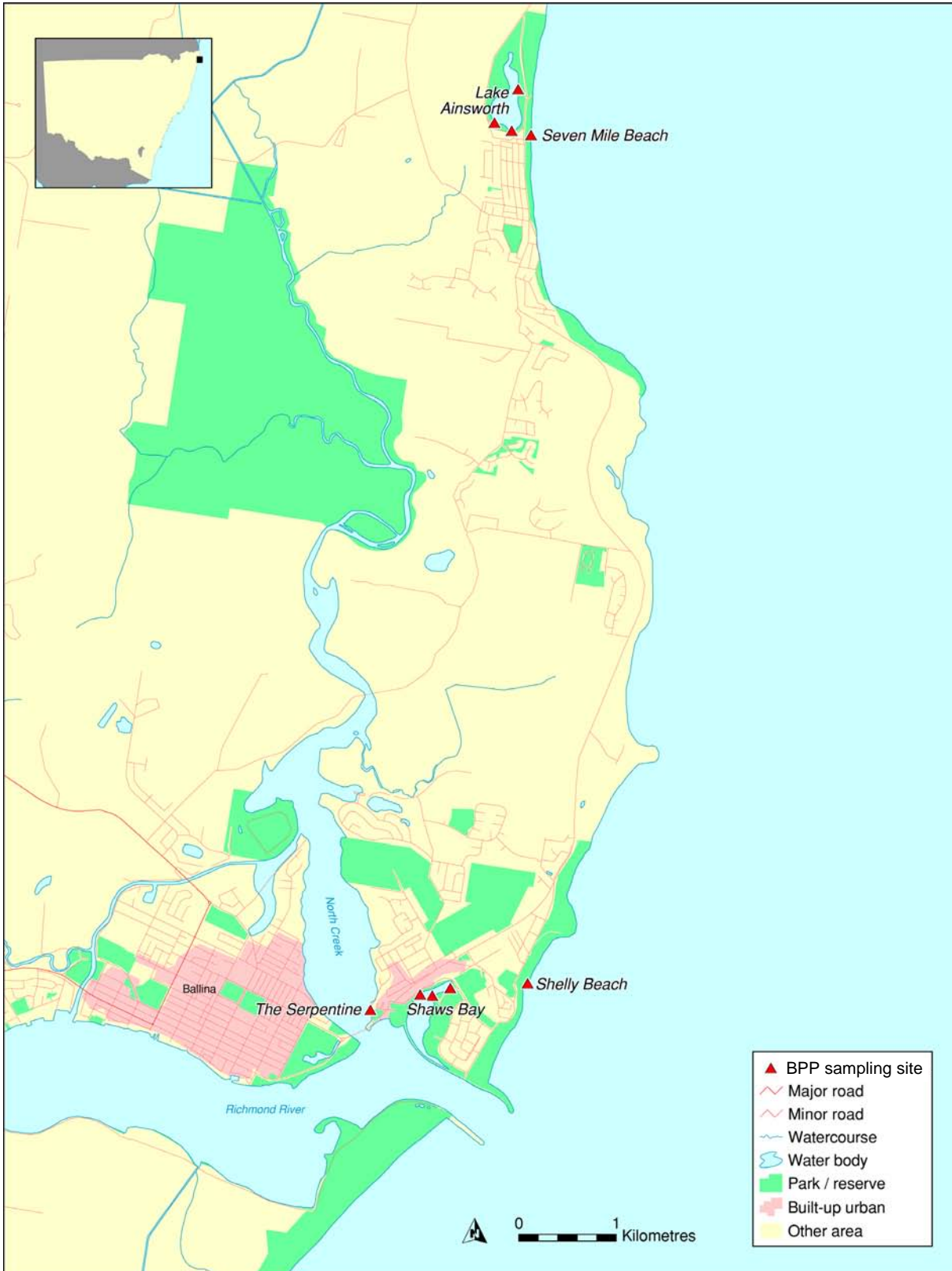


Ballina Shire Council

Ocean beaches: Seven Mile, Shelly. **Freshwater lake:** Lake Ainsworth. **Estuaries:** Shaws Bay, The Serpentine.



Local government area description

Ballina Shire is located on the New South Wales Far North Coast and covers an area of 487 square kilometres. Its coastal waters extend from Seven Mile Beach in the north to Wardell in the south.

Land use is predominantly rural, with more than 80 square kilometres of rural land along the coast. The main commercial activities are agriculture, tourism and fishing, with a growing sector of primary goods production.

Approximately 42 000 people live in the Shire and the population is growing at three per cent each year. In 2000 there were approximately 1.9 million visitors to the area and approximately half participated in outdoor recreational activities.

The major towns in the region are Ballina, Lennox Head, Alstonville, Wollongbar and Wardell. Two significant tributaries to the Richmond River in the Shire are Emigrant Creek and North Creek, both of which enter the estuary at Ballina (Ballina Shire Council 2004).

Program outline

Ballina Shire Council monitored nine locations over the 2007–2008 summer swimming season. These were the ocean beaches of Seven Mile and Shelly, three sites in Lake Ainsworth, one site at The Serpentine and three sites in Shaws Bay.

