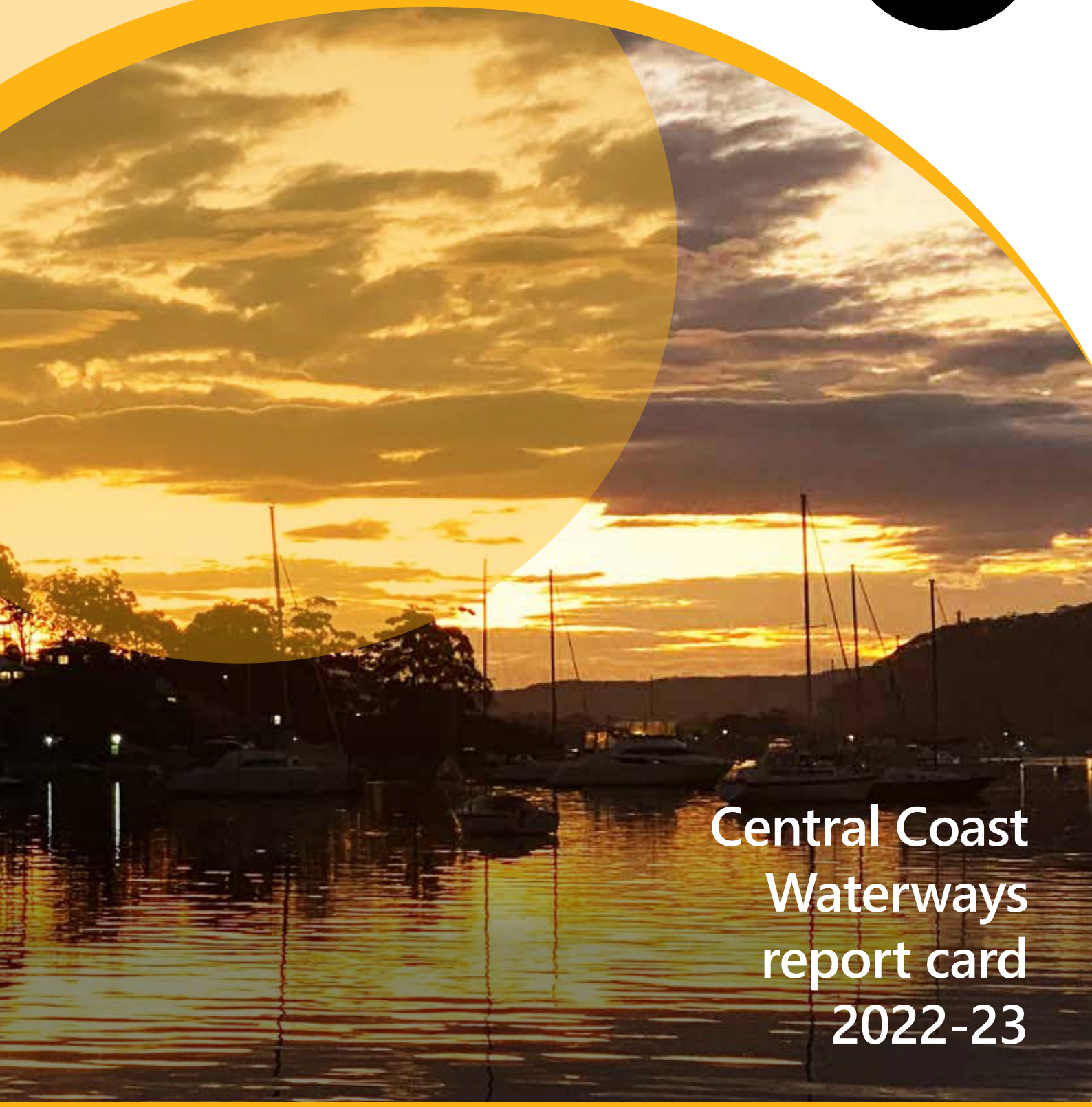
Central Coast Council



Central Coast Waterways report card 2022-23

central coast waterways

Introduction

This is the sixth 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, the lower Hawkesbury River and our larger coastal lagoons.

The ecological health data presented here were collected throughout 2022-23.

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.

> **Our beautiful and intricate waterways were, and continue to be, important and extremely valuable places to the First Nations people of the region. From the Deerubbin, or Hawkesbury River to the Awaba, traditional name of Lake Macquarie, the rivers, creeks, lakes, lagoons, and estuaries were a rich source of food and the site of important ceremonies and gatherings. Today we find much evidence around our waterways of a long, rich, and complex indigenous settlement of and connection to the region. Our waterways are a treasure to all, and we are committed to protecting and restoring them.**

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 1845 km^2.

The Central Coast's waterways form part of the NSW coastal zone and 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, cultural and economic 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 our 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 report card 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.

These indicators are 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.

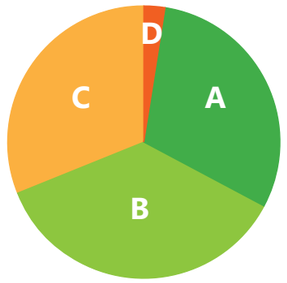
C **Fair** The indicators meet some benchmarks for part of the year. Equal to the middle 30% of scores in NSW.

