

LAGOON HEALTH REPORT CARD 2015/16

Narrabeen Lagoon
Dee Why Lagoon
Curl Curl Lagoon
Manly Lagoon

NORTHERN BEACHES
COUNCIL

northernbeaches.nsw.gov.au

Key Message 2015/16

The quality of water in our lagoons is strongly related to rainfall. Lagoon condition rankings this year were encouraging. Less rain fell this season (837mm) than last (960mm) and we had some dry periods in February and March.

Narrabeen and Dee Why's grade improved to a B while Curl Curl and Manly were rated as D due to high algae concentration in the water throughout the year.

It is important to appreciate that our lagoons are directly connected to our catchments, and our catchments are highly modified from decades of development. The loss of bushland to urban development has increased the amount of hard surfaces which are very good at collecting fine sediments, leaf litter and general rubbish. During rain events these pollutants are picked up and carried in stormwater to our lagoons and eventually to the ocean.

Therefore it's of no surprise that our lagoons are affected by stormwater and its contents, meaning their ecological condition can change from year to year. To give our lagoons the best chance at coping with the pressures of our urban environment it is important to be watchful. When you see muddy water flowing down a gutter or in our stormwater channels, please call Council and let us know. If you come across what smells or looks like a sewer leak please contact Council on 9942 2111 and Sydney Water on 13 20 90.

If we can all please keep a watchful eye on what is entering our waterways it gives our rangers the best chance at investigating the source and minimising the impacts.



Overview

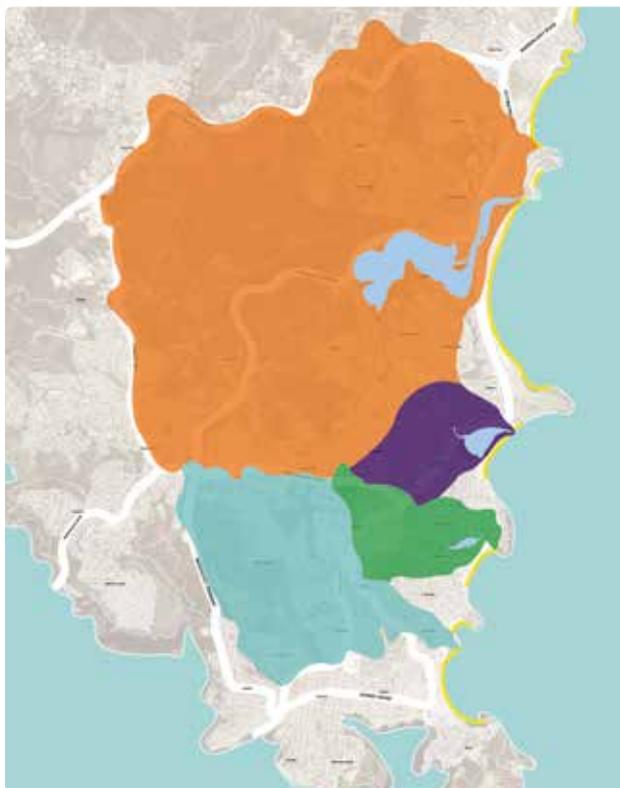
Estuaries are as diverse in their physical form as they are in their state of health.

Northern Beaches estuaries are a unique type of estuary known as 'Intermittently Open and Closed Lake or Lagoons', or ICOLLs.

Our lagoons differ in shape, size, depth and catchment type, but they share the burden of urbanised catchments which deliver a range of pollutants and nutrients during wet weather. These inputs influence their ecological health.

So it is no surprise that lagoon condition can change from year to year depending on how wet or dry the year was. A wetter year means more pollutant inputs and more lagoon breakouts.

LAGOON CATCHMENTS



- Narrabeen Lagoon Catchment
- Dee Why Lagoon Catchment
- Curl Curl Lagoon Catchment
- Manly Lagoon Catchment

