



BLEACHWATCH

MOTE MARINE LABORATORY

Community based reporting of coral bleaching and data integration with existing NOAA coral bleaching early warning products.



Florida Keys “BleachWatch” Early Warning Network Objectives

- To monitor environmental conditions.
- Provide an “Early Warning Alert” for coral bleaching for the FKNMS and surrounding waters.
- Involve the community in monitoring coral reef health.
- Provide FKNMS with the reef’s Current Conditions by summaries of the community feedback and environmental conditions.

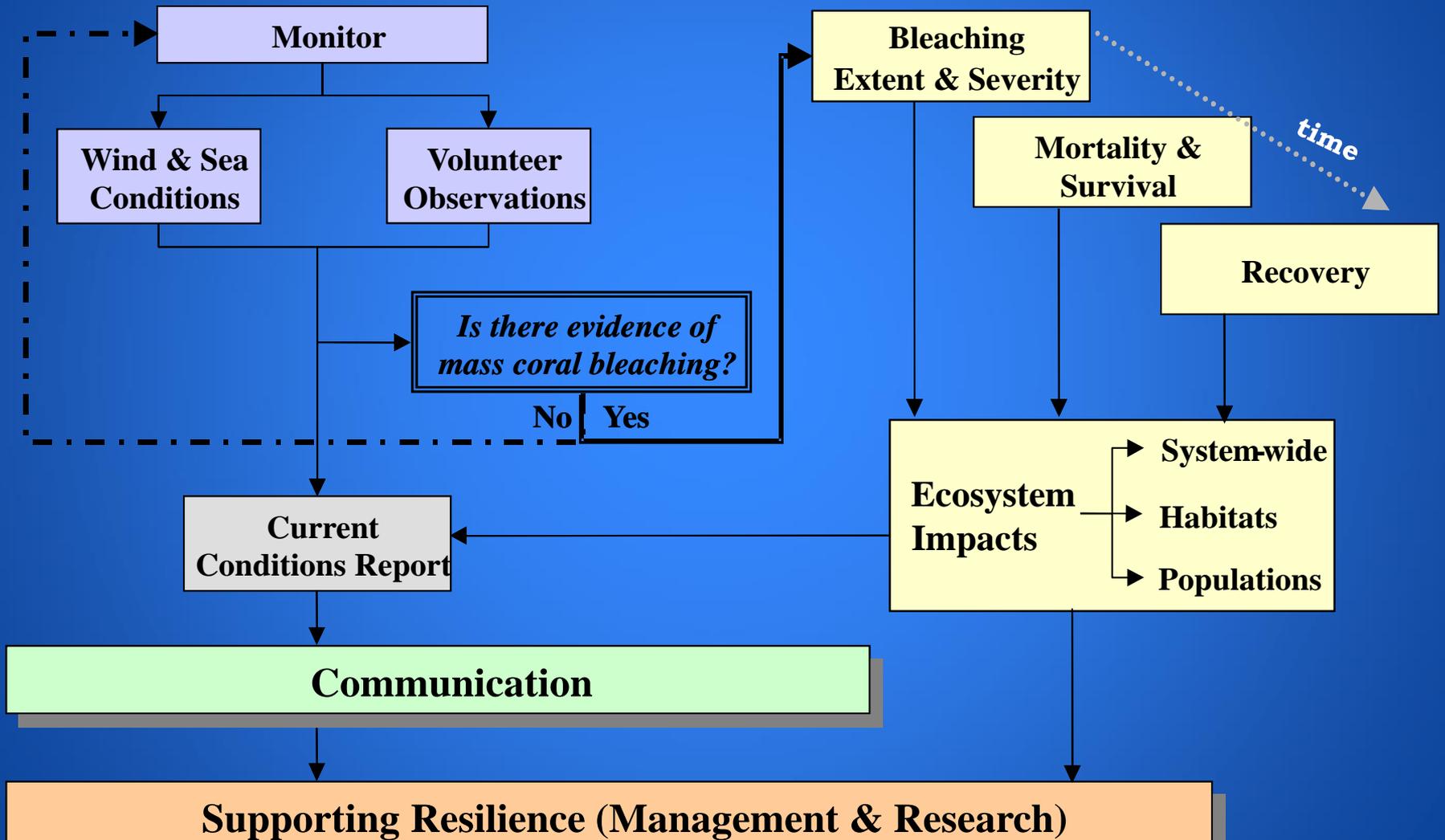


How does **BleachWatch** help “Protect Our Reefs”?

- **Outreach and Education**
- **Community’s sense of ownership**
- **Community Involvement....”Citizen Science”**
- **Early and Rapid Feedback to Resource Managers**
- **Early ground-truthing for satellite data for potential event predictions.**

Early Warning System

Impact Assessments

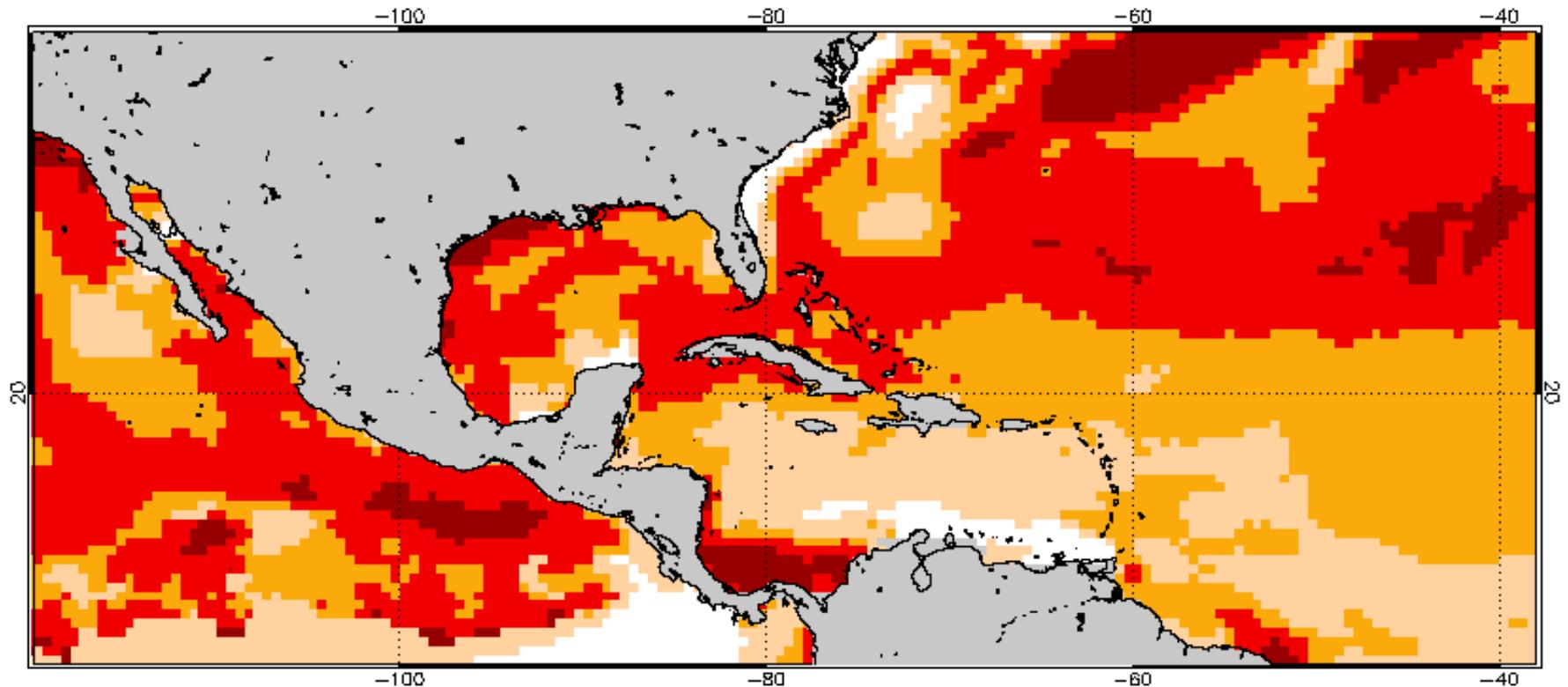


In-Situ Monitoring NOAA's ICON Stations



NOAA Coral Reef Watch

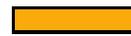
Experimental Seasonal Coral Bleaching Thermal Stress Outlook
June-September, 2016



