



2020-2021 EARTH NETWORKS WINTER OUTLOOK

PRESENTED BY SENIOR METEOROLOGIST CHAD MERRILL

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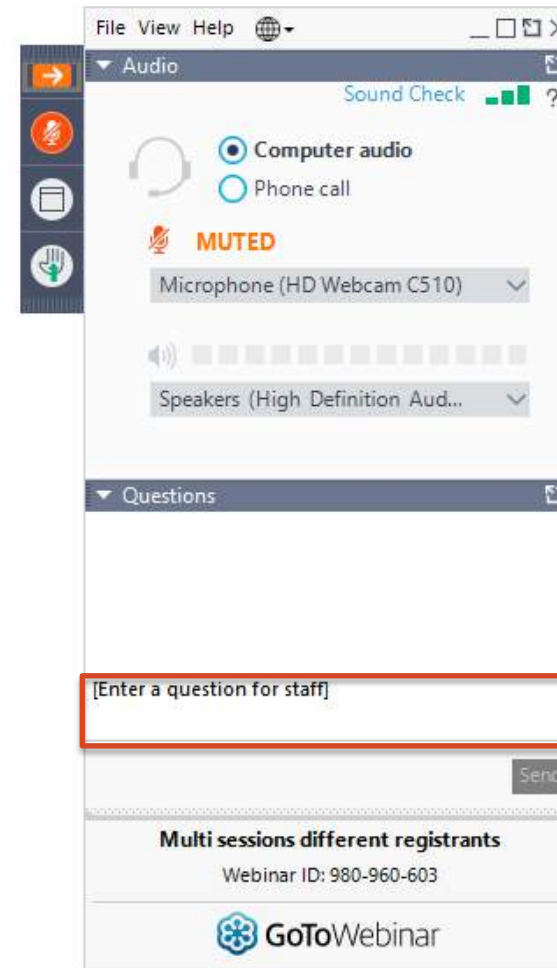
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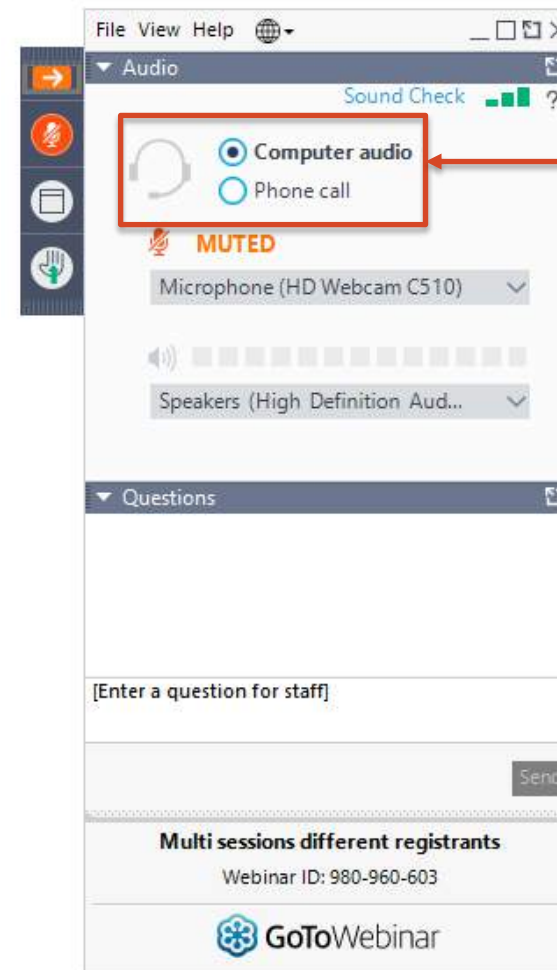
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Audio

2020-2021

WINTER OUTLOOK METEOROLOGICAL TEAM



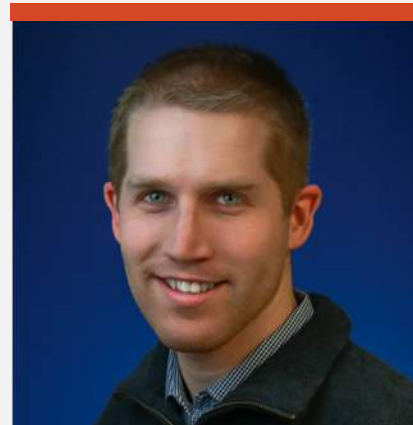
CHAD MERRILL

Sr. Meteorologist



JAMES AMAN

Sr. Meteorologist



MATT MEHALLO

Meteorologist



ALYSSA ROBINETTE

Meteorologist



DAN RUPP

Meteorologist

2020-2021 WINTER OUTLOOK



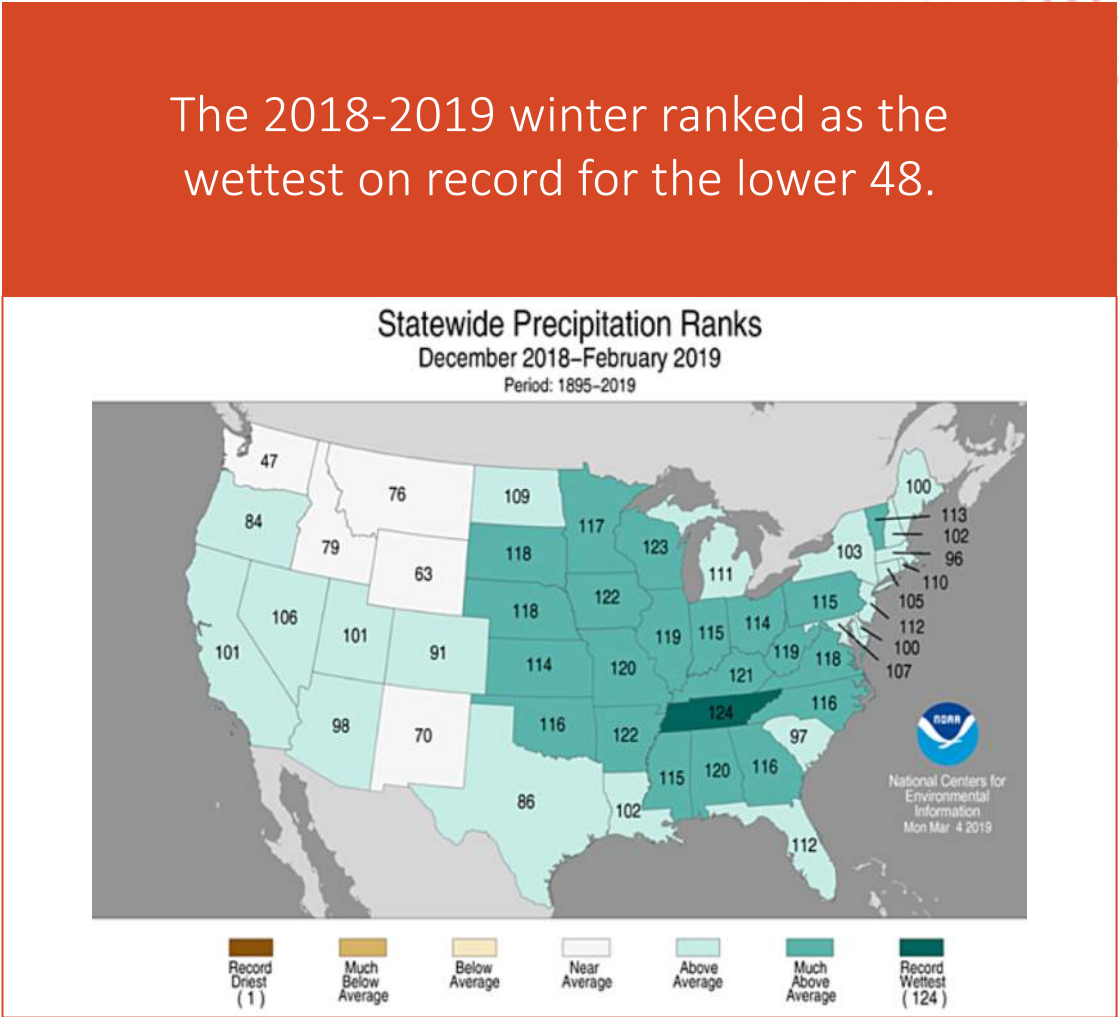
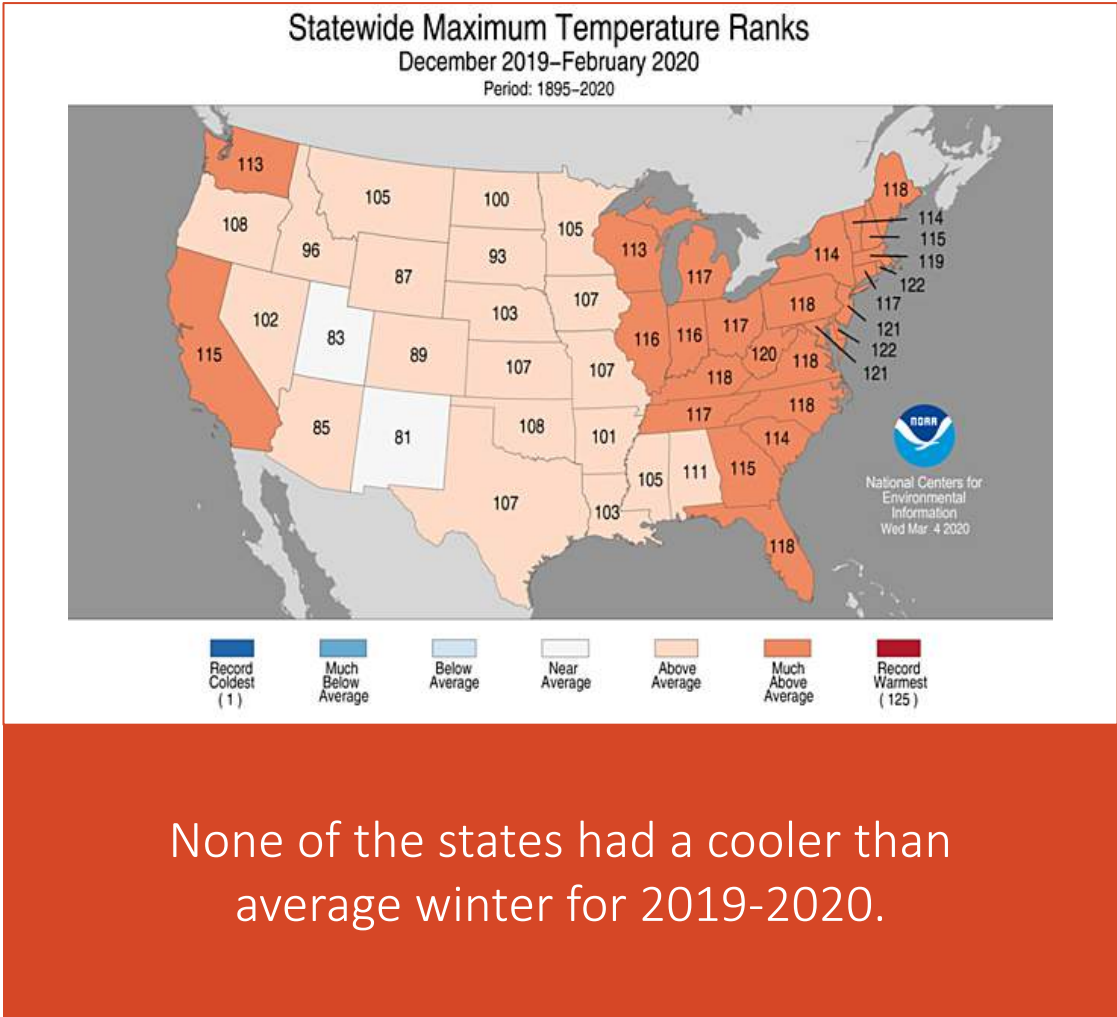
This outlook covers the three coldest months of the year into early spring:

December, January, February and March

The Winter Outlook covers the expected temperature and precipitation trends in the Lower 48.



