

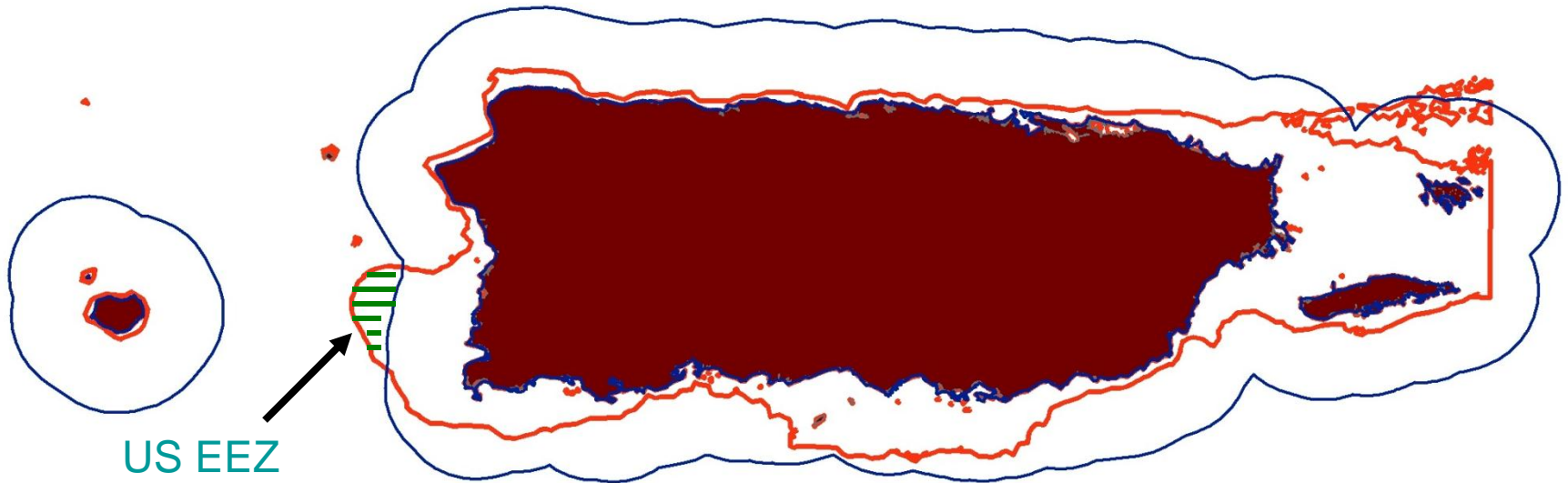
Caribbean
Coral
Reef
Institute

CCRI as an Approach to Research

- Cooperative program with NOAA
- Develop, implement, and administer management-driven research and monitoring activities
- Interact with government agencies, public and private organizations
- Utilize fully the resource base of the region to collaborate and conduct research

Why CCRI? → Coral reef management means local action!

Puerto Rico platform (50 m) and maritime zone (9 Nm)



Capacities, Governance systems, Laws and regulations, Stakeholders, Social structures, Historical context, Physical geography

Fisheries Assessment



Spawning
Aggregations

Acoustic
detection &
monitoring



Assessment of spawning stock

TEK and Aggregation Sites and Times

From 7 → 134 “Potential” Aggregations

27 now gone

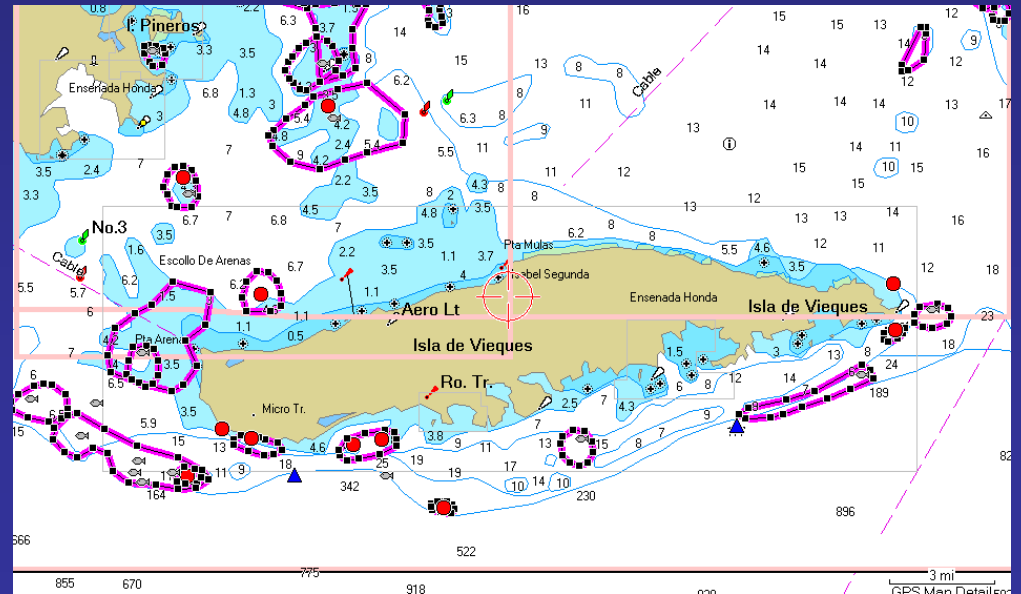
93 current w/ 76 sites being multispecies sites

61 species: snappers (12), groupers (11)

