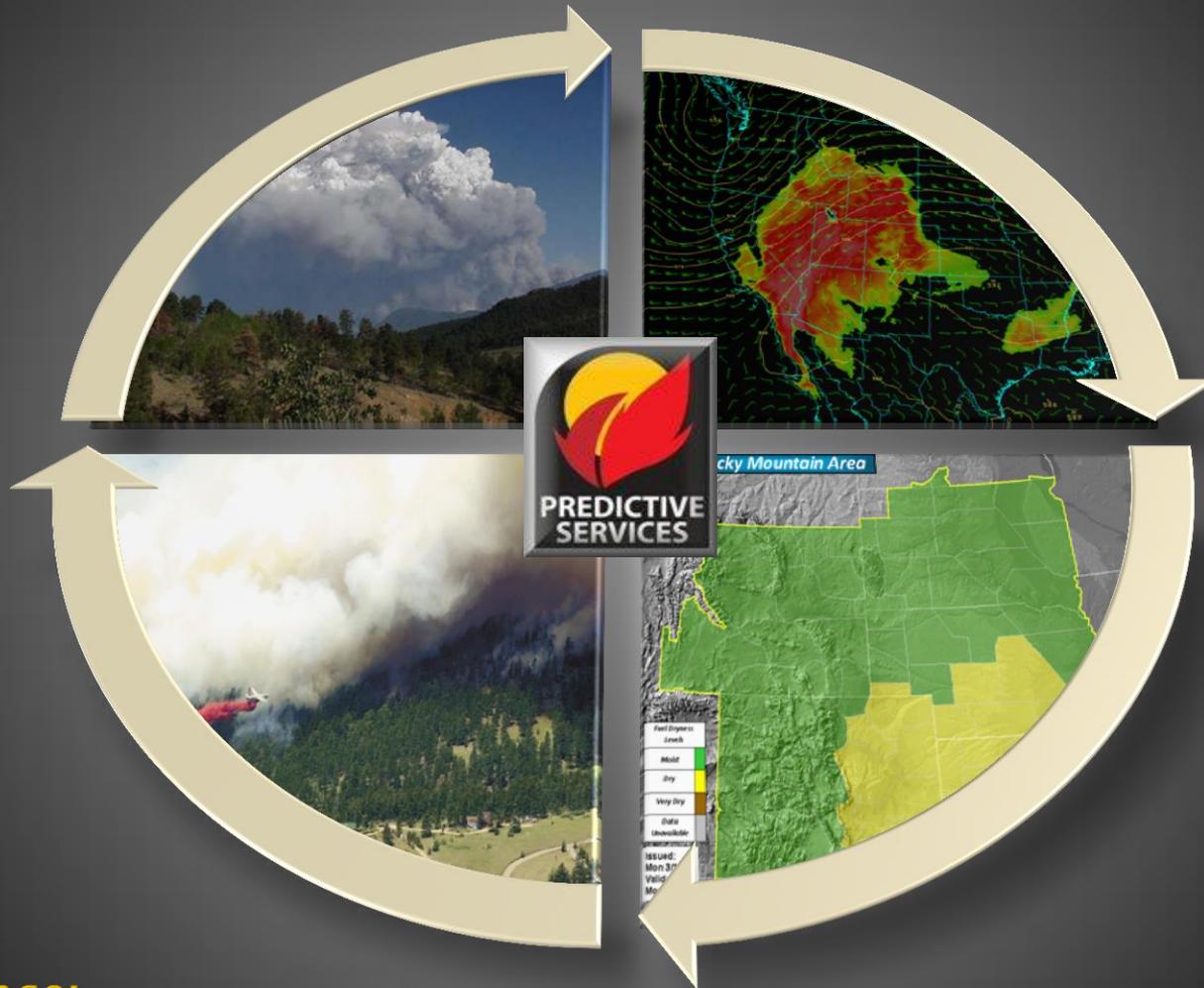




Predictive Services

2016 Rocky Mountain Area Seasonal Outlook - July 1, 2016



Correspondence:
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t2mathew@blm.gov



Seasonal Outlook

Considerations

Antecedent Conditions

- ❑ Weather Patterns of 2016 (Late Spring-Early Summer)
- ❑ Temperature Anomalies
- ❑ Current Drought Conditions and Comparisons
- ❑ Precipitation Comparisons
- ❑ Fuel Moisture

Prediction

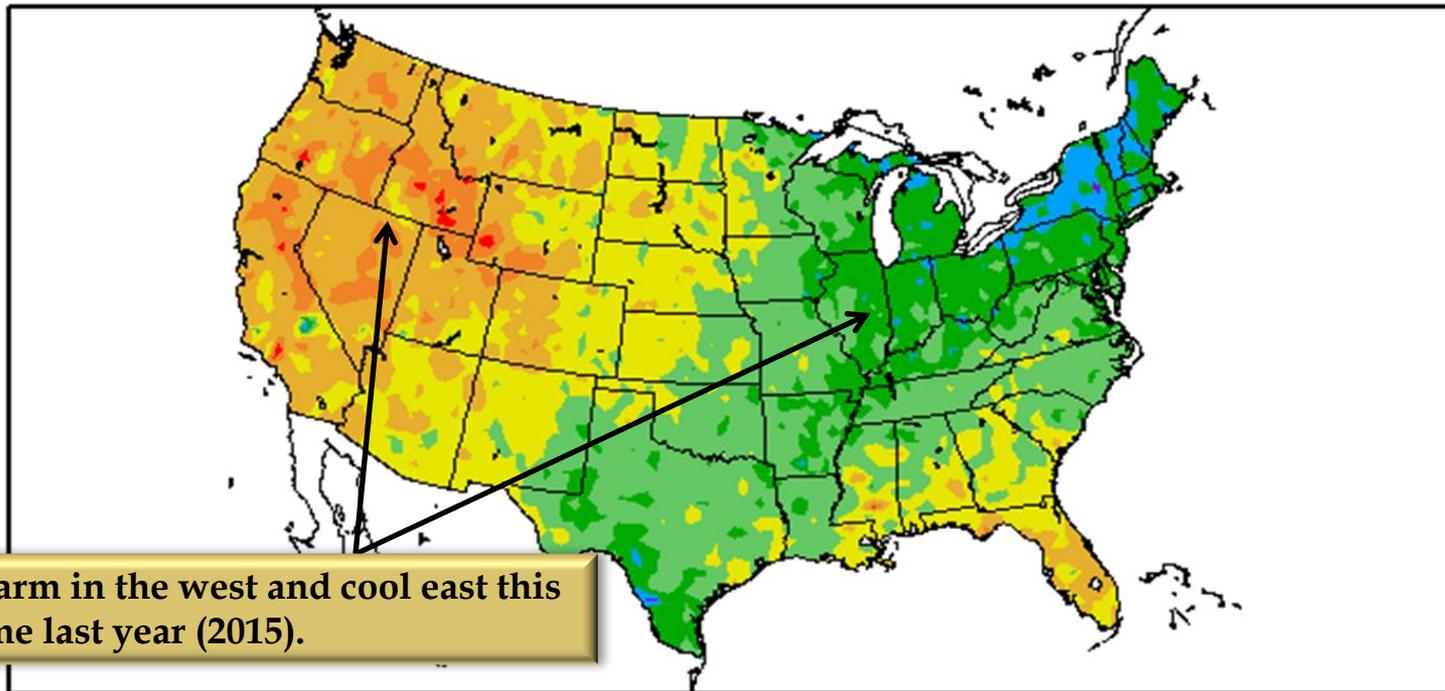
- ❑ Predictors
 - ❑ General SST Anomalies and Predictions (El Nino, La Nina)
 - ❑ Past El Nino's Transitioning into a Neutral to La-Nina Phase in the Summer/Fall (1966, 1973, 1983, 1988, 1998, 2007) and the Resultant Temperature/Precipitation Impacts
- ❑ Short Term and Long Term Forecast Charts
- ❑ Final Thoughts and Considerations for the Summer and Fall 2016



Seasonal Outlook

Temperature Departure From Normal Since Jan 1, 2015

Departure from Normal Temperature (F)
1/1/2015 – 6/4/2015



Warm in the west and cool east this time last year (2015).

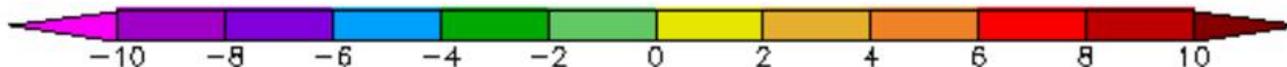
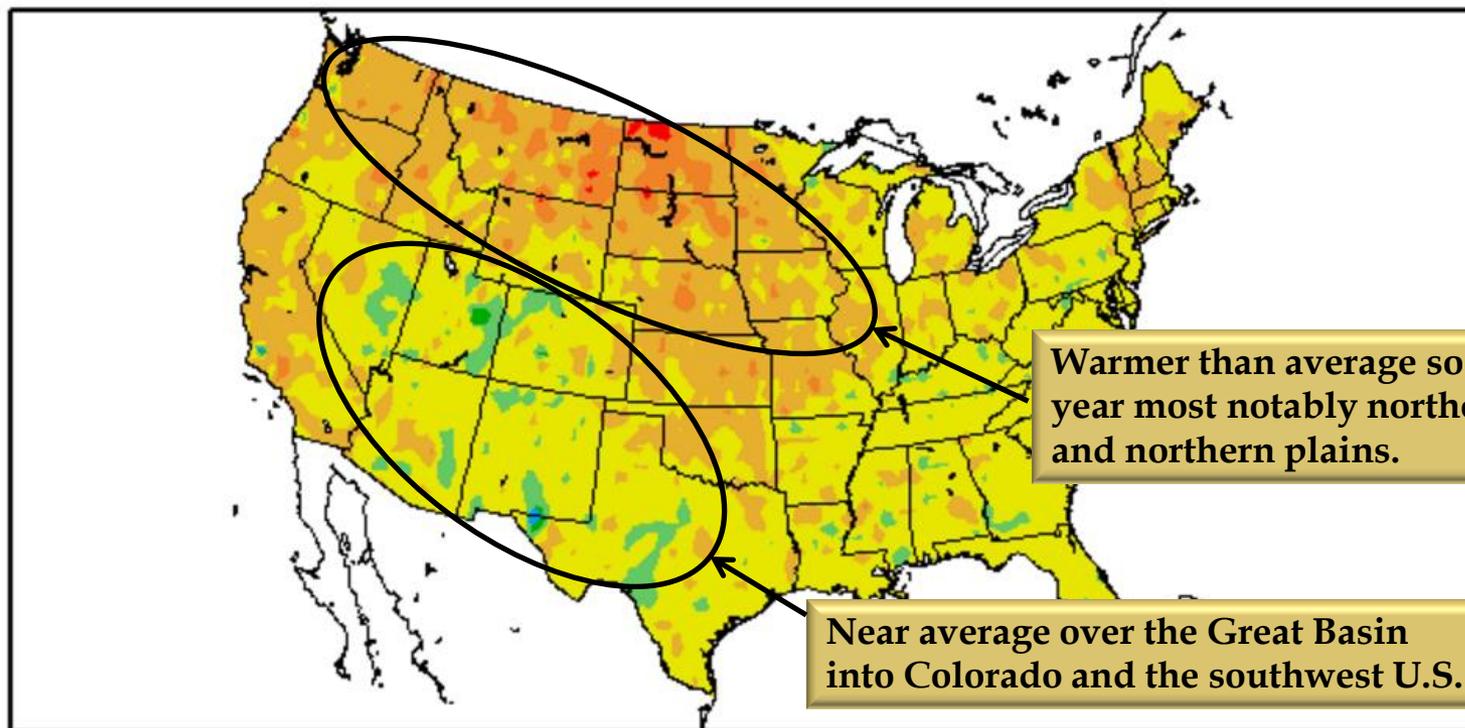