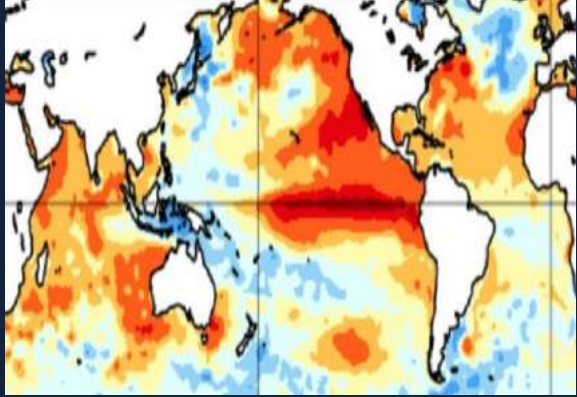
LAST TWO WINTERS SHOW WARM, WET PATTERN



LET'S DIVE INTO THE 2020-2021 WINTER OUTLOOK



LEADING FACTORS IN THE 2020-21 WINTER OUTLOOK



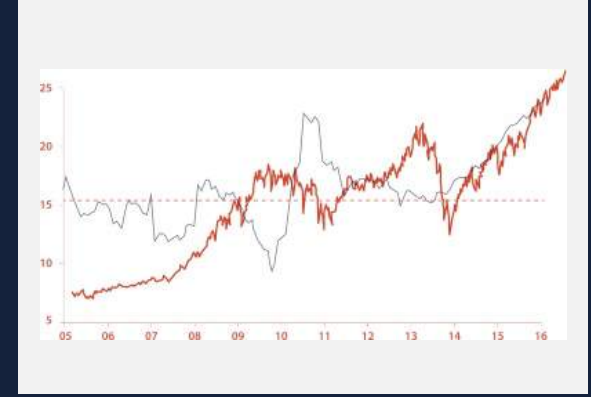
ENSO (El Niño Southern Oscillation):

Will it be an El Niño, La Niña or Neutral Winter?



Best-matched winters (analog years):

Which past years represent expected trends this winter?



Decadal Trends (temperature and precipitation):

Have there been any striking trends in the last 10 years?

ENSO

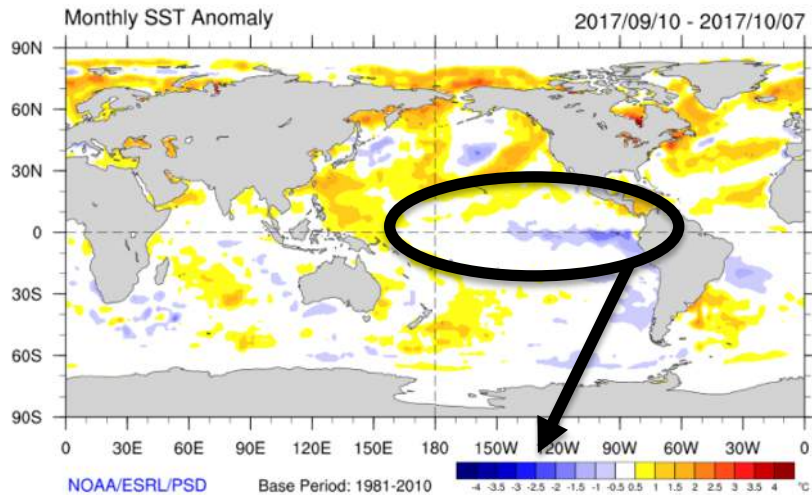
EL NIÑO SOUTHERN OSCILLATION



WHAT IS ENSO? (EL NIÑO SOUTHERN OSCILLATION)

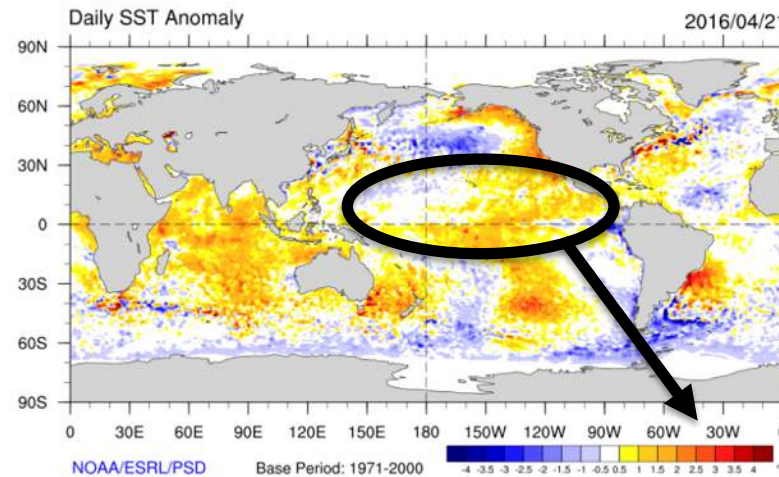
La Niña

Sea Surface Temperature Anomalies



El Niño

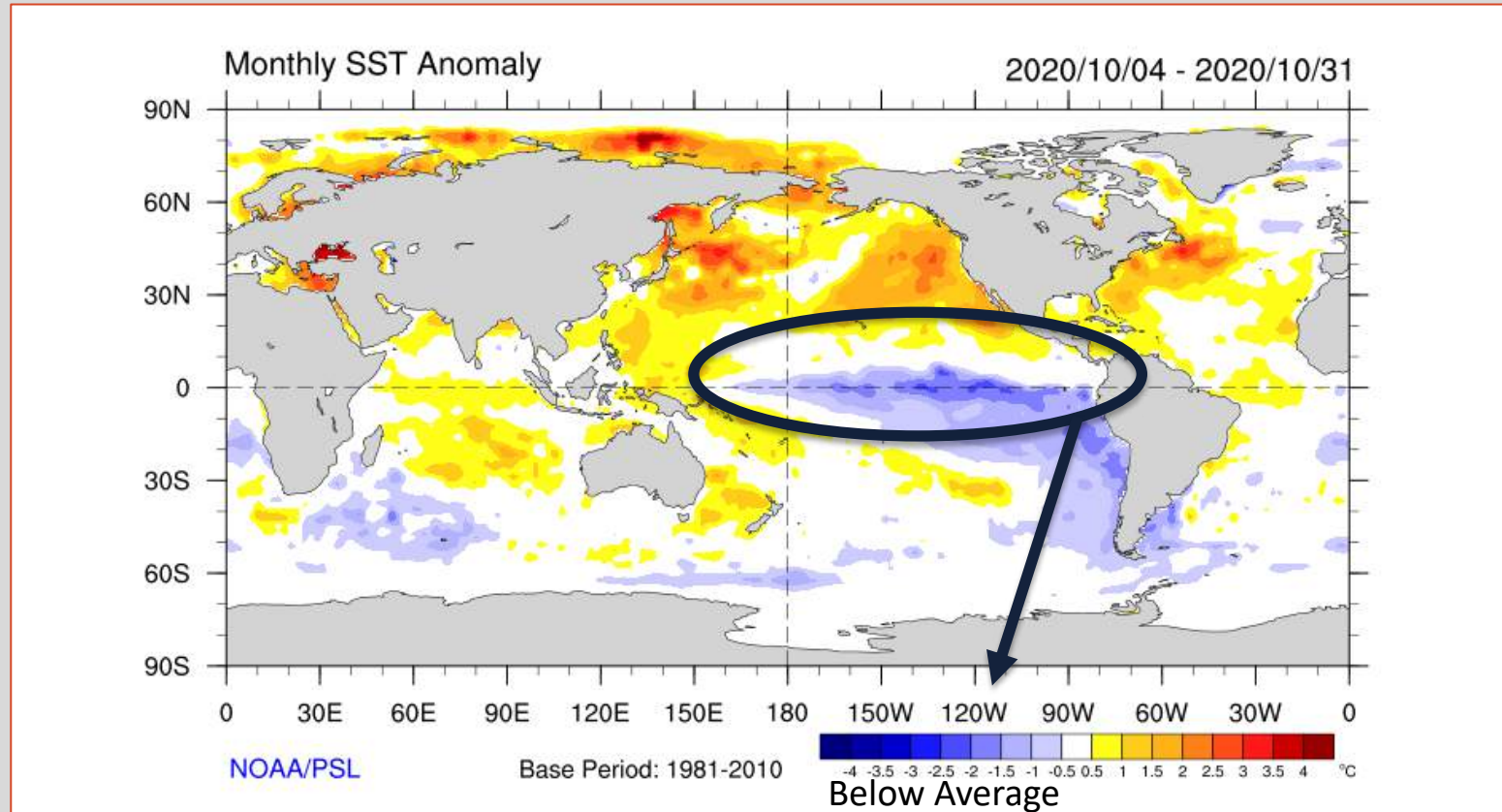
Sea Surface Temperature Anomalies



ENSO is a periodic, cyclical warming or cooling of the equatorial Pacific Ocean

WHICH PHASE OF ENSO IS EXPECTED THIS WINTER?

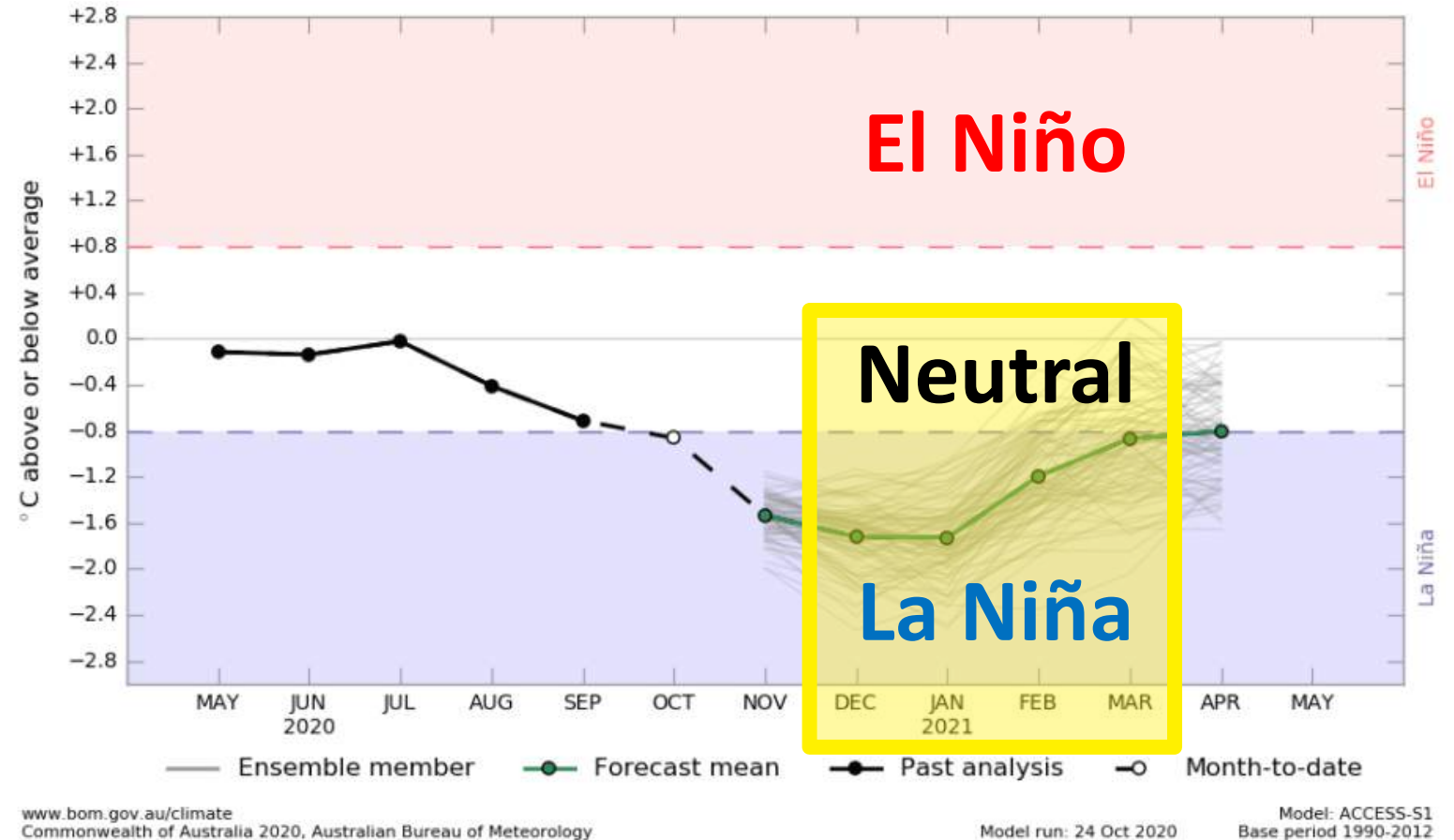
La Niña will continue through winter



The equatorial Pacific sea surface temperatures are BELOW average.

