



# The future looks hotter and drier. Now what?

Partnering challenges and strategies to move climate  
science towards application in Water Resource  
Planning



Lake Mead, NV

Keely Brooks  
Southern Nevada Water  
Authority  
May 24, 2012



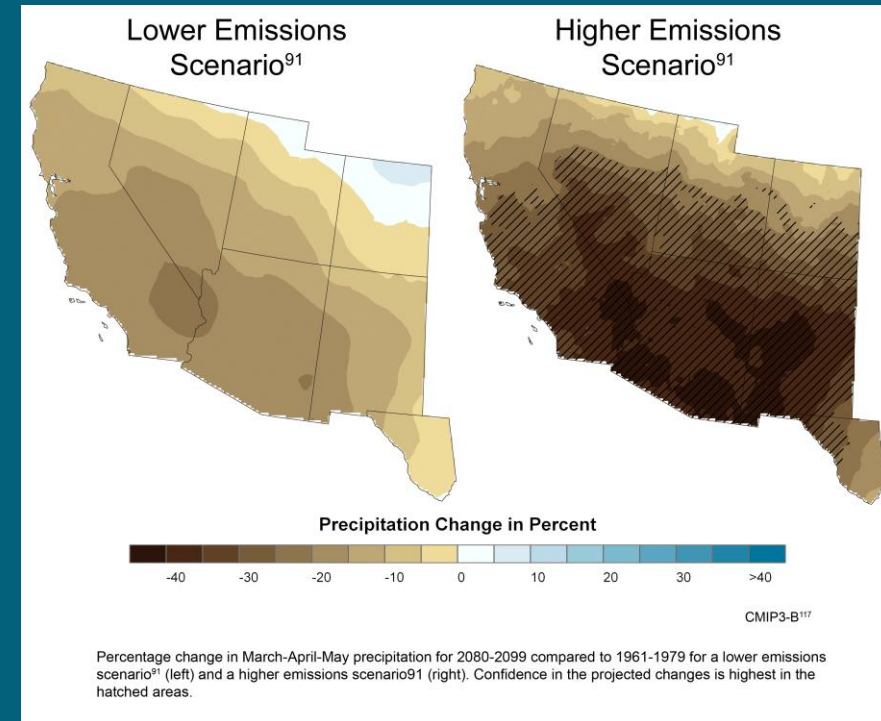
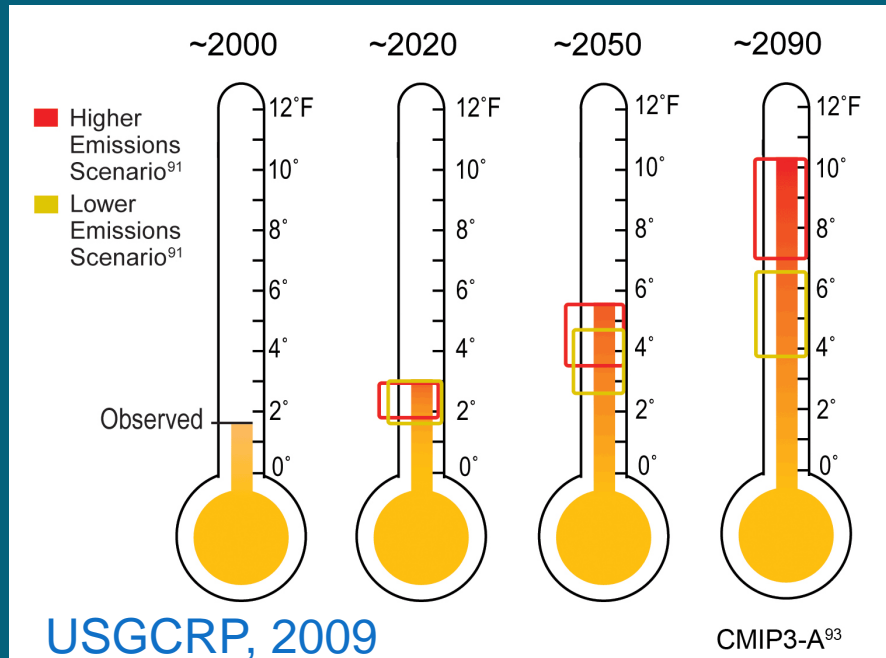
# Acknowledgements

