NSW GOVERNMENT

Department of Planning, Industry and Environment

State of the beaches 2020–2021

Statewide summary and how to read this report

Beachwatch

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Recreational water quality has been monitored in New South Wales by the Department of Planning, Industry and Environment's Beachwatch Program since 1989, and in partnership with coastal councils since 2002 under the Beachwatch Partnership Program. This report summarises the performance of 210 swimming sites along the NSW coast in 2020–2021, providing a long-term assessment of how suitable a site is for swimming. Monitored sites include ocean beaches, estuarine areas, lake and lagoon swimming sites and ocean baths.

In 2020–2021 swimming sites in New South Wales performed well with 85% of monitored swimming sites graded as Good or Very Good. These sites were suitable for swimming for most or almost all of the time. While this is an excellent result, it is a slight decline in performance from the previous year and reflects the wet weather conditions experienced in many coastal areas, including some very wet months and the wettest summer in NSW since 2012. Many estuarine and lake and lagoon swimming sites did not perform as well as the ocean beaches, being more susceptible to impacts from wet weather conditions.

State of the beaches statewide summary 2020–2021

Mona Vale Beach
Photo: Beachwatch/EES, DPIE

Beach monitoring in NSW

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 (two to four years' worth of data depending on the sampling frequency) and a risk assessment of potential pollution sources.

Recreational water quality has been monitored in New South Wales by the Department of Planning, Industry and Environment's Beachwatch Program since 1989, and in partnership with coastal councils since 2002 under the Beachwatch Partnership Program.

Rainfall impacts

During 2020–2021, 210 swimming sites were monitored including ocean beaches, estuarine areas, lake and lagoon swimming sites and ocean baths.

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 2020–2021 are based on water quality data collected over the last two to four years. Rainfall over this period has been diverse:

- 2017–2018: prolonged dry periods broken by heavy rain at times, including widespread rainfall along the NSW coast in the last week of summer

- 2018–2019: extended dry conditions, with several wet months on the coast
- 2019–2020: lengthy dry periods, with some isolated wet weather events and a significantly wet February
- 2020–2021: variable rainfall with significant wet weather events, including record wet months and wettest summer since 2012.

See the section on **How to read this report** on page 23 for an explanation of the graphs, tables and Beach Suitability Grades.

Total rainfall for winter 2020 was the wettest in New South Wales since 2016, with well above average rainfall falling along the NSW coast. Although June 2020 rainfall totals were below average, July 2020 was very wet along the coast, with two to three times the long-term monthly average rainfall falling in all coastal regions. August 2020 continued to be very wet in the Illawarra and South Coast region.

Below average rainfall was recorded in September 2020 on the NSW coast, and continued through to November 2020 for most regions, except for the Hunter, Central Coast, Sydney and Illawarra regions, which received above average rainfall in October 2020.

Debris washed up on Collaroy Beach following extreme wet weather in March 2021
Photo: Mandy Davis/EES, DPIE

New South Wales experienced its wettest summer since 2011–2012, with above average rainfall totals recorded in all coastal regions, including record summer rainfall on the North Coast. Notably, December 2020 was very wet, with two to three times the long-term average rainfall recorded on the entire coast. The North Coast experienced flooding and coastal erosion in December 2020 and February 2021.

March 2021 was significantly wet, and was the state's second wettest March on record, and wettest month since January 1995. The severe wet weather caused extensive flooding of coastal waterways, including the Hawkesbury–Nepean River experiencing its most significant flooding for more than 30 years. Beachwatch issued an extreme wet weather and flooding alert on the Hunter, Central Coast, Sydney and Illawarra daily beach pollution forecasts during March 2021, advising stormwater pollution and floodwaters may be impacting swimming sites for an extended period, with lifeguard reports of floating debris and discoloured water continuing after the rain had ceased.

Rainfall during April 2021 was well below the long-term monthly averages in all regions, except for some wet weather on the North Coast.

Beach Suitability Grades at 10 swimming sites improved in 2020–2021. These sites included eight ocean beaches and two estuarine swimming sites. Beach Suitability Grades at 22 swimming sites were downgraded from the previous year. While 13 ocean beaches and one estuarine swimming site were downgraded from Very Good to Good, one ocean beach, four estuarine swimming sites and two lagoons

See the section on **Quality assurance** on page 23 for an explanation and results of the quality assurance program.

crossed the threshold from Good to Poor. One estuarine swimming side was downgraded from Fair to Poor.

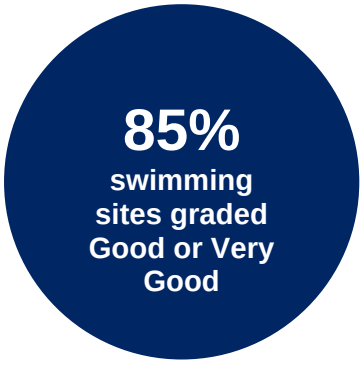
A quality assurance program ensures the information collected and reported by Beachwatch and our partners is accurate and reliable.

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.



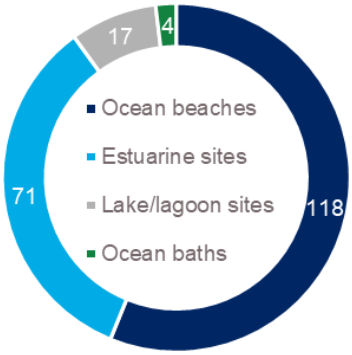
Overall beach performance for 2020–2021

In 2020–2021, 179 of the 210 monitored swimming sites in New South Wales were graded as Very Good or Good, indicating they were suitable for swimming for most or almost all of the time, a slight decline in overall performance from the previous year when 89% of swimming sites were graded as Very Good or Good.

Percentage of sites graded as Very Good or Good:

- 2020–2021: 85% of 210 monitored swimming sites
- 2019–2020: 89% of 228 monitored swimming sites
- 2018–2019: 86% of 228 monitored swimming sites
- 2017–2018: 85% of 241 monitored swimming sites.

Changes in the percentage of sites graded as Very Good or Good reflect changes in water quality over time and may also be influenced by changes in the number of sites monitored each year.



Site types monitored in NSW by Beachwatch and partnership councils

While this is an excellent result, many lake/lagoon and estuarine swimming locations did not perform as well as ocean beaches, primarily due to lower levels of flushing increasing the time needed to disperse and dilute pollution inputs. As ocean beaches, estuarine beaches, lake/lagoon swimming sites and ocean baths have very different responses to rainfall-related impacts, the results for each type of swimming area are discussed separately.

Ocean beaches

The open ocean beaches of New South Wales had excellent water quality in 2020–2021 with 98% of 118 monitored ocean beaches graded as Very Good or Good. This indicates they were suitable for swimming most or almost all of the time. This performance is similar to the 2019–2020 result, when 98% of 126 ocean beaches were graded as Very Good or Good.

