

Sydney Metropolitan Beaches

Waverley Council

Beaches: Bondi, Tamarama and Bronte



Location

Waverley Council covers an area of nine square kilometres in the Eastern Suburbs of Sydney and has a population of approximately 60,700 people.

The Waverley beaches encompass a 2.5-kilometre stretch of coastline from Bondi Beach in the north to Bronte Beach in the south. Intertidal Protection Areas are located along the coastline between Bondi Beach and Tamarama Beach and between Bronte Beach and Coojee Beach.

Land uses within the Waverley beach catchments include residential, commercial, industrial, recreational and bushland.

Compliance with guidelines

Compliance with swimming guidelines was generally very good at beaches in the Waverley Council area during summer 2008–2009 (Table 6).

Compliance was excellent at Tamarama Beach where both bacterial indicator levels complied with guidelines 100% of the time. Bondi Beach also performed very well and complied with faecal coliform guidelines 100% of the time, and 97% of the time with enterococci guidelines. Bronte Beach complied with both faecal coliform and enterococci guidelines 94% of the time.

The range of bacterial levels measured at Sydney beaches during summer 2008–2009 is shown in Figure 9, with Waverley Council beaches highlighted in grey. Levels of both faecal coliforms and enterococci were within the range of values measured at other city beaches in Sydney.

Ranking of beaches

All monitored harbour and ocean beach swimming locations in the Hunter, Sydney and Illawarra regions were ranked on the basis of their compliance with swimming guidelines during summer 2008–2009. A total of 14 distinct ranks were determined for the 131 sites monitored for both faecal coliforms and enterococci, with many sites ranked equally.

The rankings for the Waverley Council beaches were good. Tamarama Beach and Bondi Beach had very high rankings, with beaches ranked equal first and equal second, respectively. Bronte Beach was ranked equal fifth (Table 6).

Actions to improve water quality

Actions specific to individual beaches are included on the beach pages. Improvements in water quality will also be achieved as a result of a number of management plans and many other initiatives.

Management Plans and Programs

Environment Action Plan (EAP): Through this plan Council will integrate environmental planning into the broader planning framework. The plan is designed to guide the preparation and delivery of cost efficient, quantifiable projects over the medium and long term to meet community expectation of responsible environmental management.

Local Environmental Plan: This plan assesses environmental performance and identifies strengths, weaknesses and opportunities for improvement in delivering sustainable outcomes for Bondi Junction. Additionally, it will incorporate best practice environmental controls.

Environmental Management System (EMS): Council has developed an EMS that integrates environmental controls into standard work practices within council. Through training, implementation and review, the EMS minimises the impact of council's outdoor operations on local waterways.

Environmental Program of Works: The Environmental Levy Program of Works identifies, schedules and prioritises environmental works that address sustainability issues in Waverley for the period 2006–2011. These include the integration of Water-Sensitive Urban Design (WSUD) features into park, street and building upgrades, ongoing maintenance of dog tidy stations and the rehabilitation of coastal bushlands and creeks. These programs help to prevent foreign materials

from washing into the drains and onto the beaches.

Waverley Development Control Plan 2006: Council has updated the Development Control Plan to incorporate planning controls that work to manage all aspects of the water cycle in an integrated and consistent manner. This works to decrease the pressure on the stormwater system and receiving waters.

Soil and water management program: Council continues to implement the Southern Sydney Regional Organisation of Councils (SSROC) soil and water management program. This program aims to prevent degradation of waterways and stormwater systems by minimising the loss of soil and building materials from construction sites.

Grant Funding

Bronte Gully Stormwater Harvesting and Re-use system: Commissioned in September 2008, the system is designed to utilise the reliable stormwater flow travelling down the gully that would otherwise go straight out to sea. Water is stored in a 120-kilolitre underground tank, then treated via backwash filtration and UV disinfection prior to being reused for non-potable sources. The Bronte system supplies water for:

- toilet and urinal flushing in both central and southern amenity blocks
- a 1.5 ha irrigation network
- ocean pool cleaning
- Bronte Bushcare
- public place cleaning.

This project was supported by the NSW Government's Climate Change Fund and Waverley Council's Environmental Levy.

Waverley Bondi School of Arts Rainwater Harvesting System: Council has recently installed a rainwater harvesting and re-use system at the heritage-listed Waverley Bondi School of Arts. Harvested water is to be used for toilet flushing and gardening. The system incorporates 15 kilolitres of storage, automated control and monitoring. This project was assisted by a Federal Government Water Grant and Waverley Council's Environmental Levy.

Groundwater irrigation: Council has installed groundwater bores at two of its major sporting fields. Water extracted is used for irrigation and other operational services, saving 16 million litres of drinking water each year. Groundwater systems incorporate automated monitoring and control, working to ensure that a sustainable yield is extracted. These projects were assisted by funding from the NSW Government's Water Saving Fund and Waverley Council's Environmental Levy.

Educational Programs

Marine Discovery Centre: Council supports the Marine Discovery Centre at the Bondi Beach Pavilion. The centre has recently been transformed into an innovative educational facility, taking visitors on a virtual dive of Bondi Bay through a series of walk-through audiovisual experiences. These include a world-first re-creation of an actual dive site where you can experience what it's like to dive without getting wet. The site is authentic to North Bondi, a place where you can meet the local marine life face to face.

Free environmental workshops and lecture series: Waverley Council runs a series of free environmental workshops, including 'Living with Less Chemicals', 'Gardening with Native Plants', and 'Household Water Conservation'. Council's Green lecture series was launched in 2009 with a strong focus on coastal sustainability.

World Environment Day: Waverley Council held a festival at Bondi Pavilion in conjunction with local environmental groups. Workshops, tours and seminars, as well as children's activities and school events were conducted to provide community members with the knowledge, skills and practical tools to enable them to minimise water and energy use and their impact on water quality.

Business Environmental Education Program: Council works with local businesses to implement improved environmental practices, including improved waste storage, litter management, wastewater disposal practices, energy and water efficiency

Illegal dumping: Council runs an ongoing education and enforcement program to mitigate the effects of illegal dumping. Council employs a full-time ranger to investigate reported illegal waste dumps. Ongoing work in this area helps to reduce stormwater pollution.

Smoking banned on beaches: A ban on smoking on Waverley beaches (Bondi, Bronte and Tamarama) came into effect on 17 December 2004. Other educational strategies to increase awareness of the smoking ban amongst beach users and to establish a social norm that smoking is no longer acceptable on the beach included 'no smoking' signage and stencilling, display of a 'our beaches are not ashtrays' banner and the distribution of postcards. The education campaigns and the use of a beach rake have resulted in cleaner beaches.

Other Projects

Water-saving initiatives: In June 2007 council installed rainwater tanks for toilet flushing, as well as waterless urinals and timer taps, in two coastal amenity blocks.

Every Drop Counts Program: Council continues to work closely with Sydney Water to reduce water consumption across all operations.

Water Monitoring Program: Waverley Council undertakes weekly water monitoring of two ocean pools. Additionally, the council conducts regular water quality snapshots of all stormwater outlets to monitor water

quality, isolate problem catchments and identify pollution sources.

The Water CampaignTM: Council continues to work with the International Council for Local Environmental Initiatives to identify Council and community actions to improve water quality.

Litter control: Over summer 2008–2009, The 'Lovin' My Bondi Beach' summer campaign was launched with the aim of reducing the number of plastic water bottles being left on Bondi Beach. Comprehensive litter audits of the beach were completed and showed that there had been a 32% reduction in the number of plastic bottles being left on the beach compared with the number in the previous years' audit.

Sydney Water

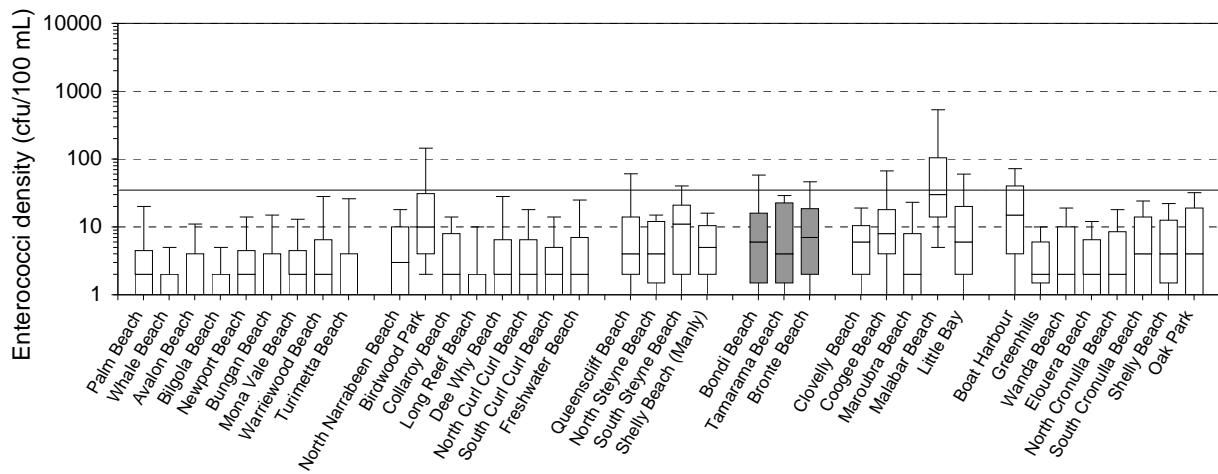
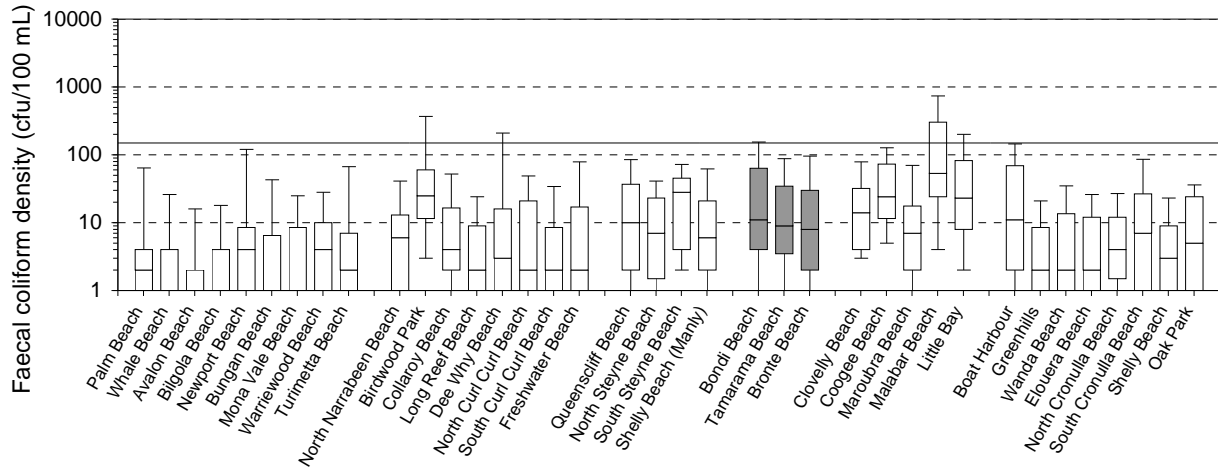
Across the catchment of the beaches from Bondi to Bronte, Sydney Water is cleaning and inspecting the sewer mains that have a high likelihood of discharging sewage to waterways if they become blocked. Where problems have been identified they are being fixed by repair or preventive maintenance.

Sydney Water also conducted a pilot study across the catchment of the beaches from Bondi to Bronte to investigate the willingness of property owners to remove tree roots from their sewers that are intruding into sewer mains. The pilot study has demonstrated a high level of property owner willingness to help reduce dry weather discharges to our waterways.

Table 6: Compliance and Ranking of Waverley Beaches for Summer 2008–2009

Site	Compliance (%)		Overall rank (out of 14)
	Faecal Coliforms	Enterococci	
Bondi Beach	100	97	2
Tamarama Beach	100	100	1
Bronte Beach	94	94	5

Figure 9: Range of Bacterial Levels at Sydney Beaches during Summer 2008–2009



Bondi Beach

See page 66 for key to map

Description

The beach is 800 metres long and backed by a promenade, car park and parklands. Rock baths are located at the northern and southern ends. Beach conditions are safest at the northern end and lifeguards patrol the beach year round.



