

An underwater photograph of a vibrant coral reef. The scene is filled with various types of coral, including large, flat, greyish corals in the foreground and more colorful, branching corals in the background. The water is clear, and the lighting is bright, highlighting the textures and colors of the marine life.

Regional Needs

Presentation for Atlantic/Caribbean
CREIOS Workshop, May 13, 2009

Context

- Capture coral reef ecosystem mapping and monitoring needs from entities outside FL, PR and USVI
- Address region-wide mapping and monitoring needs, needs that go beyond jurisdictional boundaries

Participants

- Caribbean Fishery Management Council
- U.S. Environmental Protection Agency, Region 2
- Flower Garden Banks National Marine Sanctuary
- Gulf of Mexico Fishery Management Council
- NOAA NMFS SE Regional Office - Protected Resources (*Acropora*)
- South Atlantic Fishery Management Council
- U.S. Geological Survey St. John

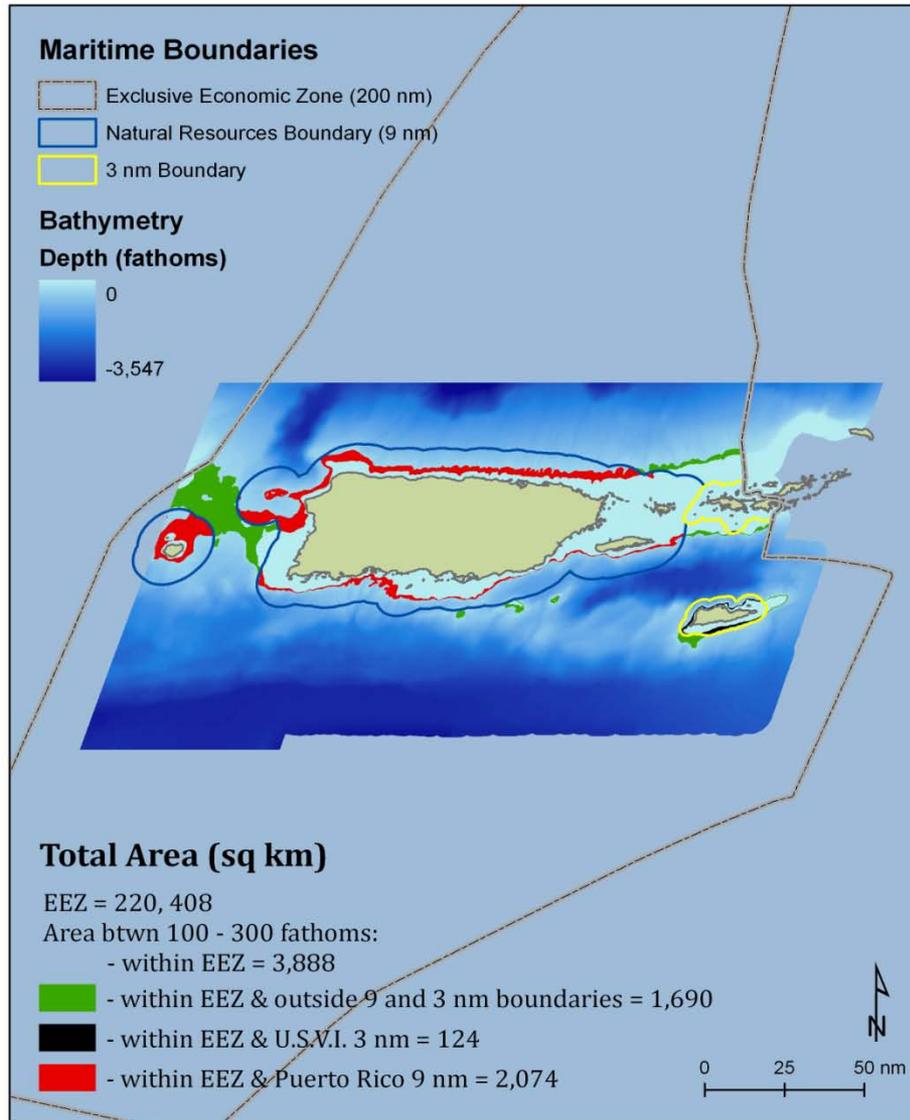
Fishery Management Councils - Context

- Caribbean Fishery Management Council
 - EEZ outside 9nm around PR
 - EEZ outside 3nm around USVI
 - EEZ around Navassa
- Gulf of Mexico Fishery Management Council
 - EEZ in Gulf of Mexico (outside 3-9nm depending on state), including Gulf side of Florida Keys
- South Atlantic Fishery Management Council
 - EEZ from North Carolina/Virginia border through Florida Keys

Fishery Management Councils – Priorities

- Map and characterize uncharted areas (e.g. potential SPAGs, existing MPAs, potential closed areas, EFH, HAPCs), particularly in deeper areas (30-100m)
- Identify and monitor fish and macro-invertebrate populations, particularly in deeper (30-100m) areas (including habitat associations)
- Monitor effects of closed areas on habitat and fish populations
- Identify sources and sinks for larvae. Particularly for protected areas, where are the larvae going? Where are the spawning fish coming from?
- Improve understanding of predator-prey interactions

