

APPROACHES TO IMPROVING CORAL SURVIVAL

Stacey M. Williams

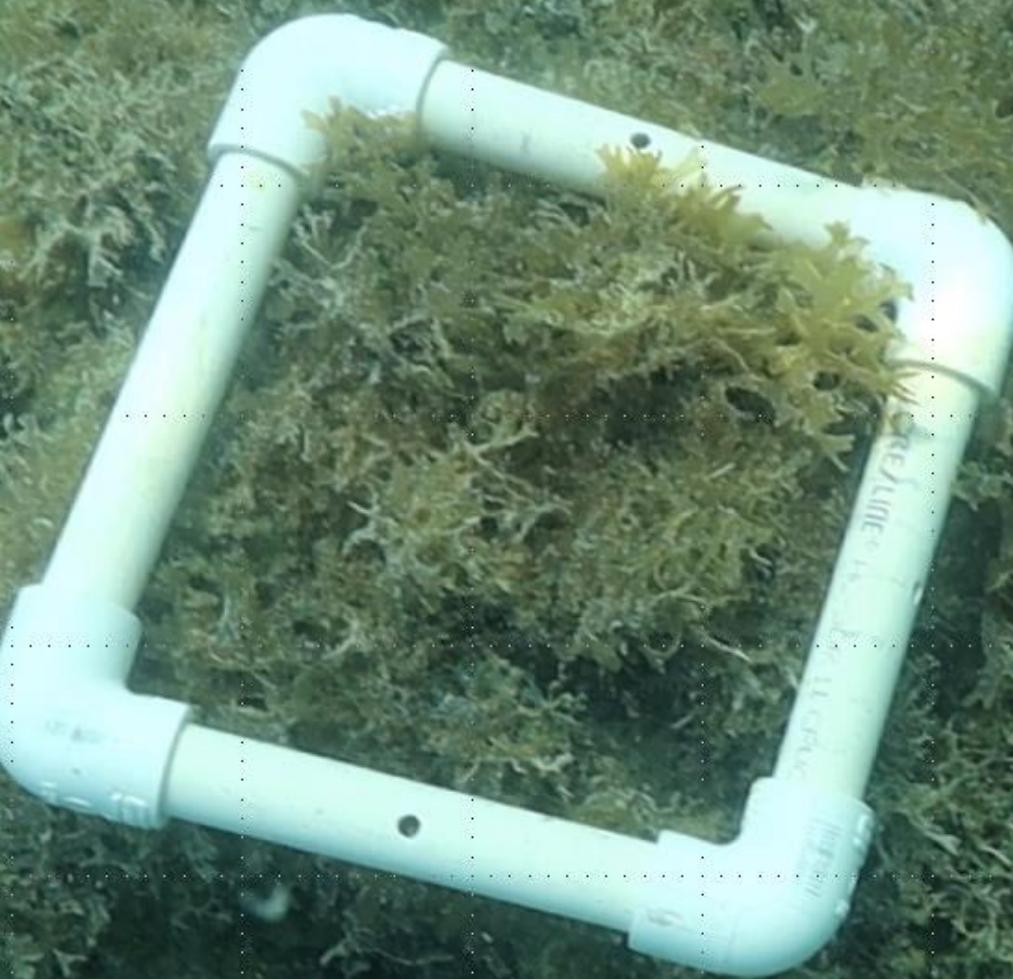
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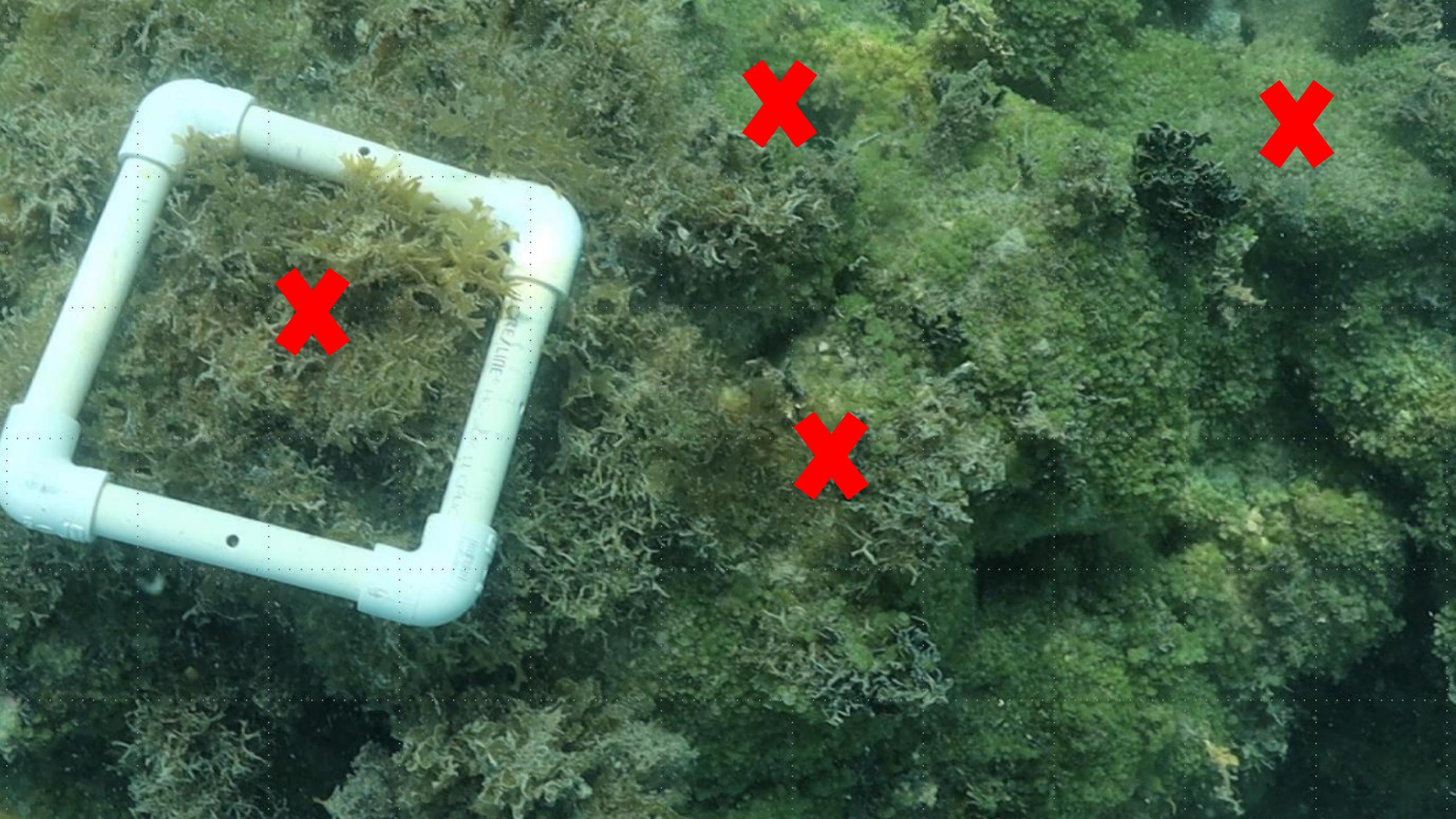
Caribbean coral reefs are changing





