

Central Coast
Waterways report card
2018-19





Introduction

This is the second combined report card for waterways of the Central Coast Local Government Area. It includes the estuarine areas of Southern Lake Macquarie, Tuggerah Lakes, Brisbane Water and the major coastal lagoons - Wamberal, Terrigal, Avoca and Cockrone and for the first year, the Lower Hawkesbury. The ecological health data presented here were collected throughout 2018-19.

Central Coast Council monitors the ecological health of our lakes, estuaries, rivers, creeks and lagoons to evaluate condition, measure change through time and target investment and on-ground works to improve ecosystem health. A healthy waterway is one that supports natural processes, is resilient to change, can recover from human impacts, and is relatively stable and sustainable through time.

By reporting the monitoring results to the community each year, Council aims to raise awareness about the state of our waterways, and the pressures that affect ecological health.

Waterways are the lifeblood of the land. They connect our landscapes via tiny ephemeral streams, fertile wetlands, raging rivers and stunning estuaries which all journey towards the sea. They provide the water we drink and the air we breathe, and our health is as dependent on them as theirs is on us.

Central Coast waterways

The Central Coast Local Government Area is located on the east-coast of New South Wales between Sydney and Newcastle. It is one of the largest Council areas in NSW covering an area of 1,845 km².

The Central Coast's waterways form part of the NSW marine estate, and are managed through implementation of Estuary and Coastal Zone Management Plans.

From the southern shores of Lake Macquarie and the valleys and floodplains of Tuggerah Lakes to the delicate coastal lagoons, rugged Brisbane Water and the shores of the mighty Hawkesbury - the Central Coast's waterways are extensive and unique. They connect our natural landscapes, carrying water from the catchments to the coast and supporting a range of important environmental, social and cultural values and uses. The health and beauty of our waterways is vital to our region's strong tourism industry and our local identity.

Community Strategic Plan

The value the community places on our local waterways was demonstrated through the development of the Community Strategic Plan (2018-2028). Maintaining environmental resources for the future and cherishing and protecting the natural beauty of the Central Coast were highlighted as key focus areas for the Central Coast.





Methods

The Central Coast waterways report card is like a health check for our estuaries: it compares current ecological health with ideal estuary health and can be used to track changes over time.

The program is designed to be consistent with the NSW Natural Resources Monitoring, Evaluation and Reporting (MER) Program and to address locally relevant issues. By following the MER protocols, waterway ecological health can be compared to other estuaries throughout NSW.

Our scientists measure turbidity, chlorophyll-a and seagrass depth range at each of the sampling sites. These tell us about how the ecosystems are performing in response to catchment pressure. The results are compared to established trigger values for each estuary type – lake, lagoon or back dune lagoon – and are used to calculate the water quality grades.

- T** **Turbidity** is a measure of water clarity or cloudiness. Elevated turbidity is caused by more sand, silt, clay and microalgae suspended in the water. Long periods of high turbidity will negatively affect estuary health.
- C** **Chlorophyll-a** is an indicator of levels of microalgae and nutrients in the water. High levels of chlorophyll-a indicate high inputs of nutrients which can lead to algal blooms and a decline in water quality.
- S** **Seagrass depth range** is a biological indicator of water clarity over longer time periods. Seagrass grows slowly and depends on high water clarity, good access to sunlight and relatively low nutrient concentrations to survive and thrive.

The water quality grade for each indicator is used to calculate an overall grade for each site. Sites are selected to represent the surrounding area. Healthy estuaries generally have low levels of microalgae and turbidity, and strong seagrass communities.

Ecological health is used to describe the current state of the environment, and how that compares to an ideal state as set out in the relevant management objectives and plans.

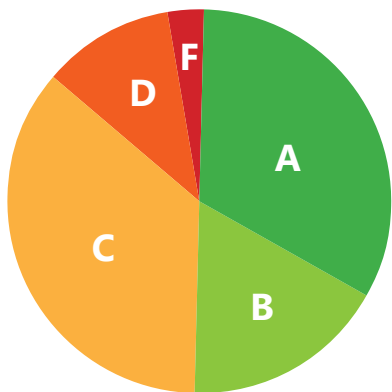
Ecological health does not refer to environmental health issues such as drinking water quality, safety for swimming, heavy metal contamination, disease, bacteria, viruses or our ability to harvest shellfish or fish.

