

USABLE SCIENCE:

A CSTPR-CSPO BRIEFING WORKSHOP ON SCIENCE FOR DECISION MAKING



CREATING USABLE SCIENCE IN AN UNCERTAIN WORLD

Carnegie Endowment for International Peace

April 12, 2010

Colorado
University of Colorado at Boulder



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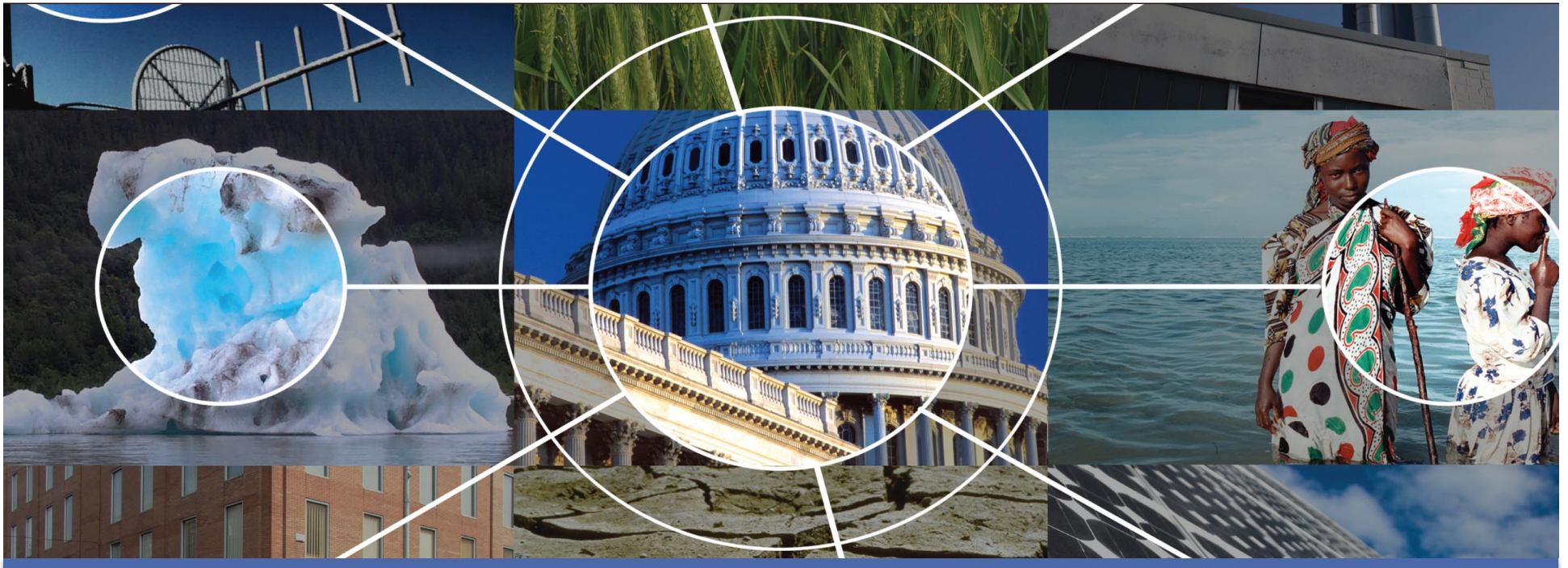
AGENDA

- **10:00 AM Choate Room Welcome and Introduction**
 - William Hooke, American Meteorological Society
 - Daniel Sarewitz, Consortium for Science, Policy & Outcomes, Arizona State University
- **10:15 AM Choate Room Presentations**
 - Creating Usable Science in an Uncertain World
 - Lisa Dilling, Center for Science and Technology Policy Research, University of Colorado
 - Federal Institutions for Usable Science and Technology
 - Nathaniel Logar, Belfer Center for Science and International Affairs, Harvard University
 - Usable Science in Practice? A Contrast of Earthquake and Hurricane Research
 - Genevieve Maricle, U.S. Agency for International Development
 - Delivering Usable Science: The Case of Climate Services
 - Elizabeth McNie, Political Science & Earth and Atmospheric Sciences, Purdue University
- **11:15 AM Choate Room Panel Discussion**
 - Moderator, William Hooke, American Meteorological Society
- **12:15 PM Root Room Luncheon**
- **Science Policy Making as a Creative Act**
 - John H. Marburger, III, Stony Brook University
- **2:00 PM Adjourn**



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The science policy context

- Programs are increasingly charged with creating science to support decision making
- In this context, how do we know what science is “the right science” to do to address societal problems, and how do we make that science “usable”?



