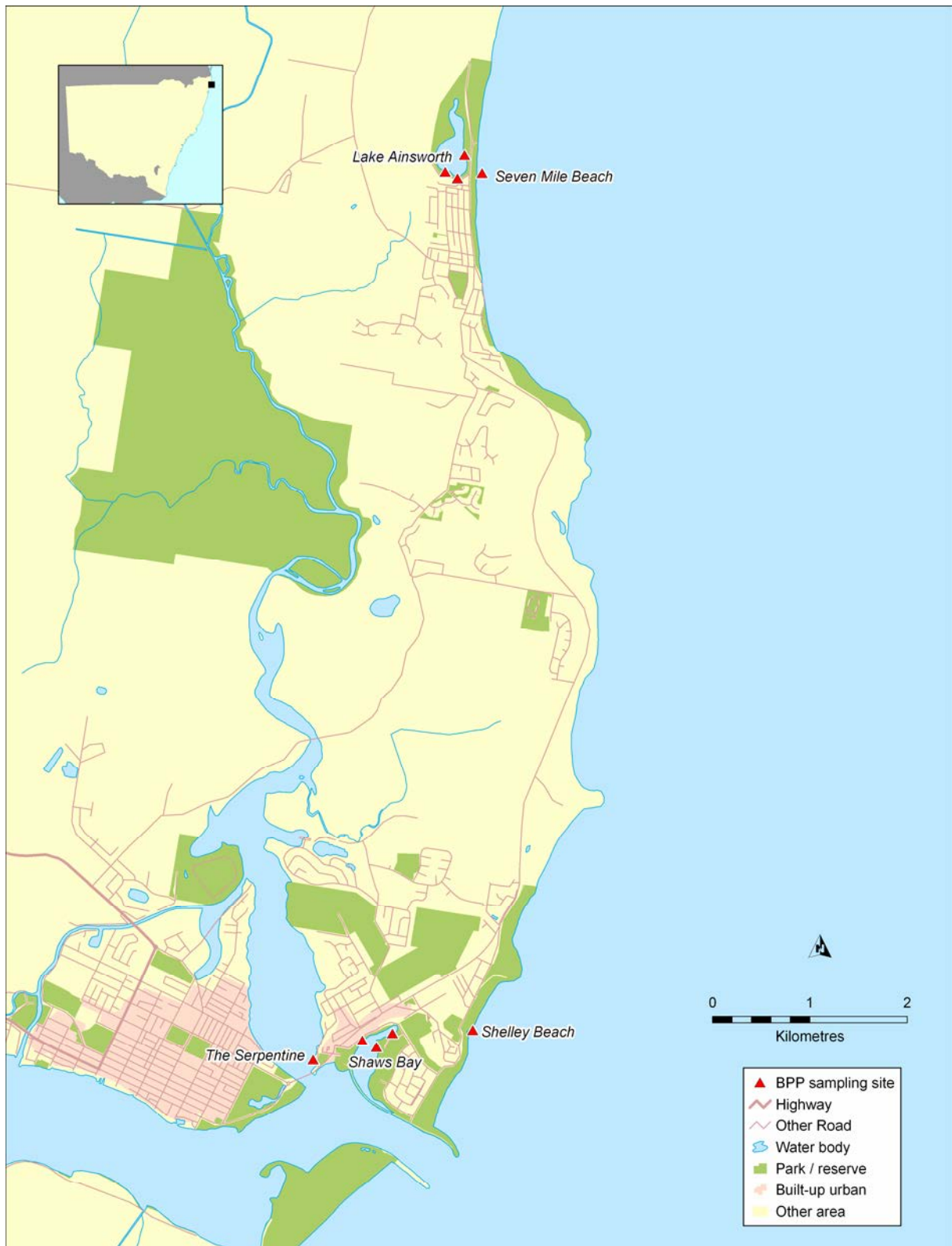


Ballina Shire Council

Ocean beaches: Seven Mile, Shelly. **Freshwater lake:** Lake Ainsworth (South, East and West).

Estuaries: Shaws Bay (North, East and West), 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 and more than 80 square kilometres of rural land lies along the coast. The main commercial activities are agriculture, tourism and fishing, with a growing sector of primary goods production.

Approximately 41,500 people live in the Shire and more than half live within ten kilometres of the coast (Ballina Shire Council 2008).

