Sydney Ocean Beaches region

Councils

The Sydney Ocean Beaches region extends from Pittwater in the north to Bate Bay in the south and covers six councils (Figure 21). Results are presented in three geographical areas:

- Northern Sydney Beaches (Pittwater, Warringah and Manly councils)
- Central Sydney Beaches (Waverley and Randwick City councils)
- Southern Sydney Beaches (Sutherland Shire Council).

The programs

Monitoring is conducted under the Beachwatch Program and currently includes 36 ocean beaches and one lagoon site (Table 18). Narrabeen Lagoon is reported with the ocean beaches due to its proximity to, and access from, North Narrabeen Beach.

Sydney's northern and central ocean beaches are sampled by Beachwatch field officers and the southern ocean beaches are sampled by Sutherland Shire Council lifeguards. Samples are collected every sixth day throughout the year. Many of the beaches have been monitored by Beachwatch since the program began in 1989.

Testing for enterococci was introduced in January 1993, with testing for the parent group, faecal streptococci, carried out between December 1989 and January 1993. As faecal streptococci and enterococci counts are equivalent in marine waters (NHMRC 2008), the faecal streptococci data have been included in the historical data plots.

To ensure that the data collected and reported under the Beachwatch Program are accurate and reliable, quality assurance of sampling, microbial analysis and reporting is undertaken. The findings of the quality assurance program are described in the quality assurance section of this report.

Results for 2010–2011

Of the 37 sites monitored in the Sydney Ocean Beaches region, 35 were graded as Very Good or Good (Table 19).

Ocean beaches

Fifteen ocean beaches were graded as Very Good:

- Palm, Whale, Avalon, Bilgola, Newport, Bungan and Mona Vale in Pittwater Council
- South Curl Curl in Warringah Council
- Greenhills, Wanda, Elouera, North Cronulla, South Cronulla, Shelly and Oak Park in Sutherland Shire Council.

Twenty of Sydney's beaches were graded as Good, indicating that microbial water quality is suitable for swimming most of the time, but the water may be susceptible to pollution from a number of potential sources of faecal contamination.

Malabar Beach was graded as Very Poor. Although microbial water quality was often suitable for swimming during dry weather conditions, the site is very susceptible to faecal contamination from a stormwater drain on the northern side of the beach. Planning to relocate the drain farther offshore is currently underway and should lead to a long-term improvement in microbial water quality. Swimming at Malabar Beach should be avoided following even light rainfall.

Lagoon

Narrabeen Lagoon is sampled near the entrance at Birdwood Park and the site was graded as Poor. While microbial water quality was generally good during dry weather, elevated enterococci levels were regularly measured following low levels of rainfall. Swimming should be avoided during and following rainfall and when the lagoon entrance is closed.

Table 18: Monitoring of Sydney Ocean Beaches region

Area	Sampling frequency	Number of sites					
		Ocean beaches	Ocean baths	Estuarine	Lagoon/ lake	Freshwater river	Total
Northern Sydney Beaches	Every 6 days (year round)	20	–	–	1	–	21
Central Sydney Beaches	Every 6 days (year round)	8	–	–	–	–	8
Southern Sydney Beaches	Every 6 days (year round)	8	–	–	–	–	8

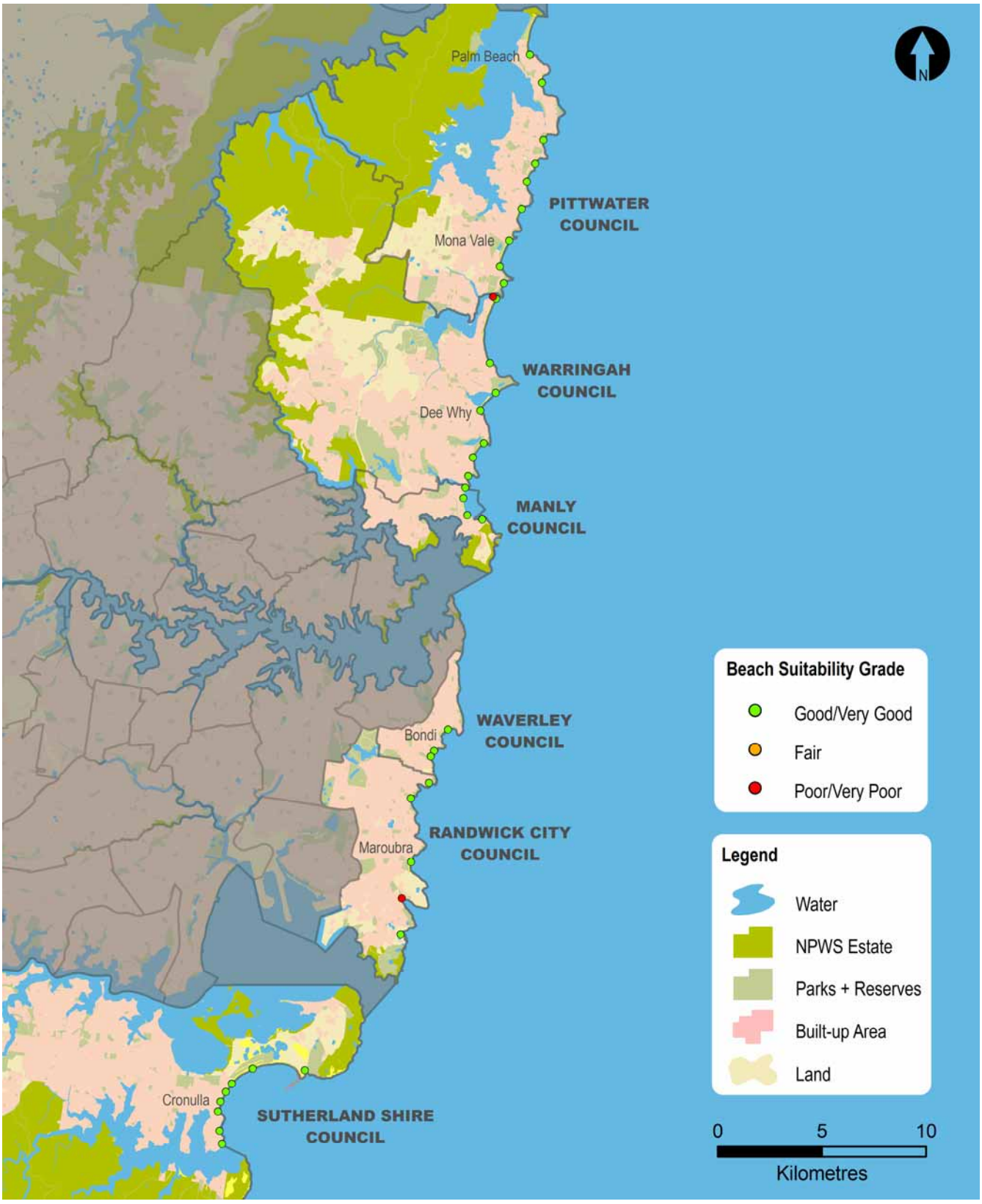


Figure 21: Councils and sampling locations in the Sydney Ocean Beaches region

Table 19: Beach Suitability Grades in the Sydney Ocean Beaches region, 2010–2011

	Site	Site type	Sanitary Inspection Category	Microbial Assessment Category	Beach Suitability Grade
Northern Sydney	Palm Beach	Ocean beach	Low	Category A	Very Good
	Whale Beach	Ocean beach	Low	Category A	Very Good
	Avalon Beach	Ocean beach	Low	Category A	Very Good
	Bilgola Beach	Ocean beach	Low	Category A	Very Good
	Newport Beach	Ocean beach	Low	Category A	Very Good
	Bungan Beach	Ocean beach	Low	Category A	Very Good
	Mona Vale Beach	Ocean beach	Low	Category A	Very Good
	Warriewood Beach	Ocean beach	Moderate	Category A	Good
	Turimetta Beach	Ocean beach	Moderate	Category A	Good
	North Narrabeen Beach	Ocean beach	Moderate	Category A	Good
	Narrabeen Lagoon	Lagoon	High	Category C	Poor
	Collaroy Beach	Ocean beach	Moderate	Category B	Good
	Long Reef Beach	Ocean beach	Moderate	Category A	Good
	Dee Why Beach	Ocean beach	Moderate	Category A	Good
	North Curl Curl Beach	Ocean beach	Moderate	Category B	Good
	South Curl Curl Beach	Ocean beach	Low	Category A	Very Good
	Freshwater Beach	Ocean beach	Moderate	Category B	Good
	Queenscliff Beach	Ocean beach	Moderate	Category B	Good
	North Steyne Beach	Ocean beach	Moderate	Category A	Good
	South Steyne Beach	Ocean beach	Moderate	Category B	Good
	Shelly Beach	Ocean beach	Moderate	Category B	Good
Central Sydney	Bondi Beach	Ocean beach	Moderate	Category B	Good
	Tamarama Beach	Ocean beach	Moderate	Category B	Good
	Bronte Beach	Ocean beach	Moderate	Category B	Good
	Clovelly Beach	Ocean beach	Moderate	Category B	Good
	Coogee Beach	Ocean beach	Moderate	Category B	Good
	Maroubra Beach	Ocean beach	Moderate	Category A	Good
	Malabar Beach	Ocean beach	High	Category D	Very Poor
	Little Bay	Ocean beach	Moderate	Category B	Good
Southern Sydney	Boat Harbour	Ocean beach	Moderate	Category B	Good
	Greenhills	Ocean beach	Low	Category A	Very Good
	Wanda Beach	Ocean beach	Low	Category A	Very Good
	Elouera Beach	Ocean beach	Low	Category A	Very Good
	North Cronulla Beach	Ocean beach	Low	Category A	Very Good
	South Cronulla Beach	Ocean beach	Low	Category A	Very Good
	Shelly Beach	Ocean beach	Low	Category A	Very Good
	Oak Park	Ocean beach	Low	Category A	Very Good

Northern Sydney Beaches

Figure 22: Sampling locations and Beach Suitability Grades in the Sydney Northern beaches area

Overview of the area

Description

The Northern Sydney Beaches cover the Pittwater, Warringah and Manly council areas, extending from Barrenjoey Headland in the north to Shelly Beach in the south.

This area has a population of approximately 235,000 people and covers an area approximately 293 square kilometres. Land use in the beach catchments is mostly residential, recreation reserves and parks, and commercial.

The area includes four aquatic reserves. These are located at Barrenjoey Head, Narrabeen Head, Long Reef and Cabbage Tree Bay.

Rainfall

Extremely high rainfall levels were recorded throughout New South Wales during 2010–2011, with the wettest spring and fifth wettest summer on record. While the Sydney region was generally drier during this period than other areas in New South Wales, November 2010 was a particularly wet month on Sydney's northern beaches, with almost double the monthly average rainfall received. After a relatively dry January and February, wet weather continued during March and April 2011, with extremely heavy rainfall recorded in the middle of March when more than 120 mm of rain fell in one day (BOM 2011).

Assessment

Microbial water quality

Enterococci samples at the 21 sites in the Northern Sydney Beaches area are collected every sixth day, providing approximately 60 samples each year, well above NHMRC's recommended 20 samples per year.

The Microbial Assessment Category for 2010–2011 was calculated from the most recent 100 data points up until the end of the 2010–2011 swimming season (September 2009 until April 2011).

Sanitary inspections

Sanitary inspections have been completed for all monitored swimming locations in the Northern Sydney Beaches area. These are scheduled for review during 2011–2012.

Beach Suitability Grades

Twenty of the 21 swimming locations in the Northern Sydney Beaches area were graded as Good or Very Good during the 2010–2011 swimming season (Figure 22).

Very Good

Eight Northern Sydney Beaches were graded as Very Good: Palm, Whale, Avalon, Bilgola, Newport, Bungan, Mona Vale and South Curl Curl.

These sites all had excellent water quality (Microbial Assessment Category A) and few potential sources of microbial contamination (Sanitary Inspection Categories of Low).

Good

Twelve Northern Sydney Beaches were graded Good: Warriewood, Turimetta, North Narrabeen, Collaroy, Long Reef, Dee Why, North Curl Curl, Freshwater, Queenscliff, North Steyne, South Steyne and Shelly (Manly).

These sites had mostly good water quality (Microbial Assessment Category A or B), but had several, or more significant, potential sources of microbial contamination, such as urban stormwater runoff, lagoon discharge or sewage overflows.

Fair

No swimming sites were classified as Fair.

Poor

The swimming location at the entrance to Narrabeen Lagoon (Birdwood Park) was graded as Poor. This site had generally good water quality during dry weather but elevated enterococci levels were regularly measured following low levels of rainfall, resulting in a Microbial Assessment Category of C. Outflow from Narrabeen Lagoon is a significant source of faecal contamination. It is recommended that swimming be avoided during and following rainfall and when the lagoon is closed. Warringah Council has a Lagoon Entrance Management Plan to reduce flooding and improve tidal flushing.

Very Poor

No swimming sites were classified as Very Poor.

Management

Wastewater management

Sydney Water manages the public sewer in this area, including two sewage treatment plants (STPs) (EPA NSW 2011).

Warriewood STP services an estimated population of 64,000 and discharges approximately 16 ML of secondary-treated and disinfected effluent each day

from a shoreline outfall at Turimetta Head. The clarification capacity of the STP has recently been increased to reduce the incidence of wet weather bypasses from the plant.

North Head STP services an estimated population of 1.24 million and discharges approximately 336 ML of high-rate primary-treated effluent each day from a deep ocean outfall located 3.7 kilometres offshore at a depth of 65 metres. A recycled water plant was constructed at the STP in 2005, and this has reduced discharge to the ocean by about 550 ML per year.

To reduce the incidence of wet weather sewage overflows in beach catchments between Narrabeen and Manly, Sydney Water is amplifying pipes and pumps and incorporating storage tanks into the sewerage system. An 18 million litre storage tank is being constructed in the Brookvale industrial area to reduce overflows to Manly Lagoon and Curl Curl Lagoon.

Sydney Water is also inspecting, cleaning and repairing sewer mains that have a high likelihood of discharging sewage to waterways if they become blocked. When significant tree root intrusion to the public sewer from the private sewer is identified, property owners are requested to remedy the problem.

Sydney Water undertakes dry weather monitoring of main stormwater drains to identify and fix sewer leaks. Leakage from the public sewer is repaired and private sewer leaks are referred to local councils.

Manly and Warringah councils are working with Sydney Water to trial a more intensive program to reduce sewer leaks. Under this program all stormwater drains discharging to Manly Lagoon and Burnt Bridge Creek are being investigated. The program was previously found to be a success with several sewer leaks found and rectified in the catchment draining to Manly ocean beach.

Lagoon management

Local councils have developed estuary management plans for Narrabeen, Dee Why, Curl Curl and Manly lagoons. The plans identify priority projects to enhance the water quality in the lagoons and at nearby beaches.

The NSW Environment Trust awarded Pittwater and Warringah councils a $1.96 million grant to restore the Narrabeen Lagoon catchment between 2007 and 2011. Nareen Wetland Plan of Management was completed by Pittwater Council in 2010. Nareen Creek flows the full length of the wetland, then into a channel that flows into Narrabeen Lagoon. Creek rehabilitation plans have also been completed for Nareen and Mullet creeks, two of the five creeks that flow into Narrabeen Lagoon.

The NSW Government's Estuary and Floodplain Management Program has provided Manly and Warringah councils with $1,055,000 in grant funds to undertake rehabilitation works in Manly Lagoon. These funds have been used by Many Council to undertake relevant environmental approvals and documentation, including a review of environmental factors, and to commission the removal of up to 6400 cubic metres of accumulated sediment in the western sections of Manly Lagoon. Dredging was completed in March 2011.

Manly and Warringah councils were awarded a $2 million NSW Environmental Trust grant in 2008 to restore and rehabilitate Burnt Bridge Creek, a major tributary of Manly Lagoon. The three year project is now in the final year of works. As part of the program a new stormwater quality improvement device has been installed on a major catchment draining into the creek; a stormwater harvesting dam is being constructed on Balgowlah Golf Course to capture and re-use stormwater previously discharged to the creek; a sediment basin is being established at the creek; substantial bushland regeneration works are underway at 12 sites; and an education program is being delivered to the community.

Stormwater management

Stormwater Management Plans have been developed by Pittwater, Warringah and Manly councils. These plans identify priority actions to improve the quality of stormwater draining to ocean beaches and lagoons, as well as actions to manage flows and flooding.

Pittwater Council's Stormwater Management Service Charge helped fund investigations and activities identified in the Stormwater Management Plan. These include various stormwater harvesting schemes and the construction and maintenance of stormwater quality improvement devices throughout the Pittwater area. Currently there are 47 gross pollutant traps preventing around 110 tonnes of sediment and floating debris from entering the waterways.

Warringah Council has installed a number of gross pollutant traps and water quality devices, and has recently installed a bioswale adjacent to Dee Why Lagoon. On average, 1000 tonnes of sediment and 17 cubic metres of floating debris are removed from these devices each year.

The NSW Government's estuary and floodplain management programs have provided Warringah and Manly councils with funding to undertake an updated Manly Lagoon Flood Study, considering

catchment and oceanic flooding, and the predicted future impacts of climate change. This project is scheduled to take approximately two years and will lead to improved development controls and stormwater and flood risk management.

Lifeguard service

Pittwater Council employs professional lifeguards five days a week at Palm, Whale, Avalon, Bilgola, Newport, Bungan, Mona Vale and Warriewood beaches. Surf Life Saving Club volunteers patrol these beaches on weekends and public holidays. Beaches are patrolled from September to April. Warriewood Beach is patrolled by professional lifeguards from December to February, and Bungan Beach only during the Christmas school holidays.

Warringah Council employs professional lifeguards seven days a week at North Narrabeen, Collaroy, Long Reef, Dee Why, North Curl Curl, South Curl Curl and Freshwater beaches. Surf Life Saving Club volunteers patrol these beaches on weekends and public holidays. Beaches are patrolled from the end of September to the end of April.

Manly Council employs professional lifeguards seven days a week. South Steyne beach is patrolled year round, with Queenscliff and North Steyne beaches patrolled during the summer season. Surf Life Saving Club volunteers also patrol these beaches on weekends and public holidays during the summer season, October to April inclusive.

Turimetta, Birdwood Park and Shelly beaches are not patrolled.

Beach closures by council lifeguards are reported in the Beachwatch Daily Bulletin, with the council updates issued from 9:30 am. Beaches can be closed due to dangerous surf conditions, pollution from stormwater or lagoon outflow, or the presence of marine stingers.

Palm Beach

Beach Suitability Grade: **Very Good**

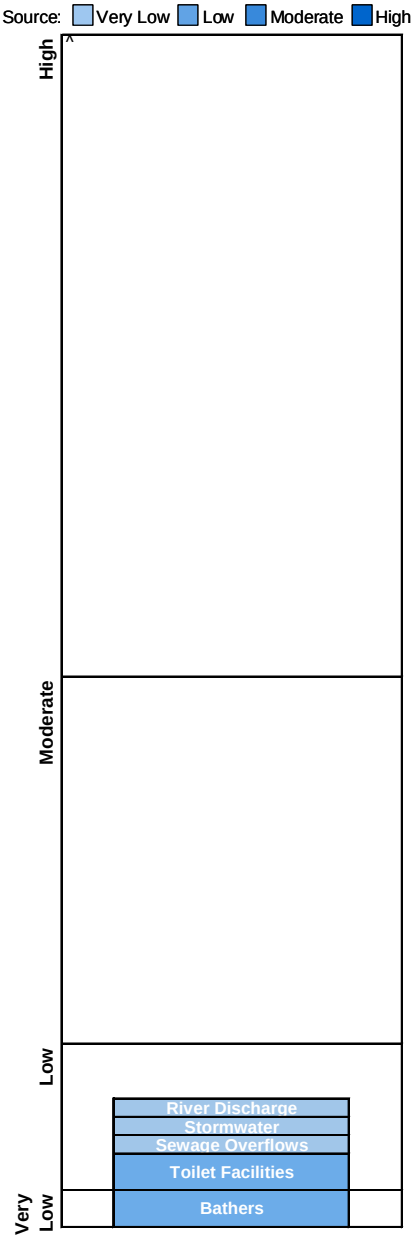
Palm Beach is 2.3 kilometres long, with rock baths in the southern corner. Samples are collected adjacent to the surf club at the southern end of the beach. Lifeguards patrol the beach from September to April.

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

The response to rainfall graph indicates that enterococci levels generally increased with increasing rainfall, occasionally exceeding the safe swimming limit in response to 20 mm of rainfall or more.

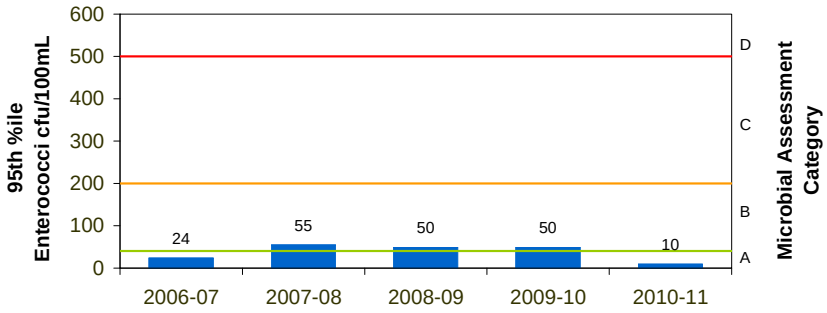
The site has been monitored since 1989. Water quality has generally been of a very high standard, with small variations among years due to rainfall patterns.

Sanitary Inspection: **Low**



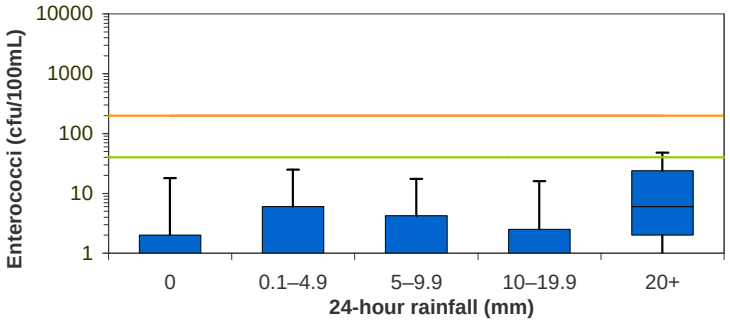
Microbial Assessment: **A**

Monitoring period for 2010–11 result is September 2009 to April 2011.

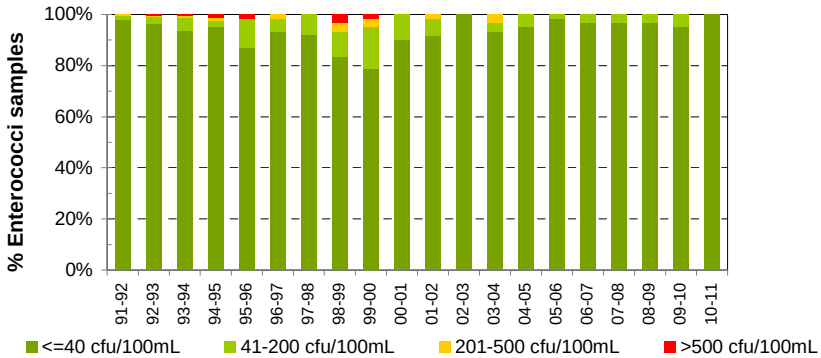


Response to rainfall

Rainfall from Avalon rain gauge

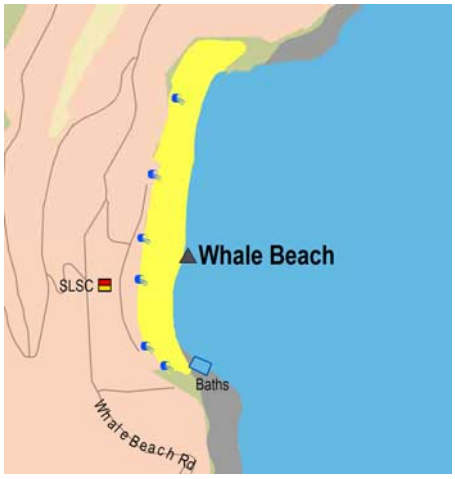


Trends in enterococci data through time



Whale Beach

Beach Suitability Grade: **Very Good**



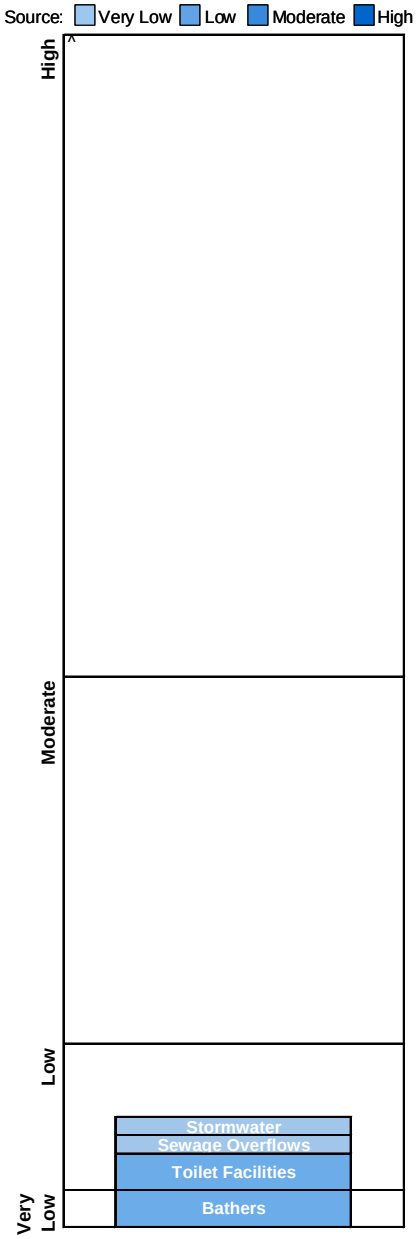
Whale Beach is 600 metres long, with rock baths located on the southern rock platform. Swimming is potentially hazardous because of persistent rips. Lifeguards patrol the beach from September to April.

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

The response to rainfall graph indicates that enterococci levels generally increased with increasing rainfall, occasionally exceeding the safe swimming limit in response to 20 mm of rainfall or more.

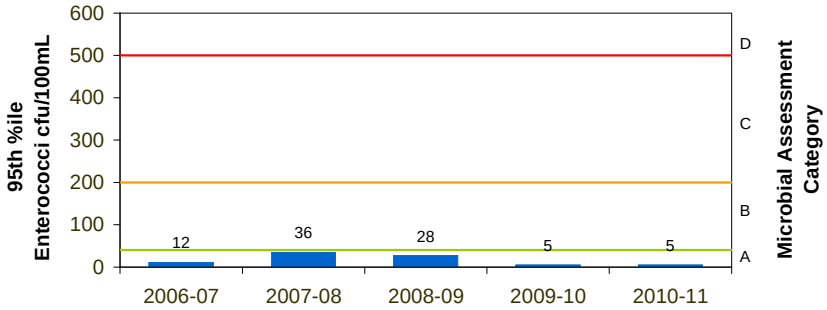
The site has been monitored since 1989. Water quality has generally been of a very high standard, with small variations among years due to rainfall patterns.

Sanitary Inspection: **Low**



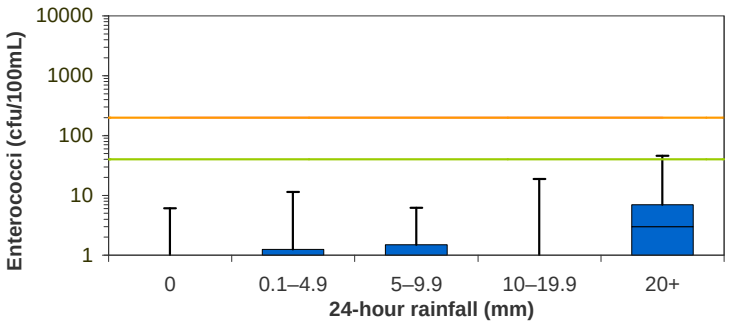
Microbial Assessment: **A**

Monitoring period for 2010–11 result is September 2009 to April 2011.

