



Supporting Climate Adaptation Planning with Robust Decision Making

Debra Knopman • July 25, 2014

Credit to: Jordan Fischbach and David Groves

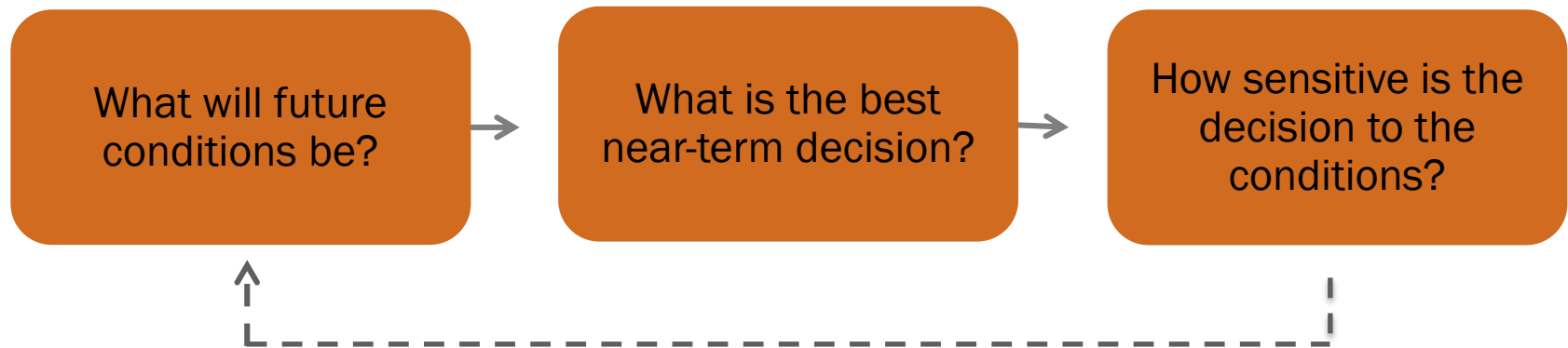


Uncertainty underlies almost every aspect of climate adaptation planning

- How might the **climate change**?
- How will **infrastructures** be affected?
- How might climate change **interact with other uncertainties** such as population shifts?
- How can we handle **large amounts of data** objectively?
- How do we know **which adaptation responses** are optimal?

Traditional decision methods are fine if we don't face much uncertainty

"Predict Then Act"



This traditional method provides a powerful approach for managing risk when the future:

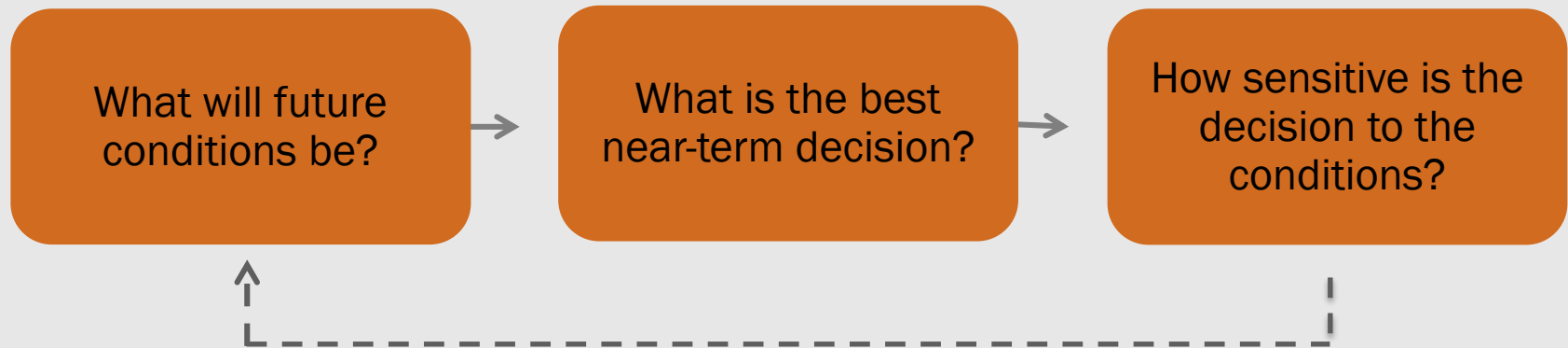
- Isn't changing fast
- Isn't hard to predict
- Doesn't generate much disagreement