Ramicrusta spp.





Ways to enhance herbivory

- Protection of parrotfish
- Redistribute healthy populations
- Larval rearing in the laboratory
- Collect post-larval settlers

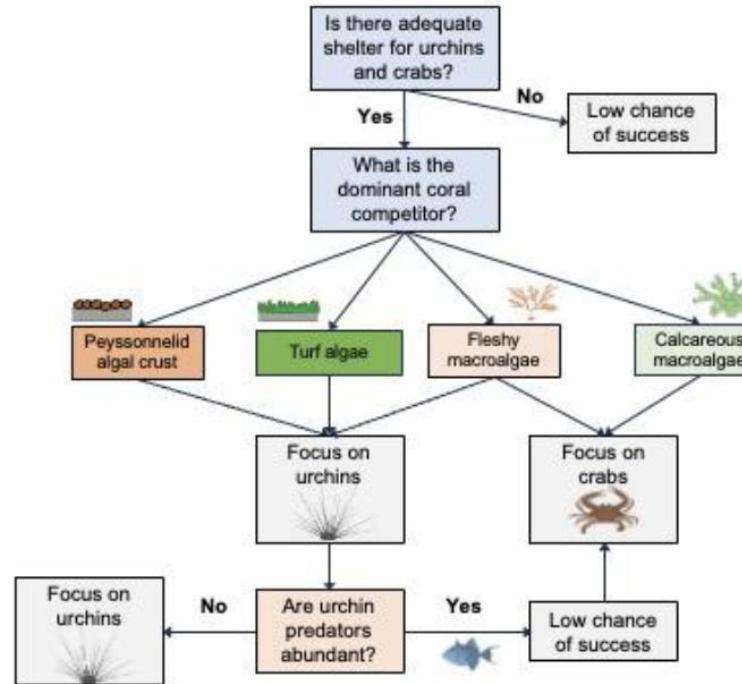


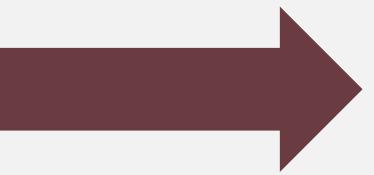
Restoration of Herbivory on Caribbean Coral Reefs: are Fishes, Urchins, or Crabs the Solution?