Maritime Boundaries



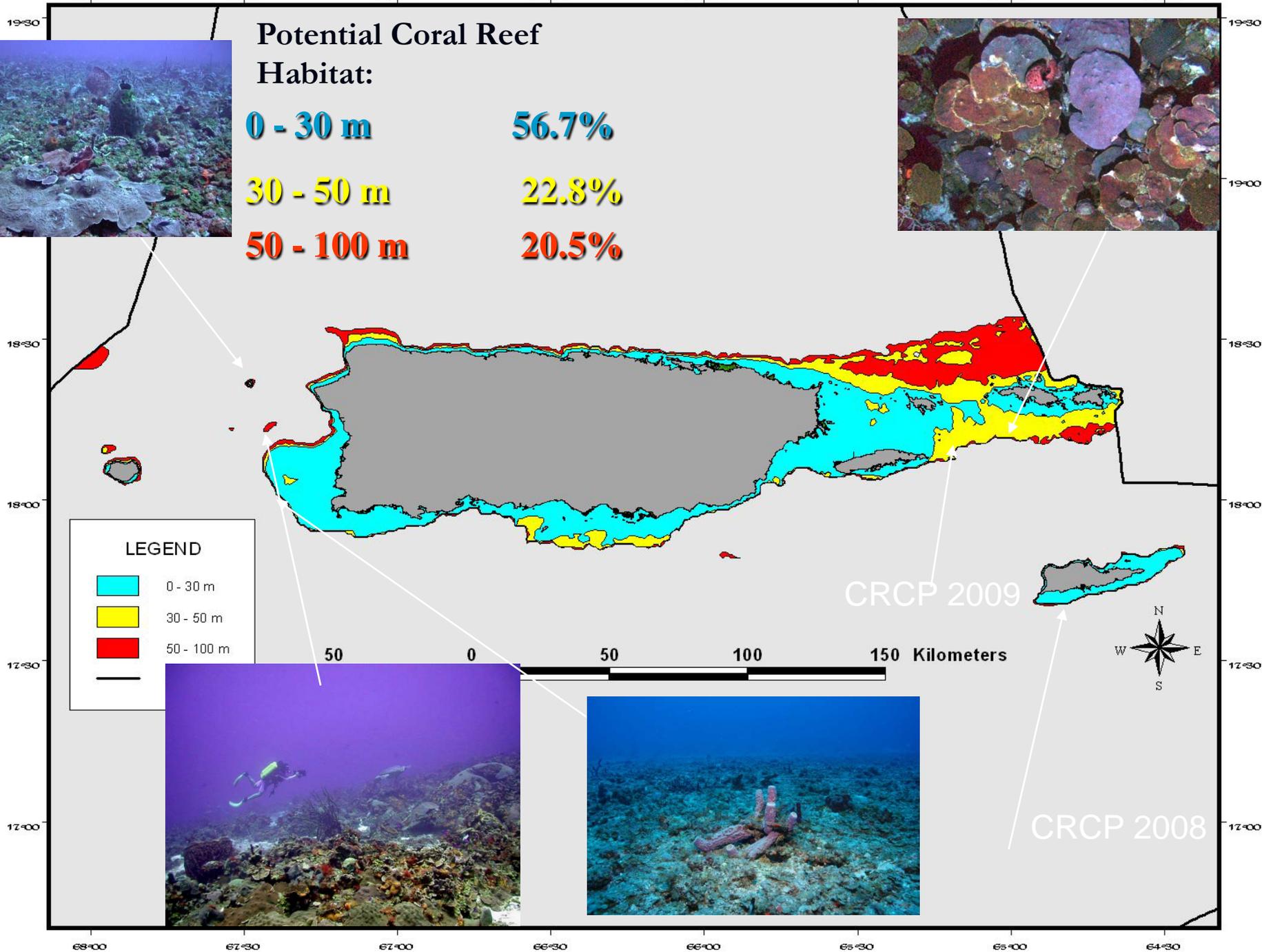
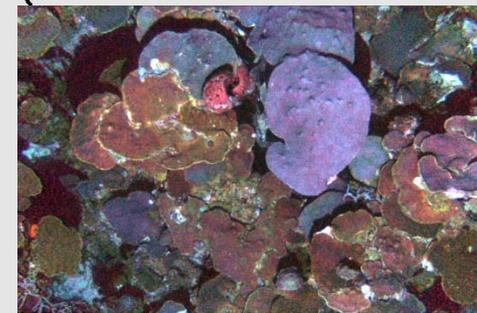
Potential Coral Reef

Habitat:

0 - 30 m **56.7%**

30 - 50 m **22.8%**

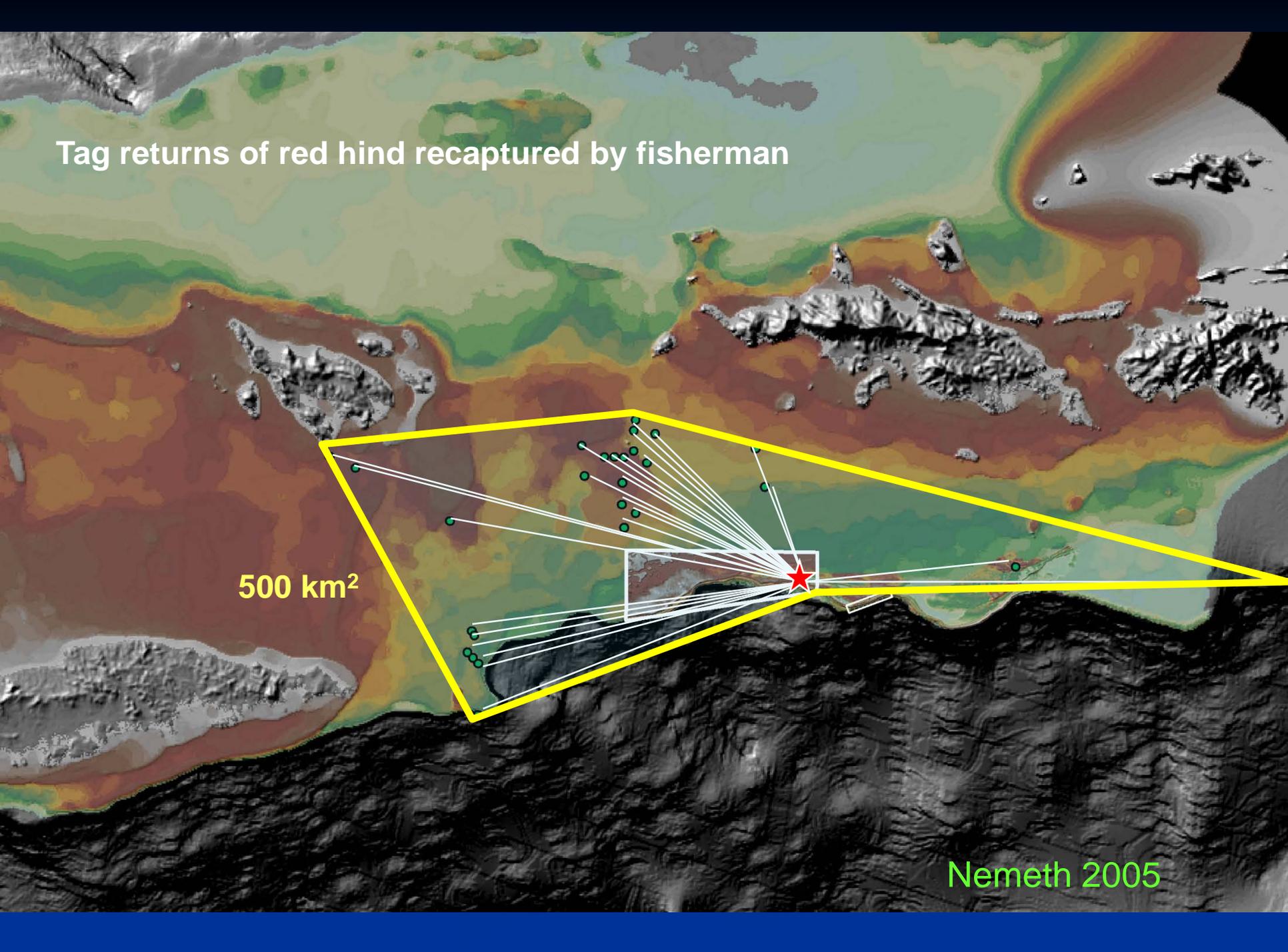
50 - 100 m **20.5%**



Tag returns of red hind recaptured by fisherman

500 km²

Nemeth 2005



Fishery Management Councils - Specific Issues

- Many protected areas with coarse bathymetry but limited or non-existent habitat characterization or monitoring
- How can we compare the impact of fishing to the impacts of habitat loss due to other impacts?
- Integrate the fishers – commercial fishers often spend much more time on the water and have years of experience – tap into wealth of knowledge.

