Beachwatch

State of the beaches 2021–22

Hunter Region

Department of Planning and Environment

NSW GOVERNMENT

Front cover: Merewether Beach (Beachwatch/DPE)

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Contents

Recreational water quality has been monitored in the Hunter region since 1996 by Hunter Water Corporation as a requirement of Environment Protection Licences. This report summarises the performance of 17 ocean beaches in the Hunter region of NSW, providing a long-term assessment of how suitable a site is for swimming.

In 2021–2022, 100% of swimming sites in the Hunter region were graded as Good or Very Good. These sites were suitable for swimming for most or almost all of the time. This is an excellent result, similar in performance to the previous year, and despite some wet months and the flooding impacts in autumn.

Hunter region summary 2021–2022

Beach monitoring in NSW

Swansea Heads Little Beach
Photo: Beachwatch/DPE

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 NSW 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 Hunter region by Hunter Water Corporation since 1996.

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

Rainfall impacts

During 2021–2022, 17 ocean beaches were monitored in the Hunter region.

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 2021–2022 are based on water quality data collected over the last 2–4 years. Rainfall over this period has been diverse:

- 2018–2019: relatively dry weather conditions, with a few wet months and occasional heavy falls
- 2019–2020: average to below average rainfall, except for a wet February and a few isolated rain events

- 2020–2021: variable rainfall with some very wet months
- 2021–2022: average to below average rainfall, except for some wet months, including a very wet March and associated flooding.

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

Average to well below the long-term average rainfall conditions were recorded in winter 2021, with July 2021 notably dry.

While September and October 2021 rainfall totals were close to the long-term average in the region, above average rainfall was recorded in November 2021, with several heavy rain events occurring mid and late in the month. Newcastle recorded more than 3 times the long-term monthly rainfall average for November with 233 mm.

The Hunter Coast received average to below average rainfall during December 2021 and January 2022.

Wet weather conditions returned with average to above average rainfall recorded from February to April 2022 in the region. March 2022 was significantly wet, particularly in the south. More than double the long-term monthly average was recorded at Swansea with 306 mm of rain for the month.

Consecutive days of heavy rainfall in early and late March resulted in flooding in the region. Beachwatch issued an extreme wet weather pollution alert on the Hunter daily beach pollution forecast during March 2022, advising stormwater pollution may be impacting swimming sites for an extended period, with lifeguard reports of floating debris and discoloured water continuing after the rain had ceased.

A heavy rainfall event was recorded on 7–8 April, with Swansea receiving a record high daily rainfall total for April of 110 mm on the 8th. Beachwatch issued an extreme wet weather pollution alert until the stormwater impacts from extreme wet weather subsided.

Marine algal blooms

Marine algal bloom present in the water

Photo: Chad Weston/NPWS, DPE

Water NSW also issued a caution alert for *Trichodesmium* sp. in November 2021 that may have impacted beaches in the Hunter region. Marine algae advisories were issued on the Water NSW website.

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 Hunter 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 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	G	↓
One Mile Beach	Ocean beach	VG	○
City of Newcastle Council			
South Stockton Beach	Ocean beach	G	↓
Nobbys Beach	Ocean beach	VG	○
Newcastle Beach	Ocean beach	VG	○
Bar Beach	Ocean beach	VG	○
Merewether Beach	Ocean beach	VG	↑
Burwood North Beach	Ocean beach	VG	○
Burwood South Beach	Ocean beach	VG	↑
Lake Macquarie City Council			
Glenrock Lagoon Beach	Ocean beach	VG	↑
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

Port Stephens Council

Overall results

100%
ocean beaches graded Good or Very Good

All 4 swimming sites were graded as Very Good or Good in 2021–2022. This is an excellent result, and similar to previous years.

Percentage of sites graded as Very Good or Good

	2019–2020	2020–2021	2021–2022	Trend
Ocean beaches (4 sites)	100%	100%	**100%**	—

Four swimming sites were monitored in the Port Stephens local government area.

All locations were monitored by Hunter Water Corporation as a requirement of Environment Protection Licences. 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

Zenith Beach, Box Beach and One Mile Beach.

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

Ocean beaches were the only site type monitored in the Port Stephens 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.

Site types in Port Stephens Council

Ocean beaches

Beach Suitability Grades for Port Stephens Council ocean beaches

Three of the 4 ocean beaches were graded as Very Good in 2021–2022: Zenith Beach, Box Beach and One Mile Beach. Water quality at these sites has continued to be of a high standard and was suitable for swimming almost all of the time.

Fingal Beach was graded Good in 2021–2022, downgraded from Very Good in the previous year. Water quality at this site was suitable for swimming most of the time but was occasionally impacted following rain.

Swimming should be avoided for one day after rainfall at ocean beaches, or if signs of pollution are present such as discoloured water or flowing stormwater drains.

Management

A **coastal management program** (CMP) outlines a long-term strategy for managing the coast, in line with the *Coastal Management Act 2016*.

The NSW Government provides guidance and funding through the Coastal and Estuary Grants Program for local councils to prepare and implement CMPs.

Port Stephens Council

Port Stephens Council is preparing a coastal management program (CMP) for the Port Stephens estuary and open coast, using funding received from the NSW Government's Coastal and Estuary Grants Program. The CMP has identified coastal inundation, beach erosion and dune transgression as the priority coastal hazards to the Port Stephens coastal zone. Council has commenced Stage 3 of the CMP, which aims to identify and prioritise management actions based on the key coastal hazards. Catchment influences on water quality and urban stormwater high-risk areas will be investigated as part of Stage 5 of the CMP.

Port Stephens Council responds to reports of suspected algal contamination, stormwater and sewage pollution by managing swimming areas to minimise the risk to swimmers. Council utilises various methods to communicate information to the public including council's website and social media. If sewage or stormwater contamination is suspected, the swimming area may be closed and further water quality testing is undertaken until samples indicate that water quality is suitable for swimming.

Zenith Beach
Photo: Beachwatch/DPE

There are more than 4,800 onsite sewage management systems in the Port Stephens Council area, many of which are in semi-rural villages and rural areas. Potential environmental and health impacts are managed by the council through routine inspections, application assessment and management of an ‘approval to operate’ database.

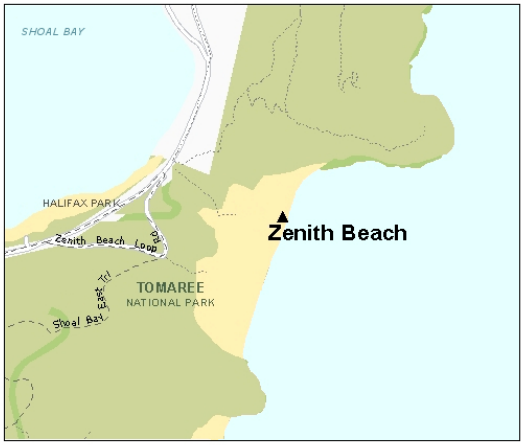
Hunter Water

Hunter Water has recently launched the ‘Respect your throne’ campaign to educate the community on products that can and cannot be flushed in the toilet, to prevent sewer blockages

Sampling sites and Beach Suitability Grades in Port Stephens Council

Zenith Beach

Beach grade: VG



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

Zenith Beach is 400 m long and is within Tomaree National Park. The beach is not patrolled by lifeguards.

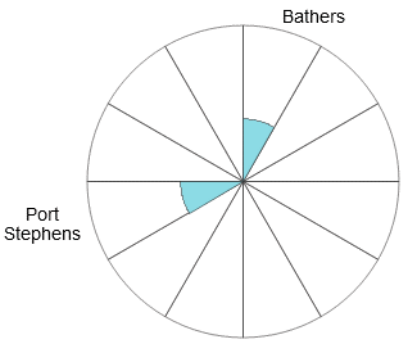
The Beach Suitability Grade of Very Good indicates microbial water quality is considered suitable for swimming almost all of the time, with very few potential sources of faecal contamination.

Enterococci levels had little response to rainfall and generally remained below the safe swimming limit across most rainfall categories.

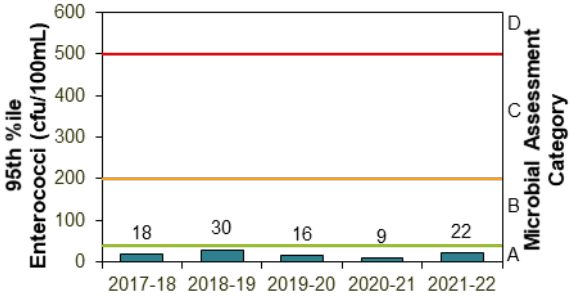
The site has been monitored since 1996.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Sep 2020 to Apr 2022	96%	100	Stable

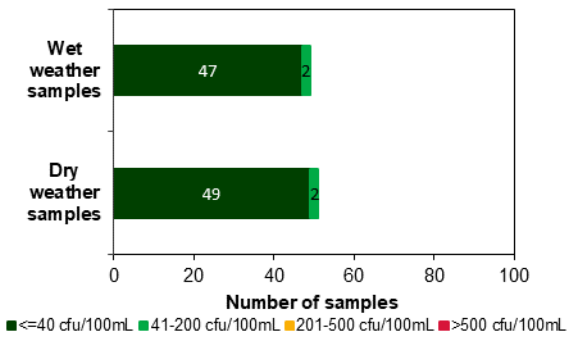
Sanitary inspection: Low



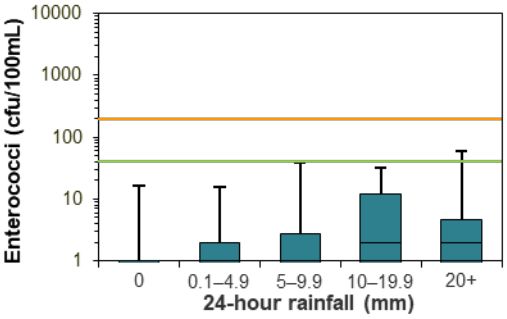
Microbial Assessment Category: A



Dry and wet weather water quality

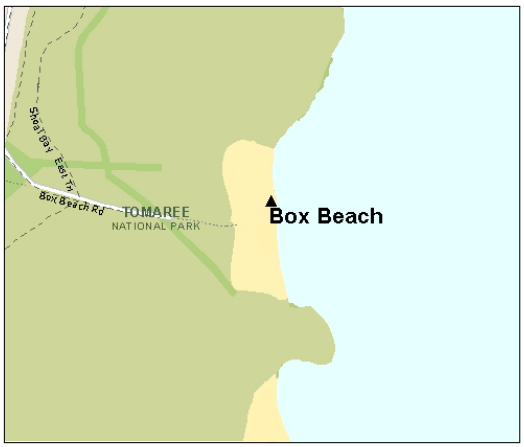


Water quality in response to rainfall



Box Beach

Beach grade: VG



See ‘How to read this report’ for key to map.