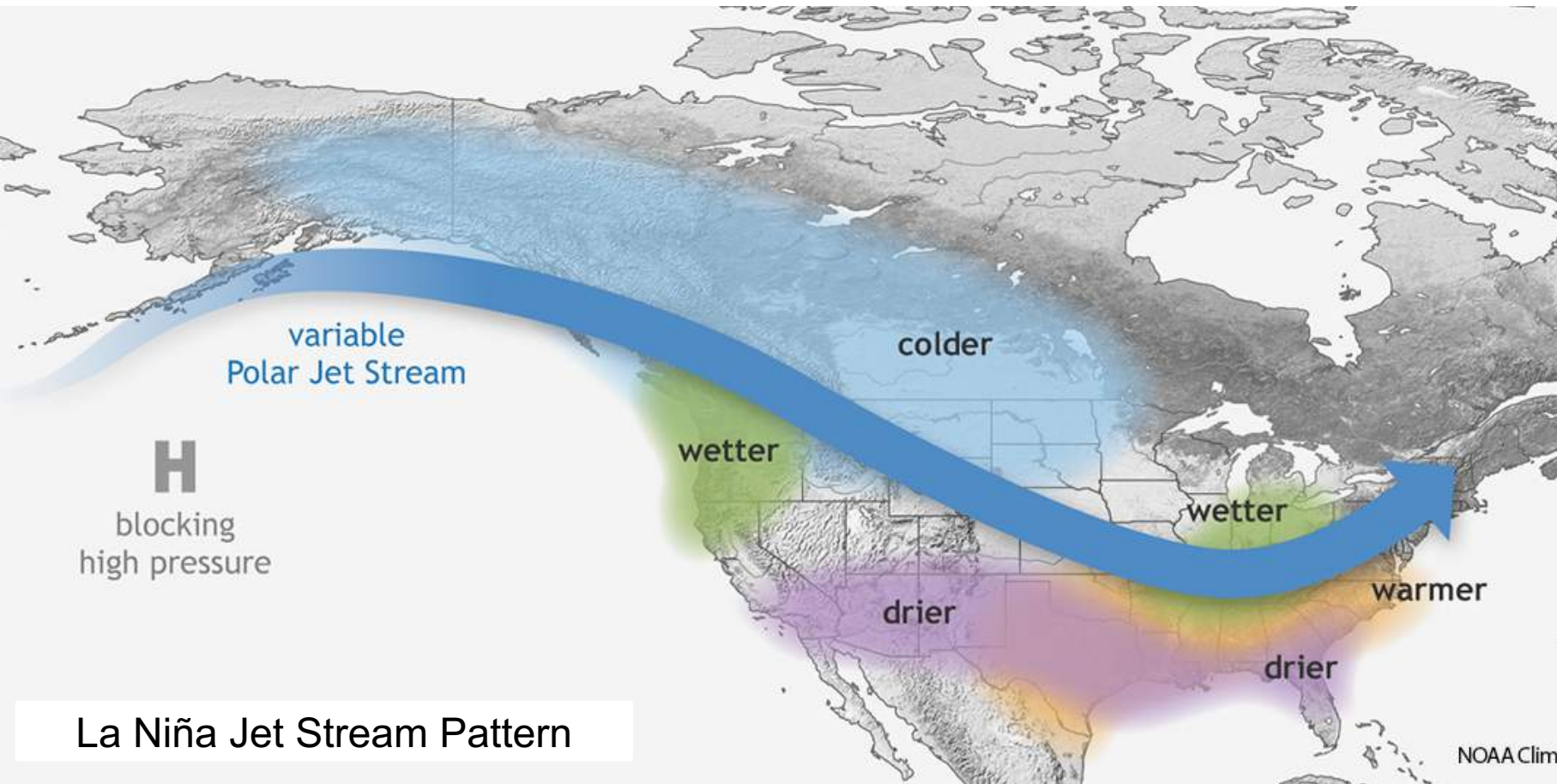
LA NIÑA EXPECTED TO PERSIST THROUGH AT LEAST FEBRUARY

Monthly sea surface temperature anomalies for NIÑO3.4 region



International climate model outlooks

TYPICAL LA NIÑA WINTERTIME U.S. PATTERN



- Wet (snowy in the mountains) and cooler from the Northwest into the Upper Mississippi Valley
- Dry and warm for much of the South
- Dry and warm in the southern tier and East Coast, wet in the Ohio Valley

HISTORICAL PERSPECTIVE ON LA NIÑA

How long does La Niña usually last?

9 - 12 months

When did the current La Niña Begin?

September

Based on past history, when will it likely diminish?

Summer or Fall 2021

How long did the most recent La Niña last?

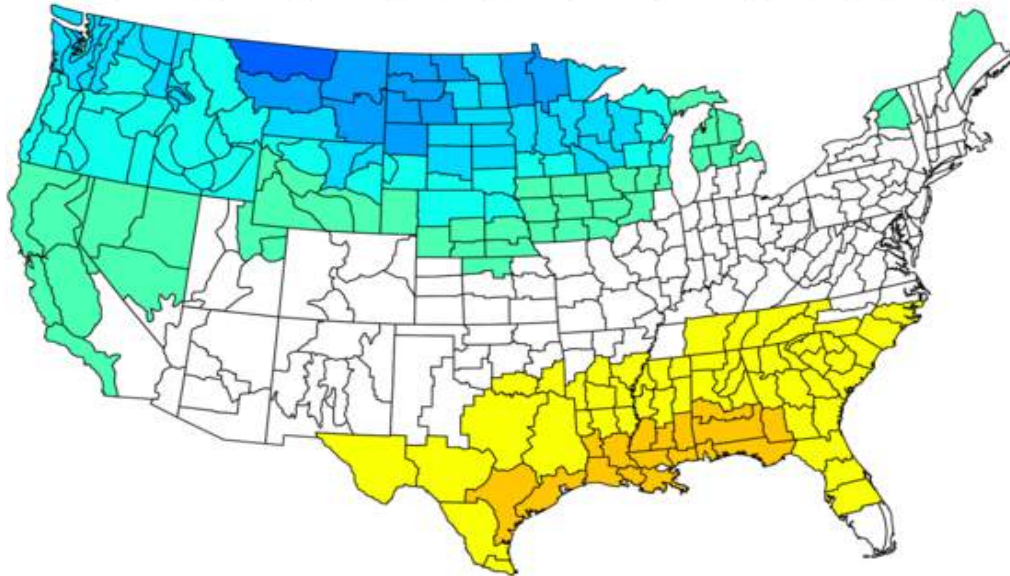
8 months (Sept 2017 – April 2018)

A CLOSER LOOK AT U.S. WINTER TRENDS IN A LA NIÑA WINTER

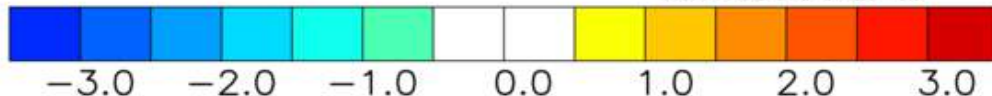
TEMPERATURE DEPARTURES FROM AVERAGE

NOAA/NCEI Climate Division Composite Temperature Anomalies (F)
Versus 1981–2010 Longterm Average

Dec to Mar 1954–55, 1964–65, 1971–72, 1974–75, 1983–84, 1984–85, 2000–01, 2005–06
2008–09, 2016–17, 2017–18, 1955–56, 1970–71, 1995–96, 2011–12, 1975–76, 1973–74, 1988–89, 1998–



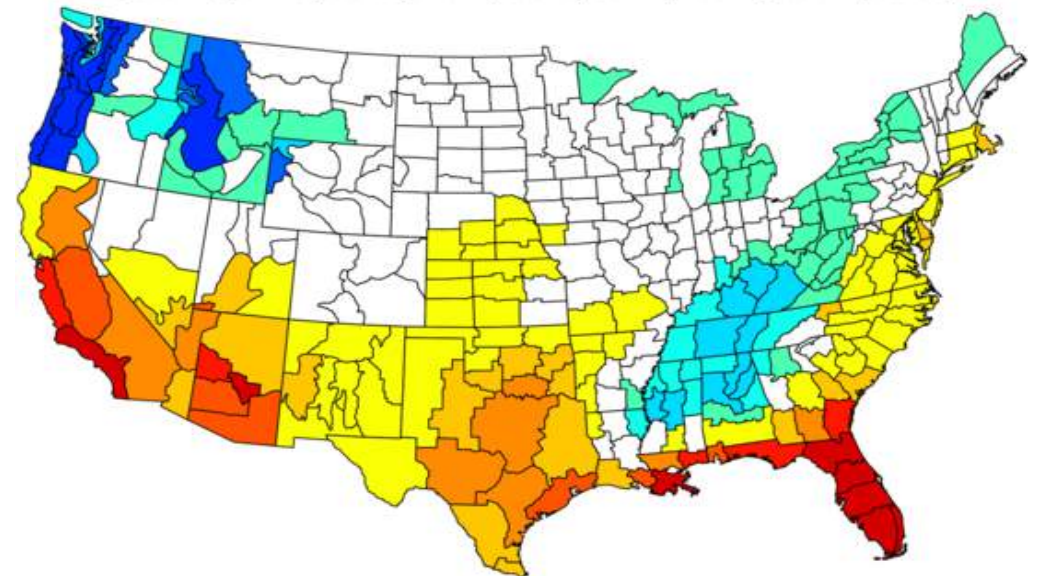
NOAA PSL and CIRES-CU



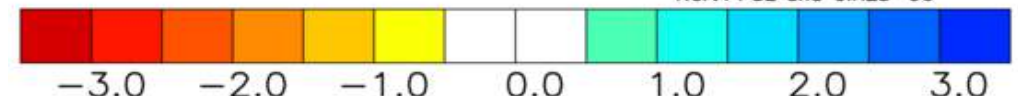
PRECIPITATION DEPARTURES FROM AVERAGE

NOAA/NCEI Climate Division Composite Precipitation Anomalies (in)
Versus 1981–2010 Longterm Average

Dec to Mar 1954–55, 1964–65, 1971–72, 1974–75, 1983–84, 1984–85, 2000–01, 2005–06
2008–09, 2016–17, 2017–18, 1955–56, 1970–71, 1995–96, 2011–12, 1975–76, 1973–74, 1988–89, 1998–

