RESTORATION IN THE GULF OF MEXICO: STRATEGIES FOR MOVING FORWARD

Denise Reed

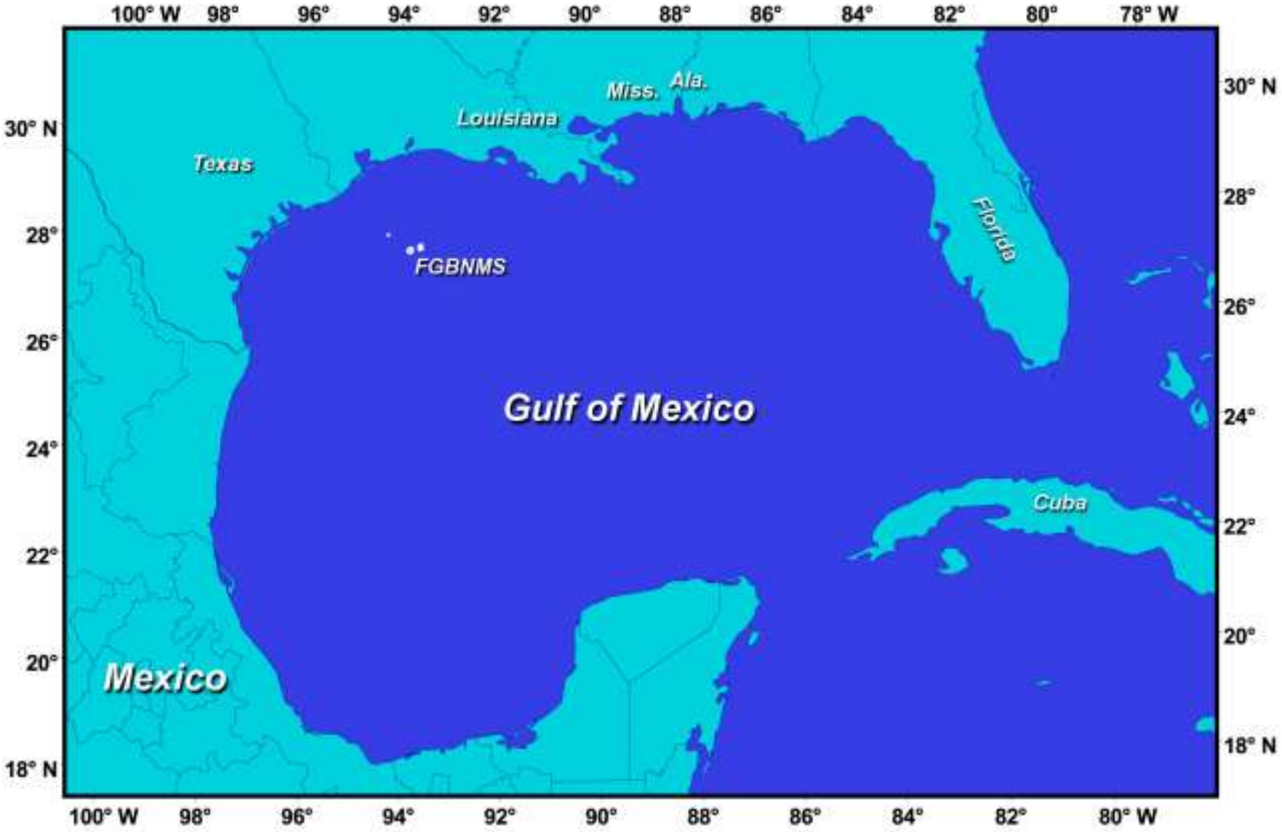
Vice President for Strategic Research Initiatives

THE WATER INSTITUTE OF THE GULF®

OUTLINE

- Ecosystem Background & Location
- Major Resource Management Issues and/or Policy Drivers
- Science Investments Used to Guide Management
- Key Results of Science Investigations
- Successes and Challenges / Key Lessons Learned

Thanks to Alyssa Daussman, RESTORE Council



GULF OF MEXICO

APRIL 20, 2010


U.S. Coast Guard

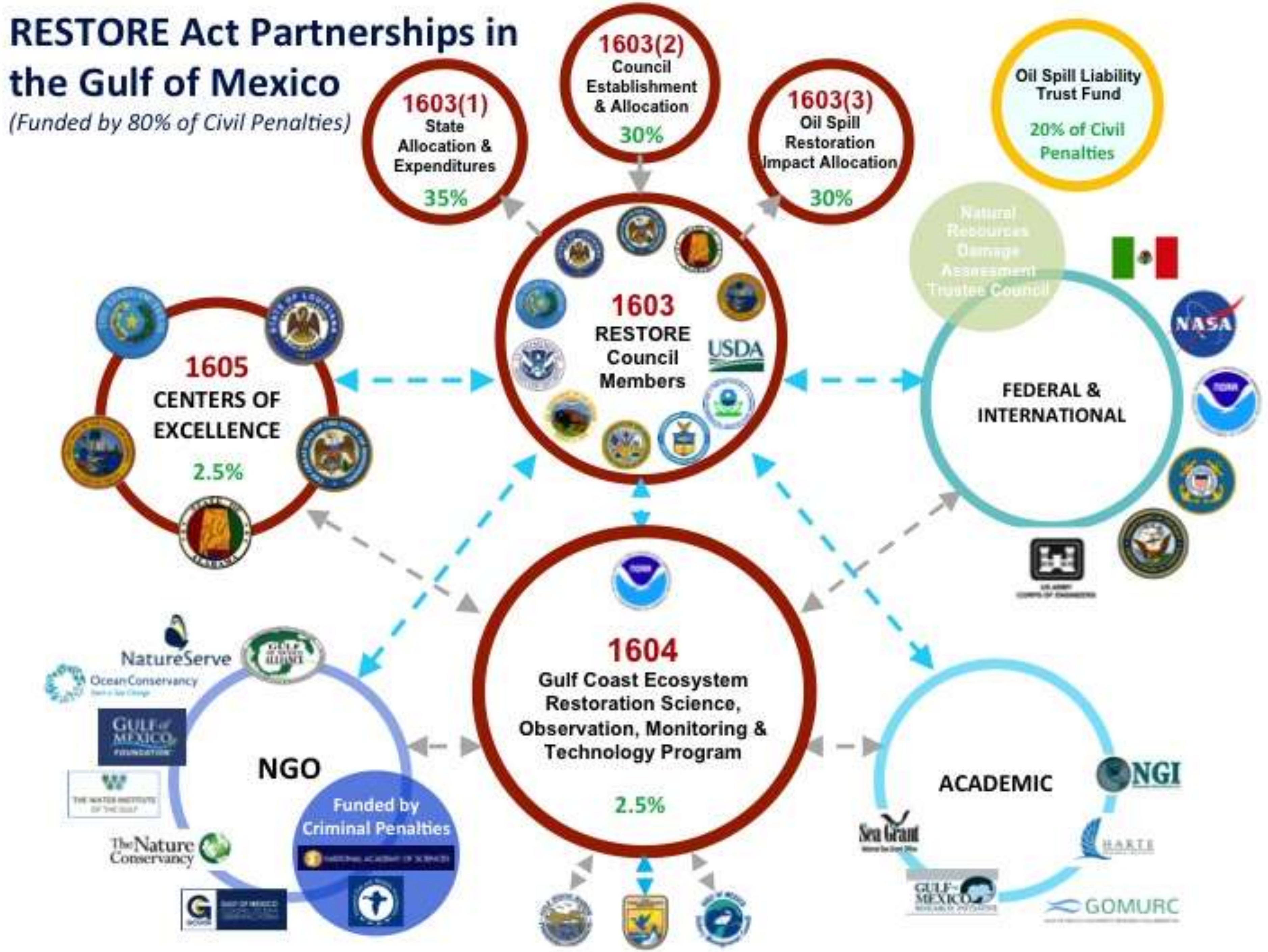
RESTORE ACT, 2012

Subtitle F: Gulf Coast Restoration
Sec. 1601: Resource and Ecosystem Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States Act of 2012

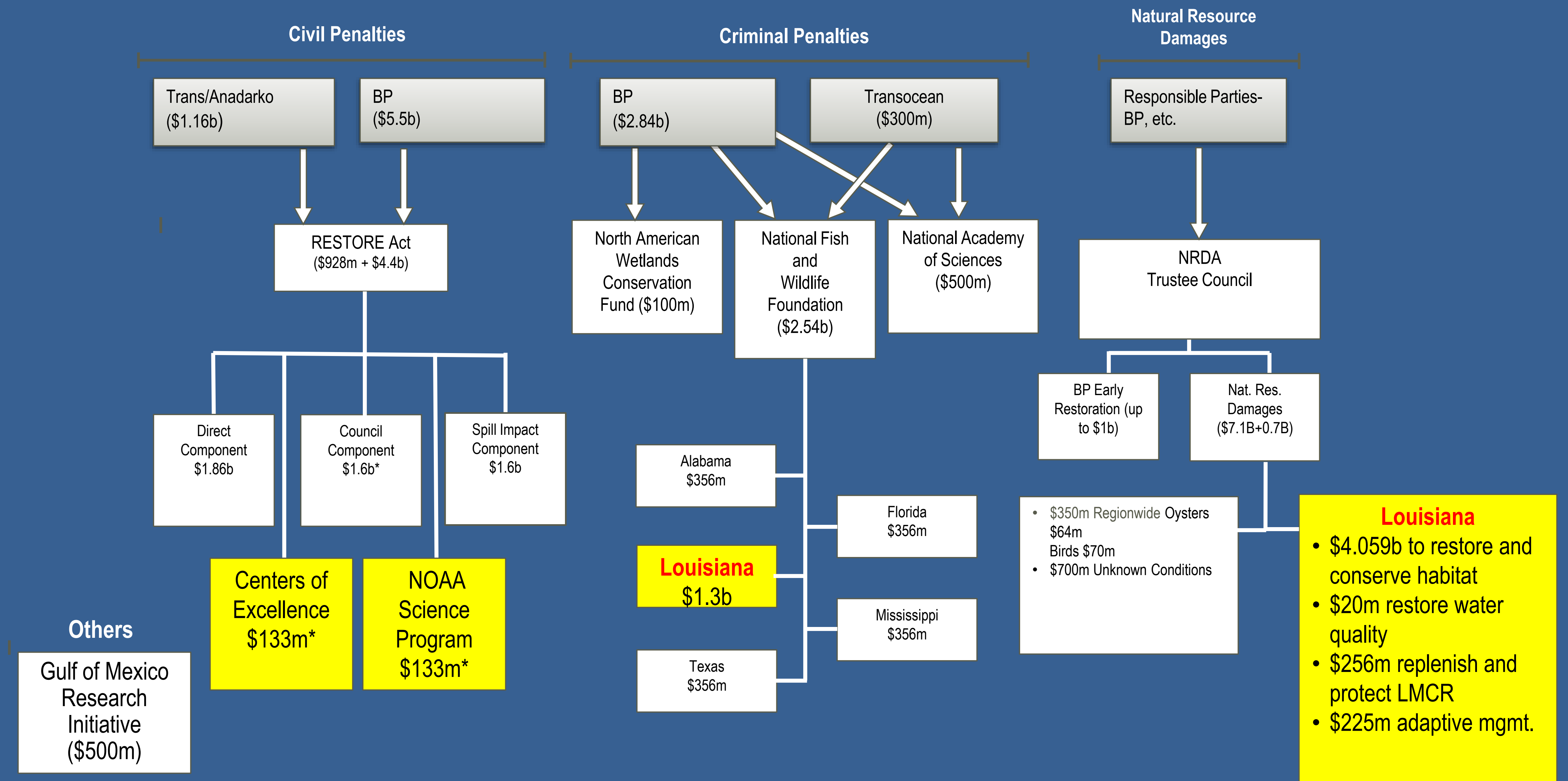
Civil Penalties

80% to RESTORE Act Gulf Coast Restoration Trust Fund

20% to Oil Spill Liability Trust Fund


RESTORE Act Partnerships in the Gulf of Mexico
(Funded by 80% of Civil Penalties)
1603(1) State Allocation & Expenditures 35%
1603(2) Council Establishment & Allocation 30%
1603(3) Oil Spill Restoration Impact Allocation 30%
Oil Spill Liability Trust Fund 20% of Civil Penalties
Natural Resources Damage Assessment Trustee Council
1603 RESTORE Council Members
USDA
1605 CENTERS OF EXCELLENCE 2.5%
FEDERAL & INTERNATIONAL
NASA
1604 Gulf Coast Ecosystem Restoration Science, Observation, Monitoring & Technology Program 2.5%
NatureServe
Ocean Conservancy
GULF of MEXICO FOUNDATION
THE WATER INSTITUTE OF THE GULF
The Nature Conservancy
NGO
Funded by Criminal Penalties
NATIONAL ACADEMY OF SCIENCES
ACADEMIC
NGI
Sea Grant
HARTE
GULF of MEXICO RESEARCH INITIATIVE
GOMURC

Deepwater Horizon Gulf Science and Restoration Initiatives



Gulf Coast Ecosystem Restoration Council

- Independent federal entity

- Composition:
  - Governors of Alabama, Florida, Louisiana, Mississippi & Texas

  - Secretaries of **Agriculture**, Army, Commerce, Homeland Security, Interior, Administrator of the EPA

- Voting structure

- Funding to members

Catherine Hibbard, USFWS

Comprehensive Plan(s)

Goals

1. Restore & Conserve Habitat
2. Restore Water Quality & Quantity
3. Replenish & Protect Living Coastal & Marine Resources
4. Enhance Community Resilience
5. Restore & Revitalize the Gulf Economy

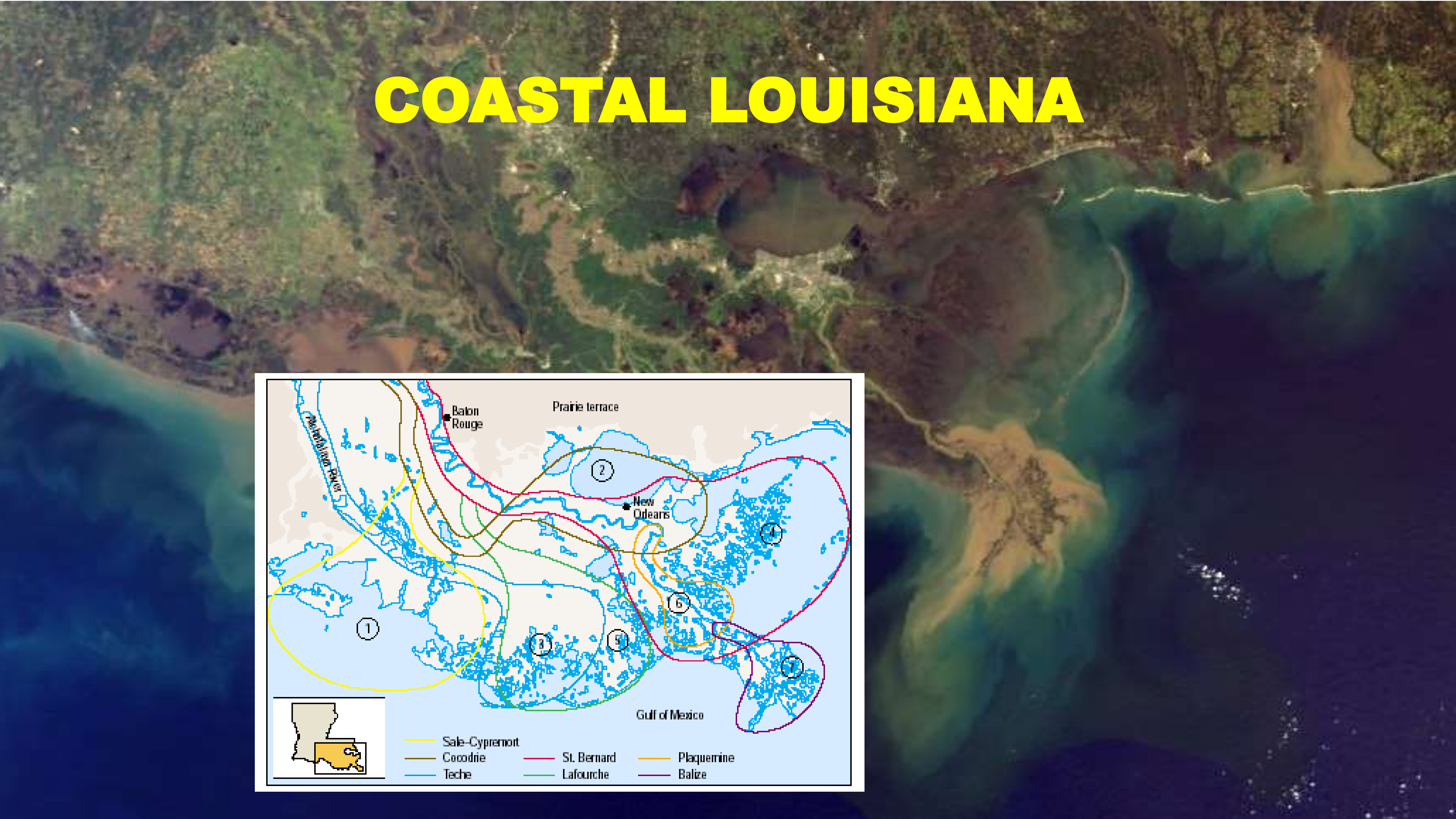
Update at least every 5 years as per the Act

