



Grantee: Cory Walter, Mote Marine Laboratory, Summerland Key, FL

Project Title: **Florida Keys BleachWatch.** *Community based reporting of coral bleaching and data integration with existing NOAA remote sensing and coral bleaching early warning products.*

Report Period: May 1 - November 1, 2018

Investigators: Cory Walter (Project Coordinator)

Deliverables: There were four BleachWatch training presentations organized to promote the BleachWatch project and train new volunteers throughout the Florida Keys as well as individual one on one training. Media provided advertisement of the program as needed to encourage continued community involvement. There have been seven Current Coral Bleaching Conditions Reports produced and updated on the BleachWatch website (www.mote.org/bleachwatch) as well as distributed to resource managers and the volunteer observers. A coral bleaching identification slate was produced to be utilized on dive and snorkel boats for reef visitors to understand the coral bleaching process (Attachment 1)

Accomplishments: The Florida Keys BleachWatch program is designed to train and coordinate volunteers who regularly report on the occurrence, or absence, of coral bleaching, as well as basic environmental conditions from the reef (Figure 1). After a short training session on coral bleaching observations, each individual receives



Figure 1 - BleachWatch Observer

a packet containing information on the project and FAQ’s on coral bleaching, report forms complete with detailed instructions, and an underwater visual aid in the form of a wristband. Observers are made to understand that observations of no bleaching are equally important as bleaching, and are asked to report regularly. Training workshops for the 2018 BleachWatch Observer Network were conducted for interested parties twice at Mote Marine Laboratory (MML), Boy Scouts “Order of the Arrow” in Islamorada, community training at Marathon

Library, along with one-on-one and specialty group training sessions throughout the season. Due to the increase in coral disease reports over the past few years, the data sheet was revised to include more detailed observations of these diseases at the observers’ sites (Attachment 2).

The Project Coordinator also routinely reviews NOAA’s “Coral Reef Watch” and “Coral Health and Monitoring” programs which have already developed remote sensing analysis and real-time monitoring data products that have proven to be extremely useful in monitoring and predicting when conditions are favorable for coral bleaching throughout the world. The observational data from BleachWatch volunteers is then synthesized with existing NOAA remote sensing and environmental monitoring data to provide the Florida Keys National Marine Sanctuary (FKNMS) with a summary of “current conditions” throughout the summer months. Current Condition Reports include a summary of relevant weather information, NOAA “hotspot” and “degree heating weeks” (DHW) analysis, and updated Integrated Coral Observing Network (ICON) *in-situ* sea temperature and wind data, all of which is combined with BleachWatch observer reports and photographs for each region during a given period. These reports are generated according to current conditions and the potential risk for coral bleaching.

Table 1 - BleachWatch Observer Categories
(June 1-November 1, 2018)

Education	27
Dive Industry	12
Resident	34
Research	307
Total	380

There have been seven Current Condition Reports produced for 2018, all of which are available online at www.mote.org/bleachwatch. These reports also helped trigger response efforts for researchers conducting more detailed surveys to assess coral bleaching, such as The Florida Fish and Wildlife’s Florida Reef Resilience Program (FRRP) Disturbance Response Monitoring.

There were a total of 380 BleachWatch observations submitted from June 1 through November 1, 2018 (Figure 2) from 41 trained observers. Individuals that reported were further classified into four categories to help focus training efforts in the future (Table 1). The scientific community accounted for the largest source of observations in 2018, including reports from researchers with the Florida Fish and Wildlife Research Institute (FWRI), FKNMS, Mote Marine Laboratory, Keys Marine Laboratory, The Nature Conservancy, Dry Tortugas National Park, and other State, Federal, and academic programs. However, a significant contribution was also made by local residents as well as environmental, educational, and community groups such as Key Largo

MarineLab, Boy Scouts “Order of the Arrow”, Coral Restoration Foundation, and many dive operations such as Southpoint Divers, Dive Key West, and Keys Diver. All of these participants submitted numerous reports throughout the season, and we congratulate them for their efforts.

BleachWatch data forms were originally designed to gather as much relevant information as possible while minimizing the time and effort required. To further reduce the effort and increase the frequency of reporting, forms were designed to be submitted electronically, either by email, fax, or using the online report form.

