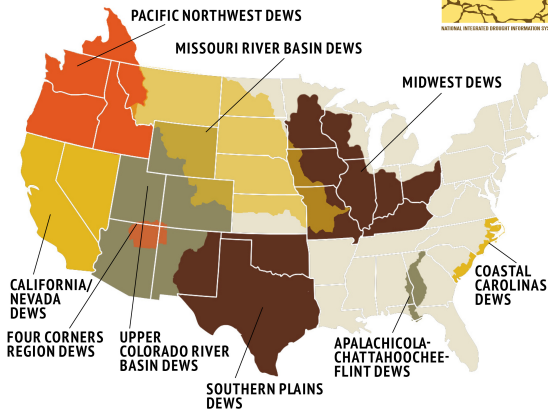
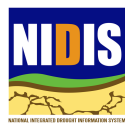
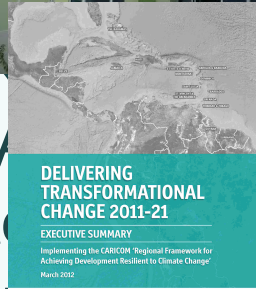


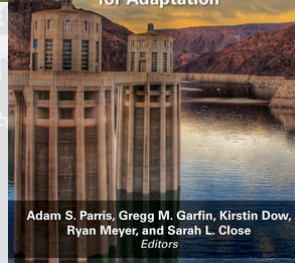
NIDIS Drought Early Warning Systems



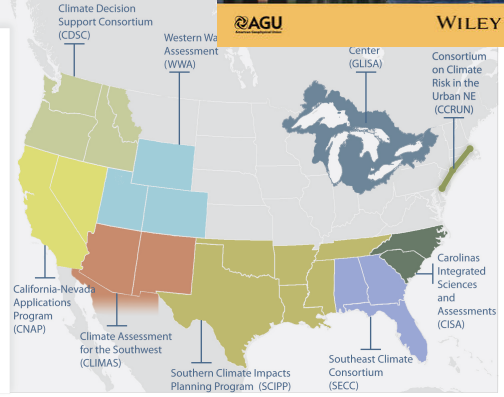
CARIBBEAN COMMUNITY CLIMATE CHANGE CENTRE
EMPOWERING...
People to act on Climate Change.



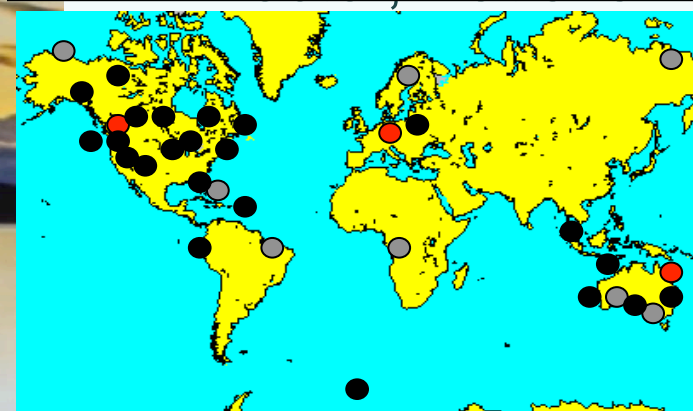
Climate in Context
Science and Society Partnering
for Adaptation



Adam S. Parris, Gregg M. Garfin, Kirstin Dow, Ryan Meyer, and Sarah L. Close
Editors

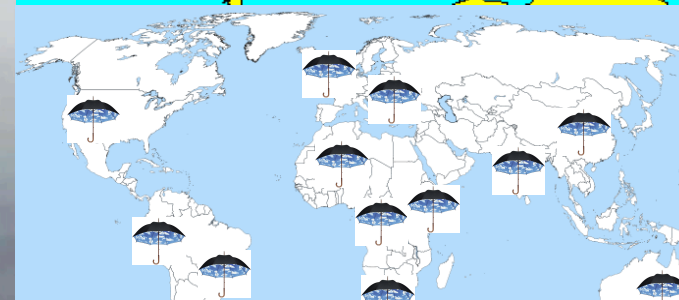


● Successful ● Modeling failure ● Implementation failure



Priority areas

Climate Services Information System



Climate Risk Management - Current Issues and Challenges (Martinez, Pulwarty... et al 2012)



Information Systems in Changing Climate (Pulwarty and Sivakumar, 2014)

Co-production is in the air.....

