



Florida's Coral Reefs: Their Importance and the Threats to Them

*Southeast Florida's Coral Reef
Innovative-Maritime Industries
And Coastal Construction Impacts Group*

International Game Fish Association

May 24-25, 2006

Dania Beach, Florida

*Billy D. Causey, Acting Regional Superintendent
Southeast Atlantic, Gulf of Mexico and
Caribbean Region*



NOAA's National Marine Sanctuary Program: 13 MPAs + NWHI



National Marine Sanctuaries - America's Ocean Treasures

Key Largo National Marine Sanctuary
353 square kilometers - Designated in 1975



Looe Key National Marine Sanctuary
18 square kilometers - Designated in 1981



STATUS OF OCEAN

HEALTH

Habitat Destruction



Coral Diseases



Pollution



Coral Bleaching



Overfishing



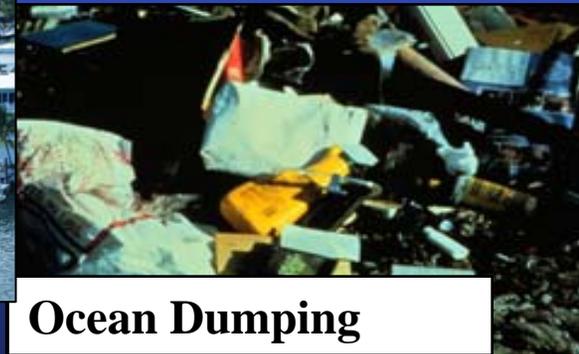
Massive Algal Blooms



Intense Coastal Development



Ocean Dumping



Introduction of Marine Exotics

Global Climate Change

SHIP GROUNDINGS

Keys had 3 major ship groundings in 17 Days
Oct-Nov 1989



M/V Alec Owen Maitland



M/V Mavro Vetranic

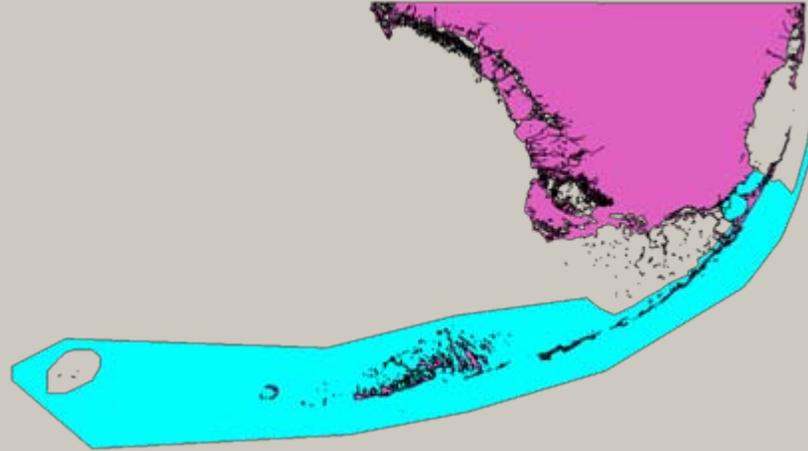


M/V Elpis



Florida Keys National Marine Sanctuary and Protection Act - 1990

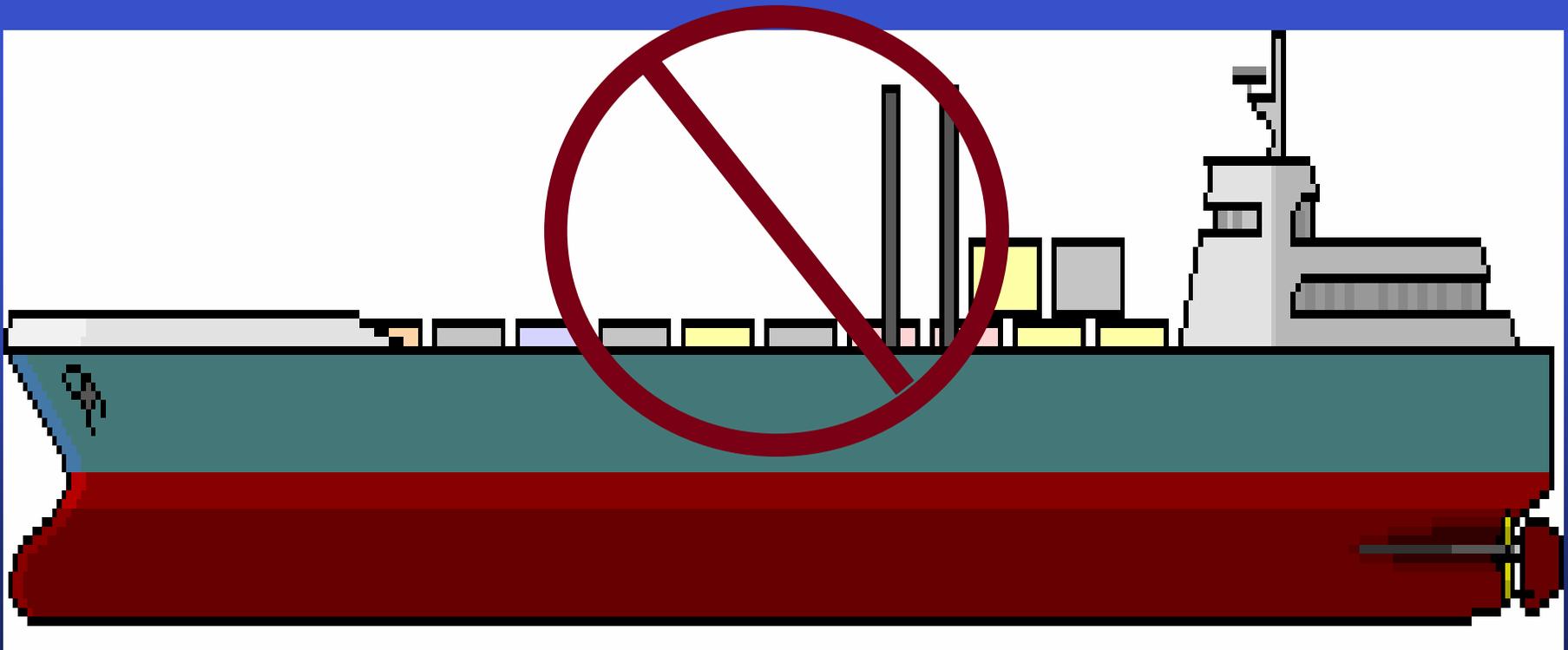
(Passed By United States Congress)



- **2800 nm² / now 2900 nm²**
- **Jurisdiction to mean high tide**
- **Surrounds Florida Keys**
- **Co-trustee Management with State of Florida**
- **60% State Waters**
- **40% Federal Waters**
- **1600 Keys / 1800 miles of shoreline**

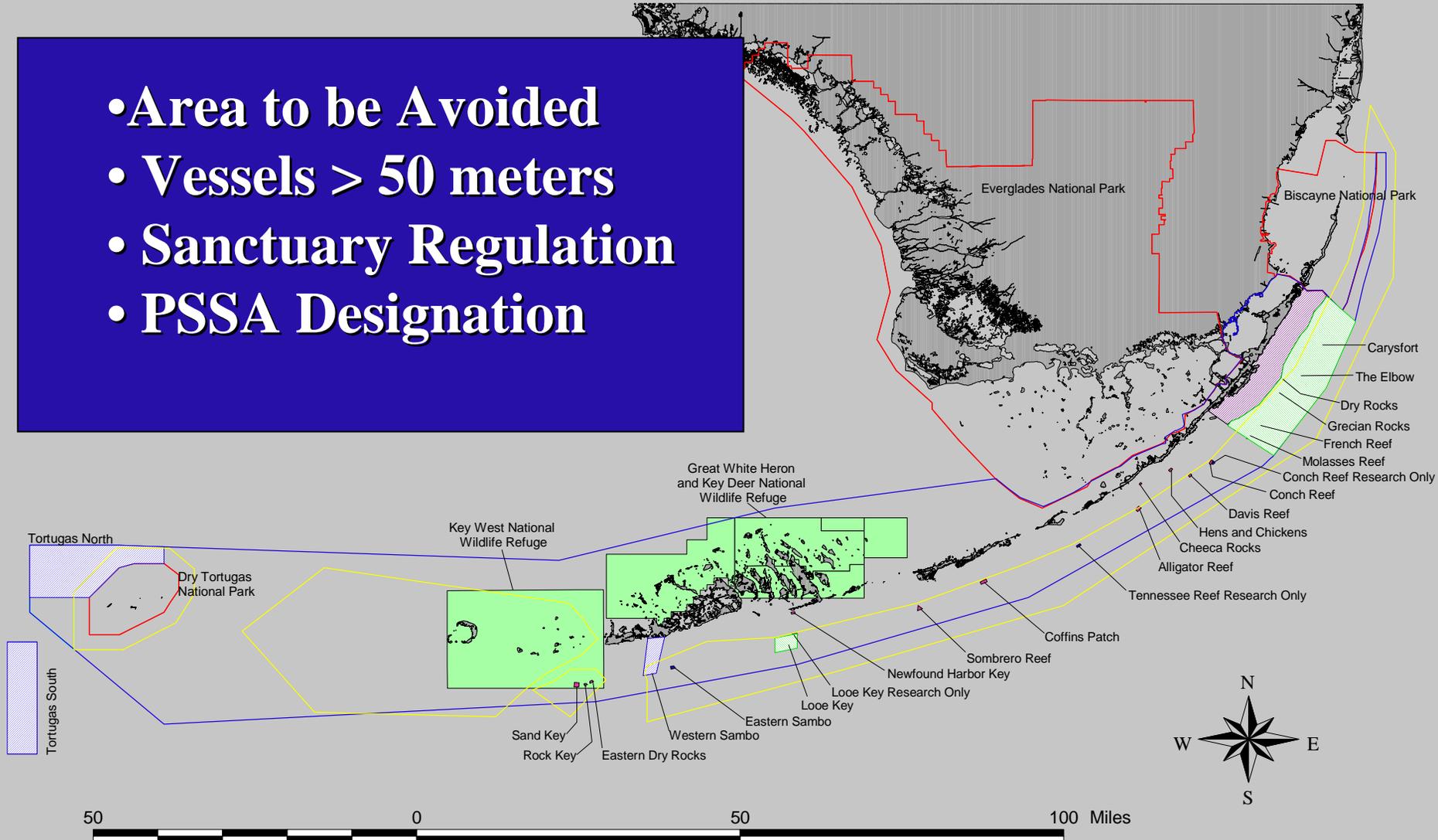


The FKNMS and Protection Act of 1990 prohibited ships greater than 50 meters (164 feet) from entering an “Area To Be Avoided” within Sanctuary boundaries

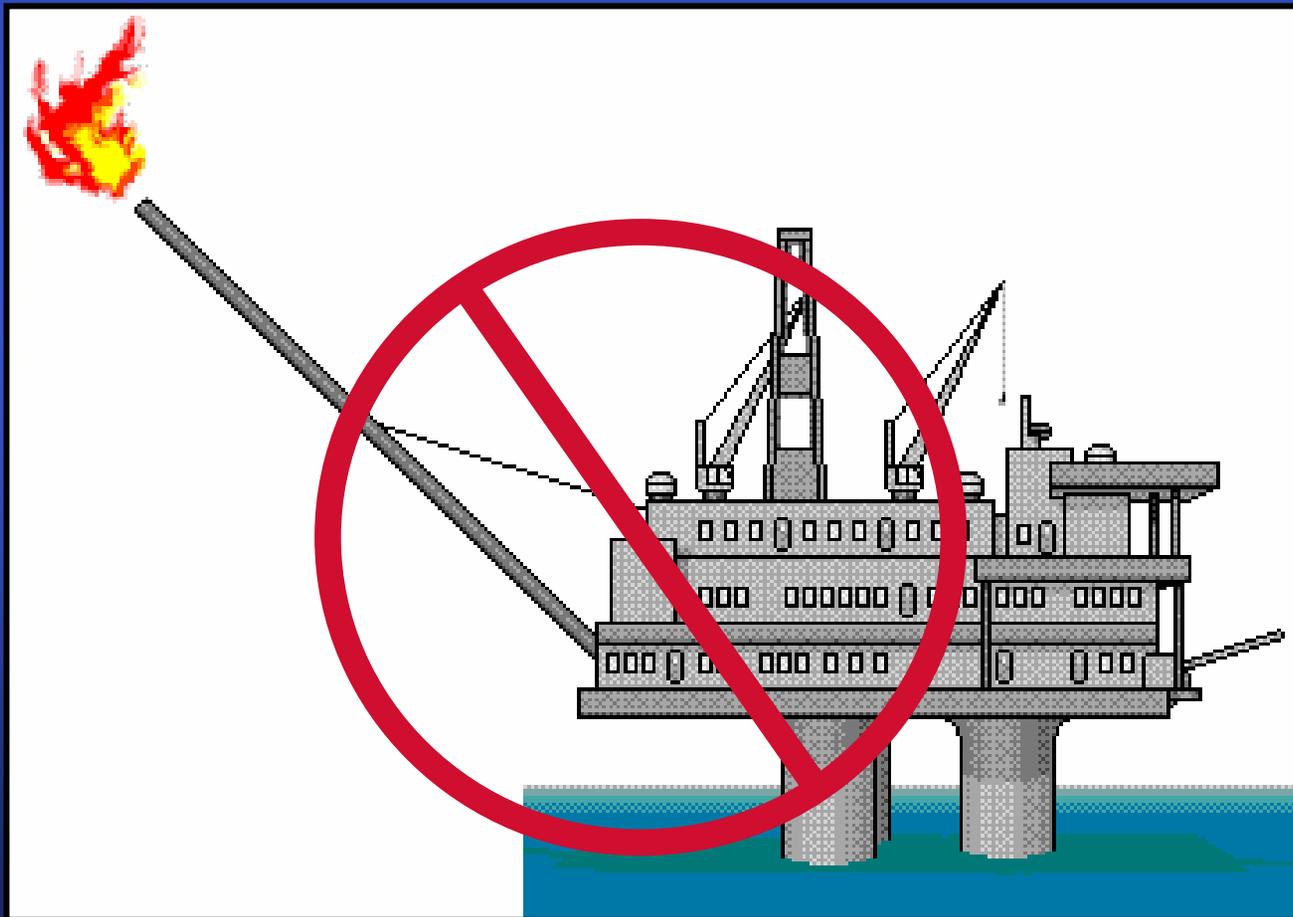


International Maritime Organization Designated ATBA

- Area to be Avoided
- Vessels > 50 meters
- Sanctuary Regulation
- PSSA Designation



The FKNMS and Protection Act of 1990 placed a permanent ban on gas, oil, and hard mineral mining within the Sanctuary.



