Florida Reef Resilience Program

Disturbance Response Monitoring

Quick Look Report:

Winter 2016

Introduction

The summer of 2015 was a moderate to severe bleaching year for Florida's coral reefs. Severe bleaching occurred in some areas of the Upper, Middle and Lower Keys, and Dry Tortugas sub-regions. High disease prevalence and recent mortality were recorded at sites throughout the Florida Reef Tract. Compared to the summer of 2014, bleaching, disease and recent mortality were lower, but still significant in certain sub-regions. Based on this data, the FRRP Steering Committee determined that post-bleaching surveys were necessary to determine the impacts of the bleaching.

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 2016, surveyors included: Mote Marine Laboratory, Broward County, Florida Department of Environmental Protection, Florida Fish and Wildlife Conservation Commission, and National Oceanic and Atmospheric Administration.

Methodology

For the 2016 DRM post-bleaching surveys, 31 fixed CREMP and SECREMP sites were chosen based on region, zone, and FWC input.

At each site, a 1x10m belt transect was completed at plots 1 and 2. Transect tapes were run from the offshore to inshore stake within each plot, and chain was laid beneath the tape. Surveyors then completed the 1x10m belt transect starting from the offshore stake, working inshore. 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 31 surveys were completed from February 2nd – March 18th, 2016. The prevalence of bleaching in each zone was determined and broken into three categories: mild (0-20%), moderate (21-50%) and severe

(>50%). Moderate bleaching (21-50%) occurred within sites of the Broward-Miami and Upper Keys sub-regions (Figure 1; Table 1).

