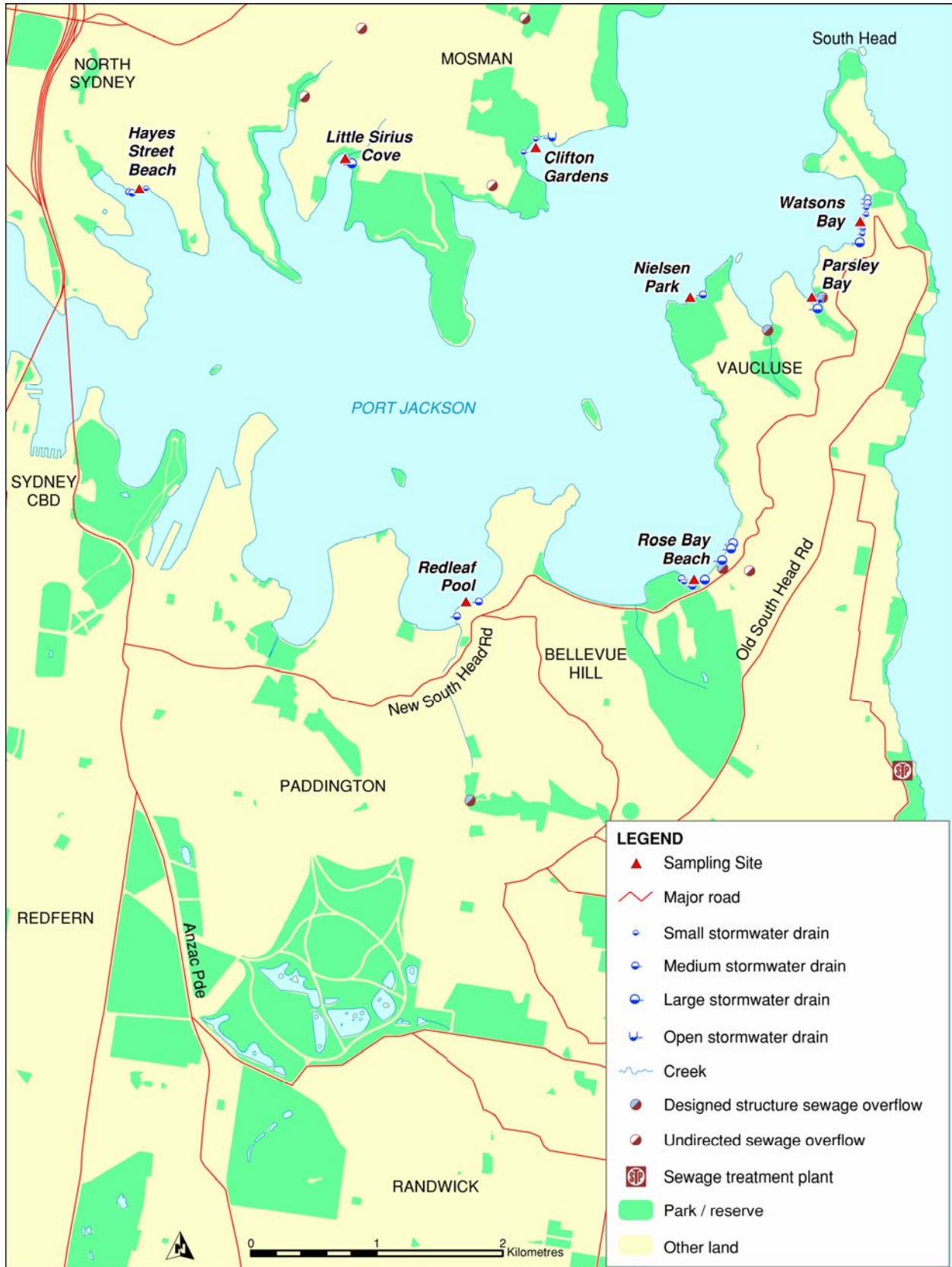


Sydney Metropolitan Area Harbour Swimming Sites

Sydney Harbour – Port Jackson

Sydney Harbour – Port Jackson

Sites: Hayes Street Beach, Little Sirius Cove, Clifton Gardens, Redleaf Pool, Watsons Bay, Parsley Bay, Nielsen Park and Rose Bay Beach



Location

Port Jackson stretches east of the Sydney Harbour Bridge to the Heads. Land use in the Port Jackson catchment is mainly residential, commercial, recreational and bushland (including Sydney Harbour National Park).

Mosman, North Sydney, Sydney City and Woollahra councils operate in this area.

Compliance with guidelines

Faecal coliform and enterococci compliance was generally high across the Port Jackson region during summer 2008–2009.

Little Sirius Cove, Clifton Gardens, Rose Bay Beach, Nielsen Park, Watsons Bay and Parsley Bay all complied with both faecal coliform and enterococci guidelines 100% of the time. A high level of compliance was also recorded at Redleaf Pool, which complied 81% of the time with faecal coliform guidelines and 97% of the time for enterococci (Table 16).

A lower level of compliance was recorded at Hayes Street Beach which complied with faecal coliform guidelines 61% of the time, and for enterococci 65% of the time.

The range of indicator bacteria levels measured at Sydney Harbour swimming areas during summer 2008–2009 is shown in Figure 23, with Port Jackson sites highlighted in grey. Levels of faecal coliforms and enterococci were within the ranges measured in other swimming sites in Sydney Harbour, with the exception of Hayes St Beach where the levels were slightly higher than most other sites.

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 eight swimming areas in the Port Jackson catchment were generally good. Little Sirius Cove, Clifton Gardens, Rose Bay Beach, Nielsen Park, Watsons Bay and Parsley Bay all ranked equal first and Redleaf ranked eighth. The exception was Hayes Street Beach which was ranked fourteenth, the lowest ranking swimming site in the Beachwatch Program.

Actions to improve water quality

Actions specific to individual swimming locations are included on the 'swimming area' pages. Improvements in water quality within Port Jackson should also be achieved as a result of the implementation of stormwater management plans and other council programs.

Stormwater Management Plans

The stormwater management plans for North Port Jackson and South Port Jackson are currently being implemented by the local councils in the area, the Roads and Traffic Authority, and Sydney Water.

Mosman Council

Stormwater Quality Improvement Device (SQID) maintenance: Council continued to maintain SQIDs throughout the catchment, improving the water quality of receiving waters, including those at Clifton Gardens and Little Sirius Cove.

Water quality monitoring: Operation of the water quality monitoring program continued during 2008–2009. The monitoring program aims to evaluate the performance of the SQIDs to improve the quality of stormwater before it enters receiving waters.

The Creek and Estuary Monitoring Program commenced in July, including quarterly sampling for physio-chemical parameters of water and sediment, and macroinvertebrate sampling twice a year. Monitoring sites include Mosman Bay Creek and Reid Park Creek, Mosman Bay.

Water Saving Initiatives: Council has completed the Drill Hall Stormwater Reuse Project. The storage tank will save up to 4 million litres of water per year and reduce

the volume of stormwater flowing to Chowder Bay and Clifton Gardens. Council has also installed rainwater tanks on the Allen Border Oval amenities block and the Council Depot to conserve water and reduce the volume of stormwater.

Community Education: Council continued to provide information to the community on rainwater tanks as a method of conserving water as well as reducing the volume of stormwater entering the waterways.

Regulation: Council continued to investigate pollution incidents and undertake regulatory approaches to reduce the risk of pollution from construction sites and landscaping works.

Sydney Water Overflow Abatement Program: The Sydney Water Overflow Abatement Program is focused on improving the wastewater collection system and alleviating stress on the overflow points in Little Sirius Cove catchment, with the aim of reducing sewage overflows and improve water quality.

North Sydney Council

North Sydney Stormwater Reuse Project: The project aims to save 90 megalitres of potable water a year by harvesting, treating and reusing stormwater for irrigation of sports fields and recreational parks. The St Leonards Park and Cammeray Park stages are complete. Three further stages are in progress.

Community education: Council developed and released Sustainability Education Kits for local primary schools with activities on waste management and water quality. It also ran gross pollutant trap excursions where students observed litter traps being cleaned. Students were encouraged to take actions to reduce the amount of litter in their school grounds.

Water-saving initiatives: Council has participated in and implemented water-saving initiatives including the Water Campaign, Every Drop Counts and North Sydney Council's Water Savings Action Plan. Outcomes included the installation of rainwater tanks and other water-saving devices at several Council facilities.

Stormwater Quality Improvement Device maintenance: Council continued to maintain SQIDs throughout the catchment, reducing the amount of litter entering the harbour.

Street Sweeper Program: Council has acquired new, smaller street sweepers that allow for mechanical sweeping of footpaths and plazas in business areas, resulting in less litter entering the stormwater system.

Additional water quality monitoring: Council takes macroinvertebrate samples from two creek sites twice a year to assess ecosystem condition. Physio-chemical water and sediment parameters are analysed as required.

City of Sydney Council

Port Jackson Stormwater Management Plan: The City of Sydney Council has implemented components of the Port Jackson South Stormwater Management Plan. Activities completed to date include regular maintenance and cleaning of stormwater quality improvement devices, channels and gully pits.

Community Education: The City of Sydney continued to raise awareness of water pollution and other environmental issues through education programs including:

- **Zero Waste Partners:** A waste education program for business to help prevent littering and illegal dumping, encourage correct bin presentation, and increase recycling and waste minimisation.
- **Butt Blitzes:** These are regular anti-littering awareness days during which the City's Waste Educators and City Rangers educate smokers by handing out free personal ashtrays and postcards, and stencil stormwater drains with stormwater pollution messages in hotspot areas.
- **Green Clean Chinatown:** A business program to reduce littering and illegal dumping in Chinatown and to recruit more Zero Waste Partners.

Stormwater harvesting and reuse: Council has implemented several rainwater and stormwater harvesting and reuse projects throughout its area of operation. The following projects will reduce stormwater

discharge within the Darling Harbour Catchment:

- Barcom Avenue Park: Stormwater is harvested from a retention tank at the adjacent St Vincent's Hospital and transferred to a 100-kilolitre underground storage tank in the park. Permeable road pavements are used with subterranean drainage and a bio-retention system. This is designed to collect runoff and remove pollutants prior to water reuse or before the water enters the stormwater system. Rainwater tanks have also been installed to irrigate the reserve. The project provides 3.3 kilolitres/day or 1.2 megalitres/year for reuse.
- Harmony Park: Roof water is collected from an Energy Australia substation adjacent to the park, filtered through a gross pollutant trap, and stored in a 240 kilolitre underground tank for irrigation. Hard-paved surface areas have been minimised to increase water infiltration and reduce stormwater flows. This initiative provides 7.8 kilolitres/day or 2.8 megalitres/year of stormwater.
- Beare Park: Roof water is collected from the amenities building for toilet flushing and stormwater was harvested from Ithaca Rd to irrigate the park.
- Water Police Site: Investigations have commenced to design a stormwater management system for the site. It will collect water from the surrounding catchment and runoff from within the park to be stored in a 300 kilolitre tank and used for irrigation. In addition, a 200 kilolitre tank to store harvested stormwater may be situated adjacent to the park. Excess water may be used to drought-proof adjacent parkland and for toilet flushing. Planted bio-swales and permeable paving are also planned to improve stormwater quality and reduce runoff.

Woollahra Council

Environmental and Infrastructure Levy:

Woollahra Council commenced the second year of a five year combined Environmental and Infrastructure Levy (2007–2012) that aims to restore aging infrastructure and

protect the local environment. The combined annual levy of \$3.1 million will fund the implementation of Council's Environmental Works Program (EWP) and the Infrastructure Renewal Program (IRP), with \$440,000 dedicated solely to implementation of the EWP. In addition to the Environmental and Infrastructure Levy, the Stormwater Management Service charge will provide an additional \$450,000 to fund stormwater infrastructure projects.

Environmental Works Program (EWP):

Council's EWP focuses on urban stormwater management that incorporates water-sensitive urban design principles like water harvesting and reuse. The program will incorporate new initiatives and projects generated through the development of Woollahra Council's long-term strategic plan.

During 2008–2009 projects implemented through the EWP included:

- the Rose Bay Promenade Project, which involved the installation of a porous paving infiltration system to treat polluted stormwater runoff collected from New South Head Road. Council is now monitoring the treated stormwater collected in underground tanks to report on the environmental performance of the system.
- the Butt Out Project, which involved the installation of 25 cigarette litter bins across the local government area to reduce the number of cigarette butts washing into Sydney Harbour
- the implementation of mechanical beach cleaning to further reduce the amount of litter and pollution entering Sydney Harbour
- the Cooper Park Pond and Creek Restoration Project, which aims to reduce the amount of sediment in Cooper Park Creek and improve water quality
- the Christison Park water-efficient irrigation and localised water reuse system which is now under operation
- completion of the Small Street remediation, drainage and landscaping works to protect Cooper Creek from uncontrolled runoff

- the Hopetoun Avenue stormwater augmentation project to protect Parsley Bay from uncontrolled run-off in under construction
- a series of water-sensitive urban design features as part of the proposed streetscape improvement works on Bellevue Road. A bio-retention system and rain gardens will reduce urban runoff, help filter pollutants from road runoff and improve the quality of water flowing into Cooper Park Creek.

Sydney Water

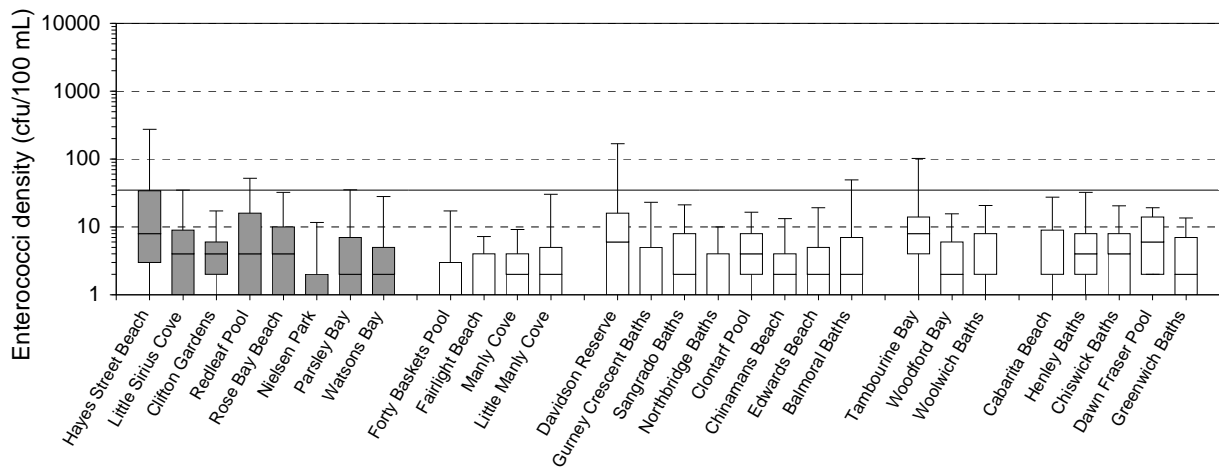
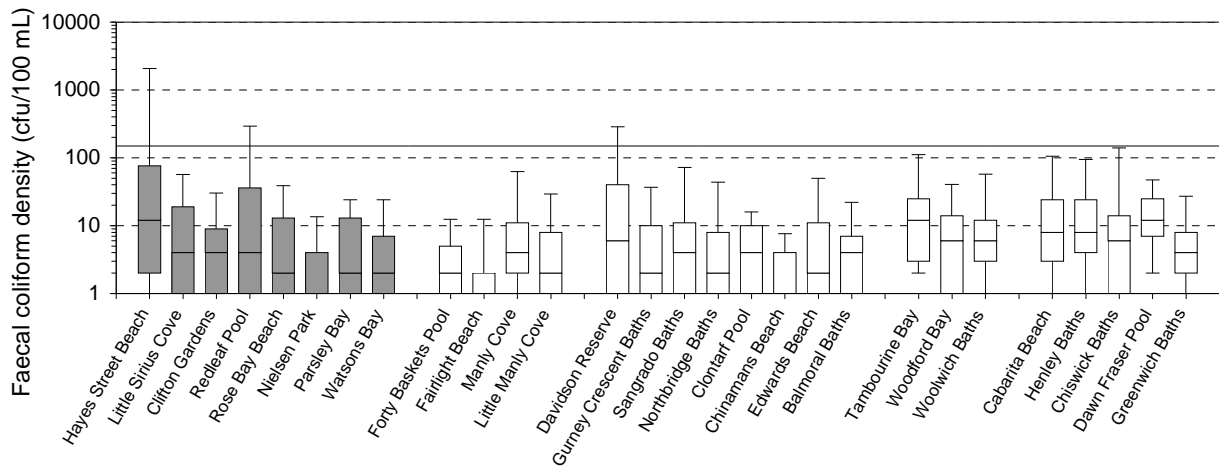
The Sydney Water SewerFix Program completed works in the catchment of Hayes Street Beach to achieve a long-term wet weather overflow target of not more than 20 overflows per ten years on average.

Across the North Shore, 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 are identified they will be fixed by repair or preventive maintenance. The cleaning and inspection is complete for Cremorne and in progress for Mosman.

Table 16: Compliance and Ranking of Port Jackson Sites during Summer 2008–2009

Site	Compliance (%)		Overall rank (out of 14)
	Faecal Coliforms	Enterococci	
Hayes Street Beach	61	65	14
Little Sirius Cove	100	100	1
Clifton Gardens	100	100	1
Redleaf Pool	81	97	8
Rose Bay Beach	100	100	1
Nielsen Park	100	100	1
Parsley Bay	100	100	1
Watsons Bay	100	100	1

Figure 23: Bacterial Levels at Sydney Harbour Sites during Summer 2008–2009



Hayes Street Beach, Neutral Bay

See page 204 for key to map

Description

This 50 metre long beach is situated east of the Hayes Street ferry wharf in Neutral Bay. The area is infrequently used for swimming and is not enclosed by netting.

Pollution sources

Stormwater drains discharge in the vicinity of the swimming area. Water quality at this site was affected by a number of dry weather sewage overflows that occurred between February and April 2009.

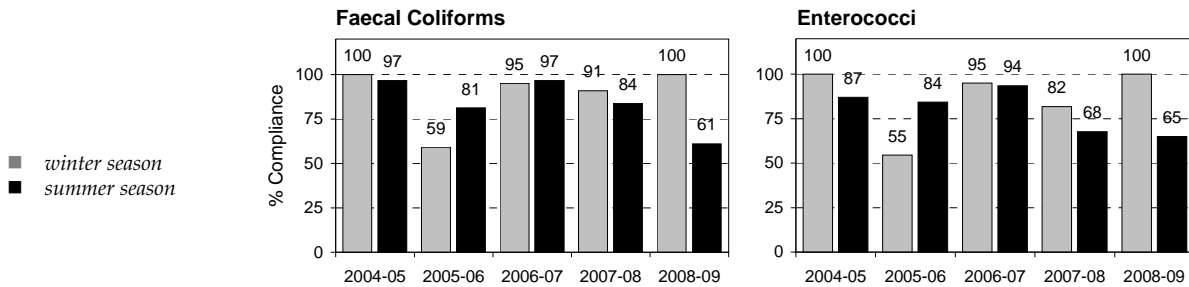
Actions

Sydney Water has cleaned and inspected sewer mains across the catchment. Where problems have been identified they are being fixed. Sydney Water is also doing works in the catchment including sewer lining, amplifying pipes and constructing a new storm pumping station.



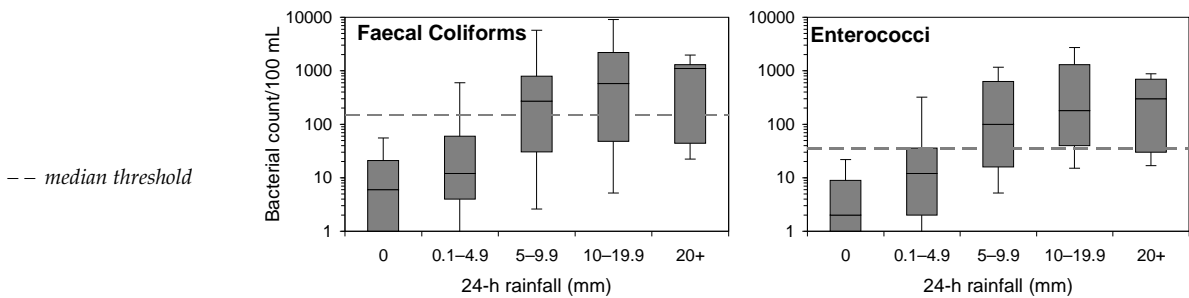
Compliance

Faecal coliform compliance with swimming guidelines ranged from 59% to 100% over the last five years. Enterococci compliance ranged from 55% to 100% over the last five years.



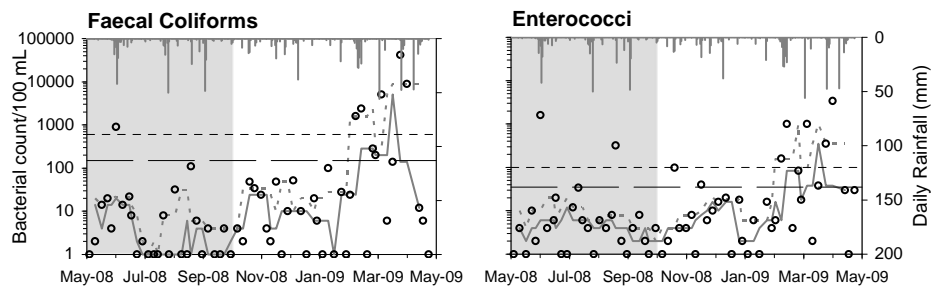
Response to rainfall

Faecal coliform and enterococci densities generally increased with increasing rainfall. Both bacterial levels regularly exceeded the median guideline limits in response to five millimetres of rain or more in the previous 24 hours. Enterococci densities occasionally exceeded the median guideline limits after light rain.



Season data

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



Little Sirius Cove

See page 204 for key to map

Description

The beach is 100 metres long and located at the northern end of Little Sirius Cove. The swimming area is not netted.

Pollution sources

Stormwater drains discharge within the vicinity of the swimming area. Taronga Zoo discharges treated animal effluent to the bay.

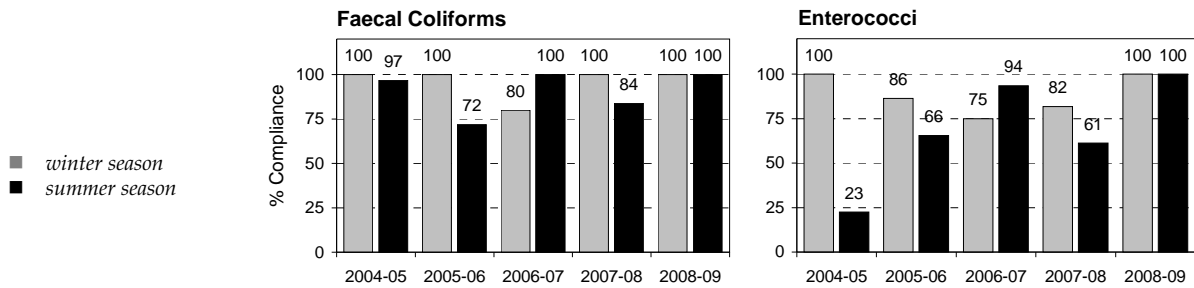
Actions

Mosman Council continued to maintain the SQIDs throughout the catchment. Sydney Water has cleaned and inspected sewer mains across the catchment. Where problems have been identified they are being fixed.



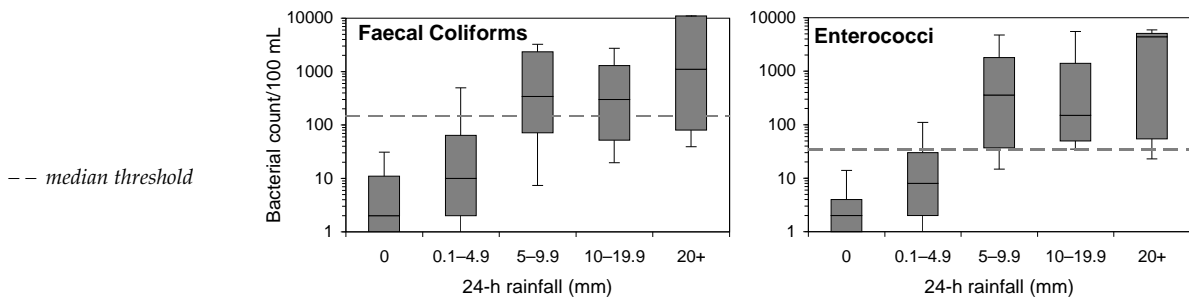
Compliance

Faecal coliform compliance with swimming guidelines ranged from 72% to 100% over the last five years. Enterococci compliance has been more variable, ranging from 23% to 100% over the last five years.



