

DECIPHERING BETWEEN PROJECT-RELATED AND REGIONAL IMPACTS TO CORAL REEF COMMUNITIES NEAR THE MIAMI HARBOR DREDGING PROJECT - THE SCIENCE BEHIND THE STORY

William F. Precht¹, Brooke Gintert^{1,2}, Terri Jordan-Sellers³, and Martha L. Robbart¹

¹Dial Cordy & Associates, Inc., Miami, FL, USA

²Rosenstiel School of Marine and Atmospheric Science, Univ. Miami, Virginia Key, FL, USA

³United States Army Corps of Engineers, Jacksonville, FL, USA



BUILDING STRONG[®]

The "Murky" Headlines

Activists sue to stop Government Cut dredge and protect coral

BY JENNY STALETOVICH - JSTALETOVICH@MIAMIHERALD.COM
10/01/2014 7:22 PM | Updated: 10/01/2014 7:22 PM

The New York Times | <http://nyti.ms/1A1IKJc>

TRUE STORY
APRIL 17

U.S.

Despite Protections, Miami Port Project Smothers Coral Reef in Silt

By LIZETTE ALVAREZ MARCH 7, 2015

Bay activists warn Corps to clean up dredge

BY JENNY STALETOVICH
07/17/2014 7:52 PM | Updated: 07/17/2014 8:20 PM

Miami-Dade County

Miami Herald

Biscayne Bay coral at risk from sloppy dredge work

BY JENNY STALETOVICH - JSTALETOVICH@MIAMIHERALD.COM
02/05/2015 4:50 PM | Updated: 02/05/2015 6:24 PM

HOWARD FAHM BEACH
New Times

ENVIRONMENTALISTS AGAIN WARN OF WIDESPREAD CORAL DAMAGE IN PORT EVERGLADES EXPANSION PROJECT

BY CHRIS JOSEPH

FRIDAY, SEPTEMBER 4, 2015 | 5 DAYS AGO

CBS NEWS / July 17, 2014, 8:43 AM

Bay dredging project threatens vital Miami reefs

Environmentalists ready to sue over Miami port's deep dredge

REUTERS | By Zachary Fagenson
August 28, 2014 7:45 PM

Miami's Choice: Bigger Ships or Coral Reefs?

Dredging in Biscayne Bay inflicts heavy damage on North America's only coral reef tract.

By Scott Wyland
for National Geographic

INTERNATIONAL BUSINESS TIMES

Twitter Rumor: 1D Fans Supposed...

Massive PortMiami Dredge Project 'Wiping Out' Vast Coral Field

Local

NOAA Says Port Miami Dredge Disaster For Reef

August 18, 2015 4:40 PM

NOAA Warns of "Rapid Deterioration" of Endangered Corals Due to Deep Dredge Sludge

By Michael E. Miller Thu., Sep. 18 2014 at 7:00 AM

8 Comments

Miami port dredging damaging sea life, state inspectors say

BY JENNY STALETOVICH
08/19/2014 6:36 PM | Updated: 08/19/2014 8:54 PM

Environment AUGUST 17, 2015

PortMiami dredge damages more coral than feds expected

Florida – Deep Dredge Critics File Emergency Demand to Stop “Destruction of Endangered Species”



