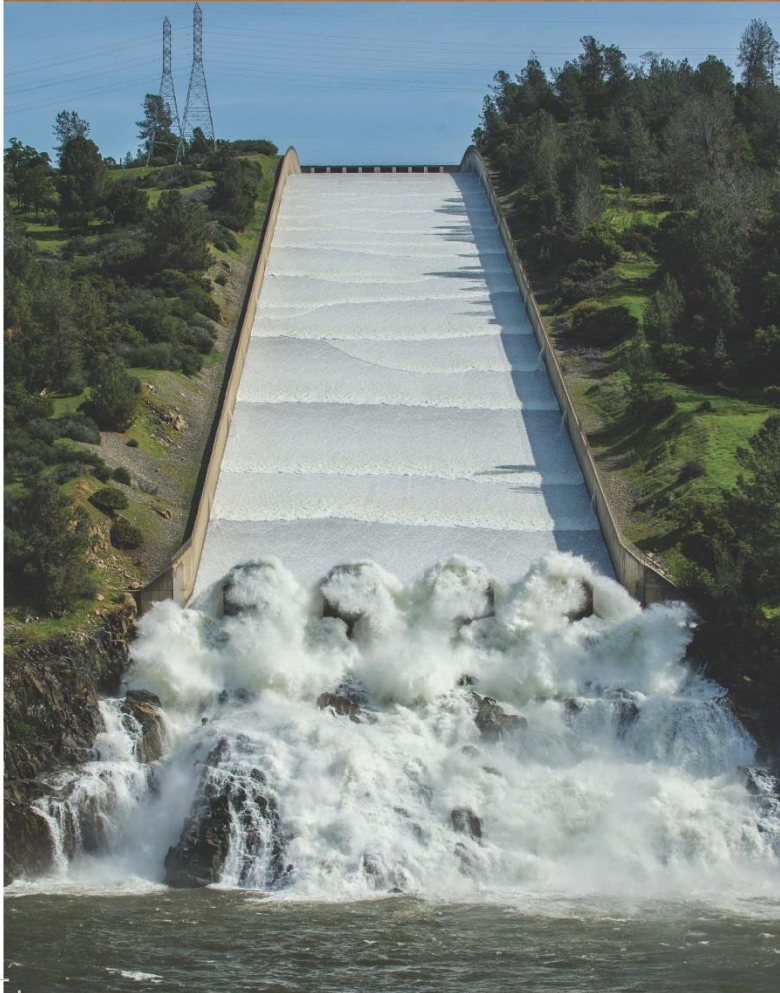


Improving
Sub-Seasonal to Seasonal
Precipitation Forecasting for
Water Management



