

Mapping and monitoring of  
*Acropora palmata*  
for informed management  
efforts & the recovery  
of a threatened coral

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Species Under the Endangered Species Act (ESA)

## *Acropora palmata* & *Acropora cervicornis*



8/19/2010

PLANIFICACION Y MANEJO DE LOS ESPACIOS  
MARINOS

2

# Goal

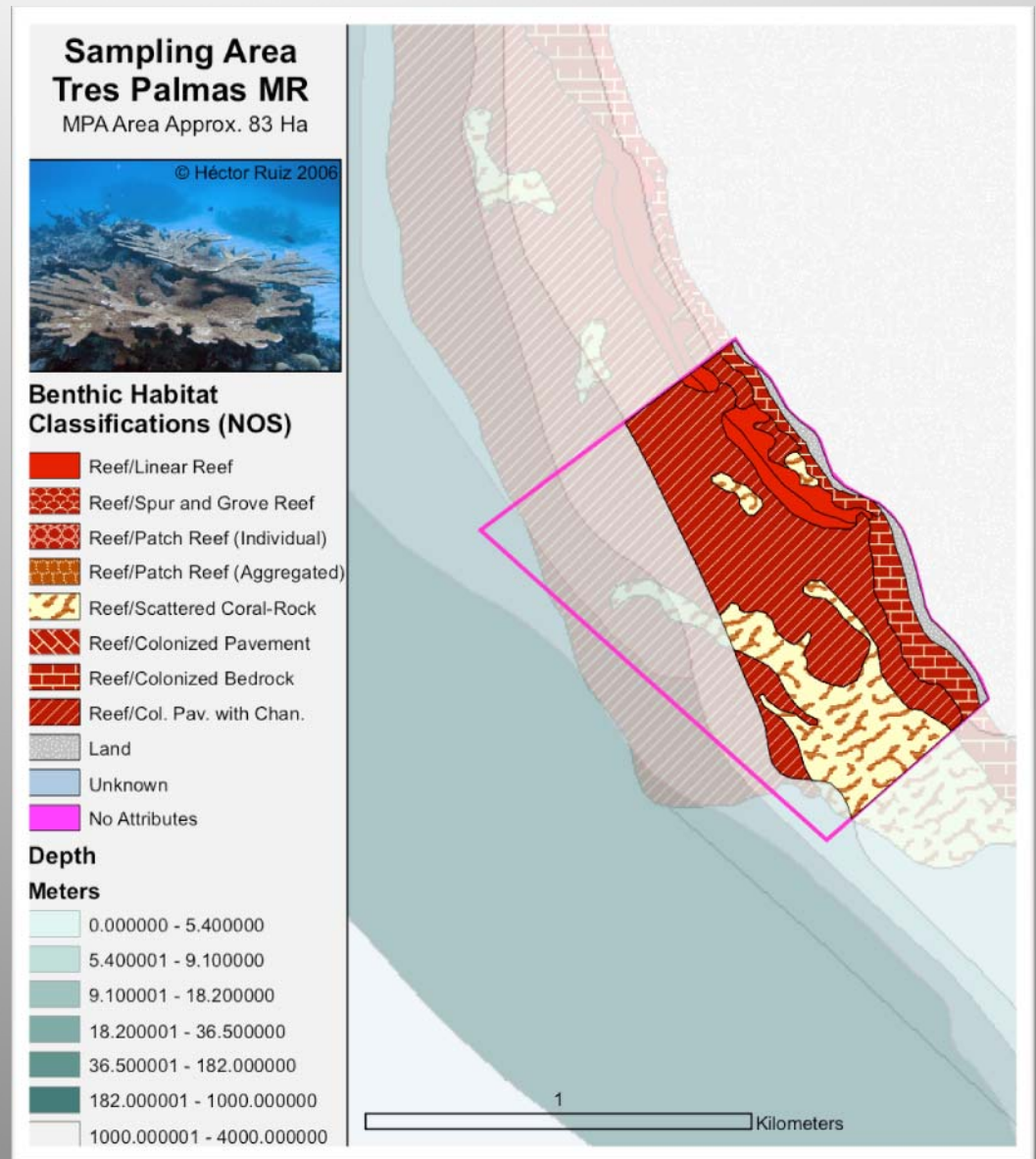
Incorporate historical distribution and determine the actual condition of Elkhorn coral in the PR jurisdiction

- Island wide potential habitat model
- Verify the validity of that model
- Quantify the population of Elkhorn coral
- Establish permanent monitoring sites
- Identify threats to the recovery of the population

