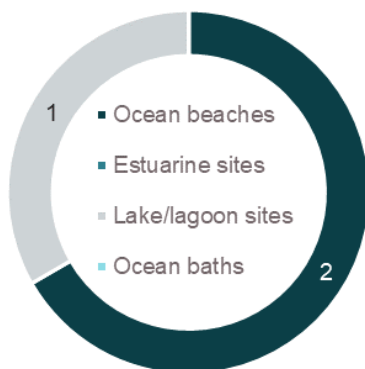
Three swimming sites were monitored in the Shellharbour local government area. All 3 locations were monitored by Sydney Water. Samples were collected every sixth day throughout the year.

See the section on **How to read this report** on page 35 for an explanation of the graphs, tables and Beach Suitability Grades.

Best beaches

Shellharbour Beach.

This site had excellent water quality and was suitable for swimming almost all of the time.



Site types in Shellharbour City Council

Swimming sites monitored in the Shellharbour region include ocean beaches and a lake/lagoon swimming site in Lake Illawarra, with each site type having a different response to rainfall-related impacts.

In general, lake/lagoon swimming sites do not perform as well as ocean beaches, due to lower levels of flushing increasing the time needed to disperse and dilute pollution inputs, taking longer to recover from stormwater events.

As a general precaution swimming should be avoided during and for at least one day after heavy rain at ocean beaches, and for up to 3 days in lake/lagoon areas, or if there are signs of stormwater pollution such as discoloured water or floating debris.

Ocean beaches



Beach Suitability Grades for Shellharbour City Council ocean beaches

Shellharbour Beach continued to be graded as Very Good in 2022–2023, consistent with previous years. This site had excellent water quality and was suitable for swimming almost all of the time.

Warilla Beach was graded as Good in 2022–2023, consistent with the previous year. While microbial water quality was suitable for swimming 100% of the time during dry weather conditions, elevated enterococci levels were regularly recorded following heavy rain.

It is recommended that swimming be avoided at ocean beaches during and for up to one day following rainfall, or if there are signs of pollution such as discoloured water, flowing drains or floating debris.

Lake/lagoon swimming sites



Beach Suitability Grades for Shellharbour City Council lake/lagoon swimming sites

Entrance Lagoon Beach was graded as Poor in 2022–2023, downgraded from Good in the previous year. Water quality at this site was mostly suitable for swimming during dry weather conditions, with 78% of dry weather samples within the safe swimming limit when there had been no rain in the previous 24 hours. Enterococci levels increased with increasing rainfall and were often recorded after light rain. The swimming site is located within the entrance of Lake Illawarra and has lower levels of flushing. Due to this, the site can retain pollution inputs and take longer to recover from the impacts of stormwater. Water quality at this site may be impacted by contaminants discharged from Lake Illawarra, and stormwater during and following rainfall.

Swimming should be avoided during and for up to 3 days following rainfall, or if there are signs of pollution such as discoloured water, flowing drains or floating debris.



Sampling sites and Beach Suitability Grades in Shellharbour City Council

Entrance Lagoon Beach

Beach grade: P



See 'How to read this report' for key to map.

Entrance Lagoon Beach is on the southern shore of the entrance to Lake Illawarra and is partly enclosed by a rock breakwater.

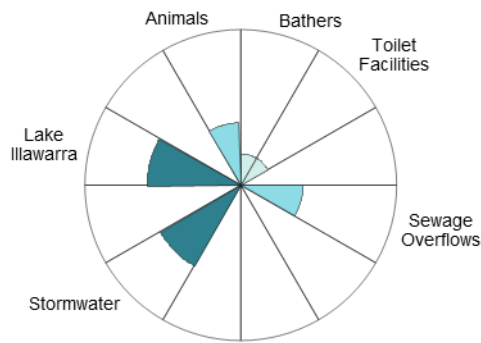
The Beach Suitability Grade of Poor indicates microbial water quality is susceptible to faecal pollution, particularly after rainfall and occasionally during dry weather conditions, with several potential sources of faecal contamination including stormwater and upstream sources in Lake Illawarra.

Enterococci levels increased with increasing rainfall, occasionally exceeding the safe swimming limit in response to no rain and often after rainfall.

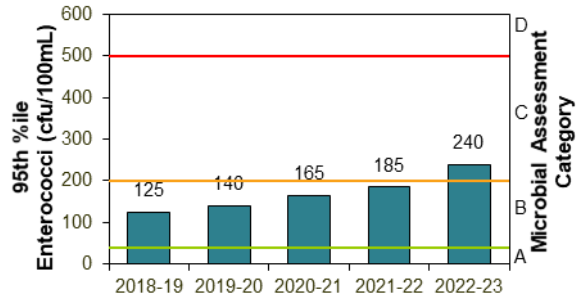
The site has been monitored since 2007.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Lake/Lagoon	Sep 2021 to Apr 2023	78%	100	Declined