Seasonal Outlook

Temperature Departure From Normal Since Jan 1, 2016

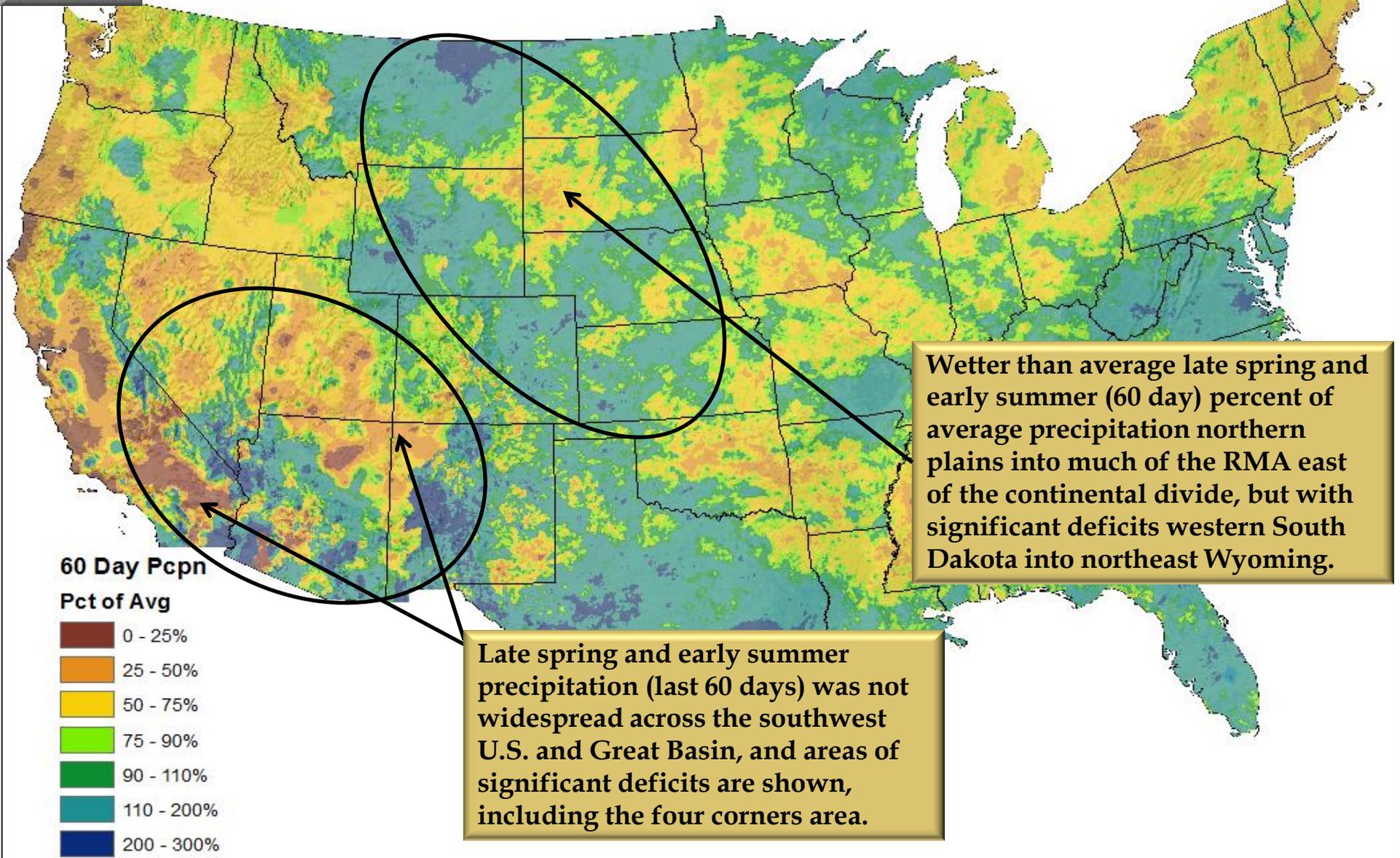
Departure from Normal Temperature (F)
1/1/2016 - 6/22/2016





Seasonal Outlook

60-Day % of Average Precipitation 7/1/2016



Wetter than average late spring and early summer (60 day) percent of average precipitation northern plains into much of the RMA east of the continental divide, but with significant deficits western South Dakota into northeast Wyoming.

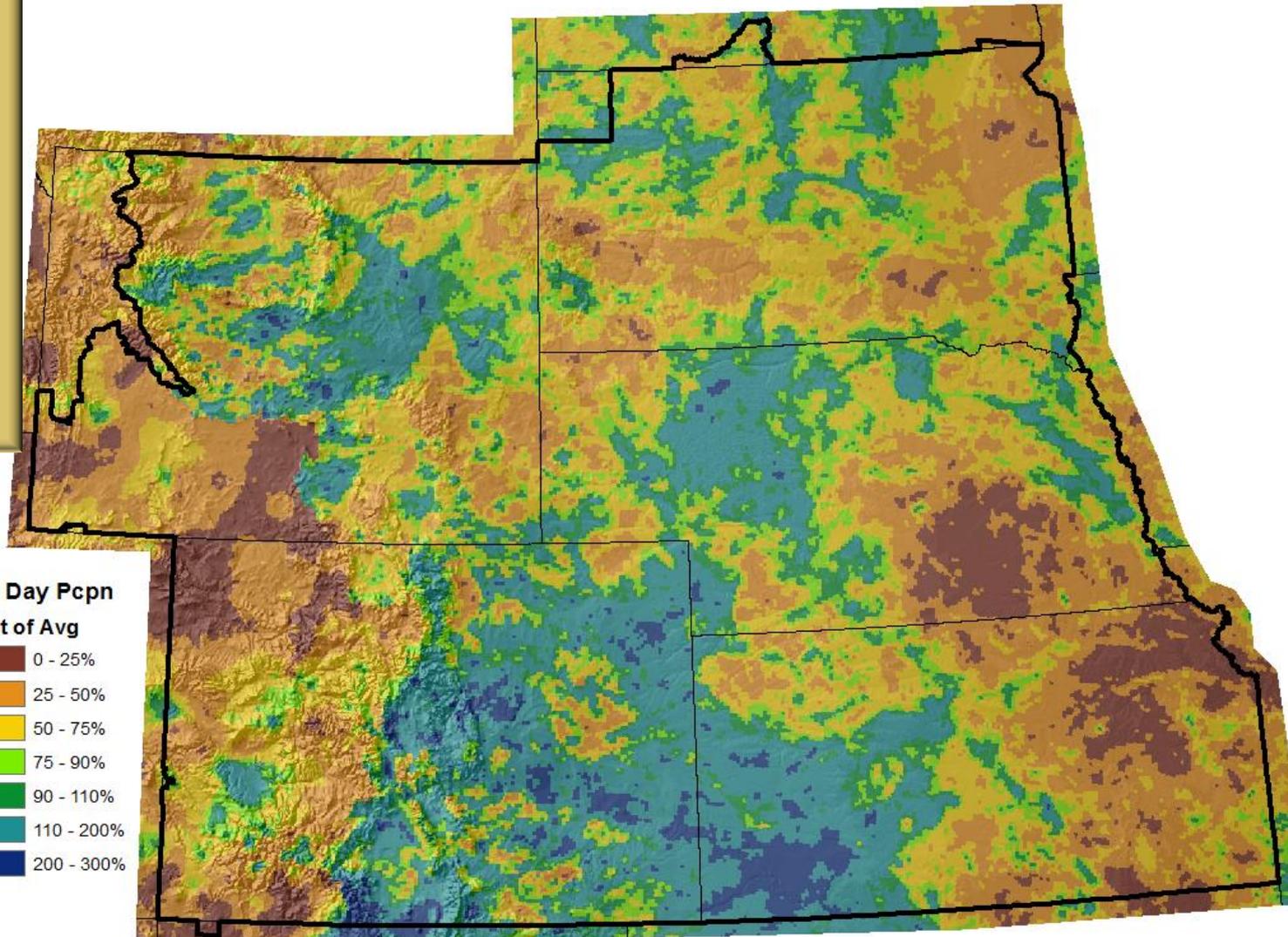
Late spring and early summer precipitation (last 60 days) was not widespread across the southwest U.S. and Great Basin, and areas of significant deficits are shown, including the four corners area.