Pollution sources

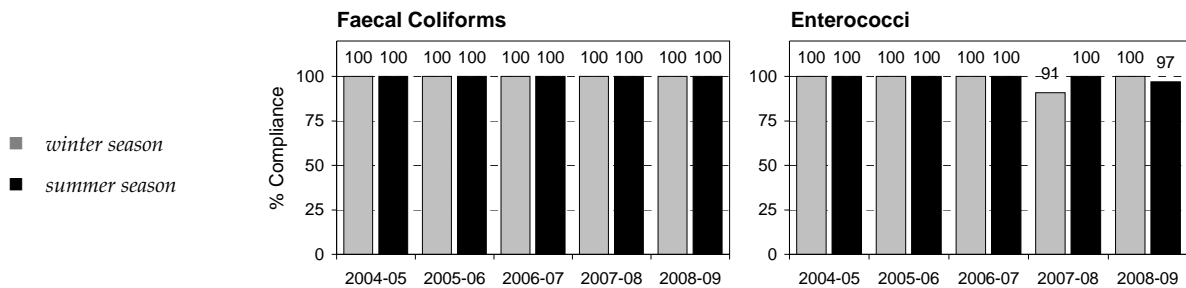
Stormwater drains discharge to the beach.

Actions

Sydney Water has cleaned and inspected the sewer mains across the catchment. Where problems have been identified they are being fixed. Sydney Water also conducted a study to investigate the willingness of property owners to remove tree roots intruding into sewer mains. A high level of willingness was demonstrated by property owners to help reduce dry weather discharges to waterways.

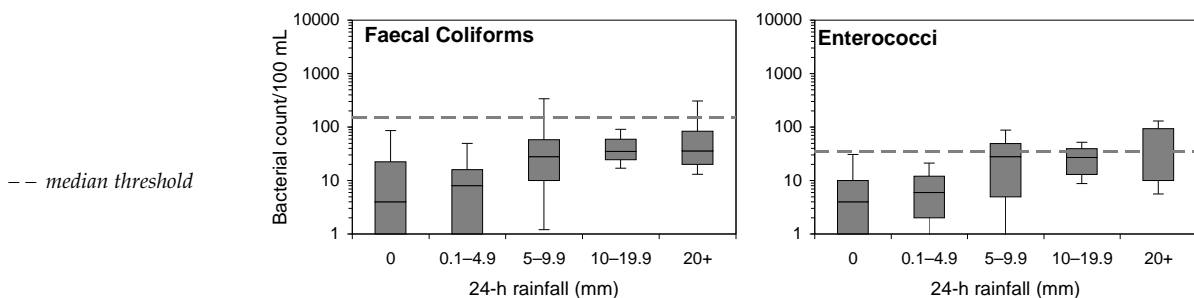
Compliance

Faecal coliform levels complied with swimming guidelines 100% of the time over the last five years. Enterococci compliance has ranged from 91% to 100% over the last five years.



Response to rainfall

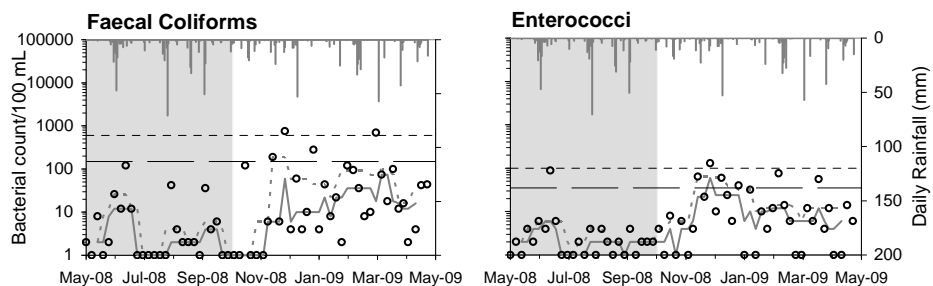
Bacterial densities generally increased with increasing rainfall. Faecal coliform levels occasionally exceeded the median guideline limit in response to five millimetres of rain or more in the previous 24 hours. Enterococci levels often exceeded the median guideline limit after five millimetres of rain or more in the previous 24 hours.



Season data

- | rainfall
- o individual result
- rolling median
- rolling 80th percentile

- Guidelines
(see page 8 for details)
- median threshold
 - 80th percentile threshold



Tamarama Beach

See page 66 for key to map

Description

The 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 October to April.

Pollution sources

A stormwater drain discharges to the beach in dry and wet weather. Elevated bacterial levels have been detected in the stormwater.

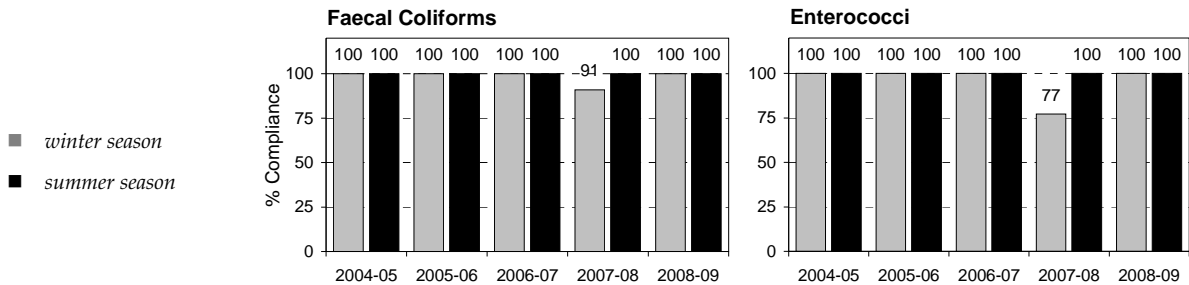
Actions

Sydney Water has cleaned and inspected the sewer mains across the catchment. Where problems have been identified they are being fixed. Sydney Water also conducted a study to investigate the willingness of property owners to remove tree roots intruding into sewer mains. A high level of willingness was demonstrated by property owners to help reduce dry weather discharges to waterways.



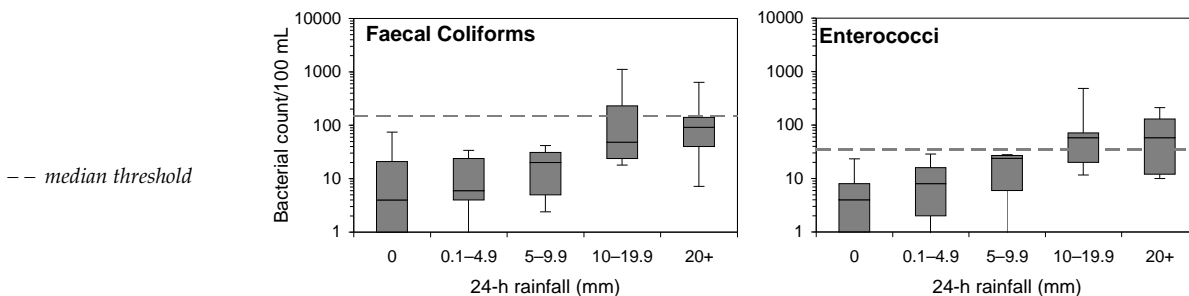
Compliance

With the exception of winter 2007, faecal coliform and enterococci levels complied with swimming guidelines 100% of the time over the last five years.



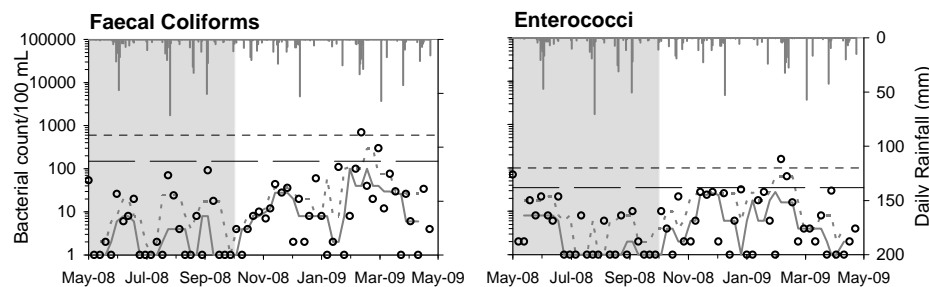
Response to rainfall

Bacterial densities generally increased with increasing rainfall. Faecal coliform levels often exceeded the median guideline limit in response to ten millimetres of rain or more in the previous 24 hours. Enterococci levels regularly exceeded the median guideline limit after ten millimetres of rain or more in the previous 24 hours.



Season data

- | rainfall
 - o individual result
 - rolling median
 - - - rolling 80th percentile
- Guidelines
(see page 8 for details)
- median threshold
 - - - 80th percentile threshold



Bronte Beach

See page 66 for key to map

Description

The beach is 250 metres long and is backed by a large park and picnic area. There are a rock-enclosed tidal swimming area and an ocean pool at the southern end. Swimming can be hazardous because of two or three large rips.

Pollution sources

Stormwater drains discharge to the beach in dry and wet weather. Elevated bacterial levels have been detected in the stormwater.

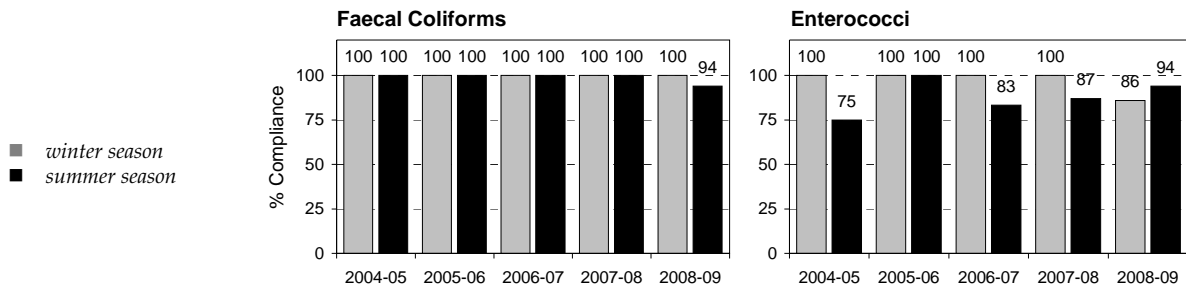
Actions

Sydney Water has cleaned and inspected the sewer mains across the catchment. Where problems have been identified they are being fixed. Sydney Water also conducted a study to investigate the willingness of property owners to remove tree roots intruding into sewer mains. A high level of willingness was demonstrated by property owners to help reduce dry weather discharges to waterways.



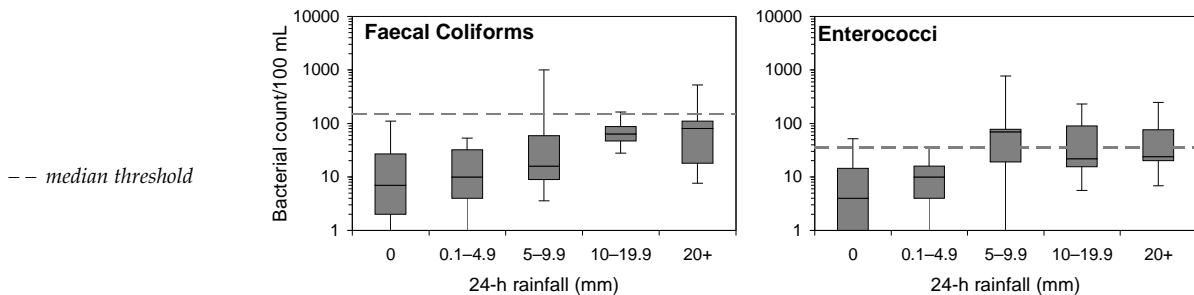
Compliance

With the exception of summer 2008–2009, faecal coliform levels complied with swimming guidelines 100% of the time over the last five years. Enterococci compliance has been more varied, ranging from 75% to 100%, with higher levels of compliance usually recorded in winter seasons.



Response to rainfall

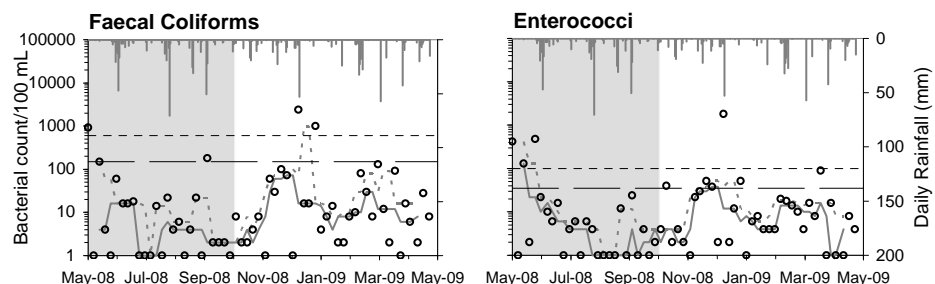
Bacterial densities generally increased with increasing rainfall. Faecal coliform densities occasionally exceeded the median guideline limit in response to five millimetres of rain or more in the previous 24 hours. Enterococci levels occasionally exceeded the median guideline limit in response to no rain, and regularly exceeded the median guideline after five millimetres of rain or more in the previous 24 hours. Bacterial levels exceeding the median guideline limit after little to no rain indicate a dry-weather contamination problem.



