

Hurricane Katrina
1445 UTC 29 August 2005
GOES-12 visible channel
over a MODIS true-color background

GOES Project NASA-GSFC



Category 5
Louisiana Coastal Protection and Restoration
(LACPR)
Technical Reports to Congress

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Department of Defense Appropriations Act, 2006 (P.L. 109-148)

SEC. 5009. Public Law 109–103 amended as follows...

- **...Chief of Engineers, is directed to conduct a comprehensive hurricane protection analysis and design at full federal expense to develop and present a full range of flood control, coastal restoration, and hurricane protection measures exclusive of normal policy considerations...**
- **...submit a preliminary technical report for comprehensive Category 5 protection within 6 months...**
- **...submit a final technical report for Category 5 protection within 24 months**
- **...consider providing protection for a storm surge equivalent to a Category 5 hurricane within the project area and may submit reports on component areas of the larger protection program for authorization as soon as practicable...**
- **...analysis shall be conducted in close coordination with the State of Louisiana and its appropriate agencies.**

Department of Defense Appropriations Act, 2006 (P.L. 109-148), Chapter 3

“...none of the \$12,000,000 provided herein for the Louisiana Hurricane Protection Study shall be available for expenditure until the State of Louisiana establishes a single state or quasi-state entity to act as local sponsor for construction, operation and maintenance of all of the hurricane, storm damage reduction and flood control projects in the greater New Orleans and southeast Louisiana area”

Policy Guidance and Key Directives

- Full integration with coastal restoration & flood control efforts
- Unification of Technical Reports with State Master Planning
- Close coordination w/MS hurricane protection project
- Use best and brightest talents from within USACE and external entities
- Use innovative designs and technologies
- Involve and educate the public
- External peer review
- Incorporate \$3.4 billion as w/o project condition
- Design storms will include:
 - Max Possible Intensity “Category 5 equivalent” storm
 - Probable Maximum “Category 5 equivalent” storm
 - Hurricane Katrina-like event
- Incorporate IPET results
- Use watershed approach in plan formulation
- Consider both structural and non-structural measures
- Produce a Programmatic EIS
- No NED or NER but consequence analysis of assets at risk
- Collaborative planning
- Bi-weekly Vertical Team In-Progress Reviews