The grades explained

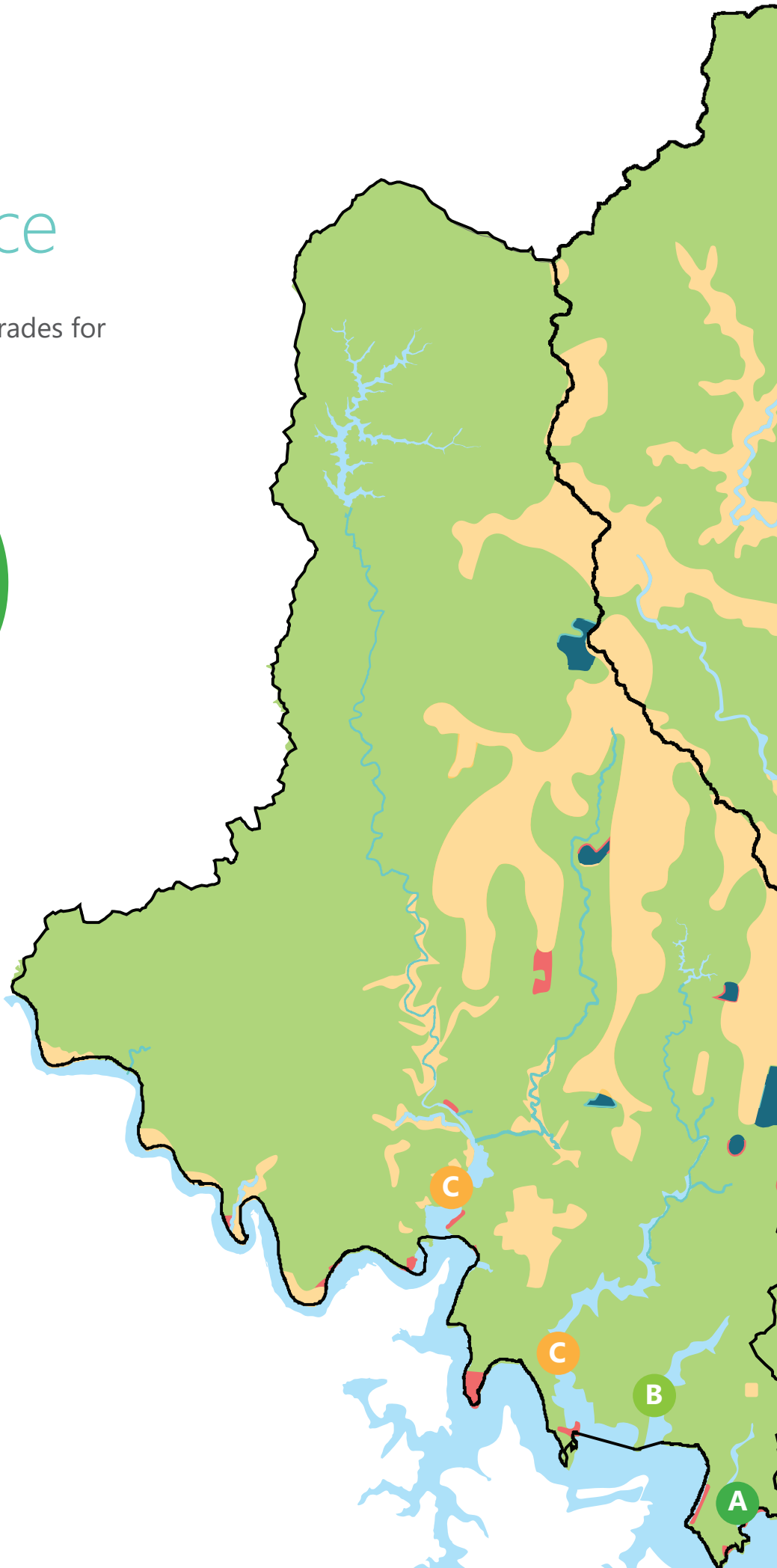
- A** **Excellent** The indicators meet all benchmarks for more than most of the year. Equal to the best 20% of scores in NSW.
- B** **Good** The indicators meet all benchmarks for most of the year. Equal to the next 30% of scores in NSW.
- C** **Fair** The indicators meet some benchmarks for part of the year. Equal to the next 30% of scores in NSW.
- D** **Poor** The indicators meet few benchmarks for part of the year. Equal to the next 15% of scores in NSW.
- F** **Very Poor** The indicators never meet benchmarks. Equal to the worst 5% of scores in NSW.