Traditional decision methods can backfire in deeply uncertain conditions

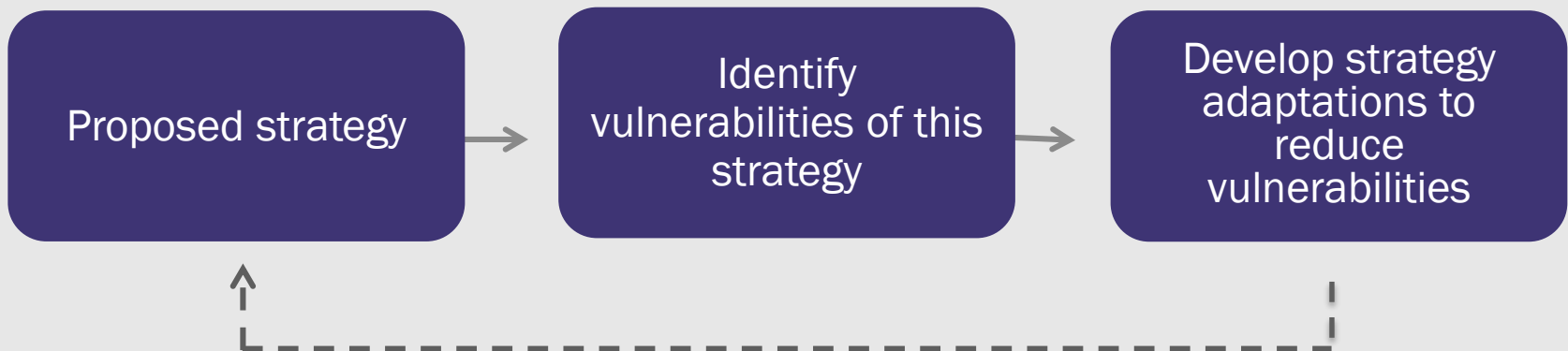
- Uncertainties are underestimated
- Competing analyses can contribute to gridlock
- Misplaced concreteness can blind decisionmakers to surprise

Robust Decisionmaking (RDM) works better under deeply uncertain conditions by running the analysis backwards

“Predict Then Act”



RDM Process



RDM works better than traditional decision methods under deep uncertainty

Traditional

Focus on predictions

Encourage bias and gridlock

Produce brittle solutions



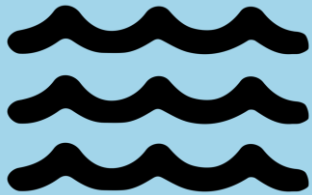
RDM

Focus on strategy(ies) vulnerabilities

Inclusive and transparent process

Produce robust solutions

RDM has been used to improve decisionmaking in a number of different applied settings