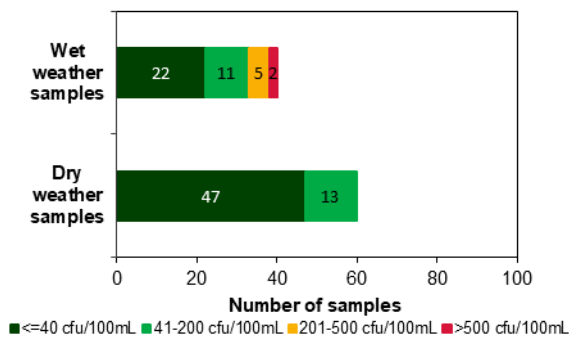
Sanitary inspection: Moderate



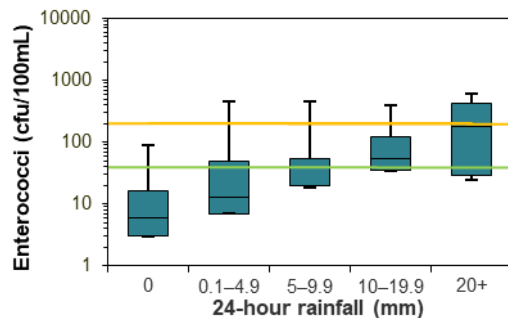
Microbial Assessment Category: C



Dry and wet weather water quality

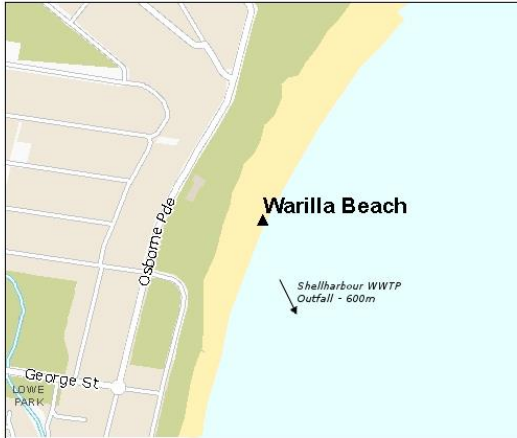


Water quality in response to rainfall



Warilla Beach

Beach grade: **G**



Warilla beach is almost 2 km long, protected by prominent headlands. Lifeguards patrol the beach from September to April.

The Beach Suitability Grade of Good indicates microbial water quality is considered suitable for swimming most of the time but may be susceptible to pollution after rain, with several potential sources of faecal contamination.

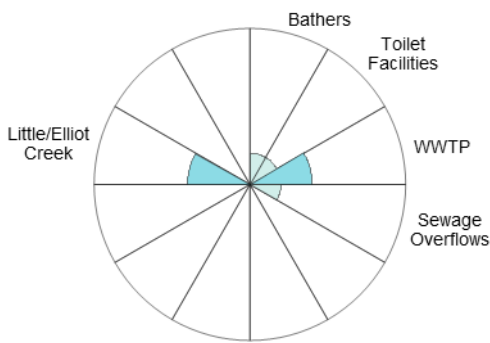
Enterococci levels generally increased with increasing rainfall, occasionally exceeding the safe swimming limit after 5 mm, and often after 20 mm or more.

See 'How to read this report' for key to map.

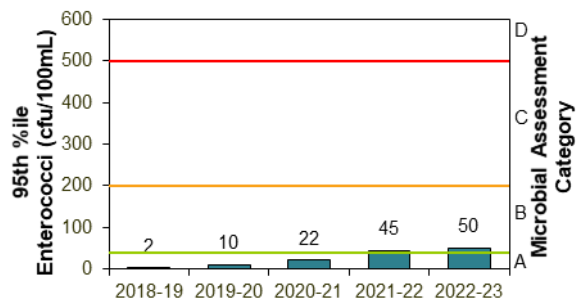
The site has been monitored since 1996.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Sep 2021 to Apr 2023	100%	100	Stable

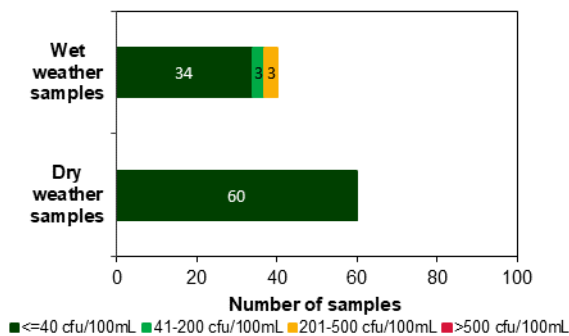
Sanitary inspection: Low



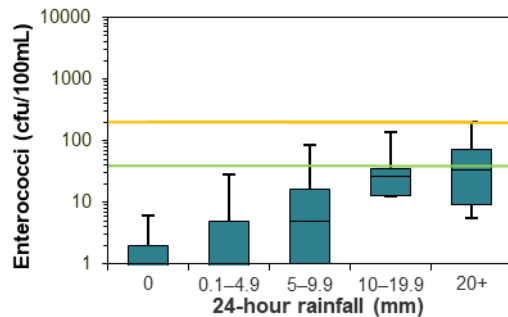
Microbial Assessment Category: B



Dry and wet weather water quality



Water quality in response to rainfall



Shellharbour Beach

Beach grade:



Shellharbour Beach is at the southern end of a small, east facing beach. Lifeguards patrol the beach from October to April.

The Beach Suitability Grade of Very Good indicates microbial water quality is considered suitable for swimming almost all of the time, with few significant sources of faecal contamination.

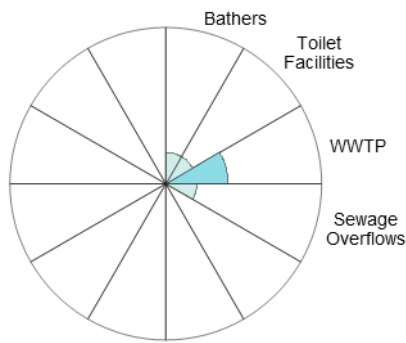
Enterococci levels increased slightly with increasing rainfall, occasionally exceeding the safe swimming limit in response rainfall.

See 'How to read this report' for key to map.

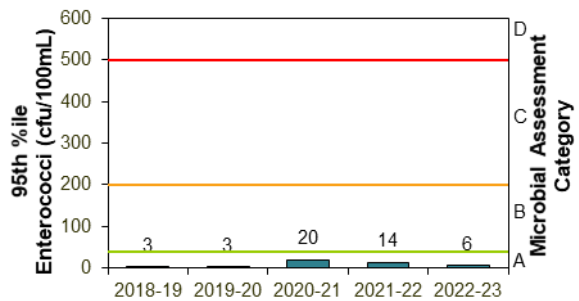
The site has been monitored since 1996.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Sep 2021 to Apr 2023	100%	100	Stable