Beach Suitability Grades for monitored ocean beaches in NSW

The impacts of rainfall on water quality are least apparent at ocean beaches with tidal flushing rapidly dispersing and diluting pollution inputs.

Six ocean beaches were upgraded to Very Good in 2020–2021:

- Shelly Beach on the North Coast
- Mona Vale Beach, Gordons Bay, Maroubra Beach and South Maroubra Beach in Sydney
- Racecourse Beach on the South Coast.

Swansea Heads Little Beach in the Hunter and Malabar Beach in Sydney were upgraded to Good in 2020–2021 from a Poor grade in the previous year, due to improved microbial water quality. Water quality at these beaches was mostly suitable for swimming in dry weather conditions, however elevated enterococci levels were occasionally recorded after no rain, and often after light rain.

While the microbial water quality at Swansea Heads Little Beach has alternated between Good and Poor since 2019, the microbial water quality at Malabar Beach has shown gradual improvement since 2016 crossing the threshold from Poor to Good in 2020–2021.

Two ocean beaches were graded as Poor in 2020–2021:

- Terrigal Beach on the Central Coast
- Surf Beach on the South Coast.

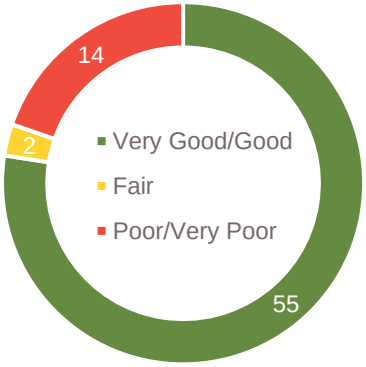
Terrigal Beach was graded as Poor, downgraded from Good in the previous year. While the microbial water quality at Terrigal Beach has shown a decline in performance in 2020–2021, it remains close to the threshold between Good and Poor. The site grade has fluctuated between Good and Poor for several years. Enterococci levels occasionally exceeded the safe swimming limit in dry weather conditions and often following light rainfall. The decline in water quality reflects a higher proportion of samples collected at Terrigal Beach during wet weather compared to the 2019–2020 assessment period.

During 2019–2020 Central Coast Council, the Department of Planning, Industry and Environment (DPIE) and the University of Technology Sydney investigated the scale and extent of elevated bacterial levels at Terrigal Beach. Council is using the findings from the investigation to detect and resolve water quality issues in the catchment.

Surf Beach was graded as Poor in 2020–2021, a similar result to the previous year. The microbial water quality at Surf Beach has been close to the threshold between Good and Poor for several years. In the last three years, the microbial water quality has continued to decline, and it is often impacted during dry weather and after rainfall.

Eurobodalla Shire Council is conducting investigations to identify the source of microbial contamination contributing to poor water quality at Surf Beach.

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



Beach Suitability Grades for monitored estuarine beaches in NSW

Estuarine beaches

Fifty-five (77%) of the 71 estuarine swimming sites were graded as Very Good or Good. This is a decline in performance from the previous year when 85% of the 78 estuarine swimming sites were graded as Very Good or Good.

While water quality at these sites was suitable for swimming most of the time, it was occasionally impacted by stormwater pollution following rainfall. These estuarine swimming sites are generally located in the well-flushed sections of the estuaries or had few potential sources of faecal contamination.

In 2020–2021 Rose Bay Beach and Hayes St Beach in Sydney Harbour improved to Good from Poor grades in the previous year. While microbial water quality at Rose Bay has shown gradual improvement since 2017, the microbial water quality at Hayes St Beach has been consistently close to the threshold between Good and Poor grades and has alternated between these grades for the last four years.

Two estuarine beaches continued to be graded as Fair in 2020–2021: Northbridge Baths and Gurney Crescent Baths in Sydney Harbour. These sites generally had good water quality, with almost all dry weather samples suitable for swimming. Elevated bacterial levels were measured during and following rainfall. Several potential sources of faecal contamination have been identified as significant risks in the sanitary inspection, including stormwater and impacts from upstream sources.

Fourteen of the estuarine beaches were graded as Poor in 2020–2021:

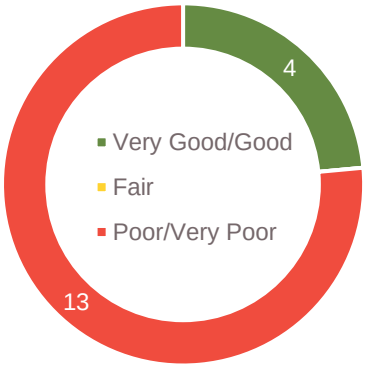
- Shaws Bay North, Shaws Bay West, Torakina Beach, Simpsons Creek and Evans River on the North Coast
- Davistown Baths, Pretty Beach Baths, Woy Woy Baths and Yattalunga Baths in Brisbane Water on the Central Coast
- Tambourine Bay and Davidson Reserve in Sydney Harbour, Frenchmans Bay and Foreshores Beach in Botany Bay and Gymea Bay Baths, Port Hacking in Sydney.

Water quality at most of these sites is often suitable for swimming in dry weather conditions, with elevated levels of bacteria measured following light rainfall. These sites were typically located in less well-flushed sections of the estuaries or had more significant pollution sources.

Shaws Bay North and Shaws Bay West on the North Coast, and Tambourine Bay in Lane Cove River, Frenchmans Bay in Botany Bay and Gymea Bay Baths in Port Hacking in Sydney were downgraded to Poor from Good in the previous year, due to a decline in microbial water quality.

Further investigation is required at poorer performing swimming sites to determine the scale and extent of the problem, and the source of microbial contamination.

Estuarine sites are generally not as well-flushed as ocean beaches, and so the time for pollution to disperse and dilute is longer. Pollution inputs are retained at some swimming sites when they are located in the upper reaches away from the main channels. As a precaution, avoid swimming in estuaries during and for up to three days following rainfall, or if there are signs of pollution such as discoloured water, flowing stormwater drains or floating debris.



Beach Suitability Grades for monitored lake/lagoon swimming sites in NSW

Lake/lagoon swimming sites

Four (24%) of the 17 lake and lagoon swimming sites continued to be graded as Good in 2020–2021. This is a decline in performance from the previous year.

Good grades were recorded at four lake and lagoon swimming sites:

- Lake Ainsworth East and Lake Ainsworth South on the North Coast
- Summerland Point Baths in Lake Macquarie on the Central Coast
- Entrance Lagoon Beach in Lake Illawarra in the Illawarra.

Water quality at these sites was mostly suitable for swimming during dry weather, with elevated enterococci levels recorded following rainfall.

Thirteen lake and lagoon swimming sites were graded as Poor this year. These are:

- Lake Ainsworth North and Lake Ainsworth West on the North Coast
- nine swimming sites on the Central Coast: Gwandalan, Chain Valley Bay and Mannering Park Baths in Lake Macquarie; Lake Munmorah Baths in Lake Munmorah; Canton Beach in Tuggerah Lakes and four coastal lagoons at Wamberal, Terrigal, Avoca and Cockrone
- Birdwood Park and Bilarong Reserve in Narrabeen Lagoon in Sydney.

