



**A State's Story:  
Progress toward Reducing Nutrients  
and Mitigating Gulf Hypoxia**

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# A Major Water Quality Threat



**Nutrient Over-Enrichment** →  
(Excessive Nitrogen and Phosphorous)

**Eutrophication** →

(Low DO, Fish Kills, Habitat Loss)

**Downstream Impacts** →  
(Gulf Hypoxia)



# What Is Being Done About This at the National, Regional, and State Levels?



Mississippi River  
Gulf of Mexico  
Watershed Nutrient  
Task Force



- **Mississippi River/Gulf of Mexico Watershed Nutrient Task Force**
  - Hypoxia Action Plan 2008
- **Gulf of Mexico Alliance**
  - Governors' Action Plan II
- **Mississippi Partners**
  - Integrate Plans
  - MOA
  - Nutrient Reduction Strategies
  - Annual Summit
  - TMDLs
  - Numeric Nutrient Criteria

# Action Plan II

- **Nutrients PIT Action Areas 2009-2014**

Action 1: Characterizing Nutrients and Nutrient Impacts

Action 2: Supporting State Efforts to Develop Nutrient Criteria

Action 3: Reducing Hypoxia

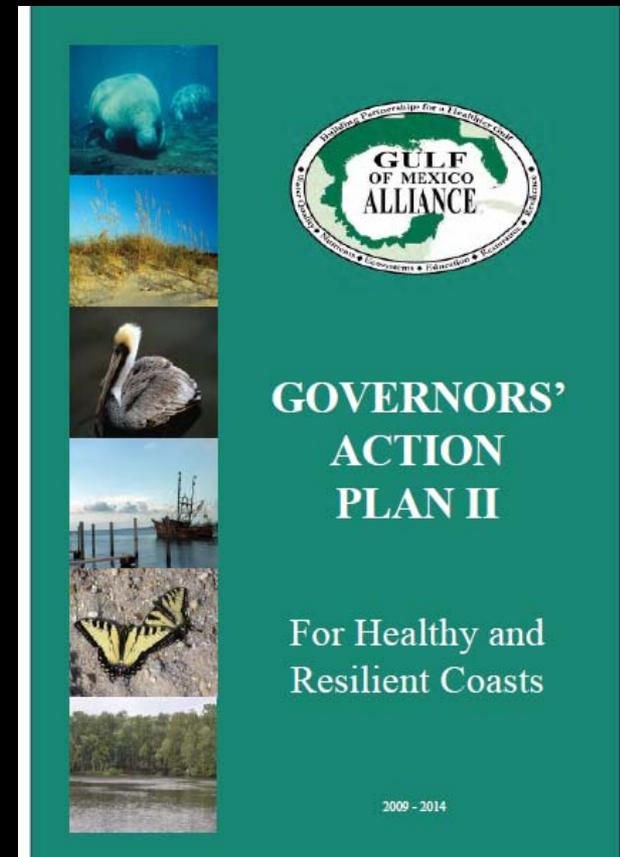
Action 4: Reducing Nutrient Inputs (Nutrient Reduction Strategies)

- **4 Actions, 22 Action Steps**

- **Tier 2 document supplements AP2**

– More detailed for implementation

- **Action Implementation Teams**



# Action 1: Nutrient Characterization

- **Nutrient Sources, Fate, Transport, and Effects Studies**
  - St. Louis Bay, MS; Weeks Bay, AL; Mission-Aransas Bay, TX; Galveston Bay, TX; Tampa Bay, FL
- **Ecosystem and Socioeconomic Impacts**
- **Strategies for Improved Monitoring and Data Collection**
- **Environmental and Biological Indicators of Nutrient Impacts**
  - Benthic Index for Gulf of Mexico Waters
- **Increase Understanding of the Role of Coastal Wetlands**
- **Increase Understanding of Contribution from Adjacent, Freshwater Systems to Coastal Waters**



# Action 2: Nutrient Criteria Development

- **Aligned, Gulf States Approach**
  - Regional Nutrient Criteria Development Plan
- **Gulf Alliance Nutrient Criteria Conferences and Workshops**
- **Technical Workgroup(s) to Evaluate Appropriate Biological Assessment Tools, Endpoints, and Nutrient Related Thresholds**
- **Gulf-wide Classification System**
- **Pilot the Process for Developing and Evaluating Nutrient Criteria**



