



Gulf of Mexico Monitoring: Developing Long-Term Water Quality Monitoring following the BP/Deepwater Horizon Oil Spill

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What makes the Gulf of Mexico Unique?

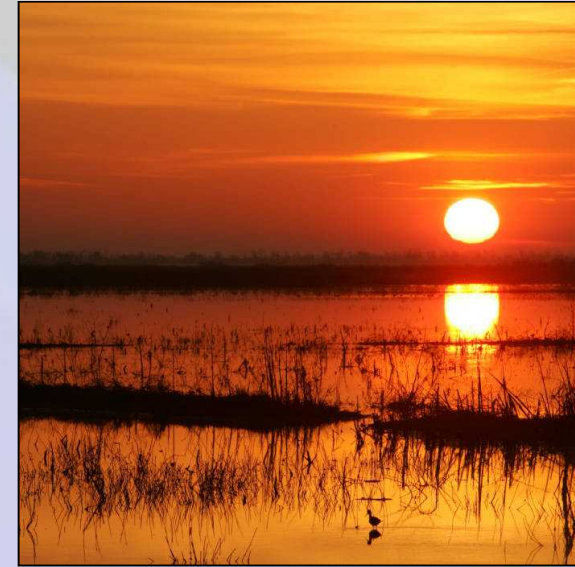


- ~ 1/3 of seafood production in US

- ~ 90% of the nation's oil/gas

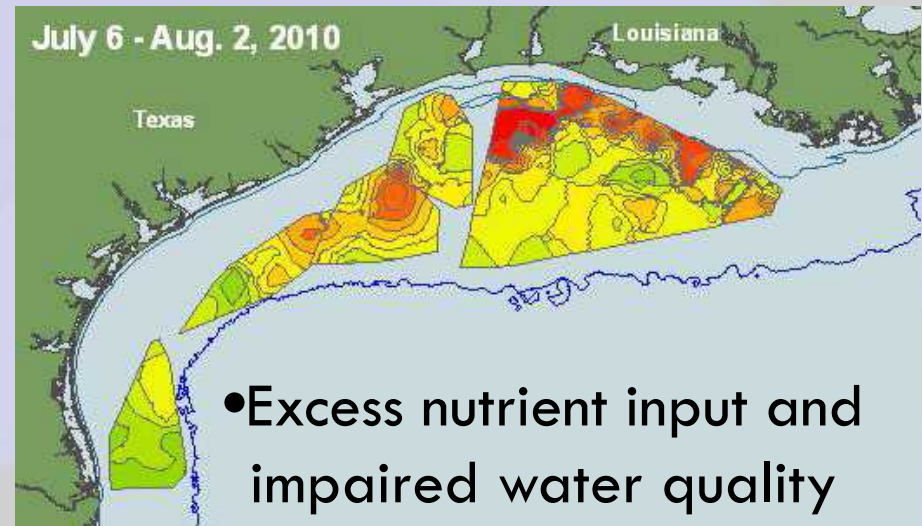
- Billions of \$\$ to economy through tourism and commercial/ recreational fishing

- Dynamic ecosystems spanning 600,000 square miles, thousands of miles of shoreline, bayous, and bays

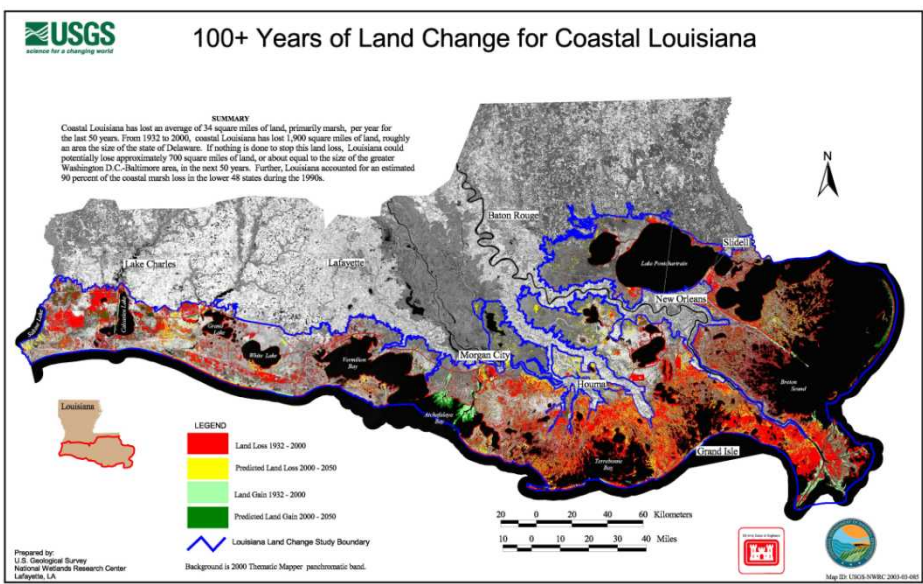




- ## Examples of Chronic Stressors for the Gulf of Mexico
- Sediment input (or lack thereof)
 - Land/habitat loss
 - Relative sea-level rise



- Excess nutrient input and impaired water quality
- Freshwater input (or lack thereof)





Gulf of Mexico Watershed Extent in the United States



Source: ESRI maps, National Hydrography Dataset, U.S. EPA (September, 2011)

Total U.S. Gulf Watershed Extent:
1,741,246 sq miles (56% of continental U.S.)

