

Statement from The Australian Institute of Marine Science:

1. Is it possible that the threat to the Reef has been overstated?

No. Climate change remains the greatest threat to the Great Barrier Reef and reefs globally. Climate change is driving coral bleaching events that are increasing in frequency and strength, leading to shortened windows for recovery. This means that recent gains in coral cover can be lost in a short amount of time. Coral bleaching is a stress response driven primarily by increased water temperatures. Prior to 1998, mass bleaching events were unheard of and since then we have had seven events on the GBR and four globally. The frequency of these events has increased substantially in the last decade, and they are now occurring every two years. In 2021, the **Global Coral Reef Monitoring Network reported that 14% of the world's corals had died** since 2009 – equating to 11,700km² of coral – and marine heat waves were driving this loss. The 2016/17 bleaching events on the Great Barrier Reef caused mortality, a reduction in reproduction and numbers of larvae settling on reefs, and a shift in the make-up of coral species on the Reef, particularly in the northern and central regions. Our annual report on coral cover on the Great Barrier Reef recently recorded regional highs in coral cover in two of the three regions of the Great Barrier Reef. What anyone writing or broadcasting in the media about these results needs to explain and emphasise is that most of the data contributing to the finding this year was collected in routine underwater surveys before and during the mass bleaching event, which was one of the most serious and extensive on record in terms of exposure to heat stress and recorded levels of bleaching. Bleached coral, while very stressed, is still alive and so it is counted as coral cover in our surveys. Some coral species can remain bleached for many weeks and even months before surviving or **dying. For these reasons, we don't yet know the full impact of the 2024 mass bleaching event.** The field season for our Long-Term Monitoring Program has already commenced and a full assessment will be complete by mid-2025.

2. If the threat to the Reef from bleaching and climate change is so grave, why is the coral cover at record or near record levels?

The recent increases in hard coral cover in the Central and Northern regions to regional highs is encouraging and due in part to a period between 2018 and 2022 free of disturbances causing corals to die in these regions. The 2020 and 2022 bleaching events were significant in terms of exposure to and spatial

extent of heat stress but did not generally reach the levels where widespread mortality is expected (>8degree heating weeks). This conflux of events, including a period of low mortality coupled with the growth strategy of corals meant that vast tracts of the GBR underwent rapid expansion in coral cover simultaneously. Previously, the GBR has been impacted by smaller scale sub-regional disturbances, such as cyclones or crown-of-thorn starfish outbreaks which partly offset the recovery in other areas – such smaller scale disturbances causing regional mortality also did not occur during this recent period. This period of lower stress has seen many corals proliferating and covering the Reef, which is an encouraging sign of resilience at current levels of global temperature increase and is driving some of the coral cover **increases we've seen. But as disturbance events continue to increase in their frequency and severity under a warming climate, they are unlikely to get enough recovery time. It takes decades for a coral community to recover a full complement of species, including fast-growing pioneers and slower-growing, most robust reef builders. Evidence shows that climate change is driving a system where it is increasingly unlikely for long enough intervals for recovery to be available. Also, to reiterate the first answer, the coral cover information we collected in our field surveys for the 2023-24 period reflects the Reef before and during the mass bleaching event. Our next field season, which has just begun, will provide more information about how many corals have survived or died during the latest mass bleaching event. Just because coral cover is at such high levels (which is good news) doesn't lessen the threat from climate change. What the current high coral cover shows is that at present the Reef is still an intact ecosystem capable of recovery from disturbance events, but such resilience is not guaranteed in the future as temperatures increase.**

3. Do any reef scientists share Peter Ridd's opinion that the Reef is NOT currently in danger or that the threat has been exaggerated?

AIMS does not exaggerate the threats to or the condition of the Reef. While **AIMS can't speak for all reef scientists, our position is that the Great Barrier Reef is threatened by climate change. Each year it is at increased risk with climate change warming the oceans and driving more frequent and severe bleaching events, which have potentially destructive consequences for coral reefs. The increased frequency of these bleaching events means the Reef has less time to recover. This finding is backed up by data from our long-term monitoring of the ecosystem, and our peer reviewed research. This is also the finding in the vast majority of the peer-reviewed scientific literature on the topic. Detailed predictions about the future are difficult because what the Reef is experiencing now is unprecedented in our 38 years of monitoring. It's a**

dynamic and complex system and its response to disturbance events is variable and something that we are learning about all the time. Up until 14 years ago, coral cover in all three regions was fairly stable with small increases and decreases in coral cover in each region each year. However, in the last 14 years, we have seen substantial oscillations in coral cover in all three regions. The reefs of the GBR have experienced large declines and recovery: with the lowest level of cover in 2012 (central and southern) and 2017 (northern) and the highest levels reached this year (in the northern and central regions before the mass coral bleaching in March). While these **regional increases in coral cover are encouraging, showing the Reef's capacity** for recovery, climate change and other disturbances mean this recovery is fragile and Reef resilience is not limitless. The five mass bleaching events we have seen on the Reef since 2016 have happened at around 1.1°C of global warming. This frequency and intensity of bleaching events is unprecedented and is only forecast to escalate under climate change, alongside other persistent threats such as cyclones and crown-of-thorns starfish. We are only ever one large scale disturbance event away from a reversal of the recent recovery. The 2024 bleaching event could be that event – almost half of the 3000 or so reefs that make up the marine park experienced more heat stress than ever recorded.

4. What is the public to make of this disagreement?

We understand that the contradictory scientific discourse around the Reef may be confusing for the public, and that is regrettable. From our own research, and that found in the vast majority of the peer-reviewed scientific literature, climate change and the disturbance events it is driving are the biggest threat to coral reef ecosystems globally, and that includes the Great Barrier Reef. At AIMS, we strive to ensure our data and research provides the Australian public, managers, policy makers, other scientists and stakeholders with the most up-to-date and scientifically robust information about the Great Barrier Reef as possible. We regularly publish in scientific journals that are rigorously peer reviewed and collaborate with many scientists with decades of experience of researching the Reef. We welcome the opportunity to help the Australian public understand our vast and complex national icon better. The high levels of hard coral cover are undoubtedly good news, but using this one data point to conclude there is no threat to coral reefs from climate change, and that the impacts of bleaching are exaggerated by scientists, ignores other data collected by AIMS, and the vast body of data collected globally by coral reef and climate scientists.

5. How long can the Reef keep on bouncing back from these mass coral bleaching events? Is it possible it could do so for ever?

We don't know – it's the million-dollar question. But we suspect that the resilience of the Reef has limits, which will be severely tested moving forward under a warming climate. We do know full reef recovery takes time, for example decades, and we also know that disturbance frequency is increasing allowing less time for recovery between events. The prognosis under climate change is that the intensity and frequency of disturbance events will continue to increase.

6. Is 'record coral cover' proof that the Reef is in good health?

It shows that the reef is currently in good condition and can recover from disturbances which is good news, but we would caution that it is only one metric of reef condition that tells us nothing of diversity, the make-up of species on reefs, and processes such as reproduction. Some of the increases were driven by types of corals that are fast growing, but also susceptible to future disturbances. These results were collected before and during the latest mass bleaching event, so they come with a note of caution as we do not yet **know the full impact of this summer's bleaching on coral survivorship/mortality.**