NSW GOVERNMENT

DEPARTMENT OF PLANNING, INDUSTRY & ENVIRONMENT

State of the beaches 2019–2020

North Coast region

Beachwatch

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Contents

Recreational water quality has been monitored in the North Coast region since 2002 by Ballina Shire Council and Richmond Valley Council under the Department of Planning, Industry and Environment's Beachwatch Partnership Program. This report summarises the performance of 18 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 including Shaws Bay, North Creek and Evans River, and swimming sites in Lake Ainsworth.

In 2019–2020, 83% of swimming sites in the North Coast region were graded as Good or Very Good. These sites were suitable for swimming for most or almost all of the time. This is a slight improvement from the previous year, despite the wettest summer on record for the North Coast, with lake/lagoon and estuarine swimming locations more susceptible to impacts from wet weather conditions.

North Coast region summary 2019–2020

Shaws Bay East Arm, Photo: Tom McAully Rix/ Ballina Shire Council

Beach monitoring in NSW

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

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

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

Recreational water quality has been monitored in the North Coast region by Ballina Shire Council since 2002 and Richmond Valley Council since 2006.

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

Rainfall impacts

During 2019–2020, 18 swimming sites were monitored including ocean beaches, estuarine areas in 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 2019–2020 are based on water quality data collected over the last two to four years. Rainfall over this period has been diverse:

- 2016–2017: the wettest March on record for many coastal areas and intense storm activity over summer
- 2017–2018: variable rainfall with prolonged dry periods and mostly wet summer with significant rainfall events
- 2018–2019: rainfall was average to below average, except for a wet spring and isolated rain events
- 2019–2020: average to below average rainfall except for the wettest summer 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.

While rainfall on the North Coast was generally below average over the winter months, there were moderate rainfall events, notably during the last week of June 2019, with Ballina and Evans Head recording 150 mm and 277 mm respectively over four days from 24 to 28 June.

Spring was dry on the North Coast with low levels of rainfall recorded. Ballina and Evans Head received their lowest total spring rainfall on record, with 15 mm and 40 mm from September to November 2019.

There were record summer rainfall totals on the North Coast, with Ballina and Evans Head recording 935 and 701 mm of rain from December 2019 to February 2020. It was the wettest February on record for Ballina and Evans Head, with 668 mm and 444 mm respectively, recorded for the month. Heavy rainfall in the first half of February caused flooding on numerous northern rivers.

Despite a return to below average rainfall totals for March and April 2020, several days recorded moderate to heavy rain totals.

Algal blooms

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

Water NSW reported several occurrences of freshwater blue-green algal blooms impacting Lake Ainsworth in May 2019, and at times during November 2019 to March 2020. While freshwater 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 Council 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 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 North Coast region

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

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

Ballina Shire Council

85%
swimming sites graded Good or Very Good

Overall results

Eleven of the 13 swimming sites were graded as Very Good or Good in 2019–2020, an improvement in performance to the previous year.

Percentage of sites graded as Very Good or Good:

- 2019–2020: 85%
- 2018–2019: 77%
- 2017–2018: 77%
- 2016–2017: 90%.

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

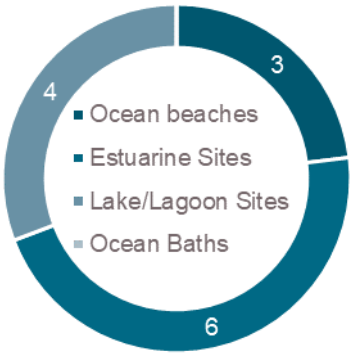
Thirteen swimming sites were monitored by Ballina Shire Council. Samples were collected weekly between November and February and sampling and laboratory analysis was fully funded by the council.

Best beaches

Seven Mile Beach and Lighthouse Beach.

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

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.



Site types in Ballina Shire Council

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 three 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

All three ocean beaches were graded as Very Good or Good in 2019–2020.

Seven Mile Beach and Lighthouse Beach continued to be graded as Very Good, similar to previous years. These beaches had excellent water quality and were suitable for swimming almost all of the time.

Shelly Beach was graded as Good. Water quality at this site was of a high standard and suitable for swimming most of the time. While water quality at Shelly Beach has performed consistently well over the past five years, there are several potential sources of faecal contamination nearby.

Estuarine beaches

Beach Suitability Grades for Ballina Shire Council estuarine beaches

All six estuarine swimming locations continued to be graded as Good in 2019–2020: Shaws Bay North, Shaws Bay East, Shaws Bay East Arm, Shaws Bay East Beach, Shaws Bay West and The Serpentine. Water quality at Shaws Bay East Beach and The Serpentine was excellent during dry weather, with all samples within the safe swimming limit. The four other swimming sites in Shaws Bay were frequently suitable for swimming in dry weather, with 90% or greater of dry weather samples within the safe swimming limit.

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 three 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 East and Lake Ainsworth South were graded as Good in 2019–2020.

Lake Ainsworth East was upgraded to Good from Poor in the previous year due to improved microbial water quality. The site was mostly suitable for swimming during dry weather, with 85% of dry weather samples within the safe swimming limit. Microbial water quality at this site remains close to the threshold between Good and Poor and has changed between the grades several times over the last five years. Water quality at Lake Ainsworth South was frequently

suitable for swimming during dry weather, with 97% of dry weather samples within the safe swimming limit. Elevated enterococci levels were regularly recorded at these sites after heavy rainfall.

Lake Ainsworth North and Lake Ainsworth West were graded as Poor, a similar result to the previous year. Elevated bacteria levels were recorded at these lake swimming sites during dry and wet weather conditions. Despite the poor grades, between 71% and 73% of dry weather samples were within the safe swimming limit. These sites may be impacted by a number of significant potential sources of faecal contamination including stormwater, and have low levels of flushing. Since 2019, council has been investigating the source of microbial contamination with additional samples collected for faecal sterol analysis at sites within Lake Ainsworth, to identify if elevated bacteria levels are from human or other animal sources.

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

Management

Ballina Shire Council

Patrolled ocean beach
Photo: Beachwatch/EES, DPIE

Ballina Shire Council is preparing coastal management programs (CMPs) for Lake Ainsworth and North Creek, using funding received in 2018 under the NSW Government's Coastal and Estuary Grants Program. Both CMP projects will investigate water quality issues such as bacterial contamination sources. The Lake Ainsworth CMP will also address the occurrence of blue-green algal blooms and best management practice to reduce the frequency of blooms.

Lake Ainsworth is in Stage 4 of the CMP, with the final program due to be submitted to the Minister for approval in August 2020. Once approved the CMP will be progressively implemented and will achieve further environmental improvements at Lake Ainsworth.

The North Creek CMP is in Stage 1, which involves collation of existing information, preliminary risk assessment, implementation of a community communication portal, development of a community consultation strategy, and scoping of technical studies to fill key information gaps.

Council has been progressively undertaking actions in recent years that are identified in the Shaws Bay Coastal Zone Management Plan (CZMP). Many of the actions and projects address a suite of issues, which aim to balance community

amenity and safety while promoting ecological resilience. The improvements include significant construction works along the western and eastern foreshore to stabilise bank erosion, development of a formal car park, construction of a shared pathway, shower and picnic facilities and upgraded stormwater infrastructure.

In 2019–2020, council plans to undertake further foreshore improvement and dredging works in Shaws Bay to address long-term sedimentation issues and improve tidal circulation and water quality within the bay. The works will create improved swimming and recreational areas in Shaws Bay. The new swimming area aims to have improved water circulation and flushing and be more suitable as an additional recreational swimming site.

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

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

Ballina Shire Council is currently working with Rous County Council and other catchment councils to transition the certified Richmond River CZMP to a CMP. Within the Richmond River catchment, there are several priority projects planned in the CZMP that will likely transition to the new CMP, including catchment riparian planting programs and floodplain management. Improved water quality monitoring will also begin in June 2020. It is anticipated that the implementation of these actions will lead to gradual improved water quality in the Richmond River, and subsequently to the associated recreational swimming sites and beaches.

Under the previous *Coastal Protection Act 1979*, councils developed a **Coastal Zone Management Plan** (CZMP) to address coastal issues. Councils can continue to implement priority actions from certified CZMPs with funding assistance from the NSW Government's Coastal and Estuary Grants Program until 2021.

In 2018, council approved the $1.8 million Lake Ainsworth Precinct project. The project includes construction of sealed roadways, including the recently upgraded and sealed access road to Camp Drewe and Seven Mile Beach, new access pathways and landscaping on the eastern, southern and western foreshores of the lake. While these enhancements will improve the public amenity, they will also continue to positively affect water quality by improving erosion control, upgrades to stormwater management, landscaping, grassed areas, bank rehabilitation and impervious parking areas.

Council has prohibited dogs on the eastern side of Lake Ainsworth to maintain and preserve the environmental health and amenity of the sensitive ecological location by reducing the amount of dog faeces.

Since 2019, Ballina Shire Council has collected additional samples from several locations within Lake Ainsworth. The samples will be tested for faecal sterols to identify if elevated enterococci are from human or animal sources. This information will be used to evaluate the risks and guide management actions to improve water quality.

Ballina Shire Council has placed precautionary signage at Lake Ainsworth advising that the area may be affected by blue-green algal blooms. This signage is only displayed when algal levels are elevated and warnings are necessary, as per Water NSW algae guidelines.

If sewage contamination is suspected at a swimming site, warnings are displayed advising that the area is unsuitable for swimming. Warnings remain in place until testing indicates the water quality is again suitable for swimming. Media releases are issued and council's website is updated during periods of heavy rain and minor flooding to advise which swimming sites are likely to be contaminated and impacted by stormwater runoff.

