



## Beachwatch

# State of the beaches 2022–23

South Coast Region

© 2023 State of NSW and Department of Planning and Environment (DPE)

With the exception of photographs, the State of NSW and Department of Planning and Environment are pleased to allow this material to be reproduced in whole or in part for educational and non-commercial use, provided the meaning is unchanged and its source, publisher and authorship are acknowledged. Specific permission is required for the reproduction of photographs.

The Department of Planning and Environment (DPE) has compiled this report in good faith, exercising all due care and attention. No representation is made about the accuracy, completeness or suitability of the information in this publication for any particular purpose. DPE shall not be liable for any damage which may occur to any person or organisation taking action or not on the basis of this publication. Readers should seek appropriate advice when applying the information to their specific needs.

Every effort has been made to ensure that the information in this document is accurate at the time of publication. However, as appropriate, readers should obtain independent advice before making any decision based on this information.

All content in this publication is owned by DPE and is protected by Crown Copyright, unless credited otherwise. It is licensed under the Creative Commons Attribution 4.0 International (CC BY 4.0), subject to the exemptions contained in the licence. The legal code for the licence is available at Creative Commons.

DPE asserts the right to be attributed as author of the original material in the following manner: © State of New South Wales and Department of Planning and Environment 2023

Front cover: Racecourse Beach (Cameron Board/DPE)

Published by:

Environment and Heritage

Department of Planning and Environment

Locked Bag 5022, Parramatta NSW 2124

Phone: +61 2 9995 5000 (switchboard)

Phone: 1300 361 967 (Environment, Energy and Science enquiries)

TTY users: phone 133 677, then ask for 1300 361 967

Speak and listen users: phone 1300 555 727, then ask for 1300 361 967

Email: [info@environment.nsw.gov.au](mailto:info@environment.nsw.gov.au)

Website: [www.environment.nsw.gov.au](http://www.environment.nsw.gov.au)

Report pollution and environmental incidents

Environment Line: 131 555 (NSW only)

or [info@environment.nsw.gov.au](mailto:info@environment.nsw.gov.au)

See also [www.environment.nsw.gov.au](http://www.environment.nsw.gov.au)

ISBN 978-1-923076-65-5

EHG 2023/0281

July 2023

# Contents

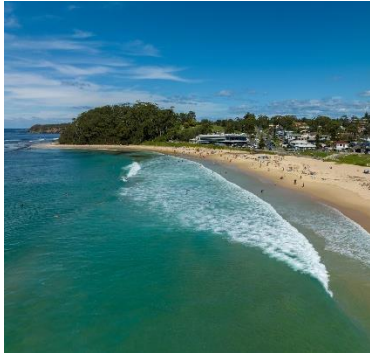
South Coast region summary 2022–2023	1
Monitoring water quality for swimming in New South Wales	1
Rainfall impacts	1
Shoalhaven City Council	5
Overall results	5
Shoalhaven Heads Beach	8
Tilbury Cove	9
Warrain Beach	10
Collingwood Beach	11
Cudmirrah Beach	12
Mollymook Beach	13
Rennies Beach	14
Racecourse Beach	15
Bawley Point Beach	16
Merry Beach	17
Eurobodalla Shire Council	18
Overall results	18
Cookies Beach	22
Caseys Beach	23
Surf Beach	24
Malua Bay Beach	25
Broulee Beach	26
South Broulee (Bengello) Beach	27
Shelley Beach	28
Tuross Main Beach	29
Brou Beach	30
Wagonga Inlet	31
Narooma Main Beach	32
How to read this report	33
Beach Suitability Grades	33
Explanation of tables	37
Explanation of graphs, charts, and information bars on beach pages	37

References	42
More information	42

Recreational water quality has been monitored in the South Coast region since 2002 by Shoalhaven City Council and Eurobodalla Shire Council under the Department of Planning and Environment's Beachwatch Partnership Program. This report summarises the performance of 21 swimming sites on the south coast of New South Wales, providing a long-term assessment of how suitable a site is for swimming. Monitored sites include ocean beaches and an estuarine swimming site in Wagonga Inlet.

In 2022–2023, 95% of swimming sites in the South Coast region were graded as Good or Very Good, including 19 ocean beaches. These sites were suitable for swimming for most or almost all of the time. This is an excellent result, and a slight improvement in performance from the previous year.

# South Coast region summary 2022–2023



Mollymook Beach  
Photo: Beachwatch/DPE

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

## Monitoring water quality for swimming in New South Wales

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

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

Recreational water quality has been monitored on the South Coast by Shoalhaven Council and Eurobodalla Shire Council since 2002.

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

## Rainfall impacts

During 2022–2023, 21 swimming sites were monitored including ocean beaches and an estuarine swimming site.

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

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

Rainfall over this period has been diverse:

- 2019–2020: well below average rainfall, except for a wet February 2020 and some isolated wet weather
- 2020–2021: variable rainfall with some wet months
- 2021–2022: a very wet summer and autumn, including significant wet weather and flooding events
- 2022–2023: varied rainfall, with some very wet months over winter and spring, including the wettest July and October on record.

See the section on **How to read this report** on page 33 for an explanation of the graphs, tables and Beach Suitability Grades.

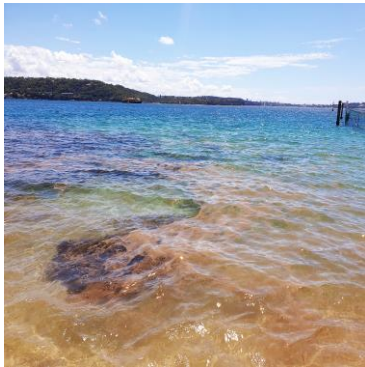
Rainfall was variable throughout winter 2022, with a notably dry June and significantly wet July. Jervis Bay received more than triple the average monthly total rainfall in July, and the highest July daily total on record with 128 mm recorded on 2 July.

While September and October 2022 were very wet, November had close to average rainfall. Jervis Bay received record high rainfall in October with 261 mm, and more than 4 times the average long-term monthly rainfall was recorded at Ulladulla and Batemans Bay in October with 375 mm and 338 mm, respectively.

Average to below average rainfall was recorded on the South Coast during summer despite some significant wet weather events. While December 2022 and January 2023 were drier than average, consecutive days of heavy rain fell in February 2023 in many areas, with highest daily totals of 94 mm recorded at Jervis Bay and Narooma and 98 mm recorded at Ulladulla.

Rainfall was variable along the South Coast in March 2023, with above average rainfall recorded at Jervis Bay and Ulladulla, and average to below average rainfall at Narooma and Moruya Heads. Storms brought heavy rainfall to the region in April with Jervis Bay recording the highest April daily rainfall on record on 30 April with 207 mm recorded.

## Marine algal blooms



Marine algal bloom present in the water

Photo: Chad Weston/NPWS, DPE

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

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

If alga is present, direct contact should be avoided as it can cause skin and eye irritations. Marine algae blooms usually dissipate with changes in tide and wind conditions.

### 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 South Coast region**

Swimming site	Site type	Beach Suitability Grade	Change
<b>Shoalhaven City Council</b>			
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	○
<b>Eurobodalla Shire Council</b>			
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	○
South Broulee (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		
							
Very Good	Good	Fair	Poor	Very Poor	Improved	Stable	Declined

# Shoalhaven City Council



## Overall results

All 10 swimming sites were graded as Very Good in 2022–2023. This is an outstanding result and a similar performance to previous years.

### Percentage of sites graded as Very Good or Good

	2020–2021	2021–2022	2022–2023	Trend
Ocean beaches (10 sites)	100%	100%	100%	—

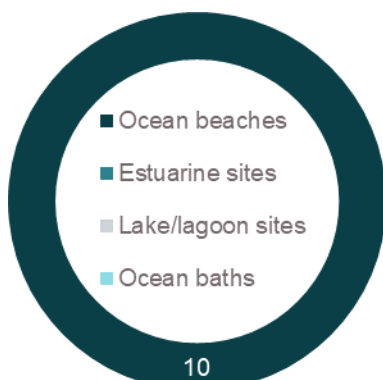
Ten swimming sites were monitored by Shoalhaven City Council. Samples were collected weekly between December and February and sampling and laboratory analysis was fully funded by the council.

See the section on **How to read this report** on page 33 for an explanation of the graphs, tables and Beach Suitability Grades.

### Best beaches

Shoalhaven Heads Beach, Tilbury Cove, Warrain Beach, Collingwood Beach, Cudmirrah Beach, Mollymook Beach, Rennies Beach, Racecourse Beach, Bawley Point Beach and Merry Beach.

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



Site types in Shoalhaven City Council

Ocean beaches were the only site type monitored in the Shoalhaven 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 Shoalhaven City Council ocean beaches**

All 10 ocean beaches continued to be graded as Very Good in 2022–2023: Shoalhaven Heads Beach, Tilbury Cove, Warrain Beach, Collingwood Beach, Cudmirrah Beach, Mollymook Beach, Rennies Beach, Racecourse Beach, Bawley Point Beach and Merry Beach.

While water quality at these sites was suitable for swimming almost all of the time, elevated bacterial levels were occasionally recorded at some of the beaches following heavy rainfall.



**Sampling sites and Beach Suitability Grades in Shoalhaven City Council**

# Shoalhaven Heads Beach

Beach grade:



Shoalhaven Heads Beach is located towards the southern end of Seven Mile Beach at Shoalhaven Heads. The beach is patrolled over the summer months.

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.

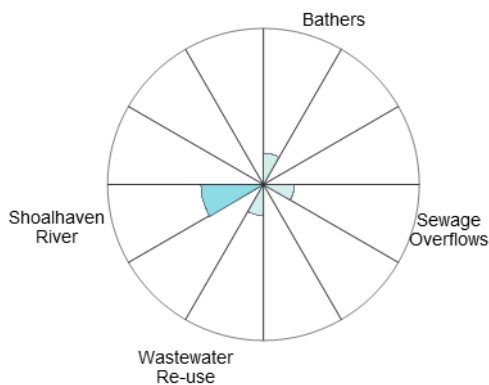
Enterococci levels had little response to rainfall and generally remained below the safe swimming limit across all rainfall categories.