Box Beach is 350 m long and within Tomaree National Park. The beach is not patrolled by lifeguards.

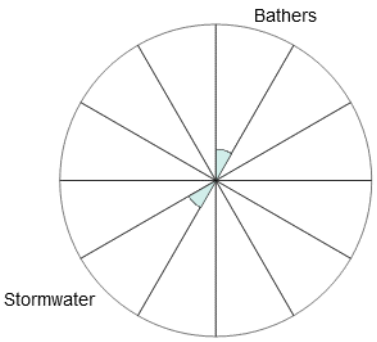
The Beach Suitability Grade of Very Good indicates microbial water quality is considered suitable for swimming almost all of the time, with only one potential source of faecal contamination.

Enterococci levels had very little response to rainfall and generally remained below the safe swimming limit across most rainfall categories.

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 2020 to Apr 2022	98%	100	Stable

Sanitary inspection: Low



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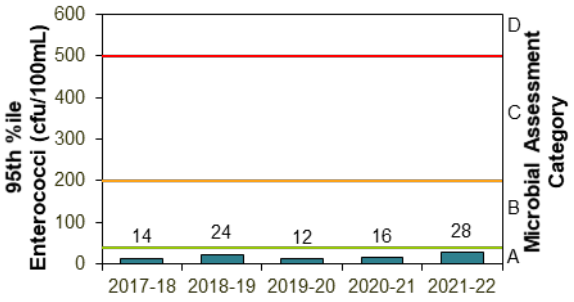
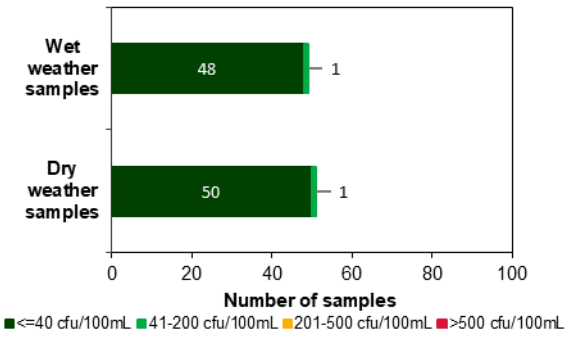
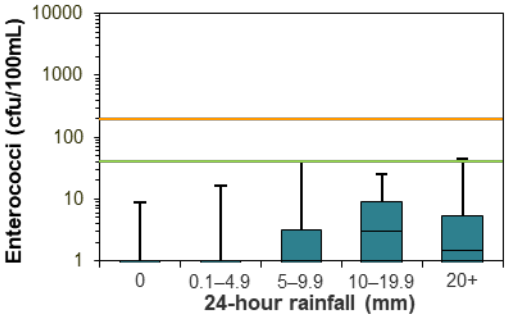


Dry and wet weather water quality



Water quality in response to rainfall



Fingal Beach

Beach grade: G

See ‘How to read this report’ for key to map.

Fingal Beach is approximately 2.7 km long and within Fingal Bay. The beach is patrolled from September to April.

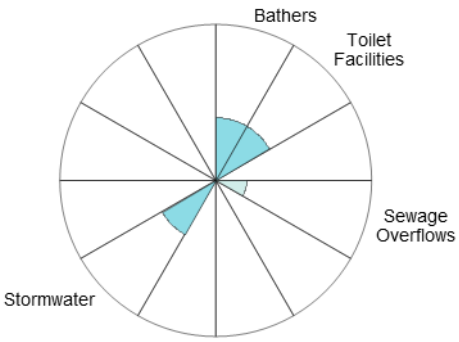
The Beach Suitability Grade of Good indicates microbial water quality is considered suitable for swimming most of the time but can be susceptible to pollution after rain, with several sources of minor faecal contamination.

Enterococci levels increased slightly with increasing rainfall, occasionally exceeding the safe swimming limit after light rain.

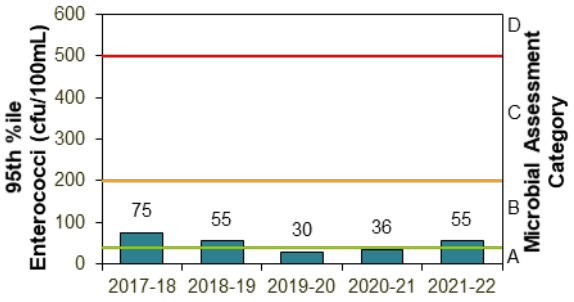
The site has been monitored since 1996.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Sep 2020 to Apr 2022	100%	100	Declined ↓

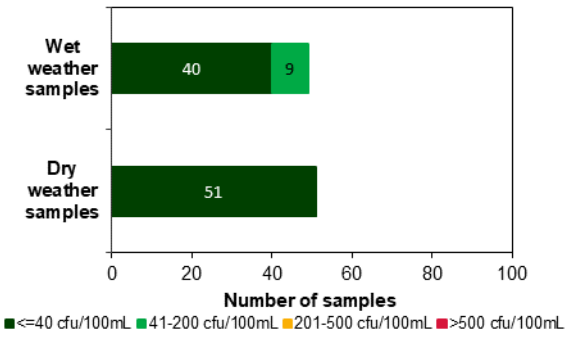
Sanitary inspection: Low



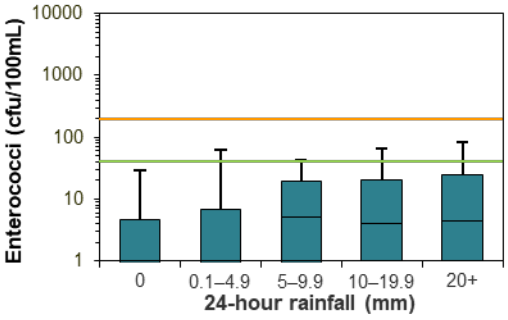
Microbial Assessment Category: B



Dry and wet weather water quality



Water quality in response to rainfall



One Mile Beach

Beach grade: VG

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

This 1.3 km stretch of beach is at the southern end of Anna Bay and is patrolled from September to April.

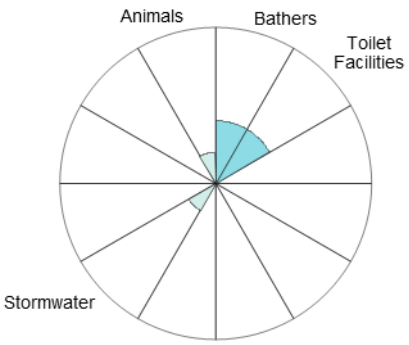
The Beach Suitability Grade of Very Good indicates microbial water quality is considered suitable for swimming almost all of the time, with few potential sources of faecal contamination.

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

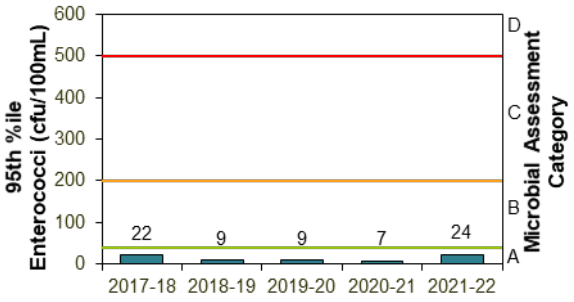
The site has been monitored since 1996.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Sep 2020 to Apr 2022	96%	100	Stable

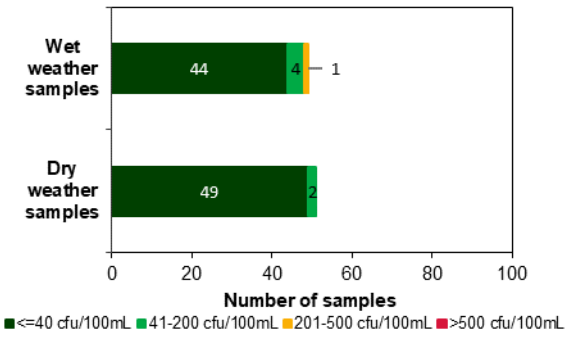
Sanitary inspection: Low



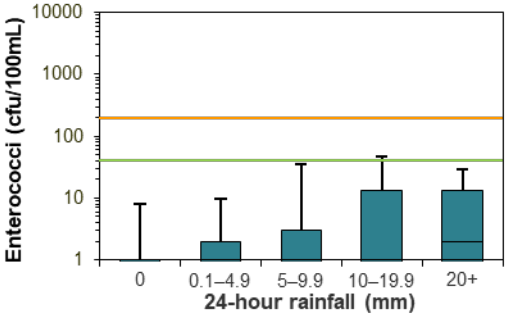
Microbial Assessment Category: A



Dry and wet weather water quality



Water quality in response to rainfall



City of Newcastle Council

100%
ocean beaches graded Good or Very Good

Overall results

All 7 swimming sites were graded as Very Good or Good in 2021–2022. Excellent results have also been recorded in previous years.