Florida Keys National Marine Sanctuary and Protection Act - 1990

US EPA - Authorized to Develop a Water Quality Protection Program (EPA, State, County, & NOAA)

- **Authorized a high level Water Quality Steering Committee**
 - Chaired by Regional Director of EPA
 - Co-Chaired by the State - FDEP
- **Identify Problems and Take Corrective Actions**
- **Establish WQ, Coral and Seagrass Monitoring Programs**





Sanctuary Management Programs



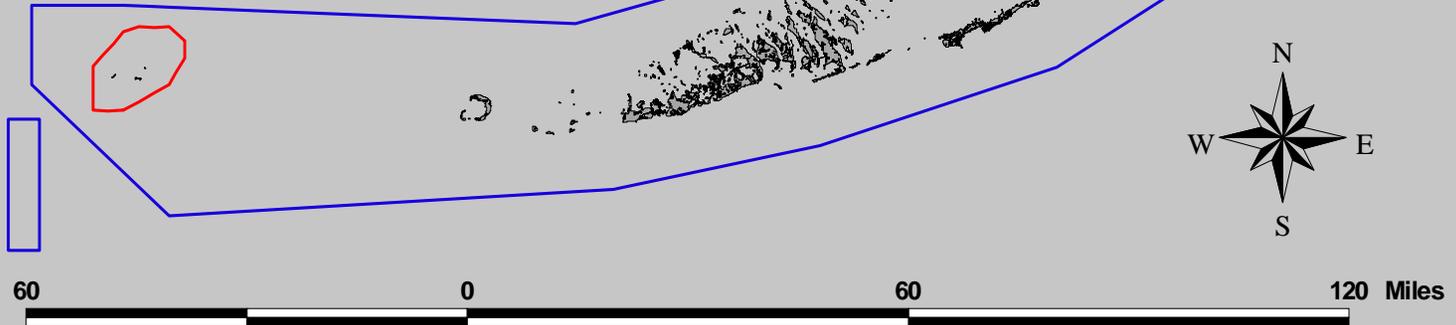
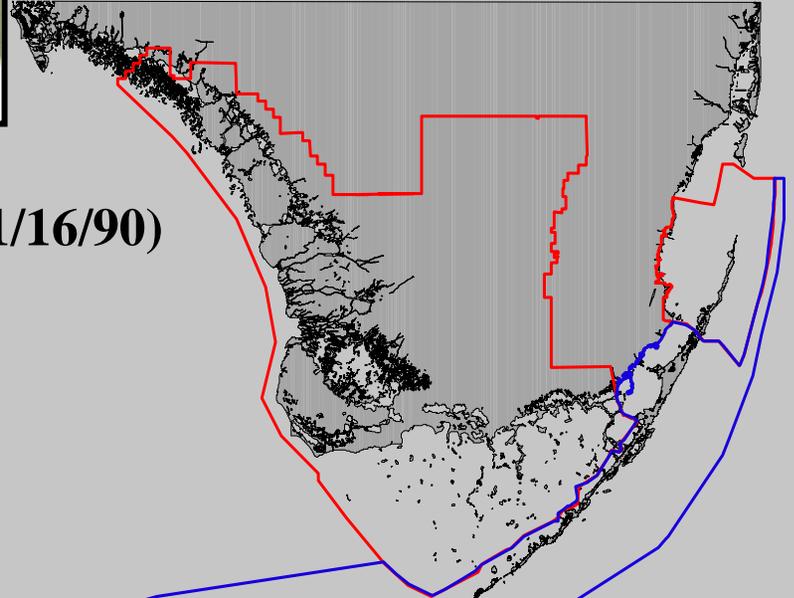
- **Research and Monitoring**
- **Education and Outreach**
- **Volunteers**
- **Enforcement**
- **Threat Reduction Measures**
- **Maritime Heritage Program**
- **Marine Zoning**



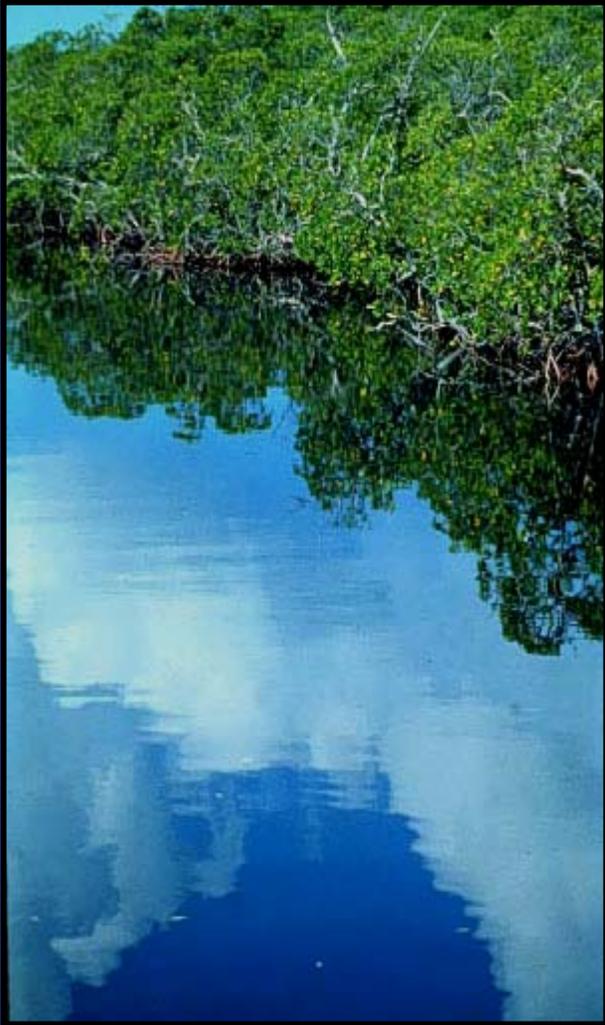
Florida Keys National Marine Sanctuary



- Designated by Congress (11/16/90)
- 9800 k² / 2900 nm²
- Surrounds the community



Coral Reef Ecosystem



Includes the Full Seascape

Full-Range of Habitats



And All of the Marinelife



**> 80,000
Residents in
Monroe
County**



(130,000 During Season)

124 miles of dredged Canals



**>3 Million
Visitors Annually**

(13.3 Million Visitor Days)



Some Challenges We Face

- No single point of entry
- Large numbers of users



Tourism Based Economy

\$1.2 Billion US Annually



> 60 Dive Shops



> 65 Boat & PWC Rental Operations



> 35 Bait & Tackle Stores

Snorkeling and SCUBA Diving # 1

User Activity



Recreational Fishing



Second most
popular tourist
activity

Commercial Fishing

Second Largest Industry

(\$70 Million US Landed Annually)





Threats to America's Coral Reefs



- **Local Threats**
- **Regional Threats**
- **Global Threats**



Local Threats



Dredging and Filling Of Wetlands

Nearshore Water Quality Degradation



Stormwater Runoff

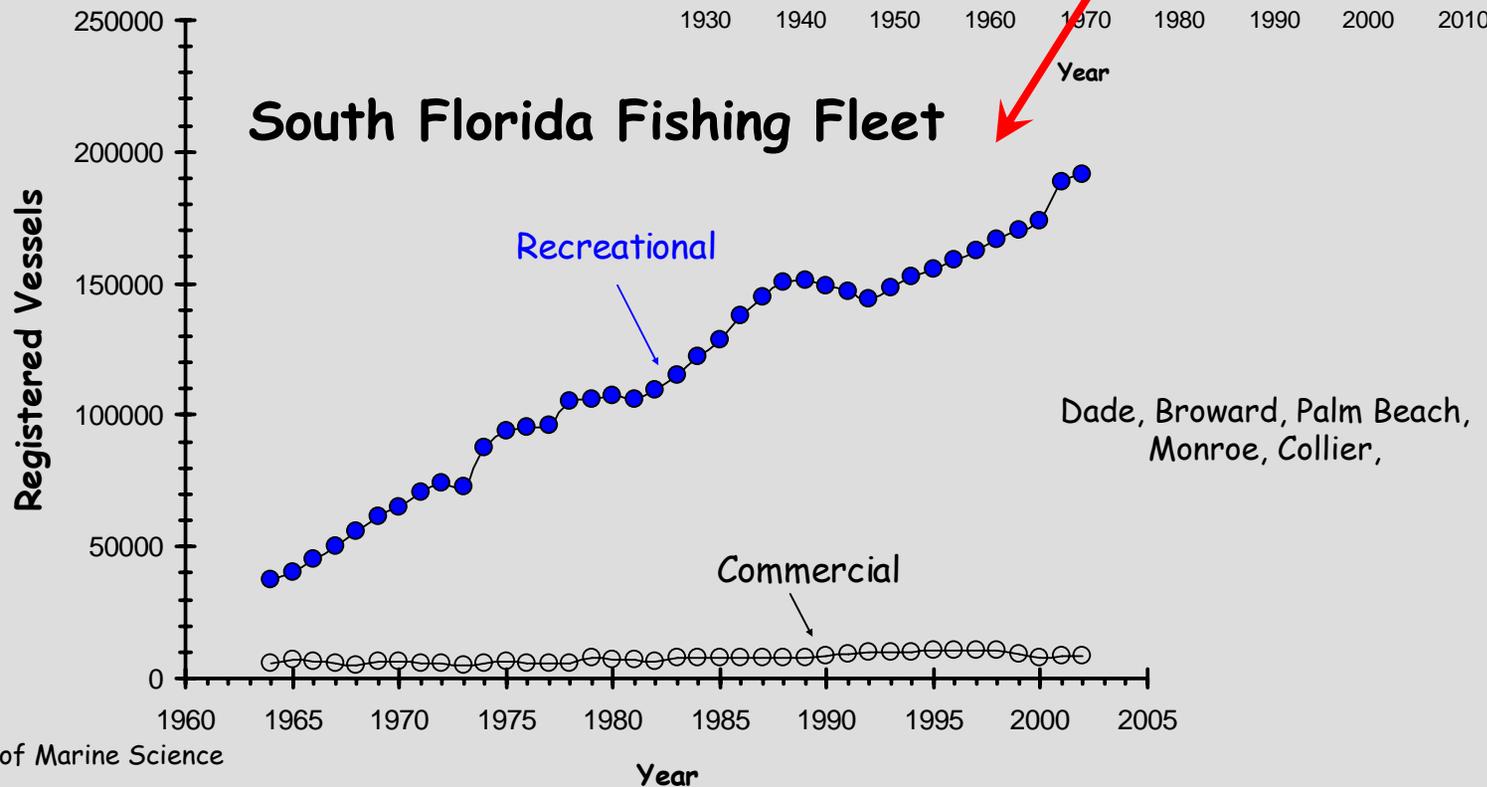
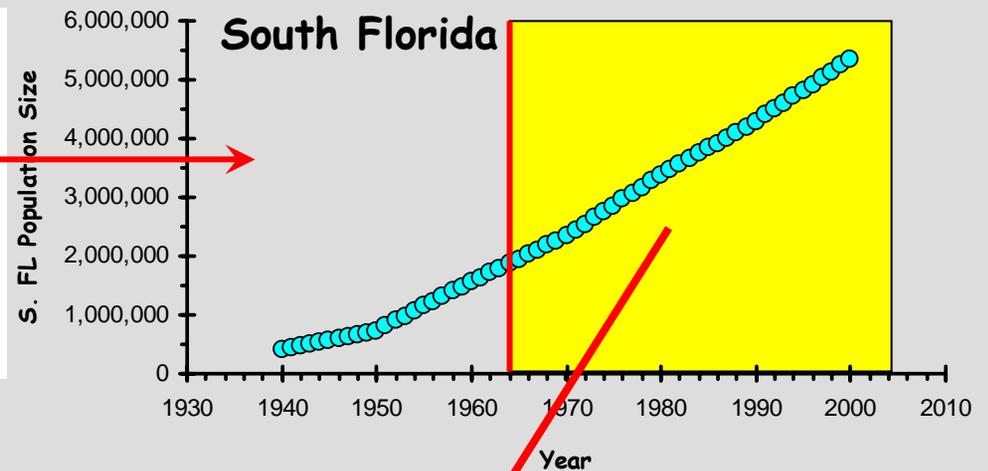
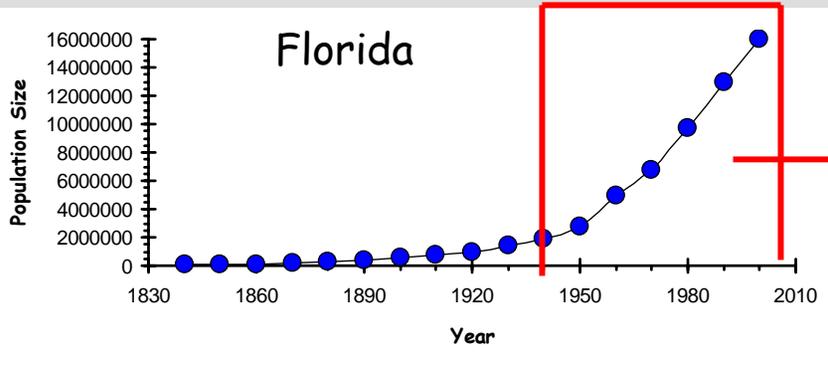
Second Largest Source of Nutrients



Physical Impacts to the Resources

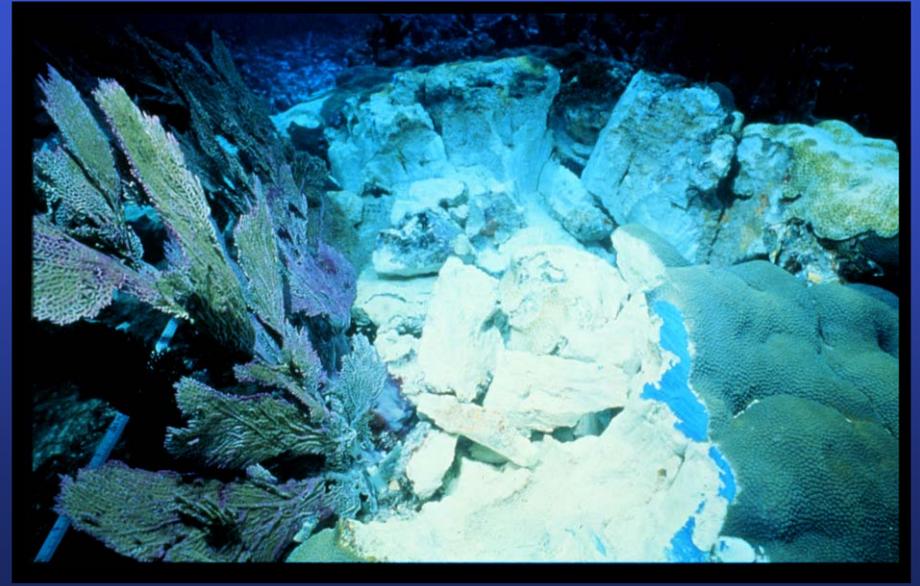
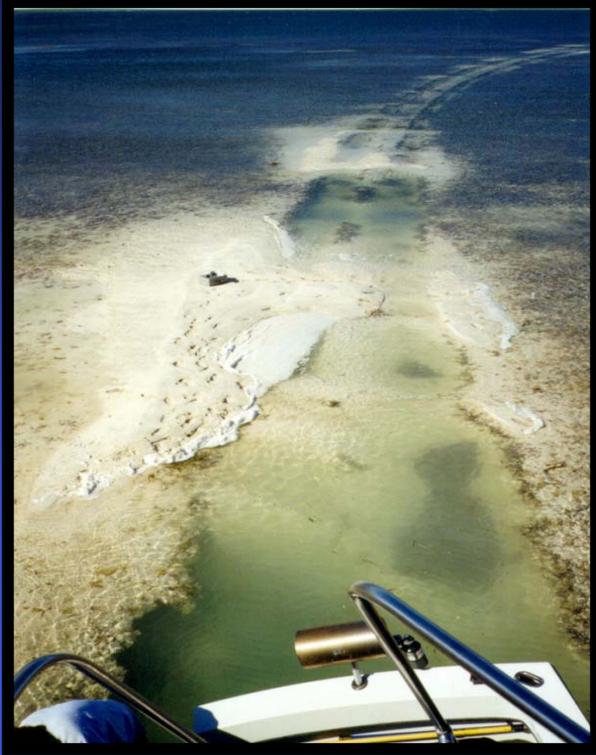


