

Linking Science & Decision Making

Global Science Summit

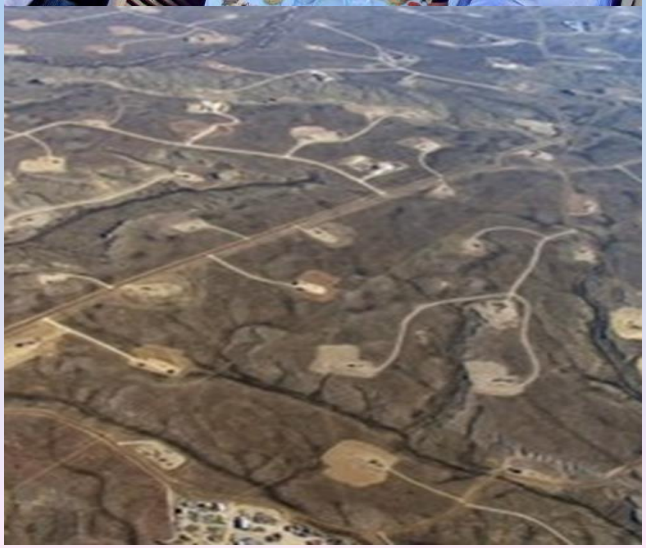
Lynn Scarlett, Chief Climate and Policy Officer



Global Policy Setting: Future of 9 Billion People
Linked Challenges for People & Nature

WATER, WATER, WATER

FOOD, ENERGY, WILDLIFE



CLIMATE, SAFETY, ECONOMY

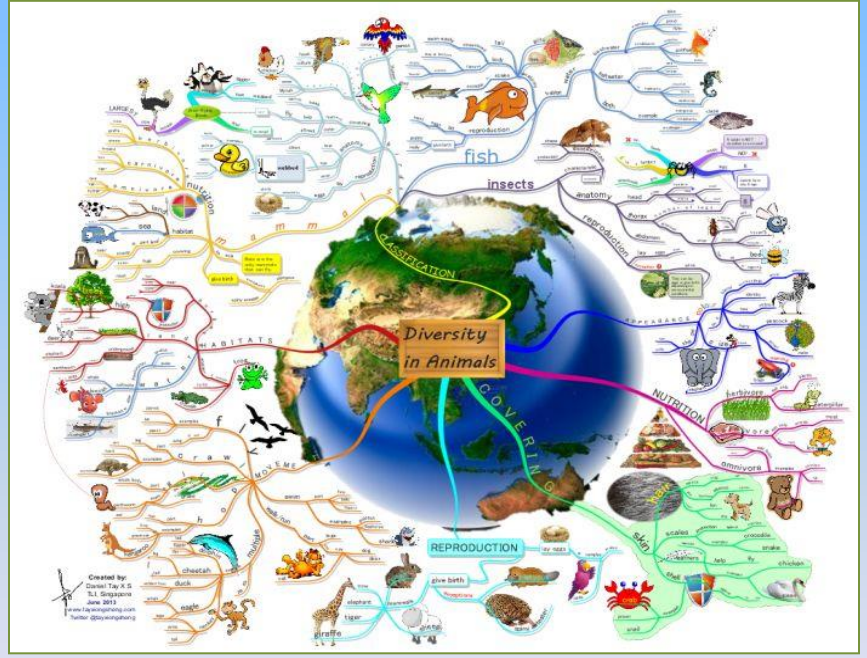


The Stuff of News Headlines, Awareness Gaps & Difficult Decisions



Reminder: Different purposes & Mental Maps

Scientist: How does the world work?



Policymaker: What values & goals are we pursuing & how?

