

Colorado Climate Center – *WATF Climate Update*

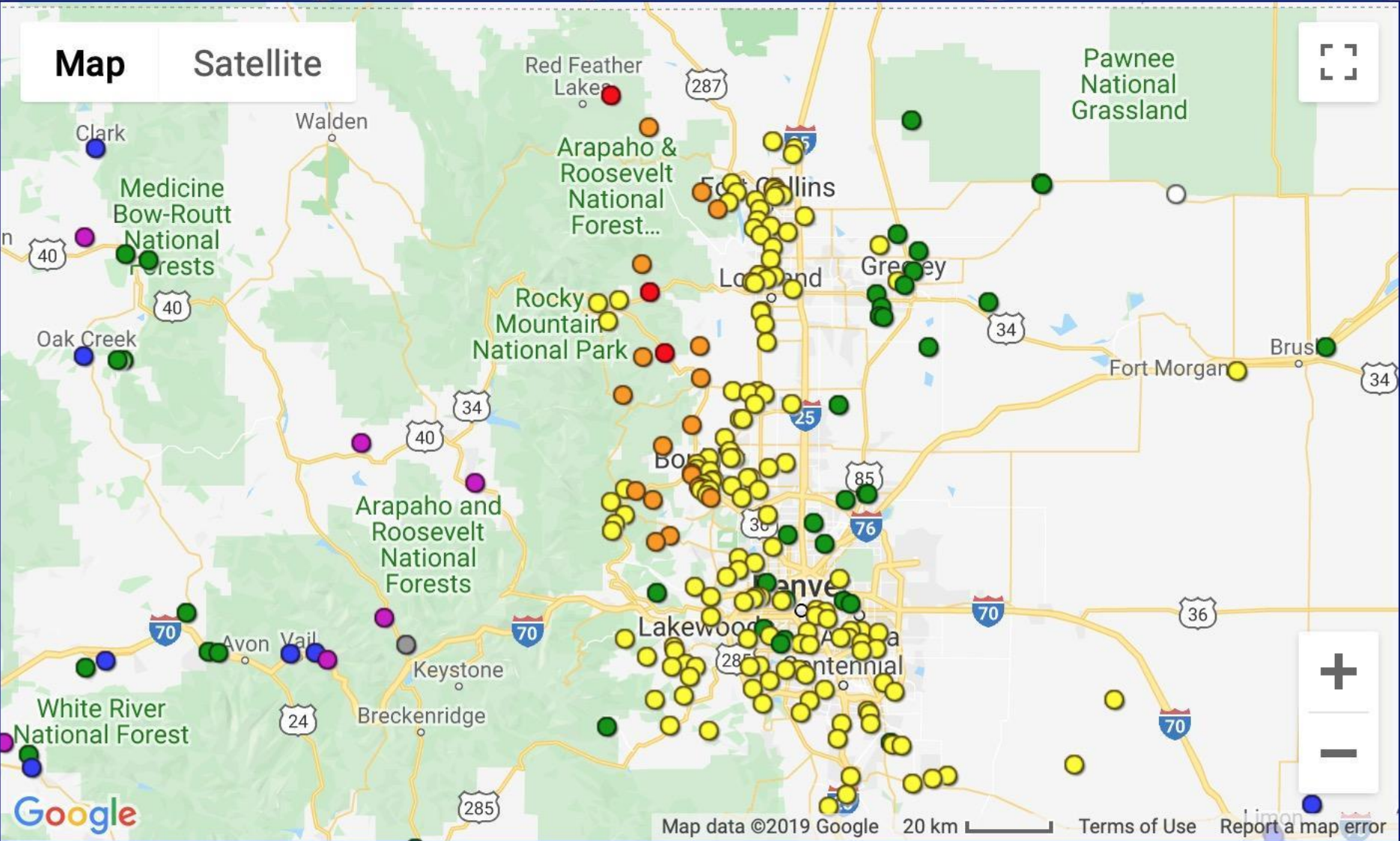
Becky Bolinger

Water Availability Task Force

November 26, 2019











ATMOSPHERIC SCIENCE
COLORADO STATE UNIVERSITY



 **CoCoRaHS** 
Snowfall Map

Date: 11/26/2019
 Country: USA
 State: CO
 Units: US Units

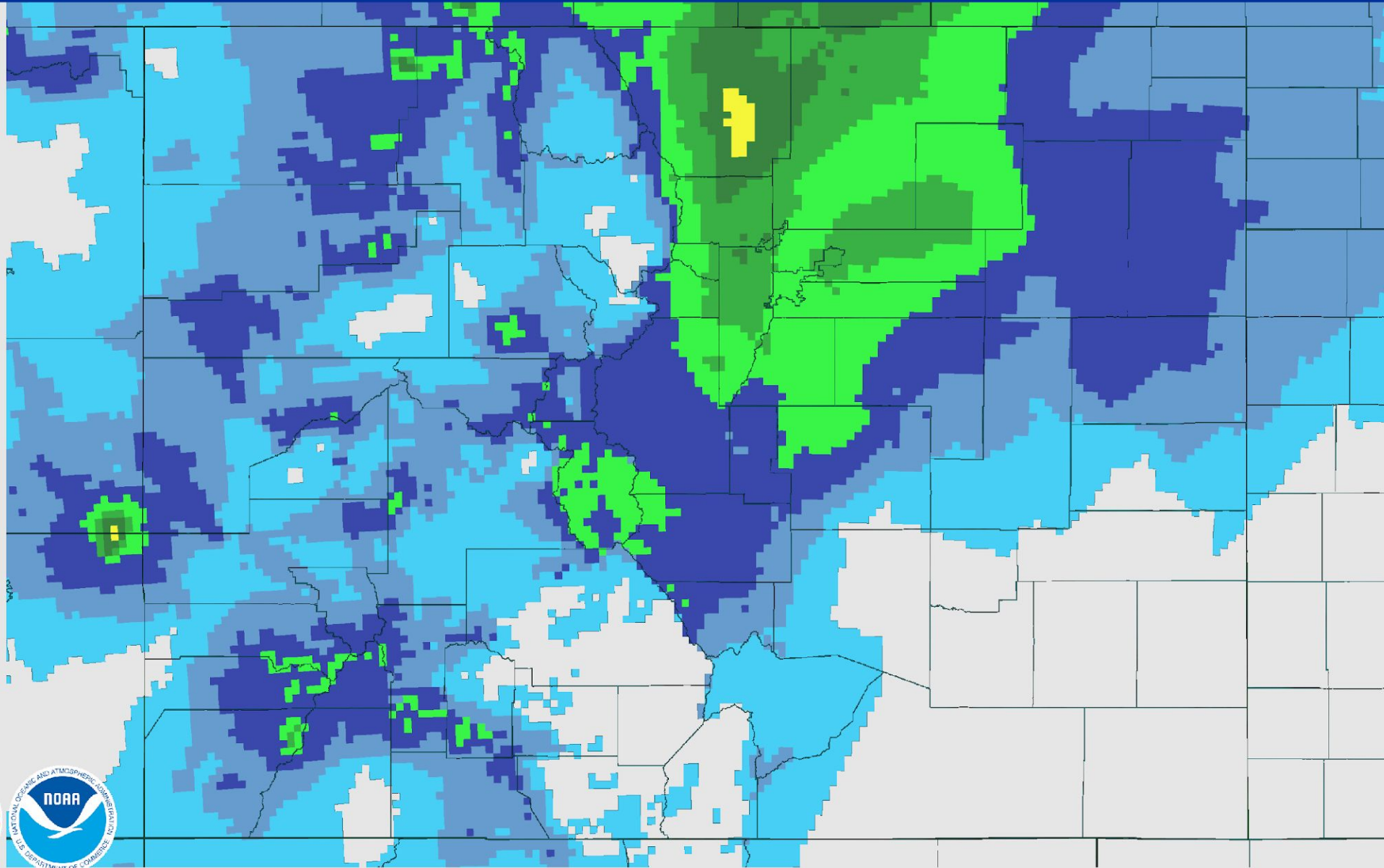
-  Zero
-  Trace
-  0.1 - 1.6 in.
-  1.7 - 3.2 in.
-  3.3 - 8.0 in.
-  8.1 - 19.2 in.
-  19.3 - 28.8 in.
-  28.9 - 32.0 in.

Show US Active Fire Perimeters
 Source: [GEOMAC](#). GEOMAC wildfire data layers courtesy of the [U.S. Geological Survey](#).

November 26, 2019 1-Day Observed Precipitation

Created on: November 26, 2019 - 16:14 UTC

Valid on: November 26, 2019 12:00 UTC



In Water Year 2019, Three New State Records Were Established!



On March 13, 2019 a bomb cyclone passed over Colorado, bringing hurricane-force winds, snowfall, and over 2 inches of precipitation to the Front Range and Eastern Plains. In Colorado Springs, a wind gust of 96 mph was reported, a new all-time record for that location. But most notable about this event was the center of the low pressure system. As it passed over southeast CO, Lamar reported a sea-level pressure of 970.4 mb, a new all-time state record low pressure, beating the old record by almost 5 millibars!

Read the statistics from the bomb cyclone here:
https://climate.colostate.edu/pdfs/storm_records.pdf



Late Friday afternoon on July 19, 2019, the high temperature at John Martin Dam topped out at 115°F. Observers came in to work on Monday morning to find the temperature observation literally off the charts on their thermograph and estimated it at 115°F on the July 20 observation report – one degree higher than our state’s previous all-time record high temperature.

Read the full report of this state record here: <https://tinyurl.com/COTempRecord>



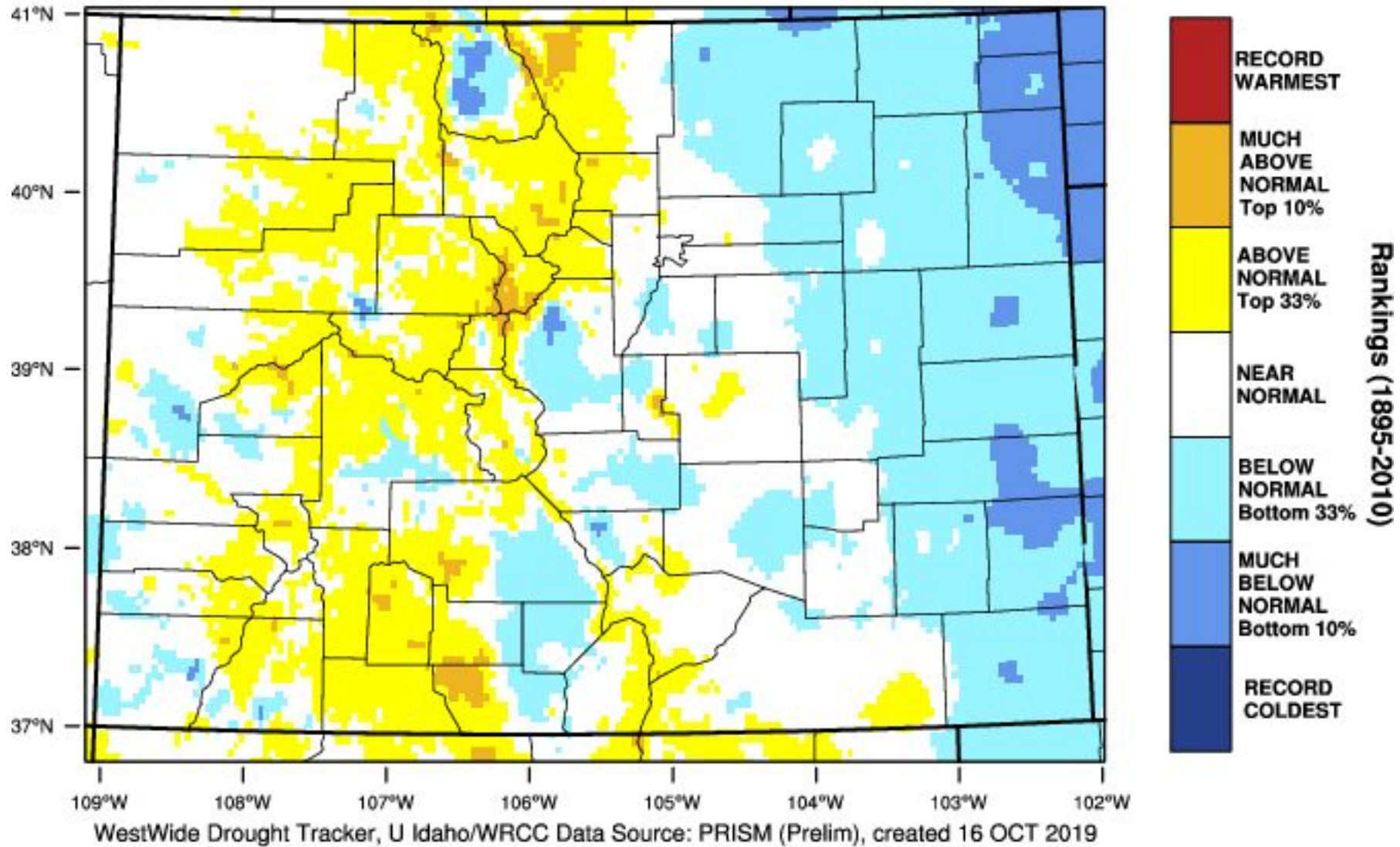
On the afternoon of August 13, 2019 the National Weather Service in Goodland warned of severe thunderstorms over eastern CO, capable of producing very large hail. Near the town of Bethune, one family watched as several chunks of large hail bounced in their front yard. While the initial size of the largest was around 5.5”, some melting occurred before it was placed in the freezer. The next day, an official measurement was taken, verifying that the diameter of 4.83” was a new record for largest hail stone ever measured in the state.

Read the full report of this state record here: <https://tinyurl.com/COHailRecord>

Water Year 2019
Colorado’s Climate in Review...

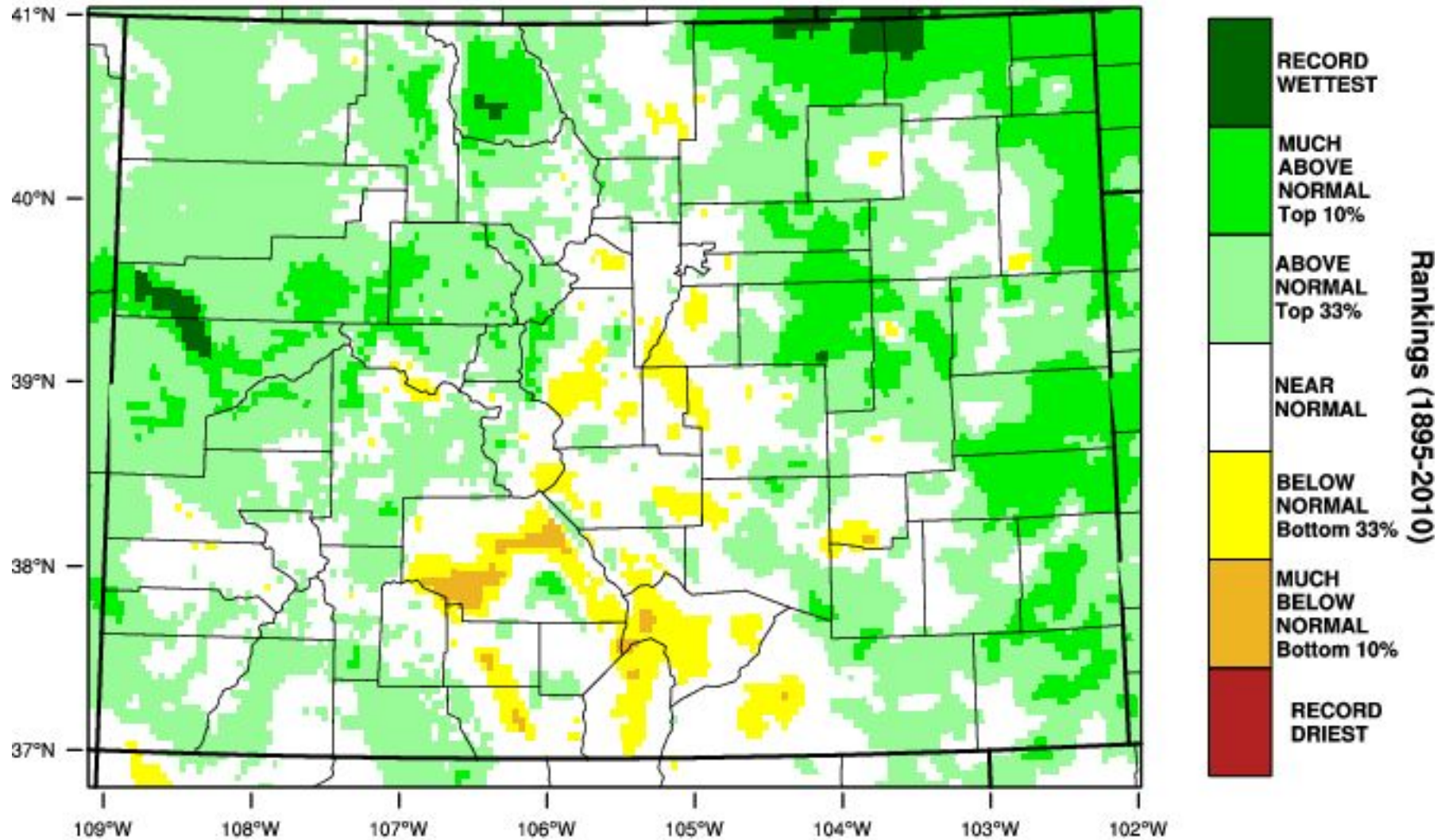


Colorado - Mean Temperature October-September 2019 Percentile



Colorado - Precipitation

October-September 2019 Percentile



WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 16 OCT 2019



CO STATEWIDE RANKING in 125-YEAR

MONTH	T RANK	P RANK
Oct 2018	31 st coolest	14 th wettest
Nov 2018	41 st coolest	near average
Dec 2018	near average	31 st driest
Jan 2019	40 th warmest	29 th wettest
Feb 2019	29 th coolest	17 th wettest
Mar 2019	near average	5th wettest
Apr 2019	18 th warmest	near average
May 2019	5th coolest	15 th wettest
Jun 2019	near average	42 nd wettest
Jul 2019	22 nd warmest	29 th driest
Aug 2019	8 th warmest	23 rd driest
Sep 2019	record warmest	21 st driest
Water Year	near average	34 th wettest

From NOAA NCEI's National Temperature and Precipitation Rank

Maps:

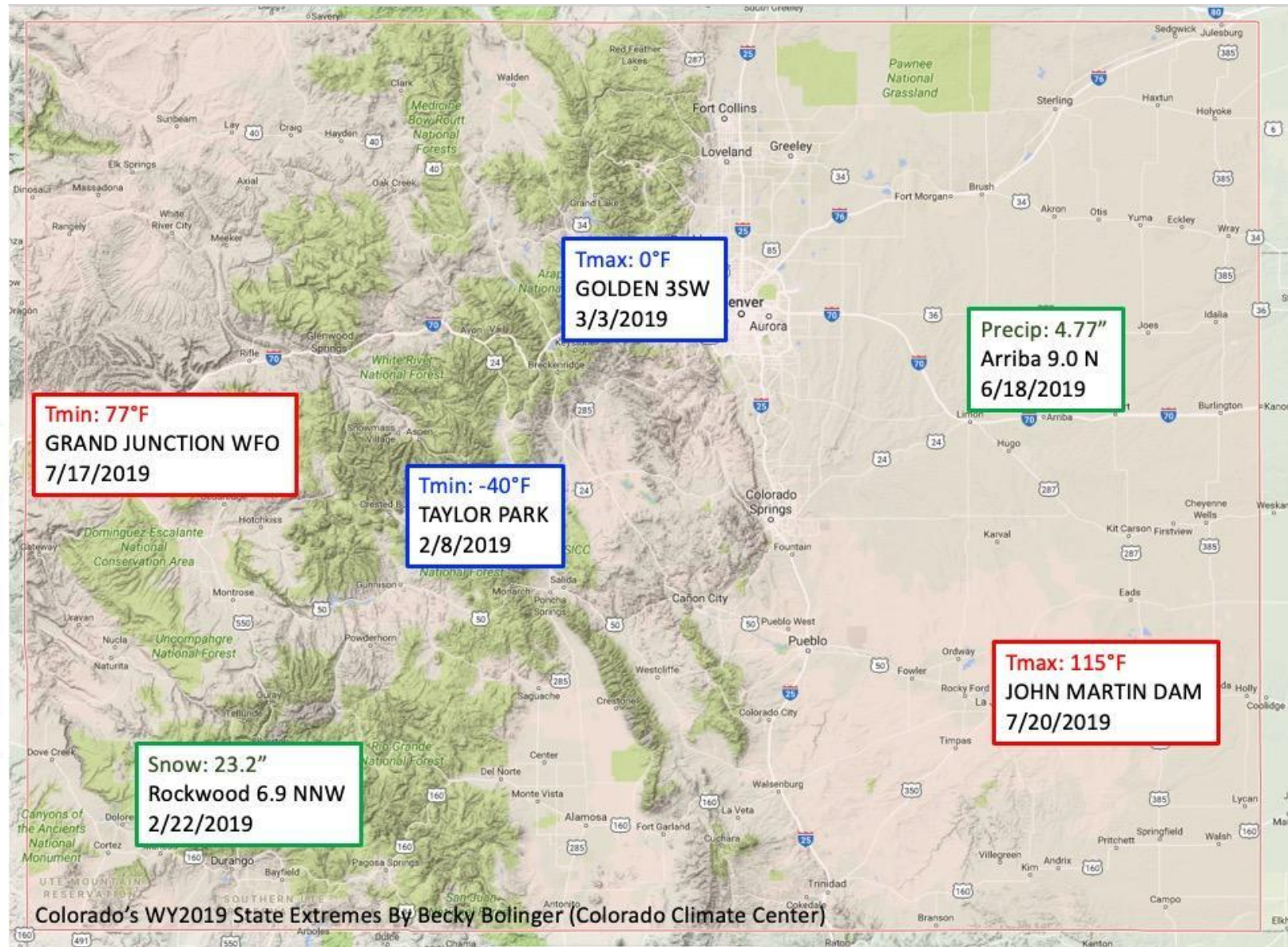
www.ncdc.noaa.gov/sotc/national



NUMBER OF DAILY AND MONTHLY STATION RECORDS BROKEN in CO

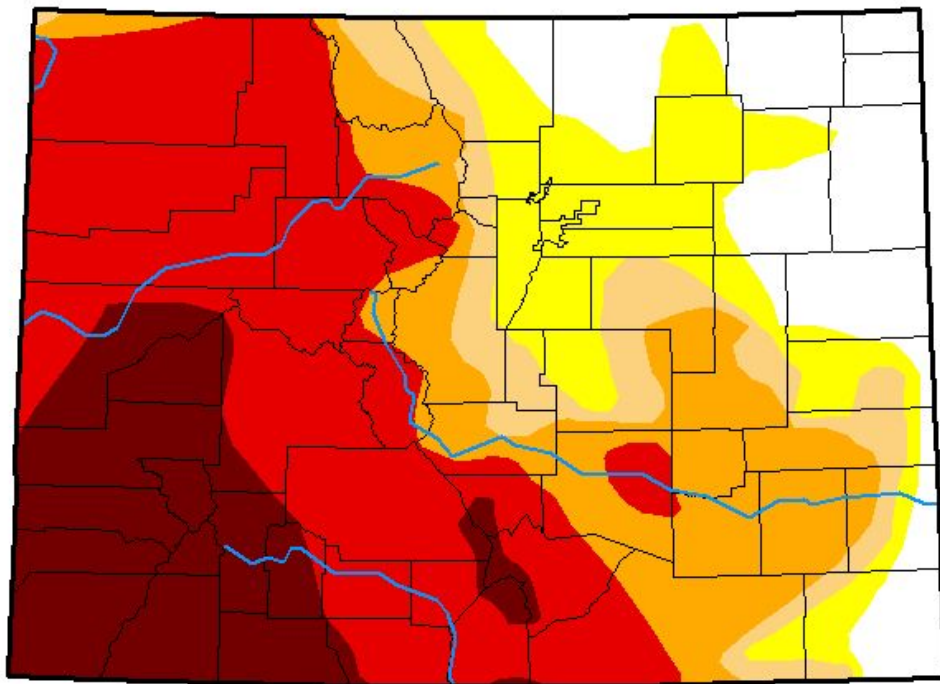
Weather Record Broken	Record broken for a day	Record broken for a month
Highest Max Temperature	555	33
Highest Min Temperature	1372	78
Lowest Max Temperature	1375	20
Lowest Min Temperature	718	5
Highest Precipitation	1275	46
Highest Snowfall	365	9

From NOAA NCEI's Select U.S. Records: www.ncdc.noaa.gov/extremes/records



U.S. Drought Monitor Colorado

October 2, 2018
(Released Thursday, Oct. 4, 2018)
Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	14.19	85.81	72.30	64.41	48.47	16.21
Last Week 09-25-2018	14.19	85.81	72.30	64.41	48.47	16.21
3 Months Ago 07-03-2018	20.46	79.54	67.30	52.31	36.46	8.81
Start of Calendar Year 01-02-2018	6.57	93.43	33.53	7.27	0.00	0.00
Start of Water Year 09-25-2018	14.19	85.81	72.30	64.41	48.47	16.21
One Year Ago 10-03-2017	70.54	29.46	3.70	0.00	0.00	0.00

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:

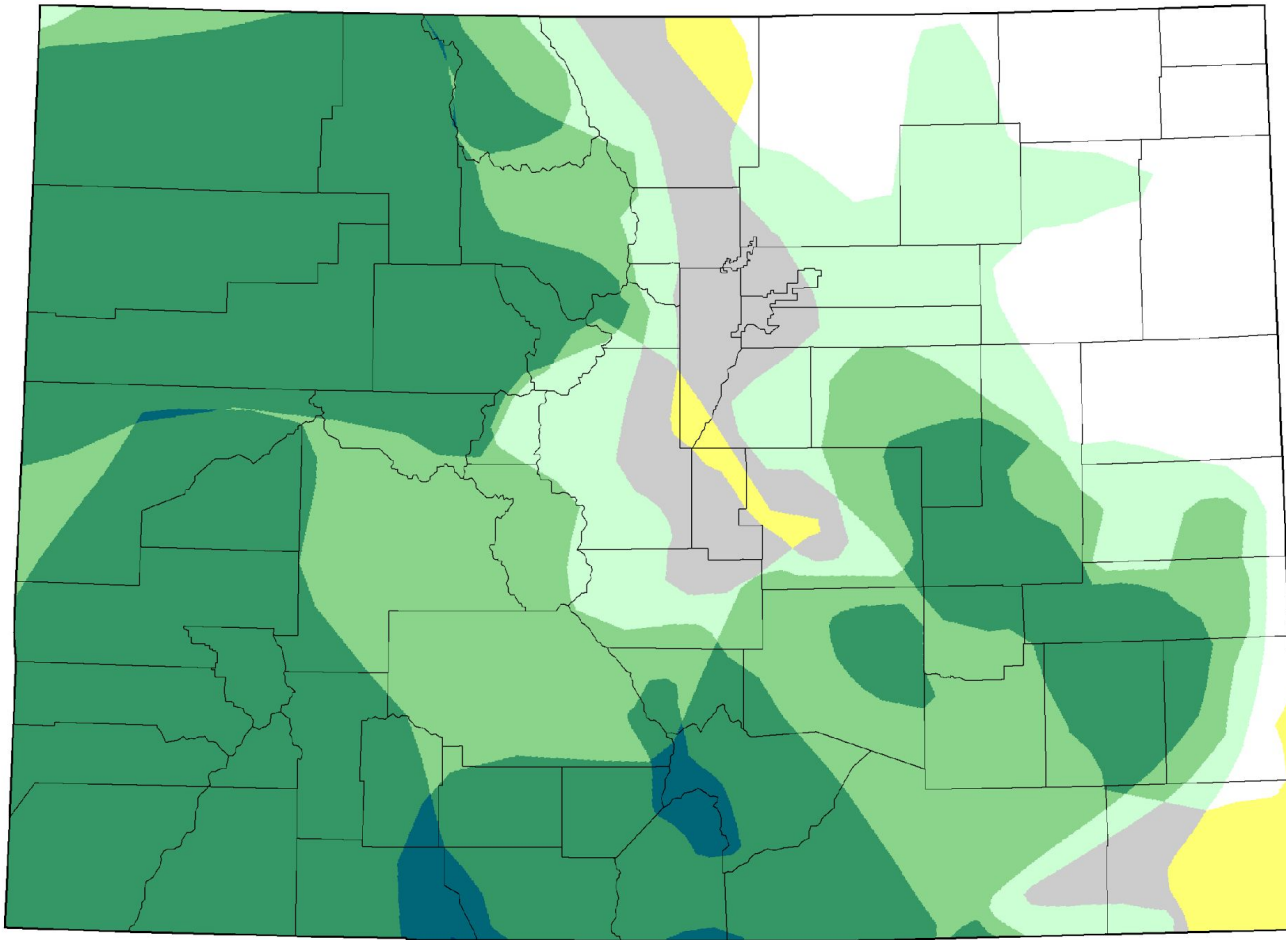
David Miskus
NOAA/NWS/NCEP/CPC



<http://droughtmonitor.unl.edu/>



U.S. Drought Monitor Class Change - Colorado 1 Year



October 1, 2019
compared to
October 2, 2018

droughtmonitor.unl.edu

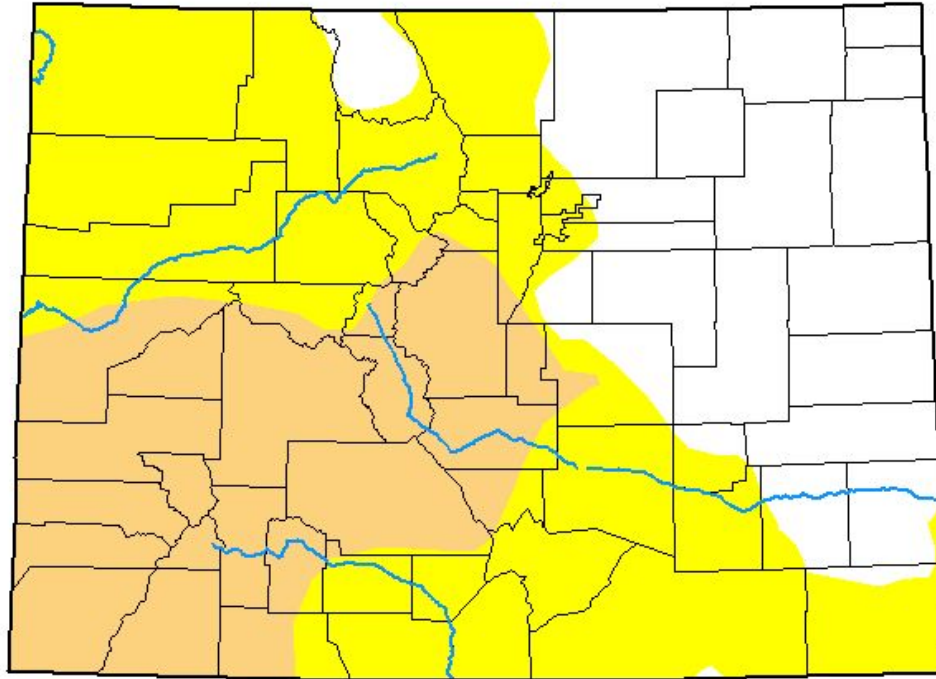


- 5 Class Degradation
- 4 Class Degradation
- 3 Class Degradation
- 2 Class Degradation
- 1 Class Degradation
- No Change
- 1 Class Improvement
- 2 Class Improvement
- 3 Class Improvement
- 4 Class Improvement
- 5 Class Improvement