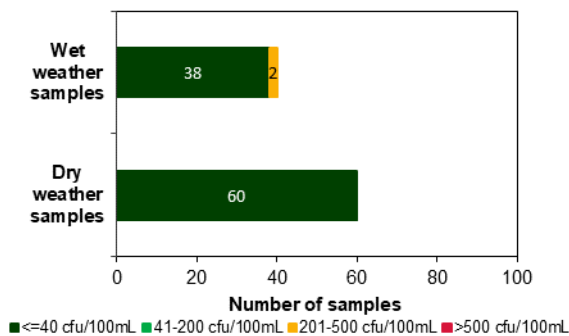
Sanitary inspection: Low



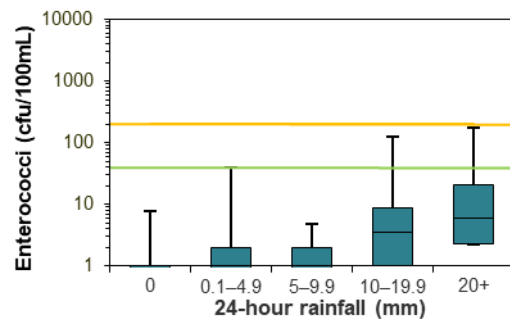
Microbial Assessment Category: A



Dry and wet weather water quality



Water quality in response to rainfall



Kiama Municipal Council

Overall results



All 5 swimming sites were graded as Very Good or Good in 2022–2023. This is an excellent result and consistent with previous years.

Percentage of sites graded as Very Good or Good

	2020– 2021	2021– 2022	2022– 2023	Trend
Ocean beaches (5 sites)	100%	100%	100%	—————

Five swimming sites were monitored in the Kiama local government area. Four locations were monitored by Sydney Water with samples collected every sixth day. Three of these locations were monitored throughout the year. One location was monitored between October and April. One location was monitored by Kiama Municipal Council. Samples were collected weekly between October and April and sampling and laboratory analysis was fully funded by the council.

See the section on **How to read this report** on page 35 for an explanation of the graphs, tables and Beach Suitability Grades.

Best beaches

Boyd's Jones Beach, Bombo Beach, Surf Beach Kiama, Werri Beach and Seven Mile Beach.

These sites had good water quality and were suitable for swimming most of the time.



Site types in Kiama Municipal Council

Ocean beaches were the only site type monitored in the Kiama region.

As a general precaution swimming should be avoided during and for at least one day after heavy rain at ocean beaches, or if there are signs of stormwater pollution such as discoloured water or floating debris.



Beach Suitability Grades for Kiama Municipal Council ocean beaches

Ocean beaches

All 5 ocean beaches were graded as Good in 2022–2023.

Boyd's Jones Beach, Bombo Beach, Surf Beach Kiama, Werri Beach and Seven Mile Beach were graded as Good in 2022–2023. Werri Beach was downgraded from Very Good to Good due to a decline in microbial water quality. While these beaches were mostly suitable for swimming during dry weather conditions, elevated enterococci levels were occasionally recorded following light rain, and more often after moderate to heavy rainfall.

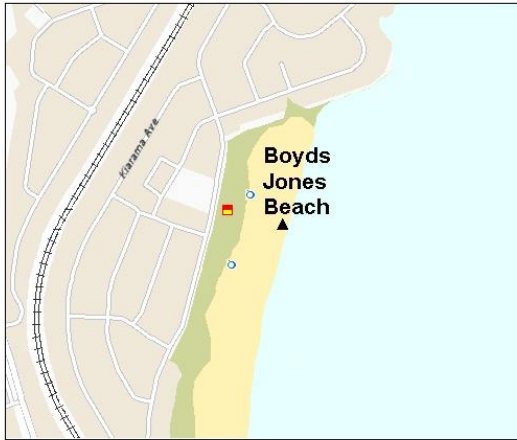
It is recommended to avoid swimming during and for at least one day following rainfall or if there are signs of stormwater pollution such as discoloured water and floating debris.



Sampling sites and Beach Suitability Grades in Kiama Municipal Council

Boyd's Jones Beach

Beach grade: G



Boyd's Jones Beach is 1 km long, east facing and backed by dunes. Lifeguards patrol the beach from October to April.

The Beach Suitability Grade of Good indicates microbial water quality is considered suitable for swimming most of the time but may be susceptible to pollution after rain, with several potential sources of faecal contamination.

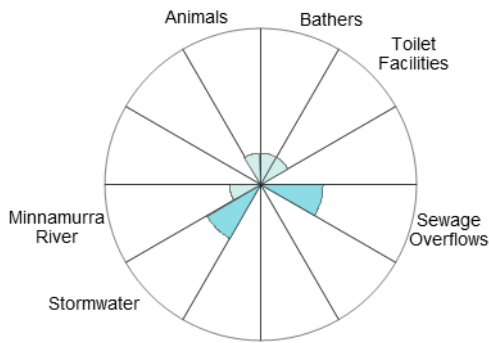
Enterococci levels generally increased with increasing rainfall, occasionally exceeding the safe swimming limit after light rain and often after 10 mm or more.

See 'How to read this report' for key to map.

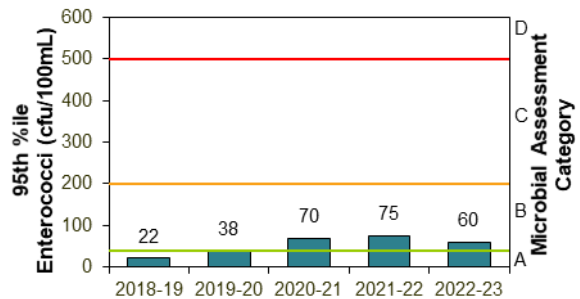
The site has been monitored since 1996.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Sep 2021 to Apr 2023	96%	100	Stable