Florida's Human Population Growth Dynamics



Over 600 Boat Groundings Each Year

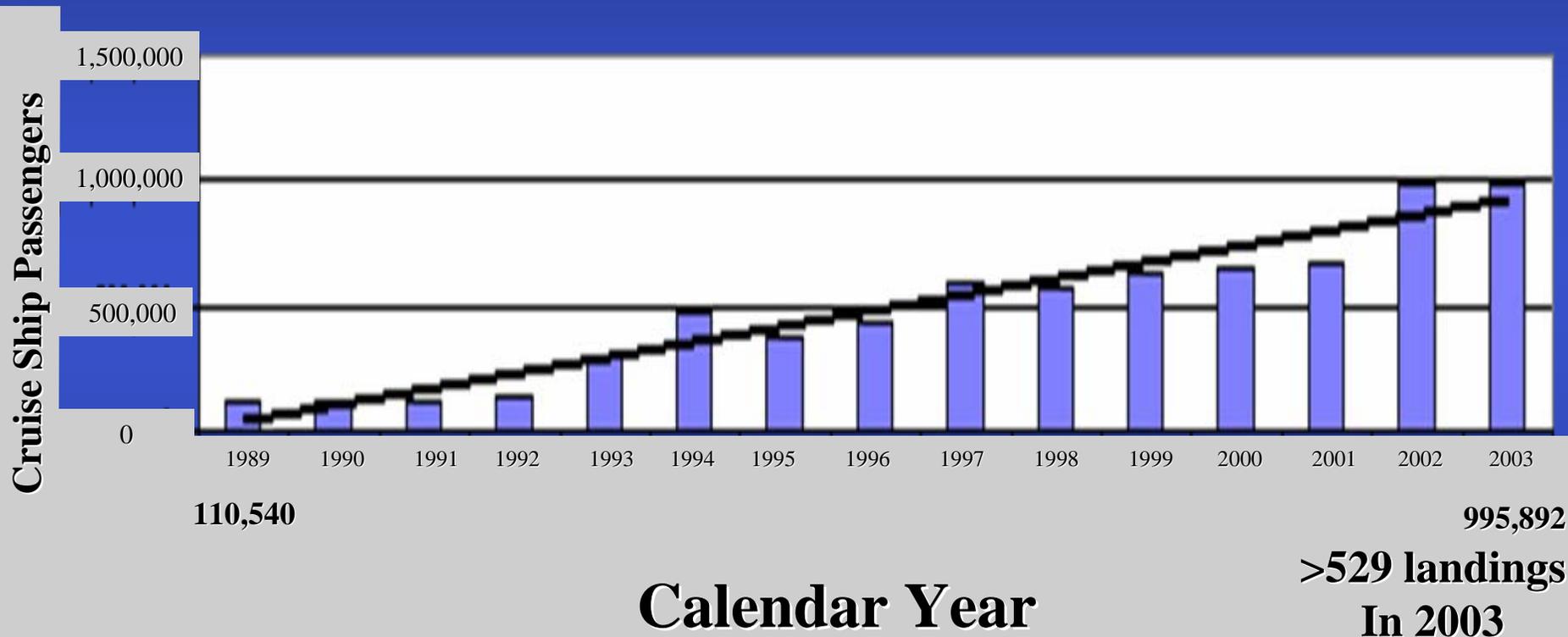




Cruise Ship landings have **increased dramatically** over the past **17 Years** in the Port of Key West with as many as **5 cruise ship landings per day**



City of Key West Cruise Ship Visitors Port Operations Data



Ship Passengers — Linear (Ship Passengers)

Increased cruise ship landings have been met with mixed reactions in Key West

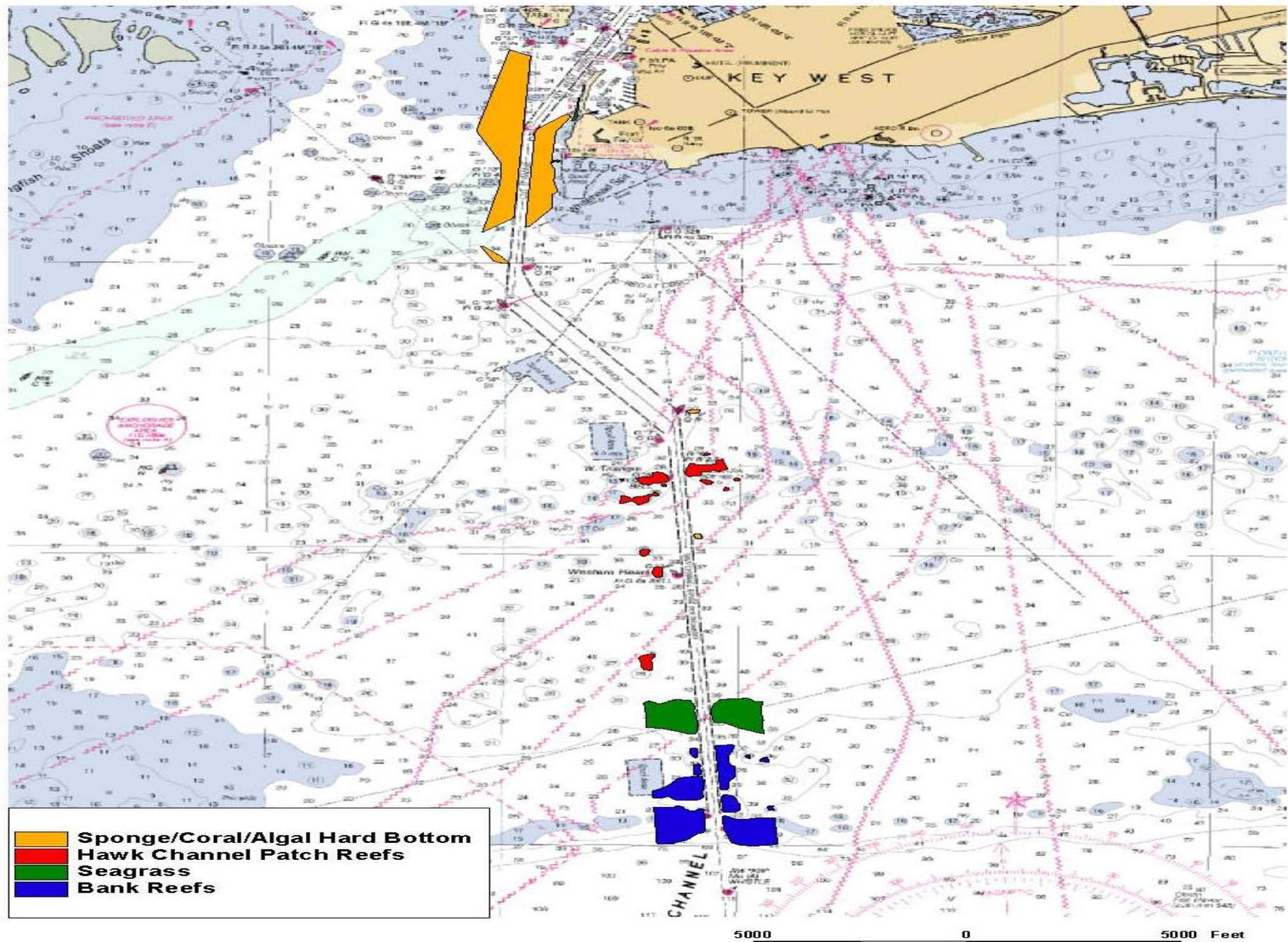


Sherwood Forest









Nearest edge of benthic resources relative to Truman Harbor, turning basin, and ship channel

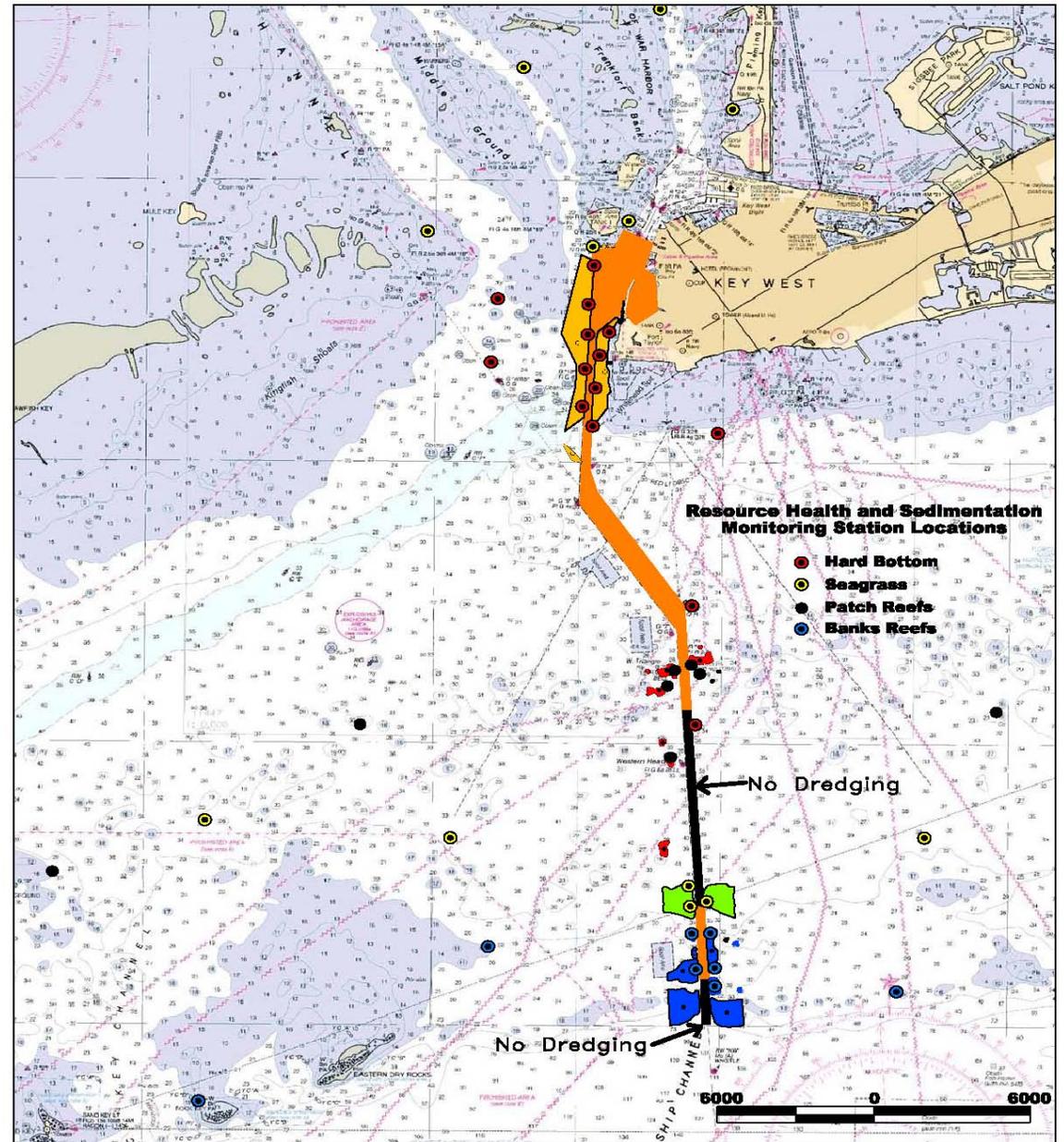


EAGLE 1



MARICAVOR

Resource Health & Sedimentation Monitoring Stations





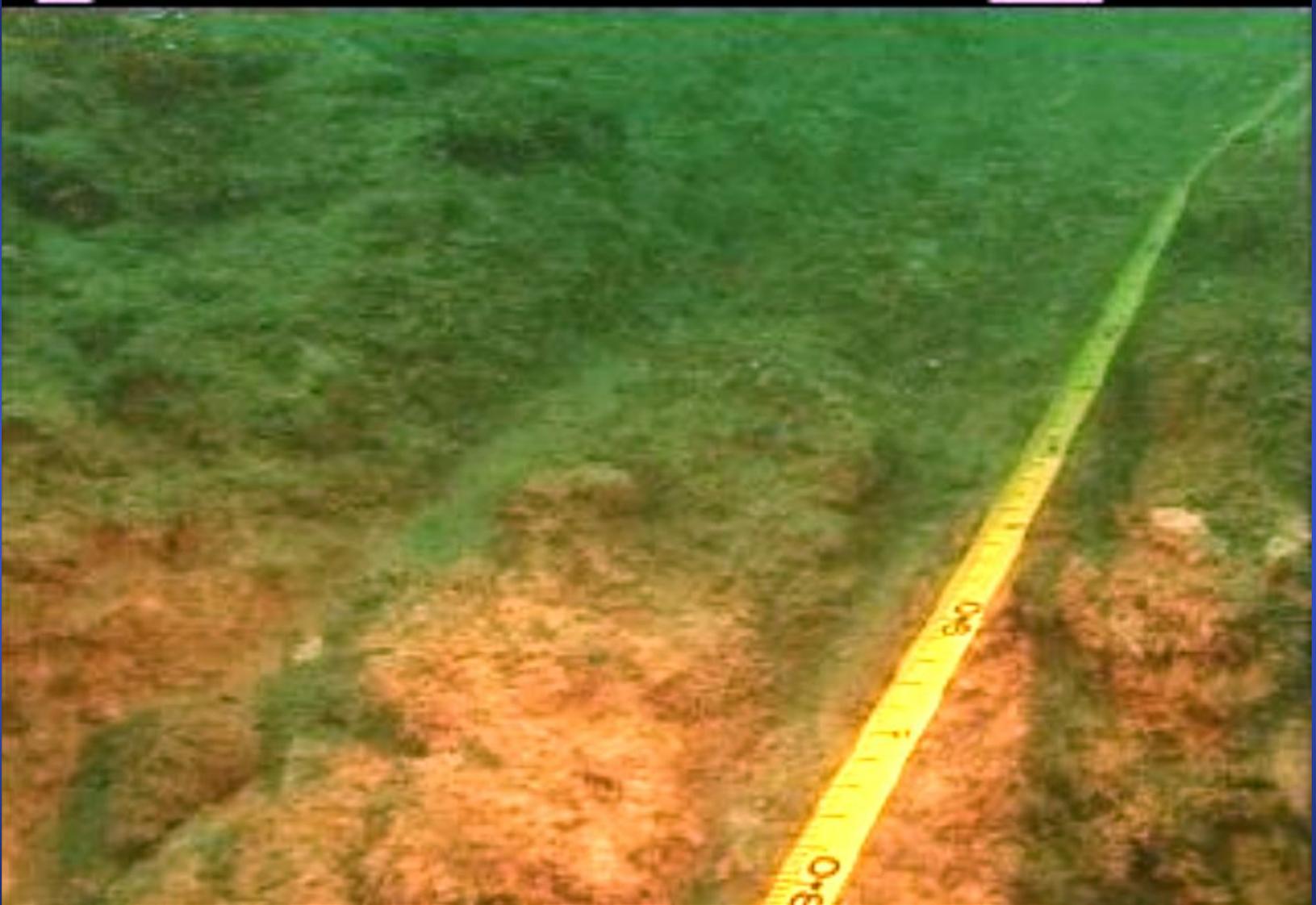
MONITORING VESSEL

KWHD_r Channel Edge Injury



Eagle I Drag Arm Teeth Scars & Scarification

KWHDR Channel Edge Injuries



Eagle I Drag Arm Teeth Scars

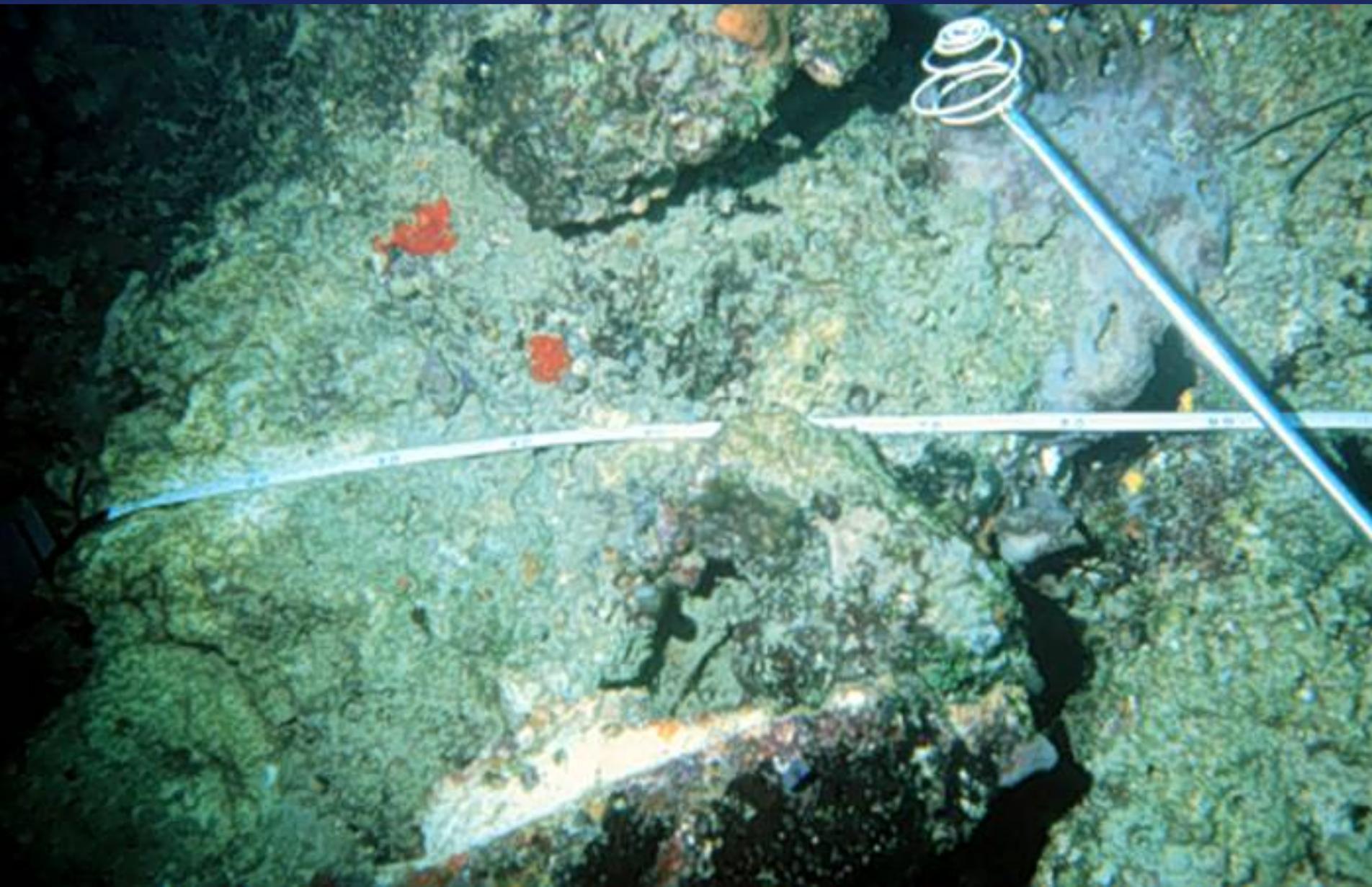
Past Experiences with Dredging Operations



