



# RESTORATION & PLANNING FOR AN UNCERTAIN FUTURE IN COASTAL LOUISIANA

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Research Engineer  
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**THE WATER INSTITUTE  
OF THE GULF®**



- The Water Institute of the Gulf is a **not-for-profit, independent** research and technical services resource with a mission to help communities around the world thoughtfully prepare for the future through water management strategies.
- Through an **integrated and inter-disciplinary** approach, the Institute's work helps create more resilient communities, thriving economies, and a healthy environment.

## ABOUT US



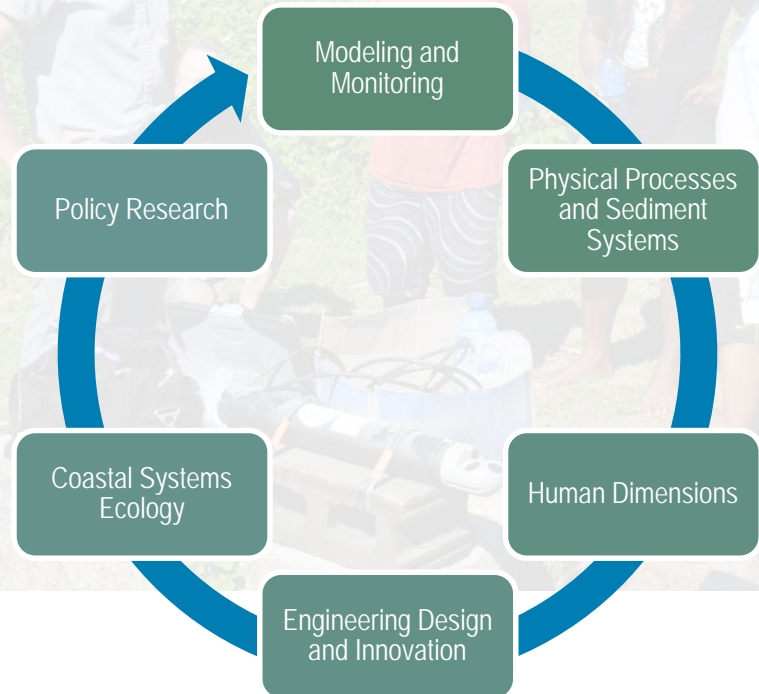
# WHAT WE DO

## Applied Research

- Field Investigations
- Monitoring and real-time sensor data collection
- Integrated natural systems modeling
- Analytics and integrated decision support
- Societal and ecosystem impact studies
- Water resources management analyses

## Technical Support

- Independent technical peer review
- Expert opinion and advisement
- Expert panel development and coordination



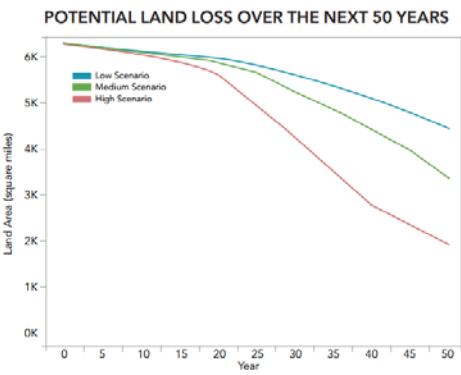
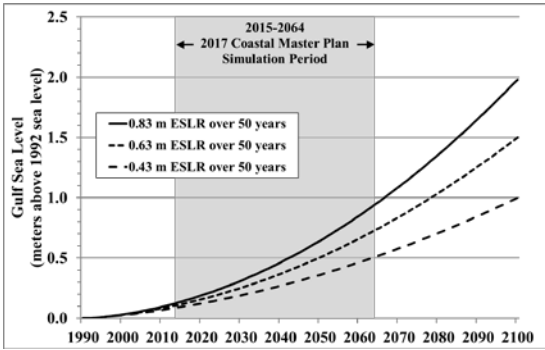




