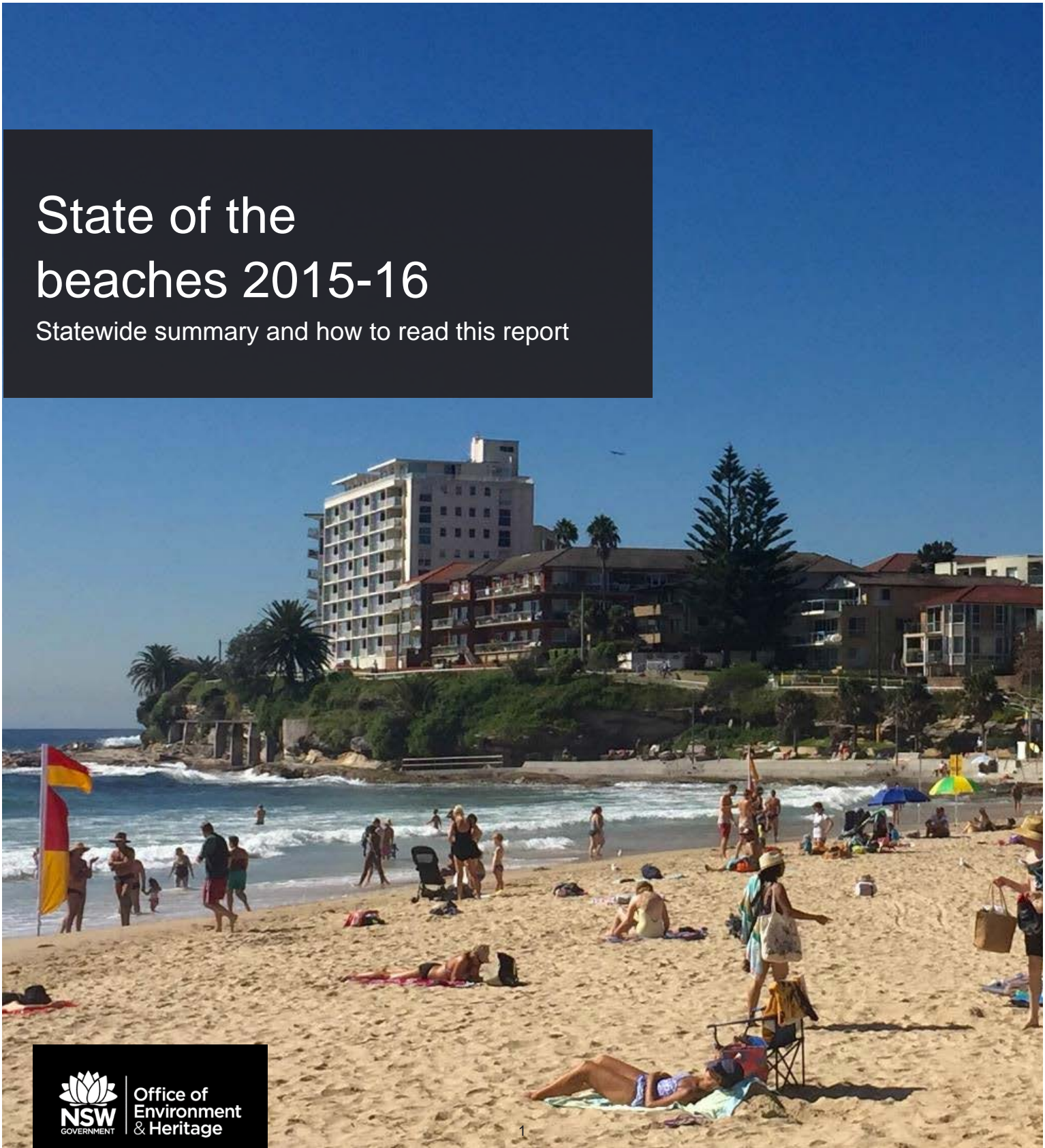




Beachwatch

State of the beaches 2015-16

Statewide summary and how to read this report



Office of
Environment
& Heritage

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State of the Beaches

STATEWIDE SUMMARY 2015–2016

Beach monitoring in New South Wales

The water quality of beaches and other swimming locations is monitored under the NSW Government's Beachwatch programs to provide the community with accurate information on the cleanliness of the water and to enable individuals to make informed decisions about where and when to swim. Routine assessment also measures the impact of pollution sources, enables the effectiveness of stormwater and wastewater management practices to be assessed and highlights areas where further work is needed.

Swimming sites in New South Wales are graded as Very Good, Good, Fair, Poor or Very Poor in accordance with the National Health and Medical Research Council's 2008 *Guidelines for Managing Risks in Recreational Waters*. These Beach Suitability Grades provide a long-term assessment of how suitable a beach is for swimming. The grades are determined from the most recent 100 water quality results (two to four years' worth of data depending on the sampling frequency) and a risk assessment of potential pollution sources.

A guide on to how to read the report is provided on pages 16–19.

Rainfall impacts

Rainfall is the major driver of pollution to recreational waters, generating stormwater runoff and triggering discharges from the wastewater treatment and transport systems. Changes in rainfall patterns are reflected in beach water quality over time due to variation in the frequency and extent of stormwater and wastewater inputs.

The Beach Suitability Grades for 2015–2016 are based on water quality data collected over the last two to four years. Rainfall over this period has been diverse, beginning with sustained wet weather conditions and flooding in many areas along the NSW coast, followed by well-below average rainfall across the state, and ending with more wet weather conditions and heavy rainfall events including significant east coast lows:

- 2012–2013: high levels of rainfall recorded in many areas
- 2013–2014: driest summer in almost 30 years
- 2014–2015: above average rainfall, particularly on the coast
- 2015–2016: varied rainfall with wettest January on record for many coastal areas.

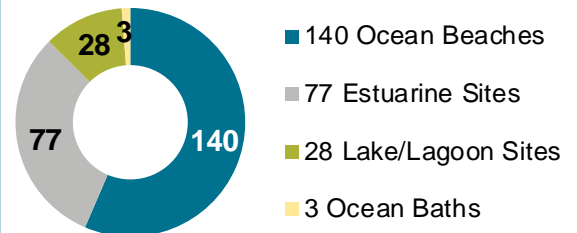
Beach Suitability Grades at 13 swimming sites were downgraded this year due to the inclusion of water quality data from the wet 2015–2016 summer and significant rainfall events. Some declines were from Very Good to Good grades, while others crossed the threshold from Good to Poor¹.

Statistics for 2015–2016:

9553
samples

248
sites

32
councils



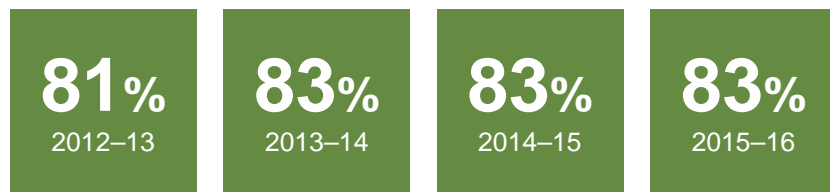
4645
Twitter followers
@BeachwatchNSW

52,782
Users
environment.nsw.gov.au/beach

See How to Read this Report for explanations of graphs and Beach Suitability Grades.

Overall results for 2015–2016

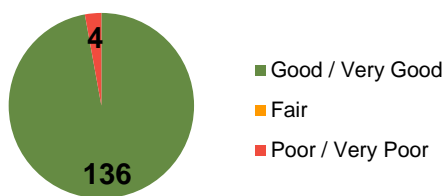
Percentage of sites graded as Very Good or Good:



In 2015–2016, 207 of the 248 monitored swimming locations were graded as Very Good or Good, indicating that they were suitable for swimming for most or almost all of the time. While overall this is an excellent result, many lake/lagoon and estuarine swimming locations did not perform as well as the ocean beaches, primarily due to limited flushing. Similar trends have been recorded in previous years.

As ocean beaches, estuarine beaches, lake/lagoon swimming sites and ocean baths have very different responses to rainfall-related impacts, the results for each type of swimming area are discussed separately.