What is usable science?

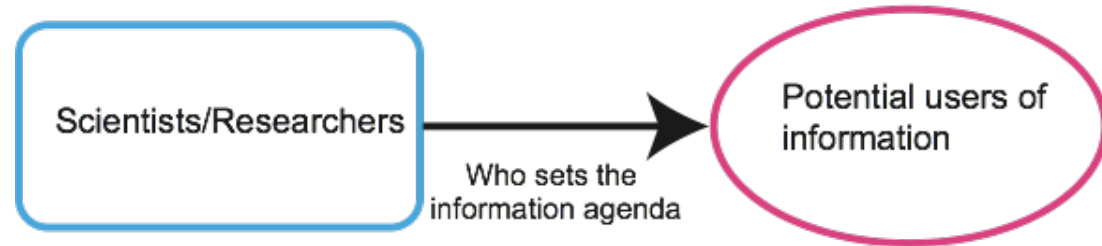
- “Science that meets the changing needs of decision makers”
 - Addressing societal goals through research often requires advances in fundamental knowledge-- they can go hand in hand
- ⇒ A complement to basic and applied science



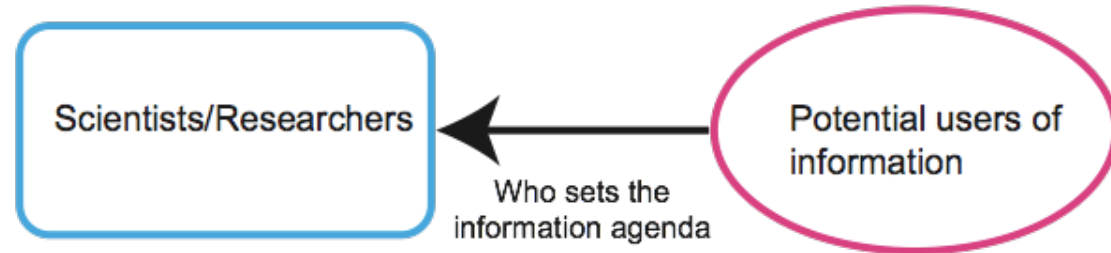
Characteristics of usable science

- **Context matters**
 - Relevant to decision, realistic options available
- **Receptive institutional and organizational setting**
- **Compatible cultural context**
- **Content, delivery and timing must meet needs of users**

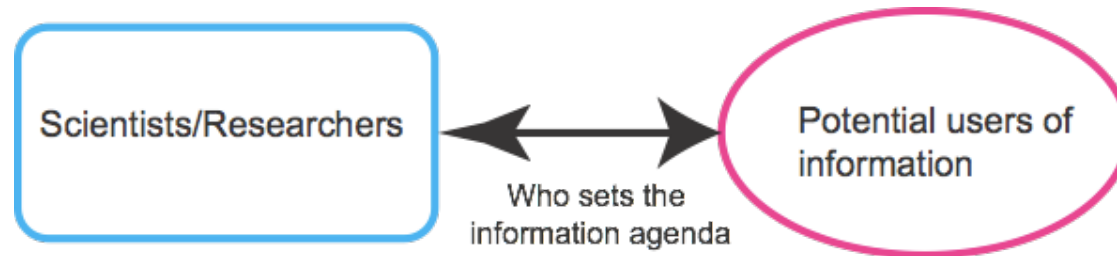
Science "Push"