Water quality at these sites was often unsuitable for swimming during dry and wet weather conditions, with bacterial levels increasing with increasing rainfall. These sites are highly susceptible to the impacts of wet weather during and for up to three days after rain.

Further investigation is required at poorer performing swimming sites to determine the extent of the problem and the source of microbial contamination. In 2019 investigations began into poor water quality at Lake Ainsworth, with preliminary results showing the main contributor to elevated bacteria levels is avian (bird) sources. Since 2019, investigations at Canton Beach and the four coastal lagoons on the Central Coast are continuing, and findings are assisting to detect and resolve water quality issues in these catchments.

The water quality at lake/lagoon sites often depends on how close the swimming area is to the ocean and whether the entrance is open to the ocean. When the entrance is open and the site is near that opening, the site can be well-flushed by clean ocean water, and water quality is often of a high standard. If the site is not near the entrance, or the entrance is closed, pollution inputs are retained, and the water quality can be affected by contamination from stormwater runoff to the lake/lagoon.

As a general precaution, it is recommended that swimming at lake and lagoon swimming sites be avoided during and for up to three days after rainfall or if there are signs of stormwater pollution such as discoloured water or floating debris.

Ocean baths

Beach Suitability Grades for monitored ocean baths in NSW

All four ocean baths were graded as Good in 2020–2021: Cabbage Tree Bay Rockpool, The Entrance Ocean Baths and Pearl Beach Rockpool on the Central Coast and South Maroubra Rockpool in Sydney. While water quality at The Entrance Ocean Baths was generally suitable for swimming during dry and wet weather conditions, water quality at the other three ocean baths was mostly suitable for swimming after little or no rain, with elevated bacterial levels recorded following higher levels of rainfall.

The water quality at ocean baths often depends on the flushing regime. While The Entrance Ocean Baths is regularly cleaned by council, other ocean baths are flushed irregularly, relying on the natural exchange of ocean water over the rocks and pool walls. It is recommended that swimming be avoided during and for up to one day after rainfall, or if there are signs of pollution such as discoloured water or floating debris.

The Beachwatch programs

Sampling in Sydney Harbour
Photo: Beachwatch/EES, DPIE

Hunter Water Corporation and Sydney Water monitor ocean beaches in the Hunter and Illawarra regions respectively.

Beachwatch

The Beachwatch Program was established in 1989 to monitor Sydney's ocean beaches and was expanded to ocean beaches in the Hunter and Illawarra regions in 1996.

Monitoring of estuarine beaches commenced in 1994, with the addition of Sydney Harbour, Botany Bay and lower Georges River to the program. Pittwater was added in 1996 and most sites in Port Hacking were added in 1999.

Beachwatch Partnership Program

The Beachwatch Partnership Program was established in 2002 and included eight local councils monitoring 78 swimming sites along the NSW coast during 2020–2021:

- Byron Shire Council
- Ballina Shire Council
- Richmond Valley Council
- Central Coast Council
- Wollongong City Council
- Kiama Municipal Council
- Shoalhaven City Council
- Eurobodalla Shire Council.

The water quality sampling and laboratory analysis are fully funded by each local council. DPIE provides quality assurance support and assistance with community reporting.

Beach pollution forecasts

Beachwatch issues daily pollution forecasts to enable beach goers to make informed decisions about where and when to swim. The forecasts are available before 7:30am during the swimming season (October to April) and before 8am between May and September, and cover swimming sites in the Sydney, Hunter, Central Coast and Illawarra regions.

Beach pollution forecasts can be accessed via the Beachwatch website, mobile website, email subscription, Twitter and Facebook.

environment.nsw.gov.au/beachwatch

Sampling sites and areas monitored in New South Wales under the Beachwatch programs

Beach Suitability Grades for North Coast region

Swimming site	Site type	Beach Suitability Grade	Change
Byron Shire Council			
Torakina Beach*	Estuarine	P^	–
Simpsons Creek*	Estuarine	P^	–
Main Beach (Byron Bay)*	Ocean beach	VG^	–
Tallow Beach (Suffolk Park)*	Ocean beach	VG^	–
Ballina Shire Council			
Seven Mile Beach	Ocean beach	VG	●
Lake Ainsworth North	Lake/Lagoon	P	●
Lake Ainsworth East	Lake/Lagoon	G	●
Lake Ainsworth South	Lake/Lagoon	G	●
Lake Ainsworth West	Lake/Lagoon	P	●
Shelly Beach	Ocean beach	VG	▲
Lighthouse Beach	Ocean beach	VG	●
Shaws Bay North	Estuarine	P	▼
Shaws Bay East	Estuarine	G	●
Shaws Bay East Arm	Estuarine	G	●
Shaws Bay East Beach	Estuarine	G	●
Shaws Bay West	Estuarine	P	▼
The Serpentine	Estuarine	G	●
Richmond Valley Council			
Airforce Beach	Ocean beach	G	▼
Main Beach	Ocean beach	G	▼
Shark Bay	Ocean beach	VG	●
Evans River	Estuarine	P	●
Elm Street Bridge North (Evans River)	Estuarine	G	●

Beach Suitability Grade					Change		
VG	G	F	P	VP			
Very Good	Good	Fair	Poor	Very Poor	Improved	Stable	Declined

* New site

^ Provisional: Information required for the analysis is incomplete due to limited bacterial data or limited information on potential pollution sources in a beach catchment.

Beach Suitability Grades for Hunter region

Swimming site	Site type	Beach Suitability Grade	Change
Port Stephens Council			
Zenith Beach	Ocean beach	VG	●
Box Beach	Ocean beach	VG	●
Fingal Beach	Ocean beach	VG	●
One Mile Beach	Ocean beach	VG	●
Newcastle City Council			
South Stockton Beach	Ocean beach	VG	●
Nobbys Beach	Ocean beach	VG	●
Newcastle Beach	Ocean beach	VG	●
Bar Beach	Ocean beach	VG	●
Merewether Beach	Ocean beach	G	↓
Burwood North Beach	Ocean beach	VG	●
Burwood South Beach	Ocean beach	G	↓
Lake Macquarie City Council			
Glenrock Lagoon Beach	Ocean beach	G	↓
Dudley Beach	Ocean beach	VG	●
Redhead Beach	Ocean beach	VG	●
Blacksmiths Beach	Ocean beach	VG	●
Swansea Heads Little Beach	Ocean beach	G	↑
Caves Beach	Ocean beach	VG	●

Beach Suitability Grade					Change		
VG	G	F	P	VP	↑	●	↓
Very Good	Good	Fair	Poor	Very Poor	Improved	Stable	Declined

