Taking on Hurricane Ian

Wave Attenuation at Eastern Dry Rocks

MISSION: ICONIC REEFS

Coral Restoration Foundation

LIFE CYCLE

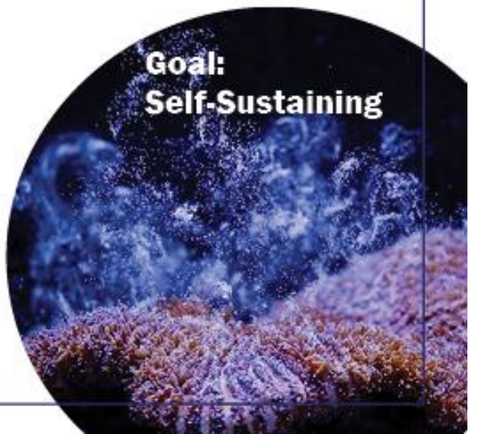
1 Site Preparation

2 Coral Propagation, Rearing and Planting

3 Thousands of Algae-Eating Grazers

4 Stewardship and Maintenance

5 Monitoring and Adaptive Management



Goal: Self-Sustaining

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REEFS

20 YEARS

500,000 CORALS

$100 MILLION


Florida Department of Environmental Protection
USGS
NOAA
National Oceanic and Atmospheric Administration
U.S. Department of Commerce
EPA
Florida Fish and Wildlife Conservation Commission
Fish & Wildlife Foundation of Florida
National Marine Sanctuary Foundation
United Way
United Way of Collier and the Keys
National Fish and Wildlife Foundation
Mote Marine Laboratory
Coral Restoration Foundation
Reef Renewal USA
Plant a Million Corals
Duke University
FIU
TNC
I.CARE
The Florida Aquarium
NSU Florida
Nova Southeastern University
Florida State University 1851
UF University of Florida
Callaway Marine Technologies
Smithsonian
Sea Base High Adventure
secore international
Zero Horizons
The College of the Florida Keys

Waves interacting with the reef =

Wave Attenuation

$$\underbrace{\frac{\partial}{\partial x}\left(F_w\right)}_{\substack{\textit{shoreward}\\ \textit{change in}\\ \textit{wave energy}}} = \underbrace{-\varepsilon_b}_{\substack{\textit{dissipation of}\\ \textit{wave energy}\\ \textit{wave breaking}}} \quad \underbrace{-\varepsilon_d}_{\substack{\textit{dissipation of}\\ \textit{wave energy}\\ \textit{bottom drag}}}$$


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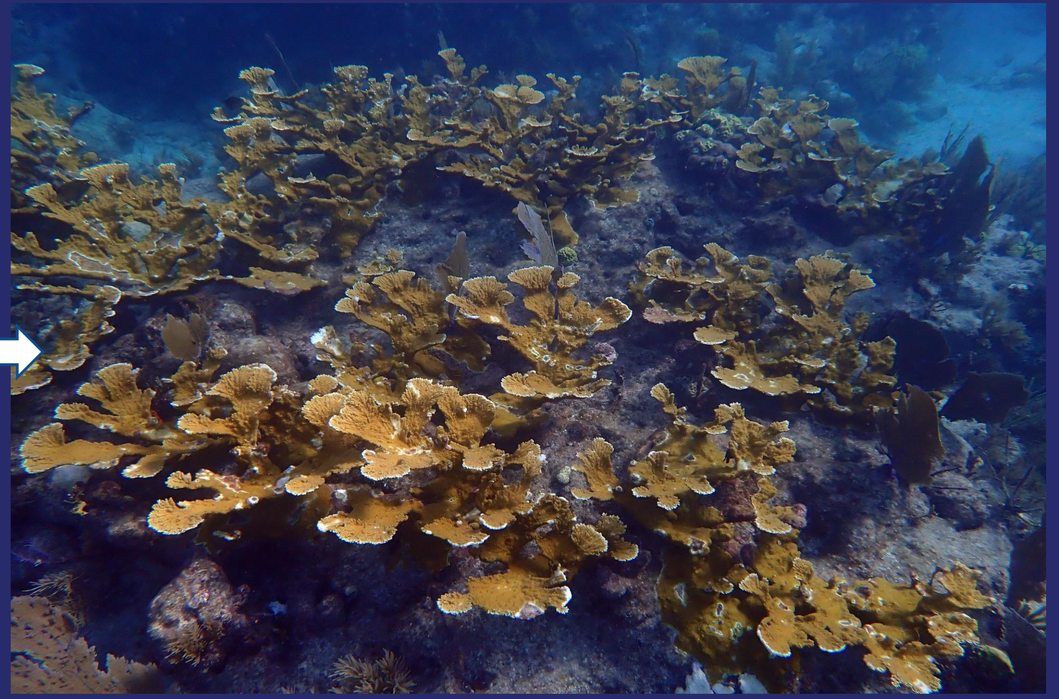
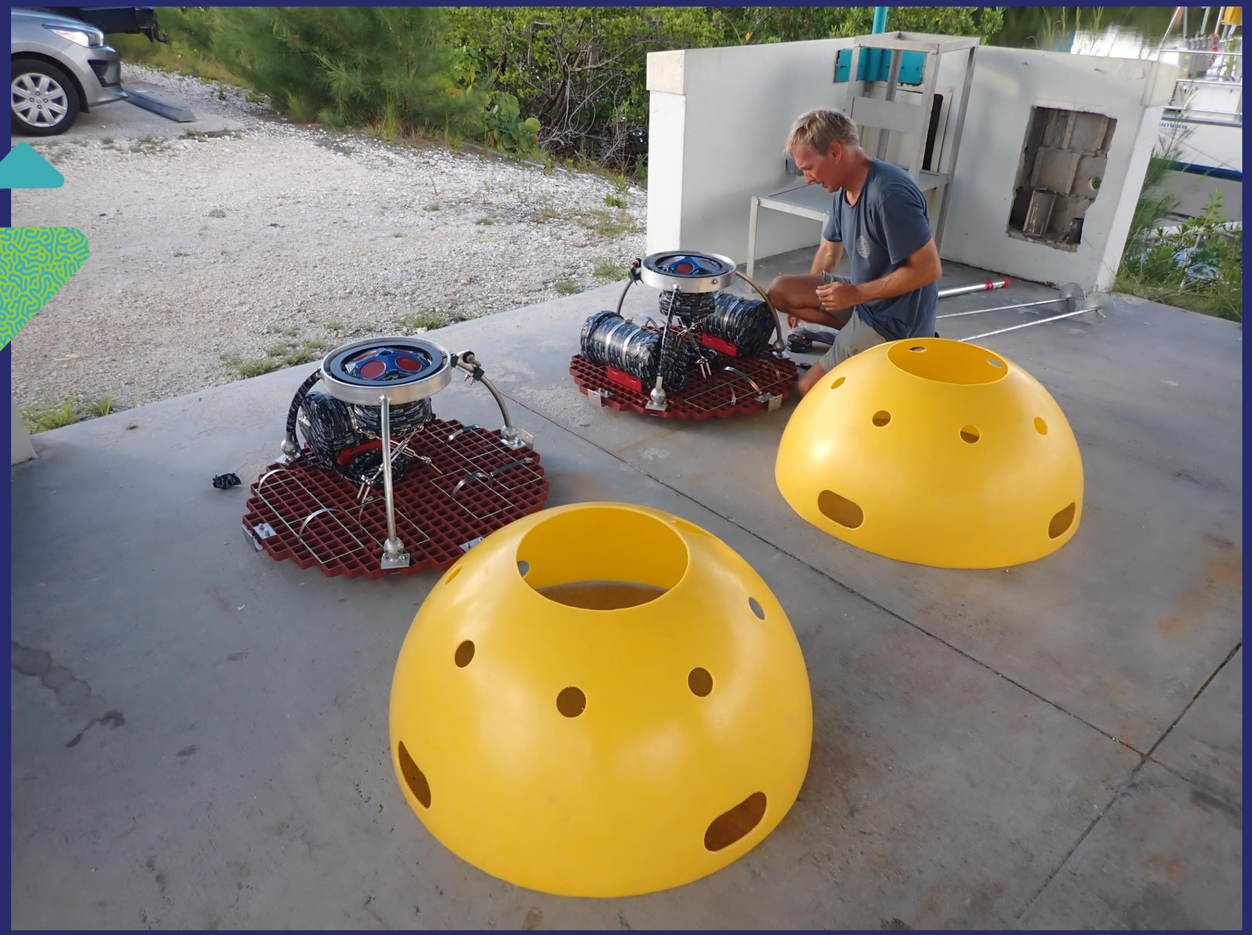
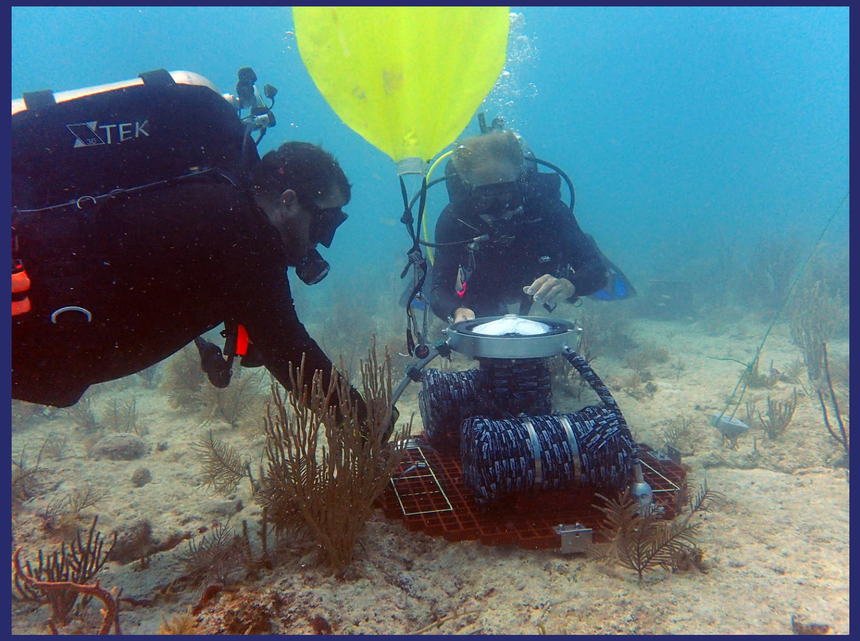
PHOTO: Coral Restoration Foundation

