



Beachwatch

State of the beaches 2022–23

North Coast Region

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Front cover: Main Beach Byron Bay (Cameron Board/DPE)

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ISBN 978-1-923076-59-4

EHG 2023/0275

July 2023

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Recreational water quality has been monitored in the North Coast region since 2002 by Ballina Shire Council, Richmond Valley Council and Byron Shire Council under the Department of Planning and Environment's Beachwatch Partnership Program. This report summarises the performance of 26 swimming sites on the north coast of New South Wales, providing a long-term assessment of how suitable a site is for swimming. Monitored sites include ocean beaches, estuarine areas in Brunswick River, Simpsons Creek, Shaws Bay, North Creek and Evans River, and swimming sites in Lake Ainsworth.

In 2022–2023, 62% of swimming sites in the North Coast region were graded as Good or Very Good, including most ocean beaches. These sites were suitable for swimming for most or almost all of the time. This is a good result despite the extreme wet weather events and flooding impacting the region in recent years. The overall decline from the previous year largely reflects the recent changes in the monitoring program, with an additional 7 swimming sites monitored by Byron Shire Council under the Beachwatch Partnership Program.

North Coast region summary 2022–2023

Monitoring water quality for swimming in New South Wales



Main Beach, Byron
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 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 in the North Coast region by Ballina Shire Council since 2002, Richmond Valley Council since 2006, and Byron Shire Council from 2009 to 2013, 2020 to 2021 and since 2022.

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

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

Rainfall impacts

During 2022–2023, 26 swimming sites were monitored including ocean beaches, estuarine areas in Brunswick River, Simpsons Creek, Shaws Bay, North Creek and Evans River, and swimming sites in Lake Ainsworth.

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: average to below average rainfall except for the wettest summer on record
- 2020–2021: rainfall was average to below average except for a very wet summer
- 2021–2022: average to well above average rainfall in spring and a very wet summer, and significant flood events
- 2022–2023: below average rainfall with some very wet months and a dry summer.

See the section on **How to read this report** on page 43 for an explanation of the graphs, tables and Beach Suitability Grades.

Rainfall on the North Coast was below the long-term monthly averages for winter 2022, with June and August 2022 particularly dry in the Northern Rivers region.

Rainfall during spring 2022 was variable, with well above average rainfall for September and October, followed by a very dry November. Rainfall totals for October 2022 were up to 2 and a half times the long-term monthly average, with 245 mm, 247 mm and 242 mm recorded at Byron, Ballina and Evans Head respectively. The North Coast recorded well below average rainfall totals in November, with extended periods of dry weather conditions.

Summer was drier than average with many areas of the Northern Rivers region experiencing below average rainfall. Despite the dry conditions, significant rainfall events occurred during February, including daily rainfall totals of 64 mm and 136 mm recorded at Byron and Ballina respectively.

Below average rainfall continued in March and April 2023 on the North Coast. In March 2023, Evans Head recorded a rainfall total of 66 mm which was well below the long-term monthly average of 226 mm.

Algal blooms



Blue-green algal bloom present in the water
Photo: Rachael Jenner/
Ballina Shire Council

Water NSW and Ballina Shire Council reported the occurrence of freshwater blue-green algal blooms, *Dolichospermum circinale* impacting Lake Ainsworth in February to March 2023. Water NSW also issued a caution alert for *Trichodesmium* sp. in the Richmond River and The Spit and Missingham Beach in December 2022, and for several places along the coastline including lower reaches of Cudgen Creek at Kingscliff, lower reaches of Richmond River and North Creek near Missingham Beach, and lower reaches of Evans River in January to February 2023.

While freshwater and marine algae occur naturally, there were times of heightened risk to recreational users due to rapid increases in abundance causing blooms.

The appearance of **algae** is sometimes mistaken for **sewage contamination** due to a strong odour and thick green scum or discolouration in the water caused by the blooms.

Algae advisories were issued on the Ballina Shire Council, Beachwatch and Water NSW websites, as well as onsite signage during blooms.

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 microorganisms) 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 North Coast region

Swimming site	Site type	Beach Suitability Grade	Change
Byron Shire Council			
South Golden Beach*	Ocean beach	 ^	-
New Brighton Beach*	Ocean beach	 ^	-
Torakina Beach	Estuarine	 ^	-
Simpsons Creek	Estuarine	 ^	-
Main Beach (Byron Bay)	Ocean beach	 ^	-
Clarkes Beach*	Ocean beach	 ^	-
Tallow Beach (Suffolk Park)	Ocean beach	 ^	-
Ballina Shire Council			
Seven Mile Beach	Ocean beach		
Lake Ainsworth North	Lake/Lagoon		
Lake Ainsworth East	Lake/Lagoon		
Lake Ainsworth South	Lake/Lagoon		
Lake Ainsworth West	Lake/Lagoon		
Shelly Beach	Ocean beach		
Lighthouse Beach	Ocean beach		
Shaws Bay North	Estuarine		
Shaws Bay East	Estuarine		
Shaws Bay East Arm	Estuarine		
Shaws Bay East Beach	Estuarine		
Shaws Bay West	Estuarine		
The Serpentine	Estuarine		
Missingham Beach*	Estuarine	 ^	-
Richmond Valley Council			
Airforce Beach	Ocean beach		
Main Beach	Ocean beach		

Swimming site	Site type	Beach Suitability Grade	Change
Richmond Valley Council (continued)			
Shark Bay	Ocean beach		
Evans River	Estuarine		
Elm Street Bridge North (Evans River)	Estuarine		

Beach Suitability Grade					Change		
							
Very Good	Good	Fair	Poor	Very Poor	Improved	Stable	Declined

* New site

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

Byron Shire Council



Overall results

Five of 7 swimming sites were graded as Very Good or Good in 2022–2023. Monitoring at these sites commenced in December 2022. Byron Shire Council previously monitored these swimming sites from 2009 to 2013 and from 2020 to 2021.

Percentage of sites graded as Very Good or Good

	2020– 2021	2021– 2022	2022– 2023	Trend
Ocean beaches (5 sites)	100%	–	100%	—————
Estuarine sites (2 sites)	0%	–	0%	—————

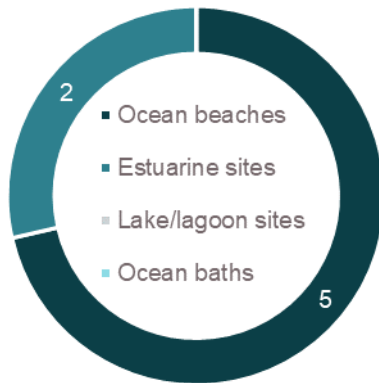
Seven swimming sites were monitored by Byron Shire Council. Samples were collected weekly between December and April and sampling and laboratory analysis was fully funded by the council.

The Beach Suitability Grades provided for monitored sites in Byron Shire are provisional and subject to change. Provisional classifications are provided where the data available for the microbial assessment, the sanitary inspection or both are incomplete. Further monitoring is required to obtain the necessary data to provide a definite classification in accordance with national guidelines.

See the section on **How to read this report** on page 43 for an explanation of the graphs, tables and Beach Suitability Grades.

Information about Byron Shire Council’s **coast and waterways planning and projects** is available on council’s website.

Best beaches
South Golden Beach, New Brighton Beach, Main Beach (Byron Bay), Clarkes Beach and Tallow Beach (Suffolk Park).
These sites had good water quality and were suitable for swimming most of the time.



Site types in Byron Shire Council

Swimming sites monitored in the Byron region include ocean beaches and estuarine areas in the Brunswick River and Simpsons Creek, with each site type having a different response to rainfall-related impacts.

Estuarine swimming sites generally did 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 Byron Shire Council ocean beaches

The 5 ocean beaches were graded as Good in 2022–2023: South Golden Beach, New Brighton Beach, Main Beach (Byron Bay), Clarkes Beach and Tallow Beach (Suffolk Park). These sites had good water quality and were suitable for swimming most of the time.

While water quality has been of a good standard, the grades are provisional as the assessment is based on limited bacterial data.

Estuarine beaches



Beach Suitability Grades for Byron Shire Council estuarine beaches

Torakina Beach, located within the entrance of the Brunswick River, and Simpsons Creek were graded as Poor in 2022–2023. Elevated bacteria levels were recorded at these sites during dry and wet weather conditions. These sites may be impacted by several potential sources of faecal contamination including stormwater and upstream sources in the Brunswick River and Simpsons Creek.

While these results are provisional due to limited bacterial data, swimming is not recommended at these sites during and for up to 3 days after rainfall, or if there are signs of stormwater pollution such as discoloured water or floating debris.



Sampling sites and Beach Suitability Grades in Byron Shire Council

South Golden Beach

Beach grade:



South Golden Beach is located towards the southern end of a 14 km long beach.

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

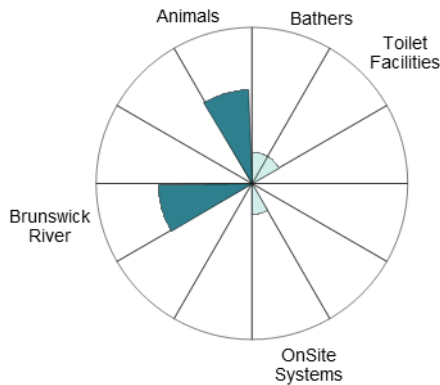
Enterococci levels increased slightly with increasing rainfall but generally remained below the safe swimming limit across all rainfall categories.

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

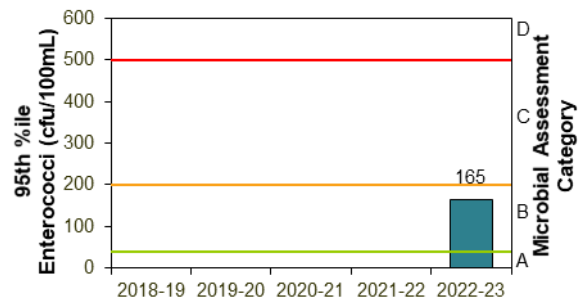
The site has been monitored since 2022.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Dec 2022 to Apr 2023	88%	17	Provisional

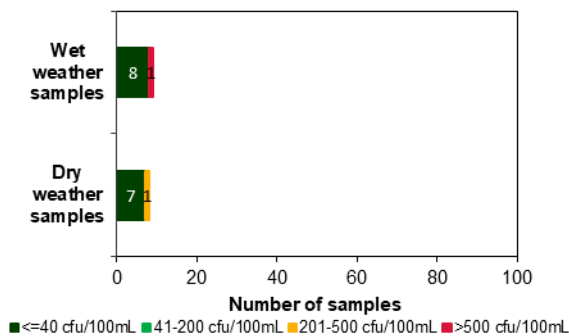
Sanitary inspection: Moderate



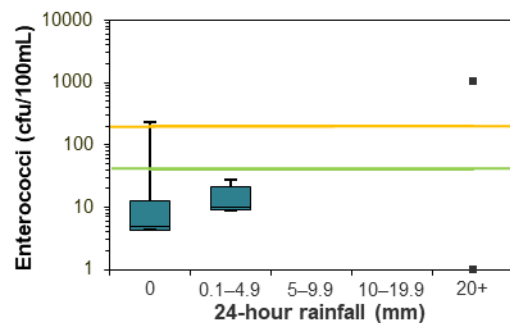
Microbial Assessment Category: B



Dry and wet weather water quality

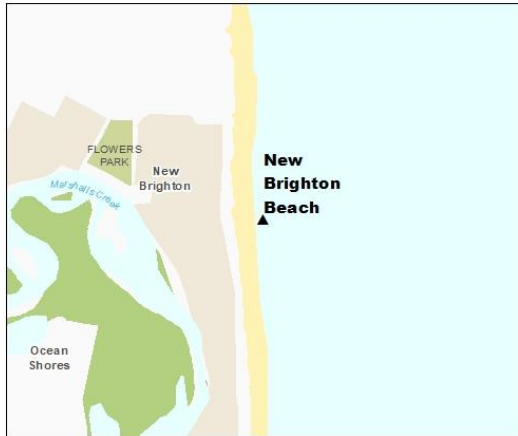


Water quality in response to rainfall



New Brighton Beach

Beach grade:



New Brighton Beach is located towards the southern end of a 14 km long beach, north of Brunswick Heads.

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

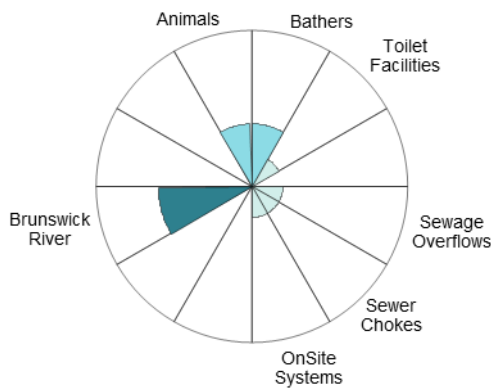
Enterococci levels generally remained below the safe swimming limit but occasionally exceeding the safe swimming limit after little or no rain.