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

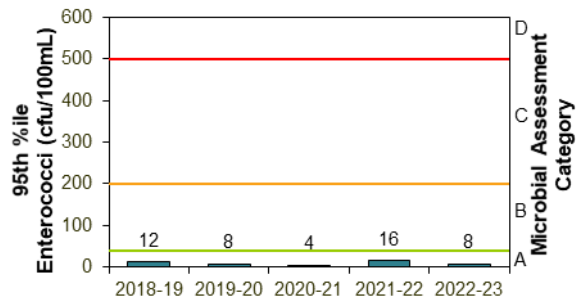
The site was monitored from 2003 to 2004 and since 2006.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Dec 2018 to Feb 2023	97%	53	Stable

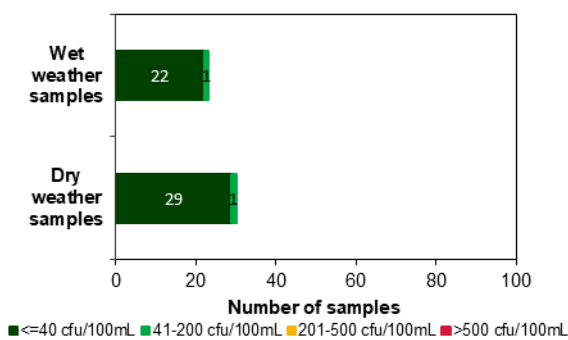
### Sanitary inspection: Low



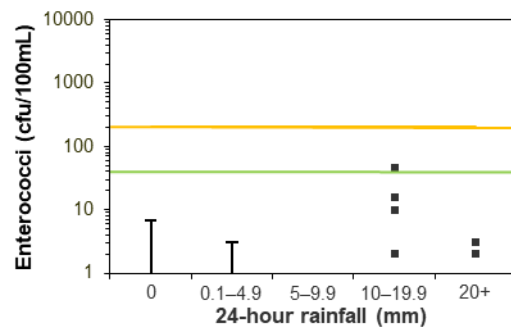
### Microbial Assessment Category: A



### Dry and wet weather water quality

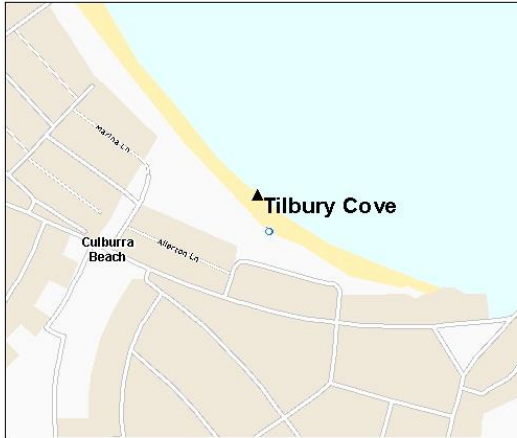


### Water quality in response to rainfall



# Tilbury Cove

Beach grade:



Tilbury Cove is located towards the south-eastern corner of Culburra Beach.

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

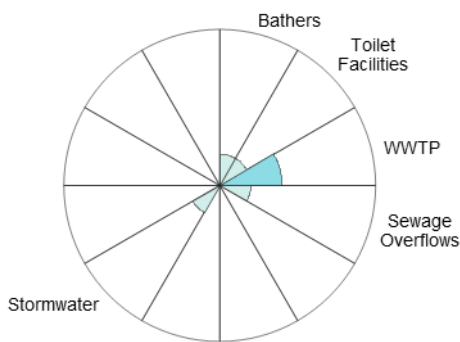
Enterococci levels had little response to rainfall and remained below the safe swimming limit across all rainfall categories.

The site was monitored from 2002 to 2004 and since 2006.

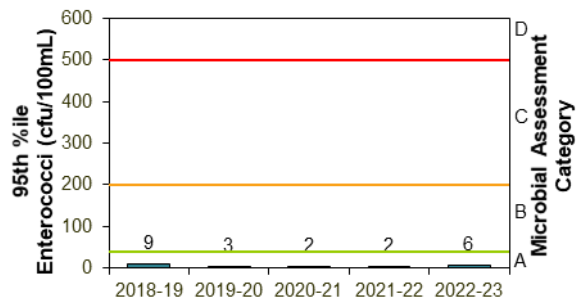
See 'How to read this report' for key to map.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Dec 2018 to Feb 2023	100%	56	Stable

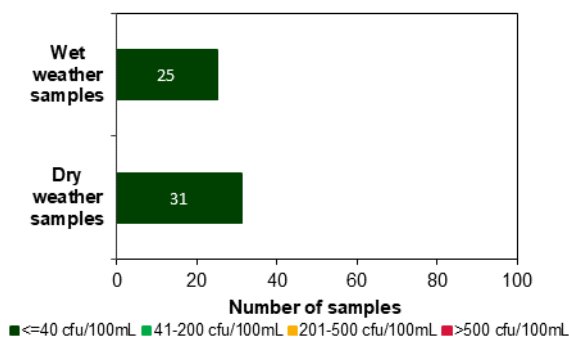
## Sanitary inspection: Low



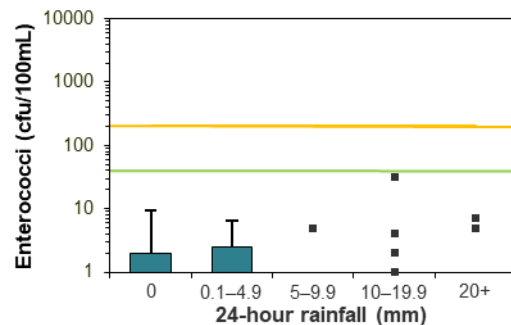
## Microbial Assessment Category: A



## Dry and wet weather water quality



## Water quality in response to rainfall



# Warrain Beach

Beach grade:



Warrain Beach is located to the south of Penguin Head. The beach is patrolled over the summer months.

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.

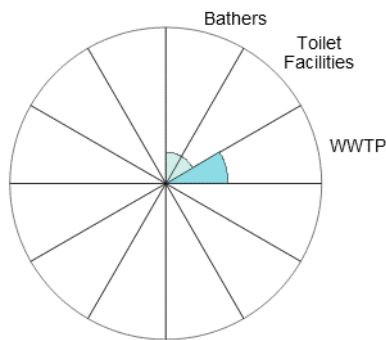
Enterococci levels increased slightly with increasing rainfall but remained below the safe swimming limit across all rainfall categories.

The site has been monitored since 2007.

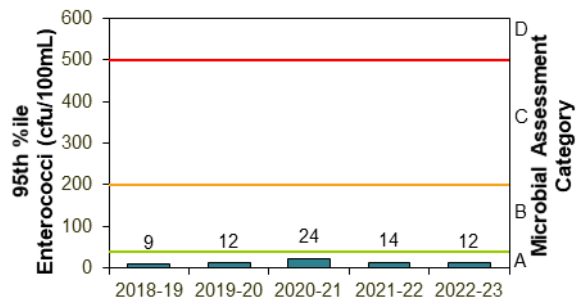
See 'How to read this report' for key to map.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Dec 2018 to Feb 2023	100%	55	Stable

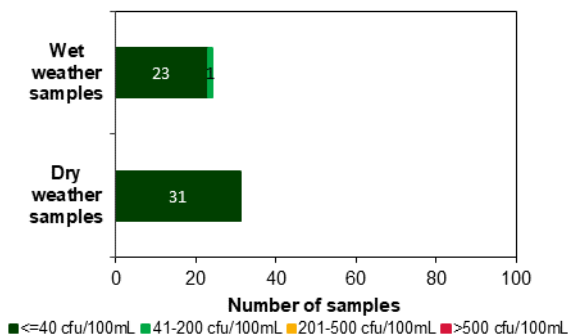
### Sanitary inspection: Low



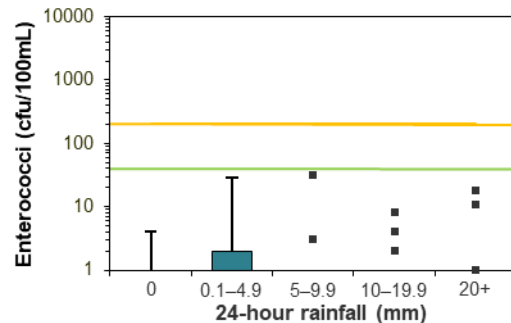
### Microbial Assessment Category: A



### Dry and wet weather water quality

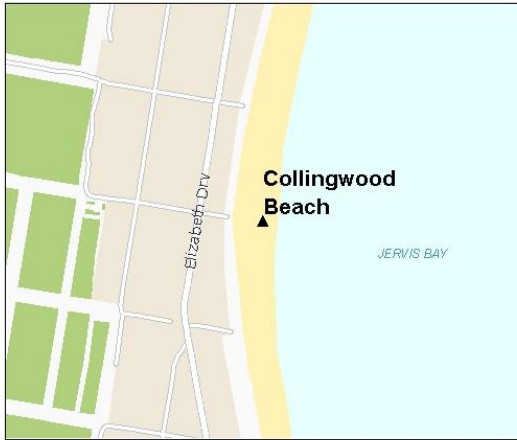


### Water quality in response to rainfall



# Collingwood Beach

Beach grade:



Collingwood Beach is located in Jervis Bay, adjacent to the town of Vincentia. The beach is approximately 2 km long.

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.

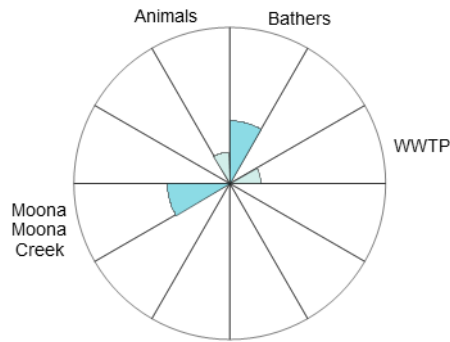
Enterococci levels increased slightly with increasing rainfall but remained below the safe swimming limit across all rainfall categories.

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

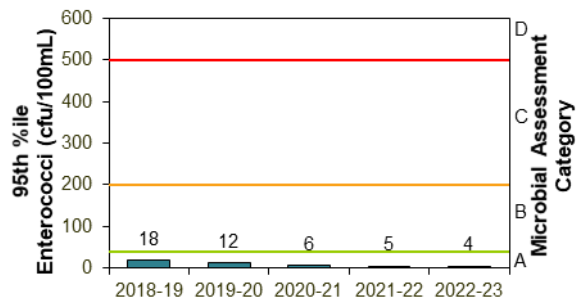
The site has been monitored since 2006.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Dec 2018 to Feb 2023	100%	56	Stable

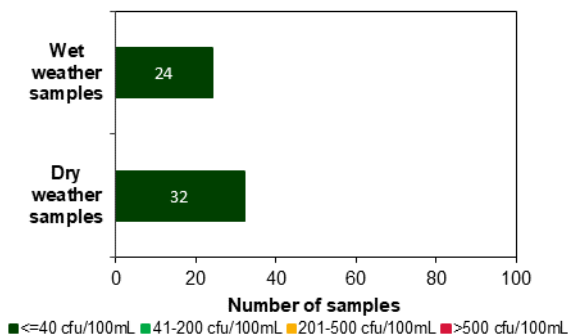
### Sanitary inspection: Low



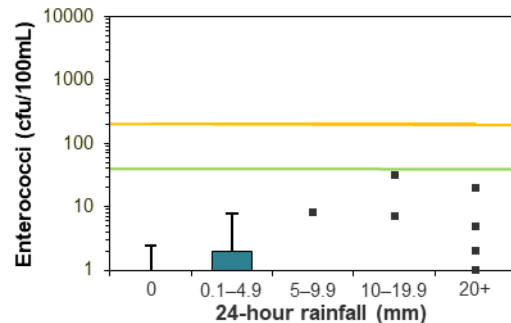
### Microbial Assessment Category: A



### Dry and wet weather water quality



### Water quality in response to rainfall





# Cudmirrah Beach

Beach grade:



Cudmirrah Beach is the main surf beach for the township of Sussex Inlet. The beach is approximately 3 km long. The beach is patrolled over the summer months.