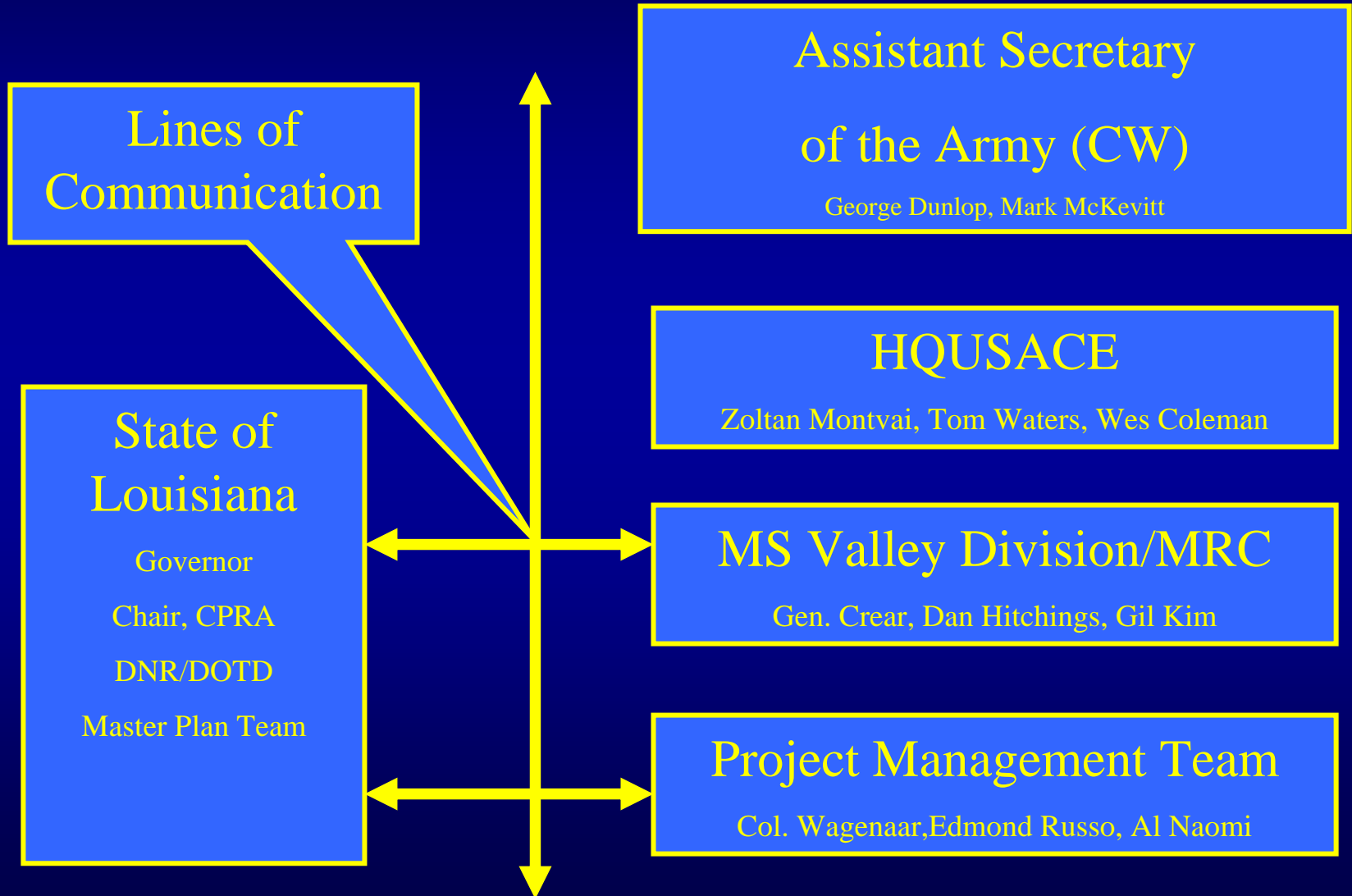
Special Considerations

- **MRGO issues**
- **Sea Level Rise**
- **Level of recovery of coastal communities and coastal resources**
- **Ecosystem restoration components contributions to storm surge reduction and overall plan performance**
- **Flood control**
- **Environmental impacts**
- **Recommendations**

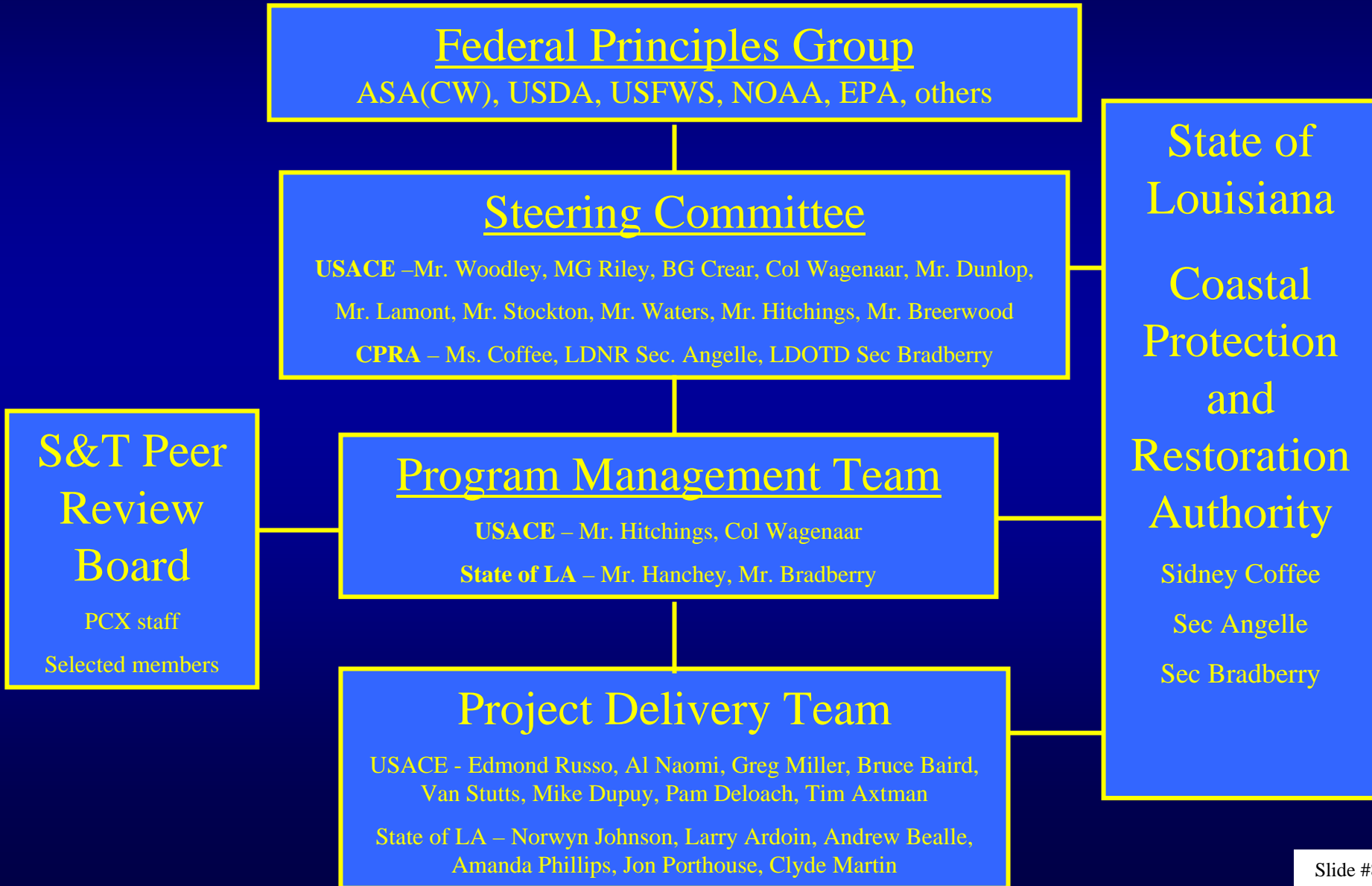
Preliminary Technical Report Outline

- **Threats** – what storm are we designing against?
 - Category 5 winds, surge and waves
- **Risks** – what is at stake?
 - Communities - industries - coastal resources – strategic resources
- **Plans** – what can be done to protect against design storm threats?
- **Costs** – how much will the protection plan cost?
- **How was the report prepared?**
 - Collaborative team, advanced modeling, risk/consequence analysis
- **What can be expected in the Final Report to Congress?**
 - Final PMP and component plan roll outs