Season data

- | rainfall
- o individual result
- rolling median
- rolling 80th percentile

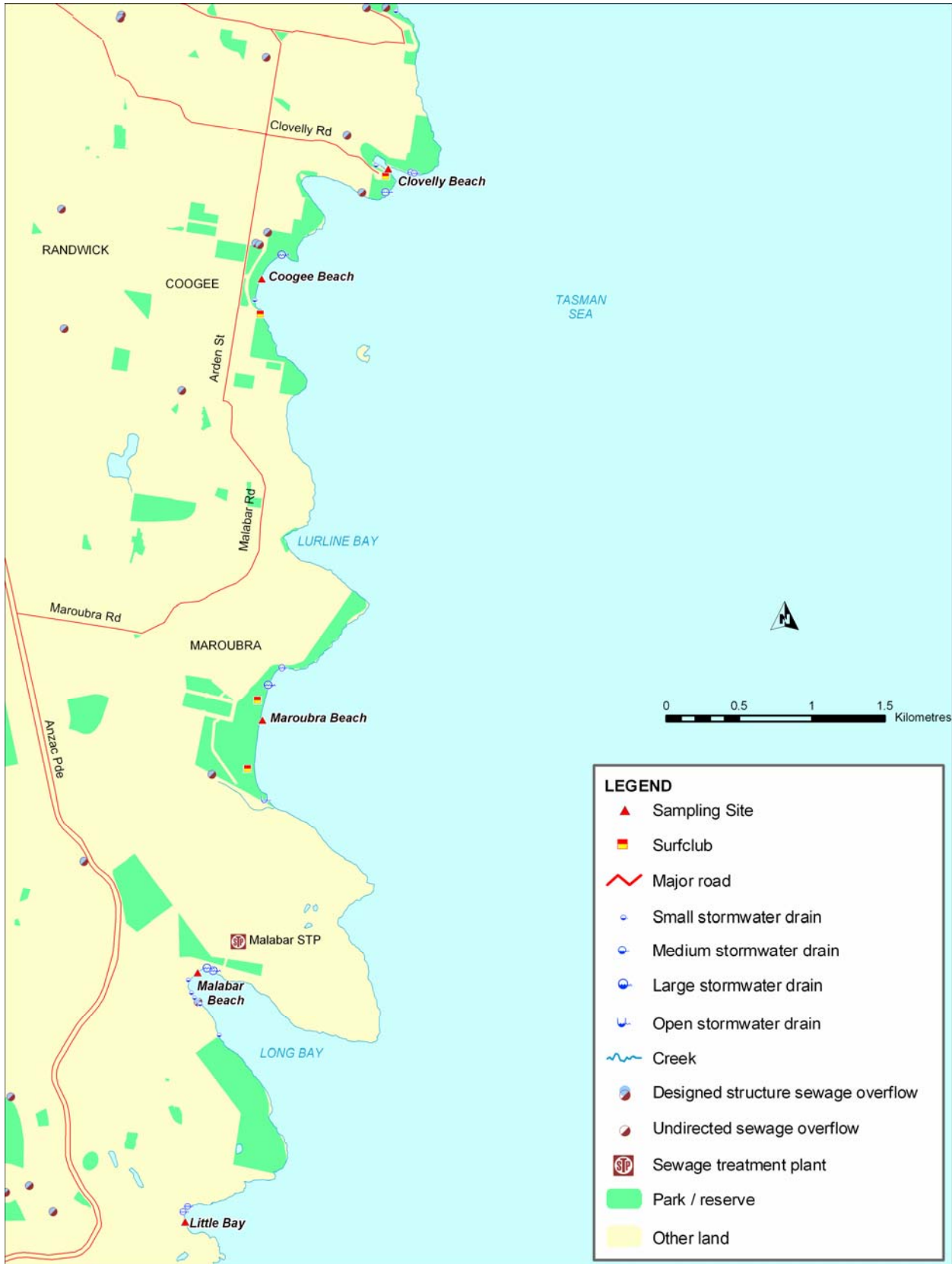
- Guidelines
(see page 8 for details)
- median threshold
 - 80th percentile threshold



Sydney Metropolitan Beaches

Randwick City Council

Beaches: Clovelly, Coogee, Maroubra, Malabar and Little Bay



Location

Randwick City Council covers an area of 37 square kilometres in the eastern suburbs of Sydney and has a population of approximately 128,400 people.

The Randwick beaches occur along a ten-kilometre stretch of coastline from Clovelly Beach in the north to Little Bay in the south.

Land uses within the Randwick beach catchments include residential, commercial, industrial, recreational and bushland.

Compliance with guidelines

Compliance with swimming guidelines was generally good at beaches in the Randwick City Council area during summer 2008–2009 (Table 7).

Compliance was excellent at Clovelly and Maroubra beaches, where bacterial indicator levels complied with guidelines 100% of the time. Coogee also performed very well and complied with faecal coliform guidelines 100% of the time, and 97% of the time with enterococci guidelines. Similarly, Little Bay performed well and complied with faecal coliform guidelines 94% of the time, and 100% of the time with enterococci guidelines.

Malabar Beach recorded 75% compliance for faecal coliform and complied 56% of the time with enterococci criteria. It should be noted that levels of bacteria occasionally exceeded the median guideline limits after little or no rainfall, indicating a possible dry-weather contamination problem.

The range of bacterial levels measured at Sydney beaches during summer 2008–2009 is shown in Figure 10, with Randwick beaches highlighted in grey. Levels of both faecal coliforms and enterococci at most beaches in Randwick City Council area were comparable to those measured in Manly and Waverly council areas. Bacterial levels at Malabar Beach were notably higher than those recorded at other Sydney beaches.

Ranking of beaches

All monitored harbour and ocean beach swimming locations in the Hunter, Sydney and Illawarra regions were ranked on the basis of their compliance with swimming guidelines during summer 2008–2009. A total of 14 rankings were determined for the 131 sites monitored for both faecal coliforms and enterococci, with many sites ranked equally.

The rankings for the Randwick City Council beaches were varied (Table 7). Clovelly and Maroubra beaches ranked equal first. Coogee Beach ranked equal second and Little Bay Beach ranked equal third. Malabar Beach ranked thirteenth.

Actions to improve water quality

Actions specific to individual beach locations are included on the beach pages. Improvements in water quality will also be achieved as a result of management plans and a range of other projects.

Management Plans and Programs

Eastern Coastal Catchments Stormwater Management Plan: Randwick Council has identified a number of actions in the Stormwater Management Plan for the Eastern Coastal Catchments to combat stormwater pollution. Source control actions include an ongoing street sweeping program and education programs in the Randwick area. Council has installed stormwater quality improvement devices aimed at controlling stormwater pollution in-system. End-of-pipe actions include the installation of continuous deflective separator gross pollutant traps (GPTs) on stormwater drains to collect stormwater contaminants. Council has conducted sampling to determine water quality at receiving waters and after rain events.

Soil and water management programs: Randwick City Council continues to implement the Southern Sydney Regional Organisation of Councils (SSROC) soil and water management program. This program aims to prevent degradation of waterways and stormwater systems by minimising the loss of soil and other building materials from building and construction sites.

Stormwater devices: A five-year environmental levy program continues to fund a number of programs, including new GPTs to prevent street litter and organic material from washing off streets, into drains and onto oceans and beaches. Work also includes repairs and improvements to adjacent drainage lines; these will contribute to improved water quality.

Educational Programs

Summer activities program: Held over a two-week period in January, the summer activities program aimed to increase the understanding and appreciation of marine and coastal water quality and conservation issues by both residents and visitors to the area. This year participants enjoyed many new activities in the program, as well as the old favourites, including snorkelling at Gordons Bay and Bare Island and learning to surf at Maroubra Beach.

Greywater fact sheet: A greywater fact sheet was developed by Council to encourage residents to install greywater systems to

conserve water and for use within the premises for flushing of toilets and use in laundries, as well as external uses. This fact sheet is supported by a Council water conservation rebate scheme for residents that covers rainwater tanks and greywater systems.

Other Projects

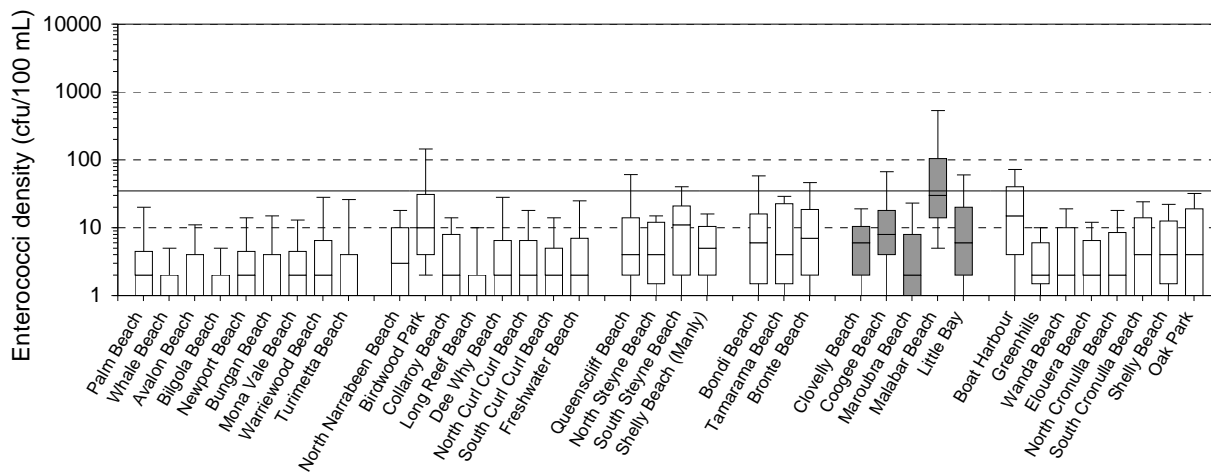
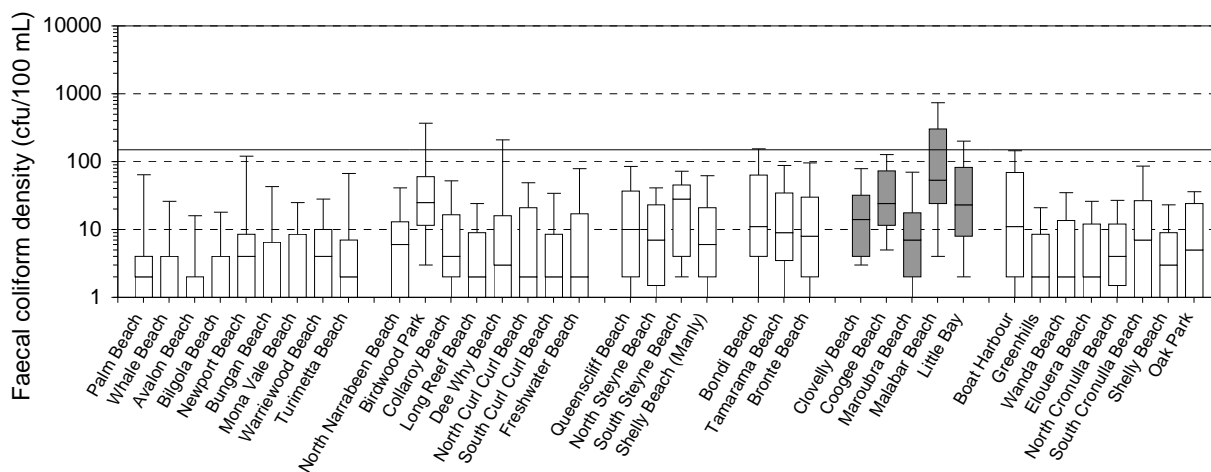
Stormwater drain relining: A number of sections of stormwater drains, thought to be close to 100 years old, have been replaced or relined in the last year. This will contribute to improved water quality and flow.

Malabar Beach Working Group: This working group, with representatives from Randwick Council, Sydney Water, Department of Environment and Climate Change and the local community, has been established to investigate and evaluate water quality improvement options at Malabar Beach.

Table 7: Compliance and Ranking of Randwick Beaches for Summer 2008–2009

Site	Compliance (%)		Overall rank (out of 14)
	Faecal Coliforms	Enterococci	
Clovelly Beach	100	100	1
Coogee Beach	100	97	2
Maroubra Beach	100	100	1
Malabar Beach	75	56	13
Little Bay	94	100	3

Figure 10: Range of Bacterial Levels at Sydney Beaches during Summer 2008–2009



Clovelly Beach

See page 76 for key to map

Description The beach backs a 300 metre long 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 September to April.

