C-OCEAN

Provides early detection, rapid response, and assessment of marine events affecting the Florida Keys National Marine Sanctuary and surrounding Ecosystems.
C-OCEAN TIMELINE

1997
Rapid Biotic Assessment (RBAT)

1999
Marine Ecosystem Event Response and Assessment (MEERA)

2003
Volunteer Harmful Algal Bloom (HAB) Monitoring

2004
Florida Keys Coral Bleaching Early Warning Network BleachWatch

2006
KADO HAB Monitoring

2015
C-OCEAN

COMMUNITY-BASED OBSERVATIONS OF COASTAL ECOSYSTEMS AND ASSESSMENT NETWORK

www.mote.org
How does C-OCEAN help “Protect Our Reefs”?

- Community Outreach of Marine Events
- Fostering the community’s sense of ownership in marine conservation
- Community Involvement…. ”Citizen Science”
- Early and Rapid Feedback to Resource Managers
OBJECTIVES AND ORGANIZATION

**Marine Observer Network**
Utilize knowledge, availability, and willingness of the community frequently on or around the water to provide valuable information.

**Project Coordinator**
Gather and evaluate information regarding the overall health of and significant changes to the marine environment.

**Response Efforts**
Ensure that prompt action is taken and coordinate response efforts to investigate significant events.

**Webpage & Reports**
Provide information to marine resource managers, environmental professionals, and the community.
Marine Observer Network
ANYONE can report – NO training, NO membership

Commercial and Recreational Fisherman

Divers and Snorkelers

Environmental Groups

Educators

Researchers

Residents
REPORT THE FOLLOWING UNUSUAL SIGHTINGS:

- Coral Bleaching
- Invasive Species
- Mammal Strandings
- Diseased Fish & Fish Kills
- Algal Blooms
- Pollution & Marine Debris
- Sick or Injured Sea Turtles
- Discolored Water
- Wildlife Violations
- Vessel Groundings

WWW.MOTE.ORG/COCEAN
Cory Walter | (305) 395-8730 | cwalter@mote.org
Response Efforts

Missions:
- Determine biological extent
- Assess spatial extent
- Collect, analyze & ship samples
- Follow duration of event
- Report findings rapidly

Initiate Response Effort

Assist Ongoing Research or Response Efforts

Forward Information to Appropriate Agency
- Oil Spills
- Wildlife Violations
- Vessel Groundings
- Mammal Strandings

www.mote.org
C-OCEAN Event Reports

- Location of the Event
- Summary of Reports and Observations
- Response Efforts
- Photos

**Florida Keys Red Tide Monitoring Program**

**Tropical Research Laboratory – Summerland Key, FL**

**Cell Count Results – January 13-16, 2006**

Summary: Water samples were collected on January 11, 2006 on Looe Key Reef and part inside of Looe Key in response to observation of green discolored water. Samples showed no indication of elevated Karenia brevis.

Water samples collected January 12, 2006 by a fisherman south of “The Quickwells” between the Morayas and Dry Tortugas showed no K. brevis present. An additional sample collected at Looe Key reef in response to continued discolored water also indicated no K. brevis present.

In response to continued satellite imagery indicating an elevated chlorophyll-a signature along the coastline of the Florida Keys, opportunistic sampling was conducted on January 15, 2006 near Pelican Shoals, mid Hawk Channel, and near the entrance to Hawk Channel. Minimal levels of K. brevis were noted at two of the three stations, with levels of “Very Low” (approx. 2,000 cells/L) K. brevis found near the reef tract.

Note: The data shown has already been provided to the FWRI/FWC Red Tide Monitoring Program, including specific coastal and water column data. Please reference the above data in your relevant data monitoring program.

Mote Marine Laboratory

Mote.org
C-OCEAN Website

www.mote.org/COCEAN
Outreach Efforts

- Red Tide
  Winter months (December-March)

- Coral Bleaching and Disease
  Summer months (June-October)

- Fish Kills
  Extreme temperatures changes
  Wind driven events
University of Georgia – “Ecology of human pathogens in coastal waters”
Woods Hole Oceanographic Institution – “Microbial symbionts of corals.”
Smithsonian Field Station - “Impacts of macroalgae and cyanobacteria on coral recruitment and survival”
Florida International University – “Adaptive responses in gene expression to thermal stress in coral.”
University of Texas at Austin – “Addressing genetic constraints to coral recovery in the Florida Keys.”
NOAA/AOML – “Coral restoration in natural ocean acidification refugia”.
Mote Marine Laboratory – “Infection Dynamics of the coral pathogen Vibrio coralliilyticus”
Harbor Branch Oceanographic Institution – “Investigation of novel compounds from marine sponges.”
Mote Marine Laboratory – “Factors controlling transmission of White-band Disease in corals.”
University of North Florida – “Synergistic effects of simultaneous exposure to Mosquito Control Pesticides with other pesticides on coral in the Florida Keys National Marine Sanctuary.
Smithsonian Field Station – “Chemical ecology of black band disease”.
University of Richmond-“ A mass bleaching event involving clionaid sponges”
A mass bleaching event involving clionaid sponges