Mark J. Butler IV^{1*}, Alain Duran¹, Colette J. Feehan², Alastair R. Harborne¹, Alwin Hykema^{3,4},
Joshua T. Patterson⁵, William C. Sharp⁶, Angelo J. Spadaro⁷, Tom Wijers^{3,4},
and Stacey M. Williams⁸

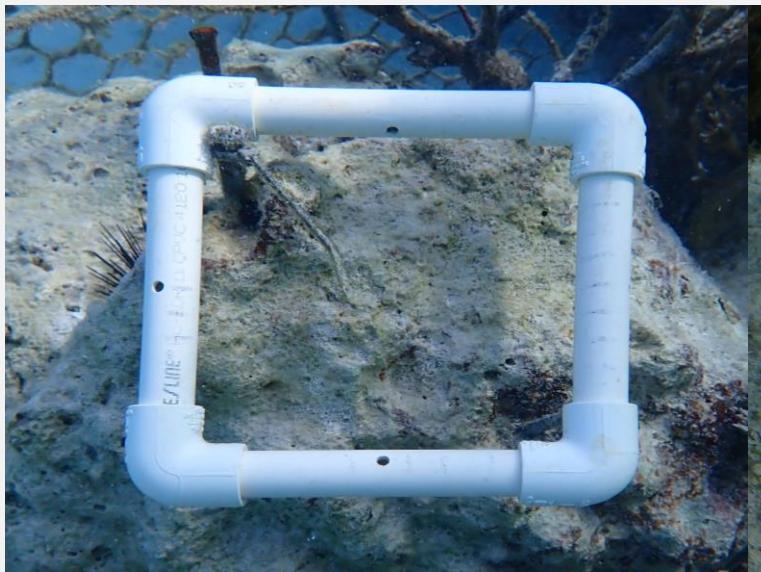


- Baseline monitoring:**
- Habitat: identify primary coral competitors
 - Predation: identify predators & pressure
 - Density: urchins & *M. spinosissimus*
 - Rugosity: shelter for urchins & crabs?
- Assumptions:**
- Repeated stocking of grazers unless/until a stock-recruitment relationship is evident
 - Grazers stocked at appropriate size and density to minimize predation

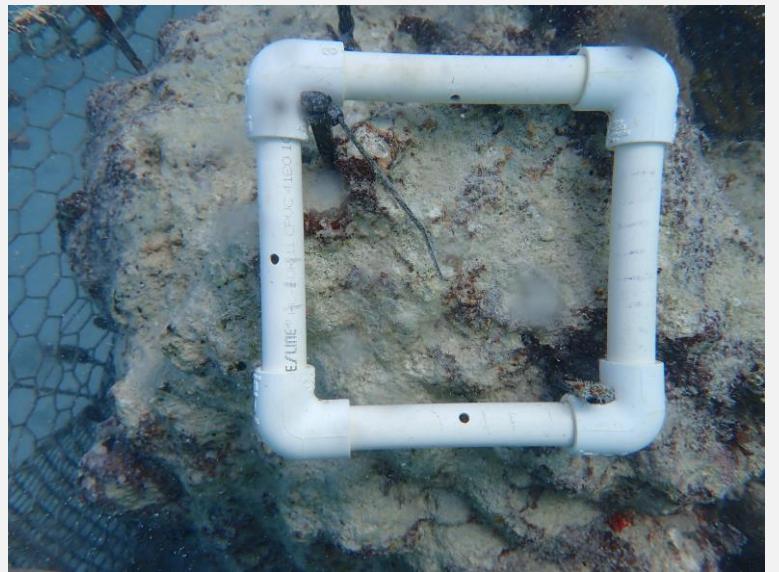




Before



2-wk



1-mo

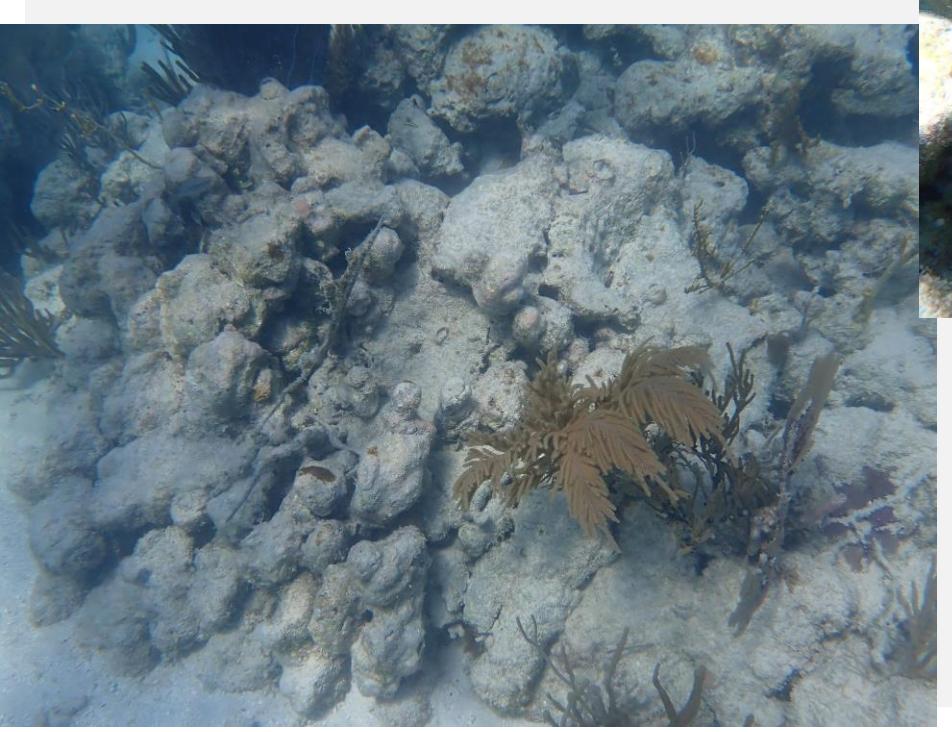
Diadema restoration-Fajardo

2021



2024







No urchins



Yes urchins!