Seasonal Outlook

30-Day % of Average Precipitation 7/1/2016

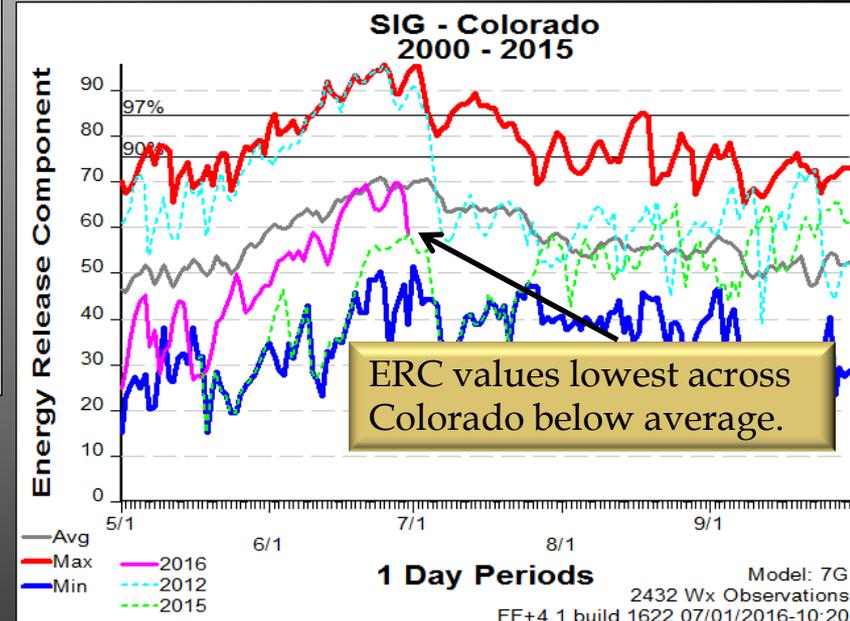
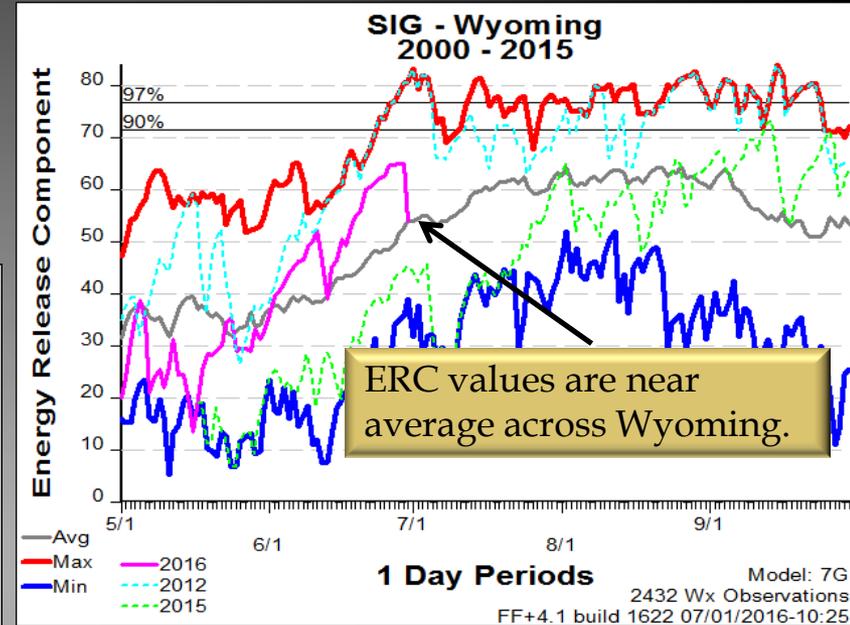
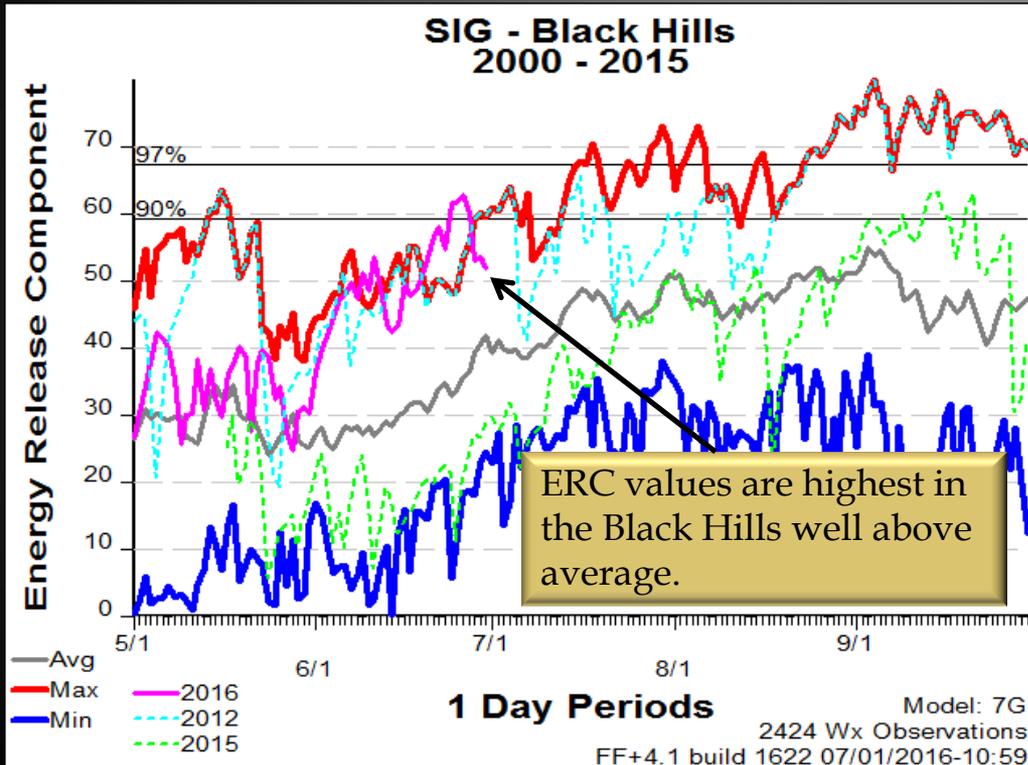
June (30 day) percent of average shows relatively dry conditions across western Colorado and southwest Wyoming, and wetter than average across eastern Colorado. A mix of below and above average elsewhere east of the continental divide, with notable deficits portions of eastern Nebraska and Kansas, and the northern Black Hills.





Seasonal Outlook

Energy Release Component (ERC's)

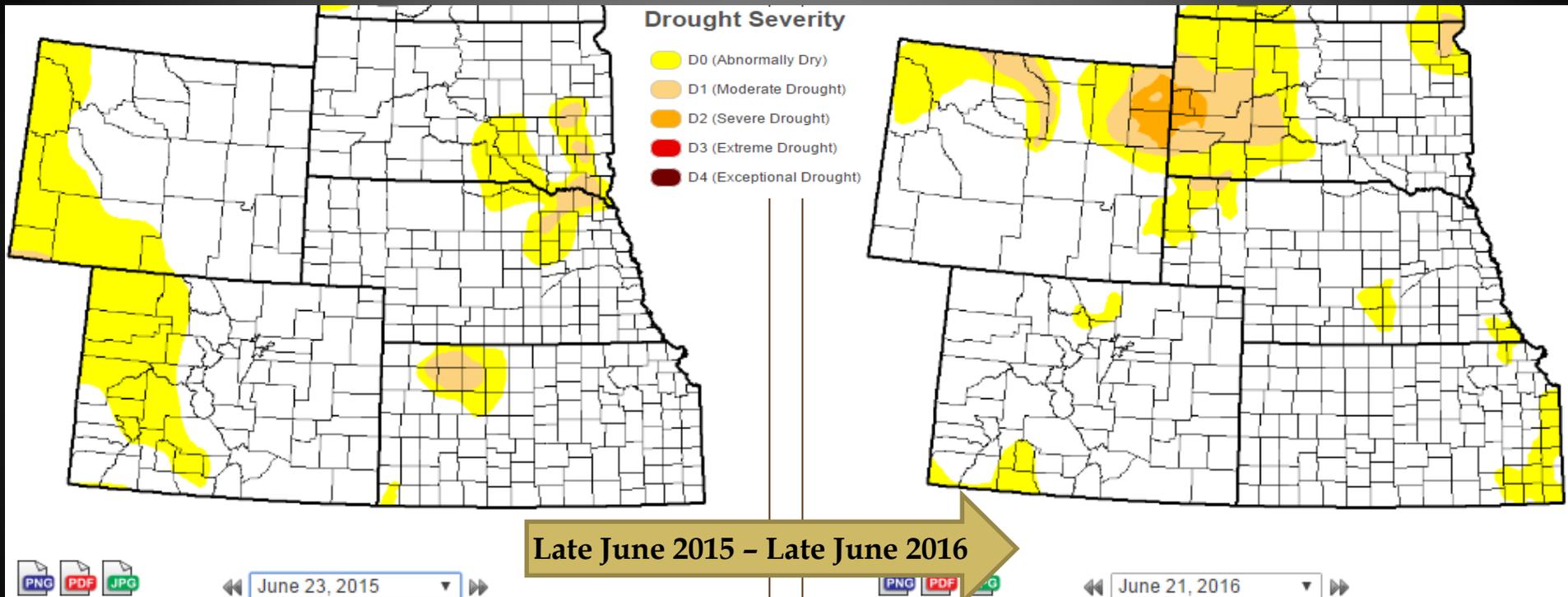




Seasonal Outlook

Drought Monitor (Drought Mitigation Center)

Change From Last Year to this Year: Late June 2015 vs. Late June 2016

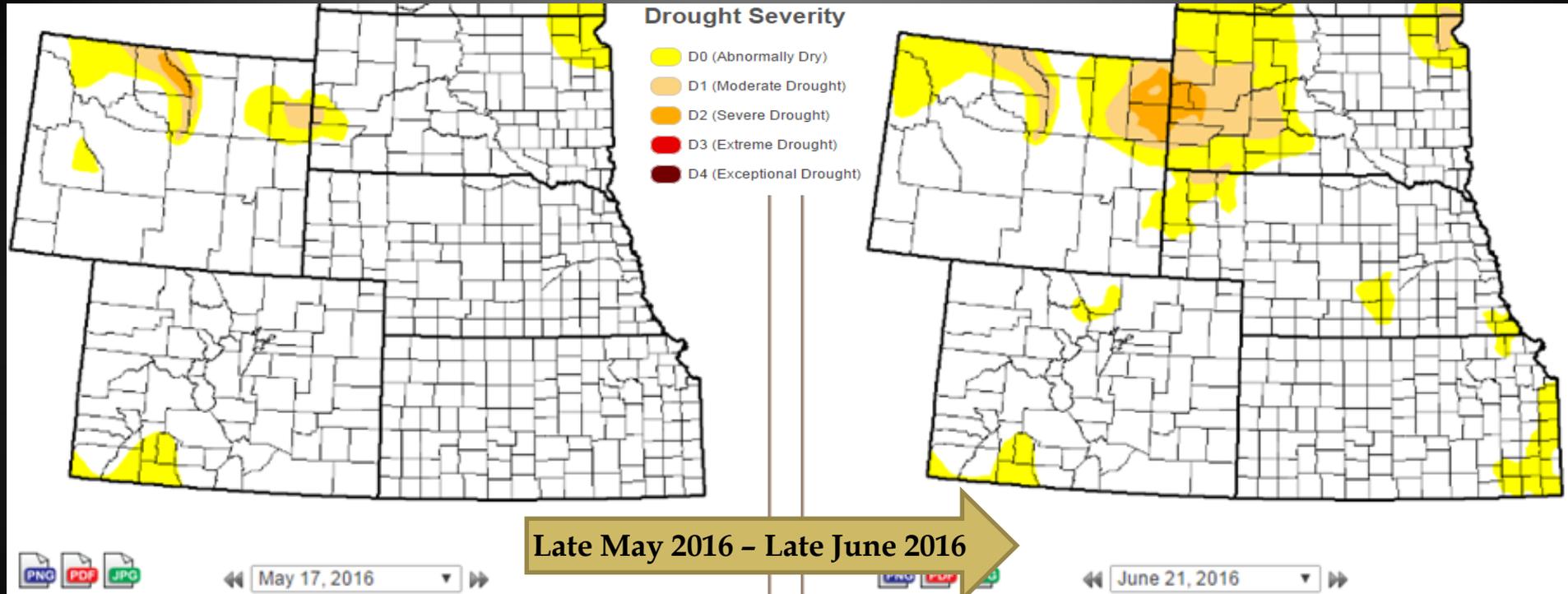


Main change from this time last year is the emergence of drought across northeast Wyoming into western South Dakota, and to a lesser degree north-central to northwest Wyoming.



