

Florida Reef Resilience Program Disturbance Response Monitoring Quick Look Report Summary

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Florida Reef Resilience Program

Disturbance Response Monitoring



Quick Look Report:

Summer 2013



Introduction

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 2013, 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, and National Oceanic and Atmospheric Administration.

The summer of 2013 was a mild bleaching year. Moderate bleaching occurred within zones of the Broward, Biscayne and Upper Keys sub-regions, mainly due to paling.

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 2013 DRM season, 91 sample sites were allocated across 23 discrete reef zones in 6 sub-regions. Eleven survey teams of scientific divers conducted the monitoring in 2013.

Two independent 1x10m belt transects were randomly placed within each 200x200m 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 mortality.

Results

A total of 100 DRM surveys were completed from August 19th - October 18th, 2013. 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).

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Moderate bleaching and paling, which is defined as 21-50% of all hard corals over 4cm surveyed showing signs of bleaching or paling, occurred within zones of the Broward, Biscayne and Upper Keys sub-regions. This was mainly due to high percentages of paling prevalence (Table 1). High winds and low water temperatures continued from August throughout October. Current Conditions reports for the Florida Keys and southeast Florida, between Miami-Dade and Martin County, reported “Low” threats of mass bleaching throughout the bleaching season.

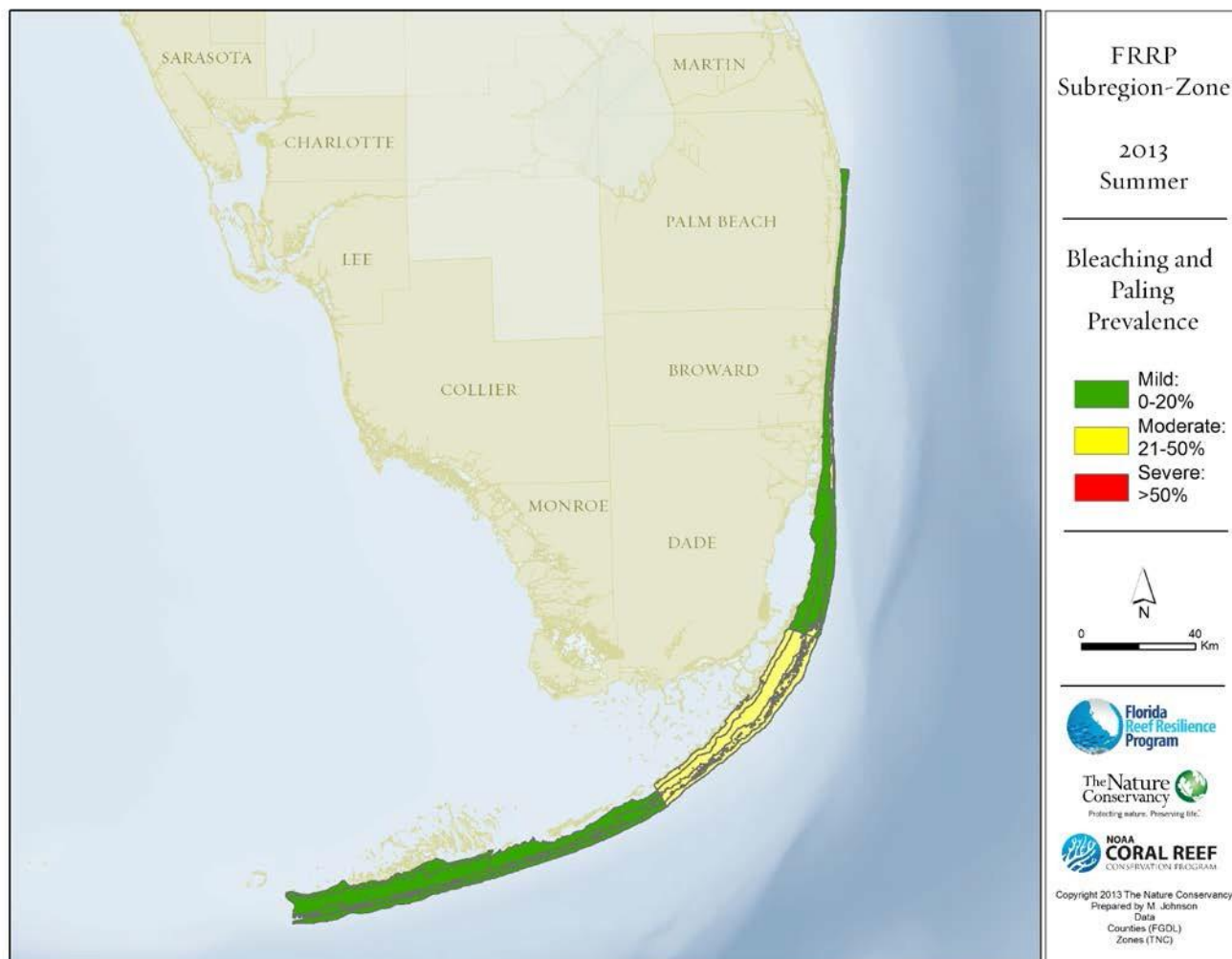


Figure 1: Percent bleaching and paling prevalence of surveyed hard coral colonies.