Lake Ainsworth South
Photo: Tom McAully Rix/ Ballina Shire Council

Council has implemented and maintains modern wastewater treatment works located at West Ballina and Lennox Head. The treatment works provide recycled wastewater via dual reticulation to properties in Lennox Head, Skennars Head, East Ballina and Cumbalum. Ballina's wastewater treatment plant is also currently supplying bulk recycled water for irrigation purposes to sports fields, Ballina Racecourse and the Ballina Golf Course. The treatment and use of recycled water greatly reduces the release of treated wastewater to the environment.

Council has also recently completed significant sewage pumping station upgrades which include emergency storage tanks to pump stations located at Shelly Beach and The Serpentine. The emergency storage tanks will reduce the possibility of accidental release of untreated sewage into the local waterways by capturing unforeseen surcharges or spills in the event of power outage, pump or mains failure.

Council has developed and implements an onsite sewage management (OSSM) strategy and guidelines. The OSSM strategy and guidelines aim to ensure OSSM systems are effectively managed, and there are no adverse effects to public and environmental health in the design, installation and maintenance of these systems.

Sampling sites and Beach Suitability Grades in Ballina Shire Council

Seven Mile Beach

Beach grade: VG

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

Seven Mile Beach extends for over eight kilometres and is patrolled over the summer period.

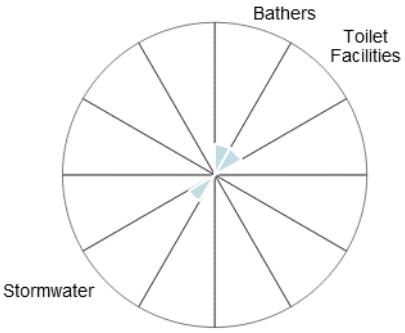
The Beach Suitability Grade of Very Good indicates microbial water quality is considered suitable for swimming almost all the time, with few potential sources of faecal contamination.

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

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 2015 to Feb 2020	98%	96	Stable

Sanitary inspection: Low



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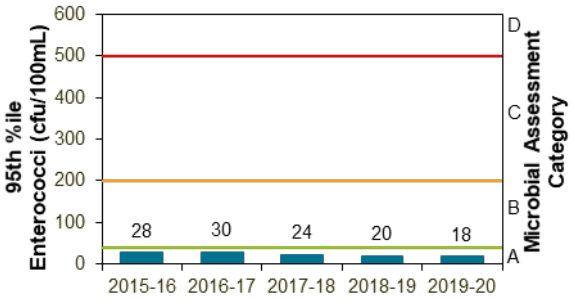
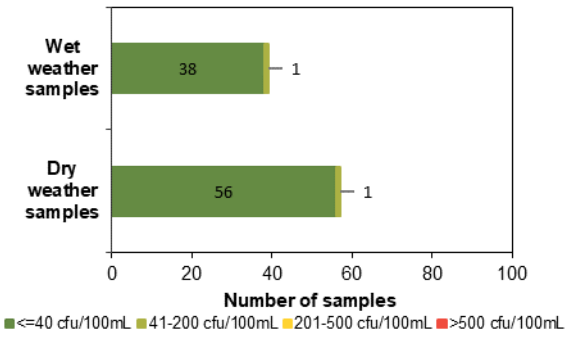
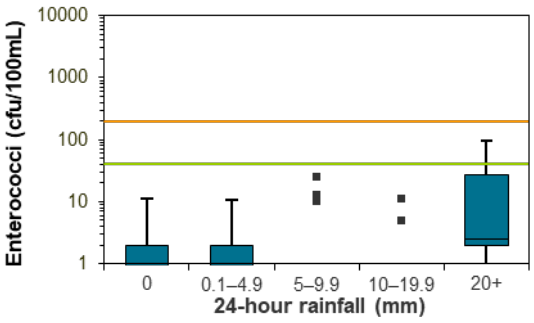


Dry and wet weather water quality



Water quality in response to rainfall



Lake Ainsworth North

Beach grade: P

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

Lake Ainsworth North is located at the northern end of Lake Ainsworth, near a pontoon.

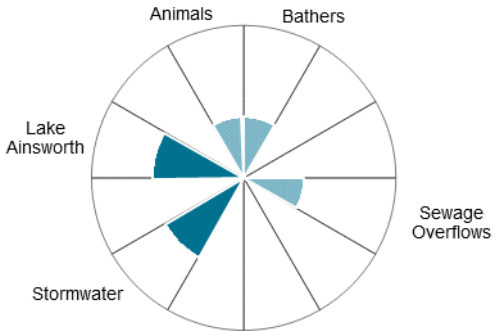
The Beach Suitability Grade of Poor indicates microbial water quality is susceptible to faecal pollution, particularly after rainfall and occasionally during dry weather conditions, with potential faecal contamination from stormwater and elsewhere within the lake.

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

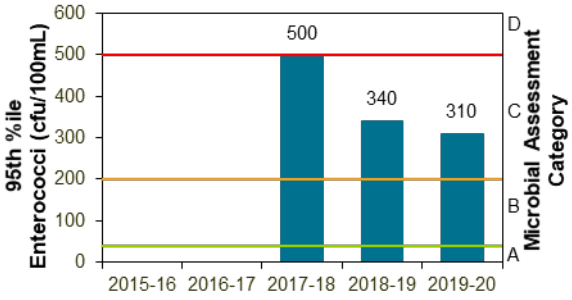
The site has been monitored since 2016.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Lake/Lagoon	Jan 2017 to Feb 2020	73%	100	Stable

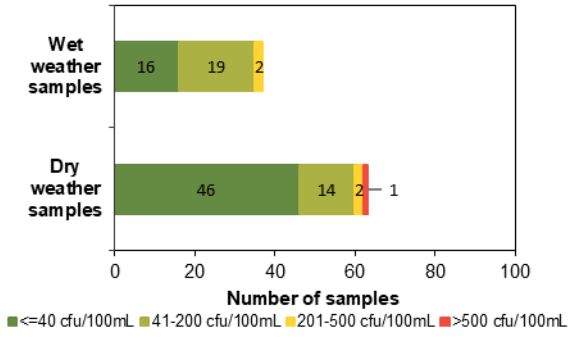
Sanitary inspection: Moderate



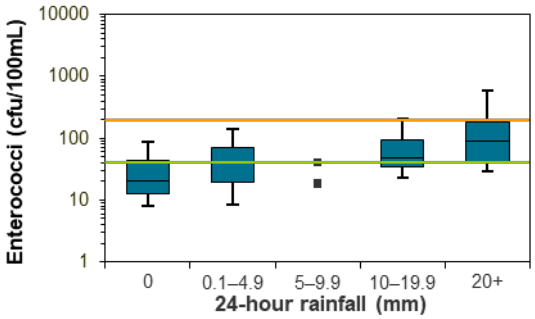
Microbial Assessment Category: C



Dry and wet weather water quality



Water quality in response to rainfall



Lake Ainsworth East

Beach grade: G

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.

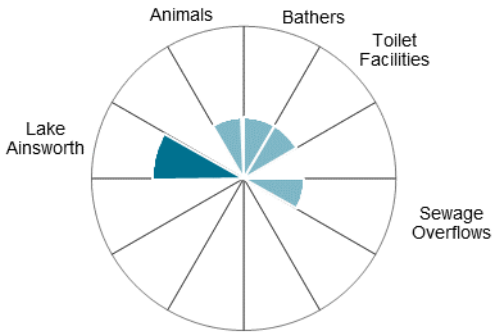
The Beach Suitability Grade of Good indicates microbial water quality is considered suitable for swimming most of the time but may be susceptible to pollution after rain, with several potential sources of faecal contamination including the lake itself.

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.

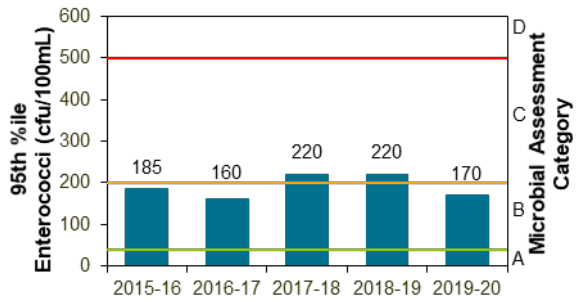
The site was monitored from 2002 until 2009, and since 2012.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Lake/Lagoon	Feb 2017 to Feb 2020	85%	100	Improved

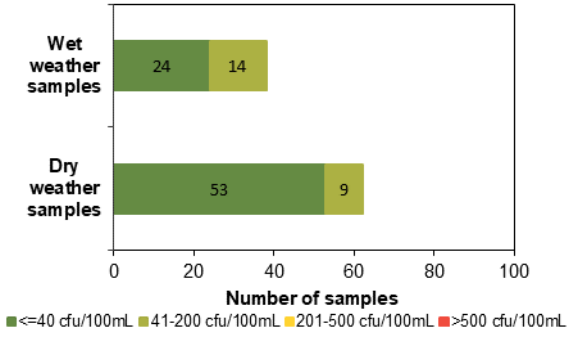
Sanitary inspection: Moderate



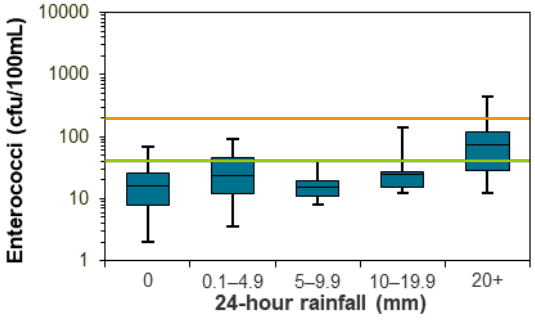
Microbial Assessment Category: B



Dry and wet weather water quality



Water quality in response to rainfall



Lake Ainsworth South

Beach grade: G

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

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

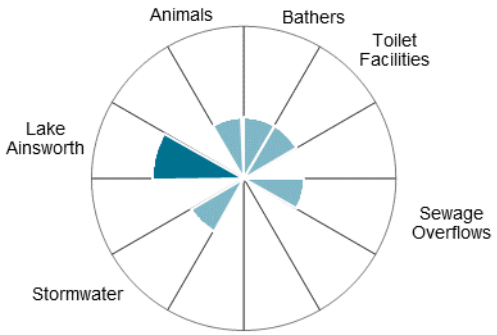
The Beach Suitability Grade of Good indicates microbial water quality is considered suitable for swimming most of the time but may be susceptible to pollution after rain, with several potential sources of faecal contamination including the lake itself.

