

# Summary of October 2016

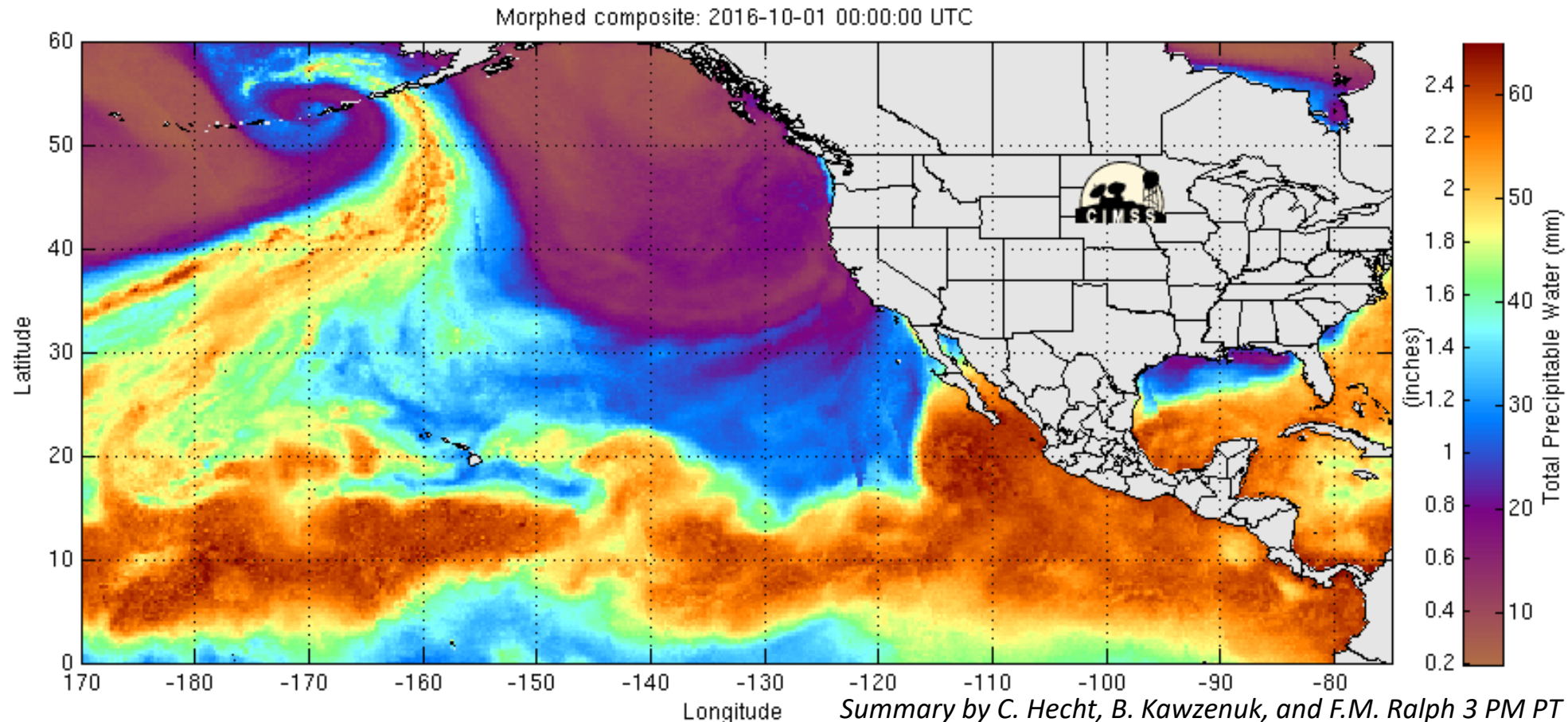
For California's DWR's AR Program



Center for Western Weather  
and Water Extremes  
SCRIPPS INSTITUTION OF OCEANOGRAPHY  
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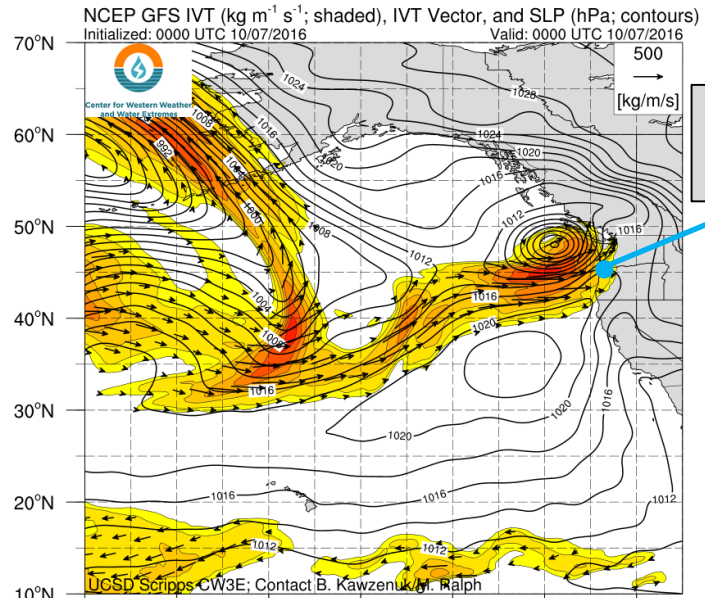
## Active Month Brings Substantial Rainfall to U.S. West Coast

- October saw several atmospheric rivers make landfall along the West Coast, making it one of the wettest Octobers on record
- Some locations in the Pacific Northwest received ~400% of the normal precipitation for October
- Oct. marks the first month of the Water Year and several locations have already received 75% of the normal WY precipitation
- While flooding was not a result due to drier soil conditions, the high precip. accumulations acted to mitigate a large region of abnormally dry and moderate drought conditions across the Northwest

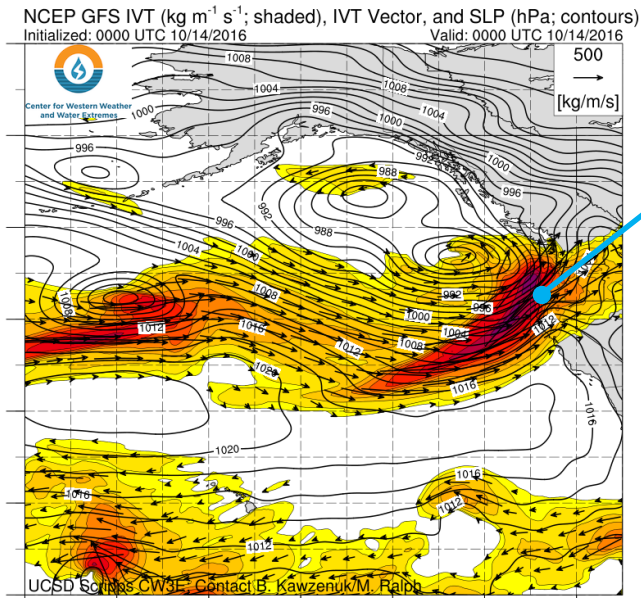


# ARs in October 2016

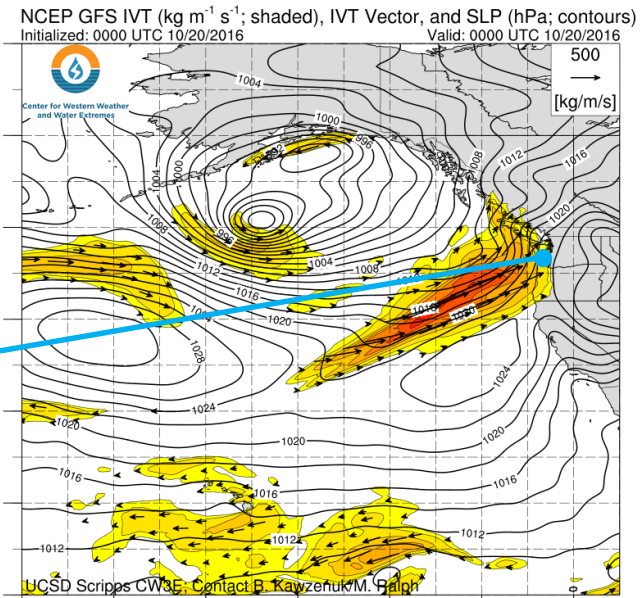
The West Coast was repeatedly hit by several ARs bringing high precipitation accumulations