water
management



flood risk
management

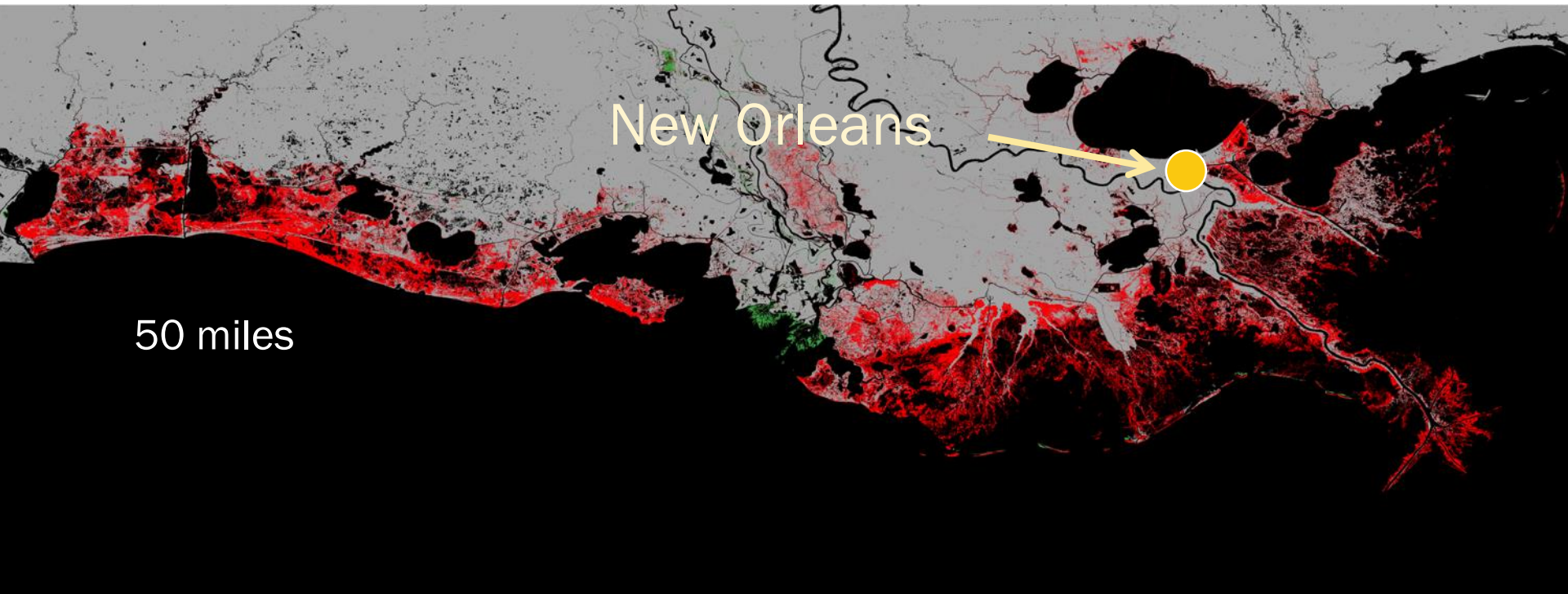


energy resource
management

Hurricanes Katrina and Rita spurred Louisiana into action in 2005



Unless Louisiana takes action, up to 1,800 square miles of land may be lost by 2061



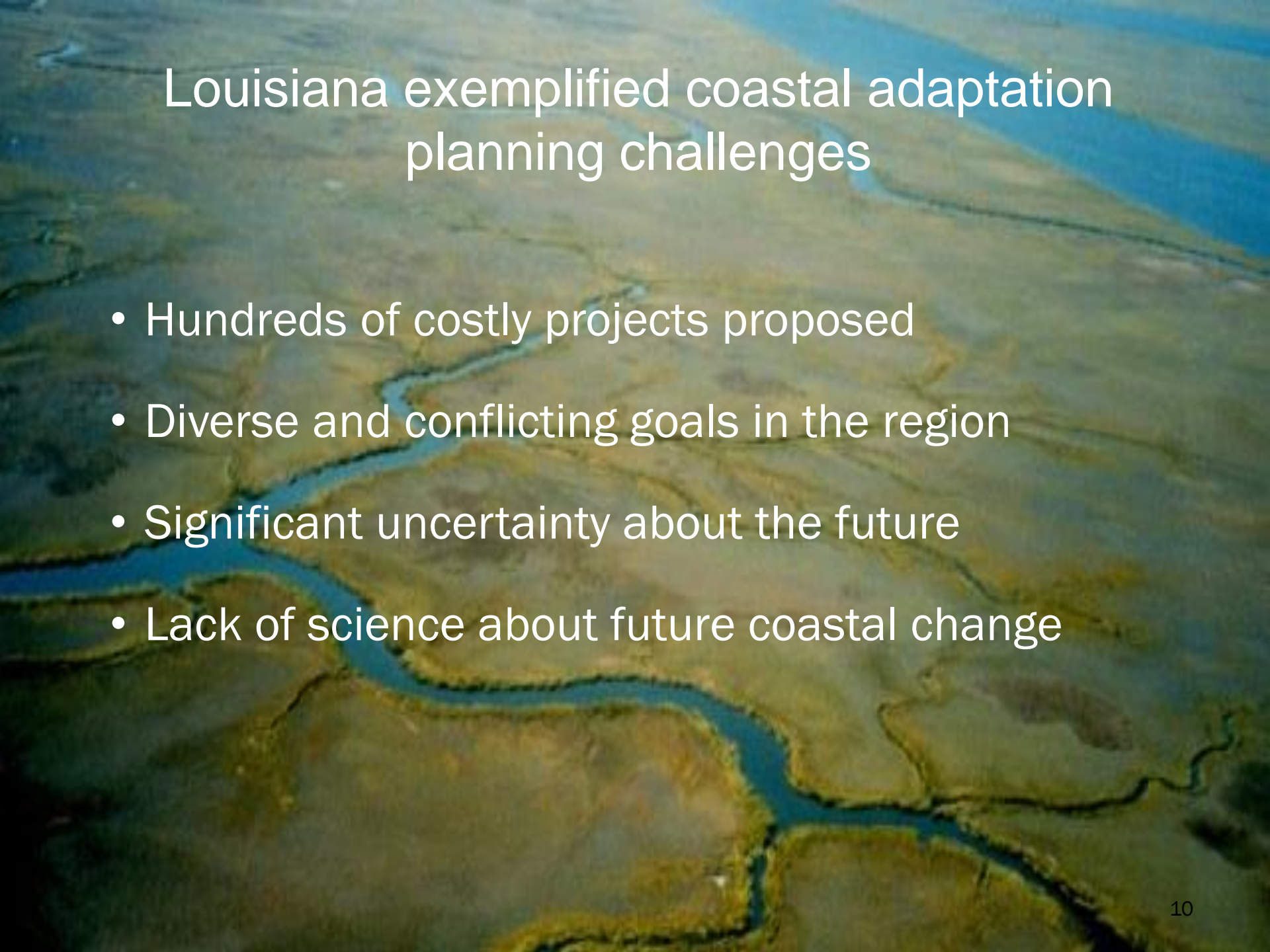
Estimated land change over next 50 years without additional restoration or revised river management



