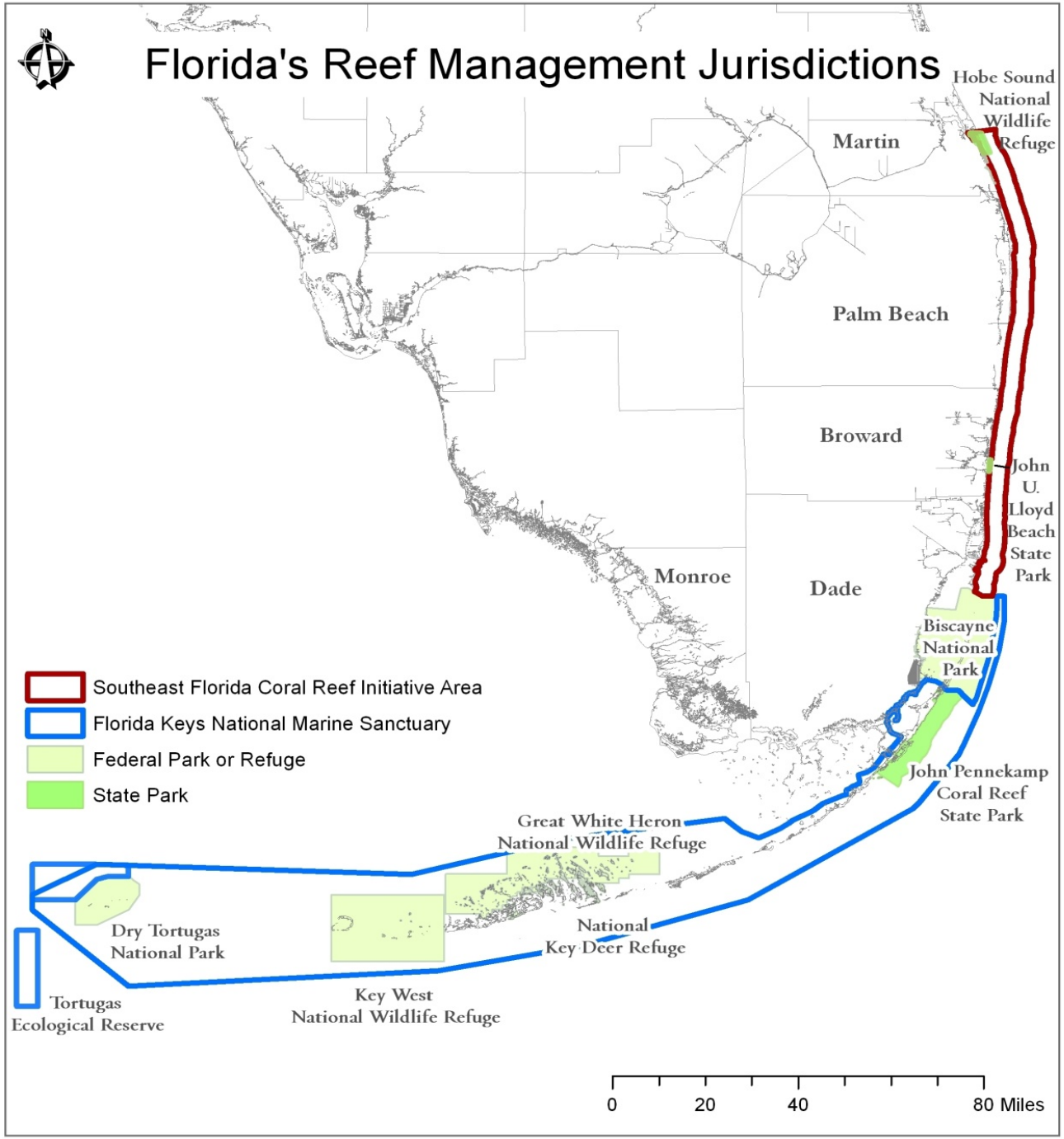
Water Management for the Florida Reef Tract

Presentation to the US Coral Reef Task Force
October 21, 2011


Florida's Reef Management Jurisdictions
Hobe Sound National Wildlife Refuge
Martin
Palm Beach
Broward
John U. Lloyd Beach State Park
Monroe
Dade
Biscayne National Park
John Pennekamp Coral Reef State Park
Great White Heron National Wildlife Refuge
National Key Deer Refuge
Dry Tortugas National Park
Tortugas Ecological Reserve
Key West National Wildlife Refuge
Southeast Florida Coral Reef Initiative Area
Florida Keys National Marine Sanctuary
Federal Park or Refuge
State Park
0
20
40
80 Miles

Working Partnerships for Water Management on the Florida Reef

- EPA South Florida Geographic Initiative
- FKNMS Water Quality Protection Program (WQPP)
- South East Florida Coral Reef Initiative (SEFCRI)
- NOAA Coral Reef Conservation Program (CRCP)
- Multiple NGO initiatives (e.g. FRRP)
- State and Local Resource Management Agencies
  - Florida's Dept. of Environmental Protection (FDEP), Fish & Wildlife Conservation Commission (FWCC), SFWMD, etc.
  - Monroe, Miami-Dade, Broward, Palm Beach, & Martin Counties
- US Coral Reef Task Force (USCRTF)
- US South Florida Ecosystem Restoration Task Force (SFERTF)
- US Gulf Coast Ecosystem Restoration Task Force (GCERTF)

Characteristics of WM in SoFlo

Highly manipulated and controlled process

- Flood control
- Stormwater management
- Water extractions (drinking, irrigation, etc.)
- Ocean wastewater disposal
- Wastewater disposal to groundwater

