HEALTHY WATERS PARTNERSHIP dry tropics

Townsville Dry Tropics
Waterways Report Card 2025

TECHNICAL REPORT

PART 6: Offshore Marine Results

Reporting on data collected 2023 - 2024

JULY 2025 | Written by Adam Shand, Healthy Waters Partnership (HWP)

7 Offshore Marine Environment

The Offshore Marine Environment in the Townsville Dry Tropics region consists of only one zone (the Offshore Marine Zone). The water quality and habit indices are measured in this zone, however currently only the habitat index is reported (see section 7.1.1 Data source). The extent of the zone is shown in Figure 21, and results are presented below.

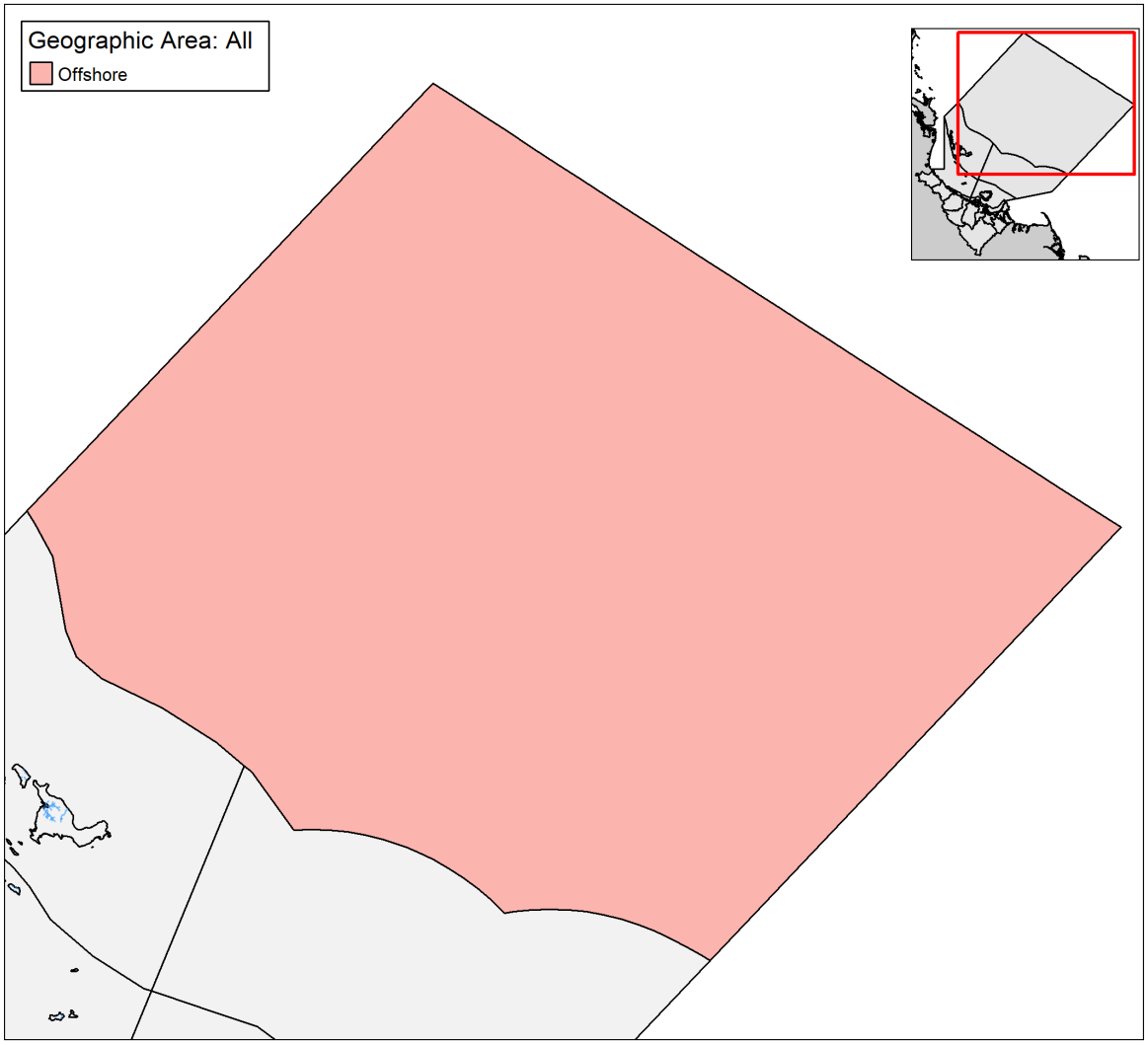

Figure 1. Dry Tropics offshore marine zone.

