

9 May 2018

SAFMC Coral Advisory Panel Meeting

Florida Coral Disease Outbreak Update

Joshua D. Voss



Special thanks to:

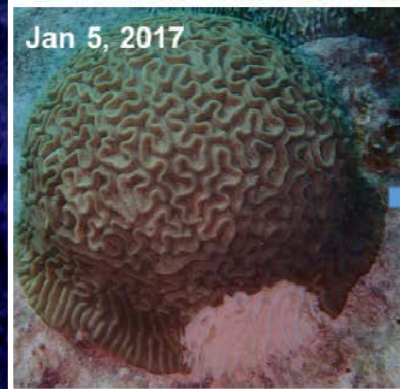
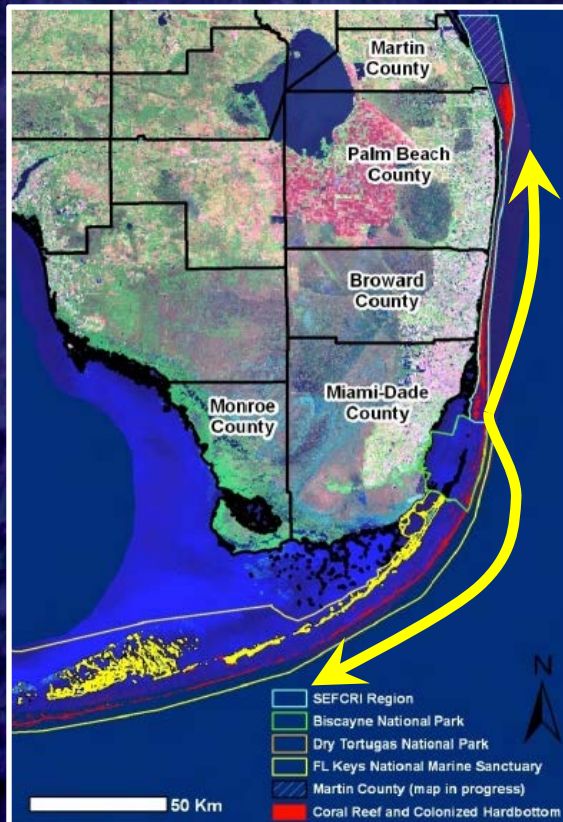
Brian Walker, Rob Ruzicka, Karen Neely, Val Paul, Greta Abey, Julie Meyer, Jan Landsberg, Cheryl Woodley, Erinn Muller, Cindy Lewis, Joanna Walczak, Karen Bohnsack, Kristi Kerrigan, Stephanie Schopmeyer, and the entire Florida Coral Disease Advisory Committee

HARBOR BRANCH

FLORIDA ATLANTIC UNIVERSITY

New Coral Disease Emergence

- First observed near Port of Miami in 2014
- Distinct line of necrosis and rapid coral tissue loss
- ≥ 15 coral species affected
- Spread to Palm Beach and Upper Keys by 2015