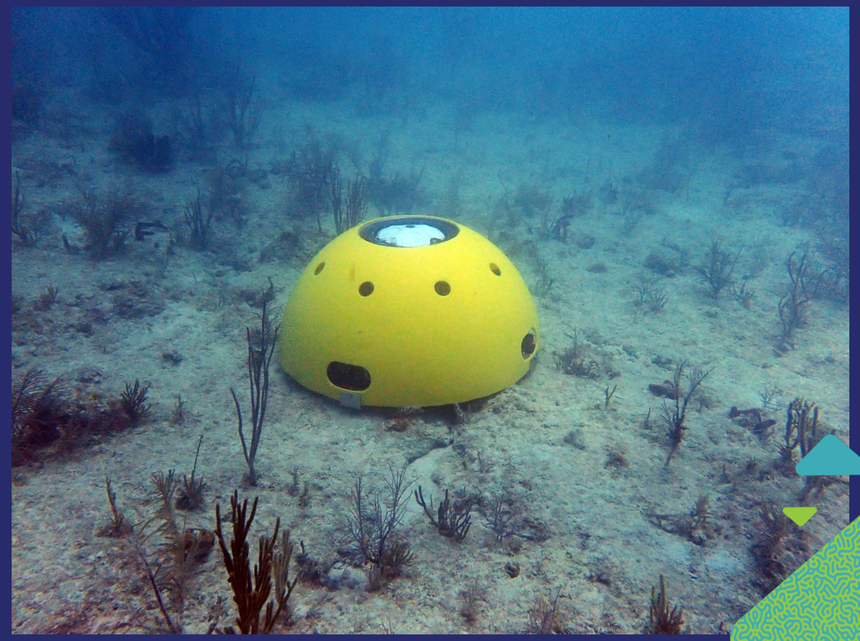


Jim Hench, Ph.D.

Associate Professor
Nicholas School of the Environment,
Duke University Marine Laboratory

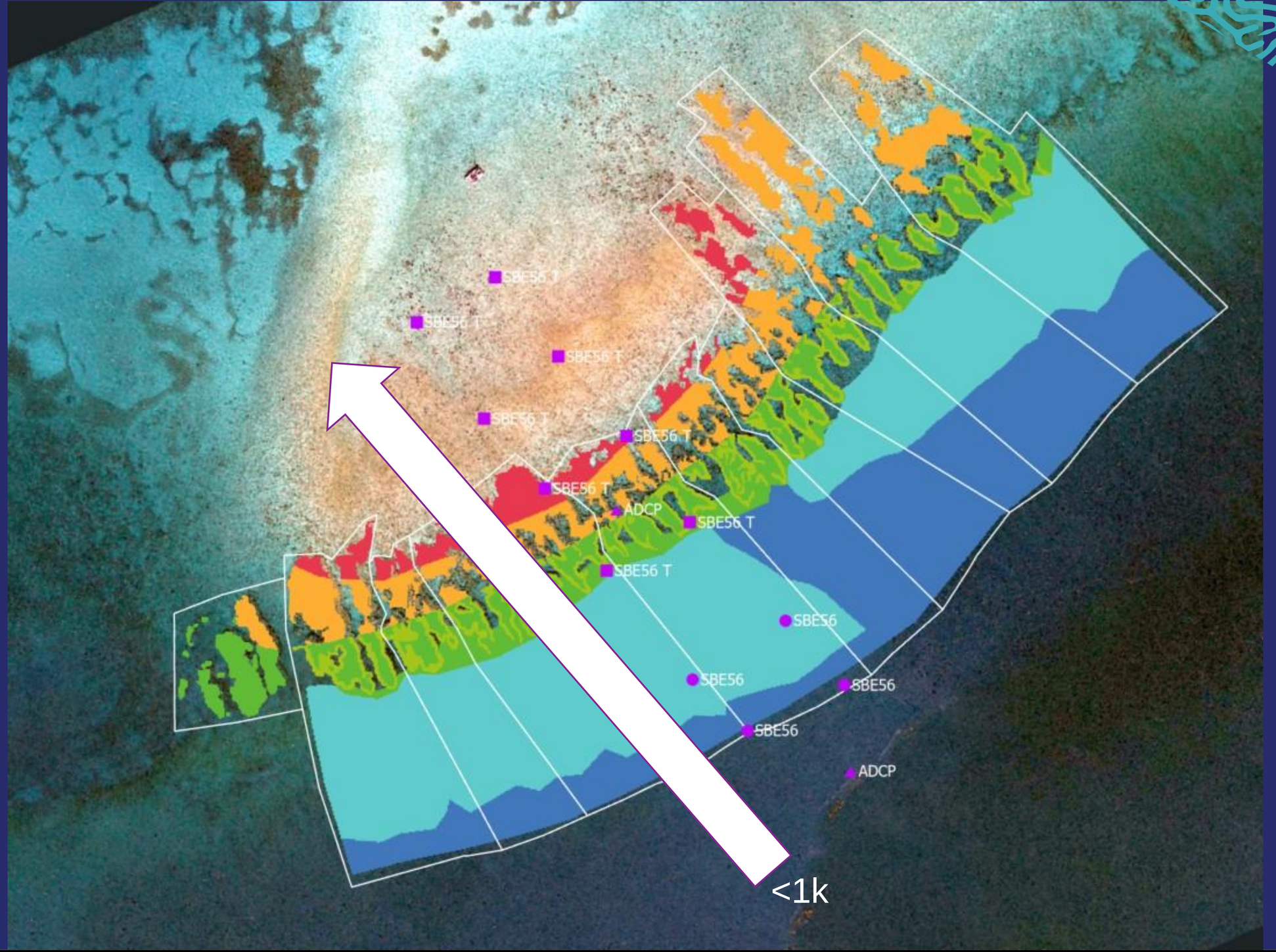






Funded by grants from the **National Fish and Wildlife Foundation and NOAA's National Centers for Ocean Coastal Science**, facilitated by the **National Marine Sanctuary Foundation** and permitted by **Florida Keys National Marine Sanctuary**, as well as the **Honda Marine Science Foundation**, and the **U.S. National Science Foundation.**