All locations have been monitored since summer 2002–2003. These results have previously been reported in State of the Beaches reports for these years (DEC 2004b, 2004c, 2006a, 2006b, DECC 2007).

Monitoring in the Shire was conducted during the four busiest months of the summer swimming season: November, December, January and February. Faecal coliform and enterococci samples were collected to assess compliance with the NHMRC (1990) swimming water quality guidelines.

More intensive sampling was conducted in January in response to extensive flooding along the Richmond River. Although eight samples were collected, only five data points were required to calculate compliance. Data

collected on consecutive days were not included in the calculations.

It should be noted that the five samples necessary to calculate compliance were not collected in all months. Where only four samples were collected, the closest sample in time from an adjacent month was 'borrowed' in order to provide the five data points required.

Ballina Council publishes 'star ratings' in *The Advocate*, and also issues regular media releases during the summer swimming season.

Rainfall

Rainfall data presented in the timeseries plots were obtained from the Bureau of Meteorology's gauge at Ballina Airport.

Actions to improve water quality

Ballina Council has been undertaking works to improve the stormwater system. Gross pollutant traps have been installed at the stormwater outlets at Shaws Bay, Seven Mile Beach and Lighthouse Beach (which adjoins Shelley Beach). Council is also in the process of installing a further six gross pollutant traps on the main stormwater discharge points along Seven Mile Beach at Lennox Head. In addition, Council continues to ensure that new developments consider and apply water-sensitive urban design principles for stormwater quality and quantity.

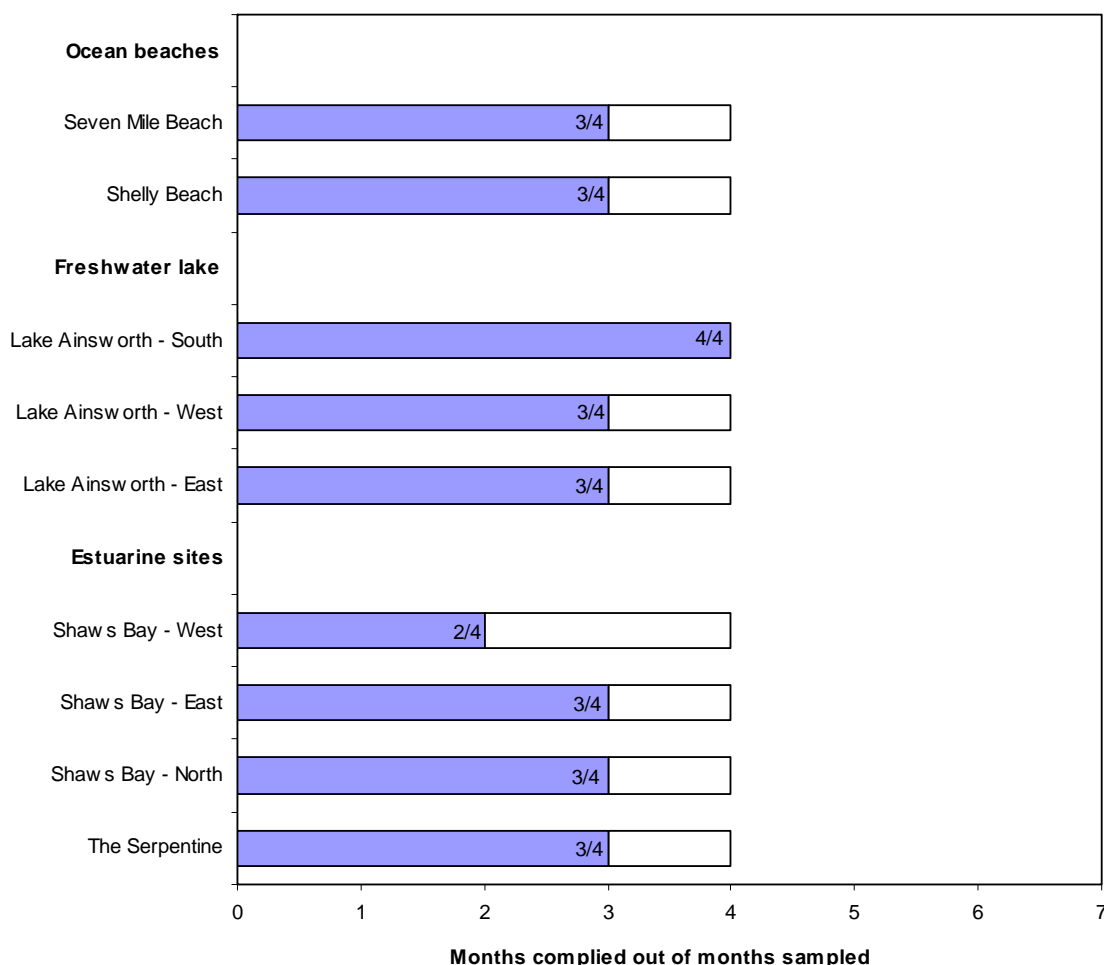
Ocean beaches

Guideline compliance assessment

Seven Mile and Shelly beaches complied with the NHMRC (1990) swimming water quality guidelines in three of the four months monitored over the 2007–2008 summer season. Both beaches failed the guidelines in January 2008 owing to elevated levels of enterococci associated with a major flooding event in the region (Figure 2).