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

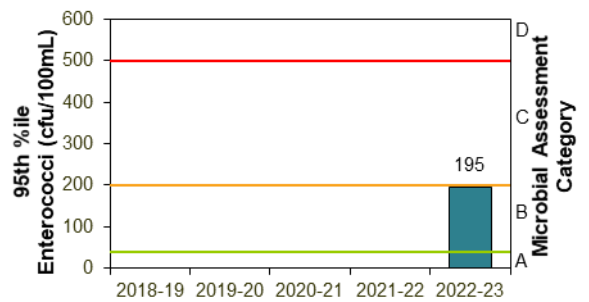
The site has been monitored since 2022.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Dec 2022 to Apr 2023	63%	17	Provisional

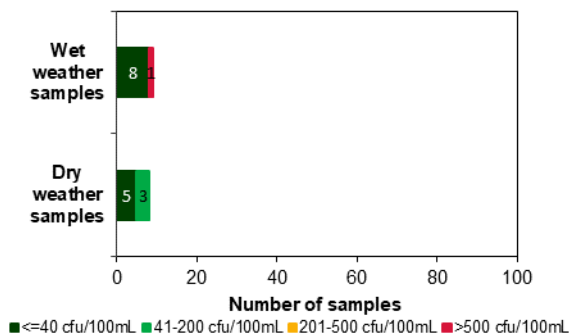
Sanitary inspection: Moderate



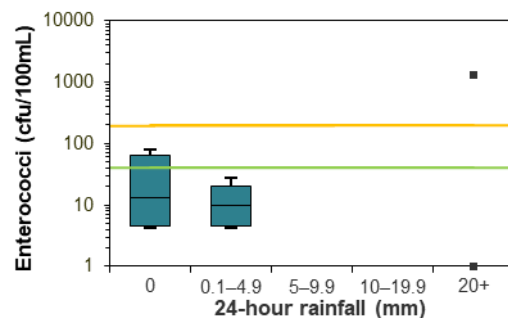
Microbial Assessment Category: B



Dry and wet weather water quality



Water quality in response to rainfall



Torakina Beach

Beach grade:



Torakina Beach is a small sandy beach next to the southern break wall of Brunswick River at Brunswick Heads.

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 upstream sources in the Brunswick River.

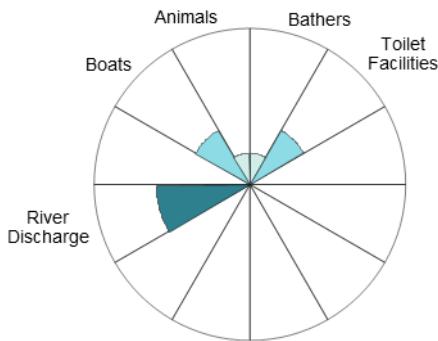
Enterococci levels generally increased with increasing rainfall, occasionally exceeding the safe swimming limit after little or no rain.

The site was monitored from 2009 until 2013, 2020 until 2021, and since 2022.

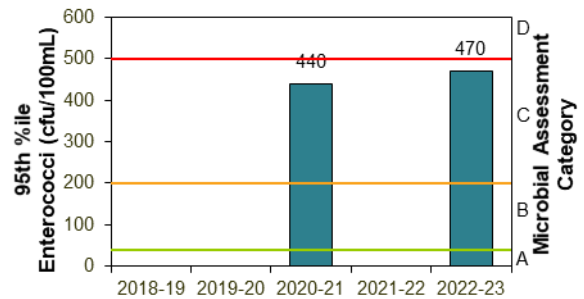
See 'How to read this report' for key to map.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Estuarine	Dec 2020 to Apr 2023	69%	31	Provisional

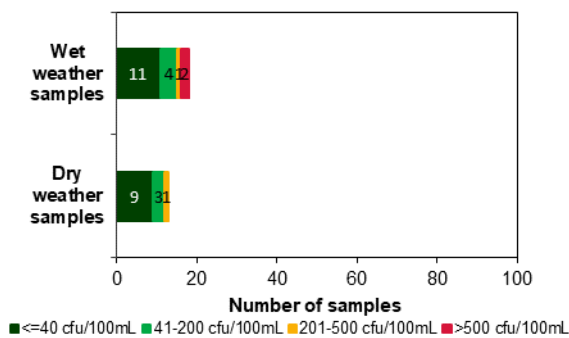
Sanitary inspection: Moderate



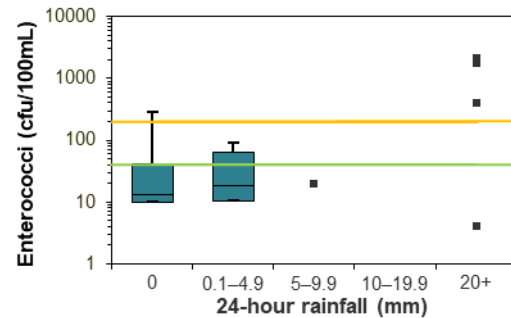
Microbial Assessment Category: C



Dry and wet weather water quality



Water quality in response to rainfall



Simpsons Creek

Beach grade:



Simpsons Creek is located adjacent to the Terrace Park in Brunswick Heads. The creek is a tributary of the Brunswick River.

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 upstream sources within Simpsons Creek.

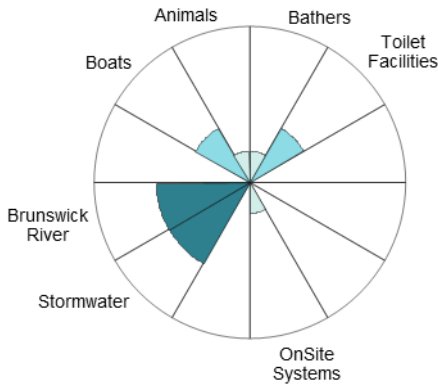
Enterococci levels increased with increasing rainfall, regularly exceeding the safe swimming limit after little or no rain.

The site was monitored from 2009 until 2013, 2020 until 2021, and since 2022.

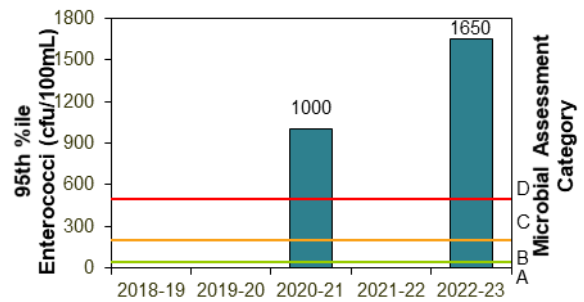
See 'How to read this report' for key to map.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Estuarine	Dec 2020 to Apr 2023	46%	32	Provisional

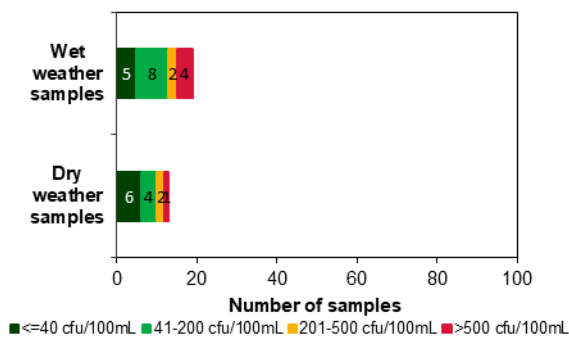
Sanitary inspection: Moderate



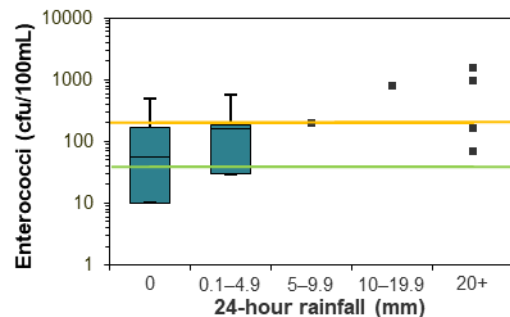
Microbial Assessment Category: D



Dry and wet weather water quality



Water quality in response to rainfall



Main Beach (Byron Bay)

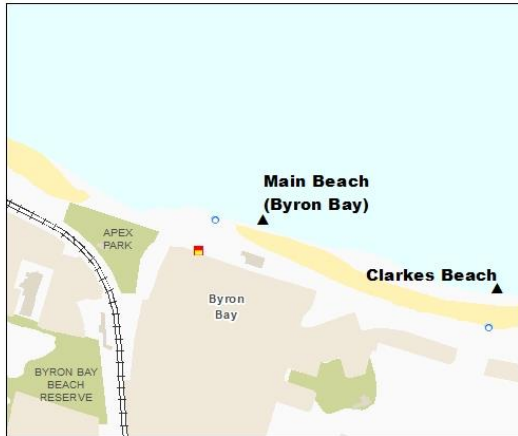
Beach grade: **G**



Main Beach is a popular long sandy beach in Byron Bay and is patrolled during the summer season.

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

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

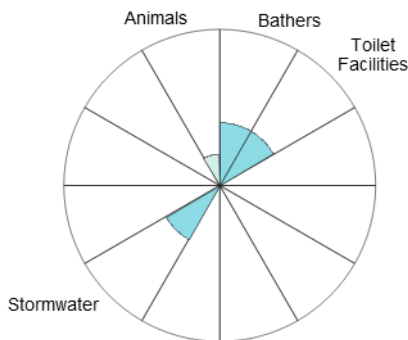


See 'How to read this report' for key to map.

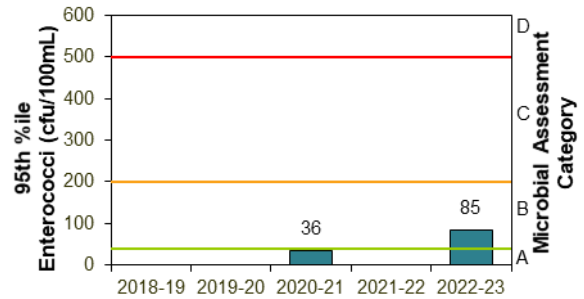
The site was monitored from 2009 until 2013, 2020 until 2021, and since 2022.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Dec 2020 to Apr 2023	85%	34	Provisional

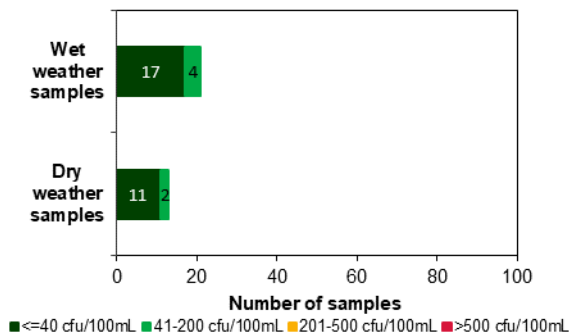
Sanitary inspection: Low



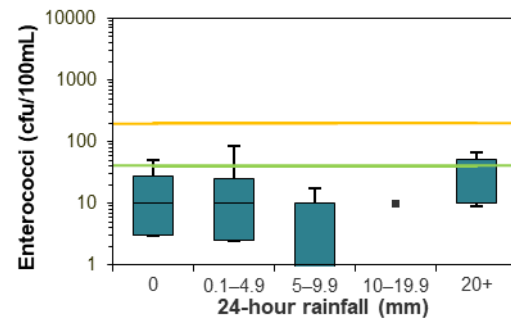
Microbial Assessment Category: B



Dry and wet weather water quality



Water quality in response to rainfall



Clarkes Beach

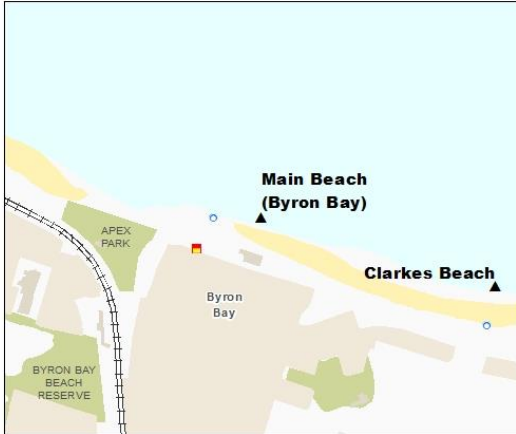
Beach grade:



Clarkes Beach is a wide sandy beach known for surfing lessons and humpback whale sightings.

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

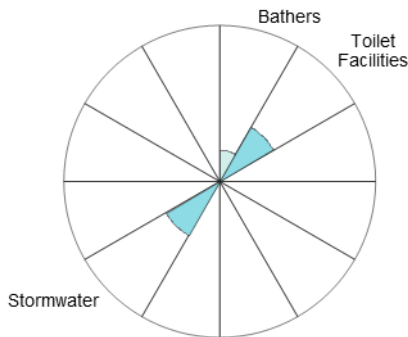
Enterococci levels had little response to rainfall and generally remained below the safe swimming limit across all rainfall categories.



