Spring 2017 Groundwater Level Data Summary – Final Draft

**Water Everywhere?**
Water Year 2017 began with one of the wettest starts on record, but its impact on California’s Spring 2017 groundwater levels is varied. While images of filling reservoirs and rushing rivers seemed to be everywhere earlier this year, groundwater levels reflected the differing hydrologic conditions of individual groundwater basins. Although water levels in shallow basins may quickly show marked improvement, deeper, severely depleted groundwater basins may take years to recharge. These changes in groundwater levels are used to describe how groundwater storage changes over time. A one year comparison of groundwater levels can provide information about the short term effects of a wet or dry year, while a multi-year comparison of groundwater levels provides information about trends in the groundwater storage.

**Data Coverage**
As of July 11, 2017, 90% of the typical spring groundwater level measurements have been reported statewide. The coverage map (Figure 1) shows a comparison of the total Spring 2017 reporting to typical reporting in previous years. Typical reporting includes wells with water level data submitted over the past four spring seasons (2013-2016) and includes CASGEM and measurements voluntarily provided by well owners. The map also displays a table of data coverage by hydrologic region.

**By the Numbers**
Using precipitation, surface water storage, and measured surface water flows, DWR determined that Water Year 2016 ended in a persistent drought; with below average statewide precipitation in 7 of the previous 10 years (Figure 2). Figure 3 depicts the one year change in groundwater levels between Spring 2016 to Spring 2017, and includes the short term effects of the exceptionally wet 2016/2017 winter. Figure 4 shows the change in groundwater levels between Spring 2011 to Spring 2017, and shows the lingering effects of the 2012 – 2015 drought period.

As seen on Figure 3, Spring 2017 groundwater levels across the state of have recovered to Spring 2016 levels. While 5.4% of wells measured in 2017 displayed significantly higher groundwater levels (greater than 25 feet increase) compared to Spring 2016, approximately 56.7% of the wells showed less than 5 feet of change in

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1 This includes CASGEM and Voluntary groundwater level measurements collected by DWR, CASGEM Monitoring Entities, and other cooperators.
2 A spring groundwater level measurement is a measurement collected from a well nearest in time to March 15, within a date range of January through May
3 Water Year 2016 Ends as Drought-Like Conditions Persist
groundwater levels. Only 1% of the wells displayed significantly lower groundwater levels (more than 25 feet decrease) compared to Spring 2016.

When comparing Spring 2017 measurements to Spring 2011 measurements (Figure 4), only 1.2% of wells statewide displayed significantly higher groundwater level elevations. Approximately 47.6% of the wells showed less than 5 feet of change, and approximately 16.3% of the wells displayed significantly lower groundwater level elevations compared to Spring 2011.

Although Spring 2017 groundwater levels have mostly recovered from last year, they have not yet recovered to pre-drought conditions in many areas of the state. This includes areas along the west side of the Sacramento Valley, the San Joaquin Valley, and portions of Santa Barbara, San Benito, Ventura, Los Angeles, San Bernardino and Riverside Counties. Furthermore, there is insufficient data coverage to determine the long term effects of the drought on Imperial, San Diego, Orange, Monterey, and San Mateo counties.

**Resources**
This document presents a draft summary of Spring 2017 groundwater level data available in the DWR groundwater level database as of July 11, 2017 and includes a discussion of Spring 2017 data coverage and groundwater level trends.

Additional information and groundwater level change maps for different time periods (including one-, three-, five-, and ten-year groundwater level change maps\(^4\)) can be obtained from the DWR Groundwater Information Center. Geospatial datasets of this groundwater level data can be downloaded from the Groundwater Information Center Interactive Map Application.

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\(^4\) DWR Groundwater Information Center, Map and Reports
Figure 1. Spring 2017 Groundwater Level Data Coverage*

Data Coverage as of 7/11/2017

<table>
<thead>
<tr>
<th>Hydrologic Region</th>
<th>Coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statewide</td>
<td>90%</td>
</tr>
<tr>
<td>North Coast</td>
<td>89%</td>
</tr>
<tr>
<td>San Francisco Bay</td>
<td>97%</td>
</tr>
<tr>
<td>Central Coast</td>
<td>100%</td>
</tr>
<tr>
<td>South Coast</td>
<td>98%</td>
</tr>
<tr>
<td>Sacramento River</td>
<td>91%</td>
</tr>
<tr>
<td>San Joaquin River</td>
<td>91%</td>
</tr>
<tr>
<td>Tulare Lake</td>
<td>78%</td>
</tr>
<tr>
<td>North Lahontan</td>
<td>91%</td>
</tr>
<tr>
<td>South Lahontan</td>
<td>95%</td>
</tr>
<tr>
<td>Colorado River</td>
<td>100%</td>
</tr>
</tbody>
</table>

