Bleaching, disease, and mortality on A. cervicornis individuals in Elliot Key, Florida during 2014 and 2015 (EMUCoReS project)

Website: https://www.bco-dmo.org/dataset/709880

Data Type: Other Field Results

Version: 1

Version Date: 2017-07-26

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
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Abstract

Bleaching, disease, and mortality on A. cervicornis individuals in Elliot Key, Florida during 2014 and 2015 (EMUCoReS project)

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Coverage

Spatial Extent: **Lat**:25.488 **Lon**:-90.109

Temporal Extent: 2014-09 - 2015-10

Dataset Description

Bleaching, disease, and mortality on an individual basis in 2014 and 2015.

Associated Publications:

Seibeck et al., 2006: Monitoring coral bleaching using a colour reference card

Acquisition Description

At indicated dates, individual corals (ramets) were visually assessed for bleaching, disease, and mortality. Corals were determined to be diseased by White band (white) when there was a band of white tissue traversing the branches progressing from the bottom to the top of the colony.

Corals were identified as diseased with Rapid Tissue Loss (RTL) when gently fanning by hand resulted in the dissociation of tissue from the coral's skeleton. Mortality was noted as no (no mortality observed), partial (the minority of the colony was no longer covered with live tissue), mostly dead (the majority of the colony was no longer covered with live tissue), or dead (no observable tissue)

Bleaching was noted for those corals paling or entirely lacking in pigmentation. A reference color card (Seibeck et al., 2006) was used as a pigmentation reference. The normal level of pigmentation was C3 or darker (not bleached). Colors lighter than C3 were considered bleached.

Processing Description

Missing sampling from late spring/early summer 2015.

BCO-DMO Processing Notes:
- added column with sampling date after converting the data from wide to long format
- modified parameter names to conform with BCO-DMO naming conventions
- filled all blank cells with nd

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Related Publications

Siebeck, U. E., Marshall, N. J., Klüter, A., & Hoegh-Guldberg, O. (2006). Monitoring coral bleaching using a colour reference card. Coral Reefs, 25(3), 453–460. doi:10.1007/s00338-006-0123-8

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Parameters

Parameter	Description	Units
month_sampled	Month sampled: September 14; March 15; October 15	unitless
genet	Asexual clone identifier; A through X	unitless
condition	Apparent health of coral; healthy or bleached	unitless
sample_number	DNA tube number; 1-80	unitless
A3_S_fitti	Percent of reads from S. fitti	percent
B2_S_psygmophilium	Percent of reads from S. psygmophilium	percent
D1a_S_trenchii	Percent of reads from S. trenchii	percent

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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.

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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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