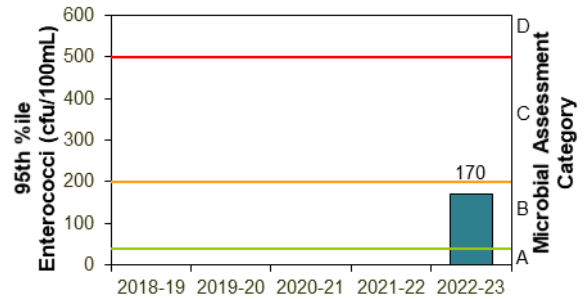
See 'How to read this report' for key to map. The site has been monitored since 2022.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Dec 2022 to Apr 2023	88%	17	Provisional

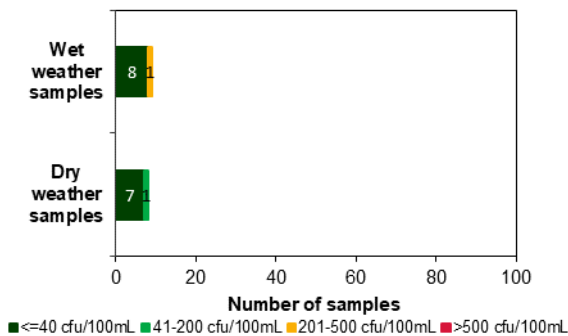
Sanitary inspection: Low



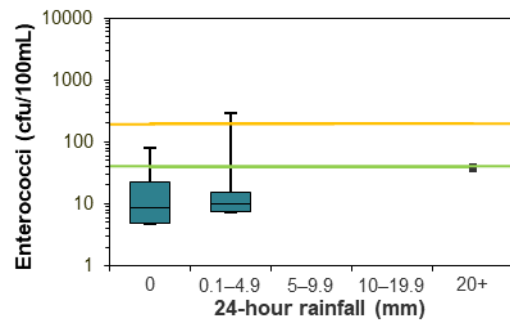
Microbial Assessment Category: B



Dry and wet weather water quality



Water quality in response to rainfall



Tallow Beach (Suffolk Park)

Beach grade: G



Tallow Beach (Suffolk Park) is located toward the southern end of a 6.5 km stretch of beach between Cape Bryon and Broken Head, and is patrolled during the summer season.

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.

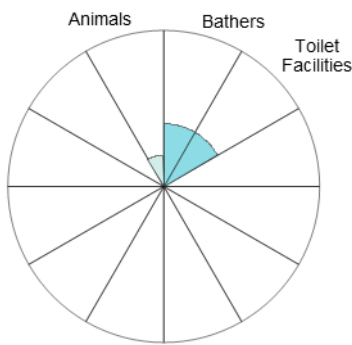
Enterococci levels had little response to rainfall and generally remained below the safe swimming limit across all rainfall categories.

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

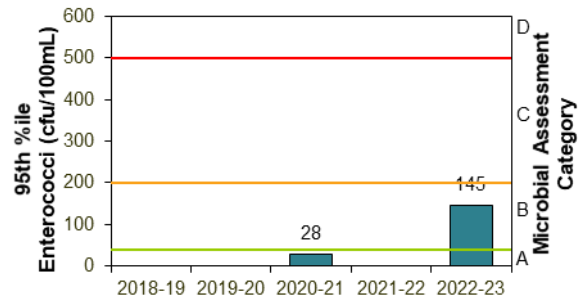
The site was monitored from 2009 until 2013, 2020 until 2021, and since 2022.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Dec 2020 to Apr 2023	83%	29	Provisional

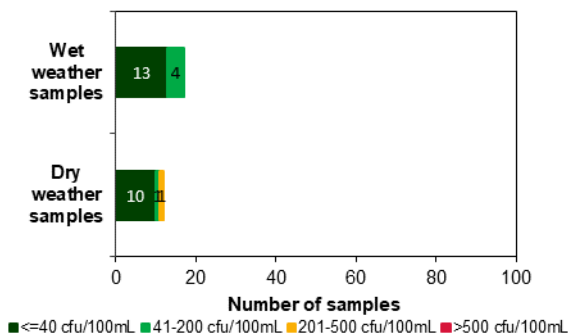
Sanitary inspection: Low



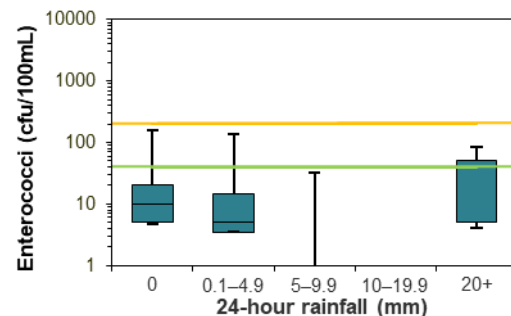
Microbial Assessment Category: B



Dry and wet weather water quality



Water quality in response to rainfall



Ballina Shire Council



Overall results

Eight of the 14 swimming sites were graded as Very Good or Good in 2022–2023, a similar performance to the previous year.

Percentage of sites graded as Very Good or Good

	2020–2021	2021–2022	2022–2023	Trend
Ocean beaches (3 sites)	100%	100%	100%	
Estuarine sites (7 sites)	67%	67%	57%	
Lake/lagoon sites (4 sites)	50%	50%	25%	

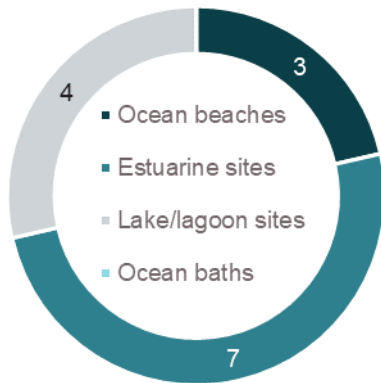
Fourteen swimming sites were monitored by Ballina Shire Council. Samples were collected weekly between November and February and sampling and laboratory analysis was fully funded by the council.

See the section on **How to read this report** on page 43 for an explanation of the graphs, tables and Beach Suitability Grades.

Best beaches

Seven Mile Beach, Shelly Beach and Lighthouse Beach.

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



Site types in Ballina Shire Council

Swimming sites monitored in the Ballina region include ocean beaches, estuarine areas in Shaws Bay and North Creek and lake/lagoon swimming sites in Lake Ainsworth, with each site type having a different response to rainfall-related impacts.

Estuarine and lake/lagoon swimming sites generally did 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 Ballina Shire Council ocean beaches

Seven Mile Beach, Shelly Beach and Lighthouse Beach continued to be graded as Very Good in 2022–2023. These beaches had excellent water quality and were suitable for swimming almost all of the time.

Estuarine beaches



Beach Suitability Grades for Ballina Shire Council estuarine beaches

Four of the 7 estuarine swimming locations were graded as Good in 2022–2023: Shaws Bay East, Shaws Bay East Arm, Shaws Bay East Beach and The Serpentine. Water quality at these sites was frequently suitable for swimming in dry weather, with 87% or greater of dry weather samples within the safe swimming limit.

Shaws Bay North and Shaws Bay West were graded Poor in 2022–2023, similar to the previous year. While these sites were mostly suitable for swimming during dry weather, elevated bacterial levels were regularly recorded following light rainfall. Monitoring at Missingham Beach commenced in November 2022. Missingham Beach was graded as Poor in 2022–2023, however the grade is provisional as the assessment is based on limited bacterial data.

The estuarine swimming locations occasionally recorded elevated enterococci levels after light rainfall and more often after heavy rainfall. Water quality at these sites can be impacted by upstream sources and can take longer to recover due to lower levels of flushing.

It is recommended that swimming should be avoided during and for up to 3 days following rainfall at estuarine swimming sites, or if there are signs of pollution such as discoloured water or floating debris.

Lake/lagoon swimming sites



Beach Suitability Grades for Ballina Shire Council lake/lagoon swimming sites

Lake Ainsworth South continued to be graded as Good in 2022–2023. This site was frequently suitable for swimming during dry weather, with 88% of dry weather samples within the safe swimming limit. Elevated enterococci levels were regularly recorded at this site after heavy rainfall.

Lake Ainsworth North and Lake Ainsworth West were graded as Poor, a result consistent with previous years. Elevated bacteria levels were recorded at these lake swimming sites during dry and wet weather conditions. Despite the poor grades, between 79% and 70% of dry weather samples were within the safe swimming limit. Lake Ainsworth East was downgraded to Poor in 2022–2023, from Good in the previous year. These sites may be impacted by a number of significant potential sources of faecal contamination, including stormwater, and have low levels of flushing.

More information about Ballina Shire Council's **Healthy Waterways** and **Coastal Management Programs** is available on council's website.

During 2019, council investigated the source of microbial contamination by testing additional samples for faecal sterols at sites within Lake Ainsworth. The results found that the main contributors to elevated bacteria levels are from avian (bird) sources.

It is recommended that swimming should be avoided during and for up to 3 days following rainfall or if there are signs of stormwater pollution such as discoloured water or floating debris.



Sampling sites and Beach Suitability Grades in Ballina Shire Council

Seven Mile Beach

Beach grade:



Seven Mile Beach extends for over 8 km and is patrolled over the summer period.

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

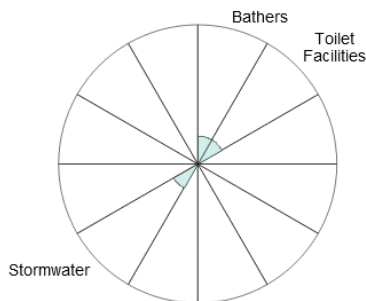
Enterococci levels increased slightly with increasing rainfall but remained below the safe swimming limit across all rainfall categories.

The site has been monitored since 2002.

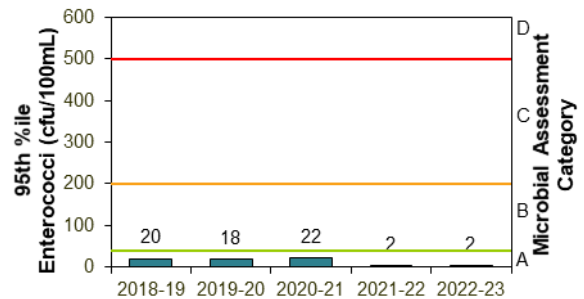
See ‘How to read this report’ for key to map.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Nov 2018 to Feb 2023	100%	99	Stable

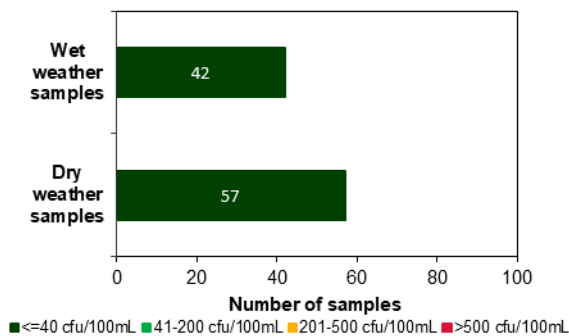
Sanitary inspection: Low



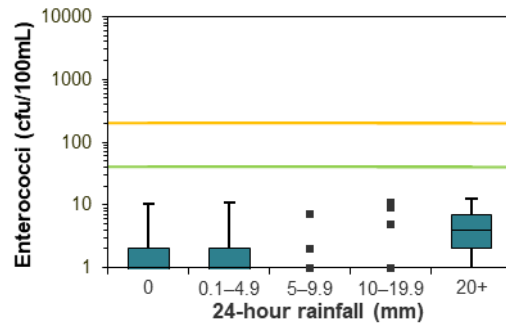
Microbial Assessment Category: A



Dry and wet weather water quality

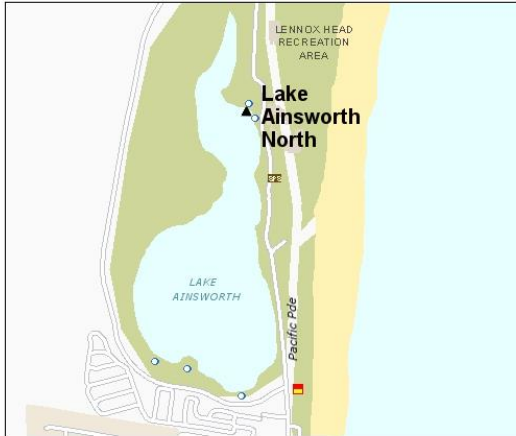


Water quality in response to rainfall



Lake Ainsworth North

Beach grade: P



Lake Ainsworth North is located at the northern end of Lake Ainsworth.

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 and elsewhere within the lake.

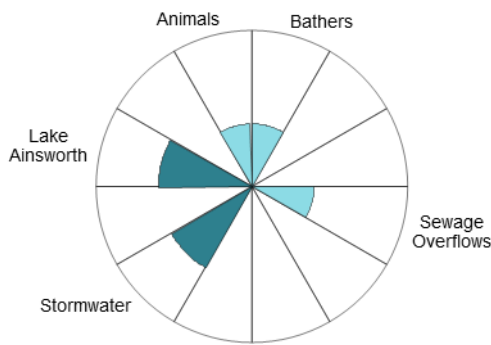
Enterococci levels increased with increasing rainfall, often exceeding the safe swimming limit after no rain, and regularly after 10 mm or more of rainfall.

