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Contacts:

[Jeanine Jones](#), DWR Interstate Resources Manager – (916) 653-8126

[Ted Thomas](#), DWR Information Officer – (916) 653-9712

DWR Experimental Winter Outlook for Water Year 2014 Sees Mostly Dry Conditions for California

SACRAMENTO – As part of ongoing work to develop seasonal water supply forecasting ability, the Department of Water Resources (DWR) annually convenes researchers to develop an experimental winter outlook forecast, and to review other factors that may assist in improving forecasting skill at lead times ranging from several weeks to a year. The forecast for water year 2014 (October 1 – September 30) is of particular interest since water years 2012 and 2013 were both dry, and 2014 brings the possibility of a third dry year.

The experimental forecast prepared for DWR by Dr. Klaus Wolter of the Cooperative Institute for Research in Environmental Sciences at the University of Colorado makes the following predictions based on statistical models that consider global influences on California climate:

- ▶ Mostly dry conditions for most of California, with dry conditions being especially likely in Southern California.
- ▶ Near-normal to drier than normal for the Colorado River Basin, an important source of water supply for Southern California, although not as dry as in water year 2013.
- ▶ A small chance of a spring shift to El Niño conditions that could bring wetter weather for Southern California late in the season.

A primary source of skill in making seasonal climate outlooks for the Western U.S. is the status and expected behavior of the El Niño-Southern Oscillation (ENSO) cycle. ENSO neutral conditions are now present in the tropical Pacific Ocean, and are expected to persist throughout the winter months. The El Niño and La Niña phases of ENSO provide some guidance as to the potential for dry or wet conditions, particularly in Southern California, but ENSO neutral conditions do not yield a predictive signal. Other considerations such as the status of the Pacific Decadal Oscillation (PDO), the Atlantic Multidecadal Oscillation, or recent Alaskan temperatures can be evaluated through statistical models to make a forecast in the absence of an ENSO-related signal.

“Atmospheric river (AR) storms are a wildcard in this forecast”, according to Wolter. “My forecast last year for dry conditions in water year 2013 seemed destined for failure at first, since California experienced record wet conditions in late November/early December of last year courtesy of AR storms. However, the remainder of the season was record dry, producing an overall result of dry for the water year”.

California’s annual water supply is determined by a relatively small number of storms – only two or three storms or their absence can shift the balance between a wet year and a dry year. On average, about half of California’s statewide precipitation occurs December through February, with three-quarters occurring November through March. Averages can mask great variability within the wet season, however. Water years 2012 and 2013 were both dry, but their precipitation patterns were complete opposites. Water year 2012 began with record dry conditions, setting a record for the latest closing date for the Tioga Pass highway due to the absence of significant snow until January. Water year 2013 began record wet in Northern California, but then turned record dry from January on.

Forecasting swings like these in weather patterns at sub-seasonal timescales is also important for making water management decisions. At DWR's winter outlook workshop, preliminary research discussed by representatives from NASA's Jet Propulsion Laboratory and by the Center for Western Weather and Water Extremes at the Scripps Institution of Oceanography is offering potential opportunities for making forecasts of opportunity. "New work is showing possible relationships between precipitation and phase of the Madden-Julian Oscillation (MJO), and between phase of the MJO and conditions favoring AR storms", said Jeanine Jones of DWR. "DWR plans to collaborate with the research community to see how this information could continue to be developed to improve forecasting at timescales useful for water management".

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The Department of Water Resources operates and maintains the State Water Project, provides dam safety and flood control and inspection services, assists local water districts in water management and water conservation planning, and plans for future statewide water needs.