Climate Report

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Abacela
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Climate Forecast 2021 – Hit or Miss?

- Globally a top 5 warmest year … close
- Continued strong climate variability … a hit
- West - spring frost risk average … a partial miss
- Increasing PNW drought concerns … a hit
- West - warmer growing season … a hit
- PNW - Extreme heat event … complete miss

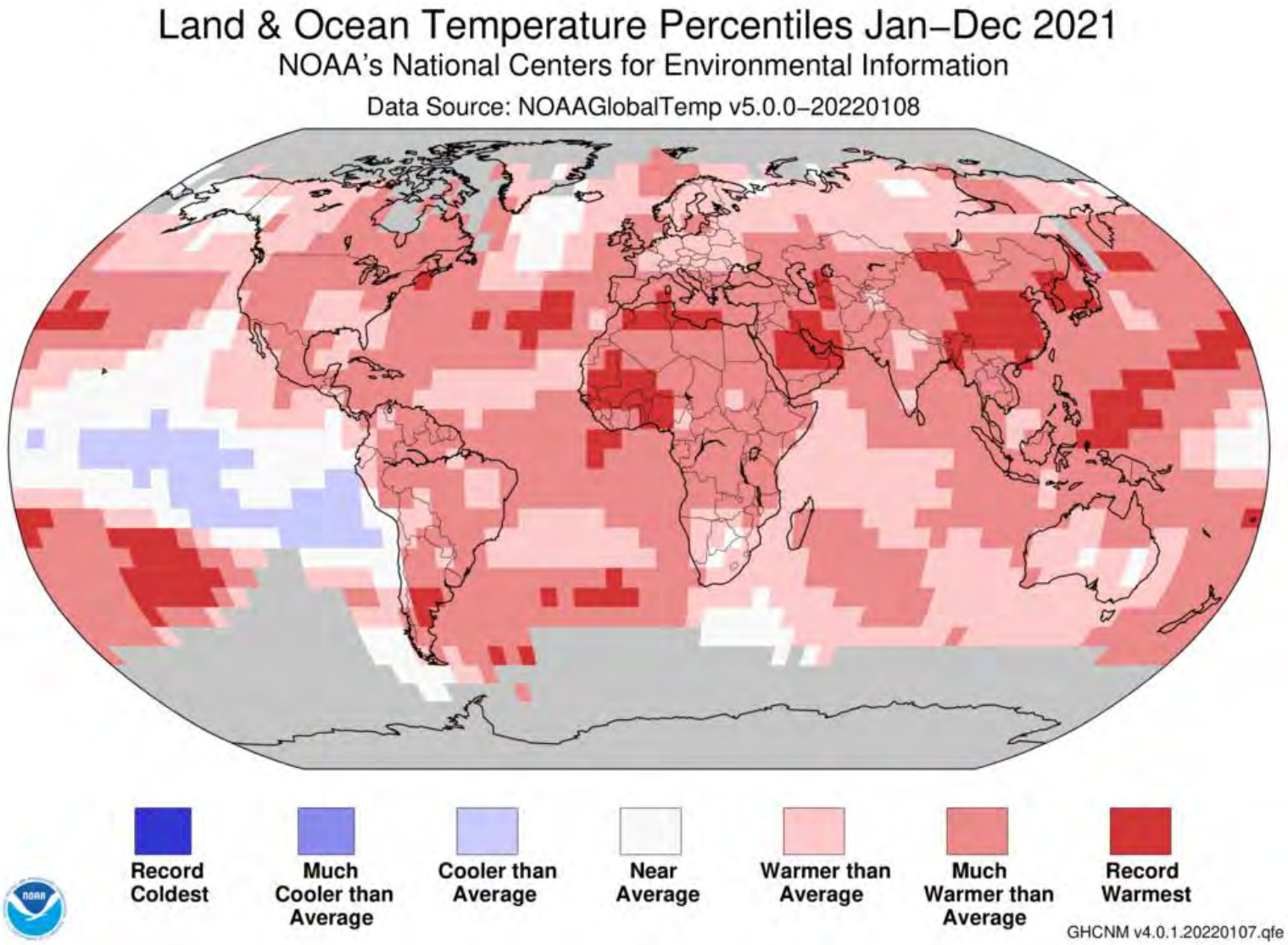
Talk Outline

- The State of the Climate
  - 2021 Global to Regional Perspective
- Current Conditions
- Summary and Vintage 2022 Forecast

State of the Climate
2021 Global to Regional Perspective

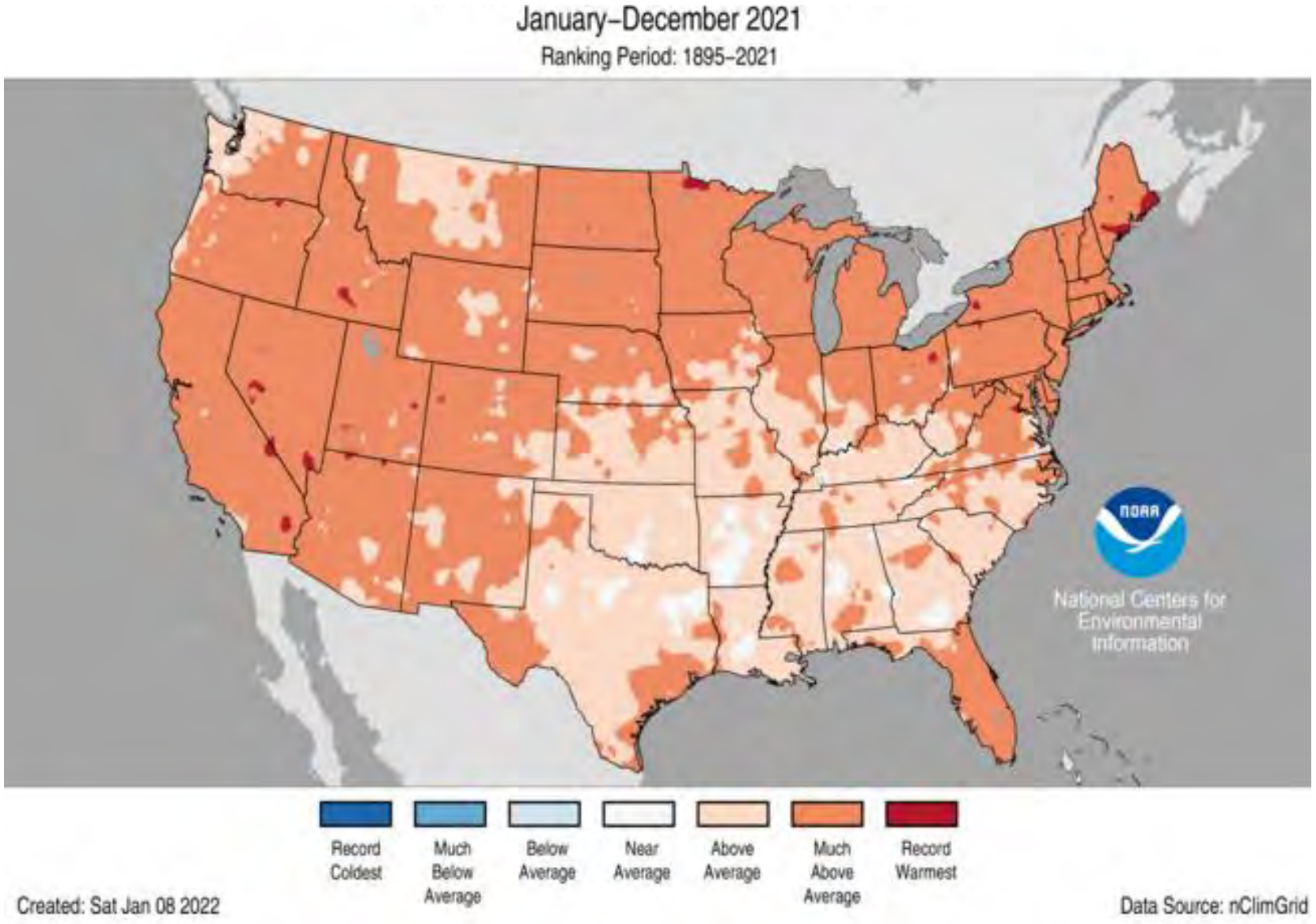
Global Temperature Departures 2021

- 2021 was the 6th warmest year on record (+1.51°F) and the last 7 years the warmest ever
- 45th consecutive year with temperatures above average
- 2021 ocean heat content at a record high
- 2021 also was the Arctic's warmest year ever, and both poles continue to lose ice mass at record paces