# Action 3: Increasing Regional Coordination to Reduce Hypoxia

- Coordinate strategies and provide guidance to better characterize hypoxia and the resulting socioeconomic impacts
  - Includes Both Localized Hypoxic Events and the Gulf Hypoxic Zone
  - Coordinate and Leverage with the Efforts of the Hypoxia Task Force (AP2 and GHAP 2008 Coordination Matrix)
  - Includes Monitoring and Modeling Components
  - Coordination of Resources and Research
  - Promote Information and Technology Exchange between the Upper and Lower MS River Basin States



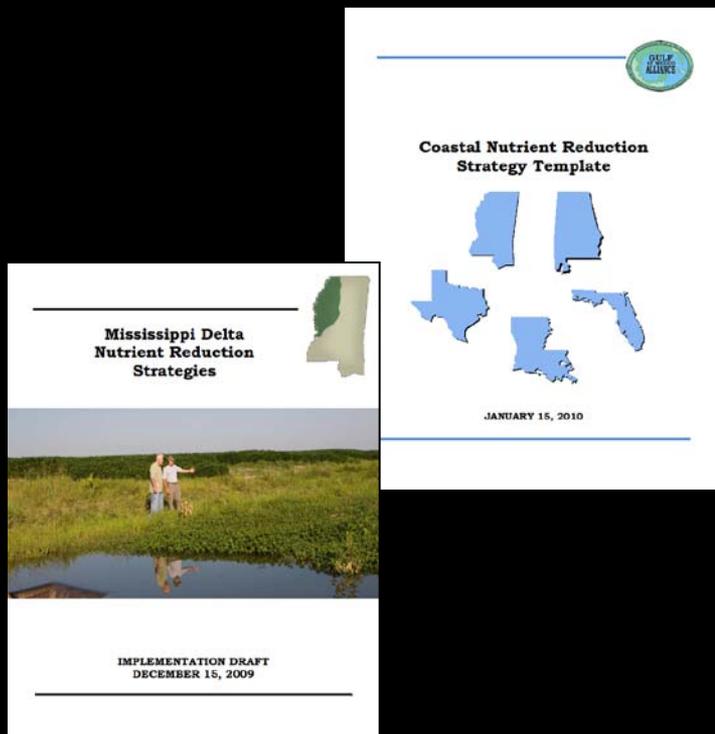
# Action 4: Reducing Nutrient Inputs

- Develop management tools and implement nutrient reduction activities
- Outreach and Education Efforts
- Decision Support Toolbox for Nutrient Reduction
- Increasing Partnerships
- Pilot New Innovative Technologies
- Nutrient Reduction Strategy Template
- Implement and Evaluate Nutrient Reduction Strategies



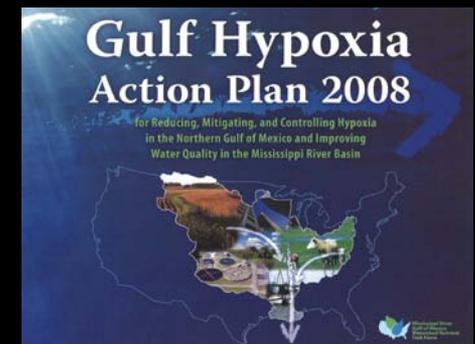
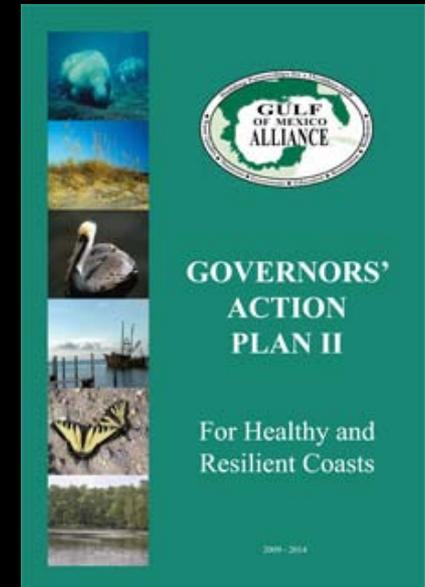
# Mississippi's Approach: Develop & Implement Strategies

- **Mississippi Delta Nutrient Reduction Strategies (2009)**
- **GOMA Coastal Nutrient Reduction Strategy Template (2010)**
- **HTF Lower Mississippi River Nutrient Reduction Framework (2010)**
- **Coastal and Upland Nutrient Reduction Strategies (2011)**
- **Statewide Strategies (2011)**
- **HTF Virtual Workshops (2012)**