7.1 Water Quality

The 2023–2024 reporting period was the fourth year in which the water quality index has not been reported (see section 7.1.1 Data source). For years previous to 2020–2021 offshore water quality results were obtained from the BoM Marine Water Quality (MWQ) dashboard and were based upon relative area (%) of the water body where the annual mean value met the water quality guideline value (Table 74). The scores were similar for all reporting years.

Table 1. Current and previous water quality scores and grades for the Townsville Dry Tropics Offshore Marine Zone.

Zone	Water Quality					
	23-24	22-23	21–22	20–21	19–20	18–19
Offshore Marine	ND	ND	ND	ND	100	97

Standardised scoring range: ■ Very Poor (E) = 0 to <21 | ■ Poor (D) = 21 to <41 | ■ Moderate (C) = 41 to <61 | ■ Good (B) = 61 to <81 | ■ Very Good (A) = 81 – 100 | ND = No Data | NA = Not Applicable (data available but not usable) | X = Data was not updated this year.

7.1.1 Data source

Since the 2020-21 reporting year there has been no data available for scoring and grading water quality for the offshore zones of the regional report cards. Up until 2019-20, the data for the offshore assessment of water quality was extracted from the marine water quality (MWQ) Bureau of Meteorology dashboard based on remotely sensed analysis of reflectance. In early 2021 the Bureau of Meteorology advised that the MWQ dashboard and underlying data preparation workflow was to be discontinued. Since 2022, the Technical Working Group for regional report cards and the Independent Science Panel recommended that services and products produced by CSIRO for eReefs are used for offshore water quality reporting and progress towards this has been made.

The Technical Working Group recommended in early 2025 that the reporting of offshore water quality is more effective using a contextual approach and should replace the scoring and grading approach. The rationale for this recommendation was based upon the following points.

- The offshore area for each report card is an extremely large water body in comparison to the other reporting zones.
- Offshore water quality under normal conditions is not affected by catchment influences.
- Applying a score and grade implies that the condition of offshore water quality can be affected by management actions.
- Average conditions across an offshore zone are expected to consistently score and grade highly with very minimal change over time.

Proposed information to be included for contextual reporting of offshore water quality include historical data of key indicators (e.g. chlorophyll a and total suspended solids or their surrogates) derived from eReefs, and mapping of flood plume extent for key indicators, which may include turbidity, total suspended solids, chlorophyll a and nutrients, derived from MMP inshore water quality reports and directly from remote sensing sources. Contextual reporting of offshore water quality will be developed and implemented as part of the 2027 Program Design update for regional report cards. Note that limitations on annual reporting of offshore water quality using eReefs data include the biennial timing of data releases which align with the Reef Report Card reporting cycle.

7.2 Habitat

The habitat index for the Offshore Marine Zone consists only of the coral indicator category. The coral indicator category sources its results from AIMS' Long-Term Monitoring Program (LTMP) (Australian Institute of Marine Science 2024). In the Townsville Dry Tropics region this data is updated every year with the most recent update occurring in 2024.

7.2.1 Overall Summary: Offshore Habitat

The score for the habitat index in the Offshore Marine Zone was similar to the previous reporting period, receiving a score of 64 within the same grade (good). These results show the continued stability of coral health in the Offshore Marine Zone after several years of disturbances (Table 75).

Table 2. Standardised score for the Offshore Marine Zone habitat index.

Zone	Coral	Habitat Index					
		23-24	22-23	21–22	20–21	19–20	18–19
Offshore Marine Zone	64	64	63	64	62	54	59

Standardised scoring range: ■ Very Poor (E) = 0 to <21 | ■ Poor (D) = 21 to <41 | ■ Moderate (C) = 41 to <61 | ■ Good (B) = 61 to <81 | ■ Very Good (A) = 81 – 100 | ND = No Data | NA = Not Applicable (data available but not usable) | X = Data was not updated this year.