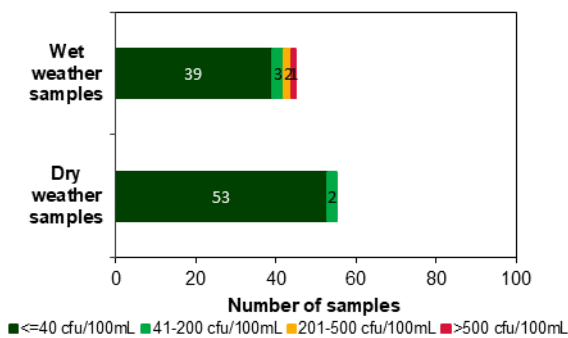
Sanitary inspection: Low



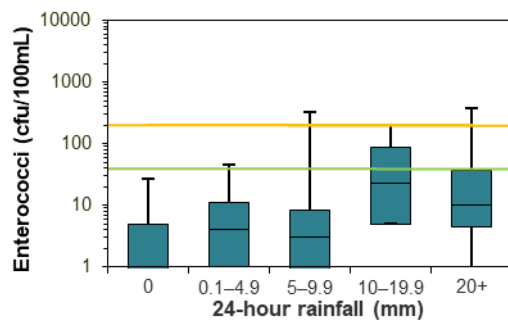
Microbial Assessment Category: B



Dry and wet weather water quality

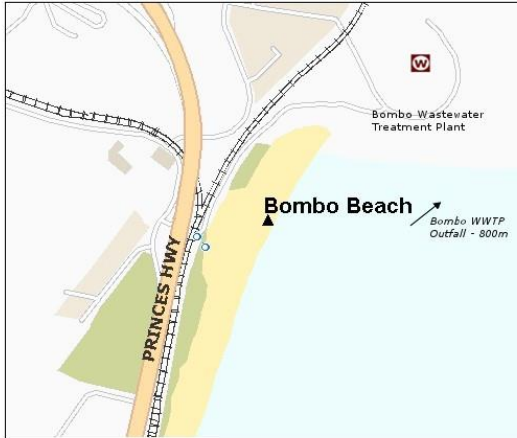


Water quality in response to rainfall



Bombo Beach

Beach grade: **G**



Bombo Beach is backed by a narrow reserve, railway and freeway. Lifeguards patrol the beach over the summer school holidays.

The Beach Suitability Grade of Good indicates microbial water quality is considered suitable for swimming most of the time but may be susceptible to pollution after rain, with several potential sources of faecal contamination.

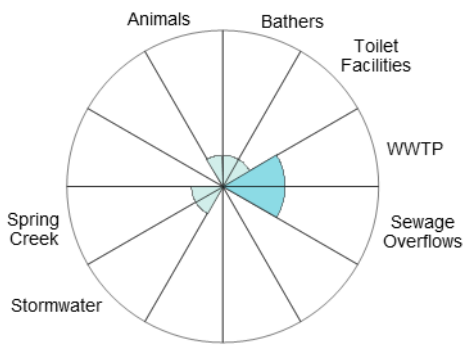
Enterococci levels increased slightly with increasing rainfall, occasionally exceeding the safe swimming limit in response to 5 mm or more of rain.

See 'How to read this report' for key to map.

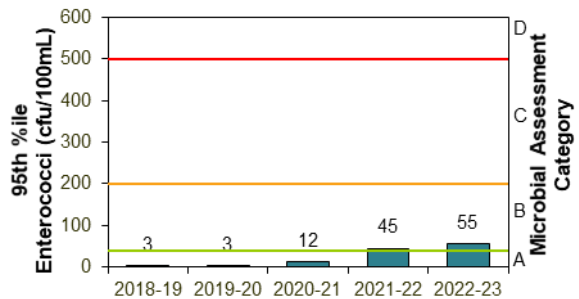
The site has been monitored since 1996.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Sep 2021 to Apr 2023	96%	100	Stable

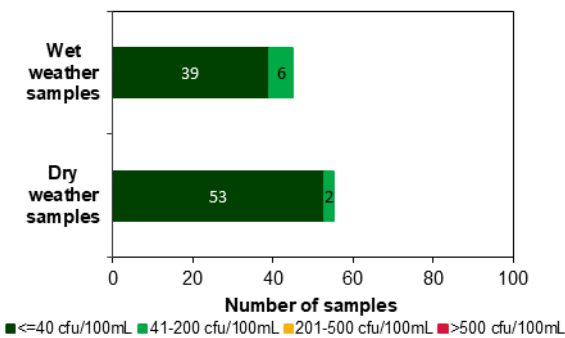
Sanitary inspection: Low



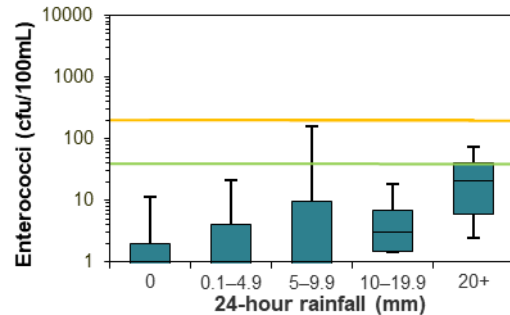
Microbial Assessment Category: B



Dry and wet weather water quality



Water quality in response to rainfall



Surf Beach Kiama

Beach grade: G



Surf Beach in Kiama is 250 m long and backed by a park and surf club. Lifeguards patrol the beach from September to April.

The Beach Suitability Grade of Good indicates microbial water quality is considered suitable for swimming most of the time but may be susceptible to pollution after rain, with several potential sources of faecal contamination including stormwater.

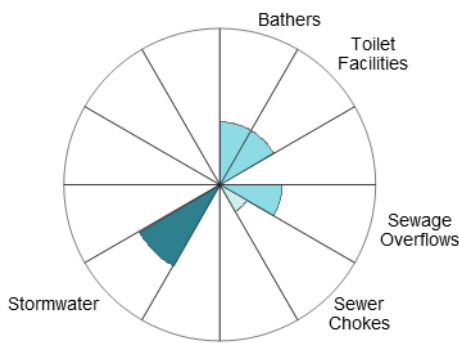
Enterococci levels increased with increasing rainfall, occasionally exceeding the safe swimming limit after little or no rain, and often after 5 mm or more.

See 'How to read this report' for key to map.

