DARWIN
HARBOUR

2021
INTEGRATED REPORT CARD

Darwin Harbour and catchment

Darwin Harbour supports the largest concentration of commerce and industry in Australia's Northern Territory (NT). It's home to most of the NT's residents and is the Country of the Larrakia people who have called the harbour home for many thousands of years.

Darwin Harbour's diverse ecosystems, including relatively intact mangrove systems, coral reefs, mudflats and seagrass beds, support high biodiversity and provide habitat for nesting turtles, dolphins, dugongs, migratory shorebirds and fish.

The harbour provides many recreational and tourism opportunities, including a large recreational fishing sector. Darwin Harbour is a strategically important working harbour and it is the only deep-water port between Cairns in Queensland and Broome in Western Australia.

For the harbour to continue to play a central role in the ongoing economy of the NT, it is critical to ensure that cultural, environmental and recreational values of the harbour are also thriving and managed sustainably.

Wagait Beach

Darwin

Palmerston

Belyuen

Darwin

NORTHERN
TERRITORY

0   10 km   N

↑

Integrated reporting for Darwin Harbour

Ongoing development of Darwin Harbour supports its continued role in the economy of the NT, but the environmental, Indigenous cultural and social values cannot be underestimated.

The Darwin Harbour Advisory Committee is working towards producing a collaborative, transparent, and cross-sectoral vision for Darwin Harbour. This integrated report card is designed to support this vision and will track the overall health of the Darwin Harbour region over time. The report card will inform and support management and the community in working towards a sustainable Darwin Harbour for future generations of all people in this magnificent region.

MAKING AN INTEGRATED REPORT CARD

Report cards have been shown to be powerful instruments for describing the integrated status of environmental, social, cultural and economic values within a region. Report cards increase public awareness, and inform and influence decision-makers to take action to improve or maintain the health of these values.

The process of developing report cards is highly participatory and includes the following five steps.

1. **identify** values important in the region
2. **select** indicators to assess values
3. **define** thresholds to compare against
4. **calculate** report card scores and grades
5. **communicate** results.

Values of a healthy Darwin Harbour and catchment

This Darwin Harbour Integrated Report Card has been developed through extensive consultation with stakeholders from the Darwin Harbour region and relies heavily on their knowledge and expertise.

A series of workshops were held in March 2020, representing the first step in this report card journey. Stakeholders from government, Indigenous communities, industry, academia and non-government organisations gathered in and around Darwin Harbour to conceptualise the harbour and its catchment, identify the environmental, social, Indigenous cultural and economic values of the region, and discuss indicators and thresholds that could be used to assess these values.

A total of 12 values were identified from these workshops (see figure below) and numerous potential indicators were proposed. The final choice of indicators used in this year's report card were ultimately dictated by data suitability and availability. In some instances, no data were available to confidently assess the health of certain values. In August 2021, report card findings were presented back to the stakeholders for their review and input.

A companion website (dhir.org.au) provides further details on indicators and the methods used to derive report card grades.

Participants in the Indigenous stakeholder workshop held at Wagait Beach on 14 March 2020.

Participants in the stakeholder workshop held in Darwin on 16 March 2020.

Values and **indicators**

Stakeholder consultation identified 12 values that are key to a healthy Darwin Harbour.

CLEAN WATER

Clean water has been assessed in the harbour using a water quality index and a sediment quality index. Both indicators were developed by the NT Department of Environment, Parks and Water Security (DEPWS).

HEALTHY ECOSYSTEMS & LANDSCAPES

Healthy ecosystems and landscapes have been assessed in the catchment and harbour using two indicators – catchment disturbance index and mangrove area change. Data were sourced from NT DEPWS.
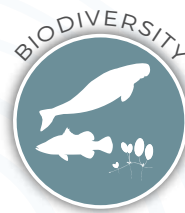
BIODIVERSITY

Although there have been numerous studies on the harbour and catchment's **biodiversity**, there is currently no systematic monitoring of flora and fauna that could be used in this assessment. Opportunities exist to include indicators for this value in future report cards.