7 Miles
Sand Key
Eastern Dry Rocks
Reef Line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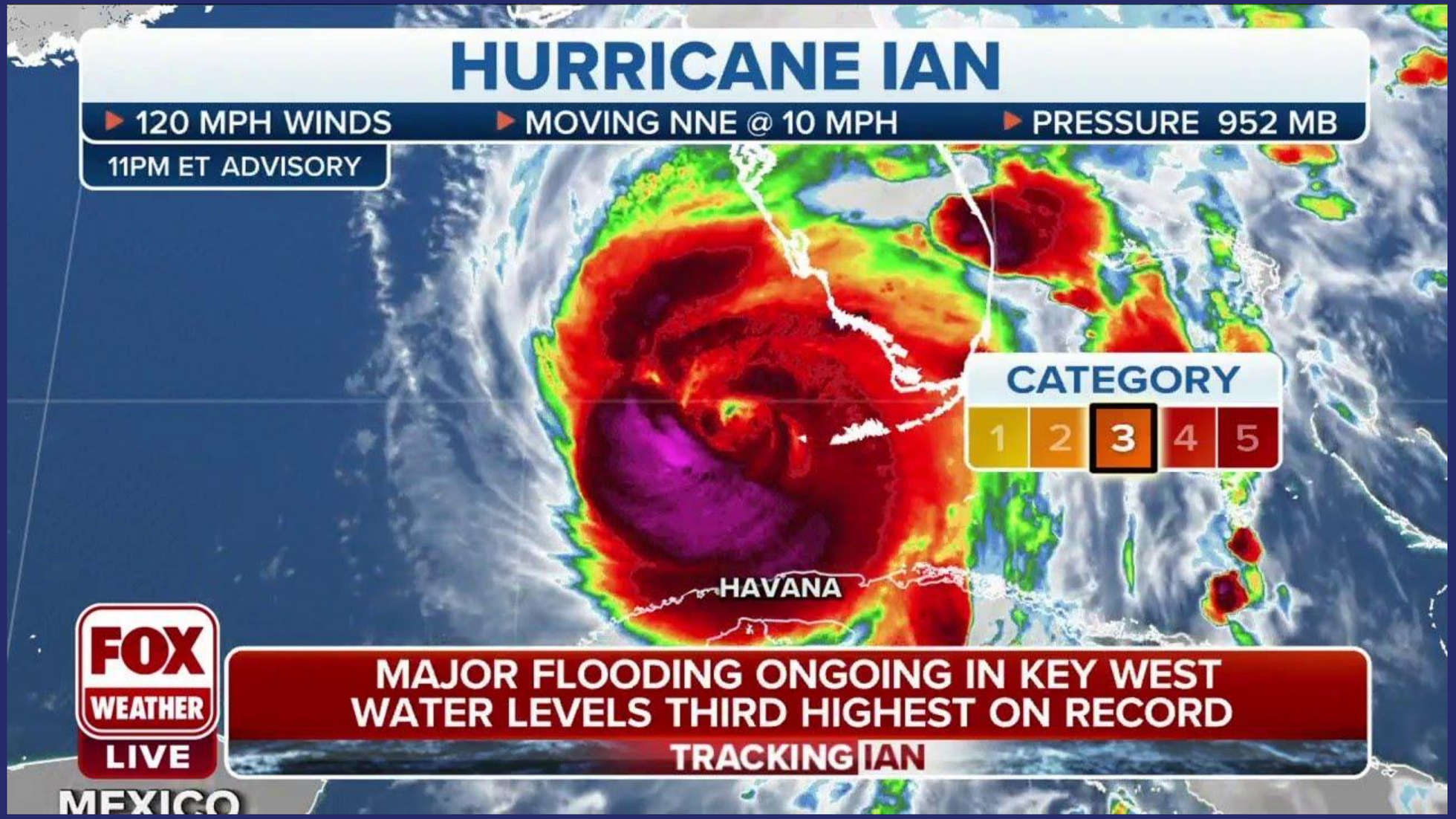
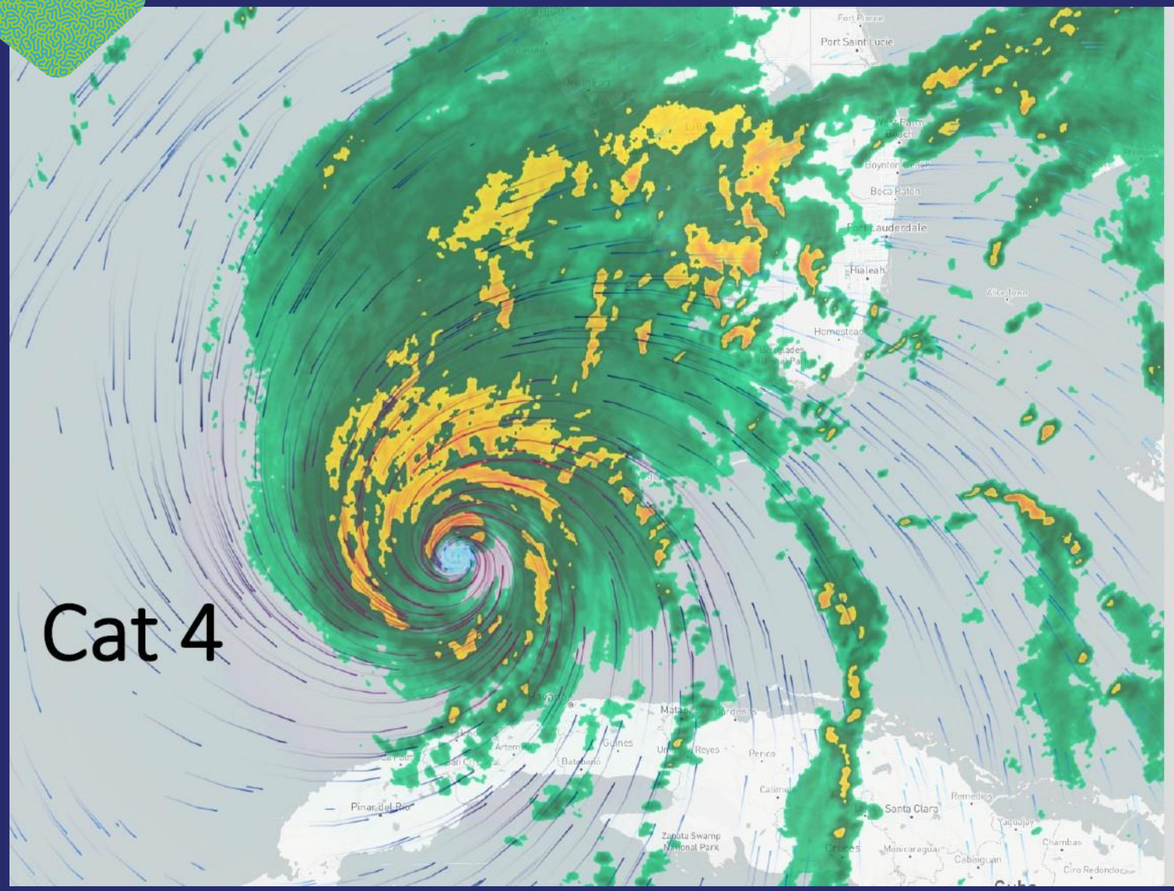
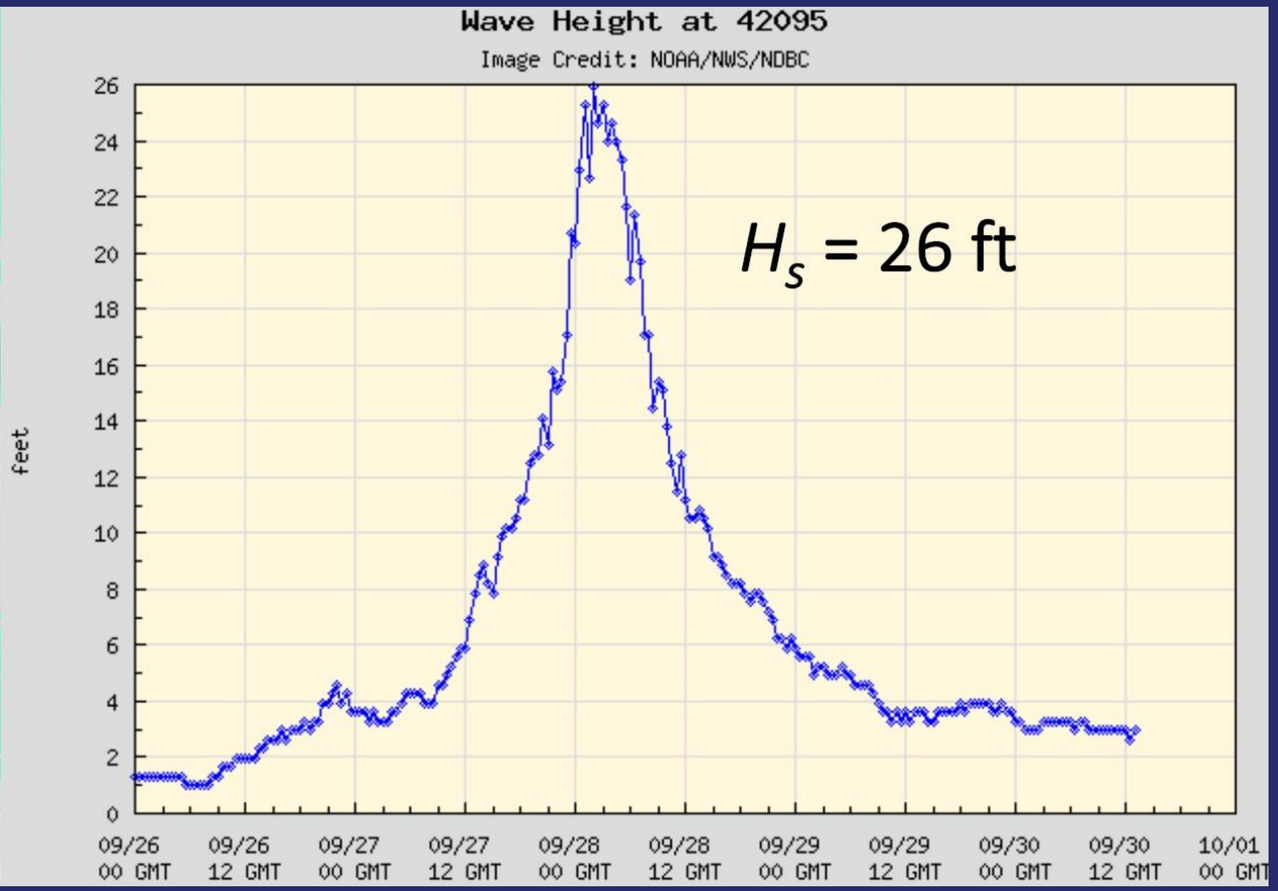