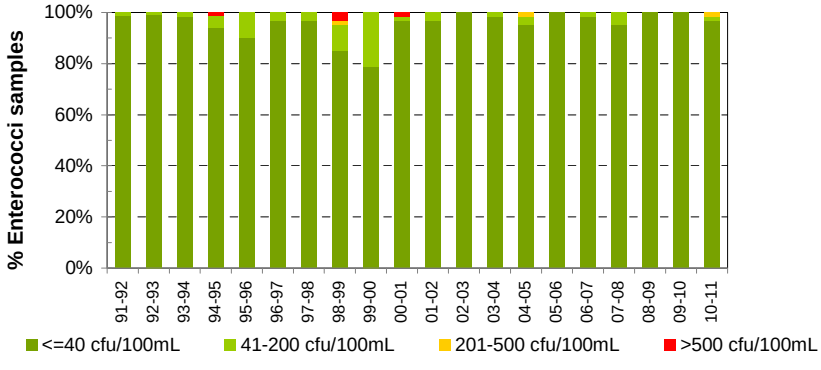


Response to rainfall

Rainfall from Avalon rain gauge



Trends in enterococci data through time



Avalon Beach

Beach Suitability Grade: **Very Good**

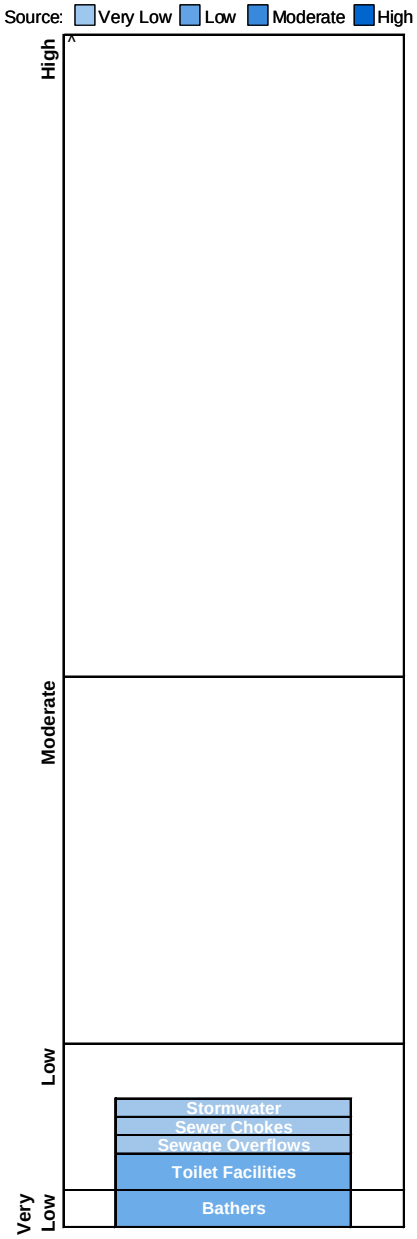
Avalon Beach is 500 metres long and backed by a park and picnic area. Swimming can be hazardous because of persistent rips. Lifeguards patrol the beach from September to April.

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

The response to rainfall graph indicates that enterococci levels increased slightly with increasing rainfall, but remained below the safe swimming limit across all rainfall categories.

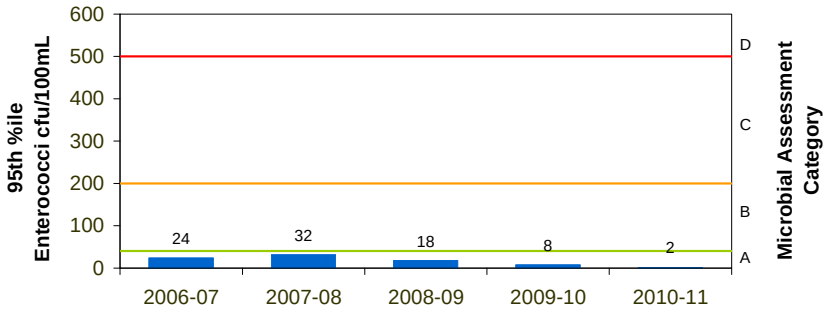
The site has been monitored since 1989. Water quality has generally been of a very high standard, with small variations among years due to rainfall patterns.

Sanitary Inspection: **Low**



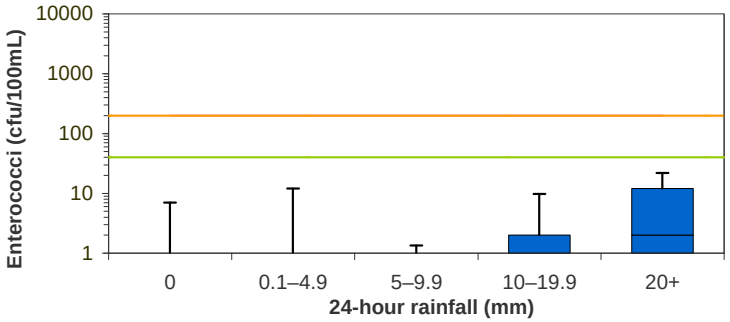
Microbial Assessment: **A**

Monitoring period for 2010–11 result is September 2009 to April 2011.

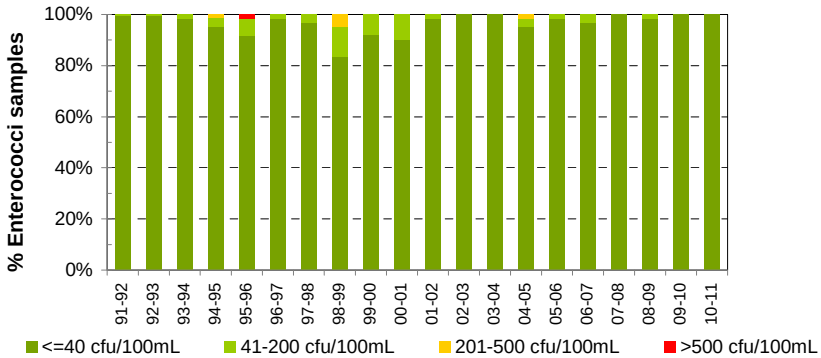


Response to rainfall

Rainfall from Avalon rain gauge



Trends in enterococci data through time



Bilgola Beach

Beach Suitability Grade: **Very Good**

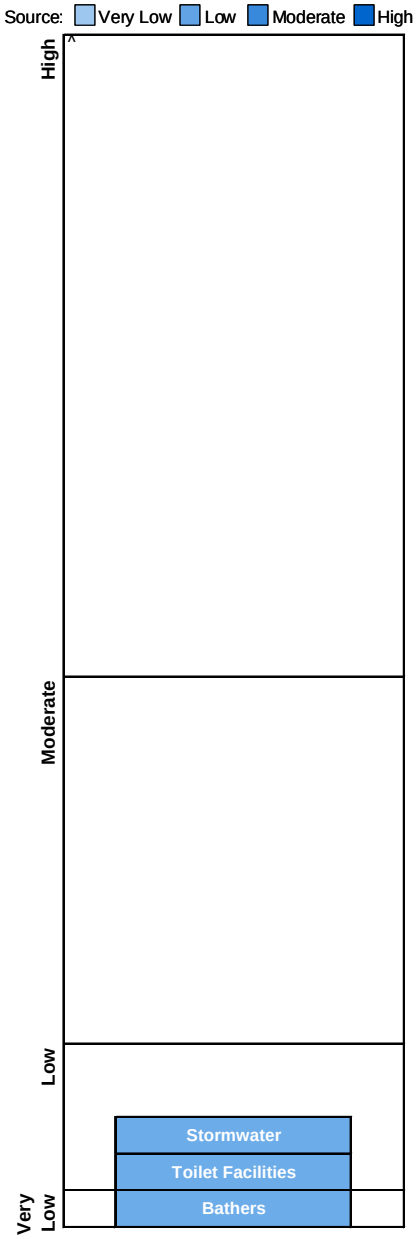
Bilgola Beach is 500 metres long, with rock baths located at the southern end. Swimming can be hazardous because of shifting and permanent rips. Lifeguards patrol the beach from September to April.

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

The response to rainfall graph indicates that enterococci levels increased with increasing rainfall, often exceeding the safe swimming limit in response to 20 mm of rainfall or more.

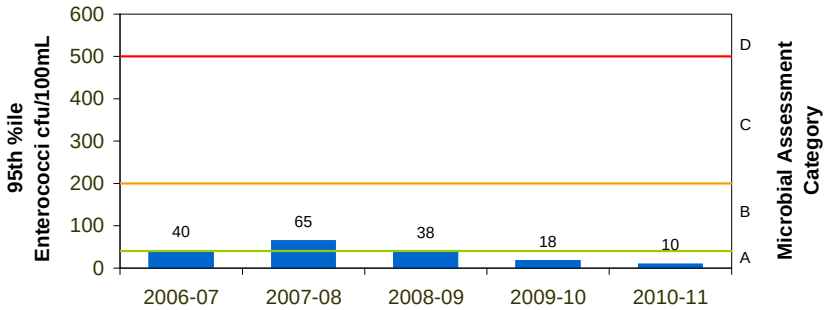
The site has been monitored since 1989. Water quality has generally been of a very high standard, with small variations among years due to rainfall patterns.

Sanitary Inspection: **Low**



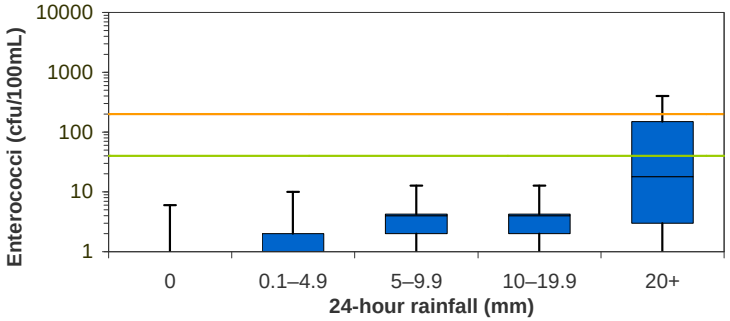
Microbial Assessment: **A**

Monitoring period for 2010–11 result is September 2009 to April 2011.

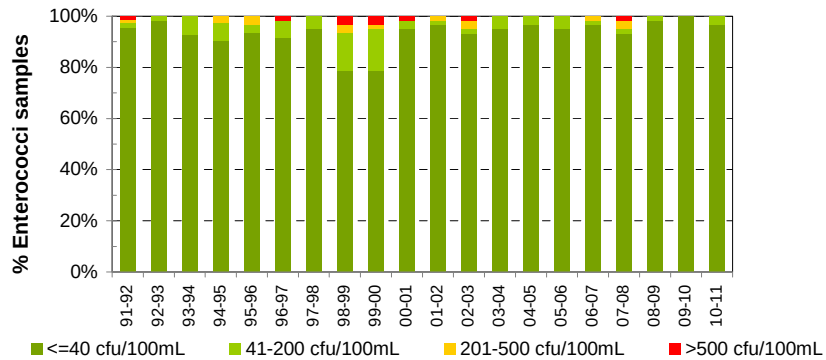


Response to rainfall

Rainfall from Avalon rain gauge



Trends in enterococci data through time



Newport Beach

Beach Suitability Grade: **Very Good**

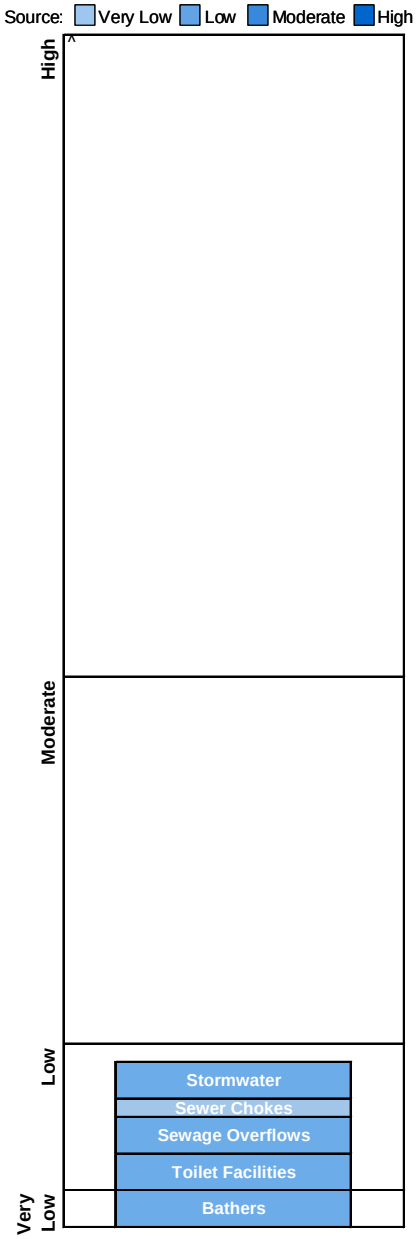
Newport Beach is 1.3 kilometres long. Several rips occur north of the surf club, and as a result beach conditions are safest in the patrolled area and in the southern corner. Lifeguards patrol the beach from September to April.

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

The response to rainfall graph indicates that enterococci levels increased with increasing rainfall, often exceeding the safe swimming limit in response to 20 mm of rainfall or more.

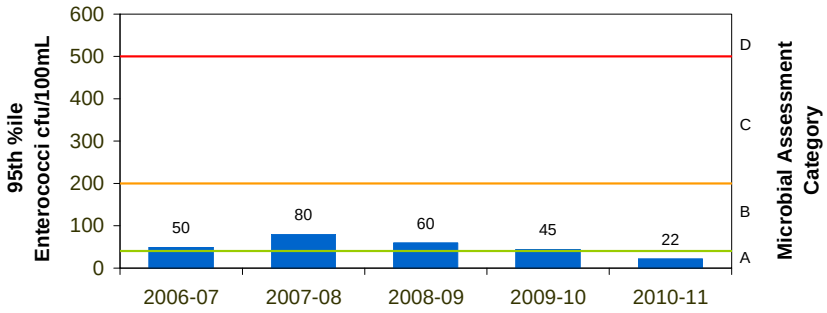
The site has been monitored since 1989. Water quality has generally been of a very high standard, with small variations due to rainfall.

Sanitary Inspection: **Low**



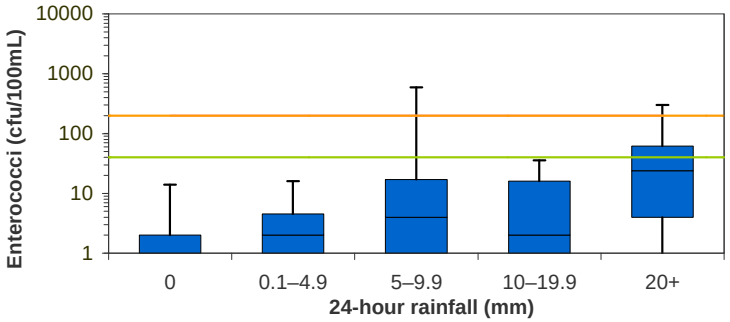
Microbial Assessment: **A**

Monitoring period for 2010–11 result is September 2009 to April 2011.

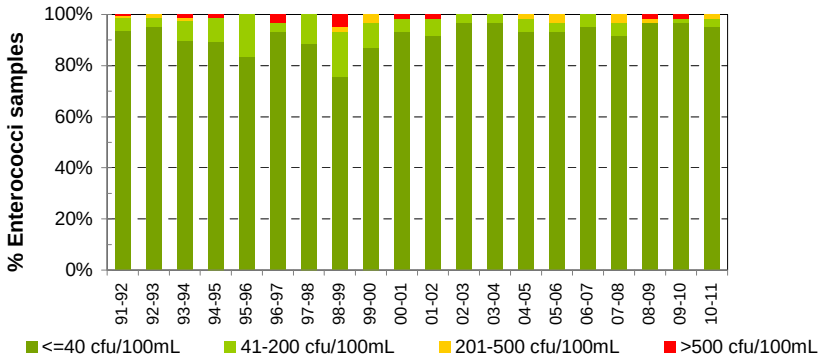


Response to rainfall

Rainfall from Warriewood STP rain gauge



Trends in enterococci data through time



Bungan Beach

Beach Suitability Grade: **Very Good**

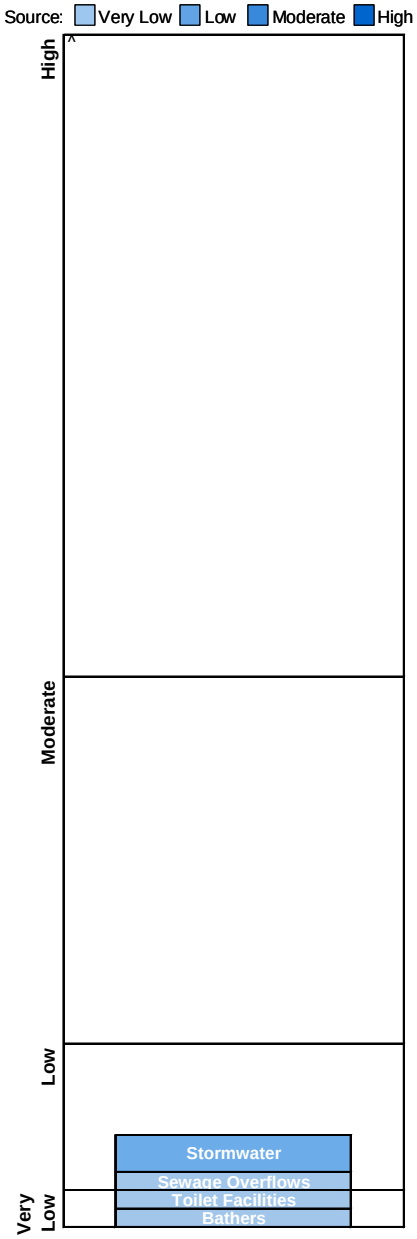
Bungan Beach is 600 metres long and backed by a steep escarpment. Swimming can be hazardous because of several shifting rips. Lifeguards patrol the beach from late December to the end of January.

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

The response to rainfall graph indicates that enterococci levels increased with increasing rainfall, occasionally exceeding the safe swimming limit in response to 20 mm of rainfall or more.

The site has been monitored since 1989. Water quality has generally been of a very high standard, with small variations among years due to rainfall.

Sanitary Inspection: **Low**



Microbial Assessment: **A**

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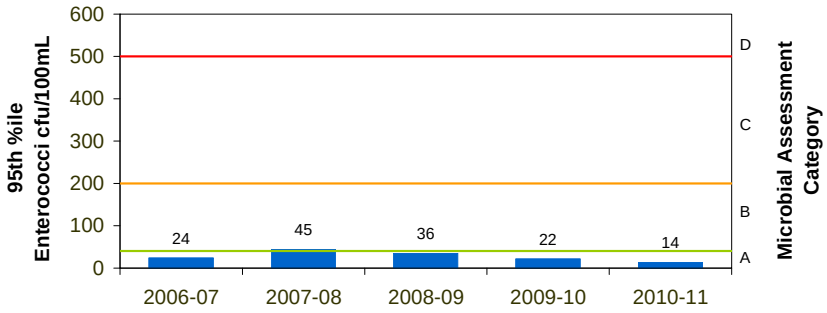
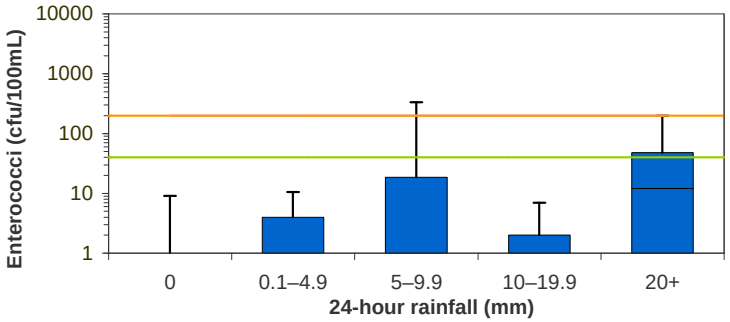
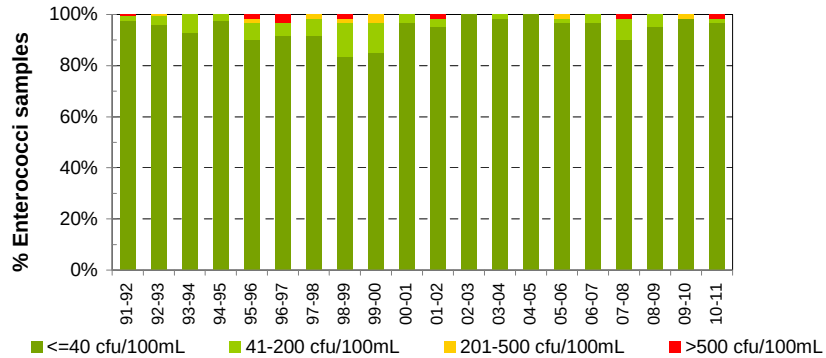


Response to rainfall

Rainfall from Warriewood STP rain gauge



Trends in enterococci data through time



Mona Vale Beach

Beach Suitability Grade: **Very Good**

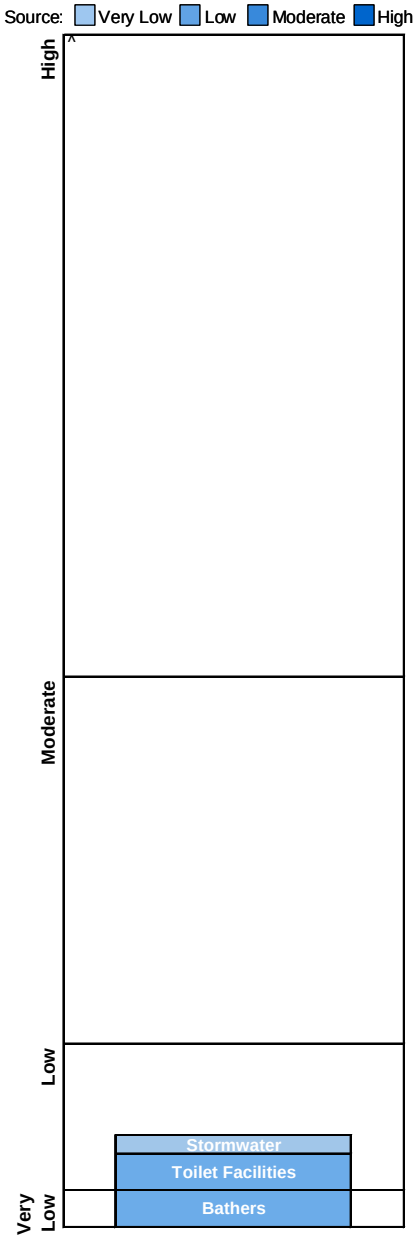
Mona Vale Beach is one kilometre long. Swimming is potentially hazardous because of a number of rips and lifeguards patrol the beach from September to April.

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

The response to rainfall graph indicates that enterococci levels increased slightly with increasing rainfall, but rarely exceeded the safe swimming limit.

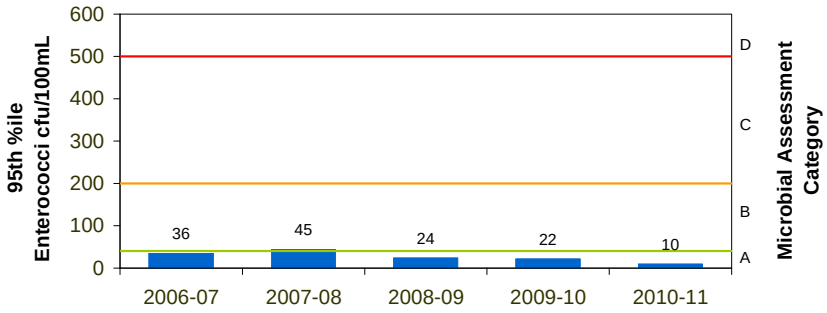
The site has been monitored since 1989. Water quality has generally been of a very high standard, with small variations among years due to rainfall.

Sanitary Inspection: **Low**



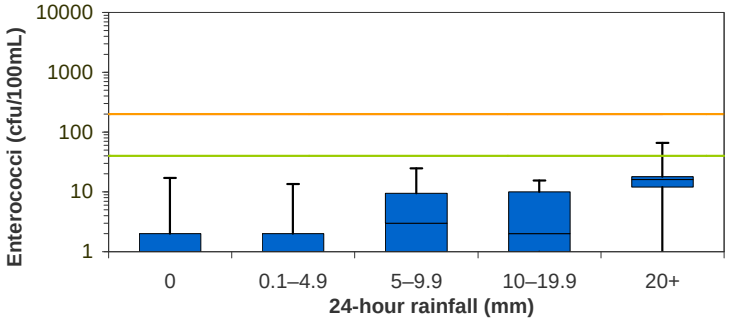
Microbial Assessment: **A**

Monitoring period for 2010–11 result is September 2009 to April 2011.

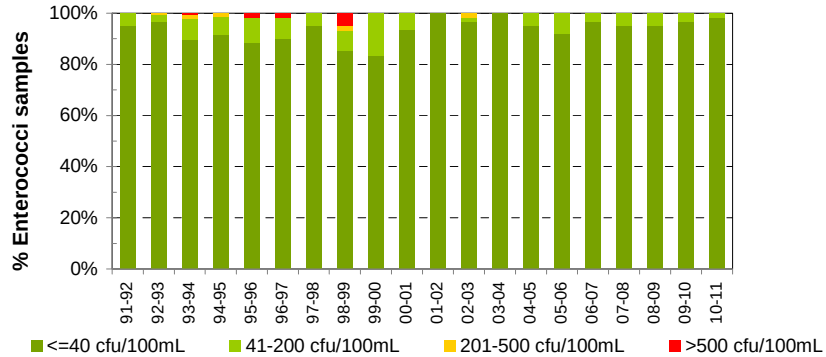


Response to rainfall

Rainfall from Warriewood STP rain gauge

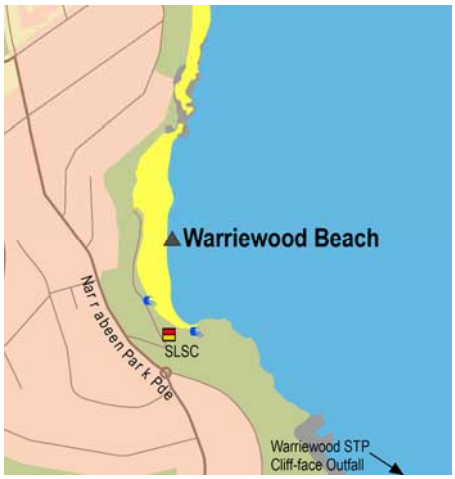


Trends in enterococci data through time



Warriewood Beach

Beach Suitability Grade: **Good**



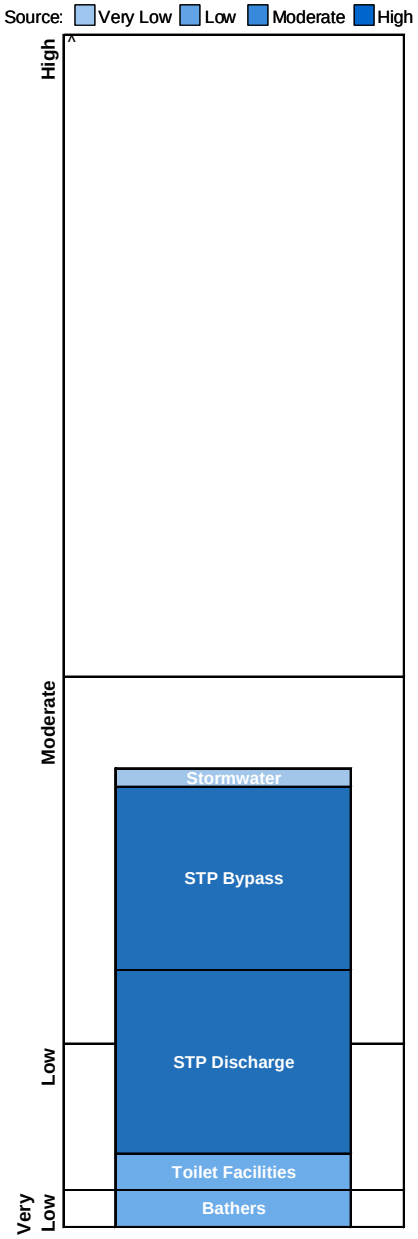
Warriewood Beach is 500 metres long and is situated below a steep bluff. Swimming can be hazardous because of rips. Lifeguards patrol the beach from December to February.