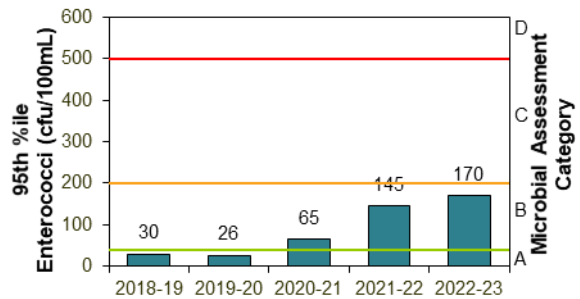
The site has been monitored since 1996.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Nov 2020 to Apr 2023	89%	100	Stable

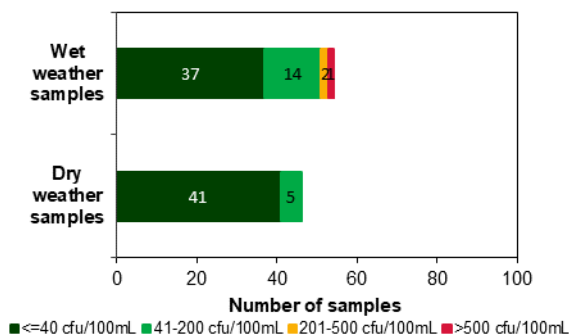
Sanitary inspection: Moderate



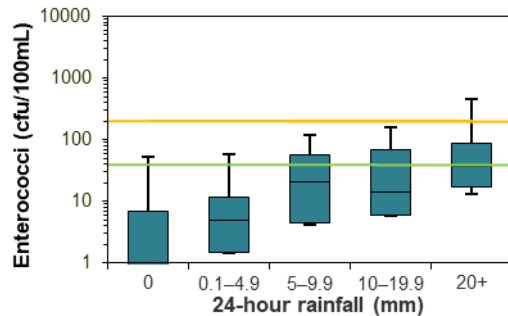
Microbial Assessment Category: B



Dry and wet weather water quality



Water quality in response to rainfall



Werri Beach

Beach grade: G



Werri Beach is 1.7 km long with an ocean pool on the southern rock platform. It is patrolled over the summer school holidays.

The Beach Suitability Grade of Good indicates microbial water quality is considered suitable for swimming most of the time but may be susceptible to pollution after rain, with several potential sources of faecal contamination including stormwater.

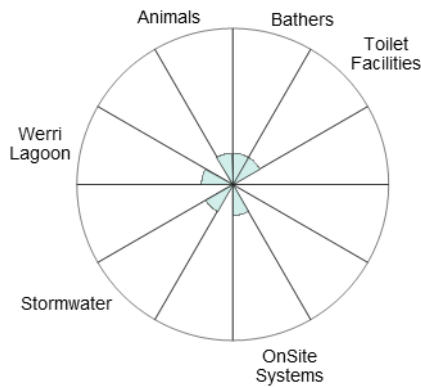
Enterococci levels generally increased with increasing rainfall, occasionally exceeding the safe swimming limit after 5 mm or more of rain, and often after 20 mm or more.

See 'How to read this report' for key to map.

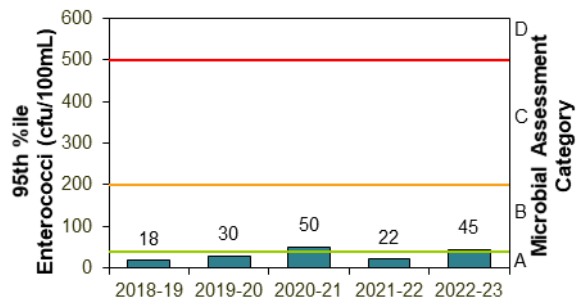
The site has been monitored since 1996.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Sep 2021 to Apr 2023	98%	100	Declined ↓

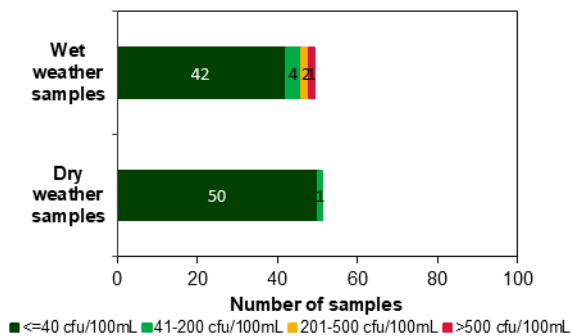
Sanitary inspection: Low



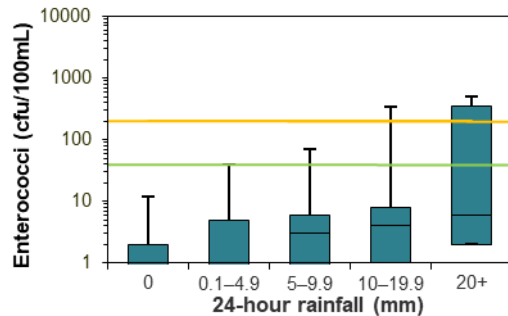
Microbial Assessment Category: B



Dry and wet weather water quality



Water quality in response to rainfall



Seven Mile Beach (Gerroa)

Beach grade: **G**



Seven Mile Beach at Gerroa is at the northern end of a long open beach. Lifeguards patrol during the summer school holidays.

The Beach Suitability Grade of Good indicates microbial water quality is considered suitable for swimming most of the time but may be susceptible to pollution after rain, with several potential sources of faecal contamination.

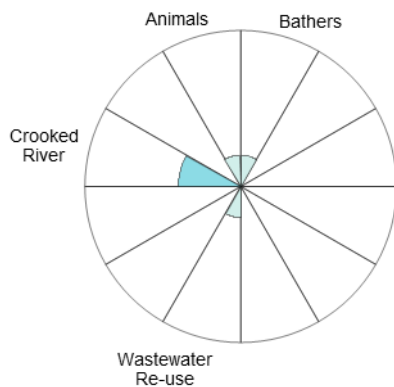
Enterococci levels increased slightly with increasing rainfall, occasionally exceeding the safe swimming limit after light rain, and regularly after 20 mm or more.

See 'How to read this report' for key to map.

