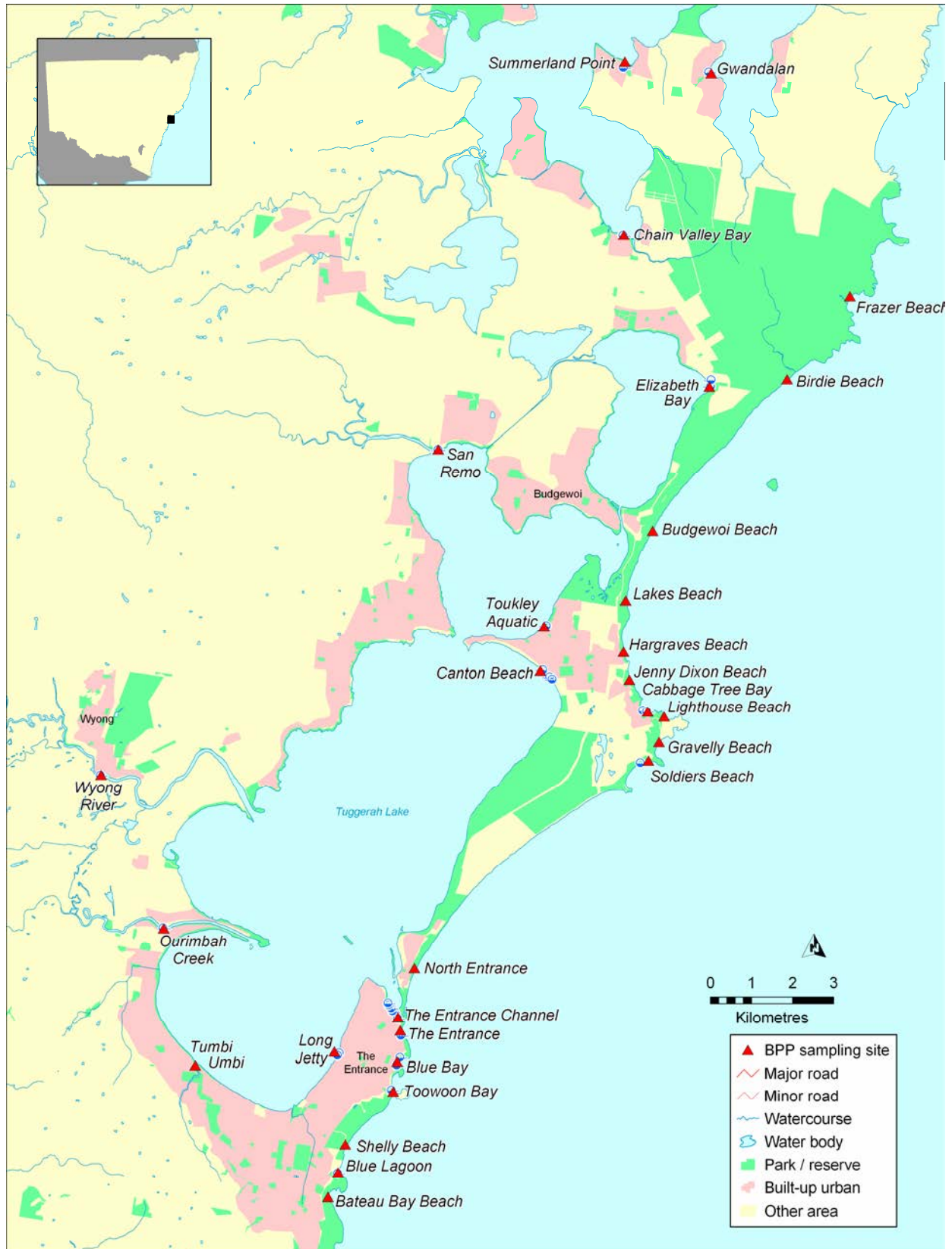


Wyong Shire Council

Ocean beaches: Frazer, Birdie, Budgewoi, Lakes, Hargraves, Jenny Dixon, Cabbage Tree Bay, Lighthouse, Gravelly, Soldiers, North Entrance, The Entrance, Blue Bay, Toowoan Bay, Shelly, Blue Lagoon, Bateau Bay. **River sites:** Wyong River, Ourimbah Creek, Tumbi Umbi Creek.

Coastal lakes: Summerland Point, Gwandalan, Chain Valley Bay, Elizabeth Bay, San Remo, Toukley Aquatic, Canton Beach, The Entrance Channel, Long Jetty.



Local government area description

Wyong Shire Council is located 100 kilometres north of Sydney and covers an area of 827 square kilometres. The Shire extends from Gwandalan in the north to Ourimbah in the south and has a population of approximately 144,000, growing at the rate of 1.3% each year. There is a considerable expansion in planned urban development within the shire.

The council area encompasses numerous ocean beaches, the southern extent of Lake Macquarie, Tuggerah Lakes and the Wyong River.

Wyong Shire is characterised by towns and villages separated by extensive areas of natural vegetation, with the three most predominant land uses being urban development, agriculture and forestry. (Wyong Shire Council, 2007).

Research by Tourism Australia indicates that, on average each year, almost 500,000 people holiday in the Wyong Shire and just over 1,000,000 people visit for the day. 'Going to the beach' is listed as a top activity by 65% of international tourists and 44% of domestic tourists holidaying in the area (Tourism Research Australia, 2008).

Program outline

A total of 29 swimming locations were monitored by Wyong Shire Council, including 17 ocean beaches, nine lake sites and three river sites in the Tuggerah Lakes catchment.

Enterococci samples were collected from all locations over the seven months of the 2008–2009 summer swimming season to assess compliance with NHMRC (1990) swimming water quality guidelines. At sites with only four samples collected in month, the closest sample in time from an adjacent month was 'borrowed' to provide the five samples necessary for the compliance calculation.

Monitoring in the Wyong Shire Council area has been conducted since the 2002–2003 summer seasons and results have been reported in the State of the Beaches reports for these years (DEC 2004a, 2004b, 2006a and 2006b, DECC 2007, DECC 2008).

Wyong Shire Council has erected warning signs at Tumbi Umbi Creek, Ourimbah Creek and a number of other estuarine swimming locations with histories of poor water quality.

Rainfall

Rainfall data presented in the timeseries plots were obtained from the Bureau of Meteorology's gauge at Wyong Bowling Club.

Ocean beaches

Guideline compliance

A high level of compliance with NHMRC (1990) swimming water quality guidelines was recorded at the 17 ocean beaches (Figure 9). All beaches were suitable for swimming in all seven months of the 2008–2009 summer swimming season.

A very high level of compliance with swimming water quality guidelines has also been reported at the ocean beaches in previous years.

Response to rainfall

Bacterial levels at all beaches were generally low throughout the monitoring period. Although slightly elevated levels of bacteria were measured at most of the ocean beaches on one or two occasions, monitoring did not reveal evidence of sewage contamination (as indicated by enterococci levels greater than 10,000 cfu/100 mL) in either dry or wet weather conditions.

Lake Macquarie

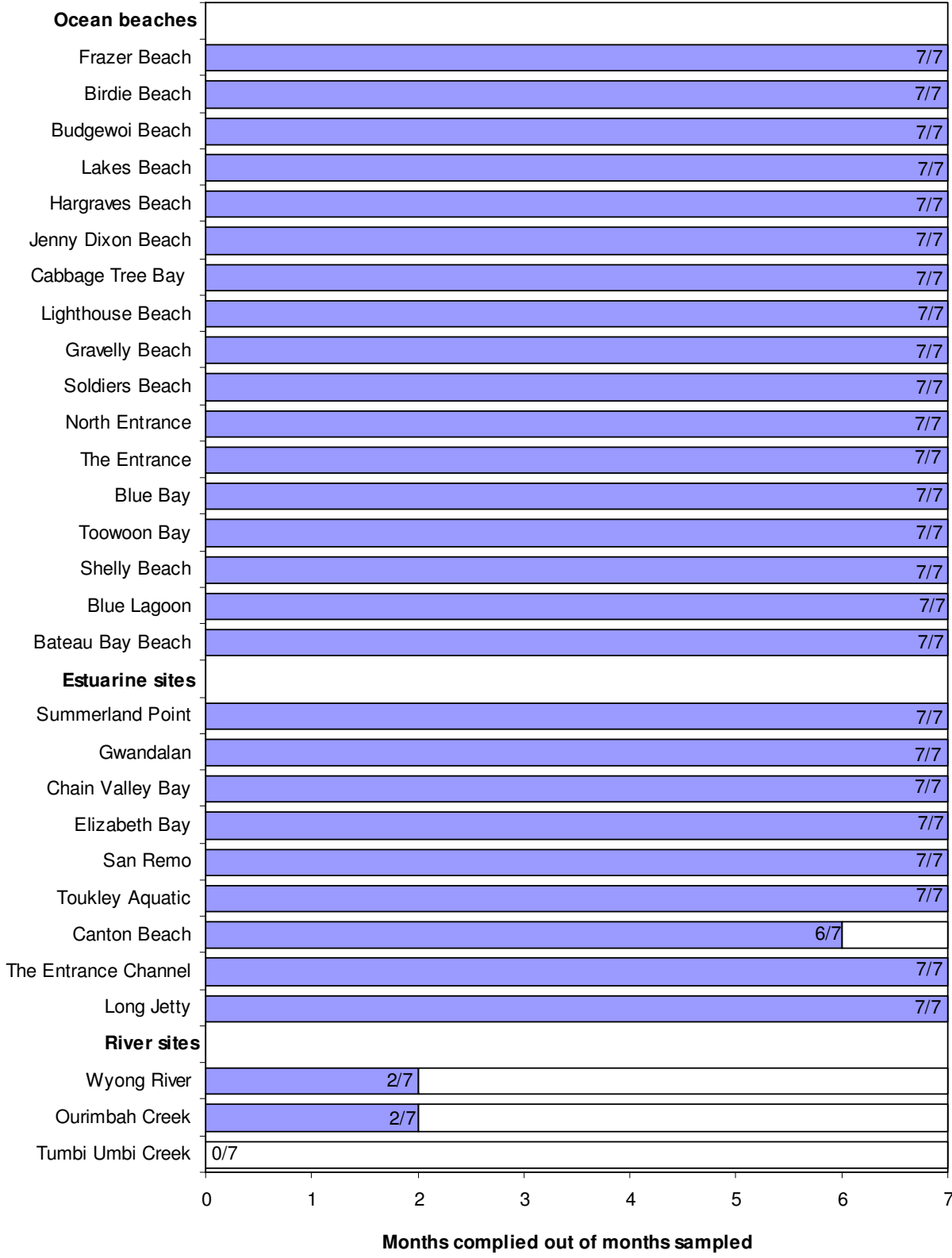
Guideline compliance

The three swimming locations monitored in Lake Macquarie (Summerland Point, Gwandalan and Chain Valley Bay) were suitable for swimming in all seven months of the 2008–2009 summer swimming season (Figure 9).