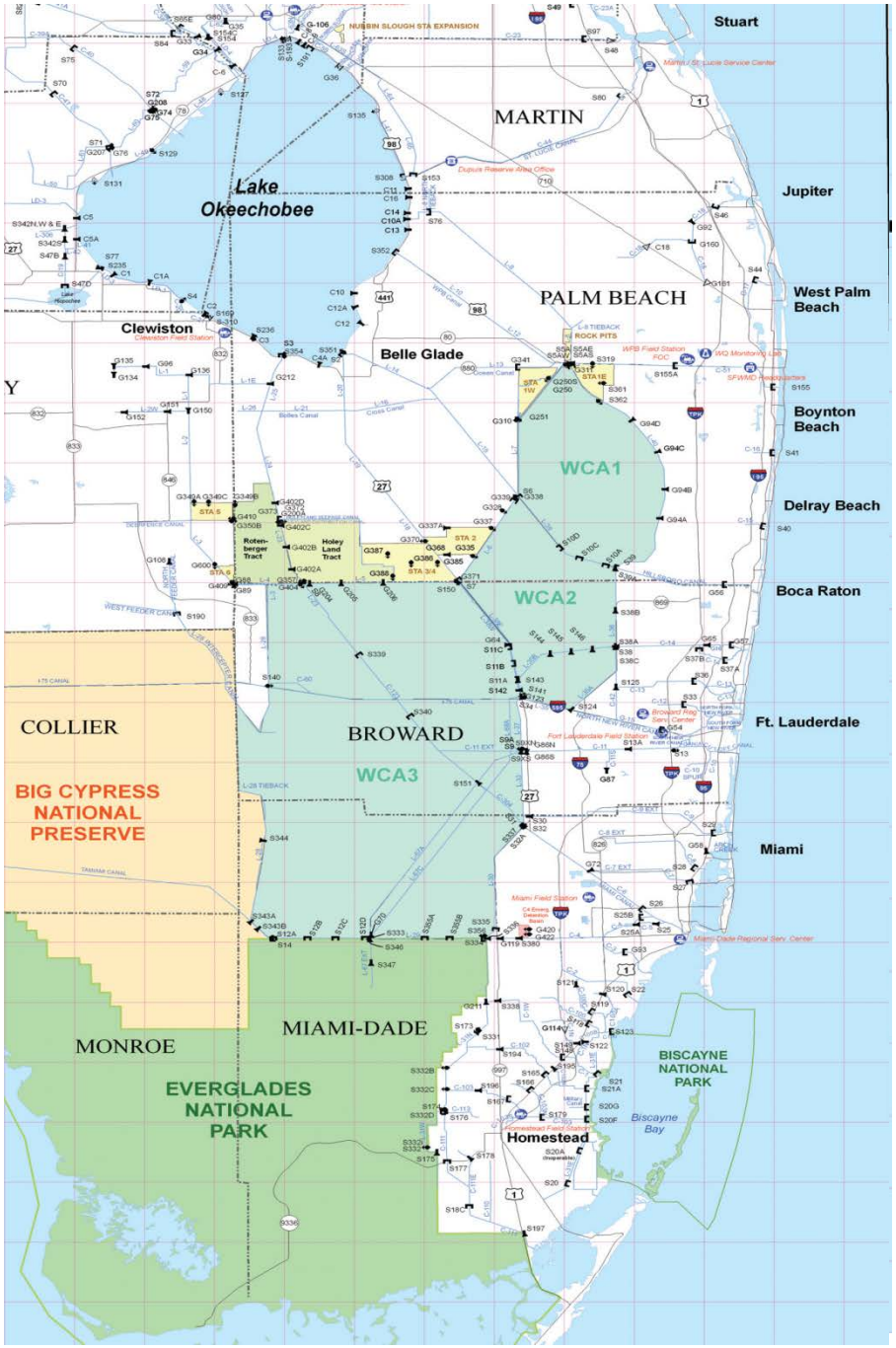
Affected hydrologic and ecological conditions

- Re-direction (disposal) of normal water flows
- Reduction/control of water volumes
- LBSP impacts to ‘downstream’ (i.e., coastal) waters & habitats
- Altered habitats and functional capabilities

SoFlo Water 'Control'

(Figures reference SFWMD operations)

- More than 1,600 miles of canals
- 1,000 miles of containment levees and berms
- 60 pump stations
- + 500 structures
- + 700 culverts
- Directs and controls
  - 661 ac-ft (+215 billion gal) of flow from Lake "O"
  - 50 - 60 inches of regional rainfall (stormwater flows) annually



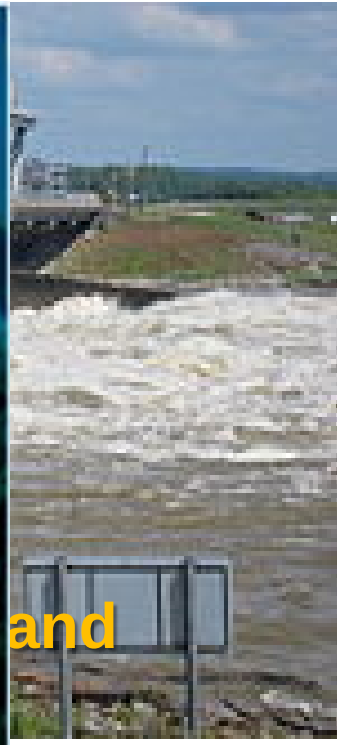
http://www.sfwmd.gov/portal/page/portal/xweb_drought_and_flood/canal_and_structure_operations