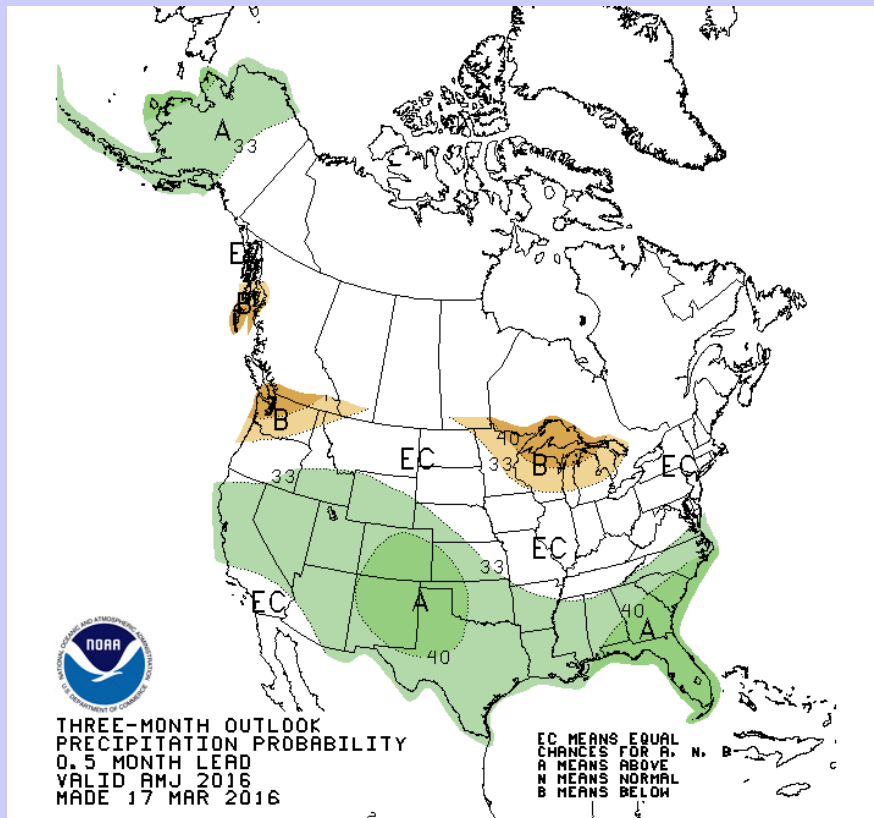
WESTERN
STATES
WATER
COUNCIL

WSWC/NOAA Workshops on S2S Precipitation Forecasting

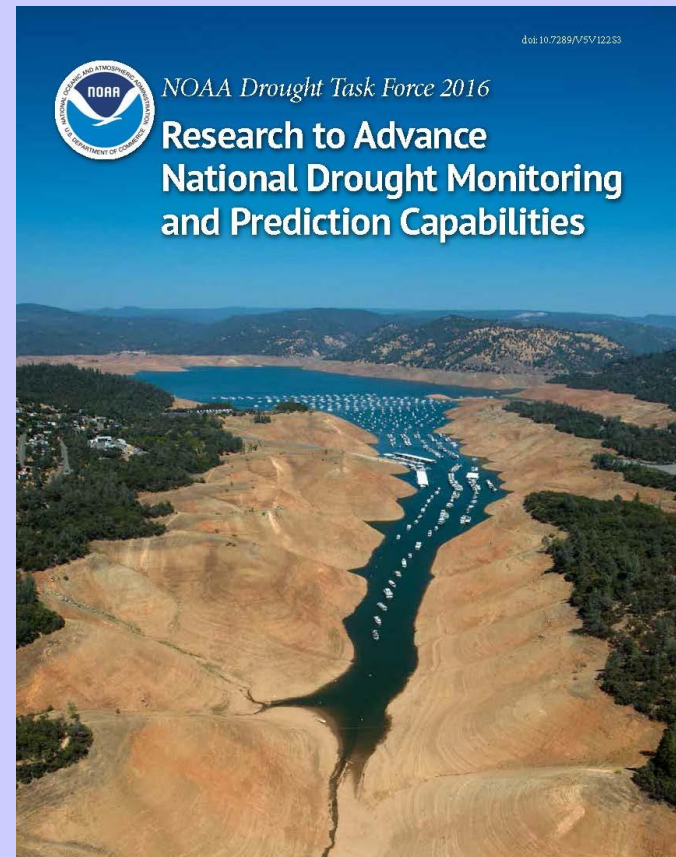
- San Diego, May 2015
- Salt Lake City at NWS Western Region HQ, October 2015
- Las Vegas at Colorado River Water Users Association, December 2015
- College Park, April 2016
- San Diego, June 2016