Land loss



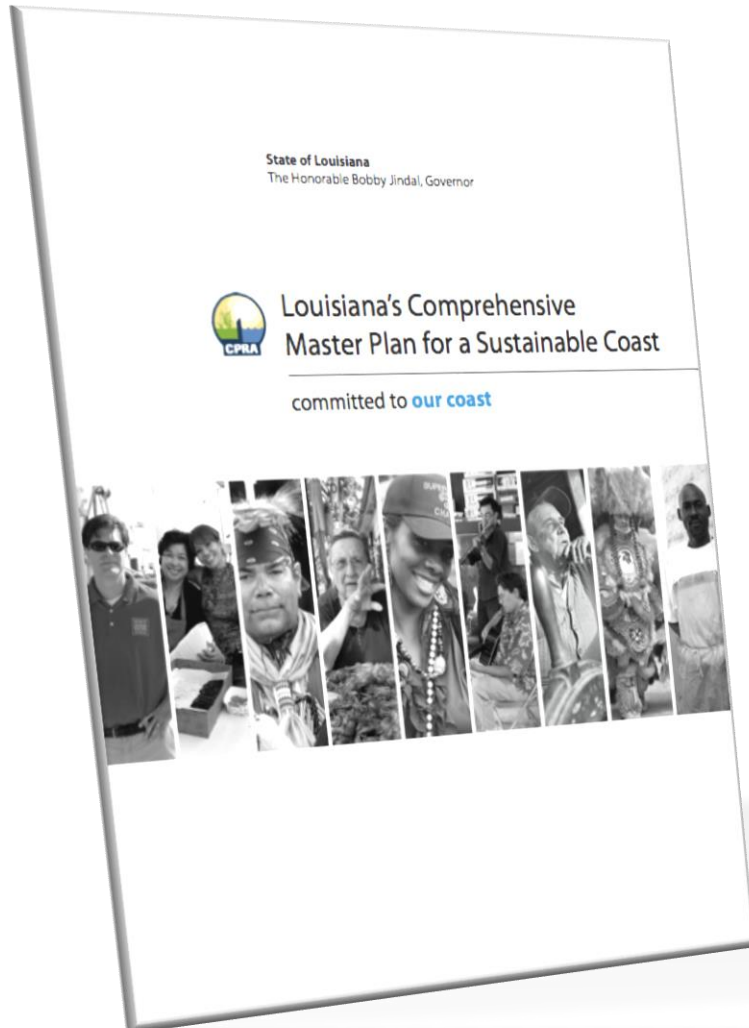
Land gain

An aerial photograph of a river delta, likely the Mississippi River delta, showing a complex network of waterways and land. The water is a deep blue, and the surrounding land is a mix of brown and green, indicating different types of terrain and vegetation. The text is overlaid on the upper portion of the image.

Louisiana exemplified coastal adaptation planning challenges

- Hundreds of costly projects proposed
- Diverse and conflicting goals in the region
- Significant uncertainty about the future
- Lack of science about future coastal change