Ocean beaches



In general, open ocean beaches in New South Wales exhibit excellent water quality with 97% of 140 monitored ocean beaches graded as Very Good or Good. This indicates that they were suitable for swimming for most or almost all of the time. This result is slightly higher than that recorded in 2014–2015, when 96% of ocean beaches were graded as Very Good or Good. The impacts of rainfall are least apparent at the ocean beaches, with tidal flushing rapidly dispersing and diluting pollution inputs.

Copacabana and Ocean beaches on the Central Coast and Boat Harbour at the northern end of Bate Bay in Cronulla were upgraded to Good from a Poor grade in 2014–2015.

Four ocean beaches were graded as Poor¹:

- Terrigal Beach and Avoca Beach on the Central Coast
- Coogee Beach and Malabar Beach in Sydney.

Sites on the Central Coast can be impacted by more significant sources of contamination, such as discharges from lagoons, large creeks or estuaries, as well as substantial rainfall events. Terrigal Beach and Avoca Beach were also graded as Poor in 2014–2015. While water quality was generally suitable for swimming in dry weather conditions, elevated enterococci levels may be recorded following light rainfall.

¹ Using the **Beach Suitability Grade** classification matrix, sites assigned a moderate Sanitary Inspection Category can only be rated as Good or Poor with no option of Fair grades. This can create the impression of a large change in water quality when in fact there need only be a slight increase in bacterial counts to push it over the threshold, with no significant increase in the risk to public health.

Health risks

Contamination of recreational waters with faecal material from animal and human sources can pose significant health problems to beach users owing to the presence of pathogens (disease-causing micro-organisms) in the faecal material. The most common groups of pathogens found in recreational waters are bacteria, protozoans and viruses.

Exposure to contaminated water can cause gastroenteritis, with symptoms including vomiting, diarrhoea, stomach-ache, nausea, headache and fever. Eye, ear, skin and upper respiratory tract infections can also be contracted when pathogens come into contact with small breaks and tears in the skin or ruptures of the delicate membranes in the ear or nose.

Certain groups of users may be more vulnerable to the threat of microbial infection than others. Children, the elderly, people with compromised immune systems, tourists, and people from culturally and linguistically diverse backgrounds are generally most at risk.

Beach pollution forecasts

Beachwatch issues daily pollution forecasts to enable beachgoers to make informed decisions about where and when to swim. The forecasts are available before 7.30am during the swimming season (October to April) and before 8am between May and September, and cover swimming sites in the Sydney, Hunter, Central Coast and Illawarra regions.

Beach pollution forecasts can be accessed via the Beachwatch website, mobile website, email subscription, Twitter and Facebook.

environment.nsw.gov.au/beach

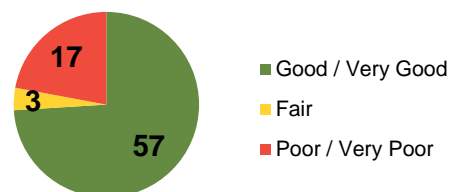
Malabar Beach and Coogee Beach were downgraded to Poor in 2015–2016 from Good in the previous year. Water quality was mostly good during dry weather conditions, however the impacts of rainfall are more apparent at these beaches.

While Coogee Beach generally had good water quality during dry weather, elevated bacteria levels were regularly measured following low levels of rainfall. Water quality was impacted by stormwater associated with frequent rainfall events during the assessment period, including the wettest January for Sydney since 1988. The impact of these events was enough to just breach the threshold from Good to Poor, however did not significantly increase the risk to public health from the previous year. With the inclusion of many wet weather results, Coogee Beach is now positioned at the top of the Poor grade instead of the bottom of the Good grade.

Malabar Beach has been monitored since 1989, with significant improvements in water quality since 2012–2013 due to the diversion of the large stormwater drain at the northern end of the beach. In 2015–2016, the beach was impacted by stormwater associated with significant rainfall events during the assessment period, including the wettest January for Sydney since 1988. This beach takes longer to recover from stormwater events than surrounding areas. Lower levels of flushing increase the time needed to disperse and dilute pollution inputs.

As a general precaution, swimming at ocean beaches should be avoided during and for up to one day after rainfall, or if there are signs of stormwater pollution such as discoloured water or floating debris.

Estuarine beaches



Fifty-seven (74%) of the 77 monitored estuarine beaches were graded as Very Good or Good, indicating the water quality was suitable for swimming for most of the time. These swimming sites were generally located in well-flushed sections of the estuaries or had few significant sources of pollution. This result is a decline on that recorded in 2014–2015 when 77% of estuarine beaches were graded as Good or Very Good. The overall fall in performance from the previous year was partly due to the inclusion of six estuarine beaches in Port Stephens, two of which were graded as Poor.

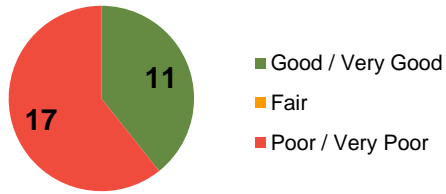
Three sites in Sydney (Gurney Crescent Baths, Clontarf Pool and Northbridge Baths) were graded as Fair. These sites generally had good microbial water quality in the assessment period, but the sanitary inspections identified risks from a number of potential sources of pollution including local stormwater runoff, upstream rivers and sewage overflows.

Sixteen (21%) of the estuarine beaches were graded as Poor. The water quality at these sites was often suitable for swimming during dry weather conditions, with elevated levels of enterococci recorded following rainfall. These sites were generally located in less well-flushed sections of the estuaries or had more significant sources of pollution.

As a general precaution, swimming at estuarine beaches should be avoided during and up to three days following rainfall or if there are signs of stormwater pollution such as discoloured water or floating debris.

Foreshores Beach in Botany Bay was graded as Very Poor, as it was in 2014–2015. The site is often suitable for swimming during dry weather conditions, but is very susceptible to pollution from the sewage overflows which discharge into Mill Pond Creek. To reduce the risk of illness, carefully follow the advisories in the Beachwatch pollution forecast and avoid swimming if there are signs of pollution such as discoloured water or floating debris.

Lake/lagoon swimming sites



Eleven of the 28 monitored lake and lagoon swimming sites (39%) were graded as Very Good or Good, an improvement on last year's 32%:

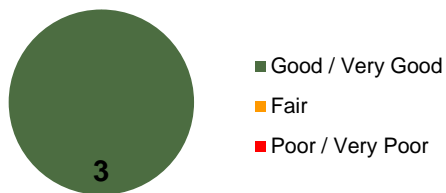
- seven locations in Lake Macquarie on the Central Coast
- Mogareeka Inlet north of Tathra on the South Coast
- Lake Ainsworth (East and South) in Ballina on the NSW North Coast
- Entrance Lagoon Beach in the Illawarra.

These swimming sites were suitable for swimming for most of the time.

Seventeen (61%) of the lake/lagoon swimming sites were graded as Poor. While many of these sites were suitable for swimming during dry weather conditions, elevated enterococci levels were frequently recorded following rainfall. Terrigal Lagoon was upgraded to Poor from Very Poor in 2014–2015. Water quality at Terrigal Lagoon has showed continual improvement since 2011. Narrabeen Lagoon (Birdwood Park) was downgraded to Poor from Good in 2014–2015. The entrance to the lagoon was closed for extended periods during the assessment period which impacted water quality at the nearby swimming site.

The water quality at coastal lake/lagoon sites often depends on how close the swimming area is to the ocean and whether the entrance is open to the ocean. When the entrance is open and the site is near that opening, the site can be well-flushed by clean ocean water and water quality is often of a high standard. If the site is not near the entrance, or the entrance is closed, the water quality of the site can be affected by contamination from stormwater runoff to the lake/lagoon. As a general precaution, it is recommended that swimming at lake and lagoon swimming sites be avoided during and up to three days following rainfall or if there are signs of stormwater pollution such as discoloured water or floating debris.