Potential Stress Level:



Watch



Warning



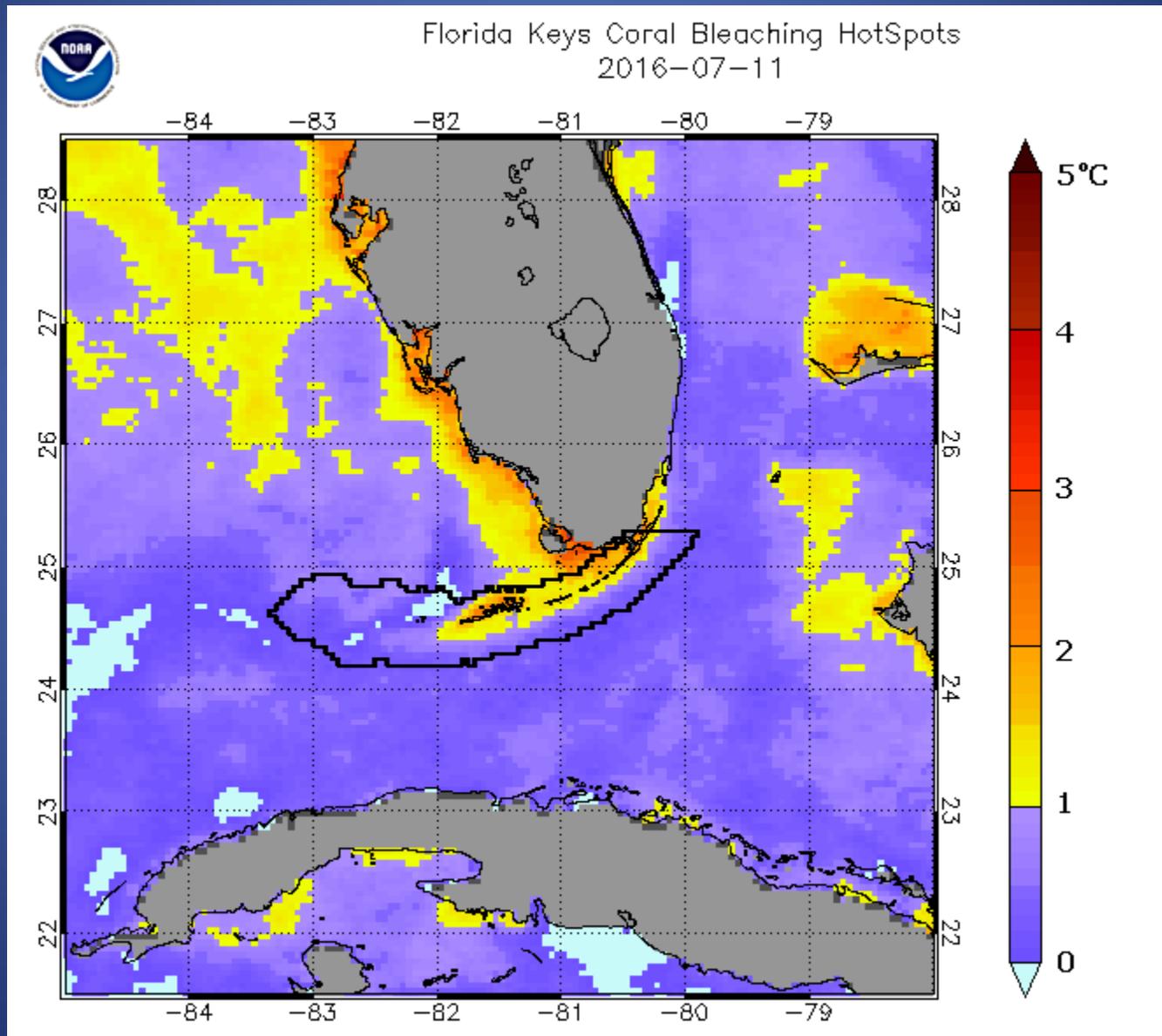
Alert Level 1



Alert Level 2

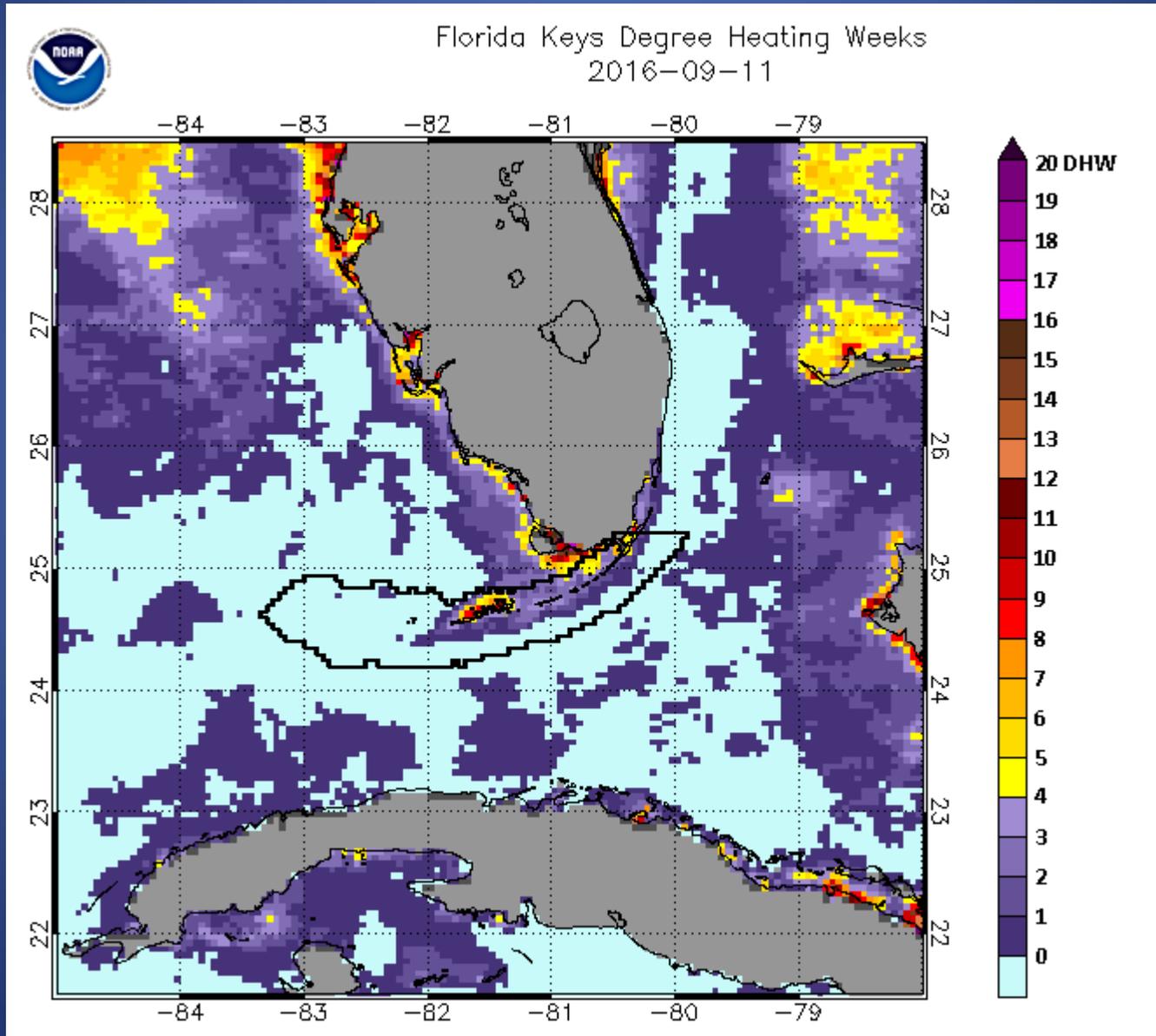
NOAA Coral Reef Watch

Experimental Enhanced 5 km Satellite HotSpots



NOAA Coral Reef Watch

Experimental Enhanced 5 km Satellite Degree Heating Weeks