Vertical Team



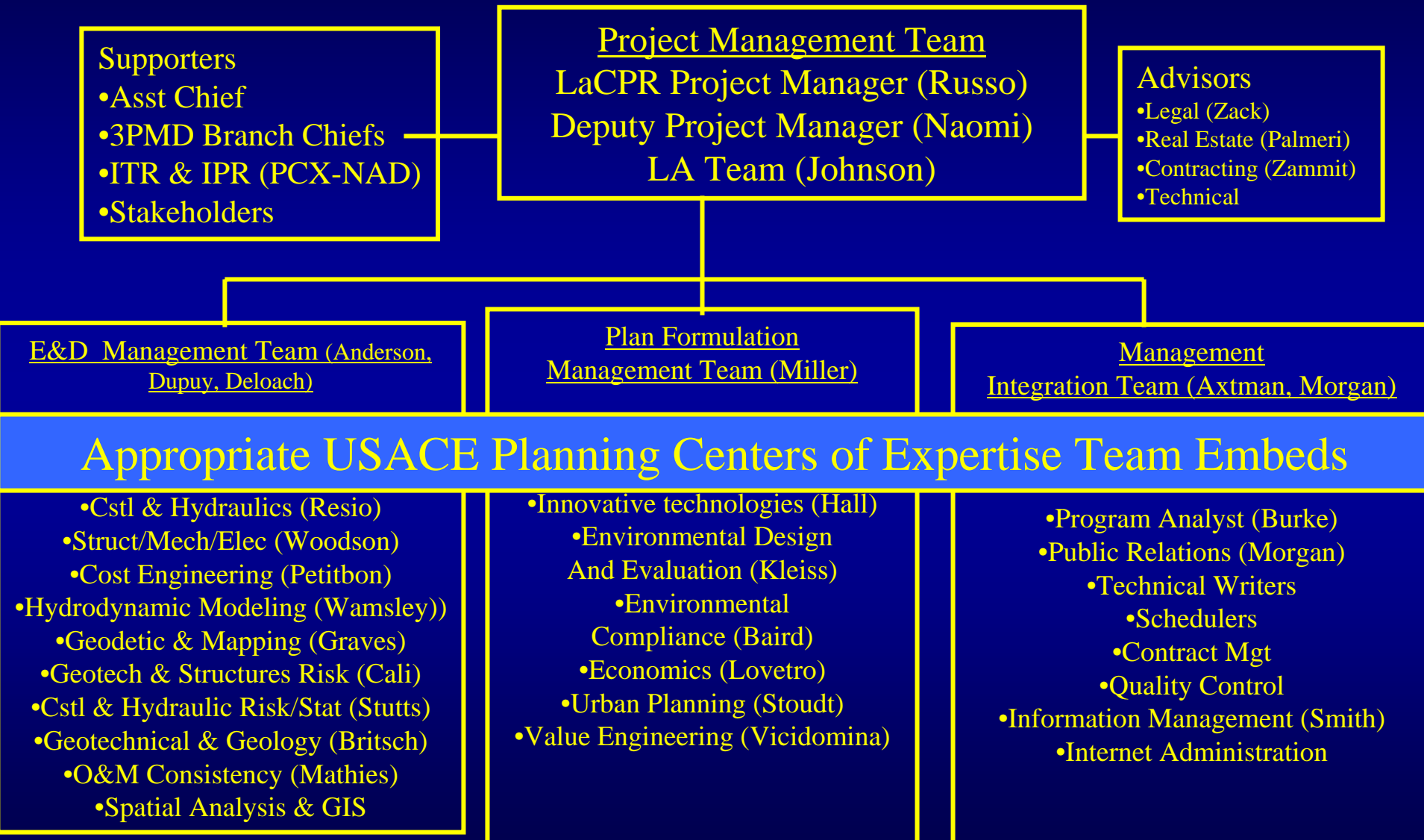
Organizational Structure



Team Composition

- **USACE-MVN, USACE-MVD, USACE-ERDC, USACE-HQ, ASA(CW)**
- **USACE Planning Centers of Expertise**
- **State of Louisiana, Coastal Protection and Restoration Authority, LDNR, LDOTD, LDWF, LDEQ**
- **LSU, UNO, Tulane, Notre Dame, Univ North Carolina, Univ Maryland, Univ Delaware, Mass Inst Tech**
- **NOAA Hurricane Center, EPA, NMFS, USFWS, USGS, NRCS**
- **Dutch Rijkswaterstaat**
- **Oceanweather, Group Solutions, URS, HDR, and other firms**

