Introduction to the Mid-Atlantic RISA (MARISA)

Northeast Monthly Climate Update

October 27, 2016

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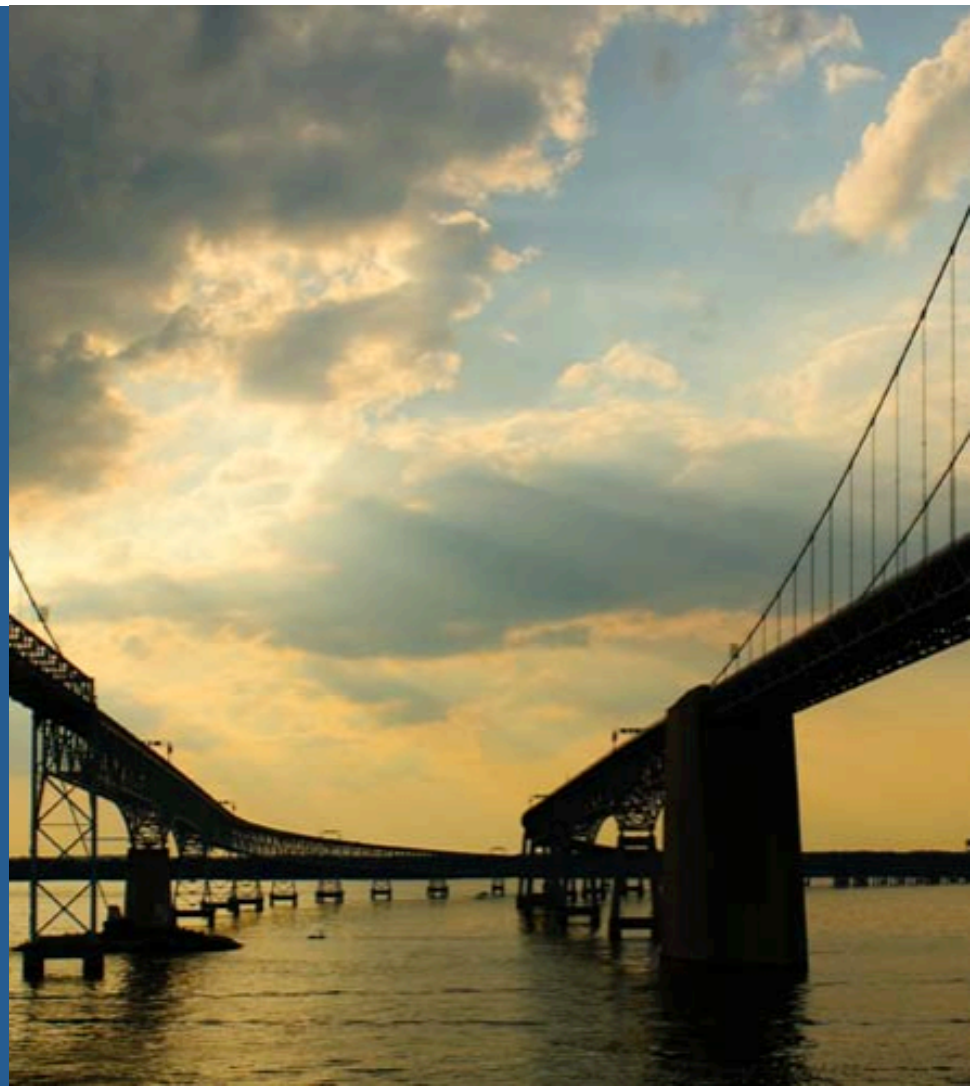

Today's Discussion

- Mission and motivation
- Overview of the MARISA team
- Key objectives and proposed activities

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Mission of MARISA

Support the effective utilization of climate science and the building of adaptive capacity and resilience to climate variability and change in the Mid-Atlantic region