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
Lower Keys	Inshore	4.52	4.52	3
Lower Keys	Mid-Channel	3.13	3.31	4
Lower Keys	Offshore Patch	4.03	4.03	2
Lower Keys	Forereef	6.70	6.88	12
Middle Keys	Inshore	0.00	0.00	3
Middle Keys	Mid-Channel	2.04	3.73	2
Middle Keys	Offshore Patch	4.85	6.61	2
Middle Keys	Forereef	10.86	13.24	9
Upper Keys	Inshore	20.79	24.75	3
Upper Keys	Mid-Channel	13.28	21.75	4
Upper Keys	Offshore Patch	31.45	39.07	4
Upper Keys	Forereef	26.00	30.71	8
Upper Keys	Deepwater	4.37	4.37	2
Biscayne	Inshore	1.66	7.68	4
Biscayne	Mid-Channel	3.32	6.16	5
Biscayne	Offshore Patch	10.20	24.49	2
Biscayne	Forereef	3.03	8.74	15
Broward	Inshore	9.65	18.42	4
Broward	Inner Reef	14.46	24.10	3
Broward	Outer Reef	10.53	14.91	4
Palm Beach	Reef Ridge	5.73	8.85	3

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 2013 Disturbance Response Monitoring results contact The Nature Conservancy at (305) 872- 7071 or email Meaghan Johnson, Marine Science Coordinator, at meaghan_johnson@tnc.org.

Florida Reef Resilience Program

Disturbance Response Monitoring



Quick Look Report:

Summer 2014



Introduction

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.

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.

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 mortality.

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.