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

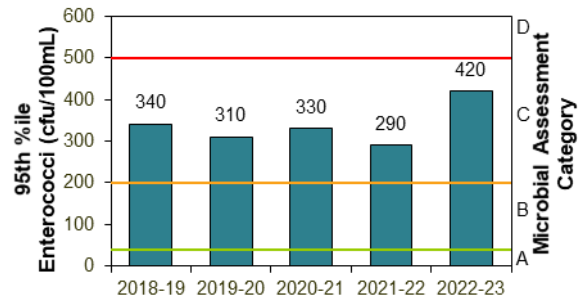
The site has been monitored since 2016.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Lake/Lagoon	Nov 2018 to Feb 2023	79%	100	Stable

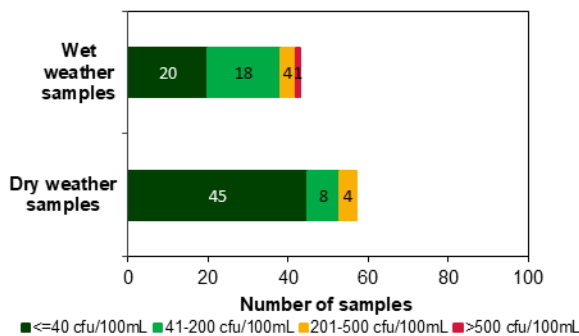
Sanitary inspection: Moderate



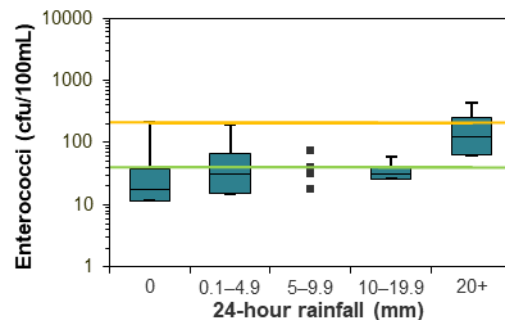
Microbial Assessment Category: C



Dry and wet weather water quality

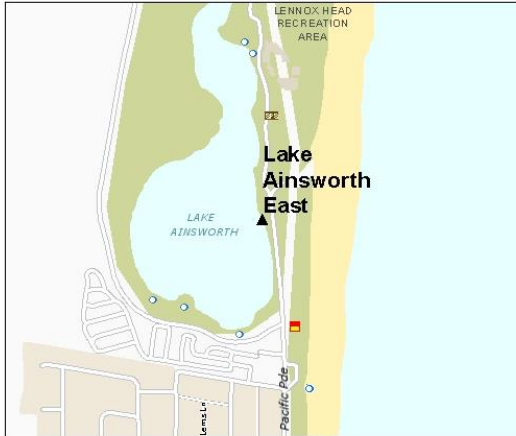


Water quality in response to rainfall



Lake Ainsworth East

Beach grade: P



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

Lake Ainsworth East is located on the eastern shore of Lake Ainsworth, a coastal freshwater lake.

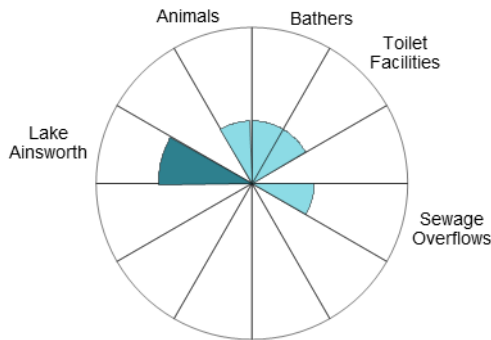
The Beach Suitability Grade of Poor indicates microbial water quality is susceptible to faecal pollution, particularly after rainfall and occasionally during dry weather conditions, with potential faecal contamination from stormwater and elsewhere within the lake.

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

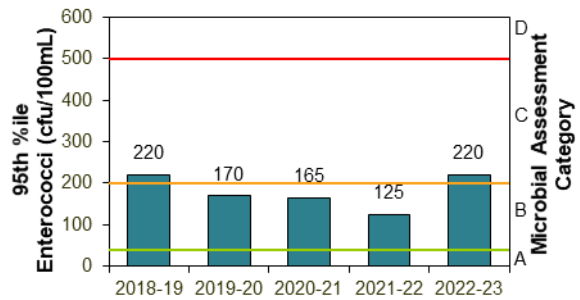
The site was monitored from 2002 until 2009, and since 2012.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Lake/Lagoon	Jun 2018 to Feb 2023	82%	100	Declined

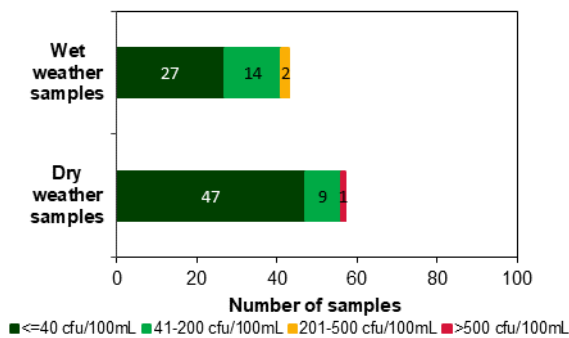
Sanitary inspection: Moderate



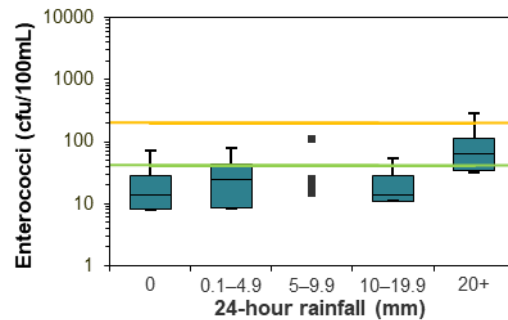
Microbial Assessment Category: C



Dry and wet weather water quality

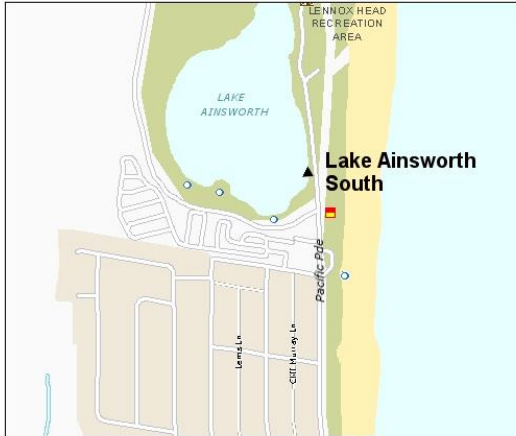


Water quality in response to rainfall



Lake Ainsworth South

Beach grade: G



Lake Ainsworth South is located on the southern shore of Lake Ainsworth, a coastal freshwater lake.

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 from elsewhere within the lake.

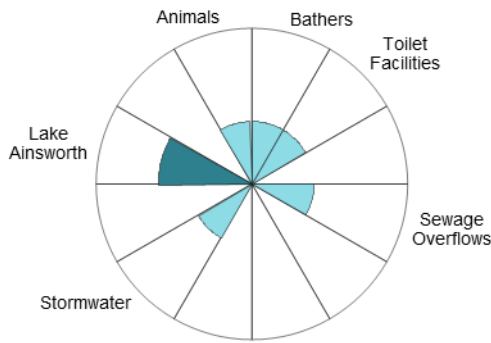
Enterococci levels generally increased with increasing rainfall, occasionally exceeding the safe swimming limit after little rain, and regularly after 20 mm or more.

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

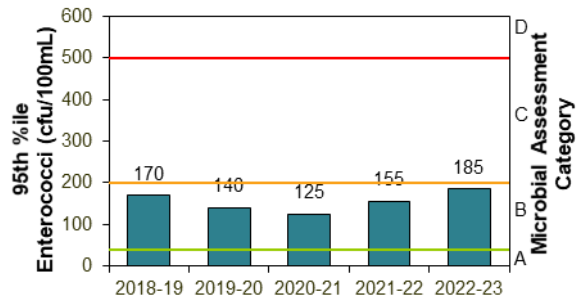
The site was monitored from 2002 until 2009, and since 2012.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Lake/Lagoon	Nov 2018 to Feb 2023	88%	100	Stable

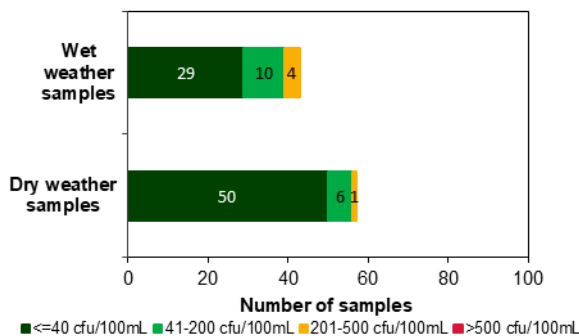
Sanitary inspection: Moderate



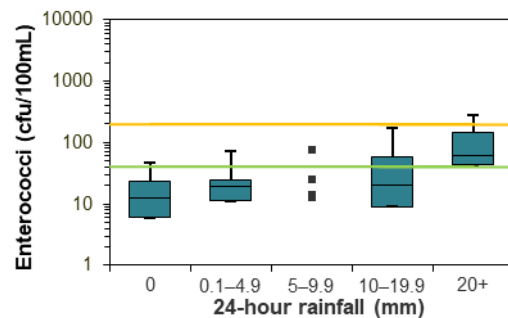
Microbial Assessment Category: B



Dry and wet weather water quality

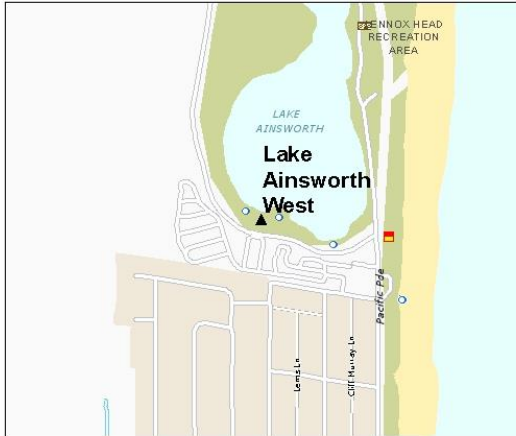


Water quality in response to rainfall



Lake Ainsworth West

Beach grade: P



Lake Ainsworth West is located on the western shore of Lake Ainsworth, a coastal freshwater lake.

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

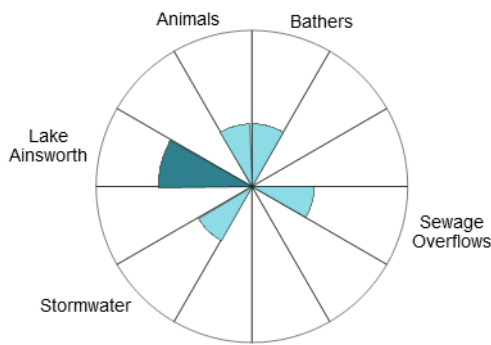
Enterococci levels generally increased with increasing rainfall, often exceeding the safe swimming limit after little or no rain, and frequently after 10 mm or more of rain.

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

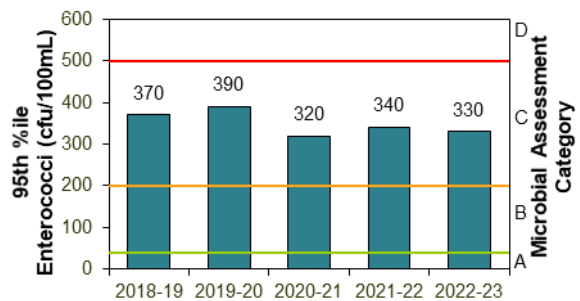
The site has been monitored since 2002.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Lake/Lagoon	Jun 2018 to Feb 2023	70%	100	Stable

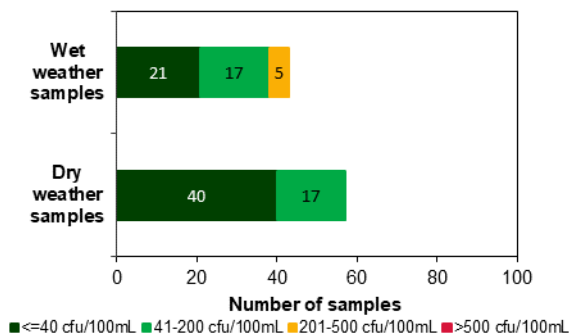
Sanitary inspection: Moderate



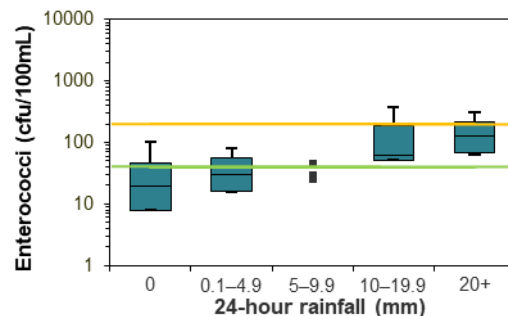
Microbial Assessment Category: C



Dry and wet weather water quality

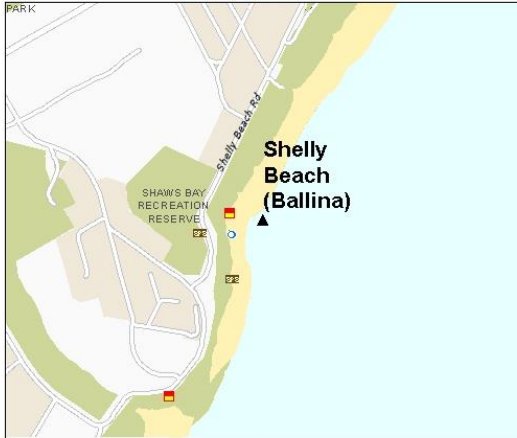


Water quality in response to rainfall



Shelly Beach

Beach grade:



Shelly Beach is a 700 m long beach located between Black Head and Richmond River Lighthouse, and is patrolled during holiday periods.