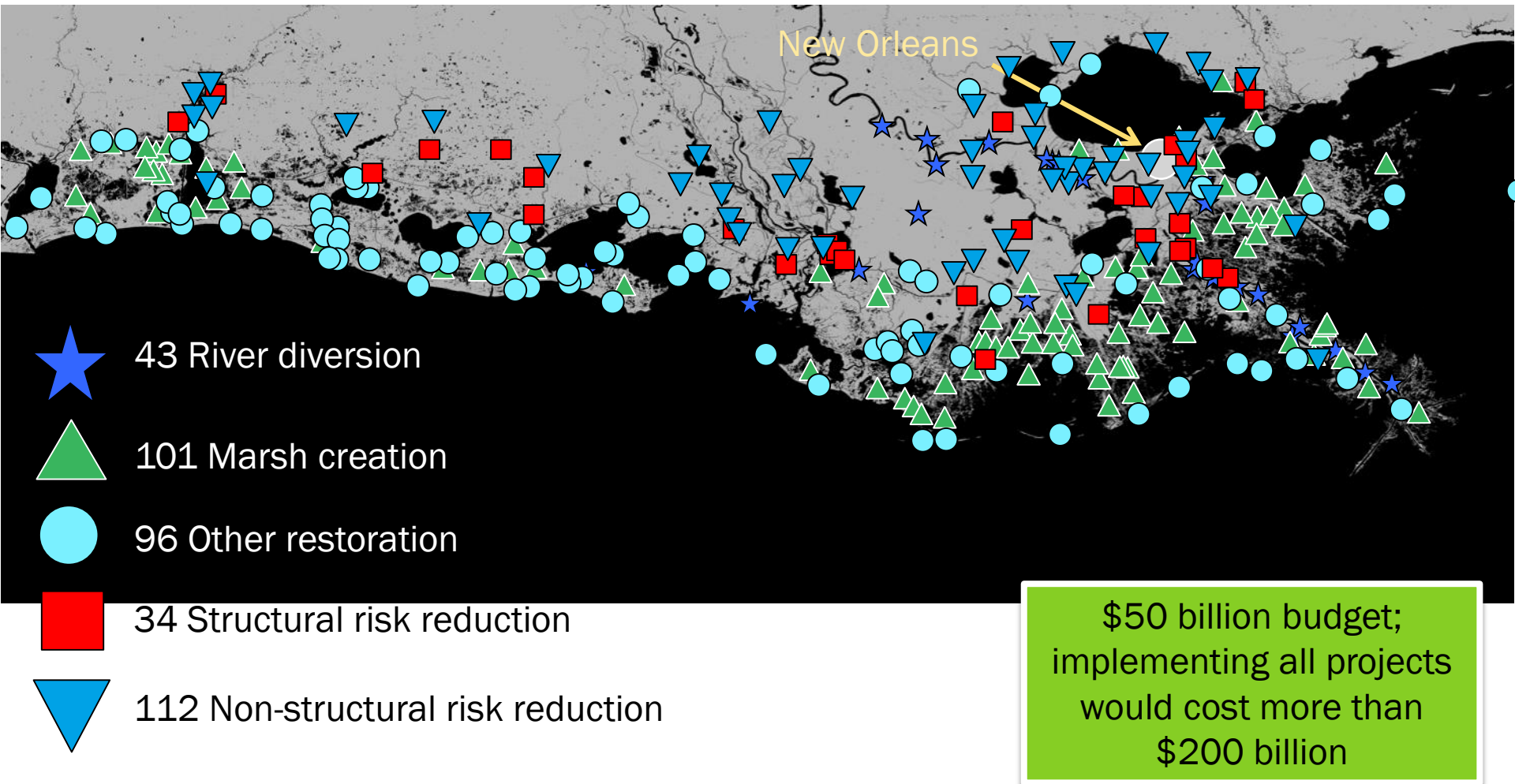
2012 Master Plan for a Sustainable Coast Proposes a Comprehensive Approach



