Oregon's 2016 Vintage Overview and 2017 Forecast

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Oregon Wine Symposium
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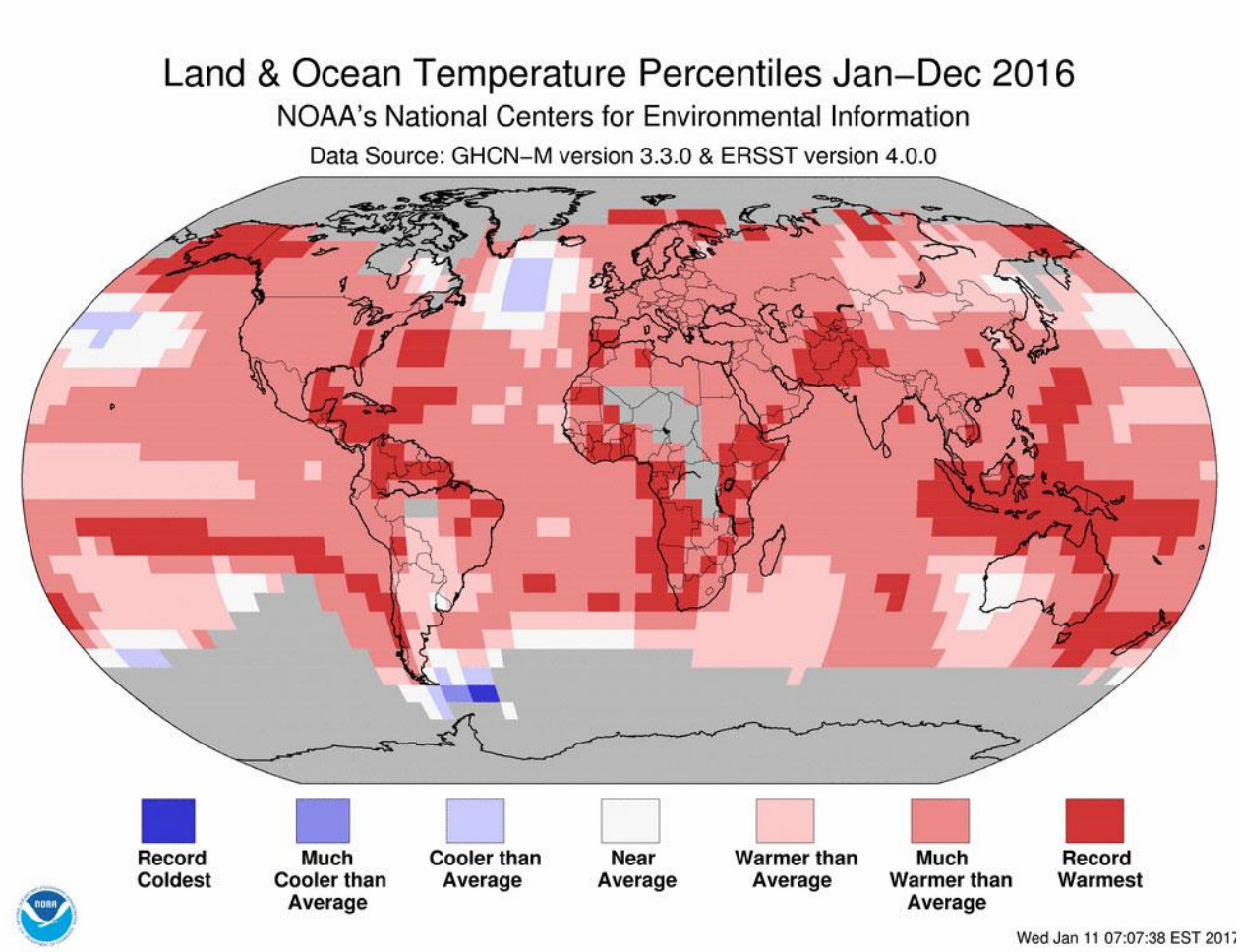
Outline of Talk

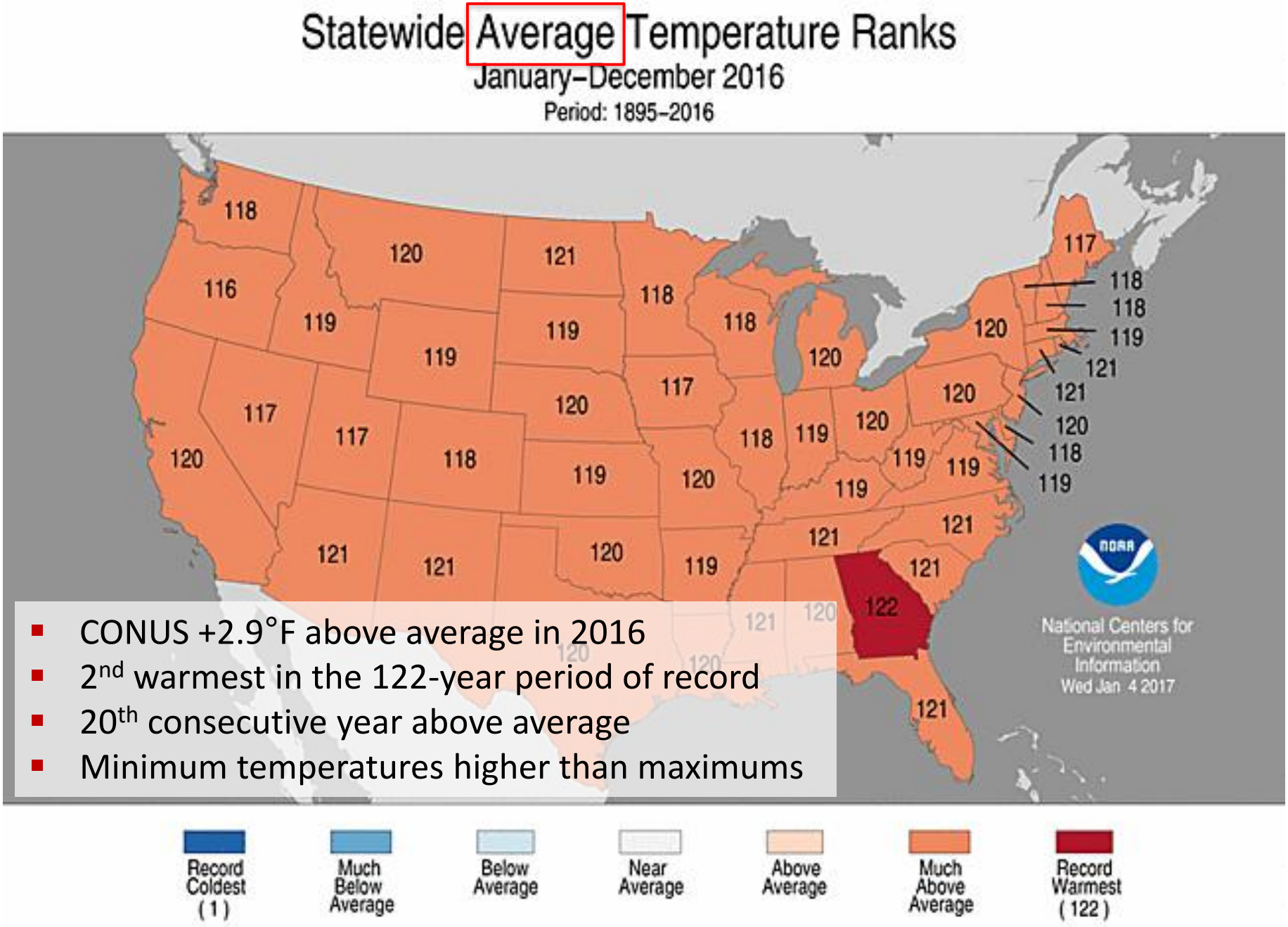
- Global to Regional Climate Summary for 2016
- Vintage 2016 in Oregon
- Current Conditions and Regional Forecast for 2017

Global to Regional Climate Summary for 2016

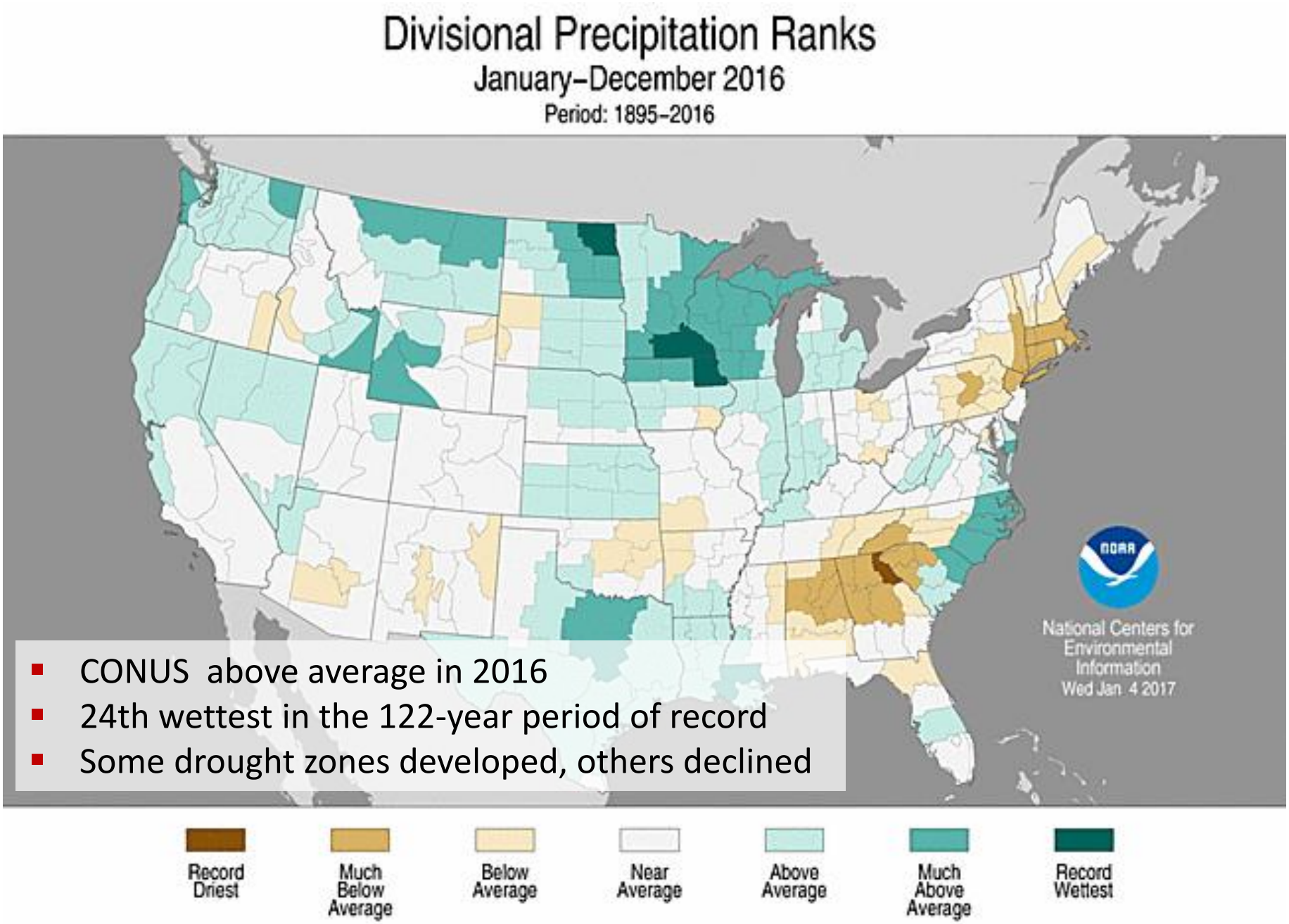
Global Temperature Departures 2016

- Highest since good records began in 1880, 1.7°F above average
- Jan-Aug were all the warmest individual months on record (a total of 17 in a row)
- The Arctic saw its warmest year ever