Marine Ornamentals

16 Fishes

20 Invertebrates

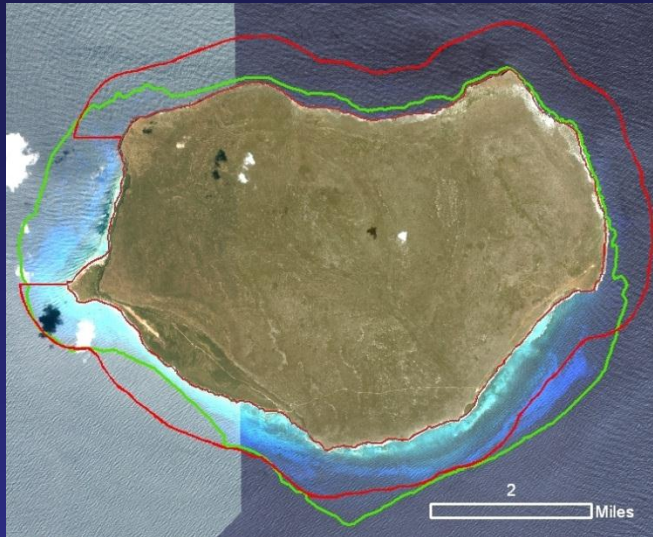


MPA's

Management Plans

GPS Products

Critical Habitats & Zoning

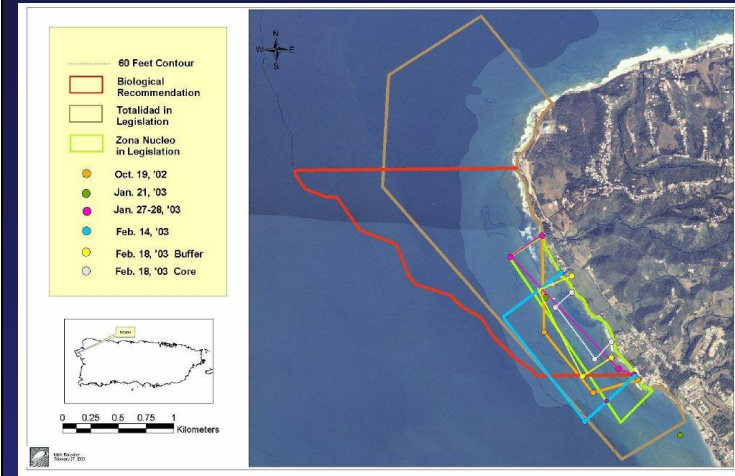


Plan de Manejo de la Reserva Natural Canal Luís Peña, Culebra



Documento base para el plan de manejo
Primer Borrador

Culebra, Puerto Rico
Octubre 28 de 2005



Outreach: Bilingual MPA Blog

Development & Implementation Steps

Capacity building

History

Resource use

Policy

Language and concepts

ID stakeholders, issues

Education

Integrated Ecological Assessments

Áreas Marinas Protegidas en Puerto Rico y el Gran Caribe

Caribbean Marine Reserves Research and Monitoring Workshop / Taller Caribeño sobre Investigación y Monitoreo en las Reservas Marinas

July 18th, 2006

Published by / Publicado por: Manuel Valdés Pizzini
From / Desde: St. John, USVI



Gary Davis, Visiting Chief Scientist, NPS served as facilitator of the workshop

Search

1 visitor online



now online
PUERTO RICO
August 2006

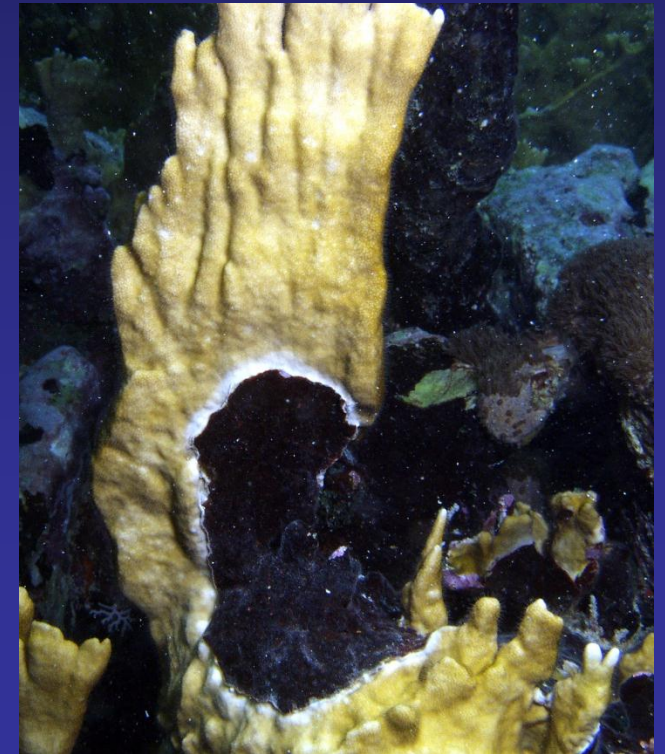
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28	29	30	31			