WATER MANGEMENT PATHWAY


Increased nutrients and
contaminant loads


Circumvention of natural ‘filtering’ system’
Photo by Tom Scott

Offshore Wastewater Inputs



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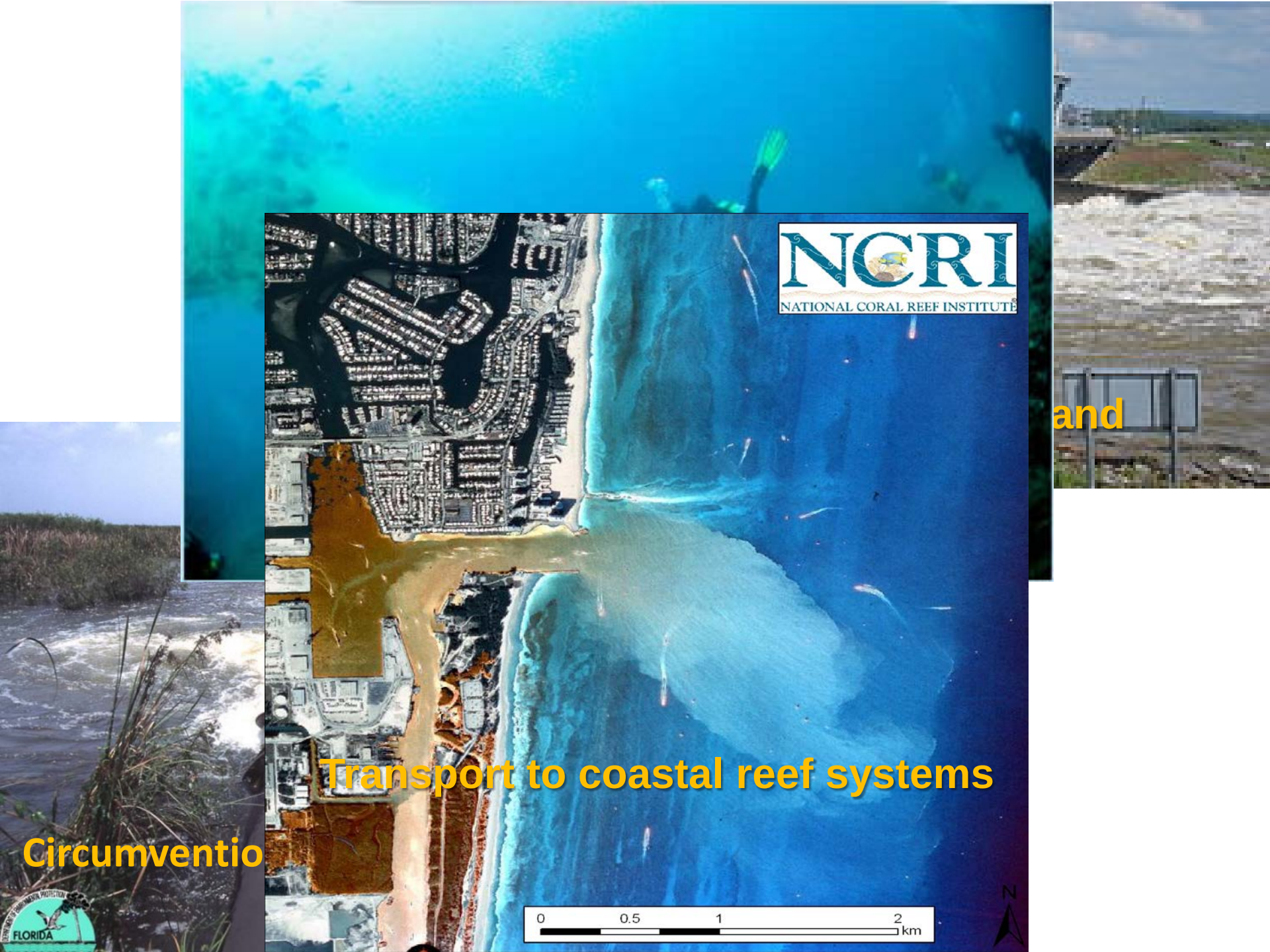
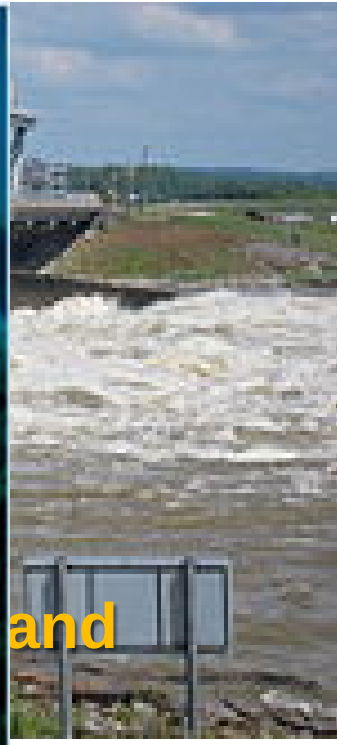
Circumvention of natural ‘filtering’ system’

Photo by Tom Scott


NCRI
NATIONAL CORAL REEF INSTITUTE
and
Transport to coastal reef systems
Circumventio
0
0.5
1
2
km
N
FLORIDA

