

Mare Nostrum Caribbean  
*VI-EPSCoR supported research and development:  
an overview of accomplishments and new  
initiatives*

Annual Conference  
St. Croix, US Virgin Islands  
May 26-28, 2015

Dr. Richard S. Nemeth



# VI-EPSCoR Objectives

- 1. Build research capacity in the Virgin Islands**
- 2. Support faculty research development**
- 3. Strengthen linkages between research and education**
- 4. Enhance local and regional awareness of environmental stewardship and management**
- 5. Connect VI-EPSCoR investments and initiatives with economic development in the USVI.**



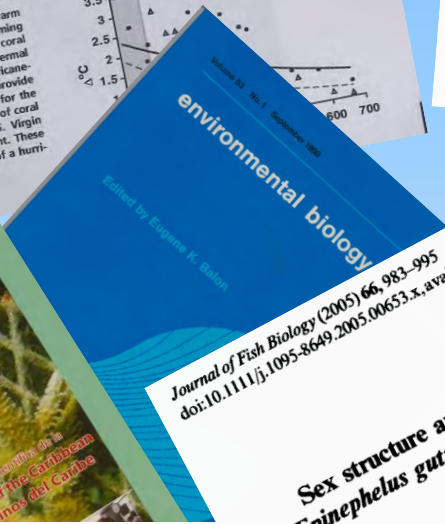
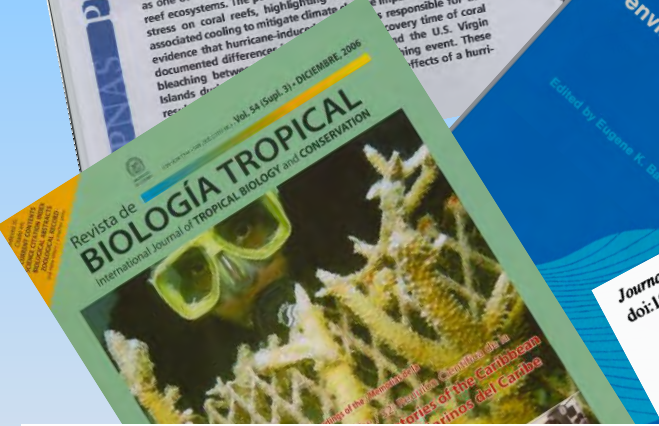
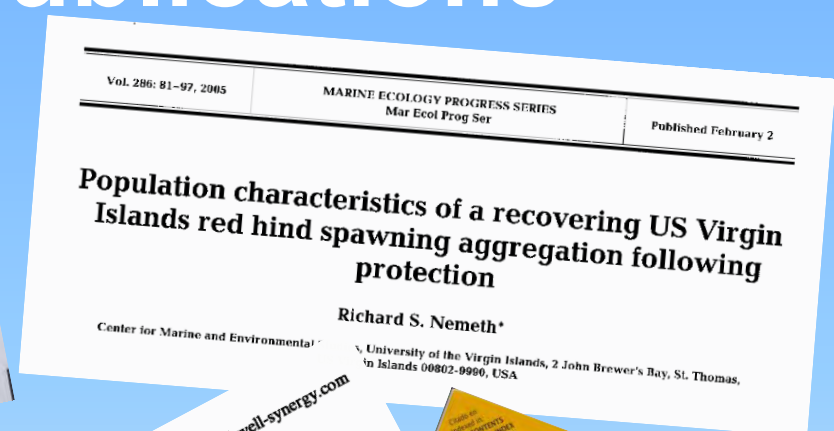
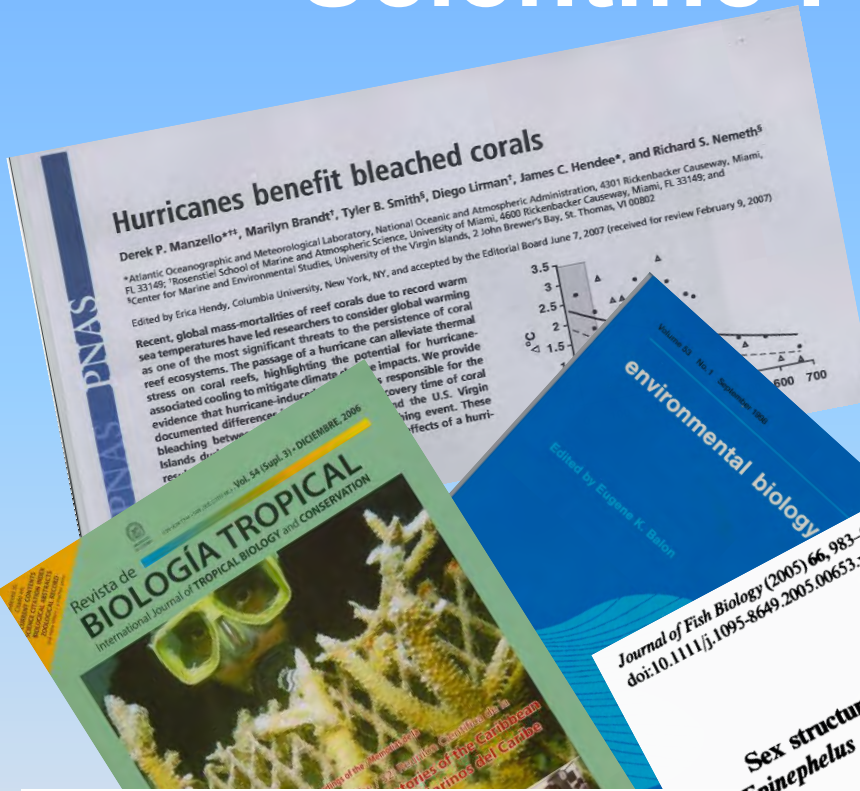
# Graduate and Undergraduate Research: *Training the next generation of scientists*



- UVI research symposia allow students to present VI-EPSCoR supported research
- Regional national and international conferences provide opportunities for students to network



# Scientific Publications



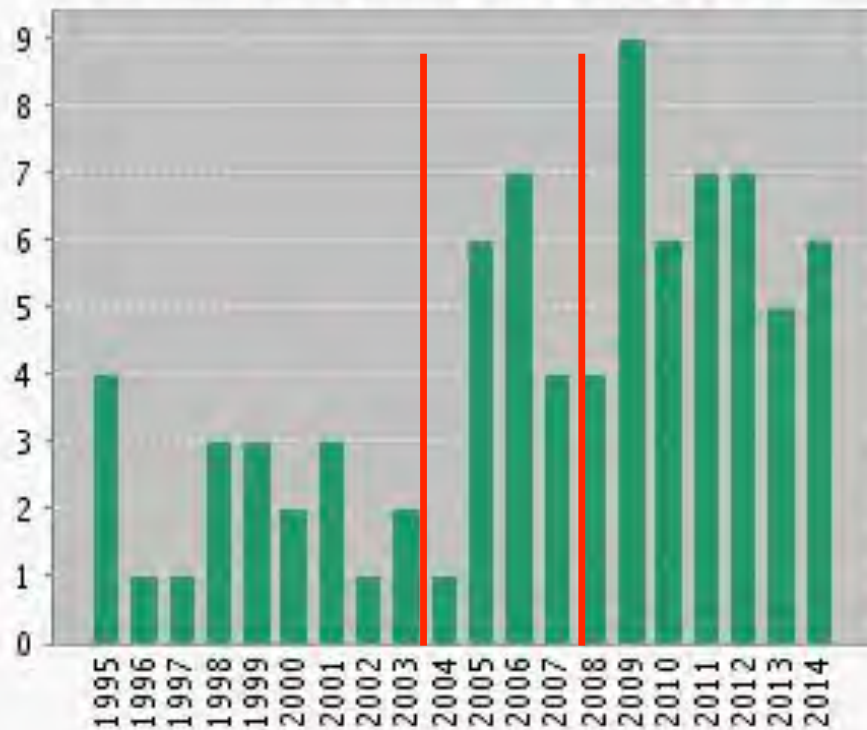
Available online at [www.sciencedirect.com](http://www.sciencedirect.com)  
 SCIENCE @ DIRECT<sup>®</sup>  
 ELSEVIER  
 Continental Shelf Research 26 (2006) 194-205  
 www.elsevier.com/locate/csr

