Drought Conditions in WA and OR: Recap and Look Ahead

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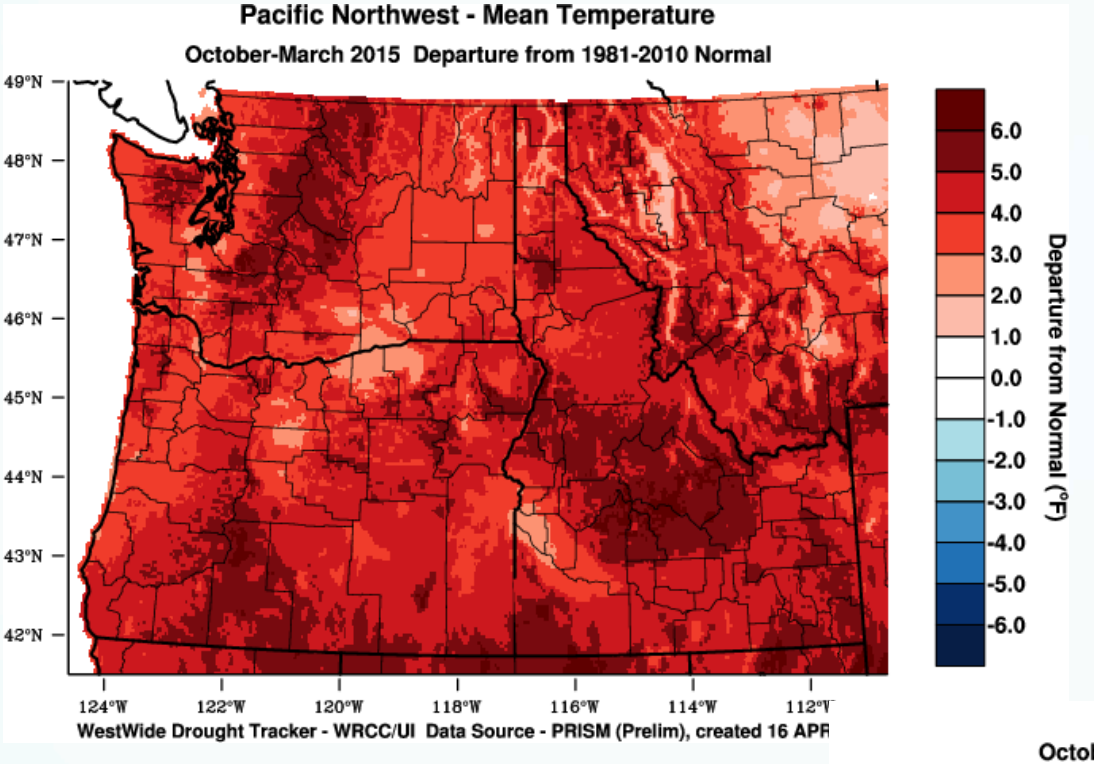
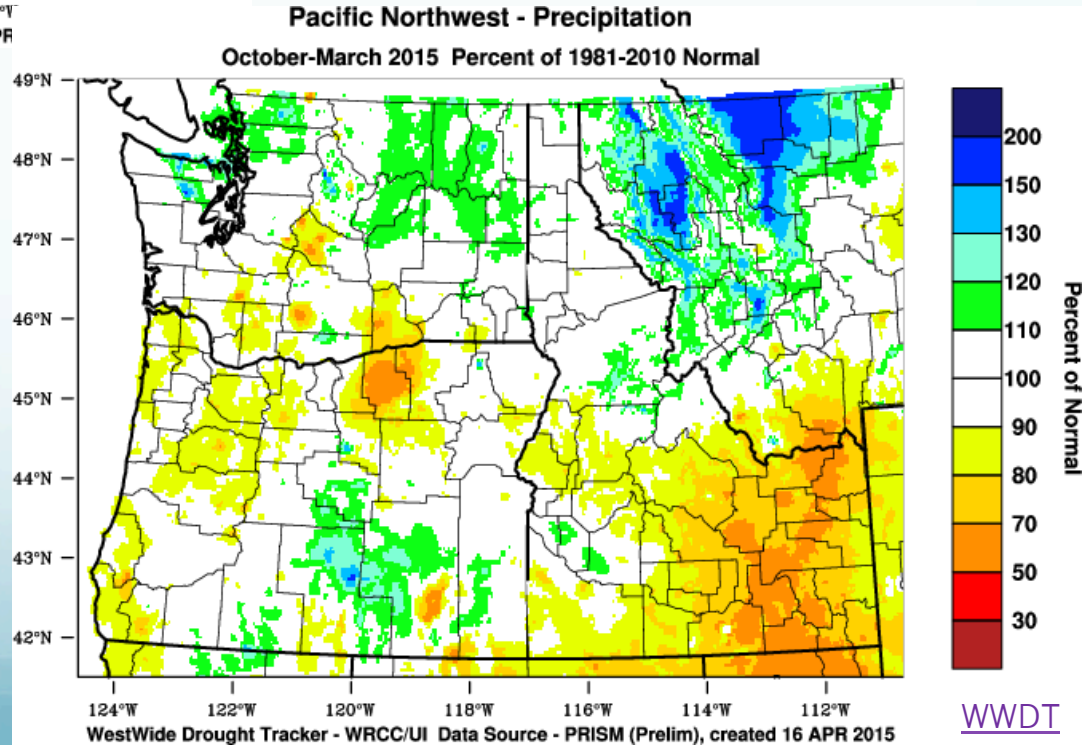
Winter Recap

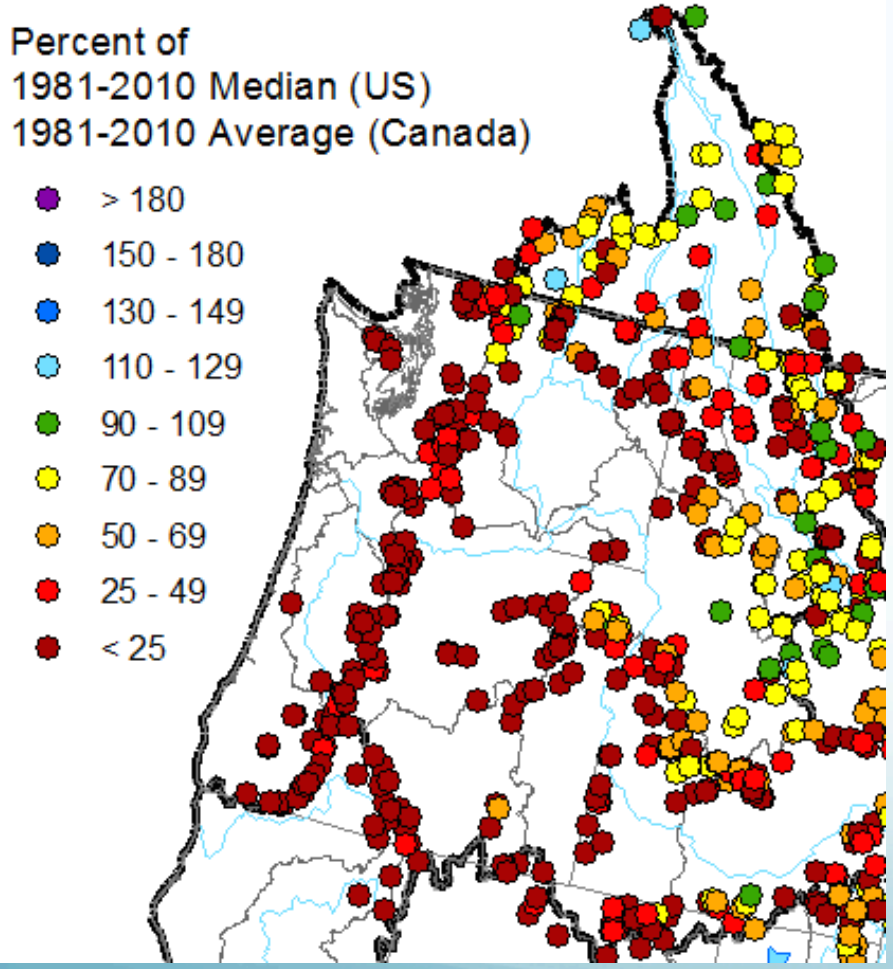


- WA: averaged statewide, **2nd warmest** Oct-Mar on record (1st: 1933-34)
- OR: averaged statewide, **tied** for warmest on record