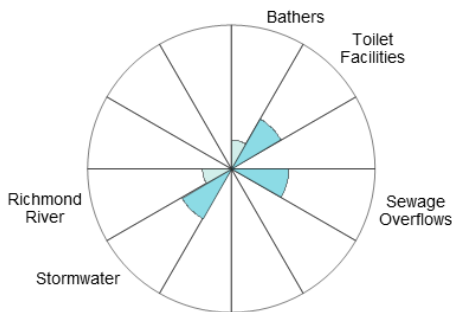
The Beach Suitability Grade of Very Good indicates microbial water quality is considered suitable for swimming almost all of the time, with few potential sources of significant faecal contamination.

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

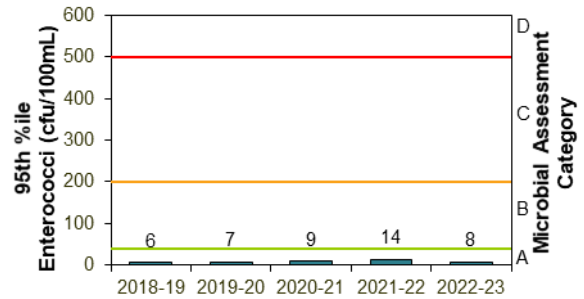
See 'How to read this report' for key to map. The site has been monitored since 2002.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Nov 2018 to Feb 2023	100%	99	Stable

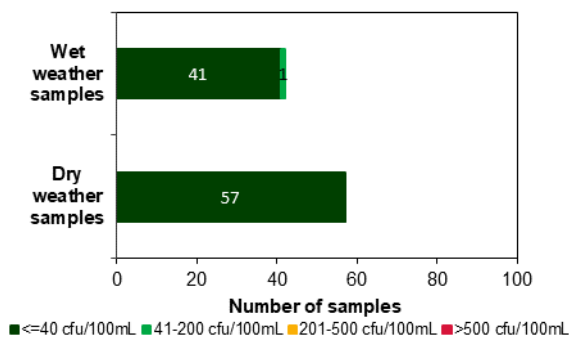
Sanitary inspection: Low



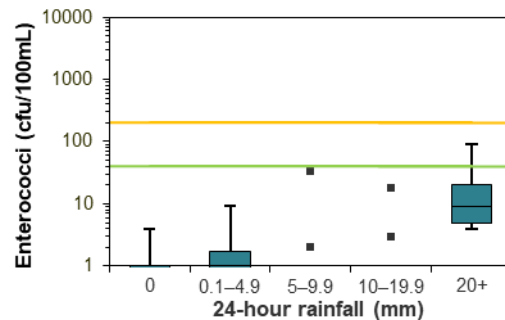
Microbial Assessment Category: A



Dry and wet weather water quality



Water quality in response to rainfall



Lighthouse Beach

Beach grade: VG



Lighthouse Beach is situated north of the sea wall at the mouth of the Richmond River and is patrolled during holiday periods.

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.

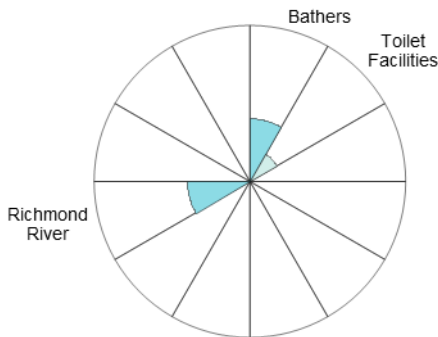
Enterococci levels increased slightly with increasing rainfall, but usually remained below the safe swimming limit across all rainfall categories.

The site was monitored from 2002 until 2003, and since 2009.

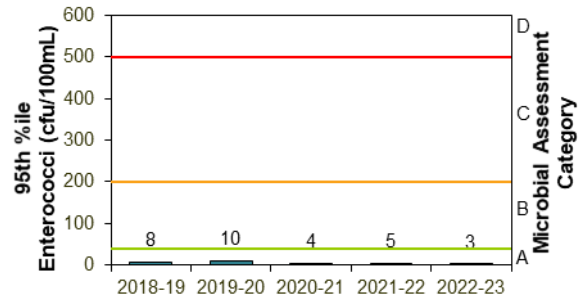
See 'How to read this report' for key to map.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Nov 2018 to Feb 2023	100%	99	Stable

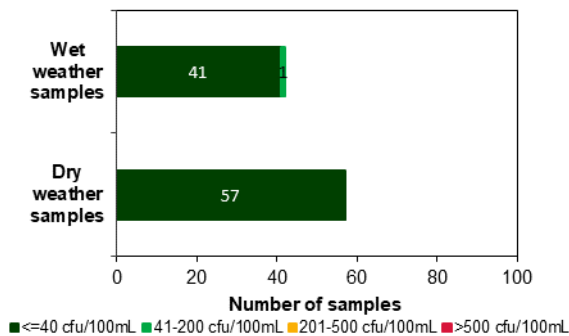
Sanitary inspection: Low



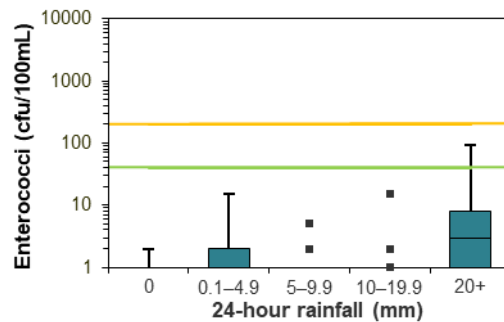
Microbial Assessment Category: A



Dry and wet weather water quality

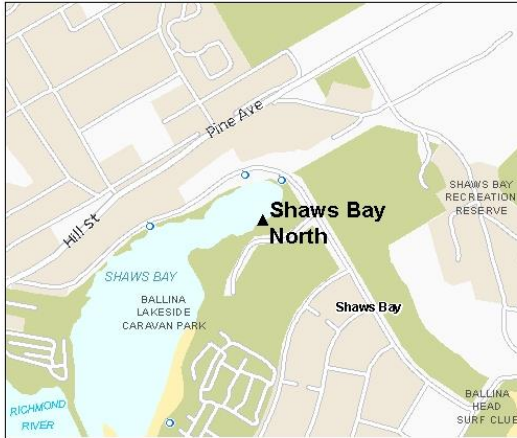


Water quality in response to rainfall



Shaws Bay North

Beach grade: P



Shaws Bay North is located on the northern side of Shaws Bay, an inlet near the mouth of the Richmond River.

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

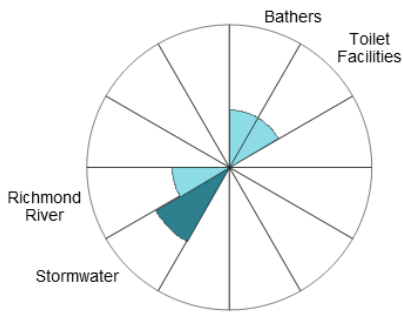
Enterococci levels increased with increasing rainfall, occasionally exceeding the safe swimming limit after no rain, and regularly after 5 mm or more.

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

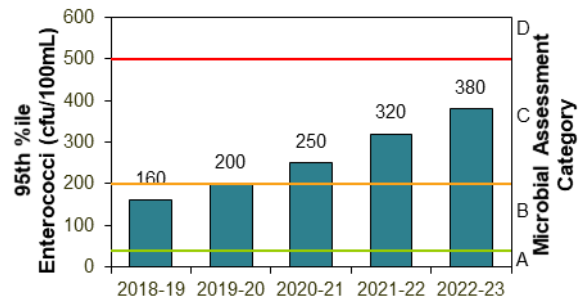
The site was monitored from 2002 until 2009, and since 2012.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Estuarine	May 2018 to Feb 2023	76%	96	Stable

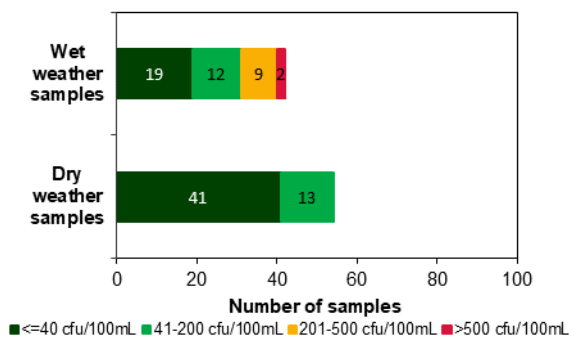
Sanitary inspection: Moderate



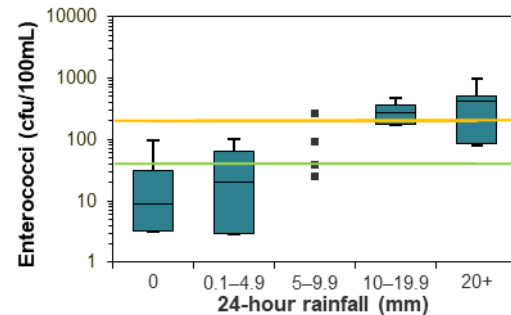
Microbial Assessment Category: C



Dry and wet weather water quality

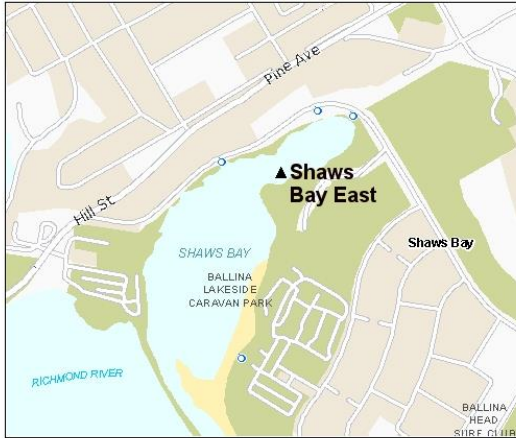


Water quality in response to rainfall



Shaws Bay East

Beach grade: G



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

Shaws Bay East is located on the eastern side of Shaws Bay, an inlet near the mouth of the Richmond River.

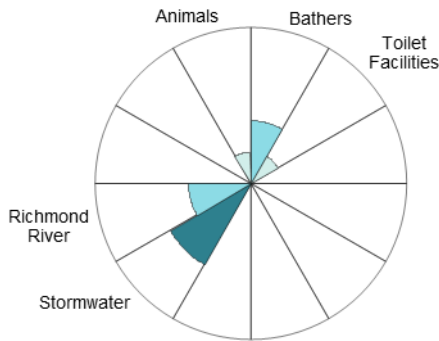
The Beach Suitability Grade of Good indicates microbial water quality is considered suitable for swimming most of the time but may be susceptible to pollution after rain, with several potential sources of faecal contamination including stormwater.