Beach Suitability Grades for Central Coast region

Swimming site	Site type	Beach Suitability Grade	Change
Central Coast Council			
Lakes Beach	Ocean beach	G	●
Cabbage Tree Bay Rockpool	Ocean baths	G	●
Soldiers Beach	Ocean beach	G	↓
North Entrance Beach	Ocean beach	G	●
The Entrance Beach	Ocean beach	G	●
The Entrance Ocean Baths	Ocean baths	G	●
Toowoon Bay	Ocean beach	G	●
Shelly Beach	Ocean beach	G	●
Gwandalan	Lake/Lagoon	P	●
Summerland Point Baths	Lake/Lagoon	G	●
Chain Valley Bay	Lake/Lagoon	P	●
Mannering Park Baths	Lake/Lagoon	P	●
Lake Munmorah Baths	Lake/Lagoon	P	●
Canton Beach	Lake/Lagoon	P	●
Wamberal Beach	Ocean beach	G	●
Wamberal Lagoon	Lagoon	P	●
Terrigal Beach	Ocean beach	P	↓
Terrigal Lagoon	Lagoon	P	●
North Avoca Beach	Ocean beach	G	●
Avoca Beach	Ocean beach	G	●
Avoca Lagoon	Lagoon	P	●
Copacabana Beach	Ocean beach	G	●
Cockrone Lagoon	Lagoon	P	●
MacMasters Beach	Ocean beach	G	↓
Killcare Beach	Ocean beach	G	↓

Swimming site	Site type	Beach Suitability Grade	Change
Central Coast Council (continued)			
Ocean beach	Ocean beach	G	●
Umina Beach	Ocean beach	G	↓
Pearl Beach Rockpool	Ocean baths	G	●
Davistown Baths	Estuarine	P	●
Pretty Beach Baths	Estuarine	P	●
Woy Woy Baths	Estuarine	P	●
Yattalunga Baths	Estuarine	P	●

Beach Suitability Grade					Change		
VG	G	F	P	VP	↑	●	↓
Very Good	Good	Fair	Poor	Very Poor	Improved	Stable	Declined

Beach Suitability Grades for Sydney region

Swimming site	Site type	Beach Suitability Grade	Change
Northern Sydney – Ocean beaches			
Palm Beach	Ocean beach	VG	●
Whale Beach	Ocean beach	VG	●
Avalon Beach	Ocean beach	VG	●
Bilgola Beach	Ocean beach	VG	●
Newport Beach	Ocean beach	VG	●
Bungan Beach	Ocean beach	VG	●
Mona Vale Beach	Ocean beach	VG	▲
Warriewood Beach	Ocean beach	G	●
Turimetta Beach	Ocean beach	G	●
North Narrabeen Beach	Ocean beach	G	●
Narrabeen Lagoon (Birdwood Park)	Lagoon	P	▼
Bilarong Reserve	Lagoon	P	▼
Collaroy Beach	Ocean beach	G	●
Long Reef Beach	Ocean beach	G	●
Dee Why Beach	Ocean beach	VG	●
North Curl Curl Beach	Ocean beach	G	●
South Curl Curl Beach	Ocean beach	VG	●
Freshwater Beach	Ocean beach	G	●
Queenscliff Beach	Ocean beach	G	●
North Steyne Beach	Ocean beach	G	●
South Steyne Beach	Ocean beach	G	●
Shelly Beach	Ocean beach	G	●
Northern Sydney – Pittwater			
Barrenjoey Beach	Estuarine	G	●
Paradise Beach Baths	Estuarine	G	●

Swimming site	Site type	Beach Suitability Grade	Change
Northern Sydney – Pittwater (continued)			
Clareville Beach	Estuarine	G	●
Taylors Point Baths	Estuarine	G	●
Bayview Baths	Estuarine	G	●
Elvina Bay	Estuarine	G	↓
North Scotland Island	Estuarine	G	●
South Scotland Island	Estuarine	G	●
The Basin	Estuarine	VG	●
Great Mackerel Beach	Estuarine	VG	●
Central Sydney – Ocean beaches			
Bondi Beach	Ocean beach	G	●
Tamarama Beach	Ocean beach	G	●
Bronte Beach	Ocean beach	G	●
Clovelly Beach	Ocean beach	VG	●
Gordons Bay	Ocean beach	VG	↑
Coogee Beach	Ocean beach	G	●
Maroubra Beach	Ocean beach	VG	↑
South Maroubra Beach	Ocean beach	VG	↑
South Maroubra Rockpool	Ocean baths	G	●
Malabar Beach	Ocean beach	G	↑
Little Bay Beach	Ocean beach	G	●
Central Sydney – Sydney Harbour			
Camp Cove	Estuarine	VG	●
Watsons Bay	Estuarine	G	●
Parsley Bay	Estuarine	G	●
Nielsen Park	Estuarine	VG	●
Rose Bay Beach	Estuarine	G	↑

Swimming site	Site type	Beach Suitability Grade	Change
Central Sydney – Sydney Harbour (continued)			
Murray Rose Pool	Estuarine	G	●
Dawn Fraser Pool	Estuarine	G	●
Chiswick Baths	Estuarine	G	●
Cabarita Beach	Estuarine	G	●
Woolwich Baths	Estuarine	G	●
Tambourine Bay	Estuarine	P	▼
Woodford Bay	Estuarine	G	●
Greenwich Baths	Estuarine	G	●
Hayes St Beach	Estuarine	G	▲
Clifton Gardens	Estuarine	G	●
Balmoral Baths	Estuarine	G	●
Edwards Beach	Estuarine	G	●
Chinamans Beach	Estuarine	G	●
Northbridge Baths	Estuarine	F	●
Davidson Reserve	Estuarine	P	●
Gurney Crescent Baths	Estuarine	F	●
Clontarf Pool	Estuarine	G	●
Forty Baskets Pool	Estuarine	G	●
Fairlight Beach	Estuarine	G	●
Manly Cove	Estuarine	G	●
Little Manly Cove	Estuarine	G	●
Southern Sydney – Ocean beaches			
Boat Harbour	Ocean beach	G	●
Greenhills Beach	Ocean beach	VG	●
Wanda Beach	Ocean beach	VG	●
Elouera Beach	Ocean beach	VG	●

Swimming site	Site type	Beach Suitability Grade	Change
Southern Sydney – Ocean beaches (continued)			
North Cronulla Beach	Ocean beach	VG	●
South Cronulla Beach	Ocean beach	VG	●
Shelly Beach	Ocean beach	VG	●
Oak Park	Ocean beach	VG	●
Southern Sydney – Botany Bay and lower Georges River			
Silver Beach	Estuarine	G	●
Como Baths	Estuarine	G	●
Jew Fish Bay Baths	Estuarine	G	●
Oatley Bay Baths	Estuarine	G	●
Carss Point Baths	Estuarine	G	●
Sandringham Baths	Estuarine	G	●
Dolls Point Baths	Estuarine	G	●
Ramsgate Baths	Estuarine	G	●
Monterey Baths	Estuarine	G	●
Brighton-Le-Sands Baths	Estuarine	G	●
Kyeemagh Baths	Estuarine	G	●
Foreshores Beach	Estuarine	P	●
Yarra Bay	Estuarine	G	●
Frenchmans Bay	Estuarine	P	▼
Congwong Bay	Estuarine	G	●
Southern Sydney – Port Hacking			
Jibbon Beach	Estuarine	VG	●
Horderns Beach	Estuarine	G	●
Gymea Bay Baths	Estuarine	P	▼

