




# Technical Report: Coral Bleaching at the Great Barrier Reef — Status Assessment and Recommendations for Action 2025

Results from the 2025 mass bleaching event and urgent conservation actions

*"2025 marked the fifth mass bleaching event within eight years — a stark reminder of the accelerating crisis facing the Great Barrier Reef."*

— Dr. Lisa Chen, AIMS

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## Chapter 1

### Introduction: The Great Barrier Reef in Crisis

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- The Great Barrier Reef (GBR) is the world's largest coral reef system, spanning 2,300 km along Australia's northeastern coast.
- Home to over 3,000 individual reefs, the GBR supports unparalleled biodiversity and provides critical ecosystem services.
- 2025 marked the fifth mass bleaching event in eight years, signaling an accelerating decline due to climate change and local stressors.
- This report assesses the 2025 bleaching event, evaluates coral coverage trends, and outlines urgent conservation measures.

## Chapter 2

### Methodology: Data Collection and Analysis

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- Aerial surveys (CoralWatch): 1,064 transects across the GBR to assess bleaching intensity on a 5-point scale (0 = no bleaching, 4 = full mortality).
- Underwater video analysis: 108 dive stations to measure coral coverage and species composition.
- Satellite remote sensing: NOAA Coral Reef Watch and Sentinel-2 data for sea surface temperature (SST) and Degree Heating Weeks (DHW).
- Geographic coverage: Four sectors (Northern, Central-North, Central-South, Southern) spanning the entire 2,300 km of the GBR.

### Chapter 3

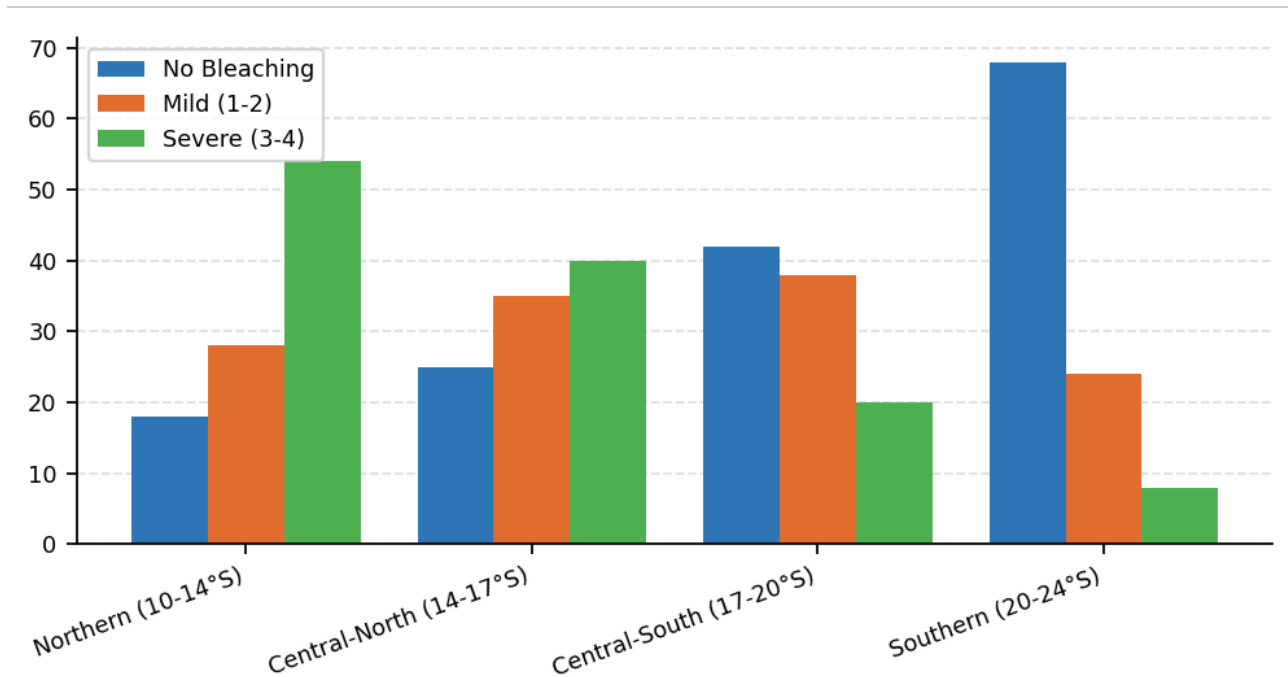
## Bleaching Intensity by Geographic Sector (Aerial Survey: February/March 2025)

Sector	Reef Sections	No Bleaching	Mild (1-2)	Severe (3-4)	Mortality (%)
Northern (10-14°S)	312	18%	28%	54%	38%
Central-North (14-17°S)	284	25%	35%	40%	24%
Central-South (17-20°S)	246	42%	38%	20%	12%
Southern (20-24°S)	222	68%	24%	8%	4%
Total GBR	1,064	38%	31%	31%	19%

*Bleaching intensity and coral mortality vary significantly by sector, with the Northern sector experiencing the highest severity (54% severe bleaching, 38% mortality). The Southern sector shows the least impact, reflecting spatial heterogeneity in heat stress.*

## Chapter 4

### Bleaching Severity Across GBR Sectors (2025)



The bar chart visualizes the proportion of reef sections in each bleaching category by sector. The Northern sector shows the highest proportion of severe bleaching, while the Southern sector remains relatively unaffected.