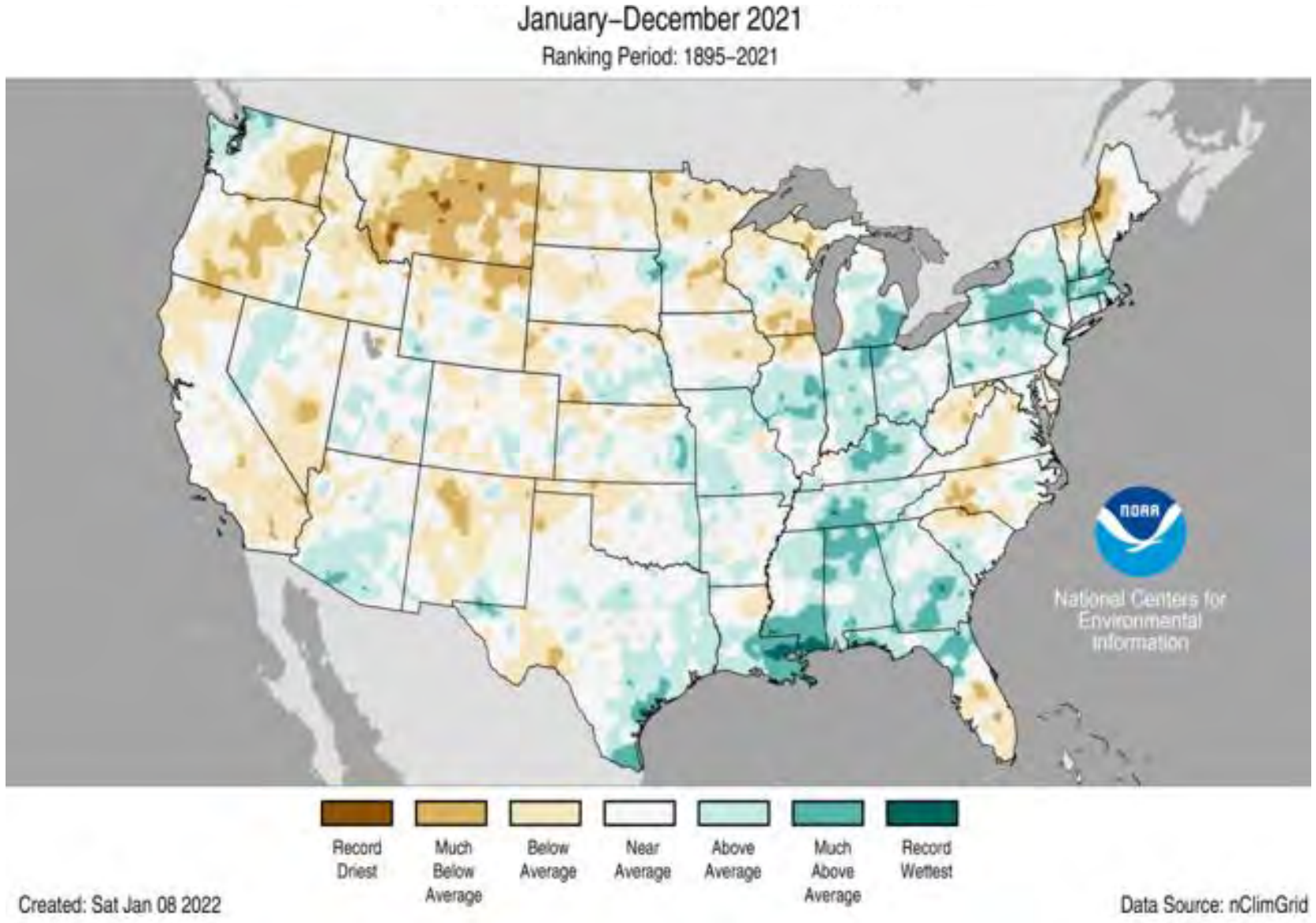
US Temperature Departures 2021

- CONUS 0.8°F to 4.1°F above average in 2021
- 4th warmest on record, +2.49°F
- 25th consecutive year CONUS above average
- Tmin up slightly more than Tmax in 2021



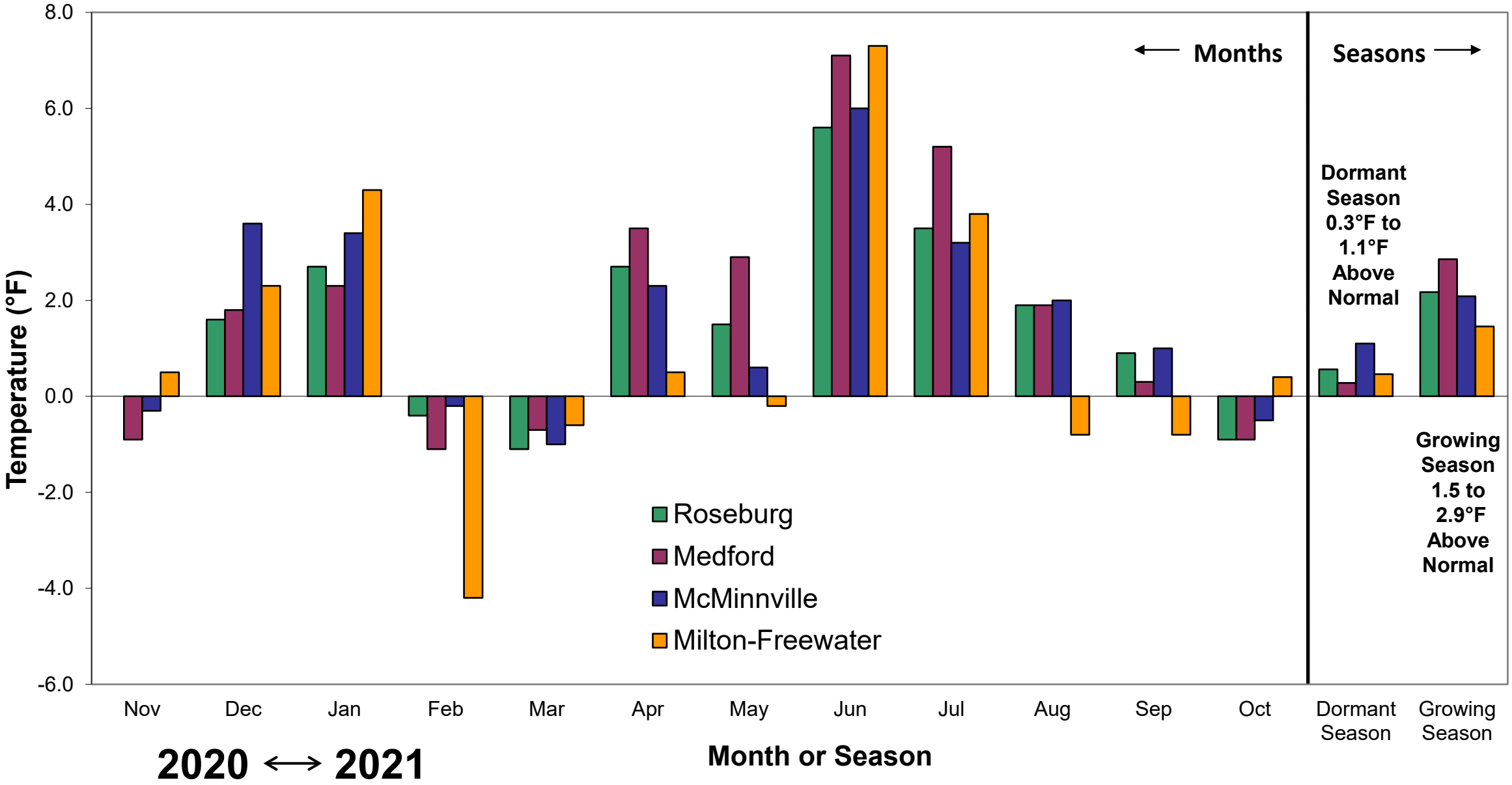
US Precipitation Departures 2021

- CONUS slightly wetter than average, but large differences across the county
- Southeast, Gulf Coast, Ohio River Valley way above
- West, Northern Plains, mid-Atlantic, Florida, and NE way below



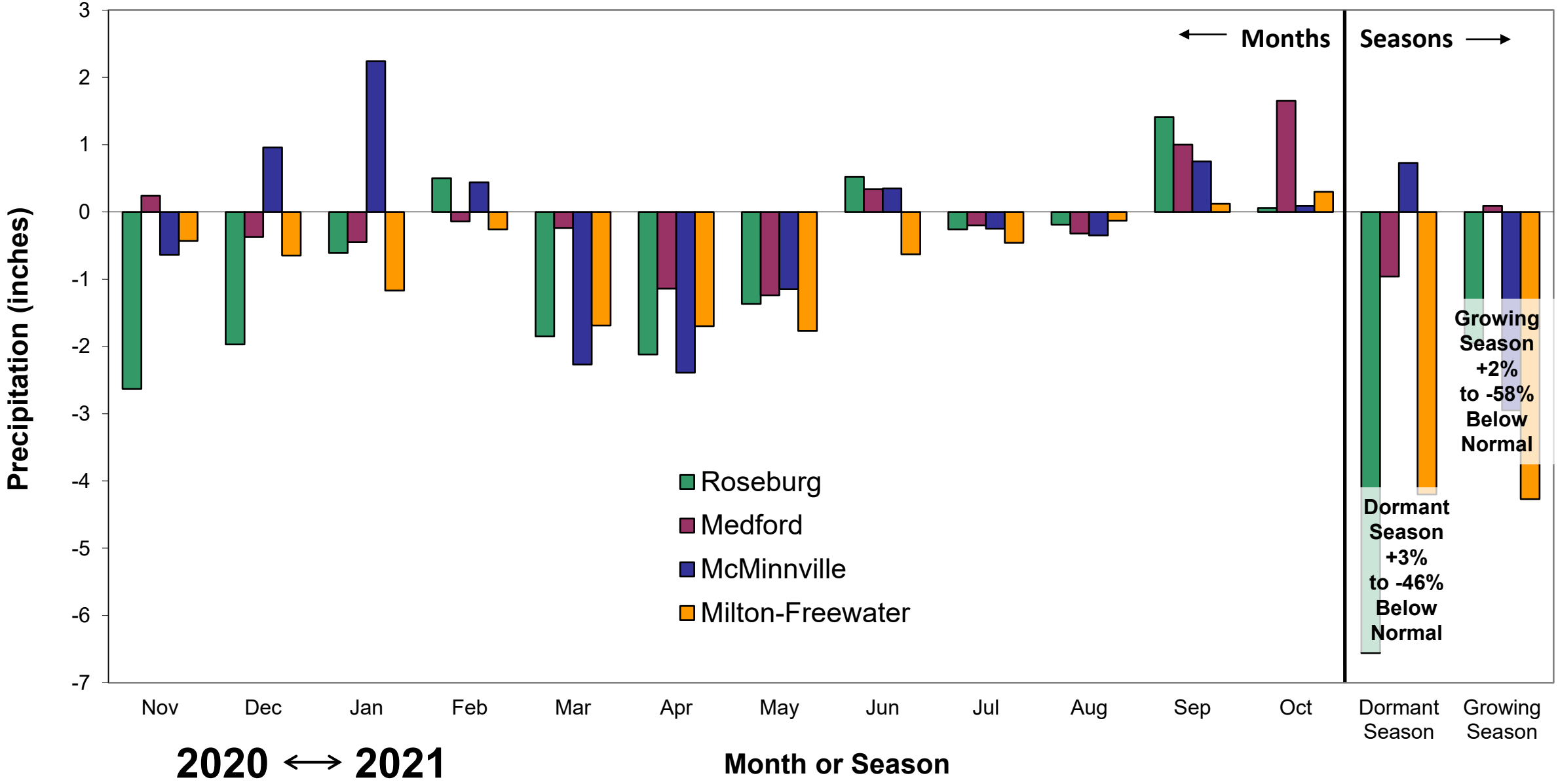
Oregon 2020-21
Weather/Climate Summary

2020-21 Regional Temperature Departures from Normal



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)