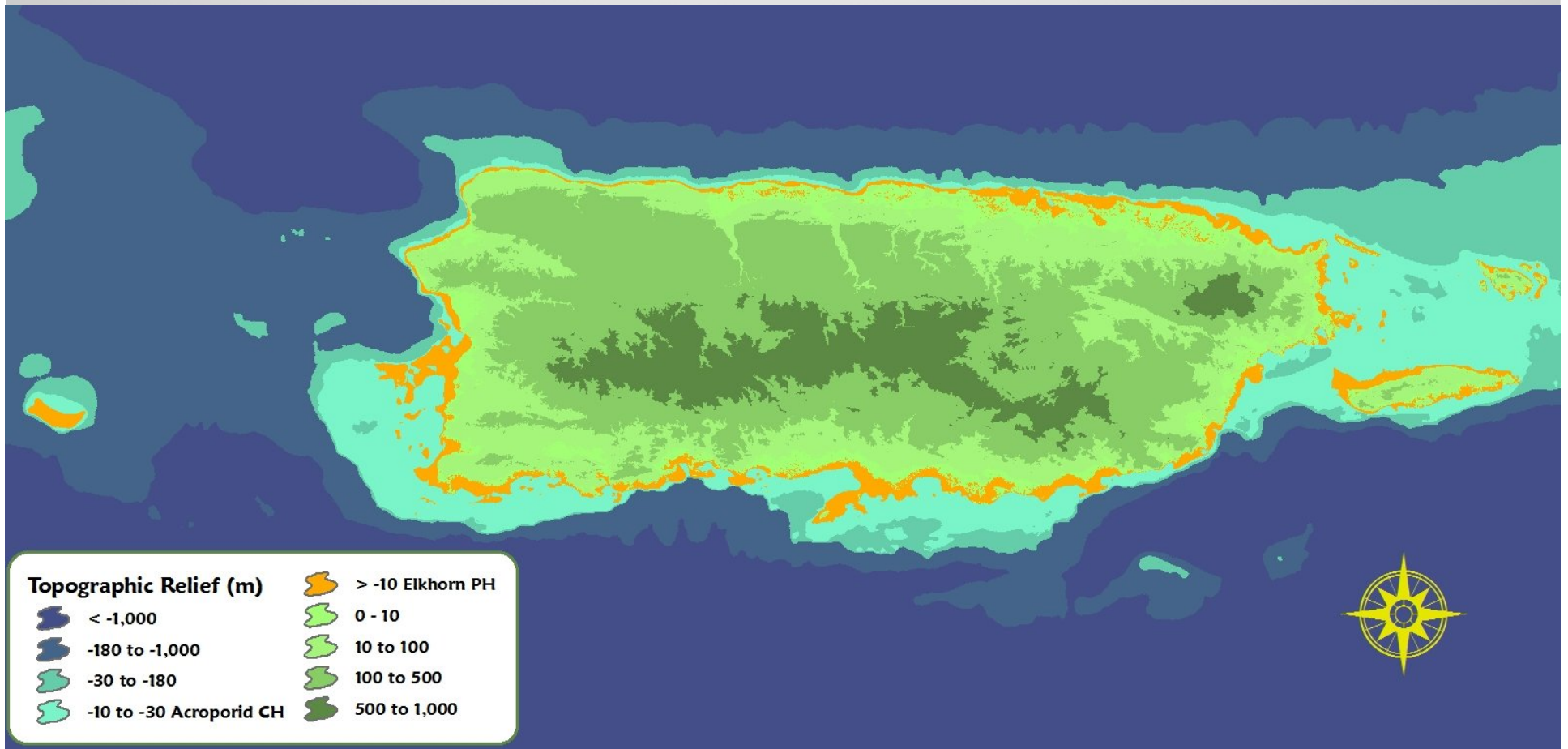


# Spatial Model of Potential Habitat

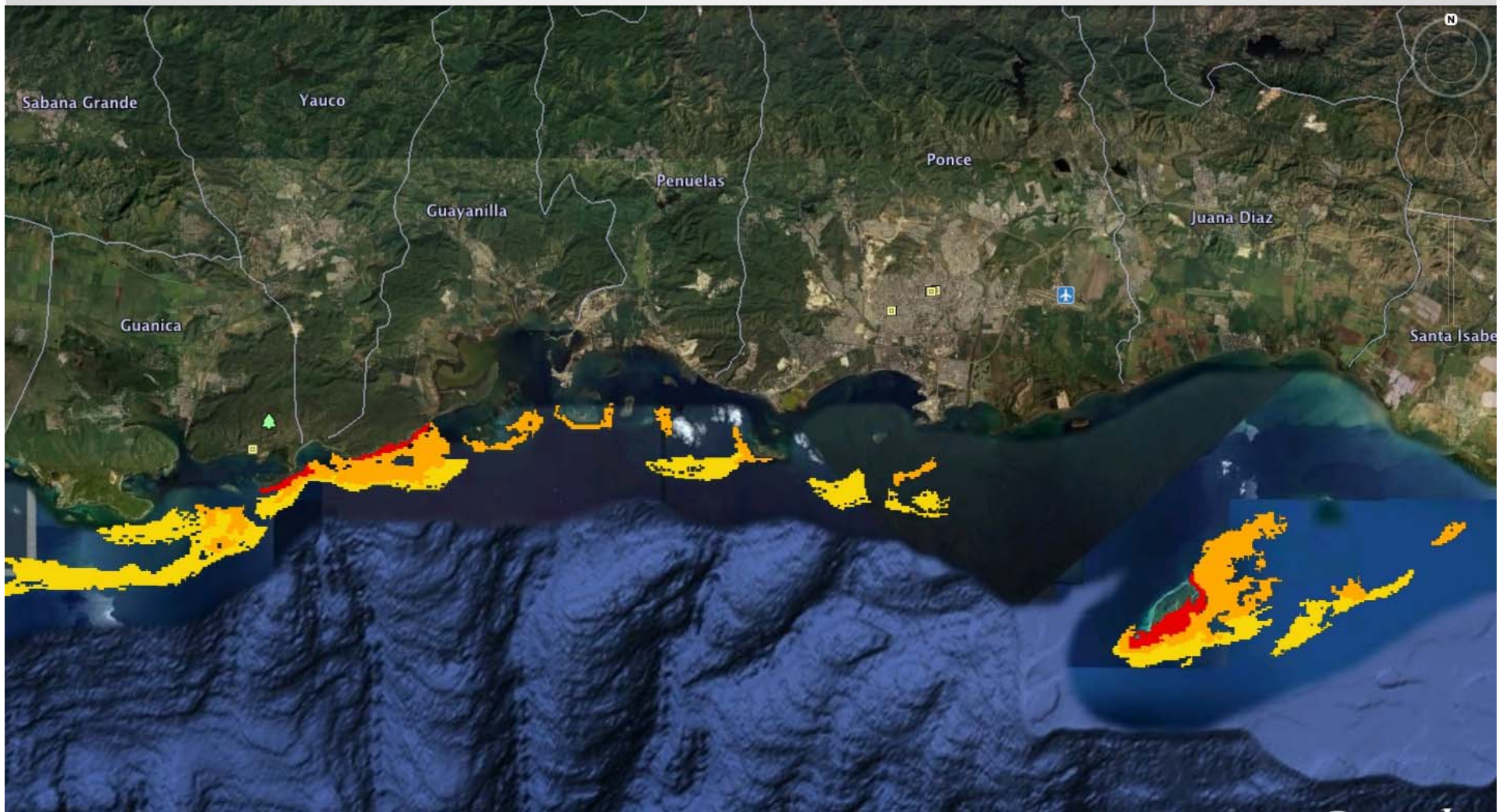
- GIS used to determine 'potential habitat' for Elkhorn coral
  - hard substratum habitats (Benthic Habitat Maps, NOAA)
  - 0 to 15 meters depth (Electronic Nautical Charts, NOAA)
- Stratified by depth into:
  - high probability (0-5 m)
  - medium probability (5-10 m)
  - low probability (10-15 m)
- Grid 50 m cell size