« Jul

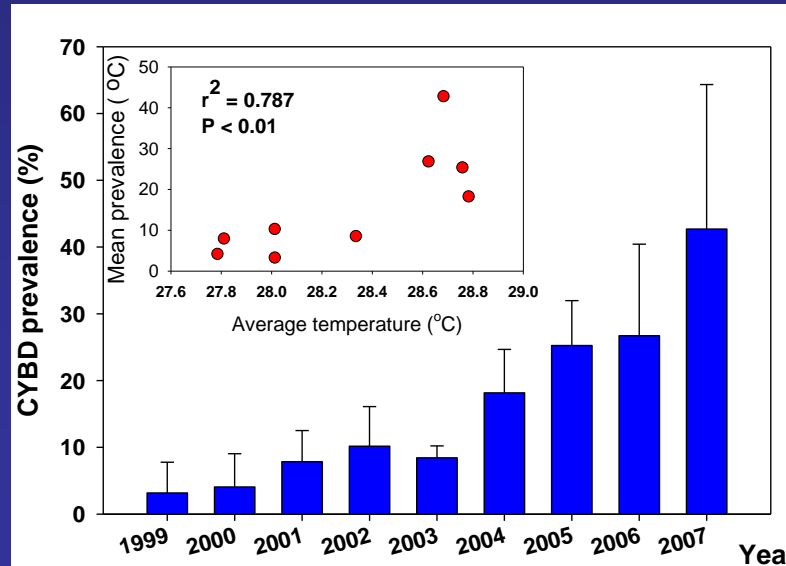
Processes Affecting Reef Resilience

Resilience

Cyanobacterial and algal epizoic growth on corals



Response of diseased corals to rising temperature and nutrient pollution

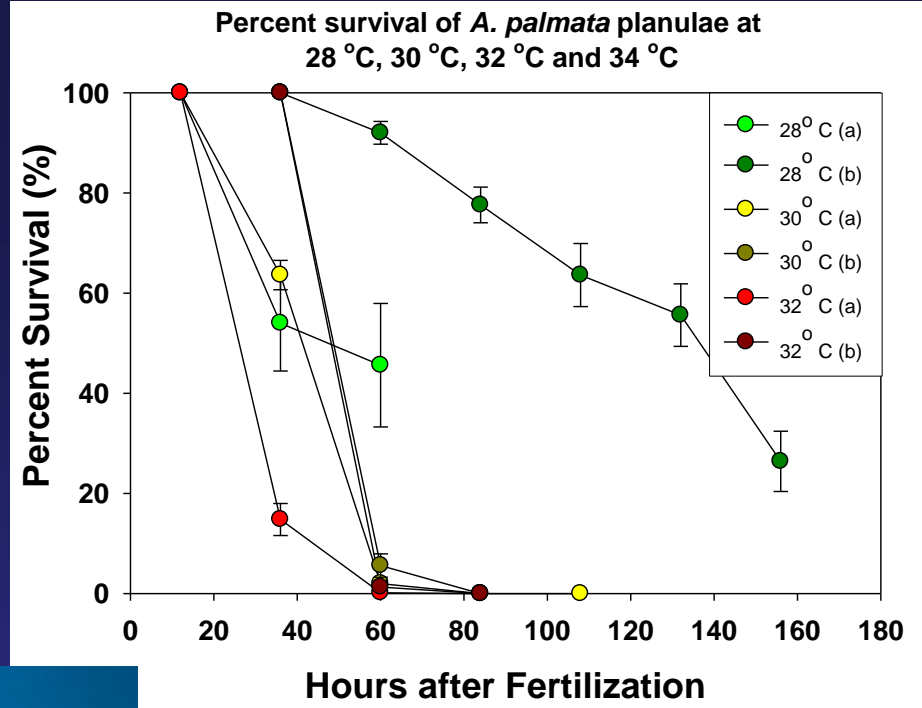


Threatened Species: *Acropora*



Spatial scale of genetic diversity

Colony → Reef → Coast → Island → Region



Early life history

Rearing

Temperature effects

Settlement Preferences

Survival

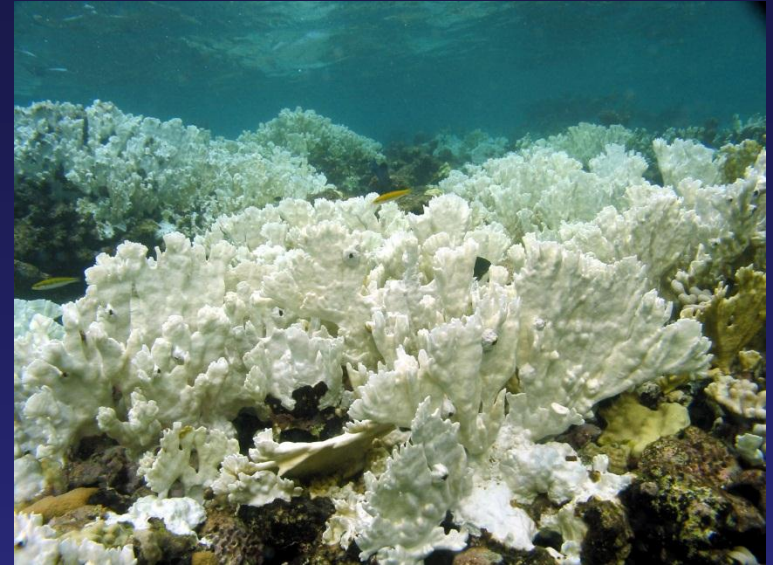


Non-fisheries Assessments

Bleaching



Disease

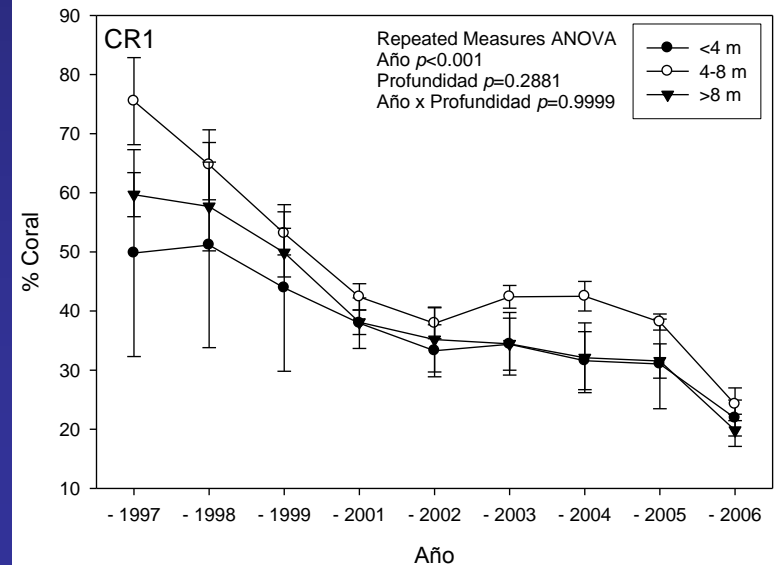


Detailed Habitat Maps



- corals_high relief
- dense_algae
- sparse_algae
- grass_coral
- dense_grass
- grass_invertebrates
- grass_sparse
- sand_invertebrates
- sand_noripple
- sand_ripple
- fine_sand
- corals_low relief
- mud_bare
- mud_invertebrates
- mud_reef
- gorgonian_patch
- coral_patch
- patch_halo
- elevated_gorgonians
- gorgonian_plain
- deep_algae
- shallow_algae

Reef Condition

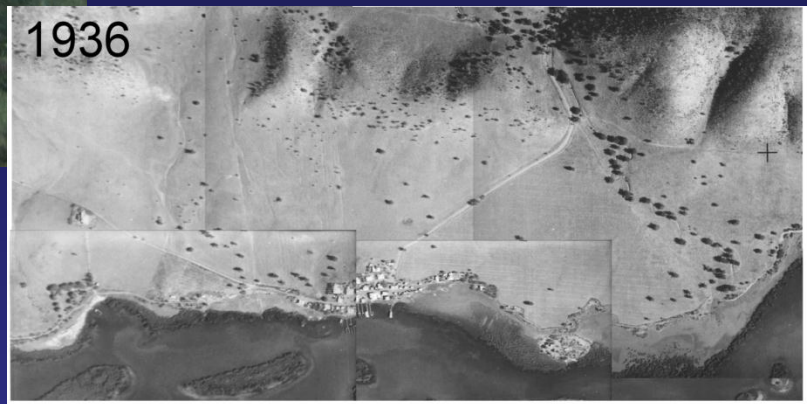
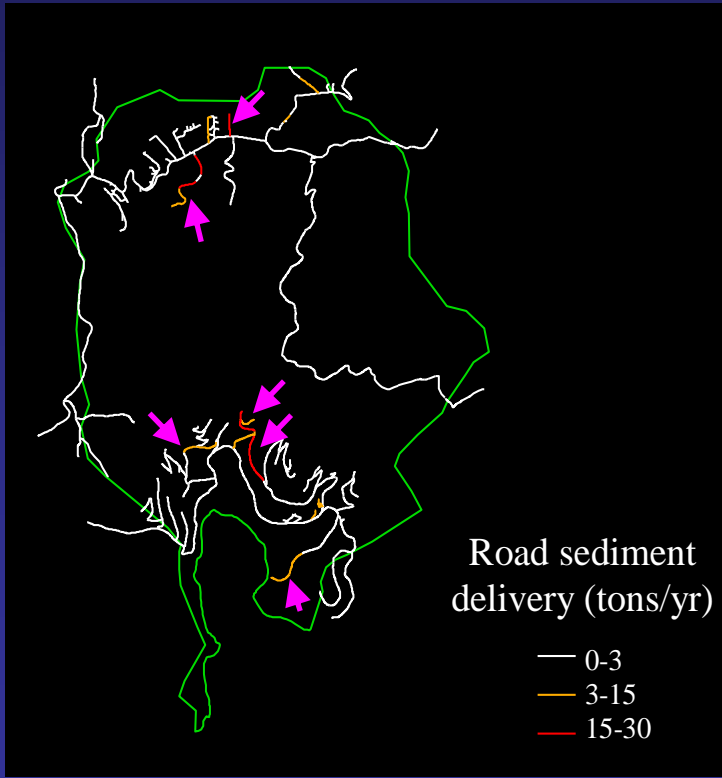