Ocean baths



All three monitored ocean baths were graded as Good: South Maroubra Rockpool in Sydney, Pearl Beach Rockpool in Gosford and Big Blue Pool on the South Coast, indicating that water quality is suitable for swimming for most of the time. Pearl Beach Rockpool was upgraded to Good in 2015–2016 from a Poor grade in the previous year.

The Beachwatch programs

Beachwatch

The Beachwatch program was established in 1989 to monitor Sydney's ocean beaches and was expanded to ocean beaches in the Hunter and Illawarra regions in 1996.

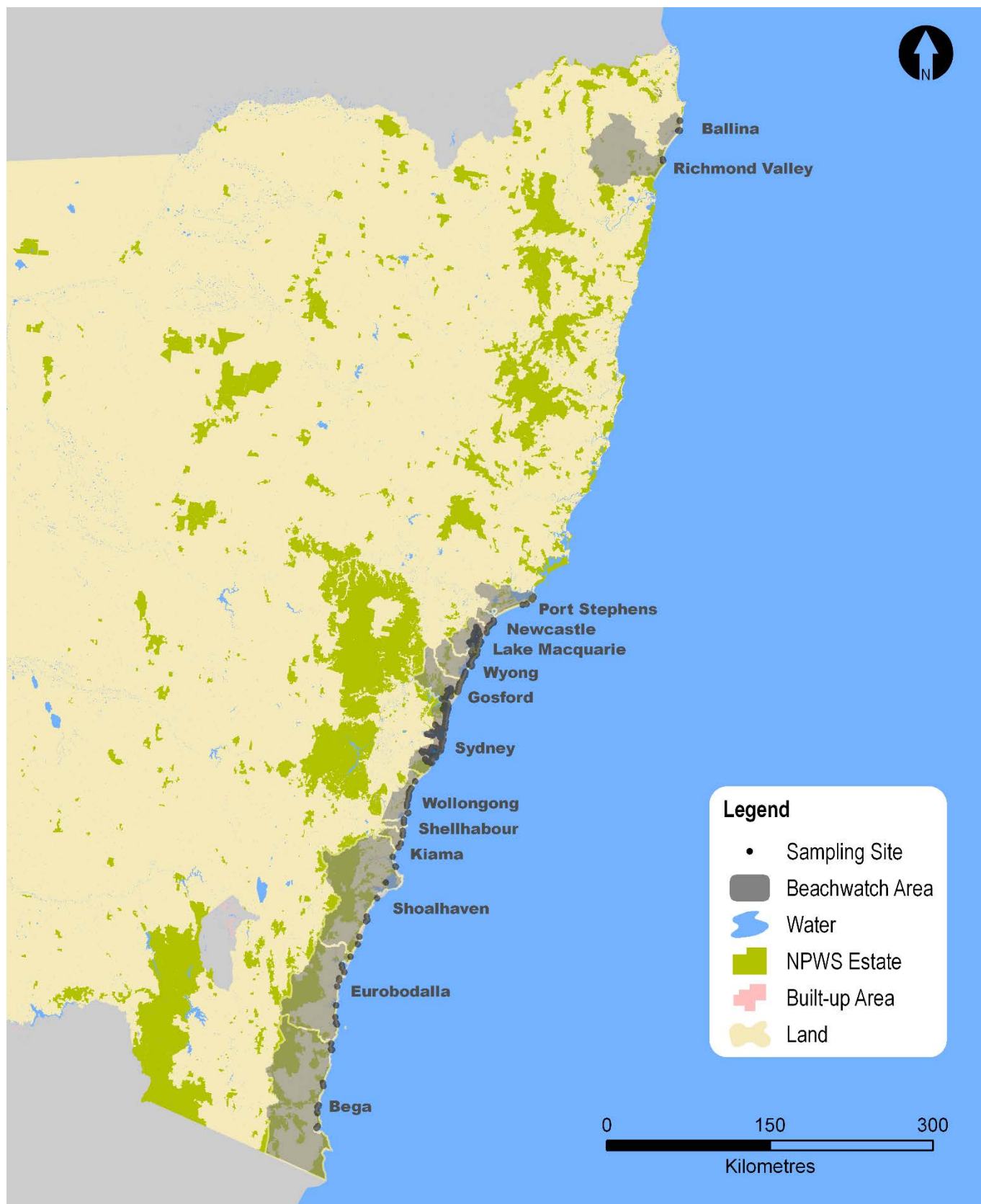
Monitoring of estuarine beaches commenced in 1994, with the addition of Sydney Harbour, Botany Bay and lower Georges River to the program. Pittwater was added in 1996 and most sites in Port Hacking were added in 1999.

Beachwatch Partnership Program

The Beachwatch Partnership Program was established as a pilot in 2002 and included 11 local councils along the NSW coast during 2015–2016:

Ballina Shire Council	Wollongong City Council
Richmond Valley Council	Kiama Municipal Council
Lake Macquarie City Council	Shoalhaven City Council
Wyong Shire Council	Eurobodalla Shire Council
Gosford City Council	Bega Valley Shire Council
Port Stephens Council	

The water quality sampling and laboratory analysis activities are fully funded by each local council. The Office of Environment and Heritage (OEH) provides quality assurance support and assistance with community reporting.



Sampling sites and areas monitored under the Beachwatch program

Beach Suitability Grades for North Coast region

North Coast region		Site Type	Beach Suitability Grade	Change	
Ballina Shire Council	Seven Mile Beach	Ocean beach	VG	●	Stable
	Lake Ainsworth East	Lagoon/lake	G	↑	Improved
	Lake Ainsworth South	Lagoon/lake	G	↑	Improved
	Lake Ainsworth West	Lagoon/lake	P	●	Stable
	Shelly Beach	Ocean beach	G	●	Stable
	Shaws Bay East	Estuarine	G	●	Stable
	Shaws Bay West	Estuarine	G	↑	Improved
	Shaws Bay North	Estuarine	P	↓	Deteriorated
	The Serpentine	Estuarine	G	●	Stable
	Lighthouse Beach	Ocean beach	VG	↑	Improved
Richmond Valley Council	Airforce Beach	Ocean beach	VG	●	Stable
	Main Beach	Ocean beach	VG	●	Stable
	Shark Bay	Ocean beach	VG	●	Stable
	Evans River	Estuarine	P	●	Stable

VG	Very Good	G	Good	F	Fair	P	Poor	VP	Very Poor
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Beach Suitability Grades for Hunter region

Hunter region	Site type	Beach Suitability Grade	Change	
Port Stephens Council	Zenith Beach	Ocean beach	VG	● Stable
	Box Beach	Ocean beach	VG	● Stable
	Fingal Beach	Ocean beach	VG	● Stable
	One Mile Beach	Ocean beach	VG	● Stable
	Bagnalls Beach	Estuarine	P	● Stable
	Dutchmans Bay	Estuarine	G	● Stable
	Birubi Beach	Ocean Beach	VG	● Stable
	Karuah Tidal Pool	Estuarine	G	● Stable
	Lemon Tree Passage Tidal Pool	Estuarine	G	● Stable
	Little Beach	Estuarine	G	● Stable
	Georges Reserve	Estuarine	P	● Stable
City of Newcastle Council	South Stockton Beach	Ocean beach	VG	● Stable
	Nobbys Beach	Ocean beach	VG	● Stable
	Newcastle Beach	Ocean beach	VG	● Stable
	Bar Beach	Ocean beach	VG	● Stable
	Merewether Beach	Ocean beach	G	● Stable
	Burwood North Beach	Ocean beach	G	● Stable
	Burwood South Beach	Ocean beach	G	● Stable
Lake Macquarie Council	Glenrock Lagoon Beach	Ocean beach	G	● Stable
	Dudley Beach	Ocean beach	VG	● Stable
	Redhead Beach	Ocean beach	VG	● Stable
	Blacksmiths Beach	Ocean beach	VG	● Stable
	Swansea Heads Little Beach	Ocean beach	G	● Stable
	Caves Beach	Ocean beach	VG	● Stable
	Eleebana (Lions Park)	Lagoon/lake	P	● Stable
	Croudace Bay	Lagoon/lake	G	● Stable
	Arcadia Vale	Lagoon/lake	G	● Stable
	Belmont	Lagoon/lake	G	● Stable
	Swansea	Lagoon/lake	P	● Stable
	Cams Wharf	Lagoon/lake	P	● Stable
	Catherine Hill Bay	Ocean beach	G	● Stable
	Speers Point Park	Lagoon/lake	P	● Stable
	Bolton Point	Lagoon/lake	P	● Stable
	Toronto	Lagoon/lake	G	▲ Improved
	Kilaben Bay	Lagoon/lake	P	● Stable
	Wangi Point (Van Park)	Lagoon/lake	G	● Stable
Balcolyn	Lagoon/lake	G	● Stable	
Sunshine	Lagoon/lake	G	● Stable	