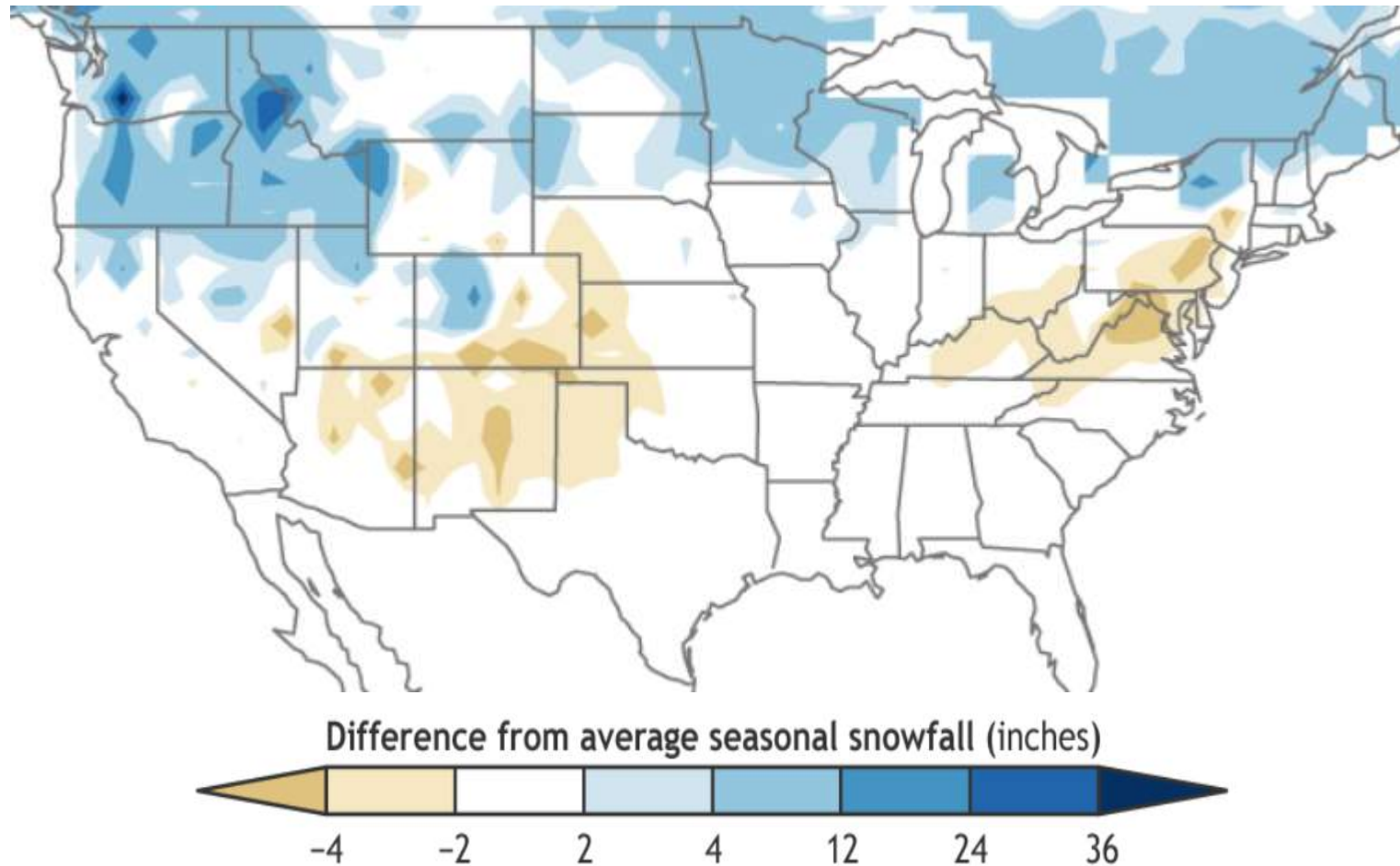


NOAA PSL and CIRES-CU



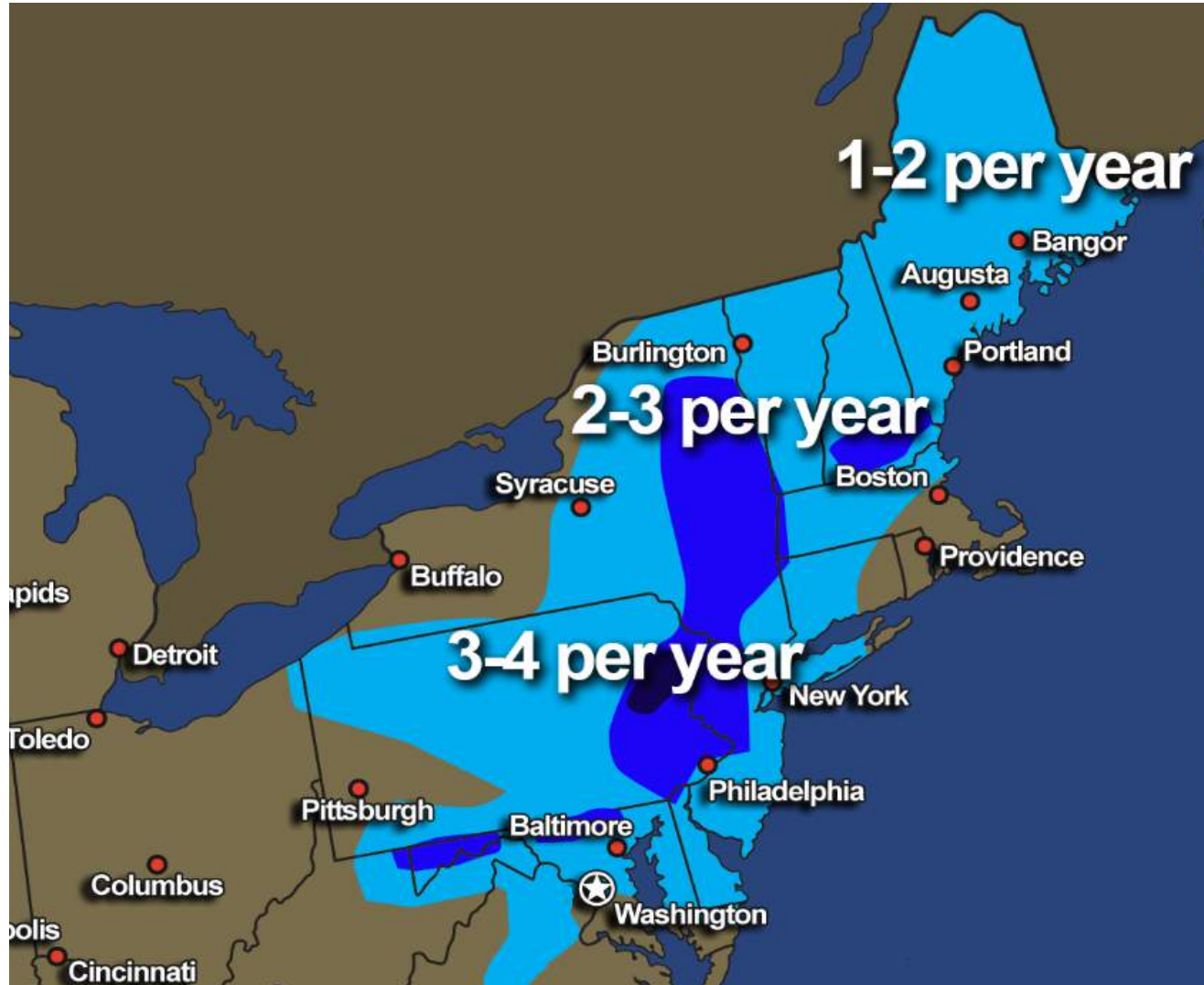
TYPICAL LA NIÑA SNOWFALL PATTERN

Average snowfall patterns for all La Niña years



- More snow than average in the Northwest, northern Rockies and Upper Mississippi Valley to interior New England
- Less snow than average in the southern Rockies, Southwest mountains, Ohio Valley and Mid-Atlantic

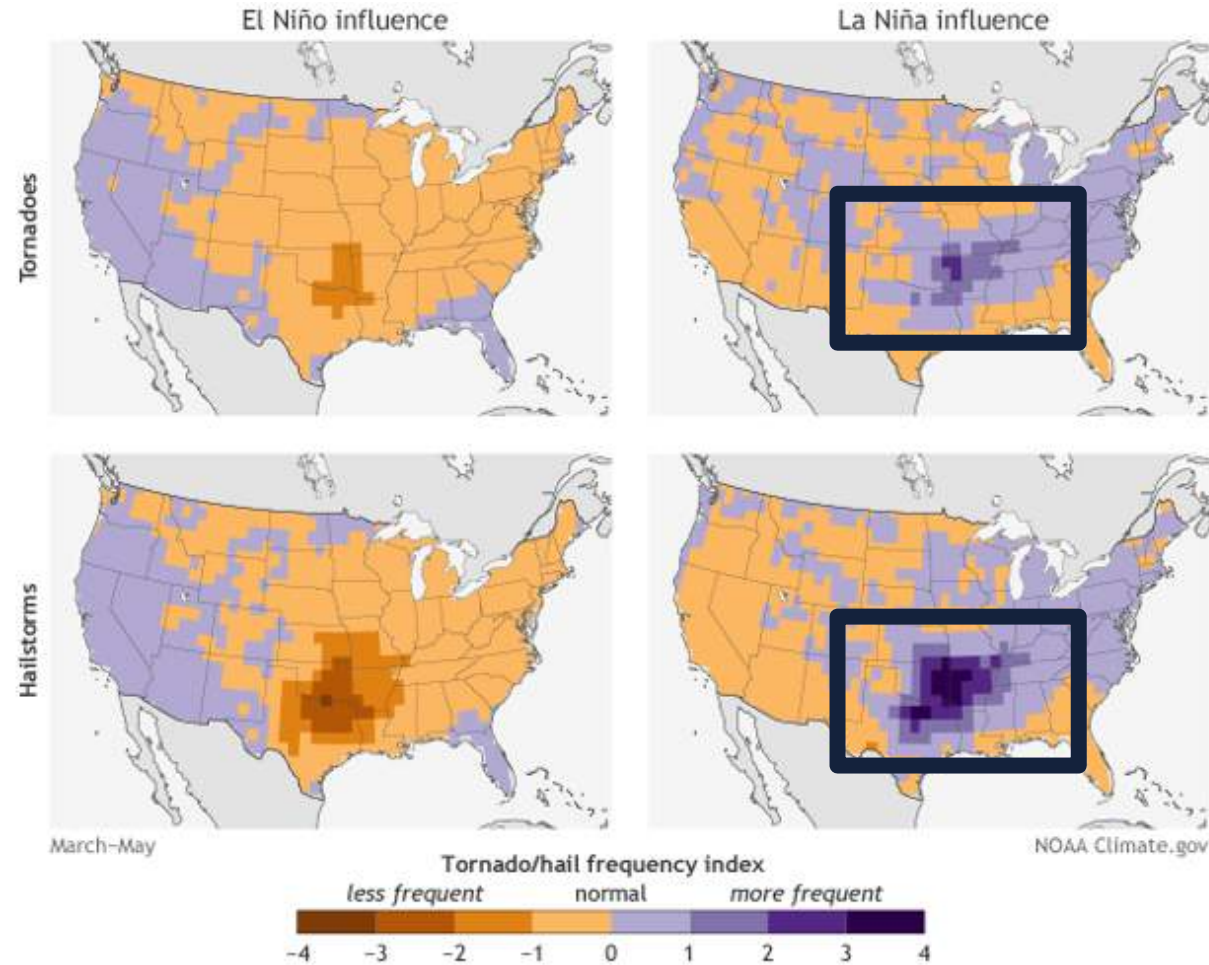
LA NIÑA INFLUENCE ON ICE STORMS



In a La Niña Winter:

Ice Storm frequency
most pronounced
from Adirondacks to
Lehigh Valley

SPRING TORNADO OUTBREAKS MORE COMMON IN LA NIÑA EPISODES



March-May values of a blend of tornado and hail reports with a tornado environment index (TEI) and a hail environment index (HEI) for El Niño and La Niña years. Maps by climate.gov; data from the authors.

A stronger signal for more severe thunderstorms producing tornadoes and hail in a La Niña spring (March-May).

ANALOG YEARS

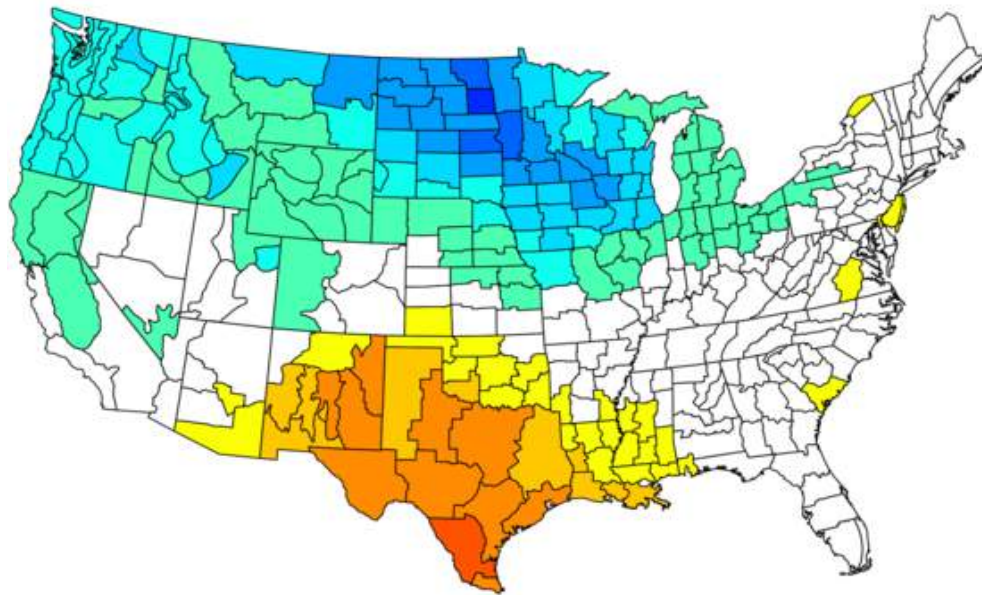
YEARS THAT LOOK SIMILAR TO
THE 2020-2021 WINTER



YEARS WITH SIMILAR LA NIÑA PATTERN TO WINTER 2020-21

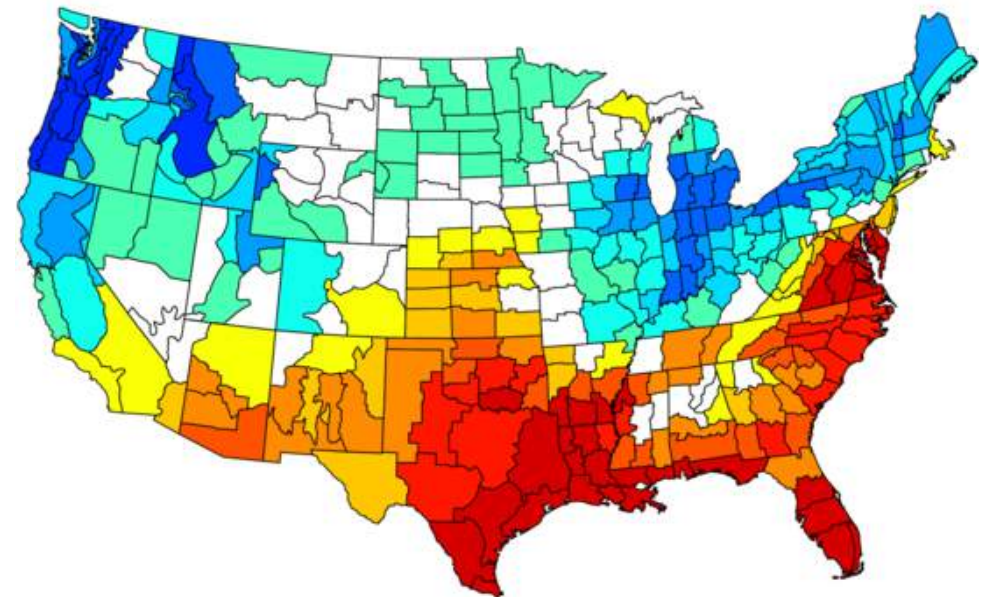
TEMPERATURE DEPARTURES FROM AVERAGE

NOAA/NCEI Climate Division Composite Temperature Anomalies (F)
Dec to Mar 2005–06, 2007–08, 2008–09, 2010–11
Versus 1981–2010 Longterm Average