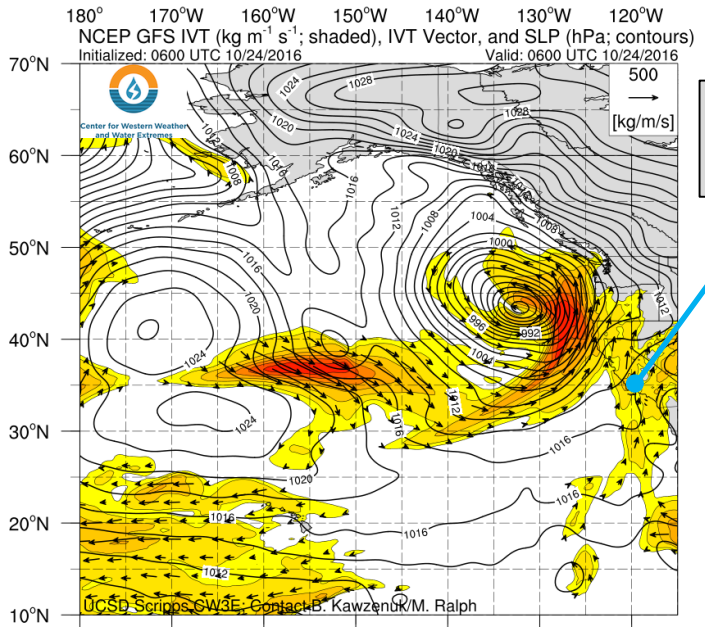
2.34 in.  
in  
24-hrs



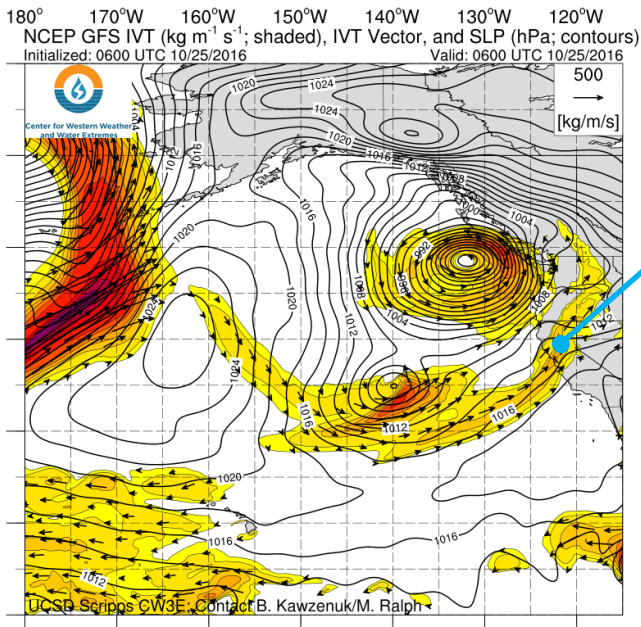
8.05 in.  
in  
24-hrs



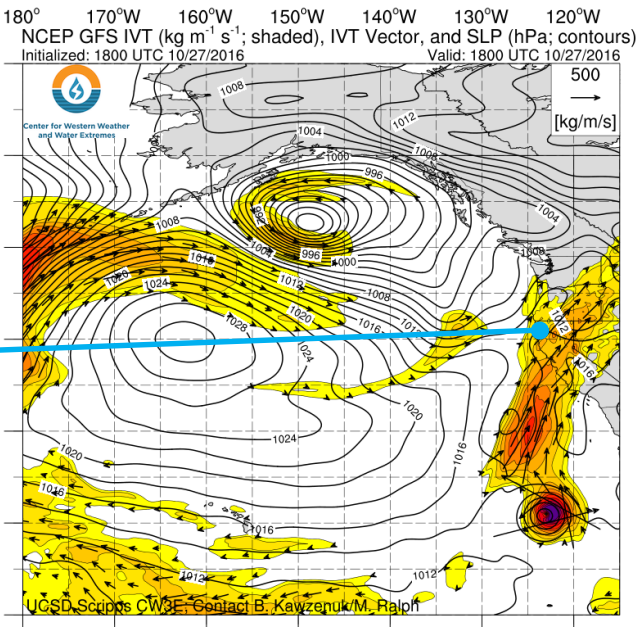
3.5 in.  
in  
24-hrs



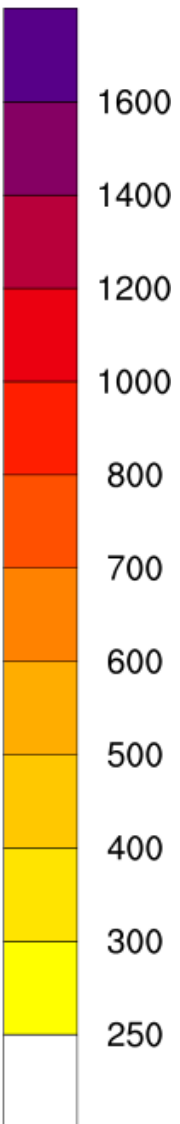
1.19 in.  
in  
24-hrs



5.75 in.  
in  
24-hrs



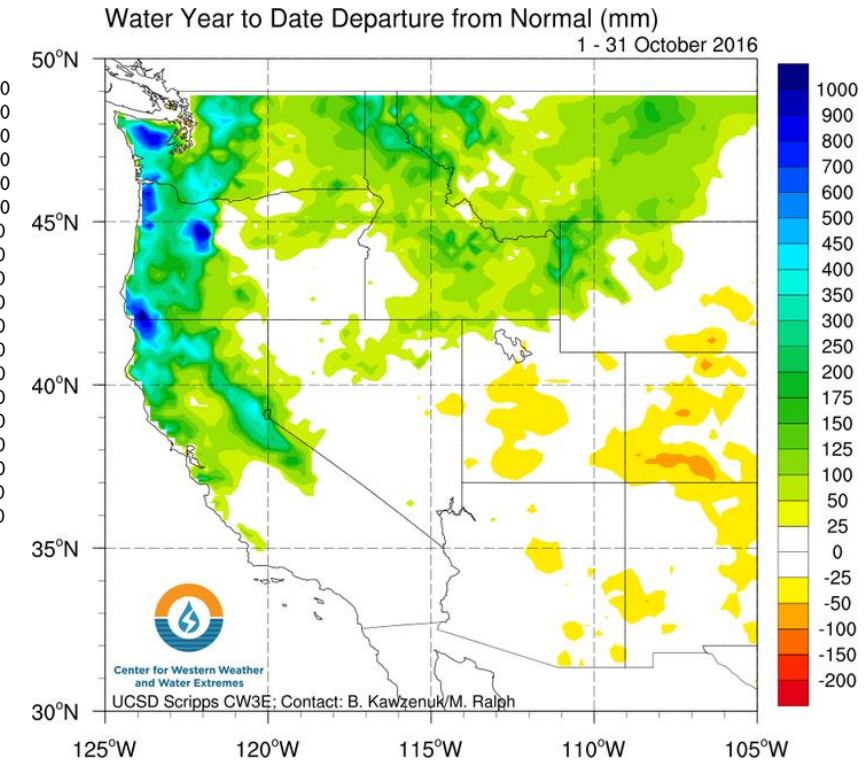
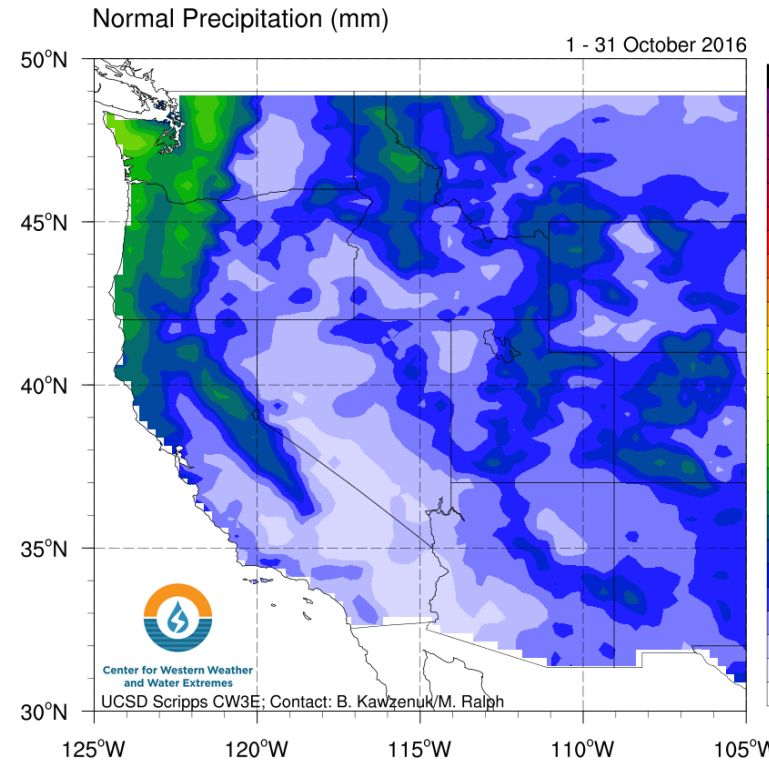
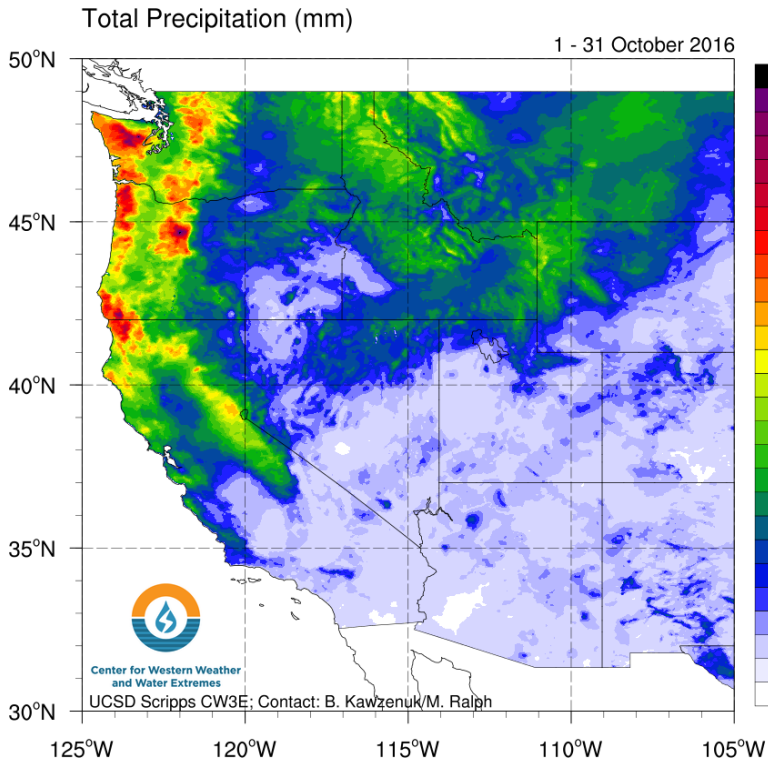
3.39 in.  
in  
24-hrs