High levels of compliance were recorded at these beaches over the last four summer seasons (DEC 2004b, 2004c, 2006a, 2006b and DECC 2007).

Figure 2: Summary of compliance with NHMRC (1990) microbiological guidelines for swimming at Ballina Shire Council swimming sites during the 2007–2008 summer swimming season



Response to rainfall

The levels of indicator bacteria measured at Seven Mile Beach and Shelly Beach over this summer swimming season were generally low, with elevated enterococci levels recorded in response to heavy rainfall in January 2008.

Results from previous monitoring show generally low bacterial levels, with little response to rainfall and little evidence of sewage contamination at these sites (DEC 2004b, 2004c, 2006a and 2006b and DECC 2007).

Lake Ainsworth

Guideline compliance assessment

Levels of faecal coliforms and enterococci were measured in the southern corner and in the east and west of Lake Ainsworth.

The southern corner of Lake Ainsworth complied with the NHMRC (1990) swimming water quality guidelines in all months sampled. Lake Ainsworth West failed the guidelines in December 2007 and Lake Ainsworth East failed swimming water quality guidelines in January 2008. Both sites failed because of elevated levels of enterococci.

Response to rainfall

Elevated levels of enterococci were measured at all three Lake Ainsworth sites in response to heavy rainfall.

The Serpentine

Guideline compliance assessment

The Serpentine is a popular swimming location situated in a tributary of the Richmond River. The site passed NHMRC (1990) swimming water quality guidelines in November 2007, December 2007 and February 2008. The site failed to comply with guidelines in January 2008 owing to elevated levels of enterococci associated with major flooding in the area.

This site consistently complied with swimming guidelines during the previous four summer seasons (DEC 2004b, 2004c, 2006a, 2006b and DECC 2007).

Response to rainfall

Slightly elevated levels of indicator bacteria were measured at The Serpentine on several occasions following heavy rainfall.

Wet weather data collected between October 2002 and July 2003 indicated that swimming in The Serpentine should be avoided during, and for three days following, heavy rainfall (DEC 2004b).

Shaws Bay

Guideline compliance assessment

Shaws Bay is located at the mouth of the Richmond River. Three locations were monitored: the north, east and west sides of the bay.

Shaws Bay East and Shaws Bay North complied with the NHMRC (1990) swimming guidelines in November 2007, December 2007 and February 2008. Both sites failed in January 2008 owing to elevated levels of enterococci associated with major flooding along the Richmond River. Shaws Bay West failed to comply with guidelines in January and February 2008.

High levels of compliance were recorded at these sites over the previous four summer seasons (DEC 2004b, 2004c, 2006a, 2006b and DECC 2007).

Response to rainfall

Faecal coliform levels at all three locations were generally low during dry weather conditions, with slightly elevated results recorded on a number of occasions, generally in response to rainfall.

Levels of enterococci at Shaws Bay East and Shaws Bay North occasionally exceeded the geometric mean guideline value in response to rainfall. Enterococci levels at Shaws Bay West exceeded the geometric mean guideline value more frequently than the other two sites, with most elevated readings in response to rainfall.

Wet weather monitoring between October 2002 and July 2003 indicated that elevated bacterial levels are present in the bay for up to two days following heavy rainfall (DEC 2004b). Swimming in the bay should be avoided during, and for at least 48 hours following, heavy rainfall.

Seven Mile Beach

See page 12 for key to map

Description

Seven Mile Beach is a long shore beach that extends for over eight kilometres. It is of considerable economic importance, forming the basis of tourism to the region. The beach is used throughout the year, but is particularly popular during the summer period. There are numerous facilities, including car parks and a surf club. The sampling site is located adjacent to the surf club at the southern end of the beach.



Pollution sources

Urban stormwater from the town of Lennox Head has a potential impact upon the waters at this site. A gross pollutant trap has been installed at the stormwater outlet, reducing the amount of litter, sediment and other pollutants discharged to the beach. Other pollution sources include general litter and faecal deposits from domestic animals.

Compliance

Seven Mile Beach complied with NHMRC (1990) swimming guidelines in three of the four months monitored in the 2007–2008 summer swimming season. The site failed the guidelines in January 2008 owing to elevated levels of enterococci.

