

Coral Disease Interventions

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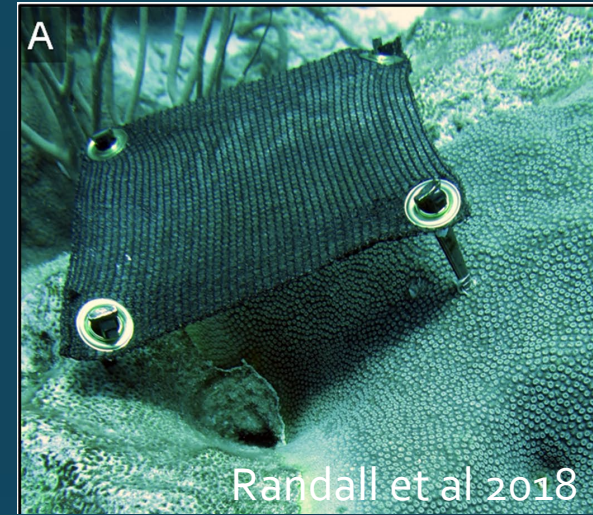
Mechanical Treatments



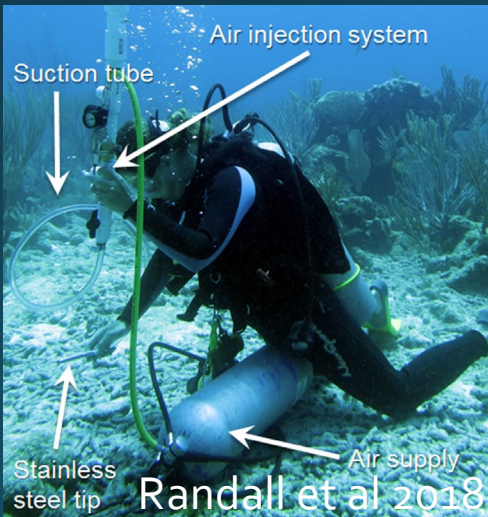
Transplantation of Healthy Tissue



Removal of Infected Tissue



Shading



Aspiration + Smothering



Smothering

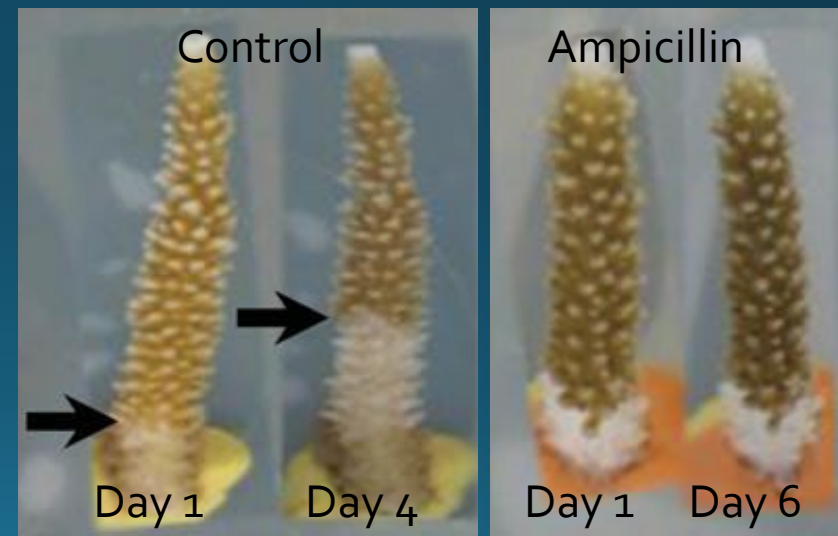
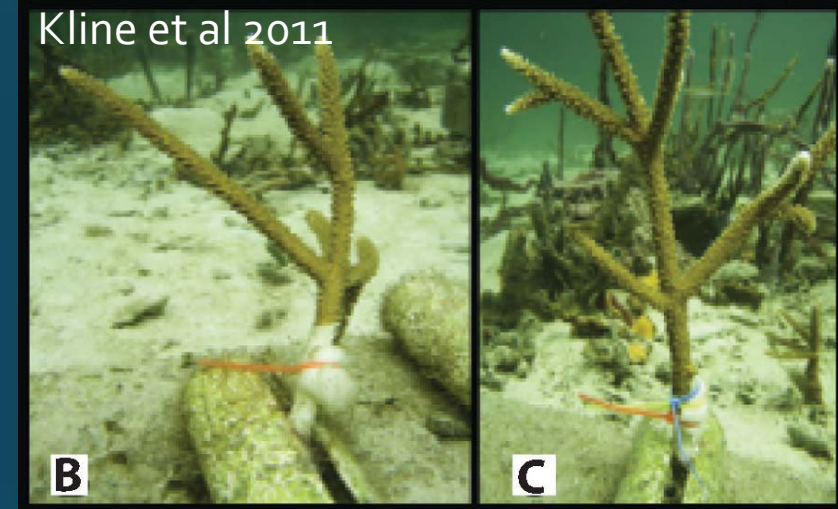


Trenching

Chemical Treatments



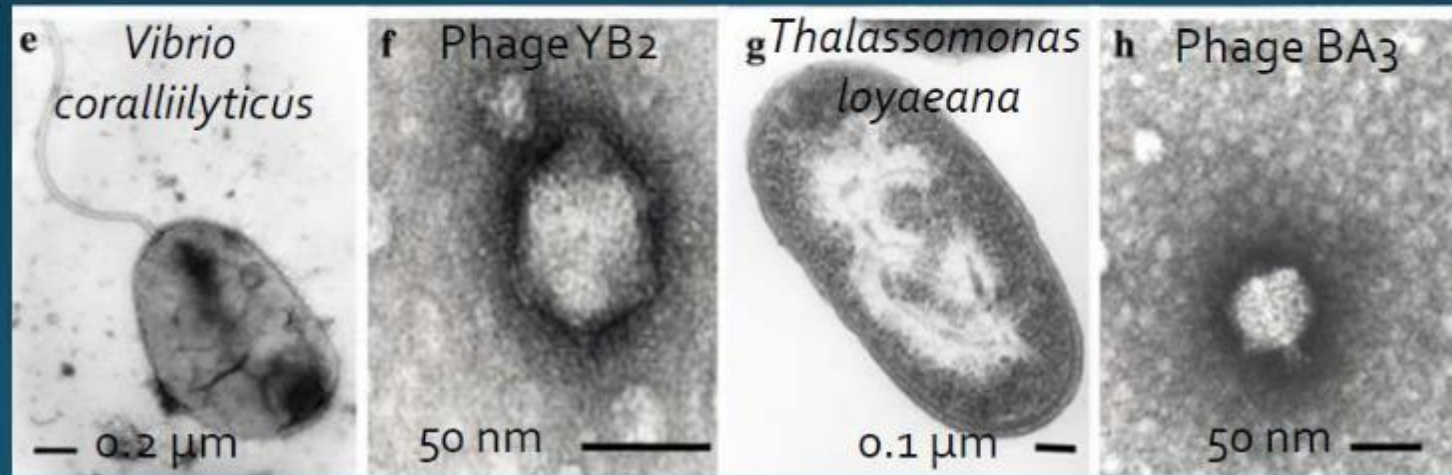
Chlorinated Epoxy (+ Trenching)