Percentage of sites graded as Very Good or Good

	2019–2020	2020–2021	2021–2022	Trend
Ocean beaches (7 sites)	100%	100%	**100%**	

Seven swimming sites were monitored in the Newcastle local government area.

All locations were monitored by Hunter Water Corporation as a requirement of Environment Protection Licences. Samples were collected every sixth day throughout the year and every third day during the swimming season at 4 sites.

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

Nobbys Beach, Newcastle Beach, Bar Beach, Merewether Beach, Burwood North Beach and Burwood South Beach.

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

Site types in City of Newcastle Council

Ocean beaches were the only site type monitored in the Newcastle 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

Beach Suitability Grades for City of Newcastle Council ocean beaches

Six of the 7 ocean beaches were graded as Very Good in 2021–2022: Nobbys Beach, Newcastle Beach, Bar Beach, Merewether Beach, Burwood North Beach and Burwood South Beach. Water quality at these sites was suitable for swimming almost all of the time and has been of a high standard for many years.

Merewether Beach and Burwood South Beach were upgraded to Very Good from Good in the previous year, due to improved microbial water quality. The grades at these sites have fluctuated between Very Good and Good due to changes in microbial water quality over the past 3 years.

South Stockton Beach was graded Good, a decline from Very Good in the previous year. Water quality was mostly suitable for swimming, with 92% of dry weather samples within the safe swimming limit. Elevated bacterial levels were often recorded following heavy rainfall.

Swimming should be avoided for one day after rainfall at ocean beaches, or if signs of pollution are present such as discoloured water or flowing stormwater drains.

Management

City of Newcastle Council

City of Newcastle is currently revising the CMP for Stockton Beach and preparing a CMP for the Newcastle Southern Beaches. Both open coast CMPs will focus on coastal hazard risks and community use opportunities and environmental attributes of the Newcastle coastline. The extended Stockton CMP is expected to be completed in 2021–2022. The Southern Beaches CMP is ongoing. Council continues to implement the Newcastle Coastal Zone Management Program (CZMP) for areas where a certified CMP is not yet in place.

Maitland City Council recently commenced development of a Hunter Estuary CMP (Stage 1) in collaboration with City of Newcastle, Port Stephens, Dungog and Cessnock councils, Hunter Water and Hunter Local Land Services. This work will update the Hunter Estuary CZMP, which focuses on the ecological health and water quality of the Hunter River.

City of Newcastle Council manages over 600 water quality devices in the local government area to reduce and recycle stormwater, helping mitigate its impact on waterways and beaches. Council mostly uses primary pollution control devices to remove coarse sediment and rubbish from

stormwater, however some areas receive additional treatment to further remove fine sediments, nutrients and heavy metals.

Stormwater quality targets are set for new developments through council's Development Control Plan.

A **coastal management program** (CMP) outlines a long-term strategy for managing the coast, in line with the *Coastal Management Act 2016*.

The NSW Government provides guidance and funding through the Coastal and Estuary Grants Program for local councils to prepare and implement CMPs.

City of Newcastle's own water quality solutions in coastal areas typically focus on complete treatment train approaches, often culminating in infiltration back to the groundwater table and using vegetation to recycle stormwater and nutrients. In recent years council has built several new water sensitive stormwater pollution control devices that provide tertiary treatment or infiltrations in the beachside areas of Stockton, Bar Beach, Dixon Park and Merewether.

City of Newcastle Council undertakes regular ocean baths cleaning, street sweeping, beach grooming, litter patrols and waste management actions to reduce the impact of stormwater pollution on beaches. Council's environmental compliance and stormwater education programs encourage stormwater pollution prevention actions such as sediment and erosion controls on building sites and picking up of dog poo by owners. Interpretive environmental signage has been installed in conjunction with city renewal to increase knowledge amongst beach visitors and users of the coastline's natural and historic value.

Council monitors the water quality at 2 ocean baths in accordance with the National Health and Medical Research Council's guidelines for managing risks in recreational water (NHRMC 2008). Water samples are collected and tested monthly. Current monitoring is limited to Merewether Ocean Baths as the Newcastle Baths are closed for upgrade works scheduled to be completed mid-2023.

Hunter Water

Hunter Water manages a number of water quality devices in the Newcastle local government area to help mitigate the impact of stormwater pollution on waterways and beaches. These include floating booms, trash racks and primary pollution control devices to remove sediment and rubbish. Hunter Water, City of Newcastle and the Newcastle Jockey Club are working together to investigate the stormwater harvesting opportunities at the Newcastle Jockey Club.

Hunter Water has an ongoing program of testing for illegal stormwater connections to ensure excess water does not enter the wastewater system during wet weather, to reduce the potential for overflows.

Bar Beach
Photo: Beachwatch/DPE

In March 2017 Hunter Water upgraded the Burwood Beach wastewater treatment plant (WWTP) with a UV disinfection system, at a cost of $13 million, to address the findings of a health risk study completed in 2010. This study indicated a small risk the effluent plume from the WWTP could be driven back to the coast under certain combinations of winds and currents. Since its commissioning, monitoring of the UV system has shown a reduction in pathogen concentrations in the effluent, meeting Environment Protection Authority (EPA) requirements.

In 2020 Hunter Water undertook another health risk assessment study using a detailed hydrodynamic model of Burwood Beach WWTP receiving environment. The assessment showed the WWTP outfall poses negligible risks to swimmers at nearby beaches all year round.

Hunter Water is currently planning the next upgrade of the Burwood WWTP, which will further improve the treatment process and effluent quality, and increase capacity to manage growth in the region.

Hunter Water has recently launched the ‘Respect your throne’ campaign to educate the community on products that can and cannot be flushed in the toilet, to prevent sewer blockages.

Sampling sites and Beach Suitability Grades in City of Newcastle Council

South Stockton Beach

Beach grade: G

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

South Stockton Beach is at the southern end of a 32 km stretch of beach and is patrolled from September to April.

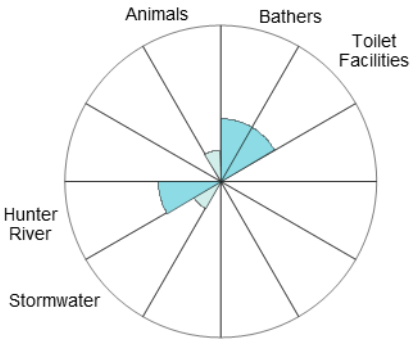
The Beach Suitability Grade of Good indicates microbial water quality is considered suitable for swimming most of the time but may be susceptible to pollution after rain, with several potential sources of minor faecal contamination.

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

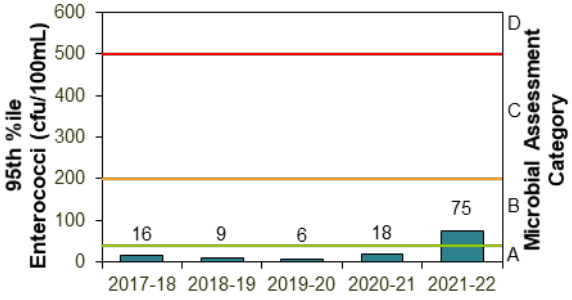
The site has been monitored since 1996.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Nov 2019 to Apr 2022	92%	100	Declined

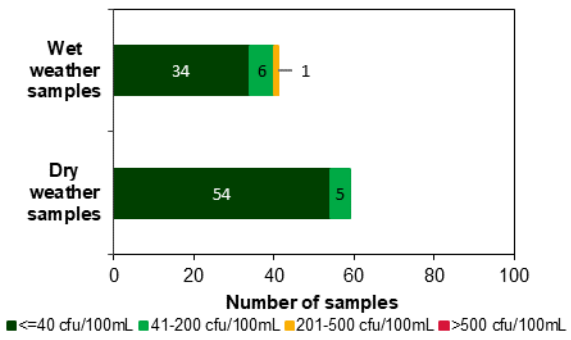
Sanitary inspection: Low



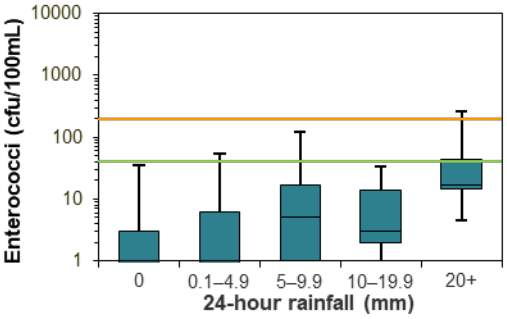
Microbial Assessment Category: B



Dry and wet weather water quality

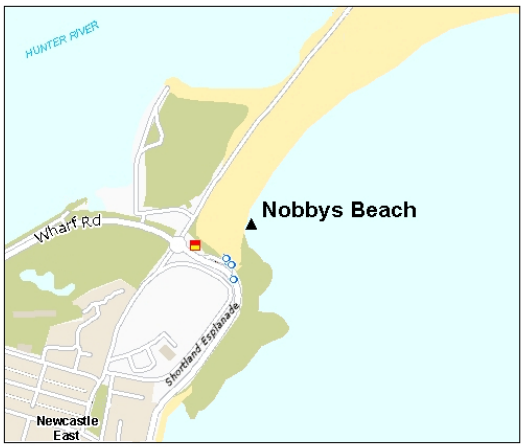


Water quality in response to rainfall



Nobbys Beach

Beach grade: VG



See ‘How to read this report’ for key to map.

Nobbys Beach is 1 km long and is patrolled year round.