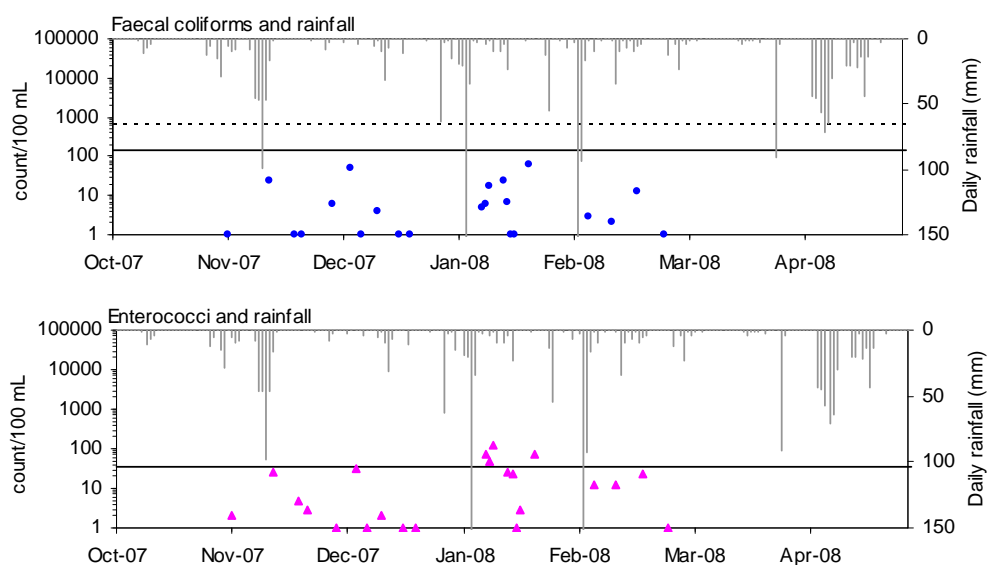
Compliance with NHMRC (1990) swimming guidelines at Seven Mile Beach

	NOV '07	DEC '07	JAN '08	FEB '08
FC	PASS	PASS	PASS	PASS*
ENT	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 faecal coliforms were generally low over the monitoring period, remaining below the guideline limits. Levels of enterococci exceeded guideline limits on several occasions in January 2008 following heavy rainfall.



See page 5 for key to graph

Shelly Beach

See page 12 for key to map

Description

Shelly Beach faces south-east and is approximately 700 metres long. It is backed by a narrow coastal reserve and urban development. Carparks are situated at each end of the beach and the surf club is located at the southern end. Shelly Beach is the main swimming beach for Ballina and is significant for local tourism.



Pollution sources

During wet weather, stormwater from the wetland behind Shelly Beach flows to the southern end of the beach, adjacent to the rock platform. The wetland is affected by urban stormwater runoff. A sewage pumping station located adjacent to the wetland is also a potential source of pollution. General litter is a further source of contamination at this site.

Compliance

Shelly Beach complied with NHMRC (1990) swimming guidelines in three of the four months monitored in the 2007–2008 summer swimming season. The site failed the guidelines in January 2008 owing to elevated levels of enterococci.

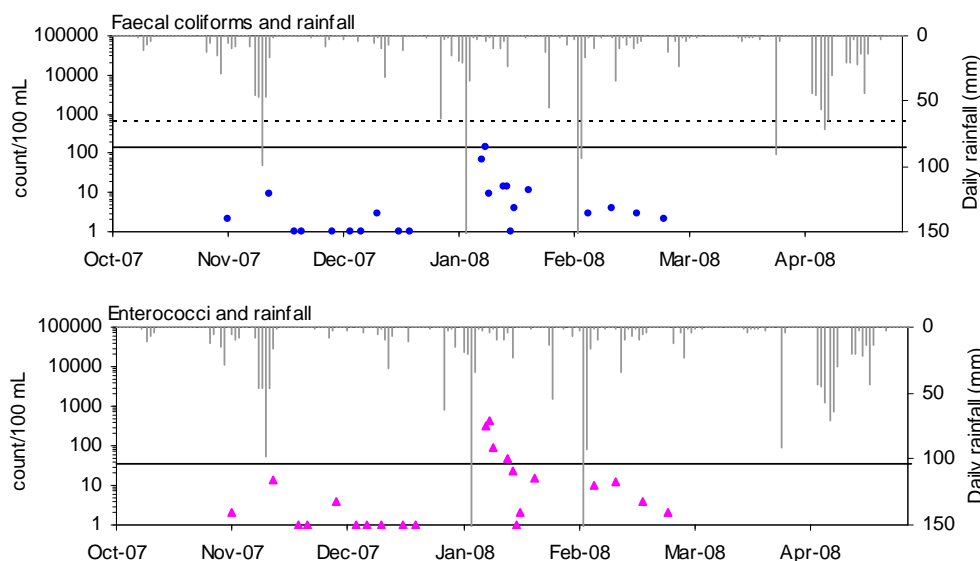
Compliance with NHMRC (1990) swimming guidelines at Shelly Beach

	NOV '07	DEC '07	JAN '08	FEB '08
FC	PASS	PASS	PASS	PASS*
ENT	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 faecal coliforms were generally low over the monitoring period, with only slightly elevated levels recorded in response to heavy rainfall. Levels of enterococci exceeded guideline limits on several occasions in January 2008 following heavy rainfall.



See page 5 for key to graph

Lake Ainsworth, East

See page 12 for key to map

Description The sampling site is located on the eastern side of Lake Ainsworth, a coastal freshwater lake. The lake is situated to the west of Seven Mile Beach and north of the township of Lennox Head. The lake is used extensively and is of high social and economic importance.

Pollution sources Urban stormwater runoff enters the lake during wet weather through a number of stormwater drains. There is a history of blue-green algal blooms at the site that pose a potential health risk for lake users.

Compliance Lake Ainsworth East complied with NHMRC (1990) swimming guidelines in three of the four months monitored in the 2007–2008 summer swimming season. The site failed the guidelines in January 2008 owing to elevated levels of enterococci.