**Characterizing the deep insular shelf coral reef habitat of the Hind Bank marine conservation district (US Virgin Islands) using the Seabed autonomous underwater vehicle**  
 Roy A. Armstrong<sup>a,\*</sup>, Hanumant Singh<sup>b</sup>, Juan Torres<sup>a</sup>, Richard S. Nemeth<sup>c</sup>, Ali Can<sup>b</sup>, Chris Roman<sup>b</sup>, Ryan Eustice<sup>b</sup>, Lauren Riggs<sup>d</sup>, Graciela Garcia-Moliner<sup>a,c</sup>

**Spawning larval history to juvenile demography in the bicolor damselfish *Stegastes partitus* (Perciformes: Pomacentridae)**  
 Richard S. Nemeth<sup>\*</sup>  
 University of New Hampshire, Department of Zoology, Durham, NH, USA 03824. Present Address: Center for Marine and Environmental Studies, University of the Virgin Islands, 2 John Brewer's Bay, St. Thomas, US Virgin Islands, 00802-9990. Phone: (340) 693-1380. Fax: (340) 693-1385. [nemeth@uvi.edu](mailto:nemeth@uvi.edu)  
 Received 15-I-2004. Corrected 18-VIII-2004. Accepted 29-III-2005.

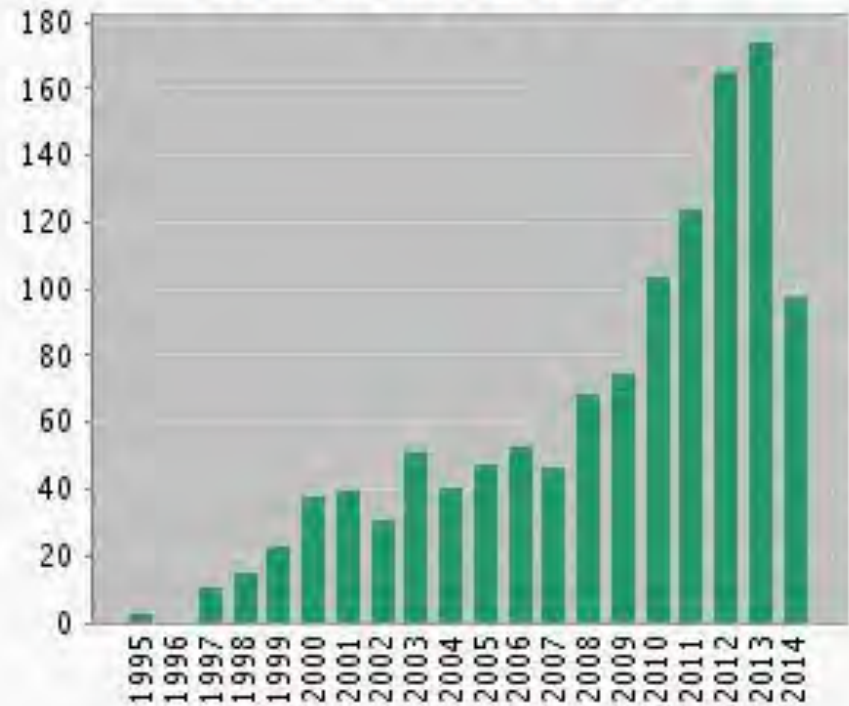
# Publications

## Published Items in Each Year



The latest 20 years are displayed.

## Citations in Each Year



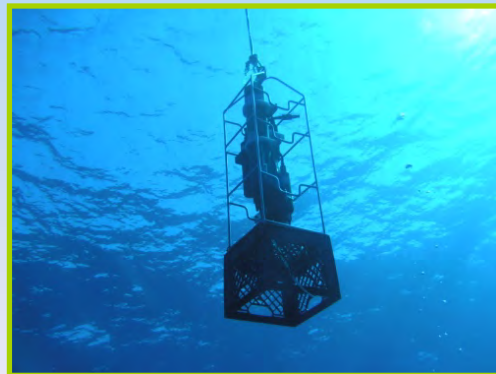
The latest 20 years are displayed.

# Modern research facilities

1. Oceanography lab
2. Expanded seawater system
3. Environmental Analysis lab
4. GeoCAS Spatial Analysis & Statistics
5. Boat ramp and storage area
6. Extended boat dock
7. VI Environmental Research Station



# Advanced equipment to support research



# Cooperative Fisheries Research Institute

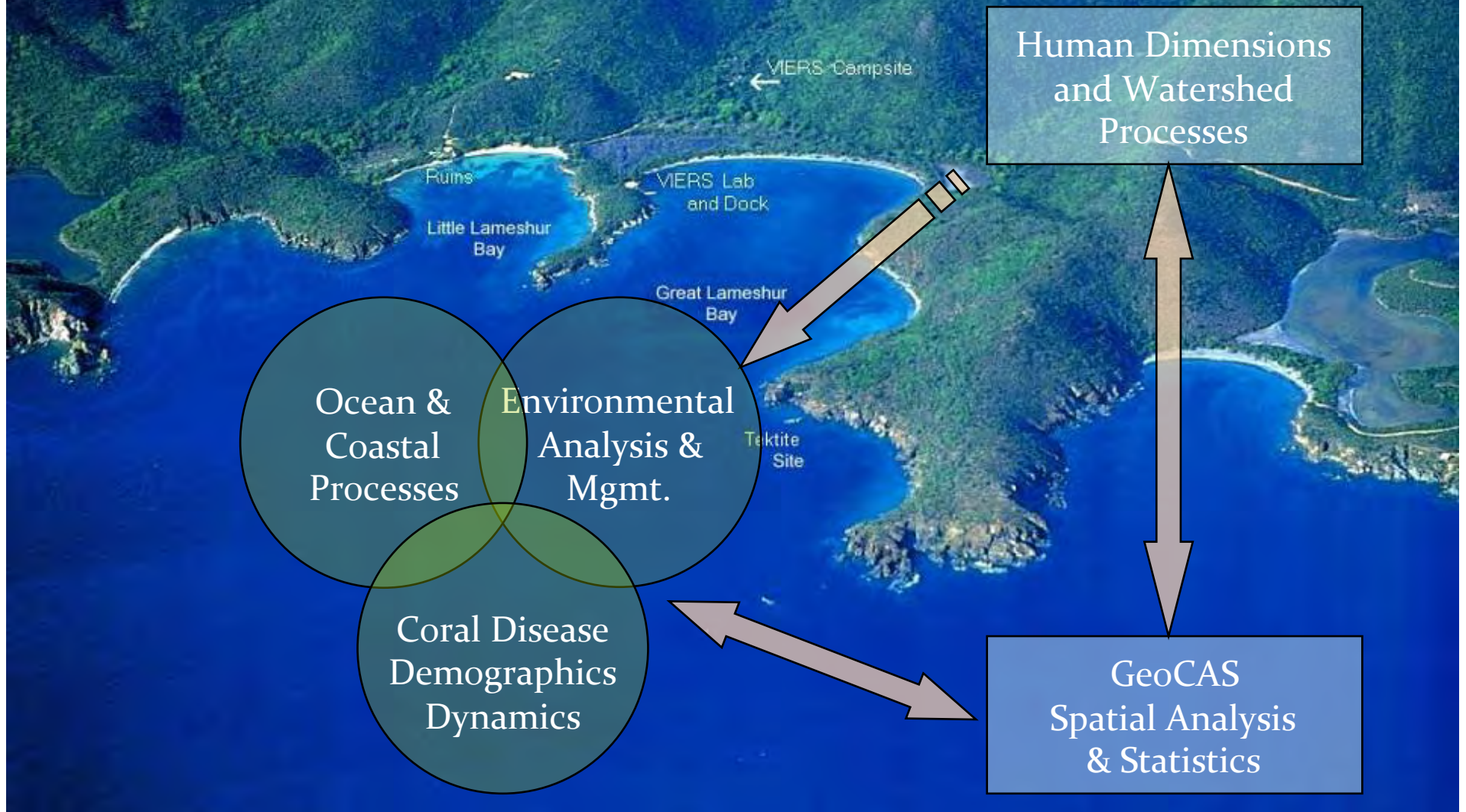
- Strengthen partnerships between UVI and agencies
- Acquisition of basic instrumentation for fisheries research
- Training for local F&W staff
  - Paid Internships for MMES students
  - Thesis projects focused on F&W prioritized needs
    - Improved management of fishery resources
    - Enhanced workforce