*Map displays data available in the CASGEM database as of July 11, 2017.
Figure 2: Statewide Annual Precipitation

Data source: NOAA National Centers for Environmental information, Climate at a Glance: U.S. Time Series, Precipitation (http://www.ncdc.noaa.gov/cag/)
Figure 3. Groundwater Level Change* - Spring 2016 to Spring 2017

Groundwater Level Change
- Increase > 25 feet
- Increase > 5 to 25 feet
- Change +/- 5 feet
- Decrease > 5 to 25 feet
- Decrease > 25 feet

North Coast (260 total wells)
- Increase > 25 feet: 81.2%
- Increase > 5 to 25 feet: 12.3%
- Change +/- 5 feet: 0.0%
- Decrease > 5 to 25 feet: 1.0%
- Decrease > 25 feet: 1.0%

Sacramento River (1423 total wells)
- Increase > 25 feet: 50.0%
- Increase > 5 to 25 feet: 47.2%
- Change +/- 5 feet: 1.4%
- Decrease > 5 to 25 feet: 0.1%
- Decrease > 25 feet: 1.3%

North Lahontan (133 total wells)
- Increase > 25 feet: 51.1%
- Increase > 5 to 25 feet: 44.4%
- Change +/- 5 feet: 1.5%
- Decrease > 5 to 25 feet: 0.0%
- Decrease > 25 feet: 3.0%

San Joaquin River (766 total wells)
- Increase > 25 feet: 61.2%
- Increase > 5 to 25 feet: 25.7%
- Change +/- 5 feet: 5.0%
- Decrease > 5 to 25 feet: 0.5%
- Decrease > 25 feet: 8.5%

Tulare Lake (690 total wells)
- Increase > 25 feet: 13.5%
- Increase > 5 to 25 feet: 27.2%
- Change +/- 5 feet: 34.9%
- Decrease > 5 to 25 feet: 13.9%
- Decrease > 25 feet: 4.2%

South Lahontan (165 total wells)
- Increase > 25 feet: 89.7%
- Increase > 5 to 25 feet: 0.0%
- Change +/- 5 feet: 0.0%
- Decrease > 5 to 25 feet: 0.0%
- Decrease > 25 feet: 0.3%

San Francisco Bay (268 total wells)
- Increase > 25 feet: 57.8%
- Increase > 5 to 25 feet: 1.0%
- Change +/- 5 feet: 1.2%
- Decrease > 5 to 25 feet: 0.0%
- Decrease > 25 feet: 0.0%

Central Coast (463 total wells)
- Increase > 25 feet: 67.2%
- Increase > 5 to 25 feet: 10.8%
- Change +/- 5 feet: 6.1%
- Decrease > 5 to 25 feet: 0.9%
- Decrease > 25 feet: 4.0%

South Coast (997 total wells)
- Increase > 25 feet: 58.4%
- Increase > 5 to 25 feet: 4.6%
- Change +/- 5 feet: 1.0%
- Decrease > 5 to 25 feet: 4.2%
- Decrease > 25 feet: 0.0%

Colorado River (102 total wells)
- Increase > 25 feet: 75.5%
- Increase > 5 to 25 feet: 3.8%
- Change +/- 5 feet: 0.0%
- Decrease > 5 to 25 feet: 11.7%
- Decrease > 25 feet: 2.0%

*Groundwater level change determined from water level measurements in wells. Map and chart based on available data from the DWR Water Data Library as of 07/11/2017. Document Name: PIEMAP_S1716_DROUGHT_25ft
Updated: 8/15/2017. Data subject to change without notice.
Figure 4. Groundwater Level Change* - Spring 2011 to Spring 2017

Groundwater Level Change
- Increase > 25 feet
- Increase > 5 to 25 feet
- Change +/- 5 feet
- Decrease > 5 to 25 feet
- Decrease > 25 feet