Disease Presentations



Diploria labyrinthiformis



Montastraea cavernosa



Pseudodiploria strigosa



Dichocoenia stokesii



Meandrina Meandrites

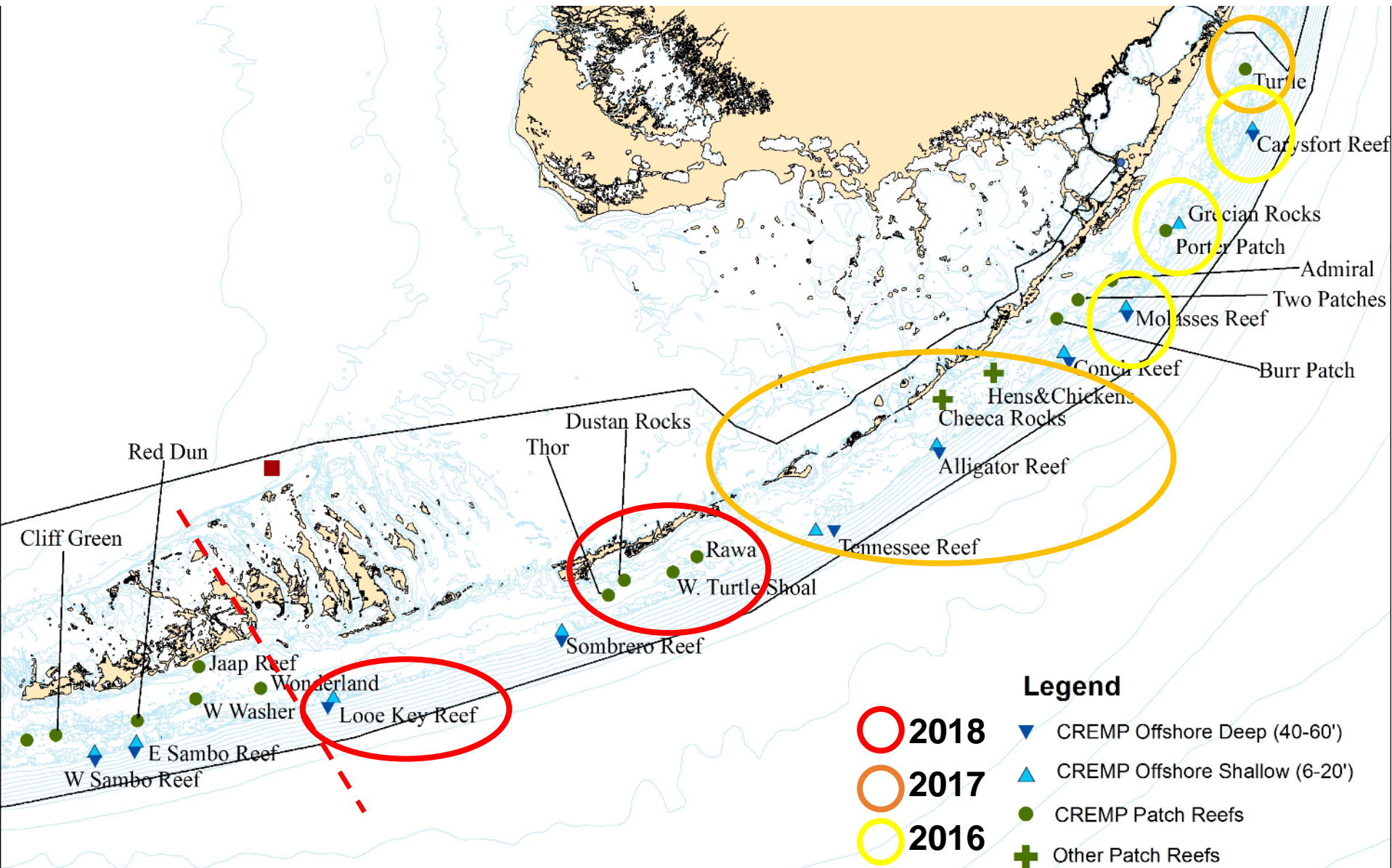


Siderastrea siderea



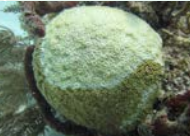





Extent of Disease Observations (April 2018)



Disease Progression in FL Keys



CREMP Coral Disease Prevalence 2011–2017 Upper FL Keys

Year	CNAT	DLAB	DSTO	MCAV	MMEA	PSTR	SSID	ORBI	Total
									
2011	0.0	11.1	7.4	0.0	0.0	9.1	6.2	1.2	3.4