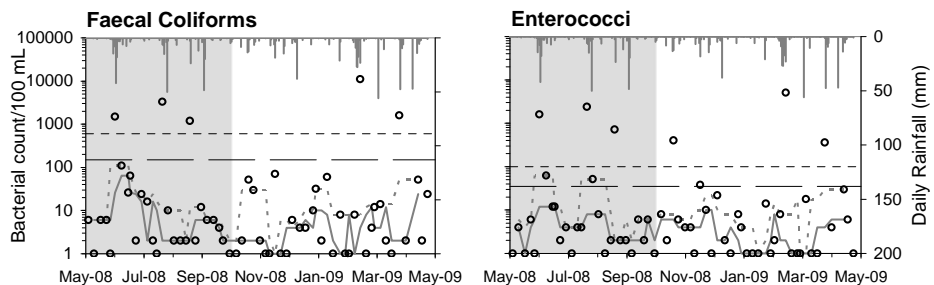
Response to rainfall

Faecal coliform and enterococci densities increased with increasing rainfall. Both bacterial indicators occasionally exceeded the median guideline limits in response to light rain. Faecal coliform levels regularly exceeded the median guideline limit in response to five millimetres of rain or more in the previous 24 hours. Enterococci levels frequently 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



Clifton Gardens

See page 204 for key to map

Description

A large netted swimming enclosure is located at the western end of the 250 metre long beach. The beach is backed by a large park and picnic area.

Pollution sources

Stormwater drains discharge in the vicinity of the swimming area. A small lagoon and creek at the northern end of the beach discharge stormwater during wet weather.

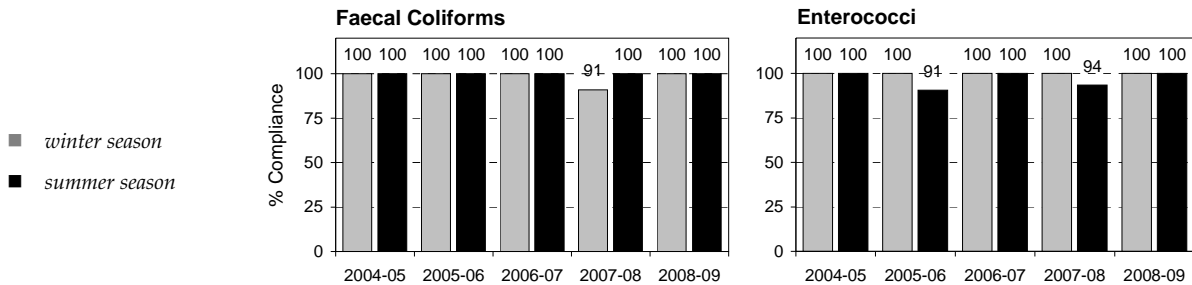
Actions

Mosman Council continued to maintain the SQIDs throughout the catchment. Pollution incidents from construction sites were investigated. Council completed the Drill Hall Stormwater Reuse Project. Sydney Water has cleaned and inspected sewer mains across the catchment. Where problems have been identified they are being fixed.



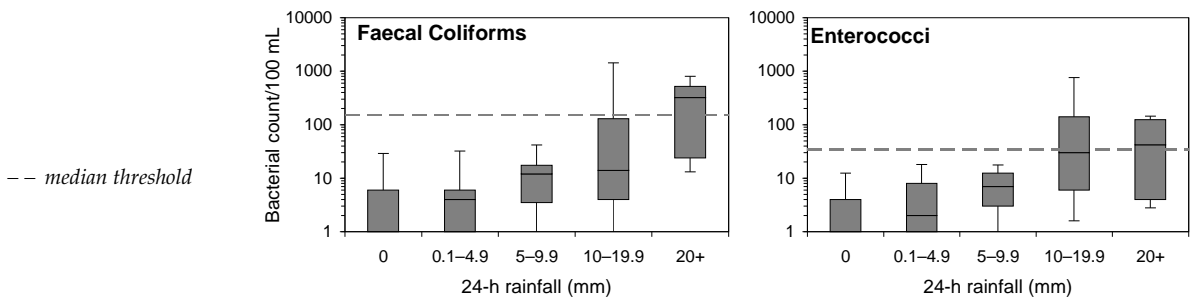
Compliance

With the exception of winter 2007–2008, faecal coliform levels complied 100% of the time over the last five years. Enterococci compliance has ranged from 91% to 100% over the last five years.



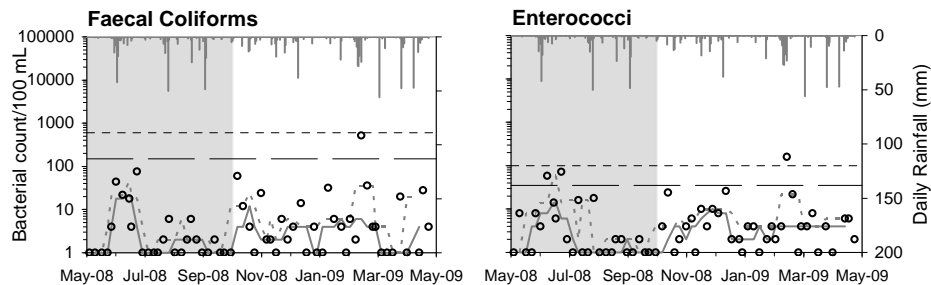
Response to rainfall

Bacterial densities tended to slightly increase 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 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



Redleaf Pool

See page 204 for key to map

Description

The netted swimming enclosure is in eastern Double Bay and is bordered on three sides by a narrow sun deck. It is backed by a small park.

Pollution sources

Stormwater drains discharge in the vicinity of the swimming area.

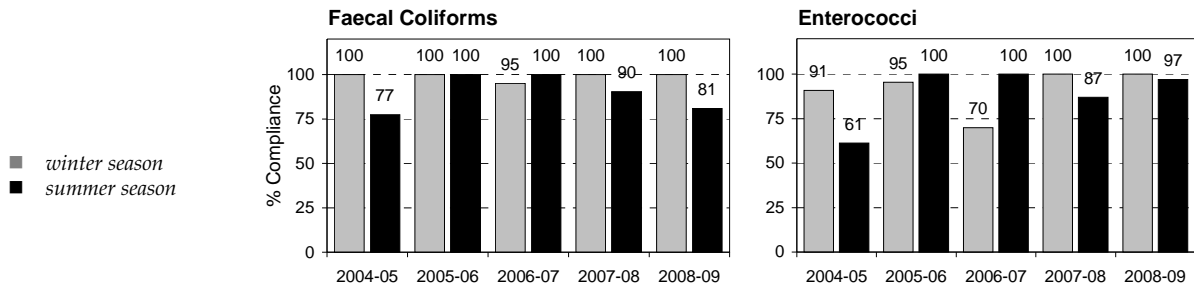
Actions

Woollahra Council continued to maintain a number of SQIDs in the Double Bay sub-catchment, which includes 81 pit baskets in the Double Bay commercial area floating litter booms, and a GPT on the stormwater line that drains to Seven Shillings Beach near Redleaf Pool, Double Bay.



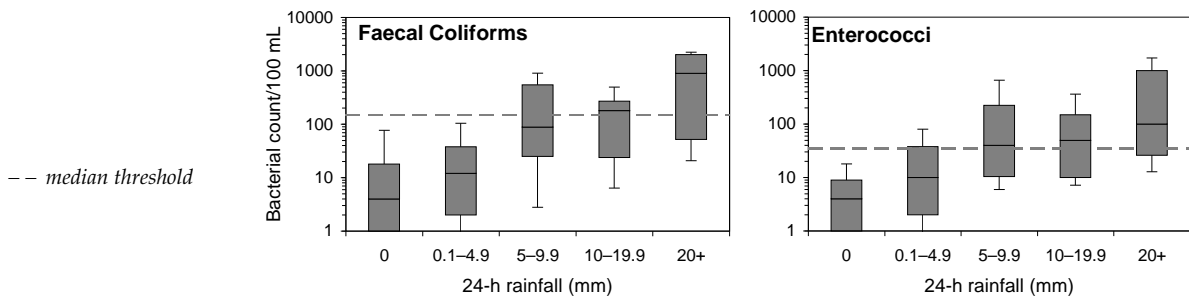
Compliance

Faecal coliform compliance with swimming guidelines ranged from 77% to 100% over the last five years. Enterococci compliance has been more variable, ranging from 61% to 100% over the last five years.



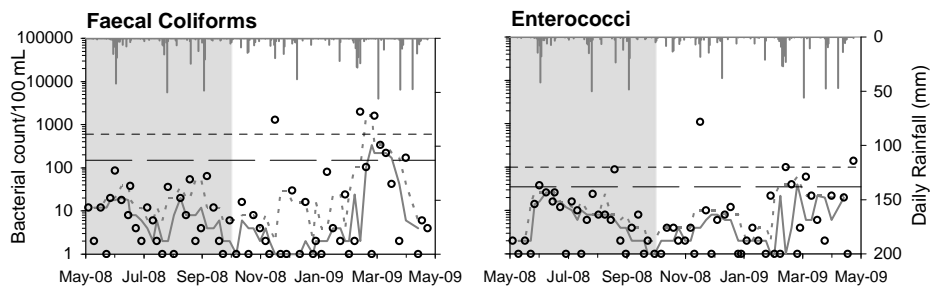
Response to rainfall

Faecal coliform densities increased with increasing rainfall, often exceeding the median guideline limit after five millimetres of rain or more in the previous 24 hours. Enterococci densities increased with increasing rainfall and regularly 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



Rose Bay Beach

See page 204 for key to map

Description

This is a 500 metre long narrow beach that is not enclosed by netting. The beach is a popular site for recreational boating. A sailing school and sailboat hire company operate in the area.

Pollution sources

Stormwater drains discharge in the vicinity of the swimming area. A large designed sewer overflow point is situated 200 metres from the sampling site.

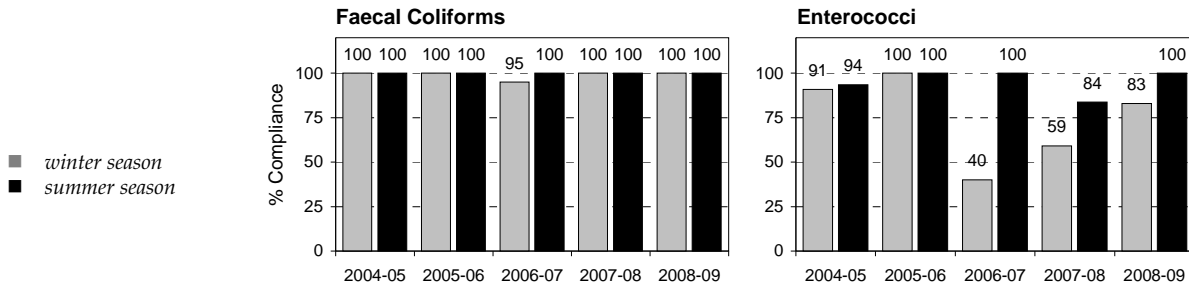
Actions

Woollahra Council maintains two SQIDs on the main stormwater lines that drain into Rose Bay. Stormwater runoff from New South Head Road is treated and reused by Council for irrigation and maintenance purposes. Sydney Water maintains the wetland, sediment basin and trash rack installed on the main stormwater line in Woollahra Golf Course.



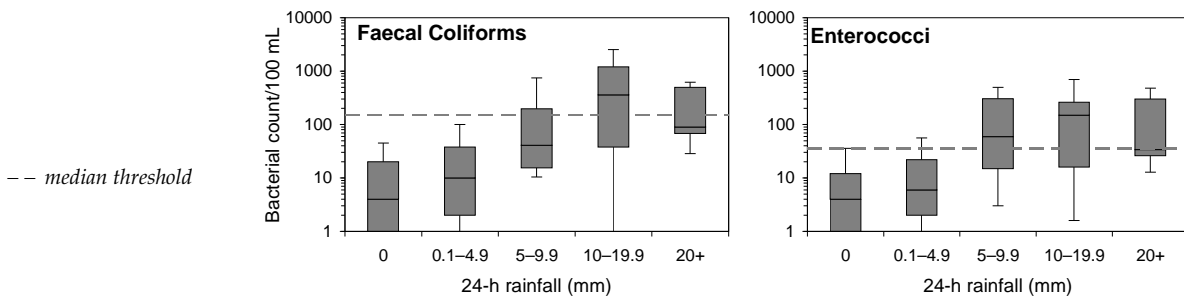
Compliance

With the exception of winter 2006–2007, faecal coliform levels complied with swimming guidelines 100% of the time over the last five years. Compliance with enterococci swimming guidelines has been more variable, ranging from 40% to 100% over the last five years.



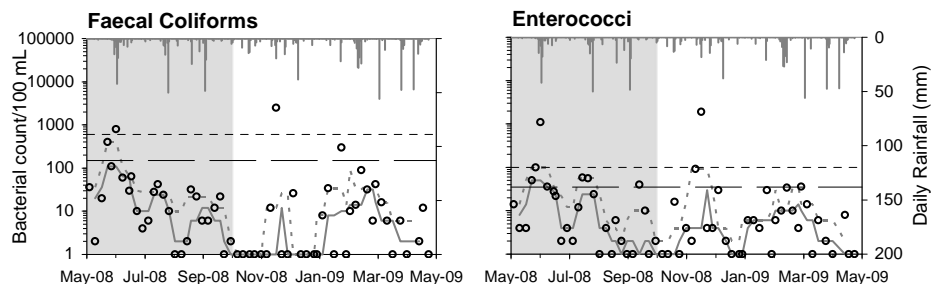
Response to rainfall

Faecal coliform and enterococci densities generally increased with increasing rainfall. Faecal coliform densities often exceeded the median guideline limit in response to five millimetres of rain or more and regularly 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 rainfall indicating a possible 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



Nielsen Park

See page 204 for key to map

Description

The swimming area is approximately 150 metres long and enclosed by netting during summer. The narrow beach and adjacent large park are part of Sydney Harbour National Park.

Pollution sources

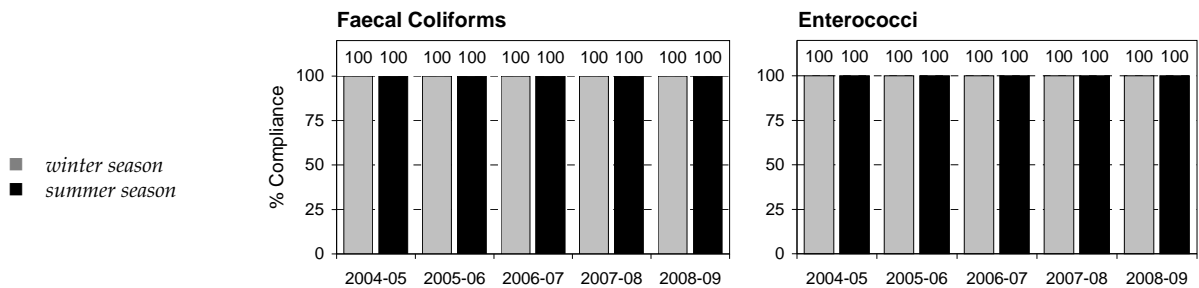
A stormwater drain discharges to the eastern end of the beach.

Actions

Woollahra Council maintains a SQID on the stormwater outlet draining to Shark Beach, Nielsen Park.

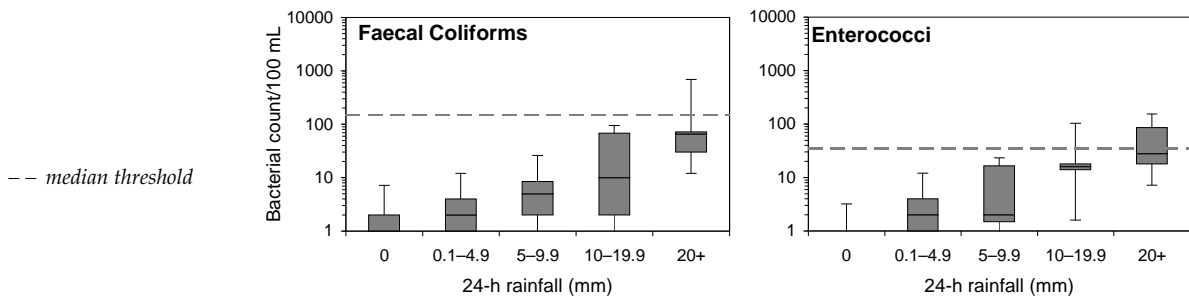
Compliance

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



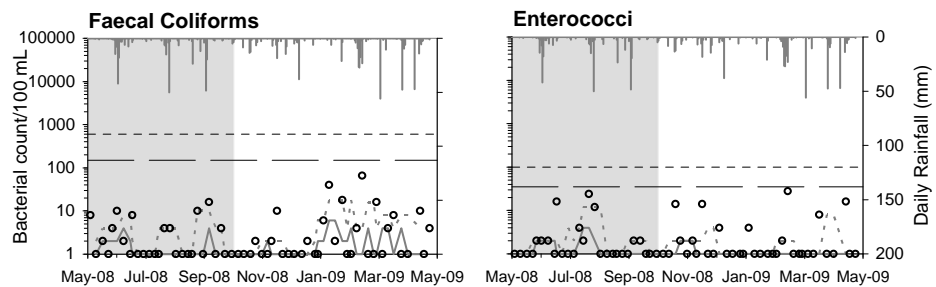
Response to rainfall

Faecal coliform and enterococci densities increased slightly with increasing rainfall. Faecal coliform densities occasionally exceeded the median guideline limit in response to 20 millimetres of rain or more in the previous 24 hours. Enterococci densities occasionally exceeded the median guideline limit in response to ten millimetres of rain or more and regularly exceeded the median guideline limit in response to 20 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



Parsley Bay

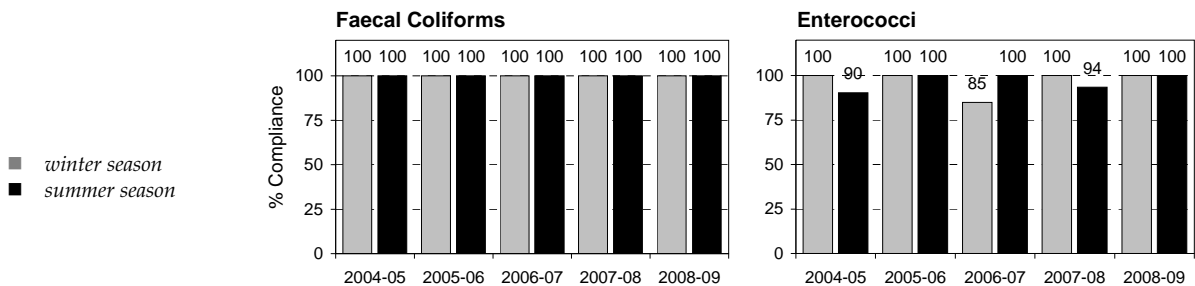
See page 204 for key to map

Description The southern end of the bay is netted to provide a large and safe swimming area. The swimming area is backed by Parsley Bay Reserve.

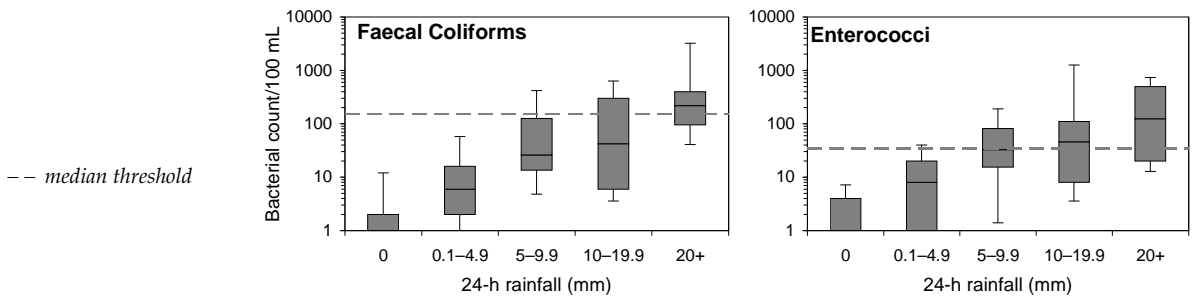
Pollution sources A stormwater drain discharges to the western side of the bay and a designed sewer overflow point is located along the drain flowing into the western side of Parsley Bay.

Actions Woollahra Council maintains four SQIDs installed on stormwater drains in the Parsley Bay sub-catchment.

Compliance Faecal coliform levels complied with swimming guidelines 100% of the time over the last five years. Compliance with the enterococci criteria has been more varied, ranging from 85% to 100% over the last five years.



Response to rainfall Faecal coliform and enterococci densities generally increased with increasing rainfall. Faecal coliform densities often exceeded the median guideline limits after five millimetres of rain or more in the previous 24 hours. Enterococci densities often exceeded the median guideline in response to light rain and regularly exceeded the median guideline limits after five millimetres of rain or more in the previous 24 hours.

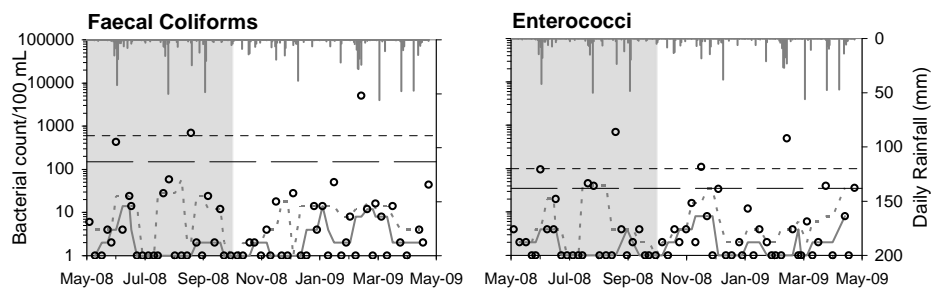


Season data

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

Guidelines
(see page 8 for details)

- median threshold
- 80th percentile threshold



Watsons Bay

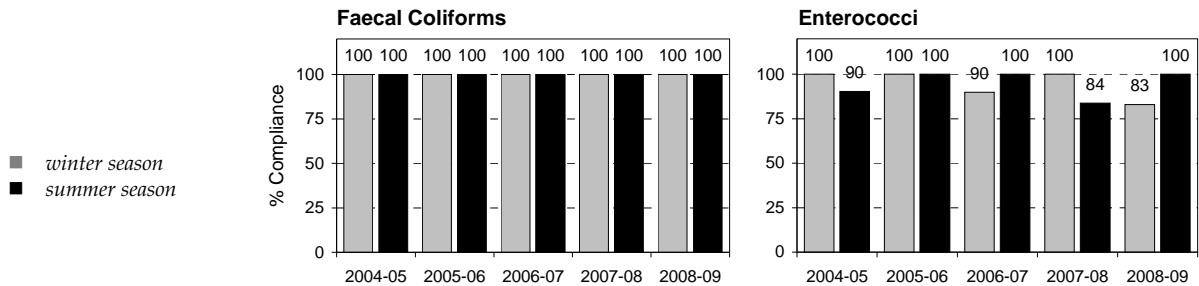
See page 204 for key to map

Description The 20 by 40 metre enclosed tidal swimming area adjoins a narrow, sandy beach.

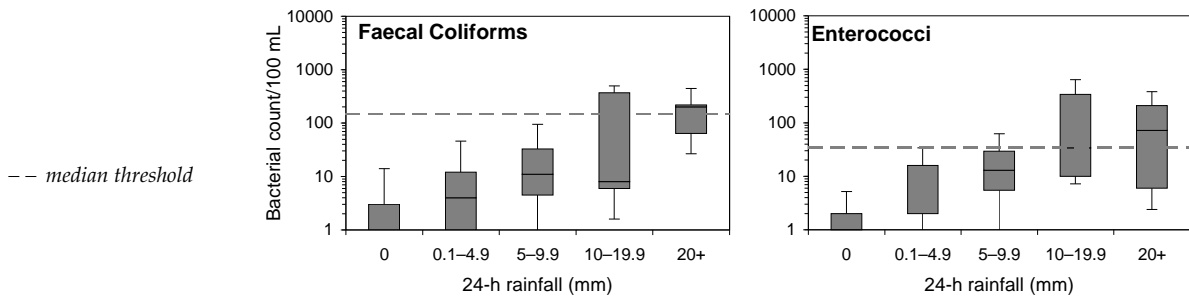
Pollution sources Stormwater drains discharge into the bay.

Actions Woollahra Council regularly maintains the SQID in Robertson Park.

Compliance Faecal coliform levels complied with swimming guidelines 100% of the time over the last five years. Enterococci compliance has been more varied, ranging from 83% to 100% over the last five years.



