Darwin Harbour Water Quality

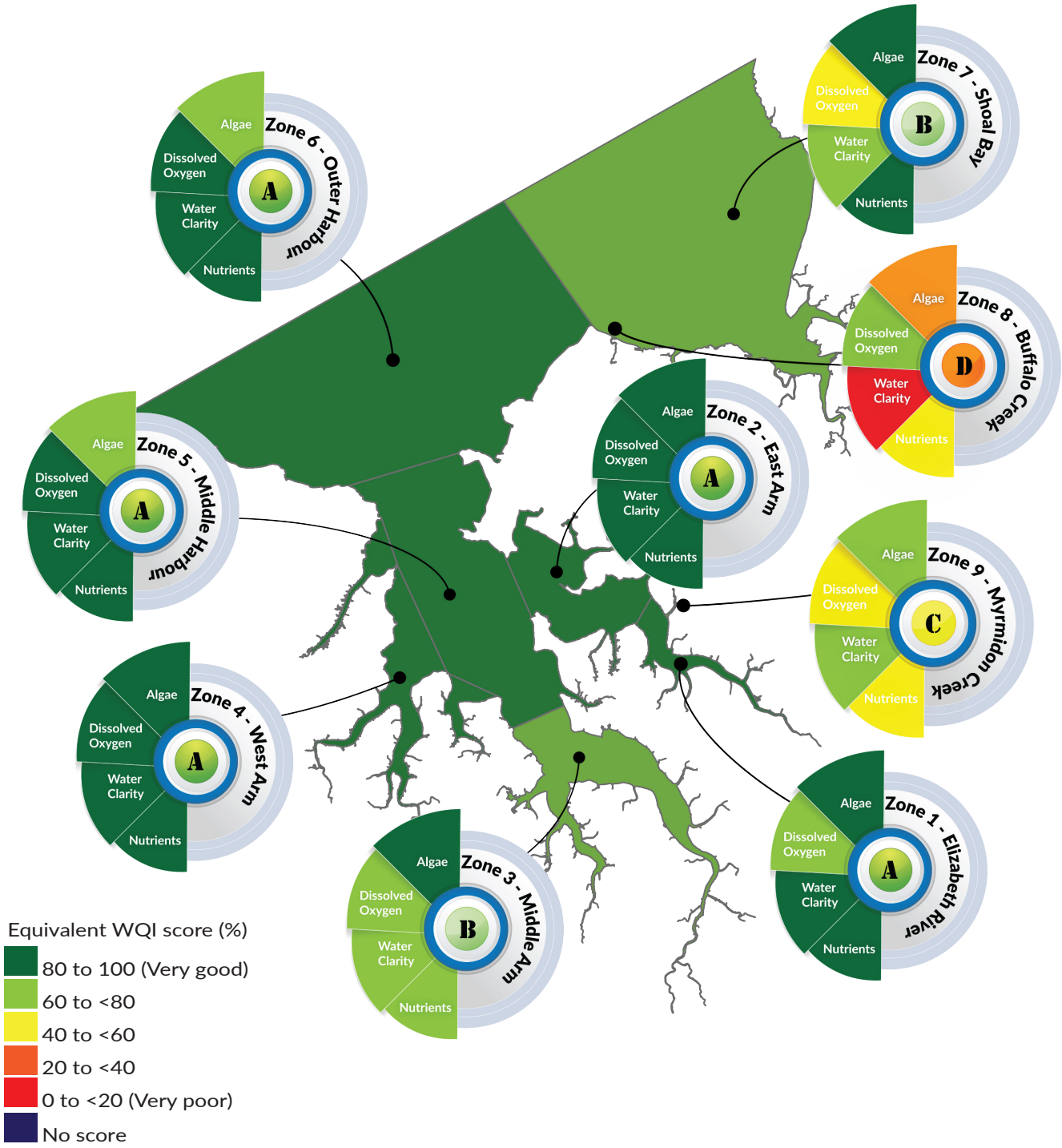
At a Glance

2023

NORTHERN TERRITORY GOVERNMENT

A water quality snap shot for 2023

In 2023 water quality in Darwin Harbour was very good overall improving since 2022 with an A- grade. Myrmidon Creek received a C grade rating with no change since the last reporting year. Buffalo Creek received a poor rating due to inflows of treated wastewater from the Leanyer-Sanderson wastewater treatment plant. Despite these localised impacts the water quality of Darwin Harbour and its estuarine reaches remain in very good condition. Changes in water quality largely reflect the natural variability typically found in this dynamic estuary.



What do the scores mean?

The Water Quality Index (WQI) is a single number which can be calculated easily and used to provide an overall description of water quality. A score between 0 and 1 is calculated and can be expressed as a percentage. The WQI is calculated for each indicator (e.g. Nutrients) and respective sub indicators (Ammmonia, Filterable Reactive Phosphorus and Oxides of Nitrogen) for sites and zones to inform the overall score.