# MARE NOSTRUM

## Integrated Caribbean Coastal Ecosystems



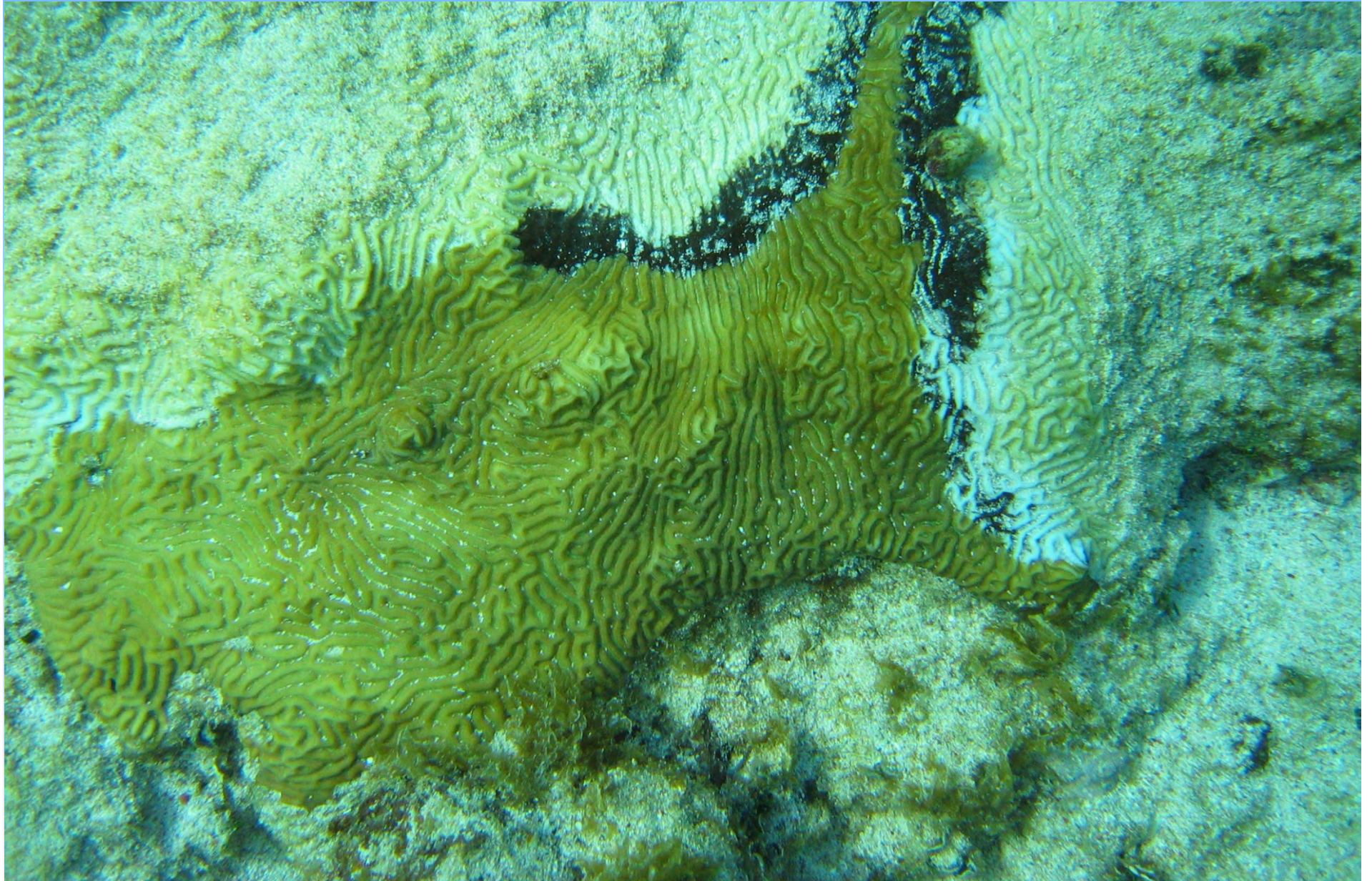
# Coral Bleaching



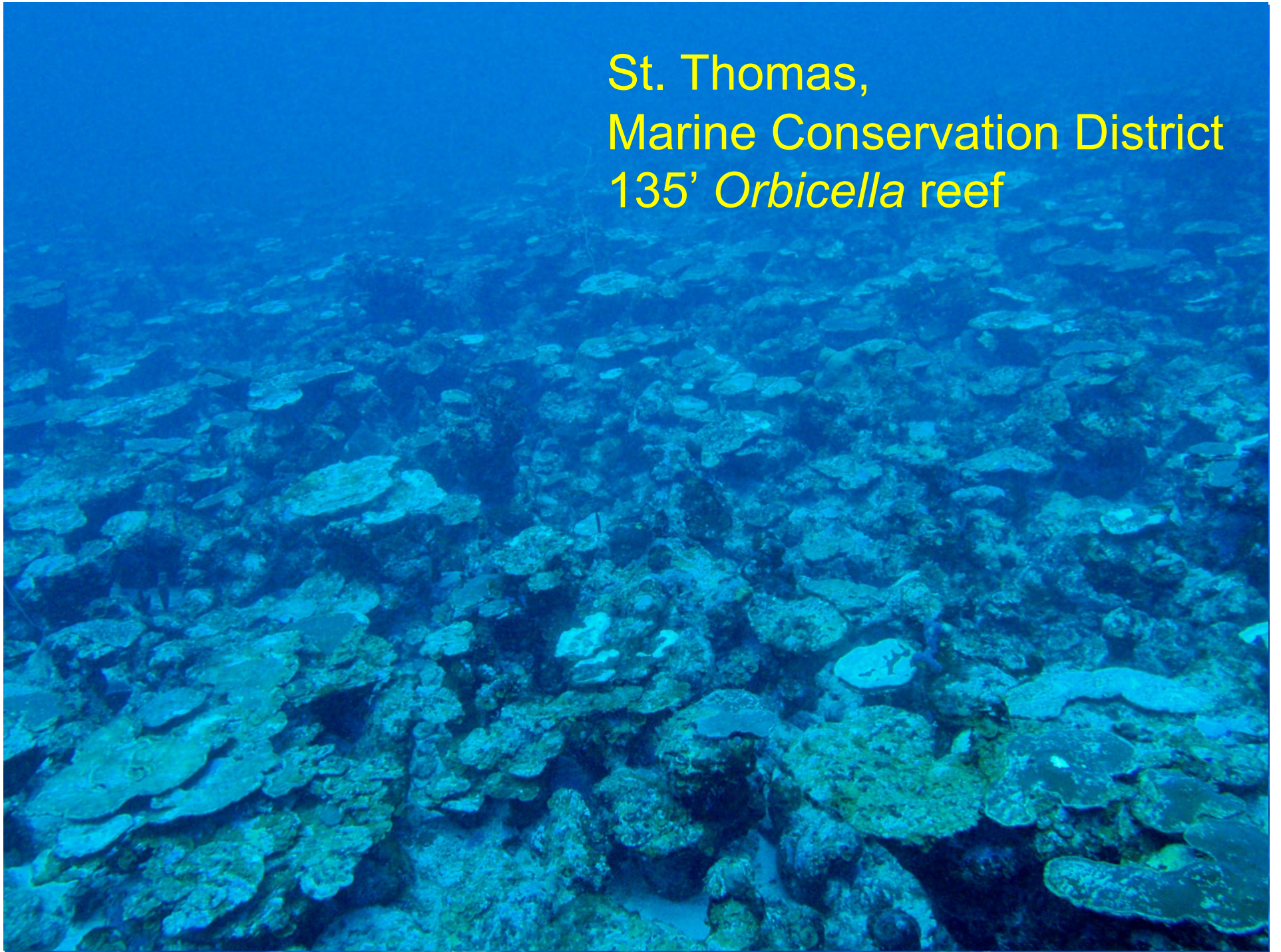
# Coral Disease – White Plague



# Coral Disease – Black Band

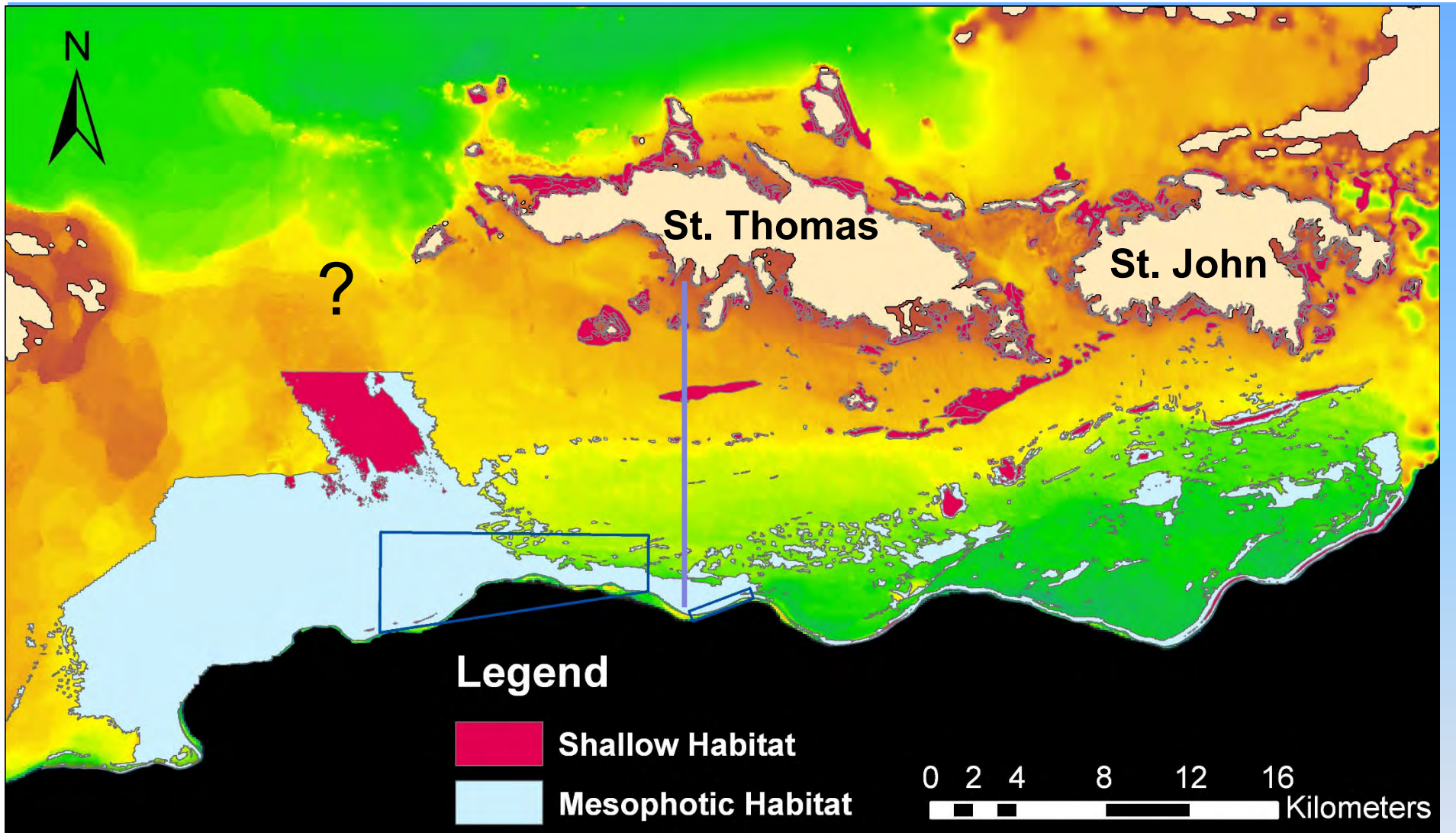