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).

Research by Tourism Australia indicates that, on average each year, 252,000 people holiday in the Ballina Shire and a further 349,000 people visit for the day. 'Going to the beach' is listed as a top activity by more than 80% of international tourists and 40% of domestic tourists holidaying in the area (Tourism Research Australia, 2008).

Program outline

Ballina Shire Council monitored nine locations over the 2008–2009 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 and the results have been reported in the State of the Beaches reports for these years (DEC 2004b, 2004c, 2006a, 2006b, DECC 2007 and DECC 2008).

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, with five samples collected in all months.

Ballina Shire 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.

Ocean beaches

Guideline compliance assessment

Seven Mile and Shelly beaches complied with the NHMRC (1990) swimming water quality guidelines in all four months monitored over the 2008–2009 summer season (Figure 2).

High levels of compliance have consistently been recorded at these beaches over the last six summer seasons (DEC 2004b, 2004c, 2006a, 2006b, DECC 2007 and DECC 2008).

Response to rainfall

The levels of indicator bacteria measured at Seven Mile Beach over this summer swimming season were generally very low. Faecal coliform and enterococci levels were also low at Shelly Beach, with a single elevated result recorded in early February 2009 in response to rainfall.

Results from previous monitoring show generally low bacterial levels, with little evidence of sewage contamination at these sites (DEC 2004b, 2004c, 2006a and 2006b, DECC 2007 and DECC 2008).

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.

All three locations complied with the NHMRC (1990) swimming water quality guidelines in three of the four months. Lake Ainsworth West failed the guidelines in January 2009, and Lake Ainsworth East and South failed the guidelines in February 2009. All sites failed because of elevated levels of enterococci.

Response to rainfall

Slightly 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 three of the four months. The site failed to comply with guidelines in February 2009 owing to elevated levels of enterococci following rainfall.

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 West complied with the NHMRC (1990) swimming guidelines in all four months. Shaws Bay North failed in December 2008 owing to elevated levels of enterococci.

High levels of compliance have been recorded at these sites over the previous six summer seasons (DEC 2004b, 2004c, 2006a, 2006b, DECC 2007 and DECC 2008).