D **Poor** The indicators met 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

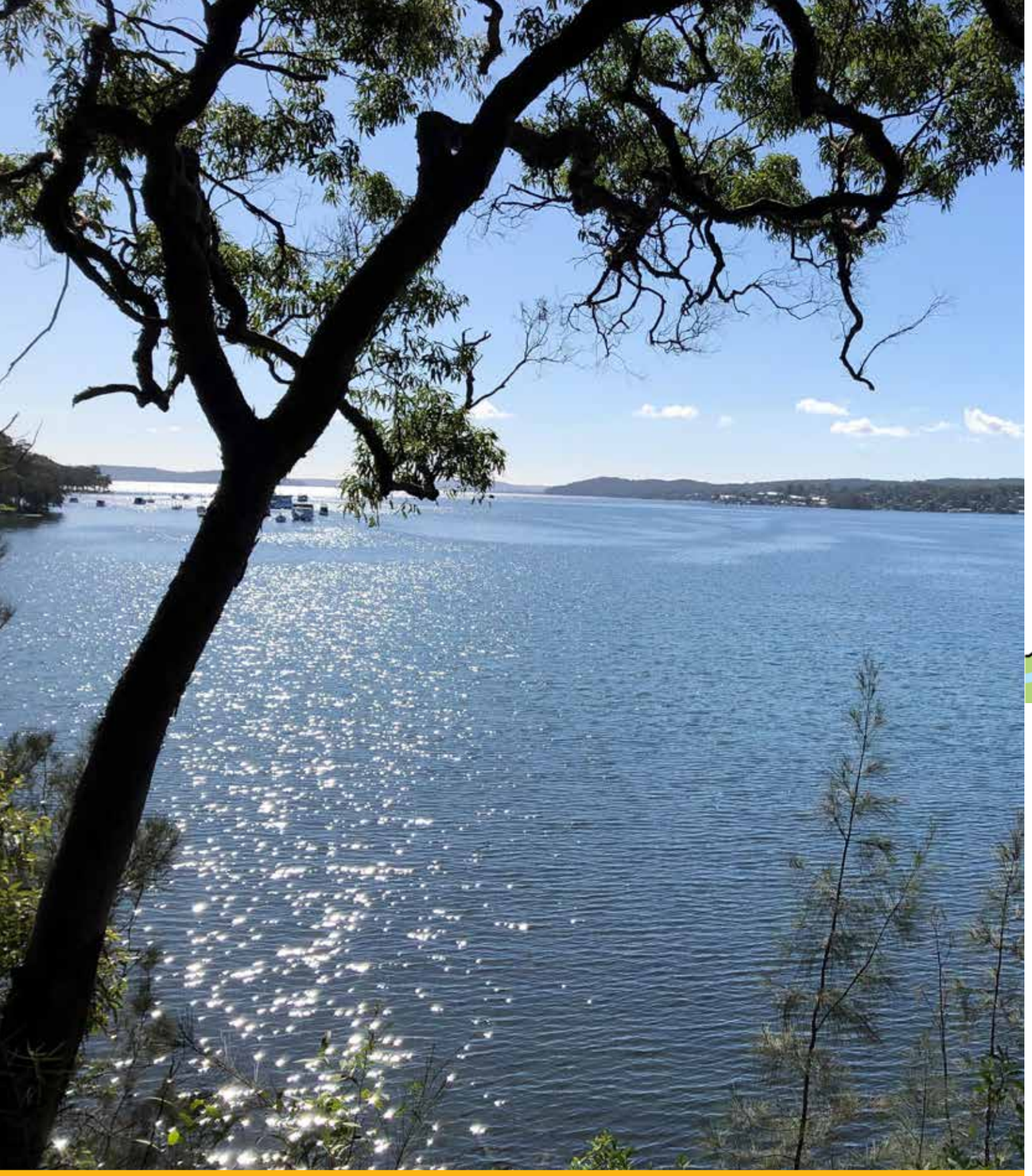
Overall water quality grades for Central Coast estuaries



