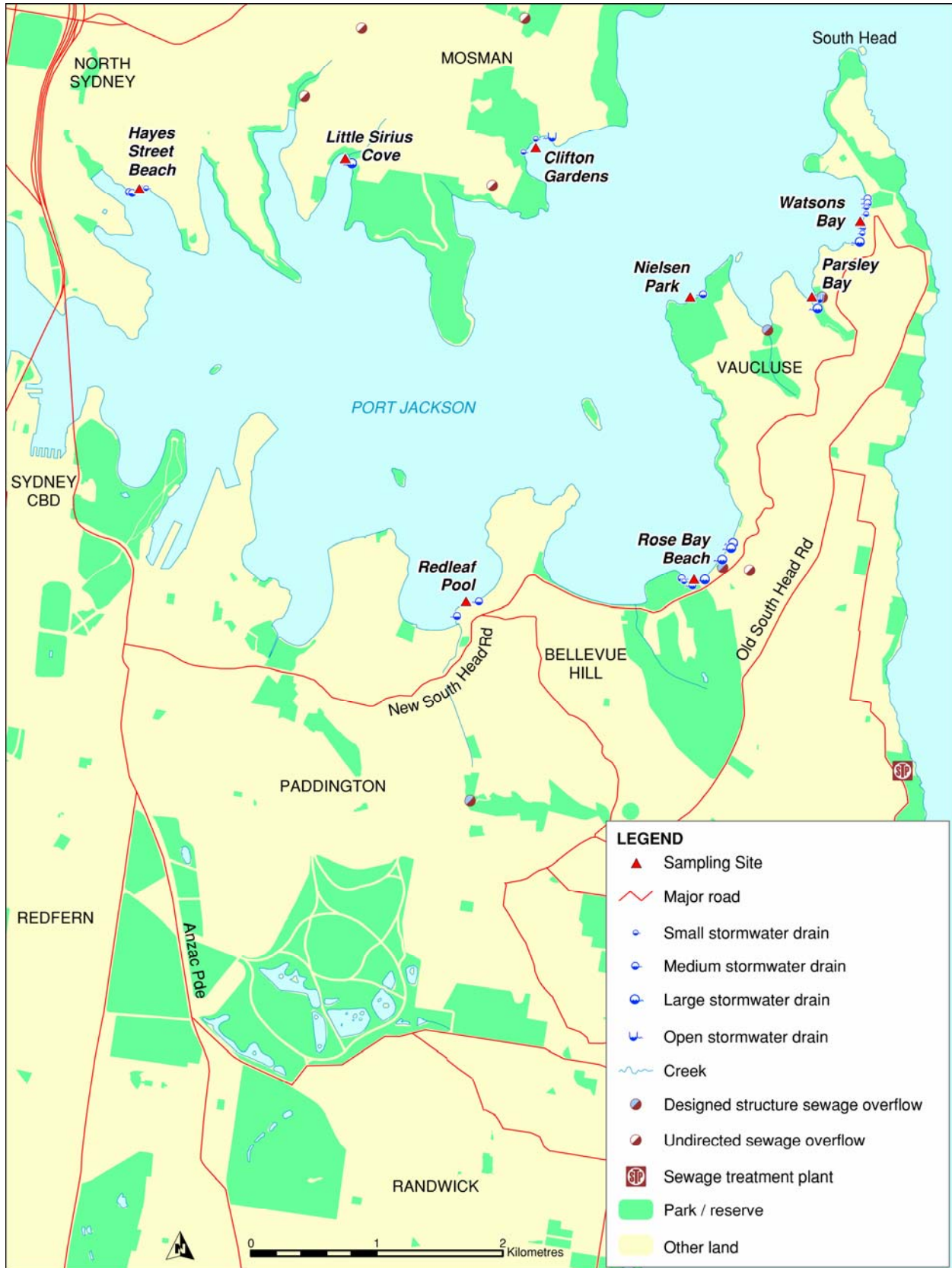


Sydney Metropolitan Area Harbour Swimming Sites

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 varied across the Port Jackson region during summer 2007–2008.

Nielsen Park complied with both faecal coliform and enterococci guidelines 100% of the time. A high level of compliance was also recorded at Clifton Gardens and Parsley Bay, which complied 100% of the time with faecal coliform guidelines and 94% of the time for enterococci (Table 16). Similarly, Rose Bay Beach and Watsons Bay recorded 100% compliance for faecal coliforms, and complied 84% of the time with enterococci guidelines.

Redleaf Pool complied 90% of the time for faecal coliforms, and 87% of the time with enterococci criteria. A lower level of compliance was recorded at Hayes Street Beach and Little Sirius Cove. Hayes Street Beach complied with faecal coliform guidelines 84% of the time, and for enterococci 68% of the time, and Little Sirius Cove complied 84% of the time for faecal coliforms, and 61% of the time with enterococci guidelines.

The range of indicator bacteria levels measured at Sydney Harbour swimming areas during summer 2007–2008 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.

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 2007–2008. A total of 41 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 ranged significantly. Nielsen Park ranked equal first, Clifton Gardens and Parsley Bay ranked equal third, Rose Bay and Watsons Bay ranked equal eighth, Redleaf ranked fourteenth, Hayes Street Beach ranked equal twenty-ninth and Little Sirius Cove ranked thirty-second.

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.

Water quality monitoring: Implementation of the water quality monitoring program continued during 2007–2008. The monitoring program aims to evaluate the performance of the SQIDs in improving the quality of stormwater before it enters receiving waters.

Estuary 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 physio-chemical parameters of water and sediment, and macroinvertebrate sampling twice a year.

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 ML 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.

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, and 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 installed at Crows Nest Community Centre and Cammeray Park amenities block.

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 more litter being removed from 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.

Woollahra Council

Environmental and Infrastructure Levy: Woollahra Council commenced the first 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 the 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 2007–2008 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 run-off collected from New South Head Road. The treated stormwater is diverted to underground tanks capable of storing up to 200,000 litres and is being used by council for irrigation and maintenance purposes, saving potable and bore water.
- 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.

- A review of Council’s beach cleaning program. The implementation of mechanical beach cleaning will further

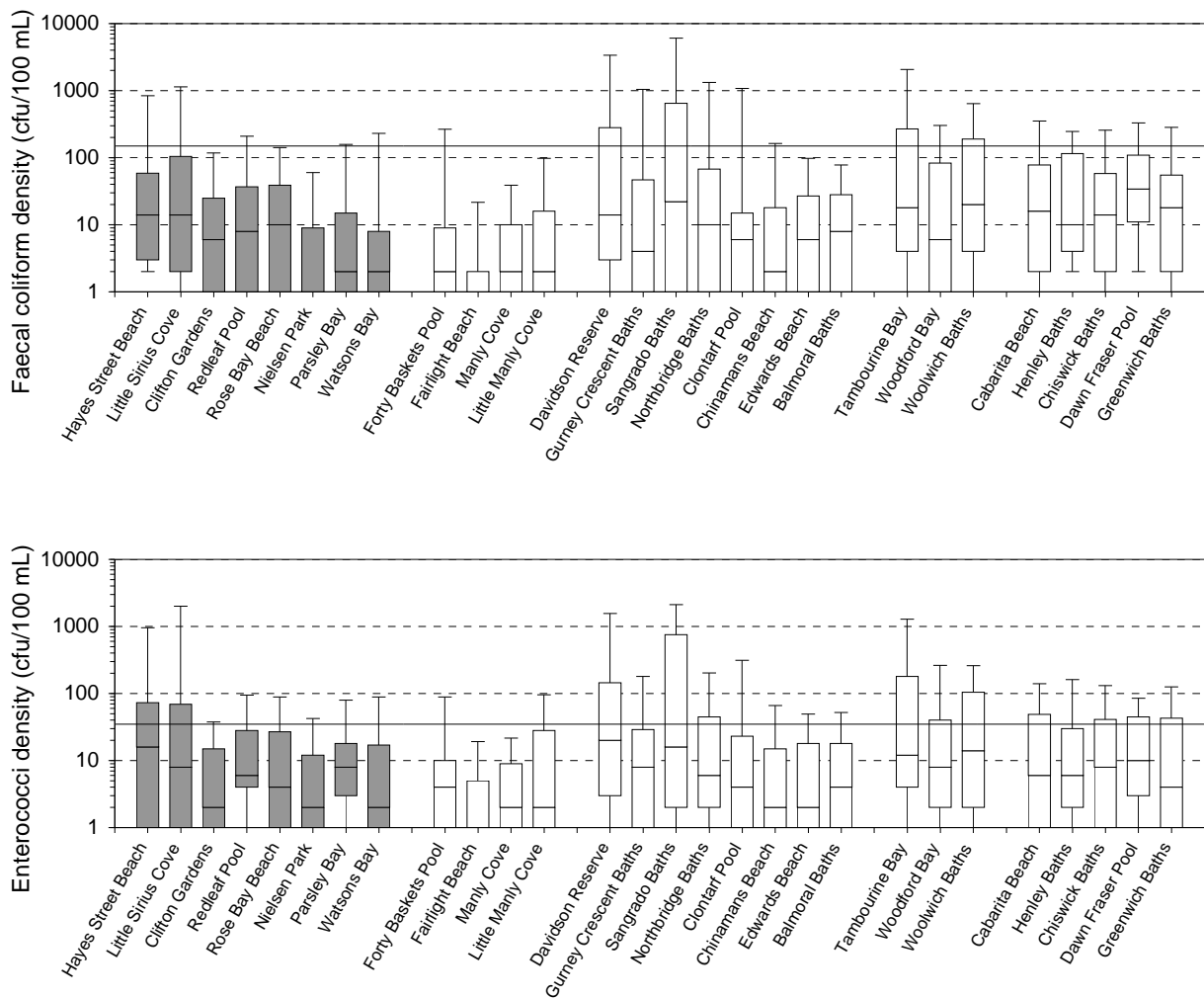
reduce the amount of litter and pollution entering Sydney Harbour.

- The Cooper Park Pond and Creek Restoration Project, which aims to reduce the amount of sediment in Cooper Park Creek and improve water quality.

Table 16: Compliance and Ranking of Port Jackson Sites during Summer 2007–2008

| Site | Compliance (%) | | Overall rank (out of 41) |
|--------------------|------------------|-------------|--------------------------|
| | Faecal Coliforms | Enterococci | |
| Hayes Street Beach | 84 | 68 | 29 |
| Little Sirius Cove | 84 | 61 | 32 |
| Clifton Gardens | 100 | 94 | 3 |
| Redleaf Pool | 90 | 87 | 14 |
| Rose Bay Beach | 100 | 84 | 8 |
| Nielsen Park | 100 | 100 | 1 |
| Parsley Bay | 100 | 94 | 3 |
| Watsons Bay | 100 | 84 | 8 |

Figure 23: Bacterial Levels at Sydney Harbour Sites during Summer 2007–2008



Hayes Street Beach, Neutral Bay

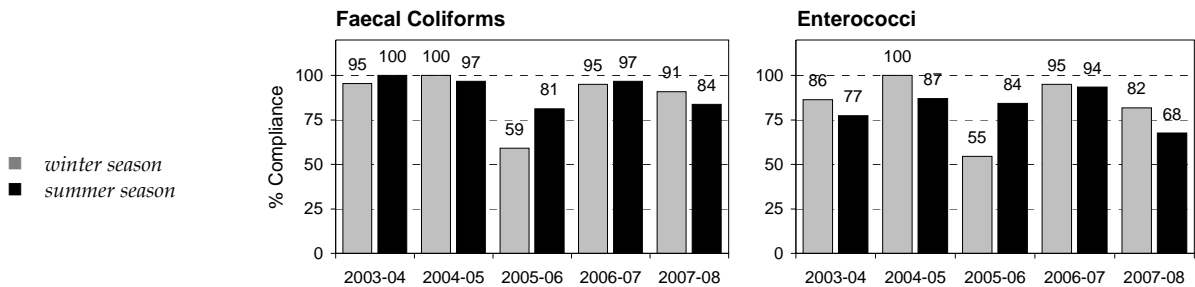
See page 202 for key to map

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.

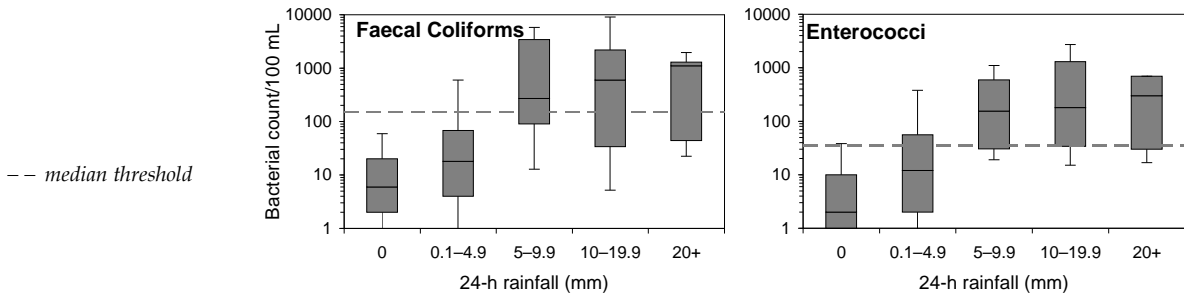
Pollution sources Stormwater drains discharge in the vicinity of the swimming area.

Actions There are no actions specific to this beach.

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.

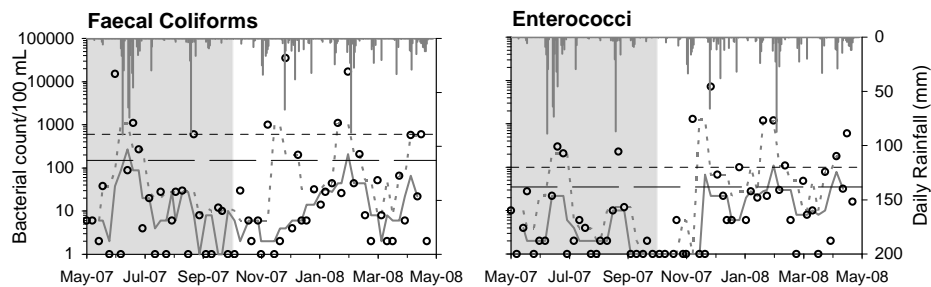


Response to rainfall Faecal coliform and enterococci densities tended to increase with increasing rainfall. Both bacterial levels regularly exceeded the median guideline limits in response to five millimetres of rain or more in the previous 24 hours. Enterococci densities occasionally exceeded the median guideline 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 7 for details)
- median threshold
 - - - 80th percentile threshold



Little Sirius Cove

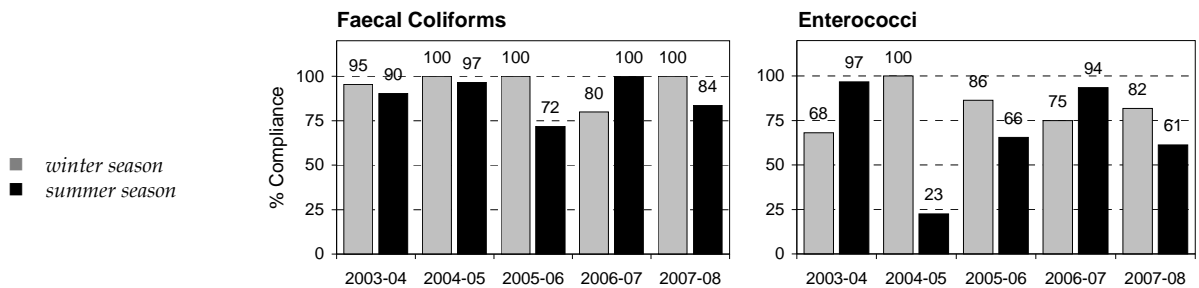
See page 202 for key to map

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

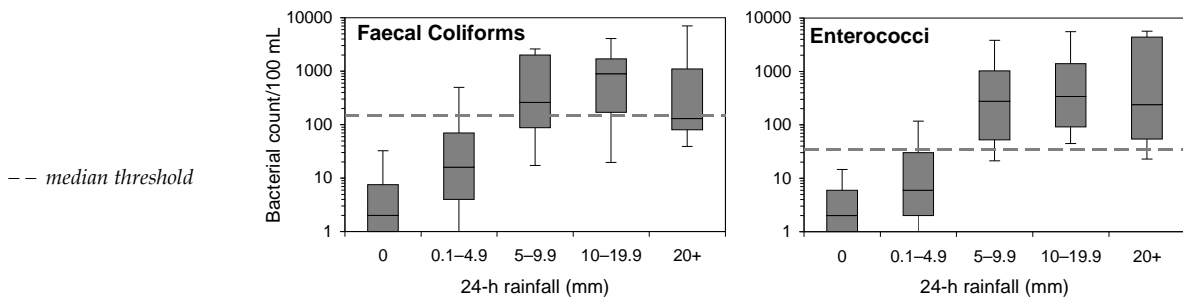
Pollution sources Stormwater drains discharge within the vicinity of the swimming area. Taronga Zoo discharges treated animal exhibit effluent to the bay.

Actions Mosman Council continued to maintain the SQIDs throughout the catchment.

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 generally 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.

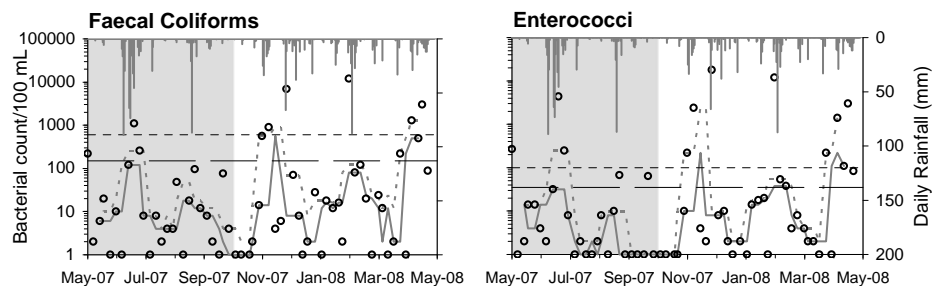


Season data

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

Guidelines
(see page 7 for details)

- median threshold
- - - 80th percentile threshold



Clifton Gardens

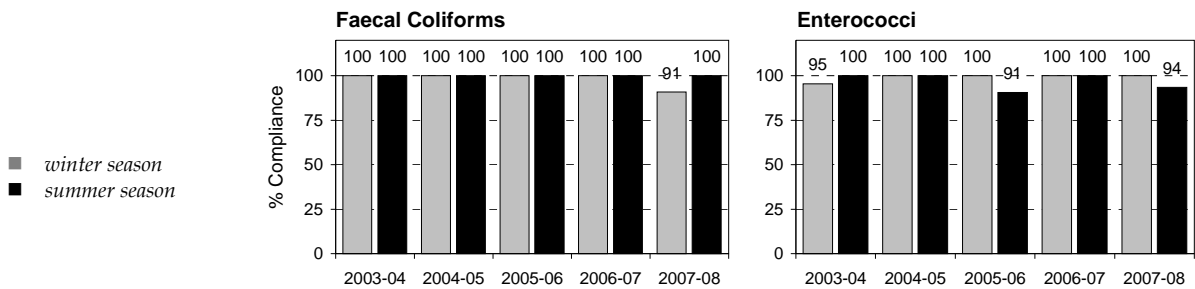
See page 202 for key to map

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.