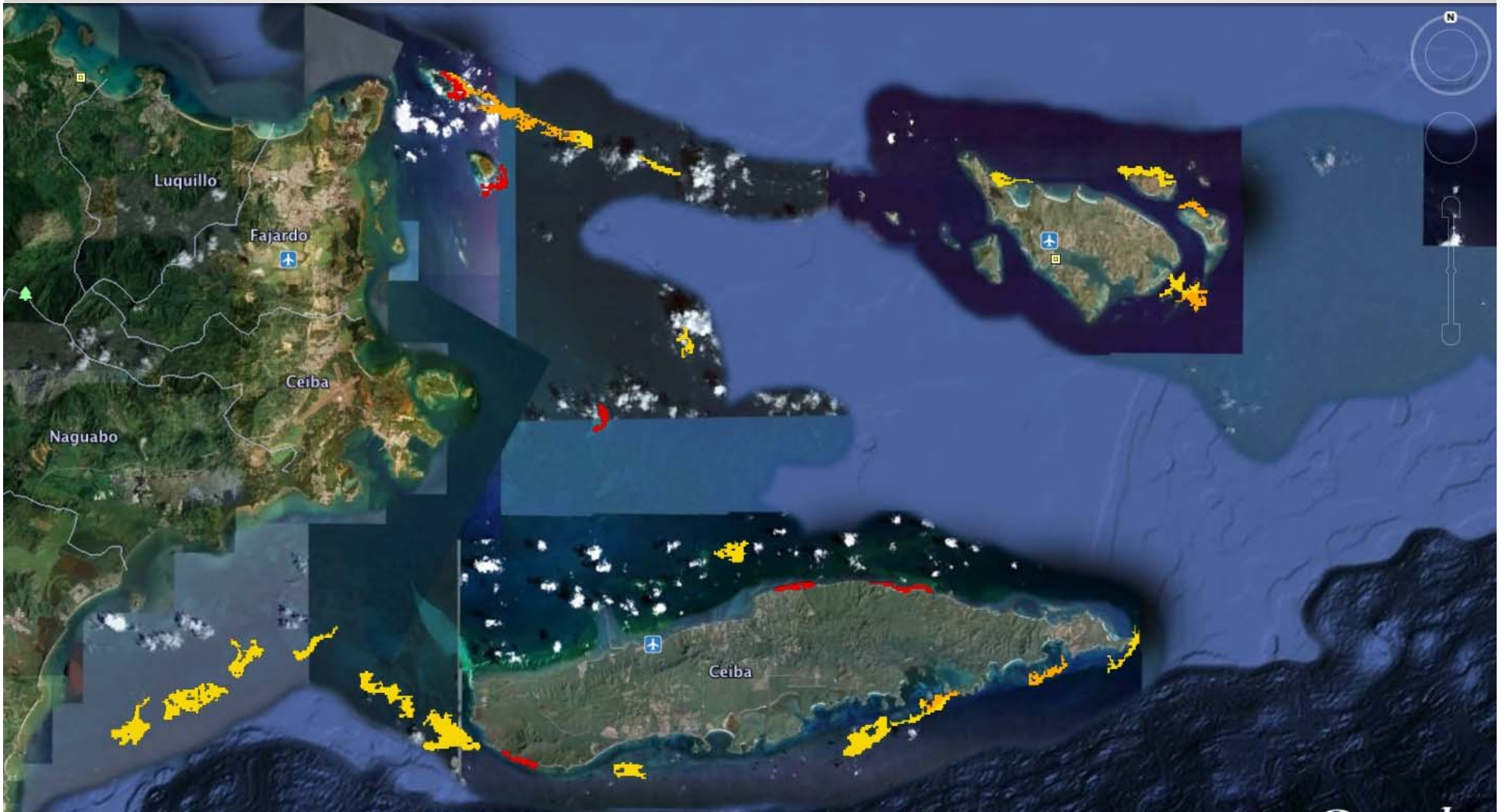


The island-wide potential habitat for Elkhorn coral was estimated at 673 km<sup>2</sup> (67,354 ha)