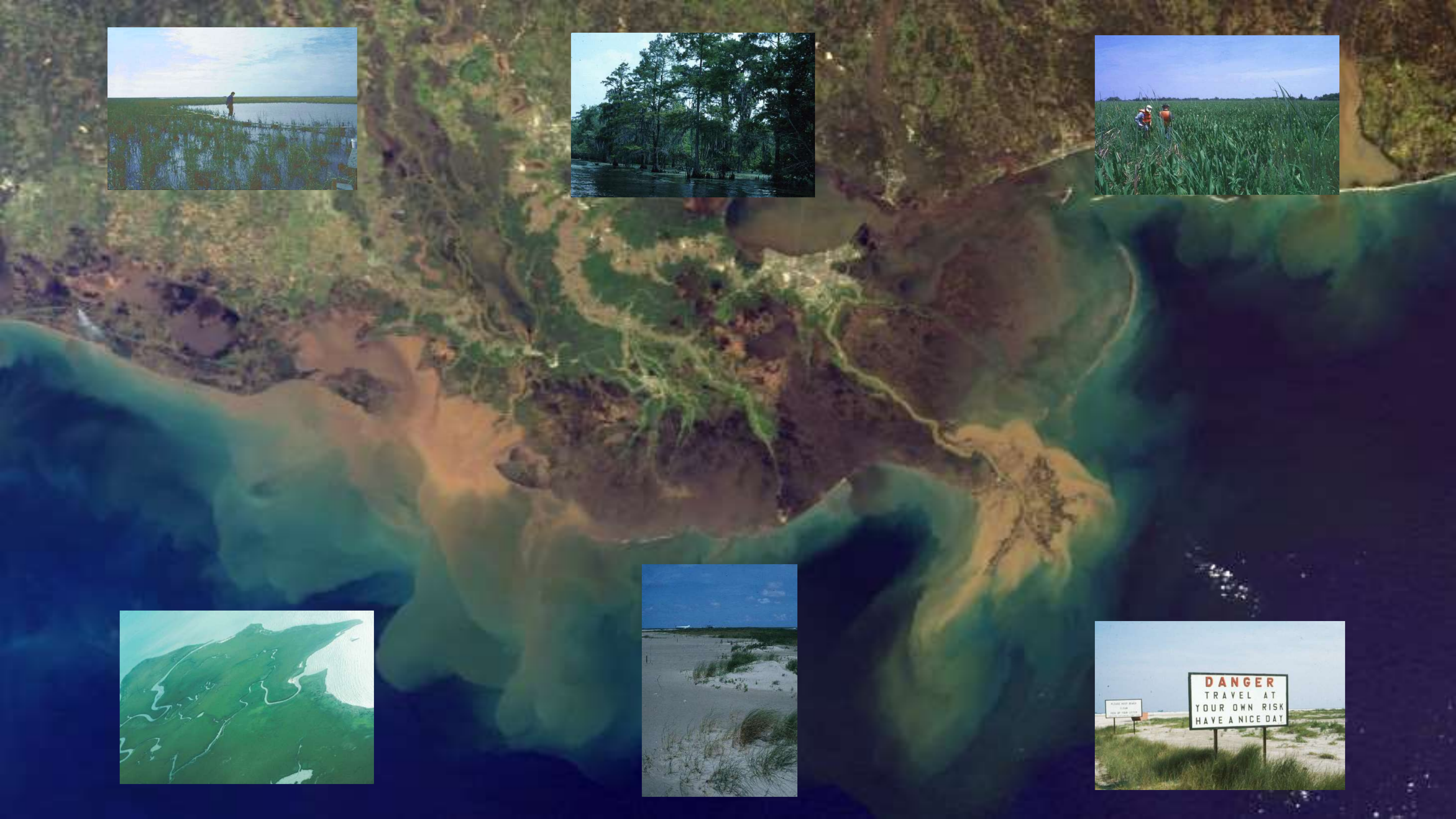
Comprehensive Plan Update

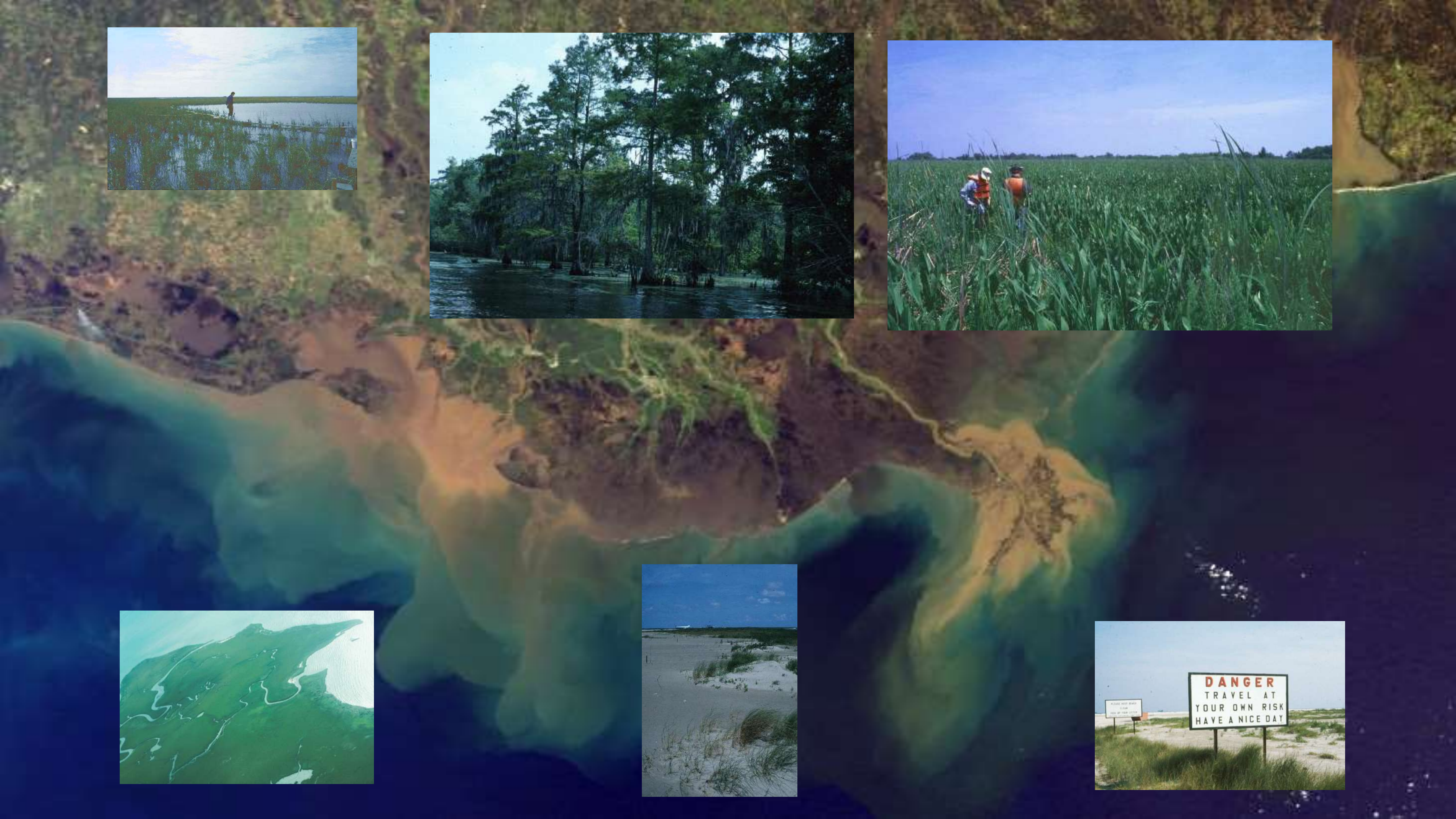
- Builds on successes, lessons, & provides strategic guidance
- Promotes collaboration
- Commits to update science review process
- Improve delivery of ecosystem science, monitoring, & data management across disciplines to report on restoration
- Adaptive Management Plan
- Positions Council for effective use of future funds
- Coordinates holistic, large-scale restoration
- Improves efficiency, effectiveness & transparency

LOUISIANA

COASTAL LOUISIANA




DANGER
TRAVEL AT
YOUR OWN RISK
HAVE A NICE DAY


DANGER
TRAVEL AT
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HAVE A NICE DAY


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DANGER
TRAVEL AT
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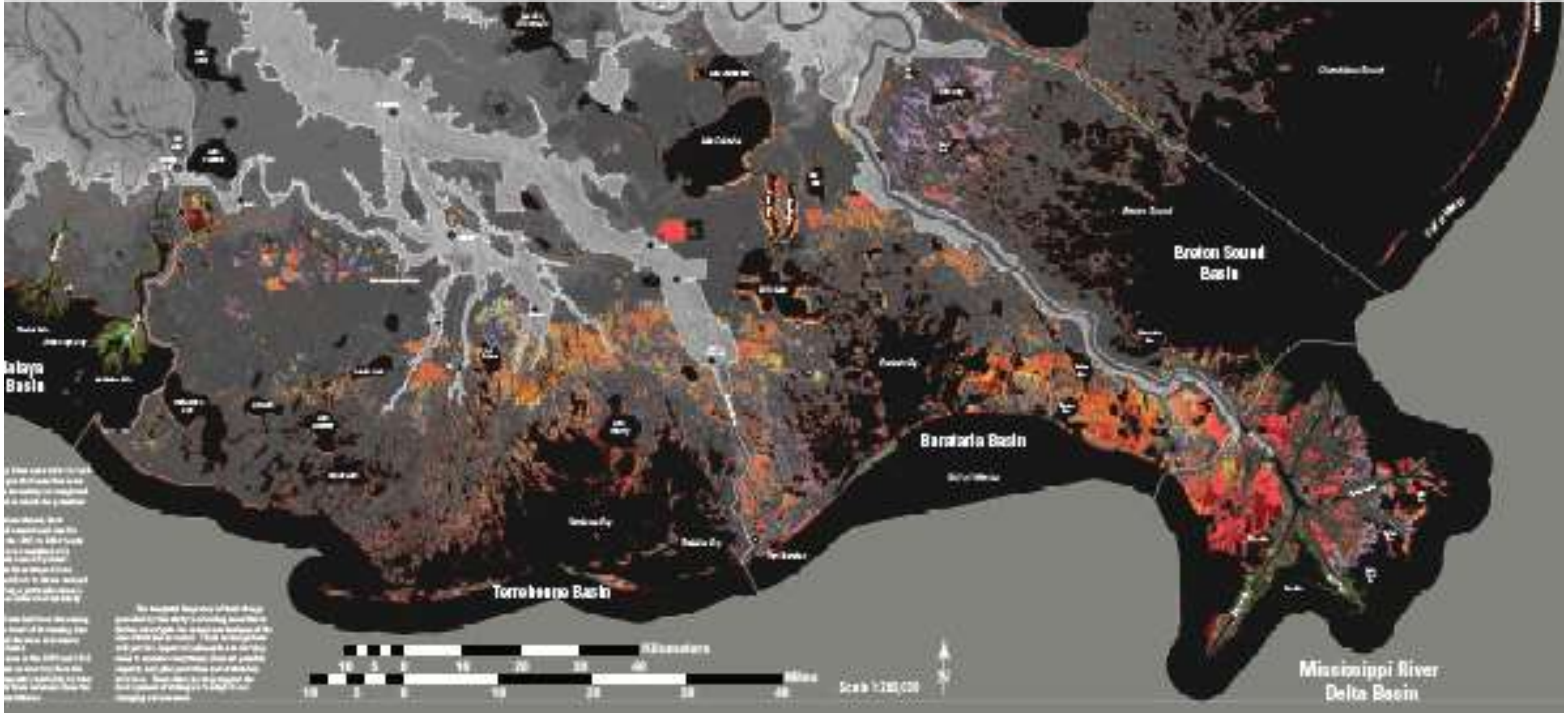
HAVE A NICE DAY

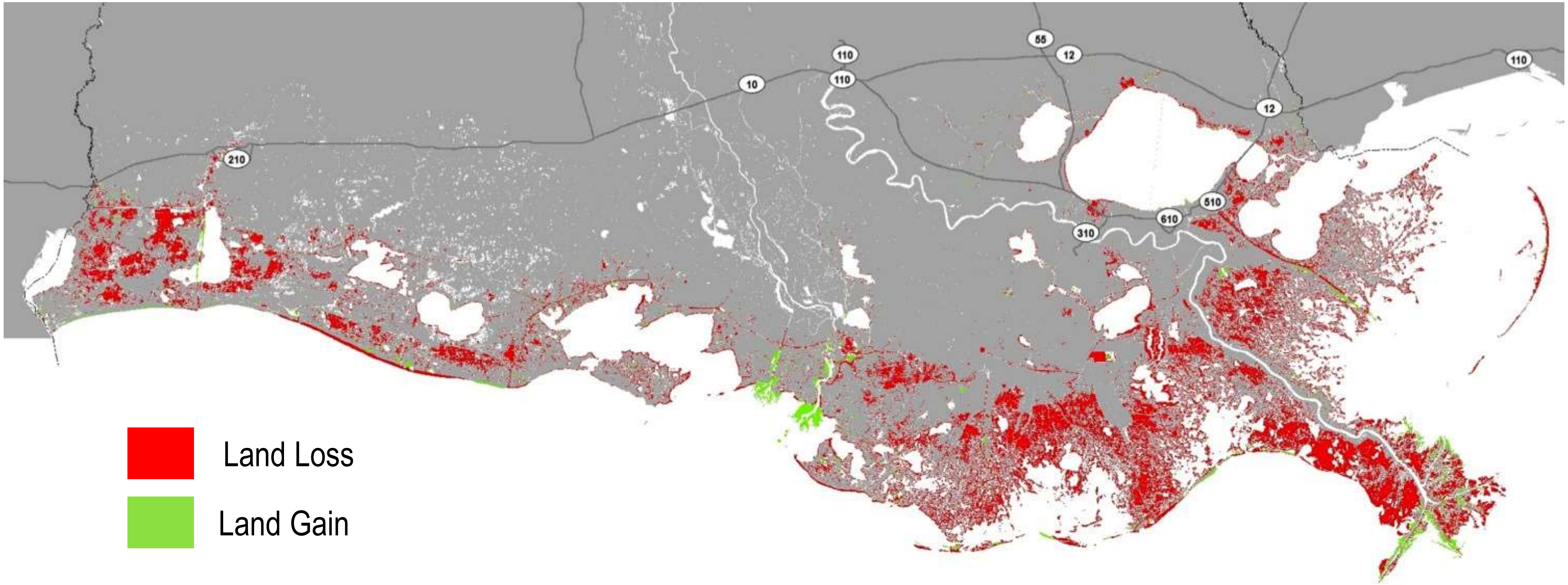
THE ISSUE

…coastal Louisiana has undergone a net change in land area of about -1,883 square miles (mi^2) from 1932 to 2010. This net change in land area amounts to a decrease of about 25 percent of the 1932 land area. … 1985 to 2010 show a wetland loss rate of 16.57 mi^2/year.

Couvillion et al. (2011)



LAND AREA CHANGE

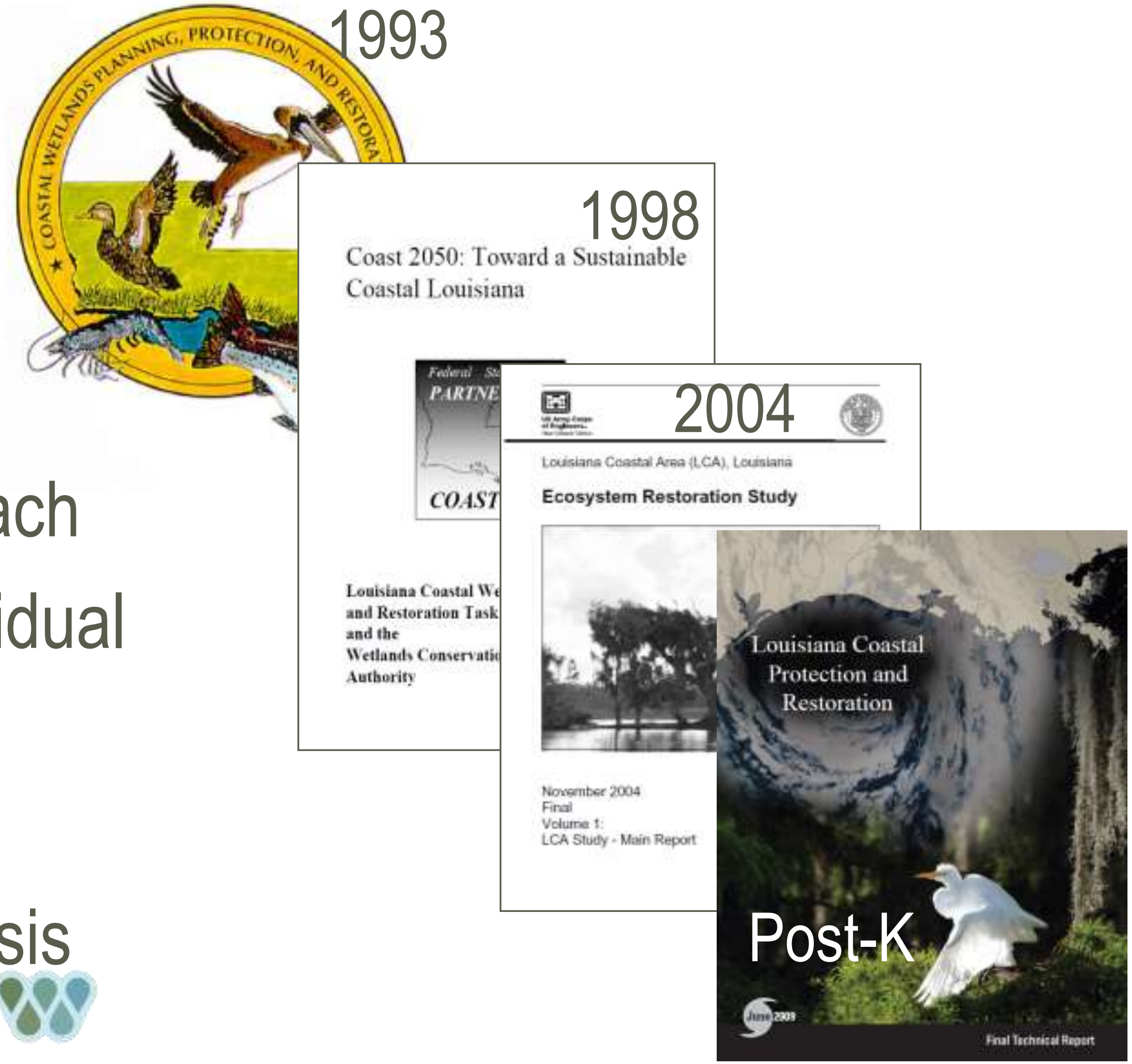


Historic Land-Water Change from 1932-2010

Couvillion et al (USGS), 2011

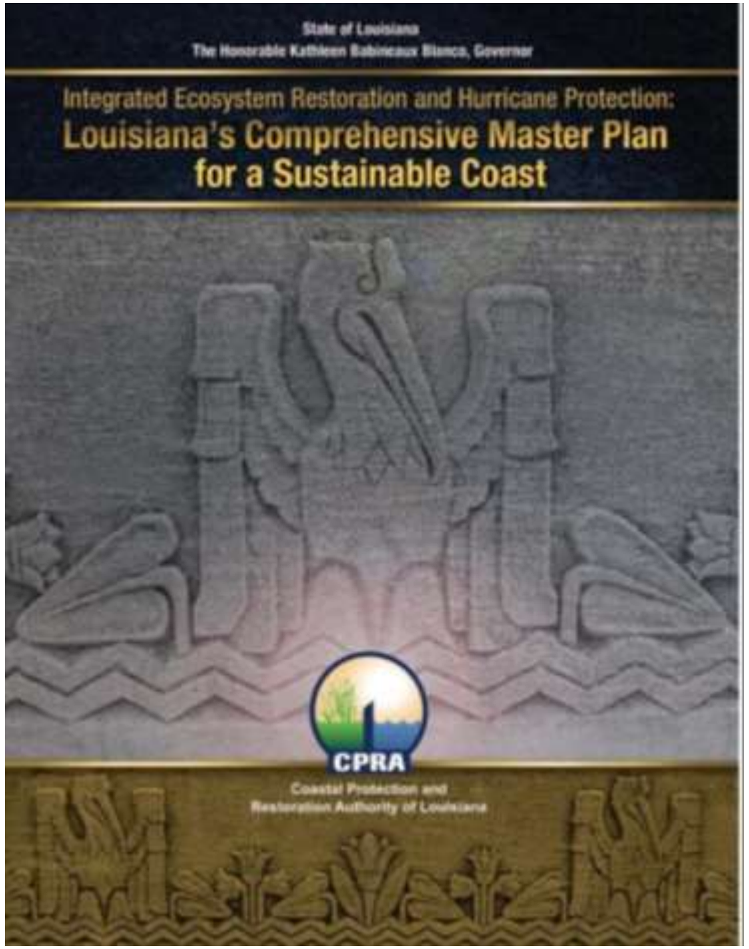
PREVIOUS COASTAL PLANNING EFFORTS

- ‘Vegetative wetlands’
- Project by project
- Strategic in nature
- Principles of ‘how’ to restore
- Began as a comprehensive approach
- Scaled down to unconnected individual projects
- Focus on protection
- Use of multi-criteria decision analysis