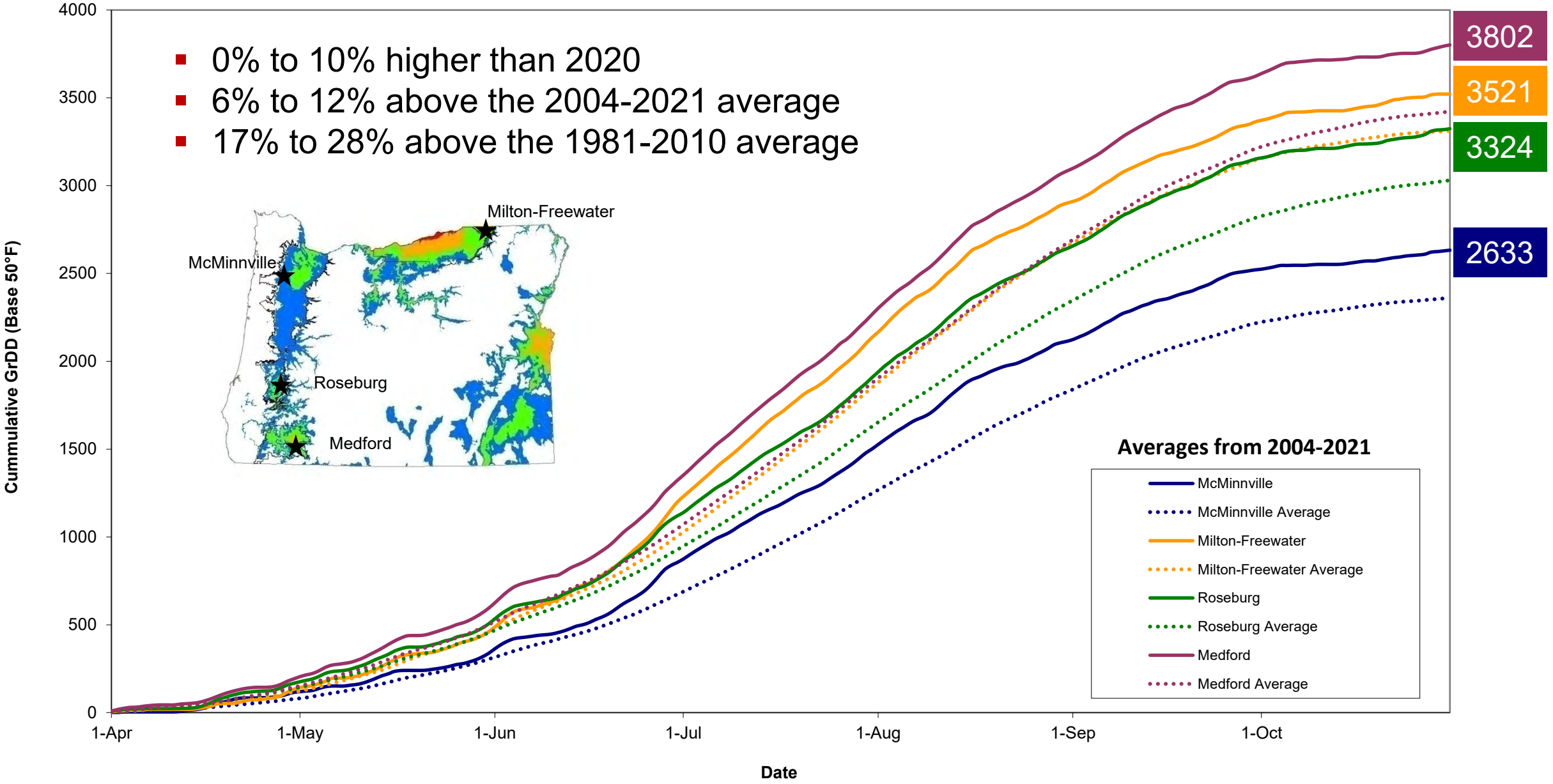
2020-21 Regional Precipitation Departures from Normal



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)

2021 Growing Season Cumulative Degree-Days

- 0% to 10% higher than 2020
- 6% to 12% above the 2004-2021 average
- 17% to 28% above the 1981-2010 average



This chart represents the 2021 cumulative growing degree-days compared to the average for 2004-2021 for the growing season (Apr-Oct) from the NWS stations (www.noaa.gov)

2021 Vintage Observations

- Dry winter and spring for most
- Irregular spring growth for some
- Early to mid April frosts, plus abnormal cold event third week in May
- Early June heat, rain during bloom to set for many, followed by record breaking heat event in late June
- Record # of days over 90°F, 95°F, & 100°F

2021 Vintage Observations

- Phenology early north and south; average east; harvest early to average for most
- Fruit set, crop load average to below average depending on region and variety
- Relatively low disease and bird pressure, mite and leafhopper pressure up in some regions
- Fruit quality reported as very good to excellent across all regions

2021 June Heat Wave

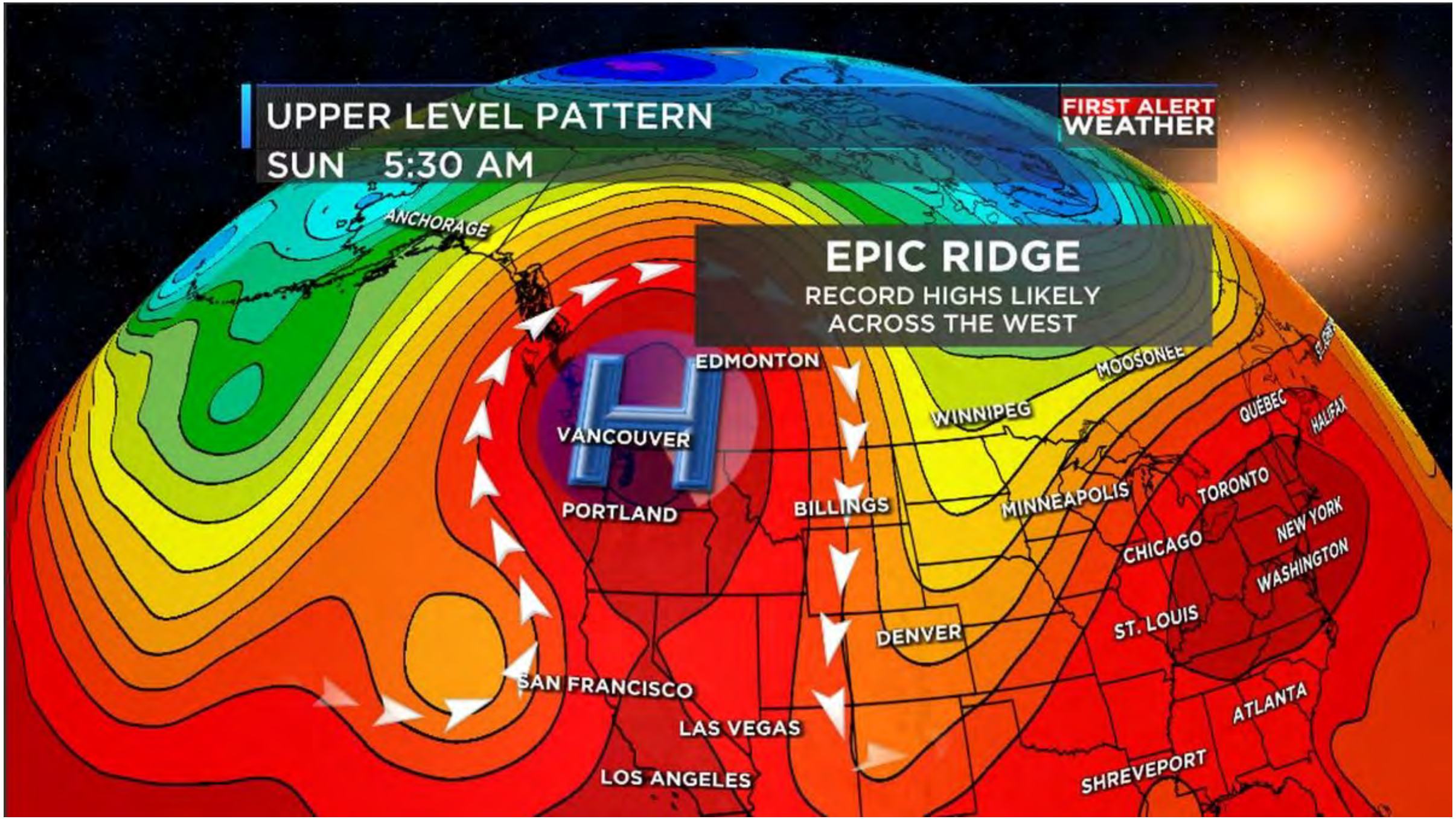
2021 June Heat Wave

- Never have so many all-time heat records fallen by such a large margins
- Shocked and speechless …
- To break a station, state, or national heat record by more than 8°F over three days … words fail me!
- The magnitude of the heatwave was unprecedented for June in North America