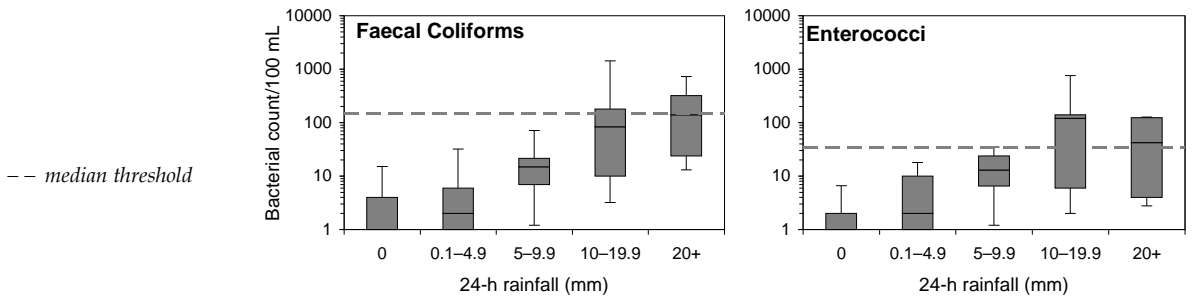
Pollution sources Stormwater drains discharge in the vicinity of the swimming area. A small lagoon and creek at the northern end of the beach discharge stormwater during wet weather.

Actions Mosman Council continued to maintain the SQIDs throughout the catchment.

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 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.

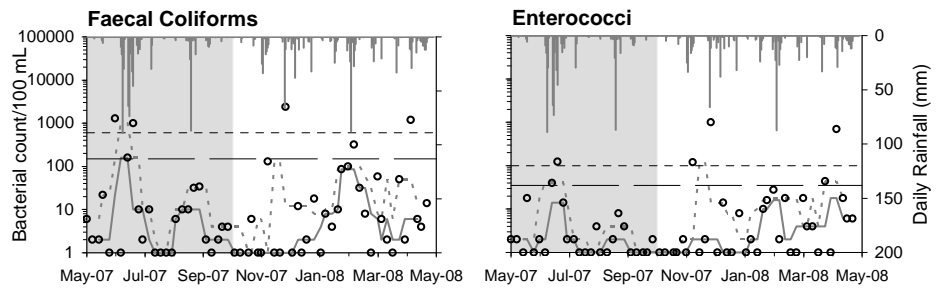


Season data

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

Guidelines
(see page 7 for details)

- median threshold
- - - 80th percentile threshold



Redleaf Pool

See page 202 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.

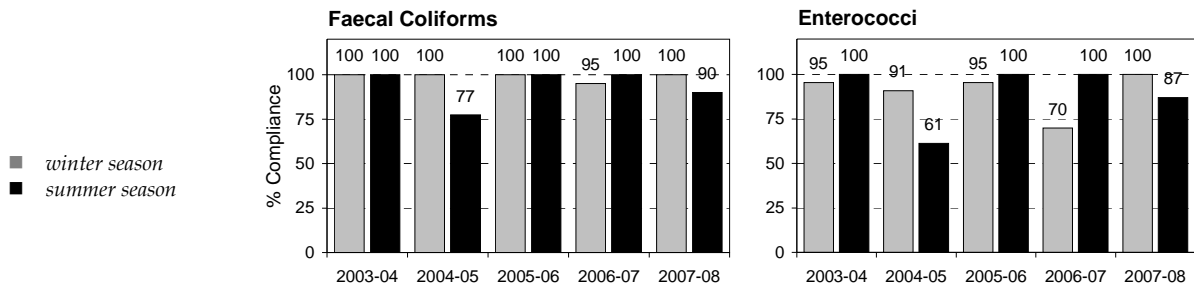
Actions

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.



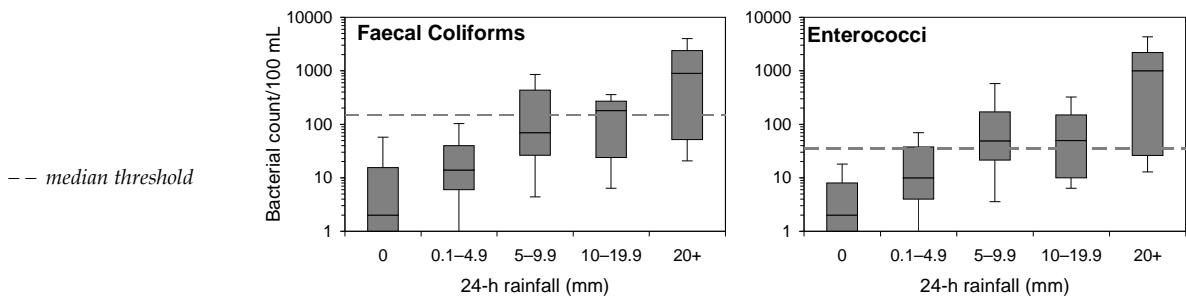
Compliance

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.



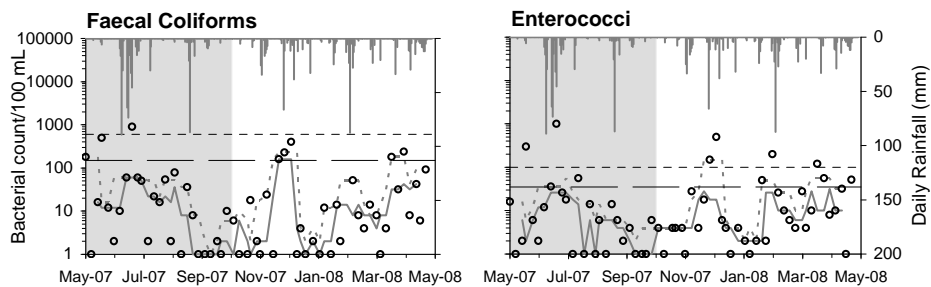
Response to rainfall

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 7 for details)
- median threshold
 - 80th percentile threshold



Rose Bay Beach

See page 202 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.

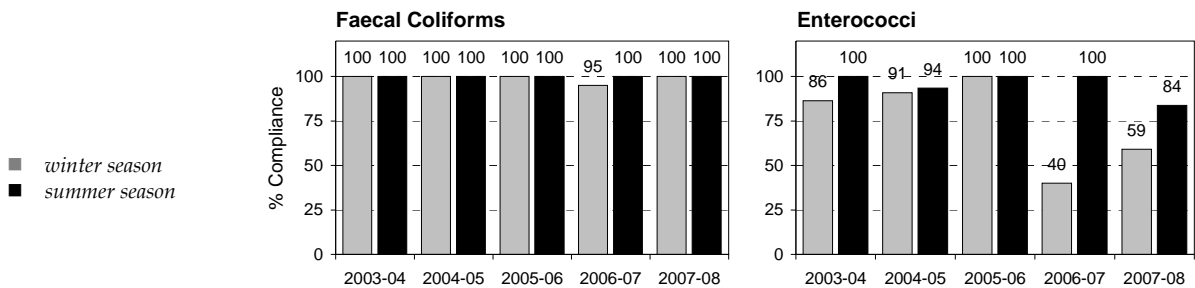
Actions

Woollahra Council maintains two SQIDs on the main stormwater lines that drain into Rose Bay. Stormwater runoff from New South Head Road is being 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.



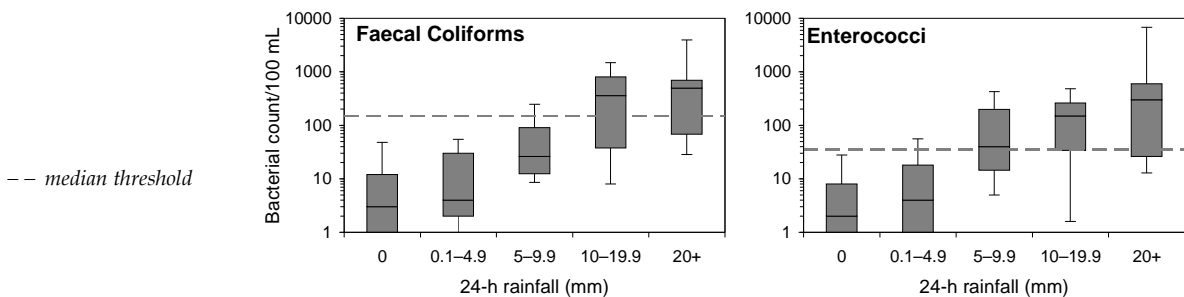
Compliance

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.



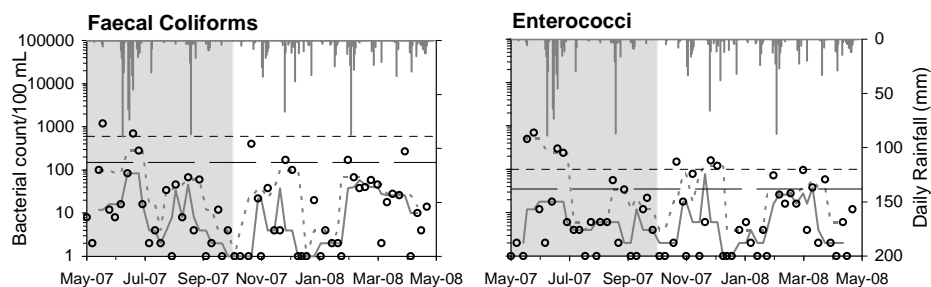
Response to rainfall

Faecal coliform and enterococci densities generally increased with increasing rainfall. Faecal coliform densities occasionally 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 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 7 for details)
- median threshold
 - - - 80th percentile threshold



Nielsen Park

See page 202 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

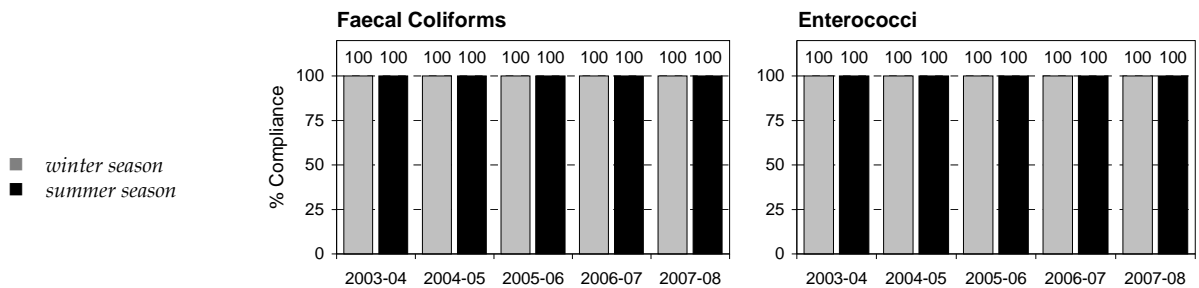
A stormwater drain discharges to the eastern end of the beach.

Actions

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

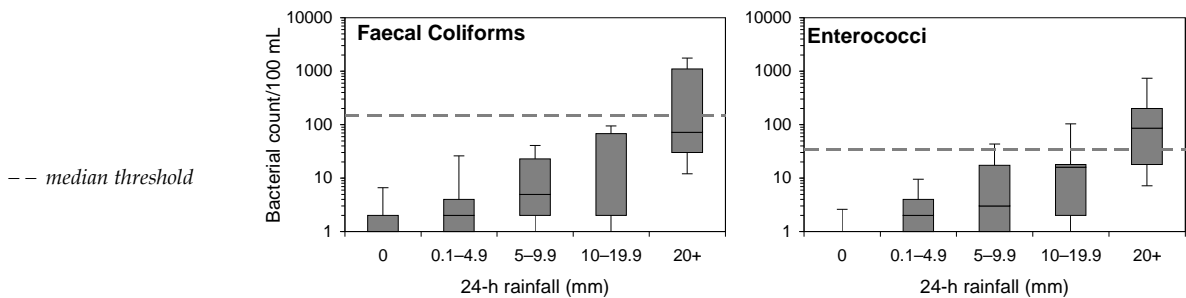
Compliance

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



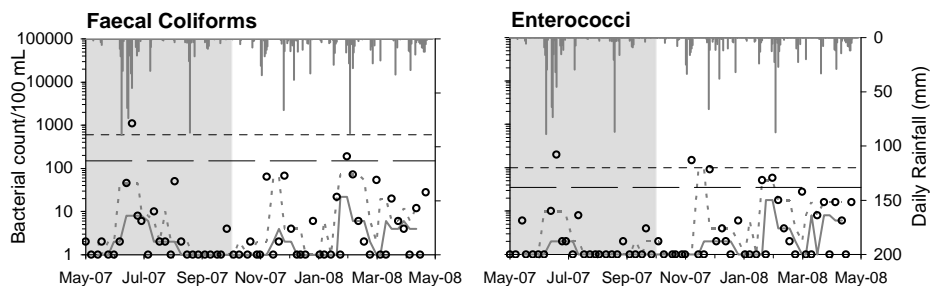
Response to rainfall

Faecal coliform and enterococci densities tended to increase with increasing rainfall. Faecal coliform densities often 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 five 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 7 for details)
- median threshold
 - - - 80th percentile threshold



Parsley Bay

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.

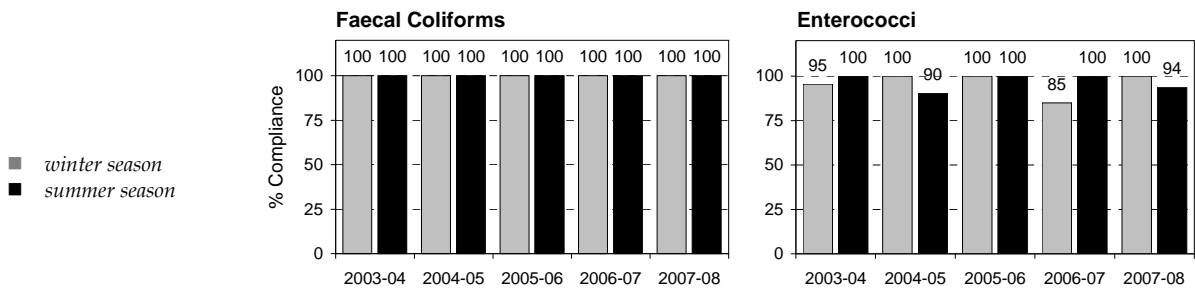
Actions

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

Compliance

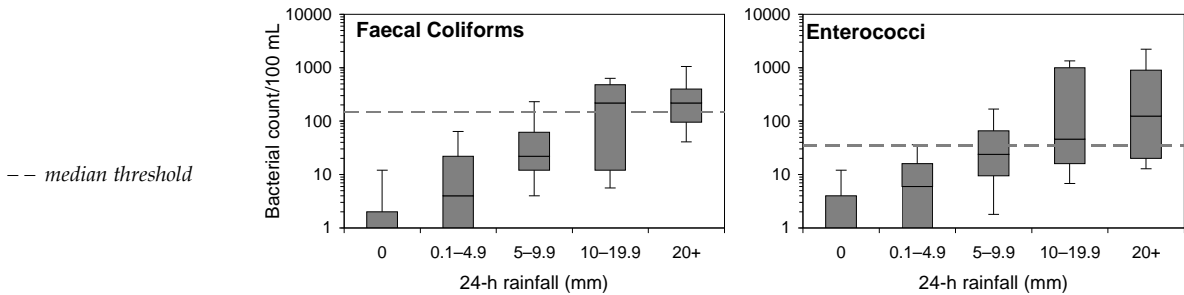
Faecal coliform levels complied with swimming guidelines 100% of the time over the last five years. Compliance with the enterococci criteria has generally been high, ranging from 85% to 100% over the last five years.

See page 202 for key to map



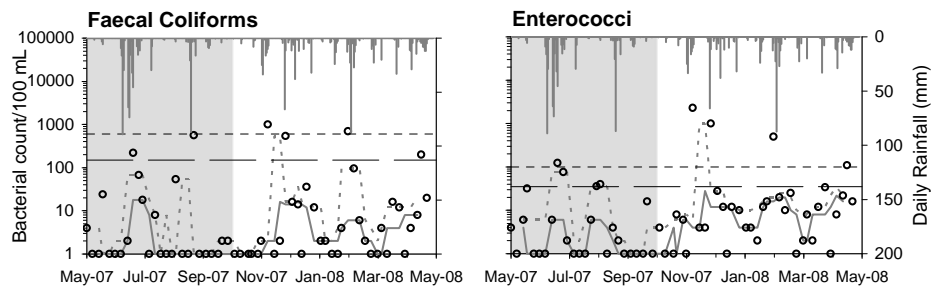
Response to rainfall

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



Season data

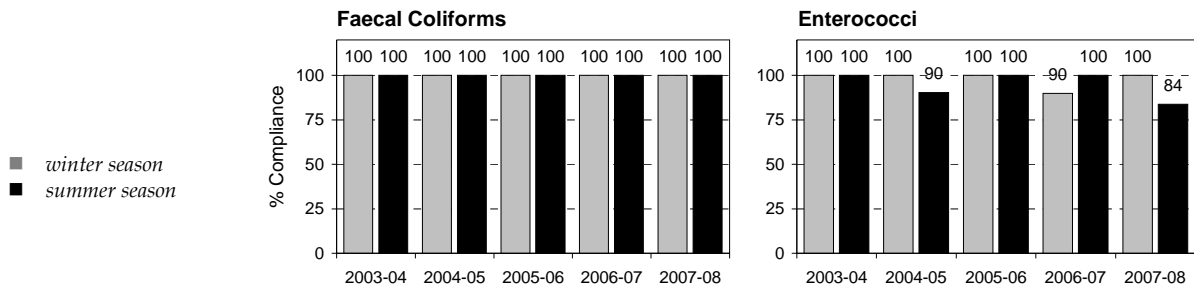
- | rainfall
 - o individual result
 - rolling median
 - rolling 80th percentile
- Guidelines
(see page 7 for details)
- median threshold
 - 80th percentile threshold



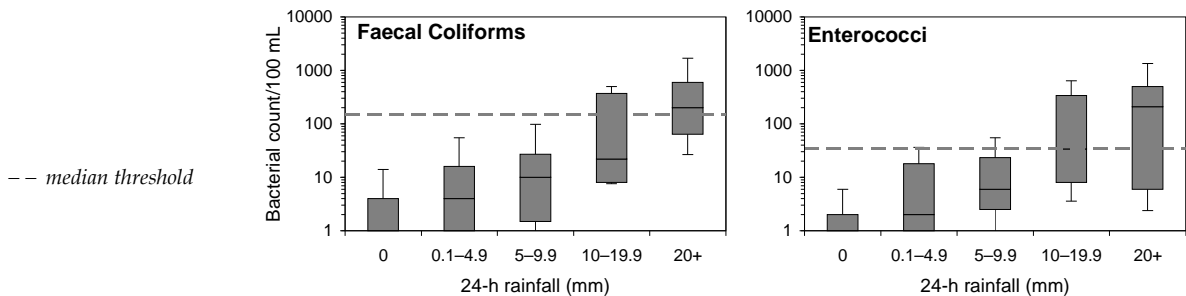
Watsons Bay

See page 202 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 maintained 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 generally been high, ranging from 84% to 100% over the last five years. |

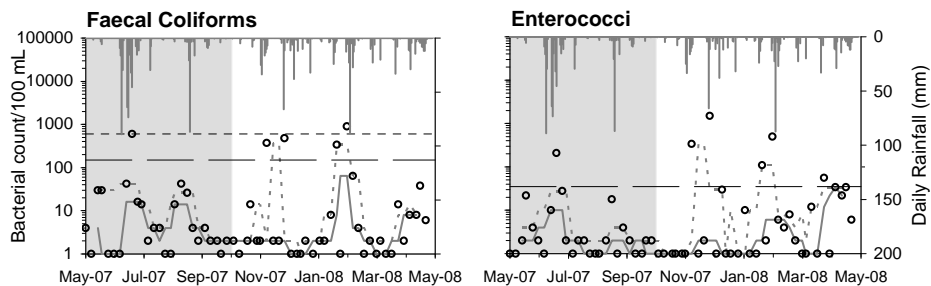


Response to rainfall Bacterial densities generally increased with increasing rainfall. Faecal coliform densities often exceeded the median guideline limit in response to ten millimetres or rain or more in the previous 24 hours. Enterococci densities occasionally exceeded the median guideline limit after light rain and 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 7 for details)
- median threshold
 - 80th percentile threshold