PRECIPITATION DEPARTURES FROM AVERAGE

NOAA/NCEI Climate Division Composite Precipitation Anomalies (in)
Dec to Mar 2005–06, 2007–08, 2008–09, 2010–11
Versus 1981–2010 Longterm Average



DECADAL TRENDS

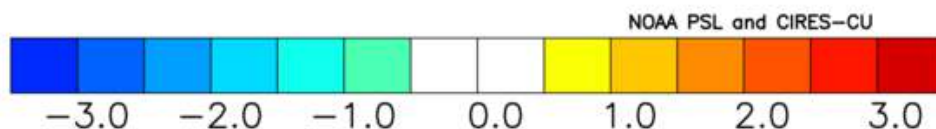
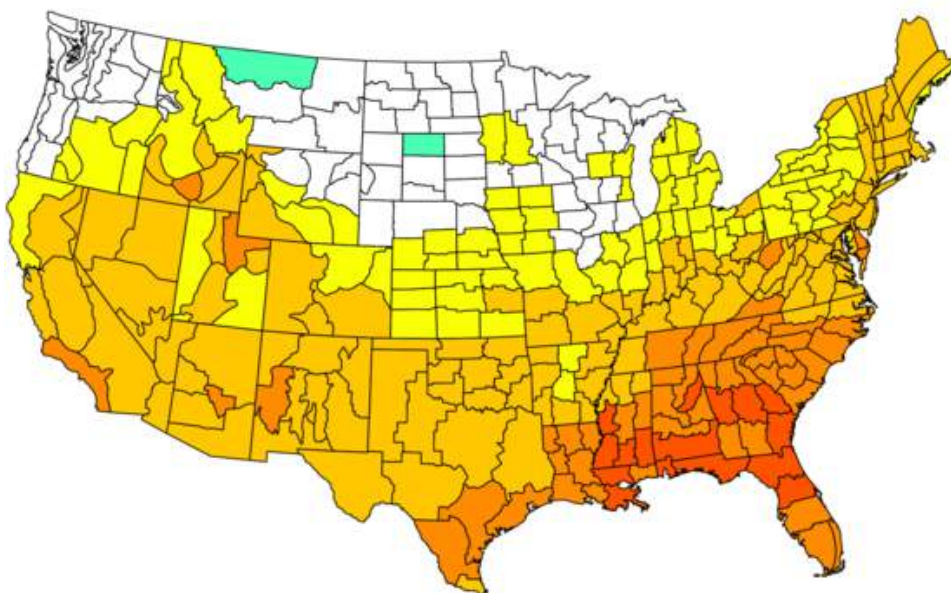
NOTEWORTHY WINTER TEMPERATURE
AND PRECIPITATION TRENDS



TRENDS IN THE LAST 10 WINTERS ACROSS THE U.S.

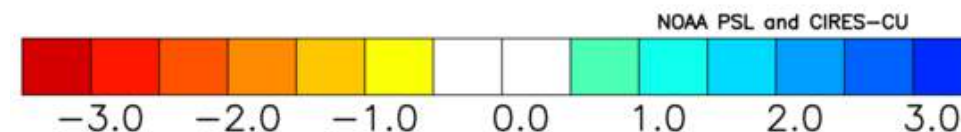
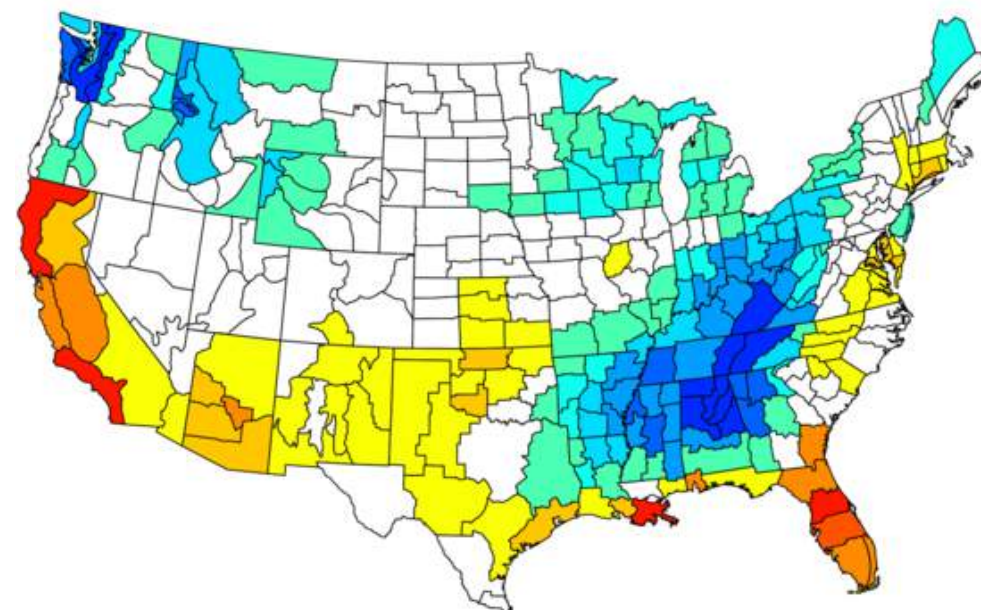
TEMPERATURES COMPARED TO AVERAGE

NOAA/NCEI Climate Division Composite Temperature Anomalies (F)
Dec to Mar 2010–11 to 2019–20
Versus 1981–2010 Longterm Average

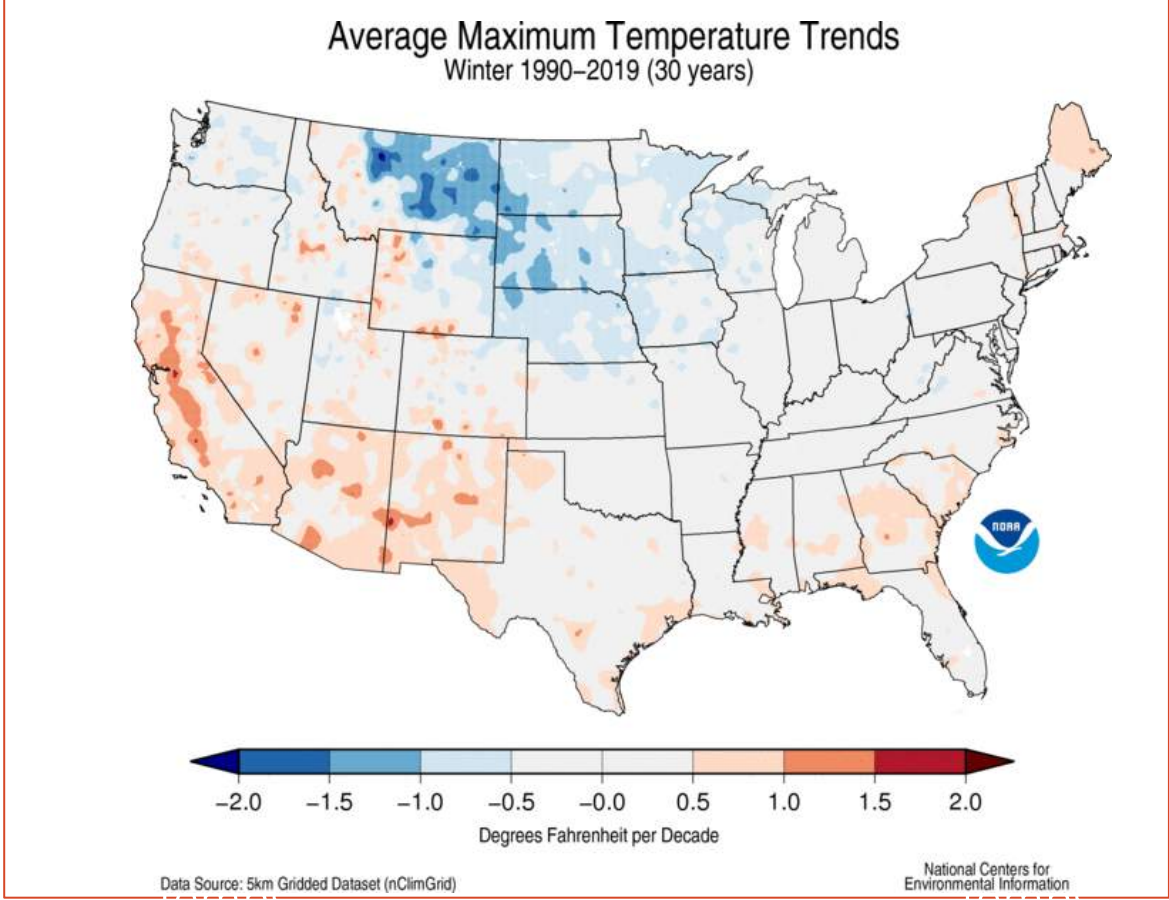
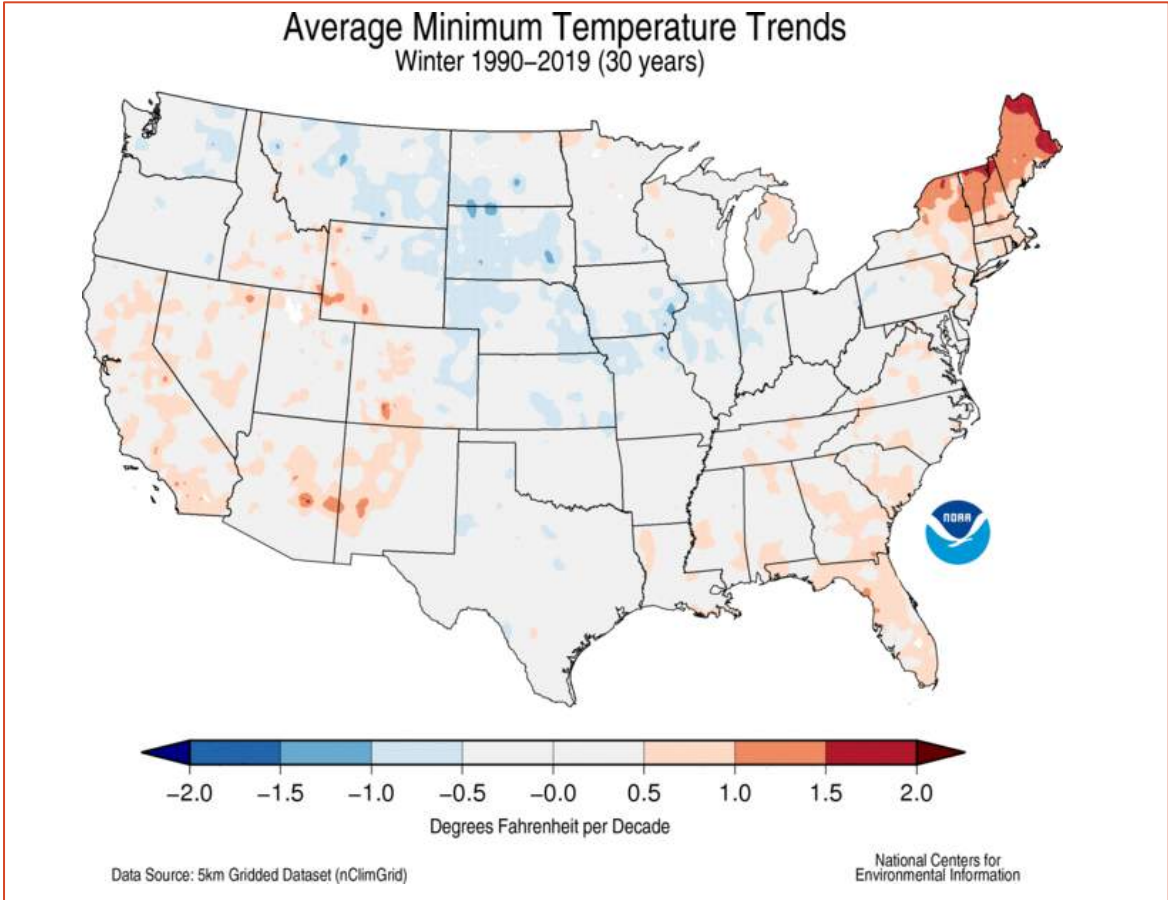