Specific Focus on S2S Precipitation Forecasting

This



Not This

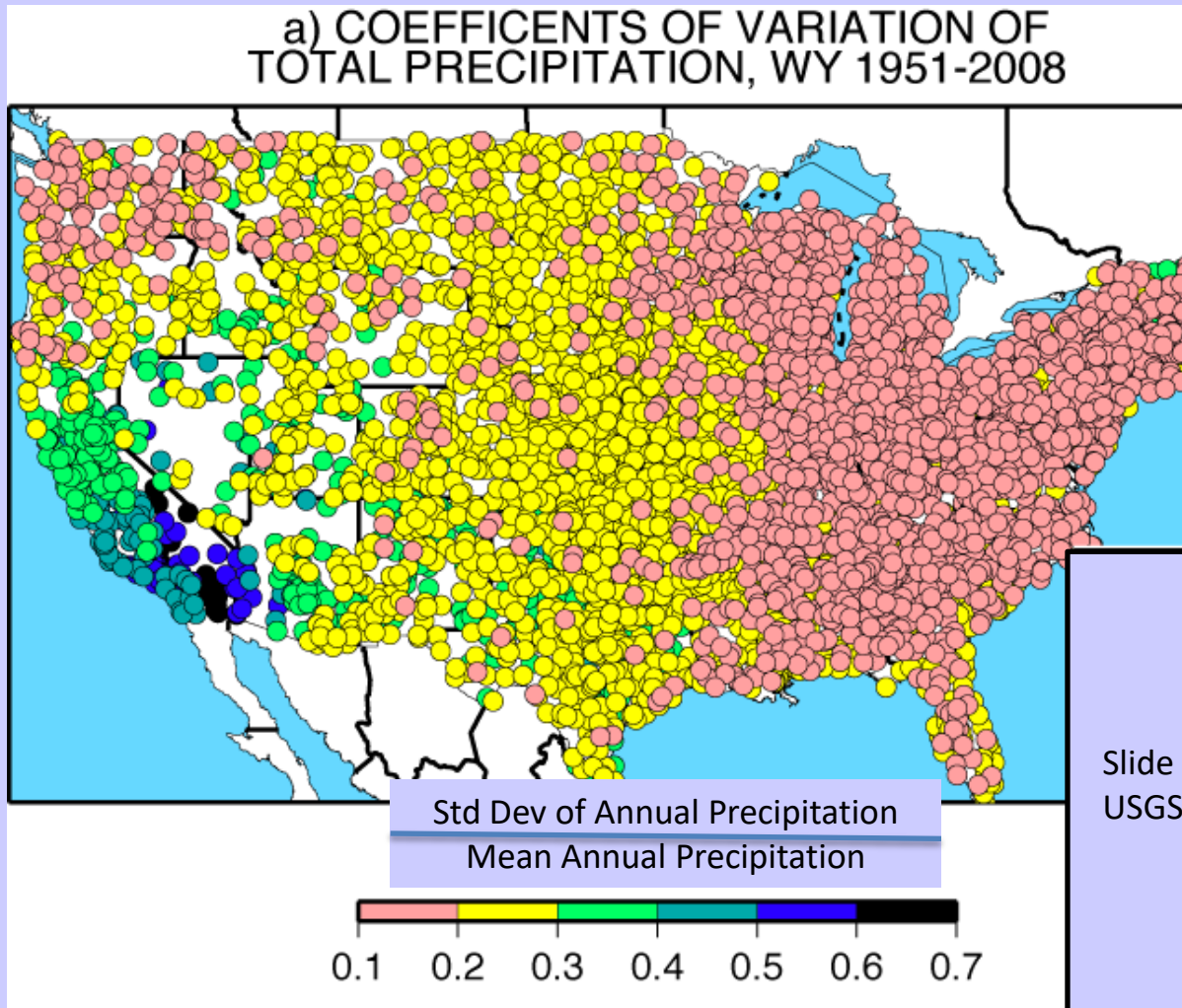


Why This Effort?

WSWC 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 prediction needs

Variability of Western Precipitation



Slide courtesy of Mike Dettinger,
USGS/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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Washington, DC

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CALIFORNIA DROUGHT



2014 SERVICE ASSESSMENT



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?
- Will we have to curtail diversions on intensively used rivers? How early in the season?

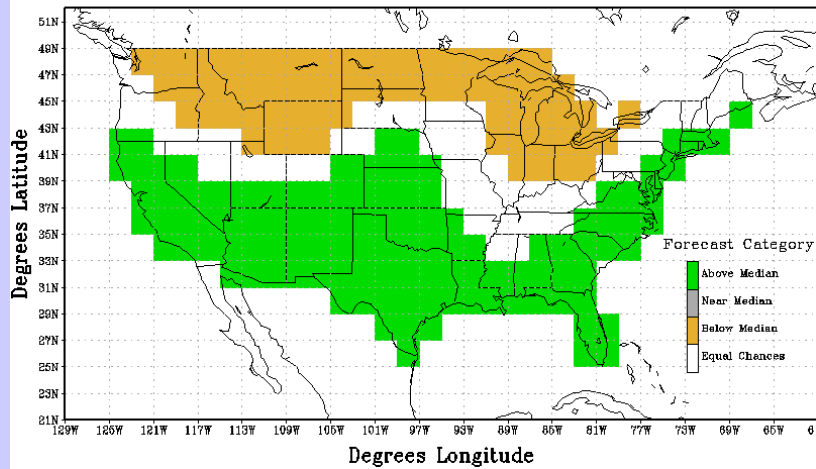
Will This Winter be Wet or Dry?