7.2.1.1 *Key Messages*

- The Offshore Marine Zone coral grade remained "good", with minimal changes to the previous Technical Report.
    - Juvenile density was graded as "very good" at 7 of 9 reefs surveyed.
    - All coral reefs had an overall grade of "moderate" or "good".
    - John Brewer Reef shows signs of recovering from a recent crown-of-thorns starfish outbreak.
    - TC Kirrily had a limited impact on total coral cover at survey sites; however, the positioning of some sites (e.g. leeward) may have provided protection.

7.2.2 Coral

Coral data was collected by the Australian Institute of Marine Science's LTMP (Australian Institute of Marine Science 2024). In previous reporting years additional coral monitoring has been conducted by Reef Check Australia (RCA), however no additional sampling occurred during 2023–2024 due to a limited budget.

7.2.2.1 *Monitoring Sites*

The coral indicator category was monitored at nine locations in the Offshore Marine Zone. All sites were monitored as part of the LTMP and have been sampled in previous years (Figure 22).

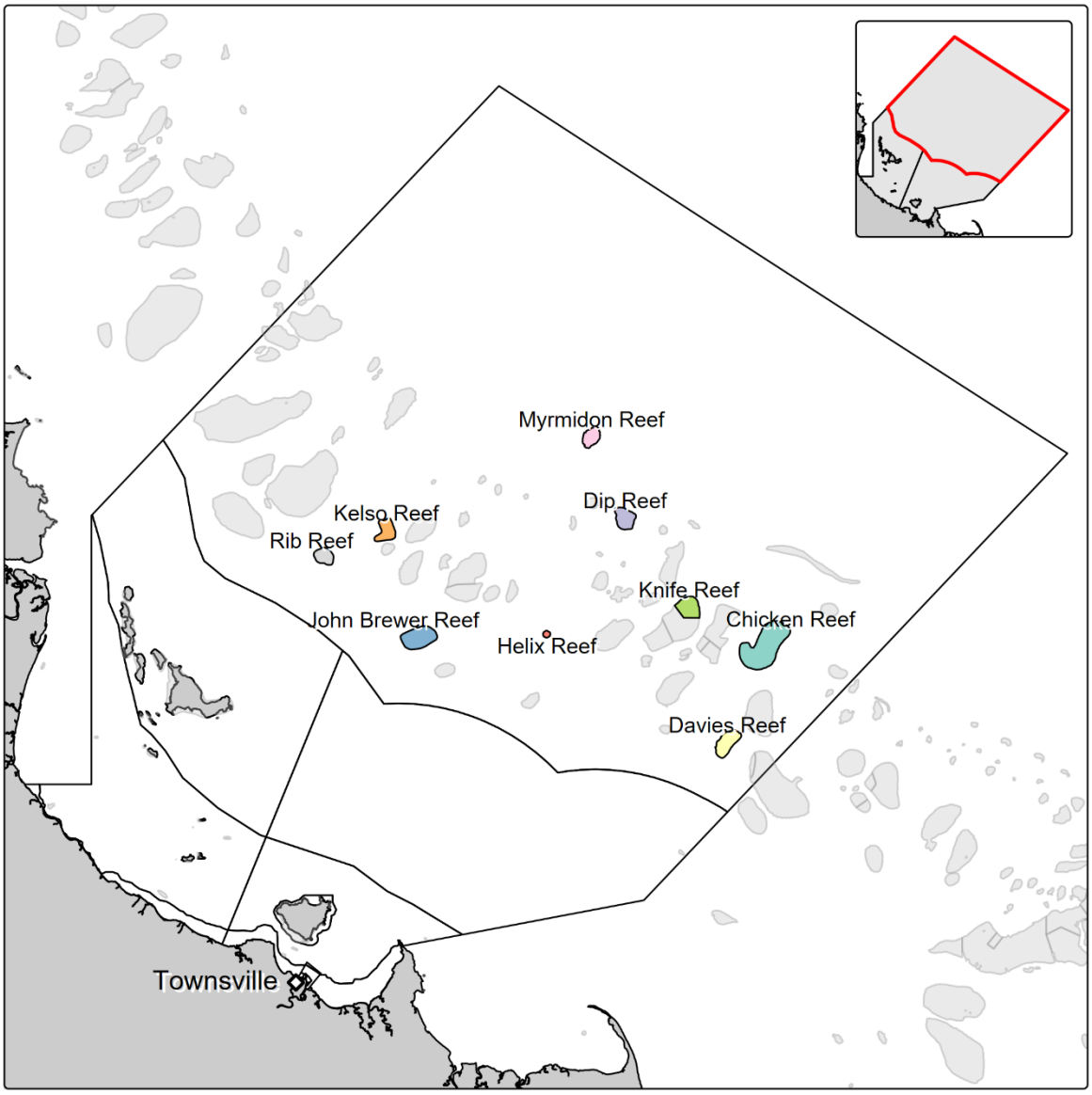

Figure 2. Offshore marine coral sampling locations in the Dry Tropics region.

7.2.2.2 *Result: Offshore Coral*

In the Offshore Marine Zone, the coral indicator category is comprised of three indicators: change in coral cover, percentage of coral cover, and juvenile density. Based on the combined scores of these indicators overall offshore coral index score remained good with grades at all reefs being in either moderate or good condition (Table 76). Contributing strongly to the good coral index score were high numbers of juvenile corals with scores for the Juvenile density indicator remaining good or very good at all reefs. In contrast, both the Change in Coral Cover, and Percentage of Coral Cover indicators showed greater variability, with grades ranging from "poor" to "good". Notably, John Brewer Reef is now showing signs of recovery from a recent crown-of-thorns starfish outbreak[1]. It should be noted that the coral data is assessed at fixed sites which may be on the leeward side of some sites (i.e.

