

NOAA Coral Reef Watch's Probabilistic Seasonal Prediction of Shallow-Water Coral Bleaching Thermal Stress for Informing Management Decisions

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Abstract

The U.S. National Oceanic and Atmospheric Administration's (NOAA) Coral Reef Watch (CRW) operates a global seasonal-scale coral bleaching thermal stress outlook system for shallow-water coral reef ecosystems, in collaboration with NOAA's National Centers for Environment Prediction (NCEP). Coral bleaching risk outlooks are based on sea surface temperature (SST) predictions from NCEP's operational Climate Forecast System Version 2 (CFSv2). Every week, the outlook system predicts the probability of thermal stress capable of causing mass coral bleaching for several months in advance (current online products are ordinarily released out to four months), derived from 28 ensemble runs of the CFSv2 SST over the previous week. This outlook system has been providing critical warning to the coral reef communities since 2012 – especially important during the ongoing global coral bleaching event that started in mid-2014 and is predicted to last at least through this year. CRW's near-real-time satellite monitoring estimates that 36% of the world's coral reefs have been affected and nearly all reefs have experienced thermal stress during the ongoing multi-year global event. This coral bleaching outlook is a critical early warning tool in CRW's global decision support system for coral bleaching management and helps managers and other stakeholders prepare for and respond to environmental stresses to coral reefs, during ongoing and accelerating rapid climate change.

Keywords: coral reef, coral bleaching, outlook, risk, stress, sea surface temperature, Coral Reef Watch

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