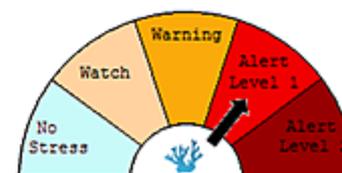
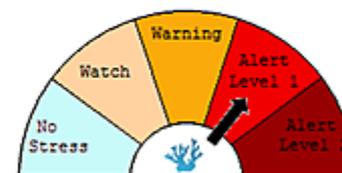
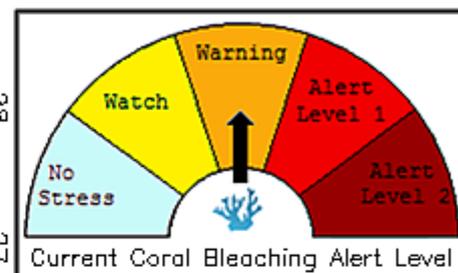
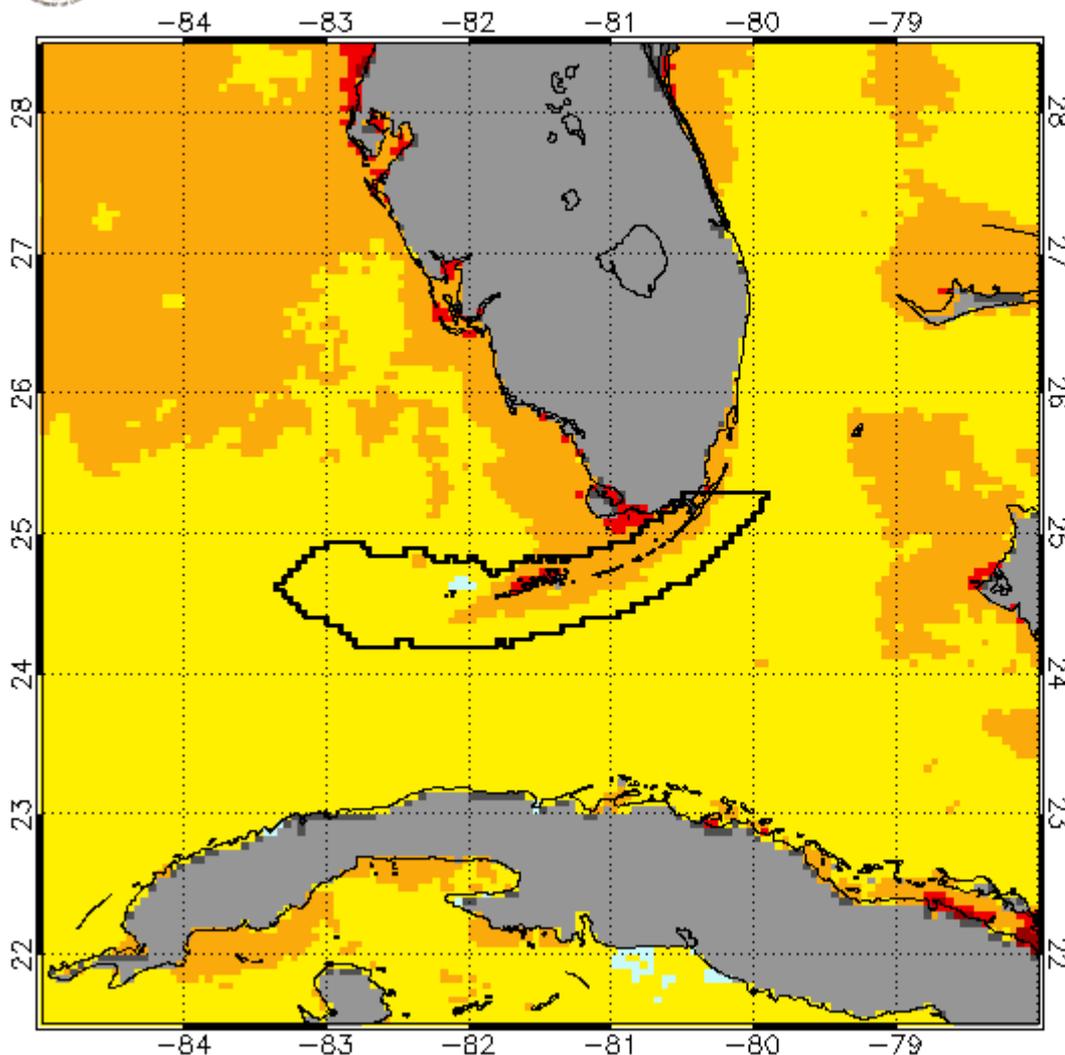


NOAA Coral Reef Watch

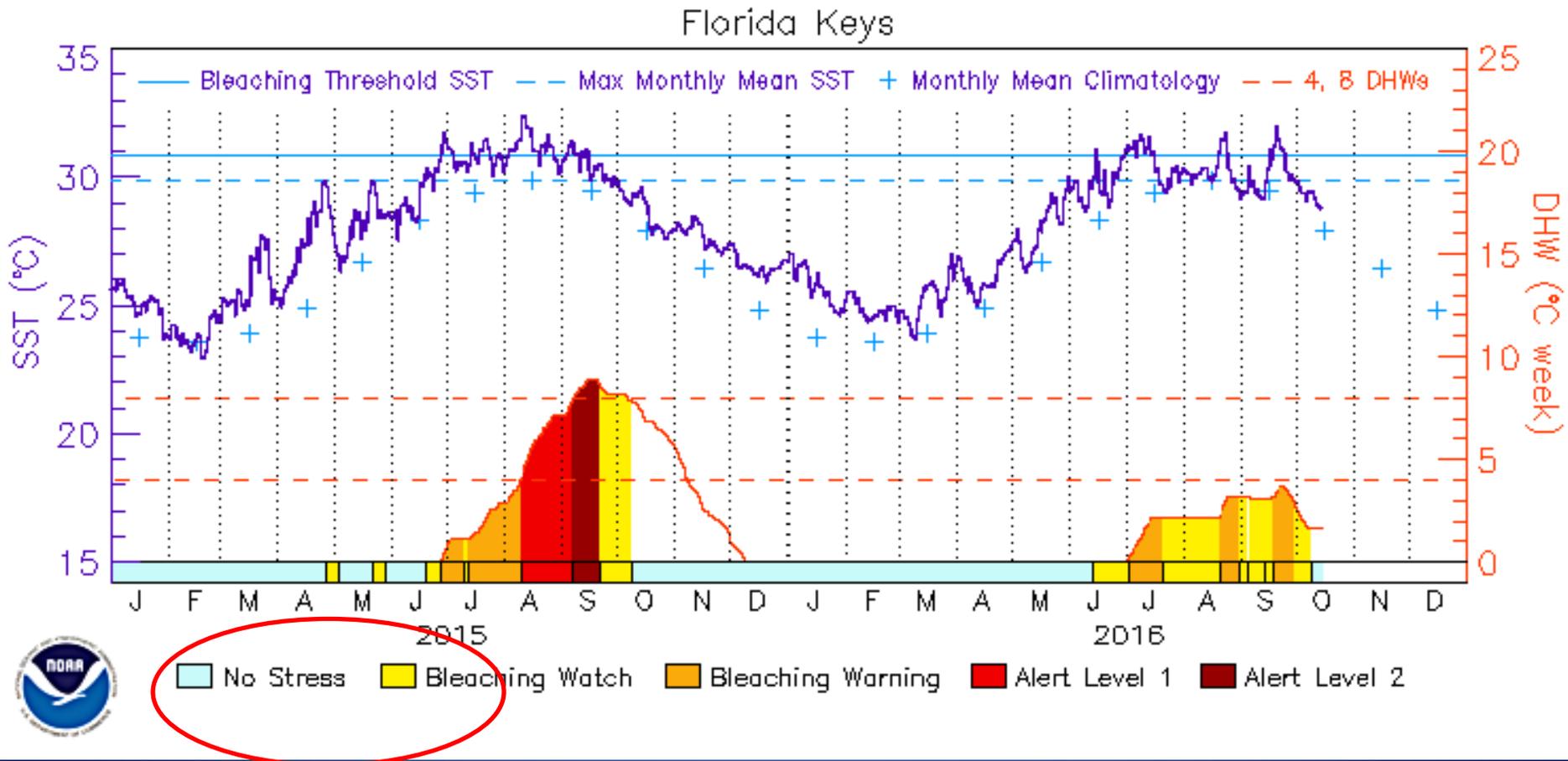
Experimental Enhanced 5 km Satellite Alert Area