Disruptions in offshore community structure



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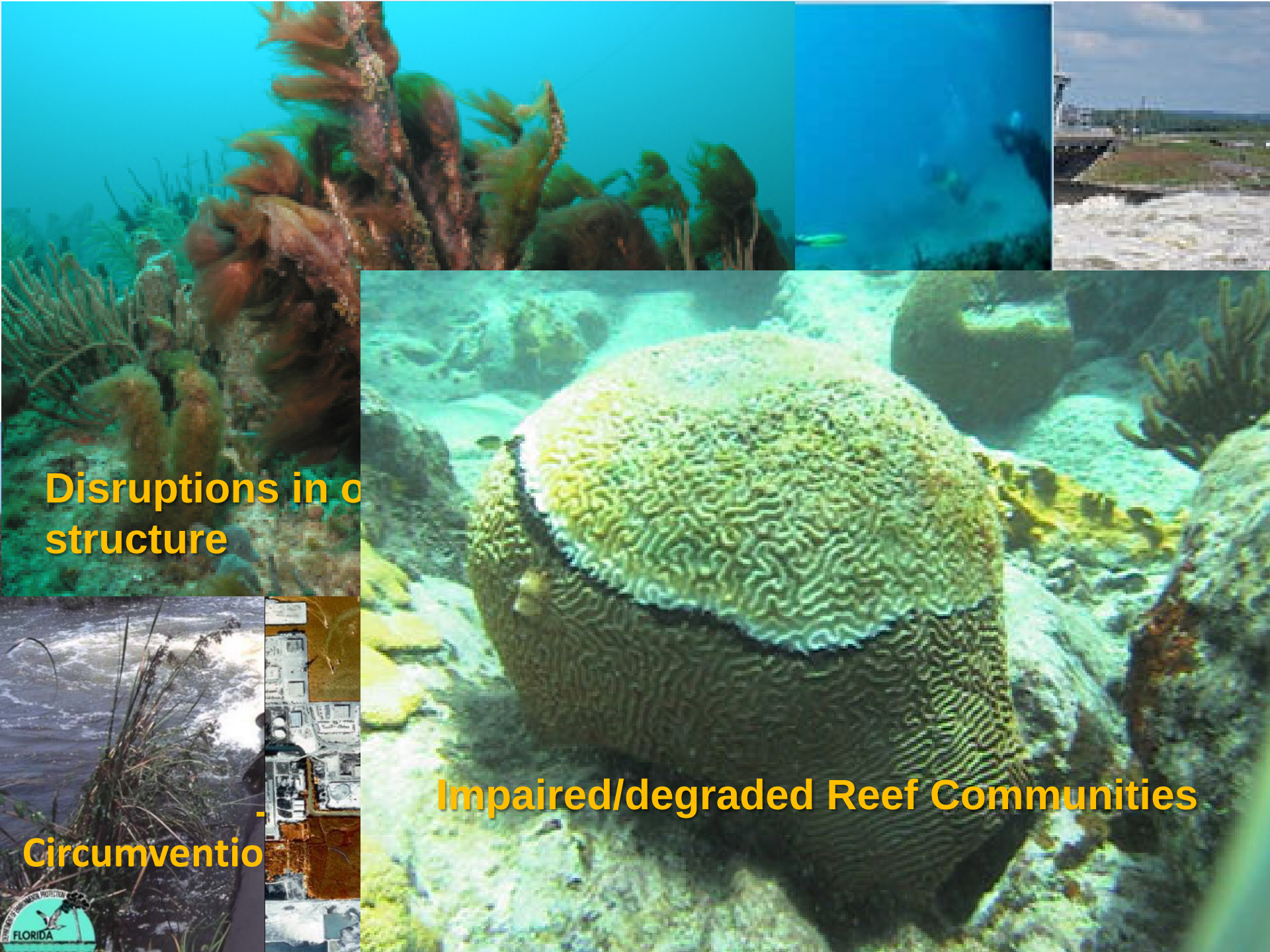
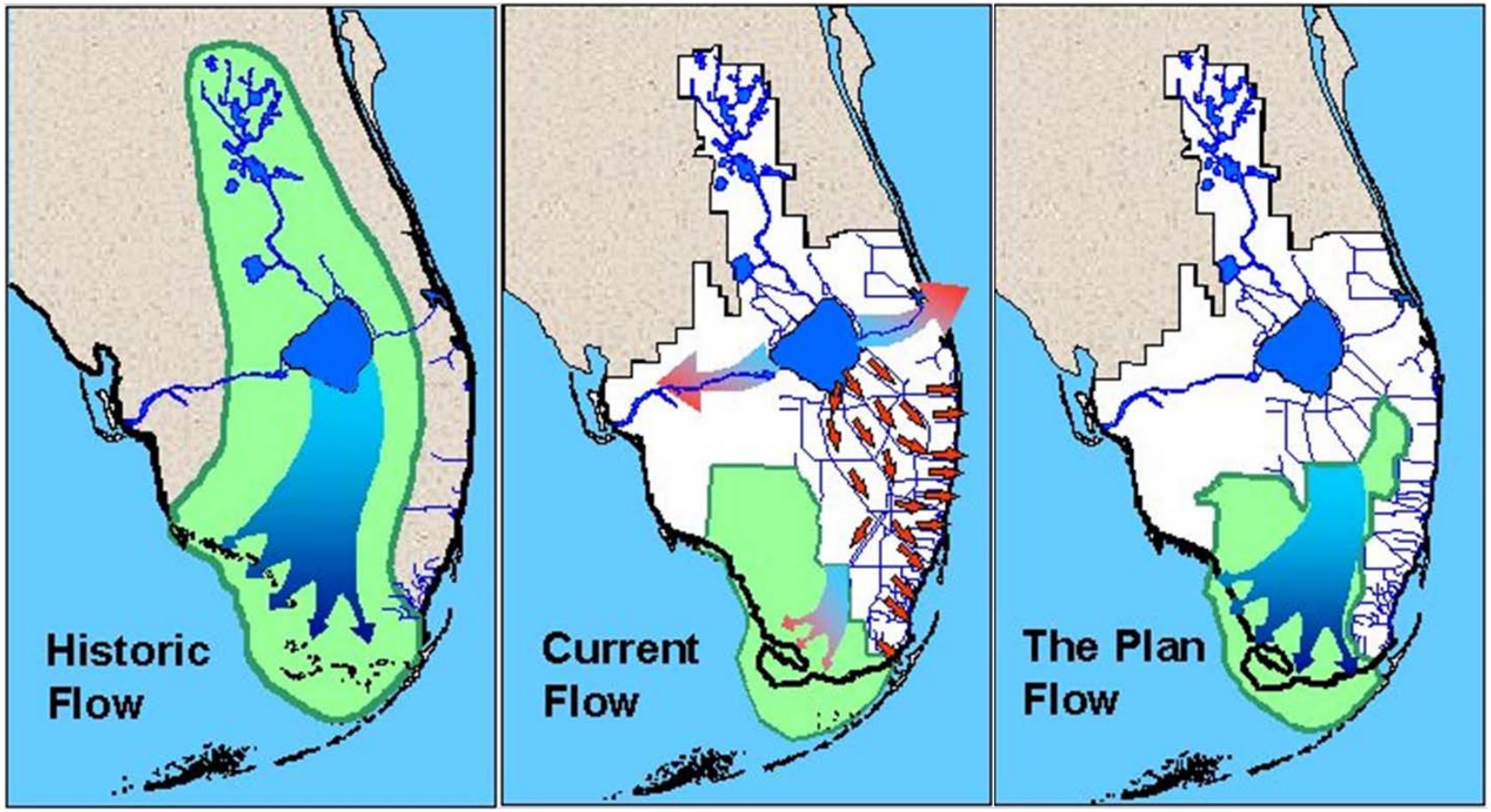

Disruptions in c
structure
Circumventio
Impaired/degraded Reef Communities

Reef Value: *Direct Economics For Florida*

- Coral Reefs are their own Stimulus Package
- 5 Florida Counties
- >$6 Billion annual use value, 71,000 jobs!
  - Broward Co., $2 Bn/yr
  - Monroe Co., $2.3 Bn/yr