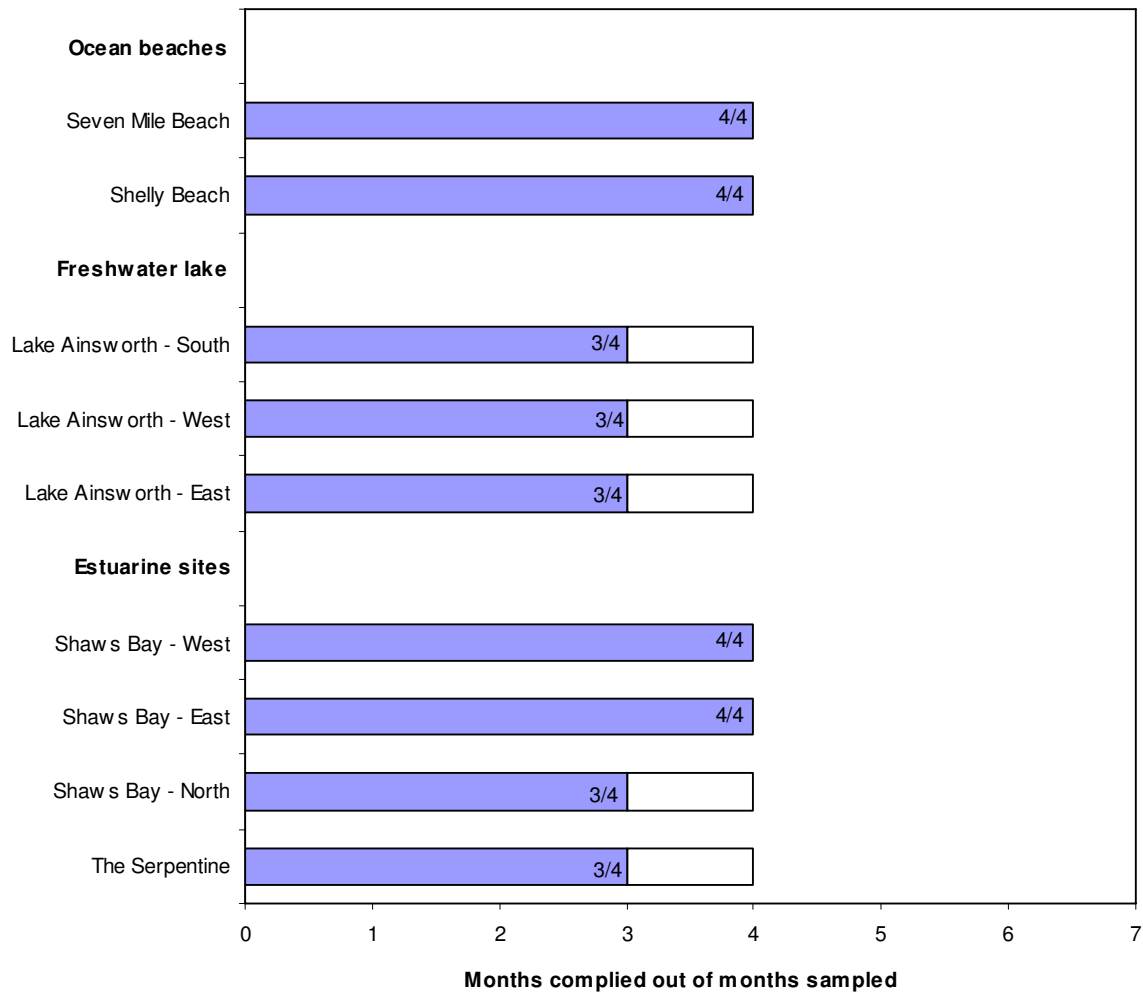
Response to rainfall

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 West occasionally exceeded the geometric mean guideline value in response to rainfall. Enterococci levels at Shaws Bay North 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.

Figure 2: Summary of compliance with NHMRC (1990) microbiological guidelines for swimming at Ballina Shire Council swimming sites during the 2008–2009 summer swimming season



Seven Mile Beach

See page 9 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

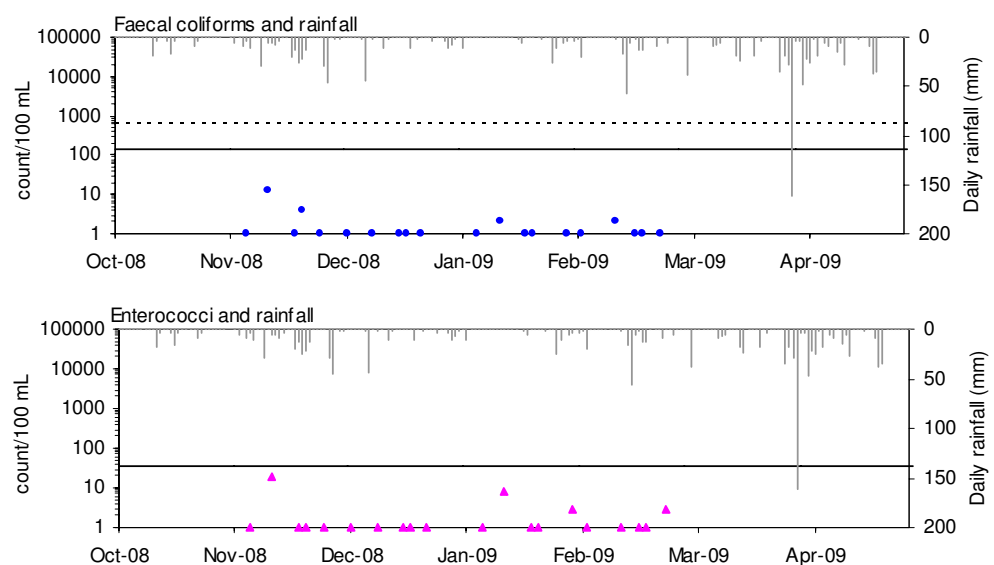
Seven Mile Beach complied with NHMRC (1990) swimming guidelines in all four months monitored in the 2008–2009 summer swimming season.

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

	NOV '08	DEC '08	JAN '09	FEB '09
FC	PASS	PASS	PASS	PASS
ENT	PASS	PASS	PASS	PASS

Timeseries plots

Levels of faecal coliforms and enterococci were consistently low over the monitoring period.