2012	0.0	0.0	3.0	1.2	0.0	0.0	6.5	2.5	2.9
2013	0.0	0.0	0.0	3.7	0.0	0.0	3.4	1.4	1.4
2014	0.0	0.0	2.9	3.1	0.0	16.7	13.5	3.2	5.7
2015	0.0	0.0	2.9	1.4	0.0	0.0	14.2	4.1	6.1
2016	0.0	0.0	0.0	6.6	0.0	7.1	4.9	9.7	3.8
2017	50.0	7.1	20.0	10.5	0.0	50.0	22.3	19.7	10.7

- $N = 14$ sites in the Upper Keys; data pooled for all sites,
- Prevalence = Percentage of all colonies

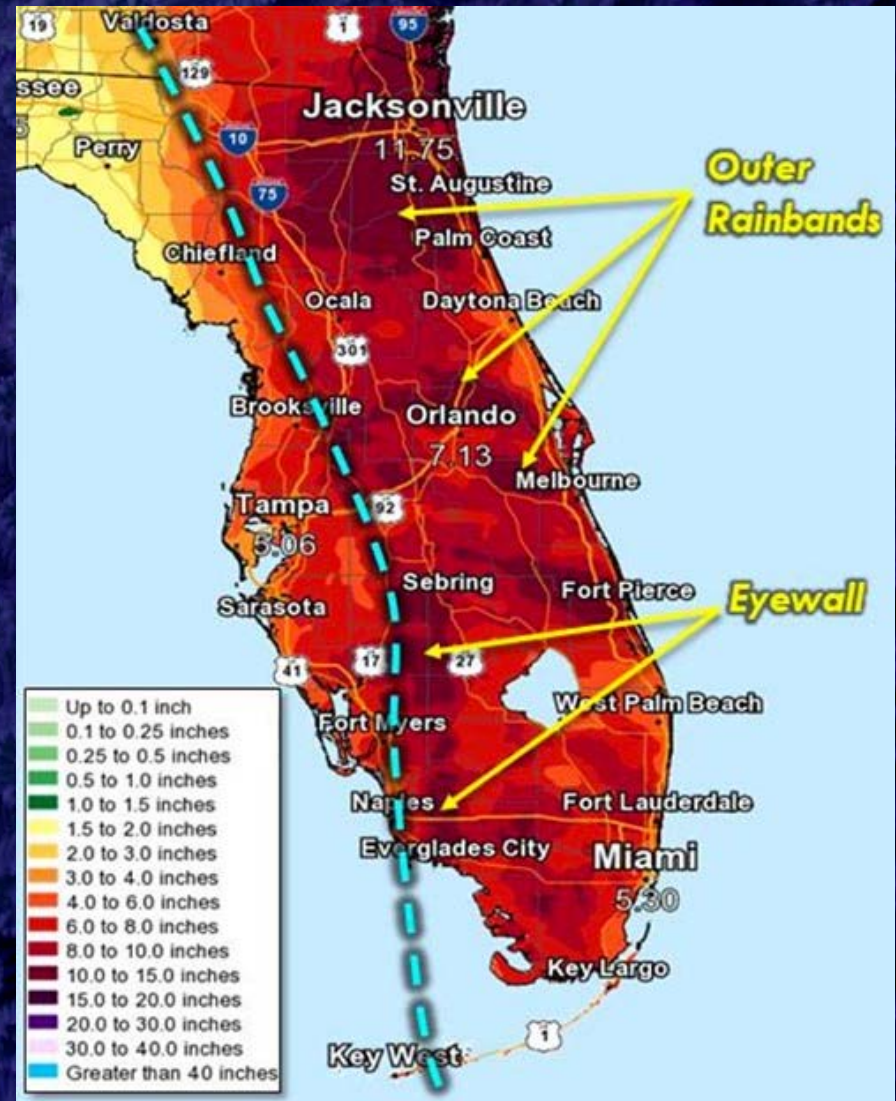
Disease Event Reaches St. Lucie Reef (Northern Extent of FRT)