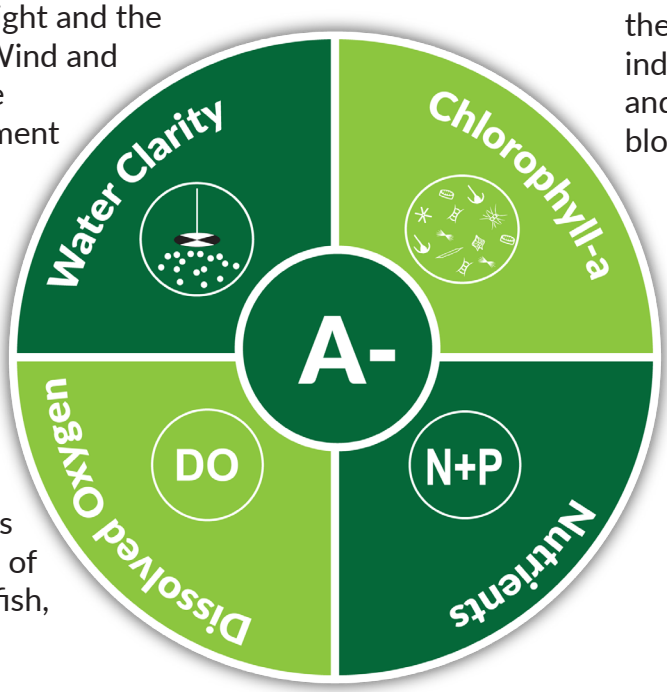
Improvements in key reporting zones

Annually the water quality of the harbour is assessed against the guidelines of the Darwin Harbour Water Quality Objectives. Nine zones represent different physical environments in the harbour, which feature diverse marine life and habitats such as seagrass beds, coral reefs and mangroves. Water quality data is collected by the Aquatic Group of the Department of Environment, Parks and Water Security and was supplemented by monitoring data from Power and Water Corporation in 2023. Stakeholders work together in the region and continue to look for ways to integrate data and information to report on the health of Darwin Harbour.

Each reporting zone in the harbour was assessed in 2023 and assigned a grade against four key water quality health indicators. These are algae, water clarity, dissolved oxygen and nutrients. The grades reflect no major long-term change for reporting zones since 2012. For the reporting year of 2023 the zones of East Arm and Elizabeth River indicate improved water quality grades. Often minor departures from water quality guidelines are associated with natural variation rather than any human induced change. Wind driven turbidity influences water clarity during the dry season and frequently explains lower scores for water clarity.

Turbidity is a measure of water clarity. High turbidity can limit light and the productivity of waters. Wind and macrotides influence the resuspension and movement of sediments.

Chlorophyll-a is a measure of the amount of algae in the water. High chlorophyll indicates poor water quality and is usually associated with bloom events.



Nitrogen is often a limiting factor in plant growth, but an excess can cause algal blooms. Ammonia (NH_3) can become toxic to aquatic biota under specific conditions.

Dissolved oxygen (DO) is essential for the survival of aquatic species such as fish, crabs and molluscs.

Phosphorus can limit plant gowth if there is not enough in the system, or it can cause algal blooms when in excess.

Aquatic Group staff measuring water quality using an EXO flowcell. This instrument collects continuous data whilst underway for indicators of dissolved oxygen and turbidity at 4 second intervals.

Reporting zone trends

Zone	1	2	3	4	5	6	7	8	9
	Elizabeth Estuary	East Arm	Middle Arm	West Arm	Middle Harbour	Outer Harbour	Shoal Bay	Buffalo Creek	Myrmidon Creek
2023 Grade	A	A	B	A	A	A	B	D	C
Change since 2022	↗	↗	→	→	→	→	↙	→	→
Long term trend*	→	→	→	→	→	→	→	→	→

*Long-term trend since 2012 reporting year

Symbols indicate change since last annual reporting period and long-term grade trend.

↗ Increase ↙ Decrease → No change

Areas for further investigation

Water quality was again poor for the zone of Buffalo Creek in 2023. This is a result of high nutrient discharge from the Leanyer Sanderson Wastewater Treatment Plant. Water quality and sediments immediately downstream of the discharge are impacted. The small tidal creek is also subject to increasing diffuse loads and stormwater from nearby urban areas. Ongoing infrastructure and operational improvements to improve discharge quality are being undertaken by the Power and Water Corporation.

To help us monitor impacts a long-term 'Pressure' monitoring program as part of the Integrated Marine Monitoring and Research Program commenced in 2020. This program evaluates trends and interactions between pollutant loads entering the harbour including those from intensive land uses and point source discharges. For more information see: https://depws.nt.gov.au/water/water-management/darwin-harbour/darwin-harbour-integrated-marine-monitoring-and-research-program.

The full summary of data collected in 2023 can be found at www.depws.nt.gov.au/reportcards