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

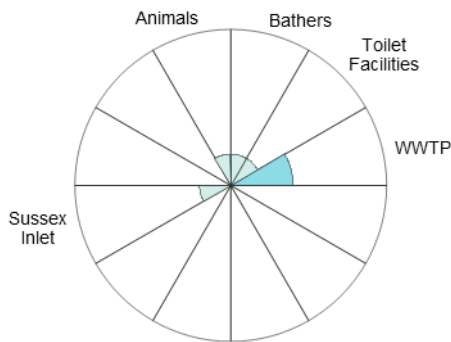
Enterococci levels increased slightly with increasing rainfall but generally remained below the safe swimming limit across all rainfall categories.

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

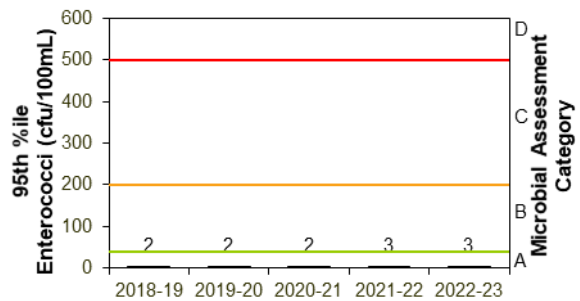
The site was monitored from 2003 to 2004 and since 2006.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Dec 2018 to Feb 2023	100%	55	Stable

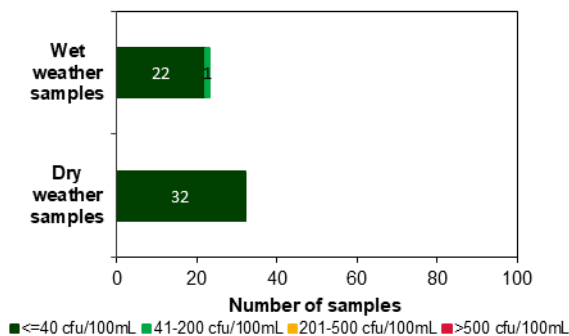
## Sanitary inspection: Low



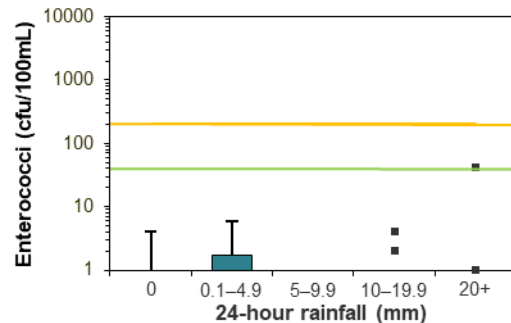
## Microbial Assessment Category: A



## Dry and wet weather water quality

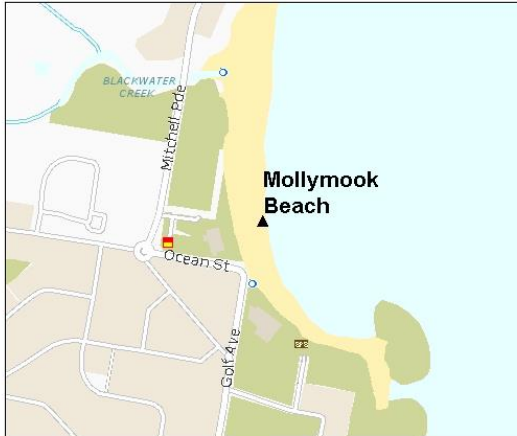


## Water quality in response to rainfall



# Mollymook Beach

Beach grade:



Mollymook Beach is a popular beach that stretches for approximately 2 km. The beach is patrolled during the summer months.

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

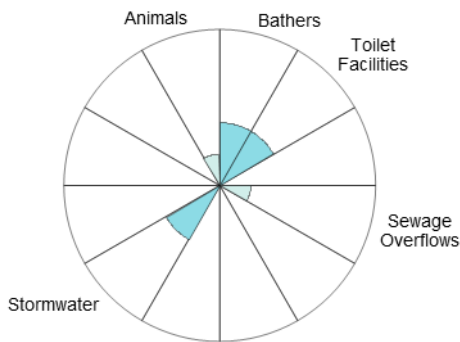
Enterococci levels increased slightly with increasing rainfall and generally remained below the safe swimming limit across most rainfall categories.

The site was monitored from 2002 to 2003 and since 2008.

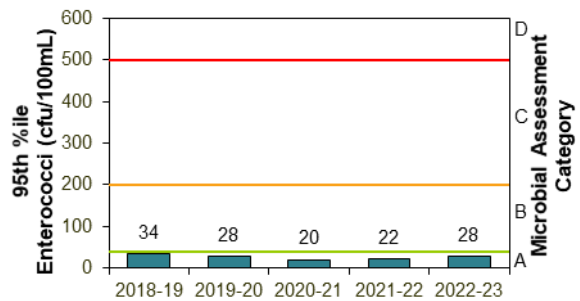
See 'How to read this report' for key to map.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Dec 2018 to Feb 2023	100%	56	Stable

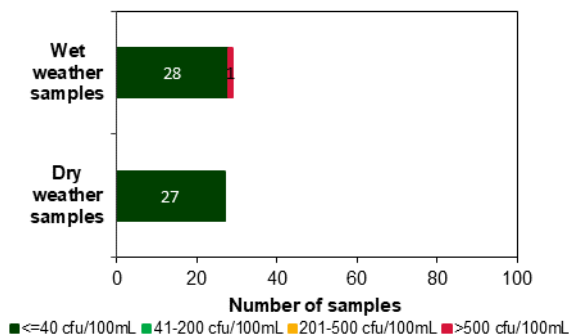
## Sanitary inspection: Low



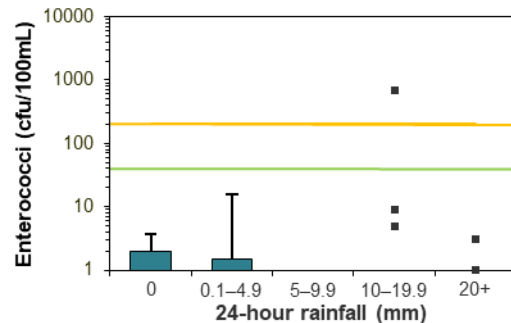
## Microbial Assessment Category: A



## Dry and wet weather water quality



## Water quality in response to rainfall



# Rennies Beach

Beach grade:



Rennies Beach is located near the town of Ulladulla. The beach is approximately 600 m long.

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

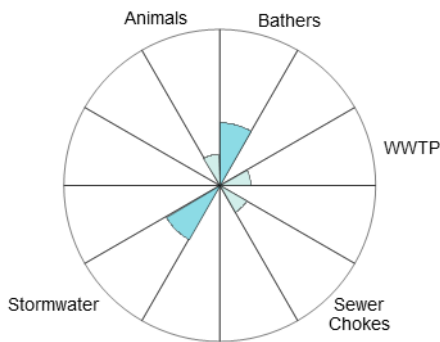
Enterococci levels had little response to rainfall and remained below the safe swimming limit across all rainfall categories.

The site has been monitored since 2006.

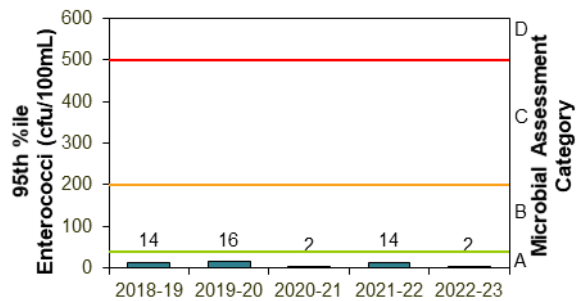
See 'How to read this report' for key to map.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Dec 2018 to Feb 2023	100%	56	Stable

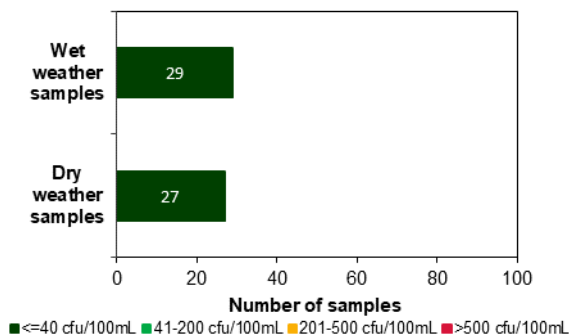
### Sanitary inspection: Low



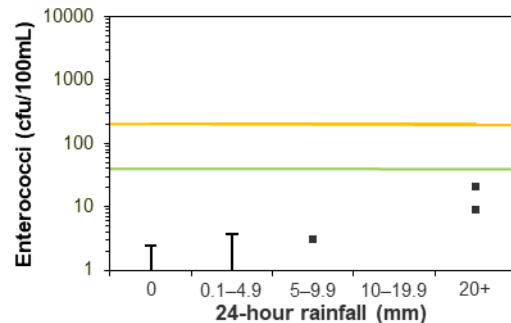
### Microbial Assessment Category: A



### Dry and wet weather water quality

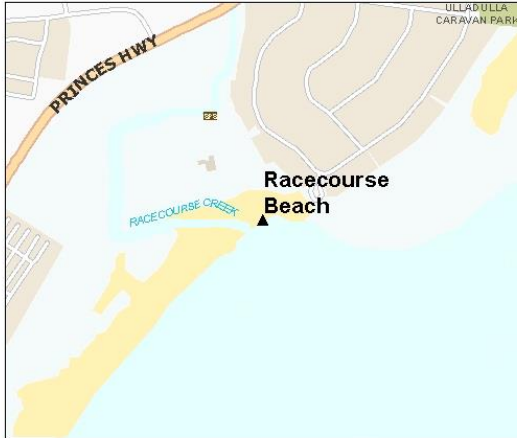


### Water quality in response to rainfall



# Racecourse Beach

Beach grade:



Racecourse Beach is located near the town of Ulladulla. The beach is approximately 1 km long.

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.

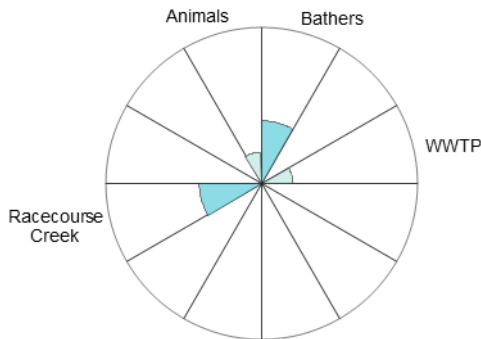
Enterococci levels had little response to rainfall and remained below the safe swimming limit across all rainfall categories.

The site was monitored from 2002 to 2004 and since 2006.