STATE MASTER PLAN – AN INTEGRATED APPROACH

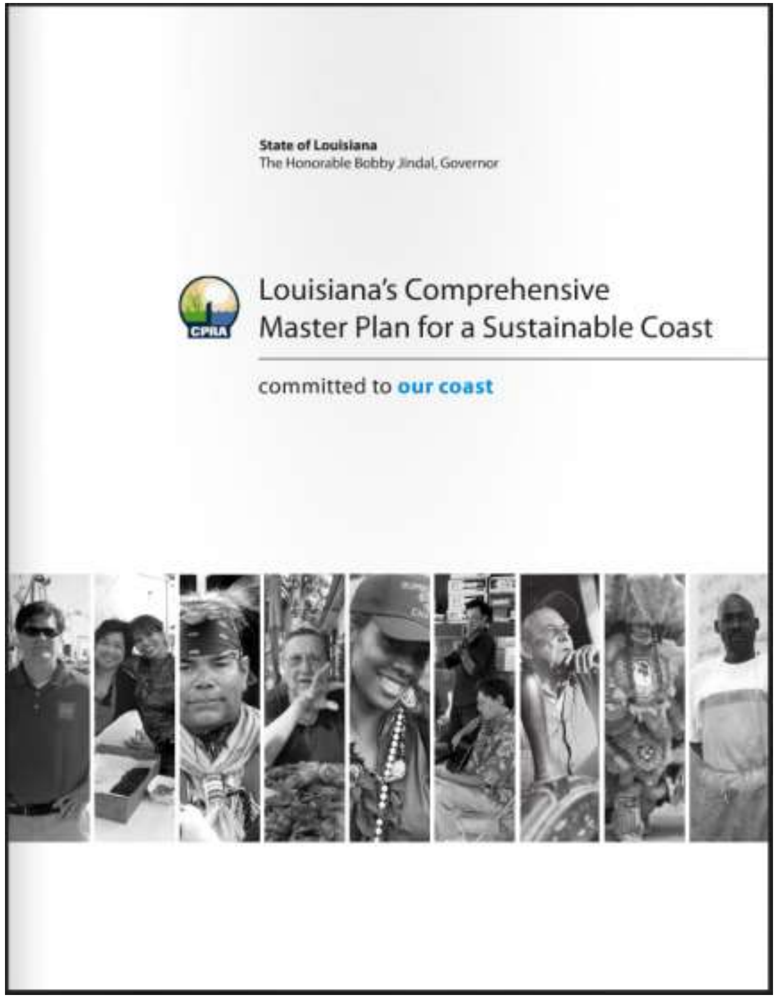
- First real attempt at integration
- Developed in 18 months with existing information
- Recognized the challenges and trade-offs



April 2007

2012 COASTAL MASTER PLAN

- Built on science and engineering
- Evaluated hundreds of existing project concepts
- Resource constrained
  - – Funding, water, sediment
- Identified investments that will pay off in the long run

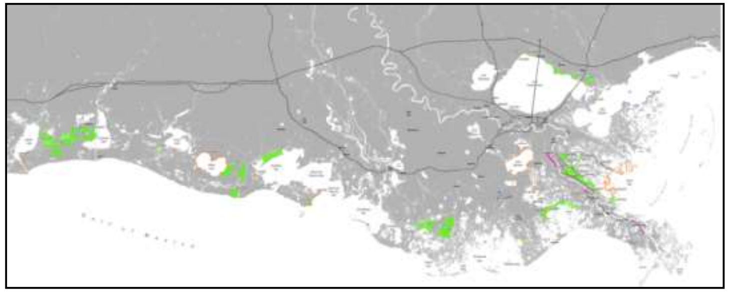


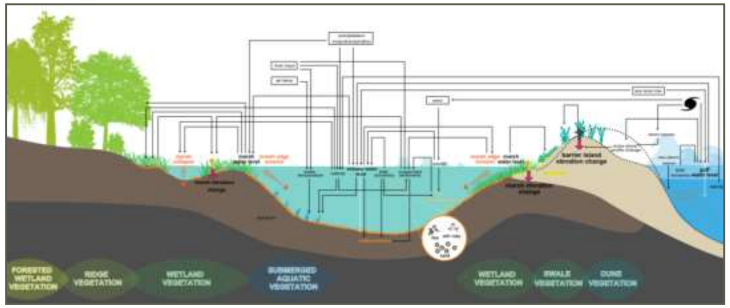
SO WHY ANOTHER PLAN?

- It's required by law to be updated every five years
- Allows the state to respond to changes on the ground and public input as well as innovations in science, engineering, and policy
- Advances a comprehensive and integrated approach to protecting and restoring the communities of Coastal Louisiana

WHAT'S DIFFERENT ABOUT THE 2017 COASTAL MASTER PLAN?

- Improved science and technical analysis
- Incorporating new ideas and information
- Focus on flood risk reduction and resilience
- Emphasis on communities
- Expanded outreach and public engagement
- Expedited funding scenarios and implementation timelines

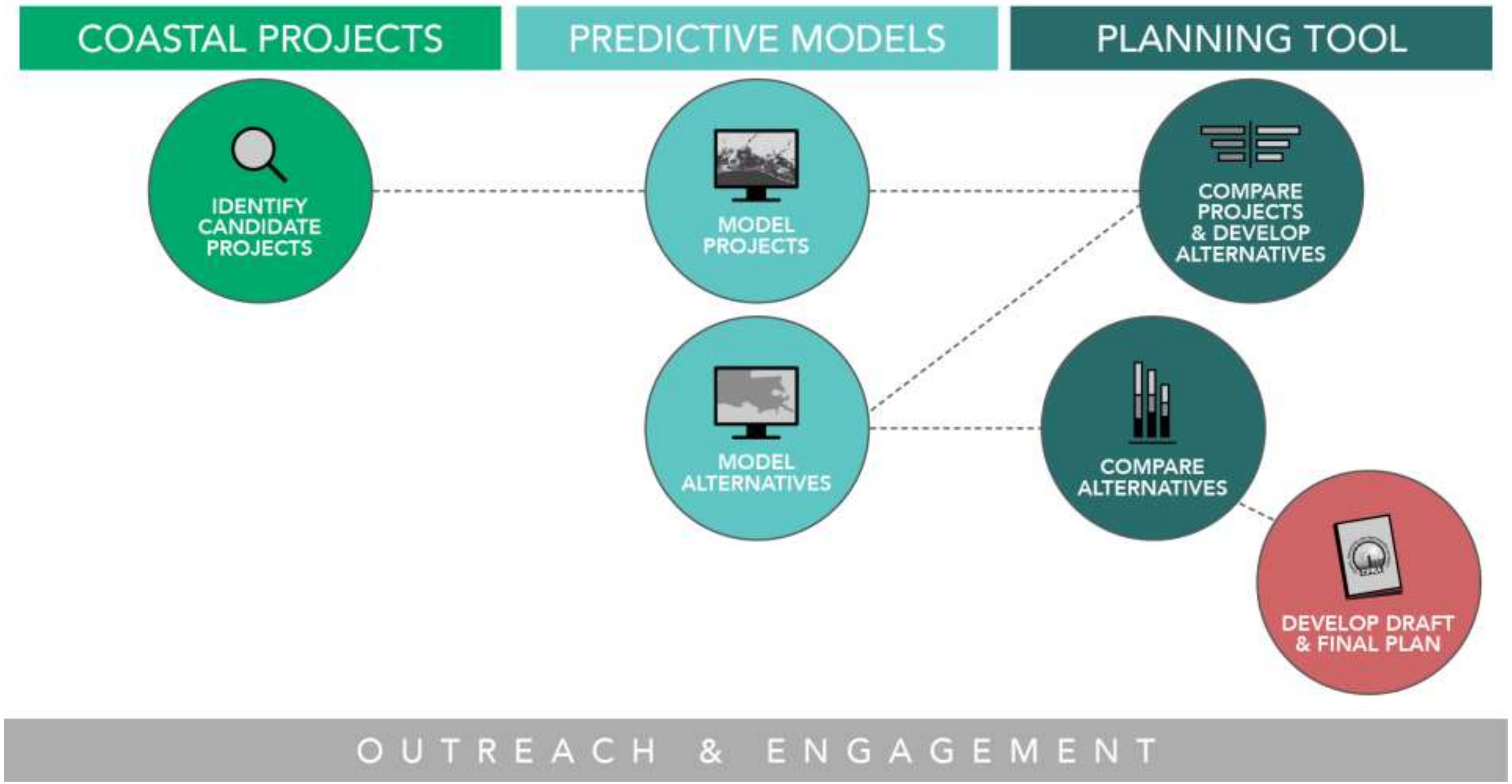




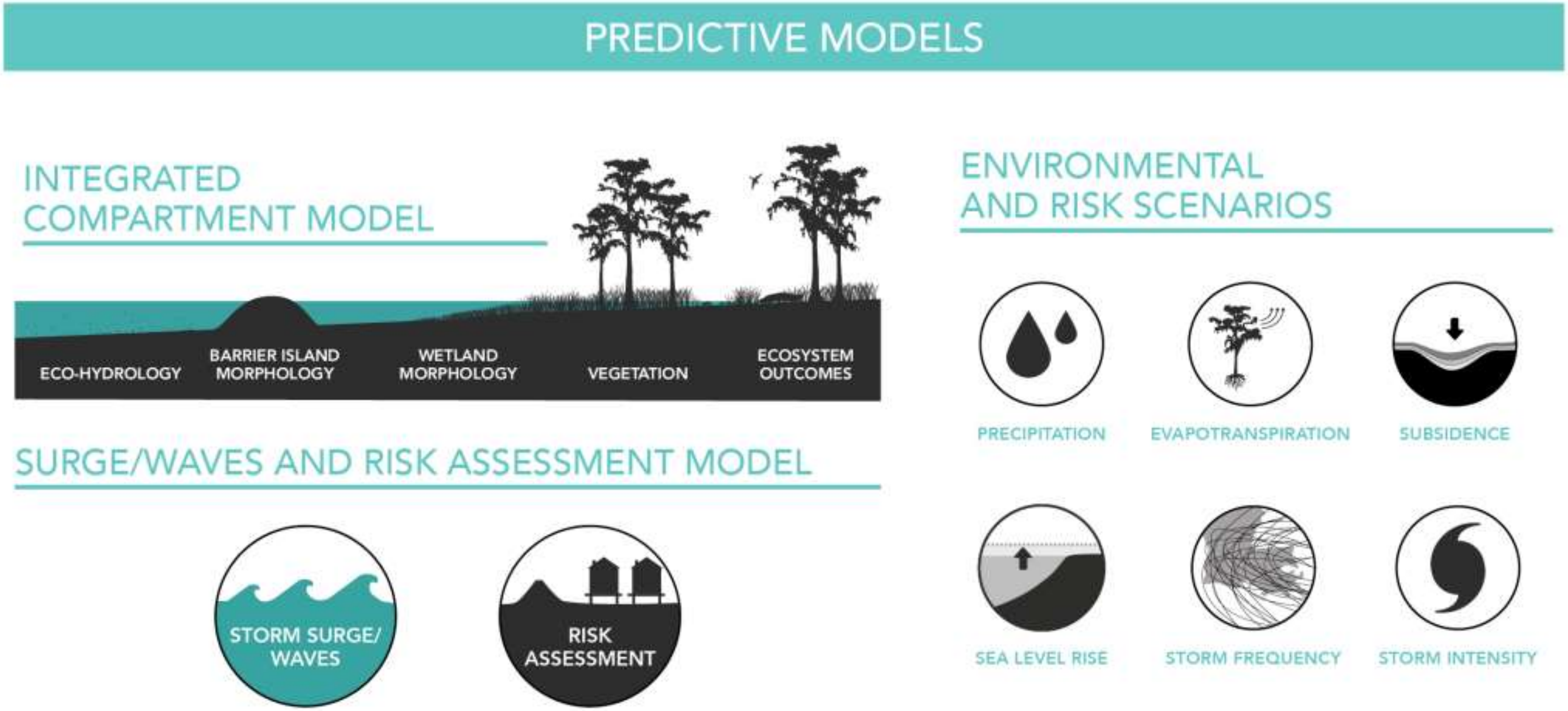
MASTER PLAN OBJECTIVES

Flood Protection	Reduce economic losses from storm-based flooding
Natural Processes	Promote a sustainable coastal ecosystem by harnessing the processes of the natural system
Coastal Habitats	Provide habitats suitable to support an array of commercial and recreational activities coast wide
Cultural Heritage	Sustain Louisiana’s unique heritage and culture
Working Coast	Provide a viable working coast to support industry

DEVELOPING THE COASTAL MASTER PLAN



ENVISIONING THE FUTURE COAST



PLANNING FOR AN UNCERTAIN FUTURE

ENVIRONMENTAL SCENARIOS CONSIDERED

SCENARIO	PRECIP	ET	SEA LEVEL RISE	SUBSIDENCE	STORM FREQUENCY	AVG. STORM INTENSITY
2017 COASTAL MASTER PLAN						
LOW	>HISTORICAL	<HISTORICAL	1.41’	20% OF RANGE	-28%	+10.0%
MEDIUM	>HISTORICAL	HISTORICAL	2.07'	20% OF RANGE	-14%	+12.5%
HIGH	HISTORICAL	HISTORICAL	2.72’	50% OF RANGE	0%	+15.0%

(FEET/50 YEARS)

DECISION DRIVERS FOR PROJECT SELECTION

REDUCING FLOOD RISK

BUILDING LAND

BUILT ON THE BEST AVAILABLE SCIENCE...

PLANNING TOOL

DECISION DRIVERS

- REDUCING FLOOD RISK
- BUILDING LAND

CONSTRAINTS

- SEDIMENT
- FUNDING

METRICS

COMMUNITY METRICS

- AGRICULTURAL COMMUNITIES
- FLOOD PROTECTION OF STRATEGIC ASSETS
- OIL & GAS COMMUNITIES
- SOCIAL VULNERABILITY
- FLOOD PROTECTION OF HISTORIC PROPERTIES
- NAVIGATION
- TRADITIONAL FISHING COMMUNITIES

ENVIRONMENTAL METRICS

- ALLIGATOR
- CRAWFISH
- SALTWATER FISHERIES
- USE OF NATURAL PROCESSES
- BLUE CRAB
- FRESHWATER FISHERIES
- SHRIMP
- WATERFOWL
- BROWN PELICAN
- OYSTERS
- SUSTAINABILITY OF LAND

TECHNICAL TEAM

COLLABORATIVE TEAM OF OVER 70 EXPERTS

SCIENCE AND ENGINEERING BOARD

Name	Organization	Expertise
Carl Friedrichs	VIMS, William & Mary	Coastal Geoscience
Dan Childers	Arizona State University	Wetlands
Ed Houde	University of Maryland	Fisheries
Jen Irish	Virginia Tech	Risk
Len Shabman	Resources for the Future	Economics
Margaret Davidson	NOAA	Natural Resource/Economic Policies
Marius Sokolewicz	Royal Haskoning	Coastal Modeling
Michael Orbach	Duke University	Socio-Economics
Sandra Knight	WaterWonks, LLC	Water Resources
William Fulton	Rice University	Urban Planning

TECHNICAL ADVISORY COMMITTEES

Predictive Models

- John Callaway, University of San Francisco
- Scott Hagen, Louisiana State University
- Courtney Harris, Virginia Institute of Marine Sciences
- Wim Kimmerer, San Francisco State University
- Mike Waldon, US Fish and Wildlife Services (retired)

Resiliency

- Daniel Aldrich, Northeastern University
- Diane Austin, University of Arizona
- Gavin Smith, University of North Carolina
- Dan Zarrilli, City of New York, Mayor’s Office of Recovery & Resiliency