Response to rainfall

Levels of enterococci at Summerland Point, Chain Valley Bay and Gwandalan were generally low throughout the summer season, with slightly elevated results recorded on a number of occasions in response to rainfall.

Figure 9: Summary of compliance with NHMRC (1990) microbiological guidelines for swimming at Wyong Shire Council swimming sites over the 2008–2009 summer season



Results from previous monitoring indicate that swimming in Lake Macquarie should be avoided during and for several days after rainfall (DEC 2004b).

Lake Munmorah

Guideline compliance

Elizabeth Bay, located in the southeast corner of Lake Munmorah, complied with the NHMRC (1990) swimming water quality guidelines in all seven months of the 2008–2009 summer swimming season.

Response to rainfall

Levels of bacteria were generally low throughout the monitoring period, with some slightly elevated results recorded in response to rainfall.

Results from previous monitoring indicate that high levels of bacteria can be measured at the site in response to heavy rainfall (DEC 2004b).

Lake Budgewoi

Guideline compliance

The two swimming locations monitored in Lake Budgewoi were San Remo in the north and Toukley Aquatic in the south. Both sites complied with NHMRC (1990) swimming water quality guidelines in all seven months of the 2008–2009 summer swimming season (Figure 9).

Response to rainfall

Enterococci levels at San Remo and Toukley Aquatic were generally low throughout the monitoring period, with elevated levels recorded on several occasions in response to heavy rainfall.

Tuggerah Lake

Guideline compliance

The three swimming locations monitored in Tuggerah Lake were Canton Beach in the north, Long Jetty in the south and The Entrance Channel.

Long Jetty and The Entrance Channel complied with the NHMRC (1990) swimming water quality guidelines in all seven months of the 2008–2009 summer swimming season (Figure 9). A high level of compliance was also recorded at Canton Beach, which complied six of the seven months. The site failed the guidelines in March 2009.

Response to rainfall

Slightly elevated levels of enterococci were occasionally recorded at The Entrance Channel and Long Jetty in response to rainfall during the 2008–2009 summer swimming season. Elevated levels were also recorded at Canton Beach in response to heavy rainfall.

Previous monitoring has revealed elevated bacterial levels in response to rainfall at these sites (DEC 2004b and 2004c).

Tuggerah Lakes catchment

Guideline compliance

The three sites monitored in the Tuggerah Lakes catchment were Wyong River, Ourimbah Creek and Tumbi Umbi Creek.

Very low levels of compliance with the NHMRC (1990) swimming water quality guidelines were recorded at all three locations. Ourimbah Creek and Wyong River failed the guidelines in five of the seven months of the 2008–2009 summer swimming season, and Tumbi Umbi Creek failed the guidelines in all seven months (Figure 9).

Response to rainfall

Due to the ongoing high levels of bacteria measured at these sites, swimming should be avoided at these sites at all times.

Frazer Beach

See page 83 for key to map

Description

Frazer Beach is located within the Munmorah State Recreation Area. The beach is patrolled during the Christmas and Easter school holidays and is frequently used on weekends and holidays for surfing, swimming, fishing and camping.



Pollution sources

There are few pollution sources at this beach. Outflow from the lagoon may affect water quality in wet weather. Illegal discharge from commercial and recreational boats is also a potential pollution source.

Compliance

The site complied with NHMRC (1990) swimming guidelines in all seven months of the 2008–2009 summer swimming season.

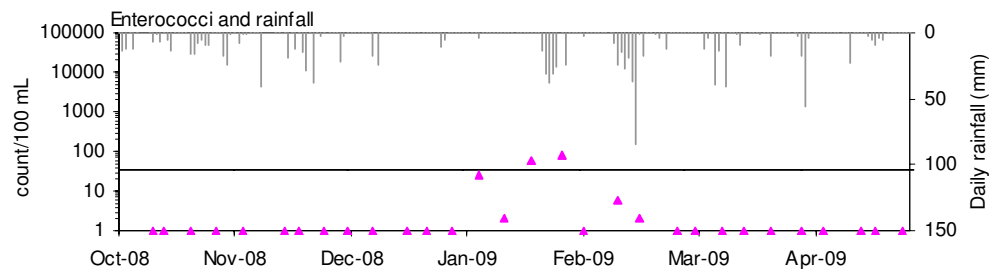
Compliance with NHMRC (1990) swimming guidelines at Frazer Beach

	OCT '08	NOV '08	DEC '08	JAN '09	FEB '09	MAR '09	APR '09
ENT	PASS*	PASS*	PASS	PASS*	PASS*	PASS*	PASS

* Only four samples were collected in this month. An additional data point was borrowed from an adjacent month to calculate compliance.

Timeseries plots

Levels of enterococci generally remained low throughout the monitoring period, just exceeding the geometric mean guideline limit on two occasions.



See page 5 for key to graph

Birdie Beach

See page 83 for key to map

Description

Birdie Beach is located within the Munmorah State Recreation Area, at the northern end of an eight kilometre-long beach. The beach is backed by a well vegetated foredune. It is popular during holiday periods and is used for swimming, surfing, fishing and camping.



Pollution sources

There are few potential pollution sources at this beach. Illegal discharge from commercial and recreational boats may affect water quality.

Compliance

The site complied with NHMRC (1990) swimming guidelines in all seven months of the 2008–2009 summer swimming season.

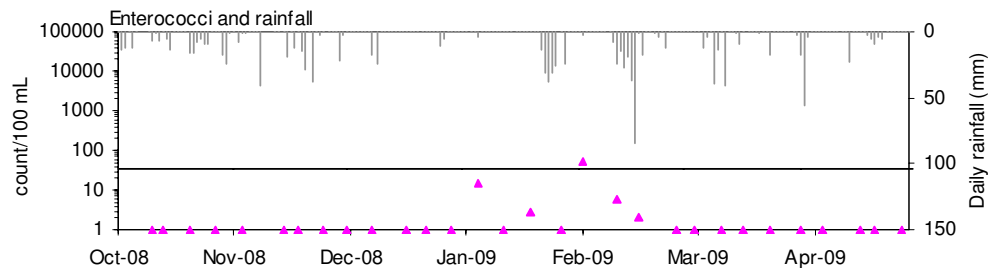
Compliance with NHMRC (1990) swimming guidelines at Birdie Beach

	OCT '08	NOV '08	DEC '08	JAN '09	FEB '09	MAR '09	APR '09
ENT	PASS*	PASS*	PASS	PASS*	PASS*	PASS*	PASS

* Only four samples were collected in this month. An additional data point was borrowed from an adjacent month to calculate compliance.

Timeseries plots

Levels of enterococci remained low throughout the monitoring period, just exceeding the geometric mean guideline limit on one occasion.



See page 5 for key to graph

Budgewoi Beach

See page 83 for key to map

Description

Budgewoi Beach is located in the centre of an eight kilometre-long beach and is backed by a reserve. The beach is frequently used on weekends and during holiday periods.

Pollution sources

There are few potential sources of pollution at this beach. Illegal discharge from commercial and recreational boats may affect water quality.

Compliance

The site complied with NHMRC (1990) swimming guidelines in all seven months of the 2008–2009 summer swimming season.



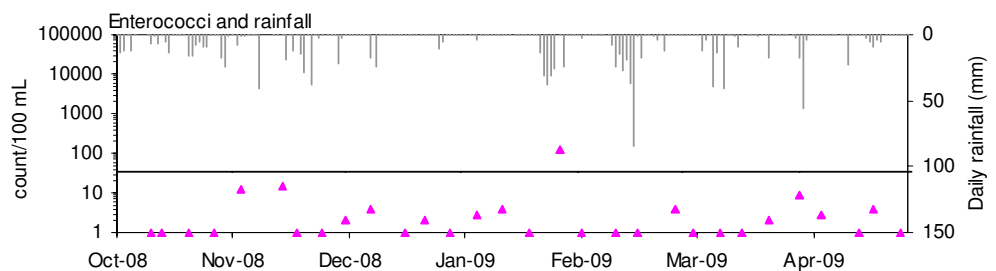
Compliance with NHMRC (1990) swimming guidelines at Budgewoi Beach

	OCT '08	NOV '08	DEC '08	JAN '09	FEB '09	MAR '09	APR '09
ENT	PASS*	PASS*	PASS	PASS*	PASS*	PASS*	PASS

* Only four samples were collected in this month. An additional data point was borrowed from an adjacent month to calculate compliance.

