SHARED CHALLENGES AND OPPORTUNITIES IN COUPLED SYSTEMS: PERSPECTIVES FROM THE GULF

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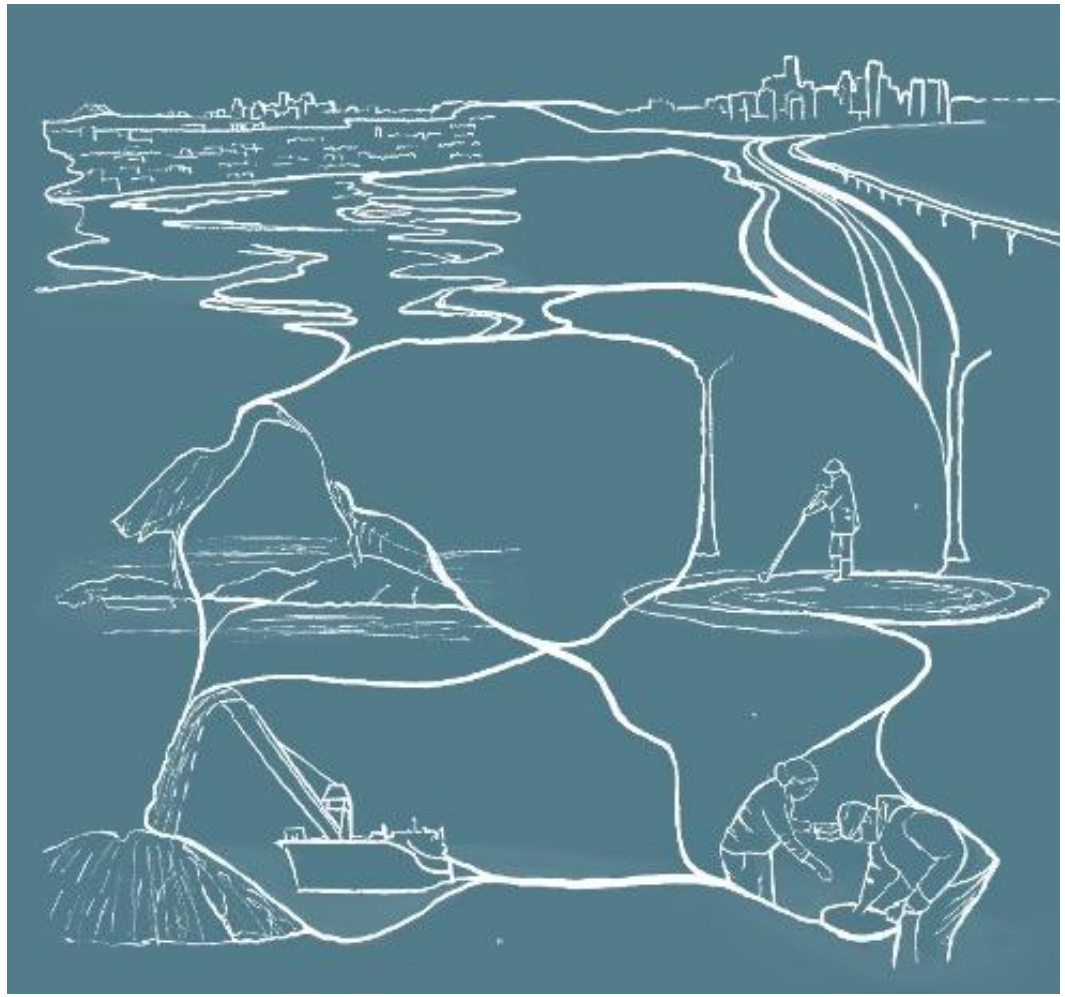
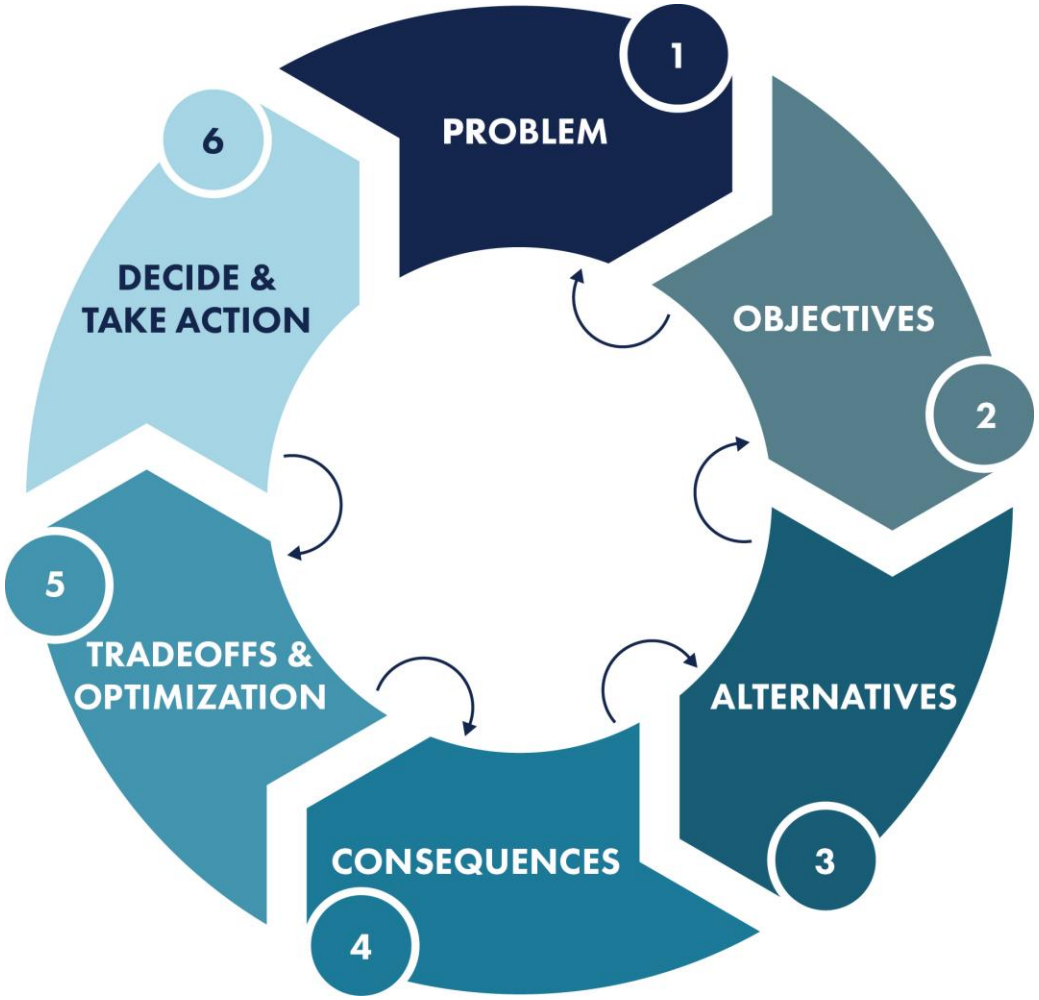