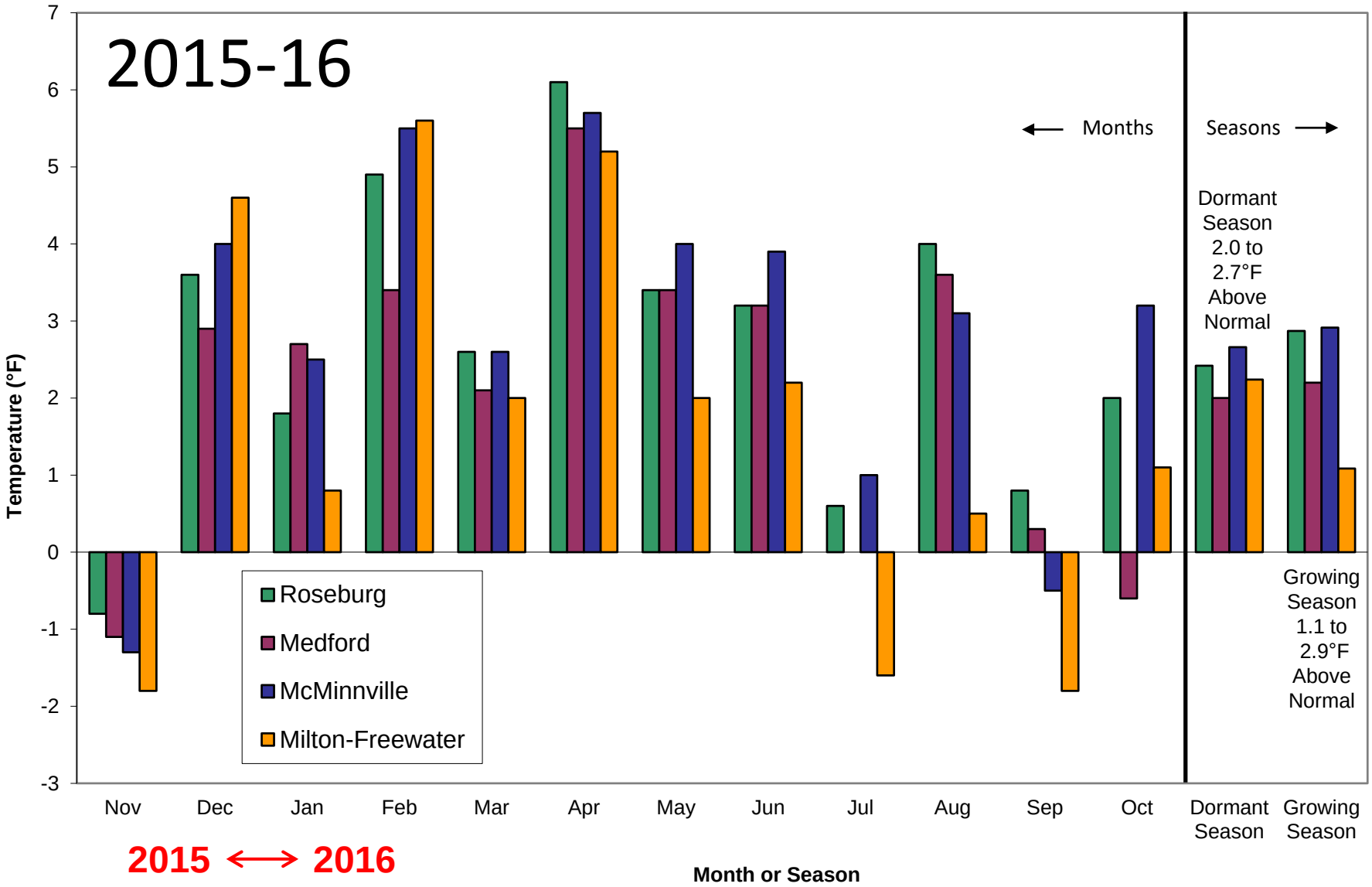


- CONUS +2.9°F above average in 2016
- 2nd warmest in the 122-year period of record
- 20th consecutive year above average
- Minimum temperatures higher than maximums



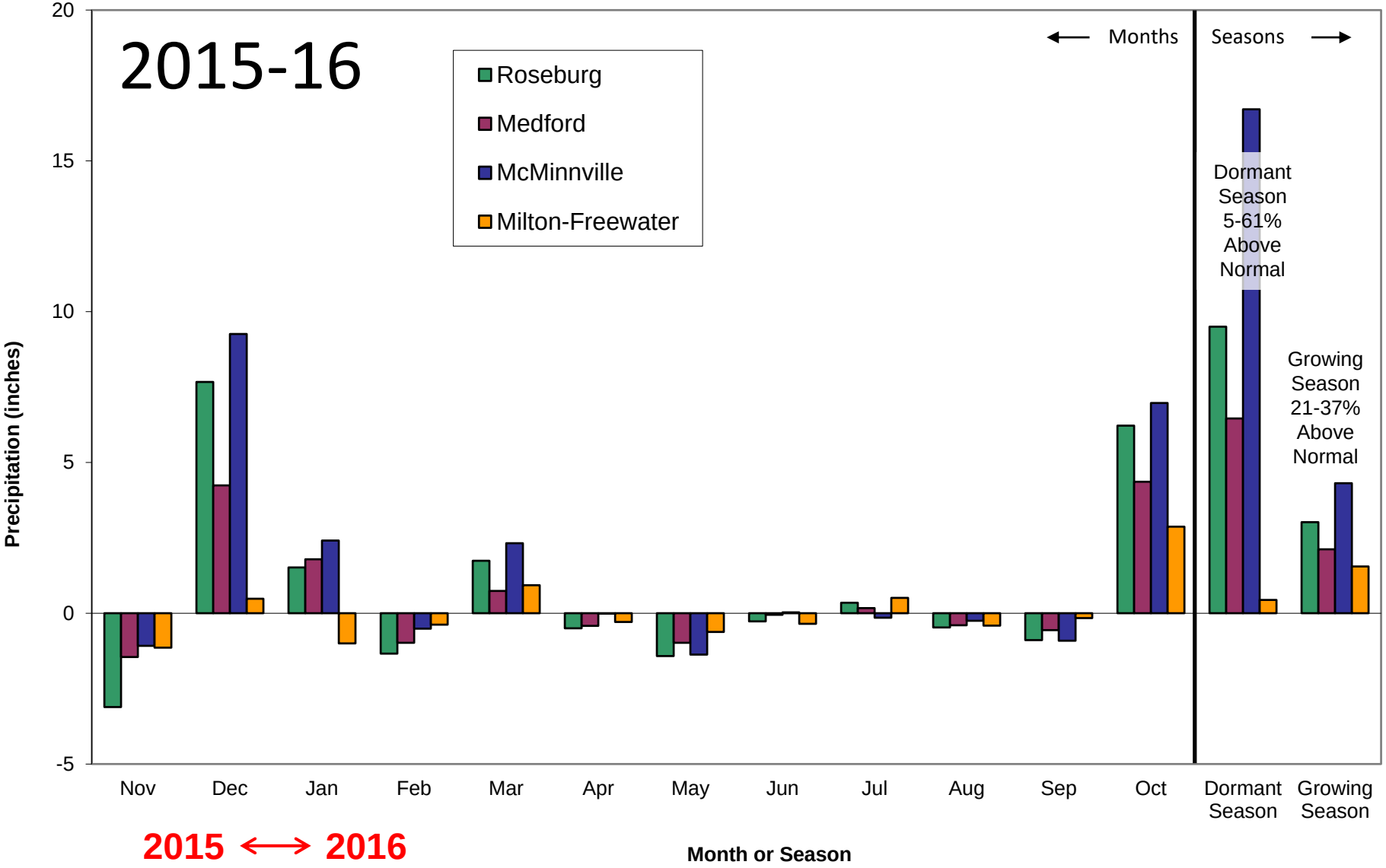
- CONUS above average in 2016
- 24th wettest in the 122-year period of record
- Some drought zones developed, others declined

2015-16 Regional Temperature Departures from Normal



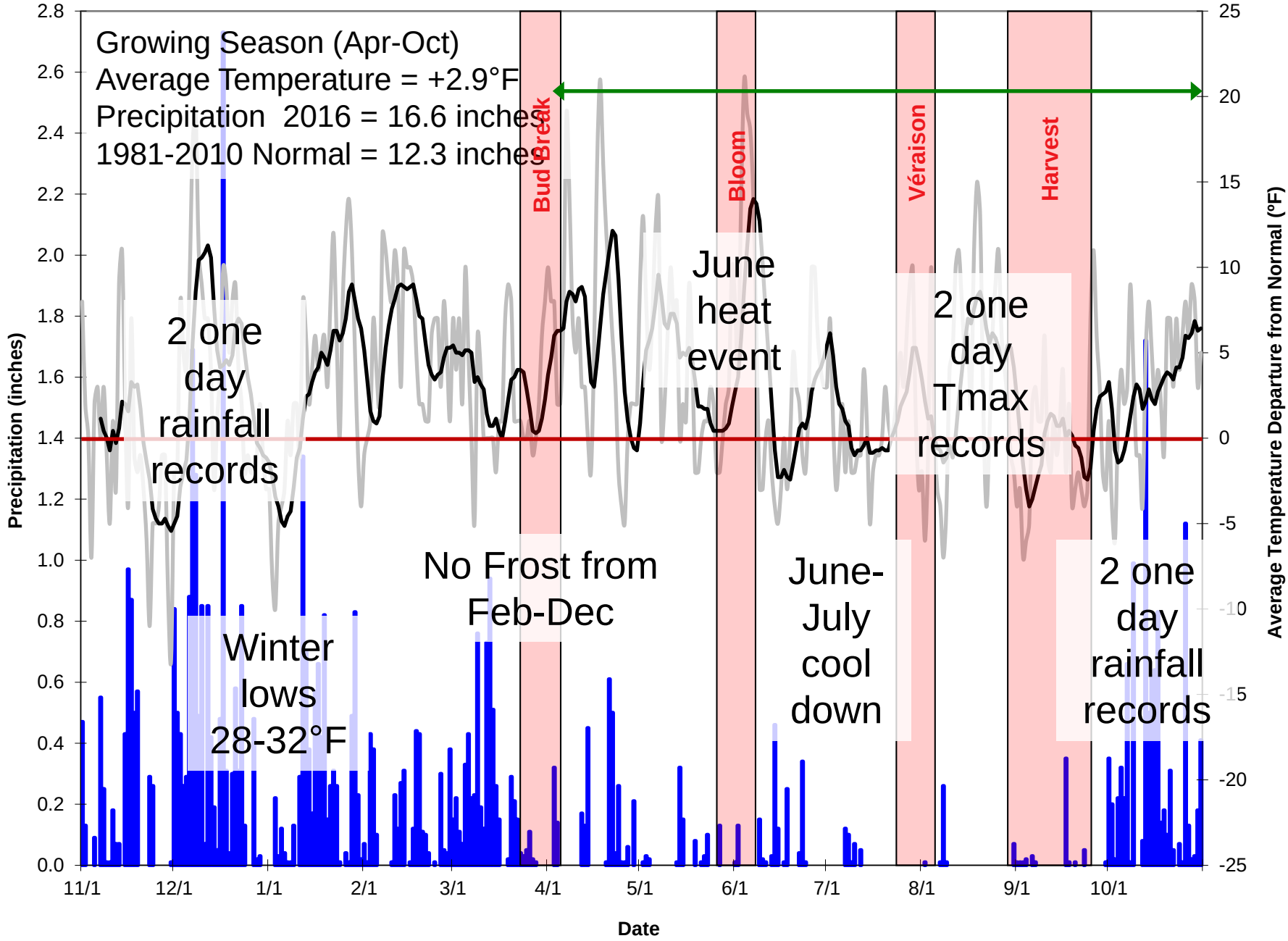
This chart represents a summation of daily temperature departures by month, the dormant period (Nov-Mar) and the growing season (Apr-Oct) compared to the 1981-2010 climate normals from the NWS stations (www.noaa.gov)