Florida Keys Satellite Coral Bleaching Alert Area
2016-07-15



Coral Reef Watch Alert Levels Florida Keys



BleachWatch Observers in the Water!

Professional BleachWatch Training



➤ Short Coral Biology Lesson

What is a Coral?

What is Zooxanthellae and its importance?

Symbiotic Relationship?

Differences between bleaching, disease, and predation.

➤ Explanation of Early Warning Program

Tools used to determine potential bleaching events.

➤ How To Fill Out Data Form



Training Materials

Coral Bleaching Information

Project Overview

Several Data Forms

Data Form Instructions

Underwater Wrist ID

Laminated Bleaching Example Sheet



Current Conditions Report

available online:

www.mote.org/bleachwatch

Updated According to Environmental Conditions

- ❖ Coral Reef Watch Thermal Stress Outlook for future bleaching events.
- ❖ ICON Sea Temperature Information
- ❖ Relevant Weather Conditions
- ❖ Coral Reef Watch HotSpot Maps and DHW Maps (5km enhanced products)
- ❖ Summary of Field Data from Observers
- ❖ Photos

Mote Marine Laboratory / Florida Keys National Marine Sanctuary
Coral Bleaching Early Warning Network
Current Conditions Report #20151012

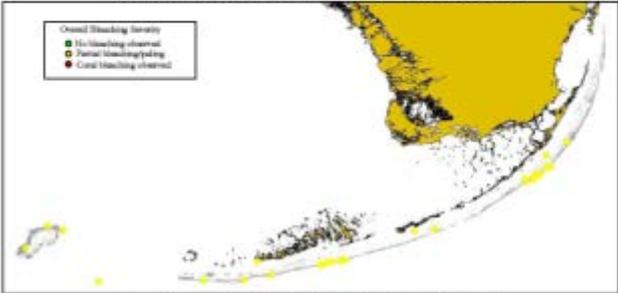
Current Coral Conditions:

A total of 33 BleachWatch Observer reports were received during the last two weeks (Fig. 6), with all reports indicating isolated colonies exhibiting signs of poling and partial bleaching (Fig. 7&8). The overall percentage of corals exhibiting signs of thermal stress at sites visited ranged from 11-50%.

Poling and partial bleaching observations consisted of nearly all species including Brain corals, Encrusting/Mound/Boulder corals, Flower corals, Branching/Plate corals, Flecky corals, and Leaf/Plate corals. Other observations included bleached *Favosites* spp., Fire Coral, and Gorgonians as well as several reports of Black Band and White Plague Disease affecting various corals throughout the Florida Key's Reef.

Despite these widespread visual observations of coral bleaching, recent changes in environmental conditions make the onset of a significant and sustained mass bleaching event unlikely at this time. However, additional field observations are needed to determine the range, duration, and severity of coral bleaching impacts throughout the remainder of the summer.

BleachWatch Reports for September 25 – October 12, 2015



For more information about the BleachWatch program, or to submit a bleaching observation, contact:

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Summerland Key, FL 33042
(305) 745-2729 ext. 4301
www.mote.org/bleachwatch

FUNDING THANKS TO ...



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Current Conditions Report Frequency

Stress Level	Definition	Potential Bleaching	Current Conditions Frequency
No Stress	HotSpot ≤ 0	No Bleaching	LOW Monthly
Bleaching Watch	$0 < \text{HotSpot} < 1$	No Bleaching	LOW Monthly
Bleaching Warning	$1 \leq \text{HotSpot}$ $0 < \text{DHW} < 4$	Possible Bleaching	MODERATE Every 2 Weeks
Alert Level 1	$1 \leq \text{HotSpot}$ $4 \leq \text{DHW} < 8$	Bleaching Likely	HIGH Every 2 Weeks
Alert Level 2	$1 \leq \text{HotSpot}$ $8 \leq \text{DHW}$	Mortality Likely	HIGH Every 2 Weeks

facebook.com/groups/bleachwatch

BLEACHWATCH

Florida Keys BleachWatch Divers

Submit a Report →

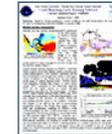
Coral bleaching is the corals' loss of their symbiotic algae (zooxanthellae), which give them their color. Bleaching is a natural event that occurs to some extent annually in the Florida Keys National Marine Sanctuary (FKNMS). Records show that coral bleaching has been occurring for many years in the Florida Keys and also indicate that the frequency and severity of these events has steadily increased since the 1980s. Large-scale mass coral bleaching events are driven by unusually warm sea temperatures and calm seas. The effects of these mass events are potentially devastating to ecosystems and the people who depend on them.

The initial onset of mass coral bleaching zones and a fluctuation of severity, via the Florida Keys BleachWatch Program, models commercial and scientific divers who visit the reef, the divers complete a data form. The data generated according to the current conditions report will be provided with an underwater camera.

- [Submit a Report Online](#)
- [Print a Report to FAX/Mail](#)
- [Reporting Instructions](#)

Information from NOAA's Coral Reef Watch (CRW) in-situ environmental monitoring system (ICON) field to provide a comprehensive overview of the current conditions report generated according to the current