Timeseries plots

Levels of enterococci remained low throughout the monitoring period, just exceeding the geometric mean guideline limit on one occasion in response to rainfall.



See page 5 for key to graph

Lakes Beach

See page 83 for key to map

Description Lakes Beach is located at the southern end of an eight kilometre-long beach and is backed by a reserve. The beach is patrolled during peak holiday periods, when large numbers of swimmers and surfers visit the beach.

Pollution sources There are few potential pollution sources at this beach.

Compliance The site complied with NHMRC (1990) swimming guidelines in all seven months of the 2008–2009 summer swimming season.



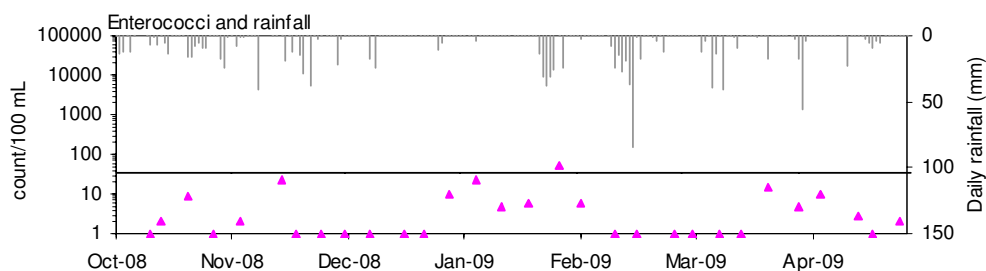
Compliance with NHMRC (1990) swimming guidelines at Lakes Beach

	OCT '08	NOV '08	DEC '08	JAN '09	FEB '09	MAR '09	APR '09
ENT	PASS*	PASS*	PASS	PASS*	PASS*	PASS*	PASS

* Only four samples were collected in this month. An additional data point was borrowed from an adjacent month to calculate compliance.

Timeseries plots

Levels of enterococci were generally low throughout the monitoring period, just exceeding the geometric mean guideline limit on one occasion in response to rainfall.



See page 5 for key to graph

Hargraves Beach

See page 83 for key to map

Description

Hargraves Beach is not patrolled and is difficult to access. Despite this, the beach is frequently used on weekends and holidays by the local community. The beach is backed by a reserve.

Pollution sources

Urban stormwater runoff may affect beach water quality after rainfall.

Compliance

The site complied with NHMRC (1990) swimming guidelines in all seven months of the 2008–2009 summer swimming season.



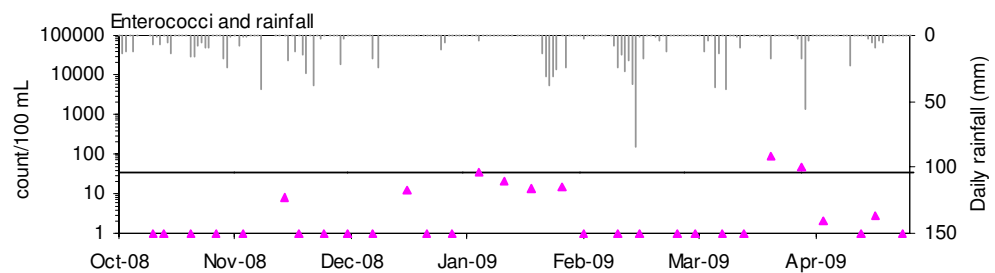
Compliance with NHMRC (1990) swimming guidelines at Hargraves Beach

	OCT '08	NOV '08	DEC '08	JAN '09	FEB '09	MAR '09	APR '09
ENT	PASS*	PASS*	PASS	PASS*	PASS*	PASS*	PASS

* Only four samples were collected in this month. An additional data point was borrowed from an adjacent month to calculate compliance.

Timeseries plots

Enterococci levels generally remained low throughout the monitoring period, just exceeding the geometric mean guideline limit on two occasions in response to rainfall.



See page 5 for key to graph

Jenny Dixons Beach

See page 83 for key to map

Description Jenny Dixons Beach is approximately 300 metres long and is protected by reefs and Norah Head. The beach is popular with the local community and is frequently used on weekends and holidays. It is backed by an escarpment and residential development.

Pollution sources Urban stormwater may affect beach water quality after rainfall.

Compliance The site complied with NHMRC (1990) swimming guidelines in all seven months of the 2008–2009 summer swimming season.

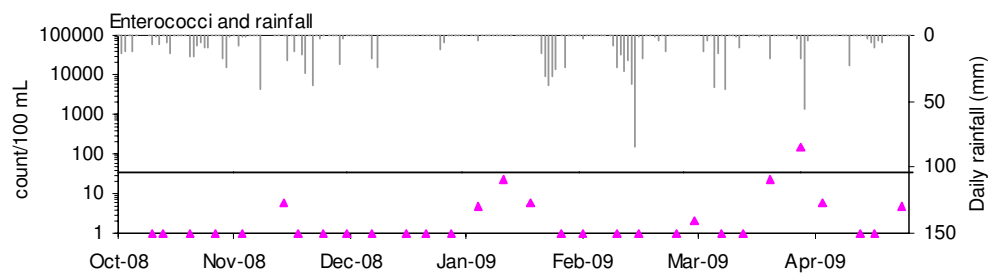


Compliance with NHMRC (1990) swimming guidelines at Jenny Dixons Beach

	OCT '08	NOV '08	DEC '08	JAN '09	FEB '09	MAR '09	APR '09
ENT	PASS*	PASS*	PASS	PASS*	PASS*	PASS*	PASS

* Only four samples were collected in this month. An additional data point was borrowed from an adjacent month to calculate compliance.

Timeseries plots Enterococci levels generally remained very low throughout the monitoring period, just exceeding the geometric mean guideline limit on one occasion in response to rainfall.



See page 5 for key to graph

Cabbage Tree Bay

See page 83 for key to map

Description

Cabbage Tree Bay is located at Norah Head and is backed by a reserve and a steep escarpment. It is not patrolled but is frequently used during the summer months for swimming, snorkeling, diving and fishing. There are also boat launching facilities at the bay.



Pollution sources

A number of stormwater drains discharge to the bay from the urban area during wet weather. Secondary treated sewage effluent from the Norah Head Sewage Treatment Plant is discharged via an outfall at Norah Head, to the south of the beach.

Compliance

The site complied with NHMRC (1990) swimming guidelines in all seven months of the 2008–2009 summer swimming season.

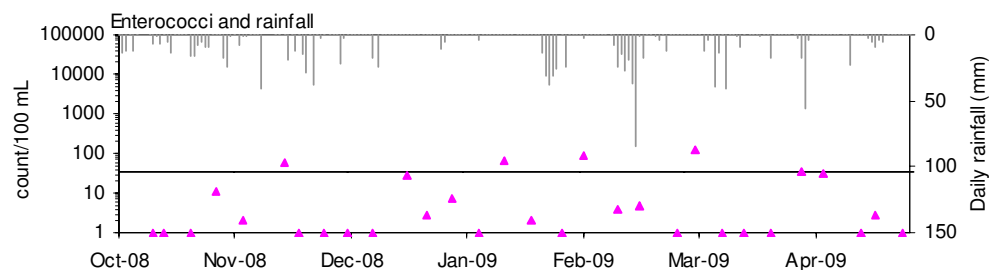
Compliance with NHMRC (1990) swimming guidelines at Cabbage Tree Bay

	OCT '08	NOV '08	DEC '08	JAN '09	FEB '09	MAR '09	APR '09
ENT	PASS*	PASS*	PASS	PASS*	PASS*	PASS*	PASS

* Only four samples were collected in this month. An additional data point was borrowed from an adjacent month to calculate compliance.

Timeseries plots

Enterococci levels were generally low throughout the monitoring period. Several results just exceeded the geometric mean guideline during dry and wet weather conditions.



See page 5 for key to graph

Lighthouse Beach

See page 83 for key to map

Description Lighthouse Beach is situated on Norah Head. It is used mainly for fishing, snorkelling, diving and surfing.

Pollution sources Secondary-treated sewage effluent from the Norah Head Sewage Treatment Plant is discharged via an outfall at Norah Head, to the south of the beach.

Compliance The site complied with NHMRC (1990) swimming guidelines in all seven months of the 2008–2009 summer swimming season.

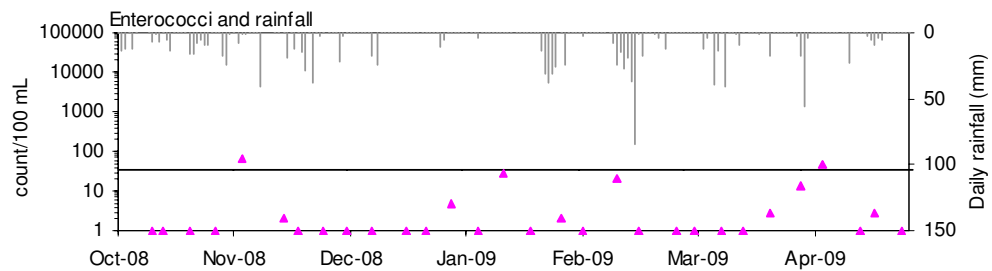


Compliance with NHMRC (1990) swimming guidelines at Lighthouse Beach

	OCT '08	NOV '08	DEC '08	JAN '09	FEB '09	MAR '09	APR '09
ENT	PASS*	PASS*	PASS	PASS*	PASS*	PASS*	PASS

* Only four samples were collected in this month. An additional data point was borrowed from an adjacent month to calculate compliance.