EPA Mapping and Monitoring Needs - Context

Drivers Used to Protect Coral

Clean Water Act (CWA)

- Support water quality monitoring in each jurisdiction.
- If water quality shows a water body is impaired, regulations can be put into place to stop land-based sources of pollutants

National Environmental Policy Act (NEPA)

Review of Environmental Impact Statements. Need mapping data for EFH and ESA locations.

Marine Protection, Research and Sanctuaries Act (MPRSA) –

Need maps to create ocean dumping sites and transport routes for dredged material

EPA Core Region-Wide Issues

- Water-quality monitoring – all jurisdictions:
 - Expansion of delegated CWA programs. Existing monitoring capacity is limited – increased monitoring partnerships could help capture important episodic events
 - Supplemental biological monitoring in same sites as water quality monitoring - help understand context for chemical and physical analyses.
- Climate Change
 - Need input for improvements in existing ocean acidification monitoring, partnerships for expanded monitoring

EPA Core Region-Wide Issues (cont'd)

- Mapping for LBSP
 - Point source discharges
 - Combined sewer outfalls (CSOs)
- Mapping and physical monitoring to understand hydrology
 - Near shore currents
 - comparative coastal conditions
 - Watershed
 - Intermittent streams
 - fate of land-based pollutants
- Benthic habitat – maps critical for planning water quality monitoring in hardbottom areas

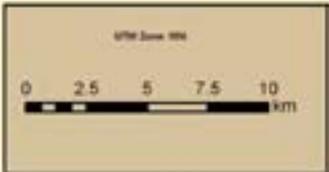
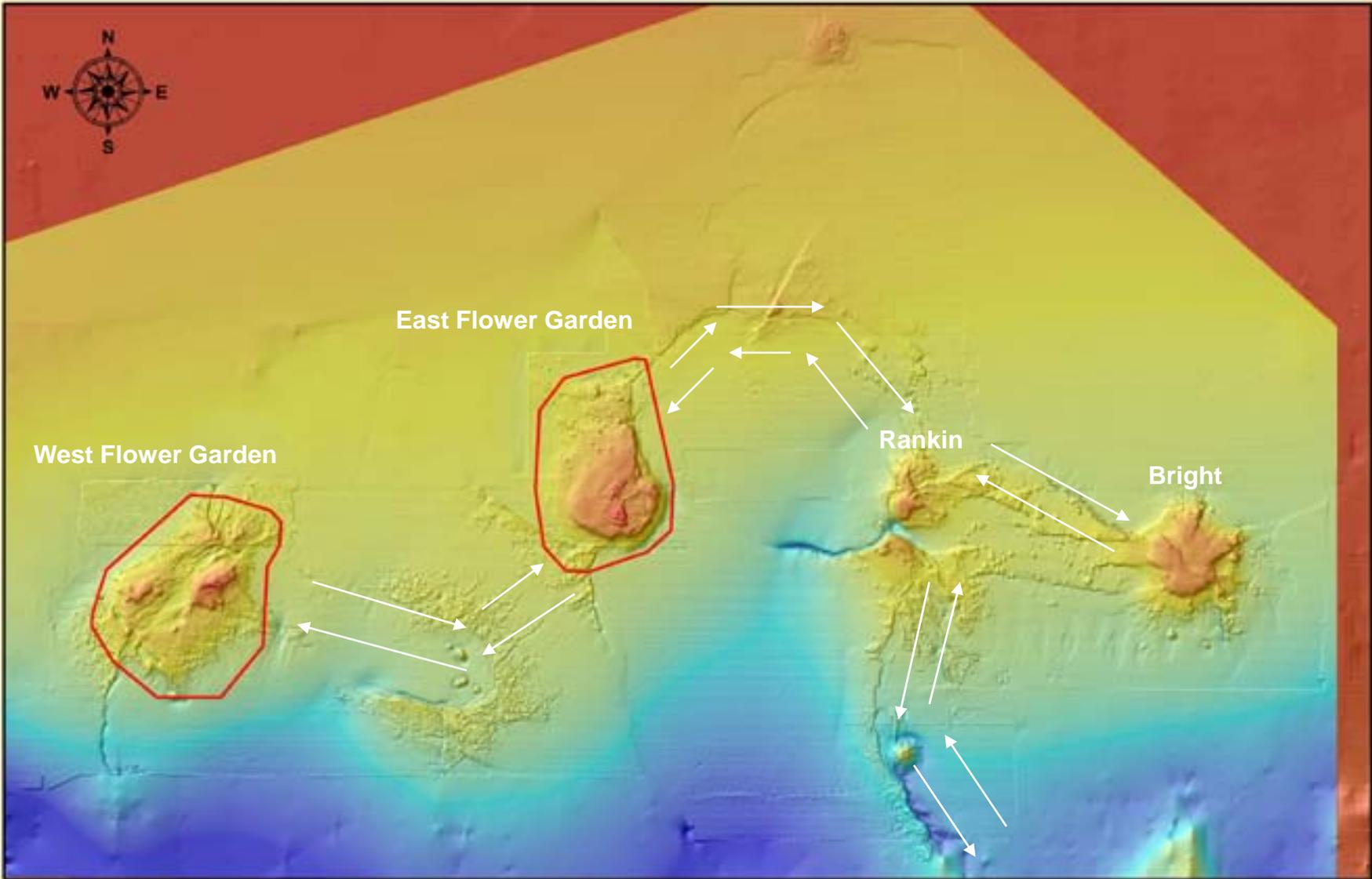
Flower Garden Banks National Marine Sanctuary - Context



- Perched atop salt domes
- Northernmost coral reefs in the continental United States
- Reef foundation formed by large, stony corals (e.g. brain and star corals)
- About 23 coral species
- Over 850 other reef invertebrate species
- ~250 fish species
- 125+ algae species