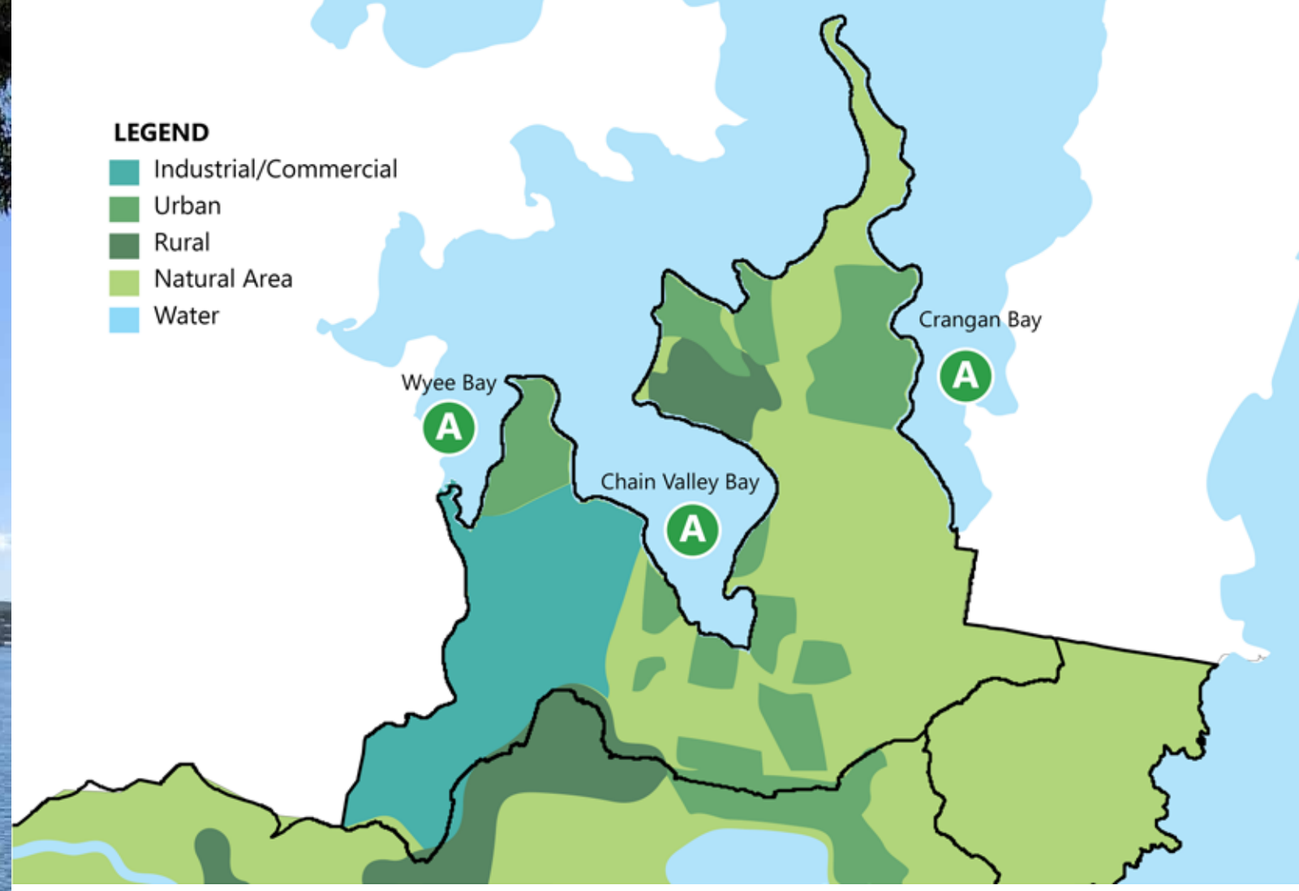
- A 30.5%
- B 36%
- C 30.5%
- D 2.7%
- F 0%

LEGEND

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



Southern Lake Macquarie



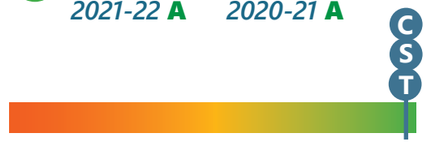
Monitoring in Southern Lake Macquarie commenced in 2022-23.

For the sixth consecutive year, overall water quality and ecological health in the three southern bays of Lake Macquarie remained excellent. Turbidity levels generally remained excellent with only one sampling occasion at Wyee Bay being above the trigger value. Chlorophyll-a levels remained well below the trigger value at all sites, suggesting minimal nutrients in the water column of the southern bays of Lake Macquarie. Seagrass depth range was graded excellent at Crangan Bay, and fair at Chain Valley Bay and Wyee Bay.

A Wyee Bay
2021-22 **A** *2020-21* **A**

A Chain Valley Bay
2021-22 **A** *2020-21* **A**

A Crangan Bay
2021-22 **A** *2020-21* **A**



C *Chlorophyll-a* T *Turbidity* S *Seagrass depth range*

Over the past 4 years Council have rehabilitated 53.83 hectares of freshwater wetlands, 18.105 hectares of saltmarsh, 12.98 hectares Swamp Oak Floodplain Forest, 6.23 hectares of riparian vegetation and 12,456.81 lineal metres of foreshore thanks to funding from the Australian Government grant for the Tuggerah Lakes Estuary. To learn more about our waterways protection and restoration projects, visit **loveourwaterways.centralcoast.nsw.gov.au**

Tuggerah Lakes

Monitoring in Tuggerah Lakes commenced in 2011-12.

Lake Munmorah

Ecological health remained good at the nearshore site and improved from fair to good in the basin site of Lake Munmorah this year. Overall water quality remained good at both sites. Turbidity and chlorophyll-a grades were good at the nearshore site, with the trigger values exceeded on one and two occasions respectively. In the basin, the turbidity grade was excellent, and the chlorophyll-a grade improved from fair to good.

Seagrass depth range at both sites improved from poor to good this year.

Budgewoi Lake

The water flowing into Budgewoi Lake from Wallarah Creek improved from poor to fair this year as a result of an improved grade for chlorophyll-a. Turbidity exceeded the trigger value on three occasions this year, with the sample collected in October 2022 four times above the guideline value. This is likely in response to a significant rainfall event during the second week of October. Chlorophyll-a levels were higher than the trigger value on all but one occasion, however exceedances were mostly minor.

Overall water quality at both sites in Budgewoi Lake were good with the nearshore zone at Lake Haven improving from fair last year to good this year due to improvements in turbidity levels. The trigger value for turbidity was exceeded on two occasions at this site in 2023. In the basin, turbidity decreased to good with one exceedance of the trigger value. Chlorophyll-a remained at a fair grade this year at both sites, with the trigger value exceeded on four sampling occasions at the shoreline and three times in the basin.