Timeseries plots Levels of enterococci were generally very low throughout the monitoring period, just exceeding the geometric mean guideline on two occasions.



See page 5 for key to graph

Gravelly Beach

See page 83 for key to map

Description

Gravelly Beach is located approximately 500 metres south of Norah Head and is backed by high dunes and vegetation. The beach is protected by wide rock platforms at both ends. Access is via Norah Head walking track or the car park located at Soldiers Beach to the south. The area is popular for sightseeing and fishing, with high use by surfers.



Pollution sources

Secondary-treated sewage effluent from the Norah Head Sewage Treatment Plant is discharged via an outfall at Norah Head, to the north of the beach.

Compliance

The site complied with NHMRC (1990) swimming guidelines in all seven months of the 2008–2009 summer swimming season.

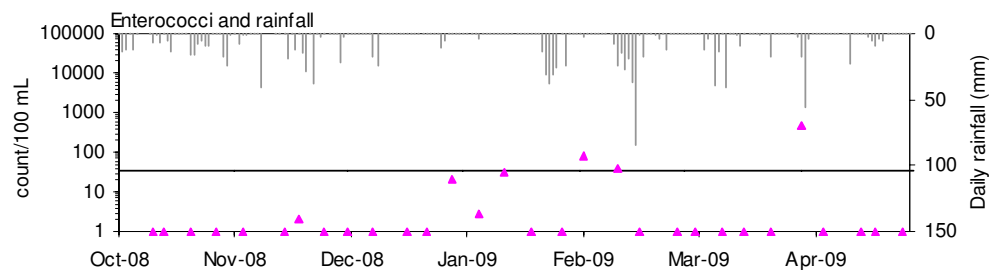
Compliance with NHMRC (1990) swimming guidelines at Gravelly Beach

	OCT '08	NOV '08	DEC '08	JAN '09	FEB '09	MAR '09	APR '09
ENT	PASS*	PASS*	PASS	PASS*	PASS*	PASS*	PASS

* Only four samples were collected in this month. An additional data point was borrowed from an adjacent month to calculate compliance.

Timeseries plots

Levels of enterococci were generally low throughout the monitoring period. A single very high result was recorded in early April 2009 in response to heavy rainfall.



See page 5 for key to graph

Soldiers Beach

See page 83 for key to map

Description

Soldiers is a patrolled beach that extends south-east from Soldiers Point to Pelican Point. A surf club is located toward the northern end of the beach, with a large car park situated on the Soldiers Point headland. The beach is popular in the summer and is used frequently by surfers throughout the year. A caravan park and residential area are located close by. The beach has high economic importance to the local community.



Pollution sources

A stormwater outlet flows to the beach just south of the surf club. This drains both urban and natural catchment areas. The beach may also be affected by secondary-treated sewage effluent discharged via an outfall at Norah Head to the north.

Compliance

The site complied with NHMRC (1990) swimming guidelines in all seven months of the 2008–2009 summer swimming season.

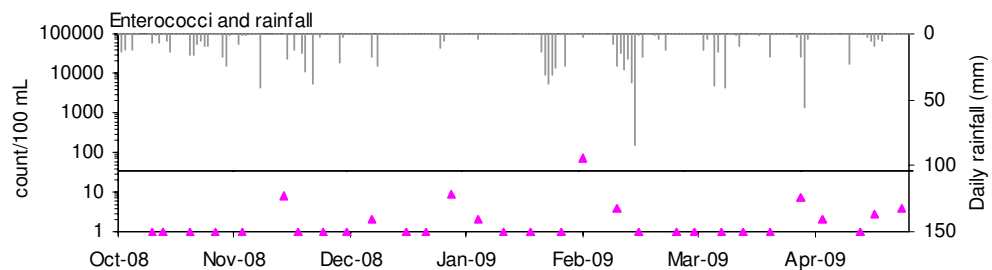
Compliance with NHMRC (1990) swimming guidelines at Soldiers Beach

	OCT '08	NOV '08	DEC '08	JAN '09	FEB '09	MAR '09	APR '09
ENT	PASS*	PASS*	PASS	PASS*	PASS*	PASS*	PASS

* Only four samples were collected in this month. An additional data point was borrowed from an adjacent month to calculate compliance.

Timeseries plots

Levels of enterococci were generally low throughout the monitoring period, with a single slightly elevated result exceeding the geometric mean guideline.



See page 5 for key to graph

North Entrance

See page 83 for key to map

Description

North Entrance is located to the north of Tuggerah Lake entrance, at the southern end of Tuggerah Beach. The sampling site is located in front of the surf club. The site is backed by urban development and a caravan park is nearby. The beach is frequently used and of high economic importance to the local community.



Pollution sources

Beach water quality may be affected by urban stormwater runoff and outflow from Tuggerah Lake.

Compliance

The site complied with NHMRC (1990) swimming guidelines in all seven months of the 2008–2009 summer swimming season.

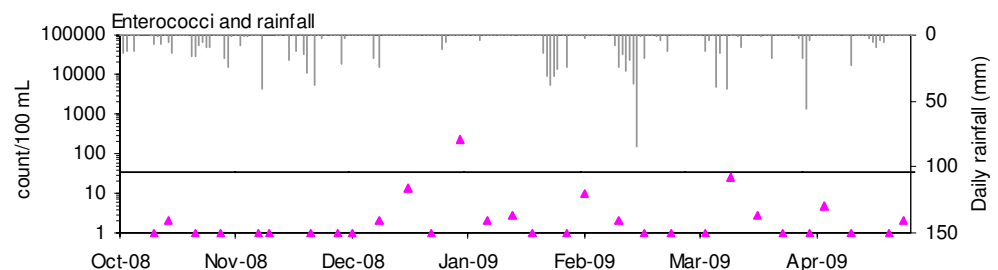
Compliance with NHMRC (1990) swimming guidelines at North Entrance

	OCT '08	NOV '08	DEC '08	JAN '09	FEB '09	MAR '09	APR '09
ENT	PASS*	PASS*	PASS	PASS*	PASS*	PASS*	PASS

* Only four samples were collected in this month. An additional data point was borrowed from an adjacent month to calculate compliance.

Timeseries plots

Levels of enterococci were generally low throughout the monitoring period, with a single elevated result exceeding the geometric mean guideline.



See page 5 for key to graph

The Entrance

See page 83 for key to map

Description The Entrance Beach is approximately 300 metres long and lies immediately south of the entrance to Tuggerah Lake. It is backed by high density residential and holiday apartment development. It is of high economic importance to the local community. The beach is very popular on weekends and during holiday periods.

Pollution sources Urban stormwater runoff, outflow from Tuggerah Lake and overflows from a sewage pumping station just south of the surf club may all potentially affect beach water quality.

Compliance The site complied with NHMRC (1990) swimming guidelines in all seven months of the 2008–2009 summer swimming season.

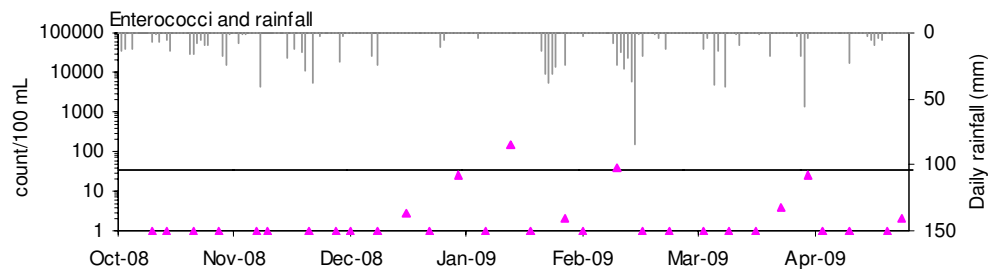


Compliance with NHMRC (1990) swimming guidelines at The Entrance

	OCT '08	NOV '08	DEC '08	JAN '09	FEB '09	MAR '09	APR '09
ENT	PASS*	PASS*	PASS	PASS*	PASS*	PASS*	PASS

* Only four samples were collected in this month. An additional data point was borrowed from an adjacent month to calculate compliance.

Timeseries plots Levels of enterococci were generally low throughout the monitoring period, with a single slightly elevated result exceeding the geometric mean guideline.



See page 5 for key to graph

Blue Bay

See page 83 for key to map

Description

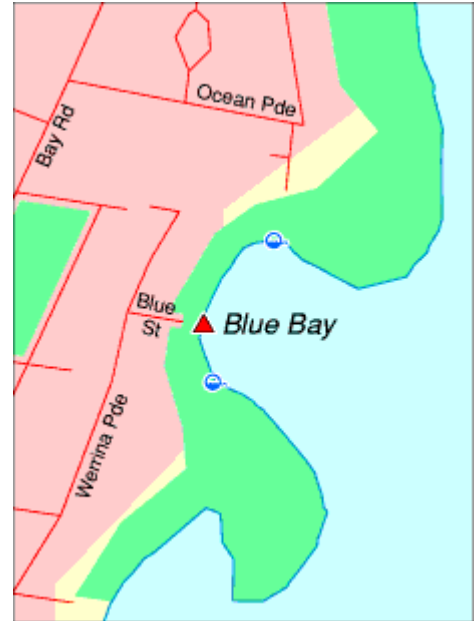
Blue Bay is a calm ocean beach bounded by a wide rock platform to the north and a long sand spit to the south. The beach is backed by residential development. It is used mainly on weekends and public holidays, and is popular with families owing to the prevailing calm water conditions.