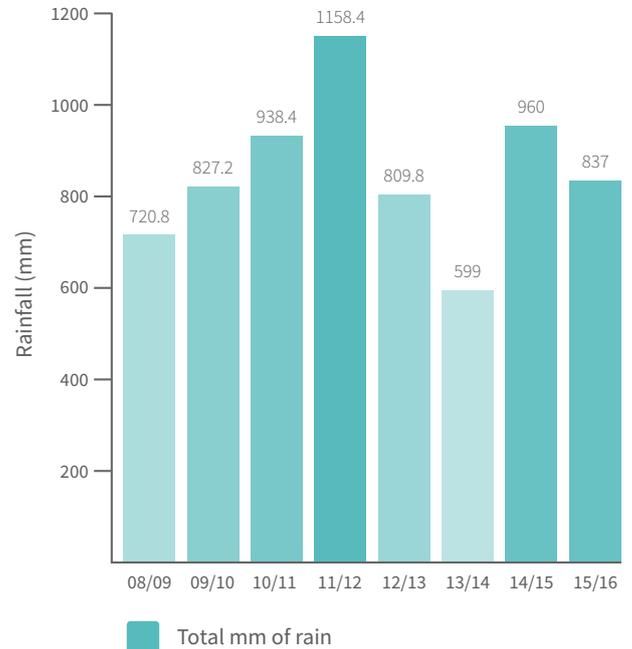
THE YEAR THAT WAS

The 2015-16 monitoring year generally saw good conditions and clear water in all lagoons. The LGA received 123 mm less rain over the sampling season with a total of 837mm compared to 960mm the year before. Curl Curl in particular displayed good water clarity throughout the spring summer season which was very encouraging. Algae levels were still high but there was a distinct improvement in visual amenity; the water was clear and there were no macro algae blooms in response to the warm and sunny weather.

The wet weather in November and January meant all our lagoons received a lot of stormwater during those months. Both Dee Why and Curl Curl opened regularly allowing the nutrient rich water to be exported out of the system.

SUMMER RAINFALL

(October - April Belrose Bureau of Meteorology station)

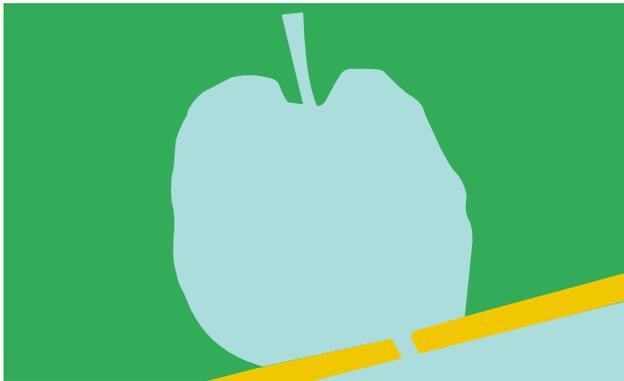


Did You Know

WHAT'S AN ICOLL?

All four of our lagoons are classified by environmental scientists as ICOLLs (Intermittently Closed and Open Lakes or Lagoons). This means that they are sometimes open to the ocean and sometimes closed. When they are closed to the ocean there is no opportunity for tides to flush water in and out of the lagoon. They become 'terminal lakes', capturing and retaining all of the

catchment runoff and pollutants. Even when they are open to the ocean, tidal flushing within the waterway is limited and most catchment pollutants are retained in the lagoon. All of this means that they are very sensitive to human pressures and one of the most challenging environments to manage. *From Haines (2008) – ICOLL Management: Strategies for a Sustainable Future*



Mixing - Dominated
(Haines 2008)



Displacement - Dominated
(Haines 2008)



Dee Why Lagoon



Curl Curl Lagoon

LAGOON SIZE AND SHAPE

Lagoon shape and size has a strong influence on how well a lagoon processes the inputs from its catchment.

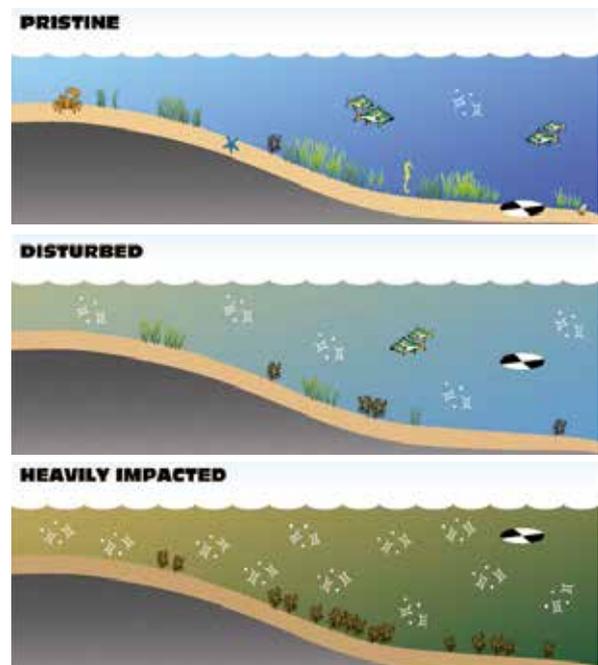
Relatively linear lagoons have been called 'displacement-dominated' systems, because catchment runoff that enters the waterway tends to push out, or displace, the resident water in the system. Relatively circular lagoons have been called 'mixing-dominated' systems. Catchment runoff that enters a mixing-dominated lagoon tends to mix with the resident water before discharging to the ocean. Mixing in this type of lagoons is enhanced by wind-generated circulation currents *(Haines 2008)*.