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

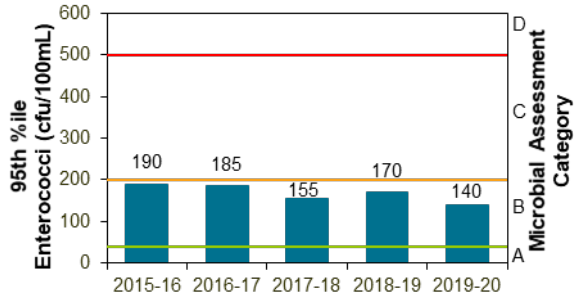
The site was monitored from 2002 until 2009, and since 2012.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Lake/Lagoon	Feb 2017 to Feb 2020	97%	100	Stable

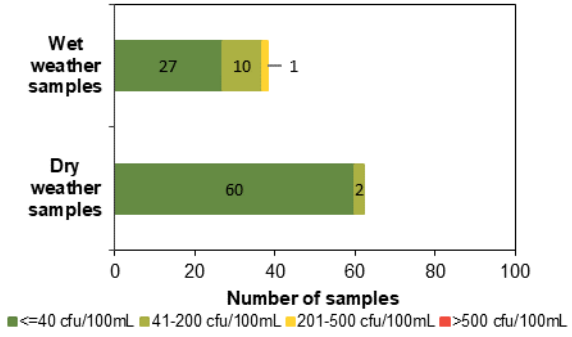
Sanitary inspection: Moderate



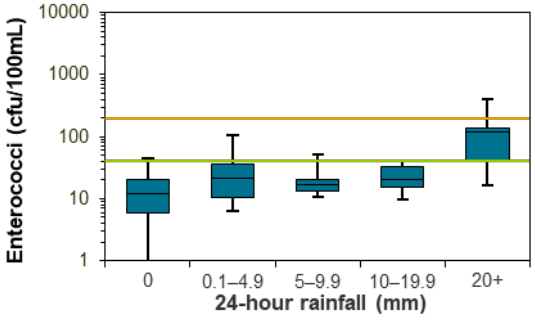
Microbial Assessment Category: B



Dry and wet weather water quality



Water quality in response to rainfall



Lake Ainsworth West

Beach grade: P

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

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

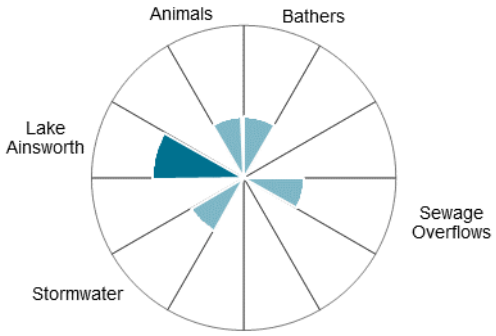
The Beach Suitability Grade of Poor indicates microbial water quality is susceptible to faecal pollution, particularly after rainfall and often during dry weather conditions, with potential faecal contamination from elsewhere within the lake.

Enterococci levels generally increased with increasing rainfall, often exceeding the safe swimming limit across most rainfall categories, and regularly after 10 mm or more of rain.

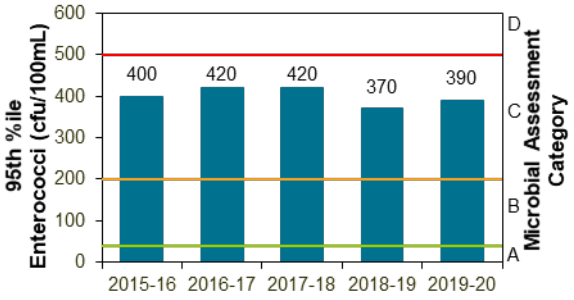
The site has been monitored since 2002.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Lake/Lagoon	Feb 2017 to Feb 2020	71%	100	Stable

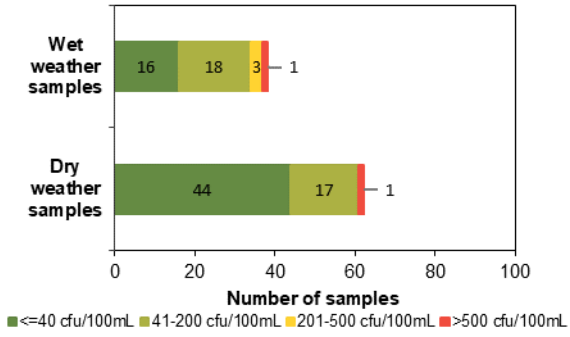
Sanitary inspection: Moderate



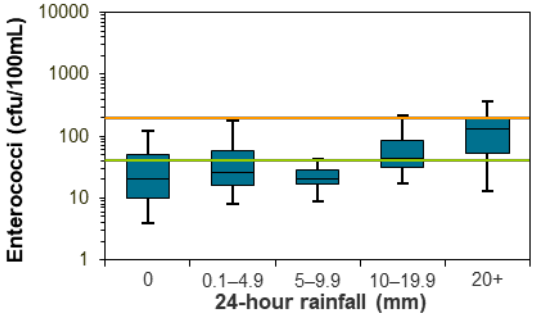
Microbial Assessment Category: C



Dry and wet weather water quality



Water quality in response to rainfall



Shelly Beach

Beach grade: G

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

Shelly Beach is approximately 700 metres long and is patrolled during holiday periods.

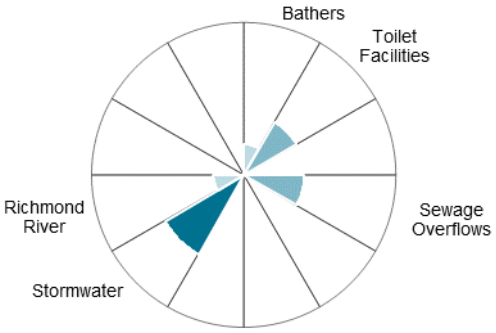
The Beach Suitability Grade of Good indicates microbial water quality is considered suitable for swimming most of the time but may be susceptible to pollution after rain, from several potential sources of faecal contamination including stormwater.

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

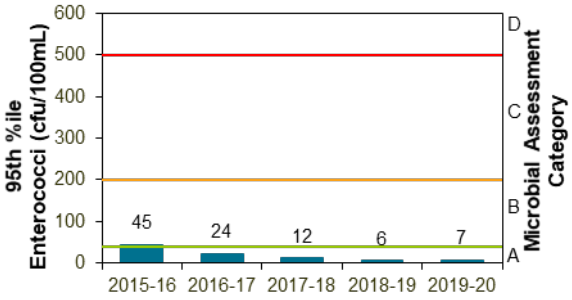
The site has been monitored since 2002.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Nov 2015 to Feb 2020	98%	96	Stable

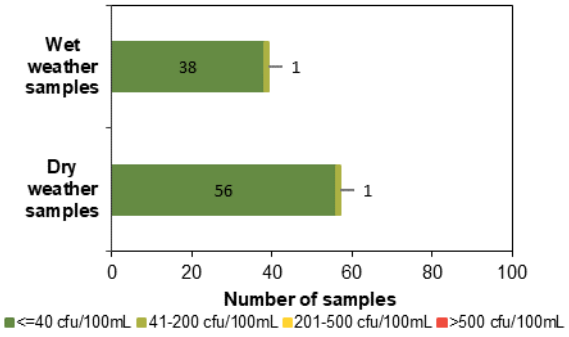
Sanitary inspection: Moderate



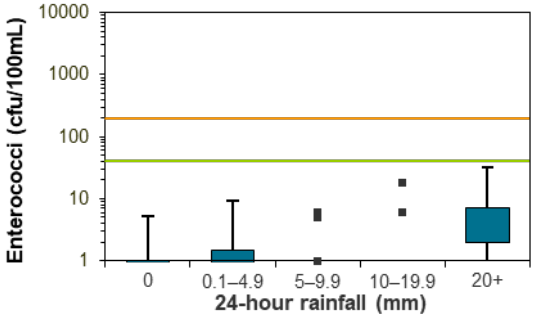
Microbial Assessment Category: A



Dry and wet weather water quality



Water quality in response to rainfall



Lighthouse Beach

Beach grade: VG

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

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

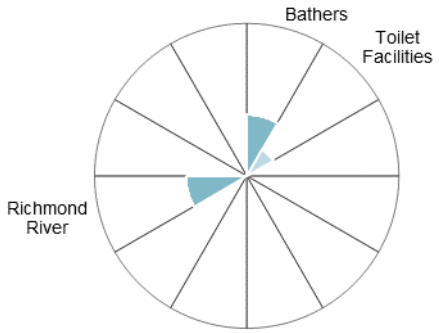
The Beach Suitability Grade of Very Good indicates microbial water quality is considered suitable for swimming almost all of the time, with few potential sources of faecal contamination.