- All Water Utility Climate Alliance Member Agencies
  - David Behar, San Francisco Public Utilities
  - Paul Fleming, Seattle Public Water
  - Lurna Kaatz, Denver Water
- SDWG Co-Chairs Lawrence Buja, NCAR; Bill Gutowski
- Tom Peichota, UNLV; Derek Kauneckis, UNR



# Vision 2050: Hot and Dry

- Projected rise in temperature for the Southwest
- Projected precipitation changes (%) by 2099





# Vision 2050: Expensive!

## 2011-2031: No Adaptation

- Drinking Water Infrastructure Investment  
**\$335 Billion<sup>1</sup>**
- Clean Water Infrastructure Investment  
**\$298 Billion<sup>2</sup>**

## 2010-2050: With Adaptation

- Drinking Water and Clean Water Sector  
**\$448 – 944 Billion<sup>3</sup>**

Needed from Rate Payers  
through 2050:

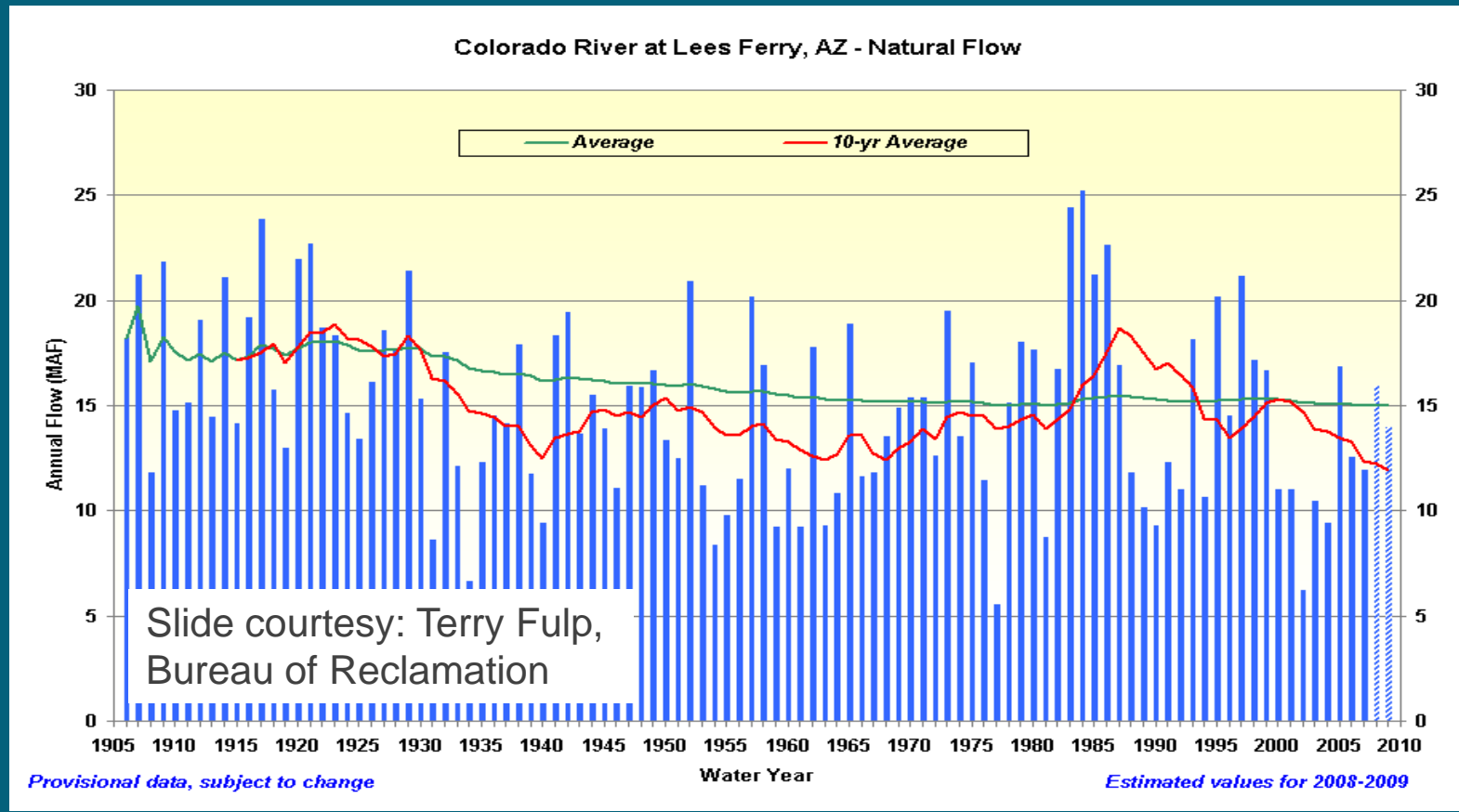