Science and Decision-making: Thinking about the Context

Nature of the Challenges

Decision Setting

The People Factor

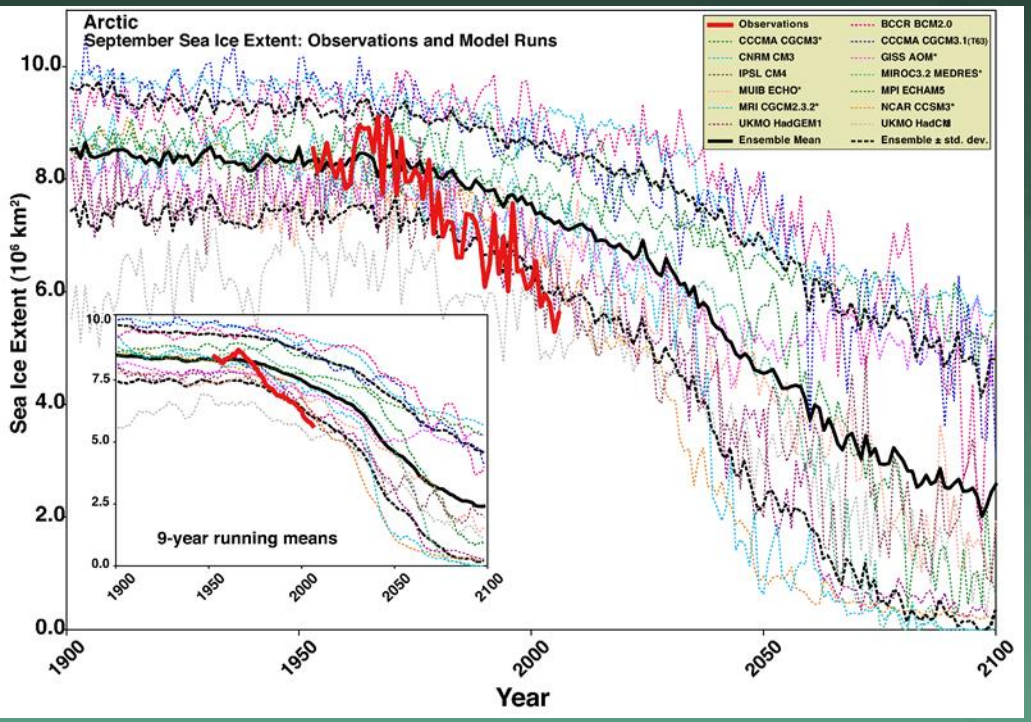
1. Nature of the Challenges

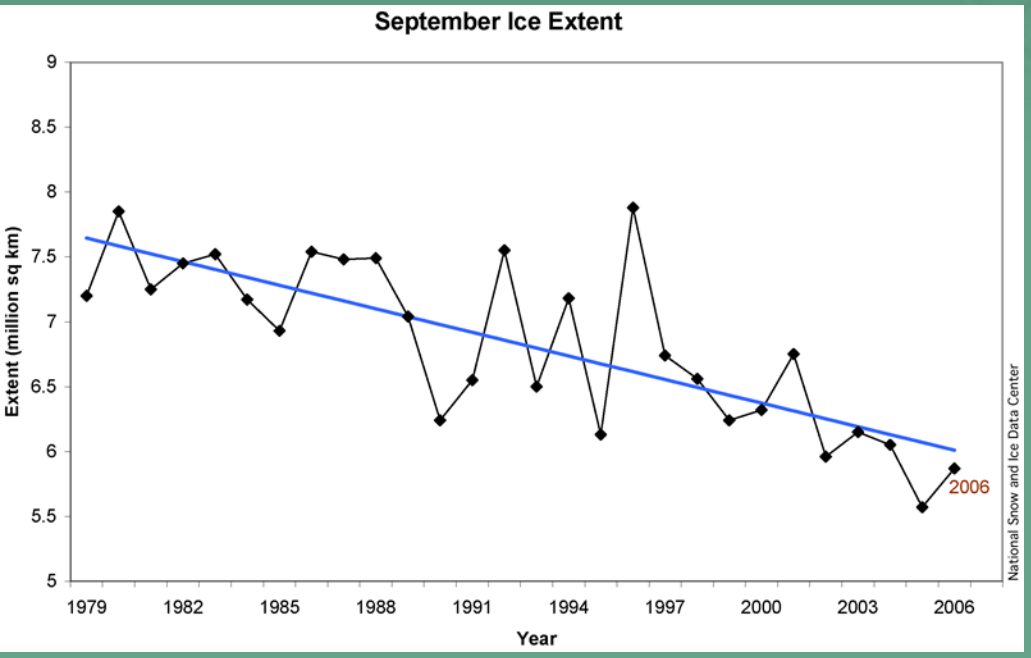
- **Interconnected Complexity**
- **Change**
  - **Setting is dynamic**
  - **Knowledge is dynamic**
  - **Science a perpetual discovery process**
- **Uncertainty**
  - **Incomplete & ambiguous information**
  - **Limits on predictive capacity**
- **Multiple Scales of Problems & Actions**

…Complicate the science—decision maker interface

Part A. Complexity, Change & Uncertainty: Polar bear listing decision

U.S. Department of the Interior
U.S. Geological Survey





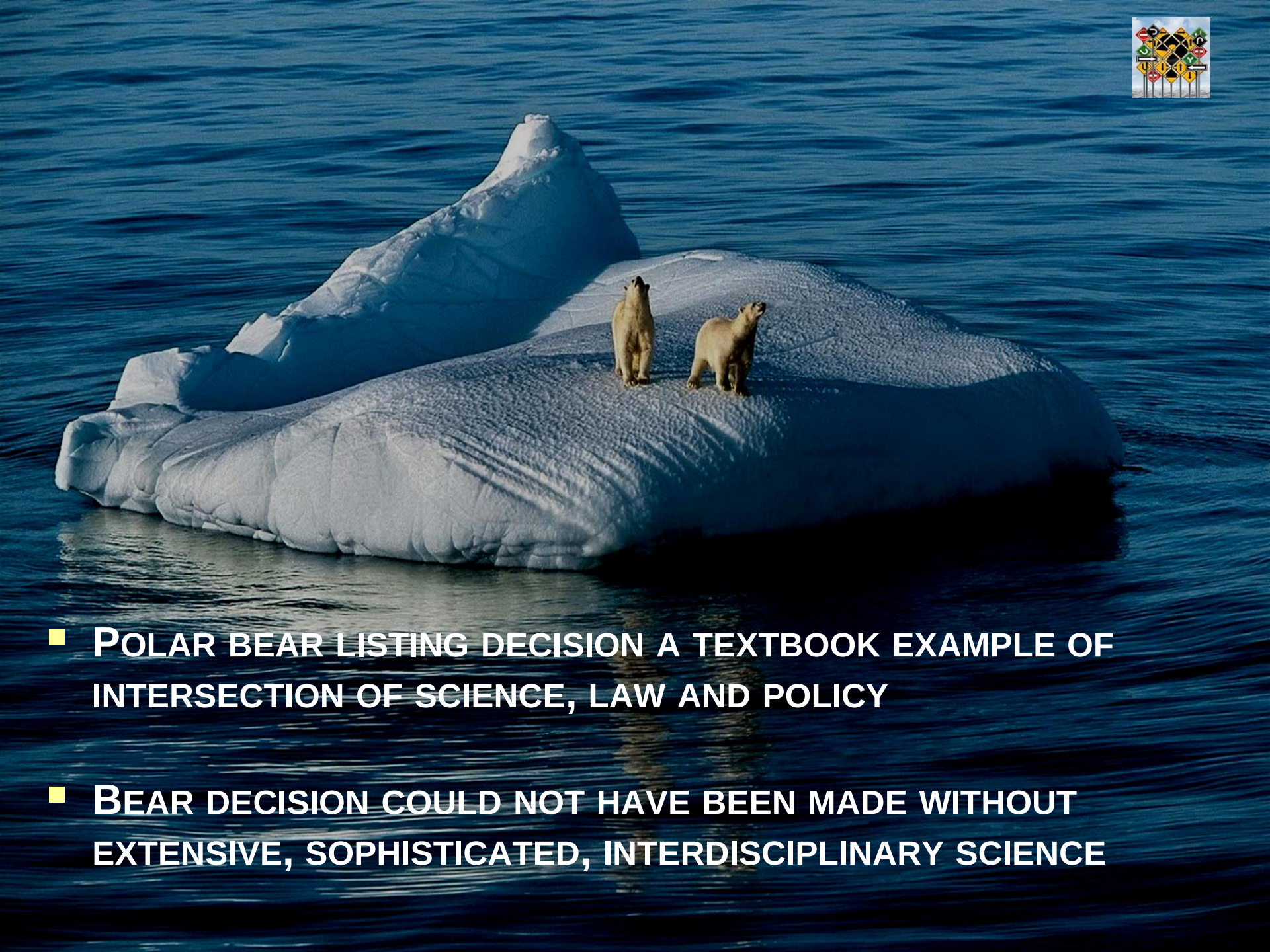
Science Data Gaps & Uncertainties

- Model variations
- Natural vs. climate causation of ice melting
- Bear population status
- Link between bear health and sea ice
- Bear adaptability to different conditions
- Bear response during other warming events

And 9 Months to Fill the Gaps!

