Counts of coral colonies per species along monitoring transects from the Caribbean Coast of Panama in August to September 2021

Website: https://www.bco-dmo.org/dataset/876676
Data Type: Other Field Results
Version: 1
Version Date: 2025-07-21

Project
» Collaborative Research: Biodiversity and resilience of corals and their microbiomes in response to ocean deoxygenation (Coral microbiome resilience)

Contributors	Affiliation	Role
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Abstract
The goal of this survey was to make a catalog of species found at the site, and determine whether they were relatively rare or abundant. Counts of coral colonies per species were made along transects to achieve this goal. Fifty-meter transect tapes were laid at each site at 10, 20, and 40 feet. Each side of the tape was referred to as either 'transect 1' or 'transect 2'. Scuba divers made a visual search for all live corals greater than 5 centimeters, and recorded the number of individuals seen per species up to 10 individuals per species per transect. The search area was 50 x 2 meters for each transect.

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Coverage

Spatial Extent: **N**:9.34 **E**:-82.21 **S**:9.22 **W**:-82.35
Temporal Extent: 2021-08-31 - 2021-09-06

Methods & Sampling

These data are counts of coral colonies along transects at monitoring sites. Each transect was 2x50 meters in length. There were two transects per depth x three depths (10, 20, and 40 feet). Counts were stopped at 10 colonies per transect such that the max number of colonies per transect was 10, even if there were more colonies present on the transect.

BCO-DMO Curation Notes

- Imported original file "Altieri 2021 Species counts 20250718.xlsx" into the BCO-DMO system.

- Renamed fields to comply with BCO-DMO naming conventions.
- Converted Date column to YYYY-MM-DD format.
- Saved the final file as "876676_v1_coral_species_counts.csv".

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Parameters

Parameter	Description	Units
Date	Date of sample collection	unitless
Site	Site of sample collection	unitless
Latitude	Latitude of sample collection	decimal degrees
Longitude	Longitude of sample collection	decimal degrees
Depth_ft	Depth of sample collection in feet	feet
Species	Species identification	unitless
Count_of_individual	Individual coral counts	unitless
Side	Location of sample on transect	unitless

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Instruments

Dataset-specific Instrument Name	scuba divers
Generic Instrument Name	Self-Contained Underwater Breathing Apparatus
Generic Instrument Description	The self-contained underwater breathing apparatus or scuba diving system is the result of technological developments and innovations that began almost 300 years ago. Scuba diving is the most extensively used system for breathing underwater by recreational divers throughout the world and in various forms is also widely used to perform underwater work for military, scientific, and commercial purposes. Reference: https://oceanexplorer.noaa.gov/technology/technical/technical.html

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Project Information

Collaborative Research: Biodiversity and resilience of corals and their microbiomes in response to ocean deoxygenation (Coral microbiome resilience)

Coverage: Caribbean Coast of Panama 9 N 82 W

NSF Award Abstract:
The world's oceans are facing the threat of deoxygenation - events of low dissolved oxygen insufficient for marine life and healthy ecosystems - which is accelerating along with other global crises including climate change and ocean acidification. The pace of these changes can lead to rapid shifts in the structure of marine communities due to changes in the distribution, abundance, and diversity of species. This collaborative project is among the first to examine the consequences of deoxygenation on coral reefs, which are sentinel ecosystems for studying ecological responses to global change because of their importance to human society, sensitivity to stress, and intricate relationships among their inhabitants. Specifically, the research team investigates why and how some coral species are more tolerant than others and the role that bacteria associated with the corals have in such tolerance. This predictive understanding is important to support conservation and management efforts by identifying stress-tolerant coral species and establishing indicators for assessment of hypoxia stress. The project provides training for multiple undergraduate and graduate students and postdoctoral researchers. Findings from this project are disseminated through undergraduate and graduate courses taught at the University of Florida, a teacher training program at the Bocas del Toro Research Station at STRI in Panama, a workshop in Panama to build a community of scientists and informed practitioners, and webinars, toolkits, and other resources communicated through established networks of coral conservation and management practitioners.

Understanding the responses of coral reefs to ocean deoxygenation is limited to a few post hoc assessments of how unanticipated hypoxic events have impacted macrofauna. This project employs a predictive approach to examine the resilience of coral reef communities to ocean deoxygenation by examining both corals and their associated microbiomes. Complimentary manipulative laboratory and field experiments and surveys along natural gradients of hypoxic stress are being used to answer the following three fundamental questions about how variation in the tolerance of corals and their microbiomes predicts the resilience of reefs to deoxygenation: (1) How does the physiological response of the coral to hypoxia predict community shifts in the microbiome with deoxygenation? (2) To what degree do corals and their microbiomes show evidence of acclimatization to reduced oxygen, and how do these functional shifts confer increased resistance to subsequent hypoxic stress? (3) How are the feedbacks between coral hosts and their microbiomes apparent in the recovery of coral communities from hypoxia and patterns of community structure at the seascape scale? This project aims at developing a mechanistic and predictive understanding of coral reef community responses to ocean deoxygenation by examining stability and resilience at two levels of ecological organization: the assemblage of coral species at the reef scale, and the assemblage of microbes at the holobiont scale. Moreover, this study examines how those responses are coupled by feedbacks at the colony scale through coral physiological responses and microbial functional shifts.

This award reflects NSF's statutory mission and has been deemed worthy of support through evaluation using the Foundation's intellectual merit and broader impacts review criteria.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-2048914

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