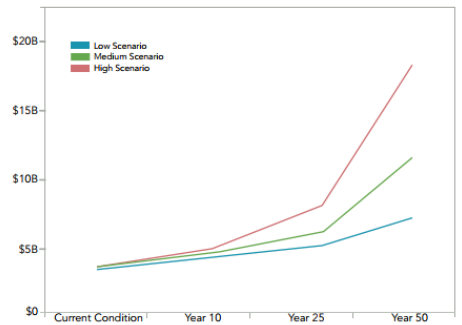
Equivalent to 25% of 1932 wetland area



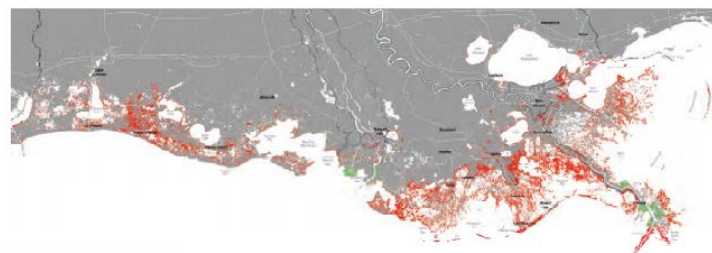
# PROJECTED FUTURE CONDITIONS



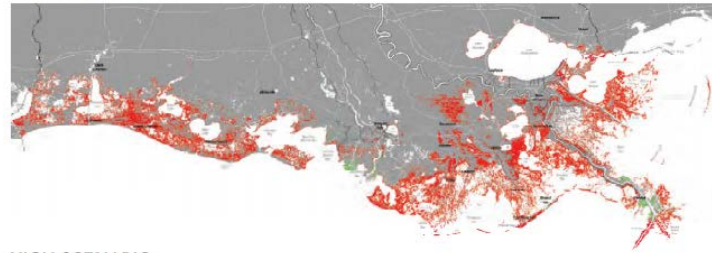
EXPECTED ANNUAL DAMAGE FROM FLOODING OVER THE NEXT 50 YEARS



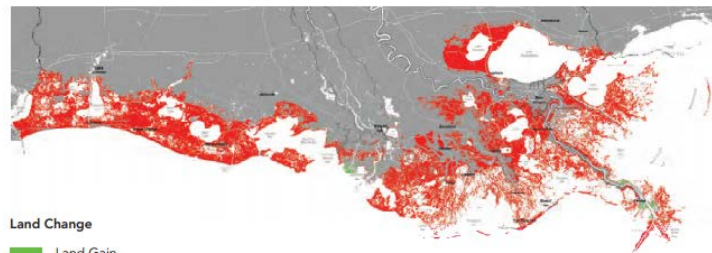
LOW SCENARIO



MEDIUM SCENARIO

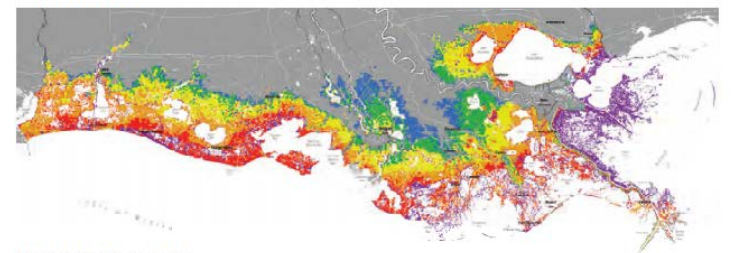


HIGH SCENARIO

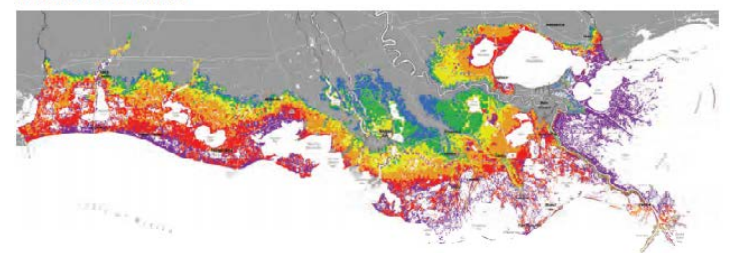


Land Change  
Land Gain  
Land Loss

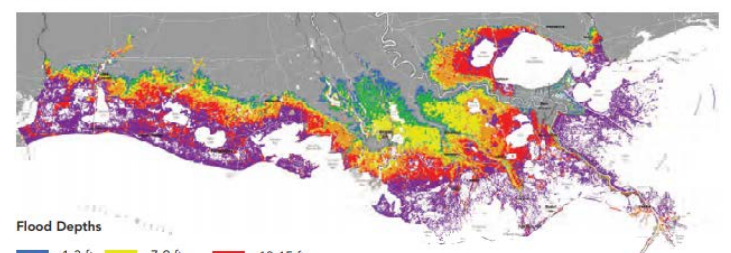
LOW SCENARIO



MEDIUM SCENARIO



HIGH SCENARIO



Flood Depths  
1-3 ft 4-6 ft 7-9 ft 10-12 ft 13-15 ft Over 15 ft



# LINKING KNOWLEDGE TO ACTION: THE INSTITUTE'S ROLE IN LOUISIANA COASTAL PROTECTION AND RESTORATION



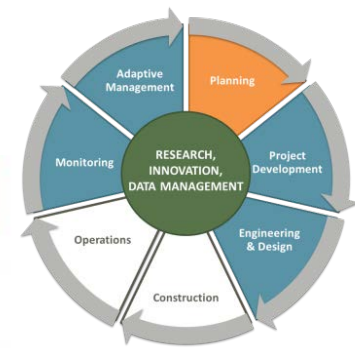
## PROJECT EXAMPLES

- Coastal Master Plan Modeling/Support
- Mississippi River and Sediment Observation and Modeling
- Sediment Diversion Project Planning
- Coastal Monitoring Framework
- Louisiana Coastal Atlas
- Water Resource Assessment