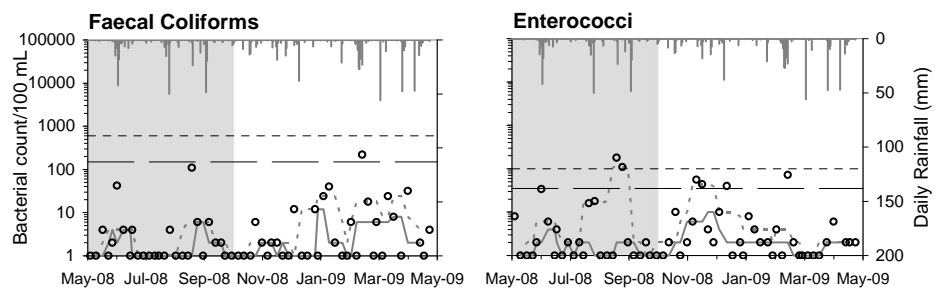
Response to rainfall Bacterial densities generally increased with increasing rainfall. Faecal coliform densities often exceeded the median guideline limit in response to ten millimetres or rain or more in the previous 24 hours. Enterococci densities occasionally exceeded the median guideline limit after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

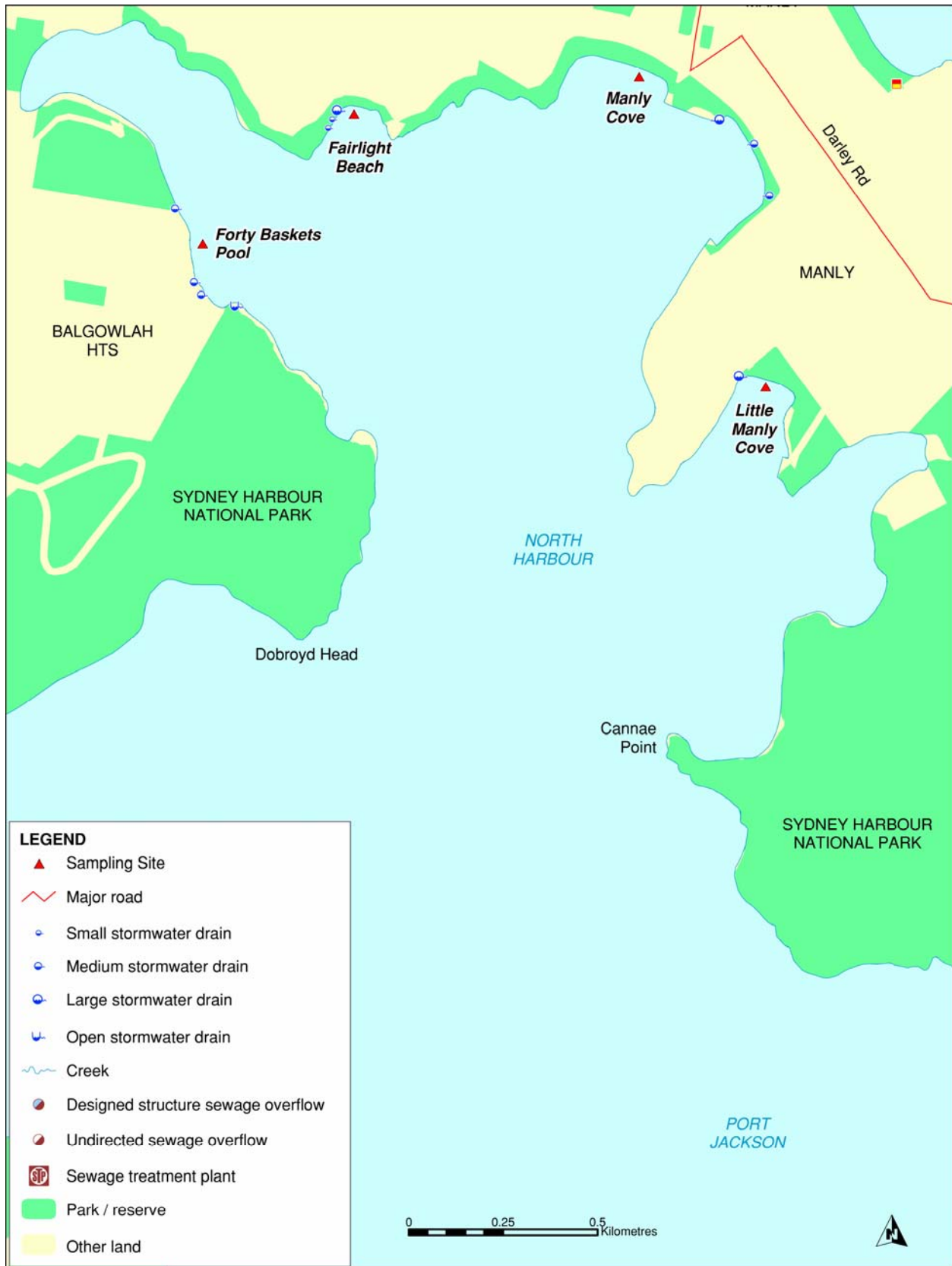


Sydney Metropolitan Area Harbour Swimming Sites

Sydney Harbour – North Harbour

Sydney Harbour – North Harbour

Sites: Forty Baskets Pool, Fairlight Beach, Manly Cove and Little Manly Cove



Location

The catchment of North Harbour is relatively small at approximately five square kilometres. Land use to the north of the catchment is primarily residential. Sydney Harbour National Park covers the eastern and western slopes and forms 30% of the catchment.

Manly Council operates in this area.

Compliance with guidelines

Compliance with swimming guidelines in North Harbour was excellent during summer 2008–2009 (Table 17).

Faecal coliform and enterococci levels at all sites complied with the swimming guidelines 100% of the time.

The range of indicator bacteria levels measured at Sydney Harbour swimming areas during summer 2008–2009 is shown in Figure 24, with North Harbour sites highlighted in grey. Levels of faecal coliforms and enterococci were slightly lower than, or similar to, levels measured across all the swimming sites monitored in Sydney Harbour.

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 swimming areas in the North Harbour catchment all ranked equal first.

Actions to improve water quality

Actions specific to individual swimming locations are included on the 'swimming area' pages. Improvements in water quality within North Harbour should also be achieved from the implementation of various management plans by Manly Council. Council has elected to develop Coastal and Estuary Management Plans (CMPs and EMPs) for the North Harbour

area in response to legislative requirements and community issues. This is current best practice for the management of coastal and estuary foreshores.

Manly Council

Manly Cove Coastline Management Plan: Manly Cove plays a functional role as a 'working cove' with a diversity of water based activities. To support formulation of the plan, the Davis Marina to Manly Point Coastline Hazard Definition Study was completed in 2004, with community consultations conducted in 2006 and 2007. Manly Cove Coastline Management Study, which describes baseline condition, is being prepared. The study describes, among various management issues, aspects of the water quality. It also suggests management options.

North Harbour Coastline Management Plan: The foreshores of North Harbour between Delwood Beach and Davis Marina have a natural setting. To support formulation of the plan, the Davis Marina to Manly Point Coastline Hazard Definition Study was completed in 2004, with community consultations conducted in 2006 and 2007. A North Harbour Coastline Management Study describing baseline conditions was finalised in March 2009. The study describes, among various management issues, aspects of the water quality. It also suggests management options.

Forty Baskets and Little Manly Cove Coastline Management Plans: Manly Council adopted the Forty Baskets and Little Manly Cove Coastline Management Plans in May 2004. The plans provide long-term strategies to guide sustainable management of the study areas. Council has implemented a Landscape Masterplan for Little Manly and Forty Baskets Reserves to improve access and dinghy storage and reduce erosion.

Dry Weather Sewer Leak Monitoring Program: This program was set up jointly between Manly Council and Sydney Water. Monitoring was conducted to determine the water quality at recreational swimming sites during dry weather, the scale of possible sewer leaks, and whether further

investigations and sewer fix works were required. Manly Council staff collected water samples during low tide, on days with less than five millimetres of rainfall in the past 24 hours, over a two month period. Stormwater samples were also collected if water samples at swimming sites tested positive for ammonia. Sydney Water tested all samples for faecal coliforms. Study sites included Forty Baskets, Fairlight, Manly Cove and Little Manly Cove.

Natural Recreational Water Quality Monitoring Program: Council developed and implemented a pilot water quality monitoring program, to complement the Beachwatch Program, for ten high risk sites including ocean and harbour beaches. The program ran from December to March 2009. A range of environmental monitoring trigger values were derived with the aim of improving procedures to be better prepared to respond to pollution incidents and potential beach closure. The program is now due for review.

Beach warning signage: Council is currently reviewing the beach warning signage in order to reflect relevant guidelines and site-specific issues.

Sydney Water

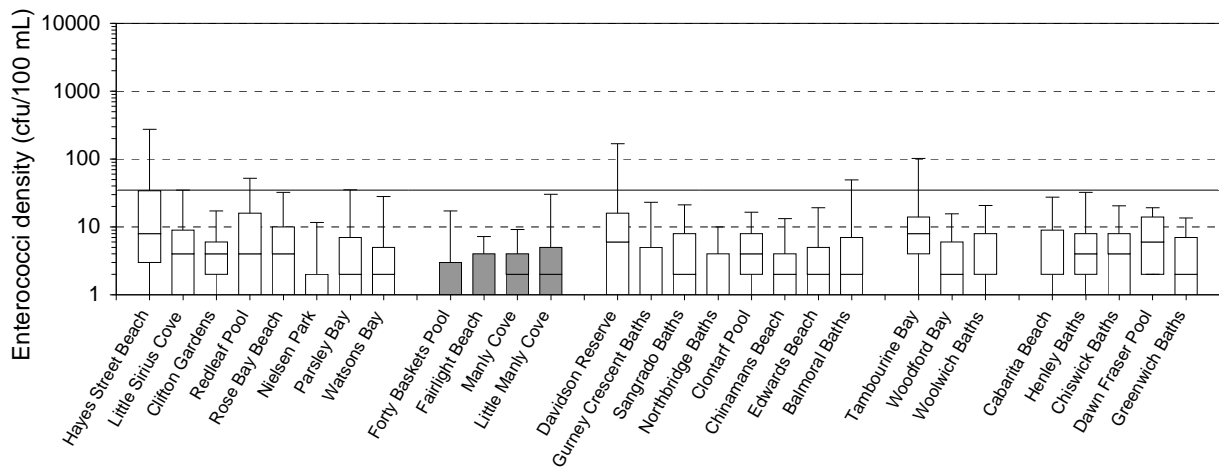
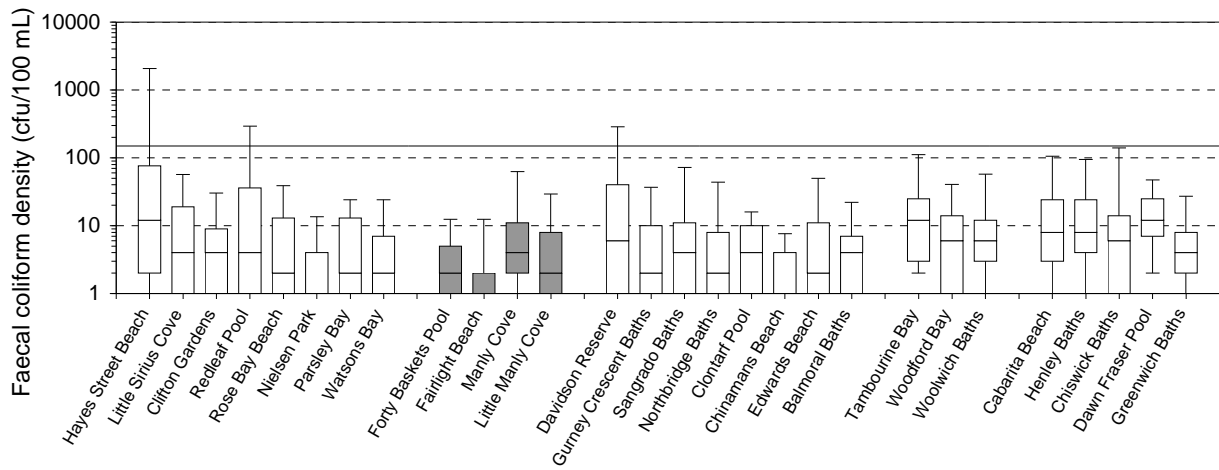
Sydney Water in collaboration with Manly Council is investigating dry weather sewer leakage across the Council's area. Early in the 2007–2008 summer season, discharges to Shelly Beach from cracked and faulty private sewers were found and fixed. After this success, this work has been expanded to dry weather discharges to the harbour beaches from Forty Baskets Pool to Little Manly Cove.

Across the catchment of the beaches from Forty Baskets Pool to Little Manly Cove, 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 17: Compliance and Ranking of North Harbour Sites during Summer 2008–2009

Site	Compliance (%)		Overall rank (out of 14)
	Faecal Coliforms	Enterococci	
Forty Baskets Pool	100	100	1
Fairlight Beach	100	100	1
Manly Cove	100	100	1
Little Manly Cove	100	100	1

Figure 24: Bacterial Levels at Sydney Harbour Sites during Summer 2008–2009



Forty Baskets Pool

See page 220 for key to map

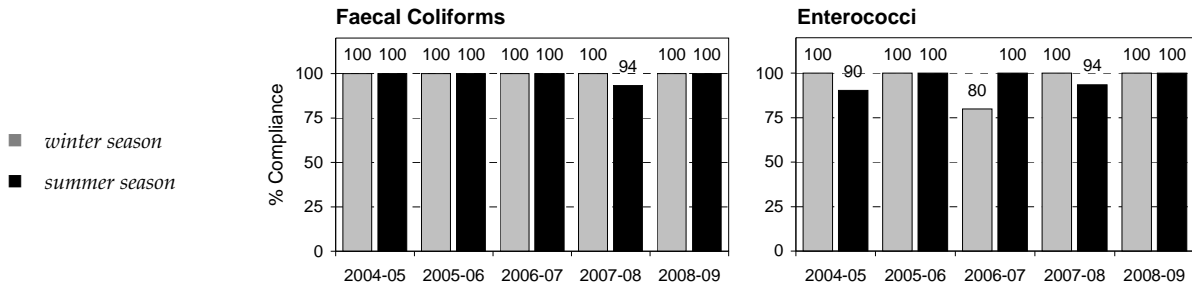
Description A 20 by 40 metre netted swimming area adjacent to a narrow beach. The beach is backed by a small park.

Pollution sources Stormwater drains discharge in the vicinity of the swimming enclosure. The area is a popular area for off-leash exercising of dogs.

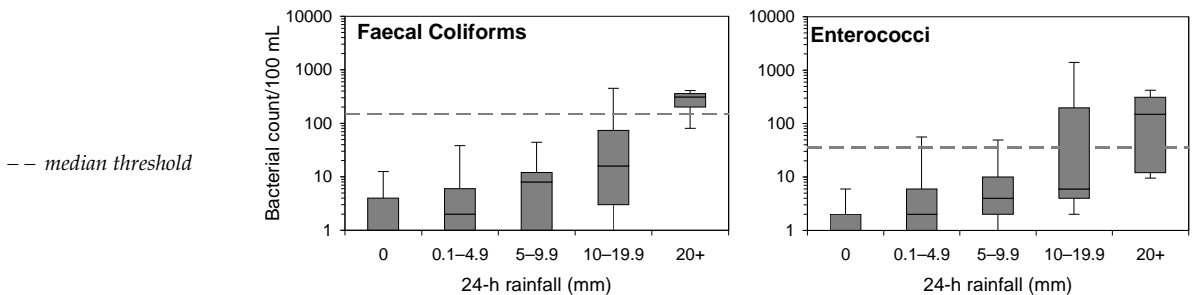
Actions Manly Council maintains GPTs in the catchment and conducts street sweeping on a regular basis to reduce the amounts of litter, nutrient, sediment and other pollutants in stormwater entering the harbour. Progress is continuing on implementation of the Forty Basket Coastline Management Plan. Sydney Water has cleaned and inspected sewer mains across the catchment. Where problems have been identified they are being fixed.



Compliance With the exception of summer 2007–2008, faecal coliform levels complied with swimming guidelines 100% of the time over the last five years. Enterococci compliance with swimming guidelines was more varied, ranging from 80% to 100% over the last five years.



Response to rainfall Bacterial densities increased with increasing rainfall. Faecal coliform densities occasionally exceeded the median guideline limits in response to ten millimetres of rain and usually exceeded the median guideline limit after 20 millimetres of rain or more in the previous 24 hours. Enterococci densities occasionally exceeded the median guideline limits after light rain and often exceeded the median guideline limit after ten millimetres of rain or more in the previous 24 hours.

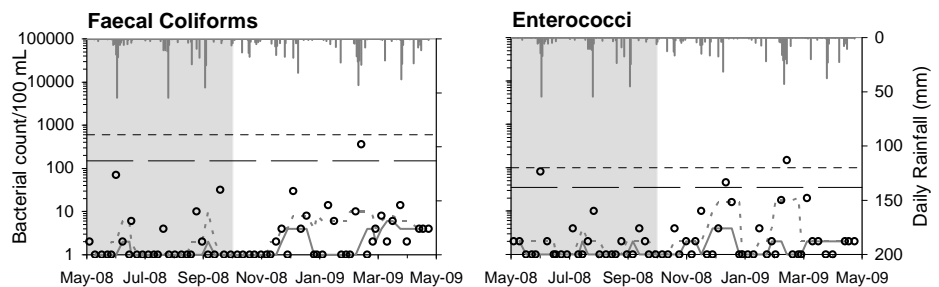


Season data

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

Guidelines
(see page 8 for details)

- median threshold
- - - 80th percentile threshold



Fairlight Beach

See page 220 for key to map

Description

The beach is long and narrow and is backed by a small reserve and picnic area. A 25 metre pool filled with water from the harbour is adjacent to the beach.

Pollution sources

Stormwater drains and a directed sewage overflow are in the vicinity of the swimming area.

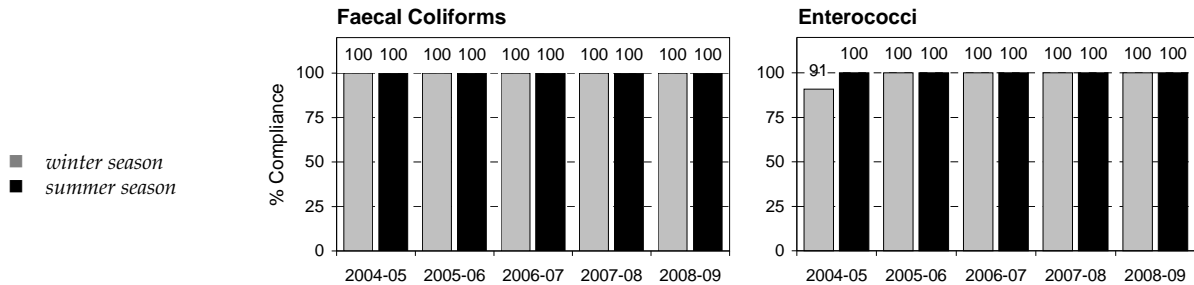
Actions

Manly Council maintains GPTs in the catchment and conducts street sweeping on a regular basis to reduce the amounts of litter, nutrient, sediment and other pollutants in stormwater entering the harbour. Sydney Water has cleaned and inspected sewer mains across the catchment. Where problems have been identified they are being fixed.



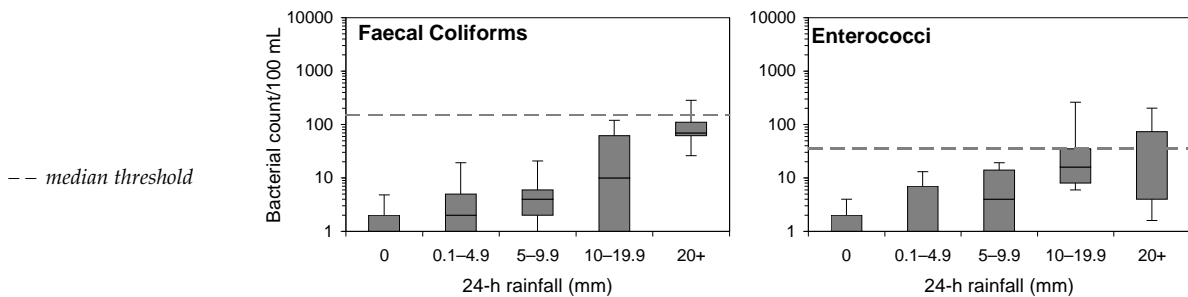
Compliance

Faecal coliform levels complied with swimming guidelines 100% of the time over the last five years. With the exception of winter 2004–2005, enterococci levels complied with swimming guidelines 100% of the time over the last five years.



Response to rainfall

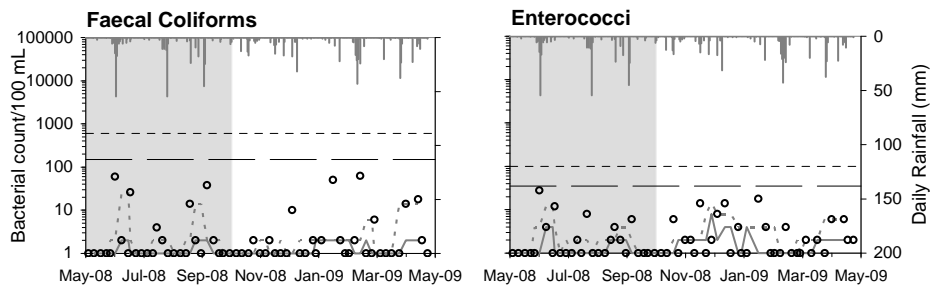
Faecal coliform and enterococci densities slightly increased with increasing rainfall. Faecal coliform densities occasionally exceeded the median guideline limit in response to 20 millimetres of rain or more in the previous 24 hours. Enterococci densities often exceeded the median guideline limit in 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



Manly Cove

Description

A netted swimming enclosure is situated towards the centre of the 250 metre long beach. The beach is to the west of the Manly ferry terminal and is backed by a promenade and park.

Pollution sources

Stormwater drains discharge east of the wharf.

Actions

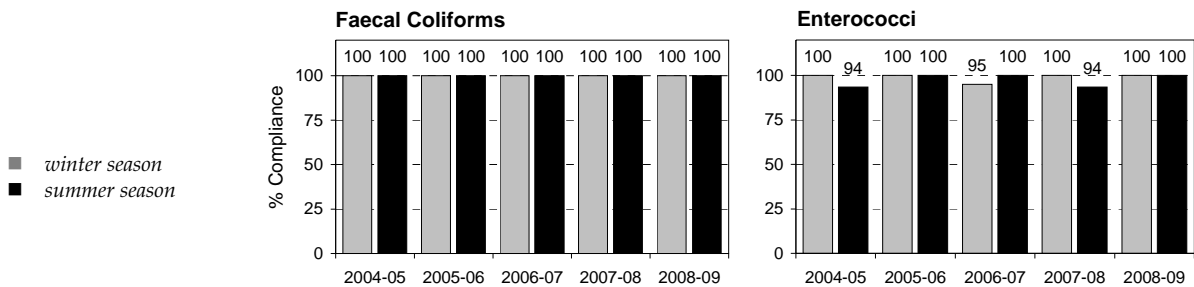
Manly Council maintains GPTs in the catchment and conducts street sweeping on a regular basis to reduce the amounts of litter, nutrient, sediment and other pollutants in stormwater entering the harbour. Sydney Water has cleaned and inspected sewer mains across the catchment. Where problems have been identified they are being fixed.

See page 220 for key to map



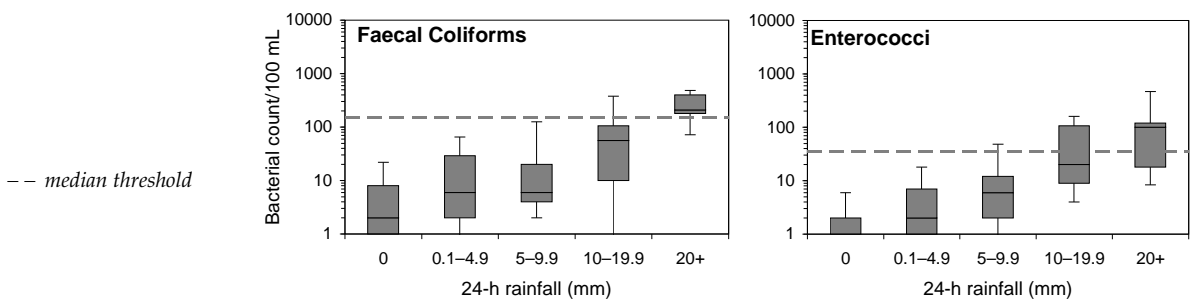
Compliance

Faecal coliform levels complied with swimming guidelines 100% of the time over the last five years. Enterococci compliance has generally been high, ranging from 94% to 100% over the last five years.