The Caribbean sponge Cliona variaens forma incrustans harbors dense intracellular populations of Cladochalina symbionts (Fig. 1a, Hill 1990). Synthesis between bcclorinating clionaid and symbionts in clionaid spp. are typically absent for the environmental stress that induce bleaching in clionaid (e.g., Schotten and Sorensen 2003). However, in October 2013 we observed widespread C. variaens bleaching on reefs at ~2-15 m in the lower Florida Keys (Fig. 1b, c, Electronic Supplementary Material Fig. S1). The cause of sponge bleaching appears related to water temperature. Average daily temperatures >21°C persisted for 10 days (3-17 September) with a maximum temperature >23°C. Sponge bleaching became obvious around the first week of October. White bleaching in C. variaens can be induced artificially (Hill and Walsh 1990), this appears to be the first report of mass bleaching involving clionaid sponges under natural conditions. Disrupting the symbiosis may have consequences for reef health if sponge filtration efficiency is impaired, rates of bioreversion are compromised, or non-native symbionts establish residency. Interestingly, the shallow-water C. variaens forms did not bleach at an adjacent island site despite experiencing 17 days with average temperatures >23°C and maximum temperatures >41°C. While differential bleaching susceptibilities may exist among individuals and clionaid species, the observations reported here indicate that sponge–symbiont extinction can be decoupled by environmental stressors in a manner similar to corals. These observations are troubling given increasing intensity and frequency of warming events, the abundance of sponges in reef ecosystems, and the essential ecological role they play in coral reef productivity.

References


Electronic supplementary material. The online version of this article (doi:10.1007/s00027-016-9803-y) contains supplementary material, which is available to authorized users.

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C-OCEAN Reported Observations
January 1, 2016 – September 30, 2016

- Algal Bloom
- Potential Algal Bloom
- Discolored Water
- Benthic Algal Bloom
- Fish Kill
- Fish Disease
- Coral Disease
- Coral Bleaching
- Potential Coral Bleaching
- Invasive Species
- Mammal Stranding
- Sea Turtle Stranding
- Mortality Event
- Unusual Observation
<p>| | |</p>
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<tr>
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<td>44</td>
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<td><strong>Total</strong></td>
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White-Blotch Syndrome on *Siderastrea siderea*

- Starts as blemishes and circular lesions from Yellow-tail Damselfish bites (first described by Glynn 1973).
- Most heal within two weeks of initial blemish.
- In some colonies – lesions fail to heal?
- Tissue necrosis occurs within circular blemishes and then expands outwards.
- Entire colony is engulfed in numerous expanding lesions.
- Eventually, entire colony dies.
- Similar patterns observed on *Acropora palmata* – often confused with White-pox disease.
Upper Keys Coral Disease

- **Grecian Rocks (FWC)-7/16/16**
  - Multiple diseases on at least nine species: *Colpophyllia natans, Pseudodiploria strigosa, Diploria labyrinthiformis, Meandrina meandrites, Dichocoenia stokesii, Siderastrea siderea, Montastraea cavernosa, Orbicella annularis, and Eusmilia fastigiata.*

- **Carysfort (FWC)- 7/21/16**
  - “White Blotch” disease on *Siderastrea siderea* was up to 69%.
  - Noted on colonies of all sizes
  - Mortality 25% (recently infected colonies) to 95%
  - Noted disease is migrating south and west as far as Molasses

- **Pennekamp SP – 7/14/16** Darkspot disease prevalent on 2-5% of the *Siderastrea siderea* at Cannon Patch
Large *Colpophyllia natans* colony #1 at Grecian Rocks mooring ball #12 photographed in 2012.

*Colpophyllia natans* colony #1 photographed with active unknown “White Blotch” disease lesions 7/16/2016.

Photos: Vanessa Brinkhuis, FWC
FKNMS: Upper Keys

- Unknown “White Blotch” disease lesions on *Diploria labyrinthiformis* colony #1. Top left and right: multifocal white lesions with bare skeleton at the center; Bottom: central multifocal lesion near colony edge with bare exposed skeleton with turf algae at center.
• *Montastraea cavernosa* colony #5 with unknown white disease. Lesions appear unlike other disease lesions observed at the site. Multifocal central and peripheral lesions are characterized by undulating margins of white bleached polyps followed by exposed bare skeleton with greenish turf algae.
FKNMS: Upper Keys

Benwood
9/12/16

Photo: Bob Jonas
FKNMS: Lower Keys

1.8 miles East of American Shoals
7/22/16
PSTR

Photo: Cory Walter, MML
Coral Disease Reports for the Florida Keys
July 7-August 17, 2016

- No Disease Reported
- 1-5 Colonies Reported
- 5-10 Colonies Reported
- 10+ Colonies Reported
Coral Disease Reports for the Florida Keys
August 19-September 21, 2016

No Disease Reported
1-5 Colonies Reported
5-10 Colonies Reported
10+ Colonies Reported
Recent Report Sources

**Researchers:**
- Florida Wildlife Research Institute (FWRI), Mote Marine Laboratory (MML)
- South Florida Coral Reef Initiative (SEFCRI)
- Coral Reef Watch Alert Network (CRW)
- Coral Restoration Foundation (CRF)
- The Nature Conservancy (TNC)
- Keys Marine Lab (KML)

**State and Federal Agency Personnel:**
- Department of Environmental Protection (DEP)
- NOAA Harmful Algal Bloom Bulletin
- FKNMS
- State and National Park Service

**Dive Shops:**
- Tilden’s Dive Center
- Abyss Dive Center
- Pennekamp Snorkel Tours
- Dive Key West

**Marine Educators and Ecotourism Groups:**
- MarineLab
- FKNMS Team OCEAN
- Key West Wildlife Center
- Boy Scouts “Order of the Arrow”
- Ocean Reef Nature Center
- Key West Power Squadron
- Reef Relief
THANK YOU
&
C-OCEAN OBSERVERS!