Sweet et al 2014

Antibiotics

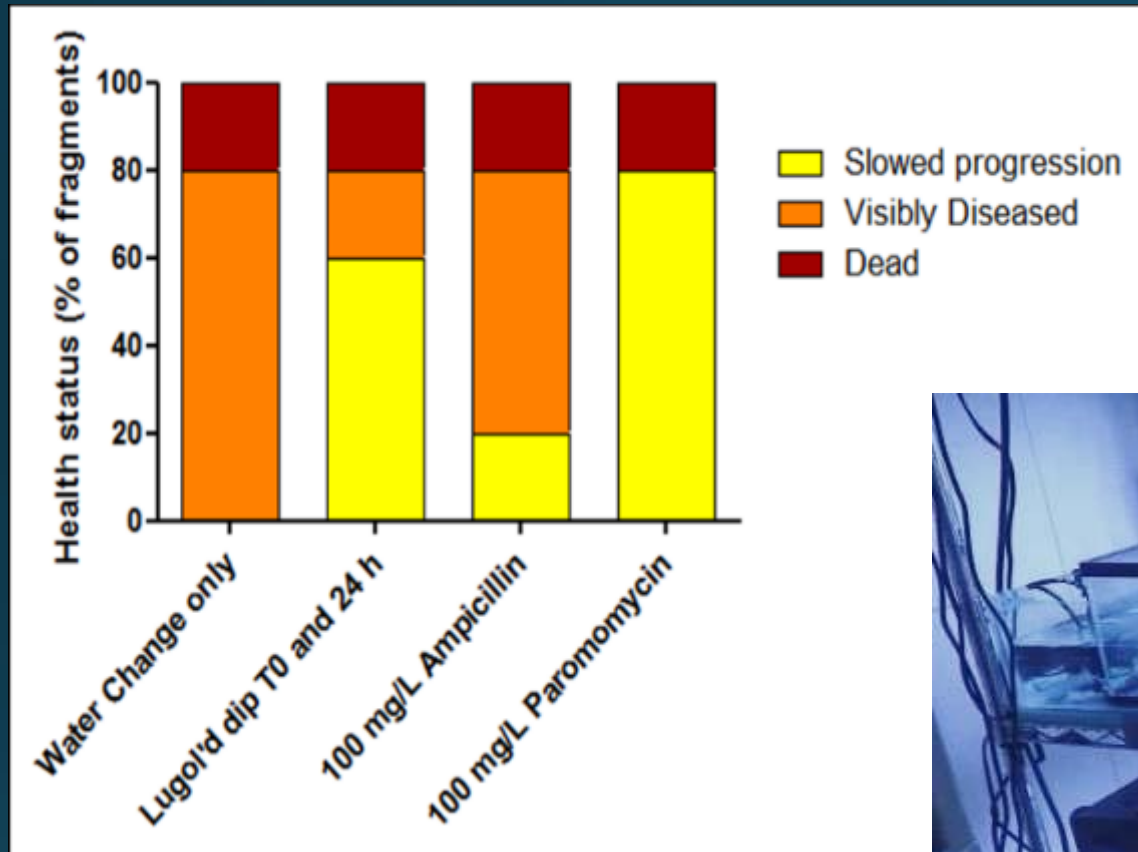
Biological Treatments



Efrony et al 2007

		Black Band Disease	Yellow Band Disease	White Band Disease	White Plague	Dark Spot Disease	Aus. Subtropic White Syndrome	Growth Anomalies
Mechanical	Transplantation			No overall. Yes in areas of low prevalence (1)				
	Removal						Yes - 80% success (2)	Yes on Acropora. No on Montipora (3)
	Shading		No (4)		Slowed, but didn't stop (5)			
	Aspiration + Smother	Yes - 70% success (6)	No (4)					
	Smother			No (1)				
	Trench		Yes - 80% success (4)					
Chemical	Trench + Chlorine	Yes - 63% success (7)						
	Antibiotics			Yes - ampicillin, paramomycin 100% success (8) Yes - ampicillin 100% preventing transmission (9)		No - neither enrofloxacin nor danofloxacin (10)		
Biological	Phage Therapy				Yes - preventative before, during, or 1 day after infection (11,12). Prevents transmission (12). Slows tissue loss (13)			