HURRICANE IAN
120 MPH WINDS
MOVING NNE @ 10 MPH
PRESSURE 952 MB
11PM ET ADVISORY
CATEGORY
1 2 3 4 5
HAVANA
FOX WEATHER LIVE
MAJOR FLOODING ONGOING IN KEY WEST
WATER LEVELS THIRD HIGHEST ON RECORD
TRACKING IAN
MEXICO

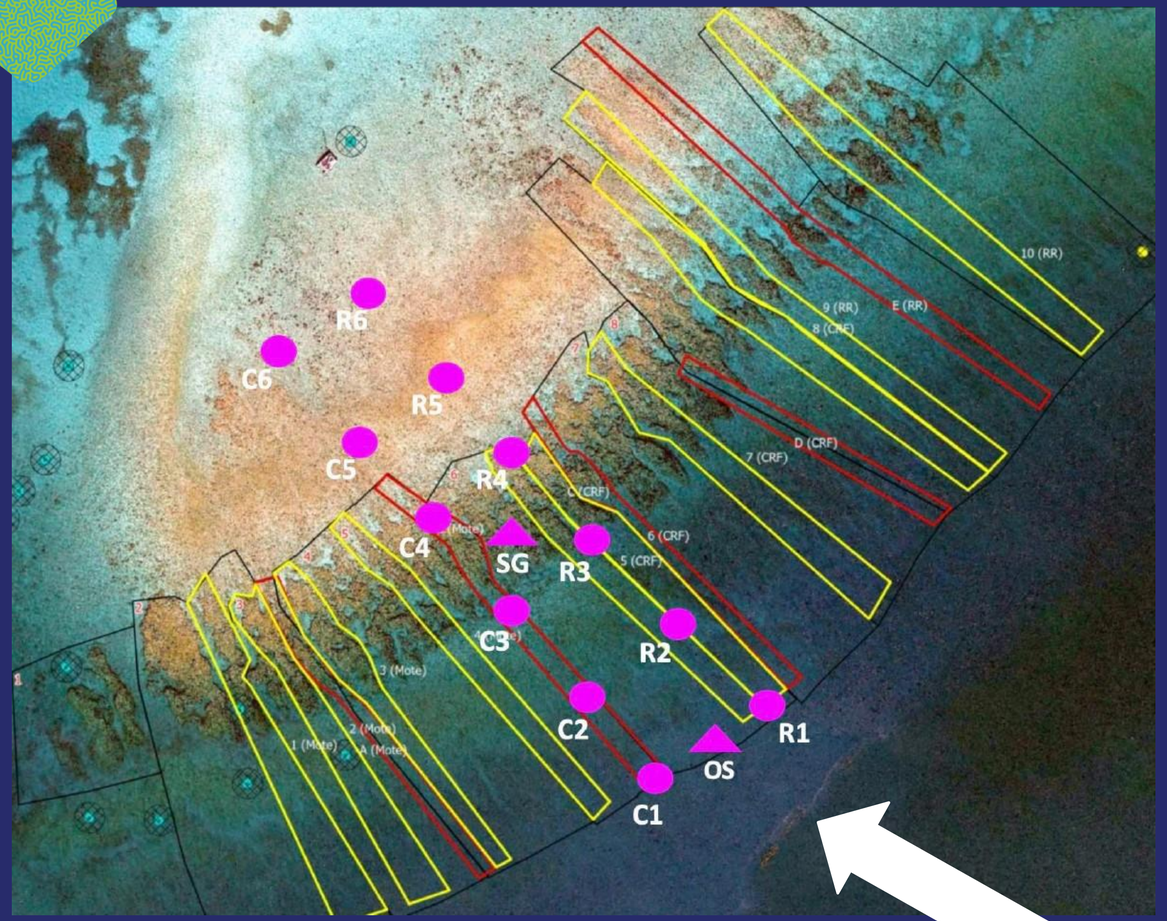
Observed Wave Height