May 2017: First observed at SLR
June 2017

- 14.3% overall prevalence
- 7 coral species affected
- *P. clivosa* >40% prevalence

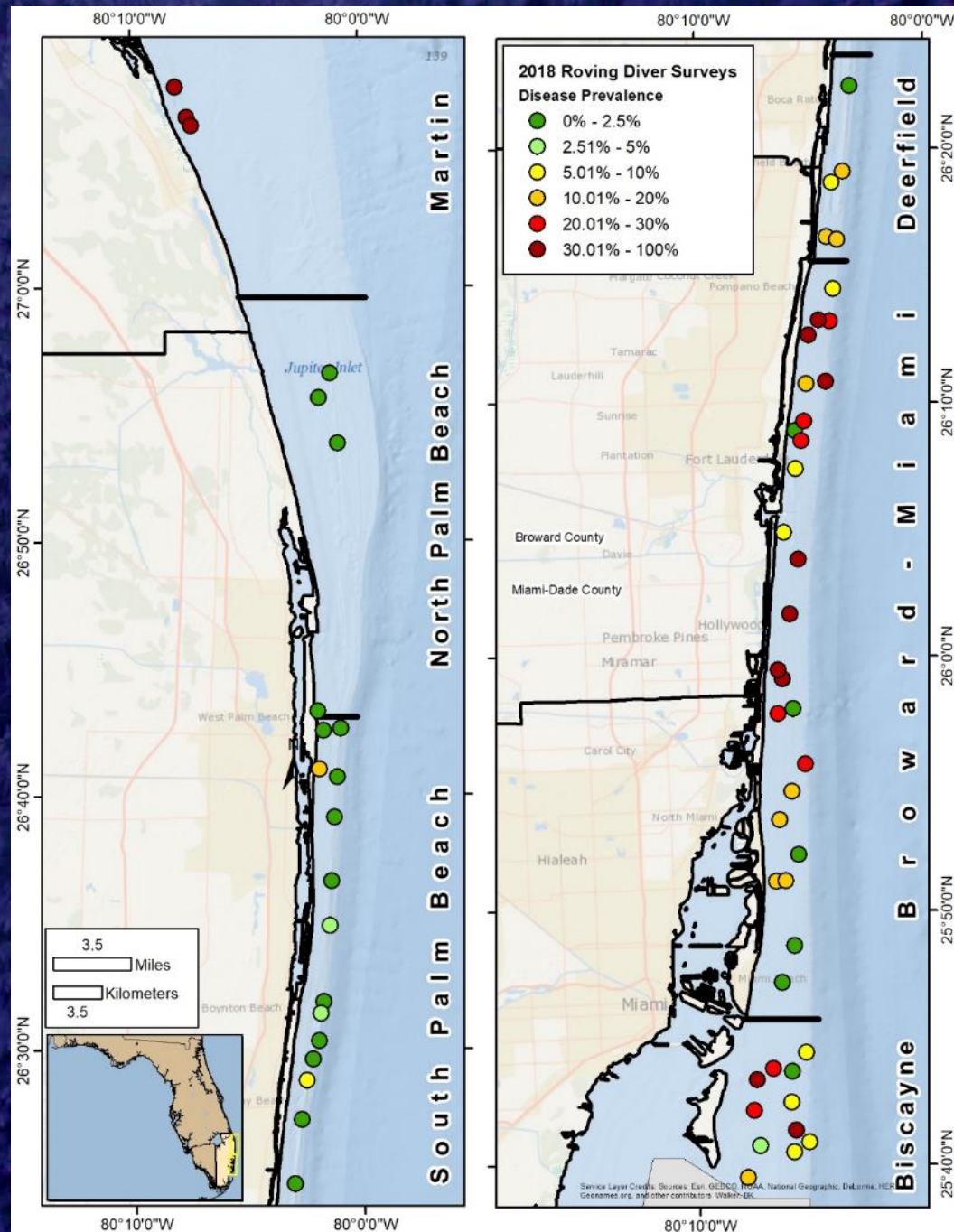
Hurricane Irma: Sept 10-11, 2017



2017 SEFL Post-Irma Surveys

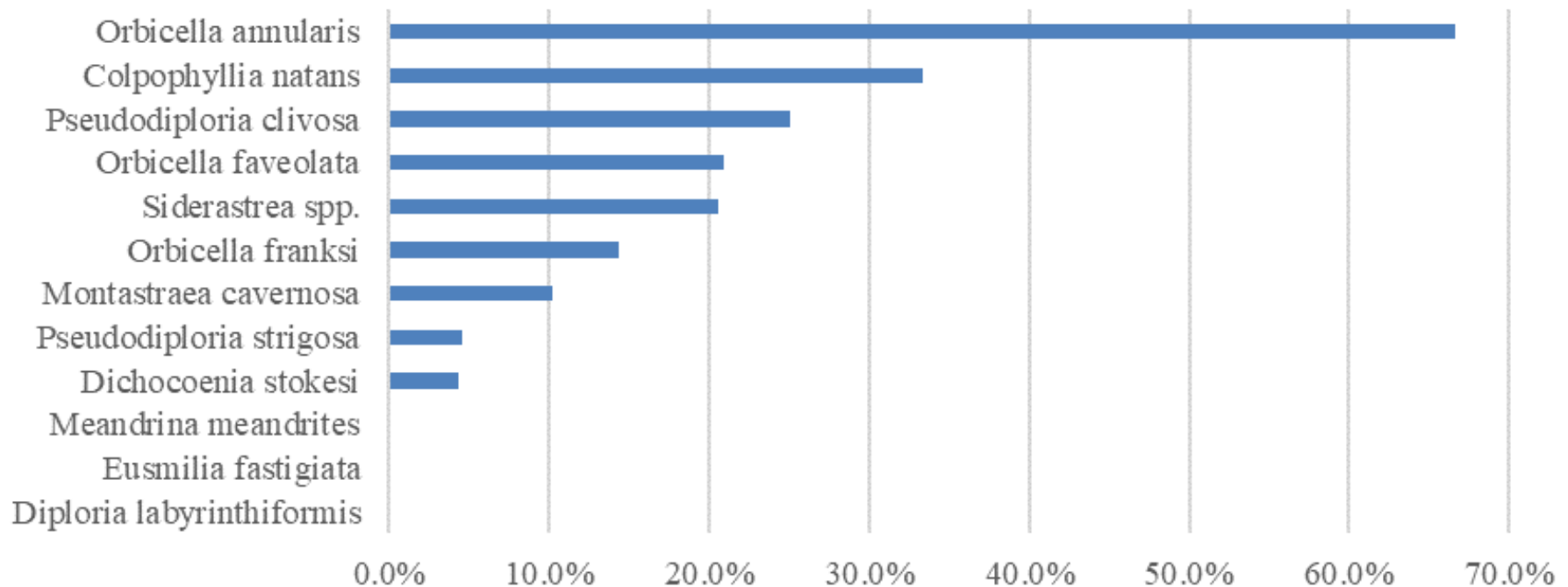
- High disease prevalence in Broward and Martin Counties
- Relatively low prevalence in Palm Beach County
- Mixed in Dade county

