



Dry Tropics Partnership for Healthy Waters
Waterways Report Card 2023

TECHNICAL REPORT

PART 6: Offshore Marine Results

Reporting on data collected 2021 - 2022



13 Offshore Marine Environment

The Offshore Marine Environment in the Dry Tropics region consists of only one zone (the Offshore Marine Zone). In this zone water quality, and habitat and hydrology indices are reported. The extent of the zone is shown in Figure 12, and results are presented below.

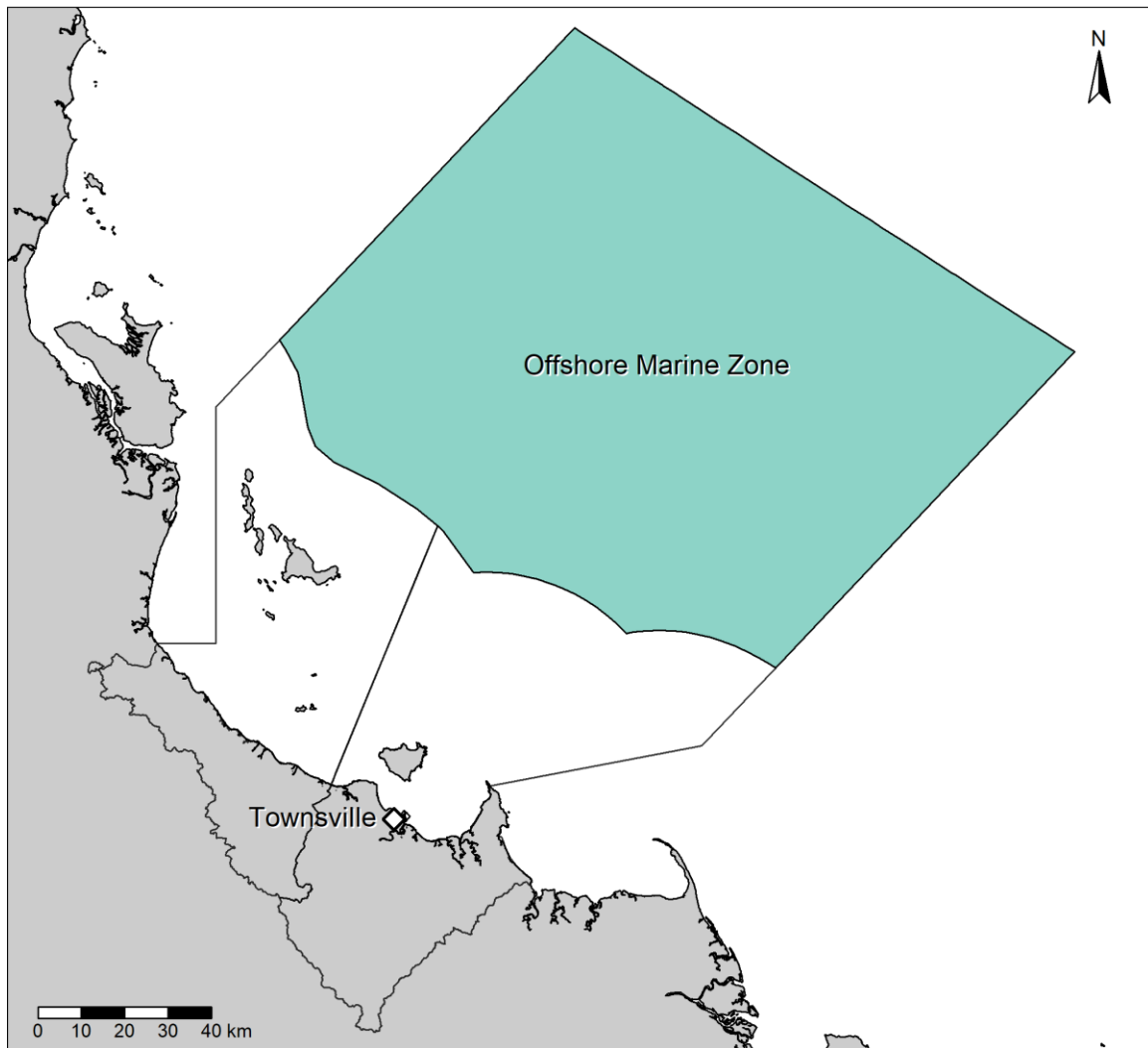


Figure 12. Dry Tropics offshore marine zone.

13.1 Water Quality

The 2021–2022 reporting period was the second year with no water quality monitoring program in place to allow for reporting on offshore water quality. 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 67). The scores were similar for all reporting years.

Table 67. Current and previous water quality scores and grades for the Dry Tropics Offshore Marine Zone.

Zone	Water Quality			
	2021–2022	2020–2021	2019–2020	2018–2019
Offshore Marine	NA	NA	100	97

Standardised scoring range: ■ = Very Poor: 0 to <21 | ■ = Poor: 21 to <41 | ■ = Moderate: 41 to <61 | ■ = Good: 61 to <81 | ■ = Very Good: 81 to 100.

During 2019–2020 there were limitations in the technical support for maintaining the MWQ processing scripts and satellite data streams. Consequently, the more recent data for the 2019–2020 time series may be of lower quality than earlier time series data and the confidence criteria for validation was lowered from 2 to 1. In early 2021 the Bureau of Meteorology advised that the MWQ dashboard had been decommissioned and that the underlying data preparation workflow was being discontinued. Alternative data sources are to be identified for reporting offshore water quality as from the 2022–2023 reporting year.

