

# **Plan to Coordinate Science**

## **Science Coordination Group**



# SCG OVERVIEW

- REVIEW WORK TO DATE on PHASE I OF THE PLAN to COORDINATE SCIENCE
- WORK PLAN SUMMARY FOR COMPLETING PHASE II OF THE PLAN
- PROPOSED APPROACH FOR DEVELOPING SYSTEM WIDE INDICATORS
- INITIAL IMPLEMENTATION REPORTS AS TASKED IN PHASE I OF THE PLAN TO COORDINATE SCIENCE

# **REVIEW OF WORK TO DATE ON** **PHASE I OF THE PLAN TO** **COORDINATE SCIENCE**

- **Coordinates strategic-level science**
- **Uses Conceptual Ecological Models (CEM) to identify priority needs and gaps**
- **Recommends Task Force Actions**

# Plan to Coordinate Science

## PHASE I

- Development of **approach** to coordinate science
- **Evaluation** of approach using two CEM's
  - Florida Bay Florida Keys
  - Total System
- Also evaluated approach for assessing Science Applications
- Phase I Plan includes initial Needs, Gaps & Recommended Actions

# **WORKPLAN SUMMARY FOR** **COMPLETING PHASE II**

- Develop Needs, Gaps and Actions for other CEM's
  - Everglades Ridge and Slough, Southern Marl Prairies, Big Cypress Regional Ecosystem/Caloosahatchee estuaries, Biscayne Bay, Everglades mangrove estuaries, Lake Worth Lagoon, St. Lucie estuaries, Indian River Lagoon, Lake Okeechobee,
- Refine Prospective Issues Needs, Gaps and Actions
- Develop Needs, Gaps and Actions for Science Applications
  - Quality Assurance, Data Sharing, Progress Tracking
- Complete Initial Draft Plan
- Independent Scientific Review of Plan
- Final Draft Plan

# PROPOSED APPROACH FOR DEVELOPING SYSTEM-WIDE INDICATORS

- Establish an SCG sub-team to review RECOVER Total System Team indicators
- Build on RECOVER effort to develop an initial set of system-wide indicators
- SCG Review and refine indicators for presentation to the Task Force
- Task Force review and comment
- Independent Scientific Review of Indicators
- Final Recommendations for Task Force Approval

# PHASE I

## Implementation Reports

**Florida Bay Florida Keys Feasibility Study**

**Dr. Peter Ortner**

**Florida Bay Strategic Science Plan**

**Dr. Peter Ortner**

**Southern Estuaries MAP Module**

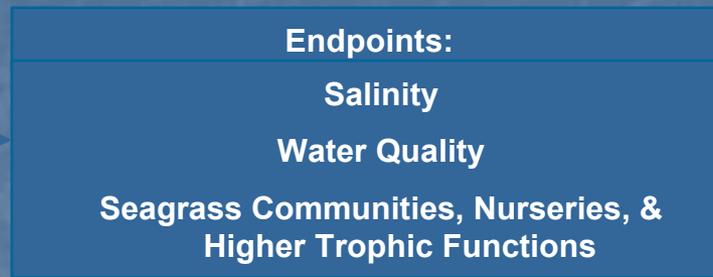
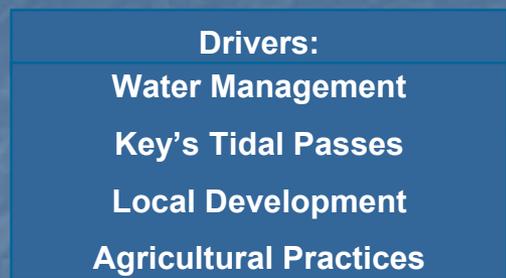
**Dr. Peter Ortner**

**Water Quality Feasibility Study**

**Dr. Susan Markley**

# Florida Bay Needs, Gaps, and Actions

## NEEDS



## GAPS

- Fully implementing critical elements within the Florida Bay and Adjacent Marine Systems Interagency Science Plan and its evaluation of current restoration plans and alternative plans (e.g. DON availability, mudbank evolution and improved bathymetry)
- Fully implementing and sustaining the CERP/RECOVER Monitoring and Assessment Plan (MAP) for the Southern Estuaries. Less than 50% of the funds required to do this are in the CERP/RECOVER budget. Task Force coordination and agency actions are required to fully implement and sustain RECOVER/MAP.

Sustaining critical elements within the Florida Bay and Adjacent Marine Systems Interagency Science Program and the Florida Bay and Florida Keys Feasibility Study water quality model in accordance with the Feasibility Study Project Schedule to provide timely recommendations to upstream CERP projects.

## ACTIONS RECOMMENDED BY THE SCG

### Task Force to review by December 2004:

- FB/FKFS model progress
- Implementation of the CERP MAP for southern estuaries
- FBAMS Strategic Science Plan

# Total System Needs, Gaps, and Actions

## NEEDS

### 11 Drivers and Stressors:

Water Management

Land Use/Development

Contaminants

Nutrients

Spatial Extent/Habitat Fragmentation

Invasive Species

## GAPS

- Completing the Comprehensive Water Quality Feasibility Study (for both contaminants and nutrients) in the South Florida Ecosystem.
- Maintaining the current scope and schedule for the RECOVER/MAP, including the monitoring not funded by CERP but by the other Task Force member organizations.

## ACTIONS RECOMMENDED BY THE SCG

### Task Force to review by December 2004:

- Current status of the CIWFS [On agenda for September Task Force Meeting]
- Implementation of the CERP MAP