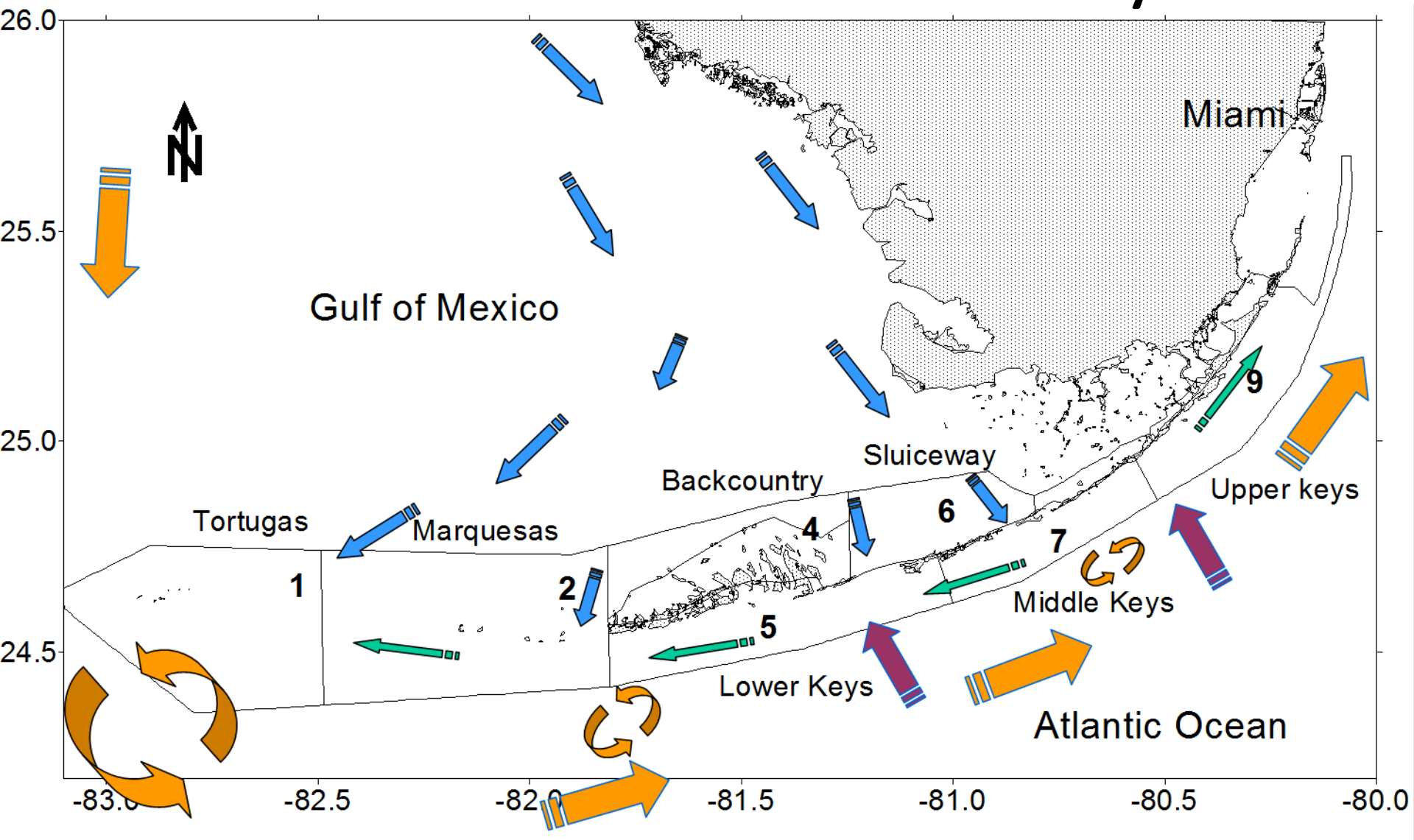
Johns et al. 2001 & 2004

So, this ain't Las Vegas: What happens in the Everglades **DOES NOT** stay in the Everglades.



Comprehensive Everglades Restoration Plan

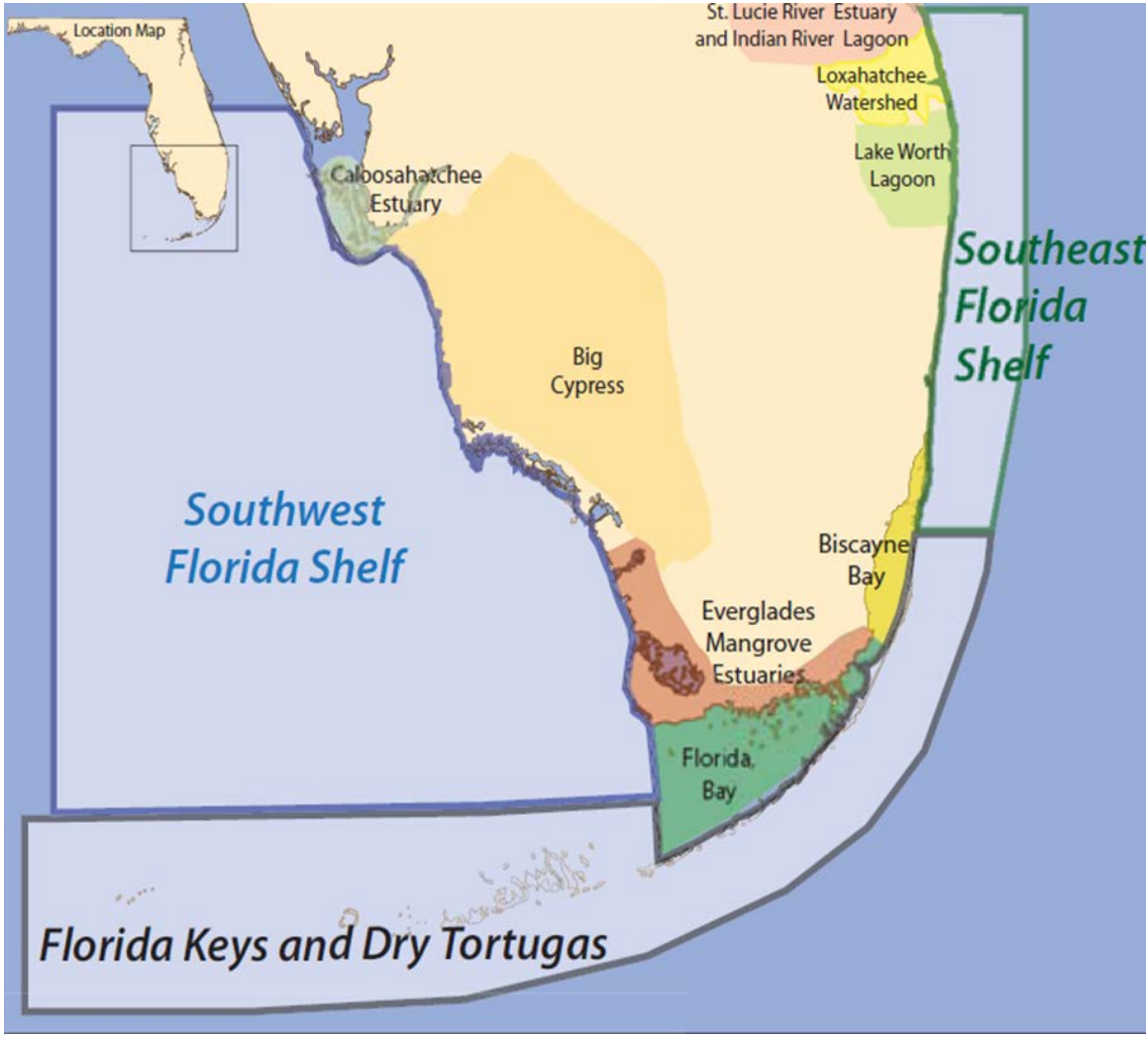
It’s All About Connectivity



MARine Ecosystem Goal Setting (MARES):