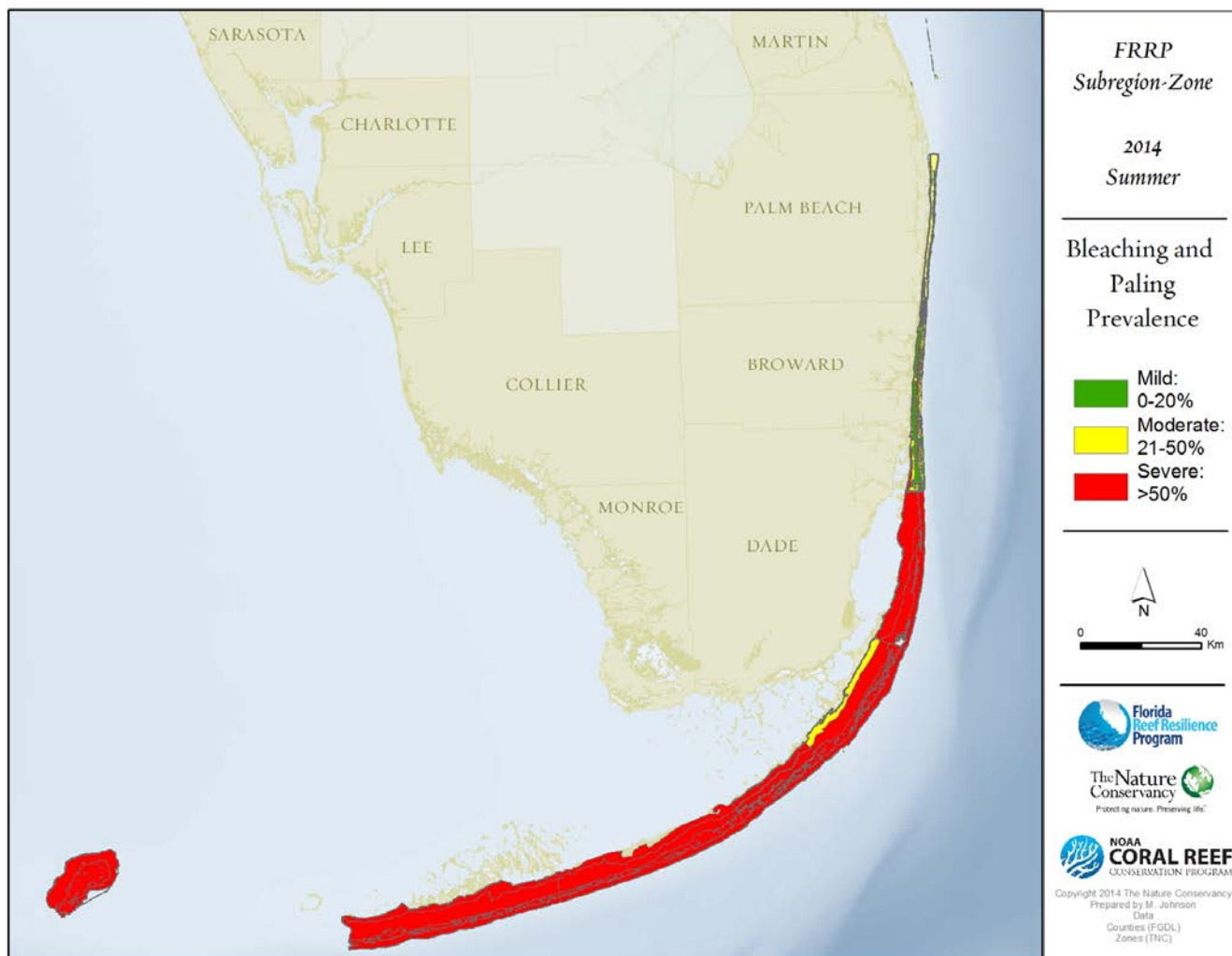


Figure 1: Percent bleaching and paling prevalence of surveyed hard coral colonies.

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.

Florida Reef Resilience Program

Disturbance Response Monitoring



Quick Look Report:

Winter 2015



Introduction

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 2015, surveyors included: Mote Marine Laboratory, Nova Southeastern University, Florida Fish and Wildlife Conservation Commission, and National Oceanic and Atmospheric Administration.

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. Due to the severity of the bleaching, the FRRP Steering Committee determined that post-bleaching surveys were necessary to determine the impacts of the bleaching.

Methodology

For the 2015 DRM post-bleaching surveys, 25 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 mortality.

Results

A total of 25 surveys were completed from January 12th – February 27th, 2015. The prevalence of bleaching in each zone was determined and broken into three categories: mild (0-20%), moderate (21-50%) and severe (>50%) (Figure 1; Table 1). Mild bleaching (0-20%) occurred within all regions surveyed (Broward-Miami, Upper Keys, Middle Keys and Lower Keys).