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

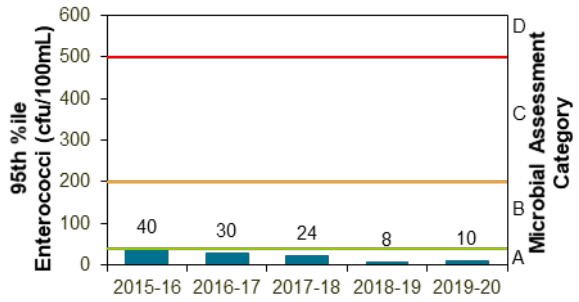
The site was monitored in 2002 until 2003, and since 2009.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Nov 2015 to Feb 2020	98%	96	Stable

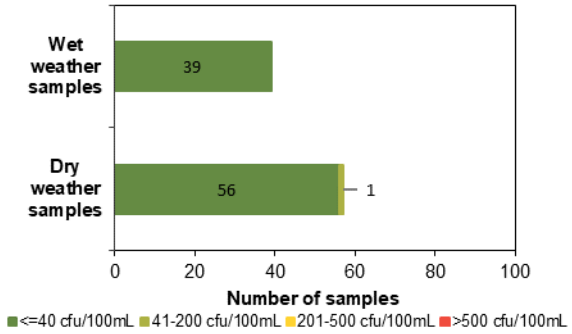
Sanitary inspection: Low



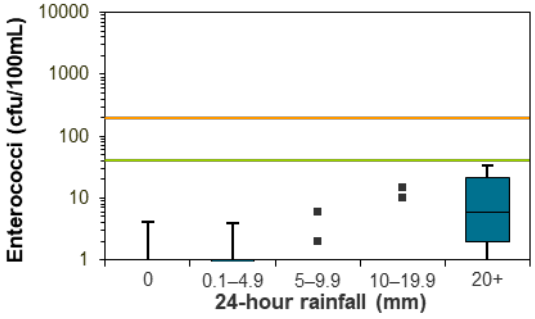
Microbial Assessment Category: A



Dry and wet weather water quality



Water quality in response to rainfall



Shaws Bay North

Beach grade: G

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

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

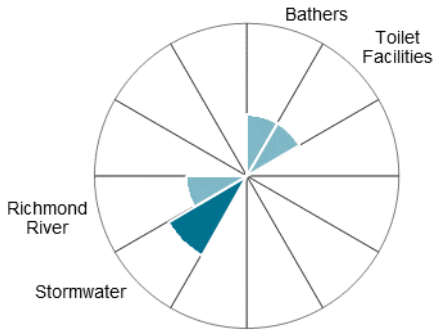
The Beach Suitability Grade of Good indicates microbial water quality is considered suitable for swimming most of the time but may be susceptible to pollution after rain, with several potential sources of faecal contamination including stormwater.

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

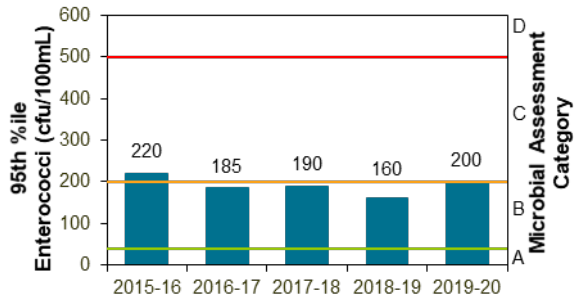
The site was monitored from 2002 until 2009, and since 2012.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Estuarine	Jan 2017 to Feb 2020	92%	100	Stable

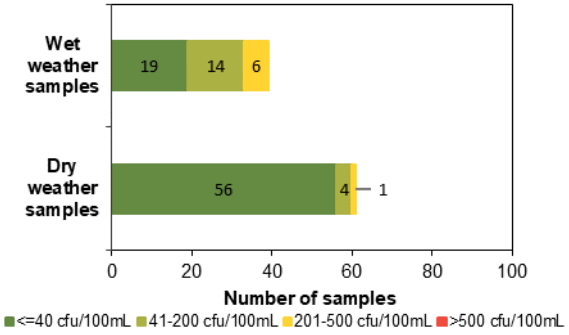
Sanitary inspection: Moderate



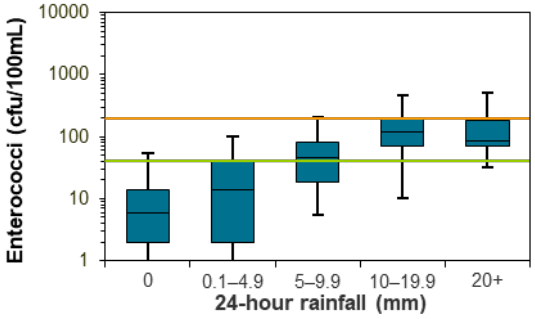
Microbial Assessment Category: B



Dry and wet weather water quality

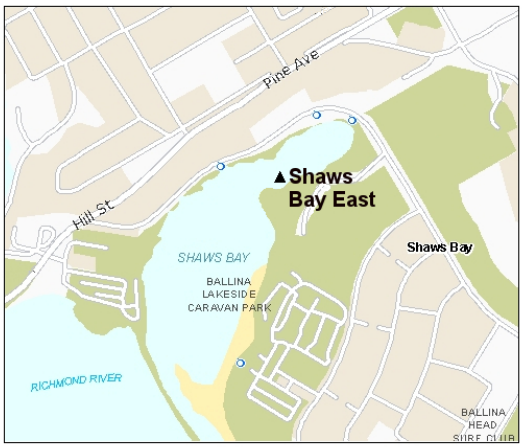


Water quality in response to rainfall



Shaws Bay East

Beach 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.

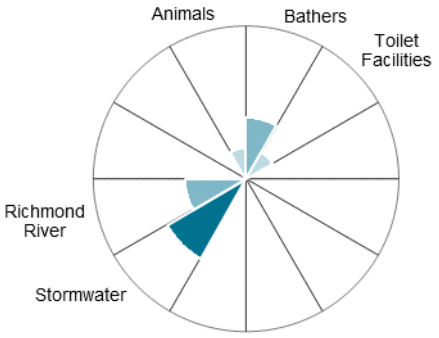
The Beach Suitability Grade of Good indicates microbial water quality is considered suitable for swimming most of the time but may be susceptible to pollution after rain, with several potential sources of faecal contamination including stormwater.

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

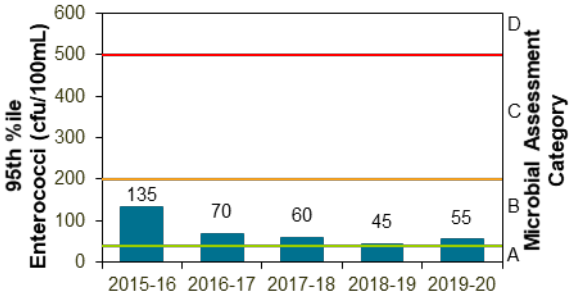
The site has been monitored since 2002.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Estuarine	Jan 2017 to Feb 2020	98%	100	Stable

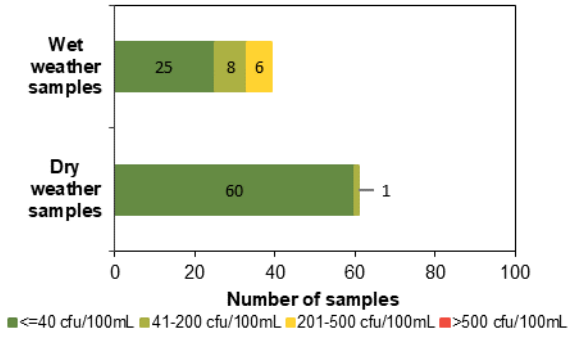
Sanitary inspection: Moderate



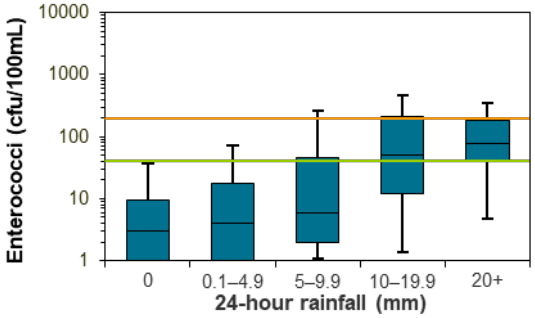
Microbial Assessment Category: B



Dry and wet weather water quality

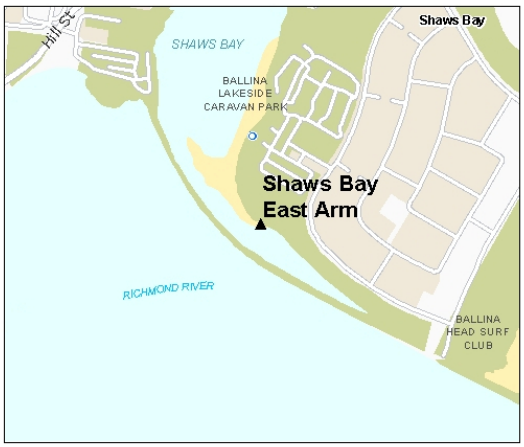


Water quality in response to rainfall



Shaws Bay East Arm

Beach grade: G



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

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.

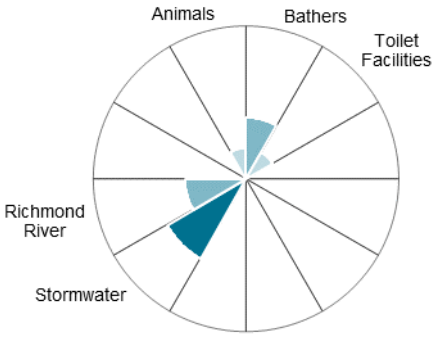
The Beach Suitability Grade of Good indicates microbial water quality is considered suitable for swimming most of the time but can be susceptible to pollution after rain, with several potential sources of faecal contamination including stormwater.