2015-16 Regional Precipitation Departures from Normal



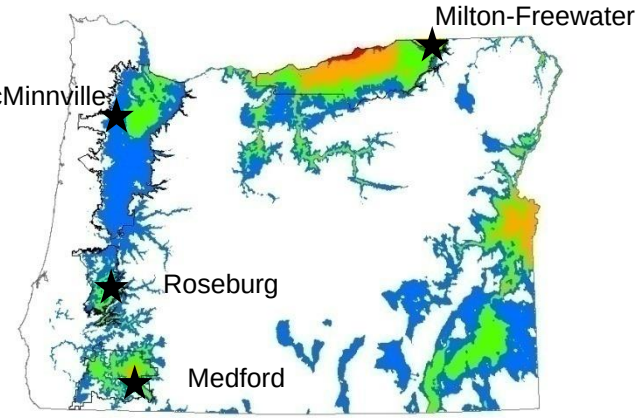
This chart represents the summation of daily precipitation departures by month, the dormant period (Nov-Mar) and the growing season (Apr-Oct) compared to the 1981-2010 climate normals from the NWS stations (www.noaa.gov)

McMinnville 2015-16 Temperature Departures from Normal and Precipitation



2016 Growing Season Cumulative Degree-Days

- 8 to 17% lower than 2015
- 2% lower to 12% above the 2004-2015 average
- 7% to 21% above the 1981-2010 average



Cummulative GrDD (Base 50°F)

4000
3500
3000
2500
2000
1500
1000
500
0

1-Apr
1-May
1-Jun
1-Jul
1-Aug
1-Sep
1-Oct

Date

3604
3287
3239
2810

Averages from 2004-2015

- McMinnville
- McMinnville Average
- Milton-Freewater
- Milton-Freewater Average
- Roseburg
- Roseburg Average
- Medford
- Medford Average

This chart represents the 2013 cumulative growing degree-days compared to the ten year average for 2004-2013 for the growing season (Apr-Oct) from the NWS stations (www.noaa.gov)

Oregon Vintage 2016 Summary

Oregon 2016 Vintage Summary

Weather/Climate

- 2015-16 produced another warm winter, 2-4°F above normal; mild to moderate cold extremes; wet
- Spring continued warm/dry, little to no frost pressure statewide
- Early June heat spike, broke records statewide

Oregon 2016 Vintage Summary

Weather/Climate

- Both maximum and minimum temperatures significantly higher than normal, but extremes down from 2015
- GDD greater than average, but lower than 2015 mostly due to the cool down in June/July
- Very late first fall frost resulting in a frost-free period of 225-325 days across the state

Oregon 2016 Vintage Summary

Phenology

- Bud break 2-4 weeks ahead of normal
- Bloom continued trend, little rain, heat spike accelerated flowering, numerous reports of lower fruit set
- Véraison 2-4 weeks earlier, carrying average sized crop
- Another early harvest, for many the earliest to start/end, no rain pressure

Oregon 2016 Vintage Summary

Harvest Composition

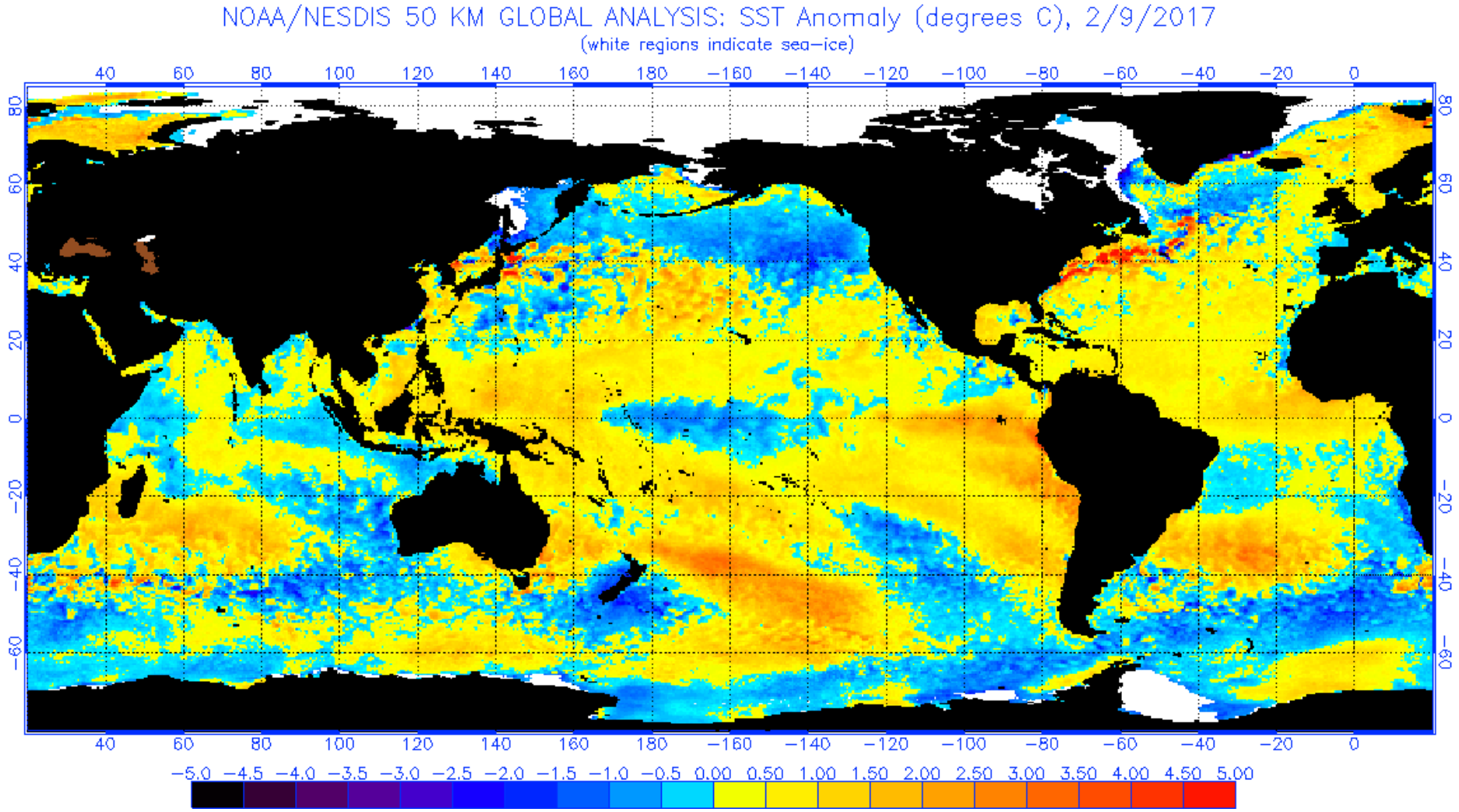
- **Brix** : ↑ to average
- **TA** : average to ↓,
- **pH** : average to ↑,
- **Yields** : reports range from 2-5% down to 5-10% up, likely to end up ~2-4% up

West Coast Climate Influences in 2016

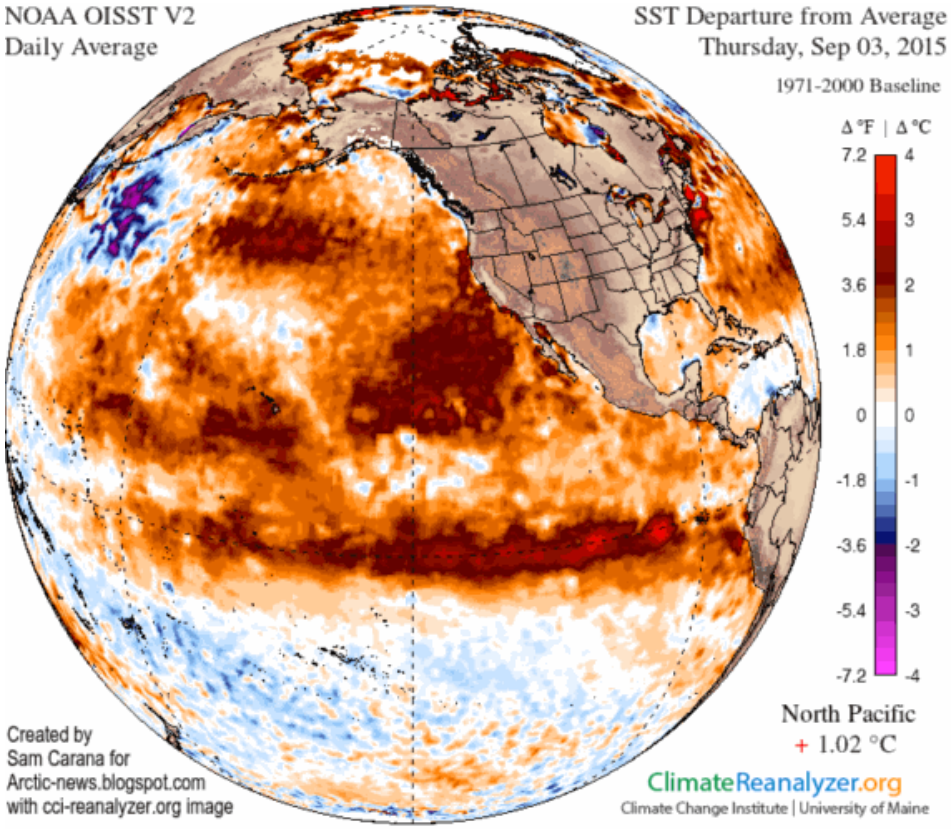
- El Niño had a minimal effect
  - Little precipitation influence
  - Mostly supported warmer temperatures
- North Pacific cool down
  - Moderated temperatures, cool July
  - Wet October
  - Cold Winter