U.S. Drought Monitor Colorado

October 1, 2019
(Released Thursday, Oct. 3, 2019)
Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	30.14	69.86	27.53	0.00	0.00	0.00
Last Week <i>09-24-2019</i>	34.06	65.94	10.81	0.00	0.00	0.00
3 Months Ago <i>07-02-2019</i>	100.00	0.00	0.00	0.00	0.00	0.00
Start of Calendar Year <i>01-01-2019</i>	17.94	82.06	66.26	54.91	27.11	11.22
Start of Water Year <i>10-01-2019</i>	30.14	69.86	27.53	0.00	0.00	0.00
One Year Ago <i>10-02-2018</i>	14.19	85.81	72.30	64.41	48.47	16.21

Intensity:

- None
- 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:

Brian Fuchs
National Drought Mitigation Center



droughtmonitor.unl.edu





2020 Water Year To Date

temperature, precipitation,
anomalies, drought conditions



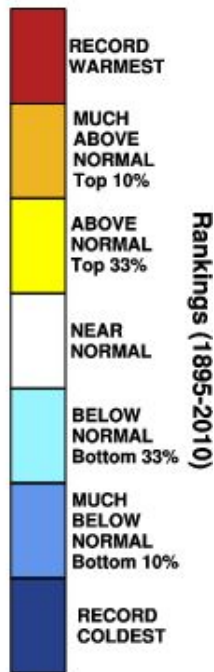
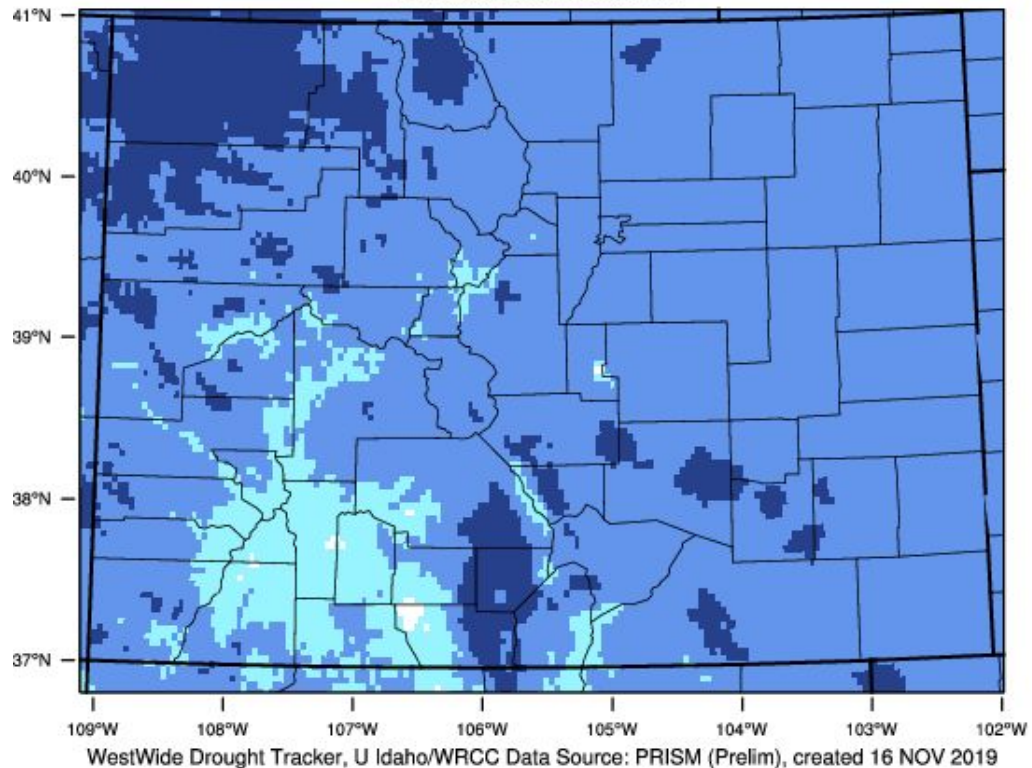
Temperature and precipitation rank maps currently unavailable

** from warmest September on record to 4th
coldest October on record is one of the largest
rank jumps ever, and also one of the biggest
changes in monthly average temperature **



Colorado - Mean Temperature

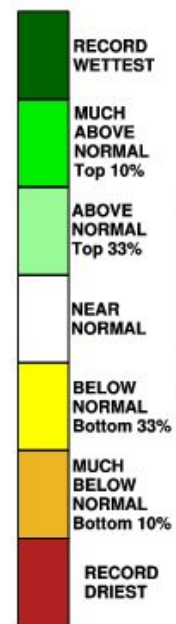
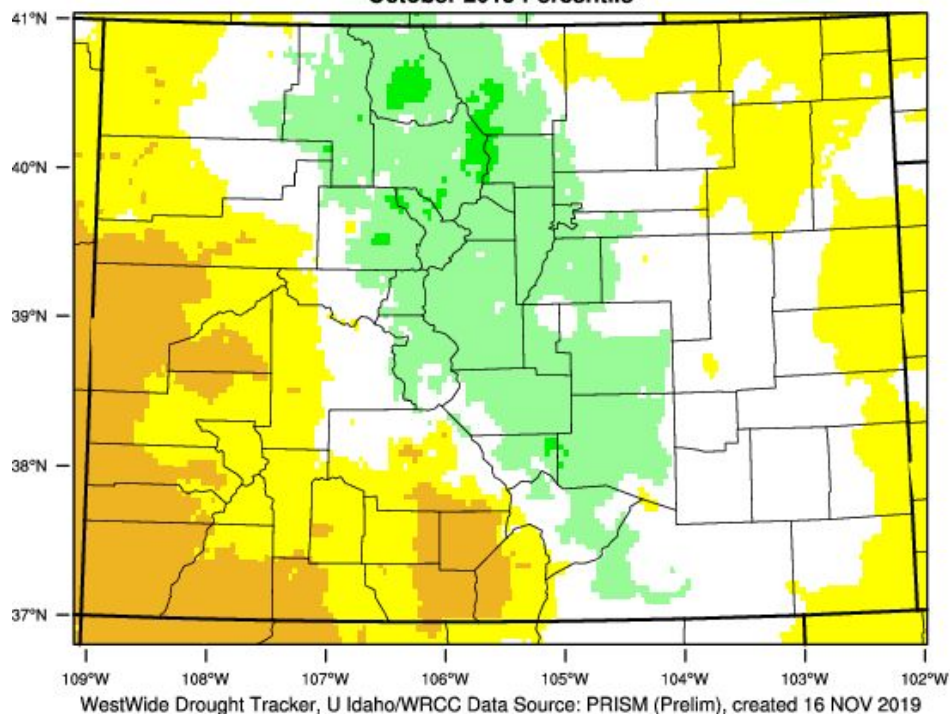
October 2019 Percentile



Rankings (1895-2010)

Colorado - Precipitation

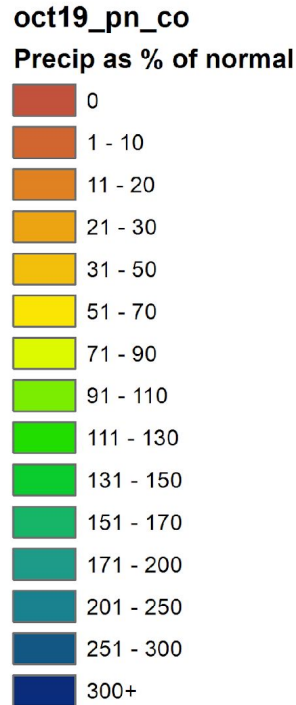
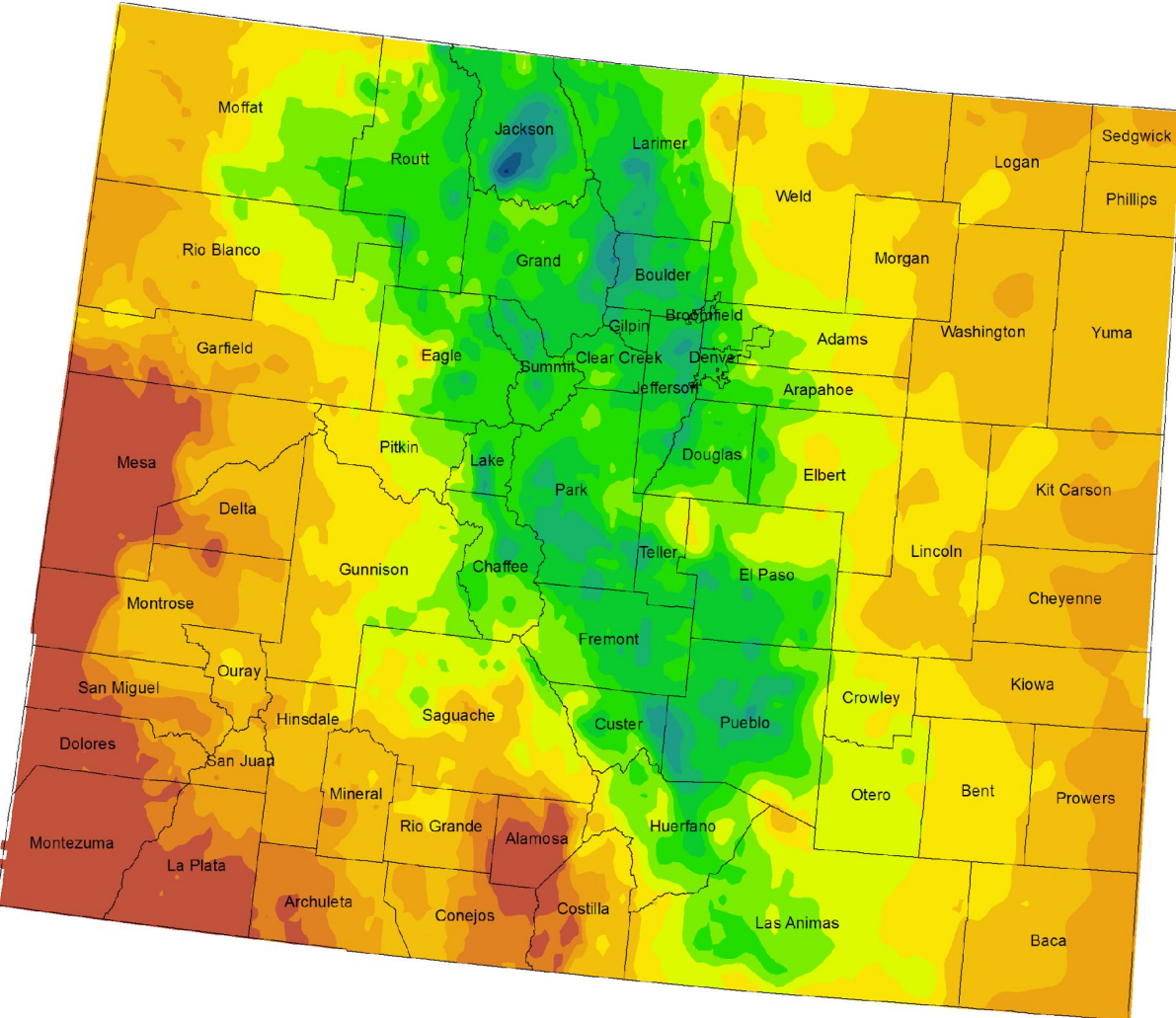
October 2019 Percentile



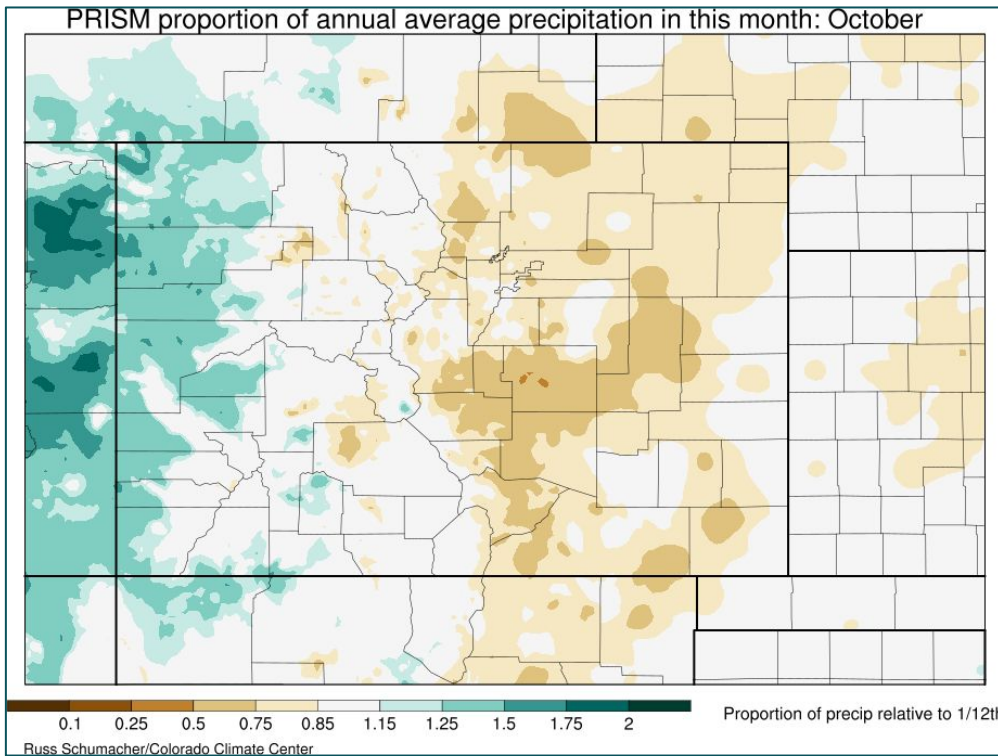
Rankings (1895-2010)



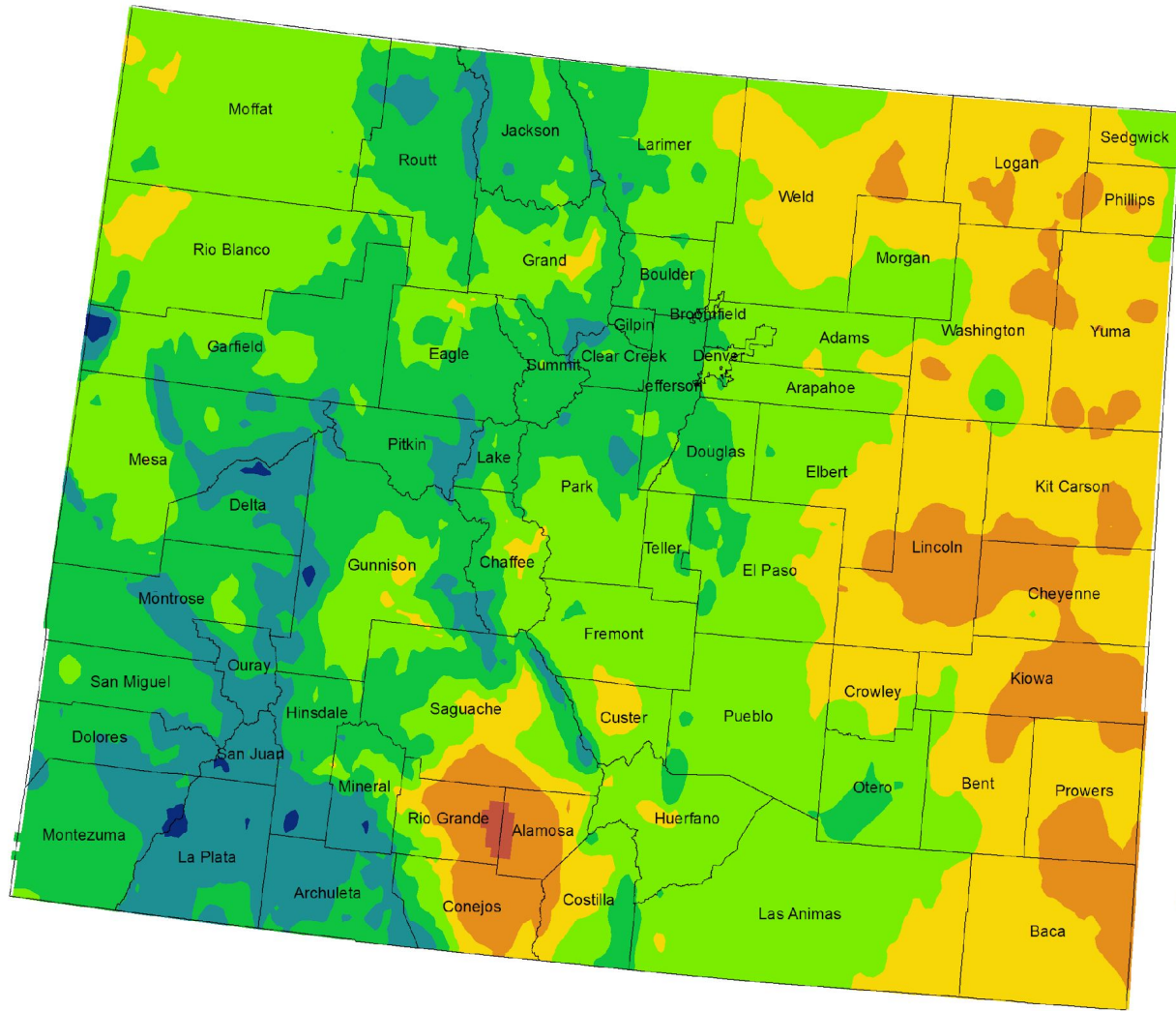
Colorado October 2019 Precipitation as a Percentage of Normal



Data from PRISM Climate Group

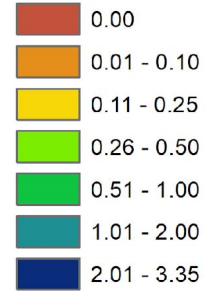


Colorado Month to Date Precipitation 1 - 24 November 2019



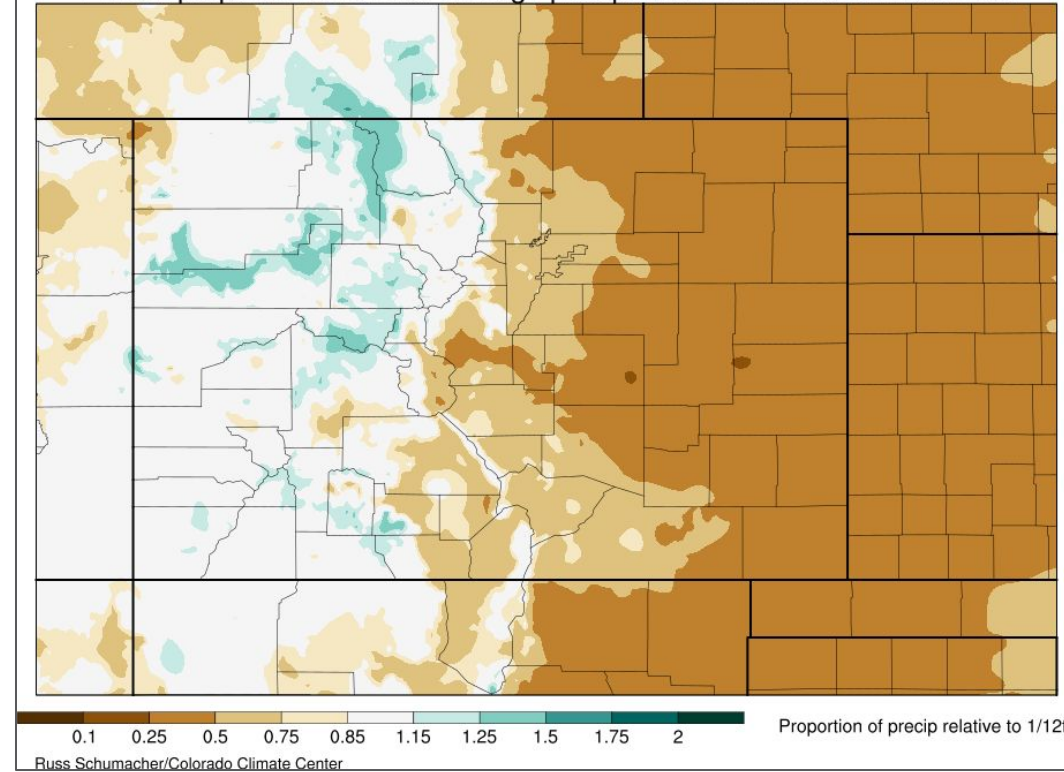
01_24nov19_CO

Precp (inches)



Data from PRISM Climate Group

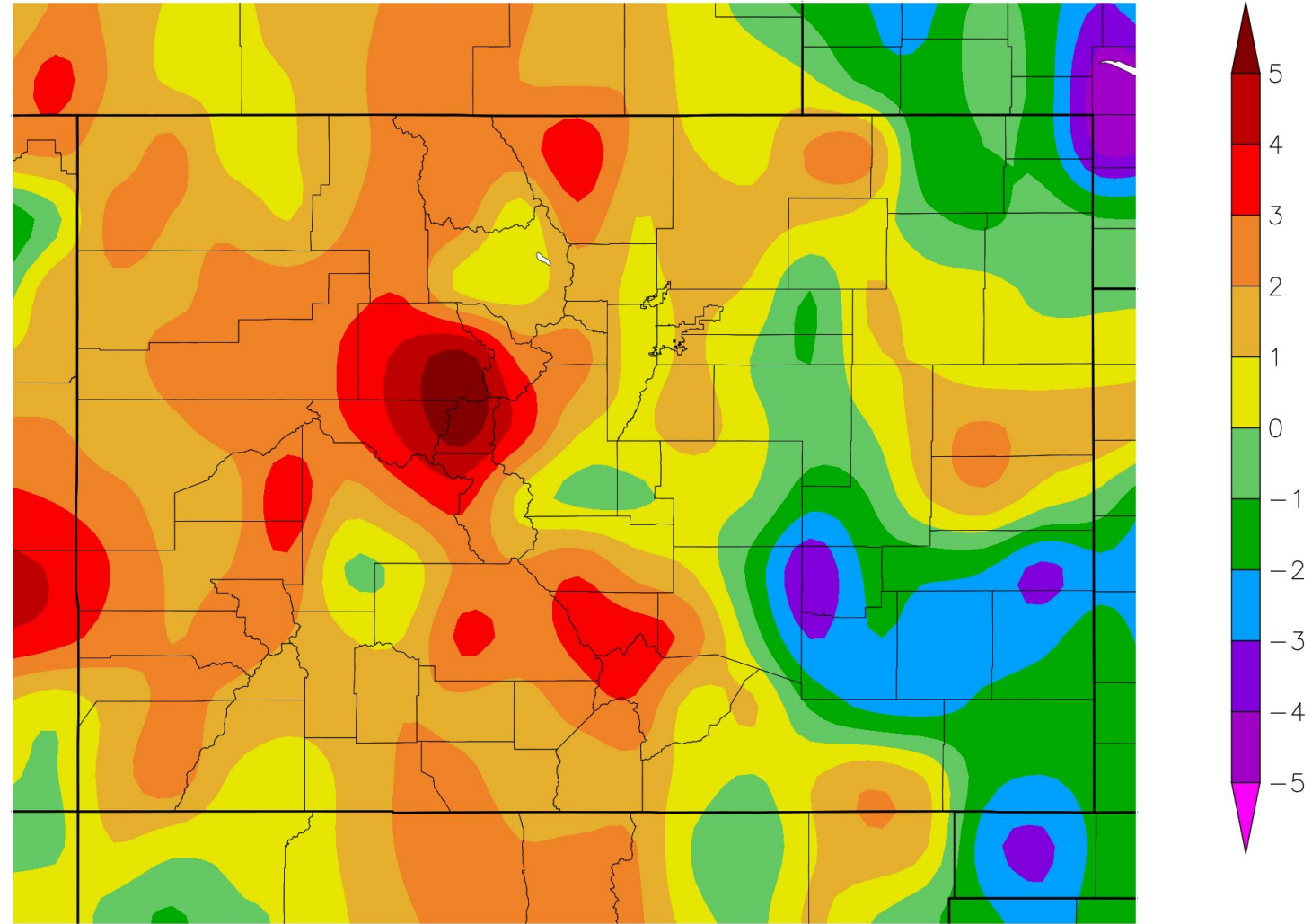
PRISM proportion of annual average precipitation in this month: November



0.1 0.25 0.5 0.75 0.85 1.15 1.25 1.5 1.75 2 Proportion of precip relative to 1/12th
Russ Schumacher/Colorado Climate Center



Departure from Normal Temperature (F) 11/1/2019 – 11/25/2019

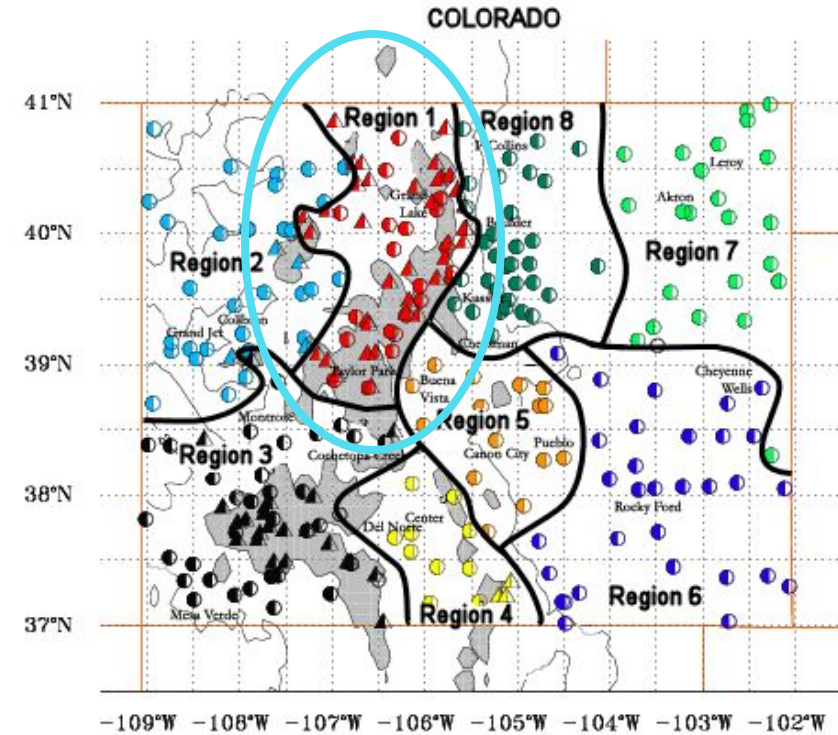
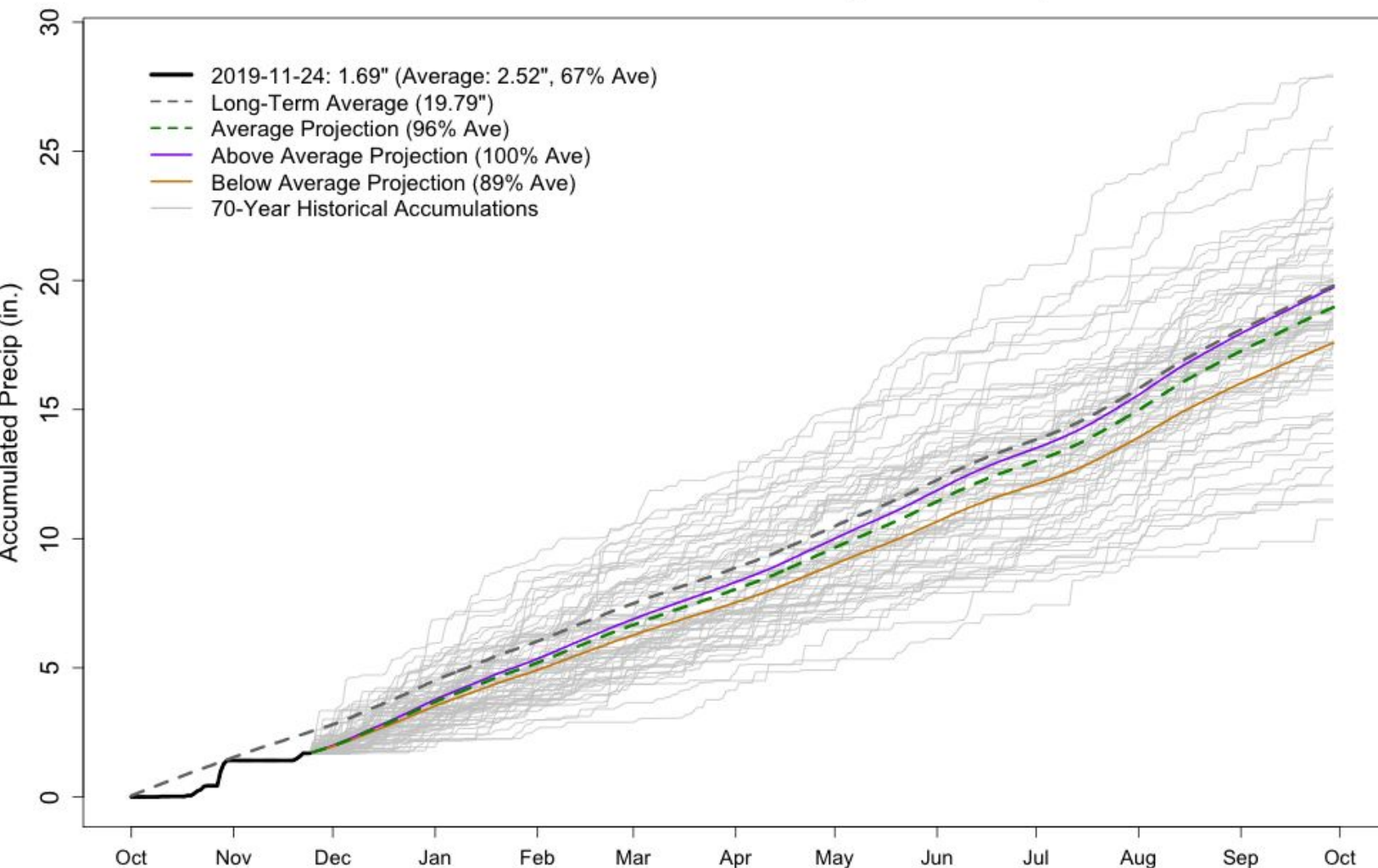


Generated 11/26/2019 at HPRCC using provisional data.