See page 5 for key to graph

Shelly Beach

See page 9 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

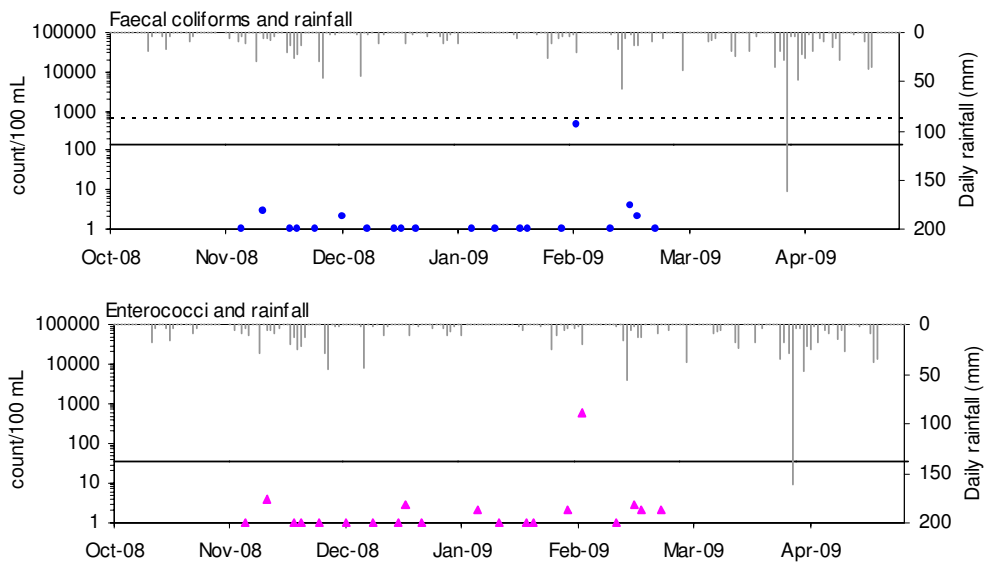
Shelly Beach complied with NHMRC (1990) swimming guidelines in all four months monitored in the 2008–2009 summer swimming season.

Compliance with NHMRC (1990) swimming guidelines at Shelly Beach

	NOV '08	DEC '08	JAN '09	FEB '09
FC	PASS	PASS	PASS	PASS
ENT	PASS	PASS	PASS	PASS

Timeseries plots

Levels of faecal coliforms and enterococci were generally low over the monitoring period. A single elevated result was measured in early February 2009 in response to rainfall.



See page 5 for key to graph

Lake Ainsworth, East

See page 9 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 2008–2009 summer swimming season. The site failed the guidelines in February 2009 owing to elevated levels of enterococci.

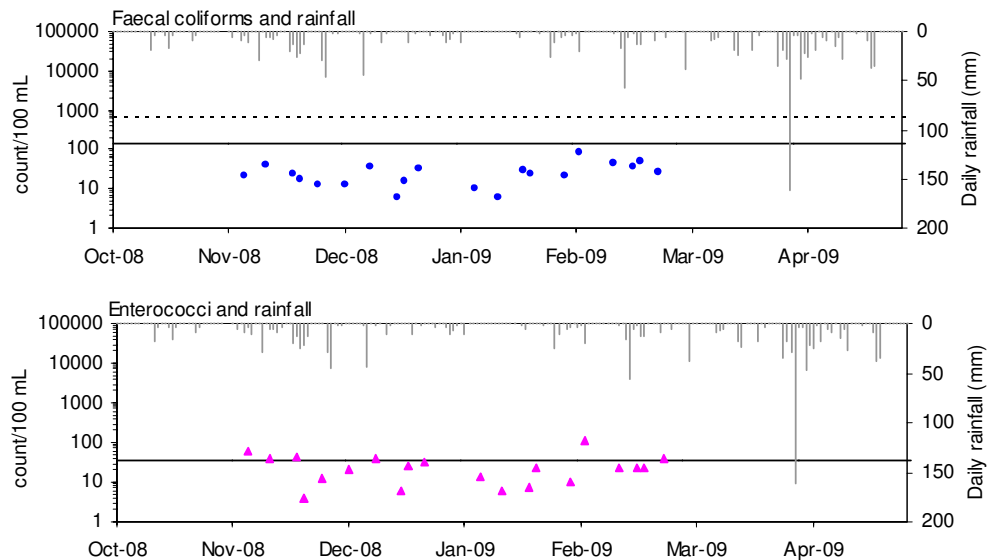


Compliance with NHMRC (1990) swimming guidelines at Lake Ainsworth East

	NOV '08	DEC '08	JAN '09	FEB '09
FC	PASS	PASS	PASS	PASS
ENT	PASS	PASS	PASS	FAIL

Timeseries plots

Levels of faecal coliforms on the eastern side of Lake Ainsworth remained below the guideline values during the monitoring period. Enterococci levels just exceeded the geometric mean guideline on a number of occasions, generally in response to rainfall.