Walker and Voss



Roving Diver Surveys SE FL 2017

Roving Diver Disease Prevalence - All

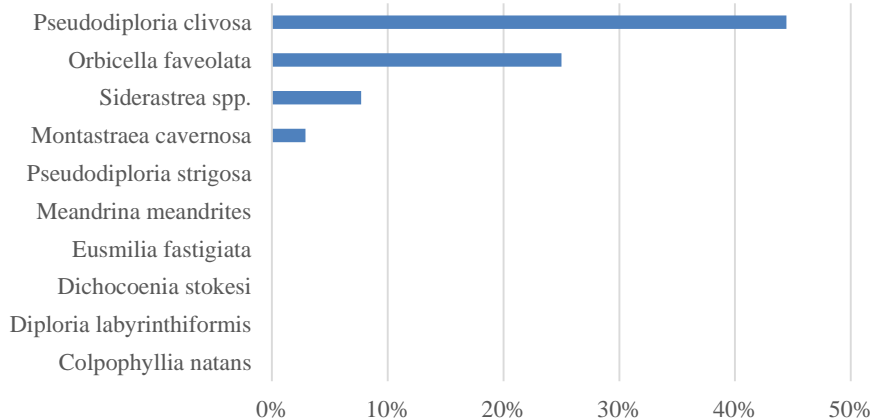


- Overall prevalence of 11.4%
- Massive species most commonly affected

Roving Diver Surveys SE FL 2017

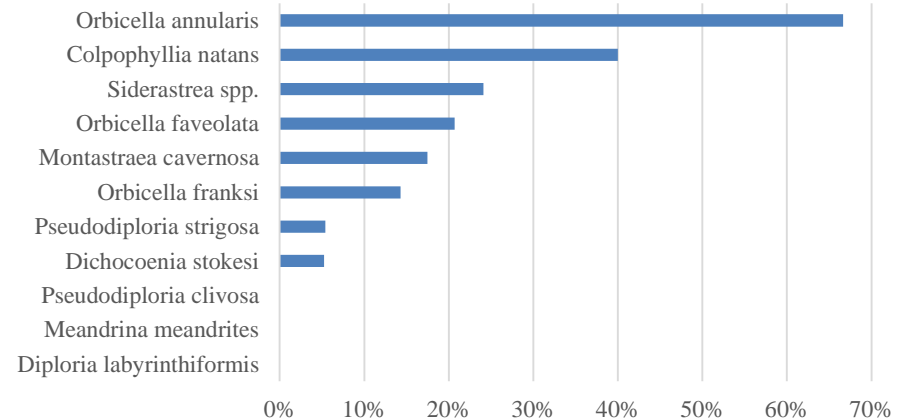
Martin and Palm Beach

Roving Diver Disease Prevalence - North



Broward and Dade

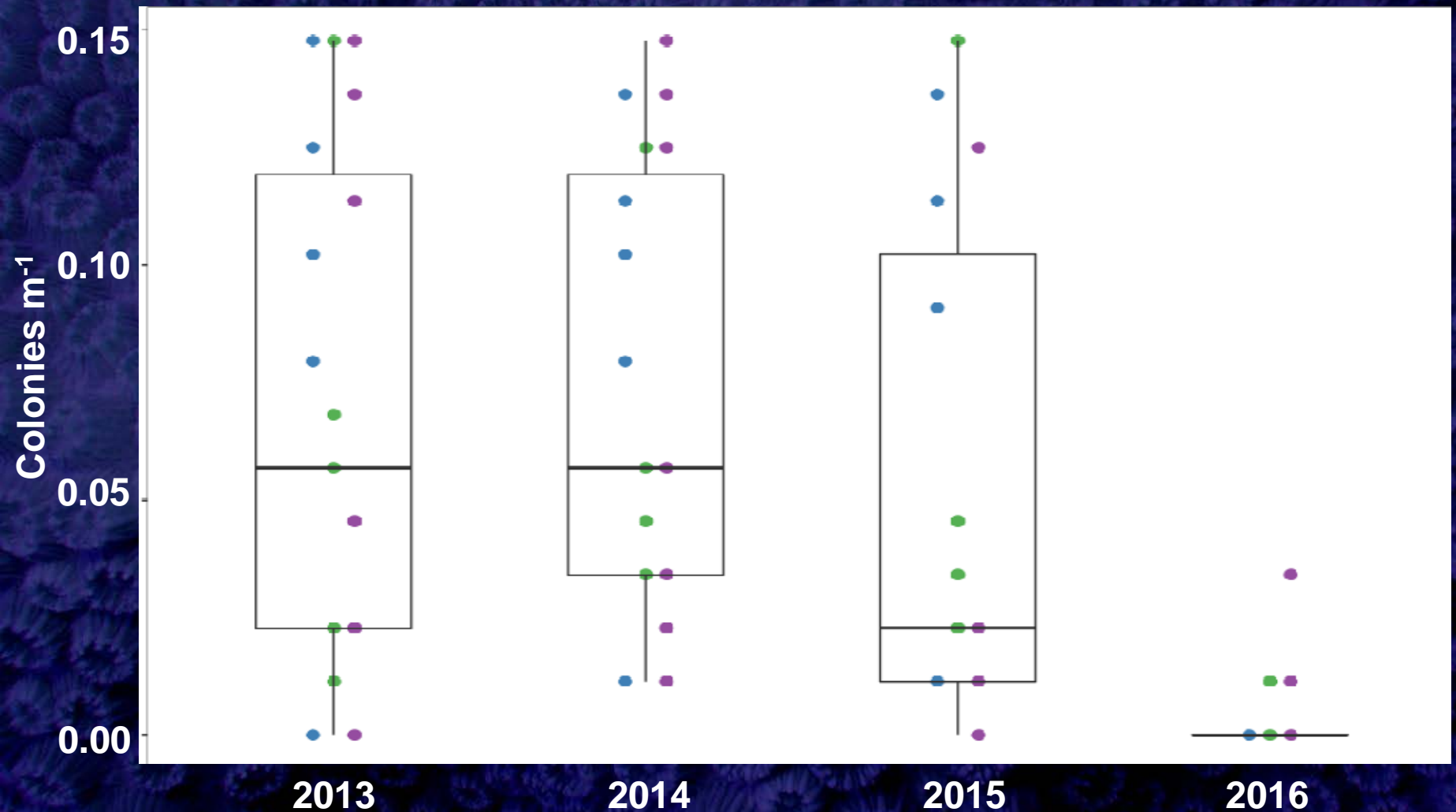
Roving Diver Disease Prevalence - South



- Varying patterns of species-specific prevalence in geographic regions
- >60% of corals lost in some sites