NOAA Regional Climate Centers

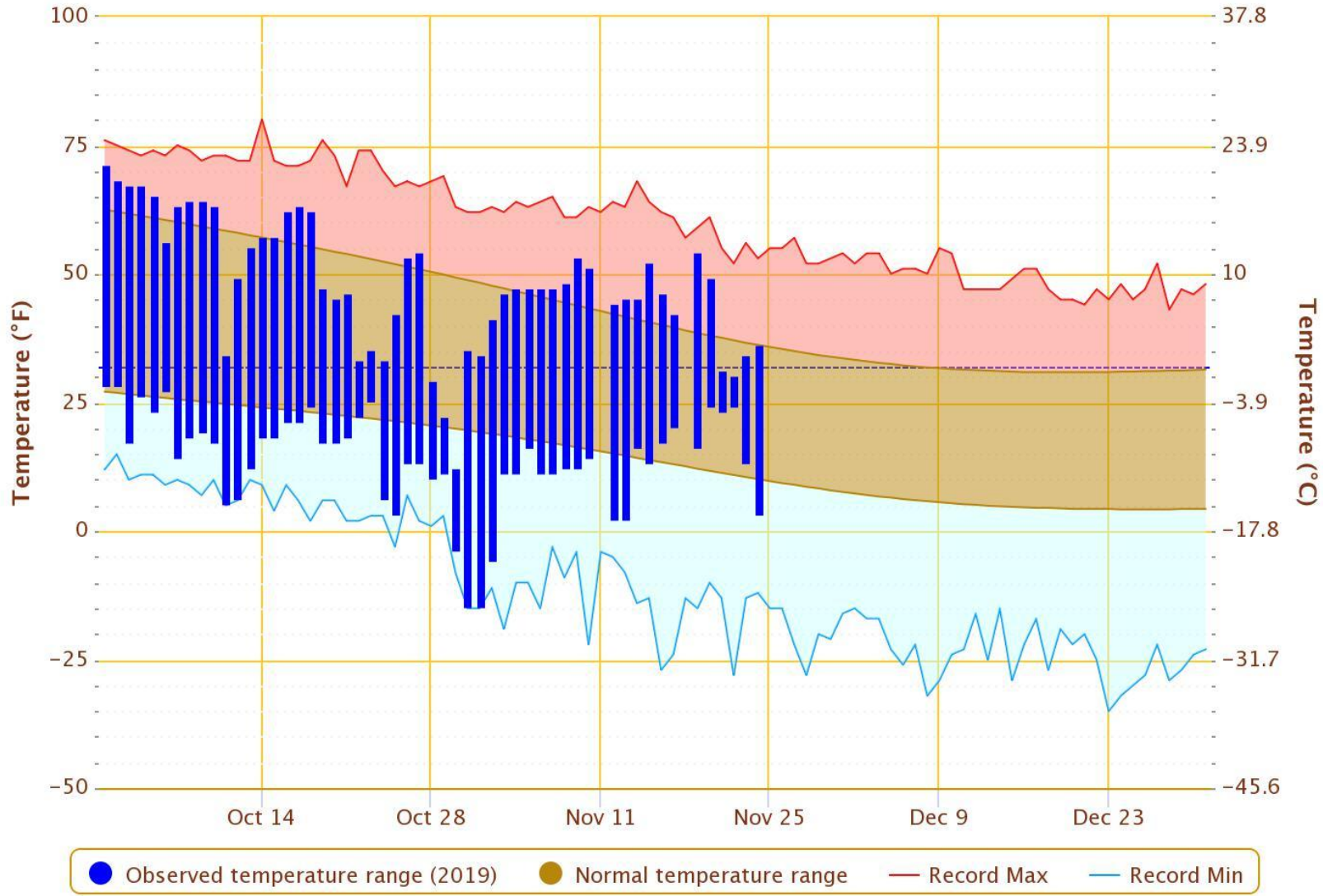


GRAND LAKE 1 NW WY2020 Precipitation Projections

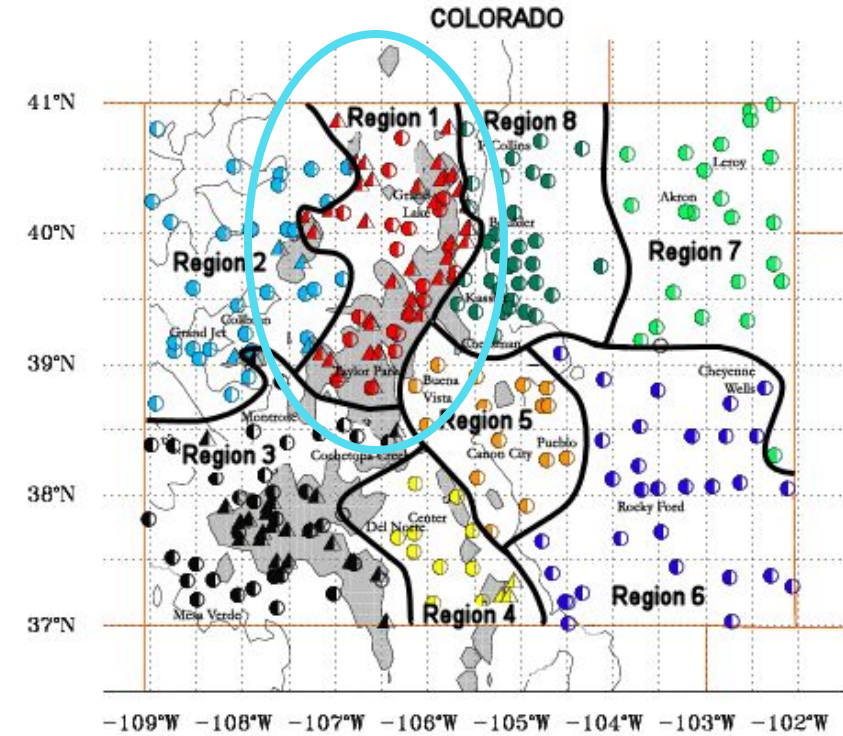


Daily Temperature Data – GRAND LAKE 1 NW, CO

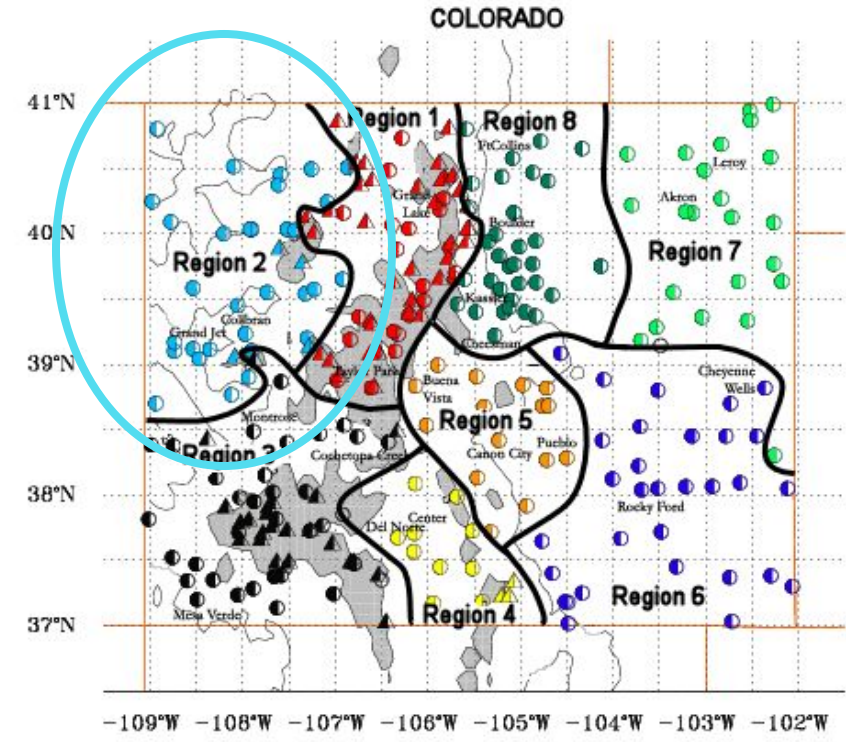
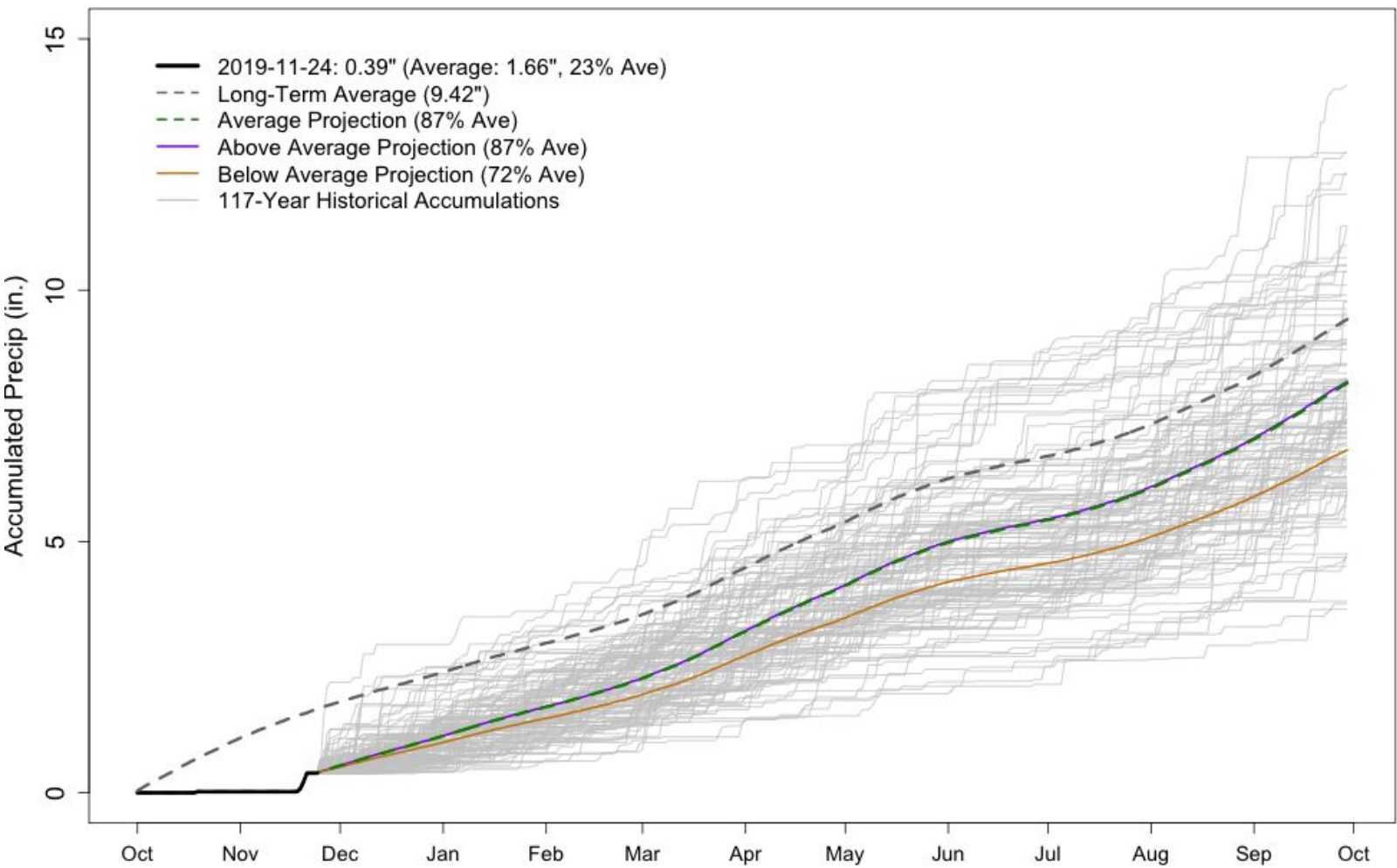
Period of Record – 1939-10-01 to 2019-11-24. Normals period: 1981-2010. Click and drag to zoom chart.



Powered by ACIS

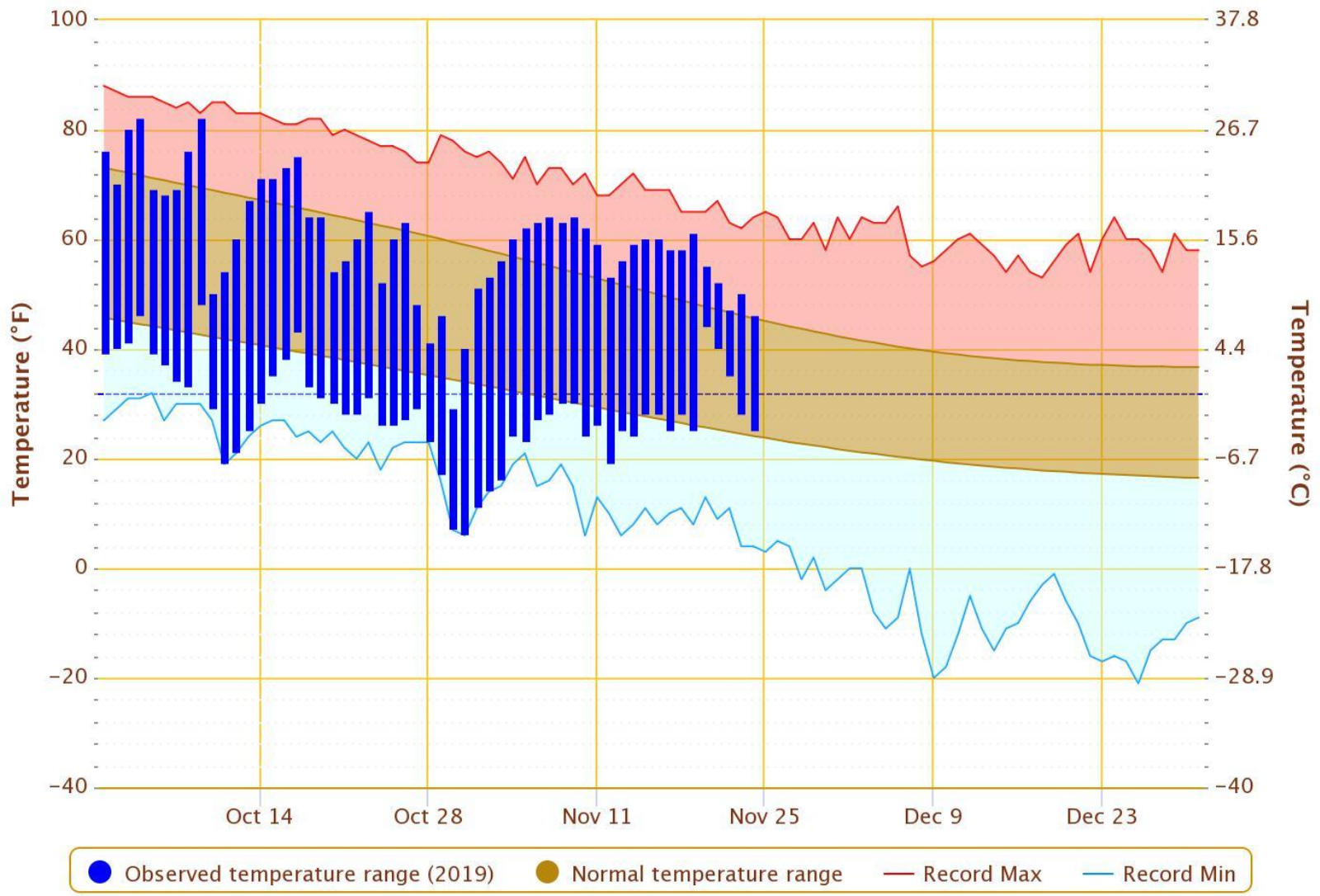


GRAND JUNCTION WALKER FIELD WY2020 Precipitation Projections

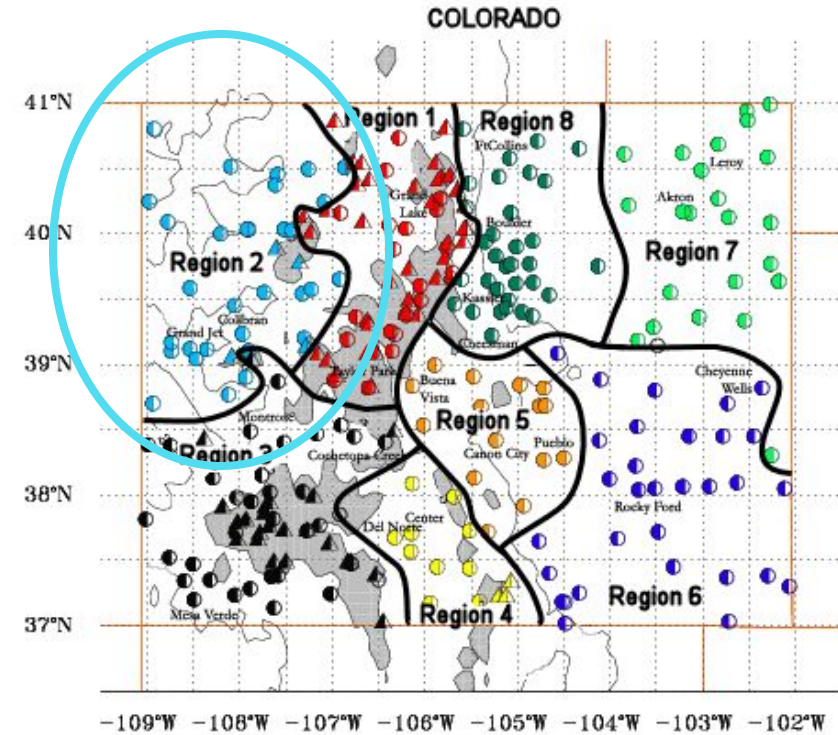


Daily Temperature Data – GRAND JUNCTION WALKER FIELD, CO

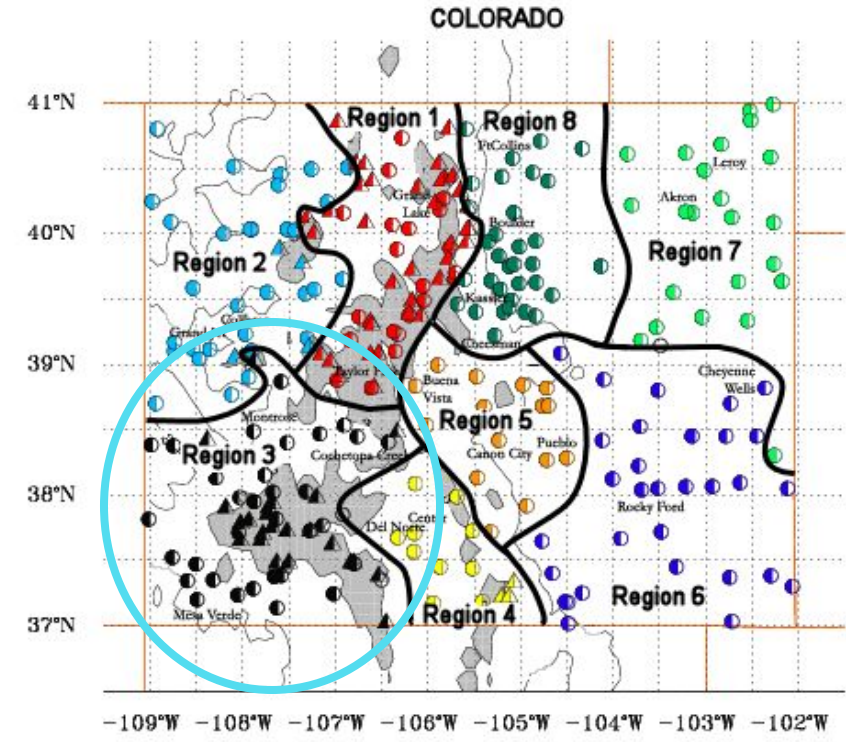
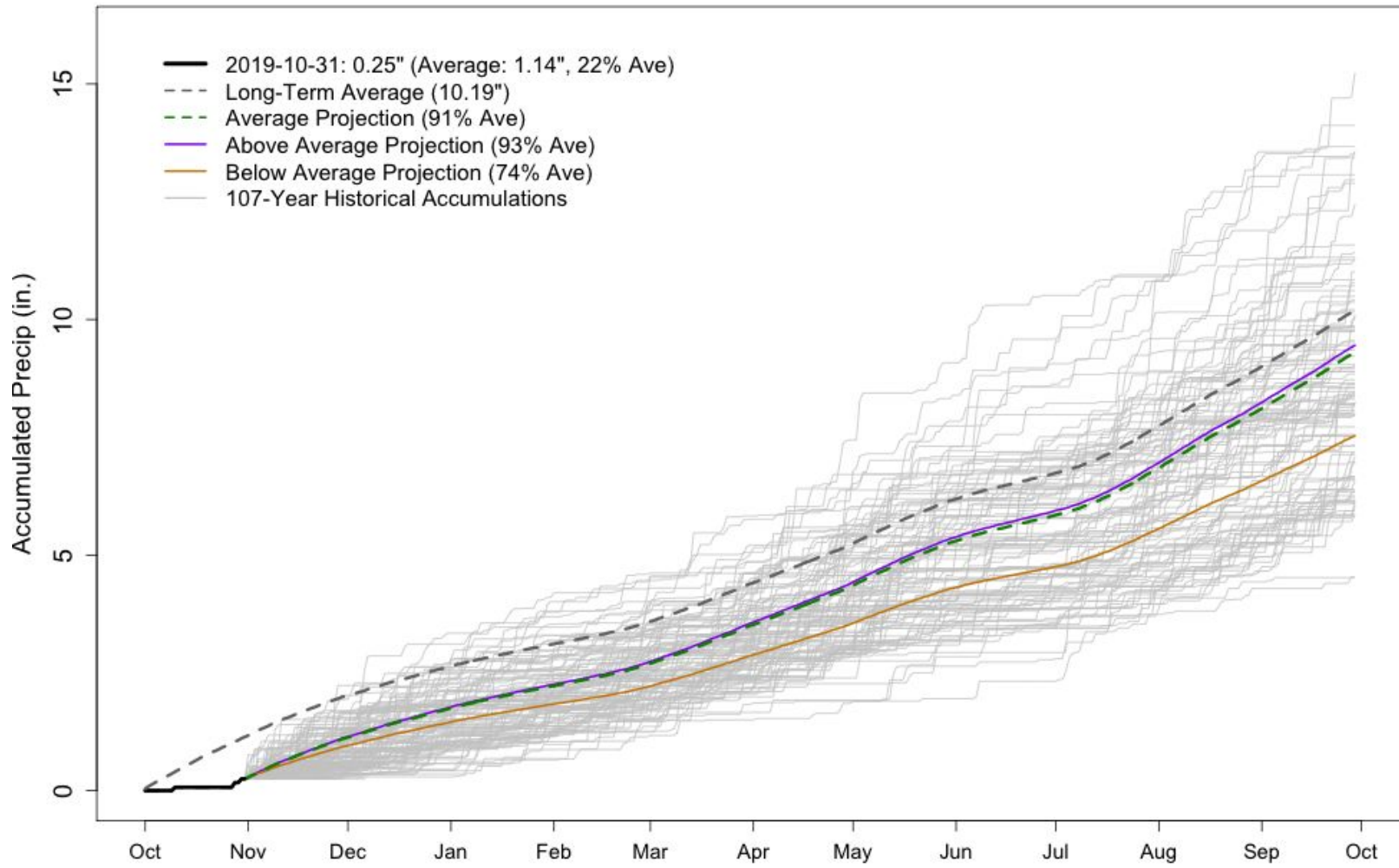
Period of Record – 1900-01-01 to 2019-11-24. Normals period: 1981-2010. Click and drag to zoom chart.