CABLE SCARS at Boca Raton Beach Re-nourishment



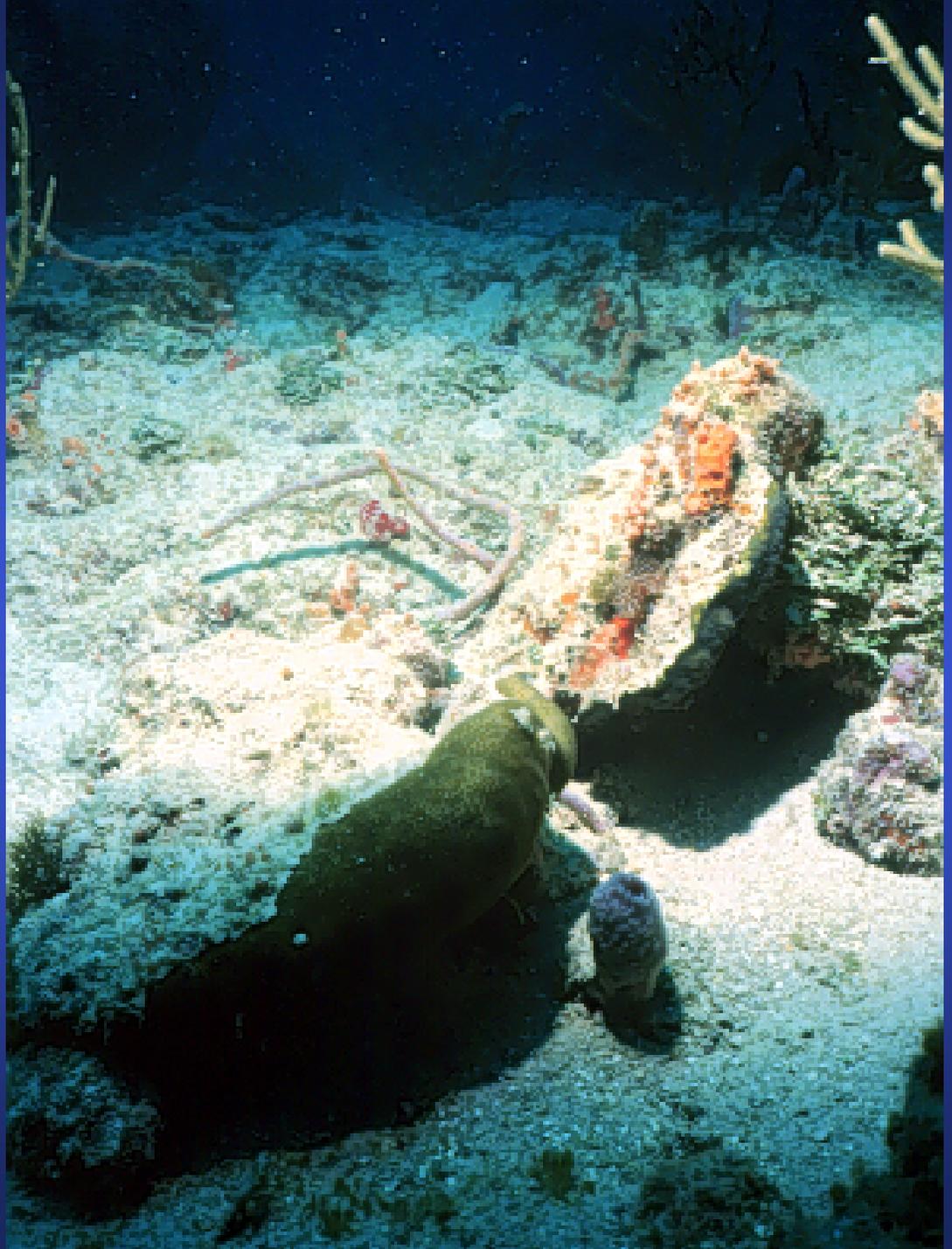
Cable Scar across top of giant brain coral



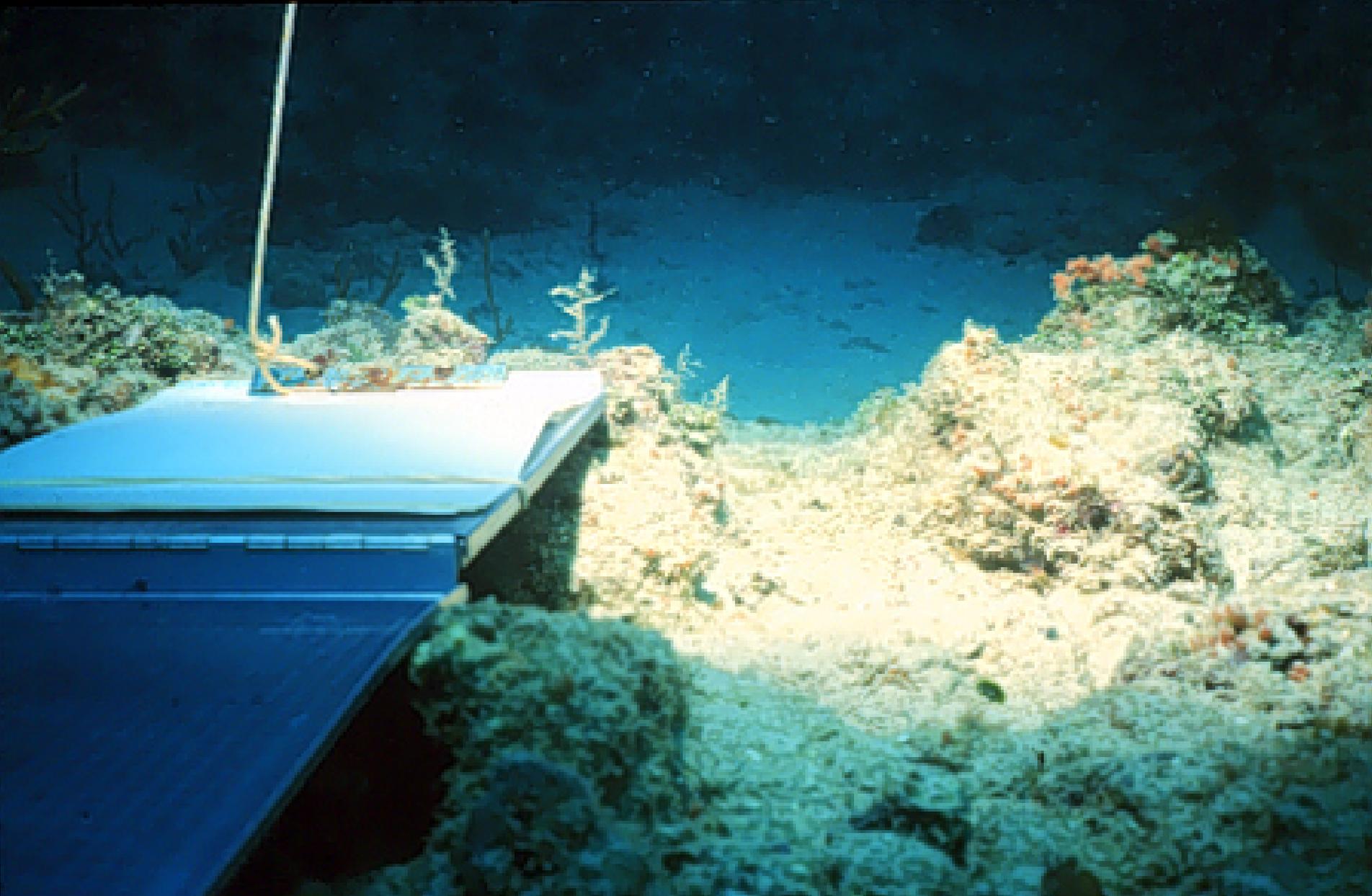
Cable cut in reef, Boca Raton Beach Re-nourishment

**Flipped
Coral Heads**

**at
Sunny Isles
Dredge Borrow
Area Injury**



Dredge Head Impacts, Sunny Isles Borrow Area Injury



Broward Tow Cable/Bridle Injuries



01/25/04

VONE

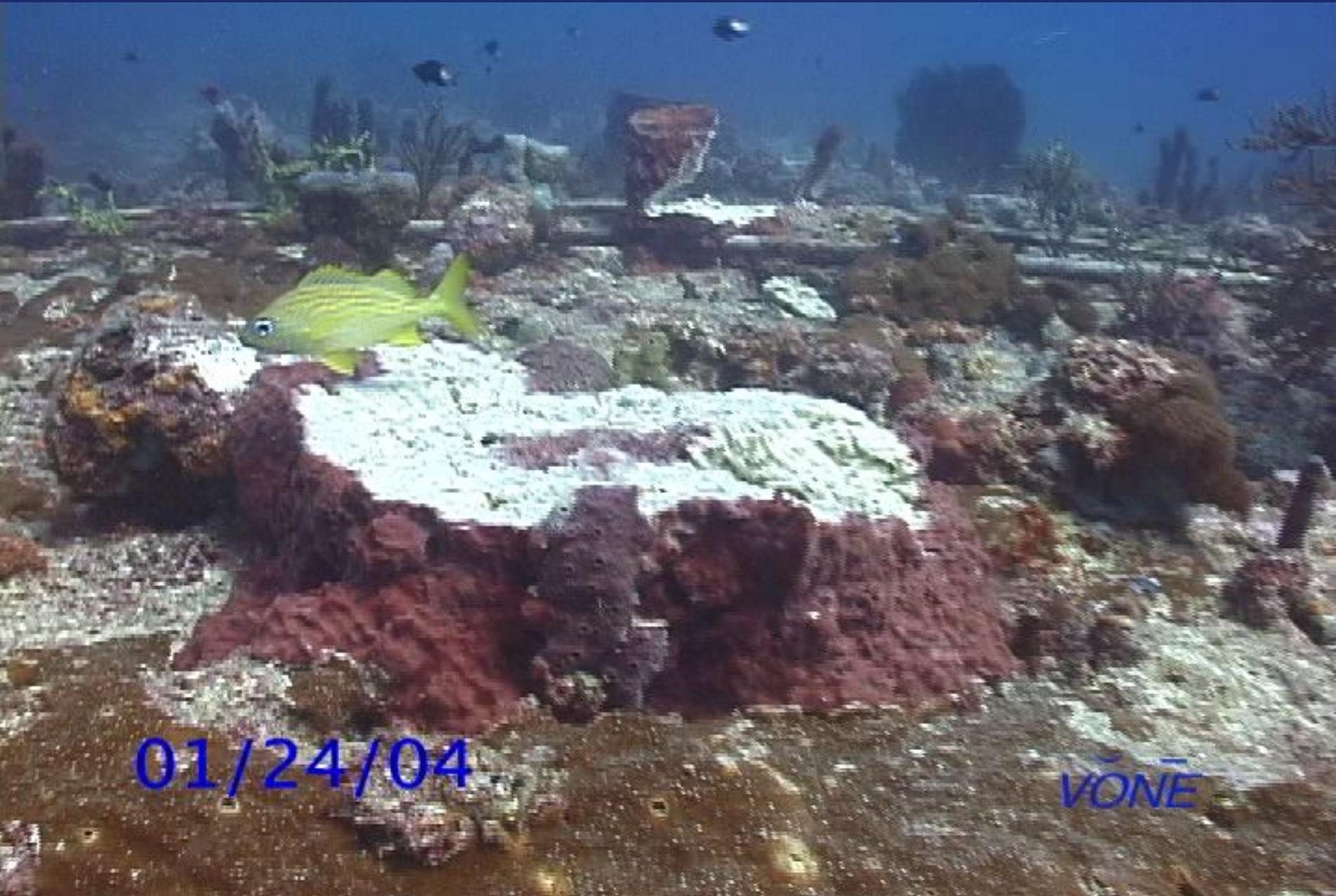
Broward Tow Cable/Bridle Injuries



01/24/04

VONE

Broward Tow Cable/Bridle Injuries

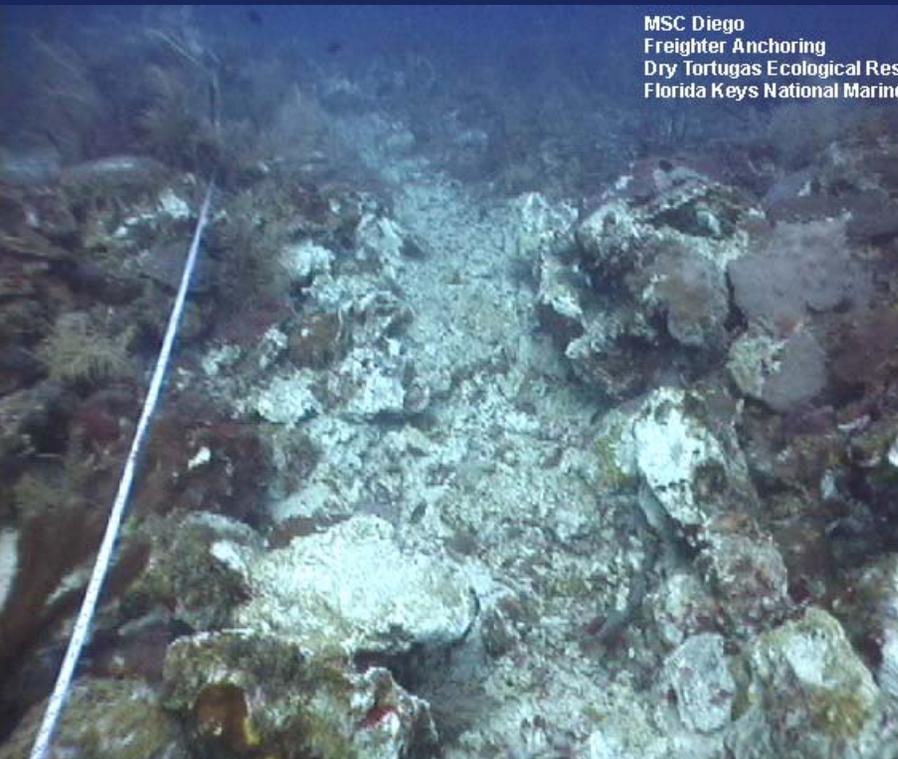


01/24/04

VONE



MSC Diego
Freighter Anchoring
Dry Tortugas Ecological Res
Florida Keys National Marine



MSC Diego
Freighter Anchoring
Dry Tortugas Ecological Reserve
Florida Keys National Marine Sanctuar