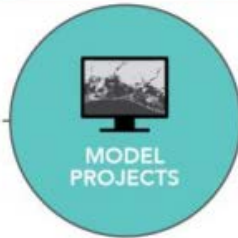
# 2017 COASTAL MASTER PLAN



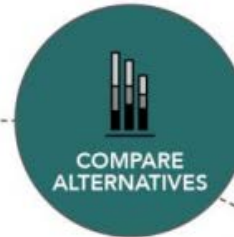
## COASTAL PROJECTS



## PREDICTIVE MODELS



## PLANNING TOOL



## OUTREACH & ENGAGEMENT

State of Louisiana is legislatively mandated to update the coastal master plan every 5 years with most up-to-date science.

Restoration projects planned across state's coastal zone must be "consistent with Master Plan."

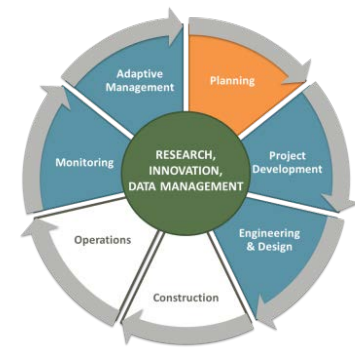
Projects chosen based on objective decision criteria

- Land area gain/sustained into the future
- Reduction in damages from storm surge events



# 2017 COASTAL MASTER PLAN : WATER INSTITUTE ROLES

- Developed the Model Improvement Plan
- Updates to the model processes
  - Sediment distribution
  - Marsh edge erosion
  - Habitat suitability indices
  - Decision metrics
- Model integration
- Development of Future Environmental Scenarios
- Model validation/calibration
- Production run modeling
  - 99 model groups – most in triplicate
- Post-processes and support for decision making