Current Conditions

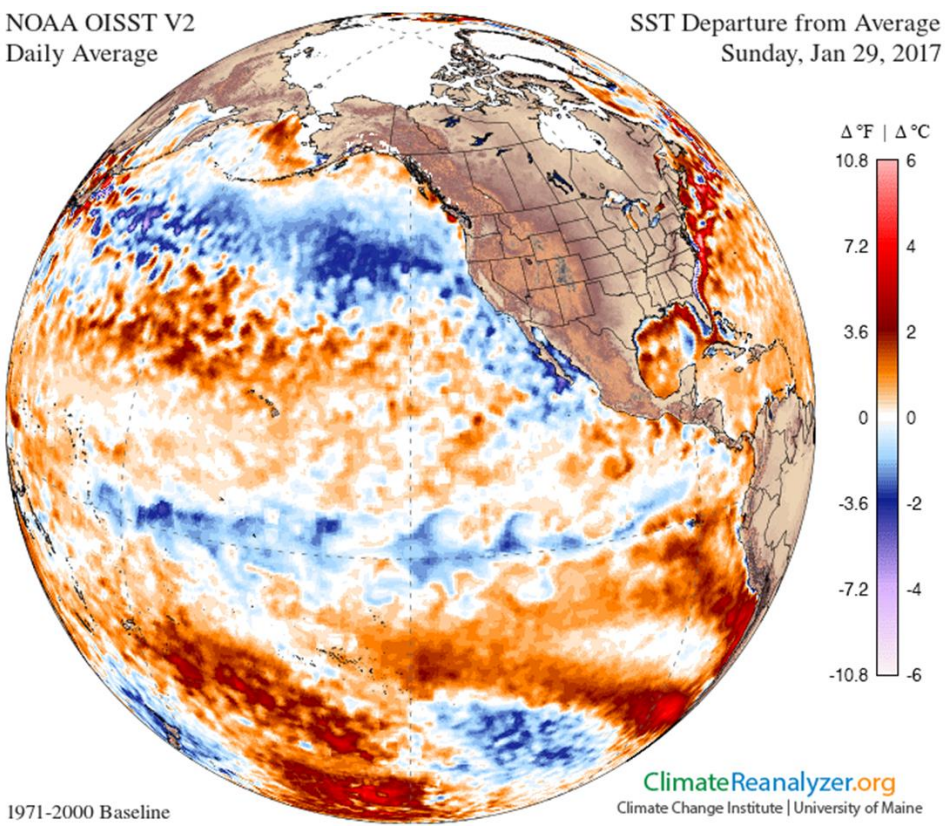
Current Sea Surface Temperatures



September 2015

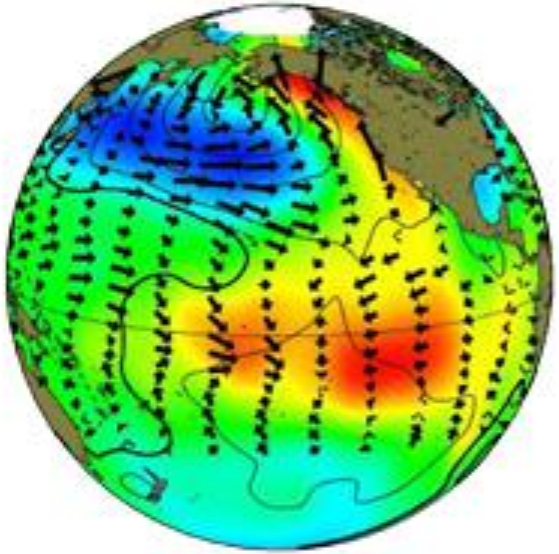


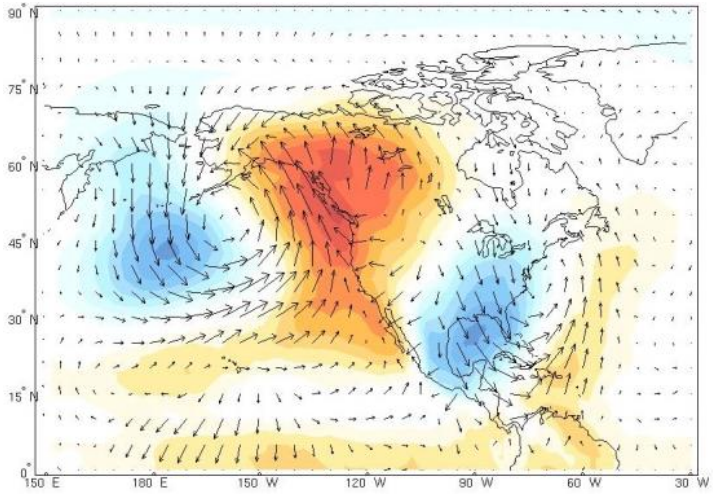
January 2017



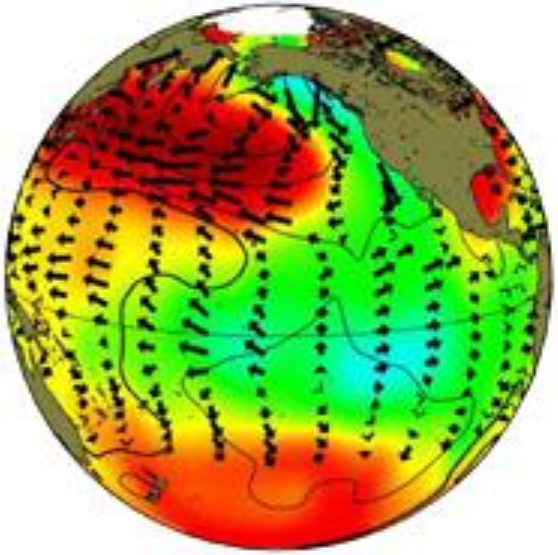
Pacific Decadal Oscillation & Climate Variability

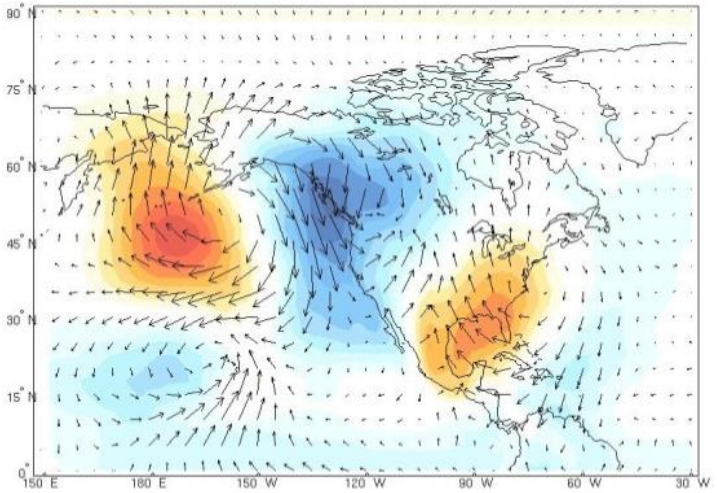
positive phase



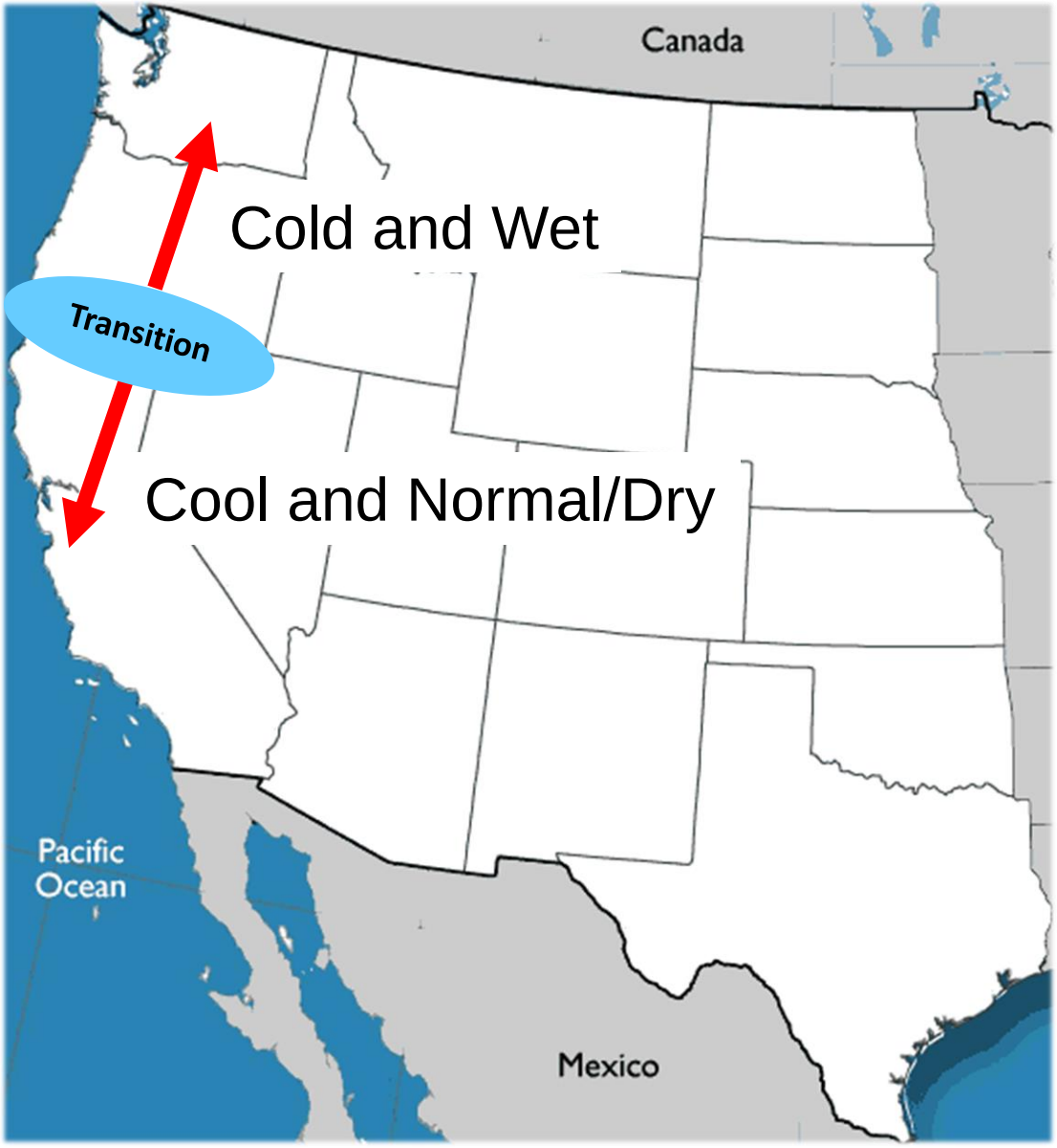


negative phase

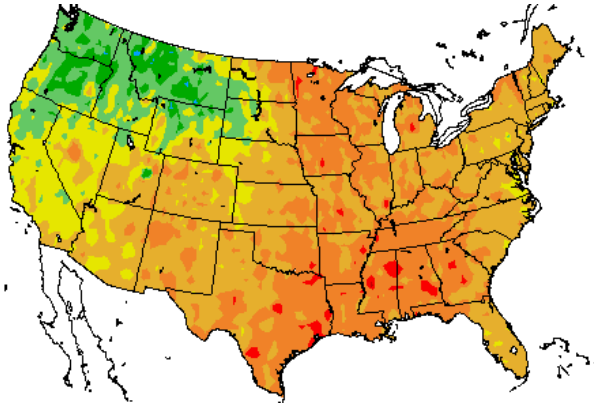




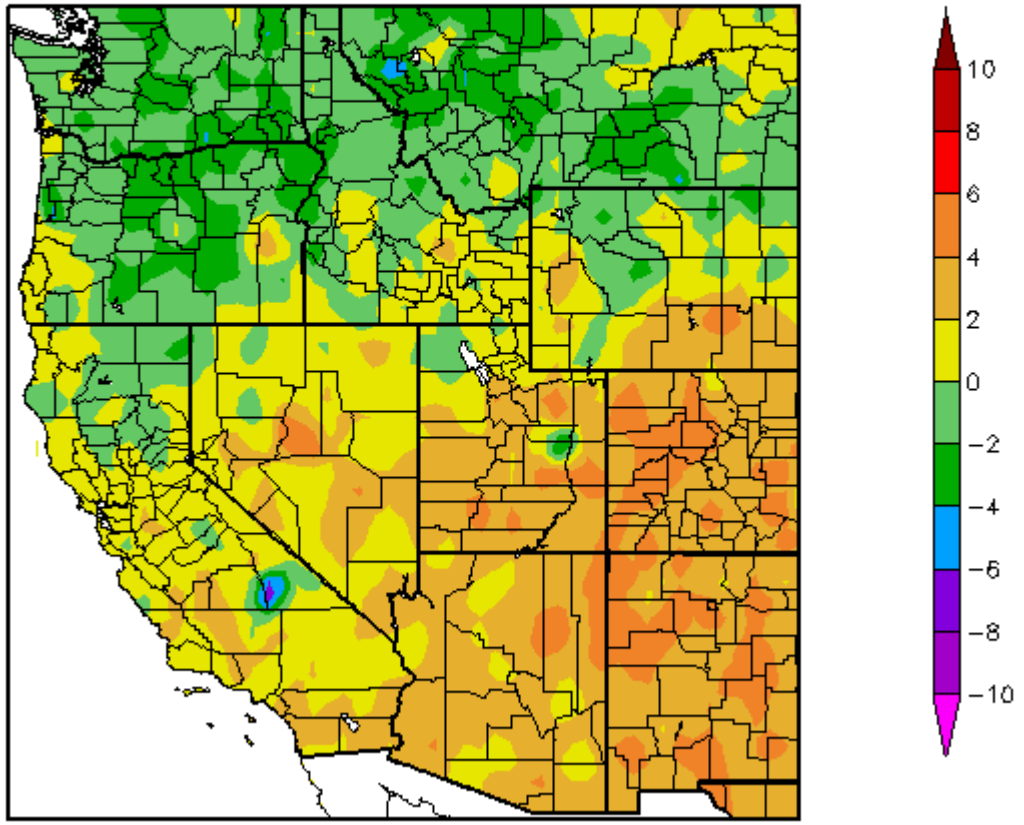
Typical La Niña Winter?