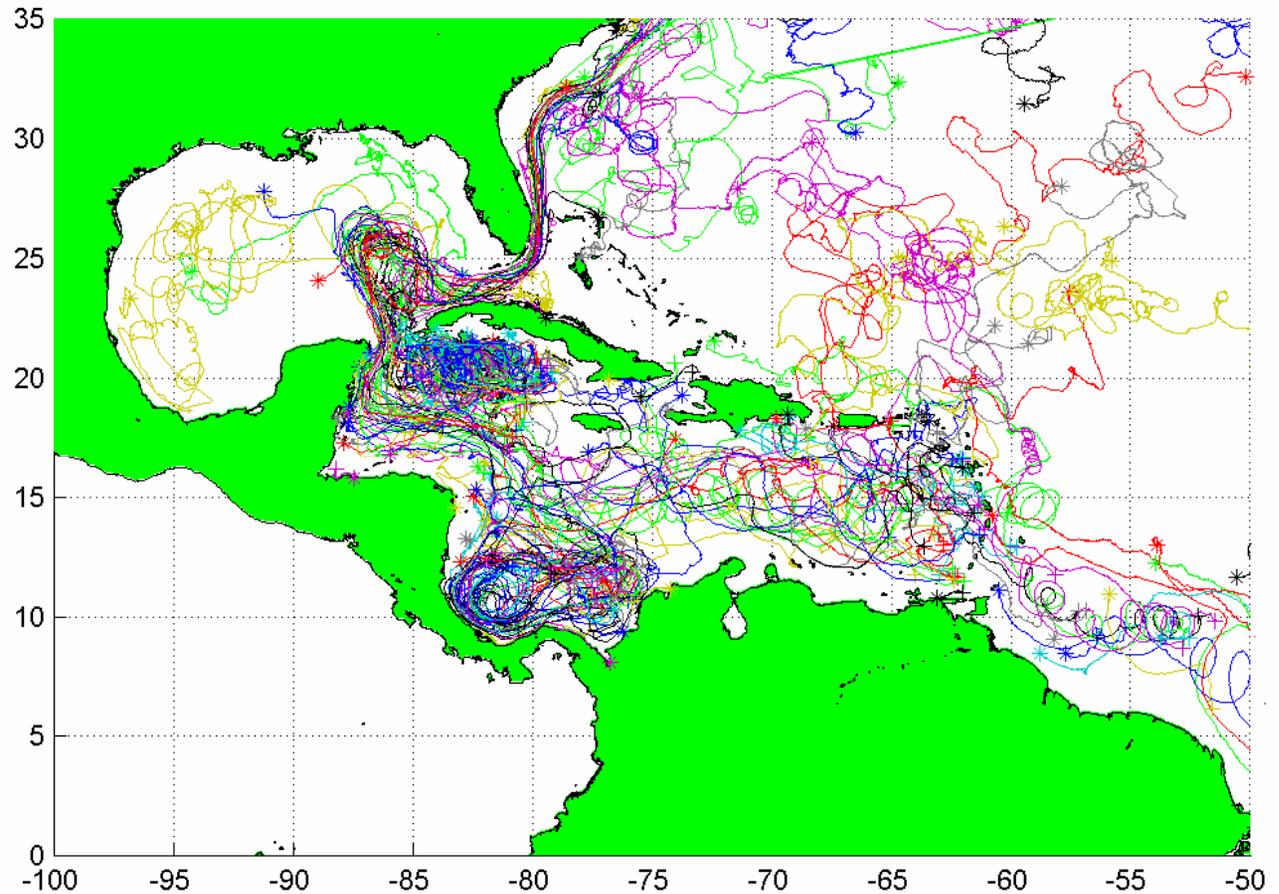
MSC Diego
Freighter Anchoring
Dry Tortugas Ecological Reserve
Florida Keys National Marine Sanctuary



Regional Threats

Current Drifters (1998-2000)

Credit: Kevin Leaman (UM/RSMAS)



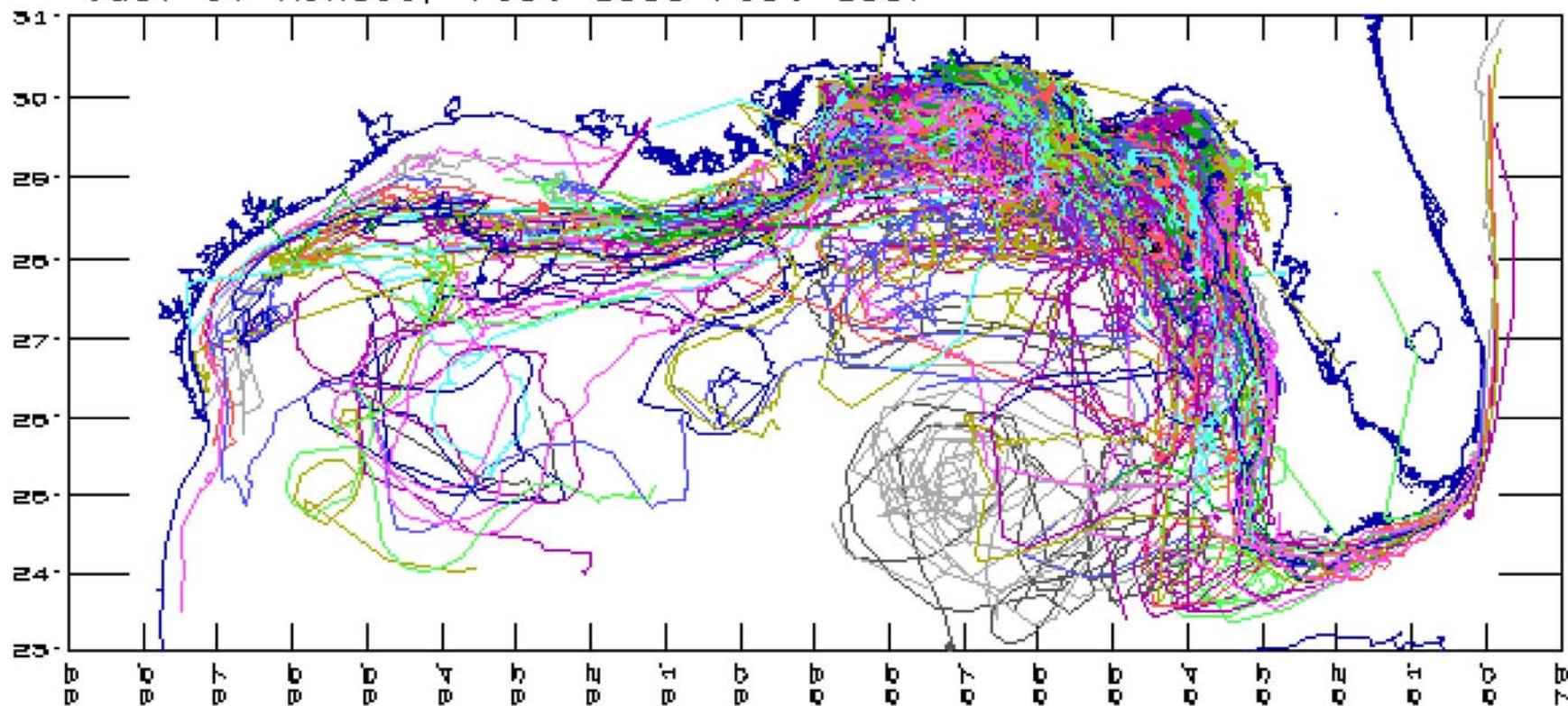
Mississippi River Basin



This map is not to scale.

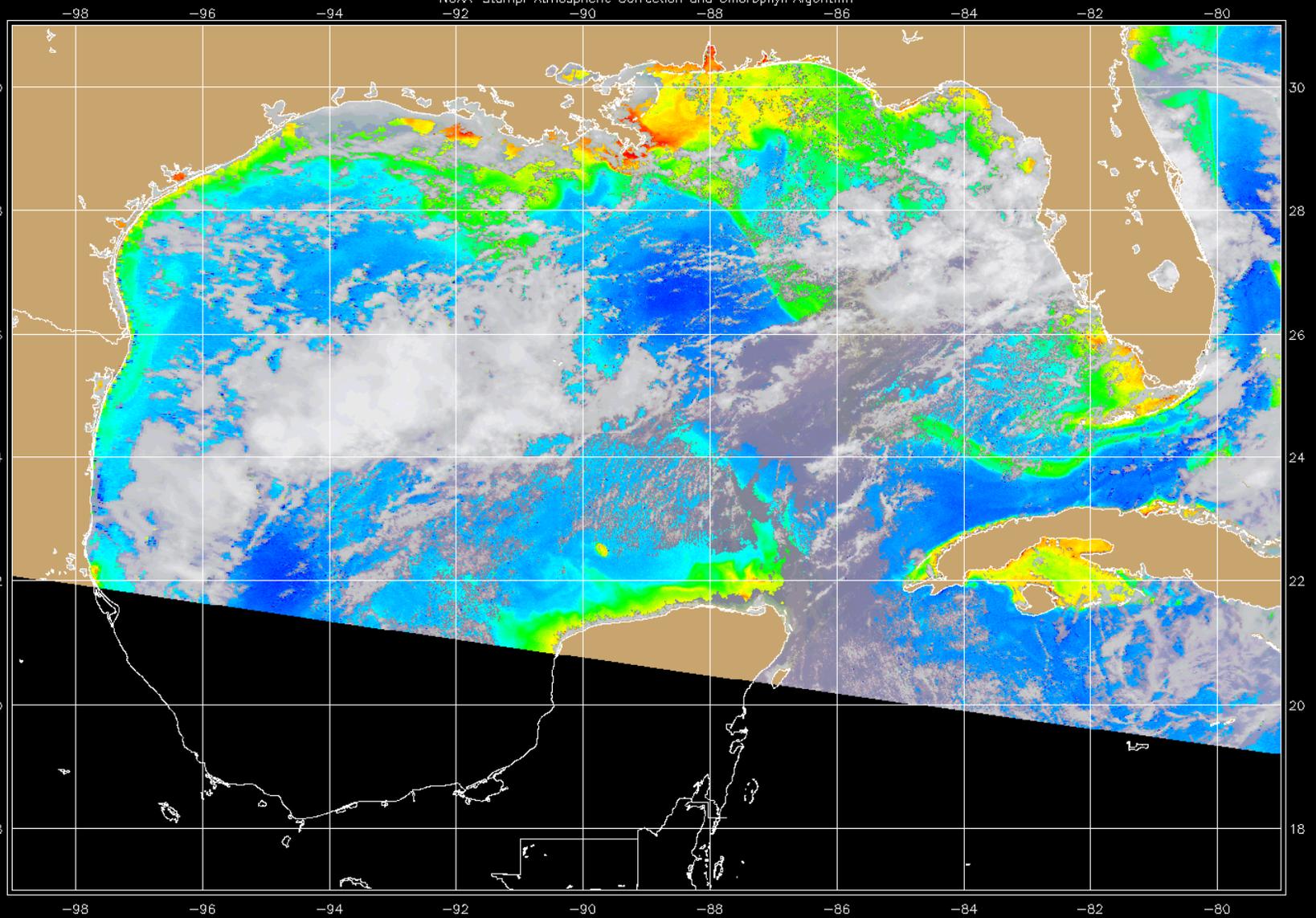
MMS

Gulf of Mexico, Feb. 1996-Feb. 1997



Chlorophyll a Concentration

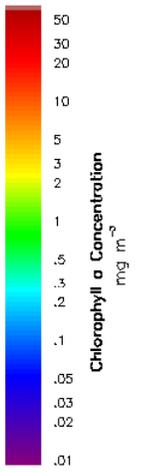
(Data from ORBIMAGE)
NOAA—Stumpf Atmospheric Correction and Chlorophyll Algorithm



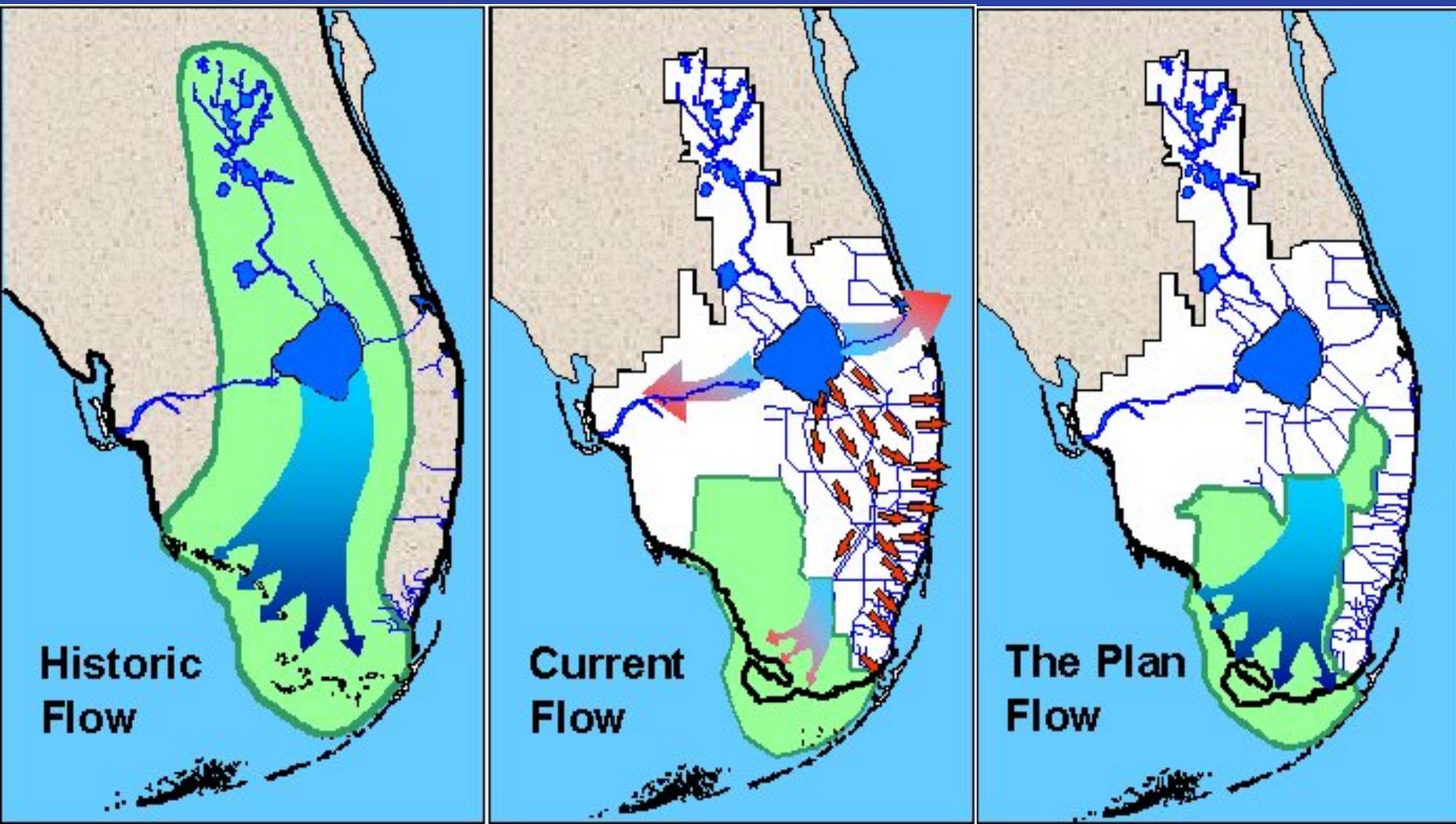
CoastWatch

2004 AUG 4 18:22:18 GMT

Full Region Gulf of Mexico
LAT: 17.00N - 31.00N
LON: 79.00W - 99.00W



The coral reefs and the Florida Keys National Marine Sanctuary are downstream of South Florida Ecosystem Restoration Project