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

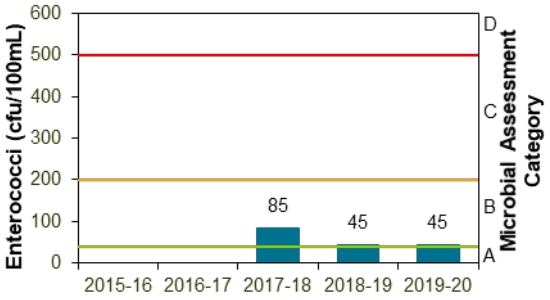
The site has been monitored since 2014.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Estuarine	Jan 2017 to Feb 2020	97%	100	Stable

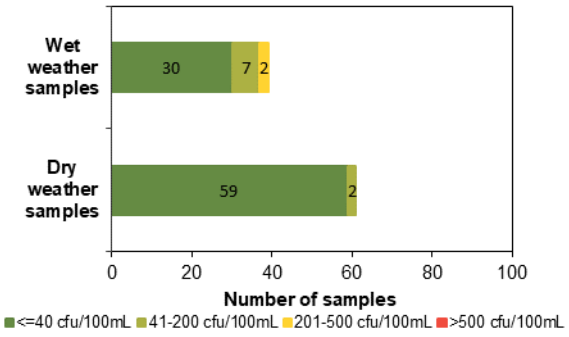
Sanitary inspection: Moderate



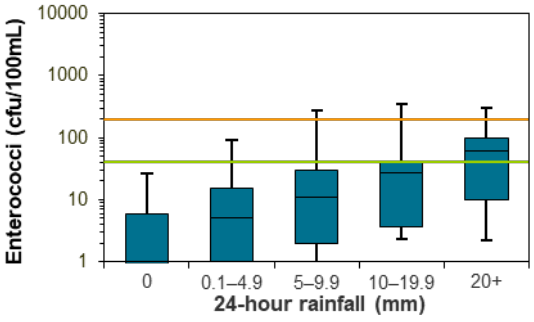
Microbial Assessment Category: B



Dry and wet weather water quality



Water quality in response to rainfall



Shaws Bay East Beach

Beach grade: G

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

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.

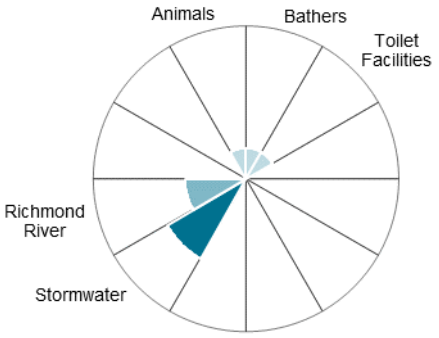
The Beach Suitability Grade of Good indicates microbial water quality is considered suitable for swimming most of the time but can be susceptible to pollution after rain, with several potential sources of faecal contamination including stormwater.

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

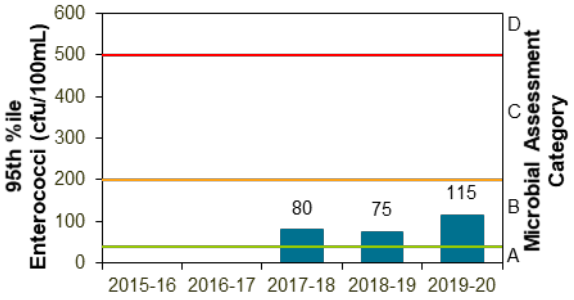
The site has been monitored since 2014.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Estuarine	Jan 2017 to Feb 2020	100%	100	Stable

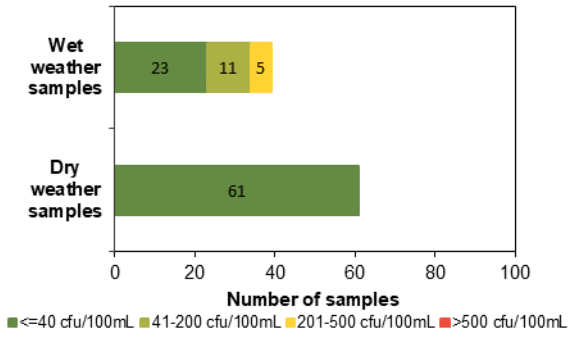
Sanitary inspection: Moderate



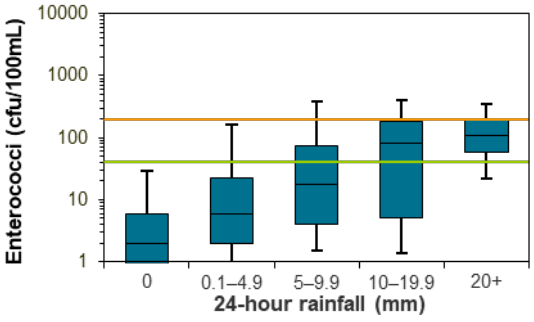
Microbial Assessment Category: B



Dry and wet weather water quality

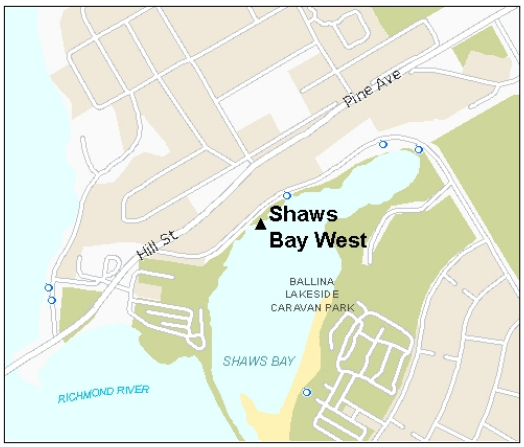


Water quality in response to rainfall



Shaws Bay West

Beach grade: G



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

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

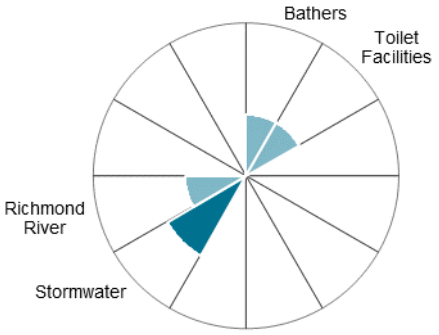
The Beach Suitability Grade of Good indicates microbial water quality is considered suitable for swimming most of the time but may be susceptible to pollution after rain, with several potential sources of faecal contamination including stormwater.

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

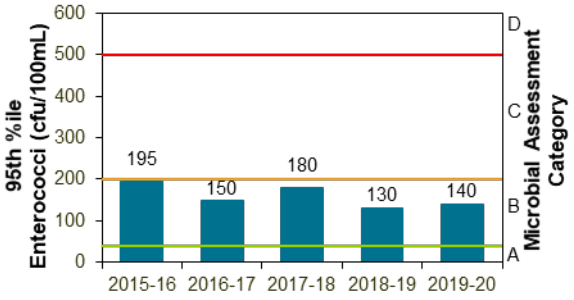
The site was monitored from 2002 until 2009, and since 2012.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Estuarine	Jan 2017 to Feb 2020	90%	100	Stable

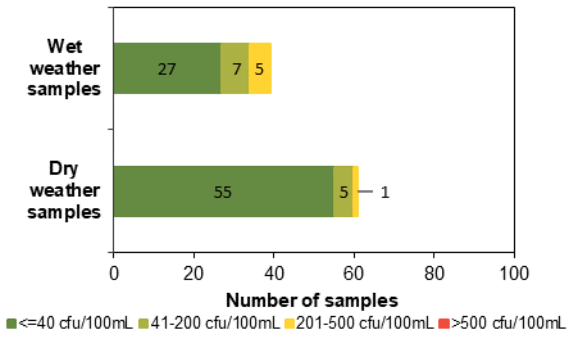
Sanitary inspection: Moderate



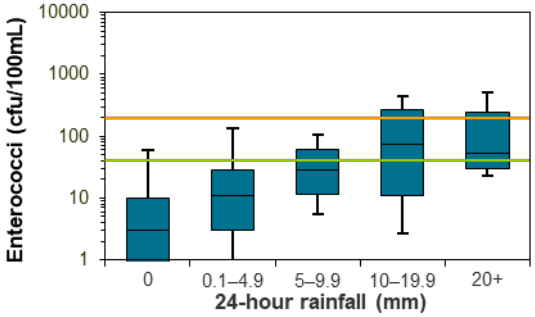
Microbial Assessment Category: B



Dry and wet weather water quality

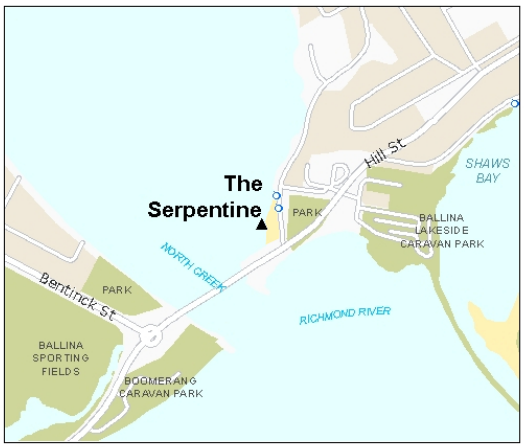


Water quality in response to rainfall



The Serpentine

Beach grade: G



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

The Serpentine is situated in North Creek, a tributary of the Richmond River.