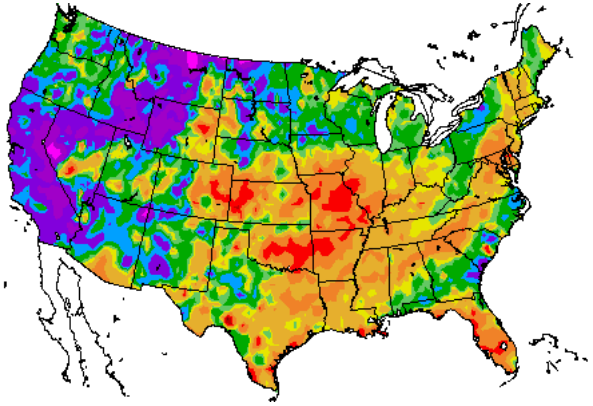
- Temperatures close to the pattern expected from a weak La Niña winter



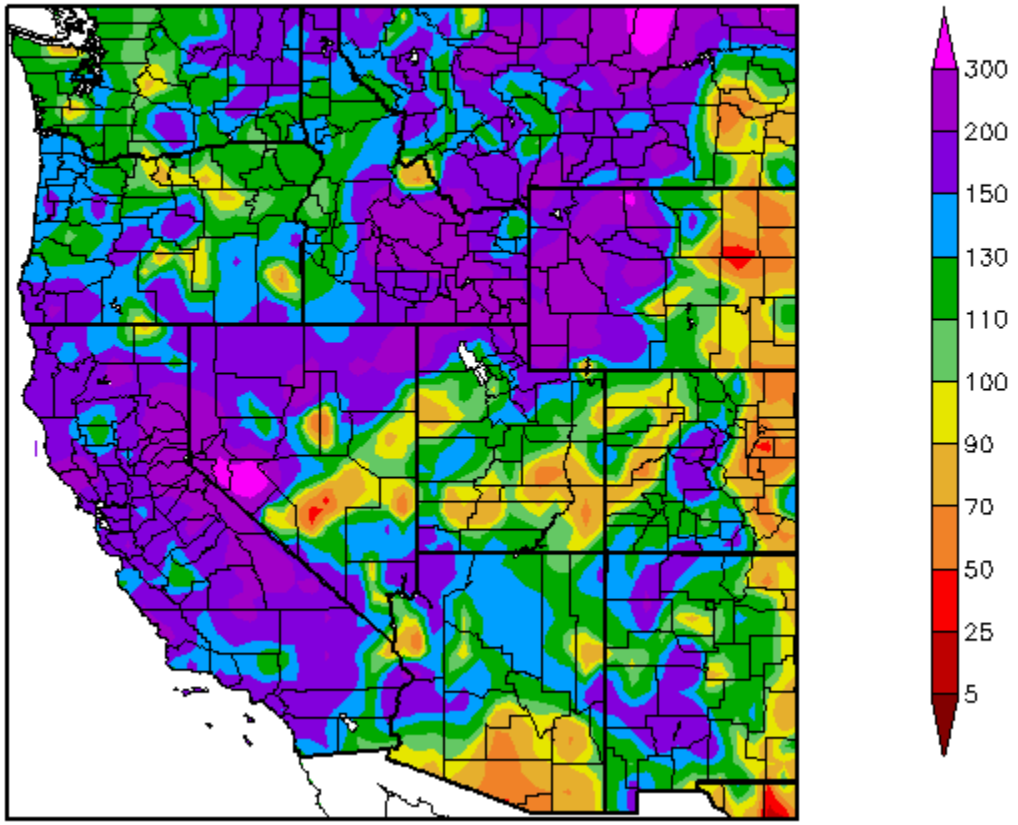
Departure from Normal Temperature (F)
10/1/2016 – 2/17/2017



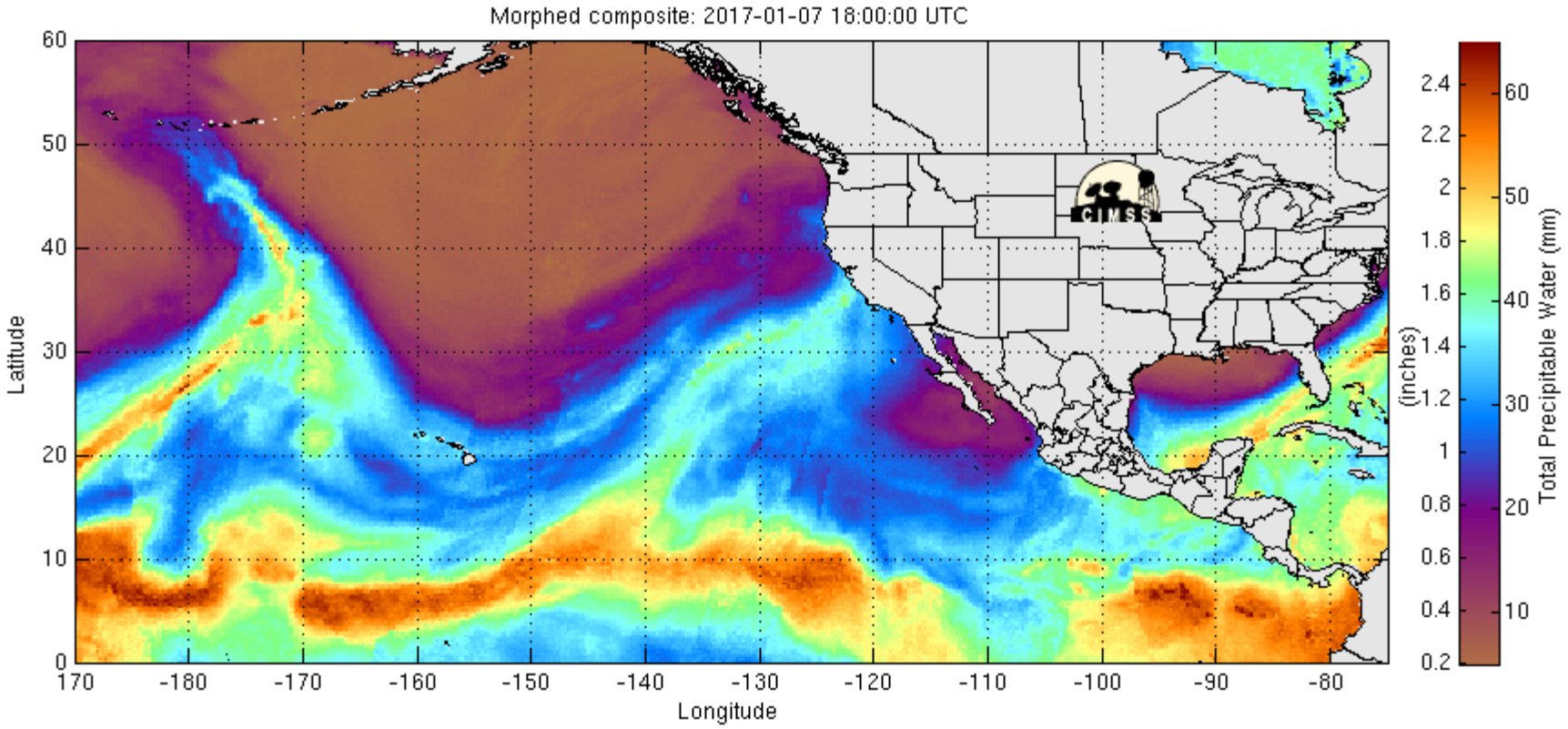
- Temperatures close to the pattern expected from a weak La Niña winter
- Precipitation greater than what would be expected from a weak La Niña, and more widespread



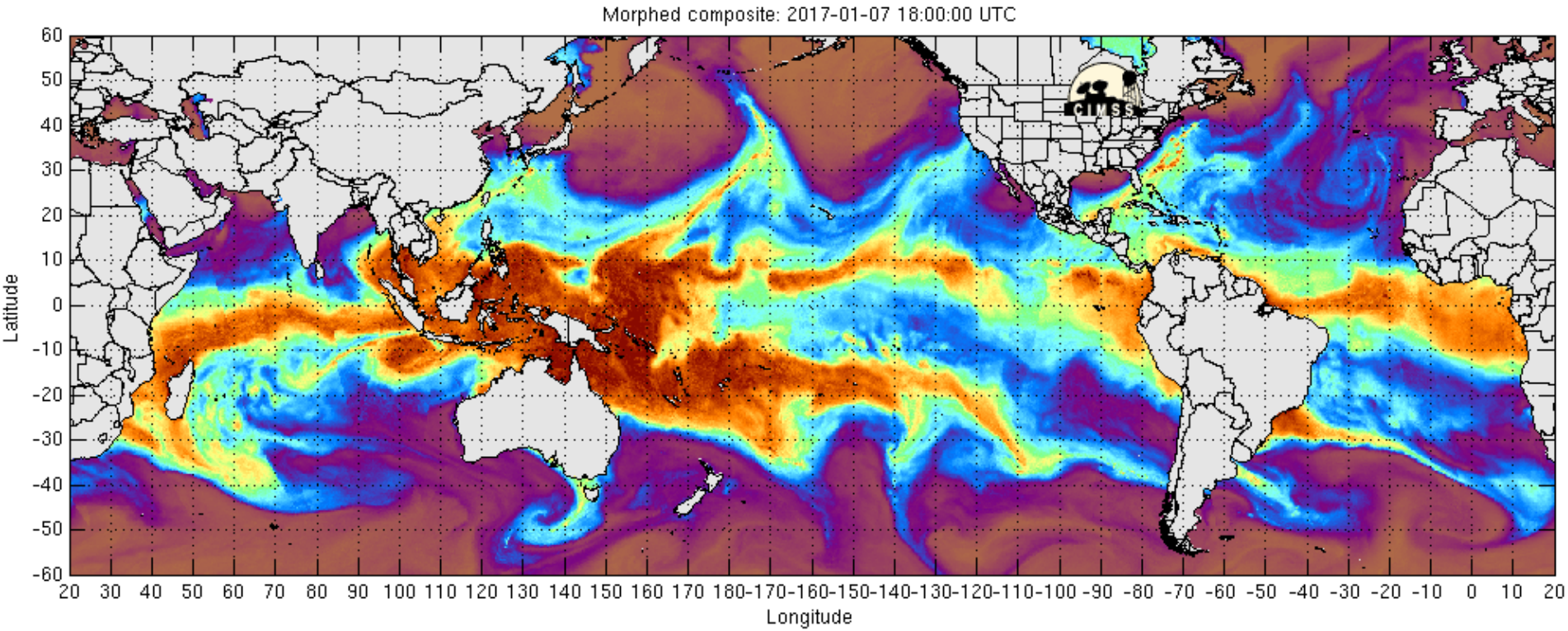
Percent of Normal Precipitation (%)
10/1/2016 – 2/17/2017



