

# WINTER 2019-2020

Mark Nelsen

DID WE REALLY SEE A WINTER LAST YEAR?



IT DIDN'T GET MUCH MORE EXCITING  
THAN THIS!





# Winter 2019-20

- ❖ Most boring winter I've seen in 29 winters of forecasting.  
>> Or at least one of the top 2 <<
- ❖ A snow-free winter for most west of Cascades
- ❖ **Stormy weather pattern never really set up last winter**
- ❖ **Terrible ski season start, reasonable by mid-January**  
5 feet in one week mid-January at Government Camp!
- ❖ No PACNW Arctic Blast (6th consecutive winter), although correct synoptic pattern Thanksgiving Weekend

# **OFFICIAL SNOW TOTAL**

**0.5"**

at PQR (NWS Office)

**0.5"** Downtown (KGW-TV)

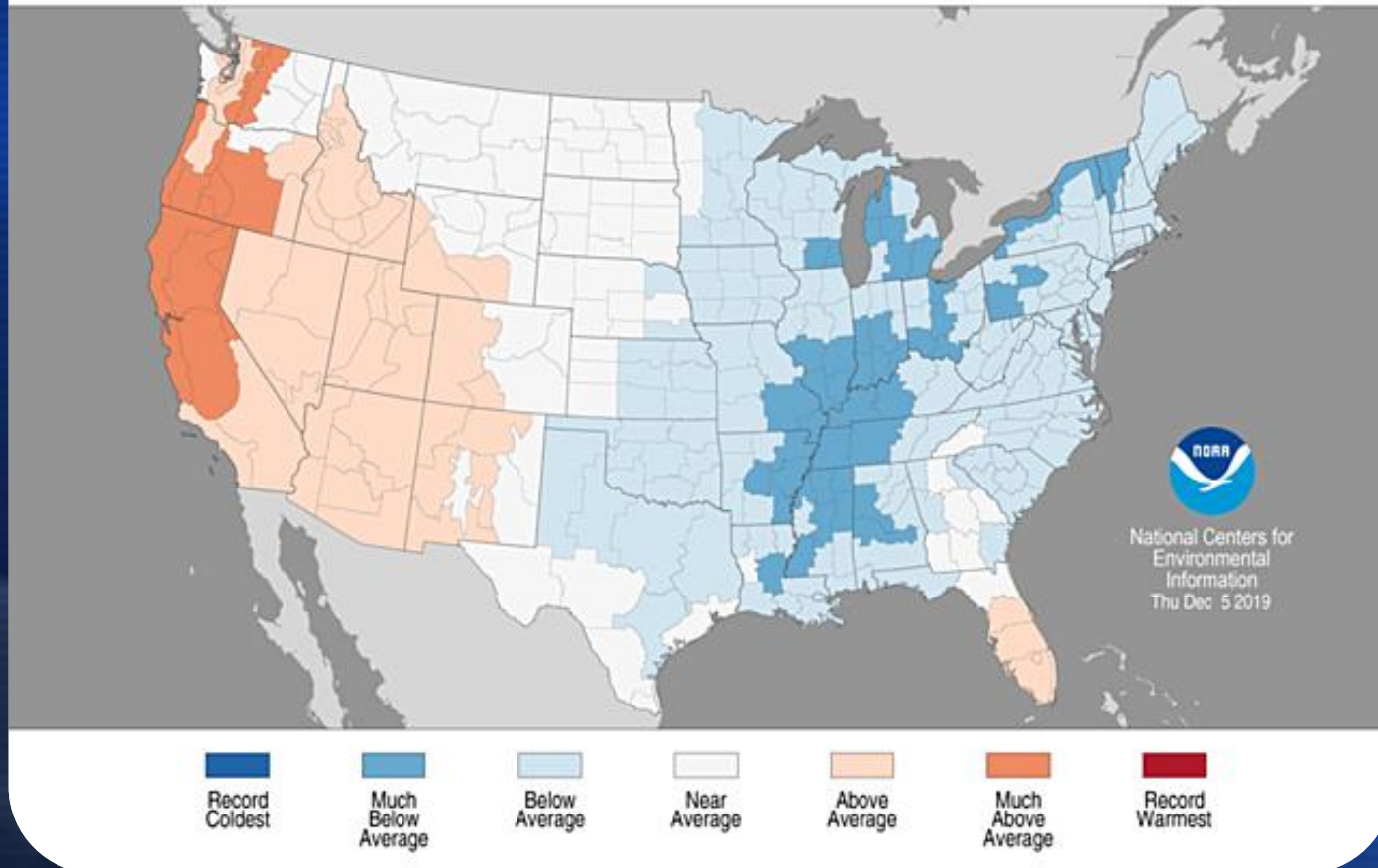


# THE USA VIEW

### Divisional Average Temperature Ranks

November 2019

Period: 1895–2019

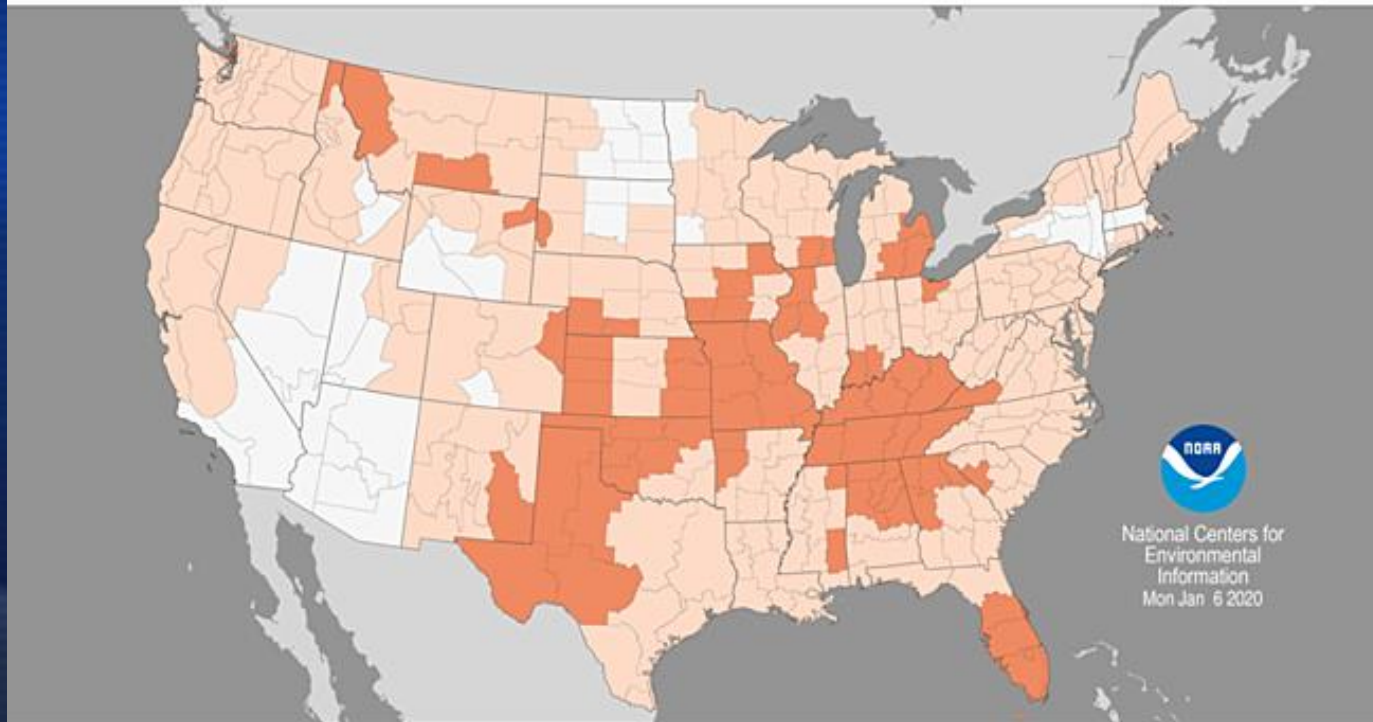


# THE USA VIEW

## Divisional Average Temperature Ranks

December 2019

Period: 1895-2019



National Centers for  
Environmental  
Information  
Mon Jan 6 2020



Record  
Coldest



Much  
Below  
Average



Below  
Average



Near  
Average



Above  
Average



Much  
Above  
Average



Record  
Warmest

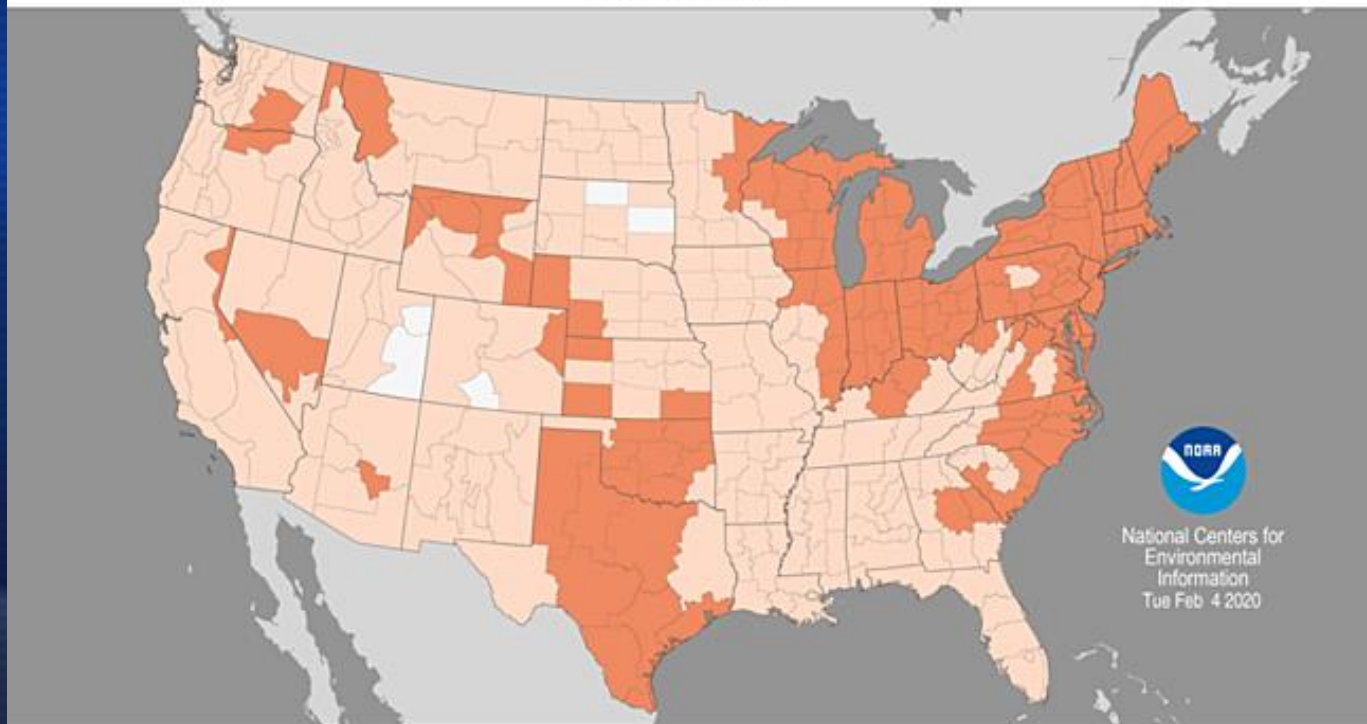


# THE USA VIEW

### Divisional Average Temperature Ranks

January 2020

Period: 1895–2020



National Centers for  
Environmental  
Information  
Tue Feb 4 2020

**Record Coldest**

Much Below Average

Below Average

Near  
Average

Above Average

Much Above Average

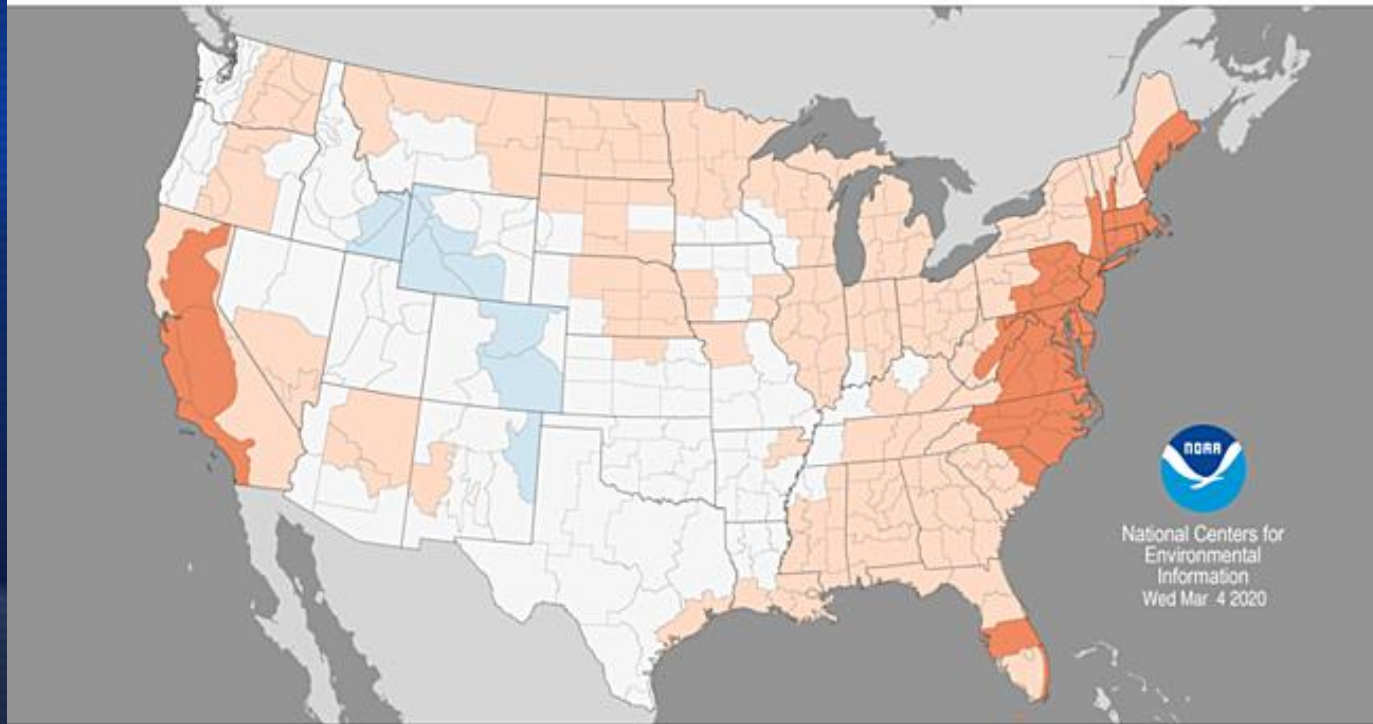
**Record Warmest**

# THE USA VIEW

## Divisional Average Temperature Ranks

February 2020

Period: 1895-2020



National Centers for  
Environmental  
Information  
Wed Mar 4 2020

Record  
Coldest

Much  
Below  
Average

Below  
Average

Near  
