

Darwin Harbour Water Quality

At a Glance

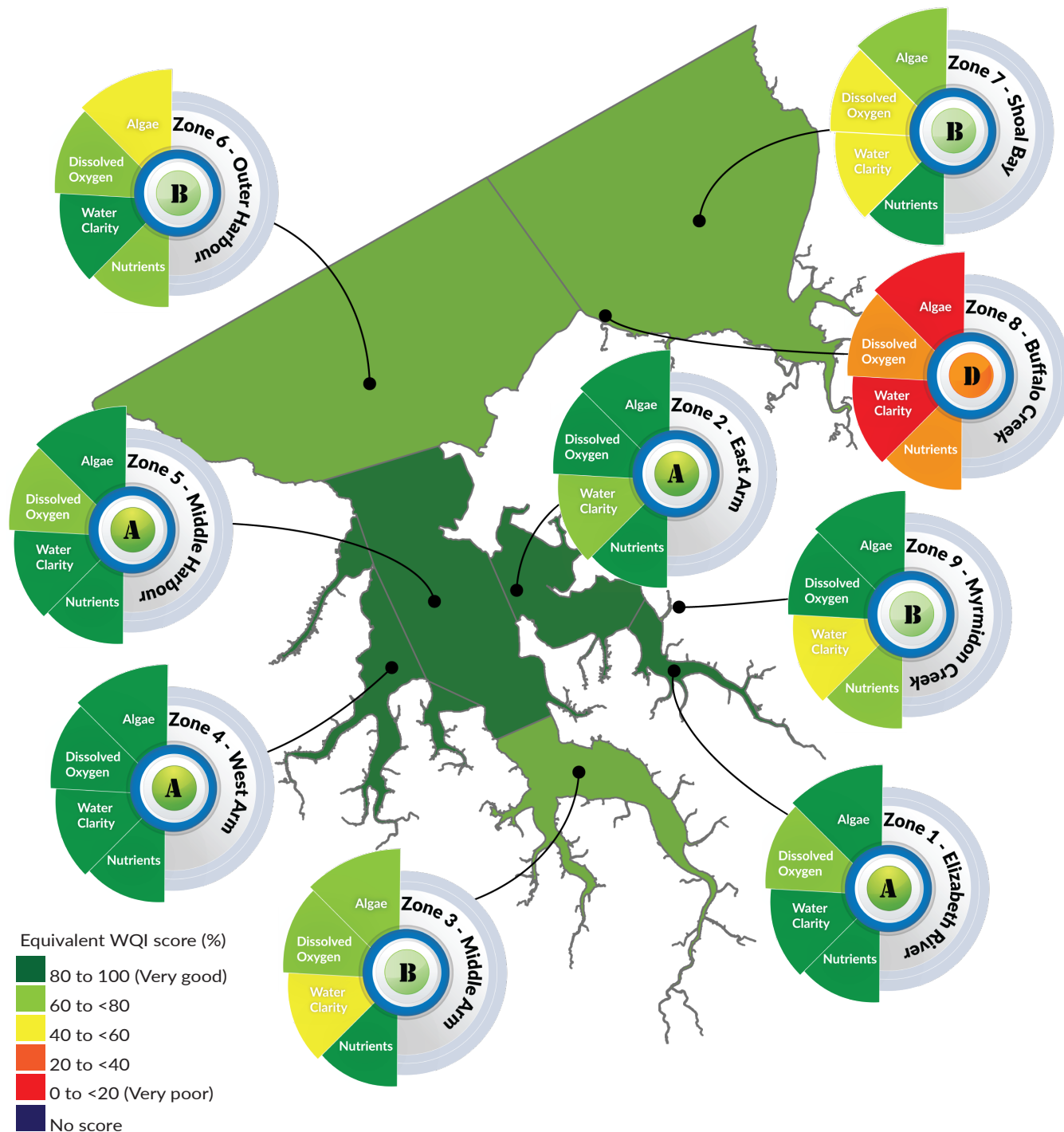
2024



**NORTHERN
TERRITORY**
GOVERNMENT

A water quality snap shot for 2024

Water quality in Darwin Harbour remains consistent with previous years with a large proportion of reporting zones continuing to have very good to good water quality. The condition of impacted systems such as Buffalo Creek continues to be poor with high algal biomass and low water clarity influencing scores. Myrmidon Creek, a system often indicating impacts of point source inputs, has shown some improvement since the last reporting period. Overall Darwin Harbour scored a 'B' grade for 2024.



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 (Ammonia, Filterable Reactive Phosphorus and Oxides of Nitrogen) for sites and zones to inform the overall score.