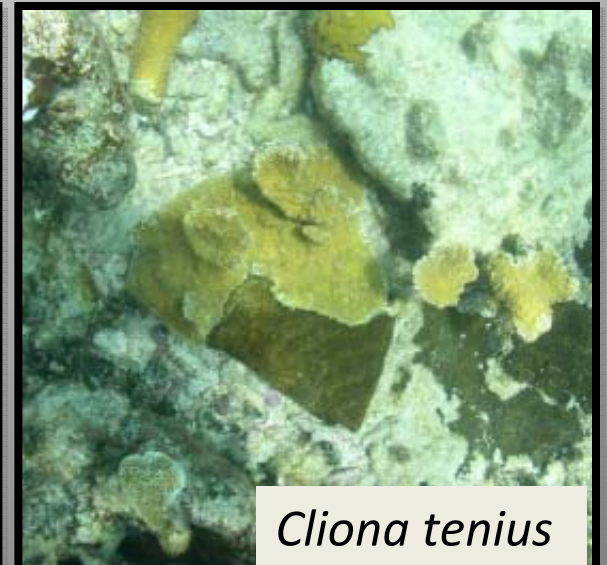


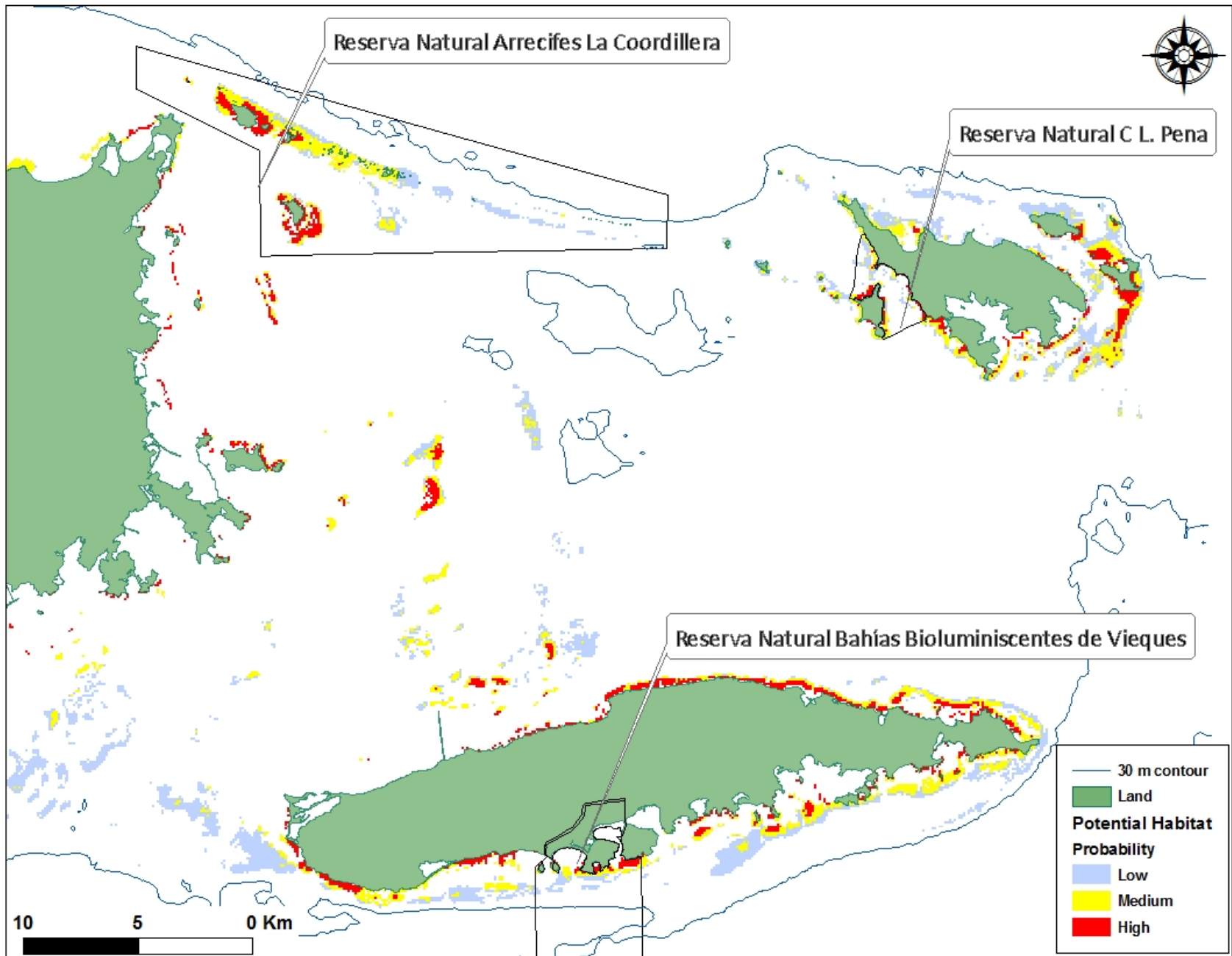


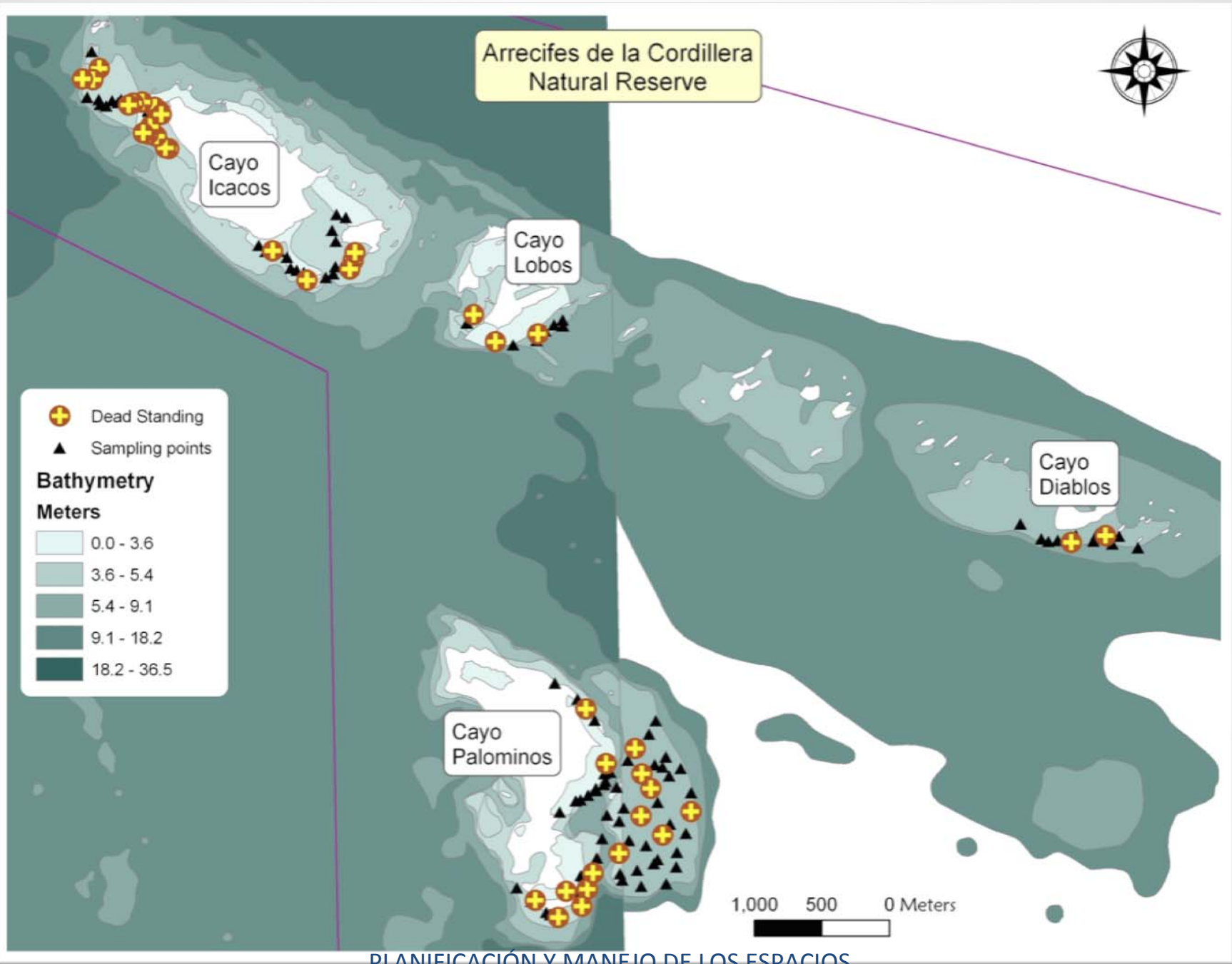


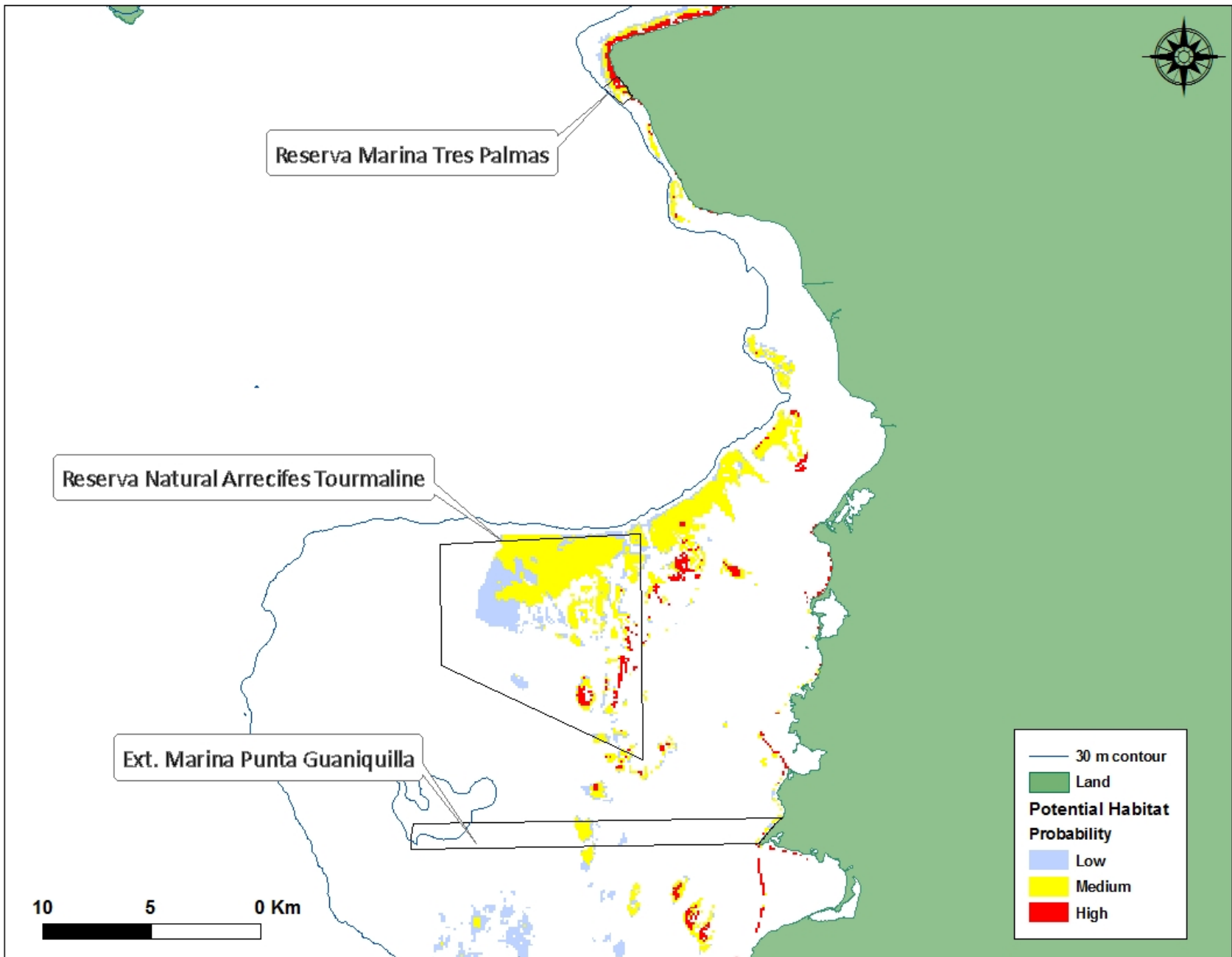
# Sampling Potential Habitat

- Random sampling scheme within potential habitat in 6 MPAs
  - Presence or absence
  - Past occurrence (rubble or dead standing skeletons)
  - If present
    - Size, Abundance, percent cover of live tissue
    - Density & Live Area Index
  - Proportion affected by threats (disease, bleaching, predation, etc.)
- With this information permanent demographic monitoring was designed