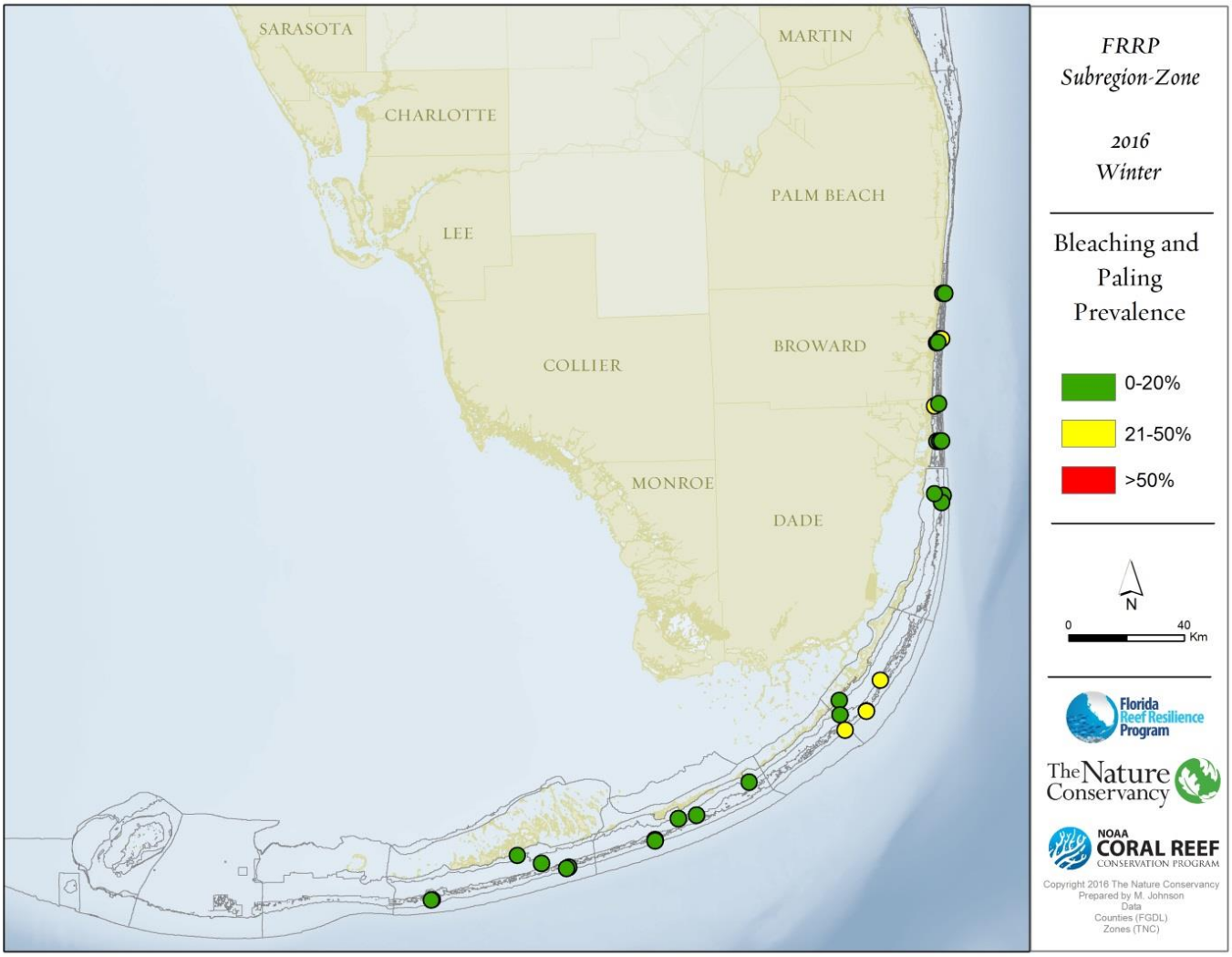

Figure 1: Percent bleaching prevalence of surveyed hard coral colonies.

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

Site	Sub-Region	Zone	% Bleaching Prevalence	% Bleaching and Paling Prevalence
4001	Lower Keys	Inshore	0.00	2.94
4002	Lower Keys	Mid Channel	0.00	3.92
4003	Lower Keys	Forereef	2.90	10.87
4004	Lower Keys	Forereef	1.16	9.83
4005	Lower Keys	Forereef	0.00	2.63
4006	Lower Keys	Forereef	4.69	18.75
4007	Middle Keys	Mid Channel	0.00	0.00
4008	Middle Keys	Mid Channel	0.00	11.03
4009	Middle Keys	Offshore Patch	0.00	10.19
4010	Middle Keys	Forereef	2.44	20.73
4011	Middle Keys	Forereef	2.94	5.88
4012	Upper Keys	Inshore	0.00	0.00
4013	Upper Keys	Mid Channel	6.29	16.78
4014	Upper Keys	Forereef	2.73	35.46
4015	Upper Keys	Forereef	7.41	29.26
4016	Upper Keys	Forereef	7.87	44.67
4017	Upper Keys	Forereef	4.55	38.64
4018	Broward-Miami	Inner Reef	0.00	2.86
4019	Broward-Miami	Middle Reef	0.00	3.45
4020	Broward-Miami	Outer Reef	0.00	0.00
4021	Biscayne	Forereef	0.00	8.16
4022	Biscayne	Forereef	0.00	9.09
4023	Broward-Miami	Inshore	5.56	22.22
4024	Broward-Miami	Middle Reef	6.67	13.33
4025	Biscayne	Inshore	0.00	0.00
4027	Broward-Miami	Inshore	0.00	5.88
4028	Broward-Miami	Middle Reef	22.22	22.22
4029	Broward-Miami	Outer Reef	23.08	38.46
4030	Broward-Miami	Inner Reef	2.08	2.08
4031	Deerfield	Middle Reef	0.00	8.33
4032	Deerfield	Outer Reef	7.69	15.39

Moderate recent mortality (6-10%) only occurred within the inshore site of the Broward-Miami sub-region, while low recent mortality (0-5%) occurred at remaining surveyed sites (Figure 2; Table 2).