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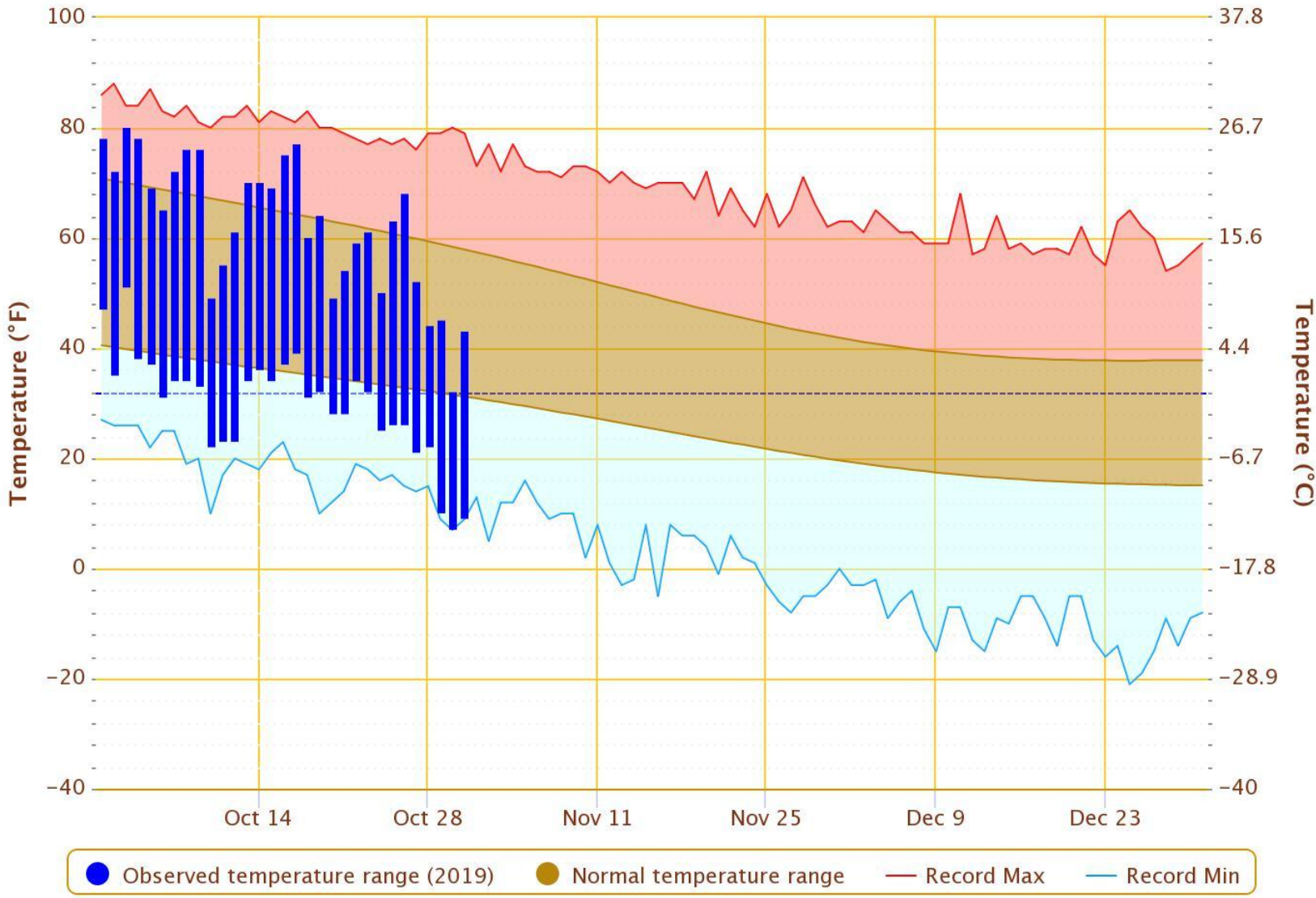


MONTROSE NO 2 WY2020 Precipitation Projections

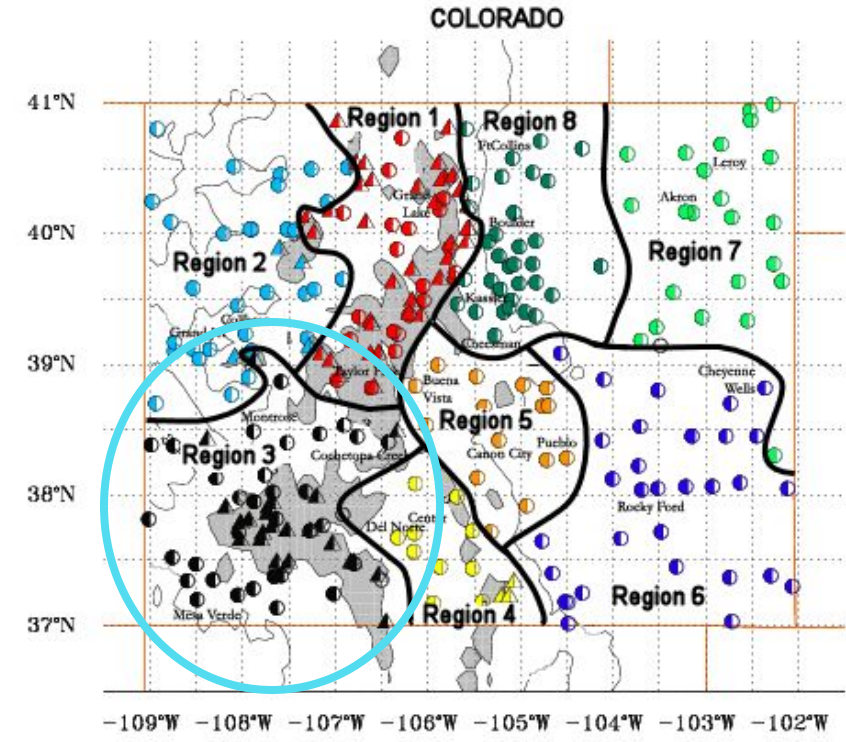


Daily Temperature Data – MONTROSE NO 2, CO

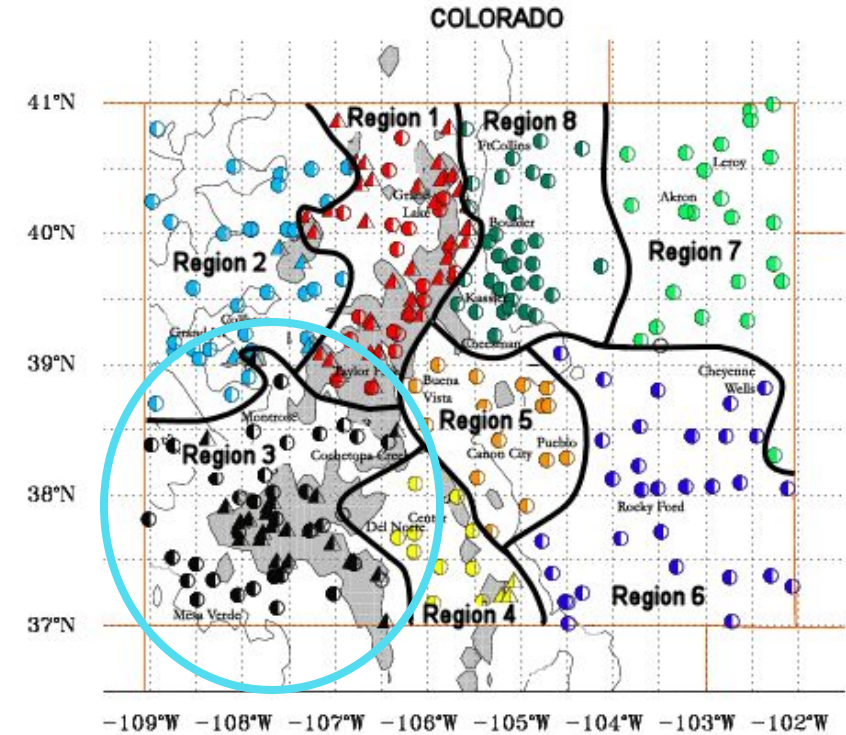
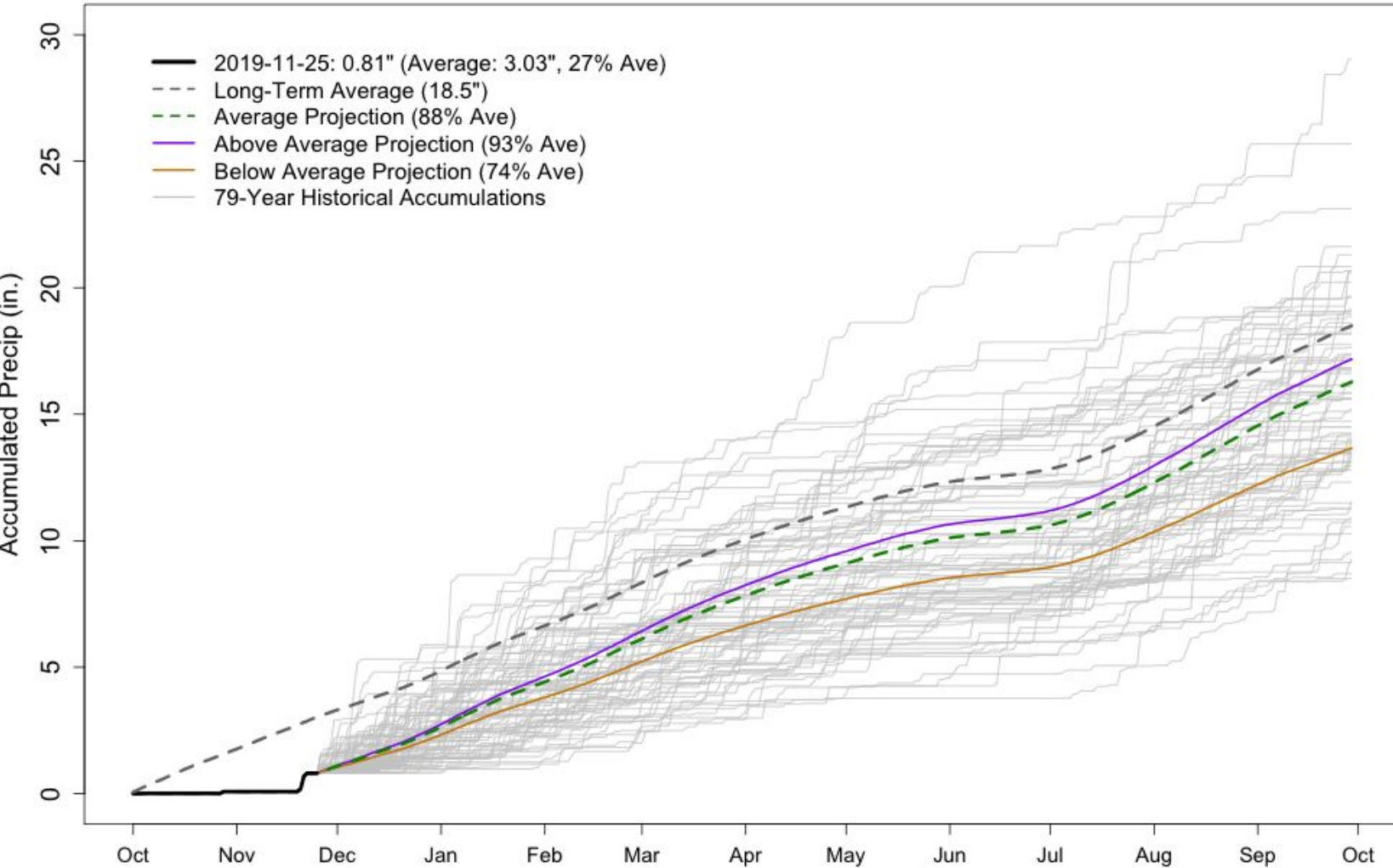
Period of Record – 1895-10-01 to 2019-10-31. Normals period: 1981-2010. Click and drag to zoom chart.



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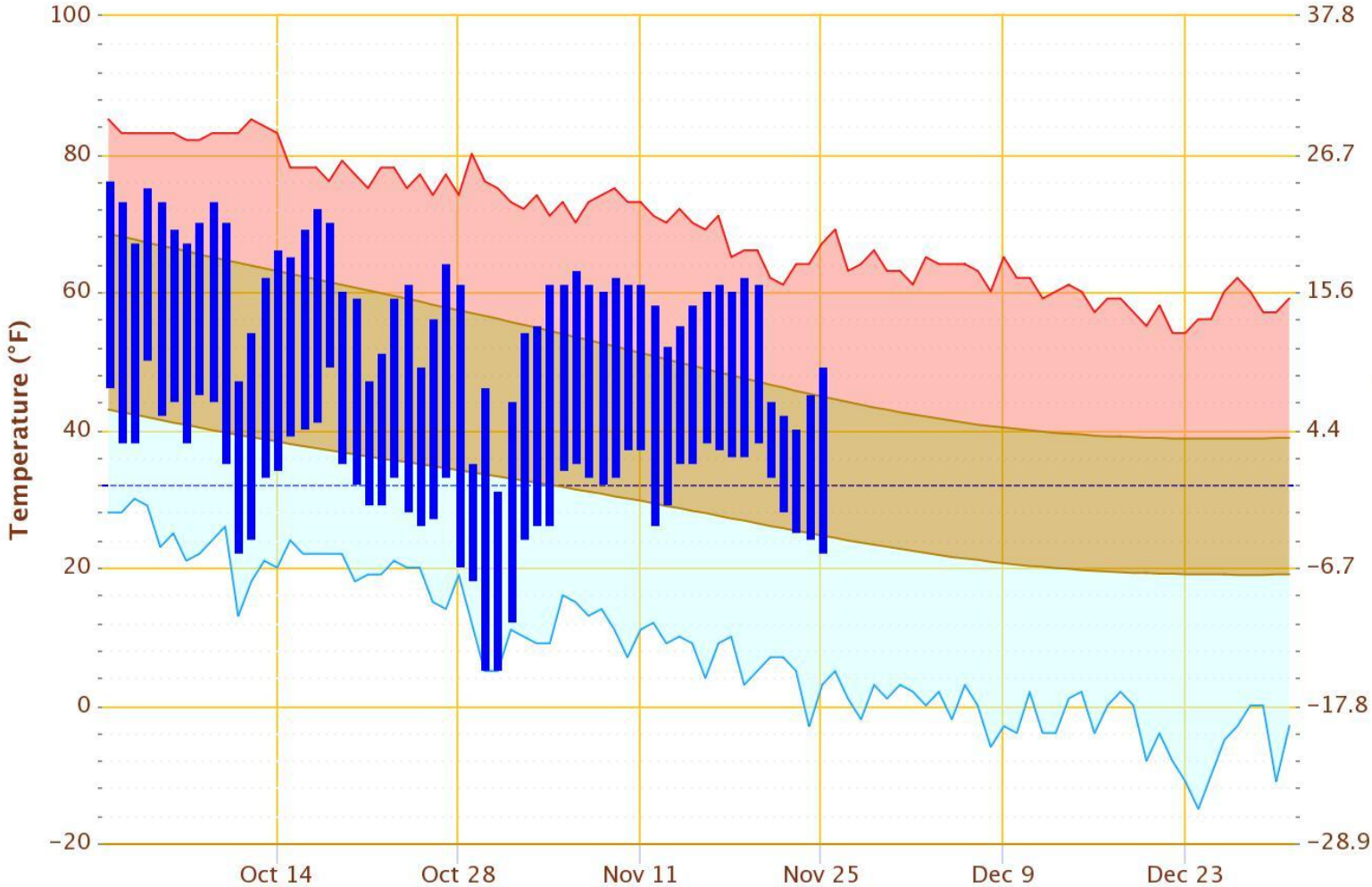


MESA VERDE NP WY2020 Precipitation Projections



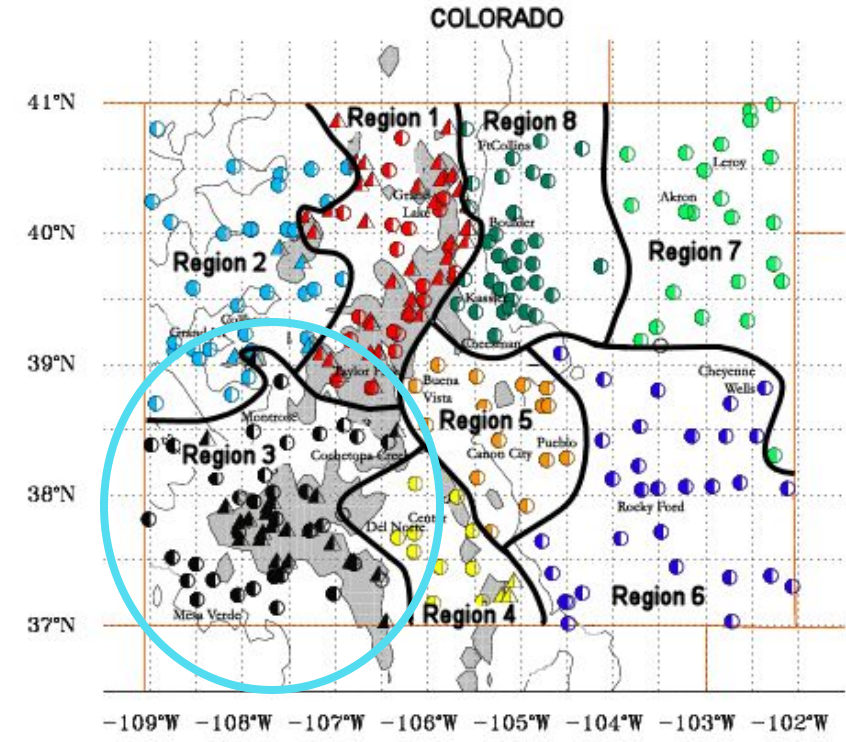
Daily Temperature Data – MESA VERDE NP, CO

Period of Record – 1922-02-16 to 2019-11-25. Normals period: 1981-2010. Click and drag to zoom chart.

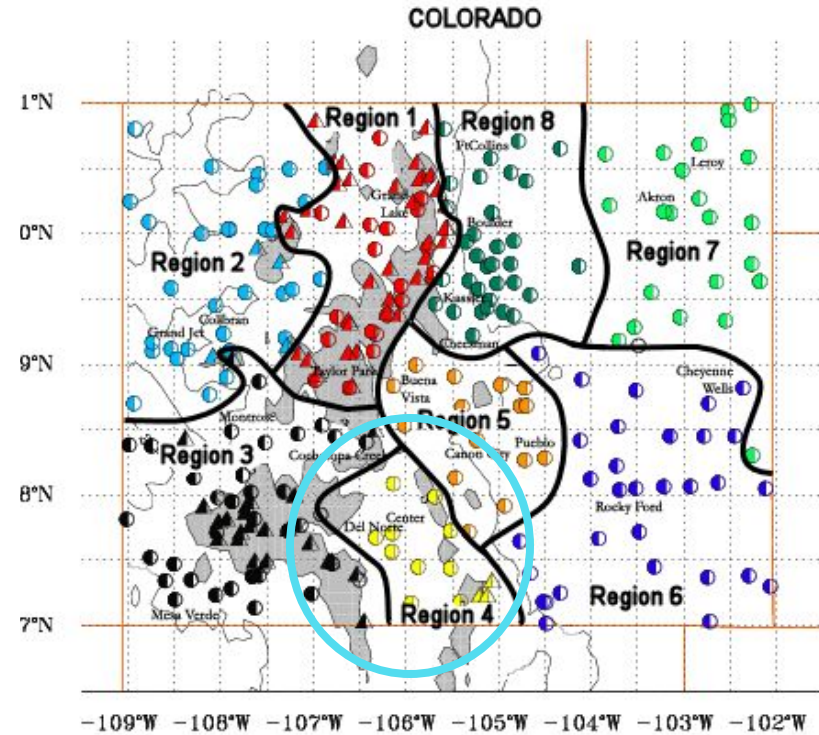
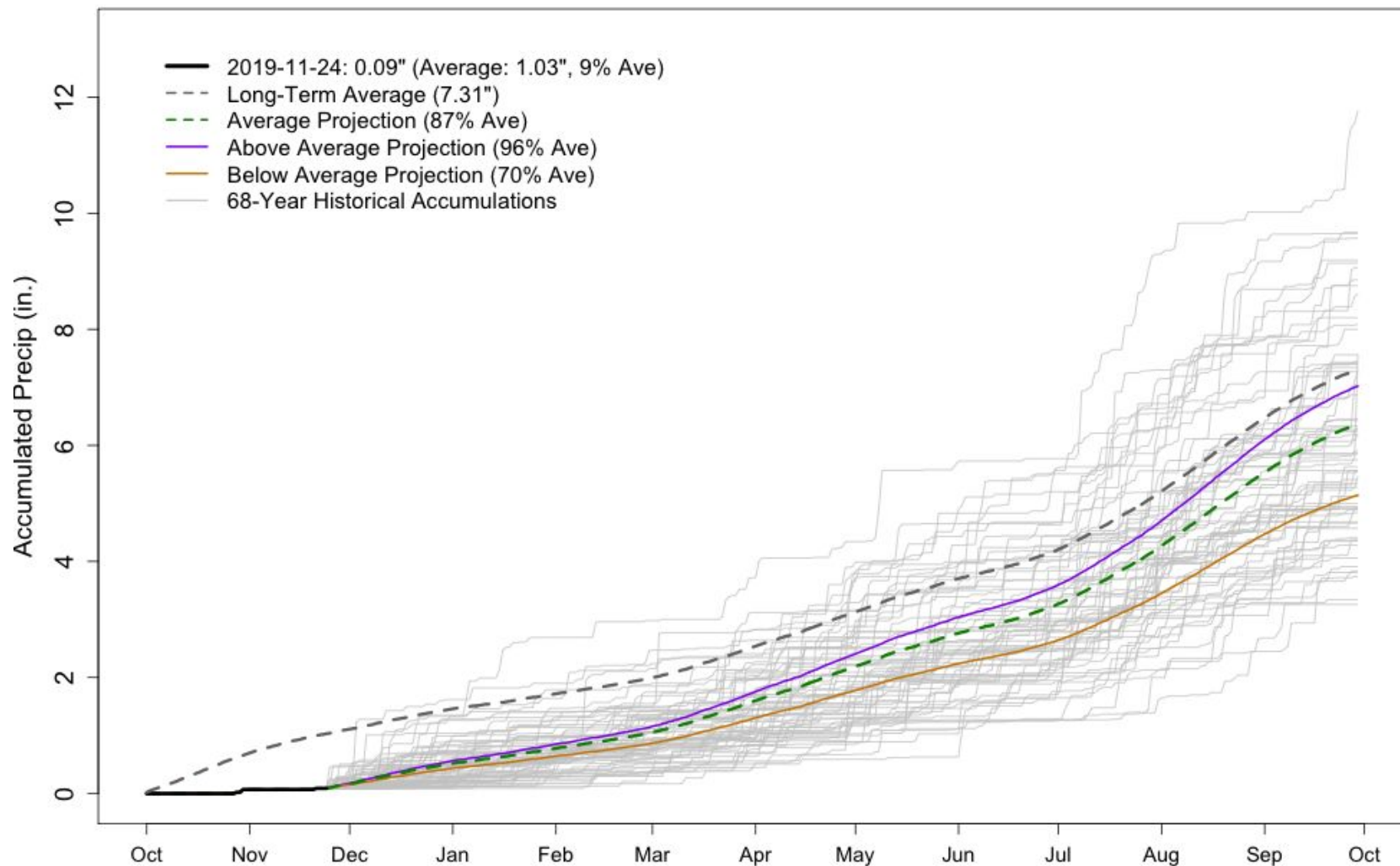


● Observed temperature range (2019) ● Normal temperature range — Record Max — Record Min

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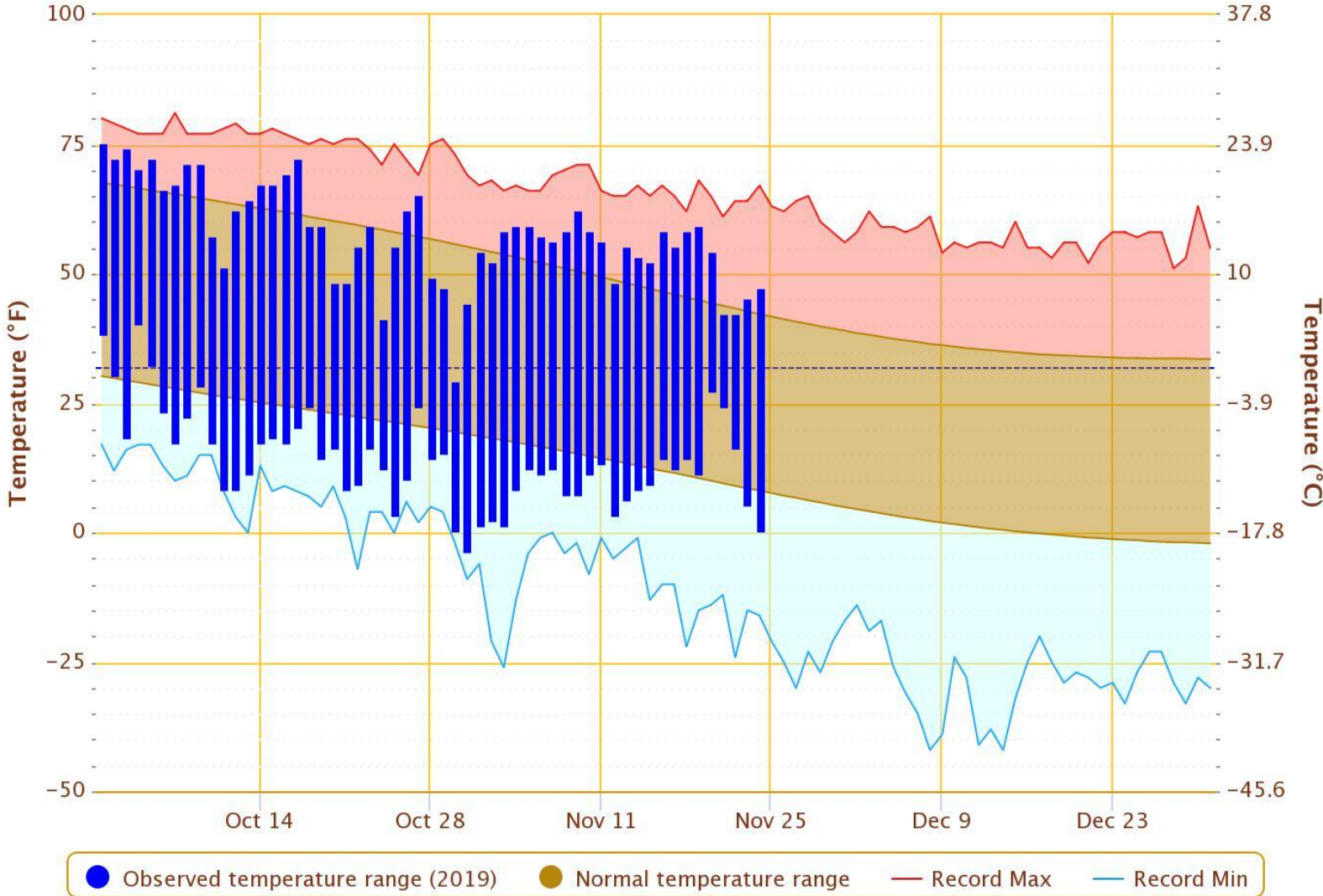


