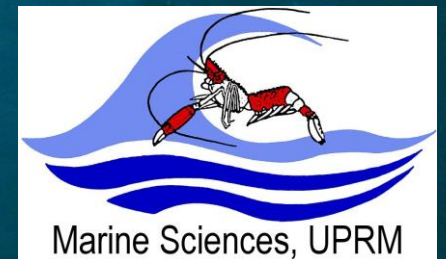


# Farming of tropical seaweed in Puerto Rico

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# Seaweed cultivation and opportunities



*Eucheuma isiforme*  
(red seaweed native to the  
Caribbean)



Small-scale cultivation in Belize



Cultivation of closely related  
species in Tanzania

## Applications

- Nutraceuticals/ Cosmetics
- Fresh food
- Processed foods
- Livestock feeds
- Fertilizers/ Soil conditioner
- Biofuels

## Markets & Product Development



## Ecosystem Services

- Nutrient remediation
- Habitat provision
- Carbon uptake
- Wave dampening



# Project Team



## Loretta Roberson

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## Co-PIs

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Michael Marty-Rivera



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Scott Lindell  
David Bailey  
Tom Bell



Rene Amador  
Jorge Casillas  
Jannette Ramos



Zhaoqing Yang  
Taiping Wang  
Fadia Ticona Rollano



Liz Diaz  
Dep. de Ciencias Marinas



Aaron Welch



Amy Van Cise



Tania Metz, Megan Considine, Robert Jones, Tiffany Waters, Julie Robinson, Seleem Chan, Francisco Nunez