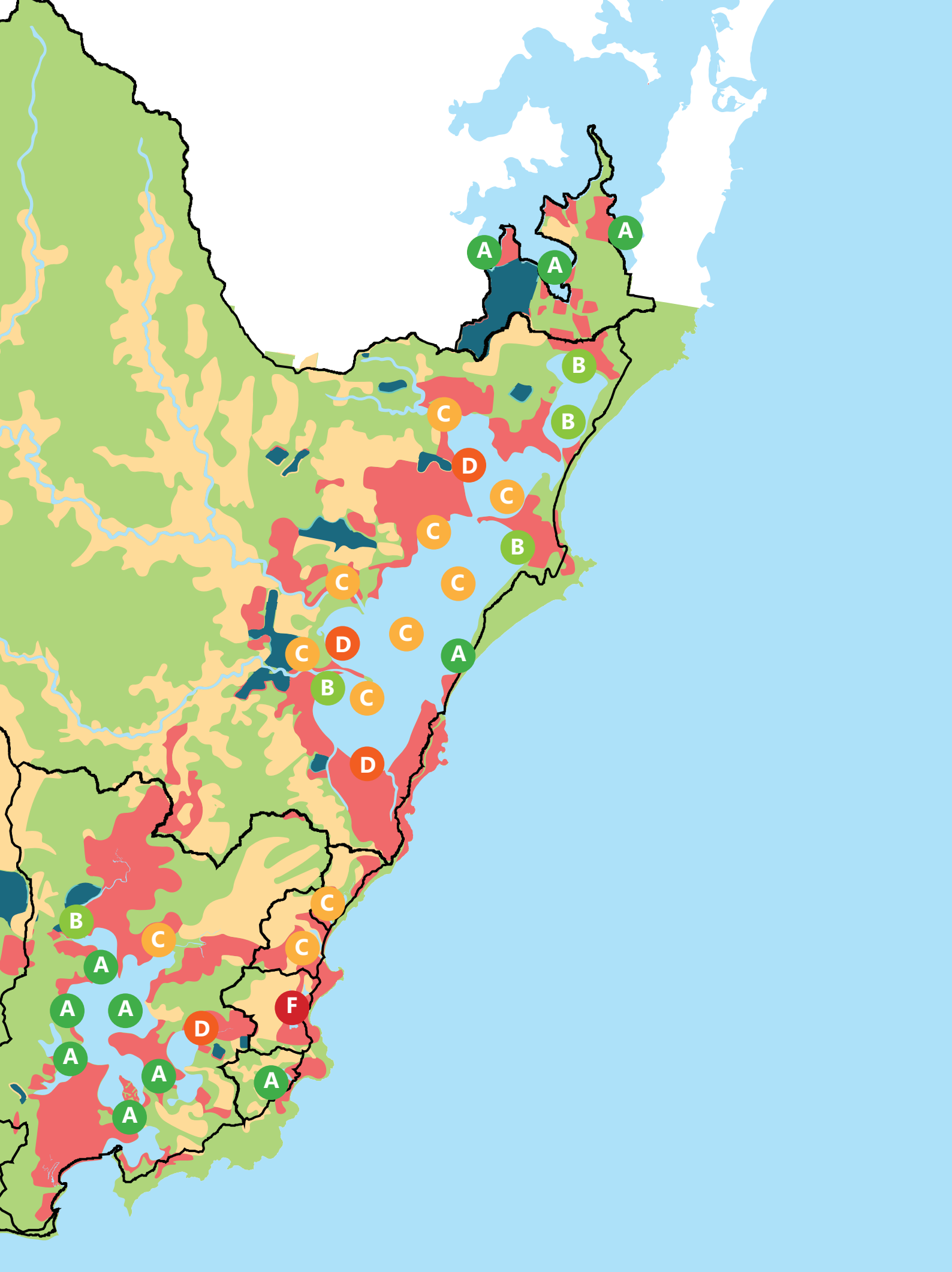
Results at a glance

Overall water quality grades for Central Coast estuaries



- A** 33%
- B** 17%
- C** 36%
- D** 11%
- F** 3%



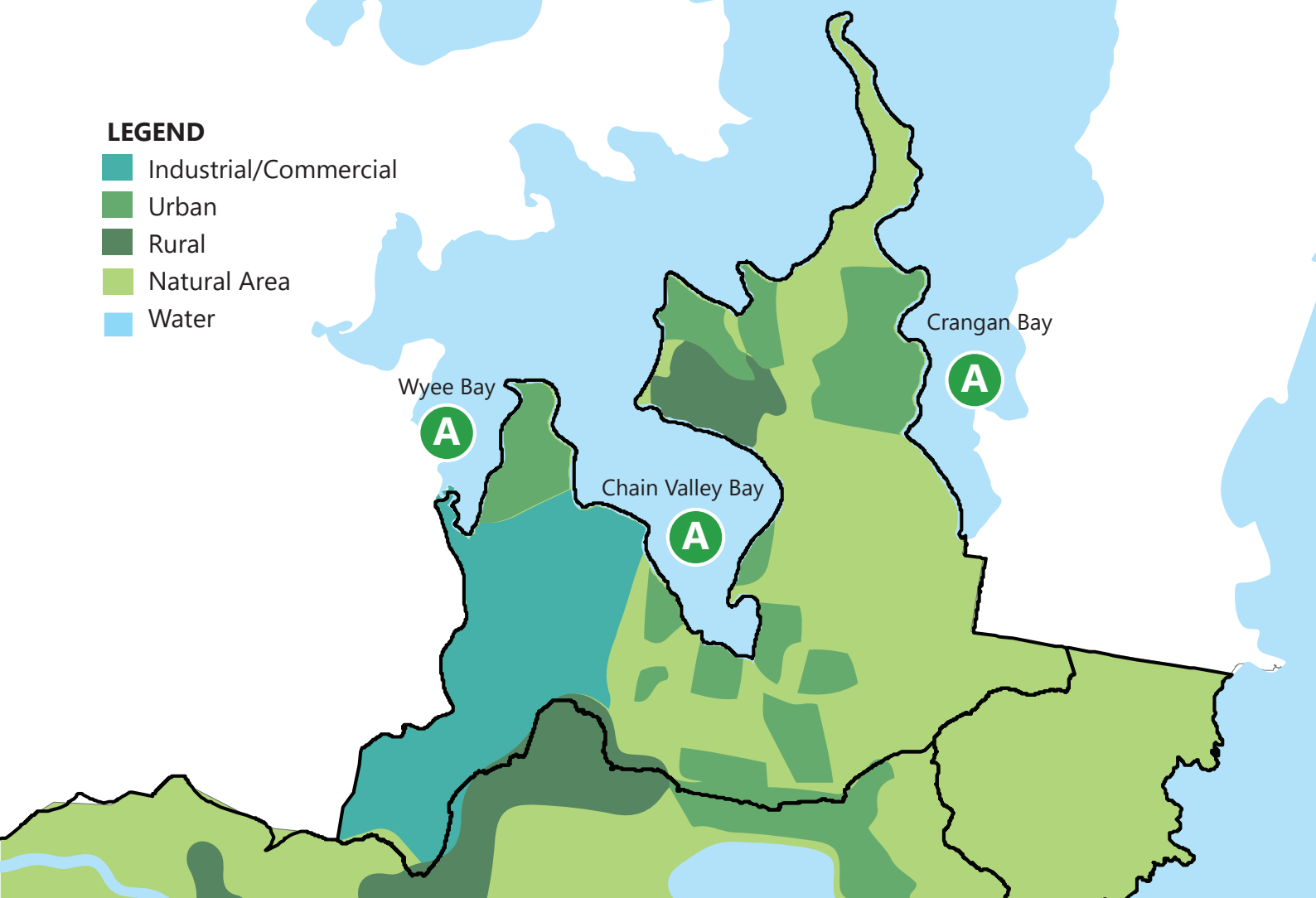




Southern Lake Macquarie

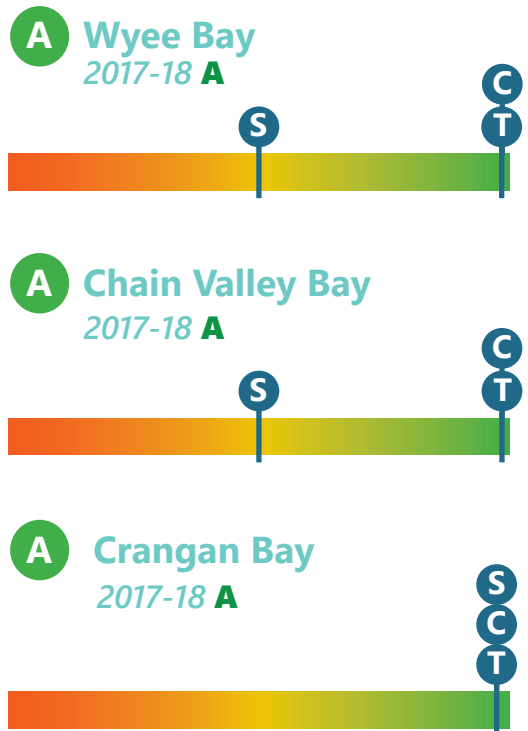
LEGEND

- Industrial/Commercial
- Urban
- Rural
- Natural Area
- Water



Monitoring in Southern Lake Macquarie commenced in 2017-18.

Water quality in the three southern bays of Lake Macquarie was considered excellent for the 2018-19 monitoring period. No trigger value exceedances were observed for the duration of sampling with both turbidity and chlorophyll-a levels remaining well below their respective trigger values. Seagrass depth range was again graded excellent at Crangan Bay, and fair at Chain Valley Bay and Wyee Bay. A reduction in turbidity was observed in Wyee Bay this year.



Tuggerah Lakes Estuary Management Plan

Council is currently delivering the Tuggerah Lakes Improving your Local Parks and Environment Grant (2017-20) – to view current and past projects, please visit centralcoast.nsw.gov.au/tuggerahlakesestuary





Tuggerah Lakes



Monitoring in Tuggerah Lakes commenced in 2011-12.

Lake Munmorah

Water quality and overall ecological health were good during the 2018-19 sampling period which is consistent with previous years. Minor declines in turbidity and seagrass depth range were observed at both sites, and a decline in chlorophyll-a was observed at the shore site only. These trends will be subject to examination in future years.

Budgewoi Lake

The water entering Budgewoi Lake from Wallarah Creek exceeded both turbidity and chlorophyll-a trigger values on most occasions throughout 2018-19, sometimes quite substantially. Lower quality water quality from the estuary catchments has a long-term impact on estuary health.

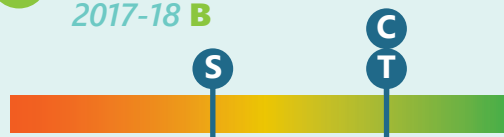
Overall water quality has decreased from fair to poor at Lake Haven and remained fair in Budgewoi Lake. This is caused by high turbidity, derived from catchment inputs and wind-driven resuspension of shallow bed sediment. Seagrass depth range has also decreased in response to longer periods of high turbidity over this monitoring period.

Northern Tuggerah Lake

Canton Beach again displayed excellent overall water quality. The overall grade for this site has decreased marginally in response to the poor seagrass depth range observed nearby. Poorer results were observed at Gorokan with a drop from good to fair largely driven by increased turbidity and chlorophyll-a in the warmer months. The northern basin site has also declined, with all variables poorer this year. A reduction in seagrass depth range from fair to poor is of concern and will be monitored over the coming year.