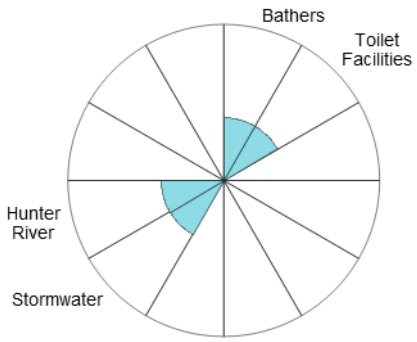
The Beach Suitability Grade of Very Good indicates microbial water quality is considered suitable for swimming almost all of the time, with few potential sources of faecal contamination.

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

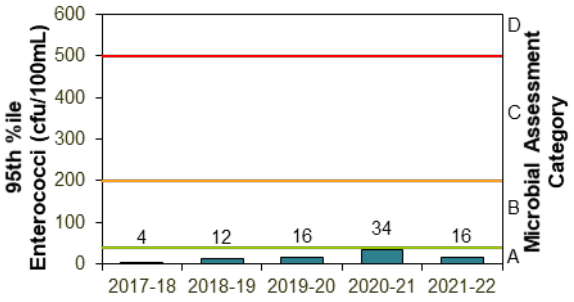
The site has been monitored since 1996.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Sep 2020 to Apr 2022	100%	100	Stable

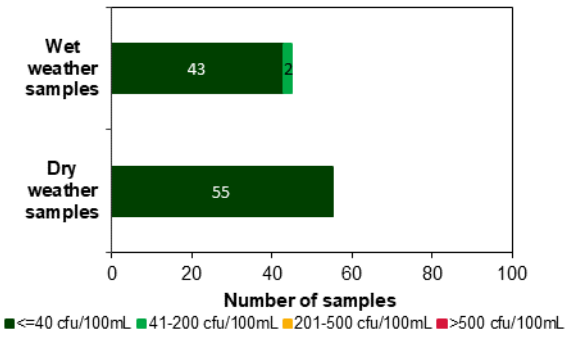
Sanitary inspection: Low



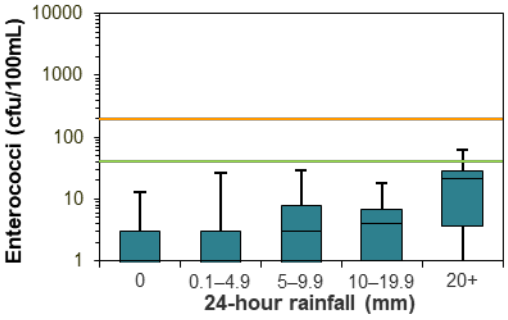
Microbial Assessment Category: A



Dry and wet weather water quality



Water quality in response to rainfall



Newcastle Beach

Beach grade: VG

Newcastle Beach is approximately 650 m long and is patrolled 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.

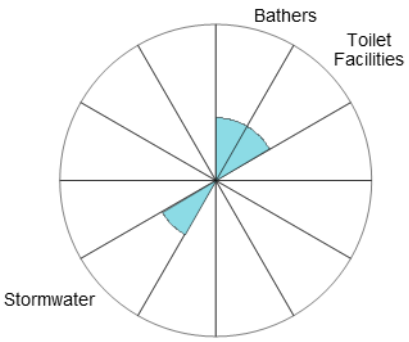
Enterococci levels increased slightly with increasing rainfall, often exceeding the safe swimming after 20 mm or more of rain.

The site has been monitored since 1996.

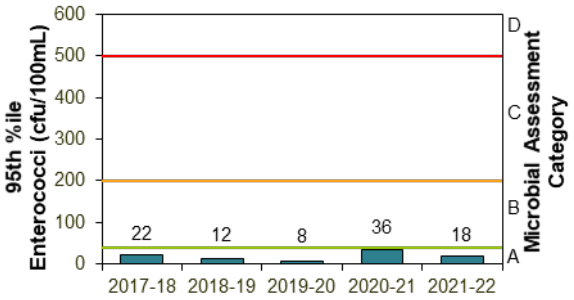
See ‘How to read this report’ for key to map.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Sep 2020 to Apr 2022	100%	100	Stable

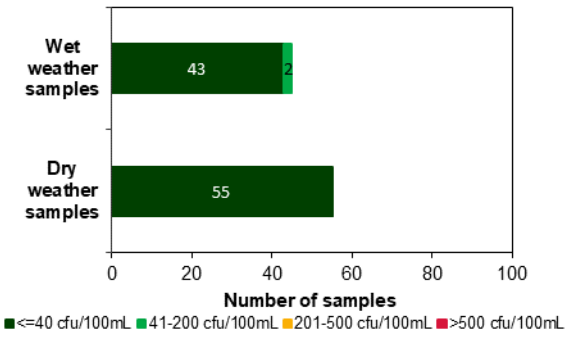
Sanitary inspection: Low



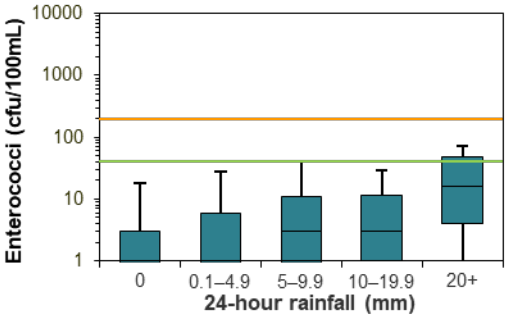
Microbial Assessment Category: A



Dry and wet weather water quality



Water quality in response to rainfall



Bar Beach

Beach grade: VG

See ‘How to read this report’ for key to map.

Bar Beach is approximately 500 m long and is patrolled all year round.

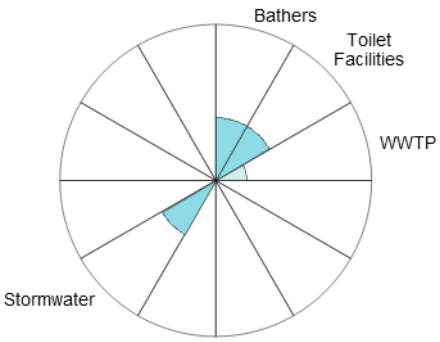
The Beach Suitability Grade of Very Good indicates microbial water quality is considered suitable for swimming almost all of the time, with few potential sources of faecal contamination.

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

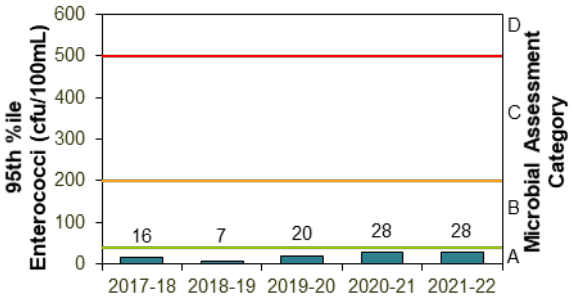
The site has been monitored since 1996.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Apr 2021 to Apr 2022	100%	100	Stable

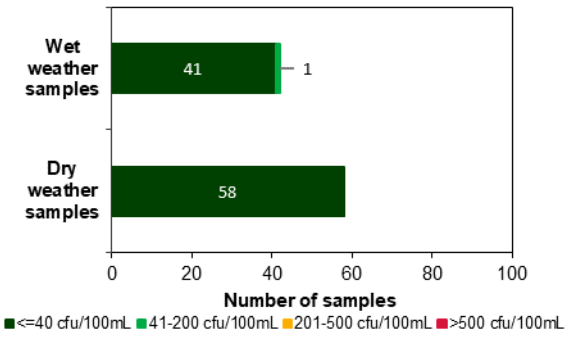
Sanitary inspection: Low



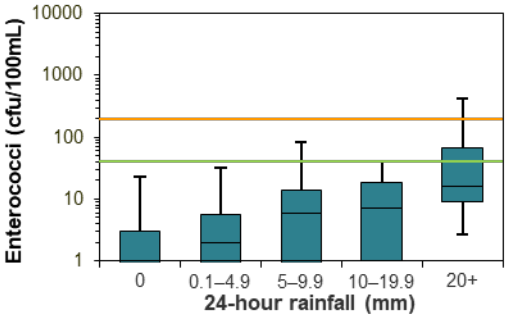
Microbial Assessment Category: A



Dry and wet weather water quality



Water quality in response to rainfall



Merewether Beach

Beach grade: VG

See ‘How to read this report’ for key to map.

Merewether Beach is at the southern end of a 900 m stretch of beach and is patrolled year round.

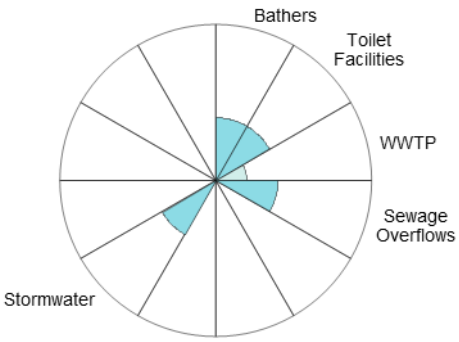
The Beach Suitability Grade of Very Good indicates microbial water quality is considered suitable for swimming almost all of the time with few potential sources of faecal contamination.