# Mississippi's Approach: Leverage Plans, Resources, Outputs

- **Incorporate Action Plans into programs**
- **Build on the guiding principles of the Action Plans**
- **Start now & do the best with what we have**
- **Annual Mississippi Nutrient/Hypoxia Summits**
- **Memorandum of Agreement**
- **Use TMDL targets now and develop numeric criteria**



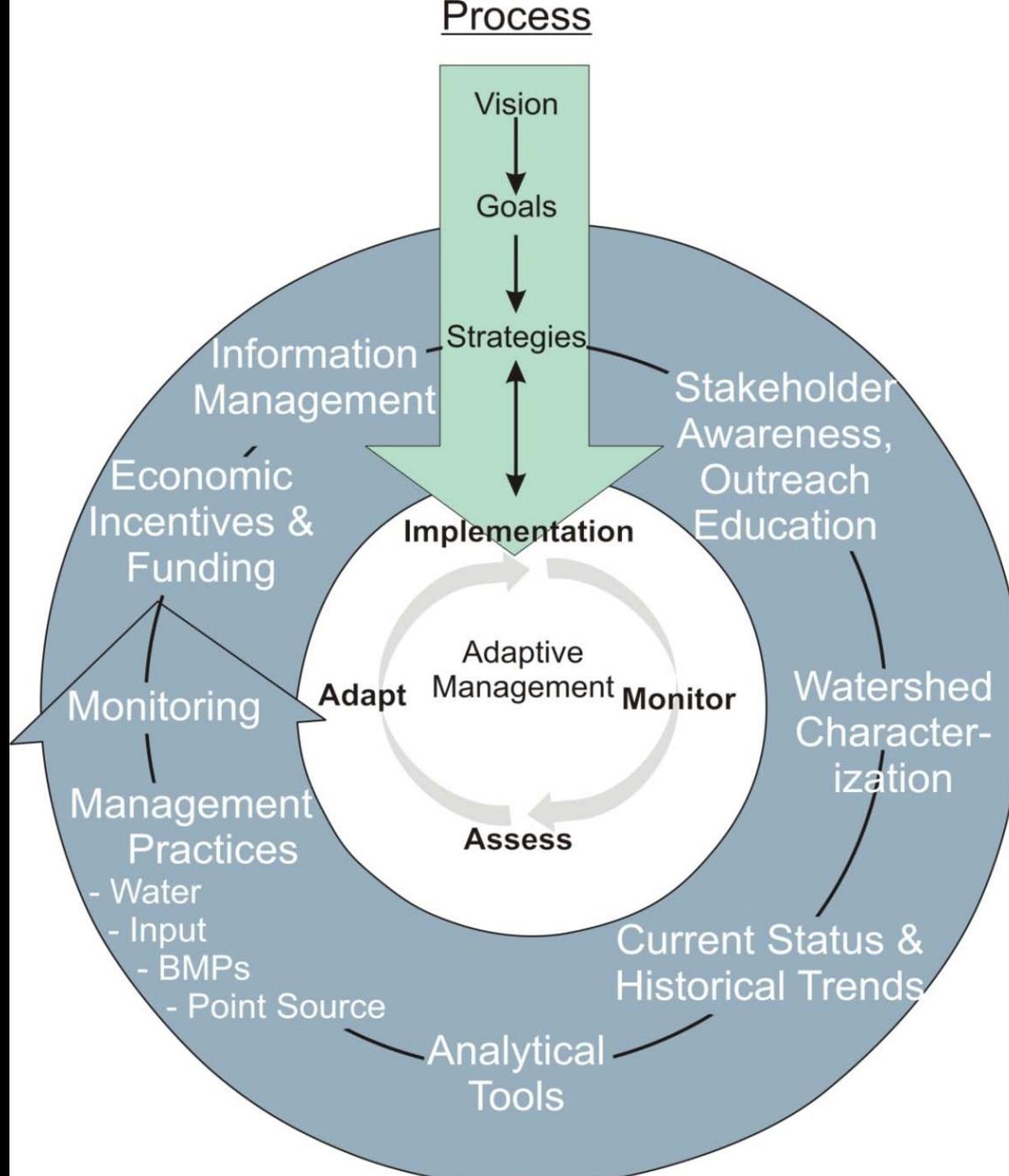
# Strategy Partners



MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY



**Nutrient  
Reduction  
Strategy Process:  
Collaborative  
&  
Comprehensive**



# Key Questions

- **What load reductions are achievable and when?**
- **What are the costs?**
- **What are the values to stakeholders?**
- **What nutrient reductions will protect State waters and the Gulf of Mexico?**