Centro de Investigación y Restauración de Organismos Marinos



NFWF



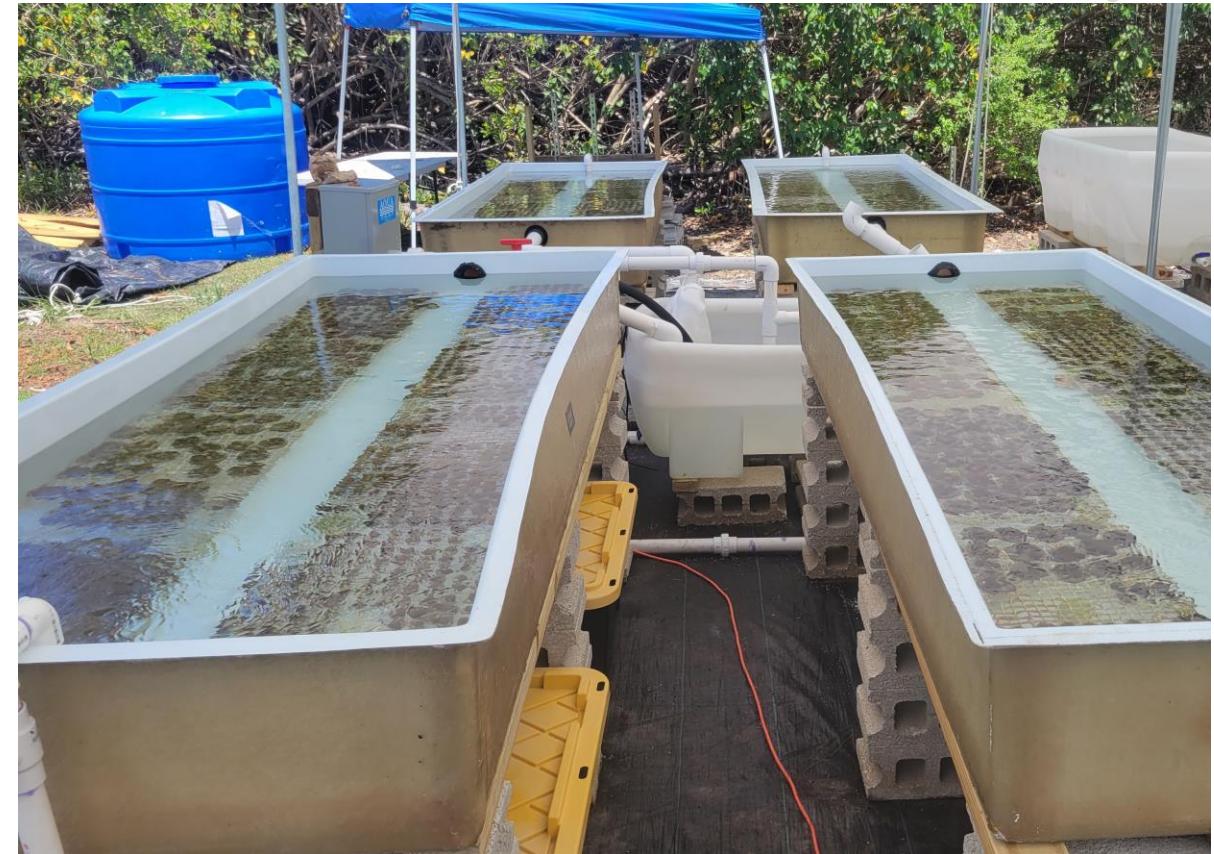
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Main herbivores



Corals
11 species (ESA species)