The Beach Suitability Grade of Good indicates that microbial water quality is suitable for swimming most of the time, but the water may be susceptible to pollution from several potential sources of faecal contamination, including discharges from Warriewood Sewage Treatment Plant.

The response to rainfall graph indicates that enterococci levels increased slightly with increasing rainfall, occasionally exceeding the safe swimming limit in response to 20 mm of rainfall or more.

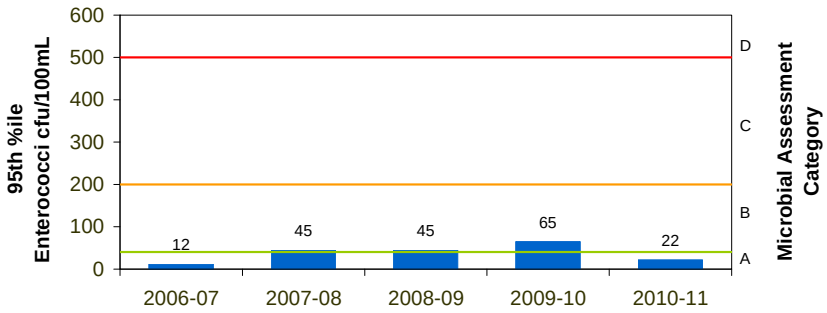
The site has been monitored since 1989. Water quality has generally been of a very high standard, with small variations due to rainfall.

Sanitary Inspection: **Moderate**



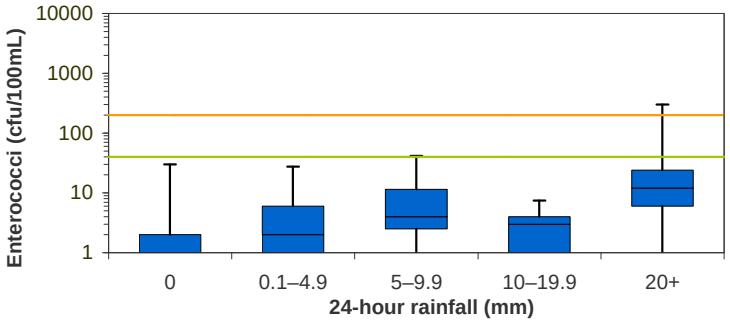
Microbial Assessment: **A**

Monitoring period for 2010–11 result is September 2009 to April 2011.

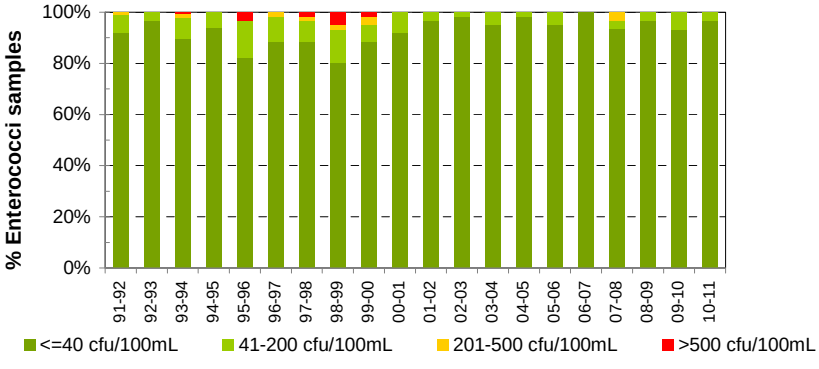


Response to rainfall

Rainfall from Warriewood STP rain gauge

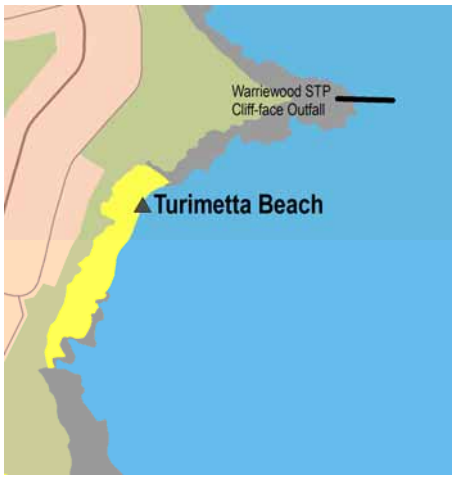


Trends in enterococci data through time



Turimetta Beach

Beach Suitability Grade: **Good**



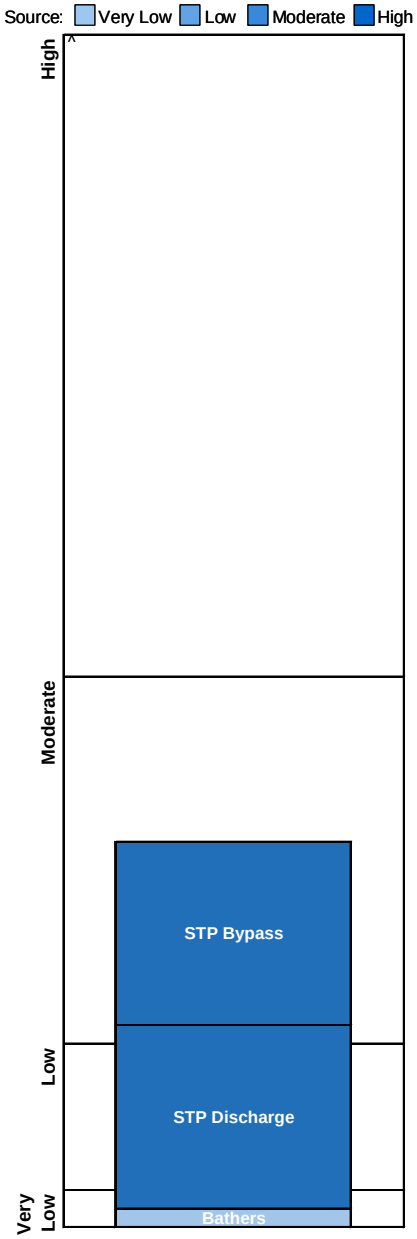
Turimetta Beach is 350 metres long and is backed by steep bluffs. Swimming can be hazardous because of rips at the centre and both ends of the beach. The beach is not patrolled by lifeguards.

The Beach Suitability Grade of Good indicates that microbial water quality is suitable for swimming most of the time, but the water may be susceptible to pollution from several potential sources of faecal contamination, including discharges from Warriewood Sewage Treatment Plant.

The response to rainfall graph indicates that enterococci levels increased slightly with rainfall but rarely exceeded the safe swimming limit.

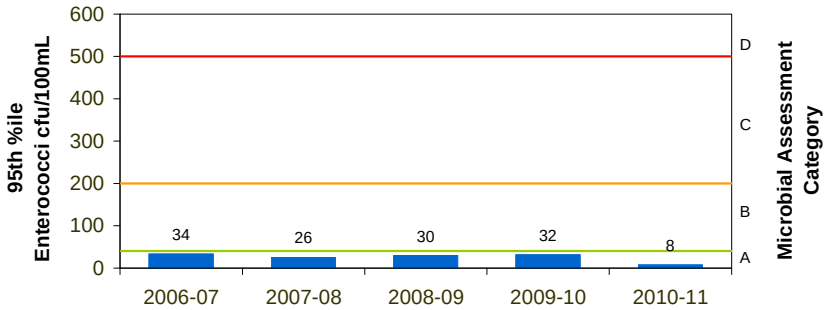
The site has been monitored since 1994. Water quality has generally been of a very high standard, with small variations due to rainfall.

Sanitary Inspection: **Moderate**



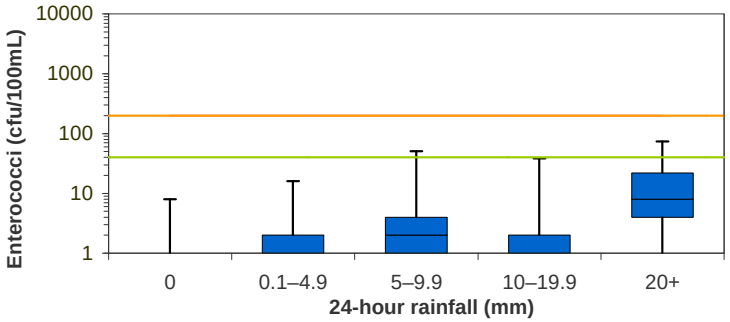
Microbial Assessment: **A**

Monitoring period for 2010–11 result is September 2009 to April 2011.

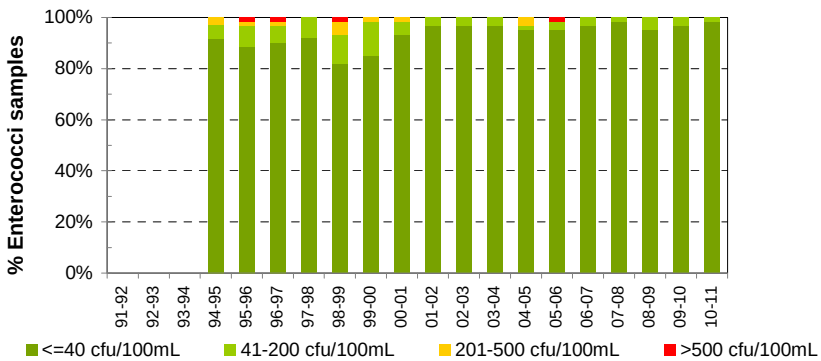


Response to rainfall

Rainfall from Warriewood STP rain gauge



Trends in enterococci data through time



North Narrabeen Beach

Beach Suitability Grade: **Good**

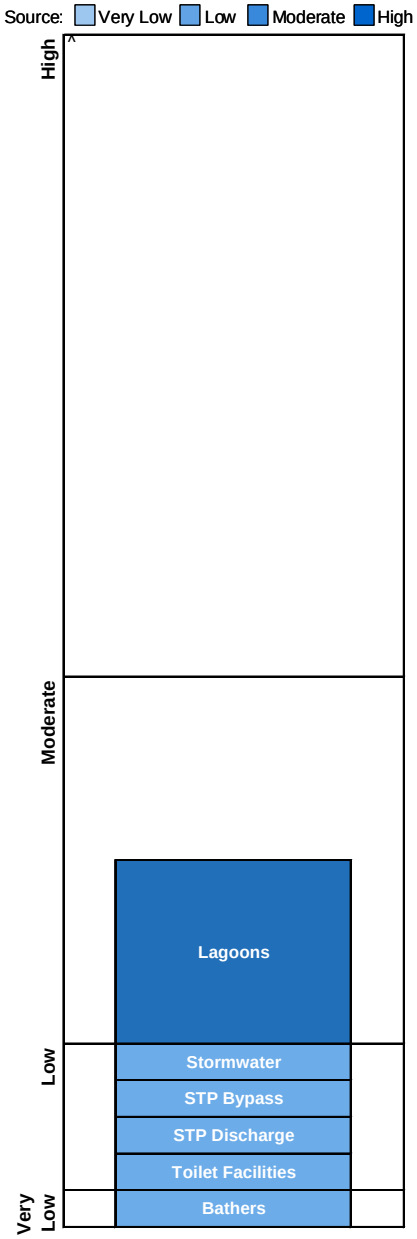
North Narrabeen Beach is located at the northern end of a beach which is 3.5 kilometres long. Strong rips can create hazardous swimming conditions and lifeguards patrol the beach from September to April.

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

The response to rainfall graph indicates that enterococci levels increased with increasing rainfall, often exceeding the safe swimming limit in response to 20 mm of rainfall or more.

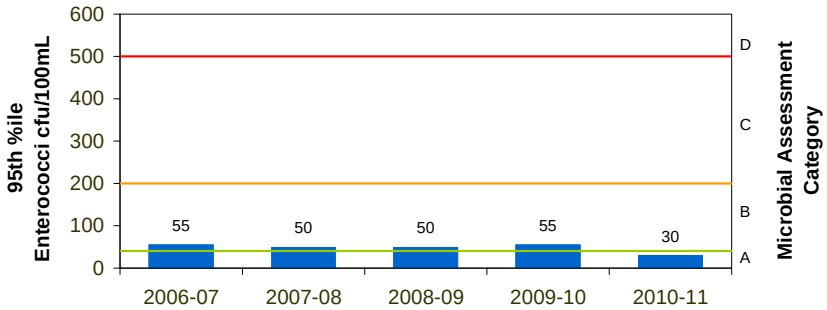
The site has been monitored since 1989. Water quality has generally been of a very high standard, with small variations due to rainfall.

Sanitary Inspection: **Moderate**



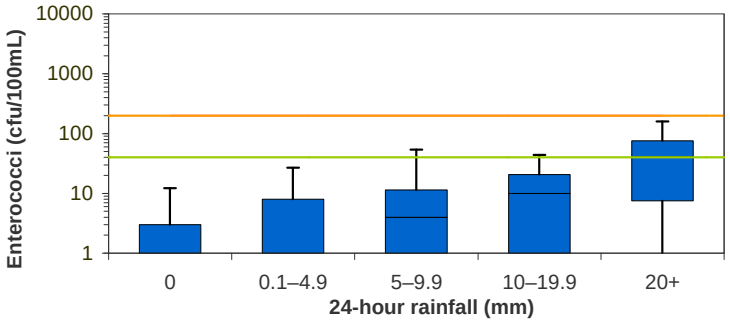
Microbial Assessment: **A**

Monitoring period for 2010–11 result is September 2009 to April 2011.

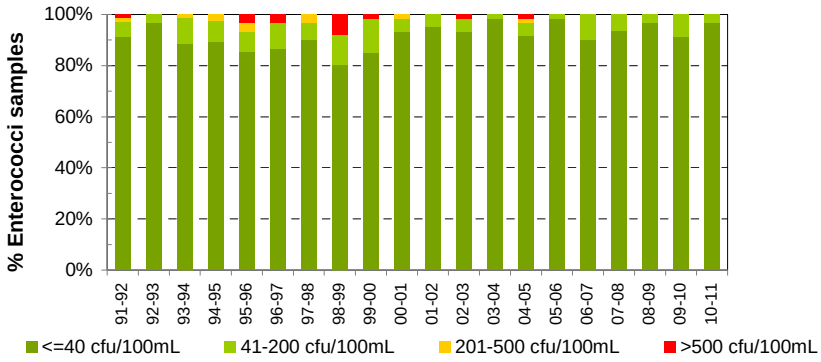


Response to rainfall

Rainfall from Warriewood STP rain gauge



Trends in enterococci data through time



Narrabeen Lagoon (Birdwood Park)

Beach Suitability Grade: **Poor**

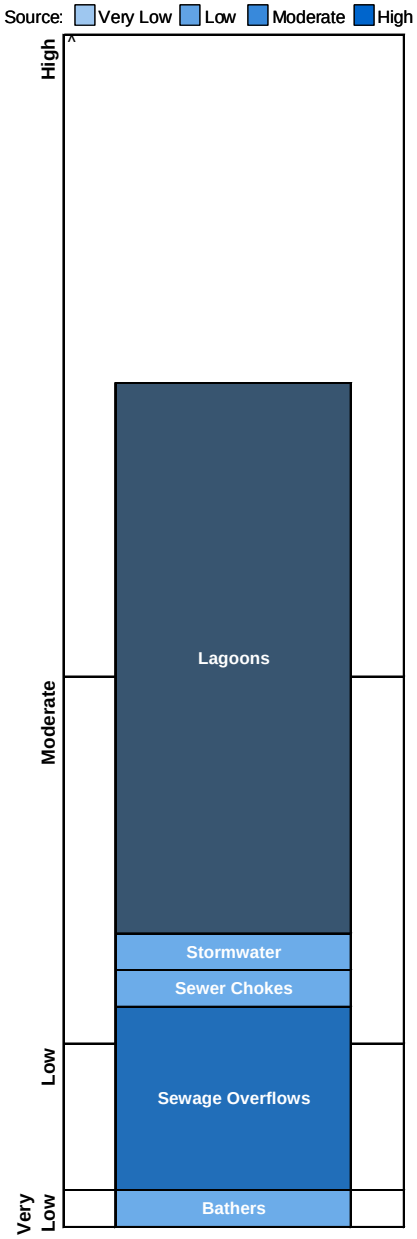
The Narrabeen Lagoon swimming site is a sandy stretch of beach located on the southern side of the entrance channel. The site is backed by Birdwood Park, a popular picnic area.

The Beach Suitability Grade of Poor indicates that the site is susceptible to pollution after rainfall and occasionally during dry weather conditions, with several potential sources of faecal contamination, including sewage overflows and the lagoon itself.

The response to rainfall graph indicates that enterococci levels increased with increasing rainfall, often exceeding the safe swimming limit in response to very light rain.

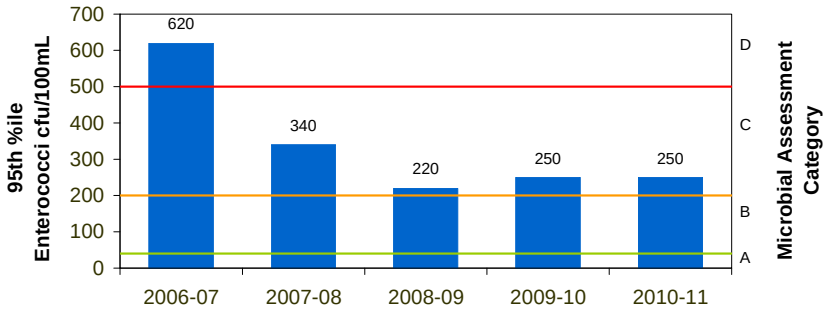
The site has been monitored since 2004. Water quality has been highest during periods when the lagoon is open to the ocean.

Sanitary Inspection: **High**



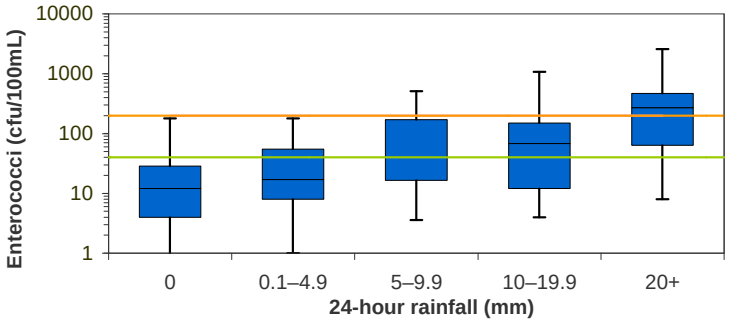
Microbial Assessment: **C**

Monitoring period for 2010–11 result is September 2009 to April 2011.

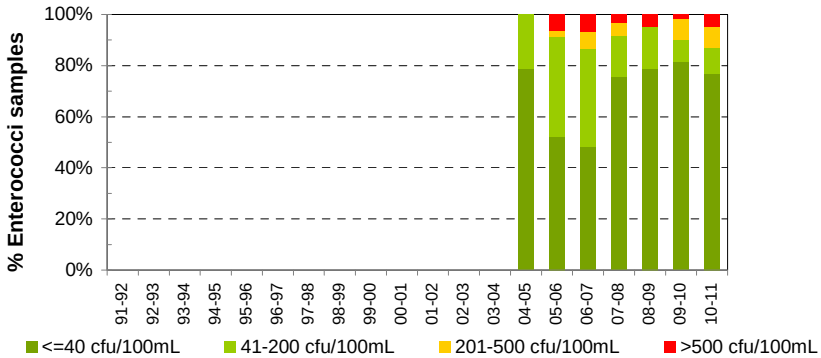


Response to rainfall

Rainfall from Warriewood STP rain gauge

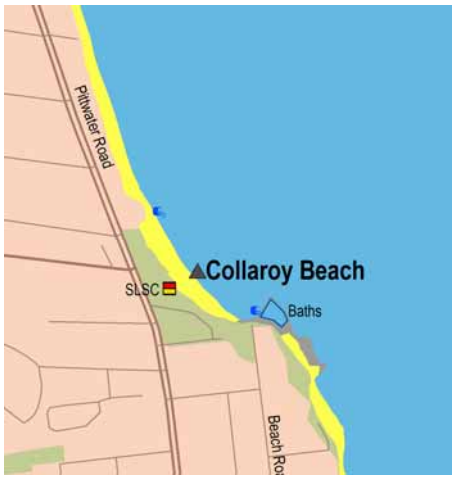


Trends in enterococci data through time



Collaroy Beach

Beach Suitability Grade: **Good**



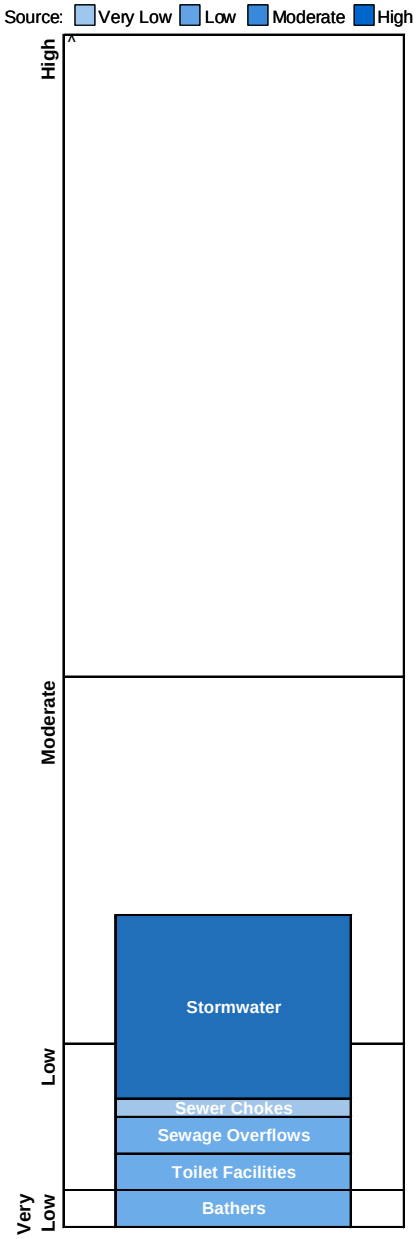
Collaroy Beach is backed by a park and picnic area and rock baths are located at the southern end. Beach conditions are relatively safe south of the stormwater drain. Lifeguards patrol the beach from late September to April.

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

The response to rainfall graph indicates that enterococci levels generally increased with increasing rainfall, often exceeding the safe swimming limit in response to 20 mm of rainfall or more.

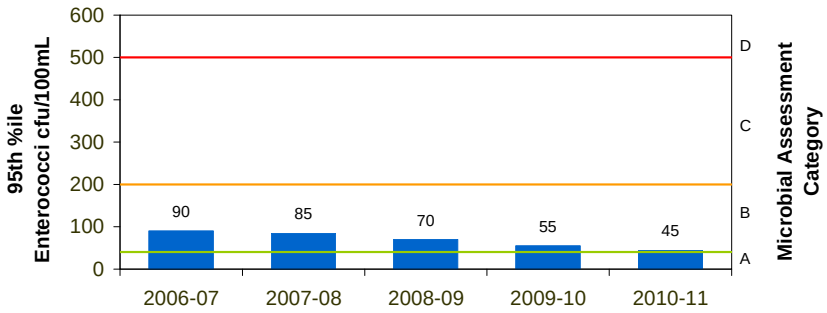
The site has been monitored since 1989. Water quality has generally been of a very high standard, with small variations due to rainfall.

Sanitary Inspection: **Moderate**



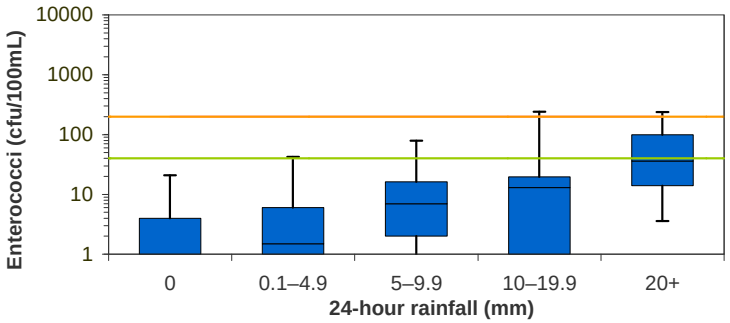
Microbial Assessment: **B**

Monitoring period for 2010–11 result is September 2009 to April 2011.

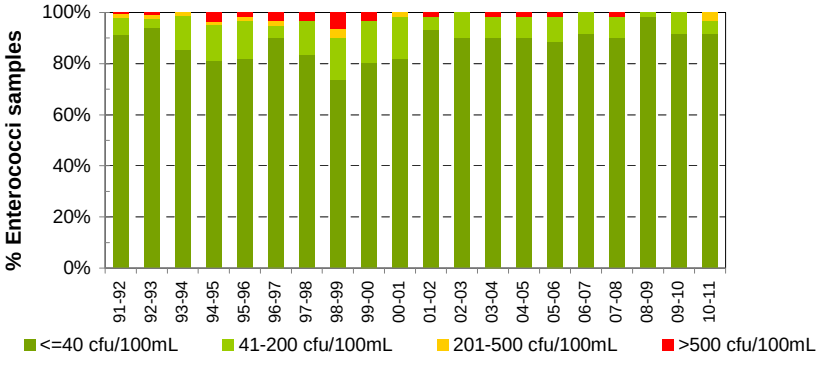


Response to rainfall

Rainfall from Dee Why rain gauge



Trends in enterococci data through time



Long Reef Beach

Beach Suitability Grade: **Good**

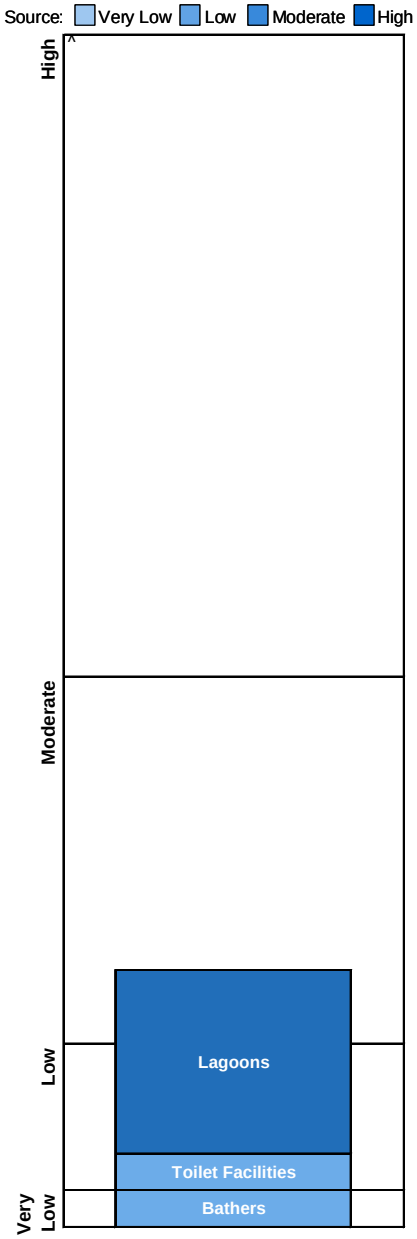
Long Reef Beach is backed by a golf course and a reserve. Strong rips create hazardous swimming conditions, and lifeguards patrol the beach from late September to April.

The Beach Suitability Grade of Good indicates that microbial water quality is suitable for swimming most of the time, but the water may be susceptible to pollution from several potential sources of faecal contamination, including discharge from Dee Why Lagoon.

The response to rainfall graph indicates that enterococci levels increased slightly with increasing rainfall but rarely exceeded the safe swimming limit.

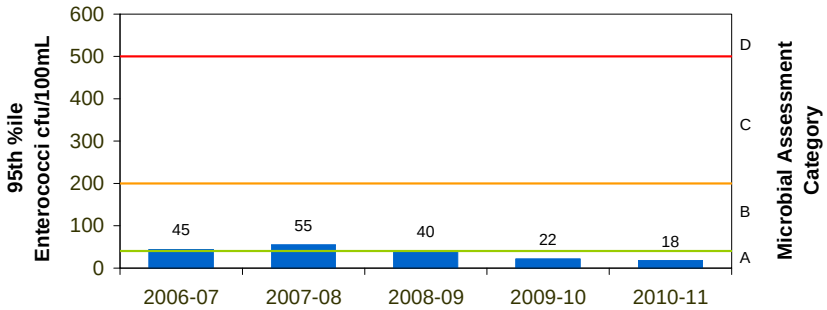
The site has been monitored since 1989. Water quality has generally been of a very high standard, with small variations due to rainfall.