Lake Munmorah

B Lake Munmorah shore
2017-18 **B**

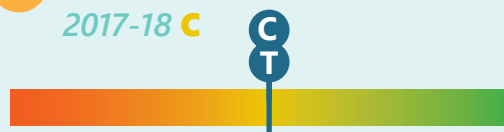


B Lake Munmorah basin
2017-18 **B**

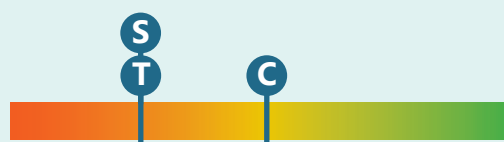


Budgewoi Lake

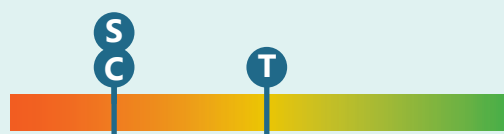
C Wallarah Creek
2017-18 **C**



D Lake Haven
2017-18 **C**



C Budgewoi Lake
2017-18 **C**



Northern Tuggerah Lake

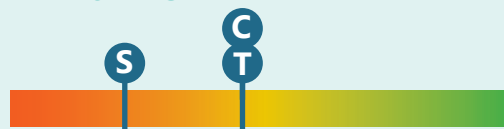
C Gorokan
2017-18 **B**



B Canton Beach
2017-18 **A**



C Tuggerah Lake North
2017-18 **B**



Central Tuggerah Lake

Water clarity in Wyong River was good throughout the monitoring period whilst chlorophyll-a exceeded the trigger value on all occasions and received a poor rating. Elevated chlorophyll can be an indicator of persistent nutrient pollution which triggers microalgal growth. This is likely to have long-term impacts on estuary water quality given catchment inputs are the most significant source of water entering the estuary.

Tuggerah Bay declined from good to poor as a result of large exceedances in the summer months. Despite this, seagrass depth range remained stable. Tuggerah Lake Centre also decreased from good to fair. The Entrance has remained excellent for the last four sampling occasions and a recovery of seagrass depth range has been observed in this area

Southern Tuggerah Lake

Overall water quality in Ourimbah Creek was fair. Chlorophyll-a always exceeded the trigger, often by a large margin and may indicate persistent nutrient pollution from the catchment. This is similar to observations in 2017-18 and is a possible contributor to poorer water quality elsewhere in the estuary. Nearby Chittaway Bay has decreased slightly from excellent to good as a result of several minor exceedances.

Overall water quality in the southern zone of Tuggerah Lake has also declined, particularly in response to poor turbidity as at other sites. Seagrass depth range remained fair. The southern foreshore adjacent to Tumbi Creek declined from good to poor as a result of consistent large exceedances of all triggers.