Non-point Source Pollution



Dispersal of Terrestrial Runoff Over the Shelf

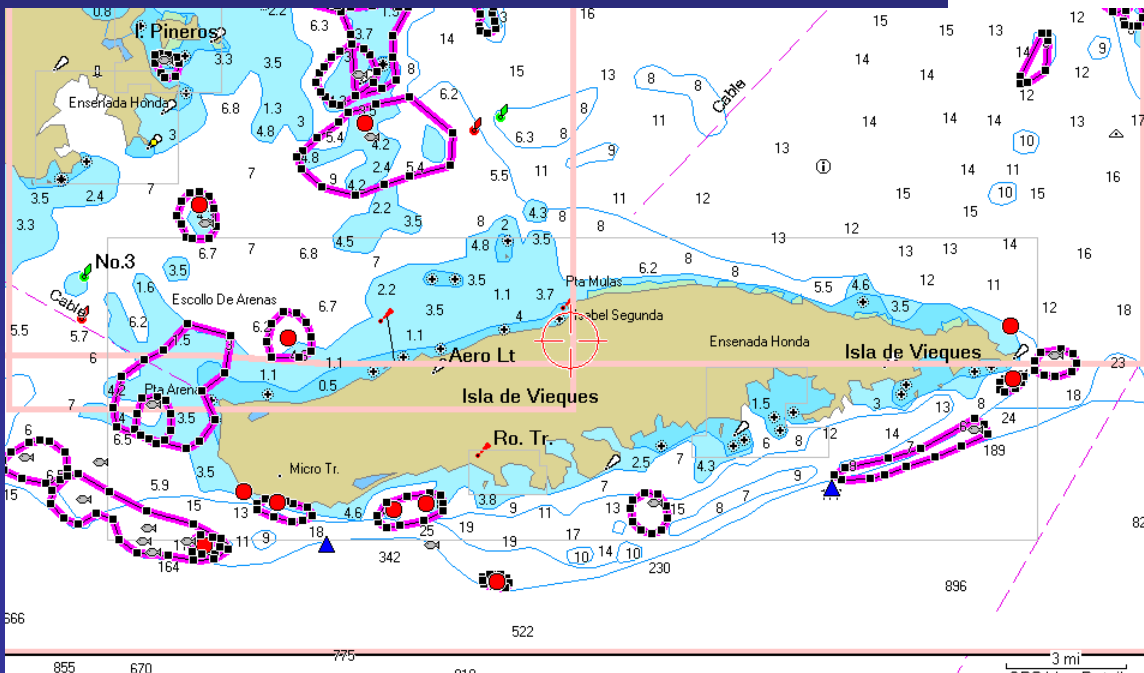
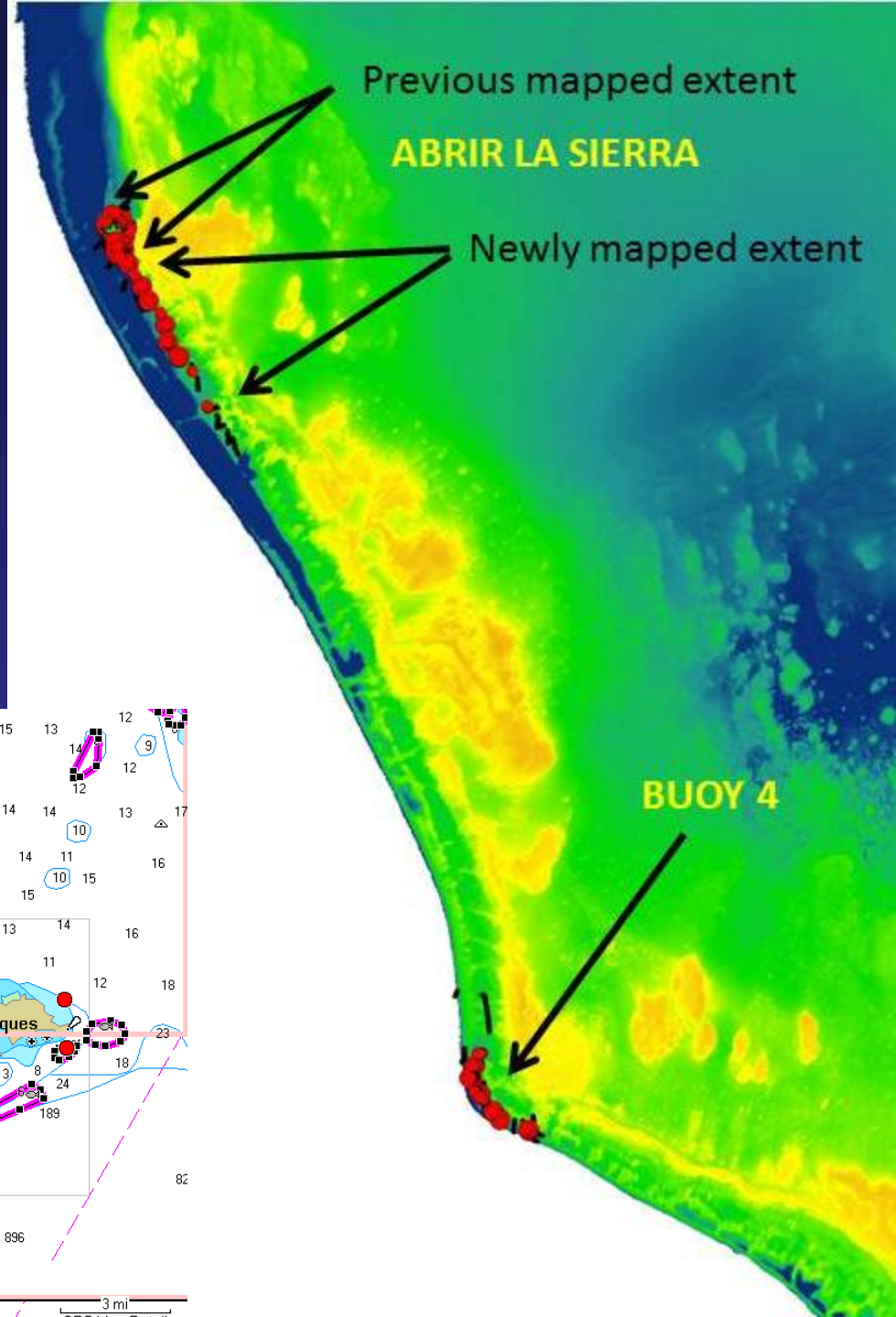
GIS Modeling of Sedimentary Runoff



