Florida Reef Resilience Program

Disturbance Response Monitoring

Quick Look Report:

Summer 2014

Introduction

The summer of 2014 was the worst severe bleaching year since the FRRP DRM surveys began in 2005. Severe bleaching occurred within zones of the Broward-Miami, Biscayne, Upper Keys, Middle Keys, Lower Keys and Dry Tortugas sub-regions.

The Florida Reef Resilience Program (FRRP) is a collaborative effort among managers, scientists, conservation organizations and reef users, to develop resilience-based management strategies for coping with climate change and other stresses on Florida's coral reefs. With projected increases in coral bleaching due to climate change, the FRRP Disturbance Response Monitoring (DRM) was developed for monitoring shallow coral reefs from the Dry Tortugas to Martin County. The DRM consists of a probabilistic sampling design and a stony coral condition monitoring protocol implemented during the annual period of peak thermal stress. Each year, survey teams from federal, state, and local government agencies, universities and non-governmental organizations cooperate to complete surveys across the south Florida Reef Tract within a six to eight week period. In 2014, surveyors included: The Nature Conservancy, Mote Marine Laboratory, University of Miami, Nova Southeastern University, Miami-Dade County, Broward County, Florida Fish and Wildlife Conservation Commission, Florida Department of Environmental Protection, National Oceanic and Atmospheric Administration and National Park Service.

Methodology

The DRM consists of a probabilistic sampling design that focuses on sampling the coral population based on how corals are distributed spatially within and across different sub-regions and zones of the overall reef tract. For the 2014 DRM season, 248 sample sites were allocated across 28 discrete reef zones in 10 sub-regions. Eleven survey teams of scientific divers conducted the monitoring in 2014.

Two independent 1x10m belt transects were randomly placed within each 100x100m sampling site. Indicators were then recorded for all stony corals greater than 4cm including: 1) hard coral size and 2) hard coral condition as determined by the presence of bleaching and paling, the precursor to bleaching, presence of disease, and percent morality.

Results

A total of 172 DRM surveys were completed from August 18th - October 17th, 2014. The prevalence of bleaching and paling in each zone was determined and broken into three categories: mild (0-20%), moderate (21-50%) and severe (>50%) (Figure 1; Table 1).

Severe bleaching and paling, which is defined as >50% of all hard corals over 4cm surveyed showing signs of bleaching or paling, occurred within zones of the Broward-Miami, Biscayne, Upper Keys, Middle Keys, Lower Keys and Dry Tortugas sub-regions. Moderate bleaching (21-50%) occurred in Martin, North and South Palm Beach, Deerfield and Upper Keys sub-regions. Mild bleaching (0-20%) only occurred in the Broward-Miami and South Palm Beach sub-regions, in the Deepwater and Outer Reef zones. One zone in each of the Biscayne, Broward Miami and Deerfield sub-regions only had 1 survey completed (Table 1). Due to the severity of the bleaching, this data was still included in the analysis. Low winds and high water temperatures continued from June throughout September, creating ideal conditions for mass bleaching. Current Conditions reports for the Florida Keys and southeast Florida, between Miami-Dade and Martin County, reported "High" threats of mass bleaching throughout most of the bleaching season.