Most Recent Current Conditions Report



October 12-MODERATE

- **2015:** [June 2-LOW](#), [July 1-MODERATE](#), [July 17, 2015-MODERATE](#), [August 3, 2015-MODERATE](#), [August 14-HIGH](#), [August 28-HIGH](#), [September 11-HIGH](#), [September 25, 2015-MODERATE](#)
- **2014:** [May 30-LOW](#), [June 30-LOW](#), [August 1-MODERATE](#), [August 14-MODERATE](#), [August 28-HIGH](#), [September 11-MODERATE](#), [September 25-MODERATE](#), [October 9-LOW](#), [November 5-LOW](#)
- **2013:** [June 3-LOW](#), [July 1-LOW](#), [July 31-LOW](#), [September 3-LOW](#), [September 28-LOW](#), [October 30-LOW](#)
- **2012:** [June 1-LOW](#), [July 2-LOW](#), [August 2-MODERATE](#), [August 17-MODERATE](#), [September 6-MODERATE](#), [September 27-LOW](#), [October 25-LOW](#)
- **2011:** [June 2-LOW](#), [July 1-LOW](#), [July 22-MODERATE](#), [August 8-MODERATE](#), [August 22-MODERATE](#), [September 6-MODERATE](#), [September 19-MODERATE](#), [October 3-LOW](#), [October 31-LOW](#)
- **2010:** [June 1-LOW](#), [July 1-MODERATE](#), [July 23-LOW](#), [August 6-MODERATE](#), [August 20-MODERATE](#), [September 3-MODERATE](#), [September 17-MODERATE](#), [October 1-LOW](#), [November 1-LOW](#)
- **2009:** [June 2-LOW](#), [July 2-LOW](#), [July 16-MODERATE](#), [July 30-MODERATE](#), [August 13-MODERATE](#), [August 27-MODERATE](#), [September 10-MODERATE](#), [September 24-MODERATE](#), [October 8-LOW](#), [November 5-LOW](#)
- **2008:** [June 2-LOW](#), [June 30-LOW](#), [August 1-LOW](#), [August 15-MODERATE](#), [September 1-MODERATE](#), [September 26-LOW](#), [October 30-LOW](#)
- **2007:** [June 1-LOW](#), [June 29-LOW](#), [July 16-MODERATE](#), [July 30-HIGH](#), [August 13-HIGH](#), [August 27-MODERATE](#), [September 10-HIGH](#), [October 1-LOW](#), [October 30-LOW](#)
- **2006:** [June 1-LOW](#), [June 30-LOW](#), [July 31-MODERATE](#), [August 14-MODERATE](#), [August 28-MODERATE](#), [September 19-LOW](#), [October 19-LOW](#)
- **2005:** [June 1-LOW](#), [June 28-LOW](#), [July 26-MODERATE](#), [August 9-HIGH](#), [August 16-MODERATE](#), [August 23-HIGH](#), [August 30-MODERATE](#), [September 13-MODERATE](#), [September 27-LOW](#), [October 18-LOW](#)

mote.org/bleachwatch



Publications

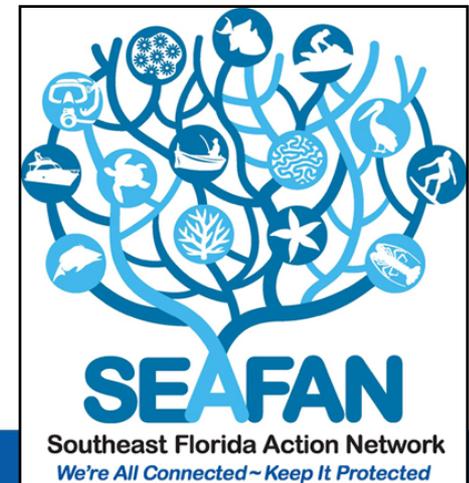
and other uses of BleachWatch Observer data:

- **Caribbean Corals in Crisis: Record Thermal Stress, Bleaching, and Mortality in 2005.** Eakin CM, Morgan JA, Heron SF, Smith TB, Liu G, et al. (2010) PLoS ONE 5(11): e13969.
- **Prediction of Coral Bleaching in the Florida Keys Using Remotely Sensed Data.** Barnes, Brian B.; Hallock, Pamela; Hu, Chuanmin; Muller-Karger, Frank; Palandro, David; Walter, Cory; Zepp, Richard (2015) Coral Reefs, Volume 34, Issue 2, pp.491-503
- **Coral bleaching data from BleachWatch in the Florida Keys National Marine Sanctuary from 2015-05-31 to 2015-11-03 (NCEI Accession 0140822)** Dieveney, Beth; Walter, Cory; Bartels, Erich (2016).



BleachWatch Reporting

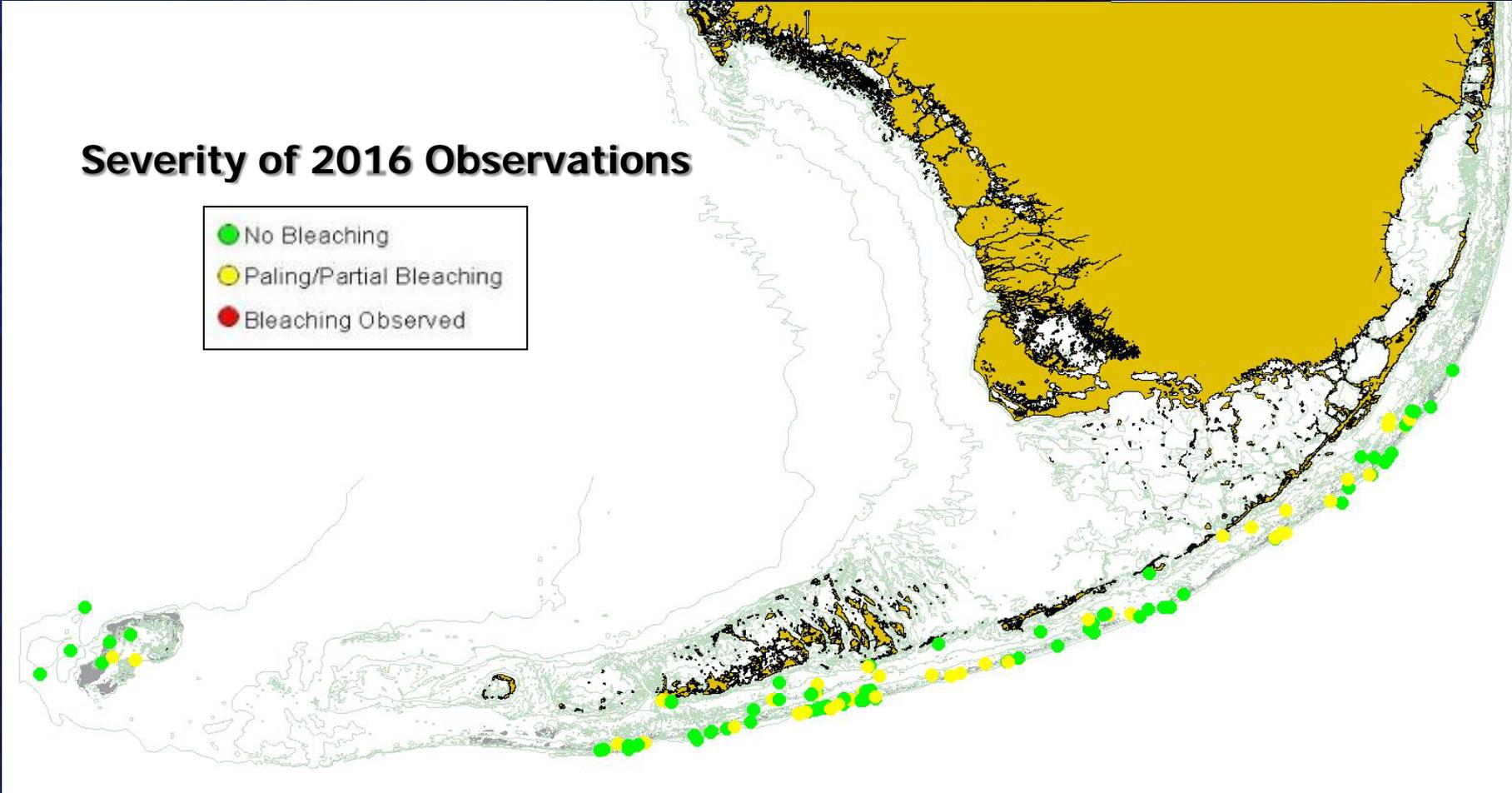
- Average 300 reports a season
- Over 500 volunteers trained to date
- Average 50 volunteers reported a season
- 95 Current Conditions Reports distributed
- Average 3 training sessions a season
- Great relationships with several organizations