See page 5 for key to graph

Lake Ainsworth, South

See page 9 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

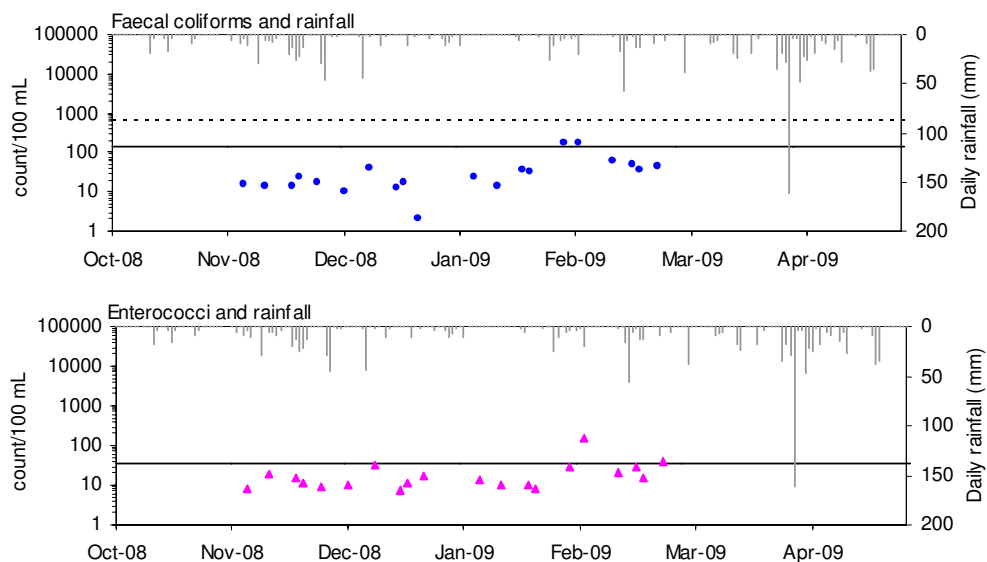
Lake Ainsworth South complied with NHMRC (1990) swimming guidelines in three of the four months monitored in the 2008–2009 summer swimming season. The site failed the guidelines in February 2009 owing to elevated levels of enterococci.

Compliance with NHMRC (1990) swimming guidelines Lake Ainsworth South

	NOV '08	DEC '08	JAN '09	FEB '09
FC	PASS	PASS	PASS	PASS
ENT	PASS	PASS	PASS	FAIL

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 recorded in early February 2009 in response to heavy rainfall.



See page 5 for key to graph

Lake Ainsworth, West

See page 9 for key to map

Description

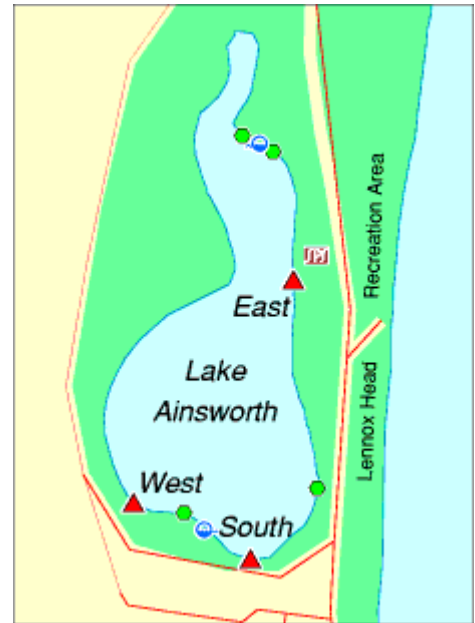
The sampling site is located on the western shore of Lake Ainsworth, a coastal freshwater lake. The lake is situated to the west of Seven Mile Beach and north of the township of Lennox Head. The lake is used extensively and is of high social and economic importance.