SCTLD: Antibiotic water dosing



Woodley et al. 2018. NOAA report



SCTLD: Antibiotic paste

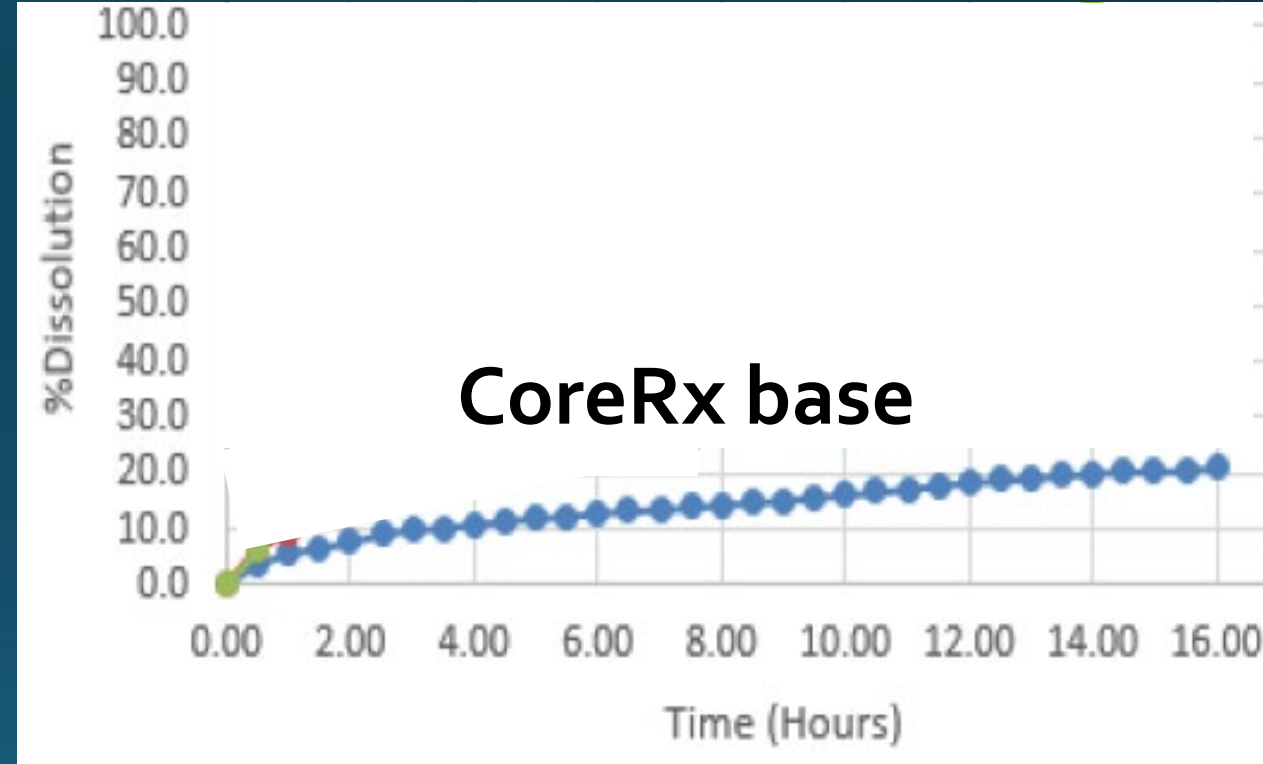
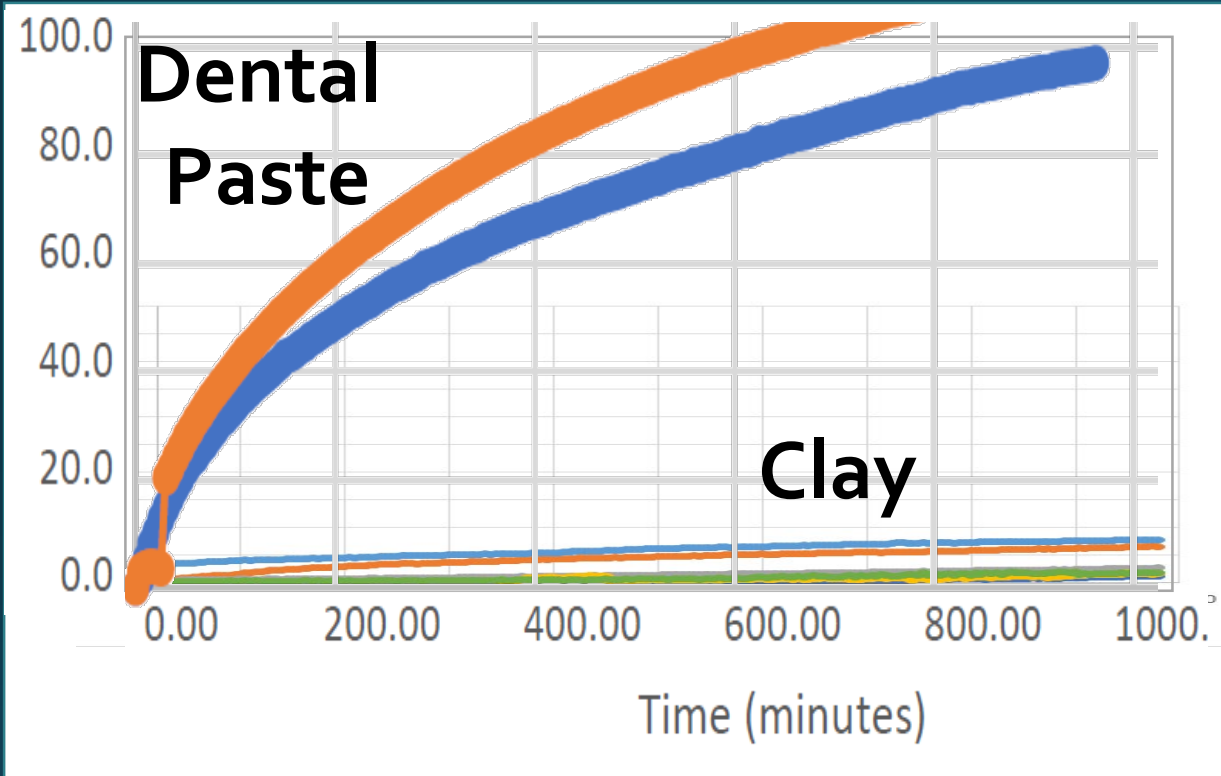


SCTLD – Lab FAILURE Rates

- Untreated controls (N=33): **97%**
- Physical barrier (trench and/or smother) (N=60): **95%**
- Chlorinated barrier (N=48): **90%**
- Antibiotic barrier (N=100): **22-75%**
 - Clay/epoxy (N=36): **75%**
 - CoreRx paste (N=9): **22%**
- Amputation and Antibiotic Dosing (N=40): **0%**