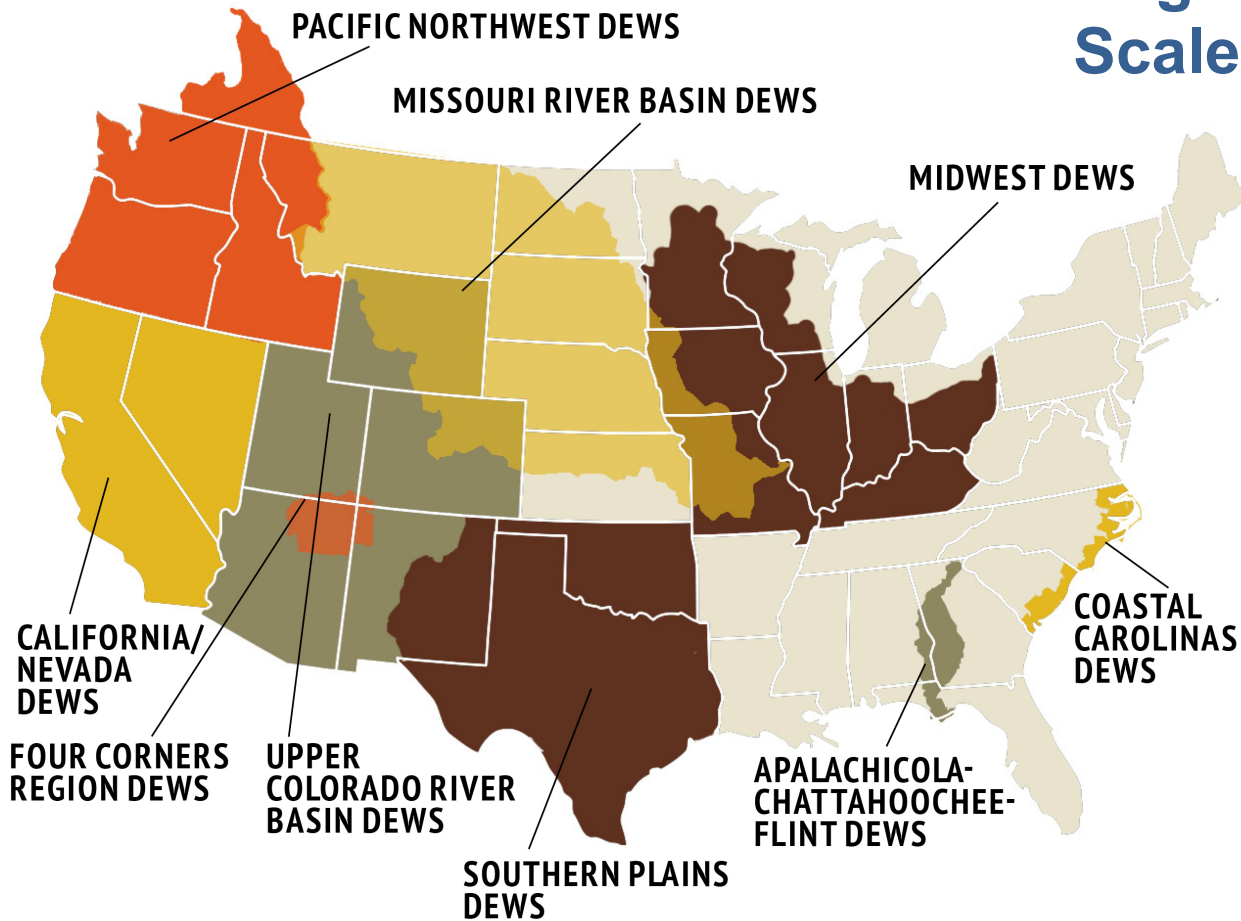
A meme featuring Sheldon Cooper from the TV show 'The Big Bang Theory'. He is shown from the chest up, wearing a blue t-shirt, with a serious and slightly skeptical expression. The background is a blurred indoor setting with a lamp and some colorful objects. The text is overlaid on the image in a bold, white, sans-serif font with a black outline.

LOVE IS IN THE AIR?