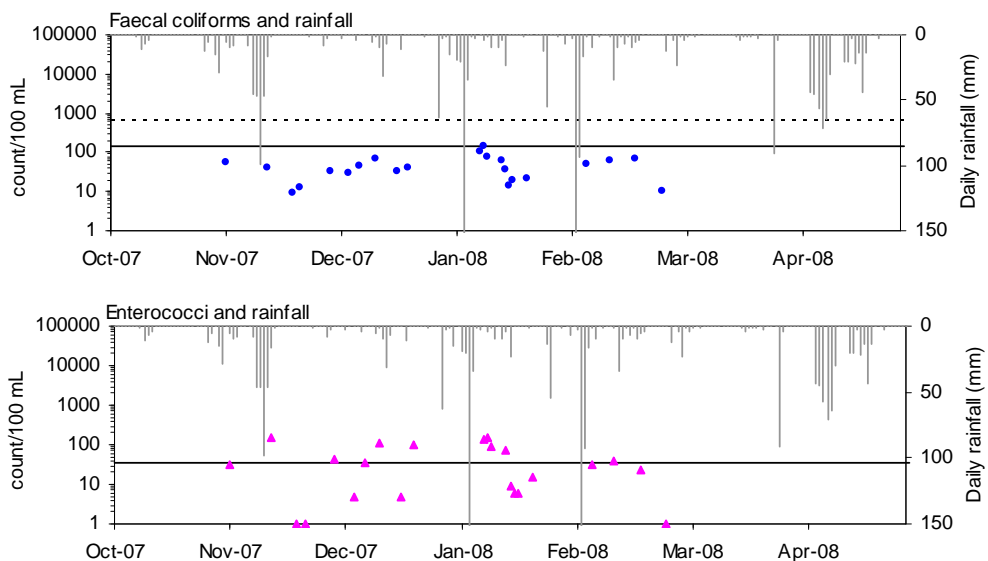


Compliance with NHMRC (1990) swimming guidelines at Lake Ainsworth East

	NOV '07	DEC '07	JAN '08	FEB '08
FC	PASS	PASS	PASS	PASS*
ENT	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 faecal coliforms on the eastern side of Lake Ainsworth generally remained below the guideline values during the monitoring period, with slightly elevated levels occasionally recorded in response to heavy rainfall. Elevated levels of enterococci were more frequently recorded throughout the monitoring period.



See page 5 for key to graph

Lake Ainsworth, South

See page 12 for key to map

Description

The sampling site is located at the main swimming site in the south of Lake Ainsworth, a coastal freshwater lake. The lake is situated to the west of Seven Mile Beach and north of the township of Lennox Head. The lake is used extensively and is of high social and economic importance.

Pollution sources

Urban stormwater runoff enters the lake during wet weather through a number of stormwater drains. There is a history of blue-green algal blooms at the site that pose a potential health risk for lake users.

Compliance

Lake Ainsworth South complied with NHMRC (1990) swimming guidelines in all four months monitored in the 2007–2008 summer swimming season.



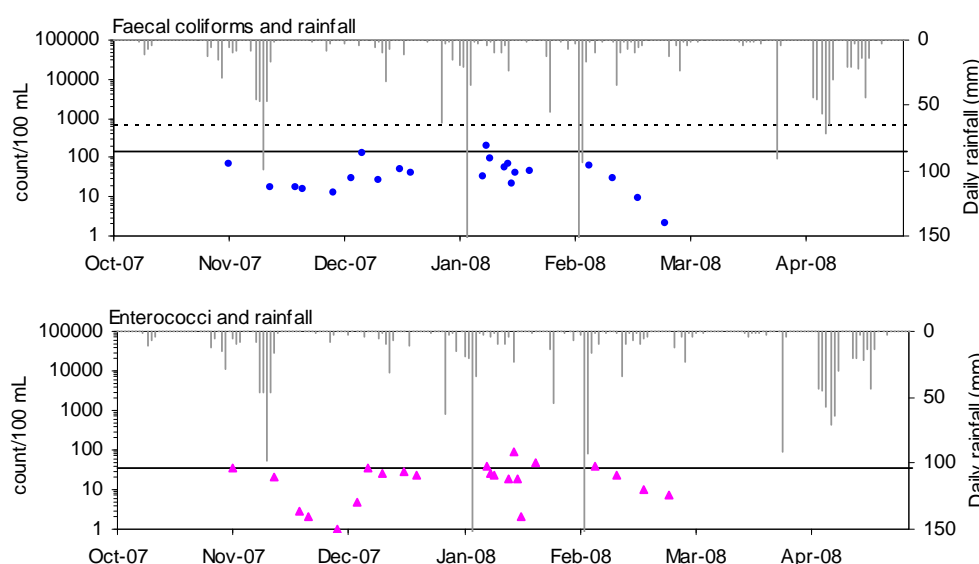
Compliance with NHMRC (1990) swimming guidelines Lake Ainsworth South

	NOV '07	DEC '07	JAN '08	FEB '08
FC	PASS	PASS	PASS	PASS*
ENT	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

Bacterial levels on the southern side of Lake Ainsworth generally remained below the guideline values during the monitoring period. Slightly elevated results were occasionally recorded in response to heavy rainfall.