Sanitary Inspection: **Moderate**



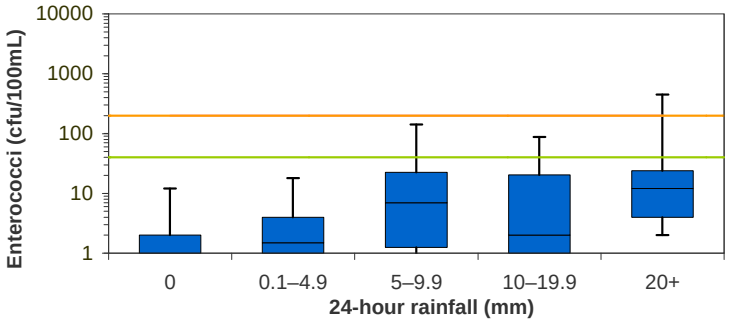
Microbial Assessment: **A**

Monitoring period for 2010–11 result is September 2009 to April 2011.

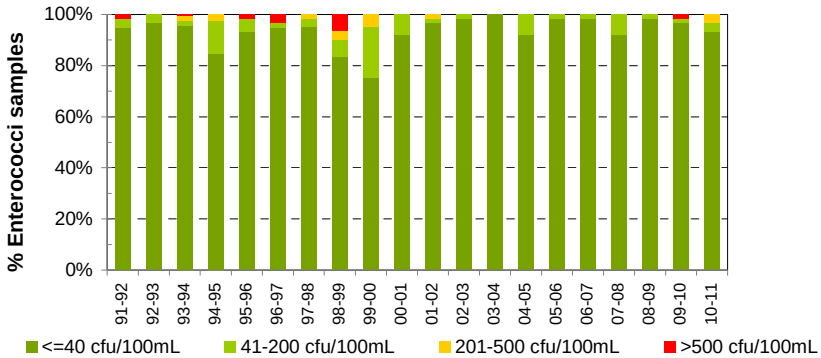


Response to rainfall

Rainfall from Dee Why rain gauge

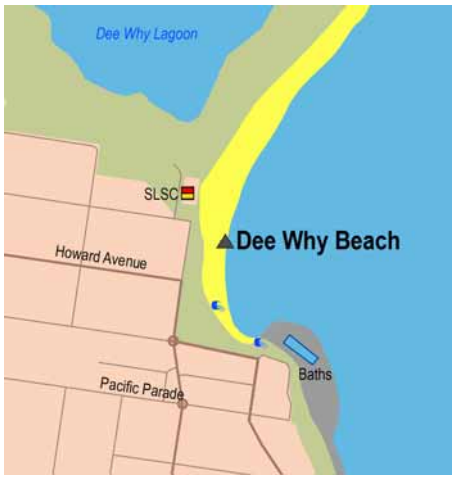


Trends in enterococci data through time



Dee Why Beach

Beach Suitability Grade: **Good**



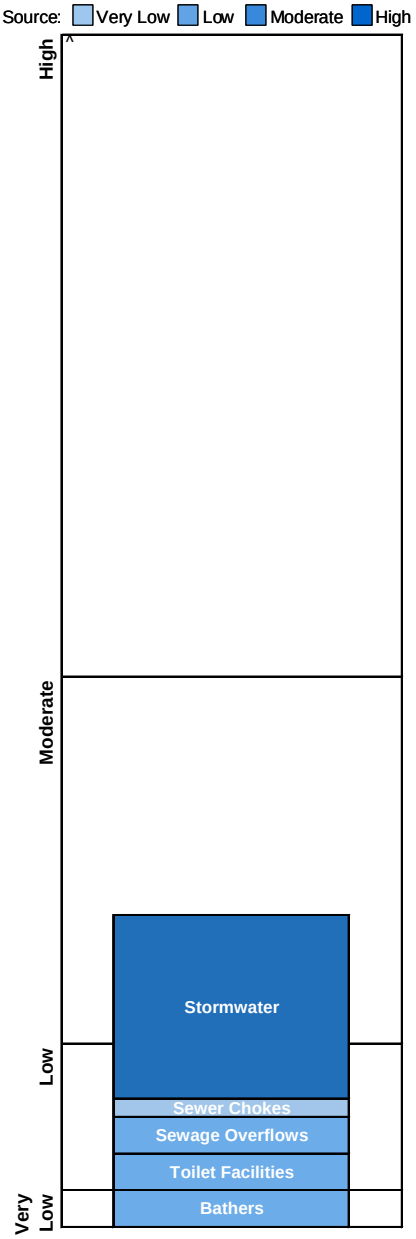
Dee Why Beach is backed in part by a park and picnic area, and an ocean pool is located at the southern end. Swimming can be hazardous because of strong rips, and lifeguards patrol the beach from late September to April.

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

The response to rainfall graph indicates that enterococci levels generally increase with increasing rainfall, but mostly remained below the safe swimming limit across all rainfall categories.

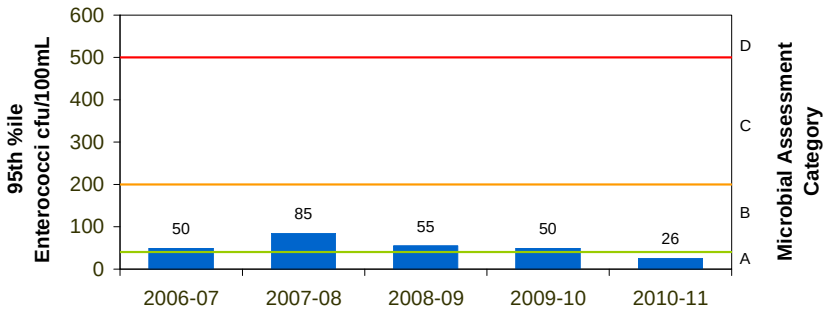
The site has been monitored since 1989. Water quality has generally been of a high standard, with variations due to rainfall.

Sanitary Inspection: **Moderate**



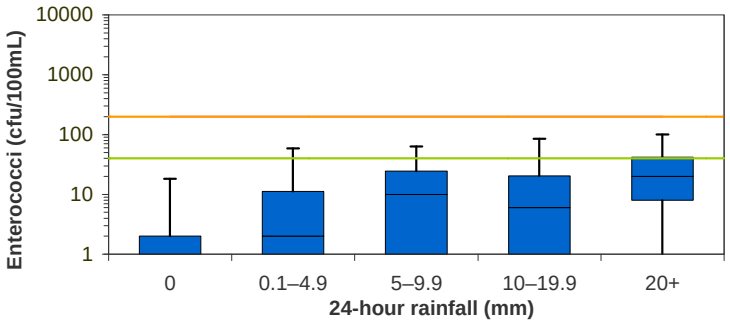
Microbial Assessment: **A**

Monitoring period for 2010–11 result is September 2009 to April 2011.

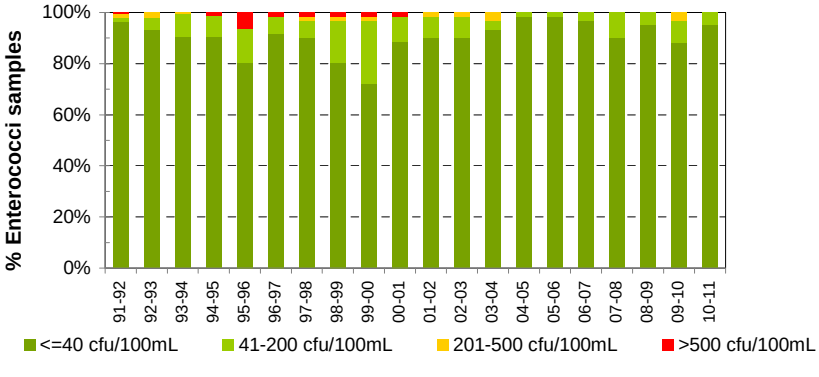


Response to rainfall

Rainfall from Dee Why rain gauge



Trends in enterococci data through time



North Curl Curl Beach

Beach Suitability Grade: **Good**

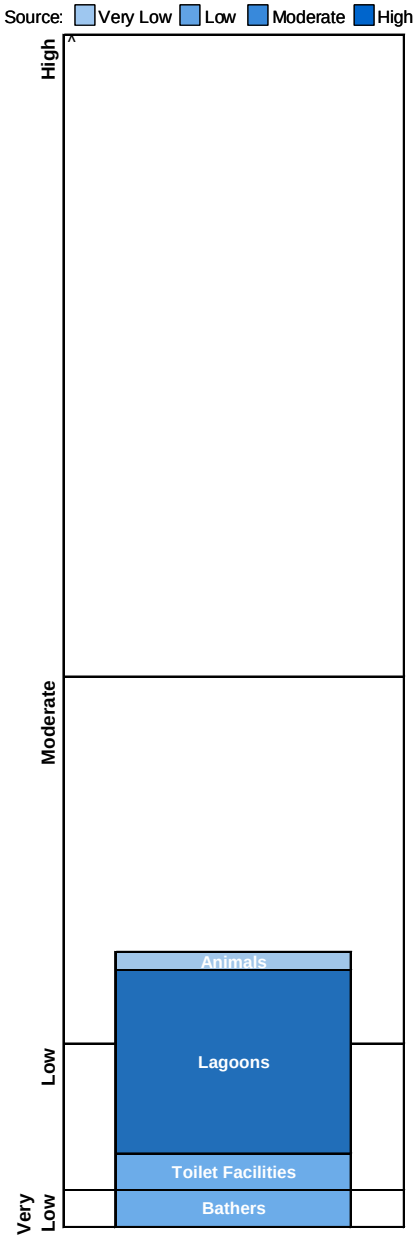
North Curl Curl Beach is safest in the northern corner. Lifeguards patrol the beach on weekends between late September and April and on weekdays as well between December and March.

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

The response to rainfall graph indicates that enterococci levels increased with increasing rainfall, regularly exceeding the safe swimming limit in response to 10 mm of rainfall or more.

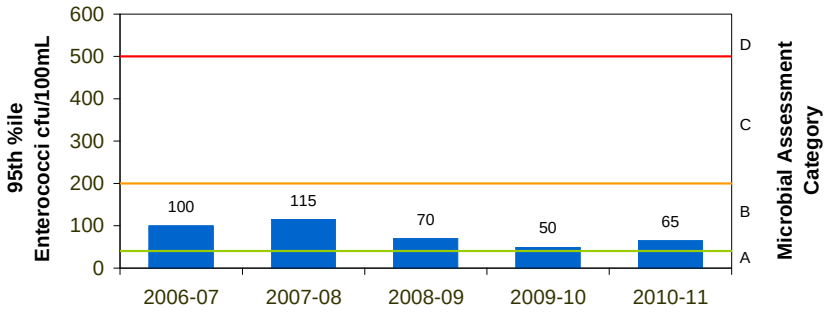
The site has been monitored since 1989. Water quality has been of a high standard, with variations the result of lagoon openings and rainfall.

Sanitary Inspection: **Moderate**



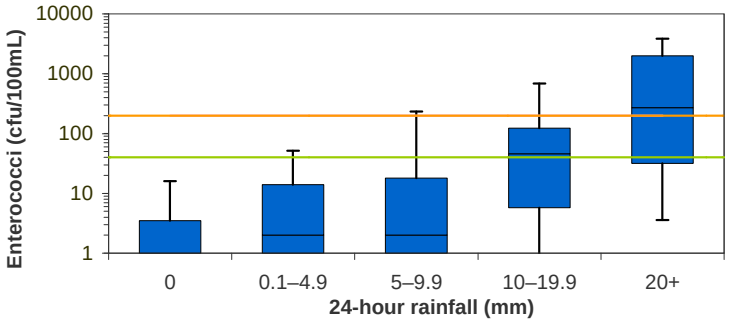
Microbial Assessment: **B**

Monitoring period for 2010–11 result is September 2009 to April 2011.

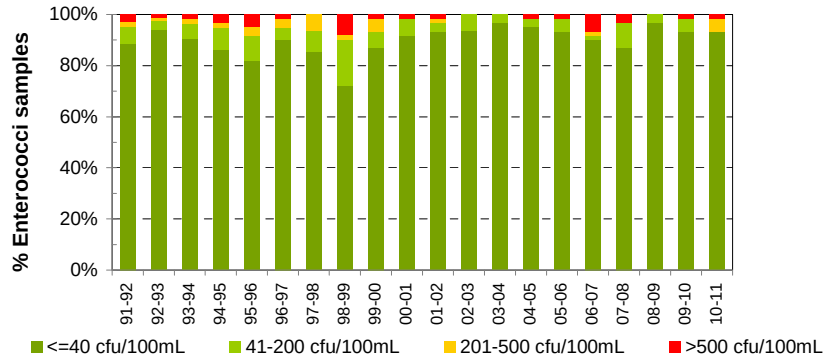


Response to rainfall

Rainfall from Harbord rain gauge



Trends in enterococci data through time



South Curl Curl Beach

Beach Suitability Grade: **Very Good**

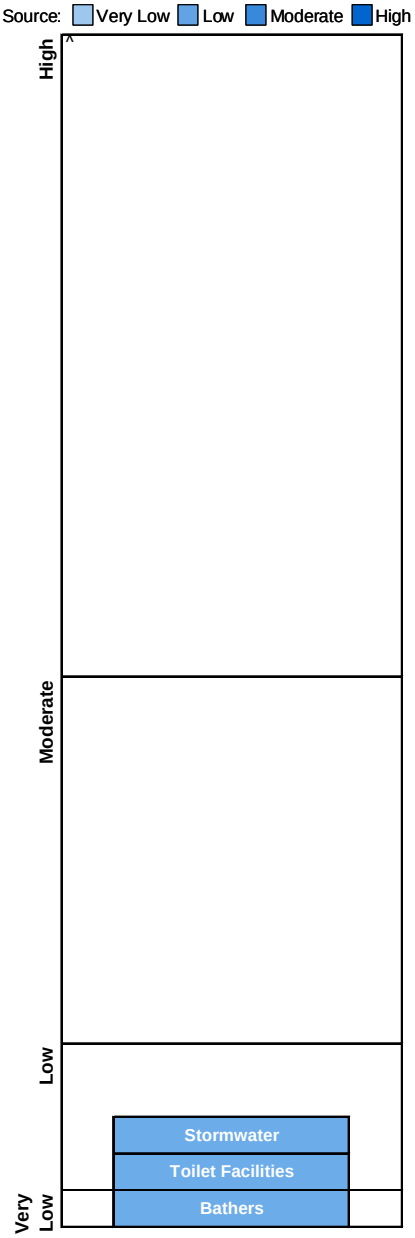
South Curl Curl Beach is located at the southern end of Curl Curl Beach. Swimming can be hazardous because of rips, and lifeguards patrol the beach from late September to April.

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

The response to rainfall graph indicates that enterococci levels increased slightly with increasing rainfall but mostly remained below the safe swimming limit across all rainfall categories.

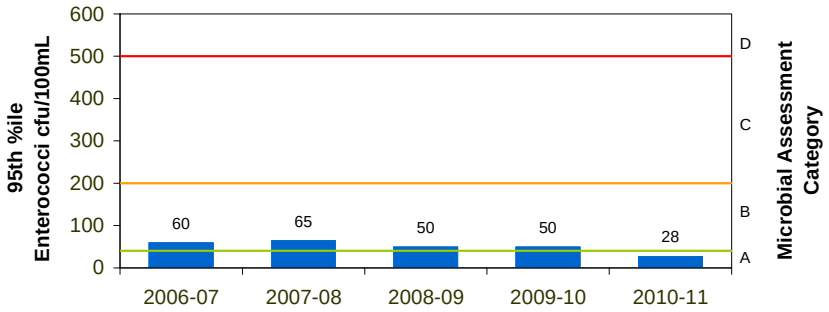
The site has been monitored since 1989. Water quality has been of a high standard, with small variations among years due to rainfall patterns.

Sanitary Inspection: **Low**



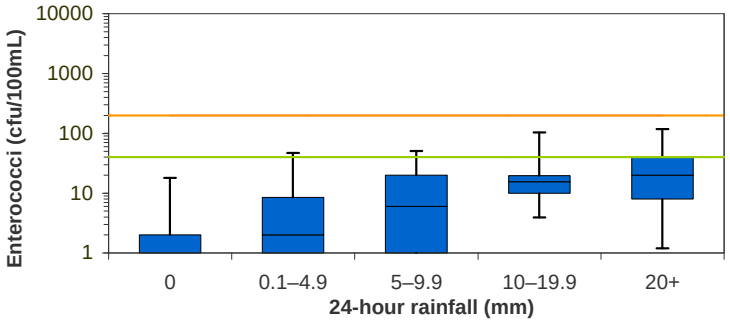
Microbial Assessment: **A**

Monitoring period for 2010–11 result is September 2009 to April 2011.

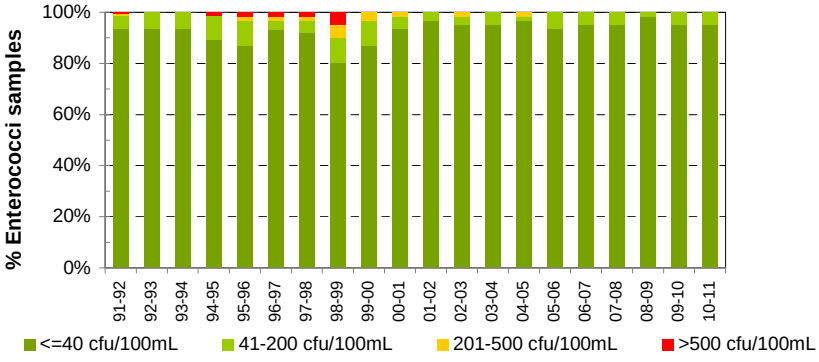


Response to rainfall

Rainfall from Harbord rain gauge



Trends in enterococci data through time



Freshwater Beach

Beach Suitability Grade: **Good**

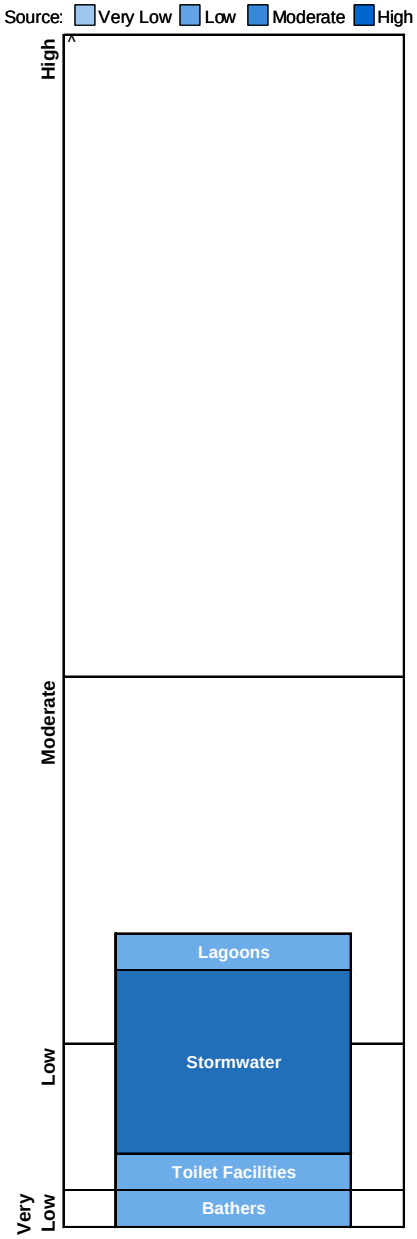
Freshwater Beach is approximately 350 metres long. Rock baths are located on the northern rock platform. Lifeguards patrol the beach from late September to April.

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

The response to rainfall graph indicates that enterococci levels increased with increasing rainfall, often exceeding the safe swimming limit in response to 10 mm of rainfall or more.

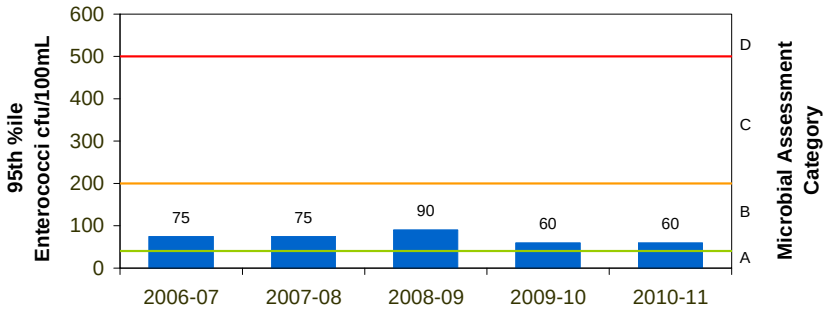
The site has been monitored since 1989. Water quality has been of a high standard, with variation among years due to rainfall patterns.

Sanitary Inspection: **Moderate**



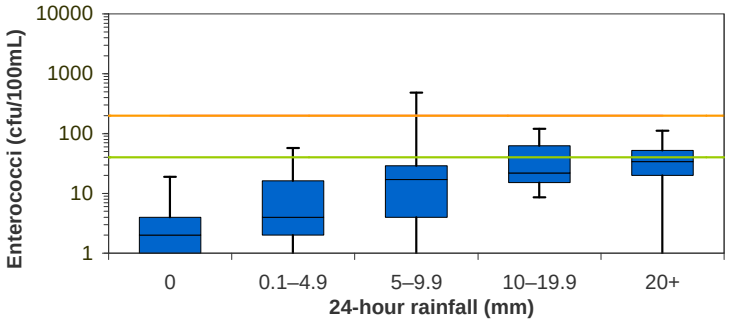
Microbial Assessment: **B**

Monitoring period for 2010–11 result is September 2009 to April 2011.

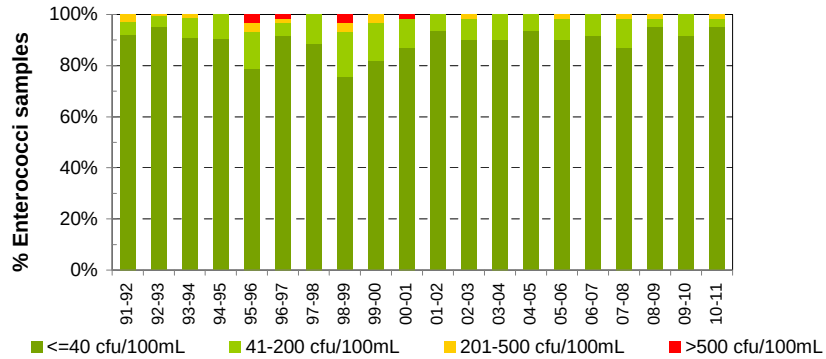


Response to rainfall

Rainfall from Harbord rain gauge



Trends in enterococci data through time



Queenscliff Beach

Beach Suitability Grade: **Good**

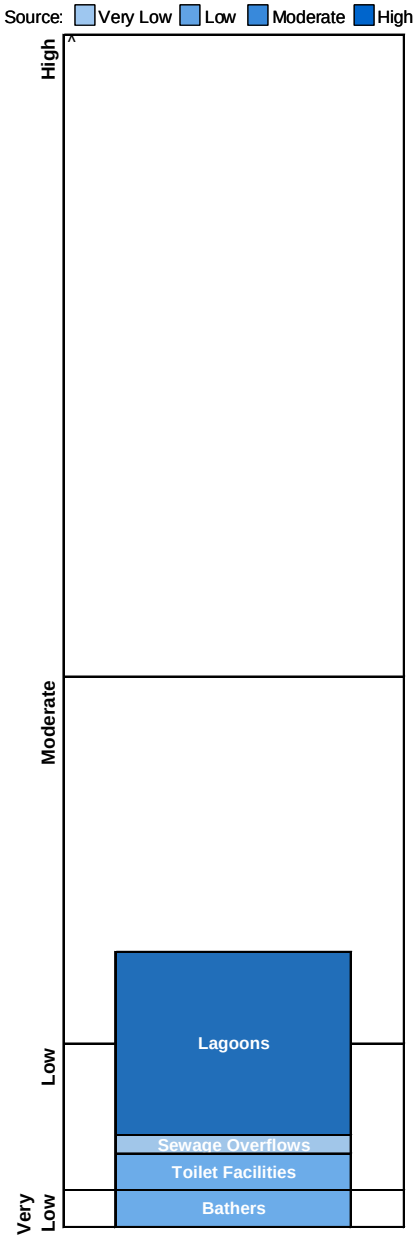
Queenscliff Beach is located at the northern end of Manly Beach. Swimming may be hazardous because of rips and lifeguards patrol the beach from October to April.

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

The response to rainfall graph indicates that enterococci levels increased with increasing rainfall, regularly exceeding the safe swimming limit after 10 mm of rainfall or more.

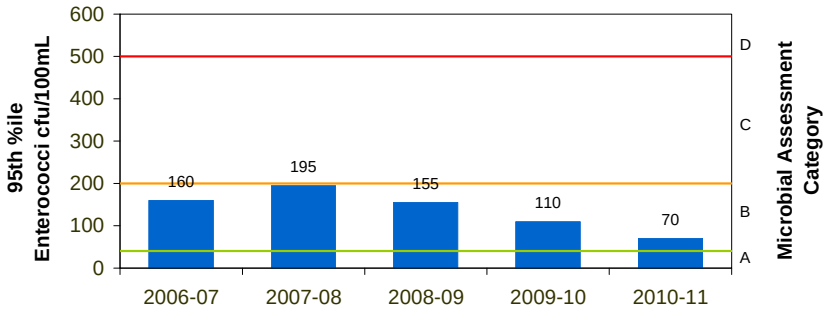
The site has been monitored since 1989, with variation in results since 1990 due to rainfall patterns and lagoon openings.

Sanitary Inspection: **Moderate**



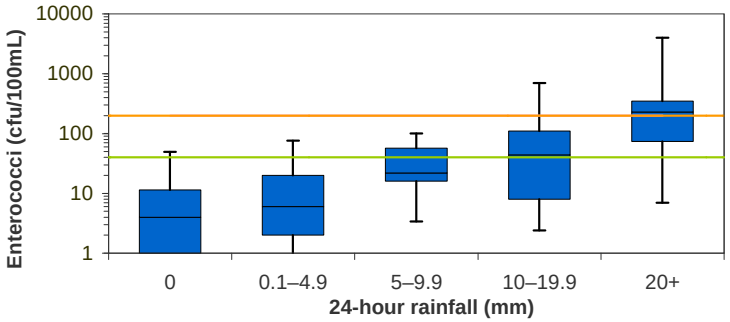
Microbial Assessment: **B**

Monitoring period for 2010–11 result is September 2009 to April 2011.

