

NEW RESEARCH TO MAP REEF CHANGES AND INFORM CORAL RESTORATION IN HAWAI`I

INTRODUCTION

Coral reefs around the world are increasingly impacted by rising ocean temperatures, pollution and overfishing. In Hawai`i, the state has committed to protecting 30% of their ocean habitats by 2030 under the state's Marine 30-by-30 Initiative, which will expand coral reef conservation and restoration efforts. Hawai`i's Division of Aquatic Resources (DAR) is currently working with communities and scientists to understand where these efforts can be most successful.

In order to make these decisions across the state, managers will need to better understand reef conditions at large spatial scales, such as the amount of live and dead coral and algal cover at reef sites. The Lenfest Ocean Program is supporting Dr. Greg Asner, Director of Arizona State University's (ASU) Center for Global Discovery and Conservation Science, to measure changing reef conditions in Hawai`i following an acute bleaching event caused by a marine heatwave in 2019.

HOW LARGE-SCALE SPATIAL MAPPING CAN HELP RESEARCHERS UNDERSTAND REEF CONDITION

Coral reef monitoring is essential for understanding reef condition. However, it can be resource intensive, requiring extensive amounts of time and effort to cover large swaths of reef area. In January 2019, Greg Asner and team utilized the ASU Global Airborne Observatory (GAO) – Dr. Asner's aircraft-based laboratory fitted with high-resolution cameras and spectrometers – to [map coral reefs across all eight Hawaiian Islands](#). This novel technology allowed researchers to "peel back" the overlying seawater and reveal live and dead coral cover at a statewide scale in a much shorter amount of time. The resulting maps helped ground ongoing dialogue between state managers and local communities with robust data and information about the status of Hawai`ian reefs.

Following the collection of that data, a marine heatwave caused a mass bleaching event from August to November throughout Hawai`ian reefs. Bleaching severity varied across islands and the extent of damage and resulting mortality is unknown. In January 2020, Dr. Asner and his team repeated their mapping across six of the main Hawai`ian Islands. While the bleaching event set back state efforts, it does provide a unique opportunity to study reef change. Large-scale spatial data comparing reefs before and after bleaching is uncommon. Such an analysis could help researchers understand the damage and dynamics related to reef recovery and resilience.

RESEARCH APPROACH

In this project, Dr. Asner and team will analyze and compare the data they collected from airborne surveys in 2019 and 2020 to understand the extent of coral survival and loss across Hawai'i from the marine heatwave. They will then produce maps from those two years showing changes to live and dead coral and macroalgal cover.

Informing Management Decisions

Researchers will work closely with DAR to develop a reef restoration decision-support analysis (DSA) based on the data from the 2019 and 2020 mapping surveys, the analysis of reef change, and existing data on other important factors (e.g., sea surface temperature, ocean turbidity, neighboring land use). Using the DSA, state decision-makers could evaluate what reef stressor(s) have the greatest impact in different areas, and where restoration might be most tractable and successful from ecological, economic, and social standpoints.

Promoting Transparency and Stakeholder Collaboration

Dr. Asner and team will work closely with a range of key partners, including the National Oceanic and Atmospheric Administration (NOAA), The Nature Conservancy, DAR, and local communities to ensure the analyses and maps are available and disseminated widely in Hawai'i to inform decisions related to the Marine 30-by-30 process and reef restoration efforts. Additionally, all maps will be made publicly available online and promoted via numerous traditional and social media networks.

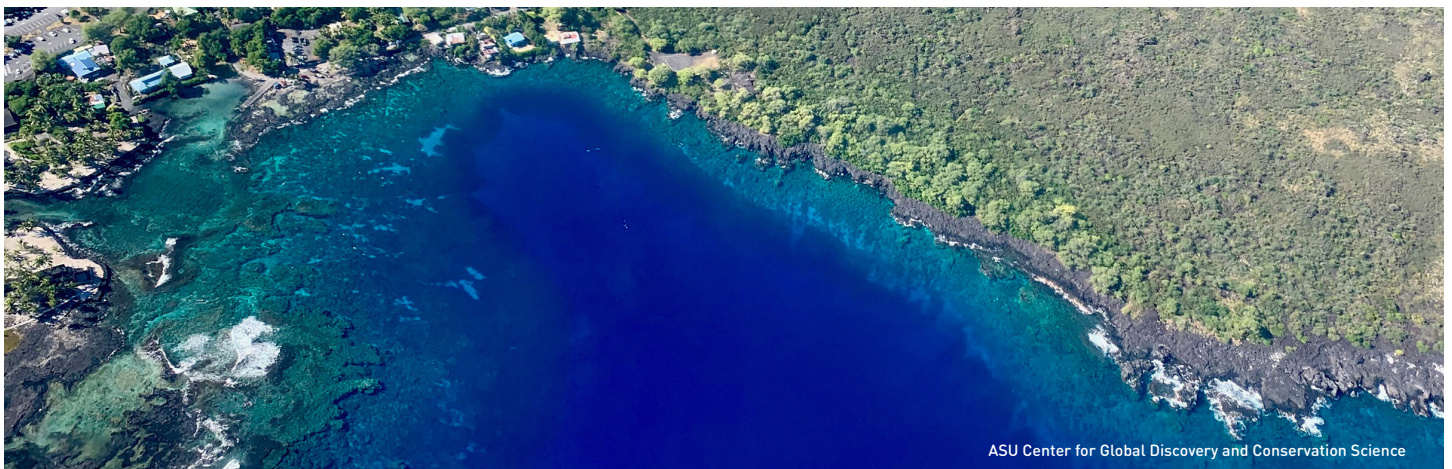
The project started in September 2020 and will span one year.

CONTACT

For questions, please contact Emily Knight, Lenfest Ocean Program, at eknight@lenfestocean.org. To learn more about this research and stay up to date on our latest projects, follow us on Twitter at [@lenfestocean](https://twitter.com/lenfestocean) or sign up for our newsletter at www.lenfestocean.org.

“ IT'S THIS BASIC INFORMATION THAT IS NEEDED BY PARTNER ORGANIZATIONS TO DRIVE MORE COST-EFFECTIVE PROTECTIONS, RESTORATION ACTIVITIES, & PUBLIC ENGAGEMENT.”

Greg Asner



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