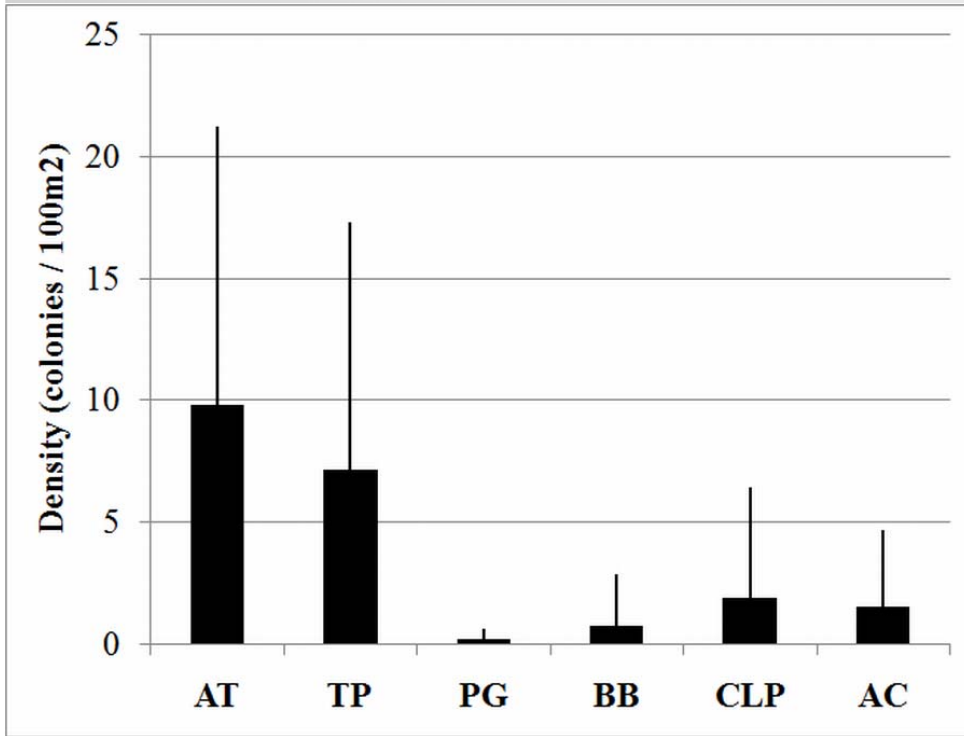




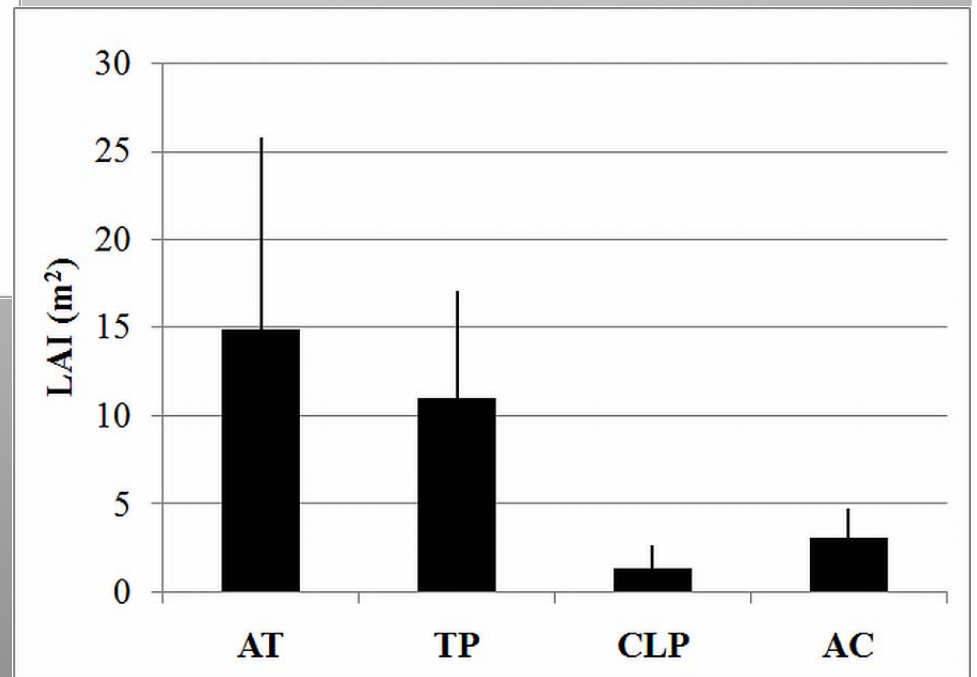


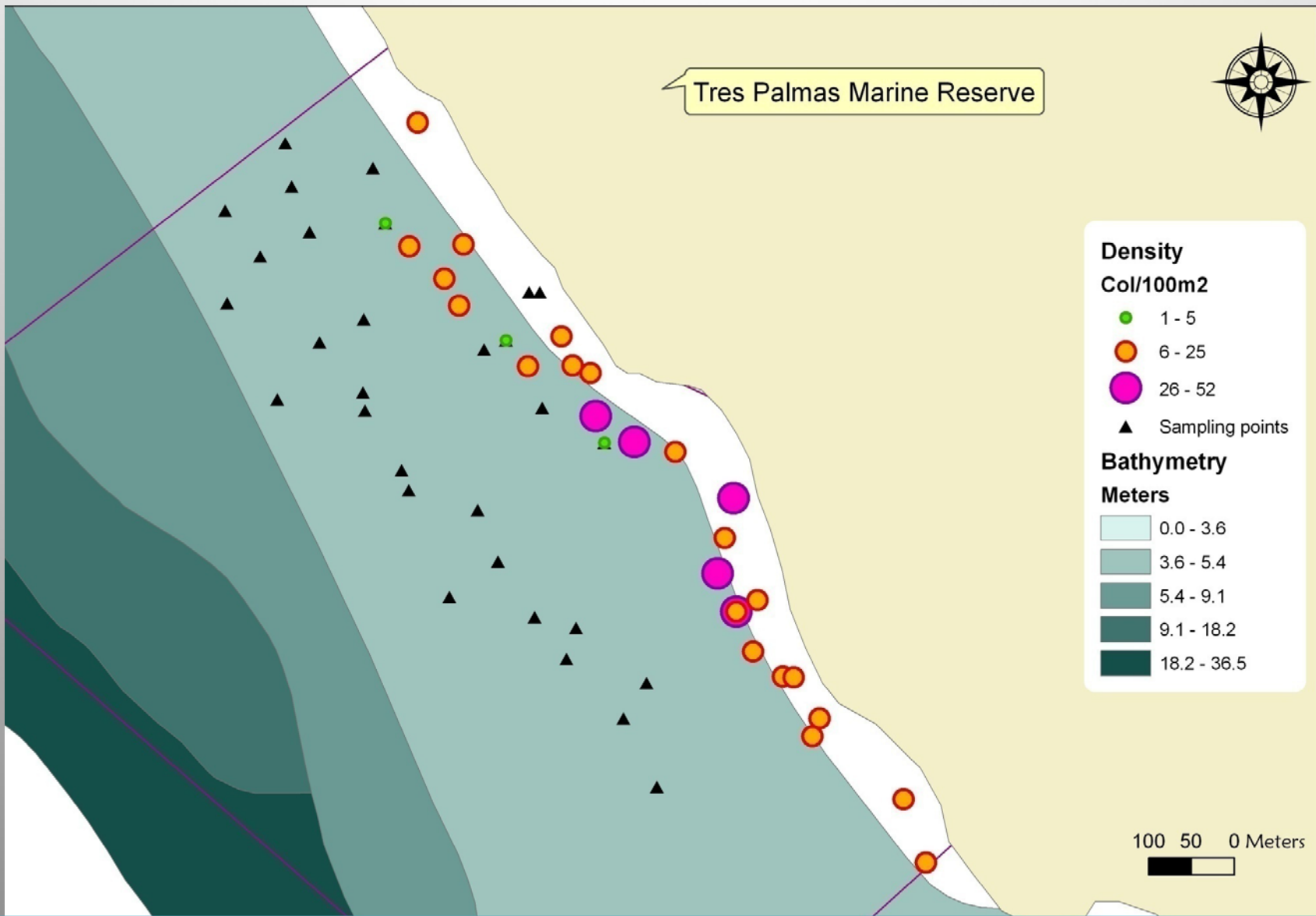


### Mean (SD) Elkhorn coral density (colonies/100m<sup>2</sup>)



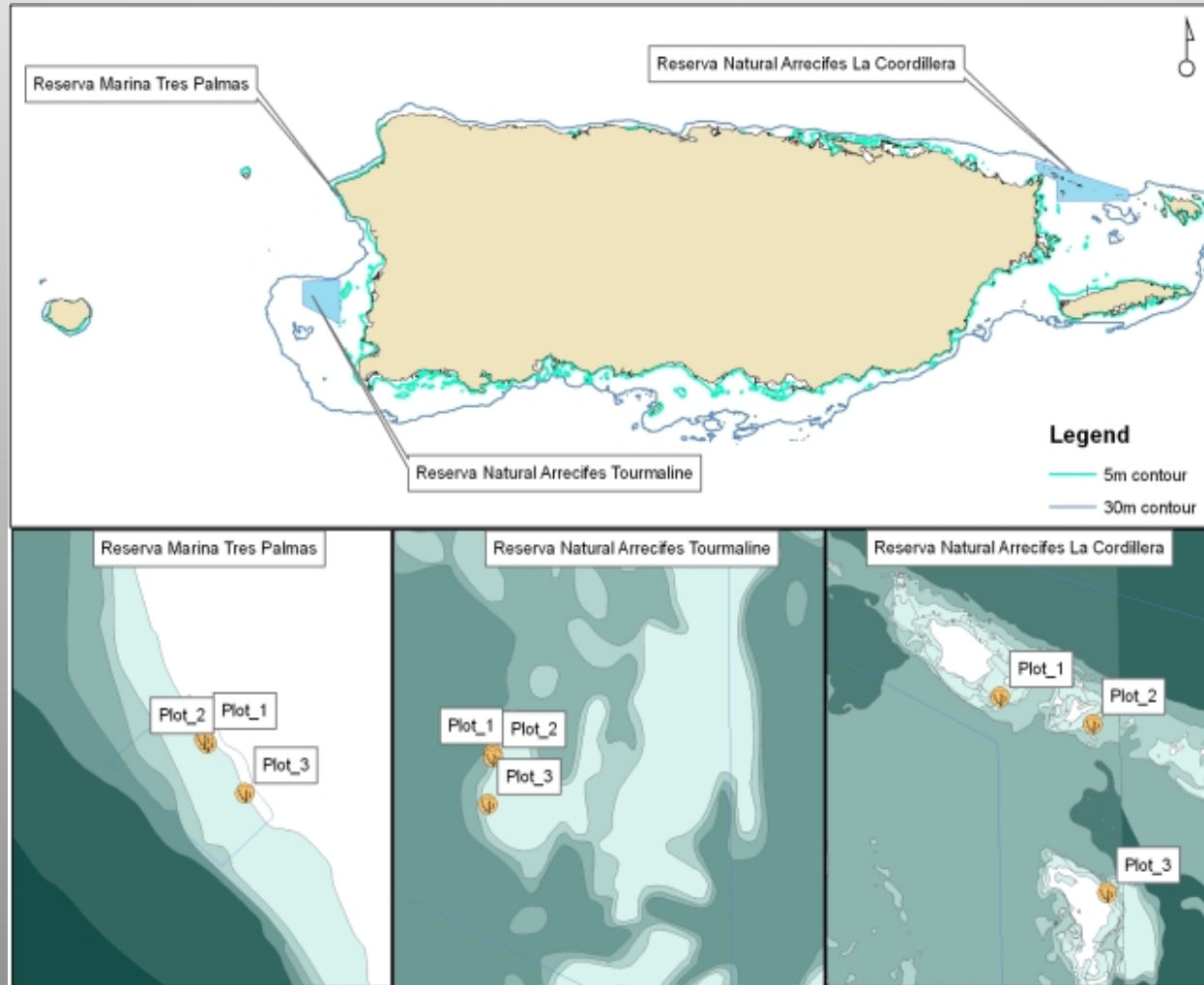
### Mean (SE) live area index (LAI) per survey area (m<sup>2</sup>)