ALAMOSA SAN LUIS VALLEY REGIONAL AP WY2020 Precipitation Projections

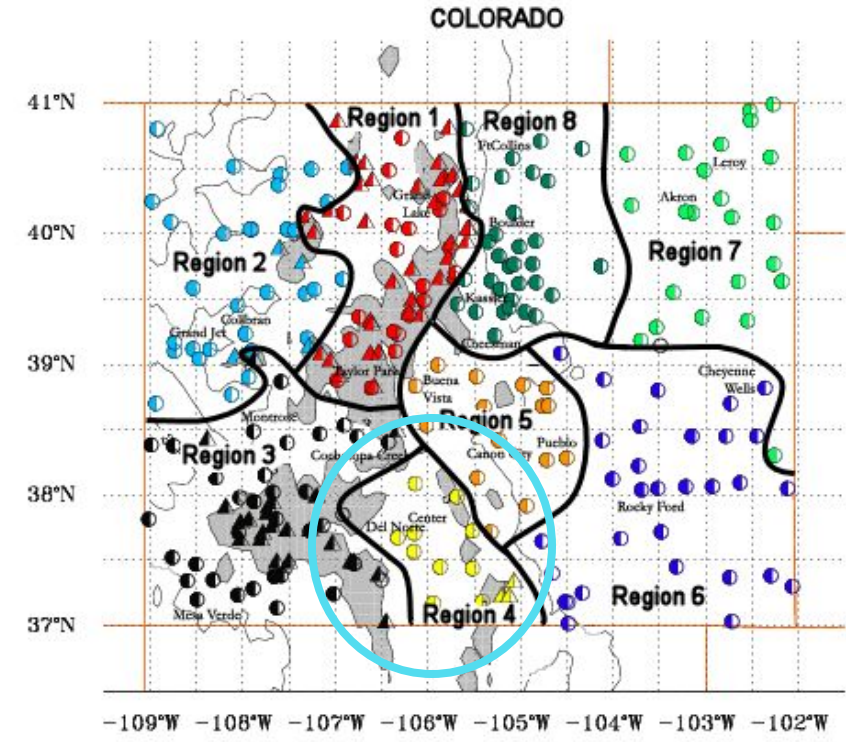


Daily Temperature Data – ALAMOSA SAN LUIS VALLEY REGIONAL AP, CO

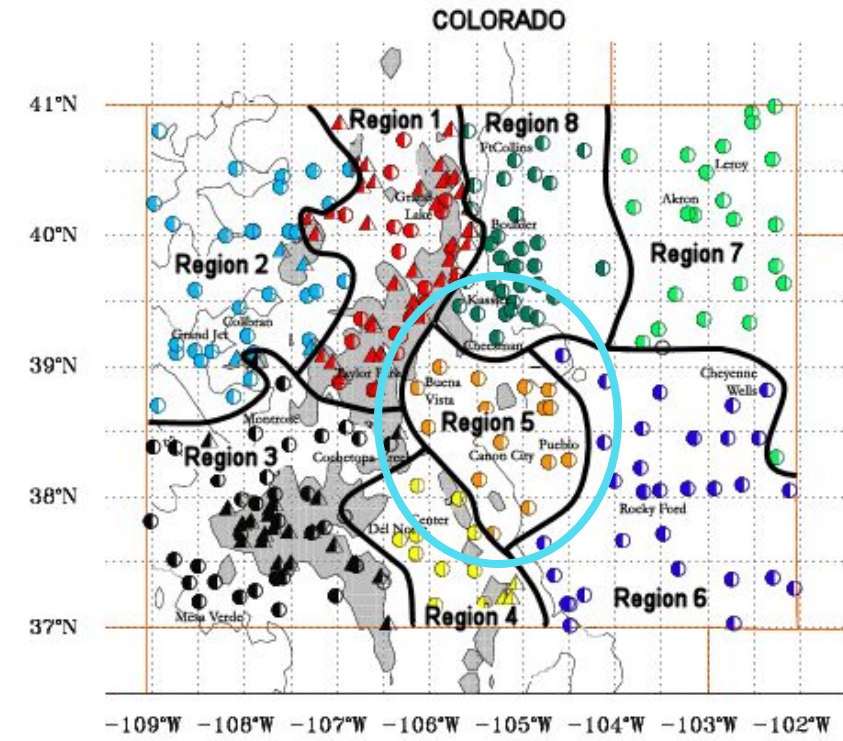
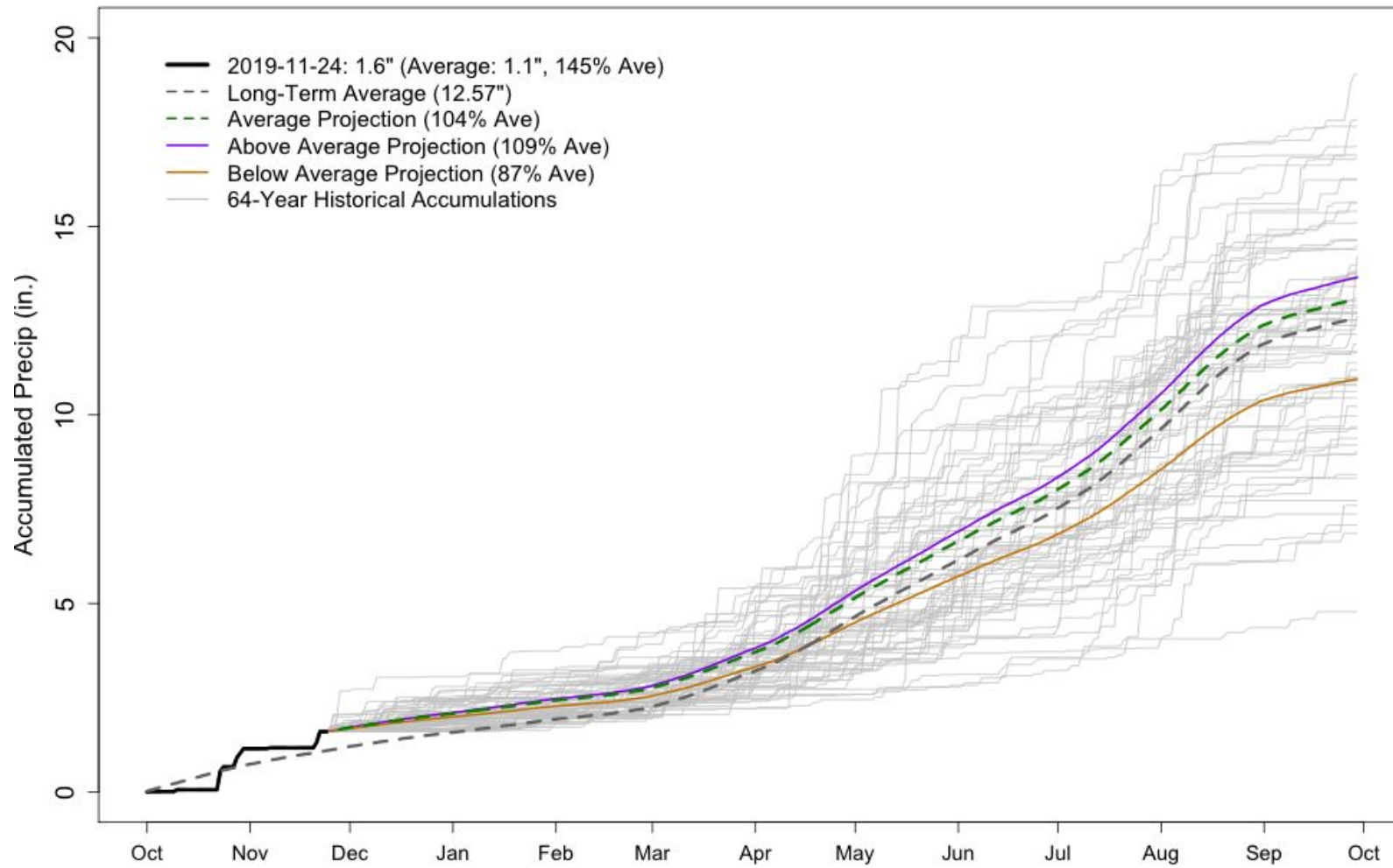
Period of Record – 1948-01-01 to 2019-11-24. Normals period: 1981-2010. Click and drag to zoom chart.



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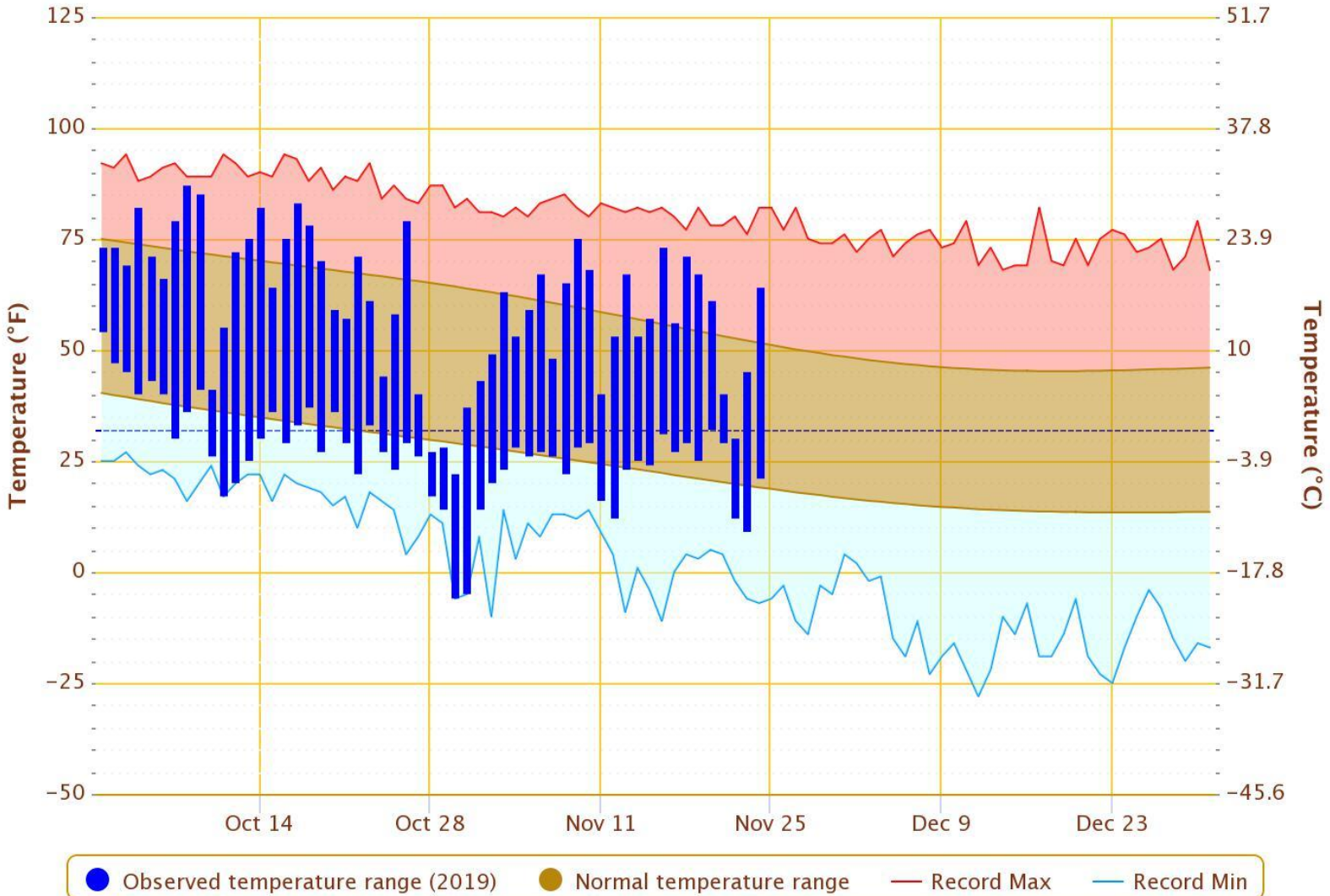


PUEBLO MEMORIAL AP WY2020 Precipitation Projections

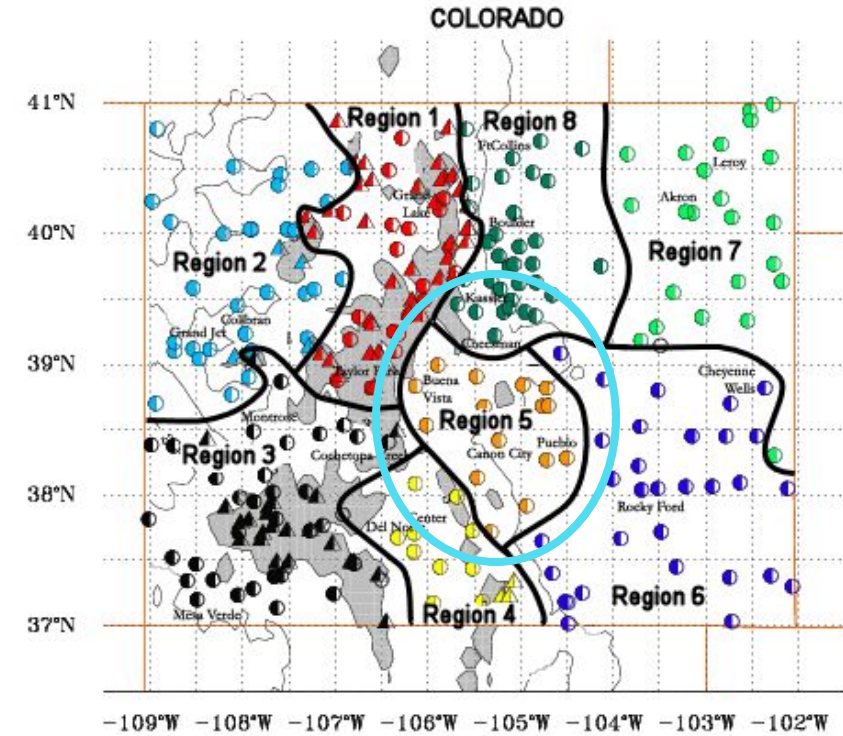


Daily Temperature Data – PUEBLO MEMORIAL AP, CO

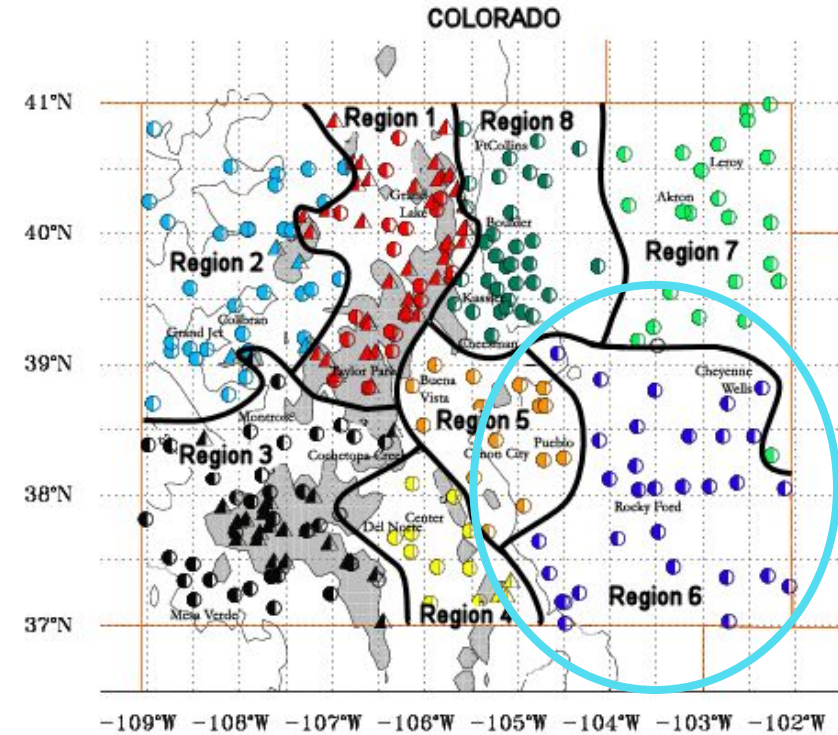
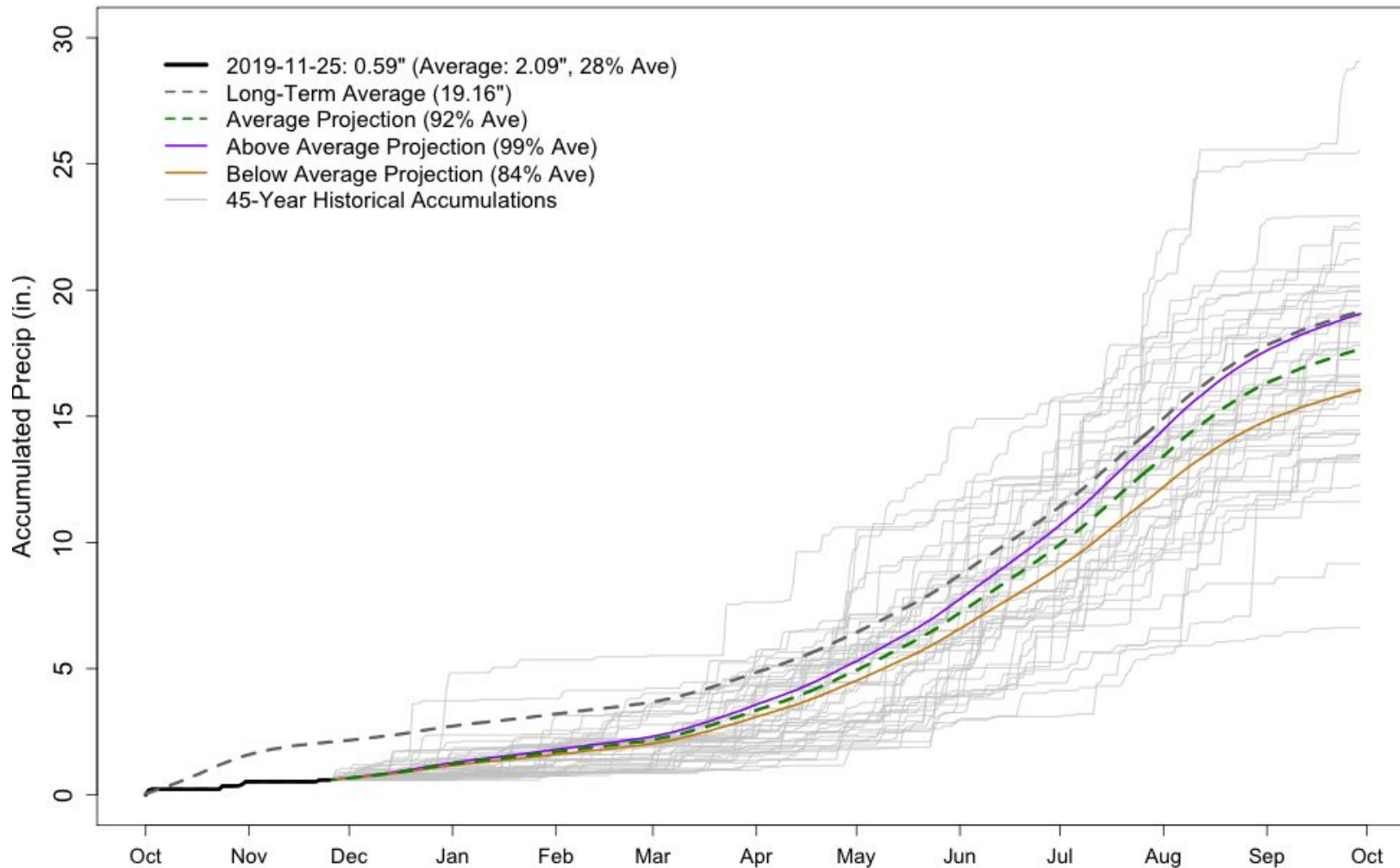
Period of Record – 1954-06-16 to 2019-11-24. Normals period: 1981-2010. Click and drag to zoom chart.



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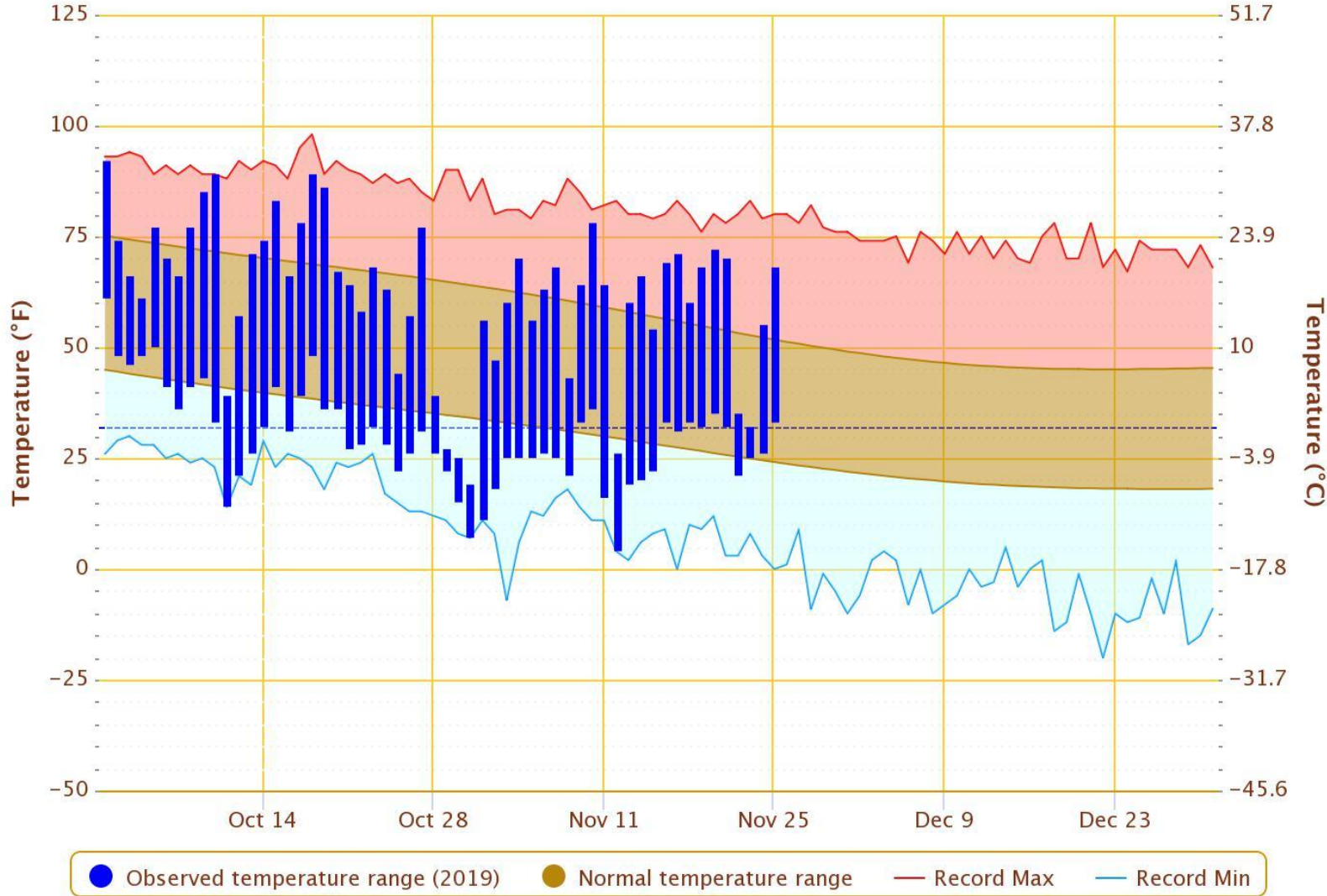


WALSH 1 W WY2020 Precipitation Projections

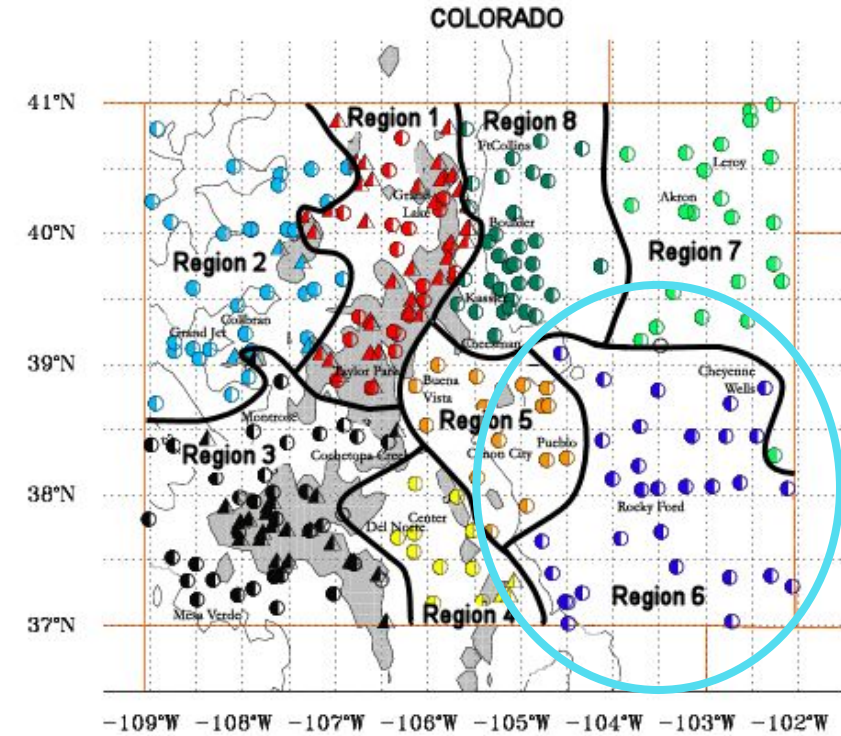


Daily Temperature Data – WALSH 1 W, CO

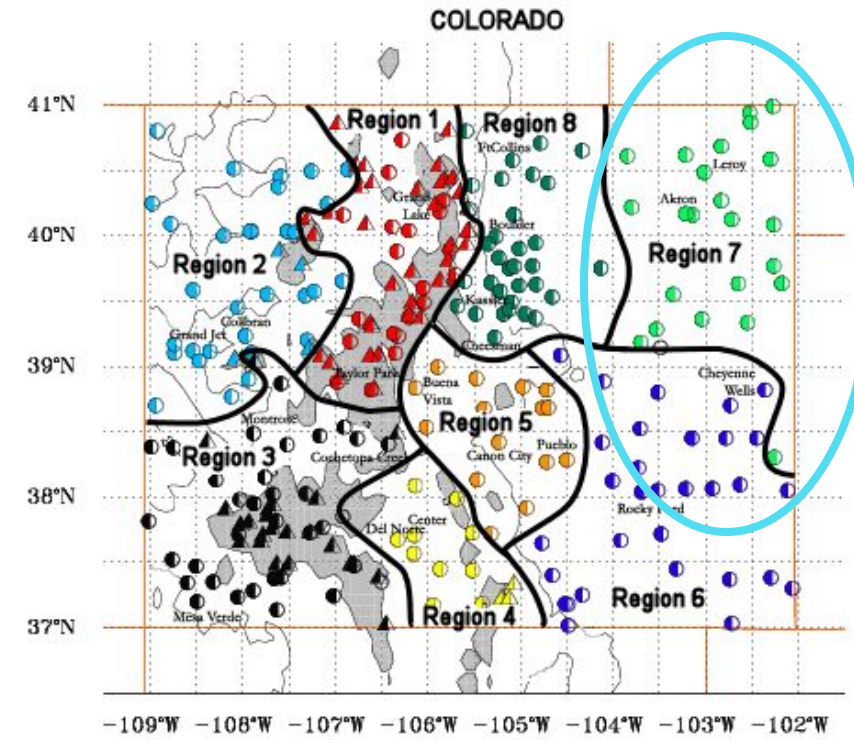
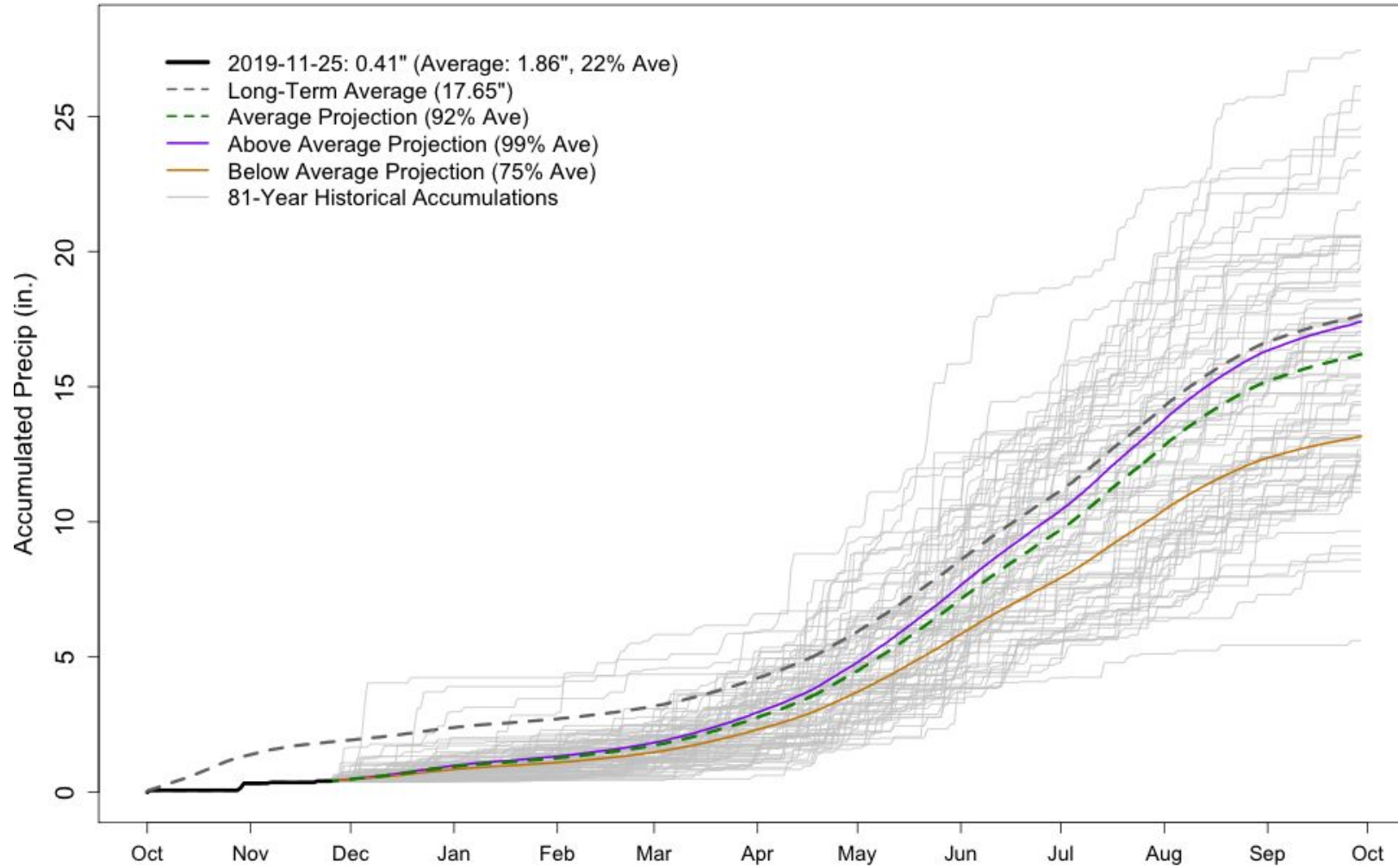
Period of Record – 1967-09-01 to 2019-11-25. Normals period: 1981-2010. Click and drag to zoom chart.