Flower Garden Banks National Marine Sanctuary - Priorities

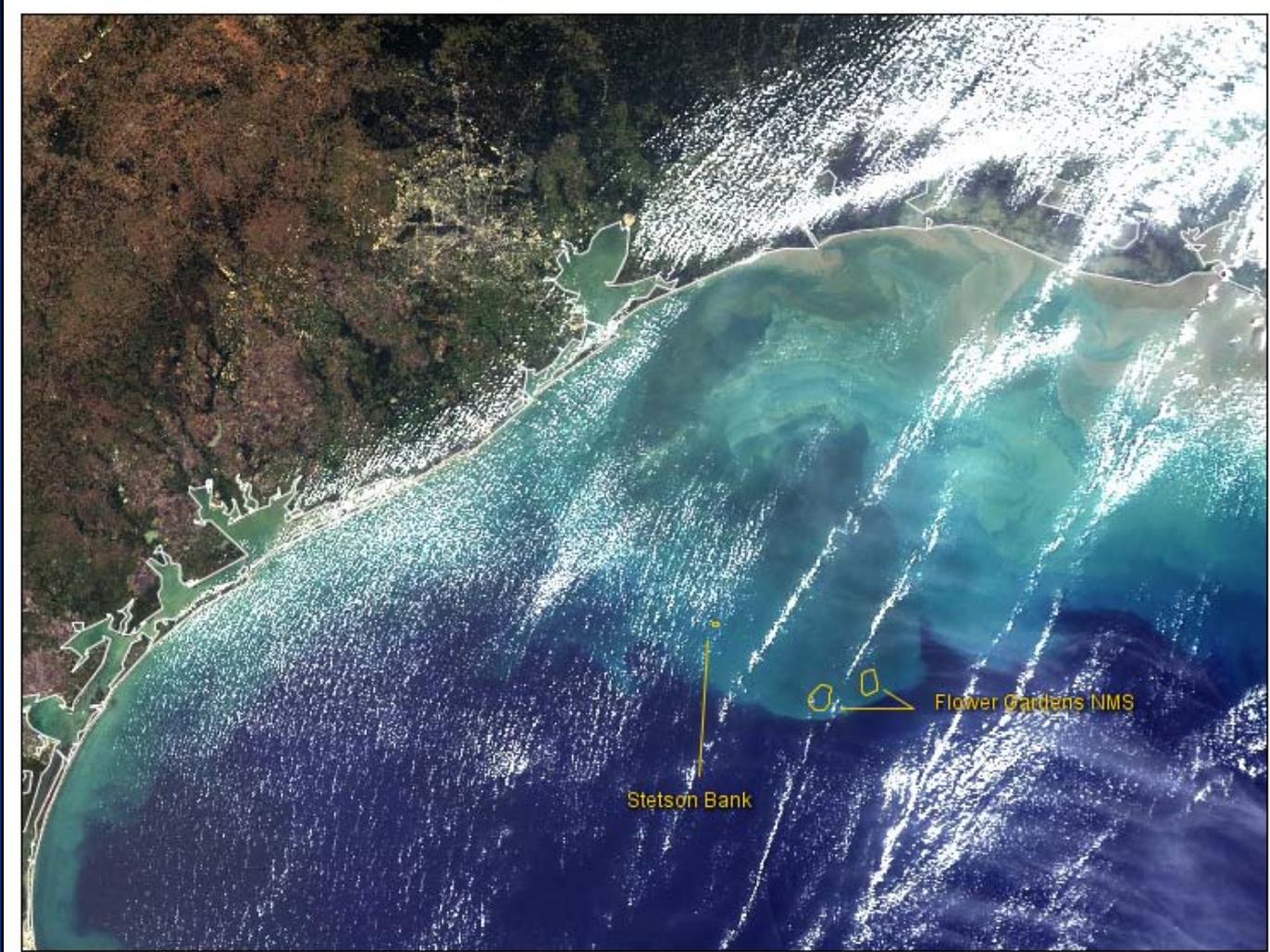
- Gaps in mapping/monitoring of deeper areas – to 100m
- Characterize string of banks with geological and likely biological connections
- Continued access to satellite data to understand green-water episodes, run-off from extreme storm events
- ROV/AUV access for deeper habitat characterization



Flower Garden Banks Region

Flower Garden Banks I&G Research Team
July 2005
Data Sources: USGS, NOAA
Contact: doug.weaver@noaa.gov





Data courtesy of:
NASA/GSFC MODIS
processed by NOAA
CoastWatch

Satellite:
TERRA
Sensor:
MODIS
Date:
2005/09/25 JD 268
Time:
17:25:00 UTC
11:25:00 -0600
Scene time:
DAY
Projection type:
MAPPED
Map projection:
0.0022 deg/pixel
GEOGRAPHIC
Latitude bounds:
26 N -> 32 N
Longitude bounds:
98 W -> 91 W



