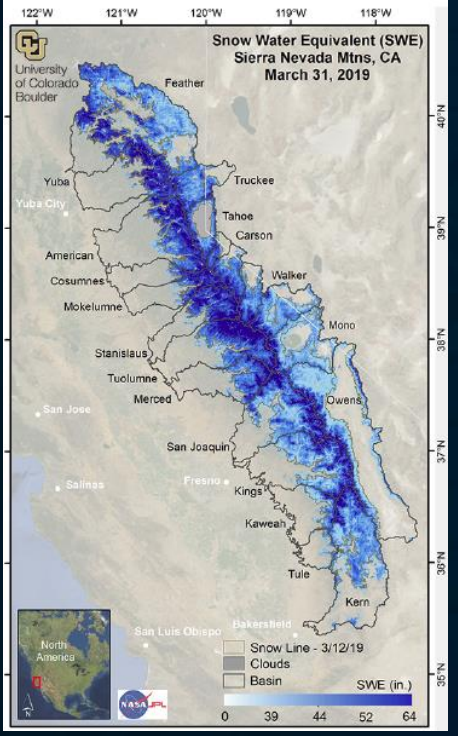
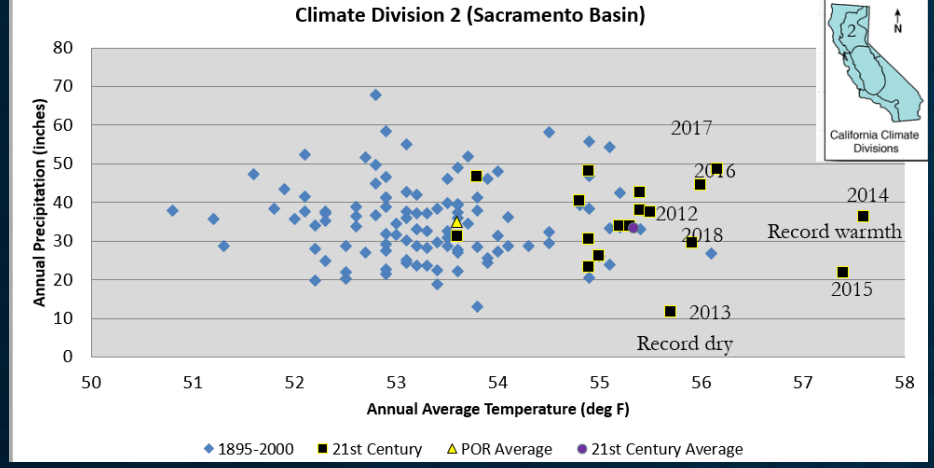
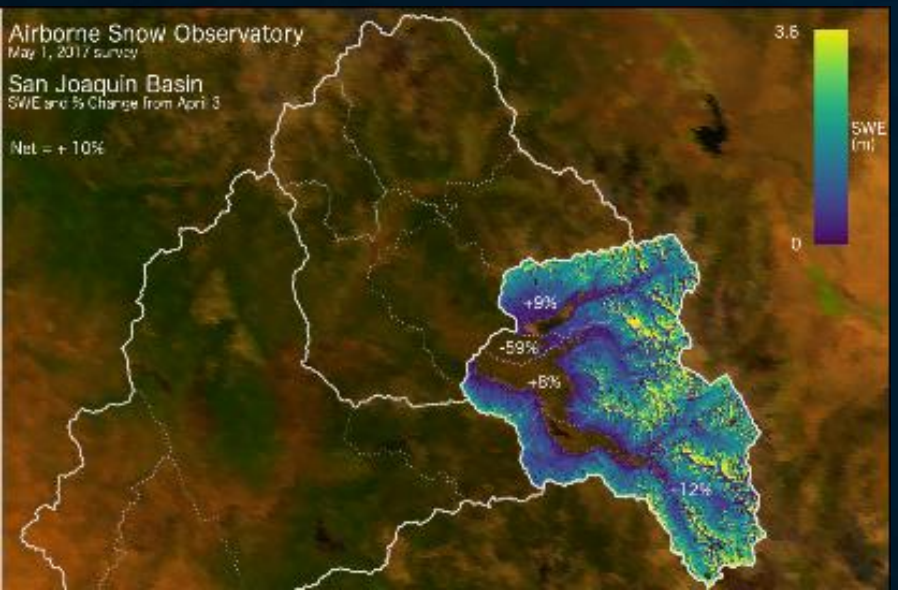




DWR Investments in Sub-Seasonal to Seasonal Forecasting – A Portfolio Approach



Dr. Michael Anderson, State Climatologist

WSWC Panel

May 23, 2019

Summary Thoughts

- Atmospheric Rivers are a key component to California's water supply and flood risk. The character, size, number, and timing of atmospheric rivers play a key role in seasonal hydrologic outcomes for California.
- Improved observations and forecasting are key elements to improved decision support enabling more options for integrated water management in California as the world warms.
- S2S Forecasting has billion dollar potential in water and related resources management.

Topography is Central to Western Water Outcomes

A Symphony of Scales In Space and Time

- Single Event – Hours to Days
- Timing of Events and Inter-Event Times
- Seasonal Accumulation & Variability
- Annual Accumulation & Interannual Variability
- Decadal Scale Variability
- Climate Change over a Century

Federal State and Local Alignment

- DWR plays a key role in facilitating the transition of new science in observations from research to operations for water management.
- Relationships with federal partners have been built over the past decade with the availability of resources on a project-by-project basis.
- Continued engagement with the science community is key to adapting to a warming world. Collaboration with local partners key to delivering best science available to water management in CA.

Timeline of Intel and Needs

WY Response Planning Billions $

Legal Mandates

Event Response Millions $

End-of-Year Storage

Precipitation Onset

Peak Snowpack

Precipitation Shutdown

Summer Heat

Peak AR Activity

Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep

Water-Year Outlook

Mid-Winter Update

Snowmelt Runoff

Fall GW Lowpoint

Spring GW Highpoint

Snowmelt Runoff Prediction

S2S Intel on:

- *Wet or Dry Year*
- *In-season Transition*
- *Extremes Potential*
- *Rain or Snow*
- *Warming World Influence*

Investments in S2S

- Collaborations with Science Agencies and Research Community
- Targeted Projects with Identified Expertise
- Opportunistic Engagements Building into a Bigger Program Picture

Strategy

- Near Term Returns: Projects whose outcomes can make immediate contributions
- Mid-Term Returns: Projects that take multiple years to yield return on investment
- Long-Term Returns: Foundational development to build upon or that will lead to larger gains later