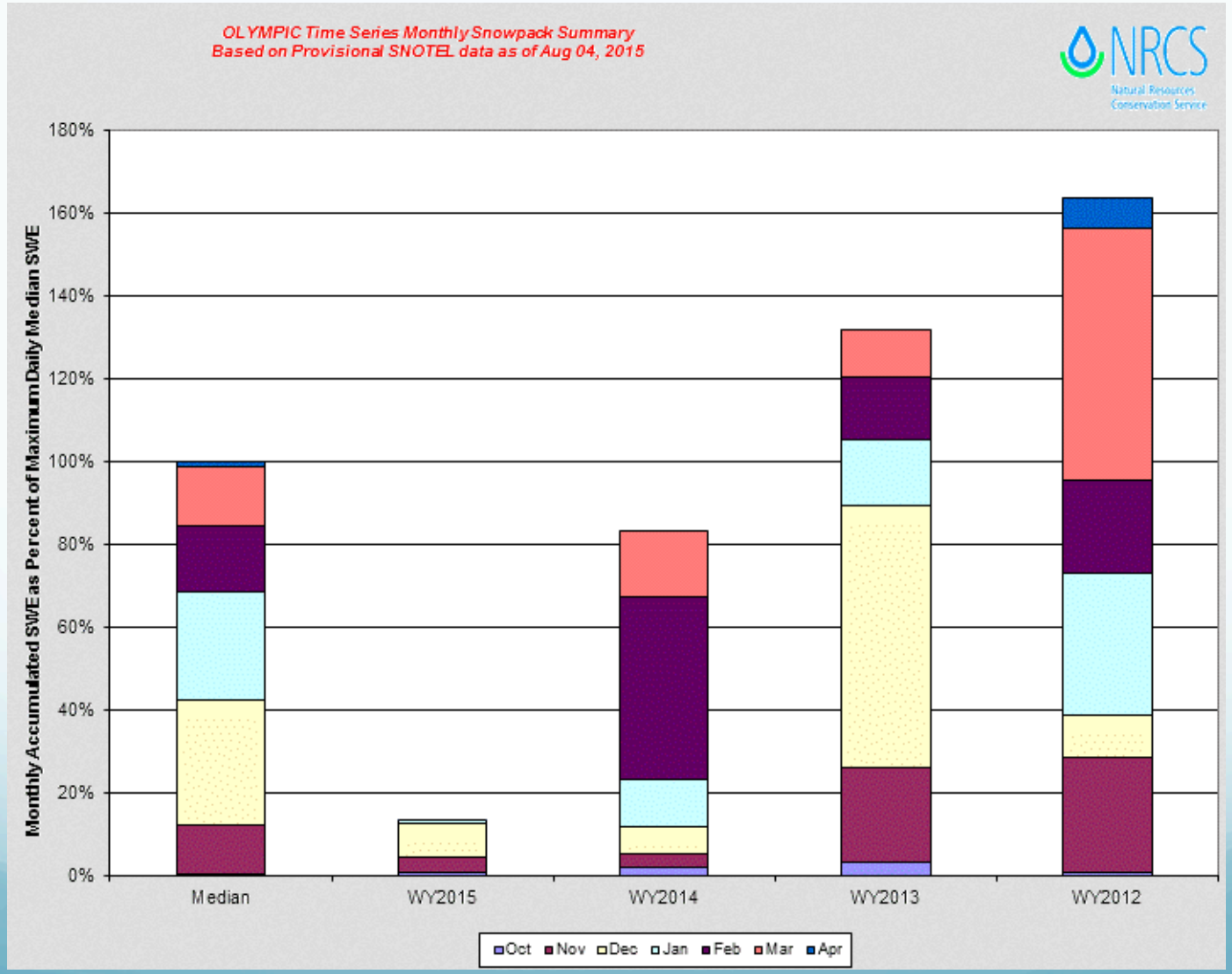
WWDT

What snow?

