Gosford City Council

**Ocean beaches:** Forresters Beach, Wamberal, Terrigal, North Avoca, Avoca Beach, Copacabana, McMasters Beach, Killcare, Umina Beach, Pearl Beach. **Lagoons:** Wamberal, Terrigal Sailboards, Terrigal Paddleboats, Avoca Lake, Bulbararing, Cockrone. **Estuarine:** Ettalong Channel.

**Tidal pools:** Davistown Baths, Yattalunga Baths, Woy Woy Baths, Pretty Beach Baths.

**Rock pool:** Pearl Beach Rockpool.
Local government area description

Gosford City Council is located on the Central Coast of New South Wales between Sydney in the south and Wyong in the north. It covers an area of 1028 square kilometres and supports a population of more than 162,000.

Gosford has an array of natural resources from coastal beaches, natural bushland, estuaries, waterways, plateaus and wetlands, with the Brisbane Water estuary a predominant feature (Gosford City Council 2006).

Program outline

Twenty-two sites were monitored by Gosford Council, including ten ocean beaches, six lagoon sites, one estuarine swimming location, four tidal pools and one rockpool.

Faecal coliform samples were routinely collected at all locations between October 2007 and April 2008 to assess compliance with NHMRC (1990) swimming water quality guidelines.

It should be noted that the required five samples were not collected in some months at some sites. Where four samples were collected, the closest sample in time from an adjacent month was 'borrowed' to provide the five samples for the compliance calculation. Only three samples were collected during December 2007 so guideline compliance could not be determined for that month.


Gosford Council provides water quality data to the community on its website.

Rainfall

Rainfall data presented in the timeseries plots were obtained from the Bureau of Meteorology’s gauge at Narara Research Station at Gosford.

Ocean beaches

Guideline compliance

A high level of compliance with the NHMRC (1990) swimming water quality guidelines was recorded at the ocean beaches in the Gosford Council area. Forresters Beach, Wamberal, Terrigal, North Avoca, Avoca Beach, Copacabana, McMasters, Killcare, Umina and Pearl beaches all passed the swimming guidelines in all months in which sufficient samples were collected to assess compliance (Figure 10).

Response to rainfall

Levels of faecal coliforms were generally low at all ocean beaches during the monitoring period, showing little response to rainfall.

Lagoons and estuarine waters

Guideline compliance

Water quality samples were collected from Cockrone, Terrigal and Wamberal lagoons, Avoca Lake and Ettalong Channel at the entrance to Brisbane Water to assess compliance with NHMRC (1990) swimming guidelines. Two sites were located in Terrigal Lagoon (Terrigal Paddleboats and Terrigal Sailboards) and two sites were located in Avoca Lake (Bulbararing and Avoca Lake).

A very high level of compliance was recorded at Ettalong Channel, Wamberal Lagoon and Avoca Lake which passed the swimming guidelines in all six months.

Terrigal Paddleboats, Bulbararing and Cockrone Lagoon also had a high level of compliance, passing the swimming guidelines in five of the six months in which compliance could be assessed. Terrigal Sailboards complied in four of the six months (Figure 10).

Response to rainfall

Levels of faecal coliforms were generally low at all lagoon and estuarine sites during dry weather conditions. Elevated faecal coliform levels were usually measured in response to rainfall. Very high levels of faecal coliforms (greater than 6000 cfu/100mL) were recorded at Terrigal.
Paddleboats and Terrigal Sailboards during February 2008 in response to heavy rainfall.

**Tidal and Rockpools**

**Guideline compliance**

Compliance with NHMRC (1990) swimming guidelines was assessed at four tidal pools and one rockpool in the six months of the 2007–2008 summer swimming season. Pretty Beach Baths, Yattalunga Baths and Pearl Beach Rockpool passed the swimming guidelines in all six months. A high level of compliance was also recorded at Woy Woy Baths and Davistown Baths, which complied in five of the six months (Figure 10).