Swimming site	Site type	Beach Suitability Grade	Change
Southern Sydney – Port Hacking (continued)			
Lilli Pilli Baths	Estuarine	G	●
Gunnamatta Bay Baths	Estuarine	G	●

Beach Suitability Grade					Change		
VG	G	F	P	VP	↑	●	↓
Very Good	Good	Fair	Poor	Very Poor	Improved	Stable	Declined

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	G	↓
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	VG	●
Fishermans Beach	Ocean beach	VG	●
Port Kembla Beach	Ocean beach	G	●
Shellharbour City Council			
Entrance Lagoon Beach	Lake/Lagoon	G	●
Warilla Beach	Ocean beach	VG	●
Shellharbour Beach	Ocean beach	VG	●
Kiama Municipal Council			
Boyds Jones Beach	Ocean beach	G	↓
Bombo Beach	Ocean beach	VG	●
Surf Beach Kiama	Ocean beach	G	●
Werri Beach	Ocean beach	G	↓
Seven Mile Beach (Gerroa)	Ocean beach	VG	●

Beach Suitability Grade					Change		
VG	G	F	P	VP	↑	●	↓
Very Good	Good	Fair	Poor	Very Poor	Improved	Stable	Declined

Beach Suitability Grades for South Coast region

Swimming site	Site type	Beach Suitability Grade	Change
Shoalhaven City Council			
Shoalhaven Heads Beach	Ocean beach	VG	●
Tilbury Cove	Ocean beach	VG	●
Warrain Beach	Ocean beach	VG	●
Collingwood Beach	Ocean beach	VG	●
Cudmirrah Beach	Ocean beach	VG	●
Mollymook Beach	Ocean beach	VG	●
Rennies Beach	Ocean beach	VG	●
Racecourse Beach	Ocean beach	VG	▲
Bawley Point Beach	Ocean beach	VG	●
Merry Beach	Ocean beach	VG	●
Eurobodalla Shire Council			
Cookies Beach	Ocean beach	VG	●
Caseys Beach	Ocean beach	G	●
Surf Beach	Ocean beach	P	●
Malua Bay Beach	Ocean beach	VG	●
Broulee Beach	Ocean beach	G	●
Bengello Beach	Ocean beach	VG	●
Shelley Beach (Moruya Heads)	Ocean beach	G	●
Tuross Main Beach	Ocean beach	G	●
Brou Beach	Ocean beach	VG	●
Wagonga Inlet	Estuarine	G	●
Narooma Main Beach	Ocean beach	G	▼

Beach Suitability Grade					Change		
VG	G	F	P	VP	▲	●	▼
Very Good	Good	Fair	Poor	Very Poor	Improved	Stable	Declined

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 five grades ranging from Very Good to Very Poor:

VG 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

G 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 three days at estuarine sites

F 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 three days following rainfall or if there are signs of pollution such as discoloured water or odour or debris in the water

P 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 three days following rainfall

VP 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*[1] 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[2].

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

[2]Department of Health, Western Australia 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, available at ww2.health.wa.gov.au/Articles/A_E/Environmental-waters-publications, accessed on 27/05/21.

Enterococci

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

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.

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

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 four 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[1].

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 four 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.

[1] 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*, vol.33(3), pp.715–722.

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. 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* [accessed 27/05/21].

Sanitary Inspection Category (SIC)

More information about the **sanitary inspection** process is available on the DPIE webpage:

Sanitary inspection of beaches

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 five categories: Very Low, Low, Moderate, High and Very High.

Stormwater at Coogee Beach
Photo: Beachwatch/EES, DPIE

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

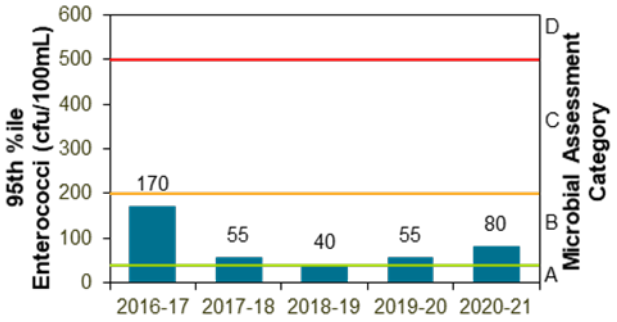
A provisional grade indicates the assessment is based on limited data collected during the assessment period and should not be compared to the beach grade from the previous year.

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

Microbial Assessment Category (MAC) chart

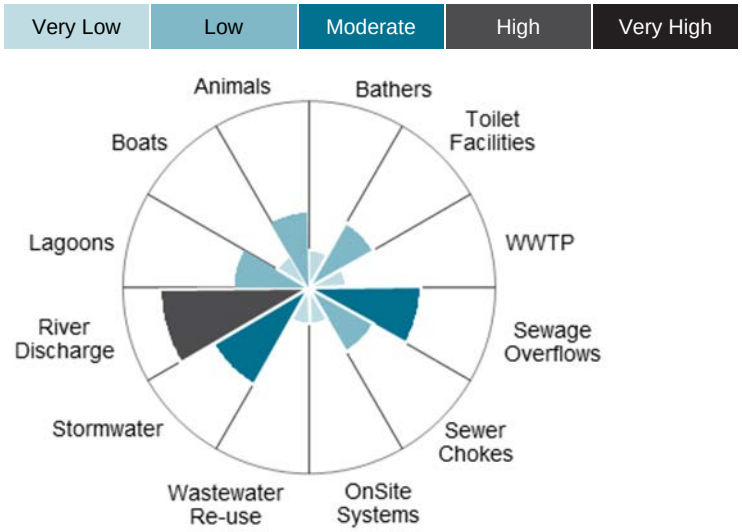
On each beach page, the MACs for the last five years are displayed on a simple bar chart. The MAC for the current year is based on enterococci data collected during the assessment period. The bars are labelled with the 95th percentile value for each year and the thresholds dividing the

A, B, C and D categories are marked in green, amber and red for reference.