Contributing U.S. Watershed Regions:
 Mississippi 1,295,860 sq miles (41.9%)
 Rio Grande 132,845 sq miles (4.2%)
 South Atlantic-Gulf 133,263 sq miles (4.3%)
 Texas-Gulf 179,278 sq miles (5.8%)

- Legend**
-  Major Rivers
 -  Mississippi Region
 -  Rio Grande Region
 -  South Atlantic-Gulf Region
 -  Texas-Gulf Region
 -  State Boundaries



Deepwater Horizon Spill

- ~ 4.9 M barrels
 - ~ 1.8 M gallons of dispersant
 - ~ 80,000 square miles of Gulf closed to fishing
- one of many catastrophic and debilitating events in the Gulf**





DWH brought attention to the Gulf, raised it to a national level

- lack of baseline data,*
- preparation for the next spill,*
- need for holistic restoration*



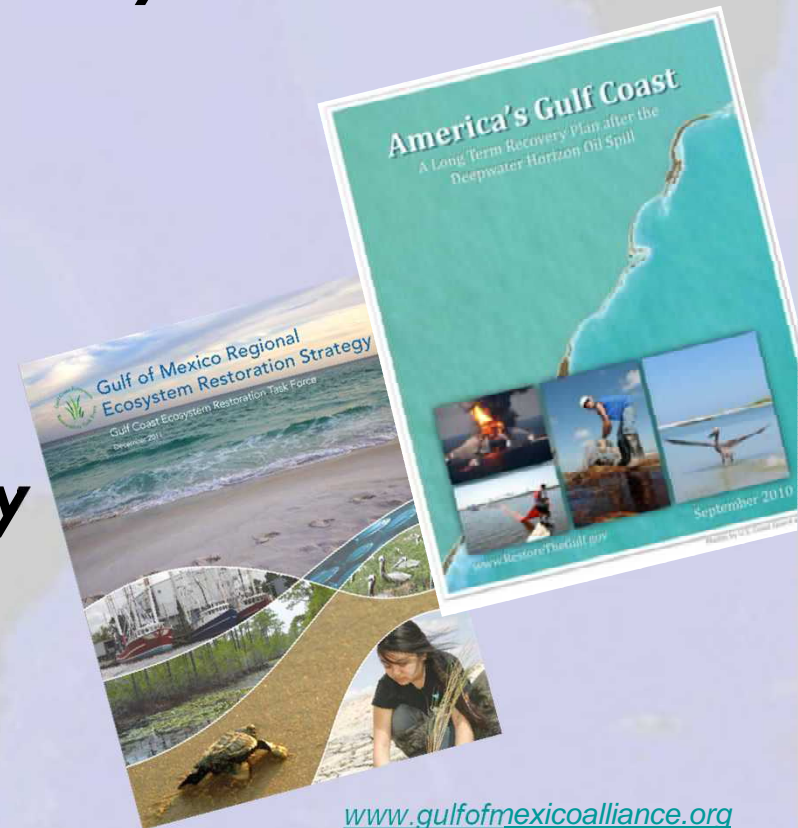
Response to DWH

- **RESPONSE:** Emergency mode, immediate need to coordinate science effort across the board
 - Federal (USCG, USGS, NOAA, EPA, etc...)
 - States
 - Research specific (academics, etc...)
 - Still ongoing
- **Natural Resource Damage Assessment (NRDA)**
-very specific
 - Assessment of damages from oil spill
 - Evaluation of planned restoration projects (early restoration and “success” monitoring)



Long-term restoration: coordinate monitoring

- Mabus Report “America’s Gulf Coast”:
***Long-term restoration and recovery
beyond the oil spill***
- Gulf Coast Ecosystem
Restoration Task Force:
***Gulf of Mexico Regional
Ecosystem Restoration Strategy***
- Gulf of Mexico Alliance:
Governors’ Action Plan





Gulf Funding

- Clean Water Act Fines
 - RESTORE Act
 - Some type of settlement
- NRDA restoration funding
- Gulf of Mexico Research Initiative (\$500M from BP)
- Annual appropriations
- However, planning needs to precede funding





Opportunity

- Develop holistic monitoring plan
- Building on existing efforts
- Need for coordination:
 - GOMA/GOMRI
 - GCERTF
 - NRDA
 - Hypoxia Task Force
 - Feds
 - States
 - Local Gov
 - NGOs