Project Delivery Team



Expert External Supporters, Contributors, and Reviewers

Planning and Design Workshops

- **Wind, Waves and Water (Dec 2005 Vicksburg, MS)**
 - Held to develop state of the science for estimating maximum hurricane for design comparison and analysis
 - Included National Hurricane Center, LSU and Dutch
- **Initial Plan Formulation (Feb 2006 Lafayette, LA)**
 - Assembly of coastal professionals to develop set of three initial alternative alignments for model runs and public presentation at scoping meetings
- **Engineering Technical Approaches and Innovations (Mar 2006 Vicksburg, MS)**
 - Experts in various design fields to assess alternatives and apply both standard and innovative approaches to assist the team in preparation of information gathering plans and tools for analysis

Consequence Analysis of Economic Assets at Risk

Preliminary Technical Report

- **Direct Damages to Physical Assets Attributable to Hurricane Katrina and Hurricane Rita**

Final Technical Report

- **Assets at Risk in the Louisiana Coastal Zone**
- **Indirect Losses by Industrial Sector Nationwide**
- **Energy & Petrochemical Industry Exposure**
- **Vulnerability of Navigation Infrastructure**
- **Disaster Response & Recovery Externalities**

Independent Review Teams

EC-1105-2-408
Peer Review of Decision Documents

Technical Review

- Occurs within USACE outside of MVN
- Employs USACE Centers of Expertise (NAD lead through Hurricane & Storm Damage Reduction)
- Embedded technical managers and reviewers on PDT for continuous input

Peer Review

- Conducted outside of USACE
- Need rapid turn around commitment to meet schedules
- Possible subset of Boesch group with additional engineering experts (developed through PCX & MS State Univ)

Stakeholder Coordination

- State of Louisiana
 - CPRA
 - LDNR
 - LDOTD
 - LDWF
 - LDEQ
- Levee Boards
- All coastal parishes
- Parishes Against Coastal Erosion
- Federal agencies
- Ports
- Industrial groups
- ESF14s
- Environmental Defense
- NO Sewerage and Water Board
- Drainage districts
- Civic associations
- Coastal zone advisory committees
- Barataria-Terrebonne National Estuary Program
- Coalition to Restore Coastal Louisiana
- Lake Pontchartrain Basin Foundation
- State of Mississippi
- State of Texas (pending)