LETTERS TO THE EDITOR MARCH 17, 2016 8:31 PM

Dredging sediment killed our port coral



BUILDING STRONG®

Project Related Sediment Impacts

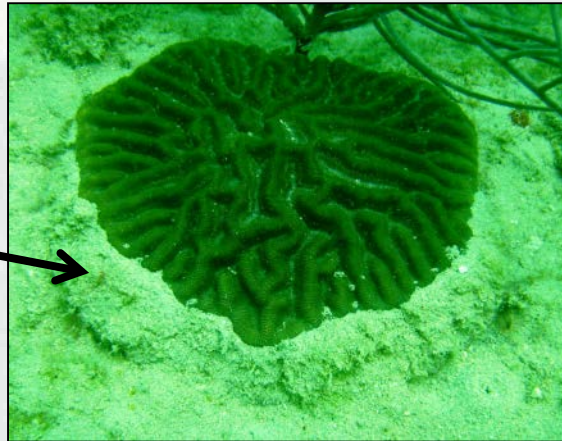
Survey Zone	Area	Site	Partial Mortality Related to Sediment Stress							
			All Corals				Without Dead Corals			
			#PM	N	Prop.	SD	#PM	N	Prop.	SD
Middle Reef	North	R2N1-RR	28	30	0.93	0.25	17	18	0.94	0.24
		R2N2-LR	15	24	0.63	0.49	12	20	0.60	0.50
		R2NC1-LR	2	28	0.07	0.25	2	24	0.08	0.27
		R2NC2-RR	2	30	0.07	0.25	2	28	0.07	0.26
	South	R2S1-RR	17	27	0.63	0.49	14	20	0.70	0.47
		R2S2-LR	15	24	0.63	0.49	6	12	0.50	0.52
Outer Reef	North	R2SC1-RR	9	30	0.30	0.47	8	21	0.38	0.50
		R2SC2-LR	2	25	0.08	0.28	1	11	0.10	0.32
	South	R3N1-LR	15	21	0.71	0.46	14	18	0.78	0.43
		R3NC1-LR	7	24	0.29	0.46	5	18	0.28	0.46
Total			137	400	0.34		100	289		

54%

Table Total Scleractinian mortality from baseline through the Middle and Outer reef impact assessment as measured at each compliance monitoring site. Mortality has been broken into categories based on cause of coral mortality and include: sediment, disease and bleaching (white plague not included), and white plague disease. The white plague disease category includes colonies photographed with definitive signs of white plague disease and those consistent with white plague due to the resulting mortality patterns, timing, location, and species involved. Corals showing active white plague have also been included.

Survey Zone	Area	Site	Scleractinian Mortality (Baseline through Middle and Outer Reef Impact Assessment)								
			N	Sediment	Bleaching / Disease	WP Mortality	WP Active	% Sediment Mortality	% WP Mortality	Total Mortality	% of Tagged Dead
			Middle Reef	South	R2S1	27	0	0	7	0	0.00
R2SC1	30	0			1	6	4	0.00	20.00	7	23.33
R2S2	24	0			0	9	4	0.00	37.50	9	37.50
North	R2SC2	25		0	2	11	0	0.00	44.00	13	52.00
	R2N1	30		0	0	12	0	0.00	40.00	12	40.00
	R2NC2	30		0	0	0	2	0.00	0.00	0	0.00
Outer Reef	South	R2N2	24	2	0	2	1	8.33	8.33	4	16.67
		R2NC1	28	0	0	0	1	0.00	0.00	0	0.00
		R3S1	19	1	0	0	0	5.26	0.00	1	5.26
	North	R3SC1	24	0	2	2	0	0.00	8.33	4	16.67
		R3S2	25	0	1	3	0	0.00	12.00	4	16.00
		R3SC2	20	0	0	7	2	0.00	35.00	7	35.00
Total	South	R3S3	25	0	0	4	4	0.00	16.00	4	16.00
		R3SC3	24	0	0	6	2	0.00	25.00	6	25.00
		R3N1	21	2	0	0	0	9.52	0.00	2	9.52
North	R3NC1	24	0	0	4	1	0.00	16.67	4	16.67	
	Totals	400	5	6	73	21	1.25	18.25	84	21.00	