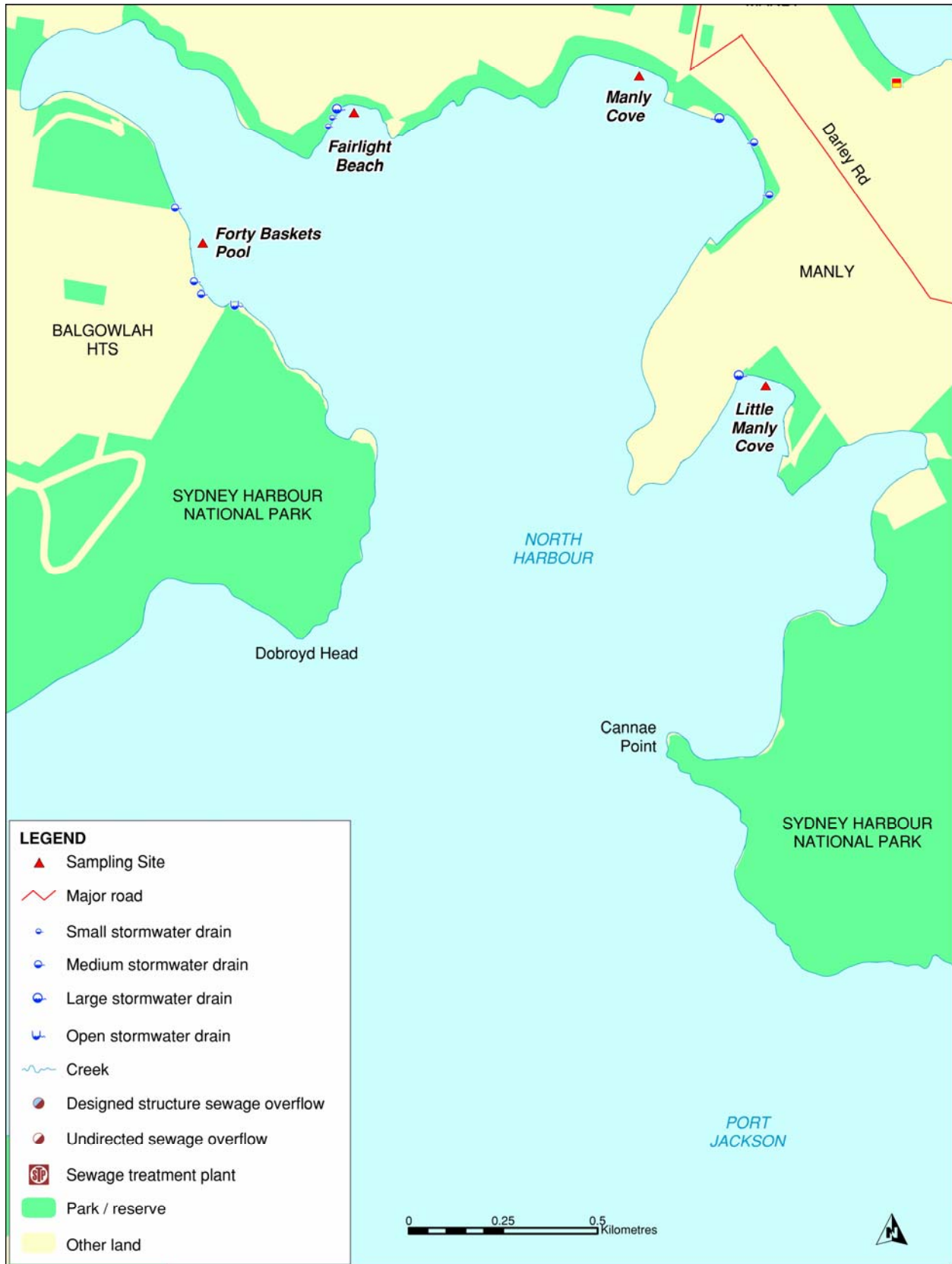


Sydney Metropolitan Area Harbour Swimming Sites

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 very good during summer 2007–2008 (Table 17).

Levels of faecal coliforms and enterococci at Fairlight Beach complied with the swimming guidelines 100% of the time. Manly Cove complied 100% of the time with faecal coliform criteria and 94% of the time for enterococci. Forty Baskets Pool recorded 94% compliance for both bacterial indicators, and Little Manly Cove complied 94% of the time for faecal coliforms and 84% of the time with enterococci criteria.

The range of indicator bacteria levels measured at Sydney Harbour swimming areas during summer 2007–2008 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 2007–2008. A total of 41 distinct ranks were determined for the 131 sites monitored for both faecal coliforms and enterococci, with many sites ranked equally.

Fairlight Beach ranked equal first, Manly Cove ranked equal third, Forty Baskets Pool ranked equal sixth and Little Manly Cove ranked thirteenth.

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.

Manly Council

Manly Cove and North Harbour Coastline Management Plans: Council has elected to develop two Coastline Management Plans (CMPs) for the North Harbour area in response to legislative requirements and community issues, in accordance with current best practice for the management of coastal and estuary foreshores. Two separate CMPs are to be developed for North Harbour owing to the differing functions and settings of the study areas. Manly Cove plays a functional role as a 'working' cove with a diversity of water based activities, whereas the foreshores between Delwood Beach and Davis Marina have a more natural setting. The Manly Cove and North Harbour Coastline Management Plans will develop a blueprint for the future management of the North Harbour area. The Coastline Management Plans will be used as an important resource to guide community action and to assist government and the local planning authority in the ongoing management of North Harbour's coastal reserves and foreshore areas.

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 the 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.

Starboard Right and Green (Community education): Manly Council has completed Phase 1 of the program. Council worked

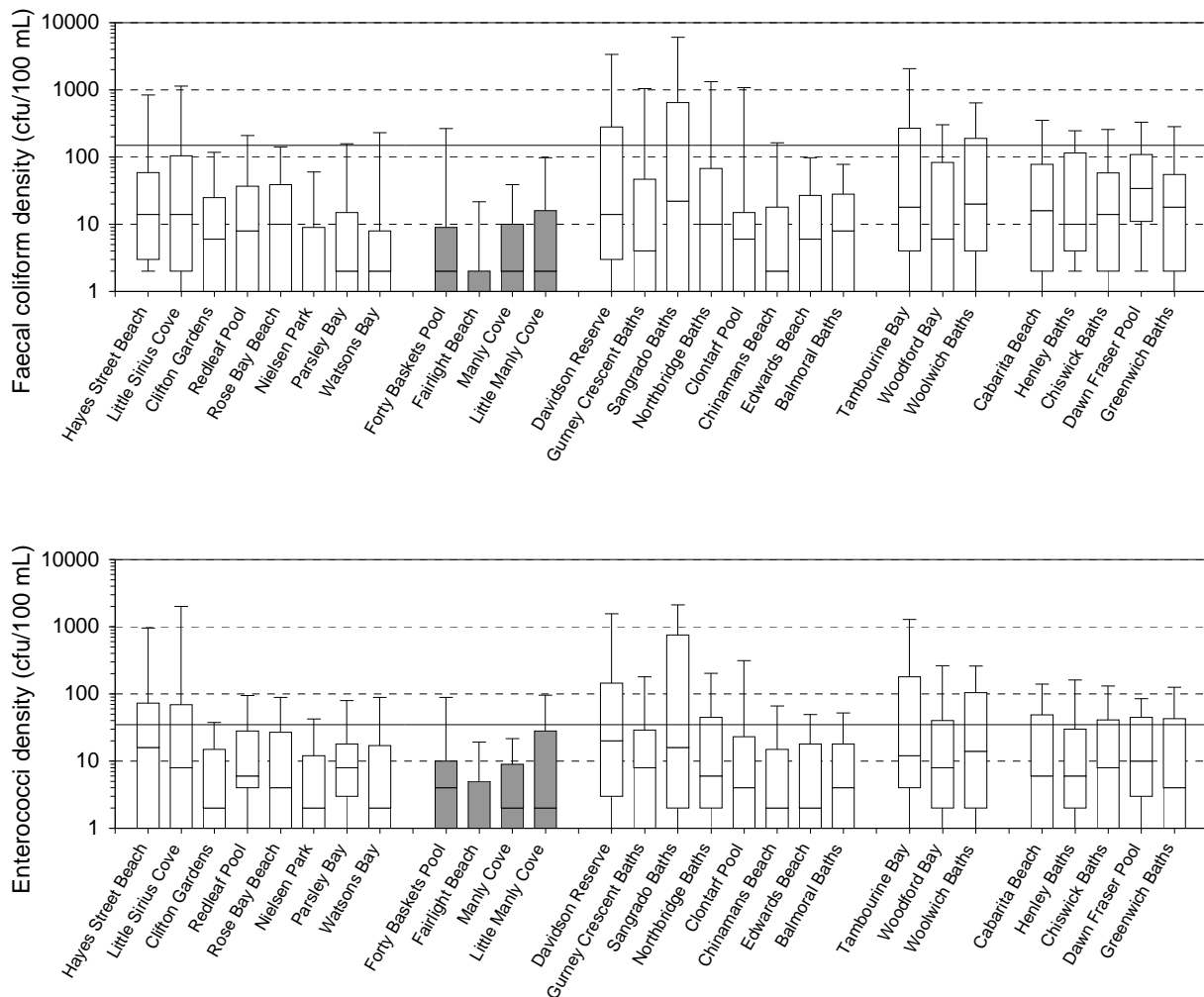
closely with three local marinas to assist them in implementing pollution prevention plans. Phase 2 of the program involves the education of recreational boat users. Council held mini expos with local businesses, NSW Government and key community figures for recreational boat

users in the past 12 months and is now expanding the program, focusing on local businesses and environmental auditing. These measures relate to actions in three Council Coastline Estuary Management Plans.

Table 17: Compliance and Ranking of North Harbour Sites during Summer 2007–2008

| Site | Compliance (%) | | Overall rank (out of 41) |
|--------------------|------------------|-------------|--------------------------|
| | Faecal Coliforms | Enterococci | |
| Forty Baskets Pool | 94 | 94 | 6 |
| Fairlight Beach | 100 | 100 | 1 |
| Manly Cove | 100 | 94 | 3 |
| Little Manly Cove | 94 | 84 | 13 |

Figure 24: Bacterial Levels at Sydney Harbour Sites during Summer 2007–2008



Forty Baskets Pool

See page 216 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

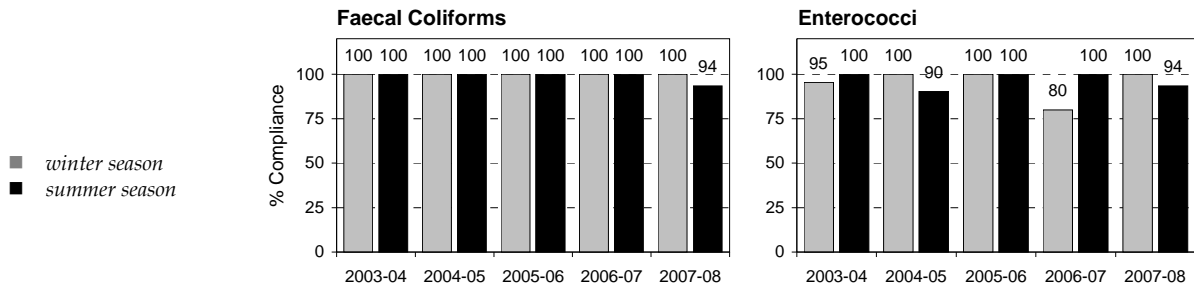
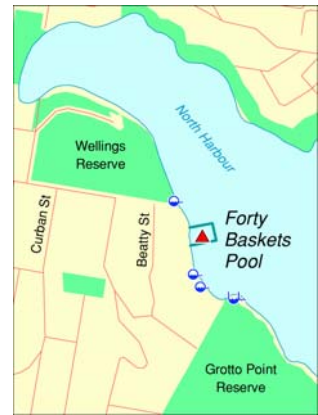
Stormwater drains discharge in the vicinity of the swimming enclosure. The area is a popular area for off-leash exercising of dogs.

Actions

Manly Council maintains GPTs in the catchment and conducts street sweeping on a regular basis to reduce litter, nutrient, sediment and other pollutant loads in stormwater entering the harbour.

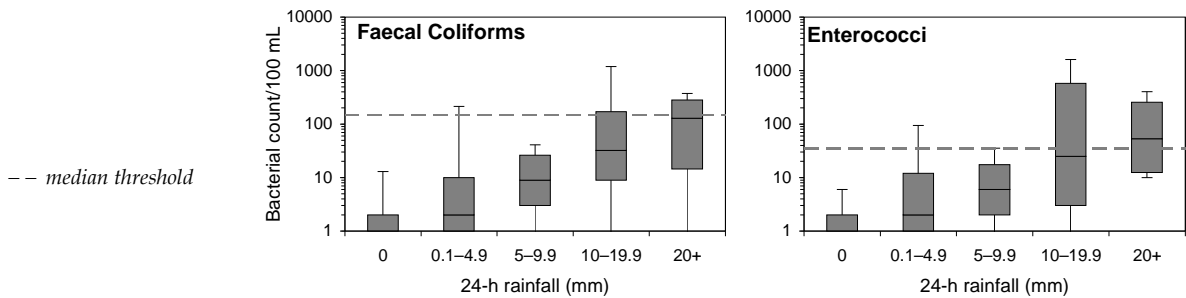
Compliance

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 generally high, ranging from 80% to 100% over the last five years.



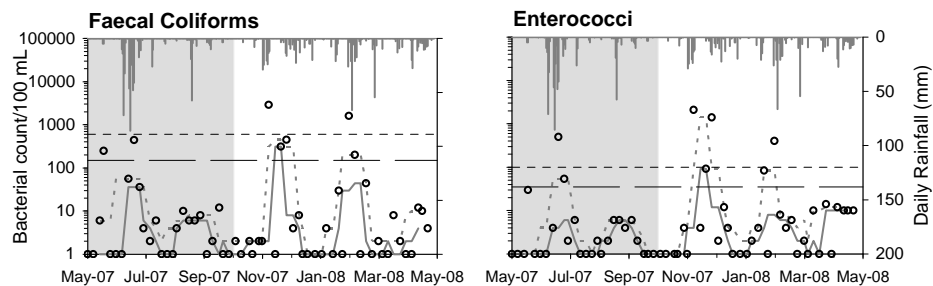
Response to rainfall

Faecal coliform and enterococci densities generally increased with increasing rainfall. Faecal coliform and enterococci densities occasionally exceeded the median guideline limits after light rain and often exceeded the median guideline limits 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 7 for details)
- median threshold
 - - - 80th percentile threshold



Fairlight Beach

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 discharge are in the vicinity of the swimming area.

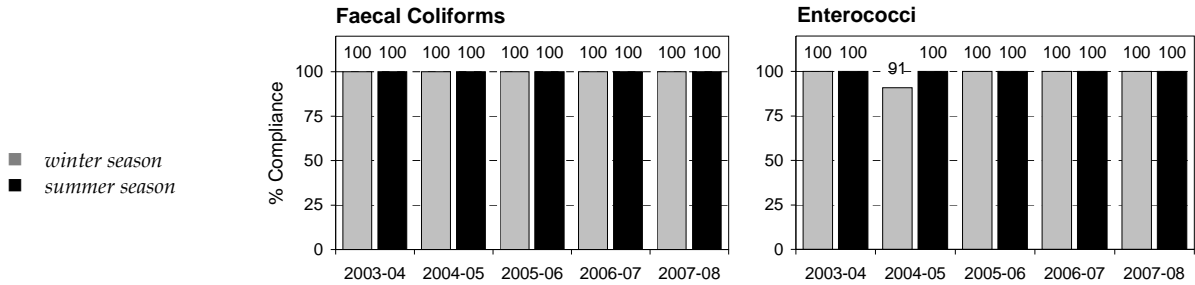
Actions

Manly Council maintains GPTs in the catchment and conducts street sweeping on a regular basis to reduce litter, nutrient, sediment and other pollutant loads in stormwater entering the harbour.

Compliance

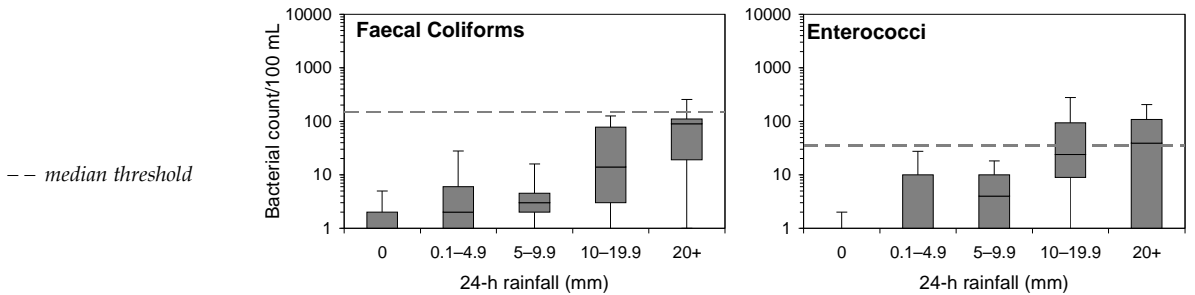
Faecal coliform levels complied with swimming guidelines 100% of the time over the last five years. With the exception of winter 2004–2005, enterococci levels complied with swimming guidelines 100% of the time over the last five years.

See page 216 for key to map



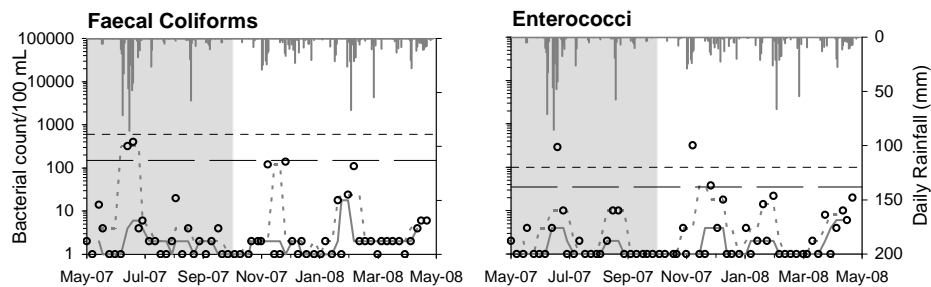
Response to rainfall

Faecal coliform and enterococci densities generally 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 7 for details)
- median threshold
 - 80th percentile threshold



Manly Cove

See page 216 for key to map

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

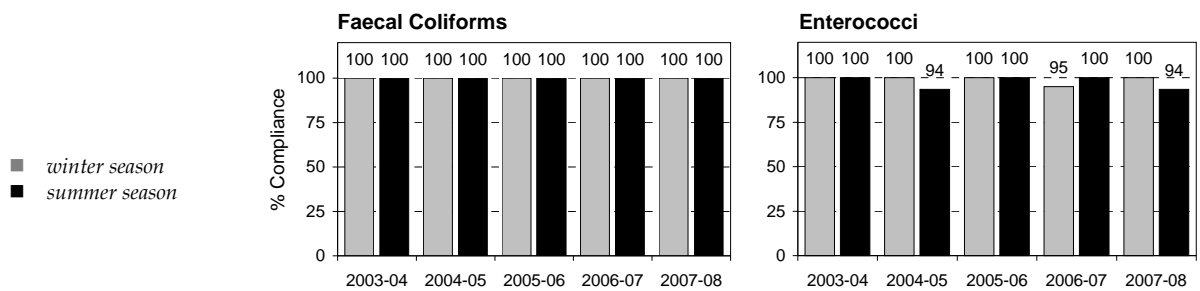
Stormwater drains discharge east of the wharf.