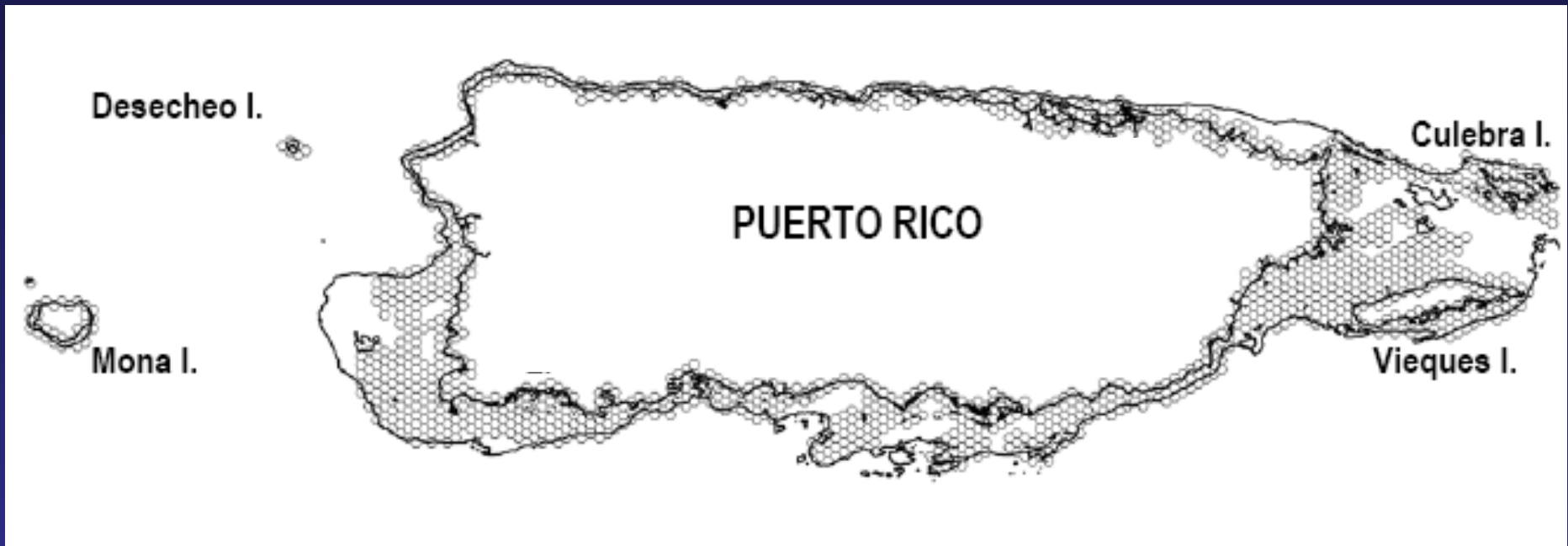
Long-term land use dynamics and erosion processes

Erosion = f (Slope, Grain size, Cover, Rainfall, Time since disturbance)

Fish Spawning Aggregations
Mapping Suspected Locations
Discovering New Aggregations
Mapping Extent
Determining Seasonality



Marxan Analyses

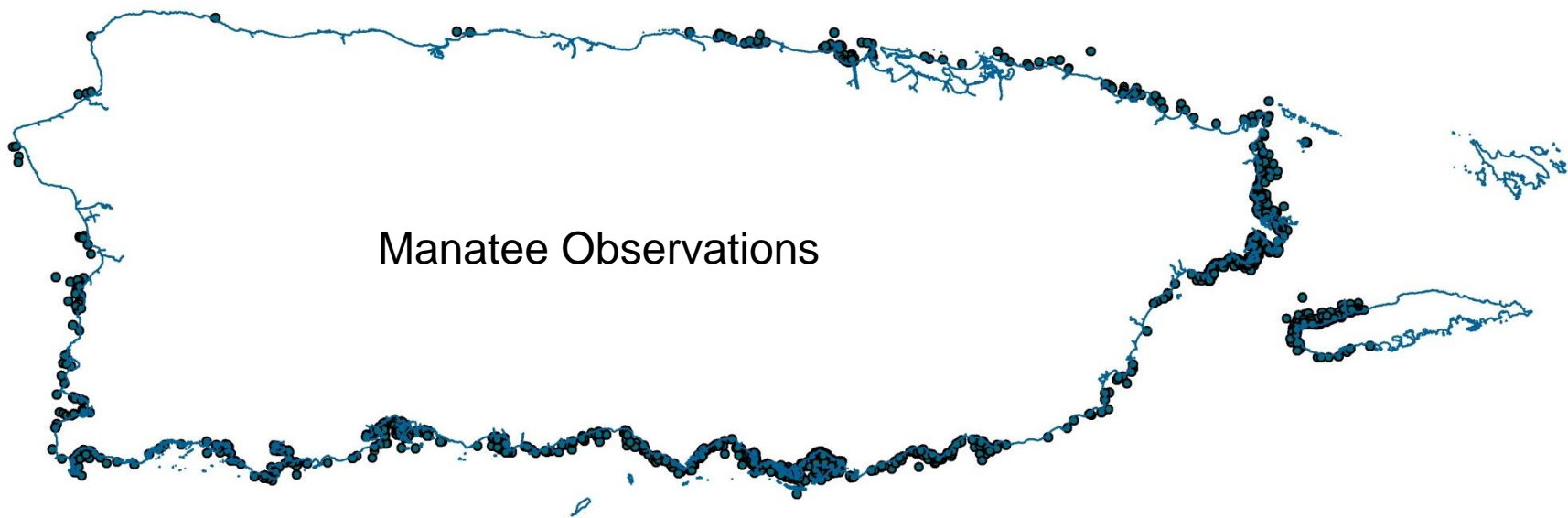


Species Distributions

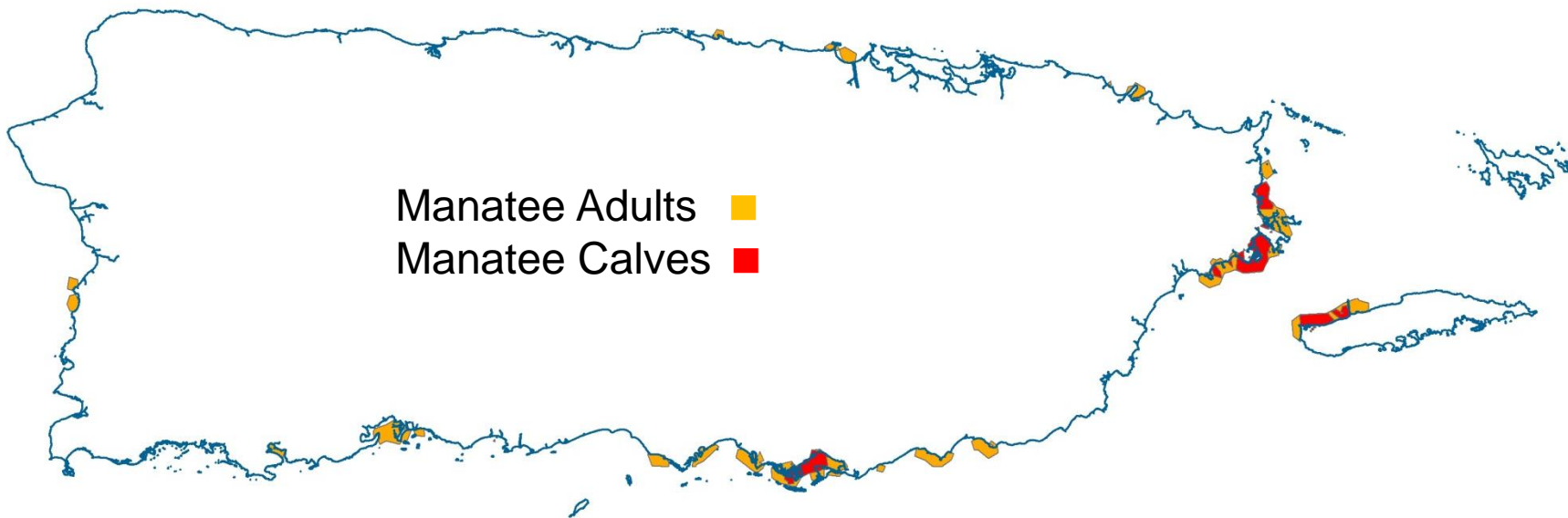
Hawksbill Turtle (Distr & Nests)
Leatherback Turtle (Distr & Nests)
Green Turtle (Distr & Nests)
Dolphins

