

Corals face historic bleaching

The stark white skeletons of the coral shown here in Australia's Great Barrier Reef were photographed earlier this year by University of Queensland biologist Ove Hoegh-Guldberg. Coral should be colorful: They harbor single-celled, brown microalgae that provide energy for coral and pigments for their distinctive hues. If water rapidly warms, the photosynthetic microalgae generate reactive oxygen species that are toxic to coral, which then expel the microalgae from the reef. The result is mass bleaching and degradation of the reef's ecosystem. Since 2016, five of the Southern Hemisphere's summers have been hot enough to trigger major bleaching events on the Great Barrier Reef.

Bleached coral, however, is not dead. If the water cools, the symbiotic microalgae can move back in, and the coral can recover. But if the temperature stays too high for too long, the entire Great Barrier Reef could be destroyed. When Benjamin Henley of the University of Melbourne, Hoegh-Guldberg, and colleagues analyzed the reconstructed average sea-surface temperature of the Great Barrier Reef over the past 400 years, they found periods with warm water temperatures that might have caused bleaching. But none are hotter than today's temperatures, which their models show are possible only because of anthropogenic climate change. With urgent human intervention, the researchers say, future losses to the Great Barrier Reef could be avoided. (B. J. Henley et al., *Nature* **632**, 320, 2024; image courtesy of Ove Hoegh-Guldberg.)

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