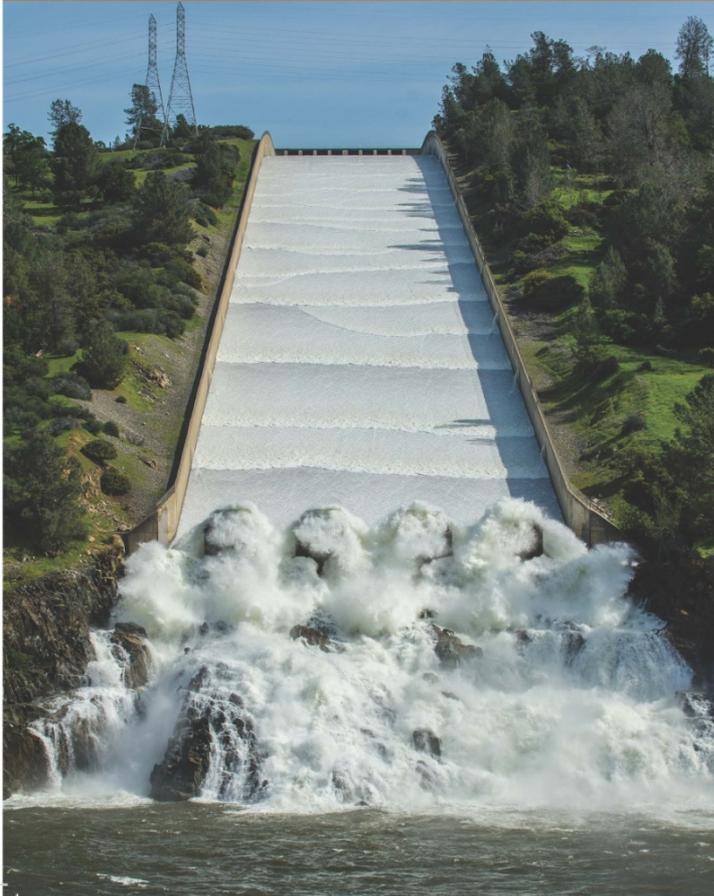


Improving  
Sub-Seasonal to Seasonal  
Precipitation Forecasting for  
Water Management



WESTERN  
STATES  
WATER  
COUNCIL

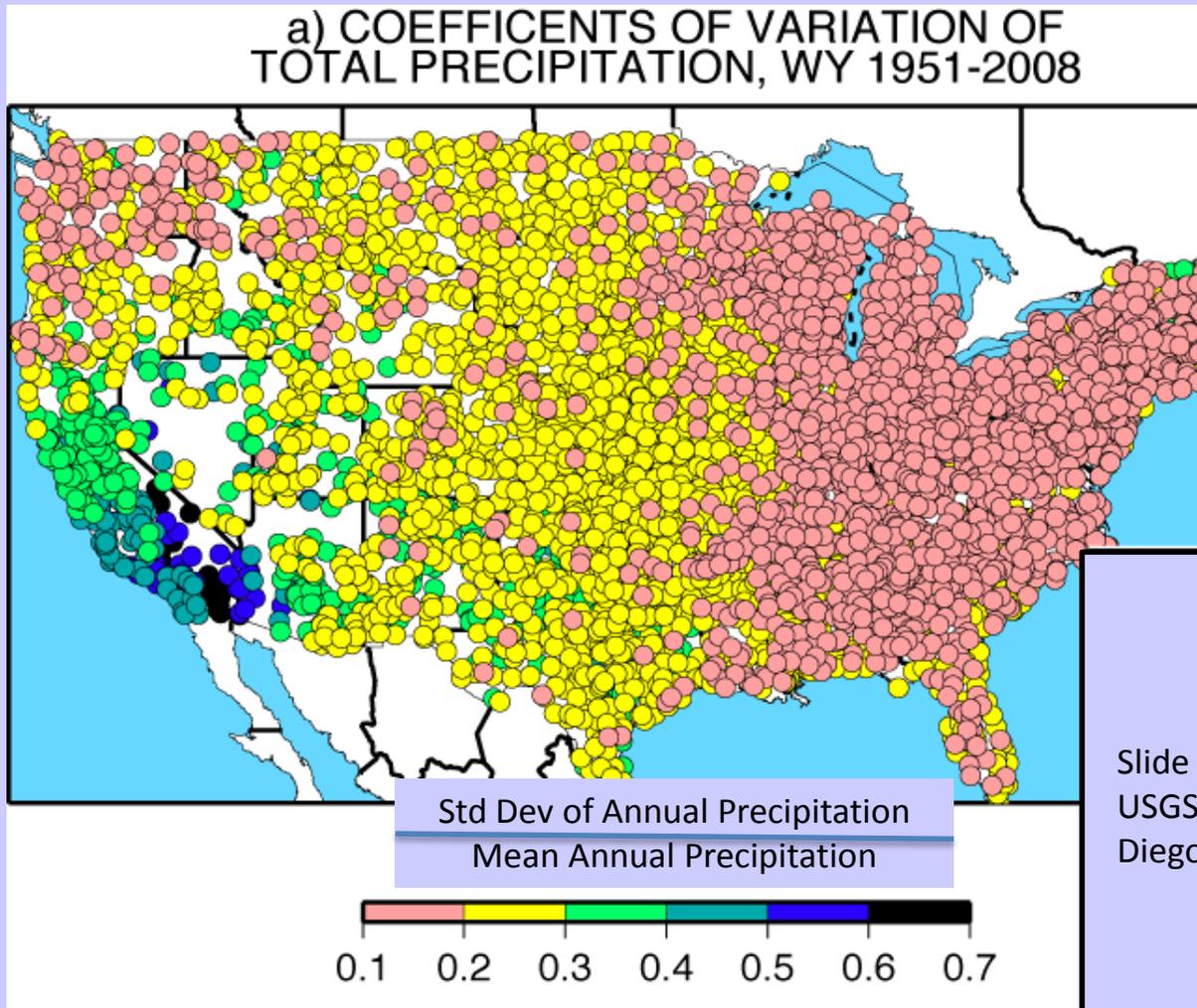
**Jeanine Jones, Western States Water Council**