Florida Bay and Adjacent  
Marine Systems (FBAMS)  
Science Program

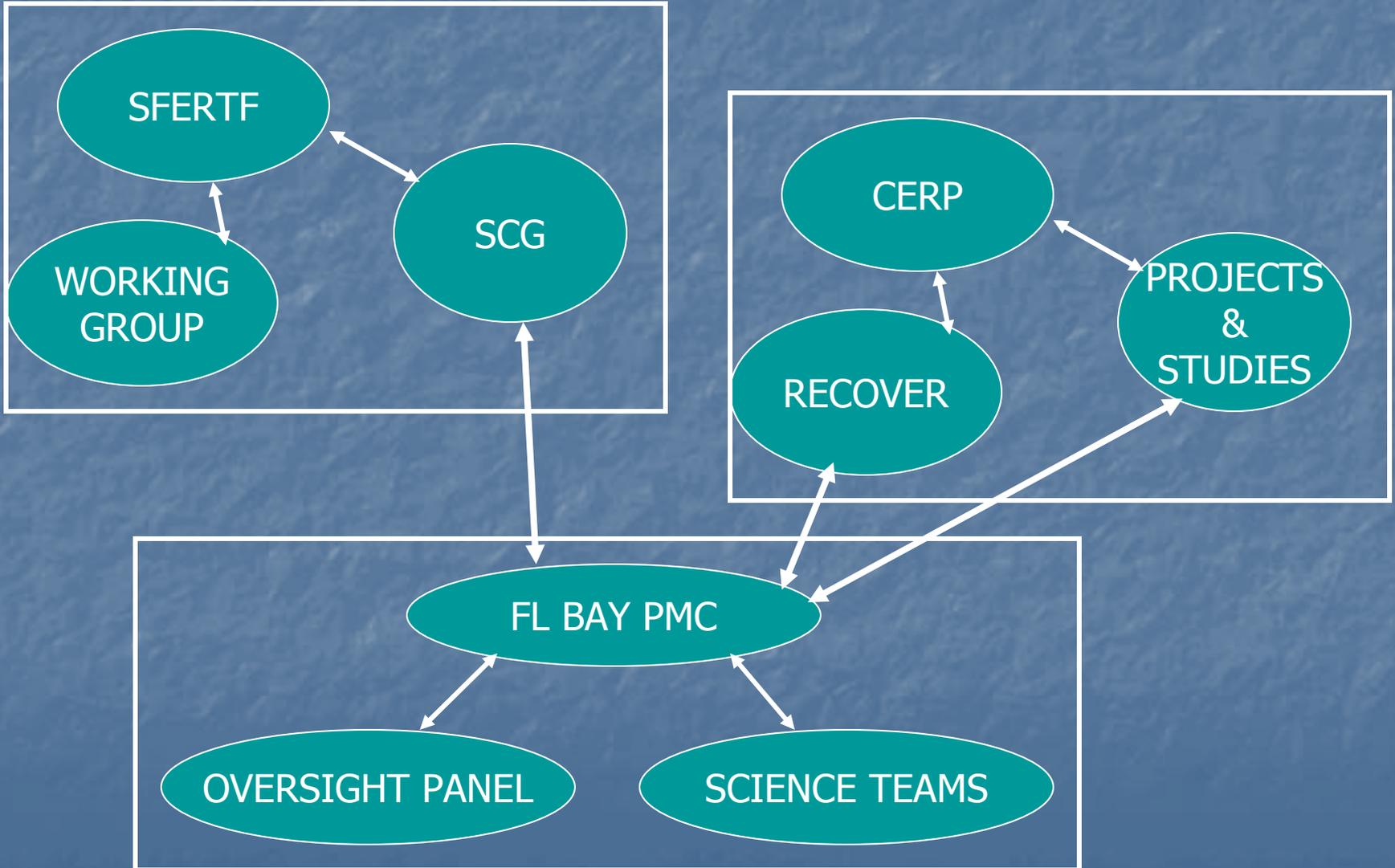
# The Strategic Science Plan for Florida Bay

- **Mission:**
- Generate science for restoration and natural resource management
- Advance basic understanding of the Florida Bay ecosystem
- Facilitate efficient exchange of scientific information

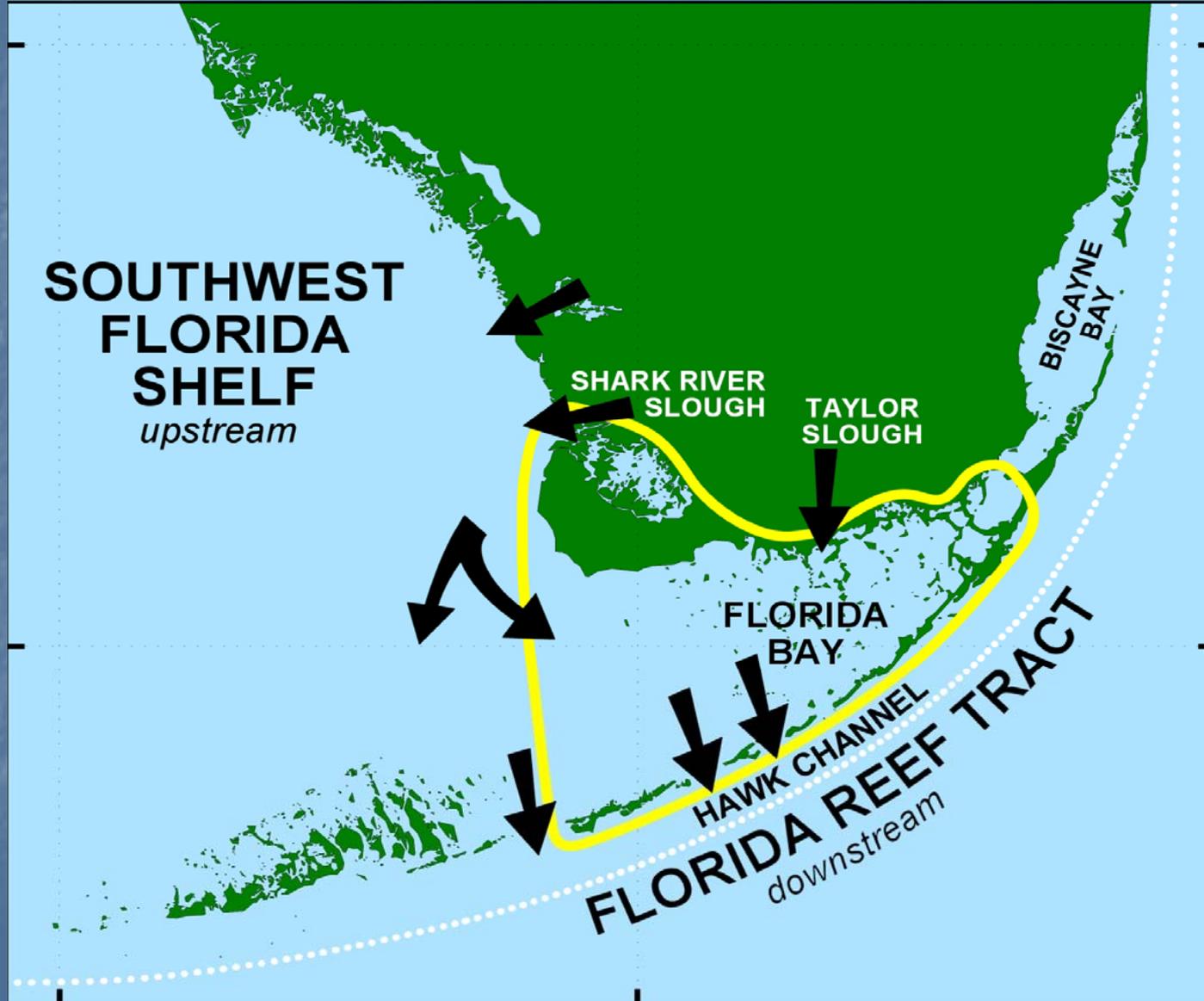
# Florida Bay and Adjacent Marine Systems (FBAMS) Science Program