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

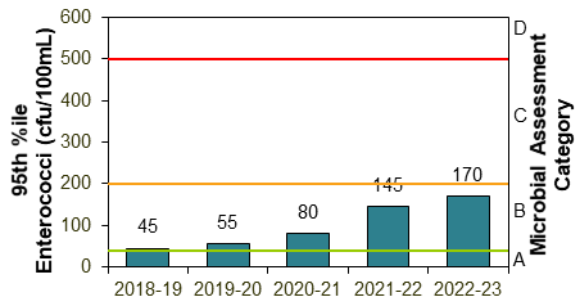
The site has been monitored since 2002.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Estuarine	May 2018 to Feb 2023	87%	96	Stable

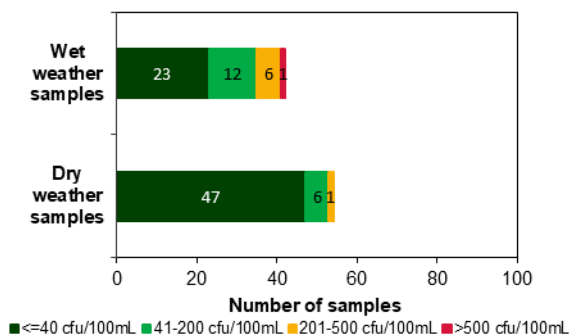
Sanitary inspection: Moderate



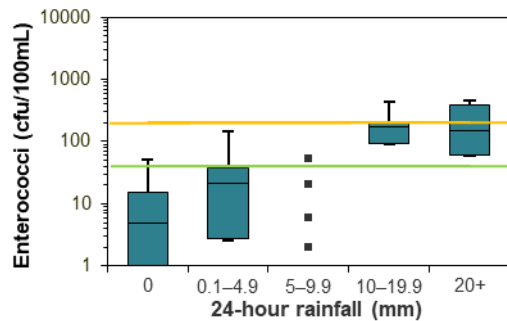
Microbial Assessment Category: B



Dry and wet weather water quality

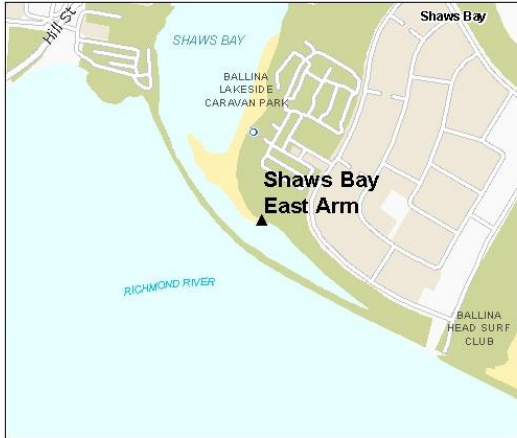


Water quality in response to rainfall



Shaws Bay East Arm

Beach grade: G



Shaws Bay East Arm is a sandy beach located on the southern side of Shaws Bay, an inlet near the mouth of the Richmond River.

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 stormwater.

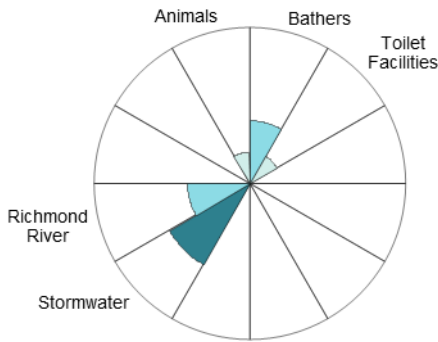
Enterococci levels increased with increasing rainfall, occasionally exceeding the safe swimming limit after light rain, and often after 10 mm or more.

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

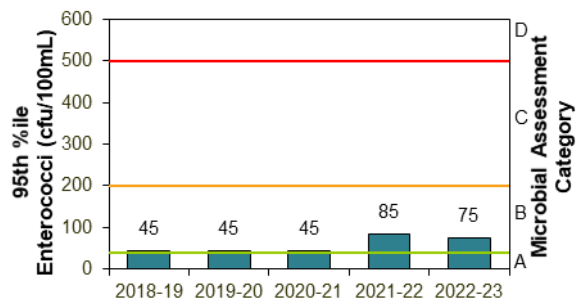
The site has been monitored since 2014.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Estuarine	May 2018 to Feb 2023	98%	100	Stable

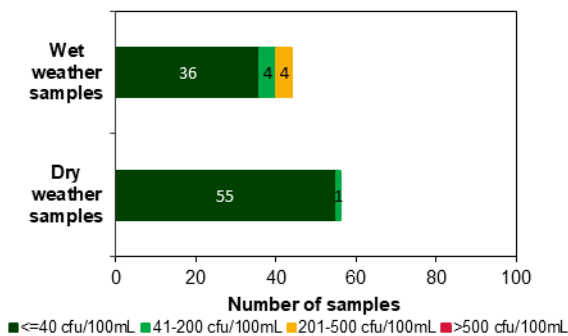
Sanitary inspection: Moderate



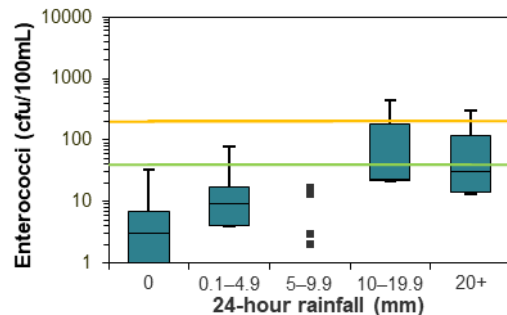
Microbial Assessment Category: B



Dry and wet weather water quality



Water quality in response to rainfall



Shaws Bay East Beach

Beach grade: G



Shaws Bay East Beach is a sandy beach located on the eastern side of Shaws Bay, an inlet near the mouth of the Richmond River.

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 stormwater.

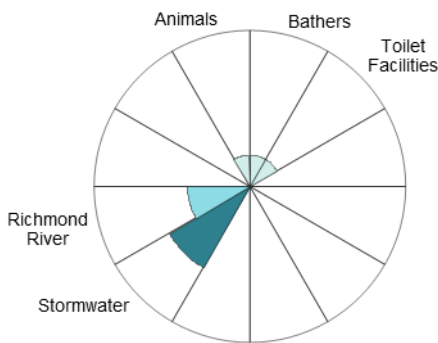
Enterococci levels increased with increasing rainfall, occasionally exceeding the safe swimming limit after light rain, and often after 5 mm or more.

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

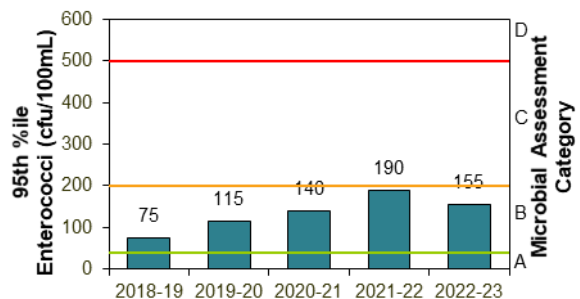
The site has been monitored since 2014.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Estuarine	May 2018 to Feb 2023	98%	96	Stable

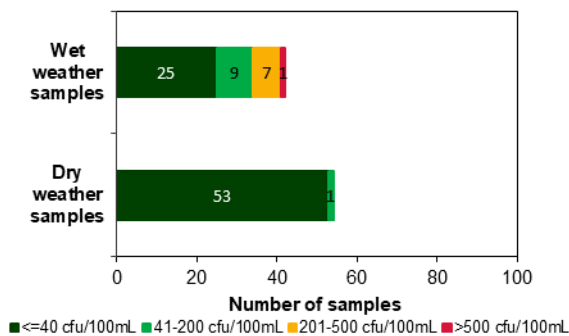
Sanitary inspection: Moderate



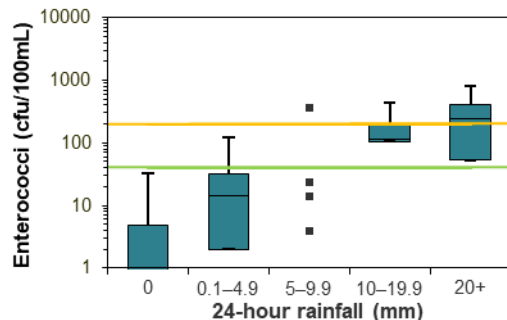
Microbial Assessment Category: B



Dry and wet weather water quality



Water quality in response to rainfall



Shaws Bay West

Beach grade: P



Shaws Bay West is located on the western side of Shaws Bay, an inlet near the mouth of the Richmond River.

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 and elsewhere within the lake.

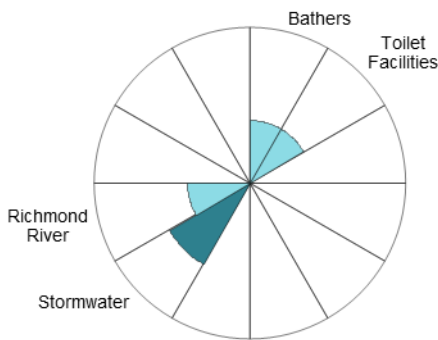
Enterococci levels increased with increasing rainfall, occasionally exceeding the safe swimming limit after little or no rain, and regularly after 5 mm or more.

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

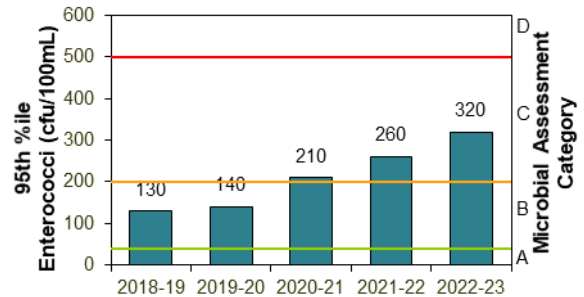
The site was monitored from 2002 until 2009, and since 2012.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Estuarine	Jun 2018 to Feb 2023	82%	100	Stable

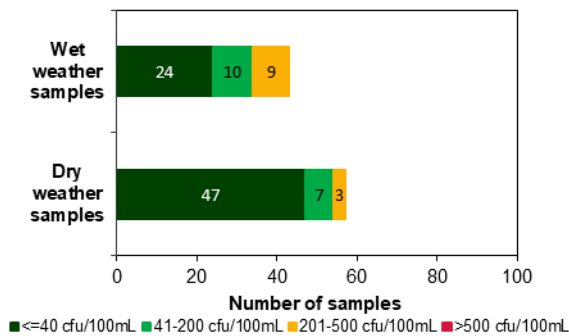
Sanitary inspection: Moderate



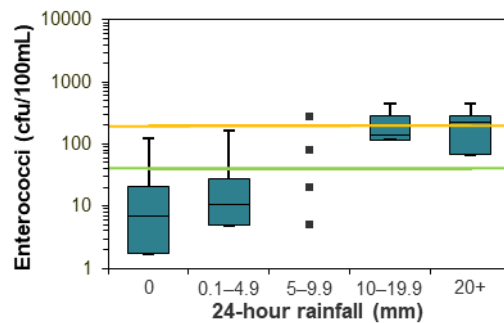
Microbial Assessment Category: C



Dry and wet weather water quality



Water quality in response to rainfall



The Serpentine

Beach grade: G



The Serpentine is adjacent to Missingham Bridge in North Creek, a tributary of the Richmond River.

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.

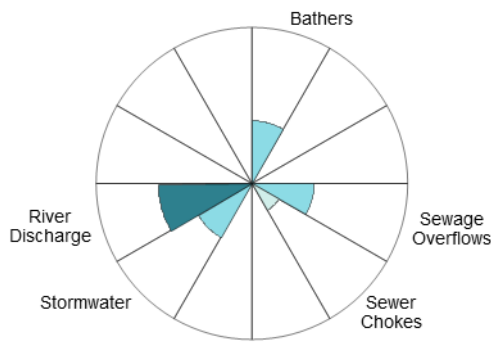
Enterococci levels generally increased with increasing rainfall, occasionally exceeding the safe swimming limit after light rain, and often after 10 mm or more.

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

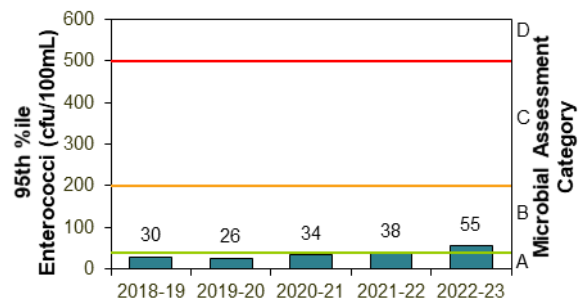
This site has been monitored since 2002.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Estuarine	Nov 2018 to Feb 2023	96%	99	Stable

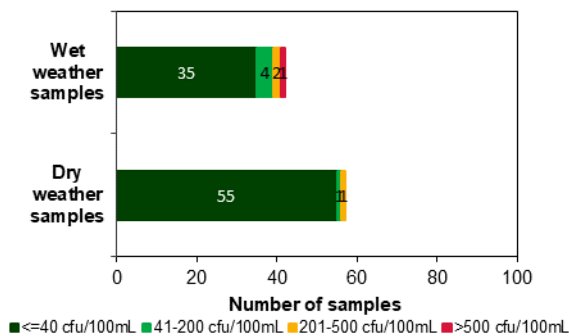
Sanitary inspection: Moderate



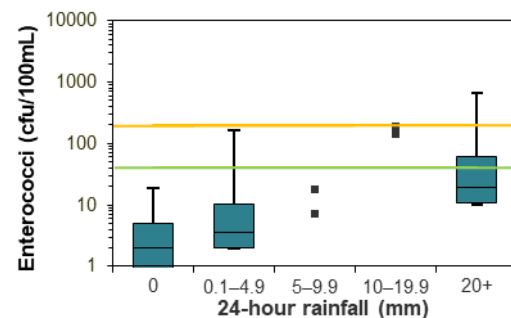
Microbial Assessment Category: B



Dry and wet weather water quality



Water quality in response to rainfall



Missingham Beach

Beach grade: P



Missingham Beach is a sandy beach located on the northern side of the Richmond River, adjacent to Missingham Park.