**Response to rainfall**

Most sites displayed some response to rainfall with slightly elevated levels of faecal coliforms recorded at Pretty Beach Baths, Woy Woy Baths, Davistown Baths and Yattalunga Baths following heavy rainfall. Pearl Beach Rockpool generally displayed little response to rainfall, with low levels recorded over the monitoring period.
Figure 10: Summary of compliance with NHMRC (1990) microbiological guidelines for swimming at Gosford City Council swimming sites over the 2007–2008 summer season

- **Ocean Beaches**
  - Forresters Beach: 6/6
  - Wamberal Beach: 6/6
  - Terrigal Beach: 6/6
  - North Avoca Beach: 6/6
  - Avoca Beach: 6/6
  - Copacobana Beach: 6/6
  - McMasters Beach: 6/6
  - Killcare Beach: 6/6
  - Umina Beach: 6/6
  - Pearl Beach: 6/6

- **Lagoons**
  - Wamberal Lagoon: 6/6
  - Terrigal Paddleboats: 5/6
  - Terrigal Sailboards: 4/6
  - Avoca Lake: 6/6
  - Bulbararing: 5/6
  - Cockrone Lagoon: 5/6

- **Estuarine sites**
  - Ettalong Channel: 6/6

- **Pools**
  - Pretty Beach Baths: 6/6
  - Pearl Beach Rockpool: 6/6
  - Woy Woy Baths: 5/6
  - Davistown Baths: 5/6
  - Yattalunga Baths: 6/6
Forresters Beach

Description
Forresters Beach is approximately 1.5 kilometres long. It is often not safe for swimming and is patrolled during the summer season. The beach is very popular with surfers owing to the presence of a reef along much of its length. A car park and amenities are located towards the middle of the beach.

Pollution sources
There are few sources of pollution at the beach, although stormwater runoff from the nearby roads and urban areas may affect water quality in heavy rain. The foreshore of the beach is composed of Wyrrabalong National Park and nature reserve.

Compliance
Forresters Beach complied with NHMRC (1990) guidelines in all months of the 2007–2008 summer swimming season in which sufficient samples were collected.

Compliance with NHMRC (1990) swimming guidelines at Forresters Beach

<table>
<thead>
<tr>
<th></th>
<th>OCT '07</th>
<th>NOV '07</th>
<th>DEC '07</th>
<th>JAN '08</th>
<th>FEB '08</th>
<th>MAR '08</th>
<th>APR '08</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC</td>
<td>PASS</td>
<td>PASS*</td>
<td>**</td>
<td>PASS</td>
<td>PASS*</td>
<td>PASS*</td>
<td>PASS</td>
</tr>
</tbody>
</table>

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

** Insufficient samples to calculate compliance were collected in this month.

Timeseries plots
Levels of faecal coliforms were generally very low over the monitoring period, exceeding the median guideline limit on only one occasion.
Wamberal Beach

Description
Wamberal Beach is the northern end of a 2.8-kilometre-long beach that extends between Wamberal Lagoon in the north and Terrigal Lagoon in the south. The northern end of the beach is backed by the Wamberal Lagoon Nature Reserve. The beach is patrolled during the summer swimming season and is popular with the local community and surfers. The sampling site is adjacent to the flagged area for the surf club, which is a focus for swimmers in summer.

Pollution sources
The foreshore of the beach is composed of Wamberal Lagoon Nature Reserve to the north and is largely urbanised to the south. Outflow from Wamberal lagoon may affect water quality at the beach following heavy rain. The catchment for the lagoon is partly urbanised.

Compliance
Wamberal Beach complied with NHMRC (1990) guidelines in all months of the 2007–2008 summer swimming season in which sufficient samples were collected.

Compliance with NHMRC (1990) swimming guidelines at Wamberal Beach

<table>
<thead>
<tr>
<th></th>
<th>OCT '07</th>
<th>NOV '07</th>
<th>DEC '07</th>
<th>JAN '08</th>
<th>FEB '08</th>
<th>MAR '08</th>
<th>APR '08</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC</td>
<td>PASS</td>
<td>PASS*</td>
<td>**</td>
<td>PASS</td>
<td>PASS*</td>
<td>PASS</td>
<td>PASS</td>
</tr>
</tbody>
</table>

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

** Insufficient samples to calculate compliance were collected in this month.

Timeseries plots
Levels of faecal coliforms were generally low over the monitoring period, remaining below the median guideline limit.
Wamberal Lagoon

**Description**
The sampling site is a sandy area located near the mouth of the lagoon and is a popular picnic and swimming area for children. The lagoon is intermittently open to the ocean and flows to Wamberal Beach.

**Pollution sources**
Much of the immediate foreshore of the lagoon is parkland and nature reserve. However, in the upper catchment there is a mixture of urban, light industrial and semi-rural properties that could contribute poor-quality stormwater following heavy rain.