- Initiated in 1994 in response to public concerns regarding changes in Florida Bay
- Comprises research, monitoring, and modeling activities conducted and/or funded by cooperating federal and state agencies
- Includes independent expert scientific review
- Guided by a Strategic Science Plan
- Coordinated through an interagency Program Management Committee

# THE BIG PICTURE



# GEOGRAPHIC SCOPE



# The FBAMS Science Program emphasizes science that:

- improves our understanding of critical ecological linkages as expressed in regional conceptual ecological models
- helps refine definitions of restoration targets
- aids in the development, calibration and validation of numerical and statistical models used to make system predictions

# Florida Bay and Florida Keys Feasibility Study

# Feasibility Study Goal

- **Evaluate Florida Bay and its connections to the Everglades, the Gulf of Mexico and the Florida Keys' marine ecosystem to determine the modifications that are needed to successfully restore water quality and ecological conditions of the Bay, while maintaining or improving these conditions in the Keys' marine ecosystem**

*Gulf of Mexico*

Miami

*Everglades*

*Biscayne Bay*

# **GEOGRAPHIC SCOPE**

**Florida Bay & Florida  
Keys  
STUDY AREA**

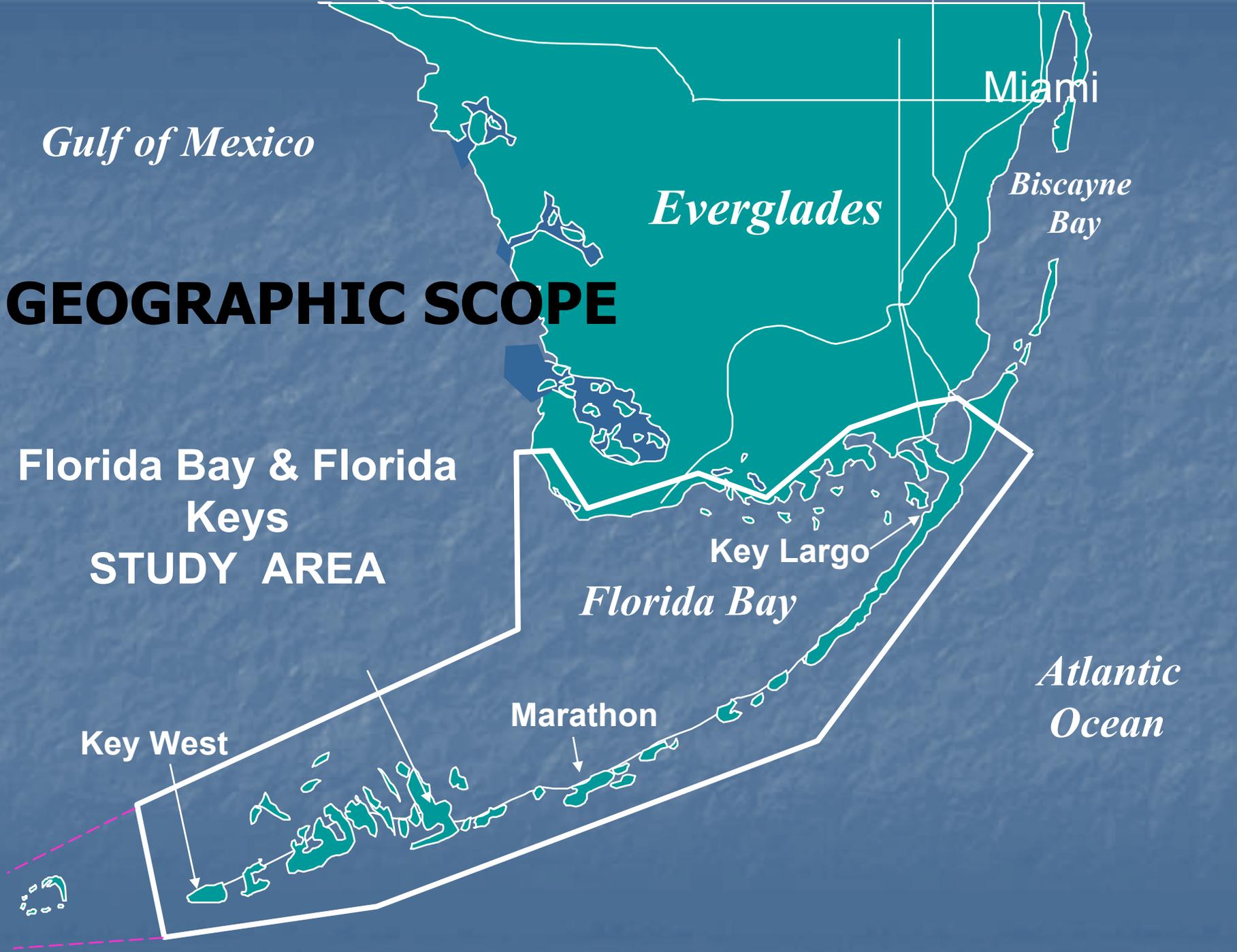
Key Largo

*Florida Bay*

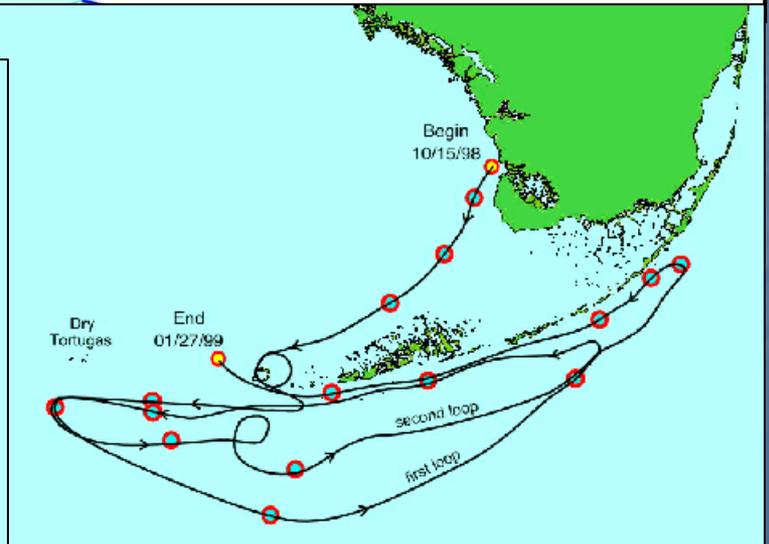
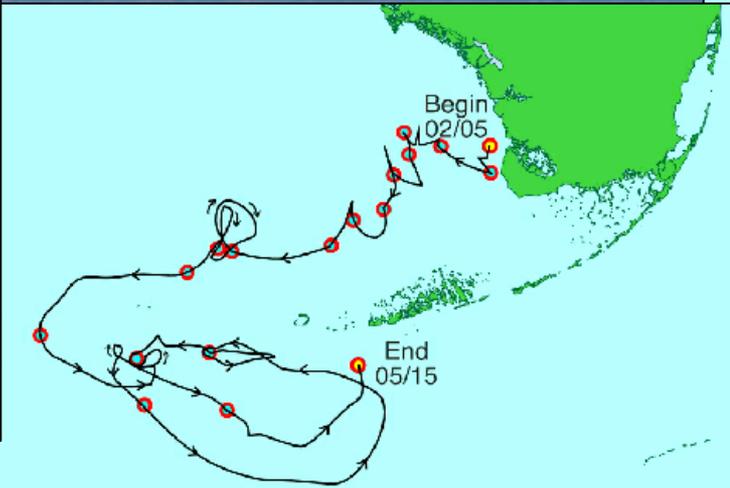
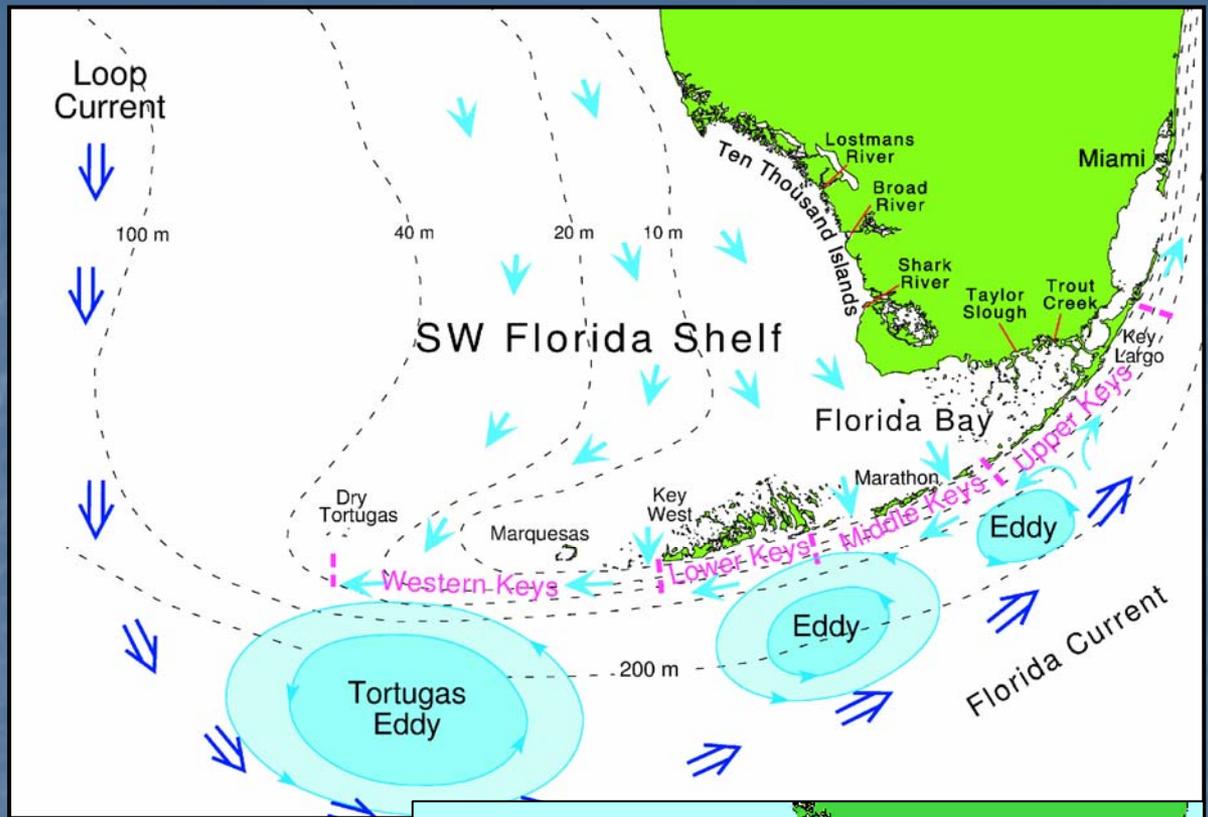
*Atlantic  
Ocean*