Average

Above  
Average

Much  
Above  
Average

Record  
Warmest

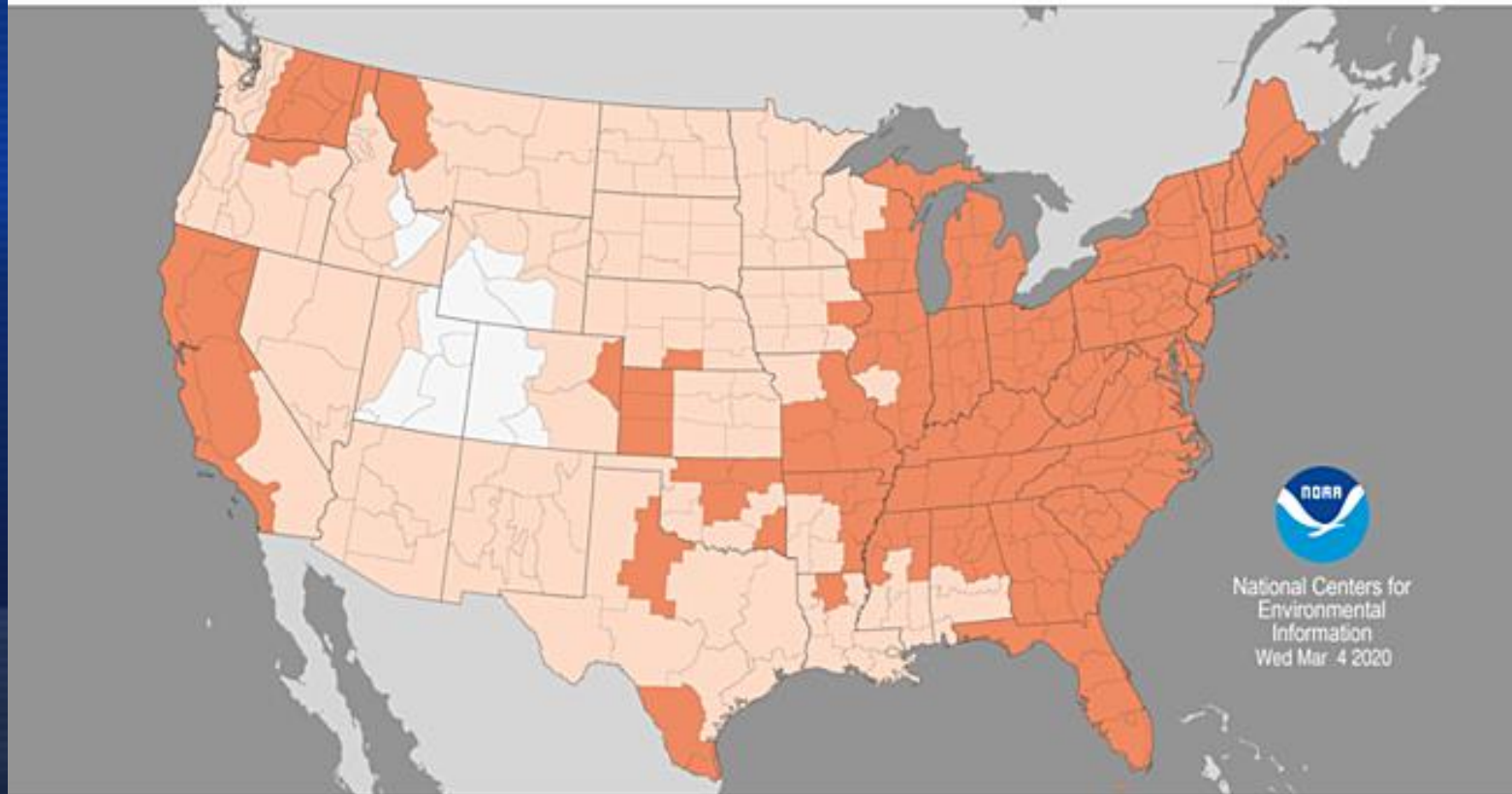


# 6<sup>th</sup> warmest USA winter

## Divisional Average Temperature Ranks

December 2019–February 2020

Period: 1895–2020



National Centers for  
Environmental  
Information  
Wed Mar 4 2020

Record  
Coldest

Much  
Below  
Average

Below  
Average

Near  
Average

Above  
Average

Much  
Above  
Average

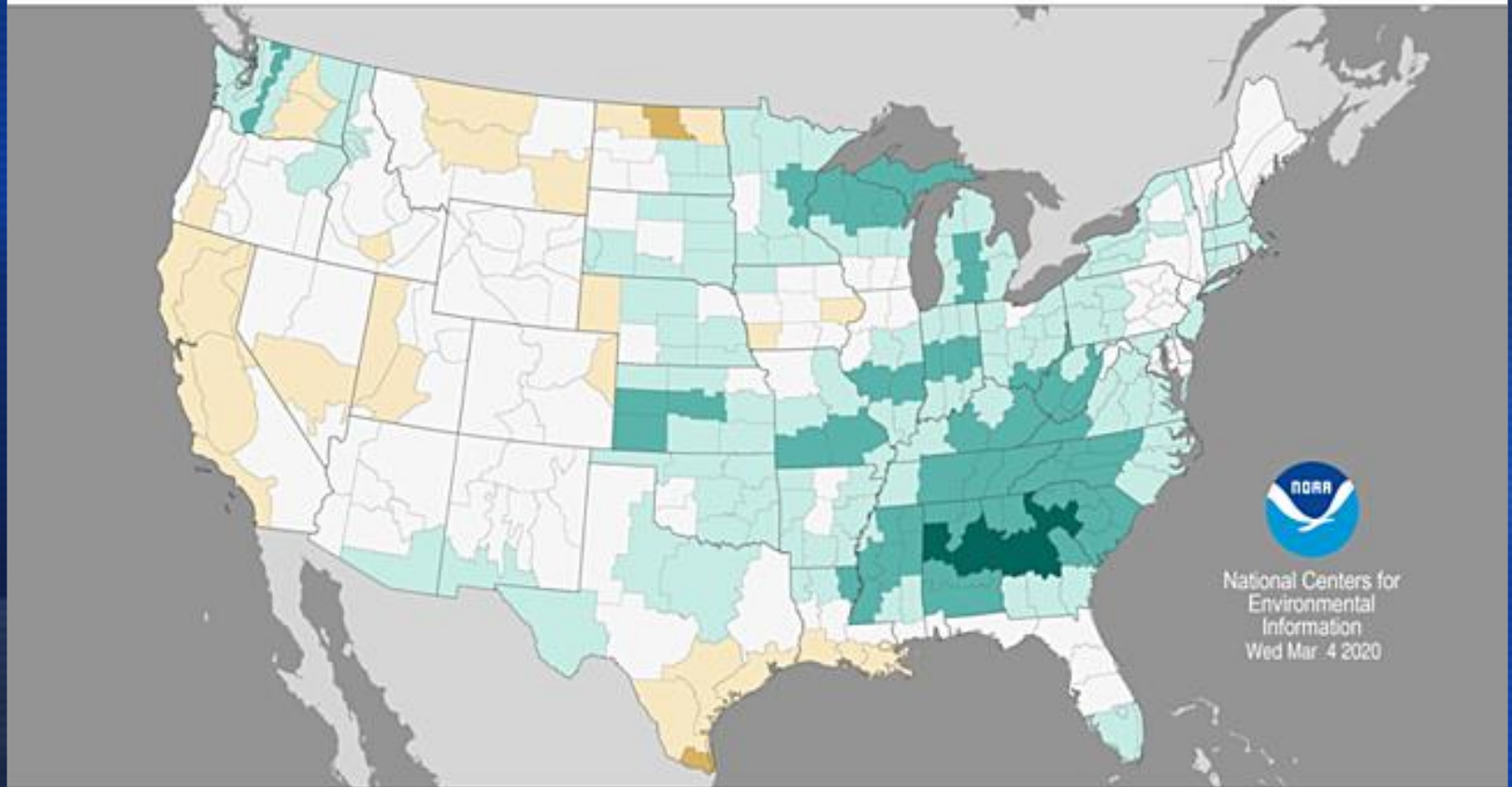
Record  
Warmest

# 3 MONTH PRECIPITATION

## Divisional Precipitation Ranks

December 2019–February 2020

Period: 1895–2020



Record  
Driest

Much  
Below  
Average

Below  
Average

Near  
Average

Above  
Average

Much  
Above  
Average

Record  
Wettest



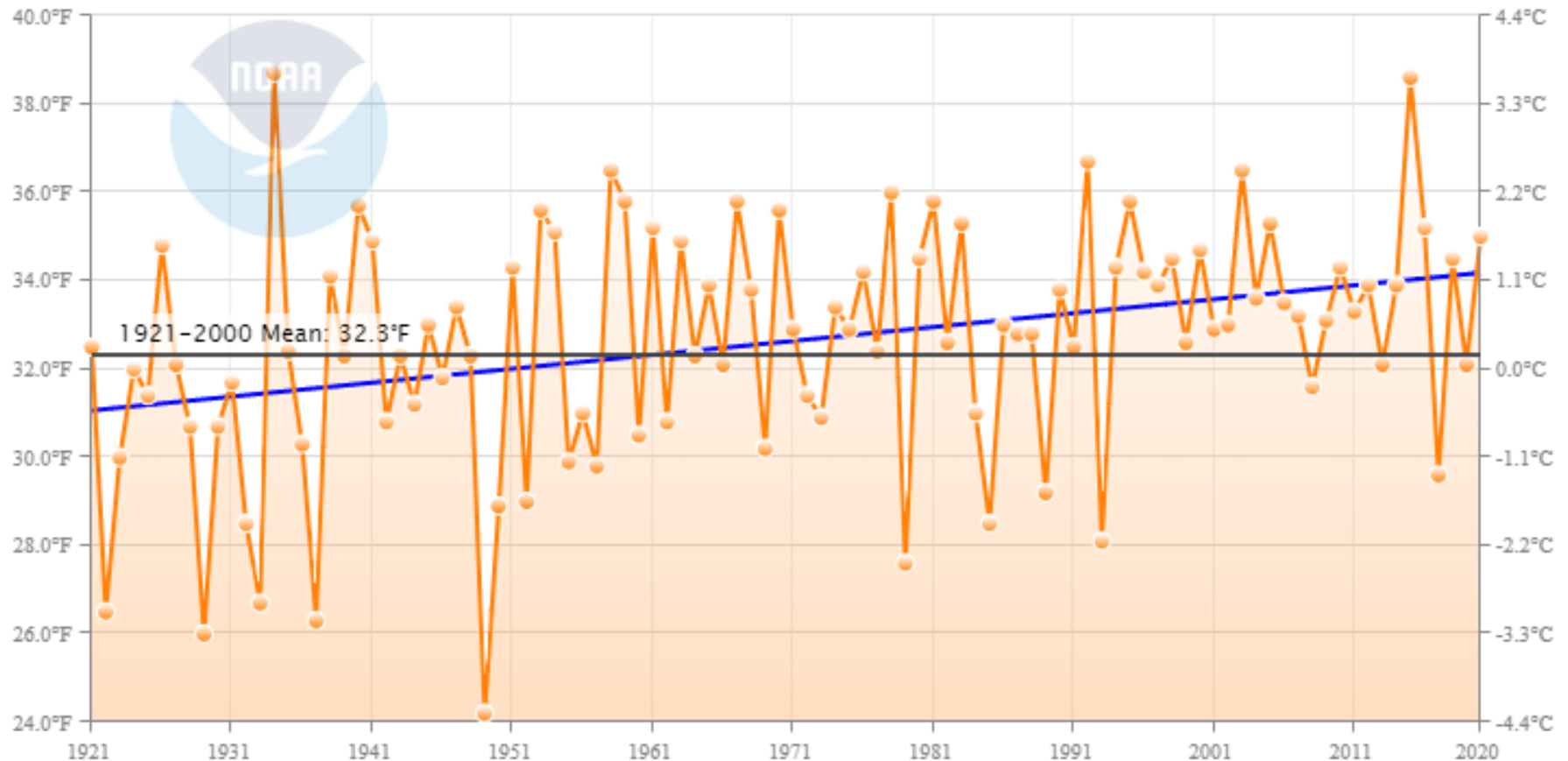
# Oregon Winter Temps

(the last 100 years)

*Slow Warming Trend (0.3/decade)*

Oregon Average Temperature  
December–February

1921–2020 Trend  
(+0.3°F/Decade)



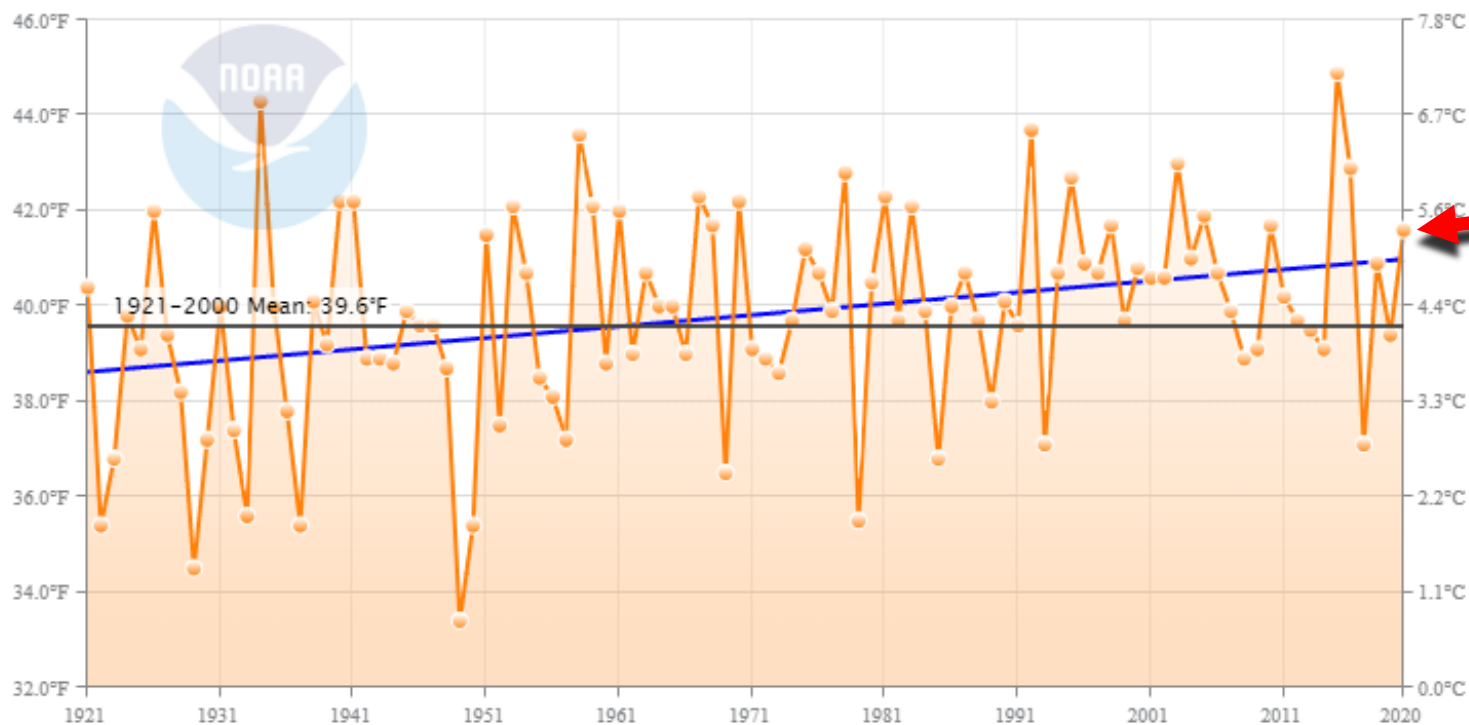
# Western Valleys Winter Temps

*(the past 100 years)*

A bit above average...warmest since 2015-16

**Last  
Winter in  
Oregon  
Zone 2  
(Willamette  
Valley)**

Oregon Climate Division 2 Average Temperature  
December–February



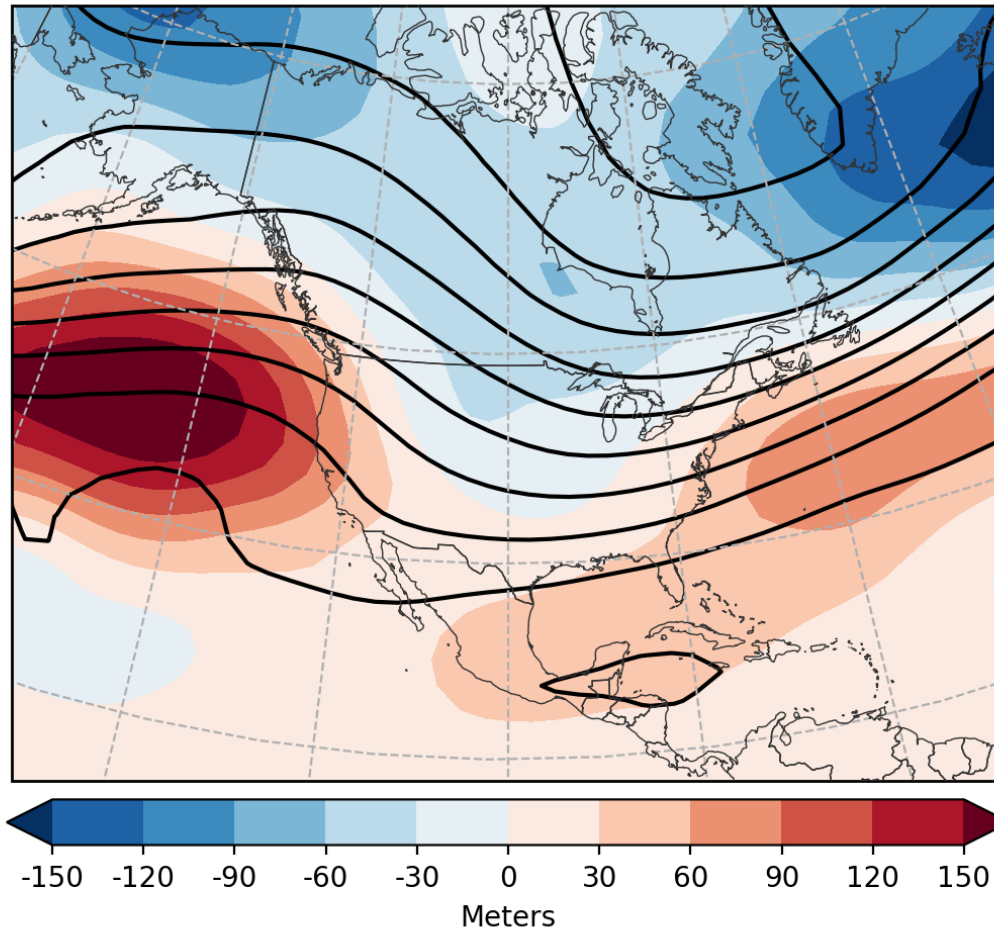


# UPPER LEVEL PATTERN

Mean 500-hPa Geopotential Heights and Anomalies

February 1-29 2020

Average Period: 1981-2010



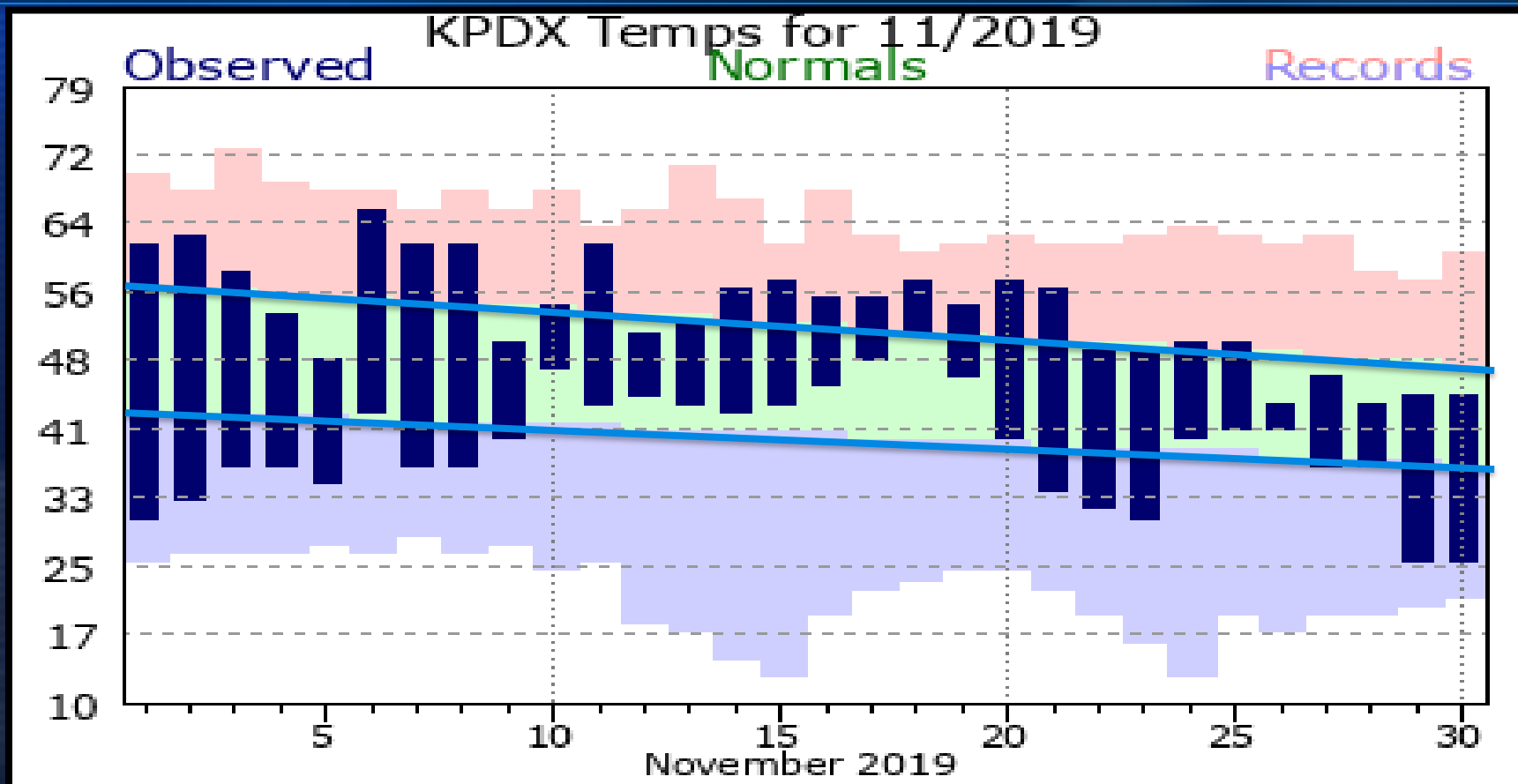
Created: Mon Mar 09 2020

Data Source: NCEP-NCAR Reanalysis

# NOVEMBER

A mild & relatively dry month, no stormy weather

- Blast of cold air from north Thanksgiving Week
- I-5 shuts down to California. Tough Thanksgiving travel!



# NOVEMBER

- A mild & relatively dry month, no stormy weather
- Blast of cold air from north Thanksgiving Week