Initial focus on the Chesapeake Bay Watershed

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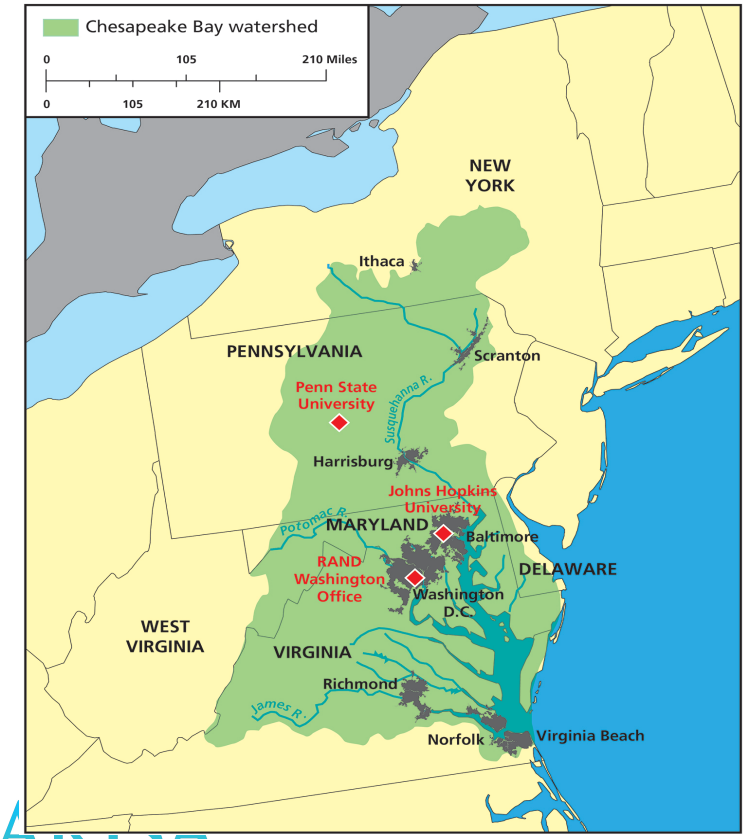
Our Region and Who We Are



Core Office

RAND, Washington, DC

- Debra Knopman (Lead Principal Investigator)
- Melissa Finucane (Co-Investigator)
- Jordan Fischbach (Co-investigator)
- Rob Lempert (Senior Researcher)
- Neil Berg (Program Manager)

Climate Information Office

Penn State University, State College, PA

- Klaus Keller (Lead Principal Investigator)
- Rob Nicholas (Co-Investigator)

Risk Analysis Office

Johns Hopkins University, Baltimore, MD

- Ben Hobbs (Co-Investigator)

Additional Support from Cornell University, Ithaca, NY

- Art DeGaetano (Senior Researcher)

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Motivating Research Questions

- Which decisions benefit most from considering alternatives that lessen vulnerability or increase adaptability to climate variability and change?
- How will probabilities of stakeholder-relevant extremes and thresholds change in the future?
- How do flooding vulnerabilities in the Chesapeake Bay Watershed change under different future climate and land-use scenarios?
- What resource protection and restoration strategies are most effective under a range of possible future conditions?
- What are actionable early warning signs to guide adaptive decision making?
- What are the mechanisms by which MARISA achieves expected outcomes?

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How We Will Work Toward Our Mission

- Integrate multiple types of new and existing information into a decision-support framework
- Use an iterative, participatory process that co-develops knowledge and strategies with decisionmakers, stakeholders, and partners
- Build credibility, relationships, and trust in the region

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Team Roles

Climate Information Office
Penn State University

- Create decision-relevant climate data archive, generate new climate model ensembles and analysis tools
- Support community outreach and stakeholder engagement
- Train students

Core Office
RAND
Washington, DC

- Overall program management
- Guide research agenda
- Direct regional coordination
- Support research-to-operations
- Maintain stakeholder communications and social media presence
- Train students

Risk Analysis Office
Johns Hopkins University

- Screen decision priorities to address climate-driven risks/ uncertainties
- Support stakeholder engagement
- Train students

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MARISA Advisory Committee

We are establishing an Advisory Committee of ~10 people representing academic, business, community, resource management, and agency representatives from the Mid-Atlantic region.