Seagrass depth range deteriorated at both sites from fair to poor.

Northern Tuggerah Lake

This year, overall water quality and ecological health remained good at all three sites in the northern zone of Tuggerah Lake. Canton Beach improved from fair last year, in response to an improved chlorophyll-a grade. During the sampling period, turbidity levels exceeded the trigger value at Gorokan twice and once at Canton Beach, this exceedance was nearly three times the trigger value and followed significant rainfall. Both nearshore sites had three minor trigger value exceedances for chlorophyll-a.

Seagrass depth range for the northern zone of Tuggerah Lake remained good this year.

Lake Munmorah

B Lake Munmorah shore
2021-22 **B** *2020-21* **C**

B Lake Munmorah basin
2021-22 **C** *2020-21* **C**

Budgewoi Lake

C Wallarah Creek
2021-22 **D** *2020-21* **C**

C Lake Haven
2021-22 **C** *2020-21* **A**

C Budgewoi Lake
2021-22 **B** *2020-21* **B**

Northern Tuggerah Lake

B Gorokan
2021-22 **B** *2020-21* **B**

B Canton Beach
2021-22 **C** *2020-21* **A**

B Tuggerah Lake North
2021-22 **B** *2020-21* **B**

Central Tuggerah Lake

Overall water quality in Wyong River remained fair this year. The fair grade for turbidity was retained, with one large exceedance recorded in October 2022 that was six times the trigger value following very high rainfall in the second week of October. The chlorophyll-a grade declined to fair with five minor to moderate exceedances of the trigger value recorded.

Ecological health and overall water quality of the Central Tuggerah Lake basin remained stable at good. Overall water quality was also good at the nearshore site at Tuggerah Bay this year, improving from fair, whilst ecological health remained stable at fair. Water quality at the nearshore site at The Entrance improved to excellent.

No turbidity exceedances were recorded in the basin or at The Entrance and just one minor one for Tuggerah Bay. The chlorophyll-a trigger value was exceeded three times at Tuggerah Bay and by almost 300% in April. The basin had two exceedances, with April also being large. Large exceedances are often experienced in the month following high rainfall and raised turbidity. The Entrance recorded three chlorophyll-a trigger value exceedances.

Sea grass depth range remained stable at good in the basin and at The Entrance but declined from fair to poor at Tuggerah Bay.

During this year, a range of water quality improvement works were completed in the Central Tuggerah Lake catchment.

Southern Tuggerah Lake

Overall water quality in Ourimbah Creek remained fair for the sixth consecutive year. Chlorophyll-a levels remained high, exceeding the trigger values on all but one occasion, and turbidity exceeded its trigger value on two occasions with the sample taken in October being three times higher than the trigger value.

Ecological health remained fair in the southern Tuggerah Bay basin, excellent at Chittaway Bay and improved from poor to fair at Tumbi Creek. Improvement in overall water quality was recorded at two sites, with the southern basin zone of Tuggerah Lake graded good this year and the nearshore zone adjacent to Tumbi Creek going from poor to fair. This was as a result of improvements in chlorophyll-a levels at all sites in the southern zone, with the trigger value exceeded only once in the basin and Chittaway Bay, however it was exceeded five times during the sampling period at Tumbi Creek. Turbidity trigger values were exceeded once in the basin and five times at Tumbi Creek.

Seagrass depth range declined in both the basin and Tumbi Creek nearshore site, both going from good to poor.