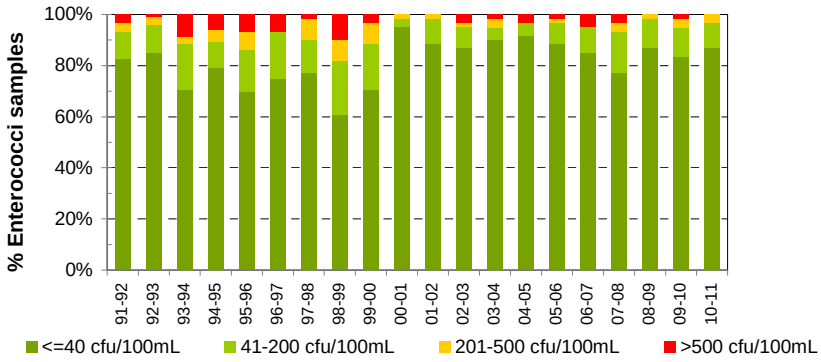


Response to rainfall

Rainfall from Manly rain gauge



Trends in enterococci data through time



North Steyne Beach

Beach Suitability Grade: **Good**

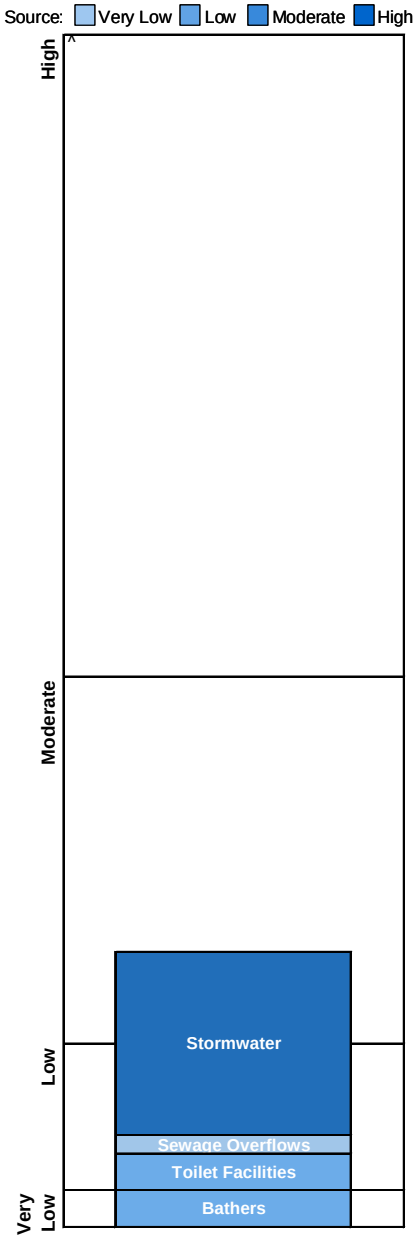
North Steyne Beach is the middle section of Manly Beach. Swimming can be hazardous, as rips occur along the beach. Lifeguards patrol the beach from October to April.

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

The response to rainfall graph indicates that enterococci levels increased with increasing rainfall, often exceeding the safe swimming limit after 20 mm of rainfall or more.

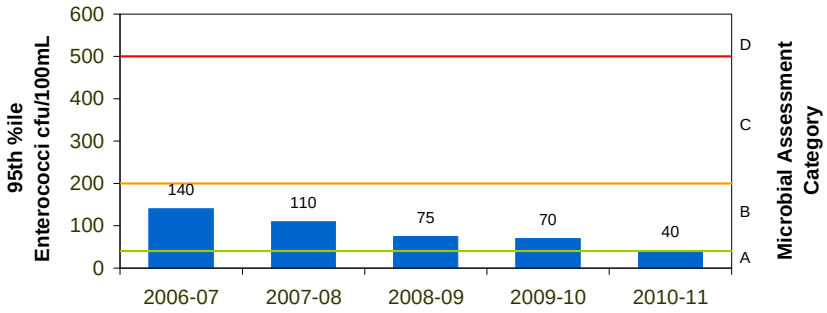
The site has been monitored since 1989, with variation in results since 1990 due to rainfall.

Sanitary Inspection: **Moderate**



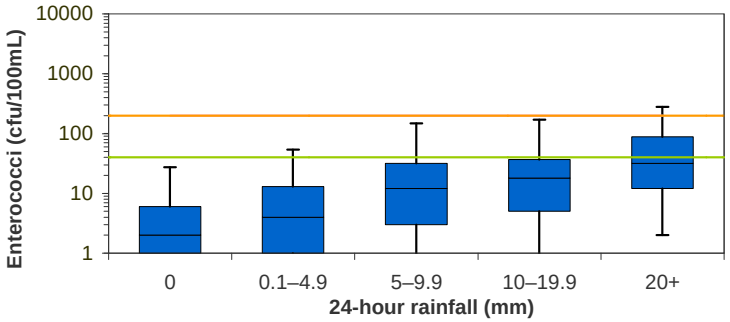
Microbial Assessment: **A**

Monitoring period for 2010–11 result is September 2009 to April 2011.

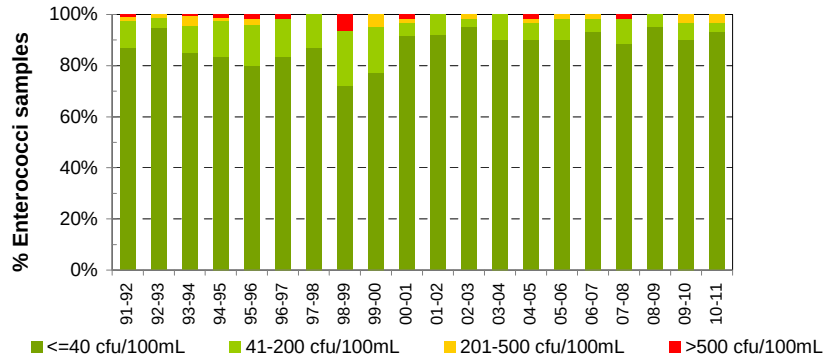


Response to rainfall

Rainfall from Manly rain gauge



Trends in enterococci data through time



South Steyne Beach

Beach Suitability Grade: **Good**

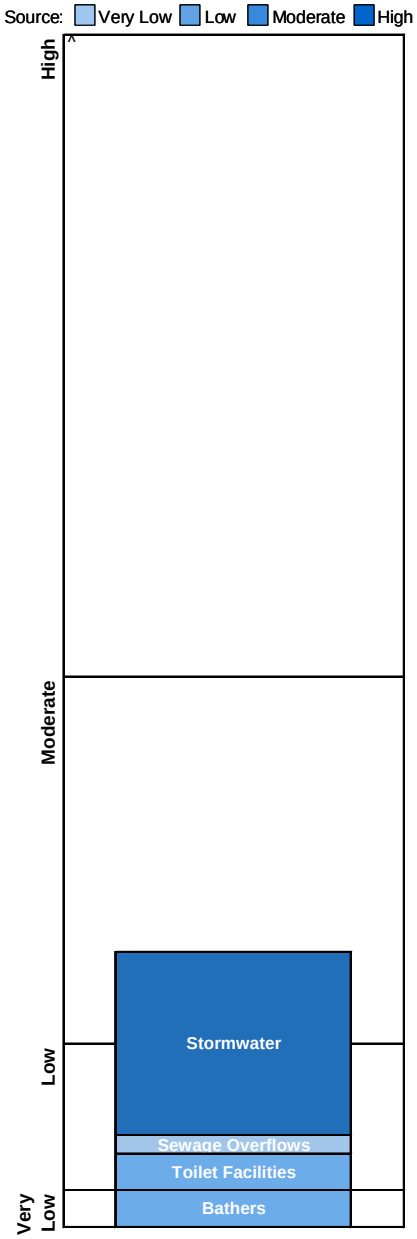
South Steyne Beach is the southern end of Manly Beach. Waves at this end tend to be lower, but rips still persist. Lifeguards patrol the beach year round.

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

The response to rainfall graph indicates that enterococci levels generally increased with increasing rainfall, often exceeding the safe swimming limit after 10 mm of rainfall or more.

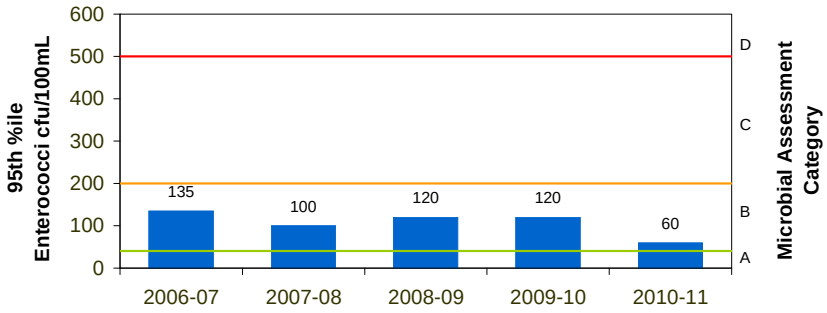
The site has been monitored since 1989, with variation in results since 1990 due to rainfall.

Sanitary Inspection: **Moderate**



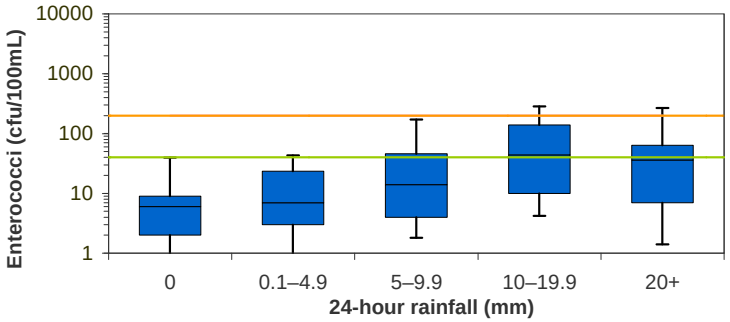
Microbial Assessment: **B**

Monitoring period for 2010–11 result is September 2009 to April 2011.

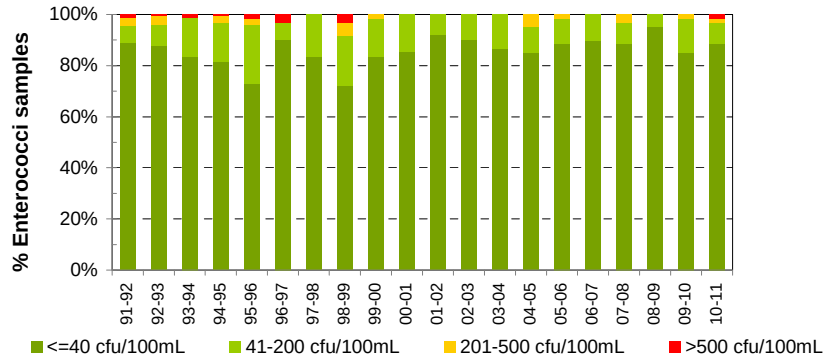


Response to rainfall

Rainfall from Manly rain gauge



Trends in enterococci data through time



Shelly Beach

Beach Suitability Grade: **Good**

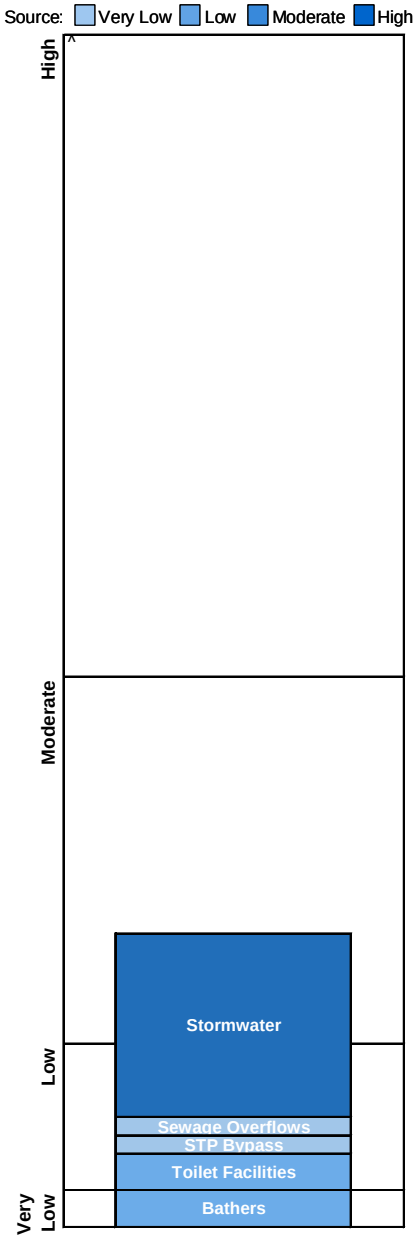
Shelly Beach is backed by a picnic area and reserve. The beach offers no surf and, apart from the deep water close to shore, is relatively safe for swimming. The beach is not patrolled by lifeguards.

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

The response to rainfall graph indicates that enterococci levels increased slightly with increasing rainfall, but mostly remained below the safe swimming limit.

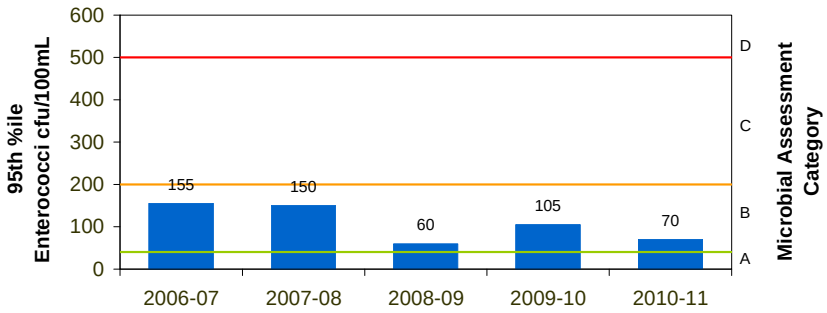
The site has been monitored since 1989. Microbial water quality improved in 2000–2001 when overflows to the bay were sealed. Since then, small variations between years have been the result of rainfall patterns.

Sanitary Inspection: **Moderate**



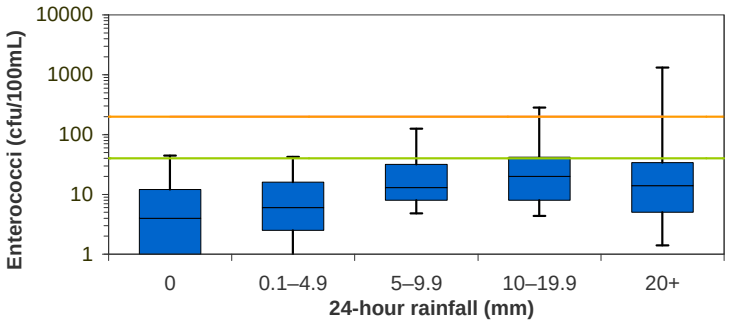
Microbial Assessment: **B**

Monitoring period for 2010–11 result is September 2009 to April 2011.

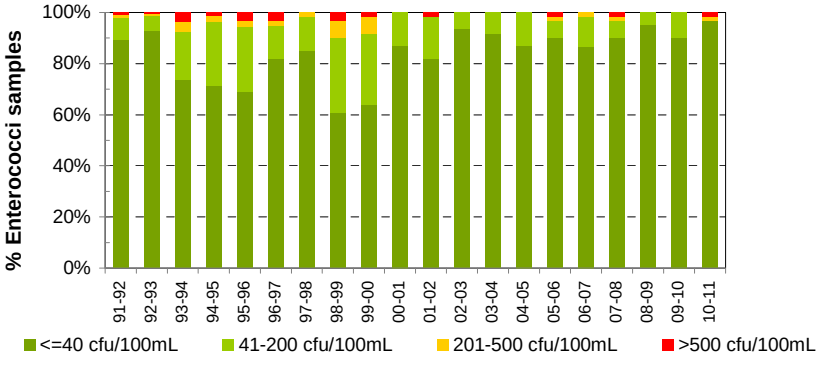


Response to rainfall

Rainfall from Manly rain gauge



Trends in enterococci data through time



Central Sydney Beaches

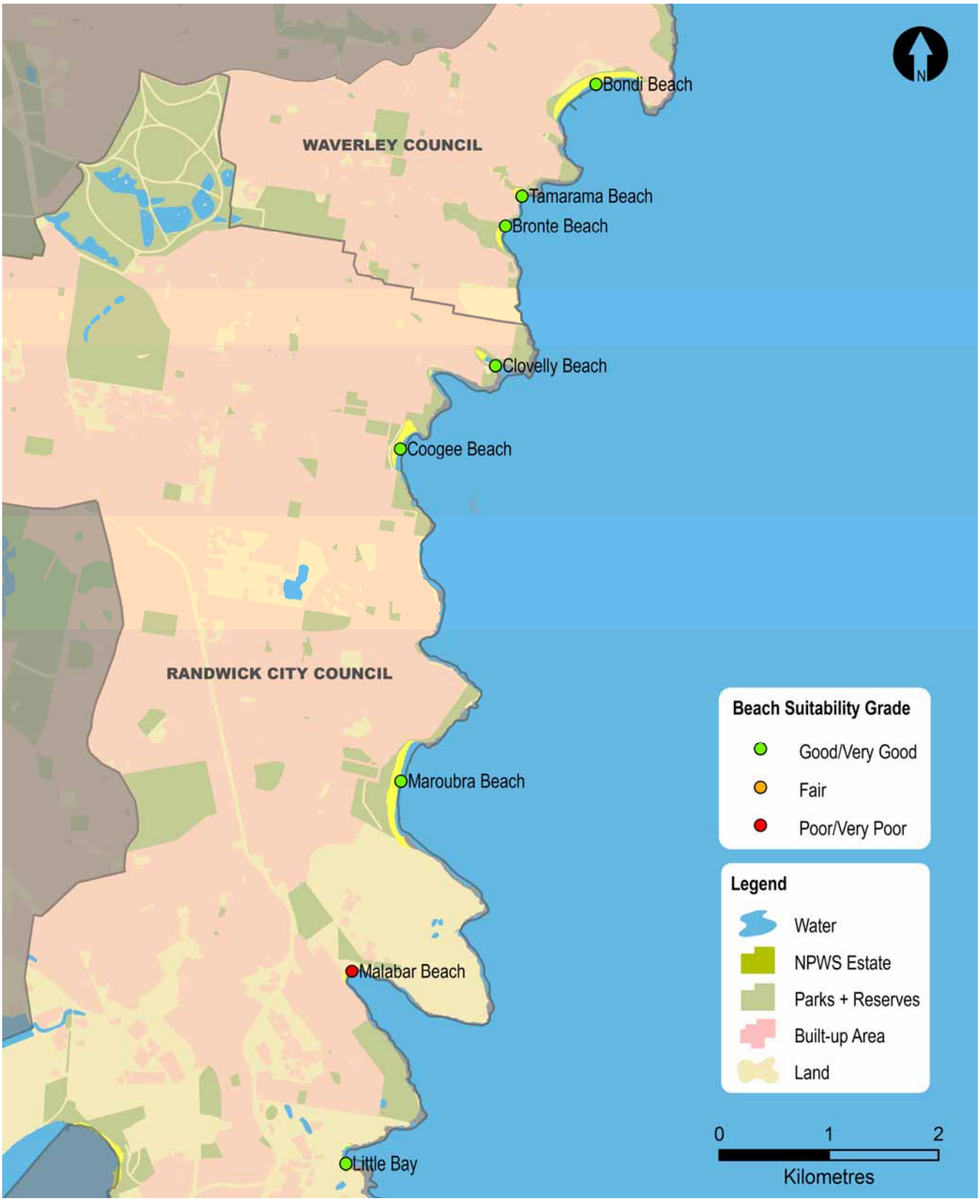


Figure 23: Sampling locations and Beach Suitability Grades in the Central Sydney Beaches area

Overview of the area

Description

The Central Sydney Beaches are located in the Waverley and Randwick City council areas and extend from Bondi Beach in the north to Little Bay Beach in the south.

The council areas have a combined population of approximately 190,000 people and cover an area approximately 46 square kilometres. Land use in the beach catchments is mostly residential, recreation reserves and parks, and commercial.

The area includes the Bronte–Coogee Aquatic Reserve, a four kilometre stretch of coastline between the southern end of Bronte Beach and the rock baths at Coogee Beach.

Rainfall

Extremely high rainfall levels were recorded throughout New South Wales during 2010–2011, with the wettest spring and fifth wettest summer on record. While the Sydney region was generally drier during this period than other areas in New South Wales, November 2010 was a particularly wet month on Sydney's central beaches, with almost double the monthly average rainfall received. After a relatively dry January and February, wet weather continued during March and April 2011, with extremely heavy rainfall recorded in the middle of March with some areas receiving more than 170 mm of rainfall in one day. This rainfall event resulted in significant flash flooding in the Sydney metropolitan area (BOM 2011).

Assessment

Microbial water quality

Enterococci samples at the eight Central Sydney Beaches are collected every sixth day, providing approximately 60 samples each year, well above NHMRC's recommended 20 samples per year.

The Microbial Assessment Category for 2010–2011 was calculated from the most recent 100 data points up until the end of the 2010–2011 swimming season (September 2009 until April 2011).

Sanitary inspections

Sanitary Inspections have been completed for all monitored swimming locations in the Central Sydney Beaches area. These are scheduled for review during 2011–2012.

Beach Suitability Grades

Seven of the eight beaches in the Central Sydney Beaches area were graded as Good during the 2010–2011 swimming season (Figure 23).

Very Good

No beaches were classified as Very Good.

Good

Seven Central Sydney Beaches were graded as Good: Bondi, Tamarama, Bronte, Clovelly, Coogee, Maroubra and Little Bay. These sites had generally good water quality (Microbial Assessment Category B), but had several, or more significant, potential sources of microbial contamination, such as urban stormwater runoff and sewage overflows.

Fair

No beaches were classified as Fair.

Poor

No beaches were classified as Poor.

Very Poor

Malabar Beach was graded as Very Poor. While microbial water quality is often suitable for swimming during dry weather conditions, the site is very susceptible to faecal contamination due to discharge from the stormwater drain on the northern side of the beach. This drain flows following light rainfall and although it is not highly polluted, bacterial levels in the discharge are sufficiently elevated to raise levels in the bay to values unsuitable for swimming. Planning to relocate the drain farther offshore is underway and should result in a long-term improvement in water quality. Swimming at Malabar Beach should be avoided following even light rainfall, or intending swimmers should follow the daily pollution advisory in the Beachwatch Daily Bulletin (www.environment.nsw.gov.au/beach).

Management

Wastewater management

Sydney Water manages the public sewer in the area, including two sewage treatment plants (STPs) (EPA NSW 2011) and several cliff-face outfalls.

Bondi STP services an estimated population of 272,500 and discharges approximately 130 million litres of high-rate primary-treated effluent each day from a deep ocean outfall located 2.2 kilometres offshore at a depth of 63 metres. A $95 million program to modernise and improve the reliability of the STP was completed in 2007. Wastewater re-use

at the STP reduces the discharge to the ocean by approximately 1100 million litres each year.

Malabar STP is the largest STP in the southern hemisphere. It services an estimated population of 1.57 million and discharges approximately 456 million litres of high-rate primary-treated effluent each day from a deep ocean outfall located 3.6 kilometres offshore at a depth of 82 metres.

Untreated sewage from Watsons Bay, Vaucluse, Diamond Bay, Rose Bay North and parts of Dover Heights is discharged to the Tasman Sea from three cliff-face outfalls, at Vaucluse, Diamond Bay and Diamond Bay South (EPA NSW 2011). The volume of untreated sewage discharged is approximately 0.5 per cent of Sydney's sewage (Sydney Water 2003). This area of the coast is very rugged and not accessible for swimming. Sydney Water is currently doing the planning to address the discharge from these outfalls.

Sydney Water is also investigating a number of options to reduce the incidence of wet weather sewage overflows in the Coogee Beach catchment.

Sydney Water is inspecting, cleaning and repairing sewer mains that have a high likelihood of discharging sewage to waterways if they become blocked. When significant tree root intrusion to the public sewer from the private sewer is identified, property owners are requested to remedy the problem.

Sydney Water undertakes dry weather monitoring of main stormwater drains to identify leaks from the sewerage system. Leaks from public sewers are repaired and leaks from private sewers are referred to local councils.

Stormwater management

The Eastern Coastal Catchments Stormwater Management Plan identifies and prioritises actions to improve stormwater quality and reduce flooding in beach catchments. Actions include installation of gross pollutant traps, drain stencilling, community education, street sweeping, and sampling to determine water quality impacts following rainfall.

Gross pollutant traps have been installed in the Bondi Beach, Tamarama Beach, Bronte Beach, Clovelly Beach, Coogee Beach, Maroubra Beach and Malabar Beach catchments.

The Bronte Gully Stormwater Harvesting and Re-use System was commissioned in September 2008. The system captures stormwater runoff and reduces discharges to Bronte Beach. The water is stored in a 120 kilolitre underground tank, treated via backwash filtration and ultraviolet-disinfection and then re-used for toilet and urinal flushing in the amenities block in the park, as well as irrigation, ocean pool cleaning, watering by Bronte Bushcare and general cleaning of public places. The program was funded by the NSW Government's Climate Change Fund and Waverley Council's Environment Levy.

In early 2011, Waverley Council successfully secured funding from the NSW Office of Water to construct a stormwater harvesting and re-use scheme at Bondi Beach. The Bondi Stormwater Project is a water recycling scheme designed to harvest and re-use stormwater currently discharged at the southern end of Bondi Beach. Annually the scheme will harvest and re-use over 50 million litres of stormwater. It will also work to improve the water quality by using biofiltration technology to remove pollutants from excess stormwater discharged at Bondi Beach. The design process for the project is underway, with construction expected to commence in late 2011 (Waverley Council 2011).

Malabar stormwater diversion

The Malabar Beach Working Group included representatives from Randwick City Council, Sydney Water, the Office of Environment and Heritage (OEH) and the local community and was established to investigate and evaluate water quality improvement options at Malabar Beach. The working group found that the stormwater outlet at the northern end of the beach was the main cause of poor microbial water quality at the site.

Randwick City Council, Sydney Water and the Environmental Trust are jointly funding stormwater drainage and diversion works, so that the stormwater discharges to the north end of Malabar Beach are directed to the ocean off Malabar Headland. It is anticipated that these works, when completed, will significantly improve the water quality at Malabar Beach.

Lifeguard service

Waverley Council employs professional lifeguards seven days a week at Bondi, Bronte and Tamarama beaches. Surf Life Saving Club volunteers patrol beaches on weekends and public holidays. Bondi Beach is patrolled all year round whereas Bronte and Tamarama beaches are patrolled from late September until the end of April.

Randwick City Council employs professional lifeguards seven days a week at Clovelly, Coogee and Maroubra beaches. Surf Life Saving Association volunteers patrol beaches on weekends and public holidays. Coogee and Maroubra beaches are patrolled all year round. Clovelly Beach is patrolled from late September until the end of April.

Malabar and Little Bay beaches are not patrolled.

Beach closures by council lifeguards are reported in the Beachwatch Daily Bulletins, with the council updates issued from 9:30 am. Beaches can be closed because of dangerous surf conditions, pollution from stormwater or lagoon outflow, or marine stingers.

Bondi Beach

Beach Suitability Grade: **Good**

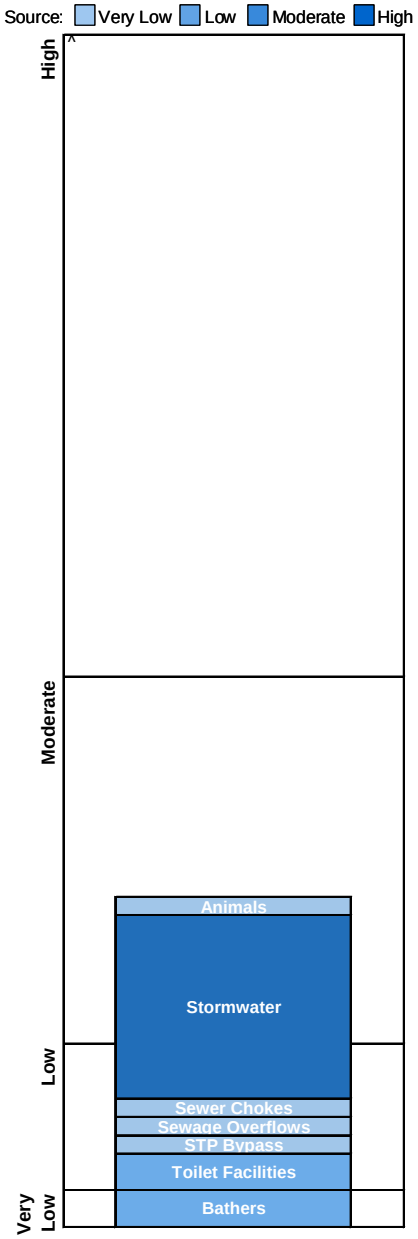
Bondi Beach is 800 metres long and backed by a promenade, car park and parklands. Beach conditions are safest at the northern end and lifeguards patrol the beach year round.

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

The response to rainfall graph indicates that enterococci levels increased with increasing rainfall, occasionally exceeding the safe swimming limit in response to 5 mm of rainfall.