Hurricane Runoff 2005

Rita & Katrina Impacts

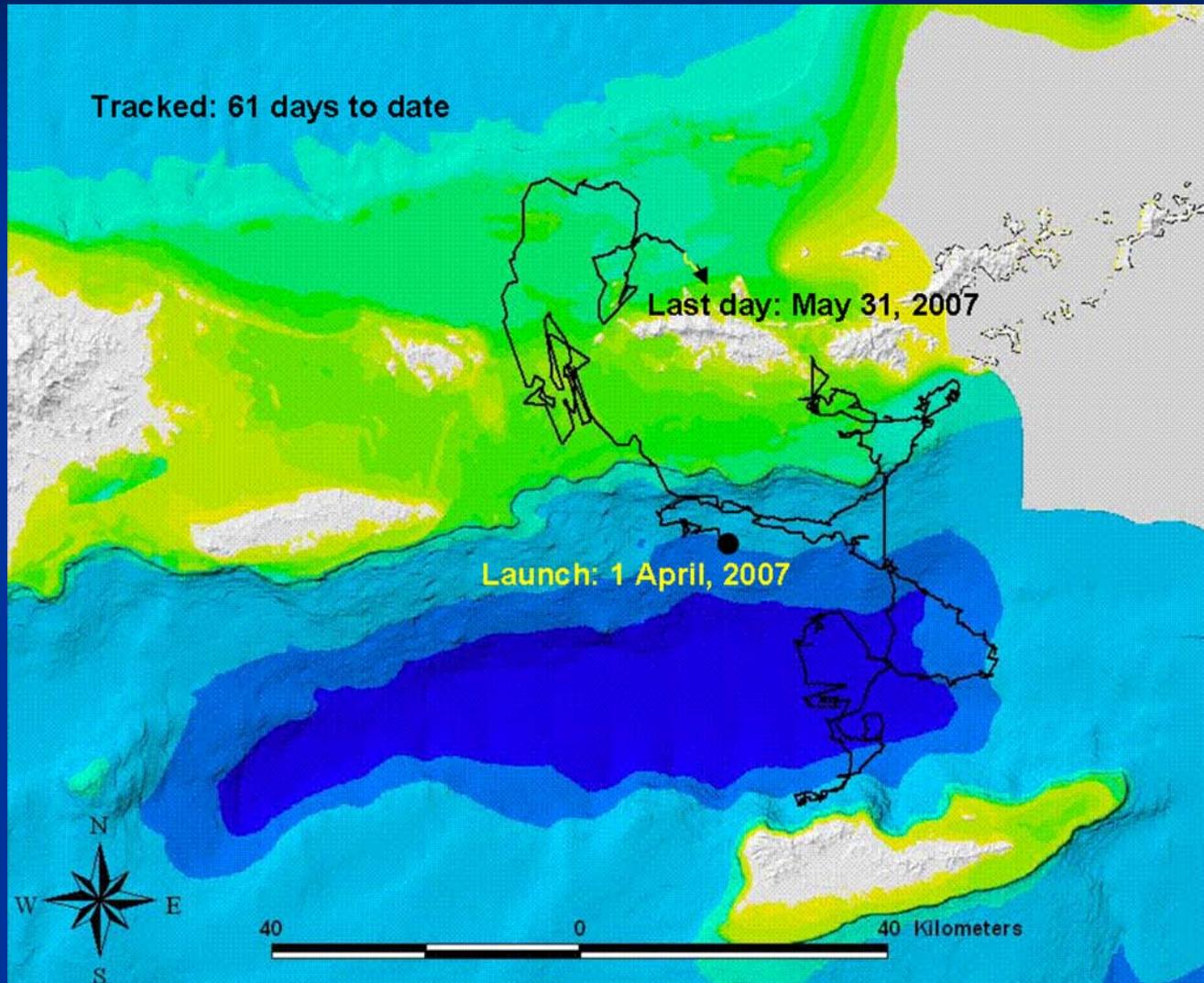
Navassa U.S. Fish and Wildlife Refuge

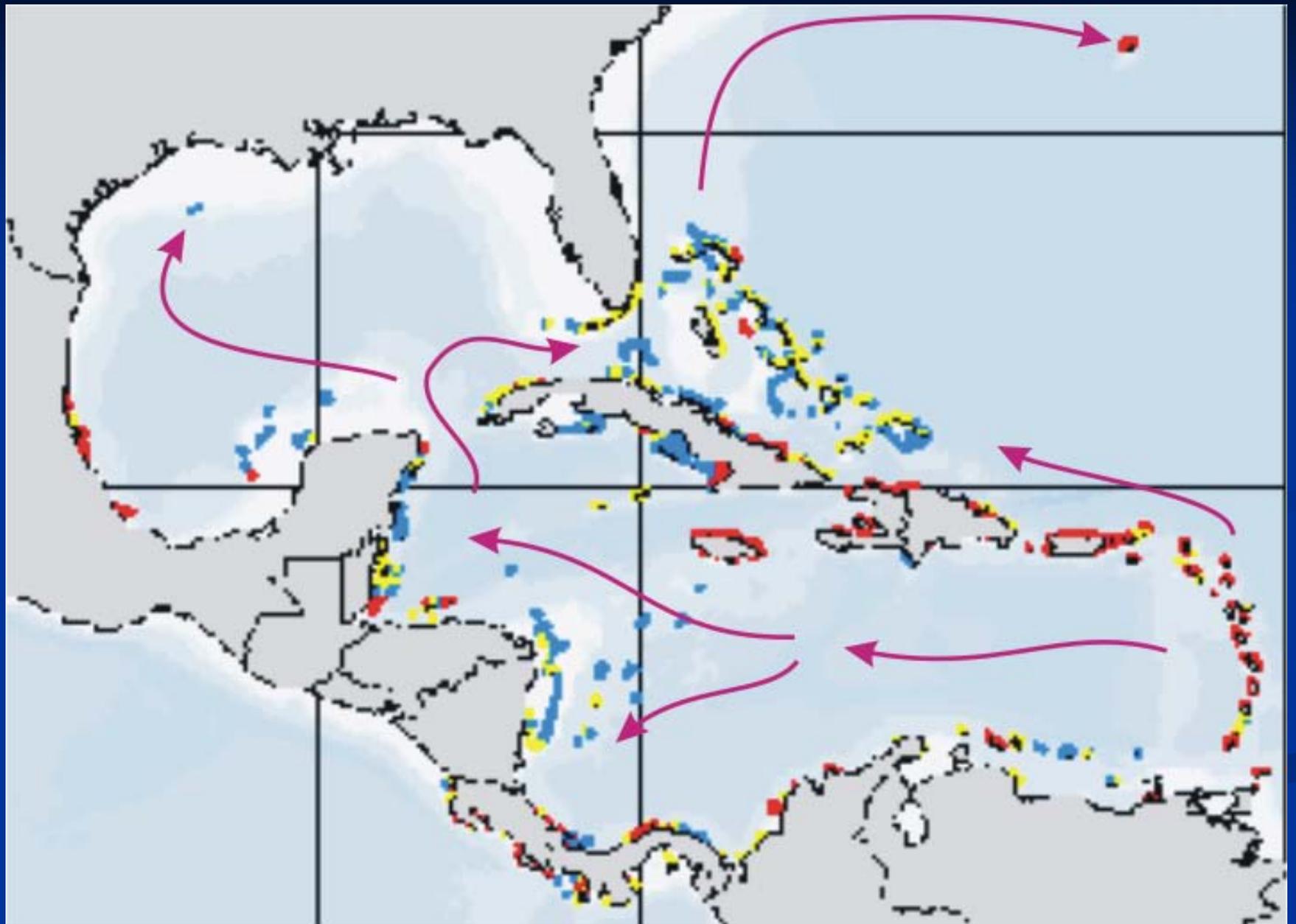
- Need fisheries catch and effort data – large subsistence fishery is primary anthropogenic impact
- Lack of physical oceanography
- Maintain biological monitoring in face of rapid change (change independent of local land-based development or pollutants)
 - Context for interpretation of data from USVI and PR

Acropora

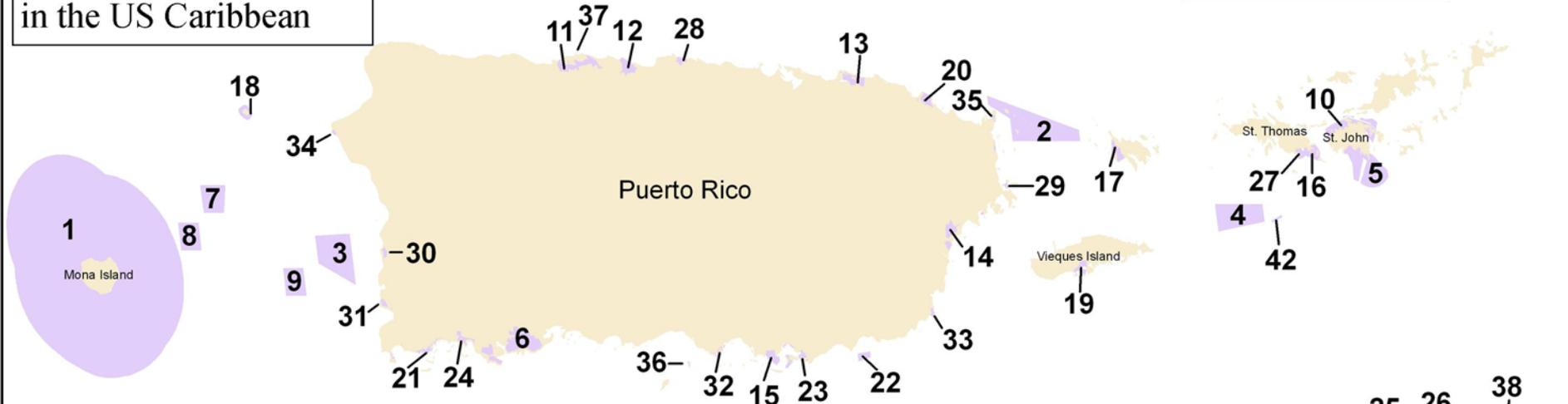
- Managing *Acropora* needs normal suite of environmental monitoring parameters and habitat mapping
- Integrate targeted *Acropora* monitoring into existing programs (e.g. fate-tracking of fragments at Florida CREMP sites)
- Expand demographic monitoring throughout U.S. Caribbean and international waters