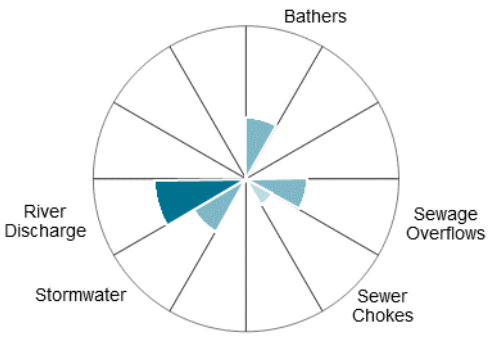
The Beach Suitability Grade of Good indicates microbial water quality is considered suitable for swimming most of the time but may be susceptible to pollution after rain, with several potential sources of faecal contamination including river discharge.

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

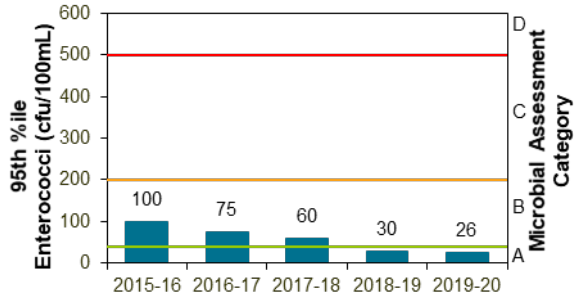
This site has been monitored since 2002.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Estuarine	Sep 2015 to Feb 2020	100%	100	Stable

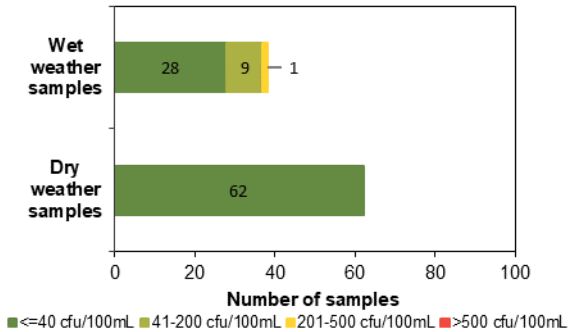
Sanitary inspection: Moderate



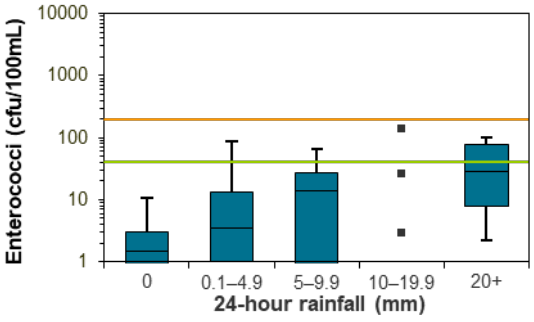
Microbial Assessment Category: A



Dry and wet weather water quality



Water quality in response to rainfall



Richmond Valley Council

80%
swimming sites graded Good or Very Good

Overall results

Four of the five swimming sites were graded as Very Good or Good in 2019–2020. This result is a similar performance to the previous year.

Percentage of sites graded as Very Good or Good:

- 2019–2020: 80%
- 2018–2019: 80%
- 2017–2018: 80%
- 2016–2017: 100%.

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

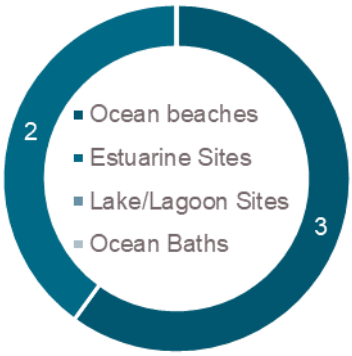
Five swimming sites were monitored by Richmond Valley Council. All sampling and laboratory analysis was fully funded by the council.

The three ocean beaches and Elm Street Bridge North were sampled weekly from October to April. Evans River is sampled weekly throughout the year.

Best beaches

Airforce Beach, Main Beach and Shark Bay.

These sites had excellent water quality and were 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 three 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

All three ocean beaches were graded as Very Good: Airforce Beach, Main Beach and Shark Bay. Water quality at these beaches has been consistently excellent for many years and is suitable for swimming almost all of the time.

Estuarine beaches

Beach Suitability Grades for Richmond Valley Council estuarine beaches

Elm Street Bridge North in the Evans River, continued to be graded as Good in 2019–2020, a similar result to the previous three years. Water quality was frequently suitable for swimming during dry weather, with 90% of samples within the safe swimming limit. Elevated enterococci levels were mostly recorded following rainfall.

Evans River, located downstream of Elm Street Bridge North, was graded as Poor in 2019–2020, the same as previous years. Water quality at this site was often suitable for swimming during dry weather conditions, with 59% of samples within the safe swimming limit. However, elevated enterococci levels were recorded in dry weather, and were regularly elevated during and following moderate to heavy rainfall. Discharge from a nearby large stormwater drain is also likely to impact water quality at this site when flowing. Further investigation is required to show the scale and extent of the problem, and the source of microbial contamination.

Management

Patrolled ocean beach
Photo: Beachwatch/EES, DPIE

Richmond Valley Council

Richmond Valley Council is responsible for four wastewater treatment plants (WWTPs). These are located at Casino, Coraki, Evans Head and Rileys Hill. The plants in Evans Head and Rileys Hill are fitted with UV disinfection. The Evans Head treatment system continues to service the Broadwater/North Woodburn area.

There are approximately 3800 onsite sewage management systems throughout the Richmond Valley Council local government area. Council runs an audit program of these systems, inspecting approximately 150 each year to ensure they are not polluting the environment or creating a health

Evans River and Main Beach
Photo: Beachwatch/EES, DPIE

risk. High risk sites with systems close to sensitive receiving environments such as waterways are prioritised. Pre-purchase inspections of these systems are also undertaken upon request from the purchaser/vendor.

Richmond Valley Council has been active in the Evans Head area investigating and issuing numerous prevention notices in regard to poor land-use practices on or near the riverbank that will help improve the water quality of the Evans River and its tributaries.

Sampling sites and Beach Suitability Grades in Richmond Valley Council

Airforce Beach

Beach grade: VG

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

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

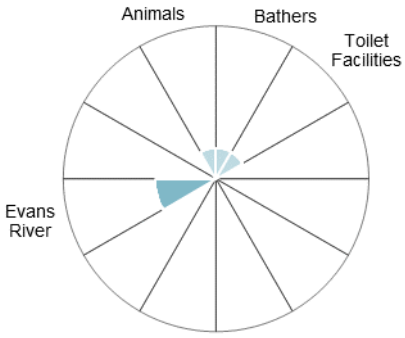
Enterococci levels increased slightly with increasing rainfall, occasionally exceeding the safe swimming limit after 10 mm or more of rain.

The site has been monitored since 2006.

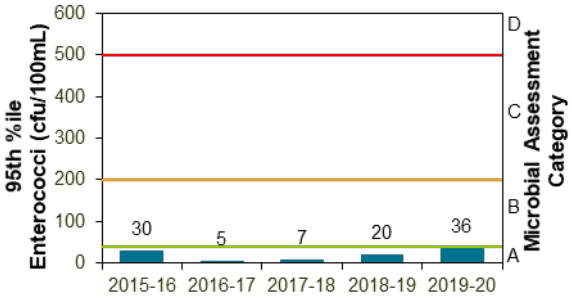
See 'How to read this report' for key to map.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Oct 2016 to Apr 2020	95%	100	Stable

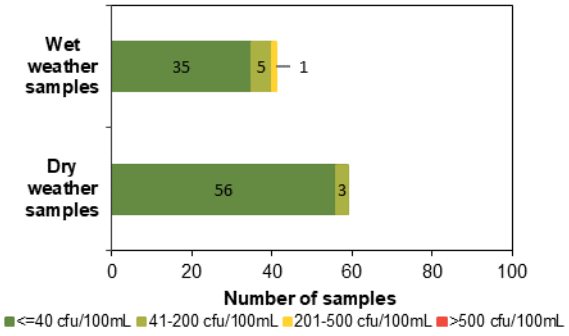
Sanitary inspection: Low



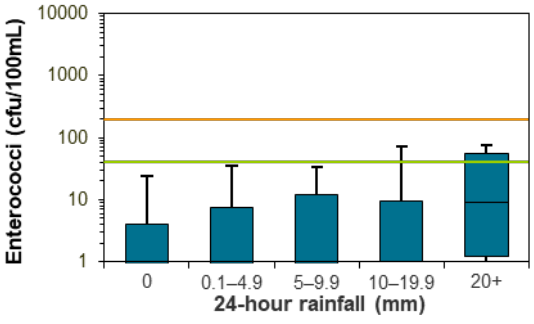
Microbial Assessment Category: A



Dry and wet weather water quality



Water quality in response to rainfall



Main Beach

Beach grade: VG

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

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

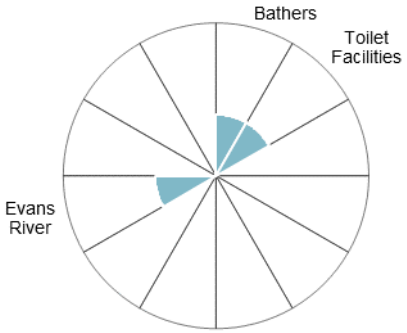
The Beach Suitability Grade of Very Good indicates microbial water quality is considered suitable for swimming almost all of the time, with few potential sources of faecal contamination.