# Precipitation in October 2016



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As much as ~1250 mm of precipitation fell over the high elevations of the Cascade, Coastal, and Olympic Mountain Ranges

The average precipitation for October over the West Coast ranges from ~50 mm at lower elevations to ~500 mm at higher elevations

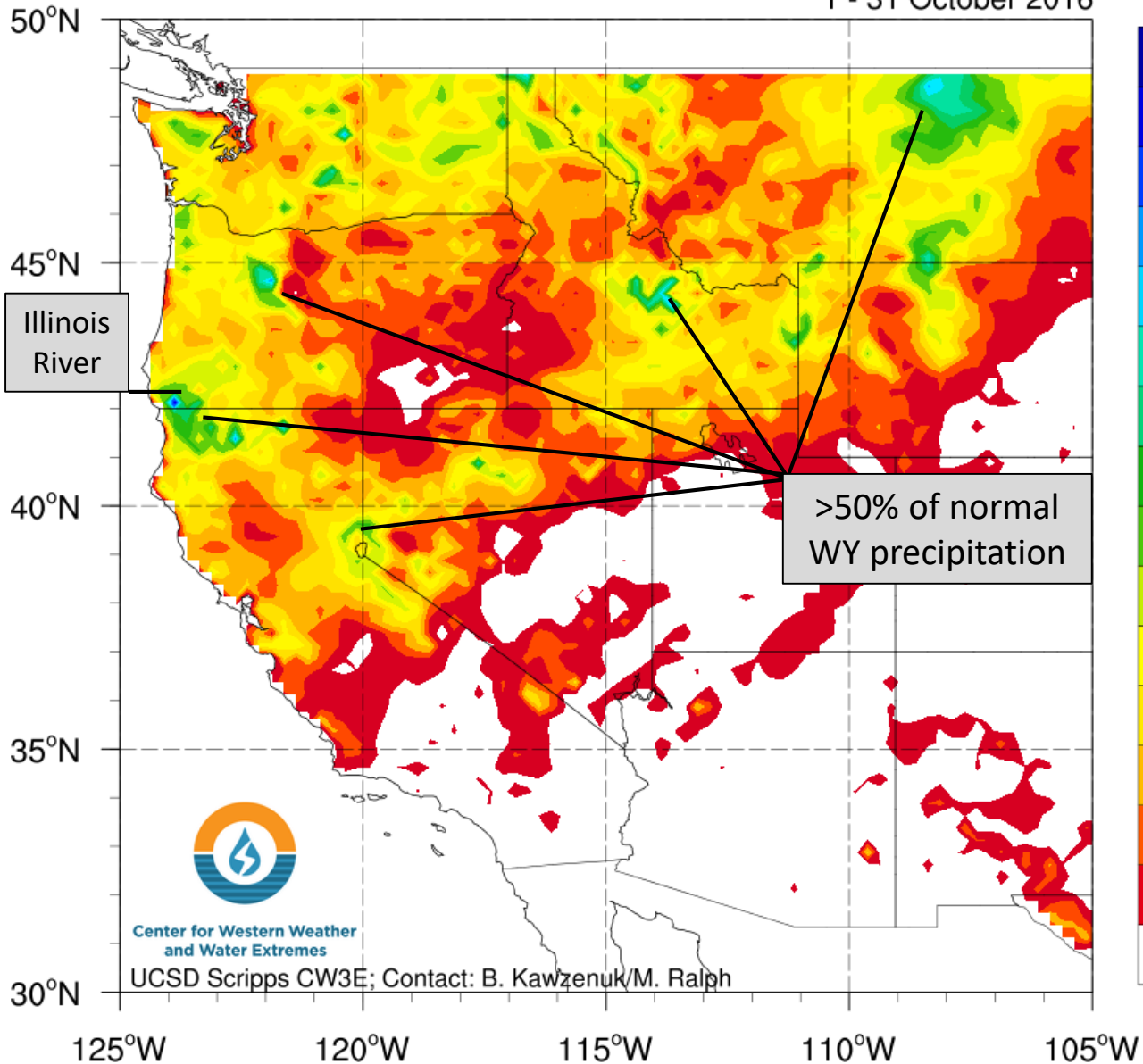
This led to some locations receiving up to 900 mm above normal monthly precipitation