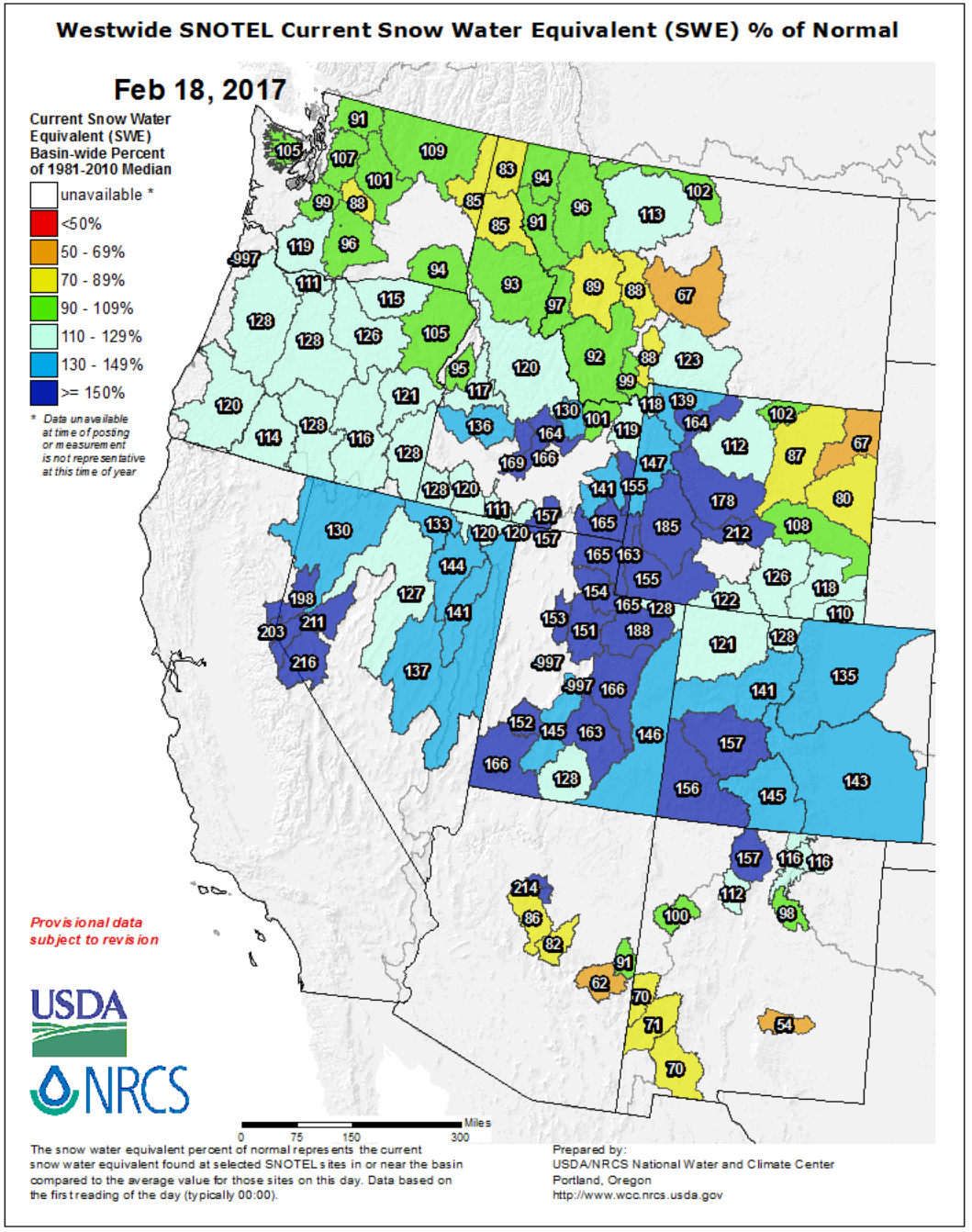
Atmospheric Rivers



Atmospheric Rivers

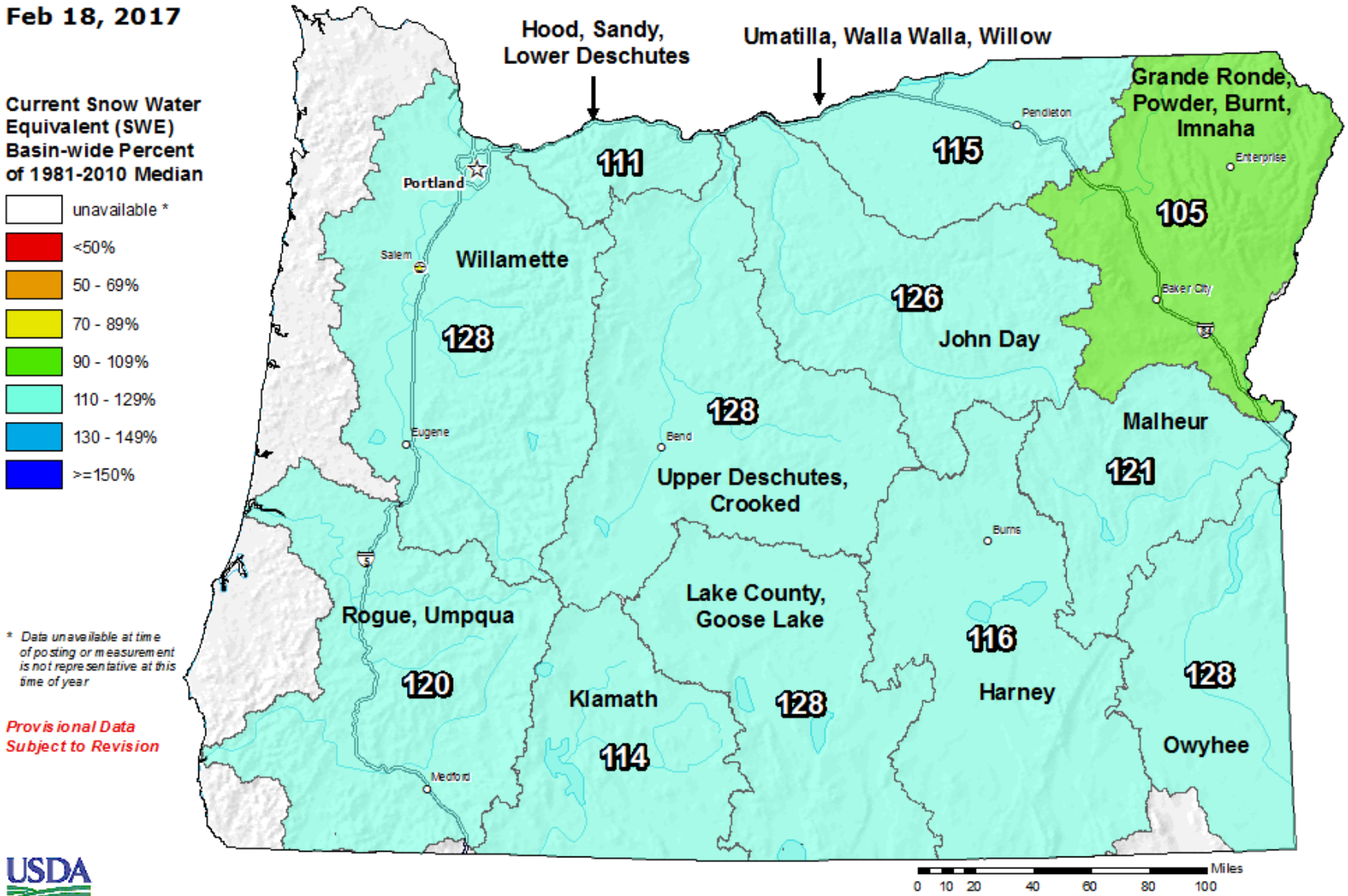


- Temperatures close to the pattern expected from a weak La Niña winter
- Precipitation greater than what would be expected from a weak La Niña, and more widespread
- SWE ↑normal west, ↓in the Northern Rockies, long way to go till end of season



Oregon SNOTEL Current Snow Water Equivalent (SWE) % of Normal

Feb 18, 2017



* *Data unavailable at time of posting or measurement is not representative at this time of year*

Provisional Data Subject to Revision

USDA NRCS

The snow water equivalent percent of normal represents the current snow water equivalent found at selected SNOTEL sites in or near the basin compared to the average value for those sites on this day. Data based on the first reading of the day (typically 00:00).

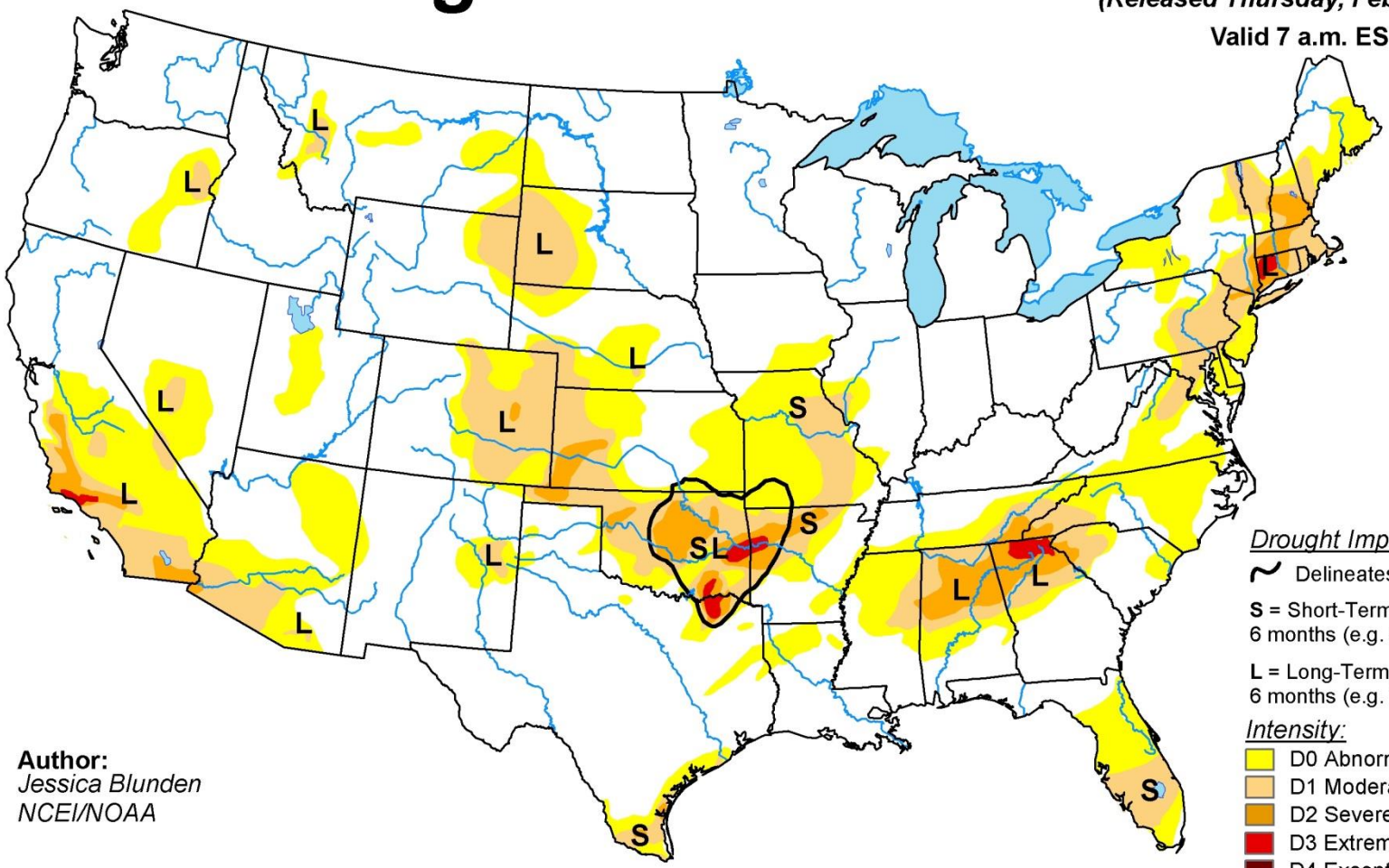
Prepared by:
USDA/NRCS National Water and Climate Center
Portland, Oregon
http://www.wcc.nrcs.usda.gov

U.S. Drought Monitor

February 14, 2017

(Released Thursday, Feb. 16, 2017)

Valid 7 a.m. EST



Author:
Jessica Blunden
NCEI/NOAA

Drought Impact Types:

Delineates dominant impacts

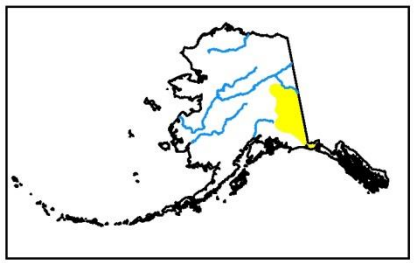
S = Short-Term, typically less than 6 months (e.g. agriculture, grasslands)

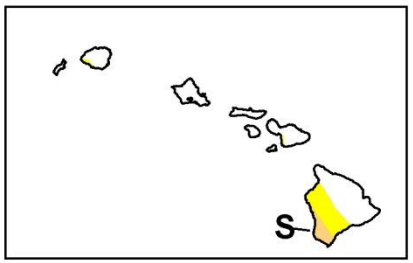
L = Long-Term, typically greater than 6 months (e.g. hydrology, ecology)

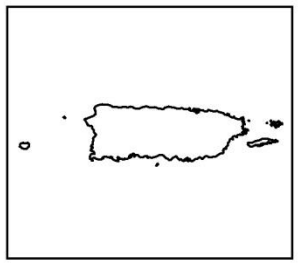
Intensity:

- 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.