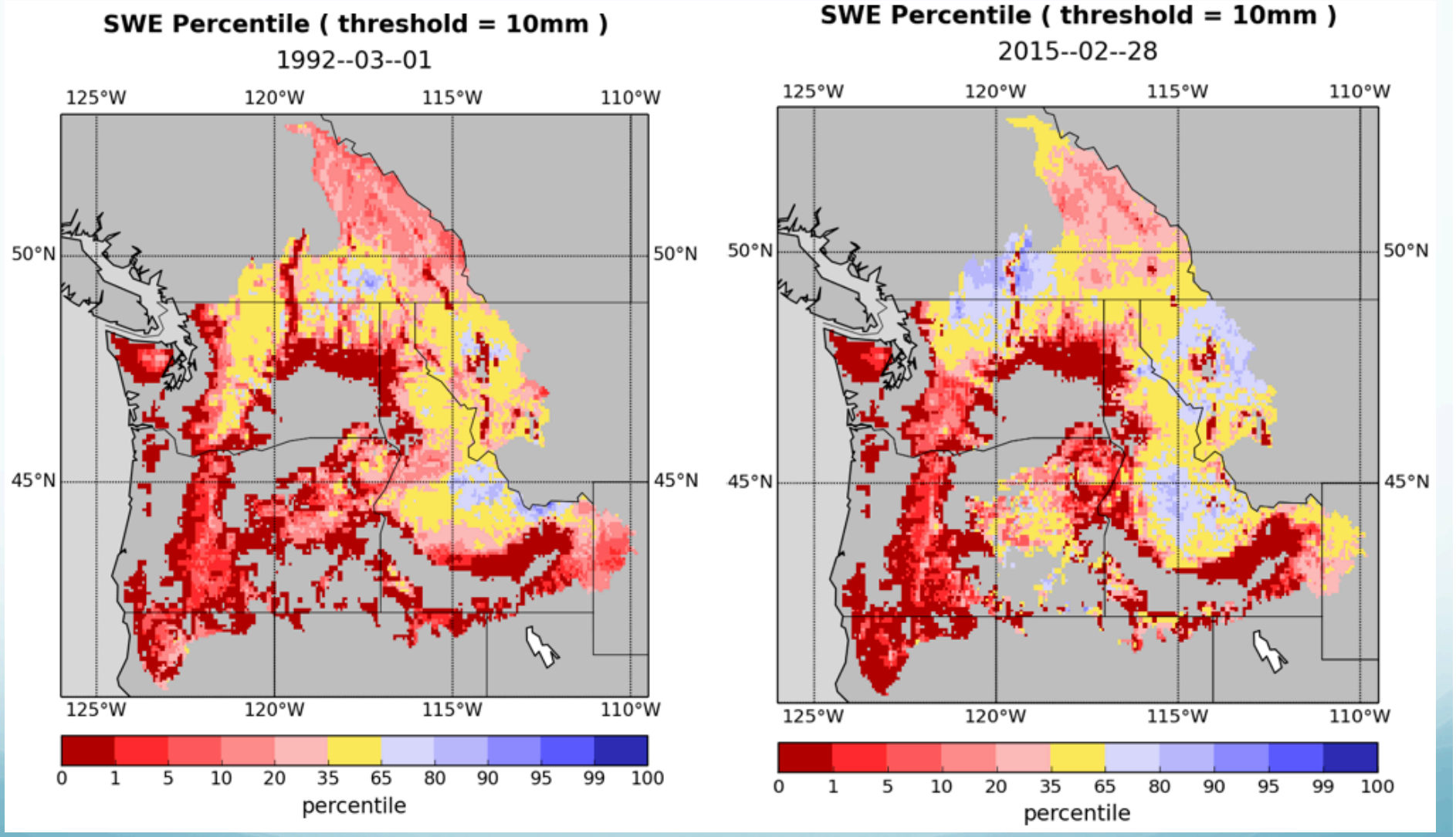


NRCS

Olympic Mountain Snowpack Summary

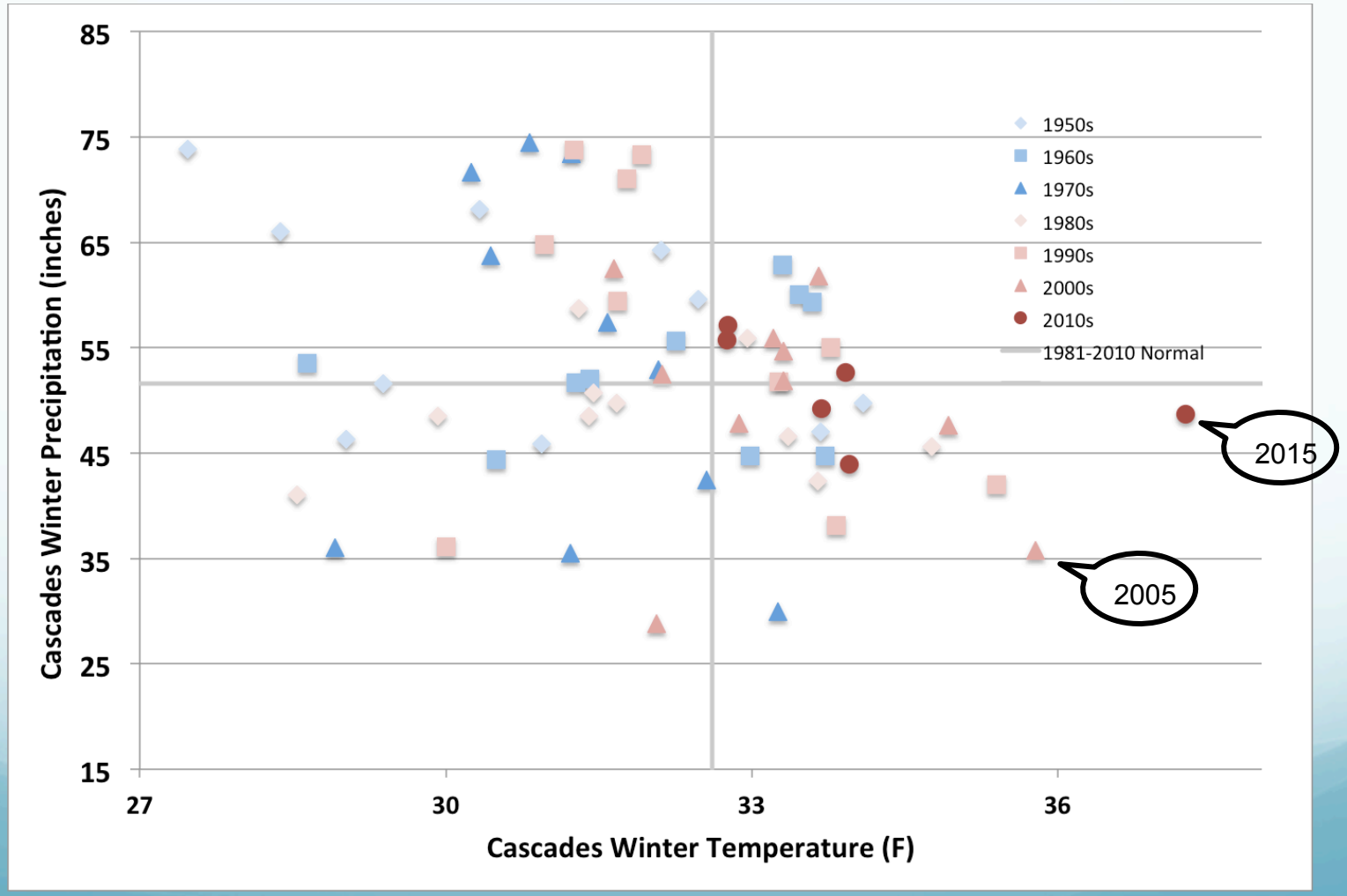


Snowpack Comparison

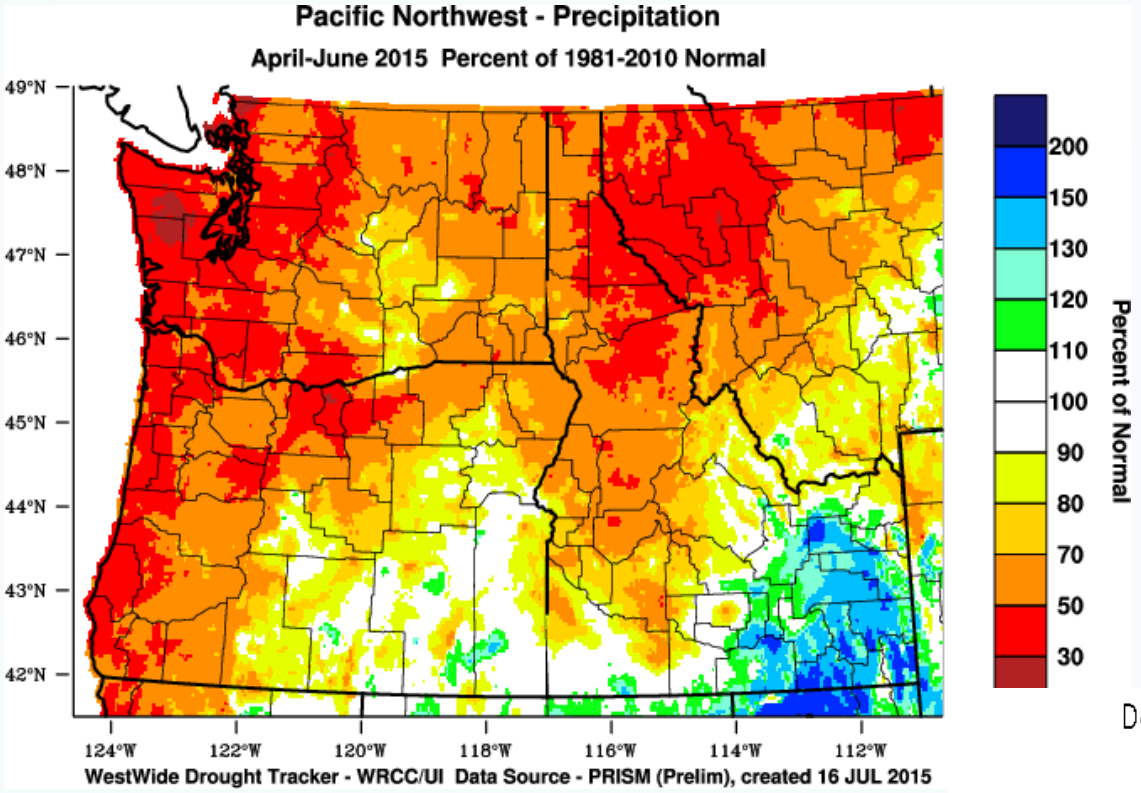


From UW Drought Monitoring System

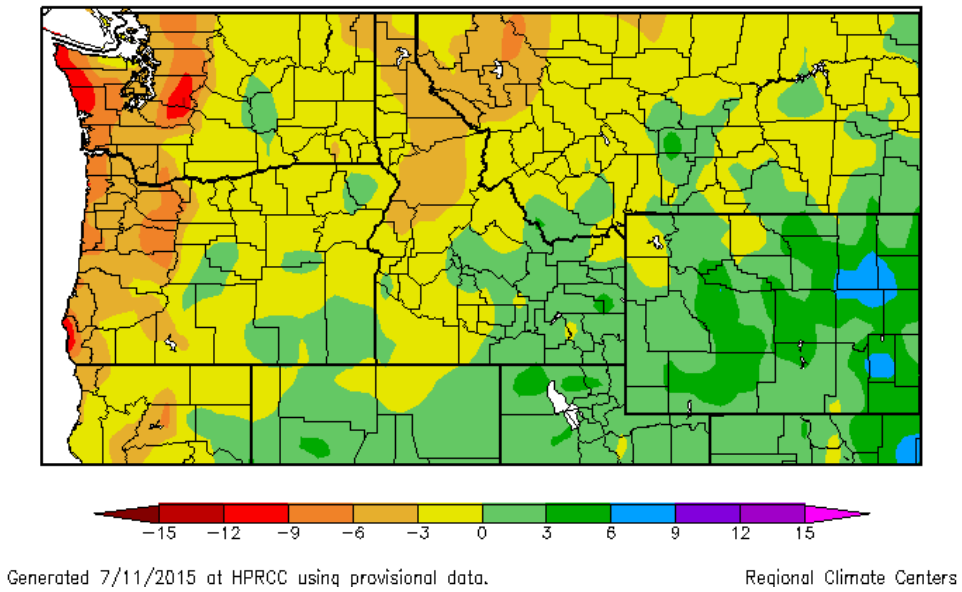
Oct-Mar WA Cascade Mountain temperature and precipitation



Spring

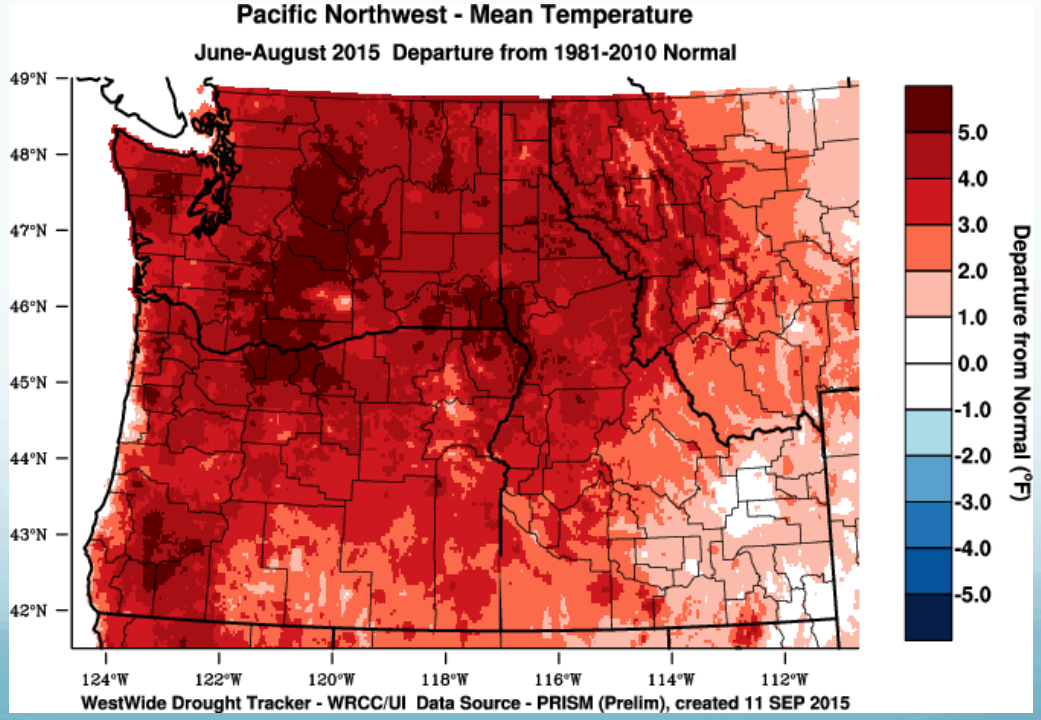


	Apr-Jun Avg T Rank	Apr-Jun Prcp Rank
SeaTac, WA	1	3
Bellingham, WA	3	1
Quillayute, WA	4	1
Astoria, OR	5	1
Portland, OR	2 (tie)	1
Eugene, OR	5	4



Summer - Temperature

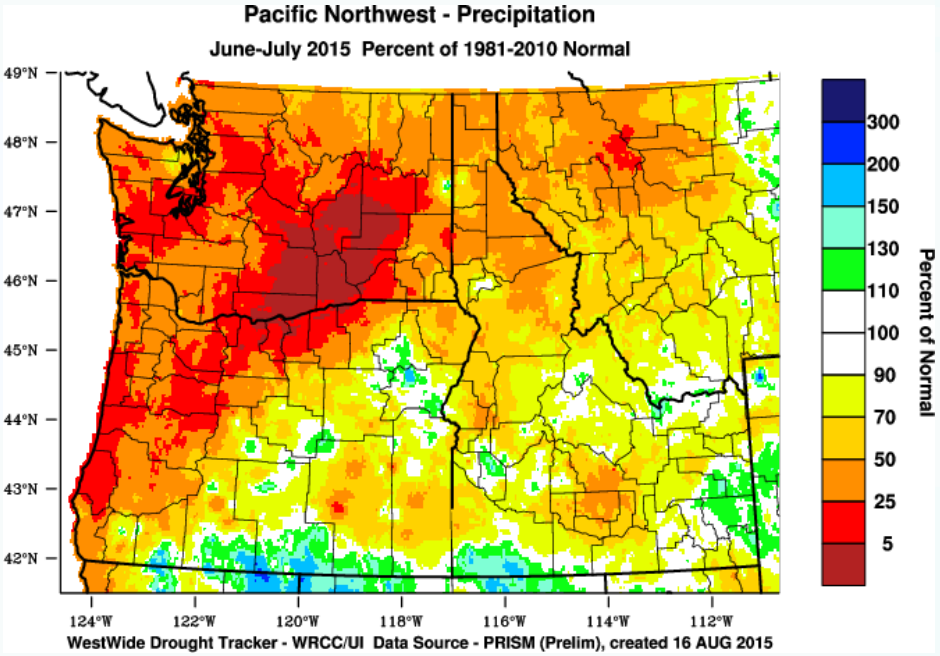
- Warmest summer (JJA) on record in WA (+5.2°F) and OR (+4.6°F)
- On track to be the warmest calendar year and water year on record for both WA and OR*
  - Assuming normal WA temps Sept-Dec, would still beat 1934 calendar year by 0.5°F