Comparing Leach Rates

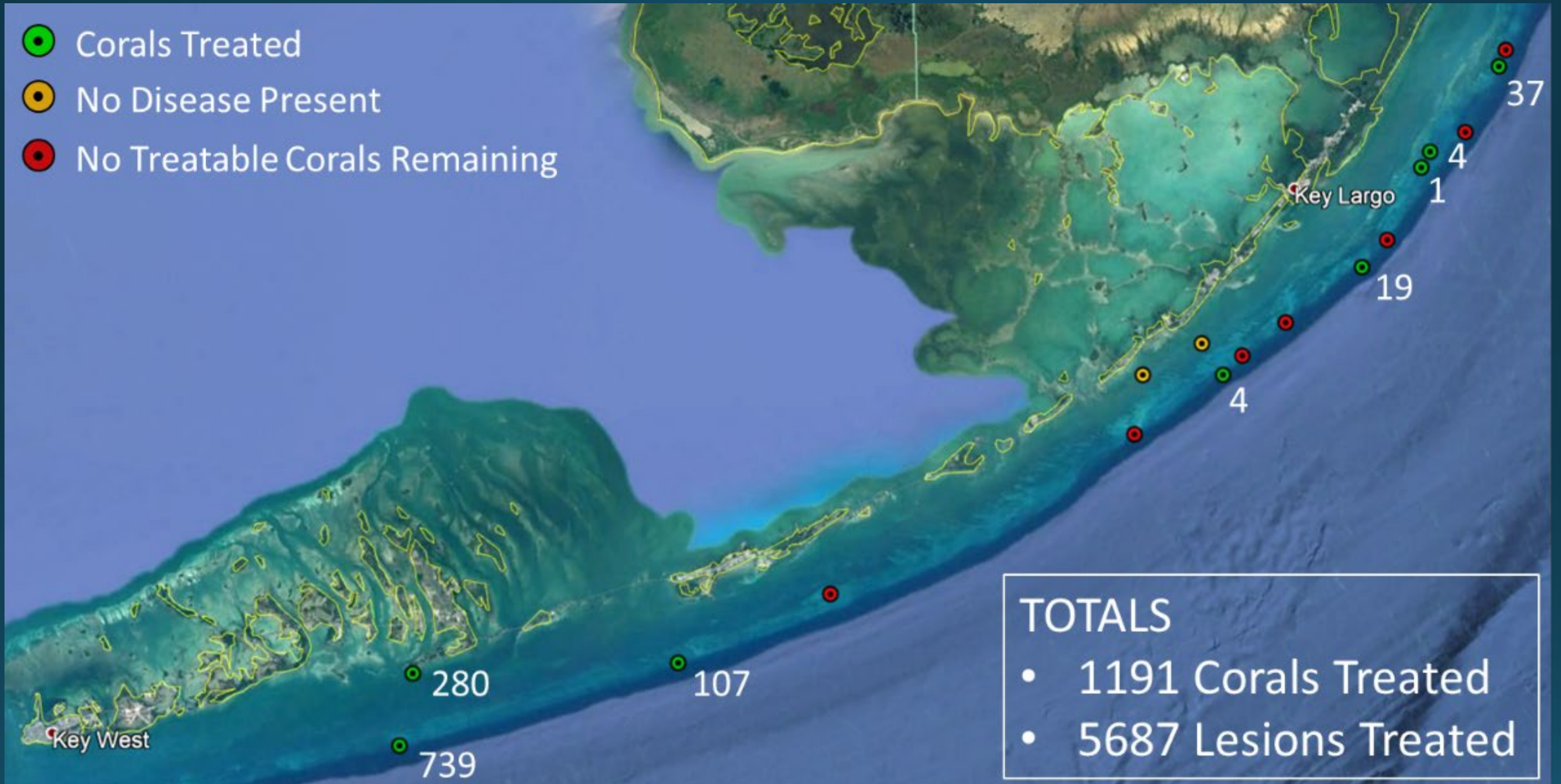


Large Scale Field Efforts



Field Efforts

- Corals Treated
- No Disease Present
- No Treatable Corals Remaining



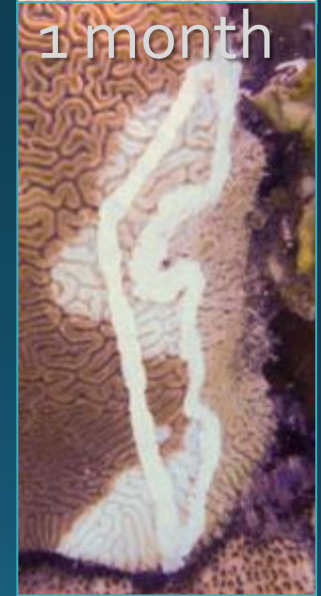
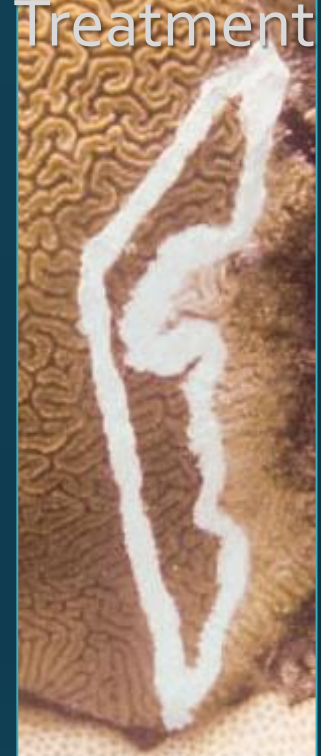
TOTALS