Pelicans (Roosts & Nests)
Manatees (Adults & Calves)
Humpback Whales (Adults & Calves)
Queen Conch (Adults & Juveniles)

Manatee Observations



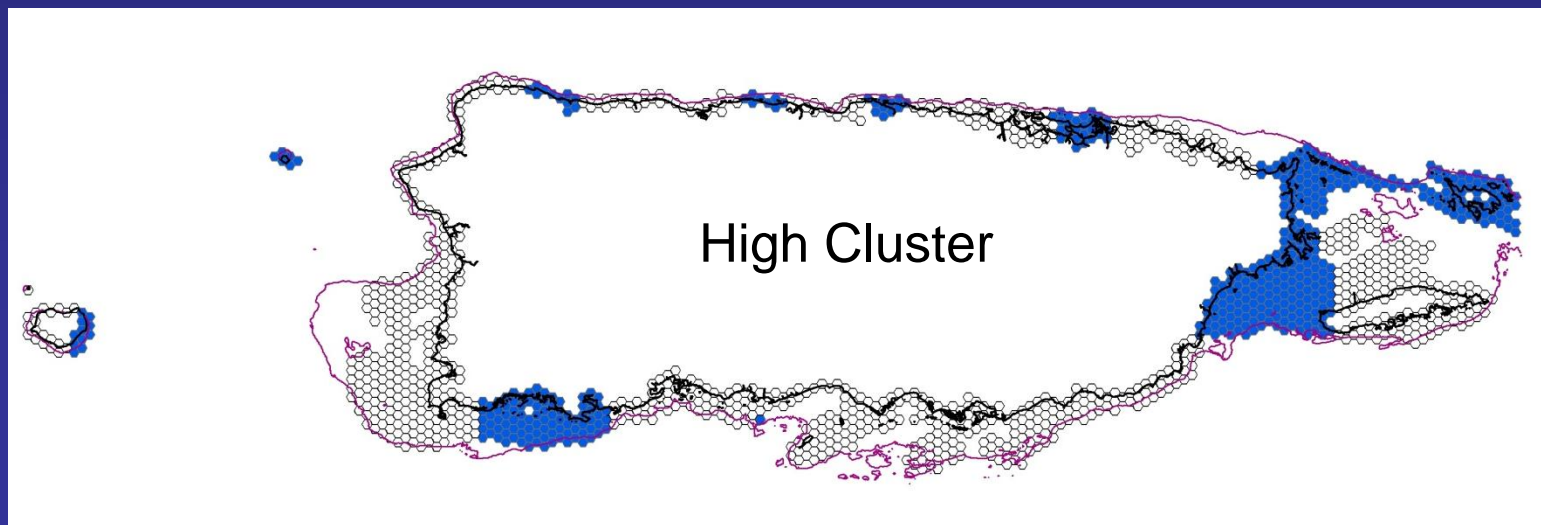
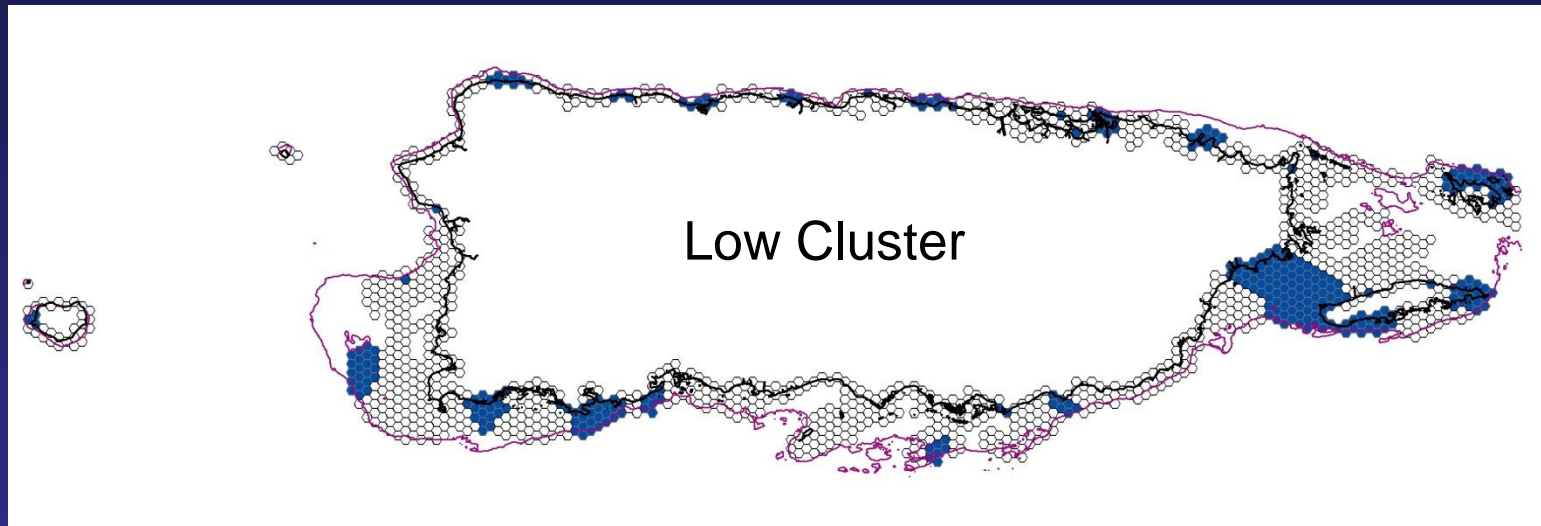
Manatee Adults ■
Manatee Calves ■



Incorporating Ecological Function into MPA Network Design in Coral Reef Ecosystems

Habitats as surrogates for biological communities
Definition and arrangement of habitats
Limits to habitat connectivity
Criteria for output assessment
Modeling cost of implementation