Key West

Marathon



# Physical Processes Are Complex And Closely Couple The Entire S FL Ecosystem



# The Florida Bay/Florida Keys Feasibility Physical Modeling Program

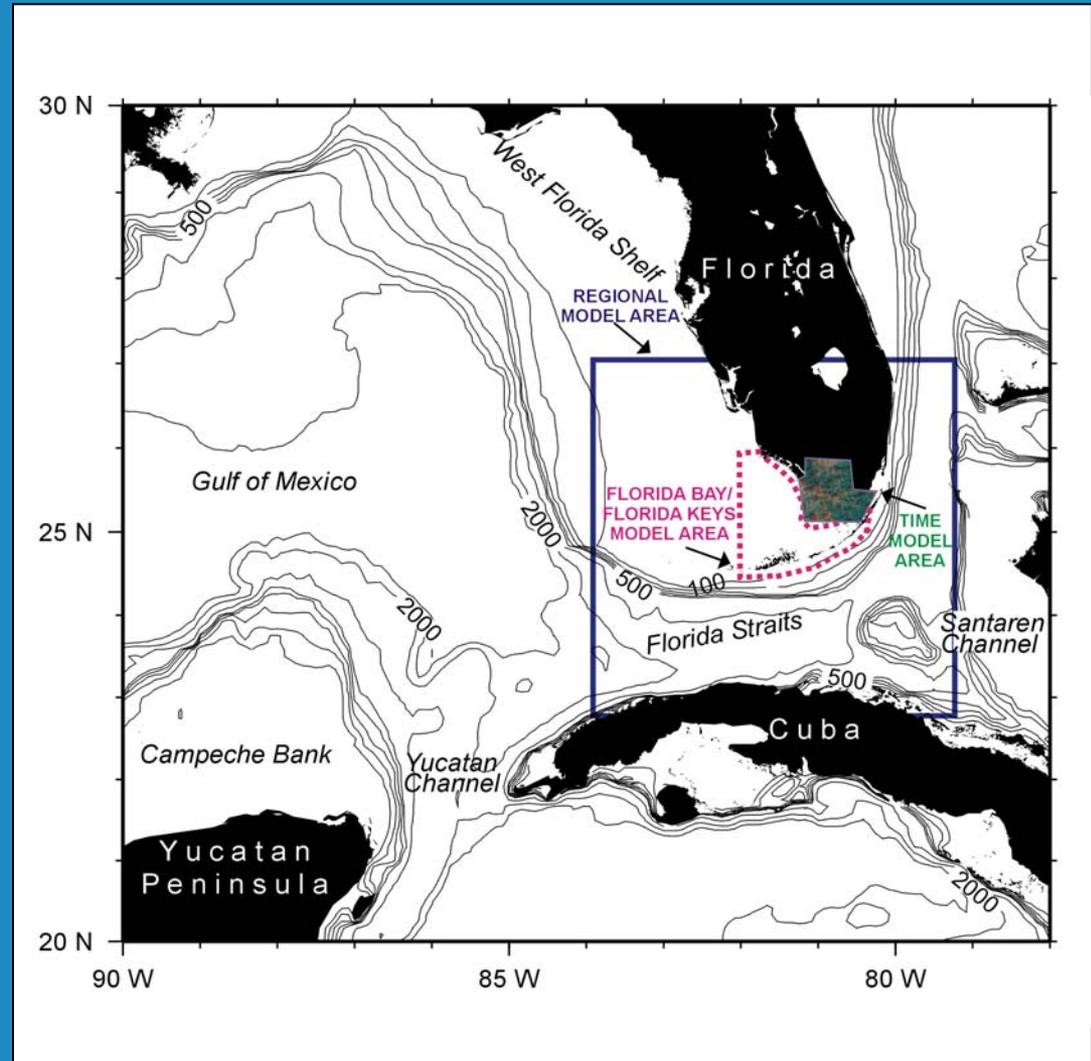
Successful **management** of the Florida Keys Reef Tract requires **numerical models** that represent the strong linkages with the surrounding and remote sources of nutrients and pollutants

A **nested modeling approach** connects the Florida Keys Reef Tract to the adjacent Florida Bay, the Florida Straits and the Gulf of Mexico through the REGIONAL SOUTH FLORIDA HYCOM model