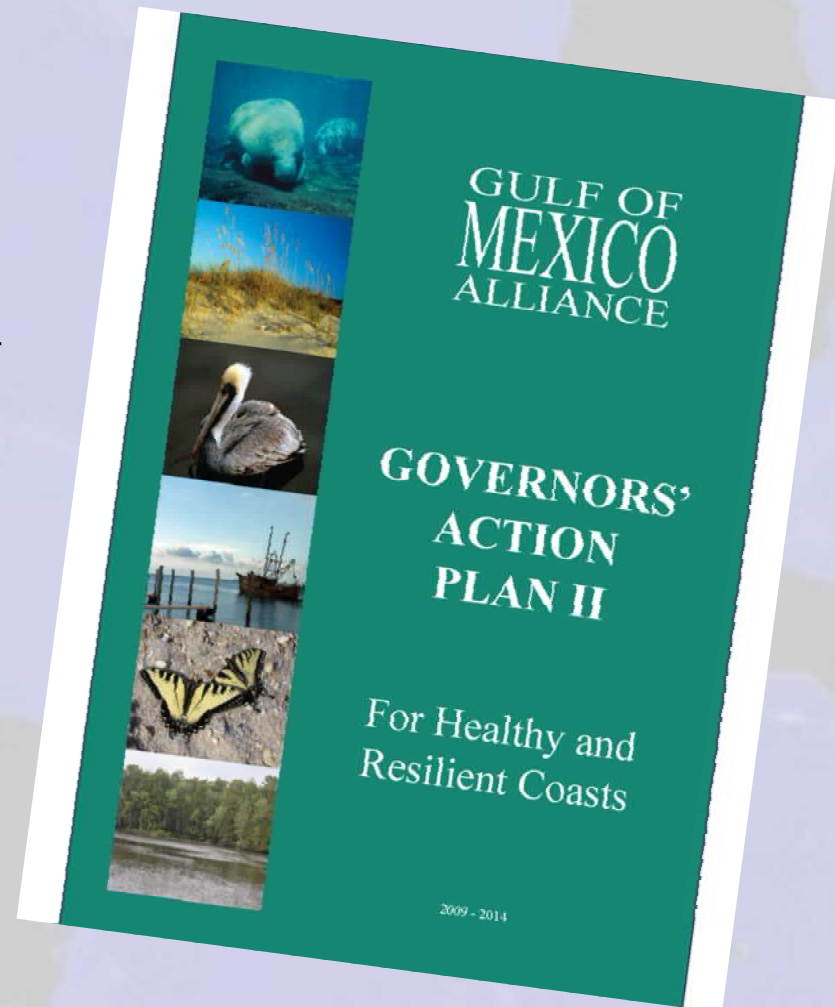
Gulf of Mexico Alliance

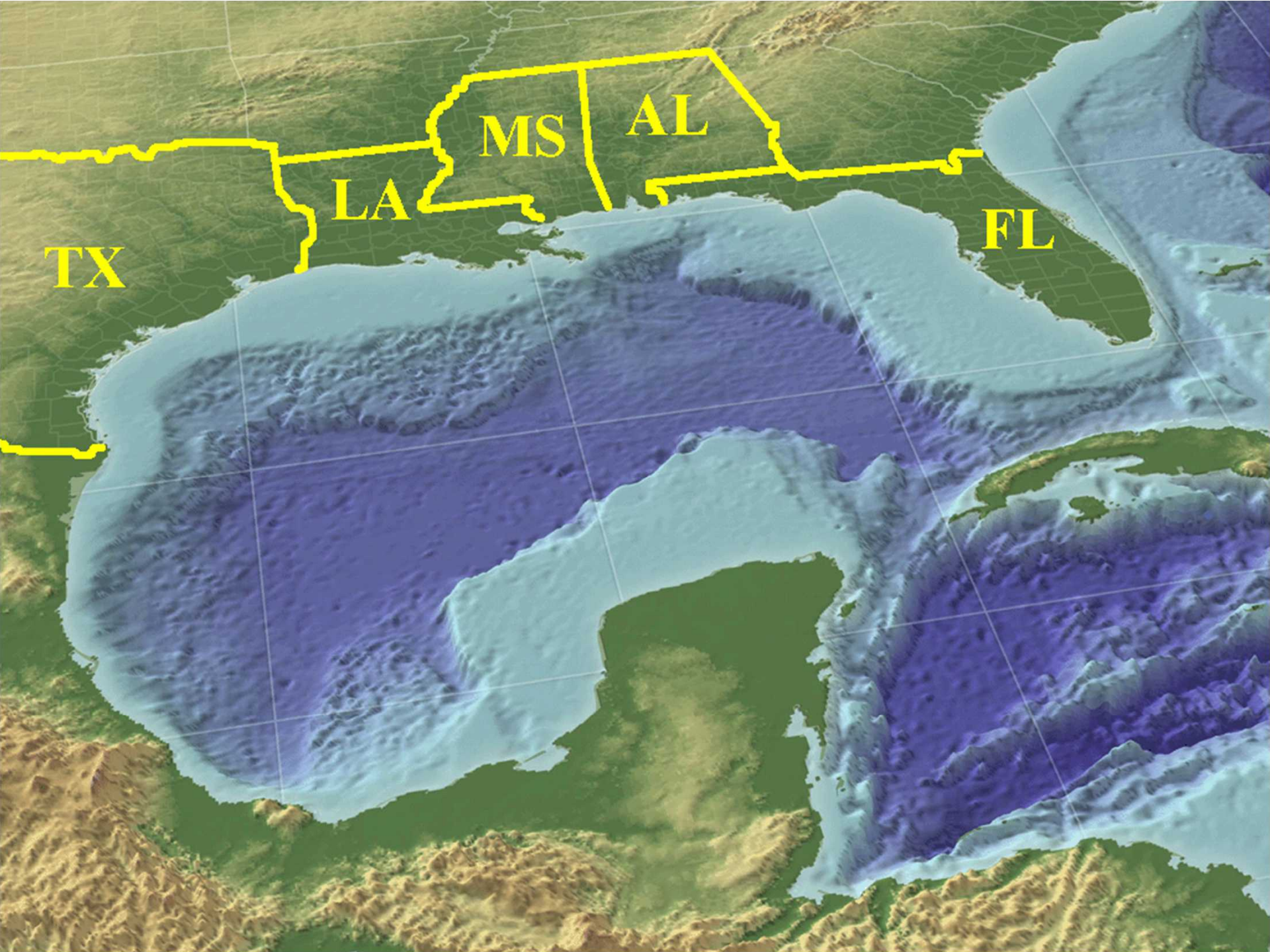
What the heck is that?