2016 Coral Bleaching (N=201)

Severity of 2016 Observations

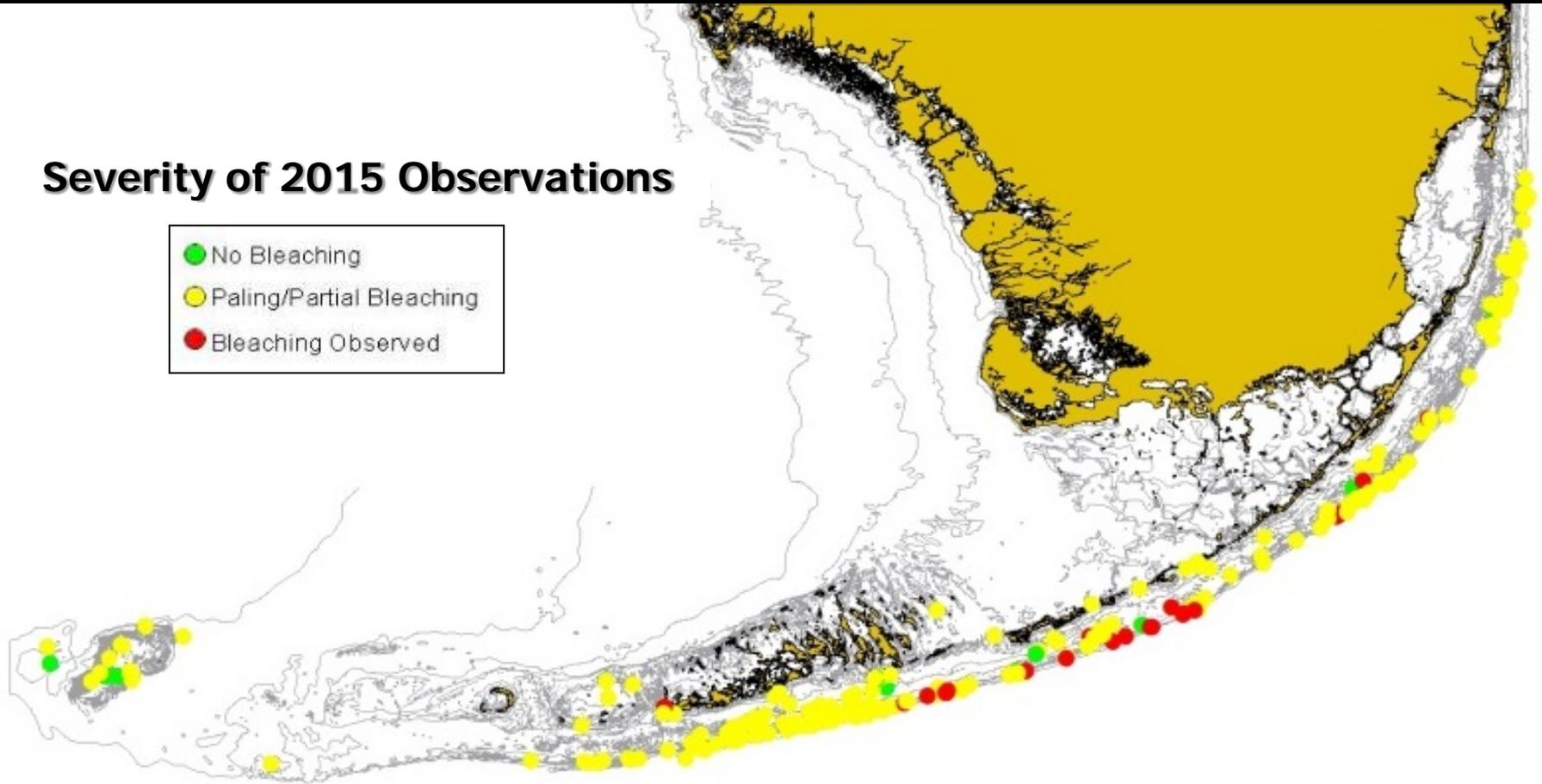
- No Bleaching
- Paling/Partial Bleaching
- Bleaching Observed



2015 Coral Bleaching (N=319)

Severity of 2015 Observations

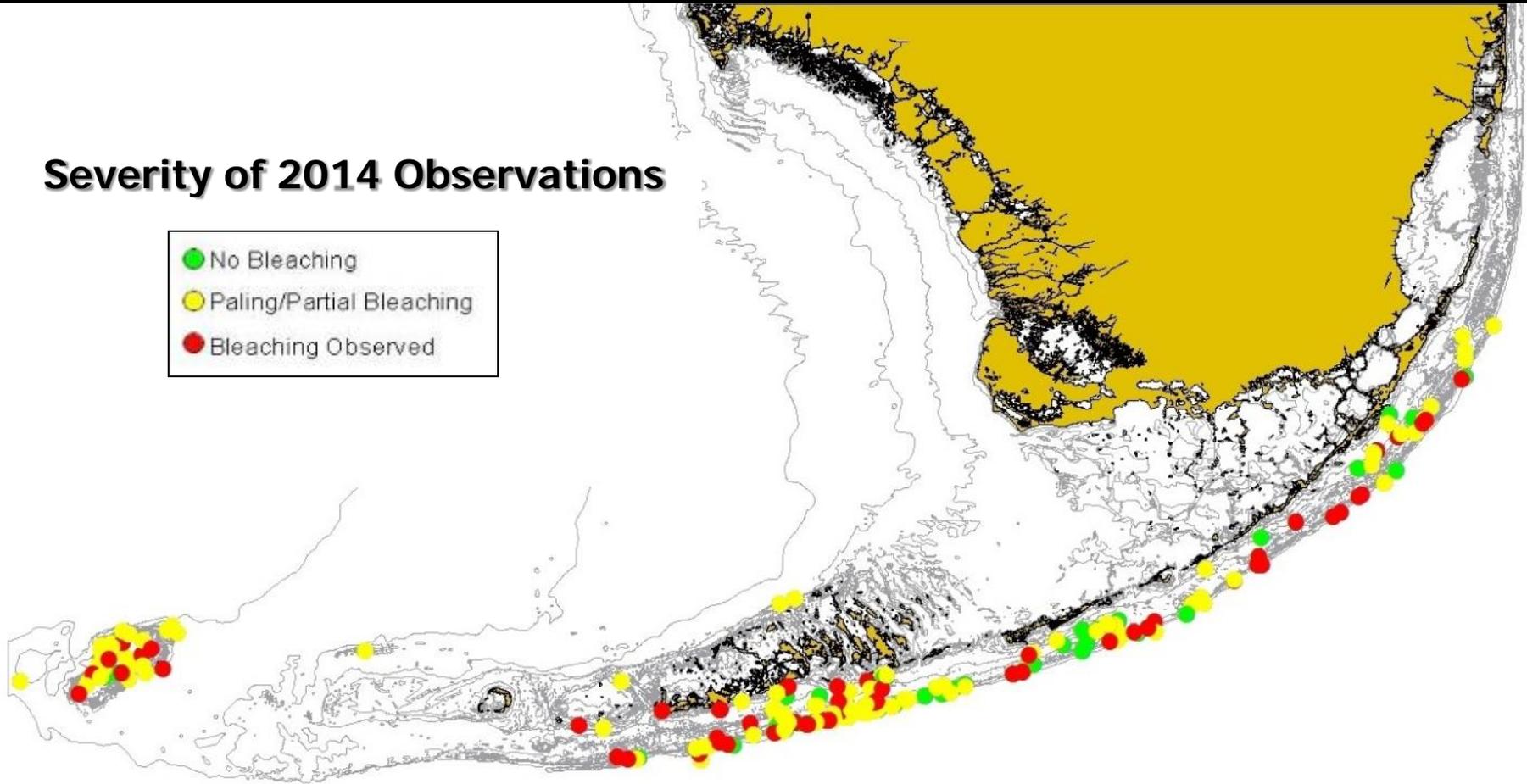
- No Bleaching
- Paling/Partial Bleaching
- Bleaching Observed