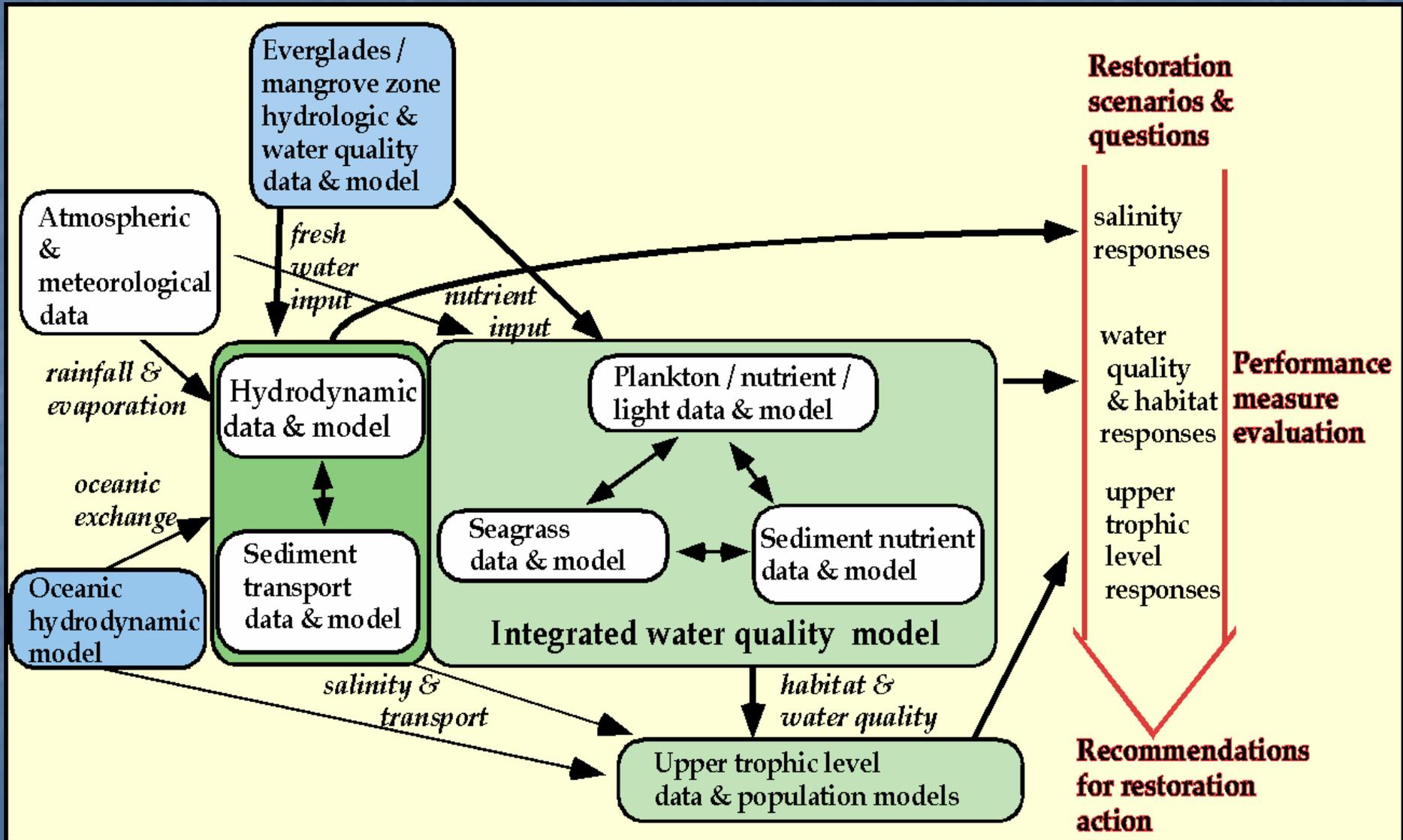
Regional Model – NOAA

Inner Bay Model – SFWMD

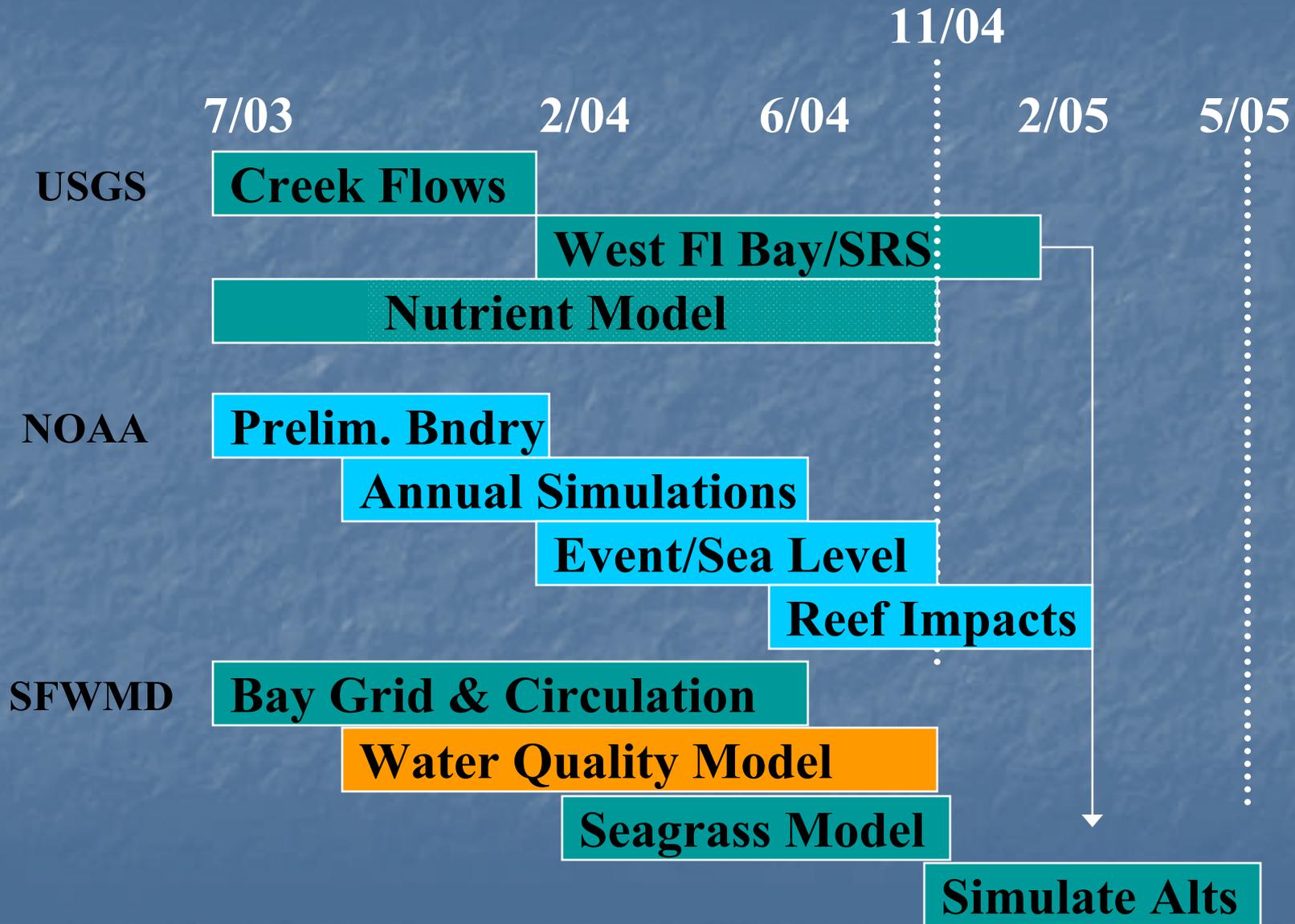
Coastal Hydrological Model-  
USGS



# Model Application in Florida Bay Restoration



# Modeling Timeline



**RECOVER  
MONITORING &  
ASSESSMENT PLAN  
(MAP)**

**GREATER  
EVERGLADES  
WETLANDS**

**SOUTHERN  
ESTUARIES**

**NORTHERN  
ESTUARIES**

**LAKE  
OKEECHOBEE**

**MODULES IN  
RECOVER  
MONITORING &  
ASSESSMENT PLAN  
(MAP)**