Greg Rocheleau

CariCOOS



Julio Morell  
Luis Rodriguez



Kristen Davis  
Marcelo Chamecki  
James McWilliams  
(UCLA)  
Isabella Arzeno



Thomas Grothues



Marine Sciences, UPRM



Cinvestav



Daniel Robledo  
Yolanda Freile-Pelegrín



Hoyoung Kwon  
George Zaimes  
Troy Hawkins



Clifford Goudey  
Dominic Manganelli

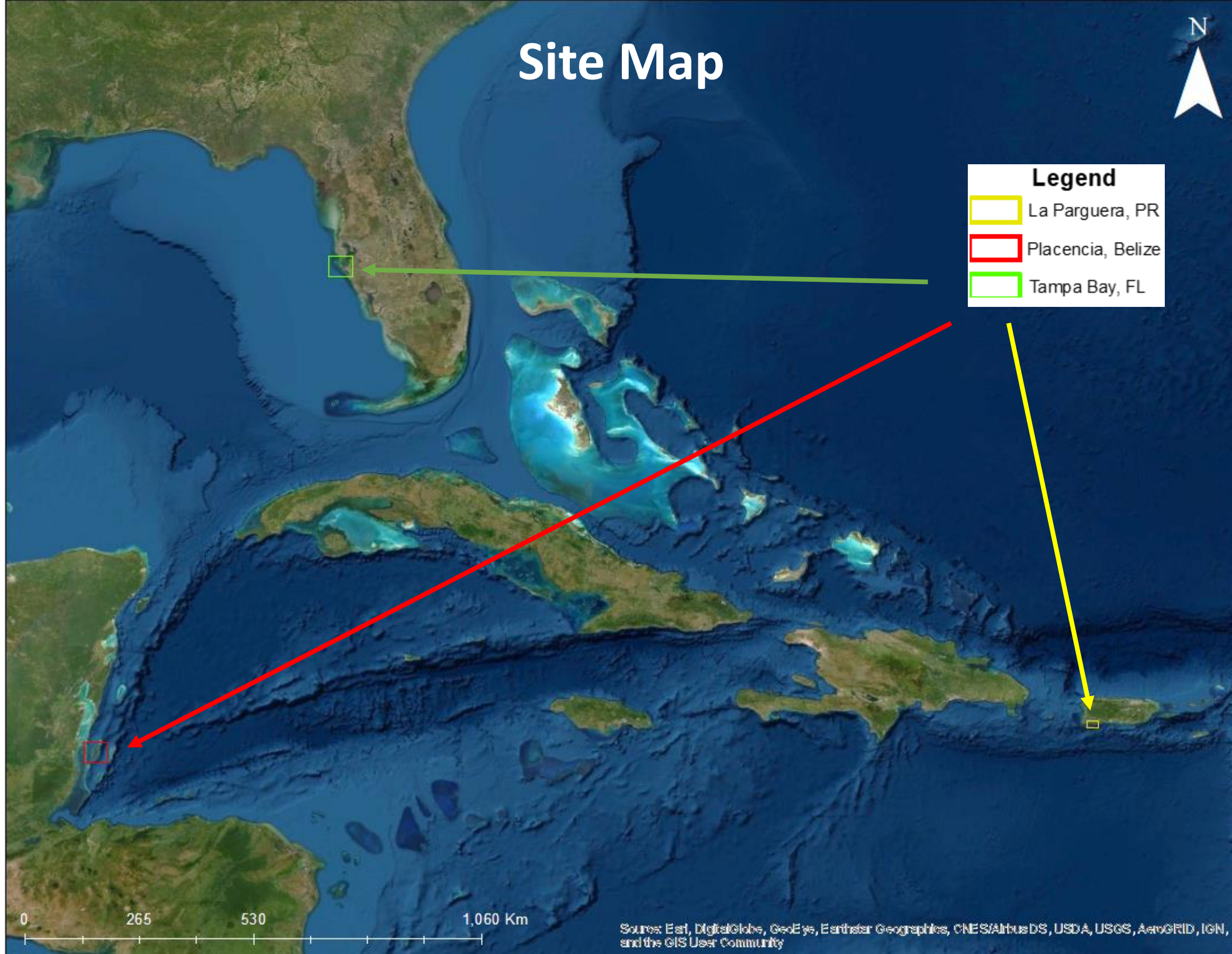
\* **ANCIENT MARINER** (Alaska, Northeast, Caribbean Initiative for ENergy Technology Macroalgae Research Inspiring Novel Energy Resources)

# Site Map



**Legend**

-  La Parguera, PR
-  Placencia, Belize
-  Tampa Bay, FL



0 265 530 1,060 Km

Sources: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



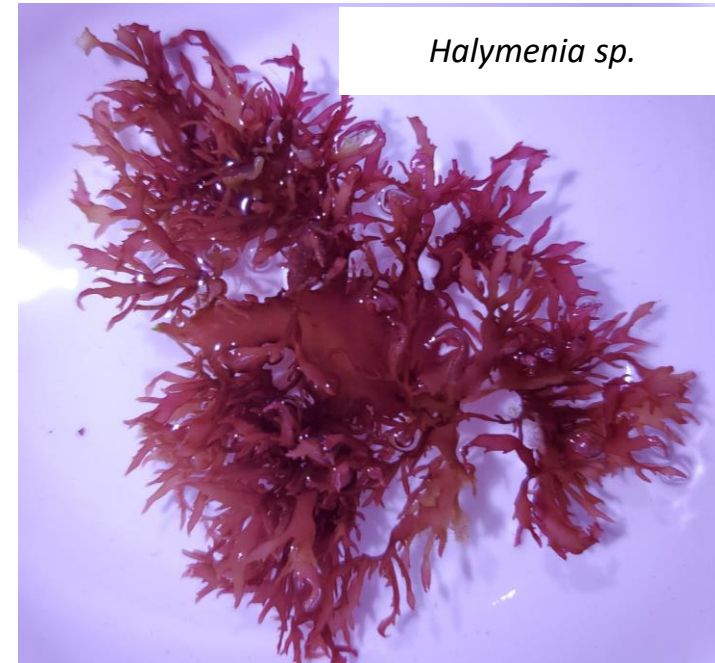
# Samples of species we are testing in Puerto Rico