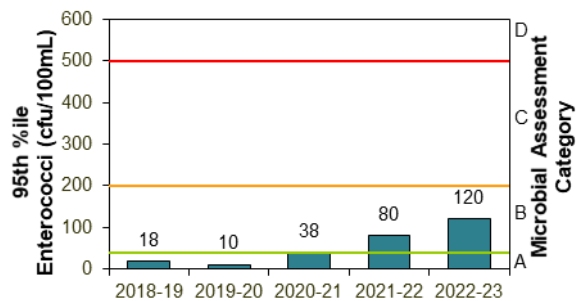
The site has been monitored since 2011.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Feb 2020 to Apr 2023	100%	100	Stable

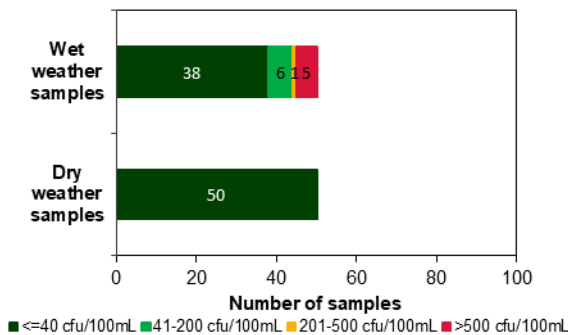
Sanitary inspection: Low



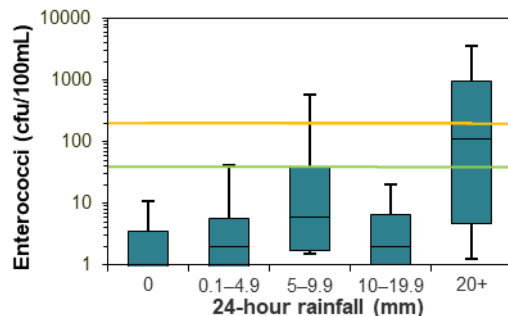
Microbial Assessment Category: B



Dry and wet weather water quality



Water quality in response to rainfall



How to read this report

Beach Suitability Grades

Beach Suitability Grades provide an assessment of the suitability of a swimming location for recreation over time and are based on a combination of sanitary inspection (identification and rating of potential pollution sources at a beach) and microbial assessment (water quality measurements gathered over previous years). There are 5 grades ranging from Very Good to Very Poor:

Very Good

Location has generally excellent microbial water quality and very few potential sources of faecal pollution. Water is considered suitable for swimming almost all of the time

Good

Location has generally good microbial water quality and water is considered suitable for swimming most of the time. Swimming should be avoided during and for up to one day following heavy rain at ocean beaches and up to 3 days at estuarine sites

Fair

Microbial water quality is generally suitable for swimming, but because of the presence of significant sources of faecal contamination, extra care should be taken to avoid swimming during and for up to 3 days following rainfall or if there are signs of pollution such as discoloured water or odour or debris in the water

Poor

Location is susceptible to faecal pollution and microbial water quality is not always suitable for swimming. During dry weather conditions, ensure that the swimming location is free of signs of pollution, such as discoloured water, odour or debris in the water, and avoid swimming at all times during and for up to 3 days following rainfall

Very Poor

Location is very susceptible to faecal pollution and microbial water quality may often be unsuitable for swimming. It is generally recommended to avoid swimming at these sites almost all of the time

Some of the Beach Suitability Grades in this report are **provisional**, as the information required for the analysis is incomplete due to limited bacterial data or limited information on potential pollution sources in a beach catchment.

The guidelines

The National Health and Medical Research Council’s guidelines for managing risks in recreational water (NHMRC 2008) were adopted for use in New South Wales in May 2009. These guidelines have been adopted in all Australian states and territories and are supported by guidance notes developed by the Department of Health Western Australia (WA Department of Health 2007).

Enterococci

The national guidelines advocate the use of enterococci as the single preferred faecal indicator in recreational waters.

These bacteria are excreted in faeces and are rarely present in unpolluted waters. Enterococci have shown a clear dose–response relationship to disease outcomes in marine waters in the northern hemisphere. In accordance with the guidelines, Beachwatch tests for enterococci only. The enterococci density in water samples is analysed in the laboratory using method AS/NZS 4276.9:2007 (Standards Australia 2007).

Enterococci are measured in colony forming units per 100 mL of sample (cfu/100 mL).

Beach Suitability Grades are determined by using the following matrix:

		Microbial Assessment Category			
		A	B	C	D
Sanitary Inspection Category	Very Low	Very Good	Very Good	Follow Up	Follow Up
	Low	Very Good	Good	Follow Up	Follow Up
	Moderate	Good	Good	Poor	Poor
	High	Good	Fair	Poor	Very Poor
	Very High	Follow Up	Fair	Poor	Very Poor

* Follow up occurs when sanitary inspection and water quality data produce potentially incongruent results; further assessment will be required.

Using the Beach Suitability Grade classification matrix, sites assigned a moderate Sanitary Inspection Category can only be rated as Good or Poor, with no option of Fair grades. This can create the impression of a large change in water quality when in fact there need only be a slight increase in bacterial counts to push it over the threshold, with no significant increase in the risk to public health.

Microbial Assessment Category (MAC)

There are 4 Microbial Assessment Categories (A to D) and these are determined from the 95th percentile of an enterococci dataset of at least 100 data points. Each MAC is associated with a risk of illness determined from epidemiological studies. The risks of illness shown below are not those associated with a single data point but are the overall risk of illness associated with an enterococci dataset with that 95th percentile (Wyer et al. 1999).

Risk of illness associated with Microbial Assessment Categories

Category	Enterococci (cfu/100 mL)	Illness risk*
A	≤40	GI illness risk: <1% AFR illness risk: <0.3%
B	41–200	GI illness risk: 1–5% AFR illness risk: 0.3–1.9%
C	201–500	GI illness risk: >5–10% AFR illness risk: >1.9–3.9%
D	>500	GI illness risk: >10% AFR illness risk: >3.9%

* GI = gastrointestinal illness; AFR = acute fever and rash

Calculating the MAC

The 95th percentile is a useful statistic for summarising the distribution of enterococci data at a site. It embodies elements of both the location of the distribution (how high/low the enterococci counts are) and the scale of the distribution (how variable the enterococci counts are).

The 95th percentile values for each of the 4 Microbial Assessment Categories were determined by the World

Health Organization using enterococci data collected from swimming locations across Europe. These values will represent different probabilities of illness if the distribution of enterococci data from swimming locations in New South Wales differs from the European distribution.