**S. FL  
HYDROLOGY  
MONITORING  
NETWORK**

**MERCURY  
BIOACCUMULATION**

# **"Successful implementation of the MAP is dependent upon two key assumptions"**

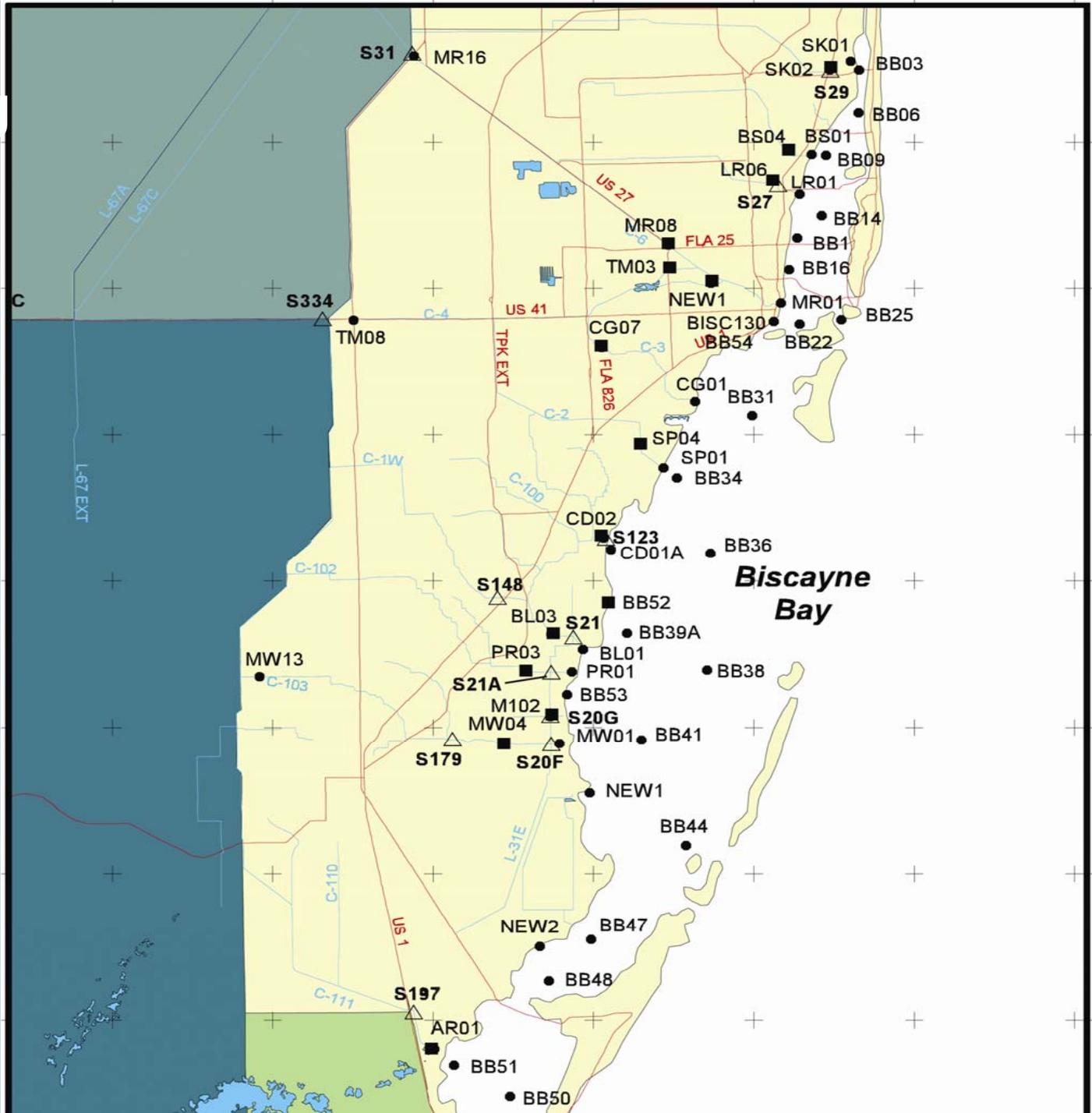
- 1. Existing monitoring will continue with existing funding sources (i.e. the MAP should not replace ongoing agency efforts that are essential to the plan implementation)**
- 2. Partnering agencies will contribute funding and/or will participate in the implementation of MAP**