**WRONG. NITROGEN, OXYGEN, ARGON AND
CARBON DIOXIDE ARE IN THE AIR.**

NIDIS Drought Early Warning Systems

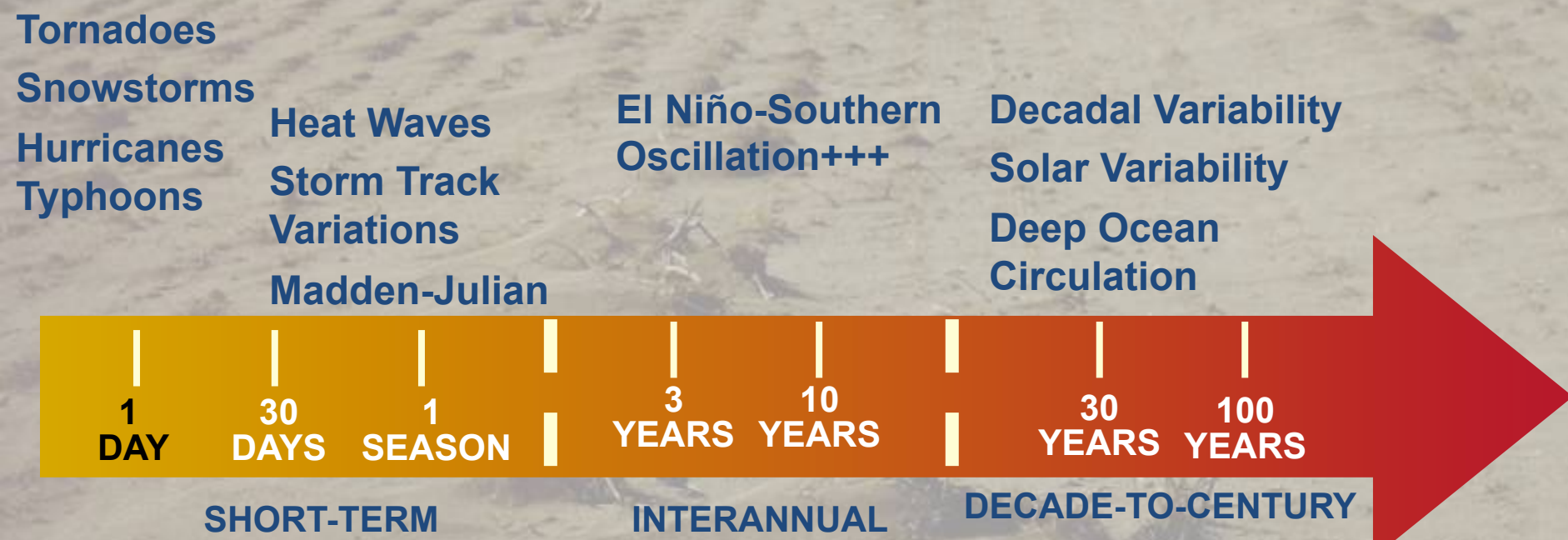
Regional Scale



Governance Attributes: Agility, Alignment, Adaptability

Network coordination, Integrated Information (monitoring, forecasting, risk assessment, narratives), Drought risk management (capacity, culture communication (e.g. outlook fora) and planning)

Weather-Climate-a Continuum and an adaptation deficit.....



Early warning...resource allocation... Infrastructure Design



Governing climate risk assessment and management (public, private, communities)

Ensure political authority and policy coherence

Develop a culture of partnerships (beyond 2-way)

Decentralize
Step by step

Partners do not just share data- they also share risks and responsibilities

Accountability.....Efficiency

Crafting “Services” to inform Adaptation: considerations

The cumulative nature of extremes, trends and risk profiles

- Systems may change faster than models can be recalibrated-Projections may be most unreliable in precisely the situations where they are most desired
- Are we pursuing spurious rigor?
- How often should our assumptions be revised?

Crafting services.....

The cumulative nature of hazards, extremes and disasters-risk profiles

Proactive decision-making: Learning and policy windows

- “Co-production”- a valuable concept but can be an incentive for mis-placed advocacy and co-optation
- “Information use” as symbolic commitment to rational choice
- Strong risk of underestimating the complexity of adaptation

Crafting Services.....


The cumulative nature of hazards, extremes and disasters-risk profiles

Proactive decision-making: Learning and policy windows

Information services to support adaptation in changing environments

- Public entrepreneurship (**Leadership at several levels**): professional risk-taking by individuals usually underestimated in institutional frameworks
- Complexity in Networks with Extensive and Hidden Interdependencies
- Where do science and policy talk to each other- Who makes the decisions?
How is the space of interaction secured?

“The term “climate information system” describes a systematic approach for coordinating the development, archiving, and use of such climate information by decision makers, with defined roles for federal agencies and nonfederal entities such as academic institutions”


 United States Government Accountability Office
 Report to Congressional Requesters

 November 2015

CLIMATE INFORMATION

Rules for gathering, storing communicating, using and evaluating information are essential elements of operating procedures

A climate information system

- coherently organizes different types of climate information
- facilitates technical assistance to help decision makers understand how to integrate climate information into their planning processes.