# Why This Effort?

## Western States Water Council Perspective

- Importance of skillful sub-seasonal to seasonal precipitation forecasting for Western water management
- Lack of resources being directed to improving S2S precipitation forecasting
- Lack of resources being directed to Western precipitation forecasting needs
- Time is ripe for action

# Variability of Western Precipitation



Slide courtesy of Mike Dettinger,  
USGS/University of California San  
Diego, Scripps

# NEXT GENERATION EARTH SYSTEM PREDICTION

## STRATEGIES FOR SUBSEASONAL TO SEASONAL FORECASTS

Committee on Developing a U.S. Research Agenda to Advance Subseasonal to  
Seasonal Forecasting

Board on Atmospheric Sciences and Climate  
Ocean Studies Board

Division on Earth and Life Studies

*This prepublication version of Next Generation Earth System Prediction: Strategies for Subseasonal to Seasonal Forecasts has been provided to the public to facilitate timely access to the report. Although the substance of the report is final, editorial changes may be made throughout the text and citations will be checked prior to publication. The final report will be available through the National Academies Press in spring 2016.*

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# **Importance of Improved Forecasting for Water Management**

# Lead Time Very Important for Water Management

- Public health & safety decisions
- Balancing risk/cost trade-offs
- Increasing water management efficiency
- Operating within legal & regulatory frameworks
- Reducing impacts of extreme events
- Responding to increased competition for resources