13.2 Habitat

The habitat and hydrology index for the Offshore Marine Zone of the Dry Tropic region consists only of the coral indicator category and is therefore referred to throughout as the habitat index. The coral indicator category sources its results from AIMS’ Long-Term Monitoring Program (LTMP). In the Dry Tropics region this data is updated every year with the most recent update occurring in 2022 (publication of 2021–2022 data).

13.2.1 Overall Summary: Offshore Habitat

Overall, the habitat index in the Offshore Marine Zone received its highest score in the past four reporting periods of 64. This is slightly higher than the previous report period of 62, and higher than the 2019–2020 and 2018–2019 reporting periods of 54 and 59. These results show the continued recovery of coral health in the Offshore Marine Zone after several years of disturbances (Table 68).

Table 68. Standardised score for the Offshore Marine Zone habitat index.

Zone	Coral	Habitat Index			
		2021–2022	2020–2021	2019–2020	2018–2019
Offshore Marine Zone	64	64	62	54	59

Coral Standardised scoring range: ■ = Very Poor: 0 to <21 | ■ = Poor: 21 to <41 | ■ = Moderate: 41 to <61 | ■ = Good: 61 to <81 | ■ = Very Good: 81 to 100.

13.2.1.1 Key Messages

- The habitat index received its highest score in the past four years of 64.
- Coral continues to recover from moderate conditions in the previous reporting periods.
- Juvenile density was graded as very good at 8 of 9 reefs surveyed.
- All coral reefs had an overall grade of moderate or good.

13.2.2 Coral

Coral data within the Dry Tropics Offshore Marine Zone was primarily collected by the Australian Institute of Marine Science’s LTMP. The LTMP is an annual survey conducted by AIMS and over its 35+ year history the program has surveyed more than 490 reefs. In previous reporting years additional coral monitoring has been conducted by Reef Check Australia (RCA), however no additional sampling occurred during 2021–2022 due to a limited budget. Coral was monitored between Feb 2022 and Mar 2022. In the Offshore Marine Zone, the coral indicator category is comprised of three indicators that make up the final score for each sample location. These three indicators are change in coral cover, percentage of coral cover, and juvenile density.

13.2.2.1 Monitoring Sites

The coral indicator category was monitored at nine locations in the Offshore Marine Zone of the Dry Tropics region. All sites were monitored as part of the LTMP, and all sites monitored for the 2021–2022 reporting period were monitored in previous report periods. However, it should be noted that some reefs that were sampled in previous report periods are no longer part of the LTMP sampling design (Page 70., Appendix III).

13.2.2.2 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. Across the nine reefs surveys these indicators ranged from very poor to very good, and the overall coral indicator score for each reef ranged from moderate to good. The change in coral cover indicator was moderate for six of nine reefs, poor at Davies Reef, and good at Knife Reef and Rib Reef. Interestingly the percentage of coral cover was moderate at only four reefs (including Davies Reef), however was poor or very poor at three reefs – including Rib Reef. The percentage of coral cover was good at Chicken Reef and Knife Reef. The juvenile density was good at John Brewer Reef and very good at all other reefs. The combination of these indicators suggests that most coral reefs are either in good condition or show clear signs of recovery (Table 69).

Table 69. 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	53	70	100	74
Davies Reef	35	55	100	63
Dip Reef	48	47	100	65
Helix Reef	48	43	100	63
John Brewer Reef	51	17	74	47
Kelso Reef	45	37	100	60
Knife Reef	66	70	100	78
Myrmidon Reef	41	58	100	66
Rib Reef	61	20	100	60
Offshore Marine Zone	49	46	97	64

Standardised scoring range: ■ = Very Poor: 0 to <21 | ■ = Poor: 21 to <41 | ■ = Moderate: 41 to <61 | ■ = Good: 61 to <81 | ■ = Very Good: 81 to 100.

13.2.2.3 Back Calculated Scores

The LTMP updated the sampling design for 2021–22 onwards. For the Dry Tropics region, the LTMP previously included 16 reefs with a subset monitored in alternating years. The updated sampling design has reduced the number of surveyed reefs to nine and conducts surveys at all reefs every year. Details of the changes to the reefs that are surveyed are presented in the methods technical report. Whilst this change reduces the number of reefs monitored it has the distinct advantage of increasing the frequency of sampling from a two-year to one-year cycle. The previous design involved rolling scores forward for reefs not sampled in a given year and meant that there was a lag in the condition assessment for reefs not surveyed for the reporting year.

As the number of coral sites sampled for the 2021–2022 technical report has been updated, results in previous technical reports have been superseded. Previous results have been back calculated and updated in Table 68. Results for previous years prior to back calculation can be found in Appendix JJJ. The update had limited impact on the final results, only changing the 2019–2020 score: from 56 down to 54.

13.2.3 Confidence Scores

The overall confidence of the coral indicator category was high with a rank of 4 out of 5. Across Offshore Marine Zone, the coral indicator received a maturity score of 3, Validation and directness both received a 3 as extensive on ground validation and direct measurement of corals occurs, however measured error received a 1 as some components of the indicator do not have their error quantified. Finally, the representativeness component of the coral indicator category was 2 as there are several reefs that are not part of the LTMP surveys.

Table 70. 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.