Connecting Science, Management, and Policy

- Why?
  - Extend CERP-like planning to marine ecosystem
- Where?
  - 3 “new” marine regions + CERP estuaries
- Who?
  - ~50 PI’s (Fed/State/Acad/NGO)
  - Human Dimension Component
- What?
  - Conceptual diagrams
  - Integrated Conceptual Ecosystem Model - DPSER
  - Quantitative Ecosystem Indicators
  - Total Marine Ecosystem Report Card
  - Address NOAA goal of Integrated Ecosystem Assessment (IEA)



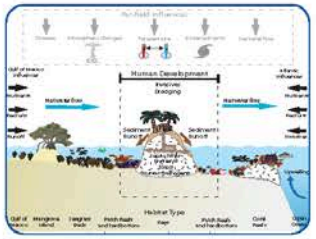
NOAA Center for Sponsored Coastal Ocean Research

Marine and Estuarine Goal Setting for South Florida

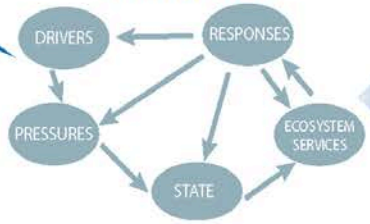
Articulating management goals

Gathering information

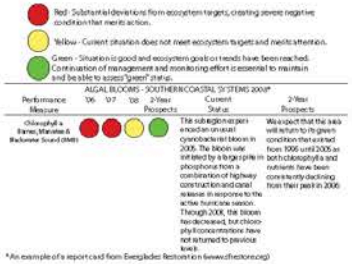
Describing the ecosystem



Developing a human-natural system framework



Developing and reporting a suite of ecosystem indicators to managers and policymakers



Red - Substantial deviations from ecosystem targets, creating severe negative condition that merits action.

Yellow - Current situation does not meet ecosystem targets and merits attention.

Green - Situation is good and ecosystem goals or trends have been reached. Continuation of management and monitoring effort is essential to maintain and be able to assess "green" status.

ALGAL BLOOMS - SOUTHERN COASTAL SYSTEMS 2008*

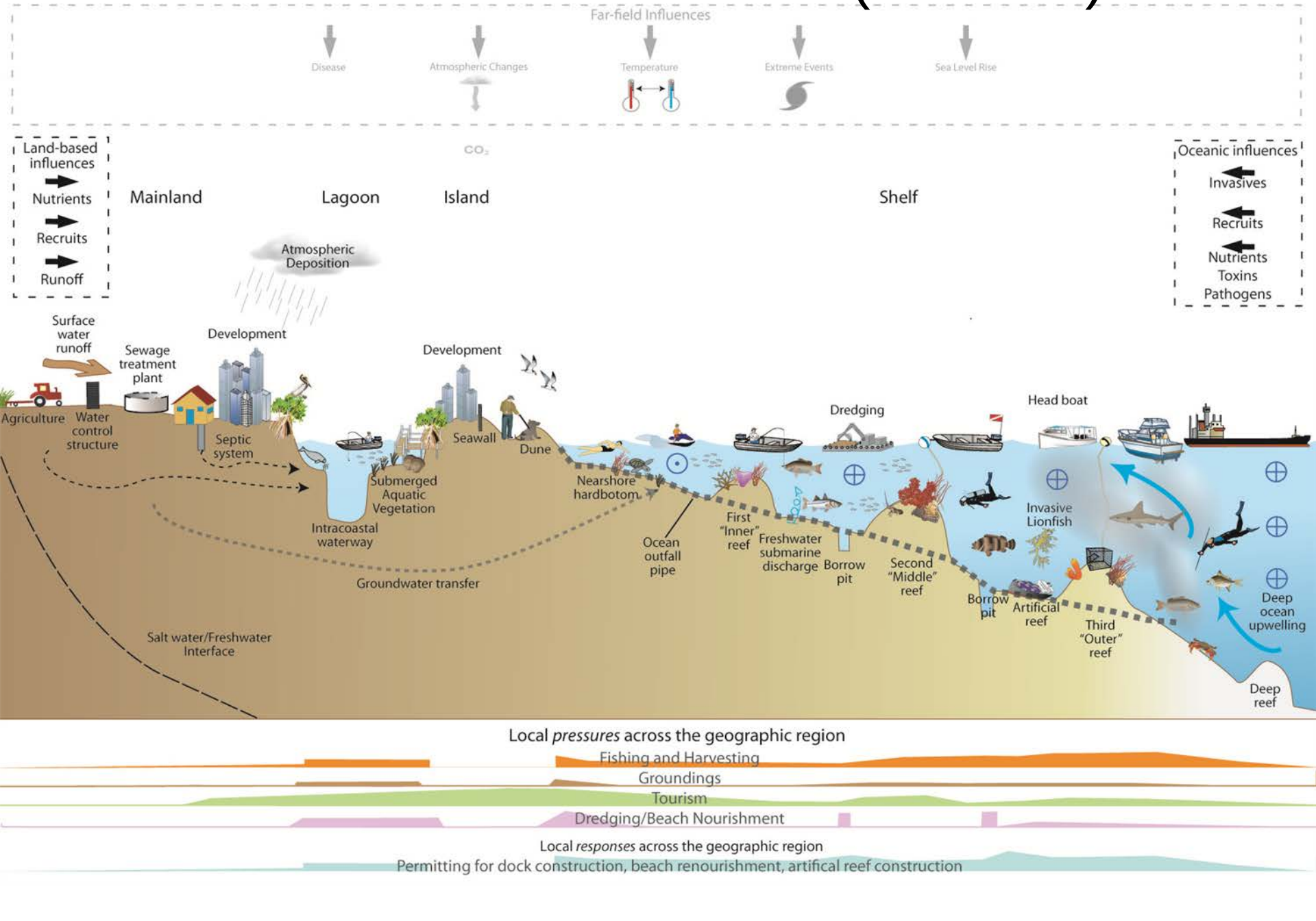
Performance Measure	'06	'07	'08	2-Year Prospects	Current Status	2-Year Prospects
Chlorophyll a, Barnes, Manatee & Blackwater Sound (BMB)					The subregion began an exceptional cyanobacterial bloom in 2005. The bloom was initiated by a large spike in phosphorus from a combination of highway construction and canal release in response to the active hurricane season. Though 2006, the bloom has decreased, but chlorophyll concentrations have not returned to previous levels.	We expect that the area will return to its green condition that existed from 1996 until 2005 as both chlorophyll a and nutrients have been consistently declining from their peak in 2006.