**Compliance**
Wamberal Lagoon complied with NHMRC (1990) guidelines in all months of the 2007–2008 summer swimming season in which sufficient samples were collected.

<table>
<thead>
<tr>
<th></th>
<th>OCT '07</th>
<th>NOV '07</th>
<th>DEC '07</th>
<th>JAN '08</th>
<th>FEB '08</th>
<th>MAR '08</th>
<th>APR '08</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC</td>
<td>PASS</td>
<td>PASS*</td>
<td>**</td>
<td>PASS</td>
<td>PASS*</td>
<td>PASS*</td>
<td>PASS</td>
</tr>
</tbody>
</table>

* 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 slightly elevated throughout the monitoring period, exceeding the median guideline limit on a number of occasions in response to rainfall.
Terrigal Beach

Description
Terrigal Beach is an extremely popular swimming site for families with young children. The beach is situated close to the retail and tourism centre of Terrigal and receives a large number of visitors each summer.

Pollution sources
Runoff from roads and pavements adjacent to the commercial district of Terrigal ends up in stormwater drains that discharge to the beach.

Compliance
Terrigal Beach complied with NHMRC (1990) guidelines in all months of the 2007–2008 summer swimming season in which sufficient samples were collected.

Compliance with NHMRC (1990) swimming guidelines at Terrigal Beach

<table>
<thead>
<tr>
<th></th>
<th>OCT '07</th>
<th>NOV '07</th>
<th>DEC '07</th>
<th>JAN '08</th>
<th>FEB '08</th>
<th>MAR '08</th>
<th>APR '08</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC</td>
<td>PASS</td>
<td>PASS*</td>
<td>**</td>
<td>PASS*</td>
<td>PASS</td>
<td>PASS</td>
<td>PASS</td>
</tr>
</tbody>
</table>

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

** Insufficient samples to calculate compliance were collected in this month.

Timeseries plots
Faecal coliform levels were generally low throughout the monitoring period, exceeding the median guideline value on only two occasions.
Terrigal Sailboards

Description

The sampling site is located in Terrigal Lagoon, adjacent to the Terrigal Lagoon Reserve near Willoughby Road. The lagoon is intermittently open to the ocean and flows to Terrigal Beach. There is a commercial watercraft rental business operating in summer months near the site, which is popular with children.

Pollution sources

Most of the immediate foreshore is parkland and sporting fields, and there is a golf course at the northern extremity of the waterway. Stormwater runoff from the mainly urban residential catchment is a potential pollution source. The catchment also contains some rural land and remnant bushland as well as two caravan parks.

Compliance

Terrigal Sailboards complied with NHMRC (1990) guidelines in four of the six months in which compliance could be assessed. The site failed the swimming guidelines in January and February 2008.

Compliance with NHMRC (1990) swimming guidelines at Terrigal Sailboards

<table>
<thead>
<tr>
<th></th>
<th>OCT '07</th>
<th>NOV '07</th>
<th>DEC '07</th>
<th>JAN '08</th>
<th>FEB '08</th>
<th>MAR '08</th>
<th>APR '08</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC</td>
<td>PASS</td>
<td>PASS</td>
<td>**</td>
<td>**</td>
<td>PASS</td>
<td>PASS</td>
<td>PASS</td>
</tr>
</tbody>
</table>

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

** Insufficient samples to calculate compliance were collected in this month.

Timeseries plots

Slightly elevated levels of faecal coliforms were recorded throughout the monitoring period, with particularly high values recorded during February 2008 on a number of occasions following rainfall.
Terrigal Paddleboats

Description

The sampling site is located in Terrigal Lagoon near the opening of the lagoon to the ocean. The lagoon is intermittently open to the ocean, and flows to Terrigal Beach. There is a commercial watercraft rental business operating in summer months near the site, which is popular with children.

Pollution sources

Most of the immediate foreshore is parkland and sporting fields, and there is a golf course at the northern extremity of the waterway. Stormwater runoff from the mainly urban residential catchment is a potential pollution source. The catchment also contains some rural land and remnant bushland as well as two caravan parks.

Compliance

Terrigal Paddleboats complied with NHMRC (1990) guidelines in five of the six months in which compliance could be assessed. The site failed the swimming guidelines in February 2008.