**\$1.7 - 2.2 Trillion**

<sup>1</sup> “2009 Drinking Water Infrastructure Needs Survey and Assessment: Third Report to Congress.” USEPA Office of Water, 2005. <sup>2</sup> “Clean Watersheds Needs Survey 2008: Report to Congress.” USEPA, May 2010. <sup>3</sup> “Confronting Climate Change: An Early Analysis of Water and Wastewater Adaptation Costs,” Association of Metropolitan Water Agencies, National Association of Clean Water Agencies, 2009. Slide courtesy of David Behar, SFPUC



# Traditional Water Supply Planning

- Based on observed weather and hydrology
- Assumes historic variability, history repeats, stationary climate

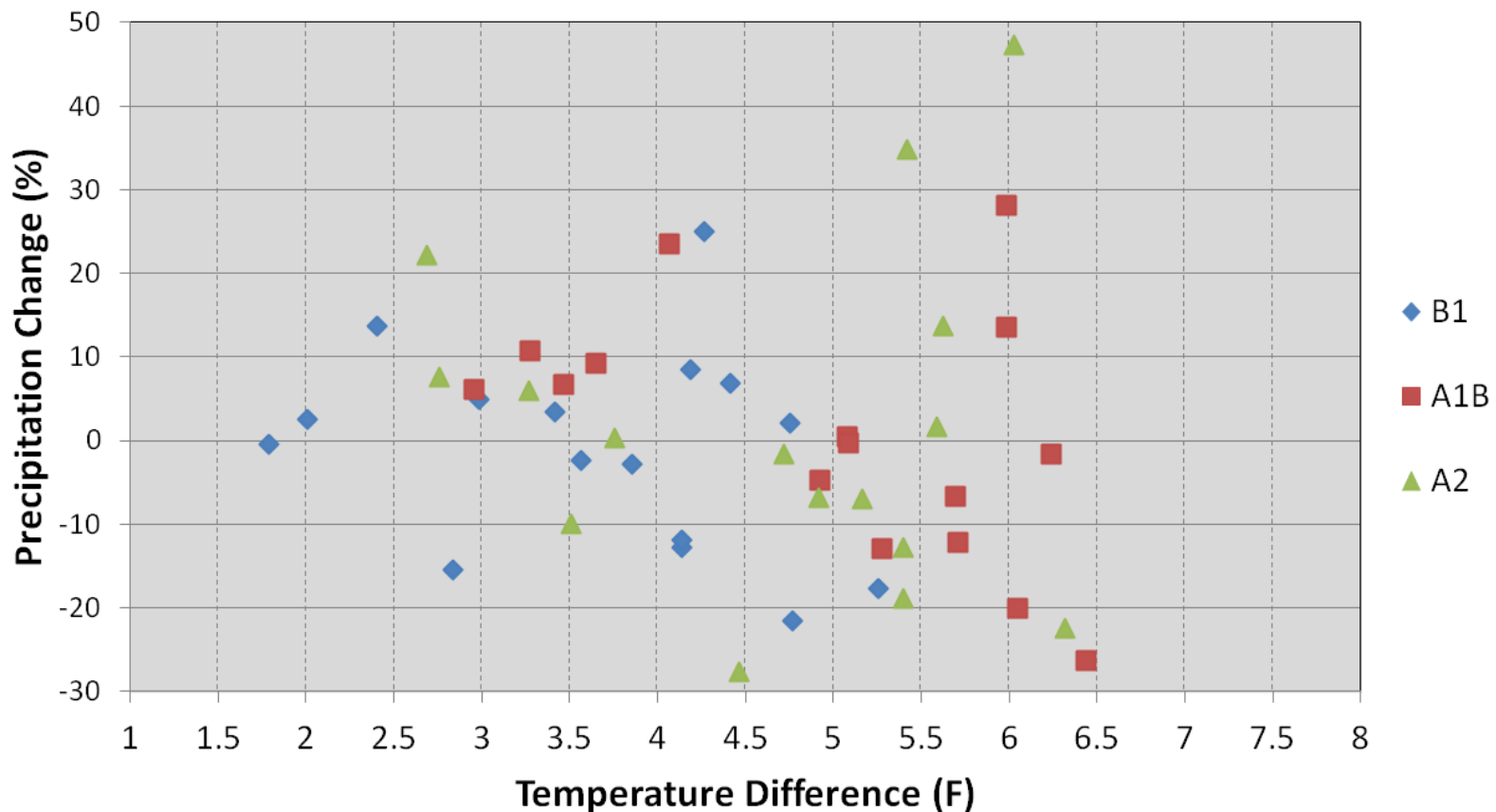




# Climate Change Planning

- Which Scenario? Which Model? Ensemble? Remove “bad models”?