# Precipitation in October 2016



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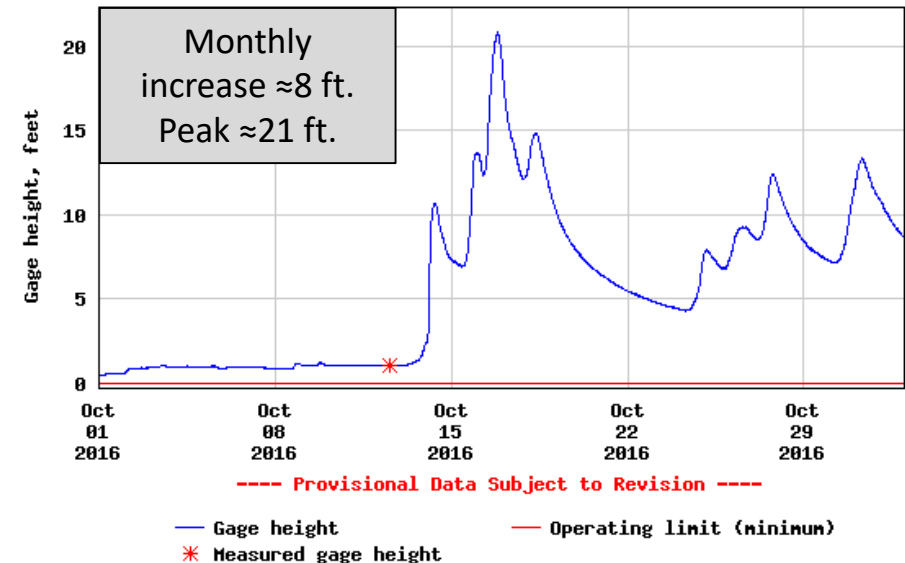
Percent of Normal Water Year Precipitation(%)  
1 - 31 October 2016



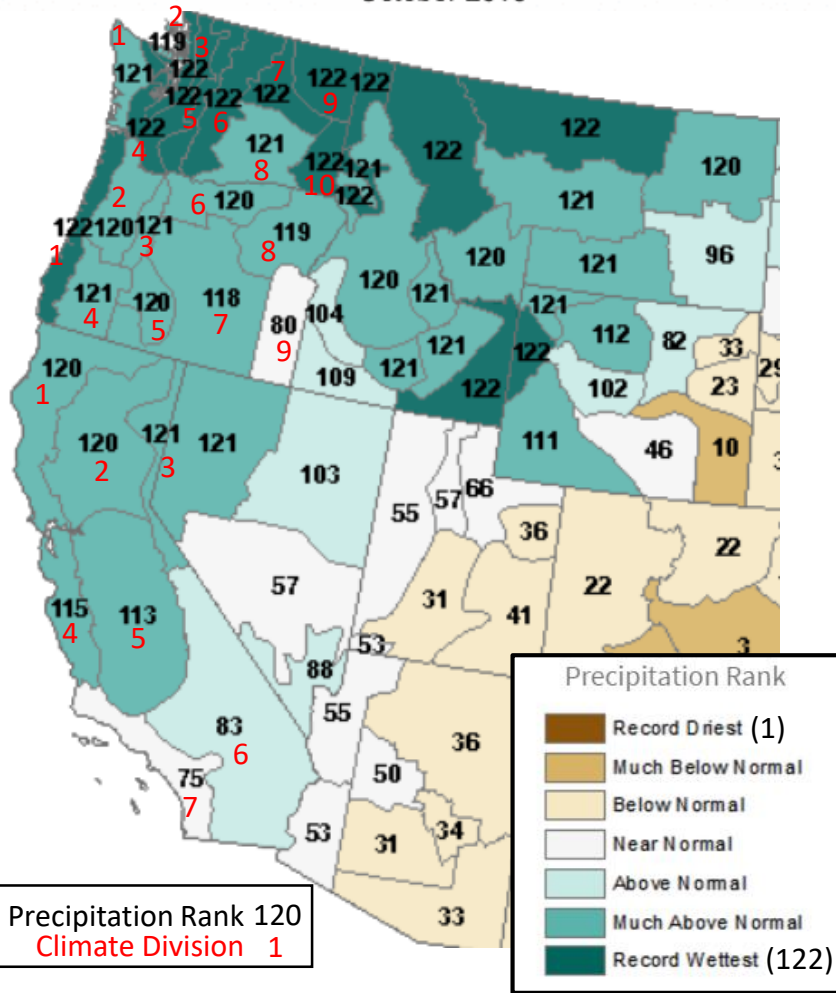
Several locations in higher elevations saw as much as 76% of their total normal water year precipitation

SW OR/NW CA saw >40% of normal water year precipitation resulting in large increases in river levels