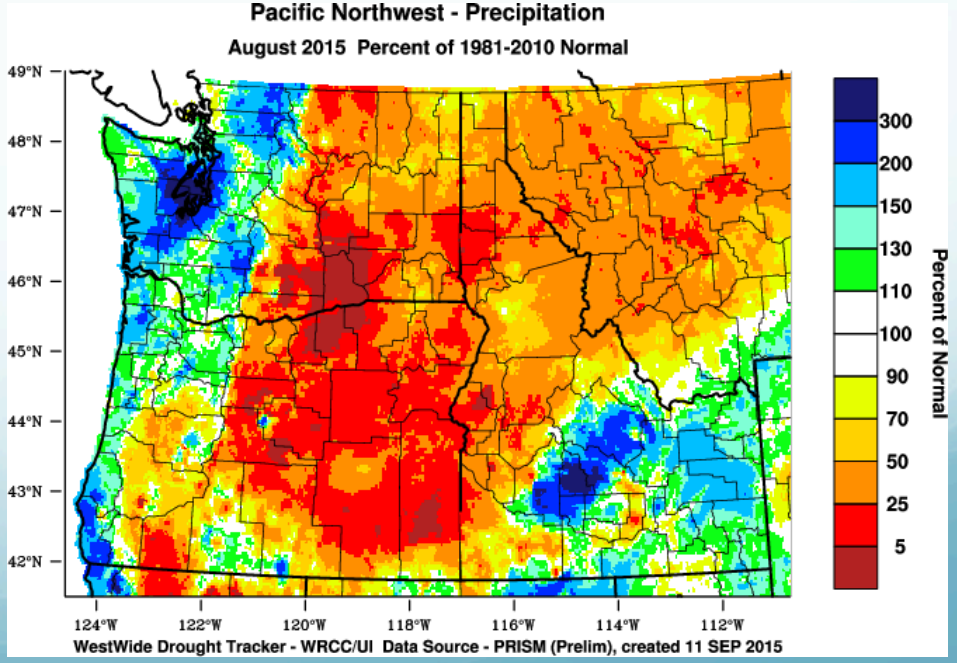


*Sept cooler so far

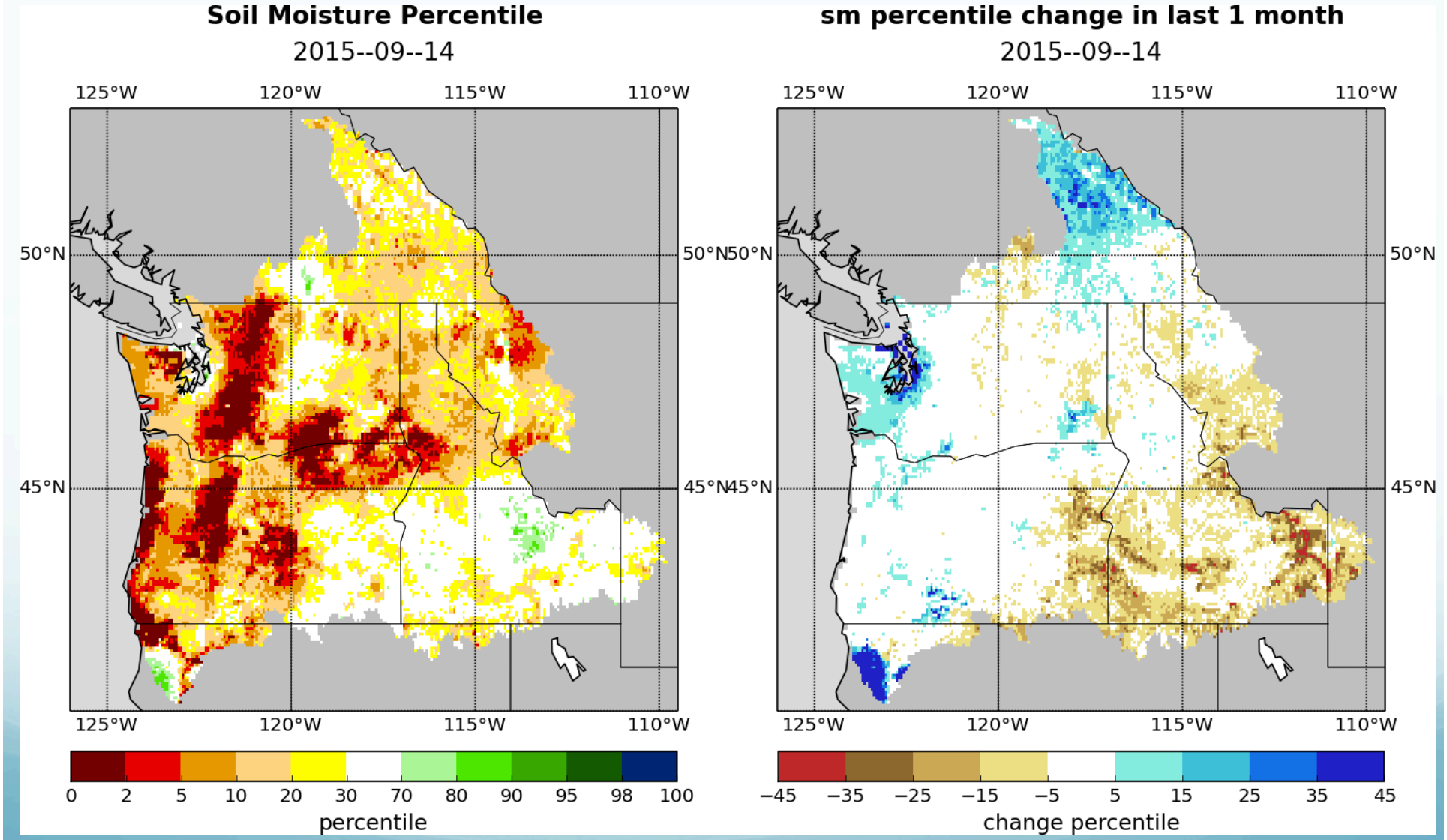
Summer - Precipitation

- June and July were drier than average for western WA and western OR
  - WA statewide: 3rd driest June-July
  - OR statewide: 28th driest June-July
- August: several wet systems that brought rain
  - Still drier than normal for the whole summer west of the Cascades except for the central Puget Sound, Kitsap Peninsula, eastern Olympics (normal)





Response in Soil Moisture

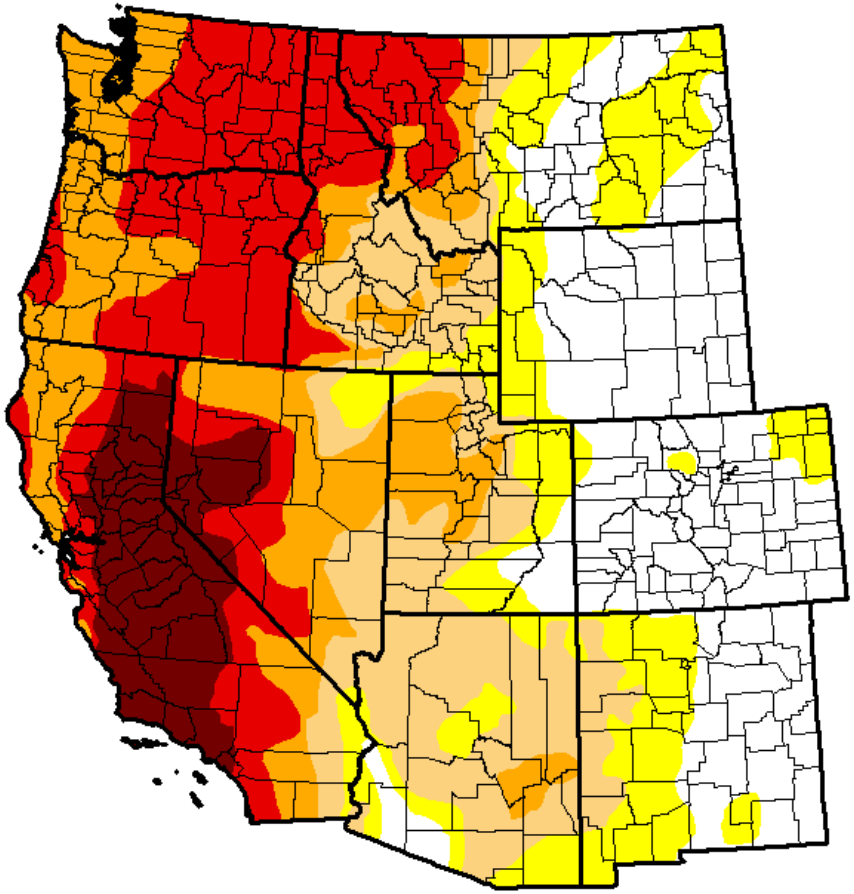


From [UW Drought Monitoring System]

US Drought Monitor

U.S. Drought Monitor

West



September 15, 2015

(Released Thursday, Sep. 17, 2015)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	24.68	75.32	59.66	42.69	26.73	7.62
Last Week 9/8/2015	24.68	75.32	59.67	42.69	26.73	7.62
3 Months Ago 6/16/2015	27.93	72.07	56.17	34.48	17.13	7.26
Start of Calendar Year 12/30/2014	34.76	65.24	54.48	33.50	18.68	5.40
Start of Water Year 9/30/2014	31.48	68.52	55.57	35.65	19.95	8.90
One Year Ago 9/16/2014	29.74	70.26	57.24	38.69	19.88	8.90

Intensity:

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

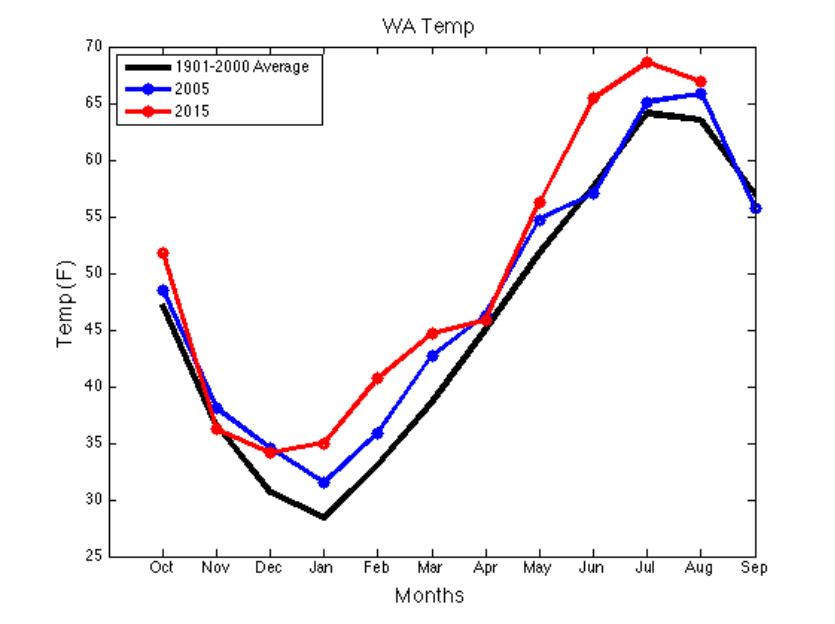
Author:

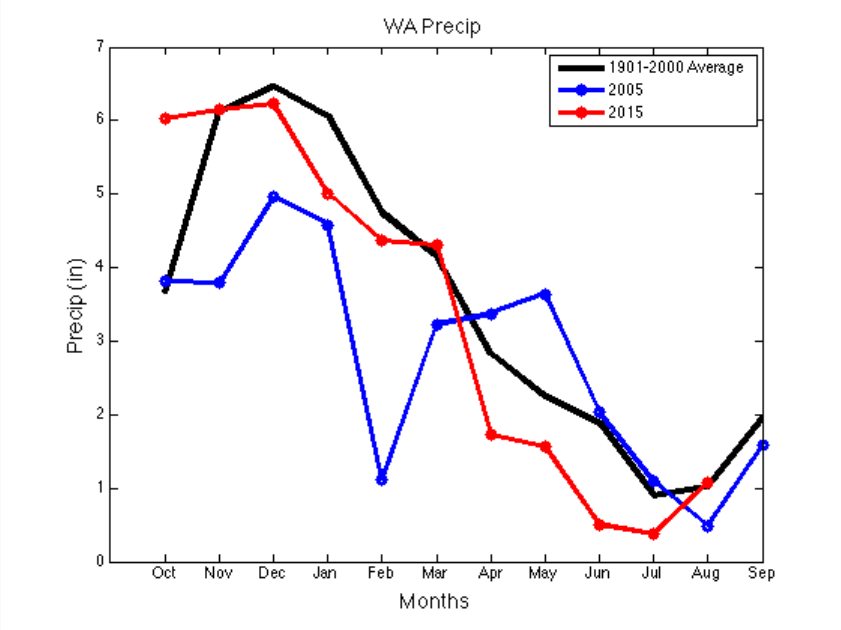
Chris Fenimore

NOAA/NESDIS/NCEI

http://droughtmonitor.unl.edu/

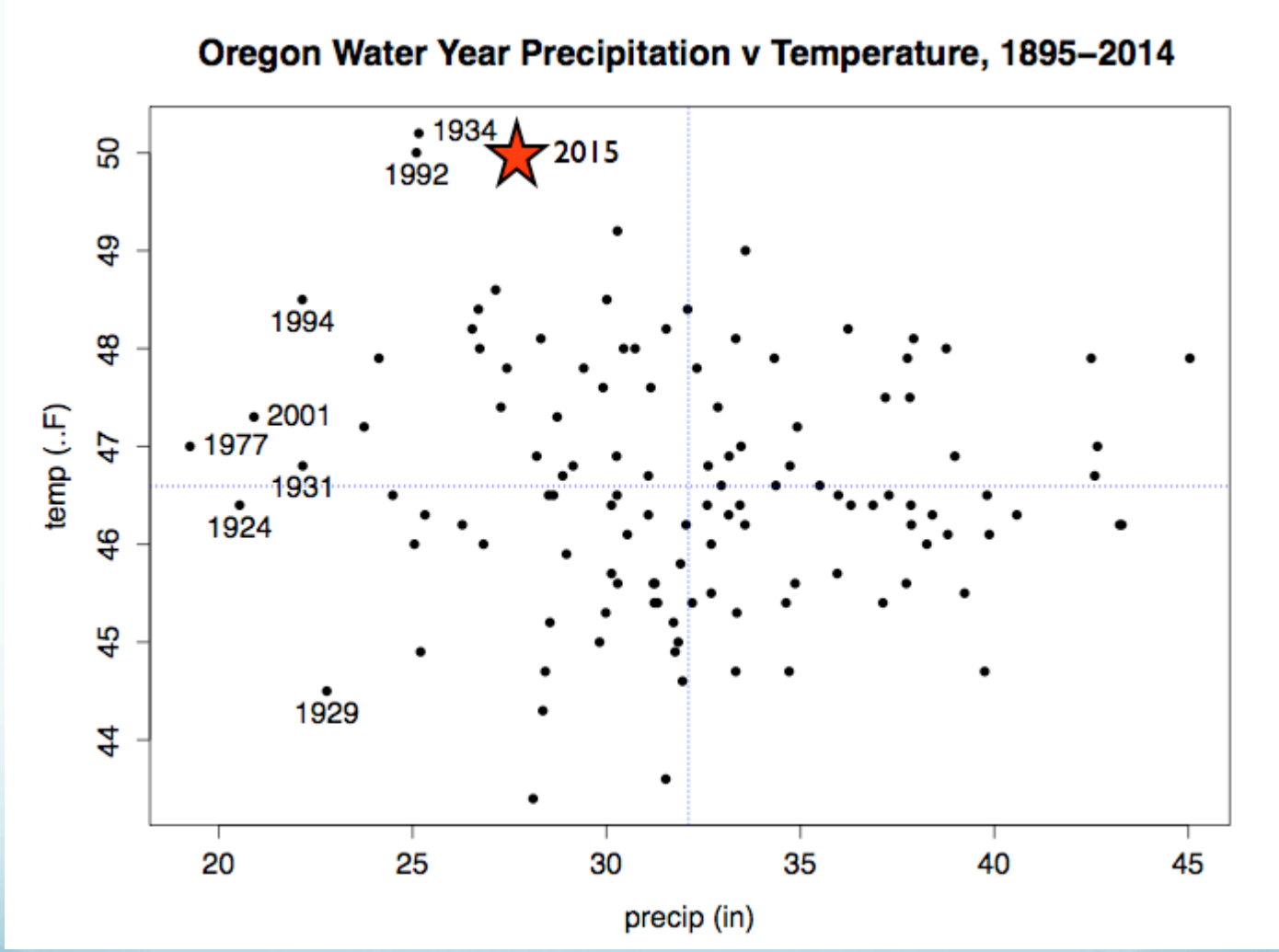
WA - Comparison to 2005





- Temperature from Jan-Mar and Jun-Jul much warmer in 2015 than 2005
  - Feb 2015 was 4.8°F warmer than Feb 2005
- 2005 winter precipitation was below normal; 2015 Oct-Mar precipitation much closer to normal
- Wet spring in 2005 – with big mountains snow in late March – helped to mitigate drought impacts; 2015 spring/summer was warm and dry