FIRST LIVE LOCAL  
**WEATHER**

## COLDEST WINTER TEMPS IN PORTLAND

### THE LAST 9 WINTERS

**24**  
in DEC

**23**  
in JAN

**12**  
in DEC

**21**  
in DEC

**24**  
in NOV

**11**  
in JAN

**23**  
DEC & FEB

**23**  
in FEB

**26**  
in NOV

2012

2013

2014

2015

2016

2017

2018

2019

2020

2015

2013

2014

2012

2016

2017

2018

2019

2020



# NOVEMBER

A mild & relatively dry month, no stormy weather

- Blast of cold air from north Thanksgiving Week

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**COLDEST TEMP THIS WINTER**  
A MILD "COLD" SEASON



**20**

SCAPPOOSE

**21**

VANCOUVER

**19**

HILLSBORO

**26**

PORTLAND

**26**

TROUTDALE

**20**

MCMINNVILLE

**21**

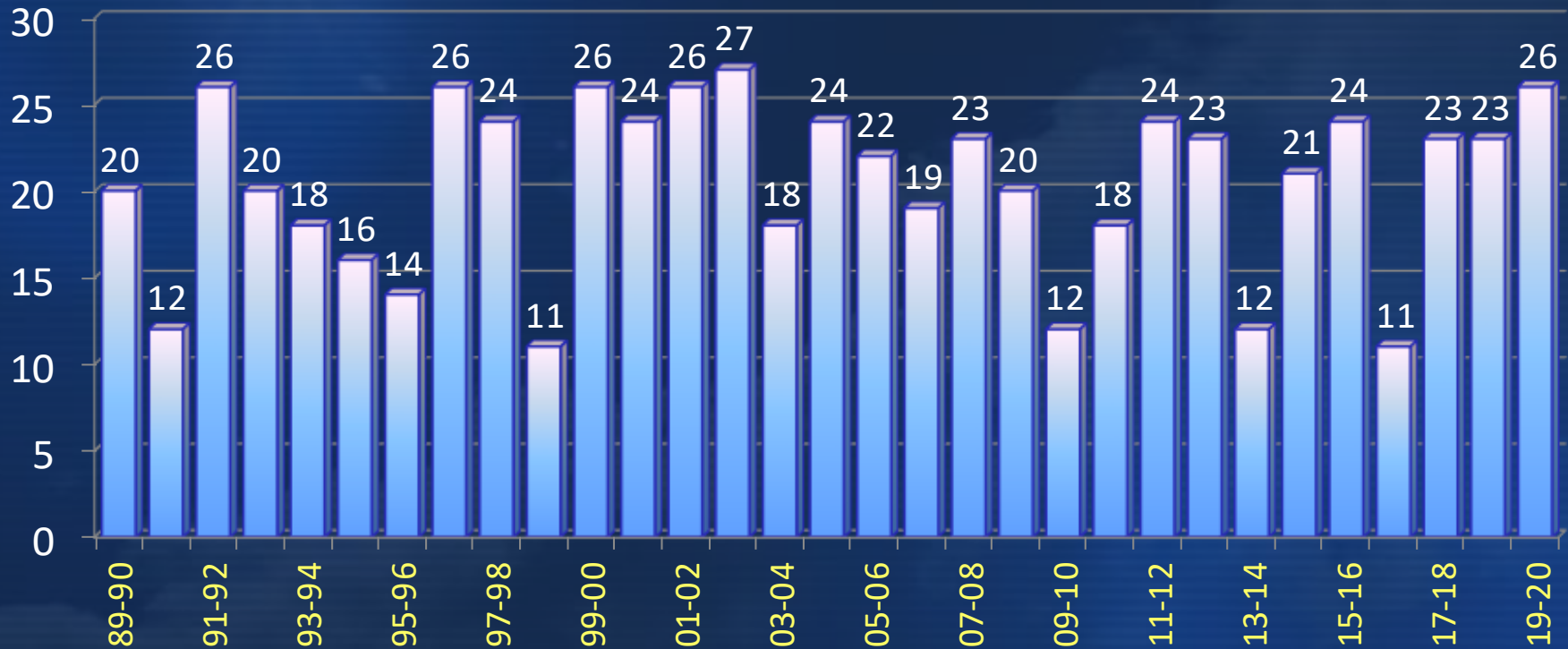
AURORA

**20**

SALEM

# Winter temps go easy on our gardens

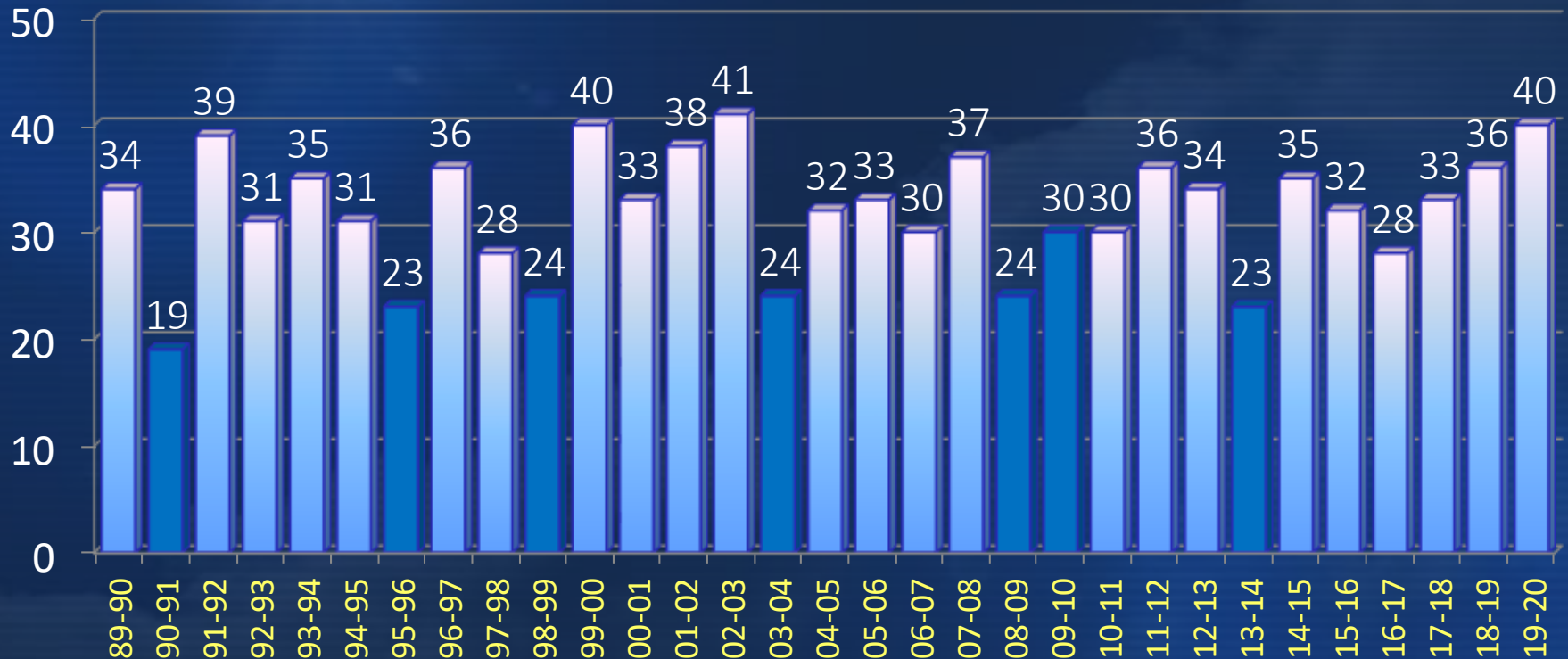
Winter Minimum Temperature @PDX





# A Better Measure of an Arctic Blast

## Coldest Daytime High at PDX



Blue = Widespread PACNW Arctic Air Outbreak



# NOVEMBER

A mild & relatively dry month, no stormy weather

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## TOP 5 DRIEST NOVEMBERS AT PDX (1940-2019)

THIS NOVEMBER: **1.52"**

A NORMAL NOVEMBER: **5.49"**

**0.77"**

1976

**1.44"**

1952

**1.47"**

1956

**1.50"**

1993

**1.52"**

2019



# Southern Oregon "Bomb Cyclone"

November 26<sup>th</sup>, Tuesday of Thanksgiving week

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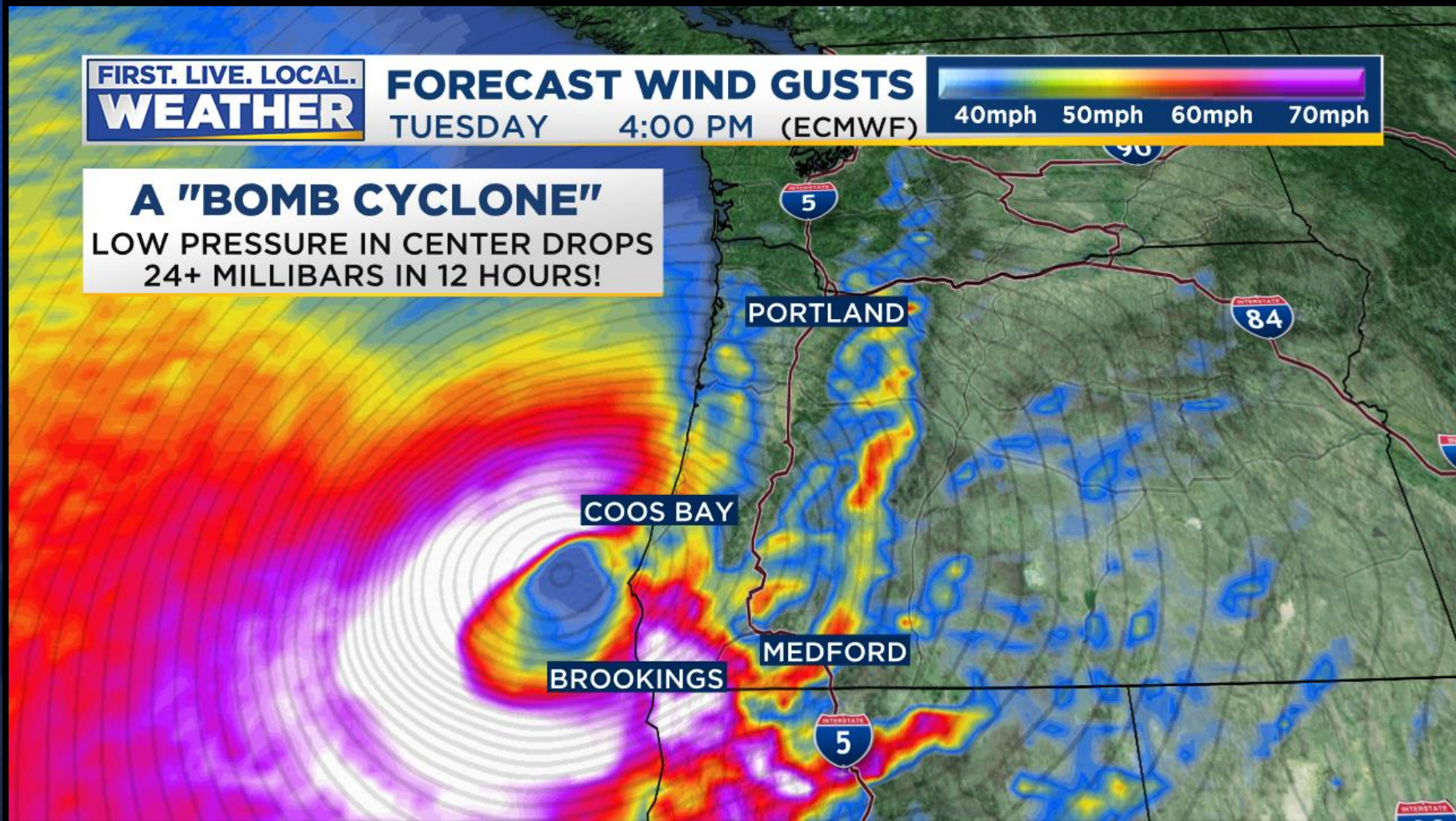
**FORECAST WIND GUSTS**

TUESDAY 4:00 PM (ECMWF)

40mph 50mph 60mph 70mph

## A "BOMB CYCLONE"

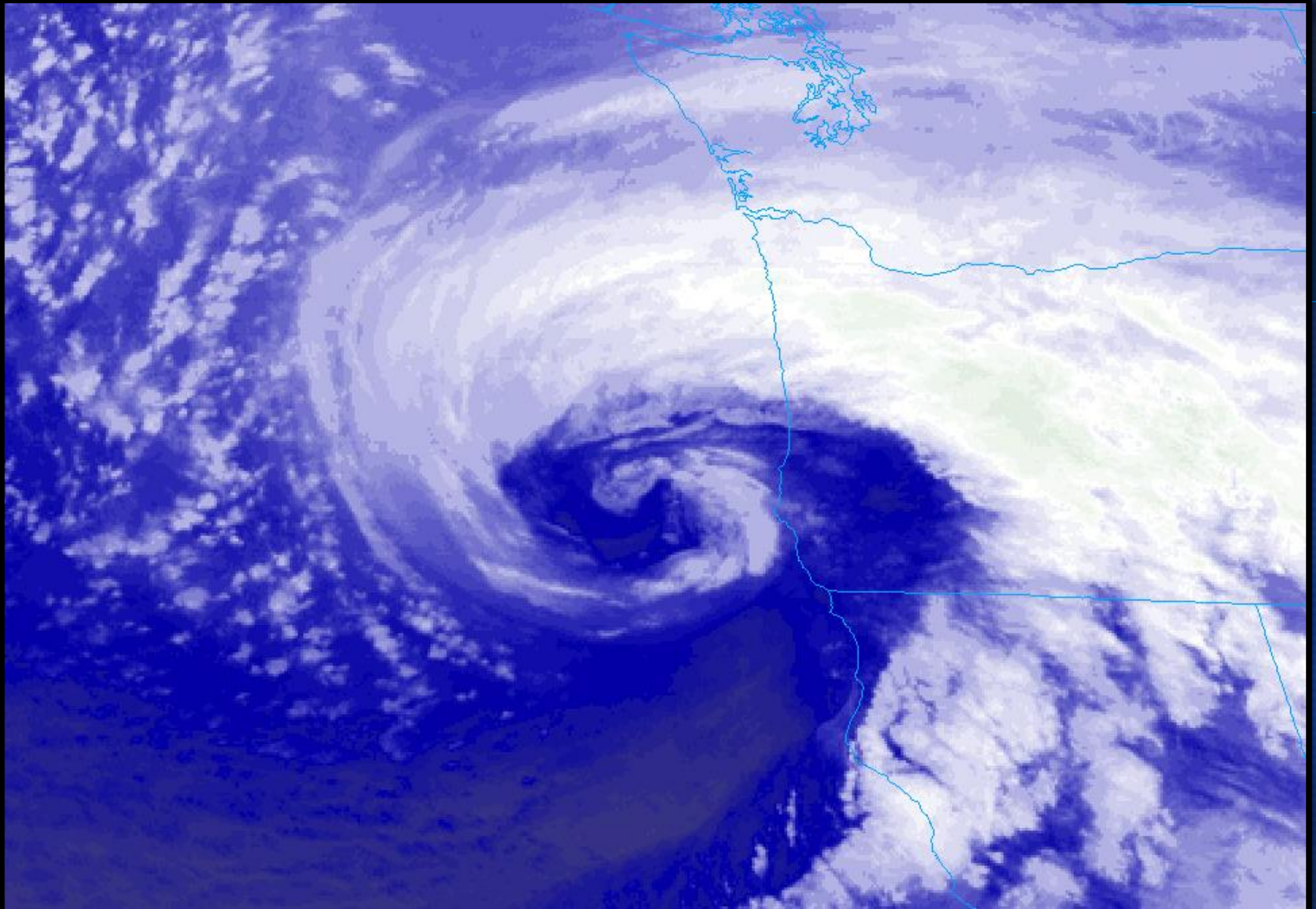
LOW PRESSURE IN CENTER DROPS  
24+ MILLIBARS IN 12 HOURS!





# Southern Oregon “Bomb Cyclone”

Moved from WNW to ESE...Unusual

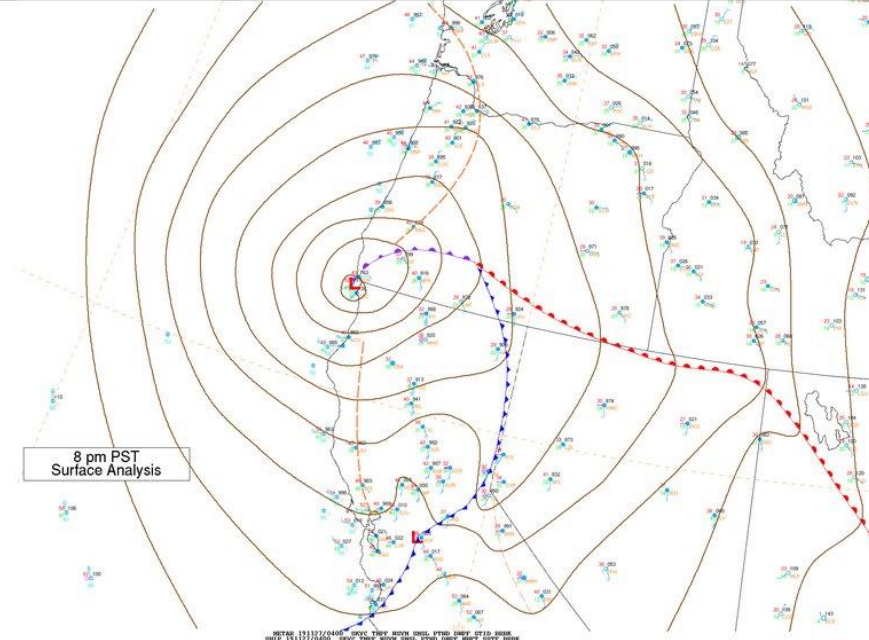
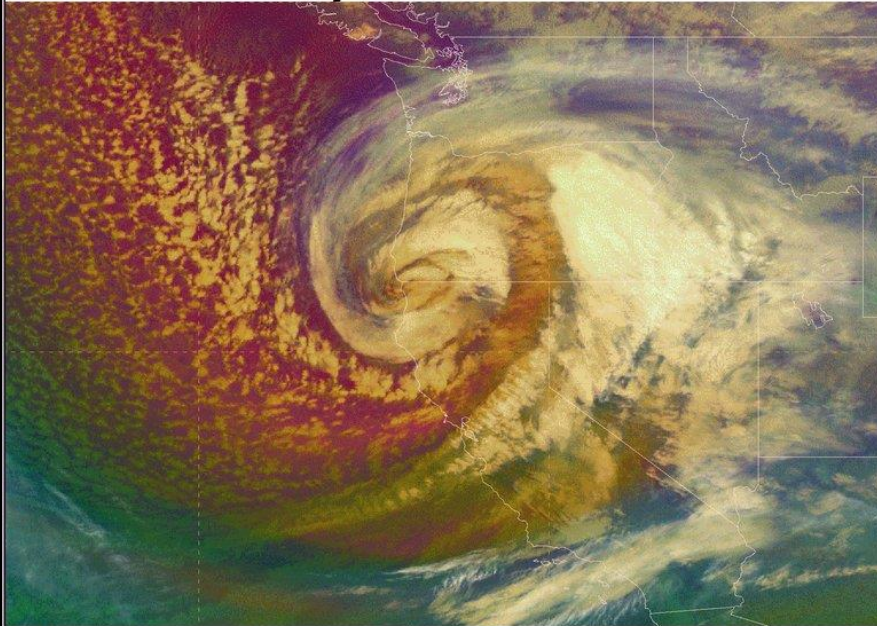




# Southern Oregon “Bomb Cyclone”

November 26<sup>th</sup>, Tuesday of Thanksgiving week

## ***Historic, unprecedented storm in southwest Oregon & northwest California***



### ***- Impacts as of late evening November 26, 2019***

- Sustained winds of 85 mph with gusts to 106 mph at Cape Blanco, OR @ 1:15 pm
- Wind gust to 69 mph at Crescent City, CA
- Whiteout conditions reported due to wind and snow from LaPine to Lakeview OR
- High seas (up to 34 foot seas so far)
- Heavy coastal rain/inland and mountain snowfall across southwest OR & northern/central CA (parts of I-5 closed)
- November low pressure records set at Medford OR (981.4 hPa/28.98") & Eureka CA (984.8 hPa/29.08")
- Lowest pressure in Oregon: 974.6 hPa/28.78" @ 6:35 pm at Gold Beach Airport
- All-time low pressure record preliminarily set for the state of California (~973.6 hPa/28.75" at Crescent City)



# Ski Areas Have Limited Terrain Thanksgiving through Christmas Vacation

No skiing at Mt. Hood Skibowl until early January!