Seasonal Outlook

Drought Monitor (Drought Mitigation Center)
Last 30 Day Change: Late May 2016 vs. Late June 2016

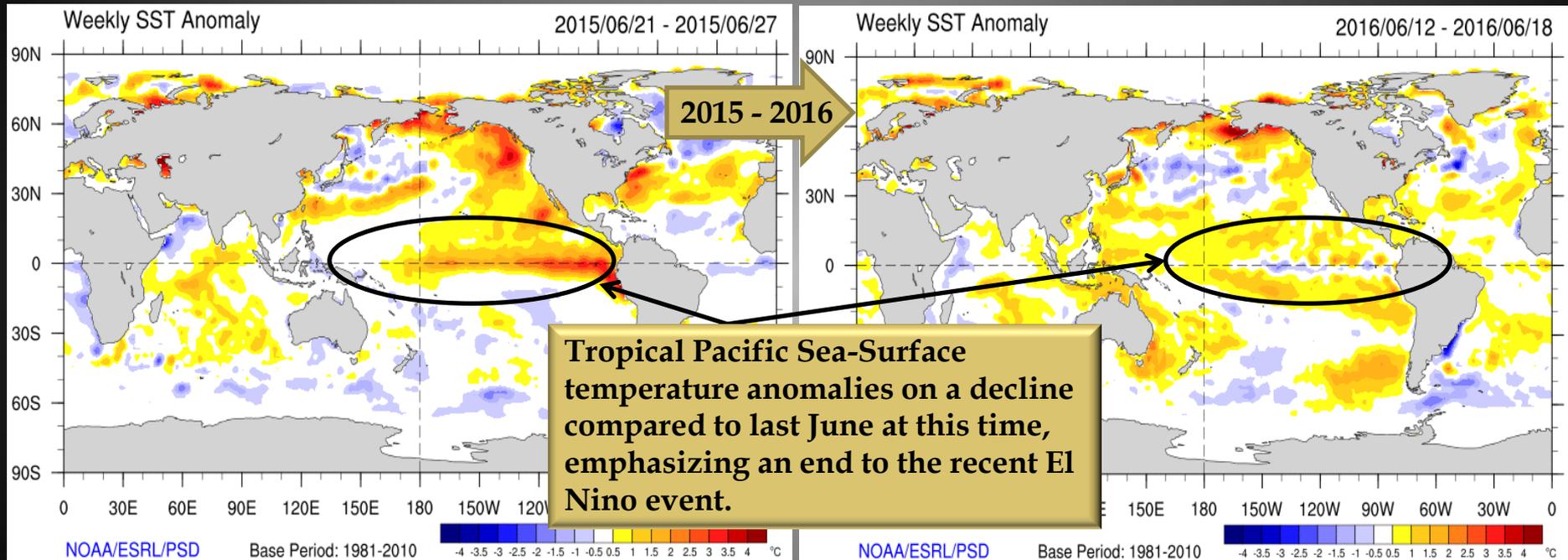


Main change from this time last month is expansion and intensification of drought across northeast Wyoming and western South Dakota, and slight drought improvement in north-central Wyoming.



Seasonal Outlook

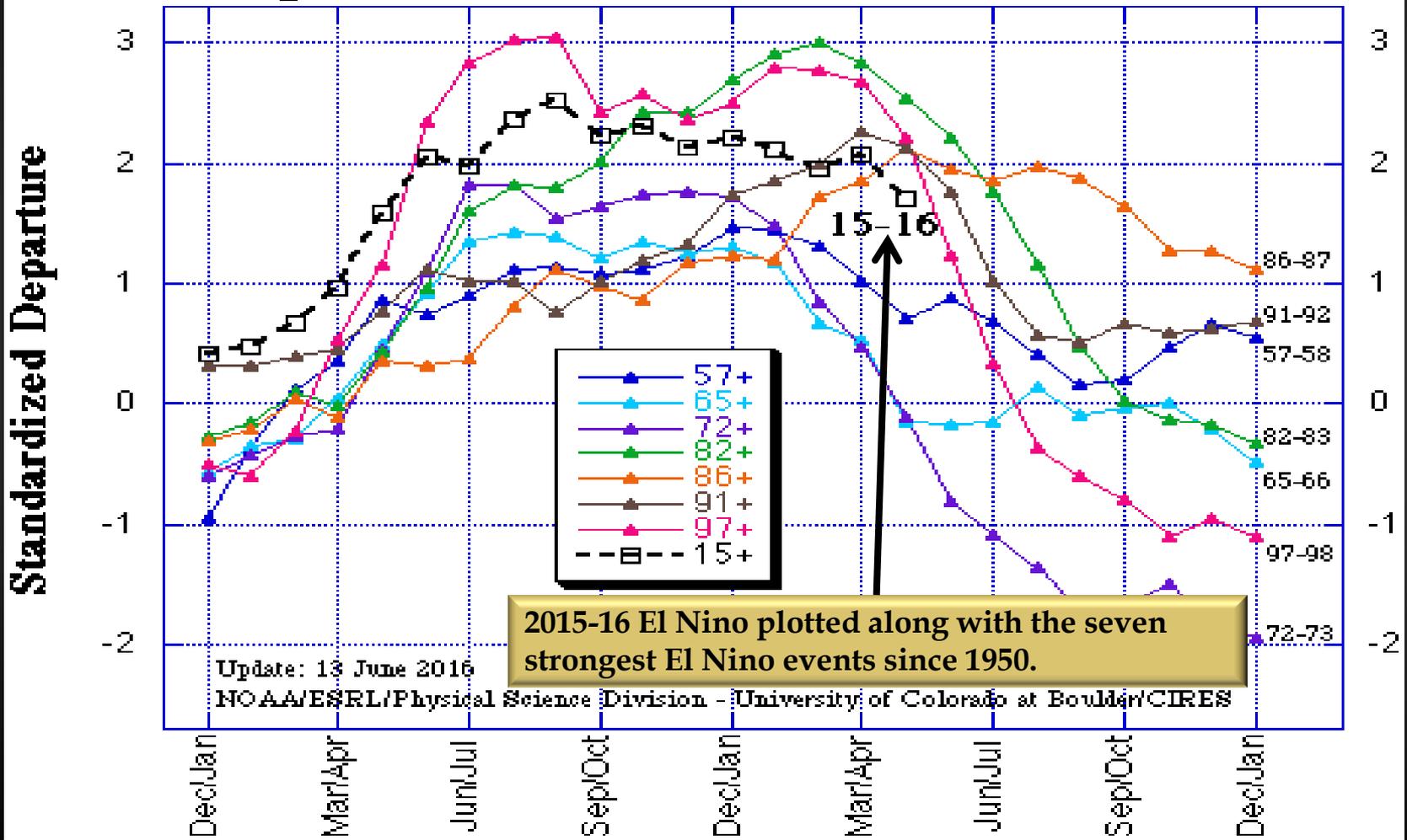
Sea Surface Temperature Anomalies



Seasonal Outlook

El Niño Southern Oscillation (ENSO) - MEI

Multivariate ENSO Index (MEI) for the seven strongest El Niño events since 1950 vs. 2015-16

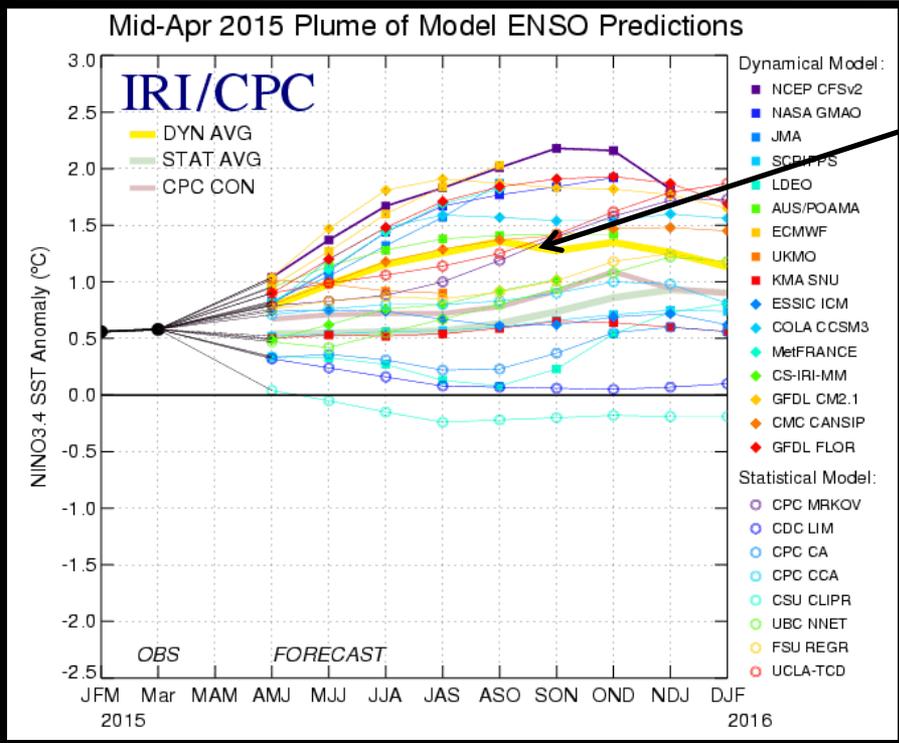




Seasonal Outlook

El Nino Southern Oscillation (ENSO) Forecast

Most models last year (run April 2015) correctly indicated strengthening El Nino for 2015 and 2016.