Actions

Manly Council maintains GPTs in the catchment and conducts street sweeping on a regular basis to reduce litter, nutrient, sediment and other pollutant loads in stormwater entering the harbour.

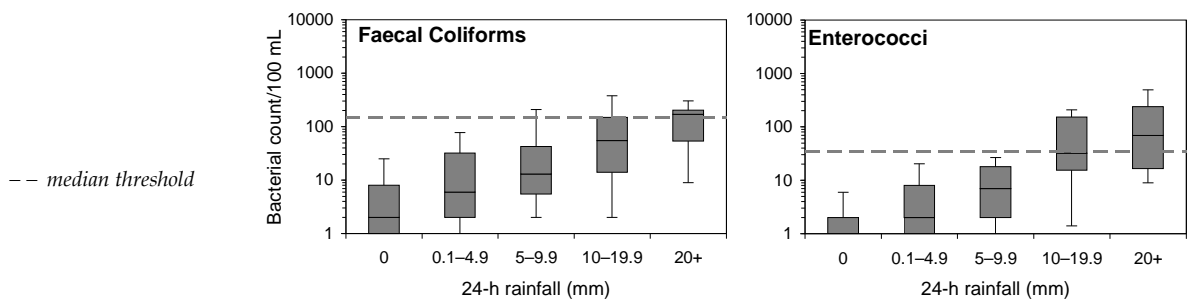
Compliance

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.



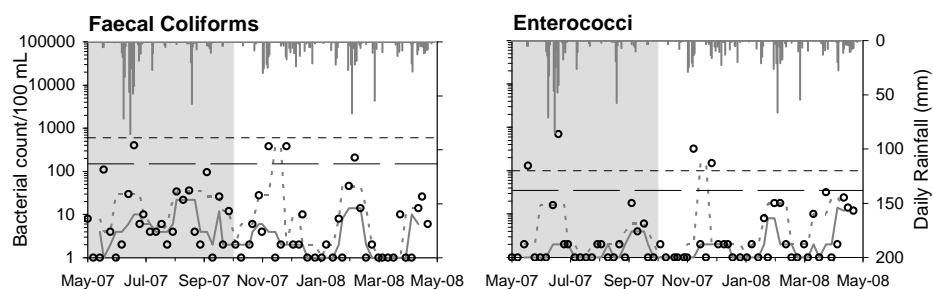
Response to rainfall

Bacterial densities tended to increase with increasing rainfall. Faecal coliform levels occasionally exceeded the median guideline limit in response to five millimetres of rain or more in the previous 24 hours. Enterococci levels often exceeded the median guideline limit 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 7 for details)
- median threshold
 - - - 80th percentile threshold



Little Manly Cove

See page 216 for key to map

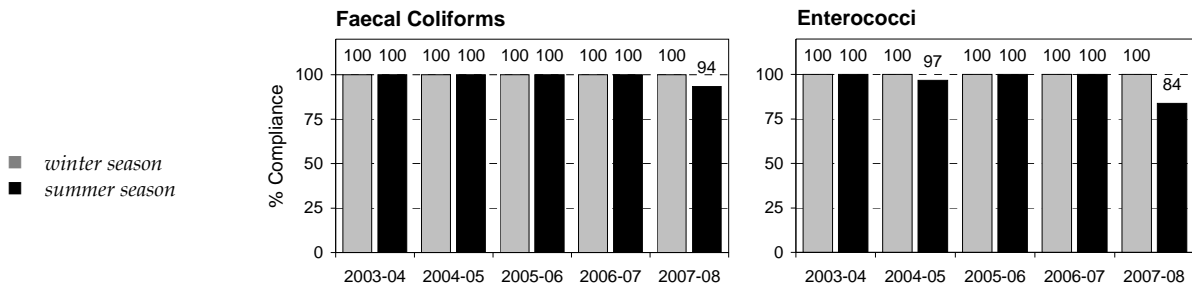
Description The beach is bounded by a small recreational reserve and a 30 metre square netted swimming enclosure is located at the eastern end.

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

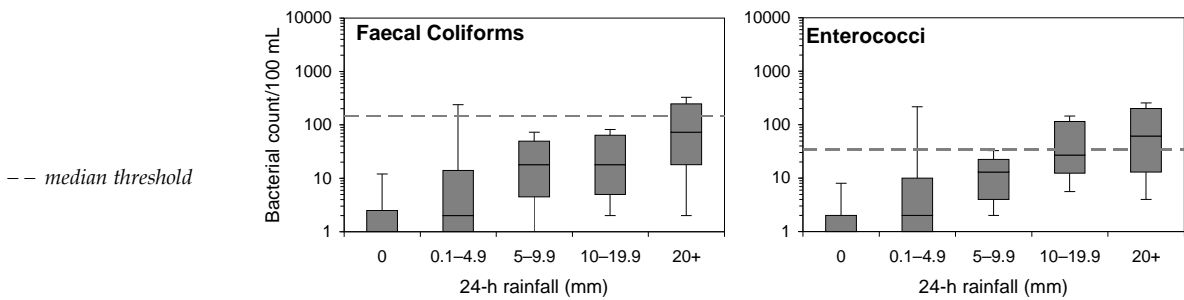
Actions Manly Council maintains GPTs in the catchment and conducts street sweeping on a regular basis to reduce litter, nutrient, sediment and other pollutant loads in stormwater entering the harbour.



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 high, ranging from 84% to 100% over the last five years.

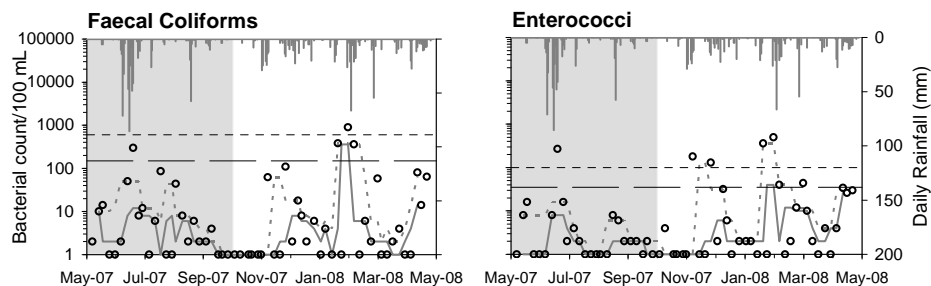


Response to rainfall Faecal coliform and enterococci densities generally increased with increasing rainfall. Faecal coliform densities occasionally exceeded the median guideline limit after light rain and often exceeded the median guideline limit after 20 millimetres of rain or more in the previous 24 hours. Enterococci densities occasionally exceeded the median guideline limit after light rain and 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 7 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 considerably varied at Middle Harbour swimming locations during summer 2007–2008 (Table 18).

Chinamans Beach and Edwards Beach complied 100% of the time with faecal coliform guidelines and 94% of the time with enterococci guidelines. Balmoral Baths performed well, complying 100% of the time for faecal coliforms and 90% of the time with enterococci guidelines.

Gurney Crescent Baths complied 84% of the time for faecal coliforms and 68% of the time with enterococci criteria. Northbridge Baths complied 81% of the time for faecal coliforms and 74% of the time with enterococci criteria. Davidson Reserve complied 74% of the time for faecal coliforms and 52% of the time with enterococci criteria. Clontarf Pool complied 71% of the time with both faecal coliforms and enterococci criteria. Sangrado Baths complied 55% of the time with faecal coliform criteria and 42% of the time for enterococci.

The range of indicator bacteria levels measured at Sydney Harbour swimming areas during summer 2007–2008 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 Sangrado

Baths were notably higher than 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 2007–2008. A total of 41 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 were widely dispersed. Chinamans Beach and Edwards beach ranked equal third, Balmoral Baths ranked equal fifth, Northbridge Baths ranked equal twenty-eight, Gurney Crescent ranked equal twenty-ninth, Clontarf Pool ranked thirty-third, Davidson ranked thirty-eighth, and Sangrado Baths ranked lowest at forty-first.

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 2007–2008. The monitoring program aims to evaluate the performance of the Stormwater Quality Improvement Devices (SQIDs) in improving stormwater quality downstream of the devices, before entering the receiving waters.

Stormwater Quality Improvement Device installation: Water quality monitoring of the Julian Street SQID (which was installed as a component of the Quakers Hat Bay Stormwater Project) was completed during 2007–2008. The project was funded by the Stormwater Trust.

Water Reuse Project: Council is implementing a stormwater reuse project at Cross Street. Water will be captured and stored in underground tanks and reused for flushing of amenities and oval irrigation. 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.

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.

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

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

Water quality monitoring: Council maintained five gross pollutant 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 in the creeks of Middle Harbour and the Lane Cove River bi-yearly. Water quality monitoring continued at Northbridge Baths.

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 has implemented 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 the responsible use of grey water.

North Sydney Council

North Sydney Stormwater Reuse Project: The project aims to save 90 ML of potable water each 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.

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, and 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 Crows Nest Community Centre and Cammeray Park amenities block.

Stormwater Quality Improvement Devices 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 more litter being removed from the stormwater system.

Manly Council

Clontarf – Bantry Bay Estuary Management Plan: Manly Council has prepared an Estuary Management Plan for the Clontarf – Bantry Bay area. The plan addresses estuarine and foreshore issues between Castle Rock Beach and the boundary of the National Park at Bantry Bay. It will provide strategic direction for the management of this area into the future.

Stormwater treatment and re-use projects: Council was awarded a \$28,000 grant from

the Federal Government for stormwater treatment, storage and on-use at Seaforth Oval. This includes stormwater treatment and harvesting from the car park and building areas for use in irrigating the field, thus improving the quality of stormwater in Middle Harbour.

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: Ku-ring-gai Council conducted stormwater harvesting at Barra Brui Oval and Soldiers Memorial Park.

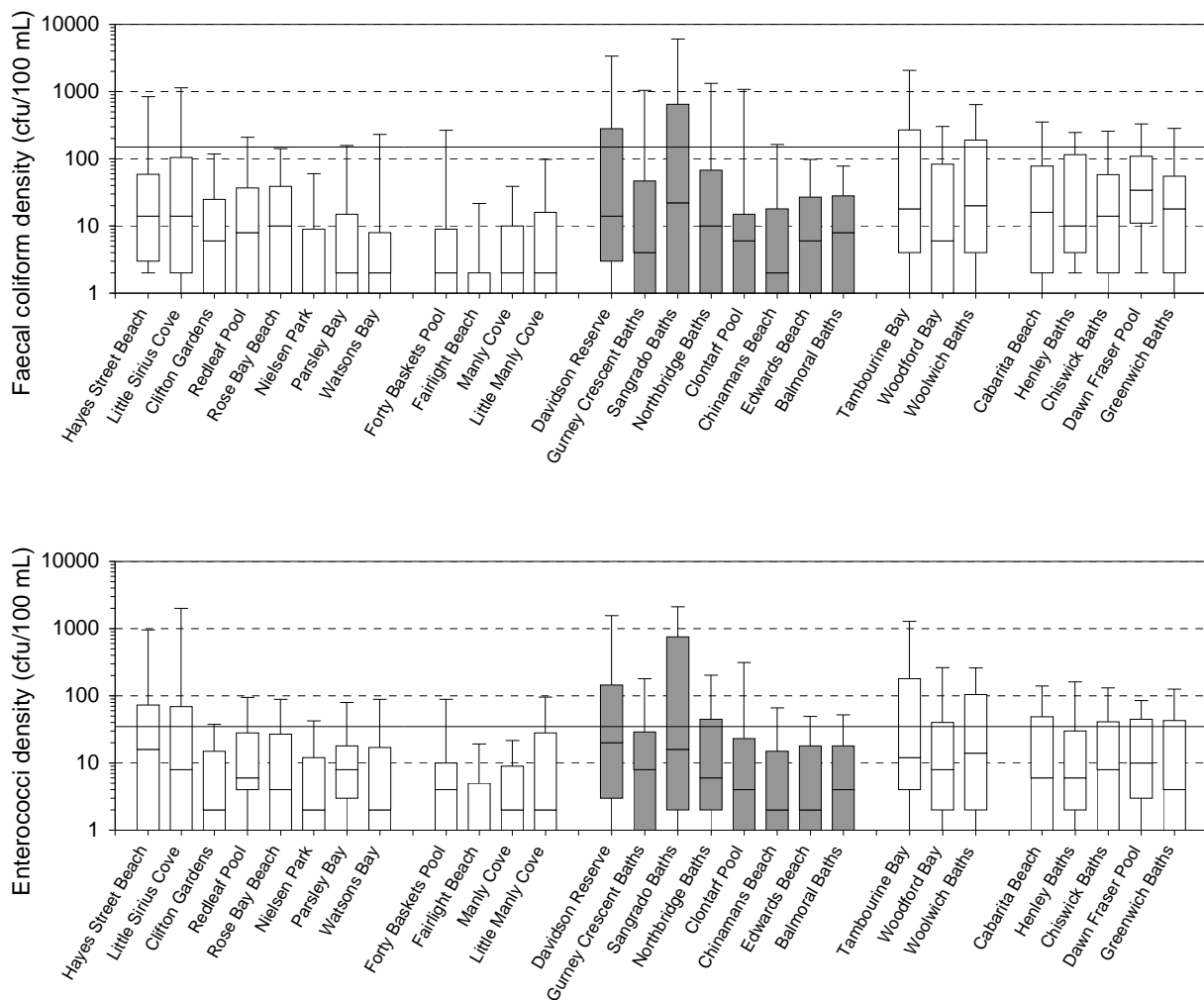
Warringah Council

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.

Table 18: Compliance and Ranking of Middle Harbour Sites during Summer 2007–2008

| Site | Compliance (%) | | Overall rank (out of 41) |
|-----------------------|------------------|-------------|-----------------------------|
| | Faecal Coliforms | Enterococci | |
| Davidson Reserve | 74 | 52 | 38 |
| Gurney Crescent Baths | 84 | 68 | 29 |
| Sangrado Baths | 55 | 42 | 41 |
| Northbridge Baths | 81 | 74 | 28 |
| Clontarf Pool | 71 | 71 | 33 |
| Chinamans Beach | 100 | 94 | 3 |
| Edwards Beach | 100 | 94 | 3 |
| Balmoral Baths | 100 | 90 | 5 |

Figure 25: Bacterial Levels at Sydney Harbour Sites during Summer 2007–2008



Davidson Reserve

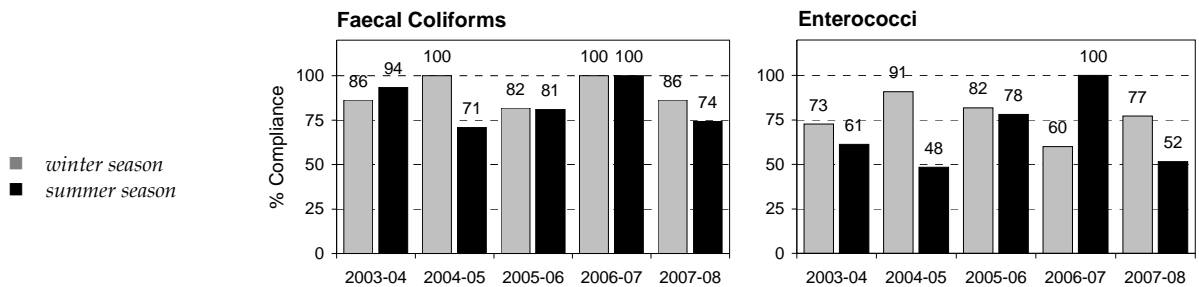
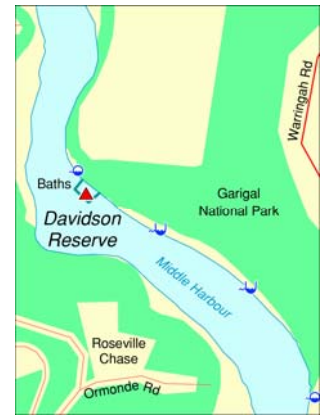
See page 224 for key to map

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.

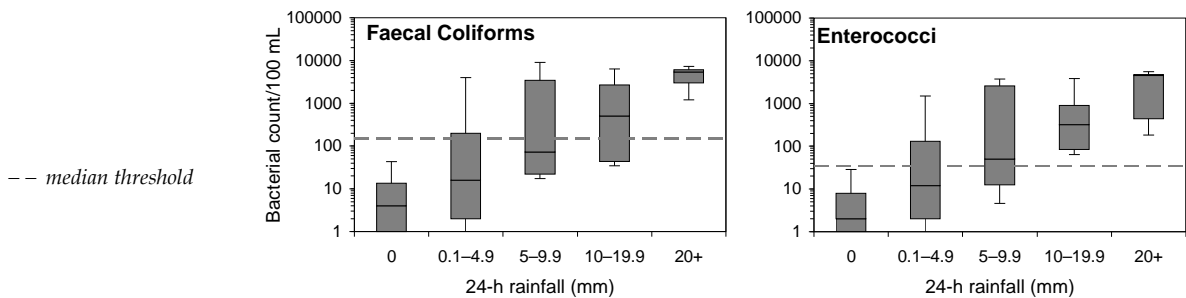
Pollution sources Stormwater drains discharge in the vicinity of the beach.

Actions There are no actions specific to this beach.

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 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 usually exceeded the median guideline limit in response to ten millimetres of rain or more in the previous 24 hours.

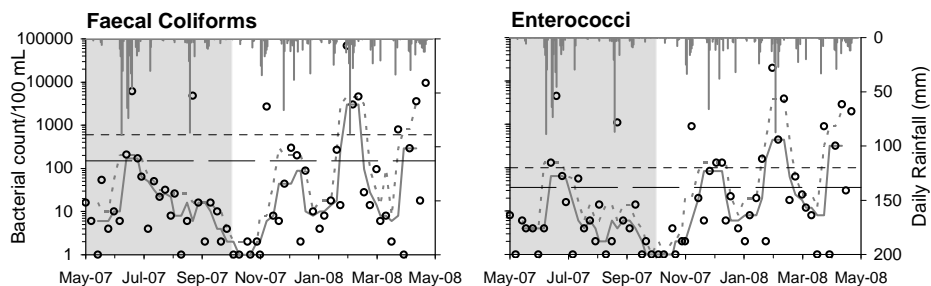


Season data

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

Guidelines
(see page 7 for details)

- median threshold
- - - 80th percentile threshold



Gurney Crescent Baths

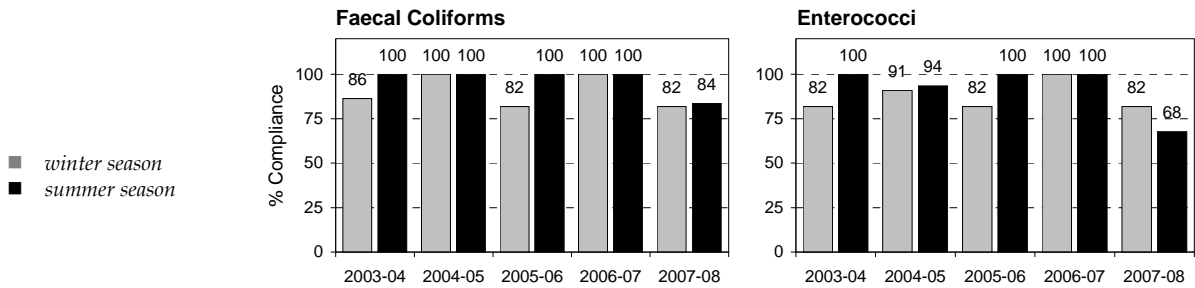
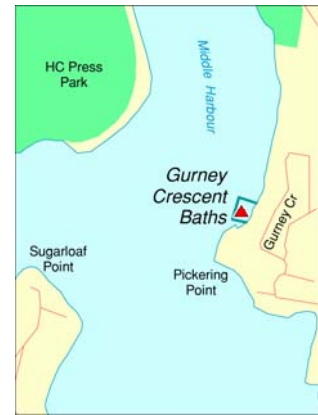
See page 224 for key to map

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

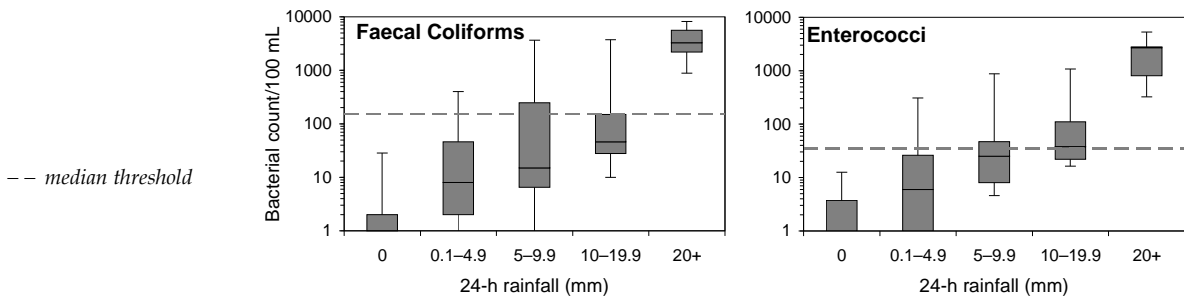
Pollution sources Water quality can be affected by bacterial contamination from sewage overflows in the catchment of Middle Harbour and by stormwater.