**Las Vegas 2050 - Change in Annual Values**  
2040-2069 minus 1961-1990





# Partnership

Core objective....

“Actionable Science”

Data, Analysis, and forecasts that are sufficiently predictive, accepted and understandable to support decision-making, including capital investment decision-making.

a working definition....

County Water Authority

Water

43 million drinking water customers



SOUTHERN NEVADA WATER AUTHORITY®



Water Utility Climate Alliance

ABOUT US

ACTIONS

PRESS ROOM

CONTACT

MEMBER FORUM

PUMA

Publications

Federal Activities

2012 Work Plan

## Water Utility Climate Alliance 2012 Work Plan

2. Piloting Utility Modeling Applications (PUMA) White Paper

3. Participate actively in first year of the SDWG of CESM

4. Decision Support and Planning Methods White Paper

7. Develop a planning methods and decision making case study white paper to deliver practical information to water utility managers and planners about methods that incorporate climate change uncertainty into water planning

8. Discern federal agencies adaptation activities

9. Actively engage in the National Climate Assessment (NCA) process





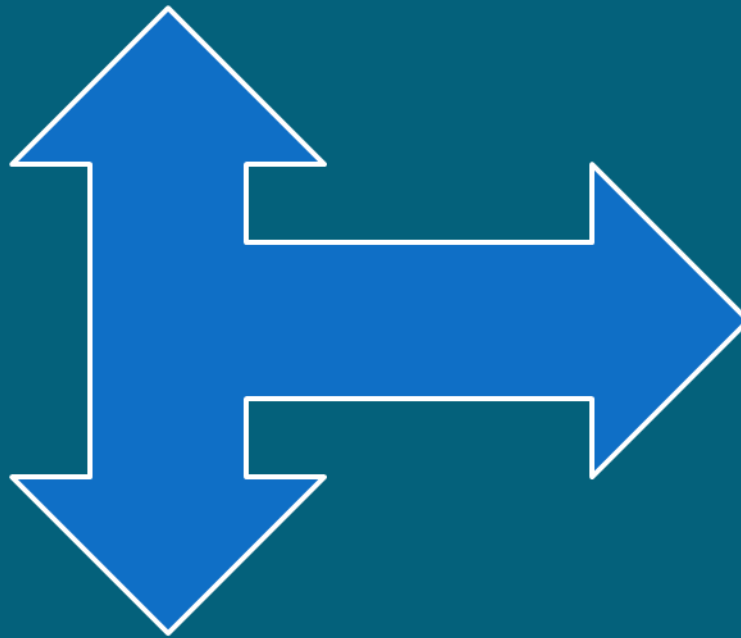