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

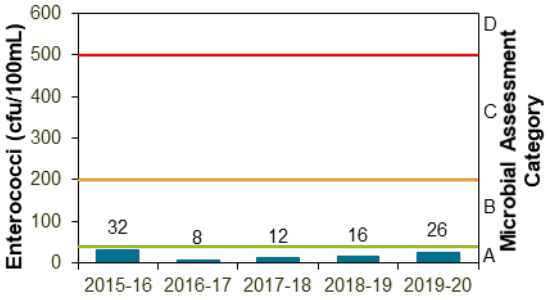
The site has been monitored since 2006.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Oct 2016 to Apr 2020	98%	100	Stable

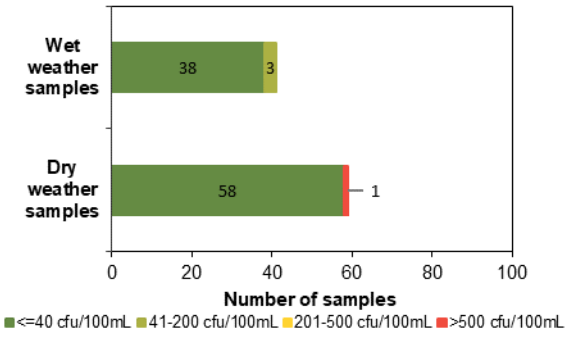
Sanitary inspection: Low



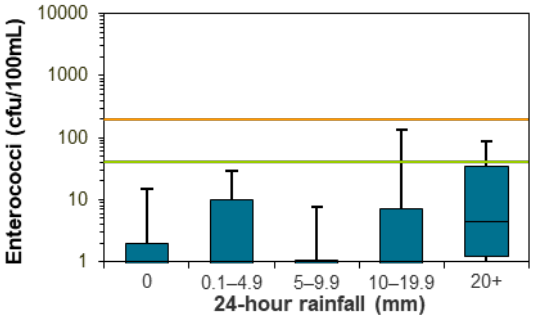
Microbial Assessment Category: A



Dry and wet weather water quality



Water quality in response to rainfall



Shark Bay

Beach grade: VG

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

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.

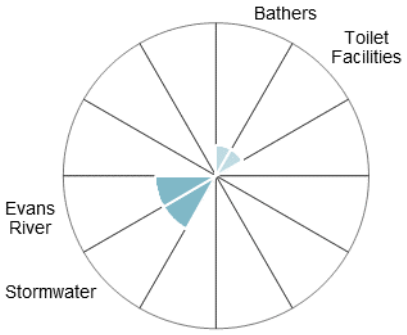
The Beach Suitability Grade of Very Good indicates microbial water quality is considered suitable for swimming almost all of the time, with few potential sources of faecal contamination.

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

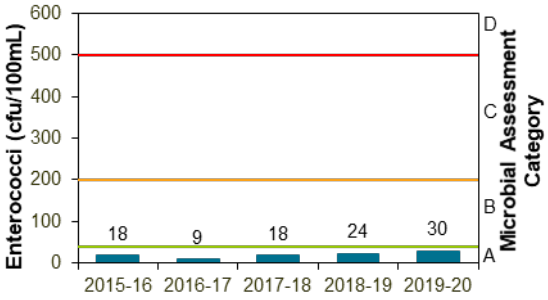
The site has been monitored since 2006.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Ocean beach	Oct 2016 to Apr 2020	98%	100	Stable

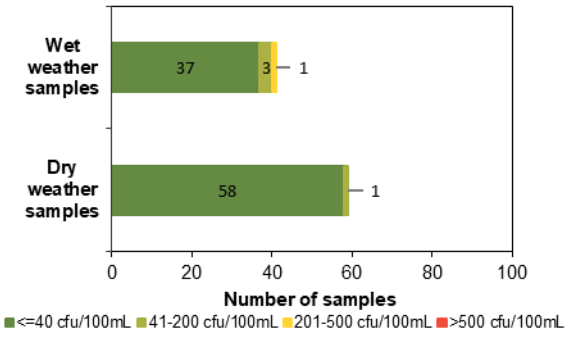
Sanitary inspection: Low



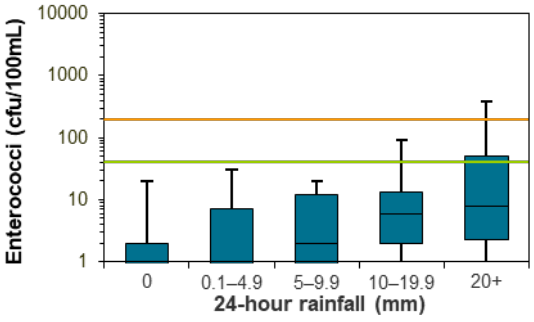
Microbial Assessment Category: A



Dry and wet weather water quality

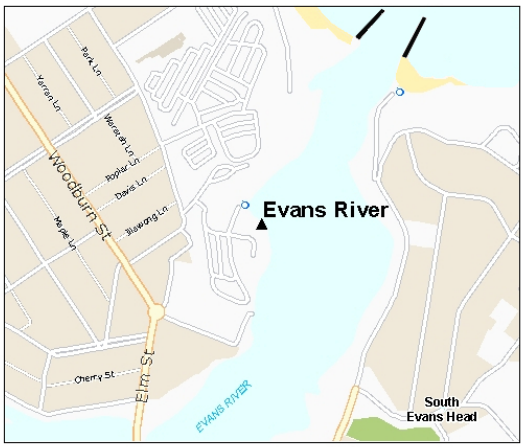


Water quality in response to rainfall



Evans River

Beach grade: P



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

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

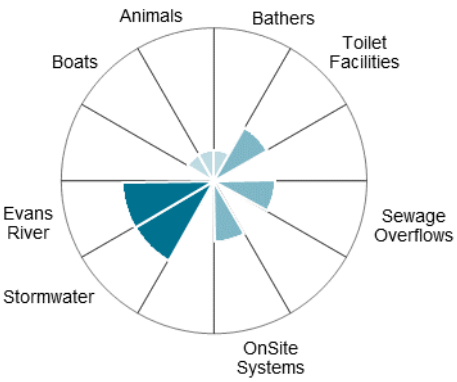
The Beach Suitability Grade of Poor indicates microbial water quality is susceptible to faecal pollution, particularly after rainfall and occasionally during dry weather conditions, with potential faecal contamination from the Evans River and stormwater.

Enterococci levels increased with increasing rainfall, often exceeding the safe swimming limit after no rain, and regularly in response to 5 mm or more of rain.

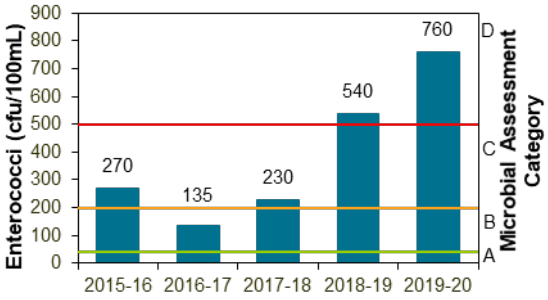
The site has been monitored since 2006.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Estuarine	Apr 2018 to Apr 2020	59%	100	Stable

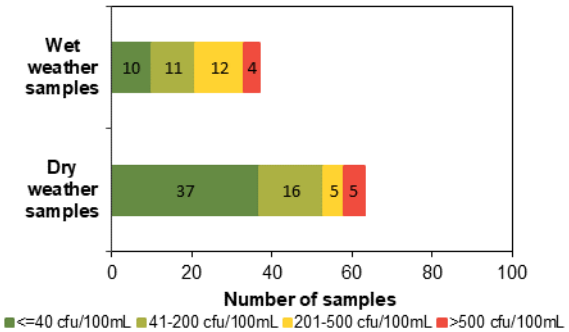
Sanitary inspection: Moderate



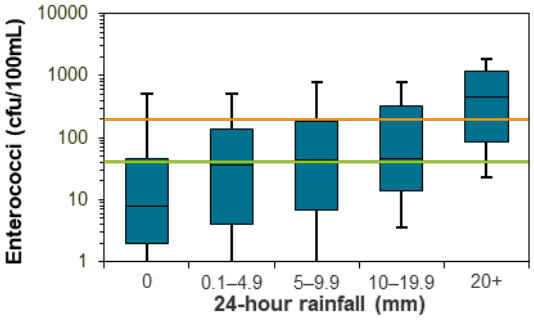
Microbial Assessment Category: D



Dry and wet weather water quality



Water quality in response to rainfall



Elm Street Bridge North (Evans River)

Beach grade: G

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

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

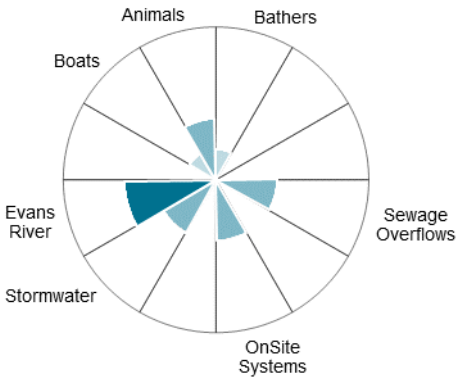
The Beach Suitability Grade of Good indicates microbial water quality is considered suitable for swimming most of the time but may be susceptible to pollution after rain, with several potential sources of faecal contamination including the Evans River.

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

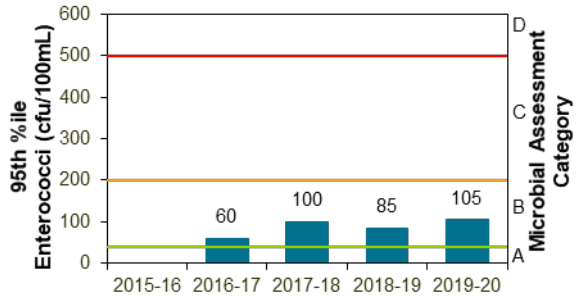
The site has been monitored since 2015.