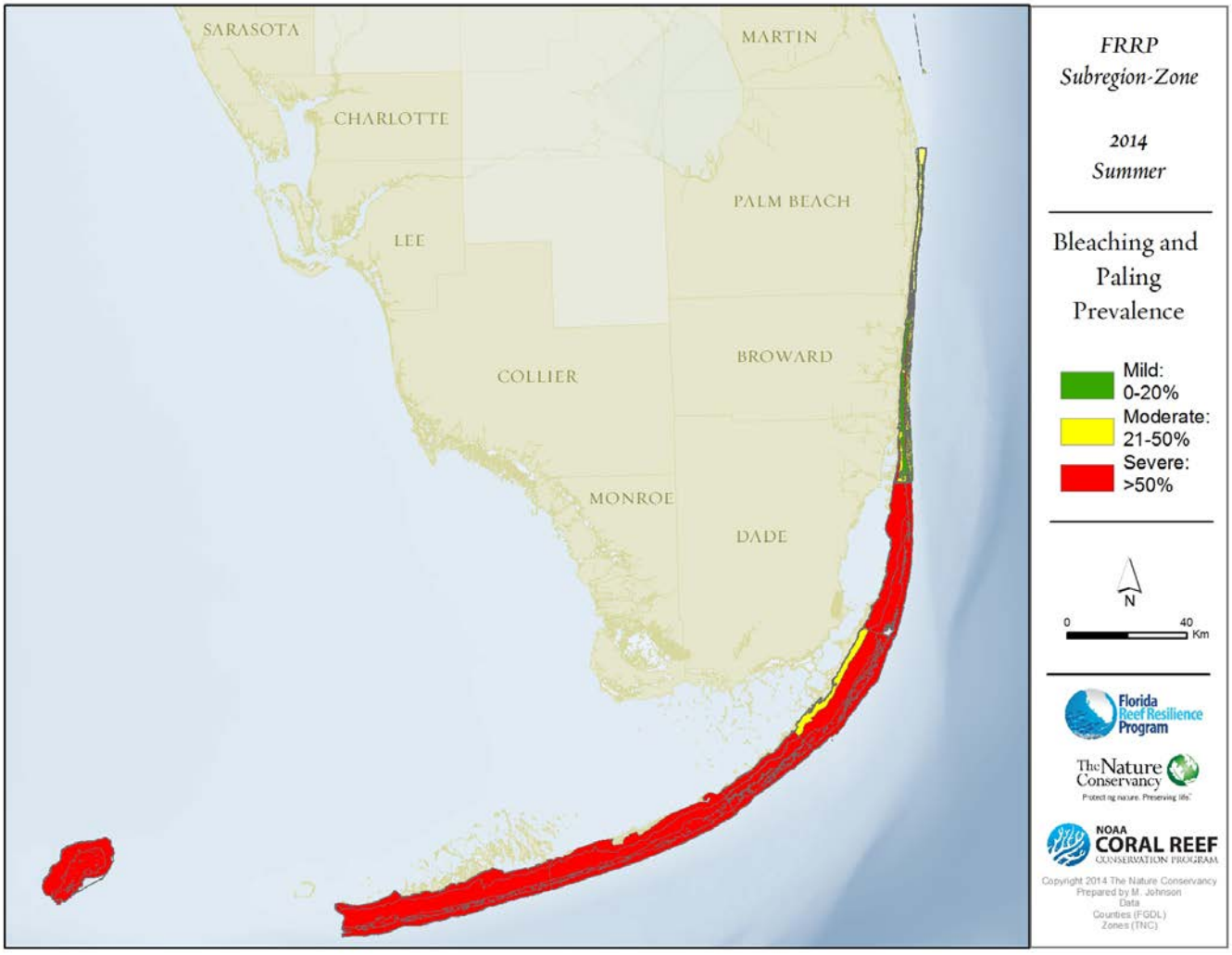

Figure 1: Percent bleaching and paling prevalence of surveyed hard coral colonies.

Table 1: Bleaching and paling prevalence of hard coral colonies surveyed by sub-region and zone. Red indicates severe (>50%), yellow indicates moderate (21-50%) and green indicates mild (0-20%) bleaching and paling prevalence.

Sub-Region	Zone	% Paling Prevalence	% Bleaching and Paling Prevalence	# of Sites
Dry Tortugas	Lagoon	19.55	70.20	11
Dry Tortugas	Forereef	20.41	55.38	17
Lower Keys	Inshore	33.52	77.18	3
Lower Keys	Mid-Channel	6.09	71.42	6
Lower Keys	Offshore Patch	15.86	80.22	9
Lower Keys	Forereef	18.98	79.83	24
Middle Keys	Inshore	32.65	52.42	2
Middle Keys	Mid-Channel	18.73	68.86	2
Middle Keys	Offshore Patch	24.73	77.66	5
Middle Keys	Forereef	29.79	59.06	8
Upper Keys	Inshore	16.67	50.00	2
Upper Keys	Mid-Channel	54.04	72.78	9
Upper Keys	Offshore Patch	12.66	90.37	2
Upper Keys	Forereef	17.18	77.98	11
Biscayne	Inshore	27.05	89.26	3
Biscayne	Mid-Channel	4.35	65.22	1
Biscayne	Forereef	10.75	61.38	15
Broward- Miami	Undetermined	11.54	42.31	1
Broward-Miami	Inshore	16.16	61.56	10
Broward-Miami	Deepwater	7.84	15.69	1
Broward-Miami	Inner Reef	18.95	54.41	8
Broward-Miami	Middle Reef	7.22	28.20	8
Broward-Miami	Outer Reef	13.75	29.90	5
Deerfield	Inshore	5.56	22.22	1
South Palm Beach	Inshore	9.38	25.00	2
South Palm Beach	Outer Reef	1.96	5.88	2
North Palm Beach	Inshore	28.57	28.57	2
Martin	Inshore	1.91	29.39	2

For more information about the Florida Reef Resilience Program and its Disturbance Response Monitoring effort see the website www.frrp.org. For more information about the 2014 Disturbance Response Monitoring results contact The Nature Conservancy at (305) 872- 7071 or email Meaghan Johnson, Marine Science Coordinator, at meaghan_johnson@tnc.org.