## Chapter 5

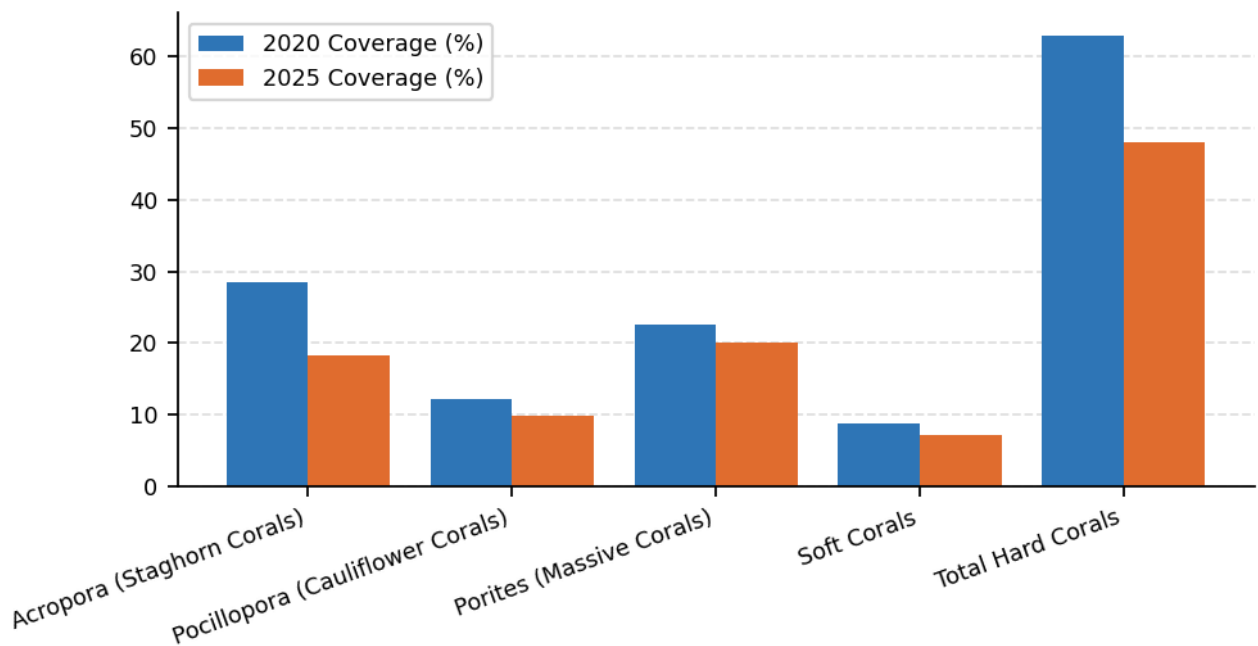
### Coral Coverage by Major Groups (Underwater Transects, 108 Stations)

Coral Group	Coverage 2020 (%)	Coverage 2025 (%)	Change	Regeneration Rate
Acropora (Staghorn Corals)	28.4	18.2	-36%	Low (5-8 years)
Pocillopora (Cauliflower Corals)	12.1	9.8	-19%	Medium (3-5 years)
Porites (Massive Corals)	22.5	20.1	-11%	High (resistant)
Soft Corals	8.7	7.2	-17%	Medium (2-4 years)
Total Hard Corals	63.0	48.1	-24%	—

Coral coverage declined across all major groups between 2020 and 2025, with *Acropora* (staghorn corals) experiencing the most significant loss (-36%). *Porites* (massive corals) showed the greatest resilience, with only an 11% reduction.

## Chapter 6

### Decline in Coral Coverage (2020 vs. 2025)



The bar chart compares coral coverage in 2020 and 2025, highlighting the significant decline across all groups, particularly for *Acropora* and total hard corals.