Compliance with NHMRC (1990) swimming guidelines at Terrigal Paddleboats

<table>
<thead>
<tr>
<th></th>
<th>OCT '07</th>
<th>NOV '07</th>
<th>DEC '07</th>
<th>JAN '08</th>
<th>FEB '08</th>
<th>MAR '08</th>
<th>APR '08</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC</td>
<td>PASS</td>
<td>PASS*</td>
<td>**</td>
<td>PASS</td>
<td>FAIL*</td>
<td>PASS*</td>
<td>PASS</td>
</tr>
</tbody>
</table>

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

** Insufficient samples to calculate compliance were collected in this month.

Timeseries plots

Faecal coliform levels were generally low during the first three months of the 2007–2008 summer swimming season, remaining below the median guideline value. High values were recorded on a number of occasions in the final four months, in both wet and dry weather conditions.

See page 5 for key to graph
North Avoca Beach

Description

North Avoca Beach is a popular swimming site for the community, especially surfers. It is less secure for children so is not favoured by families with young children. The beach is situated close to the surf club and receives a large number of visitors each summer.

Pollution sources

Runoff from roads and pavements adjacent to the beach may affect the water quality during heavy rain, although the catchment is very small. There is an untreated stormwater drain which is a potential source of water pollution.

Compliance

North Avoca Beach complied with NHMRC (1990) guidelines in all months of the 2007–2008 summer swimming season in which sufficient samples were collected.

<table>
<thead>
<tr>
<th>Month</th>
<th>FC</th>
<th>OCT '07</th>
<th>NOV '07</th>
<th>DEC '07</th>
<th>JAN '08</th>
<th>FEB '08</th>
<th>MAR '08</th>
<th>APR '08</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>PASS</td>
<td>PASS*</td>
<td>**</td>
<td>PASS</td>
<td>PASS</td>
<td>PASS*</td>
<td>PASS</td>
</tr>
</tbody>
</table>

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

** Insufficient samples to calculate compliance were collected in this month.

Timeseries plots

Levels of faecal coliforms remained low throughout the monitoring period.
Avoca Beach

Description
Avoca Beach and is an extremely popular swimming site for families with young children. The sampling site is situated close to the surf club and receives a large number of visitors each summer.

Pollution sources
Stormwater runoff from the surrounding urban and commercial area may affect water quality at the beach.

Compliance
Avoca Beach complied with NHMRC (1990) guidelines in all months of the 2007–2008 summer swimming season in which sufficient samples were collected.

Compliance with NHMRC (1990) swimming guidelines at Avoca Beach

<table>
<thead>
<tr>
<th></th>
<th>OCT '07</th>
<th>NOV '07</th>
<th>DEC '07</th>
<th>JAN '08</th>
<th>FEB '08</th>
<th>MAR '08</th>
<th>APR '08</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC</td>
<td>PASS</td>
<td>PASS*</td>
<td>**</td>
<td>PASS</td>
<td>PASS*</td>
<td>PASS</td>
<td>PASS</td>
</tr>
</tbody>
</table>

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

Timeseries plots
Faecal coliform levels were low throughout the monitoring period, remaining below the median guideline limit.
Avoca Lake

Description
The sampling site is located in Avoca Lake, just south of Bareena Island. This area of the lake is shallow and sandy and adjacent to a picnic area and park, which is a popular area for families with small children. The lagoon is intermittently open to the ocean, and flows to Avoca Beach.

Pollution sources
Most of the immediate foreshore is parkland and reserves, with some remnant bushland in places. Stormwater runoff from the mainly urban residential catchment is a potential pollution source. The catchment also contains some semi-rural land and two caravan parks.

Compliance
Avoca Lake complied with NHMRC (1990) guidelines in all months of the 2007–2008 summer swimming season in which sufficient samples were collected.

<table>
<thead>
<tr>
<th></th>
<th>OCT '07</th>
<th>NOV '07</th>
<th>DEC '07</th>
<th>JAN '08</th>
<th>FEB '08</th>
<th>MAR '08</th>
<th>APR '08</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC</td>
<td>PASS</td>
<td>PASS*</td>
<td>**</td>
<td>PASS</td>
<td>PASS*</td>
<td>PASS</td>
<td>PASS</td>
</tr>
</tbody>
</table>

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

** Insufficient samples to calculate compliance were collected in this month.

Timeseries plots
Slightly elevated levels of faecal coliforms were recorded throughout the monitoring period, with values exceeding the median guideline limit on several occasions.
Bulbararing

Description
The sampling site is located in Avoca Lake near the opening to the ocean. This area of the lake is shallow and sandy and backs on to Avoca Beach. The area is popular with families with small children, and the lagoon is intermittently open to the ocean.