Mission, culture, and incentive structure



Getting the partners right and getting the “right” partners



“Sometimes I think the collaborative process would work better without you”

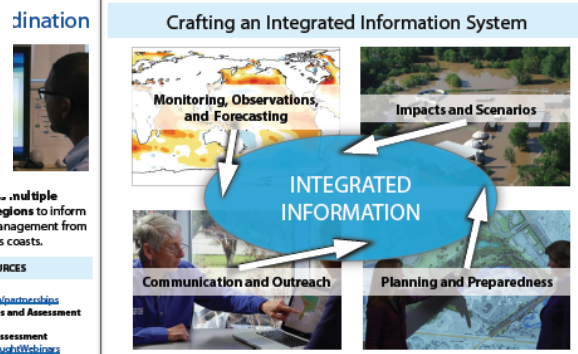
From Risk to Resilience: Research-based Integrated Information Systems



Science for Resilience

Our Office's research programs and expertise help the nation understand, anticipate and respond to climate-related changes in water resources and water-related hazards.

Skill	Better Understanding	Communication Tools
<p>Understanding the system to drought and floods.</p> <p>Links and Resources:</p> <ul style="list-style-type: none"> Report: Origins of the 2012 Great Plains Drought: http://bit.ly/2012Drought SARF Case Studies: Water Resource Strategies and Information Needs in Response to Extreme Weather and Climate Events: http://ExtremeEventsCaseStudies Pacific Northwest RISAs: pacificnw.org/projects 	<p>NOAA aims to improve understanding of the role precipitation events and land surface conditions have on amplifying or reducing drought and flood impacts.</p> <p>Links and Resources:</p> <ul style="list-style-type: none"> Report: Origins of the 2012 Great Plains Drought: http://bit.ly/2012Drought SARF Case Studies: Water Resource Strategies and Information Needs in Response to Extreme Weather and Climate Events: http://ExtremeEventsCaseStudies Pacific Northwest RISAs: pacificnw.org/projects 	<p>NOAA is developing timely, accessible communication tools to inform preparedness and adaptation</p> <p>Links and Resources:</p> <ul style="list-style-type: none"> U.S. Drought Monitor: droughtmonitor.noaa.gov Managing Drought Risk on the Ranch: http://bit.ly/RanchDrought Colorado Floods: Western Water Assessment: http://ColoradoFloods Climate and Water Resources Data in the Klamath Basin: http://KlamathClimate SECC: Climate of the Southeast United States: http://SECC2014Report



Overcoming impediments

- Do this for a long time

From our research and multiple partners, sectors, and regions to inform drought and flood risk management from watersheds to the nation's coasts.

Links and Resources:

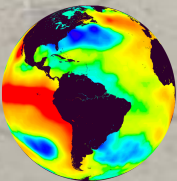
- Floodplains by Design: [www.floodplainsbydesign.org/partnerships](#)
- Regional Integrated Sciences and Assessment (RISA): [http://bit.ly/RISAs](#)
- Weekly Colorado Drought Assessment Webinars: [http://bit.ly/ColoradoDroughtWebinars](#)
- Drought Impacts Reporter: [droughtreporter.usd.edu/](#)
- NIDIS portal: [www.drought.gov](#)

To make the best decisions, stakeholders need access to more than just one piece of the puzzle. Integrated Information Systems are designed to evolve over time, offer opportunities for diverse participation, and integrate what we learn through practice.

The NIDIS touch

- **Developing an Information Pedigree-Relevant, authoritative, accessible, compatible/usable**
 - No substitute for monitoring and understanding local climates
 - Place multiple indicators within a **consistent triggering framework- (e.g. climate and vegetation mapping)** before critical thresholds
- **Overcoming impediments to information flow**
 - Existing barriers to cross-agency collaboration made explicit
 - Innovations and new information to be introduced and tested, and
 - The benefits of participation in design, implementation and maintenance to be clarified