Site type	Assessment period	Dry weather samples suitable for swimming	Water samples	Beach grade status
Estuarine	Oct 2016 to Apr 2020	90%	100	Stable

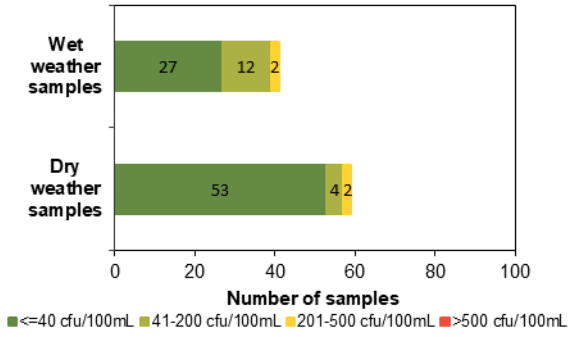
Sanitary inspection: Moderate



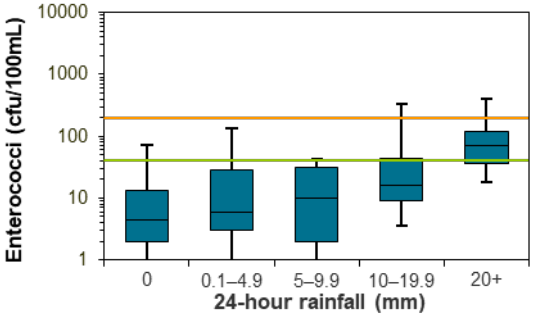
Microbial Assessment Category: B



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 five grades ranging from Very Good to Very Poor:

VG **Very Good**

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

G **Good**

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

F **Fair**

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

P **Poor**

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

VP **Very Poor**

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

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

The guidelines

The National Health and Medical Research Council's *Guidelines for managing risks in recreational water*[1] were adopted for use in New South Wales in May 2009. These guidelines have been adopted in all Australian states and territories and are supported by guidance notes developed by the Department of Health Western Australia[2].

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

[2]Department of Health, Western Australia 2007, *Microbial quality of recreational water guidance notes in support of chapter 5 of the National Health and Medical Research Council guidelines for managing risks in recreational water, 2006*, Department of Health, Western Australia and The University of Western Australia, October 2007, available at ww2.health.wa.gov.au/Articles/A_E/Environmental-waters-publications, accessed on 10/06/20.

Enterococci

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

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

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

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

Beach Suitability Grades are determined by using the following matrix:

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

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

Microbial Assessment Category (MAC)

There are four Microbial Assessment Categories (A to D) and these are determined from the 95th percentile of an enterococci dataset of at least 100 data points. Each MAC is associated with a risk of illness determined from epidemiological studies. The risks of illness shown below are not those associated with a single data point but are the overall risk of illness associated with an enterococci dataset with that 95th percentile[1].

Risk of illness associated with Microbial Assessment Categories

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

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

Calculating the MAC

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

The 95th percentile values for each of the four Microbial Assessment Categories were determined by the World Health Organization using enterococci data collected from swimming locations across Europe. These values will represent different probabilities of illness if the distribution of enterococci data from swimming locations in New South Wales differs from the European distribution.

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

In recognition of this issue, Dr Richard Lugg (Department of Health, Western Australia) has developed a Microsoft® Excel tool for calculating a modified 95th percentile that takes into account the distribution of data. This tool has been used to calculate the 95th percentile values presented in this report and has been adopted for use by other state governments in Australia.

The tool can be downloaded from the WA Government's Environmental waters publications webpage, under *Forms and templates* [accessed 10/06/20].

Sanitary Inspection Category (SIC)

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

Sanitary inspection of beaches

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

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

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

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

Stormwater at Coogee Beach
Photo: Beachwatch/EES, DPIE

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

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

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

Explanation of tables

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

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

- Stable
- Improved
- Declined

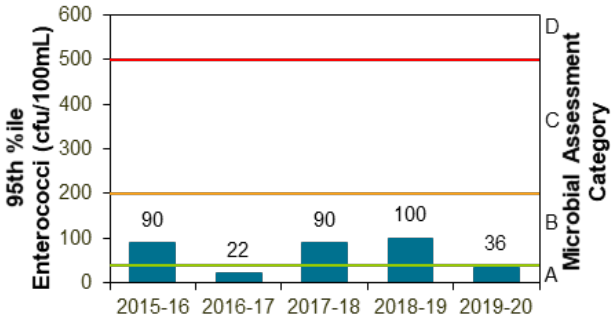
A provisional grade indicates the assessment is based on limited data collected during the assessment period and should not be compared to the beach grade from the previous year.

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

Microbial Assessment Category (MAC) chart

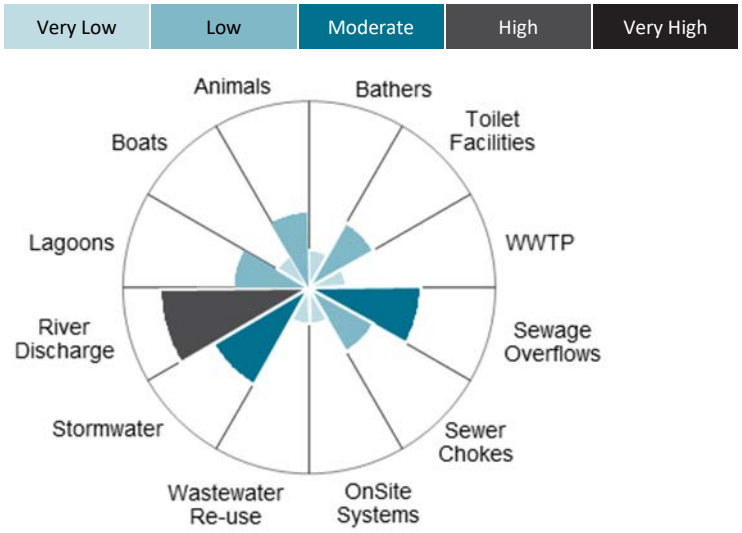
On each beach page, the MACs for the last five years are displayed on a simple bar chart. The MAC for the current year is based on enterococci data collected during the assessment period. The bars are labelled with the 95th percentile value for each year and the thresholds dividing the

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



Sanitary Inspection Category (SIC) chart

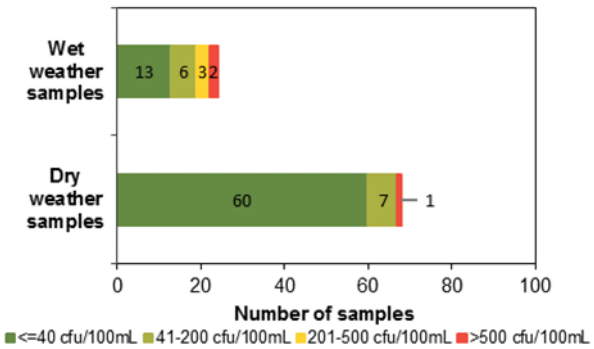
The results of the sanitary inspection for each swimming location are presented in a radar pie chart. The chart shows the likelihood that each identified pollution source will contribute to faecal contamination at a swimming site, as indicated by the size and colour of the segment, ranging from very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



Wet and dry weather water quality chart

Enterococci levels in wet and dry weather conditions are presented for each swimming location as a bar graph. All data collected during the assessment period is included in the analysis. Dry weather is defined as no rainfall recorded in the previous 24 hours. Each bar is colour coded to show the number of enterococci results up to 40 cfu/100 mL, between 41 and 200 cfu/100 mL, between 201 and 500 cfu/100 mL and greater than 500 cfu/100 mL. These categories reflect the Microbial Assessment Category thresholds and are

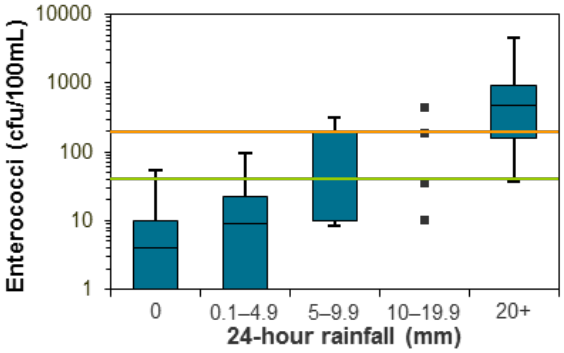
coloured on the graph as dark green, light green, amber and red respectively.



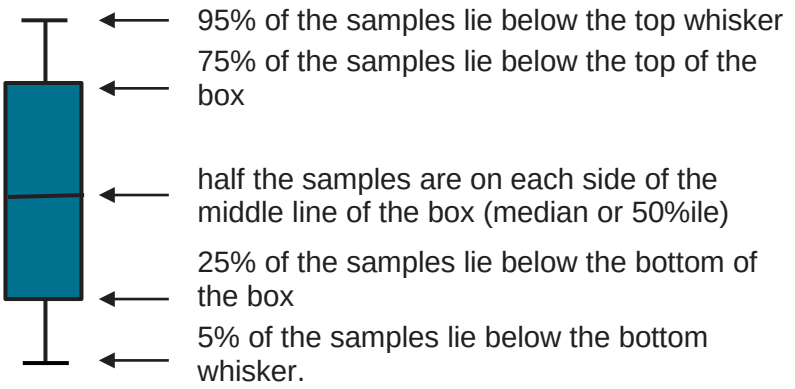
It is expected that swimming sites with lower levels of flushing will show some elevated bacterial results in dry weather samples (no rainfall in the previous 24 hours) due to the longer time needed to recover from a rainfall event. At some estuarine and lake/lagoon swimming locations the impacts of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

Water quality in response to rainfall

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



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



Information bars

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

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

Dry weather samples suitable for swimming (**dry weather swimmability**) shows the percentage of water samples with enterococci levels below 40 cfu/100 mL. Dry weather is defined as no rainfall in the previous 24 hours. Swimming sites with lower levels of flushing often have a lower percentage of dry weather samples within the safe swimming limit due to the impacts of rainfall detected up to three days after the event.

Explanation of maps

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