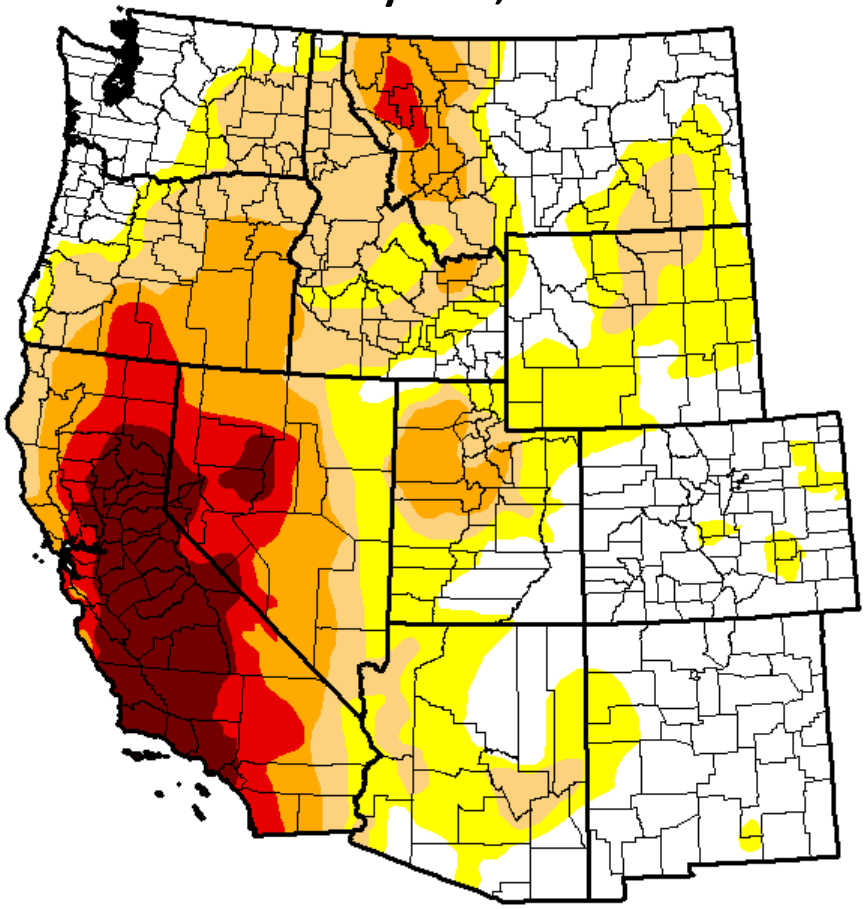


USDA | National Drought Mitigation Center | Department of Commerce, United States of America | NOAA

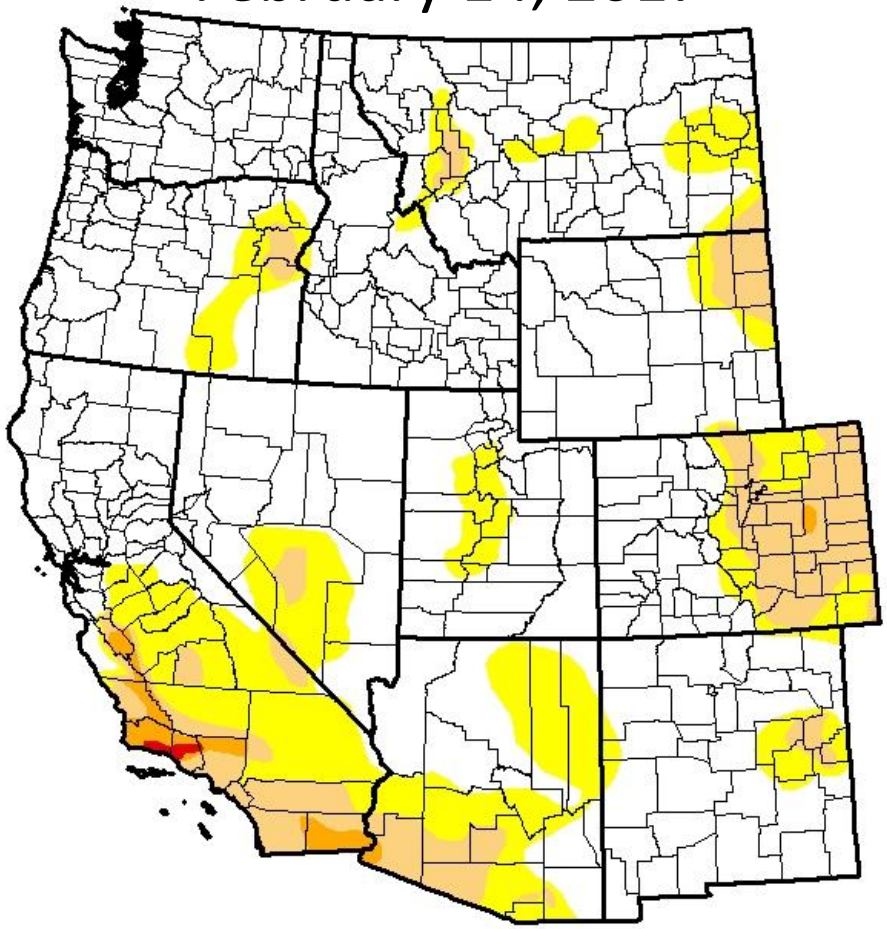
http://droughtmonitor.unl.edu/

U.S. Drought Monitor – Western Region

January 12, 2016



February 14, 2017



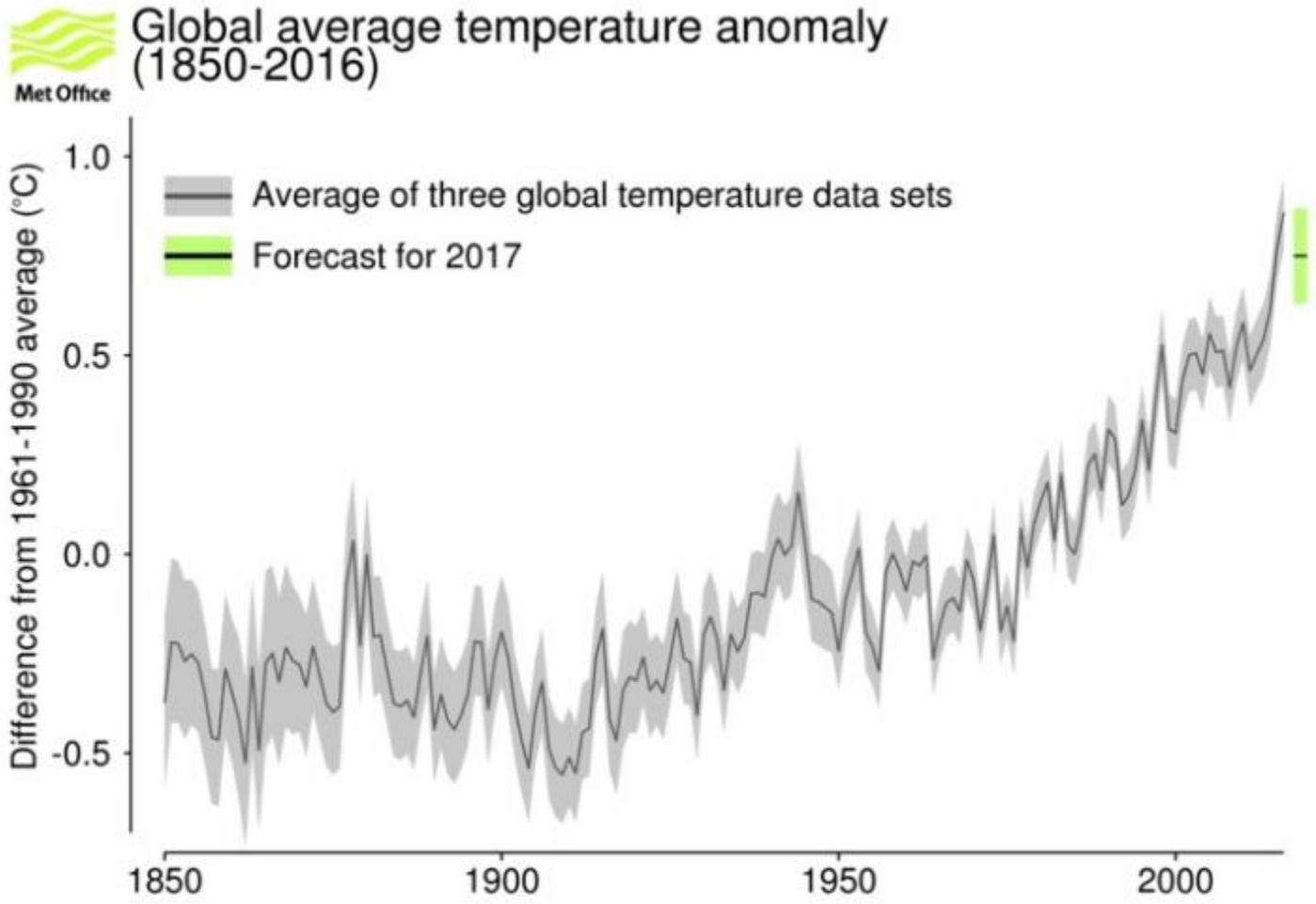
- West 35% reduction in area in moderate to severe drought
- California 45% reduction in area in moderate to severe drought
- And >60% reduction in area in extreme to exceptional drought

Summary/Forecast

Summary/Forecast

- Drought to Deluge … the western US is prone to this kind of variability, expect more in the future
- Without El Niño, expect 2017 to be cooler than 2015 and 2016 globally, likely closer to 2012-2014

Summary/Forecast



Summary/Forecast

- Drought to Deluge … the western US is prone to this kind of variability, expect more in the future
- Without El Niño, expect 2017 to be cooler than 2015 and 2016 globally, likely closer to 2012-2014
- However, there is a hint of an El Niño returning in the fall in many long term models …

Summary/Forecast

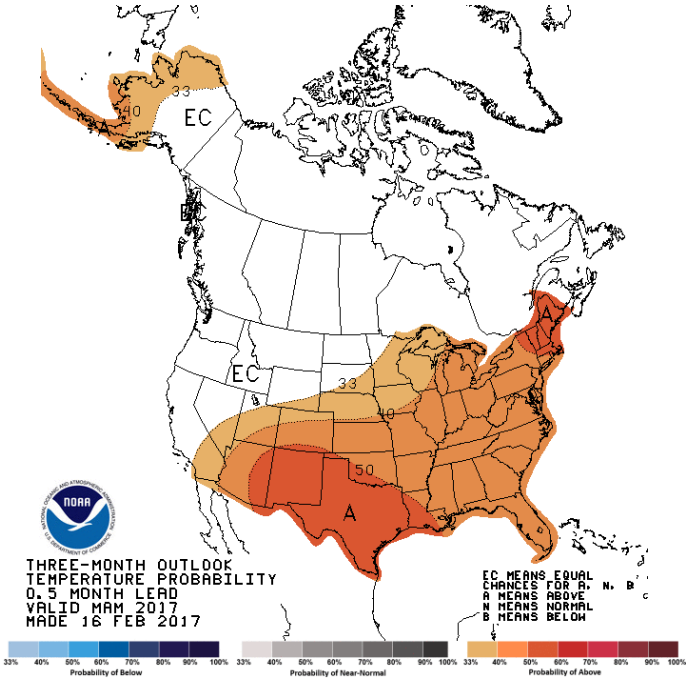
- Spatial extent of drought in the US has declined, likely to continue in most regions
- Warming Arctic producing strong mid-latitude climate variability and increased winter cold air outbreaks
- Larger than normal area of North Pacific has cooled, likely to favor a cooler year for the US