PRECIPITATION COMPARED TO AVERAGE

NOAA/NCEI Climate Division Composite Precipitation Anomalies (in)
Dec to Mar 2010–11 to 2019–20
Versus 1981–2010 Longterm Average



WINTER TEMPERATURE TRENDS OVER THE LAST 30 YEARS



WINTER OUTLOOK 2020 – 2021 INPUTS

FACTORS WEIGHTED

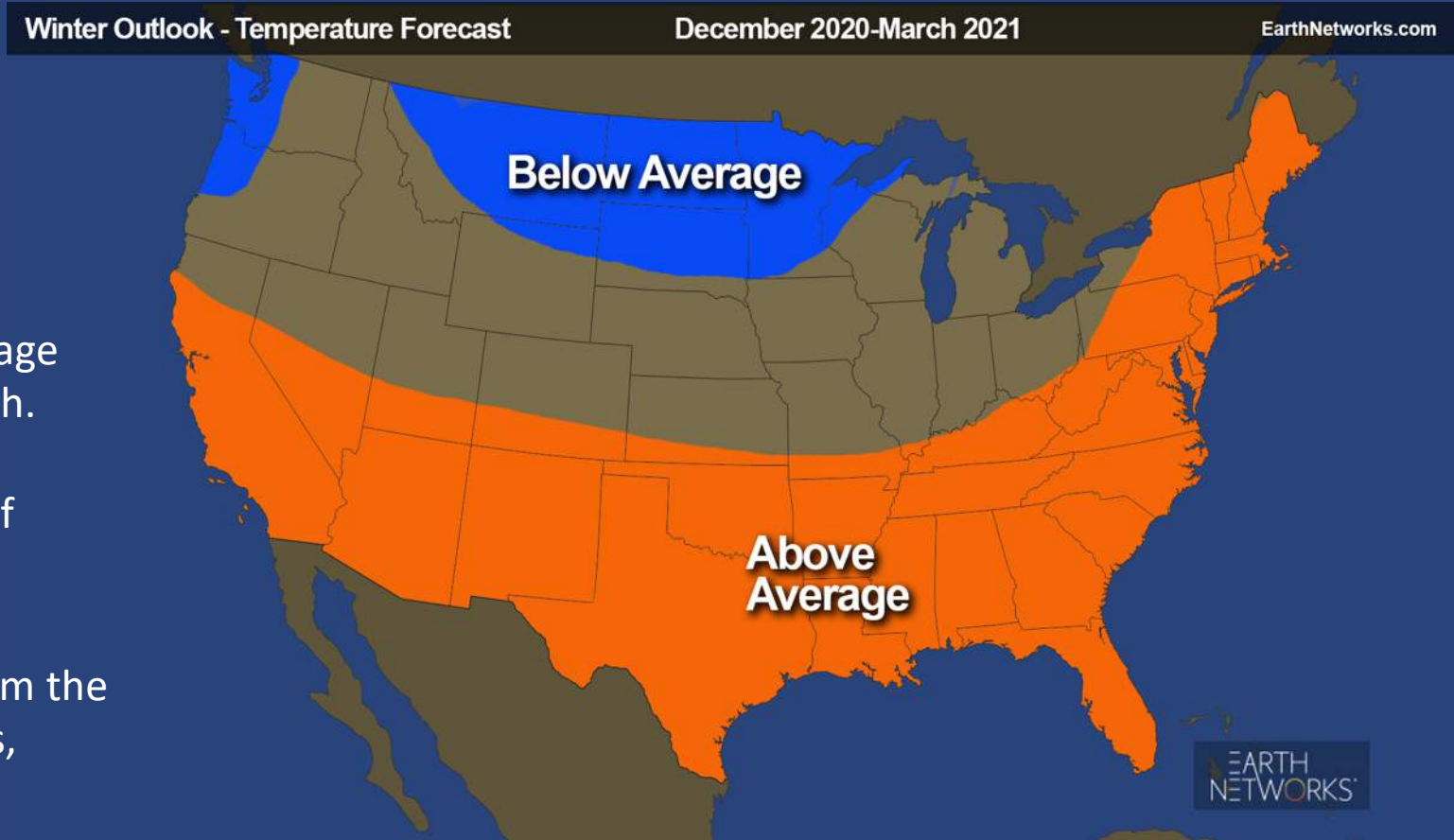
- 40%: La Niña
- 30%: Analog Years
- 30%: Decadal Trends



EARTH NETWORKS 2020-2021 WINTER OUTLOOK

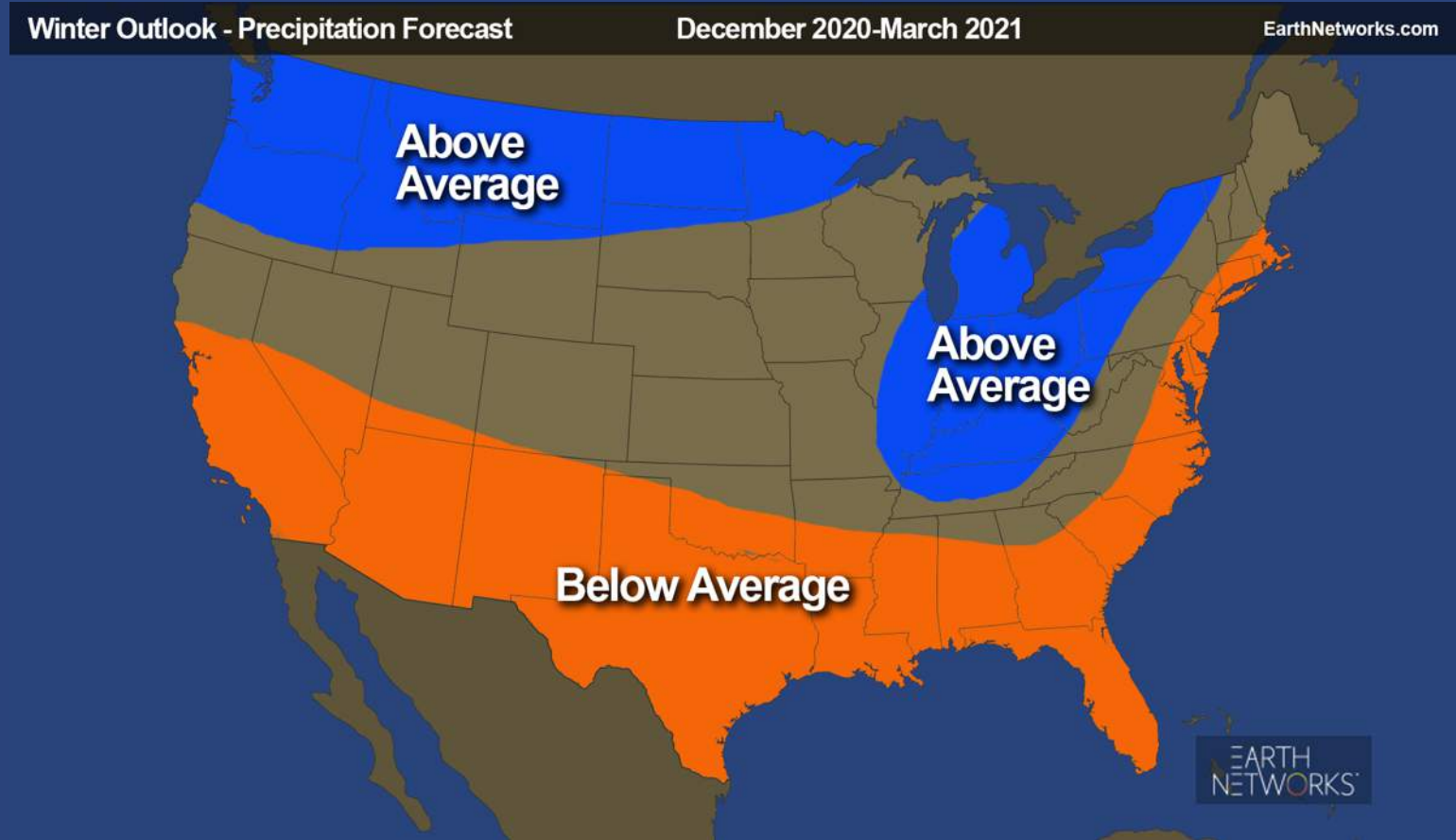
MAJOR REGIONAL IMPACT POINTS - TEMPERATURES

- Active northern tier storm track will produce below-average temperatures. Severe cold blasts will be far and few between.
- Southern tier will stay warmer than average due to active storm track staying far north. Daytime highs will likely be warmer than average on many occasions due to lack of cloud cover.
- Near average temperatures expected from the interior Northwest into the central Plains, Midwest, Ohio Valley and Great Lakes.



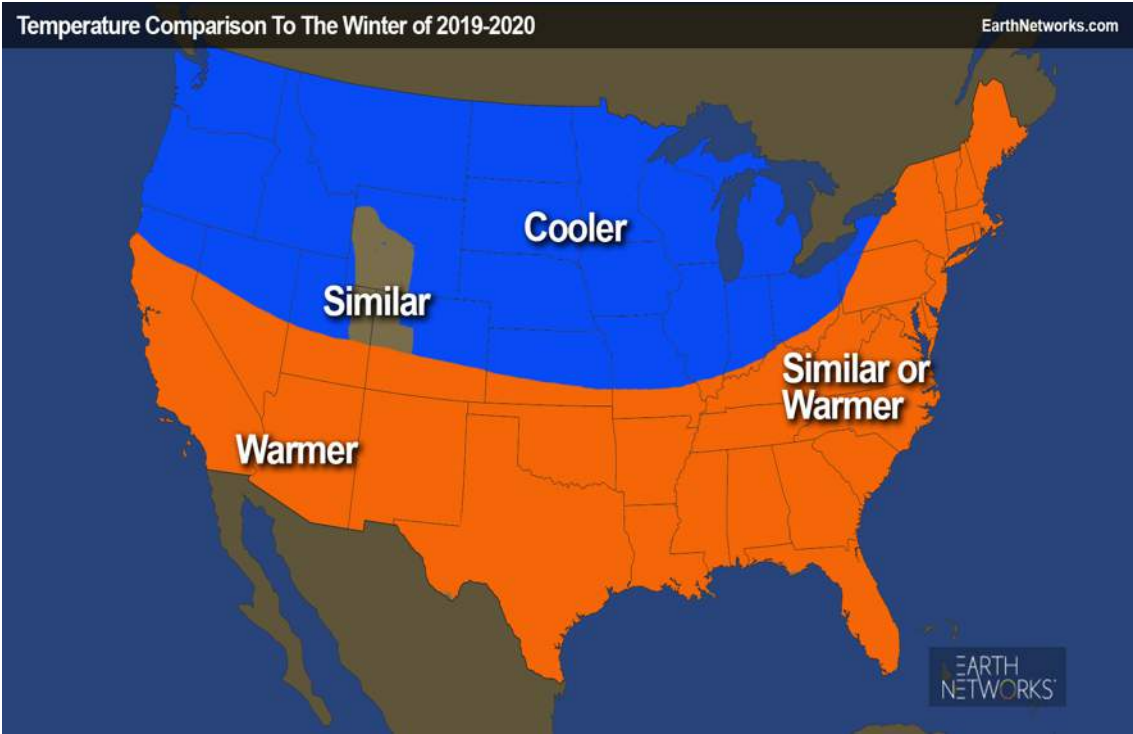
EARTH NETWORKS 2020-2021 WINTER OUTLOOK MAJOR REGIONAL IMPACT POINTS - PRECIPITATION

- Drought will intensify across California, the Four Corners, Southwest and southern Rockies. Wildfire danger will be significant during any Santa Ana wind events.
- More snow than average expected for the Cascades, northern Rockies, northern Plains and Minnesota Arrowhead. The Northwest Coast will see more rain than average.
- Active storm track for the Ohio and Tennessee valleys and Great Lakes. Less snow than average for the Ohio Valley but near to above average snow likely for the Great Lakes.
- Upstate New York and interior New England will see more snow than average.
- Southern Tier and Interstate 95 corridor will see a drier than average winter.