Sanitary Inspection Category (SIC) chart

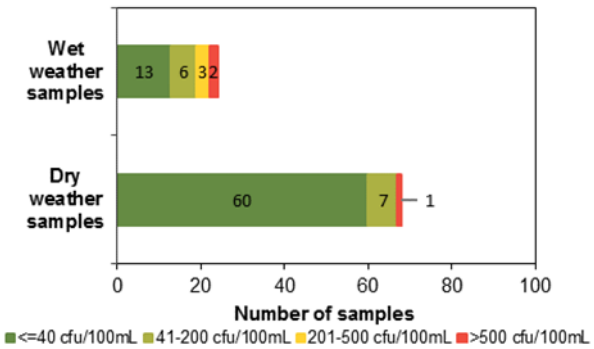
The results of the sanitary inspection for each swimming location are presented in a radar pie chart. The chart shows the likelihood that each identified pollution source will contribute to faecal contamination at a swimming site, as indicated by the size and colour of the segment, ranging from very 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

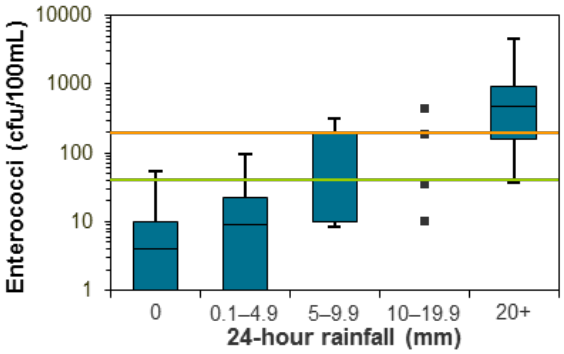
coloured on the graph as dark green, light green, amber and red respectively.



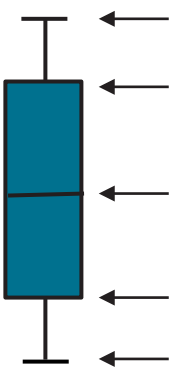
It is expected that swimming sites with lower levels of flushing will show some elevated bacterial results in dry weather samples (no rainfall in the previous 24 hours) due to the longer time needed to recover from a rainfall event. At some estuarine and lake/lagoon swimming locations the impacts of stormwater pollution on beach water quality may be detected up to three 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 five years of monitoring. Rainfall data were obtained from rain gauges situated close to the sample site and are 24-hour totals to 9am on the day of sampling. If there are fewer than five 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:



95% of the samples lie below the top whisker

75% of the samples lie below the top of the box

half the samples are on each side of the middle line of the box (median or 50%ile)

25% of the samples lie below the bottom of the box

5% of the samples lie below the bottom whisker.

Information bars

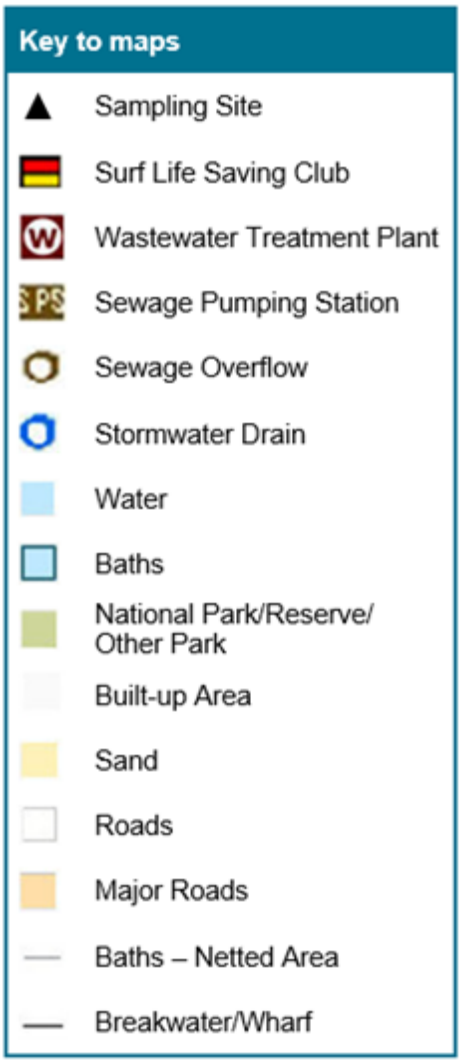
Information bars on each beach page provide a summary of details about the swimming site.

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 five-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 three 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.



Quality assurance

Water sample collection
Photo: Beachwatch/EES, DPIE

The quality assurance program

To ensure that data reported by Beachwatch is accurate and reliable, quality assurance is included in all parts of the program:

- field sampling (equipment preparation, sample collection, sample storage and sample transport)
- laboratory analysis
- data management
- community reporting.

Field sampling

Hunter Water, Sydney Water and Beachwatch collect samples throughout the year and are audited quarterly. Councils in the Beachwatch Partnership Program usually sample for part or all of the swimming season (October to April) and are audited once during this period. Due to travel restrictions placed on Beachwatch staff during the COVID-19 pandemic, one Sydney Water field audit, two Hunter Water field audits and one Beachwatch field audit could not be conducted in May and August 2020.

100%

Sampling quality assurance

Audits include an assessment of field officer performance according to established Beachwatch Programs sampling protocols, including aseptic sampling techniques, sample collection, sample storage and documentation of field observations. These protocols are based on internationally recognised methods for the collection of water samples in recreational bathing areas[1].

[1]***Standard methods for the examination of water and wastewater*, 20th edition, 1998, American Public Health Association, Washington.**

Sample collection by Beachwatch, Hunter Water and Sydney Water complied well with established sampling protocols, with a compliance of 100%. Councils in the Beachwatch Partnership Program achieved an overall compliance of 100% with Beachwatch sampling protocols.

Who samples where?

Beachwatch

Collects samples at 97 ocean and harbour beaches in Sydney.

Hunter Water

Collects samples at 17 ocean beaches in Port Stephens, Newcastle and Lake Macquarie.

Sydney Water

Collects samples at 18 ocean beaches in Wollongong, Shellharbour and Kiama.

Partner councils

Byron Shire Council, Ballina Shire Council, Richmond Valley Council, Central Coast Council, Wollongong City Council, Kiama Municipal Council, Shoalhaven City Council and Eurobodalla Shire Council collect samples at popular swimming locations in their respective local government areas.