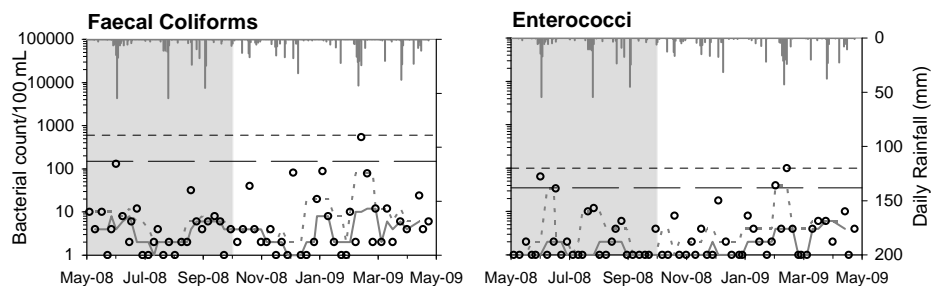
Response to rainfall

Bacterial densities generally increased with increasing rainfall. Faecal coliform levels occasionally exceeded the median guideline limit in response to ten millimetres of rain and frequently exceeded the limit following 20 millimetres or more in the previous 24 hours. Enterococci levels occasionally exceeded the median guideline limit after five millimetres of rain and often exceeded it 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



Little Manly Cove

See page 220 for key to map

Description

The beach is bounded by a small recreational reserve and a 30 metre square netted swimming enclosure is located at the eastern end.

Pollution sources

A stormwater drain discharges to the western end of the beach. A former industrial site is adjacent.

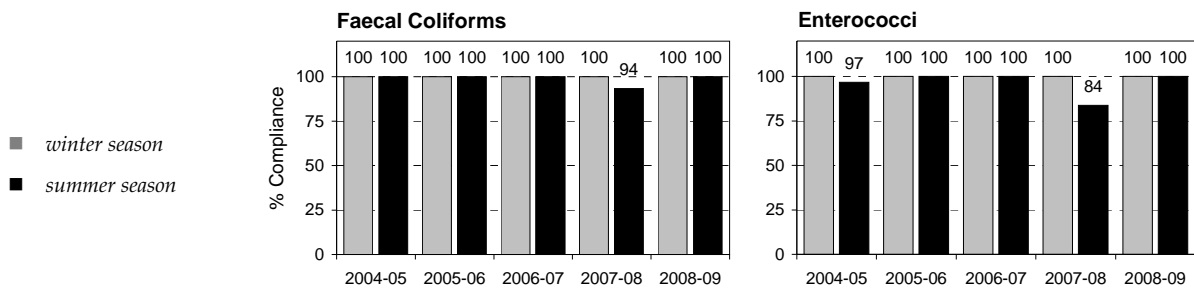
Actions

Manly Council maintains GPTs in the catchment and conducts street sweeping on a regular basis to reduce the amounts of litter, nutrient, sediment and other pollutants entering the harbour. The Little Manly Coastline Management Plan continues to be implemented. Sydney Water has cleaned and inspected sewer mains across the catchment. Where problems have been identified they are being fixed.



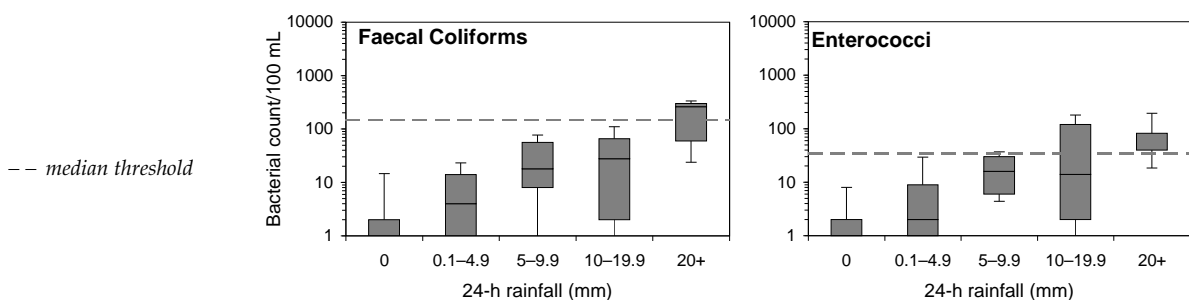
Compliance

With the exception of summer 2007–2008, faecal coliform levels complied with swimming guidelines 100% of the time over the last five years. Enterococci compliance has been more varied, ranging from 84% to 100% over the last five years.



Response to rainfall

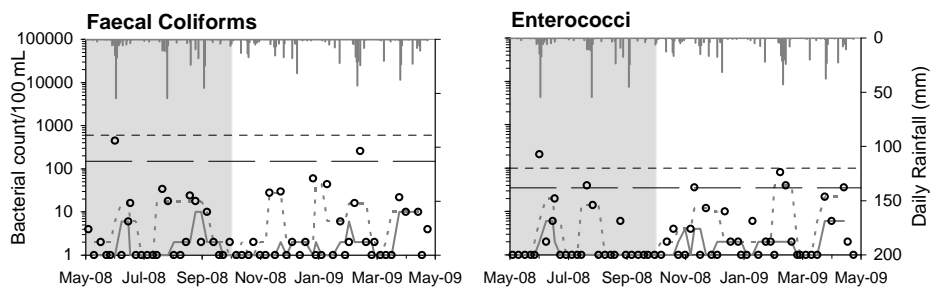
Faecal coliform and enterococci densities generally increased with increasing rainfall. Faecal coliform densities often exceeded the median guideline limit after 20 millimetres of rain or more in the previous 24 hours. Enterococci densities occasionally exceeded the median guideline limit after five millimetres of rain and frequently exceeded the median guideline limit in response to 20 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

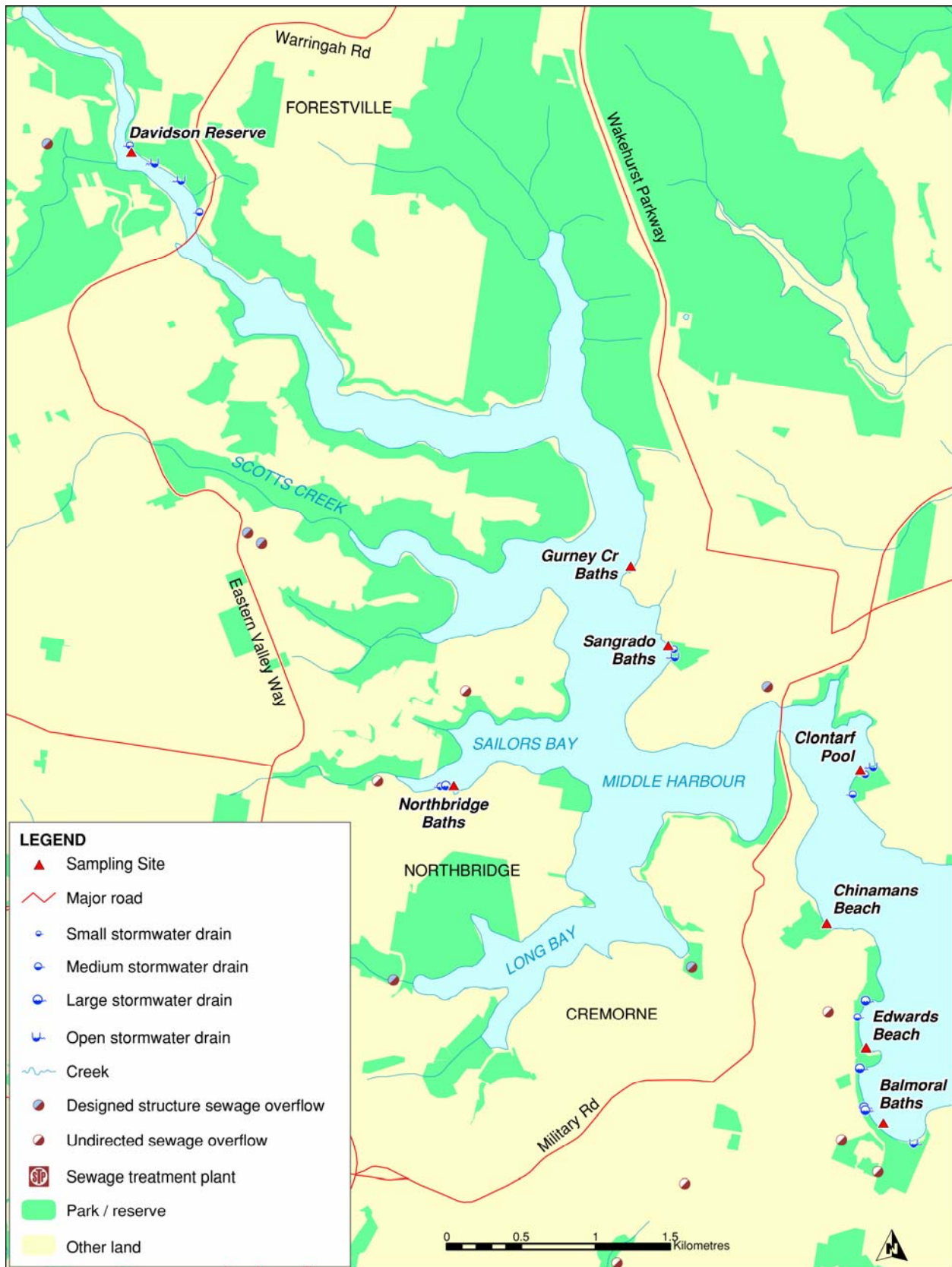


Sydney Metropolitan Area Harbour Swimming Sites

Sydney Harbour – Middle Harbour

Sydney Harbour – Middle Harbour

Sites: Davidson Reserve, Gurney Crescent Baths, Sangrado Baths, Northbridge Baths, Clontarf Pool, Chinamans Beach, Edwards Beach and Balmoral Baths



Location

The Middle Harbour catchment covers 100 square kilometres and has a population of approximately 200,000 people. Land use in the catchment is mainly residential, with some commercial and industrial use as well. Bushland covers one-quarter of the catchment and includes Garigal National Park.

Mosman, Willoughby City, North Sydney, Manly, Ku-ring-gai and Warringah councils operate in this area.

Compliance with guidelines

Faecal coliform and enterococci compliances were generally high at Middle Harbour swimming locations during summer 2008–2009 (Table 18).

Six of eight sites complied 100% of the time with both faecal coliform and enterococci guidelines. These sites were Gurney Crescent Baths, Northbridge Baths, Clontarf Pool, Chinamans Beach, Edwards Beach and Balmoral Baths.

Sangrado Baths also performed well, complying 97% of the time for faecal coliforms and 100% of the time with enterococci guidelines. Davidson Reserve complied 97% of the time for faecal coliforms and 97% of the time with enterococci criteria.

The range of indicator bacteria levels measured at Sydney Harbour swimming areas during summer 2008–2009 is shown in Figure 25, with Middle Harbour sites highlighted in grey. Levels of faecal coliforms and enterococci tended to be within the range measured in other areas of the harbour. Bacterial levels at Davidson Reserve were slightly higher than those at most Sydney Harbour swimming areas.

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 swimming areas in Middle Harbour ranked highly. Chinamans Beach, Edwards Beach, Balmoral Baths, Northbridge Baths, Gurney Crescent Baths and Clontarf Pool ranked equal first. Sangrado Baths ranked equal second and Davidson Reserve ranked at equal third.

Actions to improve water quality

Actions specific to individual swimming locations are included on the 'swimming area' pages. Improvements in water quality within Middle Harbour should also be achieved as a result of the implementation of stormwater management plans and other council programs.

The commissioning of the Northside Storage Tunnel in 2001 is continuing to provide improved water quality in Middle Harbour.

Middle Harbour Stormwater Management Plan

Local councils and other government organisations are currently implementing the Middle Harbour Stormwater Management Plan.

The plan contains initiatives such as community education campaigns, drain stencilling programs, improved street sweeping practices and the installation of stormwater quality improvement devices throughout the catchment.

Mosman Council

Water quality monitoring: Operation of the water quality monitoring program continued during 2008–2009. The monitoring program aims to evaluate the performance of the Stormwater Quality Improvement Devices (SQIDs) in improving stormwater quality.

Stormwater Quality Improvement Devices: Council continued to maintain SQIDS throughout all catchments. A new SQID was installed at Edwards Beach in early 2009.

Water Reuse Project: Council installed a rainwater tank on the Middle Head Oval pavilion and amenities block. Council is also in the design phase of the Botanic Road Reuse Project which will capture, treat and reuse stormwater. The reuse of stormwater will reduce the impacts of stormwater on the harbour.

Estuary Management Grants Program: Council has received grant funding through the Estuary Management Grants Program to monitor the water quality of Mosman's local creeks, including quarterly sampling for analysis of physio-chemical parameters of water and sediment, as well as macroinvertebrate sampling twice a year. Monitoring commenced in July 2008 and includes Wyargine Creek and Edwards Beach, and Balmoral Creek and Balmoral Beach.

Community education: Council continued to provide information to the community on rainwater tanks as a method of conserving water and reducing the quantity of stormwater entering Council's waterways.

Public Place Recycling: Council installed a new Public Place Recycling System at Balmoral beach to encourage the public to recycle plastic bottles and cans and dispose of rubbish appropriately to reduce the amount of litter in waterways.

Regulation: Council continued to investigate pollution incidents and take regulatory and educational approaches to reduce the risk of pollution from construction sites and landscaping works.

Willoughby City Council

Stormwater Management: Council implemented a program to reduce the total volume of catchment runoff by requiring either an onsite stormwater detention (OSD) or 10,000 litre rainwater tank system. This is applied to all new residential developments or redevelopments with an impervious area greater than 50% of the total site. Ninety eight per cent of all residential developments now install a 10,000 litre rainwater tank, reducing stormwater runoff from each site by an average of 20%. This assists in reducing the occurrence of frequent flushing and minimises scour of the natural streams.

Streets to Creeks Program: Council continued to educate the community within Sailors Bay about the catchment they live in and how stormwater becomes polluted through day-to-day activities.

Water quality monitoring: Council maintained five gross pollutants traps in the region, preventing waste from entering the waterways. Additionally, Council continued to monitor the catchment water quality and performed macro-invertebrate studies at seven sites bi-yearly in the creeks of Middle Harbour and the Lane Cove River catchments. A new program for extensive water quality monitoring that will include some physical and chemical parameters will commence in 2009–2010.

Northern Sydney Regional Organisations of Councils (NSROC): Council is part of the NSROC, which is a voluntary partnership of seven Sydney councils working to address regional issues and to manage the environment sustainably. Willoughby Council is also a member of the Sydney Coastal Councils Group Inc., working with other member councils on environmental and natural resource management issues relating to the urban coastal environment.

E.restore Program: Council continued to implement a number of environmental projects under the e.restore program, with the aid of the environmental levy. The program focuses on maintaining and repairing natural environments and on educational activities and environmental monitoring. Work has continued on bushland regeneration projects throughout the catchment to prevent erosion and runoff in the Willoughby region.

Sustainability workshops: Council ran sustainability street workshops to educate the community on water conservation and the reuse of water. Educational material was produced for residents to explain government rebates, health considerations for greywater reuse and rainwater tank sizing to ensure maximum benefit. Council is also encouraging the use of organic gardening amongst other environmentally friendly practices through a home visitation program.

North Sydney Council

North Sydney Stormwater Reuse Project: The project aims to save 90 megalitres of potable water a year by harvesting, treating and reusing stormwater for irrigation of sports fields and recreational parks. The St Leonards Park and Cammeray Park stages are completed. Three further stages are in progress.

Community education: Council developed and released Sustainability Education Kits for local primary schools with activities on waste management and water quality. It also ran gross pollutant trap excursions where students observed litter traps being cleaned. Students were encouraged to take actions to reduce the amount of litter in their school grounds.

Water-saving initiatives: Council has participated in and implemented water-saving initiatives including the Water Campaign, Every Drop Counts and North Sydney Council's Water Savings Action Plan. Outcomes included the installation of rainwater tanks and other water-saving devices at several Council facilities.

Stormwater Quality Improvement Device maintenance: Council continued to maintain SQIDs throughout the catchment, reducing the amount of litter entering the harbour.

Street Sweeper Program: Council has acquired new, smaller street sweepers that allow for mechanical sweeping of footpaths and plazas in business areas, resulting in less litter entering the stormwater system.

Additional water quality monitoring: Council takes macroinvertebrate samples from two creek sites twice a year to assess water quality. Physio-chemical water and sediment parameters are analysed as required.

Manly Council

Clontarf – Bantry Bay Estuary Management Plan: Manly Council adopted an Estuary Management Plan for the Clontarf – Bantry Bay area in May 2008. The plan addresses estuarine and foreshore issues between Castle Rock Beach and the boundary of the National Park at Bantry Bay. It provides strategic directions for addressing

catchment-sourced pollutants, sewage overflows and water quality and waste management education programs.

Dry Weather Sewer Leak Monitoring Program: This program was set up jointly between Manly Council and Sydney Water. Monitoring was conducted to determine the water quality of recreational swimming sites during dry weather, the scale of possible sewer leaks, and whether further investigations and sewer fix works were required. Manly Council staff collected water samples during low tide, on days with less than five millimetres of rainfall in the past 24 hours, over a two month period. Stormwater samples were also collected if water samples tested positive for ammonia. Sydney Water tested all samples for faecal coliforms. Study sites included Gurney Crescent Baths, Sangrado Baths and Clontarf Pool.

Natural Recreational Water Quality Monitoring Program: Council developed and implemented a pilot water quality monitoring program, to complement the Beachwatch Program, for ten high-risk sites including ocean and harbour beaches. The program ran from December to March 2009. A range of environmental monitoring trigger values were derived with the aim to improving procedures to be better prepared to respond to pollution incidents and potential beach closure. The program is now due for review.

Beach warning signage: Council is currently reviewing the beach warning signage in order to reflect relevant guidelines and site-specific issues.

Ku-ring-gai Council

Water quality monitoring program: Ku-ring-gai Council is in the process of finalising a new water quality monitoring program to gather information on ecological health, measure the effectiveness of on-ground works and provide sound information on which to base management decisions.

Stormwater harvesting: In addition to the stormwater harvesting systems that have been put in place at Barra Brui Oval and Soldiers Memorial Park, Ku-ring-gai Council has gone into partnership with Roseville

Golf Club to provide harvested stormwater for irrigation at Roseville Chase Oval.

Water-Sensitive Urban Design: In order to minimise the amount of diffuse pollutants entering receiving waters, Ku-ring-gai Council has implemented a program for constructing water-sensitive urban design features in the area. In the Middle Harbour Catchment a vegetated filter swale has been constructed at Slade Avenue in the Gordon Creek catchment to delay and filter runoff from the road surface.

Warringah Council

Water quality monitoring program: Council has implemented a revised water quality monitoring program for the local government area, focusing on freshwater environments. Thirteen impacted sites and two reference sites are sampled in dry weather conditions. The program will run for 24 sampling events and aims to determine base-flow water quality in the freshwater creeks.

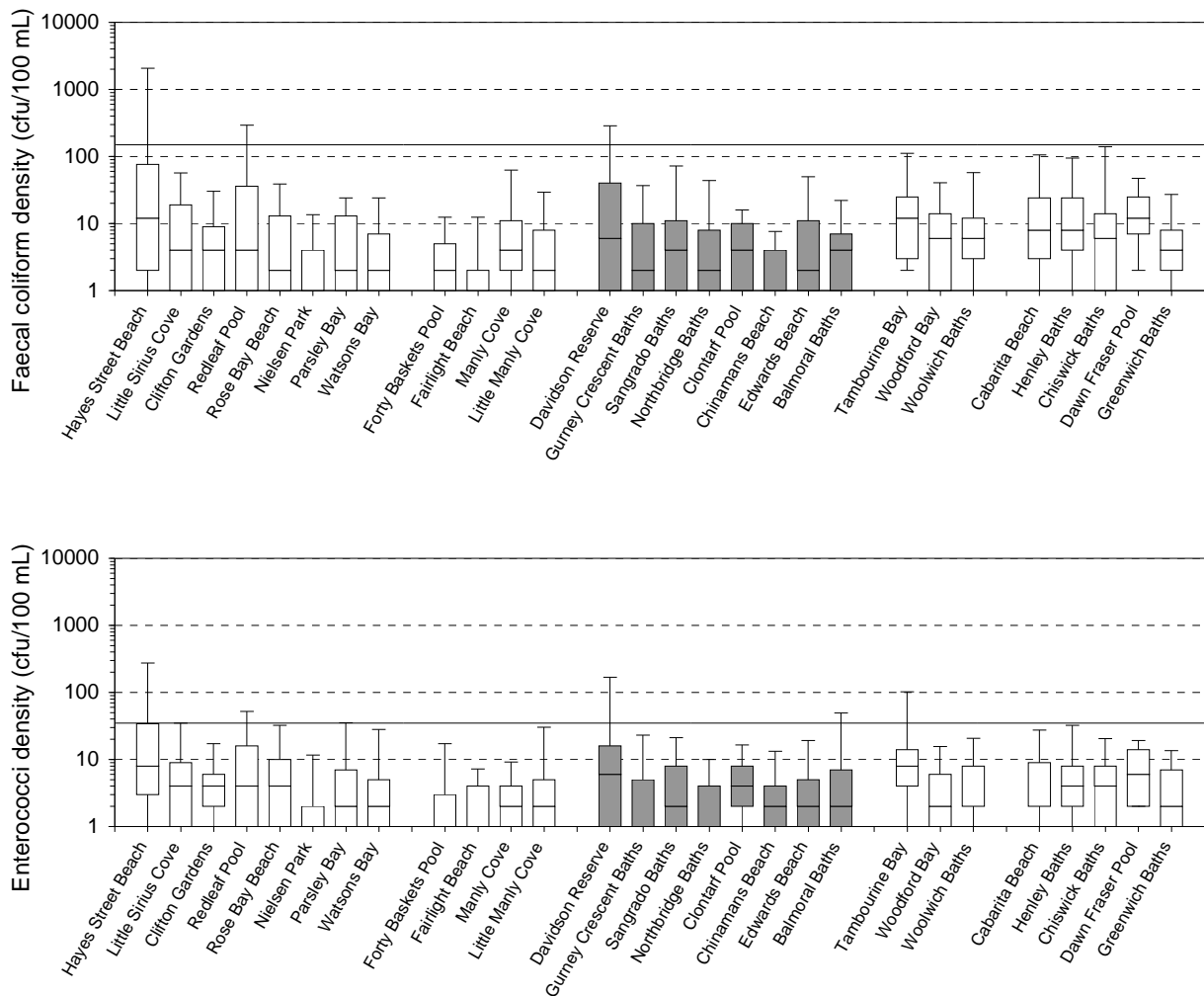
Sydney Water

Across the catchment of the beaches on Middle Harbour, 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 are identified they will be fixed by repair or preventive maintenance. The cleaning and inspection are complete except for the beaches from Chinamans Beach to Balmoral Beach and parts of the catchment of Davidson Reserve.

Table 18: Compliance and Ranking of Middle Harbour Sites during Summer 2008–2009

Site	Compliance (%)		Overall rank (out of 14)
	Faecal Coliforms	Enterococci	
Davidson Reserve	97	97	3
Gurney Crescent Baths	100	100	1
Sangrado Baths	97	100	2
Northbridge Baths	100	100	1
Clontarf Pool	100	100	1
Chinamans Beach	100	100	1
Edwards Beach	100	100	1
Balmoral Baths	100	100	1

Figure 25: Bacterial Levels at Sydney Harbour Sites during Summer 2008–2009



Davidson Reserve

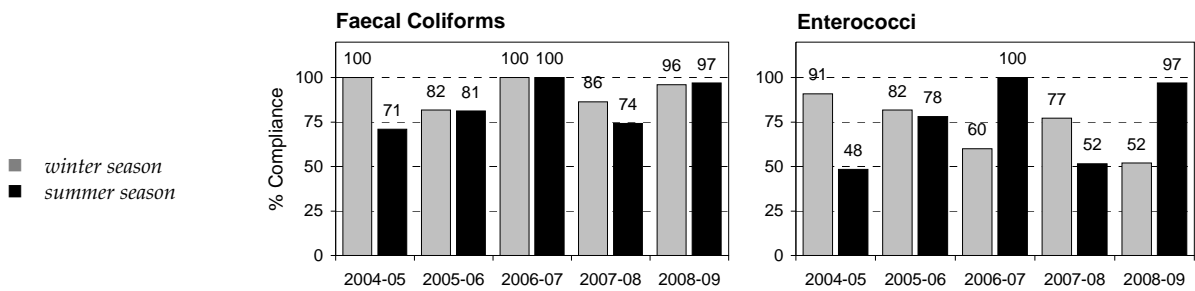
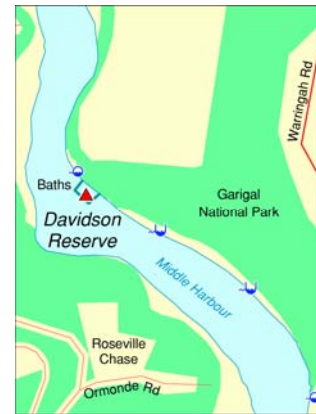
See page 230 for key to map

Description Davidson Reserve is a 25 metre long netted swimming enclosure situated within Garigal National Park. The beach is backed by a grass reserve with picnic facilities.