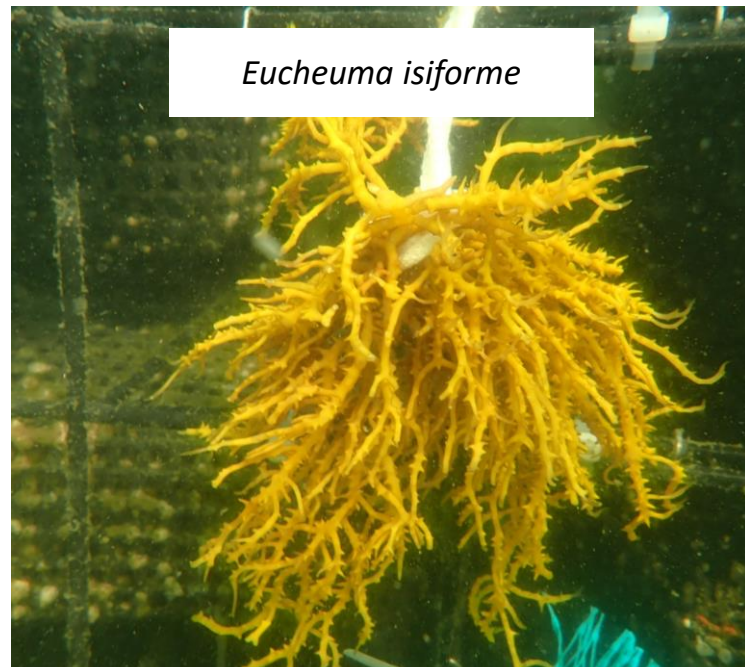
*Gracilaria damaecornis*



*Gracilaria mammillaris*