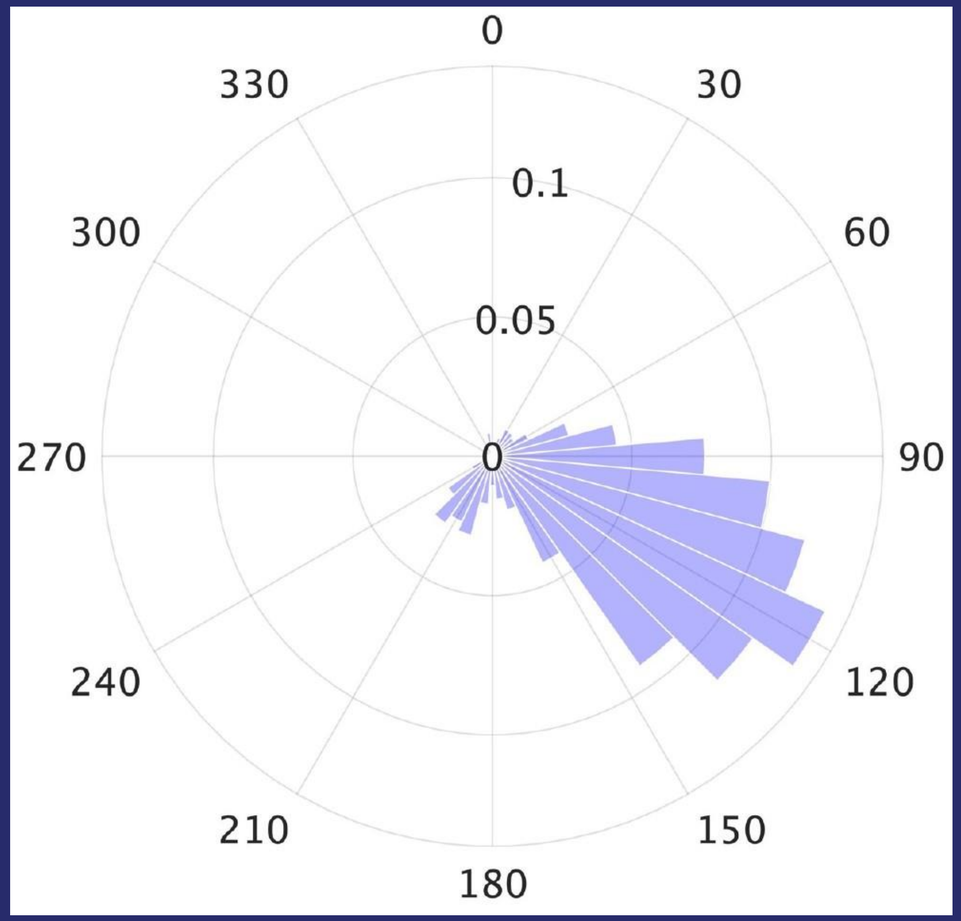




Satan Shoal, 14 miles SW of Key West

Observed Wave Direction

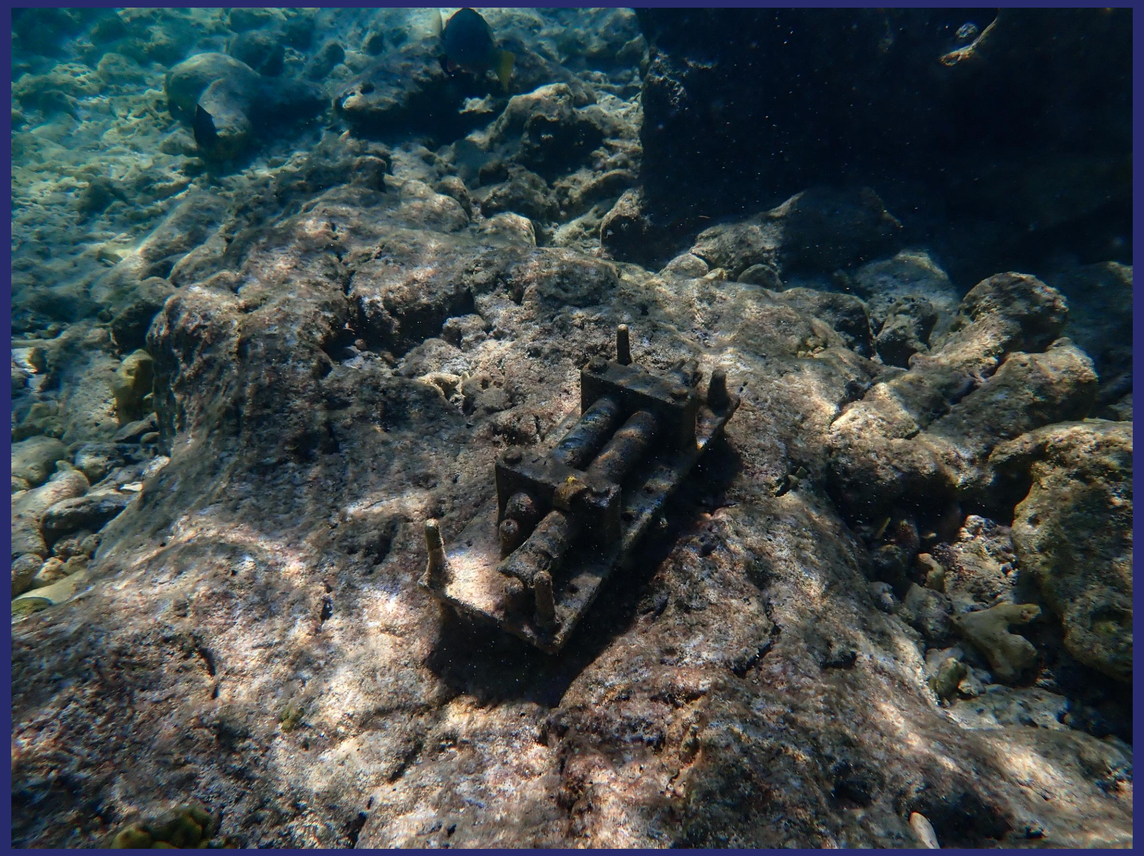




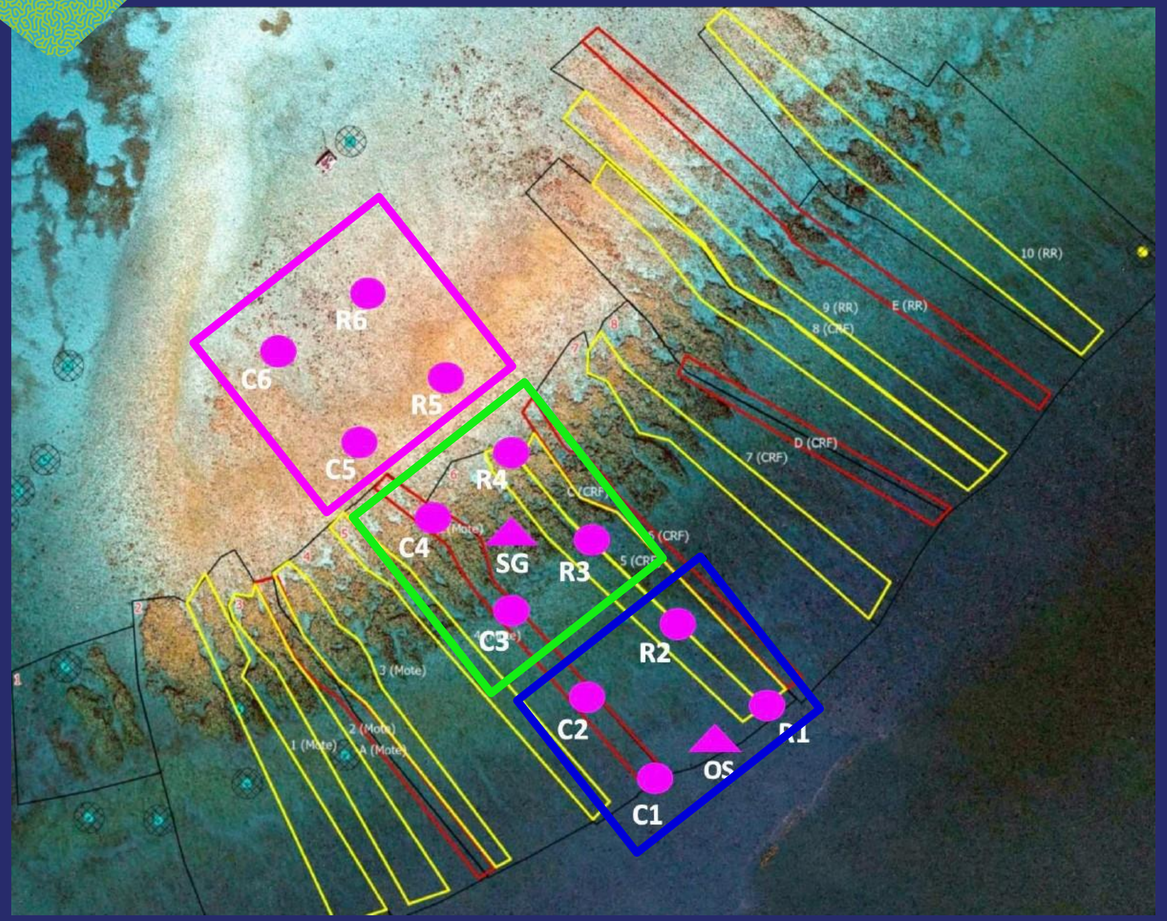
Roughly aligned with local isobaths

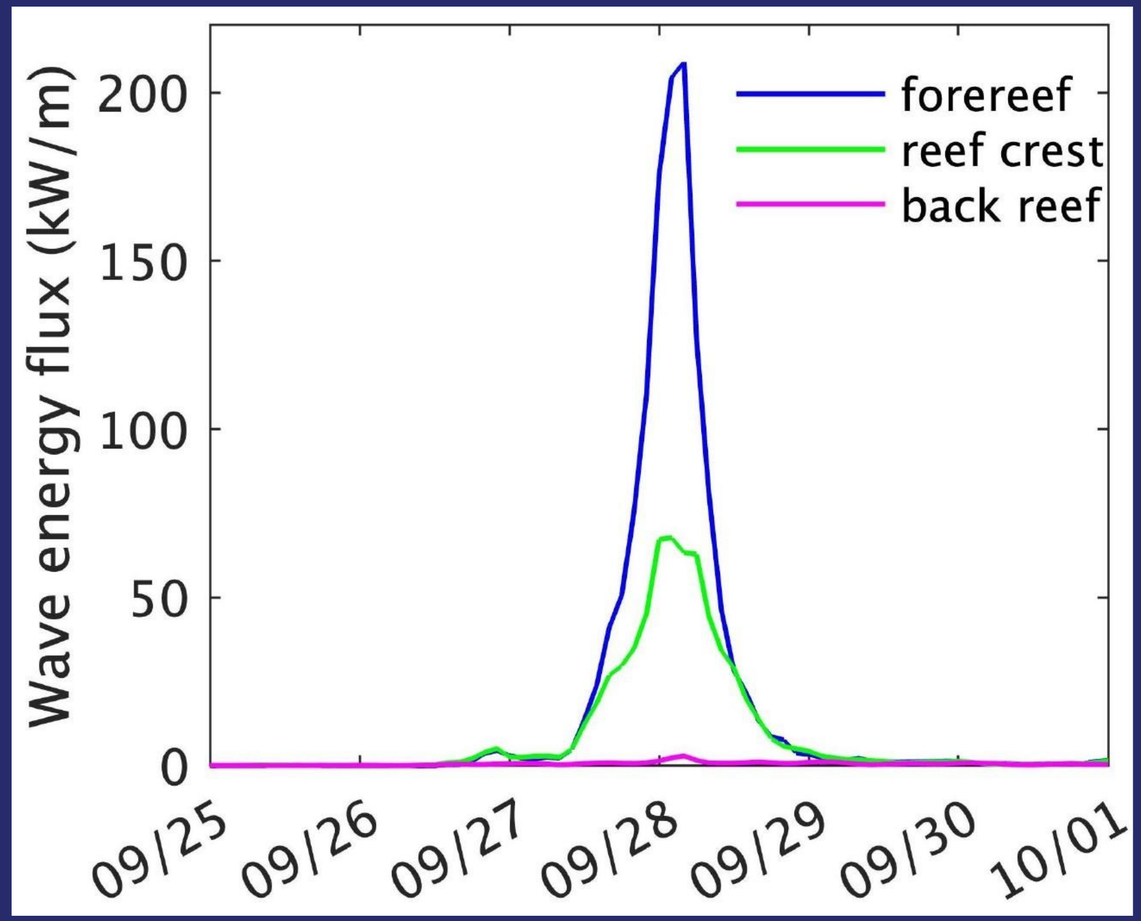