Central Tuggerah Lake

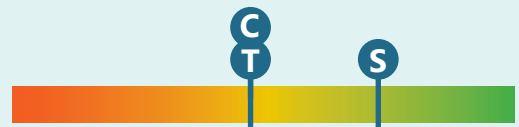
C Wyong River 2017-18 C



D Tuggerah Bay 2017-18 B



B Tuggerah Lake Centre 2017-18 B



A The Entrance 2017-18 A



Southern Tuggerah Lake

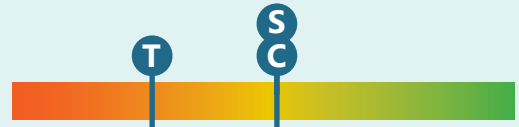
C Ourimbah Creek 2017-18 C



B Chittaway Bay 2017-18 A



B Tuggerah Lake South 2017-18 B

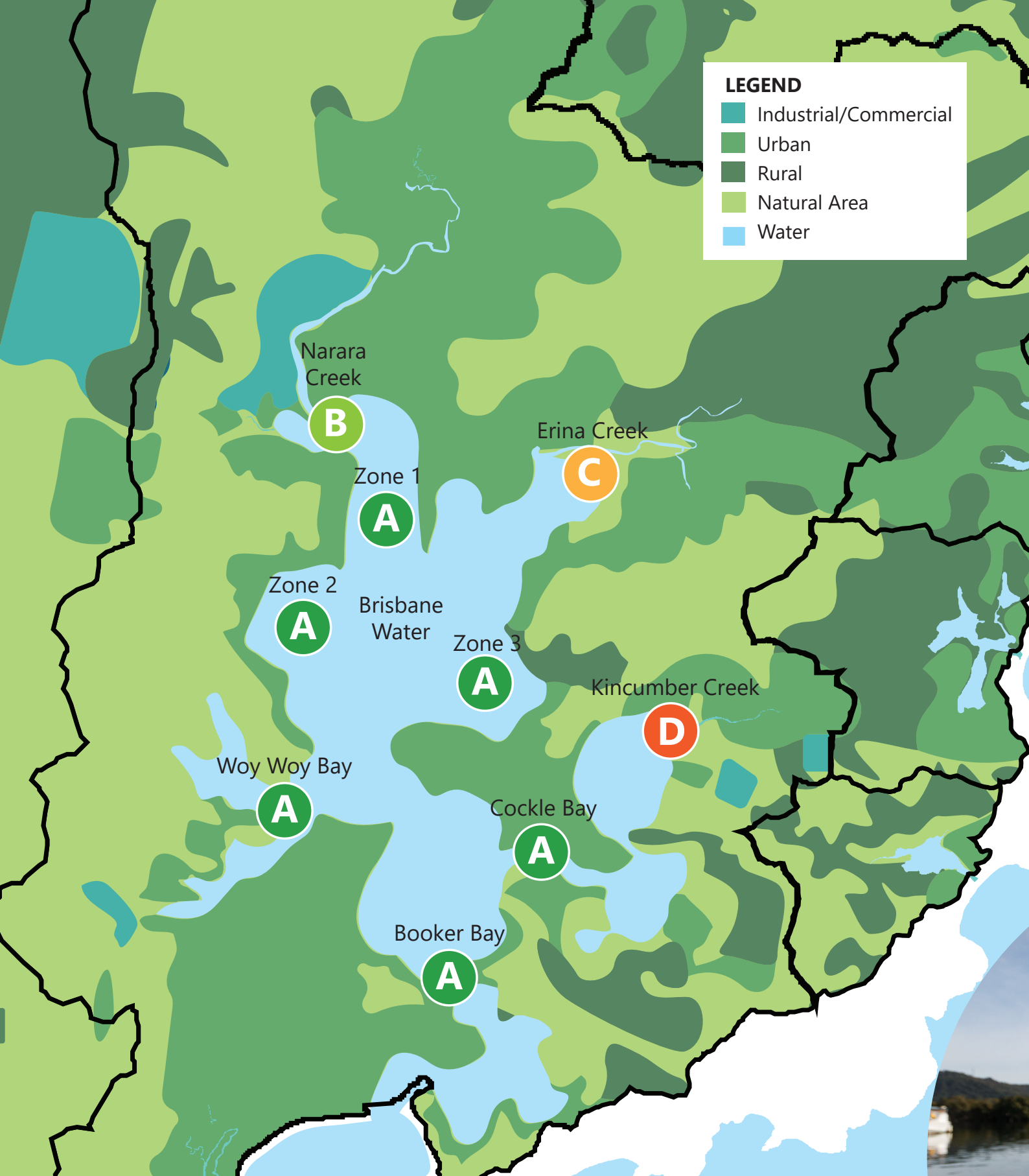


D Tumbi Creek 2017-18 B



LEGEND

- Industrial/Commercial
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- Rural
- Natural Area
- Water

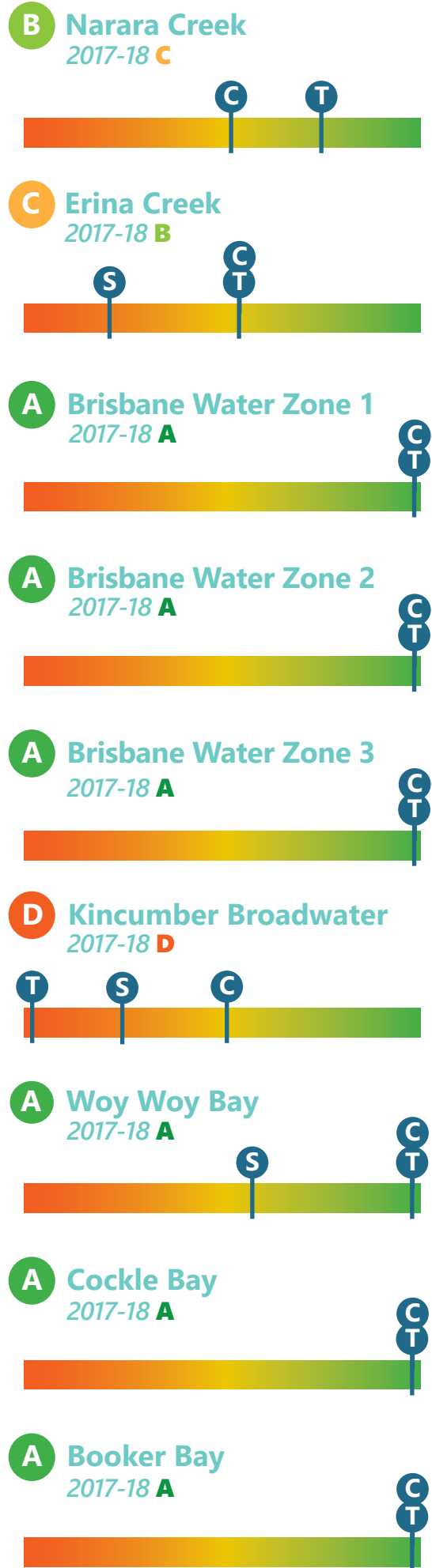


Brisbane Water

Water quality throughout Brisbane Water was generally considered excellent, with no trigger exceedances for the main basin sites including Zones 1, 2 and 3, Woy Woy Bay, Cockle Bay or Booker Bay. The well-flushed nature of the main water body ensures water quality remains excellent despite catchment inputs.

Reduced water quality at Narara Creek, Erina Creek and Kincumber Broadwater highlight some concerns for water quality entering from the estuary catchments. Turbidity improved at Narara Creek whilst chlorophyll-a declined with an overall ecological health improvement from fair to good. Conversely, Erina Creek declined in overall grade from good to fair. Numerous minor trigger value exceedances occurred throughout the sampling period. Seagrass depth range was also poor, with only very sparse seagrass observed.

Kincumber Broadwater again received an overall grade of poor due to regular high turbidity. The shallow nature of this site, coupled with its fine sediment profile, makes it susceptible to high turbidity and low water clarity during windy conditions, especially winds from the south. Chlorophyll-a was considered fair, a decline from the previous year's result. Ongoing monitoring will provide further clarity around water quality patterns at this location.



A scenic view of a coastal lagoon. In the foreground, there are tall, green reeds and some brown, dried vegetation. The water is calm and reflects the sky. In the background, there is a dense forest of trees on a hillside. The sky is clear and blue. The sun is visible in the upper right corner, creating a lens flare effect. A white circular graphic is overlaid on the top left of the image, containing text.