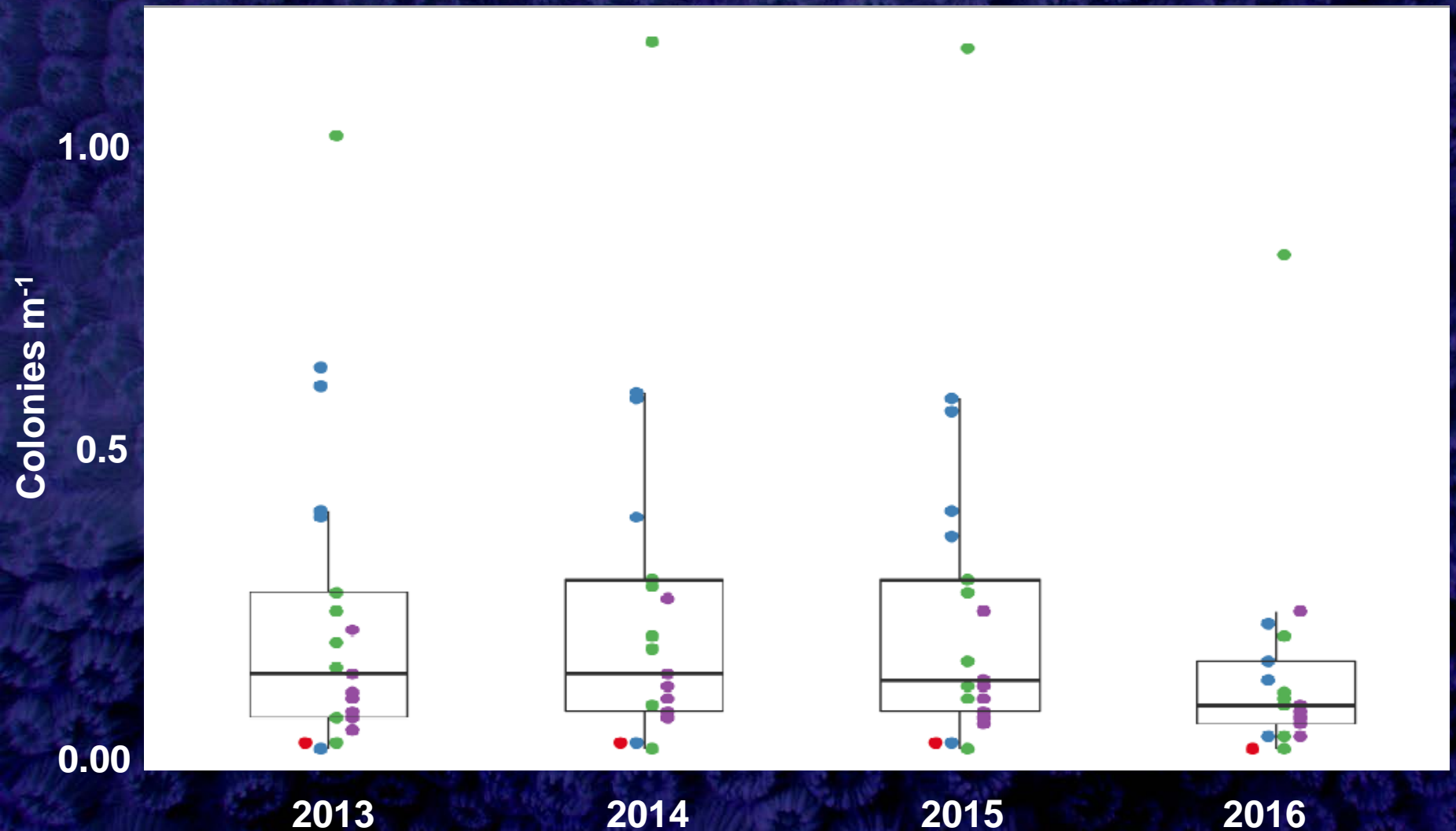
Meandrina meandrites

Impacts in Southeast FL

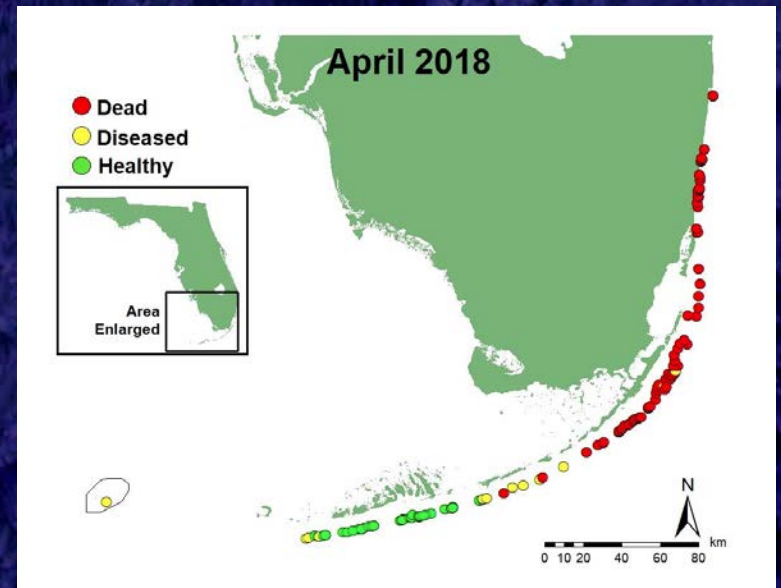