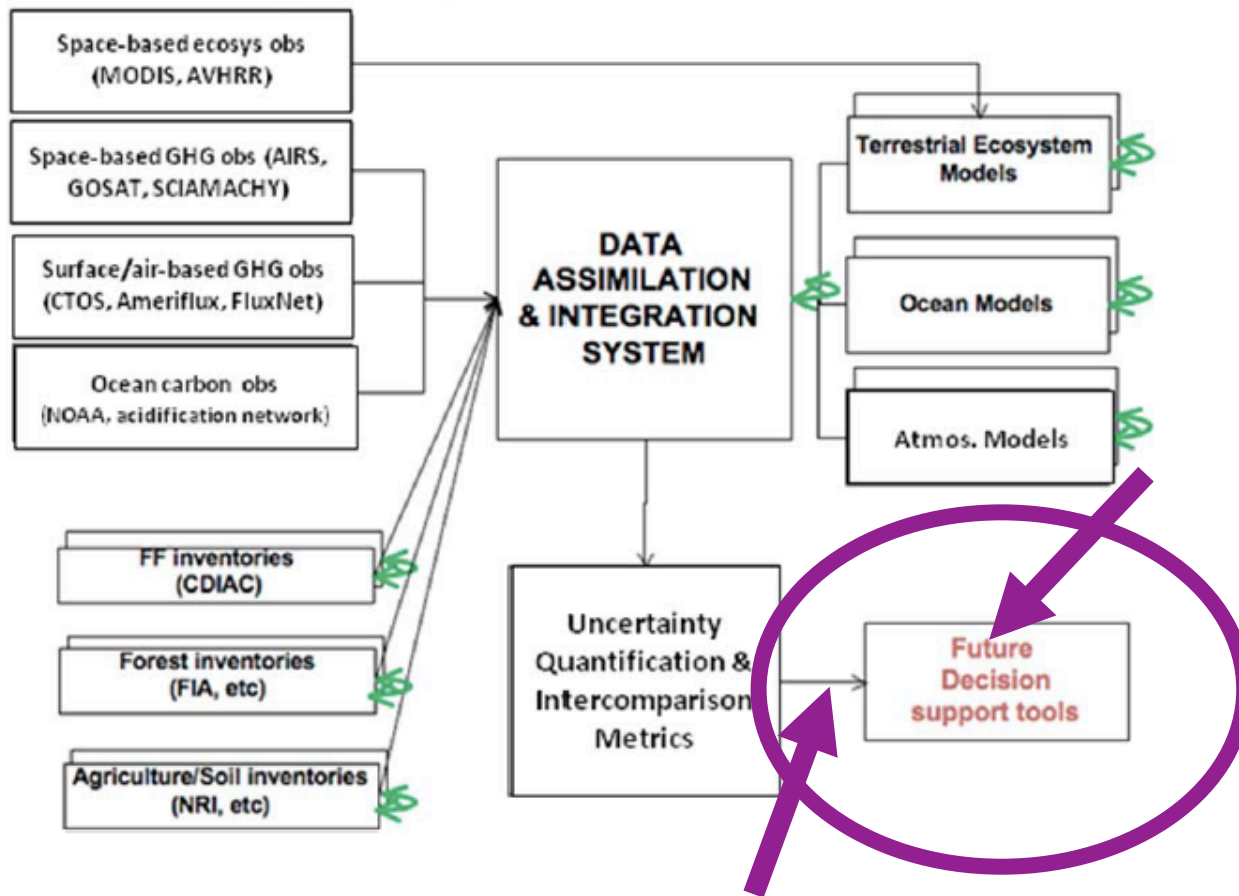


Demand "Pull"



Iterativity and coproduction





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*Federal Institutions for Usable Science and
Technology*

by Nat Logar, Harvard University

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NIST: Heilmeier Questions

- What is the problem; why is it hard?
- How is it solved today and by whom?
- What is the new technical idea; why can we succeed now?
- *Why should NIST do this?*
- *What is the impact if successful and who would care?*
- How will you measure progress?

NIST-MSEL Prioritization Process



Overall Score

Impact If MSEL Successful

H

M

L

R	G	G
R	R	R
S	S	S

L

M

H

Probability of MSEL Success



Naval Research Laboratory Agricultural Research Service

- Embedded users/ Military Deputies
- Feedback/ test runs
- Requirements Process/ Planning workshops
- DOD Research categorization
- Consideration of impact, needs, timeline, along with frequent, repeated consultation with stakeholders

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Usable Science in Practice? A Contrast of Earthquake and Hurricane Research

by Genevieve Maricle

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Hurricane Research

Mission:

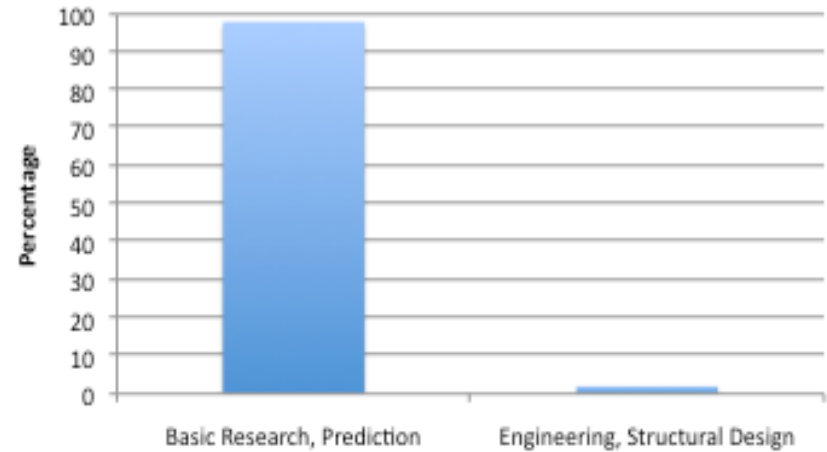
Vulnerability, Increased Resilience, Long-Term Sustainability of (largely) coastal communities

Means:

Watches, Warnings, Short-term predictive capability

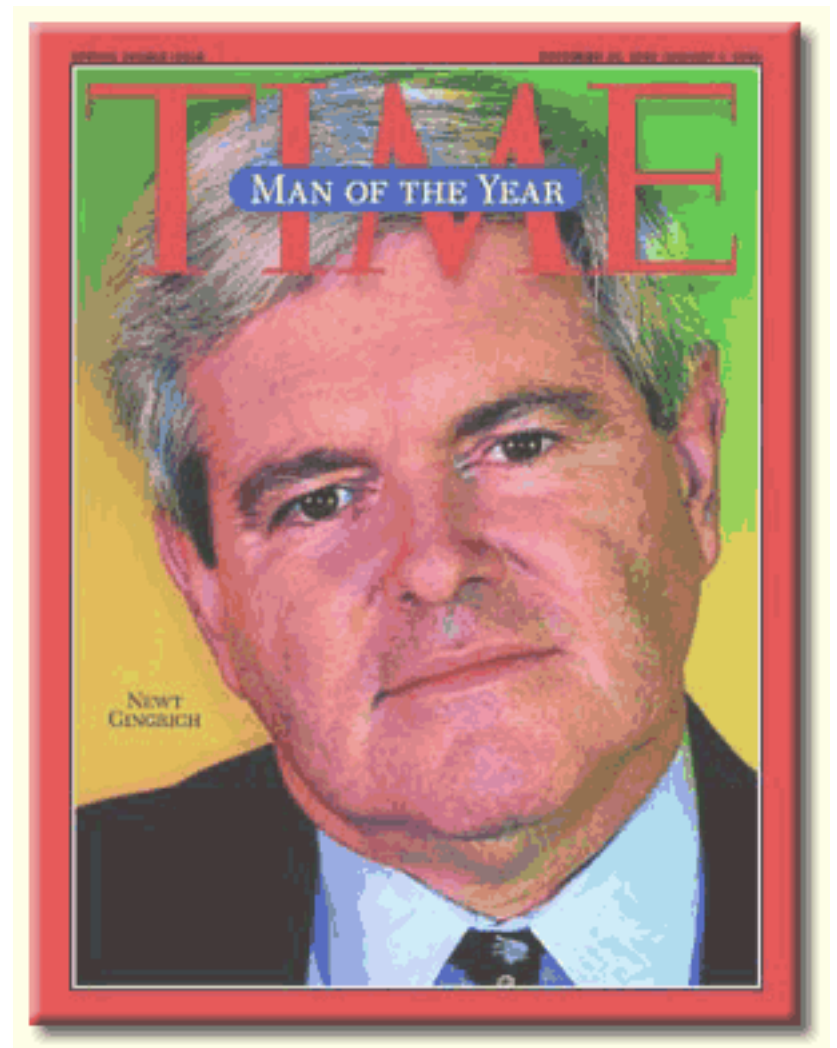
PREDICTION

Figure 4b: Federal Hazards R&D Budget: Prediction v. Engineering



(Source: Meade and Abbott, 2003)