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

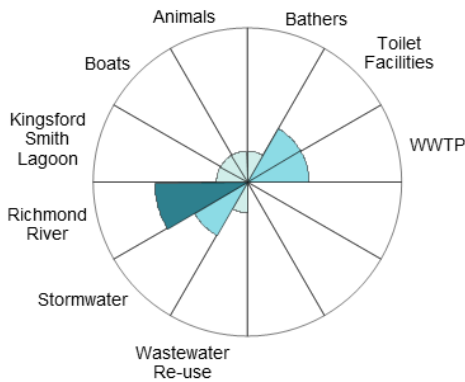
Enterococci levels increased with increasing rainfall, occasionally exceeding the safe swimming limit after little or no rain.

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

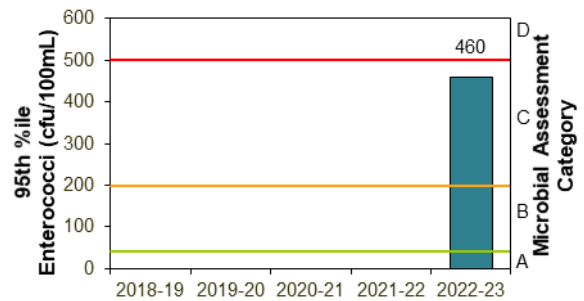
This site has been monitored since 2022.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Estuarine	Nov 2022 to Feb 2023	54%	20	Provisional

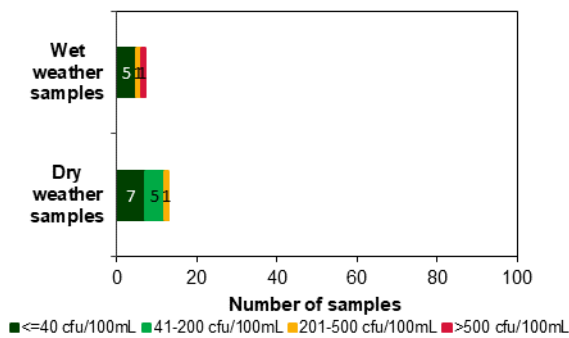
Sanitary inspection: Moderate



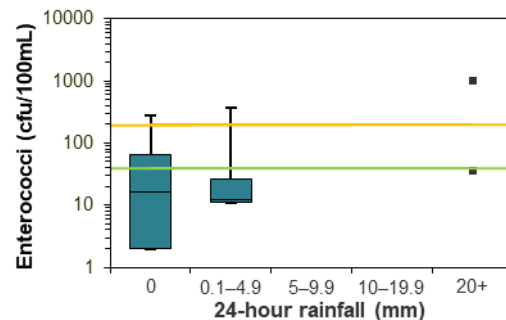
Microbial Assessment Category: C



Dry and wet weather water quality



Water quality in response to rainfall



Richmond Valley Council

Overall results



Three of the 5 swimming sites were graded as Very Good or Good in 2022–2023. This is a slight decline in performance from previous years.

Percentage of sites graded as Very Good or Good

	2020–2021	2021–2022	2022–2023	Trend
Ocean beaches (3 sites)	100%	100%	100%	
Estuarine sites (2 sites)	50%	50%	0%	

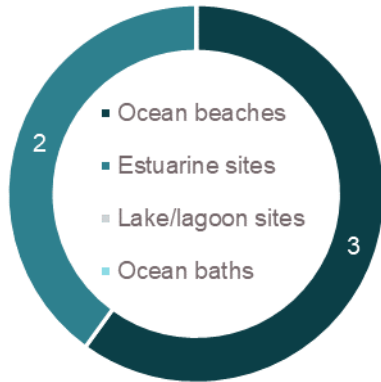
Five swimming sites were monitored by Richmond Valley Council. All sampling and laboratory analysis was fully funded by the council. The 3 ocean beaches and Elm Street Bridge North were sampled weekly from October to March. Evans River is sampled weekly throughout the year.

See the section on **How to read this report** on page 43 for an explanation of the graphs, tables and Beach Suitability Grades.

Best beaches

Shark Bay.

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



Site types in Richmond Valley Council

Swimming sites monitored in the Richmond Valley Council region include ocean beaches and estuarine areas in Evans River, with each site type having a different response to rainfall-related impacts.

Estuarine swimming sites generally did not perform as well as ocean beaches, due to lower levels of flushing 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 Richmond Valley Council ocean beaches

Shark Bay was graded as Very Good in 2022–2023. Water quality at this beach has been consistently excellent for many years and is suitable for swimming almost all of the time.

Airforce Beach and Main Beach continued to be graded as Good in 2022–2023, a similar result to the previous year. While water quality at these beaches was suitable for swimming most of the time, elevated enterococci results were occasionally recorded in dry and wet weather conditions.

Estuarine beaches



Beach Suitability Grades for Richmond Valley Council estuarine beaches

Evans River, located downstream of Elm Street Bridge North, continued to be graded as Poor in 2022–2023, consistent with previous years. Elevated bacterial levels were recorded in dry weather and were regularly elevated during and following moderate to heavy rainfall. Despite this, water quality was often suitable for swimming during dry weather, with 60% of dry weather samples within the safe swimming limit. Discharge from a nearby large stormwater drain is also likely to impact water quality at this site when flowing.

Elm Street Bridge North in the Evans River was graded as Poor in 2022–2023, downgraded from Good in the previous year. Water quality was mostly suitable for swimming during dry weather, with 79% of samples within the safe swimming limit. Elevated bacterial levels were often recorded following rainfall.

It is recommended that swimming should be avoided during and for up to 3 days following rainfall or if there are signs of stormwater pollution such as discoloured water or floating debris.



Sampling sites and Beach Suitability Grades in Richmond Valley Council

Airforce Beach

Beach grade: G



Airforce Beach is located on a 31 km stretch of beach and is not patrolled by lifeguards.

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, from several potential sources of faecal contamination including stormwater.

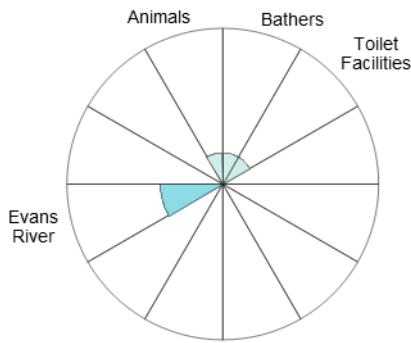
Enterococci levels increased slightly with increasing rainfall, occasionally exceeding the safe swimming limit after no rain, and after 10 mm or more of rain.

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

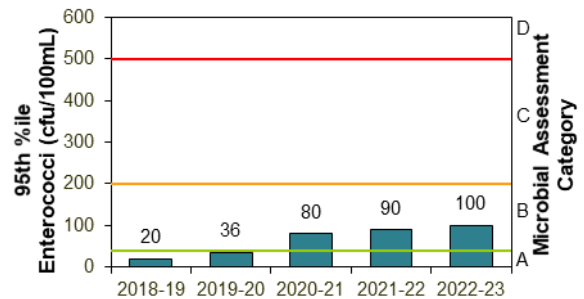
The site has been monitored since 2006.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Oct 2019 to Apr 2023	87%	100	Stable

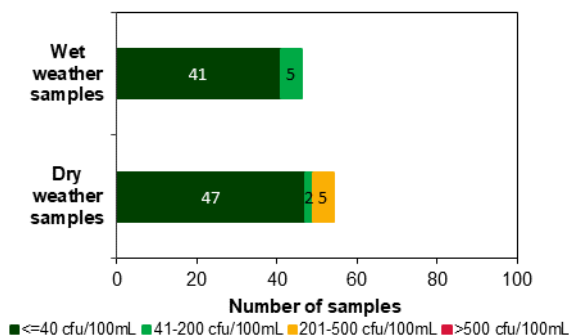
Sanitary inspection: Low



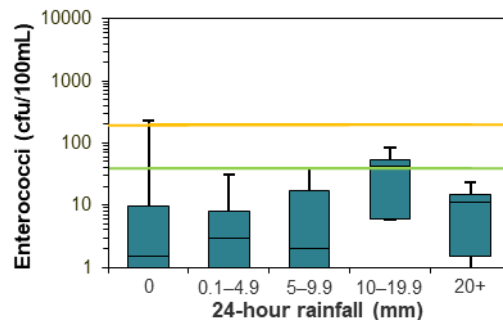
Microbial Assessment Category: B



Dry and wet weather water quality



Water quality in response to rainfall



Main Beach

Beach grade: G



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

Main Beach is located at the southern end of a 31 km stretch of beach and is patrolled during holiday periods.

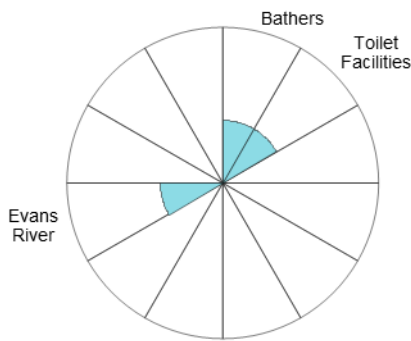
The Beach Suitability Grade of Good indicates microbial water quality is considered suitable for swimming most of the time but may be susceptible to pollution after rain, from several potential sources of faecal contamination including stormwater.

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

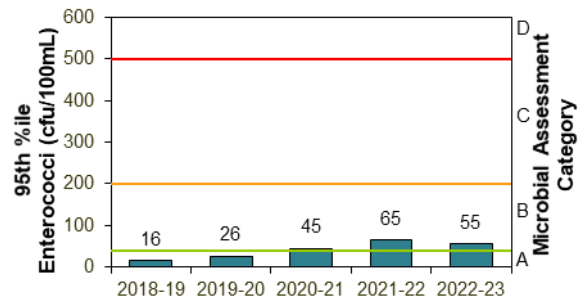
The site has been monitored since 2006.

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

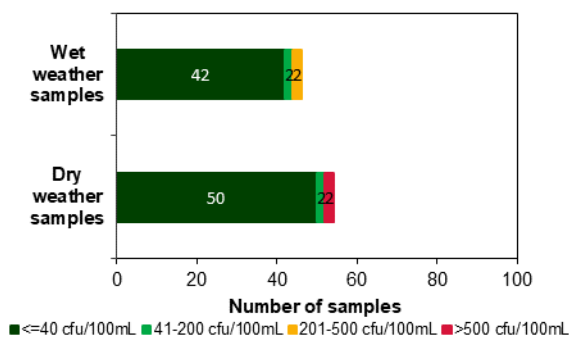
Sanitary inspection: Low



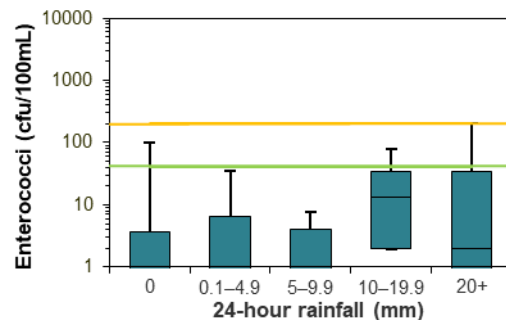
Microbial Assessment Category: B



Dry and wet weather water quality



Water quality in response to rainfall



Shark Bay

Beach grade:



Shark Bay is a small beach located between the southern entrance wall to the Evans River and the cliffs below Razorback Lookout 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.

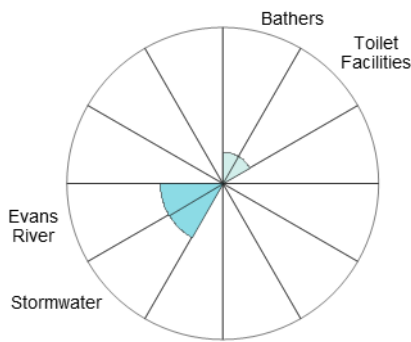
Enterococci levels increased slightly with increasing rainfall, occasionally exceeding the safe swimming limit in response to 5 mm or more of rainfall.