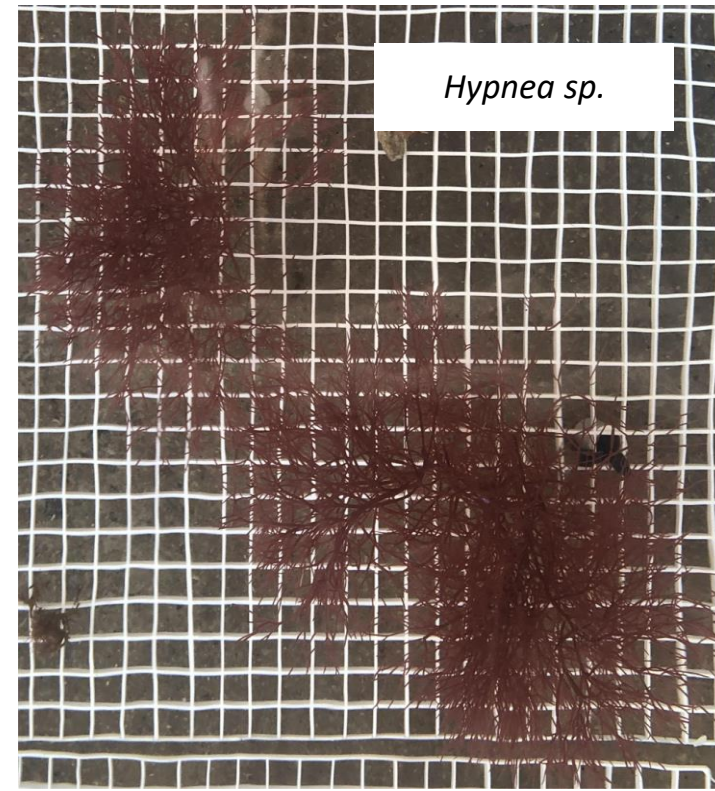
*Halymenia sp.*



*Eucheuma isiforme*



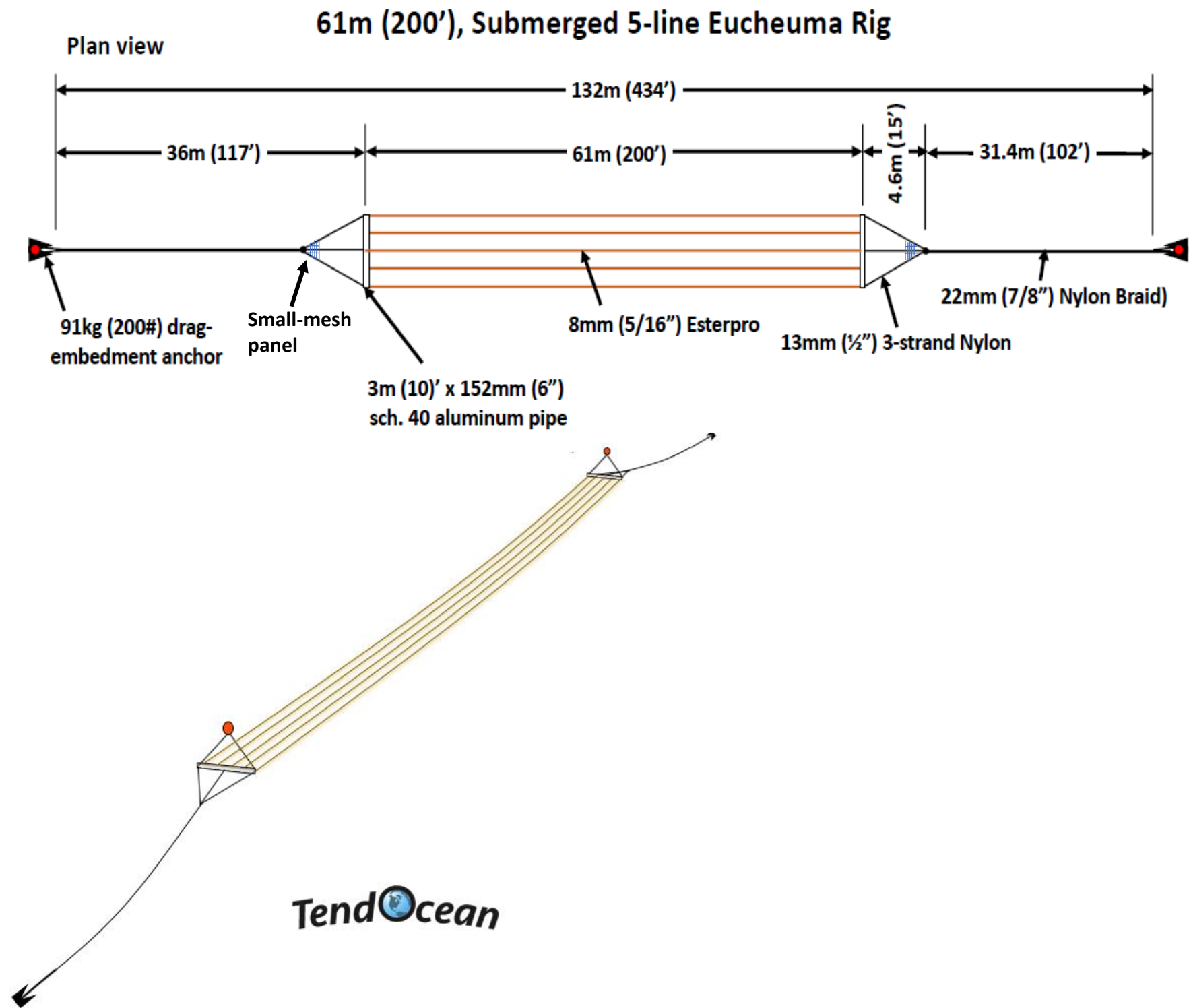