Gulf of Mexico Alliance

- Alliance of Governors of five U.S. Gulf states.
- Supported by 13 Federal agencies.
- Develops and carries out targeted *Governors' Action Plan* focused on highest Gulf priorities across states.





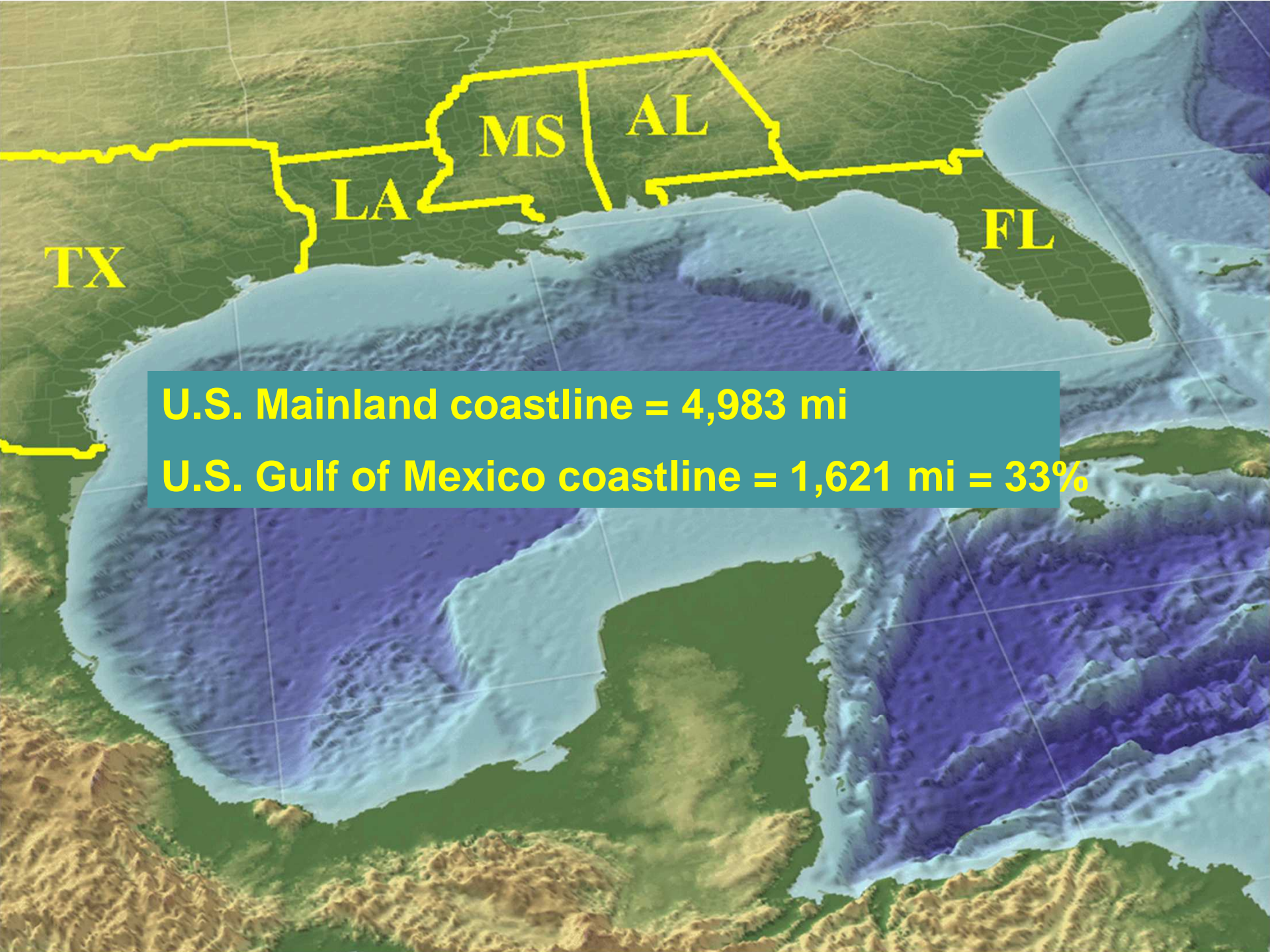
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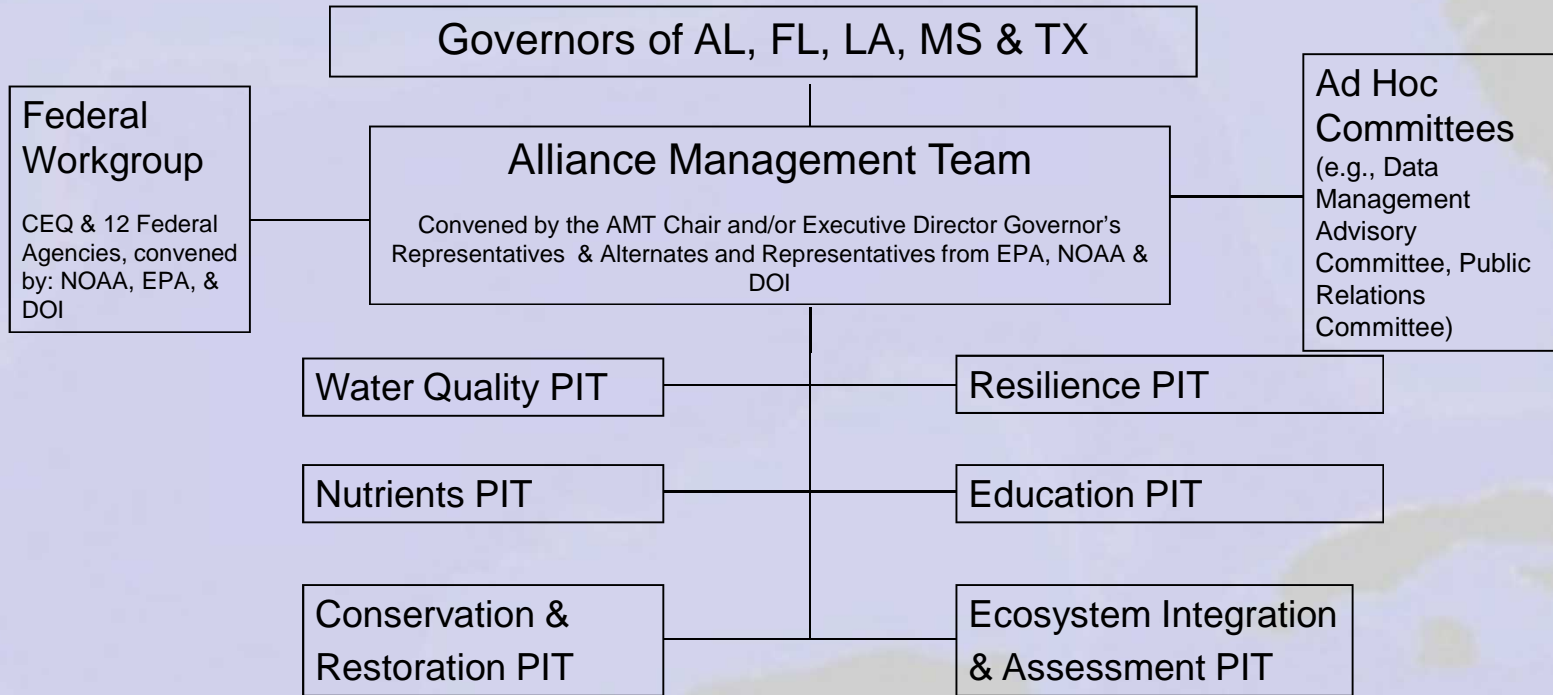