Latest models (run mid-June 2016) show current neutral conditions. Forecasts predict La-Nina evolution (anomalies less than -0.5 degrees) for much of the summer and fall 2016.

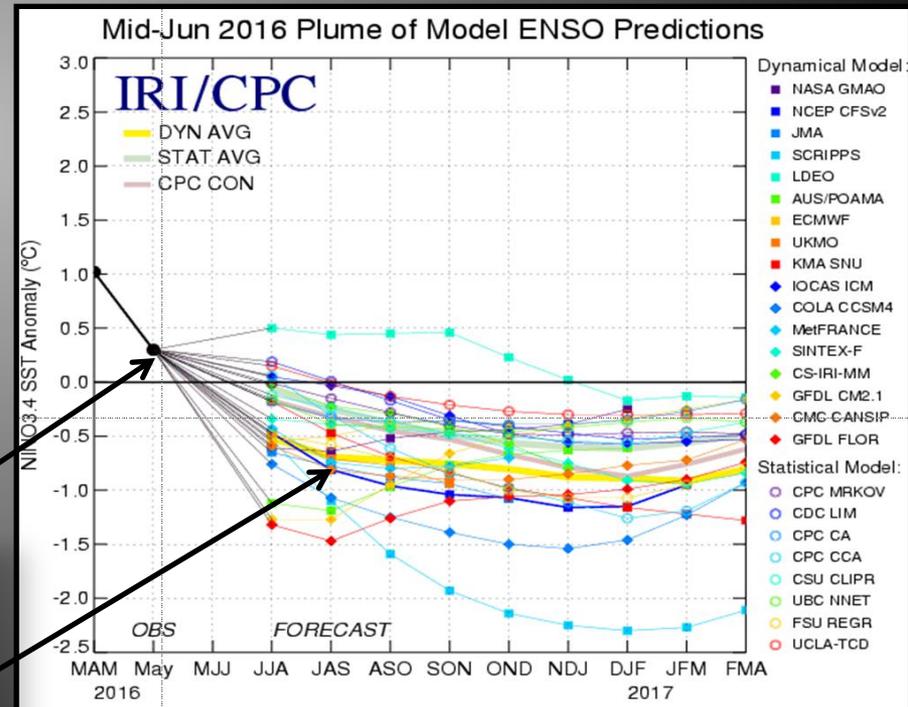


Figure provided by the International Research Institute (IRI) for Climate and Society (updated 16 June 2016).

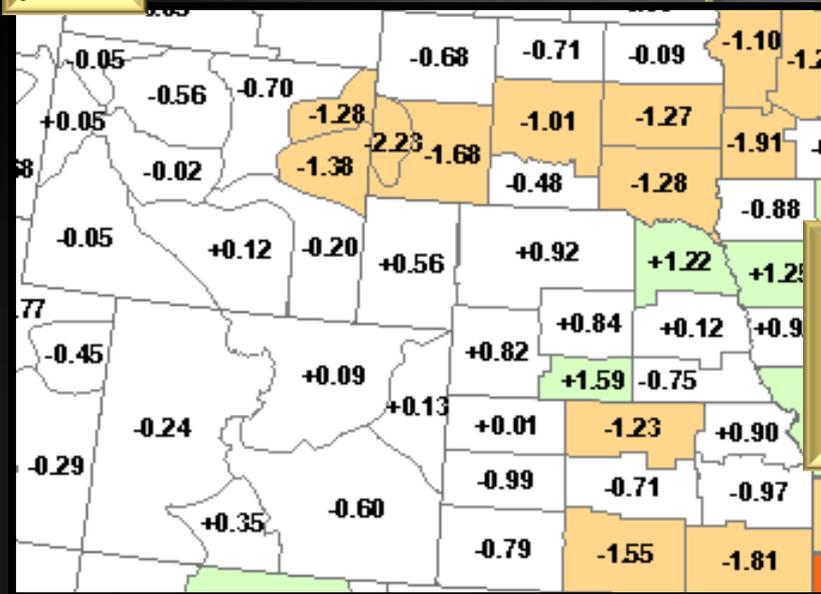


Seasonal Outlook

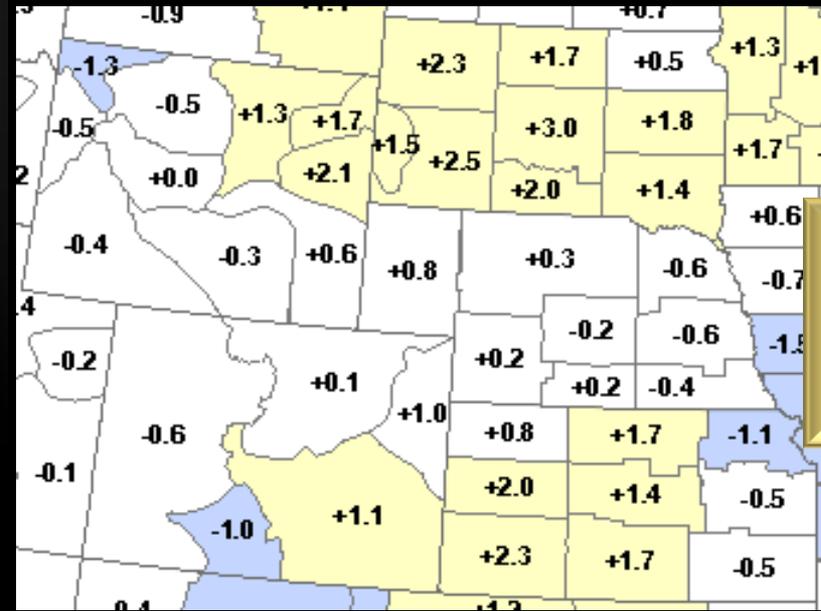
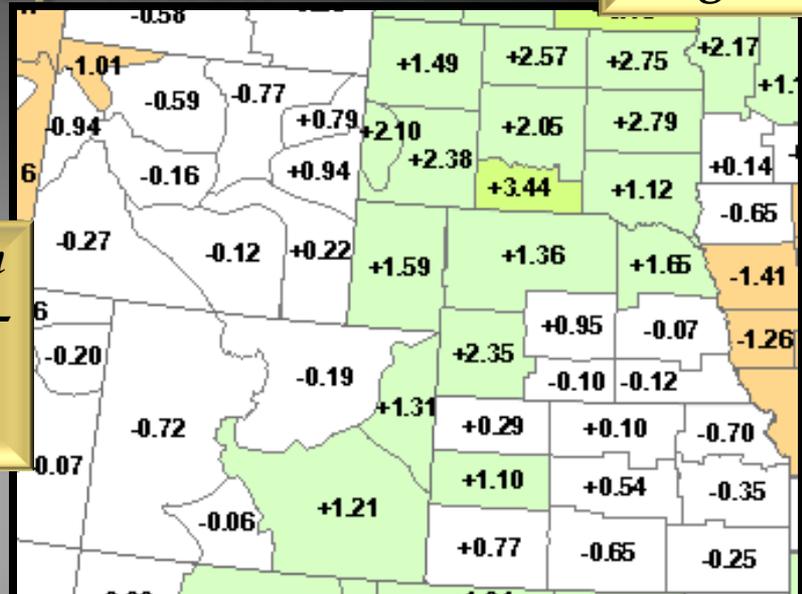
El Nino Temperature/Precipitation - 1966