Comprehensive Everglades Restoration Plan (CERP) is... *Getting the Water*

Quantity *Right!* Quality

Q

Q

T

D

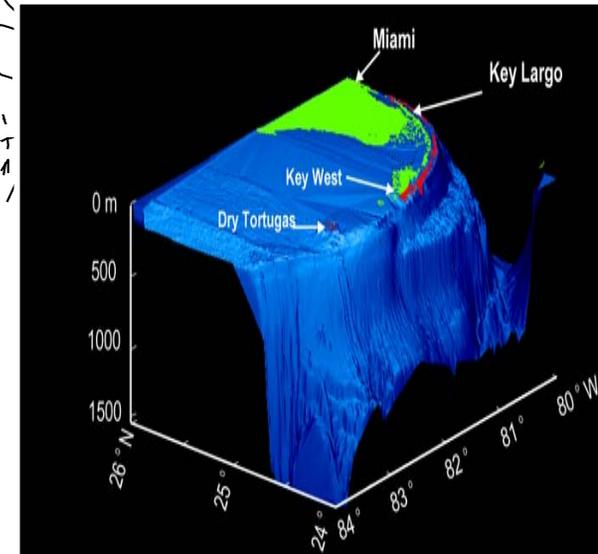
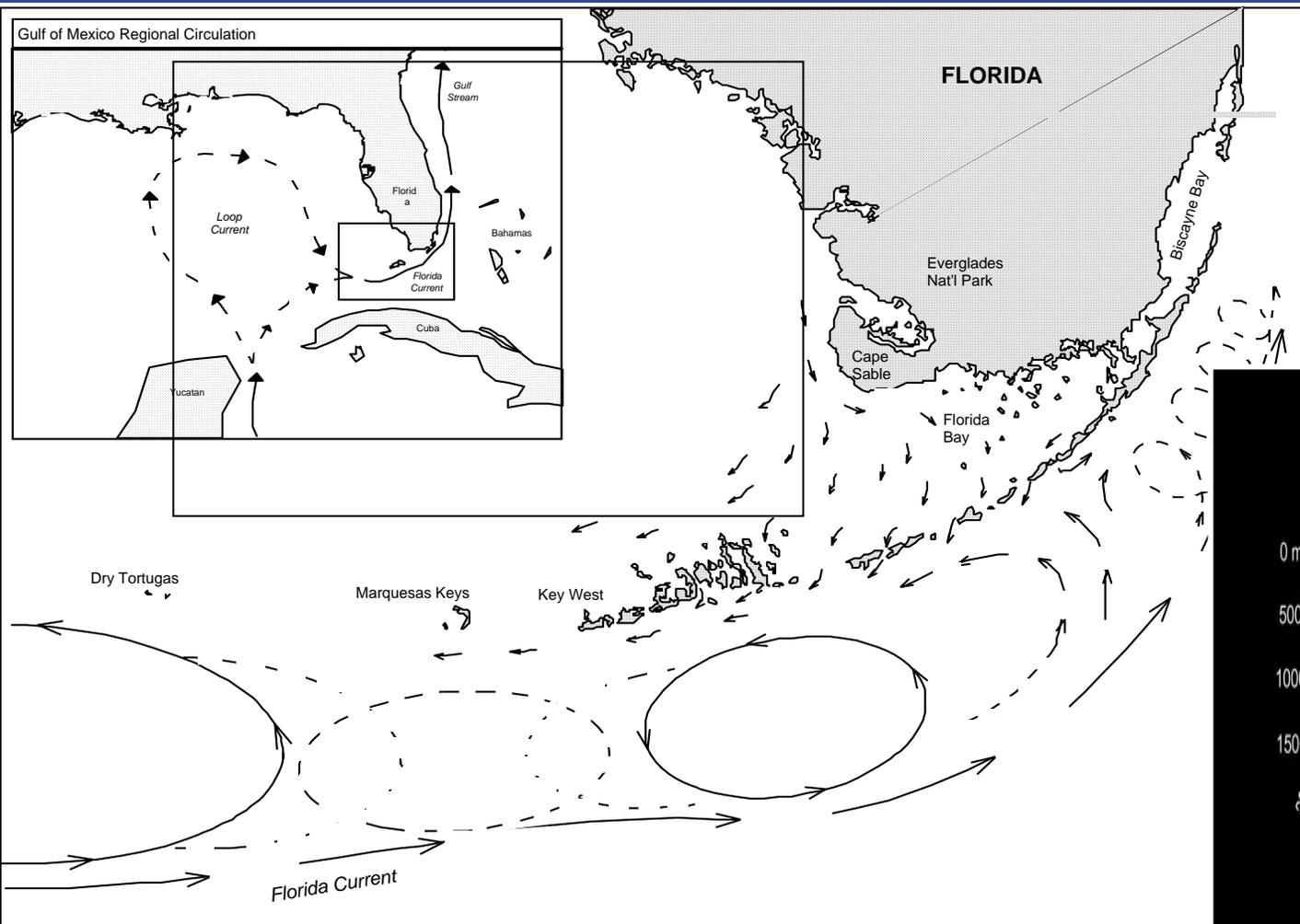
Timing

Distribution

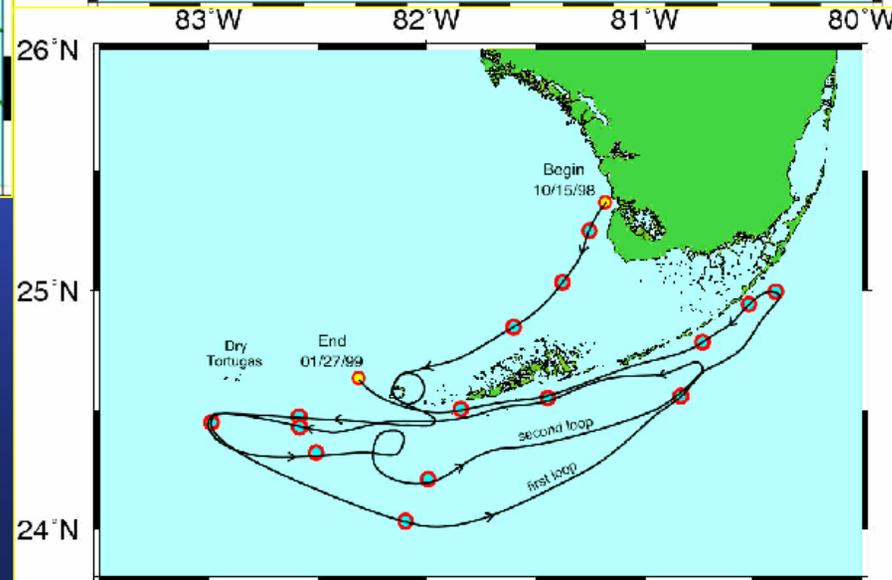
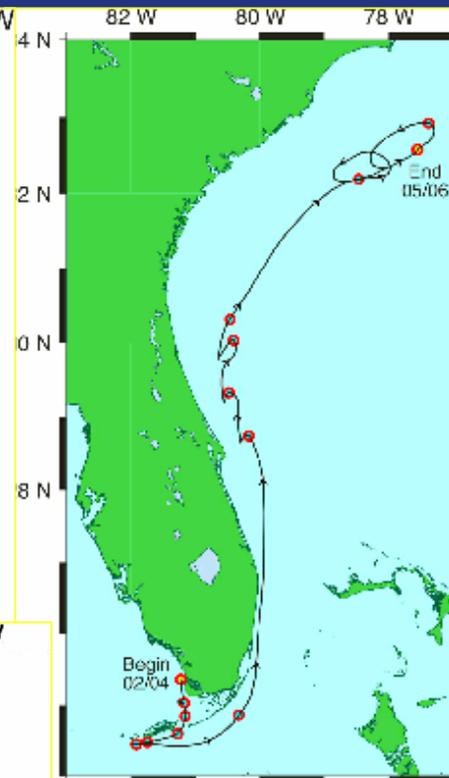
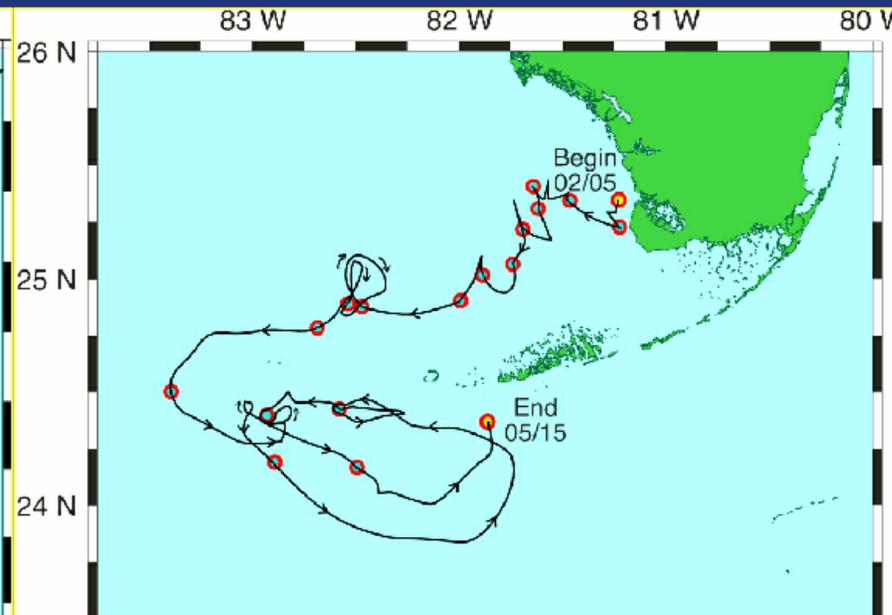
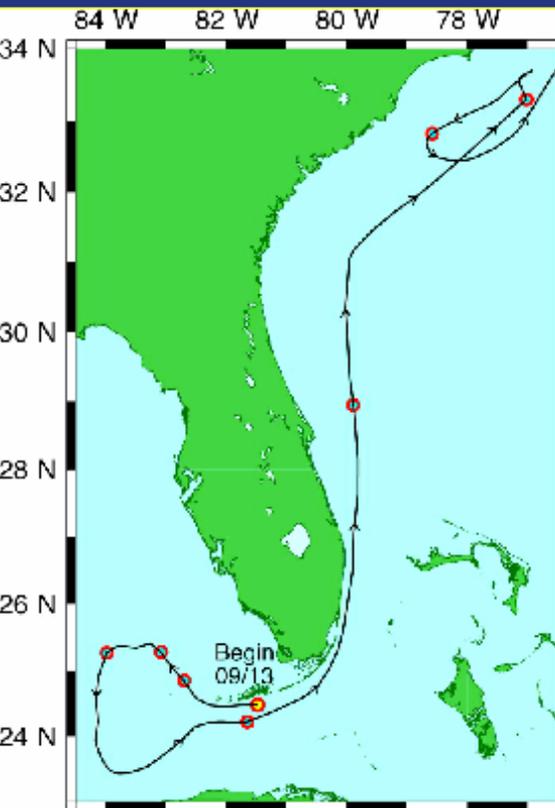


Influence from Ocean Currents

Florida Keys and coral reef are influenced by currents and flows from Florida Bay, Gulf of Mexico, Florida west coast, and Florida Current/Gulf Stream
(Lee and Williams - Univ of Miami)



Four Paths of Satellite Current-Tracking Meters



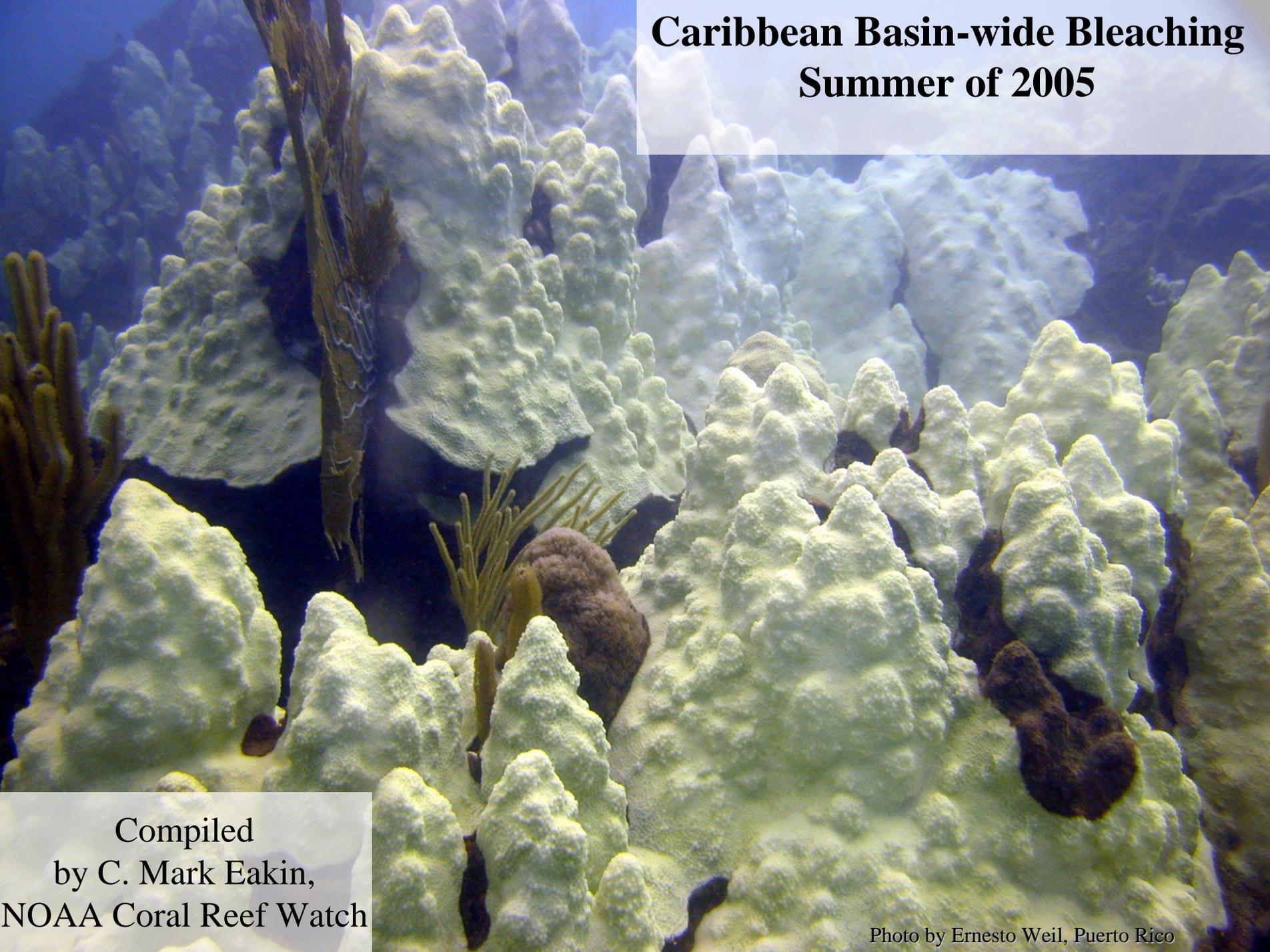
Investigators:
Dr. Tom Lee
Dr. Liz Williams