Confirmed members include:

- Ellen Mecray, NOAA Regional Climate Services Director-Eastern Division
- Zoe Johnson, NOAA CBP Climate Change Coordinator
- Mary Ratnaswamy, Co-Director, DOI Northeast Climate Services Center
- Genevieve LaRouche, Head, Chesapeake Bay Field Office, US FWS Region 5
- Leon Clarke, Joint Global Change Research Institution and Pacific NW Natl. Lab.
- Susanne Moser, Susanne Moser Research and Consulting

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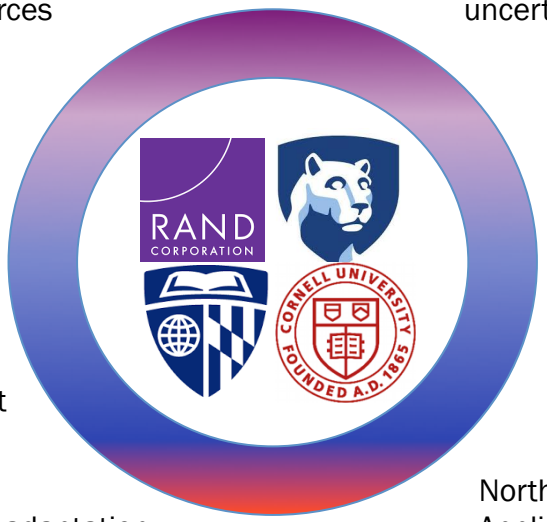
Our Prior Research and Experience

Robust Decision Making approach to water quality, storm water management, water resources

Mission-oriented Earth science and uncertainty quantification

Coastal Louisiana Risk Assessment model for Louisiana's Coastal Master Plan

Supporting 3rd National Climate Assessment, IPCC Fifth Assessment Report



Assessing Hurricane Sandy Rebuilding Task Force Infrastructure Resilience Guidelines

Framework for cost-effective sediment reduction in agricultural watersheds

STORMWise model for green infrastructure choices and urban stormwater management

Supporting the Port of Los Angeles adapt to changes in sea level and storm surge

Evaluating effectiveness of integrated research programs supporting climate adaptation

Northeast Regional Climate Center's Applied Climate Information System

Downscaled climate projections for agricultural and biodiversity applications

Former Lead PI and current co-investigator of Pacific RISA

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Leveraging Existing Partnerships & Building New Ones

MARISA will prioritize building partnerships with:

- NOAA NE Regional Climate Services Direction, NOAA CPO, NOAA Sea Grant, NOAA NRCC
- Sustainable Climate Risk Network
- Chesapeake Bay Program & Chesapeake Bay Found.
- US EPA; US Army Corps of Engineers; US Global Change Research Program
- Environmental Defense Fund
- The Nature Conservancy
- PA Dept. of Trans., District Dept. of Energy and Env., VA Dept. of Env. Quality, DE Dept. of Nat. Res. and Env. Control

MARISA will also build new partnerships with:

- US FWS Region 5 – Chesapeake Bay Field Office
- DOI Northeast Climate Services Center
- DOI North Atlantic Landscape Cons. Cooperative
- USDA Northeast Climate Hub
- MD State Water Quality Advisory Committee
- MD Assoc. Municipal Wastewater Agencies
- Other City, County, and State level departments and community groups involved with water management, land use, planning and development, natural resources, environment protection, transportation, and energy

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MARISA's Objectives

1. Assess climate risks, uncertainties, and vulnerabilities
2. Support adaptation planning, decision making, and adaptive management
3. Coordinate and support regional climate assessments and services
4. Train new leaders
5. Advance program performance

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Objectives Are Interrelated

- **An improved understanding** of climate risks, vulnerabilities, and mitigation approaches for Mid-Atlantic communities
- **Evidence-based strategic planning** for integrating and implementing adaptation strategies across a variety of sectors and stakeholders impacted by climate variability and change
- **Support for decision making at all levels** through engaging and connecting stakeholders, policymakers, and scientists