Actions Manly Council maintains GPTs in the catchment and conducts street sweeping on a regular basis to reduce litter, nutrient, sediment and other pollutant loads entering the harbour.

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.

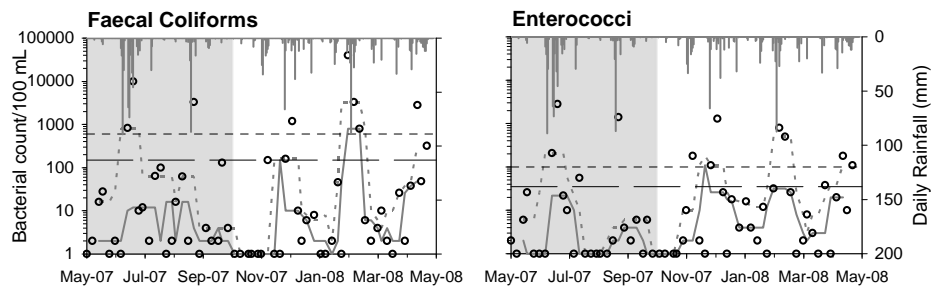


Response to rainfall Faecal coliform and enterococci densities generally increased with increasing rainfall and usually exceeded median guideline limits after 20 millimetres of rain or more in the previous 24 hours. Bacterial densities occasionally exceeded the median guideline limits after light rain 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 7 for details)
- median threshold
 - - - 80th percentile threshold



Sangrado Baths

See page 224 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.

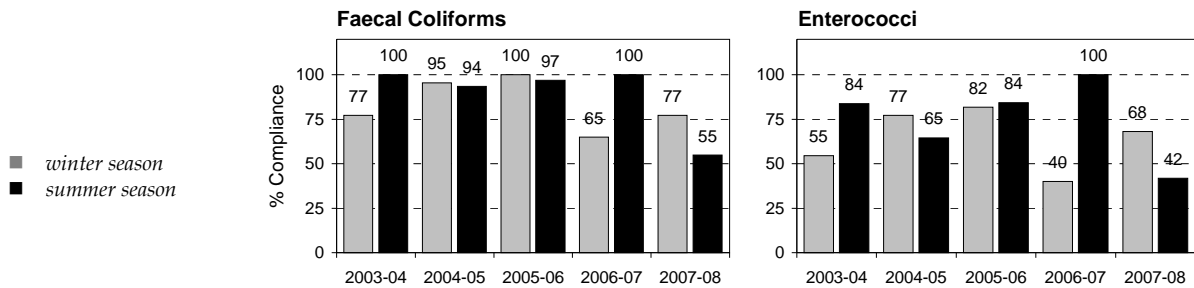
Actions

Manly Council maintains GPTs in the catchment and conducts street sweeping on a regular basis to reduce litter, nutrient, sediment and other pollutant loads entering the harbour.



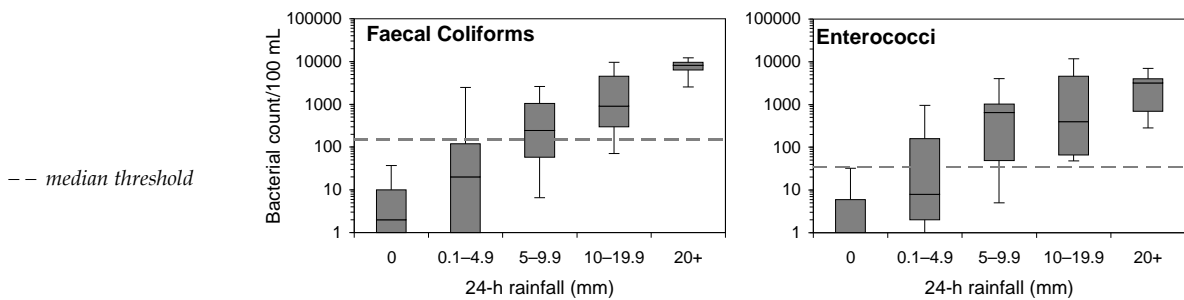
Compliance

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. Sangrado Baths had the overall lowest compliance in the 2007–2008 Beachwatch and Harbourwatch program.



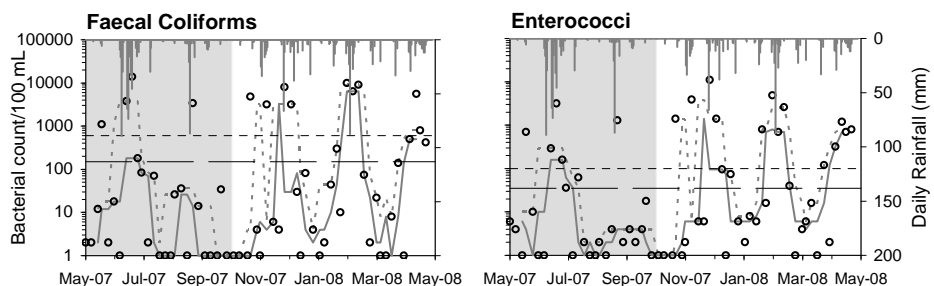
Response to rainfall

Faecal coliform and enterococci densities generally increased with increasing rainfall. Faecal coliform levels regularly exceeded the median guideline limit after five millimetres of rain or more and usually exceeded the median guideline limit in response to 20 millimetres of rain or more in the previous 24 hours. Enterococci densities 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 7 for details)
- median threshold
 - - - 80th percentile threshold



Northbridge Baths

See page 224 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

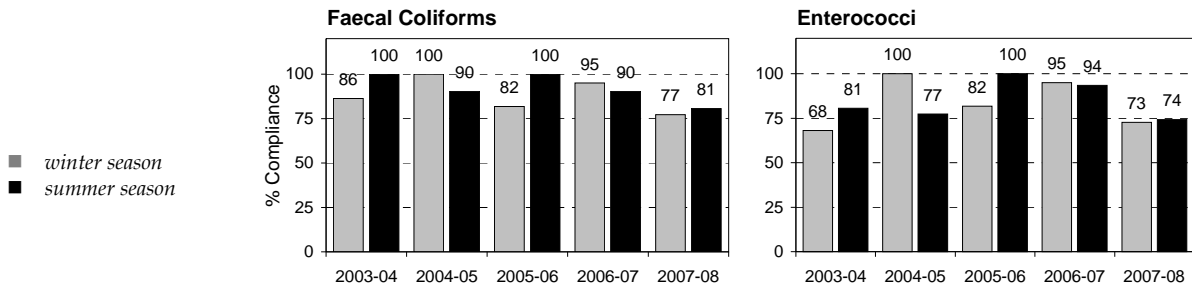
A stormwater drain discharges from the eastern pier of the baths and numerous drains discharge to the bay. Sewage overflows can discharge into the headwaters of the bay during wet weather.

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, reducing the amount of stormwater pollution entering the harbour.

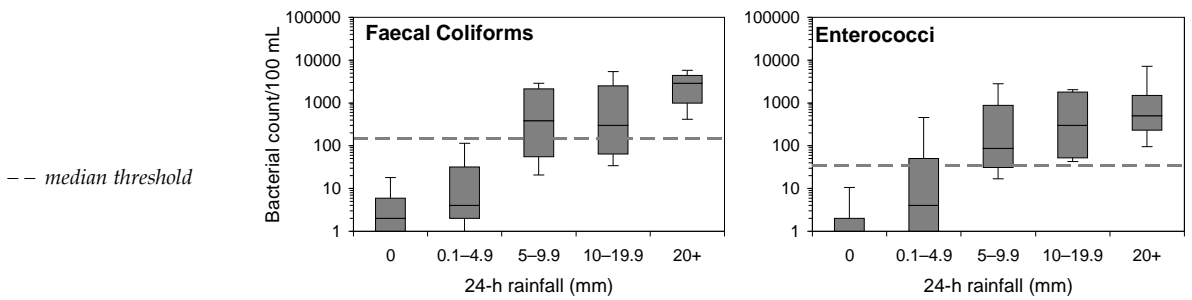
Compliance

Faecal coliform compliance with swimming guidelines ranged from 77% to 100% over the last five years. Enterococci compliance has varied, ranging from 68% to 100% over the last five years.



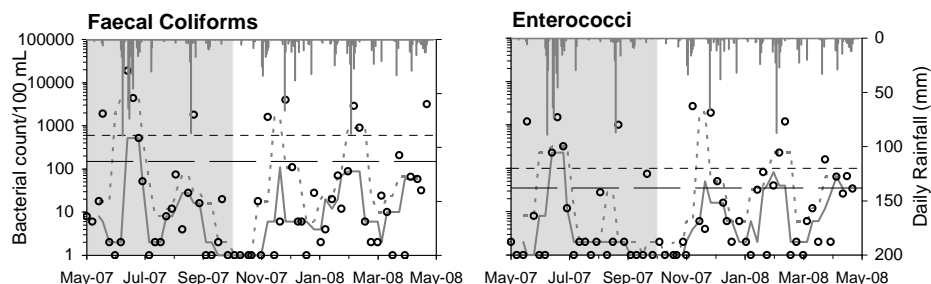
Response to rainfall

Bacterial densities of both indicators increased with increasing rainfall. Faecal coliform levels regularly exceeded the median guideline limit in response to five millimetres of rain or more 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 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 7 for details)
- median threshold
 - - - 80th percentile threshold



Clontarf Pool

See page 224 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.

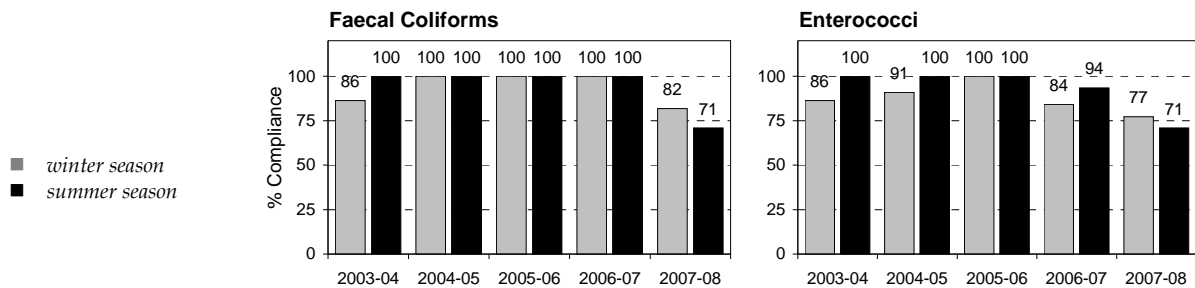
Actions

Manly Council maintains GPTs in the catchment and conducts street sweeping on a regular basis to reduce litter, nutrient, sediment and other pollutant loads entering the harbour.



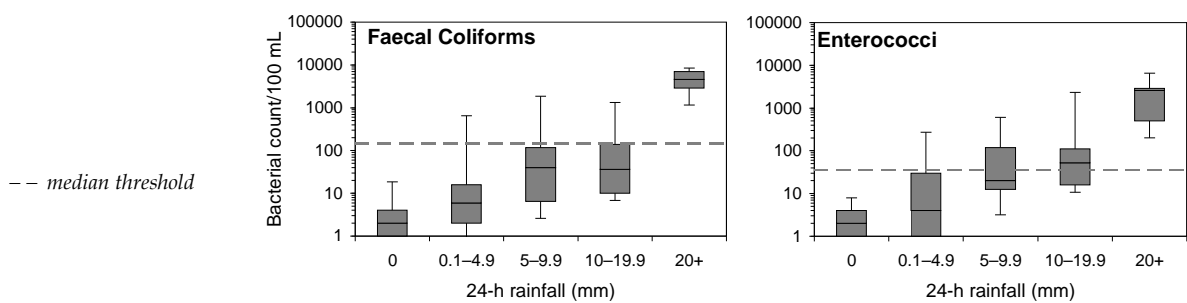
Compliance

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



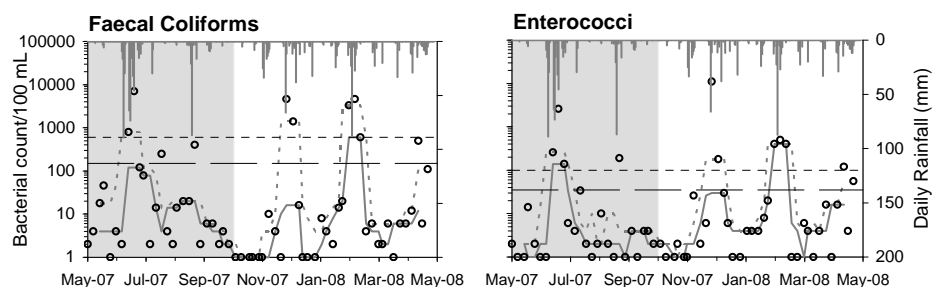
Response to rainfall

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 densities occasionally exceeded the median guideline limit in response to light rain 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 7 for details)
- median threshold
 - - - 80th percentile threshold



Chinamans Beach

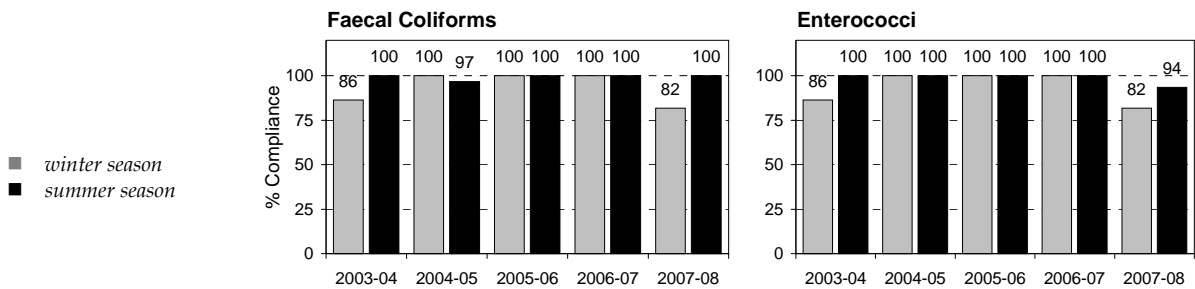
See page 224 for key to map

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.

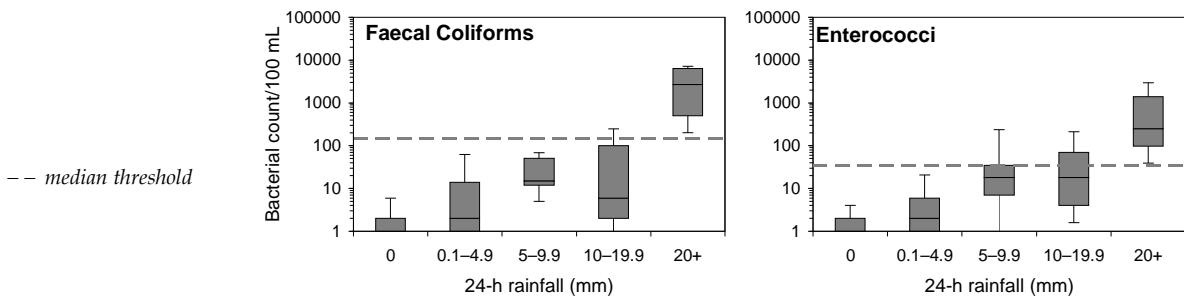
Pollution sources Stormwater drains discharge directly on to, and in the immediate vicinity of, the beach. Water quality can also be affected by bacterial contamination from sewage overflows in upper Middle Harbour.

Actions Mosman Council continued to maintain the SQIDs throughout the catchment.

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

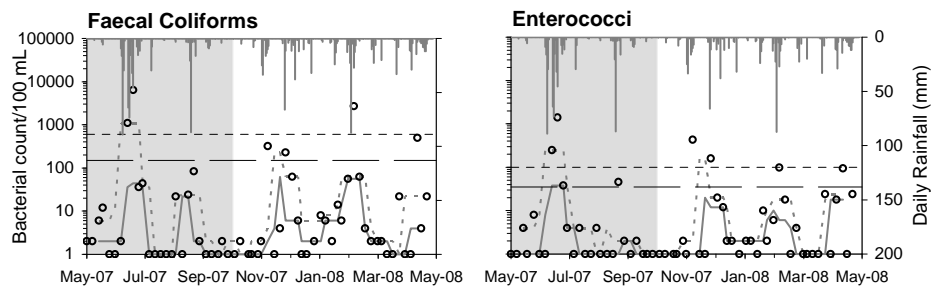


Response to rainfall Bacterial densities tended to increase with increasing rainfall, usually exceeding the median guideline limits after 20 millimetres of rain or more in the previous 24 hours. Faecal coliform densities occasionally exceeded the median guideline limit after ten millimetres of rain or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



Season data

- | rainfall
 - o individual result
 - rolling median
 - - - rolling 80th percentile
- Guidelines
(see page 7 for details)
- median threshold
 - - - 80th percentile threshold



Edwards Beach

See page 224 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

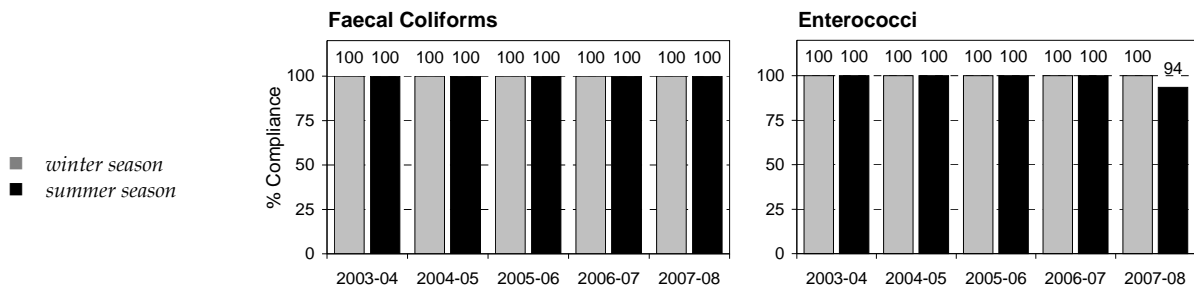
Stormwater drains discharge directly to the beach area. Water quality can also be affected by sewage overflows in upper Middle Harbour.