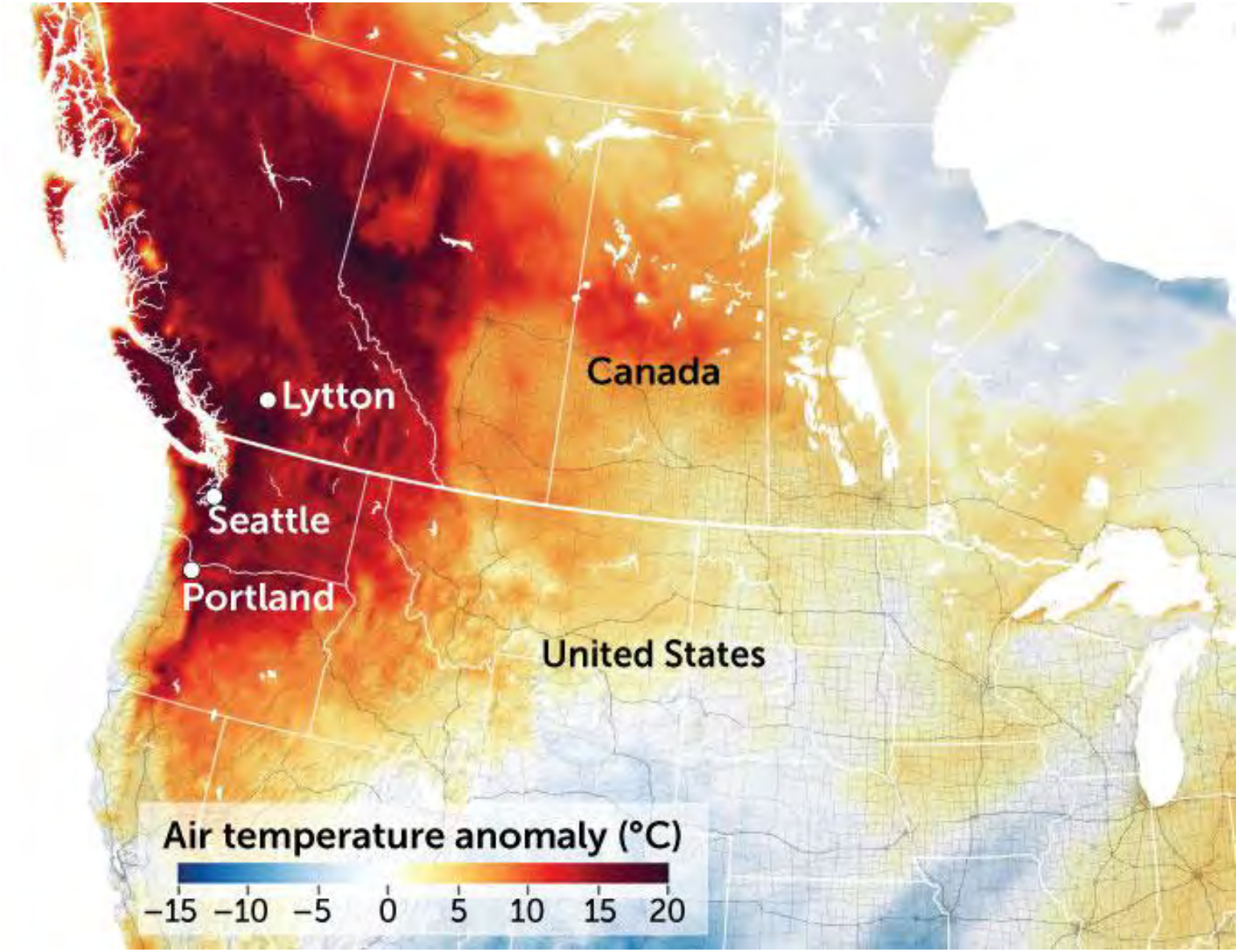
2021 June Heat Wave

Three surprising aspects:

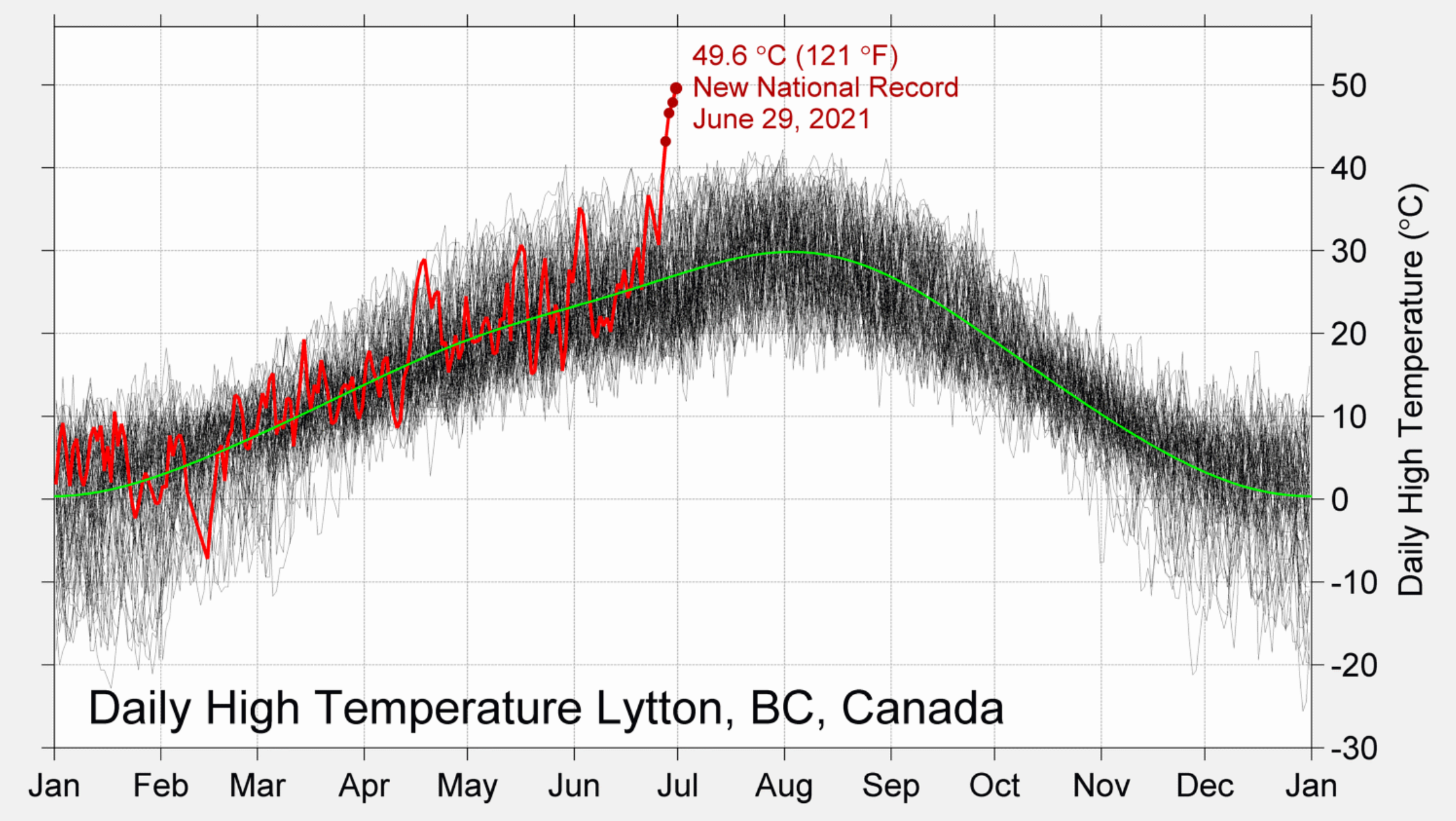
- Geography
  - More common in SW, no record in PNW
- Season
  - More likely in mid-July to late August
- Magnitude
  - Average highs were bested by 35-45°F across the PNW


UPPER LEVEL PATTERN
SUN 5:30 AM
FIRST ALERT WEATHER
EPIC RIDGE
RECORD HIGHS LIKELY ACROSS THE WEST
ANCHORAGE
EDMONTON
VANCOUVER
PORTLAND
BILLINGS
WINNIPEG
MOOSONEE
QUÉBEC
HALIFAX
MINNEAPOLIS
TORONTO
CHICAGO
NEW YORK
WASHINGTON
ST. LOUIS
DENVER
SAN FRANCISCO
LAS VEGAS
LOS ANGELES
ATLANTA
SHREVEPORT