Very Good



Good



Fair



Poor



Very Poor

Beach Suitability Grades for Central Coast region

Central Coast Council	Site type	Beach suitability grade	Change
Former Wyong Shire Council	Frazer Beach	Ocean beach	Stable
	Birdie Beach	Ocean beach	Stable
	Budgewoi Beach	Ocean beach	Stable
	Lakes Beach	Ocean beach	Stable
	Hargraves Beach	Ocean beach	Stable
	Jenny Dixon Beach	Ocean beach	Stable
	Cabbage Tree Bay	Ocean beach	Stable
	Lighthouse Beach	Ocean beach	Improved
	Gravelly Beach	Ocean beach	Stable
	Soldiers Beach	Ocean beach	Stable
	North Entrance Beach	Ocean beach	Stable
	The Entrance Beach	Ocean beach	Stable
	Blue Bay	Ocean beach	Stable
	Toowoona Bay	Ocean beach	Stable
	Shelly Beach	Ocean beach	Stable
	Blue Lagoon	Ocean beach	Stable
	Bateau Bay Beach	Ocean beach	Stable
	Gwandalan	Lagoon/Lake	Stable
	Chain Valley Bay	Lagoon/Lake	Stable
	Lake Munmorah Baths	Lagoon/Lake	Stable
Canton Beach	Lagoon/Lake	Stable	
The Entrance Channel	Estuarine	stable	

Very Good	Good	Fair	Poor	Very Poor
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Statewide Summary

Central Coast Council	Swimming site	Site type	Beach suitability grade	Change
Former Gosford City Council	Forresters Beach	Ocean Beach	G	 Stable
	Wamberal Beach	Ocean Beach	G	 Stable
	Wamberal Lagoon	Lagoon	P	 Stable
	Terrigal Beach	Ocean Beach	P	 Stable
	Terrigal Lagoon	Lagoon	P	↑ Improved
	North Avoca Beach	Ocean Beach	G	 Stable
	Avoca Beach	Ocean Beach	P	 Stable
	Avoca Lagoon	Lagoon	P	 Stable
	Copacabana Beach	Ocean Beach	G	↑ Improved
	Cockrone Lagoon	Lagoon	P	 Stable
	MacMasters Beach	Ocean Beach	G	 Stable
	Killcare Beach	Ocean Beach	G	 Stable
	Patonga Creek	Estuarine	P	 Stable
	Pearl Beach	Ocean Beach	G	 Stable
	Pearl Beach Rockpool	Ocean Bath	G	↑ Improved
	Umina Beach	Ocean Beach	G	 Stable
	Ocean Beach	Ocean Beach	G	↑ Improved
	Ettalong Channel	Estuarine	P	 Stable
	Pretty Beach Baths	Estuarine	P	 Stable
	Davistown Baths	Estuarine	P	 Stable
Woy Woy Baths	Estuarine	P	 Stable	
Yattalunga Baths	Estuarine	P	 stable	

VG Very Good	G Good	F Fair	P Poor	VP Very Poor
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Beach Suitability Grades for Sydney region

Sydney region (Northern)		Site type	Beach suitability grade	Change	
Northern Beaches	Palm Beach	Ocean beach	VG	●	Stable
	Whale Beach	Ocean beach	VG	●	Stable
	Avalon Beach	Ocean beach	VG	●	Stable
	Bilgola Beach	Ocean beach	VG	●	Stable
	Newport Beach	Ocean beach	G	●	Stable
	Bungan Beach	Ocean beach	VG	●	Stable
	Mona Vale Beach	Ocean beach	VG	●	Stable
	Warriewood Beach	Ocean beach	G	●	Stable
	Turimetta Beach	Ocean beach	G	●	Stable
	North Narrabeen Beach	Ocean beach	G	●	Stable
	Narrabeen Lagoon	Lagoon	P	↓	Deteriorated
	Bilarong Reserve	Lagoon	P	●	Stable
	Collaroy Beach	Ocean beach	G	●	Stable
	Long Reef Beach	Ocean beach	G	●	Stable
	Dee Why Beach	Ocean beach	VG	●	Stable
	North Curl Curl Beach	Ocean beach	G	●	Stable
	South Curl Curl Beach	Ocean beach	VG	●	Stable
	Freshwater Beach	Ocean beach	G	●	Stable
	Queenscliff Beach	Ocean beach	G	●	Stable
	North Steyne Beach	Ocean beach	G	●	Stable
South Steyne Beach	Ocean beach	G	●	Stable	
Shelly Beach	Ocean beach	G	↓	Deteriorated	
Pittwater	Barrenjoey Beach	Estuarine	P	↓	Deteriorated
	Paradise Beach Baths	Estuarine	G	●	Stable
	Clareville Beach	Estuarine	G	●	Stable
	Taylors Point Baths	Estuarine	G	●	Stable
	Bayview Baths	Estuarine	P	●	Stable
	Elvina Bay	Estuarine	VG	↑	Improved
	North Scotland Island	Estuarine	G	●	Stable
	South Scotland Island	Estuarine	G	●	Stable
	The Basin	Estuarine	VG	●	Stable
	Great Mackerel Beach	Estuarine	VG	●	Stable

Very Good
 Good
 Fair
 Poor
 Very Poor

Statewide Summary

Sydney region (Central)		Site type	Beach suitability grade	Change	
City Beaches	Bondi Beach	Ocean beach	G	●	Stable
	Tamarama Beach	Ocean beach	G	●	Stable
	Bronte Beach	Ocean beach	G	●	Stable
	Clovelly Beach	Ocean beach	VG	●	Stable
	Gordons Bay	Ocean beach	G	●	Stable
	Coogee Beach	Ocean beach	P	↓	Deteriorated
	Maroubra Beach	Ocean beach	VG	●	Stable
	South Maroubra Beach	Ocean beach	G	●	Stable
	South Maroubra Rockpool	Ocean baths	G	●	Stable
	Malabar Beach	Ocean beach	P	↓	Deteriorated
	Little Bay Beach	Ocean beach	G	●	Stable
Sydney Harbour	Watsons Bay	Estuarine	G	●	Stable
	Parsley Bay	Estuarine	G	●	Stable
	Nielsen Park	Estuarine	VG	●	Stable
	Rose Bay Beach	Estuarine	G	●	Stable
	Murray Rose Pool	Estuarine	G	●	Stable
	Dawn Fraser Pool	Estuarine	G	●	Stable
	Chiswick Baths	Estuarine	G	●	Stable
	Cabarita Beach	Estuarine	G	●	Stable
	Woolwich Baths	Estuarine	G	●	Stable
	Tambourine Bay	Estuarine	G	↑	Improved
	Woodford Bay	Estuarine	G	●	Stable
	Greenwich Baths	Estuarine	G	●	Stable
	Hayes St Beach	Estuarine	G	●	Stable
	Clifton Gardens	Estuarine	G	●	Stable
	Balmoral Baths	Estuarine	G	●	Stable
	Edwards Beach	Estuarine	G	●	Stable
	Chinamans Beach	Estuarine	G	●	Stable
	Northbridge Baths	Estuarine	F	●	Stable
	Davidson Reserve	Estuarine	P	●	Stable
	Gurney Crescent Baths	Estuarine	F	●	Stable
	Clontarf Pool	Estuarine	F	●	Stable
	Forty Baskets Pool	Estuarine	G	●	Stable
	Fairlight Beach	Estuarine	G	●	Stable
Manly Cove	Estuarine	G	●	Stable	
Little Manly Cove	Estuarine	G	●	Stable	