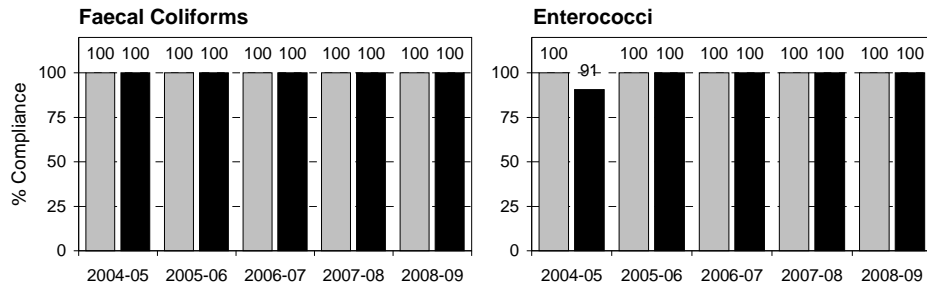
Pollution sources Stormwater drains discharge at the entrance to, and within, Clovelly Bay.

Actions Randwick Council installed two continuous deflective separators in Bundock Park to capture gross pollutants carried by stormwater. All known stormwater drains in the catchment lead to GPTs prior to entering Clovelly Bay. Council regularly undertakes street sweeping and beach cleaning.

Compliance Faecal coliform levels complied with swimming guidelines 100% of the time over the last five years. Enterococci levels complied 100% of the time over the last five years, with the exception of summer 2004–2005, when 91% compliance was recorded.

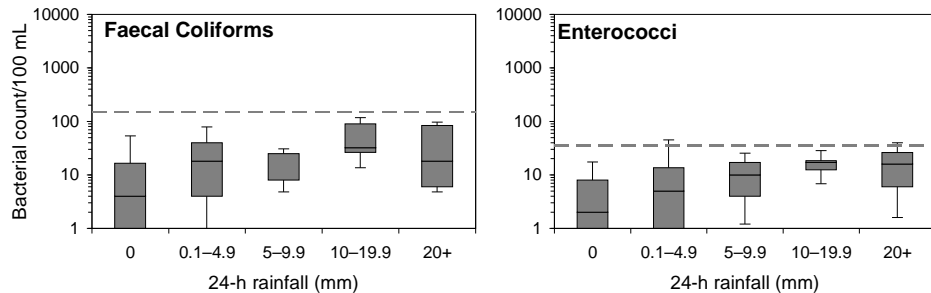


■ winter season
■ summer season



Response to rainfall Bacterial densities tended to increase slightly with increasing rainfall but generally remained below the median guideline limit across all rainfall categories. Enterococci densities very occasionally exceeded the median guideline limit in response to light rain in the previous 24 hours.

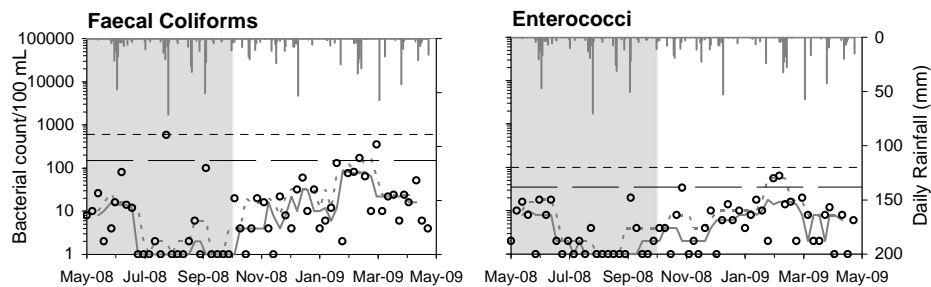
-- median threshold



Season data

■ rainfall
○ individual result
— rolling median
-- rolling 80th percentile

Guidelines (see page 8 for details)
— median threshold
-- 80th percentile threshold



Coogee Beach

See page 76 for key to map

Description

The beach is 400 metres long and is backed by a promenade and parklands. There are rock baths at the southern and northern ends. The beach has a reputation for safe swimming and lifeguards patrol the beach all year round.



Pollution sources

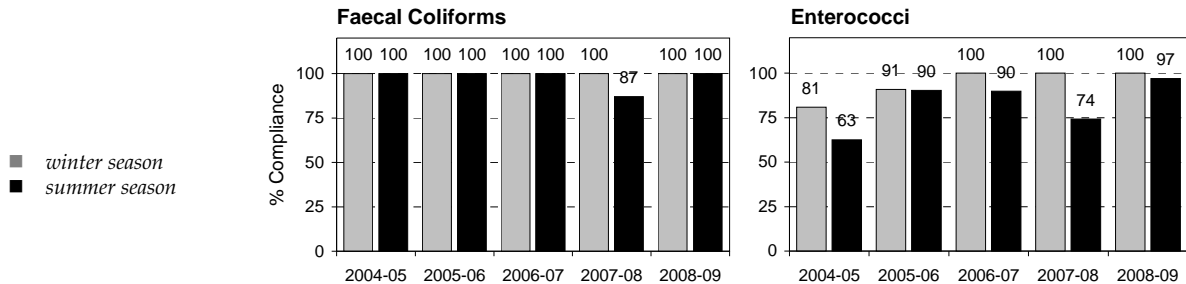
Stormwater drains discharge to the beach in dry and wet weather. Elevated bacterial levels have been detected in the stormwater.

Actions

Randwick Council installed an additional continuous deflective separate on Neptune Street. Council regularly maintains six GPTs and undertakes street sweeping and beach cleaning in the catchment. Regular water sampling of the stormwater seepage at the south end of Coogee Beach is conducted.

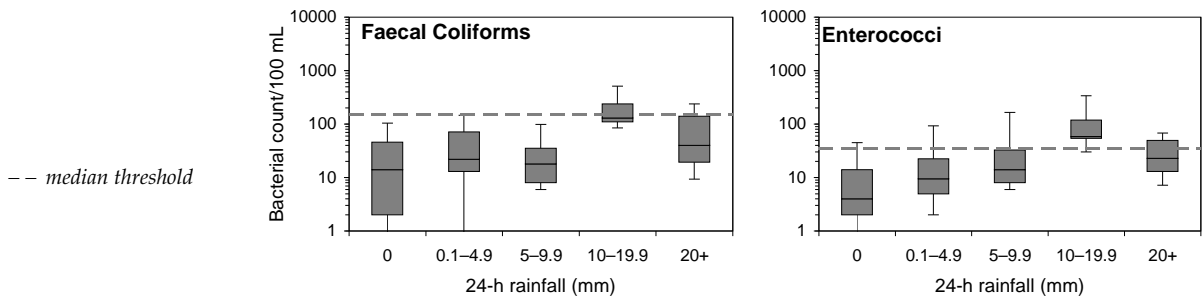
Compliance

With the exception of summer 2007–2008, faecal coliform compliance with swimming guidelines occurred 100% of the time over the last five years. Enterococci compliance has been more varied, ranging from 63% to 100% over the last five years.



Response to rainfall

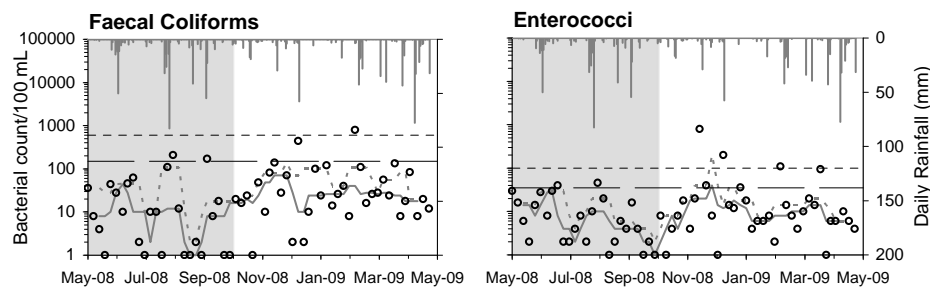
Bacterial densities tended to increase with increasing rainfall. Faecal coliform densities often exceeded the median guideline limit in response to ten millimetres of rain or more in the previous 24 hours. Enterococci densities occasionally exceeded the median guideline limit after no rain, and frequently exceeded the median guideline limit after ten millimetres of rain or more in the previous 24 hours. A dry-weather contamination problem is indicated.



Season data

- | rainfall
- o individual result
- rolling median
- - - rolling 80th percentile

- Guidelines
(see page 8 for details)
- median threshold
 - - - 80th percentile threshold



Maroubra Beach

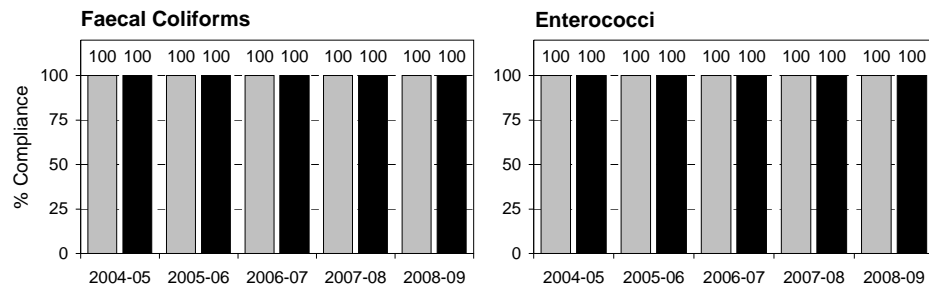
See page 76 for key to map

Description The 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.

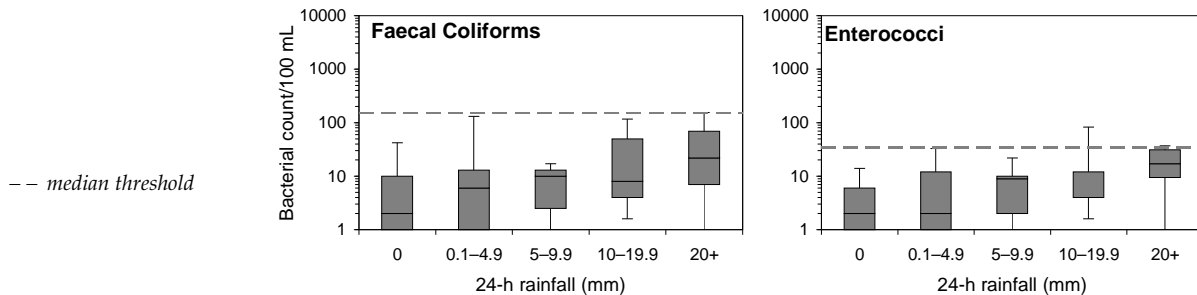
Pollution sources Stormwater drains discharge to the beach, one in both dry and wet weather. Elevated bacterial levels have been detected in the stormwater.

Actions Randwick Council has installed an additional continuous deflector separator GPT in Byrne Crescent, South Maroubra. Council regularly undertakes street sweeping and beach cleaning.

Compliance Faecal coliform and enterococci levels complied with swimming guidelines 100% of the time over the last five years.



Response to rainfall Faecal coliform densities tended to increase with increasing rainfall but generally remained below the median guideline limit across all rainfall categories. Enterococci densities occasionally exceeded the median guideline limit in response to ten millimetres of rain or more in the previous 24 hours.

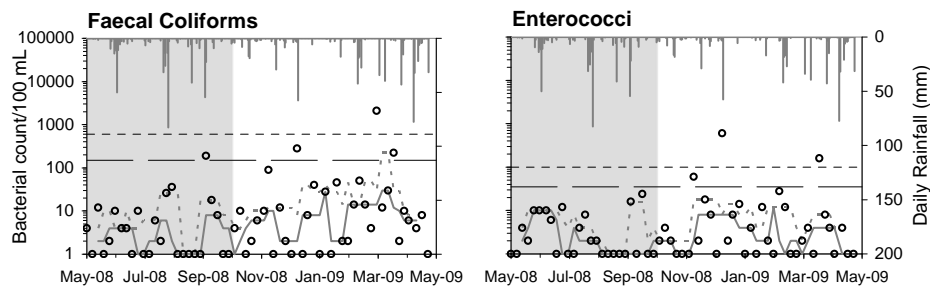


Season data

- | rainfall
- o individual result
- rolling median
- - - rolling 80th percentile

Guidelines
(see page 8 for details)

- median threshold
- - - 80th percentile threshold



Malabar Beach

See page 76 for key to map

Description

The 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. Lifeguards patrol the beach in the summer season.

Pollution sources

Stormwater drains discharge to the beach and into Long Bay. The long, narrow bay has longer flushing time after rain.