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 2008–2009 summer swimming season. The site failed the guidelines in January 2009 owing to elevated levels of enterococci.

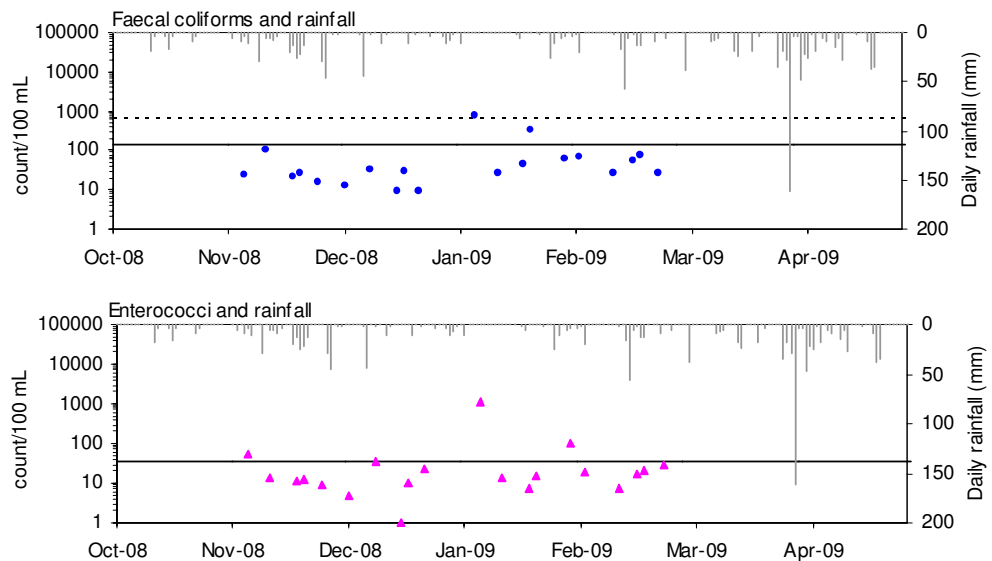


Compliance with NHMRC (1990) swimming guidelines at Lake Ainsworth West

	NOV '08	DEC '08	JAN '09	FEB '09
FC	PASS	PASS	PASS	PASS
ENT	PASS	PASS	FAIL	PASS

Timeseries plots

Bacterial levels on the western side of Lake Ainsworth generally remained below the guideline values during the monitoring period. Elevated faecal coliform levels were recorded on two occasions in January 2009 during dry weather conditions. Enterococci levels exceeded the geometric mean on three occasions.



See page 5 for key to graph

Shaws Bay, North

See page 9 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 but 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 amounts of litter, sediment and other pollutants discharged to the bay.

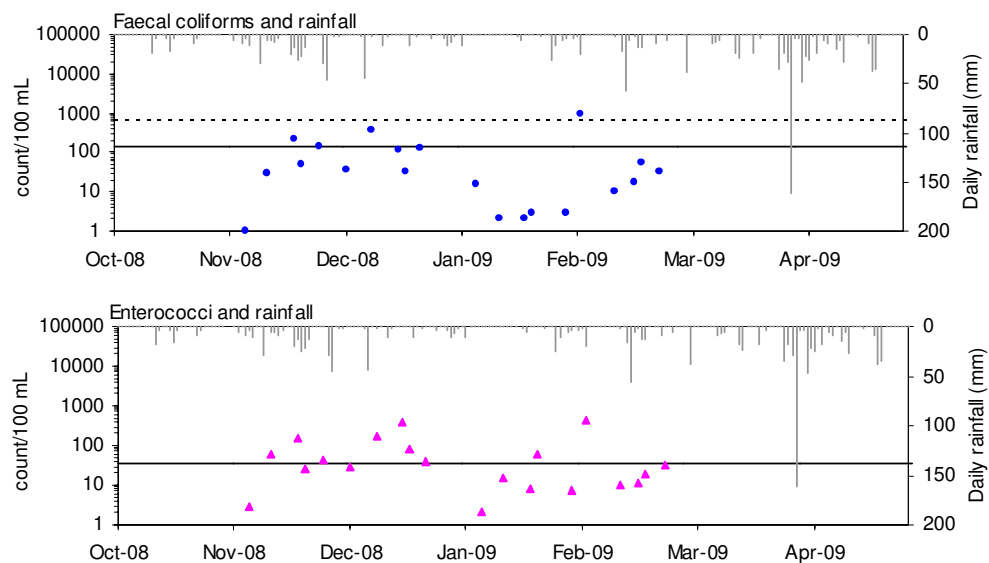
Compliance Shaws Bay North complied with NHMRC (1990) swimming guidelines in three of the four months monitored in the 2008–2009 summer swimming season. The site failed the guidelines in December 2008 owing to elevated levels of enterococci.