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## SOME THANKSGIVING SKIING

**TIMBERLINE**

**OPEN**

**20"**

Base

**MEADOWS**

**OPEN FRI**

**26"**

Base

**SKIBOWL**

**TUBING FRI**

**17"**

Base

**MT. BACHELOR**

**OPEN FRI**

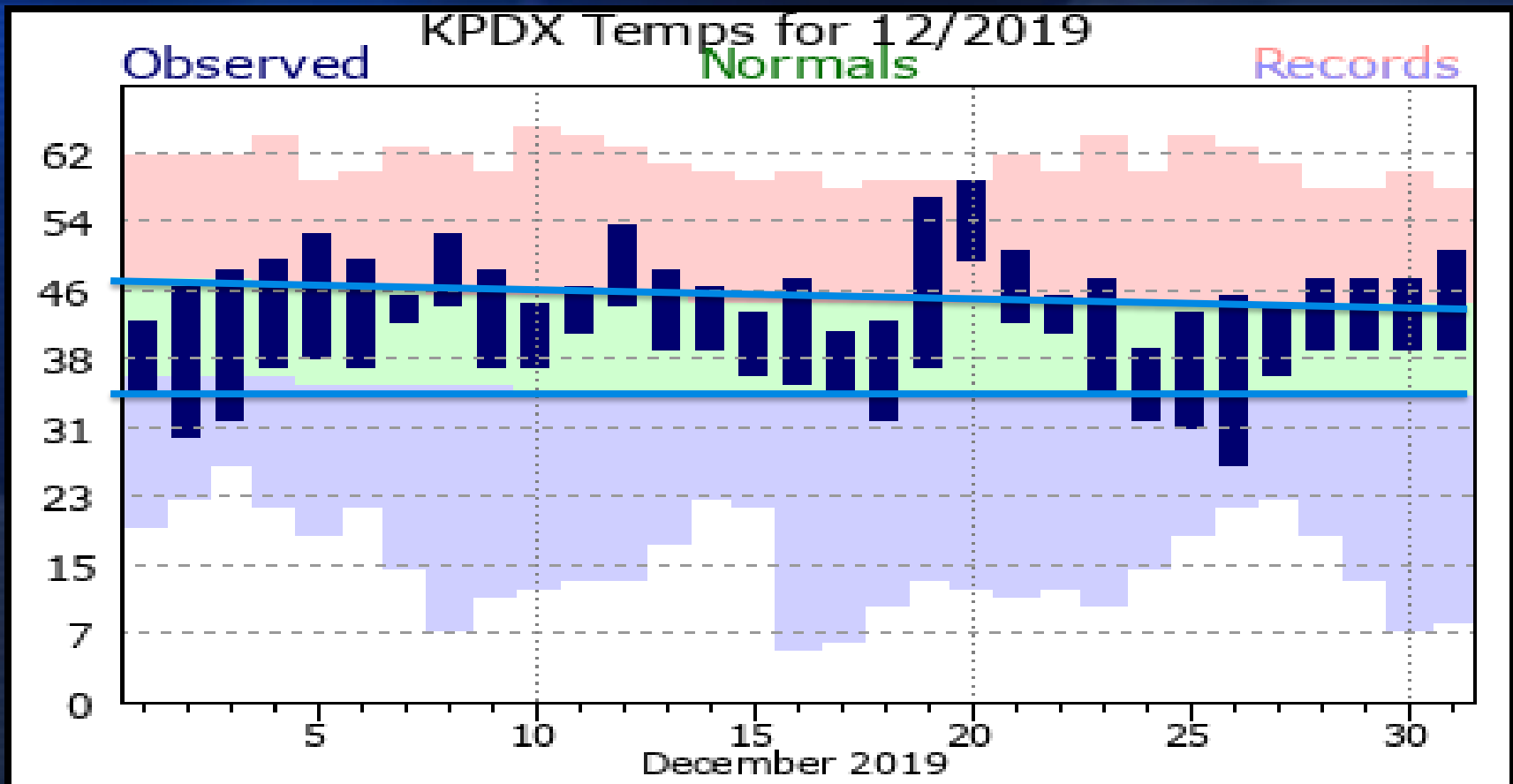
**19"**

Base

# DECEMBER

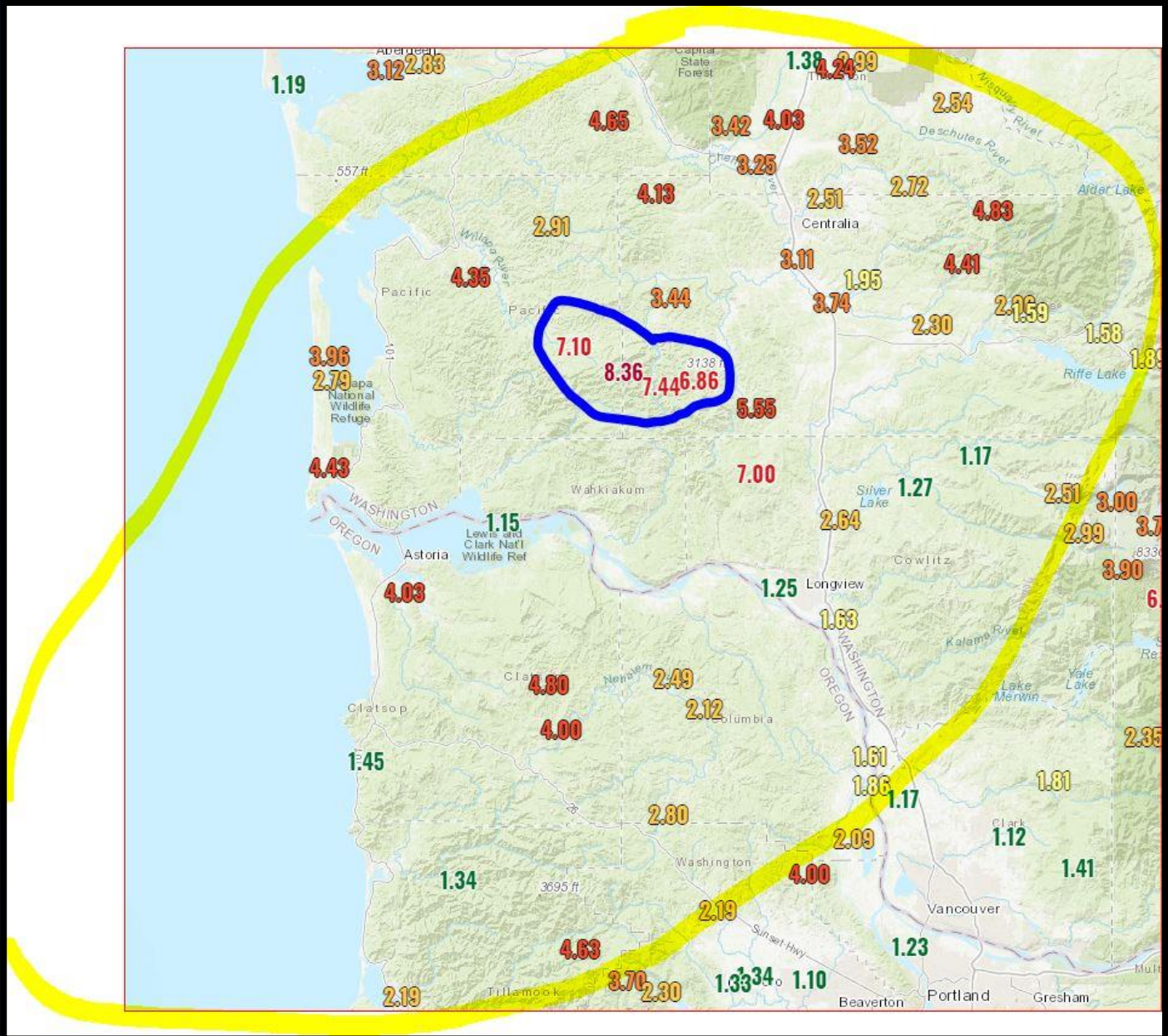
**\* Another unremarkable month \***

**Not much storminess, but a brief mid-month Atmospheric River  
(notice the 20<sup>th</sup>?)**





# DECEMBER



# HEAVY RAIN CLIPS N.W. OREGON

Flooding north of us  
on December 20<sup>th</sup>

Flooding north of us  
on December 20<sup>th</sup>

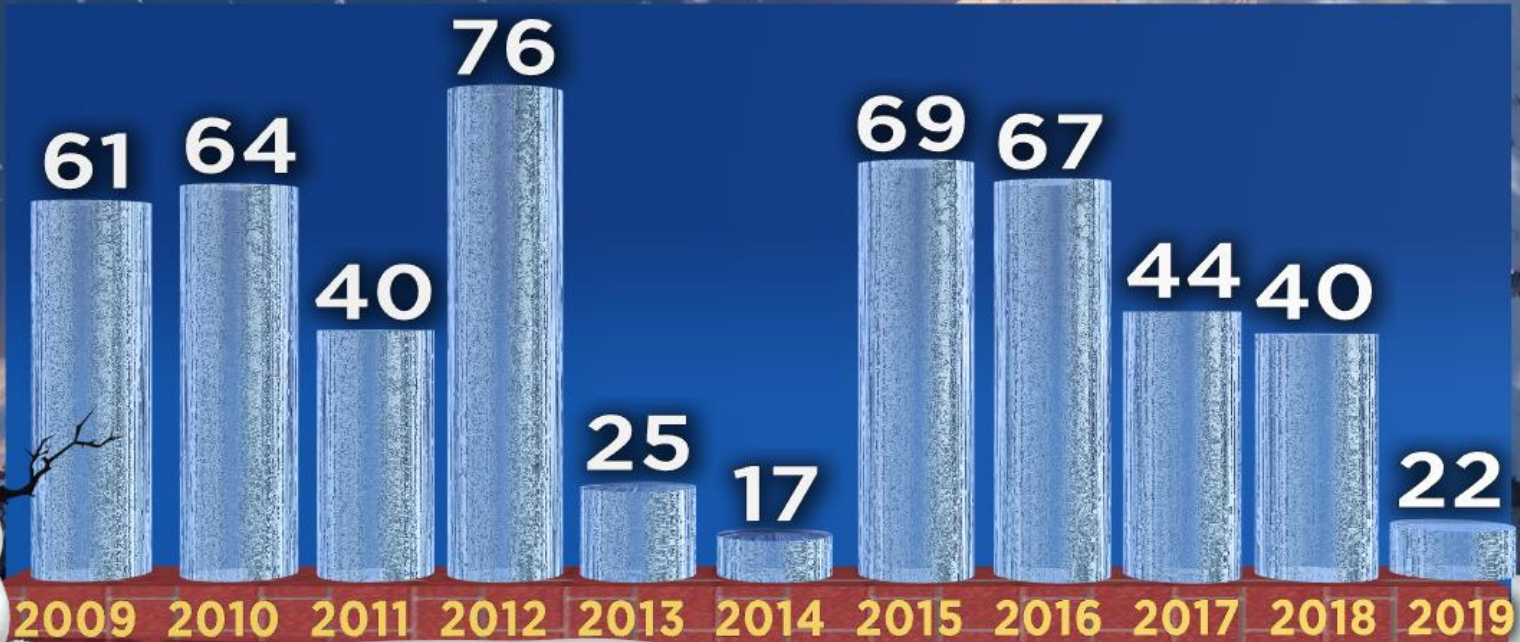


# Ski Areas Have Limited Terrain Thanksgiving through Christmas Vacation

No skiing at Mt. Hood Skibowl until early January!

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**SNOW AT 5,400' ON MT. HOOD**  
ON DECEMBER 22ND



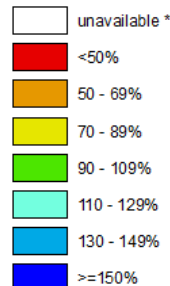
# Ski Areas Have Limited Terrain Thanksgiving through Christmas Vacation

No skiing at Mt. Hood Skibowl until early January!

DECEMBER 29TH

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

Current Snow Water  
Equivalent (SWE)  
Basin-wide Percent  
of 1981-2010 Median

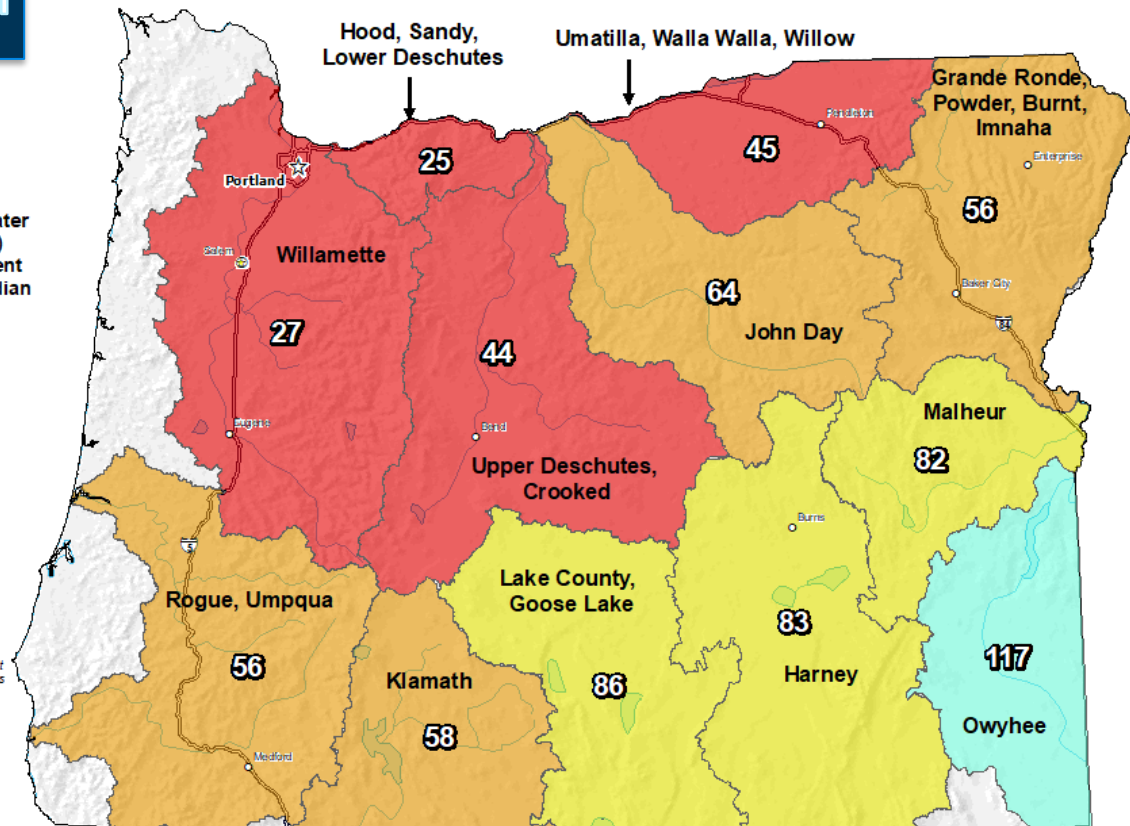


\* Data unavailable at time  
of posting or measurement  
is not representative at this  
time of year

Provisional Data  
Subject to Revision



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).



0 10 20 40 60 80 100 Miles

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



# **Ski Areas Have Limited Terrain Thanksgiving through Christmas Vacation**

No skiing at Mt. Hood Skibowl until early January!

2020 01/01 (Wed) 11:23:34 - Hoodoo Bowl, Base area - (Northwest view)



**HOODOO SKI AREA – NEW YEAR'S DAY**

# **Ski Areas Have Limited Terrain**

## **Thanksgiving through Christmas Vacation**

No skiing at Mt. Hood Skibowl until early January!



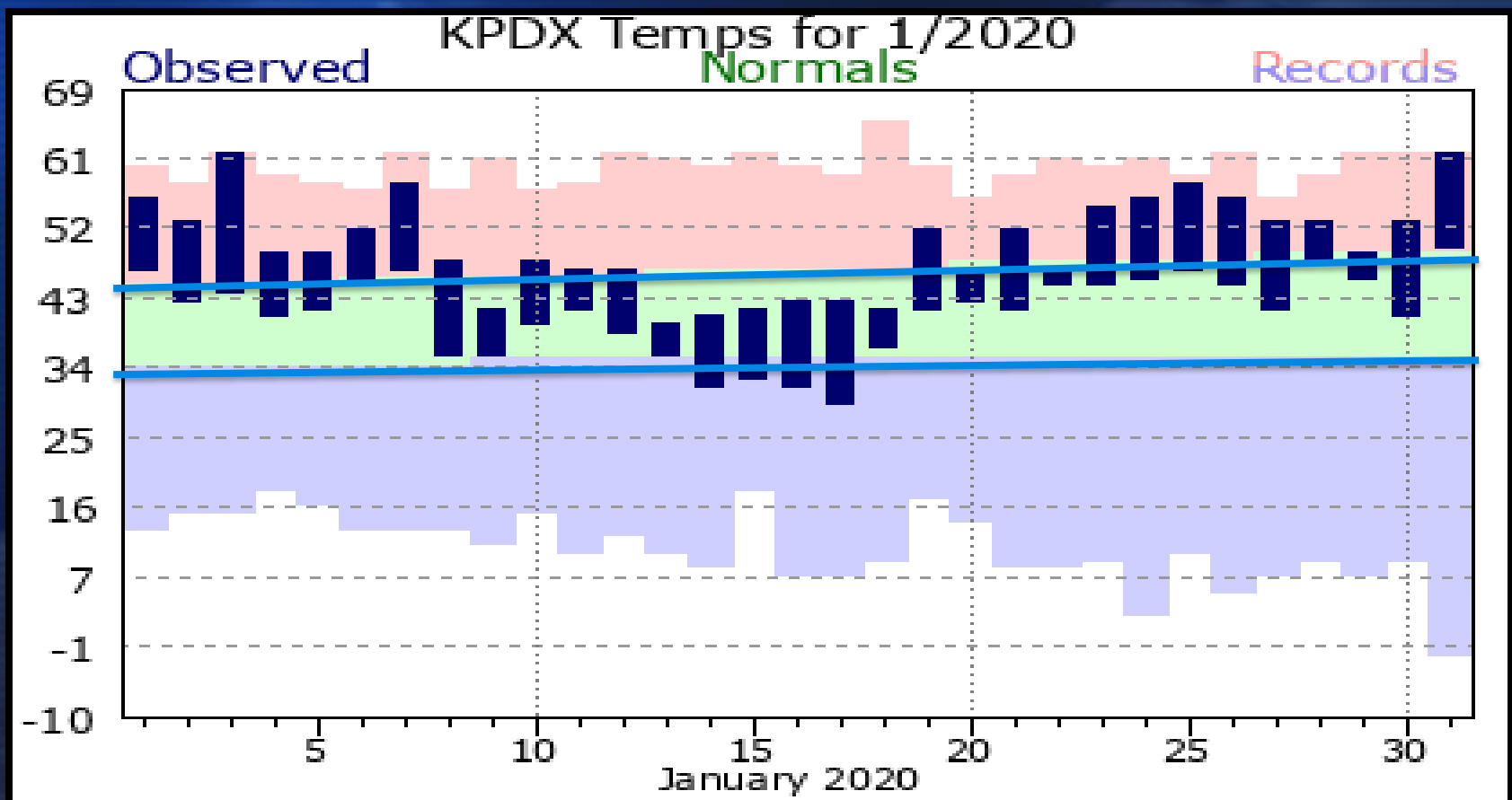
**MT HOOD SKIBOWL**

**Worst early January snowpack since 1990! (at 5,400')**

# JANUARY

## A very mild month

Only “wet” month of the entire cold season!

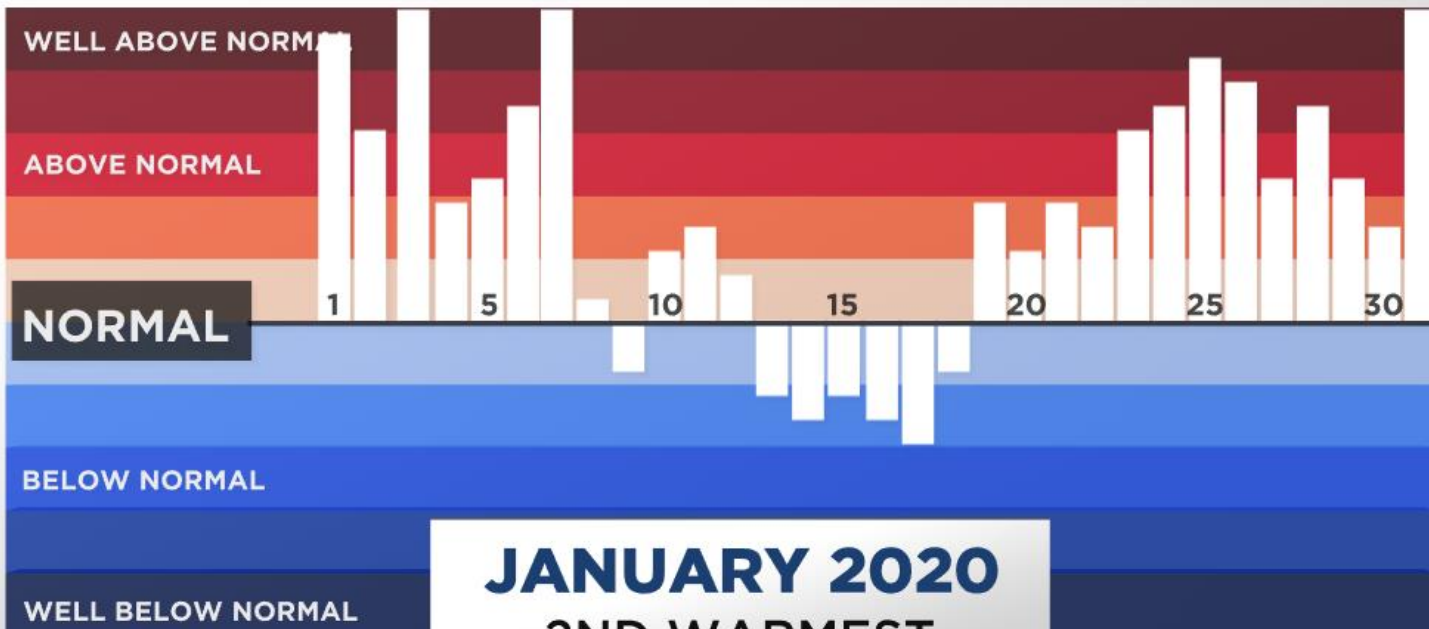




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**WEATHER**

# A VERY MILD JANUARY

## DAILY TEMPERATURE DEPARTURE



**JANUARY 2020**  
2ND WARMEST  
in past 80 years at PDX

j.wiLx  
PROFESSIONAL

# JANUARY

THE ONLY "BIG SNOW WEEK" OF THE WINTER  
In the Cascades January 10<sup>th</sup>-17<sup>th</sup>

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**STORM TOTAL SNOWFALL**  
FRIDAY THROUGH TUESDAY (JAN 10-14TH)