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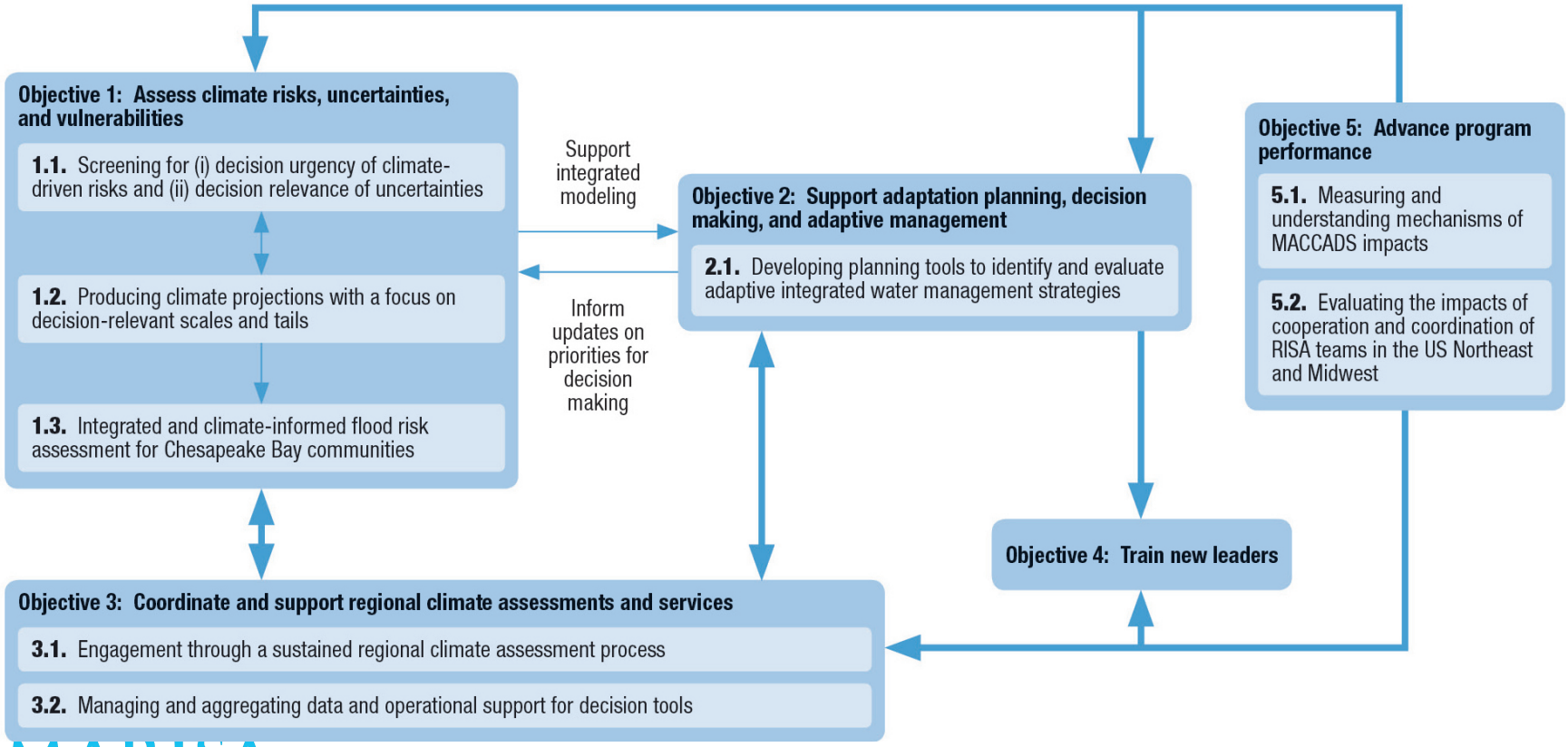
Objectives Are Interrelated



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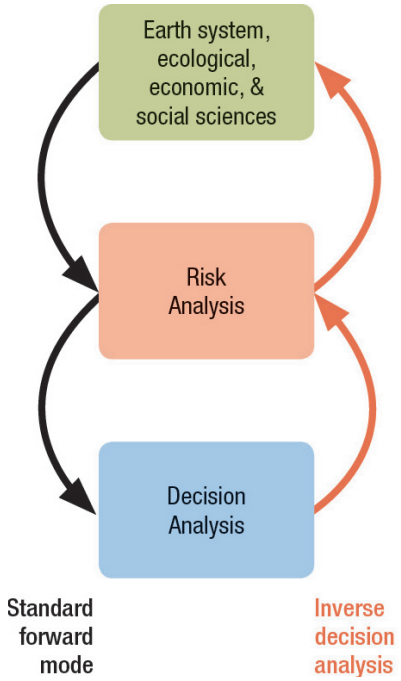
Objective 1: Assessment

Assessing climate risks, uncertainties, and vulnerabilities by:

1. Screening for decision urgency of climate-driver risks and decision relevance of uncertainties



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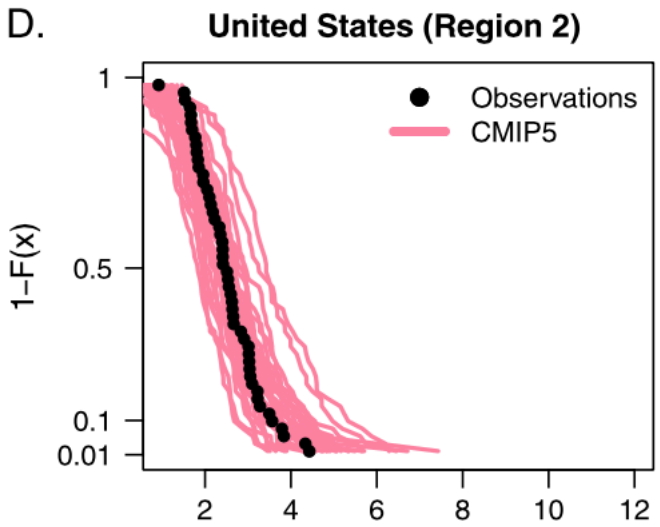
Objective 1: Assessment, cont.

Assessing climate risks, uncertainties, and vulnerabilities by:

1. Screening for decision urgency of climate-driver risks and decision relevance of uncertainties

2. Producing climate projections with a focus on decision-relevant scales and tails



Sriver, R.L., Forest, C. E. & Keller, K. Effects of initial conditions uncertainty on regional climate variability: An analysis using a low-resolution CESM ensemble. *Geo. Res. Lett.* **42**, 2015GL064546 (2015)

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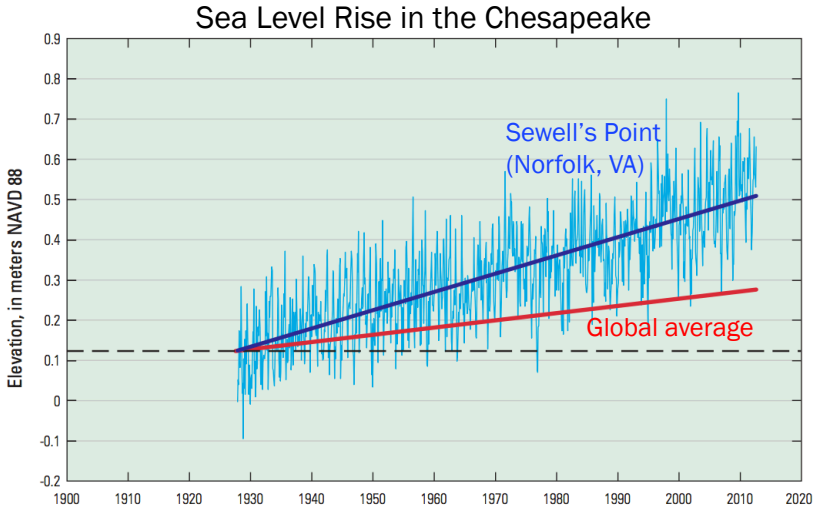
Objective 1: Assessment, cont.

Assessing climate risks, uncertainties, and vulnerabilities by:

1. Screening for decision urgency of climate-driver risks and decision relevance of uncertainties

2. Producing climate projections with a focus on decision-relevant scales and tails

3. Performing an integrated and climate-informed flood risk assessment for Chesapeake Bay communities



Adopted from Eggleston and Pope (2013) "Land Subsidence and relative sea-level rise in the southern Chesapeake Bay region." USGS Circular 1392.

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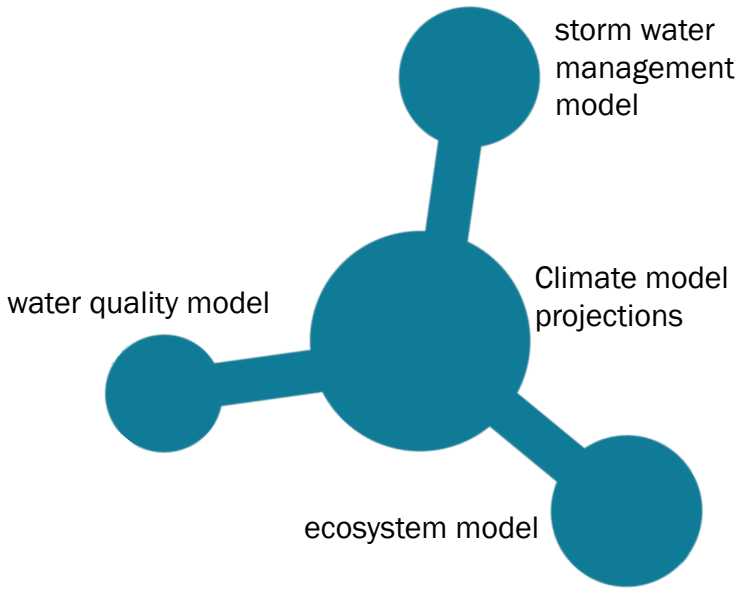
Objective 2: Adaptation