Statewide Summary

Sydney region (Southern)		Site type	Beach suitability grade	Change	
Southern Beaches	Boat Harbour	Ocean beach	G	↑	Improved
	Greenhills Beach	Ocean beach	VG	●	Stable
	Wanda Beach	Ocean beach	VG	●	Stable
	Elouera Beach	Ocean beach	VG	●	Stable
	North Cronulla Beach	Ocean beach	VG	●	Stable
	South Cronulla Beach	Ocean beach	G	●	Stable
	Shelly Beach	Ocean beach	VG	●	Stable
	Oak Park	Ocean beach	VG	●	Stable
Botany Bay and lower Georges River	Silver Beach	Estuarine	G	●	Stable
	Como Baths	Estuarine	G	●	Stable
	Jew Fish Bay Baths	Estuarine	G	●	Stable
	Oatley Bay Baths	Estuarine	G	●	Stable
	Carss Point Baths	Estuarine	G	●	Stable
	Sandringham Baths	Estuarine	G	●	Stable
	Dolls Point Baths	Estuarine	G	●	Stable
	Ramsgate Baths	Estuarine	G	●	Stable
	Monterey Baths	Estuarine	G	●	Stable
	Brighton-Le-Sands Baths	Estuarine	G	●	Stable
	Kyeemagh Baths	Estuarine	G	●	Stable
	Foreshores Beach	Estuarine	VP	●	Stable
	Yarra Bay	Estuarine	P	↓	Deteriorated
	Frenchmans Bay	Estuarine	G	●	Stable
Port Hacking	Congwong Bay	Estuarine	VG	●	Stable
	Jibbon Beach	Estuarine	G	↓	Deteriorated
	Horderns Beach	Estuarine	G	●	Stable
	GyMEA Bay Baths	Estuarine	P	↓	Deteriorated
	Lilli Pilli Baths	Estuarine	G	●	Stable
	Gunnamatta Bay Baths	Estuarine	P	↓	Deteriorated

Very Good
 Good
 Fair
 Poor
 Very Poor

Beach Suitability Grades for Illawarra region

Illawarra Region		Site type	Beach suitability Grade		Change
Wollongong City Council	Stanwell Park Beach	Ocean beach	VG	●	Stable
	Coledale Beach	Ocean beach	VG	●	Stable
	Austinmer Beach	Ocean beach	VG	●	Stable
	Thirroul Beach	Ocean beach	G	●	Stable
	Bulli Beach	Ocean beach	G	●	Stable
	Woonona Beach	Ocean beach	VG	●	Stable
	Bellambi Beach	Ocean beach	G	●	Stable
	Corrimal Beach	Ocean beach	G	●	Stable
	North Wollongong Beach	Ocean beach	G	●	Stable
	Wollongong City Beach	Ocean beach	VG	●	Stable
	Coniston Beach	Ocean beach	VG	●	Stable
	Fishermans Beach	Ocean beach	VG	●	Stable
	Port Kembla Beach	Ocean beach	G	●	Stable
Shellharbour City Council	Entrance Lagoon Beach	Lagoon/lake	G	●	Stable
	Warilla Beach	Ocean beach	VG	●	Stable
	Shellharbour Beach	Ocean beach	VG	●	Stable
Kiama Municipal Council	Boyds Jones Beach	Ocean beach	G	●	Stable
	Bombo Beach	Ocean beach	G	●	Stable
	Surf Beach Kiama	Ocean beach	G	●	Stable
	Werri Beach	Ocean beach	VG	●	Stable
	Seven Mile Beach, Gerroa	Ocean beach	G	●	Stable

VG

Very Good

G

Good

F

Fair

P

Poor

VP

Very Poor

Beach Suitability Grades for the South Coast region

South Coast Region		Site type	Beach suitability grade	Change	
Shoalhaven City Council	Shoalhaven Heads Beach	Ocean beach	VG	●	Stable
	Tilbury Cove	Ocean beach	VG	●	Stable
	Warrain Beach	Ocean beach	VG	●	Stable
	Collingwood Beach	Ocean beach	G	●	Stable
	Cudmirrah Beach	Ocean beach	VG	●	Stable
	Mollymook Beach	Ocean beach	VG	▲	Improved
	Rennies Beach	Ocean beach	VG	●	Stable
	Racecourse Beach	Ocean beach	G	●	Stable
	Bawley Point Beach	Ocean beach	VG	▲	Improved
	Merry Beach	Ocean beach	VG	●	Stable
Eurobodalla Shire Council	Cookies Beach	Ocean beach	VG	●	Stable
	Caseys Beach	Ocean beach	VG	●	Stable
	Surf Beach	Ocean beach	G	●	Stable
	Malua Bay Beach	Ocean beach	VG	●	Stable
	Broulee Beach	Ocean beach	G	▼	Deteriorated
	Bengello Beach	Ocean beach	G	●	Stable
	Shelley Beach	Ocean beach	G	●	Stable
	Tuross Main Beach	Ocean beach	G	●	Stable
	Brou Beach	Ocean beach	G	●	Stable
	Wagonga Inlet	Estuarine	G	●	Stable
	Narooma Main Beach	Ocean beach	VG	●	Stable
	Bega Valley Shire Council	Camel Rock Beach	Ocean beach	VG	●
Bruce Steer Pool		Estuarine	G	●	Stable
Horseshoe Bay		Ocean beach	G	●	Stable
Big Blue Pool		Ocean baths	G	●	Stable
Beares Beach		Ocean beach	VG	●	Stable
Mogareeka Inlet		Lagoon/lake	G	●	Stable
Tathra Beach		Ocean beach	VG	●	Stable
Short Point Beach		Ocean beach	G	▼	Deteriorated
Bar Beach		Estuarine	G	●	Stable
Main Beach (Merimbula)		Ocean beach	G	▼	Deteriorated
Pambula Beach		Ocean beach	VG	●	Stable
Pambula River Mouth		Estuarine	G	●	Stable
Aslings Beach		Ocean beach	VG	●	Stable
Cocora Beach		Ocean beach	G	●	Stable

VG Very Good
 G Good
 F Fair
 P Poor
 VP Very Poor

State of the Beaches

HOW TO READ THIS REPORT

Beach Suitability Grades

Beach Suitability Grades provide an assessment of the suitability of a swimming location for recreation over time and are based on a combination of sanitary inspection (identification and rating of potential pollution sources at a beach) and microbial assessment (water quality measurements gathered over previous years). There are five grades ranging from Very Good to Very Poor:

VG Very Good

Location has generally excellent microbial water quality and very few potential sources of faecal pollution. Water is considered suitable for swimming almost all of the time.

G Good

Location has generally good microbial water quality and water is considered suitable for swimming most of the time. Swimming should be avoided during and for up to one day following heavy rain at ocean beaches and up to three days at estuarine sites.

F Fair

Microbial water quality is generally suitable for swimming, but because of the presence of significant sources of faecal contamination, extra care should be taken to avoid swimming during and for up to three days following rainfall or if there are signs of pollution such as discoloured water or odour or debris in the water.

P Poor

Location is susceptible to faecal pollution and microbial water quality is not always suitable for swimming. During dry weather conditions, ensure that the swimming location is free of signs of pollution, such as discoloured water, odour or debris in the water, and avoid swimming at all times during and for up to three days following rainfall.

VP Very Poor

Location is very susceptible to faecal pollution and microbial water quality may often be unsuitable for swimming. It is generally recommended to avoid swimming at these sites.

Some of the Beach Suitability Grades in this report are provisional, as the information required for the analysis is incomplete due to limited bacterial data or limited information on potential pollution sources in a beach catchment.

Beach Suitability Grades are determined by using the following matrix:

The guidelines

The National Health and Medical Research Council's *Guidelines for managing risks in recreational water*¹ were adopted for use in New South Wales in May 2009. These guidelines have been adopted in all Australian states and territories and are supported by guidance notes developed by the Department of Health Western Australia².