Narrabeen and Dee Why Lagoons are "mixing dominated" lagoons. Their broad area and generally shallow nature enables wind generated circulation to penetrate to the bottom waters, facilitating nutrient cycling. Curl Curl and Manly are "displacement dominated" lagoons with their narrow and elongated shape, small fetches and tendency to form freshwater layers on surface waters due to the presence of fresh groundwater entering the systems. These factors, as well as the lack of mixing, add to the complex issue of nutrient processing and lagoon health in these lagoons.

Method

THE GRADES EXPLAINED

- 
EXCELLENT
 The indicators meet all benchmarks almost all of the year. Equal to the best 20% of scores in NSW.
- 
VERY GOOD
 The indicators meet all benchmarks for most of the year. Equal to the best 20% of scores in NSW.
- 
FAIR
 The indicators meet some benchmarks for part of the year. Equal to the middle 30% of scores in NSW.
- 
POOR
 The indicators meet few benchmarks for part of the year. Equal to the next 15% of scores in NSW.
- 
VERY POOR
 The indicator almost never meet benchmarks all of the year. Equal to the worst 5% of scores in NSW.



Source: OEH

These grades allow us to compare our lagoons with the lagoons, estuaries and river mouths that the NSW Office of Environment and Heritage has been monitoring all along the NSW coast.

HEALTHY ESTUARIES IN NSW

This Report Card is reporting on Ecological Health. Estuarine ecosystems are complex living environments with communities of plants, animals and micro-organisms all living together and interacting with one another.

This busy community of living creatures have a very important job in maintaining a healthy waterway. They all work together to process nutrients coming off the catchment. The indicators used to determine the Report Card grades are measures of the performance of these processes in an estuary.

The indicators used to measure the ecological health of the lagoons don't tell us anything about the suitability of the water to swim in or to drink from. There are other programs in place to determine this type of health such as NSW Beachwatch.

To see recreational water quality data for our beaches go to your favourite search engine and search for NSW Beachwatch. Here you will find all the information you need to make an informed decision on where

and when to swim. You can also download the Beachwatch app onto your smart phone.

Lakes and lagoons that are intermittently closed and open (like the lagoons in Warringah) are often not suitable to swim in after rain, as stormwater flows into them. Stormwater contains many types of pollutants including bacteria, so water quality in these waterways is quickly affected. Beachwatch recommend that you avoid swimming during heavy rain and at least one day after heavy rain at ocean beaches, and for at least three days at harbour beaches, due to the possibility of pollution from stormwater drains.

The 'ideal situation' for NSW estuaries includes intact aquatic habitats like seagrass, aquatic plants and riparian vegetation, minimal algal blooms, and minimal sediment inputs.

The vision for our waterways is to maintain or improve their condition in order to protect biological diversity and maintain ecological processes.

For more information contact:

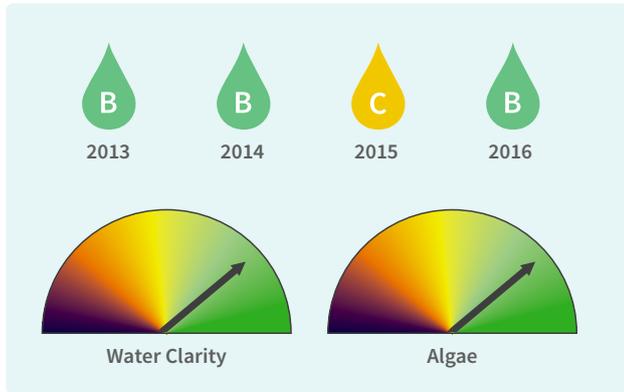
Natural Environment and Climate Change
 Northern Beaches Council
 9942 2111

Estuaries and Catchments (ECU)
 NSW Office of Environment and Heritage
 9995 5496

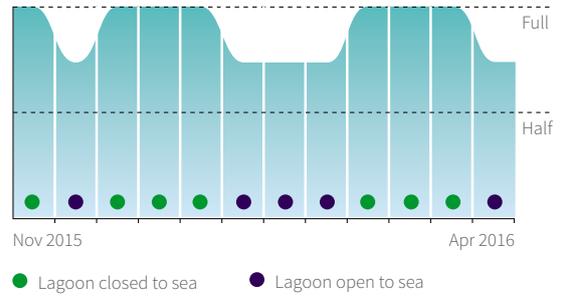
Full details of the NSW MER Program can be found in Roper et al 2011 on www.environment.nsw.gov.au. Data analysis and interpretation by ECU.