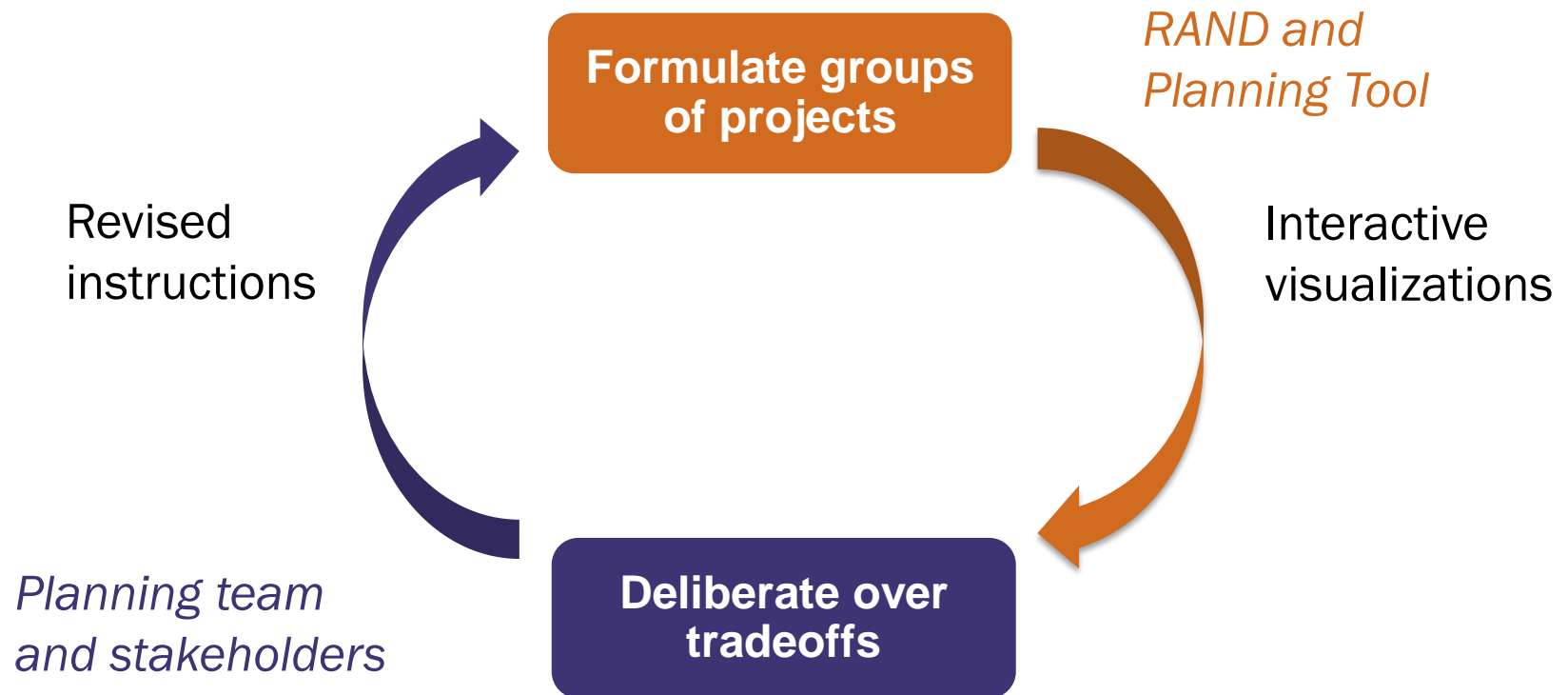
Key innovations

- *New systems modeling* to better understand future coastal conditions
- *Objective planning framework* to identify effective investments and tradeoffs

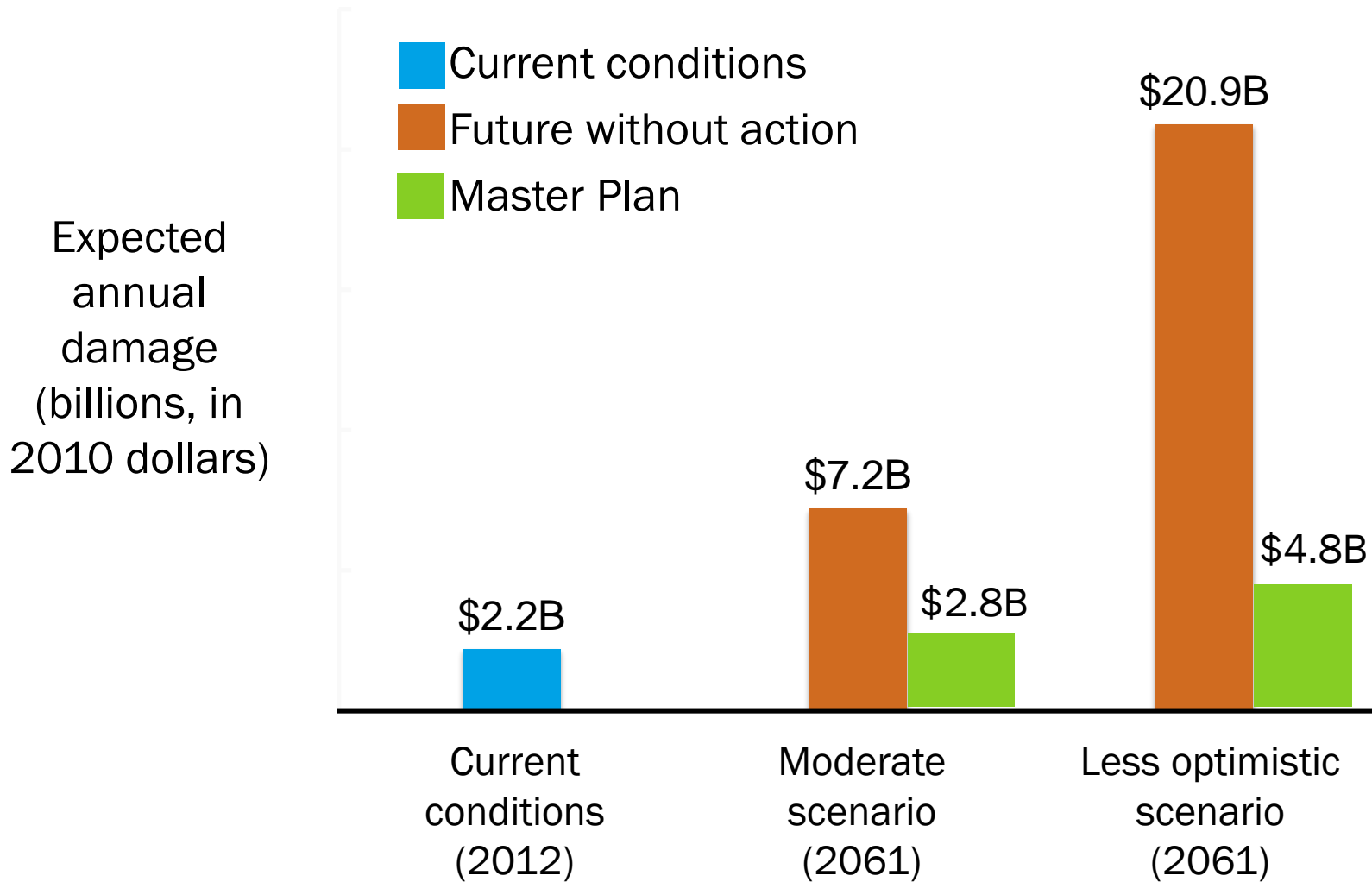
We developed a Planning Tool to compare hundreds of restoration and risk-reduction projects