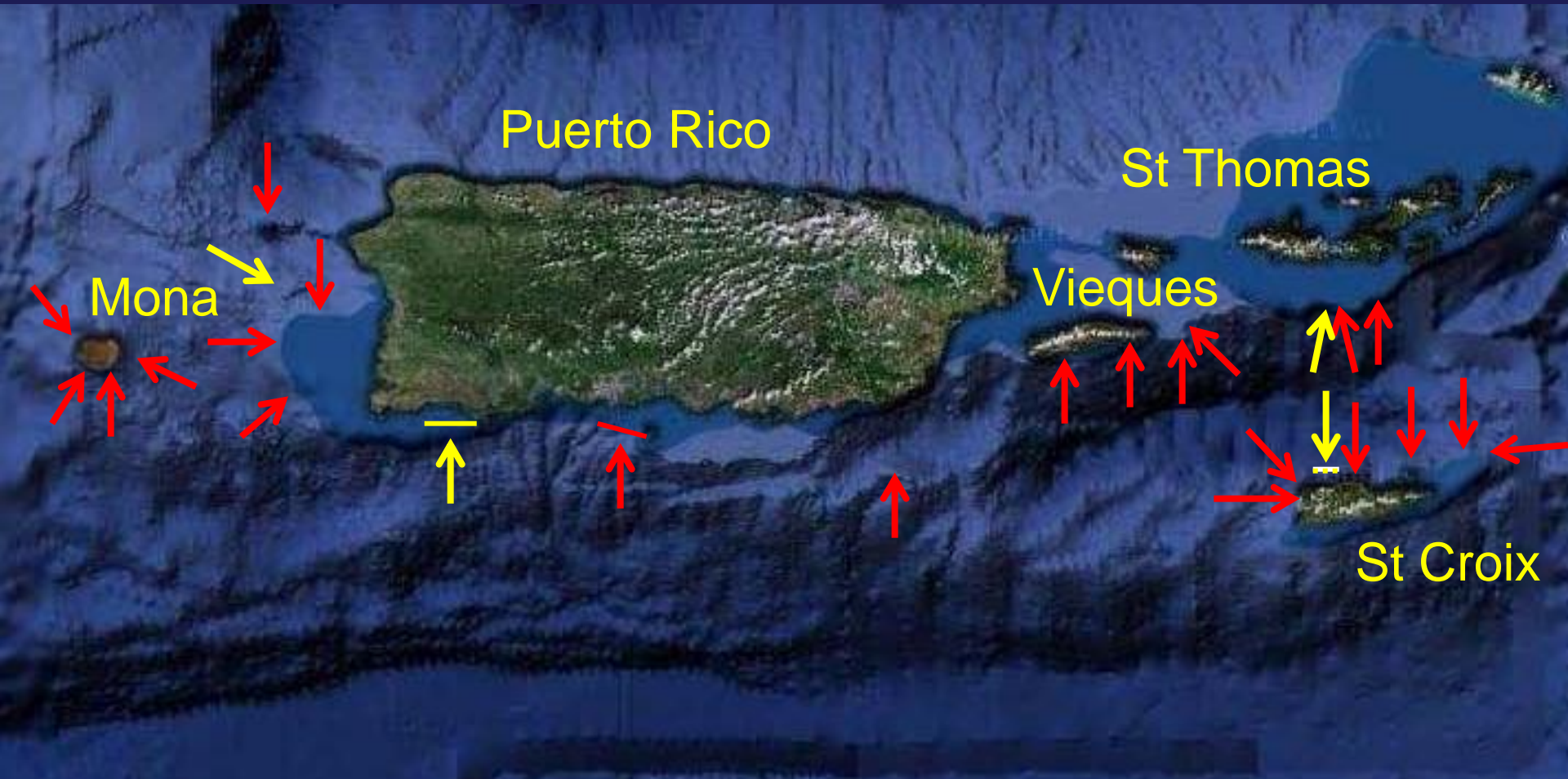
Best selection from Marxan

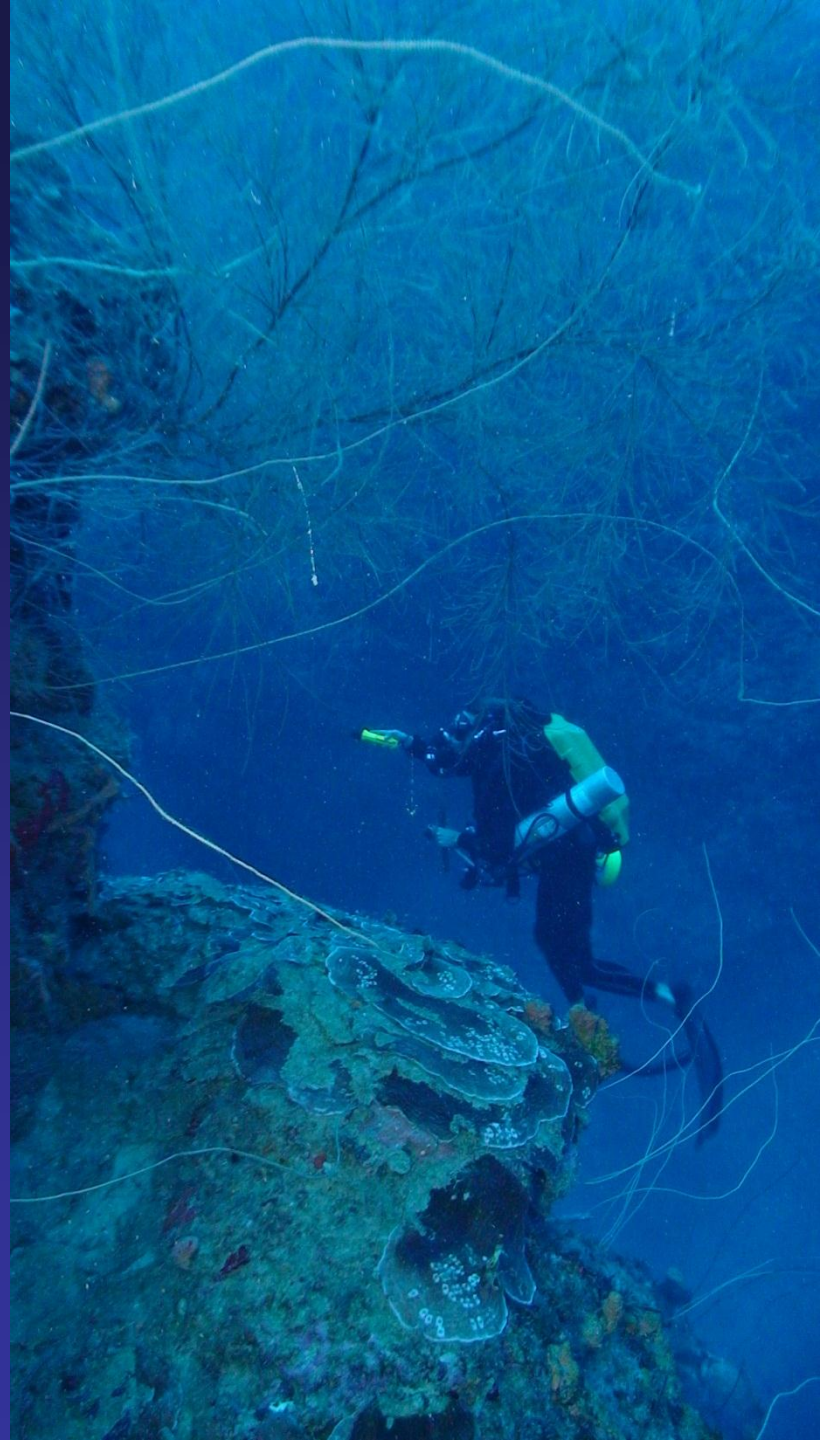
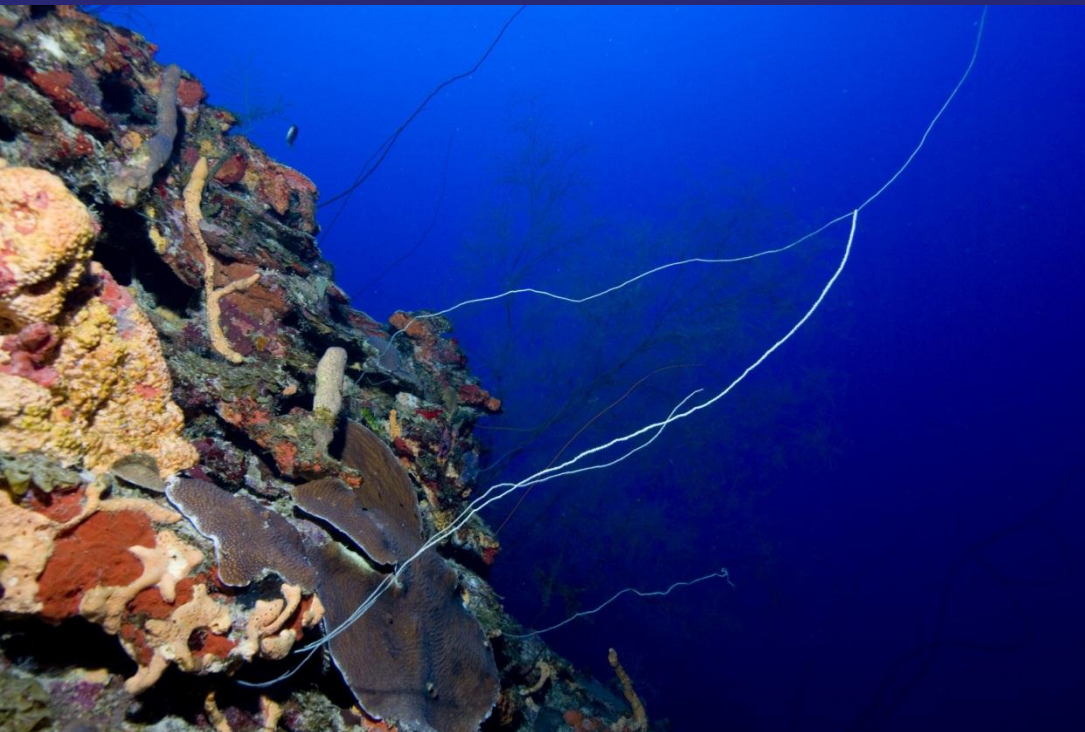