In recognition of this issue, Dr Richard Lugg (Department of Health, Western Australia) has developed a Microsoft® Excel tool for calculating a modified 95th percentile that takes into account the distribution of data. The WA Department of Health recommends a minimum of 65 samples, collected from a particular site over 5 consecutive years, to provide sufficient confidence and reliability in the 95th percentile data output. This tool has been used to calculate the 95th percentile values presented in this report and has been adopted for use by other state governments in Australia.

The tool can be downloaded from the WA Government's 'Environmental waters publications' webpage, under *Forms and templates*.

Sanitary Inspection Category (SIC)

More information about the **sanitary inspection** process is available in the Beachwatch Protocol for assessment and management of microbial risks in recreational waters, found on the department's website.

The aim of a sanitary inspection is to identify all sources of faecal contamination that could affect a swimming location and assess the risk to public health posed by these sources. It is an assessment of the likelihood of bacterial contamination from identified pollution sources and should, to some degree, correlate with the bacterial water quality results obtained from sampling.

The main sources of faecal contamination considered in the sanitary inspection are: bathers, toilet facilities, wastewater treatment plants (WWTPs), sewage overflows, sewer chokes, onsite systems, wastewater re-use, stormwater, river discharge, lagoons, boats and animals.

Rivers, lakes and estuaries themselves can be potential sources of faecal contamination to sites located in these waterbodies, with contaminated water from upstream or surrounding areas impacting water quality at the swimming location. This source is captured in river discharge or lagoon category, and shown as the waterbody in the sanitary inspection charts.

Through the sanitary inspection process, beaches are categorised to reflect the overall likelihood of faecal contamination. There are 5 categories: Very Low, Low, Moderate, High and Very High.



Stormwater drain flow
Photo: Beachwatch/DPE

Stormwater in urban areas often contains sewage from leakages, overflows or sewer chokes when the sewerage system fails.

Sewage overflows can occur in wet weather when the network has exceeded capacity due to rainwater entering the system. The mix of sewage and rainwater discharges from designated overflow points and drains to waterways, usually via the stormwater system. Overflows from the sewerage system can also occur in dry weather due to mechanical failure or power outage.

Sewer chokes occur due to blockages in the pipes usually due to tree roots, oil, grease or debris. This causes sewage to back up and escape via sewer inspection points, designed overflow structures or cracks in the pipes, then drain to waterways, usually via the stormwater system.

Explanation of tables

Each region contains tables listing all monitored swimming sites including site type, beach grade and change in grade from the previous year.

The following symbols are used to show the change in beach grade from the previous year:

- Stable
- ↑ Improved
- ↓ Declined

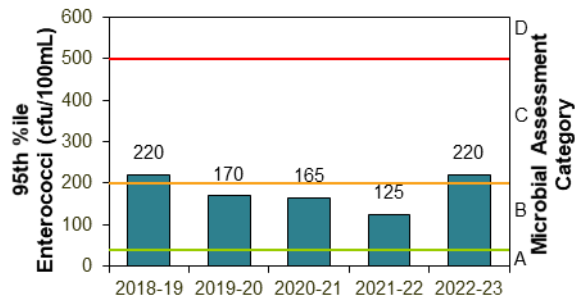
A provisional grade indicates the assessment is based on limited data collected during the assessment period and should not be compared to the beach grade from the previous year.

Explanation of graphs, charts, and information bars on beach pages

Microbial Assessment Category (MAC) chart

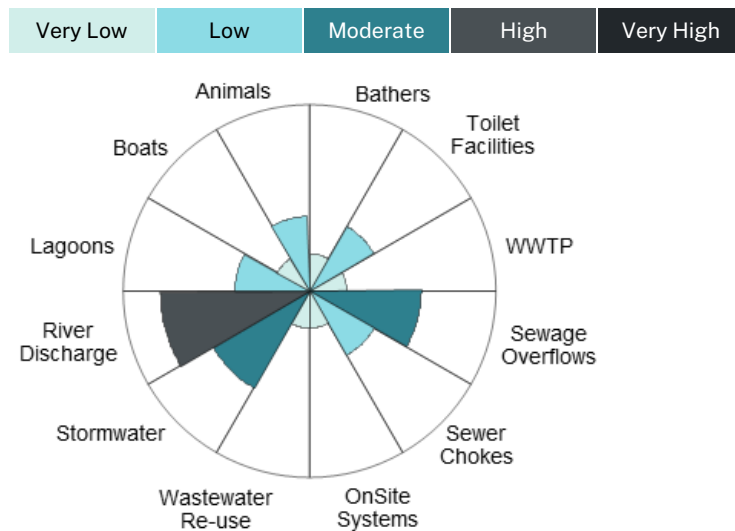
On each beach page, the MACs for the last 5 years are displayed on a simple bar chart. The MAC for the current year is based on enterococci data collected during the assessment period. The bars are labelled with the 95th

percentile value for each year and the thresholds dividing the A, B, C and D categories are marked in green, amber and red for reference.



Sanitary Inspection Category (SIC) chart

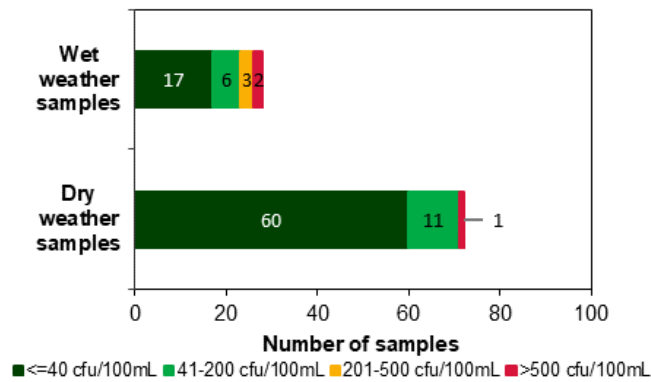
The results of the sanitary inspection for each swimming location are presented in a radar pie chart. The chart shows the likelihood that each identified pollution source will contribute to faecal contamination at a swimming site, as indicated by the size and colour of the segment, ranging from very low (lightest colour) to very high (darkest colour) as shown below. The sum of these contributions is the overall likelihood, or Sanitary Inspection Category.