¹NHMRC 2008, *Guidelines for managing risks in recreational water*, National Health and Medical Research Council, Australian Government Publishing Service, Canberra, ACT.

²Department of Health, Western Australia 2007, *Microbial quality of recreational water guidance notes in support of chapter 5 of the National Health and Medical Research Council guidelines for managing risks in recreational water, 2006*, Department of Health, Western Australia and The University of Western Australia, October 2007. [Available at www.public.health.wa.gov.au/3/1287/2/publications.pm. Accessed on 6/06/16]

Enterococci

The national guidelines advocate the use of enterococci as the single preferred faecal indicator in marine waters. These bacteria are excreted in faeces and are rarely present in unpolluted waters. Enterococci have shown a clear dose–response relationship to disease outcomes in marine waters in the northern hemisphere. In accordance with the guidelines, Beachwatch tests for enterococci only. The enterococci density in water samples is analysed in the laboratory using method AS/NZS 4276.9:2007³.

Enterococci are measured in colony forming units per 100mL of sample (cfu/100mL).

³AS/NZS 4276.9:2007, Water microbiology Method 9: Enterococci – Membrane filtration method (ISO 7899-2:2000, MOD), Standards Australia International Ltd, Sydney and Standards New Zealand, Wellington.

Matrix used to determine Beach Suitability Grades

		Microbial Assessment Category (MAC)			
		A	B	C	D
Sanitary Inspection Category	Very Low	Very Good	Very Good	Follow Up	Follow Up
	Low	Very Good	Good	Follow Up	Follow Up
	Moderate	Good	Good	Poor	Poor
	High	Good	Fair	Poor	Very Poor
	Very High	Follow Up	Fair	Poor	Very Poor

Microbial Assessment Category (MAC)

There are four Microbial Assessment Categories (A to D) and these are determined from the 95th percentile of an enterococci dataset of at least 100 data points. Each MAC is associated with a risk of illness determined from epidemiological studies. The risks of illness shown below are not those associated with a single data point but are the overall risk of illness associated with an enterococci dataset with that 95th percentile⁴.

Category	Enterococci (cfu/100mL)	Illness risk*
A	≤40	GI illness risk: <1% AFR illness risk: <0.3%
B	41–200	GI illness risk: 1–5% AFR illness risk: 0.3–1.9%
C	201–500	GI illness risk: >5–10% AFR illness risk: >1.9–3.9%
D	>500	GI illness risk: >10% AFR illness risk: >3.9%

* GI = gastrointestinal; AFR = acute fever and rash

Sanitary Inspection Category (SIC)

The aim of a sanitary inspection is to identify all sources of faecal contamination that could affect a swimming location and assess the risk to public health posed by these sources. It is an assessment of the likelihood of bacterial contamination from identified pollution sources and should, to some degree, correlate with the bacterial water quality results obtained from sampling.

Through the sanitary inspection process⁵, beaches are categorised to reflect the likelihood of faecal contamination. There are five categories: Very Low, Low, Moderate, High and Very High.

⁴Wyer MD, Kay D, Fleisher JM, Salmon RL, Jones F, Godfree AF, Jackson G and Rogers A 1999, An experimental health related classification for marine waters, *Water Research* 33(3), pp.715–722.

⁵Office of Environment and Heritage 2013, *Sanitary Inspections*, Office of Environment and Heritage, Sydney, NSW, viewed 25 May 2016, www.environment.nsw.gov.au/beach/sanitaryinspections.htm.

Calculating the MAC

The 95th percentile is a useful statistic for summarising the distribution of enterococci data at a site. It embodies elements of both the location of the distribution (how high/low the enterococci counts are) and the scale of the distribution (how variable the enterococci counts are).

The 95th percentile values for each of the four Microbial Assessment Categories were determined by the World Health Organization using enterococci data collected from swimming locations across Europe. These values will represent different probabilities of illness if the distribution of enterococci data from swimming locations in New South Wales differs from the European distribution.

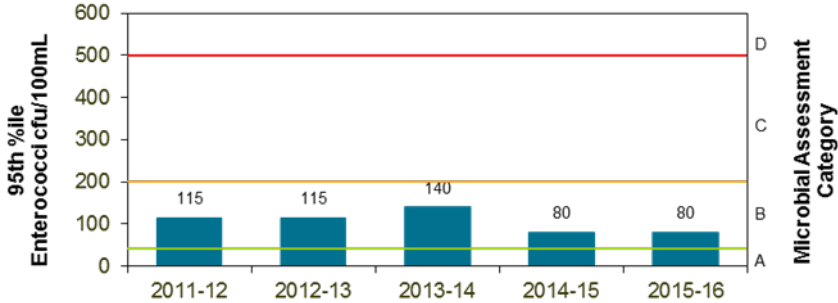
In recognition of this issue, Dr Richard Lugg (Department of Health, Western Australia) has developed a Microsoft® Excel tool for calculating a modified 95th percentile that takes into account the distribution of data. This tool has been used to calculate the 95th percentile values presented in this report and has been adopted for use by other state governments in Australia.

The tool can be downloaded from: www.public.health.wa.gov.au/3/1287/2/publications/pm under Forms and Templates [accessed 06/06/16].

Explanation of graphs and charts on beach pages

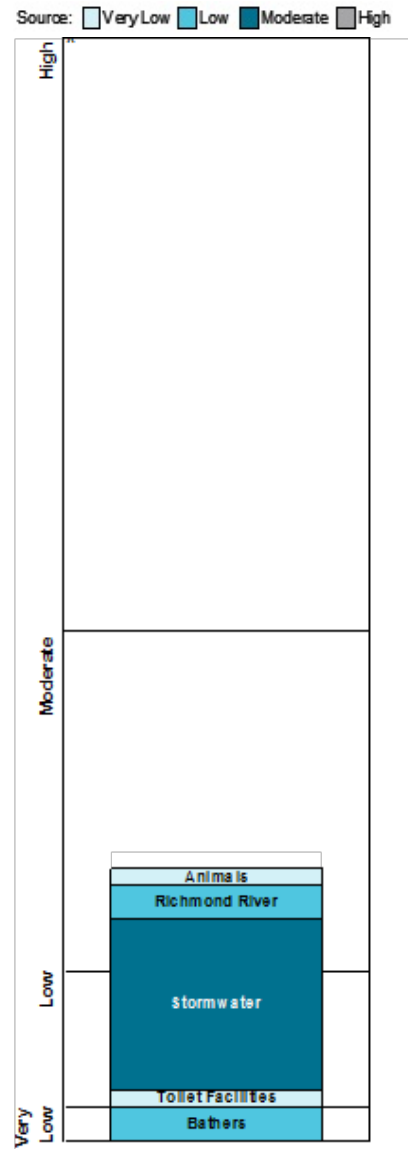
Microbial Assessment Category (MAC) chart

On each beach page, the MACs for the last five years are displayed on a simple bar chart. The bars are labelled with the 95th percentile value for each year and the thresholds dividing the A, B, C and D categories are marked for reference.



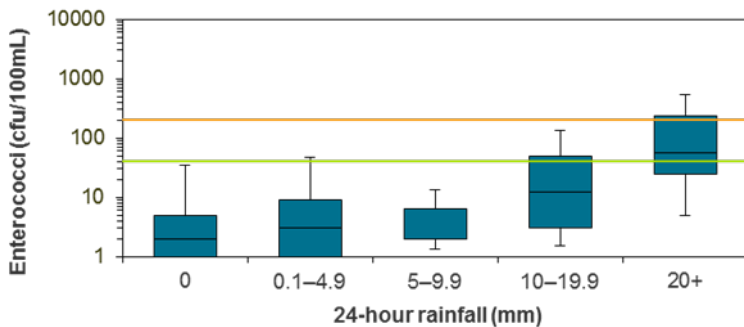
Sanitary Inspection Category (SIC) chart

The results of the sanitary inspection for each swimming location are presented in a vertical bar chart, such as the one to the right. The graph shows the likelihood that each identified pollution source will contribute to faecal contamination at a swimming site, as indicated by the size and colour of the components of the bar, with the sum of these contributions being the overall likelihood, or Sanitary Inspection Category.