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

The site has been monitored since 1996.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Apr 2021 to Apr 2022	100%	100	Improved ↑

Sanitary inspection: Low



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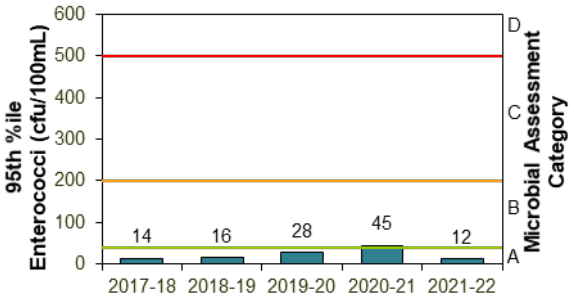
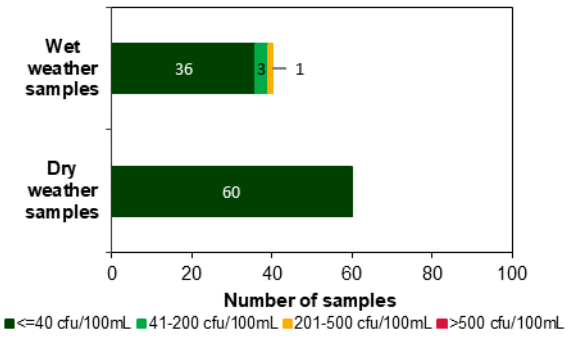
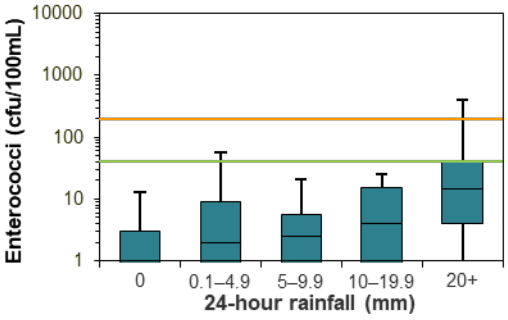


Dry and wet weather water quality

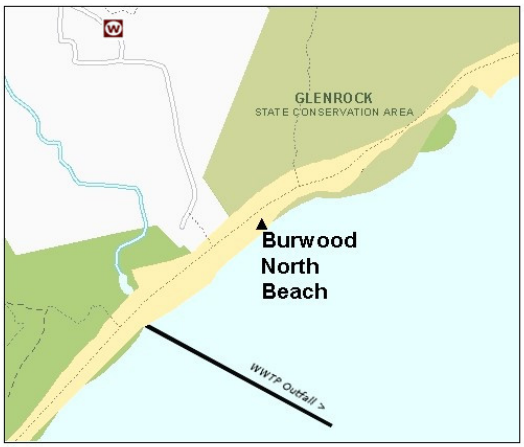


Water quality in response to rainfall



Burwood North Beach

Beach grade: VG



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

Burwood North Beach is at the northern end of an 800 m stretch of beach and is not patrolled by lifeguards.

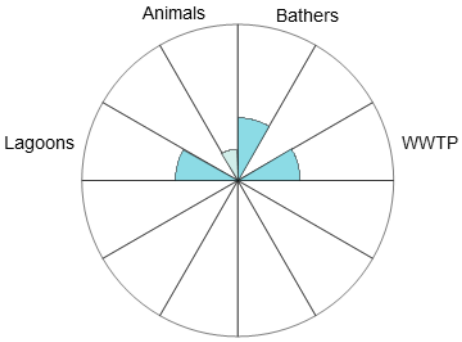
The Beach Suitability Grade of Very Good indicates microbial water quality is considered suitable for swimming almost all of the time with few potential sources of faecal contamination.

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

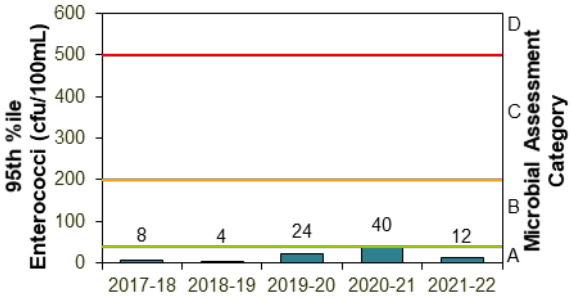
The site has been monitored since 1996.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Apr 2021 to Apr 2022	100%	100	Stable

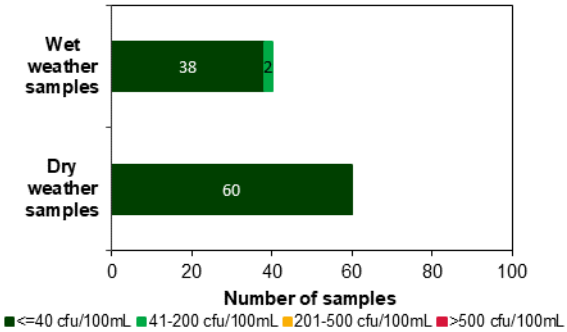
Sanitary inspection: Low



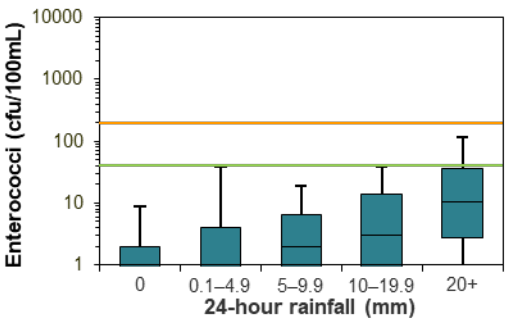
Microbial Assessment Category: A



Dry and wet weather water quality



Water quality in response to rainfall



Burwood South Beach

Beach grade: VG

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

Burwood South Beach is located at the southern end of an 800 m stretch of beach and is not patrolled by lifeguards.

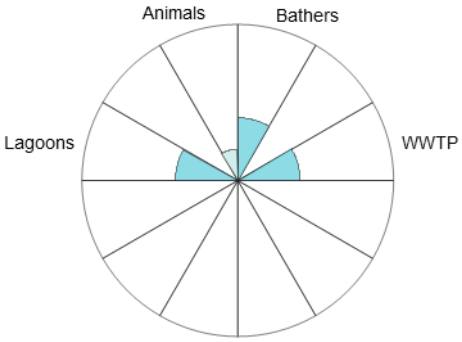
The Beach Suitability Grade of Very Good indicates microbial water quality is considered suitable for swimming almost all of the time with few potential sources of faecal contamination.

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

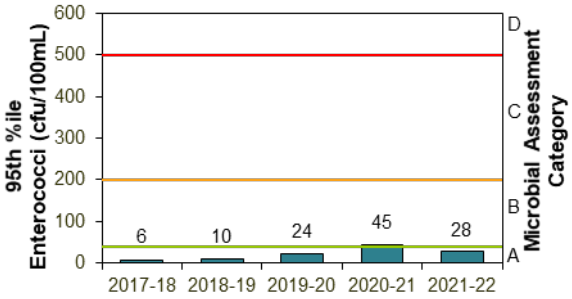
The site has been monitored since 1996.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Apr 2021 to Apr 2022	100%	100	Improved ↑

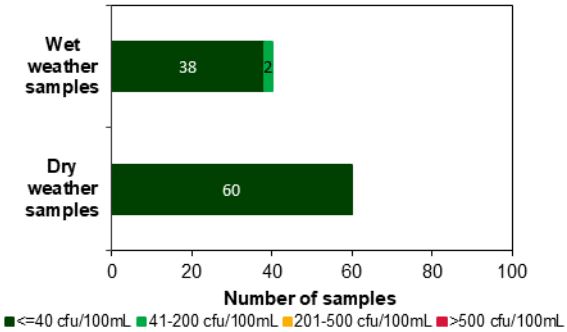
Sanitary inspection: Low



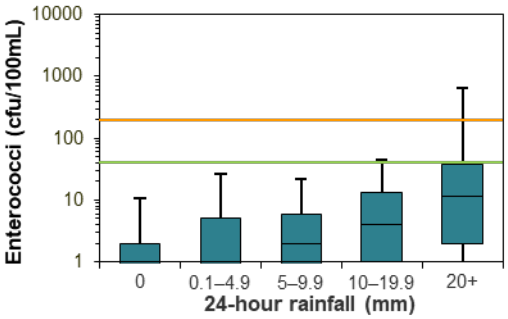
Microbial Assessment Category: A



Dry and wet weather water quality



Water quality in response to rainfall



Lake Macquarie City Council

100%
ocean beaches graded Good or Very Good

Overall results

All 6 swimming sites were graded as Very Good or Good in 2021–2022. This is an excellent result and consistent with the previous year.

Percentage of sites graded as Very Good or Good

	2019–2020	2020–2021	2021–2022	Trend
Ocean beaches (6 sites)	83%	100%	**100%**	

Six swimming sites were monitored in the Lake Macquarie local government area.

All locations were monitored by Hunter Water Corporation as a requirement of Environment Protection Licences. 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

Glenrock Lagoon Beach, Dudley Beach, Redhead Beach, Blacksmiths Beach and Caves Beach.

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

Ocean beaches were the only site type monitored in the Lake Macquarie 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.

Site types in Lake Macquarie City Council

Ocean beaches

Beach Suitability Grades for Lake Macquarie City Council ocean beaches

Five of the 6 ocean beaches were graded as Very Good in 2021–2022: Glenrock Lagoon Beach, Dudley Beach, Redhead Beach, Blacksmiths Beach and Caves Beach. Glenrock Lagoon Beach improved to Very Good from Good in the previous year. The water quality at these beaches is suitable for swimming almost all of the time.

Swansea Heads Little Beach continued to be graded Good in 2021–2022, consistent with the previous year. While the water quality was mostly suitable for swimming during dry weather conditions, with 97% of dry weather samples within the safe swimming limit, elevated levels occasionally exceeded the safe swimming limit in dry weather conditions and often following light rainfall.

Microbial water quality has generally been more elevated at Swansea Heads Little Beach in comparison to nearby beaches for the last 5 years. This beach is located at the entrance to Lake Macquarie in a 100 m long bay bordered by a rock platform and breakwall, which may reduce flushing and dilution of contaminants compared to other nearby open ocean beaches.