Results

NARRABEEN LAGOON

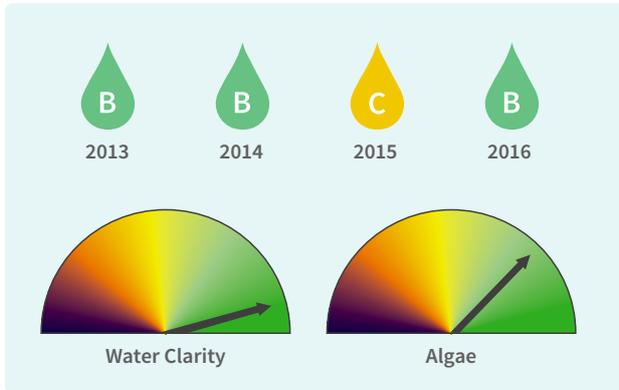


Lagoon Water Levels

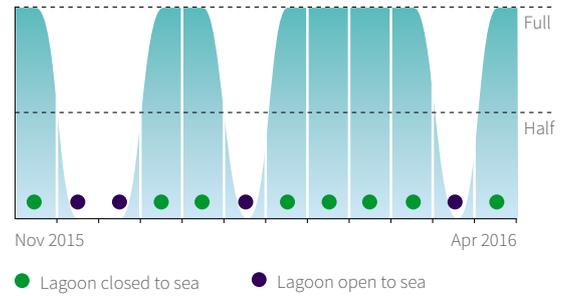


Narrabeen Lagoon had a good grade this year despite the entrance closing in October 2015 which is consistent with the 4 year open/closing cycle that Narrabeen displays. The western and central basins of the lagoon maintained good water clarity and low concentrations of algae. We monitored Birdwood Park this year to assess the influence of the closed entrance and lack of tidal flow on lagoon water quality. Apart from the noticeable decline in water clarity and some macro algae accumulating along the fringe of the banks, which looked unappealing, overall lagoon condition remained good.

DEE WHY LAGOON

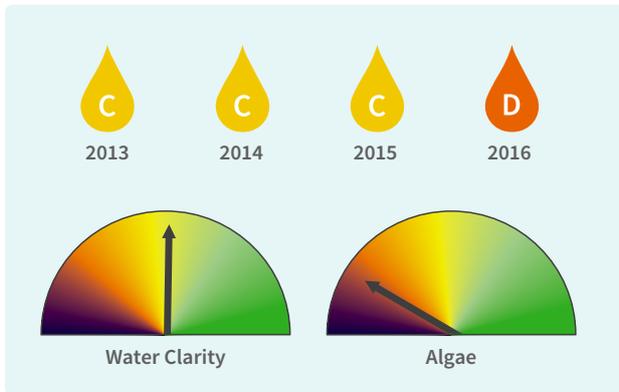


Lagoon Water Levels



Dee Why Lagoon maintained great water clarity and low algae levels throughout the season this year. Frequent breakouts assisted in refreshing the lagoon and exporting nutrient rich stormwater out of the system. Swans frequented the lagoon throughout the spring and summer.

MANLY LAGOON



Lagoon Water Levels



Manly Lagoon had consistently high algae concentrations and water clarity was poor in the upper zones. This is a common characteristic for Manly as it suffers from high organic loading and is poorly flushed due to its shape and size. Council is investigating groundwater inputs and nutrient levels to better understand why the lagoon has such high algae concentrations.