Master Plan Team used iterative approach to find balance of projects for 50-year, \$50B plan



Risk reduction projects will reduce flood damage by billions of dollars annually



RDM-based approach allowed Louisiana to make difficult choices

Faced with...

A complex coastal system; uncertain future

Hundreds of costly proposed projects

Diverse stakeholder interests



Process provided...

Scientific information about future risks and project benefits

An **objective means** to prioritize investment

A **non-political framework** to help resolve tradeoffs

Methods such as RDM can provide the analytical basis for more robust, adaptive decisions



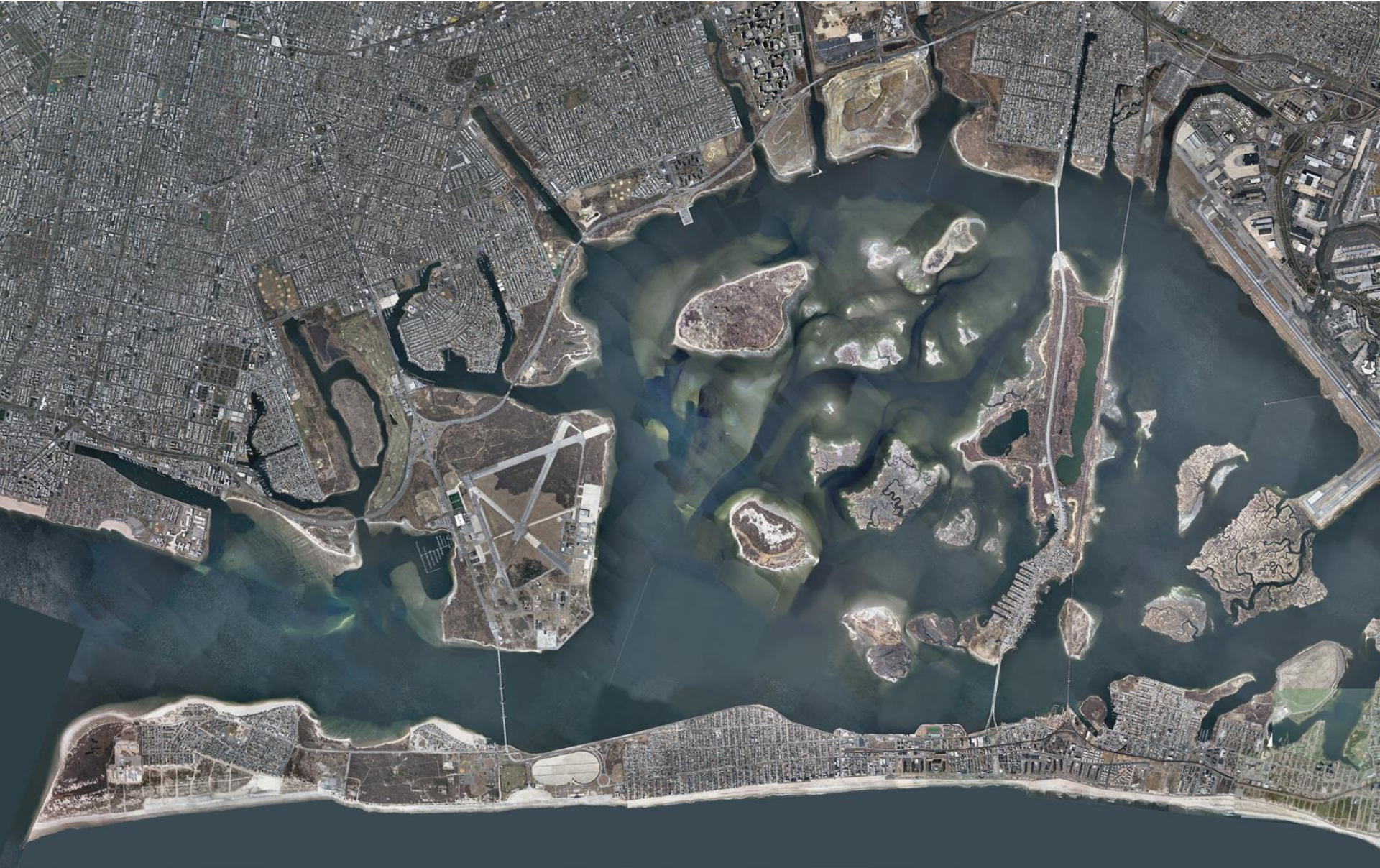
Highlight key assumptions, project benefits and costs, and tradeoffs