Actions

Mosman Council continued to maintain the SQIDs throughout the catchment.

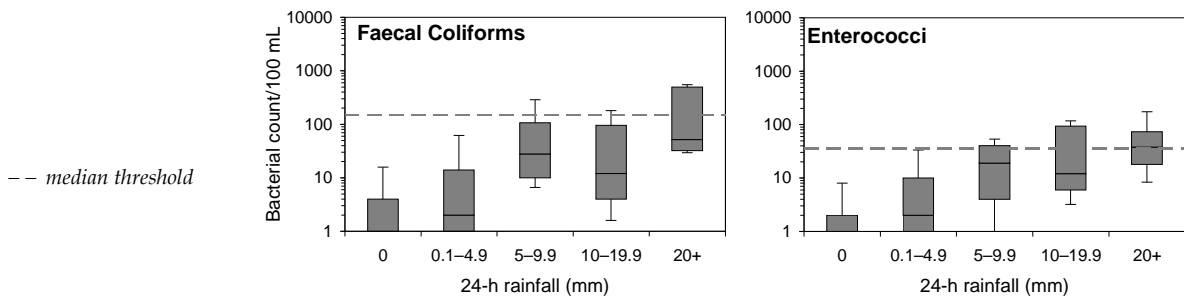
Compliance

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 of the last five years.



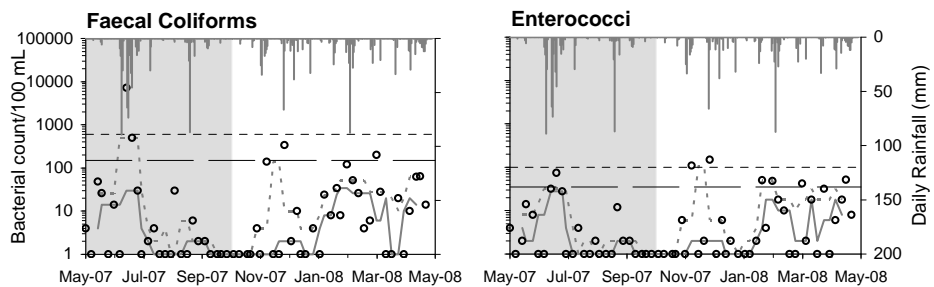
Response to rainfall

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 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 7 for details)
- median threshold
 - 80th percentile threshold



Balmoral Baths

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.

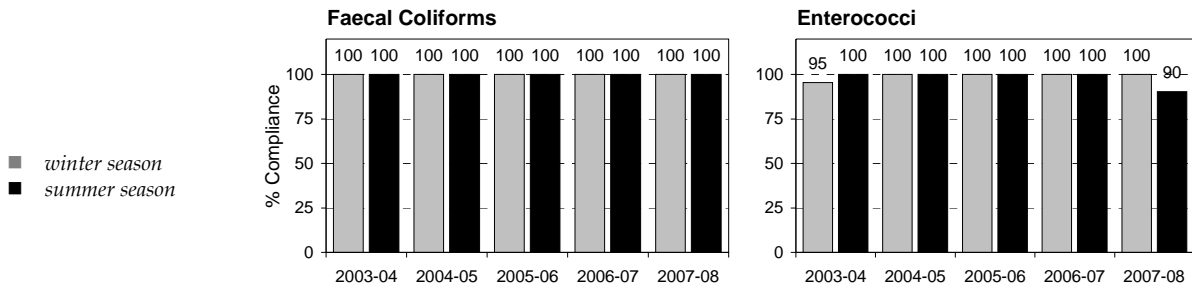
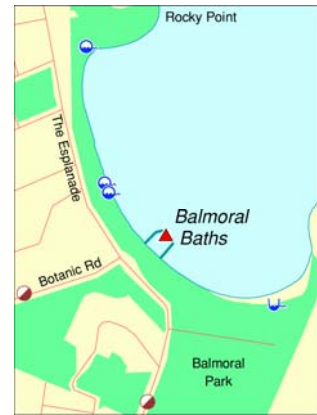
Actions

Mosman Council continued to maintain SQIDs throughout the catchment. Council has commenced the planning stages of the Botanic Road Stormwater Reuse Program.

Compliance

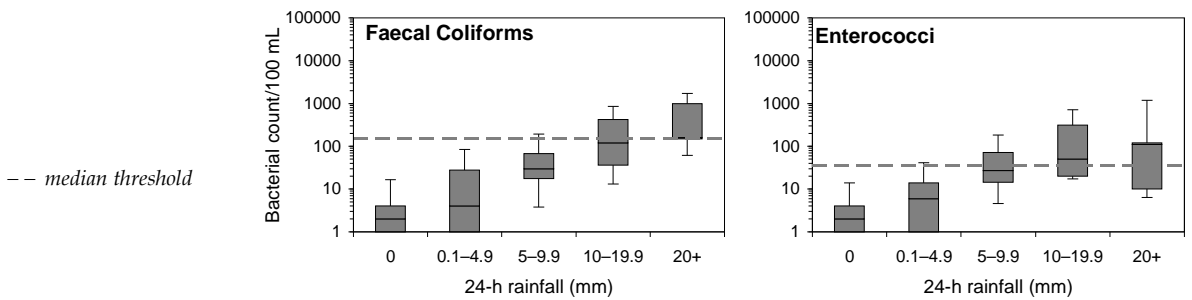
Faecal coliform levels have complied 100% of the time with swimming guidelines over the last five years. Enterococci compliance has been high, ranging from 90% to 100% over the last five years.

See page 224 for key to map



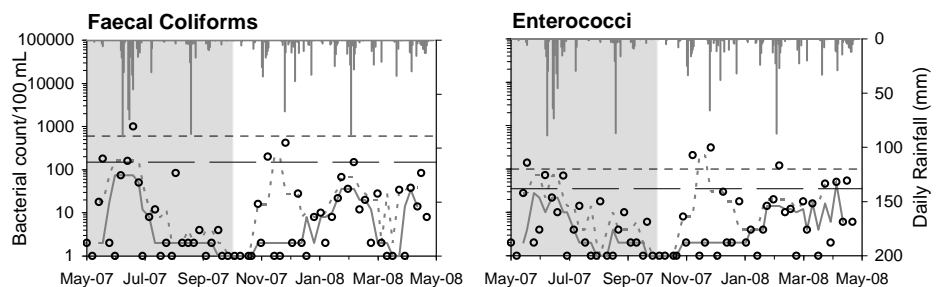
Response to rainfall

Bacterial densities increased with increasing rainfall. Faecal coliform densities occasionally 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 often exceeded the median guideline limit after 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.



Season data

- | rainfall
 - o individual result
 - rolling median
 - - - rolling 80th percentile
- Guidelines
(see page 7 for details)
- median threshold
 - - - 80th percentile threshold

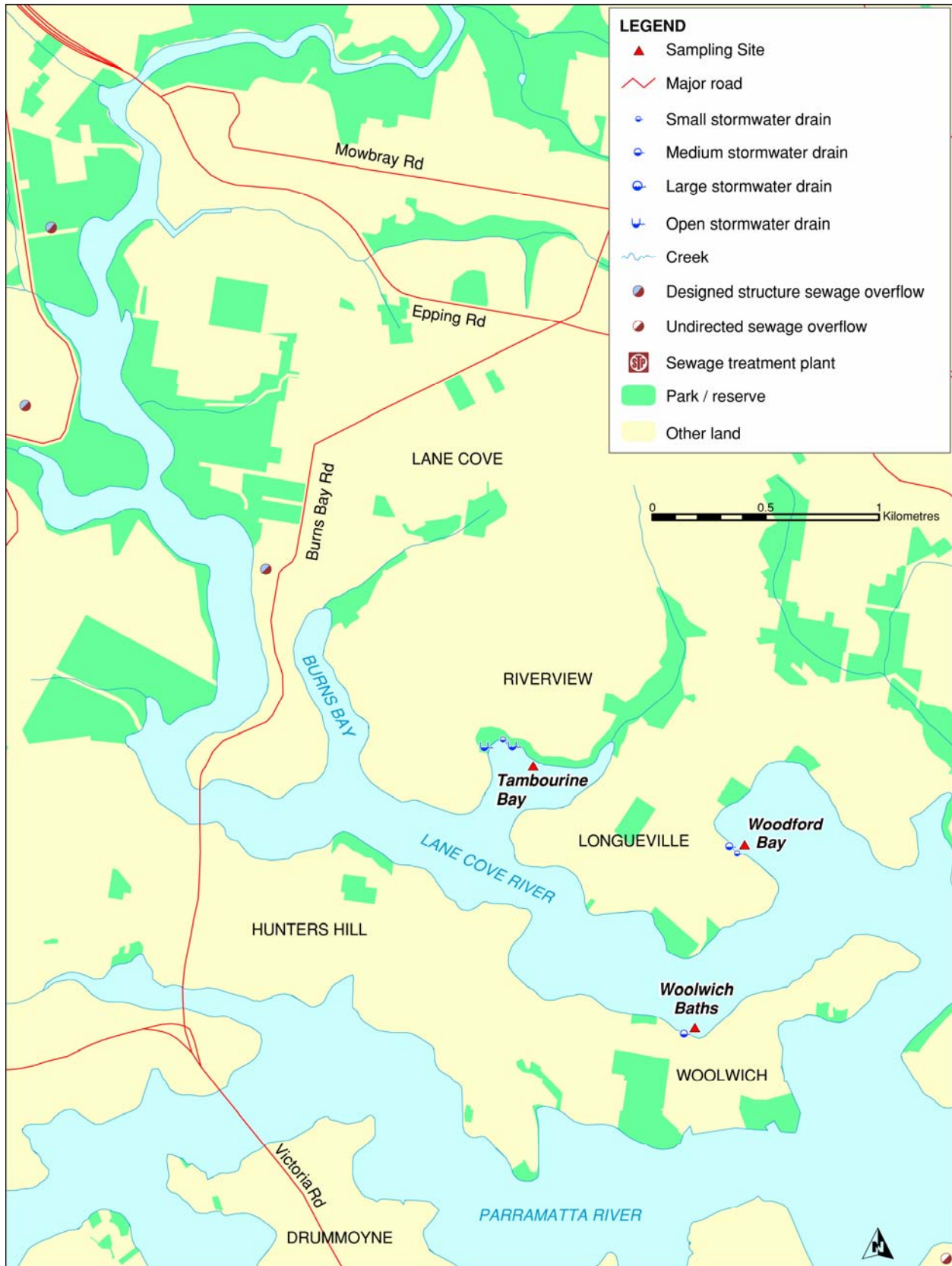


Sydney Metropolitan Area Harbour Swimming Sites

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 average during summer 2007–2008 (Table 19).

Woodford Bay complied 97% of the time for faecal coliforms and 77% of the time with enterococci guidelines. Woolwich Baths recorded 77% compliance for faecal coliforms and 71% compliance with enterococci guidelines. Tambourine Bay complied 74% of the time for faecal coliforms and 61% of the time with enterococci guidelines.

The range of indicator bacteria levels measured at Sydney Harbour swimming areas during summer 2007–2008 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 2007–2008. A total of 41 distinct ranks were determined for the 131 sites monitored for both faecal coliforms and enterococci, with many sites ranked equally.

All lower Lane Cove sites ranked relatively poorly with Woodford Bay ranked equal seventeenth, Woolwich Baths ranked thirtieth, and Tambourine Bay ranked thirty-sixth (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 the 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.

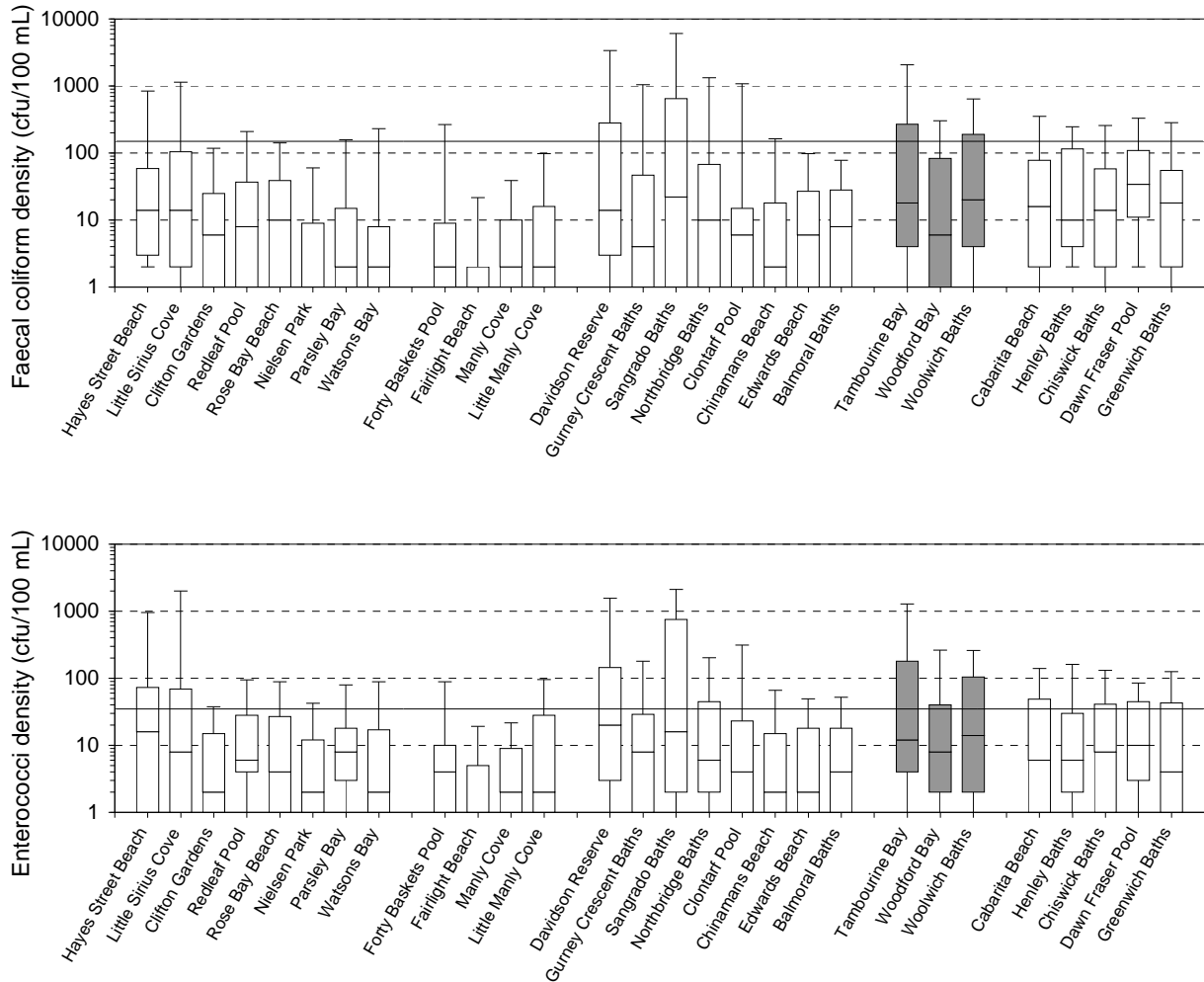
Clean-Up Australia Day: Council participated in Clean-Up Australia Day activities and coordinated the collection and disposal of gathered waste. The event attracted a high level of community participation.

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 2007–2008

| Site | Compliance (%) | | Overall rank (out of 41) |
|----------------|------------------|-------------|--------------------------|
| | Faecal Coliforms | Enterococci | |
| Tambourine Bay | 74 | 61 | 36 |
| Woodford Bay | 97 | 77 | 17 |
| Woolwich Baths | 77 | 71 | 30 |

Figure 26: Bacterial Levels at Sydney Harbour Sites during Summer 2007–2008



Tambourine Bay

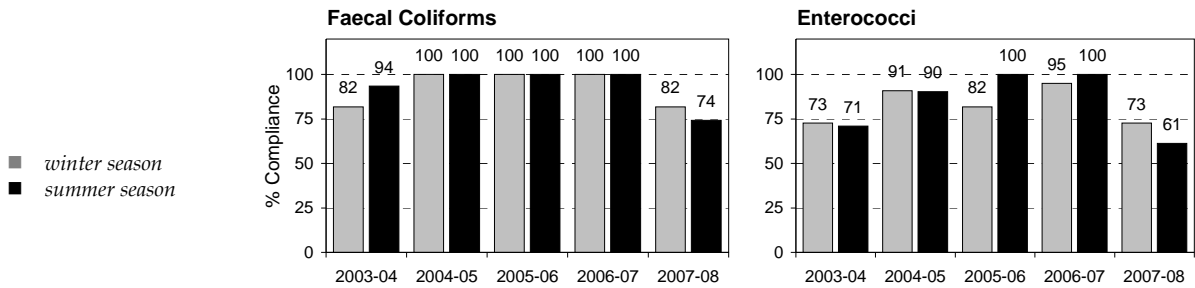
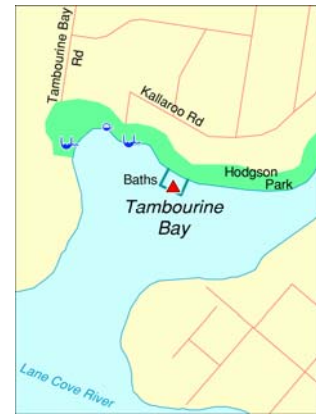
See page 238 for key to map

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

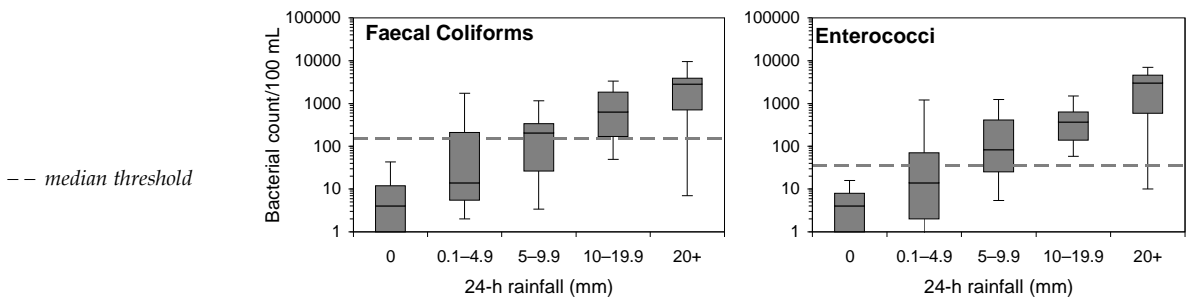
Pollution sources Stormwater drains discharge alongside the pool and a sewage overflow may discharge into the bay during wet weather. Waters from the upper Lane Cove River also affect water quality.

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

Compliance Faecal coliform compliance with swimming guidelines has varied over the last five years, ranging from 74% to 100%. Enterococci compliance with swimming guidelines also varied, ranging from 61% to 100% over the last five years.