- 1191 Corals Treated
- 5687 Lesions Treated

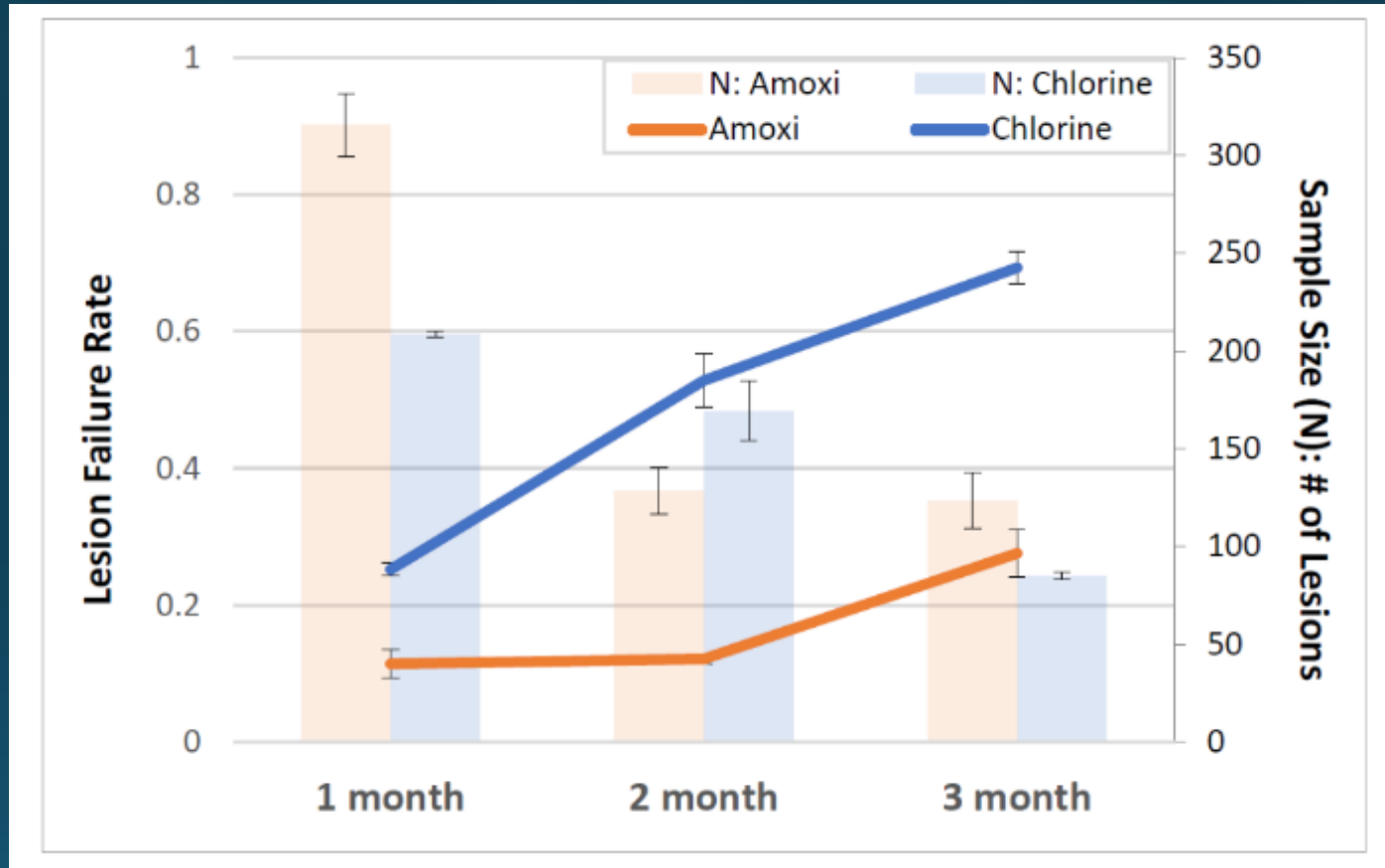
Treatment Failure Rates



Amoxicillin Paste

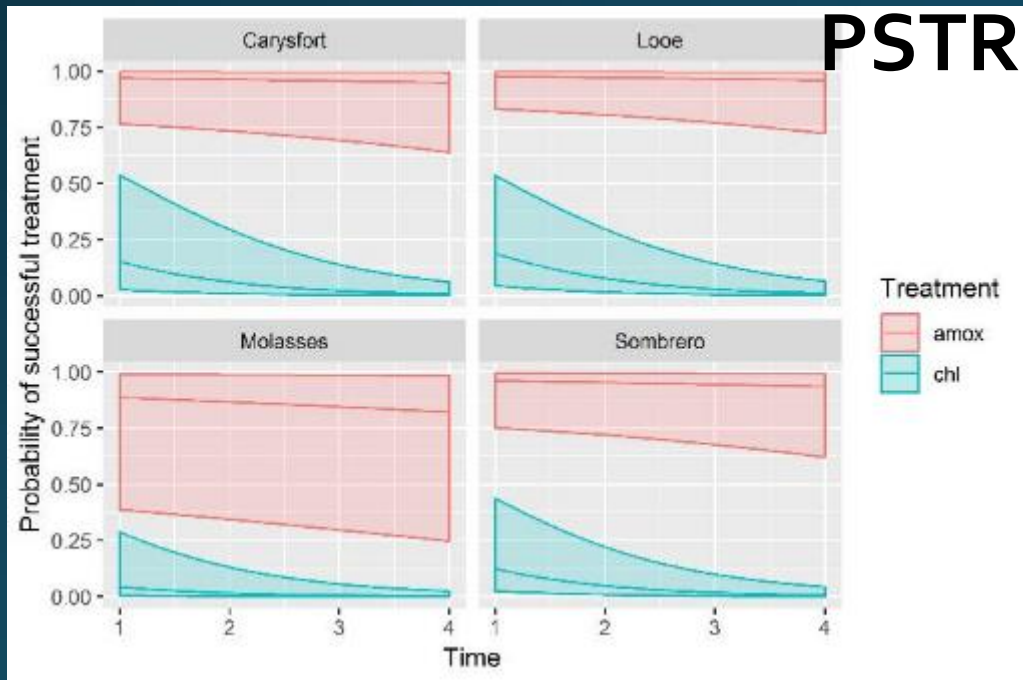
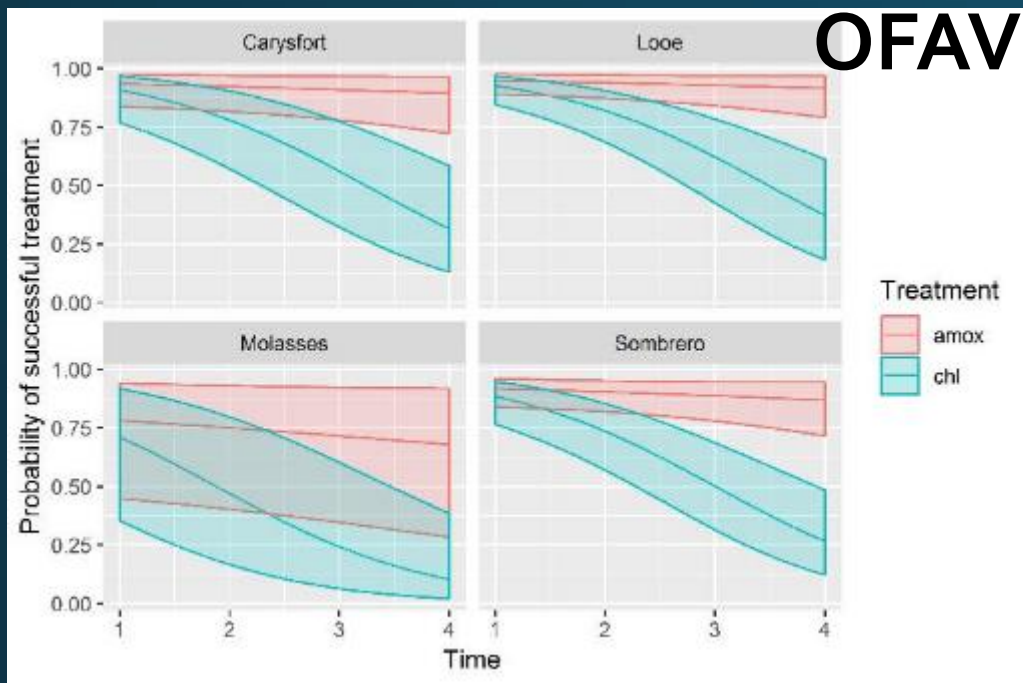


Chlorinated Epoxy



Species Differences

- With time, ALL species have lower failure rates with amoxicillin
- Brain corals QUICKLY fail when treated with chlorinated epoxy



Amoxicillin – 1 month



Chlorine - 1 month

FIELD STEPS

1. Use guiding principles to identify high-priority sites and high-priority corals

Guiding principles for determining priority coral sites

Ecological:

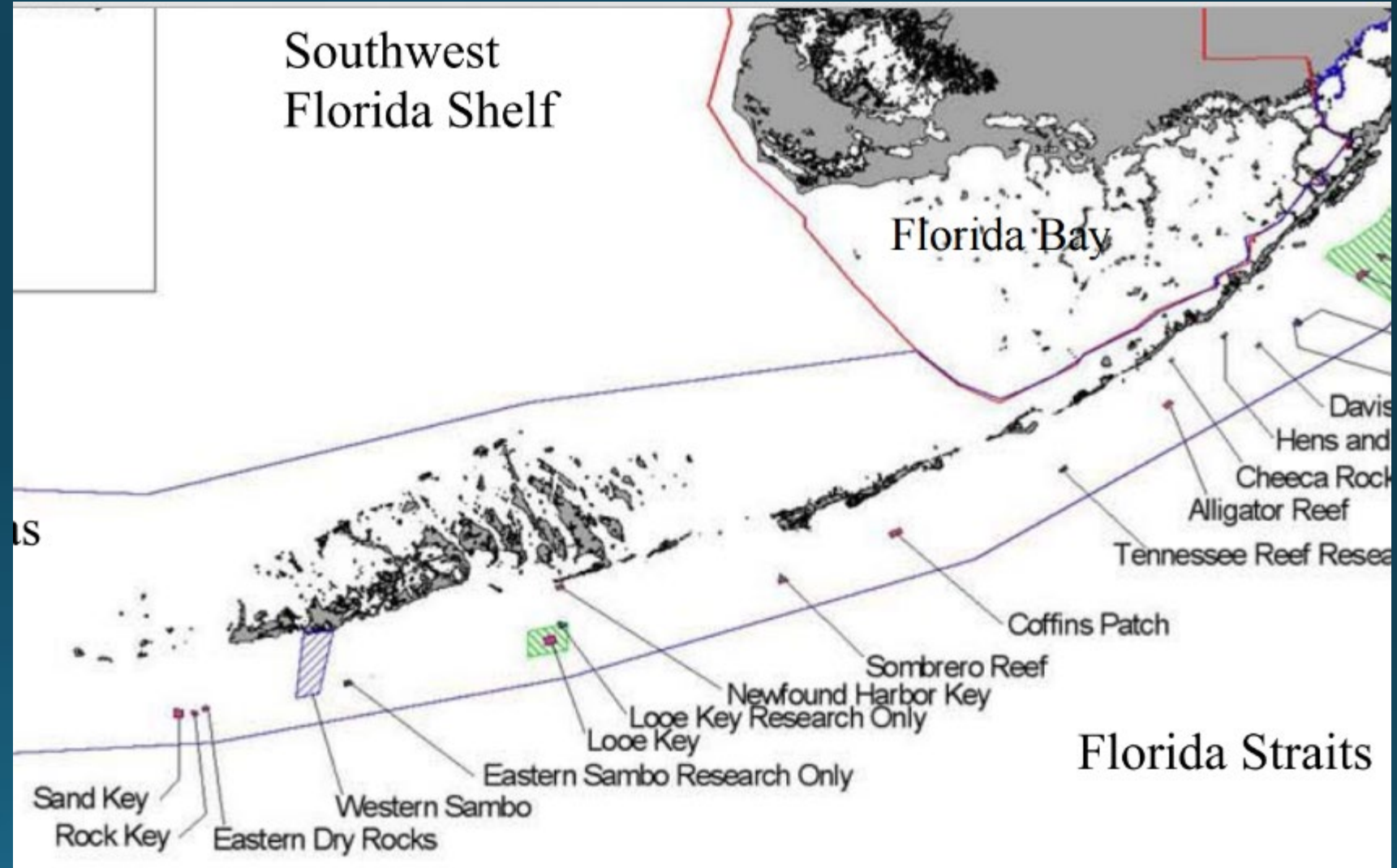
- Coral diversity
- Coral density
- Target species (ESA-species, reef-building species)
- Coral demographics
- Site isolation



Guiding principles for determining priority coral sites

Regulatory:

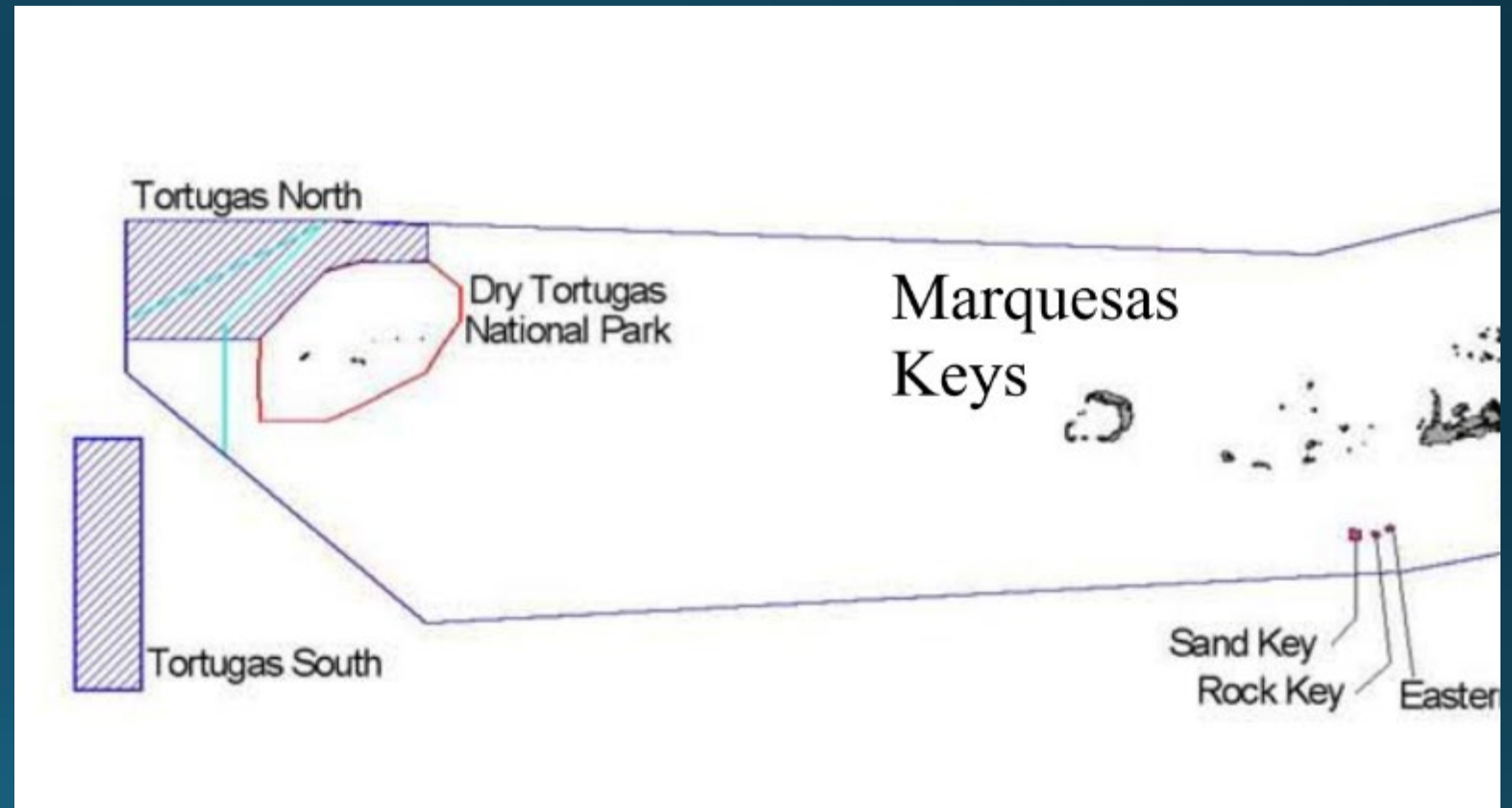
- Level of protection (MPA)
- Recreational area:
 - project visibility
 - citizen science
 - risks
 - effectiveness