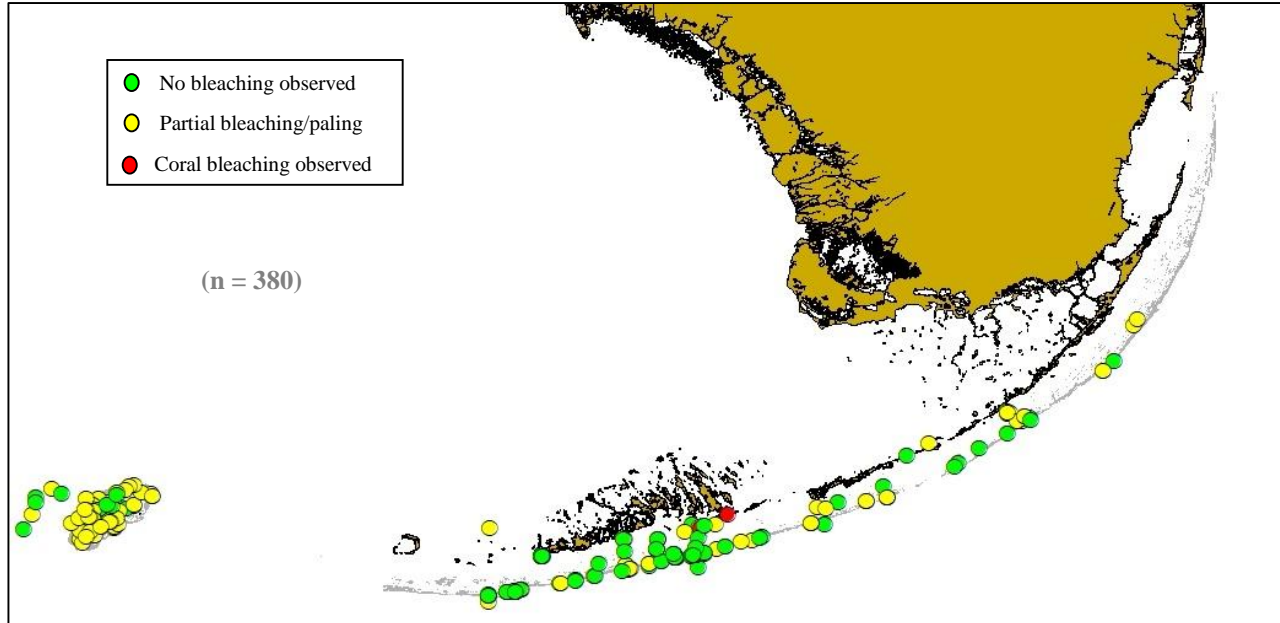


Figure 2 – Observations Reported (May 1 – November 1, 2018)

The majority of BleachWatch reports received indicated paling and partial bleaching, comprising 248 out of the total 380 reports submitted June-October 2018 (Figure 3). Of those reefs that were noted as “paling or partial bleaching” the overall percentage of corals exhibiting signs of stress was mostly 1-10%, however a few deep and inshore sites noted up to 50% of corals affected. Observations of “paling” or “partially bleached” corals were observed throughout all of the FKNMS and surrounding water and across all habitat types, including inshore, mid-channel, offshore, and intermediate and deep reefs. Many useful additional observations were also noted including disease outbreaks and continued reports of Hurricane Irma damage and debris. Coral disease is still running rampant throughout the FKNMS with the disease front now located in the Lower Keys. Even after the BleachWatch season is complete, Mote will encourage volunteers to continue to report on disease or no disease at their sites if possible.

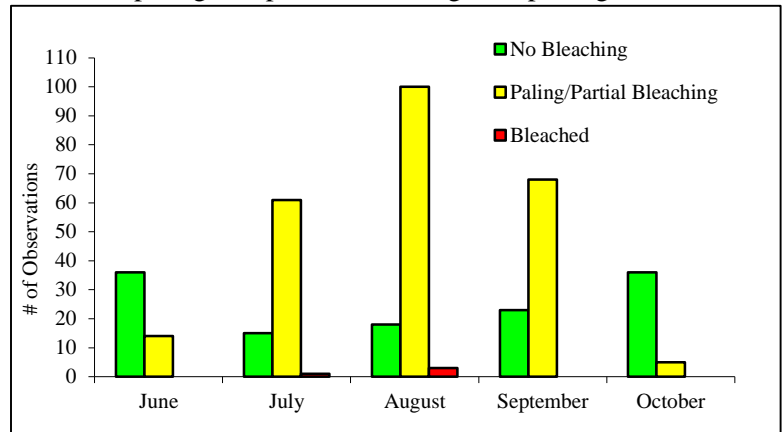




Figure 3 – Number of Observation by Severity of Bleaching Observed (June 1- October 31, 2018)

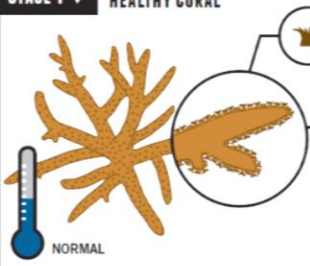
Recent Current Conditions Reports, archived reports from 2005-2017, online report forms, and information related to coral bleaching as well as how to become a BleachWatch Observer can all be found at www.mote.org/bleachwatch. All BleachWatch data is sent to NOAA’s Data Catalog.