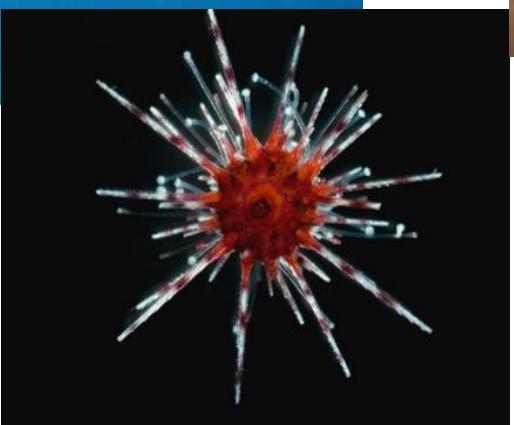
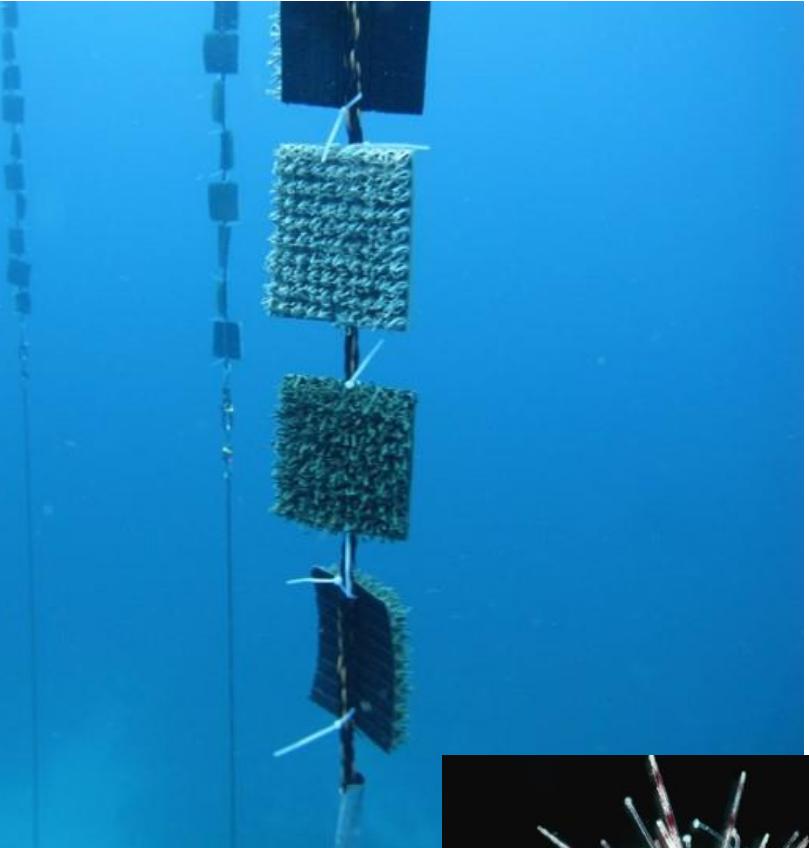


Ways to enhance herbivory

- Protection of parrotfish
- Redistribute healthy populations
- **Larval rearing in the laboratory**
- **Collect post-larval settlers**



Post-larval settlement

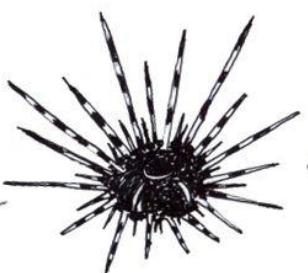
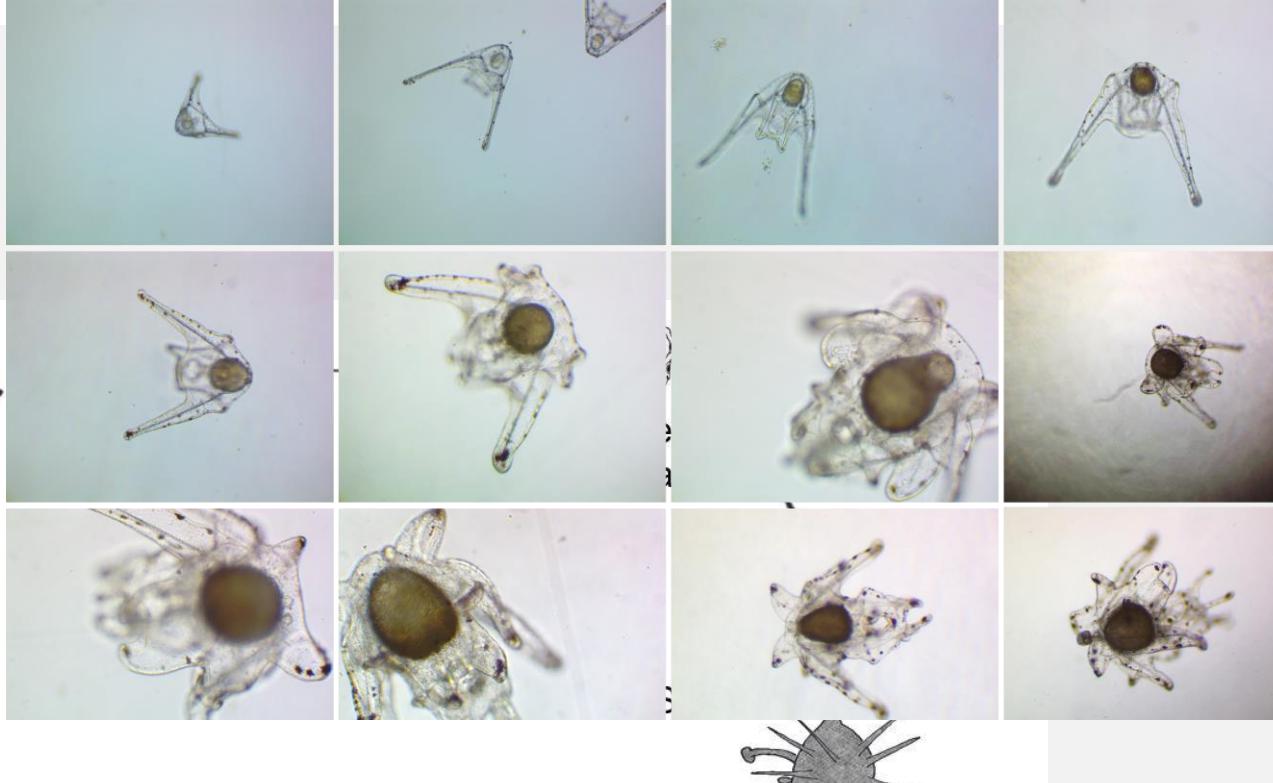