Central Tuggerah Lake

C Wyong River
2021-22 **C** *2020-21* **C**

C Tuggerah Bay
2021-22 **C** *2020-21* **B**

B Tuggerah Lake Centre
2021-22 **B** *2020-21* **B**

A The Entrance
2021-22 **B** *2020-21* **A**

Southern Tuggerah Lake

C Ourimbah Creek
2021-22 **C** *2020-21* **C**

A Chittaway Bay
2021-22 **A** *2020-21* **A**

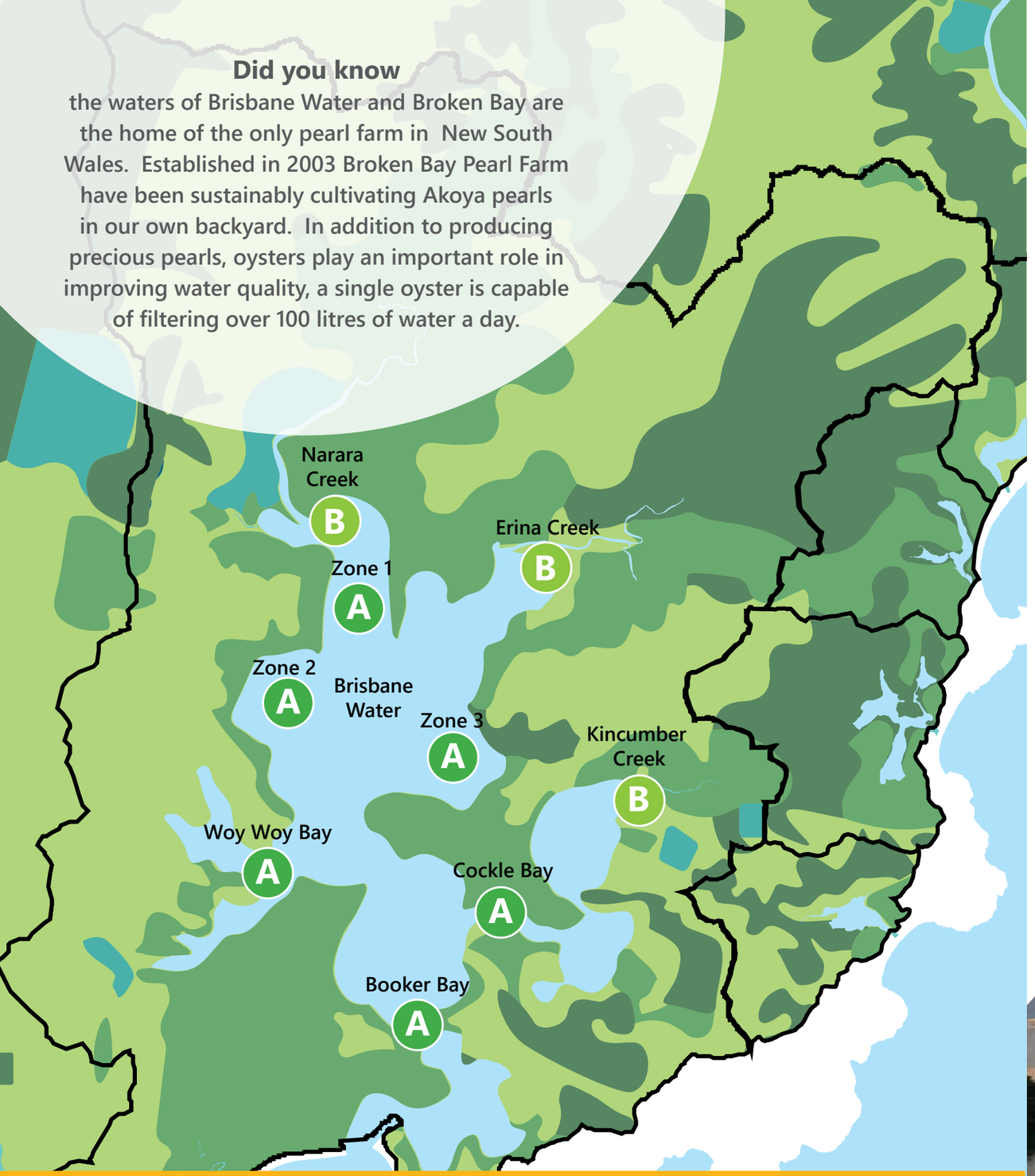
C Tuggerah Lake South
2021-22 **C** *2020-21* **B**

C Tumbi Creek
2021-22 **D** *2020-21* **B**

C *Chlorophyll-a* T *Turbidity* S *Seagrass depth range*

Did you know

the waters of Brisbane Water and Broken Bay are the home of the only pearl farm in New South Wales. Established in 2003 Broken Bay Pearl Farm have been sustainably cultivating Akoya pearls in our own backyard. In addition to producing precious pearls, oysters play an important role in improving water quality, a single oyster is capable of filtering over 100 litres of water a day.



Brisbane Water

Monitoring in Brisbane Water commenced in 2017-18.

Water quality throughout Brisbane Water in 2022-23 was graded between excellent and good. The ecological health grades of the three main basin sites, remained excellent with no exceedances of either the turbidity or chlorophyll-a trigger values. The seagrass depth range improved from good to excellent in 2022-23.

Overall water quality improved from fair to good in both Erina and Narara Creeks in 2022-23. These improvements were driven mostly by marked improvement in turbidity grades with no exceedances in Narara Creek and just two in Erina Creek. Chlorophyll-a declined to fair at both creeks along with seagrass depth range at Erina. Despite this ecological health was graded as good at both sites, an improvement from fair.

Overall water quality and ecological health in Woy Woy Bay improved from good to excellent in 2022-23. Turbidity and chlorophyll-a graded excellent with no exceedances recorded for either. This was a stable result for turbidity and an improvement from good for chlorophyll-a. Seagrass depth range all remained stable at fair.

During 2022-23 Booker Bay and Cockle Bay remained stable with an excellent rating for ecological health, overall water quality, turbidity and chlorophyll-a. There was just one minor exceedance in chlorophyll-a trigger value at Cockle Bay. Kincumber Creek also remained stable at good for both turbidity and chlorophyll-a with just one minor exceedance for both. Overall water quality and ecological health was also stable at good during 2022-23. Seagrass depth range at Kincumber declined from good to fair.

B Narara Creek
2021-22 **C** *2020-21* **B**

B Erina Creek
2021-22 **C** *2020-21* **B**

A Brisbane Water Zone 1, 2, 3
2021-22 **A** *2020-21* **B**

B Kincumber Broadwater
2021-22 **B** *2020-21* **C**

A Woy Woy Bay
2021-22 **B** *2020-21* **B**

A Cockle Bay
2021-22 **A** *2020-21* **B**

A Booker Bay
2021-22 **A** *2020-21* **B**

C *Chlorophyll-a* T *Turbidity* S *Seagrass depth range*

Council is working with the NSW Government to better understand water quality dynamics and management strategies for Avoca Lagoon through Stage 2 of the Coastal Management Program – **yourvoiceourcoast.com/waterways**.