Science & Decision makers: Keys to effective interaction

- Dialogue on Legal Requirements
- Co-Framing of Key Questions
- USGS Independent Work Plan
- Scientist-Decision Maker "Wall" During USGS Research Phase
- Decision Maker Briefing on Findings
- Decision Maker Final Regulatory Decision



- Polar bear listing decision a textbook example of intersection of science, law and policy
- Bear decision could not have been made without extensive, sophisticated, interdisciplinary science

PART B. INTERCONNECTED COMPLEXITY: MANY "KNOWLEDGES", MANY SCALES

Performance	Value	Enabling Conditions
Ecology		
Hydrology		
Oceanography		
Engineering		
Environmental Economics		
Social & Behavioral Sciences		
Economics		
Political Science		

Oyster Reef Restoration in Alabama

TRANSDISCIPLINARY KNOWLEDGE: INVESTING IN NATURE'S SOLUTIONS

- **Performance:** Where and when do habitats help reduce risk and provide other benefits?
- **Value:** What are the economic and non-economic values of these services to businesses and communities?
- **Enabling Conditions:** What behaviors, practices, or policies need to be encouraged or changed?

Transdisciplinary Knowledge: Evaluating Solutions

2. The decision setting

- Many decision types
- Intersecting dynamics
- Challenges of time, space, and scope

Decision-making setting: many decision types…

- Budgets & Funding
- Making Laws
- Setting Standards
- Resource Planning & Management
- Risk Assessment & Management

Mean many different science-decision making approaches

DECISION SETTING: INTERSECTING DYNAMICS…

Laws & Regulations

Science

Markets

Cognition & Cultures

Technologies

PRESENT CONSTRAINTS, COMPLEXITIES, & COMPETING NARRATIVES

DECISION TYPES:
VARIATIONS IN TIME, SPACE & SCOPE

Span time & geographic space

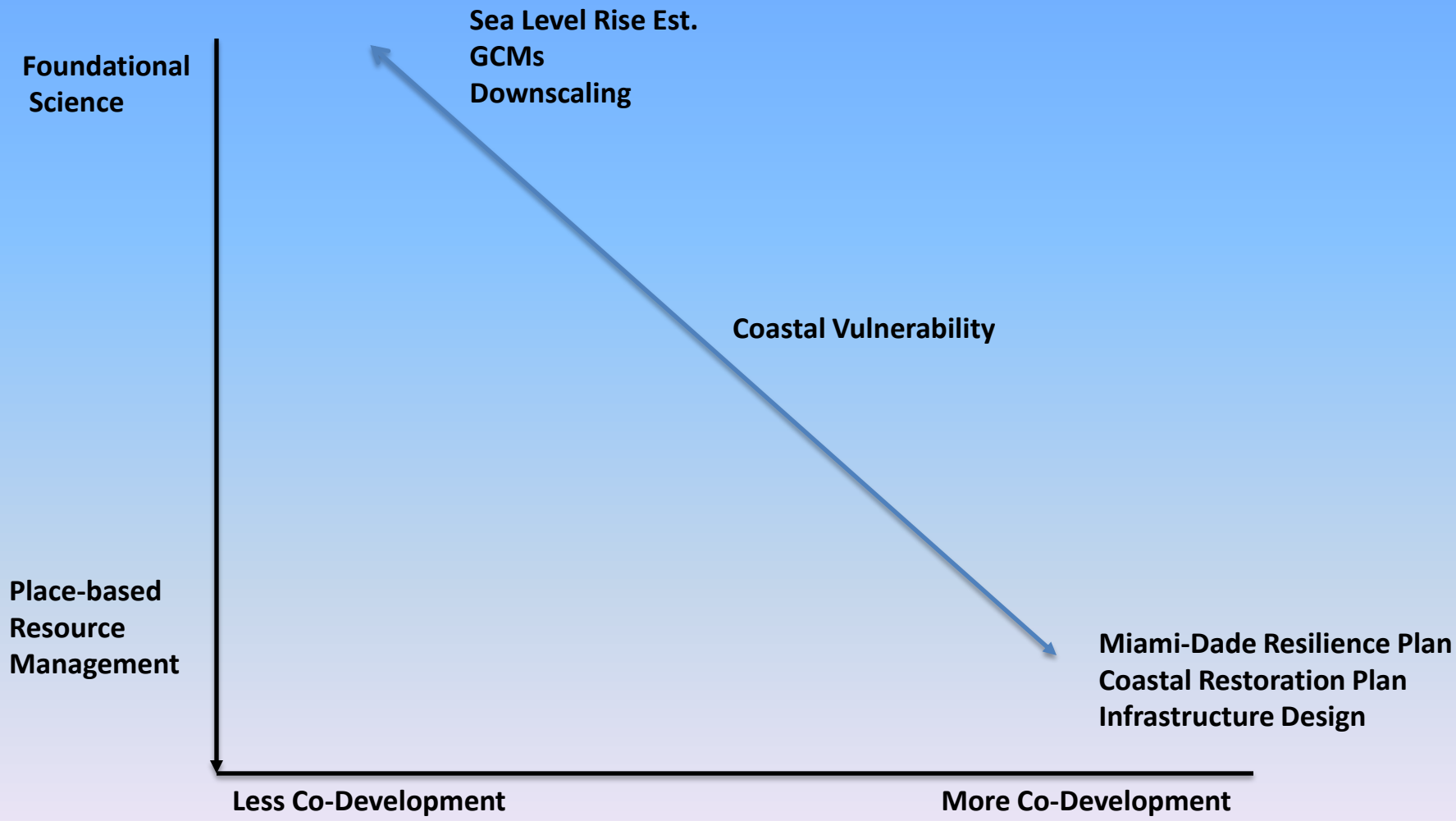
Transcend jurisdictional boundaries & agency authorities