MY LENS & EXPERTISE

- Structured Decision Making (SDM)
- Science–policy integration across agencies
- Scienced based/informed Planning
- Natural Resource Management across scales
- Gulf-wide Restoration post DWH



PrOACT Cycle: ADAPTED FROM JEAN FITTS COCHRANE

1. What are the most important connections between people, institutions, and environmental conditions in your watershed or system, and how are those currently tracked, understood, or managed?

2. What aspects of those dynamics are especially difficult to observe, represent, or act on? (for example: data limitations, model structure, institutional incentives, governance fragmentation, or social norms)

3. Based on your experience, what are the biggest challenges in how we typically design models, policies, or management approaches for real-world watershed problems?

4. What feels distinctive about your watershed, system, or case? And which lessons or insights do you think are most transferable to other settings?

THE CHALLENGE:
NATURAL SYSTEMS ARE NOT ONLY ABOUT NATURE

- For example, water connects many things: energy, food, ecosystems, health, economy, etc.
- Increasing climate and socio-economic pressures
- Traditional governance and approaches no longer work
- Traditional geographic (i.e. watershed) approaches no longer suffice
- **Nexus Thinking**
  - Considers interdependencies, tradeoffs, co-benefits, systems governance
  - Can support institutions in transparent, science-informed decisions across sectors, scales, and under deep uncertainty

INSTITUTIONAL BARRIERS

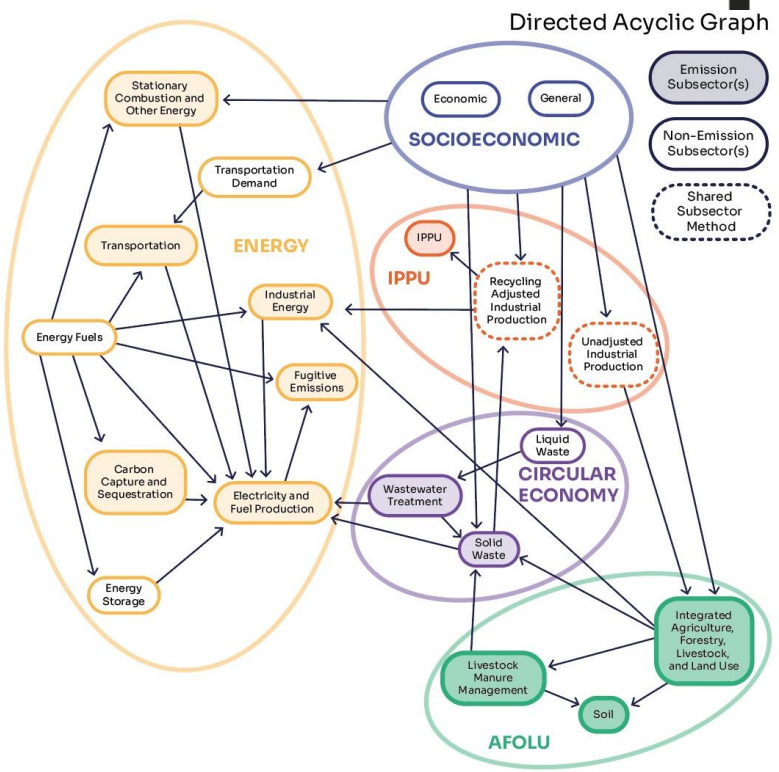
- Siloed mandates
- Misaligned institutions
- Leadership turnover
- Constituency engagement
- Lack of cross-sector governance
- Conflicting statutes
- Political & Hydrologic Boundaries (local, state, watersheds)

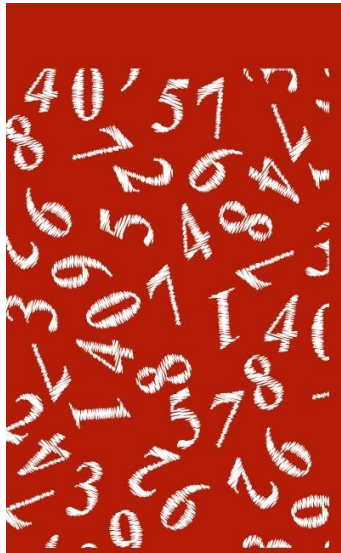
DATA BARRIERS

- Fragmented datasets across sectors
- Different spatial and temporal scales
- Access to data challenging
- Efforts to reconcile seem “overwhelming” and “unachievable’

METHODOLOGICAL BARRIERS

- Models not designed for decision-making
- Tools not co-developed with end users
- Unclear entry points for Nexus integration to solve governance challenges
- Tradeoffs invisible without structured frameworks