Life Cycle



Spawning

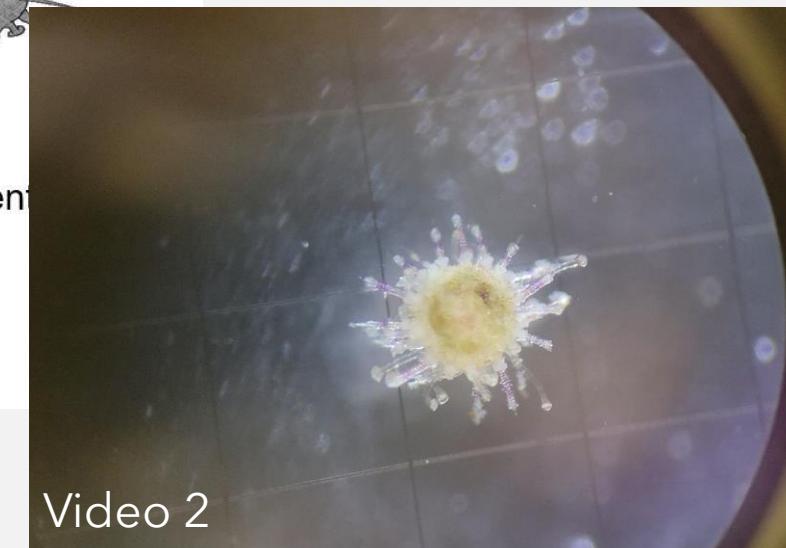
Sperm



Recruit (first phase
visible on the reef)



Post-settlement
survival



Video 2



E. viridis larval run



Video 3



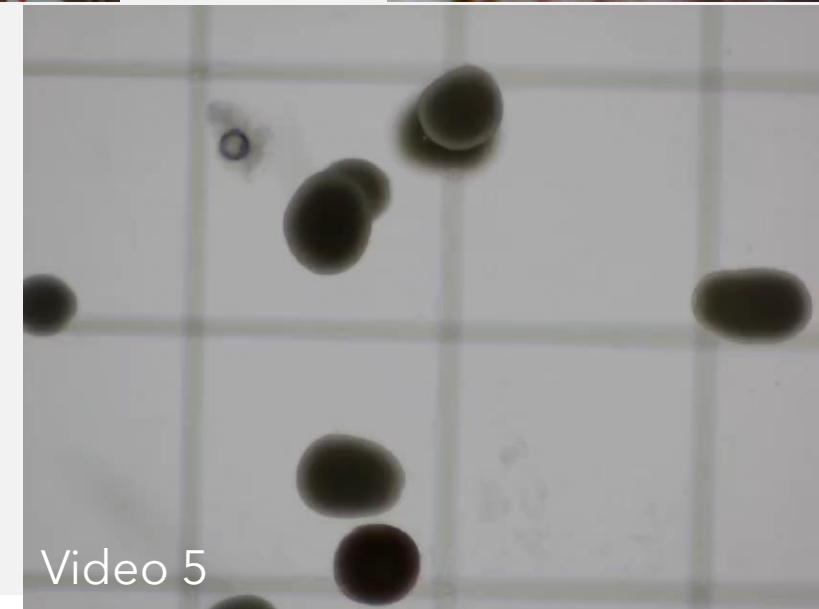
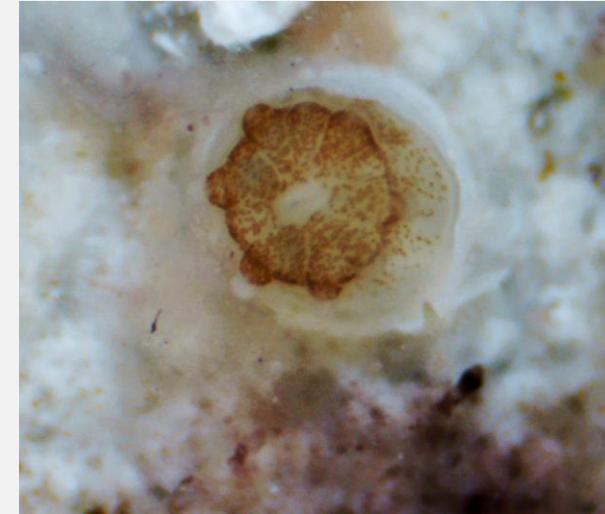
Video 4





Crab Nursery

Coral Reproduction



Video 5

New Hope for Puerto Rico's Coral Reefs

December 04, 2023

With \$10.6 million in new funding through NOAA, our long-time Puerto Rico partner Institute for Socio-Ecological Research is poised to restore coral reefs on a massive scale

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More Information

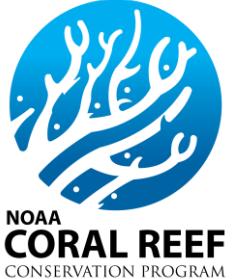
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- › [Restored Corals are Thriving Three Years after Hurricane Matthew](#)