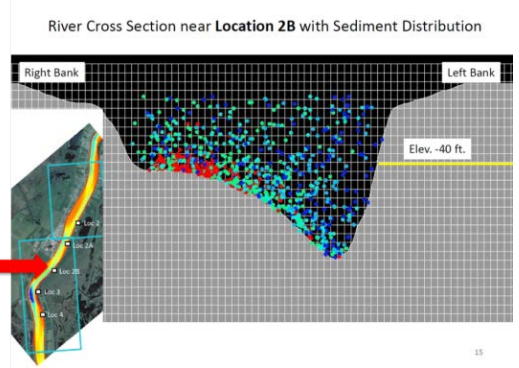




# DIVERSION PLANNING, OPERATIONAL DESIGN, & ENGINEERING SUPPORT



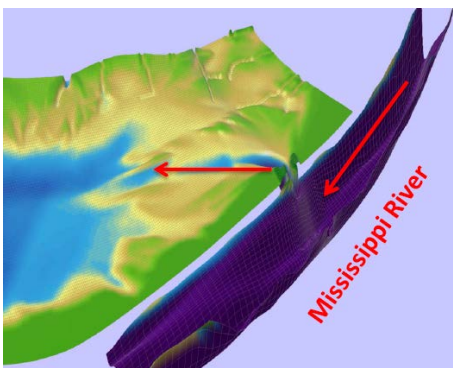
## RIVER MODELS



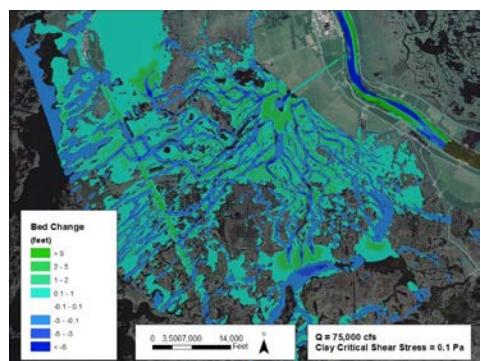