Univ of Miami

**Shark River
Slough/
FL West
Coast
Releases**



Global Threats



Caribbean Basin-wide Bleaching Summer of 2005

Compiled
by C. Mark Eakin,
NOAA Coral Reef Watch

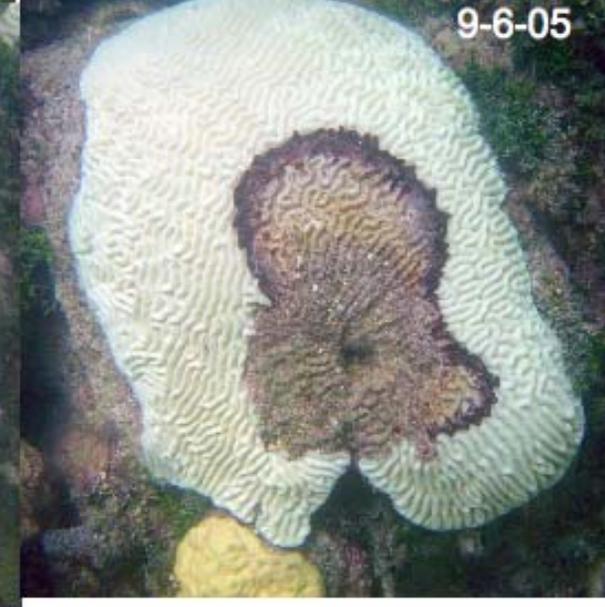
Photo by Ernesto Weil, Puerto Rico

Preliminary Bleaching Reports

Bleaching Can Promote Coral Disease Outbreaks

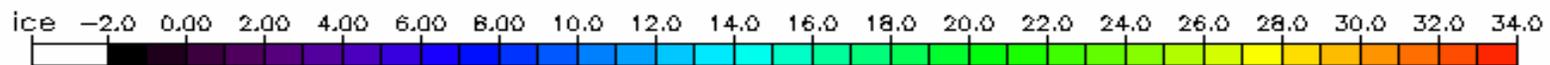
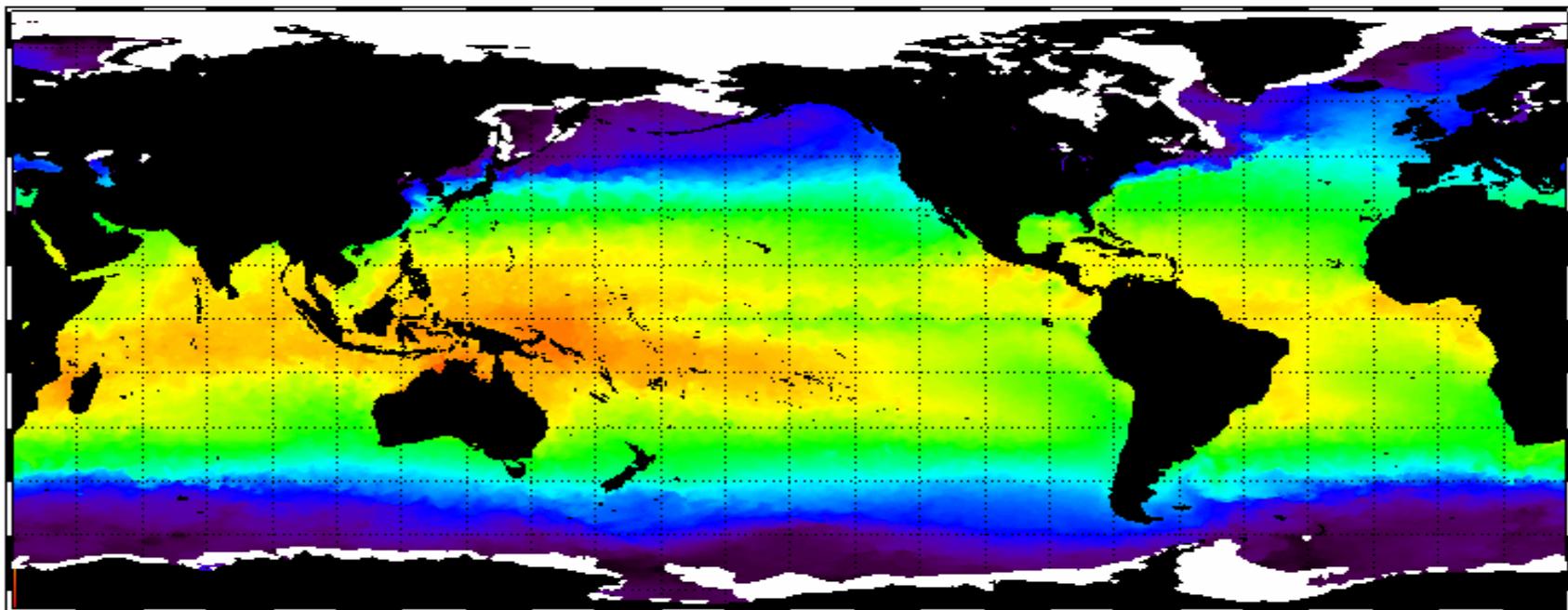
Inshore patch reefs
Middle Florida Keys

Marilyn E. Brandt
University of Miami



NOAA Current Experimental 50km Nighttime SST (C)

1/24/2006

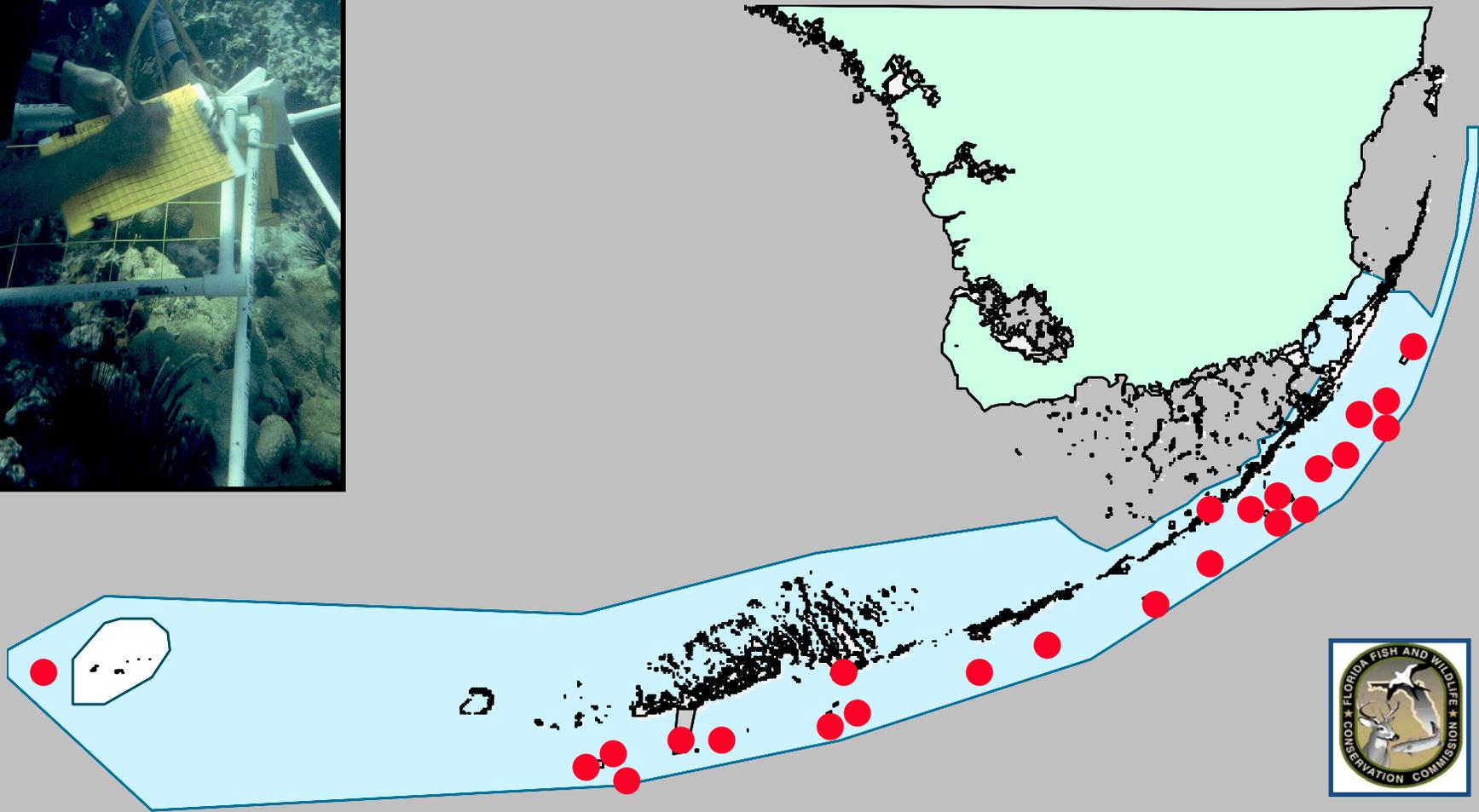




Coral Reef Evaluation and Monitoring Project (CREMP)

Sandra Brooke, Carl Beaver, et al., FWC

- 43 Sites / 3-4 Stations each
- 4 Different Habitat Types

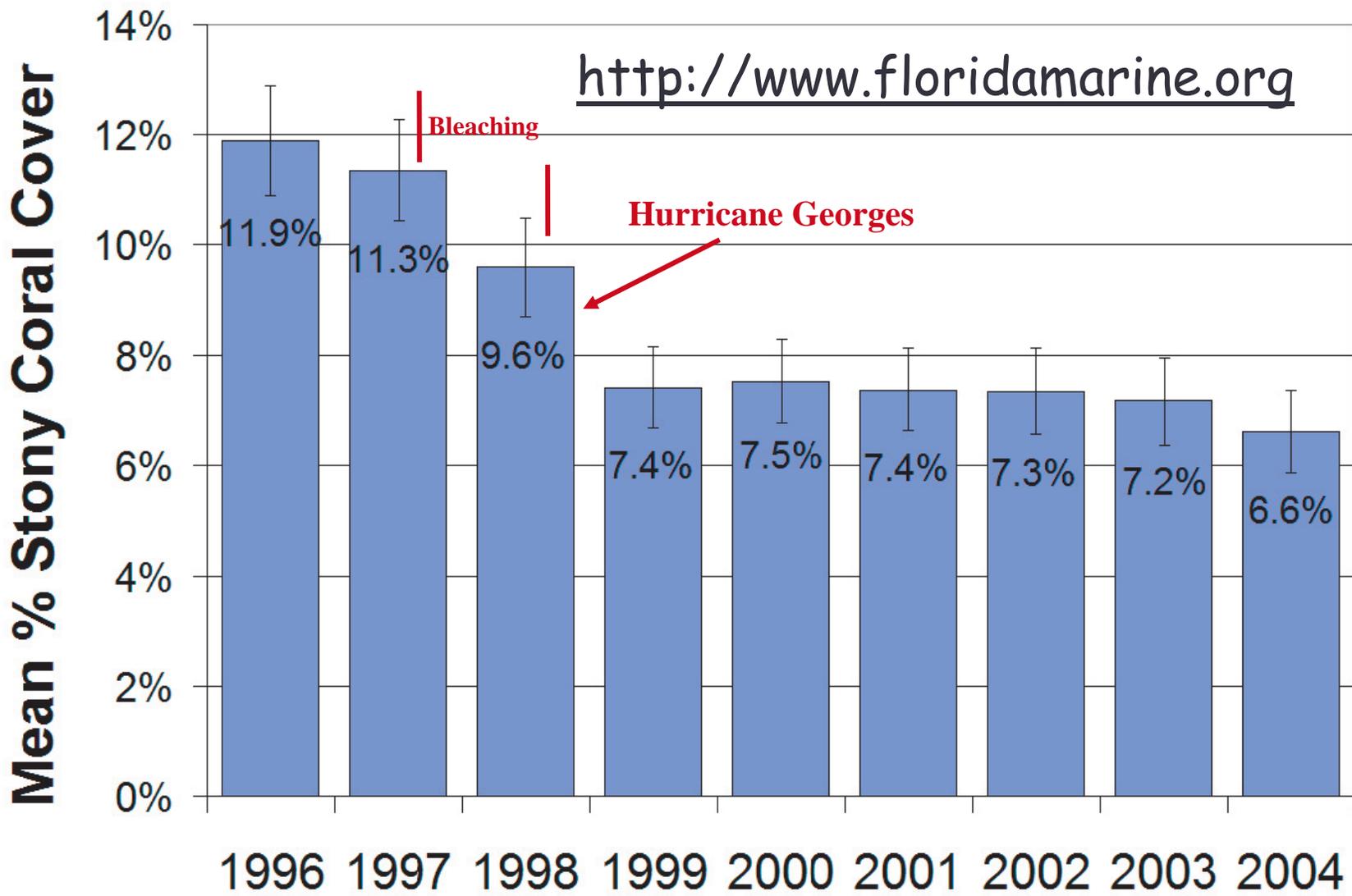




CREMP: Overall Coral Cover Over Time



<http://www.floridamarine.org>





What can we do to make a difference?