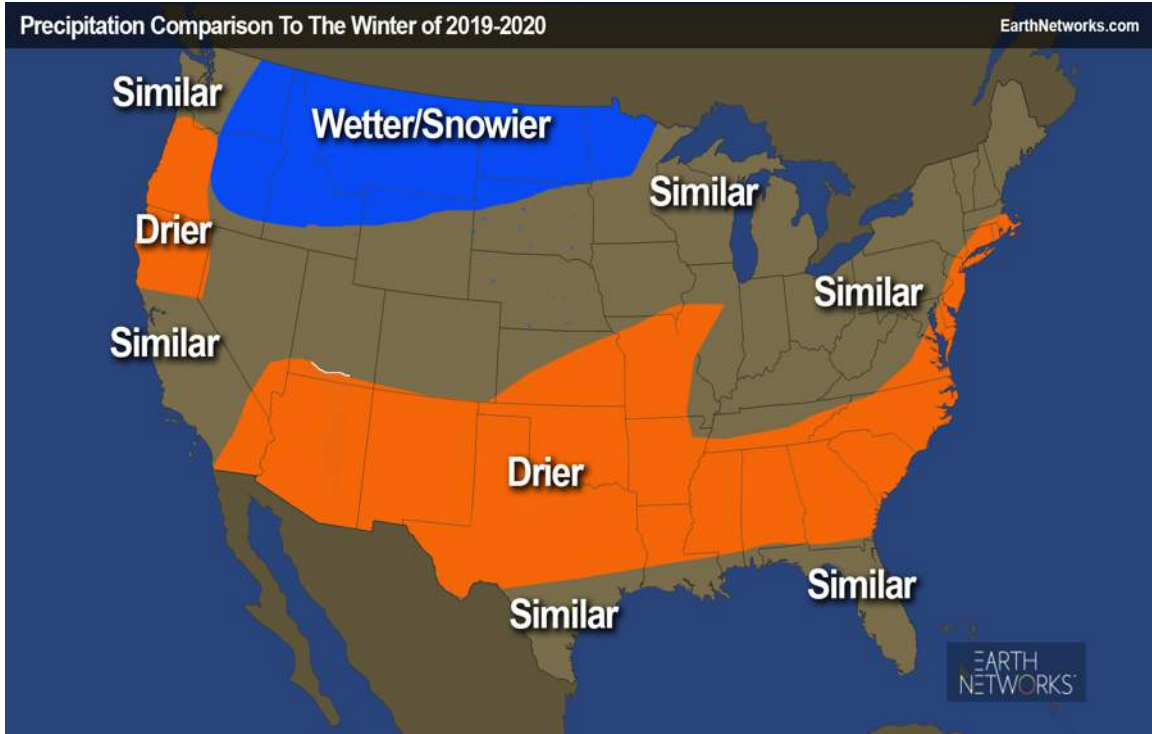


HOW WILL THIS WINTER COMPARE TO LAST YEAR?

TEMPERATURES

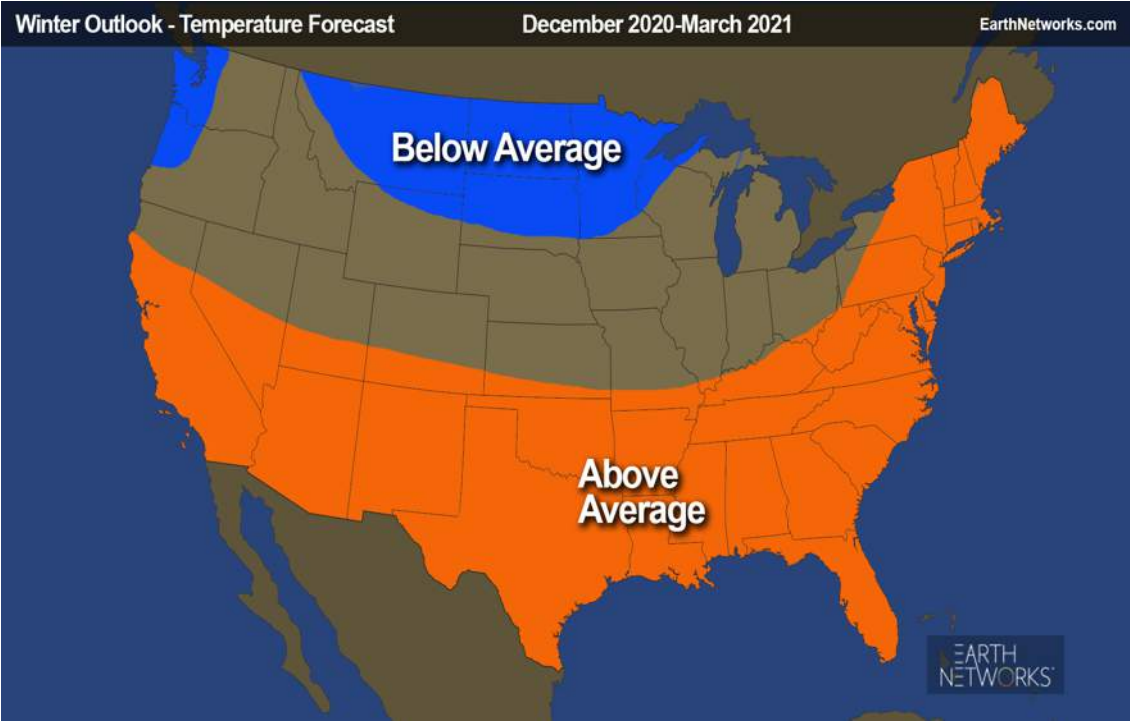


PRECIPITATION

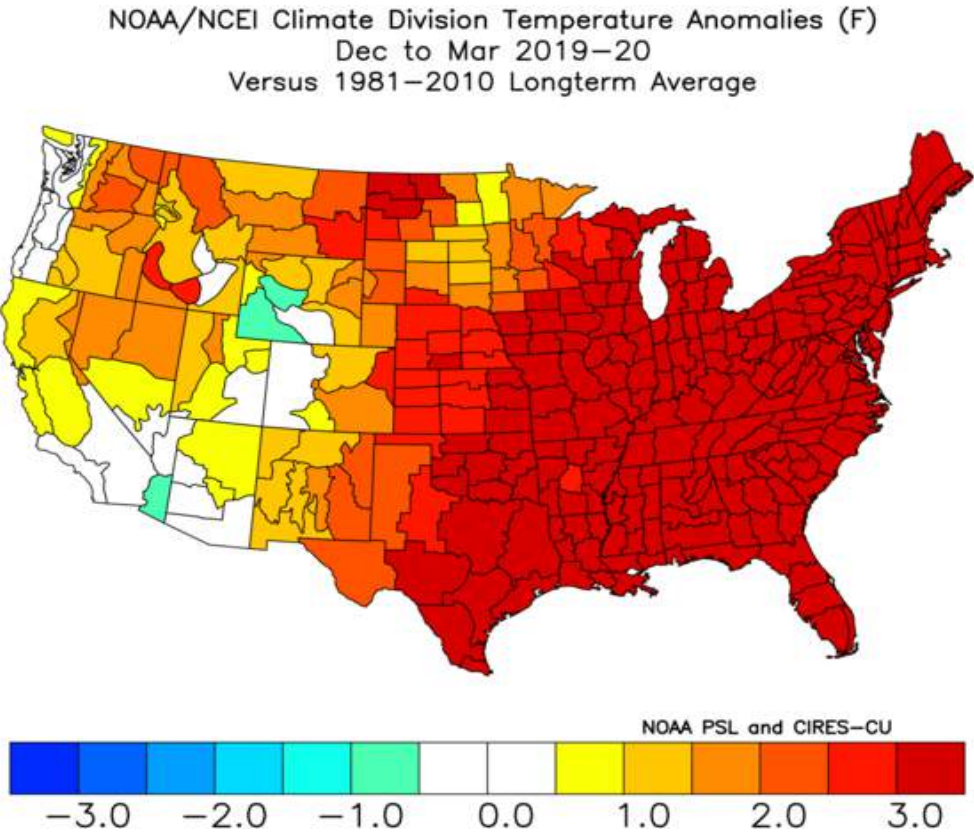


HOW WILL THIS WINTER'S TEMPERATURES COMPARE TO LAST YEAR?

THIS WINTER'S OUTLOOK



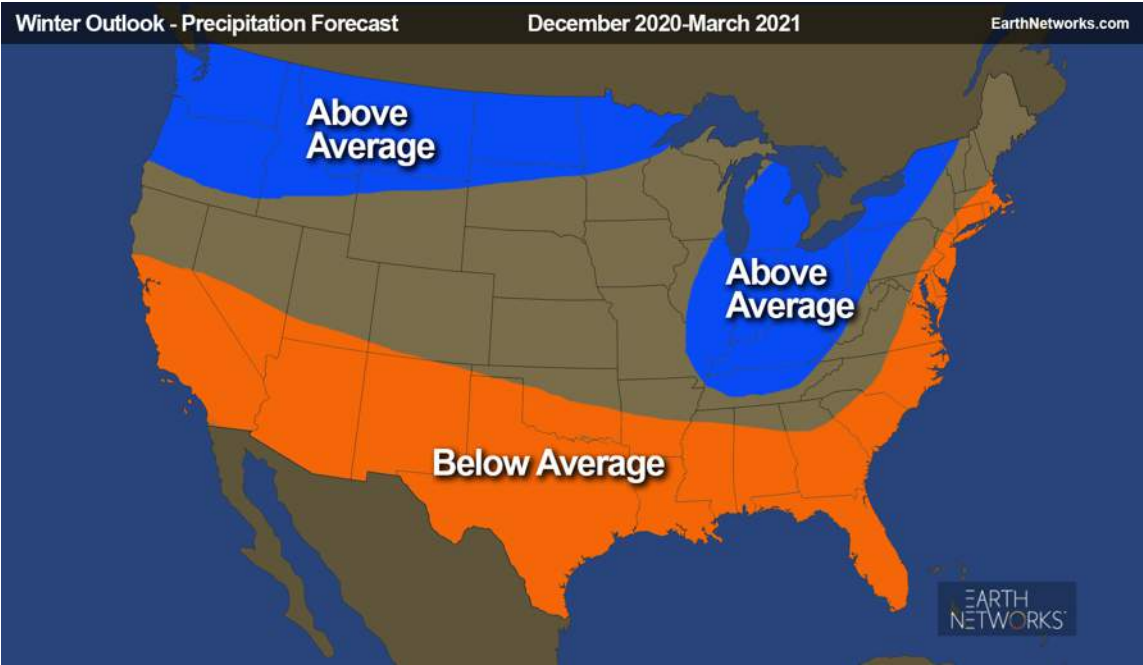
LAST WINTER'S TEMPERATURES



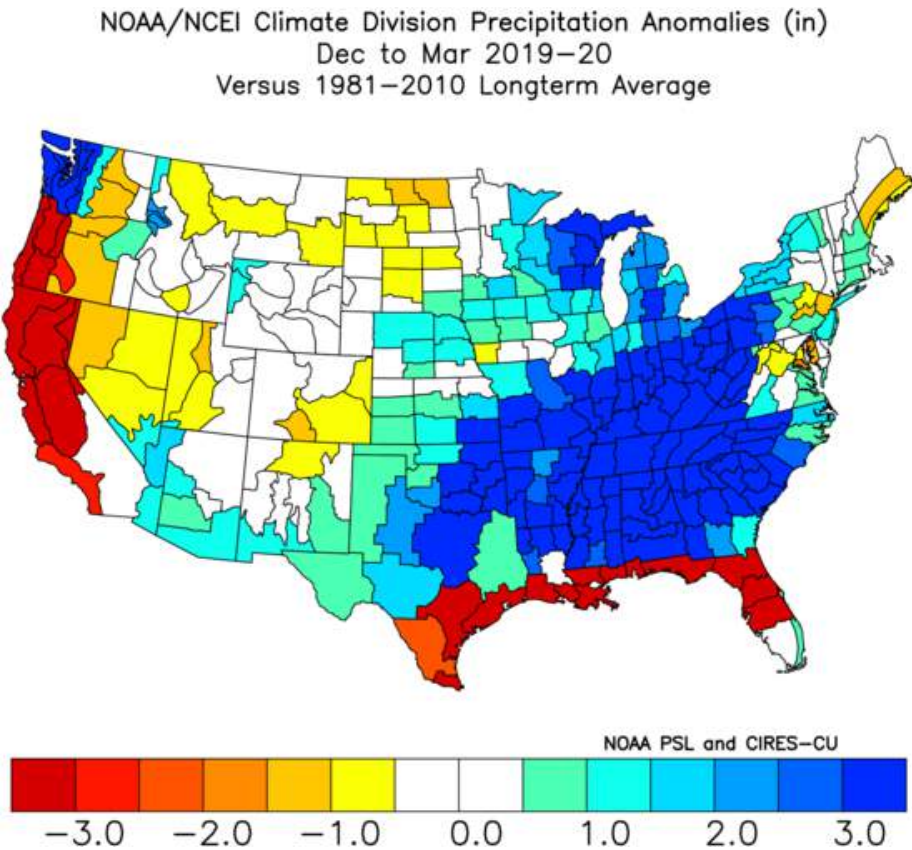
*Similar east of the Mississippi Valley, in the southern tier and California.
*Colder along the Northwest Coast, northern Rockies, northern Plains to the Minnesota Arrowhead.

HOW WILL THIS WINTER'S PRECIPITATION COMPARE TO LAST YEAR?