## BASIN MODELS



## MODEL VALIDATION



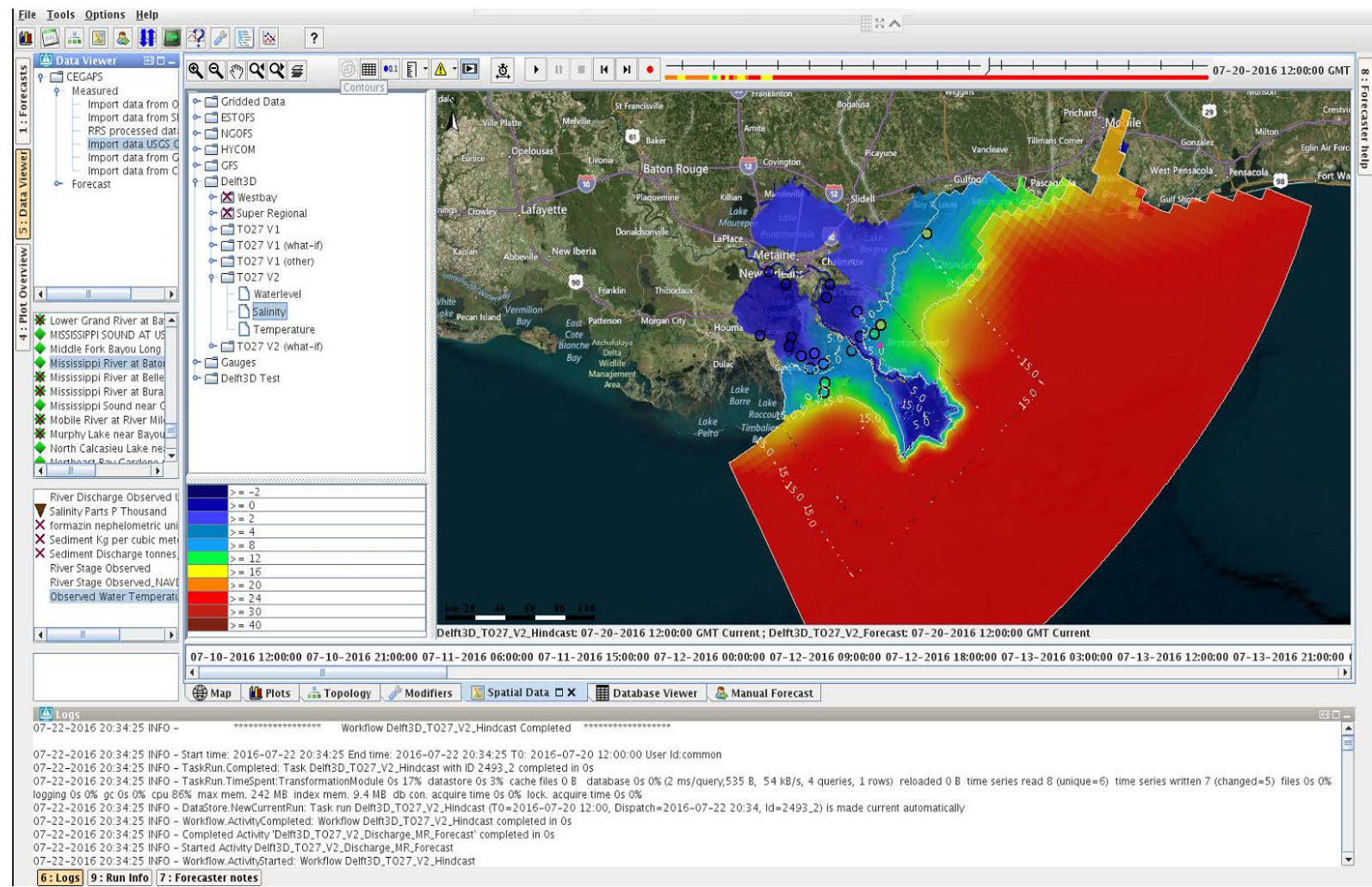
## LAND BUILDING ANALYSIS



## EXPERT PANEL

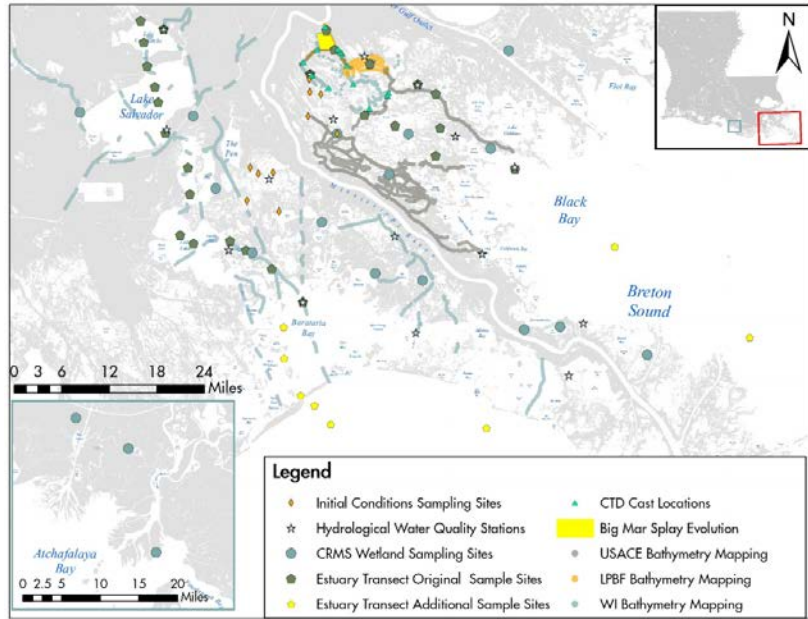
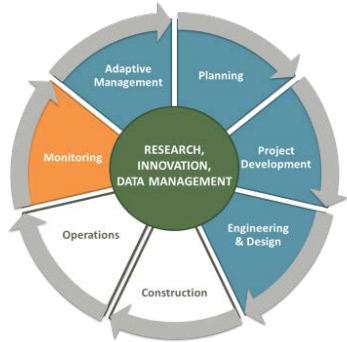