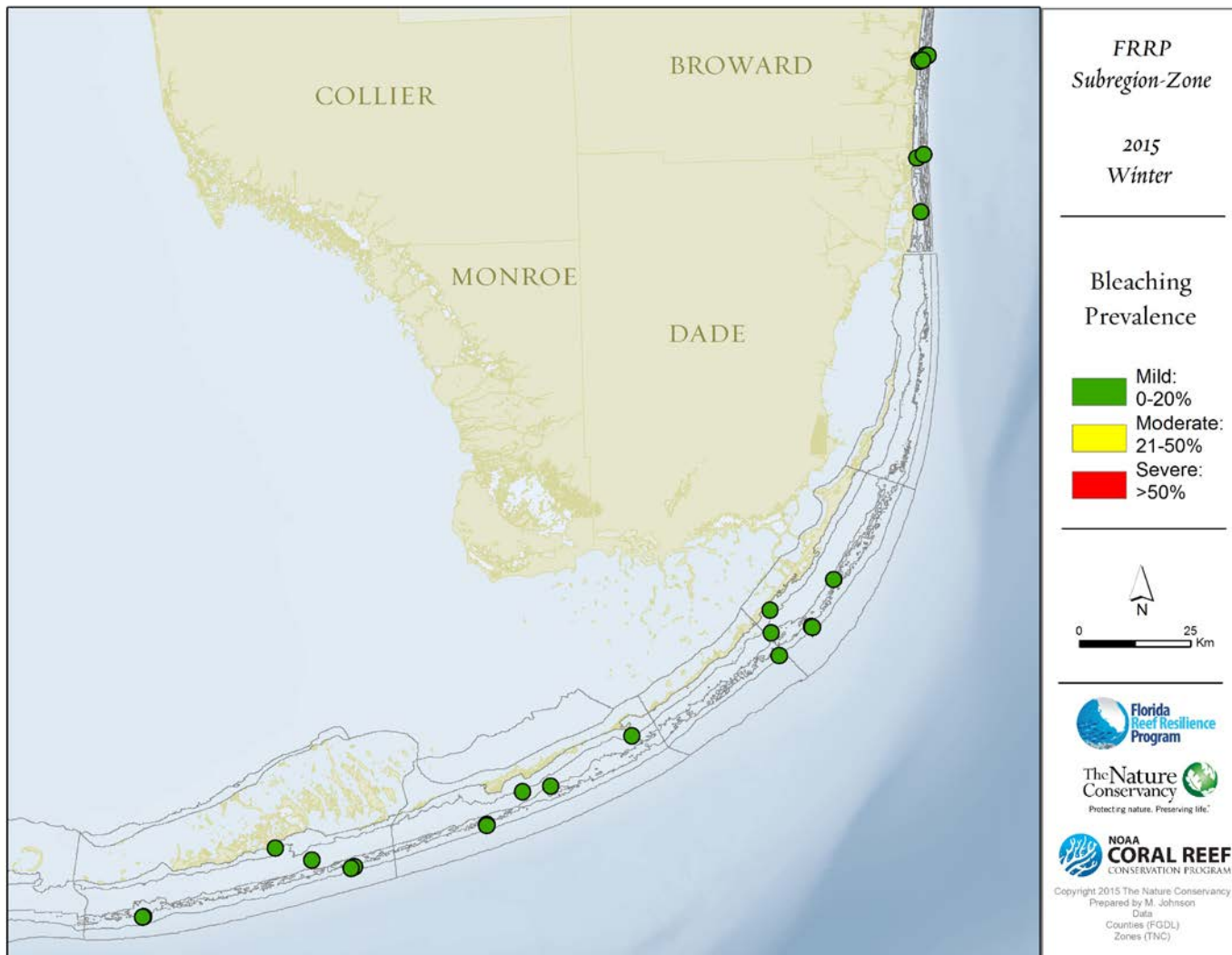


Figure 1: Percent bleaching prevalence of surveyed hard coral colonies.

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
N1001	Lower Keys	Inshore	0.00	0.00
N1002	Lower Keys	Mid-Channel	0.86	11.11
N1003	Lower Keys	Forereef	6.09	20.87
N1004	Lower Keys	Forereef	8.38	22.16
N1005	Lower Keys	Forereef	1.82	1.82
N2003	Lower Keys	Forereef	0.00	0.00
N1006	Middle Keys	Mid-Channel	2.44	3.05
N1007	Middle Keys	Mid-Channel	1.21	5.46
N1008	Middle Keys	Offshore Patch	1.47	17.65
N1009	Middle Keys	Forereef	3.85	9.23
N1010	Middle Keys	Forereef	0.00	33.33
N1016	Mid-Upper Keys Transition	Forereef	4.83	26.21
N1011	Upper Keys	Inshore	1.55	33.33
N1012	Upper Keys	Mid-Channel	5.10	18.88
N1013	Upper Keys	Forereef	4.94	14.07
N1014	Upper Keys	Forereef	8.21	22.02
N1015	Upper Keys	Forereef	3.33	4.44
N2023	Broward-Miami	Inner Reef	3.20	5.60
N2028	Broward-Miami	Inshore	0.99	3.96
N2029	Broward-Miami	Undetermined	0.00	2.86
N2031	Broward-Miami	Inshore	0.00	5.88
N2032	Broward-Miami	Inshore	0.00	2.38
N2033	Broward-Miami	Middle Reef	0.00	11.11
N2034	Broward-Miami	Outer Reef	2.04	2.04
N2035	Broward-Miami	Inner Reef	1.09	5.98

The prevalence of recent mortality at each site was determined and broken into three categories: mild (0-5%), moderate (5-10%) and severe (>10%) (Figure 2; Table 2). Severe recent mortality (>10%) occurred within the inshore zones of the Upper Keys and Broward-Miami sub-regions.