What we have done in your catchment

NARRABEEN CATCHMENT

-  Bush regeneration programs across 21 sites covering approximately 212 hectares (including the lagoon foreshores, South Creek, Deep Creek – East and West, Upper Middle Creek, Bilarong Reserve, Jamieson Park, Narrabeen Creek, Frenchs Forest, Elanora Bushcare Site, Kywong Reserve, Kundibah Reserve, Nareen Wetlands, Warriewood Wetlands, Irrawong Reserve and Epworth Park)
-  46 Bushcare volunteers have been working across 10 sites (South Creek, Anzac Reserve, Wakehurst Public School, Wheeler Creek, Warriewood Wetlands, Ingleside Chase Reserve, Irrawong Reserve, Kundibah Reserve, Elanora Road and Bahai Temple).
-  Education programs incorporating student contribution of 200 hours to native vegetation restoration and weed removal at Bilarong Reserve and Deep Creek, covering approximately 2 hectares.
-  Stabilised 15 metres of eroding bank at South Creek, reducing sediment entering the waterway.
-  \$25,000 Greater Sydney Local Land Services grant for Bush Regeneration and revegetation works in riparian zones around the lagoon and the sand dunes fronting Narrabeen Beach

CURL CURL CATCHMENT

-  Bush regeneration programs across 4 sites covering 25 hectares, (including Greendale Creek, the lagoon riparian area, Wingala Reserve and North Curl Curl Headland).
-  10 bushcare volunteers worked across 3 sites (Alan Newton Reserve, Carrington Pde and Wingala Reserve).
-  Removed 10 cubic metres of rubbish from the riparian areas around the lagoon over seven days of cleaning.
-  \$25000 Greater Sydney Local Land Services Grant funding bush regeneration and over 5000 plants planted including National Tree Day community planting

DEE WHY CATCHMENT

-  Bush regeneration programs across 6 sites covering approximately 53 hectares (including at Dee Why wetland, Dee Why Creek, Dee Why Lagoon and Lincoln Reserve)
-  20 Bushcare volunteers have been working across 4 sites (including Dee Why wetland, Dee Why Lagoon and Stoney Range) .
-  Removed 8.5 cubic metres of rubbish from the riparian areas around the lagoon over seven days of cleaning.
-  1500 people attended Fauna Fair at Dee Why Lagoon and planted 300 plants.
-  30 members of Australian Marine Science Association (AMSA) removed 20 bags of rubbish collected from the riparian vegetation around Dee Why Lagoon.
-  \$33,000, Environmental Trust funding for restoration of Ecologically Endangered Communities (EECs), feral animal control, fauna surveying and the Dee Why Fauna Fair.
-  \$25,000, Salty Communities funding from the Sydney Coastal Council Group to restore coastal saltmarsh, community engagement and planting of 1000 native tube stock, fauna surveying, mapping habitat hollows and feral animal control

MANLY CATCHMENT

-  Bush regeneration programs across 13 sites covering 400 hectares (including Manly Dam, Allenby Park, Aquatic Drive Reserve, Brookvale Creek, Goroka Reserve, Burnt Bridge Creek Valley Park, Bligh Park, Upper Clontarf Street Road Reserve, Macmillan Street Road Reserve, Keirle Park and Lagoon Reserve).
-  18 bushcare volunteers have been working across 7 sites (Allenby Park, Manly Dam, Gumbooya Reserve, Manly Lagoon, Mermaid Pool, Bligh Park and Witches Glen on Burnt Bridge Creek).
-  Stabilised eroding banks at Hinkler Park, Manly Lagoon and at Brookvale Creek, reducing sediment entering the waterway.
-  Trialled Sydney rock oysters in the lagoon as filters of excess algae.
-  Constructed the Manly West Park Sediment Interception Basin. It captures pollution by allowing stormwater in the creek to slow down and sediment pollution to sink or drop out of the flowing water.

What you can do to help improve lagoon health



Report pollution events, your first 2 actions when coming across a pollution incident should be to call Council on 9942 2111 and then NSW EPA on 131 555. If you see someone littering from their vehicle, NSW EPA is the correct authority to contact, using your mobile phone, type in "Reporting pollution NSW" into your search engine of choice and follow the instructions. In order to protect our vulnerable environment and highly valued waterways, Council spends tens of thousands of dollars each year removing litter from creeks and lagoons.



Help combat sediment run off from building sites or illegal clearing or dumping by sending council an image of the incident via email. This helps our staff investigate the issue.



Join a Bushcare group - find out from Council how you can get involved to help reduce the number of exotic and invasive plants, particularly in urban areas.



Sweep your gutter and driveway regularly and place the clippings and leaf litter on the garden, in the compost or vegetation bin. This prevents them being washed down the drain, into a creek and then into the lagoons.



Avoid unnecessary use of fertiliser on your property. Fertilisers are easily washed into waterways and result in higher levels of nutrients which can have a number of knock on effects, including higher levels of algae in the lagoons.