Require public & private-sector action

Intersect cities & countryside

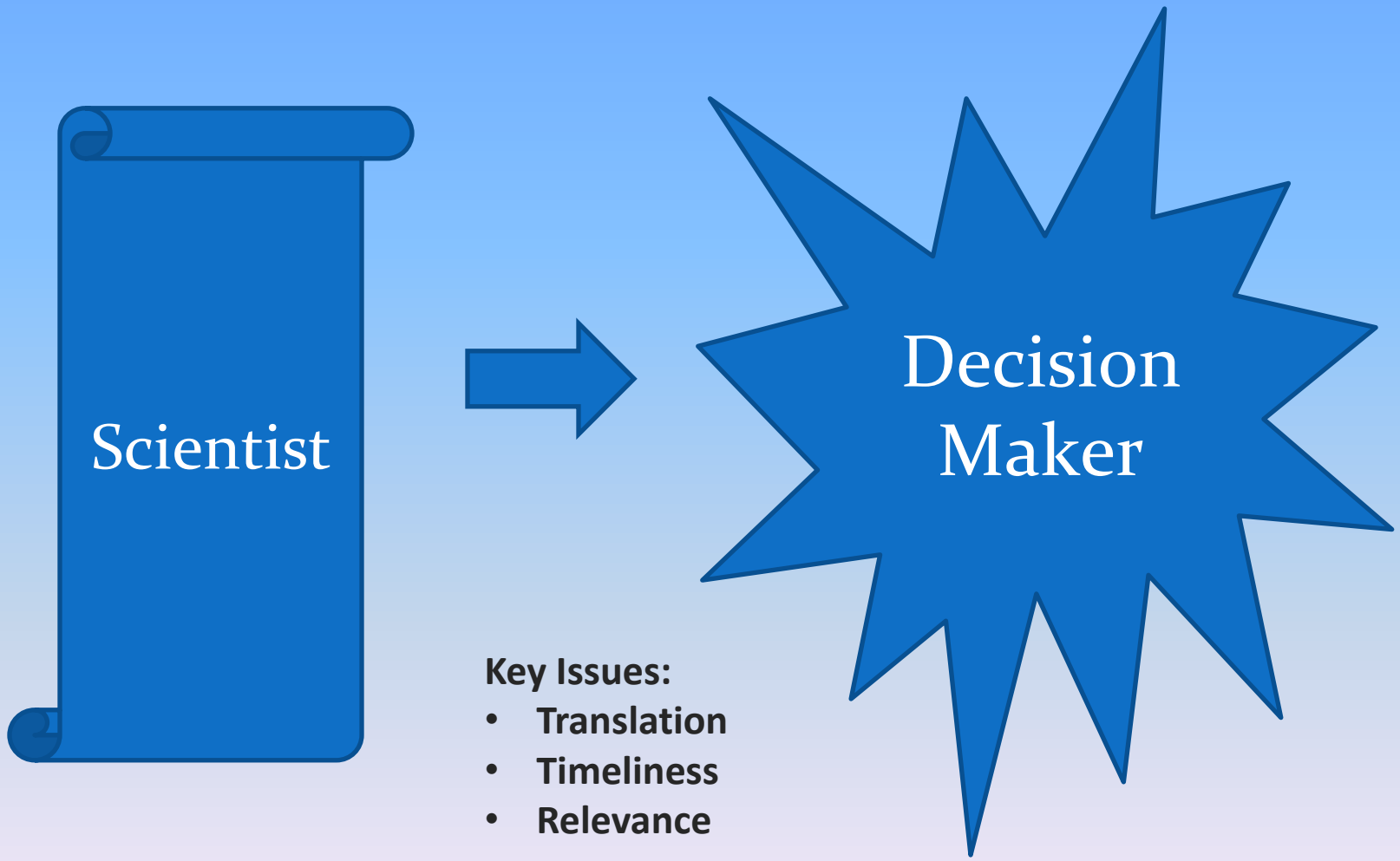
Involve economic, cultural, social, and ecological effects

A FRAMEWORK: DECISION TYPES AFFECT SCIENCE & DECISION-MAKING INTERFACE



Adapted from science co-development chart, Gerard McMahon, Director, SE Climate Science Center

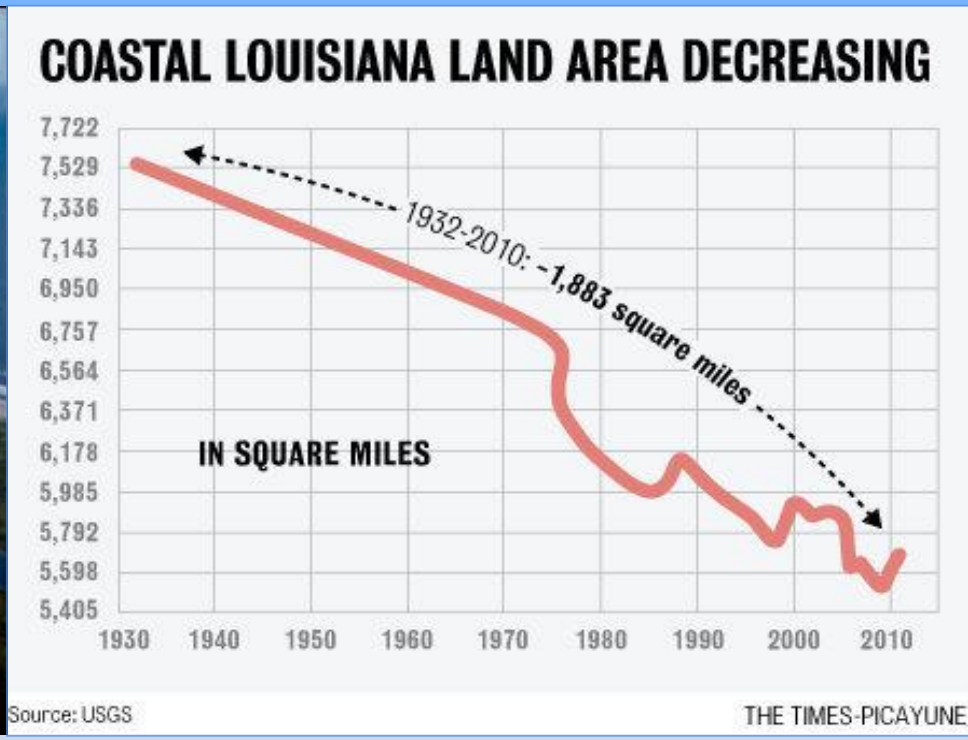
Foundational Science: One-way information transfer