St. Thomas,  
Marine Conservation District  
135' *Orbicella* reef



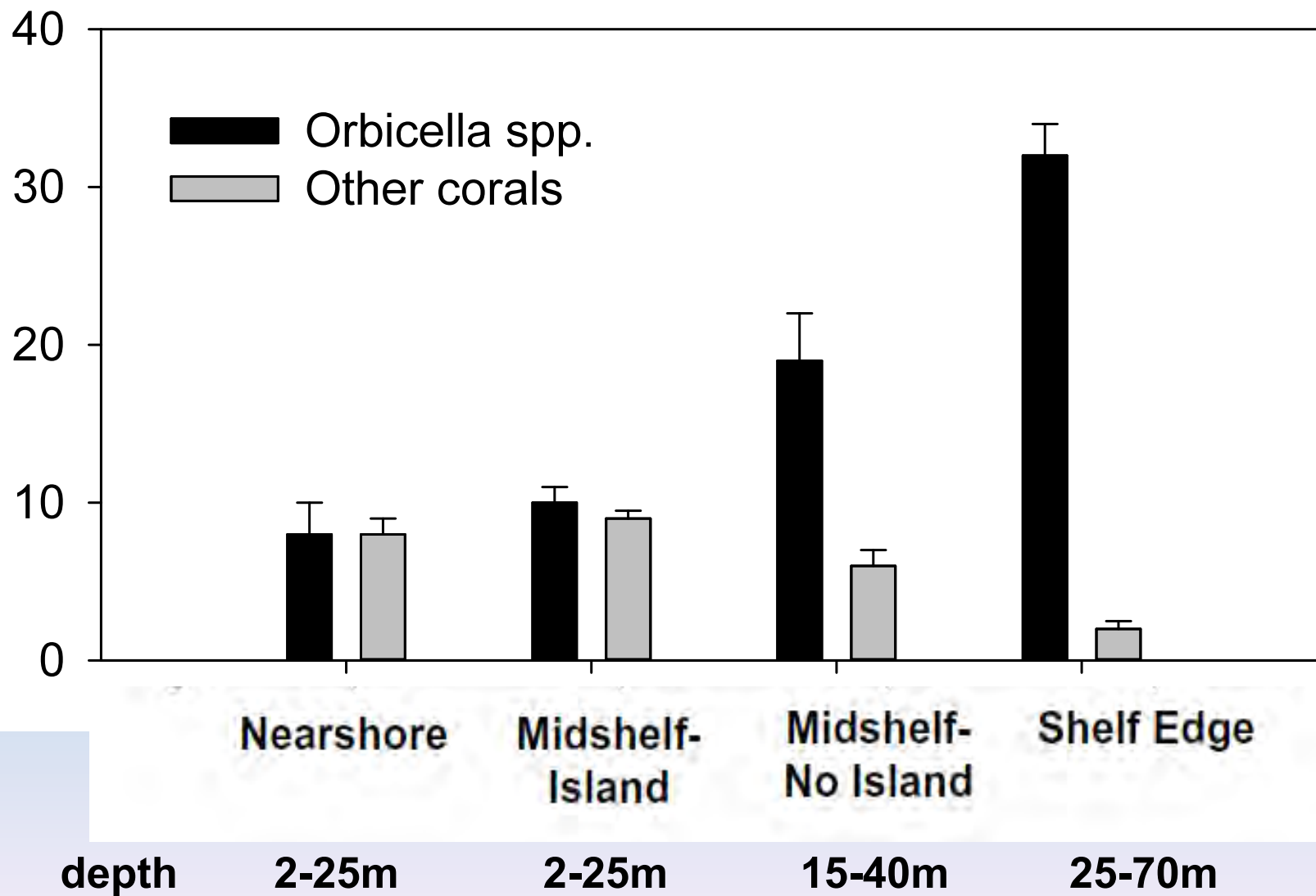


St. Thomas,  
Grammanik Bank  
210' *Agaricia* reef



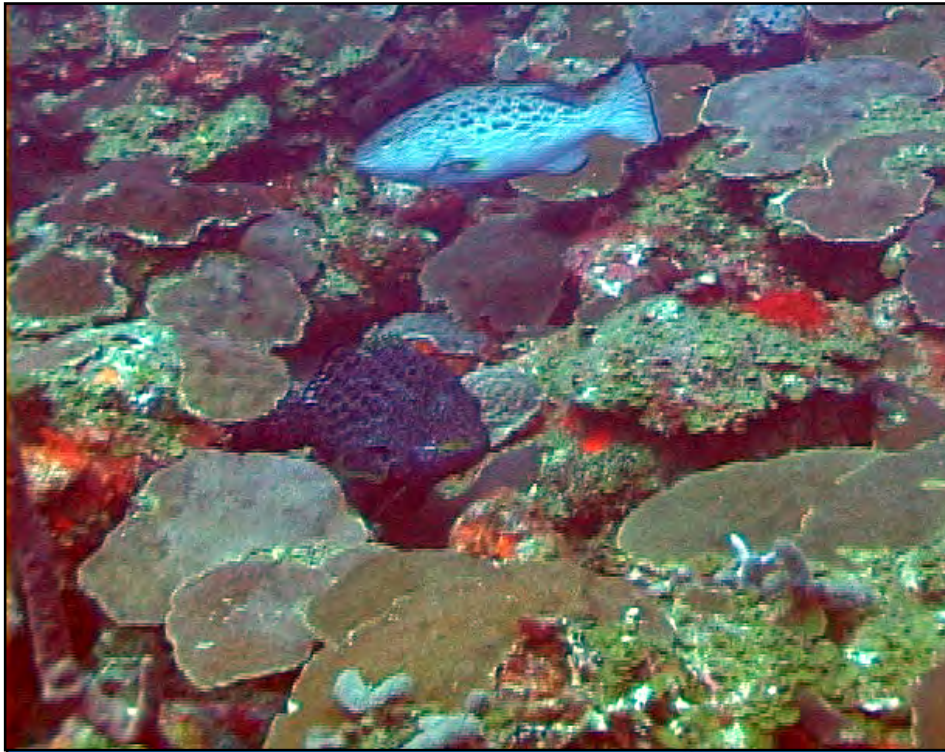
- Shallow reefs (90.9 km<sup>2</sup> = 39.8%)