SOURCES OF SCIENCE

- Universities
- Agencies
- Research institutes/NGOs
- Private sector

- Few coordinating mechanisms

A LONG HISTORY OF RESEARCH



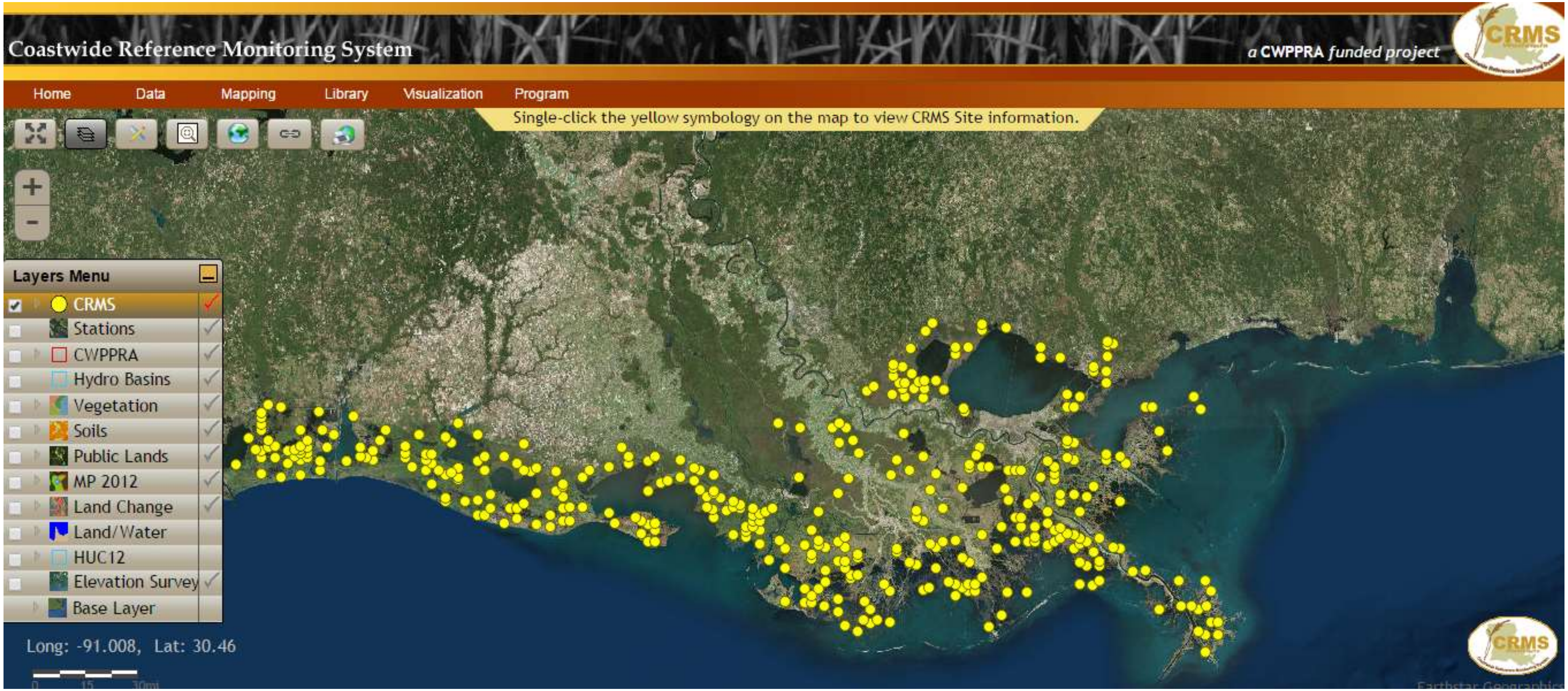




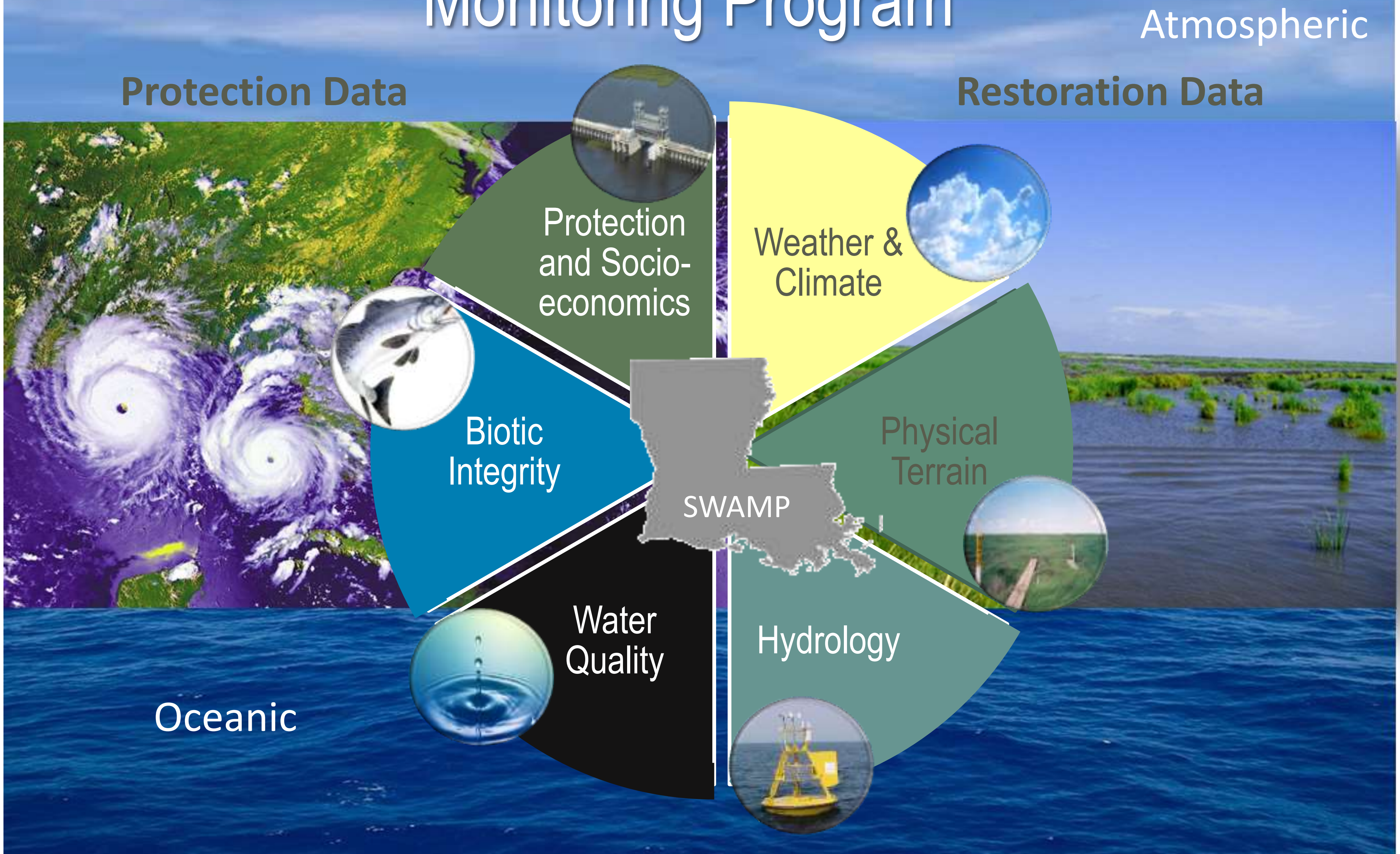




COASTWIDE REFERENCE MONITORING SYSTEM



System-Wide Assessment and Monitoring Program



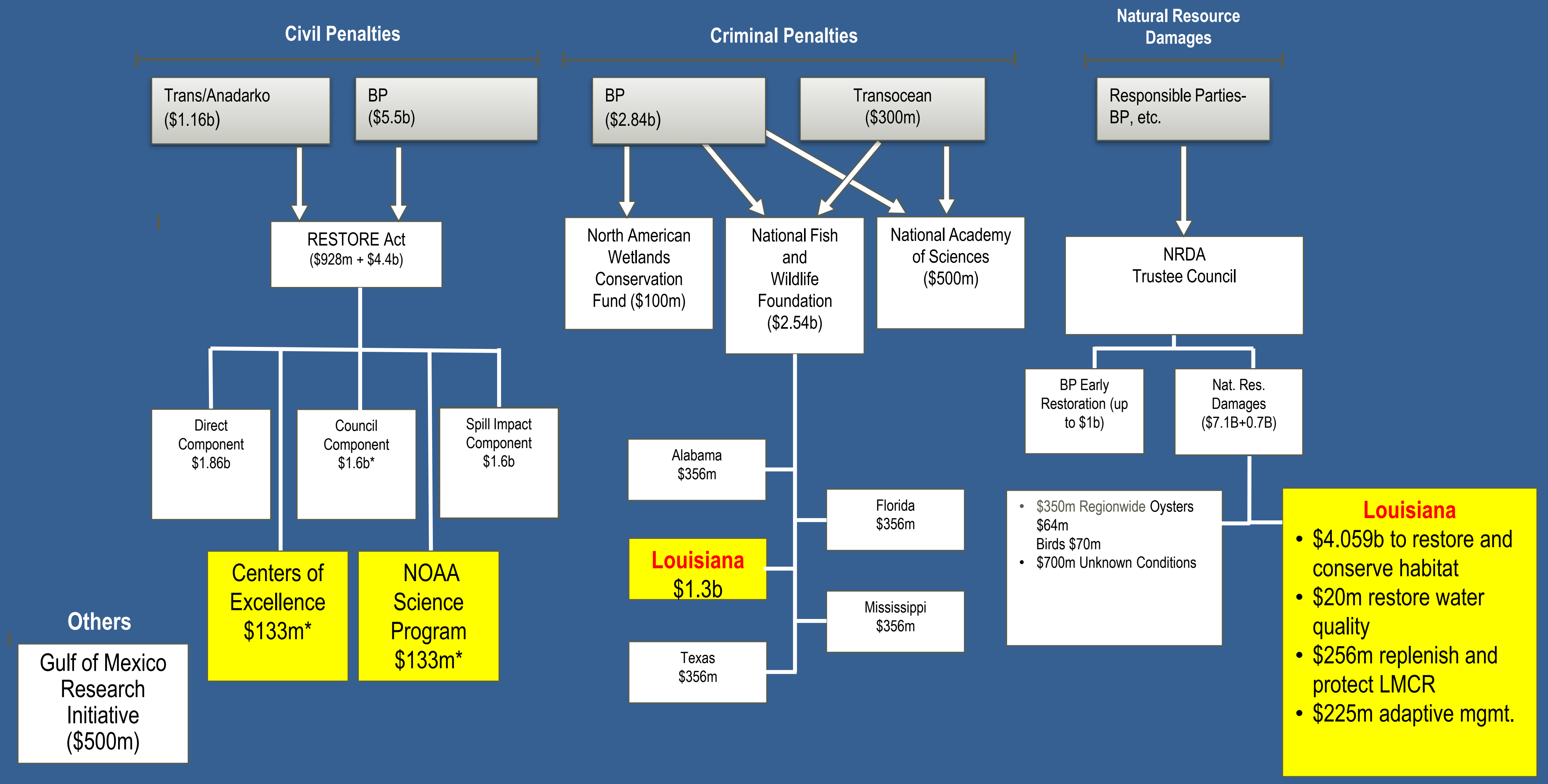
FUNDING FOR SCIENCE

Specific support for coastal research is limited

Programmatic monitoring provides baseline

Project-specific opportunities, e.g., Master Plan

Deepwater Horizon Gulf Science and Restoration Initiatives

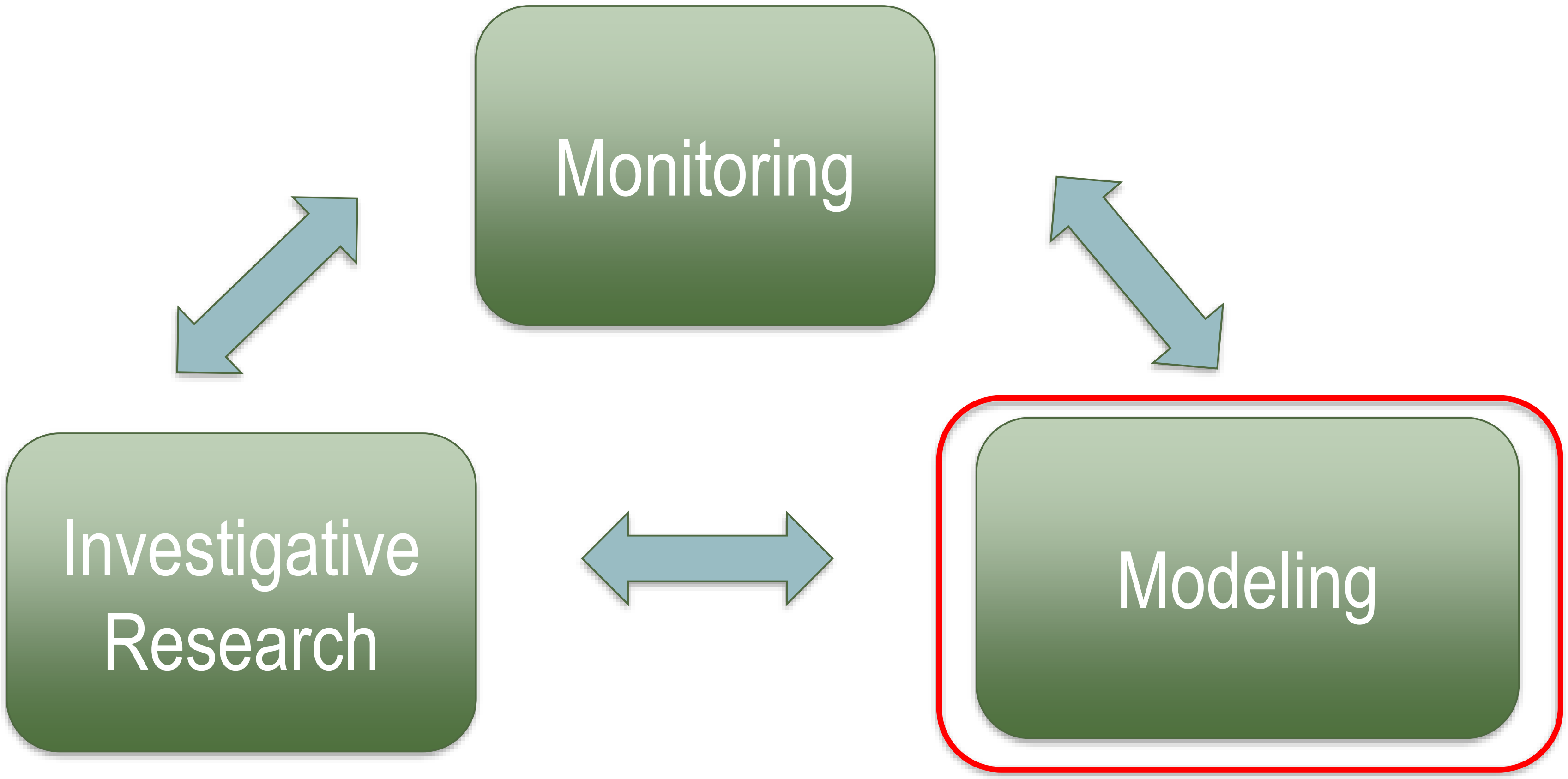


The Water Institute of the Gulf
RESTORE ACT
CENTER OF EXCELLENCE
LOUISIANA

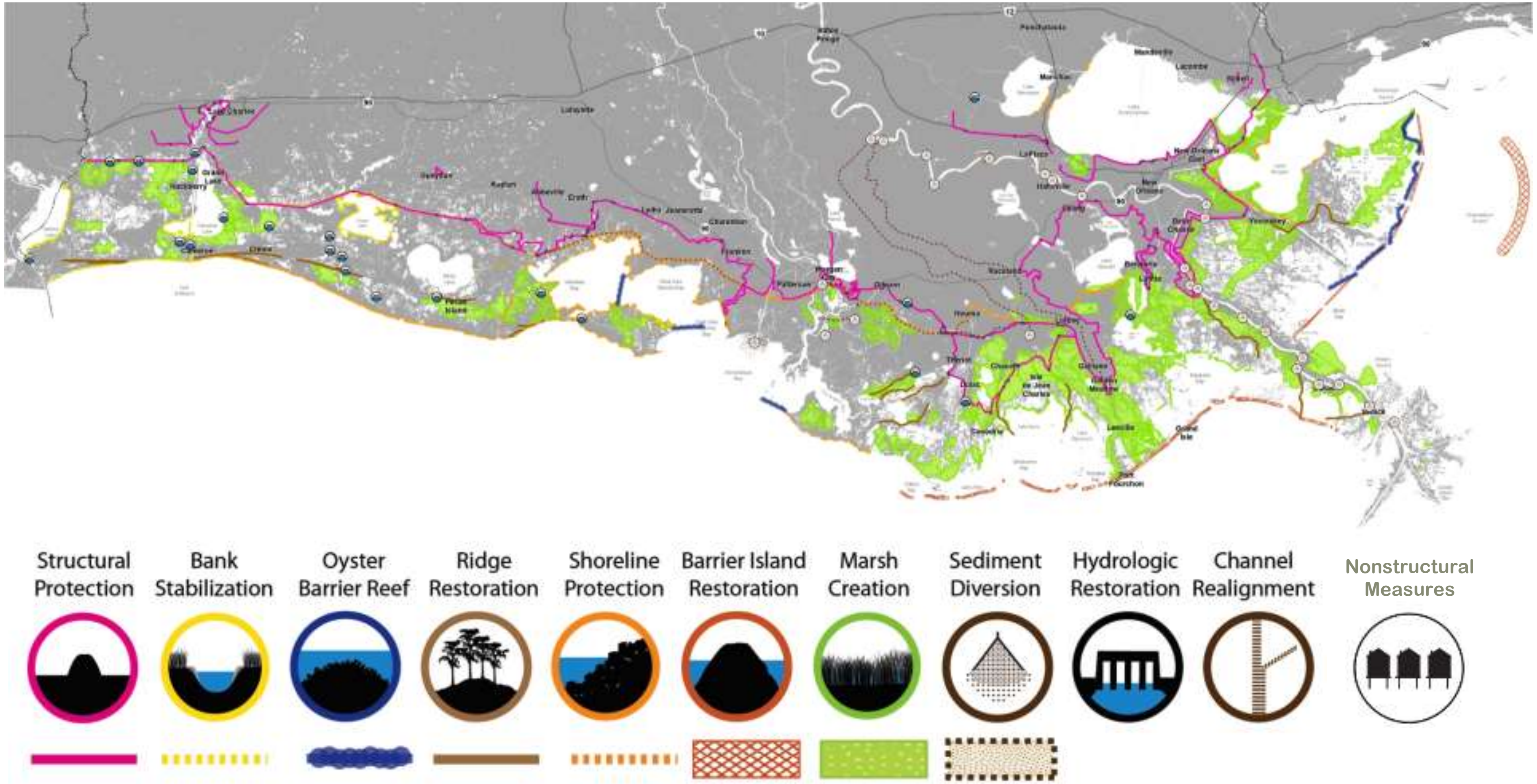
Request for Proposals
issued November 2017
~$3m