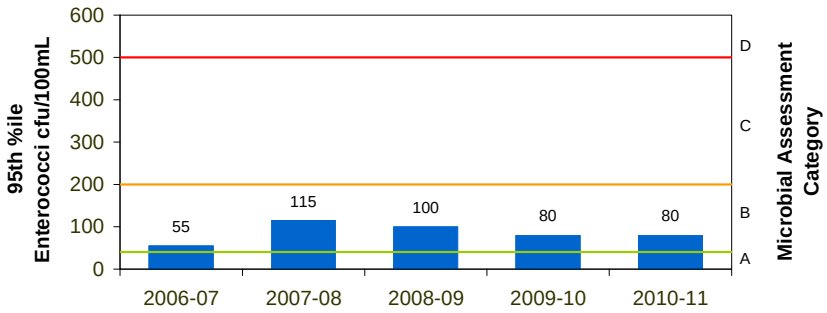
The site has been monitored since 1989. Microbial water quality improved in 1991–1992 following the commissioning of the Bondi Deep Ocean Outfall in August 1991. Variation in subsequent years is due to rainfall.

Sanitary Inspection: **Moderate**



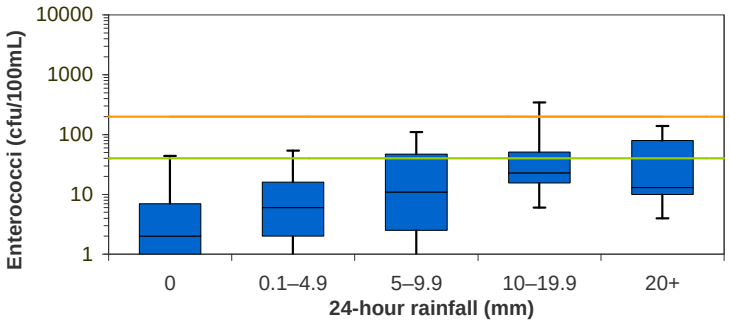
Microbial Assessment: **B**

Monitoring period for 2010–11 result is September 2009 to April 2011.

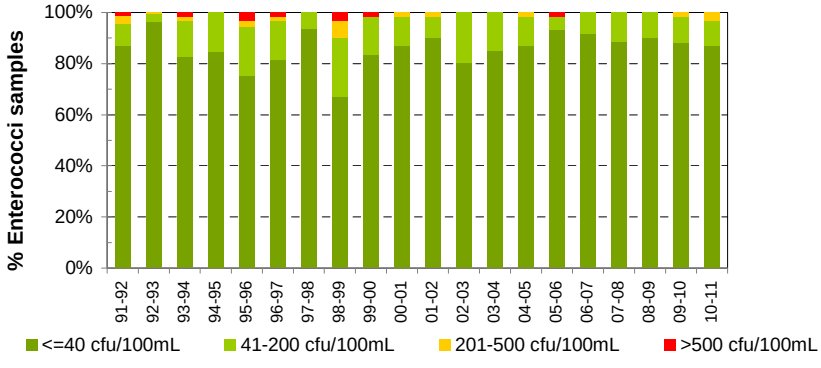


Response to rainfall

Rainfall from Waverly rain gauge



Trends in enterococci data through time



Tamarama Beach

Beach Suitability Grade: **Good**

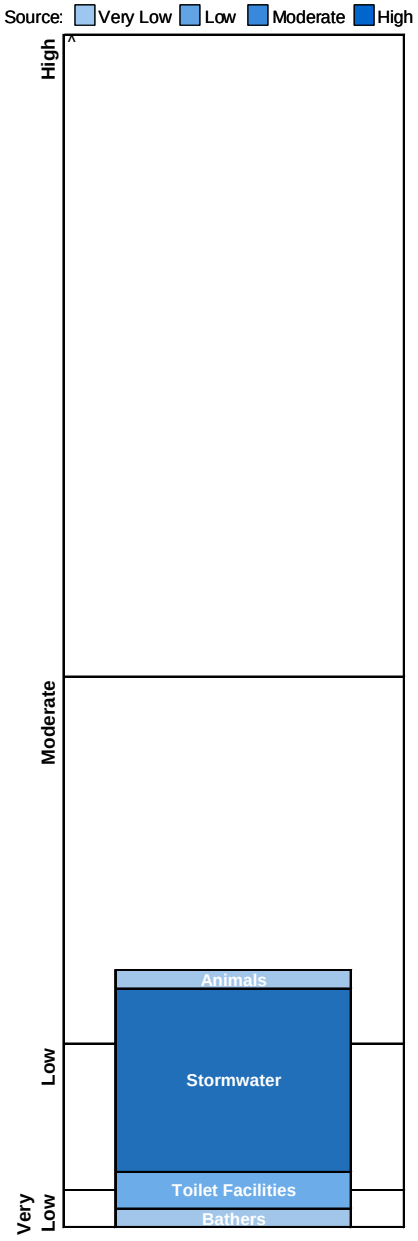
Tamarama Beach is approximately 80 metres long and is closed to board riders during patrol hours. Swimming can be very hazardous because of the rips, and lifeguards patrol the beach from late September to April.

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

The response to rainfall graph indicates that enterococci levels increased with increasing rainfall, regularly exceeding the safe swimming limit in response to 10 mm of rainfall or more.

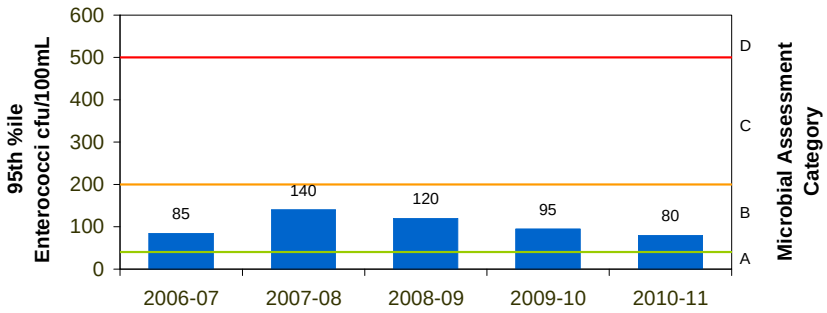
The site has been monitored since 1989. Microbial water quality improved in 1991–1992 following the commissioning of the Bondi Deep Ocean Outfall in August 1991. Variation in subsequent years is due to rainfall.

Sanitary Inspection: **Moderate**



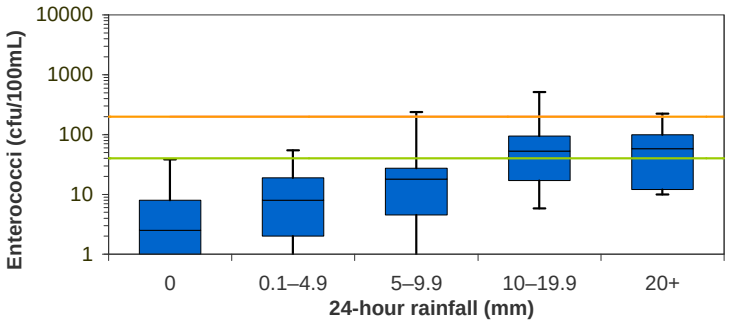
Microbial Assessment: **B**

Monitoring period for 2010–11 result is September 2009 to April 2011.

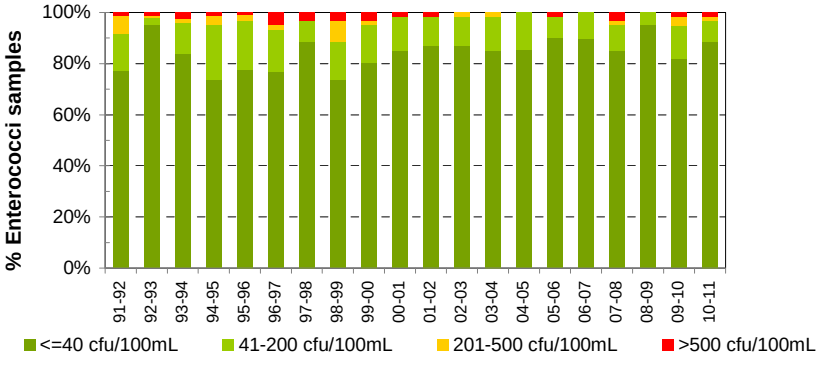


Response to rainfall

Rainfall from Waverly rain gauge



Trends in enterococci data through time



Bronte Beach

Beach Suitability Grade: **Good**

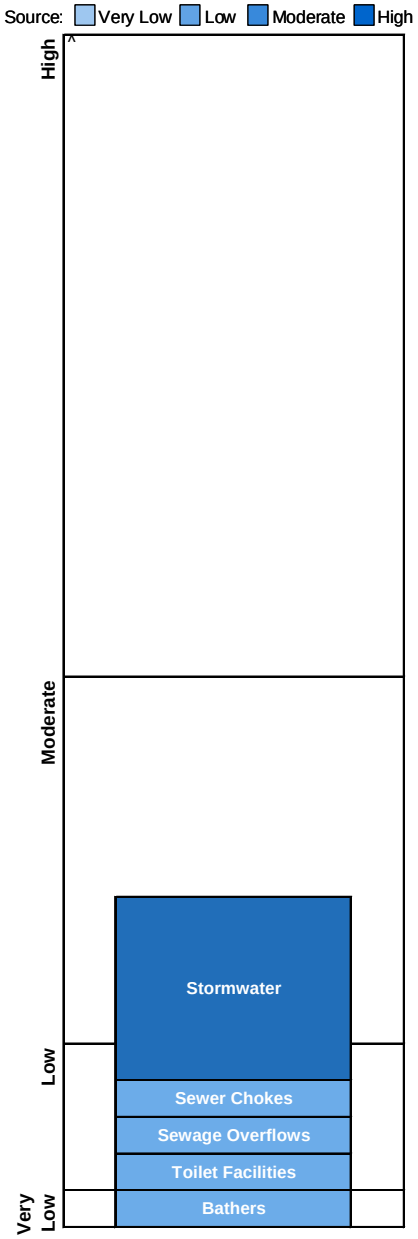
Bronte Beach is 250 metres long and backed by a large park and picnic area. Lifeguards patrol the beach between late September and mid-May.

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

The response to rainfall graph indicates that enterococci levels generally increased with increasing rainfall, often exceeding the safe swimming limit after 5 mm of rainfall or more.

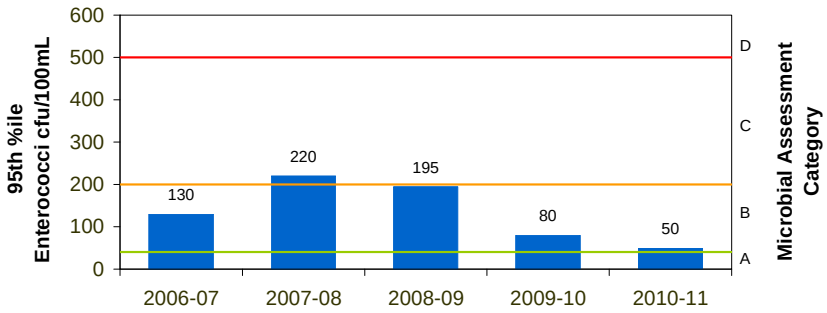
The site has been monitored since 1989. Microbial water quality improved in 1991–1992 following the commissioning of the Bondi Deep Ocean Outfall in August 1991. Variation in subsequent years is due to rainfall patterns.

Sanitary Inspection: **Moderate**



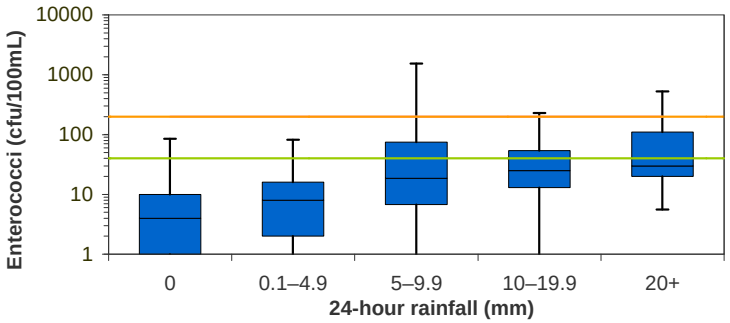
Microbial Assessment: **B**

Monitoring period for 2010–11 result is September 2009 to April 2011.

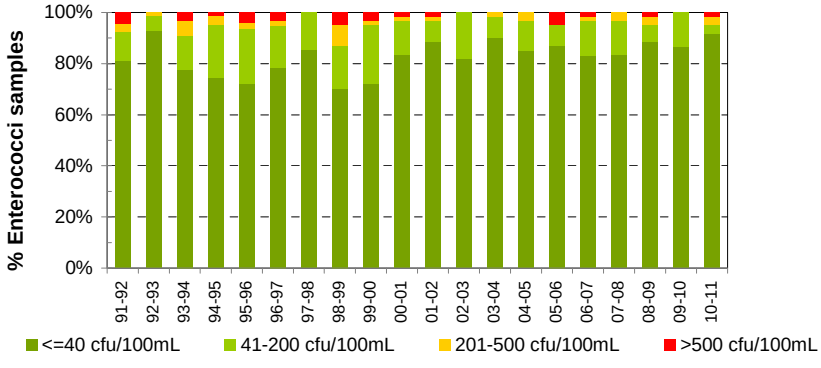


Response to rainfall

Rainfall from Waverly rain gauge



Trends in enterococci data through time



Clovelly Beach

Beach Suitability Grade: **Good**

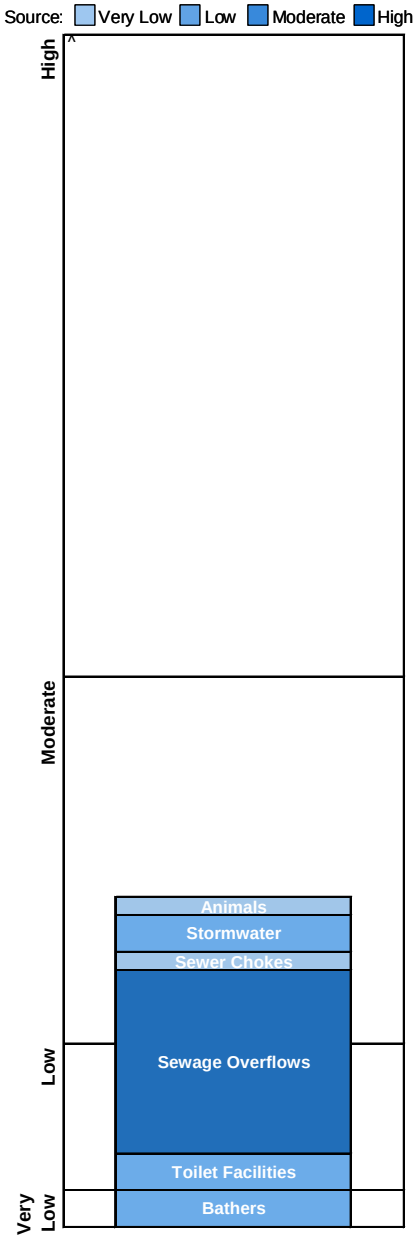
Clovelly Beach backs a long and narrow bay and has a pool-like atmosphere. Wheelchair access to the water is provided. It is one of the safest beaches in Sydney and is patrolled from late September to April.

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

The response to rainfall graph indicates that enterococci levels generally increased with increasing rainfall but rarely exceeded the safe swimming limit in any rainfall category.

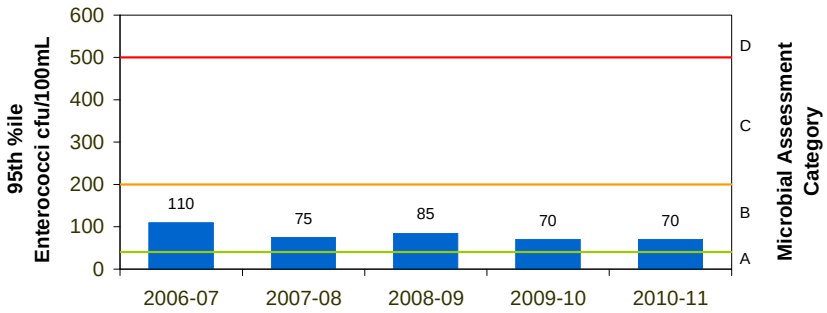
The site has been monitored since 1989. Variation in microbial water quality has been the result of rainfall patterns, with 1998–1999 a year with particularly high rainfall.

Sanitary Inspection: **Moderate**



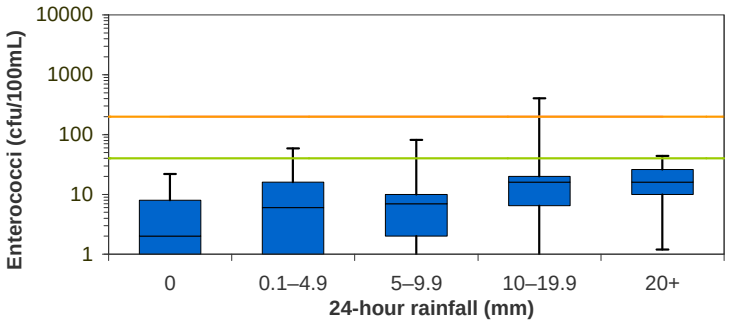
Microbial Assessment: **B**

Monitoring period for 2010–11 result is September 2009 to April 2011.

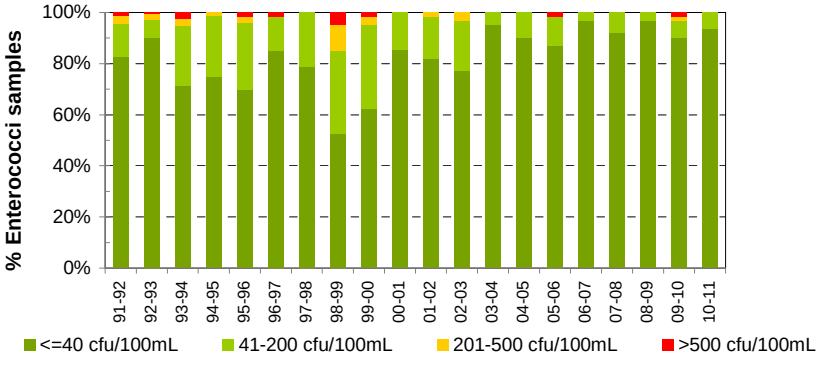


Response to rainfall

Rainfall from Waverly rain gauge



Trends in enterococci data through time



Coogee Beach

Beach Suitability Grade: **Good**

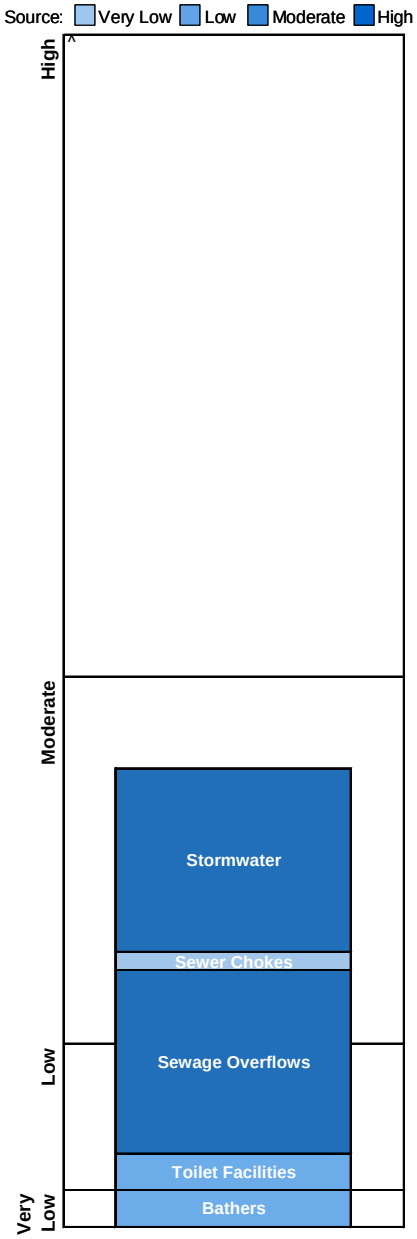
Coogee Beach is 400 metres long and is backed by a promenade and parklands. The beach has a reputation for safe swimming and lifeguards patrol the beach all year round.

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

The response to rainfall graph indicates that enterococci levels increased with increasing rainfall, often exceeding the safe swimming limit after 5 mm of rainfall or more.

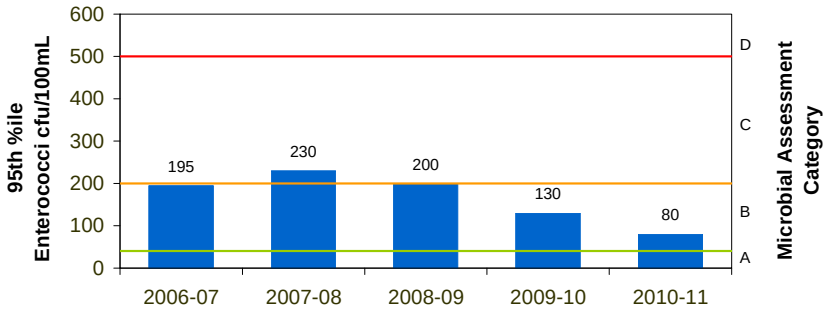
The site has been monitored since 1989, with variation in results since 1990 due to rainfall patterns.

Sanitary Inspection: **Moderate**



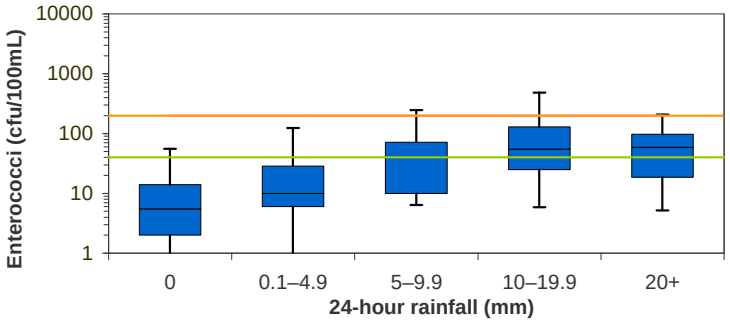
Microbial Assessment: **B**

Monitoring period for 2010–11 result is September 2009 to April 2011.

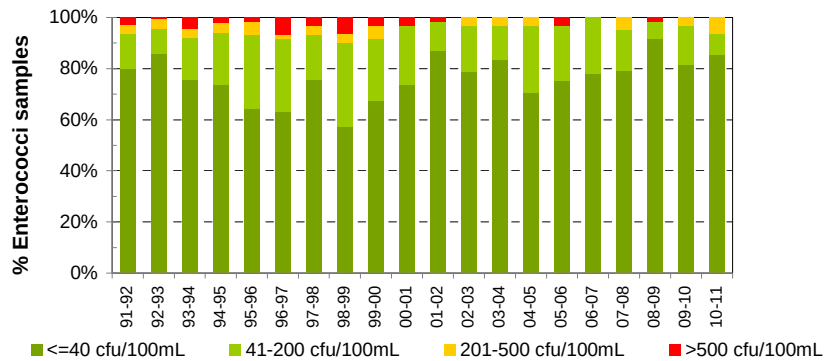


Response to rainfall

Rainfall from Malabar STP rain gauge



Trends in enterococci data through time



Maroubra Beach

Beach Suitability Grade: **Good**

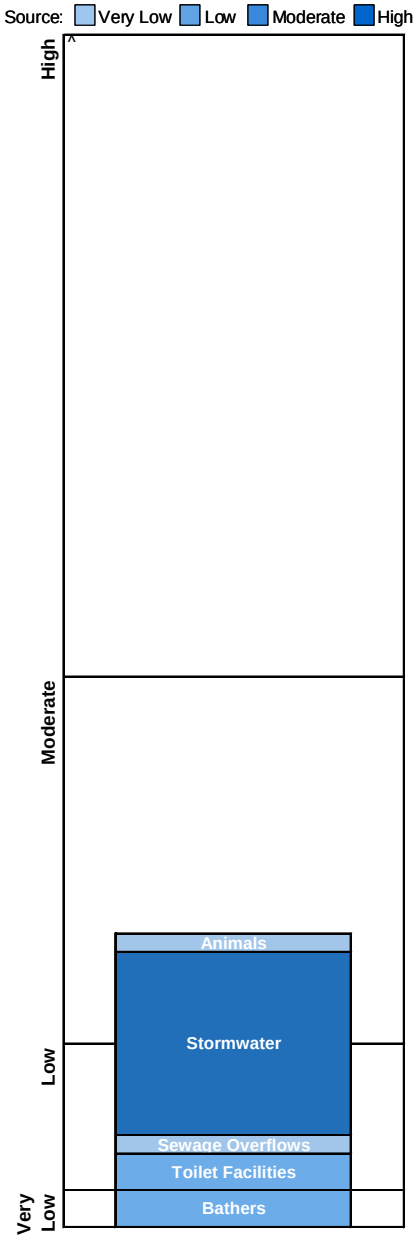
Maroubra Beach is one kilometre long. Strong rips create hazardous conditions at the beach, particularly in the centre and north. Lifeguards patrol the beach all year round.

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

The response to rainfall graph indicates that enterococci levels increased slightly with increasing rainfall but generally remained below the safe swimming limit across all rainfall categories.

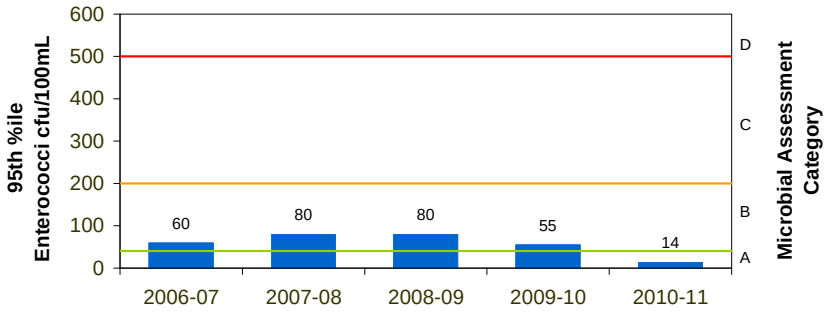
The site has been monitored since 1989, with variation in results since 1990 due to rainfall patterns.

Sanitary Inspection: **Moderate**



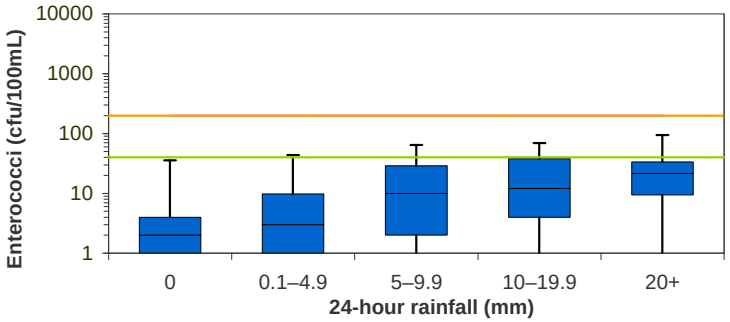
Microbial Assessment: **A**

Monitoring period for 2010–11 result is September 2009 to April 2011.