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?

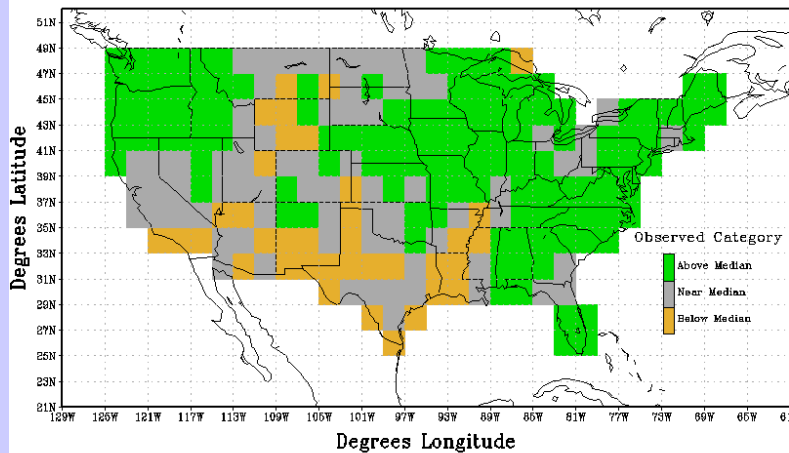
Present Forecasting Skill Not Usable for Water Management