July-August

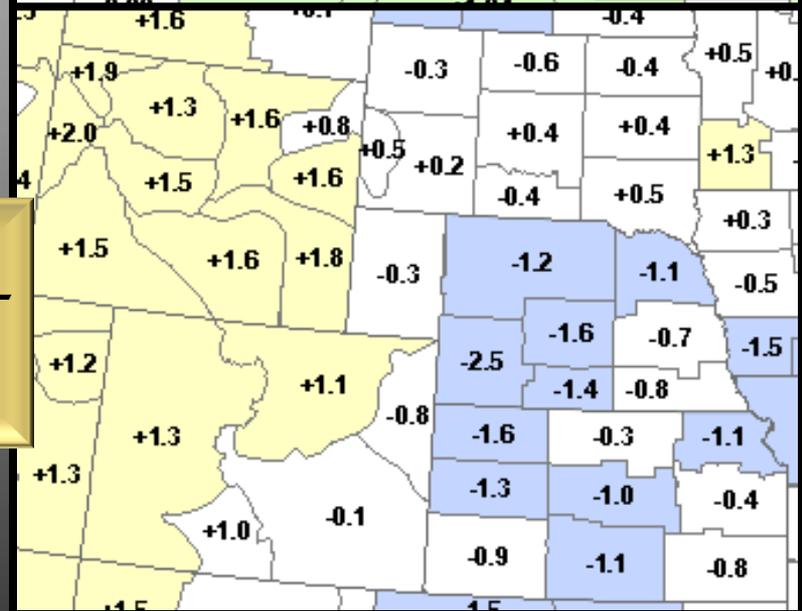
June



Precipitation anomalies El-Nino event 1966



Temperature anomalies El-Nino event 1966



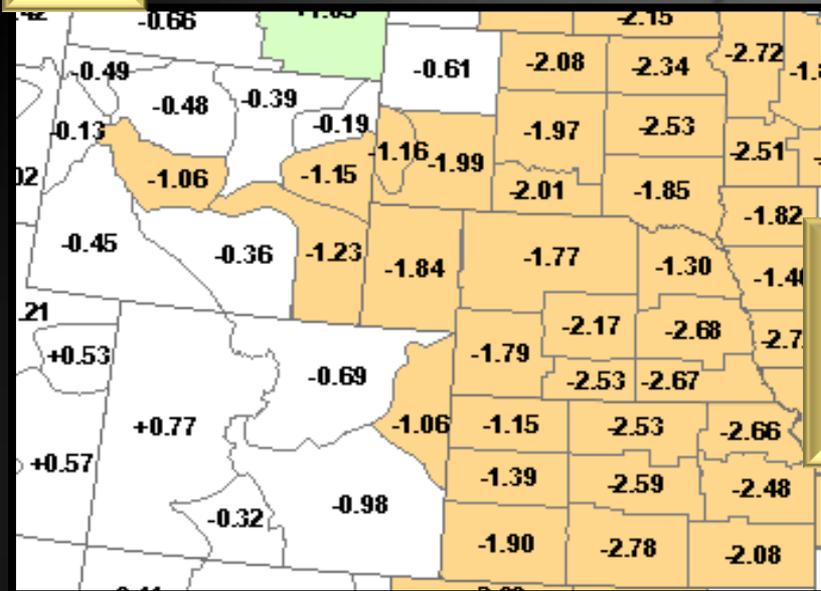


Seasonal Outlook

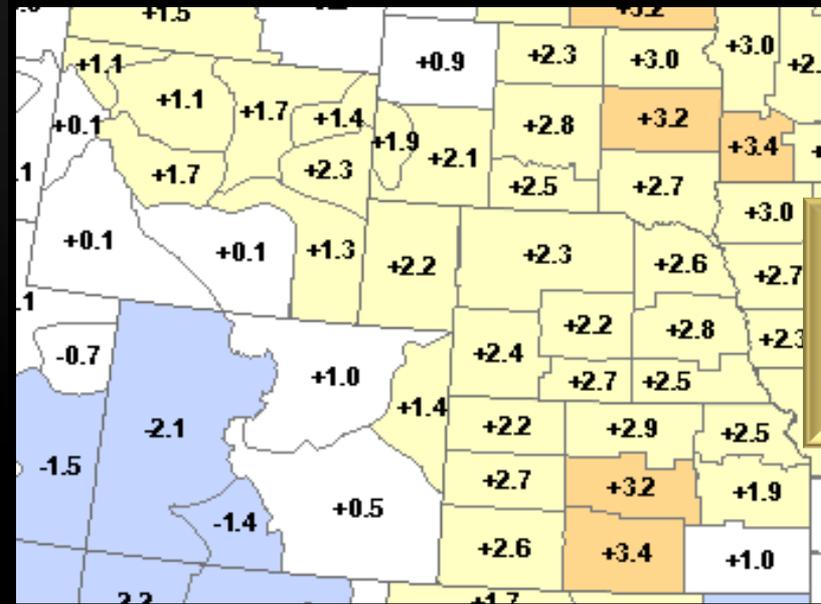
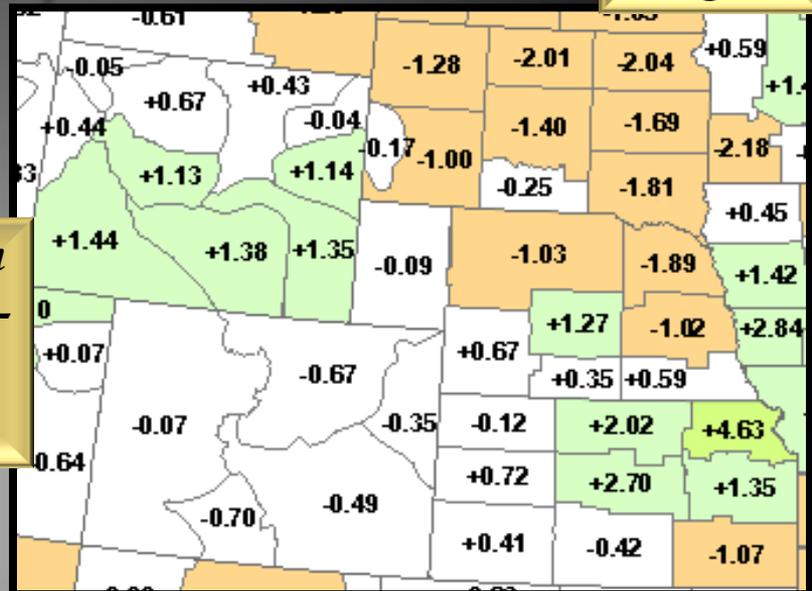
El Nino Temperature/Precipitation - 1973

June

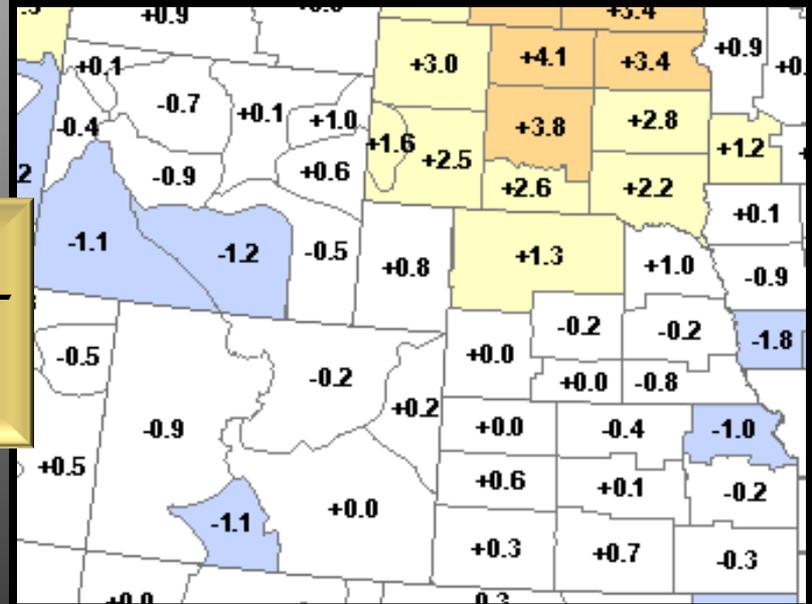
July-August



Precipitation anomalies El-Nino event 1973



Temperature anomalies El-Nino event 1973



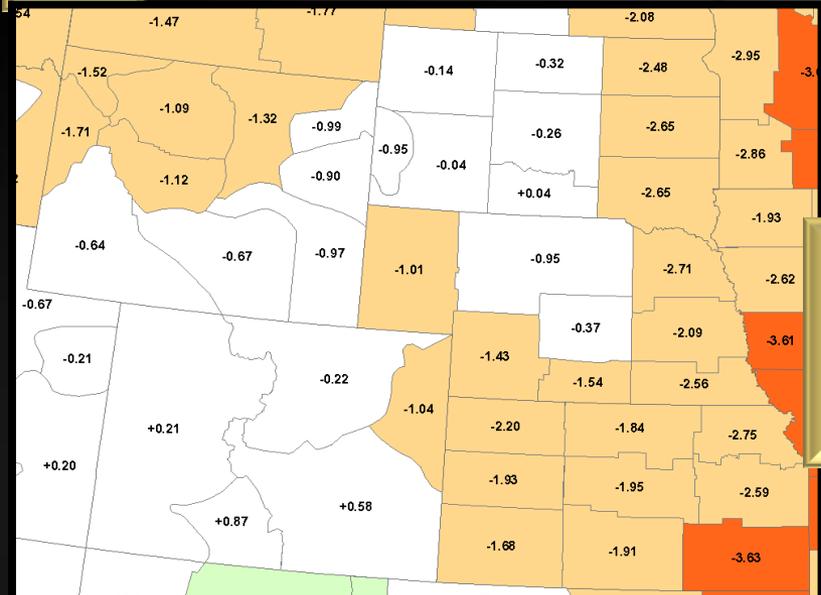


Seasonal Outlook

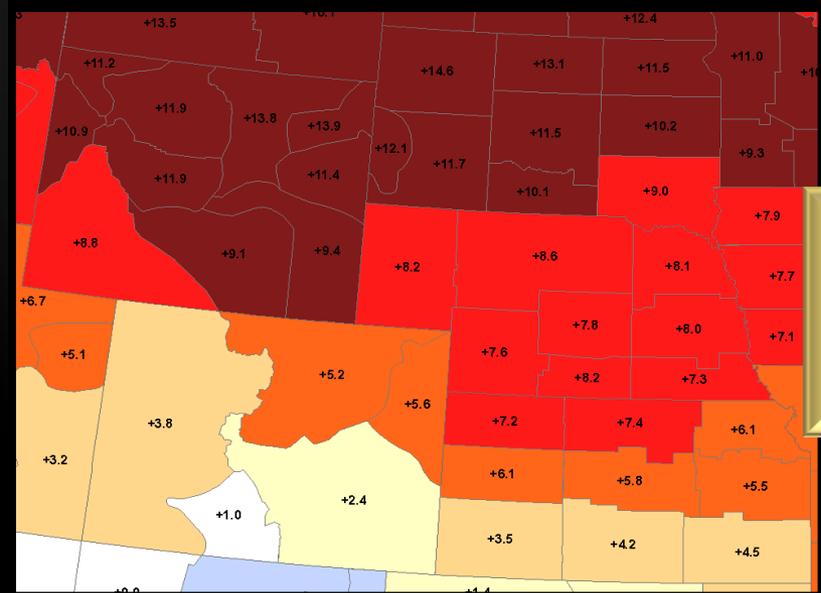
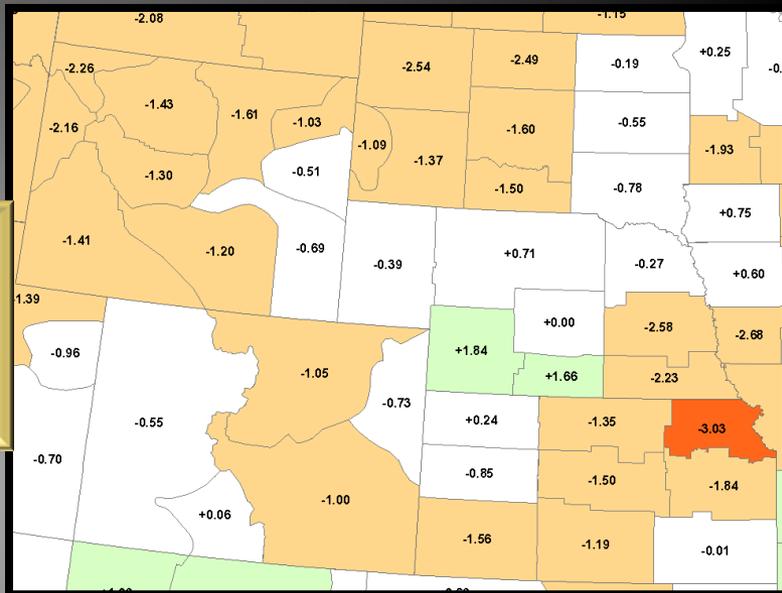
El Nino Temperature/Precipitation - 1988