**Congressional
Direction**

Dec 05

State Coordination

Policy Guidance

Jan 06

**Project Management Plan
and
Team Assembly**

ITR

Feb 06

**Broad-based Information Development
Workshops
Design Storm - Plan Formulation - E&D Approaches**

Mar 06

Technical Analysis and Preliminary Design

**Public Scoping and Stakeholder Involvement
Initial Technical Results**

Briefing

Apr 06

IPR

First Review Draft

Content Coordination with State Master Plan

Briefing

May 06

Resolve Comments

Final Review Draft

Briefing

Pre-printing Coordination

Jun 06

**Preliminary Technical
Report to Congress**

Schedule Details

Preliminary Technical Report

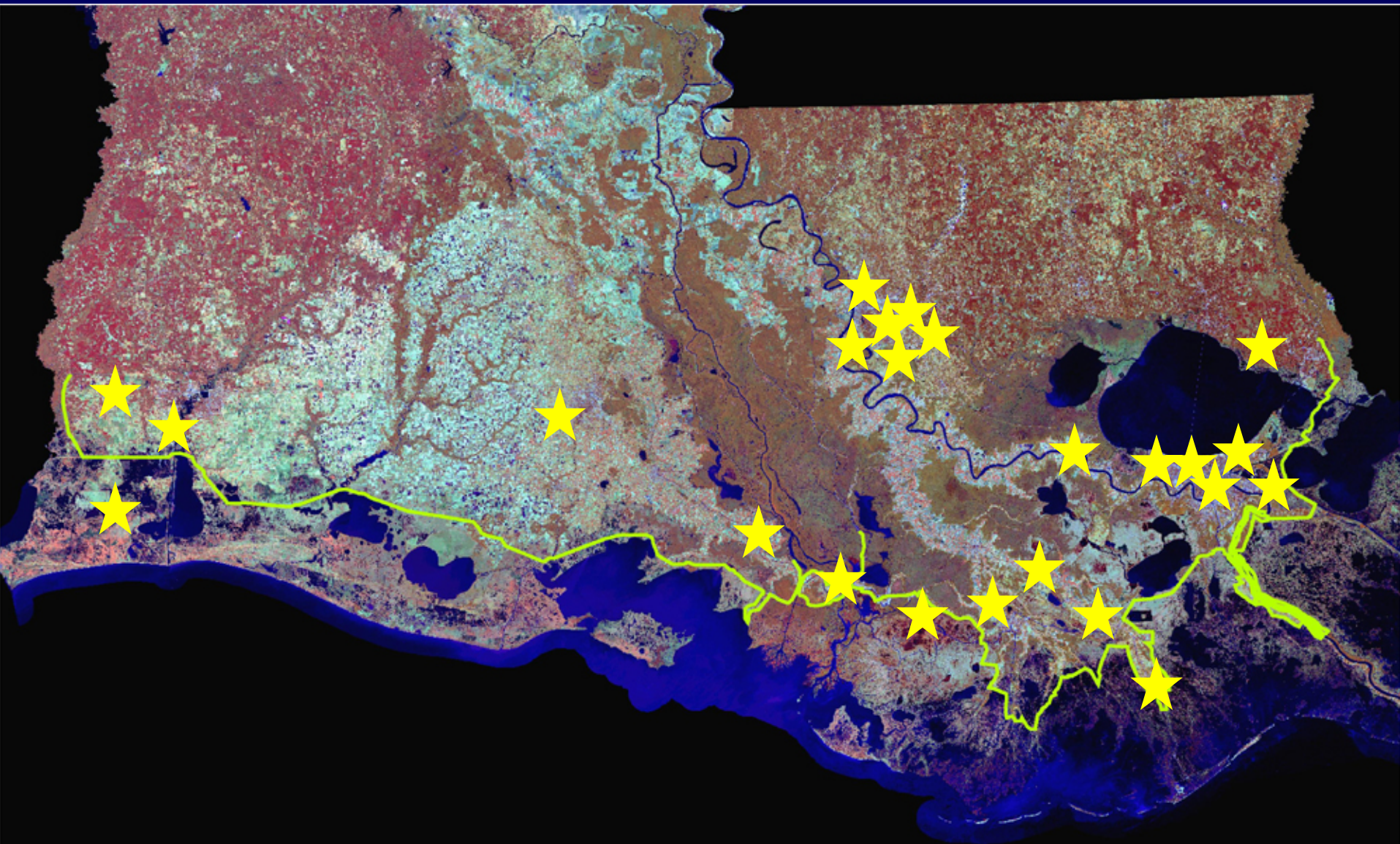
- State coordination meetings – Jan 2006
- Policy Guidance developed – Jan 2006
- PMP approval – Feb 2006
- Plan Formulation Workshop – Feb 2006
- Report outline developed – Feb 2006
- Initial alignments identified – Feb 2006
- E&D Workshop – Mar 2006
- Public Scoping Meetings – Mar 2006
- 1st draft of report distributed for review – April 2006
- ITR briefing – April 2006
- Alignment ADCIRC model runs complete – April 28, 2006
- Final review draft distributed – May 16, 2006
- Final review completed – May 23, 2006
- Pre-printing briefings for Vertical Team – June 8, 2006
- Printing and pre-distribution briefings – June 15, 2006
- Report to Congress submitted – June 30, 2006