- Mesophotic reefs (137.3 km<sup>2</sup> = 60.2%)

# Coral Cover

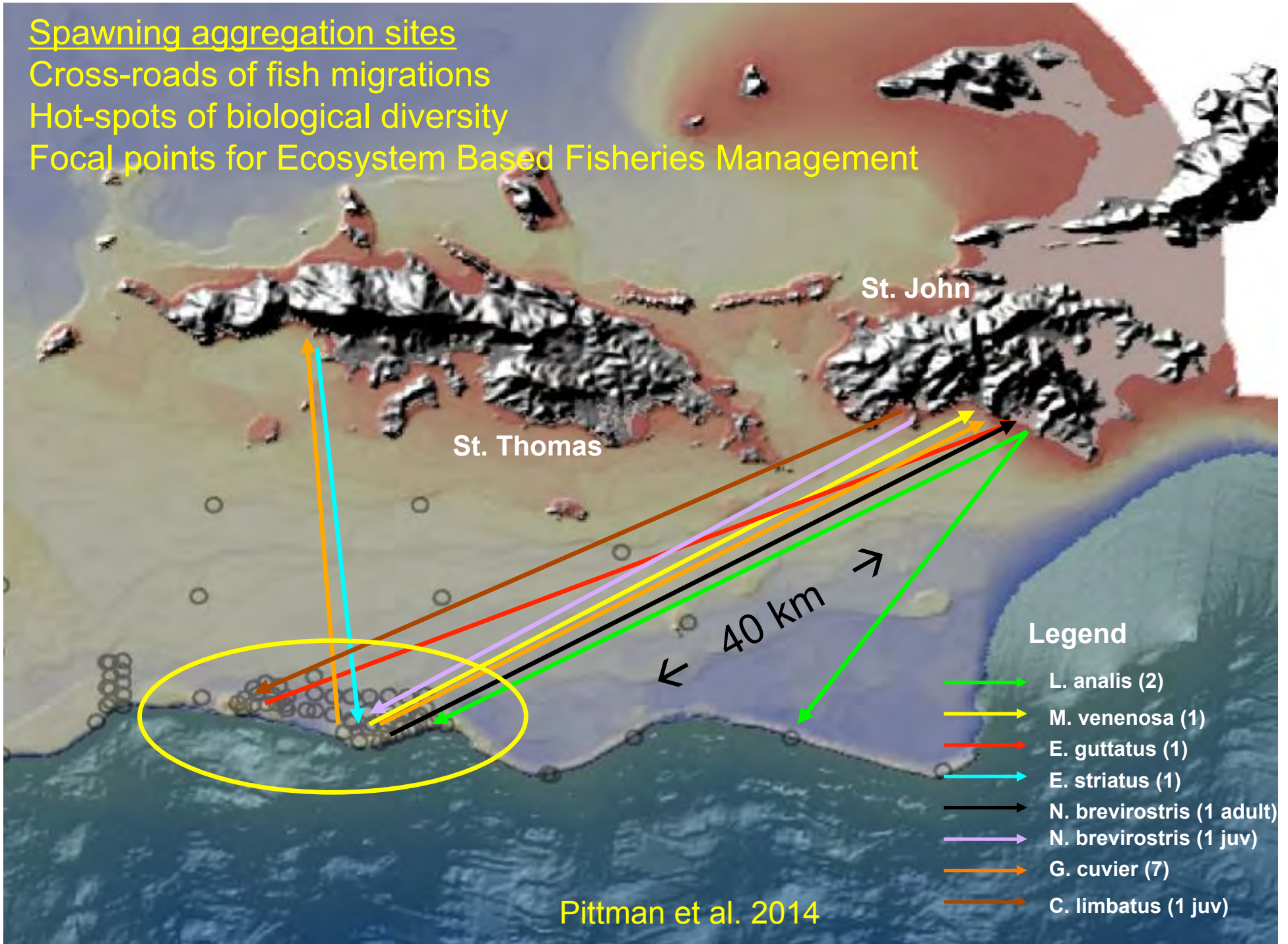


Smith et al. 2008





Spawning aggregation sites  
Cross-roads of fish migrations  
Hot-spots of biological diversity  
Focal points for Ecosystem Based Fisheries Management