[1] Reef Monitoring | John Brewer Reef | Benthic community cover (aims.gov.au)

protected from some swell and wind directions) and thus scores might not demonstrate the impact of severe disturbances such as TC Kirrily. Monitoring from different programs for the entire reef site are available on the Reef Monitoring Dashboard.

Fluctuation in coral cover is expected as reefs are exposed to severe disturbances; of concern is the slower recovery suggested by poor scores from the Cover change indicator at Davies and Helix. However, the moderate to good cover change scores at other reefs demonstrate ongoing recovery potential (Table 76).

Table 3. Coral indicator and indicator category scores for the Offshore Marine Zone.

Reef	Change in Coral Cover	% Coral Cover	Juvenile Density	Standardised Score (Grade)
Chicken Reef	54	67	100	74
Davies Reef	39	53	100	64
Dip Reef	61	41	69	57
Helix Reef	27	40	97	55
John Brewer Reef	51	23	78	51
Kelso Reef	45	35	100	60
Knife Reef	66	62	100	76
Myrmidon Reef	43	58	100	67
Rib Reef	74	38	100	71
Offshore Marine Zone	51	46	94	64

Standardised scoring range: ■ Very Poor (E) = 0 to <21 | ■ Poor (D) = 21 to <41 | ■ Moderate (C) = 41 to <61 | ■ Good (B) = 61 to <81 | ■ Very Good (A) = 81 – 100 | ND = No Data | NA = Not Applicable (data available but not usable) | X = Data was not updated this year.

7.2.3 Confidence Scores

The overall confidence of the coral indicator category was high with a rank of 4 out of 5. Only Representativeness and Measured Error were not given 3/3 as some components of the indicator do not have their error quantified, and there are several reefs that are not part of the LTMP surveys.

Table 4. Confidence scores for the coral and seagrass indicator categories.

Indicator Category	Maturity (x0.36)	Validation (x0.71)	Representativeness (x2)	Directness (x0.71)	Measured error (x0.71)	Score (Rank)
Coral	3	3	2	3	2	10.8 (4)

Rank based on score: 1 (very low) = 4.5 to 6.3; | 2 (low) = >6.3 to 8.1; | 3 (moderate) = >8.1 to 9.9; | 4 (high) = >9.9 to 11.7; | 5 (very high) = >11.7 to 13.5.