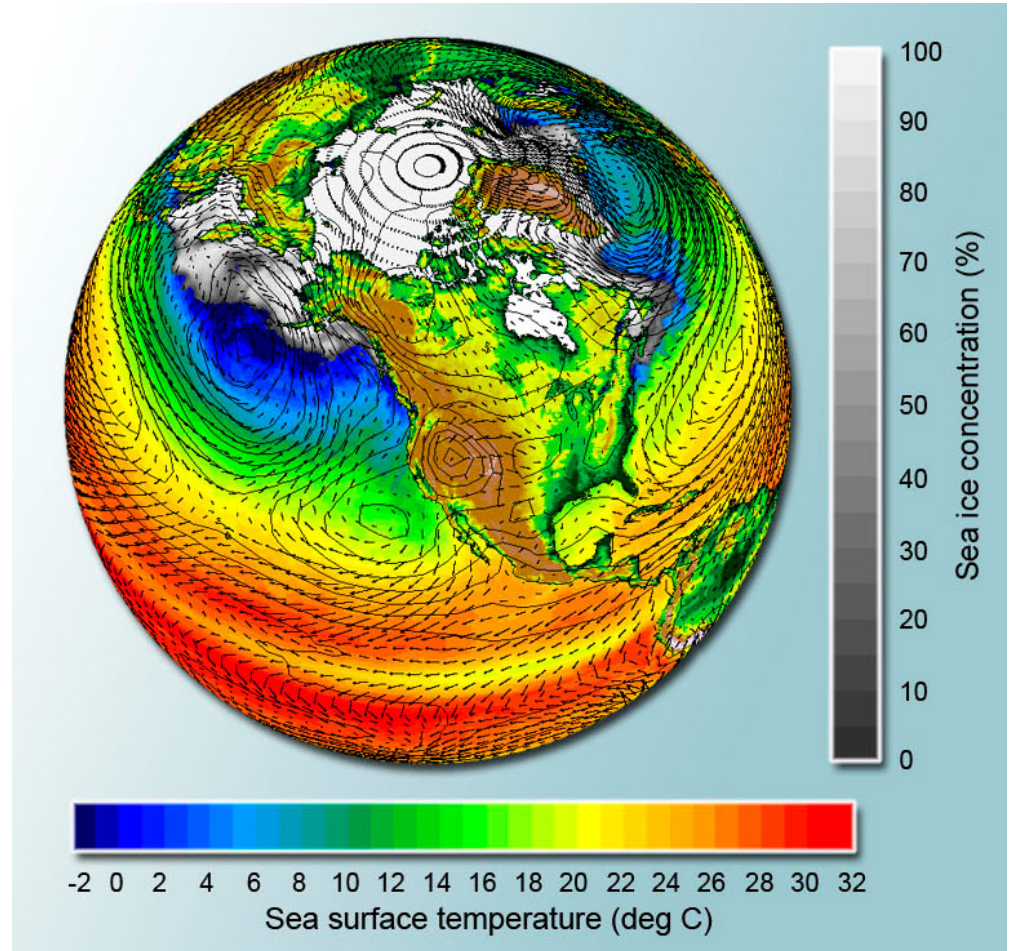
Earthquake Research



Implications

These trends are not limited to hurricane research.

- Climate
- Ecology, Environmental science
- Sustainability Science.



Real opportunity to harness lessons from Earthquake Research.



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Delivering Usable Science: The Case of Climate Services

Elizabeth C. McNie, Purdue University

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Delivering Usable Science

- Usable = salient, credible, legitimate
- Key conditions and attributes
- How? Institutional and organizational design considerations



Key Conditions and Attributes

- Knowledge integration (multiple)
- Strong relationships based on trust and mutual respect
- ‘Whole system’ perspective
- Reflexive learning community
- Patient, flexible, maverick(?)

Institutional & Organizational Design

- **Build robust engagement mechanisms**
 - Early, iterative, two-way communication
 - Stakeholder needs and concerns
 - Informal and formal feedback mechanisms
 - Capacity building
 - Decision support



Institutional & Organizational Design

- Build flat, decentralized organizations
- Provide strong leadership, 'champions'
- Utilize multiple evaluation metrics
- Reward work related to social systems
- Increase time for deadlines, deliverables





RSD Framework: *The Missed Opportunity Matrix*

Demand: Can User Benefit from Research?

Yes

No

Yes

Sophisticated users taking advantage of well-deployed research

Institutional constraints, or other obstacles prevent information use

Supply:
Is Information Being Produced?

No

Opportunity to shape research agenda to meet needs

Non-user