# **Southern Estuaries MAP Module**

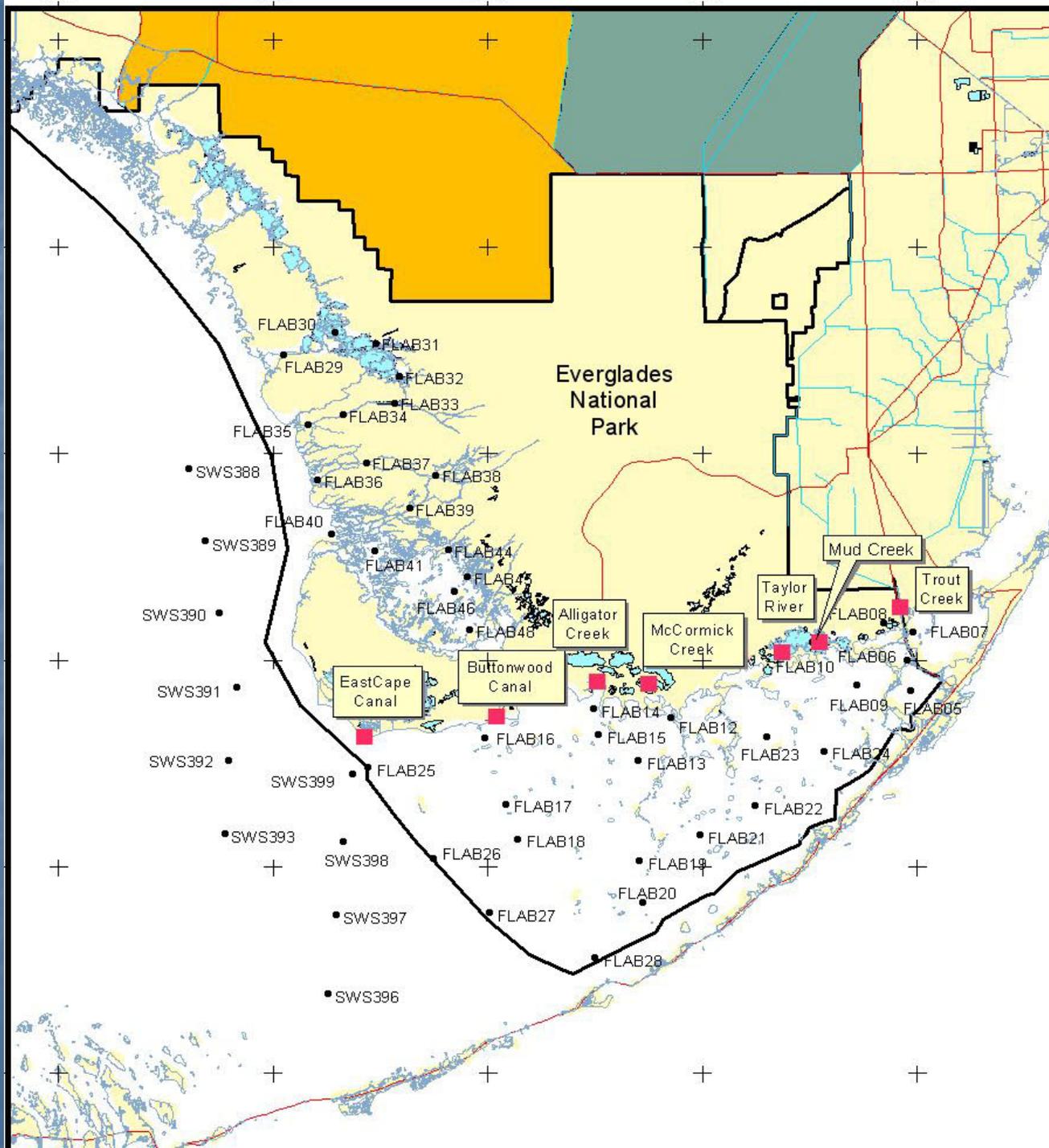
**Water Quality and Phytoplankton  
Network Components**