Results Summary

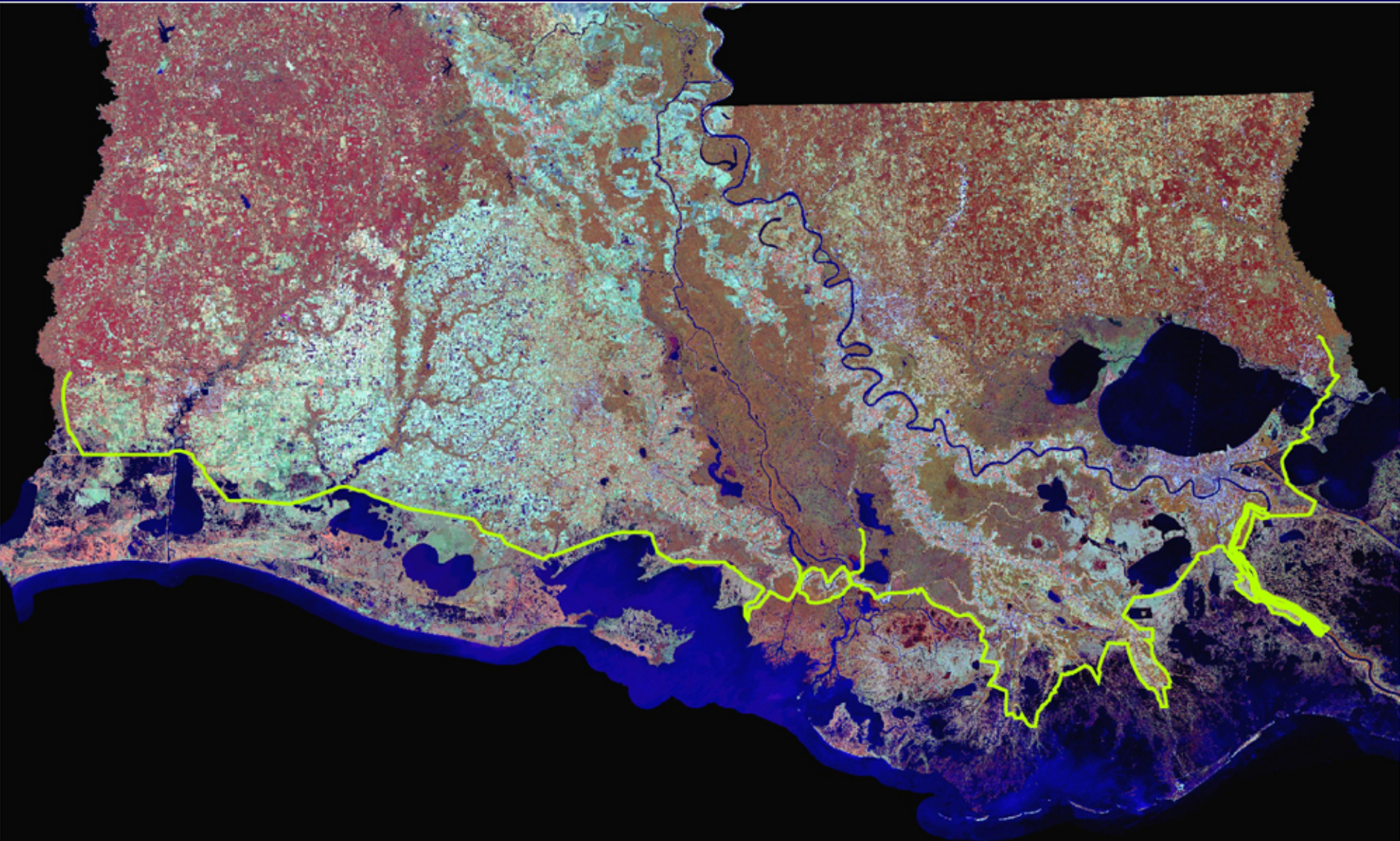
Initial Plan Formulation Workshop

- **100+ participants**
 - **10 coastal parish representatives**
 - **4 levee boards**
 - **1 port**
 - **6 environmental organizations**
 - **5 state agencies**
 - **6 federal agencies**
 - **3 universities**
 - **Dutch Rijkswaterstaat**
- **Follow up visit to Parishes Against Coastal Erosion planned**
- **125+ concepts involving coastal restoration & protection offered**
- **Five model alignments identified**
- **Four alignments include barriers to keep water out of Lake Pontchartrain at Rigolets and Chef Passes**
- **Alternatives screening underway to assess:**
 - **storm surge/wave performance**
 - **potentially critical adverse environmental impacts**