*Caulerpa racemosa*



*Hypnea sp.*

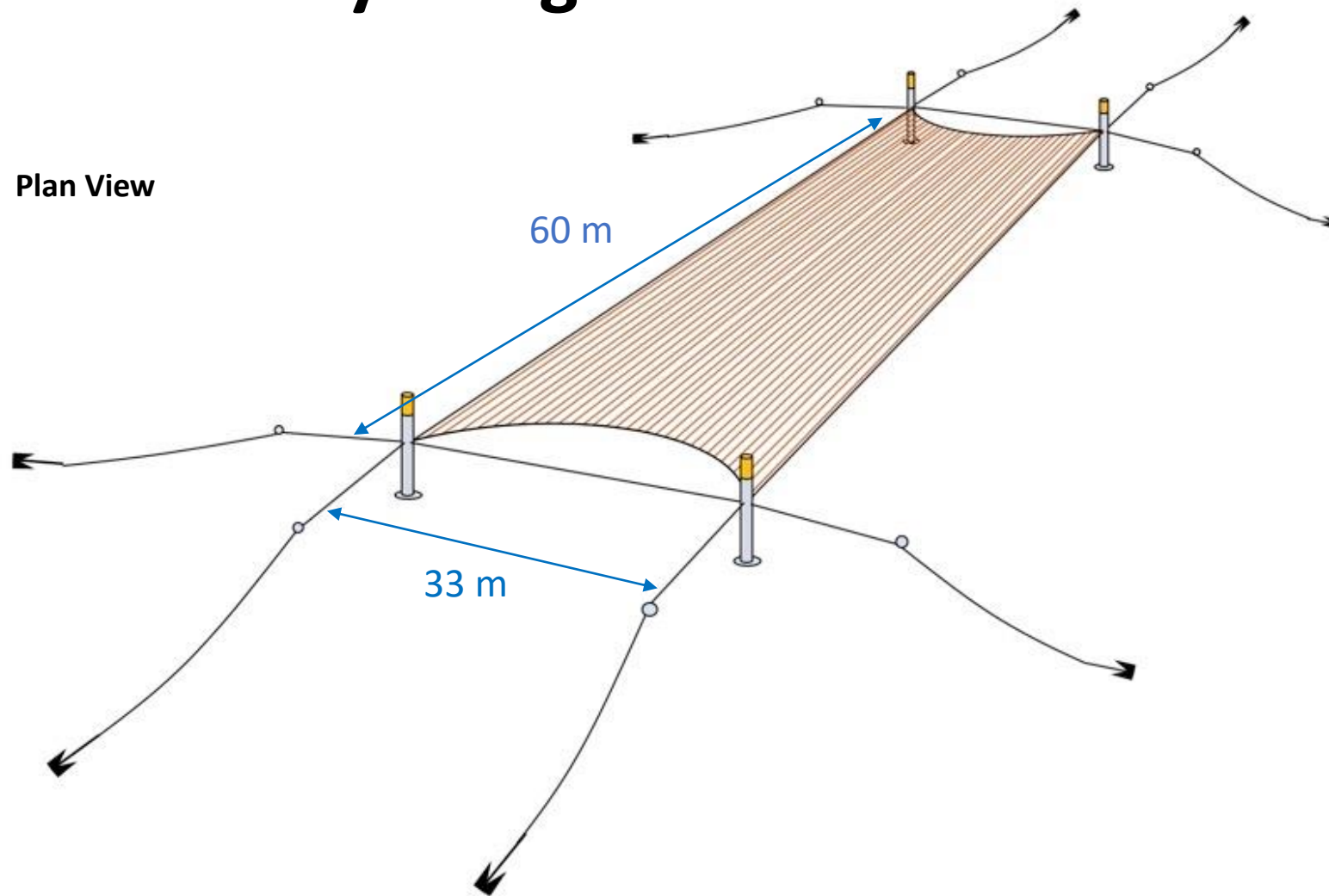