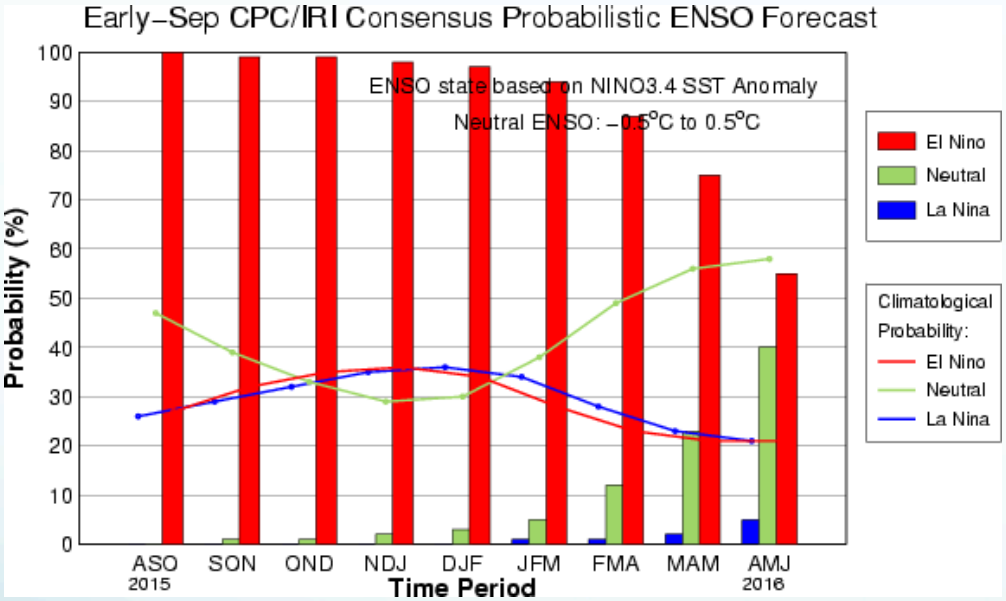
OR – Water Year Historical Context

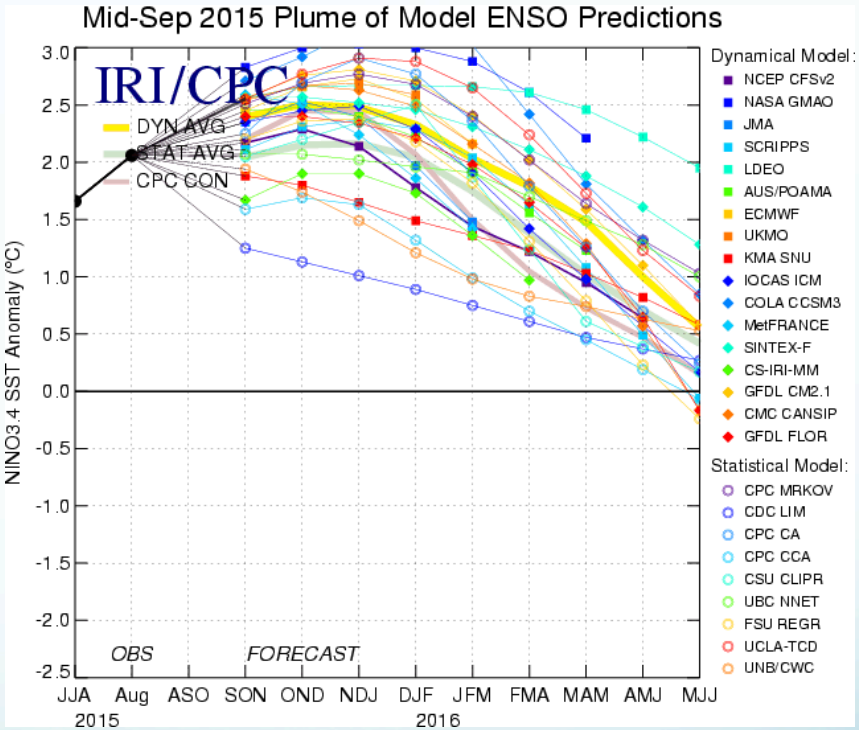


Oregon Climate Service

ENSO Predictions

- >95% chance that El Niño will continue through winter 2015-16 (Climate Prediction Center)

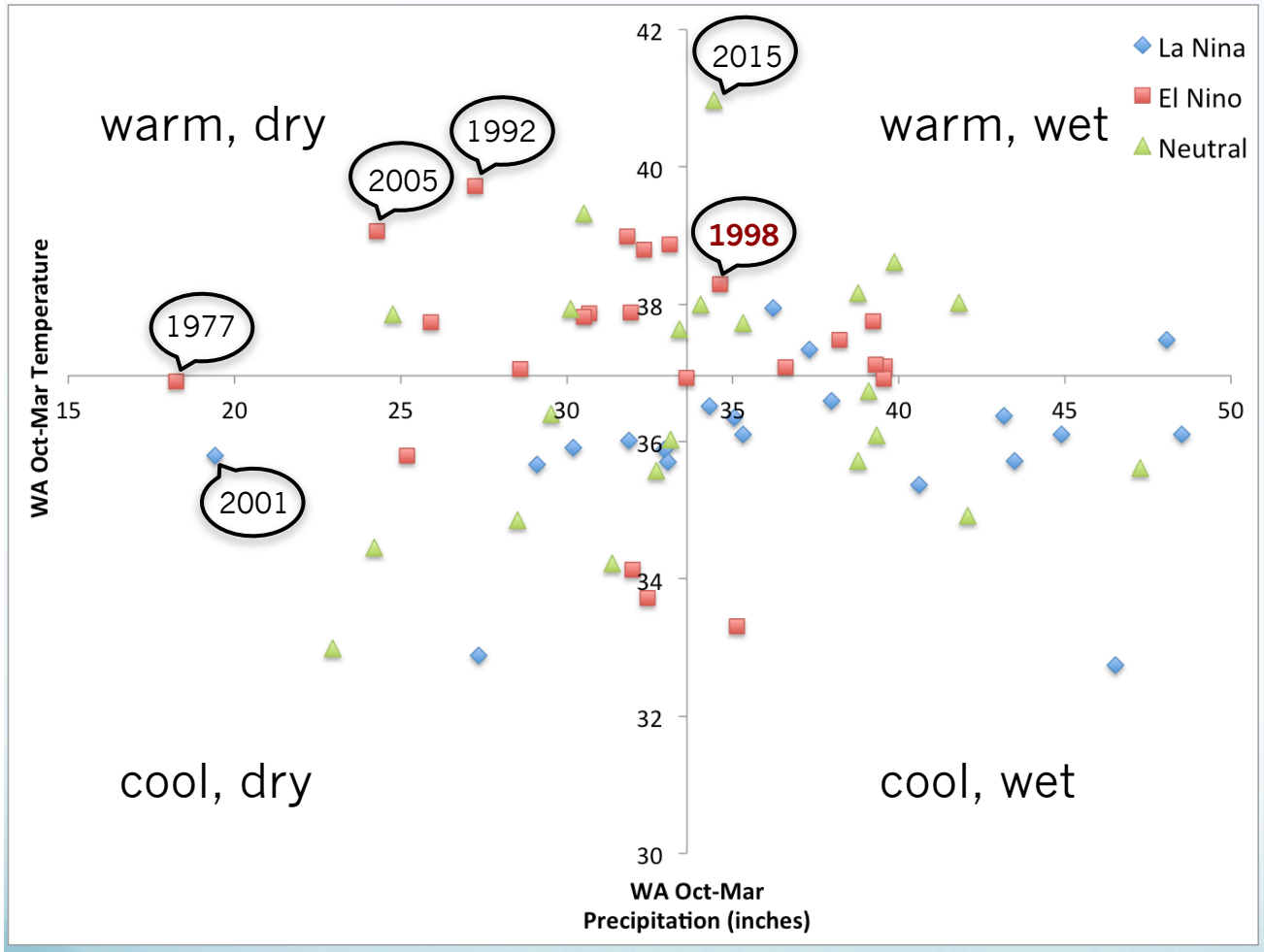




- PNW: warmer/drier than normal during El Niño with less snowpack by the end of season

Drought Predictability: Links?

WA Statewide



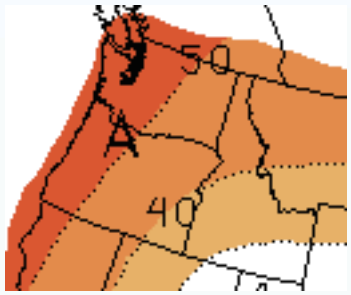
- Relationship only works sometimes and doesn't take into account the different types of El Niño events
- Other sources of potential predictability have not been fully explored
- Need a better way to anticipate droughts on a seasonal scale

Seasonal Outlook

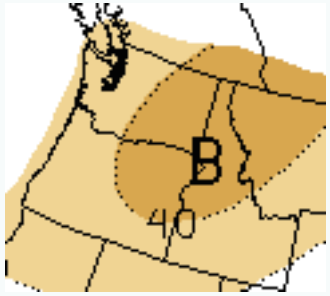
- From NOAA's Climate Prediction Center (released Sept 17)

