

# Disease prevalence, estimated through observations by divers, at coral reefs in Curacao, Grand Cayman, Grenada in 2009 and 2011

**Website:** <https://www.bco-dmo.org/dataset/3978>

**Data Type:** Other Field Results

**Version:** 1

**Version Date:** 2013-09-06

## Project

» [Impact of the 2010 Caribbean Coral Bleaching Event: Assessing Changes in Coral Immune Function](#)

(Climate\_Corals\_Bleach\_Disease)

Contributors	Affiliation	Role
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## Abstract

This dataset reports disease prevalence, estimated through observations by divers, at coral reefs in Curacao, Grand Cayman, Grenada in 2009 and 2011.

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## Coverage

**Spatial Extent:** N:19.3775 E:-61.75907 S:12.02697 W:-81.3835

**Temporal Extent:** 2009 - 2011

## Dataset Description

Disease-bleaching prevalence is reported for Caribbean coral reefs at the Cayman Islands, Curacao, and Grenada in 2009 and 2011.

## Methods & Sampling

Disease prevalence was estimated after normalizing the data collected. The condition (disease, bleached, injured, other) of each coral, octocoral, hydrocoral, sponge and zoanthid colony was checked along five 20 sqm permanent (hammered tagged stakes into reef structure) band transects in each of three depth intervals (habitats= 0-5, 7-12 and > 15m deep) at two-three reefs each at Curacao, Cayman and Grenada (N= 15 per reef).

Proportions of colonies in each group (scleractinians, hydrocorals, octocorals, CCA, etc) affected by each disease were calculated for each transect. Data was normalized and prevalence means were calculated for each habitat in each reef. From here, mean disease/bleaching prevalence could be calculated for each coral

species (genera or the scleractinians as a whole) affected in each habitat, reef and geographic locality to test the hypotheses that disease and/or bleaching prevalence are similar across habitat within reefs, reefs within localities and across geographic localities, and that they were similar in 2009 and 2011.

## Data Processing Description

BCO-DMO Processing Notes:

- 'nd' entered to indicate 'no data'.
- Modified parameter names to conform with BCO-DMO naming conventions.
- Added lat and lon from the metadata provided.
- Replaced abbreviated reef names and conditions with full text.

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## Data Files

File
<b>disease.csv</b> (Comma Separated Values (.csv), 26.41 KB) MD5:fc06dbd756626cc9d6c7a144493caec8 Primary data file for dataset ID 3978

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## Supplemental Files

File
<b>disease_codes.csv</b> (Comma Separated Values (.csv), 559 bytes) MD5:a6efdb82b2392cb8c45e4441b0c06939 Disease Codes from project: Impact of the 2010 Caribbean Coral Bleaching Event: Assessing Changes in Coral Immune Function PI: Ernesto Weil Version date: 27 June 2013

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## Parameters

Parameter	Description	Units
location	Name of the country where the reefs are located.	text
reef	Name of the reef.	text
year	4-digit year when reefs were surveyed.	unitless
habitat	Description of the habitat: Deep, Intermediate (INT), or Shallow (SHA).	text
lat	Latitude of the reef.	decimal degrees
lon	Longitude of the reef.	decimal degrees
group	Type of coral: SCL = scleractinia OCT = octocoral	text
condition	Condition of the reef (Healthy, Diseased, or Injured).	text
disease	Type of disease. See the Supplemental File "disease_codes.csv".	text
num_colonies	Number of colonies.	integer
mean_pcmt	Percent of diseased or bleached colonies in a population/community in a particular area (habitat, reef) in a given time.	%
stdev	Standard deviation.	%

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## Deployments

### Coral Bleaching Dives Weil

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/59046">https://www.bco-dmo.org/deployment/59046</a>
<b>Platform</b>	Caribbean_Coral_Reefs
<b>Start Date</b>	2008-01-01
<b>End Date</b>	2011-12-31
<b>Description</b>	Coral reef surveys as part of the project "Impact of the 2010 Caribbean Coral Bleaching Event: Assessing Changes in Coral Immune Function".

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## Project Information

### Impact of the 2010 Caribbean Coral Bleaching Event: Assessing Changes in Coral Immune Function (Climate\_Corals\_Bleach\_Disease)

**Coverage:** Puerto Rico, Grenada, Caracao, Grand Cayman

The investigators requested RAPID funding to assess the impact of the 2010 Caribbean bleaching event on coral gene expression, immune function and coral reef communities. 2010 is currently tracking as the warmest year ever on record, potentially creating one of the largest thermal anomalies in the Caribbean basin and in the southeastern Caribbean, exceeding the previous record-breaking temperatures of 2005. These investigators will perform coral surveys at selected sites in the southeastern Caribbean and sample collections in Puerto Rico during and after this transient event to compare coral health measures with previously collected pre-event data. The study will integrate several levels of data, from remote temperature sensing satellite records, to coral health, cover and diversity surveys, to studies of individual coral immune function and microbial assemblages. The scale of this thermal event is significant enough that the investigators hypothesize levels of disease will increase following this event, as was observed after the 2005 Caribbean bleaching event and the 2002

Australian bleaching event. The RAPID study will also test the hypothesis that this large scale thermal anomaly will stress corals in Puerto Rico and down-regulate immune gene expression in thermally sensitive species (*Montastrea* spp), but potentially up-regulate expression in a thermally resilient species (*Gorgonia ventalina*). The investigators also hypothesize that this expected level of coral bleaching will change the surface microbial communities of both species toward more *Vibrio*-based communities, and this is the first step in increased disease susceptibility to opportunistic pathogens.

This project is relevant to an understanding of the resilience of marine ecosystems and the impact of ocean warming events on coral physiology and biodiversity. Current understanding of the impacts of warm thermal anomalies is largely restricted to the bleaching response of the corals themselves, with much less known about how warm temperatures change the functioning of the coral holobiont via the microbial constituents and/or the immune responses of corals. There is tremendous value in following the physiology and gene expression of corals in the field through an extreme and transient event like this. Laboratory studies could never truly duplicate these field conditions, particularly with respect to disruptions to the natural resident microbial community that is so critical to the coral holobiont.

This RAPID project will focus on objectives for which pre-event data/samples exist:

- (1) Monitoring levels of coral disease, coral species diversity and coral cover in Puerto Rico, Grenada, Trinidad, the Mexican Yucatan, and Panama.
- (2) Assessment of coral immune responses and immune gene expression in a resilient gorgonian (*Gorgonia ventalina*) and a susceptible scleractinian (*Montastraea* spp). Sampling will occur pre-bleaching, during the heating event and after recovery.
- (3) Assessment of changes in total microbial community before, during and after the heating event in the two above mentioned species.

This project is associated with the project titled "[Influence of Temperature and Acidification on the Dynamics of Coral Co-Infection and Resistance](#)" (OCE-0849776).

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## Funding

Funding Source	Award
<a href="#">NSF Division of Ocean Sciences (NSF OCE)</a>	<a href="#">OCE-1105143</a>

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