# Will the Rest of This Winter be Wet or Dry?

## Example Sub-Seasonal Decisions

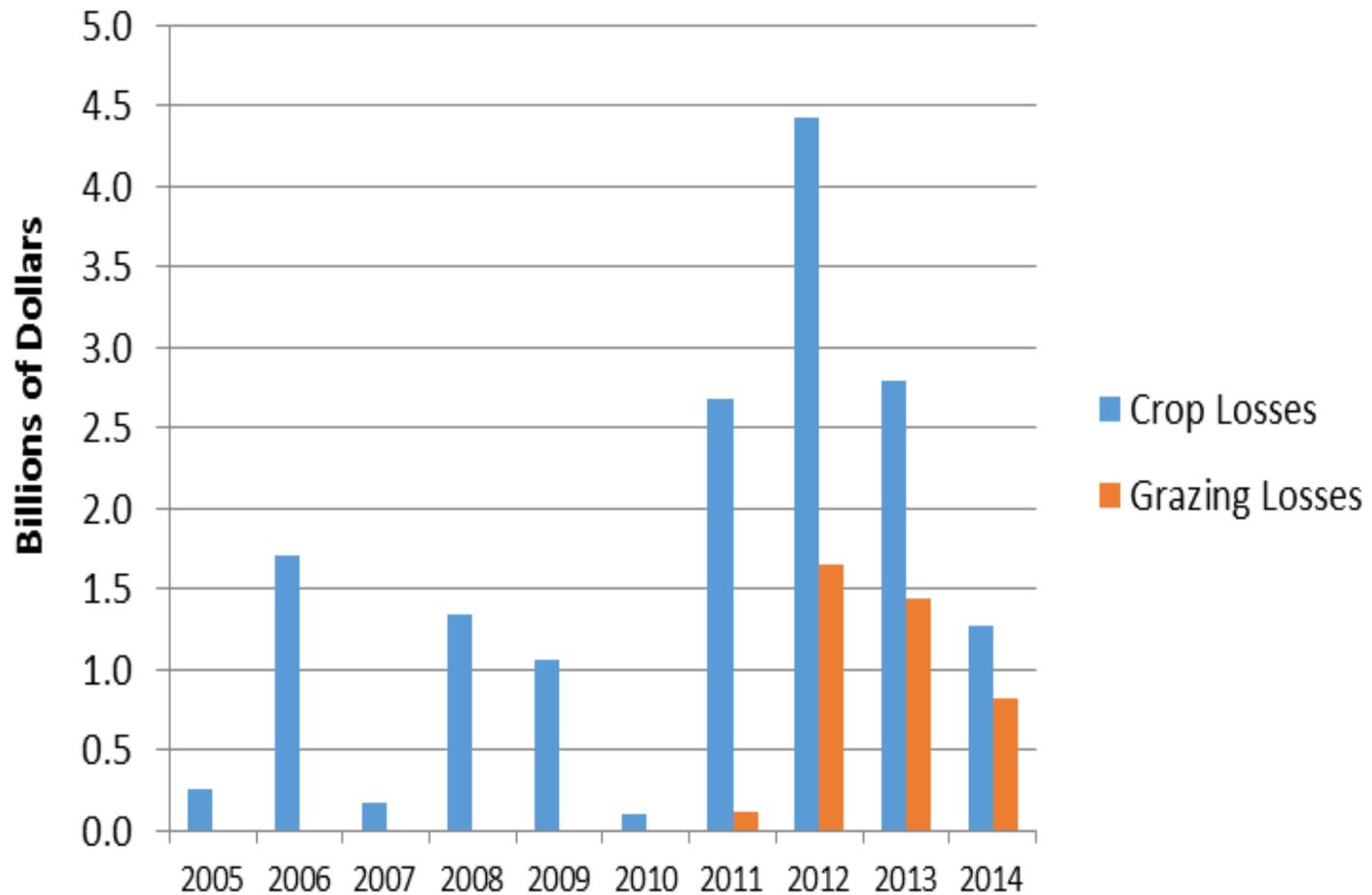
- How much water will we be able to provide to our water users? When can we make the announcement?
- Will we hit hydrologic shortage triggers that require extraordinary conservation measures, or the need to negotiate contracts or adopt regulations?
- Is an elevated flood risk likely this spring? Should we pre-position resources?
- If the rest of this winter looks dry, can we use reservoir flood control space to store water for allocation to users (e.g., forecast-informed reservoir operations)?
- Will we have to curtail diversions on intensively used rivers? How early in the season?