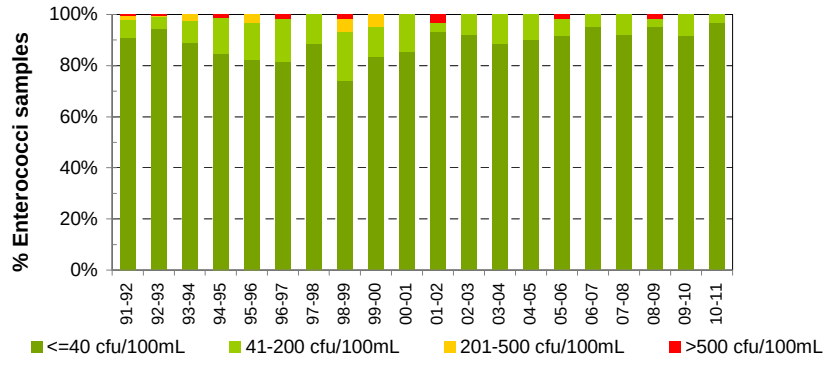


Response to rainfall

Rainfall from Malabar STP rain gauge



Trends in enterococci data through time



Malabar Beach

Beach Suitability Grade: **Very Poor**

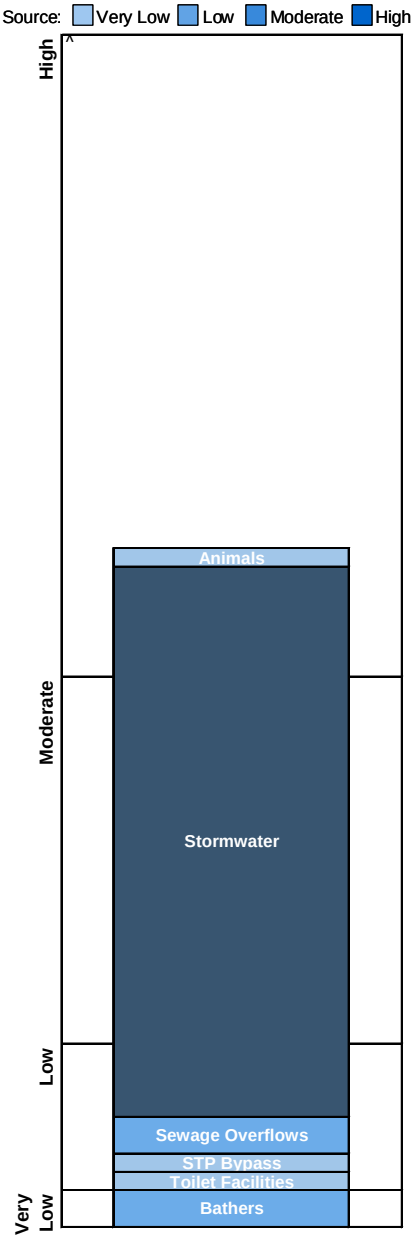
Malabar Beach is 150 metres long and situated at the end of a long, narrow bay. It is backed by a small park and picnic area. The beach is not patrolled.

The Beach Suitability Grade of Very Poor indicates that microbial water quality is highly influenced by faecal pollution, with elevated enterococci levels often recorded. The stormwater drain at the northern end of the beach has been identified as the primary source of faecal contamination at the site.

The response to rainfall graph indicates that enterococci levels generally increased with increasing rainfall, often exceeding the safe swimming limit in response to low levels of rainfall.

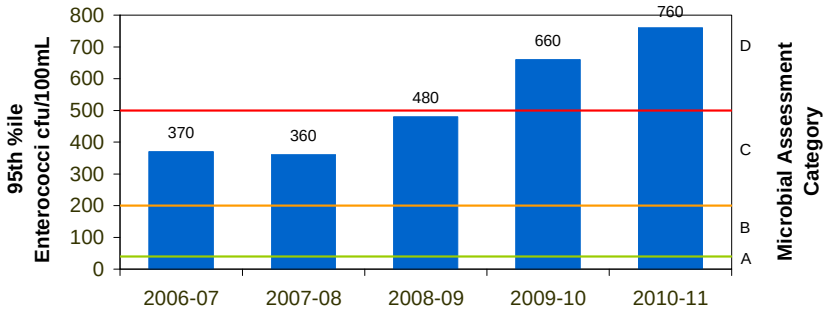
The site has been monitored since 1989, with variation in results since 1990 due to rainfall.

Sanitary Inspection: **High**



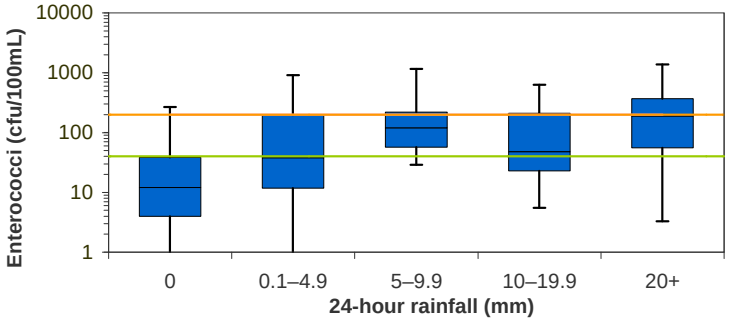
Microbial Assessment: **D**

Monitoring period for 2010–11 result is September 2009 to April 2011.

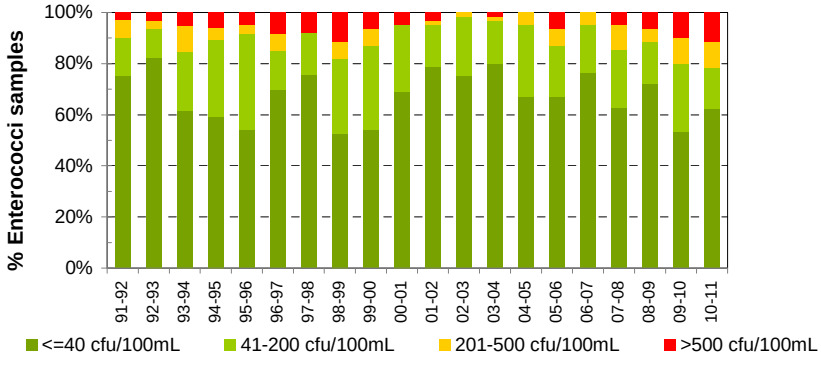


Response to rainfall

Rainfall from Malabar STP rain gauge



Trends in enterococci data through time



Little Bay Beach

Beach Suitability Grade: **Good**

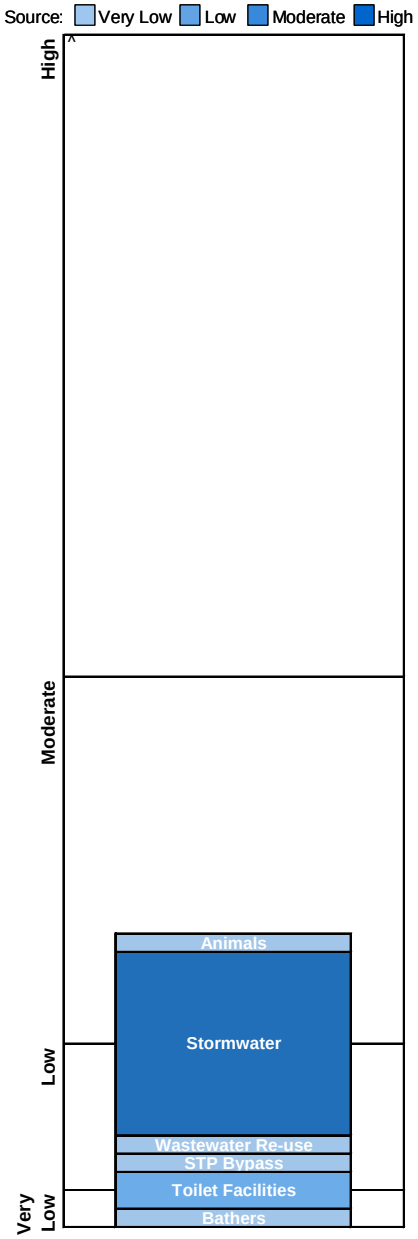
Little Bay Beach is a small, crescent-shaped beach bounded by rocky headlands to the north and south. Beach conditions are generally calm and the beach is not patrolled. The bay is backed by a golf course and a new residential development.

The Beach Suitability Grade of Good indicates that water quality is safe for swimming most of the time, but the water can be susceptible to pollution, with several potential sources of faecal contamination.

The response to rainfall graph indicates that enterococci levels increased with increasing rainfall, often exceeding the safe swimming limit after 20 mm of rainfall or more.

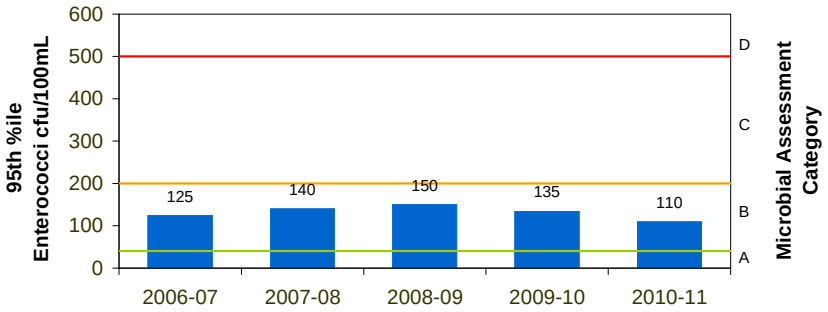
The site was monitored between 1989 and 1995. Sampling recommenced in 2006 in response to the increased popularity of the beach as a result of surrounding urban development. Variation among years is due to rainfall.

Sanitary Inspection: **Moderate**



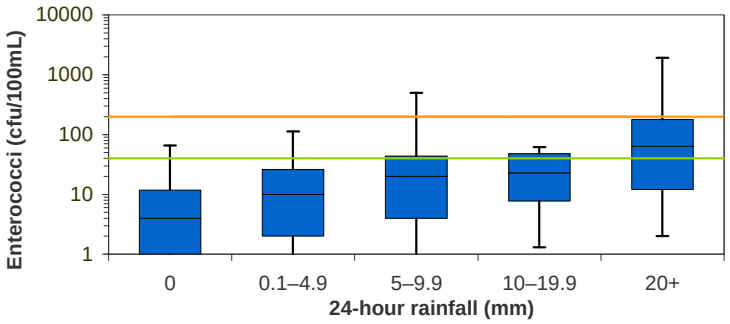
Microbial Assessment: **B**

Monitoring period for 2010–11 result is September 2009 to April 2011.

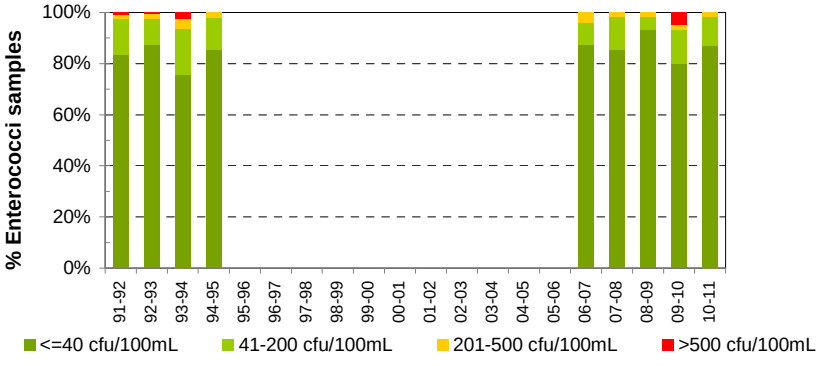


Response to rainfall

Rainfall from Malabar STP rain gauge



Trends in enterococci data through time



Southern Sydney Beaches

Figure 24: Sampling locations and Beach Suitability Grades in Sydney Southern Beaches area

Overview of the area

Description

The Southern Sydney Beaches are located in the Sutherland Shire Council area and extend around Bate Bay, from Potter Point in the north to the mouth of Port Hacking in the south.

Sutherland Shire Council has a population of approximately 215,000 people and covers an area approximately 370 square kilometres. Land use in the beach catchments is mostly recreational reserves and parks, residential, commercial and some industrial.

The area includes the Boat Harbour Aquatic Reserve on the southern end of the Kurnell Peninsula which covers Merries Reef, Pimelwi Rocks and Boat Harbour.

Rainfall

Extremely high rainfall levels were recorded throughout New South Wales during 2010–2011, with the wettest spring and fifth wettest summer on record. While the Sydney region was generally drier during this period than other areas in New South Wales, November 2010 was a particularly wet month on Sydney's southern beaches, with almost double the monthly average rainfall received. After a relatively dry January and February, wet weather continued during March and April 2011, with extremely heavy rainfall recorded in the middle of March when more than 120 mm of rain fell in one day (BOM 2011).

Assessment

Microbial water quality

Enterococci samples at the eight Southern Sydney Beaches are collected every sixth day, providing approximately 60 samples each year – well above NHMRC's recommended 20 samples per year.

The Microbial Assessment Category for 2010–2011 was calculated from the most recent 100 data points up until the end of the 2010–2011 swimming season (September 2009 until April 2011).

Sanitary inspections

Sanitary inspections have been completed for all monitored swimming locations in the Southern Sydney Beaches area. These are scheduled for review during 2011–2012.

Beach Suitability Grades

All eight locations in the Sydney Southern Beaches area were graded as Very Good or Good during the 2010–2011 swimming season (Figure 24).

Very Good

Seven beaches were graded as Very Good: Greenhills Beach, Wanda Beach, Elouera Beach, North Cronulla Beach, South Cronulla Beach, Shelly Beach (Sutherland) and Oak Park.

These sites all had excellent water quality (Microbial Assessment Category A) and few potential sources of microbial contamination (Sanitary Inspection Categories of Low).

Good

One beach graded as Good: Boat Harbour.

This site had mostly good water quality (Microbial Assessment Category B) and several potential sources of microbial contamination, including on-site sewage management systems and sewage treatment plant bypasses.

Fair

No beaches were classified as Fair.

Poor

No beaches were classified as Poor.

Very Poor

No beaches classified as Very Poor.

Management

Wastewater management

Sydney Water manages the public sewer in the area, including the Cronulla Sewage Treatment Plant (STP). The plant services an estimated population of 200,000 and discharges approximately 54 ML of tertiary-treated and disinfected effluent each day from the shoreline outfall at Potter Point (EPA NSW 2011).

Cronulla STP was upgraded in April 2001, and the work resulted in significant improvements in the water quality at ocean beaches in this area (refer to trends in enterococci measurements through time graphs on the beach pages).

To reduce the incidence of wet weather sewage overflows in beach catchments across the Cronulla Peninsula, Sydney Water has amplified sewer pipes and pumps and included storage tanks.

Sydney Water is also inspecting, cleaning and repairing sewer mains that have a high likelihood of discharging sewage to waterways if they become blocked. When significant tree root intrusion to the public sewer from the private sewer is identified, property owners are requested to remedy the problem.

Sydney Water monitors the dry weather water quality of main stormwater drains in the area to identify sewer leaks. Leaks from public sewers are repaired by Sydney Water and leaks from private sewers are referred to the local council.

In August 2011, work was completed on a $4 million recycled water facility, which treats wastewater to irrigate ovals and recreation areas in the eastern part of the shire. The Cronulla–Woolooware Wastewater Recycling Project was jointly funded by the council, the NSW Government's climate change fund, and private users. Works included the design and construction of a wastewater treatment facility, pumping station and 4.5 kilometres of pipelines. The treatment plant takes the tertiary treated effluent from the Sydney Water Cronulla Wastewater Treatment Plant, and applies additional disinfection treatments and removes phosphorus before it is delivered to nearby playing fields, gardens and golf courses for irrigation (Sutherland Shire Council 2011).

There are 27 registered on-site sewage disposal systems in the shanty village behind Boat Harbour. These systems have not been approved by Sutherland Shire Council and have not been inspected.

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Stormwater management

The Hacking River Stormwater Management Plan identifies and prioritises actions to improve stormwater quality and reduce flooding in beach catchments in Bate Bay. Sutherland Shire Council has also prepared a coastal management plan for Bate Bay; it covers beach facilities and use, safety, vegetation, water quality and emergency action plans.

Sutherland Shire Council has installed more than 20 systems to improve stormwater quality, including artificial wetlands, gross pollutant traps, continuous deflective separators and natural sand drainage systems. It has also undertaken education programs, drain stencilling and water quality monitoring of the drainage system.

Lifeguard service

Sutherland Shire Council employs professional lifeguards at Wanda, Elouera, North Cronulla and South Cronulla beaches. Surf Life Saving Club volunteers patrol beaches on weekends and public holidays. Beaches are patrolled from October to April, with the popular North and South Cronulla beaches patrolled all year round. South Cronulla Beach is patrolled daily whereas North Cronulla is patrolled on weekdays only.

Boat Harbour, Greenhills, Shelly and Oak Park beaches are not patrolled.

Beach closures by council lifeguards are reported in the Beachwatch Daily Bulletins, with the council updates issued from 9:30 am. Beaches can be closed because of dangerous surf conditions, pollution from stormwater or lagoon outflow, or marine stingers.

Boat Harbour

Beach Suitability Grade: **Good**

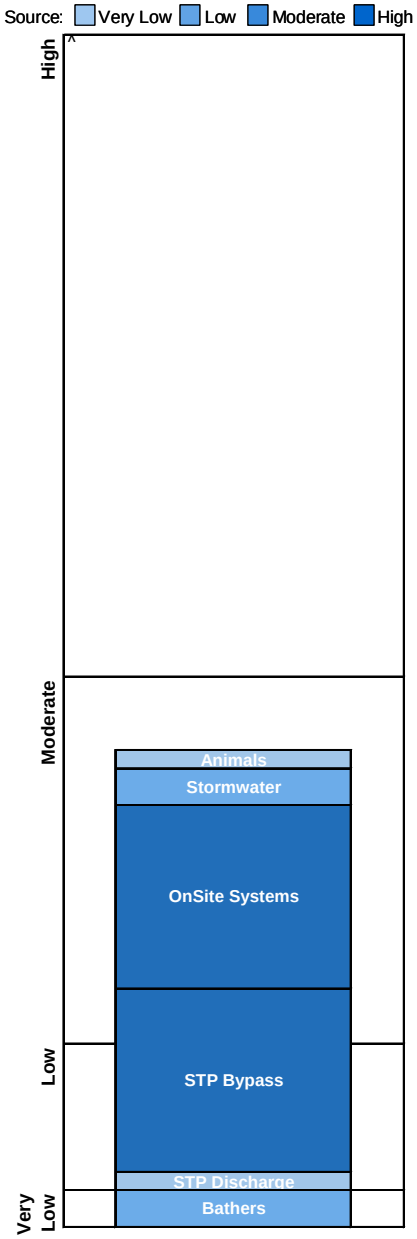
Boat Harbour is a narrow, 150 metre long private beach at the northern end of Bate Bay. It is the closest beach to the Cronulla STP Potter Point outfall. Boat Harbour is not patrolled by lifeguards.

The Beach Suitability Grade of Good indicates that microbial water quality is suitable for swimming most of the time but the water may be susceptible to pollution from several potential sources of faecal contamination, including on-site systems and STP bypass.

The response to rainfall graph indicates that bacterial levels remain slightly elevated during dry and wet weather conditions.

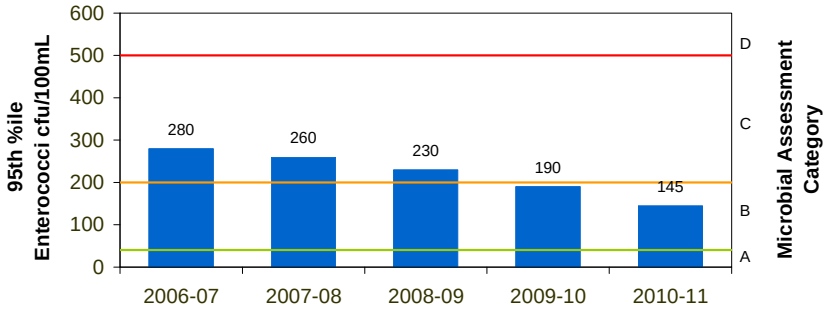
The site has been monitored since 1989. Microbial water quality improved in 2001–2002 following the upgrade of the Cronulla STP in April 2001. Leachate from the unsewered development behind the beach is a likely cause of the ongoing, low levels of microbial contamination.

Sanitary Inspection: **Moderate**



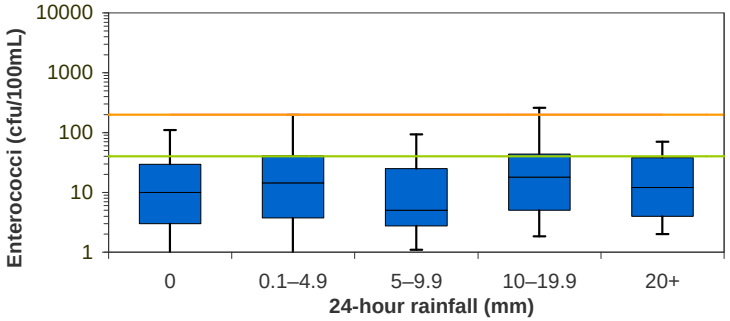
Microbial Assessment: **B**

Monitoring period for 2010–11 result is September 2009 to April 2011.

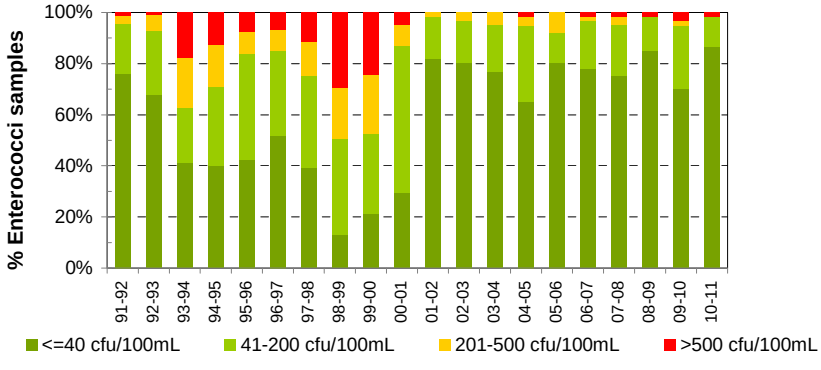


Response to rainfall

Rainfall from Cronulla STP rain gauge

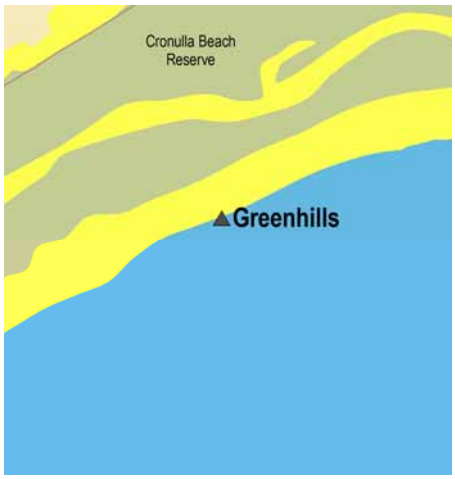


Trends in enterococci data through time



Greenhills Beach

Beach Suitability Grade: **Very Good**



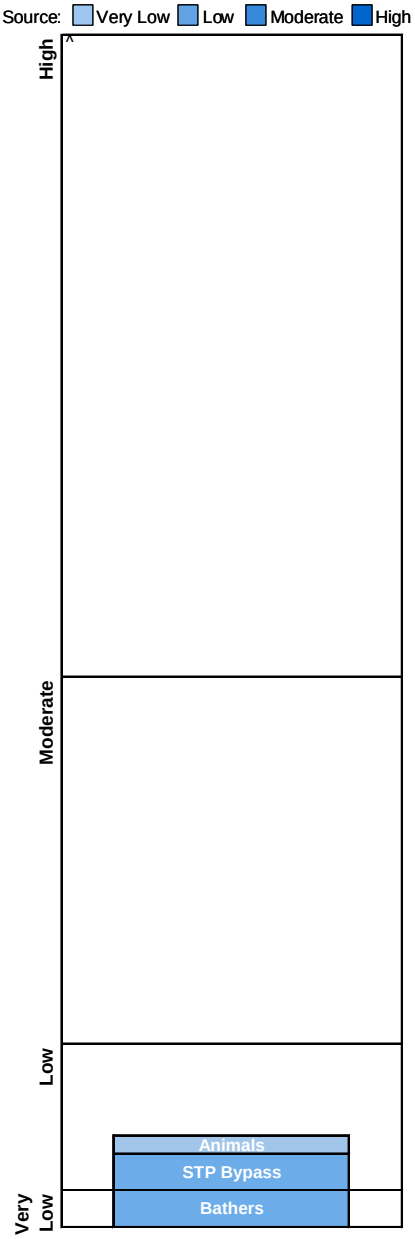
Greenhills Beach is three kilometres long and situated at the northern end of Bate Bay. Merries Reef protects the beach at the north end from the larger waves and rips common at the southern end. The beach is not patrolled.

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

The response to rainfall graph indicates that enterococci levels had little response to rainfall and generally remained below the safe swimming limit across all rainfall categories.

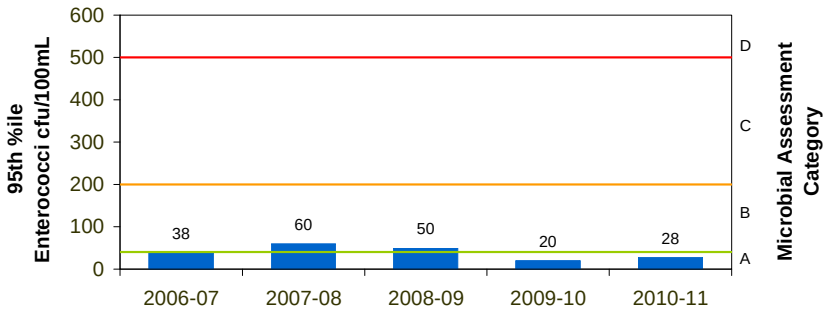
The site has been monitored since 1989. Microbial water quality improved in 2001–2002 following the upgrade of the Cronulla STP in April 2001. Since then, small variation among years has been due to rainfall patterns.

Sanitary Inspection: **Low**



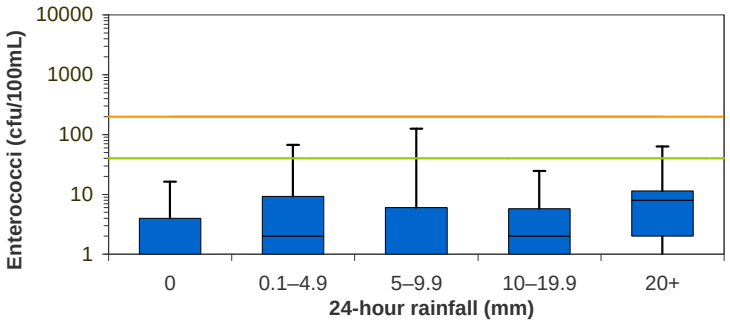
Microbial Assessment: **A**

Monitoring period for 2010–11 result is September 2009 to April 2011.

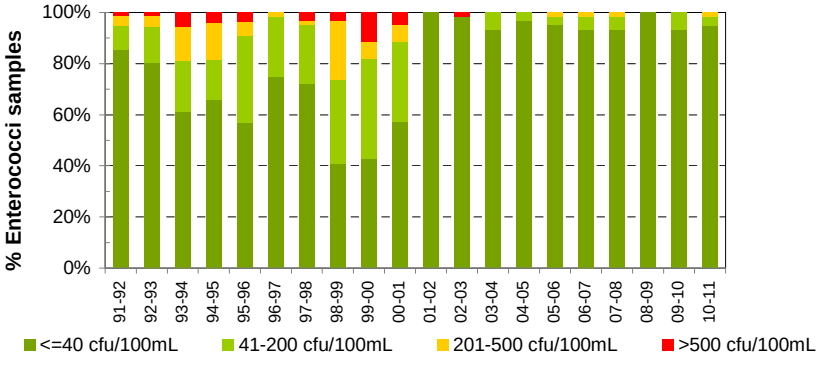


Response to rainfall

Rainfall from Cronulla STP rain gauge



Trends in enterococci data through time



Wanda Beach

Beach Suitability Grade: **Very Good**

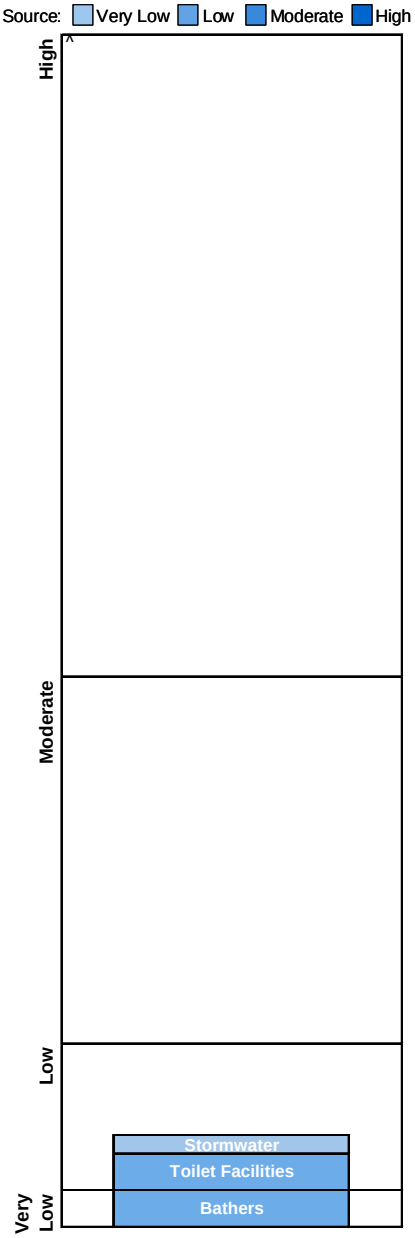
Wanda, Elouera and North Cronulla beaches form a 1.5 kilometre stretch of beach towards the southern end of Bate Bay. Swimming can be hazardous, with numerous rips. Lifeguards patrol from October to April.