A detailed catchment audit for
Terrigal Beach, Terrigal Haven
and the coastal lagoons began in
2019. For more information visit
yourvoiceourcoast.com/tcla

Coastal Lagoons

B Wamberal Lagoon

2017-18 B



Overall water quality within Wamberal Lagoon was fair for the 2018-19 sampling period, with turbidity often exceeding the 80th percentile trigger value. Again as recorded in 2017-18, turbidity values were often higher in Zone 1 (furthest upstream site) than in Zone 2. Chlorophyll-a concentrations were generally good throughout the lagoon with only one relatively minor exceedance of the trigger value occurring during the sampling period.

C Terrigal Lagoon

2017-18 C



Overall water quality within Terrigal Lagoon was again fair with both turbidity and chlorophyll-a values exceeding the trigger values on every sampling occasion throughout the sampling period. The turbidity grade decreased from fair to poor due to values on most occasions being more than double the trigger value. The chlorophyll-a grade improved from fair to good as exceedances were often only minor.

F Avoca Lagoon

2017-18 F



Overall water quality in Avoca Lagoon was again very poor, with turbidity and chlorophyll-a both exceeding their respective trigger values on most of the sampling surveys throughout 2018-19. There was a large phytoplankton bloom recorded in March 2019 at both zones within the lagoon, with chlorophyll-a concentrations recorded several times greater than the trigger value. A detailed catchment audit of Avoca Lagoon commenced in 2019 – yourvoiceourcoast.com/tcla to help understand the drivers of poor water quality and to rectify them.

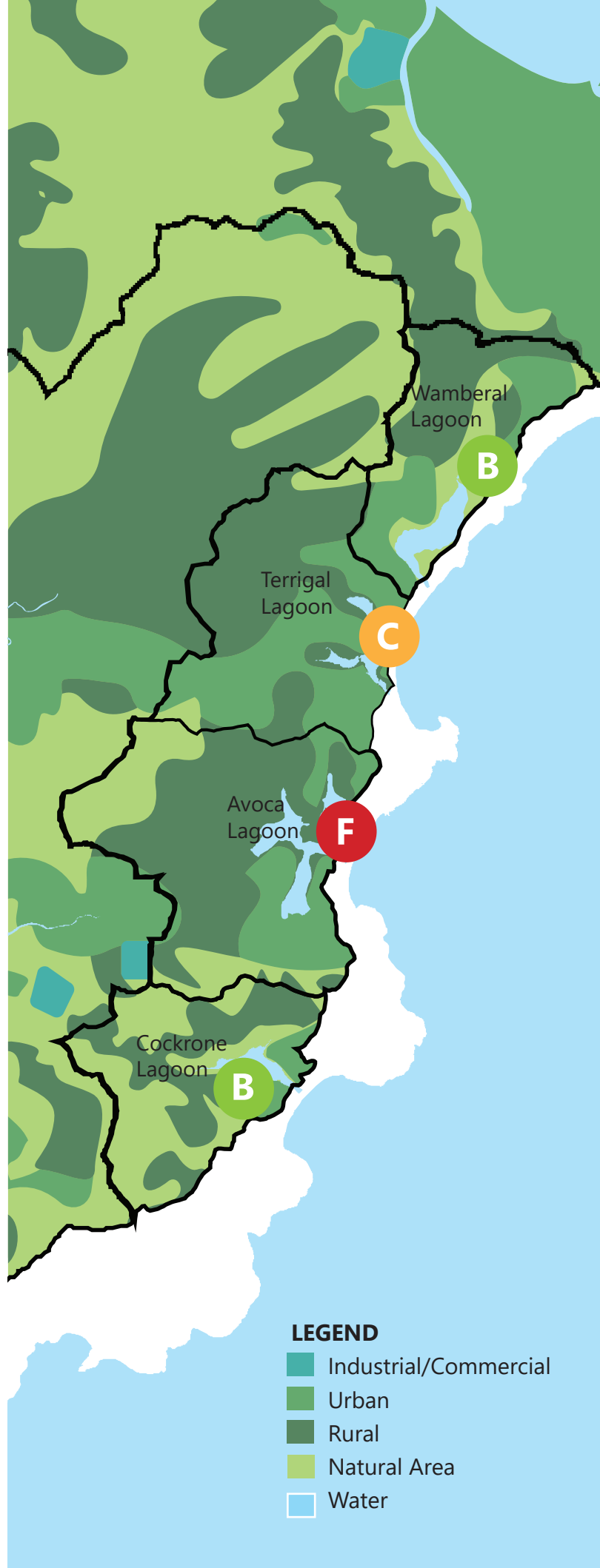
B Cockrone Lagoon

2017-18 A



Overall water quality within Cockrone Lagoon was good for the 2018-19 sampling period. Turbidity exceedances occurred in October 2018 and March 2019 coinciding with higher than average rainfall. For the most part, chlorophyll-a concentrations were below the trigger value throughout the sampling period.

S Seagrass depth range is not measured in the coastal lagoons



LEGEND






- Industrial/Commercial
- Urban
- Rural
- Natural Area
- Water



Lower Hawkesbury River



LEGEND

-  Industrial/Commercial
-  Urban
-  Rural
-  Natural Area
-  Water

A Patonga Creek



Overall water quality within the Patonga Creek was excellent, with only one trigger value exceedances for turbidity and none for chlorophyll-a observed over the sampling period.