See page 5 for key to graph

Lake Ainsworth, West

See page 12 for key to map

Description The sampling site is located on the western shore of Lake Ainsworth, a coastal freshwater lake. The lake is situated to the west of Seven Mile Beach and north of the township of Lennox Head. The lake is used extensively and is of high social and economic importance.

Pollution sources Urban stormwater runoff enters the lake during wet weather through a number of stormwater drains. There is a history of blue-green algal blooms at the site that pose a potential health risk for lake users.

Compliance Lake Ainsworth West complied with NHMRC (1990) swimming guidelines in three of the four months monitored in the 2007–2008 summer swimming season. The site failed the guidelines in December 2007 owing to elevated levels of enterococci.

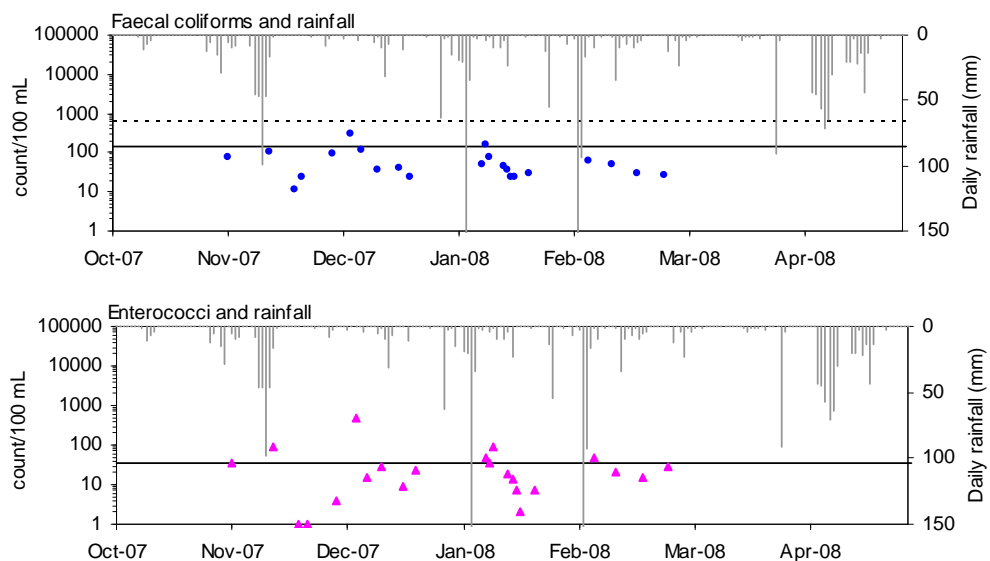


Compliance with NHMRC (1990) swimming guidelines at Lake Ainsworth West

	NOV '07	DEC '07	JAN '08	FEB '08
FC	PASS	PASS	PASS	PASS*
ENT	PASS	FAIL	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 Faecal coliform levels on the western side of Lake Ainsworth generally remained below the guideline values during the monitoring period. Enterococci levels exceeded the geometric mean guideline more frequently, usually in response to rainfall.



See page 5 for key to graph

Shaws Bay, North

See page 12 for key to map

Description

The sampling site is located in the north of Shaws Bay, an inlet near the mouth of the Richmond River. A wall protects the bay and allows tidal flushing. The bay is of great importance to local caravan parks and is used primarily for swimming.



Pollution sources

There are several major stormwater outlets in the vicinity of the site, as well as numerous small drains. Previous monitoring has revealed faecal contamination and nutrients in the stormwater. Gross pollutant traps have been installed, reducing the amount of litter, sediment and other pollutants discharged to the bay. Oil and grease from vehicles are also considered to be potential pollutants.

Compliance

Shaws Bay North complied with NHMRC (1990) swimming guidelines in three of the four months monitored in the 2007–2008 summer swimming season. The site failed the guidelines in January 2008 owing to elevated levels of enterococci.

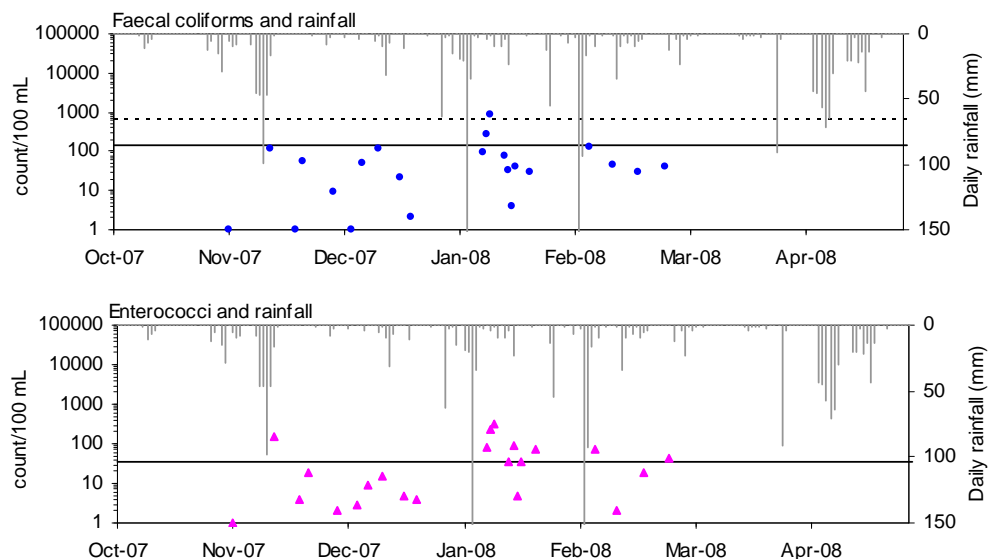
Compliance with NHMRC (1990) swimming guidelines at Shaws Bay North