Supporting adaptation planning, decision making, and adaptive management by:

- Using existing models and data to better understand options for improved water quality BMPs, flood risk, and erosion reduction



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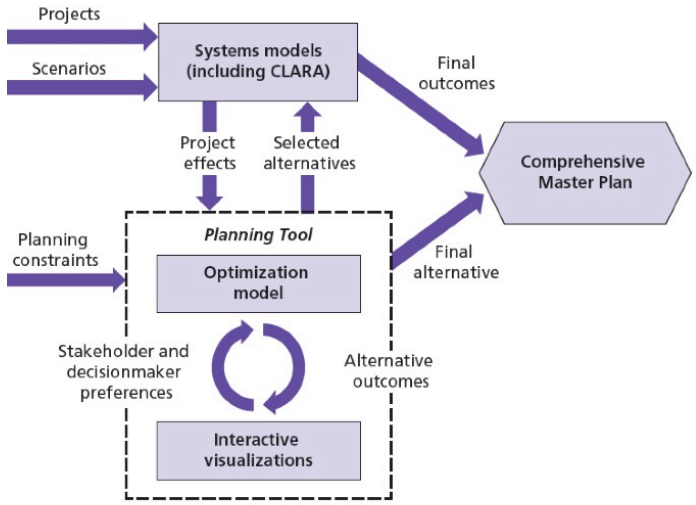
Objective 2: Adaptation, cont.

Supporting adaptation planning, decision making, and adaptive management by:

- Using existing models and data to better understand options for improved water quality BMPs, flood risk, and erosion reduction
- Developing planning tools to identify and evaluate adaptive, integrated water management strategies



Example schema of integrated models and planning tool used in the Robust Decision Making approach

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Objective 3: Regional Coordination

Supporting regional climate assessments and services by:

- Contributing Mid-Atlantic regional information for NCA4

Cover page for Ch. 16 “Northeast” in NCA3

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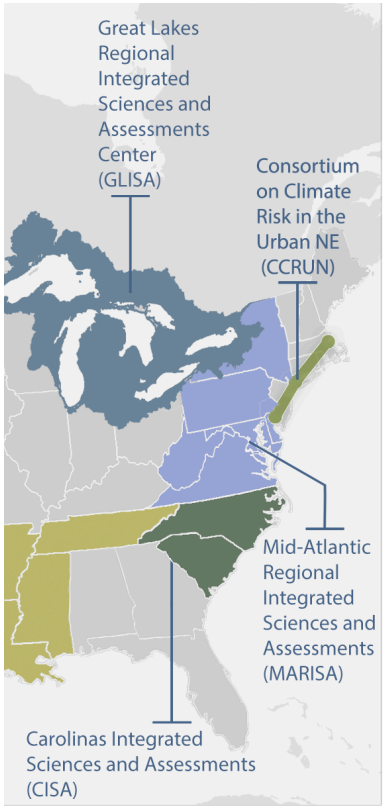
Objective 3: Regional Coordination, cont.

Supporting regional climate assessments and services by:

- Contributing Mid-Atlantic regional information for NCA4
- Collaborating with adjacent RISAs



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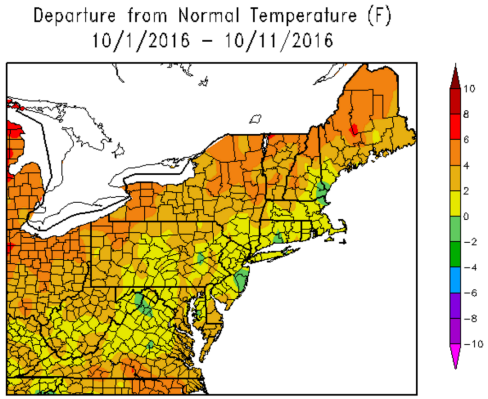
Objective 3: Regional Coordination, cont.