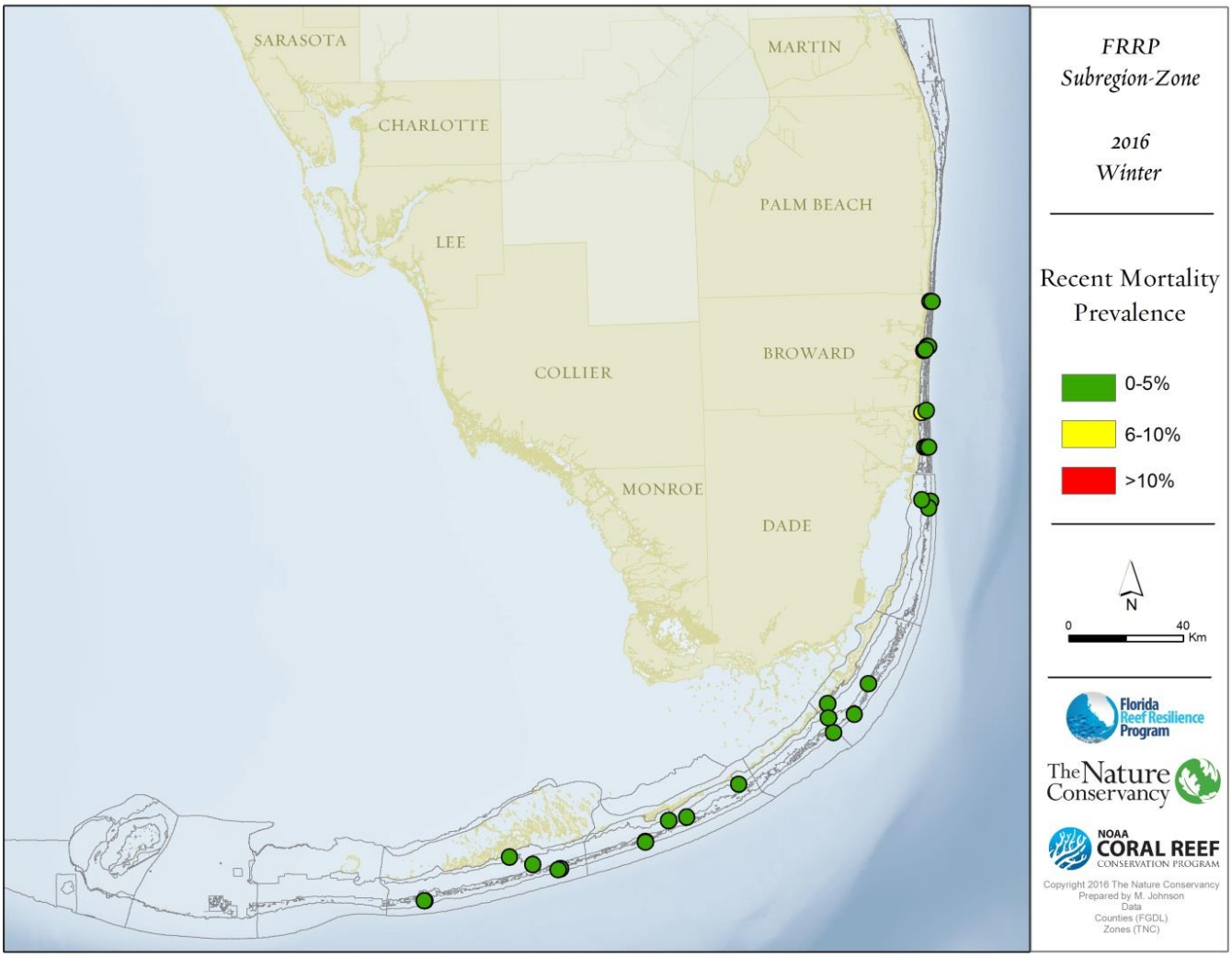

Figure 2: Percent recent mortality prevalence of surveyed hard coral colonies.

Table 2: Recent mortality prevalence of hard coral colonies surveyed by site. Red indicates severe (>10%), yellow indicates moderate (5-10%) and green indicates mild (0-5%) recent mortality prevalence.