	NOV '07	DEC '07	JAN '08	FEB '08
FC	PASS	PASS	PASS	PASS*
ENT	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 faecal coliforms at Shaws Bay North generally remained below the guideline limits throughout the monitoring period, with elevated results recorded on two occasions in January 2008. Enterococci levels exceeded the geometric mean guideline more frequently in response to heavy rainfall.



See page 5 for key to graph

Shaws Bay, East

See page 12 for key to map

Description The sampling site is located on the eastern side of Shaws Bay, an inlet near the mouth of the Richmond River. A training wall protects the bay and allows tidal flushing. The bay is of great importance to local caravan parks and is used primarily for swimming.

Pollution sources There are several major stormwater outlets in the vicinity of the site, as well as numerous small drains. Previous monitoring has revealed faecal contamination and nutrients in the stormwater. Gross pollutant traps have been installed, reducing the amount of litter, sediment and other pollutants discharged to the bay. Oil and grease from vehicles are also considered to be potential pollutants.



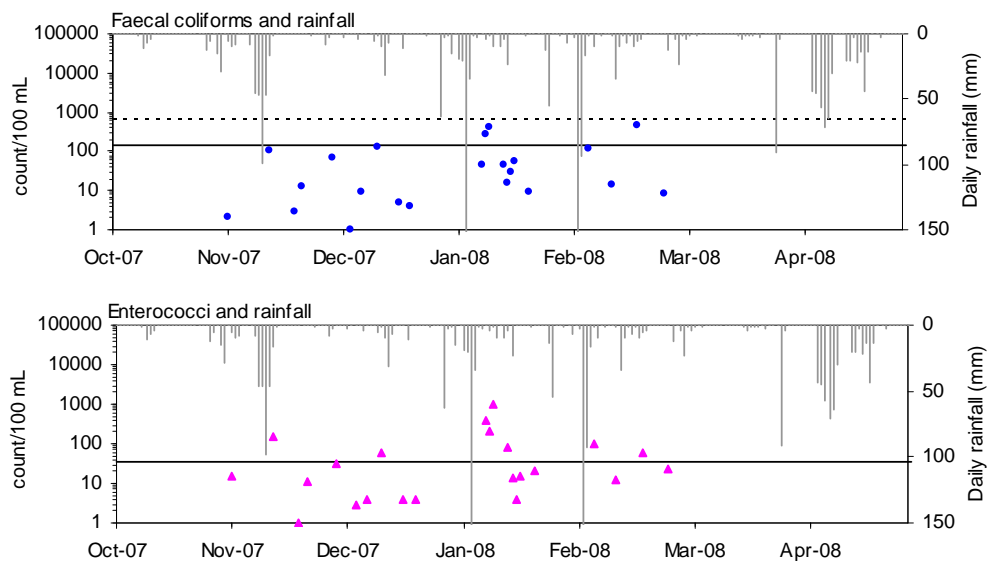
Compliance Shaws Bay East complied with NHMRC (1990) swimming guidelines in three of the four months monitored in the 2007–2008 summer swimming season. The site failed the guidelines in January 2008 owing to elevated levels of enterococci.

Compliance with NHMRC (1990) swimming guidelines at Shaws Bay East

	NOV '07	DEC '07	JAN '08	FEB '08
FC	PASS	PASS	PASS	PASS*
ENT	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 faecal coliforms at Shaws Bay East were generally below guideline limits throughout the monitoring period, with three elevated results recorded following rainfall. Enterococci levels more frequently exceeded the geometric mean guideline limit, often in response to heavy rainfall.



See page 5 for key to graph

Shaws Bay, West

See page 12 for key to map

Description

The sampling site is located on the western side of Shaws Bay, an inlet near the mouth of the Richmond River. A training wall protects the bay and allows tidal flushing. The bay is of high importance to local caravan parks and is used primarily for swimming.



Pollution sources

There are several major stormwater outlets in the vicinity of the site, as well as numerous small drains. Previous monitoring has revealed faecal contamination and nutrients in the stormwater. Gross pollutant traps have been installed, reducing the amount of litter, sediment and other pollutants discharged to the bay. Oil and grease from vehicles are also considered to be potential pollution sources.

Compliance

Shaws Bay West complied with NHMRC (1990) swimming guidelines in two of the four months monitored in the 2007–2008 summer swimming season. The site failed the guidelines in January 2008 and February 2008 owing to elevated levels of enterococci.