Connectivity



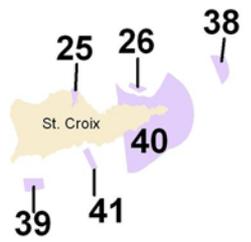


Marine Protected Areas in the US Caribbean



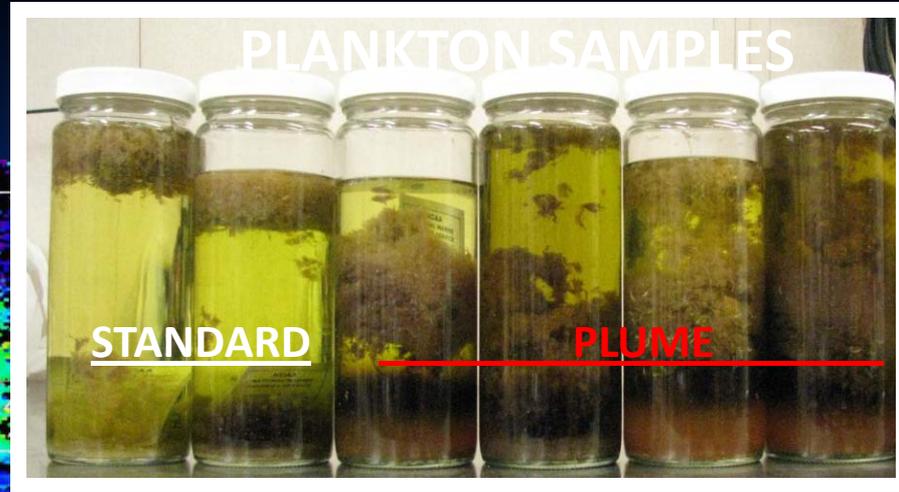
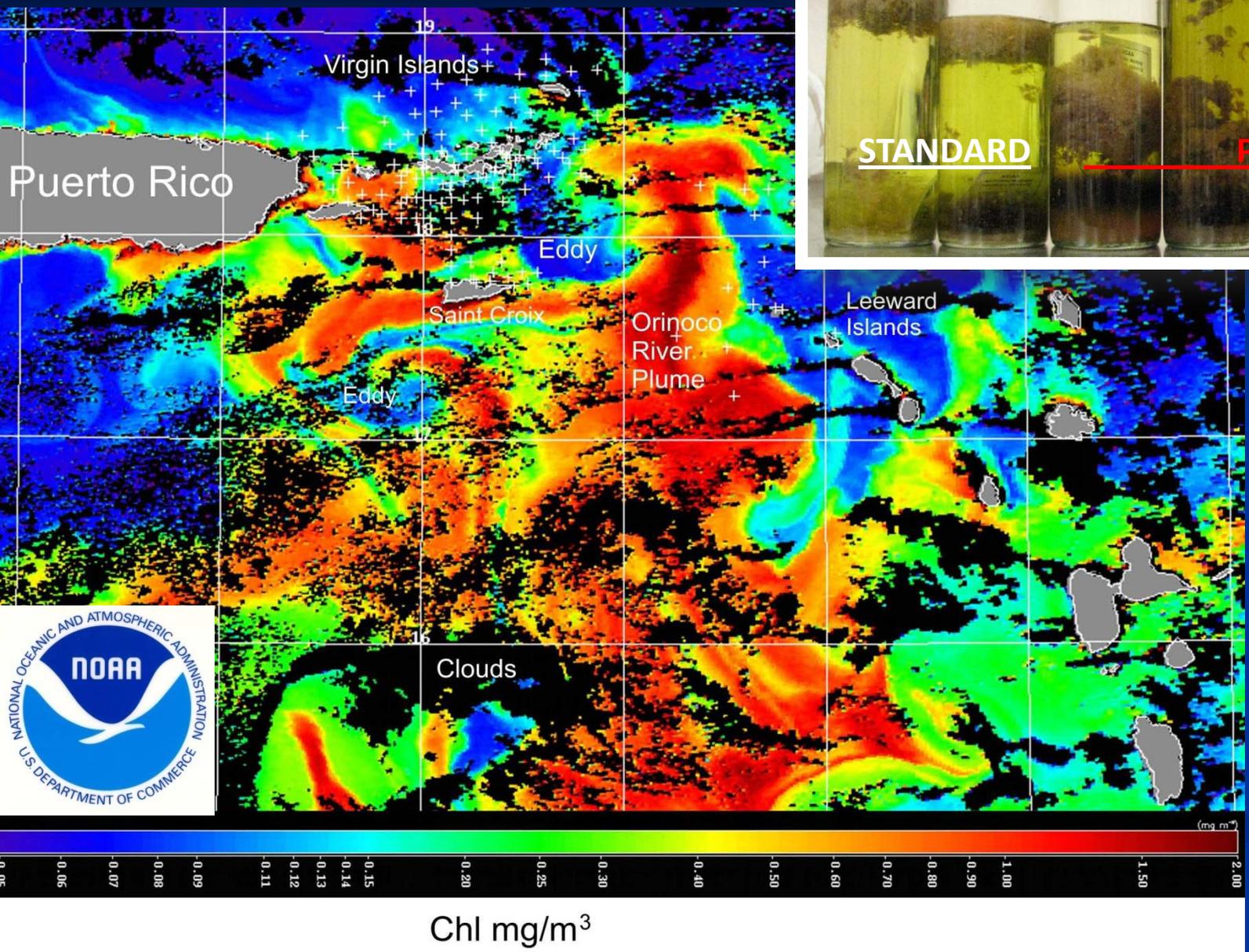
ID	Name	Area (km)
1	Isla de Mona Natural Reserve	1522.11
2	Arrecifes de la Cordillera Natural Reserve	99.99
3	Arrecifes de Tourmaline Natural Reserve	73.08
4	Hind Bank Marine Conservation District	55.47
5	Virgin Islands Coral Reef National Monument	51.76
6	Bosque Estatal de Guanica Natural Reserve	36.36
7	Red Hind SPAG West of Puerto Rico - Bajo de Cico	33.10
8	Red Hind SPAG West of Puerto Rico - Tourmaline Bank	29.76
9	Red Hind SPAG West of Puerto Rico - Abrir La Sierra Bank	29.45
10	Virgin Islands National Park	22.94
11	Cano Tiburones Natural Reserve	15.07
12	Hacienda La Esperanza Natural Reserve	9.13
13	Bosque Estatal de Pinones Natural Reserve	8.89
14	El Pantano, Bosque de Pterocarpus y Lagunas Mandry y Santa Teresa Natural Reserve	8.84
15	Jobos Bay National Estuarine Research Reserve	7.48
16	St. James Marine Reserve and Wildlife Sanctuary	7.06
17	Canal Luis Pena Natural Reserve	6.36
18	Isla de Desecho Marine Reserve	6.13
19	Bahias Bioluminiscentes de Vieques Natural Reserve	5.75
20	Rio Espiritu Santo Natural Reserve	5.16