Key Issues:

- **Translation**
- **Timeliness**
- **Relevance**

Foundational Science: Loss of Wetlands



Post-Katrina Reframing of the Challenge

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Photo credit: Jennifer Molnar

MORE LOSSES MEAN MORE COASTAL RISKS

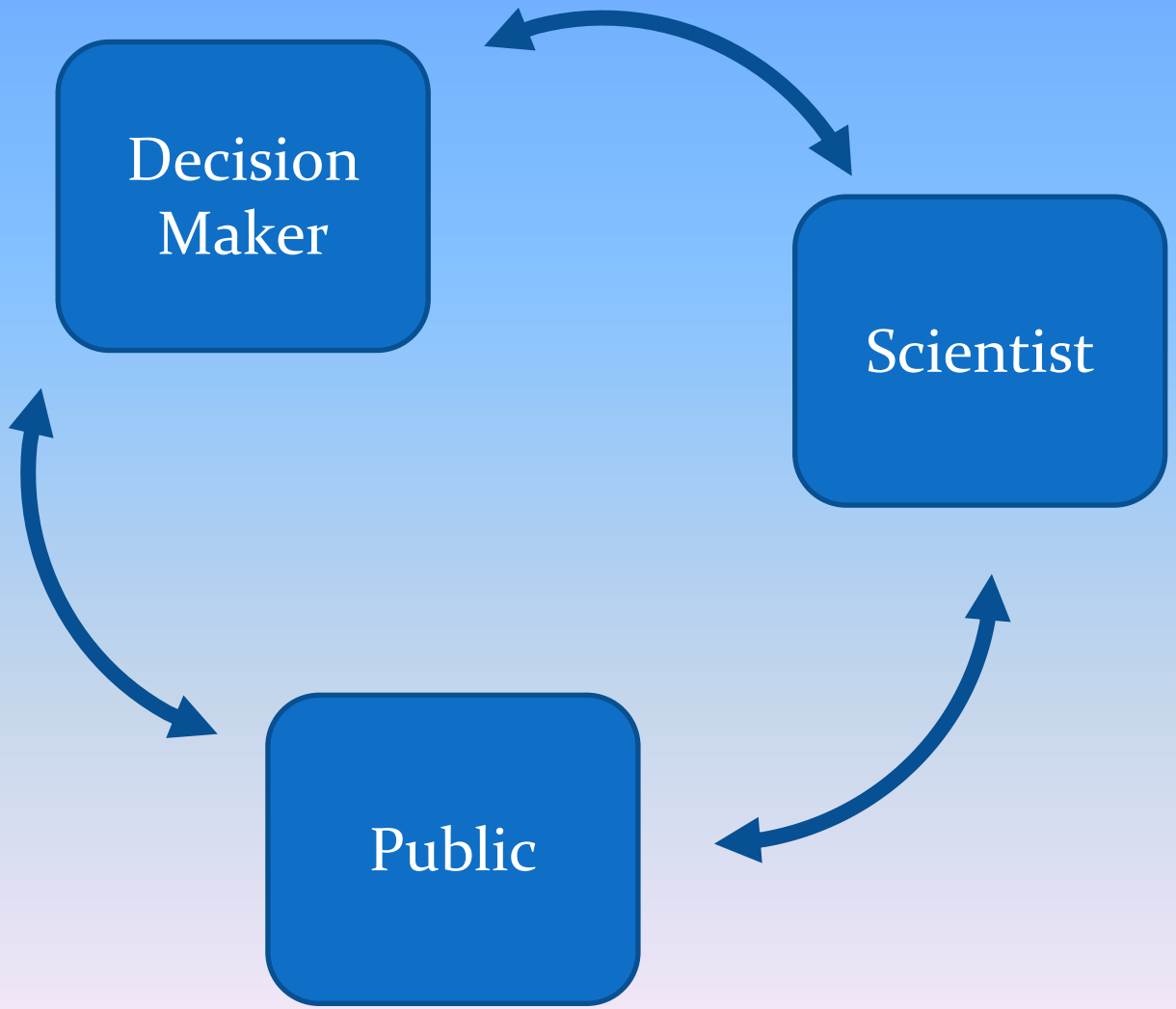
EST. $1.3 TRILLION IN PROPERTY AT RISK

Place-based Decisions & Management: A Central Challenge

How can one provide meaningfulness in a context of complexity…

While providing simplicity in a context of management constraints on time and resources?

Place-based Management: Relevance of Co-development & Mutual Learning



Linking Science & Communities: Mutual Learning—Key Issues?

- How are problems defined & priorities developed?
- How is relevant information identified & generated?
- How is science/decision-making discussion conducted?
- How is information used, tested & augmented?
- How are decisions adjusted as information evolves?

Linking Science & Communities: Mutual Learning—why?

- Framing of problem & defining decision boundaries are significant considerations
- Framing not simply matters for scientific & technical determination

Mutual Learning: challenges are institutional & procedural

- How are dialogues initiated, structured, and sustained?
- How are results of collaboration affirmed as public policy and formal management decisions?