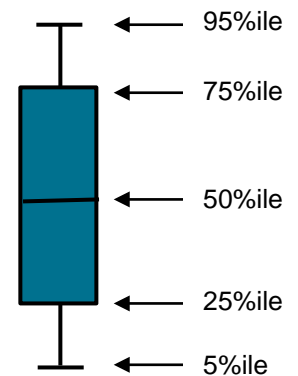
Response to rainfall plots

Trends in enterococci levels in response to rainfall are shown using a box plot (see below). For reference, enterococci levels of 40cfu/100mL and 200cfu/100mL are indicated with a green and orange line, respectively. The 40cfu/100mL level is referred to as the 'safe swimming limit'. The enterococci data were obtained from the last five years of monitoring. Rainfall data were obtained from rain gauges situated close to the sample site and are 24-hour totals to 9am on the day of sampling. If there are fewer than five enterococci data points in a rainfall category, individual data points are presented instead of a box plot. At sites where many results are below the detection limit (1cfu/100mL), only the upper portion of the box plots will be visible.



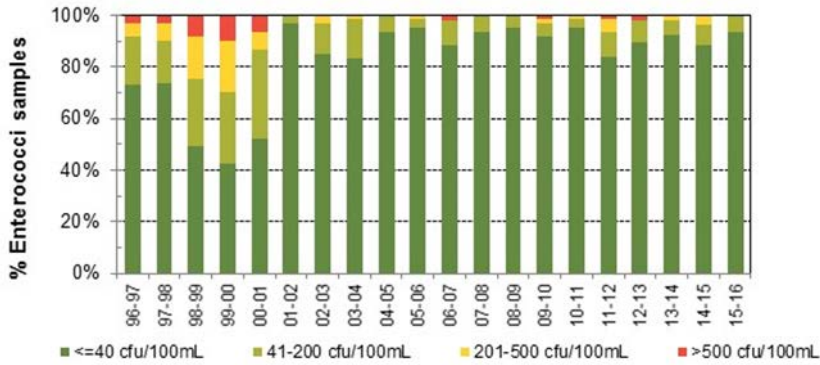
Each part of the box plot represents a significant percentile value of the sample population:

- 5% of the samples lie below the bottom whisker
- 25% of the samples lie below the bottom of the box
- half the samples are on each side of the middle line of the box (median or 50%ile)
- 75% of the samples lie below the top of the box
- 95% of the samples lie below the top whisker.



Historical enterococci data graphs

Trends in enterococci levels through time are presented for each swimming location as a bar graph. Each year's bar is colour coded to show the percentage of enterococci results up to 40cfu/100mL, between 41 and 200cfu/100mL, between 201 and 500cfu/100mL and greater than 500cfu/100mL. These categories reflect the Microbial Assessment Category thresholds and are coloured on the graph by dark green, light green, amber and red respectively.




















Explanation of maps

A map of individual swimming locations is presented on each beach page. The scale of the maps is 1:15,000. Each map shows the location of the sampling site, land use and features such as surf lifesaving clubs. Potential pollution sources such as stormwater drains, sewage pumping stations, wastewater treatment plants, lagoons, rivers and creeks, are shown where accurate data is held.



Key to maps

-  Sampling site
-  Surf lifesaving club
-  Wastewater treatment plant
-  Storm sewage treatment plant
-  Sewage pumping station
-  Stormwater drain
-  Water
-  Baths
-  National park
-  Other park/reserve
-  Built-up area
-  Sand
-  Land
-  Roads
-  Rock/cliff/reef
-  Baths – netted area
-  Breakwater/wharf

Quality assurance

State of the Beaches 2015–2016

The quality assurance program

To ensure that data reported by Beachwatch is accurate and reliable, quality assurance is included in all parts of the program:

- field sampling (equipment preparation, sample collection, sample storage and sample transport)
- laboratory analysis
- data management
- community reporting.

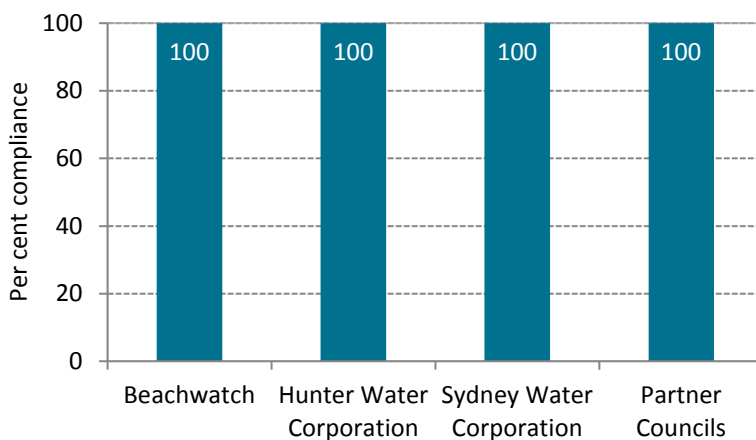
Field sampling

Hunter Water, Sydney Water and Beachwatch collect samples throughout the year and are audited quarterly. Councils in the Beachwatch Partnership Program usually sample for part or all of the swimming season (October to April) and are audited once during this period. Sample locations can be found on the individual beach maps.

Audits include an assessment of field officer performance according to established Beachwatch Programs sampling protocols, including aseptic sampling techniques, sample collection, sample storage and documentation of field observations. These protocols are based on internationally recognised methods for the collection of water samples in recreational bathing areas¹.

Beachwatch, Hunter Water Corporation, Sydney Water Corporation and the councils in the Beachwatch Partnership Program all achieved 100% compliance with sampling protocols.

Sampling quality assurance results for 2015–2016:



¹ *Standard methods for the examination of water and wastewater*, 20th edition, 1998. American Public Health Association, Washington DC.

100%

Sampling quality assurance

PASS

Laboratory quality assurance

Who samples where?

Beachwatch

Collects samples at 96 ocean and harbour beaches in Sydney.

Hunter Water Corporation

Collects samples at 17 ocean beaches in Port Stephens, Newcastle and Lake Macquarie.

Sydney Water

Collects samples at 18 ocean beaches in Wollongong, Shellharbour and Kiama.

Partner councils

Ballina Shire Council, Richmond Valley Council, Lake Macquarie City Council, Wyong Shire Council, Gosford City Council, Wollongong City Council, Kiama Municipal Council, Shoalhaven City Council, Eurobodalla Shire Council, Bega Valley Shire Council, Port Stephens Council.

Collect samples at popular swimming locations in their respective local government areas.

Laboratory analysis

Beachwatch program

To assess the reliability of laboratory data, Beachwatch sends duplicate water samples to our contracted microbiological laboratory, which is accredited by the National Association of Testing Authorities (NATA). Duplicate samples are collected from the same site at the same time and the laboratory is unaware that the samples are collected from a single location. The results are expected to be similar.

Due to the inherent variability of bacterial levels in environmental samples, duplicate results that are within 0.3 log-units of each other (equivalent to a halving or doubling of density on a linear scale) are considered to be acceptable. Some enterococci results were outside this range. The majority of these were at very low bacterial densities which were below the safe swimming limit. Where higher values were outside this range, the site result was mostly higher than the replicate, indicating that results were rarely underestimated.

Beachwatch Partnership Program

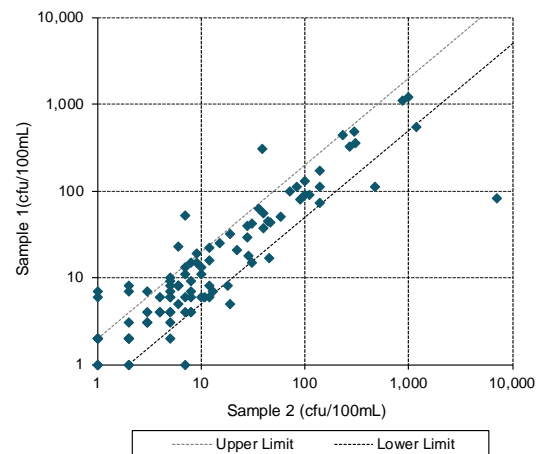
Council laboratories were invited to take part in proficiency testing in November 2015 to determine the reliability of data. Laboratories with NATA accreditation or which could provide evidence of regular proficiency testing were not included in the program as they already comply with strict assessments. This year Bega Valley Shire Council (Bega) and Wyong Shire Council (Wyong) were proficiency tested.