POST IAN

Observation at Eastern Dry Rocks



Wave Dissipation





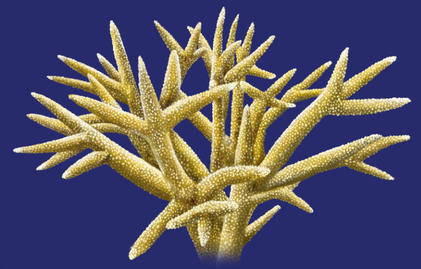
> 90%


DODGE
4X4
FLORIDA
50GMW

BY THE NUMBERS

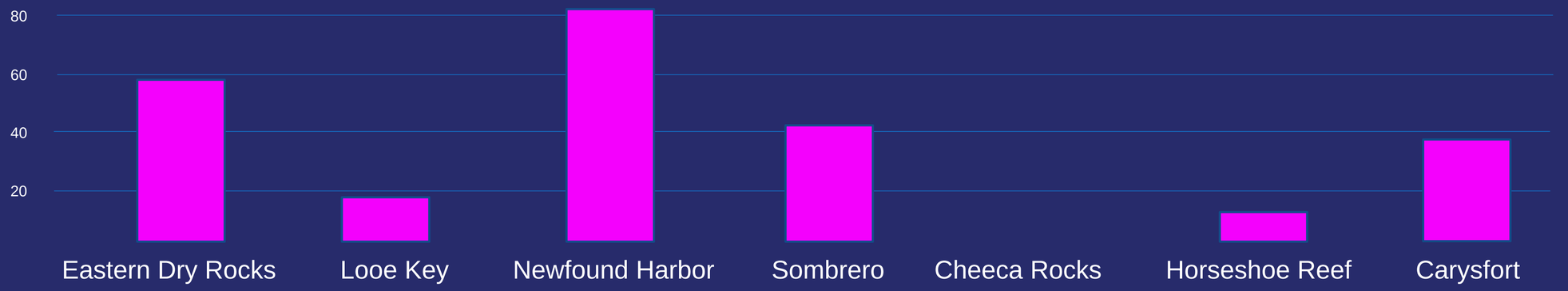
Outplant Progress

29,300



18,200

11,200