2021 June Heat Wave



2021 June Heat Wave



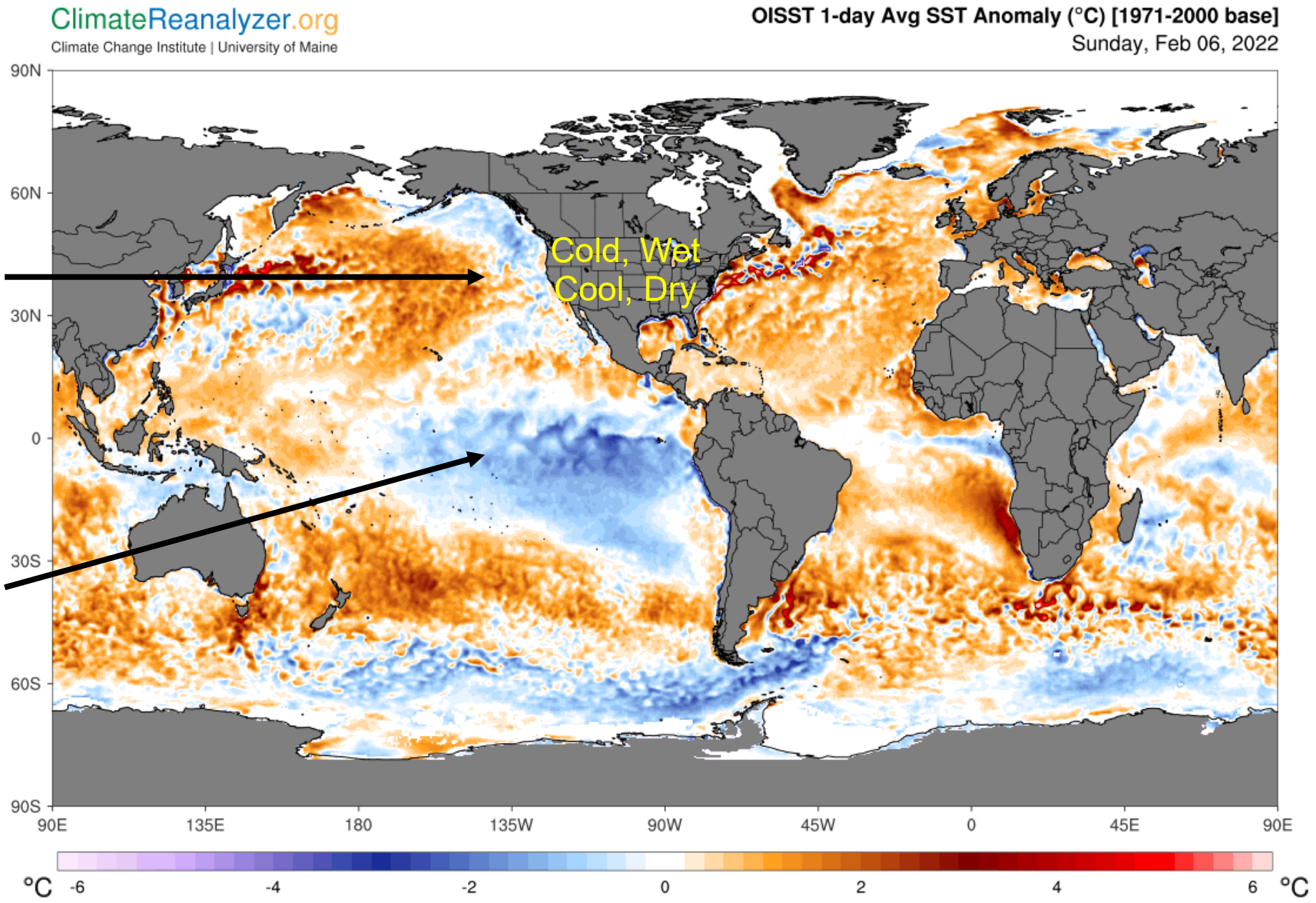
2021 June Heat Wave

- Fortunate the heat event occurred when it did during the vine growth stage in the PNW
- But scorched native, ornamental, & crop plants
- Likely the deadliest weather event on record for the PNW
- Hard to quantify with confidence how rare the event was, likely 1:1000 year or more event
- Essentially impossible without climate change

Current Conditions

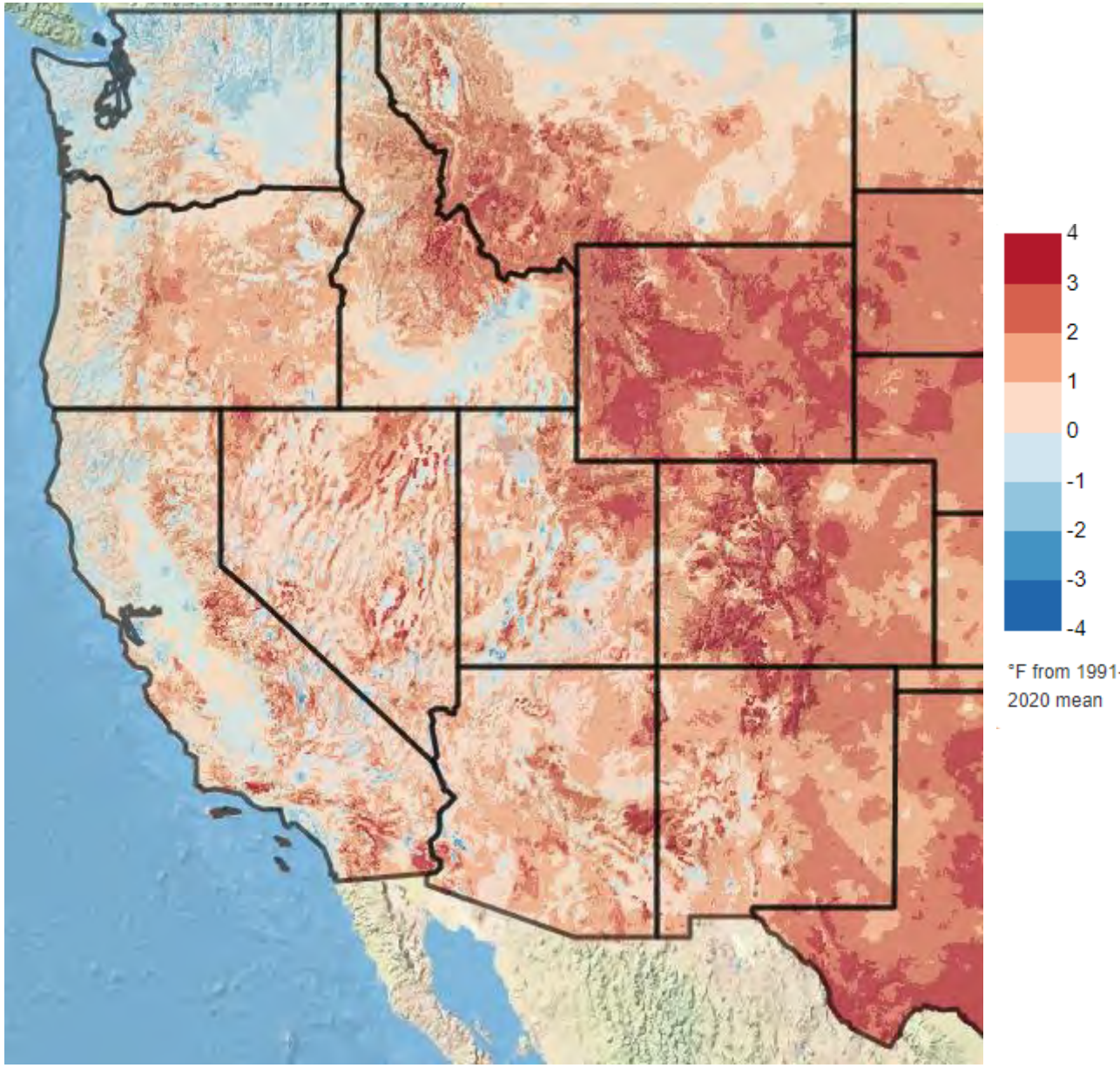
Current Sea Surface Temperatures

- North Pacific is warmer than average west, colder than average east, currently displaying strong negative Pacific Decadal Oscillation (PDO) conditions
- Tropics have been in weak to moderate La Niña this winter, expected to stay until spring



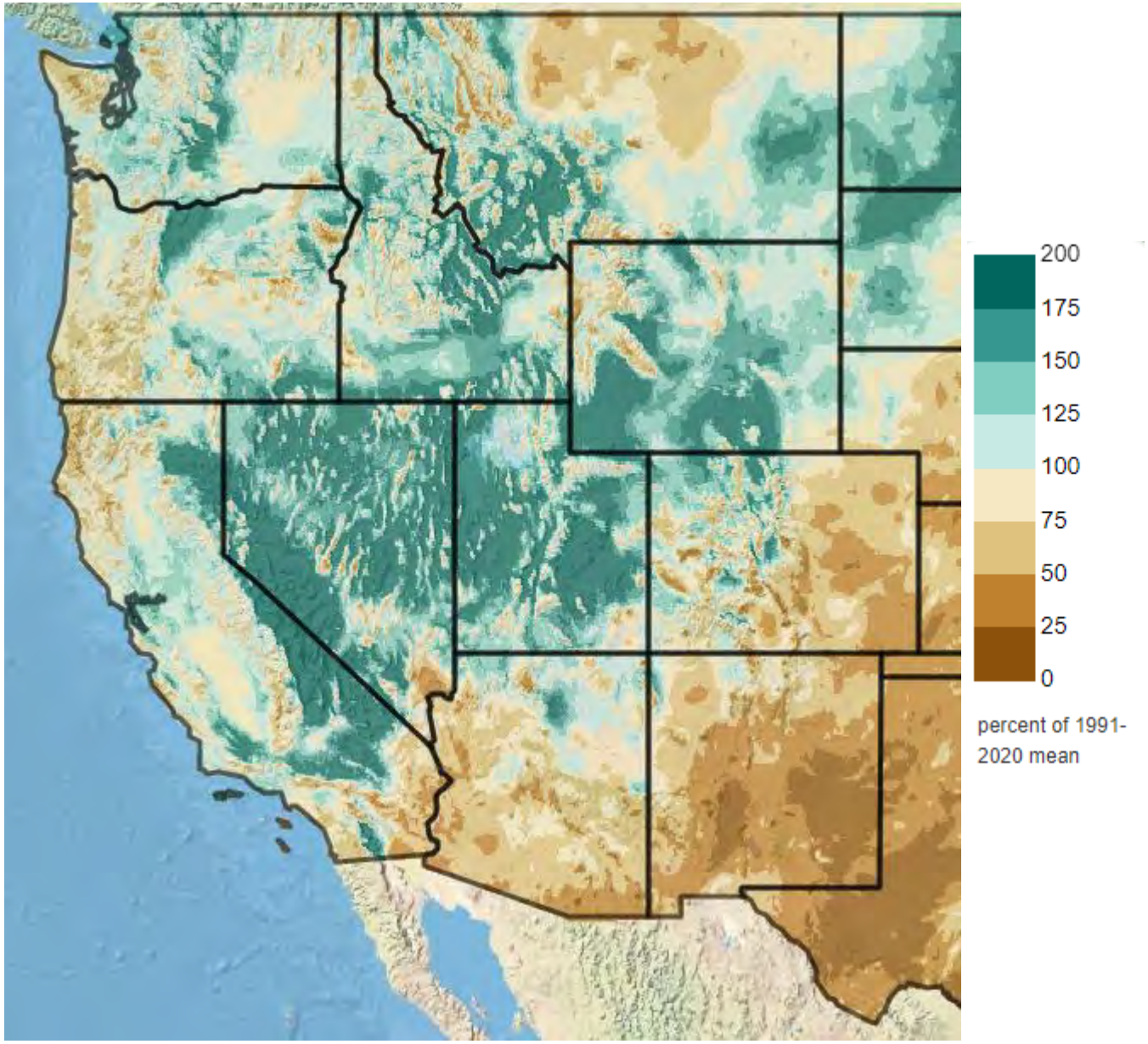
- Temperatures close to the pattern expected from a weak to moderate La Niña winter, plus elevated areas warmer than lowlands