Guiding principles for determining priority coral sites

Treatability:

- Site size, coral density
- Number of sites
- Location (ease of access, anchoring, visibility, co-occurrence with management)



Guiding principles for determining priority coral colonies

Ecological:

- Structure building species
- Large colonies
- Colonies surrounded by others of same species

Regulatory:

- Iconic corals
- ESA-listed corals



Guiding principles for determining priority coral colonies

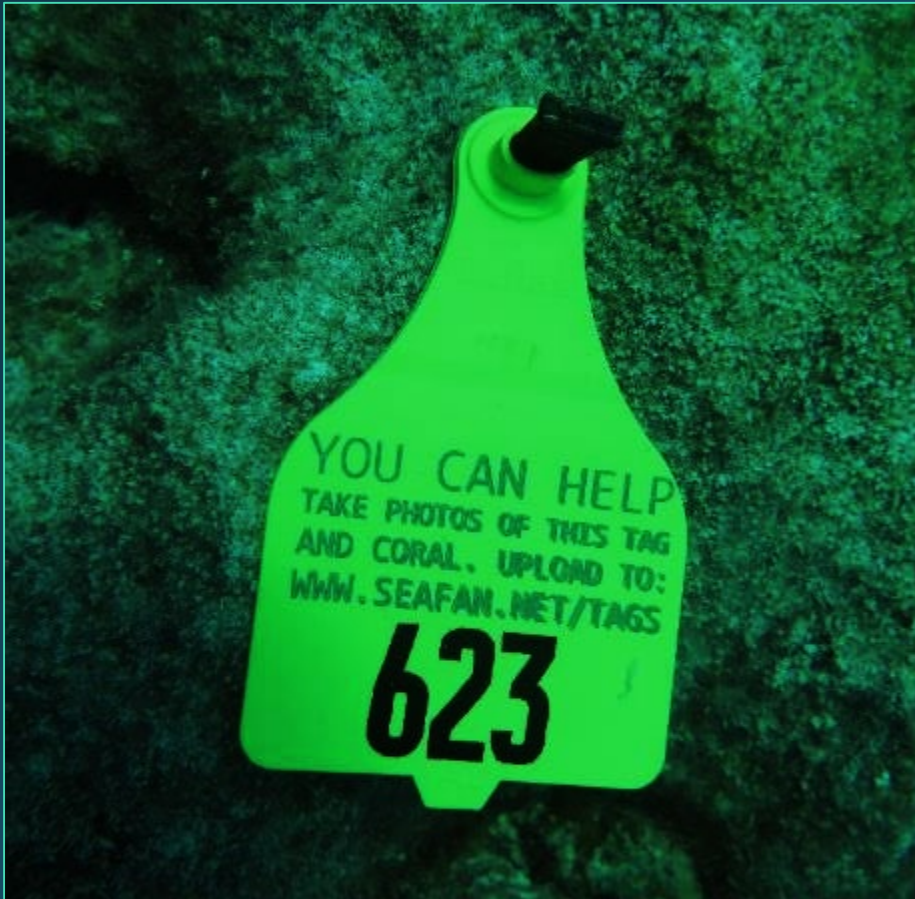
Treatability:

- High amount of remaining tissue
- Small number of active lesions
- Treatable lesions



FIELD STEPS

1. Use guiding principles to identify a high-priority coral
2. Tag and collect any relevant data and photos for follow-up monitoring





Citizen Science Photo Submission Form

About this project (click to expand) ▾

SCTLD

Since 2014, stony coral tissue loss disease (SCTLD) has progressively spread throughout the Florida Reef Tract affecting up to 25 species of stony corals. In an effort to reduce impacts of SCTLD, response teams are conducting in water treatment of corals. In order to evaluate the effectiveness of different treatments, it is necessary to monitor the treated corals. Response teams are tagging treated corals and we need your help to monitor the progress of treatments over time.

You can help!

You can help by finding a tagged coral, taking photos of the tagged corals and submitting those photos to the response team through this online reporting tool using your mobile device or personal computer. Please make sure to select the dive date photos were taken and the coral tag number. Submit 1 report and group of photos for each coral tag you visited. You can upload a photo of the tag and up to 4 photos that best show the coral structure and disease extent. Thanks for your help!

For more information about SCTLD, visit [Florida Reef Tract Coral Disease Outbreak](#).

Data Entry ▾

Diver Name


E-mail

Dive Date*

Coral Tag Number*

Please input a number between 1 and 2,000

Coral Tag Photo


Coral Photo 2

Coral Photo 3

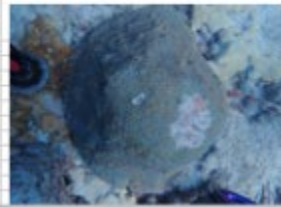
Coral Photo 4

Coral Photo 5

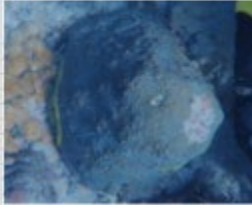
Prior to Treatment

2019_02_08



Post Treatment

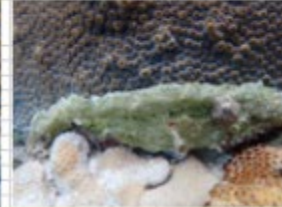
2019_02_08



1 Month

1 Month

2019_03_05



1+ Month

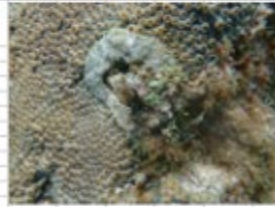
Citizen Science

2019_03_17



3 Month

2019_05_12



FIELD STEPS

1. Use guiding principles to identify a high-priority coral
2. Tag and collect any relevant data and photos for follow-up monitoring
3. Conduct treatment and place indicator nails for follow-up monitoring