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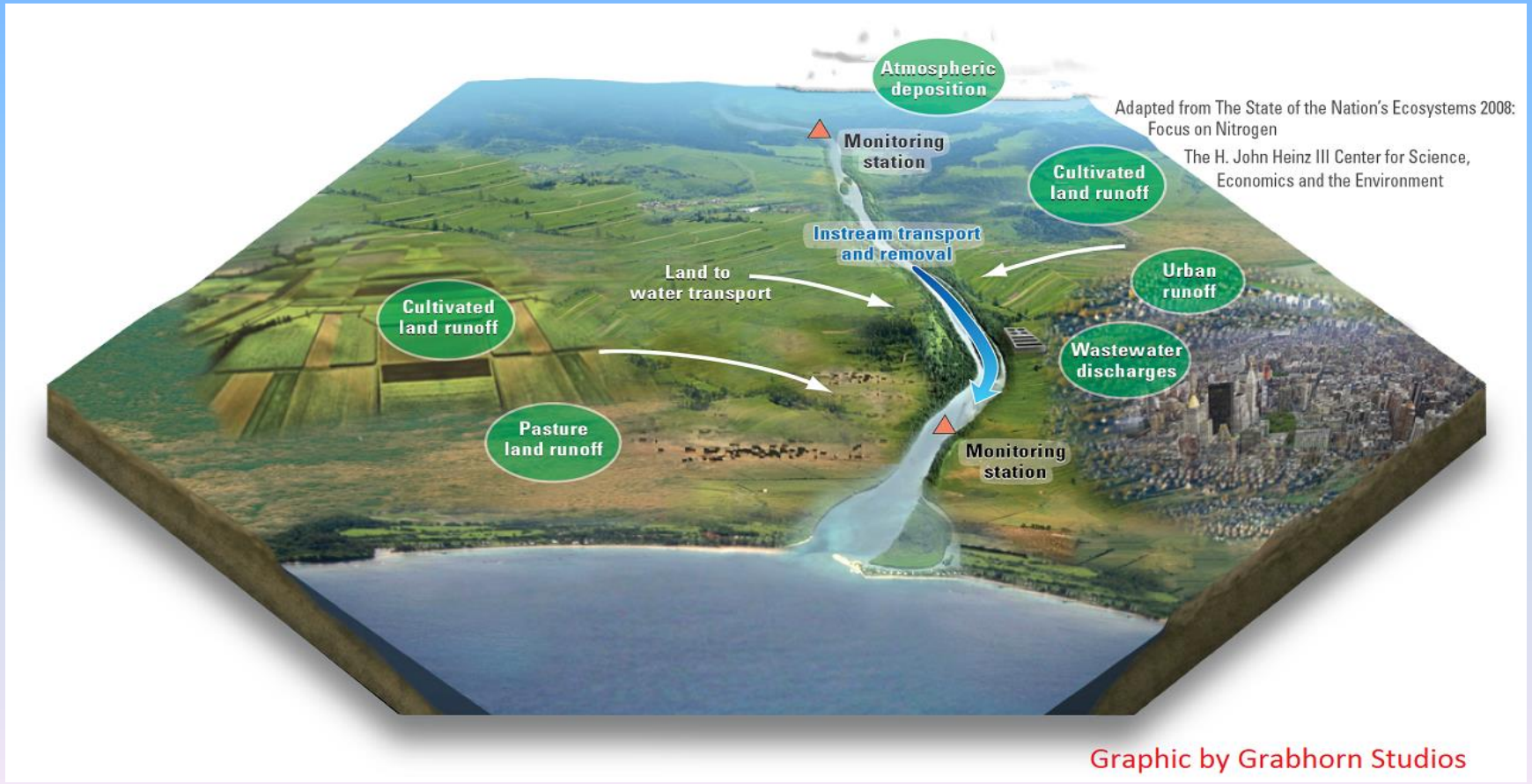
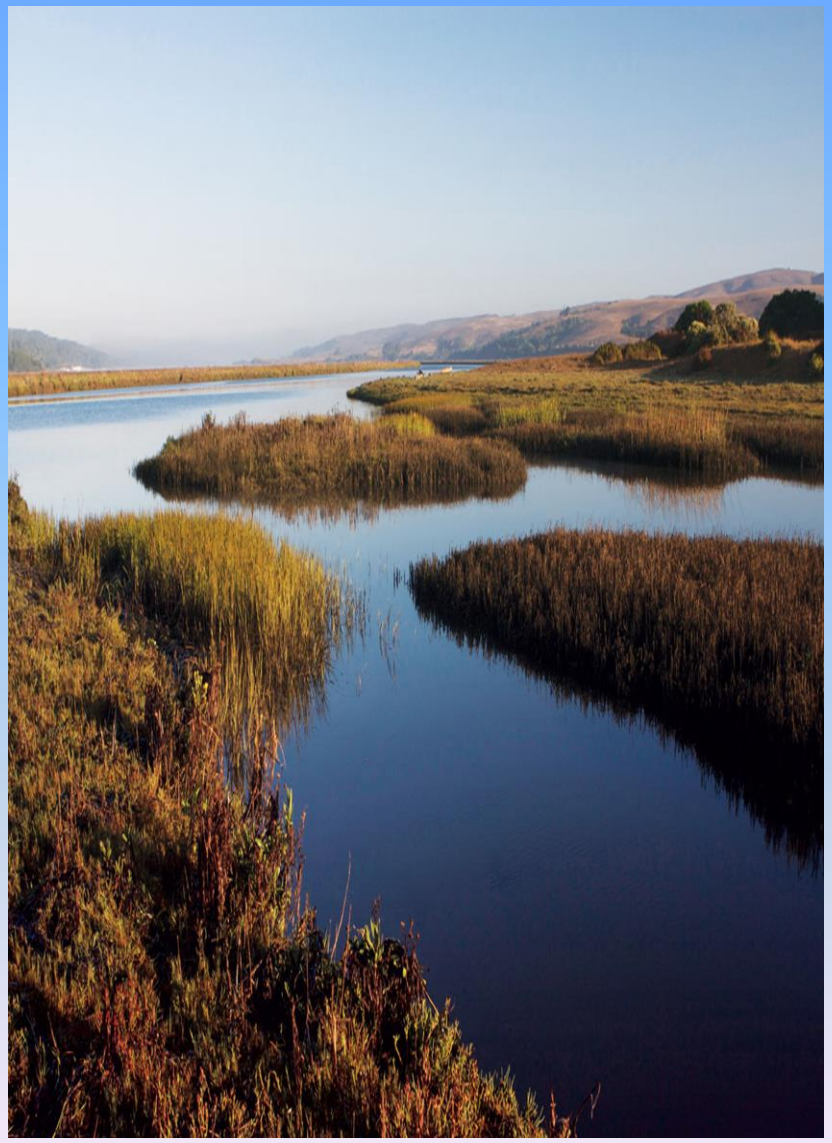
Enhancing mutual learning: joint fact-finding