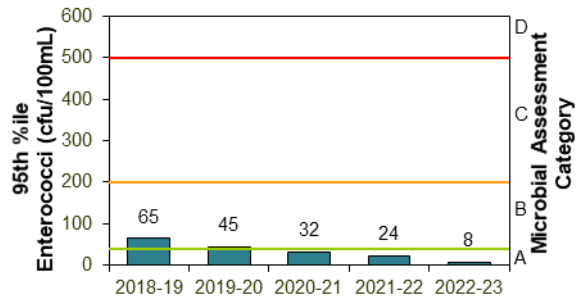
See 'How to read this report' for key to map.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Dec 2018 to Feb 2023	100%	56	Stable

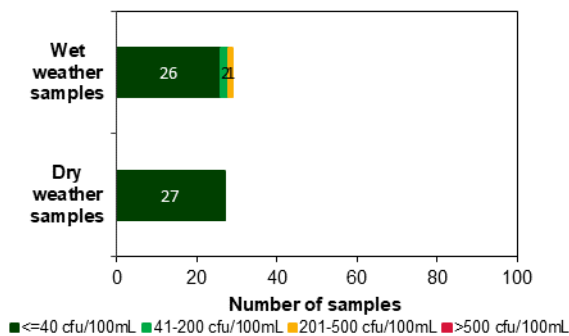
## Sanitary inspection: Low



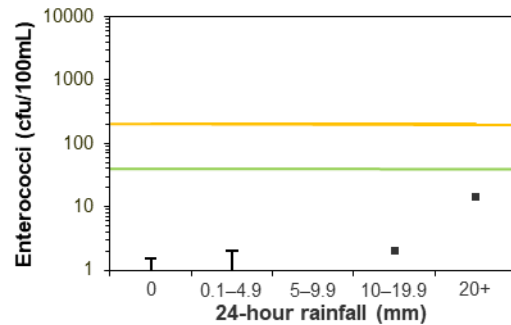
## Microbial Assessment Category: A



## Dry and wet weather water quality



## Water quality in response to rainfall



# Bawley Point Beach

Beach grade:



Bawley Point Beach is located on the northern side of Bawley Point and is approximately 250 m long.

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

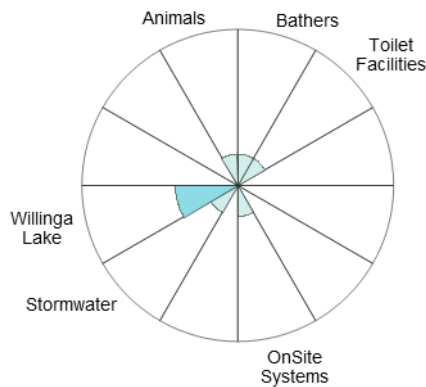
Enterococci levels had little response to rainfall and remained below the safe swimming limit across all rainfall categories.

The site has been monitored since 2006.

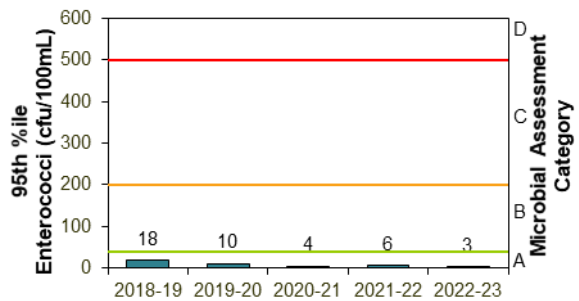
See 'How to read this report' for key to map.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Dec 2018 to Feb 2023	100%	55	Stable

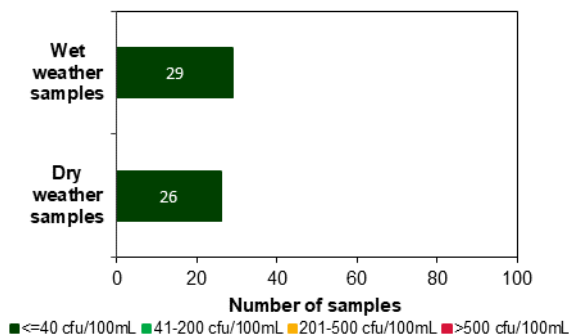
## Sanitary inspection: Low



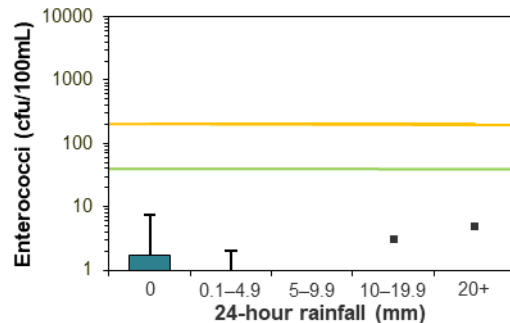
## Microbial Assessment Category: A



## Dry and wet weather water quality



## Water quality in response to rainfall



# Merry Beach

Beach grade:

VG



Merry Beach is located south of the town of Kioloa. The beach is approximately 400 m long and is backed by a reserve and caravan park.

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.

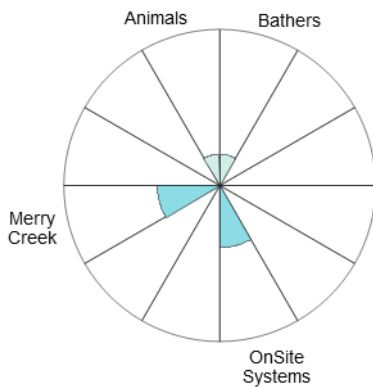
Enterococci levels had little response to rainfall and generally remained below the safe swimming limit across all rainfall categories.

The site has been monitored since 2006.

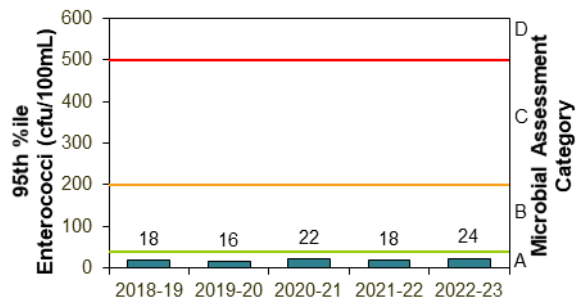
See 'How to read this report' for key to map.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Dec 2018 to Feb 2023	96%	55	Stable

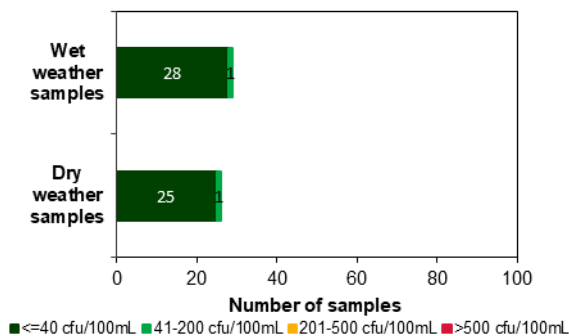
## Sanitary inspection: Low



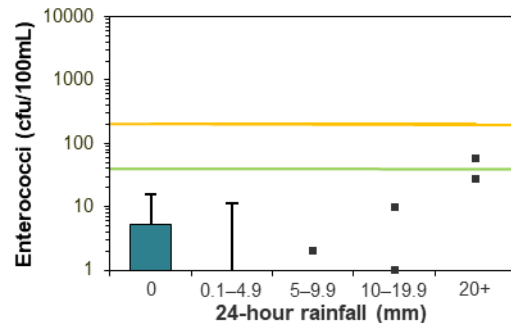
## Microbial Assessment Category: A



## Dry and wet weather water quality

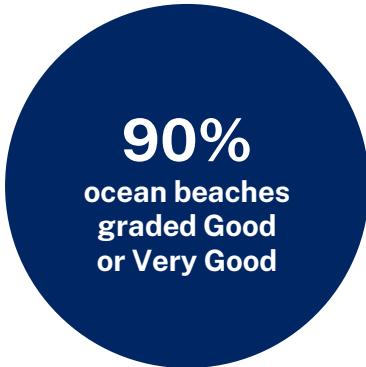


## Water quality in response to rainfall



# Eurobodalla Shire Council

## Overall results



Ten of the 11 swimming sites were graded as Very Good or Good in 2022–2023. This is a slight improvement in performance from previous years.

### Percentage of sites graded as Very Good or Good

	2020–2021	2021–2022	2022–2023	Trend
Ocean beaches (10 sites)	90%	80%	<b>90%</b>	
Estuarine sites (1 sites)	100%	100%	<b>100%</b>	

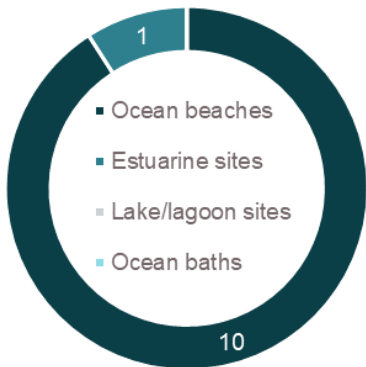
Eleven swimming locations were monitored by Eurobodalla Shire Council. Samples were collected weekly between November and March and sampling and analysis was fully funded by the council.

See the section on **How to read this report** on page 33 for an explanation of the graphs, tables and Beach Suitability Grades.

### Best beaches

Cookies Beach, Malua Bay Beach, South Broulee (Bengello) Beach and Brou Beach.

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



Site types in Eurobodalla Shire Council

Swimming sites monitored in the Eurobodalla region include ocean beaches and an estuarine area in Wagonga Inlet, with each site type having a different response to rainfall-related impacts.

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

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

## Ocean beaches



**Beach Suitability Grades for Eurobodalla Shire Council ocean beaches**

Nine of the 10 ocean beaches were graded as Very Good or Good in 2022–2023.

Cookies Beach, Malua Bay Beach, South Broulee (Bengello) Beach and Brou Beach were graded as Very Good. Malua Bay Beach was upgraded from Good in the previous year. Water quality at these sites was suitable for swimming almost all of the time.

Caseys Beach, Broulee Beach, Shelley Beach, Tuross Main Beach and Narooma Main Beach were graded as Good in 2022–2023. Caseys Beach was upgraded from Poor in the previous year. While water quality at these sites was frequently suitable for swimming during dry weather conditions, elevated enterococci levels sometimes exceeded the safe swimming limit following rain.

Surf Beach was graded as Poor in 2022–2023, consistent with the previous year. Elevated bacterial levels were recorded during dry weather conditions, and increased following rainfall. Despite this, 68% of dry weather samples were within the safe swimming limit.

Microbial water quality at Surf Beach has continued to decline for several years. Council has been investigating the water quality at Surf Beach since 2019, which is at times identified as poor. The investigation is searching for potential sources of contamination in the catchments draining to Surf Beach Creek and Surf Beach. The public toilet block adjacent to Surf Beach Creek was demolished, and a new toilet block was completed in 2022. Council completed dye testing at the toilet block, which showed there was no contamination from this facility. Council is currently liaising with CSIRO to conduct genetic analysis of samples to identify whether faecal contamination detected at Surf Beach is from human or animal sources.