**47"**

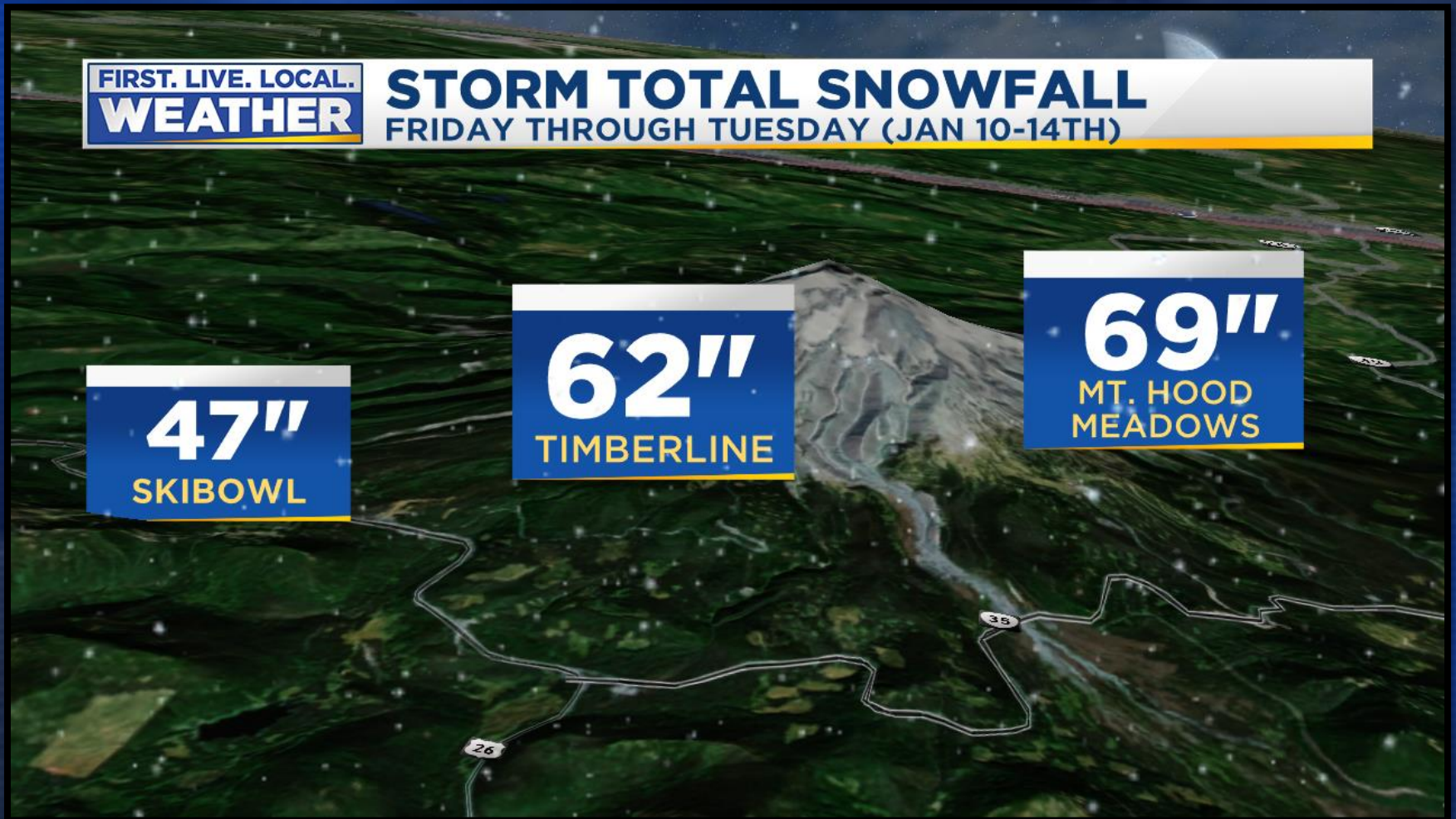
SKIBOWL

**62"**

TIMBERLINE

**69"**

MT. HOOD  
MEADOWS





# JANUARY

THE ONLY “BIG SNOW WEEK” OF WINTER  
In the Cascades January 10<sup>th</sup>-17<sup>th</sup>



# JANUARY

## MODELS SHOW POSSIBLE BIG SNOW/ICE EVENT

In the lowlands Wednesday/Thursday the 15th

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### WINTER WEATHER NEXT WEEK

**ALL MODELS AGREE WE'RE GOING TO SEE COLDER WEATHER**

Strong hints that some sort of "snow/ice event" shows up sometime between Tuesday-Thursday

**SNOWY WEATHER MAY AFFECT YOUR LIFE THE MIDDLE OF NEXT WEEK**

**0** inches  
SNOW SO FAR THIS WINTER IN PORTLAND

The graphic features a snowman on the left, a city skyline in the background, and a blue box with white text on the right. The overall theme is winter weather forecasting.



# JANUARY

## WHAT HAPPENED? NOT MUCH

- Close to snow for a few days, but big surface low headed too far north for big event
- Luckily models (especially ECMWF/GEM) caught on 2-3 days out



# JANUARY

## A very mild month

Only “wet” month of the entire cold season!



### Jan 21<sup>st</sup> 2020 Oregon Coast EF-0 Tornado



Courtesy  
Tillamook County EM  
Gorden McCraw



Courtesy  
Tillamook County EM  
Gorden McCraw



Courtesy  
Tillamook County EM  
Gorden McCraw

- ~11:15 AM Jan 21<sup>st</sup> 2020
- EF-0 (65-70 mph)
- Minor damage to two properties along Kahnle Trail Loop ~3 miles north of Manzanita, Oregon
- Path Length: ~1/4 mile.



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**WEATHER**

# A VERY WET JANUARY!

**JANUARY  
IN PORTLAND**

**7.58"**

27 days  
with  
measurable rain!

**LAST TIME WE'VE SEEN 7" IN ONE MONTH?**

**7.26"** March 2017

**RECENT MONTHS WITH MORE THAN 7.00"**

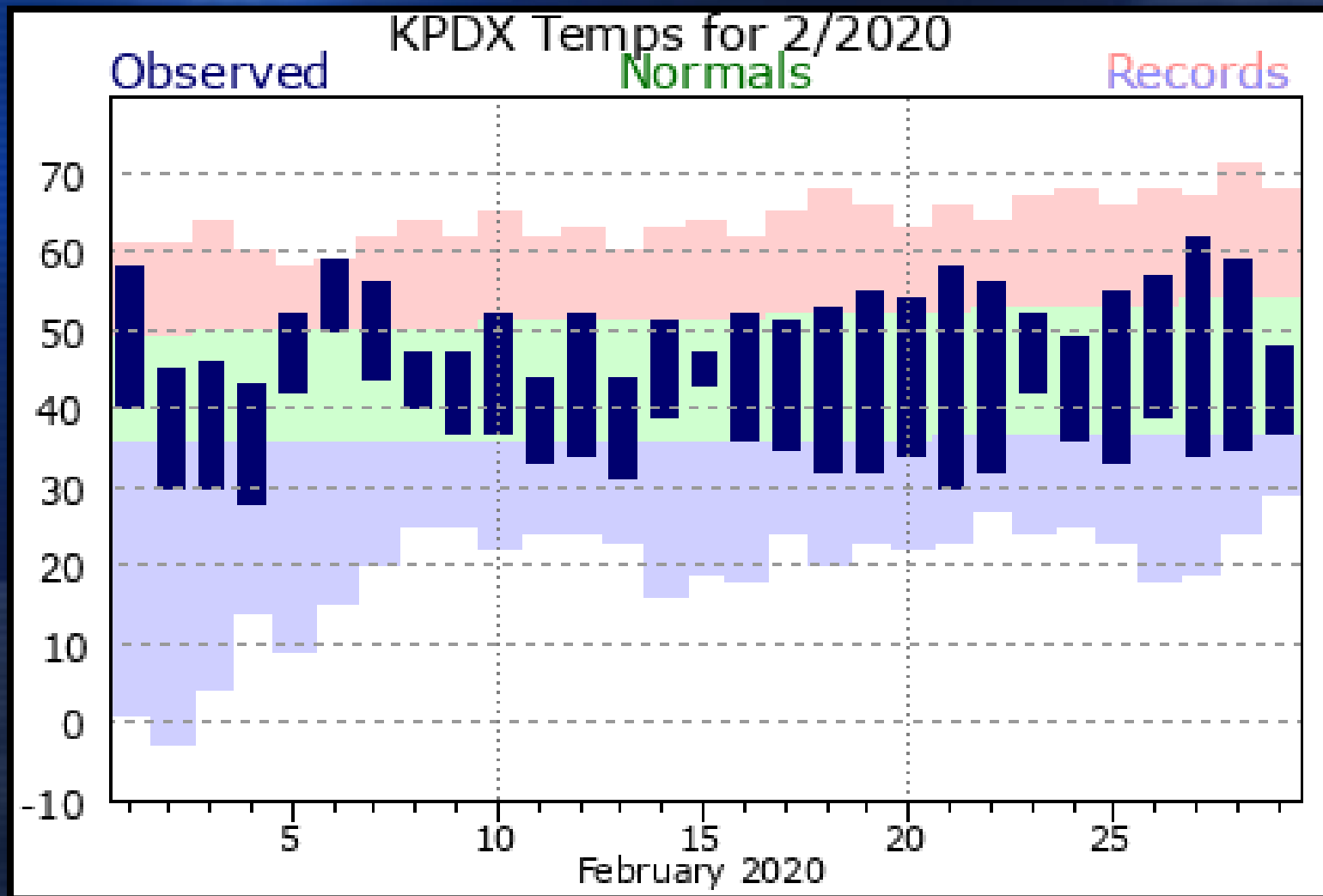
Feb 2017, Oct 2016, Jan 2016, May 2015



# FEBRUARY

## A VERY SLOW MONTH FOR GEEKS

Near normal temps, large diurnal range 2<sup>nd</sup> half of month...chilly nights!



# FEBRUARY

- Flooding 7<sup>th</sup>-9<sup>th</sup> in Blue Mountains
- Heavy snow followed by heavy rain
- AR coming over top of offshore ridge = unusual
- Flooding in western Washington at same time



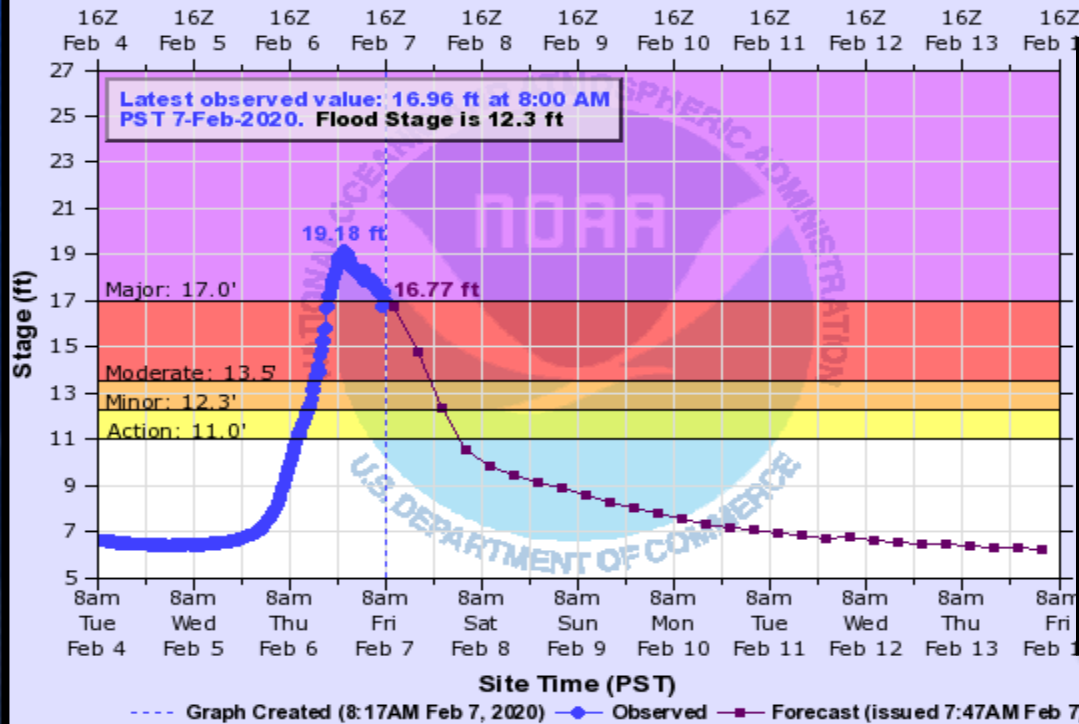


# FEBRUARY

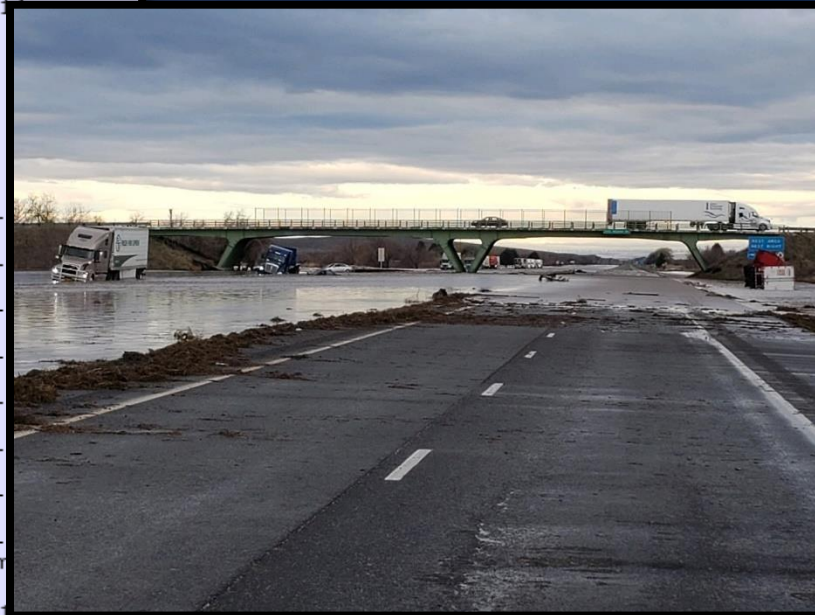
- Flooding 7<sup>th</sup>-9<sup>th</sup> in Blue Mountains
- Heavy snow followed by heavy rain
- AR coming over top of offshore ridge = unusual
- Flooding in western Washington at same time

## UMATILLA RIVER AT PENDLETON

Universal Time (UTC)

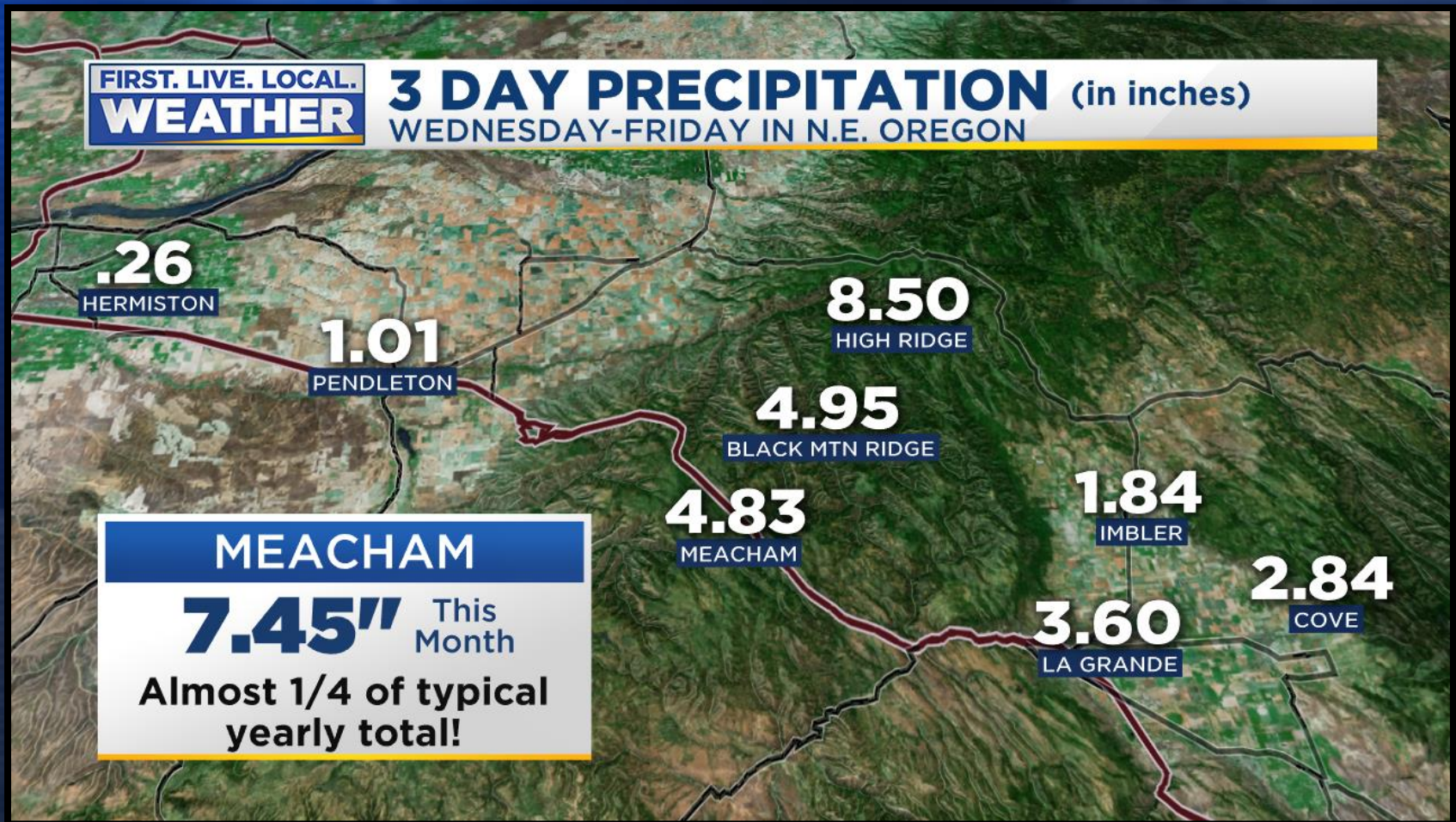


PDT03(plotting HGIRG) "Gage 0" Datum: 1054.3'



# FEBRUARY

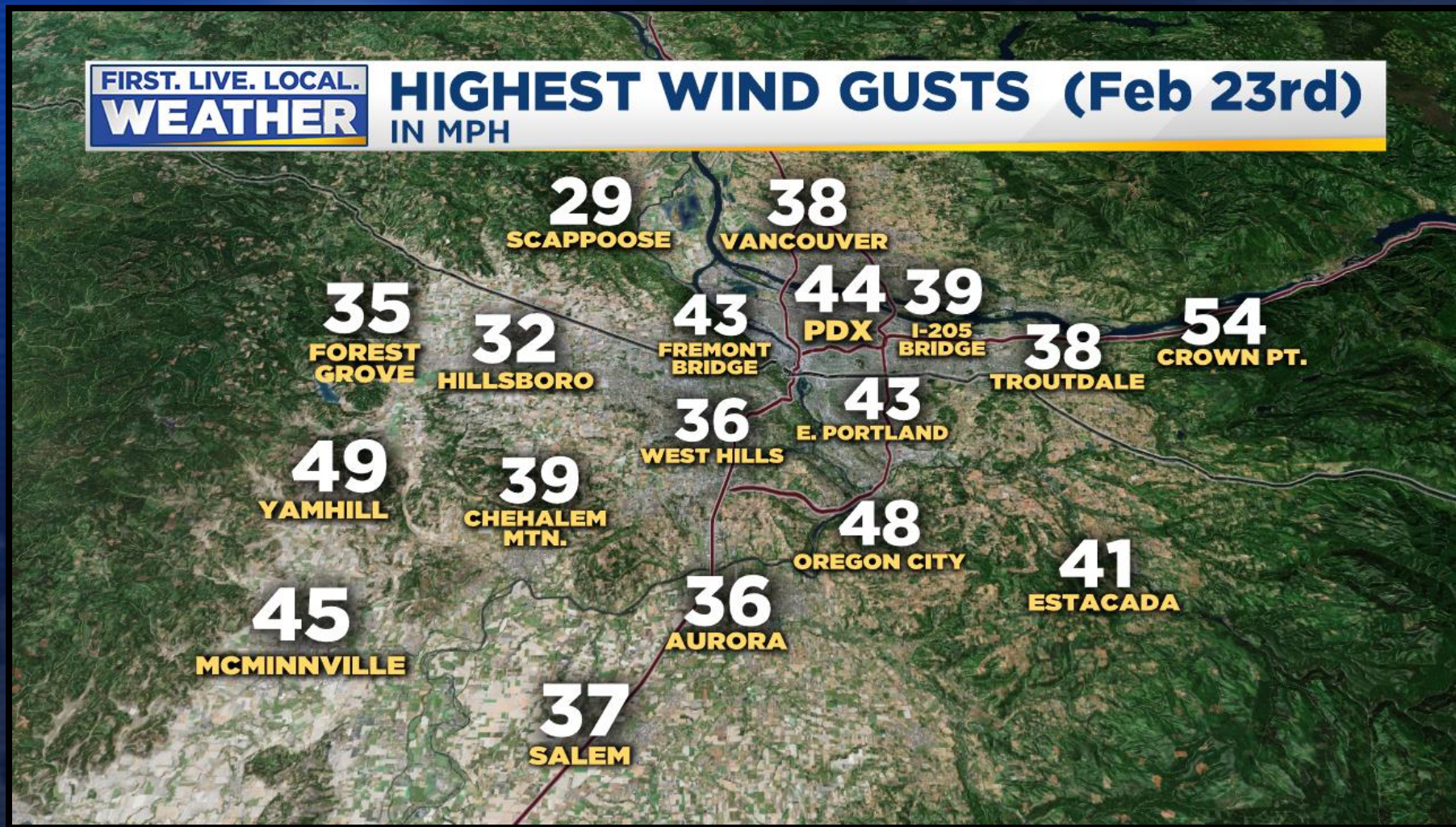
- Flooding 7<sup>th</sup>-9<sup>th</sup> in Blue Mountains
- Heavy snow followed by heavy rain
- AR coming over top of offshore ridge = unusual
- Flooding in western Washington at same time