**NOAA, SFWMD, MIAMI-DADE DERM**

# MAP Sampling by DERM



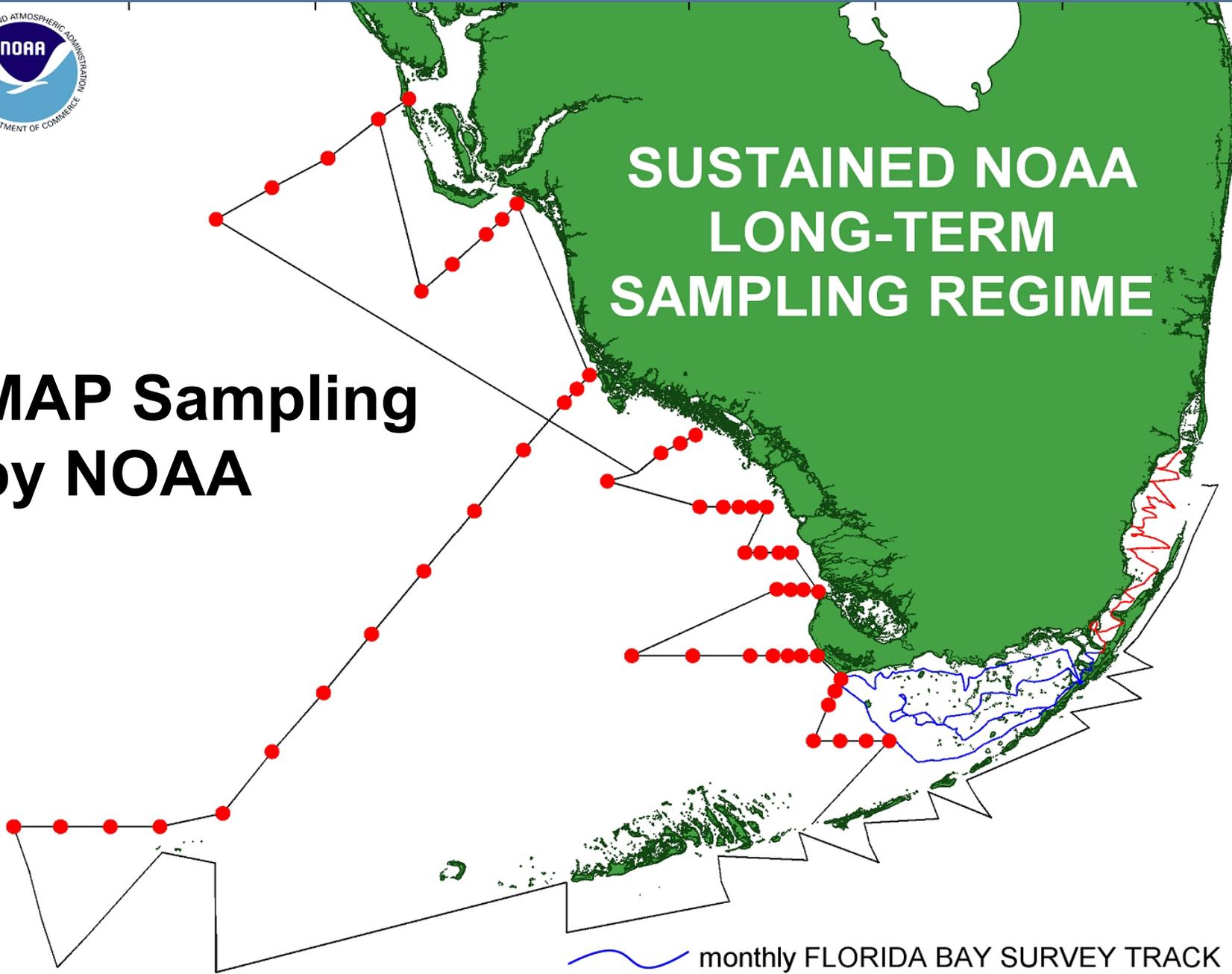
# MAP Sampling by FIU (Funding by SFWMD)





# SUSTAINED NOAA LONG-TERM SAMPLING REGIME

## MAP Sampling by NOAA



 monthly FLORIDA BAY SURVEY TRACK  
 monthly BISCAYNE BAY SURVEY TRACK

 bimonthly REGIONAL SURVEY TRACK *and associated CTD / water quality stations*

CERP Map Identified \$2.8  
Million Funding needed for  
Southern Estuaries Module

# **RECOVER Support**

## **Southern Estuaries MAP Module**

**COE/SFWMD**

**\$800 K**

# **Non-RECOVER Support by Agency**

## **Southern Estuaries MAP Module**

**MIAMI-DADE DERM**

**\$100 K**

**SFWMD**

**\$700 K**

**NOAA**

**\$1.2 M**

# Florida Bay Gaps

- Fully implementing critical elements within the Florida Bay and Adjacent Marine Systems Interagency Science Plan and its evaluation of current restoration plans and alternative plans (e.g. DON availability, mudbank evolution and improved bathymetry)
- Fully implementing and sustaining the CERP/RECOVER Monitoring and Assessment Plan (MAP) for the Southern Estuaries. Less than 50% of the funds required to do this are in the CERP/RECOVER budget. Task Force coordination and agency actions are required to fully implement and sustain RECOVER/MAP.
- Sustaining critical elements within the Florida Bay and Adjacent Marine Systems Interagency Science Program and the Florida Bay and Florida Keys Feasibility Study water quality model in accordance with the Feasibility Study Project Schedule to provide timely recommendations to upstream CERP projects.

# Task Force Actions

- **Review the FB/FKFS model progress and assure its timely completion**
- **Secure agency commitments to address critical elements in the FBAMS Strategic Science Plan**
- **Secure non-sponsor agency commitment to sustain and implement MAP**

# SYSTEM-WIDE WATER QUALITY

# System-Wide Water Quality Needs

- Understand **NUTRIENT** transport, transformation, and ecological effects
- Understand fate, transport, and effects of **CONTAMINANTS**, including
  - Organic chemicals (eg. pesticides)
  - Heavy metals
  - Sediment/soil contamination effects
  - Emerging Pollutants of Concern (EPOCs, e.g. antibiotics, hormones, unregulated compounds)

# Regulatory Criteria – a good place to start

- Not always the same as restoration targets
- How to apply narrative standards
  - Distinguish human-related from natural changes
  - Determining “ambient” or natural balance
- Very low concentrations in water (which meet standards) may still affect soil, sediment, or animal tissues
- EPOCs – no regulatory criteria yet

Nutrient concentrations may be acceptable for some uses or sites but may be too high for others



Distinguish natural changes vs. human-related



The water may meet all current regulatory standards, but...



...alternative uses or deliveries of water may still expose people or wildlife to biologically unacceptable levels of contaminants.

# Initial SYSTEM-WIDE WATER QUALITY GAPS

- Completing the **Comprehensive Water Quality Feasibility Study (CIWQFS)** including contaminants and nutrients in the South Florida Ecosystem
  - An important tool for evaluating ongoing plans, programs and projects
- Scope of the study in the **“Yellow-Book”** extends to **non-CERP** restoration and regulatory programs

# Initial TOTAL SYSTEM GAPS

- Completing the **Comprehensive Water Quality Feasibility Study (CIWQFS)** including contaminants and nutrients in the South Florida Ecosystem

# Initial **TOTAL SYSTEM ACTIONS for TASK FORCE**

- Review current status of the **CIWQFS**

# SUMMARY of KEY SCG RECOMMENDATIONS

- COE/SFWMD include Florida Bay/Florida Keys **Water Quality Model** in FB/FK Feasibility Study
- **Water Quality Feasibility Study** should complete by 2006:
  - Identification of links between water quality & ecosystem function throughout the system
  - Water Quality targets for ecosystem restoration
- Task Force agencies continue CERP and non-CERP funding support for **science & CERP MAP** in Florida Bay and Southern Estuaries