Issue scoping, conduct, & employment of technical & scientific information to define problems & info needs



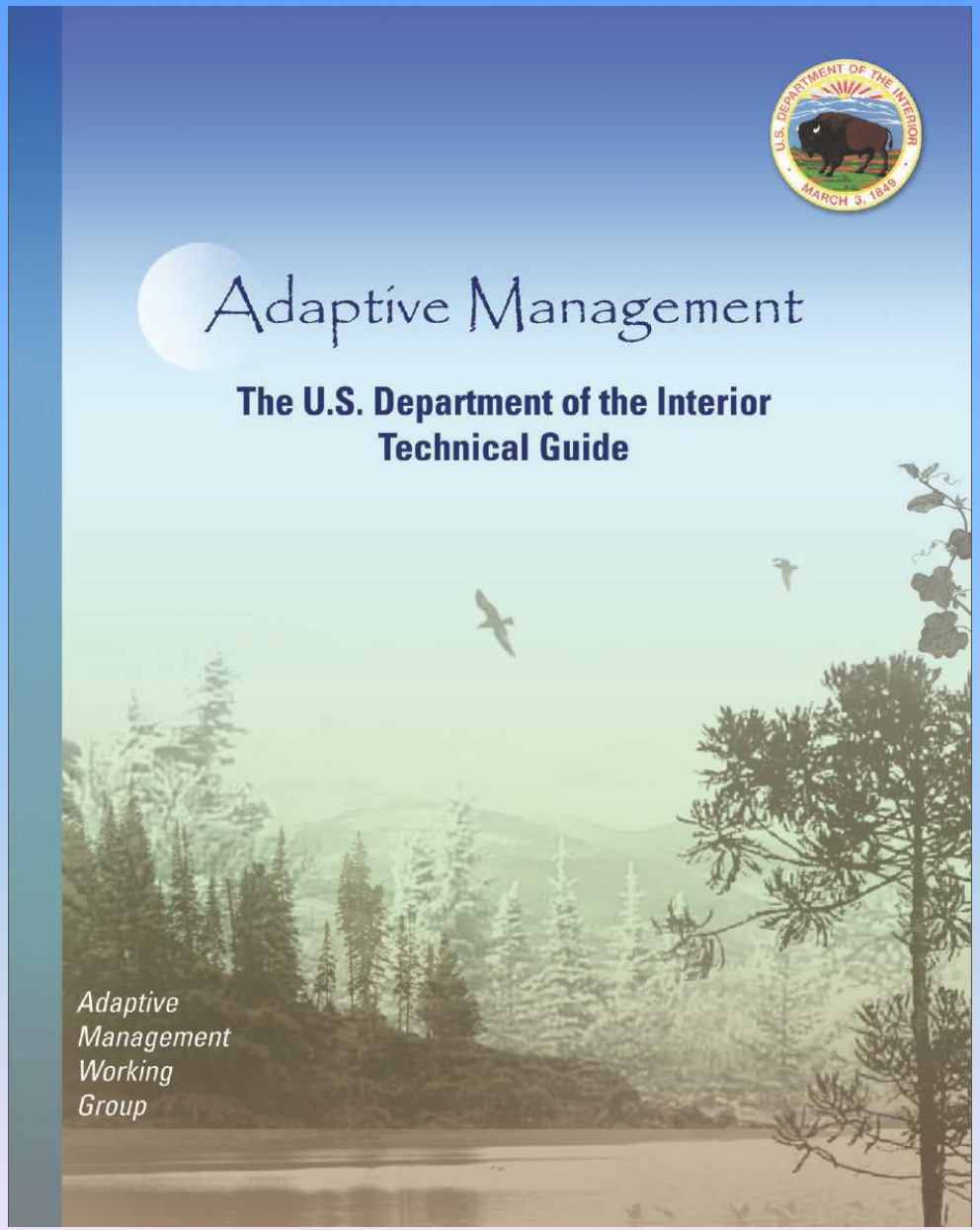
Enhancing mutual learning: tomales Bay

- Joint fact-finding: shift from "data battles" to data gaps
- Better understanding of causation of water quality problem
- Focus on problem-solving