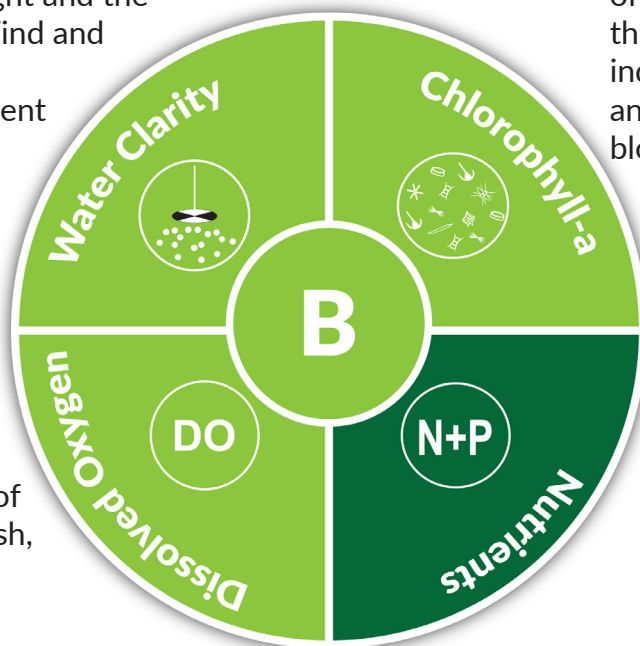
Improvements in key reporting zones

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 Lands, Planning and Environment (DLPE) and was supplemented by monitoring data from Power and Water Corporation in 2024. 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 2024 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 2024 the zone of Myrmidon Creek indicated improved water quality grades. The outer harbour zone received a B grade with lower scores for algae which was largely associated with localised discharge from Ludmilla Wastewater Treatment Plant. Often minor departures from water quality guidelines are associated with natural variation rather than any human induced change. Wind driven turbidity in particular influences water quality 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.

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



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.

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



Aquatic Group technicians deploy water quality buoys in Darwin Harbour. These systems collect water quality data at 10 minute intervals and relay data to the DLPE using remote telemetry. Aquatic group staff can observe water quality in real-time.

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
2024 Grade	A	A	B	A	A	B	B	D	B
Change since 2023									
Long term trend*									

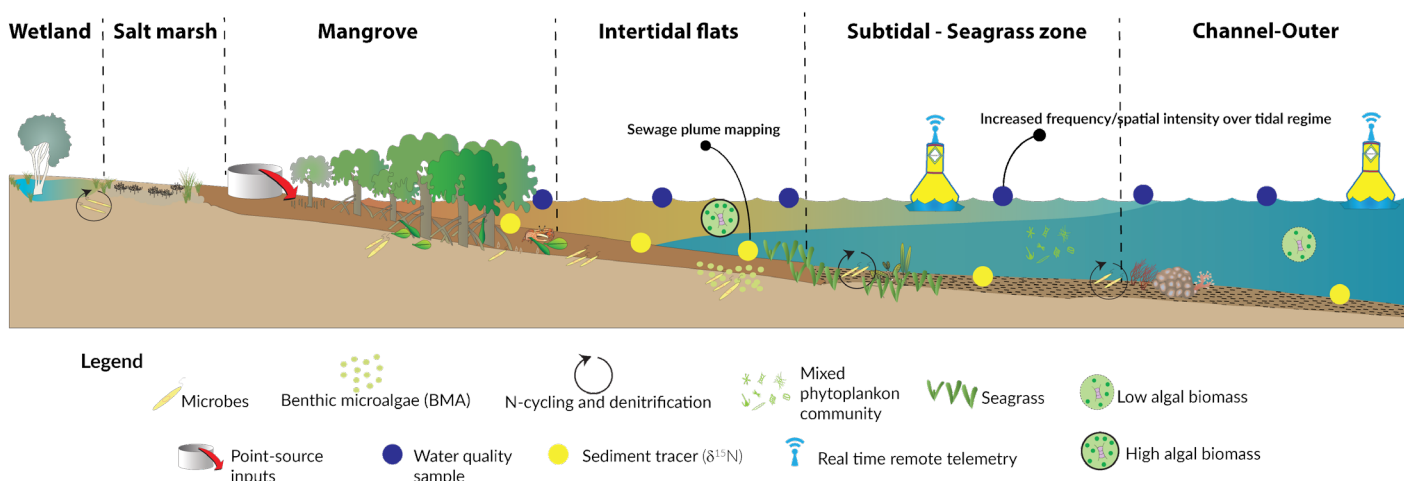
*Long-term trend since 2012 reporting year

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



Tracking water quality in Darwin Harbour

To help discern the extent of any water quality impacts and the source of inputs to Darwin Harbour a program of water quality buoy deployments and sampling is underway. Tracking water quality over tidal and seasonal cycles will help us understand the influence of these physical forces and inputs. Nitrogen stable isotopes ($\delta^{15}\text{N}$) are a tool to distinguish sewage-derived nitrogen from other nitrogen sources. The use of these isotopes are currently being explored to detect the extent of point-source inputs in conjunction with routine sediment quality monitoring. Sediment samples enriched by treated sewage indicate values of +9 parts per thousand (‰). Non impacted sediments typically have values <3 ‰



The full summary of data collected in 2024 can be found at:
<https://environment.nt.gov.au/water/darwin-harbour/darwin-harbour-region-report-cards>