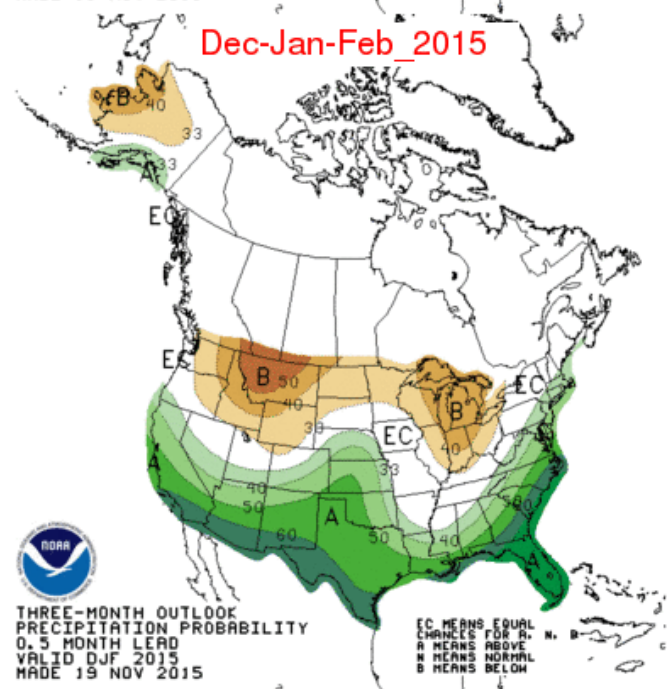
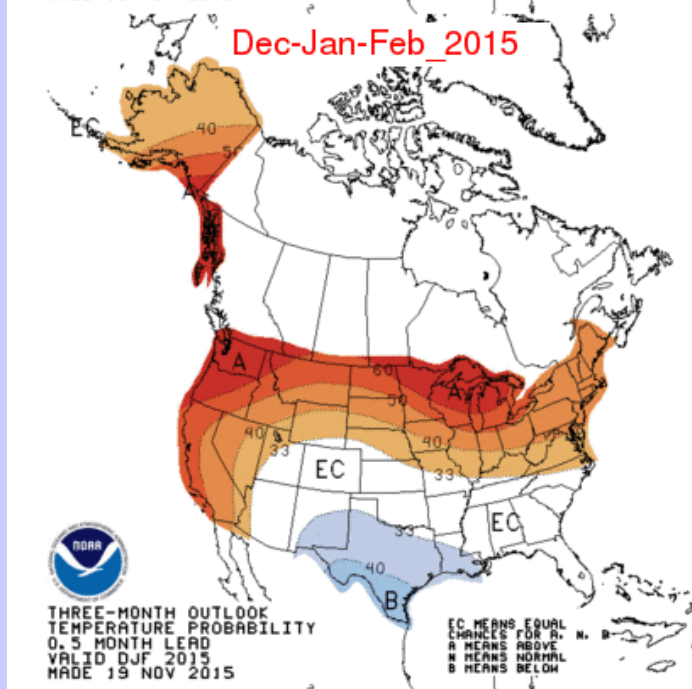
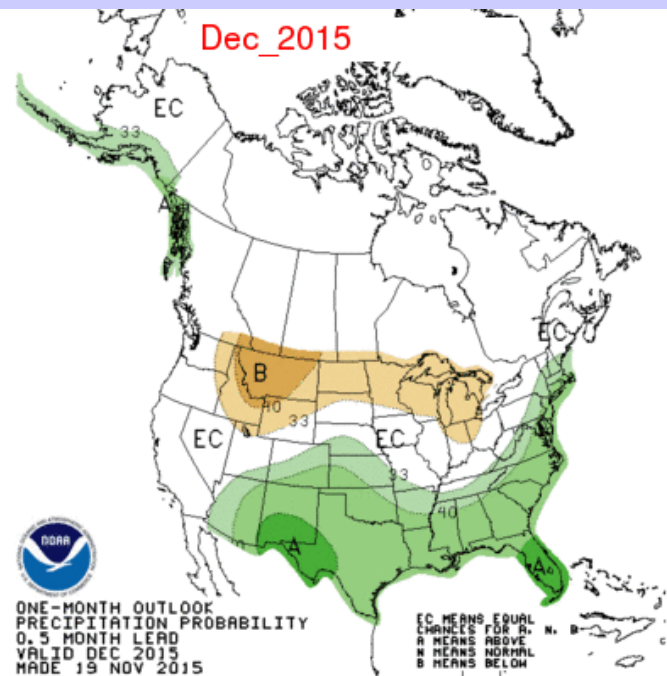
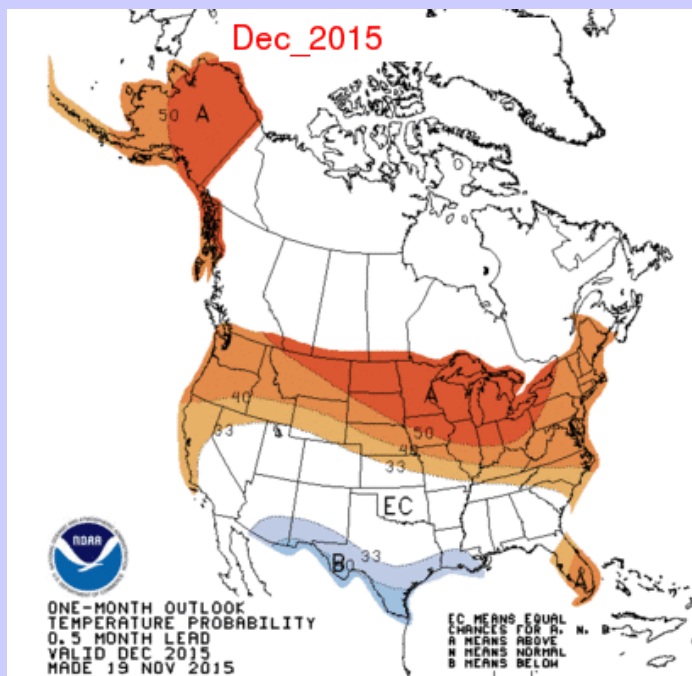
Categorical Precipitation Official Forecast
Issued: Nov 2015 Valid: Dec-Jan-Feb 2015-16



Precipitation Forecast Heidke Skill Scores :
Non-Equal Chance(non EC) forecasts: -7.87
All forecasts: -6.03
% coverage not Equal Chance forecasts : 76.72

Categorical Precipitation Observations
Valid: Dec-Jan-Feb 2015-16





Potential Opportunities for Forecast Improvements & Use

- 10-year research agenda (national scale) identified in NRC report – requires sustained funding commitment
- Developing capacity to predict extreme events (e.g., atmospheric river storms) at regional (Western) level
- Pilot projects for forecast improvement
- Forecast-informed reservoir operations

Next Steps for WSWC?

- Ongoing support for federal funding for operations/research to improve S2S precipitation forecasting
- Possible subcommittee or affiliated working group
- For group discussion later on agenda