Bega collected two duplicate samples on four occasions during the summer season. Bega laboratory analysed one sample while the duplicate was sent to a NATA accredited laboratory for testing. Comparison of results showed that when enterococci were present, Bega laboratory frequently reported bacterial counts higher than that reported by the NATA accredited laboratory. Further investigation showed that contamination of council laboratory equipment was not the cause of the higher counts, as all sterile water samples processed during the season returned negative results for enterococci. This suggests Bega laboratory is overestimating the numbers of bacteria when present. As a result, water quality within Bega Valley Shire is likely to be of a higher standard than what has been reported.

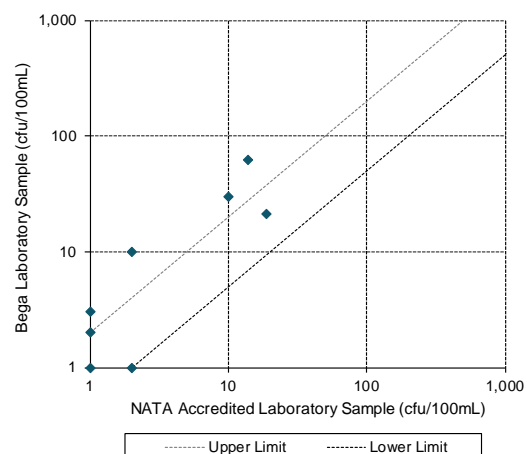
The proficiency testing of Wyong was conducted by IFM Quality Services Pty Ltd. Samples were dispatched to the laboratory in November 2015, December 2015 and January 2016. The samples were presented in freeze dried form and required reconstitution prior to testing. Results were mostly good, and confidence can be placed in the accuracy of data from this laboratory and water quality results reported in the Wyong region. While they overestimated the number of bacteria in the first test, the following two tests produced excellent results.

Community reporting

Providing the community with current beach water quality information is a core function of the Beachwatch programs, so reporting has been incorporated into the quality assurance program. This enables Beachwatch to measure the accuracy, consistency of content (quality) and punctuality (timeliness) of all reports released. When necessary, this information is used to improve the reporting process.



Distribution of duplicate enterococci results for the contracted laboratory, May 2015 to April 2016



Distribution of duplicate enterococci results for Bega and NATA accredited laboratories

There are two main types of Beachwatch reports: Beach pollution forecasts and star rating reports.

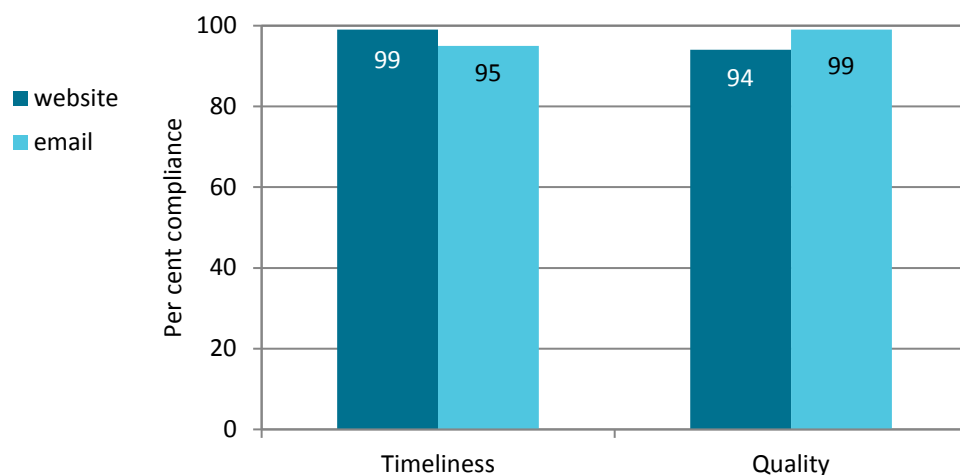
Beach pollution forecasts

Beach pollution forecasts provide advice to assist beach users on deciding when and where to swim. The forecasts are generated daily to report on the likelihood of bacterial contamination at swimming sites in the Hunter, Central Coast, Sydney and Illawarra regions. This information can be accessed by the public through the Beachwatch website (www.environment.nsw.gov.au/beach), and is reported on Twitter @BeachwatchNSW and Facebook (www.facebook.com/BeachwatchNSW). The information is also sent by email to subscribers, stakeholders and media.

The forecasts are based on telemetered rainfall data and any reported pollution incidents that could affect beach water quality. The forecasts include a prediction of the likelihood of pollution at ocean beaches and harbour swimming areas, as well as daily weather, tides and coastal conditions, based on the Australian Bureau of Meteorology's Metropolitan Forecast and Coastal Waters Forecast. During summer, forecast updates are also issued to advise of beach conditions such as dangerous surf, marine stingers, lagoon openings, closures and other information reported by council lifeguards.

Forecasts are audited weekly to assess the punctuality and quality of information reported. The punctuality of the forecasts and forecast updates to the website and by email is assessed to ensure the timeliness of our service. Lateness of forecasts was usually only by a few minutes and the result of technical problems. Formatting, spelling and punctuation are also checked to ensure the quality of the reports in emails and on the website.

Beach pollution forecasts quality assurance results for 2015–2016:



The results from the quality assurance audits are stored in an electronic database, with a weekly summary of any detected errors distributed to the field officers for their attention and action, if necessary.

The daily pollution forecast scenarios are analysed against bacterial data to track the accuracy of predictions. During 2015–2016, 93% of overall predictions were correct. While pollution forecasts at most beaches were accurate almost all of the time,

Data management

Water quality results for swimming sites in the Sydney, Hunter and Illawarra regions are regularly forwarded electronically to Beachwatch Programs from the contracted laboratory, and by Hunter Water and Sydney Water laboratories. The water quality data are uploaded to the Beachwatch water quality database (BACTO) for storage and data evaluation.

All partnership councils transferred water quality data to OEH on a regular basis, for centralised storage on the BACTO database. In some cases, data were emailed directly from the analysing laboratory.

Quality assurance procedures for the storage of data on the centralised database followed a rigorous protocol that was developed as part of the Beachwatch program. This includes data validation procedures to identify anomalous results.

Beachwatch data is uploaded to our website and can be downloaded online:

environment.nsw.gov.au/beach

a few beaches where water quality improved or declined during the assessment period, such as Malabar (77% accuracy) and Barrenjoey Beach (67% accuracy), lowered the overall accuracy. The prediction models for these sites has been readjusted to incorporate the changes in water quality to ensure that the accuracy of forecasts at these sites improves. The accuracy of ocean beach predictions was slightly higher than for estuarine beaches, owing to the catchment and site recovery times.

Star rating reports

The star ratings provide an indication of recent bacterial water quality results, based on NHMRC (2008) guidelines, with one star indicating poor water quality, through to a four star rating indicating excellent water quality. The star ratings are calculated using a spreadsheet, and are quality assured prior to reporting on the Beachwatch website, with any errors in calculations detected before publishing (www.environment.nsw.gov.au/beach/Reportstar.htm). Inaccuracies in reporting of star ratings only occurred on two occasions (23 February and 1 March 2016) for some swimming sites in Ballina due to human error in entering the data onto the Beachwatch website. Most star ratings are updated weekly throughout the year for swimming sites in Sydney, Hunter and Illawarra regions and during the summer season for regional partner councils where the frequency of sampling is reduced for some swimming sites that are not used during winter. All historical water quality data is available on the Beachwatch website (www.environment.nsw.gov.au/beachapp/report_enterococci.aspx).