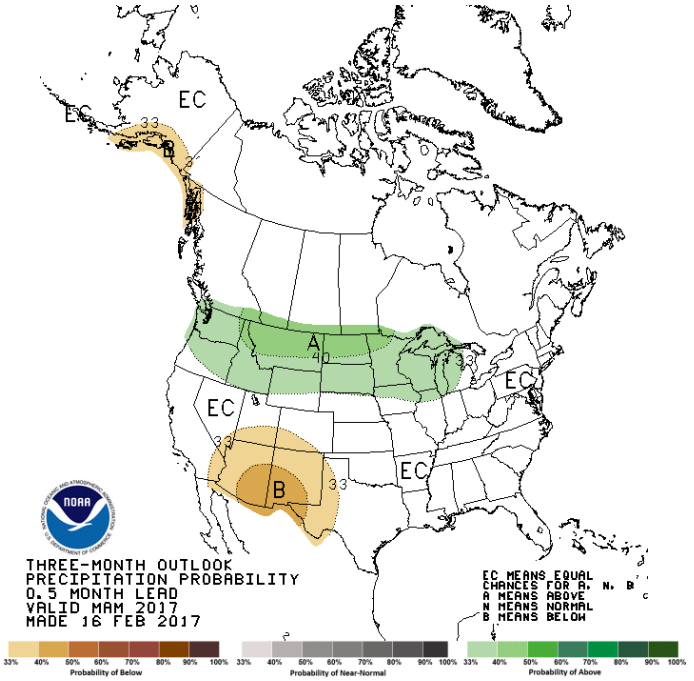
NOAA Spring 2017 Forecasts

The March-April-May (MAM) temperature forecast indicates west to be close to average, rest of country warm (probability increases for warmer western US for AMJ and beyond).

The March-April-May (MAM) precipitation forecast points to PNW having greater odds to be average to wetter than average through spring (shifts to drier in AMJ and beyond).

The seasonal forecasts should be interpreted as the tilting of odds towards general categories of conditions, and should not be viewed as a guarantee that the specified conditions will be realized.

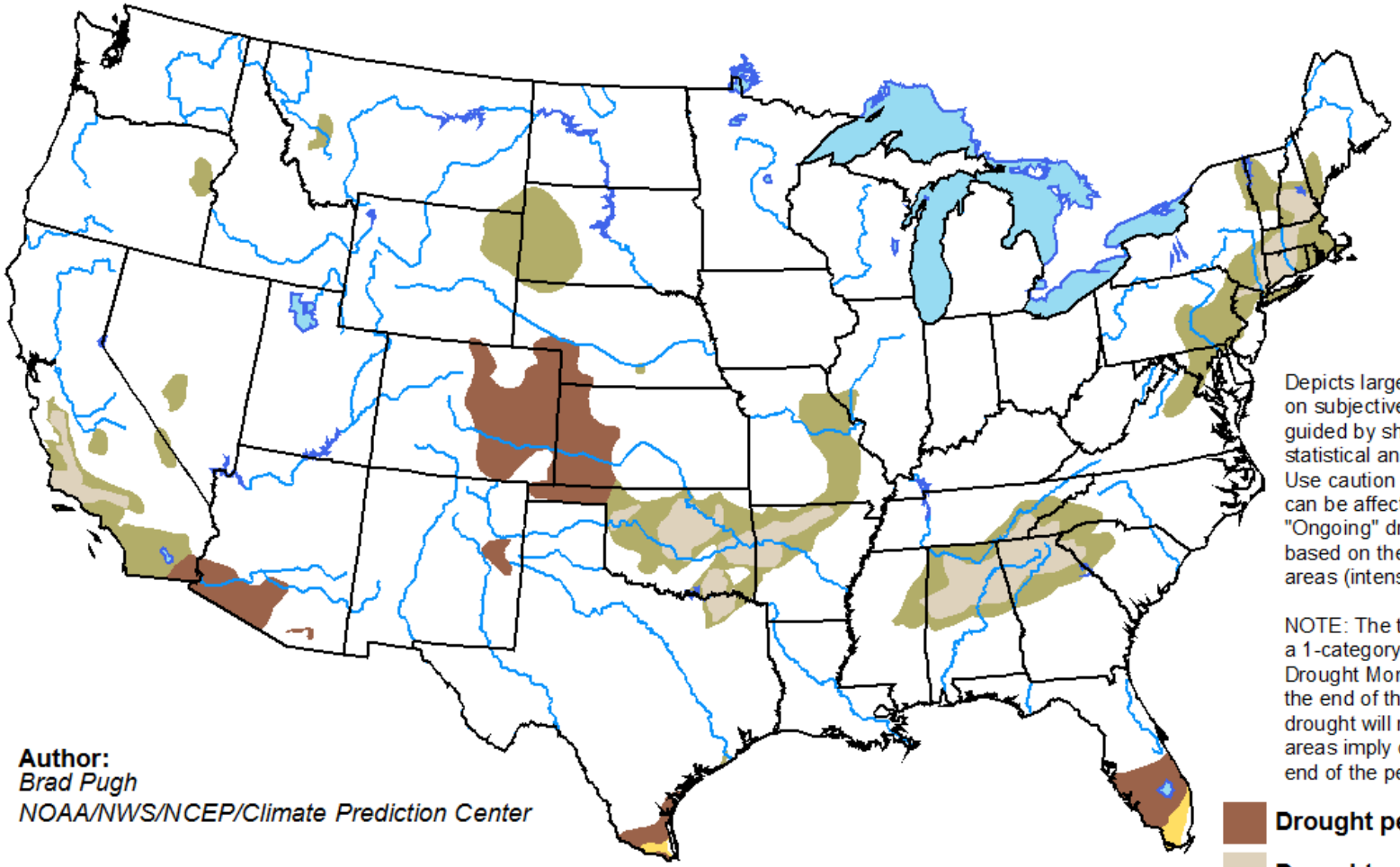




U.S. Seasonal Drought Outlook

Drought Tendency During the Valid Period

Valid for February 16 - May 31, 2017
Released February 16, 2017



Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Use caution for applications that can be affected by short lived events. "Ongoing" drought areas are based on the U.S. Drought Monitor areas (intensities of D1 to D4).

NOTE: The tan areas imply at least a 1-category improvement in the Drought Monitor intensity levels by the end of the period, although drought will remain. The green areas imply drought removal by the end of the period (D0 or none).

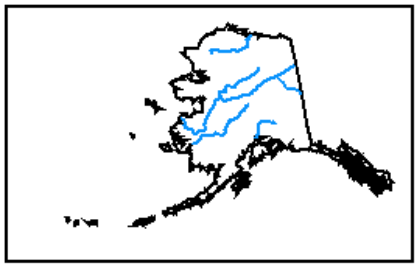
Drought persists

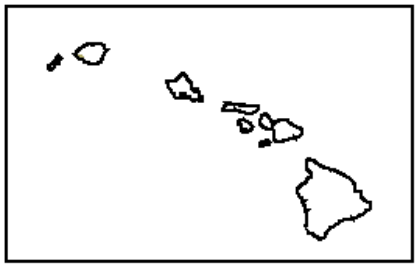
Drought remains but improves

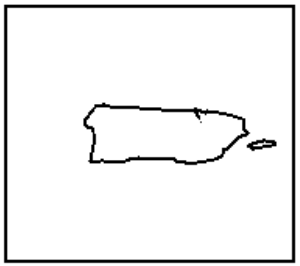
Drought removal likely

Drought development likely

Author:
Brad Pugh
NOAA/NWS/NCEP/Climate Prediction Center







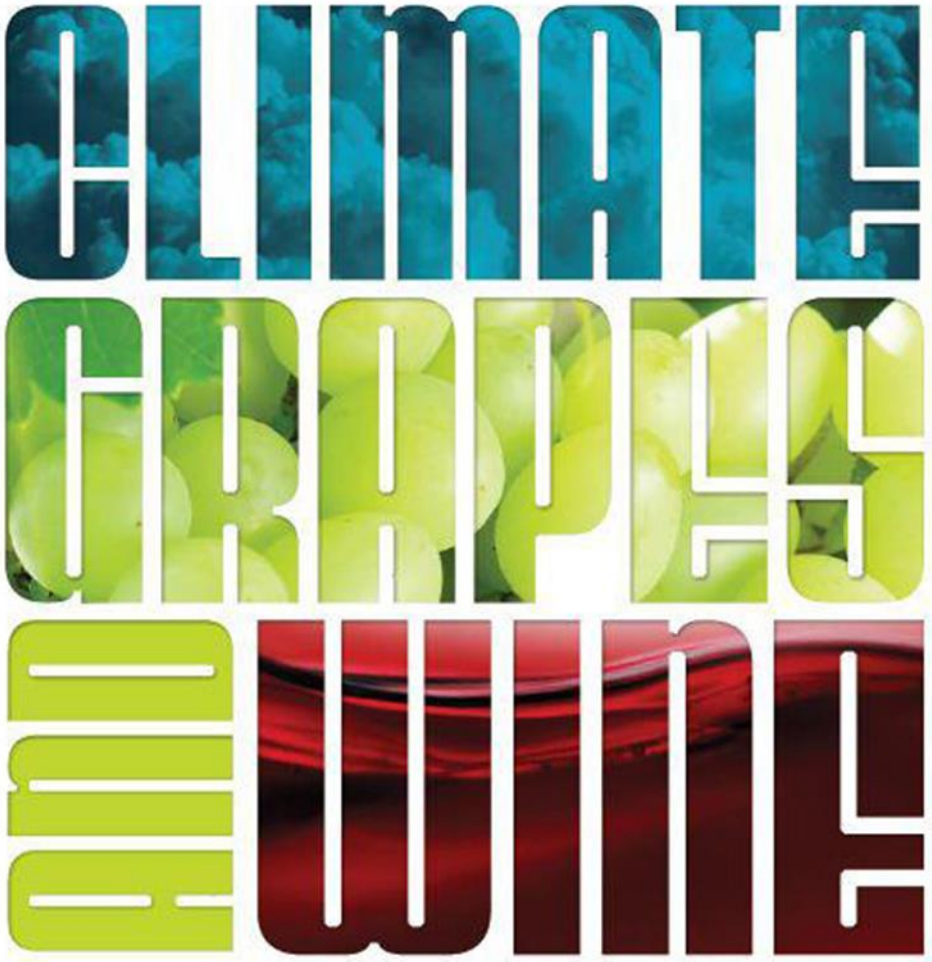
http://go.usa.gov/3eZ73

Spring/Summer 2017 Forecast Summary

- Tropical SST conditions have transitioned from La Niña to neutral (normal) and expected to continue into summer
- North Pacific SST conditions remain cooler than normal
- Taken together the conditions tilt the odds in favor of;
  - California cool and drier late winter/early spring
  - PNW cool and wet late winter/early spring

Spring/Summer 2017 Forecast Summary

- Spring frost frequency/severity and timing **tends** to be higher and later in years with these conditions
- Growing seasons **tend** be on the cool side with lower heat stress in years with these conditions
- Complete drought removal likely for Oregon
- Drought relief in California will slow into 2017, and complete recovery likely needs 3 or more winters like this one



Thank You!

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Director: Business, Communication and the Environment
Professor: Environmental Science and Policy

SOU Southern OREGON UNIVERSITY