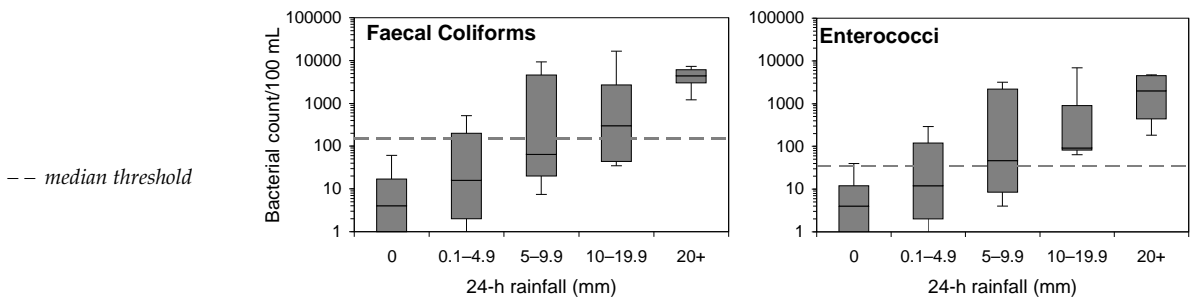
Pollution sources Stormwater drains discharge in the vicinity of the beach.

Actions Sydney Water has cleaned and inspected sewer mains across the catchment. Where problems have been identified they are being fixed.

Compliance Faecal coliform compliance with swimming guidelines varied over the last five years, ranging from 71% to 100%. Enterococci compliance also varied, ranging from 48% to 100% over the last five years.

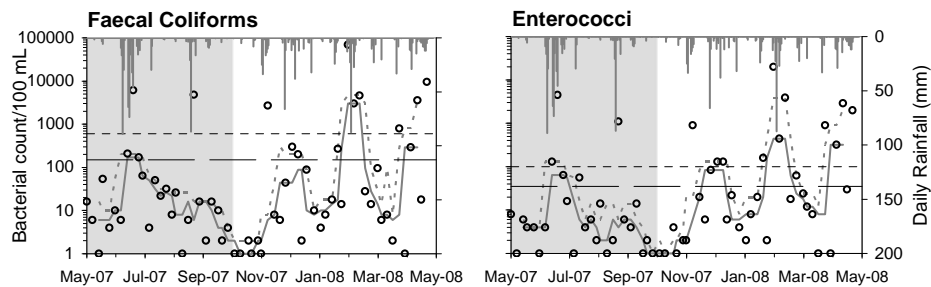


Response to rainfall Faecal coliform and enterococci densities increased with increasing rainfall. Faecal coliform densities often exceeded the median guideline limit in response to light rain and usually exceeded the median guideline limit in response to five millimetres of rain or more in the previous 24 hours. Enterococci densities occasionally exceeded the median guideline limit in response to no rain and indicate a possible dry-weather contamination problem. The median guideline limit was frequently exceeded in response to 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



Gurney Crescent Baths

See page 230 for key to map

Description

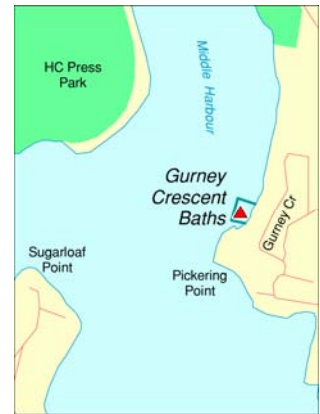
The baths are a 20 metre square netted swimming enclosure backed by a bush reserve. The baths are located on Pickering Point.

Pollution sources

Water quality can be affected by bacterial contamination from sewage overflows in the catchment of Middle Harbour and by stormwater.

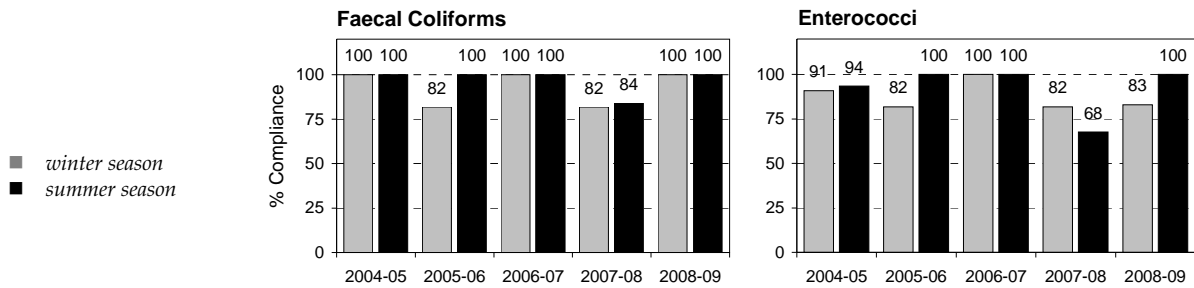
Actions

Manly Council maintains GPTs in the catchment and conducts street sweeping on a regular basis to reduce the amounts of litter, nutrient, sediment and other pollutants entering the harbour. Sydney Water has cleaned and inspected sewer mains across the catchment. Where problems have been identified they are being fixed.



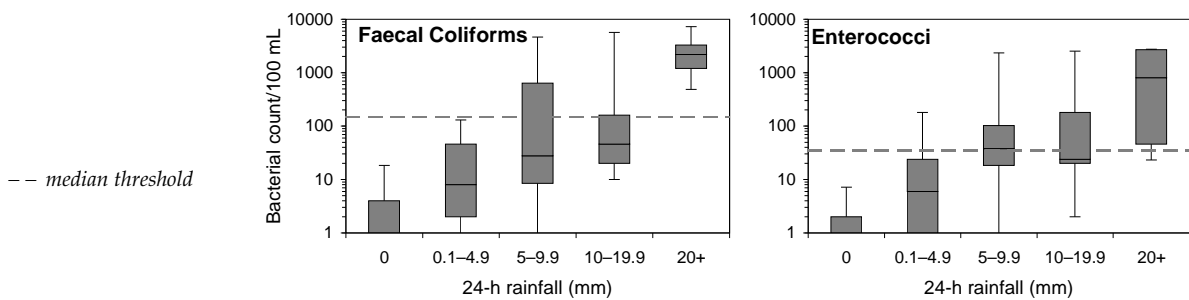
Compliance

Faecal coliform compliance with swimming guidelines ranged from 82% to 100% over the last five years. Enterococci compliance has been more varied, ranging from 68% to 100% over the last five years.



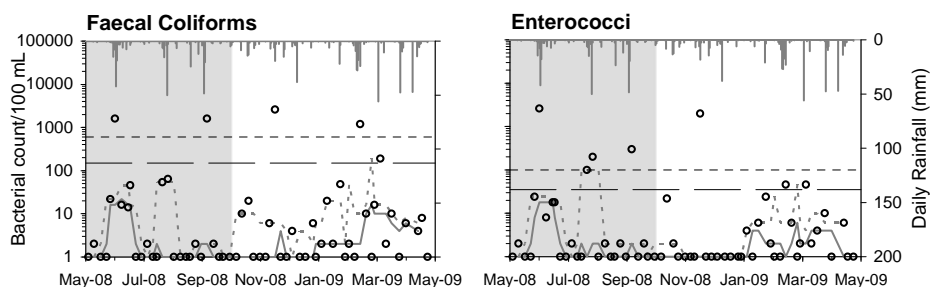
Response to rainfall

Faecal coliform and enterococci densities increased with increasing rainfall and usually exceeded median guideline limits after 20 millimetres of rain or more in the previous 24 hours. Bacterial densities occasionally exceeded the median guideline limits after light rain and often exceeded median guideline limits 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



Sangrado Baths

See page 230 for key to map

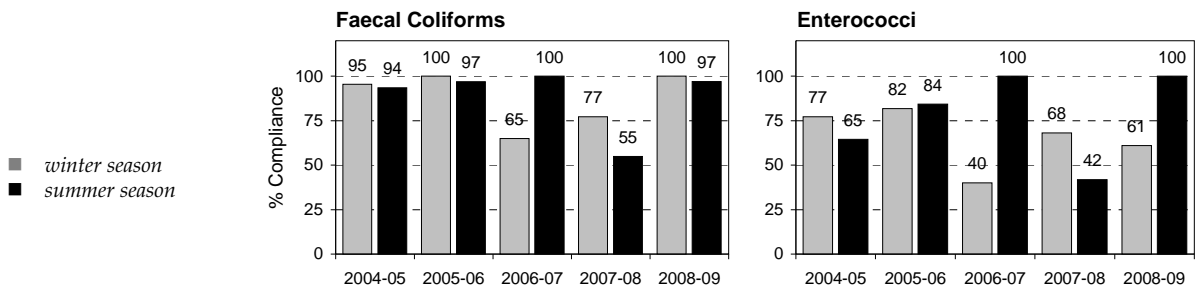
Description The baths are a 25 by 20-metre netted swimming enclosure in Powder Hulk Bay. They are backed by a bush reserve.

Pollution sources Stormwater drains discharge to Powder Hulk Bay. Water quality can be affected by bacterial contamination from sewage overflows in the catchment of Middle Harbour and by stormwater.

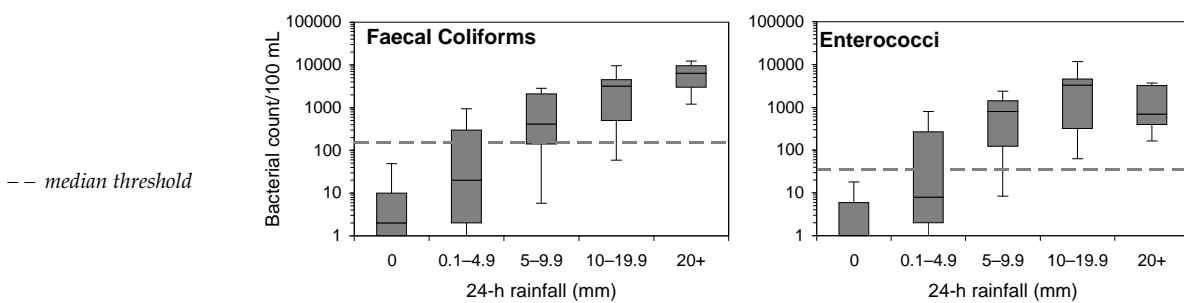
Actions Manly Council maintains GPTs in the catchment and conducts street sweeping on a regular basis to reduce the amounts of litter, nutrient, sediment and other pollutants entering the harbour. Sydney Water has cleaned and inspected sewer mains across the catchment. Where problems have been identified they are being fixed.



Compliance Faecal coliform compliance with swimming guidelines has varied over the last five years, ranging from 55% to 100%. Enterococci compliance also varied considerably, ranging from 40% to 100% over the last five years.



Response to rainfall Faecal coliform and enterococci densities increased with increasing rainfall. Bacterial densities regularly exceeded the median guideline limit after light rain and usually exceeded the median guideline limit in response to 20 millimetres of rain or more in the previous 24 hours.

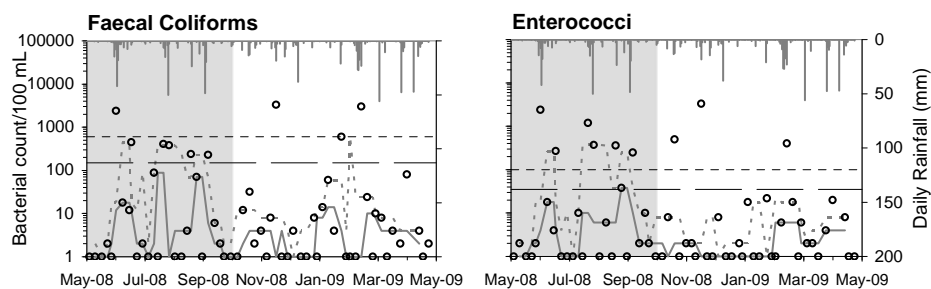


Season data

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

Guidelines
(see page 8 for details)

- median threshold
- - - 80th percentile threshold



Northbridge Baths

See page 230 for key to map

Description

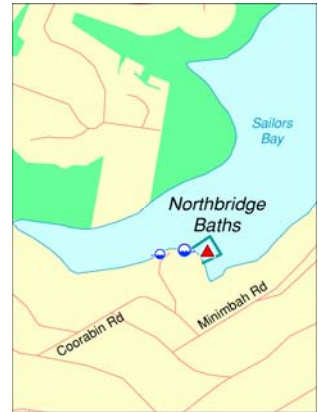
The baths are a 30 by 65 metre enclosed tidal swimming area. Lifeguards patrol the swimming area from October to March. On Beachwatch advice, the council closes the baths when there is likely to be stormwater pollution.

Pollution sources

A stormwater drain discharges from the eastern pier of the baths and numerous drains discharge to the bay. Sewage overflows can discharge into the headwaters of the bay during wet weather.

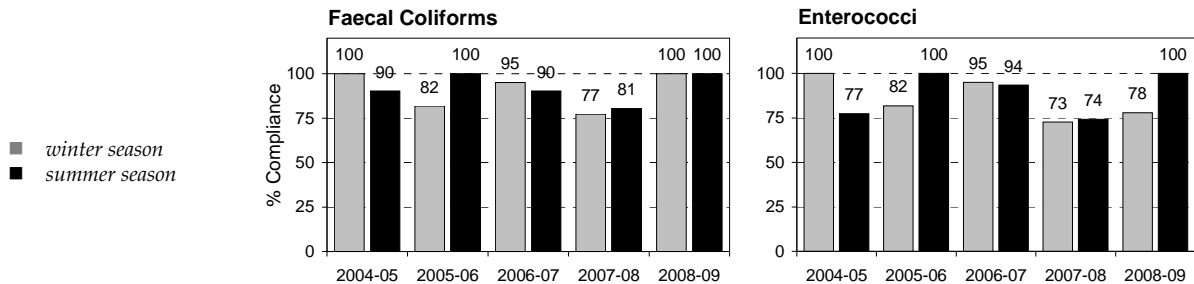
Actions

Willoughby Council continued to educate the community about stormwater pollution through the Streets to Creeks program. Council maintained a number of GPTs in the catchment. New signs will be installed prior to the winter season and will include information on pollution. Sydney Water has cleaned and inspected sewer mains across the catchment. Where problems have been identified they are being fixed.



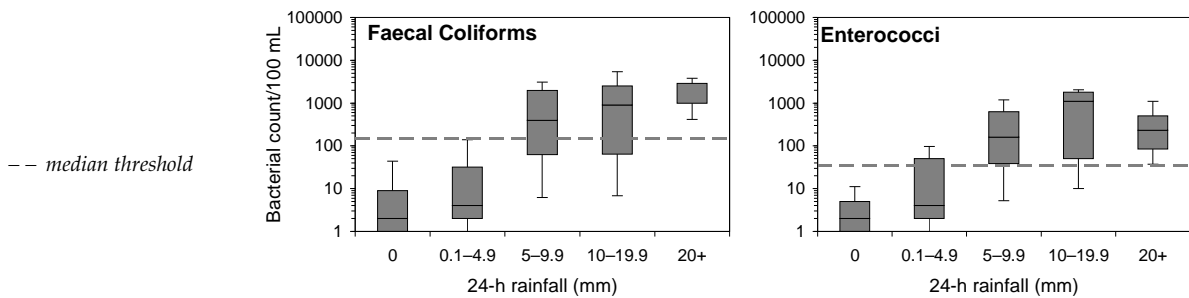
Compliance

Faecal coliform compliance with swimming guidelines ranged from 77% to 100% over the last five years. Enterococci compliance has varied, ranging from 73% to 100% over the last five years.



Response to rainfall

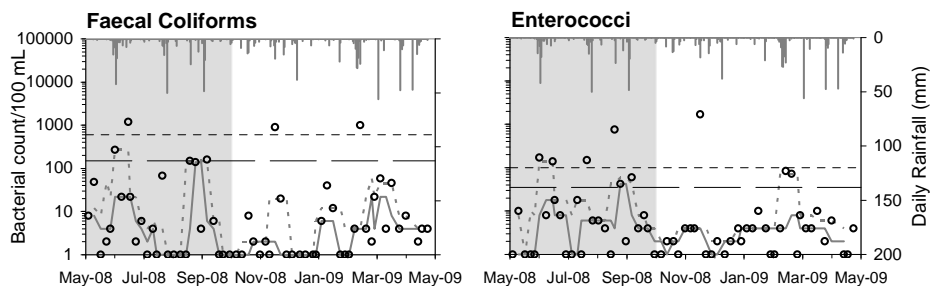
Bacterial densities of both indicators increased with increasing rainfall. Faecal coliform levels occasionally exceeded the median guideline limit in response to light rain and usually exceeded the median guideline limit in response to 20 millimetres of rain or more in the previous 24 hours. Enterococci densities often exceeded the median guideline limit after light rain and usually exceeded the median guideline limit in response to 20 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



Clontarf Pool

See page 230 for key to map

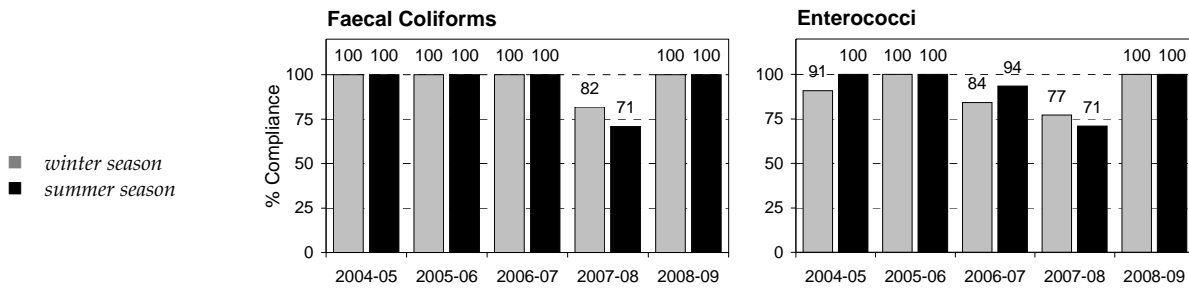
Description The baths are backed by Clontarf Reserve and consist of a small netted swimming enclosure with a narrow sandy beach.

Pollution sources Stormwater drains discharge directly into, and in the immediate vicinity of, the baths. Water quality can be affected by bacterial contamination from sewage overflows in upper Middle Harbour.

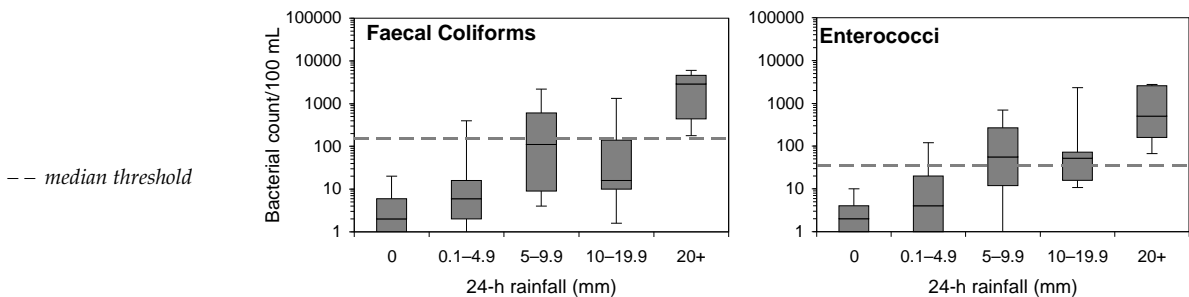
Actions Manly Council maintains GPTs in the catchment and conducts street sweeping on a regular basis to reduce the amounts of litter, nutrient, sediment and other pollutant loads entering the harbour. Sydney Water has cleaned and inspected sewer mains across the catchment. Where problems have been identified they are being fixed.



Compliance Faecal coliform and enterococci compliance with swimming guidelines has ranged from 71% to 100% over the last five years.

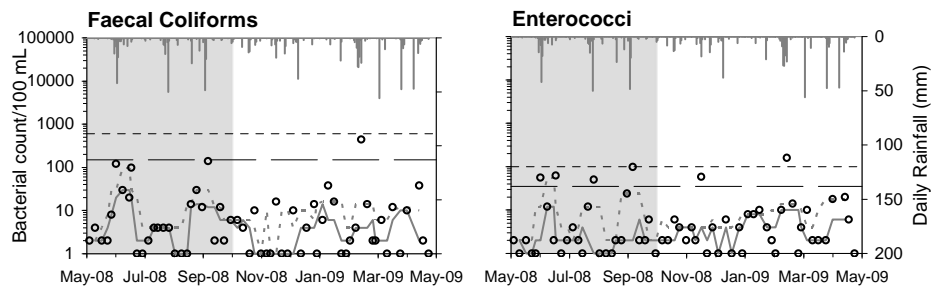


Response to rainfall Bacterial densities increased with increasing rainfall, usually exceeding the median guideline limit after 20 millimetres of rain or more in the previous 24 hours. Faecal coliform and enterococci densities occasionally exceeded the median guideline limit in response to light rain 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



Chinamans Beach

See page 230 for key to map

Description

Chinamans Beach is a popular unnetted swimming area in Middle Harbour. The beach is approximately 250 metres long and is backed by Rosherville Reserve.



Pollution sources

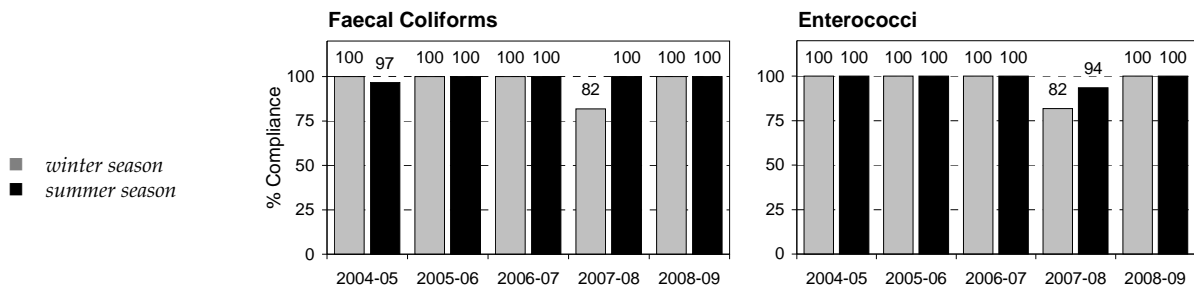
Stormwater drains discharge directly on to, and in the immediate vicinity of, the beach. Water quality can also be affected by bacterial contamination from sewage overflows in upper Middle Harbour.

Actions

Mosman Council continued to maintain the SQIDs throughout the catchment. Sydney Water is cleaning and inspecting sewer mains across the catchment. Where problems are identified they will be fixed.

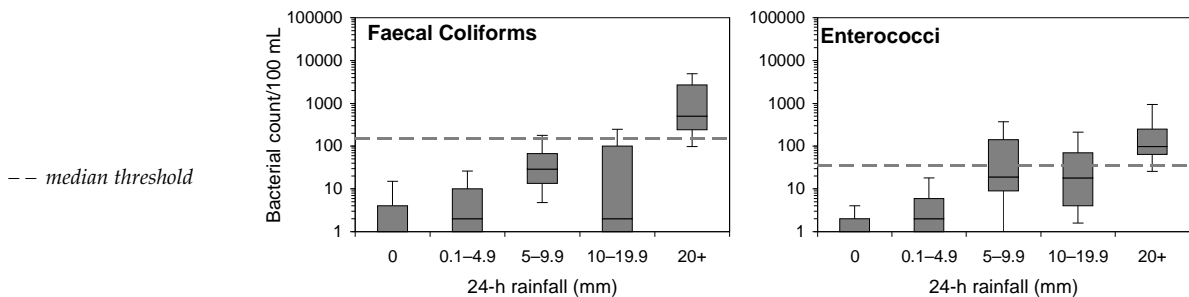
Compliance

Faecal coliform and enterococci compliance with swimming guidelines has generally been high, ranging from 82% to 100% over the last five years.