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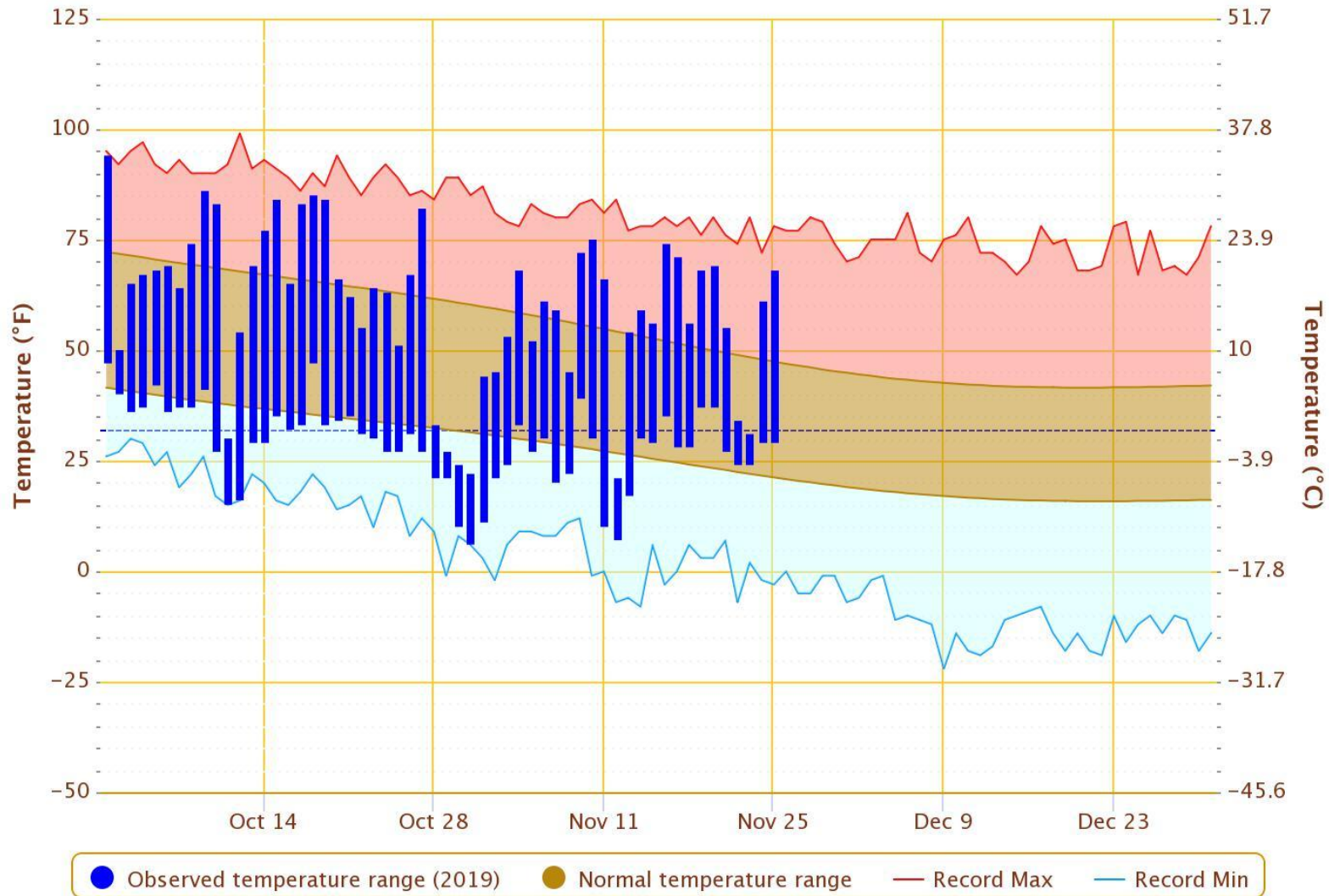


BURLINGTON WY2020 Precipitation Projections

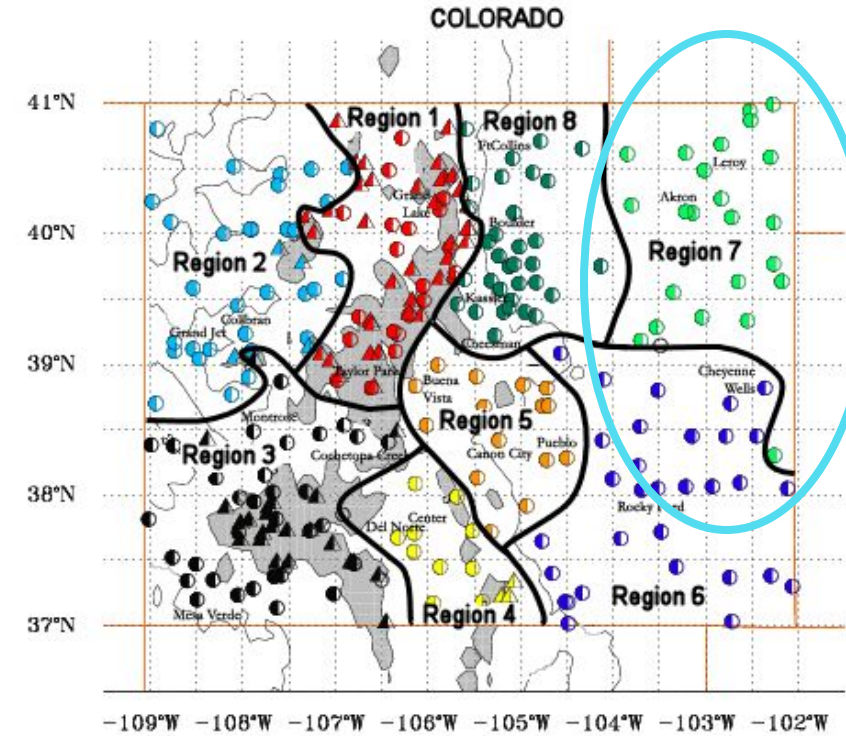


Daily Temperature Data – BURLINGTON, CO

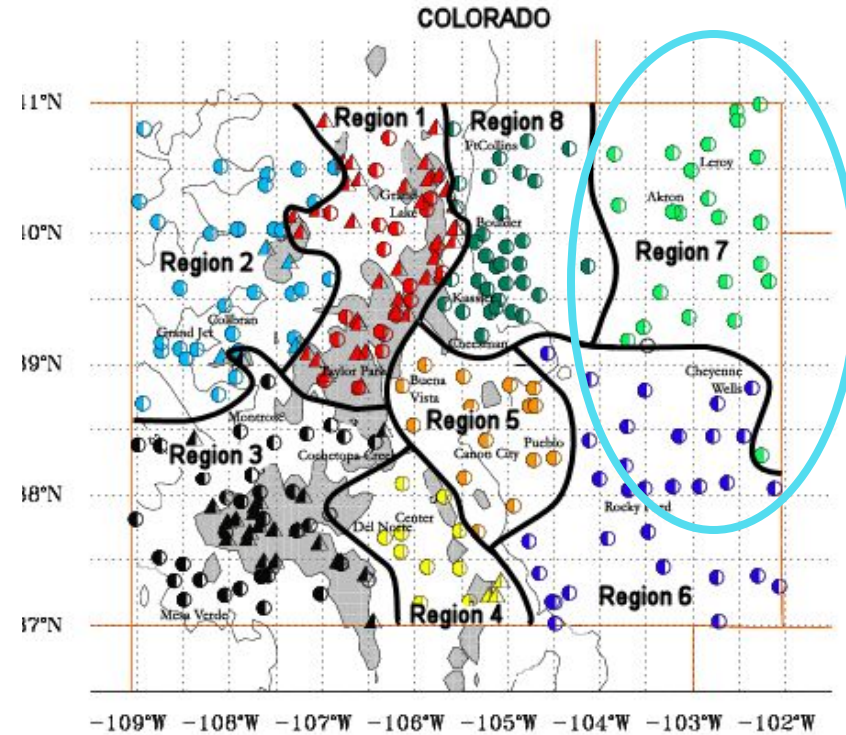
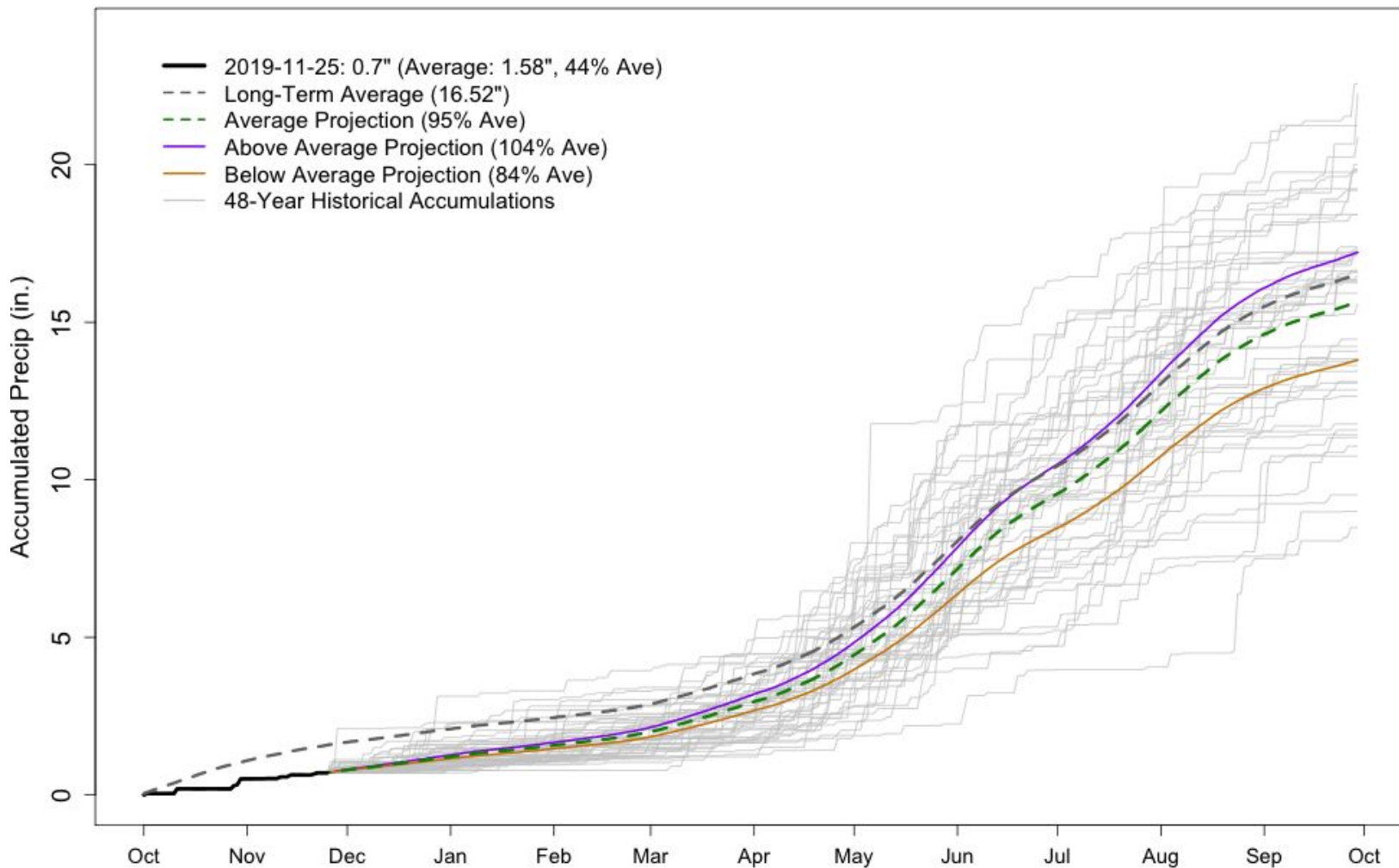
Period of Record – 1903-12-01 to 2019-11-25. Normals period: 1981-2010. Click and drag to zoom chart.



Powered by ACIS

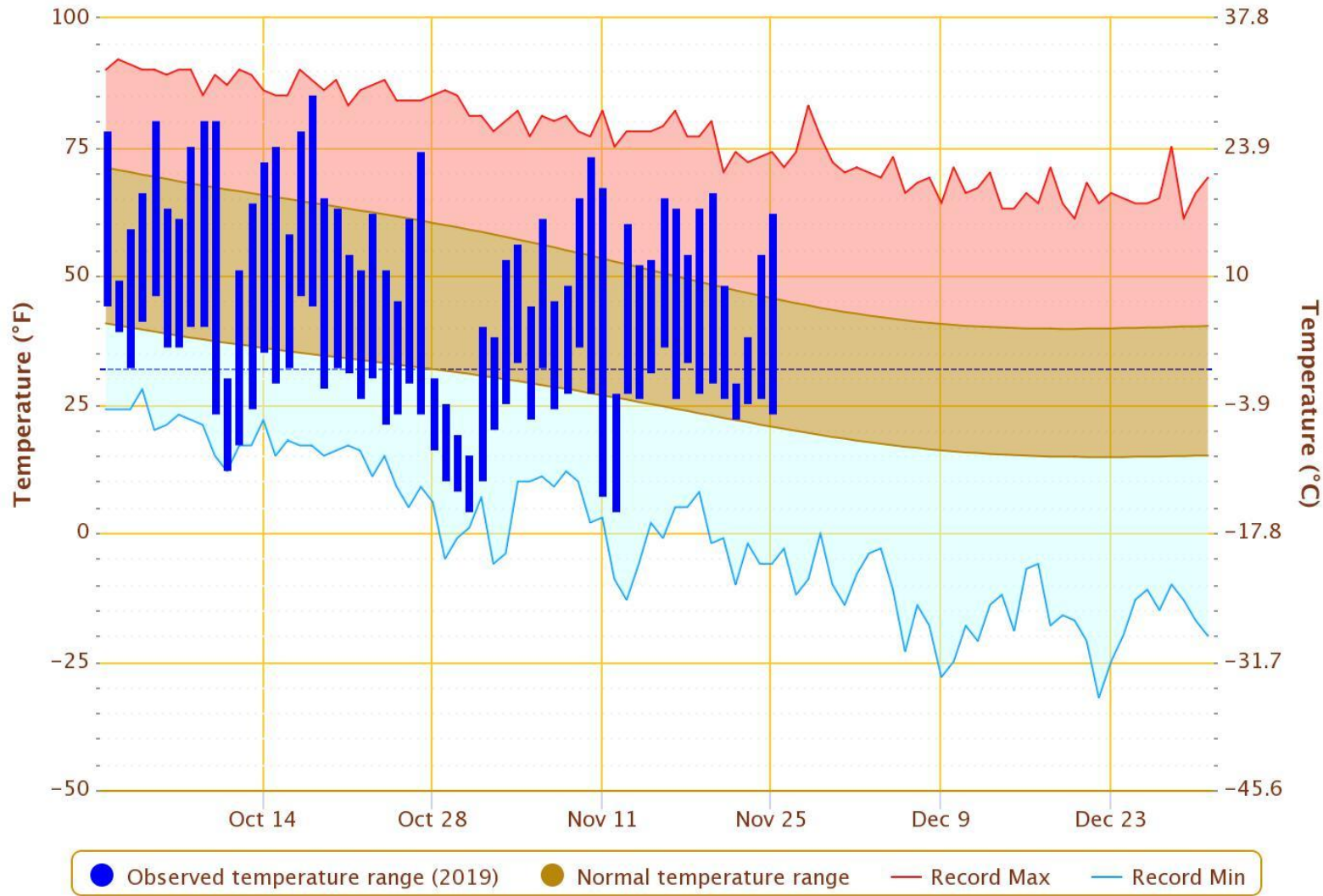


AKRON 4 E WY2020 Precipitation Projections

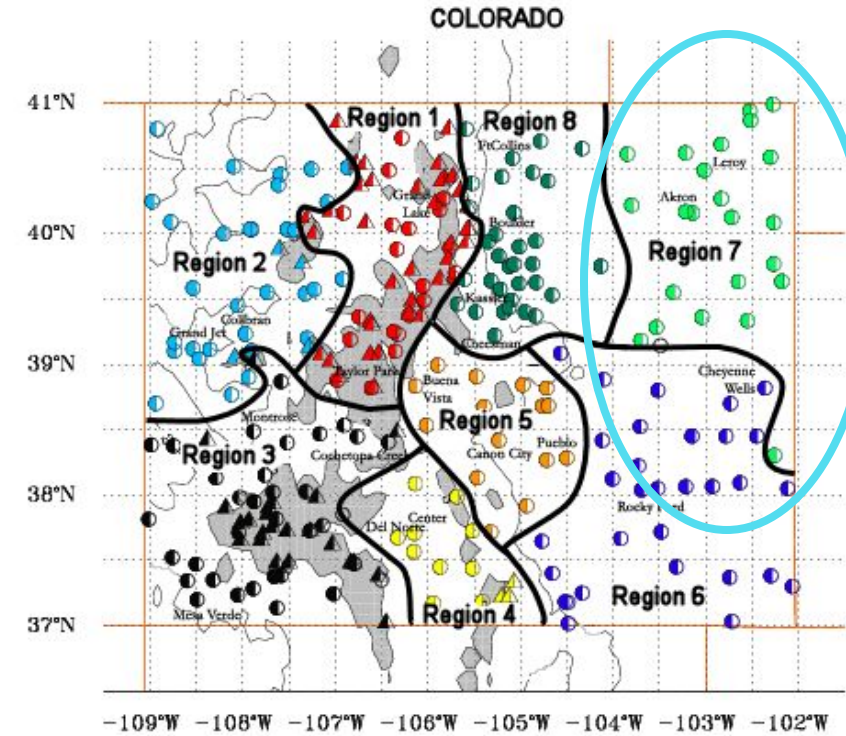


Daily Temperature Data – AKRON 4 E, CO

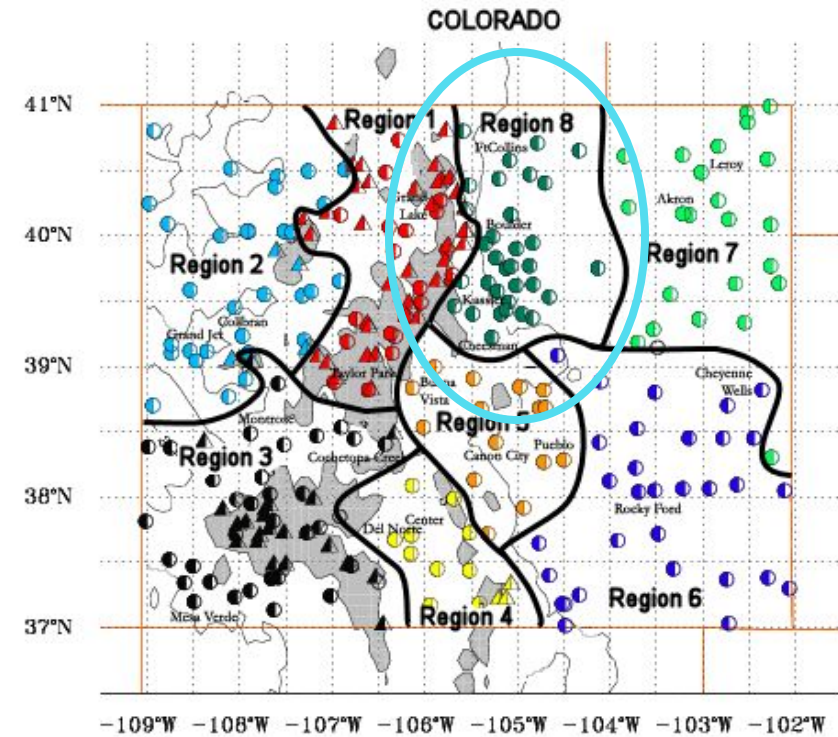
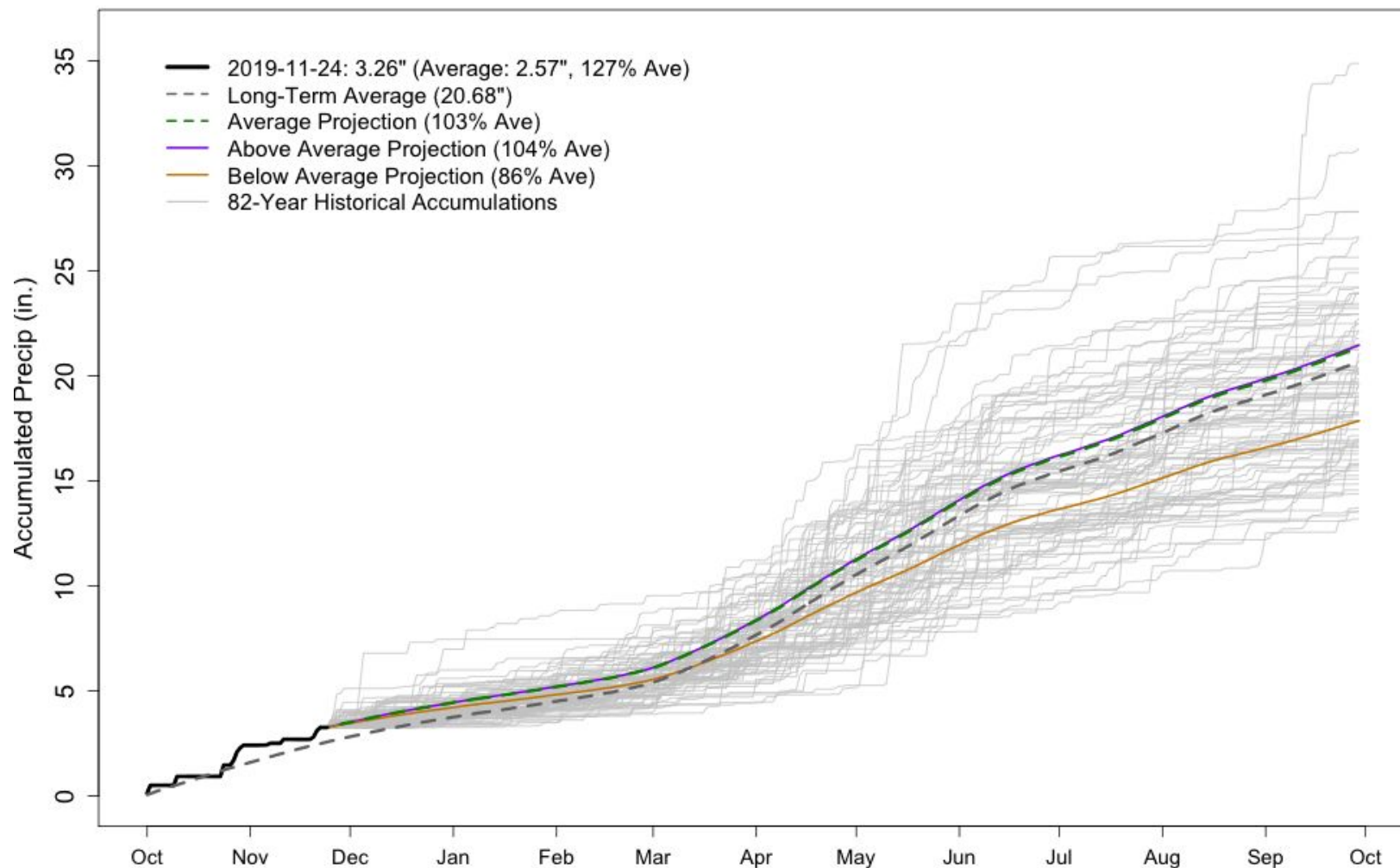
Period of Record – 1893-06-01 to 2019-11-25. Normals period: 1981-2010. Click and drag to zoom chart.