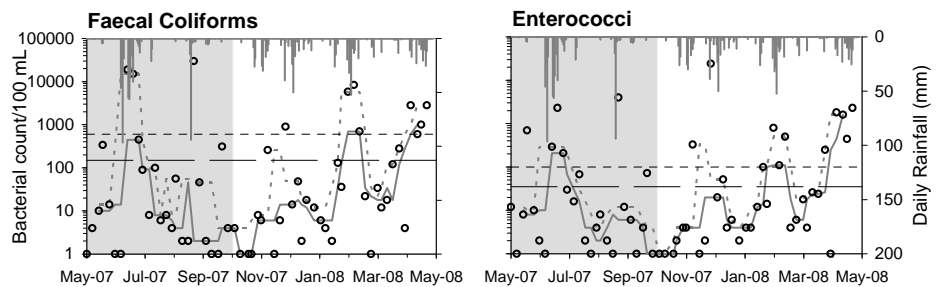


Response to rainfall Faecal coliform and enterococci densities generally increased with increasing rainfall and often exceeded the median guideline limits after light rain in the previous 24 hours. Faecal coliform levels frequently exceeded the median guideline limit in response to 10 millimetres of 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 7 for details)
- median threshold
 - 80th percentile threshold



Woodford Bay

See page 238 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

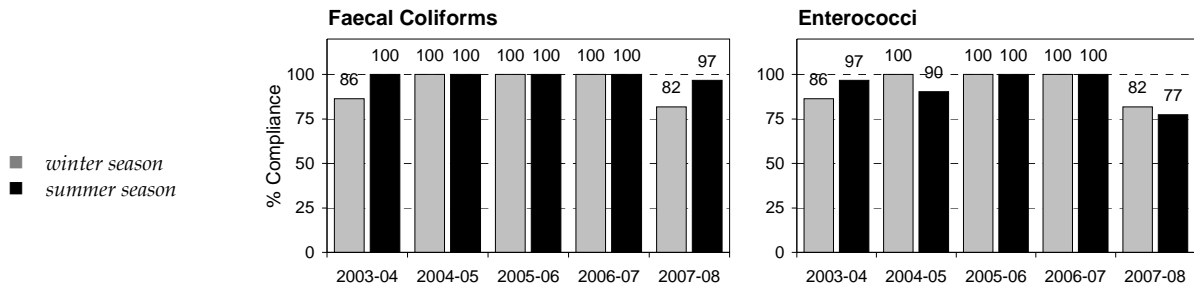
Stormwater drains discharge in the area. Water quality is also likely to be affected by waters from the upper Lane Cove River and by wet-weather sewage overflows.

Actions

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

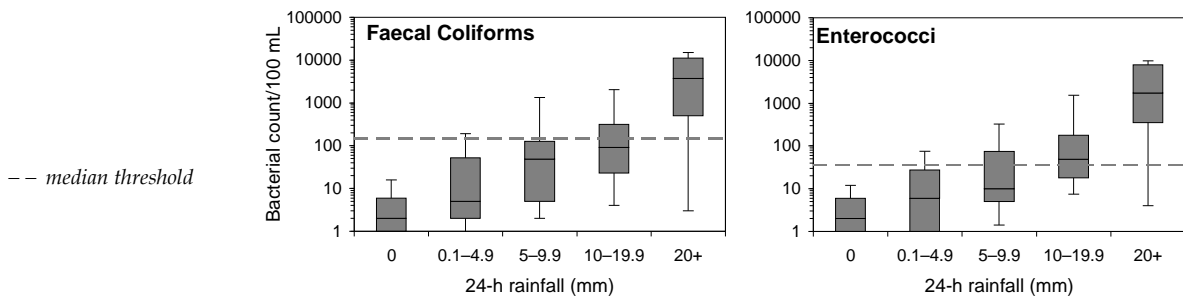
Compliance

Faecal coliform compliance with swimming guidelines has generally been high, ranging from 82% to 100% over the last five years. Enterococci compliance with swimming guidelines has varied, ranging from 77% to 100% over the last five years.



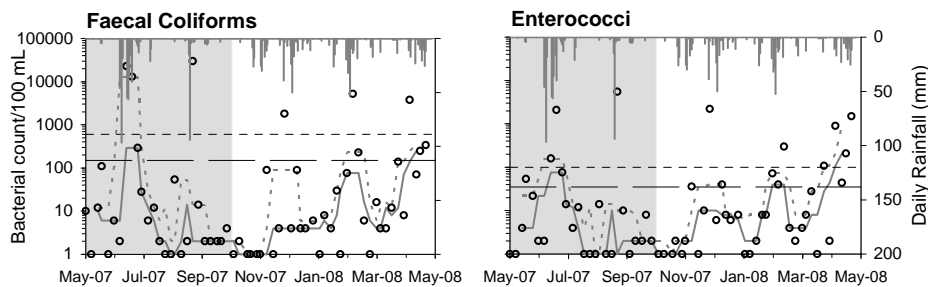
Response to rainfall

Faecal coliform and enterococci densities generally increased with increasing rainfall, occasionally exceeding the median guideline limits after light rain in the previous 24 hours. Faecal coliform and enterococci 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 7 for details)
- median threshold
 - 80th percentile threshold



Woolwich Baths

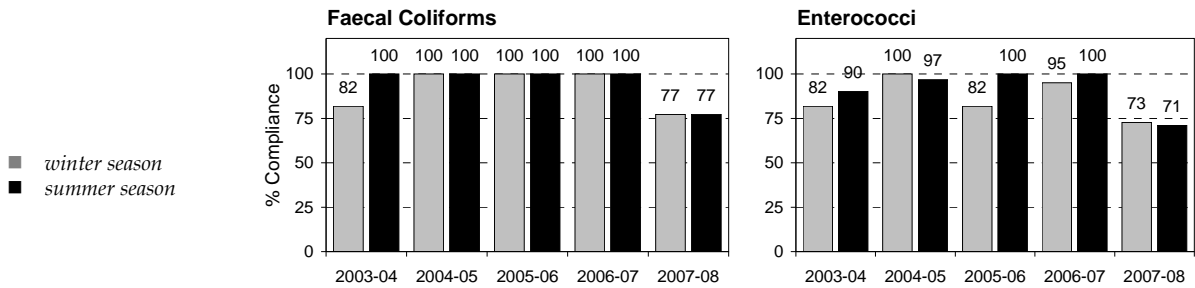
See page 238 for key to map

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

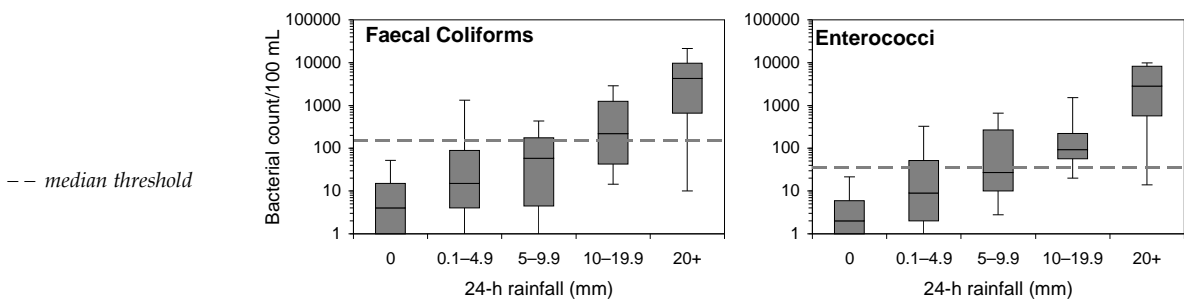
Pollution sources A stormwater drain discharges alongside the swimming enclosure. Water quality is likely to be affected by the waters from the upper Lane Cove River.

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

Compliance Faecal coliform compliance with swimming guidelines has varied over the last five years, ranging from 77% to 100%. Enterococci compliance with swimming guidelines has been variable, ranging from 71% to 100% over the last five years.

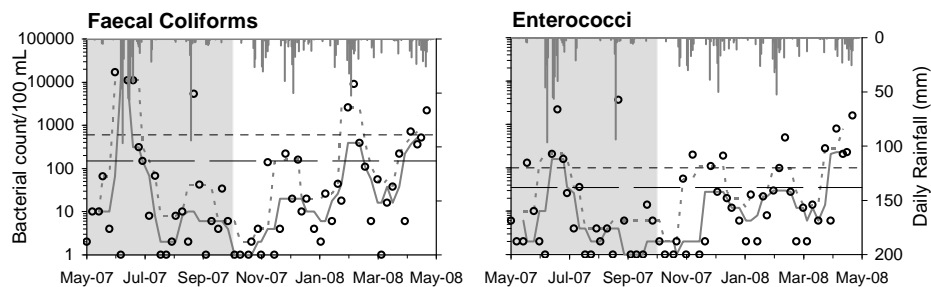


Response to rainfall Faecal coliform and enterococci densities generally increased with increasing rainfall. Faecal coliform densities occasionally exceeded the median guideline limit in response to light rain and regularly exceeded the median guideline limit in response to ten millimetres of rain or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



Season data

- | rainfall
 - o individual result
 - rolling median
 - rolling 80th percentile
- Guidelines
(see page 7 for details)
- median threshold
 - 80th percentile threshold

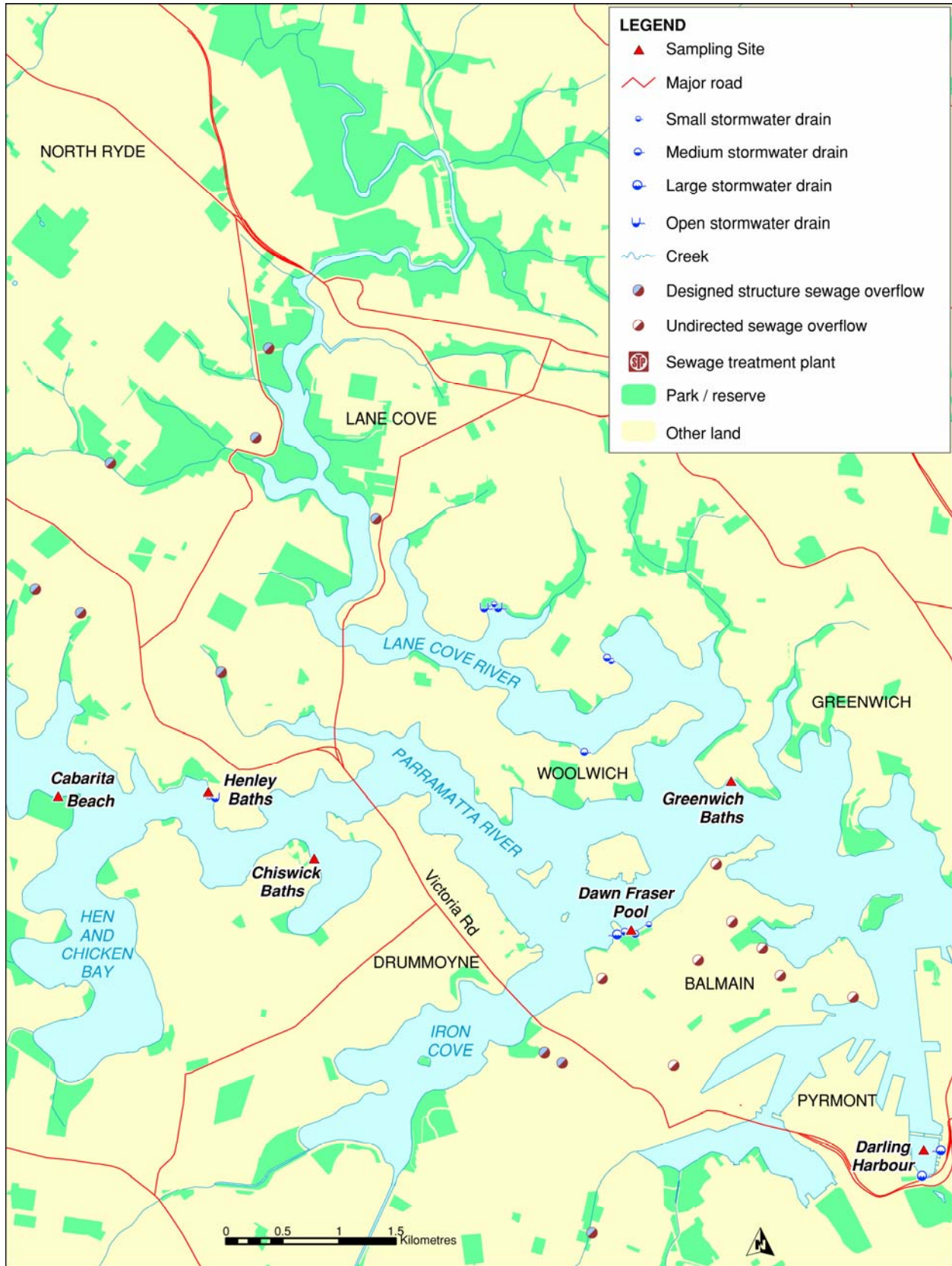


Sydney Metropolitan Area Harbour Swimming Sites

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 2007–2008 was generally good for both faecal coliforms and enterococci (Table 20).

Chiswick Baths recorded 90% compliance for faecal coliforms and 77% compliance for enterococci. Cabarita Beach, Henley Baths, Dawn Fraser Pool and Greenwich Baths all complied 87% of the time with faecal coliform criteria. Compliance with enterococci criteria was varied; Cabarita Beach (68%), Henley Baths (77%), Dawn Fraser Pool (81%), and Greenwich Baths (84%).

The range of indicator bacteria levels measured at Sydney Harbour swimming areas during summer 2007–2008 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 2007–2008. A total of 41 distinct ranks were determined for the 131 sites monitored for both faecal coliforms and enterococci, with many sites ranked equally.

Greenwich Baths ranked nineteenth, Dawn Fraser Pool ranked equal twentieth, Chiswick Baths ranked twenty-first, Henley

ranked twenty-fourth and Cabarita ranked equal twenty-eighth (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

Barnwell Park Golf Course stormwater re-use project: Canada Bay Council has completed a sand-filter and re-use system at Barnwell Park golf course, which utilises treated stormwater for irrigation. The re-use of stormwater reduces the amount of stormwater entering Hen and Chicken Bay at Drummoyne on the Parramatta River.

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.

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 generated \$500,000 a year to spend on stormwater initiatives. In 2007–2008 expenditure included preparation of a flood study for the local government area and the Water Reuse Feasibility Study.

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 eleven water using Council properties. The plan aims to save 18 ML a year once implemented. Water usage is now monitored monthly within the council to ensure progress is made.

Water Re-use and Feasibility Study: Council is undertaking a Water Reuse Feasibility Study during 2007–2008. The study aims to identify major projects within the local government area that could utilise rainwater, stormwater, groundwater or sewage to reduce water usage within Council facilities and operations, as well as by other major water users. It will also include opportunities to improve water quality through water-sensitive urban design.

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 and followed.

Installation of rainwater tanks: In the last year Leichhardt Council has produced a very popular guide to installing rainwater tanks, run workshops, waived DA fees (where

required) and provided 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.

Whites Creek Wetland: Council employs a contractor to maintain the wetland. Routine maintenance includes removal of common aquatic weeds and pump maintenance. Native aquatic plants are routinely cut back and removed to allow continual water flow through the wetland as well as to remove nutrients absorbed by the plants. Sediment is removed from the wetland every six to eight weeks depending on how much has come down the creek. In 2007, approximately 15 square metres of sediment and approximately 200 goldfish and exotic fish were removed from the wetland. The sighting of an eastern water dragon this year was indicative of the good conditions in the wetland. Eight educational signs have been installed to explain the history, function and wildlife values in and around the wetland.

Parramatta River Estuary Data Compilation Study: Recently Council has begun to take part in the Parramatta River Estuary Data Compilation Study.

Additional water quality monitoring: School students from St Scholastica's High School last monitored Whites Creek Wetland in June 2007 through the Streamwatch monitoring program.

Stormwater pollution monitoring: To improve the data on water quality in the local government area, a project has been initiated with The University of Sydney to carry out modelling of stormwater pollution sources and conduct a monitoring program. Results should be available to include in Leichhardt Council 2007-2008 State of the Environment Report.

North Sydney Council

North Sydney Stormwater Reuse Project: The project aims to save 90 ML 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.

Community education: Council developed and released Sustainability Education Kits for local primary schools, with activities on waste management and water quality. Council also ran gross pollutant trap excursions where students observed litter traps being cleaned and 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 Crows Nest Community Centre and Cammeray Park amenities block.

Stormwater Quality Improvement Devices 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 more litter being removed from 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.

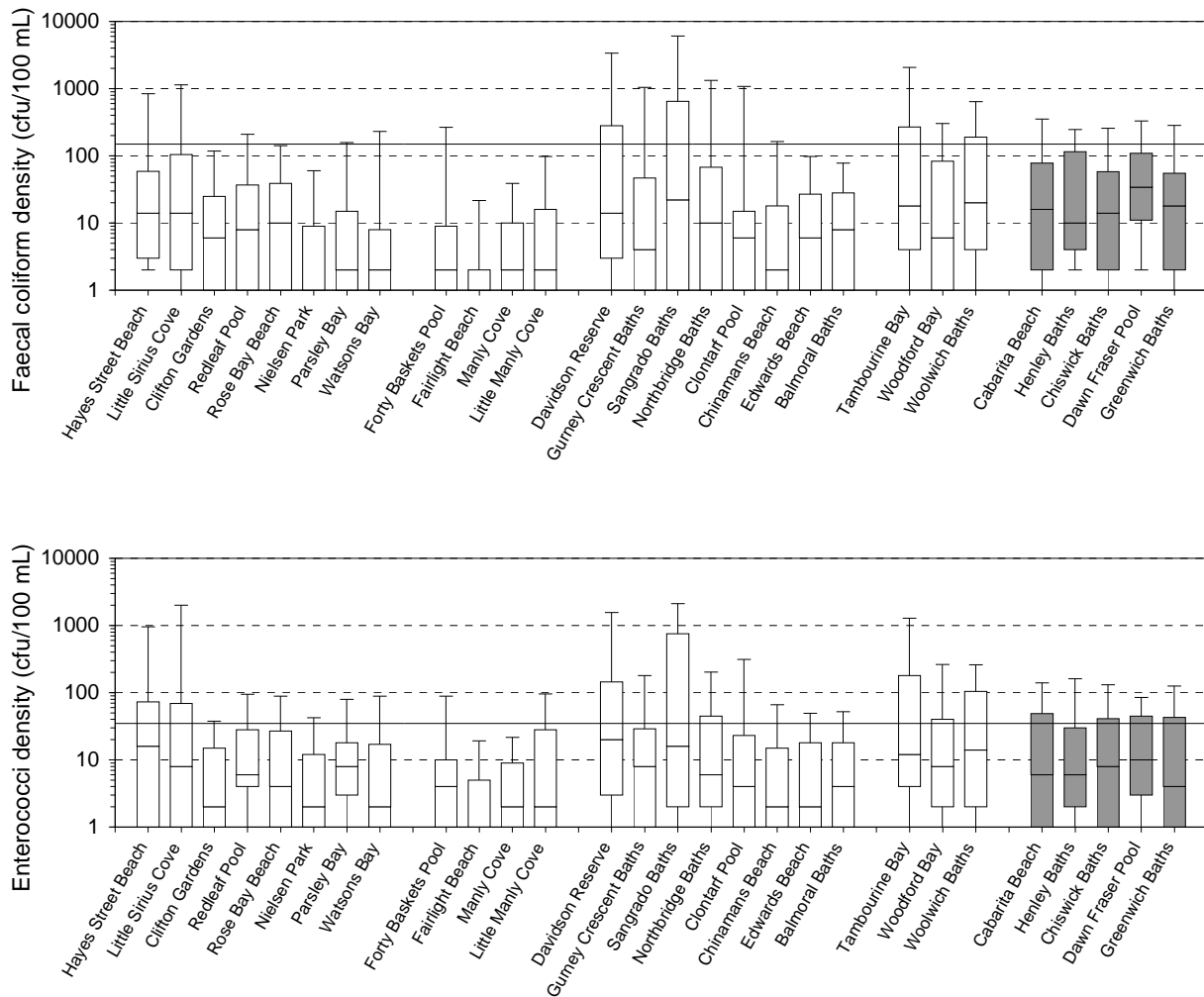
City of Sydney Council

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.