# Mini farm design

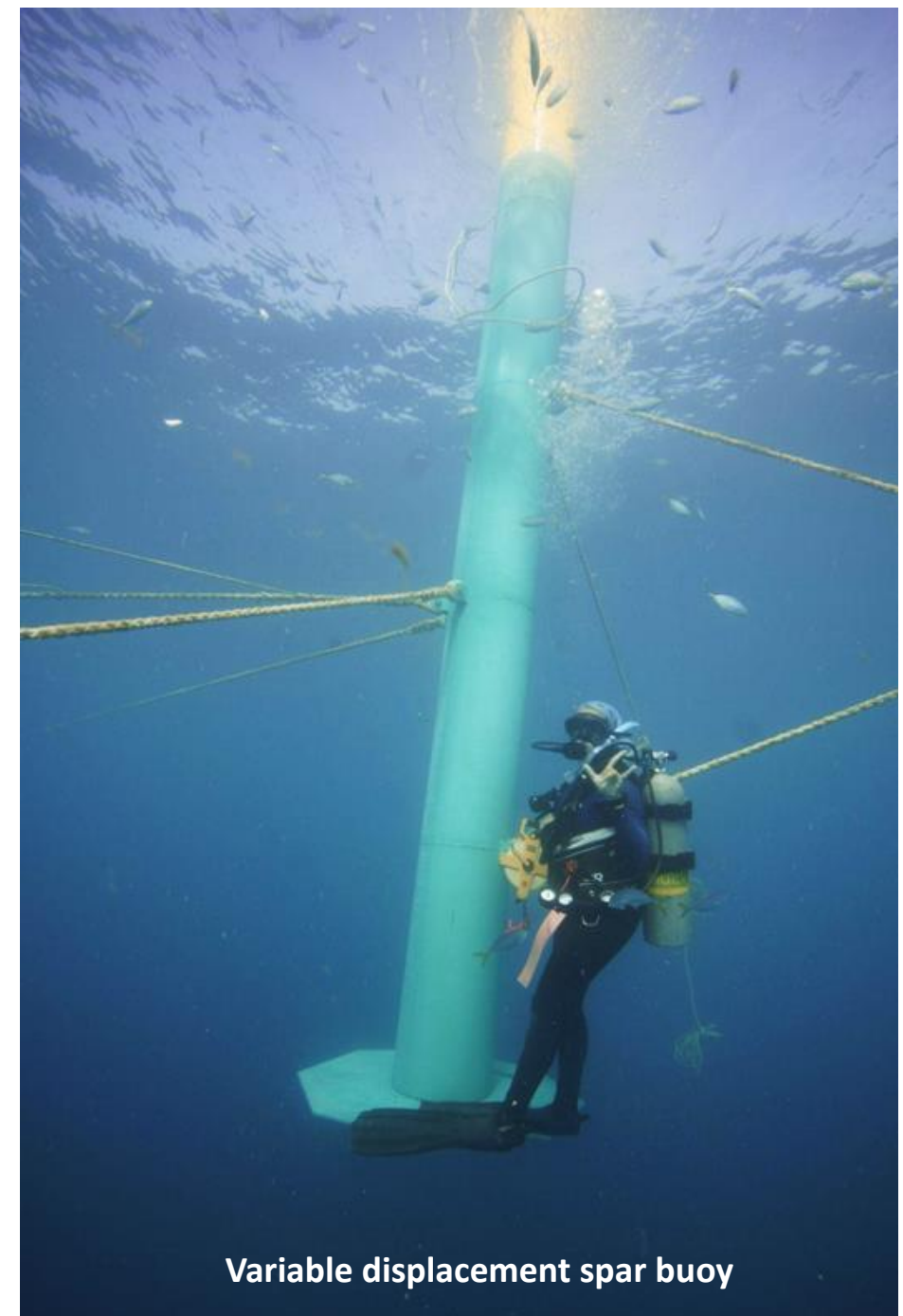
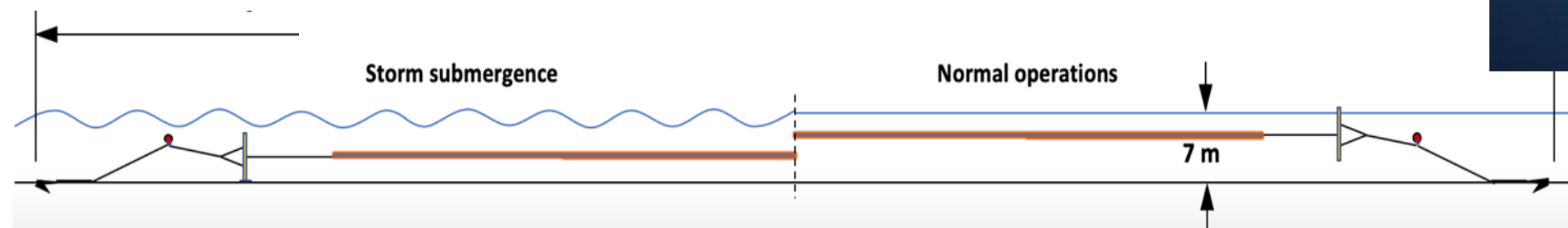