2014 Coral Bleaching (n=302)

Severity of 2014 Observations

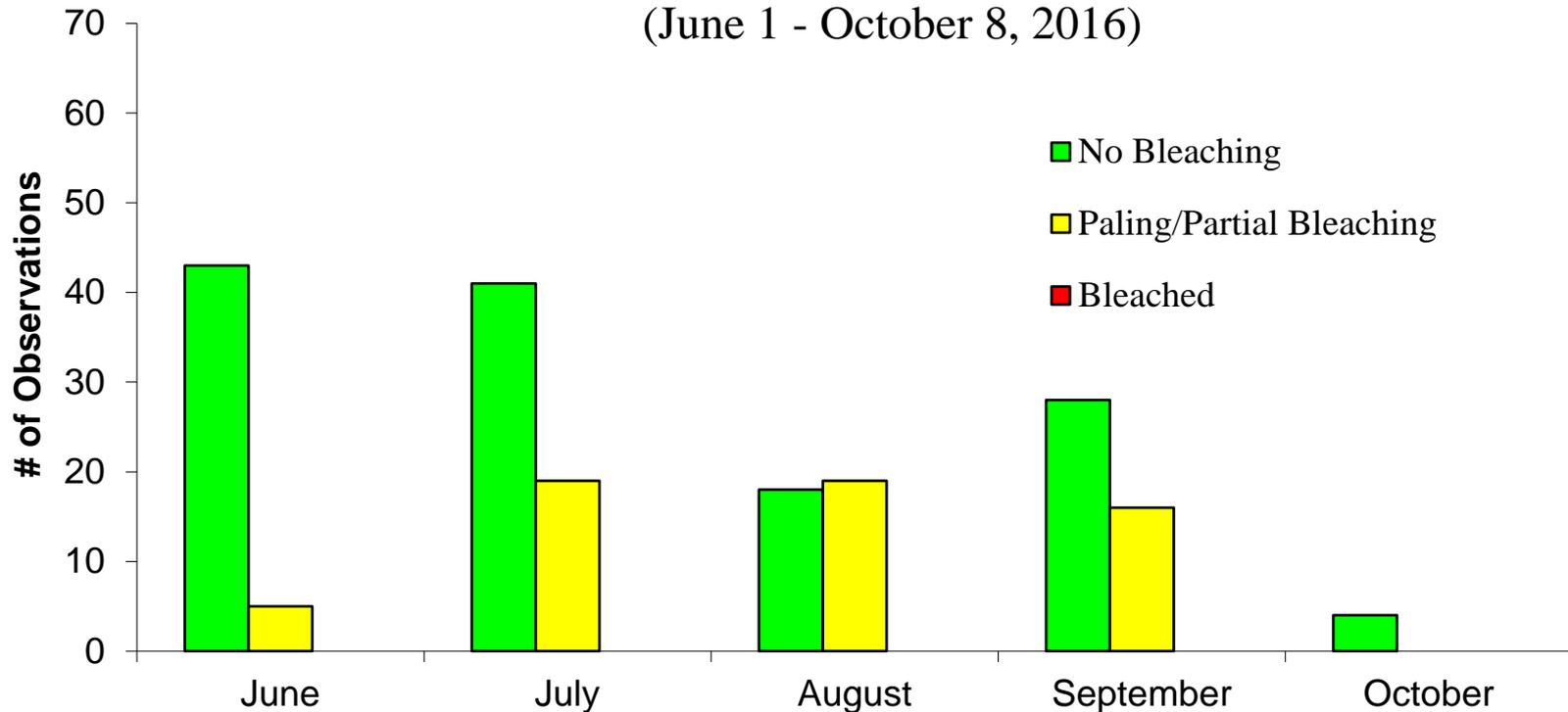
- No Bleaching
- Paling/Partial Bleaching
- Bleaching Observed



2016 Coral Bleaching

(N=193)

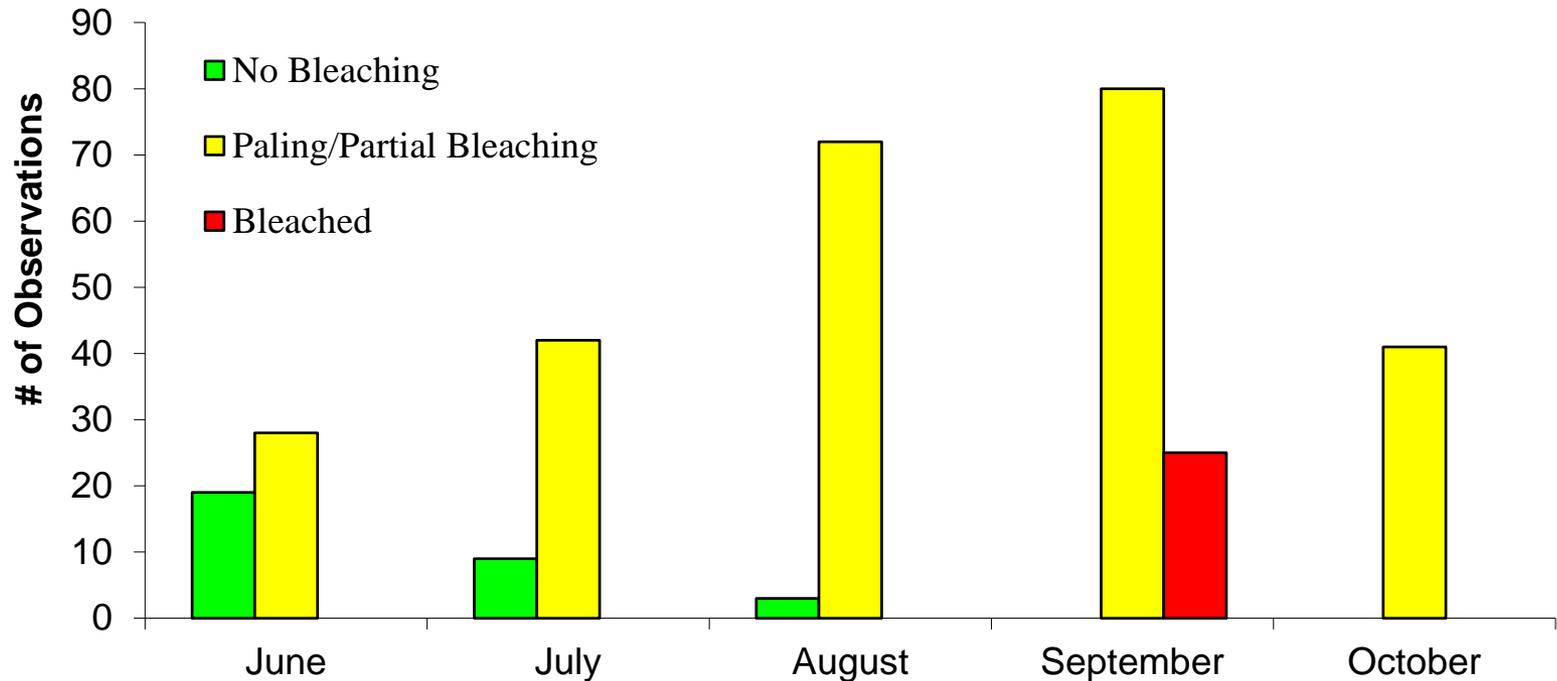
**2016 Number of Observations
by Coral Bleaching Severity**
(June 1 - October 8, 2016)