Partial Coral Mortality In CNAT



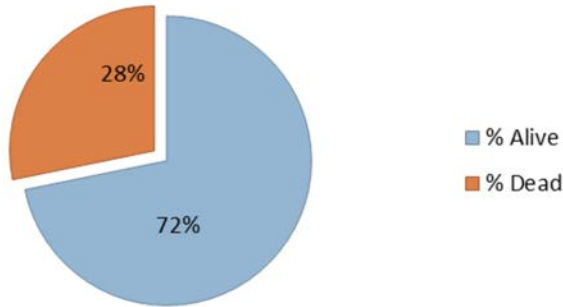
<2%



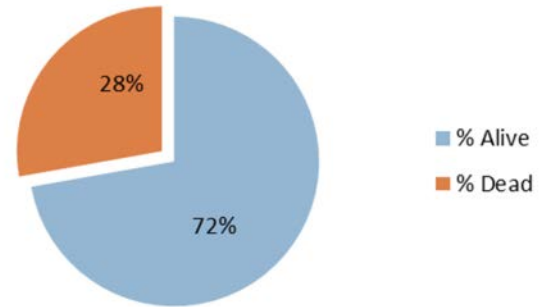
BUILDING STRONG®

What does the data say?

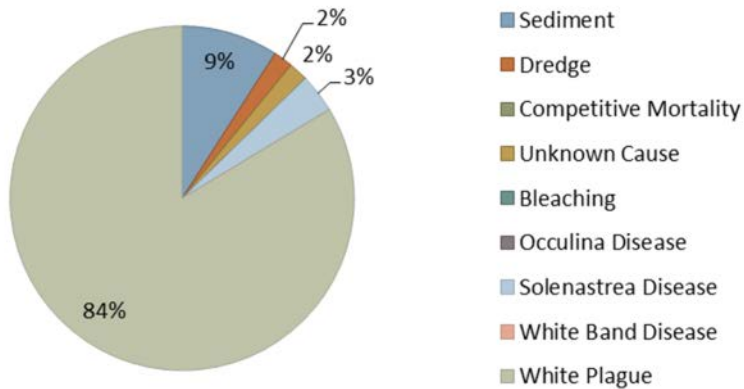
Middle and Outer Reef Channel-side (Baseline-Post)



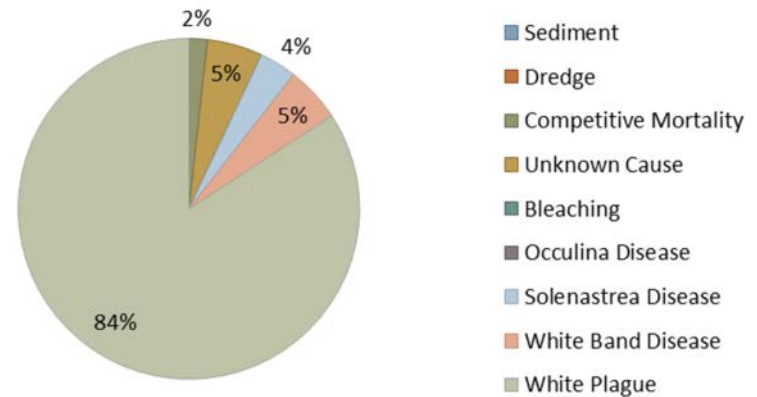
Middle and Outer Reef Controls (Baseline-Post)