U.S. Mainland coastline = 4,983 mi

U.S. Gulf of Mexico coastline = 1,621 mi = 33%



Gulf of Mexico Alliance





Six Priority Issue Teams (PITs)

- **Water Quality - *Florida***
- **Nutrient Reduction - *Mississippi***
- **Ecosystem Integration & Assessment - *Texas***
- **Habitat Conservation & Restoration - *Louisiana***
- **Environmental Education - *Alabama***
- **Coastal Community Resilience - *Mississippi***



First Action Plan Spring of 2005

- **Three-year plan**

Second Action Plan June 2009

- **Five-year plan**
 - **Note: Action Plans target specific problems that all five states have agreed are highest priorities.**
 - **In addition to the broad Governors' Action Plan, each Team has a detailed "Tier 2" Action Plan**



Water Quality Team

- **Led by Florida**
- **Composed of 4 Workgroups, each with state and federal co-chairs**
 - **Coastal Pathogens**
 - **Harmful Algal Blooms**
 - **Mercury in Seafood**
 - **WQ Monitoring**





Why are we here?

- **Action WQ-4: Obtain and provide vital information about the conditions of Gulf of Mexico waters.**

Support good management decisions about coastal fisheries, recreation, tourism, public health, and infrastructure planning by providing information on the condition of Gulf of Mexico waters and the plants and animals living in them.



Why are we here?

- **WQ-4.1:** Improve data comparability across the Gulf of Mexico.
- **WQ-4.2:** Coordinate the collection and management of information about monitoring programs across the Gulf of Mexico and improve data dissemination tools to deliver information to resource managers.
- **WQ-4.3** Design a framework for a water-quality monitoring network for the Gulf of Mexico adequate to address Gulf Alliance needs.
 - **4.3.1** Identify the monitoring network objective, needs, and design.
- **WQ-4.4:** Improve the knowledgebase needed to properly manage water quality in coastal waters.



GOMA process:

- 1. Develop Monitoring Framework.**
- 2. Identify priority monitoring issues.**
- 3. Identify most important questions for issues.**
- 4. Design monitoring to answer those questions.**
- 5. Compare needed monitoring to existing.**
- 6. Develop plan to fill gaps & provide integration.**
 - Incorporate “foundational monitoring.”**
- 7. Implement.**