# Partnerships

- Utilities

- SNWA



- WUCA



- Academia

- RISAs

- CESM – NCAR

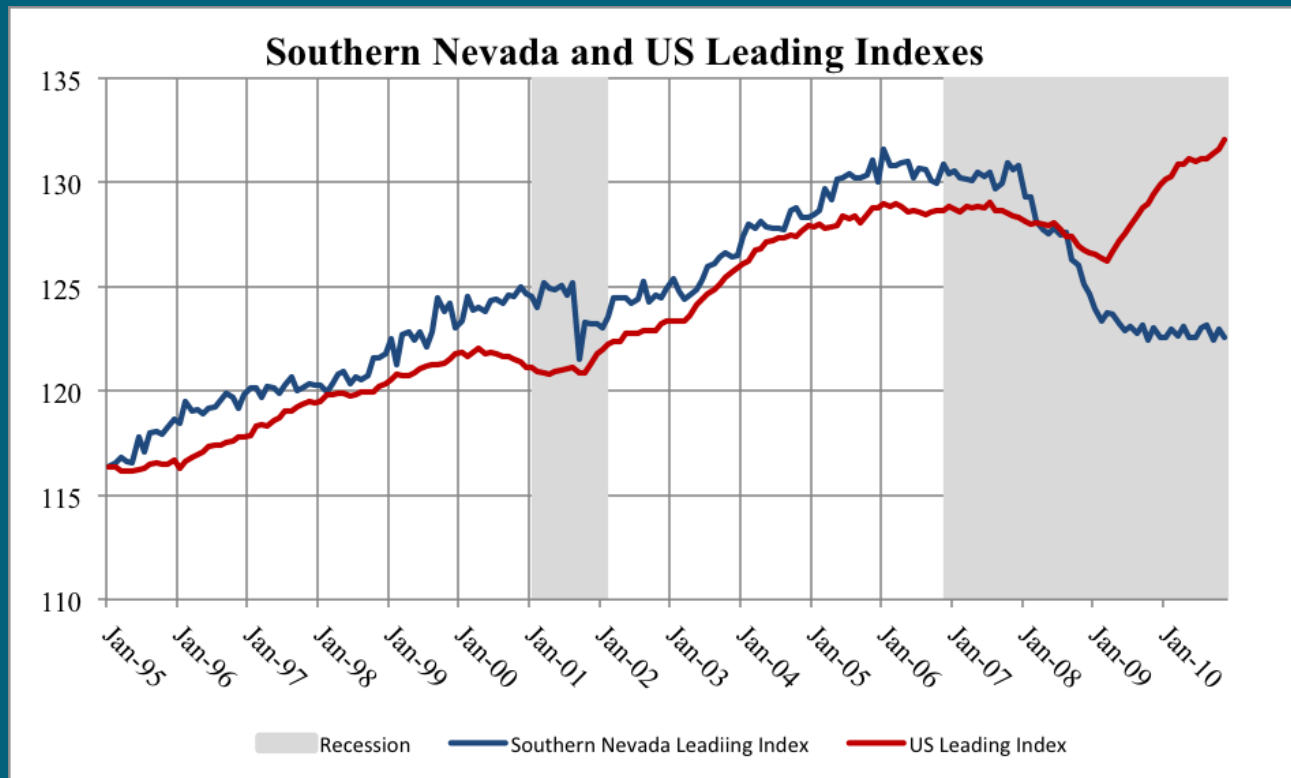


- NSHE



# Challenges

- Economic- \$\$ and Resources



- Multiple, sometimes competing end goals



# Challenges

- It's all Greek to me!
- Different Timeframes





# Strategies

- Get educated
- Lose the jargon
- Communicate often and stay engaged

## Terms that have different meanings for scientists and the public

Scientific term	Public meaning	Better choice
enhance	improve	intensify, increase
aerosol	spray can	tiny atmospheric particle
positive trend	good trend	upward trend
positive feedback	good response, praise	vicious cycle, self-reinforcing cycle
theory	hunch, speculation	scientific understanding
uncertainty	ignorance	range
error	mistake, wrong, incorrect	difference from exact true number
bias	distortion, political motive	offset from an observation
sign	indication, astrological sign	plus or minus sign
values	ethics, monetary value	numbers, quantity
manipulation	illicit tampering	scientific data processing
scheme	devious plot	systematic plan
anomaly	abnormal occurrence	change from long-term average