# FEBRUARY

The best south wind “event” we had last winter... #SAD





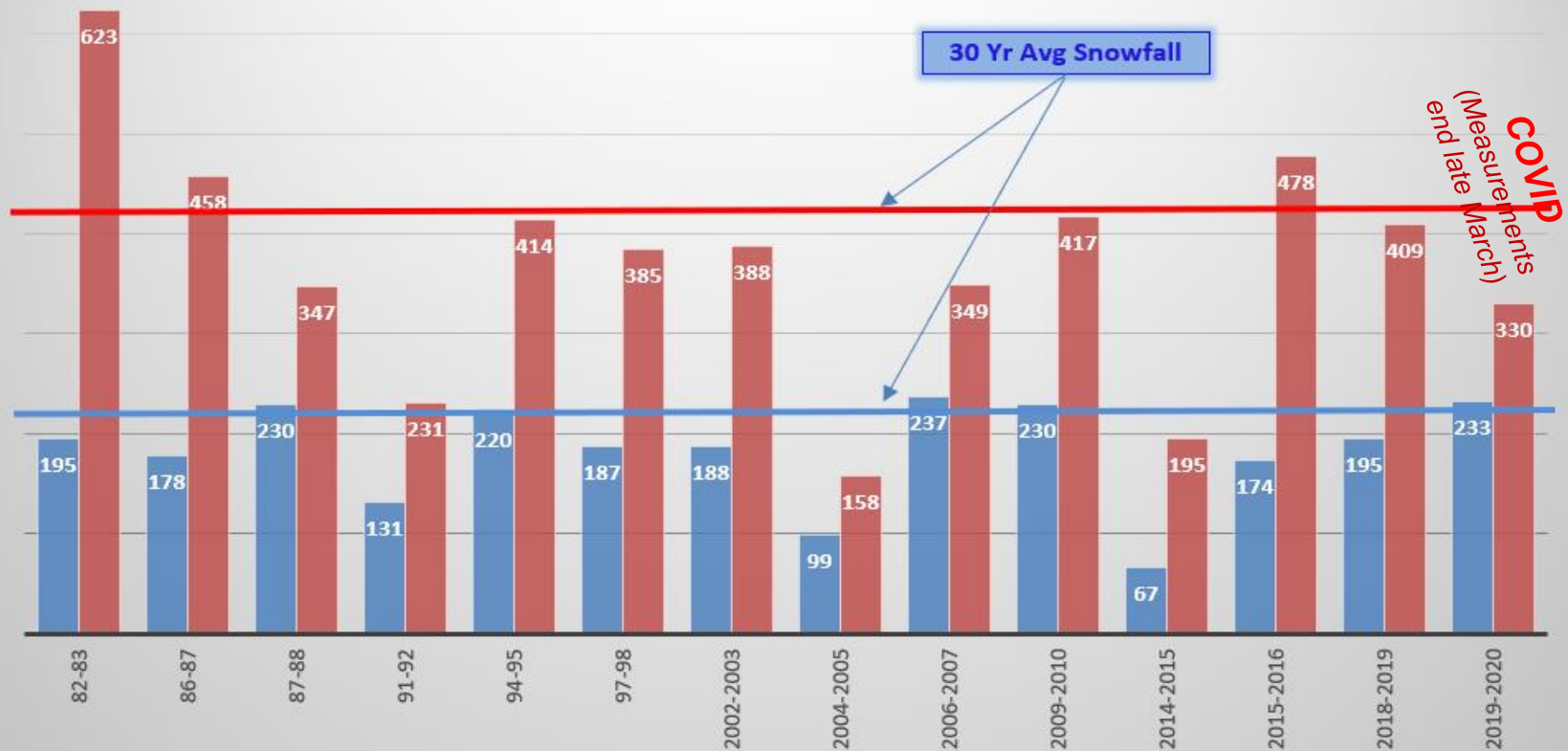
# Cascade Snowfall

Tough first half, much better mid-January

1. Well below normal through early January
2. BIG SNOW WEEK MID-JANUARY
3. February near-normal...an okay ski season

## Winter Snowfall On Mt. Hood In El Nino Winters

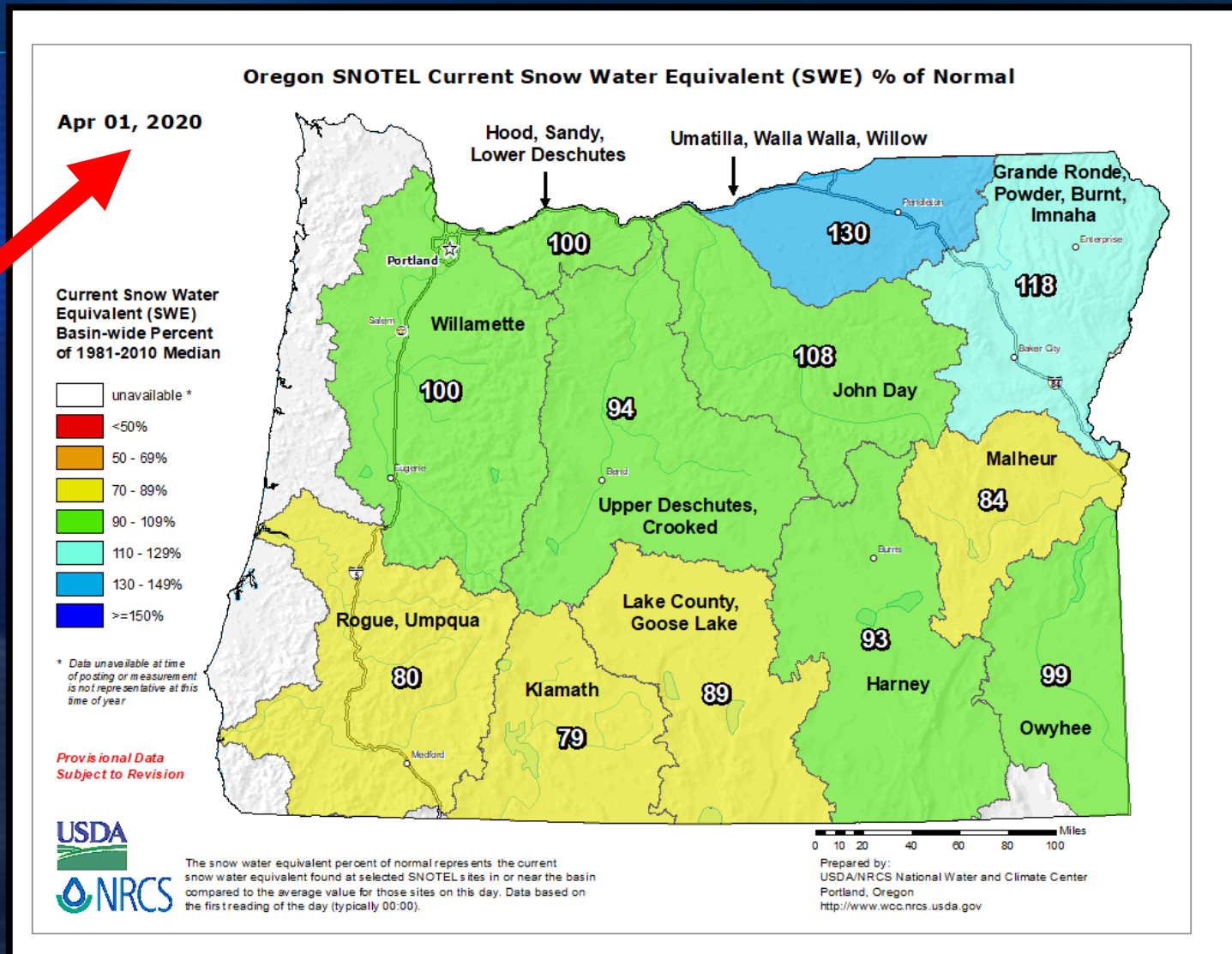
**Meadows** vs. **Gov't Camp** (in inches)





# Early April Snowpack

Recovery to normal in northern Oregon, below southern half of state

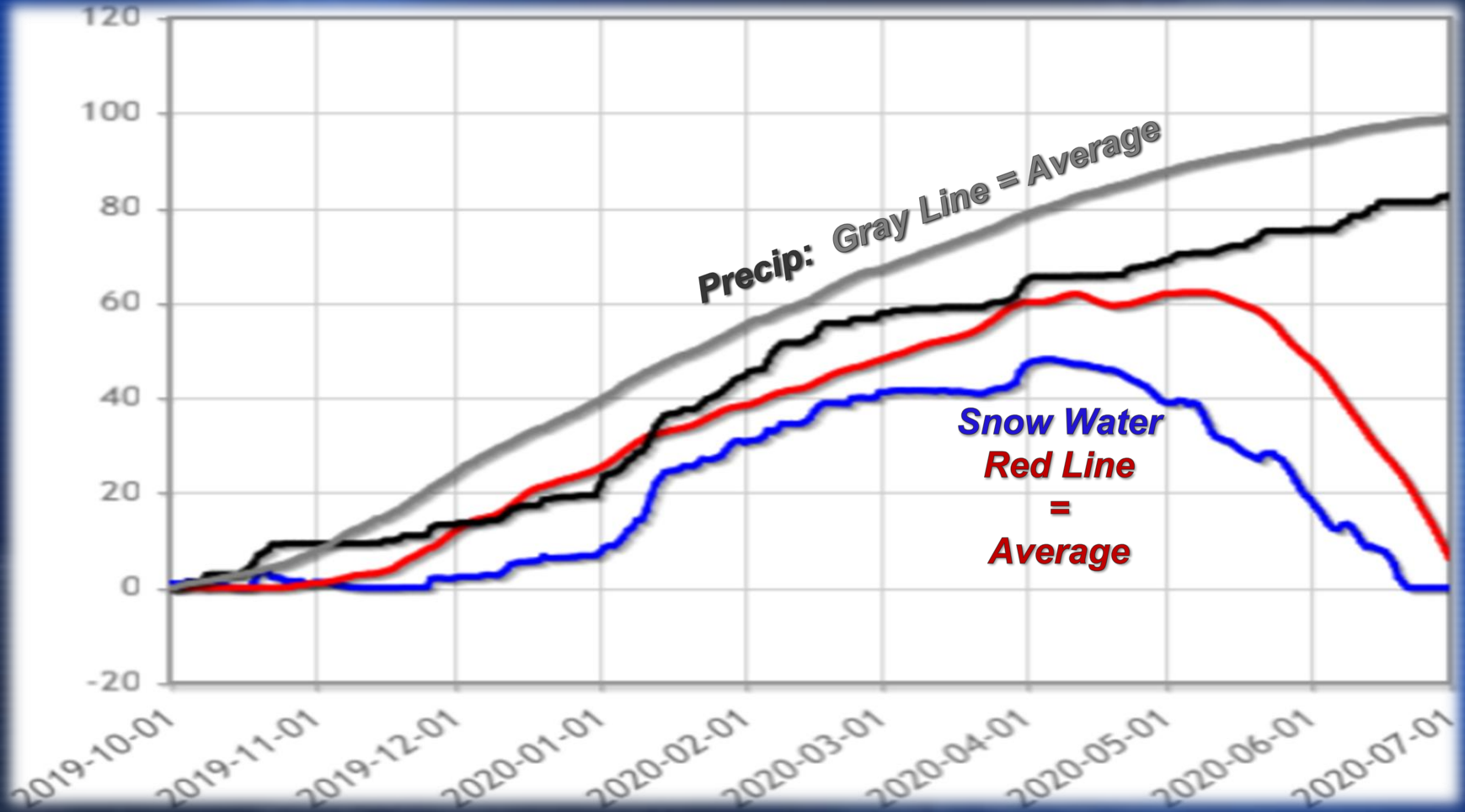


# Mountain Snowpack @ 5,400'

Bottom of Pucci Lift @Timberline

Courtesy  
NRCS  
Oregon Office

Water Year Precipitation: **BELOW AVERAGE**  
Snowpack: **BELOW AVERAGE**





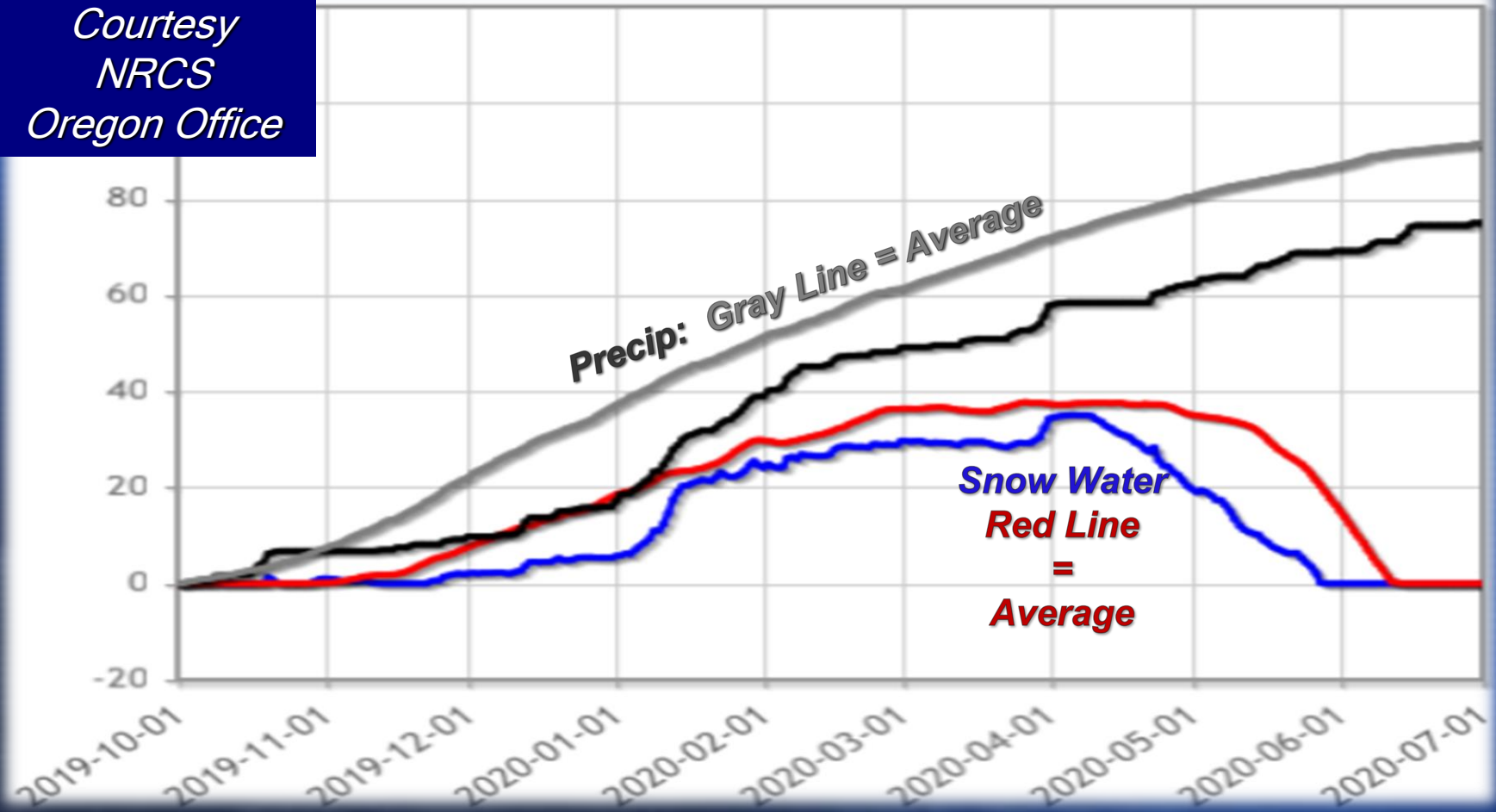
# Mountain Snowpack @ 4,700'

Central Oregon Cascades - McKenzie SNOTEL

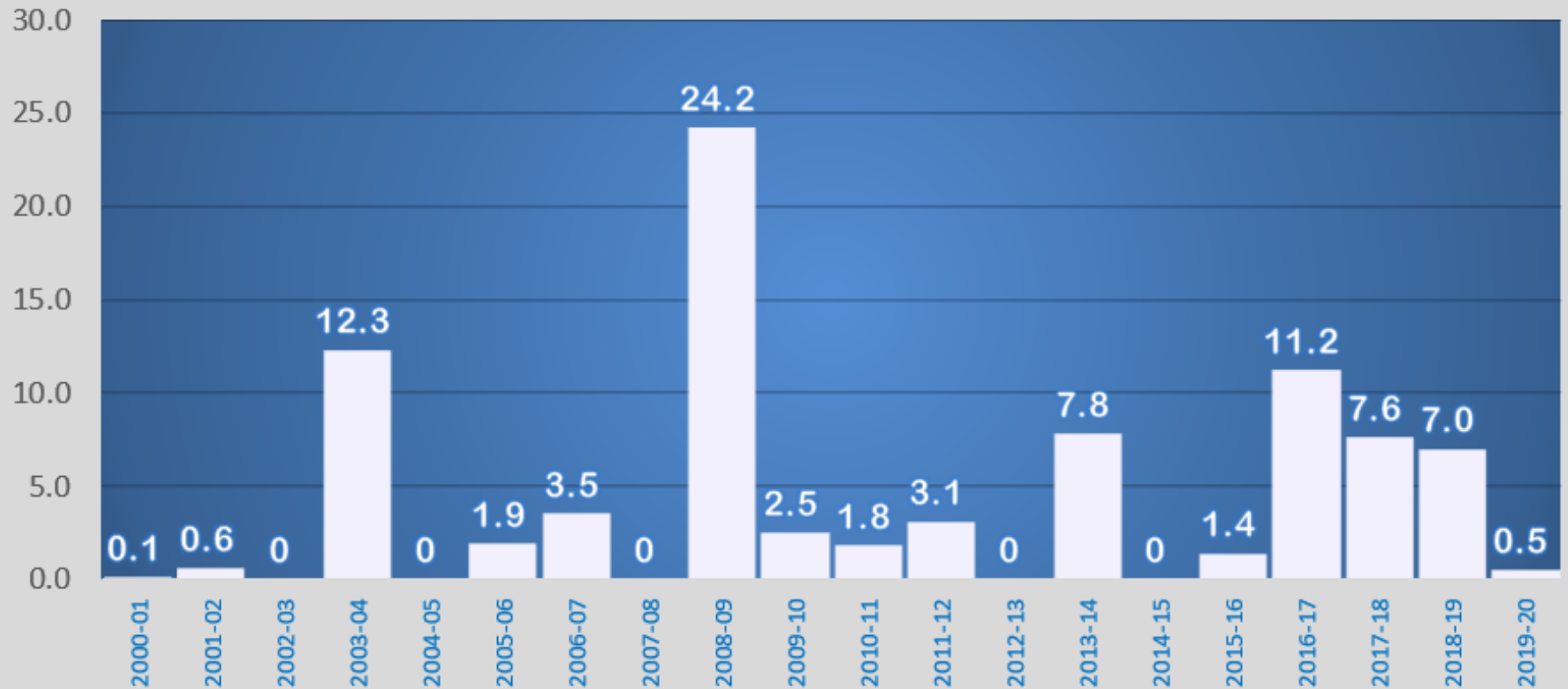
Water Year Precipitation: **BELOW AVERAGE**