Research to support
implementation of the
Coastal Master Plan

SCIENTIFIC TOOLS



COASTAL MASTER PLAN EVALUATED OF HUNDREDS OF EXISTING PROJECTS



Nearly 400 Projects Evaluated Across the Coast

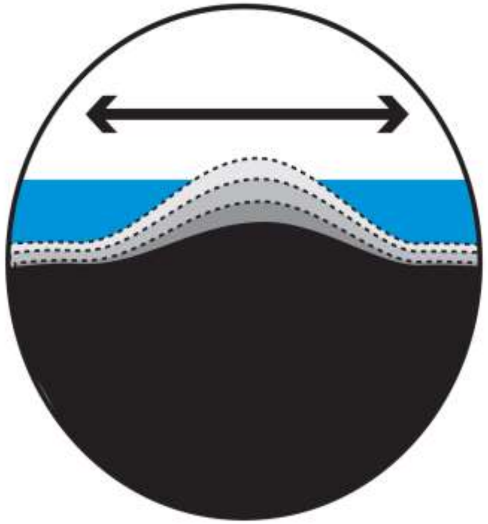
DECISION DRIVERS

- Flood Risk Reduction and Land Built/Maintained as Decision Drivers

Risk Reduction

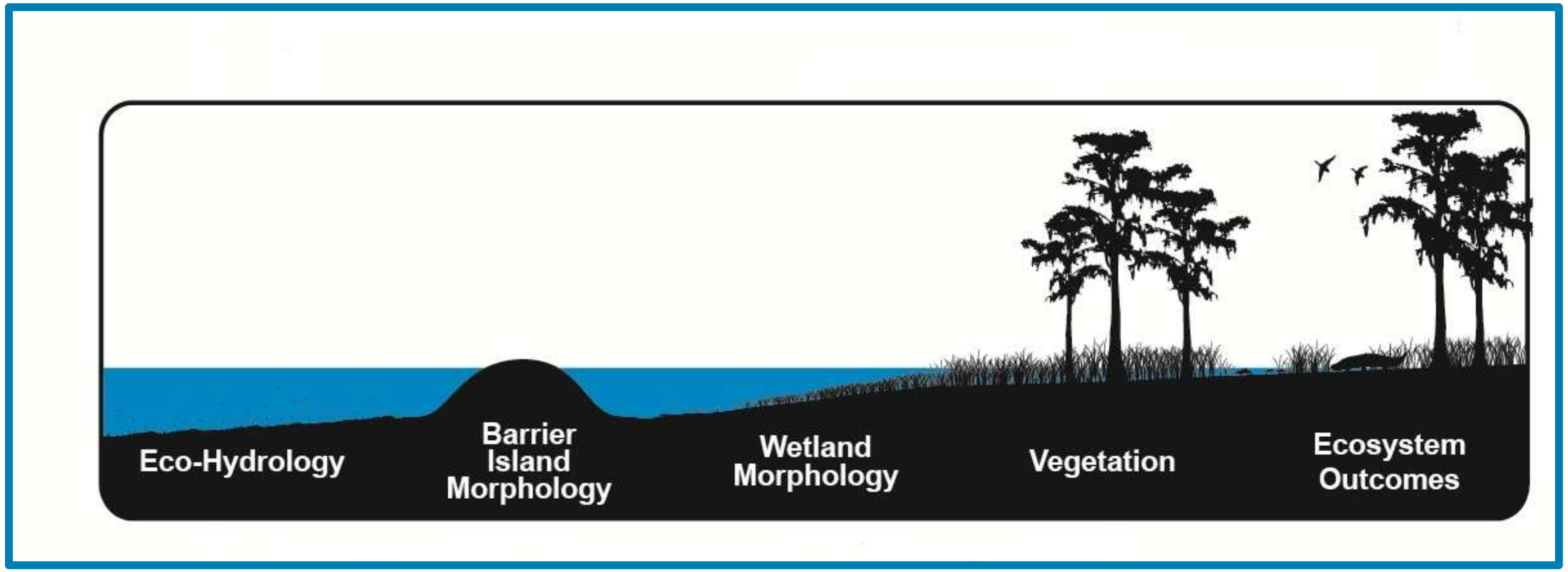
Expected Annual Damages

Restoration

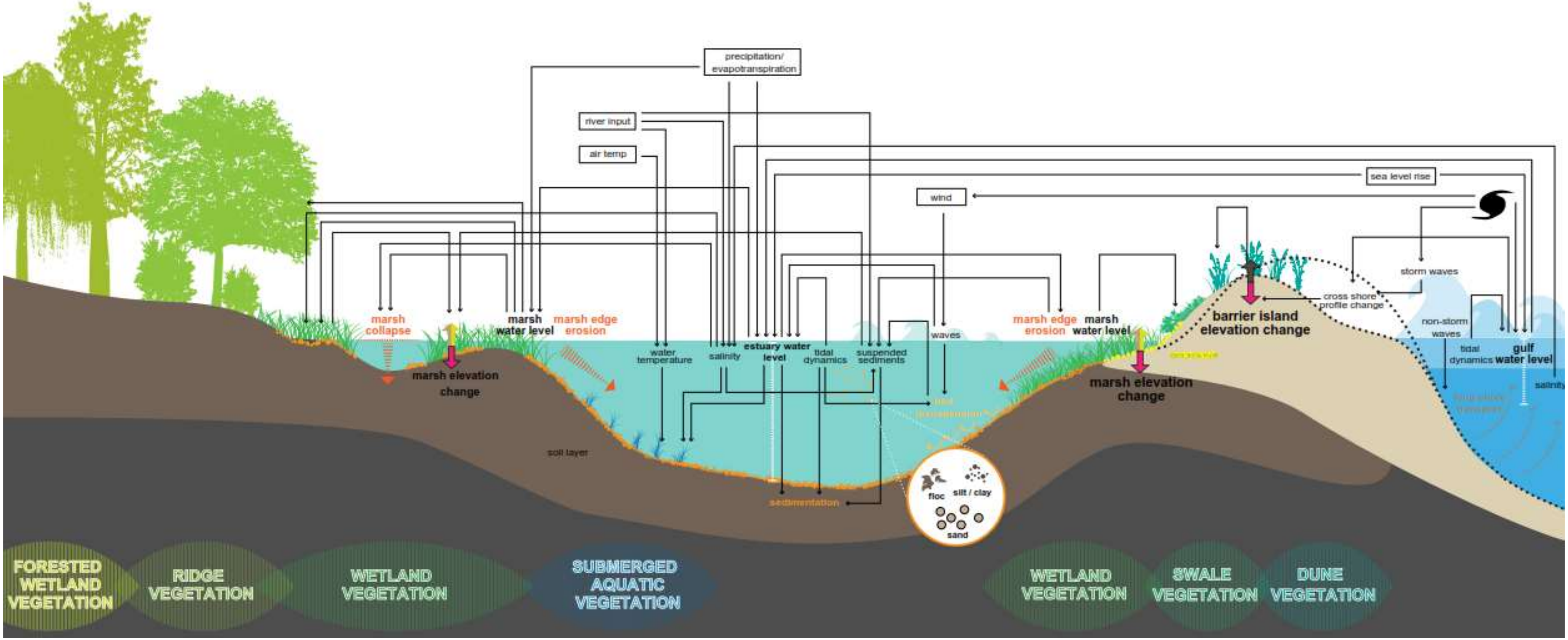


Land Area

INTEGRATED COMPARTMENT MODEL (ICM)