Pollution sources
Most of the immediate foreshore is parkland and reserves, with some remnant bushland in places. Stormwater runoff from the mainly urban residential catchment is a potential pollution source. The catchment also contains some semi-rural land and two caravan parks.

Compliance
Bulbararing complied with NHMRC (1990) guidelines in five of the six months in which compliance could be assessed during the 2007–2008 summer swimming season. The site failed the swimming guidelines in November 2007.

<table>
<thead>
<tr>
<th></th>
<th>OCT '07</th>
<th>NOV '07</th>
<th>DEC '07</th>
<th>JAN '08</th>
<th>FEB '08</th>
<th>MAR '08</th>
<th>APR '08</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC</td>
<td>PASS</td>
<td>FAIL*</td>
<td>**</td>
<td>PASS</td>
<td>PASS*</td>
<td>PASS*</td>
<td>PASS</td>
</tr>
</tbody>
</table>

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

** Insufficient samples to calculate compliance were collected in this month.

Timeseries plots
Slightly elevated levels of faecal coliforms were recorded throughout the monitoring period, with values exceeding the median guideline limit on several occasions.
**Copacabana Beach**

**Description**
Conditions at Copacabana Beach depend on tide height and wave energy, but when calm, the beach is very popular with families with young children. A surf club, carpark and amenities are located nearby.

**Pollution sources**
The beach is backed by parkland reserve, which contains remnant bushland. Runoff from roads and pavements adjacent to the beach may affect the water quality during heavy rain, and outflow from Cockrone Lagoon may at times be a source of pollution.

**Compliance**
Copacabana Beach complied with NHMRC (1990) guidelines in all months of the 2007–2008 summer swimming season in which sufficient samples were collected.

<table>
<thead>
<tr>
<th>Compliance with NHMRC (1990) swimming guidelines at Copacabana Beach</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OCT’ 07</strong></td>
</tr>
<tr>
<td>FC</td>
</tr>
</tbody>
</table>

* 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 were generally low throughout the monitoring period, providing no evidence of sewage contamination.
Cockrone Lagoon

Description
The sampling site is a shallow sandy area located near the mouth of the lagoon at Mcmasters Beach. The site is adjacent to a wetland and coastal reserve. Parts of the lagoon are known to contain nuisance amounts of aquatic plants. The lagoon is intermittently open to the ocean.

Pollution sources
Much of the immediate catchment contains urban development, with waste management facilities, remnant bushland and nature reserves located in the upper catchment. The lagoon is known to suffer from the effects of high loads of nutrients, which in recent years have led to environmental problems such as excess weed-growth and fish kills. Stormwater may contain both high levels of nutrients and sewage contamination.

Compliance
Cockrone Lagoon complied with NHMRC (1990) guidelines in five of six months of the 2007–2008 summer swimming season in which sufficient samples were collected. The site failed the swimming guidelines in January 2008.

Compliance with NHMRC (1990) swimming guidelines at Cockrone Lagoon

<table>
<thead>
<tr>
<th></th>
<th>OCT '07</th>
<th>NOV '07</th>
<th>DEC '07</th>
<th>JAN '08</th>
<th>FEB '08</th>
<th>MAR '08</th>
<th>APR '08</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC</td>
<td>PASS</td>
<td>PASS*</td>
<td>**</td>
<td>FAIL</td>
<td>PASS*</td>
<td>PASS</td>
<td>PASS</td>
</tr>
</tbody>
</table>

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

** Insufficient samples to calculate compliance were collected in this month.

Timeseries plots
Levels of faecal coliforms generally remained below the guideline limits over the monitoring period, with values occasionally exceeding the median guideline limit usually following rainfall.
McMasters Beach

Description
The sampling site at McMasters beach is located close to the surf club. The beach is backed by a carpark and residential area. The beach is an extremely popular swimming site for families with young children and receives a large number of visitors each summer.

Pollution sources
The beach is backed by parkland reserve, which contains remnant bushland. Runoff from roads and pavements adjacent to the beach may affect the water quality during heavy rain, and outflow from Cockrone Lagoon may at times be a source of pollution.