Support integrated, participatory adaptation planning

Expand the range of options under consideration

Develop adaptive plans that evolve as new information and insight emerges

We are applying this approach to Jamaica Bay with support from the Rockefeller Foundation



We will be helping to develop a Master Plan for Jamaica Bay that is robust and adaptive



We will consider multiple goals of

- Coastal risk reduction
- Ecosystem restoration
- Water quality improvement

Key leaders: Public Agency Council of the Science and Resilience Institute of Jamaica Bay

12-18 month effort: deliberation with analysis

Principles for Integrated Coastal Planning

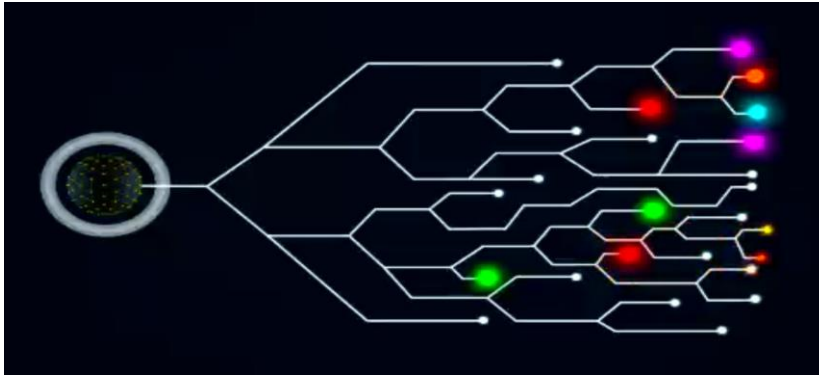


Public participation is essential throughout the planning process

Technical analysis is meant to inform deliberations and value judgments by decisionmakers

A sustainable long-term strategy must be robust and adaptive

You can review our adaptation-related work online



RAND's RDMLab

<http://www.rand.org/methods/rdmlab.html>



Adapting to a Changing Colorado River: Making Future Water Deliveries More Reliable

As water needs grow and climate conditions change, ColoradoRiver managers and users look for ways to prepare for the future.

Colorado River Basin support

<http://www.rand.org/jie/projects/colorado-river-basin/interactive-brief.html>



Strengthening Coastal Planning

How Coastal Regions Could Benefit from Louisiana's Planning and Analysis Framework

David G. Groves, Jordan R. Fischbach, Debra Knopman,
David R. Johnson, Kate Giglio



2012 Louisiana Master Plan support

http://www.rand.org/pubs/research_/RR437.html



www.rand.org