# REAL-TIME MONITORING & FORECAST MODELING





# PROJECT SPECIFIC MONITORING & DATA COLLECTION





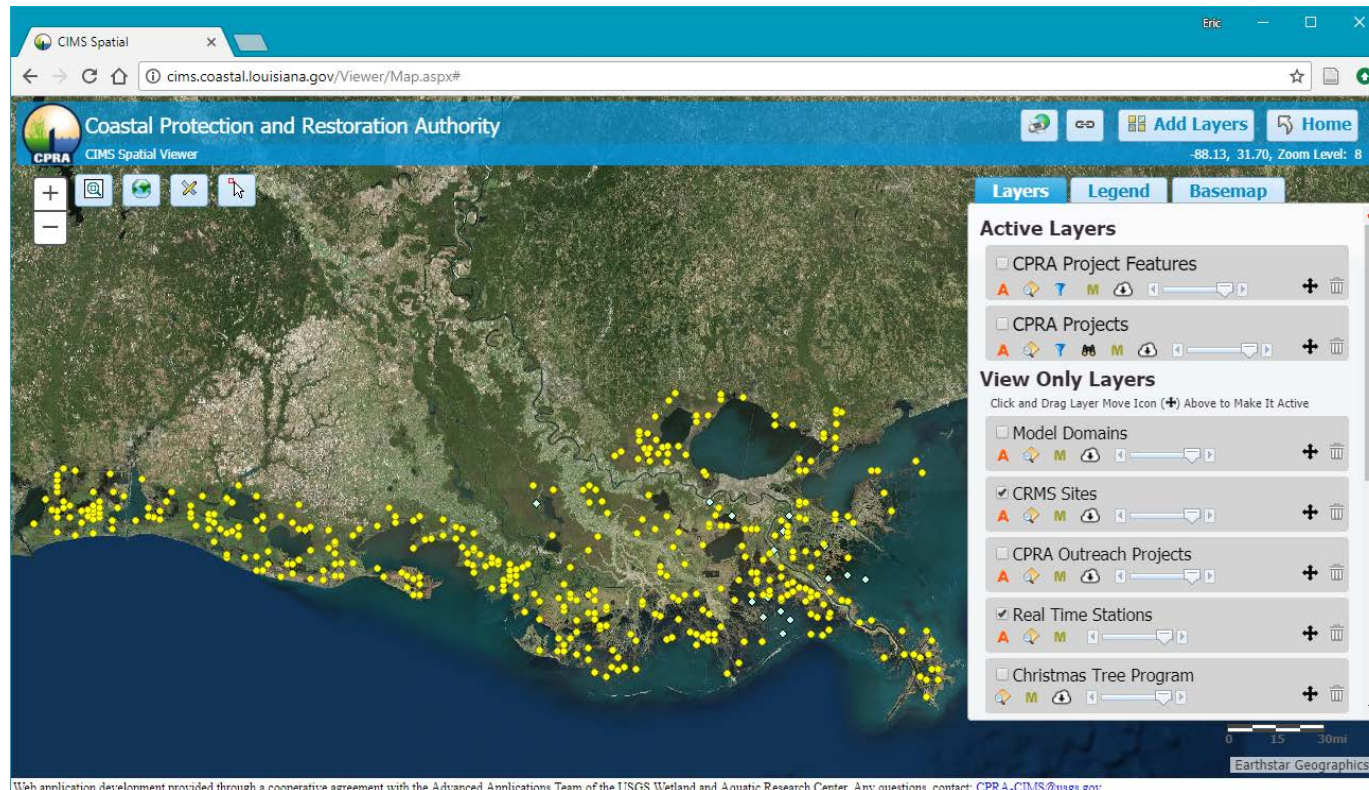
# PROGRAMMATIC MONITORING & DATA COLLECTION