# Pilot catenary design

Plan View



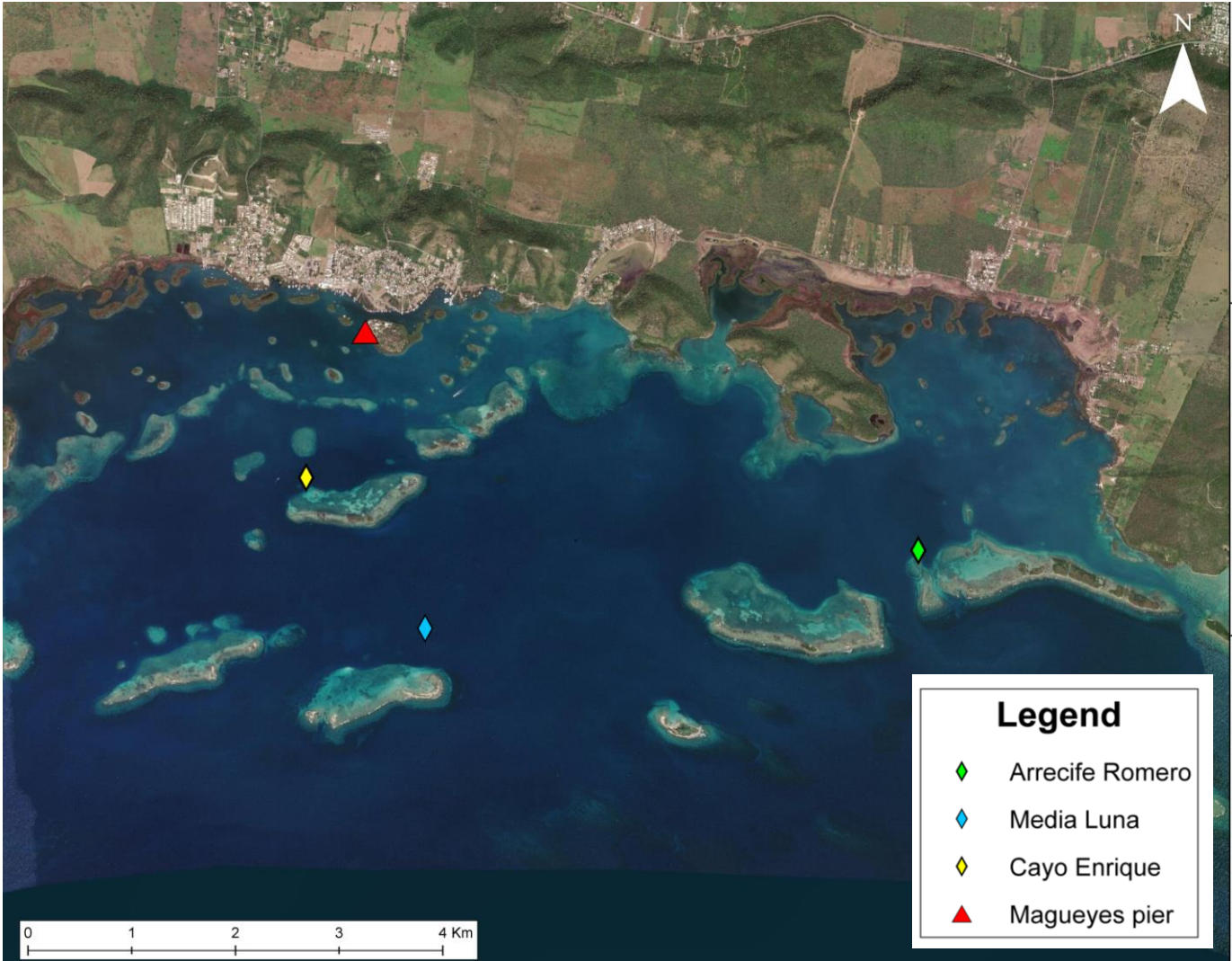
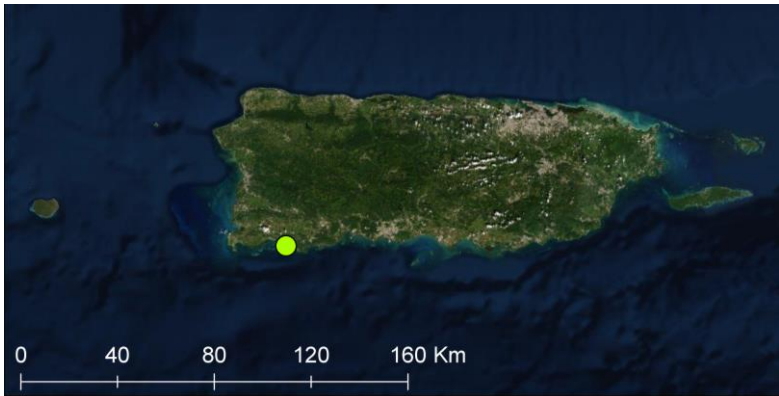
Side View