July-August

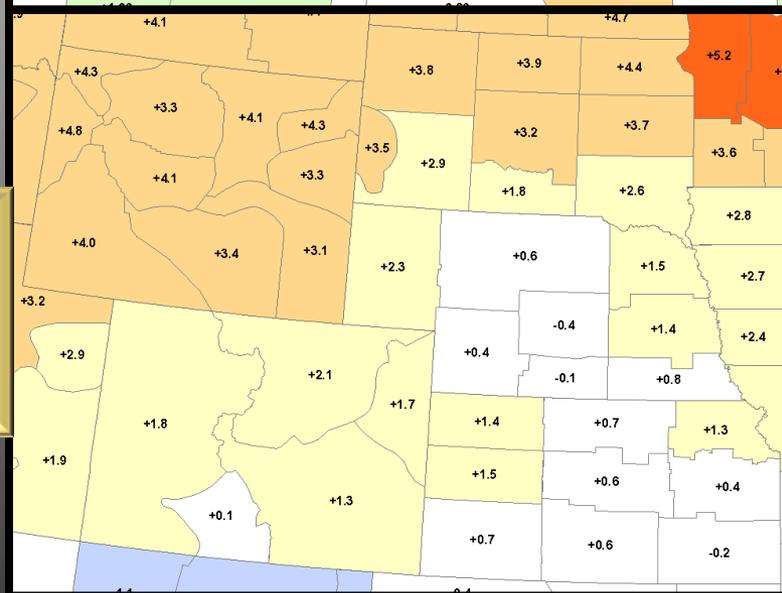
June



Precipitation anomalies El-Nino event 1988



Temperature anomalies El-Nino event 1988



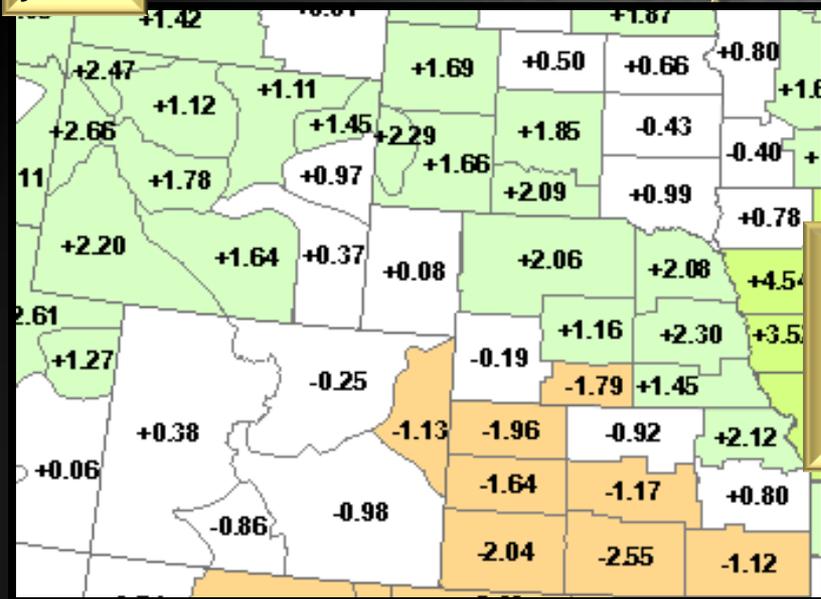


Seasonal Outlook

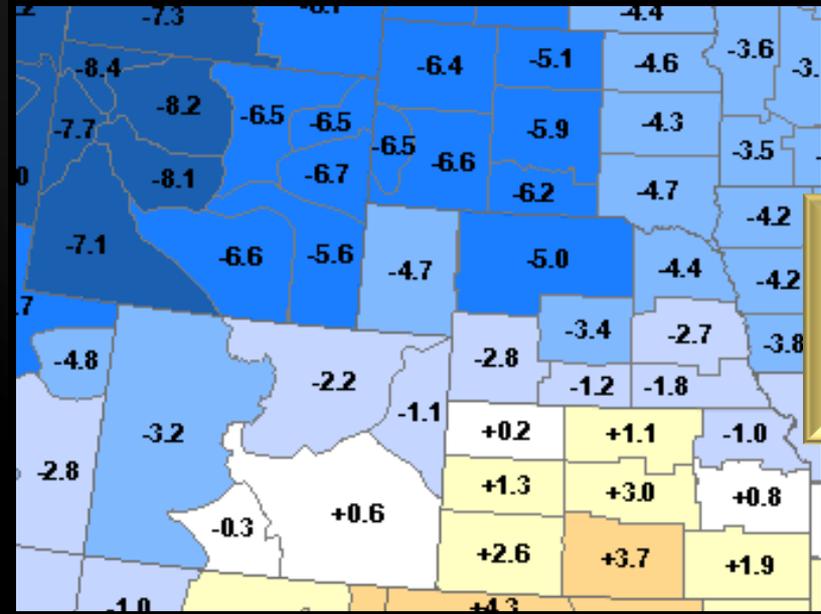
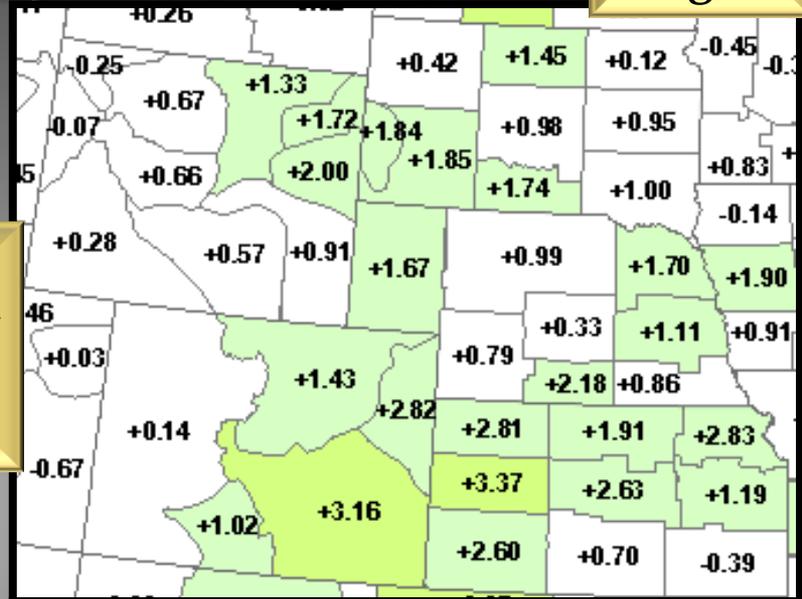
July-August

June

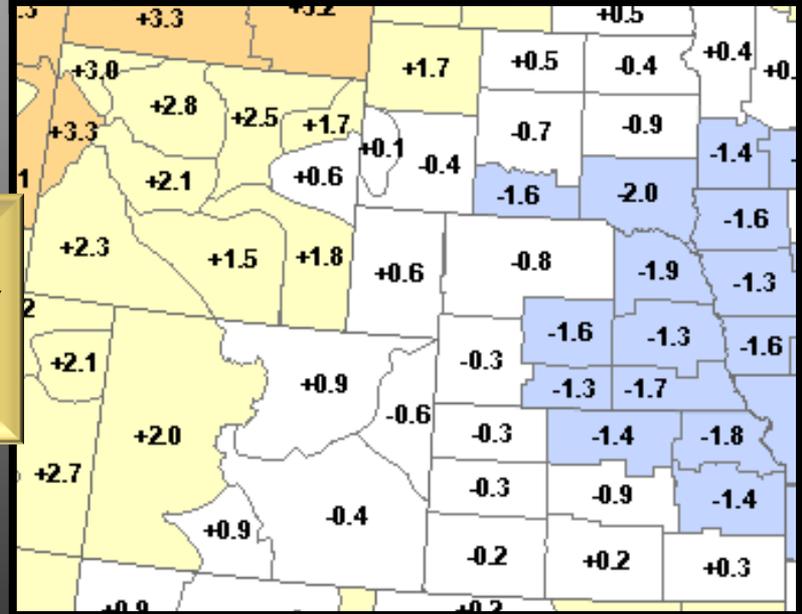
El Nino Temperature/Precipitation - 1998