Compliance
McMasters Beach complied with NHMRC (1990) guidelines in all months of the 2007–2008 summer swimming season in which sufficient samples were collected.

<table>
<thead>
<tr>
<th></th>
<th>OCT '07</th>
<th>NOV '07</th>
<th>DEC '07</th>
<th>JAN '08</th>
<th>FEB '08</th>
<th>MAR '08</th>
<th>APR '08</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC</td>
<td>PASS</td>
<td>PASS*</td>
<td>**</td>
<td>PASS</td>
<td>PASS*</td>
<td>PASS*</td>
<td>PASS</td>
</tr>
</tbody>
</table>

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

** Insufficient samples to calculate compliance were collected in this month.

Timeseries plots
Faecal coliform levels were generally low throughout the monitoring period, providing no evidence of sewage contamination.

See page 5 for key to graph
Killcare Beach

Description
Conditions at Killcare Beach depend on tide height and wave energy, but when calm the beach is very popular with families with young children. A surf club, carpark and amenities are located nearby. Bouddi National Park and nature reserve form the beach foreshore.

Pollution sources
There are few sources of pollution, although stormwater runoff from the nearby roads and urban area may affect water quality following heavy rain.

Compliance
Killcare Beach complied with NHMRC (1990) guidelines in all months of the 2007–2008 summer swimming season in which sufficient samples were collected.

Compliance with NHMRC (1990) swimming guidelines at Killcare Beach

<table>
<thead>
<tr>
<th></th>
<th>OCT '07</th>
<th>NOV '07</th>
<th>DEC '07</th>
<th>JAN '08</th>
<th>FEB '08</th>
<th>MAR '08</th>
<th>APR '08</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC</td>
<td>PASS</td>
<td>PASS*</td>
<td>**</td>
<td>PASS</td>
<td>PASS*</td>
<td>PASS*</td>
<td>PASS</td>
</tr>
</tbody>
</table>

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

** Insufficient samples to calculate compliance were collected in this month.

Timeseries plots
Faecal coliform levels were generally low throughout the monitoring period, providing no evidence of sewage contamination.
Pearl Beach

Description
The sampling site is located near Pearl Beach Lagoon, where the water is used as a play area by children. The beach is backed by a carpark and residential area. The beach is an extremely popular swimming site for families with young children because of the calm nature of the beach and it receives a large number of visitors each summer.

Pollution sources
Stormwater runoff from the surrounding urban area and discharge from Pearl Beach Lagoon may affect water quality at the beach.

Compliance
Pearl Beach complied with NHMRC (1990) guidelines in all months of the 2007–2008 summer swimming season in which sufficient samples were collected.

<table>
<thead>
<tr>
<th></th>
<th>OCT '07</th>
<th>NOV '07</th>
<th>DEC '07</th>
<th>JAN '08</th>
<th>FEB '08</th>
<th>MAR '08</th>
<th>APR '08</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC</td>
<td>PASS</td>
<td>PASS*</td>
<td>**</td>
<td>PASS</td>
<td>PASS*</td>
<td>PASS*</td>
<td>PASS</td>
</tr>
</tbody>
</table>

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

** Insufficient samples to calculate compliance were collected in this month.

Timeseries plots
Faecal coliform levels were generally low throughout the monitoring period, remaining below the median guideline limit.
Pearl Beach Rockpool

Description
The rockpool is located at the foot of cliffs at the southern end of Pearl Beach in Broken Bay and is a popular swimming site for families with young children. The pool is situated close to the surf club, and the beach is a busy holiday venue in summer.

Pollution sources
The baths are backed by Brisbane Water National Park. Runoff from roads and pavements in the township of Pearl Beach and outflow from the lagoon may affect the water quality during heavy rain, although the catchment is very small.

Compliance
Pearl Beach Rockpool complied with NHMRC (1990) guidelines in all months of the 2007–2008 summer swimming season in which sufficient samples were collected.

