

Coral disease outbreaks linked to cooler temperatures

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For the first time, scientists have linked mild water temperatures during the preceding winter period with outbreaks of coral diseases on Australia's Great Barrier Reef. By studying satellite measurements of unusual sea surface temperatures, the international team of scientists also examined the magnitude of stress upon corals from unusually warm temperatures, particularly in summer, and confirmed a strong relationship with coral disease outbreaks.

The [study](#), a collaboration between scientists from NOAA, the Australian Research Council Centre of Excellence for Coral Reef Studies, James Cook University and the Australian Institute of Marine Science, was published Aug. 17 in [PLoS ONE](#), an international, peer-reviewed, open-access, online publication.

“Previous studies examined the relationship between warm conditions throughout the year and the likelihood of disease,” said Scott Heron, Ph.D., physical scientist with NOAA’s Coral Reef Watch. “We considered the influence of summer and winter separately, taking into account both cold and warm stress, to find that winter temperatures are just as important as summer stress in determining the susceptibility of corals to disease outbreaks.”

The decline and loss of [coral reefs](#) has significant social, cultural, economic and ecological impacts on people and communities in Australia, the United States and throughout the world. As the “rainforests of the sea,” coral reefs provide services estimated to be

worth as much as \$375 billion each year.

“Satellite monitoring of [sea surface temperature](#) has been useful in predicting coral bleaching,” said C. Mark Eakin, Ph.D., coordinator of NOAA’s Coral Reef Watch. “Now we’ve used [satellite measurements](#) to find links between disease and temperature stress. Our new product should allow us to predict the risk of potential disease outbreaks in Australia, providing reef managers with vital information and enabling rapid management response. We look forward to expanding it to other areas as well.”

Advanced warning will not stop coral disease or bleaching, but will give managers time to reduce human-use stressors like diving, swimming, fishing and boating. The paper also describes the analysis that underpins a new experimental Coral Disease Outbreak Risk Map product, available [online](#). This regional product provides a seasonal outlook based on winter metrics and an outbreak risk assessment updated in near-real-time during summer for the [Great Barrier Reef](#). Ongoing work will soon expand it to the Hawaiian archipelago.

“Predictive satellite tools for forecasting disease outbreaks are an important step forward because they enable us to focus our research efforts on vulnerable reefs and thereby continue increasing our understanding of environmental factors that lead to disease outbreaks,” said Bette Willis, a chief investigator in the ARC CoE for Coral Reef Studies.

Some outbreaks of coral disease have been observed following bleaching events when the resistance of corals is reduced. Severe coral bleaching has been reported throughout Southeast Asia, the Indian Ocean and the Pacific since May.

NOAA Coral Reef Watch is currently predicting a high potential for

bleaching throughout the Caribbean this year. NOAA also recently reported that the combined global land and ocean surface temperature made this past July the second warmest on record and the warmest averaged January-July on record. This warming is expected to increase the incidents of coral bleaching worldwide.

Provided by NOAA

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