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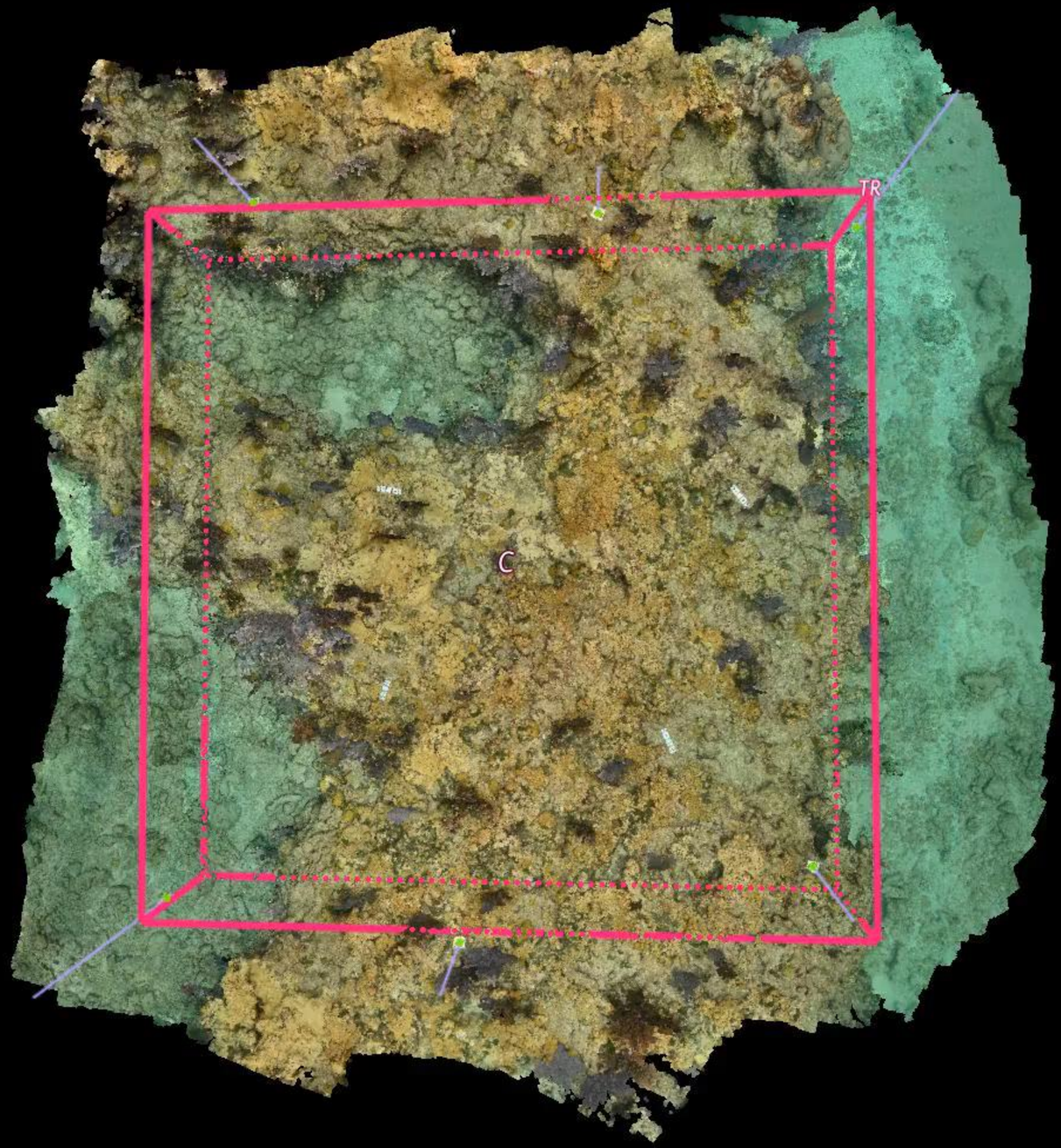
The importance of

Monitoring


TR
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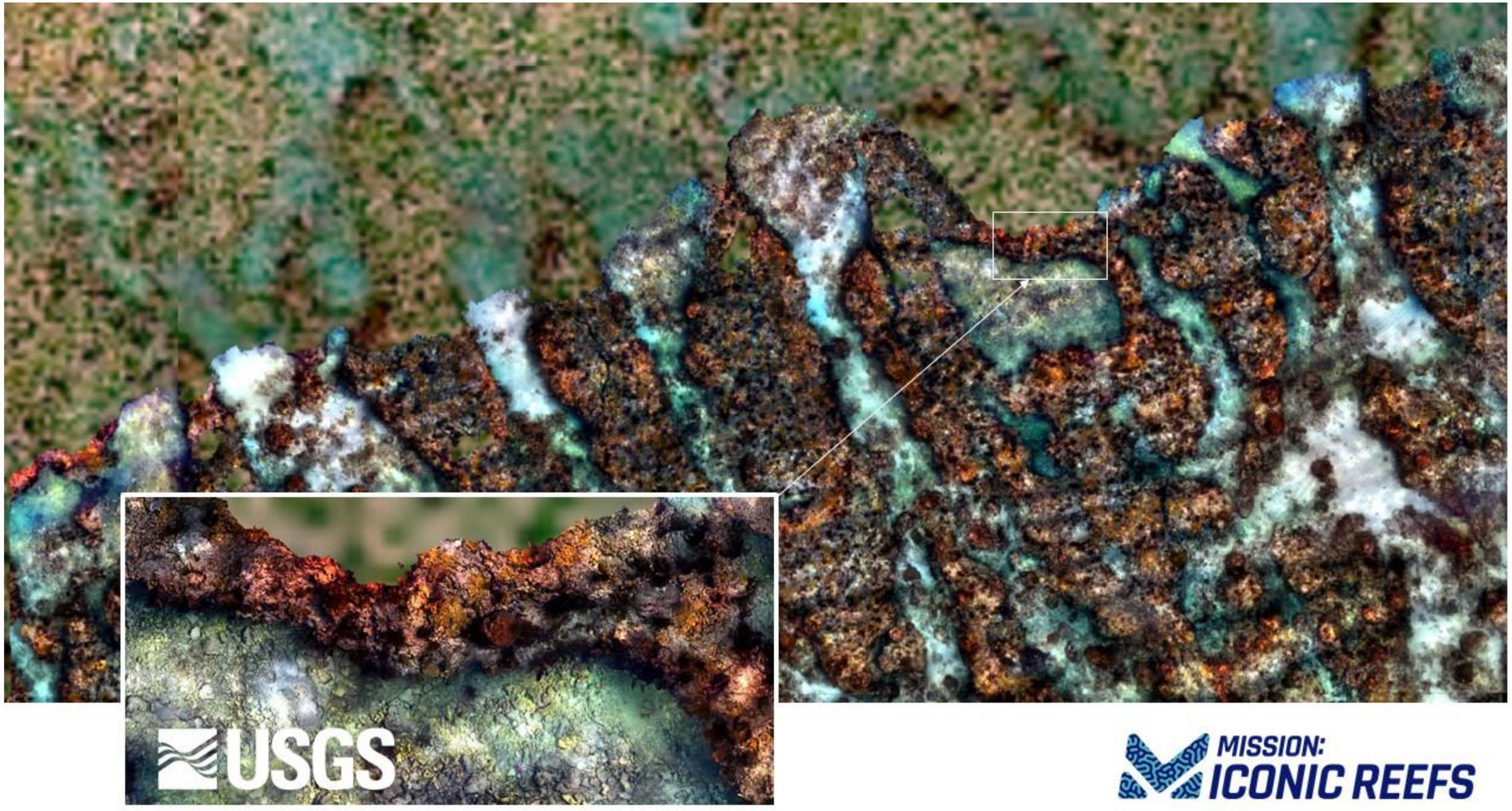
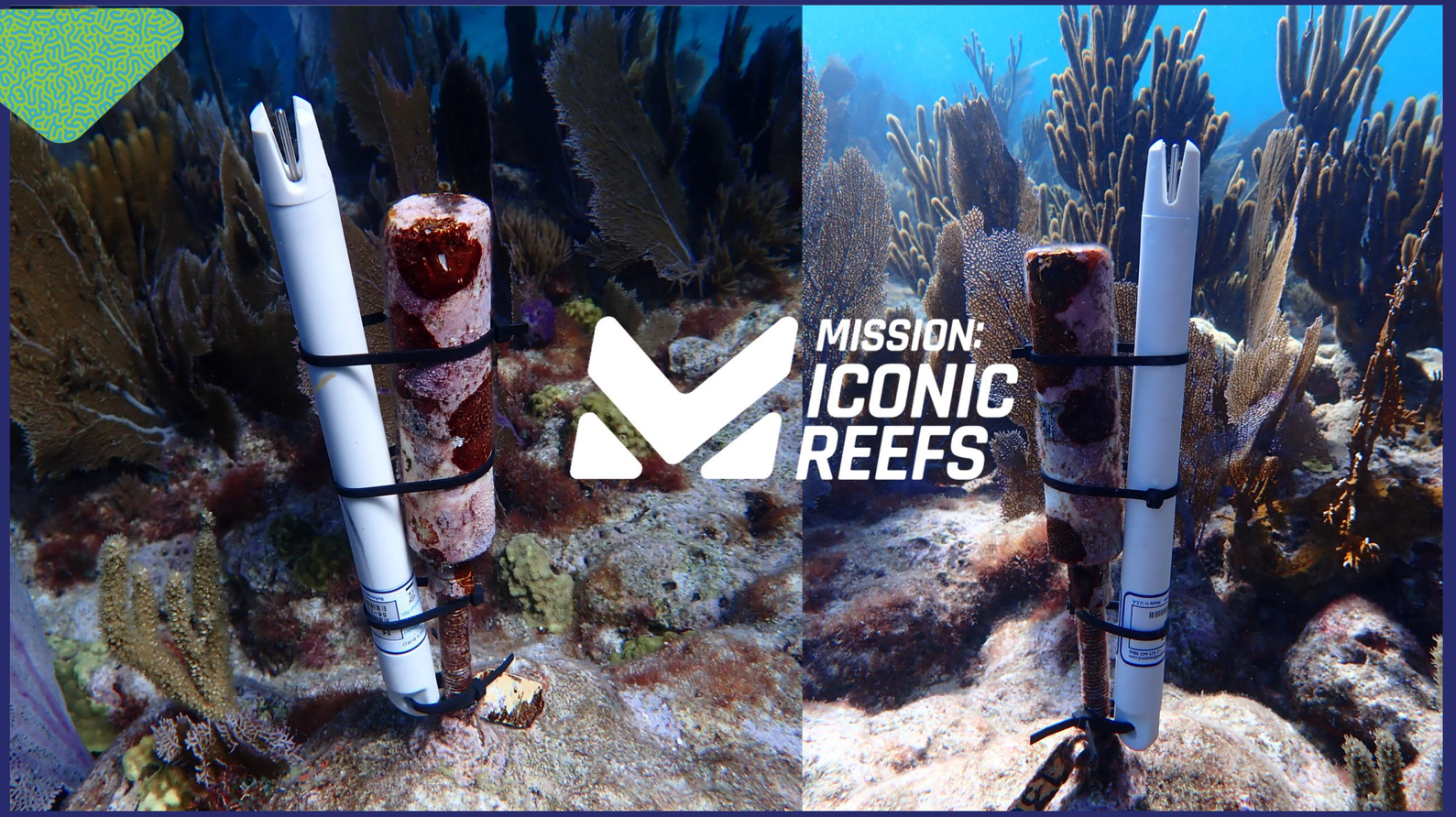
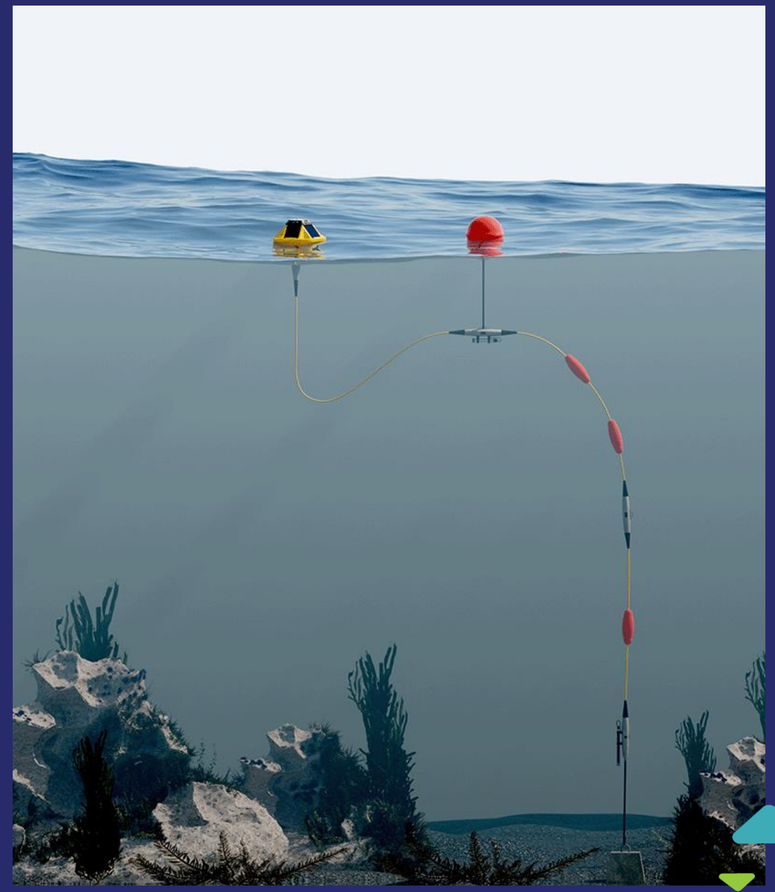
USGS