Supporting regional climate assessments and services by:

- Contributing Mid-Atlantic regional information for NCA4
- Collaborating with adjacent RISAs
- Developing research-to-operations decision-support tools



ACIS Applied Climate Information System

Northeast Regional Climate Center

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Objective 4: Training

Training a new generation of leaders in climate change adaptation and risk management at RAND, PSU, and JHU through:

- Summer School on Sustainable Climate Risk Management
- Decision-analytical workshops
- Training sessions for stakeholders and resource managers
- Providing open-source training materials and tools
- Hosting research and professional fellows

Students in the Summer School on Sustainable Climate Risk Management at Penn State Univ.

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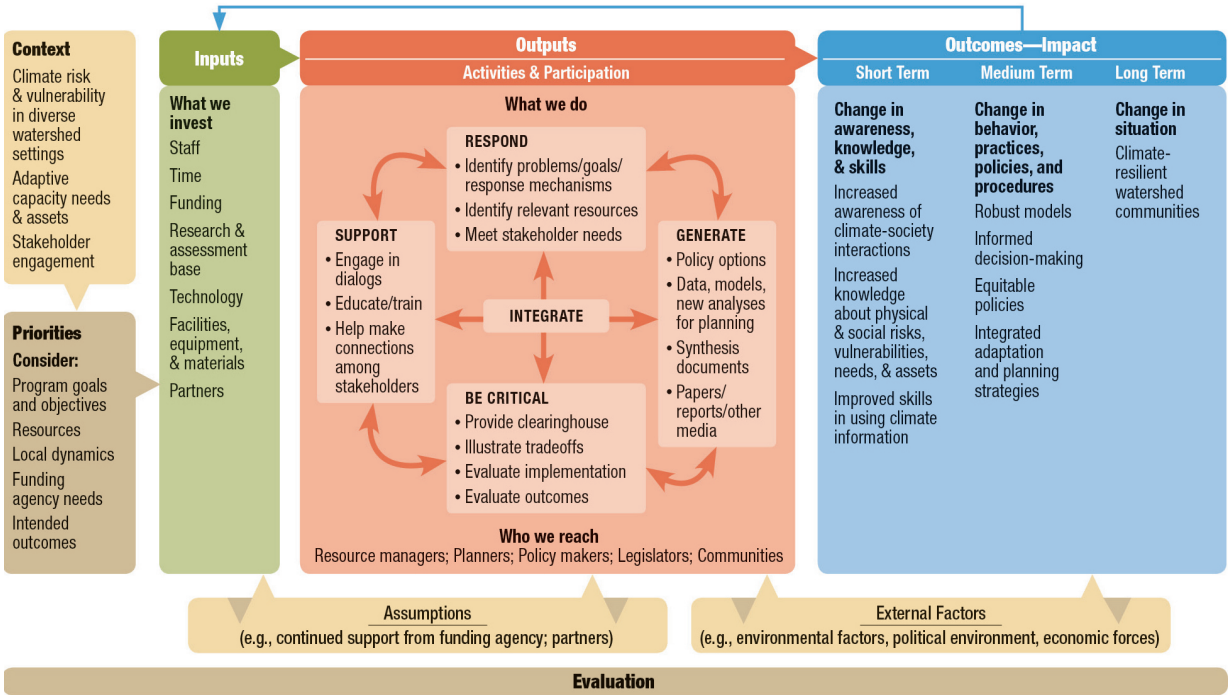
Objective 5: Program Performance

Advancing program performance by:

- Measuring and understanding the mechanisms of MARISA impacts
- Evaluating the impacts of cooperation and coordination of RISA teams in the Mid-Atlantic, Northeast, and Midwest

Action-Logic model of impact for MARISA



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Timeline to Accomplish Objectives

Year 1

- Elicit climate decision-relevant needs and data gaps in the Mid-Atlantic
- Build relationships with regional partners and stakeholders
- Update existing and develop new climate data sets to meet regional needs
- Understand existing models and data in use to support decision making
- Establish program evaluation model and conduct initial evaluation
- Contribute to NCA4 Northeast chapter and relevant sectors

Years 2-5

- Refine stakeholder needs and data gaps
- Create and publish user-inspired climate data sets
- Generate decision-support tools and guidance documents
- Develop climate data visualization and analysis tools
- Evaluate MARISA and combined-RISA impacts

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Contact Information

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