## CRMS: Coastwide Reference Monitoring System



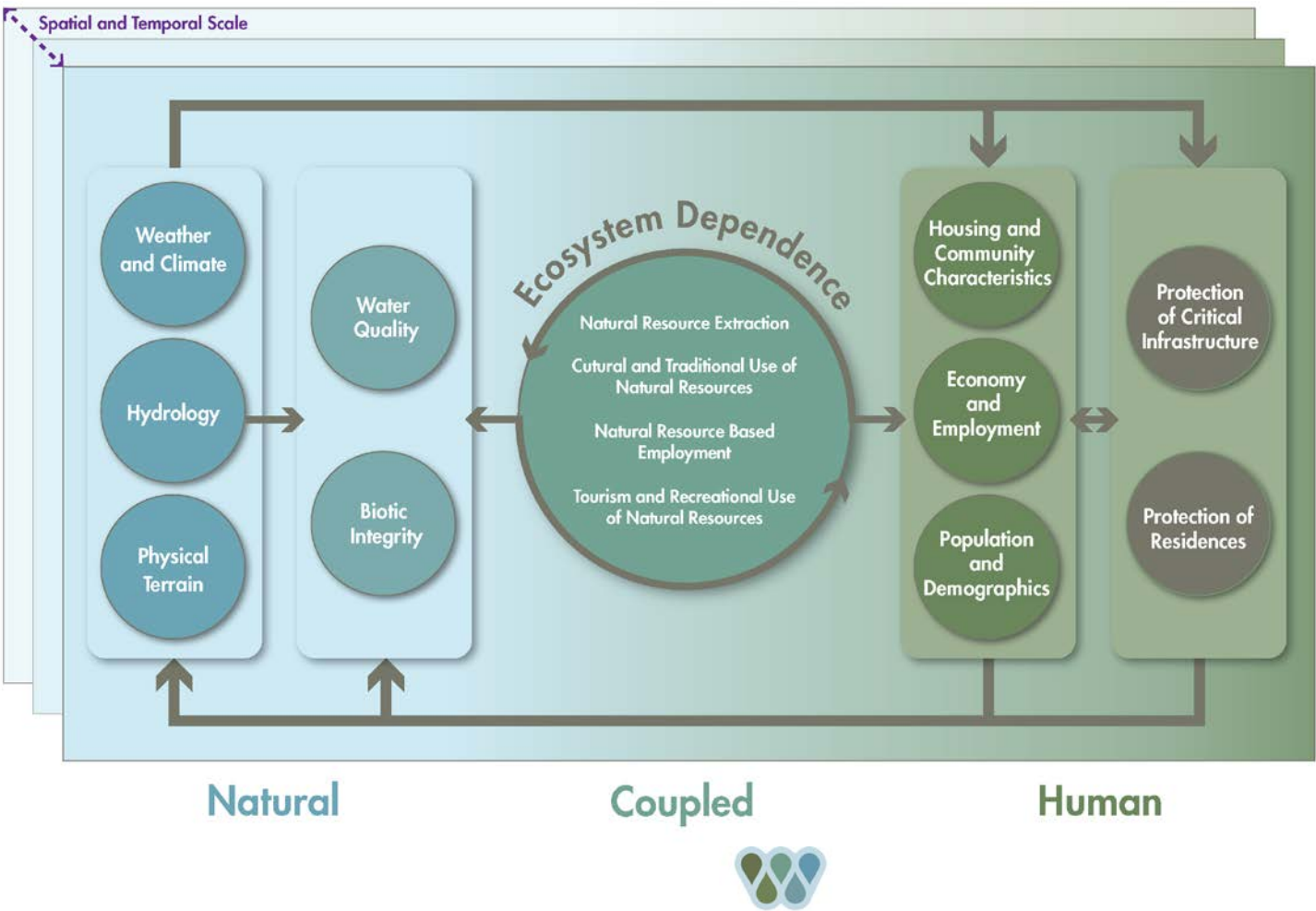
- Hourly Water Level and Salinity
- Annual Vegetation Surveys
- Annual Wetland Soil Accretion
- Annual Elevation
- Decadal Soil Properties