Response to rainfall

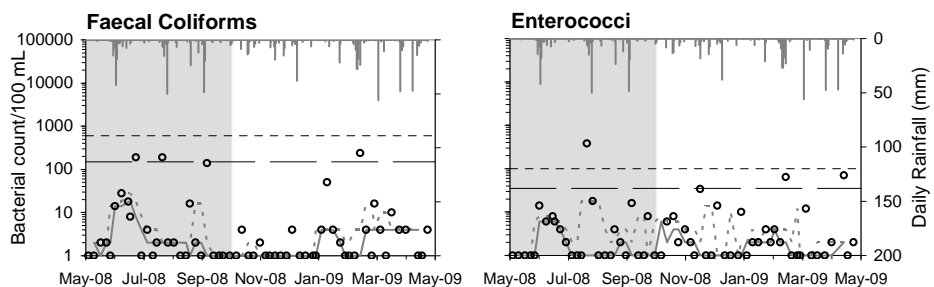
Bacterial densities tended to increase with increasing rainfall, usually exceeding the median guideline limits after 20 millimetres of rain or more in the previous 24 hours. Faecal coliform densities occasionally exceeded the median guideline limit after five millimetres of rain or more in the previous 24 hours. Enterococci densities regularly 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



Edwards Beach

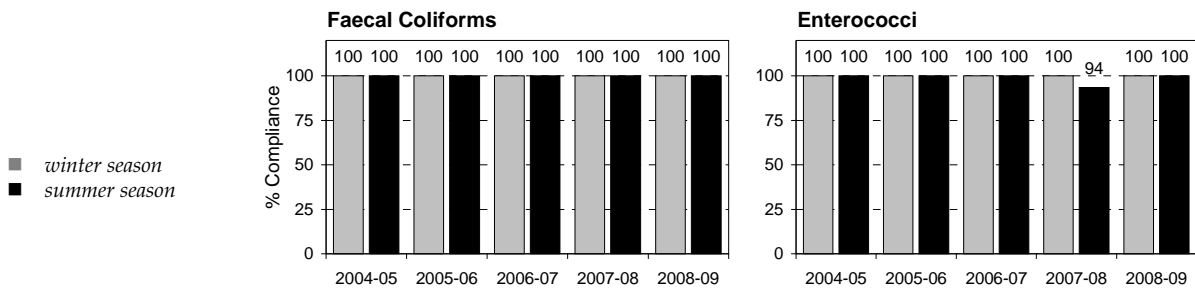
See page 230 for key to map

Description A promenade and a small park at the northern end back the beach. A netted swimming enclosure is located at the beach's southern end.

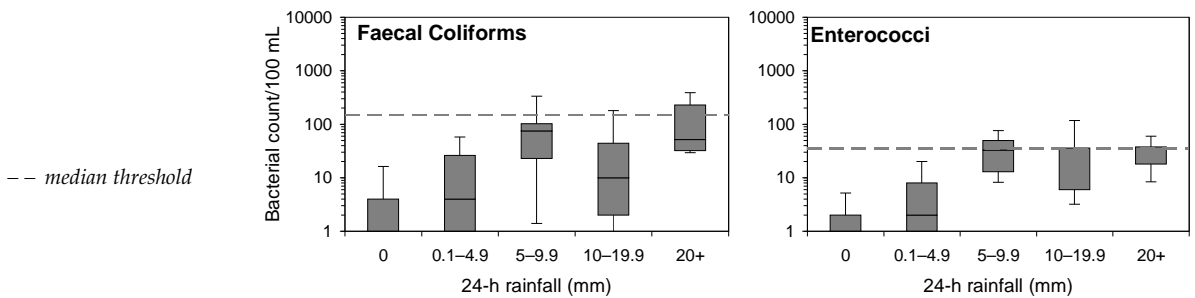
Pollution sources Stormwater drains discharge directly to the beach area. Water quality can also be affected by sewage overflows in upper Middle Harbour.

Actions Mosman Council installed a new SQID at Edwards Beach. Monitoring of Wyargine Creek and Edwards Beach commenced. Sydney Water is cleaning and inspecting sewer mains across the catchment. Where problems are identified they will be fixed.

Compliance Faecal coliform levels complied with the swimming guidelines 100% of the time over the last five years. With the exception of summer 2007–2008, enterococci levels complied 100% of the time over the last five years.



Response to rainfall Faecal coliform and enterococci densities tended to increase with increasing rainfall. Faecal coliform densities occasionally exceeded the median guideline limit in response to five millimetres of rain or more and often exceeded the median guideline limit in response to 20 millimetres of rain or more in the previous 24 hours. Enterococci levels regularly exceeded the median guideline limit in response to five millimetres of rain or more in the previous 24 hours.

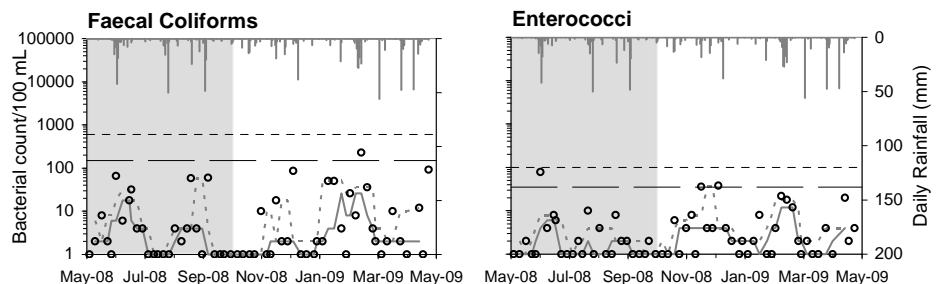


Season data

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

Guidelines
(see page 8 for details)

- median threshold
- 80th percentile threshold



Balmoral Baths

See page 230 for key to map

Description

A promenade and a large park with picnic area back the beach. The netted swimming enclosure is located towards the eastern end of the beach.

Pollution sources

Stormwater drains discharge directly to the beach area. Water quality can also be affected by sewage overflows in upper Middle Harbour.

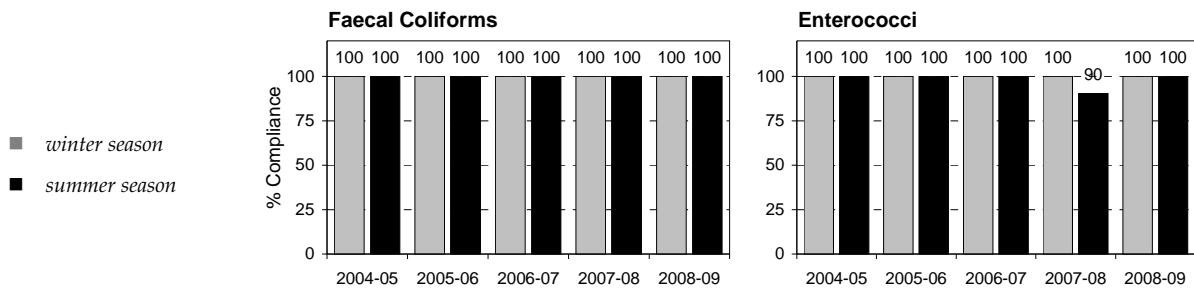
Actions

Mosman Council continued to maintain SQIDs. Council commenced the design phase of the Botanic Road Stormwater Reuse Program, as well as monitoring of Balmoral Creek and Balmoral Beach. A Public Place Recycling System was put in place. Sydney Water is cleaning and inspecting sewer mains across the catchment. Where problems are identified they will be fixed.



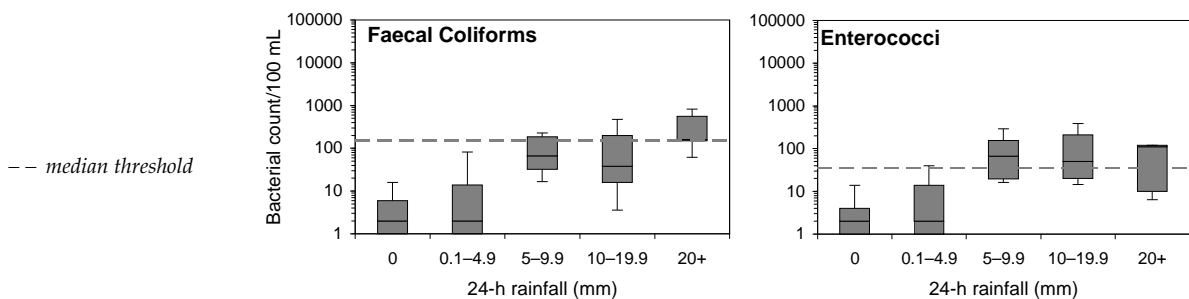
Compliance

Faecal coliform levels have complied 100% of the time with swimming guidelines over the last five years. With the exception of summer 2007–2008, enterococci levels complied 100% of the time over the last five years.



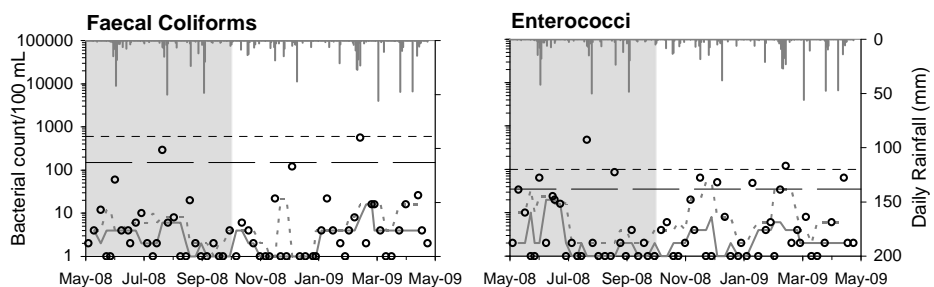
Response to rainfall

Bacterial densities increased with increasing rainfall. Faecal coliform densities regularly exceeded the median guideline limit after five millimetres of rain or more and frequently exceeded the median guideline limit in response to 20 millimetres of rain or more in the previous 24 hours. Enterococci densities occasionally exceeded the median guideline limit after light rain and often 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

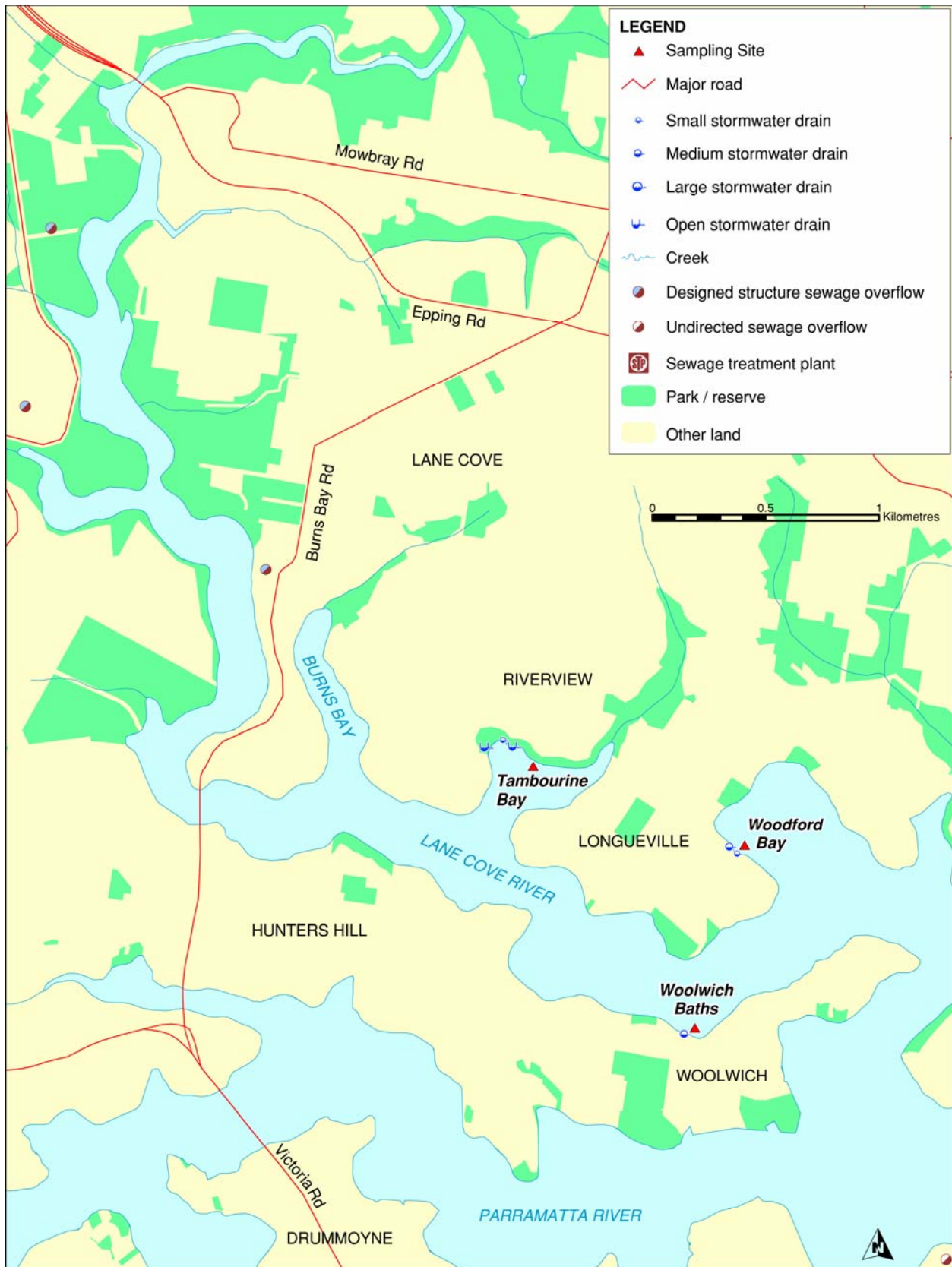


Sydney Metropolitan Area Harbour Swimming Sites

Sydney Harbour – Lower Lane Cove River

Sydney Harbour – Lower Lane Cove River

Sites: Tambourine Bay, Woodford Bay and Woolwich Baths



Location

The lower Lane Cove River is the three kilometre long downstream reach of the Lane Cove River. Land use in this area of the catchment is mainly residential, with some bushland, commercial and recreational uses.

Hunters Hill Municipal Council and Lane Cove Council operate in this area.

Compliance with guidelines

Compliance with the guidelines in the lower Lane Cove River was excellent during summer 2008–2009 (Table 19). Woodford Bay, Woolwich Baths and Tambourine Bay all complied with both bacterial indicators 100% of the time.

The range of indicator bacteria levels measured at Sydney Harbour swimming areas during summer 2008–2009 is shown in Figure 26, with lower Lane Cove River sites highlighted in grey. Levels of faecal coliforms and enterococci were similar to those at other sites across Sydney Harbour.

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.

Lower Lane Cove sites ranked highly with Woodford Bay, Woolwich Baths and Tambourine Bay all ranked equal first (Table 19).

Actions to improve water quality

Actions specific to individual swimming locations are included on the 'swimming area' pages. Improvements in water quality within lower Lane Cove River should also be achieved as a result of the implementation of the stormwater management plan and other council programs.

The commissioning of the Northside Storage Tunnel in 2001 has provided ongoing safeguards to water quality in the lower Lane Cove River.

Lane Cove River Stormwater Management Plan

Lane Cove Council and Hunters Hill Municipal Council are currently implementing the components of the Lane Cove River Stormwater Management Plan that relate to the Lower Lane Cove River. Other government organisations such as Sydney Water and the Roads and Traffic Authority are also involved in this process.

The plan consists of a series of major projects that address specific issues of concern within the catchment. The project areas include nutrients, sediment, toxicants, and health and safety. Each project consists of a range of measures such as education campaigns, inspections of the sewerage system, reporting programs and the installation of wetlands and gross pollutant traps.

Hunters Hill Council

Stormwater Improvement Program: Funds received from Council's Environmental Levy have been used to produce a Strategic Management Plan for improving stormwater quality.

Northern Sydney Regional Organisation of Councils (NSROC): Hunters Hill Council is a member of the NSROC and Parramatta River Catchment Group, working together with a number of councils and groups to jointly manage stormwater issues within the region to improve water quality.

International Council for Local Environmental Initiatives (ICLEI) Water Campaign: Council is a member of ICLEI, which aims to improve the water quality of local rivers, streams and groundwater through implementing on-ground actions. Actions have included the establishment of water quality criteria and setting measurement goals.

Gross Pollution Trap (GPT) maintenance: Council has over 20 GPTs and Enviropods (a type of gross pollutant trap) and four artificial wetlands to help prevent pollution from entering the river and harbour. The constructed wetlands are maintained and dredged on a regular basis.

Street Sweeping Program: Council has a regular street sweeping program which reduces the amount of litter entering the stormwater system.

Clean-Up Australia Day: Volunteers helped to clean up a number of sites along the Lane Cove and Parramatta Rivers. More than one tonne of rubbish was collected.

Community education: Council has implemented a program to reduce the amount of foreign matter in gutters and drains. The program included the development of a stormwater education brochure provided to residents.

Tarban Bay environment walk: The walk offers the local community and visitors an educational tour through the Hunters Hill catchment, with useful maps, signs and drain stencilling.

Additional water quality monitoring: Hunters Hill Council carried out macroinvertebrate sampling at Brickmakers Creek and Tarban Creek. Students from Riverside Girls High School continue to participate in the Streamwatch monitoring program.

Lane Cove Council

Stormwater Quality Improvement Device (SQID) maintenance: Council continued to maintain the SQIDs throughout the catchment, reducing the amount of litter entering the river and harbour.

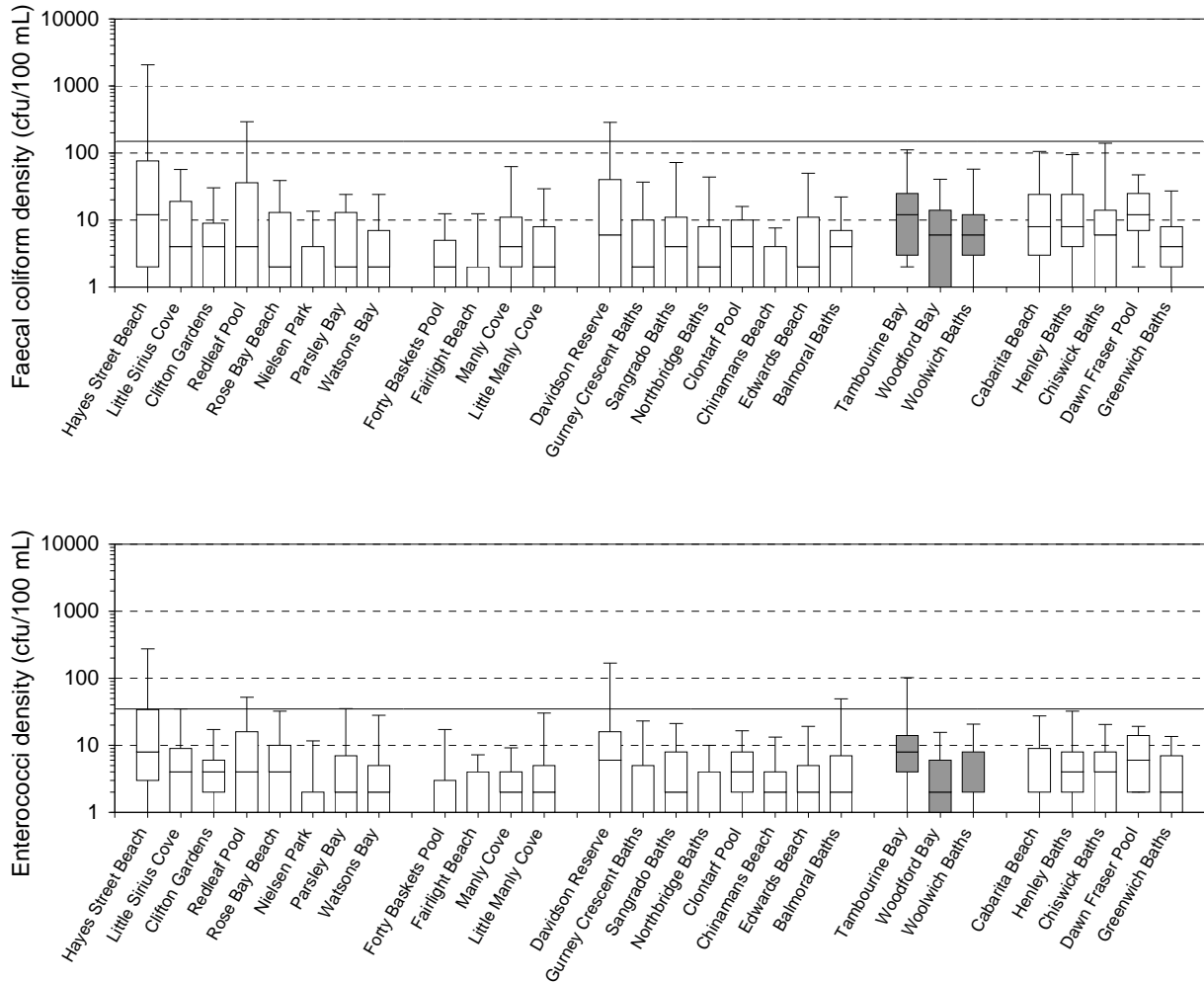
Clean-Up Australia Day: Council participated in Clean-Up Australia Day activities and coordinated the collection and disposal of gathered waste. The event attracted a high level of community participation.

Additional water quality monitoring: Lane Cove Council has continued to monitor water quality at four creeks in the Lane Cove catchment. Council also carried out macroinvertebrate monitoring of the creeks in the Lane Cove Council area.

Table 19: Compliance and Ranking of Lower Lane Cove River Sites during Summer 2008–2009

Site	Compliance (%)		Overall rank (out of 14)
	Faecal Coliforms	Enterococci	
Tambourine Bay	100	100	1
Woodford Bay	100	100	1
Woolwich Baths	100	100	1

Figure 26: Bacterial Levels at Sydney Harbour Sites during Summer 2008–2009



Tambourine Bay

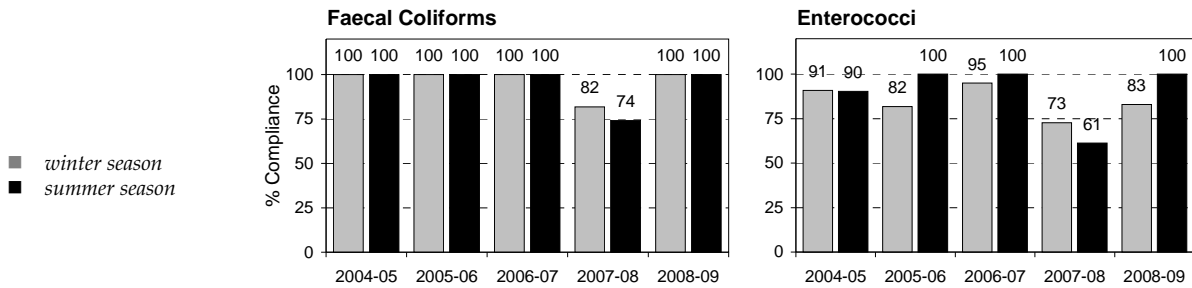
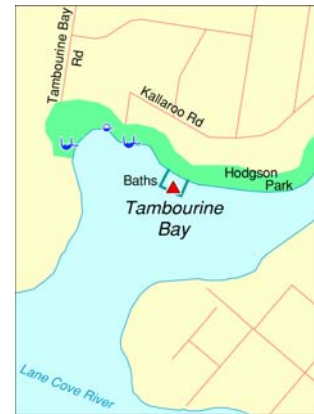
See page 246 for key to map

Description The pool is located at the end of the bay and is backed by parklands. It is regularly filled with river water.

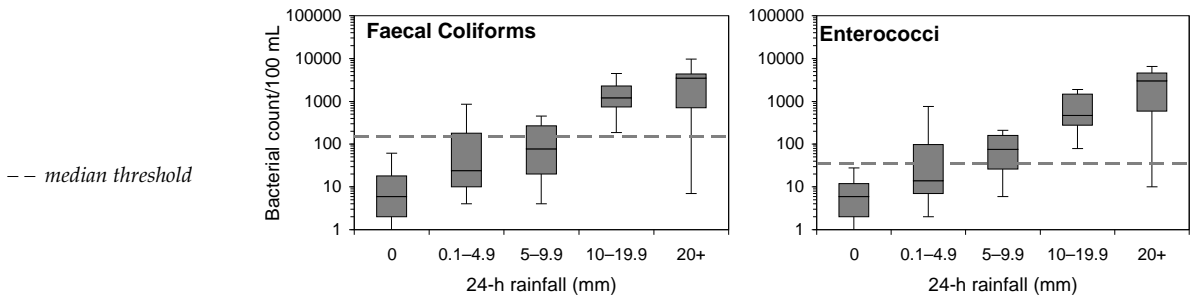
Pollution sources Stormwater drains discharge alongside the pool and a sewage overflow may discharge into the bay during wet weather. Waters from the upper Lane Cove River also affect water quality.