Swimming should be avoided for one day after rainfall at ocean beaches, or if signs of pollution are present such as discoloured water or flowing stormwater drains.

Management

Lake Macquarie City Council

Lake Macquarie City Council coordinates the development and implementation of the Lake Macquarie CZMP. The plan covers Lake Macquarie's coastline, estuary, and Swansea Channel. It contains actions to manage coastal hazards, improve the health of the coastal zone, and improve community access to coastal areas. This plan is currently being reviewed and updated to a CMP in accordance with the NSW Coastal Management Framework. The CMP is expected to be completed in 2022.

With funding from the NSW Government's Coastal and Estuary Grants Program, council is currently undertaking a number of priority actions identified in the CZMP, including the removal of weeds from coastal dunes (especially bitou bush), reshaping of dunes, wetland and saltmarsh rehabilitation, revegetation works, the installation of stormwater treatment devices in priority locations, as well as completing works to stabilise eroding streambanks and foreshore areas around the lake and on the coastal dunes.

Council and the Department of Planning and Environment (DPE) collaborate to undertake an integrated coastal zone monitoring program that considers water quality, seagrass habitat and coastal dunes to help inform future rehabilitation works. These projects aim to maintain and improve the ecological health of the Lake Macquarie estuary and surrounding beaches.

A **coastal management program** (CMP) outlines a long-term strategy for managing the coast, in line with the *Coastal Management Act 2016*.

The NSW Government provides guidance and funding through the Coastal and Estuary Grants Program for local councils to prepare and implement CMPs.

Lake Macquarie City Council continues to invest significant resources to improve water quality, especially within the Lake Macquarie estuary. Council currently manages and maintains over 350 stormwater quality improvement devices (including gross pollutant traps, constructed wetlands and bioretention basins). Council also requires that all new development complies with strict criteria for water quality discharges to the estuary, coast and other receiving waters.

Hunter Water

In March 2017 Hunter Water upgraded the Burwood Beach WWTP with a UV disinfection system, at a cost of $13 million, to address the findings of a health risk study completed in 2010. This study indicated a small risk the effluent plume from the WWTP could be driven back to the coast under certain combinations of winds and currents. Since its commissioning, monitoring of the UV system has shown a reduction in pathogen concentrations in the effluent, meeting EPA requirements.

In 2020 Hunter Water undertook another health risk assessment study using a detailed hydrodynamic model of Burwood Beach WWTP receiving environment. The assessment showed the WWTP outfall poses negligible risks to swimmers at nearby beaches all year round.

Hunter Water is currently planning the next upgrade of the Burwood WWTP, which will further improve the treatment process and effluent quality, and increase capacity to manage growth in the region.

Hunter Water has recently launched the ‘Respect your throne’ campaign to educate the community on products that can and cannot be flushed in the toilet, to prevent sewer blockages.

Glenrock Lagoon Beach
Photo: Beachwatch/DPE

Sampling sites and Beach Suitability Grades in Lake Macquarie City Council

Glenrock Lagoon Beach

Beach grade: VG

See ‘How to read this report’ for key to map.

Glenrock Lagoon Beach is 300 m long and is located at the southern end of Burwood Beach. The beach is not patrolled by lifeguards.

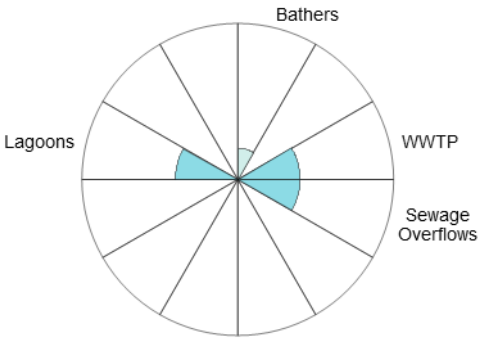
The Beach Suitability Grade of Very Good indicates microbial water quality is considered safe for swimming almost all of the time, with few potential sources of faecal contamination.

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

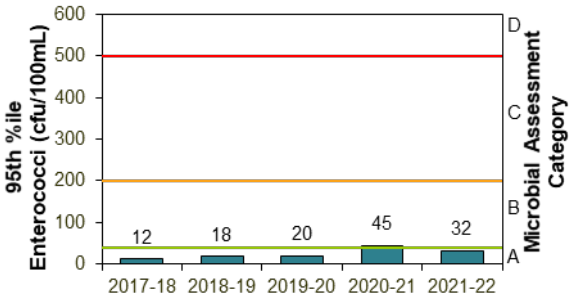
The site has been monitored since 1996.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Sep 2020 to Apr 2022	98%	100	Improved ↑

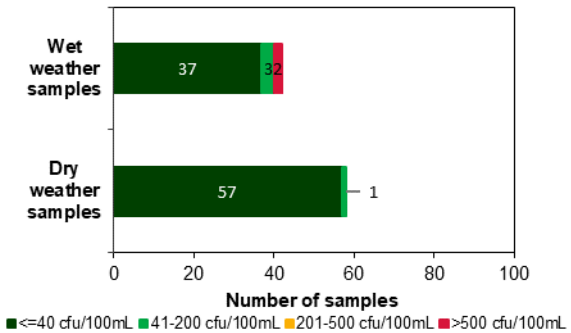
Sanitary inspection: Low



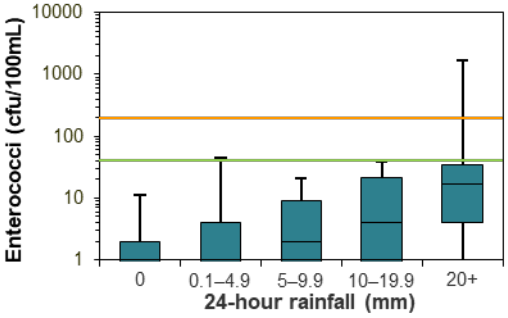
Microbial Assessment Category: A



Dry and wet weather water quality

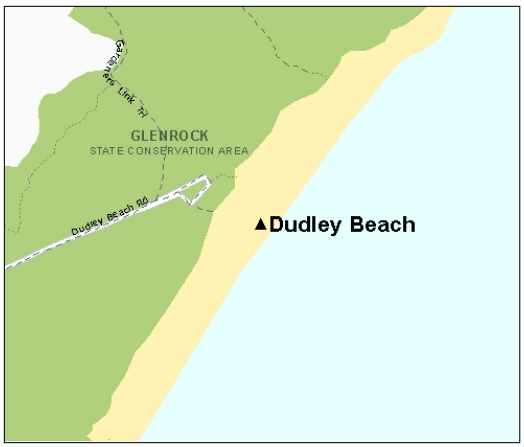


Water quality in response to rainfall



Dudley Beach

Beach grade: VG



Dudley Beach is one kilometre long and is not patrolled by lifeguards.

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

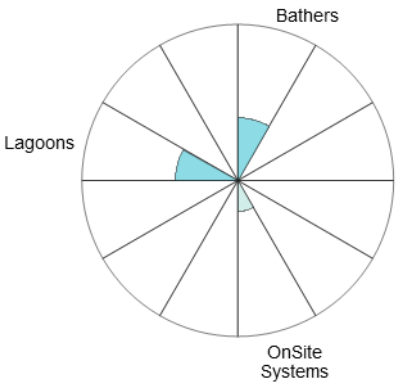
Enterococci levels increased slightly with increasing rainfall, occasionally exceeding the safe swimming limit in response to 20 mm or more of rain.

The site has been monitored since 1996.

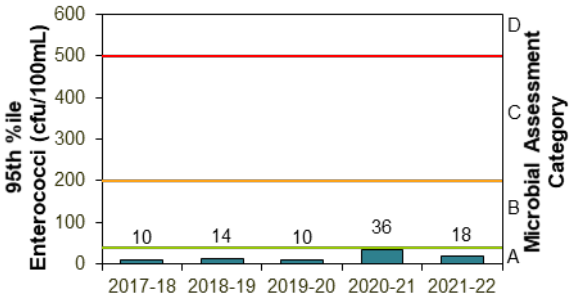
See ‘How to read this report’ for key to map.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Sep 2020 to Apr 2022	100%	100	Stable

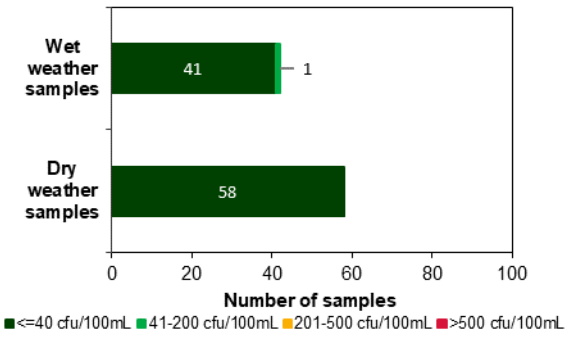
Sanitary inspection: Low



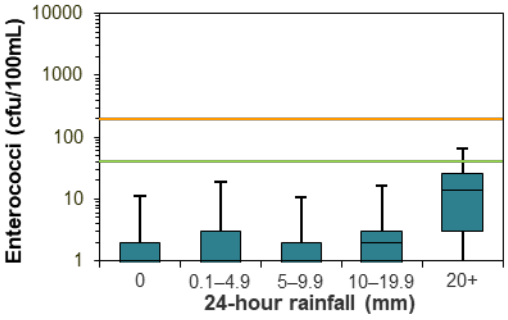
Microbial Assessment Category: A



Dry and wet weather water quality



Water quality in response to rainfall



Redhead Beach

Beach grade: VG

See ‘How to read this report’ for key to map.

Redhead Beach is located at the northern end of a 10 km stretch of beach and is patrolled between September and April.