Cost to Functionality

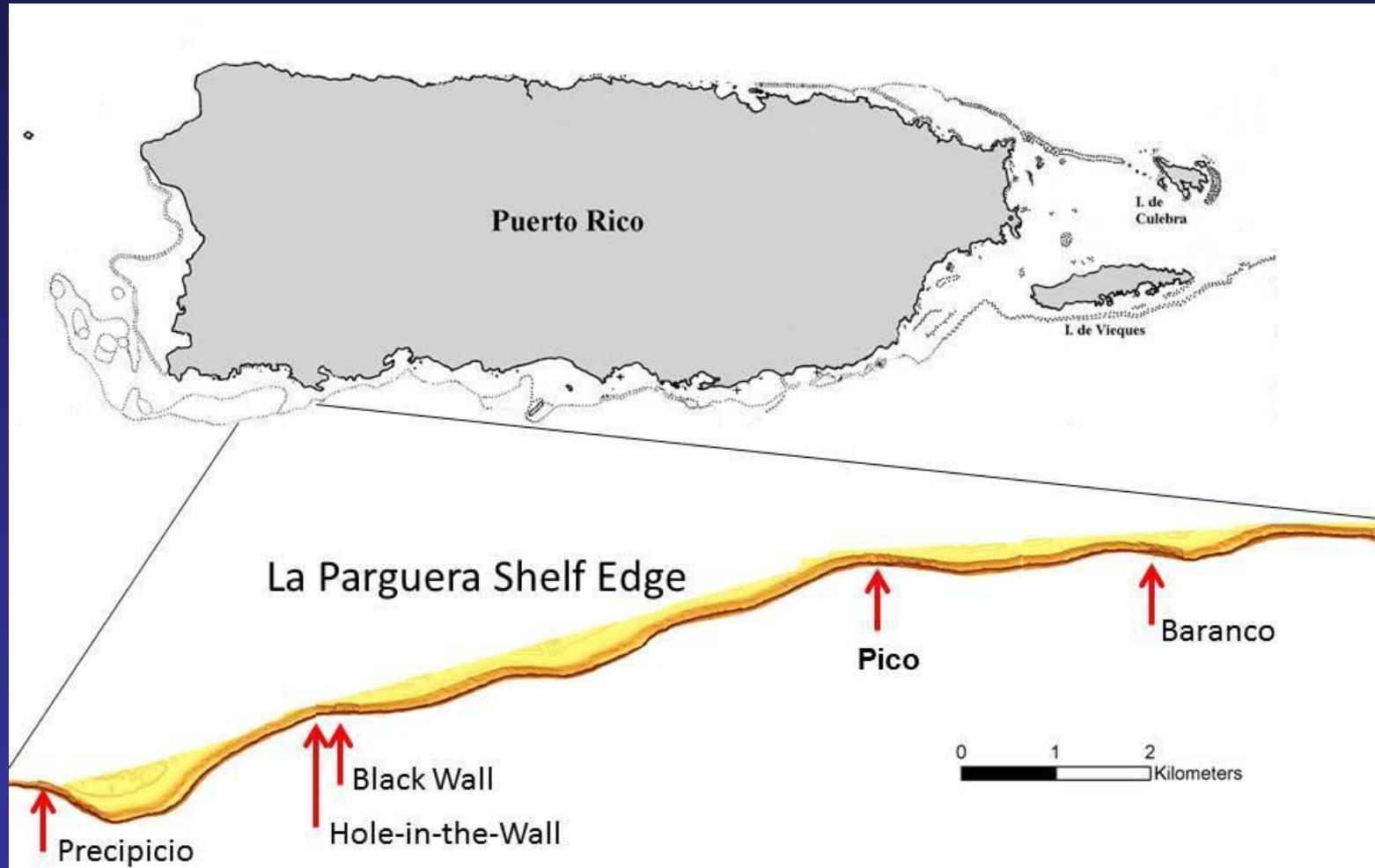
Marxan Run	Total Planning Units	Planning Units Included	% Area	% Above Null
Low Cluster				
Null Habitat	1353	230	17.00	
Functional Habitat	1353	299	22.10	30.0
High Cluster				
Null Habitat	1353	346	25.57	
Functional Habitat	1353	455	33.63	31.5

Mesophotic Coral Ecosystems





Large-scale Geomorphology Affects MCE Distribution



SW Sides - Greater MCE Development