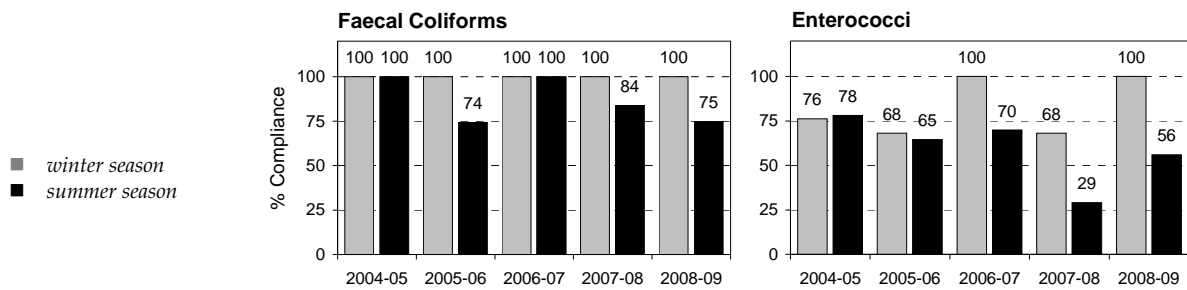
Actions

Randwick Council maintains four GPTs in the catchment. Council regularly undertakes street cleaning and beach sweeping in the catchment area. Drain stencilling was also recently conducted in the area. Malabar Beach Working Group was convened in February 2009 to address water quality issues at the beach.



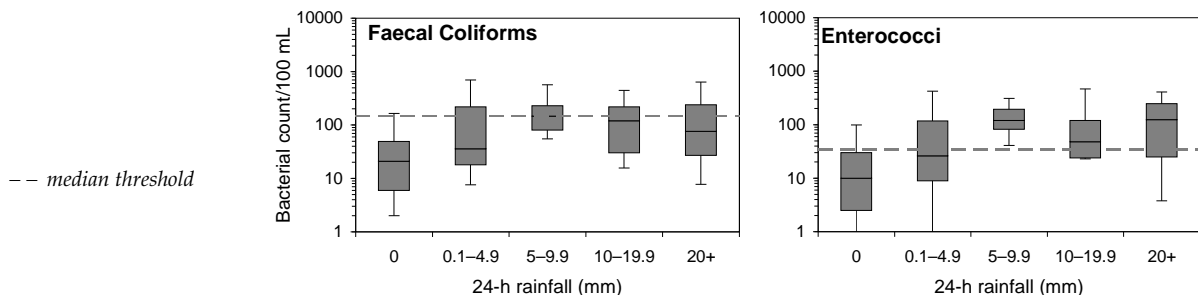
Compliance

Faecal coliform compliance has ranged from 74% to 100% over the last five years. Enterococci compliance has been more variable, ranging from 29% to 100% over the last five years.



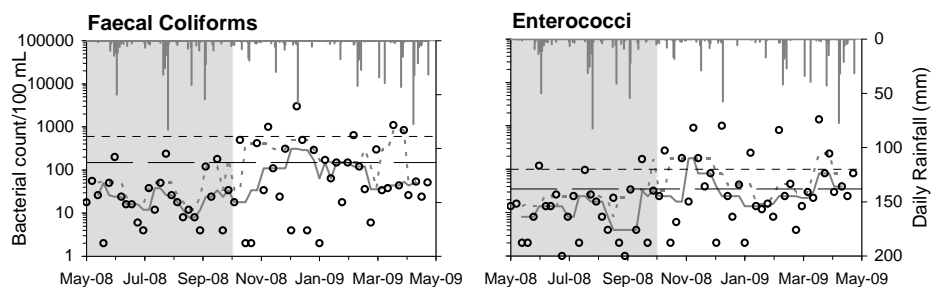
Response to rainfall

Bacterial densities increased with increasing rainfall and occasionally exceeded the median guideline limits after little or no rainfall, indicating a dry-weather contamination problem. Enterococci levels usually exceeded the median guideline limit in response to five millimetres of rain or more in the previous 24 hours.



Season data

- | rainfall
 - o individual result
 - rolling median
 - - - rolling 80th percentile
- Guidelines
(see page 8 for details)
- median threshold
 - - - 80th percentile threshold



Little Bay

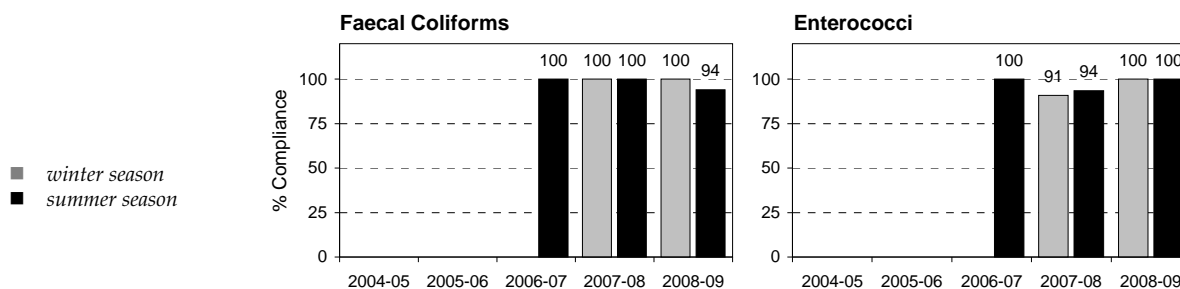
See page 76 for key to map

Description The beach is situated at the end of a long, narrow bay. It is backed by a golf course and new residential development. The beach is unpatrolled.

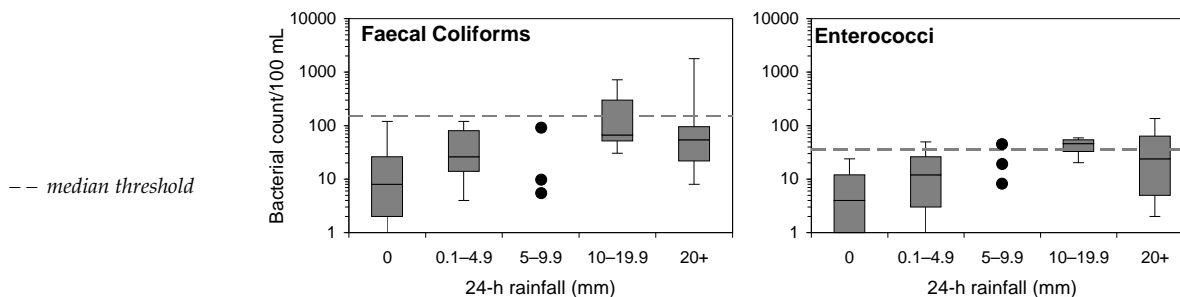
Pollution sources Stormwater drains discharge to the beach and into Little Bay. The long, narrow bay has a longer flushing time after rain.

Actions There are no actions specific to this beach.

Compliance Monitoring at Little Bay began in December 2006. Since then faecal coliform compliance has ranged from 94% to 100% and enterococci compliance has ranged from 91% to 100%.

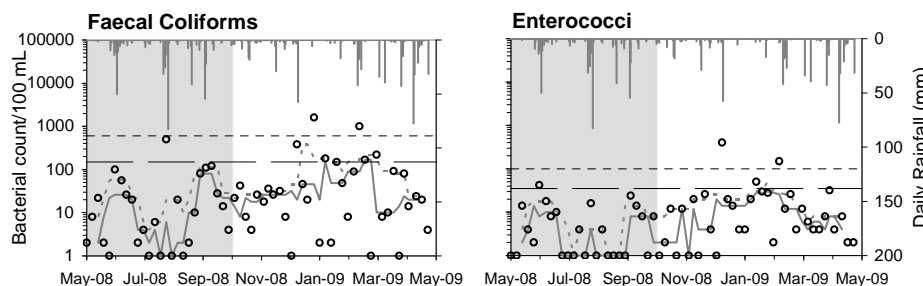


Response to rainfall Bacterial densities generally increased with increasing rainfall. Faecal coliform levels often exceeded the median guideline limit after ten millimetres of rain or more in the previous 24 hours, and enterococci levels regularly exceeded the median guideline limit in response to ten millimetres of rain or more in the previous 24 hours.



Season data

- | rainfall
 - o individual result
 - rolling median
 - rolling 80th percentile
- Guidelines
(see page 8 for details)
- median threshold
 - 80th percentile threshold



Sydney Metropolitan Beaches

Sutherland Shire Council

Sutherland Shire Council

Beaches: Boat Harbour, Greenhills, Wanda, Elouera, North Cronulla, South Cronulla, Shelly and Oak Park



Location

Sutherland Shire Council covers an area of 370 square kilometres and has a population of approximately 215,000 people.

The Sutherland beaches are situated around the rim of Bate Bay.

Land uses within the Sutherland beach catchments include urban residential, commercial, industrial, recreational and bushland.

Compliance with guidelines

Compliance with swimming guidelines at Sutherland beaches during summer 2008–2009 was excellent, with seven of the eight beaches complying with both bacterial indicators 100% of the time (Table 8). The exception was Boat Harbour, which achieved 100% compliance for faecal coliforms and 91% with enterococci criteria.

The range of bacterial levels measured at Sydney beaches during summer 2008–2009 is shown in Figure 11, with Sutherland beaches highlighted in grey. Bacterial levels at the Sutherland beaches were generally low, with most beaches recording levels similar to those within the Warringah Council area. Bacterial levels at Boat Harbour were higher than at other Sutherland Council beaches.

Ranking of beaches

All monitored harbour and ocean beach swimming locations in the Hunter, Sydney and Illawarra regions were ranked on the basis of their compliance with swimming guidelines during summer 2008–2009. A total of 14 distinct ranks were determined for the 131 sites monitored for both faecal coliforms and enterococci, with many sites ranked equally.

With the exception of Boat Harbour, all Sutherland Council beaches were ranked equal first. Boat Harbour was ranked fourth.

Actions to improve water quality

Actions specific to individual swimming sites are included on the beach pages. Improvements in water quality are also expected as a result of various management plans and a number of key programs.

The upgrade to the Cronulla Sewage Treatment Plant (STP) in April 2001 significantly improved the water quality at the Cronulla beaches.

Bate Bay Coastline Management Plan

Sutherland Shire Council is currently implementing the coastal management plan for Bate Bay, encompassing the area from Potter Point in the north to Jibbon Beach in the south. The plan covers beach facilities and use, safety, vegetation, water quality and the impact of adjacent urban development, as well as emergency action plans. The plan identified stormwater pollution as the greatest threat to recreational water quality in the area now that the Cronulla Sewage Treatment Plant has been upgraded. Sewer overflows and leachate from a former landfill site in Wanda Reserve were also identified as potential sources.

Council is undertaking work to reconstruct the Prince Street seawall over the winter period, with work scheduled to be completed by June 2009. The seawall prevents erosion of the foreshore and protects Prince Street and the properties behind it.

Work is ongoing for the stabilisation of the dune system between Wanda and Elouera Beaches. Works include weed control, fencing and revegetation.

Other Programs

Clean Waters Management Plan: The management plan outlines actions undertaken to improve water quality, including the installation of water quality control devices such as artificial wetlands, gross pollutant traps, continuous deflective separators and a natural sand filter system; educational programs; drainage pit stencilling; and an extensive water

monitoring program encompassing the majority of the sub-catchments within the shire. Computer-based mapping (Geographic Information Systems, GIS) data of water quality devices and catchments served, as well as other data pertinent to the Sutherland area, have been compiled by Council. Council plans to update this resource and to collect all water management information in the one document.

Water Sensitive Urban Design (WSUD): The current stormwater management Development Control Plan (DCP) and stormwater specifications DCP require that WSUD be implemented for all new development, with conventional drainage systems a last resort.

Educational Programs

Environmental education: Council is involved in programs to educate the community on pollution and water quality. Programs such as Streamwatch, Enviroworks and Green Street help to inform the community about preventing pollution from entering our waterways, ensuring that beach and harbour environments are suitable for swimming and recreational use.

Council representatives attend 'Water Tight' and other educational activities days held at local primary and high schools and run by the Observatory Hill Environmental Education Centre. By involving the children in water audits of their schools, water quality testing of the local waterways, stormwater simulations, ecosystem studies and water-related arts and crafts programs, they learn about water conservation and water quality.

Other Projects

SewerFix: Sydney Water has been operating the SewerFix program in the Sutherland Shire area during 2007 and 2008. SewerFix is an extensive program of activities designed to improve the performance of the sewerage network, reduce the frequency of sewage overflows and protect public health. The key projects in Cronulla are the amplification of sewer mains and upgrades of sewage pumping stations.