Snowpack: **NEAR AVERAGE, QUICK MELT**

Courtesy  
NRCS  
Oregon Office



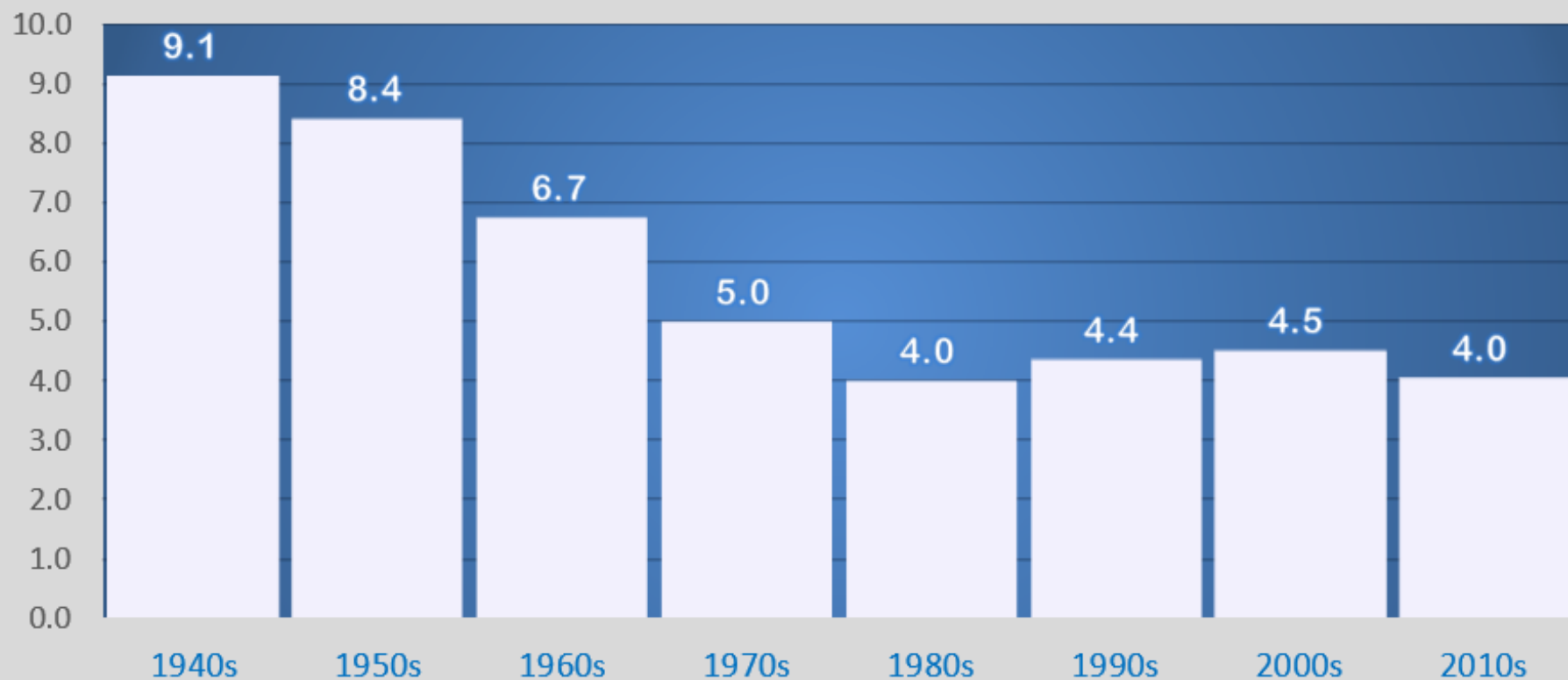
# PORTLAND (NWS-PARKROSE) SNOWFALL THE LAST 20 WINTERS





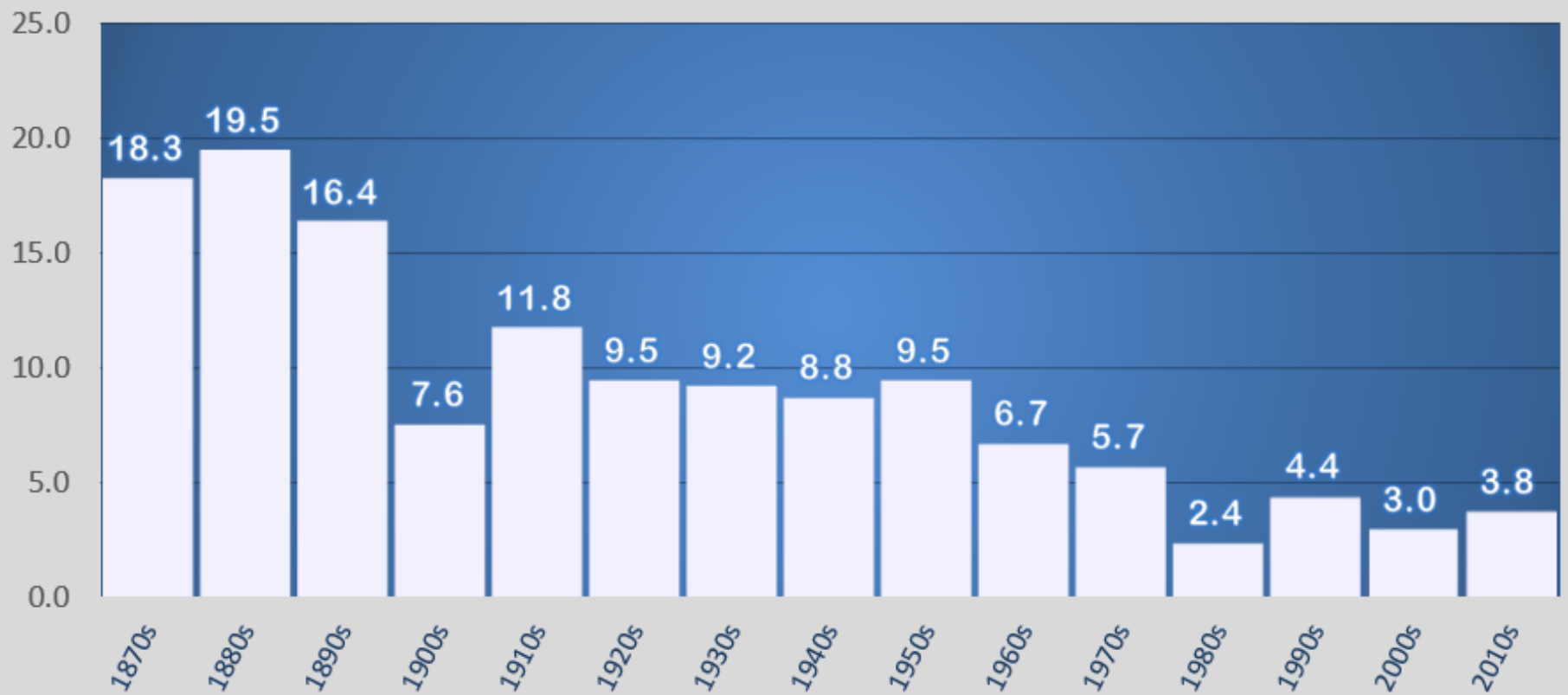
## OFFICIAL PORTLAND SNOWFALL

*Average per winter in inches (Portland Airport & NWS Office)*



## DOWNTOWN PORTLAND SNOWFALL

*Average per winter in inches*



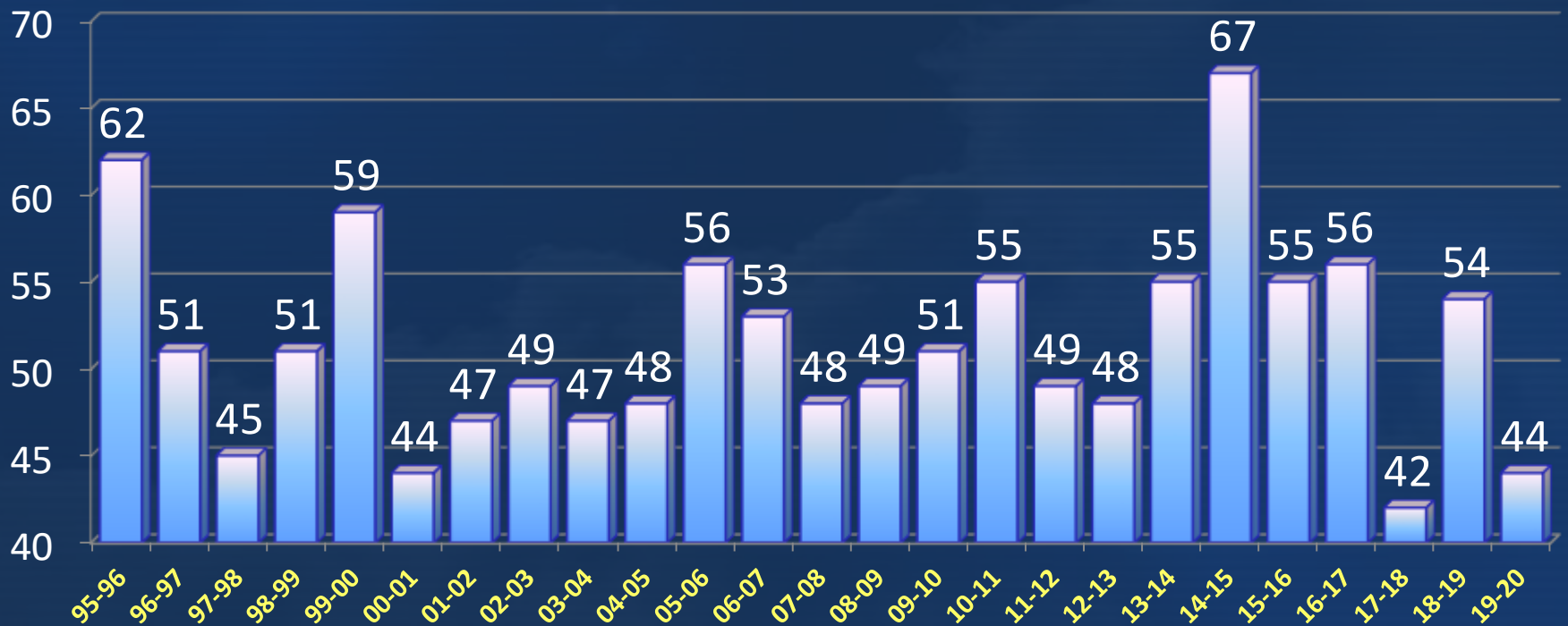


# No Wind Storms

24 winters without a major REGIONAL storm

## Yearly Peak Wind Gust at PDX in MPH

(Generally southerly)



# FINAL THOUGHTS

For discussion too!

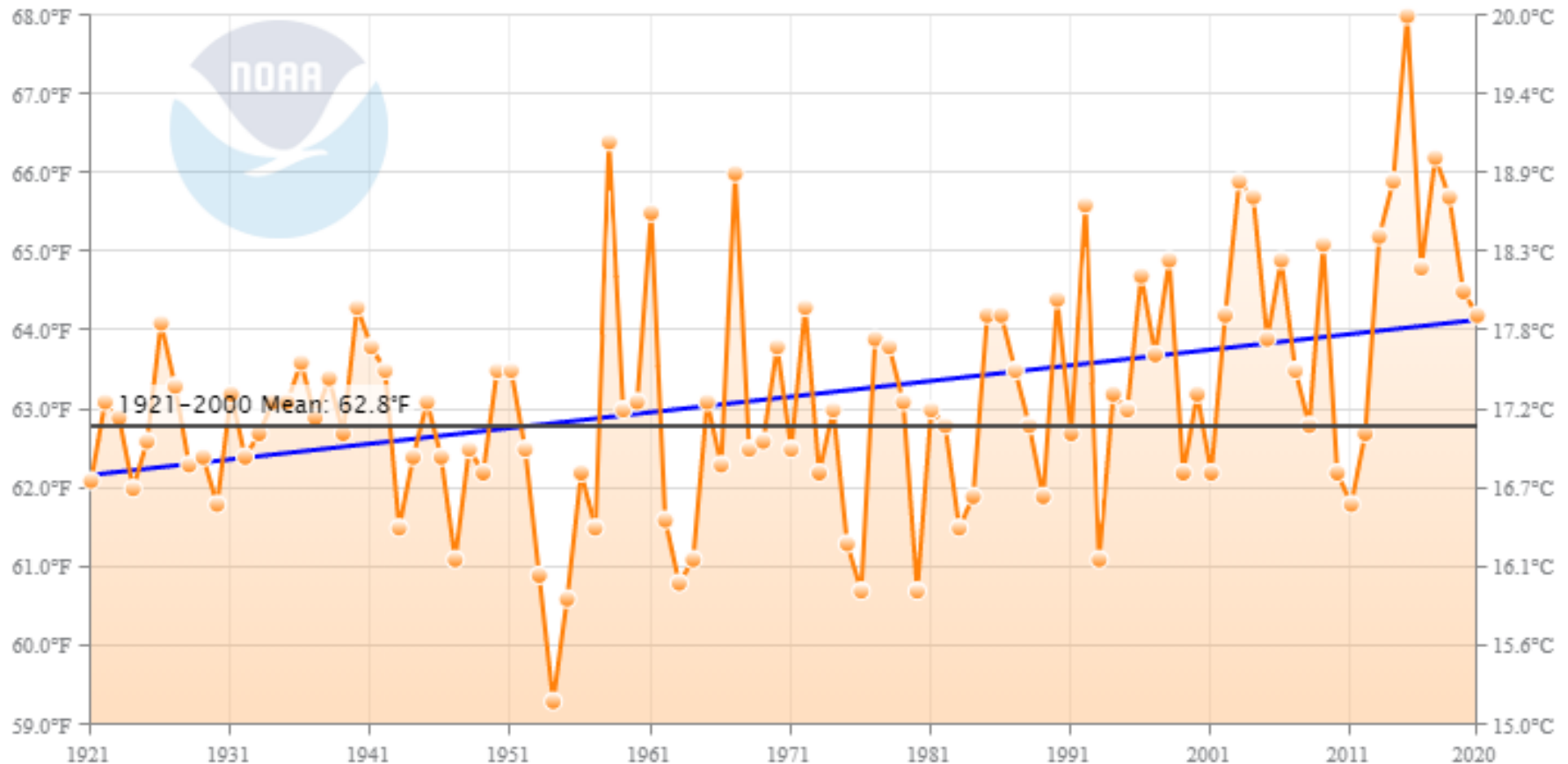
1. Seemed like typical slow El Nino season this year, but with no stormy periods
2. Never had a stormy westerly flow pattern...odd. Weak systems coming over ridge produced several of the rainy periods
3. **Persistent pattern produced coldest Alaska winter in years**
4. Social media and 24/7 news coverage of approaching snow is a real problem for forecasters

# SUMMER: AVERAGE TO WARM AGAIN

(the last 100 years)

*WESTERN VALLEYS: 8<sup>th</sup> consecutive warm (or hot) summer*

Oregon, Climate Division 2 Average Temperature  
June–August





# SUMMER: AVERAGE TO WARM AGAIN

(the last 100 years)

*WESTERN VALLEYS: 8<sup>th</sup> consecutive warm (or hot) summer*

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## 90° WEATHER

### 90°+ DAYS EACH SUMMER IN PORTLAND

Average = 13 each year

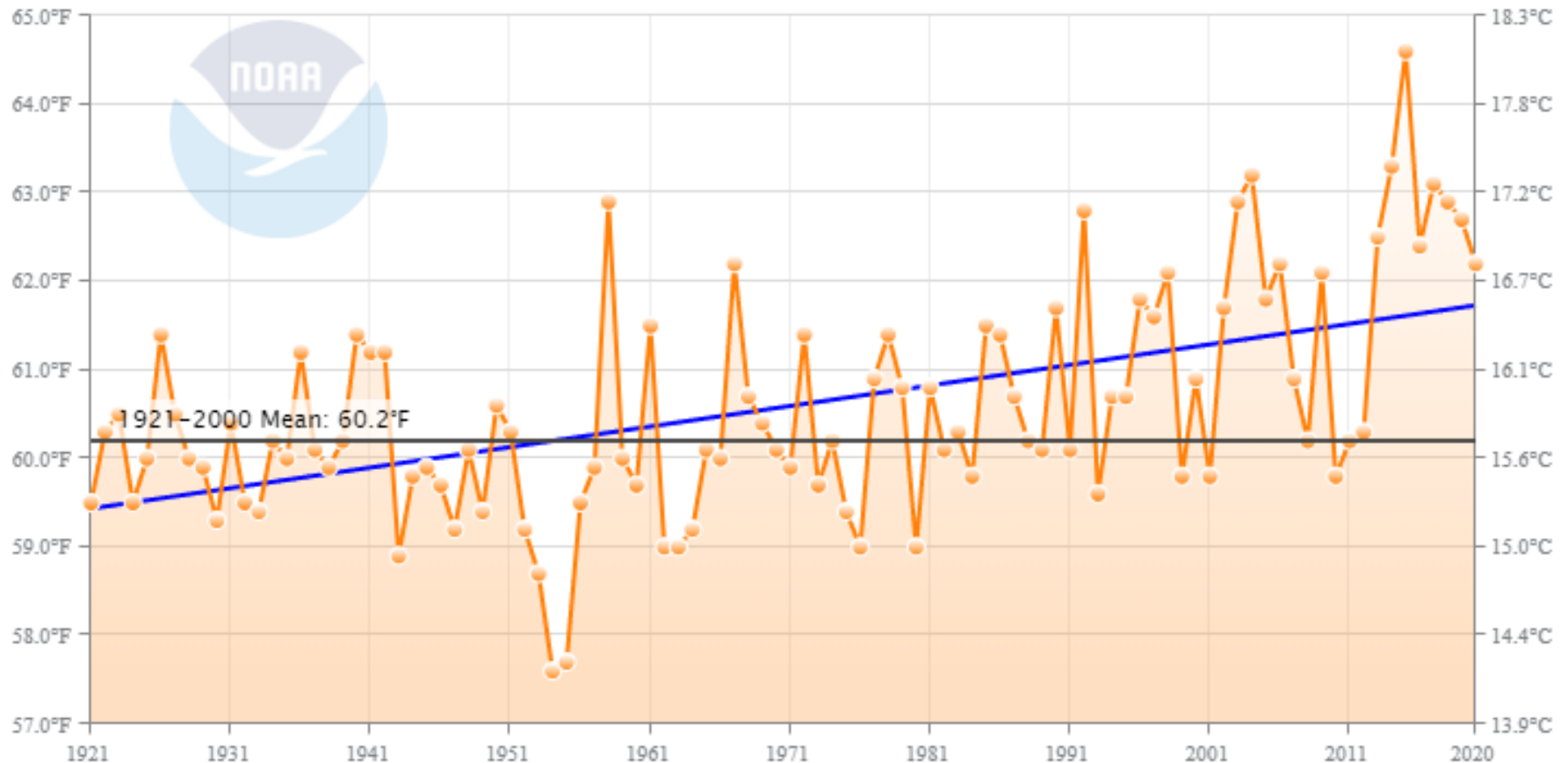


# SUMMER: AVERAGE TO WARM

(the last 100 years)

*OREGON COASTLINE*

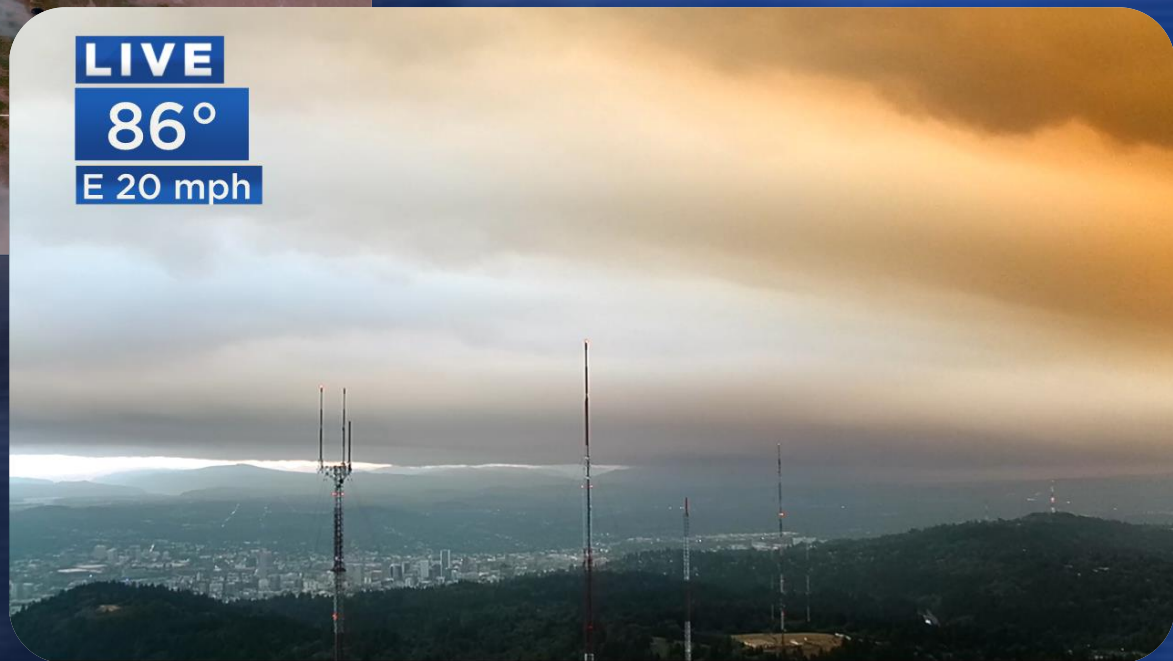
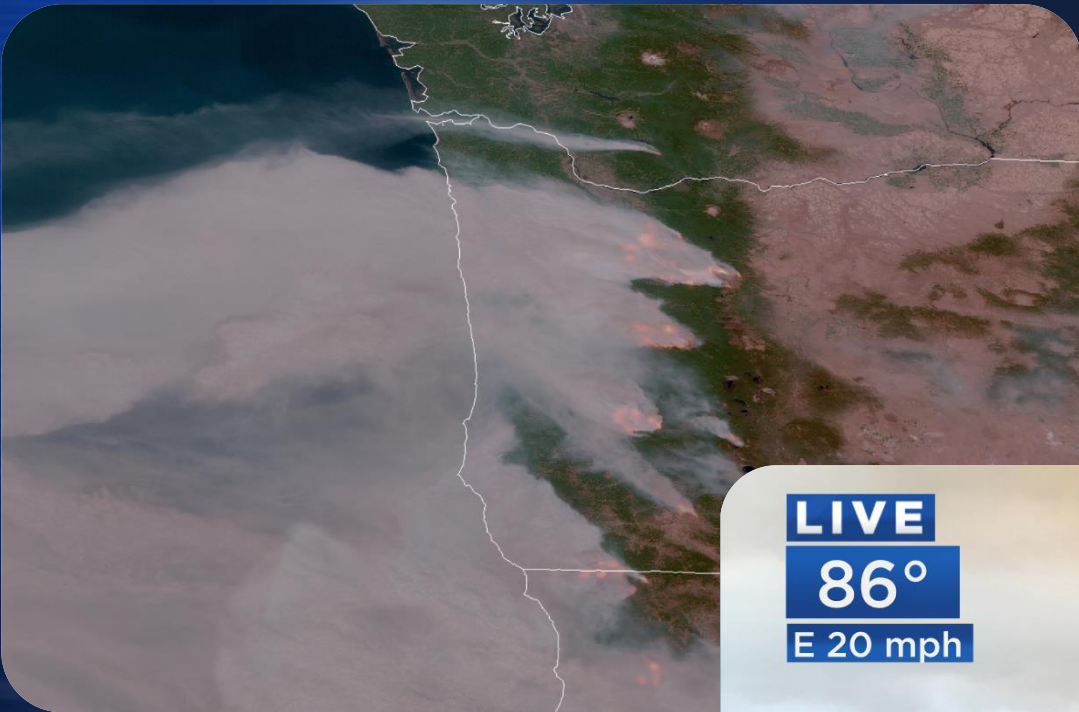
Oregon, Climate Division 1 Average Temperature  
June–August



# HISTORIC WESTERN OREGON FIRES

(Early-Mid September)

*"famous or important in history, or potentially so"*





FIRST. LIVE. LOCAL.  
**WEATHER**

**OREGON FROM SPACE**  
DARK SHADED AREAS ARE BURN SCARS



## The Numbers

**10 lives lost**

~4,000 homes gone

~900,000 acres burned (*in 1 week*)

## The Last 100 Years

11 “mega-fires” over/west  
of Cascades

5 were in September!

