Acropora cervicornis population data during bleaching events from shoreside Florida_Coral_Reefs Coral_Bleaching_FRRP in the Florida Reef Tract from 2014-2015 (EMUCoReS project)

Website: https://www.bco-dmo.org/dataset/640238
Data Type: Other Field Results
Version: 1
Version Date: 2016-03-11

Project
» RAPID: A hyper-thermal anomaly in the Florida Reef Tract: An opportunity to explore the mechanisms underpinning patterns of coral bleaching and disease (EMUCoReS)

Contributors	Affiliation	Role
Rodriguez-Lanetty, Mauricio	Florida International University (FIU)	Principal Investigator
Lirman, Diego	University of Miami Rosenstiel School of Marine and Atmospheric Science (UM-RSMAS)	Co-Principal Investigator, Contact
Richardson, Laurie	Florida International University (FIU)	Co-Principal Investigator
Allison, Dicky	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

Abstract
Regional Acropora cervicornis size, mortality, and health condition data during summer bleaching events in 2014 and 2015.

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Coverage

Spatial Extent: **N**:26.1379 **E**:-80.0934 **S**:24.4524 **W**:-82.9164
Temporal Extent: 2014 - 2015

Methods & Sampling

Colonies of *Acropora cervicornis* were surveyed for annual Florida Reef Resilience Program (FRRP) Disturbance Response Monitoring during the summers of 2014 and 2015. At each site, two independent 1x10m belt transects were randomly placed and indicators were then recorded for all stony corals greater than 4cm including: 1) hard coral size (maximum height and diameter) and 2) hard coral condition as determined by the presence of bleaching and paling, presence of disease, and percent recent or old morality.

A full description of the FRRP program is available at their website: www.frrp.org.

Description of this ongoing study: Coral Bleaching Response Plan (dmoserv3.bco-dmo.org/data_docs/EMUCoReS/Coral-Bleaching-Response-Plan-6.pdf).

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Data Files

File
acro_cervi_rs.csv (Comma Separated Values (.csv), 15.54 KB) MD5:be557605fe2952bbf18605f8028aebf9 Primary data file for dataset ID 640238

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Parameters

Parameter	Description	Units
year	year of observation	2014 or 2015
region	regions of the reefs around Florida being studied	text
site	sample number of the coral being studied	alphanumeric
lat	latitude of observation	decimal degrees
lon	longitude of observation; West is negative	decimal degrees
species	species being documented	taxonomic binomial
diameter	diameter of the fragment being measured; maximum diameter is defined as the outward-facing surface of the colony (perpendicular to the axis of growth);includes both living and dead areas of the colony	centimeter
height	height of the fragment being measured; maximum height is parallel to the axis of growth when viewed from the side of the colony	centimeters
mortality_old	characterized by the absence of any corallite structure and often overgrown by algae or invertebrates;(does not include whole colonies that are dead)	percentage
mortality_recent	characterized by algae-free and intact or slightly eroded calyx structure in the absence of any living tissue	percentage
colony_isolates	the number of isolated tissue fragments on the colony	number
bleaching	coral described by severity of discoloration; P = Pale (discoloration of coral tissue) PB = Partly Bleached (patches of fully bleached or white tissue) BL = Bleached (Tissue is totally white; no zooxanthallae visible)	text
disease	coral observed to have diseases of these color categories; WB = White band; UK = unknown	text

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Deployments

Coral_Bleaching_FRRP

Website	https://www.bco-dmo.org/deployment/640250
Platform	shoreside Florida_Coral_Reefs
Start Date	2014-01-01
End Date	2015-08-20
Description	Coral reef surveys as part of the project "RAPID: A hyper-thermal anomaly in the Florida Reef Tract: An opportunity to explore the mechanisms underpinning patterns of coral bleaching and disease". Single location entered: Florida Reef Tract, 24.8684, -80.6435 in order to 'ground' the datasets. **Methods & Sampling** Central location for this whole study.

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Project Information

RAPID: A hyper-thermal anomaly in the Florida Reef Tract: An opportunity to explore the mechanisms underpinning patterns of coral bleaching and disease (EMUCoReS)

Coverage: Florida Reef Tract (24.868358, -80.643495)

Description from NSF award abstract:
Coral reefs are among the most biologically diverse and economically important ecosystems on the planet. However, coral reefs are in a state of global decline due to effects of climate change, disease outbreaks, and other stressors. Mass coral bleaching events, a breakdown of the association between corals and their symbiotic algae, are predicted to become more frequent and severe in response to climate change, and it is expected that subsequent disease outbreaks will become more common. Beginning in August 2014, nearly all coral species in the Florida Reef Tract have undergone severe bleaching, in some cases followed by coral mortality and/or disease outbreaks. This widespread, thermal-induced event presents a unique time-sensitive opportunity to explore the mechanisms underpinning the patterns of coral bleaching, disease, and recovery. The mechanisms linking patterns of bleaching, disease, mortality, and recovery remain relatively unexplored. This research will explore the influences that genotype combinations of host polyps, their algal symbionts, and associated bacterial have on bleaching/disease likelihood and recovery/mortality predisposition of coral specimens. By providing a mechanistic understanding of the processes that underlie coral bleaching and subsequent recovery this research will contribute to measures in support of preserving this invaluable natural resource. The study will further involve students from diverse backgrounds as well as provide project internship opportunities for high school students. A web based radio blog will disseminate project results and other relevant developments to the broad audiences

Mass coral bleaching events are predicted to become more frequent and severe in response to climate change, and it is expected that subsequent disease outbreaks will become more common. The lack of a baseline genetic datasets for coral holobionts prior to previous natural bleaching events has hindered our understanding of recovery patterns and physiological tolerance to thermal stress, also known as coral bleaching. An extensive pre-thermal stress baseline of genotypic identity of coral hosts, Symbiodinium, and associated bacterial community offers a unique opportunity to analyze changes associated with current bleaching event along the Florida coastline and to document holobiont compositions most and least resistant/resilient to bleaching and disease. Repeated sampling of the same coral colonies will allow the investigators to compare holobiont composition before, during and after bleaching of both healthy and diseased individuals. This bleaching event is a time-sensitive natural experiment to examine the dynamics of microbes (Symbiodinium and bacteria) associated with affected colonies, including their potential influence on disease susceptibility and resistance of reef corals. This effort would constitute the first time that high throughput sequencing of coral, Symbiodinium endosymbiont, and the coral-associated bacterial community genotypes are together used to explain patterns of disease, recovery, and mortality following natural bleaching. This study will likely change the way investigators study emerging wasting diseases of keystone species that define marine benthic communities.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1503483
NSF Division of Ocean Sciences (NSF OCE)	OCE-1503430

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