Wet and dry weather water quality chart

Enterococci levels in wet and dry weather conditions are presented for each swimming location as a bar graph. All data collected during the assessment period is included in the analysis. Dry weather is defined as no rainfall recorded in the previous 24 hours. Each bar is colour coded to show the number of enterococci results up to 40 cfu/100 mL, between 41 and 200 cfu/100 mL, between

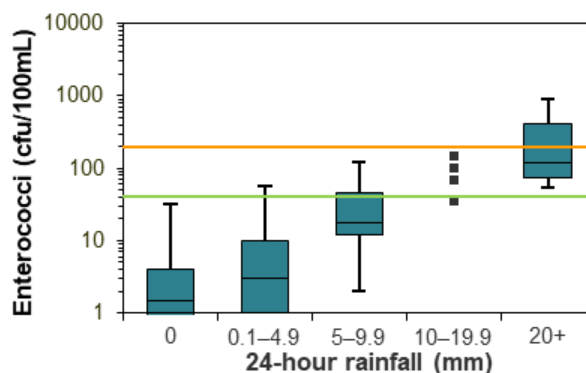
201 and 500 cfu/100 mL and greater than 500 cfu/100 mL. These categories reflect the Microbial Assessment Category thresholds and are coloured on the graph as dark green, light green, amber and red respectively.



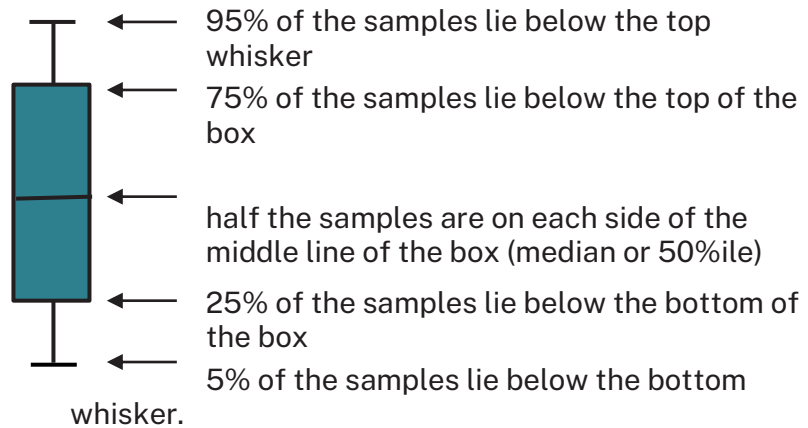
It is expected that swimming sites with lower levels of flushing will show some elevated bacterial results in dry weather samples (no rainfall in the previous 24 hours) due to the longer time needed to recover from a rainfall event. At some estuarine and lake/lagoon swimming locations the impacts of stormwater pollution on beach water quality may be detected up to 3 days after rainfall.

Water quality in response to rainfall

Trends in enterococci levels in response to rainfall are shown using a box plot. For reference, enterococci levels of 40 cfu/100 mL and 200 cfu/100 mL are indicated with a green and orange line, respectively. The 40 cfu/100 mL level is referred to as the ‘safe swimming limit’. The enterococci data were obtained from the last 5 years of monitoring. Rainfall data were obtained from rain gauges situated close to the sample site and are 24-hour totals to 9 am on the day of sampling. If there are fewer than 5 enterococci data points in a rainfall category, individual data points are presented instead of a box plot. At sites where many results are below the detection limit (1 cfu/100 mL), only the upper portion of the box plots will be visible.



Each part of the box plot represents a significant percentile value of the sample population:



Information bars

Information bars on each beach page provide a summary of details about the swimming site.
















The **assessment period** shows the timeframe in which the water samples were collected. The NHMRC guidelines state beach grades should be determined from the most recent 100 water quality results collected within a 5-year period. The assessment period varies between sites depending on sampling frequency.

Dry weather samples suitable for swimming (**dry weather swimmability**) shows the percentage of water samples with enterococci levels below 40 cfu/100 mL. Dry weather is defined as no rainfall in the previous 24 hours.

Swimming sites with lower levels of flushing often have a lower percentage of dry weather samples within the safe swimming limit due to the impacts of rainfall detected up to 3 days after the event.

Explanation of maps

A map of individual swimming locations is presented on each beach page. The scale of the maps is 1:10,000. Each map shows the location of the sampling site, land use and features such as surf lifesaving clubs. Potential pollution sources such as stormwater drains, sewage pumping stations, wastewater treatment plants, lagoons, rivers and creeks, are shown where accurate data is held.

Key to maps	
	Sampling Site
	Surf Life Saving Club
	Wastewater Treatment Plant
	Sewage Pumping Station
	Sewage Overflow
	Stormwater Drain
	Water
	Baths
	National Park/Reserve/ Other Park
	Built-up Area
	Sand
	Roads
	Major Roads
	Baths – Netted Area
	Breakwater/Wharf

References

NHMRC (2008) *Guidelines for managing risks in recreational water*, National Health and Medical Research Council, Australian Government Publishing Service, Canberra, ACT.

Standards Australia (2007) *AS/NZS 4276.9:2007, Water microbiology Method 9: Enterococci – Membrane filtration method (ISO 7899-2:2000, MOD)*, Standards Australia International Ltd, Sydney and Standards New Zealand, Wellington.

WA Department of Health (2007), *Microbial quality of recreational water guidance notes in support of chapter 5 of the National Health and Medical Research Council guidelines for managing risks in recreational water, 2006*, Department of Health, Western Australia and The University of Western Australia, October 2007, ww2.health.wa.gov.au/Articles/A_E/Environmental-waters-publications, accessed 23/06/23.

Wyer MD, Kay D, Fleisher JM, Salmon RL, Jones F, Godfree AF, Jackson G and Rogers A (1999) 'An experimental health related classification for marine waters', *Water Research*, 33(3):715–722.

More information

- [Beachwatch NSW on Twitter](#)
- [Beachwatch NSW on Facebook](#)
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