# Will This Winter be Wet or Dry?

## Example Seasonal Decisions

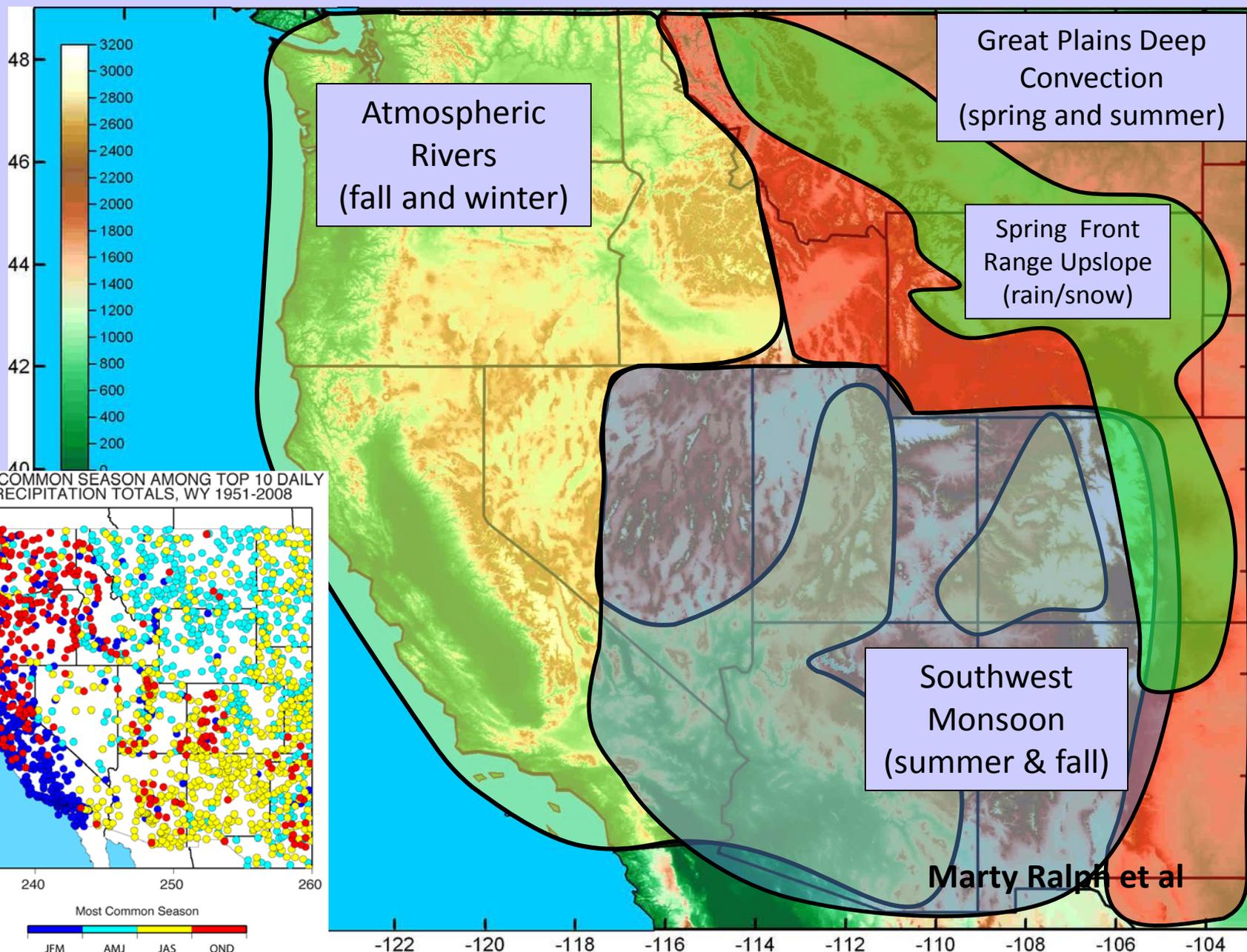
- Should we begin negotiating contracts for one-time sale of surplus wet-weather water? Can we set up a temporary groundwater banking program to take advantage of wet conditions?
- Do we need to seek additional drought response funding or raise water rates? Do we need to budget for enhanced water conservation activities?
- Should we make plans and adopt regulations for adopting a drought water bank?
- Should we intensify flood preparedness activities in vulnerable areas?

## Claimed crop losses (USDA- FCIC, 2005-2014) and grazing losses (USDA-LFP, 2011-2014) due to drought in WSWC member states



**New understandings of role of  
extreme precipitation (e.g.,  
atmospheric river storms) in West,  
implications for improving  
predictability at regional scale**

# Schematic illustration of regional variations in the primary weather phenomena that lead to extreme precipitation, flooding and contribute to water supply in the Western U.S.



# California State Agency Investments in Observing & Researching AR Storms

- State share of NOAA Hydrometeorology Testbed program (HMT) in California -- \$15M
- CalWater field observing campaigns building on the HMT project -- \$5M
- Advanced precipitation monitoring & forecasting state grant to Bay Area local agencies -- \$19M
- Research with Scripps/UC San Diego -- \$3.5M

# Summary

- High need for improved S2S precip forecasting for water management
- Scientifically challenging, but large potential payoff for water, agriculture, transportation, etc. sectors
- Recent National Academy of Sciences report, new regional-scale observations of extreme precipitation show pathway forward