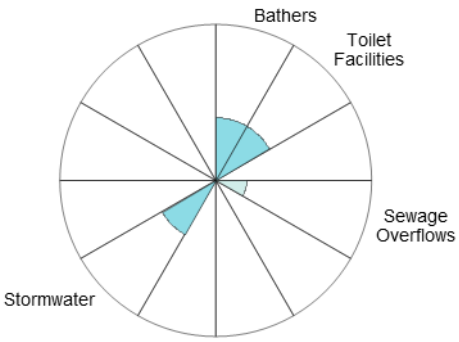
The Beach Suitability Grade of Very Good indicates microbial water quality is considered suitable for swimming almost all of the time, with few potential sources of faecal contamination.

Enterococci levels generally increased with increasing rainfall, occasionally exceeding the safe swimming limit after light rain.

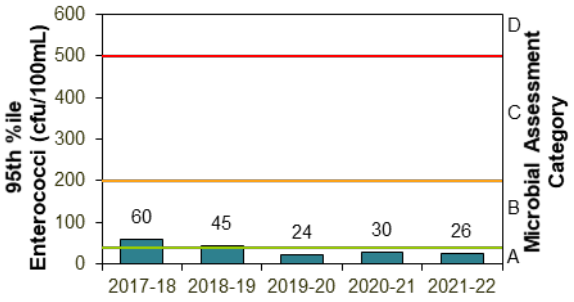
The site has been monitored since 1996.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Sep 2020 to Apr 2022	98%	100	Stable

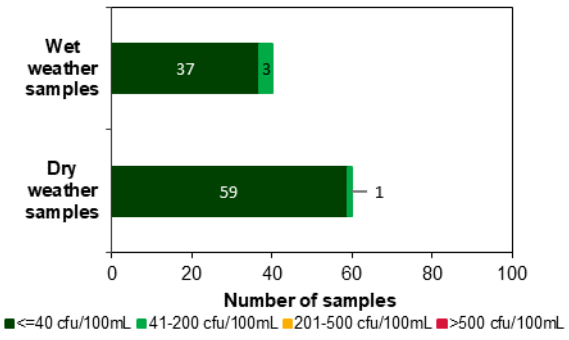
Sanitary inspection: Low



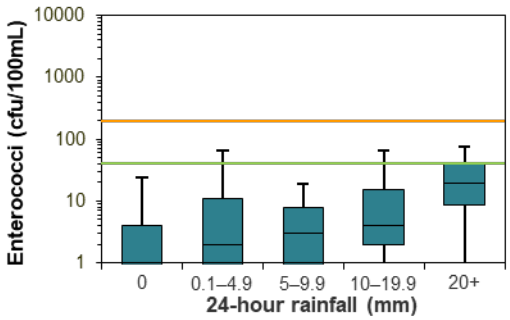
Microbial Assessment Category: A



Dry and wet weather water quality



Water quality in response to rainfall



Blacksmiths Beach

Beach grade: VG

See ‘How to read this report’ for key to map.

Blacksmiths Beach is at the southern end of a 10 km stretch of beach and is patrolled between September and April.

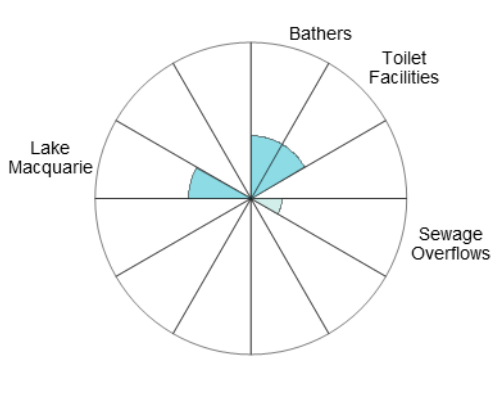
The Beach Suitability Grade of Very Good indicates microbial water quality is considered suitable for swimming almost all of the time, with few potential sources of faecal contamination.

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

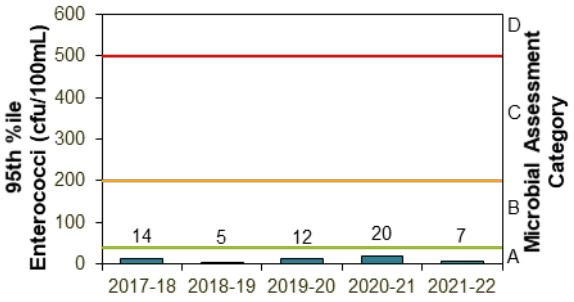
The site has been monitored since 1996.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Sep 2020 to Apr 2022	100%	100	Stable

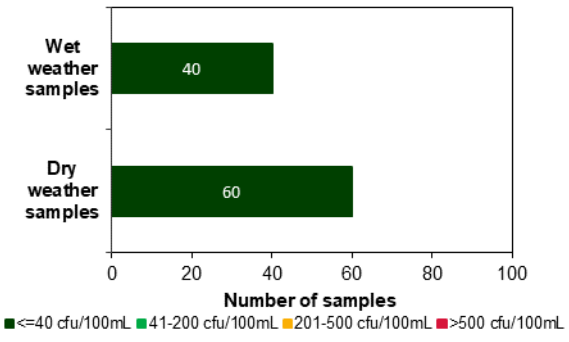
Sanitary inspection: Low



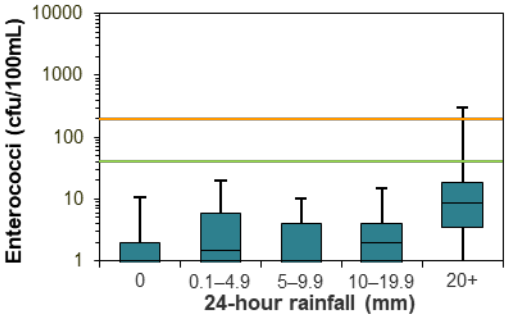
Microbial Assessment Category: A



Dry and wet weather water quality

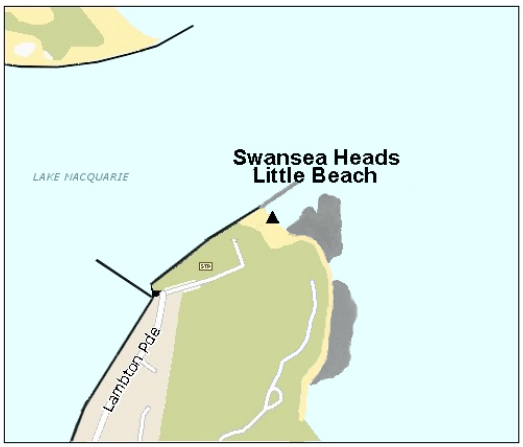


Water quality in response to rainfall



Swansea Heads Little Beach

Beach grade: G



See ‘How to read this report’ for key to map.

Swansea Heads Little Beach is 60 m long and located on the southern side of the entrance to Lake Macquarie. The beach is patrolled from September to April.

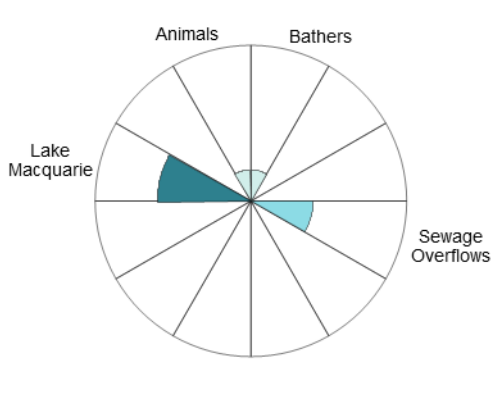
The Beach Suitability Grade of Good indicates microbial water quality is considered suitable for swimming most of the time but can be susceptible to pollution after heavy rain, with several potential sources of faecal contamination including outflow from Lake Macquarie.

Enterococci levels increased slightly with increasing rainfall, occasionally exceeding the safe swimming limit after no rain, and often after light rain.

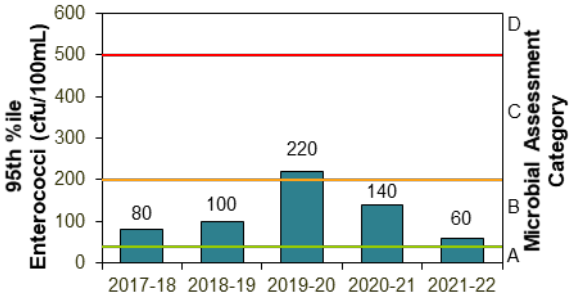
The site has been monitored since 1996.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Sep 2020 to Apr 2022	97%	100	Stable

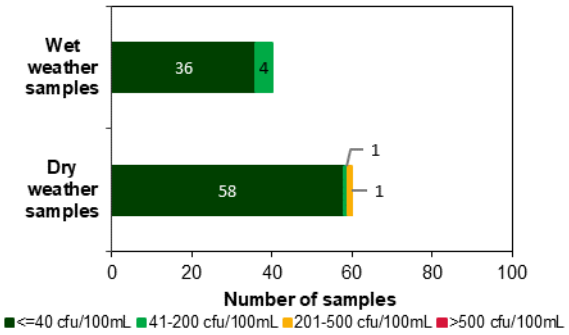
Sanitary inspection: Moderate



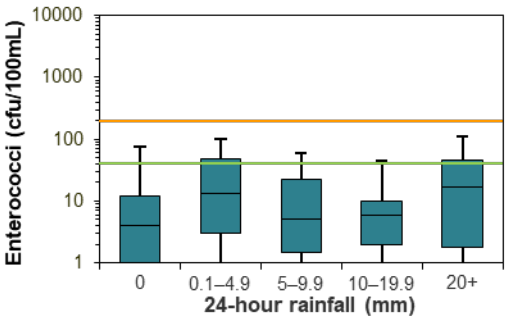
Microbial Assessment Category: B



Dry and wet weather water quality



Water quality in response to rainfall



Caves Beach

Beach grade: VG

See ‘How to read this report’ for key to map.