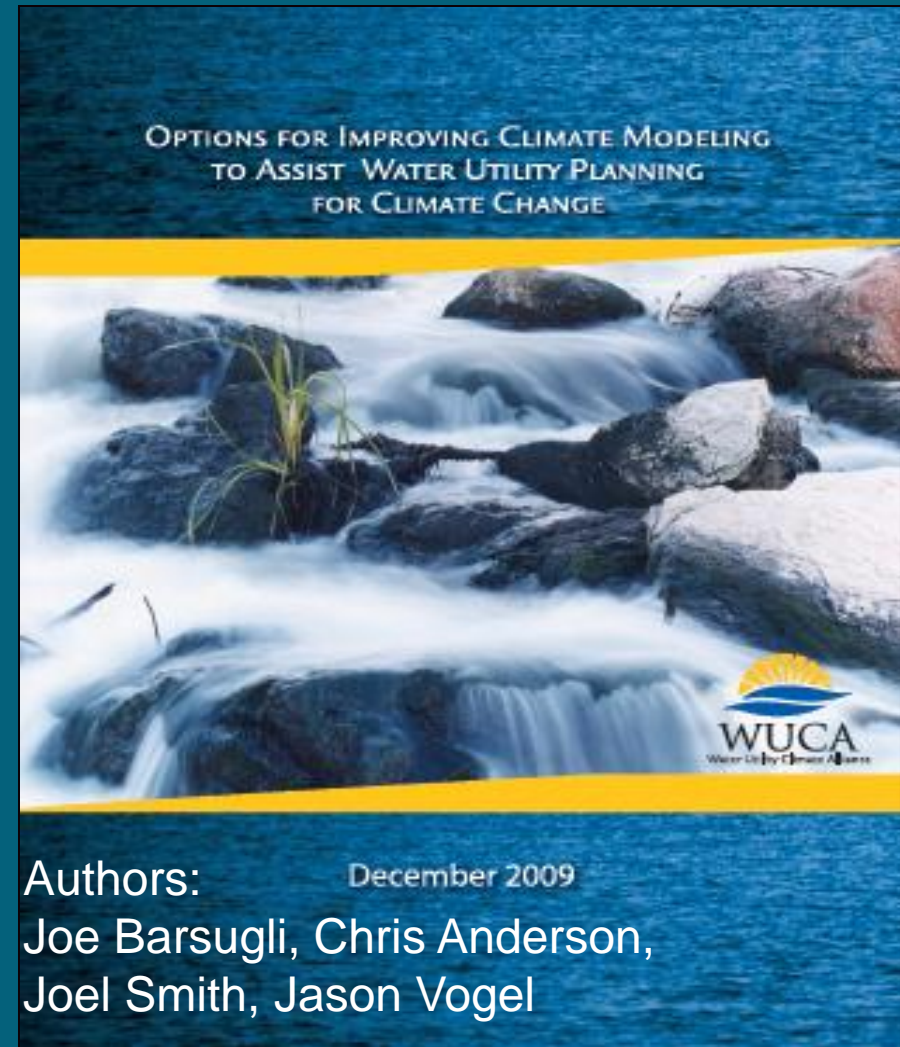
Table from Physics Today: Somerville and Hassol  
[“Communicating the Science of Climate Change”](#), 2011





# Strategies

- Clearly define needs and priorities
- Establish expectations for both sides

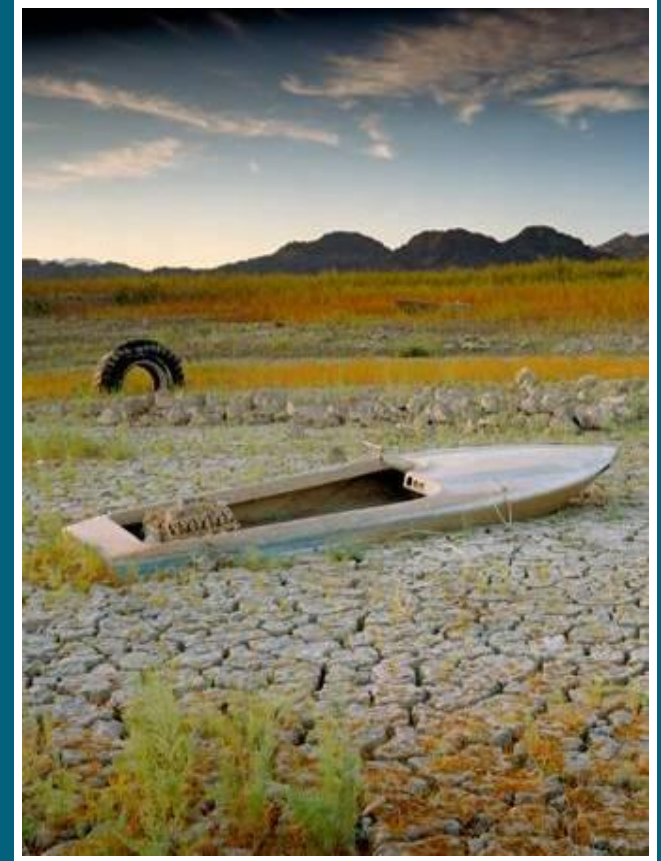


Available at  
[www.wucaonline.org](http://www.wucaonline.org)



# Next Steps

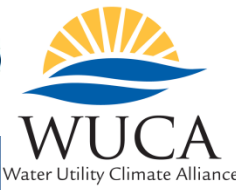
- Work with CESM to define needed simulation runs
- Piloting Utilities and Modeling Applications
- Decision Support and Planning Methods
- NSHE/SNWA







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A wide-angle photograph of the Hoover Dam and Lake Mead. The dam's massive concrete structure, including its two iconic intake towers, is visible in the center. The water is a deep blue, and the surrounding desert landscape with reddish-brown cliffs is in the background. The word "Questions?" is overlaid in white text on the lower right portion of the image.

Questions?