## **HOW ABOUT THIS COMING WINTER?**

# **LIGHTNING ROUND OF WINTER FORECASTS**

**Organizations/individuals who can't make it  
here today or don't want to be here**

**OR**

**They don't know (or care) that we exist.**



# **COLLECTION OF WINTER OUTLOOKS**

1. **Old Farmer's Almanac**
2. **Farmers' Almanac**
3. **AccuWeather**
4. **WeatherBELL**
5. **Models**



FIRST. LIVE. LOCAL.  
**WEATHER**

# THOSE ALMANAC FORECASTS?

BETTER LUCK TOSSING A COIN!

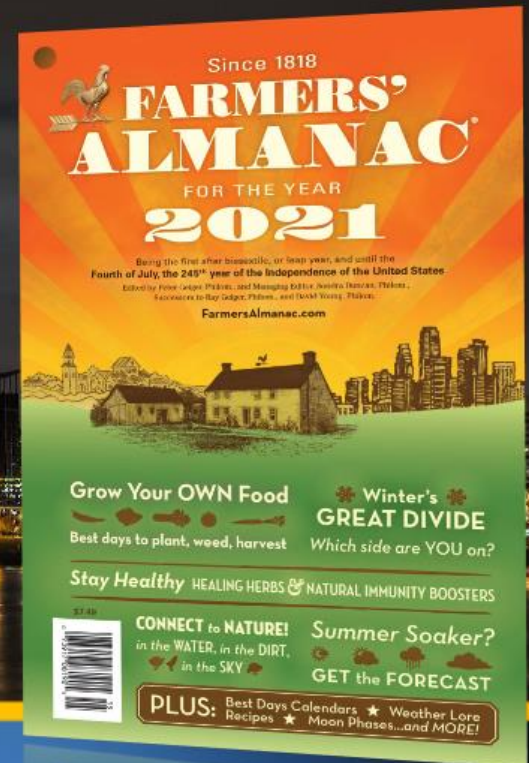


## 2020-21 WINTER OUTLOOK

*Winter of the Great Divide*



FarmersAlmanac.com



Remember the accuracy...

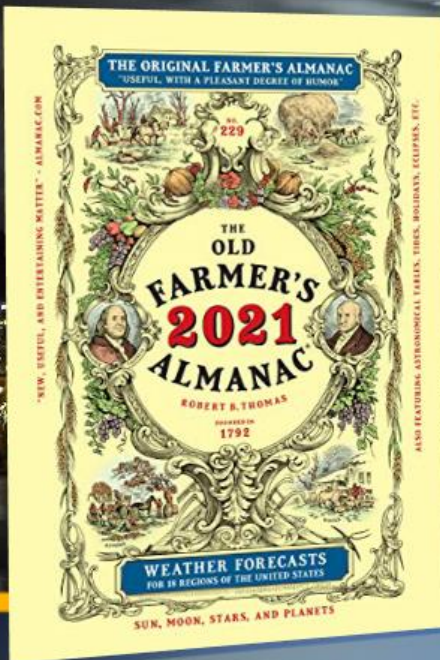


FIRST. LIVE. LOCAL.  
**WEATHER**

# THOSE ALMANAC FORECASTS?

BETTER LUCK TOSSING A COIN!

WINTER 2020-21



Remember the accuracy...

## TEMPERATURE DEPARTURES FROM NORMAL

DECEMBER - FEBRUARY 2020-2021

TEMPERATURES (°F)

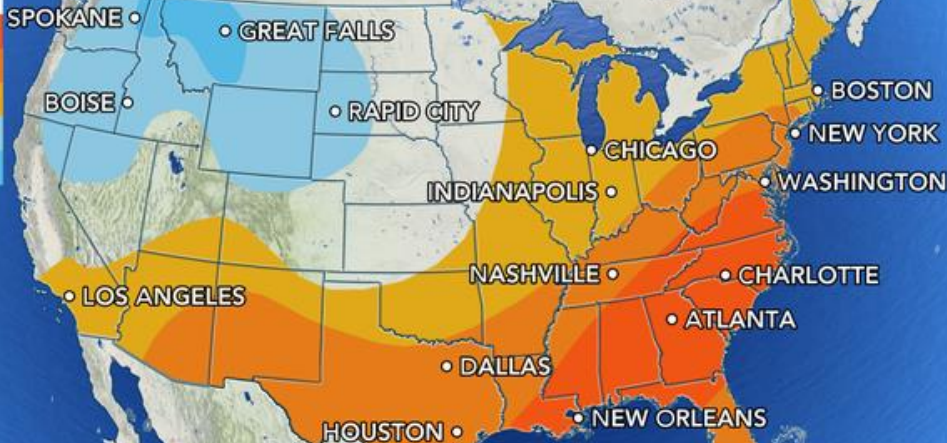
+3° & Higher

+2° to +3°

+1° to +2°

-1° to -2°

+2° & Lower



### West Coast

Autumn may feel shorter this year across the Pacific Northwest as wintry weather makes an early entrance across the region.

“Mountain snow and stormy conditions may arrive in late fall for the Northwest, northern California and northern Rockies,” Pastelok said.

Even the Interstate 5 corridor from Medford, Oregon, through Seattle will have several opportunities for accumulating snowfall, potentially even before 2020 draws to a close.

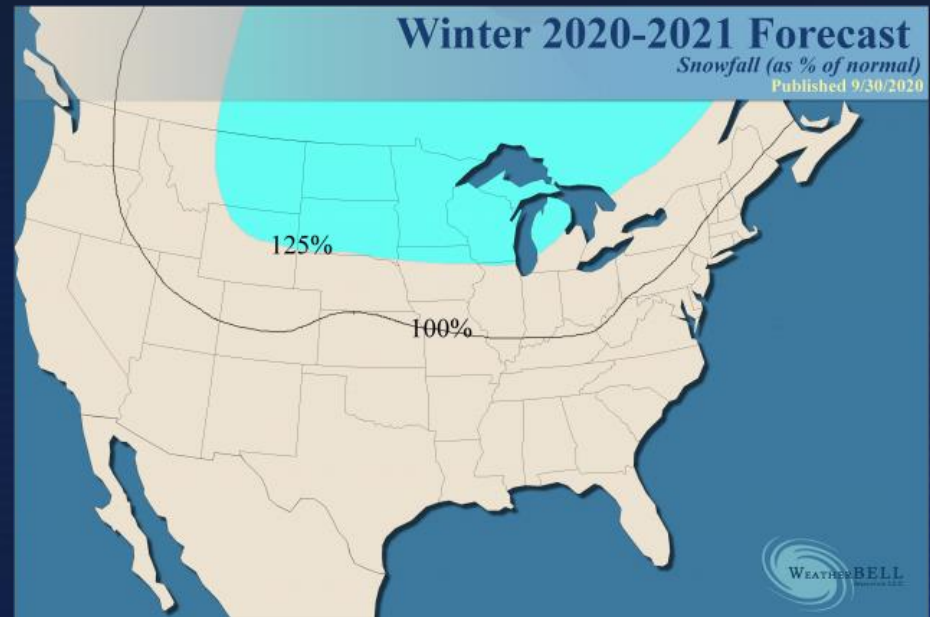




## Winter 2020-2021 Forecast

Snowfall (as % of normal)

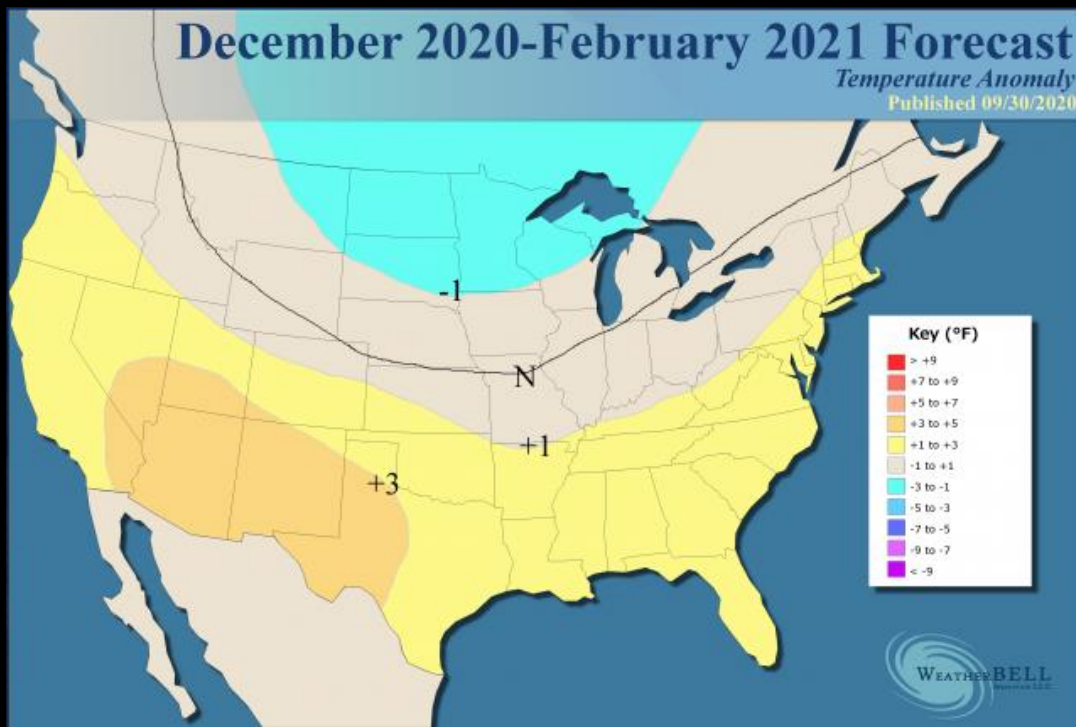
Published 9/30/2020



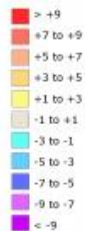
## December 2020-February 2021 Forecast

Temperature Anomaly

Published 09/30/2020

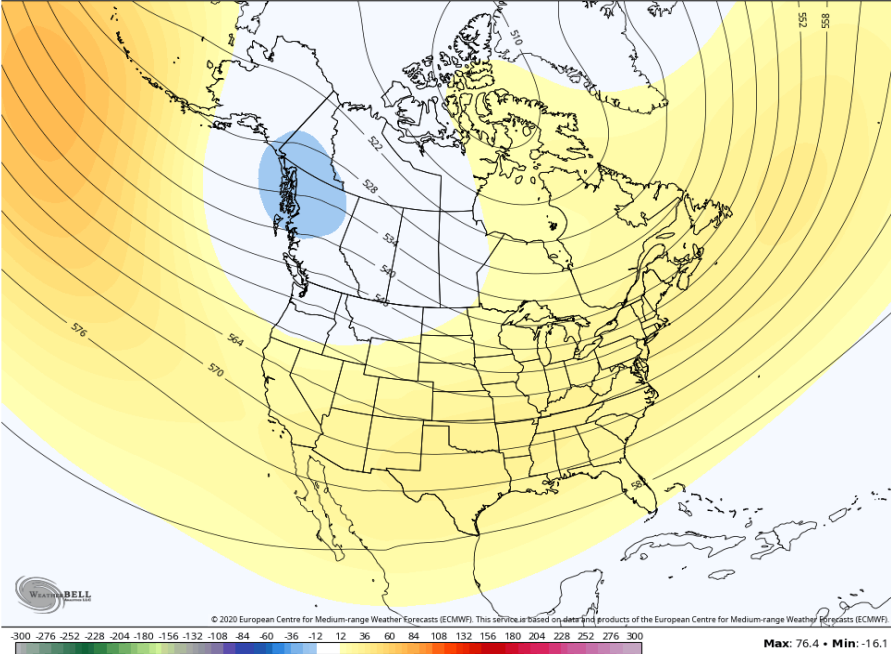


### Key (°F)



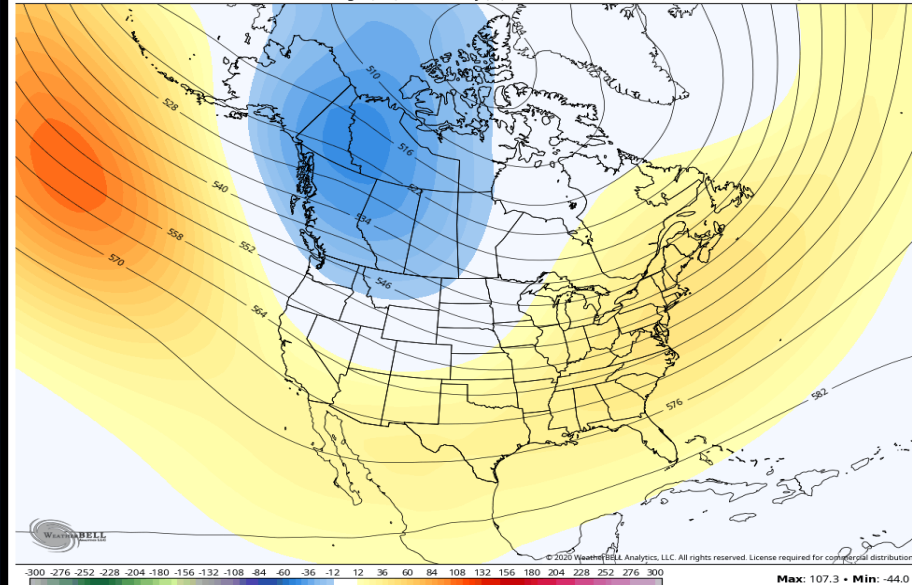
# TWO MODEL FORECASTS

ECMWF Seasonal [M] 0.75° Init 00z 1 Oct 2020 • 500mb Height (dm) and Anomaly (m) Valid: Dec/Jan/Feb 2020-2021



## ECMWF DEC-FEB 500MB

CANSIPS [M] 1.0° Init 00z 1 Oct 2020 • 500mb Height (dm) and Anomaly (m) Valid: Dec/Jan/Feb 2020-2021



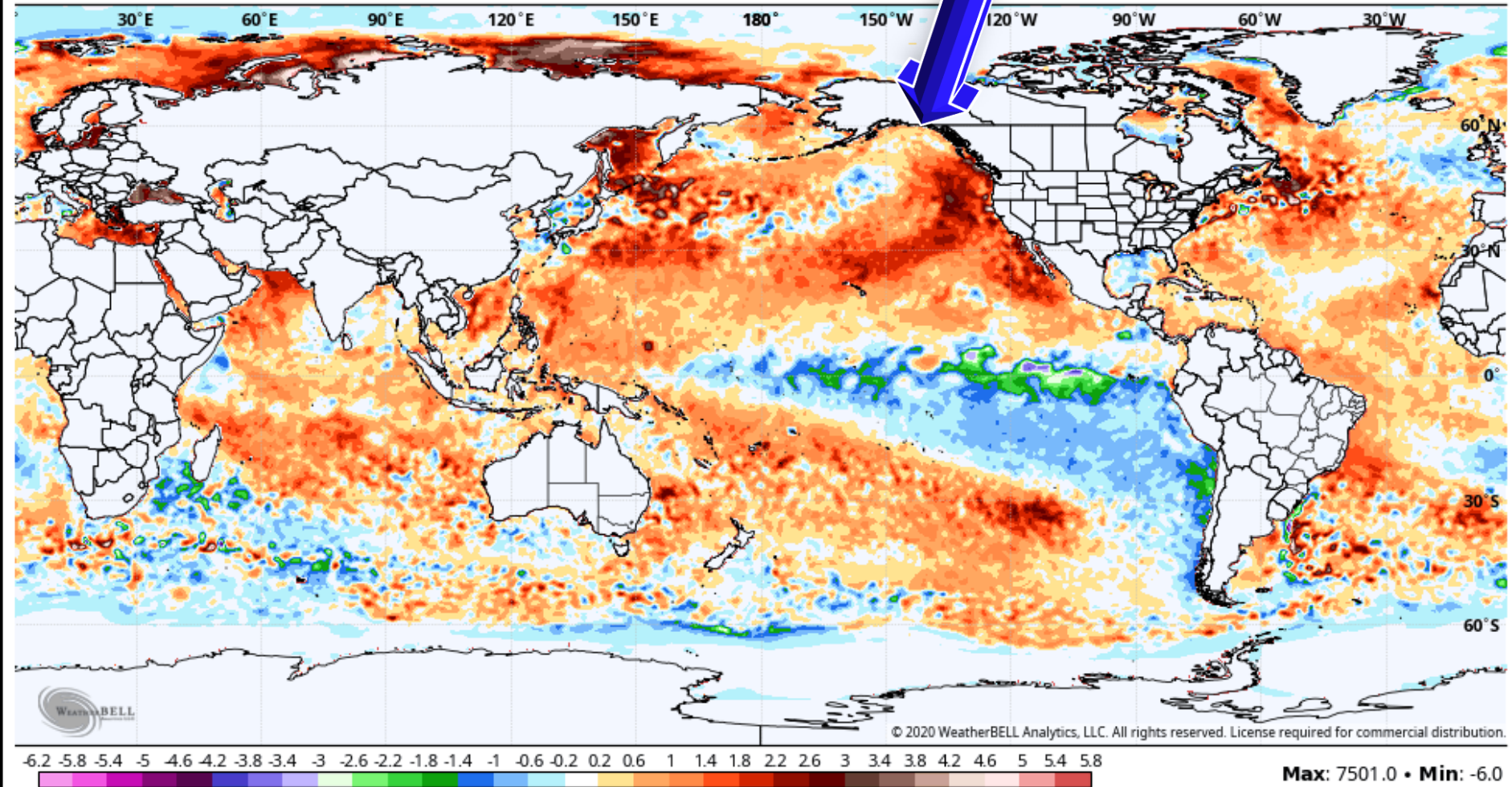
## CANSIPS DEC-FEB 500MB



# WHAT ABOUT VERY WARM NORTH PACIFIC?

OISST 0.25° • Sea Surface Temperature Anomaly (°C)

Valid: 00z Sat 10 Oct 2020







**ENJOY  
YOUR  
WINTER!**