ID	Name	Area (km)
21	Bosque Natural de Boqueron Natural Reserve	5.02
22	Arrecifes de Guayama Natural Reserve	4.44
23	Bosque Estatal de Aguirre	4.36
24	La Parguera Natural Reserve	4.12
25	Salt River Bay National Historic Park and Ecological Preserve	3.86
26	Buck Island Reef National Monument	3.57
27	Cas Cay-Mangrove Lagoon Marine Reserve & Wildlife Sanctuary	2.97
28	Pantano Cibuco Natural Reserve	2.73
29	Bosque Estatal de Ceiba Natural Reserve	2.05
30	Laguna Joyuda Natural Reserve	1.79
31	Punta Guaniquilla Natural Reserve	1.67
32	Punta Petrona Natural Reserve	1.51
33	Punta Yeguas Natural Reserve	1.25
34	Tres Palmas de Rincon Marine Reserve	0.83
35	Cabezas de San Juan Natural Reserve	0.83
36	Caja de Muertos Natural Reserve	0.41
37	Cueva del Indio Natural Reserve	0.06
38	Red Hind Spawning Aggregation Area East of St. Croix	11.70
39	Mutton Snapper Spawning Aggregation Area	8.72
40	St. Croix East End Marine Park	149.5
41	USCG Security Zone: Hovensa Refinery, St. Croix (estimated)	5.10
42	Grammanik Bank closed area (estimated)	1.46



Total Protected Area: 2251.85 km

Satellite imagery from MODIS Aqua Chlorophyll-a, April 14, 2009



Effects of Climate Change

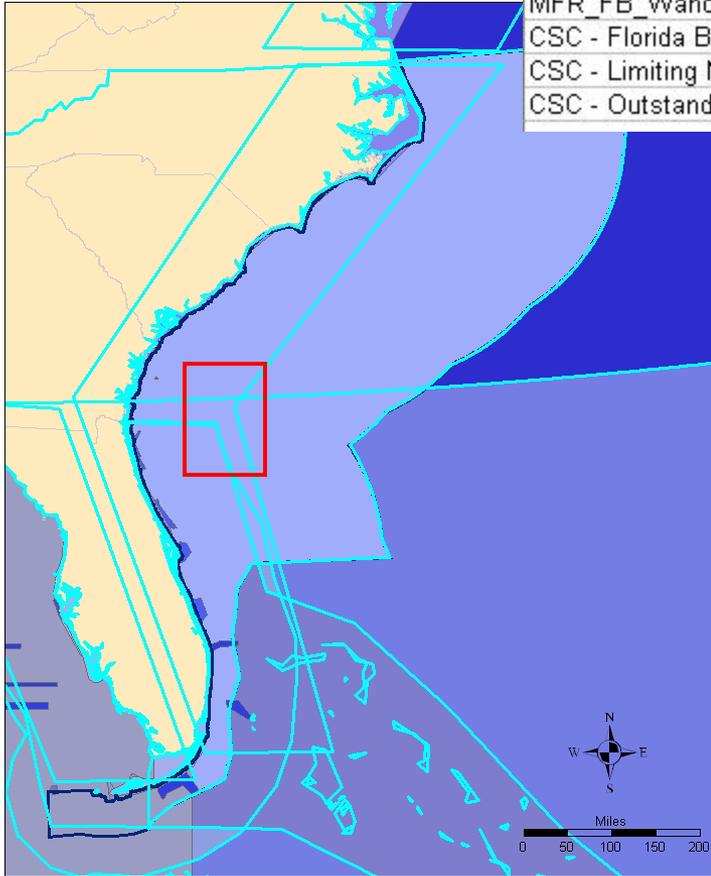
- Monitor basin-wide bleaching events, links to coral disease
- Characterize ocean acidification, including locations of freshwater inputs (potential OA hotspots)
- Monitor impacts on associated habitats (seagrass, mangrove, etc.)
- Monitor population movements – shifts to deeper areas, different latitudes.
- Assess changes to fish and macro-invertebrate populations when coral cover declines

Comparability Across Region

- Decide on a few universal monitoring metrics
 - Key parameters
 - GPS locations of CRCP projects (see SAFMC EcoResearch database)
 - Metadata for how specific parameters are defined
 - Consistency in habitat classifications
- Expand proven monitoring methods across region
- Promote use of common nomenclature (e.g. MPAs)

NAME	RECORD_ID
CSC - Florida Manatee Sanctuary Act	78728182252765184
USF - SeaWiFS Sea Surface Temperature	78743990331179008
NOAA - Estuarine Living Marine Resources (ELMR)	78728131240198144
AOML - ENVIDS Atlantic Tropical Storm Tracking by Year and Storm	78728130748350464
NRL - Intra-Americas Sea Ocean Nowcast/Forecast System	78743996577284096
WR_MTR_sea turtle Florida statewide nesting beach survey 1979- present	77322836872986624
WR_MTR Florida Sea Turtle Stranding and Salvage Network (1986-2004)	77725981517807616
WR_MTR_sea turtle_Florida sea turtle stranding and salvage network	77322836640137216
MFR_FB_Wahoo_Life History	77322672112402432
CSC - Florida Boating Restricted Areas	78728182032236544
CSC - Limiting Marine Net Fishing in Florida	78728182143778816
CSC - Outstanding Florida Waters	78728182350807040