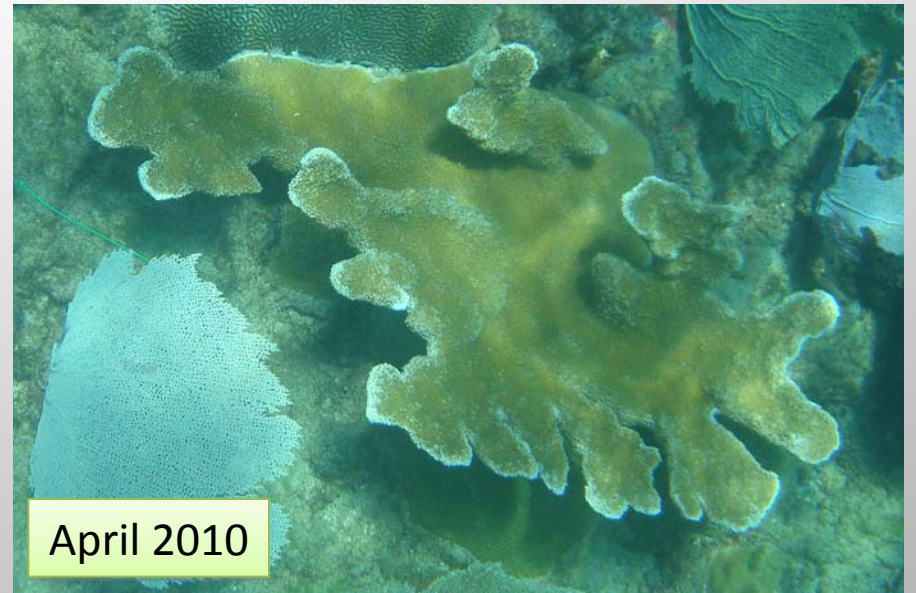
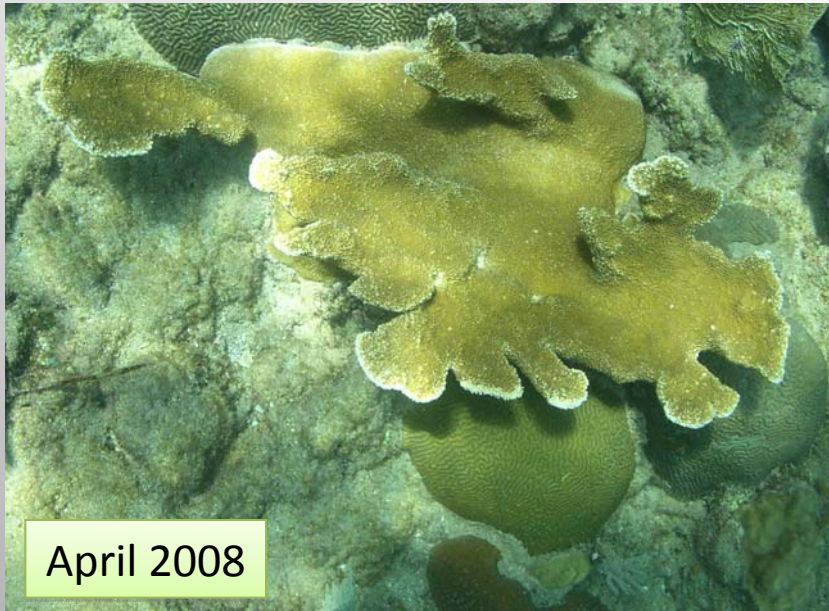




Spatial variability of Elkhorn coral density  
(colonies/100m<sup>2</sup>)

# Demographic Monitoring of Elkhorn Coral 9 plots (2007 – present)



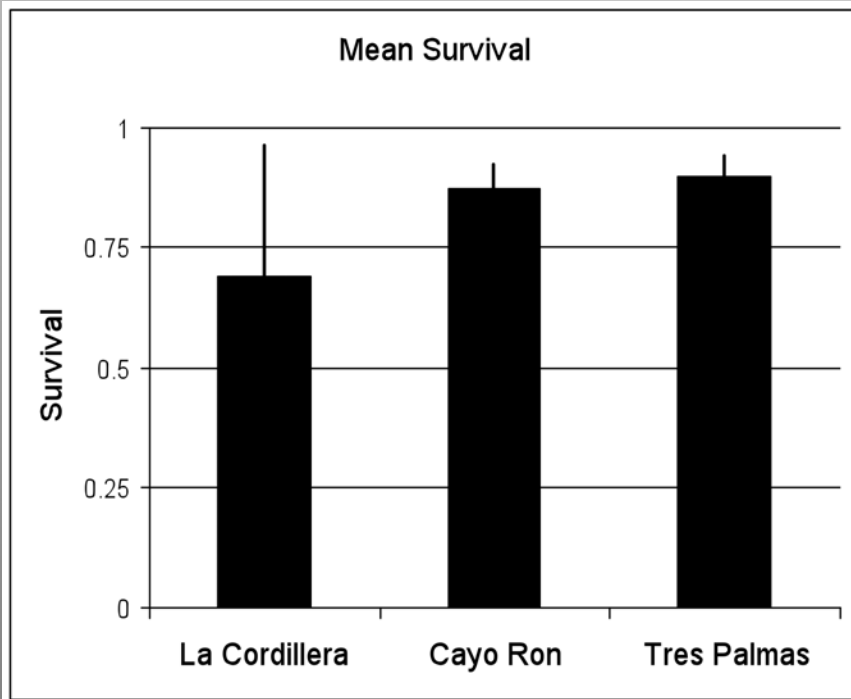


### Tres Palmas

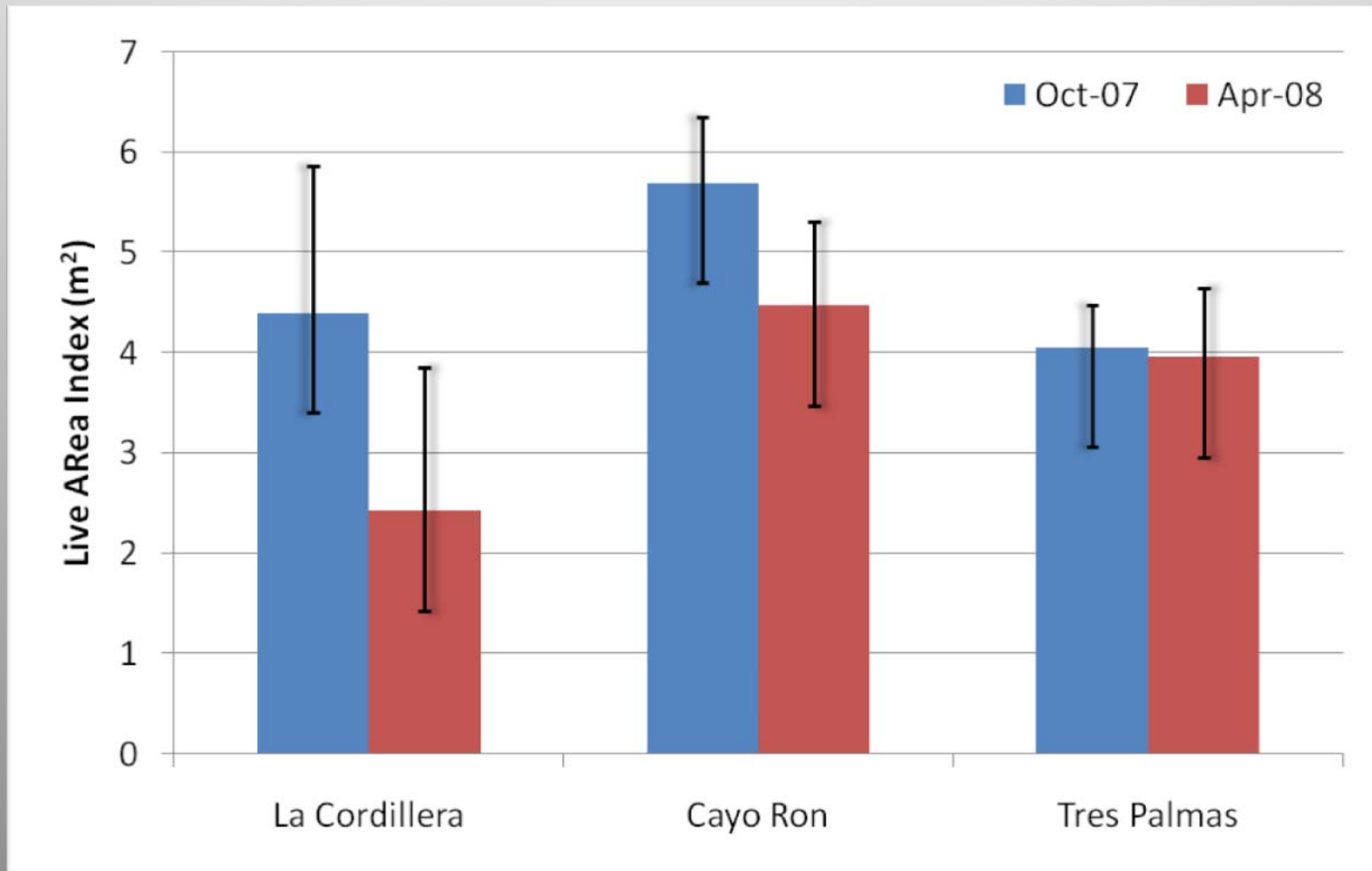




# Cayo Icacos, Arrecifes de la Cordillera



Mean (SE) live area index (LAI) (m<sup>2</sup>) of tagged colonies over two sampling periods.