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

	NOV '08	DEC '08	JAN '09	FEB '09
FC	PASS	PASS	PASS	PASS
ENT	PASS	FAIL	PASS	PASS

Timeseries plots Levels of faecal coliforms and enterococci at Shaws Bay North exceeded the guideline limits on a number of occasions during the monitoring period, with most elevated results recorded in response to rainfall.



See page 5 for key to graph

Shaws Bay, East

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 but 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 amounts of litter, sediment and other pollutants discharged to the bay.

Compliance

Shaws Bay East complied with NHMRC (1990) swimming guidelines in all four months monitored in the 2008–2009 summer swimming season.

See page 9 for key to map

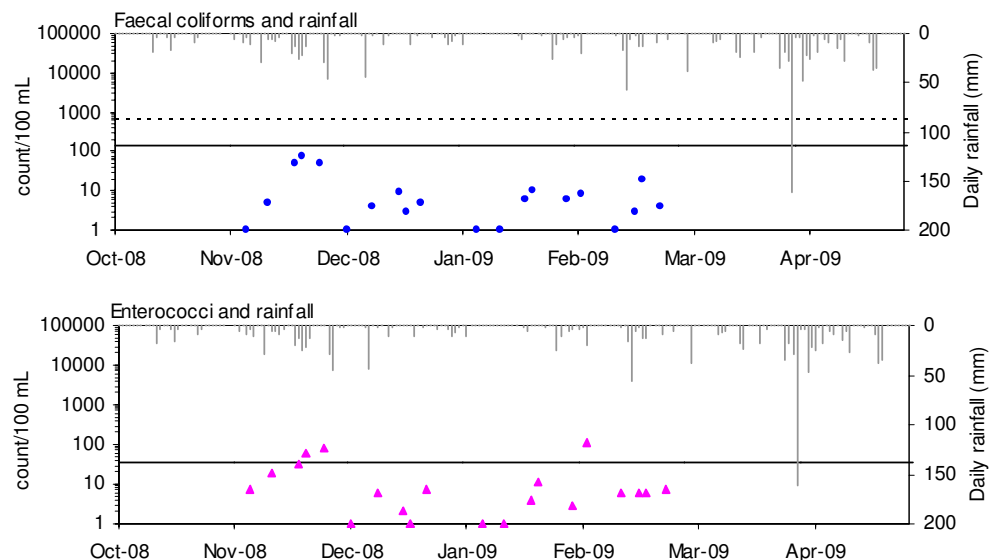


Compliance with NHMRC (1990) swimming guidelines at Shaws Bay East

	NOV '08	DEC '08	JAN '09	FEB '09
FC	PASS	PASS	PASS	PASS
ENT	PASS	PASS	PASS	PASS

Timeseries plots

Levels of faecal coliforms at Shaws Bay East remained below guideline limits throughout the monitoring period. Enterococci levels more frequently exceeded the geometric mean guideline limit, usually in response to heavy rainfall.



See page 5 for key to graph

Shaws Bay, West

See page 9 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 but 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 amounts of litter, sediment and other pollutants discharged to the bay.