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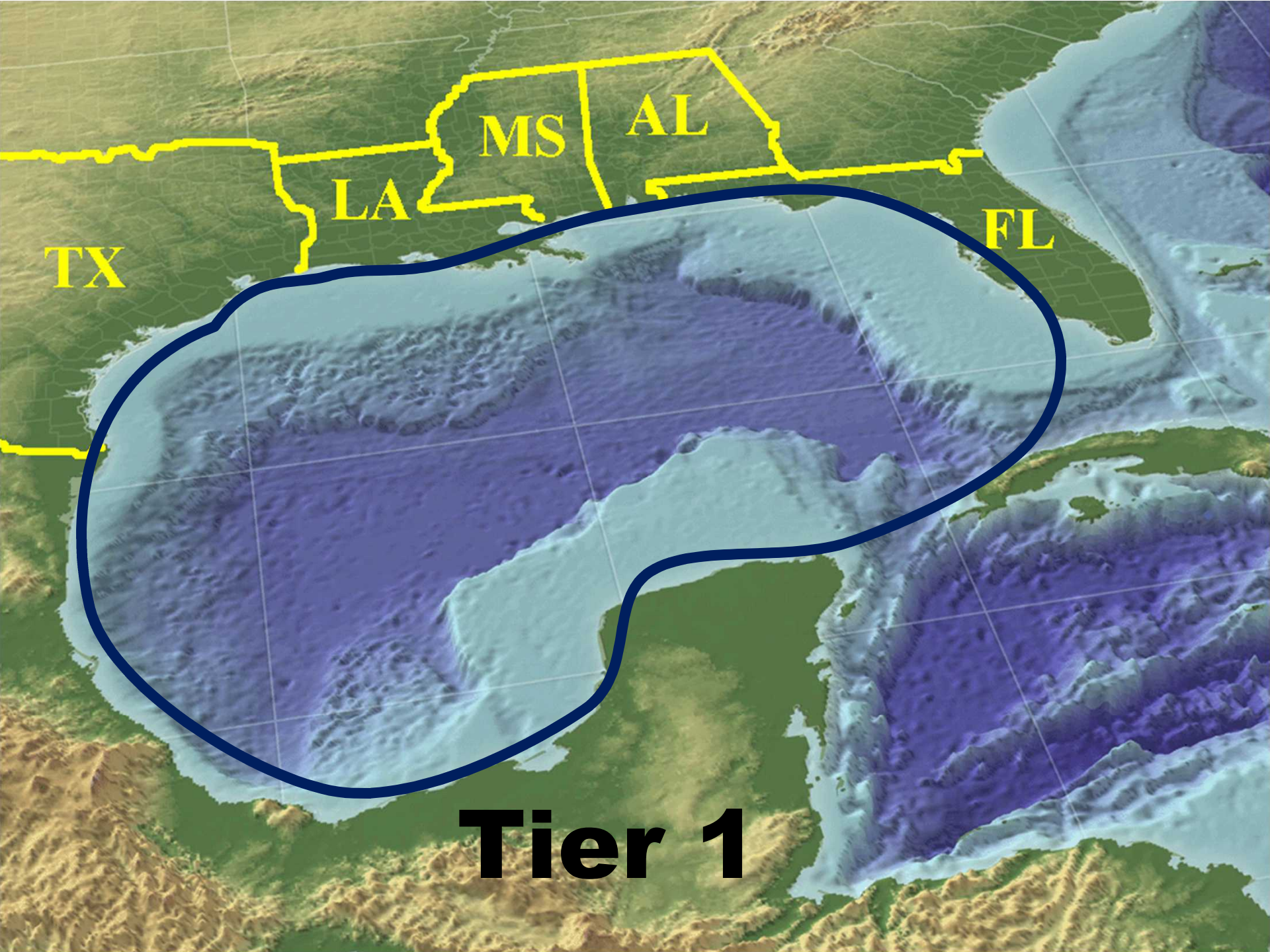
Dealing with Scale

- Monitoring systems are designed to address specific questions.
- Scale of the monitoring question(s) being asked drives scale of the monitoring system required.
- Gulf Monitoring Framework organized around the scale of monitoring required.



GOMA Monitoring Framework

- **Tier 1-** to address questions requiring **Gulf-wide** monitoring.
- **Tier 2 -** to address questions requiring **regional** monitoring
- **Tier 3 -** to address questions requiring monitoring at the scale of an **estuary or similar-sized coastal segment**.
- **Tier 4 -** to address questions about **site-specific** problems (*not in scope of GOMA*)