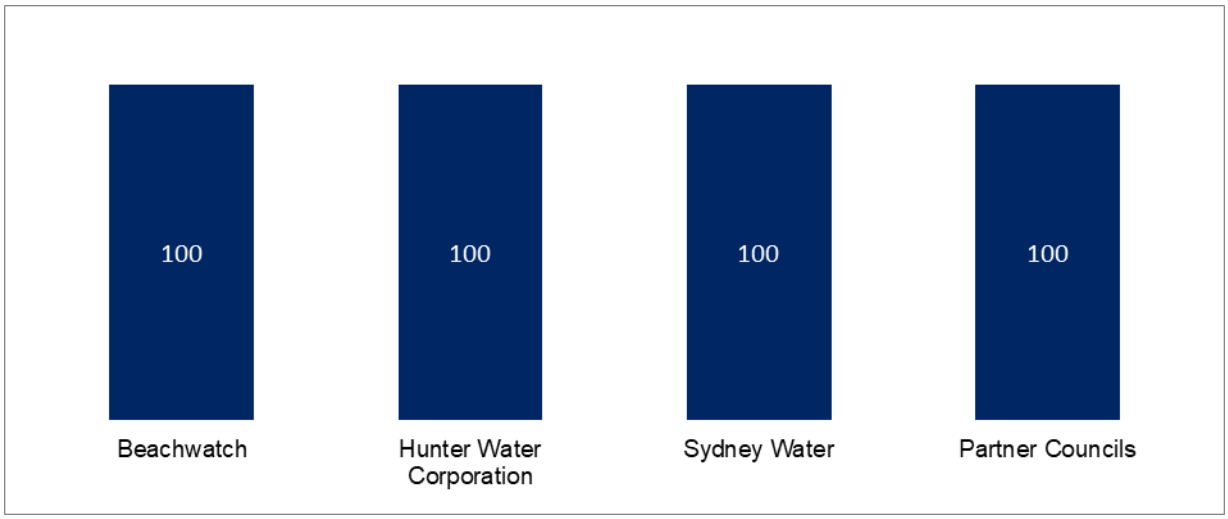


Figure 1 Percentage compliance with Beachwatch sampling protocols in 2020–2021

Laboratory analysis

Beachwatch program

PASS

Laboratory quality assurance

To assess the reliability of laboratory data, Beachwatch sends duplicate water samples to our contracted microbiological laboratory, which is accredited by the National Association of Testing Authorities (NATA). Duplicate samples are collected from the same site at the same time and the laboratory is unaware that the samples are collected from a single location. The results are expected to be similar.

Due to the inherent variability of bacterial levels in environmental samples, duplicate results that are within 0.3 log-units of each other (equivalent to a halving or doubling of density on a linear scale) are considered to be acceptable. Most duplicate samples were within the acceptable limits; however, some enterococci results were outside this range, with most of these at very low bacterial densities that were below the safe swimming limit. Out of the 132 sets of duplicate samples, there were only three values outside the acceptable range and above the safe swimming limit; two results were below the replicate, and one was higher than the replicate. This indicates that results were rarely underestimated.

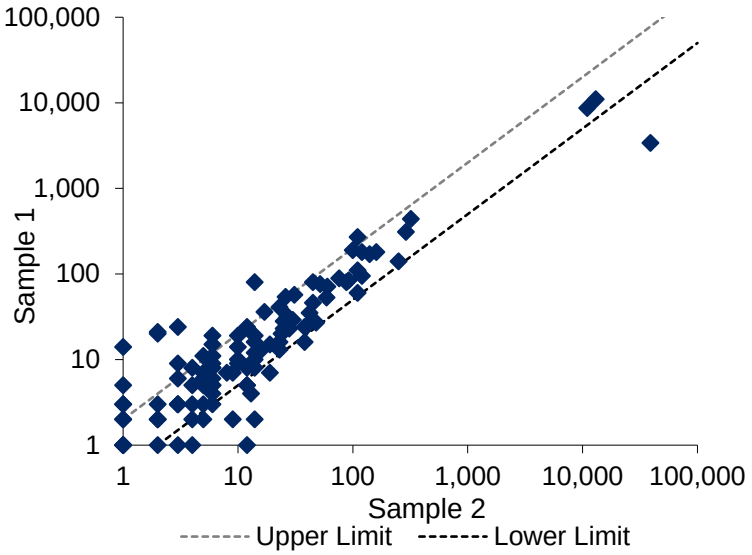


Figure 2 **Distribution of duplicate enterococci (cfu/100 mL) results for the contracted laboratory, May 2020 to April 2021**

Beachwatch Partnership Program

Water sample
Photo: Beachwatch/EES, DPIE

Council laboratories in the Beachwatch Partnership Program are required to undertake proficiency testing to determine the reliability of data. This year, most laboratories were NATA accredited or participated in regular proficiency testing programs to demonstrate competence in enterococci analysis.

Water samples for Wollongong City Council, Kiama Municipal Council, Shoalhaven City Council and Eurobodalla Shire Council were tested by NATA accredited laboratories that comply with strict assessments.

The proficiency testing for Ballina, Richmond Valley and Central Coast councils' laboratories was conducted by IFM Quality Services Pty Ltd. IFM Quality Services despatches samples in freeze dried form that require reconstitution prior to testing. The council laboratories underwent regular proficiency testing during October 2020 to April 2021 and recorded good results with enterococci counts reported within defined limits. Confidence can be placed in the accuracy of data from these laboratories and water quality results reported in the Ballina, Richmond Valley and Central Coast local government areas.

Confirmed colonies of enterococci on plate
Photo: Silliker Australia

Byron Shire Council collected duplicate samples on two occasions during January 2021, at the commencement of council's monitoring program. The Byron laboratory analysed four samples on each occasion, and the duplicates were sent to a NATA accredited laboratory for testing. Comparison of results showed six of the eight samples were within the acceptable limits (Figure 3). Of the two out of limit results, one was below the lower limit, and lower than the bacterial count reported by the NATA accredited laboratory, and the other was above the upper limit, with council's result higher than reported by the NATA accredited laboratory. Byron Council's laboratory has performed very well, and confidence can be placed in data reported for swimming sites in the Byron Shire.

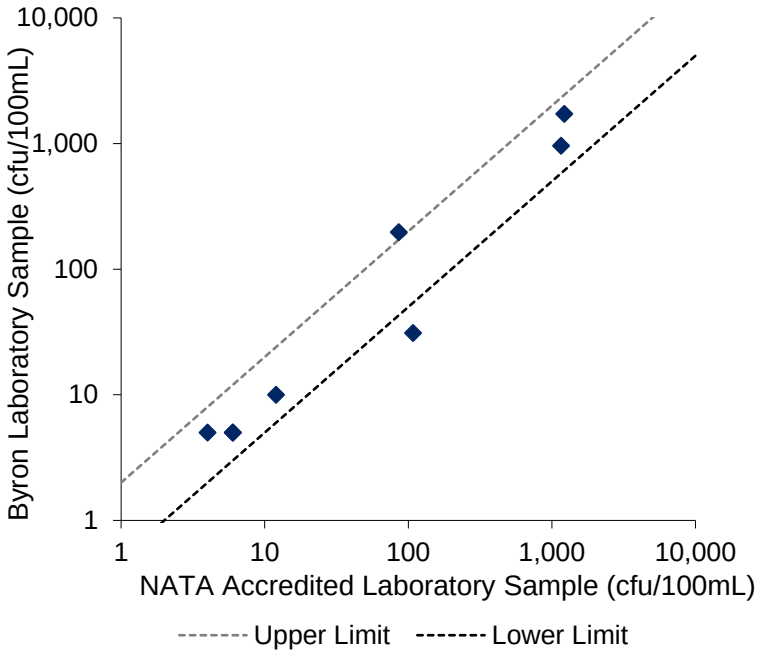


Figure 3 Distribution of duplicate enterococci (cfu/100 mL) results for Byron and NATA accredited laboratories

Download data

Beachwatch data is available online on the Enterococci data download webpage

Data management

Water quality results for swimming sites in the Sydney, Hunter and Illawarra regions are regularly forwarded electronically to the Beachwatch program from the contracted laboratory, and by Hunter Water and Sydney Water laboratories. The water quality data are uploaded to the Beachwatch water quality database (BACTO) for storage and data evaluation.