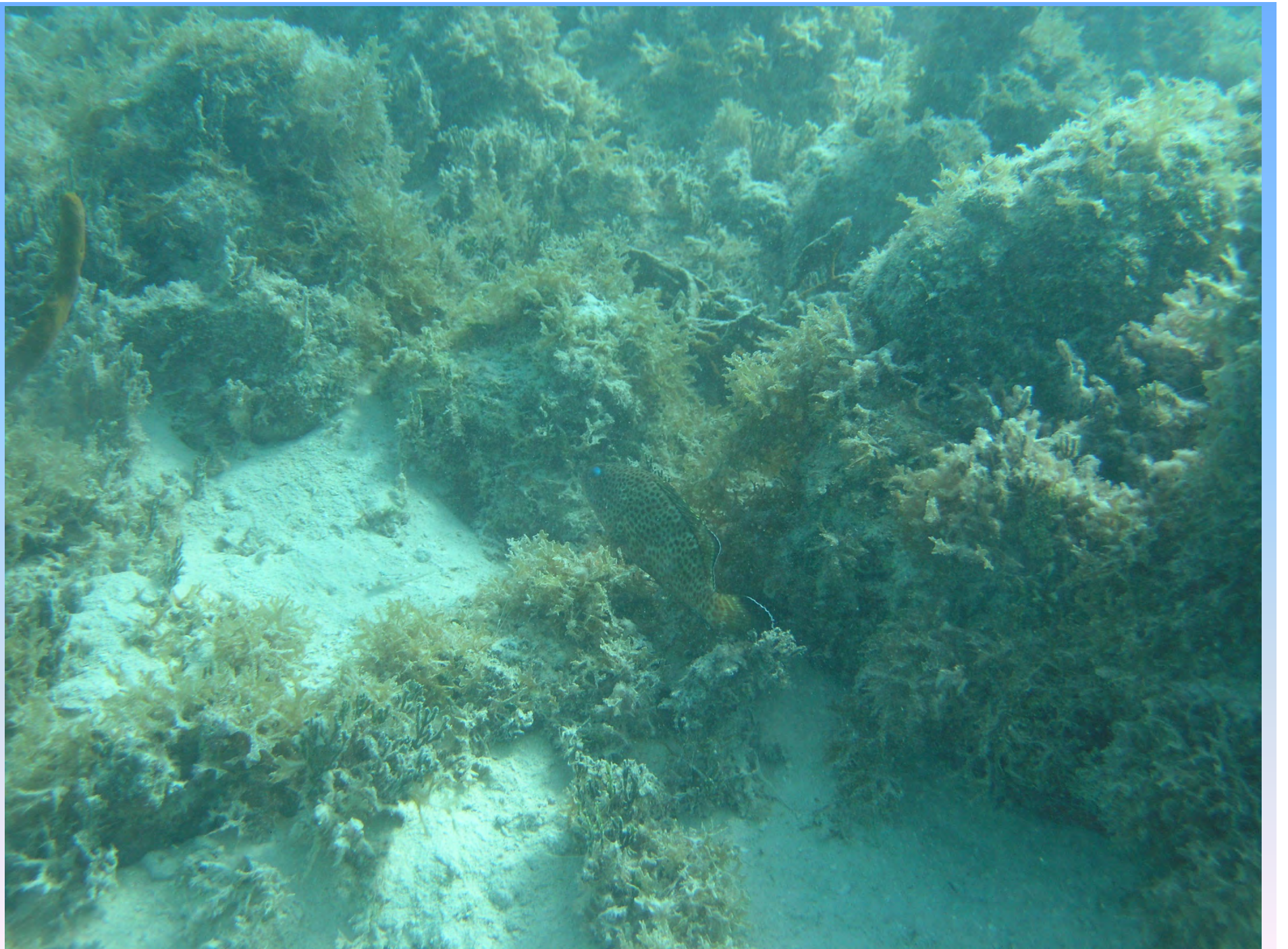


# Latitudinal gradients in reef function

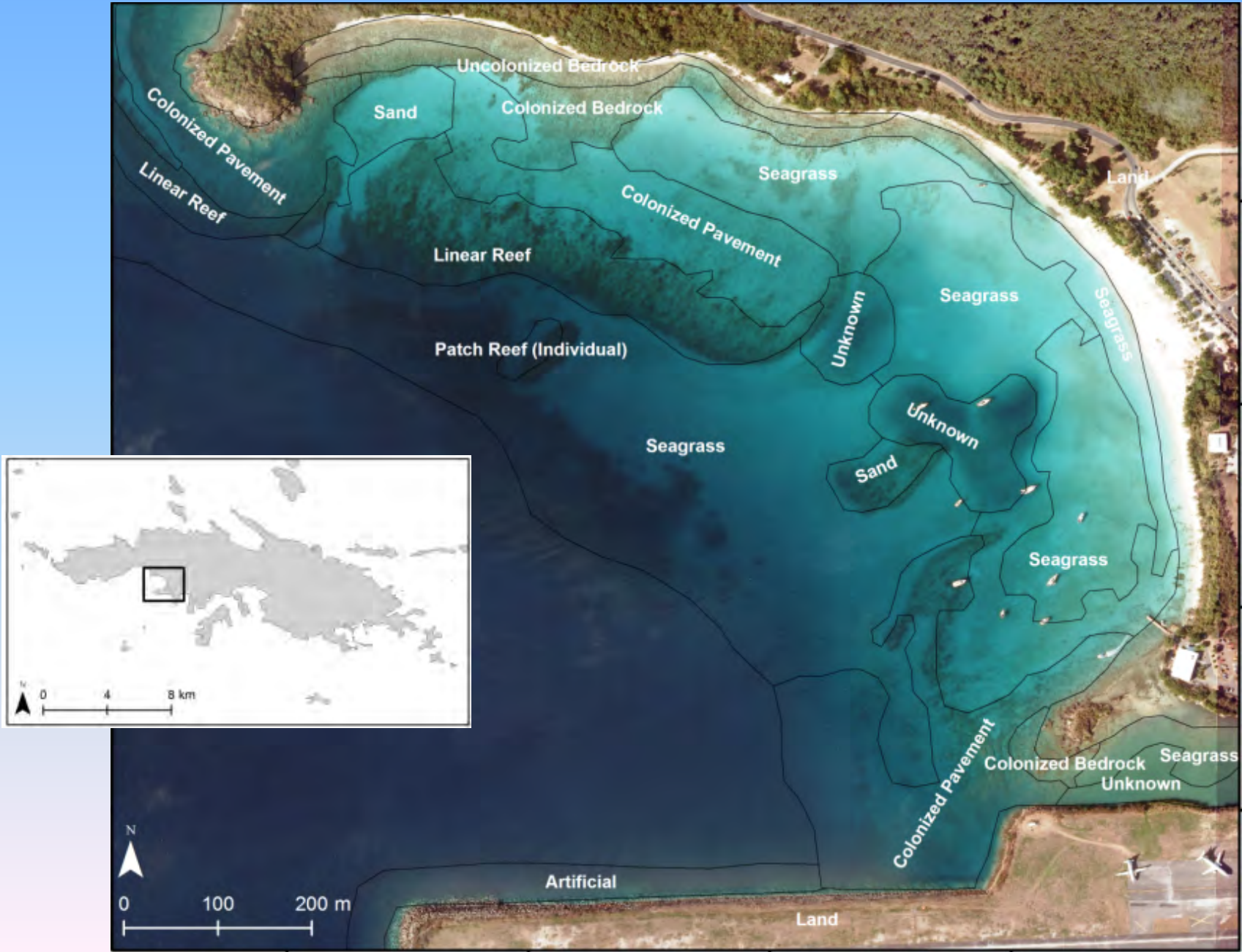


# Herbivory and reef function





# Ecosystem Study of Brewer's Bay, St. Thomas



**Human Dimension**

resource use  
attitudes, behaviors

**Watersheds**

linkages to coast  
inputs (chem, sediments)

