- Mary Glackin, AMS President Elect and Member, Science to Climate Action Network

- With credit to Dr. Richard Moss

- 6 June 2019

Evaluating Knowledge for Applications: A Framework for Sustained Assessment

Application of Climate Science

Mitigation Efforts

- Mature area
- Evaluation will become increasingly important

Adaptation Efforts

- Large growth area
- Communities, businesses, regions, nations are all actors
- Must recognize the limitations of science
- Propose: Pathways for decision making

Business Consumption

Some key factors:

- Client Interest – Do they perceive a problem? Or, are they required to take it into account (e.g., Australian Gov't policy)

- Confidence in services – How do I know this is as good as you say?

- Favorable Cost/Loss Equation – The cost of (in)action is favorable to doing nothing

- Must be in the context of other factors

"Sustained Assessment"

"… an inclusive, broad-based, and sustained process for assessing and communicating scientific knowledge of the vulnerabilities, impacts, risks, and opportunities associated with a changing global climate …"

Motivating insights:

- Usability depends on **sustained communication** among users and experts
- Desire to improve efficiency, provide additional products

Four "critical elements":

- Enduring partnerships
- Scientific foundations
- Process infrastructure
- Priorities and broad resource base

Status:

- NCADAC recommended in 2013
- Incorporated into subsequent federal research strategies
- Federal advisory committee (2016-17)
  - "Gaps analysis" and special report
- Much was left unspecified

Advisory Committee Report Published

Published in AMS Journals and Eos
Structure/topics:
- Practitioner perspectives
- National climate info system
  - Potential role of assessment
- Recommendations
  1. Establish a civil-society component of assessment process
  2. Assess applications
  3. Advance methods
     - User-driven climate data evaluation
     - Benefit-cost analysis
     - Artificial intelligence
     - Citizen science
     - Indicators
     - Geospatial analysis

EARLY ONLINE RELEASE
This preliminary version has been accepted for publication in the *Bulletin of the American Meteorological Society*. The final copyedited article will replace the Early Online Release when published.

FORUM

A FRAMEWORK FOR SUSTAINED CLIMATE ASSESSMENT IN THE UNITED STATES

R. H. Moss, S. Avery, K. Baja, M. Burkett, A. M. Chischilly, J. Dell, P. A. Fleming, K. Geil, K. Jacobs, A. Jones, K. Knowlton, J. Koh, M. C. Lemos, J. Melillo, R. Pandya, T. C. Richmond, L. Scarlett, J. Snyder, M. Stults, A. Waple, J. Whitehead, D. Zarrilli, J. Fox, A. Ganguly, L. Joppa, S. Julius, P. Kirshen, R. Kreutter, A. McGovern, R. Meyer, J. Neumann, W. Solecki, J. Smith, P. Tissot, G. Yohe, and R. Zimmerman

This significantly condensed version of the full report on implementation of a sustained National Climate Assessment in the United States is published here for the benefit of the wider AMS membership. Readers interested in full details are encouraged to seek the *full report in Weather, Climate, and Society*.

Managing Climate Risk: Situation "on the Ground"

Perspectives of cities, states, tribes, NGOs, and businesses

Findings:

- Some institutions and jurisdictions are adapting and mitigating
- Many more need basic facts and support
- Even where action plans are completed, implementation can stall

Support needed:

- How to use information to guide implementation, e.g., engage, design options, analyze benefits/costs, update codes and policies, monitor results, etc.

- What is "best practice" – what data and information are appropriate?

Practitioner requests:

- Integrate adaptation, mitigation, other goals

- Assess equity implications

- Sustain partnerships

- Provide authoritative guidance and information, e.g., "tested practices", data evaluated for application

- Provide feedback to research community on information needs

Implications for Sustained Assessment?

What?

1. Add a focus on adaptation and mitigation goals (or challenges) faced by communities
2. Assess information to guide implementation
3. Use "communities of practice" for "sustained engagement"

How?

- Establish a network
  - GAO: A "blended approach"
- Elevate role of civil society and practitioners

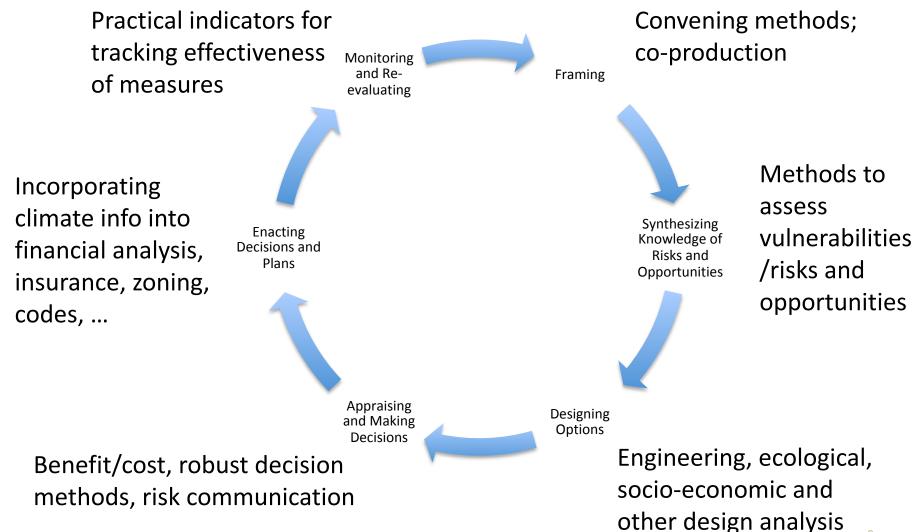# 1. Community Challenges: Example Topics for Assessment