Sydney Water

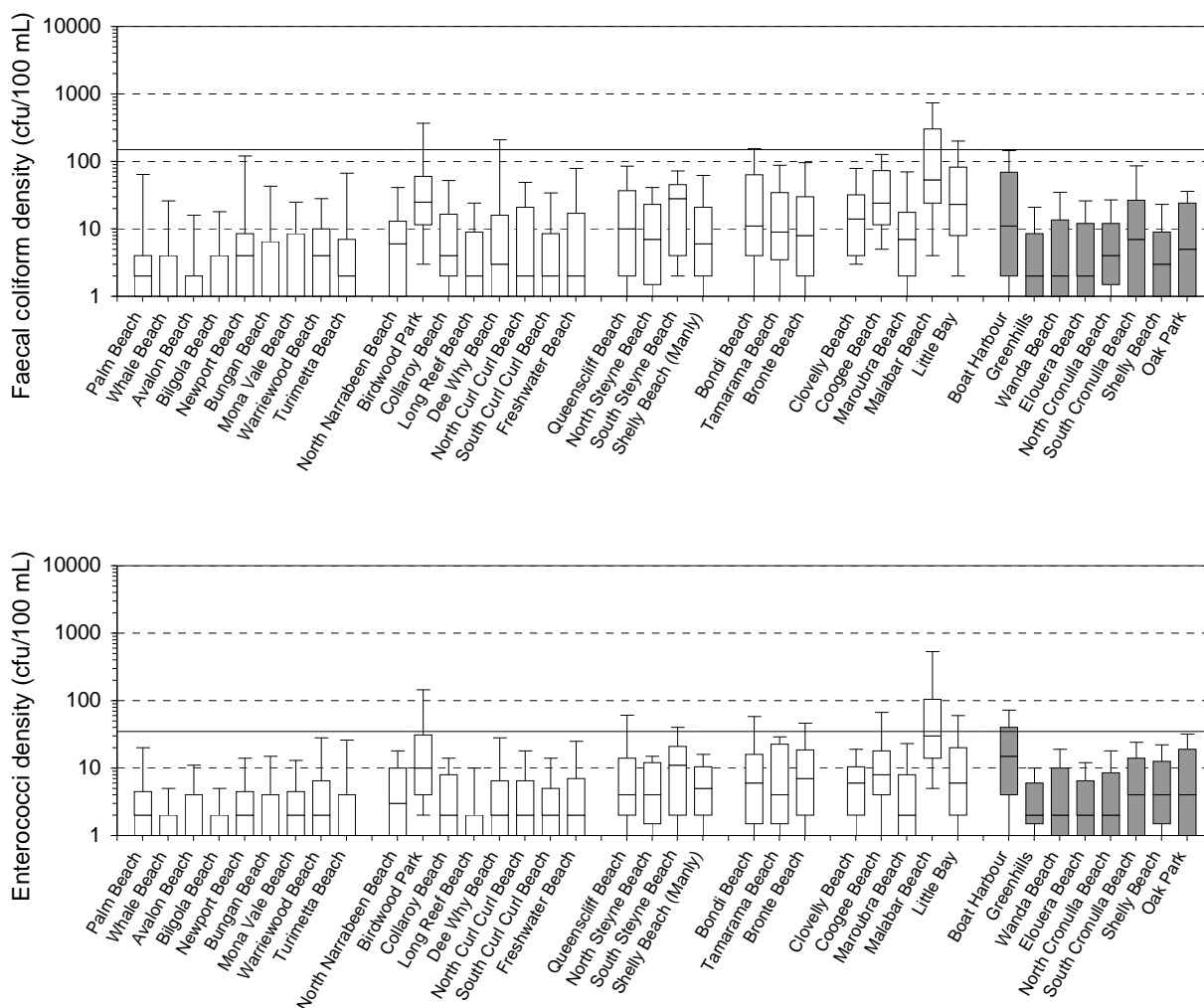
The Sydney Water SewerFix Program completed works across the Cronulla Peninsula to achieve a long-term wet weather overflow target of not more than 40 overflows per ten years on average. These works will improve suitability for swimming in the coastal waters from Salmon Haul Beach to Cronulla.

Across the catchment of Wanda Beach and Elouera Beach, Sydney Water is cleaning and inspecting the sewer mains that have a high likelihood of discharging sewage to waterways if they become blocked. Where problems have been identified they are being fixed by repair or preventive maintenance.

Table 8: Compliance and Ranking of Sutherland Beaches for Summer 2008–2009

Site	Compliance (%)		Overall rank (out of 14)
	Faecal Coliforms	Enterococci	
Boat Harbour	100	91	4
Greenhills	100	100	1
Wanda Beach	100	100	1
Elouera Beach	100	100	1
North Cronulla Beach	100	100	1
South Cronulla Beach	100	100	1
Shelly Beach	100	100	1
Oak Park	100	100	1

Figure 11: Range of Bacterial Levels at Sydney Beaches during Summer 2008–2009



Boat Harbour

See page 86 for key to map

Description

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

Pollution sources

Cronulla STP discharges tertiary treated disinfected effluent via the cliff-face outfall at Potter Point and may be a potential pollution source during bypass and overflow conditions. There are unsewered fishing shacks behind the beach.

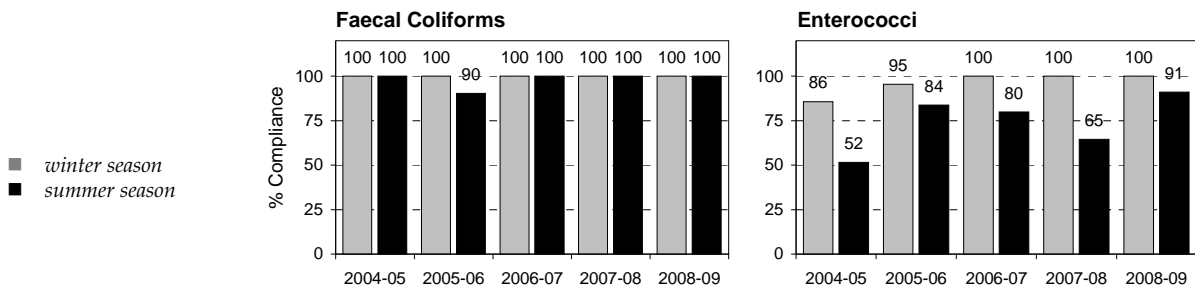
Actions

Sutherland Council continued to implement the Bate Bay Coastline Management Plan to ensure that water quality at Boat Harbour remains suitable for swimming.



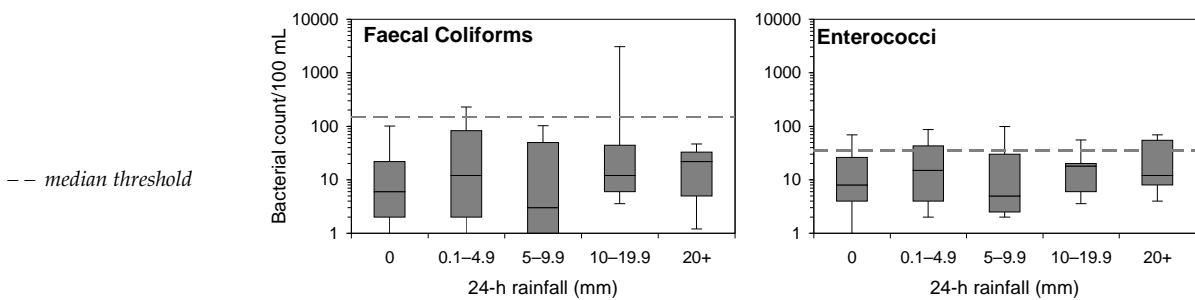
Compliance

With the exception of summer 2005–2006, faecal coliform levels complied with swimming guidelines 100% of the time over the last five years. Compliance with enterococci has been more varied, ranging from 52% to 100%, with higher compliance occurring during the winter seasons over the last five years.



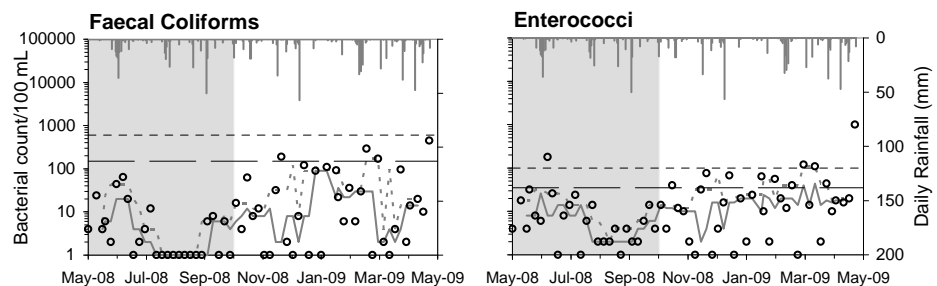
Response to rainfall

Bacterial densities displayed a slight response to rainfall. Faecal coliform densities occasionally exceeded the median guideline limit after little rainfall, and enterococci densities exceeded the median guideline limit after no rain in the previous 24 hours, indicating a dry-weather contamination problem.



Season data

- | rainfall
 - o individual result
 - rolling median
 - rolling 80th percentile
- Guidelines
(see page 8 for details)
- median threshold
 - 80th percentile threshold



Greenhills

See page 86 for key to map

Description

The beach is three kilometres long and situated at the northern end of Bate Bay. The north end of the beach is protected by Merries Reef, with larger waves and rips more prevalent at the southern end. Lifeguards do not patrol the beach.



Pollution sources

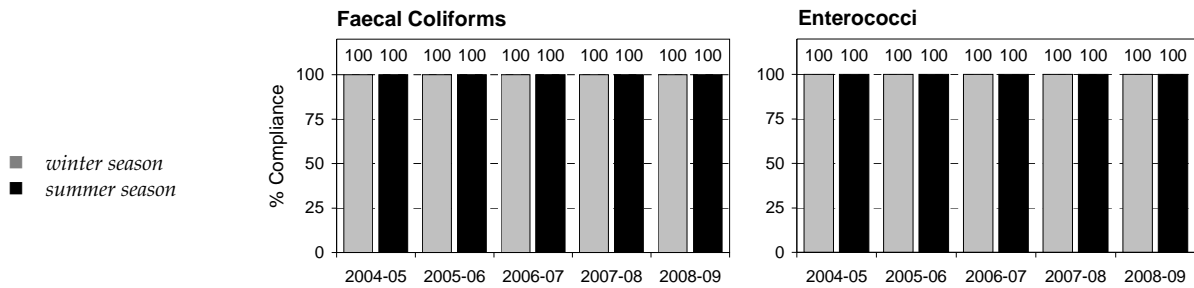
Leachate from a former landfill site at Wanda Reserve could pose a threat to water quality in the area. Cronulla STP discharges tertiary treated disinfected effluent via the cliff-face outfall at Potter Point and may be a potential pollution source during bypass and overflow conditions.

Actions

Sutherland Council continued to implement the Bate Bay Coastline Management Plan to ensure that water quality at Greenhills Beach remains suitable for swimming.

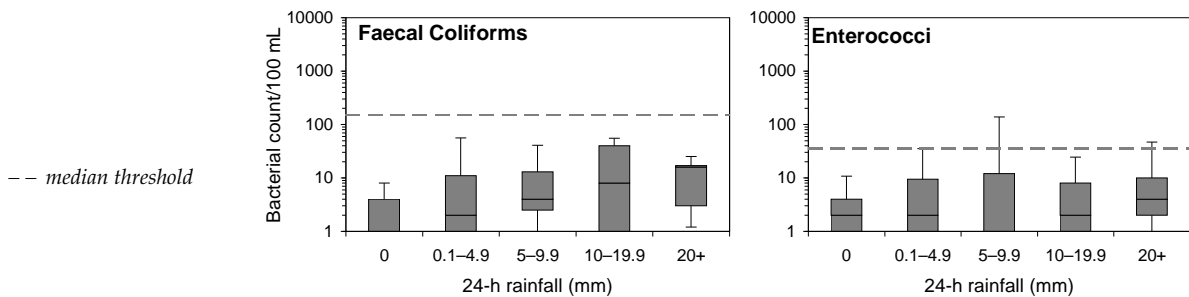
Compliance

Faecal coliform and enterococci levels complied with swimming guidelines 100% of the time over the last five years.



Response to rainfall

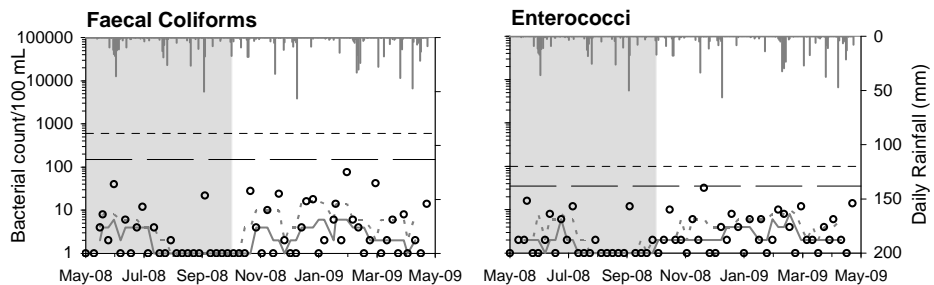
Faecal coliform levels displayed little response to rainfall and generally remained below the median guideline limit across all rainfall categories. Enterococci levels showed little response to rainfall but occasionally exceeded the median guideline limit after rainfall.