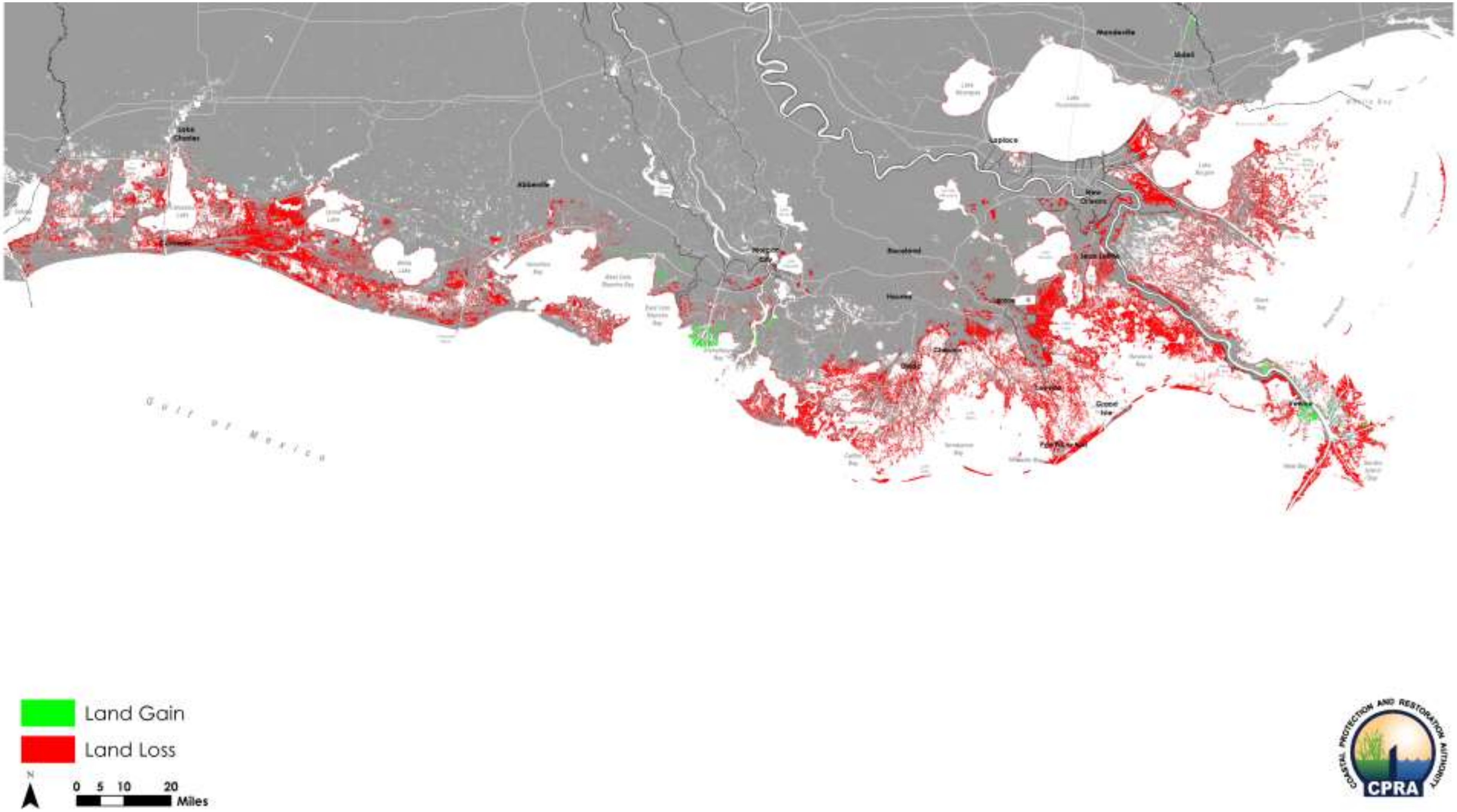


INTEGRATED COMPARTMENT MODEL



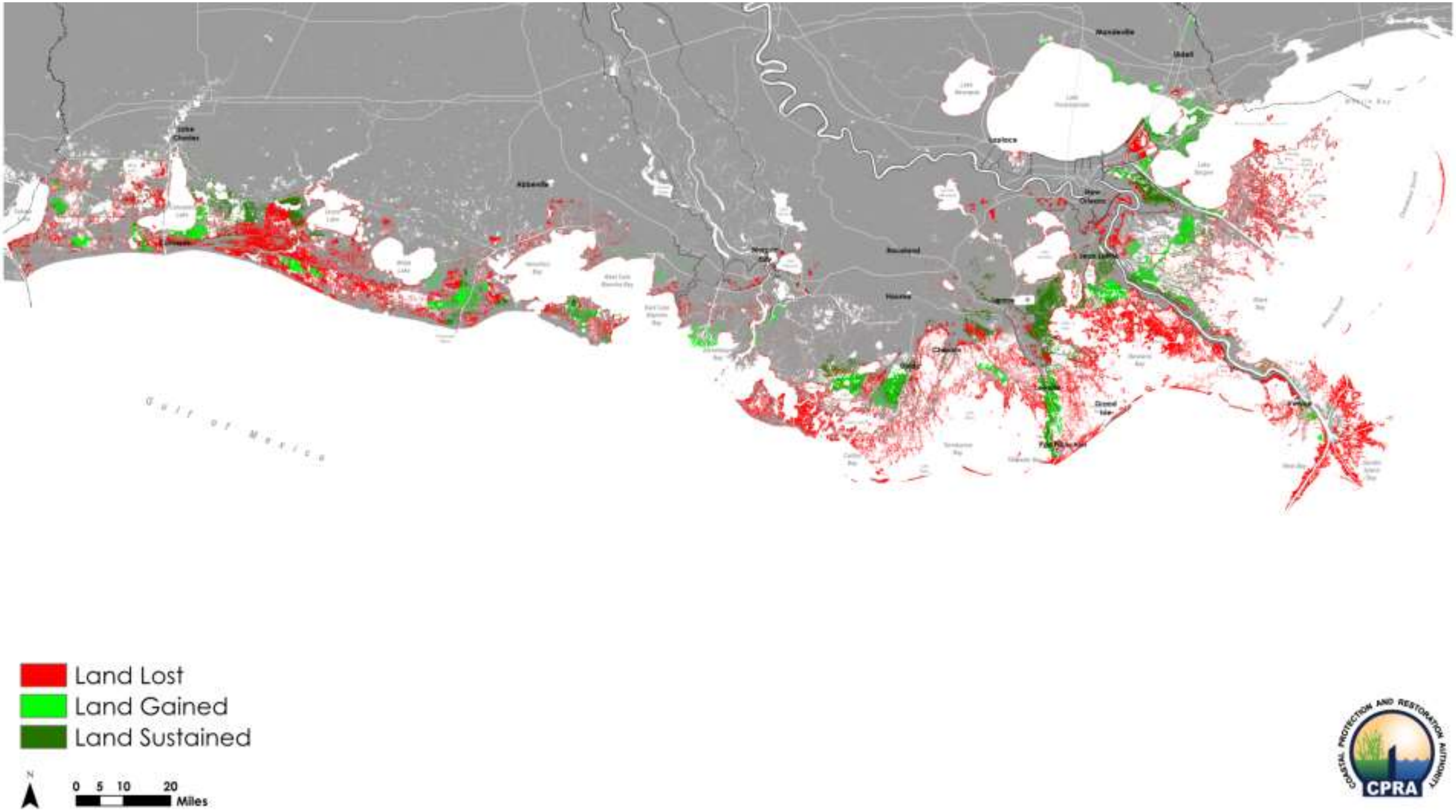
FUTURE WITHOUT ACTION

HIGH SCENARIO | YEAR 30



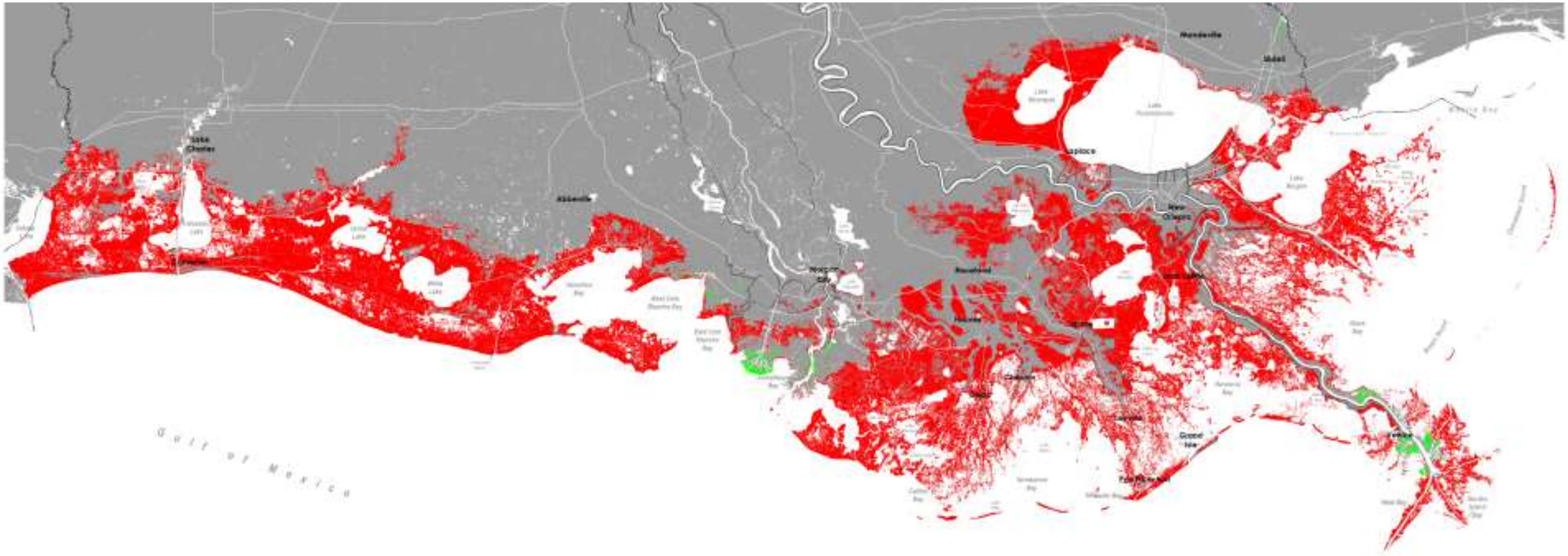
WHAT THE PLAN DELIVERS: LAND CHANGE

HIGH SCENARIO | YEAR 30



FUTURE WITHOUT ACTION

HIGH SCENARIO | YEAR 50



Land Gain

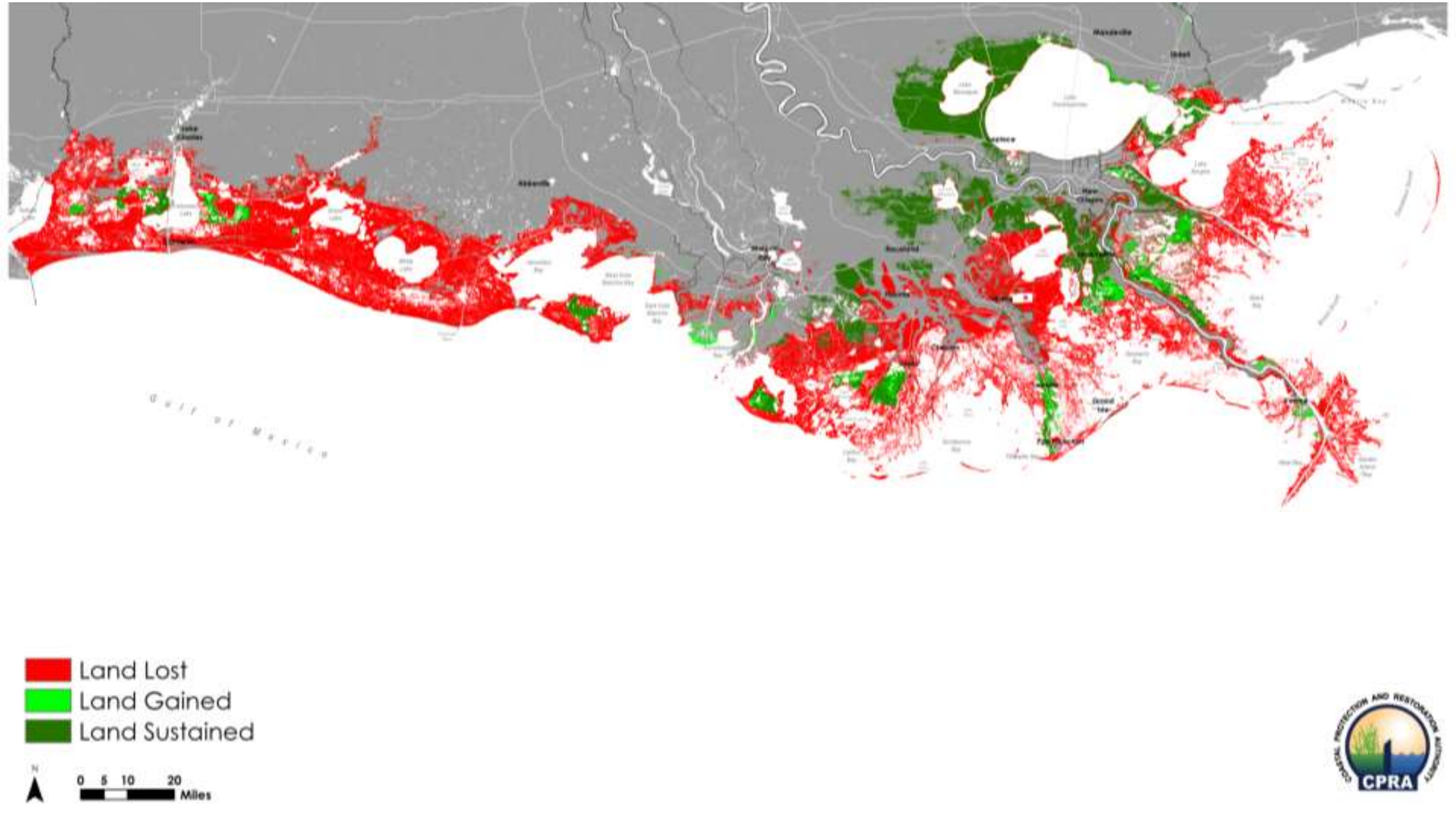
Land Loss

N

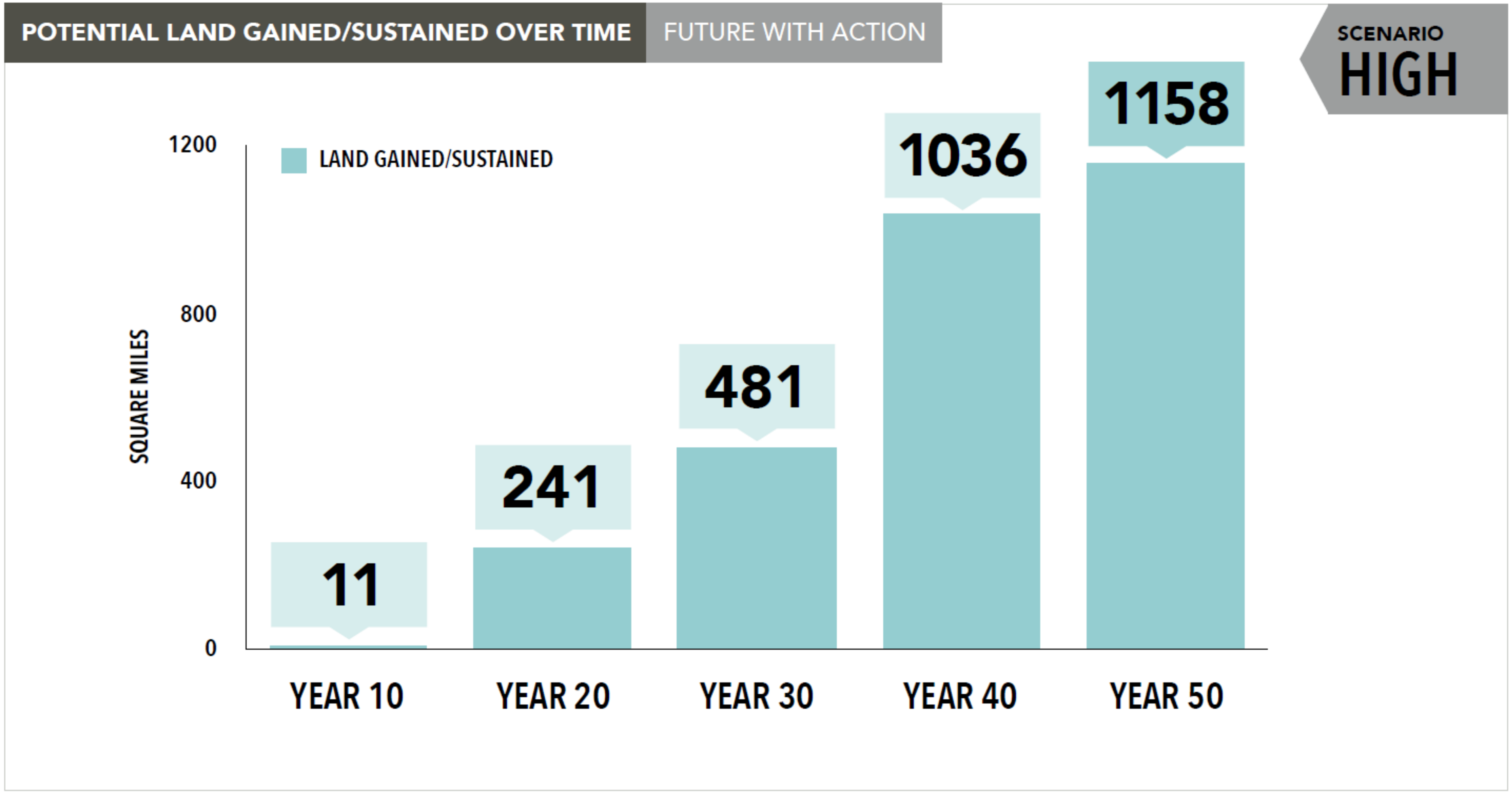
0 5 10 20 Miles

WHAT THE PLAN DELIVERS: LAND CHANGE

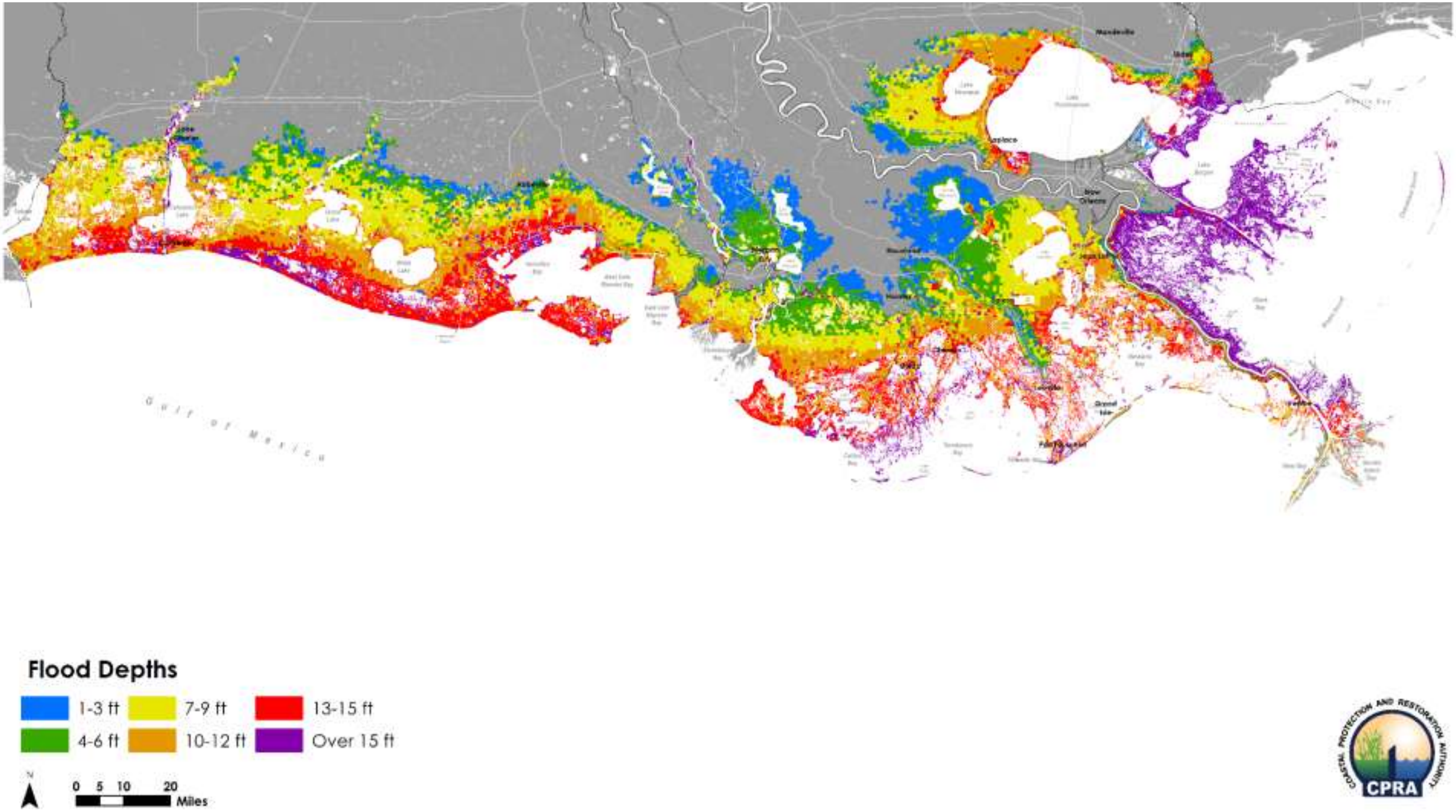
HIGH SCENARIO | YEAR 50

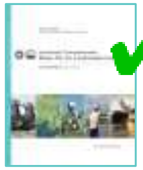


WHAT THE PLAN DELIVERS
LAND GAINED/SUSTAINED

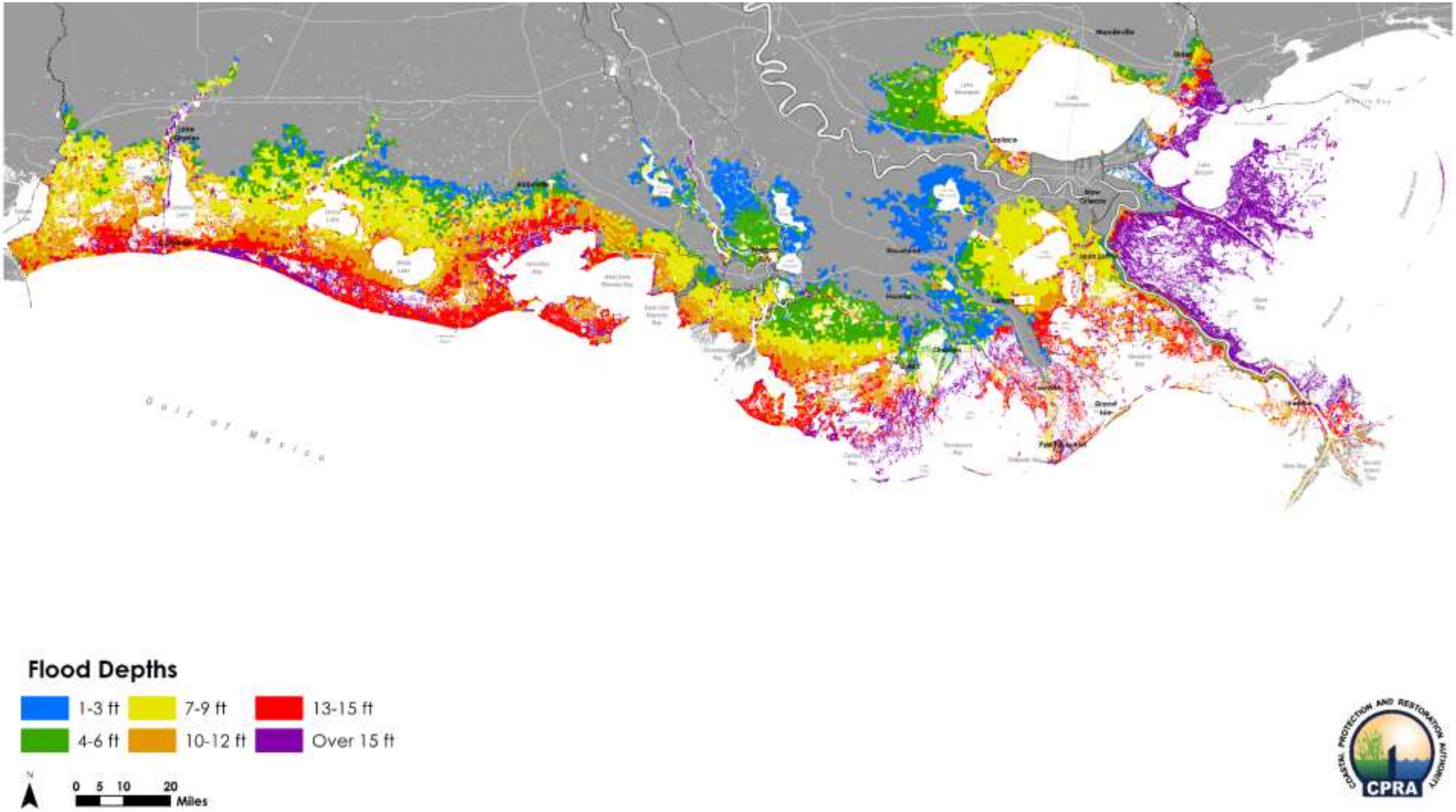


FUTURE WITHOUT ACTION: FLOOD DEPTHS
MEDIUM SCENARIO | YEAR 25 | 100-YEAR EVENT



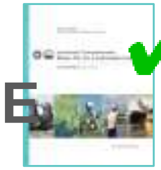


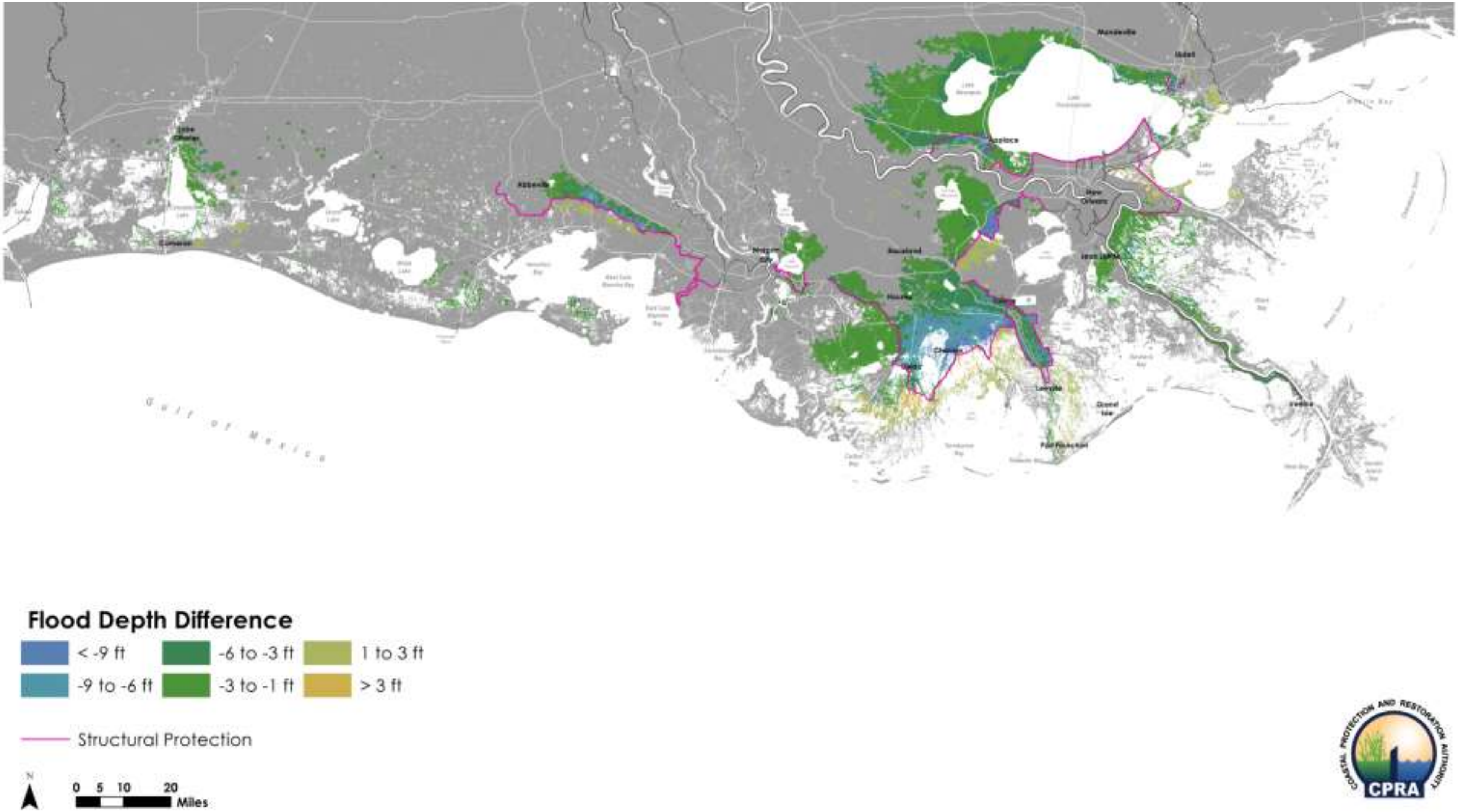
WHAT THE PLAN DELIVERS: FLOOD DEPTHS
MEDIUM SCENARIO | YEAR 25 | 100-YEAR EVENT



WHAT THE PLAN DELIVERS: FLOOD DEPTH DIFFERENCE

MEDIUM SCENARIO | YEAR 25 | 100-YEAR EVENT





FUTURE WITHOUT ACTION: FLOOD DEPTHS
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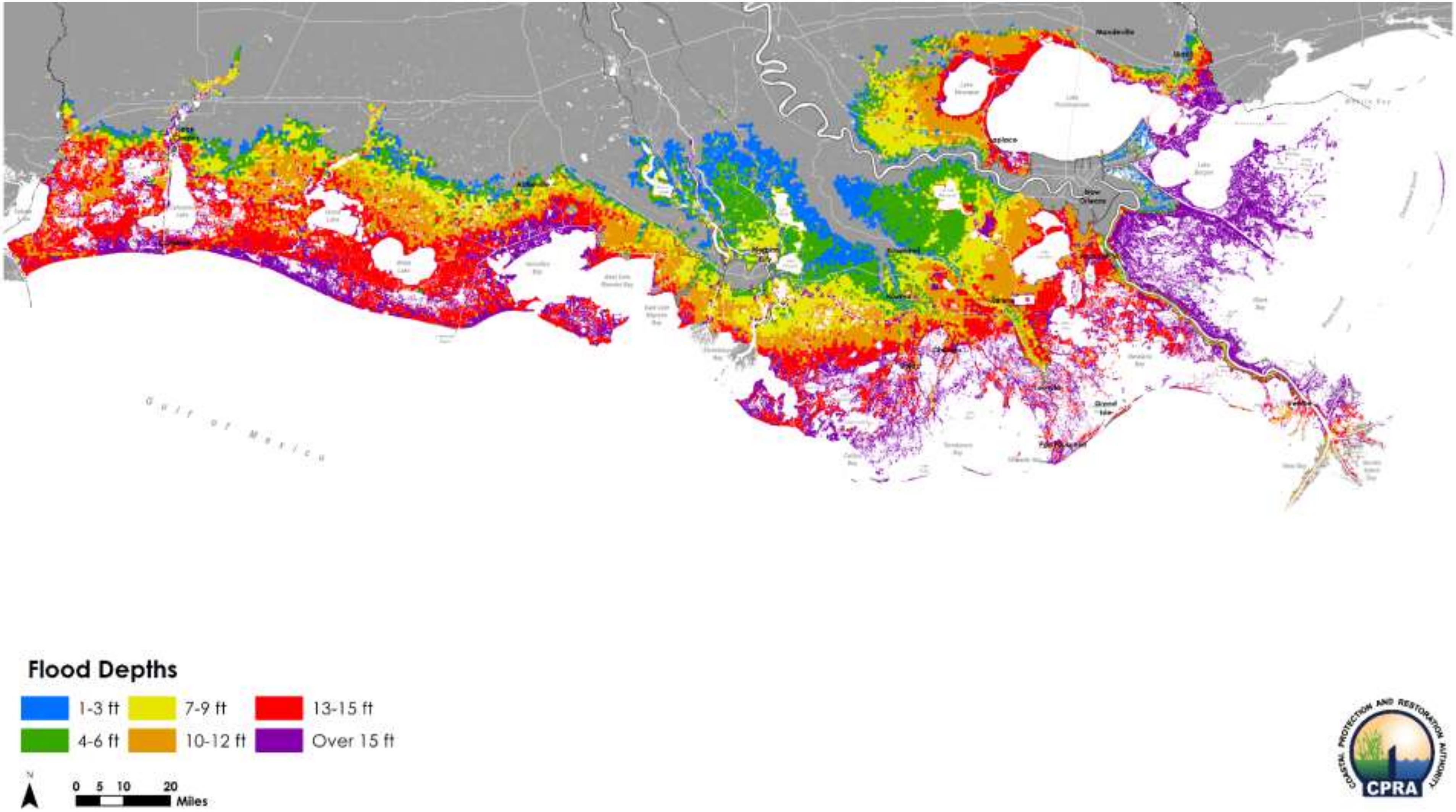
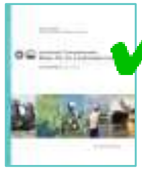
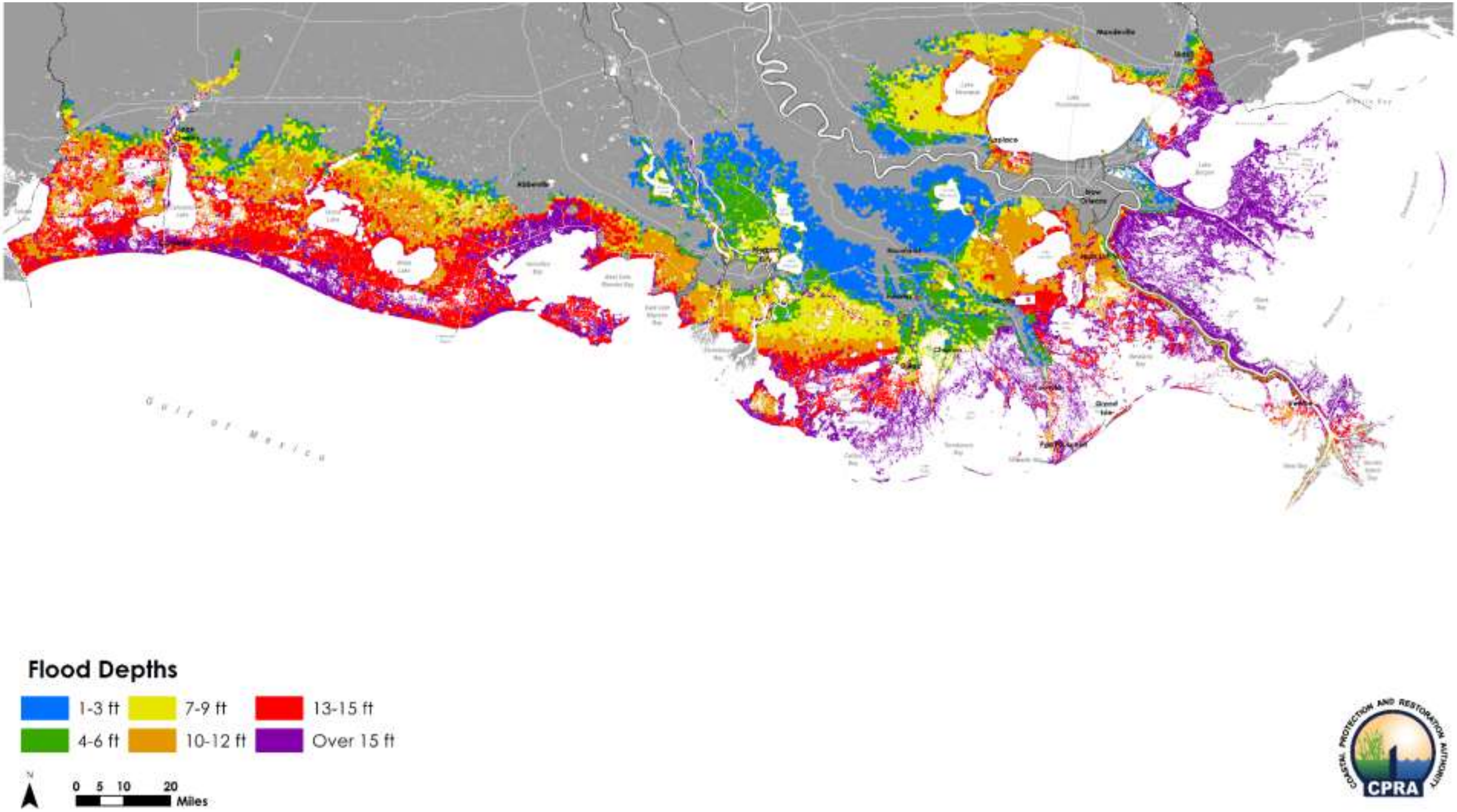
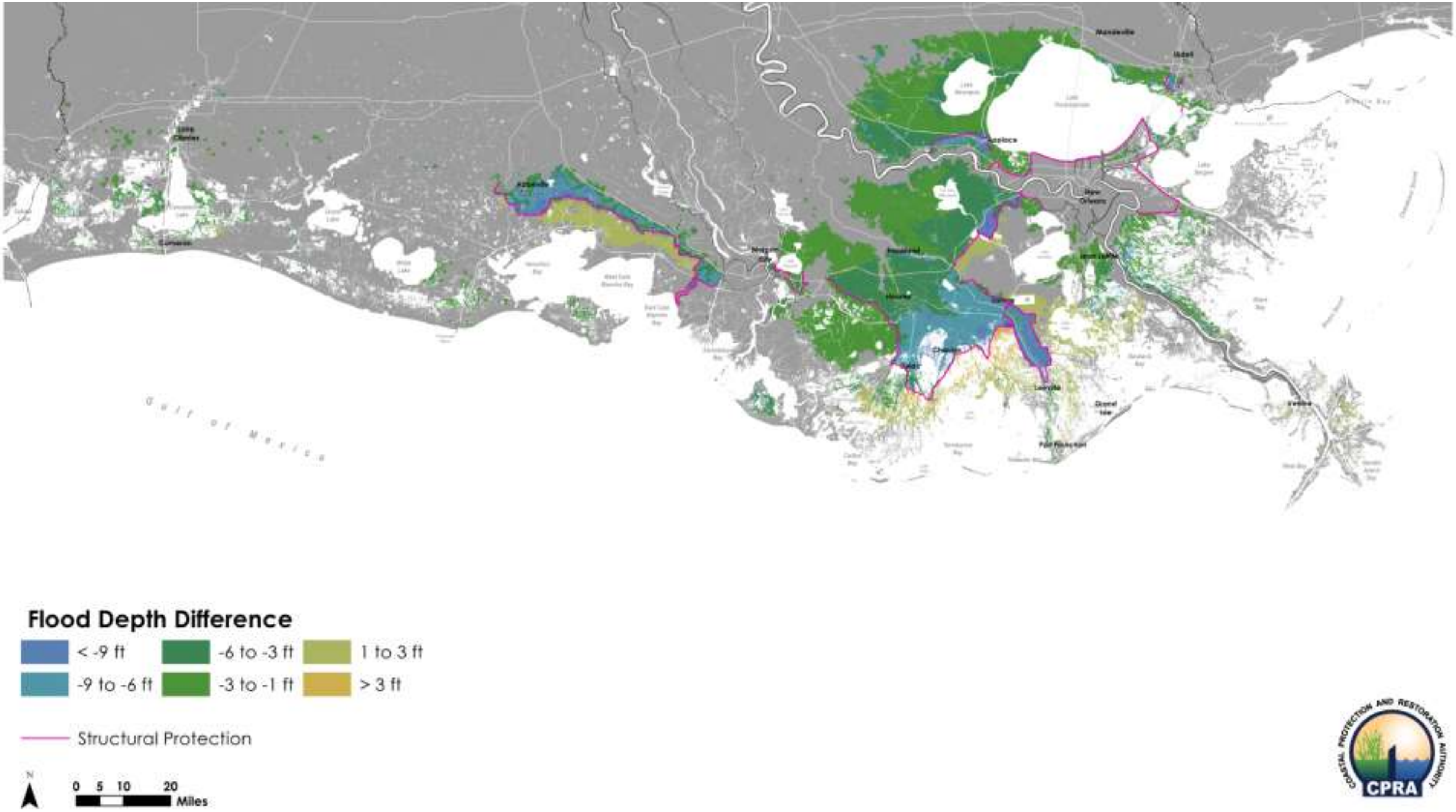