**Implementation:  
Mississippi  
Nutrient  
Reduction  
Watershed  
Projects**

Buffer Project

BMP Evaluation

Bee Lake I

Bee Lake II

Delta F.A.R.M.  
Program Development

**\$4.4 Million**  
in 319 Funds

Porter Bayou

Harris Bayou

Wolf Lake

Steele Bayou



Corporate

DF-CCPI

NRCS-CIG

**\$50.3 Million**  
Other Federal, State, Private Funds

Farmers

EPA-GMPO

MS-DMR

MRBI-WREP

MRBI-CCPI

# Mississippi MRBI Funding/Applications

## Sunflower Watershed

### MRBI Funds Received

2010 = \$3,530,548.31

2011 = \$2,543,854.41

## Producer Applications

### Submitted in MRBI Watersheds:

2009 = \$6,815,890.42

2010 = \$15,034,822.67

2011 = \$46,877,903.84

## Steele Bayou/Deer Creek Watershed

### MRBI Funds Received

2010 = \$347,506.16

2011 = \$662,372

## Upper Yazoo Watershed

### MRBI Funds Received

2010 = \$556,185.60

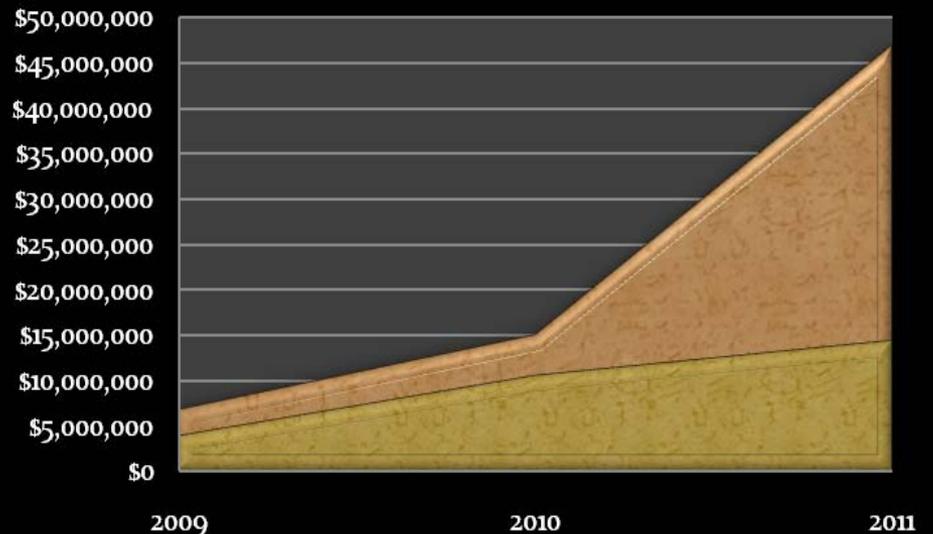
2011 = \$340,845.44

## Coldwater River Watershed

### MRBI Funds Received

2011 = \$2,580,000

## EQIP Money Requested vs Funded



# Mississippi's Approach: Numeric Nutrient Criteria Plan

- System-wide approach to criteria development to ensure protection of downstream uses
- Timelines allow incorporating results from numerous on-going efforts within MS
  - Trophic State Index (TSI) for lakes
  - Biological tools for Coastal Waters and the MS Delta
  - Implementation of nutrient reduction strategies in the Delta
  - Completion of intensive study of St. Louis Bay

# MS Numeric Nutrient Criteria TAG



MISSISSIPPI STATE  
UNIVERSITY  
EXTENSION SERVICE



US Army Corps  
of Engineers®



GULF COAST  
RESEARCH LABORATORY  
THE UNIVERSITY OF SOUTHERN MISSISSIPPI



# Numeric Nutrient Criteria Development Timeline

- **Public Comment Period Begins by June 30, 2013**
  - Lakes and Reservoirs
  - Wadeable Streams
  - Non-wadeable Streams
  - Coastal and Estuarine Waters
- **Public Comment Period Begins by November 30, 2014**
  - Delta Waters

# A New Challenge

- Flood of 2011
- Drought of 2011
  - Increasing withdrawal permit applications
  - Continuing overbalances of groundwater withdrawals vs recharge
  - Continuing declines in alluvial aquifer
  - Continuing reductions in base flow



# Effects of Declining Aquifer Levels