Season data

- | rainfall
- o individual result
- rolling median
- rolling 80th percentile

- Guidelines**
 (see page 8 for details)
- median threshold
 - 80th percentile threshold



Wanda

Description

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 Wanda Beach from October to April.

Pollution sources

Leachate from a former landfill site at Wanda Reserve could pose a threat to water quality in the area. Cronulla STP discharges tertiary treated disinfected effluent via the cliff-face outfall at Potter Point and may be a potential pollution source during bypass and overflow conditions.

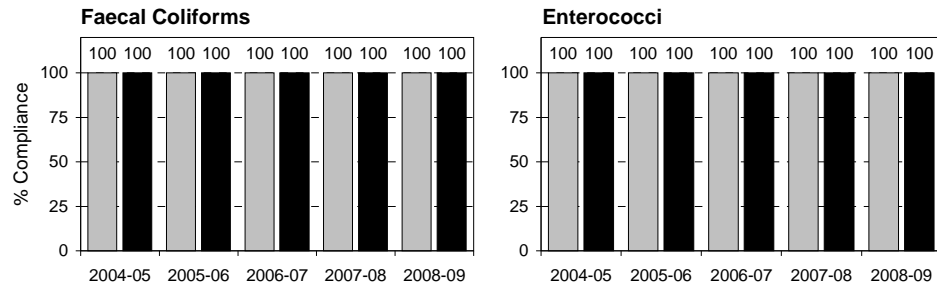
Actions

Sutherland Council continued to implement the Bate Bay Coastline Management Plan to ensure that water quality at Wanda Beach remained suitable for swimming. Funding was obtained to reduce stormwater outflows and improve access south of the surf club. Sydney Water has cleaned and inspected sewer mains across the catchment. Where problems have been identified they are being fixed.

Compliance

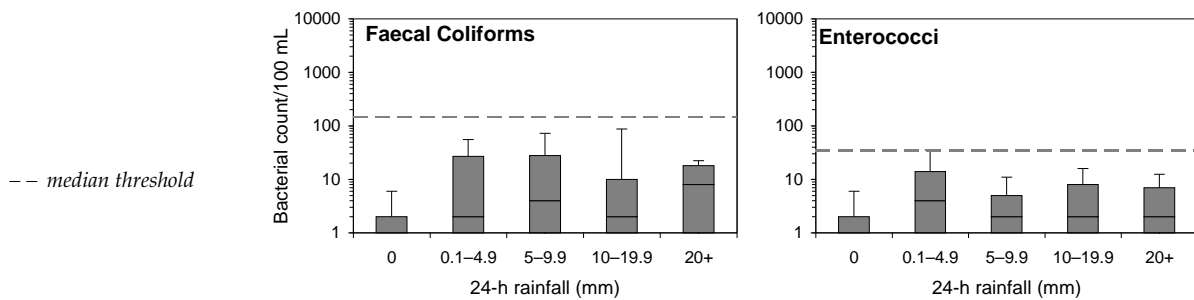
Faecal coliform and enterococci levels complied with swimming guidelines 100% of the time over the last five years.

See page 86 for key to map



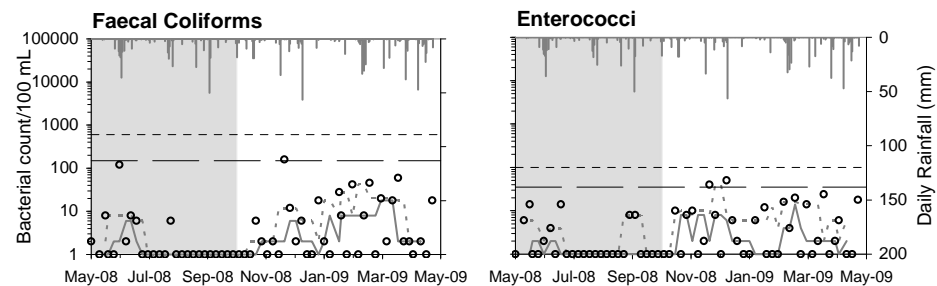
Response to rainfall

Faecal coliform and enterococci levels displayed little response to rainfall and generally remained below the median guideline limits across all rainfall categories. Enterococci levels occasionally exceeded the median guideline limit after rain.



Season data

- | rainfall
 - o individual result
 - rolling median
 - rolling 80th percentile
- Guidelines
(see page 8 for details)
- median threshold
 - 80th percentile threshold



Elouera

See page 86 for key to map

Description

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 Elouera Beach from October to April.



Pollution sources

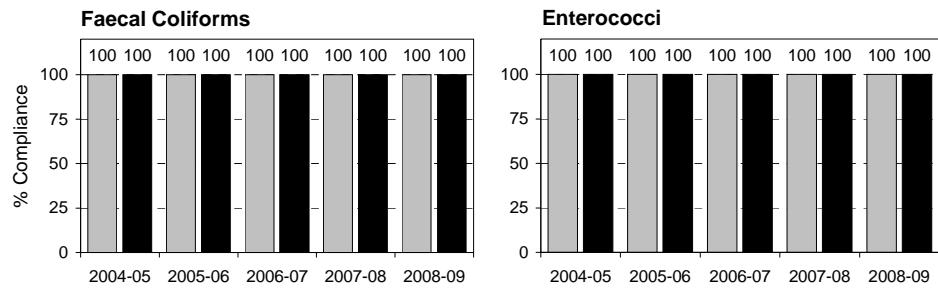
Cronulla STP discharges tertiary treated disinfected effluent via the cliff-face outfall at Potter Point and may be a potential pollution source during bypass and overflow conditions.

Actions

Sutherland Council continued to implement the Bate Bay Coastline Management Plan to ensure water quality at Elouera Beach remained suitable for swimming. Sydney Water has cleaned and inspected sewer mains across the catchment. Where problems have been identified they are being fixed.

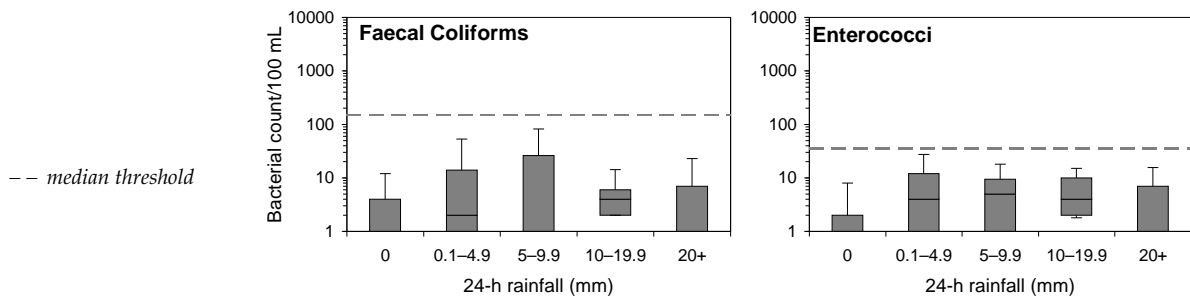
Compliance

Faecal coliform and enterococci levels complied with swimming guidelines 100% of the time over the last five years.



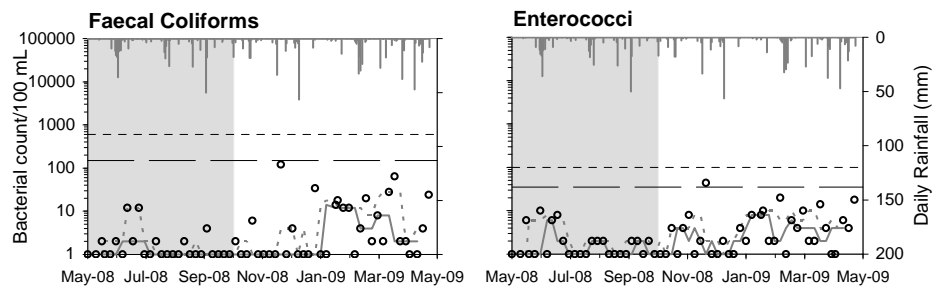
Response to rainfall

Bacterial densities displayed little response to rainfall and generally remained below the median guideline limits across all rainfall categories.



Season data

- | rainfall
 - o individual result
 - rolling median
 - - - rolling 80th percentile
- Guidelines
(see page 8 for details)
- median threshold
 - - - 80th percentile threshold



North Cronulla

See page 86 for key to map

Description

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 North Cronulla Beach from October to April.

Pollution sources

Urban runoff discharges to the beach via an open drain. Cronulla STP discharges tertiary treated disinfected effluent via the cliff-face outfall at Potter Point and may be a potential pollution source during bypass and overflow conditions.

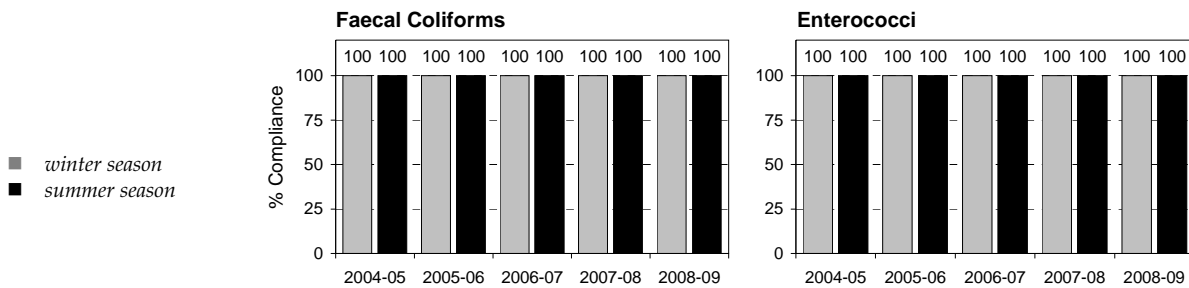
Actions

Sutherland Council continued to implement the Bate Bay Coastline Management Plan to ensure water quality at North Cronulla Beach remained suitable for swimming.



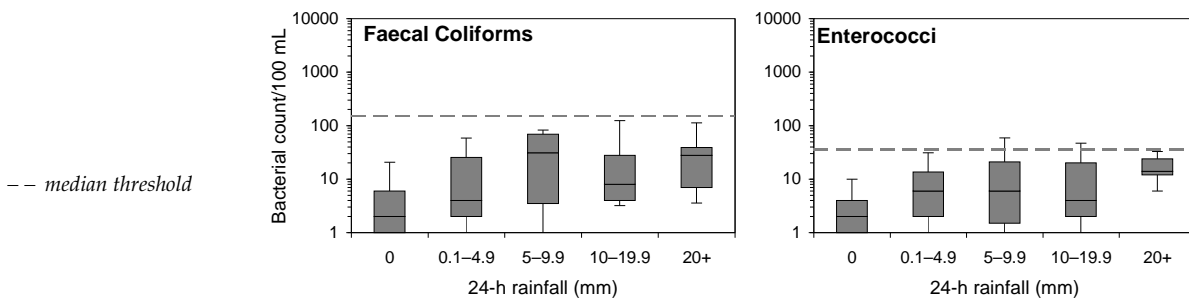
Compliance

Faecal coliform and enterococci levels complied with swimming guidelines 100% of the time over the last five years.



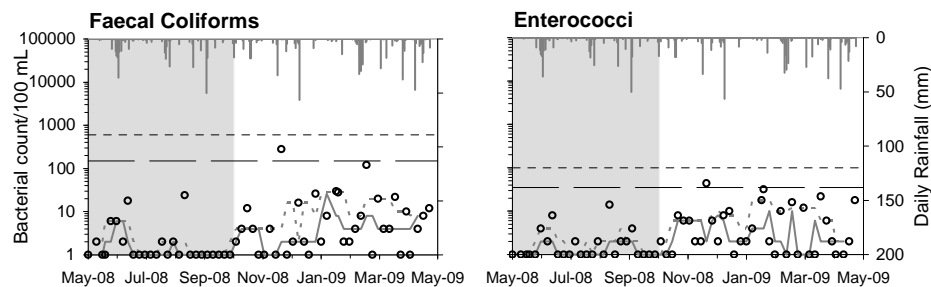
Response to rainfall

Bacterial densities tended to increase with increasing rainfall. Faecal coliform levels generally remained below the median guideline limit across all rainfall categories. Enterococci levels occasionally exceeded the median guideline limit in response to five millimetres of rain or more in the previous 24 hours.