2015 Coral Bleaching

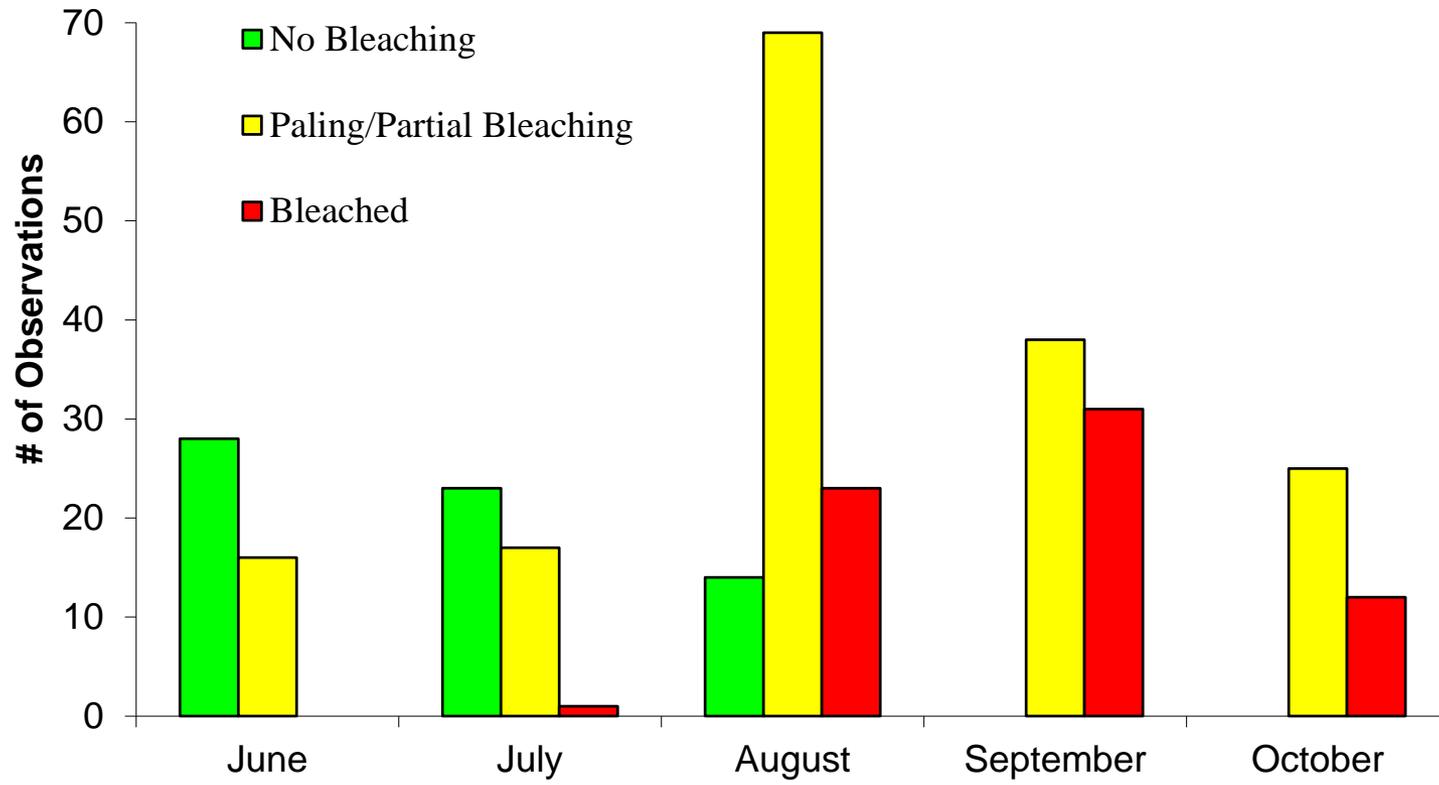
(n=319)

**2015 Number of Observations
by Coral Bleaching Severity**
(June 1 - October 31, 2015)



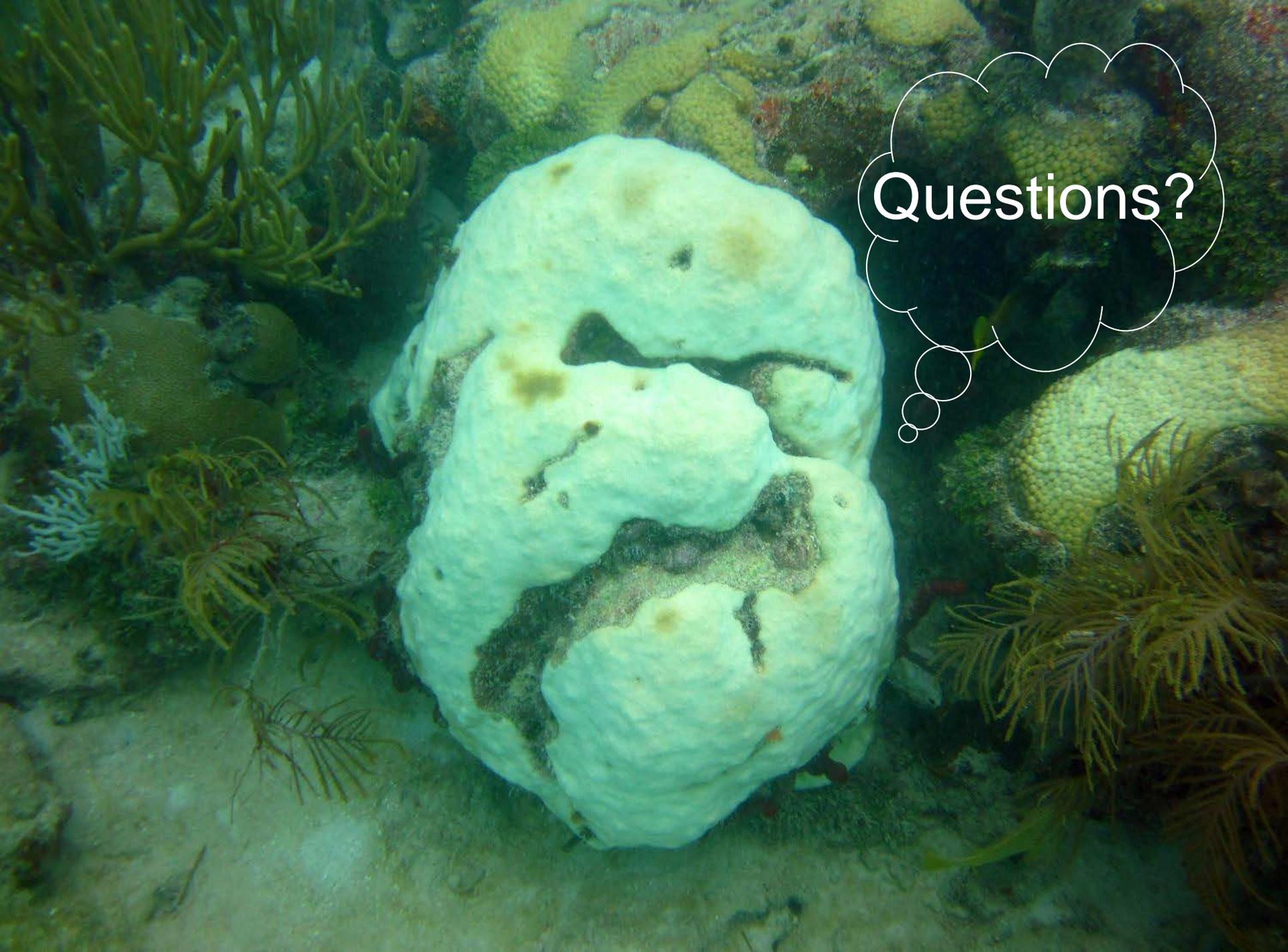
2014 Coral Bleaching (N=302)

**2014 Number of Observations
by Coral Bleaching Severity
(June - October, 2014)**



Thank You



A large, white, porous, brain-like coral structure is the central focus of the image. It has a complex, irregular shape with many small openings and a textured surface. The coral is surrounded by other reef life, including green branching corals, brown feathery corals, and yellowish sponges. The background is a mix of these colors and textures, creating a rich, diverse reef environment. The lighting is somewhat dim, suggesting an underwater setting.

Questions?