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



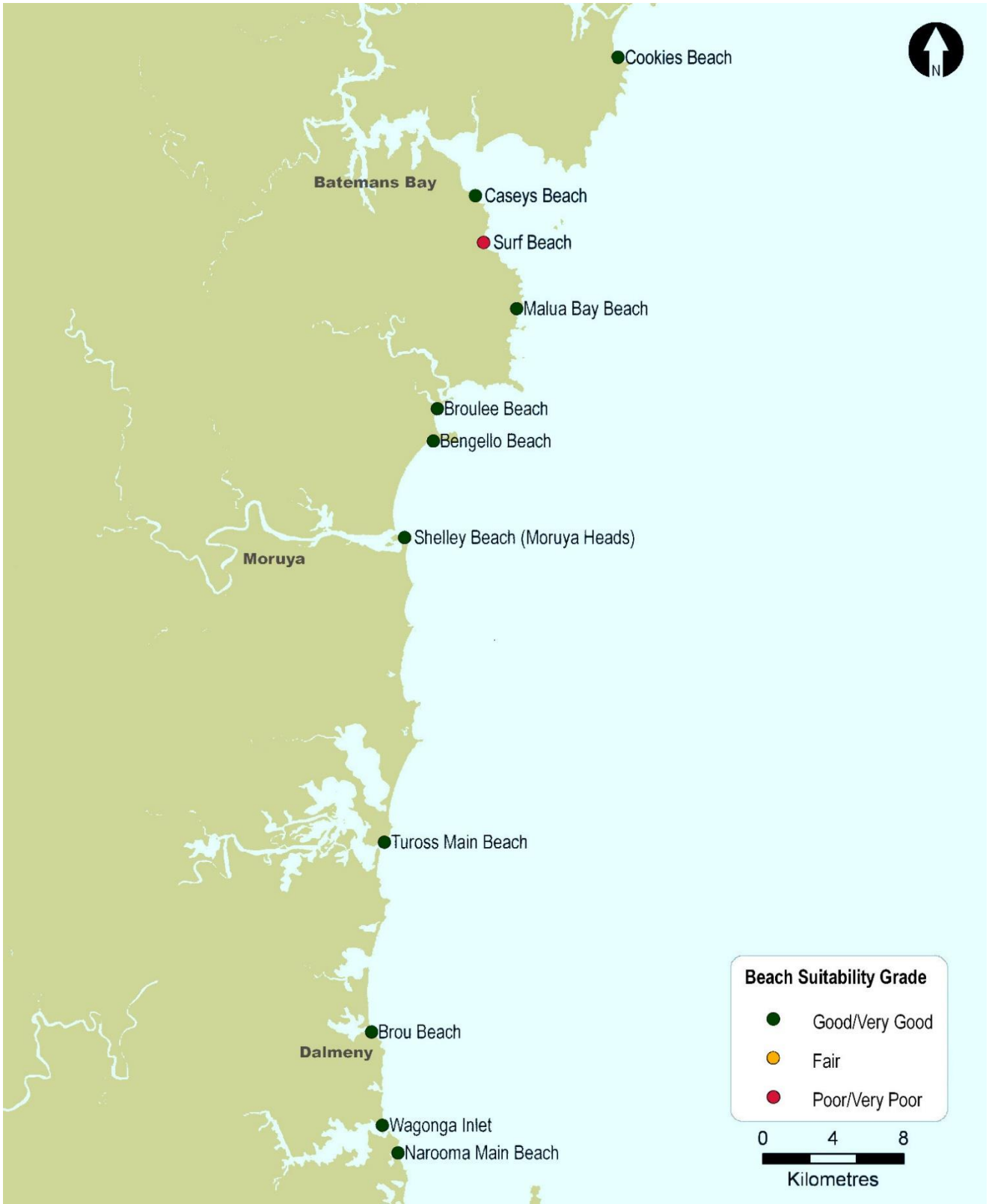
## Estuarine beaches



**Beach Suitability Grades for Eurobodalla Shire Council estuarine beaches**

Wagonga Inlet continued to be graded as Good in 2022–2023, similar to previous years. While water quality at this site was mostly suitable for swimming, elevated enterococci results were occasionally recorded after light rain, and regularly after heavy rainfall. Pollution inputs from elsewhere within Wagonga Inlet may impact water quality at this site.

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



**Sampling sites and Beach Suitability Grades in Eurobodalla Shire Council**

# Cookies Beach

Beach grade:



Cookies Beach is located near the town of South Durras. Murramarang National Park lies to the south.

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

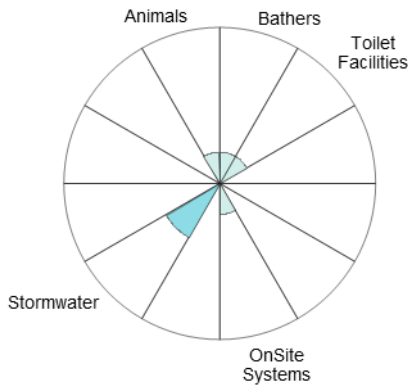
Enterococci levels increased slightly with increasing rainfall, occasionally exceeding the safe swimming limit after 20 mm or more of rain.

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

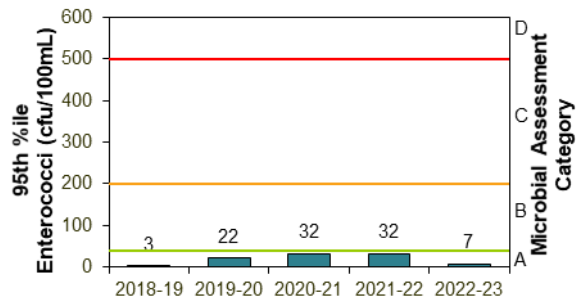
The site has been monitored since 2002.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Nov 2019 to Mar 2023	95%	100	Stable

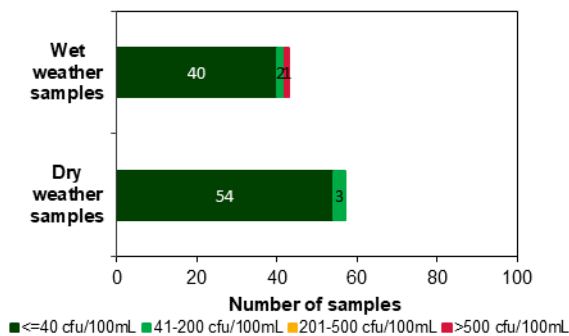
### Sanitary inspection: Low



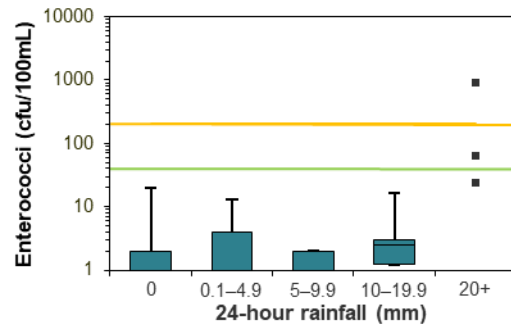
### Microbial Assessment Category: A



### Dry and wet weather water quality

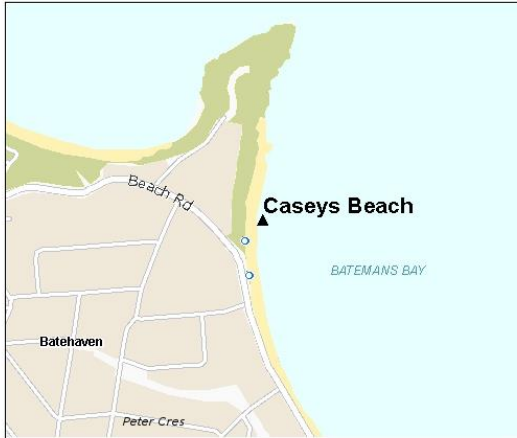


### Water quality in response to rainfall



# Caseys Beach

**Beach grade:**



Caseys Beach is approximately 800 m long and is located to the south of Observation Point.

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

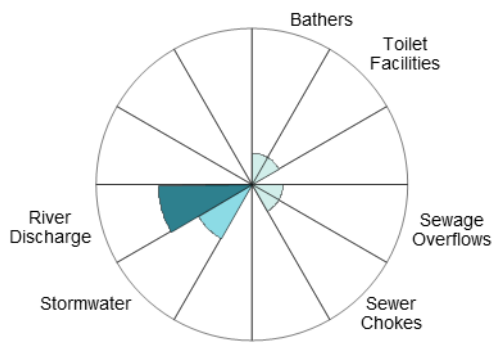
Enterococci levels generally increased with increasing rainfall, occasionally exceeding the safe swimming limit in response to little or no rain, and regularly after 20 mm or more.

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

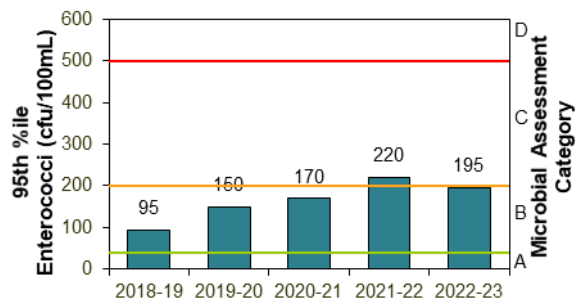
The site has been monitored since 2002.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Nov 2019 to Mar 2023	88%	100	Improved

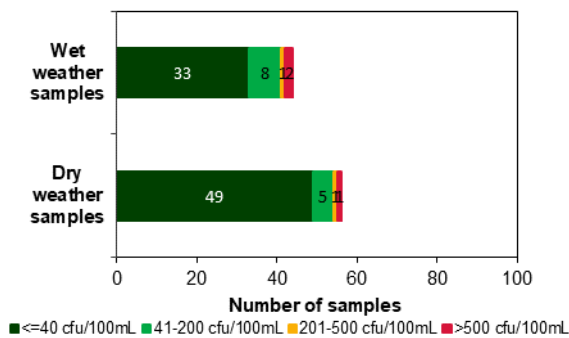
## Sanitary inspection: Moderate



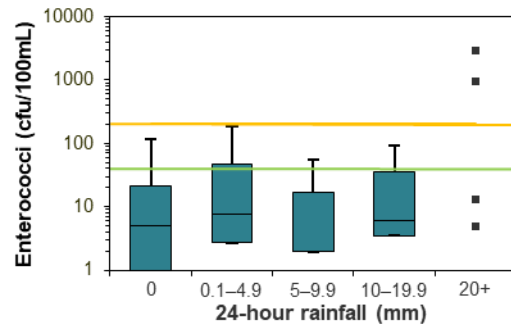
## Microbial Assessment Category: B



## Dry and wet weather water quality



## Water quality in response to rainfall



# Surf Beach

**Beach grade:**



Surf Beach is a popular beach approximately 350 m long and is patrolled in the warmer months.

The Beach Suitability Grade of Poor indicates microbial water quality is susceptible to faecal pollution, particularly after rainfall and occasionally during dry weather conditions, with potential faecal contamination from stormwater.

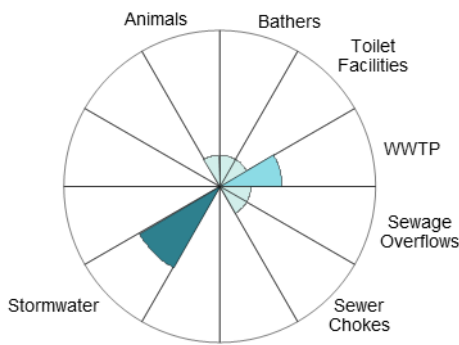
Enterococci levels increased with increasing rainfall, often exceeding the safe swimming limit after little or no rain, and regularly after 10 mm or more.