Water Year Mean Temperature Departure from Normal
Oct 1, 2021, to Feb 9, 2022

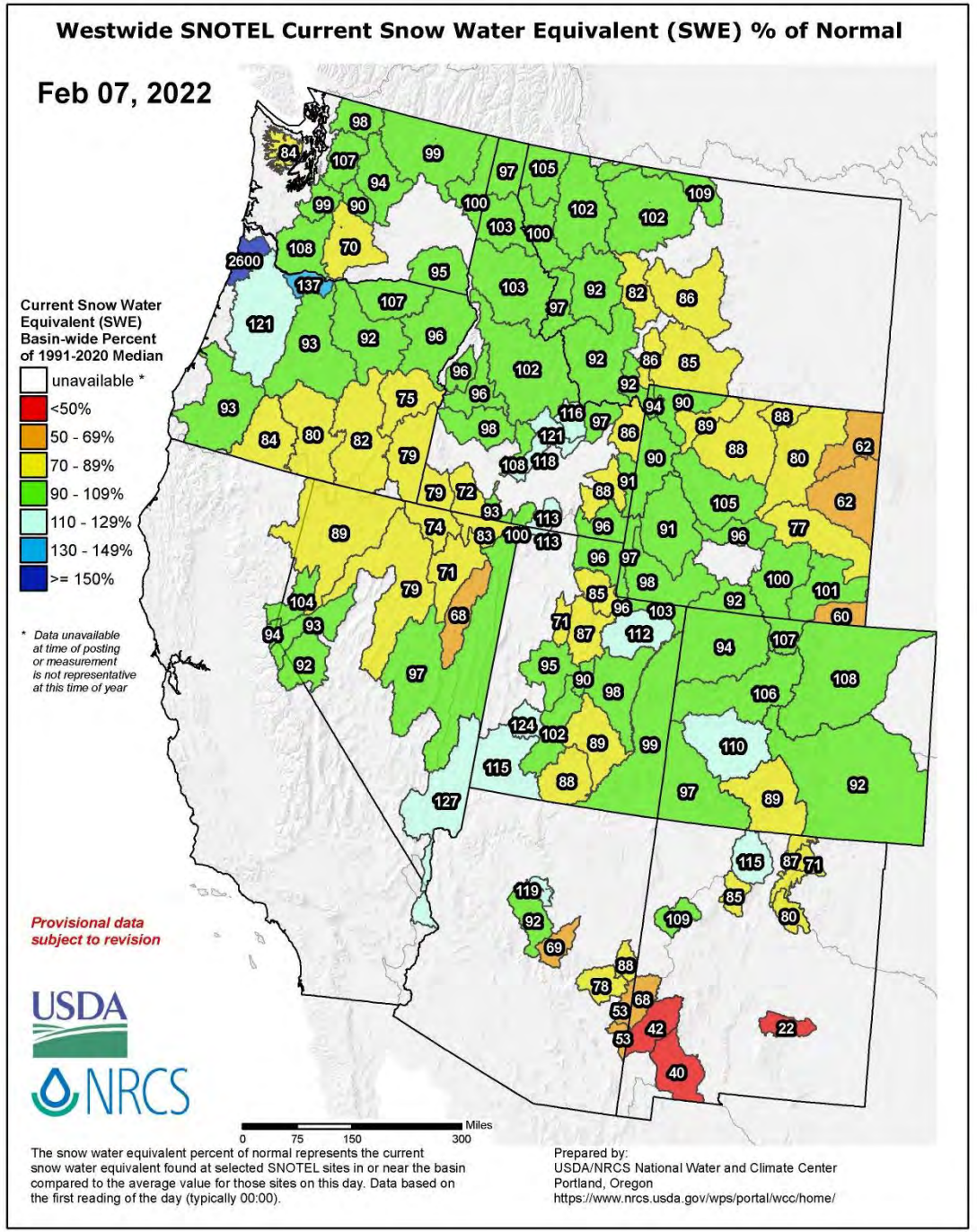


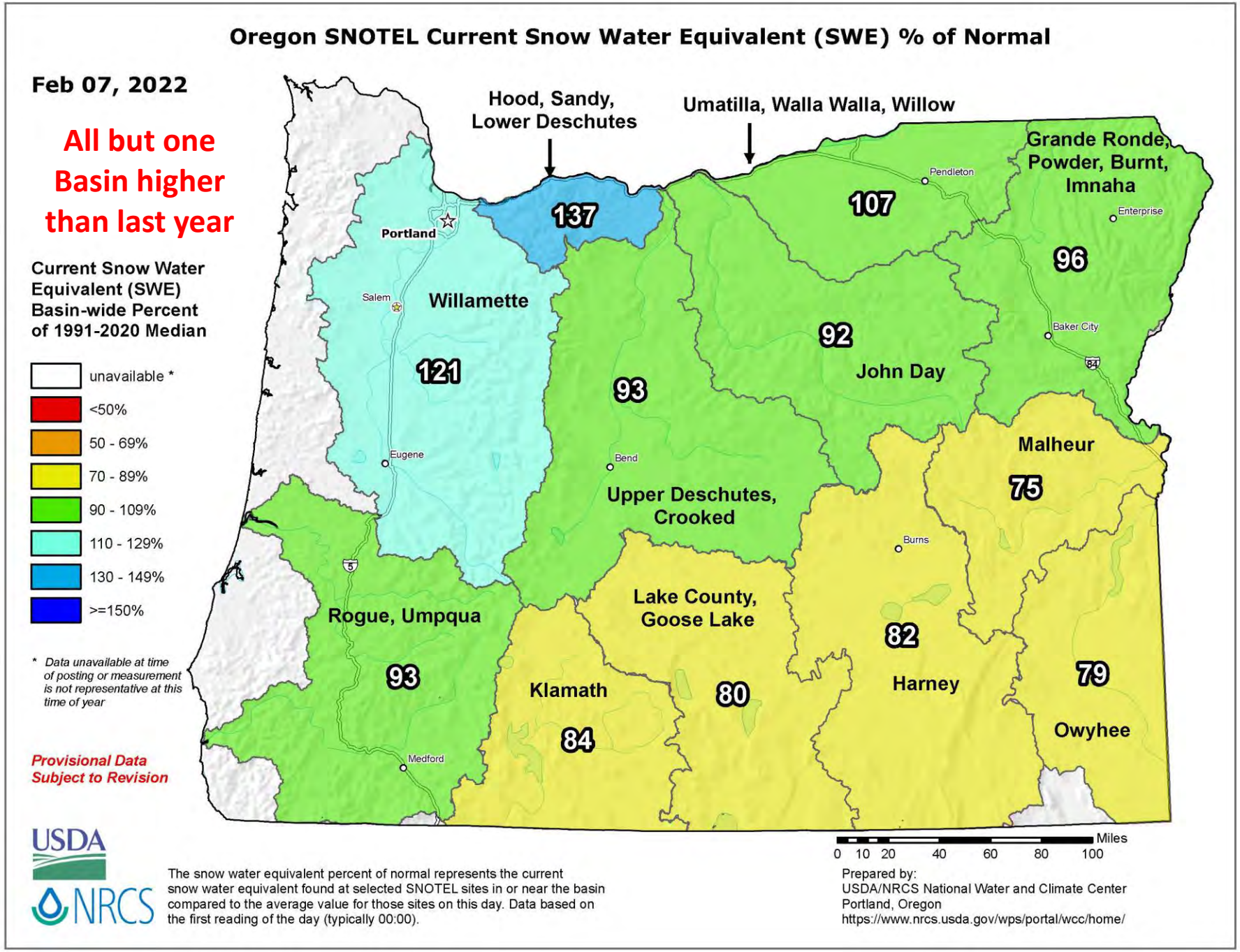
- Temperatures close to the pattern expected from a weak to moderate La Niña winter, plus elevated areas warmer than lowlands
- Wet start for much of the west, but all from a handful of storms, little input in the last six weeks