USGS 14377100 ILLINOIS RIVER NEAR KERBY, OR



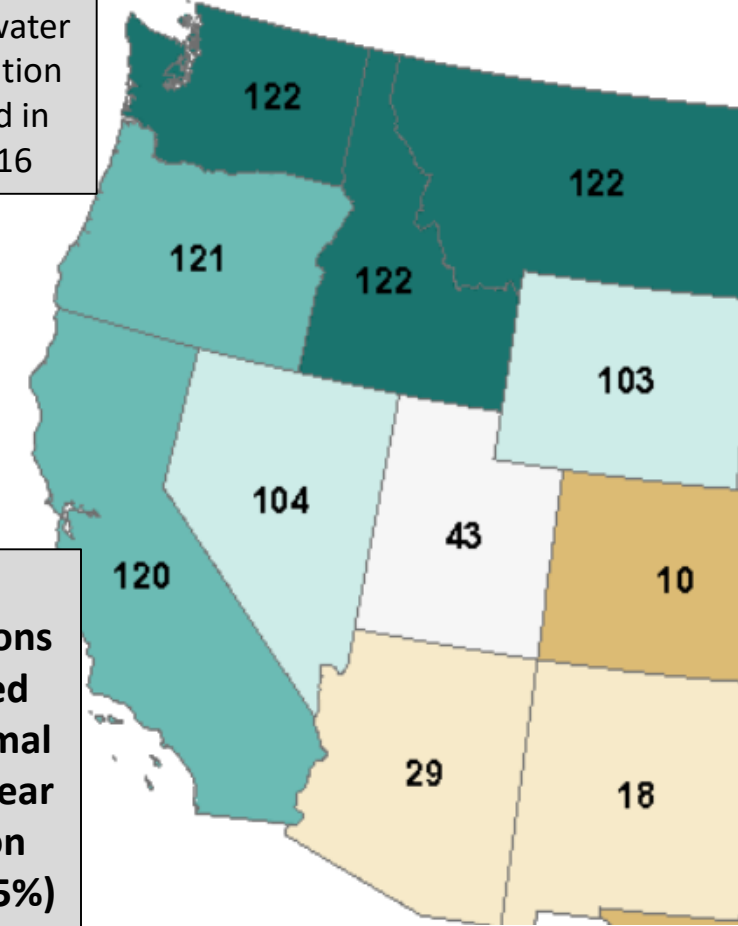
## Divisional Precipitation Ranks October 2016



State / Climate Division	Oct 2016 Precip (in)	Normal WY Precip (in)	Percentage of Normal WY
ALL	3.58	22.39	15.99
<b>1</b>	<b>10.65</b>	<b>48.68</b>	<b>21.88</b>
2	6.66	35.18	18.93
<b>3</b>	<b>4.47</b>	<b>20.62</b>	<b>21.68</b>
4	2.49	20.96	11.88
5	2.39	20.07	11.91
6	0.58	18.98	3.06
7	0.39	6.26	6.23
OR ALL	<b>6.87</b>	<b>32.21</b>	<b>21.33</b>
1	<b>20.57</b>	<b>83.49</b>	<b>24.64</b>
2	<b>13.22</b>	<b>57.42</b>	<b>23.02</b>
<b>3</b>	<b>12.57</b>	<b>47.22</b>	<b>26.62</b>
4	<b>17.91</b>	<b>79.53</b>	<b>22.52</b>
5	<b>5.64</b>	<b>25.72</b>	<b>21.93</b>
6	<b>3.59</b>	<b>18.1</b>	<b>19.83</b>
7	<b>2.66</b>	<b>15.73</b>	<b>16.91</b>
8	<b>3.82</b>	<b>24.71</b>	<b>15.46</b>
9	<b>1.05</b>	<b>12.55</b>	<b>8.37</b>
WA ALL	<b>9.98</b>	<b>42.03</b>	<b>23.74</b>
1	<b>24.68</b>	<b>108.26</b>	<b>22.80</b>
2	<b>5.43</b>	<b>27.77</b>	<b>19.55</b>
3	<b>9.88</b>	<b>43.32</b>	<b>22.81</b>
4	<b>16.55</b>	<b>73.79</b>	<b>22.43</b>
5	<b>19.56</b>	<b>86.35</b>	<b>22.65</b>
6	<b>8.45</b>	<b>36.96</b>	<b>22.86</b>
<b>7</b>	<b>3.89</b>	<b>13.13</b>	<b>29.63</b>
<b>8</b>	<b>2.95</b>	<b>10.16</b>	<b>29.04</b>
<b>9</b>	<b>6.87</b>	<b>22.41</b>	<b>30.66</b>
<b>10</b>	<b>4.94</b>	<b>19.66</b>	<b>25.13</b>

## Statewide Precipitation Ranks

October 2016  
Period: 1895-2016



Percentage of normal total water year precipitation that occurred in October 2016

**Bold rows indicate regions that received >20% of normal total water year precipitation (highlight >25%)**

Several climate divisions in WA, Western OR had the wettest October on record

All but one Climate Division in California had above average precipitation for October

October 2016 was Washington's wettest, Oregon's second wettest, and California's third wettest October on Record

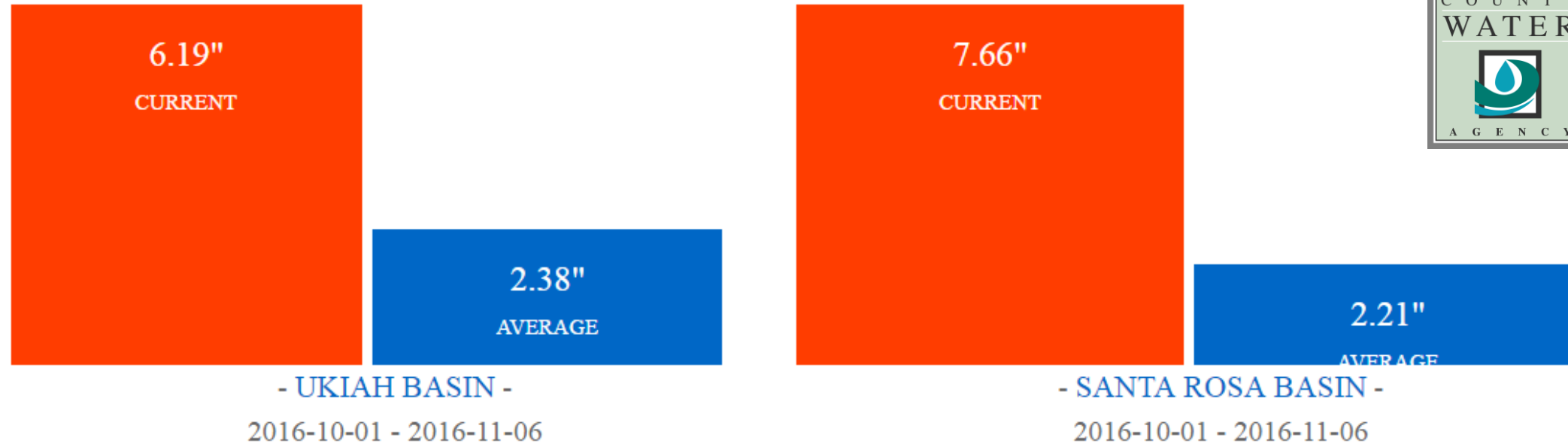
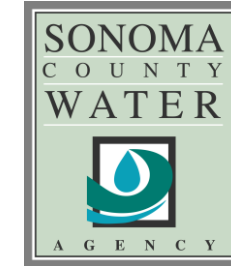


# Russian River Watershed



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Current Water Year vs. Average For This Date. The Water Year begins on October 1.