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

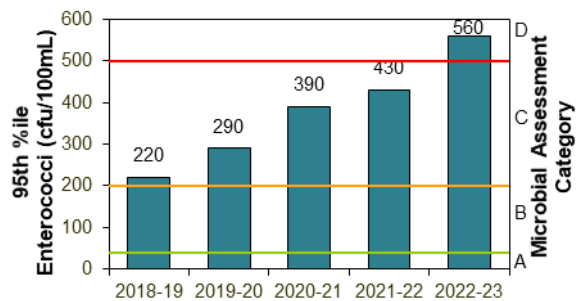
The site has been monitored since 2002.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Nov 2019 to Mar 2023	68%	100	Stable

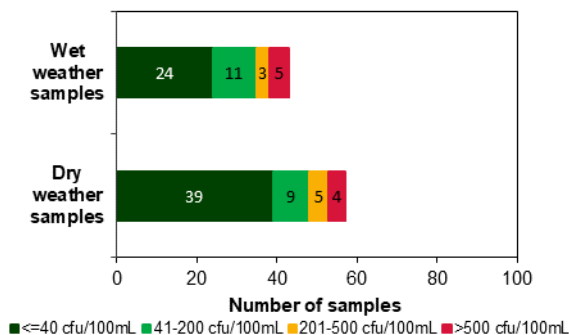
## Sanitary inspection: Moderate



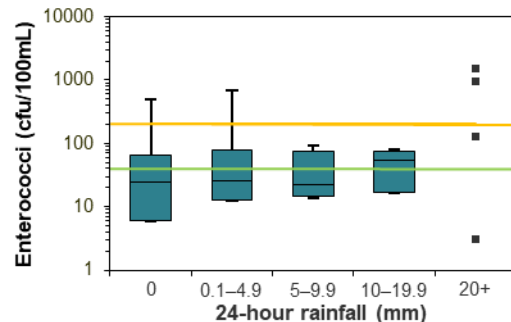
## Microbial Assessment Category: D



## Dry and wet weather water quality



## Water quality in response to rainfall



# Malua Bay Beach

Beach grade:



Malua Bay Beach is approximately 500 m long and is patrolled during the warmer months.

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

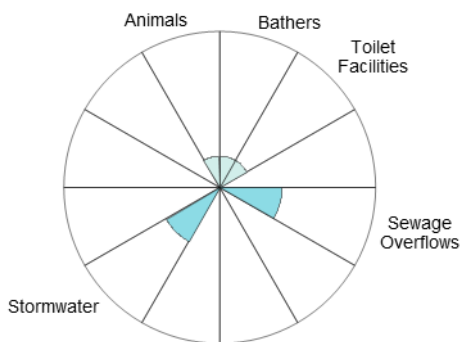
Enterococci levels increased slightly with increasing rainfall, regularly exceeding the safe swimming limit in response to 20 mm or more of rain.

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

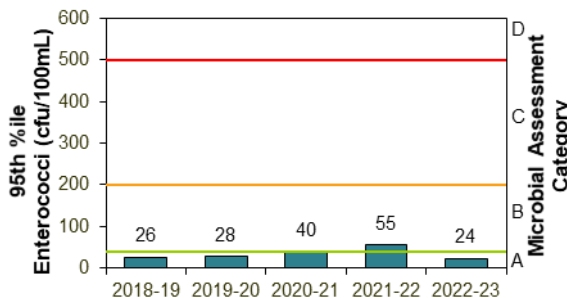
The site has been monitored since 2002.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Nov 2019 to Mar 2023	98%	100	Improved

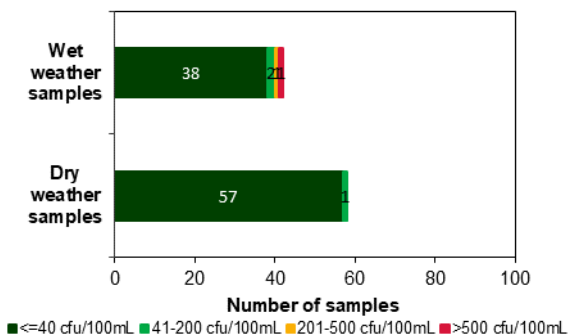
## Sanitary inspection: Low



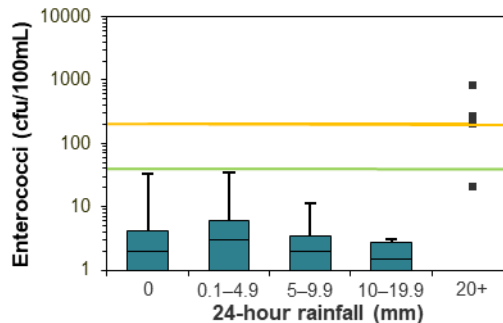
## Microbial Assessment Category: A



## Dry and wet weather water quality



## Water quality in response to rainfall



# Broulee Beach

Beach grade: **G**



Broulee Beach extends from Candlagan Creek in the north to Broulee Island in the south.



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.

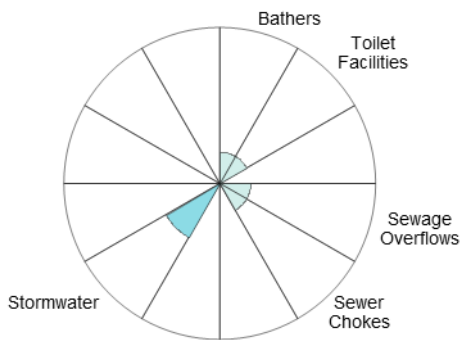
Enterococci levels increased slightly with increasing rainfall, occasionally exceeding the safe swimming limit after little or no rain.

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

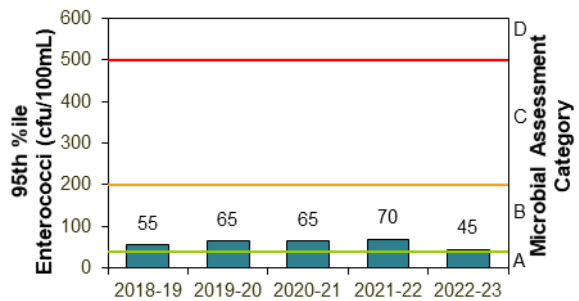
The site has been monitored since 2002.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Nov 2019 to Mar 2023	93%	100	Stable

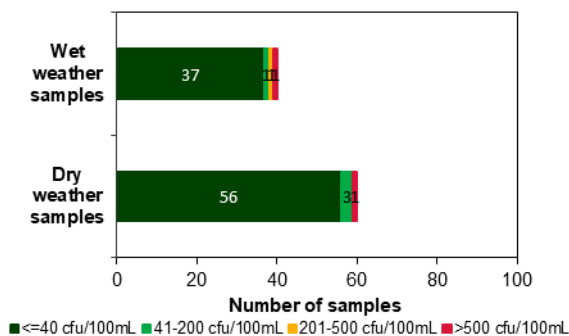
## Sanitary inspection: Low



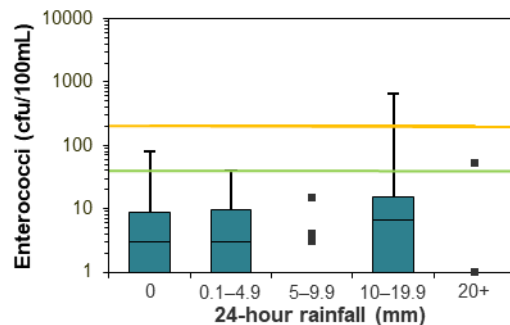
## Microbial Assessment Category: B



## Dry and wet weather water quality



## Water quality in response to rainfall



# South Broulee (Bengello) Beach

Beach grade: **VG**



Bengello Beach extends from Broulee Head to the mouth of the Moruya River. The beach is patrolled during the summer months.

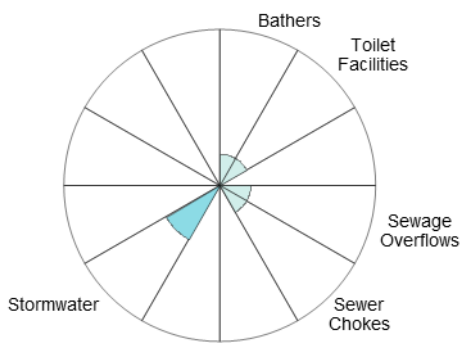
The Beach Suitability Grade of Very Good indicates microbial water quality is considered suitable for swimming almost all of the time, with few potential sources of significant faecal contamination.

Enterococci levels increased slightly with increasing rainfall, occasionally exceeding the safe swimming limit after little or no rain, and often after 10 mm or more.

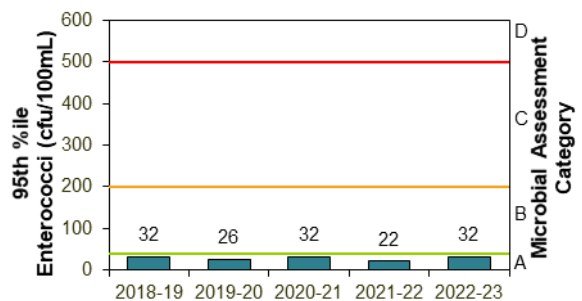
See ‘How to read this report’ for key to map. The site has been monitored since 2002.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Nov 2019 to Mar 2023	93%	100	Stable

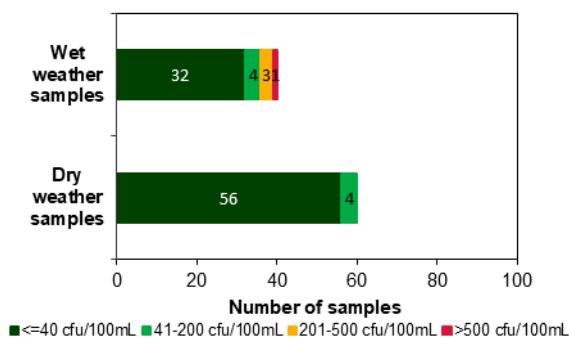
### Sanitary inspection: Low



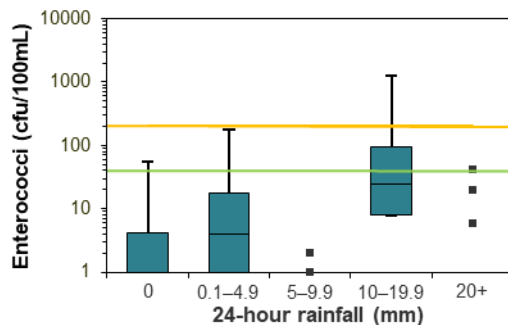
### Microbial Assessment Category: A



### Dry and wet weather water quality



### Water quality in response to rainfall





# Shelley Beach

**Beach grade:** G



Shelley Beach is located near the mouth of the Moruya River and backed by Eurobodalla National Park.

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

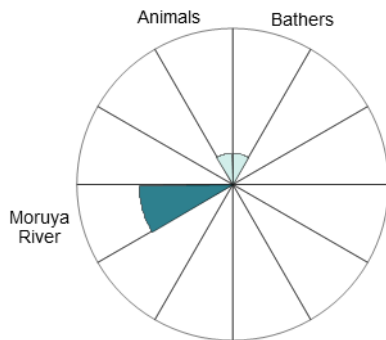
Enterococci levels increased slightly with increasing rainfall, occasionally exceeding the safe swimming limit in response to no rain and after rainfall.