Attachment 1

WHAT IS CORAL BLEACHING?

STAGE 1 ▼ HEALTHY CORAL

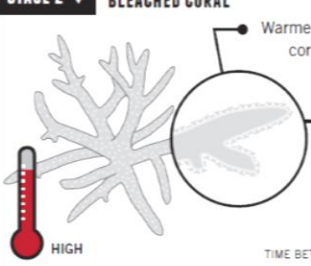


POLYP (CORAL ANIMAL)
Thousands of polyps make up a coral colony.

ZOOXANTHELLAE
Tiny algae that live inside polyp tissues. They provide food for coral through photosynthesis and give the coral its color.

NORMAL

STAGE 2 ▼ BLEACHED CORAL



Warmer water temperatures can stress corals, causing them to expel their zooxanthellae, or bleach.

Bleached corals appear white, but they are still alive and can return to health if conditions improve.

HIGH

TIME BETWEEN STAGE 1 AND STAGE 2: DAYS - WEEKS

STAGE 3 ▼ RECOVERED CORAL OR DEAD CORAL?

If temperatures return to normal, the coral could recover its zooxanthellae and return to health.

Recovery could take weeks to months, and the recovering coral may be more susceptible to disease.

RETURNS TO NORMAL

WEEKS - MONTHS

If conditions do not improve and temperatures remain elevated, the prolonged stress could kill the coral after only a few weeks.

Dead corals are often covered in algae.

REMAINS HIGH

DAYS - WEEKS

CORAL BLEACHING IDENTIFICATION





HEALTHY ▼	HEALTHY ▼				HEALTHY REEF	UNHEALTHY REEF ▼
						
PALING ▼	▼ PALING / PARTIALLY BLEACHED ▼					
						
BLEACHED ▼	▼ BLEACHED ▼					
						
DEAD ▼	▼ DEAD ▼					
						

▼ CORAL DISEASES (NOT BLEACHING) ▼

Attachment 2



Mote Marine Laboratory / Florida Keys National Marine Sanctuary

Florida Keys BleachWatch Program

BLEACHWATCH DATA FORM

Online Forms: www.mote.org/bleachwatch



A. OBSERVER INFORMATION: Date of Visit: _____ Time: _____

Name: _____ Phone: _____ Email: _____

Address: _____

(please circle): Resident Visitor Tourism Industry Commercial Research Education Other

Vessel/Organization (if applicable): _____

B. SITE INFORMATION: Latitude: _____ Longitude: _____

Location/Site Name: _____ Max. Depth: _____ Buoy #/ Area of Reef: _____

Reef Zone (circle) Hard Bottom Patch Reef Mid-Channel Deep Reef Bank Reef Other

Environmental Conditions: (Optional)

Wind Speed: _____ Air Temp: _____ Water Surface Temp: _____ Water Bottom Temp: _____

Cloud Cover (circle): Clear Partly Cloudy Mostly Cloudy Overcast

Did You Observe Signs of Bleaching and/or Disease? Please Check

YES—Continue with Section C No—Finished

C. OVERALL BLEACHING AT SITE

In general, how severe was the bleaching over entire site? Please Check

Bleached only on upper surface Pale (very light) Bleached White Bleached Coral with Algae

Percent of live coral bleached at entire site? (Circle One)

0% 1-10% 11-30% 31-50% 51-75% 76-100%

D. BLEACHING AND DISEASE OBSERVATIONS

	Bleaching:				Disease:		Other Disease or Unusual Observation:
	No Stress	Paling	Partial Bleaching	Bleached	BlackBand Disease	White Disease	
Brain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Branching	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Fleshy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Flowering/Cups	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Leaf/Plate/Sheet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Mound/Boulder	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

E. NOTES (note bleaching of fire coral, Palythoa, and Gorgonians, or other unusual observations.)

Remember: If there is no bleaching, we still need to know regularly about your site.

The National Marine Sanctuary values your time and assistance.

Please direct any questions to:
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