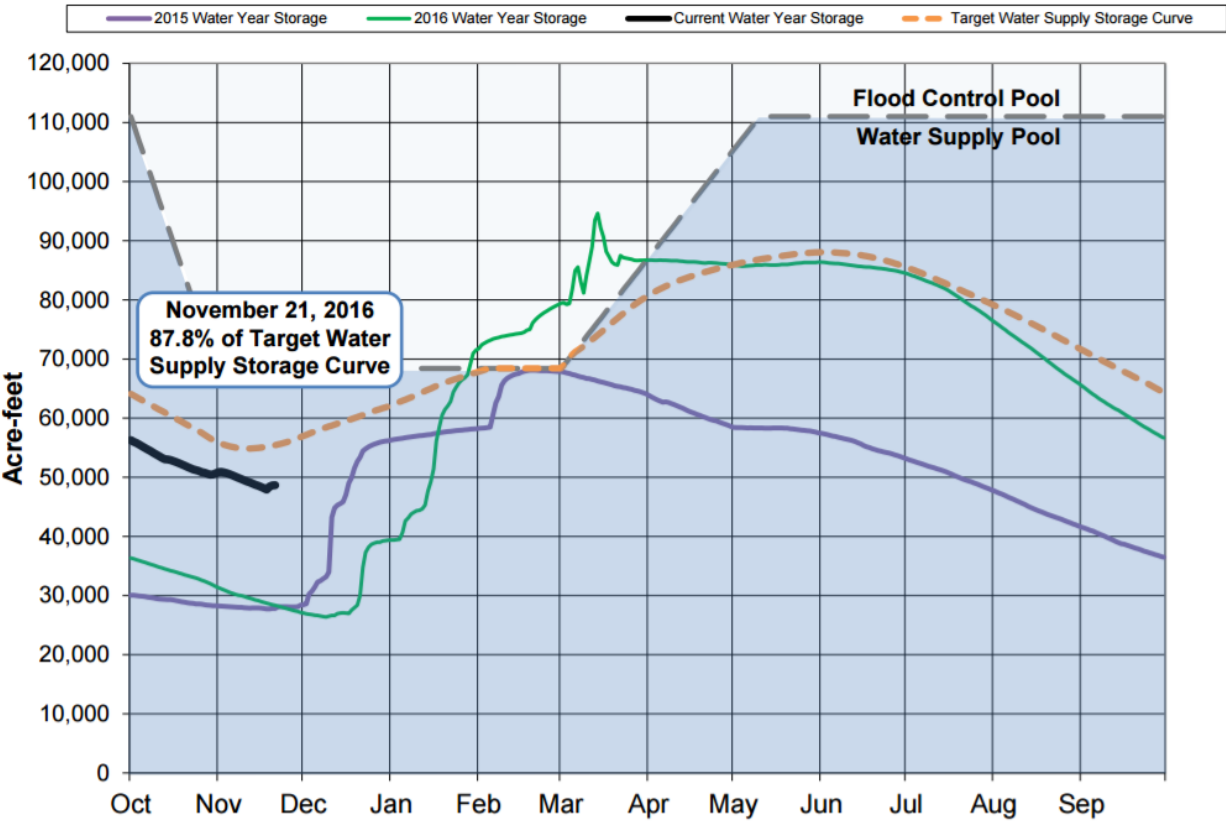
The Ukiah and Santa Rosa Basins in the Russian River Watershed, have received 3.81" and 5.45" more than the average WY precipitation to date

The ground water beneath these two basins provide a source of water for residents and municipal systems, irrigation water for agriculture, and base flow to streams, surface water bodies and associated ecosystems

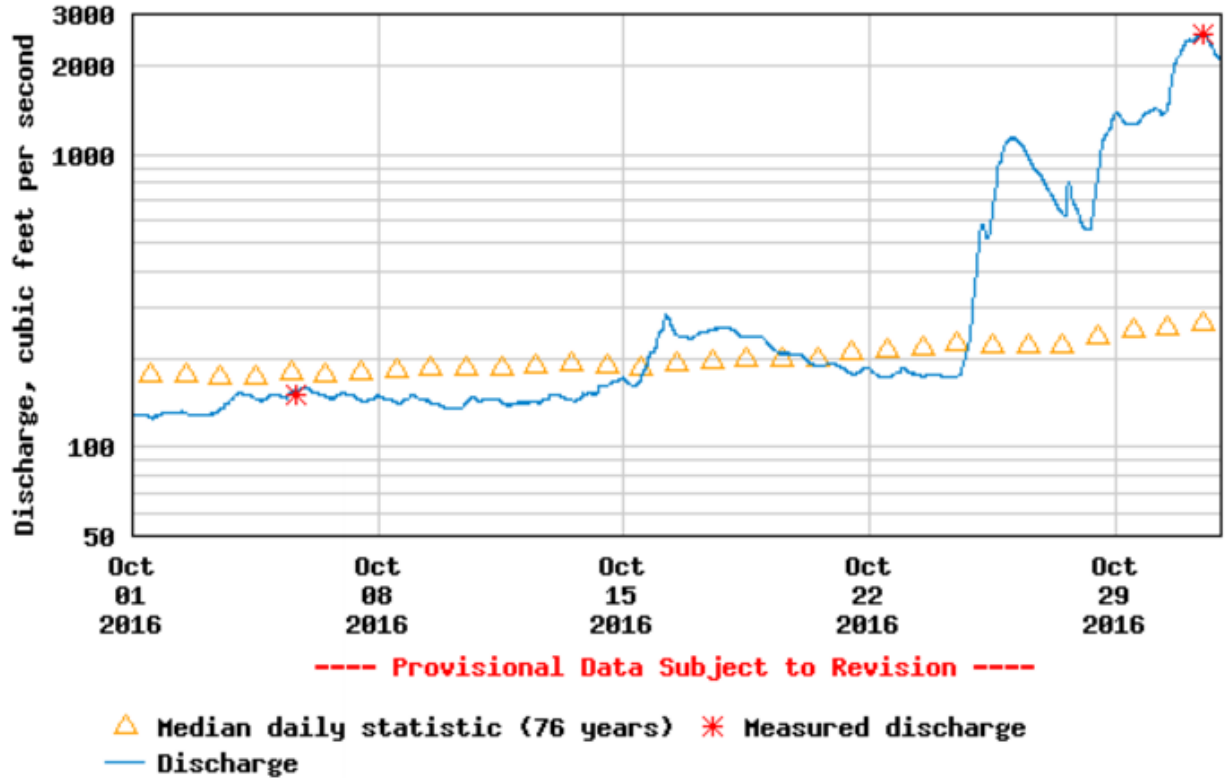
# Russian River Watershed

Despite high precipitation, reservoir levels on the Russian River (Lakes Mendocino (below) and Sonoma) had a decrease in levels due to water supply needs of the region. Although the decrease in storage was slightly less than normal October decreases

**Lake Mendocino Water Supply Storage**



USGS 11467000 RUSSIAN R NR GUERNEVILLE CA



The Russian River at Guerneville, California saw discharge reach as high as ~2500 cubic feet per second. High precipitation occurred throughout the month, but most rivers did not show a response due to dry soils early in the month. Soil moisture increased sufficiently by late October resulting in high runoff.