THIS WINTER'S OUTLOOK



LAST WINTER'S PRECIPITATION

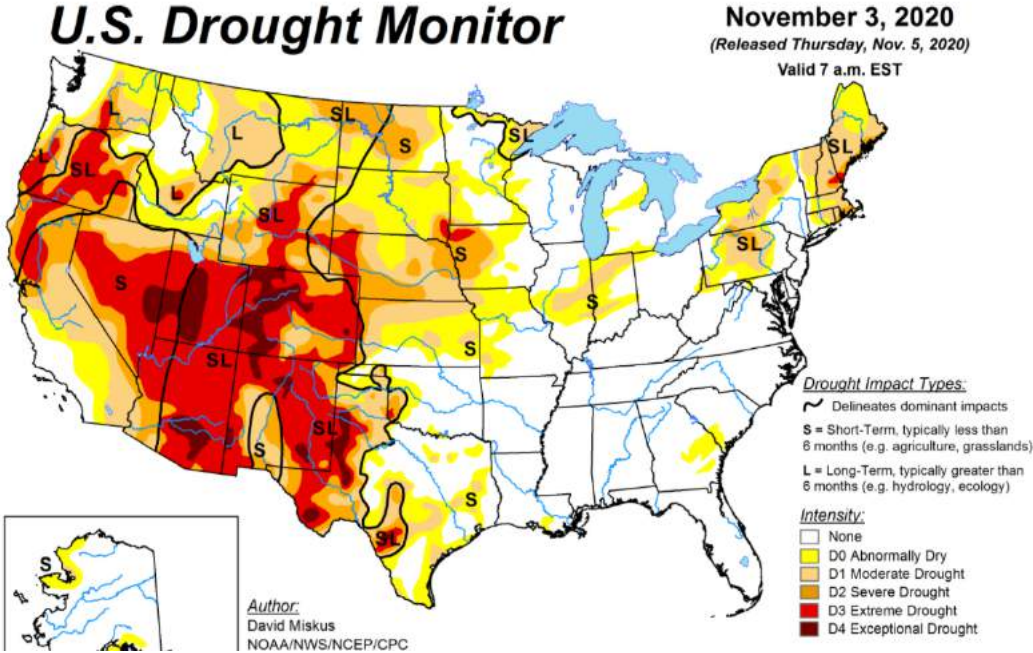


*Similar dry pattern in California to the southern Rockies.
*Similar wet pattern in the Northwest.

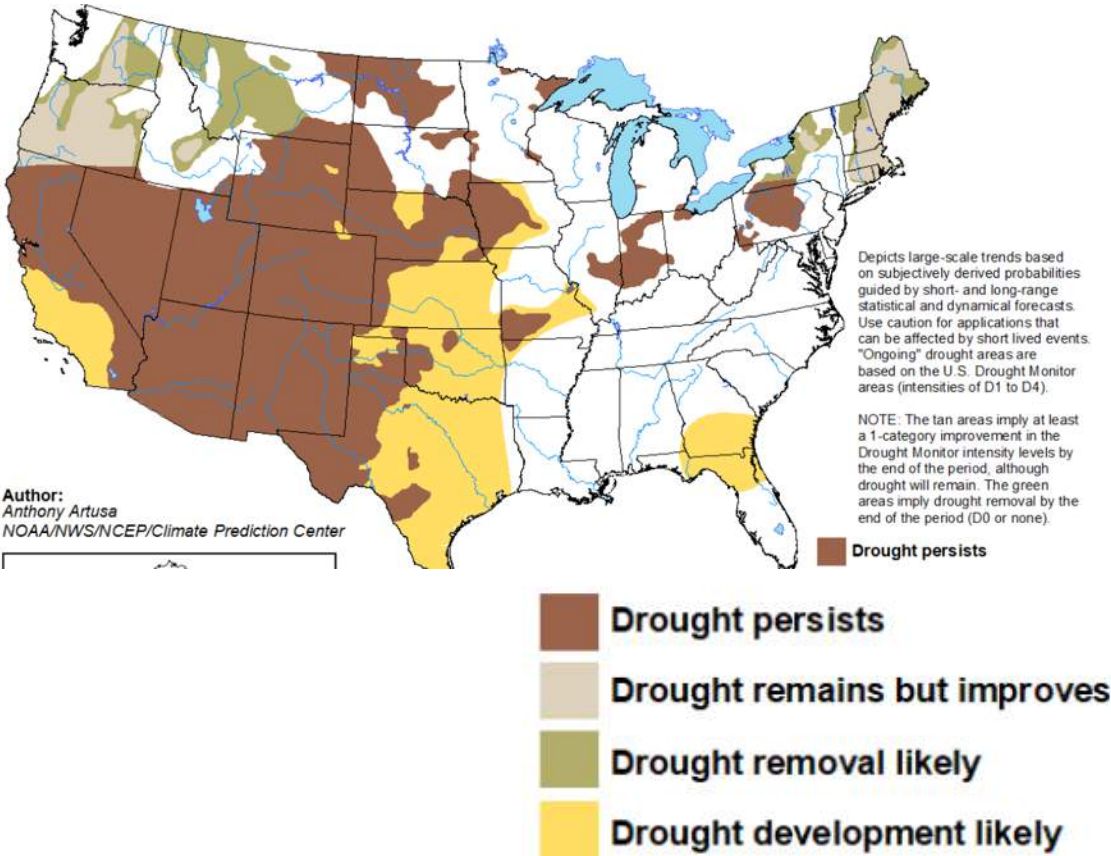
*More precipitation in the northern Rockies to northern Plains.
*Similar wet pattern in the Ohio and Tennessee valleys, drier for much of the South and East Coast.

LATEST DROUGHT INFORMATION AND EXPECTED TRENDS

CURRENT DROUGHT STATUS



DROUGHT OUTLOOK THROUGH JANUARY





THANK YOU

QUESTIONS AND COMMENTS?

Contact us at info@earthnetworks.com or **301-250-4000**

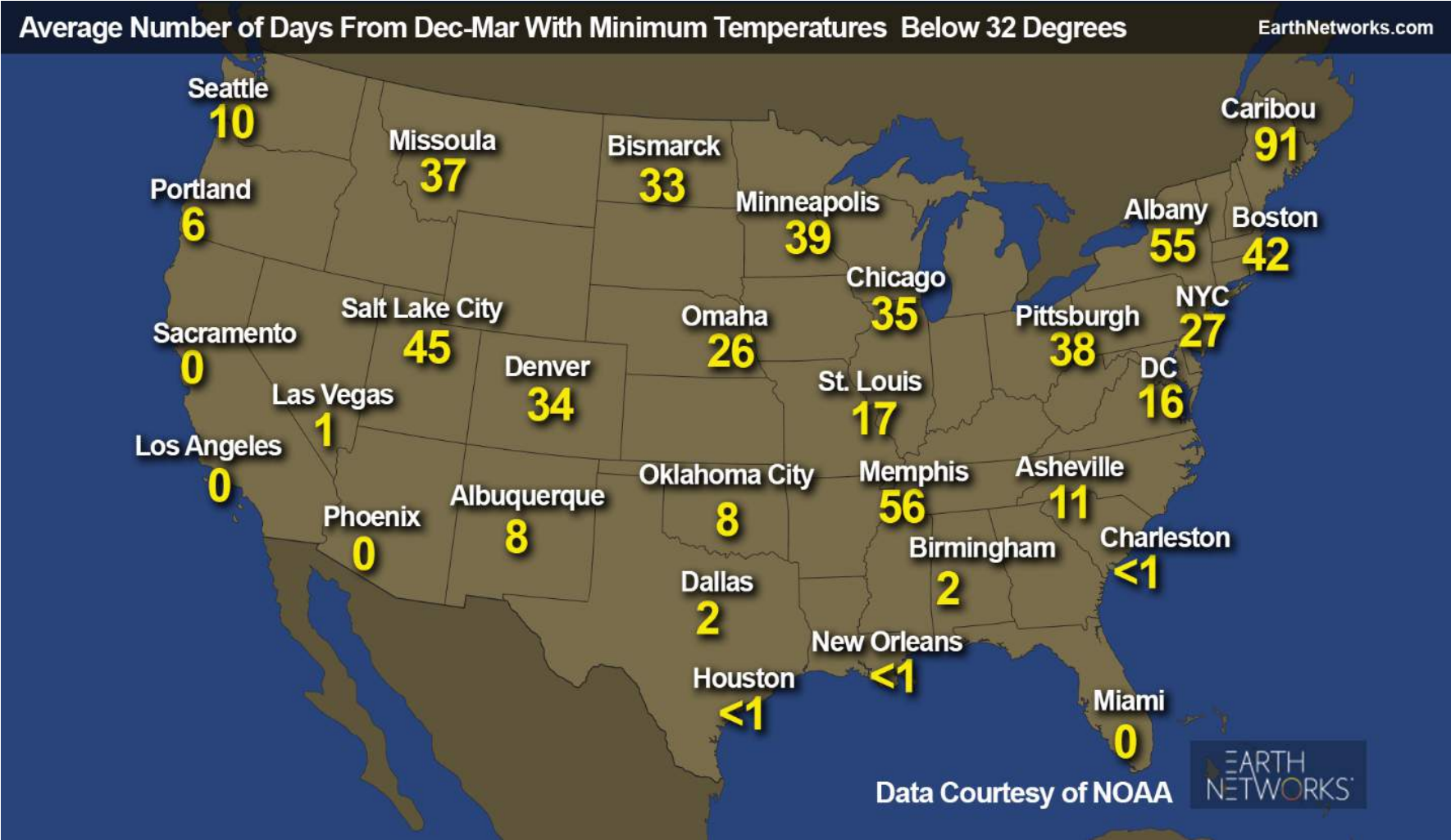
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**WEATHER
BRIEFING**

TUESDAYS AT 11:00AM ET

SIGN UP



COLD WEATHER CLIMATOLOGY



Interior Northeast, Mountain West On Average See The Most Number of Days With Minimum Temperatures Below 32 Degrees

RECENT CHANGES IN LONG-TERM WINTER COLD TRENDS

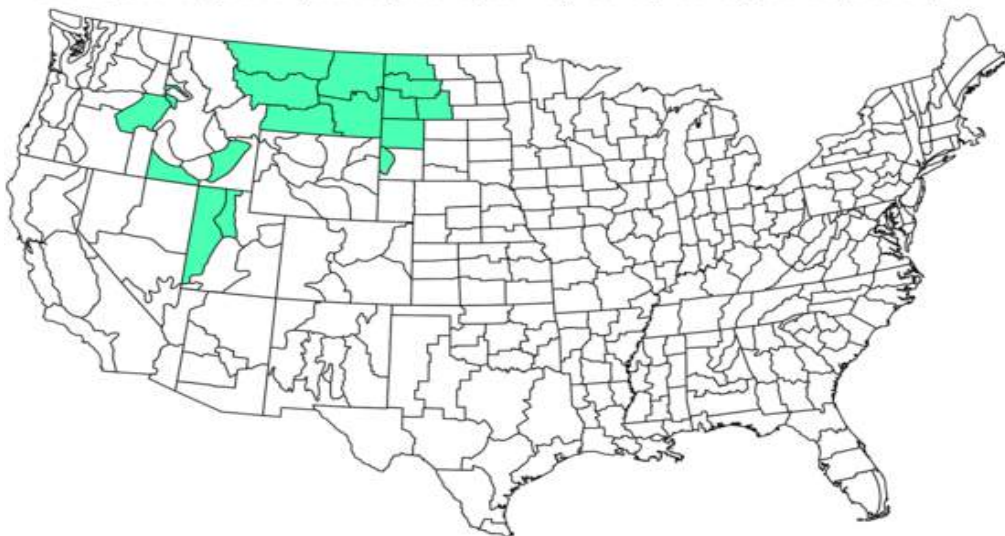


Change in average number of days in the longest streak of consecutive winter days below normal since 1970

CATALOG OF ALL KNOWN STRATOSPHERIC WARMING EVENTS AND THEIR WINTER TRENDS

TEMPERATURE TRENDS

NOAA/NCEI Climate Division Composite Temperature Anomalies (F)
Versus 1981–2010 Longterm Average
Dec to Mar 2017–18, 2018–19, 2012–13, 2009–10, 2008–09, 2006–07, 2005–06, 2003–04,
2002–03, 2001–02, 2000–01, 1999–00, 1998–99, 1987–88, 1988–89, 1986–87, 1984–85, 1983–84, 1981–



PRECIPITATION TRENDS

NOAA/NCEI Climate Division Composite Precipitation Anomalies (in)
Versus 1981–2010 Longterm Average
Dec to Mar 2017–18, 2018–19, 2012–13, 2009–10, 2008–09, 2006–07, 2005–06, 2003–04,
2002–03, 2001–02, 2000–01, 1999–00, 1998–99, 1987–88, 1988–89, 1986–87, 1984–85, 1983–84, 1981–