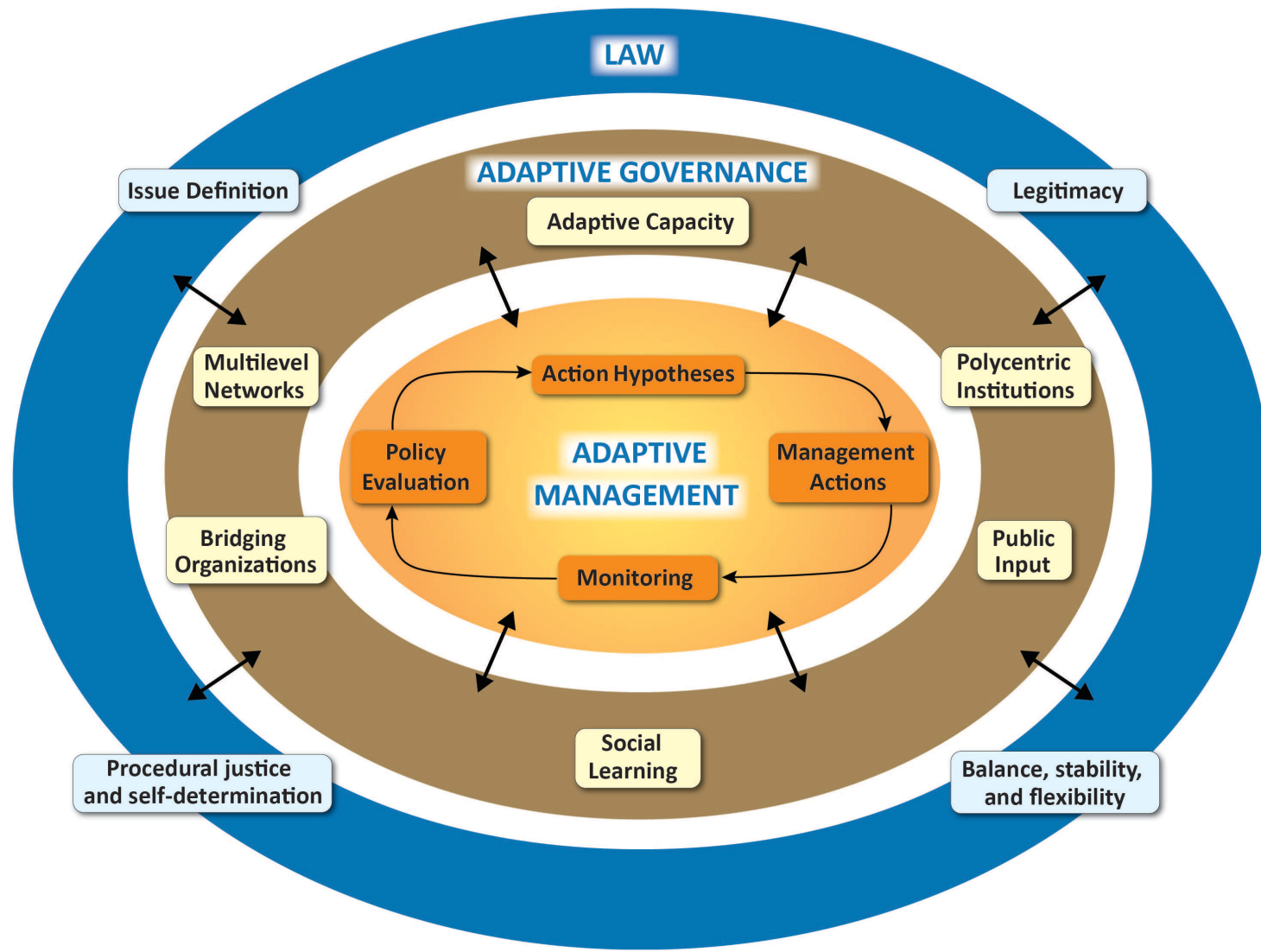
Mature prototypes become the regional early warning system and are more likely to be viewed as transferable



Where Things Go Wrong

Allen, CR and LH Gunderson. 2011. Pathology and failure in the design and implementation of adaptive management.

- ◆ Reasons why this process fails in the long term:
 - Failure to use results from modeling process (passive involvement in process)
 - Need for champions of the process
 - Endless modeling based on the presumption we can model our way out of fundamental uncertainties as a substitute for large-scale field experiments.
 - Endless workshops and technical meetings.
 - Experiments too risky (battle of the T&E's) or too expensive to implement.
 - Strong opposition to experimental policies by stakeholders protecting self-interests.
 - Value conflicts associated with resource trade-offs.
 - Failure to identify objectives.



Climate Information products

Historical Data	Climatologies Special Publication	Indices Analyses for CC Metadata	Status reports Reviews	Near real time data/ analysis	Web accessible statistics, visualization
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Structural	Management	Operations	Public information	Planning
Design	Site planning	Siting designs	National drought planning	Monthly/seasonal
Safety factors	Community health and well being	Hazards and health	Resource allocation	Planning
Energy	Climate-related standards	Streamflow	Agriculture	International Markets
	Zillman, Pulwarty others		Hazards and health	Demand