Coastal Lagoons

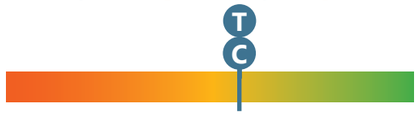
B Wamberal Lagoon

2021-22 **B** *2020-21* **C**

Overall water quality within Wamberal Lagoon remained good during the 2022-2023 sampling period although the turbidity grade changed from good to poor while the chlorophyll-a grade changed from excellent to good. Average turbidity was higher upstream, which is to be expected, and chlorophyll-a was also generally slightly higher at the higher site. The turbidity trigger value was exceeded on all 6 trips while the trigger value for chlorophyll-a was exceeded on 2 trips.

C Terrigal Lagoon

2021-22 **C** *2020-21* **C**



Overall water quality within Terrigal Lagoon remained fair during the 2022-2023 sampling period, despite an improvement in turbidity. Turbidity exceeded the trigger values on all but two occasions throughout the sampling period. The average chlorophyll-a concentration in the samples exceeded the trigger value on 4 sampling occasions and was graded as fair.

For information on the implementation of the water quality and catchment audit at Terrigal Beach, Terrigal Haven and Terrigal Lagoon visit **yourvoiceourcoast.com/tcla**.

D Avoca Lagoon

2021-22 **C** *2020-21* **B**

An additional sampling zone was added to the monitoring program at Avoca Lagoon in October 2022. Water quality in Avoca Lagoon was graded as poor during the 2022-2023 sampling period after receiving a fair grade the previous summer. The trigger value for turbidity was exceeded on all sampling occasions across the estuary which saw the grade decrease from fair to poor. The trigger value for chlorophyll-a was exceeded in 4 out of 5 samples, and the grade decreased from good to poor.

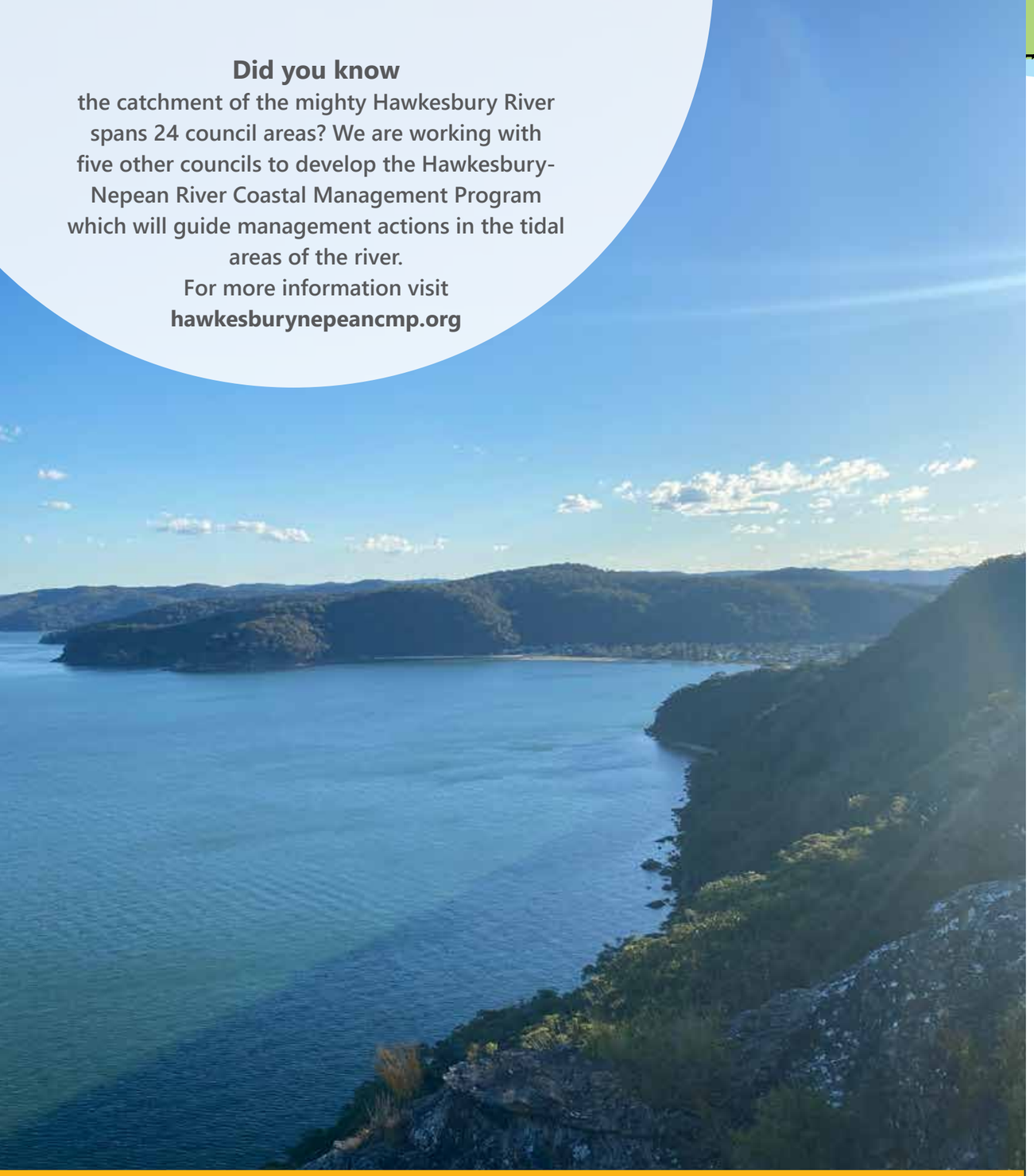
Council is working with the NSW Government to better understand water quality dynamics and management strategies for Avoca Lagoon through Stage 2 of the Coastal Management Program – **yourvoiceourcoast.com/waterways**.