Powered by ACIS

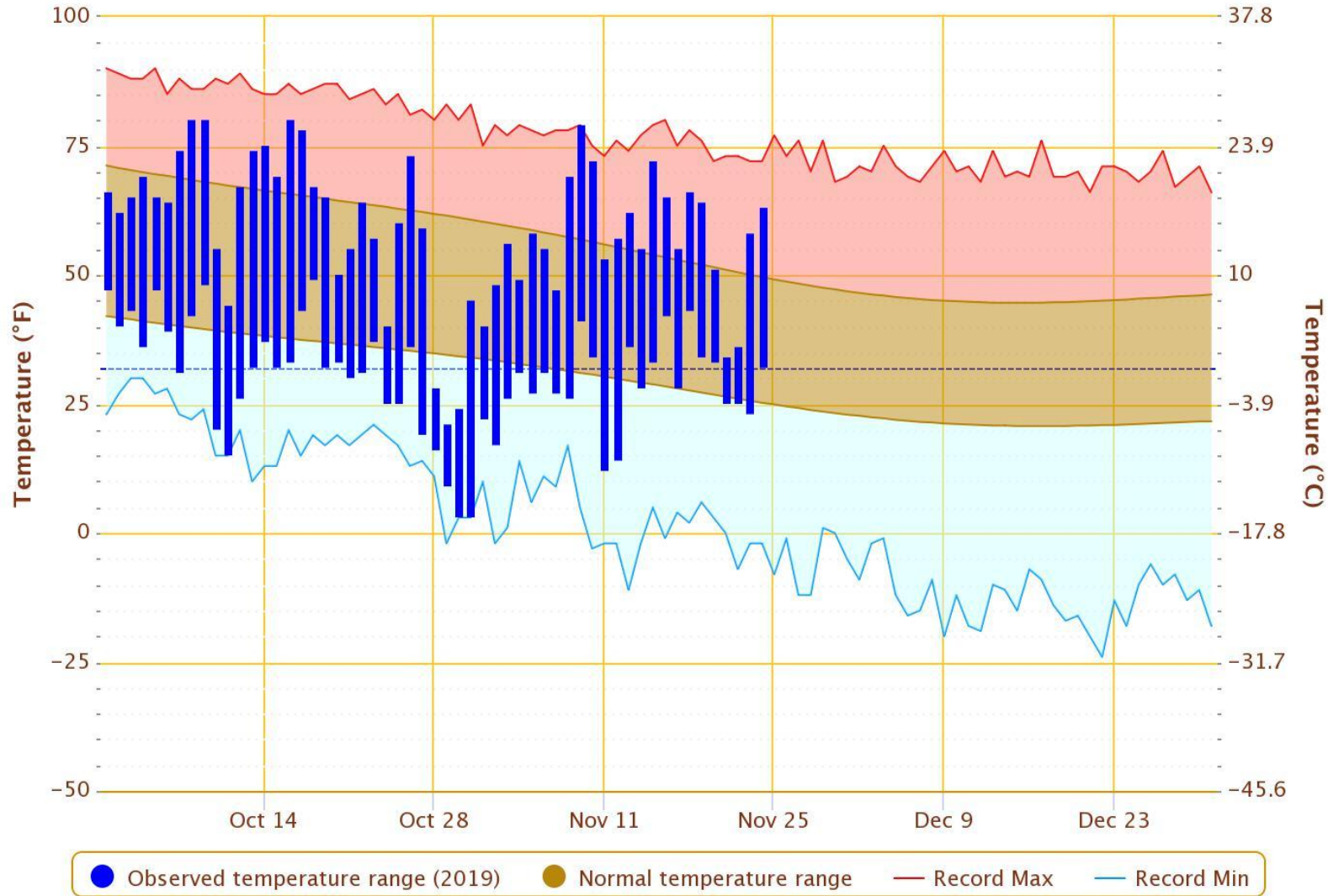


BOULDER WY2020 Precipitation Projections

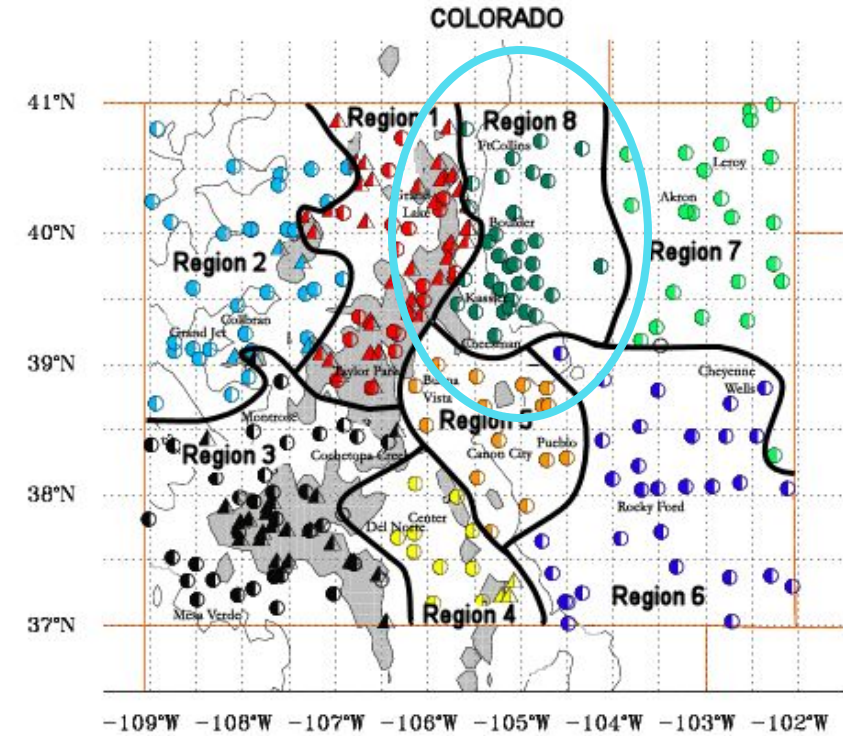


Daily Temperature Data – BOULDER, CO

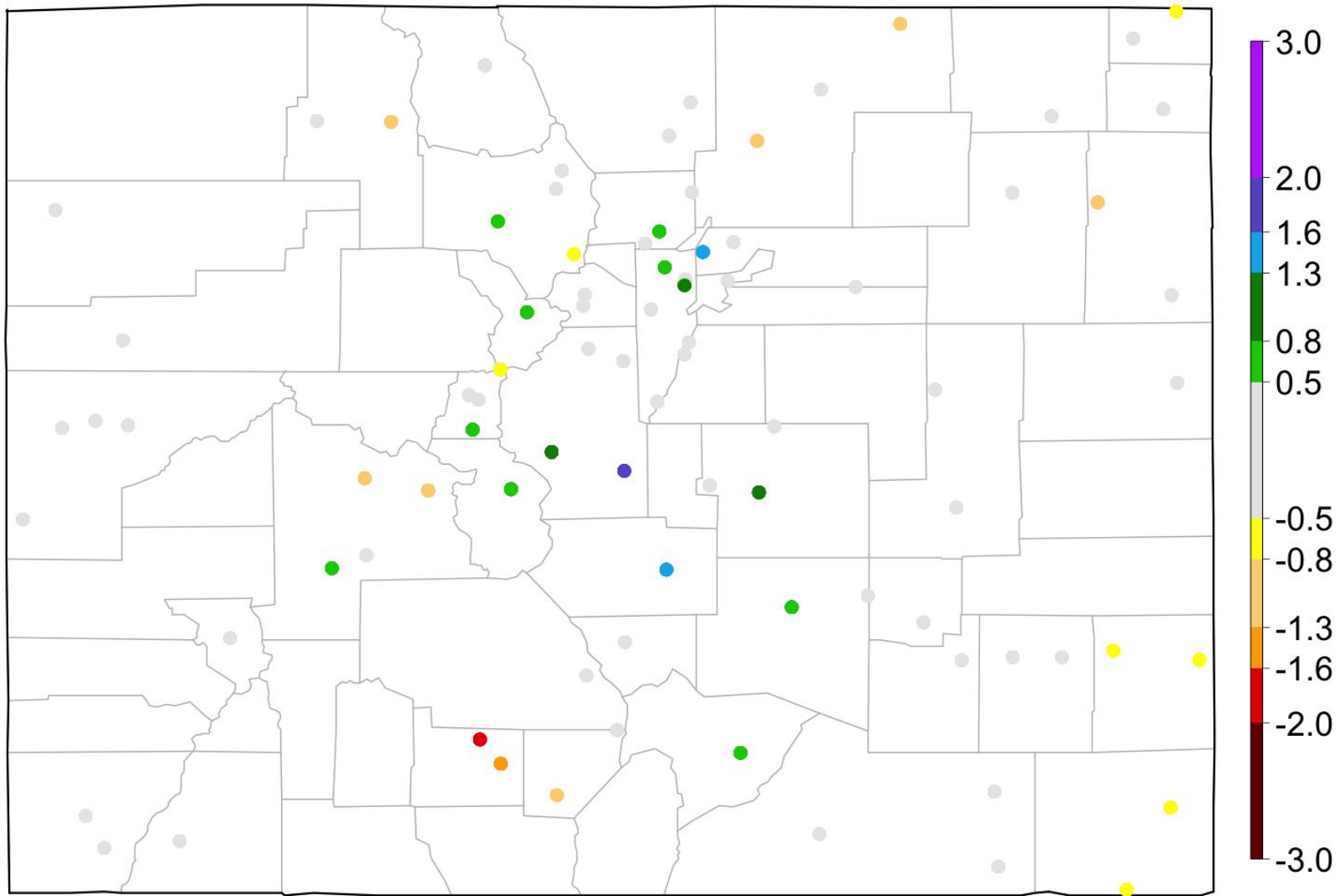
Period of Record – 1893-10-01 to 2019-11-24. Normals period: 1981-2010. Click and drag to zoom chart.



Powered by ACIS



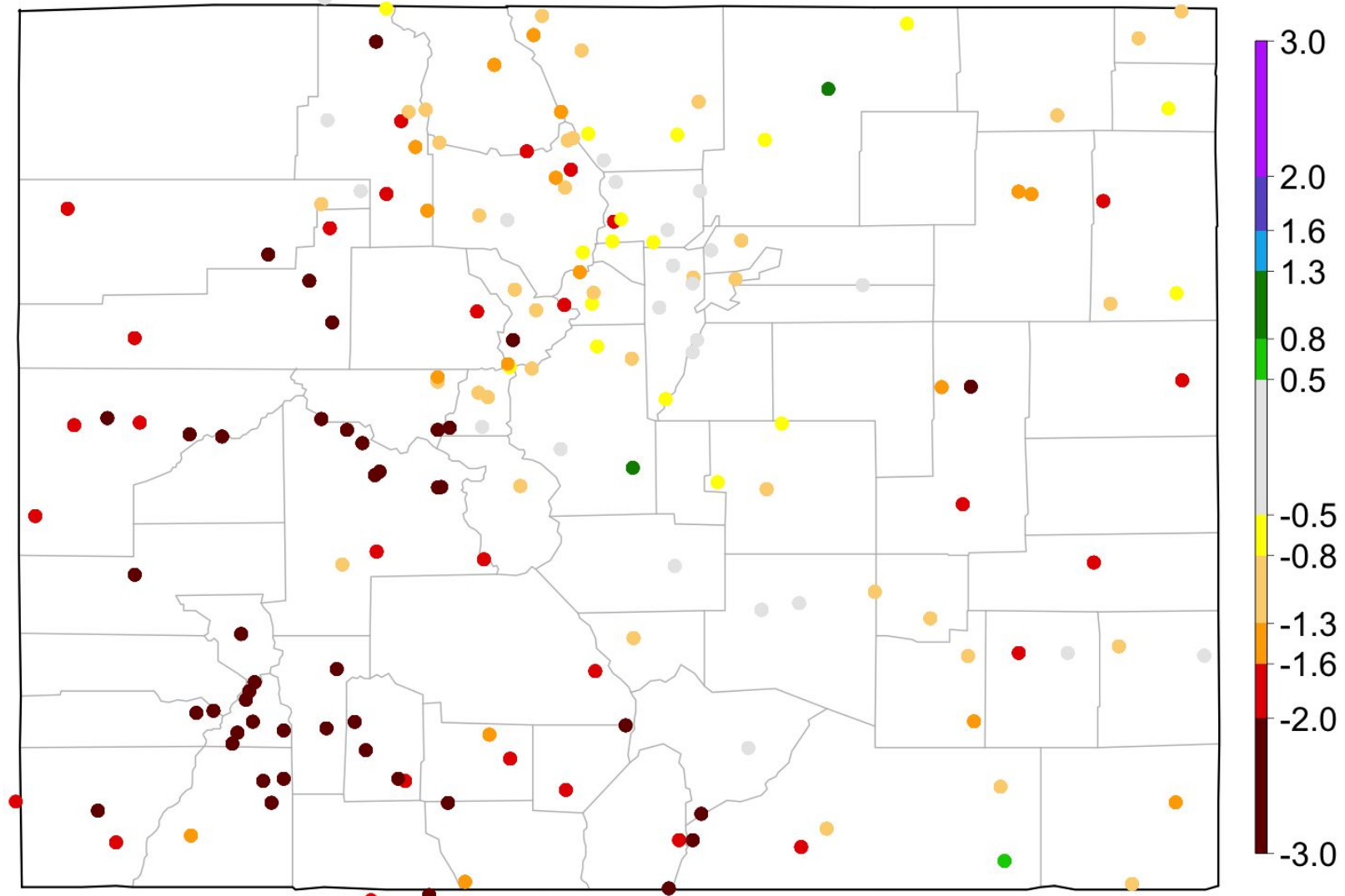
30-day SPI: 10/25/2019 - 11/23/2019



Data from High Plains Regional Climate Center and ACIS



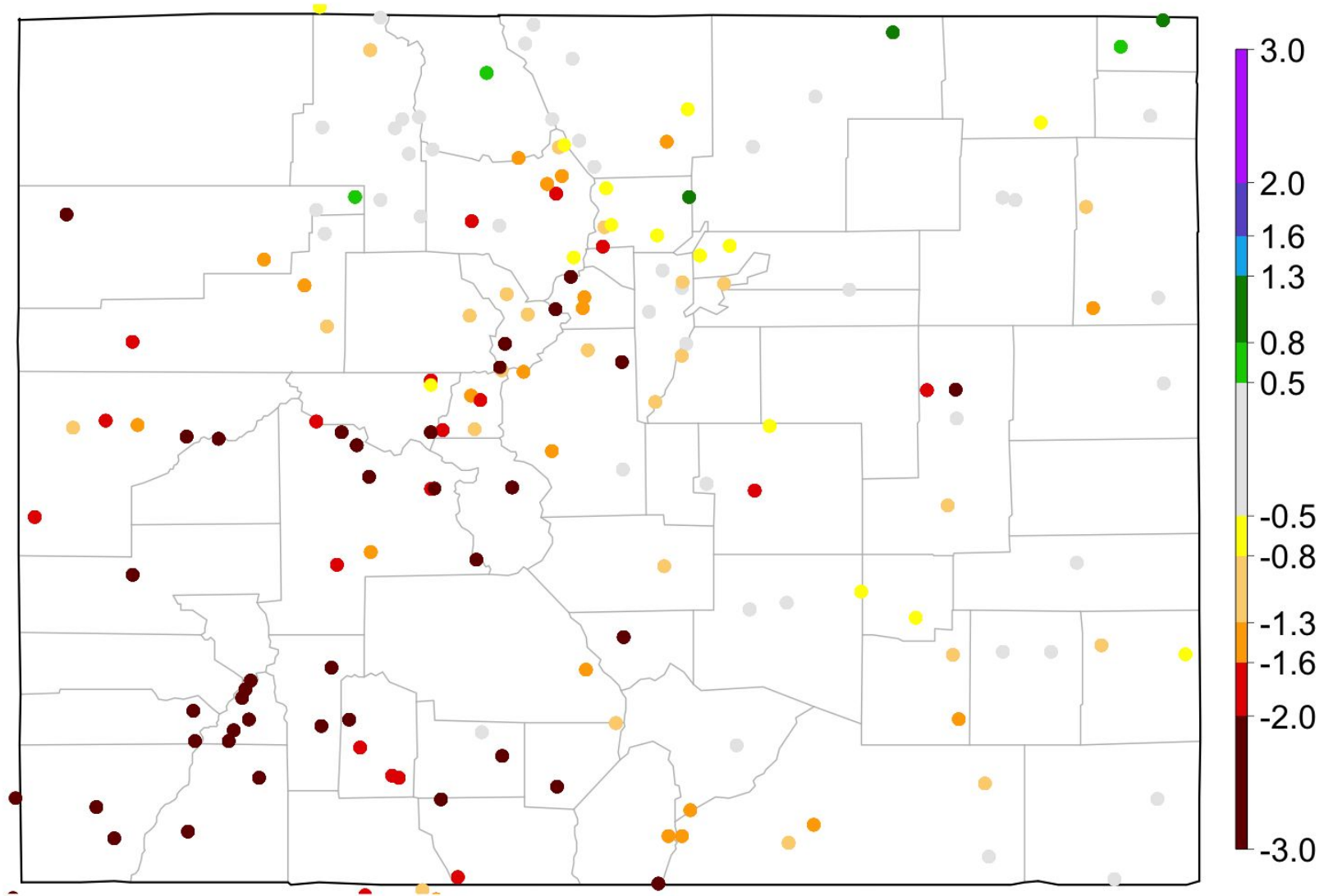
90-day SPI: 8/26/2019 - 11/23/2019



Data from High Plains Regional Climate Center and ACIS



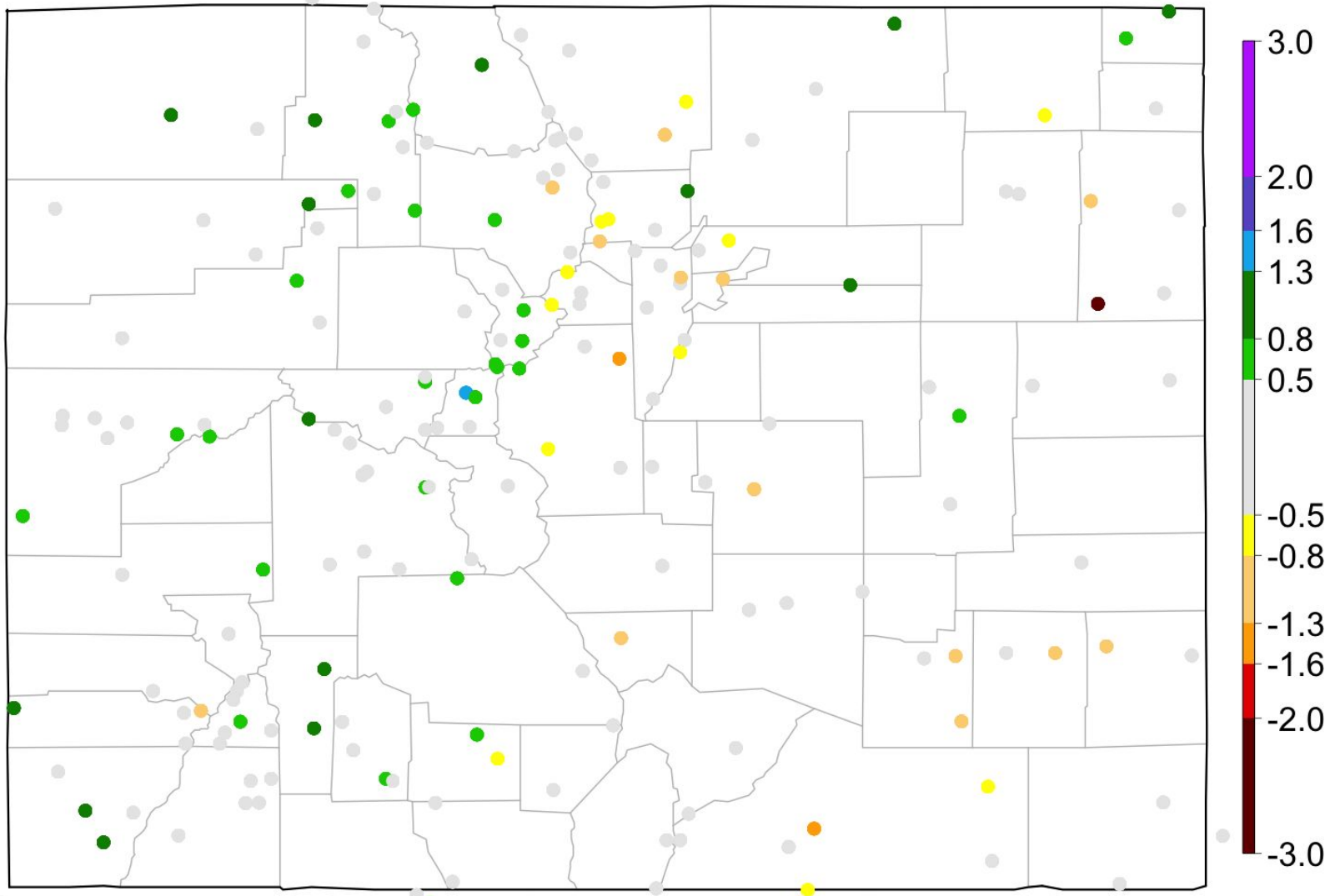
6-month SPI: 5/24/2019 - 11/23/2019



Data from High Plains Regional Climate Center and ACIS



12-month SPI: 11/24/2018 - 11/23/2019



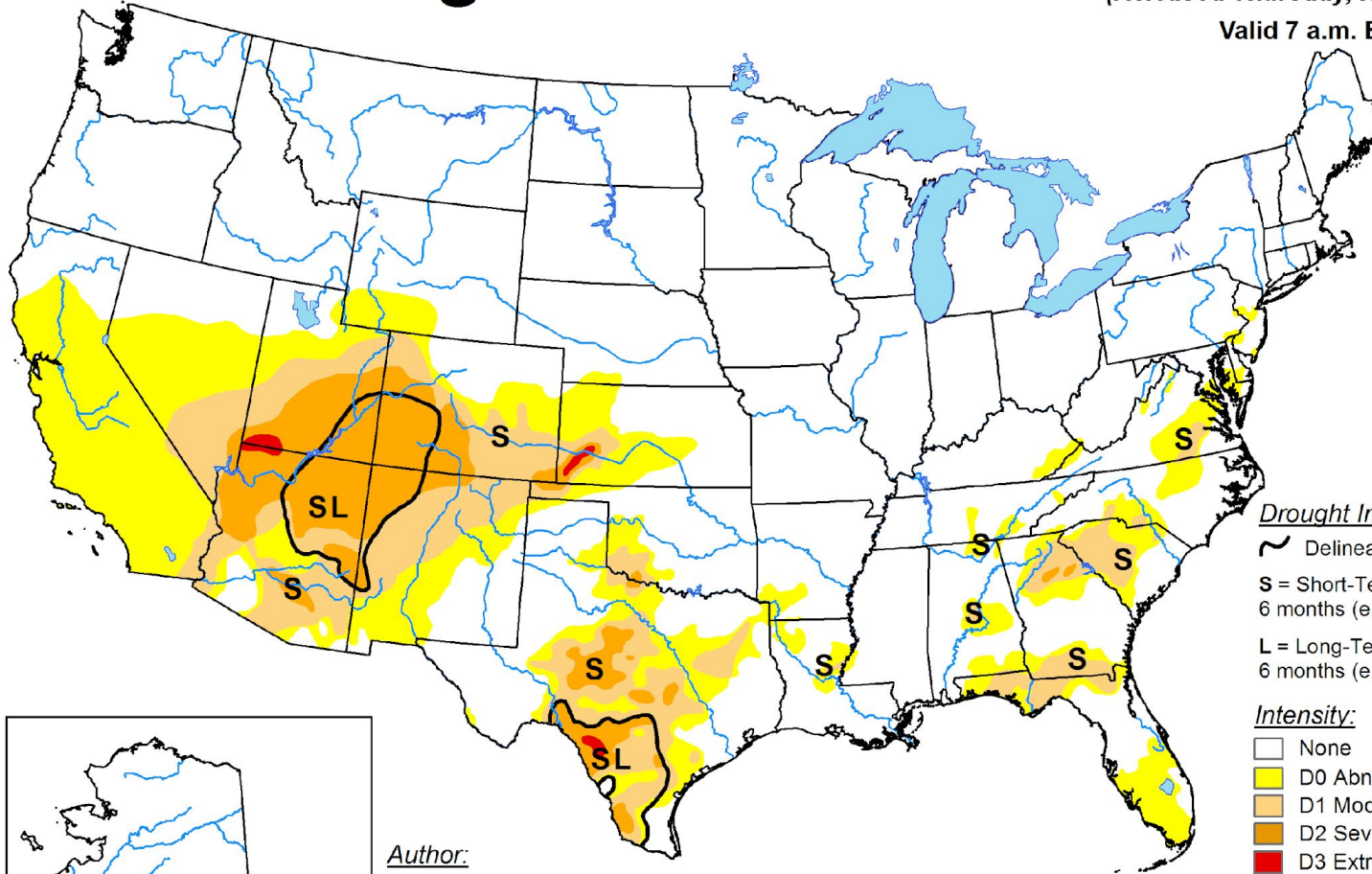
Data from High Plains Regional Climate Center and ACIS



U.S. Drought Monitor

November 19, 2019
(Released Thursday, Nov. 21, 2019)

Valid 7 a.m. EST



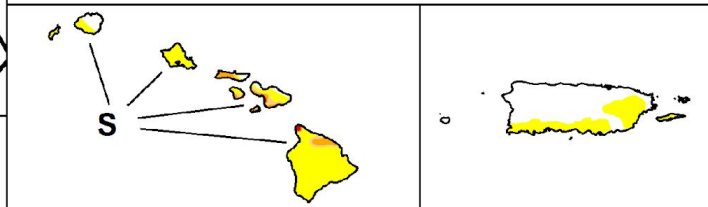
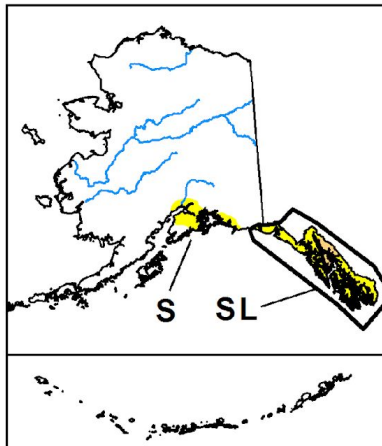
Drought Impact Types:

- ~ 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:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

Author:
Brad Rippey
U.S. Department of Agriculture



The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

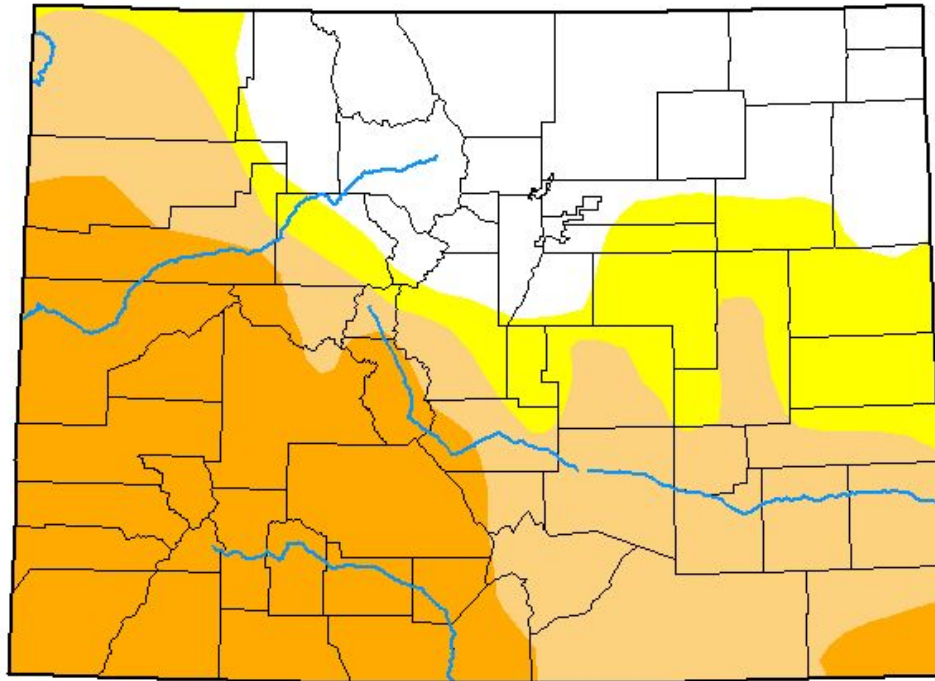


droughtmonitor.unl.edu



U.S. Drought Monitor Colorado

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Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	25.19	74.81	59.95	32.23	0.00	0.00
Last Week <i>11-12-2019</i>	25.74	74.26	55.27	31.02	0.00	0.00
3 Months Ago <i>08-20-2019</i>	93.35	6.65	0.00	0.00	0.00	0.00
Start of Calendar Year <i>01-01-2019</i>	17.94	82.06	66.26	54.91	27.11	11.22
Start of Water Year <i>10-01-2019</i>	30.14	69.86	27.53	0.00	0.00	0.00
One Year Ago <i>11-20-2018</i>	17.10	82.90	66.26	54.82	34.13	13.35

Intensity:

- None
- 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. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author:

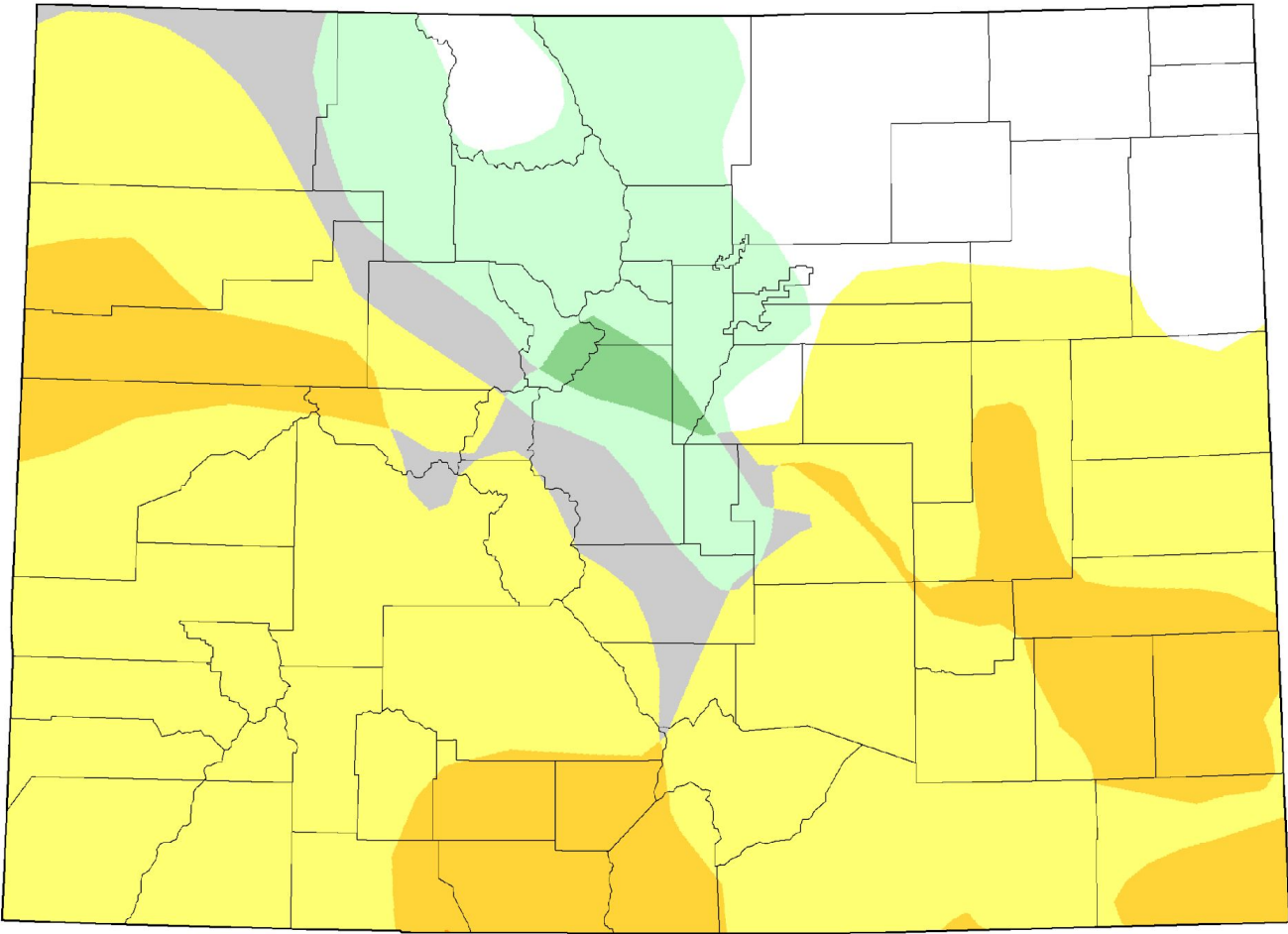
Brad Rippey
U.S. Department of Agriculture



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U.S. Drought Monitor Class Change - Colorado Start of Water Year



November 19, 2019
compared to
October 1, 2019

droughtmonitor.unl.edu



- 5 Class Degradation
- 4 Class Degradation
- 3 Class Degradation
- 2 Class Degradation
- 1 Class Degradation
- No Change
- 1 Class Improvement
- 2 Class Improvement
- 3 Class Improvement
- 4 Class Improvement
- 5 Class Improvement





Winter Outlook

El Niño or La Niña?