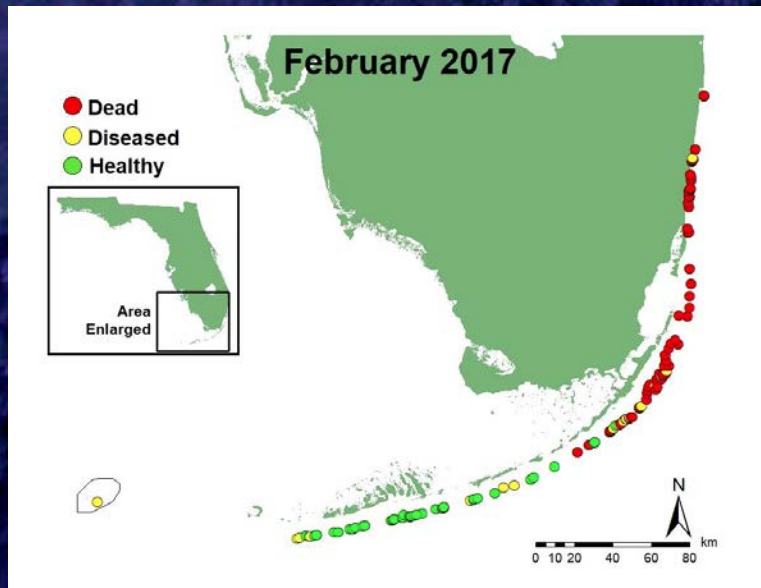
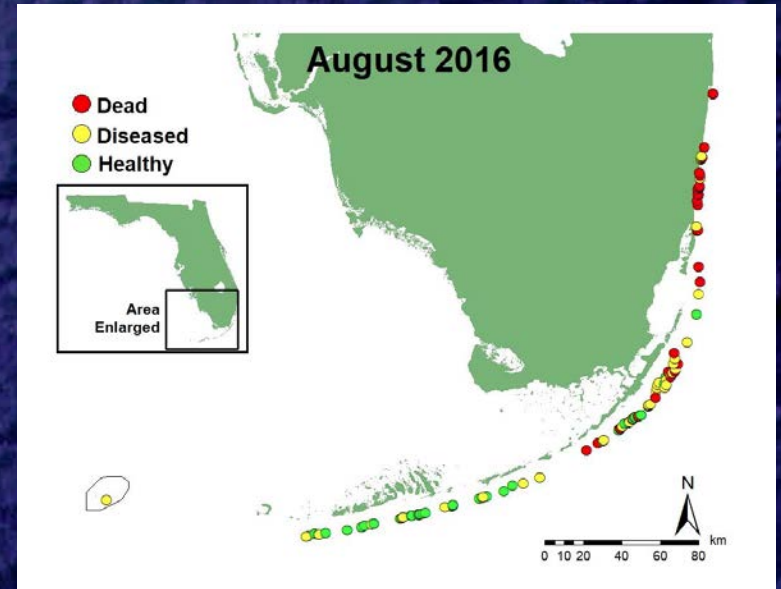
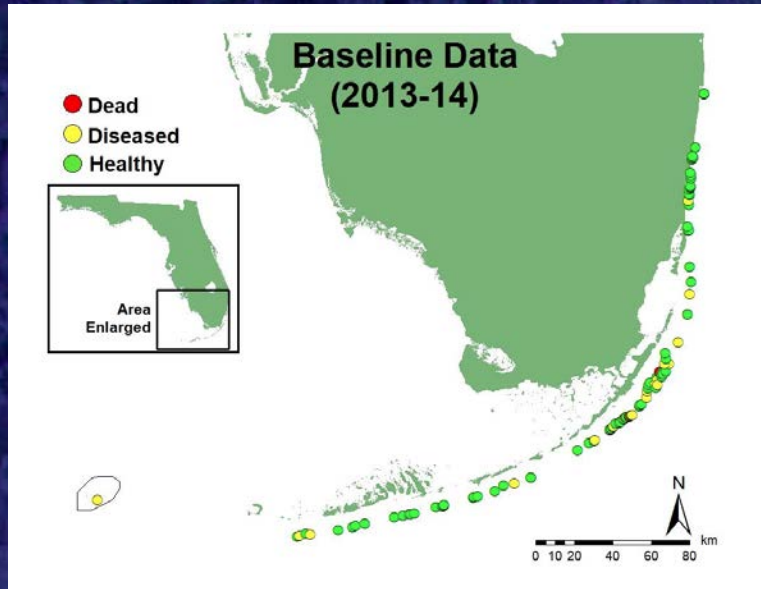