All partnership councils transferred water quality data to Beachwatch on a regular basis, for centralised storage on the BACTO database. In some cases, data were emailed directly from the analysing laboratory.

Quality assurance procedures for the storage of data on the centralised database followed a rigorous protocol that was developed as part of the Beachwatch program. This includes data validation procedures to identify anomalous results, restricting user access to the database, using fixed templates for upload of data, and database settings to prevent duplicate entries.

Beachwatch data is uploaded to our website and can be downloaded online from the Enterococci data download webpage.

Community reporting

Providing the community with current beach water quality information is a core function of the Beachwatch programs, so reporting has been incorporated into the quality assurance program. This enables Beachwatch to measure the accuracy, consistency of content (quality) and punctuality (timeliness) of all reports released. When necessary, this information is used to improve the reporting process.

There are two main types of Beachwatch reports: Beach pollution forecasts and star rating reports.

Subscribe

Daily beach pollution forecast emails are available from the DPIE Subscribe to e-newsletters webpage

Beach pollution forecasts

Beach pollution forecasts provide advice to assist beach users on deciding when and where to swim. The forecasts are generated daily to report on the likelihood of bacterial contamination at swimming sites in the Hunter, Central Coast, Sydney and Illawarra regions. This information can be accessed by the public through the Beachwatch website, and is reported on Twitter and Facebook. The information is also sent by email to subscribers.

The forecasts are based on telemetered rainfall data and any reported pollution incidents that could affect beach water quality. The forecasts include a prediction of the likelihood of pollution at ocean beaches and harbour swimming areas, as well as daily weather, tides and coastal conditions, based on the Australian Bureau of Meteorology's Metropolitan Forecast and Coastal Waters Forecast. Forecasts are updated throughout the day if conditions change, using information provided by the Bureau of Meteorology, local councils, lifeguards, the Environment Protection Authority or Sydney Water.

Accuracy of beach pollution forecast predictions

94%

Pollution forecast prediction accuracy

The daily pollution forecast scenarios are analysed against bacterial data to track the accuracy of predictions. During 2020–2021, 94% of overall predictions were correct. The Pittwater and Illawarra forecasts were the most accurate with 96% of scenarios correctly predicted. The Hunter and Sydney ocean beaches forecasts also recorded high accuracy during the assessment period, with 95% of forecast scenarios correctly predicted.

When the accuracy of the pollution predictions for a swimming site declines, the prediction models are reassessed and adjusted to incorporate the changes in water quality. Regular tracking of the accuracy of pollution scenarios ensures a high level of overall accuracy is maintained.

Quality and timeliness of beach pollution forecast reports

Forecast reports are audited weekly to assess the quality and punctuality of information issued on the Beachwatch website and in emails:

- The quality of the forecasts is checked for formatting, spelling, punctuation and incorrect pollution scenarios or weather information to ensure the information provided is clear and concise.
- The timeliness of the forecasts issued to the website and sent by email is assessed to ensure punctuality of our service.

In 2020–2021 an overall compliance of 99% was achieved with the beach pollution forecast reporting protocols for quality and timeliness. The breakdown of compliance performance for forecast reports on the Beachwatch website and by email is shown in Figure 4.

The results from the quality assurance audits are stored in an electronic database, with a weekly summary of any detected errors distributed to Beachwatch staff for their attention and action, if necessary.

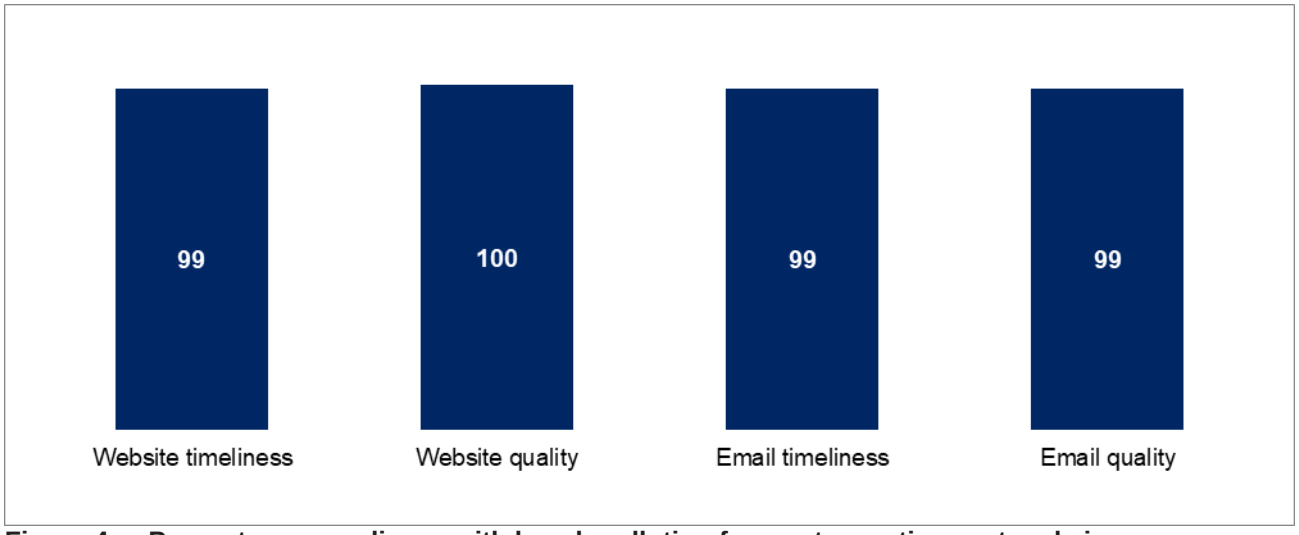


Figure 4 Percentage compliance with beach pollution forecast reporting protocols in 2020–2021

Beach warning signs
Photo: Beachwatch/EES, DPIE

Star ratings reports

The star ratings provide an indication of recent bacterial water quality results, based on NHMRC (2008) guidelines, with one star indicating poor water quality, through to a four-star rating indicating excellent water quality. The star ratings are calculated using a spreadsheet, and are quality assured prior to reporting on the Beachwatch website, with any errors in calculations detected before publishing. Star ratings are published under each region on the Beachwatch websites, see About weekly star ratings for beach water quality.

Most star ratings are updated weekly throughout the year for swimming sites in the Sydney, Hunter and Illawarra regions and during the summer season for regional partner councils where the frequency of sampling is reduced for some swimming sites that are often not used during winter. All historical enterococci water quality data is available on the Beachwatch website.