*An example of a report card from Everglades Restoration (www.sfrestore.org)

MARES Goals:

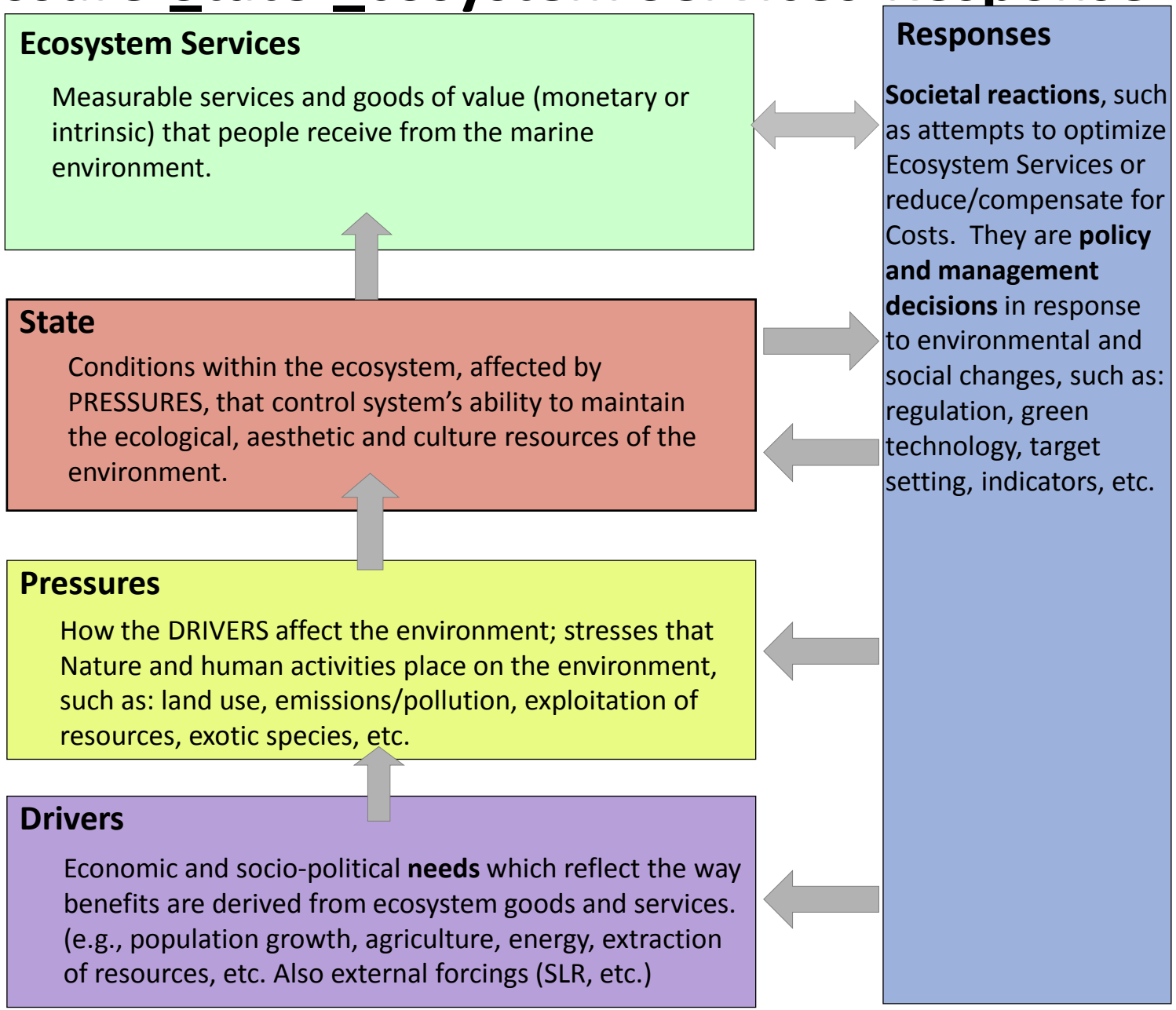
Engaging and building awareness
Priortizing research in South Florida
Forging a common vision

MARES Southeast Florida Reef (SEFCRI) ICEM



Driver-Pressure-State-Ecosystem Services-Response

DPSER
Framework



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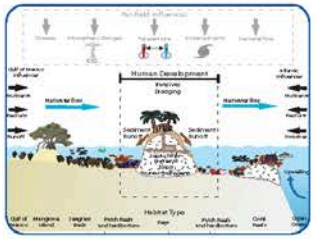

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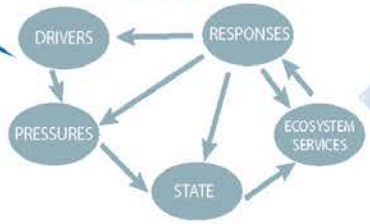

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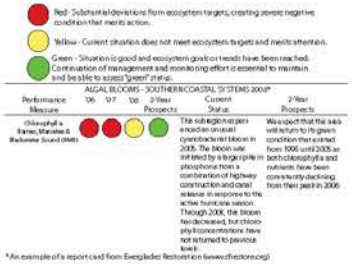

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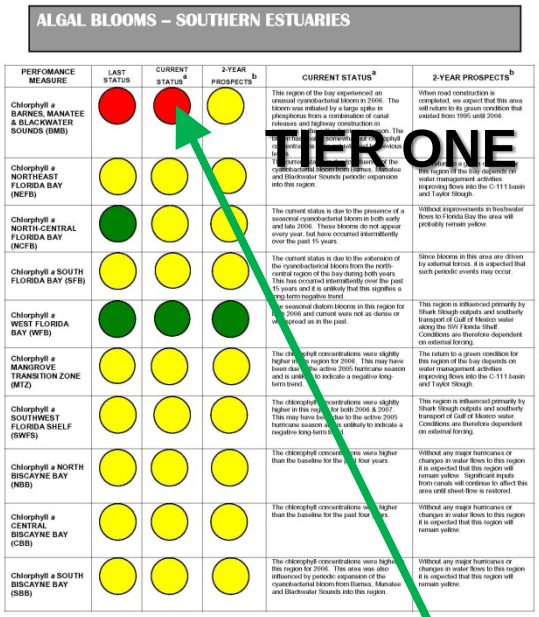
Quantitative Ecosystem Indicators

Example: SFERTF System-wide Indicators, which provides direct and transparent links from data to the stoplights