Montastraea cavernosa

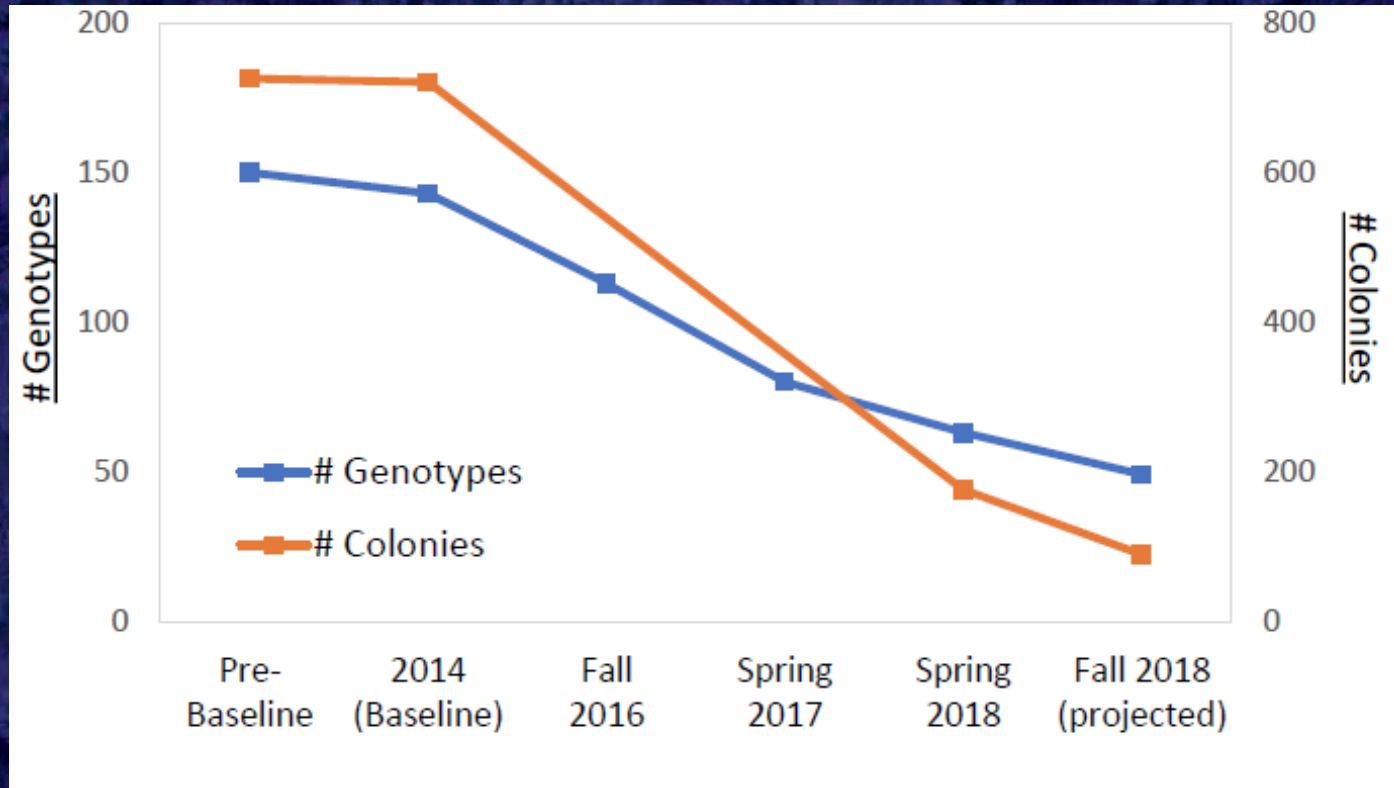
Impacts in Southeast FL



Dendrogyra cylindrus Impacts: FL Keys



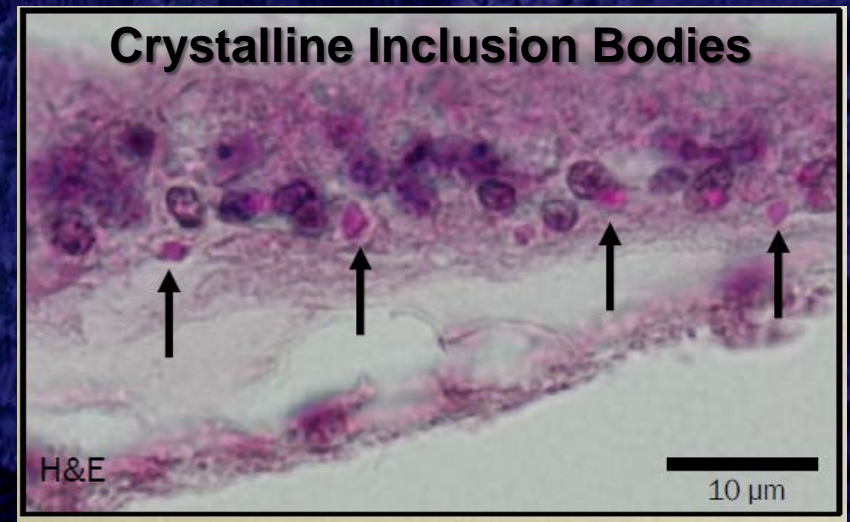
Declines in Florida's *Dendrogyra* Population



- Estimated >95% of *Dendrogyra* lost from FRT
- ~200 fragments of 61 genotypes in culture
- Plans for sexual reproduction and restoration

Ongoing Research Efforts

- Colony fate tracking and monitoring teams (multiple groups)
- Transmission experiments (Paul, Aeby, et al.)
- Pathogen characterization (Meyer, Paul, et al.)
- Epidemiological modeling (Muller et al.)
- Histology (Landsberg et al.)
- Gene expression and genotypic resistance (Voss)



Intervention Technique Development

- Amputation, euthanization
- UV light, welding torches
- Topical treatments



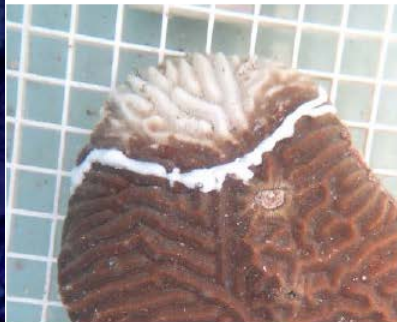
Barrier: Epoxy or Modeling Clay



Antibiotic or Chlorine: in Modeling Clay or Epoxy



Chlorine: in Gelatin Strips



Antibiotic: in Dental Paste



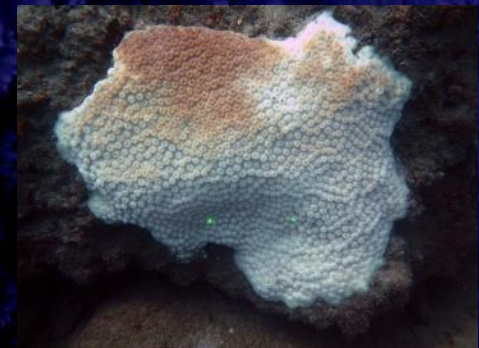
Trenching + Antibiotic Epoxy



Amputation + Antibiotic Dental Paste

Summary for FL Disease Outbreak

- Four consecutive years and still expanding in scope
 - ~ 2/3 of the Florida Reef Tract affected
- ~Half of Florida's coral species affected
 - Including large, dominant reef builders
- High frequency of mortality
- Additional contributing factors to coral disease susceptibility and losses
 - Hurricanes, water quality, thermal stress, etc.
- Recent surveys in Palm Beach, Broward, Key West, and Dry Tortugas indicated no disease incidence



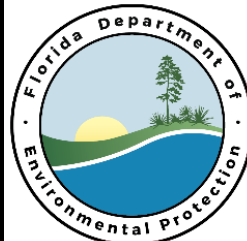


Smithsonian



NATIONAL MARINE
SANCTUARIES

FLORIDA KEYS



NOAA
CORAL REEF
CONSERVATION PROGRAM



Southeast
Florida
Coral Reef
Initiative

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