Actions Lane Cove Council continued to maintain the SQIDs throughout the catchment, reducing the amount of litter entering the river and harbour.

Compliance With the exception of 2007–2008, faecal coliform levels complied 100% of the time over the last five years. Enterococci compliance with swimming guidelines was more varied, ranging from 61% to 100% over the last five years.

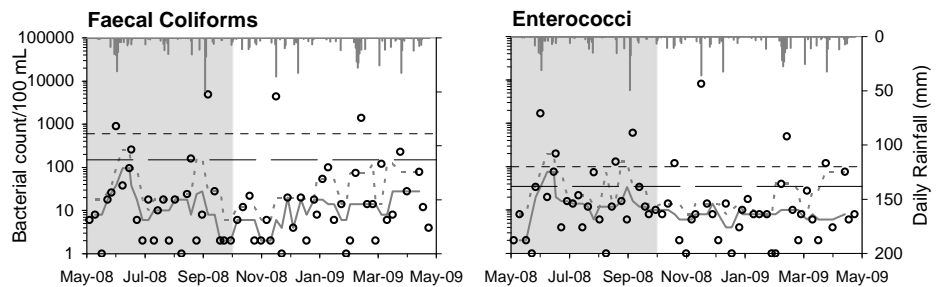


Response to rainfall Faecal coliform and enterococci densities increased with increasing rainfall and often exceeded the median guideline limits after light rain in the previous 24 hours. Faecal coliform levels usually exceeded the median guideline limit in response to 10 millimetres of rain or more in the previous 24 hours. Enterococci levels usually exceeded the median guideline limit in response to 10 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



Woodford Bay

See page 246 for key to map

Description

The narrow, sandy beach is enclosed by a 20 by 25 metre swimming area. The pool is located in the western corner of the bay.

Pollution sources

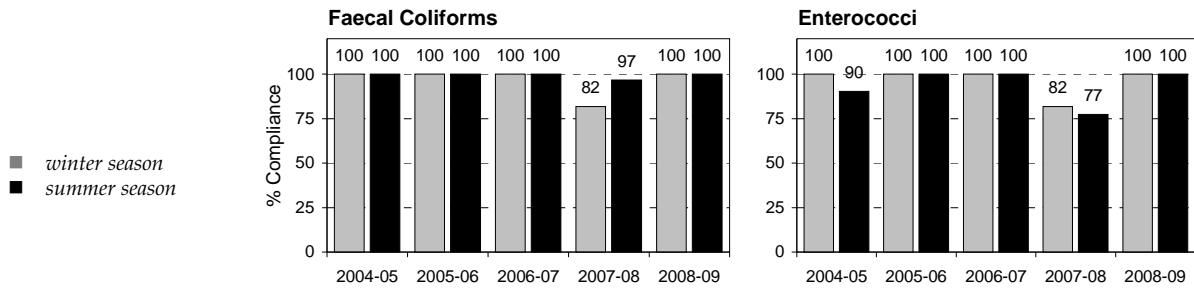
Stormwater drains discharge in the area. Water quality is also likely to be affected by waters from the upper Lane Cove River and by wet-weather sewage overflows.

Actions

Lane Cove Council continued to maintain the SQIDs throughout the catchment, reducing the amount of litter entering the river and harbour.

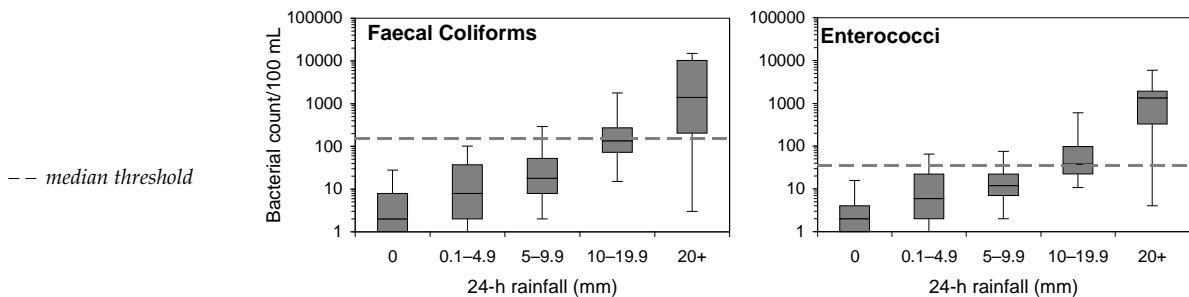
Compliance

With the exception of 2007–2008, faecal coliform levels complied 100% of the time over the last five years. Enterococci compliance with swimming guidelines was more varied, ranging from 77% to 100% over the last five years.



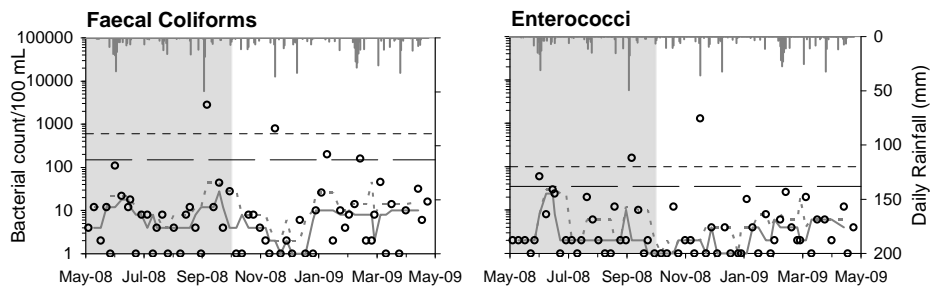
Response to rainfall

Faecal coliform and enterococci densities generally increased with increasing rainfall. Faecal coliform densities occasionally exceeded the median guideline limits after five millimetres of rain or more in the previous 24 hours. Enterococci densities occasionally exceeded the median guideline limit after light rain in the previous 24 hours. Both bacterial densities frequently exceeded median guideline limits in response to 20 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



Woolwich Baths

Description

The baths are a 20 by 30 metre netted swimming area with a narrow, sandy beach. The baths are backed by a reserve.

Pollution sources

A stormwater drain discharges alongside the swimming enclosure. Water quality is likely to be affected by the waters from the upper Lane Cove River.

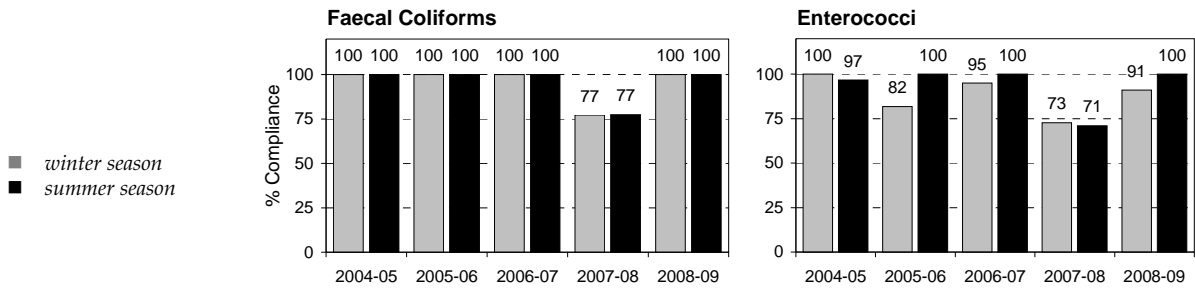
Actions

Hunters Hill Council continued to maintain GPTs throughout the catchment, reducing the amount of litter entering the river and harbour.

Compliance

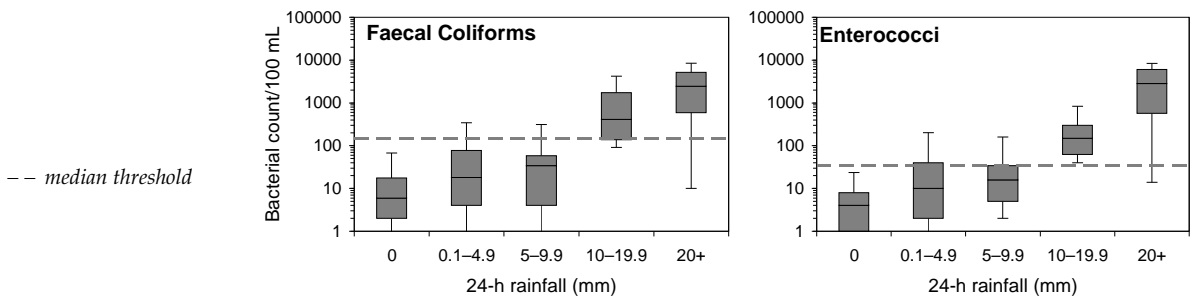
With the exception of 2007–2008, faecal coliform levels complied 100% of the time over the last five years. Enterococci compliance with swimming guidelines has been variable, ranging from 71% to 100% over the last five years.

See page 246 for key to map



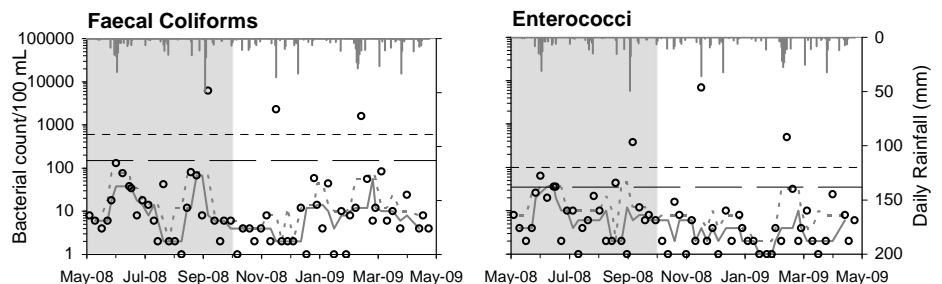
Response to rainfall

Faecal coliform and enterococci densities increased with increasing rainfall. Faecal coliform densities occasionally exceeded the median guideline limit in response to light rain and usually exceeded the median guideline limit in response to ten millimetres of rain or more in the previous 24 hours. Enterococci densities often exceeded the median guideline limit in response to light rain and usually 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

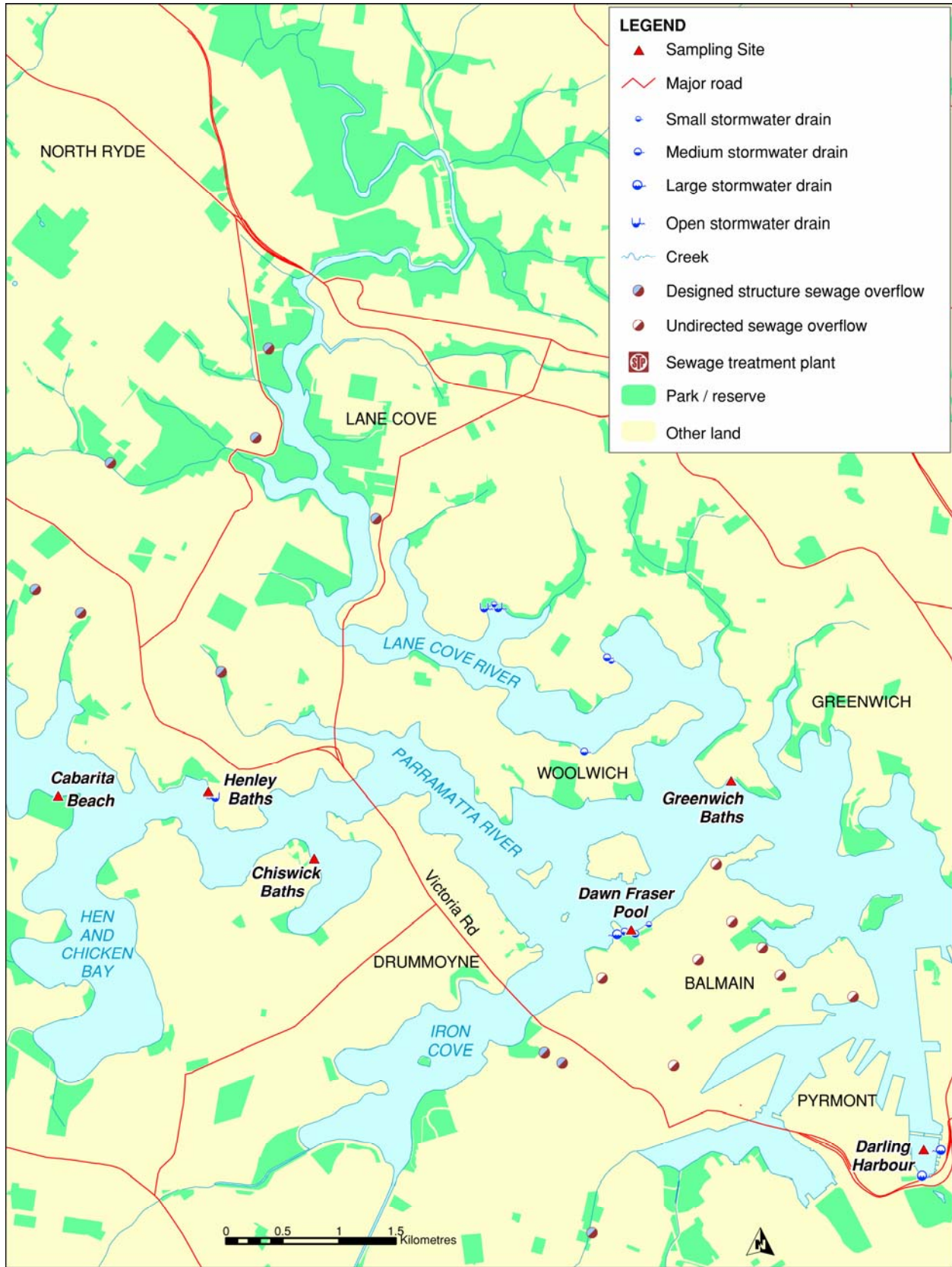


Sydney Metropolitan Area Harbour Swimming Sites

Sydney Harbour – Lower Parramatta River

Sydney Harbour – Lower Parramatta River

Sites: Cabarita Beach, Henley Baths, Chiswick Baths, Dawn Fraser Pool, Greenwich Baths and Darling Harbour



Lower Parramatta River Catchment

The lower Parramatta River stretches between Breakfast Point in the west and Sydney Harbour Bridge in the east. Land use in the catchment is mainly residential and commercial.

Canada Bay, Hunters Hill, Lane Cove, Leichhardt, North Sydney and Sydney City councils and the Sydney Harbour Foreshore Authority operate in this area.

Compliance with guidelines

Compliance with swimming guidelines at lower Parramatta River sites during summer 2008–2009 was excellent for both faecal coliforms and enterococci (Table 20). All sites complied with both bacterial indicators 100% of the time.

The range of indicator bacteria levels measured at Sydney Harbour swimming areas during summer 2008–2009 is shown in Figure 27, with Lower Parramatta River sites highlighted in grey. The levels of bacteria were generally within the range measured at other swimming sites in Sydney Harbour.

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.

Greenwich Baths, Dawn Fraser Pool, Chiswick Baths, Henley Baths and Cabarita Beach all ranked equal first (Table 20).

Actions to improve water quality

Actions specific to individual swimming locations are included on the 'swimming area' pages. Improvements in water quality within the lower Parramatta River should also be achieved as a result of the implementation of stormwater management plans and other council programs.

Stormwater management plans

Local councils and other government organisations are currently implementing the Stormwater Management Plans for the Lower Parramatta River, North Port Jackson and South Port Jackson.

Initiatives contained within these plans include stormwater education campaigns, drain stencilling, review of street sweeping practices, water quality monitoring programs and a range of structural controls.

A number of streambank stabilisation projects are under way along Stringybark Creek and accompanying tributaries. Works vary from the establishment of riparian vegetation to rock armouring. These projects will reduce sediment flow into the Lane Cove River and improve water quality.

Canada Bay City Council

Water Saving and Stormwater Re-Use

Initiatives: City of Canada Bay has implemented several water re-use projects in recent years. The reuse of stormwater through each of these projects reduces the amount of stormwater entering the Parramatta River. Projects include: Barnwell Park Stormwater Re-Use Scheme, Cintra Hockey Water recycling Project, Powell's Creek Reserve Stormwater Harvesting Project, Concord Oval Water Reuse, and weather-based 'Smart irrigation' at Council's sport fields. Each of these projects has been identified in Council's Water Savings Action Plan and serves the purpose of reducing the amount of stormwater entering the bays while also reducing the demand on potable water supplies.

Street Sweeping Program: Council has augmented its street sweeping program, which continues to reduce the amounts of litter and other pollutants entering the stormwater system.

Gross Pollutant Trap (GPT) maintenance:

Canada Bay City Council maintains a number of gross pollutant traps, intercepting pollution from the stormwater entering the bays of the Parramatta River. An additional two GPTs were installed during 2008–2009 along with 16 Enviropod filters.

Hunters Hill Council

Stormwater Improvement Program: Funds received from Council's Environmental Levy have been used to produce a Strategic Management Plan for improving the management of stormwater.

Gross Pollutant Trap (GPT) maintenance: Council has over 20 GPTs and Enviropods (a type of gross pollutant trap) and four artificial wetlands to help prevent pollution from entering the river and harbour. The constructed wetlands are maintained and dredged on a regular basis.

Northern Sydney Regional Organisation of Councils (NSROC): Hunters Hill Council is a member of the NSROC and Parramatta River Catchment Group, working together with a number of councils and groups to jointly manage stormwater issues within the region to improve water quality.

Additional water quality monitoring: Hunters Hill Council has carried out macroinvertebrate sampling at Brickmakers Creek and Tarban Creek. Students from Riverside Girls High School continue to participate in the Streamwatch monitoring program.

Community education: Council has implemented a program to reduce the amount of foreign matter in gutters and drains. The program included the development of a stormwater education brochure provided to residents.

The Tarban Bay environment walk: The walk offers the local community and visitors an educational tour through the Hunters Hill catchment, with useful maps, signs and drain stencilling.

Lane Cove Council

Stormwater Quality Improvement Device (SQID) maintenance: Council continued to maintain the SQIDs throughout the catchment, reducing the amount of litter entering the river and harbour.

Clean Up Australia Day: Council participated in 'Clean-Up Australia Day' activities and coordinated the collection and disposal of gathered waste. This event attracted a high level of community participation.

Additional water quality monitoring: Lane Cove Council has continued to monitor water quality at four creeks within the Lane Cove catchment. Council also carried out macroinvertebrate monitoring of creeks in the Lane Cove Council area.

Leichhardt Council

Stormwater management charge: Council implemented a Stormwater Management Charge as part of the Council rates. This generates \$500,000 per annum to spend on stormwater initiatives. In 2008–2009 expenditure included preparation of a flood study for the local government area and part of the Water Reuse Feasibility Study.

Spill response: Council has a Spill Response Trailer for the purpose of cleaning up serious spills that threaten the water quality in the catchment. Spills entering and affecting the Whites Creek Wetland are minimised by turning off the pump supplying the wetland with water from the creek. A manual is being produced for the Wetland to ensure operational issues are documented.

Leichhardt's Water Savings Action Plan 2006–2010: This was completed and approved by the Department of Water and Energy during 2006–2007 and identifies water savings in the top 11 water using Council properties. The plan aims to save 18 megalitres a year once implemented. Water usage is now monitored quarterly within the Council by the Senior Management Team to ensure progress is made.

Community Water Grant for Leichhardt Oval: Leichhardt Council successfully applied for a Commonwealth Community Water Grant to install rainwater tanks with a total capacity of 450,000 litres at Leichhardt Oval, home of the Balmain Tigers and Wests Tigers football clubs. Water falling on the oval, spectator hill, carparks and grandstands will be collected and diverted into the rainwater tanks. When full, the tanks will be able to irrigate the Oval for five to six weeks during the peak watering season (summer), significantly reducing the need for potable town water to irrigate the oval. The tanks have been installed and are starting to take water.

NSW Environment Trust Urban Sustainability Program Grant – Iron Cove Water Quality Improvement Project: Leichhardt Council successfully applied for a State Government grant to install two biofiltration systems at Dobroyd and Hawthorn Canals. These systems are effective at removing diffuse pollutants such as heavy metals, organo-chlorine compounds and poly aromatic hydrocarbons (PAHs). This project aims to restore the estuarine function of Iron Cove to allow the existing seagrass and salt marshes to expand. It will provide habitat for creatures such as seahorses and pipe fish within the upper reaches of Sydney Harbour.

Gross Pollutant Trap and Water Harvesting at King George Park: Council has commenced design of a water quality and stormwater harvesting project at King George Park. This has been part-funded by the Department of Environment and Climate Change's Estuary Management Program. The project will see a Gross Pollutant Trap installed at King George Park and stormwater collected on-site in rainwater tanks for use in irrigating the park grounds.

Encouraging Installation of Rainwater Tanks in the Community: Leichhardt Council has updated its very popular guide to installing rainwater tanks, provided workshops on this and removed financial barriers such as waiving development application fees (where required) and providing interest-free loans in partnership with Sydney Credit Union. The number of rainwater tank rebates given to residents has increased strongly over the last few years.

Water Reuse and Feasibility Study: Council will complete a Water Reuse Feasibility Study during 2008–2009. The study aims to identify major projects within the LGA that could utilise rainwater, stormwater, ground water or sewage to reduce water usage within Council facilities and operations and the facilities of other major water users in the LGA. It will also include opportunities to improve water quality through water-sensitive urban design. This strategic approach will direct future expenditure of the stormwater management charge and grant funding applications.

Whites Creek Wetland: Council employs a contractor to maintain the wetland. To aid routine maintenance, the wetland was drained in 2009; this has no adverse effect on the vegetation of the wetland. Routine maintenance includes removal of common aquatic weeds and pump maintenance every six months. Native aquatic plants are routinely cut back and removed to allow continual water flow through the wetland and to remove nutrients absorbed by the plants. Sediment is removed from the wetland as required. Council is currently investigating ways to remove any contaminants that appear in the sediment. This year approximately 15 cubic metres of sediment was removed, with goldfish and exotic fish also being removed from the wetland. The sighting of an Eastern Water Dragon and Turtle this year was indicative of the good conditions in the wetland.

Eight educational signs have been installed explaining the history, function and wildlife values in and around the wetland.

Council contracts a consultant to conduct educational tours of the wetland for schools, on request and as budgets allow. Two primary schools received tours through the wetland in 2008–2009. Council also organised for Sydney TAFE Ultimo Campus to receive a wetland tour at their own expense.

A community centre adjacent to the wetland (at 31 White St, Lilyfield) has been completed and is now open. The centre incorporates many sustainability features including rainwater tanks, a composting toilet, a solar hot water system, natural ventilation, furniture made from recycled products and energy-efficient lighting. Council plans on running environmental workshops in this Centre in the future.

Additional water quality monitoring: School students from St Scholastica's High School last monitored Whites Creek Wetland, which flows into Whites Creek, in March 2008 through the Streamwatch monitoring program.

To improve the data on water quality in the LGA, a project has been initiated with the University of Sydney to model stormwater pollution sources in the area and carry out a

program of monitoring. Results should be available to include in the comprehensive 2009 *State of the Environment* report.

Council is continuing to take part in the Parramatta River Estuary Data Compilation Study and the compilation of existing data has been completed. Council is now a financially contributing member of the Estuary Management Committee. Through this Committee a consultant has been contracted to undertake an Estuary Process Study and a second consultant has been engaged to undertake a condition assessment of the estuary bank and its assets. An agreement with Sydney University to complete the hydrodynamic modelling of the estuary is currently being considered. Additional funding opportunities to carry out further works are currently being investigated.

North Sydney Council

North Sydney Stormwater Reuse Project: The project aims to save 90 megalitres of potable water a year by harvesting, treating and reusing stormwater for irrigation of sports fields and recreational parks. The St Leonards Park and Cammeray Park stages are complete. Three further stages are in progress.

Community education: Council developed and released Sustainability Education Kits for local primary schools with activities on waste management and water quality. It also ran gross pollutant trap excursions where students observed litter traps being cleaned. Students were encouraged to take actions to reduce the amount of litter in their school grounds.

Water saving initiatives: Council has participated in and implemented water-

saving initiatives including the Water Campaign, Every Drop Counts and North Sydney Council's Water Savings Action Plan. Outcomes included the installation of rainwater tanks and other water-saving devices at several Council facilities.

Stormwater Quality Improvement Device maintenance: Council continued to maintain SQIDs throughout the catchment, reducing the amount of litter entering the harbour.

Street Sweeper Program: Council has acquired new, smaller street sweepers that allow for mechanical sweeping of footpaths and plazas in business areas, resulting in less litter entering the stormwater system.

Additional water quality monitoring: Council takes macroinvertebrate samples from two creek sites twice a year to assess water quality. Physio-chemical water and sediment parameters are analysed as required.