Causes of Mortality: Channel-side

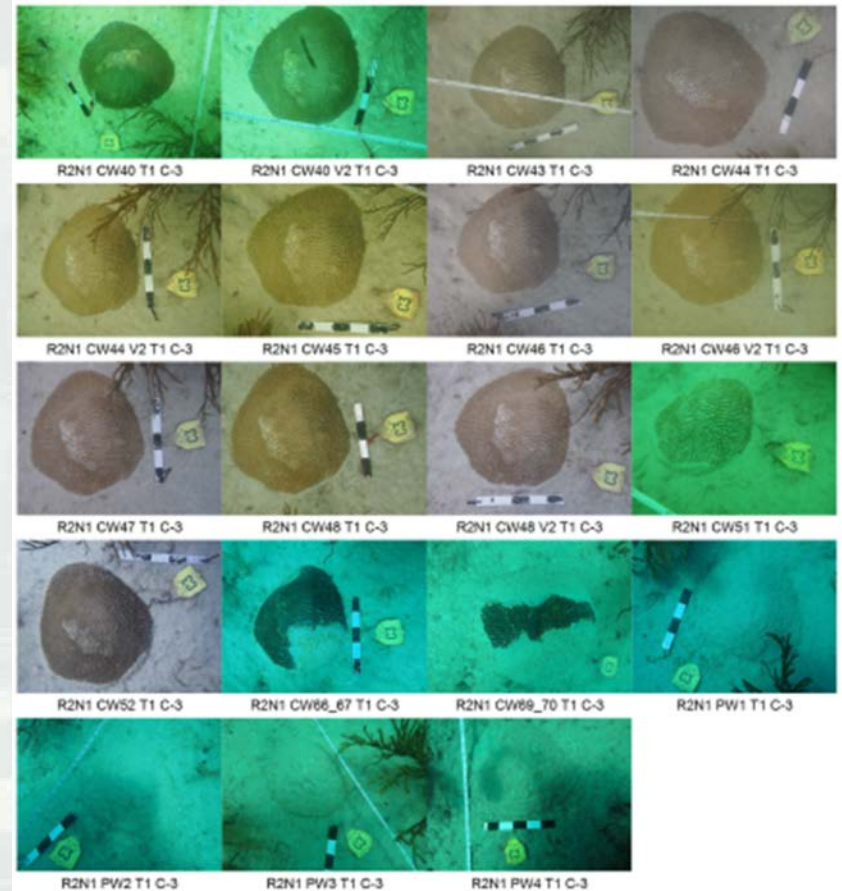


Causes of Mortality: Controls



The temporal data tells the story!

"Figure 5a and 5b. Likely colonies of *Meandrina meandrites* smothered by fine sediment from the Port of Miami expansion dredging." (from Report - NOAA Port of Miami Field Observations from May 19, 2015)



One-Off Surveys



PortMiami dredge damages more coral than feds expected | Miami Herald August 17, 2015

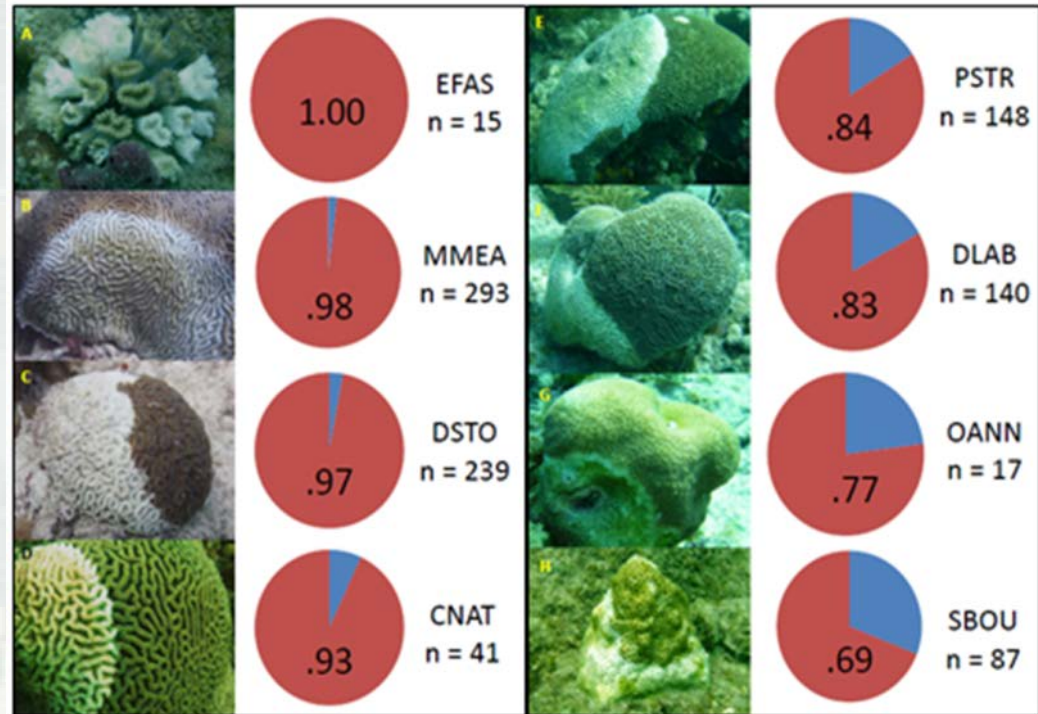
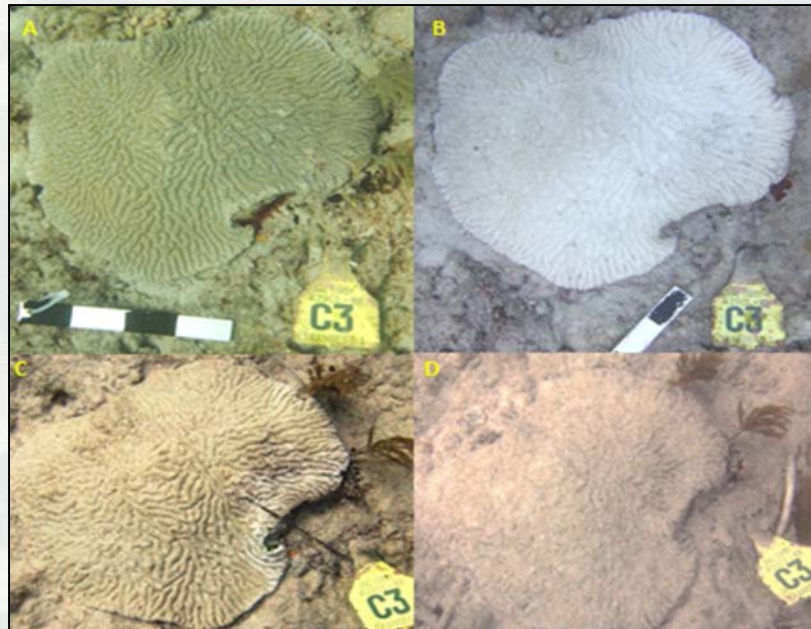
vs. Repeated Measures