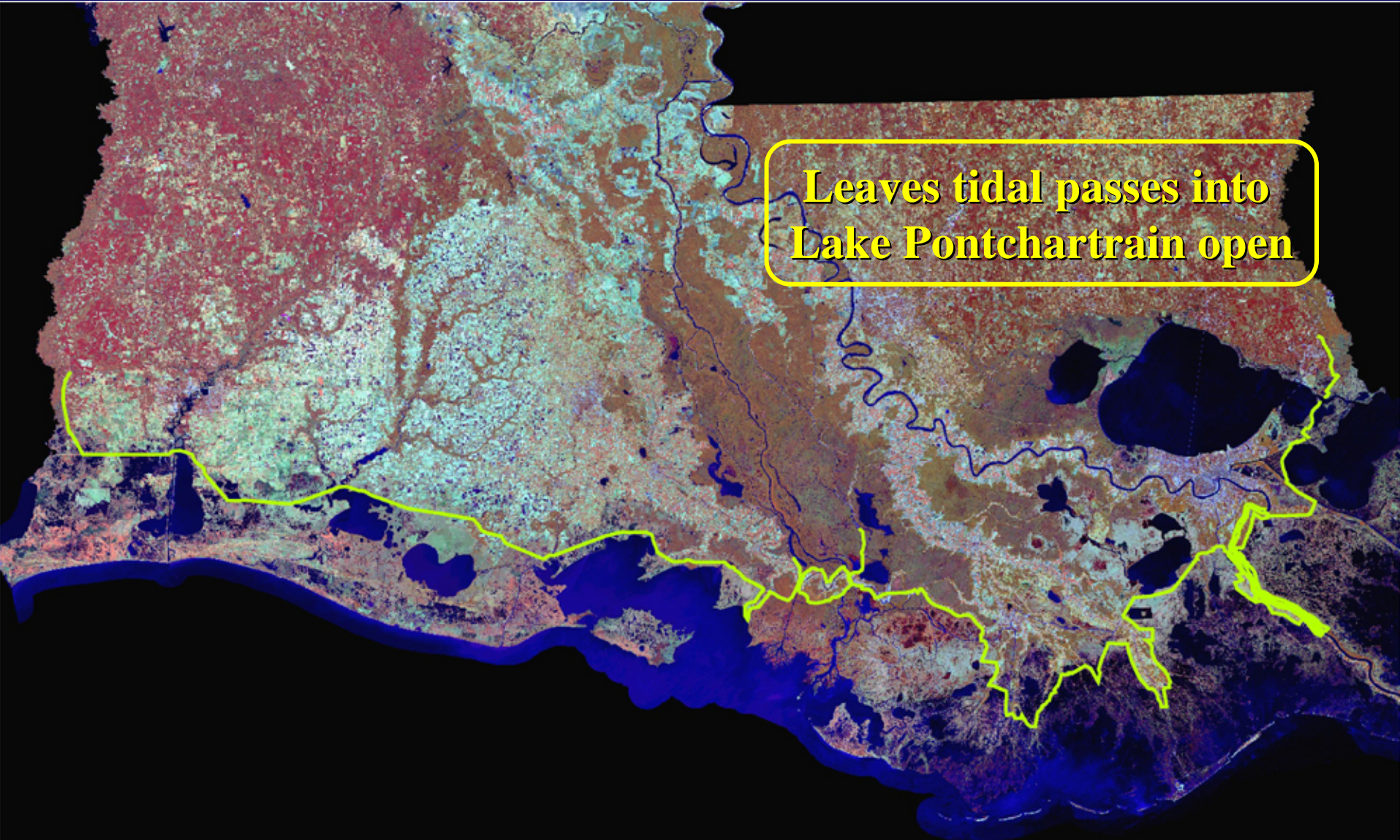
Attendee Geographic Distribution



Model Alignment #1

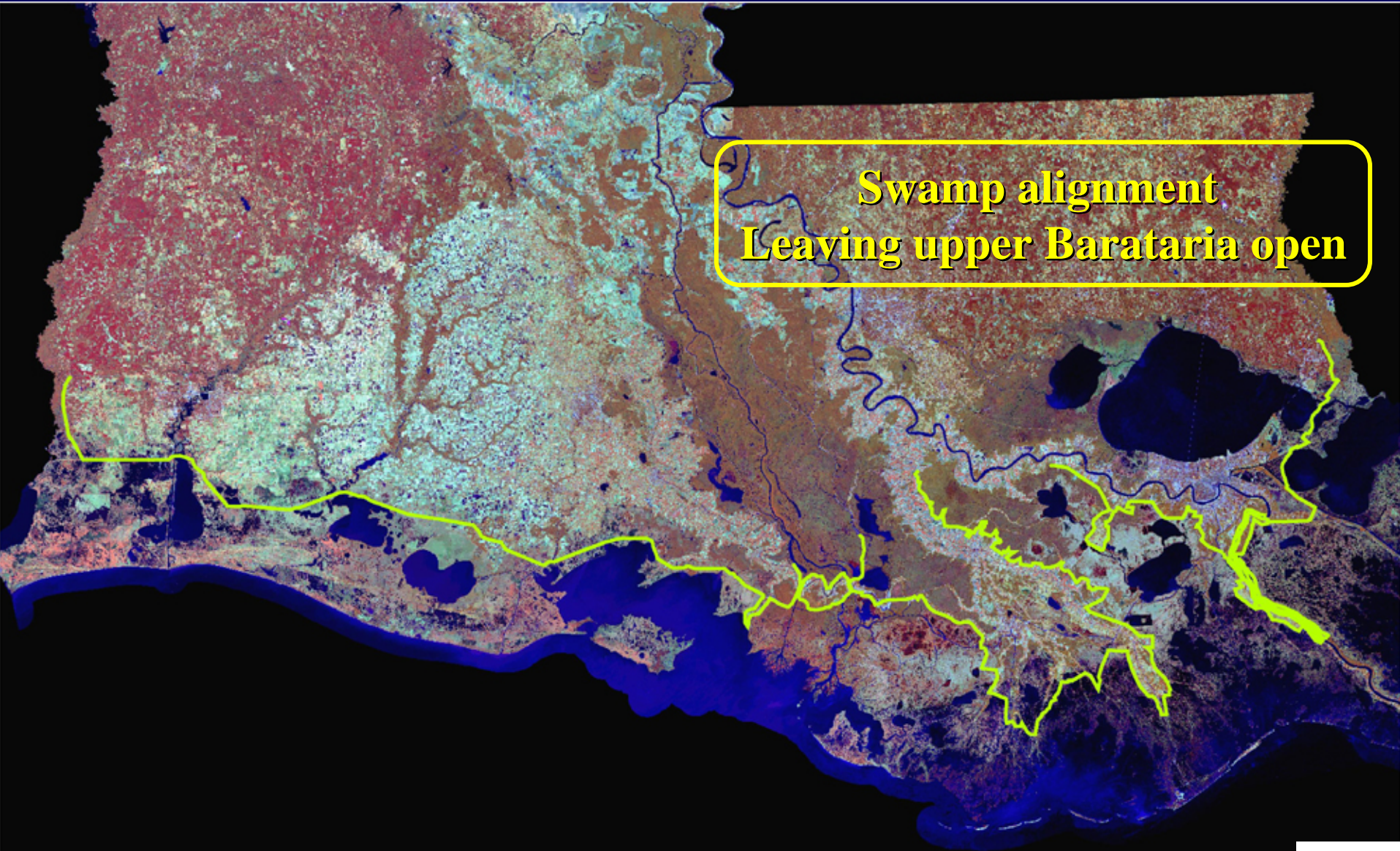


Model Alignment #2



**Leaves tidal passes into
Lake Pontchartrain open**

Model Alignment #3



Swamp alignment
Leaving upper Barataria open

Model Alignment #4



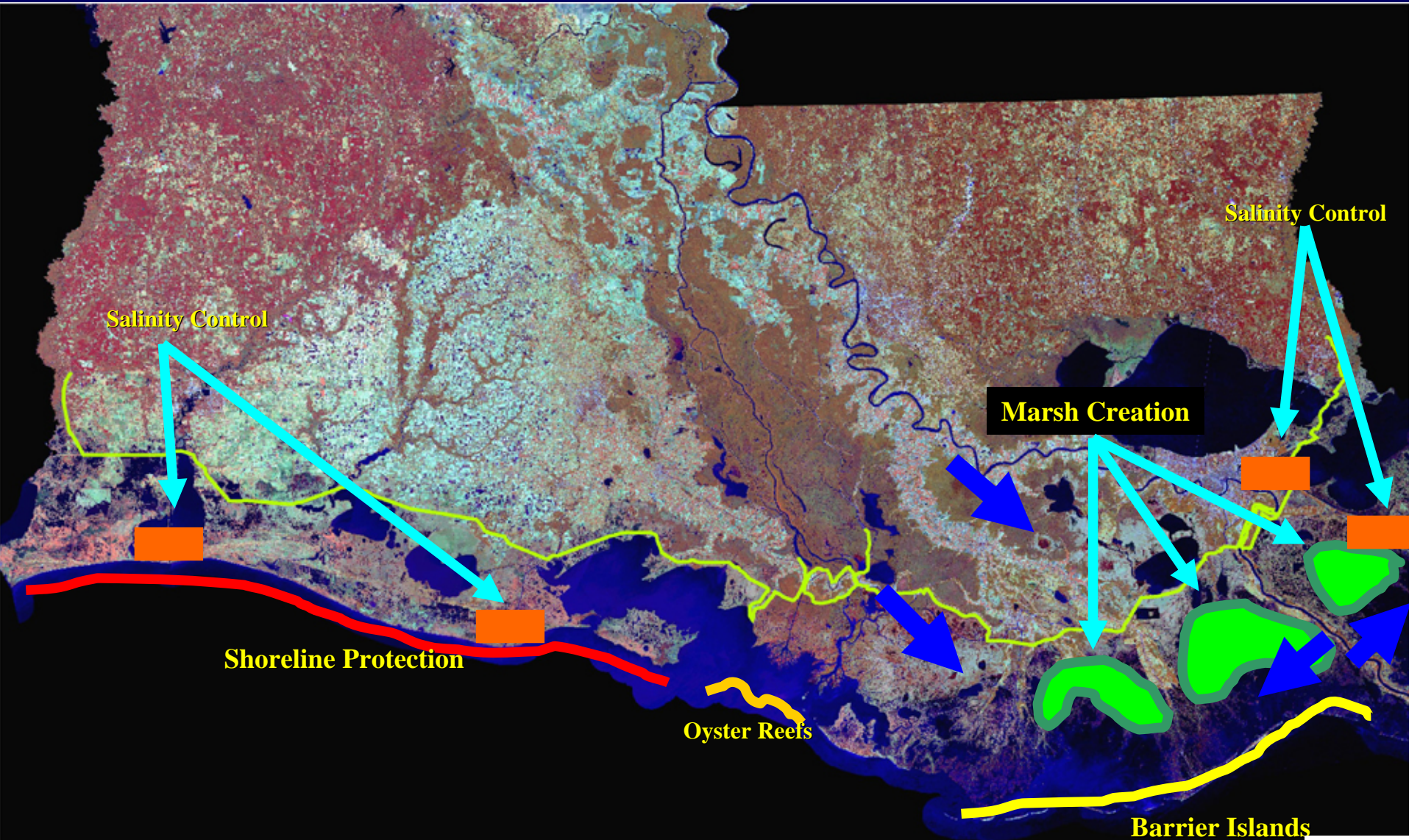
**Highway 90 alignment
Closing off upper Barataria**

Model Alignment #5

**LSU Hurricane Center alignment
omitting lower finger communities
in Plaquemines and Lafourche**

Coastal Restoration Features

Modeling Approaches Being Developed



Plan Formulation Workshop Results

- Groups pleased with opportunity to participate
- Facilitation effective generating input from diverse groups
- Press interest high
- Some participation lacking because of special legislative session called to debate single levee board bills
- Follow up visits to parishes planned through PACE organization
- Team moving forward with model execution on alternatives

Cat 5 LaCPR Summary to Date

- Working closely with State of Louisiana
- Broad based PDT (includes state, fed, academic and international members and contributors)
- High-performance computer modeling employed
- State of art design and technology innovations
- Coastal lines of defense strategy
- ITR and IPR through Planning Centers of Expertise
- Frequent stakeholder and public involvement

An aerial photograph of a vast, green marshy landscape. In the foreground and middle ground, there are numerous small, interconnected water channels and ponds. To the right, a tall, dark, lattice-structured lighthouse stands prominently. In the background, a large body of water is visible under a clear blue sky, with a few small boats or structures on the horizon.

QUESTIONS?

<http://www.mvn.usace.army.mil/>