City of Sydney Council

Port Jackson Stormwater Management Plan: The City of Sydney Council has implemented components of the Port Jackson South Stormwater Management Plan. Activities completed to date include regular maintenance and cleaning of stormwater quality improvement devices, channels and gully pits.

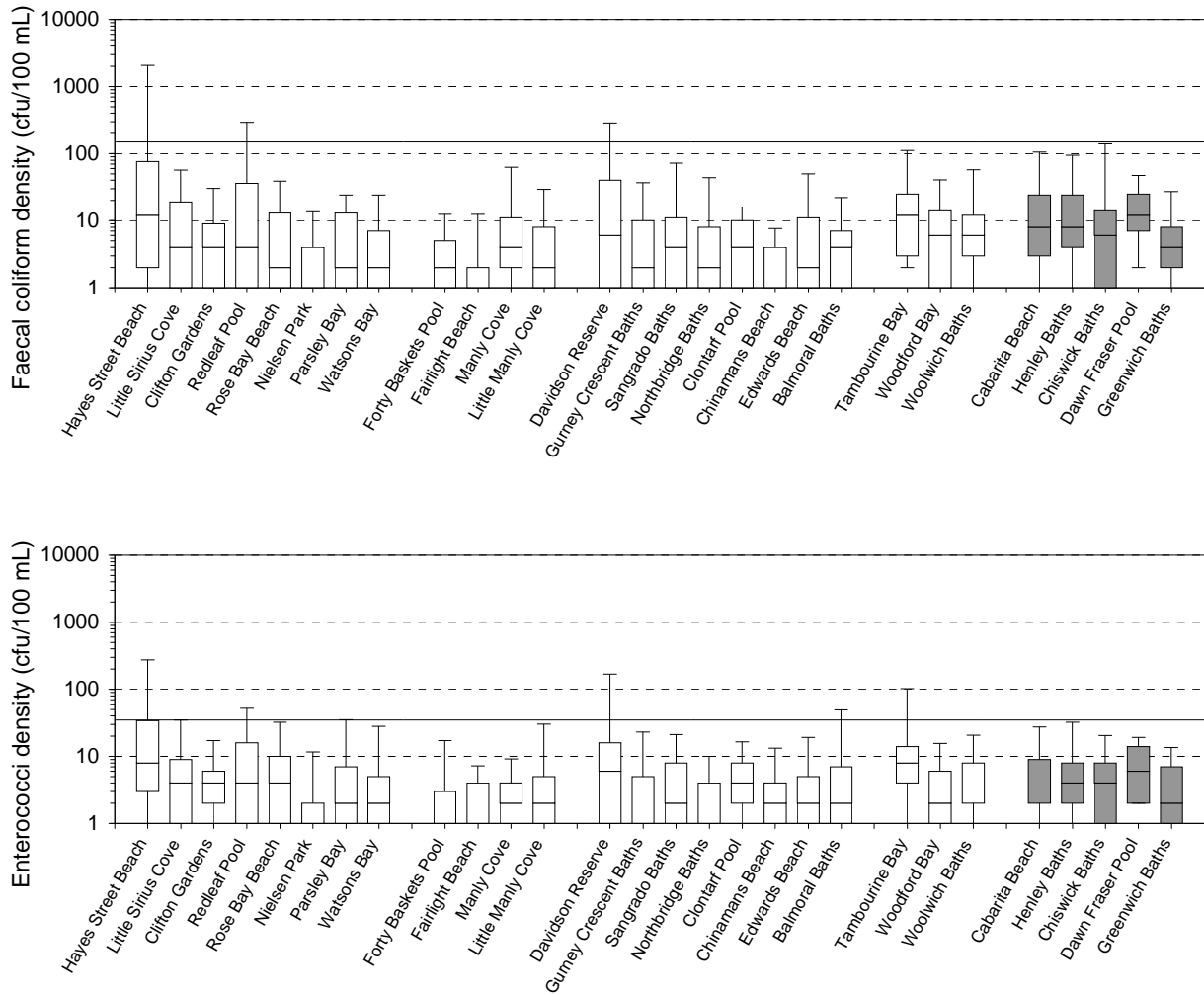
Sydney Water

Sydney Water is cleaning and inspecting the sewer mains across Drummoyne and Chiswick that have a high likelihood of discharging sewage to waterways if they become blocked. Where problems are identified they will be fixed by repair or preventive maintenance.

Table 20: Compliance and Ranking of Lower Parramatta River Sites during Summer 2008–2009

Site	Compliance (%)		Overall rank (out of 14)
	Faecal Coliforms	Enterococci	
Cabarita Beach	100	100	1
Henley Baths	100	100	1
Chiswick Baths	100	100	1
Dawn Fraser Pool	100	100	1
Greenwich Baths	100	100	1

Figure 27: Bacterial Levels at Sydney Harbour Sites during Summer 2008–2009



Cabarita Beach

Description

This 120 metre long narrow beach is located west of Cabarita Point and is backed by a large reserve with a picnic area.

Pollution sources

Water quality is likely to be affected by waters from numerous nearby urban stormwater drains and the upper Parramatta River.

Actions

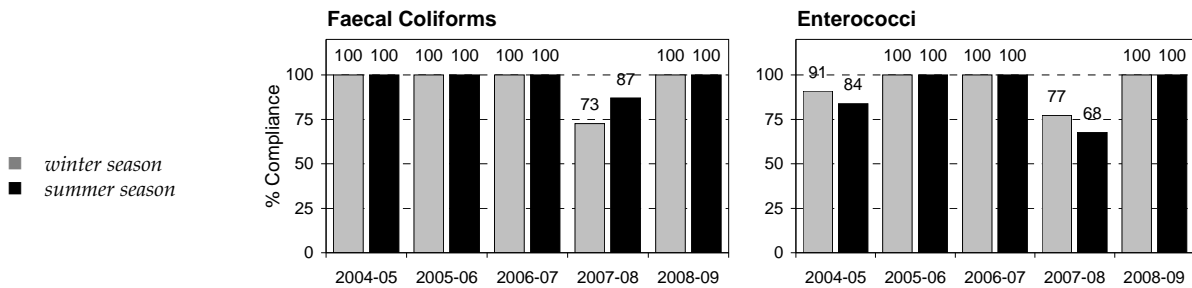
Canada Bay Council maintains a number of GPTs throughout the catchment, reducing the amount of pollution entering the river and harbour. Sydney Water has cleaned and inspected sewer mains across the catchment. Where problems have been identified they are being fixed.

See page 254 for key to map



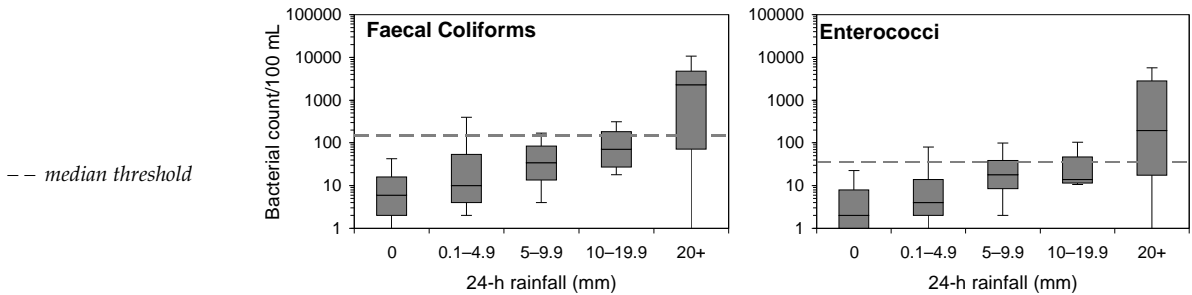
Compliance

With the exception of 2007–2008, faecal coliform levels complied 100% of the time over the last five years. Enterococci compliance with swimming guidelines has been more variable, ranging from 68% to 100% over the last five years.



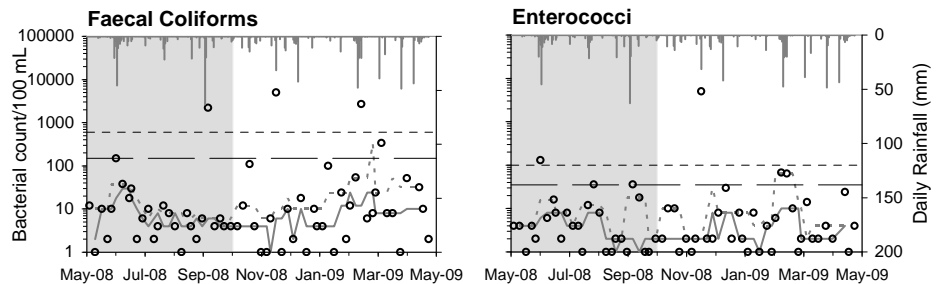
Response to rainfall

Faecal coliform and enterococci densities generally increased with increasing rainfall, occasionally exceeding the median guideline limit in response to light rain in the previous 24 hours. Bacterial densities of both bacterial indicators frequently exceeded the median guideline limit in response to 20 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



Henley Baths

See page 254 for key to map

Description

This swimming site is backed by a grassy reserve. Hunters Hill Council has removed the bathing nets as the site is infrequently used.

Pollution sources

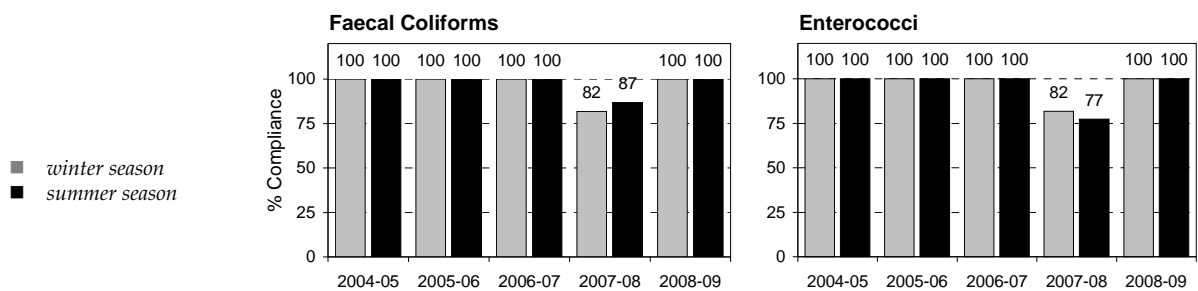
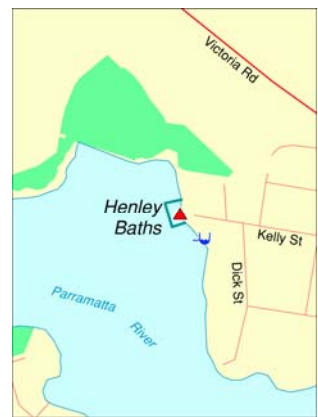
Water quality is likely to be affected by waters from numerous nearby urban stormwater drains and the upper Parramatta River.

Actions

Hunters Hill Council continued to maintain a number of GPTs throughout the catchment, reducing the amount of pollution entering the river and harbour.

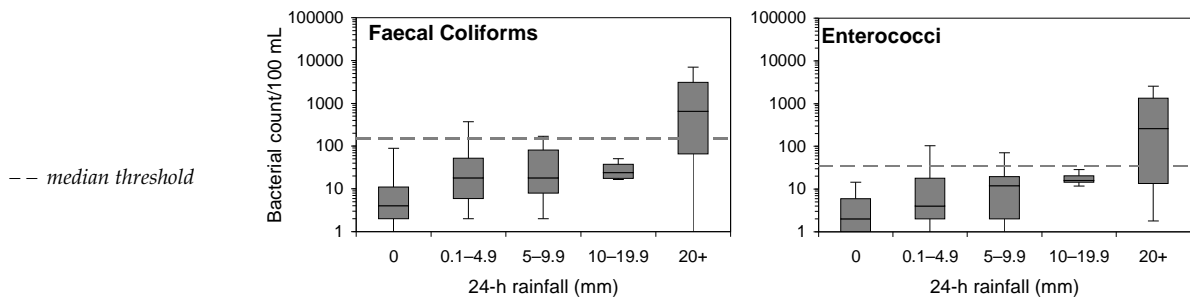
Compliance

With the exception of 2007–2008, faecal coliform and enterococci levels complied with swimming guidelines 100% of the time over the last five years.



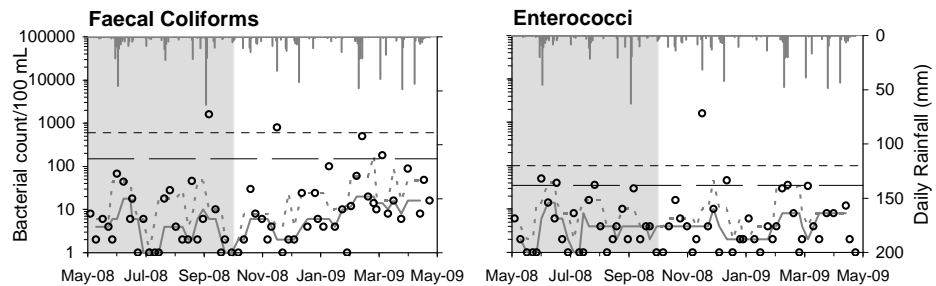
Response to rainfall

Faecal coliform and enterococci densities generally increased with increasing rainfall, occasionally exceeding the median guideline limits in response to light rain in the previous 24 hours. Bacterial densities of both bacterial indicators frequently exceeded the median guideline limits in response to 20 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



Chiswick Baths

Description

A narrow sandy beach and a picnic area back the netted swimming enclosure.

Pollution sources

Water quality is likely to be affected by waters from numerous nearby urban stormwater drains and the upper Parramatta River.

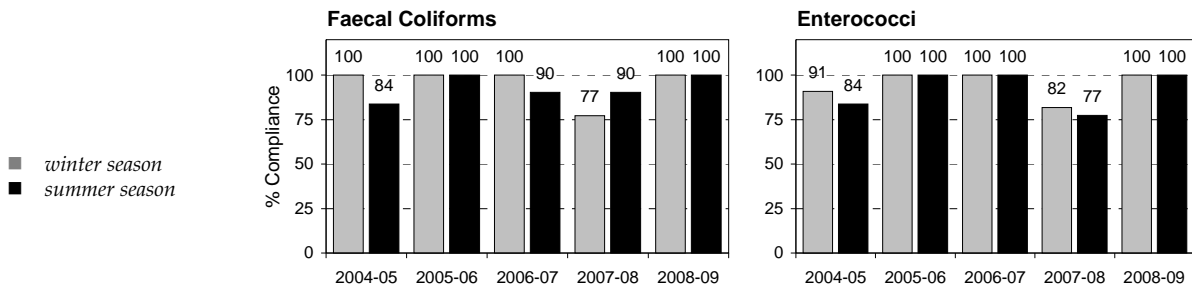
Actions

Canada Bay Council maintains a number of GPTs throughout the catchment, reducing the amount of litter entering the river and harbour.

Compliance

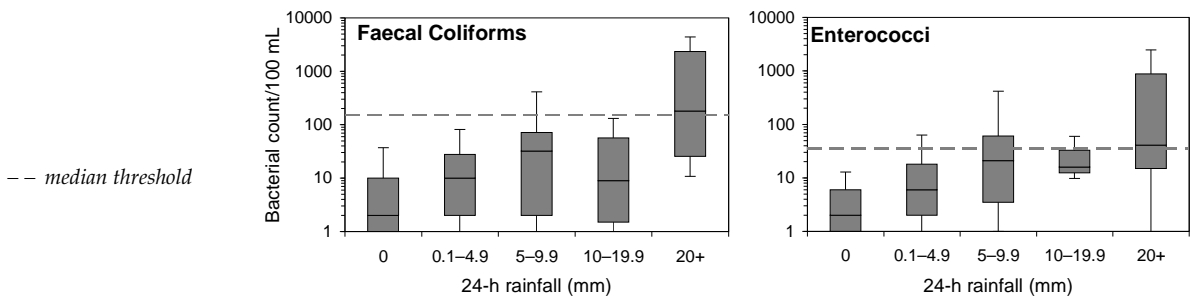
Faecal coliform and enterococci compliance with swimming guidelines has varied over the last five years, ranging from 77% to 100%.

See page 254 for key to map



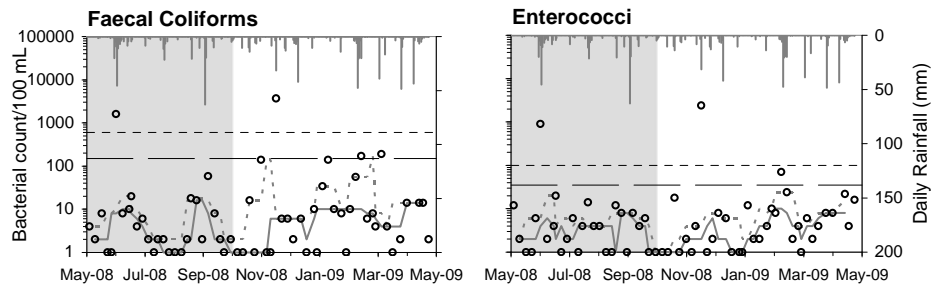
Response to rainfall

Bacterial densities of both bacterial indicators 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 densities occasionally exceeded the median guideline limit after light rain in the previous 24 hours. Densities of both bacterial indicators regularly exceeded the median guideline limit in response to 20 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



Dawn Fraser Pool

See page 254 for key to map

Description

Boardwalks and a pavilion surround this enclosed tidal swimming area. The pool, a famous swimming site, is listed on the NSW State Heritage Register.

Pollution sources

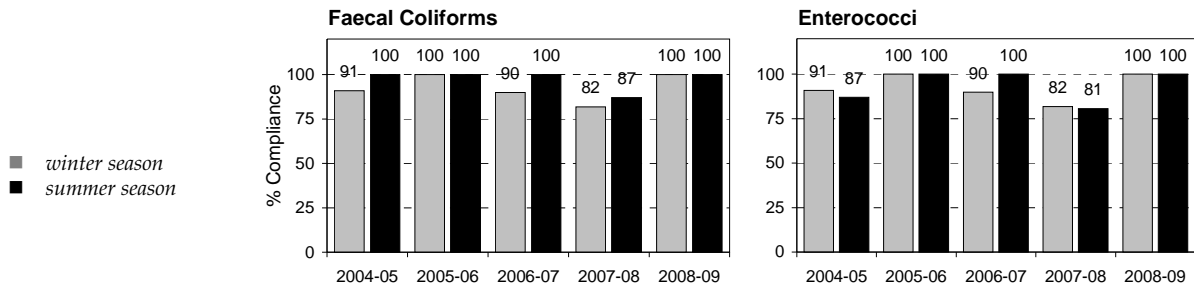
Stormwater drains discharge alongside the swimming enclosure. Pollution from the upper Parramatta River, Lane Cove River and Iron Cove Bay can affect water quality at this site.

Actions

During 2007 Leichhardt Council installed a pollution control device on the stormwater pipeline that currently discharges adjacent to Dawn Fraser Pool.

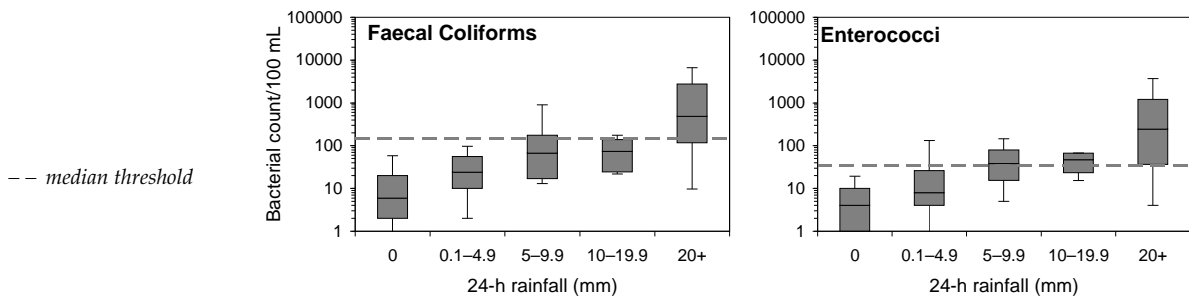
Compliance

Faecal coliform compliance with swimming guidelines has generally been high over the last five years, ranging from 82% to 100%. Enterococci compliance has ranged from 81% to 100% over the last five years.



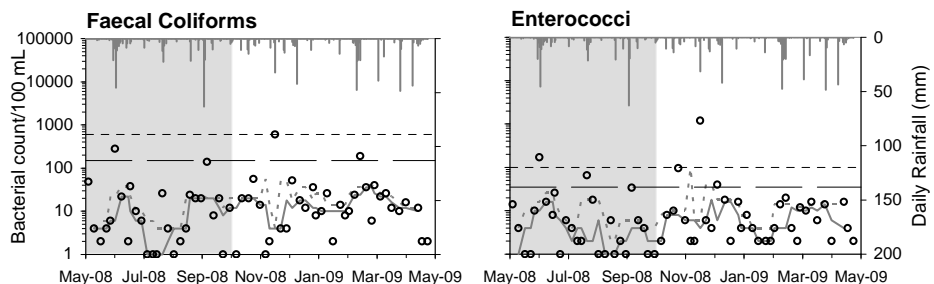
Response to rainfall

Faecal coliform and enterococci densities increased with increasing rainfall. Faecal coliform densities often exceeded the median guideline limit in response to five millimetres of rain or more and frequently exceeded the median guideline limit in response to 20 millimetres of rain or more in the previous 24 hours. Enterococci densities often exceeded the median guideline limit in response to light rain, and frequently exceeded the median guideline limit in response to 10 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



Greenwich Baths

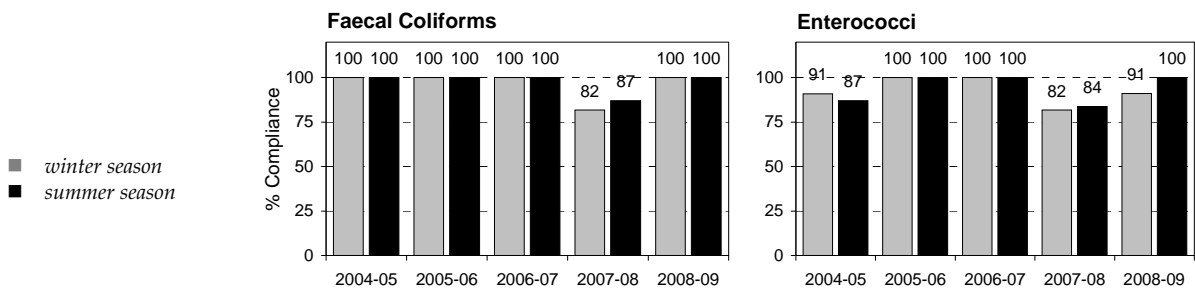
See page 254 for key to map

Description The 40 metre long netted swimming area is backed by a small, sandy beach. The baths are open for swimming only in summer.

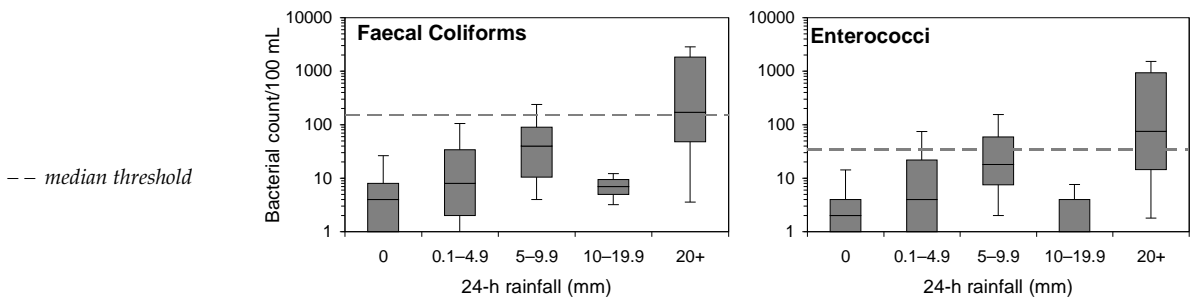
Pollution sources Water quality is likely to be affected by pollution from the Lane Cove River and the upper Parramatta River.

Actions Lane Cove Council continued to maintain SQIDs throughout the catchment, reducing the amount of litter entering the river and harbour.

Compliance With the exception of 2007–2008, faecal coliform levels complied with swimming guidelines 100% of the time over the last five years. Enterococci compliance has ranged from 82% to 100% over the last five years.



Response to rainfall Faecal coliform and enterococci densities tended to increase with increasing rainfall. Faecal coliform densities occasionally exceeded the median guideline limits in response to five millimetres of rain in the previous 24 hours. Enterococci densities occasionally exceeded the median guideline limit after light rain in the previous 24 hours. Densities of both bacterial indicators regularly exceeded the median guideline limits in response to 20 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