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

The response to rainfall graph indicates that enterococci levels had little response to rainfall and generally remained below the safe swimming limit across all rainfall categories.

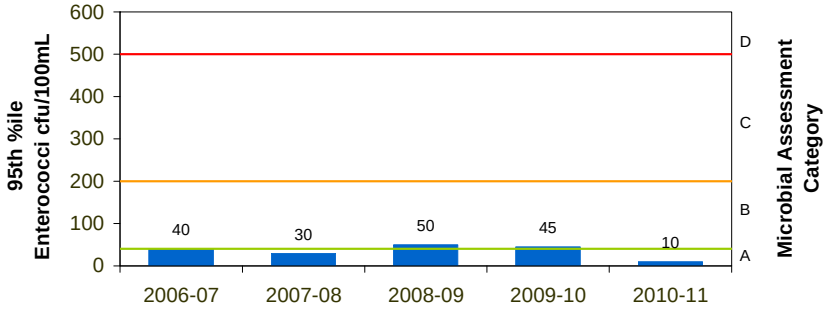
The site has been monitored since 1989. Microbial water quality improved in 2001–2002 following the upgrade of the Cronulla STP in April 2001.

Sanitary Inspection: **Low**



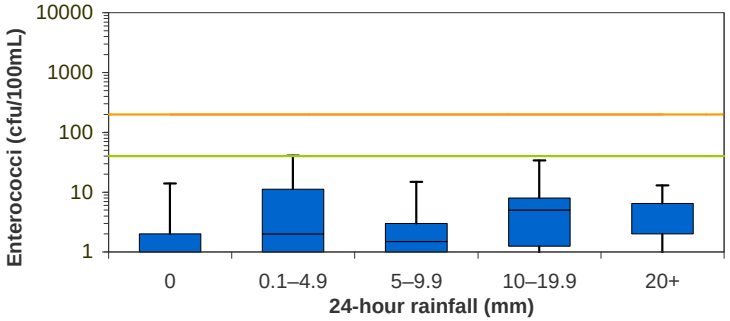
Microbial Assessment: **A**

Monitoring period for 2010–11 result is September 2009 to April 2011.

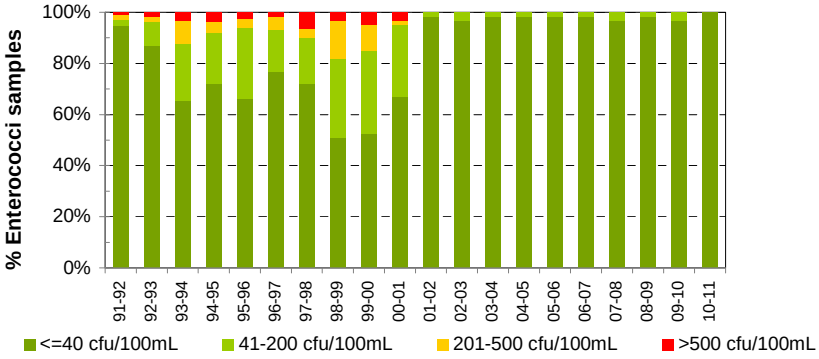


Response to rainfall

Rainfall from Cronulla STP rain gauge



Trends in enterococci data through time



Elouera Beach

Beach Suitability Grade: **Very Good**

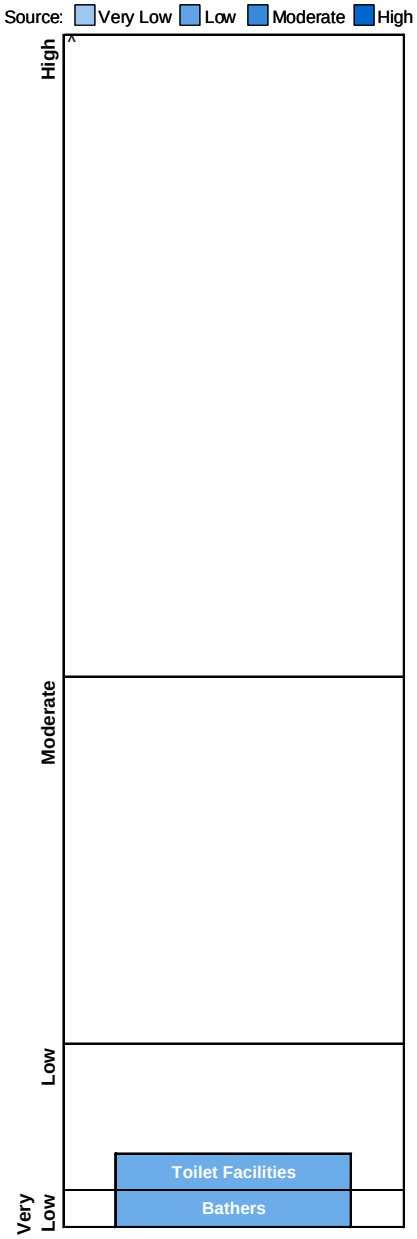
Wanda, Elouera and North Cronulla beaches form a 1.5 kilometre stretch of beach towards the southern end of Bate Bay. Swimming can be hazardous, with numerous rips, and lifeguards patrol the beach from October to April.

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

The response to rainfall graph indicates that enterococci levels had little response to rainfall and generally remained below the safe swimming limit across all rainfall categories.

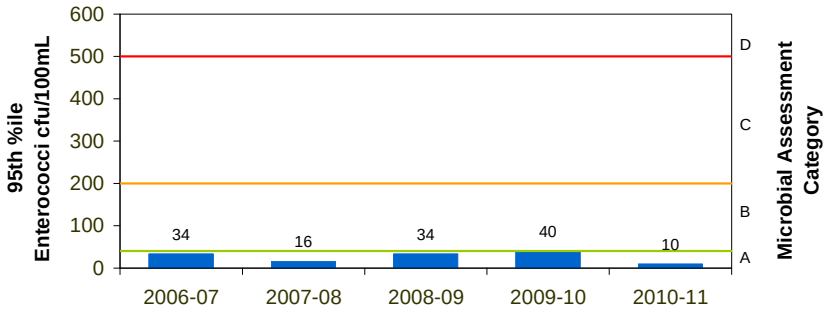
The site has been monitored since 1989. Microbial water quality improved in 2001–2002 following the upgrade of the Cronulla STP in April 2001.

Sanitary Inspection: **Low**



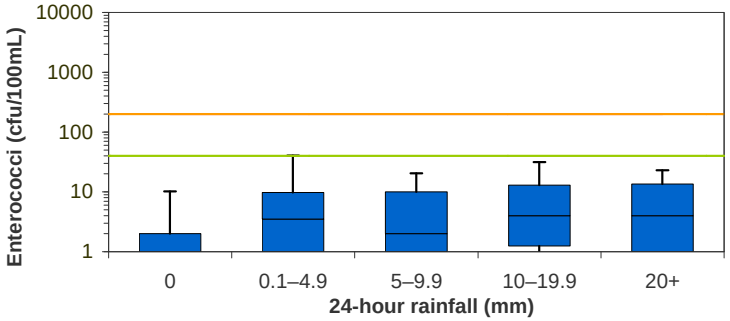
Microbial Assessment: **A**

Monitoring period for 2010–11 result is September 2009 to April 2011.

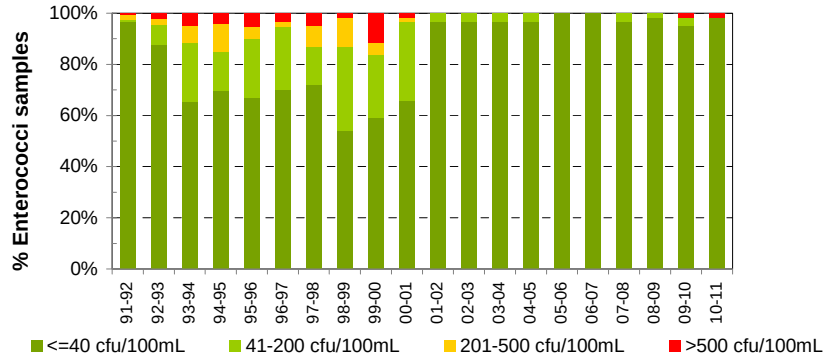


Response to rainfall

Rainfall from Cronulla STP rain gauge



Trends in enterococci data through time



North Cronulla Beach

Beach Suitability Grade: **Very Good**

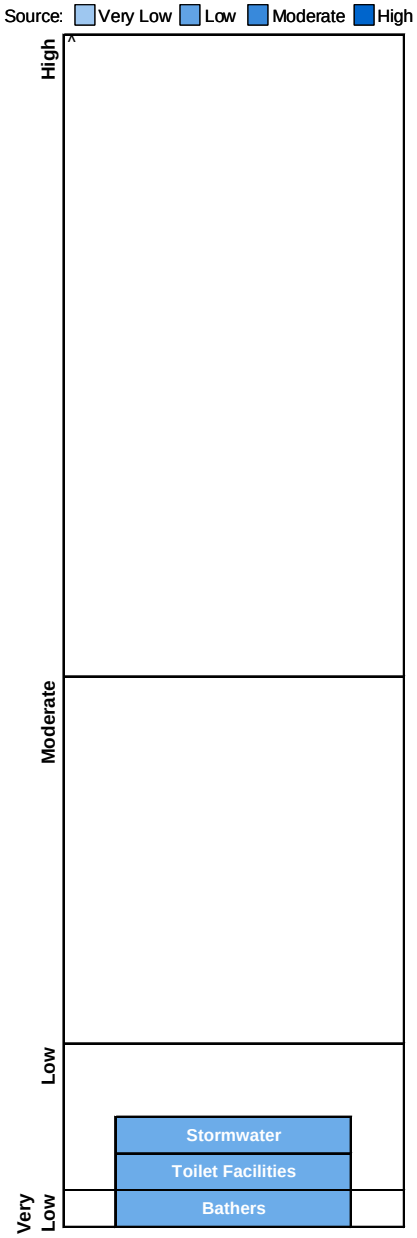
North Cronulla beach is at the southern end of a 1.5 kilometre stretch of beach in Bate Bay. Swimming can be hazardous, with numerous rips. Lifeguards patrol the beach all year round.

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

The response to rainfall graph indicates that enterococci levels increased in response to 20 mm or more of rain.

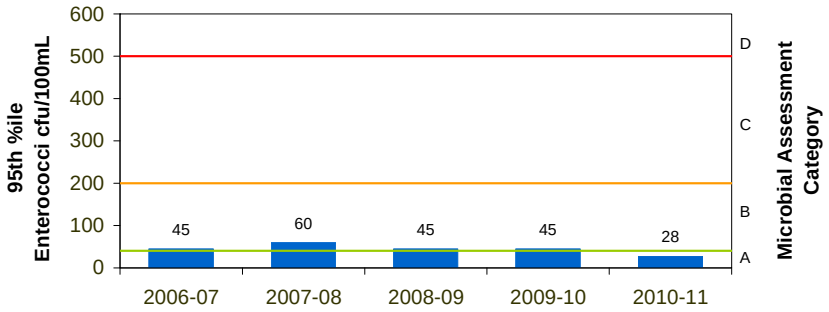
The site has been monitored since 1989. Microbial water quality improved in 2001–2002 following the upgrade of the Cronulla STP in April 2001.

Sanitary Inspection: **Low**



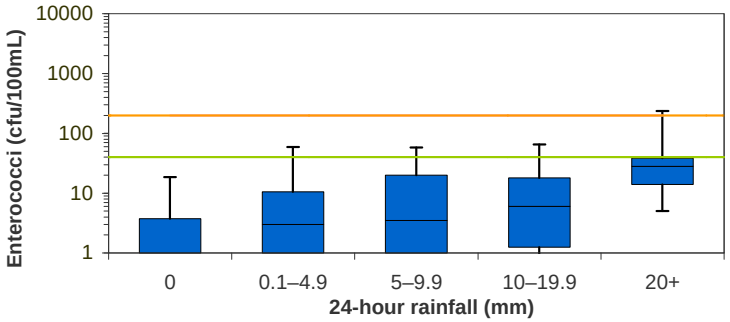
Microbial Assessment: **A**

Monitoring period for 2010–11 result is September 2009 to April 2011.

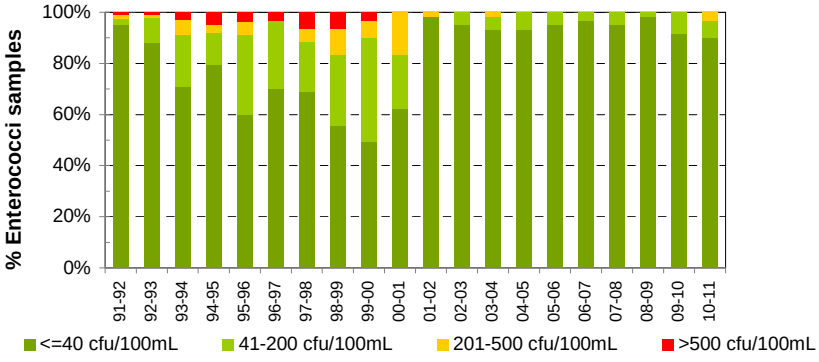


Response to rainfall

Rainfall from Cronulla STP rain gauge



Trends in enterococci data through time



South Cronulla Beach

Beach Suitability Grade: **Very Good**

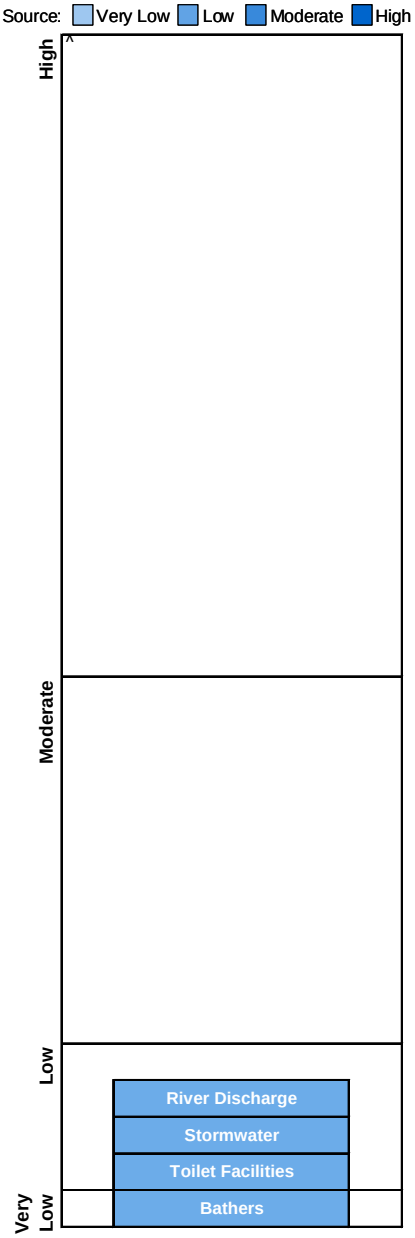
South Cronulla beach is 300 metres long and situated at the southern end of Bate Bay. Swimming is relatively safe, but rips occasionally form at either end of the beach. Lifeguards patrol the beach all year round.

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

The response to rainfall graph indicates that enterococci levels increased slightly with increasing rainfall, but rarely exceeded the safe swimming limit in any rainfall category.

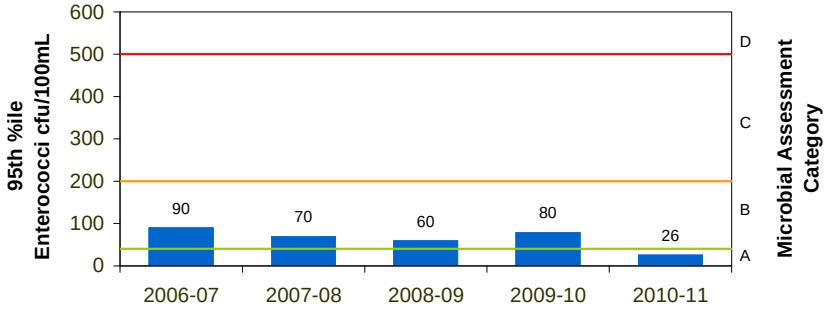
The site has been monitored since 1989. Microbial water quality improved in 2001–2002 following the upgrade of the Cronulla STP in April 2001. Since then, small variations among years have been the result of rainfall.

Sanitary Inspection: **Low**



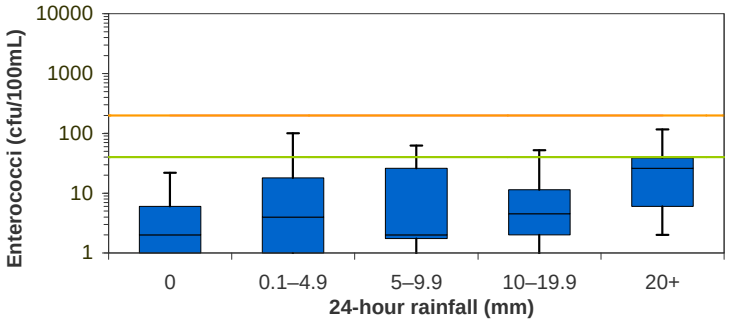
Microbial Assessment: **A**

Monitoring period for 2010–11 result is September 2009 to April 2011.

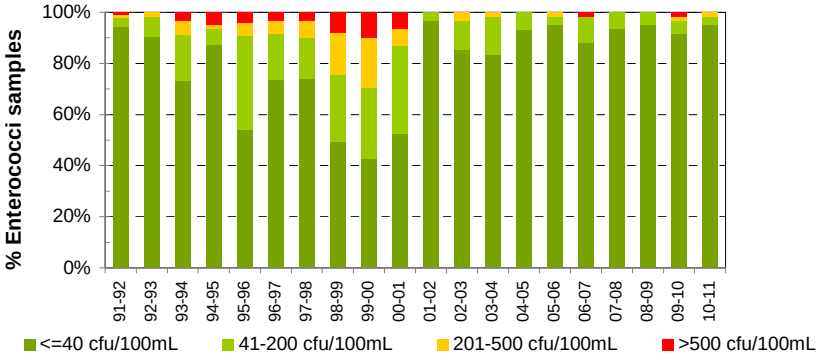


Response to rainfall

Rainfall from Cronulla STP rain gauge



Trends in enterococci data through time



Shelly Beach

Beach Suitability Grade: **Very Good**

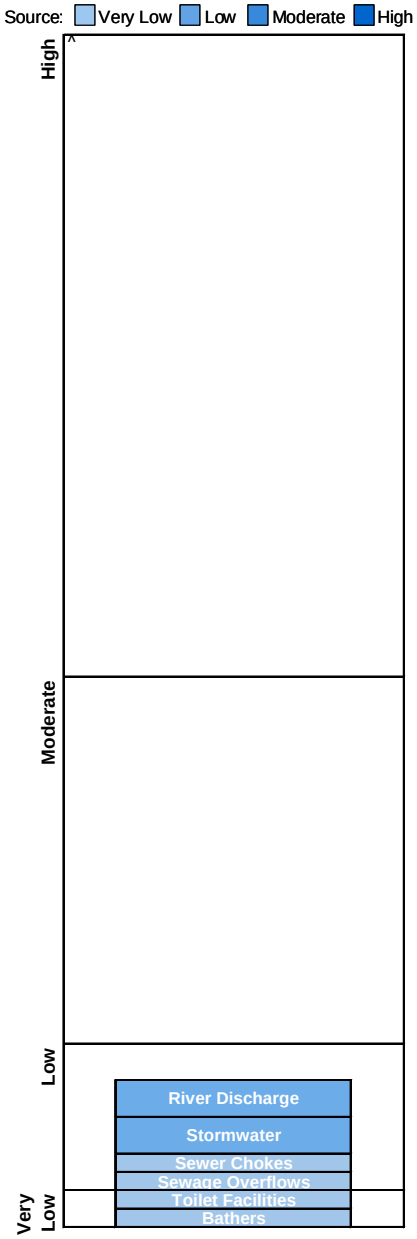
Shelly beach is 50 metres long and backed by a foreshore walk and a large park and picnic area. The adjacent ocean pool is the most suitable area for swimming. Lifeguards do not patrol the swimming area.

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

The response to rainfall graph indicates that enterococci levels did not increase with rainfall and rarely exceeded the safe swimming limit in any rainfall category.

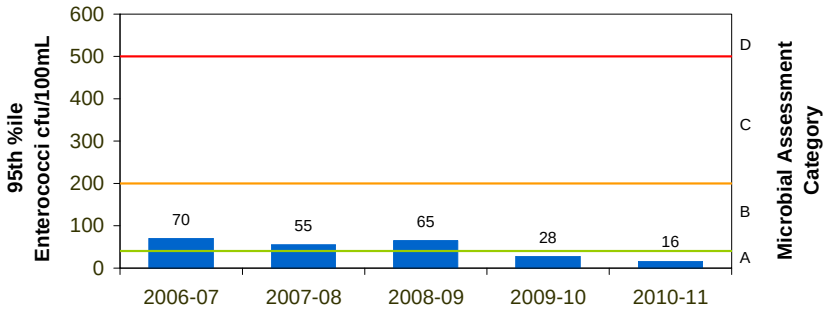
The site has been monitored since 1989. Microbial water quality improved in 2001–2002 following the upgrade of the Cronulla STP in April 2001. Since then, small variations among years have been the result of rainfall.

Sanitary Inspection: **Low**



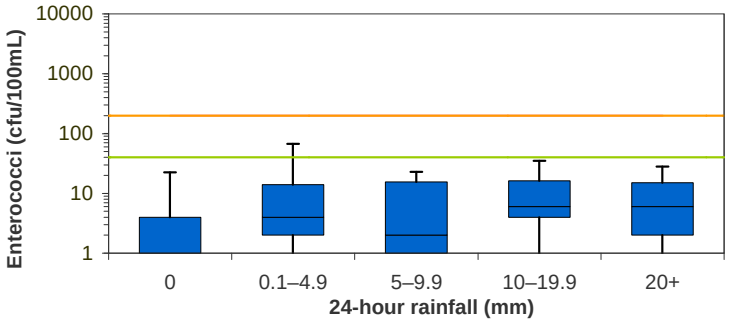
Microbial Assessment: **A**

Monitoring period for 2010–11 result is September 2009 to April 2011.

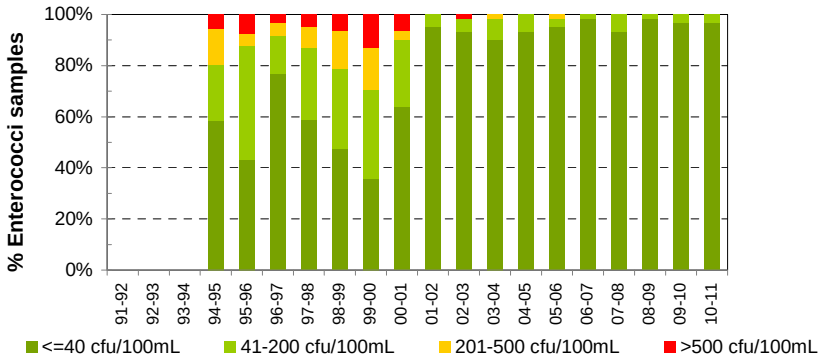


Response to rainfall

Rainfall from Cronulla STP rain gauge



Trends in enterococci data through time



Oak Park

Beach Suitability Grade: **Very Good**

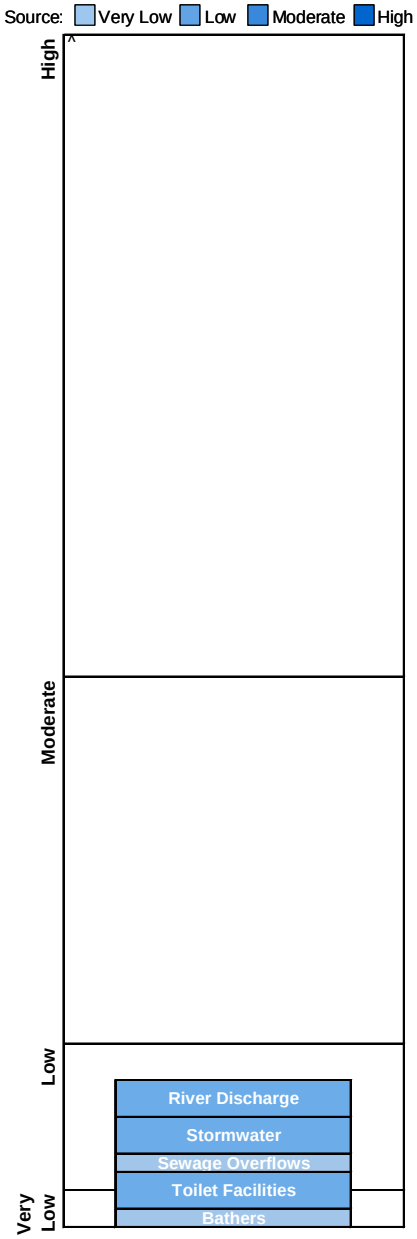
Oak Park beach is 15 metres long, with the most suitable area for swimming adjacent to the ocean pool. The beach is backed by a park and picnic area. Lifeguards do not patrol the swimming area.

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

The response to rainfall graph indicates that enterococci levels did not increase with rainfall and rarely exceeded the safe swimming limit in any rainfall category.

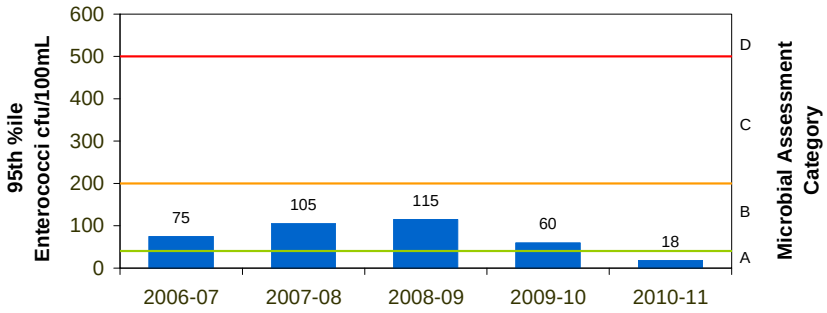
The site has been monitored since 1989. Microbial water quality improved in 2001–2002 following the upgrade of the Cronulla STP in April 2001. Since then, small variations among years have been the result of rainfall.

Sanitary Inspection: **Low**



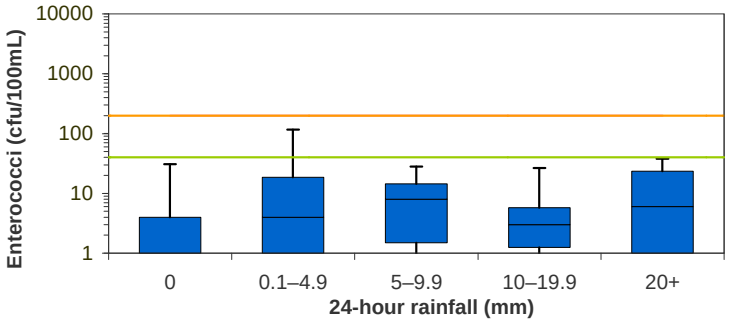
Microbial Assessment: **A**

Monitoring period for 2010–11 result is September 2009 to April 2011.



Response to rainfall

Rainfall from Cronulla STP rain gauge



Trends in enterococci data through time