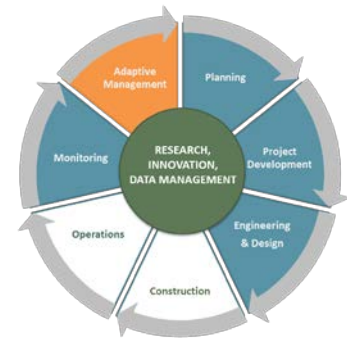
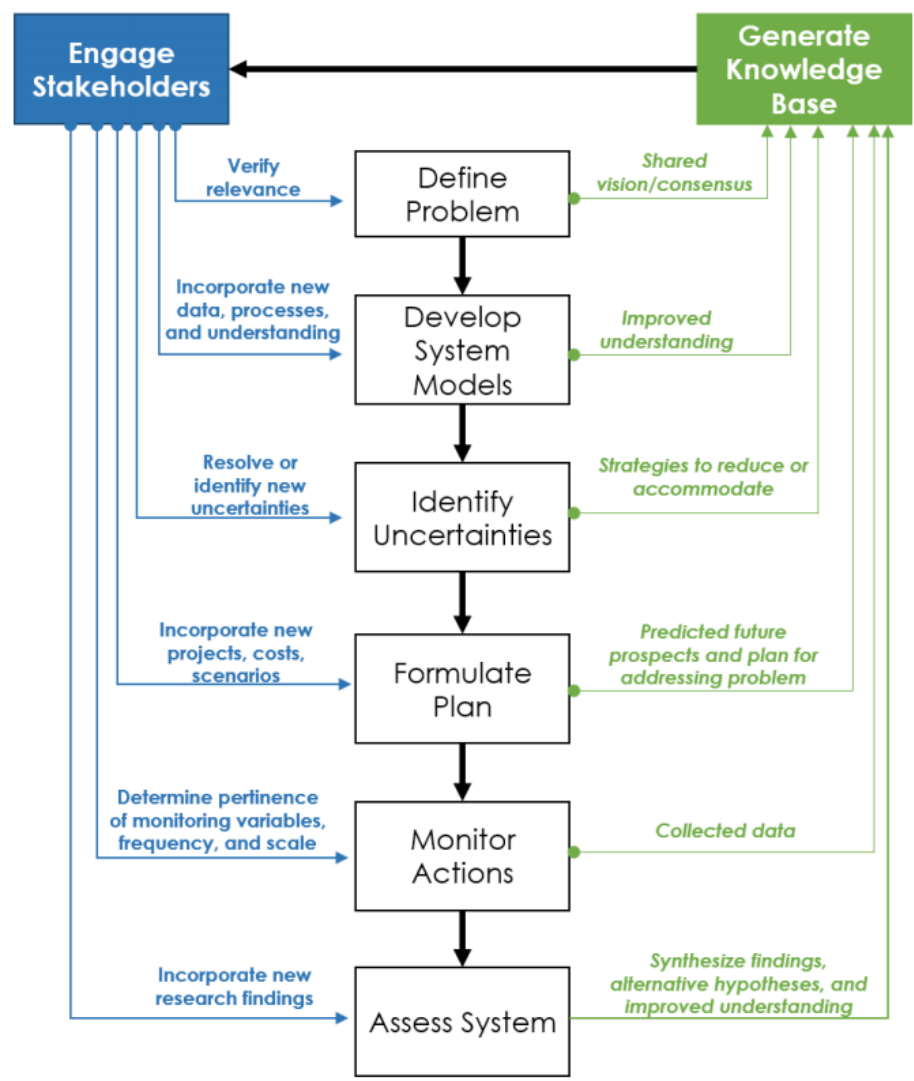
# PROGRAMMATIC MONITORING & DATA COLLECTION



## SWAMP: System-Wide Assessment & Monitoring Program



# IMPLEMENT PROJECTS & ADAPTIVELY MANAGE







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THANK YOU

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