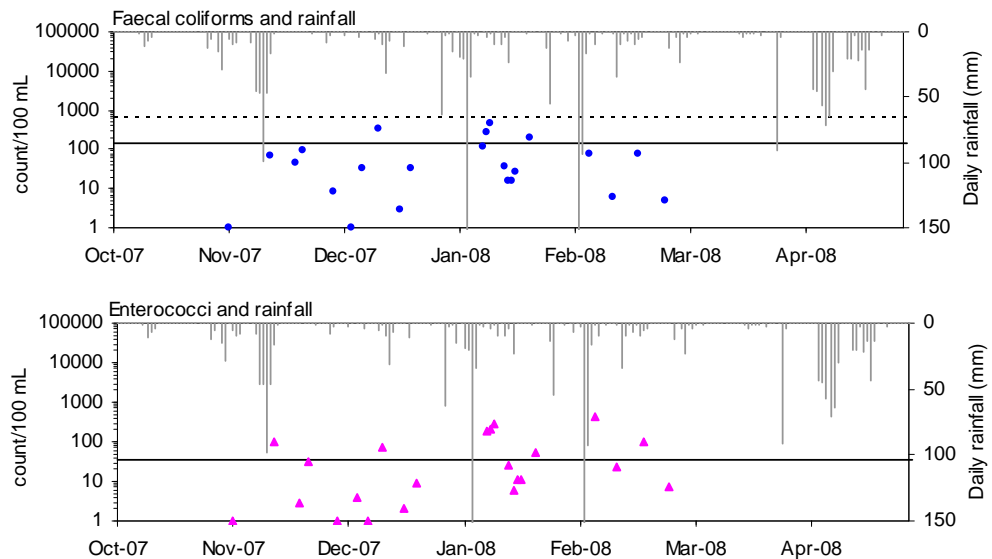
Compliance with NHMRC (1990) swimming guidelines at Shaws Bay West

	NOV '07	DEC '07	JAN '08	FEB '08
FC	PASS	PASS	PASS	PASS*
ENT	PASS	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

Levels of faecal coliforms at Shaws Bay West generally remained below the median guideline level during the monitoring period, with slightly elevated results recorded on four occasions. Elevated enterococci values were recorded on several occasions, often in response to rainfall.



See page 5 for key to graph

The Serpentine

See page 12 for key to map

Description The Serpentine is situated in North Creek, a tributary of the Richmond River. It is a popular swimming and fishing location for local residents, tourists, and particularly families, over the summer months. The shore is lined with urban development. The waterway is characterised by flat shallow sandbars. The sampling site is located between two stormwater outlets.



Pollution sources Urban stormwater runoff may affect the site, especially during wet weather. Rural and industrial land uses in the upper catchments may also affect water quality during wet weather. General litter and domestic pet droppings are further potential pollutants.

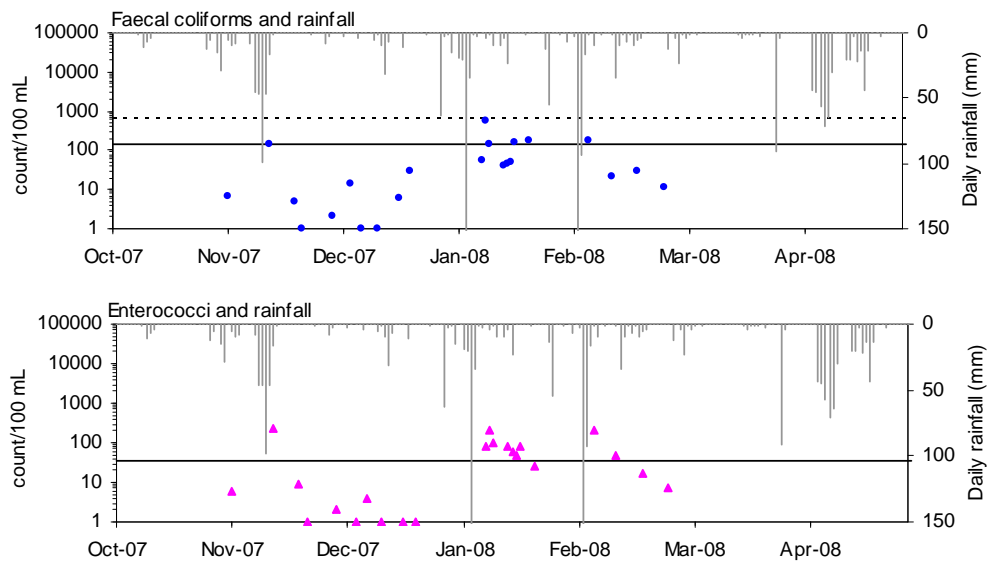
Compliance The Serpentine complied with NHMRC (1990) swimming guidelines in three of the four months monitored in the 2007–2008 summer swimming season. The site failed the guidelines in January 2008 owing to elevated levels of enterococci.

Compliance with NHMRC (1990) swimming guidelines at The Serpentine

	NOV '07	DEC '07	JAN '08	FEB '08
FC	PASS	PASS	PASS	PASS*
ENT	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 faecal coliforms at The Serpentine generally remained below the median guideline level during the monitoring period, with slightly elevated results recorded usually following rainfall. Elevated enterococci values were recorded on several occasions, particularly after heavy rain.



See page 5 for key to graph