**Oceanography**

chemical  
physical  
biological

**Mobile organisms**

distribution, habitat use  
movement patterns  
response variables

**Benthic Habitats**

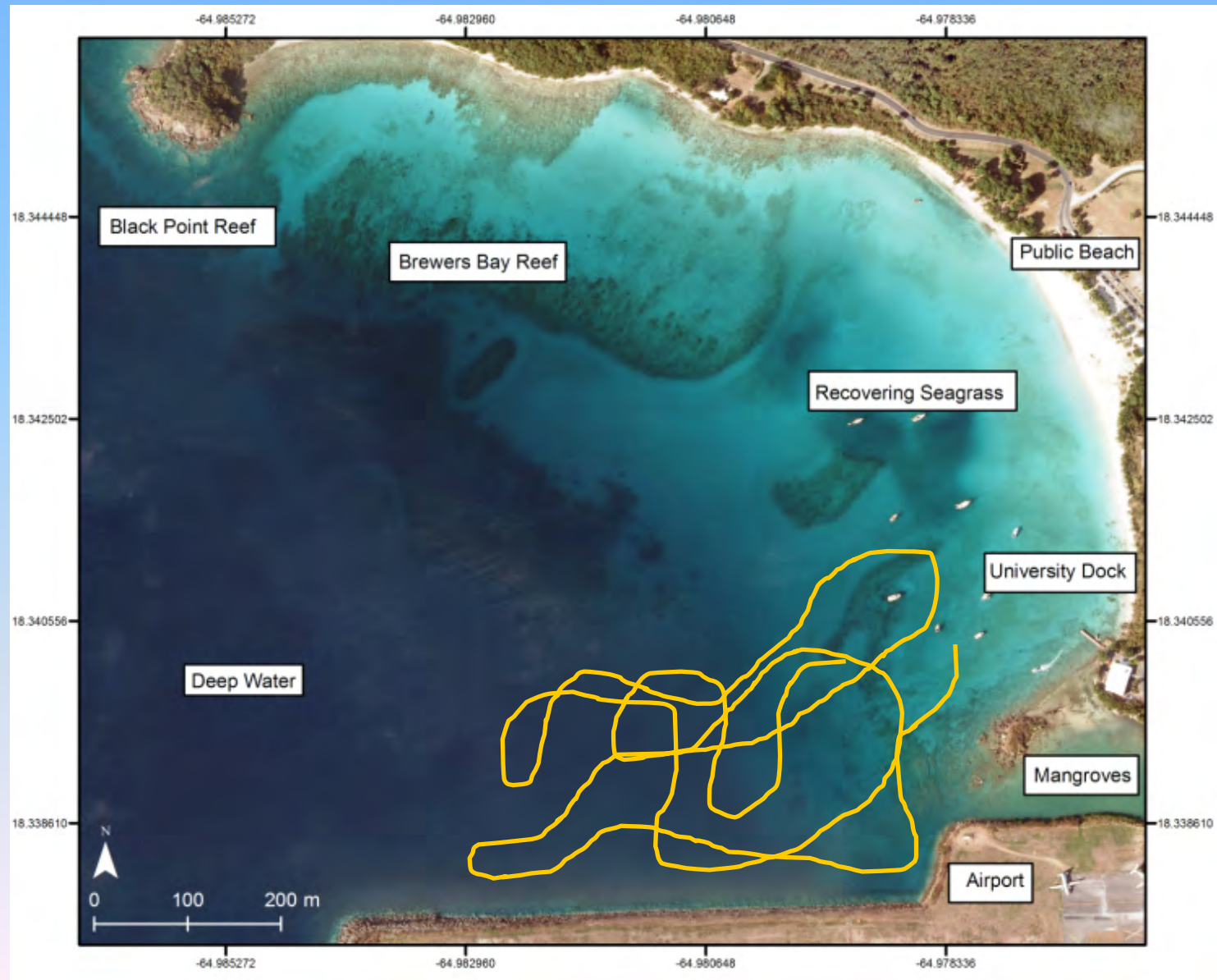
coral reef  
seagrass  
sediments

Develop inter-disciplinary research questions.