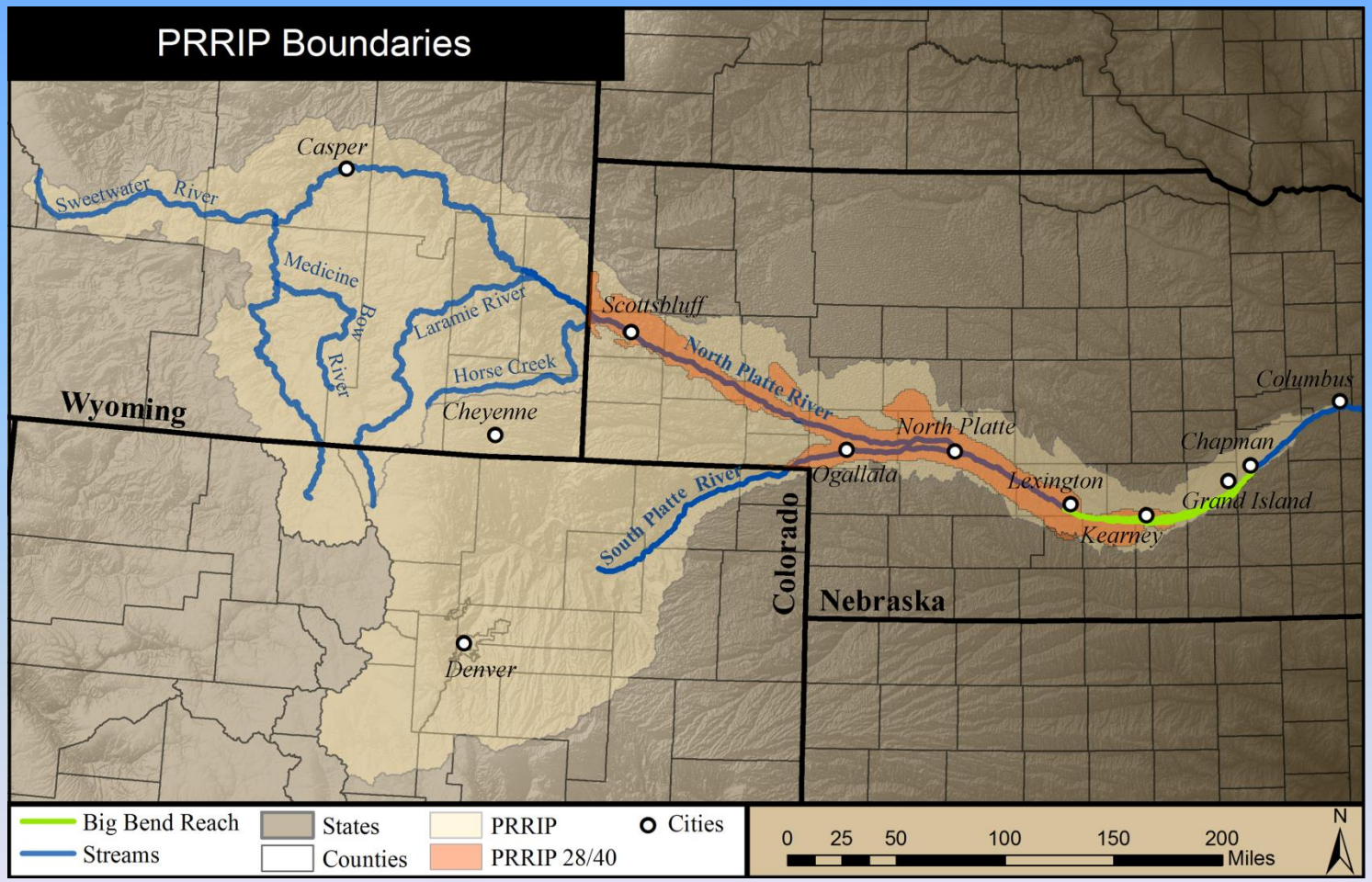


Collaborative Adaptive Management

- Collaborative process to identify goals and select actions to fulfill goals
- Evaluate and monitor results of actions
- Collaboratively revise actions based on results of monitoring



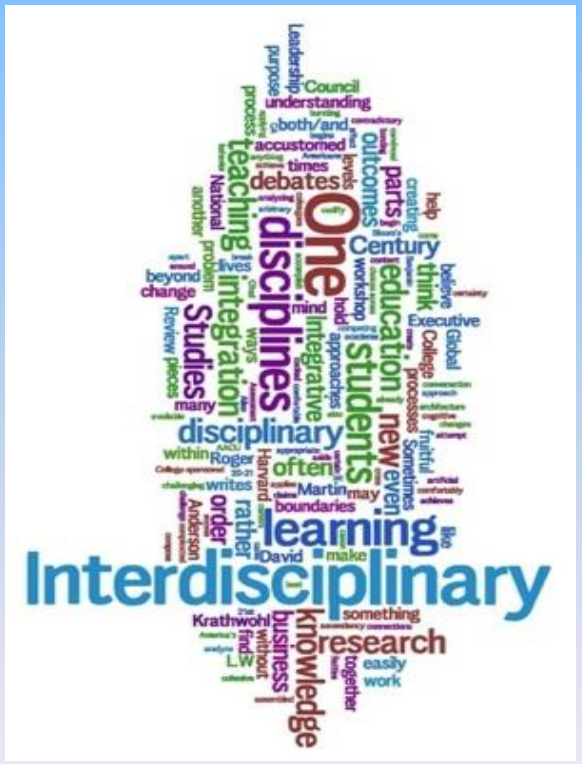
Platte River Recovery Implementation Plan



Place-based Decision-making: enhancing effectiveness

Strengthening Coordination

Generating Transdisciplinary Knowledge



Enhancing Mutual Learning

Implementing Collaborative Science Processes

Key questions:

- Are current institutions sufficient to link science & management in Decision making?
- Are current processes capable of incorporating the results of collaborative science processes into decisions?
- Do institutions facilitate "shared governance" and engagement of relevant participants?

3. THE PEOPLE FACTOR: THINKING, LEARNING, BEHAVING, COMMUNICATING

THE IDEA OF HOT COGNITION

PERHAPS "BELIEVING IS SEEING"

Gudmund Hermes

Social embedding & the relevance of collaborative dialogue to Learning

COLLABORATIVE PROCESSES INFLUENCE LEARNING & ATTITUDES & BEHAVIORS

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Ideas, Behavior, and Choices

- **POLICY DECISIONS HAVE DISTRIBUTIONAL EFFECTS**
- **INCENTIVE STRUCTURES MATTER**
- **PERCEPTIONS & TRUST MATTER**

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And then there are economic dynamics

“It is difficult to get a man to understand something when his salary depends on his not understanding.”

Upton Sinclair

The big Picture: Summing it all up

The Context Matters

Elements of Effectiveness Vary

Governance & Institutions Matter

And, of course, Who, How, When, Where Communicate

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Key Governance Needs: political science & public administration

- Multi-jurisdictional and multi-agency coordination
- Landscape & seascape integration
- Getting the incentives right
- Public & private sector dialogue
- Monitoring and Capacity for Decision Adjustments