Impact-driven goals
- Manage catastrophic wildfire risk
- Reduce inland flooding
- Manage coastal risk
- Safeguard public health in extreme heat

Traditional goals affected by climate
- Promote economic vitality
- Modernize infrastructure
- Site public or private facilities
- Sustain safe water supply
- Conserve ecosystems

2. Assess Science for Implementation

Practical indicators for tracking effectiveness of measures

Convening methods; co-production

Monitoring and Re-evaluating

Framing

Incorporating climate info into financial analysis, insurance, zoning, codes, …

Enacting Decisions and Plans

Synthesizing Knowledge of Risks and Opportunities

Methods to assess vulnerabilities /risks and opportunities

Appraising and Making Decisions

Designing Options

Benefit/cost, robust decision methods, risk communication

Engineering, ecological, socio-economic and other design analysis

3. Community of Practice: Approach to "Enduring Partnerships"

Composed of user communities, professionals, scientists, intermediaries needed to implement solutions to a specific problem

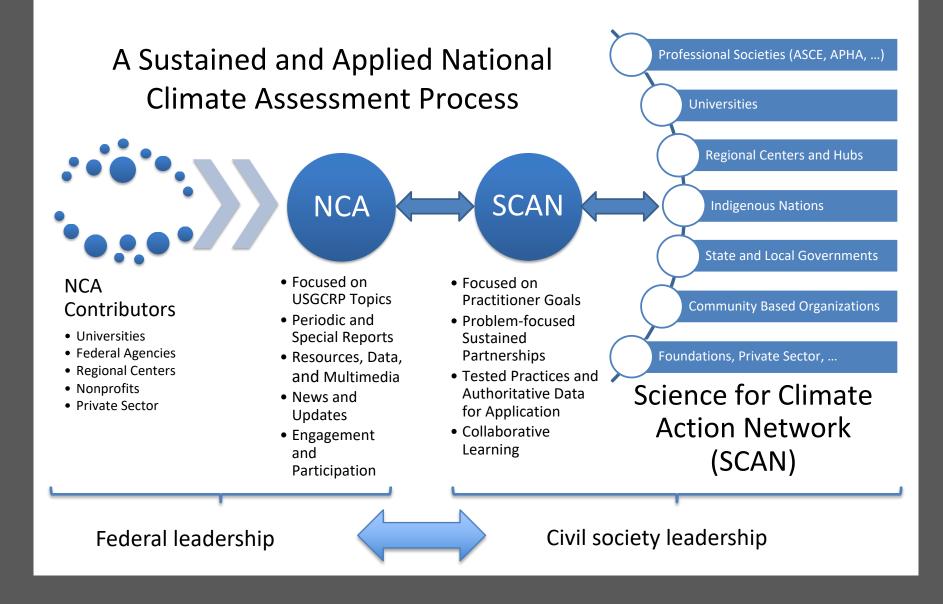Long-term interactions to build confidence, trust, working relationships

Compare challenges and methods used in different states, cities, communities with the following goals:

- Identify shared information needs
- Assess scientific robustness and usability of different ways to provide needed information
- Establish and support application of methods tested for appropriateness in different settings

Community of Practice (example)

Objective/locations	Shared information needs	Topics for technical assessment
Plan Climate-Resilient Stormwater Infrastructure + Connellsville, PA + De Soto, MO + Northern VA + Ellicott City, MD + Chicago, IL + … Notes: 1) Source information from case studies (TEX, CAKE, COMPASS, and many others…), firms, etc. 2) More thorough case study data collection	1. Project future vulnerability to flooding under climate and growth scenarios	• Data quality • Methods to assess social vulnerability • Projections • Risk assessment and communication
	2. Evaluate benefits of different stormwater infrastructure management options	• Appraise benefit-cost for options • GIS-based modeling methods
	3. Design and implement infrastructure projects	• Design processes for stormwater infrastructure components • Implementation tools: updating codes/standards • …

Problem-specific "community of practice" sustains interactions, identifies shared information needs, and evaluates approaches to identify "practice tested applications"

A Sustained and Applied National Climate Assessment Process

NCA Contributors
- Universities
- Federal Agencies
- Regional Centers
- Nonprofits
- Private Sector

NCA
- Focused on USGCRP Topics
- Periodic and Special Reports
- Resources, Data, and Multimedia
- News and Updates
- Engagement and Participation

SCAN
- Focused on Practitioner Goals
- Problem-focused Sustained Partnerships
- Tested Practices and Authoritative Data for Application
- Collaborative Learning

Science for Climate Action Network (SCAN)

Professional Societies (ASCE, APHA, …)
Universities
Regional Centers and Hubs
Indigenous Nations
State and Local Governments
Community Based Organizations
Foundations, Private Sector, …

Federal leadership

Civil society leadership

Discussion

- Thank you!