Look familiar? BUILDING STRONG®



It's important to understand what happened regionally.



2014-2015 were bad years for corals in southeast Florida due to thermal stress (bleaching) and disease.



BUILDING STRONG®

The Washington Post

Energy and Environment

Bleaching and disease are devastating the biggest coral reef in the continental U.S.

By **Chelsea Harvey** October 26

The disease outbreaks have been especially severe in the area off the coast of Miami, where bleaching was particularly heavy, Morton said. While several different types of coral disease have been observed, a disease known as “white plague” has been the most prevalent.



BUILDING STRONG®

It's important to understand what happened in earlier similar projects!

Proceedings of the Fourth International Coral Reef Symposium, Manila, 1981, Vol. 1

IMPACT OF DREDGING ON A SUBTROPICAL REEF COMMUNITY, SOUTHEAST FLORIDA, U.S.A.

Donald S. Marszalek

Rosenstiel School of Marine and Atmospheric Science, University of Miami,
4600 Rickenbacker Causeway, Miami, Florida 33149 U.S.A.

Many of the small colonies of *D. stokesii*, *M. cavernosa* and other hemispherical forms showed a band of dead tissue adjacent to the substrate, buried beneath the layer of silt which covered the reef surface.

Scleractinian corals appeared to be the most impacted of the reef macrofauna. Although mass mortality of corals has not occurred, the number of corals exhibiting stress symptoms has increased during the course of the dredging project. All species present in the study area showed a similar tolerance to dredging. In 1978, after two dredging seasons, about 5% of the corals near the dredge showed a partial loss of zooxanthellae (pale spots); after the 1980 dredging season, as many as 32.3% of scleractinian corals along a transect adjacent to the dredge exhibited pale spots or loss of tissue near the base of



Conclusions

The regular monitoring of tagged corals at control and near project sites provided the detailed information needed to assign the correct cause of mortality to corals in the project area as opposed to the undocumented assertions of project opponents who conducted one-off surveys. The actual monitoring results from the project emphasize the requirement for implementing scientifically-based, not ideologically-based management of natural systems to best understand and protect our fragile coral resources.