Season data

- | rainfall
 - o individual result
 - rolling median
 - - - rolling 80th percentile
- Guidelines
(see page 8 for details)
- median threshold
 - - - 80th percentile threshold



South Cronulla

See page 86 for key to map

Description

The beach is 300 metres long and situated at the southern end of Bate Bay. An ocean pool is located at the northern end of the beach. Swimming is relatively safe, but rips occasionally form at either end of the beach. Lifeguards patrol the beach all year round.



Pollution sources

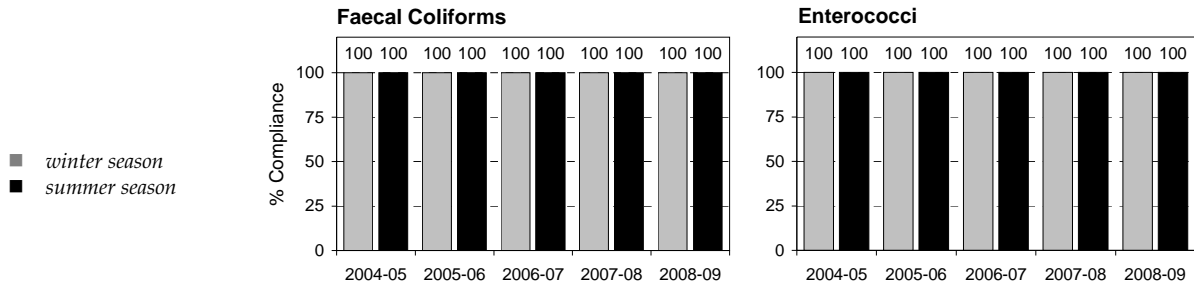
Stormwater drains discharge to the beach. Cronulla STP discharges tertiary treated disinfected effluent via the cliff-face outfall at Potter Point and may be a potential pollution source during bypass and overflow conditions.

Actions

Sutherland Council continued to implement the Bate Bay Coastline Management Plan to ensure water quality at South Cronulla Beach remained suitable for swimming. The Cronulla rock pools were regularly cleared of weed and sand. During summer, the southern rock pool was tested fortnightly by Council for faecal coliforms and enterococci.

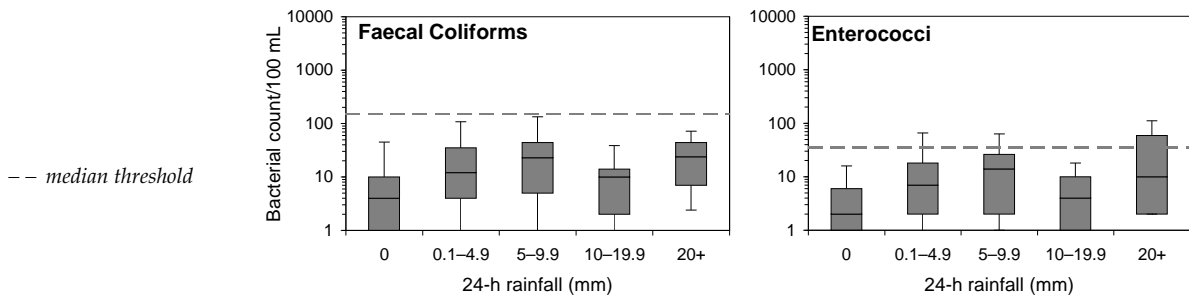
Compliance

Faecal coliform and enterococci levels complied with swimming guidelines 100% of the time over the last five years.



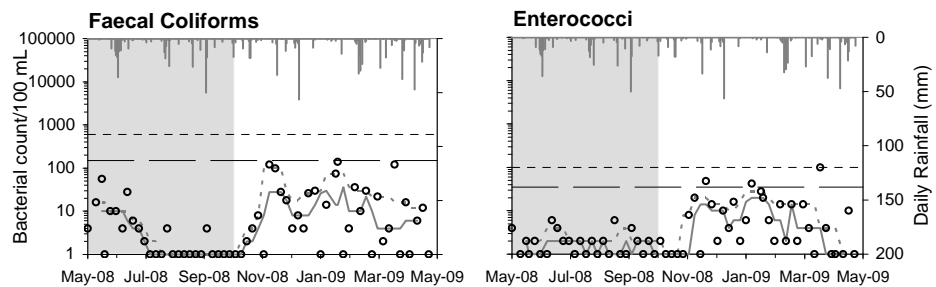
Response to rainfall

Faecal coliform densities generally remained below the median guideline limit across all rainfall categories. Enterococci densities tended to increase slightly with increasing rainfall, occasionally exceeding the median guideline limit after rain.



Season data

- | rainfall
 - o individual result
 - rolling median
 - - - rolling 80th percentile
- Guidelines
(see page 8 for details)
- median threshold
 - - - 80th percentile threshold



Shelly Beach

See page 86 for key to map

Description

The 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.

Pollution sources

Stormwater drains discharge to the beach. Estuarine plumes from Port Hacking may also be a source of pollution during and after wet weather. Cronulla STP discharges tertiary treated disinfected effluent via the cliff-face outfall at Potter Point and may be a potential pollution source during bypass and overflow conditions.

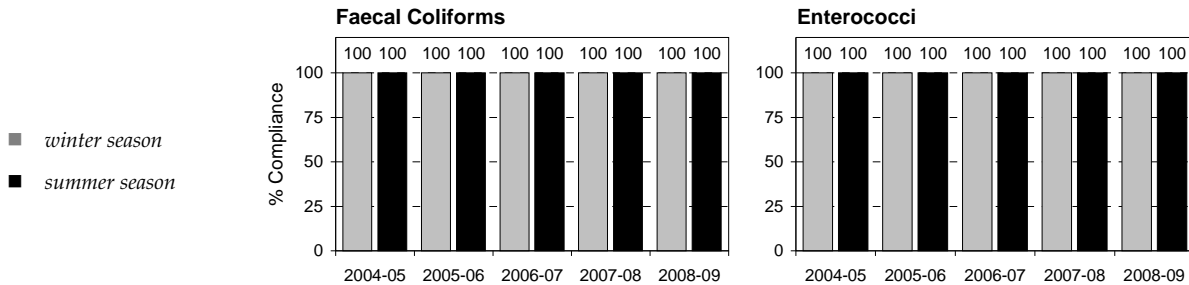
Actions

Sutherland Council implemented the Bate Bay Coastline Management Plan to ensure water quality at Shelly Beach remained suitable for swimming. Ongoing maintenance was carried out on the tidal pool to ensure the pool was safe for swimmers. Sydney Water completed works across the Cronulla peninsula in 2007. It enlarged pumps and pipes to improve transport of sewage, diverted excess flows to sewers with more capacity, and added storage.



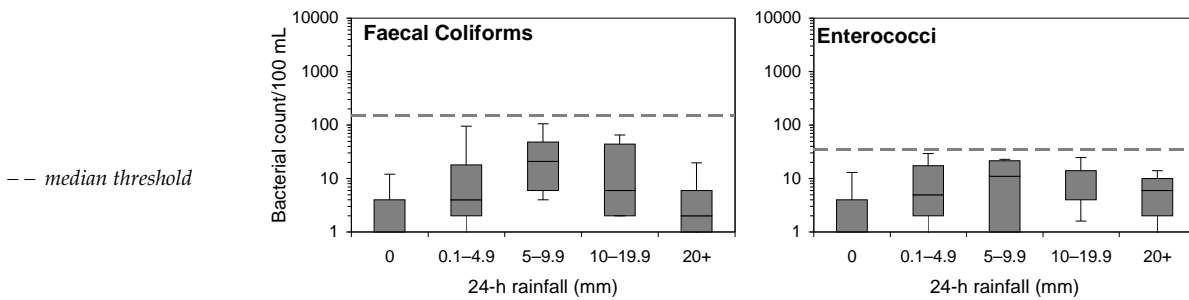
Compliance

Faecal coliform and enterococci levels complied with swimming guidelines 100% of the time over the last five years.



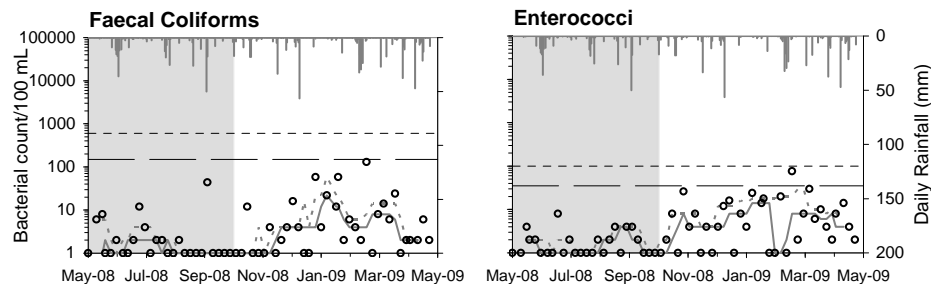
Response to rainfall

Bacterial densities increased slightly with increasing rainfall but generally remained below the median guideline limits across all rainfall categories.



Season data

- | rainfall
 - o individual result
 - rolling median
 - - - rolling 80th percentile
- Guidelines
(see page 8 for details)
- median threshold
 - - - 80th percentile threshold



Oak Park

See page 86 for key to map

Description

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



Pollution sources

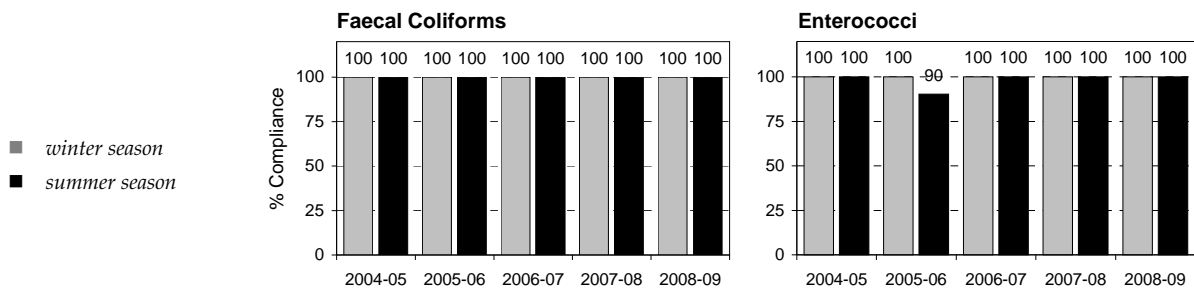
Stormwater drains discharge to the beach. Estuarine plumes from Port Hacking can pollute the beach. Cronulla STP discharges tertiary treated disinfected effluent via the cliff-face outfall at Potter Point and may be a potential pollution source during bypass and overflow conditions.

Actions

Sutherland Council implemented the Bate Bay Coastline Management Plan. Ongoing maintenance was carried out on the tidal pool. A proposal is being developed to divert stormwater runoff from Jibbon Street across the park to a pipe outlet at the eastern side of the Esplanade. Sydney Water completed works across the Cronulla peninsula in 2007. It enlarged pumps and pipes to improve transport of sewage, diverted excess flows to sewers with more capacity, and added storage.

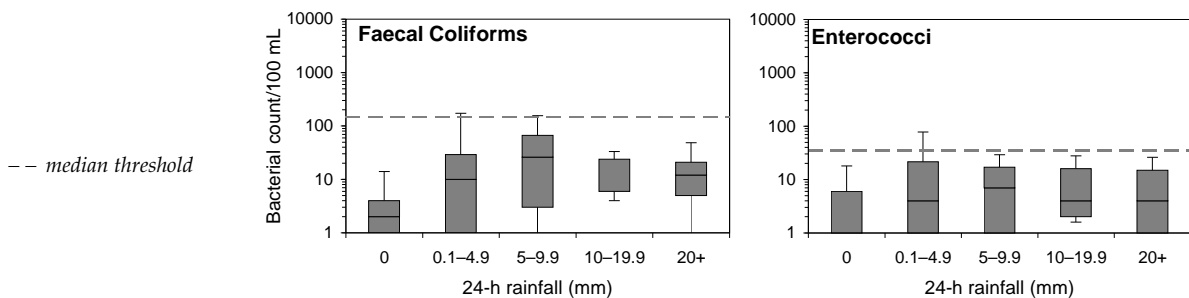
Compliance

Faecal coliform levels complied with swimming guidelines 100% of the time over the last five years. With the exception of summer 2005–2006, enterococci levels complied with swimming guidelines 100% of the time over the last five years.



Response to rainfall

Bacterial densities displayed little response to rainfall. Faecal coliform and enterococci levels occasionally exceeded the median guideline limit after light rain in the previous 24 hours.



Season data

- | rainfall
- o individual result
- rolling median
- - - rolling 80th percentile

- Guidelines
(see page 8 for details)
- median threshold
 - - - 80th percentile threshold