Site	Sub-Region	Zone	% Recent Mortality Prevalence
4001	Lower Keys	Inshore	0.00
4002	Lower Keys	Mid Channel	0.00
4003	Lower Keys	Forereef	1.60
4004	Lower Keys	Forereef	0.05
4005	Lower Keys	Forereef	0.05
4006	Lower Keys	Forereef	0.30
4007	Middle Keys	Mid Channel	0.15
4008	Middle Keys	Mid Channel	2.60
4009	Middle Keys	Offshore Patch	0.30
4010	Middle Keys	Forereef	0.95
4011	Middle Keys	Forereef	0.60
4012	Upper Keys	Inshore	0.00
4013	Upper Keys	Mid Channel	1.50
4014	Upper Keys	Forereef	0.05
4015	Upper Keys	Forereef	1.15
4016	Upper Keys	Forereef	0.30
4017	Upper Keys	Forereef	0.45
4018	Broward-Miami	Inner Reef	0.00
4019	Broward-Miami	Middle Reef	0.00
4020	Broward-Miami	Outer Reef	0.00
4021	Biscayne	Forereef	0.00
4022	Biscayne	Forereef	0.75
4023	Broward-Miami	Inshore	9.15
4024	Broward-Miami	Middle Reef	0.60
4025	Biscayne	Inshore	1.45
4027	Broward-Miami	Inshore	2.65
4028	Broward-Miami	Middle Reef	0.00
4029	Broward-Miami	Outer Reef	0.00
4030	Broward-Miami	Inner Reef	2.50
4031	Deerfield	Middle Reef	0.00
4032	Deerfield	Outer Reef	1.25

The disease prevalence at each site was determined and broken into three categories: (0-5%), (5-10%) and (>10%). Moderate disease (6-10%) occurred within the Broward-Miami inshore and Deerfield outer reef sites (Figures 3 and 4; Table 3).