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FEATURE STORY

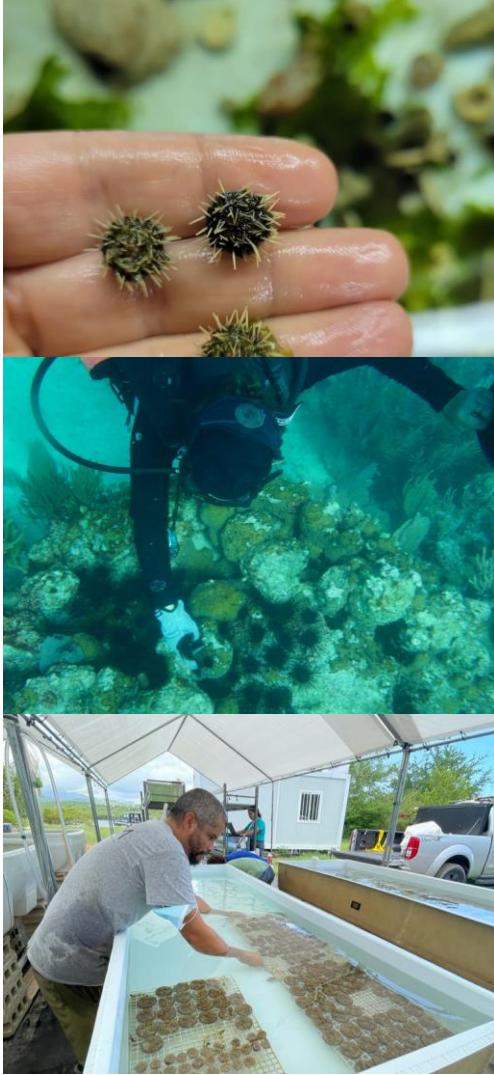
[Return 'Em Right Best Release](#)





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CARIBE**

Caribbean Reef Project



Caribbean Reef Project

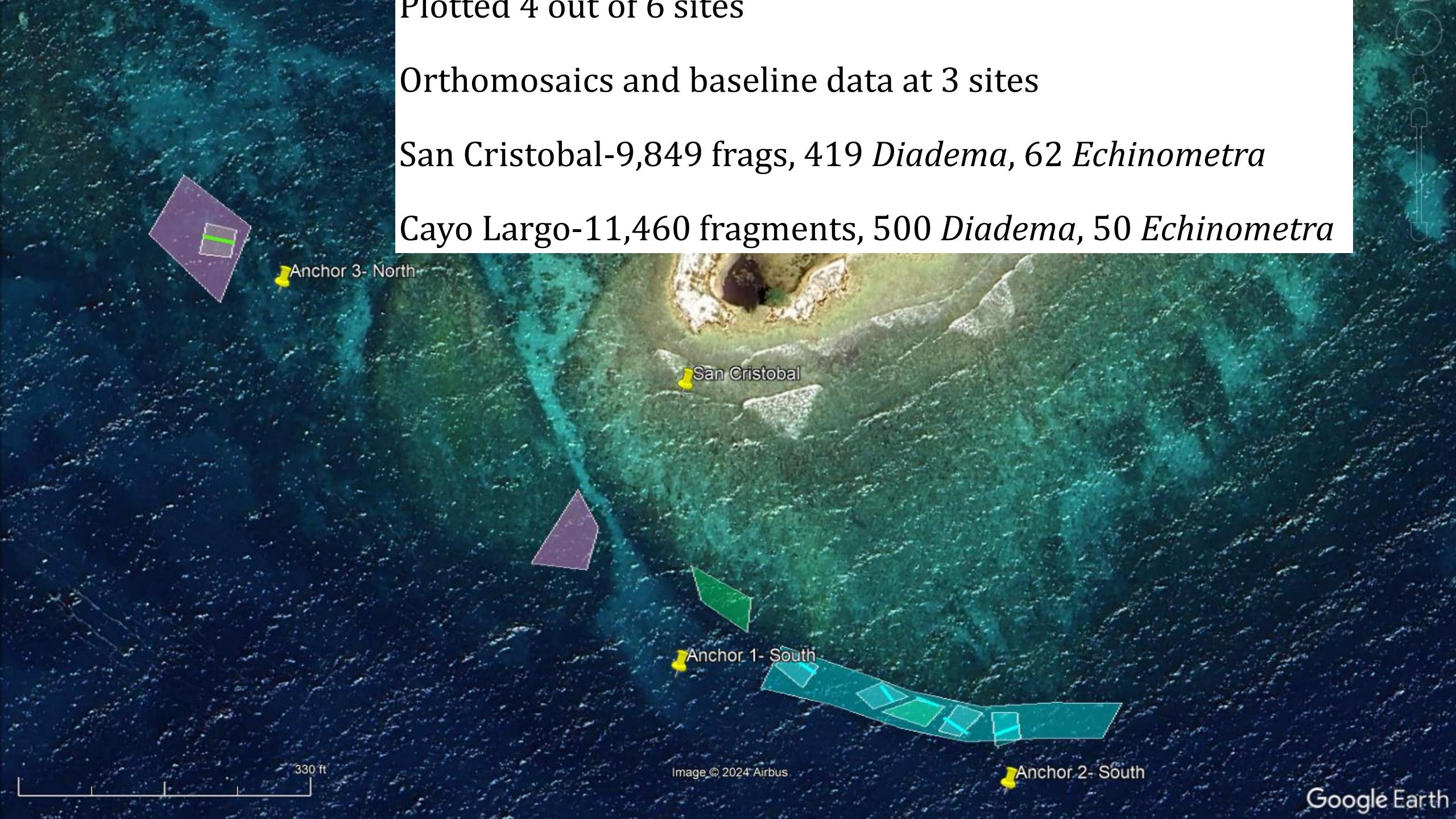
Taking an ecosystem-based approach to coral reef restoration. We will restore 5 acres of coral reefs in La Parguera, Mayagüez and Fajardo. At each reef, we will outplant more than 21,000 coral fragments of different species (ESA-listed) and four species of herbivores, including 3 species of sea urchins and herbivorous crab.