<table>
<thead>
<tr>
<th></th>
<th>OCT '07</th>
<th>NOV '07</th>
<th>DEC '07</th>
<th>JAN '08</th>
<th>FEB '08</th>
<th>MAR '08</th>
<th>APR '08</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC</td>
<td>PASS</td>
<td>PASS*</td>
<td>**</td>
<td>PASS</td>
<td>PASS*</td>
<td>PASS*</td>
<td>PASS</td>
</tr>
</tbody>
</table>

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

** Insufficient samples to calculate compliance were collected in this month.

Timeseries plots
Levels of faecal coliforms were generally low over the monitoring period, with most remaining well below the median guideline limit.
Umina Beach

Description
Umina Beach is a very popular beach located near the entrance to Brisbane Waters. The beach is patrolled during the summer swimming season. As the beach faces the open ocean, conditions can vary and depend on the size and direction of ocean swell. When calm, it is a popular area for families with small children. The area is also known for sailboarding and surfriding in some conditions. A surf club, carpark, amenities and caravan park are located nearby.

Pollution sources
The catchment contains part of Brisbane Water National Park but is substantially urbanised. Ettalong Creek and a number of stormwater drains discharge into Broken Bay in the vicinity of the site, and these may affect water quality during heavy rain.

Compliance
Umina Beach complied with NHMRC (1990) guidelines in all months of the 2007–2008 summer swimming season in which sufficient samples were collected.

Compliance with NHMRC (1990) swimming guidelines at Umina Beach

<table>
<thead>
<tr>
<th></th>
<th>OCT '07</th>
<th>NOV '07</th>
<th>DEC '07</th>
<th>JAN '08</th>
<th>FEB '08</th>
<th>MAR '08</th>
<th>APR '08</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC</td>
<td>PASS</td>
<td>PASS*</td>
<td>**</td>
<td>PASS</td>
<td>PASS*</td>
<td>PASS</td>
<td>PASS</td>
</tr>
</tbody>
</table>

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

** Insufficient samples to calculate compliance were collected in this month.

Timeseries plots
Levels of faecal coliforms were generally low over the monitoring period, with most remaining well below the median guideline limit.

See page 5 for key to graph
Pretty Beach Baths

Description
These tidal baths are netted and are located in Brisbane Water near the entrance to Broken Bay. There is a narrow sandy beach, a foreshore park, boat ramp and picnic area. The area is popular with families with small children during summer.

Pollution sources
The foreshore is predominantly urban and the waterway is a popular boating area. During heavy rain, water quality at this location could be affected by stormwater pollution from both upstream and downstream of the baths, depending on the tidal flow.

Compliance
Pretty Beach Baths complied with NHMRC (1990) guidelines in all months of the 2007–2008 summer swimming season in which sufficient samples were collected.

Compliance with NHMRC (1990) swimming guidelines at Pretty Beach Baths

<table>
<thead>
<tr>
<th></th>
<th>OCT '07</th>
<th>NOV '07</th>
<th>DEC '07</th>
<th>JAN '08</th>
<th>FEB '08</th>
<th>MAR '08</th>
<th>APR '08</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC</td>
<td>PASS</td>
<td>PASS*</td>
<td>**</td>
<td>PASS*</td>
<td>PASS*</td>
<td>PASS</td>
<td></td>
</tr>
</tbody>
</table>

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

** Insufficient samples to calculate compliance were collected in this month.

Timeseries plots
Levels of faecal coliforms were generally low over the monitoring period, with elevated results recorded occasionally in February and April 2008 in response to rainfall.
Ettalong Channel

**Description**
This estuarine beach is not netted and is situated in the main channel of Brisbane Water near the entrance to Broken Bay. The beach is adjacent to a foreshore park and picnic area and is popular for sailboarding.

**Pollution sources**
The foreshore in the vicinity is predominantly urban parkland, although much of the catchment is urbanised, and large stormwater drains discharge to the beach near the swimming areas. During heavy rain, water quality at this location could also be affected by stormwater pollution.

**Compliance**
Ettalong Channel complied with NHMRC (1990) guidelines in all months of the 2007–2008 summer swimming season in which sufficient samples were collected.

<table>
<thead>
<tr>
<th></th>
<th>OCT '07</th>
<th>NOV '07</th>
<th>DEC '07</th>
<th>JAN '08</th>
<th>FEB '08</th>
<th>MAR '08</th>
<th>APR '08</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC</td>
<td>PASS</td>
<td>PASS*</td>
<td>**</td>
<td>PASS</td>
<td>PASS*</td>
<td>PASS</td>
<td>PASS</td>
</tr>
</tbody>
</table>

* 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 generally remained below the guideline limits over the monitoring period, with elevated results recorded occasionally in February and April 2008 usually in response to rainfall.