Stoplight Report

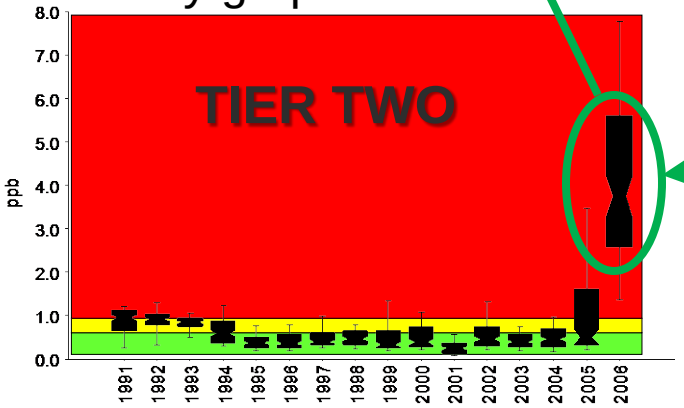


ALGAL BLOOMS – SOUTHERN ESTUARIES

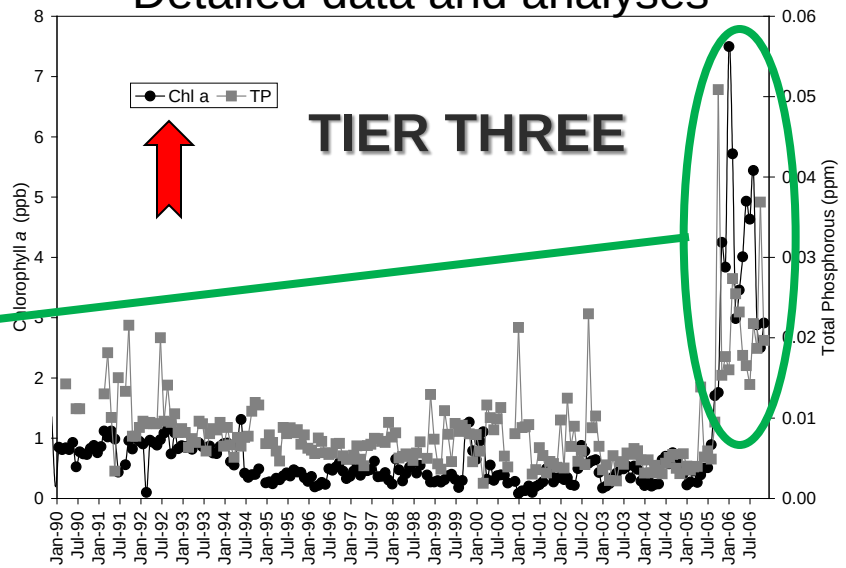
PERFOMANCE MEASURE	LAST STATUS	CURRENT STATUS[a]	2-YEAR PROSPECTS[b]	CURRENT STATUS[a]	2-YEAR PROSPECTS[b]
Chlorphyll a BARNES, MANATEE & BLACKWATER SOUNDS (BMB)				This region of the bay experienced an unusual cyanobacterial bloom in 2006. The bloom was initiated by a large spike in phosphorus from a combination of canal releases and highway construction in [illegible]	When road construction is completed, we expect that this area will return to its green condition that existed from 1995 until 2006.
Chlorphyll a NORTHEAST FLORIDA BAY (NEFB)				[illegible] cyanobacterial bloom from Barnes, Manatee and Blackwater Sounds periodic expansion into this region.	[illegible] this region of the bay depends on water management activities improving flows into the C-111 basin and Taylor Slough.
Chlorphyll a NORTH-CENTRAL FLORIDA BAY (NCFB)				The current status is due to the presence of a seasonal cyanobacterial bloom in both early and late 2006. These blooms do not appear every year, but have occurred intermittently over the past 15 years.	Without improvements in freshwater flows to Florida Bay the area will probably remain yellow.
Chlorphyll a SOUTH FLORIDA BAY (SFB)				The current status is due to the extension of the cyanobacterial bloom from the north-central region of the bay during both years. This has occurred intermittently over the past 15 years and it is unlikely that this signifies a long-term negative trend.	Since blooms in this area are driven by external forces, it is expected that such periodic events may occur.
Chlorphyll a WEST FLORIDA BAY (WFB)				[illegible] seasonal diatom blooms in this region for [illegible] 2006 and current were not as dense or as widespread as in the past.	This region is influenced primarily by Shark Slough outputs and southerly transport of Gulf of Mexico water along the SW Florida Shelf. Conditions are therefore dependent on external forcing.
Chlorphyll a MANGROVE TRANSITION ZONE (MTZ)				The chlorophyll concentrations were slightly higher in this region for 2006. This may have been due to the active 2005 hurricane season and is unlikely to indicate a negative long-term trend.	The return to a green condition for this region of the bay depends on water management activities improving flows into the C-111 basin and Taylor Slough.
Chlorphyll a SOUTHWEST FLORIDA SHELF (SWFS)				The chlorophyll concentrations were slightly higher in this region for both 2006 & 2007. This may have been due to the active 2005 hurricane season and is unlikely to indicate a negative long-term trend.	This region is influenced primarily by Shark Slough outputs and southerly transport of Gulf of Mexico water. Conditions are therefore dependent on external forcing.
Chlorphyll a NORTH BISCAYNE BAY (NBB)				The chlorophyll concentrations were higher than the baseline for the past four years.	Without any major hurricanes or changes in water flows to this region it is expected that this region will remain yellow. Significant inputs from canals will continue to affect this area until sheet-flow is restored.
Chlorphyll a CENTRAL BISCAYNE BAY (CBB)				The chlorophyll concentrations were higher than the baseline for the past four years.	Without any major hurricanes or changes in water flows to this region it is expected that this region will remain yellow.
Chlorphyll a SOUTH BISCAYNE BAY (SBB)				The chlorophyll concentrations were higher this region for 2006. This area was also influenced by periodic expansion of the cyanobacterial bloom from Barnes, Manatee and Blackwater Sounds into this region.	Without any major hurricanes or changes in water flows to this region it is expected that this region will remain yellow.

TIER ONE

Summary graphics and data charts



Detailed data and analyses



Continued Paths for Management

- Broad-scaled Regional Integrated Ecosystem Management (e.g., CERP, FK-WQPP)
  - Minimize impacts of regional water management
  - Optimize water QQTD
- Storm/wastewater Control and Management
  - Minimize sources and loads from land-based sources of pollution
- FL Reef Integrated Coastal Ecosystem Management Strategy
  - Recognize ecosystem services are a result of pressures & responses on state (MARES approach?)

For more information

www.sofla-mares.org

Facebook: www.facebook.com/pages/Mares-Project/

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305-348-4076

FIU | Southeast Environmental Research Center

FLORIDA INTERNATIONAL UNIVERSITY

NOAA NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION U.S. DEPARTMENT OF COMMERCE

Center for Sponsored Coastal Ocean Research