Pollution sources

Beach water quality may be affected by urban stormwater runoff.

Compliance

The site complied with NHMRC (1990) swimming guidelines in all seven months of the 2008–2009 summer swimming season.



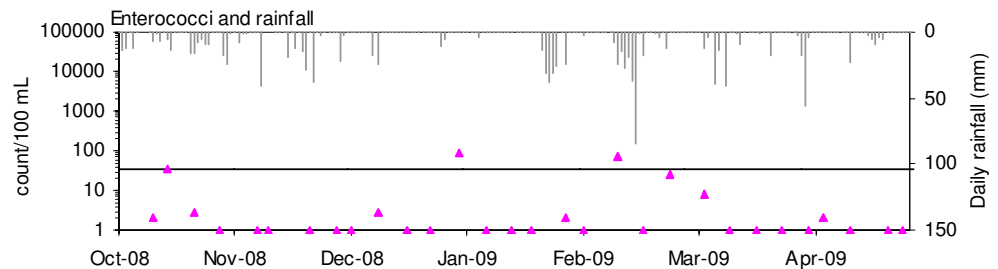
Compliance with NHMRC (1990) swimming guidelines at Blue Bay

	OCT '08	NOV '08	DEC '08	JAN '09	FEB '09	MAR '09	APR '09
ENT	PASS*	PASS*	PASS	PASS*	PASS*	PASS*	PASS

* Only four samples were collected in this month. An additional data point was borrowed from an adjacent month to calculate compliance.

Timeseries plots

Levels of enterococci remained generally low over the monitoring period, just exceeding the geometric mean guideline on two occasions.



See page 5 for key to graph

Toowoan Bay

See page 83 for key to map

Description Toowoan Bay is a relatively calm, semi-circular ocean beach that is protected by headlands. Parking, picnic areas, a surf club and a caravan park are located at the southern end of the beach. The beach is very popular for swimming and snorkelling, particularly during the summer holiday period. It has high economic importance to the local community.

Pollution sources Urban stormwater runoff and overflows from a sewage pumping station may affect beach water quality.

Compliance The site complied with NHMRC (1990) swimming guidelines in all seven months of the 2008–2009 summer swimming season.

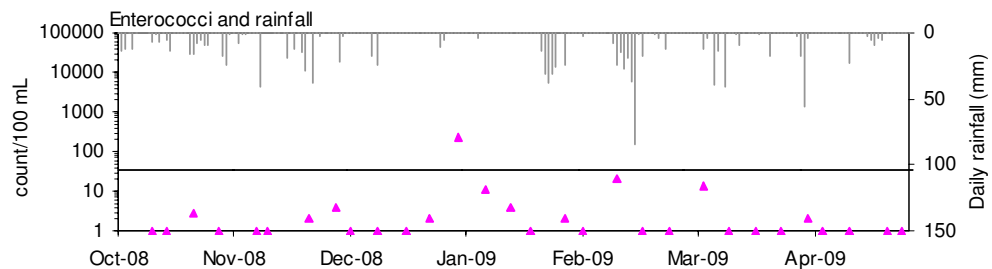


Compliance with NHMRC (1990) swimming guidelines at Toowoan Bay

	OCT '08	NOV '08	DEC '08	JAN '09	FEB '09	MAR '09	APR '09
ENT	PASS*	PASS*	PASS	PASS*	PASS*	PASS*	PASS

* Only four samples were collected in this month. An additional data point was borrowed from an adjacent month to calculate compliance.

Timeseries plots Levels of enterococci remained generally low over the monitoring period, just exceeding the geometric mean guideline on one occasion.



See page 5 for key to graph

Shelly Beach

See page 83 for key to map

Description

Shelly Beach is backed by a high foredune and a golf course. A surf club, carpark and caravan park are located at the southern end of the beach. The area is used primarily on weekends and public holidays. It has high economic importance to the local community.

Pollution sources

Urban stormwater discharged at the southern end of the beach may affect water quality. Treated effluent from the Bateau Bay Sewage Treatment Plant is discharged via an outfall at Wonga Point to the south of the beach.

Compliance

The site complied with NHMRC (1990) swimming guidelines in all seven months of the 2008–2009 summer swimming season.



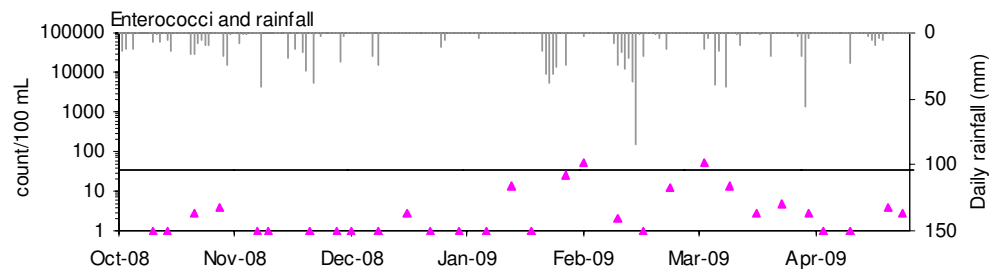
Compliance with NHMRC (1990) swimming guidelines at Shelly Beach

	OCT '08	NOV '08	DEC '08	JAN '09	FEB '09	MAR '09	APR '09
ENT	PASS*	PASS*	PASS	PASS*	PASS*	PASS*	PASS

* Only four samples were collected in this month. An additional data point was borrowed from an adjacent month to calculate compliance.

Timeseries plots

Levels of enterococci remained generally low over the monitoring period, just exceeding the geometric mean guideline on two occasions.



See page 5 for key to graph

Blue Lagoon

See page 83 for key to map

Description Blue Lagoon is a short and calm ocean beach that is protected by a reef approximately 200 metres offshore. It is backed by a caravan park and is popular with tourists to the area. The beach is used extensively on weekends and holiday periods for swimming and snorkelling.

Pollution sources Urban stormwater discharged at the southern end of the beach may affect water quality. Treated effluent from the Bateau Bay Sewage Treatment Plant is discharged via an outfall at Wonga Point to the south of the beach.

Compliance The site complied with NHMRC (1990) swimming guidelines in all seven months of the 2008–2009 summer swimming season.

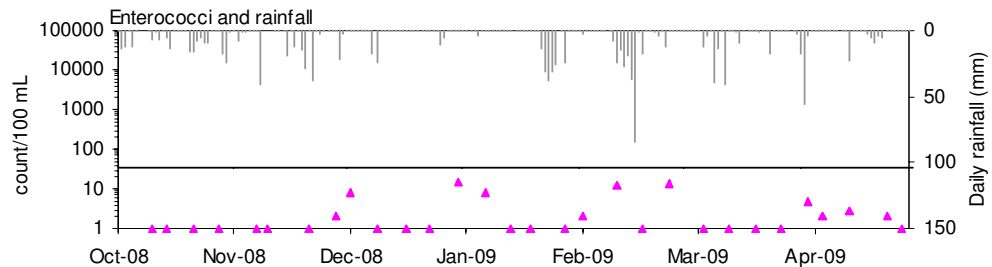


Compliance with NHMRC (1990) swimming guidelines at Blue Lagoon

	OCT '08	NOV '08	DEC '08	JAN '09	FEB '09	MAR '09	APR '09
ENT	PASS*	PASS*	PASS	PASS*	PASS*	PASS*	PASS

* Only four samples were collected in this month. An additional data point was borrowed from an adjacent month to calculate compliance.

Timeseries plots Levels of enterococci remained low over the monitoring period.



See page 5 for key to graph

Bateau Bay Beach

See page 83 for key to map

Description

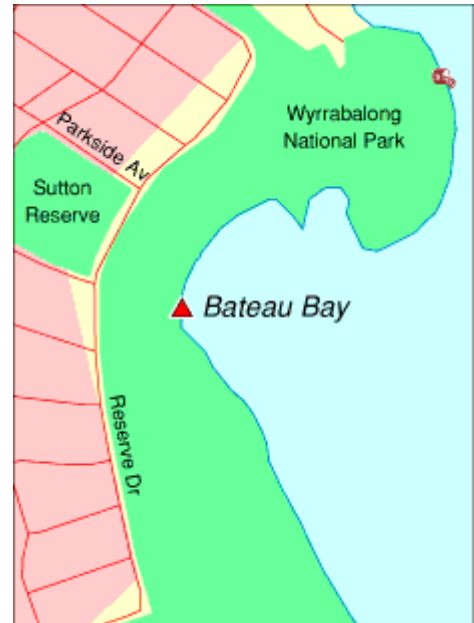
Bateau Bay Beach is approximately 200 metres long and backed by the southern section of Wyrabalong National Park. The beach is not patrolled and is protected by prominent headlands and reefs. It is popular with family groups on weekends and during holiday periods.

Pollution sources

Urban stormwater may affect beach water quality during wet weather. Treated effluent from the Bateau Bay Sewage Treatment Plant is discharged via an outfall at Wonga Point to the north of the beach.

Compliance

The site complied with NHMRC (1990) swimming guidelines in all seven months of the 2008–2009 summer swimming season.