WHAT THE PLAN DELIVERS: FLOOD DEPTHS
MEDIUM SCENARIO | YEAR 50 | 100-YEAR EVENT

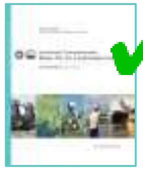


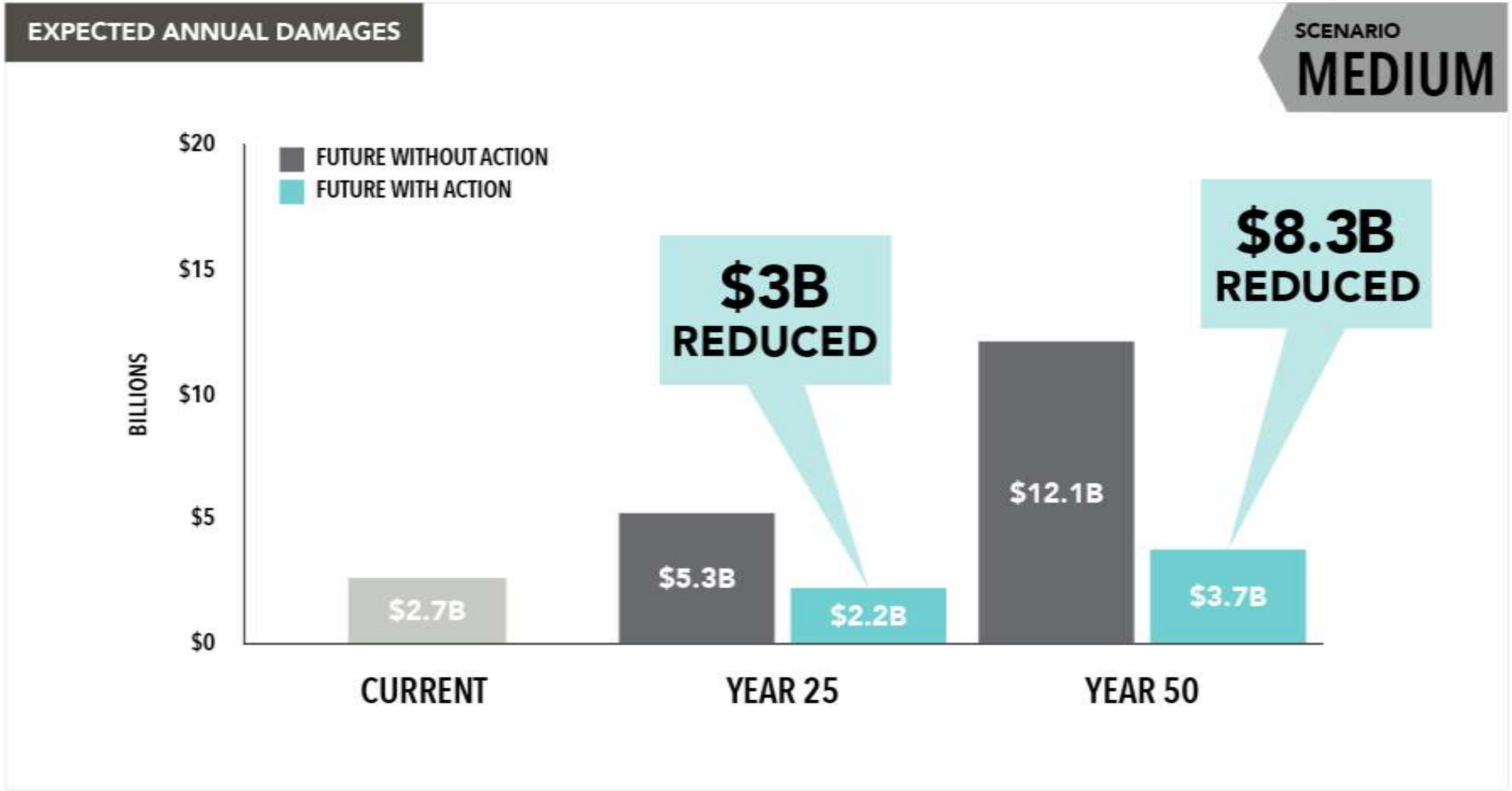


WHAT THE PLAN DELIVERS: FLOOD DEPTH DIFFERENCE
MEDIUM SCENARIO | YEAR 50 | 100-YEAR EVENT



WHAT THE PLAN DELIVERS
REDUCTION IN EXPECTED ANNUAL DAMAGES





- Planning and Technical Teams

Master Plan Data Viewer

Get Involved!

Flood Risk and Resilience Program

2012 Coastal Master Plan

2018 Annual Plan

2017 Coastal Master Plan Appendices

To access the appendices to the **2017 Coastal Master Plan**, please click the links below. If you have any questions regarding the appendices, please e-mail us at MasterPlan@la.gov.

Appendix A: Project Definition	Appendix B: People and the Landscape	Appendix C: Modeling (by chapter below)	Appendix D: Planning Tool	Appendix E: Floo Risk and Resilienc Program Framew

Appendix F: Adaptive Management	Appendix G: Outreach and Engagement

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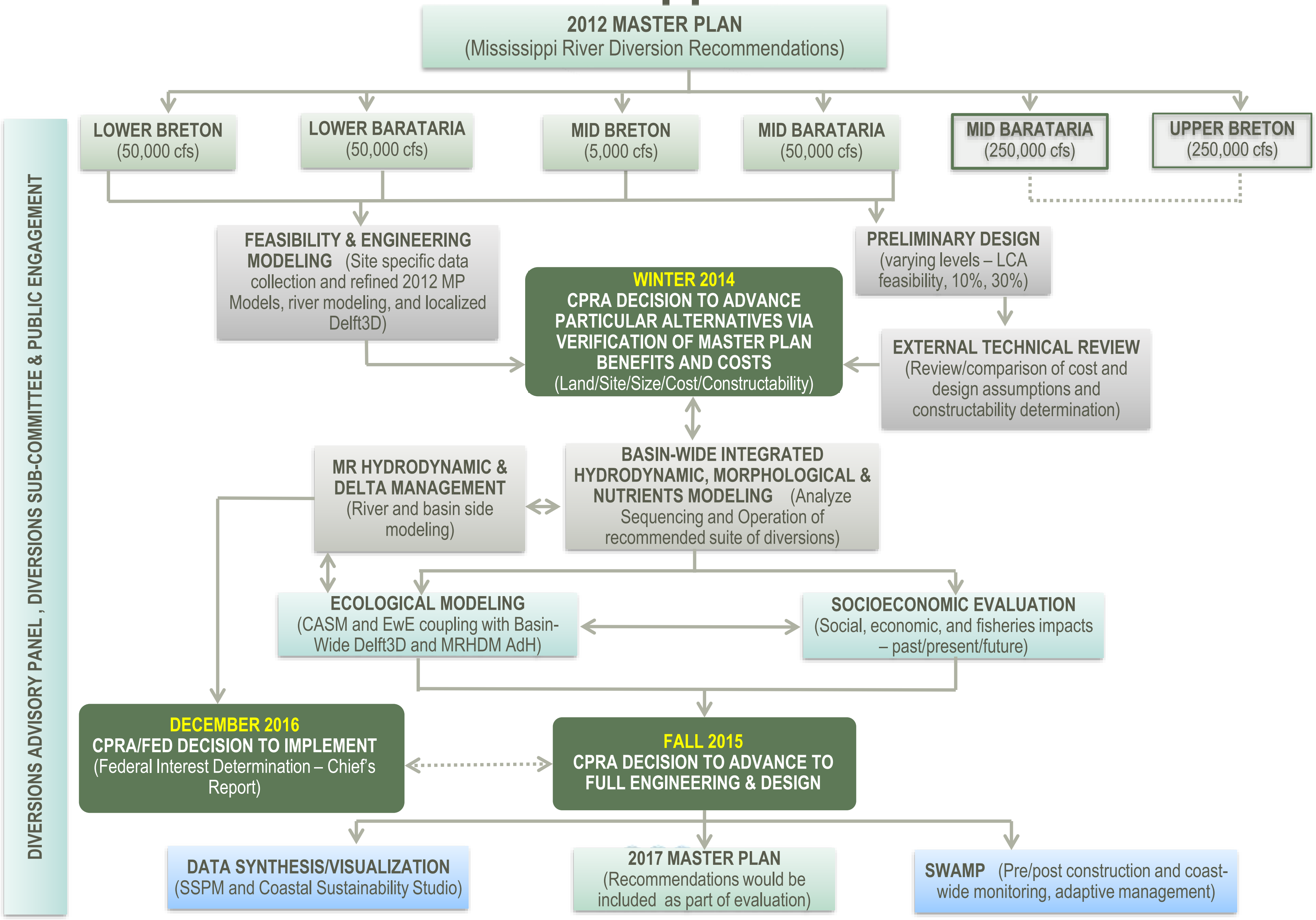
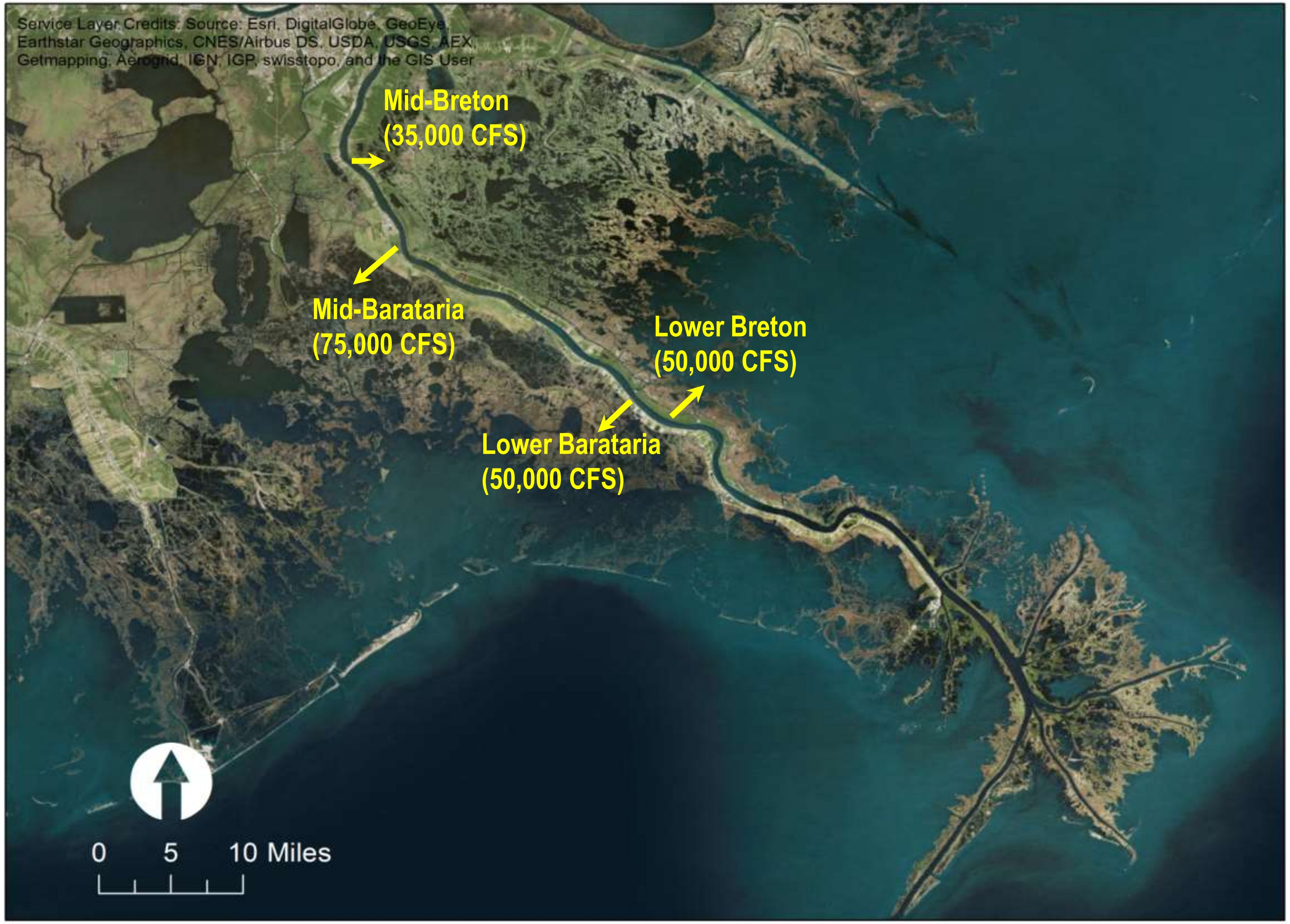
Forward Alt+Right Arrow
Reload Ctrl+R
Save as... Ctrl+S
Print... Ctrl+P
Cast...
Translate to English
Zotero Connector
View page source Ctrl+U
Inspect Ctrl+Shift+I