October-November-December

temperature



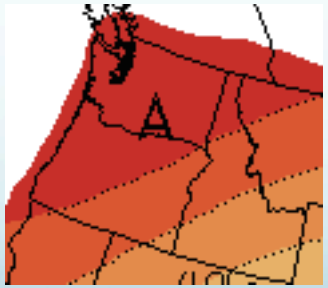
precipitation



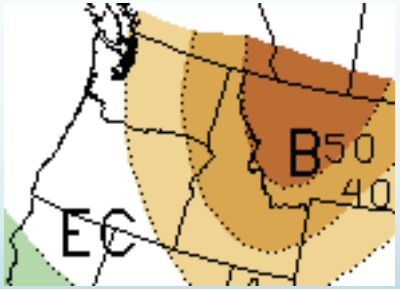
EC MEANS EQUAL
CHANCES FOR A, N, B
A MEANS ABOVE
N MEANS NORMAL
B MEANS BELOW

January-February-March

temperature

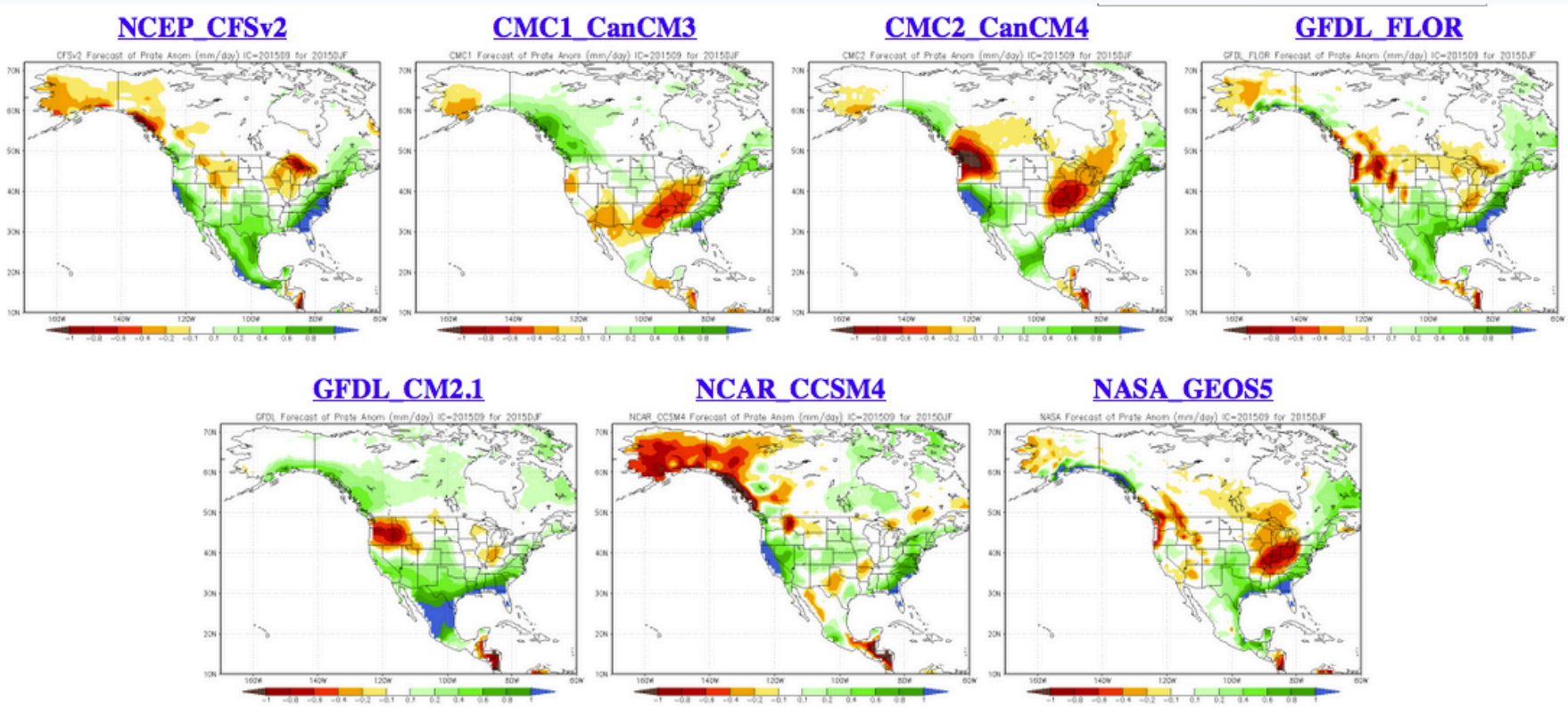


precipitation



Variation in Individual Models

Dec-Jan-Feb

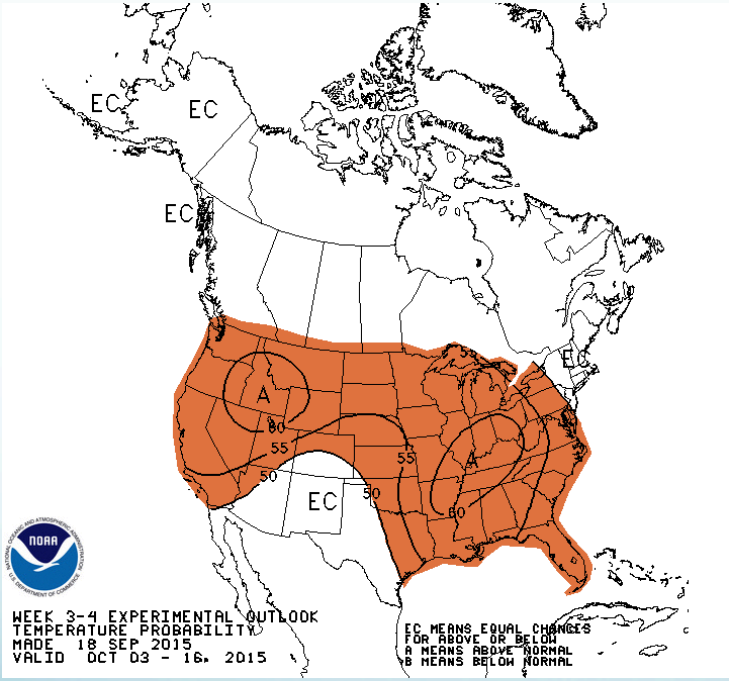


- Same models have stronger indication for drier than normal conditions for the January through March period

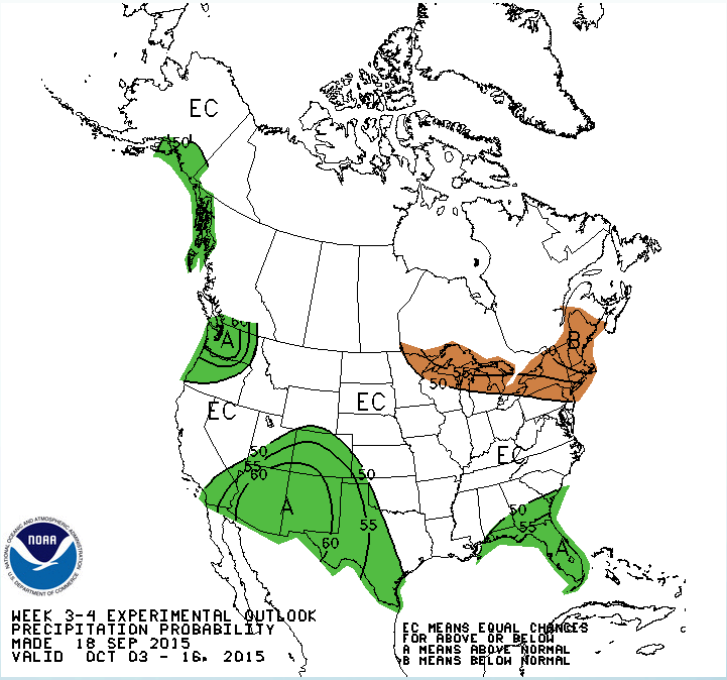
Short term outlook

- Experimental 3 week forecast made Sept 18 and valid for Oct 3-16

temperature

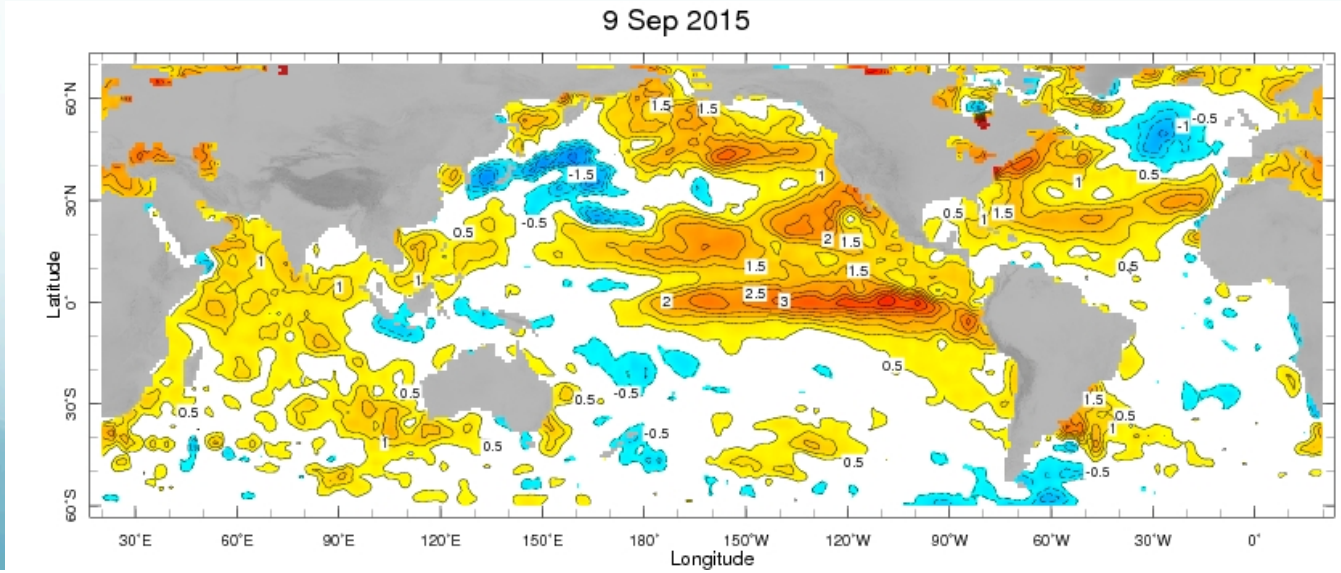


precipitation

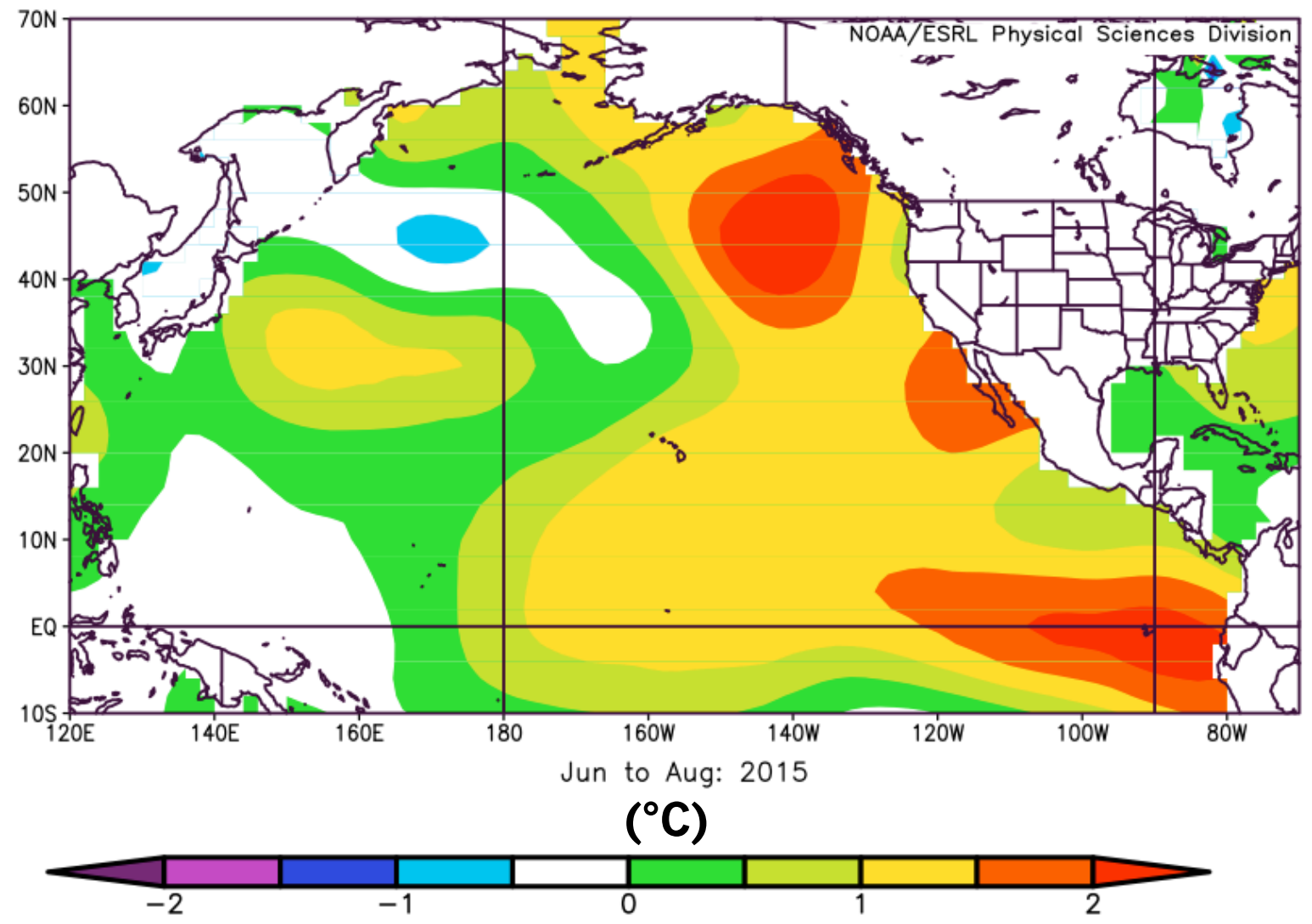


Is the 2014-15 drought due to climate change?