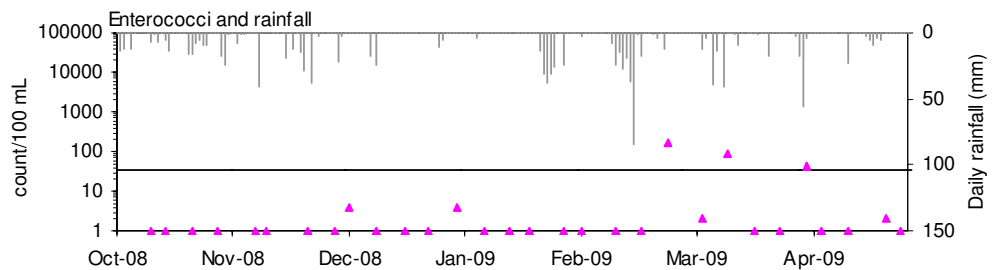
Compliance with NHMRC (1990) swimming guidelines at Bateau Bay

	OCT '08	NOV '08	DEC '08	JAN '09	FEB '09	MAR '09	APR '09
ENT	PASS*	PASS*	PASS	PASS*	PASS*	PASS*	PASS

* Only four samples were collected in this month. An additional data point was borrowed from an adjacent month to calculate compliance.

Timeseries plots

Levels of enterococci remained generally low over the monitoring period, just exceeding the geometric mean guideline on three occasions in response to rainfall.



See page 5 for key to graph

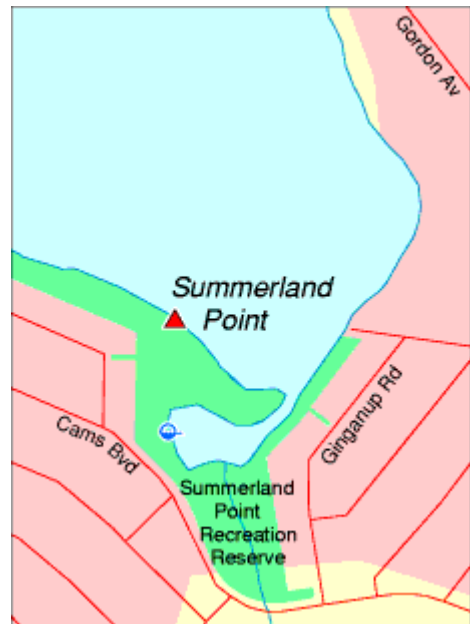
Summerland Point

See page 83 for key to map

Description Summerland Point is a netted swimming enclosure within Lake Macquarie. The sampling site is backed by a small reserve and the residential area of Summerland Point. The site is popular with local children.

Pollution sources Several stormwater outlets discharge in the vicinity of the swimming location. A boat pumpout facility on the adjacent wharf and droppings from birdlife are also potential pollution sources.

Compliance The site complied with NHMRC (1990) swimming guidelines in all seven months of the 2008–2009 summer swimming season.

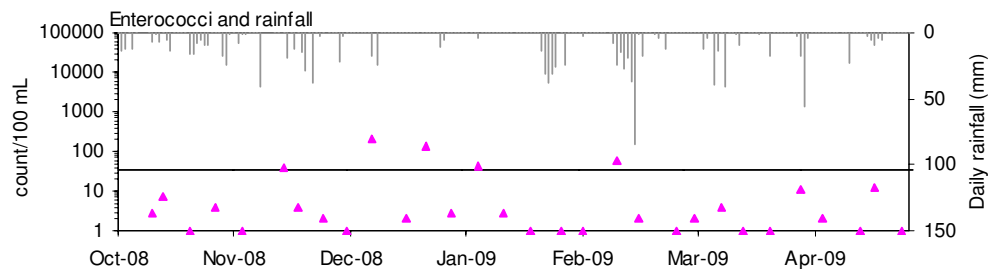


Compliance with NHMRC (1990) swimming guidelines at Summerland Point

	OCT '08	NOV '08	DEC '08	JAN '09	FEB '09	MAR '09	APR '09
ENT	PASS*	PASS*	PASS	PASS*	PASS*	PASS*	PASS

* Only four samples were collected in this month. An additional data point was borrowed from an adjacent month to calculate compliance.

Timeseries plots Levels of enterococci remained low over most of the monitoring period, just exceeding the geometric mean guideline on a number of occasions.



See page 5 for key to graph

Gwandalan

See page 83 for key to map

Description

The Gwandalan sampling site is a netted swimming enclosure within Crangan Bay in Lake Macquarie. The site is backed by a small reserve and the township of Gwandalan. The location is popular with local children.

Pollution sources

Urban stormwater is discharged via an outlet to the north of the swimming area. Waterbirds common to the area may also affect water quality.

Compliance

The site complied with NHMRC (1990) swimming guidelines in all seven months of the 2008–2009 summer swimming season.



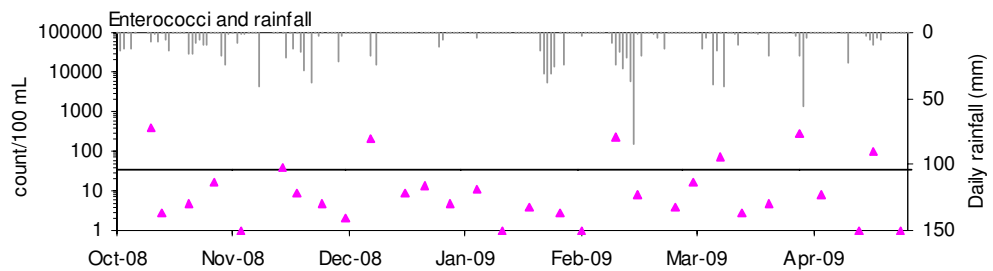
Compliance with NHMRC (1990) swimming guidelines at Gwandalan

	OCT '08	NOV '08	DEC '08	JAN '09	FEB '09	MAR '09	APR '09
ENT	PASS*	PASS*	PASS	PASS*	PASS*	PASS*	PASS

* Only four samples were collected in this month. An additional data point was borrowed from an adjacent month to calculate compliance.

Timeseries plots

Levels of enterococci were generally low throughout the monitoring period, with elevated levels recorded on a number of occasions in response to rainfall.



See page 5 for key to graph

Chain Valley Bay

See page 83 for key to map

Description

The Chain Valley Bay site is an enclosed swimming area located in the south-east of Lake Macquarie. The site is backed by a small reserve and residential development. The swimming site is popular with local children.



Pollution sources

Water quality is potentially affected by urban stormwater, outflow from Karignan Creek and overflows from a nearby sewage pumping station. Water birds may also contribute to faecal contamination.

Compliance

The site complied with NHMRC (1990) swimming guidelines in all seven months of the 2008–2009 summer swimming season.

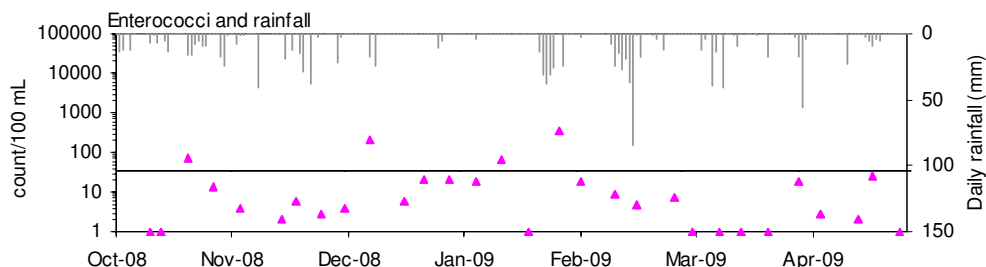
Compliance with NHMRC (1990) swimming guidelines at Chain Valley Bay

	OCT '08	NOV '08	DEC '08	JAN '09	FEB '09	MAR '09	APR '09
ENT	PASS*	PASS*	PASS	PASS*	PASS*	PASS*	PASS

* Only four samples were collected in this month. An additional data point was borrowed from an adjacent month to calculate compliance.

Timeseries plots

Levels of enterococci were generally low throughout the monitoring period, with elevated levels recorded on a number of occasions in response to rainfall.



See page 5 for key to graph

Elizabeth Bay

See page 83 for key to map

Description

Elizabeth Bay is in the north-eastern corner of Lake Munmorah and is backed by Elizabeth Bay Reserve. A creek draining a residential area flows into the bay and birdlife is common. The area is not a popular swimming location, but local children are known to swim here.

Pollution sources

Two large stormwater outlets drain into the bay and there is a sewage pumping station located in the reserve. Faecal contamination from waterbirds and creek discharge are further potential sources of contamination.

Compliance

The site complied with NHMRC (1990) swimming guidelines in all seven months of the 2008–2009 summer swimming season.



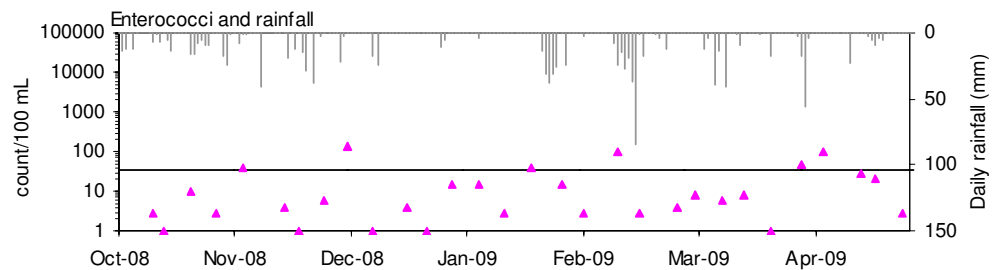
Compliance with NHMRC (1990) swimming guidelines at Elizabeth Bay

	OCT '08	NOV '08	DEC '08	JAN '09	FEB '09	MAR '09	APR '09
ENT	PASS*	PASS*	PASS	PASS*	PASS*	PASS*	PASS

* Only four samples were collected in this month. An additional data point was borrowed from an adjacent month to calculate compliance.