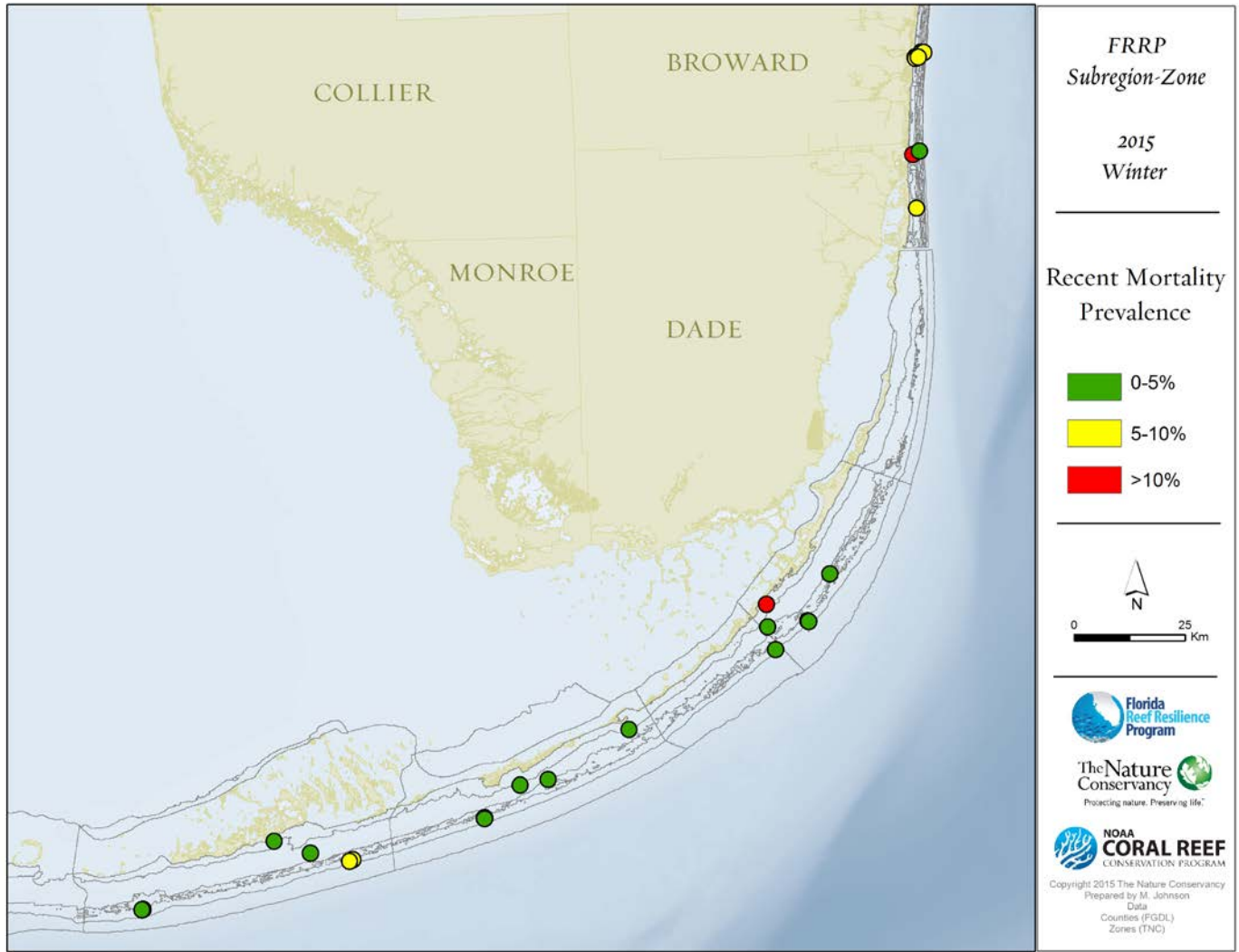


Figure 2: Percent recent mortality prevalence of surveyed hard coral colonies.

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
N1001	Lower Keys	Inshore	0.00
N1002	Lower Keys	Mid-Channel	2.56
N1003	Lower Keys	Forereef	7.83
N1004	Lower Keys	Forereef	9.58
N1005	Lower Keys	Forereef	0.00
N2003	Lower Keys	Forereef	1.11
N1006	Middle Keys	Mid-Channel	0.00
N1007	Middle Keys	Mid-Channel	1.83
N1008	Middle Keys	Offshore Patch	3.33
N1009	Middle Keys	Forereef	5.88
N1010	Middle Keys	Forereef	3.08
N1016	Mid-Upper Keys Transition	Forereef	1.49
N1011	Upper Keys	Inshore	33.33
N1012	Upper Keys	Mid-Channel	2.07
N1013	Upper Keys	Forereef	3.10
N1014	Upper Keys	Forereef	5.10
N1015	Upper Keys	Forereef	5.32
N2023	Broward-Miami	Inner Reef	10.40
N2028	Broward-Miami	Inshore	13.86
N2029	Broward-Miami	Undetermined	2.86
N2031	Broward-Miami	Inshore	17.65
N2032	Broward-Miami	Inshore	5.56
N2033	Broward-Miami	Middle Reef	1.85
N2034	Broward-Miami	Outer Reef	8.16
N2035	Broward-Miami	Inner Reef	9.78

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