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

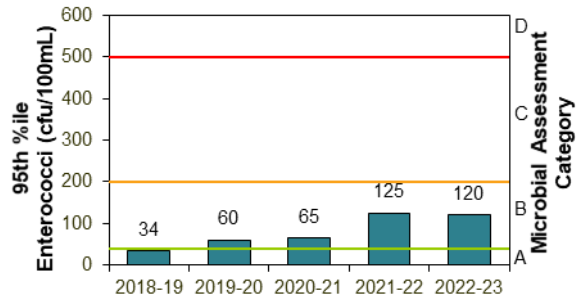
The site has been monitored since 2002.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Nov 2019 to Mar 2023	90%	100	Stable <span style="border: 1px solid black; border-radius: 50%; width: 15px; height: 15px; display: inline-block; vertical-align: middle;"></span>

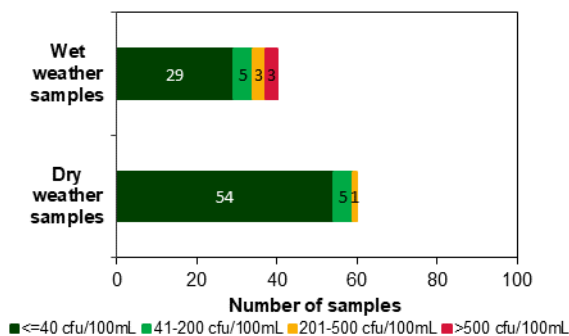
## Sanitary inspection: Moderate



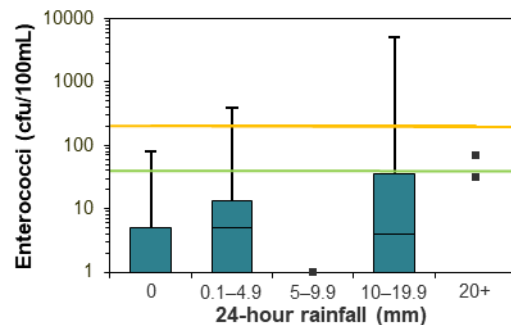
## Microbial Assessment Category: B



## Dry and wet weather water quality

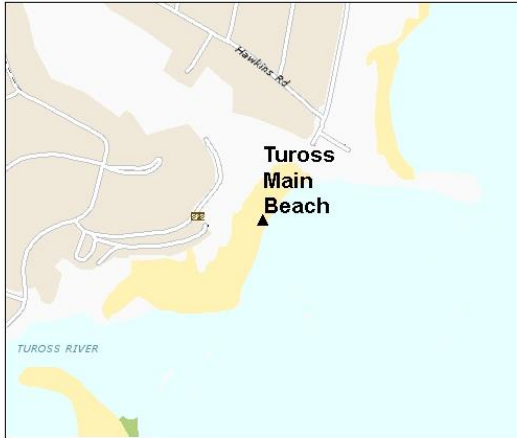


## Water quality in response to rainfall



# Tuross Main Beach

Beach grade:



Tuross Main Beach is a 250 m long beach located between Tuross Headland in the north and Tuross Lake in the south.

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 potential sources of faecal contamination including upstream river sources.

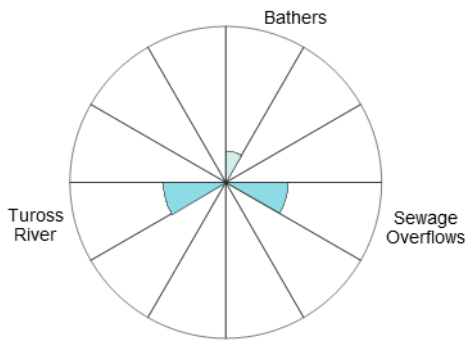
Enterococci levels increased slightly with increasing rainfall, occasionally exceeding the safe swimming limit in response to no rain and after rainfall.

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

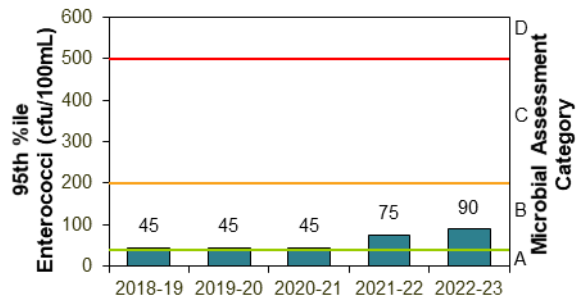
The site has been monitored since 2002.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Nov 2019 to Mar 2023	93%	100	Stable

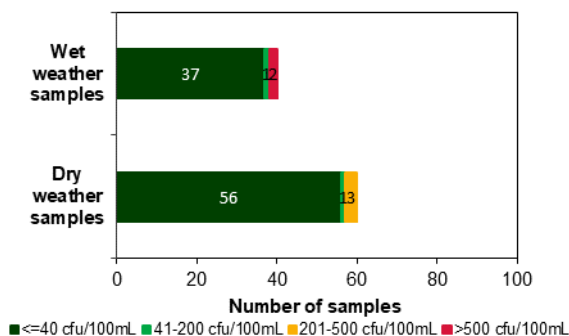
## Sanitary inspection: Low



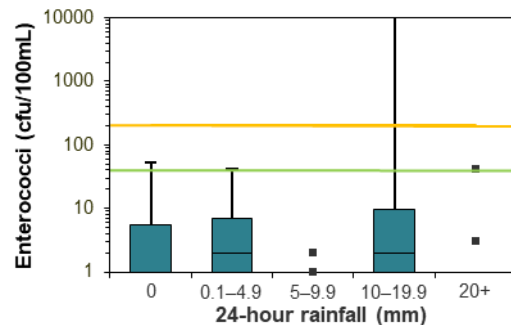
## Microbial Assessment Category: B



## Dry and wet weather water quality



## Water quality in response to rainfall



# Brou Beach

Beach grade: **VG**



Brou Beach is located to the north of Dalmeny. The beach is approximately 6.5 km long and is backed by Eurobodalla National Park.

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.

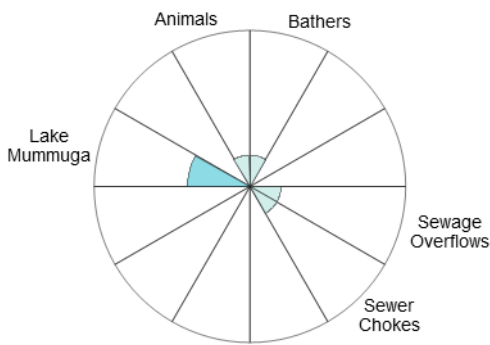
Enterococci levels increased slightly with increasing rainfall, often exceeding the safe swimming limit after 10 mm or more of rain.

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

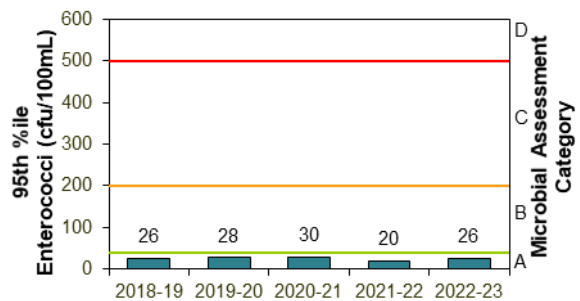
The site has been monitored since 2002.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Nov 2019 to Mar 2023	98%	100	Stable

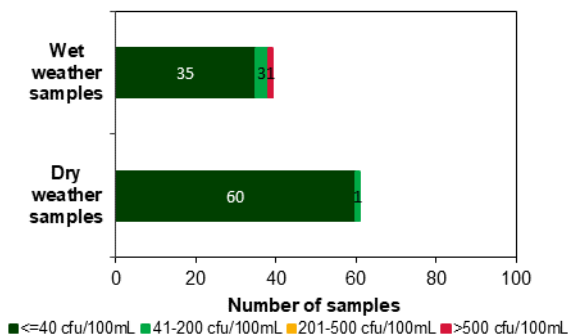
## Sanitary inspection: Low



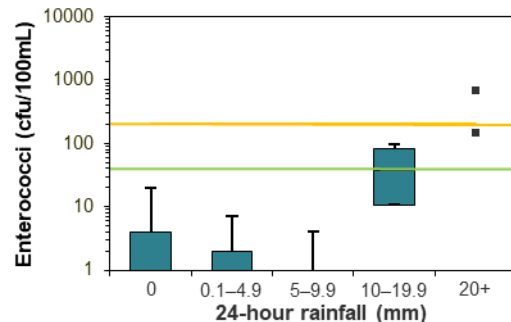
## Microbial Assessment Category: A



## Dry and wet weather water quality



## Water quality in response to rainfall



# Wagonga Inlet

**Beach grade:** G



The swimming site is a netted enclosure at the mouth of Wagonga Inlet. The town of Narooma is located on the southern side of the inlet.

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 potential faecal contamination from upstream sources in Wagonga Inlet.

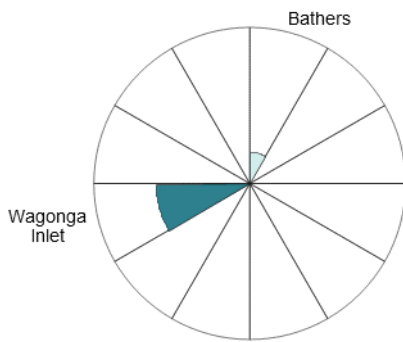
Enterococci levels increased slightly with increasing rainfall, occasionally exceeding the safe swimming limit after little or no rain, and often after 10 mm or more.