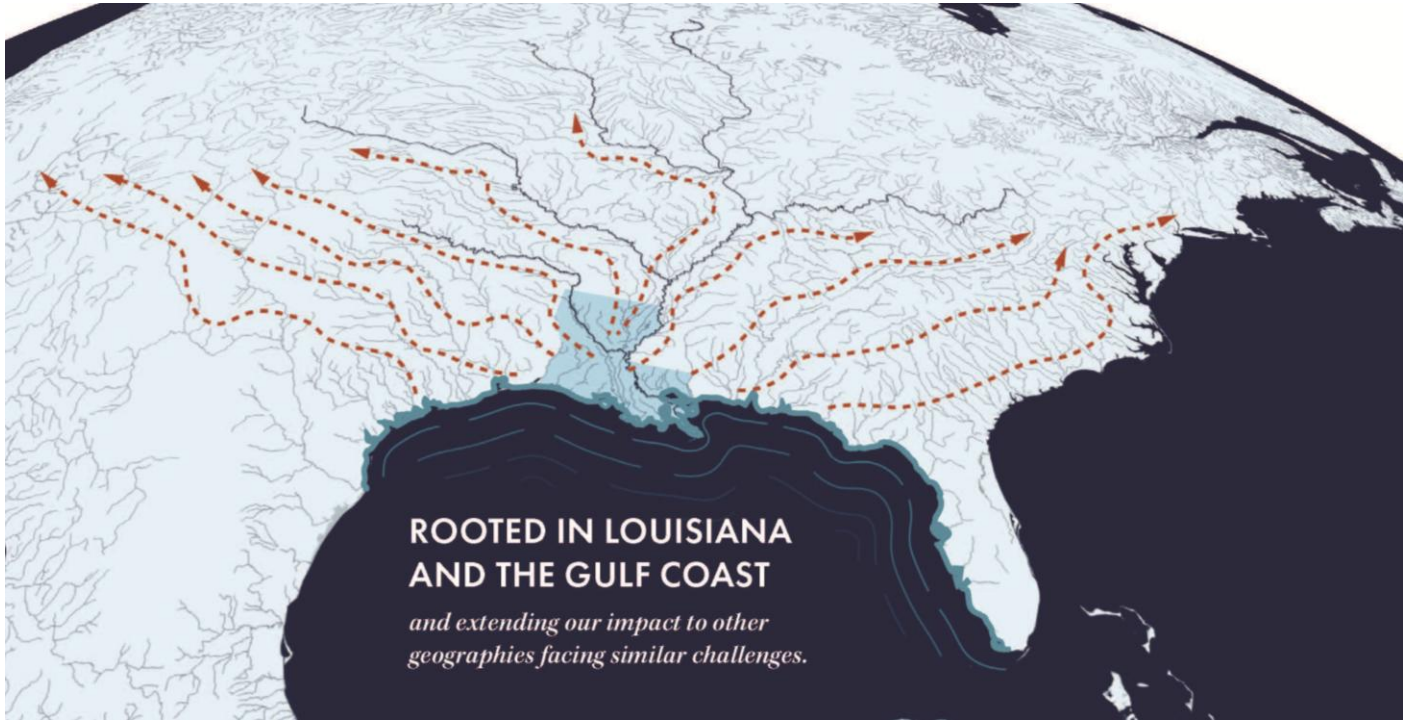




What Are Numerical Models?

WATERSHEDS MATTER

- Hydrologic coherence
- Ecological processes
- Foundation for modeling and monitoring