INDIGENOUS VALUES

Indigenous values were assessed using three indicators – food security, future generations, and spiritual and sacred sites. Information for each of these indicators was collected through a survey of 50 Indigenous representatives living within the Darwin Harbour catchment.

MANAGEMENT

Management of the environment of Darwin Harbour and catchment has been assessed using information on actual versus budgeted management deliverables published by NT DEPWS.

JOBS

Jobs have been assessed using unemployment rates. Information was sourced from the Small Area Labour Markets published by the Australian Government and represents unemployment as a proportion of the labour force in the Darwin Harbour region.

LIFESTYLES & RECREATION

Lifestyles and recreation for those living and enjoying the Darwin Harbour region were assessed using two indicators – park visitation and air quality. Information on both indicators was sourced from NT DEPWS.

PORT OF DARWIN

Efforts were made to develop indicators to assess the **Port of Darwin**; however, a useful indicator could not be identified for this assessment. It is anticipated that opportunities will exist to include indicators for this value in future report cards.

SUSTAINABILITY

Sustainability was assessed in this year's report card using information on domestic solar panel installations within the Darwin Harbour catchment region. Data were sourced from the Australian PV Institute.

TOURISM

Tourism was assessed in this year's report card using a combination of visitors to, and expenditure in, the Greater Darwin region. Information was sourced from the NT Department of Tourism.

MULTICULTURALISM

Efforts were made to develop indicators to assess **multiculturalism**; however, a useful indicator could not be identified for this assessment. Opportunities exist to include indicators for this value in future report cards.

RESILIENCE & CLIMATE CHANGE

Efforts were made to develop indicators to assess **resilience and climate change**; however, a useful indicator could not be identified for this assessment. Opportunities exist to include indicators for this value in future report cards.

Darwin Harbour and catchment

Darwin Harbour is currently in good health,
yet more can be done to improve and better understand it

CLEAN WATER

HEALTHY ECOSYSTEMS & LANDSCAPES

BIODIVERSITY

INDIGENOUS VALUES

MANAGEMENT

JOBS

LIFESTYLES & RECREATION

PORT OF DARWIN

SUSTAINABILITY

TOURISM

MULTICULTURALISM

RESILIENCE & CLIMATE CHANGE

B⁻

2021 report card

What do the grades mean?

(A) **Very good** — 80–100% of results meet objectives

(B) **Good** — 60–80% of results meet objectives

(C) **Moderate** — 40–60% of results meet objectives

(D) **Poor** — 20–40% of results meet objectives

(E) **Very poor** — 0–20% of results meet objectives

( ) **Insufficient data**

Overall, Darwin Harbour and its catchment received a grade of B− in 2021. This grade was comprised of information on eight values, each with variable results. Management of the environment was assessed as being very good. Clean water, and lifestyles and recreation each received a good rating. Moderate grades were given to healthy ecosystems and landscapes, Indigenous values, and jobs. Poor grades were assigned to sustainability and tourism – the latter attributed to impacts due to COVID-19.

Insufficient information was available to confidently assign grades to biodiversity, Port of Darwin, multiculturalism, and resilience and climate change.

Darwin Harbour findings

The water quality index identified good to very good water quality conditions in most regions of Darwin Harbour, with an area-weighted average score across all regions of 67% (B). Certain areas, however, did show signs of degraded water quality, including a poor grade for Buffalo Creek (D) and a moderate grade for Myrmidon Creek (C+). Buffalo Creek is influenced by treated effluent from the Leanyer Sanderson Waste Stabilisation Ponds. Myrmidon Creek receives treated effluent from the Palmerston Waste Stabilisation Ponds.