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

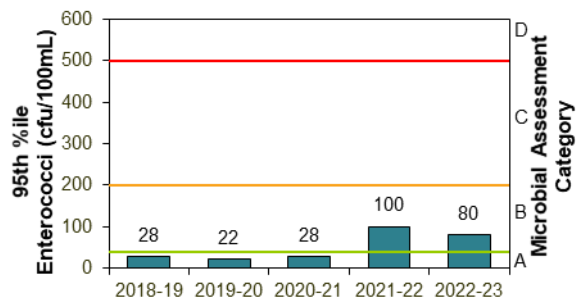
The site has been monitored since 2002.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Estuarine	Nov 2019 to Mar 2023	95%	100	Stable <span style="border: 1px solid black; border-radius: 50%; width: 15px; height: 15px; display: inline-block; vertical-align: middle;"></span>

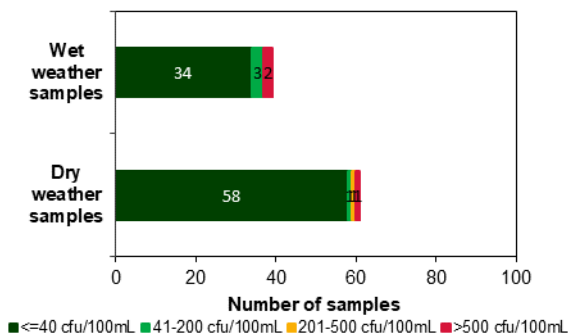
## Sanitary inspection: Moderate



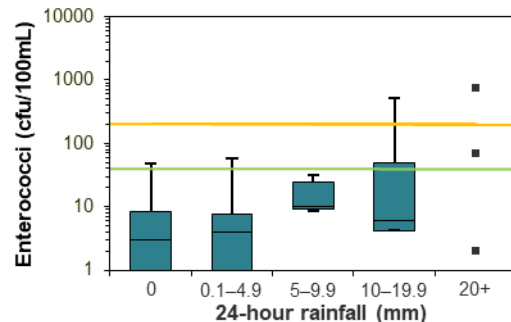
## Microbial Assessment Category: B



## Dry and wet weather water quality

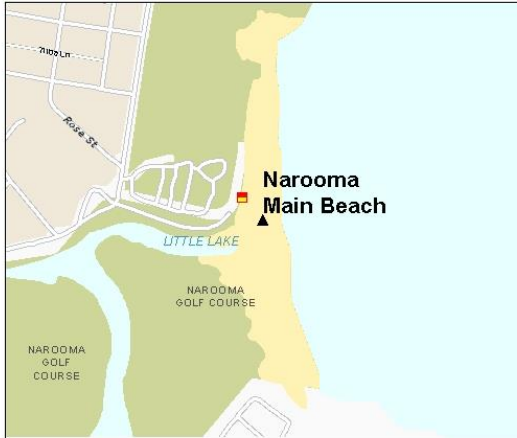


## Water quality in response to rainfall



# Narooma Main Beach

**Beach grade:** G



Narooma Beach is approximately 750 m long and is patrolled on weekends and holidays during the summer months.

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 potential sources of faecal contamination including outflow from Little Lake.

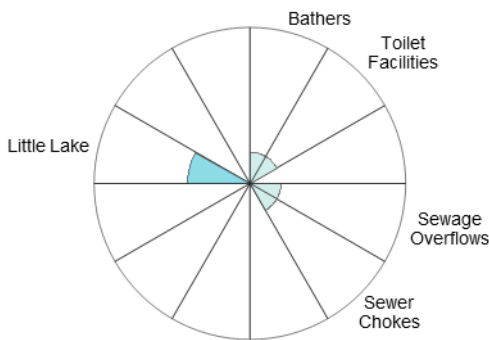
Enterococci levels increased slightly with increasing rainfall, often exceeding the safe swimming limit after 10 mm or more of rain.

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

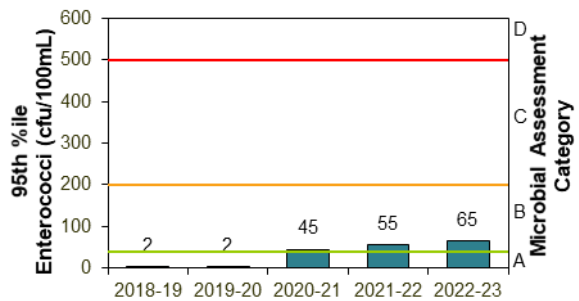
The site has been monitored since 2002.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Nov 2019 to Mar 2023	97%	100	Stable <span style="border: 1px solid black; border-radius: 50%; width: 15px; height: 15px; display: inline-block; vertical-align: middle;"></span>

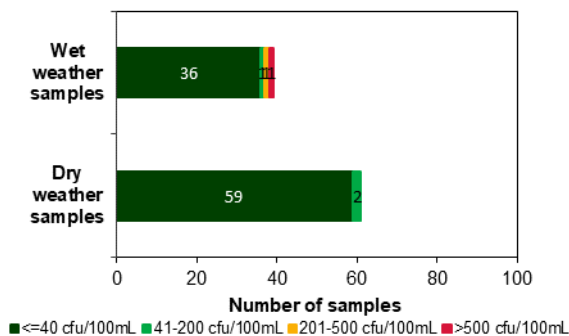
### Sanitary inspection: Low



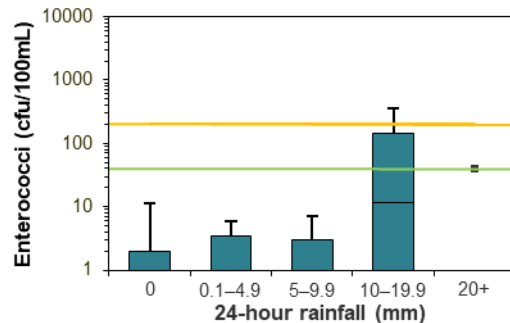
### Microbial Assessment Category: B



### Dry and wet weather water quality



### Water quality in response to rainfall



# How to read this report

## Beach Suitability Grades

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

### Very Good

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

### Good

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

### Fair

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

### Poor

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

### Very Poor

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

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

### The guidelines

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

### Enterococci

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

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

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

Beach Suitability Grades are determined by using the following matrix:

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

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

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

## Microbial Assessment Category (MAC)

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

### Risk of illness associated with Microbial Assessment Categories

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

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

### Calculating the MAC

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

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



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

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

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

## Sanitary Inspection Category (SIC)

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

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

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

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

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



Stormwater drain flow  
Photo: Beachwatch/DPE

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

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

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

## Explanation of tables

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

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

- Stable
- ↑ Improved
- ↓ Declined

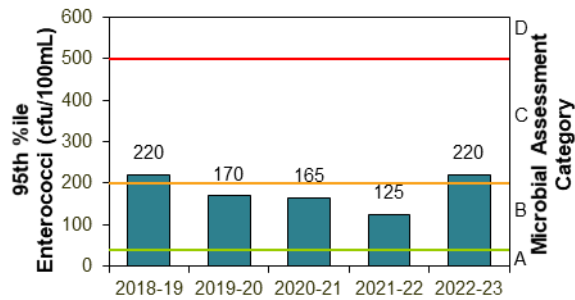
A provisional grade indicates the assessment is based on limited data collected during the assessment period and should not be compared to the beach grade from the previous year.

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

### Microbial Assessment Category (MAC) chart

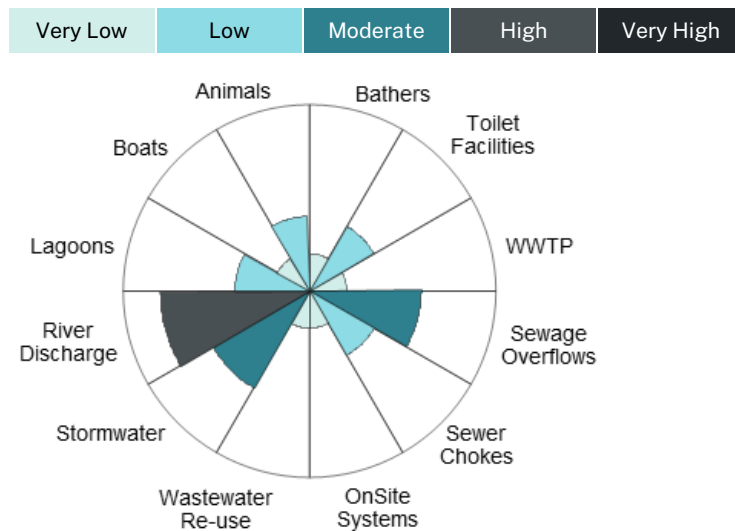
On each beach page, the MACs for the last 5 years are displayed on a simple bar chart. The MAC for the current year is based on enterococci data collected during the assessment period. The bars are labelled with the 95th

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



### Sanitary Inspection Category (SIC) chart

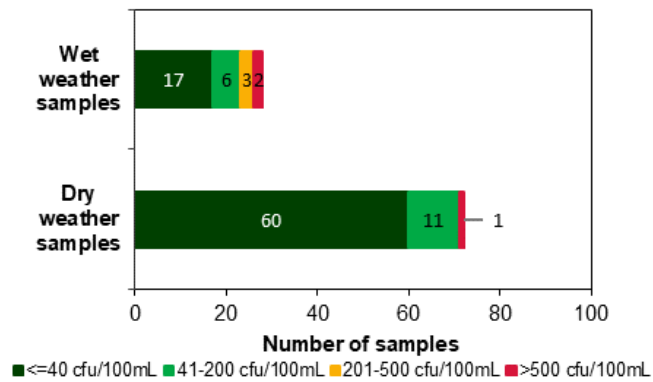
The results of the sanitary inspection for each swimming location are presented in a radar pie chart. The chart shows the likelihood that each identified pollution source will contribute to faecal contamination at a swimming site, as indicated by the size and colour of the segment, ranging from very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



### Wet and dry weather water quality chart

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

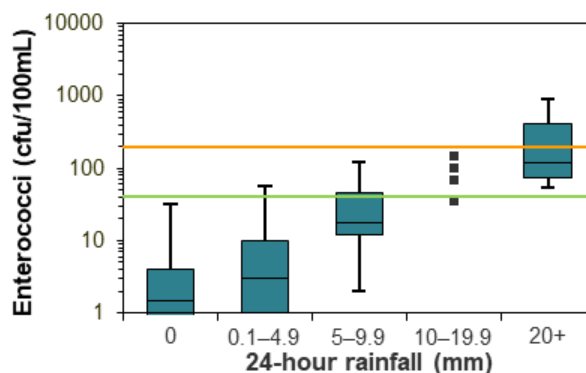
201 and 500 cfu/100 mL and greater than 500 cfu/100 mL. These categories reflect the Microbial Assessment Category thresholds and are coloured on the graph as dark green, light green, amber and red respectively.



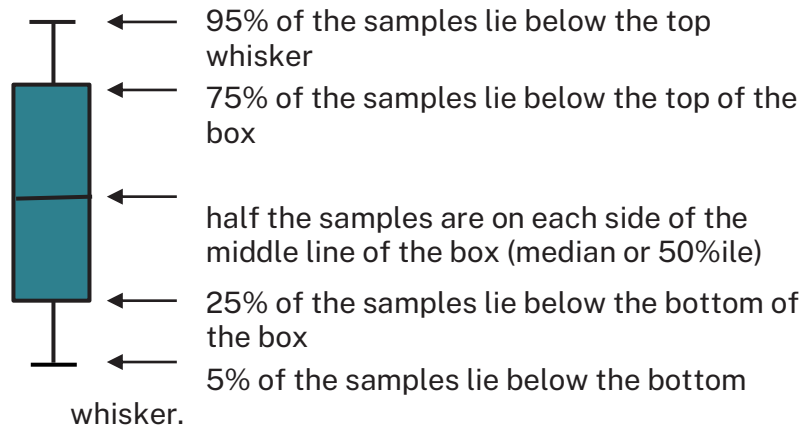
It is expected that swimming sites with lower levels of flushing will show some elevated bacterial results in dry weather samples (no rainfall in the previous 24 hours) due to the longer time needed to recover from a rainfall event. At some estuarine and lake/lagoon swimming locations the impacts of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

### Water quality in response to rainfall

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



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



## Information bars

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
















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

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

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

## Explanation of maps

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

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

## References

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

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

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

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

## More information

- [Beachwatch NSW on Twitter](#)
- [Beachwatch NSW on Facebook](#)
- [Beachwatch webpage](#)
- [Coastal management program progress](#)
- [Sanitary inspection of beaches](#)
- [Subscribe to daily pollution forecast emails](#)
- [WA Government environmental water publications](#)