# Applications to Coastal Zone Management



# Example: Reserva Marina Tres Palmas, Rincón

## Governance

- Designation 2004
  - PR Legislature
- Administrative Order 2008
  - DRNA
- Management Plan Approved 2010
  - Planning Board
- Management Board 2010
  - Local, NGO & government action

## Management

- Limit sign & buoy installation
- Delimitation ZMT
- Restore watershed in surrounding areas
- Habitat restoration plans
  - Marine debris
  - Blue Water task force
  - Lion Fish control
- Education & Outreach
- Scientific Committee

**Plan de Manejo Reserva Marina Tres Palmas Rincón, Puerto Rico**

+ RMTP management plan (~7 MB)

**MANAGING THE RMTP RESERVE**  
 In an effort to protect some of the healthiest **elkhorn corals** and the surf that breaks over them, the Reserva Marina Tres Palmas was established in January 2004. This marine reserve, the first on the mainland of Puerto Rico, was established through a community-driven effort.

Protecting Rincón's coastal and ocean resources is a priority because they are the **"economic engine"** of the community's economy. With funding from NOAA's Coral Reef Conservation Program the development of a management plan for the marine reserve commenced in **2005**.

**Developing the plan**  
 Dr. Manuel "Manolo" Valdés-Pizzini and his team from **CIEL** facilitated the process to create the management plan.

The development of the management plan was guided by a **Steering Committee** with representatives from local and federal government, fishers, educators, scientists, local

+ Management Plan Process

The plan mandates the formation of a management board to collaborate with DRNA officials in managing the reserve. This board has not yet been constituted.

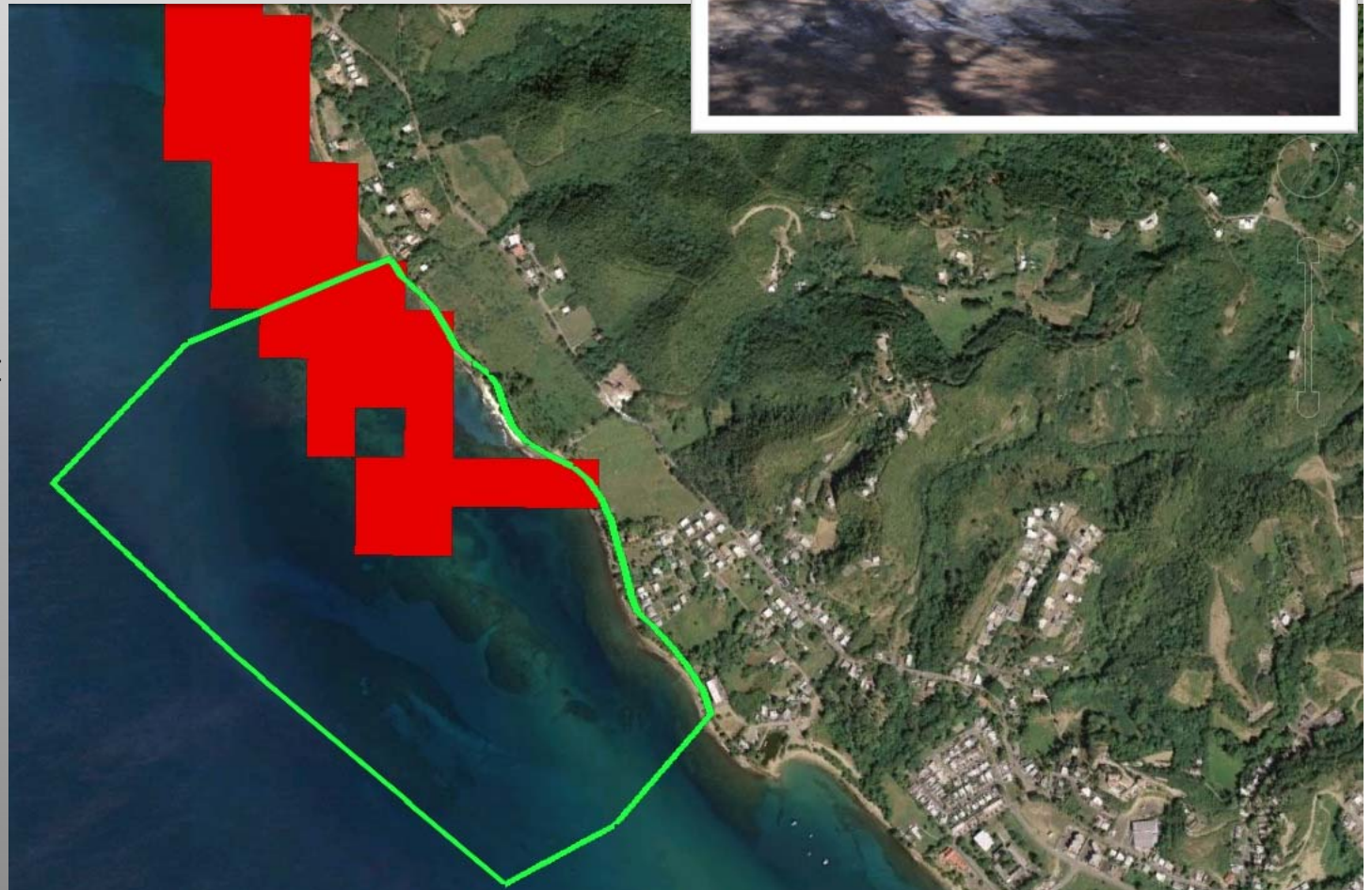
+ Junta de Manejo

+ RMTP Administrative Order

**CIELO CENTRO INTERDISCIPLINARIO PE ESTUARIOS PEL LITORAL**

# Uses and potential impacts

- Tourism & recreation
  - lodging
  - parking
  - beachgoers
  - water sport
    - parasailing
    - banana boat
    - surfing
    - diving
    - snorkeling
    - SUP
- Coastal Development
  - residential
  - commercial



# Acknowledgements

- K. Eckert, Widecast
- L. Manning NMFS – NOAA
- A. Valdivia, M. Miller, D. Williams & L. Johnson – SEFSC, RSMAS
- H. Horta, I. Santiago, R. Soler,
- A. Álvarez, G. Oliveras, Gustavo Olivieri
- Officers ‘Papote’ & ‘Macho’ CV
- Y. Vargas, E. Hernandez-Delgado, R. van Dam, M. Nava, W. Merten. M. Rincón, P. Menge, C. Pacheco
- Sea Ventures, Fajardo
- El Conquistador, Palominos

Funding was provided through the National Fish and Wildlife Foundation Section 6 Program of NMFS/NOAA and the NOAA Coral Reef Conservation Program through PR-DNER