Table 20: Compliance and Ranking of Lower Parramatta River Sites during Summer 2007–2008

| Site | Compliance (%) | | Overall rank (out of 41) |
|------------------|------------------|-------------|--------------------------|
| | Faecal Coliforms | Enterococci | |
| Cabarita Beach | 87 | 68 | 28 |
| Henley Baths | 87 | 77 | 24 |
| Chiswick Baths | 90 | 77 | 21 |
| Dawn Fraser Pool | 87 | 81 | 20 |
| Greenwich Baths | 87 | 84 | 19 |

Figure 27: Bacterial Levels at Sydney Harbour Sites during Summer 2007–2008



Cabarita Beach

See page 246 for key to map

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

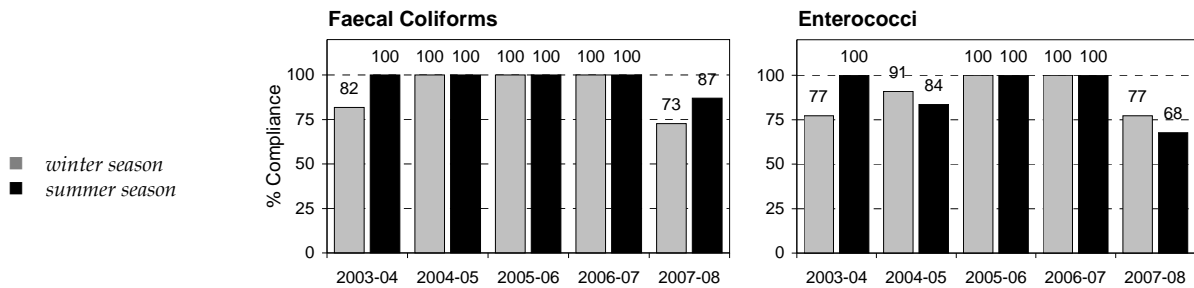
Water quality is likely to be affected by waters from numerous nearby urban stormwater drains and the upper Parramatta River.

Actions

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

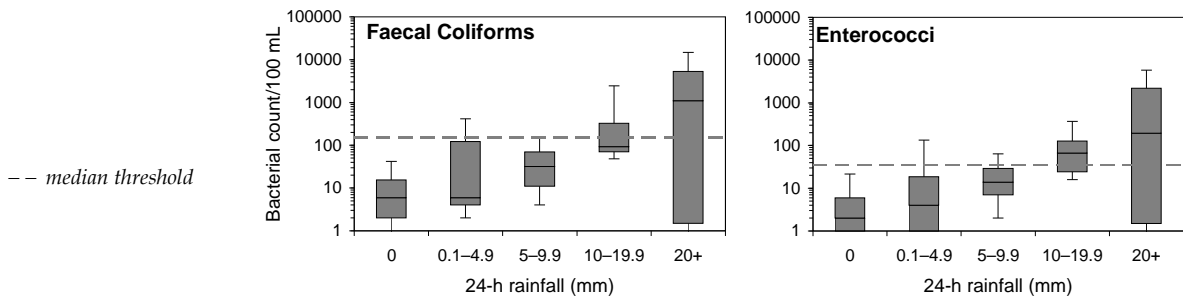
Compliance

Faecal coliform compliance with swimming guidelines has varied over the last five years, ranging from 73% to 100%. Enterococci compliance has been more variable, ranging from 68% to 100% over the last five years.



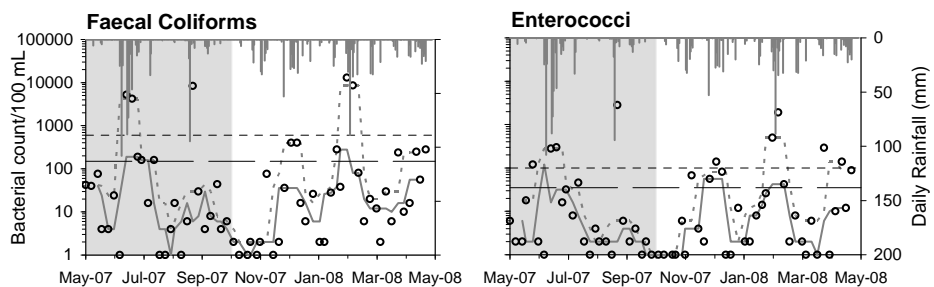
Response to rainfall

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 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 7 for details)
- median threshold
 - 80th percentile threshold



Henley Baths

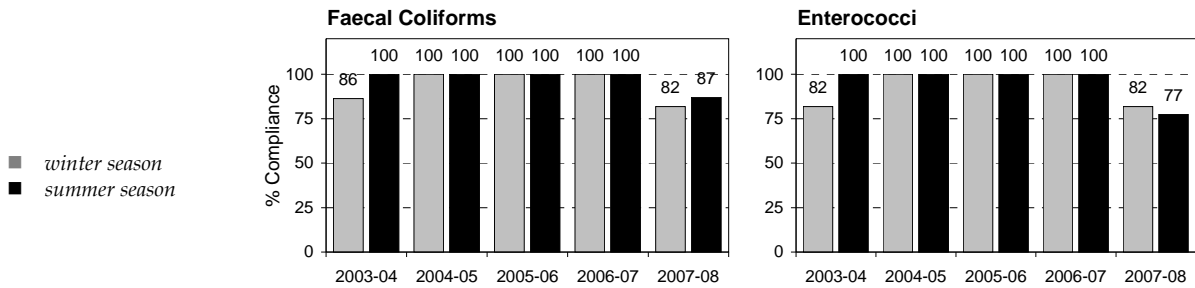
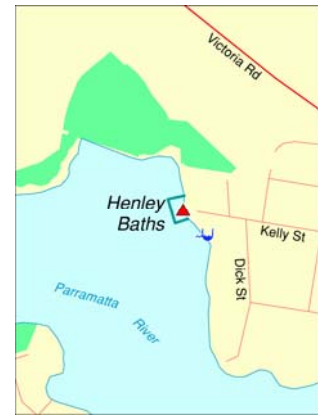
See page 246 for key to map

Description This small 20 metre square netted swimming enclosure is backed by a grassy reserve. The baths are infrequently used and are in poor condition.

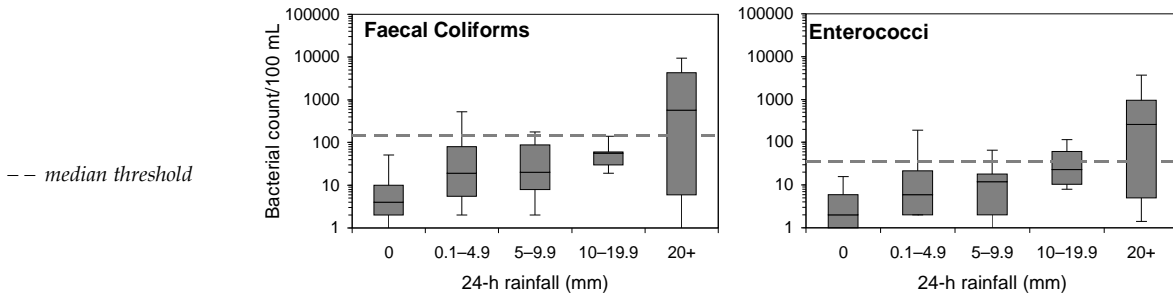
Pollution sources Water quality is likely to be affected by waters from numerous nearby urban stormwater drains and the upper Parramatta River.

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 Faecal coliform compliance with swimming guidelines has generally been high, ranging from 82% to 100% over the last five years. Enterococci compliance with swimming guidelines has been more varied, ranging from 77% to 100% over the last five years.

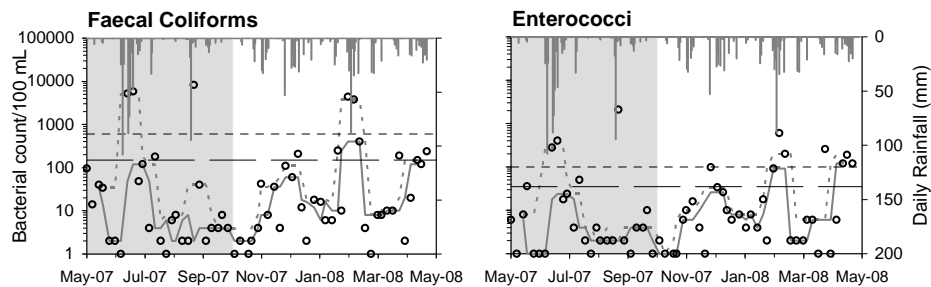


Response to rainfall Faecal coliform and enterococci densities generally increased with increasing rainfall, occasionally exceeding the median guideline limits in response to light rain in the previous 24 hours. Bacterial densities of both bacterial indicators regularly exceeded the median guideline 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 7 for details)
- median threshold
 - - - 80th percentile threshold



Chiswick Baths

See page 246 for key to map

Description

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

Pollution sources

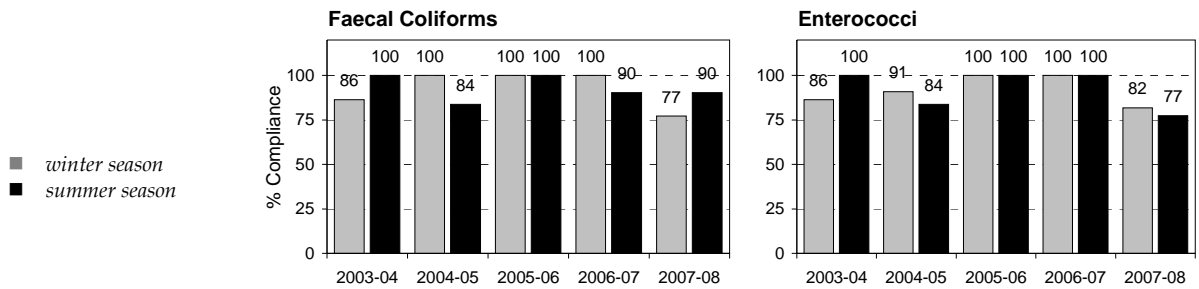
Water quality is likely to be affected by waters from numerous nearby urban stormwater drains and the upper Parramatta River.

Actions

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

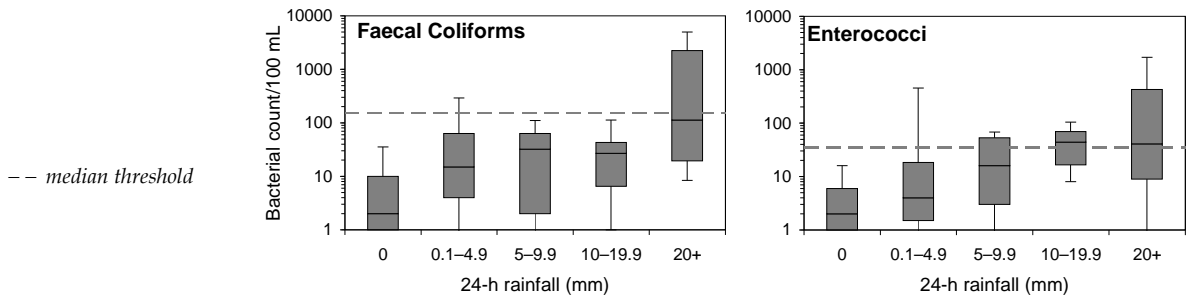
Compliance

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



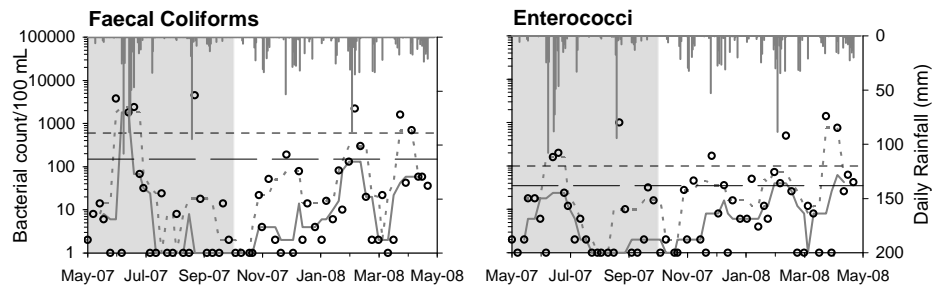
Response to rainfall

Bacterial densities of both bacterial indicators generally increased with increasing rainfall, occasionally exceeding the median guideline limit after light rain in the previous 24 hours. Faecal coliform densities often exceeded the median guideline limit in response to 20 millimetres of rain or more in the previous 24 hours. Enterococci densities 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 7 for details)
- median threshold
 - - - 80th percentile threshold



Dawn Fraser Pool

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.

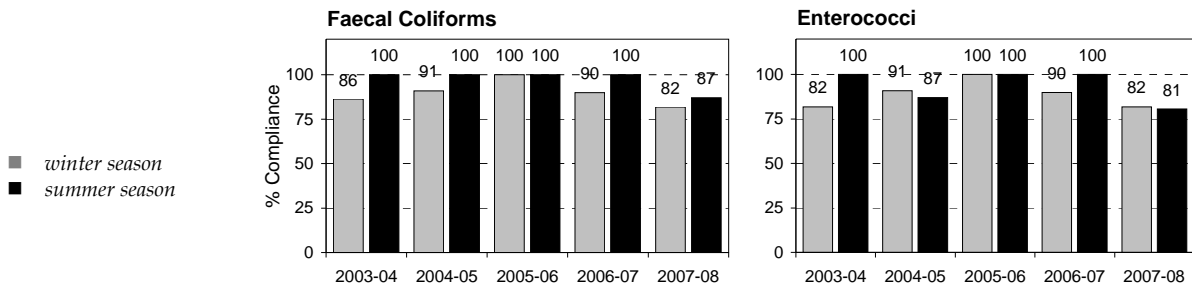
Actions

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

Compliance

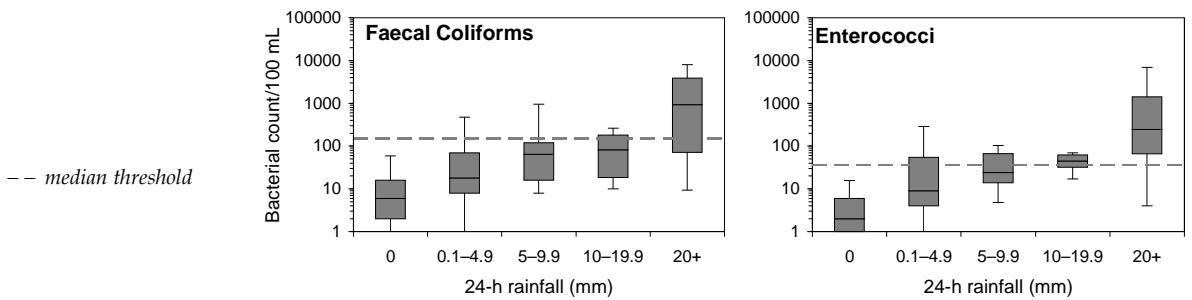
Faecal coliform compliance with swimming guidelines has generally been high over the last five years, ranging from 82% to 100%. Enterococci compliance has ranged from 81% to 100% over the last five years.

See page 246 for key to map



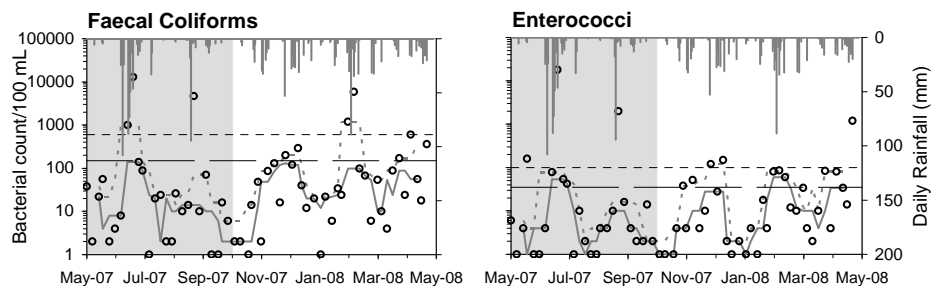
Response to rainfall

Faecal coliform and enterococci densities generally increased with increasing rainfall. Faecal coliform densities occasionally exceeded the median guideline limit in response to light rain and regularly 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 7 for details)
- median threshold
 - - - 80th percentile threshold



Greenwich Baths

See page 246 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

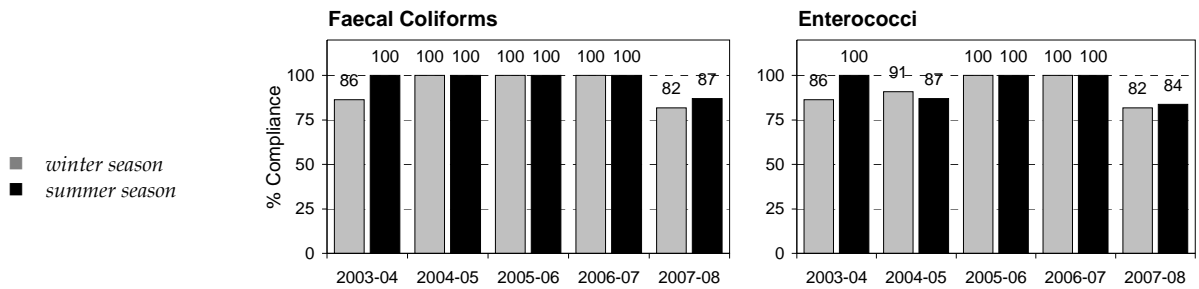
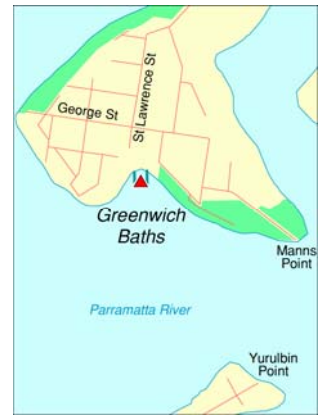
Water quality is likely to be affected by pollution from the Lane Cove River and the upper Parramatta River.

Actions

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

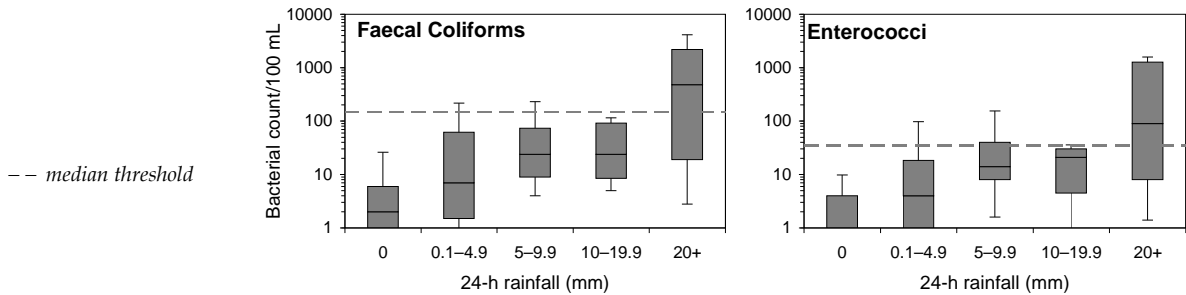
Compliance

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



Response to rainfall

Faecal coliform and enterococci densities tended to increase with increasing rainfall, occasionally exceeding the median guideline limits in response to light rain in the previous 24 hours. Bacterial densities 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 7 for details)
- median threshold
 - - - 80th percentile threshold