- Hard to say; likely contributions from both natural variability and climate change
- The “blob” – an area of warmer than normal sea surface temperatures off the coast since early 2014 – linked to warm air over land, esp. west of Cascade Mountains



Blob – SST Anomalies in Summer of 2015

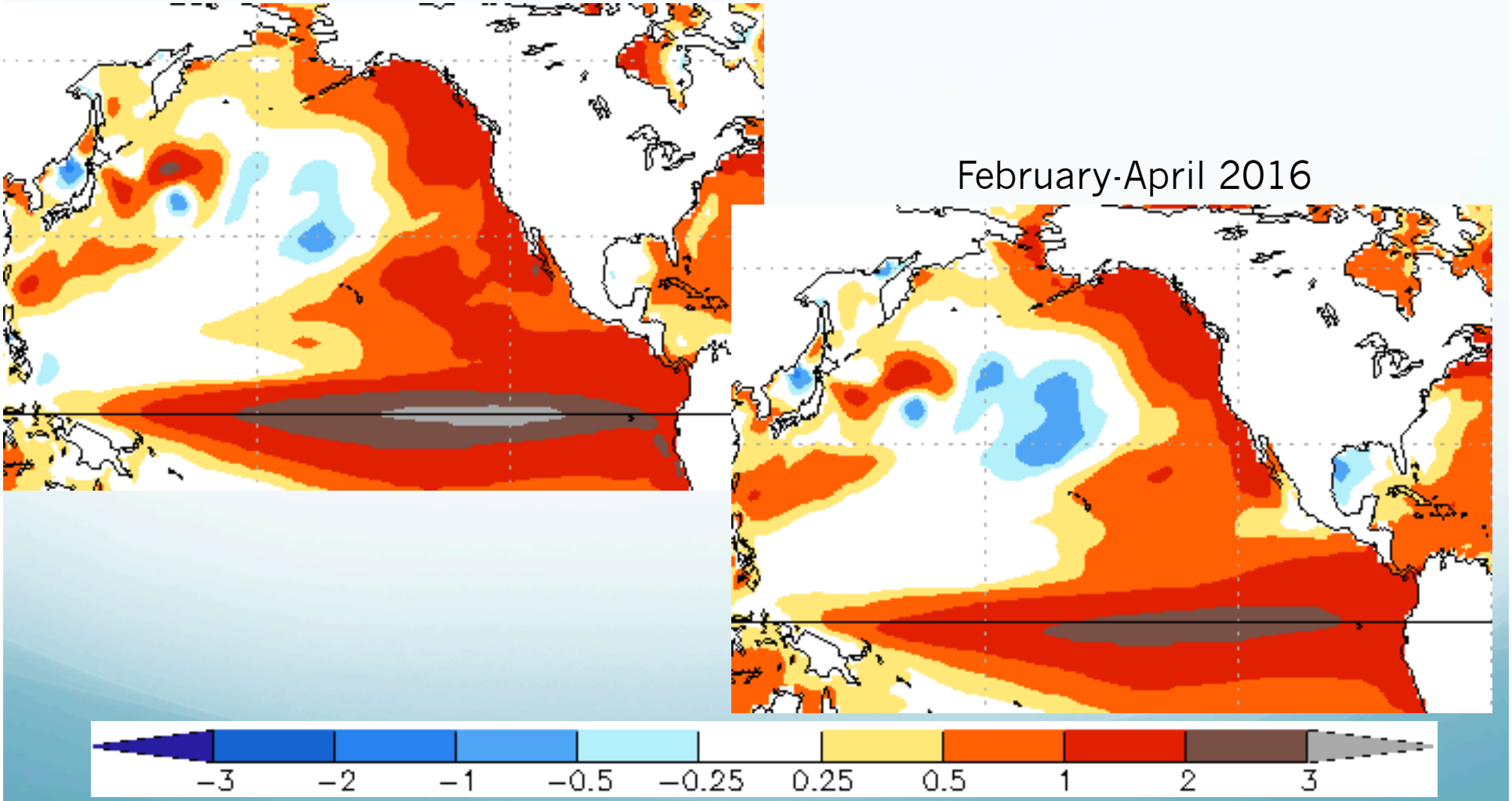


Blob Outlook

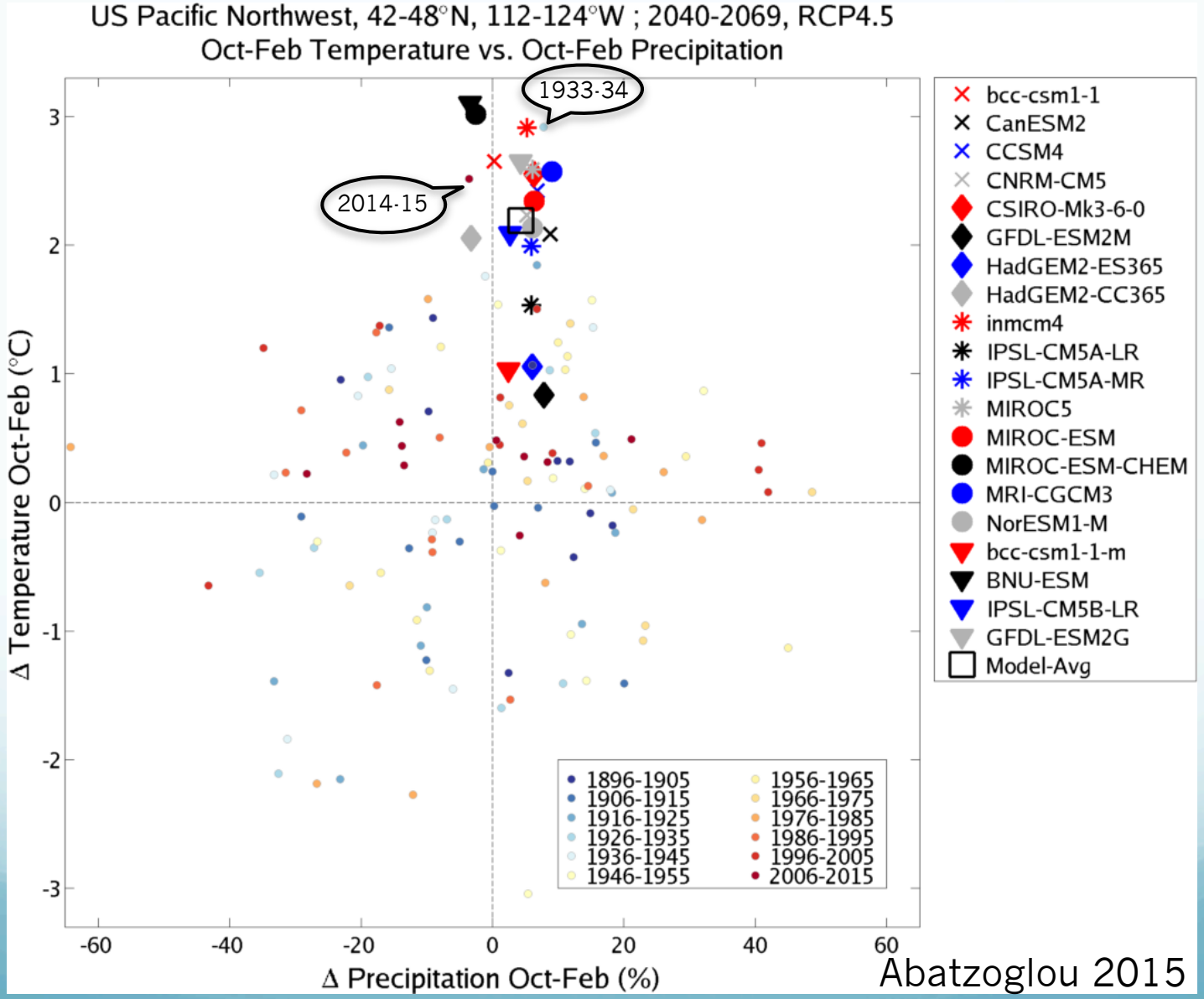
- NMME Projected SST anomalies (°C)

December-February 2016

February-April 2016



A look into the future...



Abatzoglou 2015

Conclusions

- Record warmth played a big role in the drought of 2014-15
- Historically, the recent drought is not very similar to others in the recent record
- A strong El Niño is expected for the upcoming winter
  - More confidence in warmer than normal temp forecast
  - Drier than normal precipitation forecast more uncertain
- We can use 2014-15 as a “dress rehearsal” for what winters may look like under climate change scenarios