See page 24 for key to map

See page 5 for key to graph
Davistown Baths

Description
These tidal baths are netted and are located in the channel between Brisbane Water and the Kincumber Broadwater. The baths are adjacent to a foreshore park and picnic area that are used often in summer by families with small children.

Pollution sources
The foreshore in the vicinity is predominantly parks and reserves, although much of the catchment is urbanised. There are numerous waterfront residences nearby and the waterway is a popular boating area. During heavy rain, water quality at this location could be affected by stormwater pollution from both upstream and downstream of the baths, depending on the tidal flow.

Compliance
Davistown Baths complied with NHMRC (1990) guidelines in five of the six months of the 2007–2008 summer swimming season in which sufficient samples were collected. The site failed to comply with the swimming guidelines in February 2008.

Compliance with NHMRC (1990) swimming guidelines at Davistown Baths

<table>
<thead>
<tr>
<th></th>
<th>OCT '07</th>
<th>NOV '07</th>
<th>DEC '07</th>
<th>JAN '08</th>
<th>FEB '08</th>
<th>MAR '08</th>
<th>APR '08</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC</td>
<td>PASS</td>
<td>PASS*</td>
<td>**</td>
<td>PASS</td>
<td>FAIL*</td>
<td>PASS*</td>
<td>PASS</td>
</tr>
</tbody>
</table>

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

Timeseries plots
Levels of faecal coliforms were slightly elevated throughout the monitoring period, exceeding the median guideline limit on several occasions in February, March and April 2008, in both wet and dry weather conditions.

See page 5 for key to graph.
Woy Woy Baths

Description
These estuarine tidal baths consist of a netted enclosure and surrounding boardwalk and are located in Woy Woy channel, a branch of Brisbane Water. The baths are situated close to the commercial district of Woy Woy and are adjacent to a foreshore park and picnic area.

Pollution sources
The foreshore in the vicinity is predominantly parks and reserves, although much of the catchment is urbanised. There are several wharves and waterfront residences nearby and the waterway is a popular boating area. During heavy rain, water quality at this location could be affected by stormwater pollution from both upstream and downstream of the baths depending on the tidal flow, as well as by local sources.

Compliance
Woy Woy Baths complied with NHMRC (1990) guidelines in five of the six months of the 2007–2008 summer swimming season in which sufficient samples were collected. The site failed to comply with the swimming guidelines in March 2008.

<table>
<thead>
<tr>
<th></th>
<th>OCT '07</th>
<th>NOV '07</th>
<th>DEC '07</th>
<th>JAN '08</th>
<th>FEB '08</th>
<th>MAR '08</th>
<th>APR '08</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC</td>
<td>PASS</td>
<td>PASS*</td>
<td>**</td>
<td>PASS</td>
<td>PASS*</td>
<td>FAIL*</td>
<td>PASS</td>
</tr>
</tbody>
</table>

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

** Insufficient samples to calculate compliance were collected in this month.

Timeseries plots
Levels of faecal coliforms generally remained below the guideline limits over the monitoring period, exceeding the median guideline limit on four occasions in both wet and dry weather conditions.
Yattalunga Baths

Description
These estuarine tidal baths consist of a netted enclosure and boardwalk in the upper reaches of Brisbane Water. There is a sandy beach nearby and the baths are adjacent to a foreshore park.

Pollution sources
The foreshore in the vicinity is predominantly parks and reserves, although much of the catchment is urbanised. There are several wharves and waterfront residences nearby and the waterway is a popular boating area. During heavy rain, water quality at this location could be affected by stormwater pollution from nearby creeks as well as from local sources.

Compliance
Yattalunga Baths complied with NHMRC (1990) guidelines in all months of the 2007–2008 summer swimming season in which sufficient samples were collected.

<table>
<thead>
<tr>
<th></th>
<th>OCT '07</th>
<th>NOV '07</th>
<th>DEC '07</th>
<th>JAN '08</th>
<th>FEB '08</th>
<th>MAR '08</th>
<th>APR '08</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC</td>
<td>PASS</td>
<td>PASS*</td>
<td>**</td>
<td>PASS</td>
<td>PASS*</td>
<td>PASS*</td>
<td>PASS</td>
</tr>
</tbody>
</table>

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

** Insufficient samples to calculate compliance were collected in this month.

Timeseries plots
Levels of faecal coliforms were generally low over the monitoring period, with elevated results recorded occasionally in February, March and April 2008 in response to rainfall.

See page 5 for key to graph