Water Year Precipitation % of Normal
Oct 1, 2021, to Feb 9, 2022

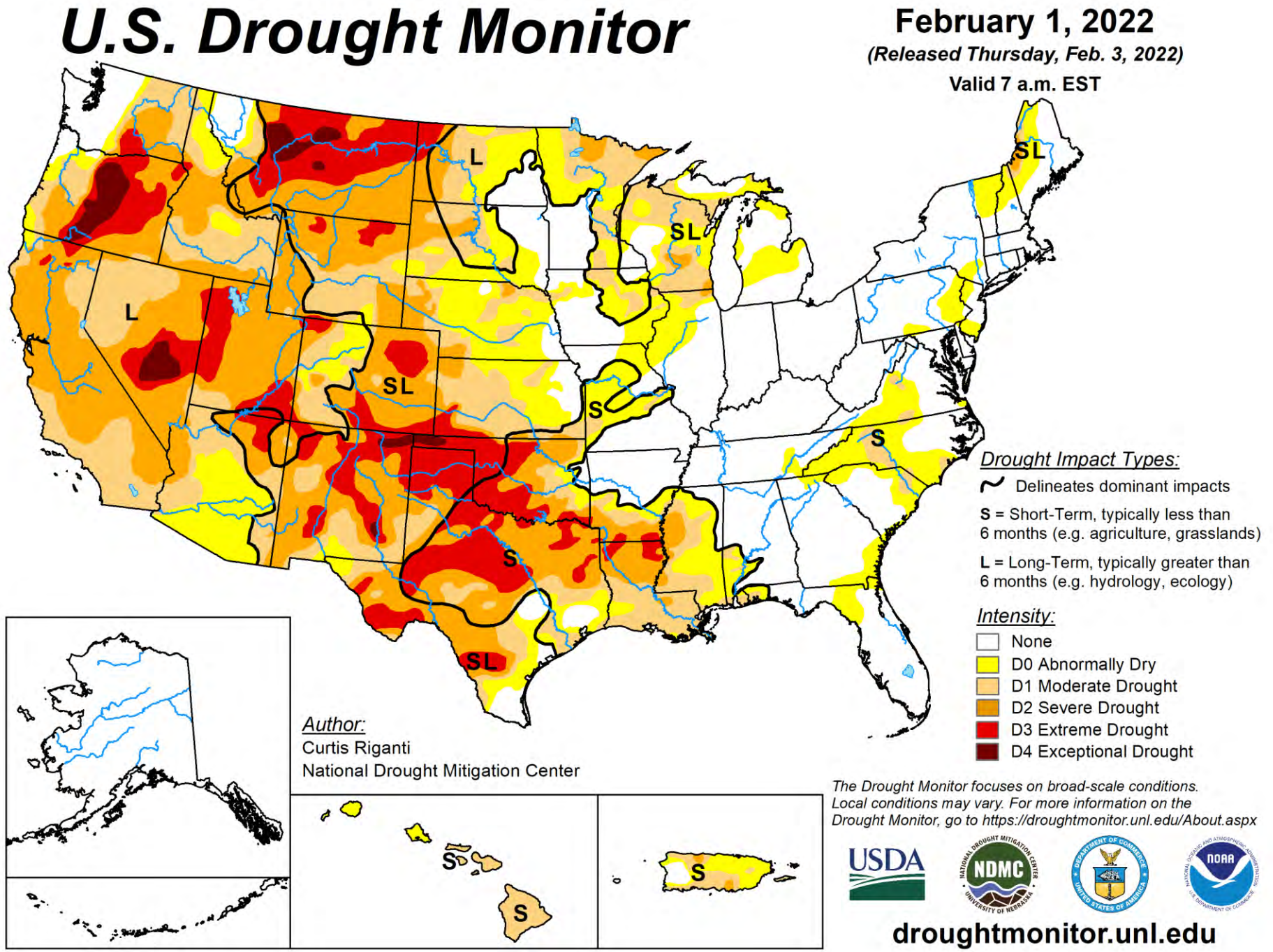


- Temperatures close to the pattern expected from a weak to moderate La Niña winter, plus elevated areas warmer than lowlands
- Wet start for much of the west, but all from a handful of storms, little input in the last six weeks
- SWE higher than 2021, but still quite low SW, portions of the Rockies, and Basin




Oregon SNOTEL Current Snow Water Equivalent (SWE) % of Normal
Feb 07, 2022
All but one Basin higher than last year
Current Snow Water Equivalent (SWE) Basin-wide Percent of 1991-2020 Median
unavailable *
<50%
50 - 69%
70 - 89%
90 - 109%
110 - 129%
130 - 149%
>=150%
* Data unavailable at time of posting or measurement is not representative at this time of year
Provisional Data Subject to Revision
Hood, Sandy, Lower Deschutes
Umatilla, Walla Walla, Willow
Grande Ronde, Powder, Burnt, Imnaha
137
107
96
Willamette
121
92
John Day
93
Upper Deschutes, Crooked
Malheur
75
Rogue, Umpqua
93
Lake County, Goose Lake
82
Harney
79
Owyhee
Klamath
84
80
Portland
Salem
Eugene
Bend
Pendleton
Enterprise
Baker City
Burns
Medford
Miles
0 10 20 40 60 80 100
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
https://www.nrcs.usda.gov/wps/portal/wcc/home/

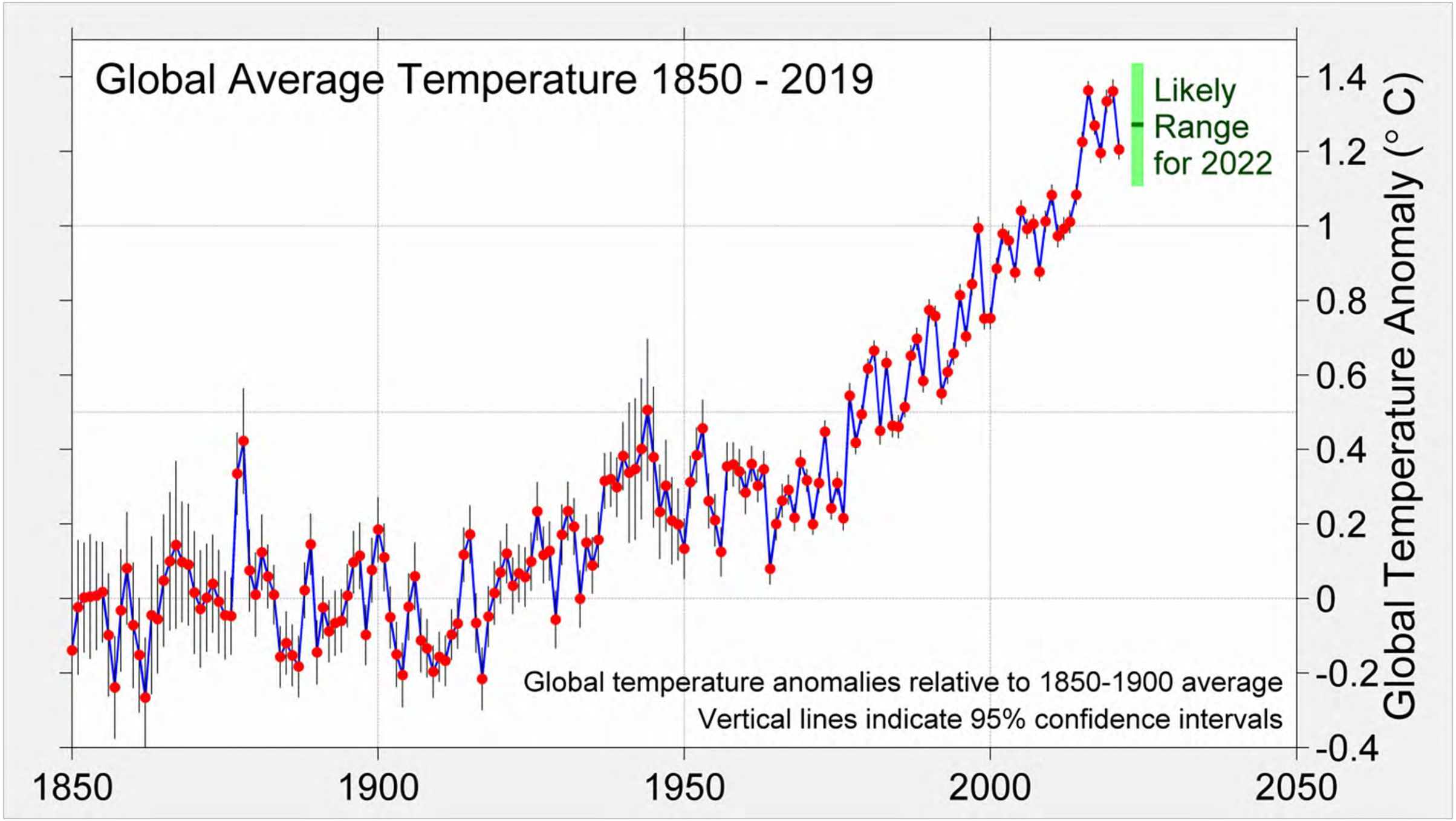
- Large drought footprint in the west continues
- 95% in some level of drought
- ~20% in extreme to exceptional drought
- Area of impacts has expanded east into the Plains
- PNW seeing some recovery, but …



Summary

Summary

- As mentioned in previous years, persistence in the global climate system points to continued warming highly likely



Data from Berkeley Earth (www.BerkeleyEarth.org)

Summary

- As mentioned in previous years, persistence in the global climate system points to continued warming highly likely
- Further, substantial variability in weather/climate factors are also likely to continue
- Potential El Niño in the late summer, early fall could increase temperatures some