CPC Outlooks

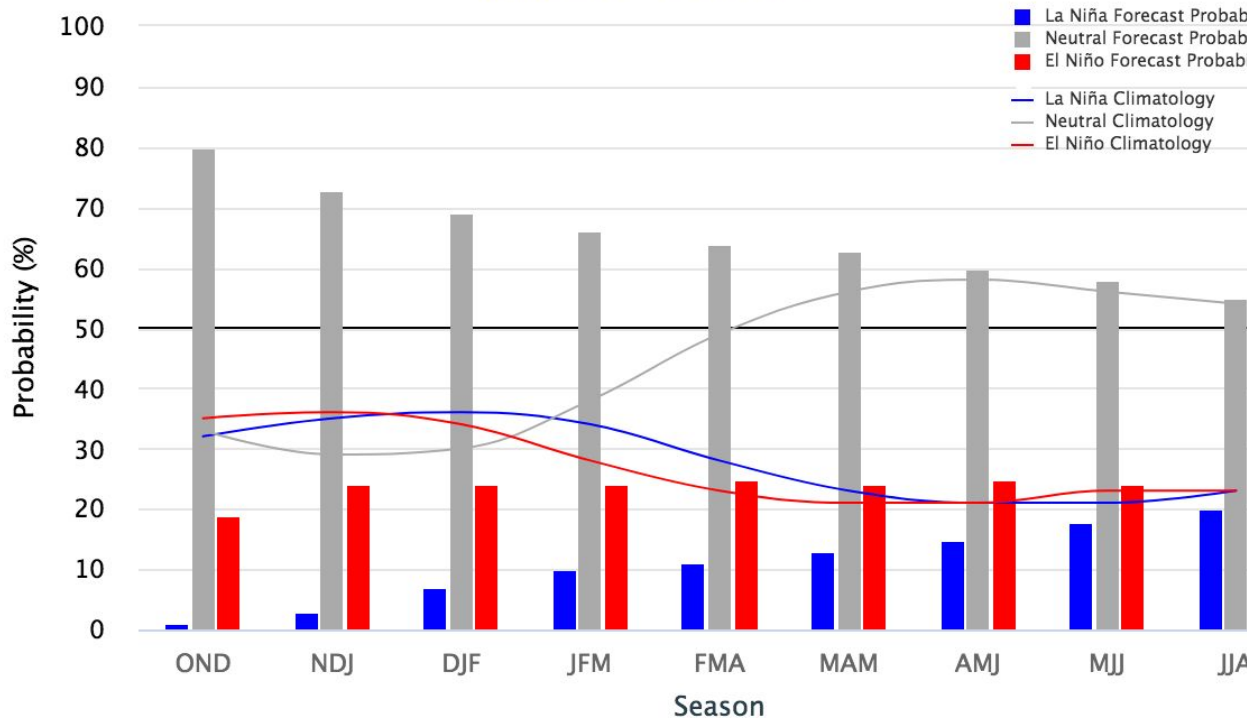
How important is start of season?



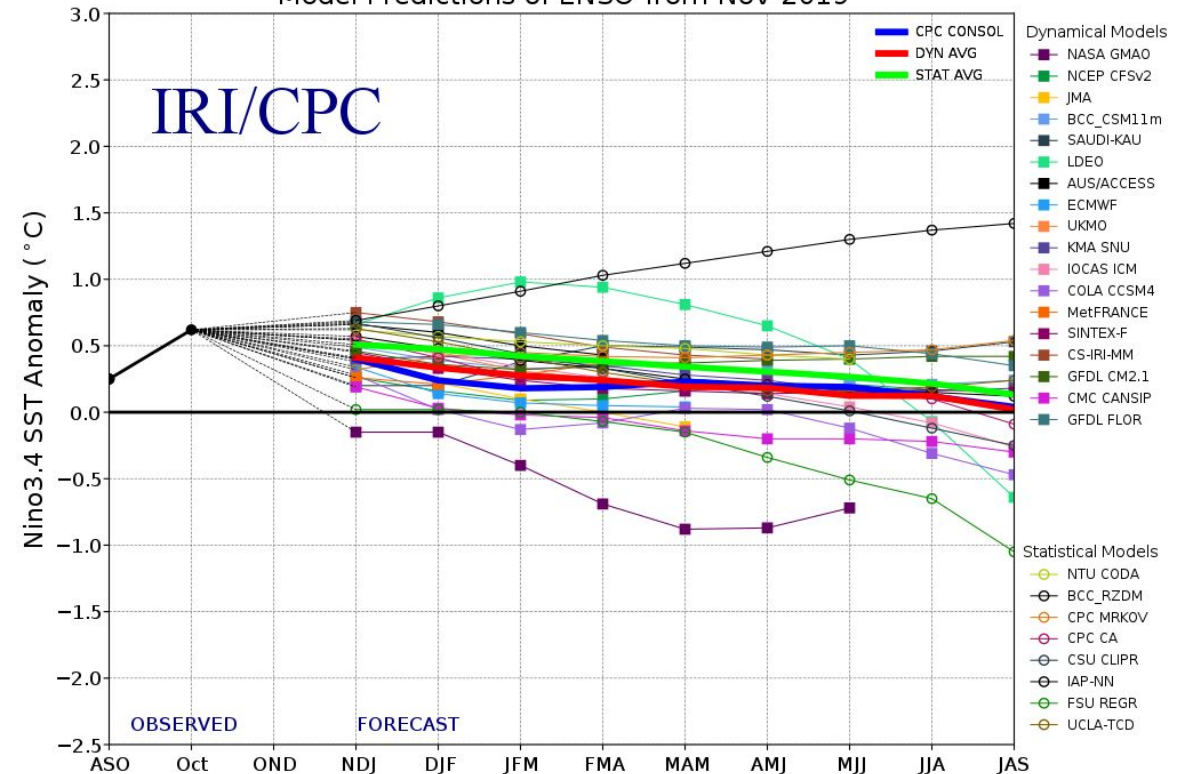
No El Niño or La Niña forecast

Early-November 2019 CPC/IRI Official Probabilistic ENSO Forecasts

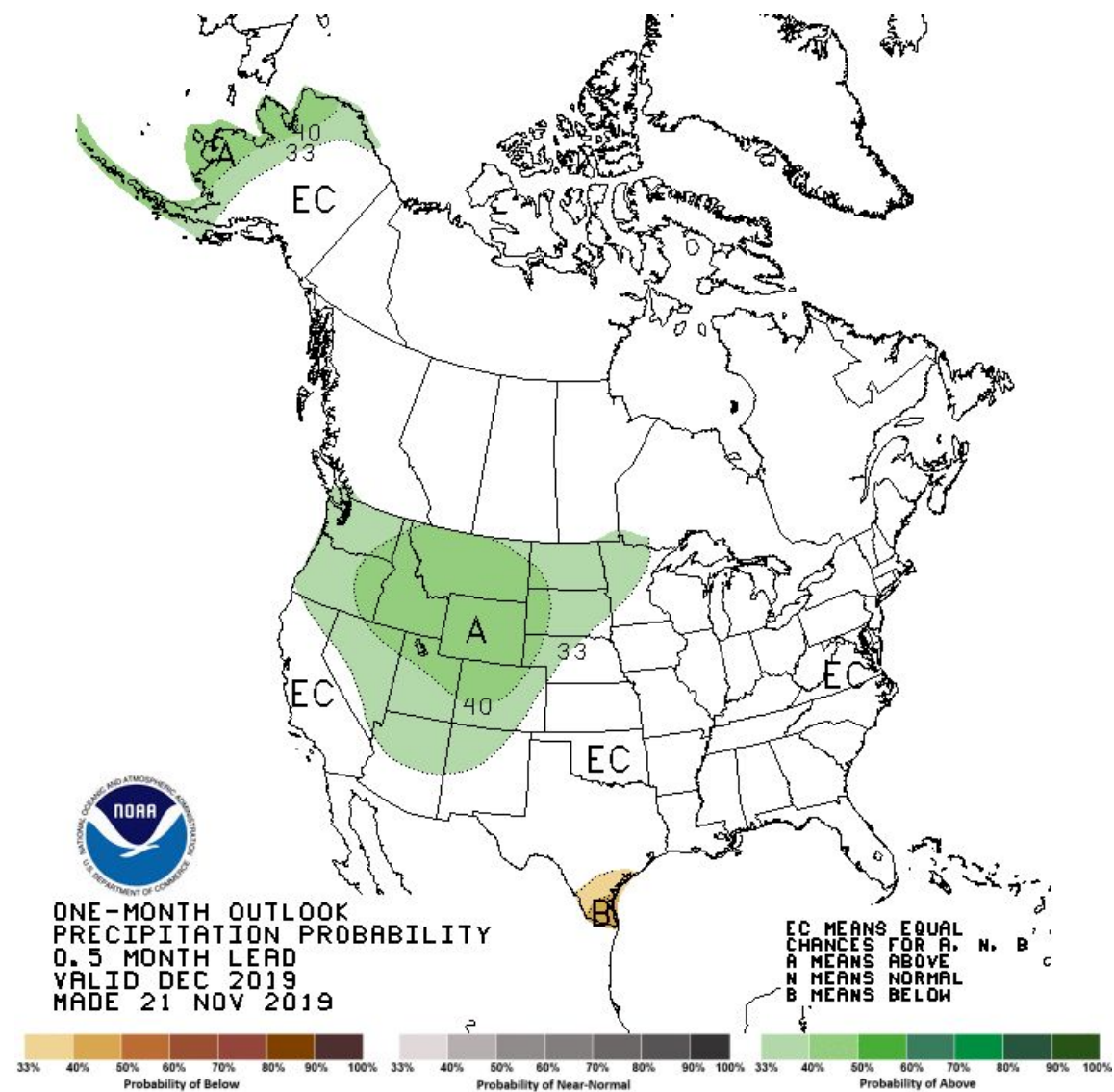
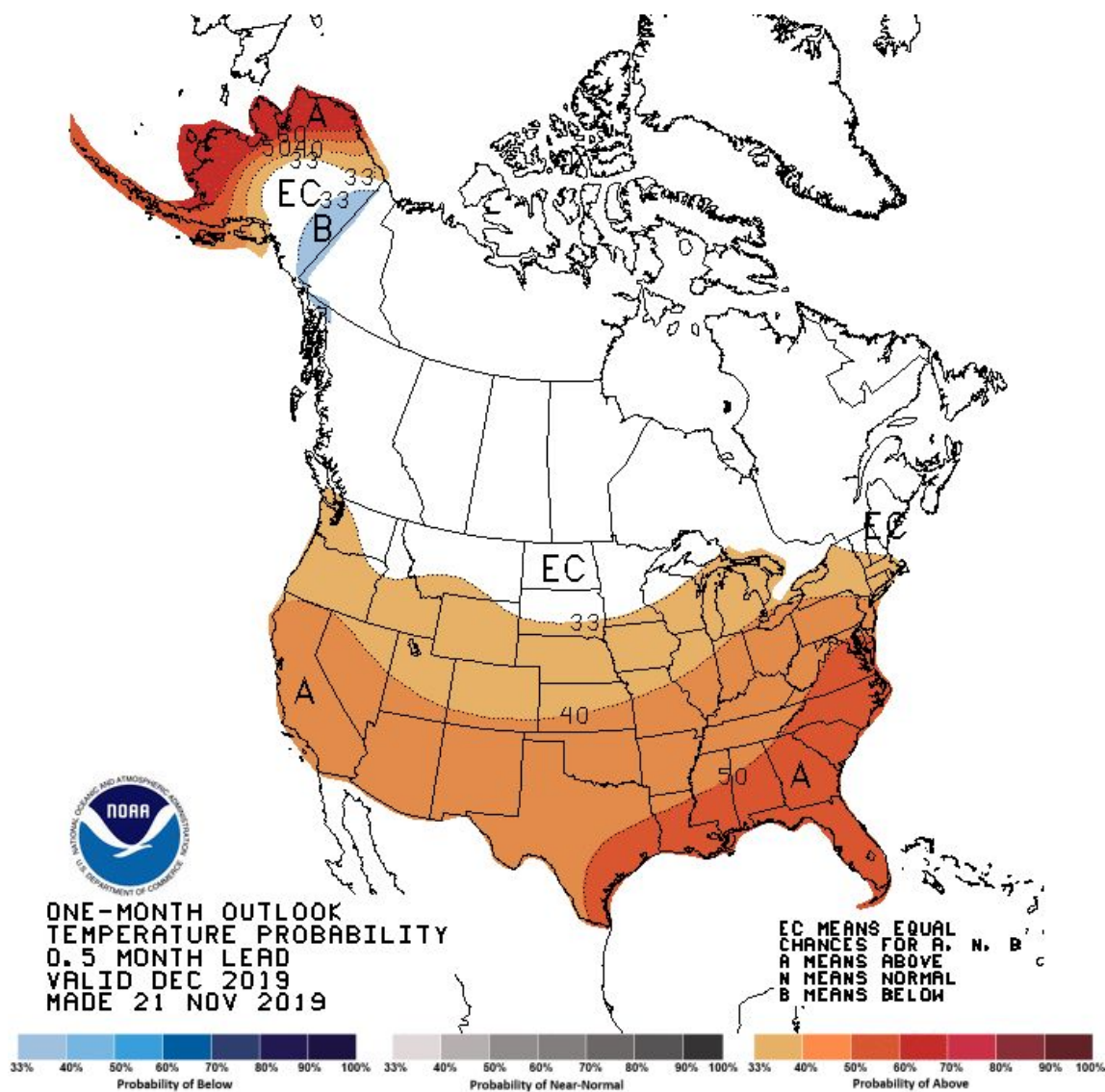
ENSO state based on NINO3.4 SST Anomaly
Neutral ENSO: $-0.5\text{ }^{\circ}\text{C}$ to $0.5\text{ }^{\circ}\text{C}$



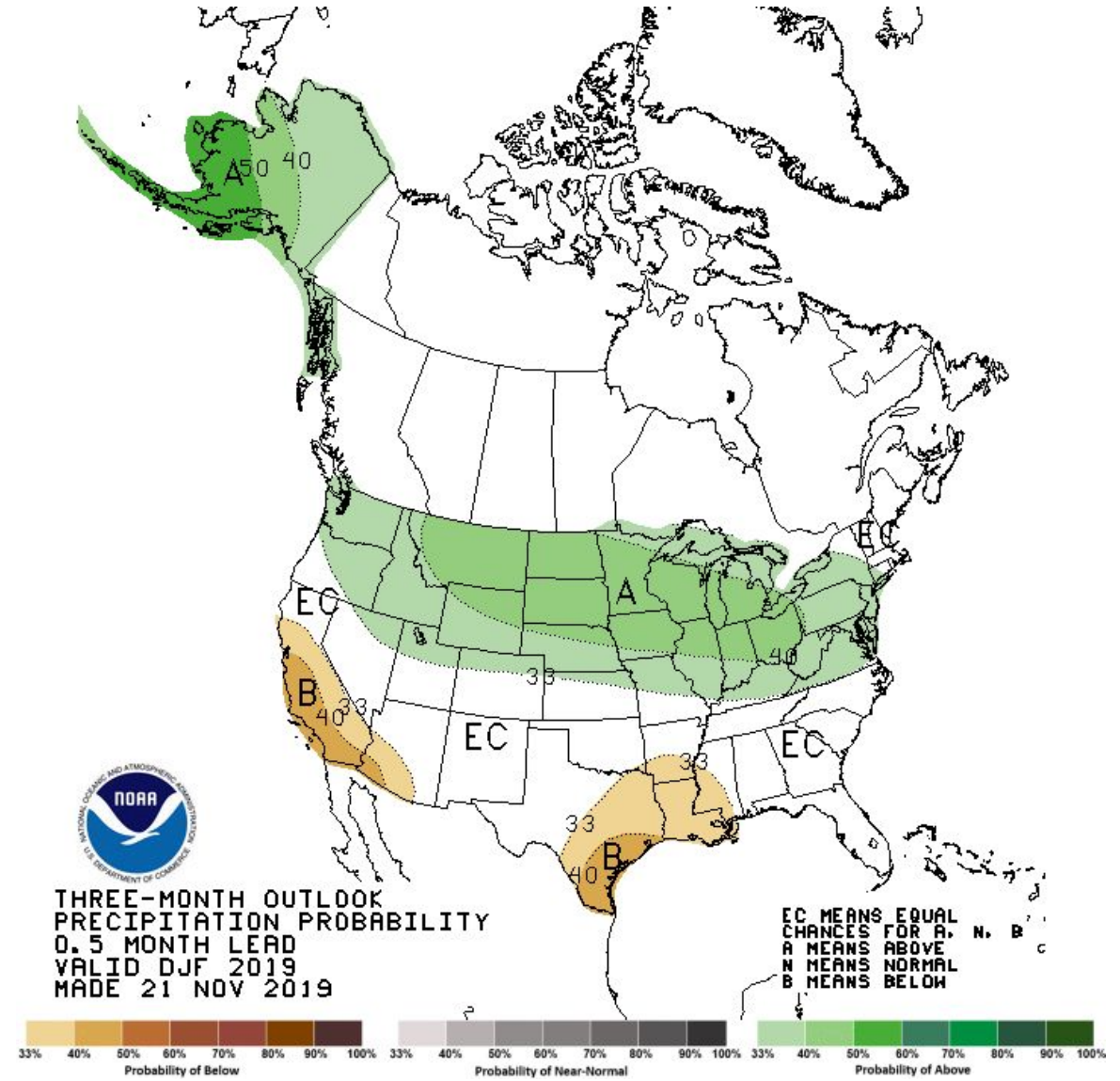
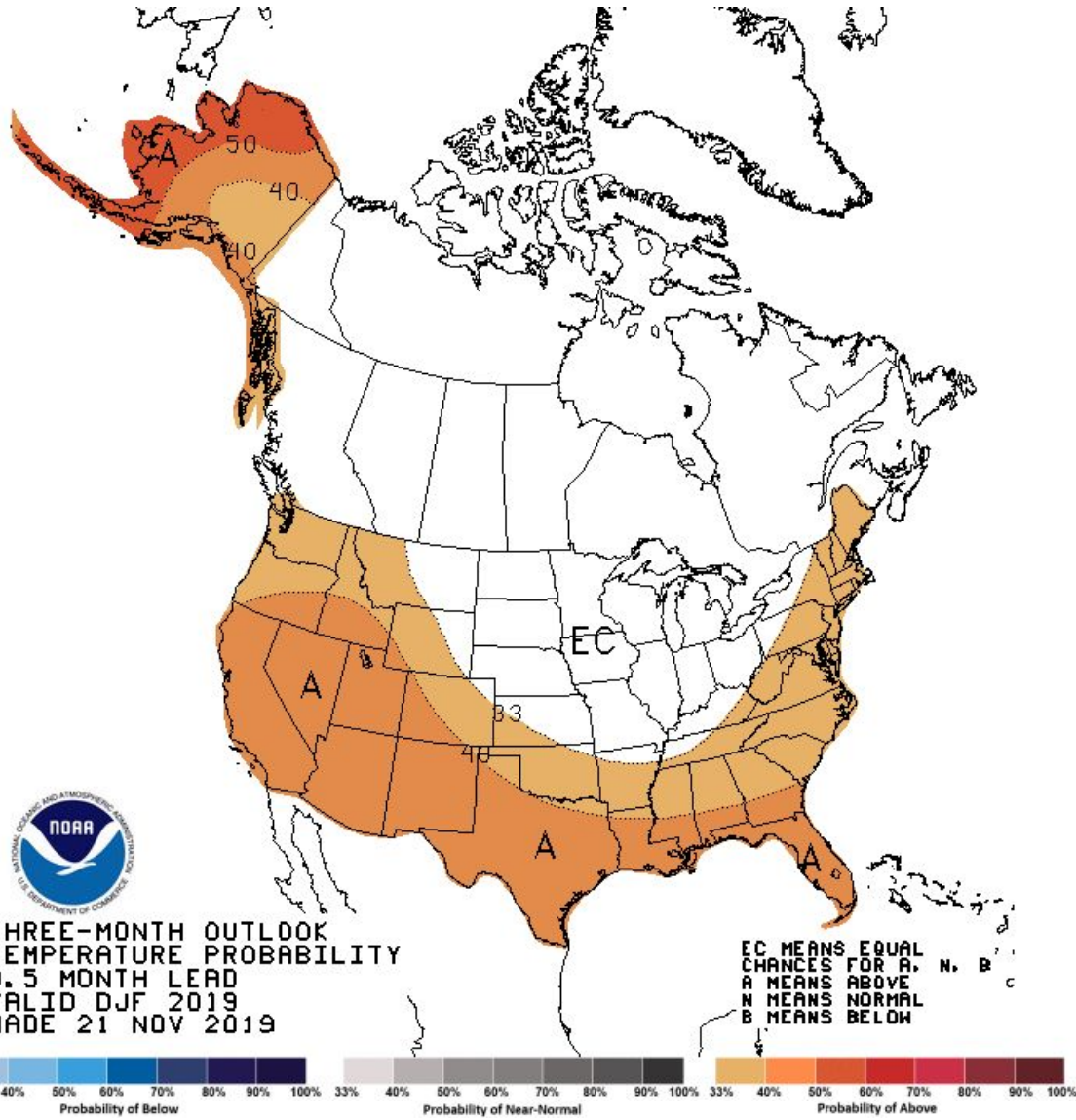
Model Predictions of ENSO from Nov 2019



One Month Outlook



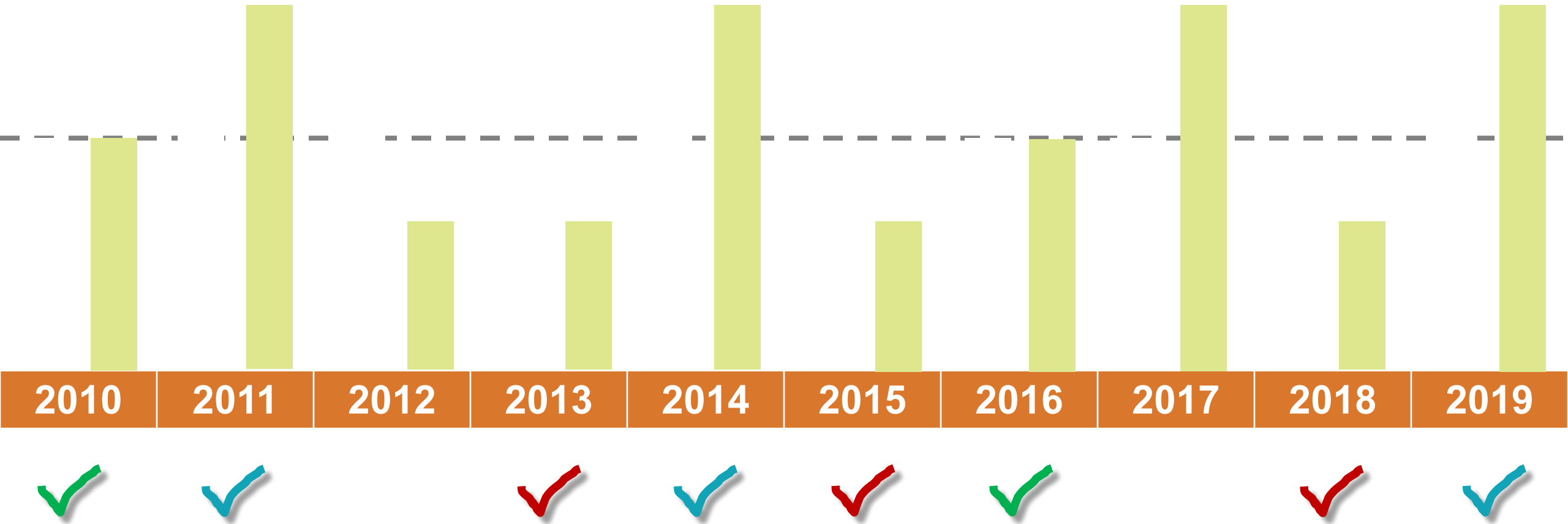
Dec-Jan-Feb Outlook

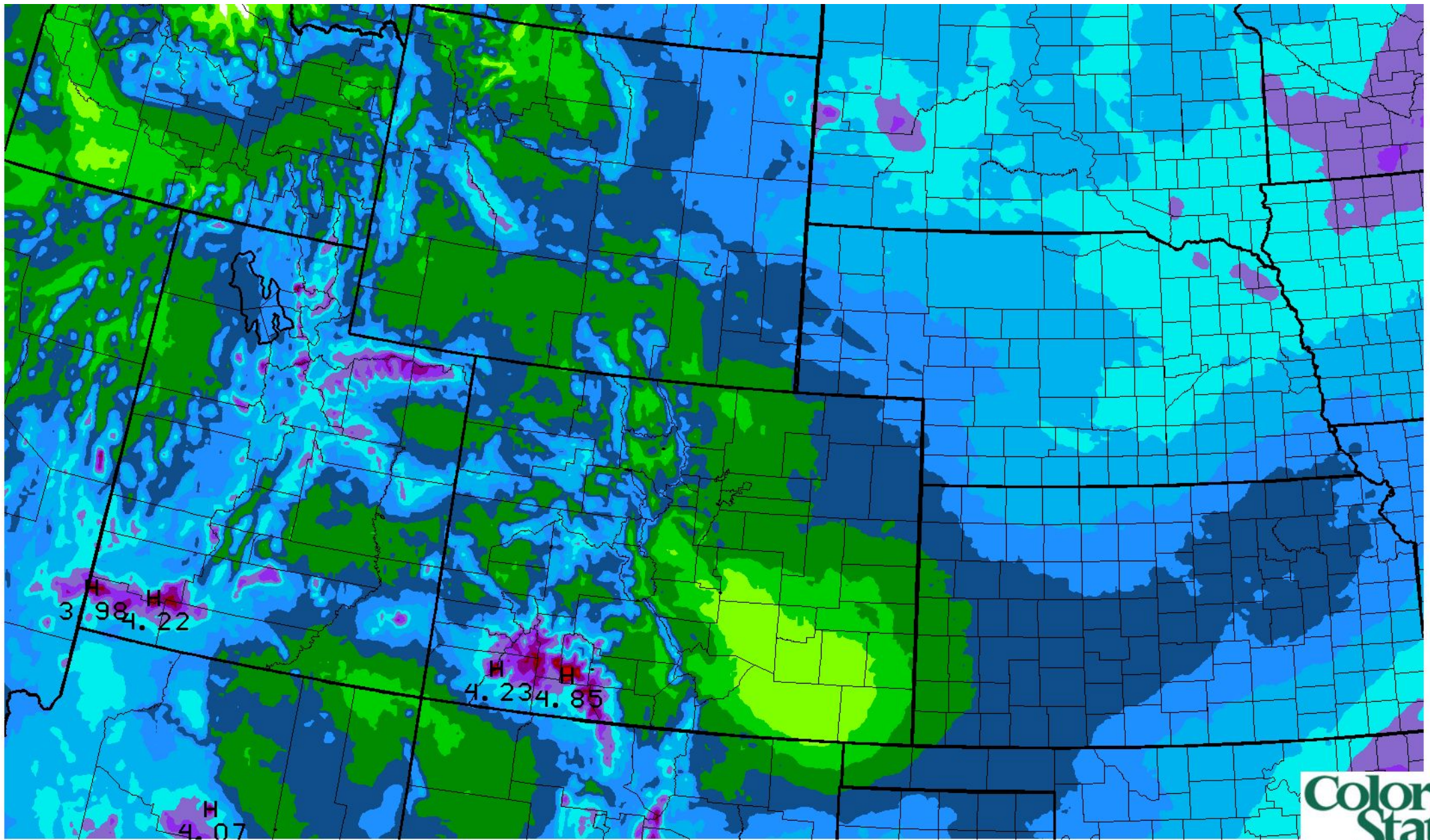
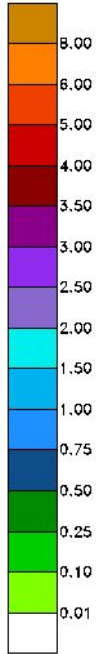


Oct-Nov snowpack

 Total season snowpack

good season
----- near normal
bad season





WPC FORECAST PRECIPITATION (INCHES) IN 7 DAYS ENDING TUE 191203/1200V168
FORECAST ISSUED 191126/1200F168



CPC and Model Outlooks...

- ✓ With no El Niño or La Niña forecast to dominate large-scale patterns, the outlook is a bit more uncertain for the winter.
- ✓ Temperature probabilities leaning toward warmer than average, likely driven by climate change signal.
- ✓ Precipitation probabilities are a lot more uncertain.
- ✓ Promising outlook for those areas that had a strong start to the water year with good snowpack in October and November.
- ✓ Don't worry yet, there's still a lot of snow accumulating season yet to go!

Becky.Bolinger@colostate.edu

**To view this and other presentations:
http://climate.colostate.edu/ccc_archive.html**

Thank you



ATMOSPHERIC SCIENCE
COLORADO STATE UNIVERSITY