EcoResearch Footprints

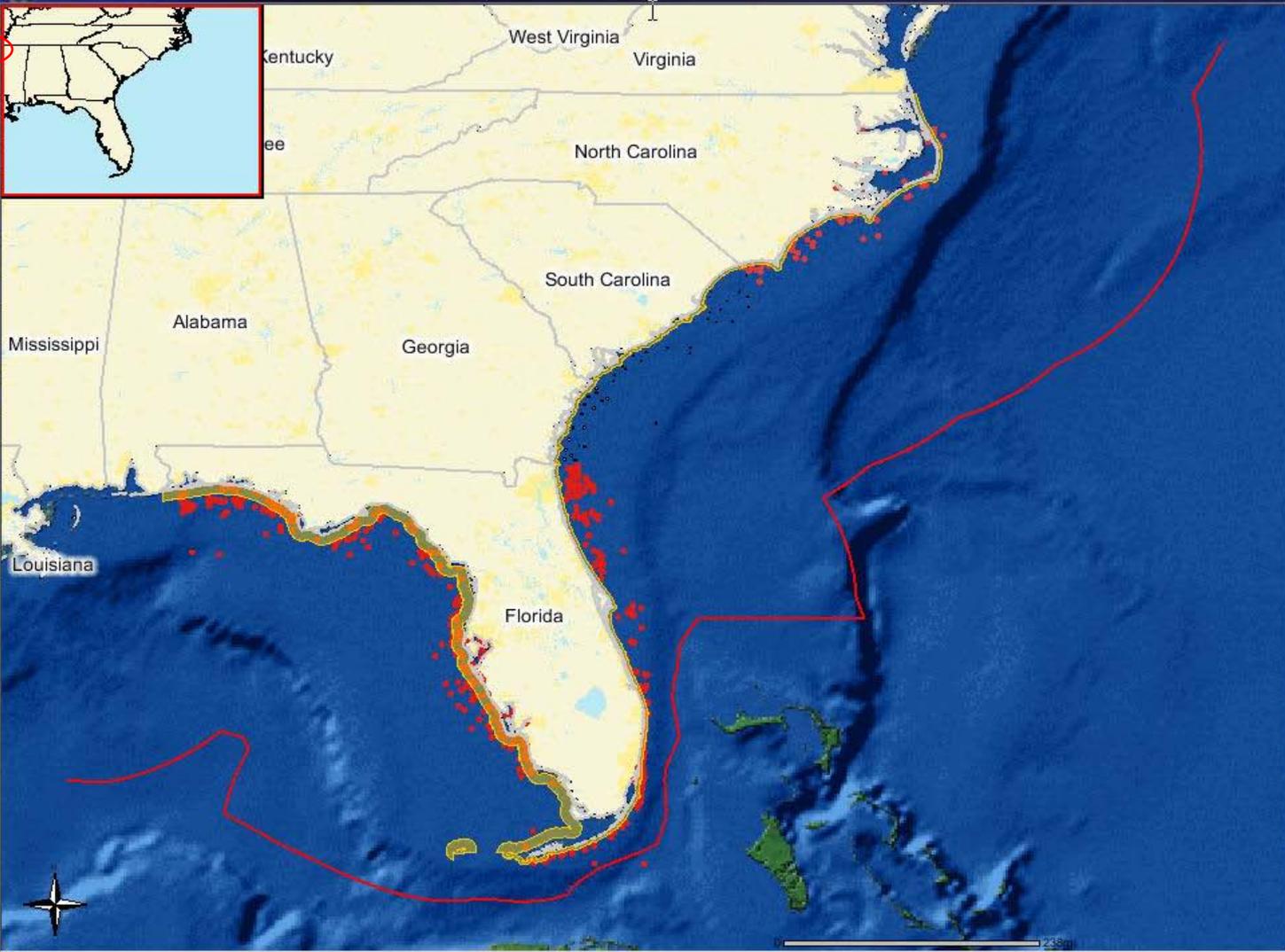


Record Title: Florida Sea Turtle Stranding and Salvage Network, Stranding Locations, 1986-2004	Full Metadata
Originator: Florida Fish and Wildlife Conservation Commission-Fish and Wildlife Research Institute-Marine Turtle Program	Browse Graphic
<p>Abstract: Coordinated by the Florida Fish and Wildlife Conservation Commission - Fish and Wildlife Research Institute (FWRI), the Florida Sea Turtle Stranding and Salvage Network (STSSN) is responsible for gathering standardized data on stranded marine turtles throughout the state. The Florida STSSN functions as a part of an eighteen state network led by NOAA's National Marine Fisheries Service (NMFS). In Florida, strandings are documented by FWRI staff biologists and by a network of permitted participants located around the state. Live strandings are rescued and transported to properly permitted rehabilitation facilities. Data from strandings are collected on a standardized reporting form and include date, species, location, carapace length and width, carcass condition, carcass disposition, and information on anomalies (e.g., entanglement, propeller damage, fibropapillomas). Additionally, certain carcasses are regularly collected by FWRI staff for gross or detailed necropsy. Each week, FWRI reports Florida strandings to NMFS as a part of a management plan that is intended to reduce the incidental take of turtles in the shrimp fishery. FWRI also generates monthly and yearly stranding summary reports to monitor mortality and to detect and describe any unusual stranding events. Stranding data collected through the Florida STSSN have been used extensively in the identification of mortality factors and in the development of recovery actions (e.g., Turtle Excluder Device (TED) requirements, gill net regulations).</p>	
<p>Purpose: The purpose is to monitor marine turtle mortality and identify mortality factors in Florida by documenting stranded marine turtles.</p>	
Start Date: 1986	End Date: 2004
Status - Progress: Complete	Status - Update: As needed
Contact:	Contact Organization:
Contact E-mail:	Data

Data Access

- Support common platform for data access, warehousing and storage
- Existing efforts – e.g. SAFMC
- Bridge gaps between science and management – e.g. what mapping has been done in Florida Middle Grounds, in areas of proposed South Atlantic hardbottom EFH
- Translation of science into both English and Spanish

- Legend
- Zoom In
- Zoom Out
- Zoom Full Extent
- Zoom Active Layer
- Zoom Last Extent
- Pan
- Hotlink
- Identify
- Query
- Find
- Buffer
- Select By Rectangle
- Select By Line/Polygon
- Clear Selection
- Print
- Download



Legend Refresh Map Layers GIS Data Help

LAYERS

- All Layers
- Base Map Layers
- Ocean Observing Systems
- Other Federally Managed A
- Management and Regulator
- SAFMC Gear Restrictions
- Marine Sanctuaries
- Species Occurrence
- Spawning Locations
- Unique Habitats
- Coral HAPCs
- SEAMAP Bottom Mapping
- General Habitats
 - Fish Nursery Areas (North
 - Significant Waters (North
 - Artificial Reefs (Georgia a
 - Artificial Reefs (North Car
 - Artificial Reefs (Florida)
 - ESI Shoreline (Florida)
 - Seagrass (Florida)
 - Mangroves (Florida)
 - Saltmarsh (Florida)
 - Tidal Flats (Florida)
 - Bed Types (South Carolin
 - Bottom Habitat Points (G
 - Base Geology
 - Coral Mounds
 - Benthic Inventory
 - South Florida Benthic Co
- Estuaries
- Imagery
- 3D Bathymetry Image

Refresh Map

Auto Refresh

Legend Help

OGC Backgrounds

Visible

- MODIS RGB Composite(USF)
- Optimal Interpolation SST (USF)
- Optimal Interpolation SST

Zoom In

Artificial Reefs