# Northern Sierra 8-Station Index



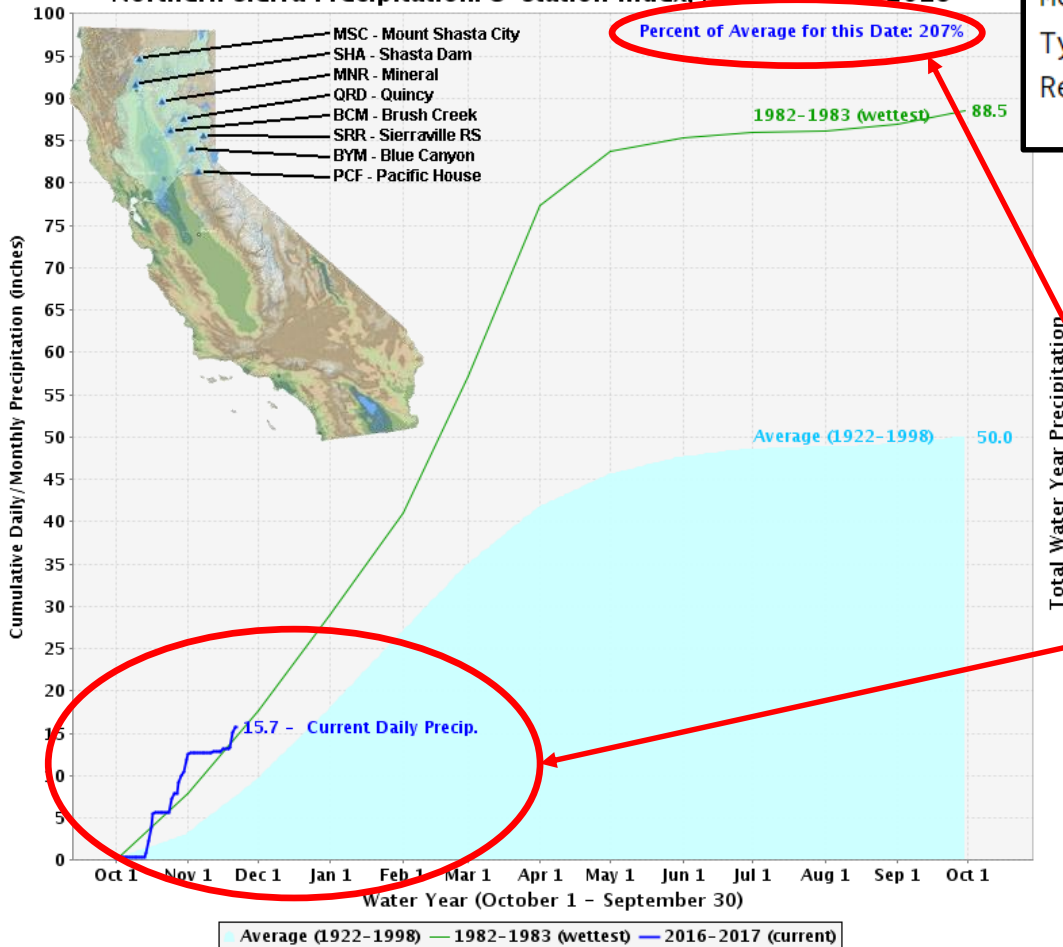
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Percentage of WY Precipitation to Date for 16 October 2016 at Northern Sierra 8-station index

Current:	8.6%	1-day Δ:	2.87%	2-day Δ:	5.12%	3-day Δ:	7.79%
-----							
	(1958/10/16)						
Rec_low:	0.0%	50-ptile:	0.15%	50-ptile:	0.25%	50-ptile:	0.34%
Typ_low:	0.0%	90-ptile:	1.82%	90-ptile:	2.82%	90-ptile:	3.58%
Mean:	2.5%	95-ptile:	2.70%	95-ptile:	4.34%	95-ptile:	5.47%
Typ_high:	5.4%	99-ptile:	4.68%	99-ptile:	7.12%	99-ptile:	9.12%
Rec_high:	32.8%	Record:	11.46%	Record:	20.52%	Record:	25.53%
		(1962/10/16)	(1962/10/12)	(1962/10/13)	(1962/10/14)		