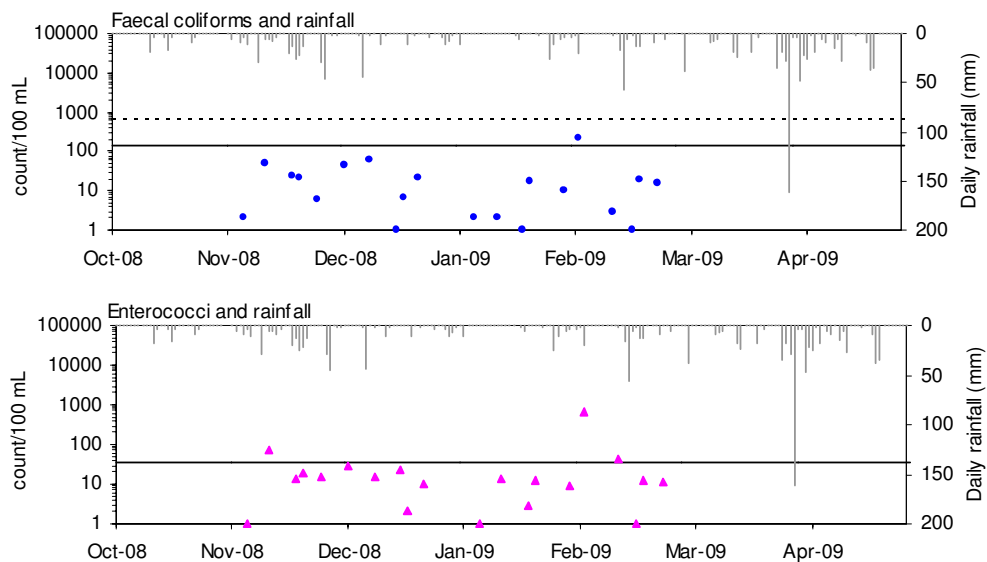
Compliance Shaws Bay West complied with NHMRC (1990) swimming guidelines in all four months monitored in the 2008–2009 summer swimming season.



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

	NOV '08	DEC '08	JAN '09	FEB '09
FC	PASS	PASS	PASS	PASS
ENT	PASS	PASS	PASS	PASS

Timeseries plots Levels of faecal coliforms and enterococci at Shaws Bay West generally remained below the median guideline level during the monitoring period. Elevated bacterial levels were measured in early February 2009 in response to rainfall.



See page 5 for key to graph

The Serpentine

See page 9 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

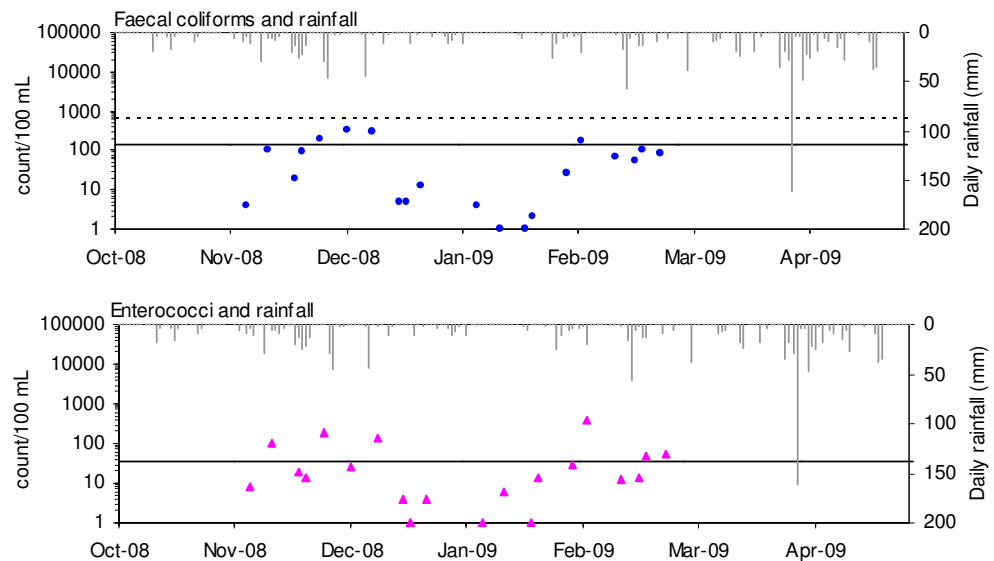
The Serpentine complied with NHMRC (1990) swimming guidelines in three of the four months monitored in the 2008–2009 summer swimming season. The site failed the guidelines in February 2009 owing to elevated levels of enterococci.

Compliance with NHMRC (1990) swimming guidelines at The Serpentine

	NOV '08	DEC '08	JAN '09	FEB '09
FC	PASS	PASS	PASS	PASS
ENT	PASS	PASS	PASS	FAIL

Timeseries plots

Levels of faecal coliforms and enterococci at The Serpentine exceeded the median guideline levels on a number of occasions during the monitoring period, with most elevated results recorded following rainfall.



See page 5 for key to graph