The **sediment quality index** indicated good conditions for sediment metals in all assessed regions of Darwin Harbour, with an area-weighted average score across all regions of 73% (B). Certain sampling sites, however, did show signs of degraded sediment quality, primarily in East Arm.
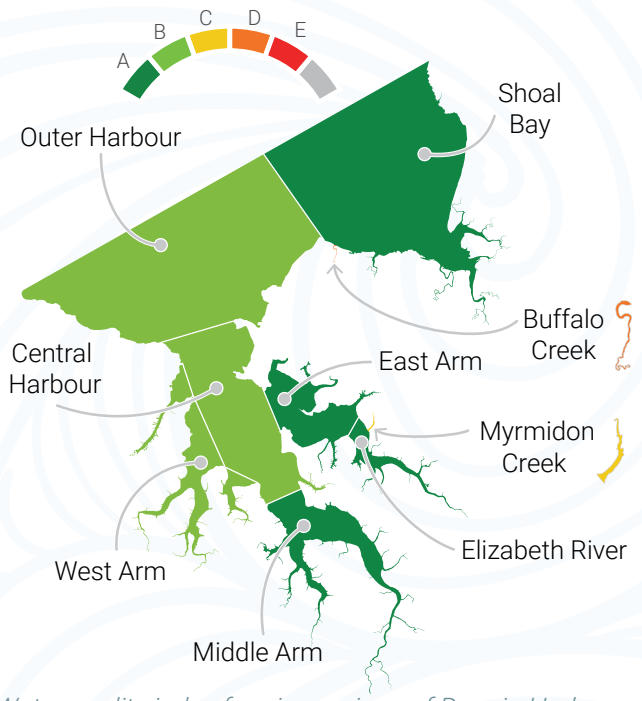
Water quality index for nine regions of Darwin Harbour.

The **catchment disturbance index** for the entire Darwin Harbour catchment was assessed as in very good condition (A). Typically, the most populated regions (i.e. those around Darwin) displayed higher catchment disturbance. Very poor catchment condition was identified in the Rapid Creek region (E), with poor catchment condition identified for the Darwin City region (D−), and good condition for the City of Palmerston and Elizabeth River regions (B− and B+, respectively). The remainder of the catchment was assessed as being in very good condition.

Mangrove area change within Darwin Harbour appeared to show a slight decrease in mangrove extent across the harbour (<1%) between 2016 and 2020, resulting in a moderate rating (C+) for the harbour as a whole. The data used to assess this indicator, however, were still in draft format at the time of publishing this report card. As such, this finding is of low confidence and work is underway to improve the confidence and sensitivity of this indicator moving forward.
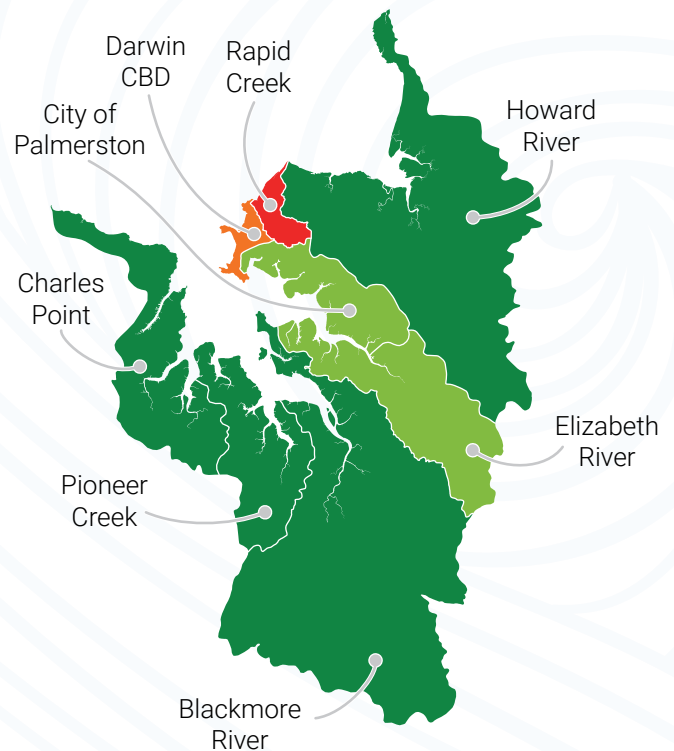
Catchment disturbance index for eight regions of Darwin Harbour catchment.

Indigenous food security received a moderate grade (C), reflecting survey responses that indicated a decline in sea and mainland food sources over time. This was attributed, by the respondents, to over-fishing, poor governance, habitat destruction and invasive species.