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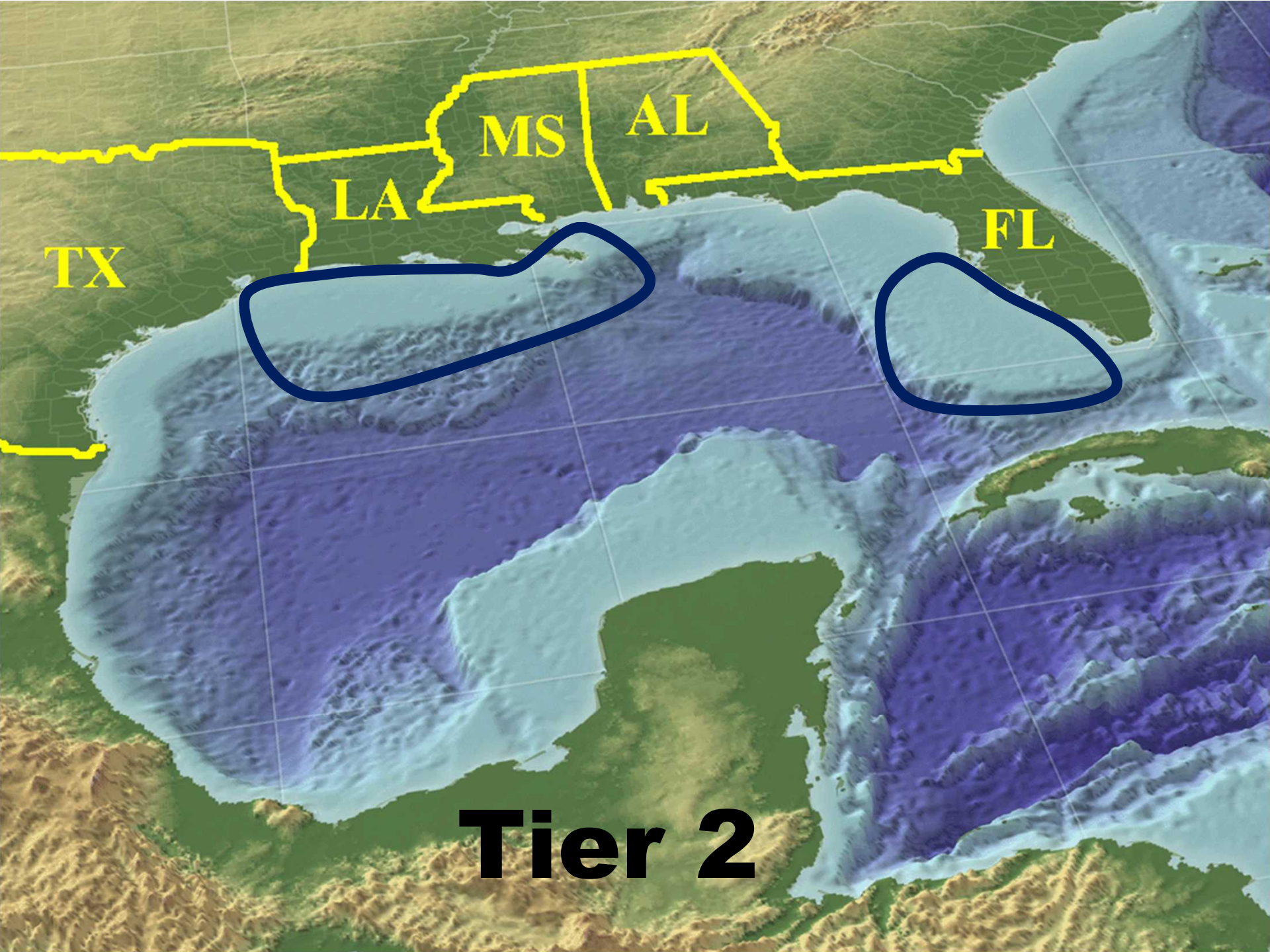
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Tier 1



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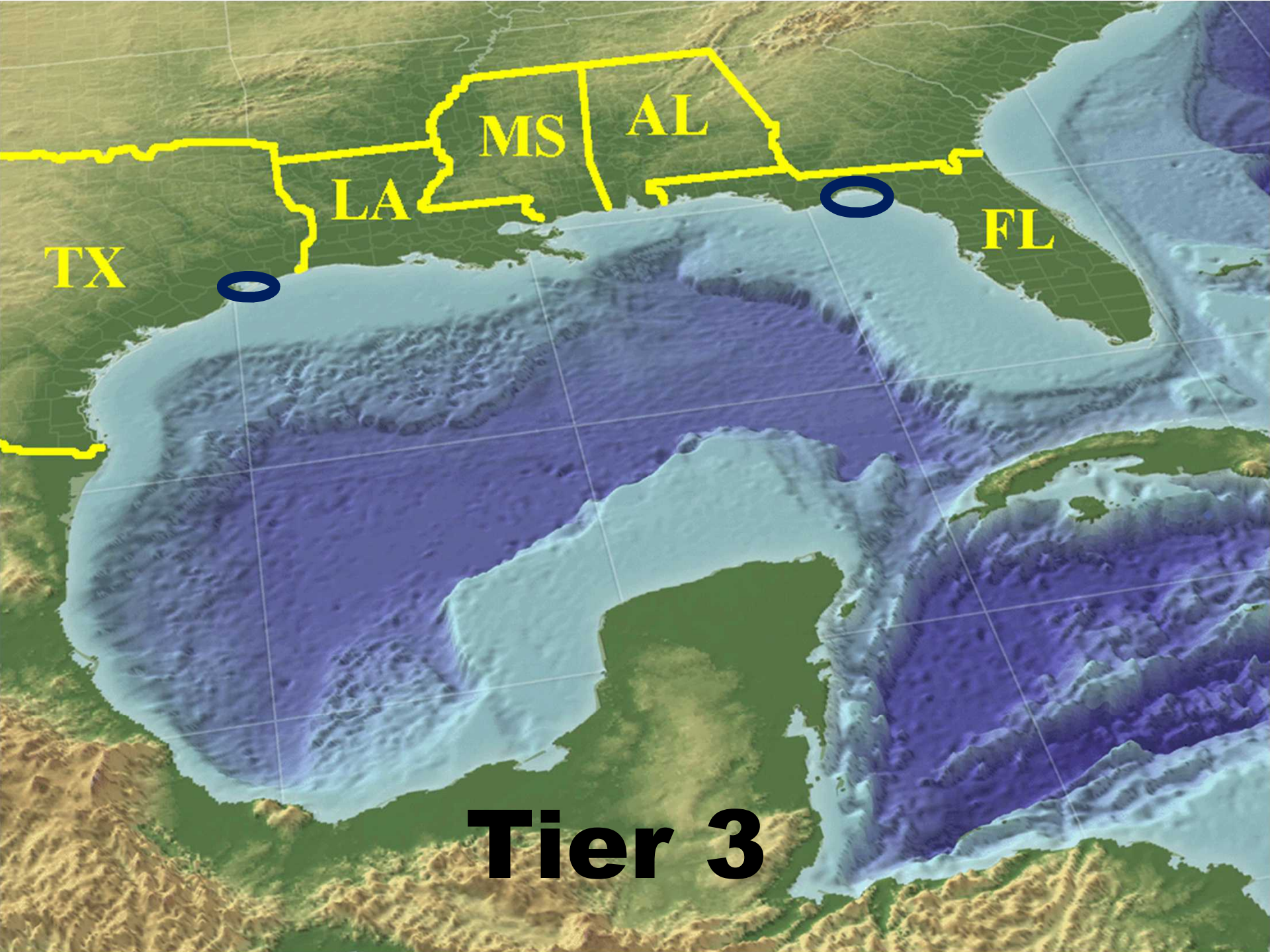
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Tier 2