Timeseries plots

Levels of enterococci were mostly low throughout the monitoring period. Levels exceeded the geometric mean guideline on a number of occasions, generally in response to rainfall.



See page 5 for key to graph

San Remo

See page 83 for key to map

Description The San Remo swimming location is situated in Budgewoi Lake, near the mouth of Wallarah Creek. The site is popular with local children.



Pollution sources Urban stormwater runoff is discharged via two drains in the immediate vicinity of the swimming site. Outflow from Wallarah Creek may also affect swimming water quality. Bird faeces may be source of contamination.

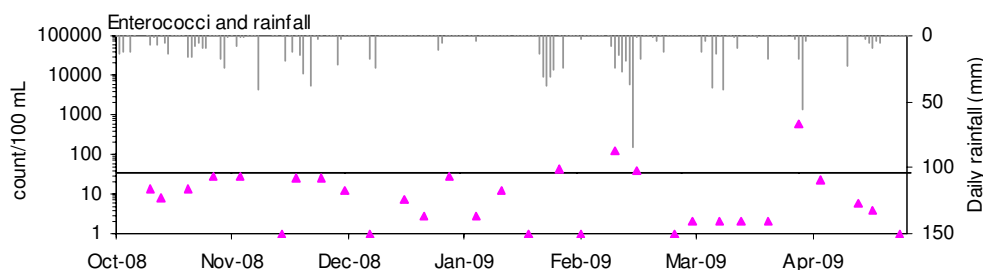
Compliance The site complied with NHMRC (1990) swimming guidelines in all seven months of the 2008–2009 summer swimming season.

Compliance with NHMRC (1990) swimming guidelines at San Remo

	OCT '08	NOV '08	DEC '08	JAN '09	FEB '09	MAR '09	APR '09
ENT	PASS*	PASS*	PASS	PASS*	PASS*	PASS*	PASS

* Only four samples were collected in this month. An additional data point was borrowed from an adjacent month to calculate compliance.

Timeseries plots Enterococci levels generally remained generally low throughout the monitoring period, occasionally exceeding the geometric mean guideline limit in response to heavy rainfall.



See page 5 for key to graph

Toukley Aquatic

See page 83 for key to map

Description

Toukley Aquatic is a netted swimming enclosure located in Lake Budgewoi. It is backed by a large urban development. The pool is not a popular swimming location but is occasionally used by children.



Pollution sources

Urban stormwater runoff may affect swimming water quality in wet weather. Waterbirds in the area may also contribute to faecal contamination.

Compliance

The site complied with NHMRC (1990) swimming guidelines in all seven months of the 2008–2009 summer swimming season.

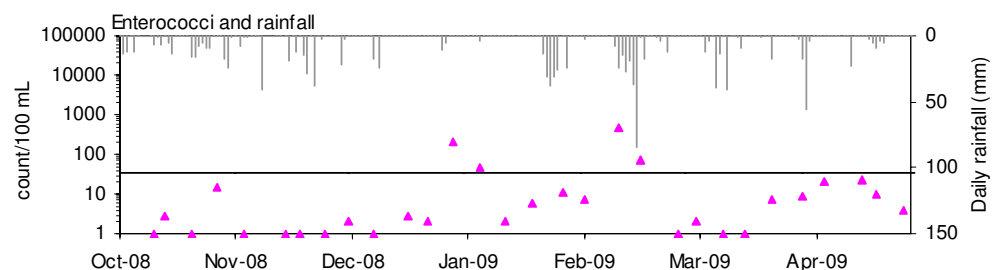
Compliance with NHMRC (1990) swimming guidelines at Toukley Aquatic

	OCT '08	NOV '08	DEC '08	JAN '09	FEB '09	MAR '09	APR '09
ENT	PASS*	PASS*	PASS	PASS*	PASS*	PASS*	PASS

* Only four samples were collected in this month. An additional data point was borrowed from an adjacent month to calculate compliance.

Timeseries plots

Levels of enterococci were generally low throughout the monitoring period, exceeding the geometric mean guideline limit on four occasions.



See page 5 for key to graph

Canton Beach

See page 83 for key to map

Description Canton Beach is situated in Tuggerah Lake and is backed by a narrow reserve and picnic area and the town of Toukley. The shallow, calm waters of this beach are popular with children and families during holiday periods. Sailing is popular throughout the year and the beach has high economic importance to the local community.



Pollution sources Urban stormwater runoff is discharged to the beach via three drains. The largest drain is located near Crossingham Street. Faecal contamination from birds may also be a source of pollution.

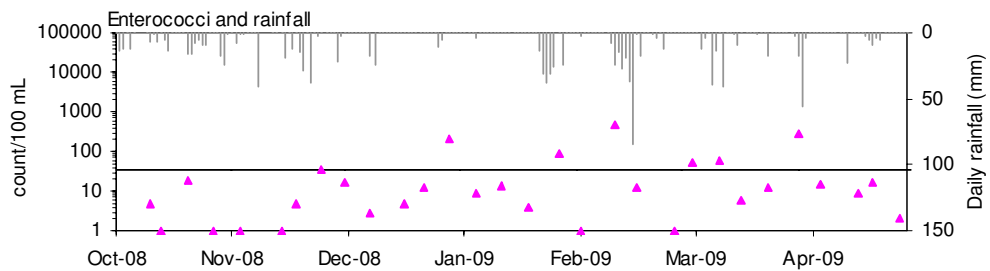
Compliance Canton Beach complied with NHMRC (1990) swimming guidelines in six of the seven months of the 2008–2009 summer swimming season. The site failed the guidelines in March 2009.

Compliance with NHMRC (1990) swimming guidelines at Canton Beach

	OCT '08	NOV '08	DEC '08	JAN '09	FEB '09	MAR '09	APR '09
ENT	PASS*	PASS*	PASS	PASS*	PASS*	FAIL*	PASS

* Only four samples were collected in this month. An additional data point was borrowed from an adjacent month to calculate compliance.

Timeseries plots Levels of enterococci mostly remained below the geometric mean guideline limit throughout the monitoring period. Elevated levels were recorded on several occasions, generally in response to rainfall.



See page 5 for key to graph

The Entrance Channel

Description

The Entrance Channel is situated in the mouth of Tuggerah Lake. It is backed by high-density urban, commercial and resort development. The beach is not patrolled but is popular during school holidays. Pelican feeding is a regular attraction near this site.

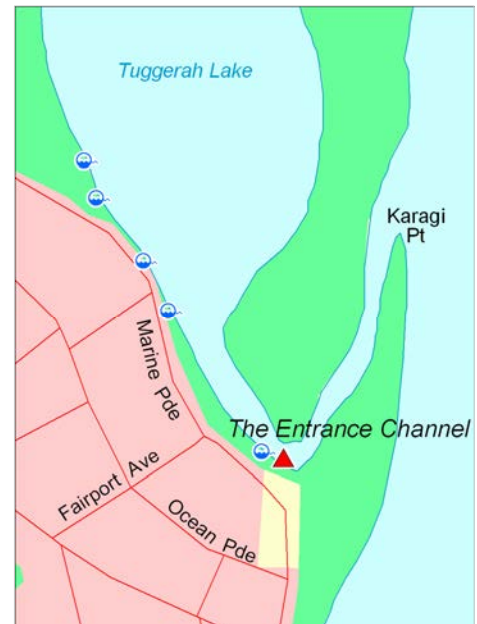
Pollution sources

Numerous stormwater drains discharge in the immediate vicinity of the site. The site may also be affected by outflow from Tuggerah Lakes. Droppings from waterbirds, including pelicans, may also have an impact on water quality.

Compliance

The site complied with NHMRC (1990) swimming guidelines in all seven months of the 2008–2009 summer swimming season.

See page 83 for key to map



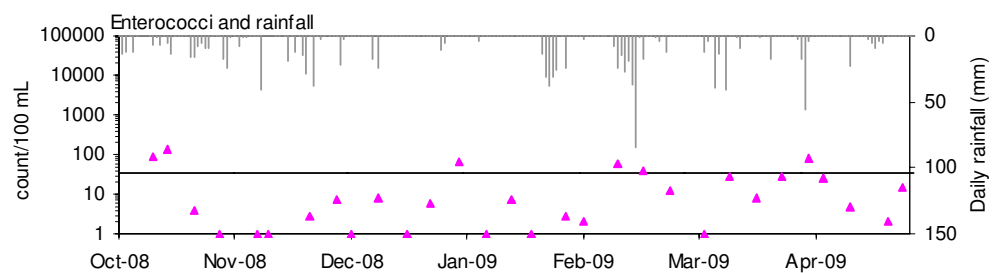
Compliance with NHMRC (1990) swimming guidelines at The Entrance Channel

	OCT '08	NOV '08	DEC '08	JAN '09	FEB '09	MAR '09	APR '09
ENT	PASS*	PASS*	PASS	PASS*	PASS*	PASS*	PASS

* Only four samples were collected in this month. An additional data point was borrowed from an adjacent month to calculate compliance.

Timeseries plots

Levels of enterococci were mostly below the geometric mean guideline limit throughout the monitoring period, with slightly elevated results recorded on a number of occasions, generally in response to rainfall.



See page 5 for key to graph

Long Jetty

See page 83 for key to map

- Description** Long Jetty is located in Tuggerah Lake and is backed by urban development. Children are the most frequent users of the swimming location.
- Pollution sources** Urban stormwater runoff is discharged in the immediate vicinity of the sampling site.
- Compliance** The site complied with NHMRC (1990) swimming guidelines in all seven months of the 2008–2009 summer swimming season.