Future generations received a good grade (B), reflecting survey responses that cultural knowledge is still practiced within the community and being passed onto children. While most respondents agreed that they had access to job training programs, few agreed that there were enough jobs in their community. Respondents mostly disagreed that their opinions were taken into account when government or other stakeholders make decisions, and less than half agreed that they were recognised for their knowledge of country.

Spiritual and sacred sites received an overall moderate grade (C+). A large proportion of respondents agreed that spiritual and sacred sites are respected by Indigenous people. Less than 20% agreed that sites are respected by non-Indigenous people and that enough is being done to protect these sites.

Darwin Harbour **findings**

Key **management deliverables** by the NT Department of Environment, Parks and Water Security were assessed as very good for the 2019–20 year. The Flora and Fauna, Rangelands, Bushfires NT and Environment departmental divisions achieved very good (A) grades (between 83–100% of budgeted key performance indicators); while Water Resources achieved a good score (76% of its budgeted key performance indicators were met).

The **unemployment rate** for the Darwin Harbour region was 5.7% (based on the workforce-weighted annual average for Belyuen, Coomalie, Darwin, Litchfield, Palmerston, Wagait and Unincorporated areas between March 2020 and March 2021). Unemployment rates for each local government area were as follows: Palmerston 7.4%, Darwin 5.7%, Litchfield 4.2%, Belyuen 3%, Wagait and Unincorporated 2.8% and Coomalie 2.7%. All unemployment rates showed an increase over the reporting period and were above previous years' rates. This is likely a result of COVID-19 restrictions impacting domestic and international tourism numbers in the region and associated tourism-related jobs.

Park and reserve visitation rates were, on average across all parks and reserves assessed, 31% lower in 2020 compared to the 2016–2019 visitation rates. This resulted in a moderate grade (C–). As with jobs and tourism, this overall reduction is attributed to COVID-19 restrictions impacting local, domestic and international tourism. Not all parks and reserves saw a reduction in visitation, however, with Casuarina Coastal Reserve experiencing a 17% increase in visitation on previous years, likely reflecting its proximity to Darwin and usage by local residents during the pandemic. Visitation for the other parks assessed include Berry Springs Nature Reserve (30% reduction), Fogg Dam Conservation Reserve (38% reduction), and Howard Springs Nature Park (23% reduction).

The **air quality** parameter $PM_{2.5}$ is a suitable indicator to represent deteriorated air quality due to bushfire smoke that is experienced annually in the Darwin Harbour region. This variability throughout the year is shown in the figure to the right with elevated $PM_{2.5}$ levels between May and November, peaking in June. However, for 2020, there were 4 days where the average $PM_{2.5}$ exceeded the National Environment Protection Measure standard of 25 µg/m³, resulting in 98.9% of the year meeting this air quality standard corresponding to a very good grade (A).
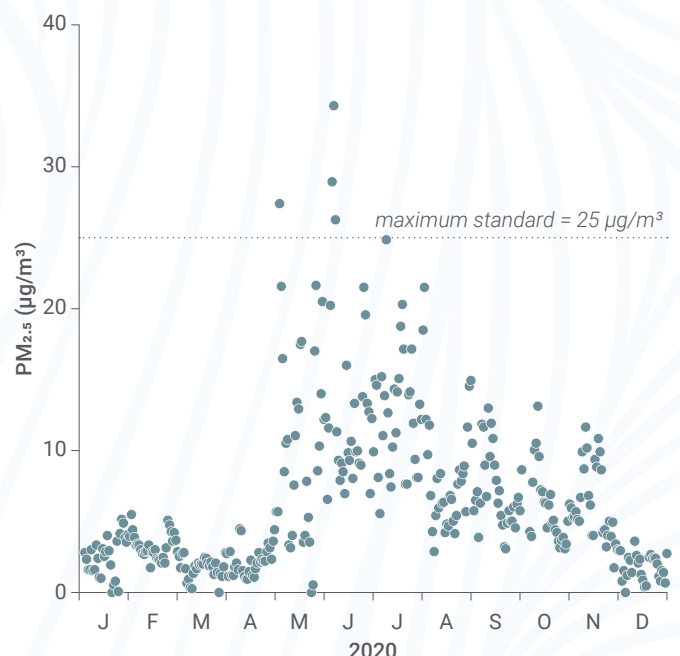
Daily averages for the air quality parameter $PM_{2.5}$ recorded at Stokes Hill for 2020.