Chapter 7

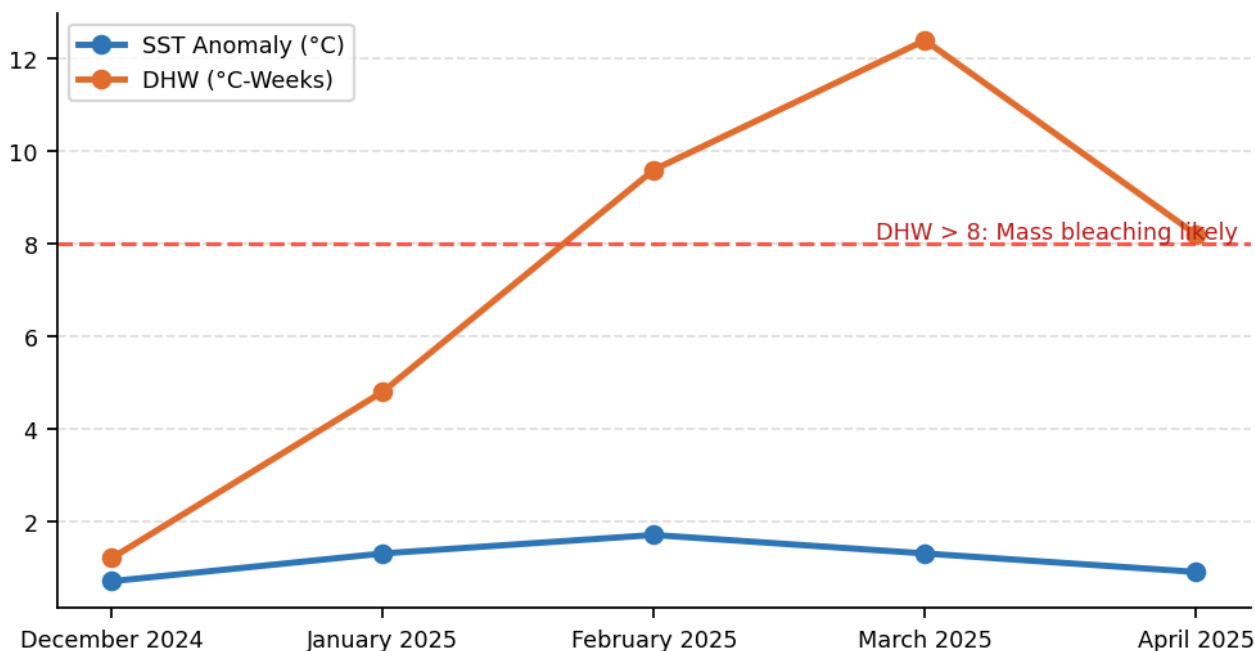
**Sea Surface Temperatures (SST) and Degree Heating Weeks (DHW) — Northern Sector**

Month	Mean SST 2025 (°C)	Long-Term Average (°C)	Anomaly (°C)	DHW (°C-Weeks)
December 2024	28.2	27.5	+0.7	1.2
January 2025	29.4	28.1	+1.3	4.8
February 2025	30.1	28.4	+1.7	9.6
March 2025	29.5	28.2	+1.3	12.4
April 2025	28.3	27.4	+0.9	8.2

*Sea surface temperatures in the Northern sector exceeded long-term averages by up to 1.7°C in February 2025, resulting in a peak DHW of 12.4°C-weeks. DHW values above 8°C-weeks are associated with a high likelihood of mass bleaching.*

## Chapter 8

### Degree Heating Weeks (DHW) and Sea Surface Temperature Anomalies (Northern Sector, 2025)



The line chart shows the progression of SST anomalies and DHW in the Northern sector during the 2025 bleaching event. DHW values exceeded the critical threshold of 8°C-weeks from February to April.

## Chapter 9

### Critical Statistics: 2025 Bleaching Event

**62%**

of surveyed reef sections affected by bleaching

- Highest mortality rate: 38% in the Northern sector (Hartcorals).
- Average sea surface temperature (Feb/Mar 2025): 29.8°C (+1.4°C above long-term average).

- Peak Degree Heating Weeks (DHW): 12.4°C-weeks in the Northern sector.
- Total hard coral coverage declined by 24% since 2020.

## Chapter 10

### Conclusion: Urgent Action to Protect the GBR

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1. The 2025 mass bleaching event affected 62% of surveyed reef sections, with the Northern sector experiencing the highest mortality (38%).
2. Coral coverage declined by 24% since 2020, with *Acropora* corals suffering the most significant losses (-36%).
3. Sea surface temperatures in 2025 were 1.4°C above the long-term average, driving heat stress (DHW > 8°C-weeks) and bleaching.
4. Immediate action is required to expand marine protected areas, reduce sediment runoff, and scale up restoration efforts.
5. Long-term survival of the GBR depends on global climate action and innovative conservation strategies.

## References

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- [1] Hughes, T.P. et al. (2024): Recurring mass bleaching and the future of coral reefs. *Nature* 628, 345-351.
- [2] AIMS (2025): Long-Term Monitoring Program — Annual Summary Report 2025. AIMS Technical Report.