B Cockrone Lagoon

2021-22 **B** *2020-21* **A**

The overall water quality grade for Cockrone Lagoon remained good for the 2022-2023 sampling period. There were 2 minor exceedances of the trigger values for turbidity and two minor exceedances for chlorophyll-a samples resulting in an improved chlorophyll-a grade to very good.

C *Chlorophyll-a* T *Turbidity*

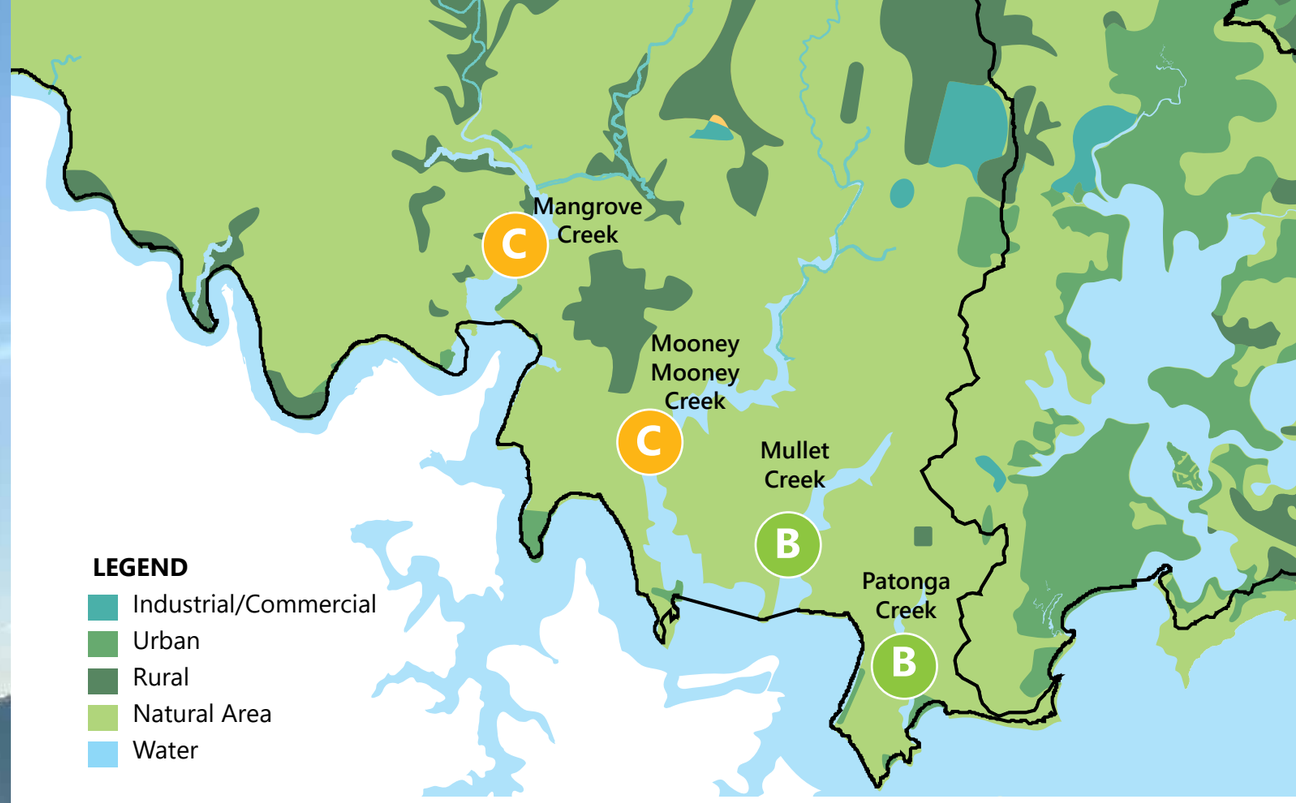


Did you know

the catchment of the mighty Hawkesbury River spans 24 council areas? We are working with five other councils to develop the Hawkesbury-Nepean River Coastal Management Program which will guide management actions in the tidal areas of the river.

For more information visit **hawkesburynepeancmp.org**

Lower Hawkesbury River



B Patonga Creek

2021-22 **B** *2020-21* **A**

Overall water quality within Patonga Creek remained good in 2022-2023. There was only one exceedance of the turbidity trigger value and the grade improved from good to excellent. Three exceedances of the chlorophyll-a trigger value however resulted in a decline in grade from good to poor in 2022-2023. This was driven by a 400% exceedance of the trigger value in the October sampling following 300mm of rainfall in September and October 2022.

B Mullet Creek

2021-22 **C** *2020-21* **B**

Overall water quality in Mullet Creek improved from fair in 2021-2022 to good in 2022-2023. The trigger value for turbidity was exceeded on three sampling occasions, however most exceedances were relatively minor. The trigger value for chlorophyll-a was exceeded on 5 sampling occasions, including one large exceedance (three-fold the trigger value). This resulted in the grade decreasing to poor for chlorophyll-a in 2022-2023. Like the previous year, trigger value exceedances for turbidity were driven by the downstream site, with turbidity recorded in the upper site generally close to the trigger value.