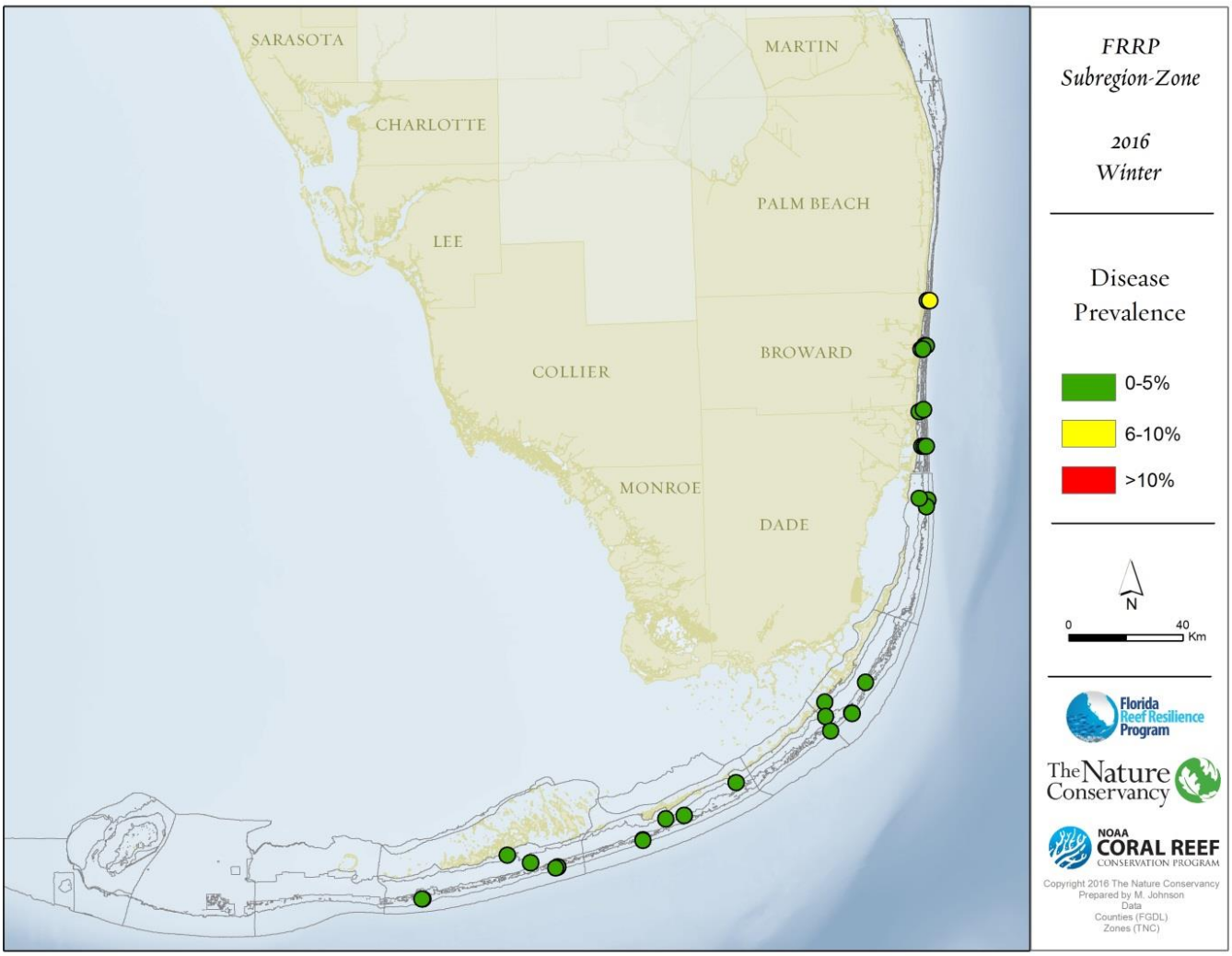

Figure 3: Percent disease prevalence of surveyed hard coral colonies.