MOVING PROJECTS TO IMPLMENTATION

After the Master Plan: Mississippi River Sediment Diversions



PROJECT LEVEL ANALYSIS - SEDIMENT DIVERSIONS



DELTA KNOWLEDGE

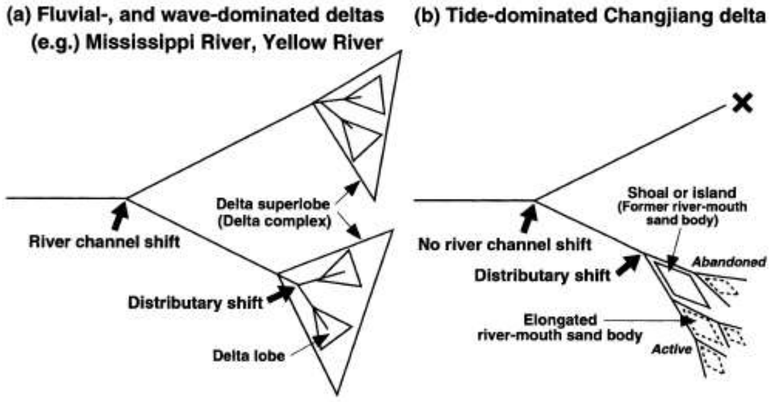
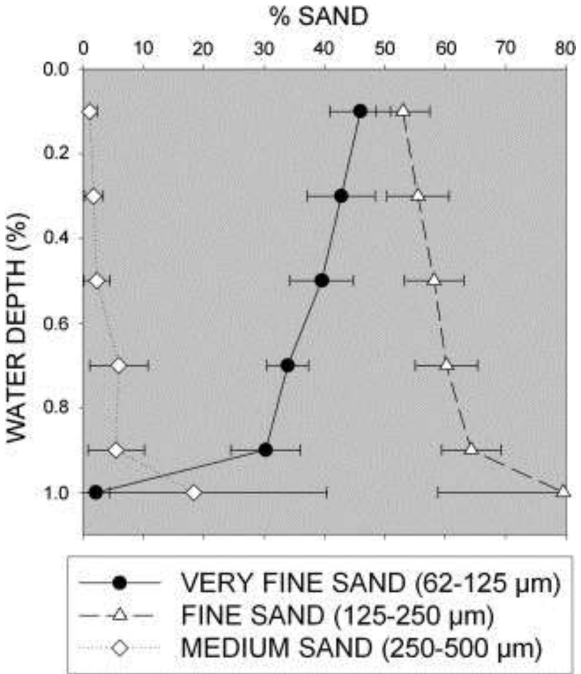
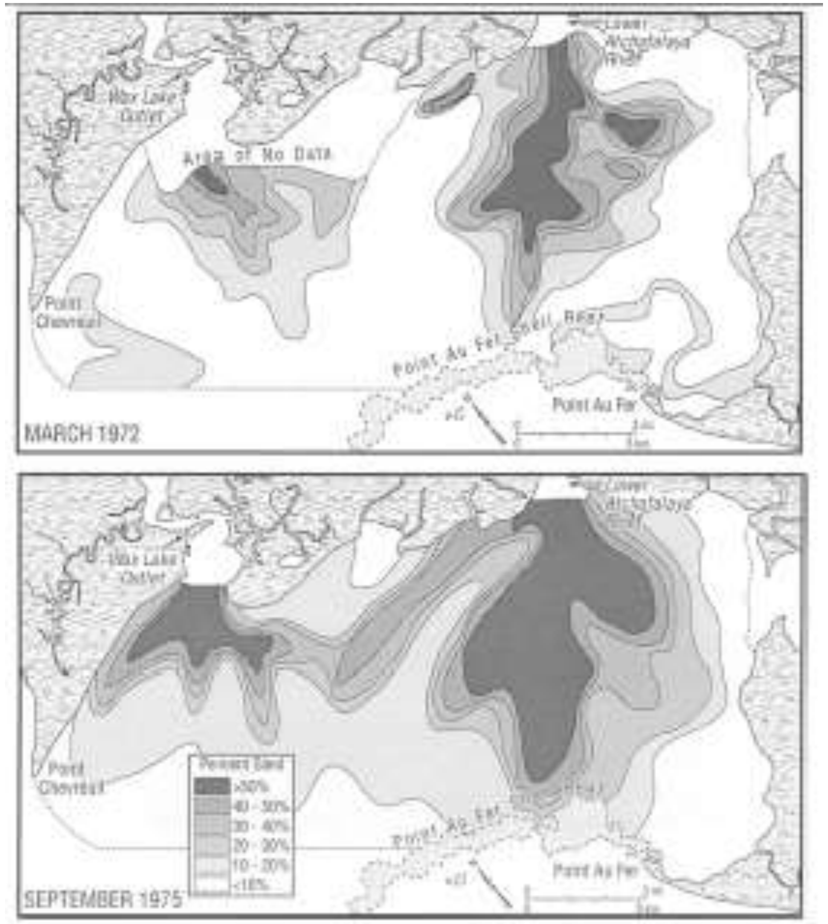


Fig. 10. Schematic illustration of delta switching.

Hori, 2002

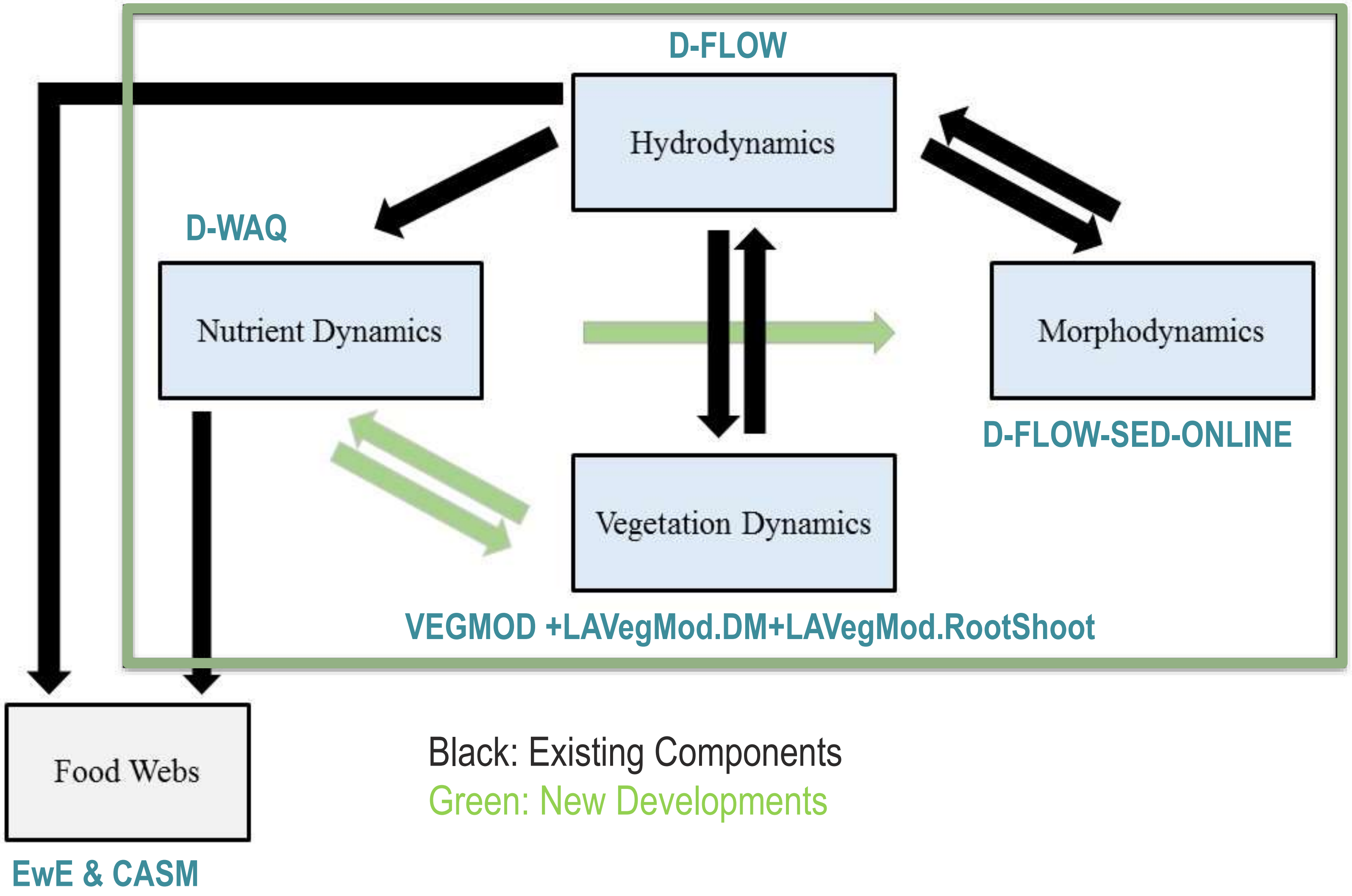


Allison & Meselhe 2013



Roberts, 1998

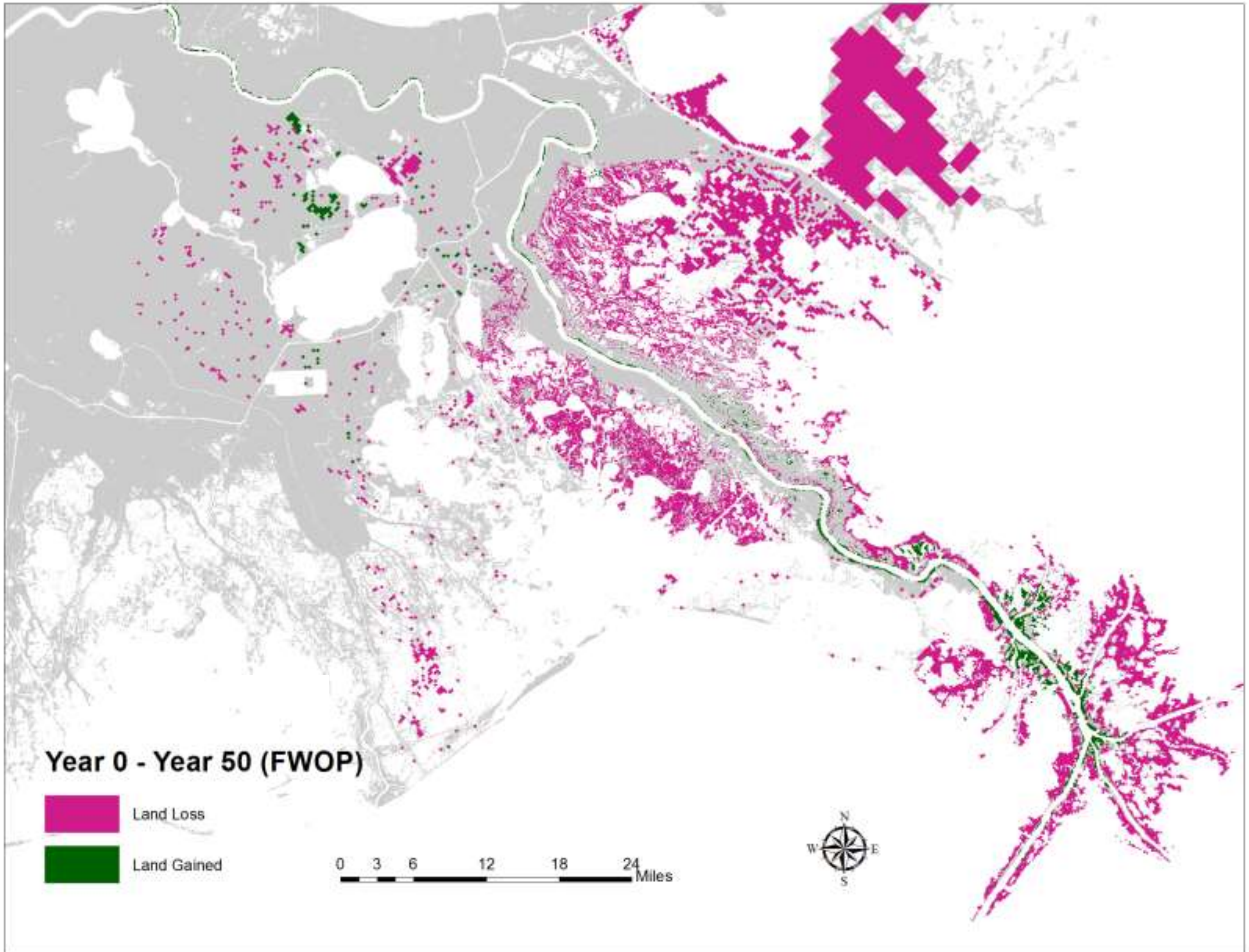
DIVERSION MODEL OVERVIEW



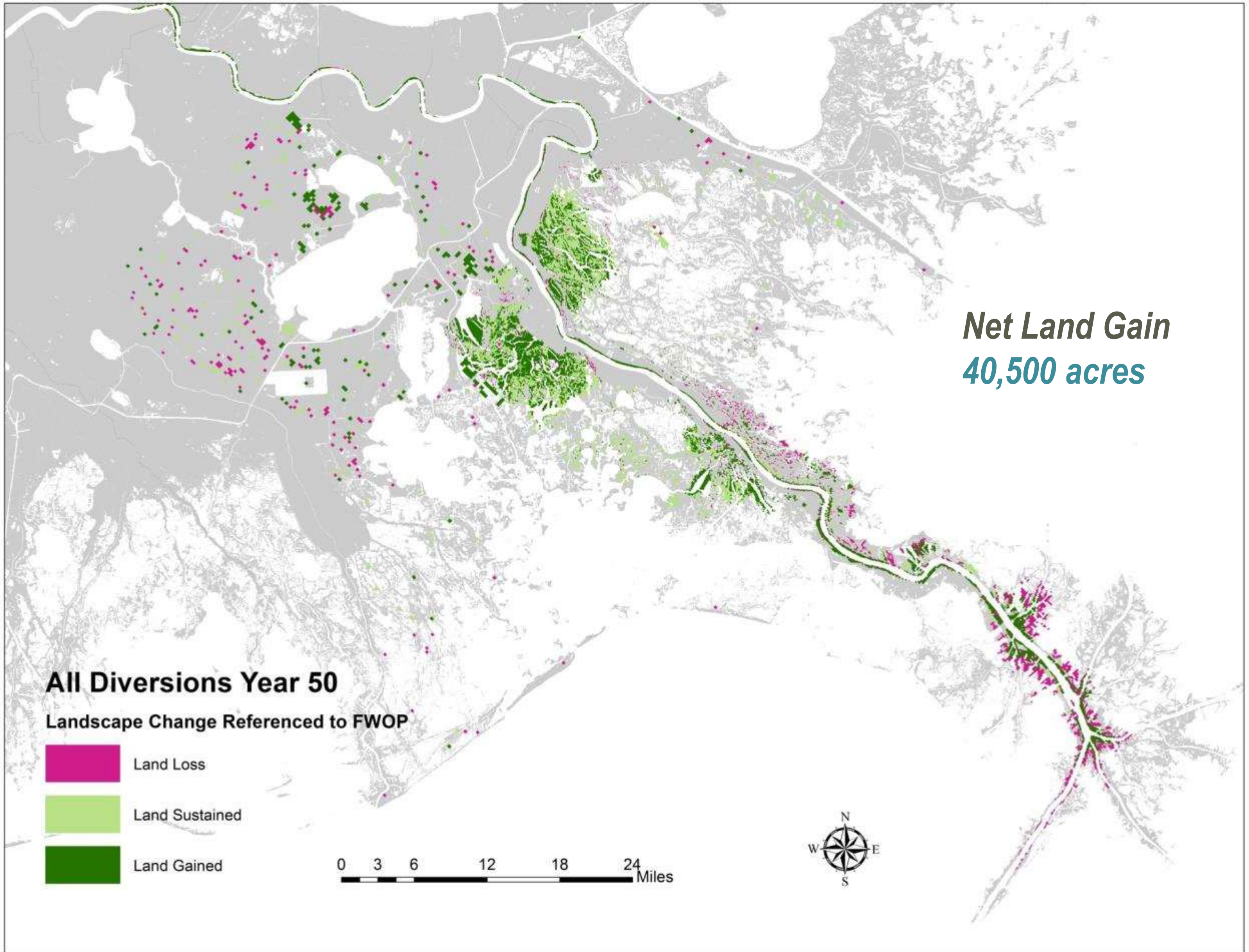
Black: Existing Components
Green: New Developments

LAND CHANGE BY YEAR 2070

FUTURE WITHOUT PROJECT

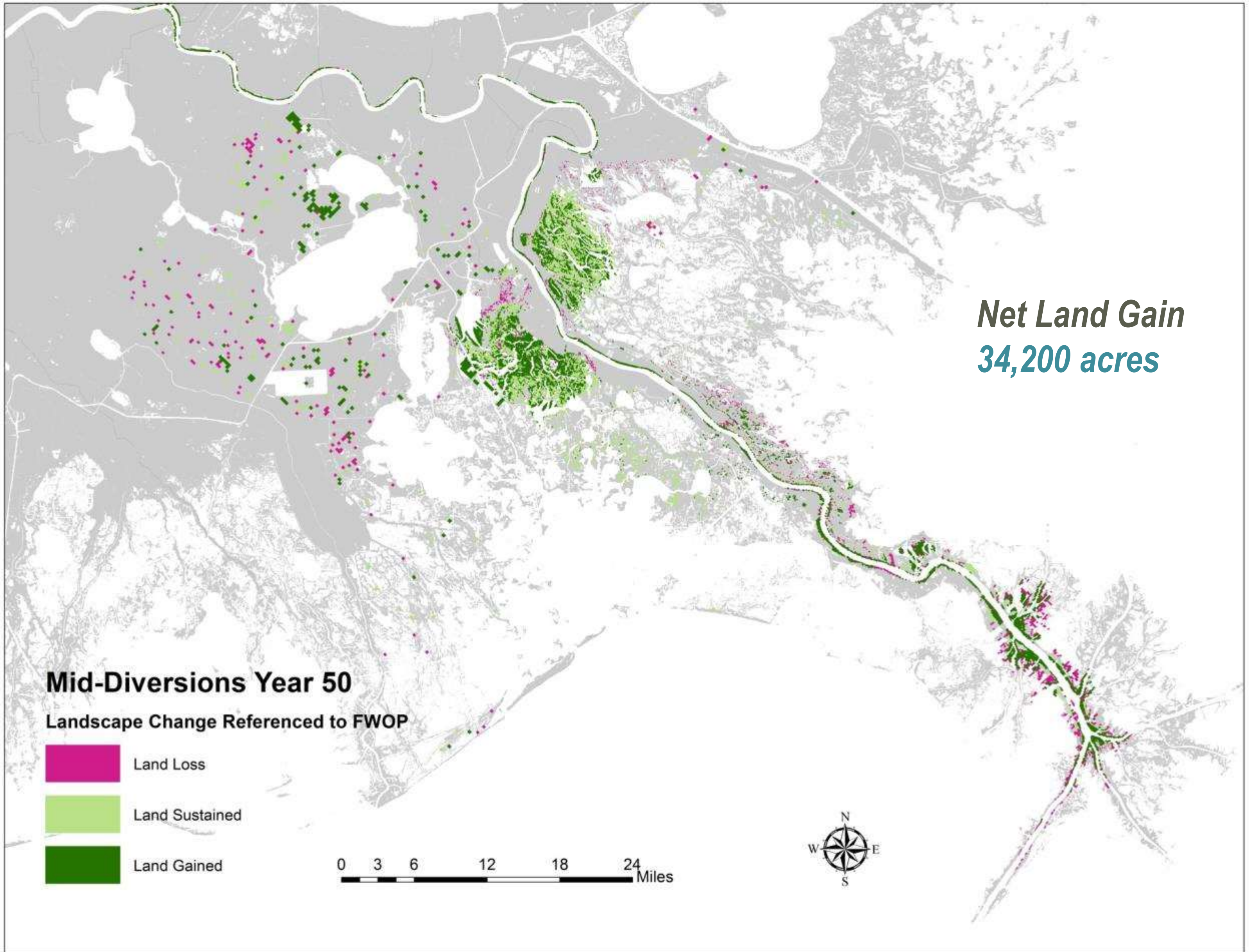


LAND CHANGE BY YEAR 2070
ALL DIVERSIONS



Net Land Gain
40,500 acres

LAND CHANGE BY YEAR 2070
MID DIVERSIONS



CHALLENGES / KEY LESSONS LEARNED

- No formal mechanisms for cross-discipline/cross institution discussion of how science can help
- Lack of opportunity to synthesize outside of modeling
- Non-agency scientists leverage other sources, e.g., NSF
  – reviewers aren't always looking for what might be locally relevant
- Developing ideas on 'adaptive management' may provide an opportunity for 'collective' input from scientists

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THANK YOU

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