Northern Sierra Precipitation: 8-Station Index, November 22, 2016



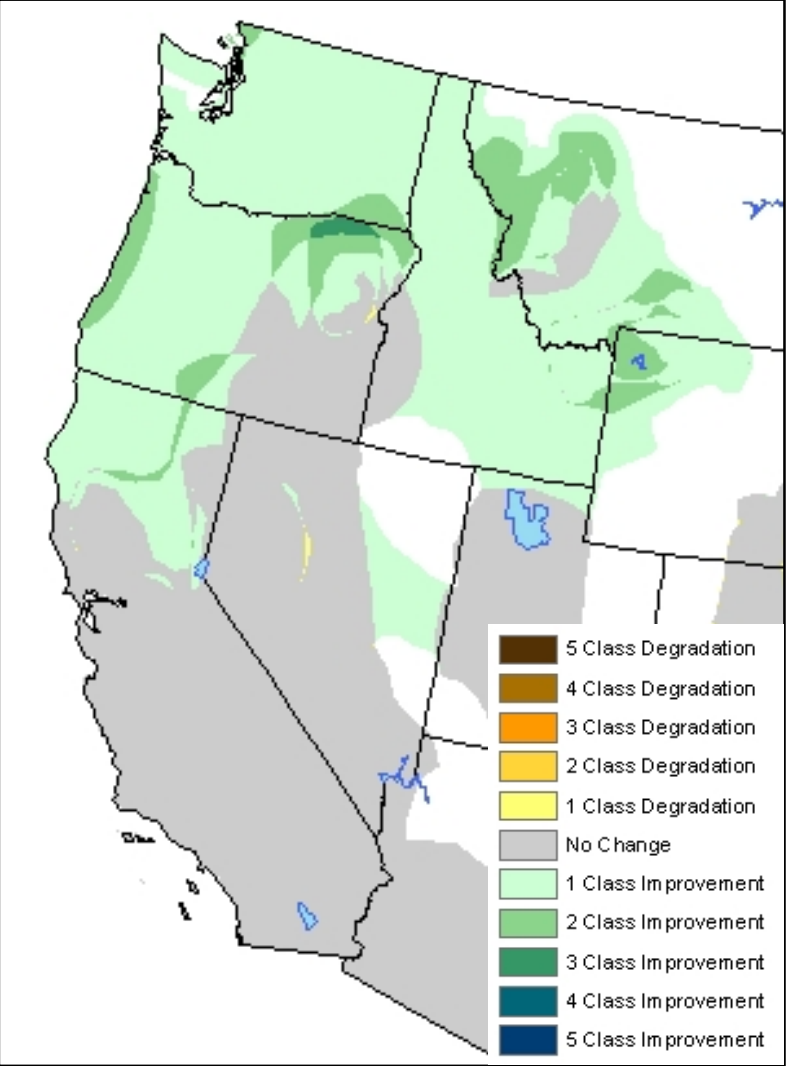
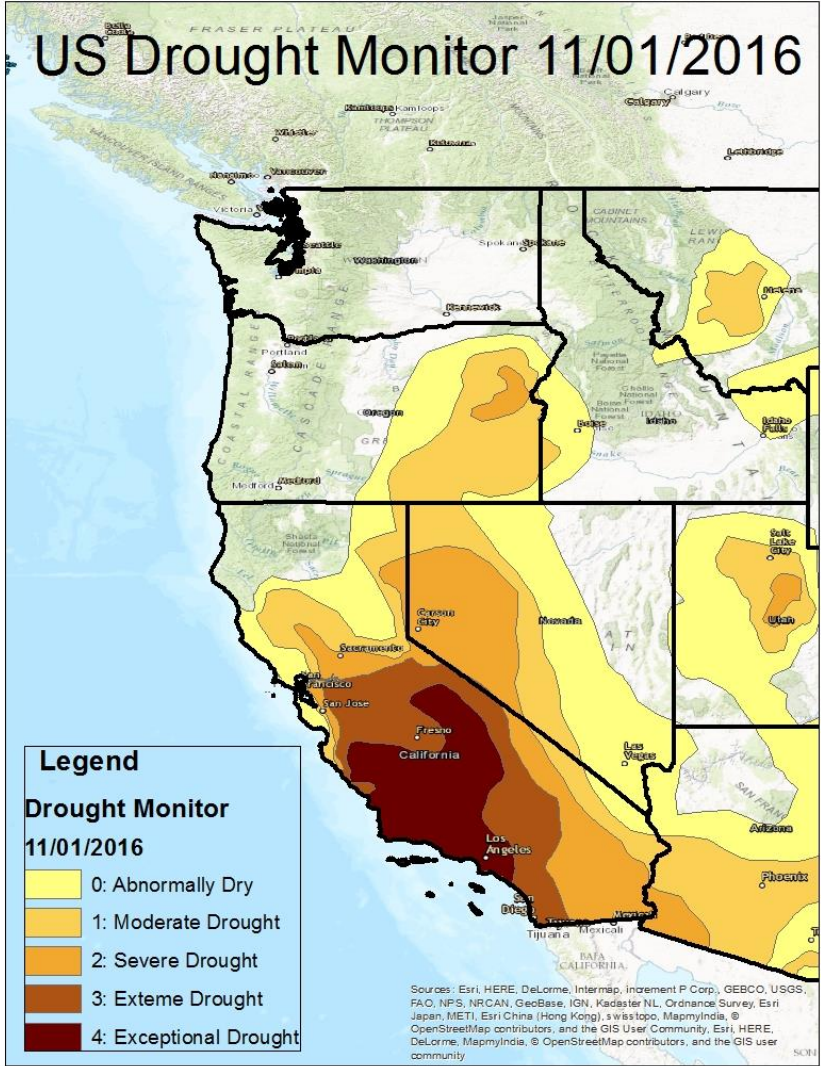
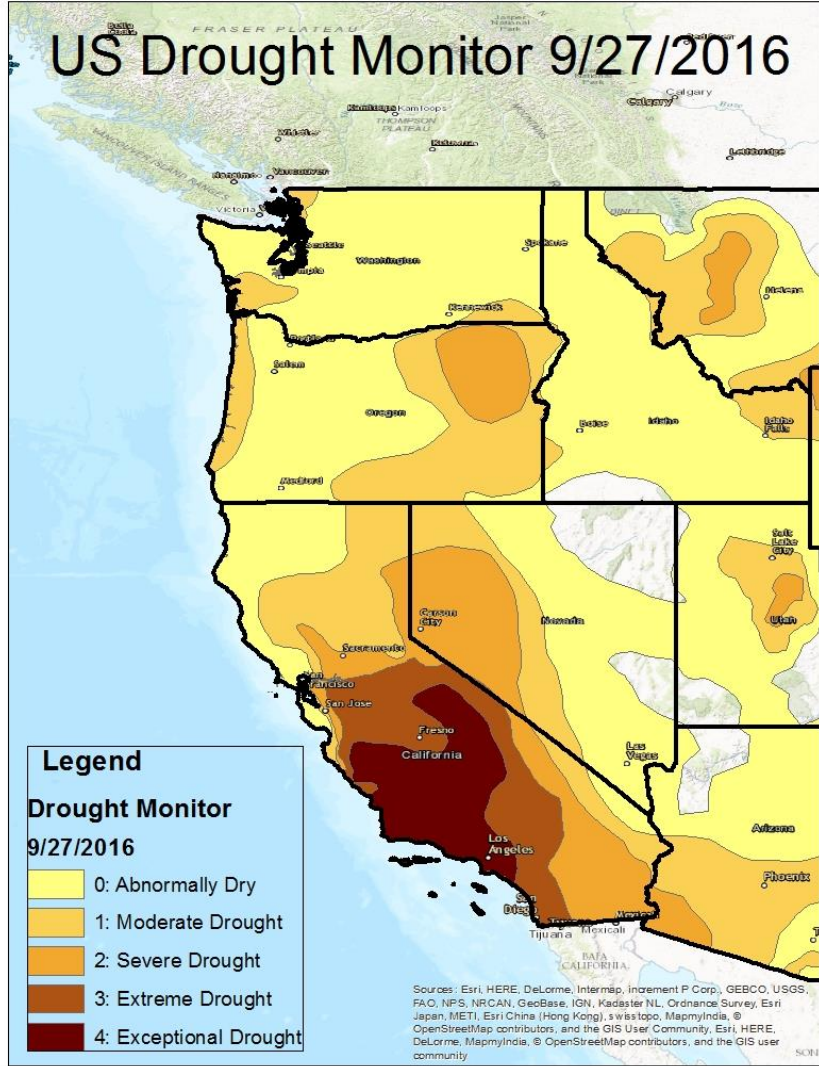
The three day change from 14–16 October 2016 of the percentage of WY precipitation at the 8-station index in the Northern Sierra was 7.79%, which is approaching the 99<sup>th</sup> percentile of all events.

Due to the large precipitation amounts of Oct. and some more precipitation in Nov., the 8-station index is currently at 207% of average precipitation for this date (through November 22<sup>nd</sup>).



# Drought Improvement

# U.S. Drought Monitor Class Change 1 Month



- The large amounts of precipitation resulted in drought mitigation over a large portion of the Pacific NW
- All of WA, a majority of OR and parts of northern CA saw a class improvement of at least 1

# Media Coverage



The active month of October 2016 made for one of the wettest Octobers on record for several locations in the Pacific Northwest

**Record-breaking wet October with over 10 inches rain**

Rich Marriott, KING 3:05 PM, PDT November 01, 2016

October started wet and stayed wet the whole month. It was the wettest October ever recorded at Sea-Tac and shattered a bunch of records across the state.

Dana Felton, a meteorologist at the National Weather Service office in Seattle (and who has a thing for weather statistics) put together some numbers.

**Regional Forecast Video**

**Record Wet October in Parts of Oregon, Washington**

By Linda Lam and Jon Erdman | Published Oct 31 2016 02:38 PM EDT | weather.com

**Story Highlights**

This is one of the wettest Octobers on record in the Northwest.

**Drought Improvement**

A series of low pressure systems brought much-needed rainfall to the Pacific Northwest early in the month. [Damaging winds were also observed](#) in Oregon and Washington the weekend of Oct. 15.

The drought monitor released on Oct. 20 showed, for the first time since early June, a small part of California that isn't analyzed as even abnormally dry, in the far northwest corner of the state. In fact, 8.96 percent of the state is not experiencing at least abnormally dry conditions.

The month has become quite popular and has made headlines with several news outlets across the west

Weather

## Super wet October launches Napa County into the rainy season

BARRY EBERLING beberling@napanews.com Nov 1, 2016



f t e b v

Napa County has kicked off the rain season with an October that ranks among the wettest of the last 100 years.

"October rain is not unusual, but this October rain is highly unusual," said Mike Pechner of Fairfield-based Golden West Meteorology.

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- 4 Napa's Walt Ranch open with protest
- 5 Napa restaurants m find workers