Variable displacement spar buoy



# PR farm site in La Parguera





# We need to understand the physical, chemical, biological, and ecological conditions at seaweed farms

## Monitoring physical and ecological conditions



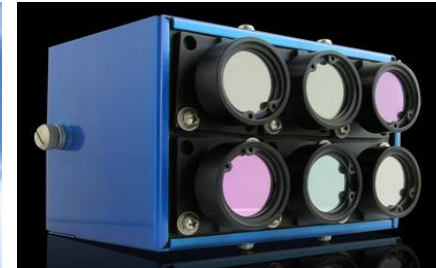
Acoustical instruments can measure waves, currents, and marine mammal visitations. Water sampling measures nutrients, temperature, salinity, etc.

## Drone and autonomous vehicles testing and maneuvering



The Drone Tug is an autonomous vessel built for transporting harvested seaweed from offshore farms back to shore.

Drones with hyperspectral and regular camera imaging to characterize nutrients at the pilot sites.



Autonomous underwater and surface vehicles can monitor growth and use of the farm as habitat.



# Developing cultivation systems and best management practices for Caribbean seaweeds in US waters



<https://www.mbl.edu/tropical-seaweed>  
lroberson@mbi.edu

Loretta Roberson, Marine Biological Laboratory



# Project goals

- Develop local markets for seaweed (e.g., food, feed, fertilizer, etc.)
- Local and large-scale, mechanized cultivation and harvesting of tropical marine macroalgae (seaweeds)
- Utilize species with rapid, vegetative (asexual) growth
- Assess environmental impacts and ecosystem services of seaweed farms
- Economic modeling and life cycle analysis of seaweed production

## Initial questions

- Collaborators that you would recommend?
- Other groups we should engage?
- How do we find, involve, and support potential seaweed farmers?
- How can we best use our La Parguera site?

### Connect with us:

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