- Regulatory relevance-laws and institutions are often watershed bound

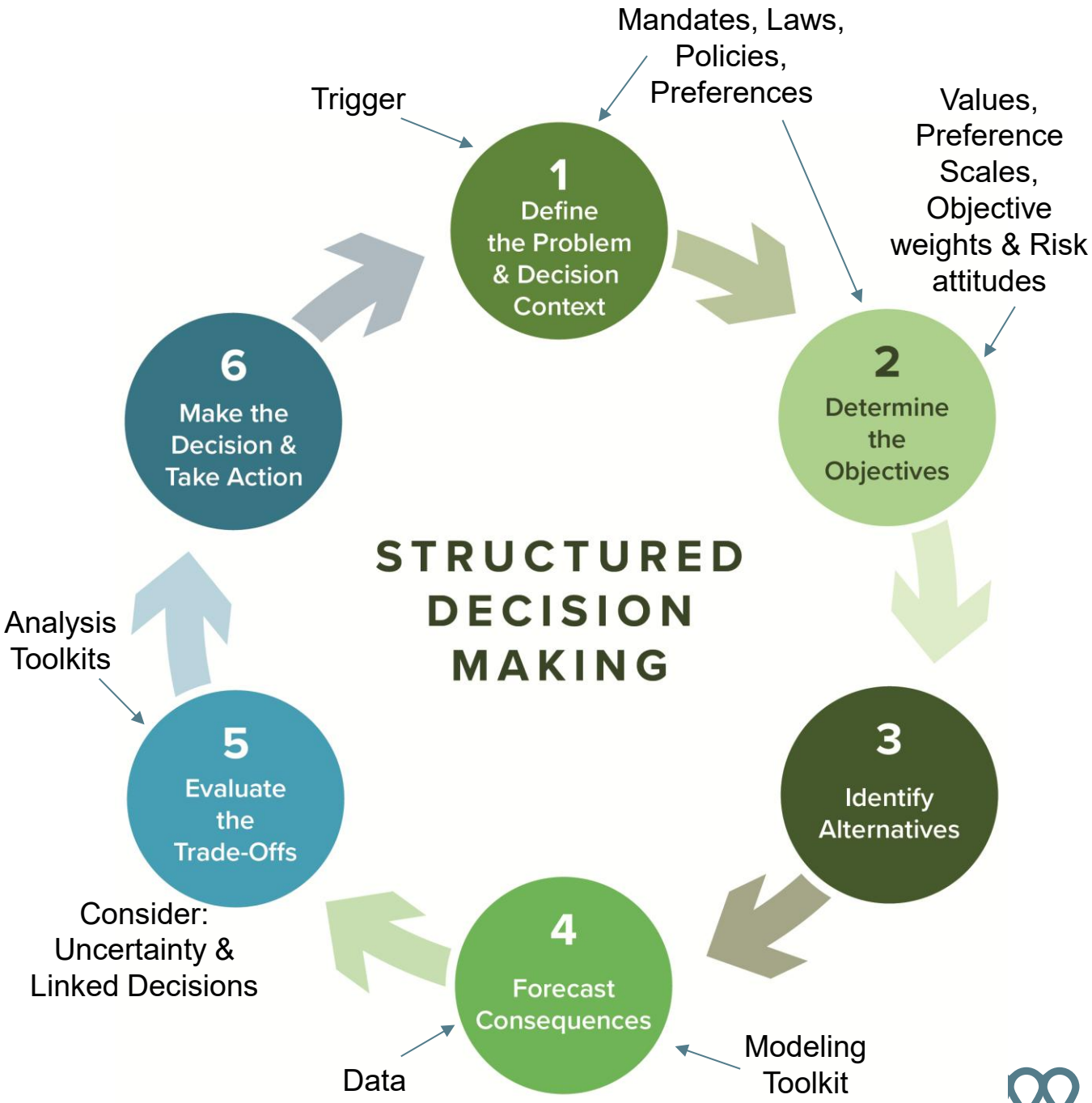
…BUT ARE NOT ENOUGH

- Groundwater flows cross political and watershed boundaries
- Coastal and ocean drivers shape outcomes
- Climate teleconnections affect basins
- Virtual water and supply chain dependencies
- Economy, energy, food, ecosystems, health, etc. are not based on watersheds

TRANSFERABLE SOLUTIONS:

PROBLEM-DRIVEN & PEOPLE DRIVEN OPERATIONAL SCALE

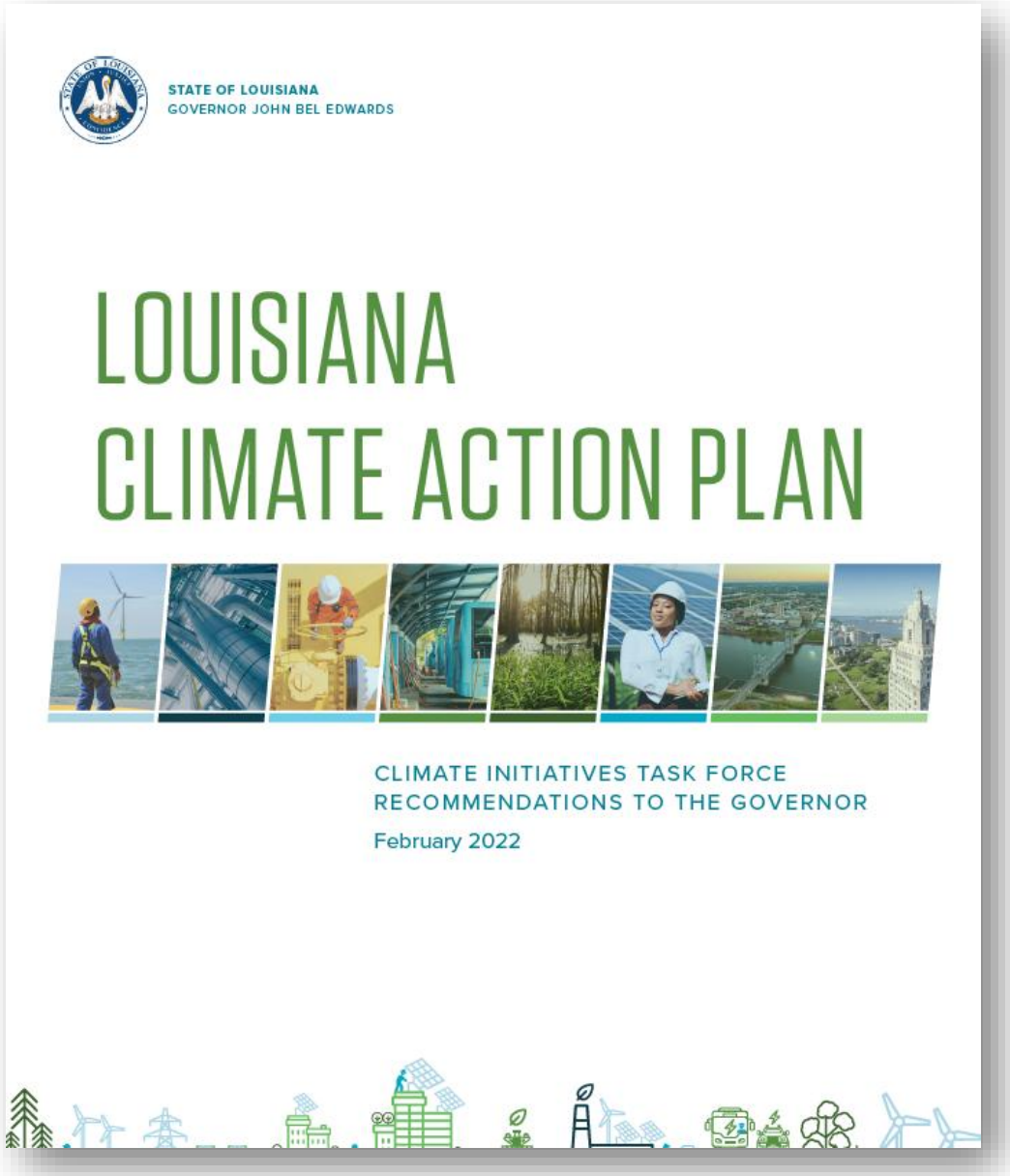
START WITH THE DECISION, NOT THE GEOGRAPHY



Source: Jean Fitts Cochrane

TRANSFERABLE SOLUTIONS:

- Clearly identify decision-makers and stakeholders
- Listen, invest, and understand stakeholders: ***people make decisions based on values***
- Repeatable, durable decision frameworks when possible
  - Structured Decision Making (SDM) for transparency
  - Robust Decision Making/Decision Making Under Deep Uncertainty
- Co-develop tools with stakeholders and resource managers
- Operationalizing robust transparent planning processes that support adaptive, multi-scale governance



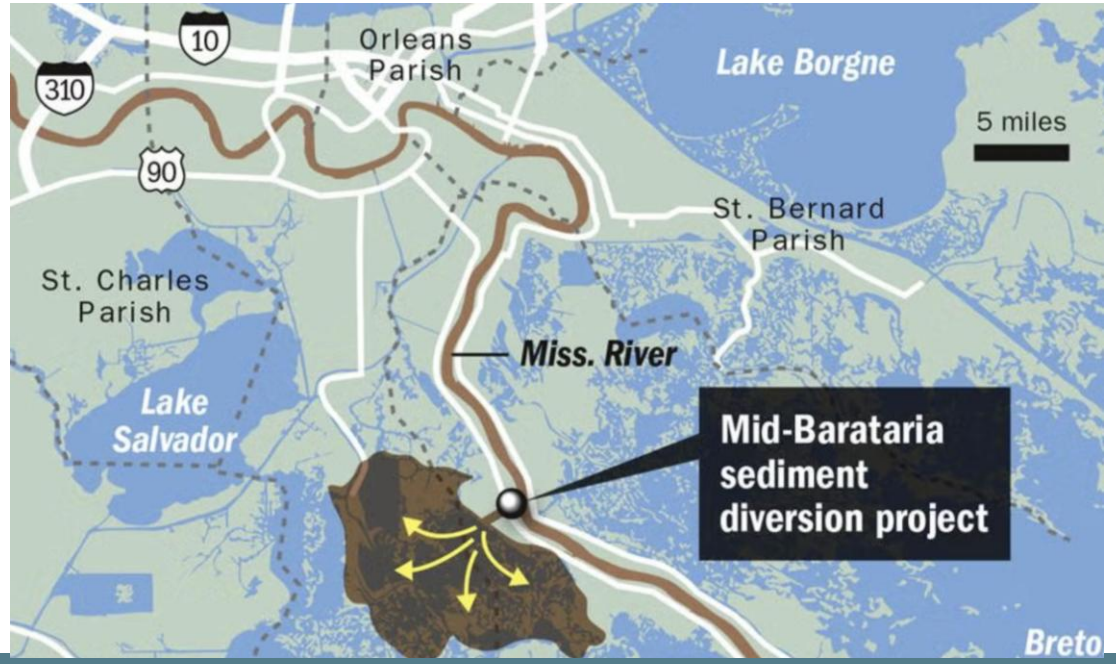
SDM, RDM, & NEXUS IN PRACTICE

- Water Resource Planning in Louisiana
  - Law/Governance Changes from local to state
  - Surface-water, Groundwater, Economic and Agricultural integration, Cross-state considerations
- Louisiana Climate Action Plan
- Louisiana Coastal Master Plan
- Resilient Jacksonville
- MacDill Airforce Base
- New Orleans Stormwater
- Texas Social Determinants of Health
- Louisiana Energy Analysis Plan

WHEN IT WORKS, WHEN IT DOESN'T WORKS

- RESTORE Council
- 5 Governors, 6 Secretaries of Federal agencies
- 5 Republicans, 6 Democrats
- Ample engagement (over and over and over)
- Consensus decision on $183 million in restoration across the Gulf

- Louisiana cancelled the $3+ billion Mid-Barataria Sediment Diversion (MBSD) in July 2025, halting the largest coastal restoration project in U.S.
- Purpose: To reconnect the Mississippi River to the Barataria Basin, using sediment to rebuild and sustain over 20 square miles of land.
- Controversy: Critics argued it would damage oyster, shrimp, and dolphin populations, while proponents highlighted it as essential for long-term coastal sustainability.



THE WATER INSTITUTE

THANK YOU!

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