TX

LA

MS

AL

FL

Tier 3



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Priority Issues for Long-Term Monitoring

- WQ Team Leads from the five Gulf states identified draft GOMA Monitoring Priorities following a GOMA workshop focused on Gulf monitoring needs.
- These draft priorities were vetted through the five State governments before being finalized.



WQ Monitoring Priorities

- 1. Use the existing GOMA interagency structure to coordinate funding and monitoring.**
- 2. Long-term monitoring to support nutrient management and reduction efforts**
- 3. Long-term monitoring to support GOMA water quality human-health priorities: coastal pathogens, harmful algal blooms, and mercury in fish.**



Long-term monitoring priorities for GCERTF

- **The GOMA priorities align well with the water-quality monitoring goals laid out in the recommendations to the President from the Gulf Coast Ecosystem Restoration Task Force.**



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Priority Monitoring Questions

The following entities charged with identifying the most important questions that require Gulf WQ monitoring:

- 1. Nutrients** - the GOMA Nutrients Team
- 2. Harmful Algal Blooms** – the HABs Workgroup of the GOMA WQ Team
- 3. Mercury in Seafood** – the Mercury Workgroup of the GOMA WQ Team
- 4. Coastal Pathogens** - the Pathogens Workgroup of the GOMA WQ Team



Priority Monitoring Questions

- **Nutrients questions scheduled to be finalized before or at the annual GOMA All-Hands Meeting in June.**



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Design Monitoring to Answer Questions

- Design monitoring system to address highest-priority issue – *Nutrients*.
- Separate design required for each Tier, total of three monitoring-system designs.
- Add monitoring necessary to address other priority issues by sequentially expanding upon nutrient design.



Design Monitoring to Answer Questions

- A workshop scheduled for late-July to create nutrient system designs for the three Monitoring Tiers.



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Compare Design to Existing Monitoring

- Catalog of Monitoring Programs presently under construction.
 - Catalog is GIS-based application containing information as to who monitors what in the Gulf using which methods, and exactly where that monitoring is taking place.
 - Due to roll out June 2012.
 - Due to be populated with data about existing monitoring programs by September 2012.



Compare Design to Existing Monitoring

- Nutrient-monitoring design will be “overlaid” on Catalog information to identify gaps in monitoring coverage (sites) as well as in types of monitoring that are needed to address the nutrient-monitoring questions.
- A workshop scheduled for Sept 2012 to perform nutrient “overlay”.



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Fill Gaps, Integrate Monitoring

- Develop implementation plan to guide monitoring network build out.
- The Gulf Alliance has the collaborations and partnerships in place to accomplish this task.
- Details of plan will depend in part on the funding mechanisms available at the time, and will include:



Why This Workshop?

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Potential Monitoring Strategies

What is “Foundational Monitoring”?

What is the logic behind the strategy?



What is the foundational monitoring program?

The core of the comprehensive monitoring program - The scope of monitoring that we are committed to continue even during budget slumps

- The minimal amount of monitoring necessary to meet the basic purpose of the monitoring program
- The minimal amount of monitoring needed to define status and trends
- The minimal amount of monitoring necessary to maintain credibility of the program's prioritization or decision-support process
- The minimal amount of monitoring necessary to support a "report card" or other reporting/tracking mechanism



What is the logic behind the strategy?

There are several options/approaches

(1) Monitor the most commonly needed parameters:

at the most commonly needed tier?

at all three tiers?

- Poll the work groups (water quality, nutrients, harmful algal blooms, mercury) for a list of parameters that would be useful to them.
- Poll the stakeholders (Federal, State, and local) for a list of parameters that would be useful to them.
- Design a program to monitor the most frequently listed parameters.



What is the logic behind the strategy?

(2) Address the most common questions:
at the most common tier?
at all three tiers?

- Poll same group collecting a list of the questions that they are trying to answer.
- Identify the commonality/similarity/overlap in the questions.
- Design program to provide data that will help answer the most frequently asked questions.



What is the logic behind the strategy?

(3) Address the most important questions:
at the most important tier?
at all three tiers?

- Poll the same group collecting a list of their most important question(s)
- Rank the questions to identify highest priorities.
- Design program to provide data that will help answer the most important questions.



What is the logic behind the strategy?

- (1) Monitor the most commonly needed parameters:
- (2) Address the most common questions:
- (3) Address the most important questions:
 - at the most common tier?
 - at the most important tier?
 - at all tiers?

What other logic would you suggest?