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

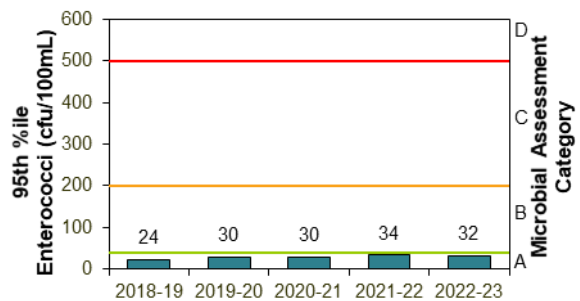
The site has been monitored since 2006.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Mar 2019 to Mar 2023	92%	100	Stable

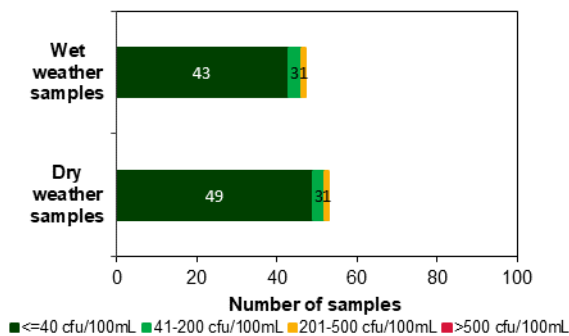
Sanitary inspection: Low



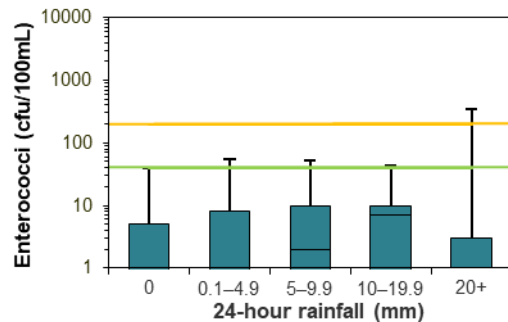
Microbial Assessment Category: A



Dry and wet weather water quality

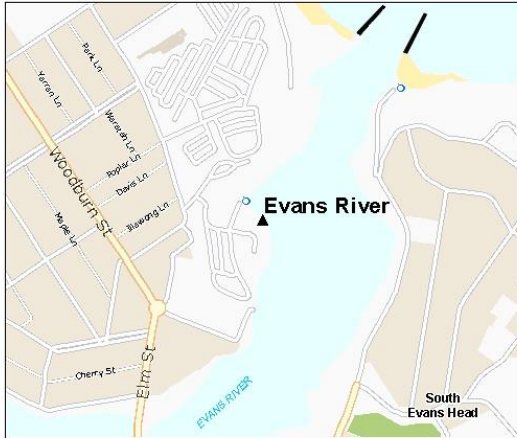


Water quality in response to rainfall



Evans River

Beach grade: P



Evans River sampling site is located upstream of the river mouth and near the caravan park.

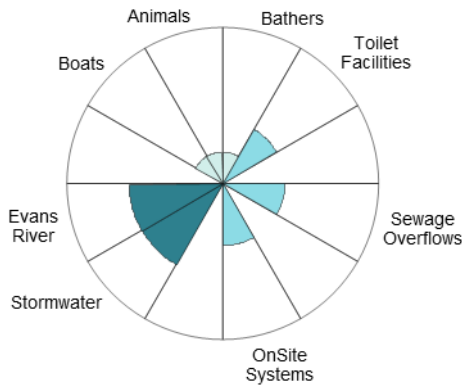
The Beach Suitability Grade of Poor indicates microbial water quality is susceptible to faecal pollution, particularly after rainfall and occasionally during dry weather conditions, with potential faecal contamination from upstream river sources and stormwater.

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

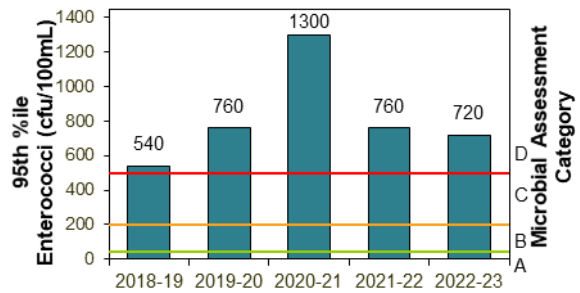
See 'How to read this report' for key to map. The site has been monitored since 2006.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Estuarine	May 2021 to Apr 2023	60%	100	Stable

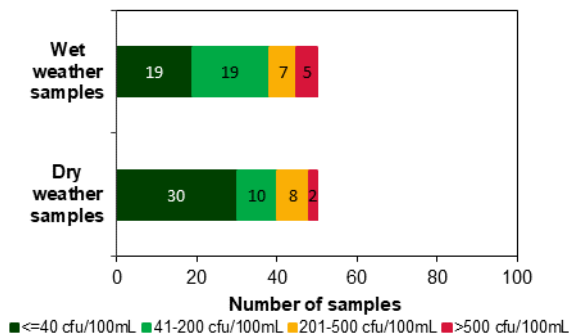
Sanitary inspection: Moderate



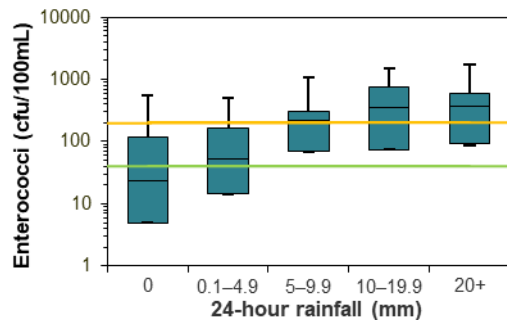
Microbial Assessment Category: D



Dry and wet weather water quality



Water quality in response to rainfall



Elm Street Bridge North (Evans River)

Beach grade: P



Elm Street Bridge North (Evans River) is located on the eastern side of Elm Street Bridge in the Evans River.

The Beach Suitability Grade of Poor 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.

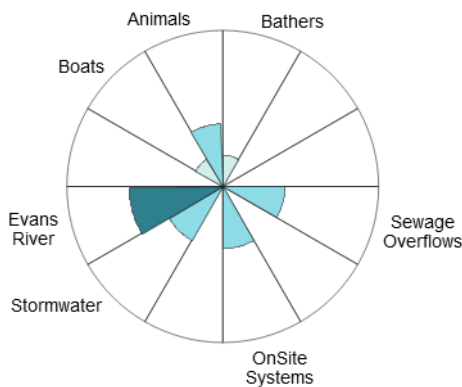
Enterococci levels increased with increasing rainfall, occasionally exceeding the safe swimming limit after no rain, and often in response to rain.

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

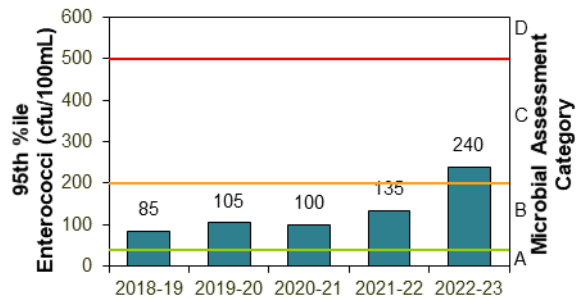
The site has been monitored since 2015.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Estuarine	Oct 2019 to Mar 2023	79%	100	Declined ↓

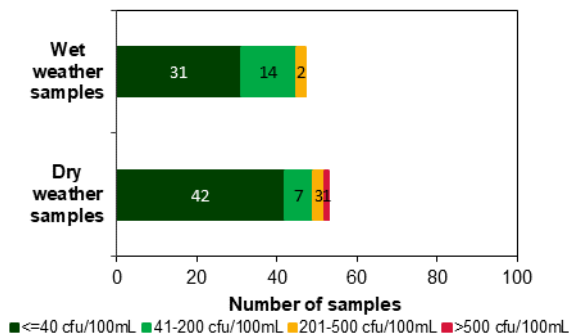
Sanitary inspection: Moderate



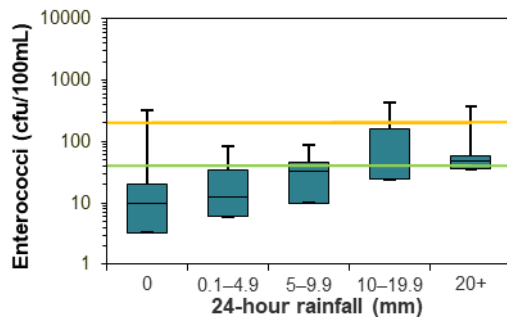
Microbial Assessment Category: C



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

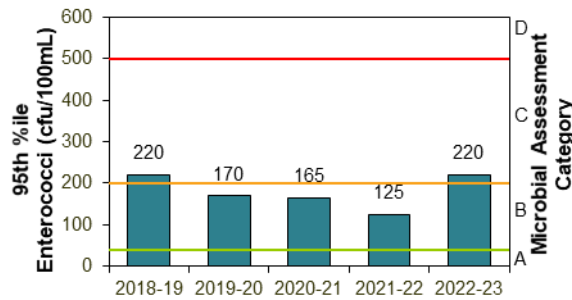
A provisional grade indicates the assessment is based on limited data collected during the assessment period and should not be compared to the beach grade from the previous year.

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

Microbial Assessment Category (MAC) chart

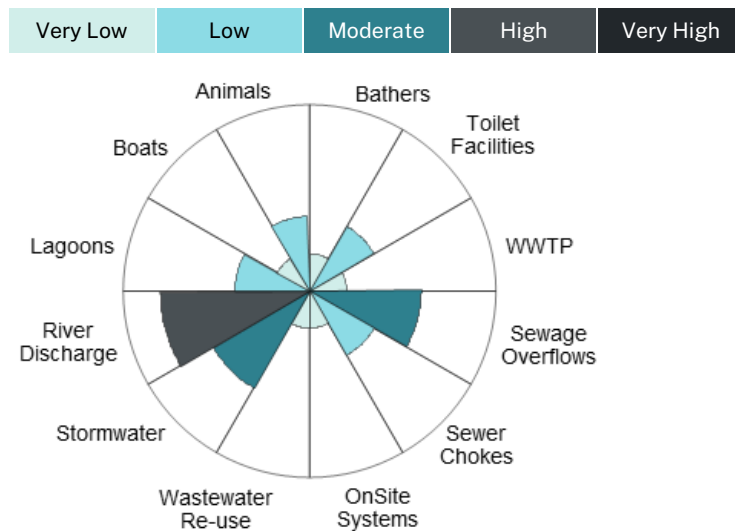
On each beach page, the MACs for the last 5 years are displayed on a simple bar chart. The MAC for the current year is based on enterococci data collected during the assessment period. The bars are labelled with the 95th

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

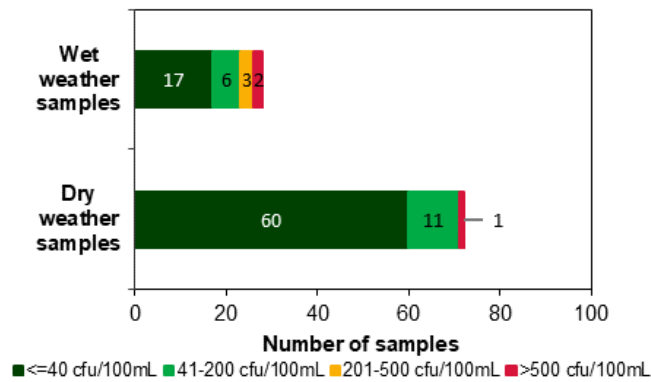
The results of the sanitary inspection for each swimming location are presented in a radar pie chart. The chart shows the likelihood that each identified pollution source will contribute to faecal contamination at a swimming site, as indicated by the size and colour of the segment, ranging from very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

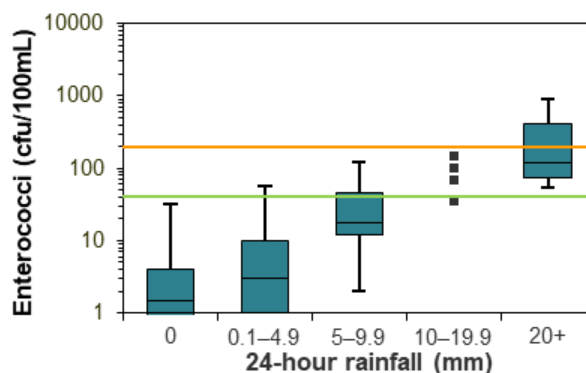
201 and 500 cfu/100 mL and greater than 500 cfu/100 mL. These categories reflect the Microbial Assessment Category thresholds and are coloured on the graph as dark green, light green, amber and red respectively.



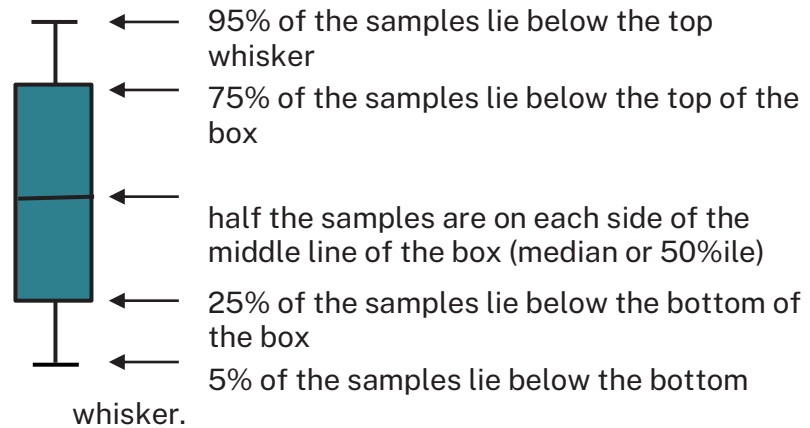
It is expected that swimming sites with lower levels of flushing will show some elevated bacterial results in dry weather samples (no rainfall in the previous 24 hours) due to the longer time needed to recover from a rainfall event. At some estuarine and lake/lagoon swimming locations the impacts of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

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More information

- [Beachwatch webpage](#)
- [Coastal management program progress](#)
- [Sanitary inspection of beaches](#)
- [Subscribe to daily beach pollution forecast emails](#)
- [WA Government environmental water publications](#)
- [Byron Shire Council's coast and waterways planning and projects](#)
- [Ballina Shire Council's Healthy Waterways program](#)
- [Ballina Shire Council Coast and Estuary Management](#)