Caves Beach is located at the southern end of a 1.8 km beach and is patrolled between September and April.

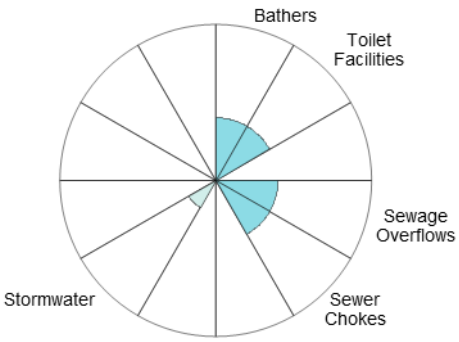
The Beach Suitability Grade of Very Good indicates microbial water quality is considered suitable for swimming almost all of the time, with few potential sources of significant faecal contamination.

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

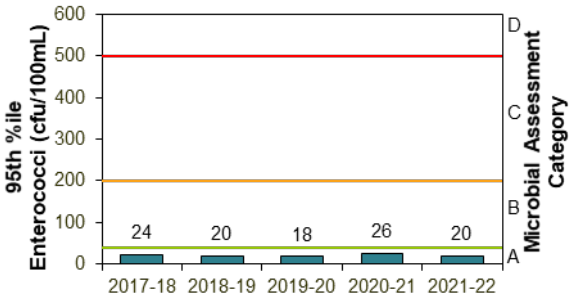
The site has been monitored since 1996.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Sep 2020 to Apr 2022	100%	100	Stable

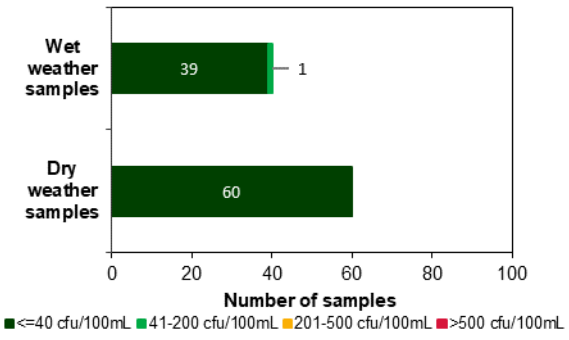
Sanitary inspection: Low



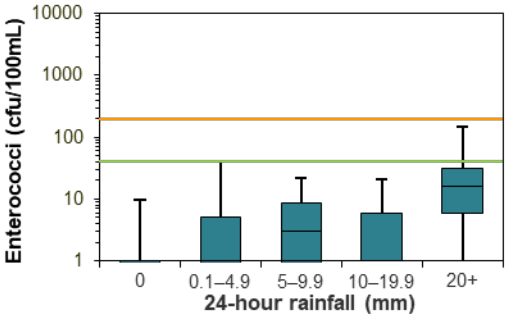
Microbial Assessment Category: A



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:

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 3 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 3 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 3 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 (NHMRC 2008) were adopted for use in NSW 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 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 (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

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 NSW 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. 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 on the DPE 'Sanitary inspection of beaches' webpage.

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

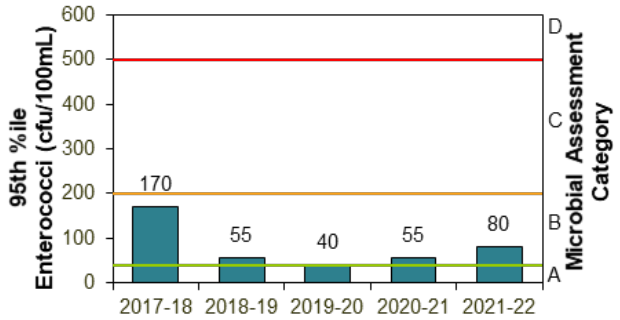
Declined

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

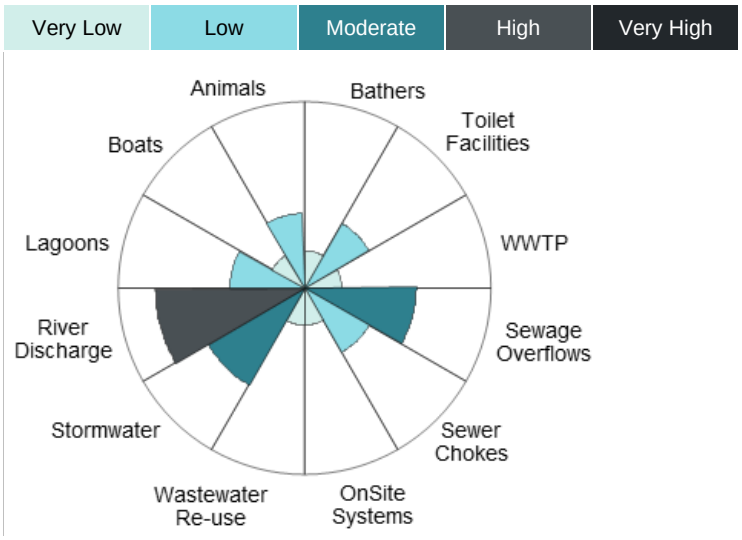
On each beach page, the MACs for the last 5 years are displayed on a simple bar chart. The MAC for the current year is based on enterococci data collected during the assessment period. The bars are labelled with the 95th percentile value for each year and the thresholds dividing the A, B, C and D categories are marked in green, amber and red for reference.



Sanitary Inspection Category (SIC) chart

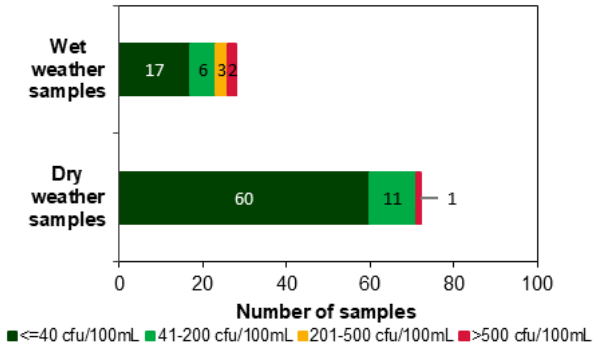
The results of the sanitary inspection for each swimming location are presented in a radar pie chart. The chart shows the likelihood that each identified pollution source will contribute to faecal contamination at a swimming site, as indicated by the size and colour of the segment, ranging from

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

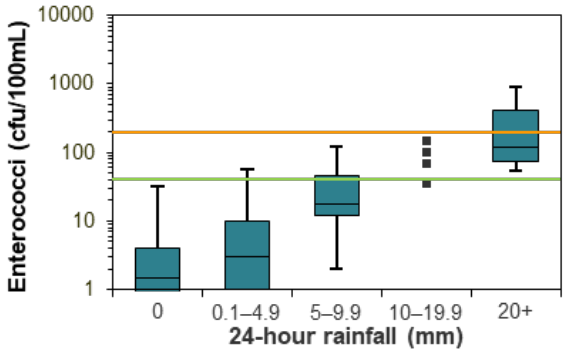
Enterococci levels in wet and dry weather conditions are presented for each swimming location as a bar graph. All data collected during the assessment period is included in the analysis. Dry weather is defined as no rainfall recorded in the previous 24 hours. Each bar is colour coded to show the number 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.



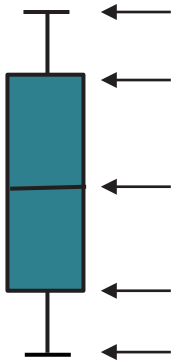
It is expected that swimming sites with lower levels of flushing will show some elevated bacterial results in dry weather samples (no rainfall in the previous 24 hours) due to the longer time needed to recover from a rainfall event. At some estuarine and lake/lagoon swimming locations the impacts of 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 9am 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:



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

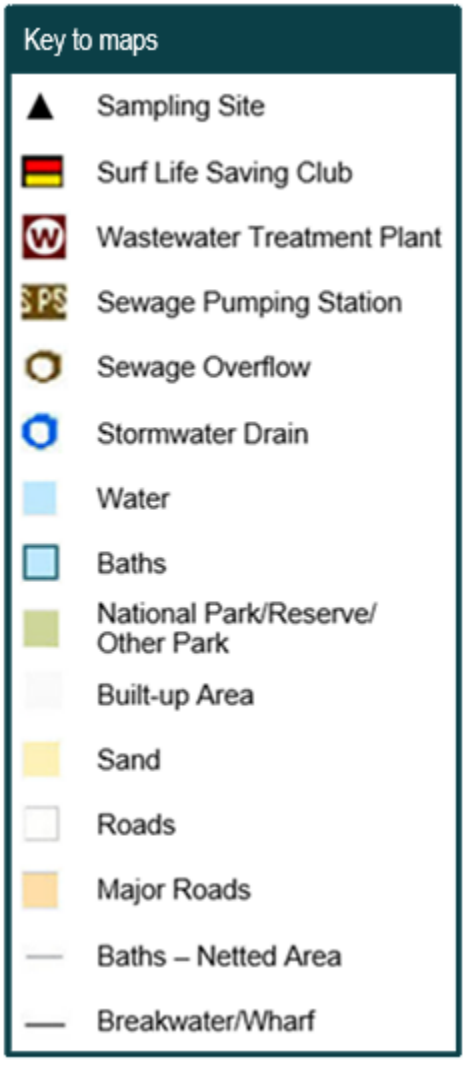
Information bars on each beach page provide a summary of details about the swimming site.

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 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.



References

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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 23/06/22.

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
- Beachwatch webpage
- Coastal management program progress
- Sanitary inspection of beaches
- Subscribe to environment and heritage newsletters
- WA Government environmental water publications