Plotted 4 out of 6 sites

Orthomosaics and baseline data at 3 sites

San Cristobal-9,849 frags, 419 *Diadema*, 62 *Echinometra*

Cayo Largo-11,460 fragments, 500 *Diadema*, 50 *Echinometra*



330 ft

Image © 2024 Airbus

Anchor 2- South

Google Earth

Thanks

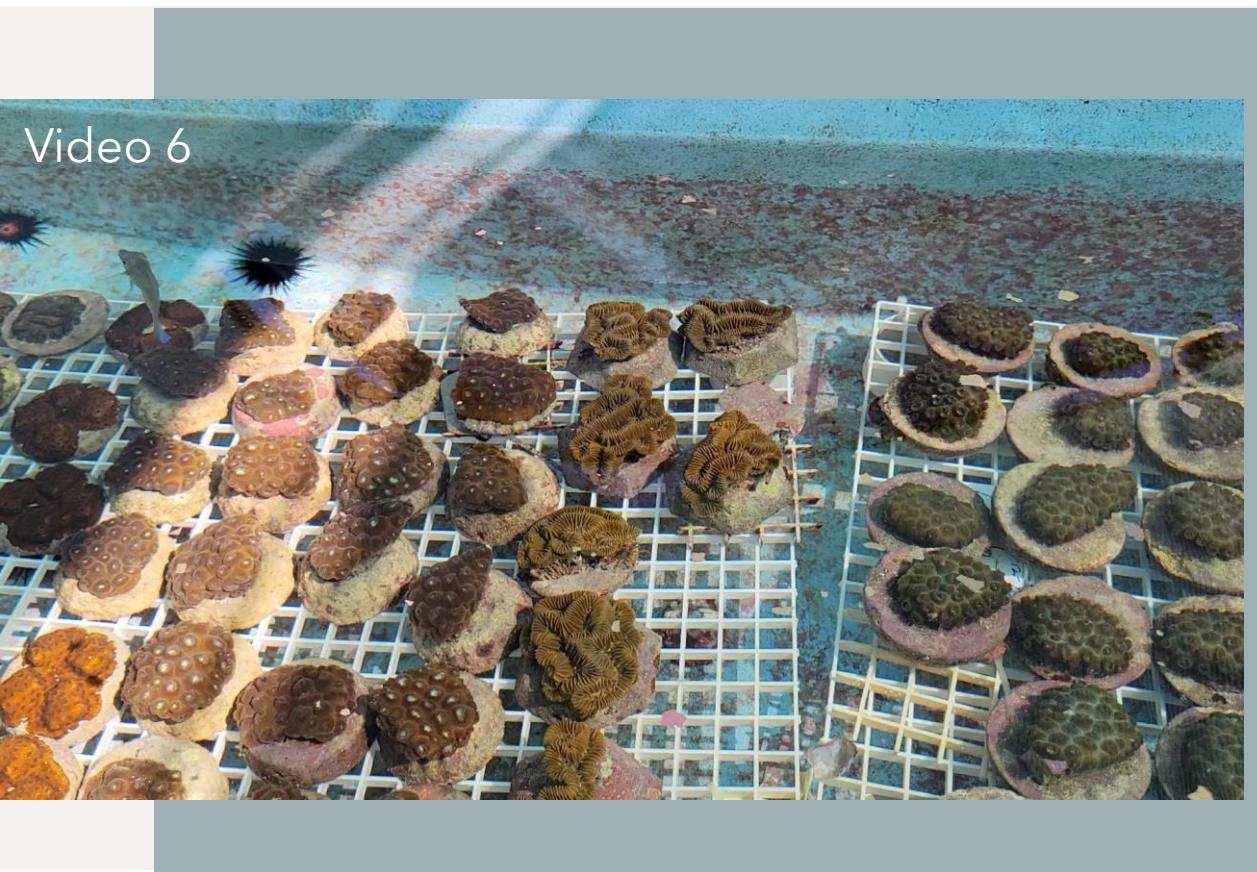
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Video 6