C Mooney Mooney Creek

2021-22 **D** *2020-21* **C**

Overall water quality within Mooney Mooney Creek improved from poor in 2021-2022 to fair in 2022-2023. Although the trigger value for turbidity was exceeded on all occasions, these were minor, and the overall grade was good. The chlorophyll-a trigger value was exceeded on 4 occasions, with neither site within the zone preforming well. The chlorophyll-a grade remained stable at poor because of a couple of substantial exceedances of the trigger value following high rainfall in September and October 2022.

C Mangrove Creek

2021-22 **B** *2020-21* **B**

Overall water quality in Mangrove Creek deteriorated to fair for 2022-2023. This is due to a drop in grade for chlorophyll-a, with the trigger value being exceeded on half the sampling trips. On two of these occasions, chlorophyll-a was more than triple the trigger value, following high rainfall in September and October 2022. Turbidity exceeded the trigger value on all but two occasions, however most of these exceedances were relatively minor.

C *Chlorophyll-a* T *Turbidity* S *Seagrass depth range*

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 local waterways and catchments. In the past 12 months Council has:

- Progressed into latter stages of the development of our Coastal Management Programs for our estuaries and open coast in partnership with our neighbouring Councils and the NSW Government – yourvoiceourcoast.com/waterways
- Continued investigations and remediation of the sewer network throughout the coast including the inspection of over 107 km and relining of over 38 km of sewer pipes in the coastal lagoon catchments. – yourvoiceourcoast/tcla
- Continued riverbank stabilisation of Wyong River and estuary foreshores to reduce erosion and sediment flow into the waterways and rehabilitation of riparian and wetland areas around the lakes and estuarine areas.
- Restoration and reconstruction of coastal saltmarsh along the shores of Tuggerah Lakes and Brisbane Water.
- Removed 61.19 tonnes of marine debris from waterways with the assistance of Clean4Shore.
- Upgraded existing stormwater quality improvement devices (SQID) to reduce pollutant loads to the waterways and through a network of 454 SQIDs intercepted and removed from our waterways over 775 tonnes of sediment and pollution.
- Removed just under 6,900m^3 of excess seagrass wrack and floating algae from Tuggerah Lakes and cleaned up after a significant fish kill on the southern shores of Lake Macquarie which was believed to be caused by a naturally occurring black water event
- Undertaken environmental DNA studies to track sources of microbial contamination in waterways
- Initiated a comprehensive responsible pet ownership education program with a focus on "bag it and bin" message
- Prioritised education and compliance enforcement of best practice sediment and erosion control at building and large-scale green field development sites.

Simple things you can do to help keep your patch healthy

- Report environmental vandalism to Council especially if it is going to impact a local waterway. From the building of illegal structures to insufficient sediment and erosion control to unsanctioned foreshore mowing, illegal actions such as these can all have detrimental impacts on our waterways.
- Bag it and bin it. Always pick up after pets. Remember wherever you are, you are in a catchment and stormwater networks can quickly take unwanted material to a local waterway.
- Respect our catchments - whether you are near the waterways or up in the bush, your actions have an impact. Take a bag with you to bring out any rubbish you create and safely pick up any rubbish you find when you venture out.
- Get your onsite sewage systems checked. - If you have a septic system, or another onsite sewage management system, make sure you have it checked periodically to ensure it is working correctly and not allowing untreated wastewater to get into the ground water or a nearby waterway.
- Help reduce algal blooms in our waterways – runoff containing excess nutrients makes its way into our waterways where it can cause algal blooms. By reducing the amount of fertiliser you use on your lawn and garden, or by planting a native garden which doesn't need as much fertiliser, you can help to minimise blooms of the algal kind.
- Learn more about our very special waterways. Search "Central Coast Waterways" on YouTube to find our dedicated playlist.
- Get involved! Protect saltmarsh, wetlands and bushland first-hand by joining your local Environmental Volunteer group.

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

TAKE YOUR RUBBISH WITH YOU

IF IT'S ON THE GROUND, IT'S IN OUR WATERWAYS.

Did you know

Council in collaboration with University of Technology Sydney (UTS) and University of Newcastle (UoN) has recently undertaken environmental DNA testing in our waterways to determine the sources of raised microbial levels. Markers for dog faeces were detected in 80% of samples with levels much higher during and after rainfall. In addition to the impact on human health, the raised nutrient will have an impact on overall water quality and these studies highlight the importance of picking up after your pet, no matter where in the catchment you are.

(October 2023)

More Information

https://www.centralcoast.nsw.gov.au/environment/coastlines/estuaries-lagoons-and-wetlands

loveourwaterways.centralcoast.nsw.gov.au

https://www.environment.nsw.gov.au/topics/water/water-quality/about-water-quality

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

Contact

Central Coast Council
P: 02 4306 7900
E: waterways@centralcoast.nsw.gov.au

Photography – Doug Beckers, Central Coast Council, Environmental Protection Authority (EPA)

Central Coast Council acknowledge the Traditional Custodians of the land on which we live, work and play. We pay respects to Elders, past, present and emerging and recognise their continued connection to the lands and waterways.
We acknowledge our shared responsibility to care for and protect our place and people.

central coast waterways

NSW GOVERNMENT

Central Coast Council