# How Acidification is Killing the Great Barrier Reef

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#### What is the Problem?

- Coral reefs are being bleached and rising acidification worsens this
- The great barrier reef has already declined and more dies off each year (3)
- 90% of all coral reefs will be affected by 2055 (5)



Source Figure A: Elnar, A., Cena, C., Bernido, C., & Carpio-Bernido, M. (2021). Great Barrier Reef degradation, sea surface temperatures, and atmospheric CO2 levels collectively exhibit a stochastic process with memory. Climate Dynamics, 57(9-10), 2701-2711.

Source Figure B: CSIRO. (2018). Oceans. State of the Climate 2018. Retrieved April 16, 2022, from https://www.csiro.au/en/research/environmental-impacts/climate-change/state-of-the-climate/pre vious/state-of-the-climate-2018/oceans

## What is Acidification?

- Acidification occurs when atmospheric CO<sup>2</sup> is absorbed into the ocean (1)
- Rising CO<sup>2</sup> levels cause the water to become more acidic and higher temperature (4)
- Rising acidity causes many issues in the ocean, not exclusively coral



Source: Feely, R., Doney, S., & Cooley, S. (2009). Ocean Acidification. Oceanography (Washington, D.C.), 22(4), 36-47.

# How does acidification affect Coral in the Great Barrier Reef?

- Rising acidity worsens coral bleaching
- Lowers aragonite concentration in waters, preventing growth (3)
- Causes decline of calcification rates (6)
- Will result in the decimation of coral reefs around the world (5)



Source: Kleypas, J.A., R.A. Feely, V.J. Fabry, C. Langdon, C.L. Sabine, and L.L. Robbins, 2006. Impacts of Ocean Acidification on Coral Reefs and Other Marine Calcifiers: A Guide for Future Research, report of a workshop held 18–20 April 2005, St. Petersburg, FL, sponsored by NSF, NOAA, and the U.S. Geological Survey, 88 pp

## What does the Future Hold for the Great Barrier Reef?

- If nothing is done, the Great Barrier Reef will die out
- Half of the reef is already bleached
- Natural processes compound with acidification to harm the great barrier reef even more (2)
- So long as water Ph continues to decrease, the Great Barrier reef will continue to decline



Source: Butler, R. A. (2005, November 17). Coral reefs decimated by 2050, Great Barrier Reef's coral 95% dead. Mongabay Environmental News. Retrieved April 16, 2022, from

https://news.mongabay.com/2005/11/coral-reefs-decimated-by-2050-g reat-barrier-reefs-coral-95-dead/

# Takeaways

- Acidification is a major threat
- Carbon emissions must be reduced
- Clean energy technology must advance quickly
- Conservation efforts should be increased



Source: Telesur. (2017, November 16). Climate change threatens 1 in 4 natural heritage sites. Progreso Weekly. Retrieved April 17, 2022, from https://progresoweekly.us/climate-change-threatens-1-4-natural-heritage-sites/

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