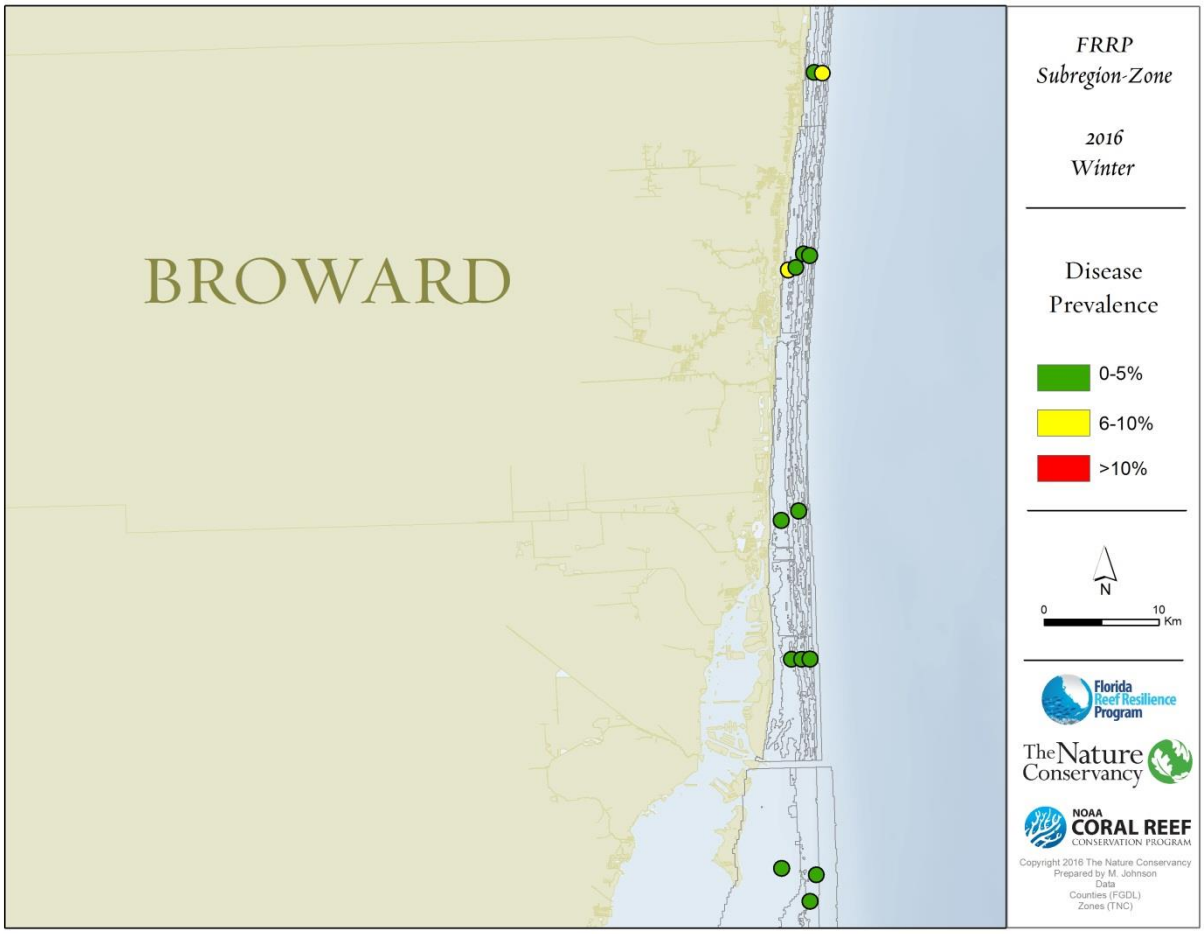

Figure 4: Percent disease prevalence of surveyed hard coral colonies in SEFL

Table 3: Disease prevalence of hard coral colonies surveyed by site. Red indicates severe (>10%), yellow indicates moderate (5-10%) and green indicates mild (0-5%) disease prevalence. Dark spots and white plague were the most recorded diseases.

Site	Sub-Region	Zone	% Disease Prevalence	%White Plague	% Dark Spots
4001	Lower Keys	Inshore	0.00		
4002	Lower Keys	Mid Channel	0.00		
4003	Lower Keys	Forereef	0.00		
4004	Lower Keys	Forereef	0.00		
4005	Lower Keys	Forereef	1.32		1.32
4006	Lower Keys	Forereef	4.69		4.69
4007	Middle Keys	Mid Channel	0.00		
4008	Middle Keys	Mid Channel	0.69		0.69
4009	Middle Keys	Offshore Patch	2.78		2.78
4010	Middle Keys	Forereef	0.00		
4011	Middle Keys	Forereef	0.49		0.49
4012	Upper Keys	Inshore	0.00		
4013	Upper Keys	Mid Channel	0.00		
4014	Upper Keys	Forereef	0.00		
4015	Upper Keys	Forereef	0.37		
4016	Upper Keys	Forereef	0.76		0.76
4017	Upper Keys	Forereef	0.38		0.38
4018	Broward-Miami	Inner Reef	2.86		
4019	Broward-Miami	Middle Reef	0.00		
4020	Broward-Miami	Outer Reef	0.00		
4021	Biscayne	Forereef	0.00		
4022	Biscayne	Forereef	0.00		
4023	Broward-Miami	Inshore	0.00		
4024	Broward-Miami	Middle Reef	0.00		
4025	Biscayne	Inshore	0.00		
4027	Broward-Miami	Inshore	9.80	9.80	
4028	Broward-Miami	Middle Reef	0.00		
4029	Broward-Miami	Outer Reef	0.00		
4030	Broward-Miami	Inner Reef	4.17	4.17	
4031	Deerfield	Middle Reef	0.00		
4032	Deerfield	Outer Reef	7.69	7.69	

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 2016 Winter Disturbance Response Monitoring results contact The Nature Conservancy at (305) 872- 7071 or email Meaghan Johnson, Marine Science Coordinator, at meaghan_johnson@tnc.org.