B Mullet Creek



Whilst the trigger value were often exceeded for both turbidity and chlorophyll-a in Mullet Creek, the exceedances observed over the sampling period were for the most part relatively minor. As a result, overall water quality within the Mullet Creek was good. Most of the trigger value exceedances for turbidity were driven by Zone 2 (lower site), with turbidity recorded in Zone 1 (upper site) generally below the trigger values.

C Mooney Mooney Creek



Overall water quality within Mooney Mooney Creek was only fair throughout 2018-19 sampling period with both zone exhibiting similar patterns. Trigger values for both turbidity and chlorophyll-a were exceeded on all occasions. Monitoring at this location commenced in 2018-19 and water quality patterns will be reviewed in future years.

C Mangrove Creek



The overall water quality in Mangrove Creek was only fair. The trigger value for turbidity was exceeded on all sampling trips, with chlorophyll-a significantly exceeding the trigger values on all but one occasion. Like Mooney Mooney Creek both sites were equally responsible for the fair overall grade. Monitoring at this location commenced in 2018-19 and water quality patterns will be reviewed in future years.

Management actions

The health of the Central Coast's waterways is dependent on the health of the broader catchment areas – whatever comes down the rivers or enters the stormwater, ends up in our waterways and can have good or bad impacts. Our personal actions can directly affect the health of our waterways, not only right where we live or work but all the way to the estuaries and ocean. By working together, we can all do our bit to improve and protect our beautiful coastal areas now, and for the future.

Actions Council has taken to help

Council has a strong commitment to the health of our waterways and catchments. In the 2018-19 financial year Council:

- commenced the Terrigal and Coastal Lagoon Audit – a comprehensive water quality monitoring and improvement program in partnership with the NSW Government – yourvoiceourcoast.com/tcla
- continued rehabilitation of natural wetlands at Elizabeth Bay, Doyalson, Budgewoi, Toukley, Tacoma, Chittaway Bay, Berkeley Vale, Erina, Davistown, Saratoga, Bensville, Tascott and Avoca
- protected and rehabilitated Coastal Saltmarsh and foreshore bushland along the shores of Tuggerah Lake and Brisbane Water
- supported 80 Environmental Volunteer groups to conserve natural areas and improve the amenity of the Central Coast
- constructed new stormwater quality improvement devices at Berkeley Vale, Killarney Vale (x2) and Gosford to reduce pollutant loads to the waterways
- maintained a network of over 418 stormwater quality improvement devices throughout the estuary catchments to improved water quality
- intercepted and removed approximately 1000T of sediment and pollution from stormwater quality improvement devices before it reached the waterways
- removed around 15,000m³ of excess seagrass wrack and floating algae from Tuggerah Lakes and installed two new wrack collection pads
- delivered an extensive estuary education and communication program including eco-tours, information sessions, short film screenings and school visits
- celebrated everything our beautiful waterways have to offer by hosting the annual Lakes Festival.

Simple things you can do to help keep your patch healthy

- Reduce your household water consumption so that less water is taken from the rivers and more is available for environmental flows.
- Put litter, pet droppings and garden waste in the bin – this will stop pollution before it occurs and keep our waterways and foreshores clean and tidy for everyone to enjoy.
- Wash your car on the grass or better still, at a car wash – this will reduce the amount of chemicals and detergent entering the stormwater system.
- Build a rain garden or install a rainwater tank to capture and reuse runoff from rooftops and hardstand areas.
- Report environmental vandalism to Council.
- Use less fertiliser on your lawn or grow a native garden which doesn't need as much fertiliser – this helps reduce the nutrients entering the waterways which can cause algal blooms.
- Keep to formed walking trails and boat ramps to minimise your impact.
- Get involved! Protect saltmarsh, wetlands and bushland first hand by joining your local Environmental Volunteer group.

Did you know – Council removes the equivalent of **70 full garbage trucks of litter and pollution from gross pollutant traps every year!**

Keeping our waterways healthy is the responsibility of everyone who lives in, works in or visits the catchment. We all impact the lakes, let's make our impacts positive.



**TAKE RUBBISH
WITH YOU!
IF IT'S ON THE
GROUND,
IT'S IN OUR
WATERWAYS.**

More Information

centralcoast.nsw.gov.au/waterwayhealth

loveourwaterways.centralcoast.nsw.gov.au

environment.nsw.gov.au/resources/soc/130125esthlthprot.pdf

waterquality.gov.au/anz-guidelines/resources/previous-guidelines/anzecc-armcanz-2000

Central Coast Council has published six interactive Multi-Touch Books about our waterways. Two about wetlands, one about Brisbane Water and three about Tuggerah Lakes. The wetlands books contain interactive activities, games, videos and animal sounds and are linked to the Australian curriculum for primary and infant students. The Brisbane Water book covers major habitats and tips on how we can all help and the Tuggerah Lakes books look at habitats, impacts, case studies and recreational activities including fishing, birdwatching, walking and bike riding. The Explore book partners with the Tuggerah Lakes Estuary Explore application that you can download to discover more fishing, birdwatching and walking/riding areas around the lakes. Download the books for FREE on the Apple book store and the app on the Apple and Google Play stores.

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Photography – Andy Smith, David Ross