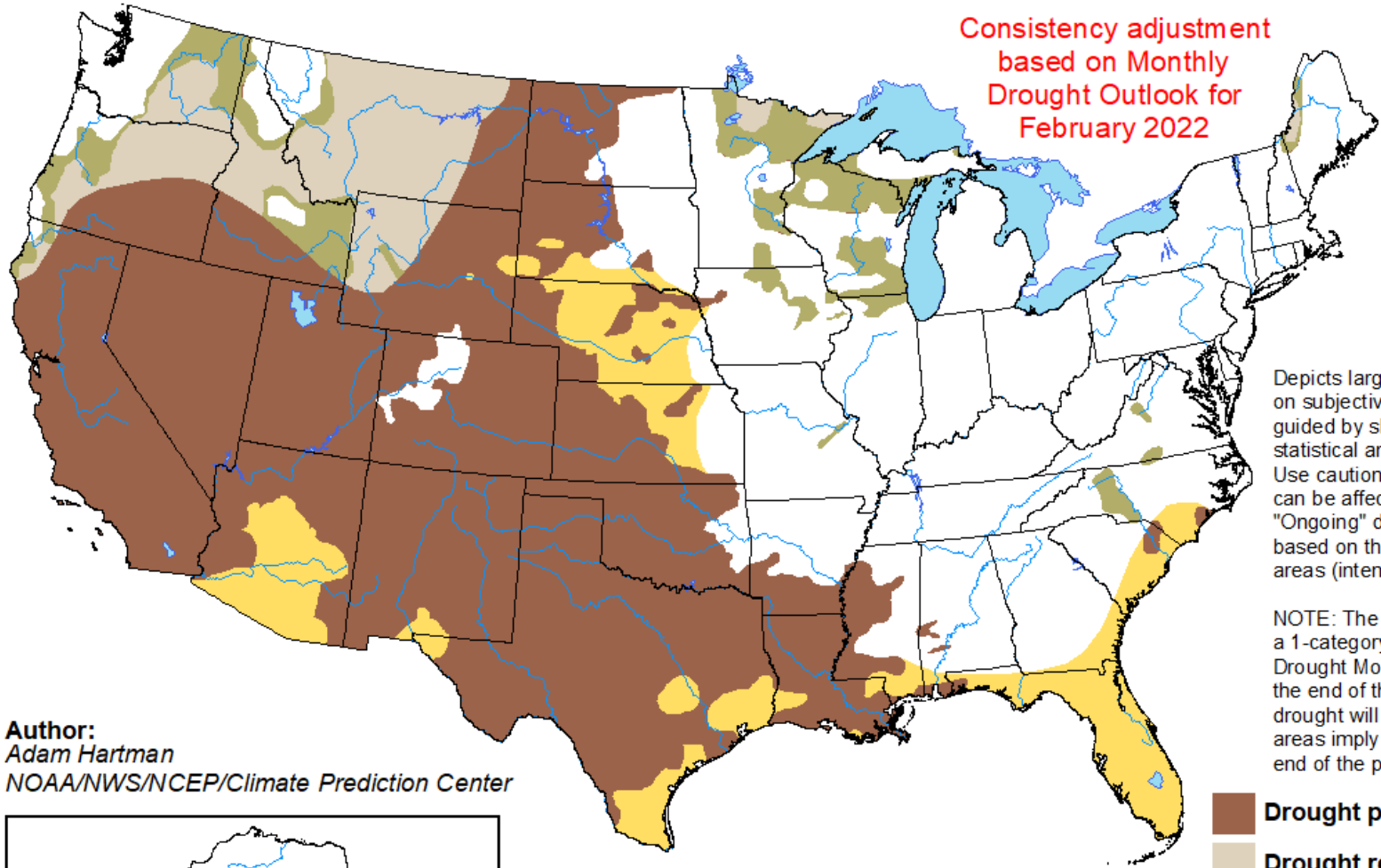
Summary

- Spatial extent of drought in the west has increased but severity is lower
- Some improvement north, likely continuing south

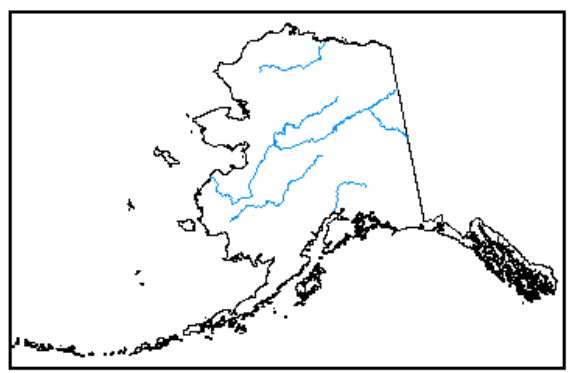
U.S. Seasonal Drought Outlook

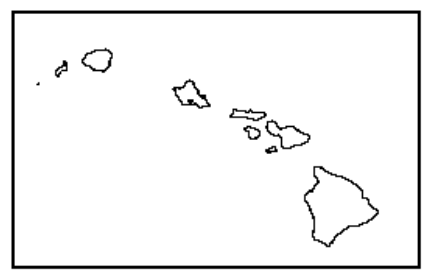
Drought Tendency During the Valid Period

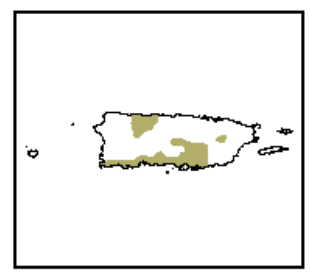
Valid for February 1 - April 30, 2022
Released January 31, 2022



Author:
Adam Hartman
NOAA/NWS/NCEP/Climate Prediction Center







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**

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

Summary

- Spatial extent of drought in the west has increased but severity is lower
- Some improvement north, likely continuing south
- Sustained warming in the Arctic likely to continue influencing greater than expected mid-latitude climate variability
- The warmth of the North Pacific should continue to drive higher humidity levels and warmer Tmin over the western US, especially second half of summer

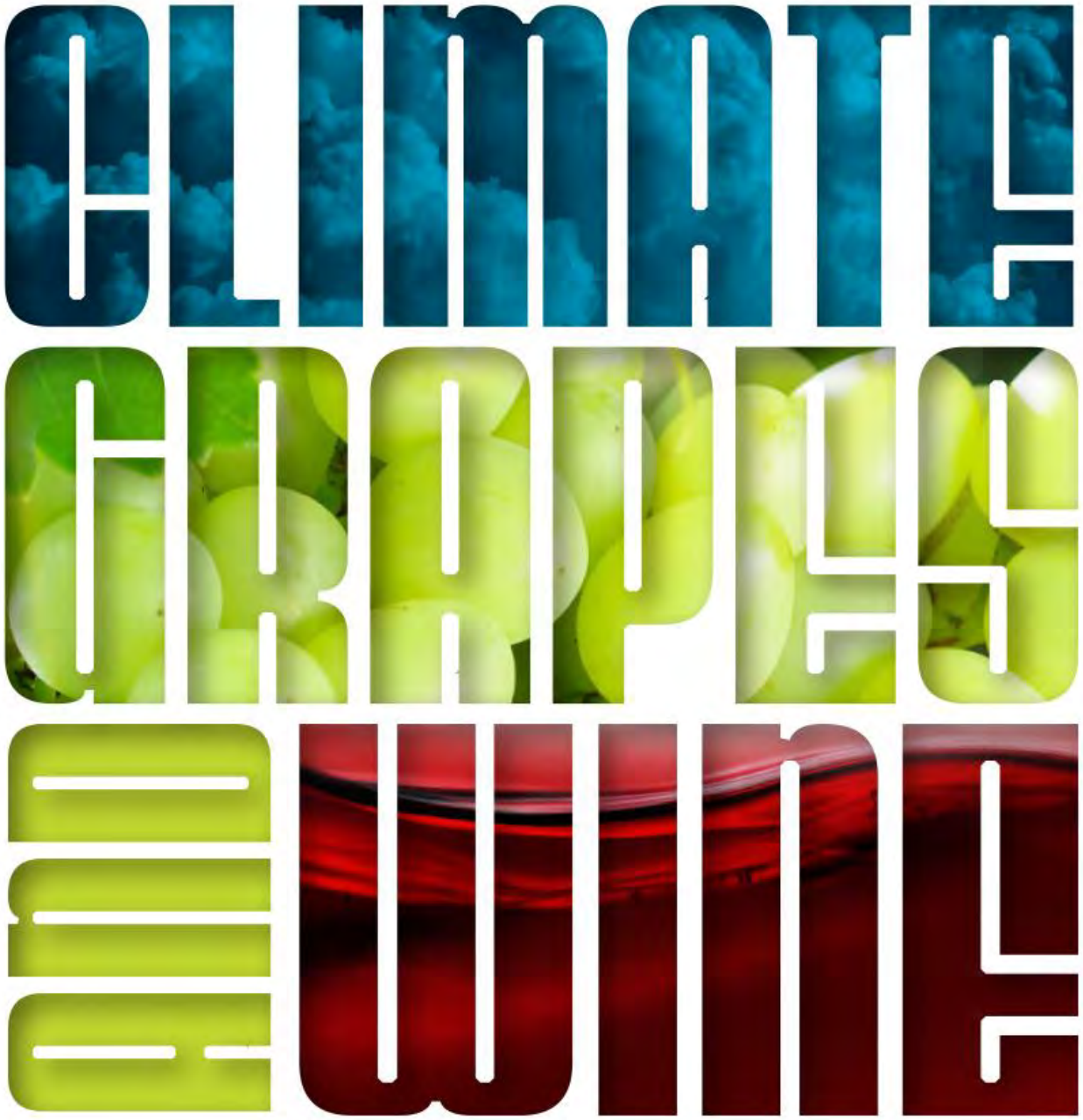
Forecast

Spring/Summer 2022 Forecast

- Tropical SST transitions from La Niña to neutral to El Niño
- North Pacific SST cooler than average coastal, shifting to warmer than average later in the summer
- Current conditions and forecast models are tilting the odds in favor of;
  - PNW cooler than average temperatures late winter through spring, models hint at average precipitation in MAM
  - California average to warm now through spring, sadly no indications for anything but a dry spring

Spring/Summer 2022 Forecast

- Spring frost frequency and severity higher in the PNW, lower in California, in years with these conditions
- But dry conditions increase frost concern everywhere
- After slow start to the growing season, no reason to believe temperatures and GDD will be too far off those of the last few years in the west
- Drought concerns appear headed lower in the PNW into the spring; California and southwest likely to continue the run of moderate to extreme drought through the summer



Thank You!

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