USGS
MISSION:
ICONIC REEFS

The importance of

Monitoring





The importance of

Maintenance


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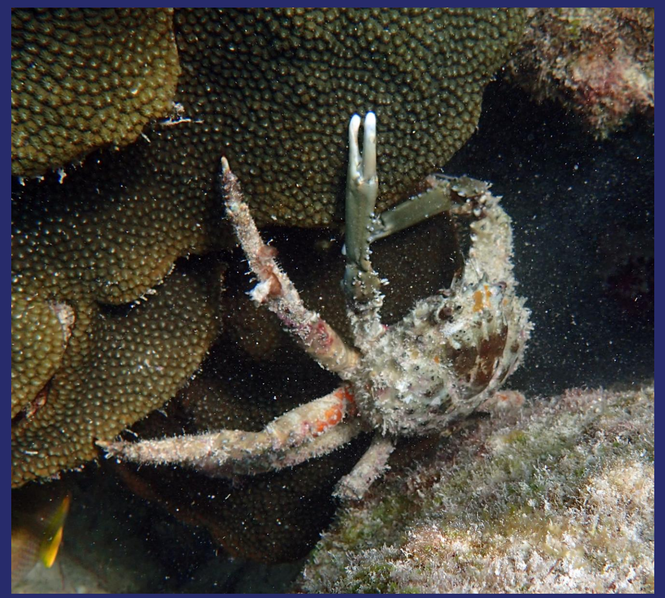
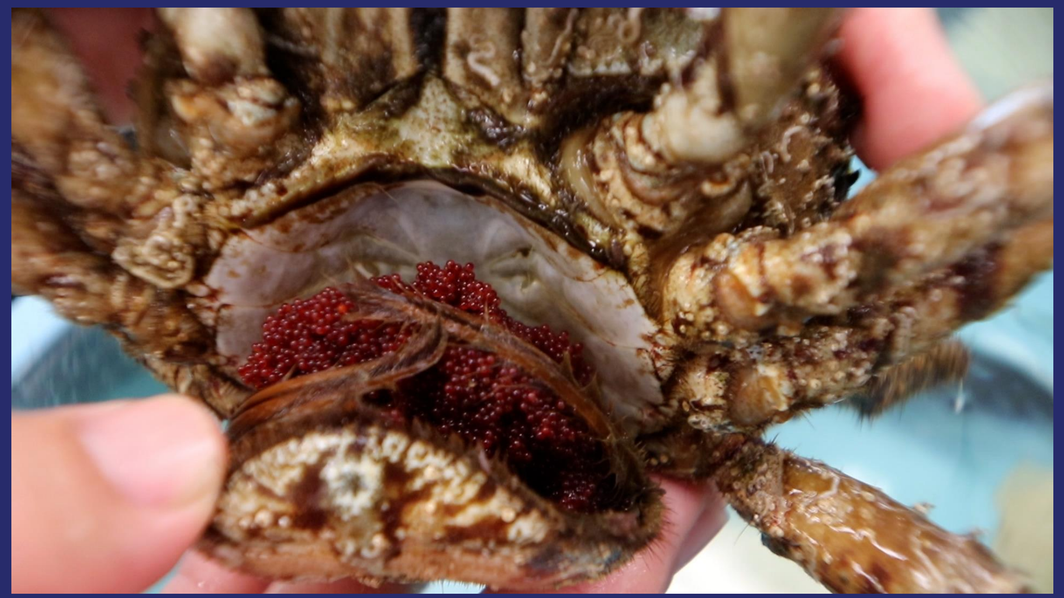
PHOTO: Reef Renewal


MISSION:
ICONIC REEFS
PHOTO: Jim Brittsan





The importance of

Stewardship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ICONIC
REEFS