- **Manage Locally**
- **Increase Regional Awareness**
- **Think Globally**

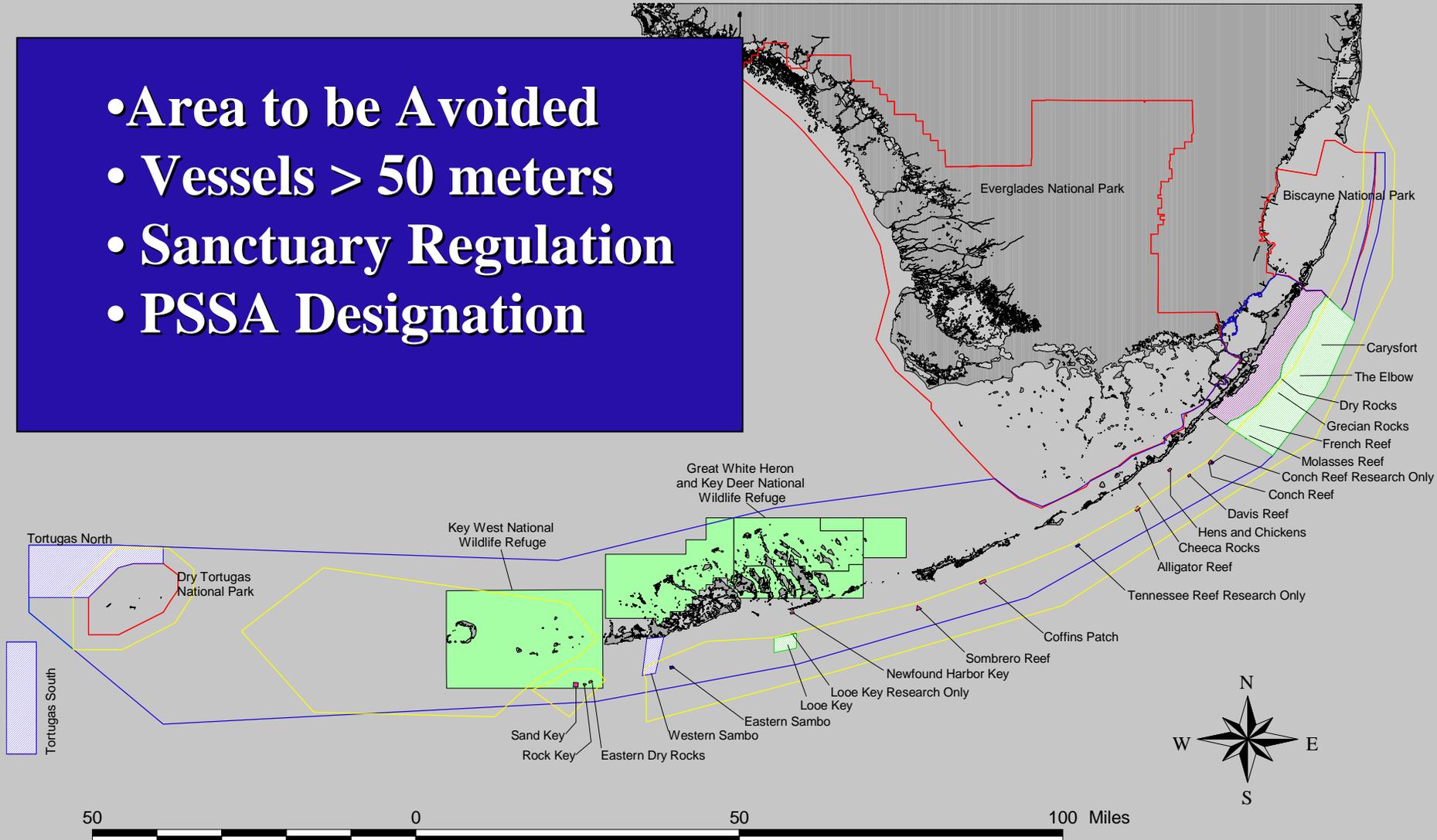


Preventative Measures Are Having Positive Results

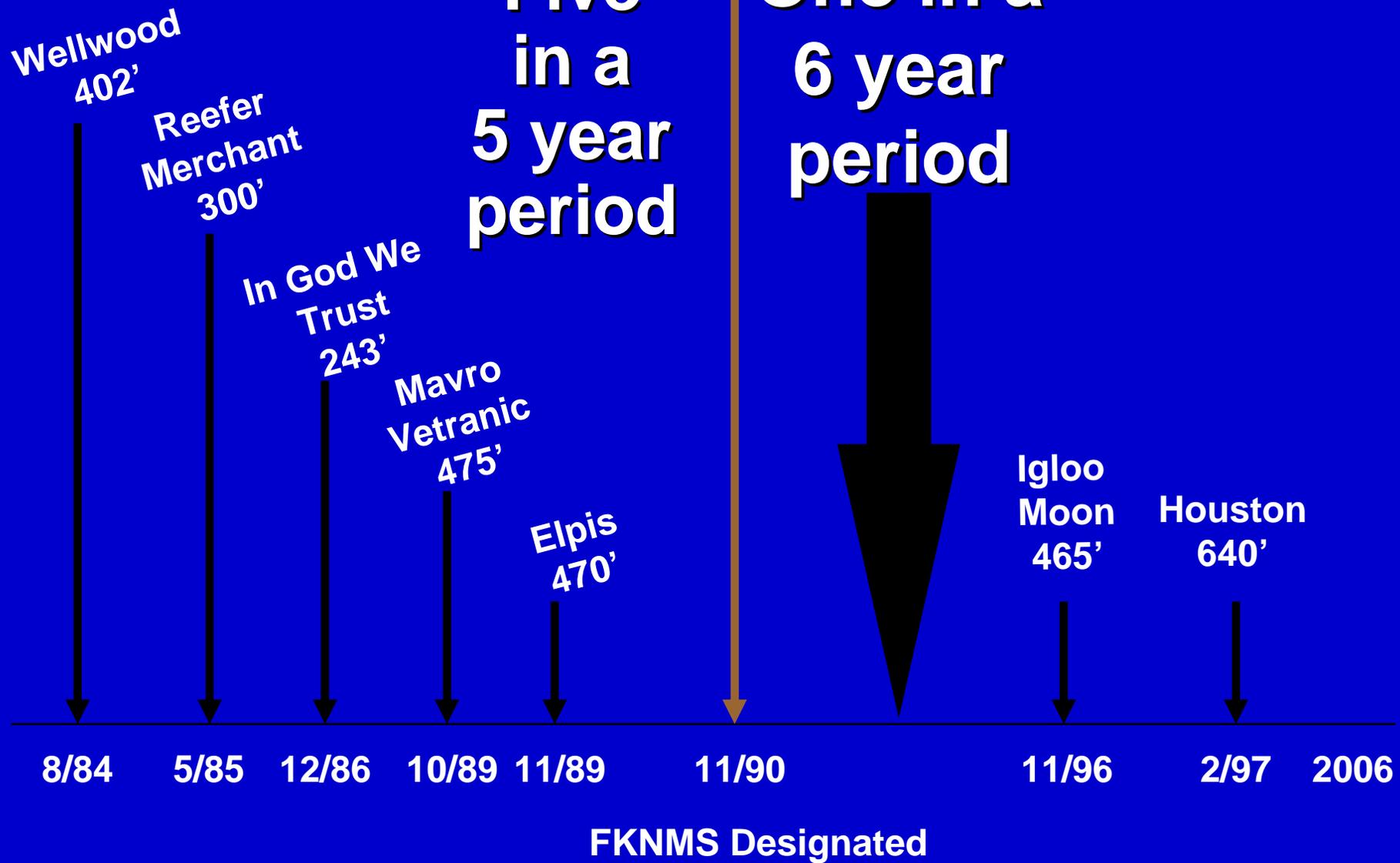
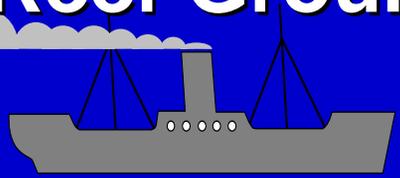


International Maritime Organization Designated ATBA

- Area to be Avoided
- Vessels > 50 meters
- Sanctuary Regulation
- PSSA Designation



Reef Groundings Of Ships Over 50 m In Length



Five
in a
5 year
period

One in a
6 year
period

FKNMS Designated



February/1997

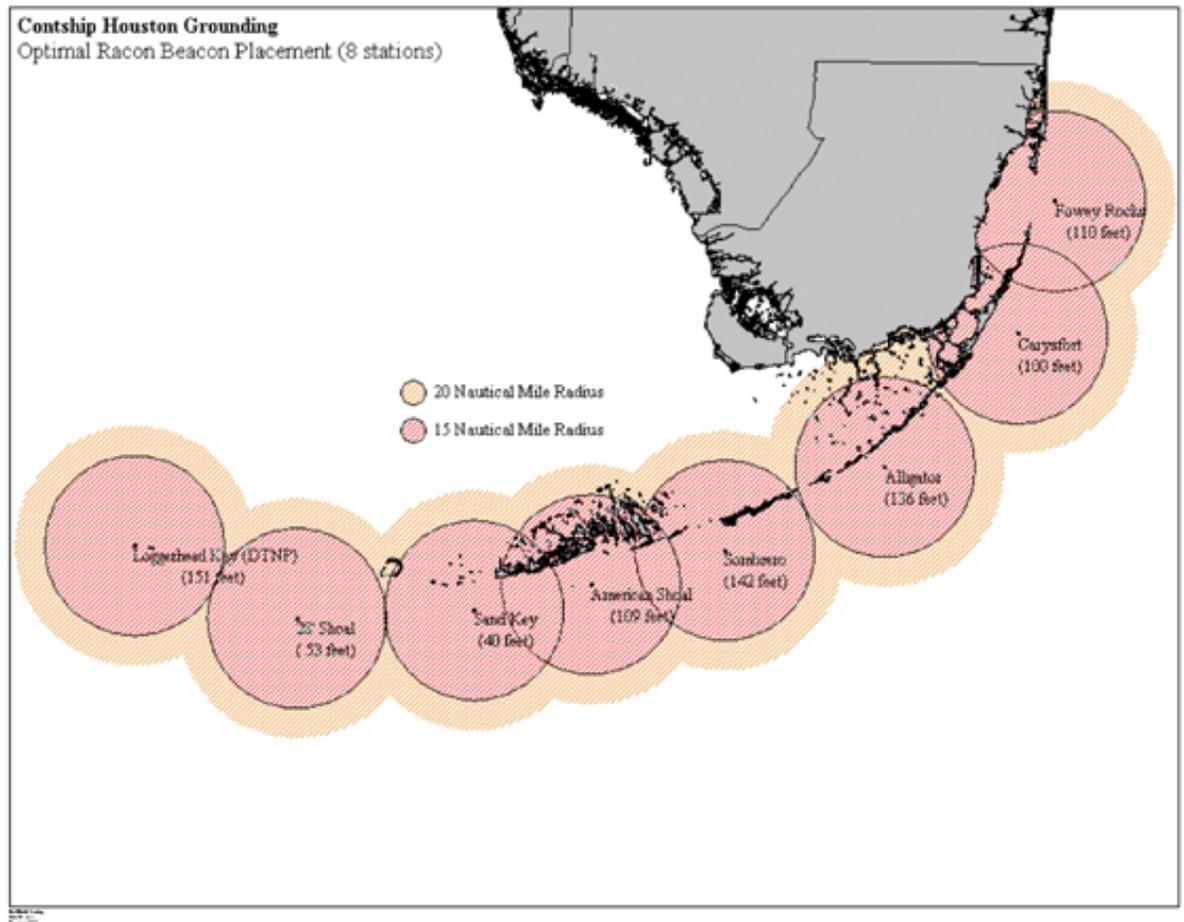
M/V Contship Houston

- 600' Container ship
- Maryland Shoal
- 1 degree navigation error

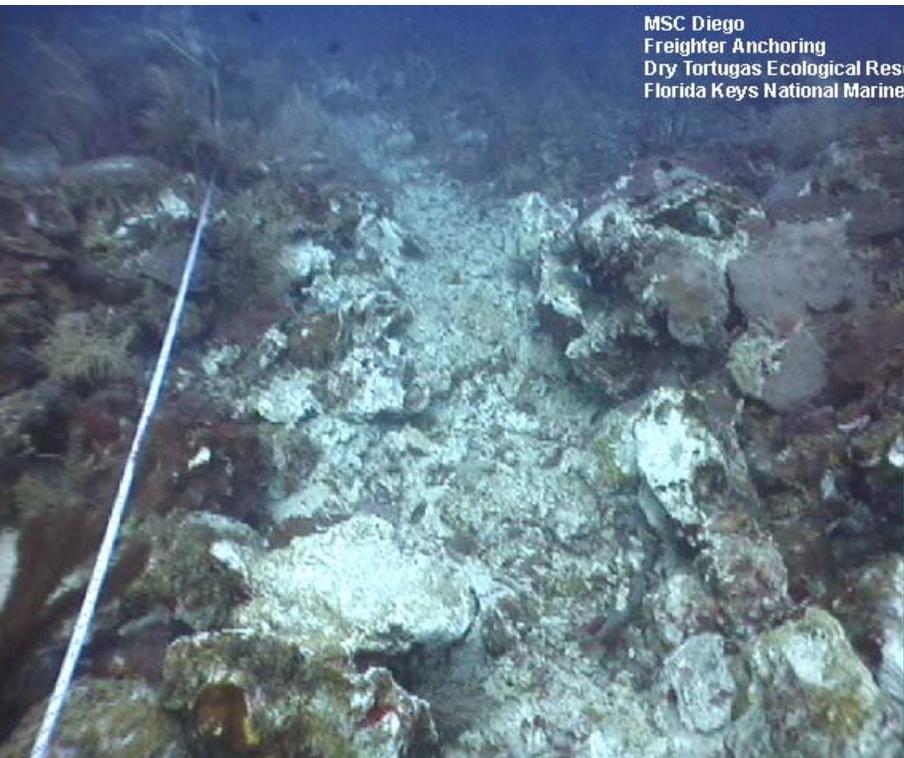


8 RACON Beacons Placed Along Reef Tract

- Warn Ships on Radar Screen
- 20 mile range







MSC Diego
Freighter Anchoring
Dry Tortugas Ecological Res
Florida Keys National Marine



MSC Diego
Freighter Anchoring
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MSC Diego
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MSC Diego
Freighter Anchoring
Dry Tortugas Ecological Reserve
Florida Keys National Marine Sanctuary



R/V Columbus Iselin
USCG MSO Response
\$ 3.1 million / \$ 1.1 m for Restoration

***Iselin* grounding site restoration**



Boulder deployment



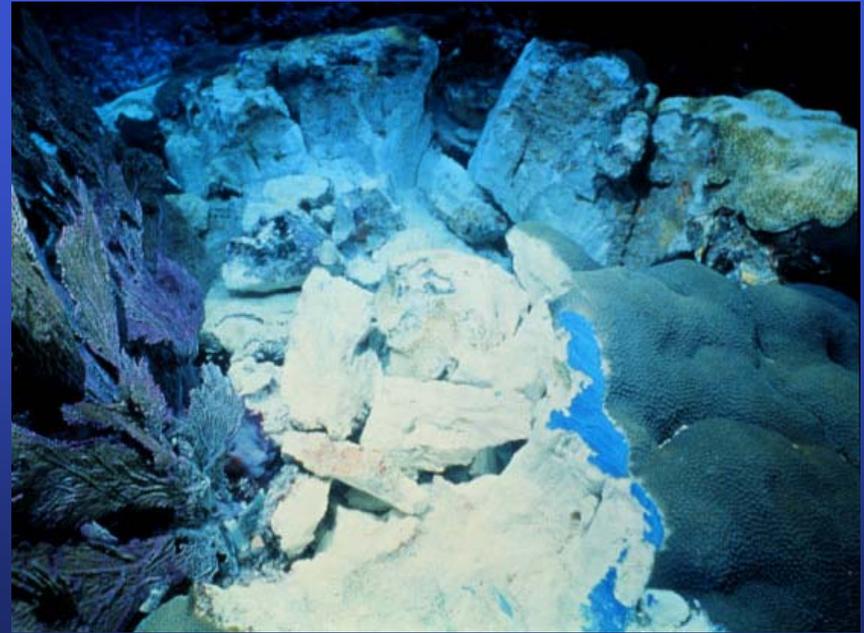


The Florida Aquarium



The Problem...

- Each year, 500-600 vessel groundings are reported on reefs, seagrass meadows and other shallow areas of the Florida Keys.
- Corals are lost and destroyed





Partners

- The Florida Aquarium
- Mote Aquarium
- University of Florida
- Ken Nedimyer

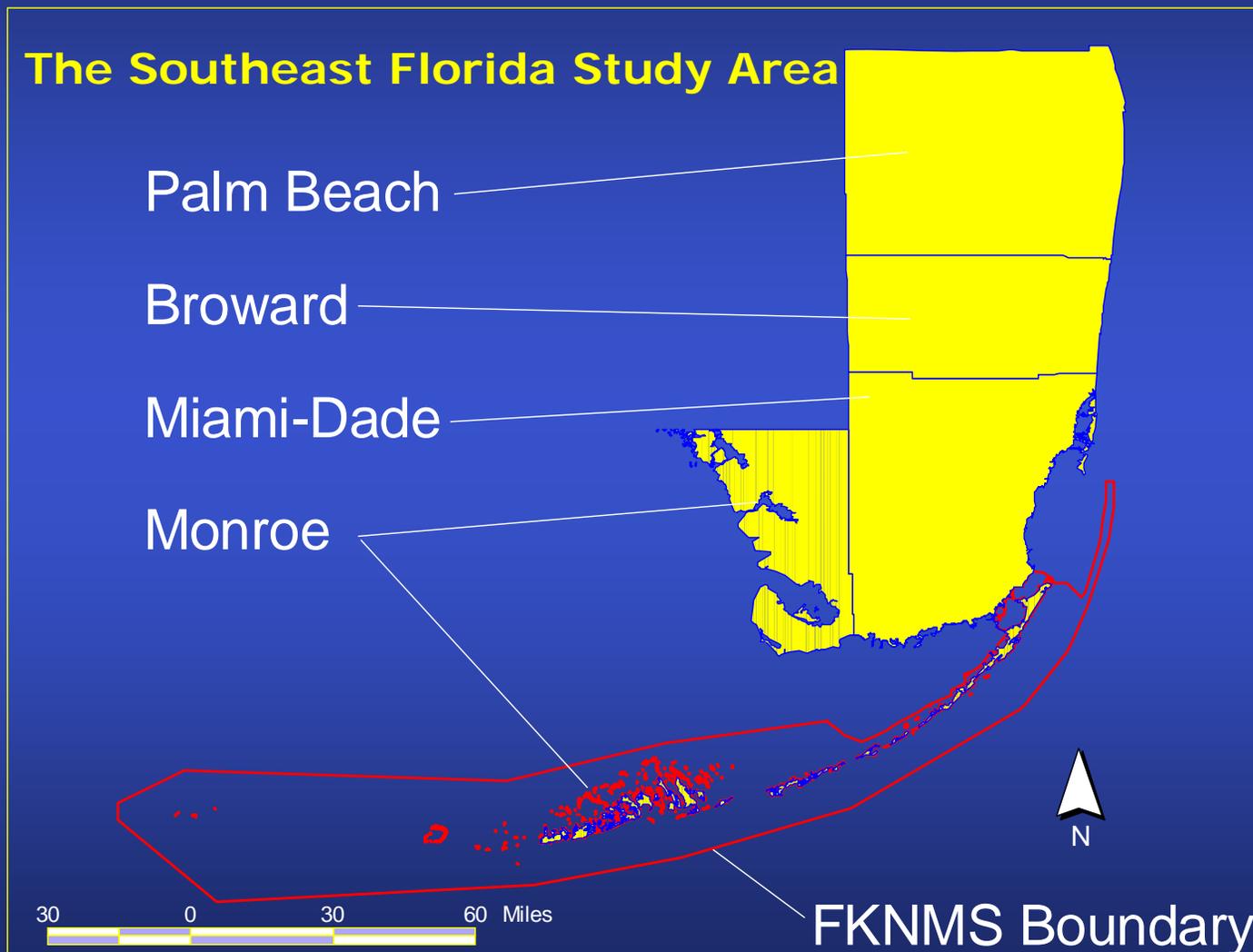


Why Do We Care About the Health of Our Coral Reefs?



Socioeconomic Study of Reefs in Southeast Florida

Geographic Scope of Study



Questions?