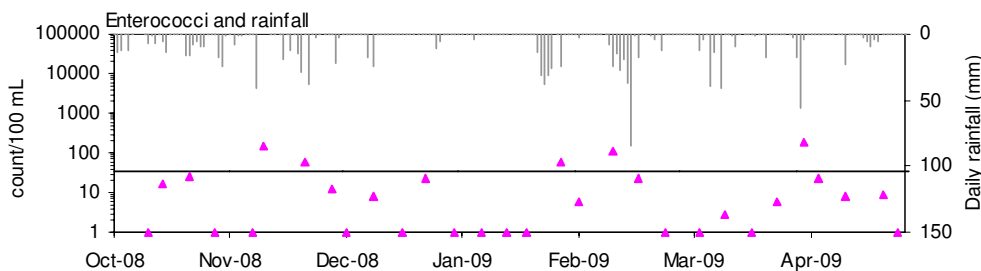
Compliance with NHMRC (1990) swimming guidelines at Long Jetty

	OCT '08	NOV '08	DEC '08	JAN '09	FEB '09	MAR '09	APR '09
ENT	PASS*	PASS*	PASS	PASS*	PASS*	PASS*	PASS

* Only four samples were collected in this month. An additional data point was borrowed from an adjacent month to calculate compliance.

Timeseries plots

Levels of enterococci were mostly below the geometric mean guideline limit throughout the monitoring period, with slightly elevated results recorded on a number of occasions in response to rainfall.



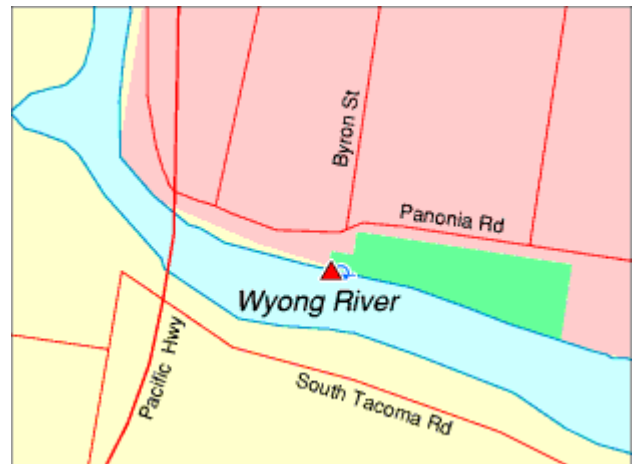
See page 5 for key to graph

Wyong River

See page 83 for key to map

Description

The Wyong River sampling site is located to the south of the township of Wyong. This area of the river is predominantly used for recreational boating and fishing.



Pollution sources

Urban stormwater runoff is discharged in the immediate vicinity of the sampling site. Water quality may also be affected by leachate from onsite wastewater management systems and runoff from rural areas in the upper catchment.

Compliance

Wyong River failed to comply with the NHMRC (1990) swimming guidelines in five of the seven months of the 2008–2009 summer swimming season. The site passed the guidelines in October 2008 and January 2009.

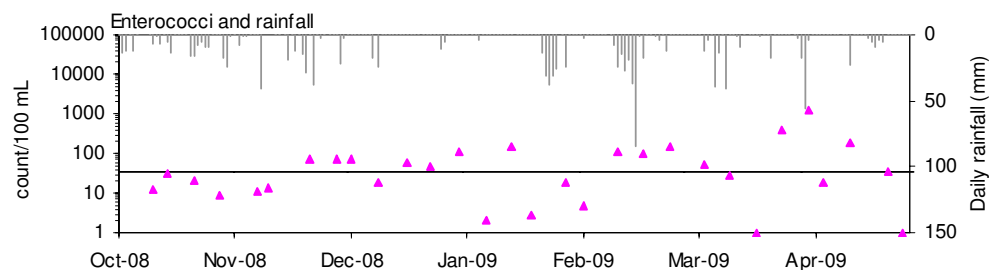
Compliance with NHMRC (1990) swimming guidelines at Wyong River

	OCT '08	NOV '08	DEC '08	JAN '09	FEB '09	MAR '09	APR '09
ENT	PASS*	FAIL*	FAIL	PASS*	FAIL*	FAIL*	FAIL

* Only four samples were collected in this month. An additional data point was borrowed from an adjacent month to calculate compliance.

Timeseries plots

Enterococci levels exceeded the geometric mean guideline level throughout much of the monitoring period, indicating that the site is affected by faecal contamination in dry and wet weather conditions.



See page 5 for key to graph

Ourimbah Creek

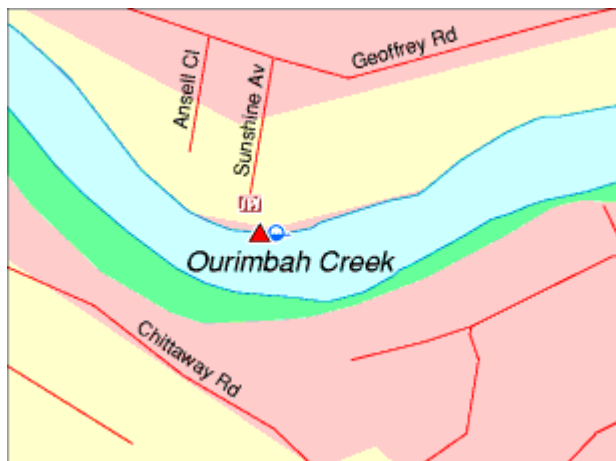
See page 83 for key to map

Description

This site is located at Chittaway Point, adjacent to the boat ramp. The area is used for swimming by local children.

Pollution sources

Urban stormwater runoff is discharged in the immediate vicinity of the swimming site. Leachate from onsite wastewater management systems and rural runoff from the upper catchment may also affect water quality. Faecal contamination from birds is a potential source of pollution.



Compliance

Ourimbah Creek failed to comply with the NHMRC (1990) swimming guidelines in five of the seven months of the 2008–2009 summer swimming season. The site passed the guidelines in October 2008 and February 2009.

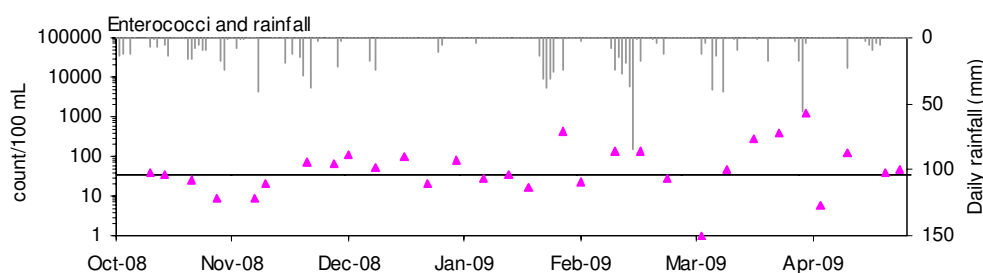
Compliance with NHMRC (1990) swimming guidelines at Ourimbah Creek

	OCT '08	NOV '08	DEC '08	JAN '09	FEB '09	MAR '09	APR '09
ENT	PASS*	FAIL*	FAIL	FAIL*	PASS*	FAIL*	FAIL

* Only four samples were collected in this month. An additional data point was borrowed from an adjacent month to calculate compliance.

Timeseries plots

Enterococci levels exceeded the geometric mean guideline level throughout much of the monitoring period, indicating that the site is affected by faecal contamination in dry and wet weather conditions.



See page 5 for key to graph

Tumbi Umbi Creek

See page 83 for key to map

Description

Tumbi Umbi Creek drains into the southern end of Tuggerah Lake. The creek mouth is blocked by a sandbar and as a result the creek is poorly flushed. The swimming area is known to be used by local children.



Pollution sources

Water quality in Tumbi Umbi Creek is affected by urban and industrial stormwater runoff from the lower catchment and by leachate from onsite wastewater management systems and rural runoff from the upper catchment. Faecal contamination from birds is also a potential source of pollution.

Compliance

The site failed the NHMRC (1990) swimming guidelines in all seven months of the 2008–2009 summer swimming season.

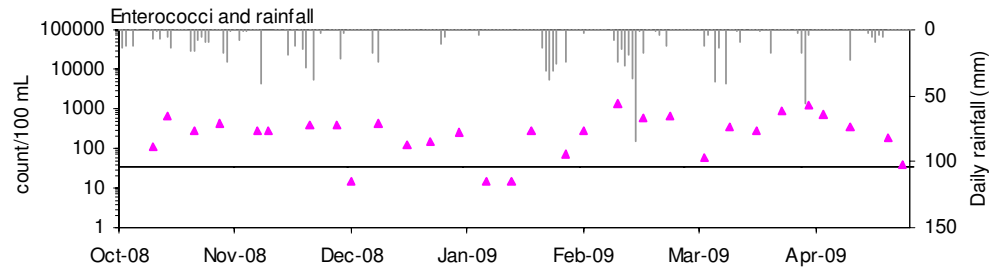
Compliance with NHMRC (1990) swimming guidelines at Tumbi Umbi Creek

	OCT '08	NOV '08	DEC '08	JAN '09	FEB '09	MAR '09	APR '09
ENT	FAIL *	FAIL *	FAIL	FAIL *	FAIL *	FAIL *	FAIL

* Only four samples were collected in this month. An additional data point was borrowed from an adjacent month to calculate compliance.

Timeseries plots

High levels of bacteria were measured throughout the monitoring period, indicating that the site is affected by faecal contamination in dry and wet weather conditions.



See page 5 for key to graph