The percentage of **domestic solar installations** within the Darwin Harbour catchment received a poor grade (D). Solar installations were assessed by post code. There were higher installation rates in the eastern catchment (between 30–40% of residential dwellings) compared to installations in the central (10–20%) and western (0–10%) parts of the catchment.

The number of **visitors** and their **expenditure** in the Greater Darwin area received a poor grade (D+) for 2020. This was determined using information sourced from Tourism NT and using the NT's Tourism Industry Strategy 2030 target of 2% annual increase in visitors and expenditure between 2018–2019 and 2029–2030 for the NT. The poor grade received this year is highly likely due to COVID-19 restrictions impacting domestic and international tourism numbers in the region.

No robust indicators could be identified for these values in this year's assessment. Opportunities exist to include indicators for these values in future report cards.

Report Card **recommendations**

1. **Clean water** – continue long-term water quality monitoring and adjust sampling locations for sediment metals to include more sites in Buffalo and Myrmidon Creeks. Investigate source of elevated metals identified at sites in East Arm. In accordance with work currently being conducted by NT Department of Infrastructure, Planning and Logistics, a key priority item for water quality in Darwin Harbour is the development of a Dredging Strategy and Plan.

2. **Healthy ecosystems and landscapes** – implement water-sensitive urban design practices in Darwin CBD and Rapid Creek regions, where catchment condition was assessed as poor to very poor, to reduce impacts to water quality. Continue to refine mangrove area monitoring to improve confidence in results.

3. **Biodiversity** – urgent need for systematic and ongoing biodiversity monitoring programs in the harbour and catchment. Opportunities were identified through this project to partner in the future with Indigenous rangers, biosecurity departments and volunteer groups to assist in collecting this information.

4. **Indigenous values** – work with the Indigenous community to address threats to Indigenous food security, improve two-way consultation (listen more and speak less), address shortages in job availability, and invest in respecting and protecting spiritual and sacred sites.

5. **Management** – maintain achievement levels of key performance indicators and continue public reporting of these results in annual reports. Seek public feedback on budgeted performance indicators.

6. **Jobs** – monitor rising unemployment levels during and after the COVID-19 pandemic. Provide government support for those affected throughout the Darwin Harbour region, with a focus on the areas of Palmerston and Darwin which are showing the highest unemployment rates.

7. **Lifestyles and recreation** – monitor decreasing visitation to parks and reserves during and after the COVID-19 pandemic. Set upper thresholds on the carrying capacity of these parks to guarantee a sustainable future for the management and biodiversity of these parks and reserves. Address stakeholder concerns about poor air quality, which is not currently reflected in this report card grade or other reporting mechanisms (e.g. State of the Environment reporting). Investigate and develop other indicators for lifestyles and recreation such as recreational fishing.

8. **Port of Darwin** – work with the Port of Darwin to develop indicators that can assess the status of the port and its role in contributing to and maintaining a healthy Darwin Harbour.

9. **Sustainability** – promote and support uptake of domestic solar installations and work towards including larger-scale solar installations and greenhouse gas emissions in future report cards.

10. **Tourism** – monitor decreasing visitor numbers and expenditure experienced in the Greater Darwin Area during the COVID-19 pandemic, and track recovery after the the pandemic to ensure visitor and expenditure re-aligns with the NT's Tourism Industry Strategy for 2030.

11. **Multiculturalism** – work with the NT Government to develop Darwin Harbour-specific indicators to assess progress with the Multicultural Policy for the NT 2020–2025.

12. **Resilience and climate change** – develop indicators to assess the preparedness of the Darwin Harbour region to rising sea levels and storm surges and other targets set in the NT Climate Change Response: Towards 2050.

Acknowledgements

Credits

Visit dhir.org.au for more information