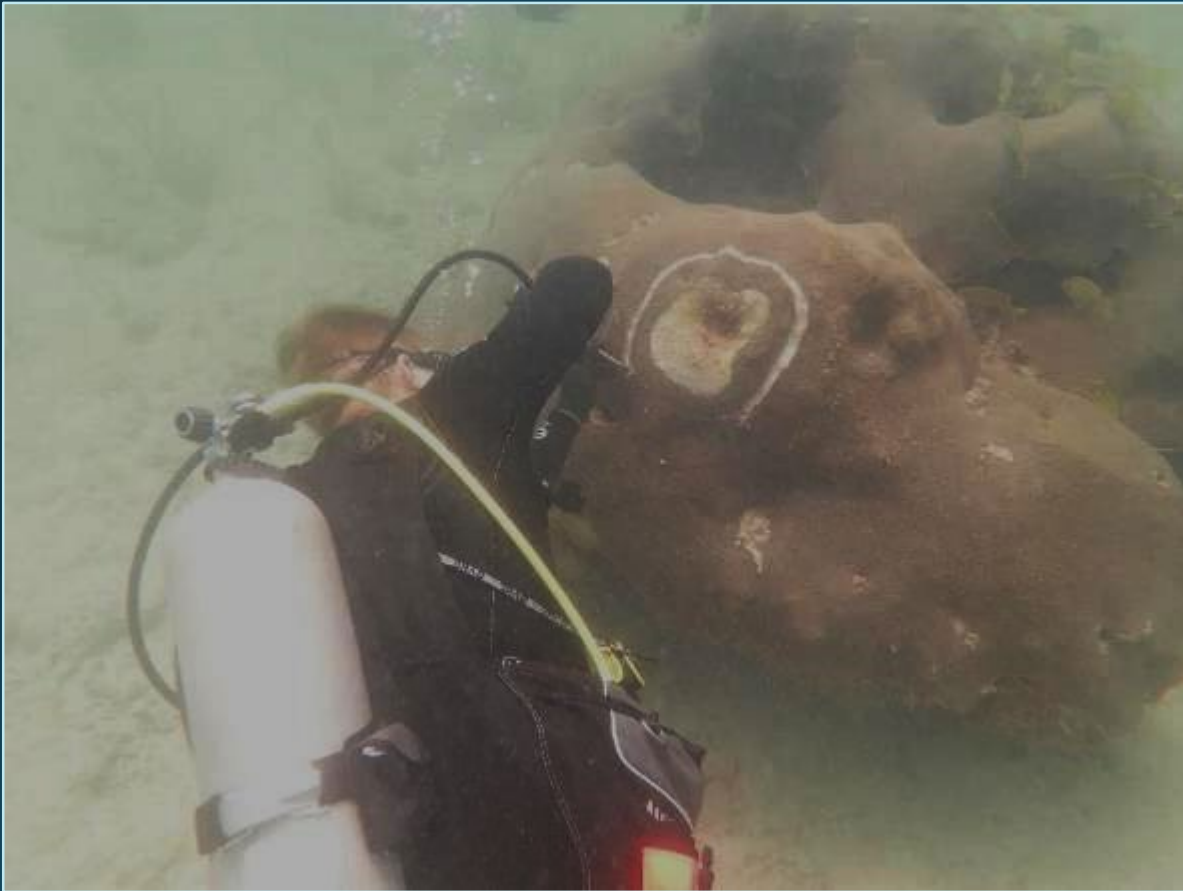
Chlorine: Preparation

Chlorine powder into Splash Zone epoxy
(3:10 by volume)

- Combine 15 mL of chlorine powder + 50 mL of “part A” and store in container
- Store 50 mL of “part B” in separate container



Field Treatment: Chlorinated Epoxy



Application:

- Mix Part A & B underwater and pack over disease margin.
- Use angle grinder to create a trench ~5 cm away from disease margin.
- Pack trench with chlorinated epoxy

Amoxicillin: Preparation

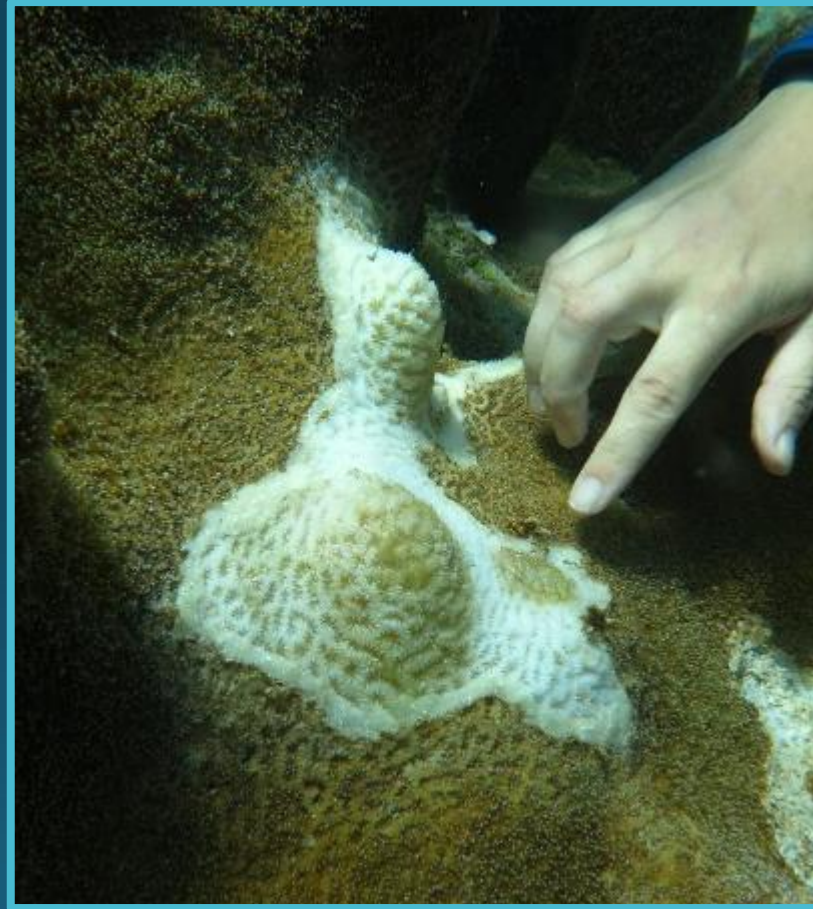
Amoxicillin powder into Shea Butter (1:8 by weight)

- Mix in container (metal spatula works well)
- Pack into back of catheter syringes
- Keep cool
- One diver in high-disease area uses ~50 g of amoxi / day (~5 syringes)



Amoxicillin: Field Treatment

- Squeeze from syringe directly onto disease margin
- Press lightly with finger
- If it doesn't adhere, place modeling clay over top





Retreatments & Future Directions



REINFECTION RATE:

% of amoxicillin-treated colonies needing new treatments

	1 month	2 month
MCAV	53%	58%
OFAV	75%	69%
CNAT	56%	68%
DLAB	33%	67%
PSTR	40%	
SSID	68%	