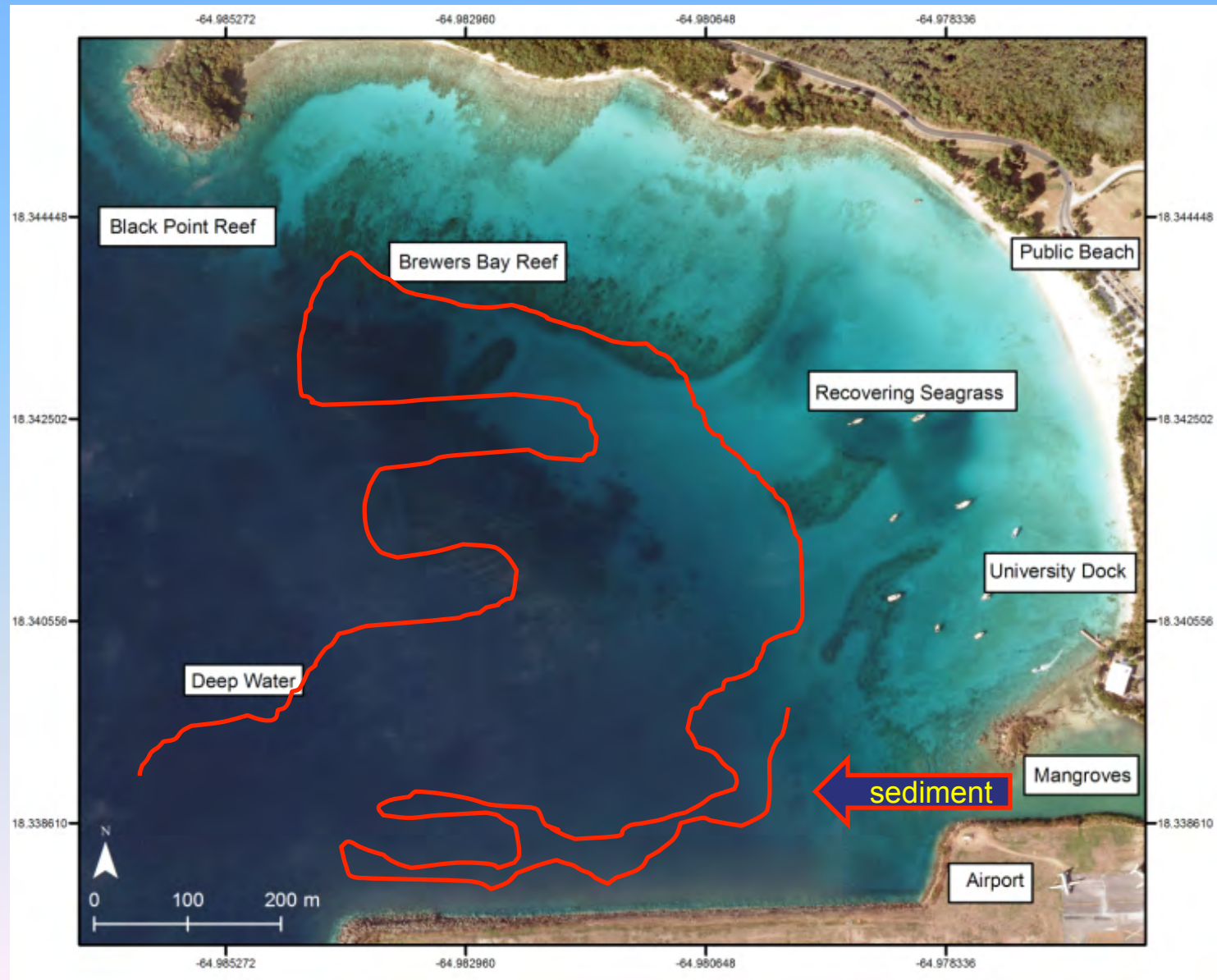


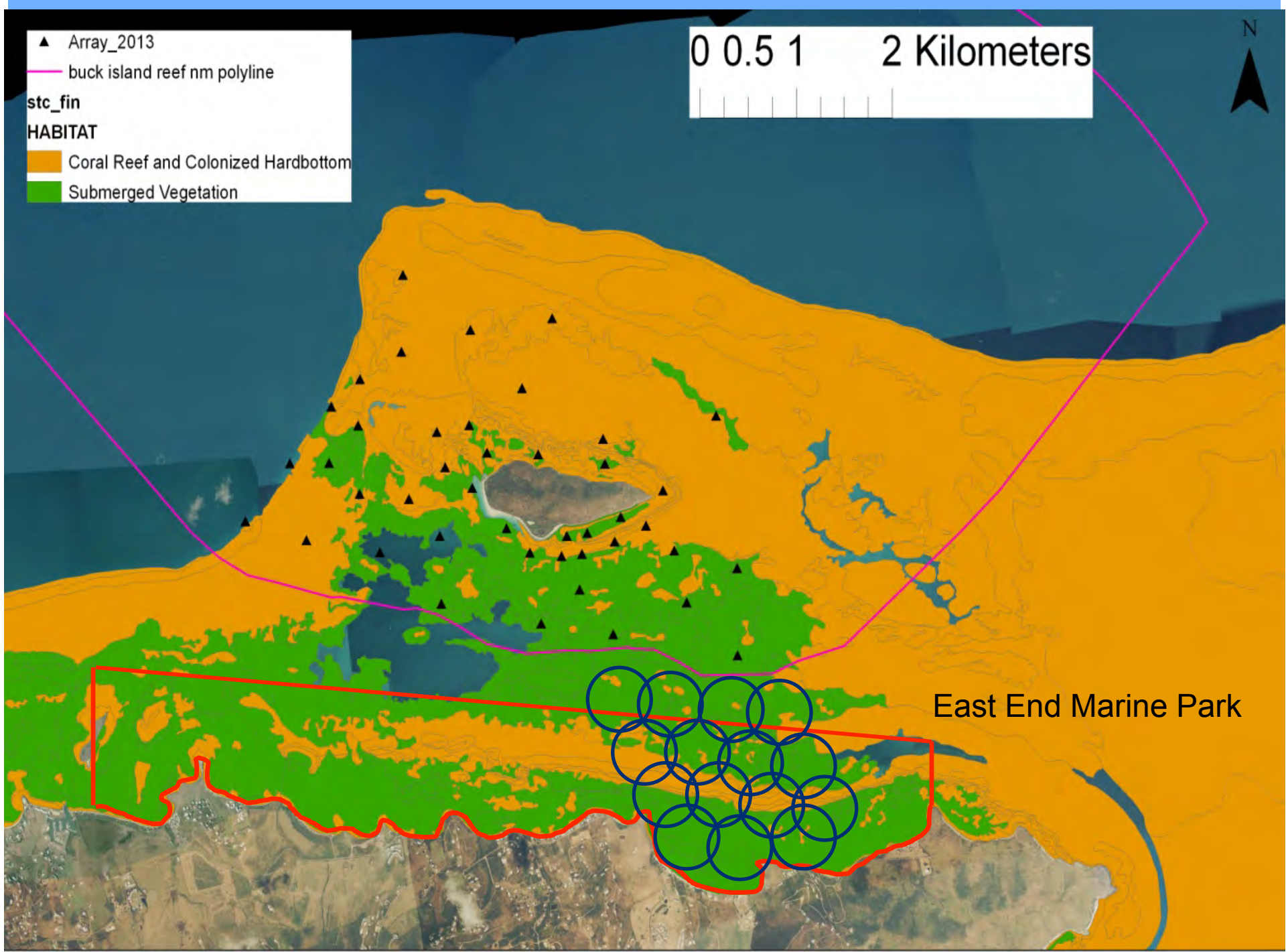


## Acoustic tracking of mobile marine animals



## Acoustic tracking of mobile marine animals





▲ Array\_2013  
— buck island reef nm polyline  
stc\_fin  
HABITAT  
Coral Reef and Colonized Hardbottom  
Submerged Vegetation

0 0.5 1 2 Kilometers



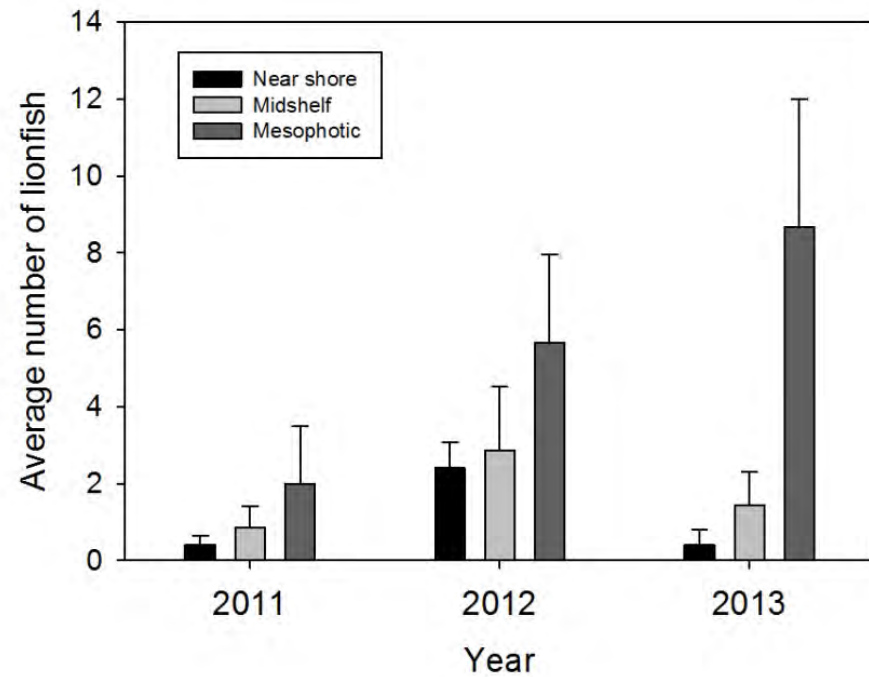
East End Marine Park

# Invasive species

## *Pterois volitans*



Lionfish invasion





# Citizen Science program concept to control and eliminate erosion and sedimentation in the USVI