Precipitation anomalies El-Nino event 1998



Temperature anomalies El-Nino event 1998





Seasonal Outlook

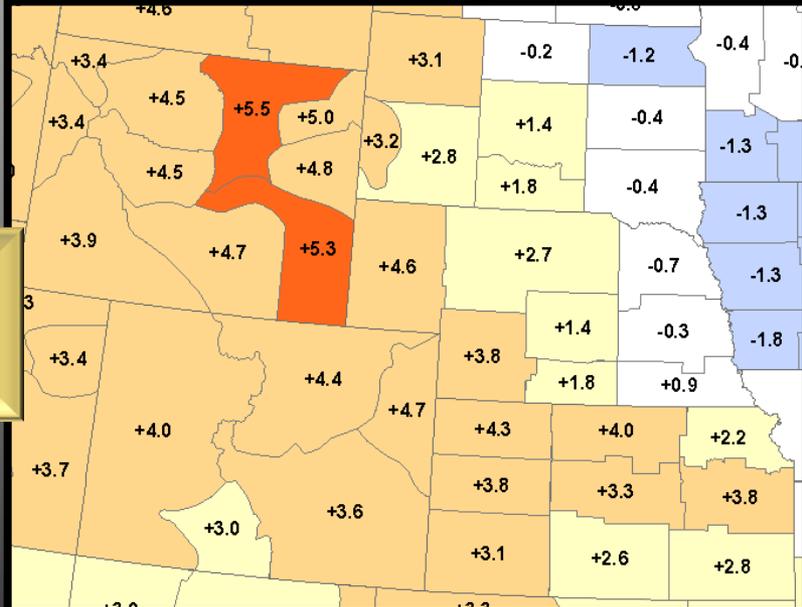
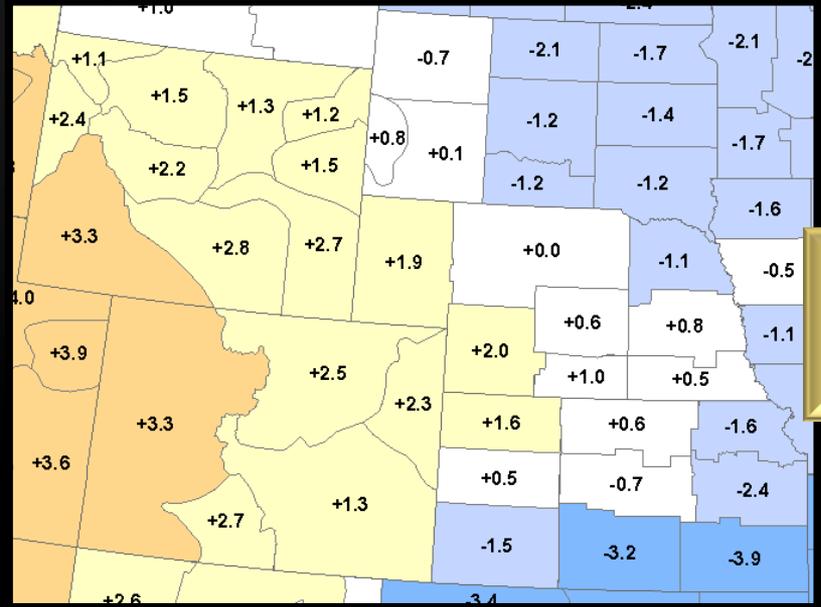
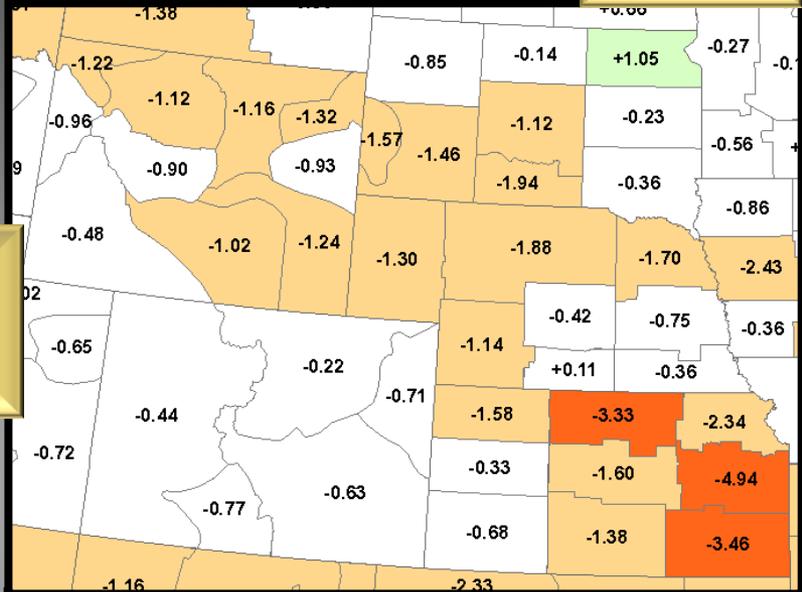
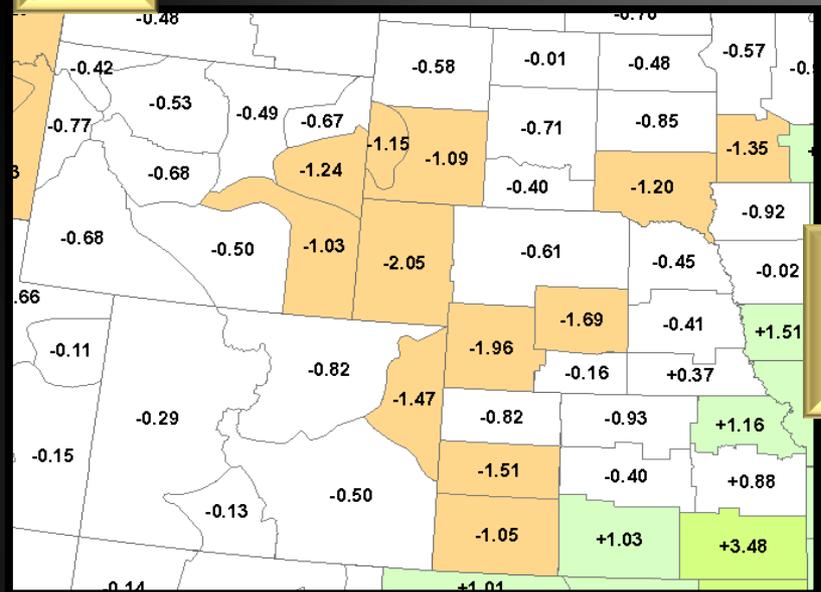
July-August

June

Active Fire Years - Temperature/Precipitation

Precipitation Anomalies 2000

Temperature Anomalies 2000





Seasonal Outlook

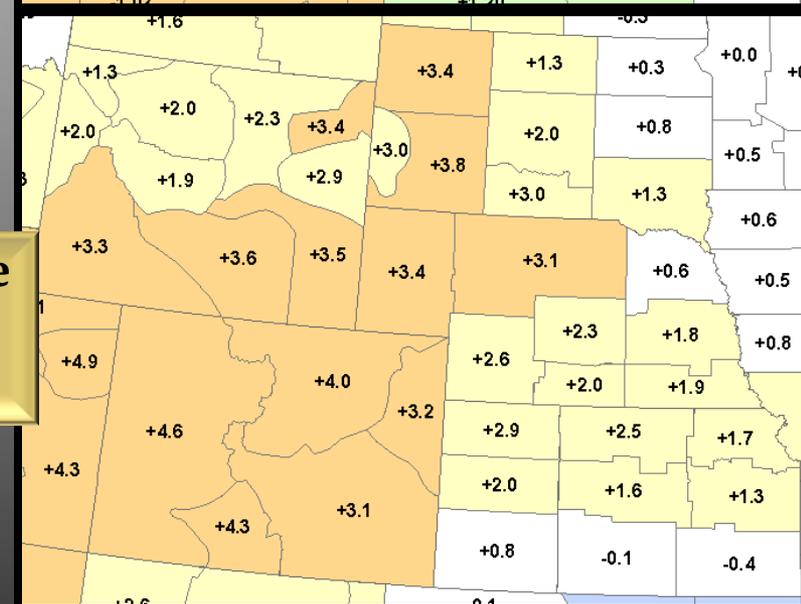
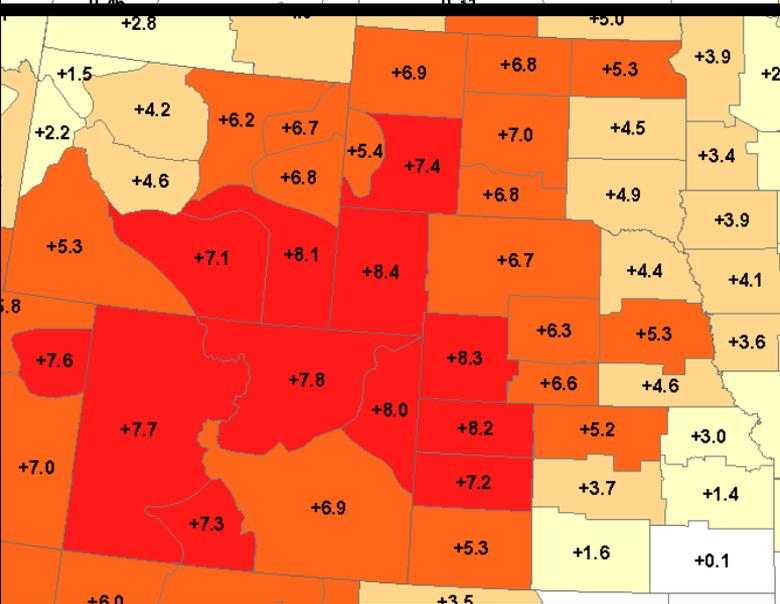
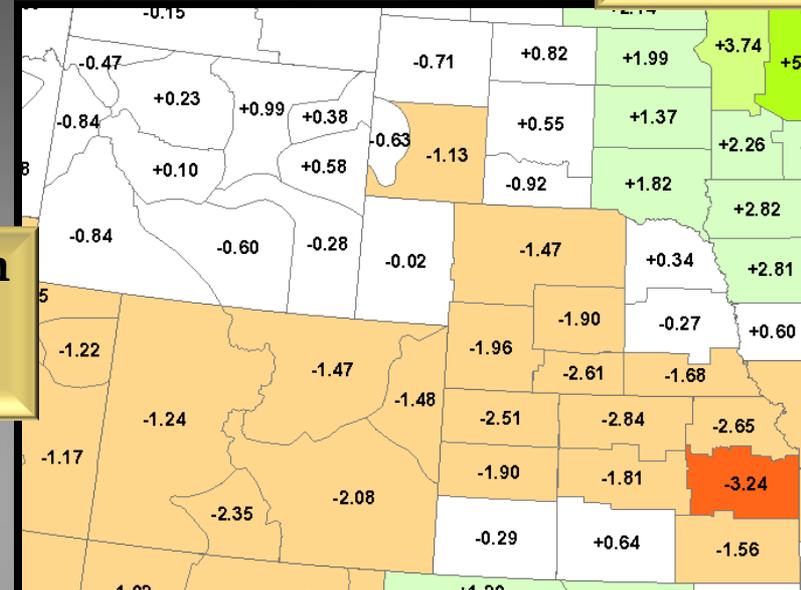
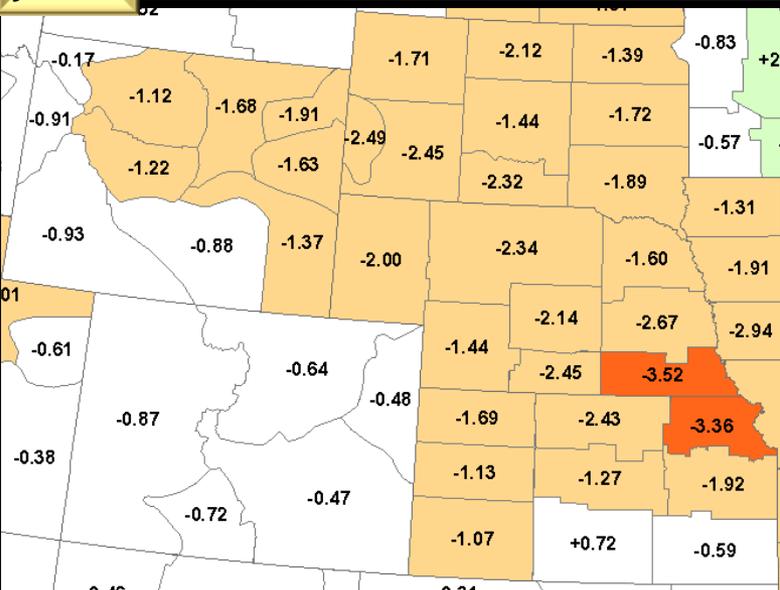
July-August

June

Active Fire Years - Temperature/Precipitation

Precipitation Anomalies 2002

Temperature Anomalies 2002





Seasonal Outlook

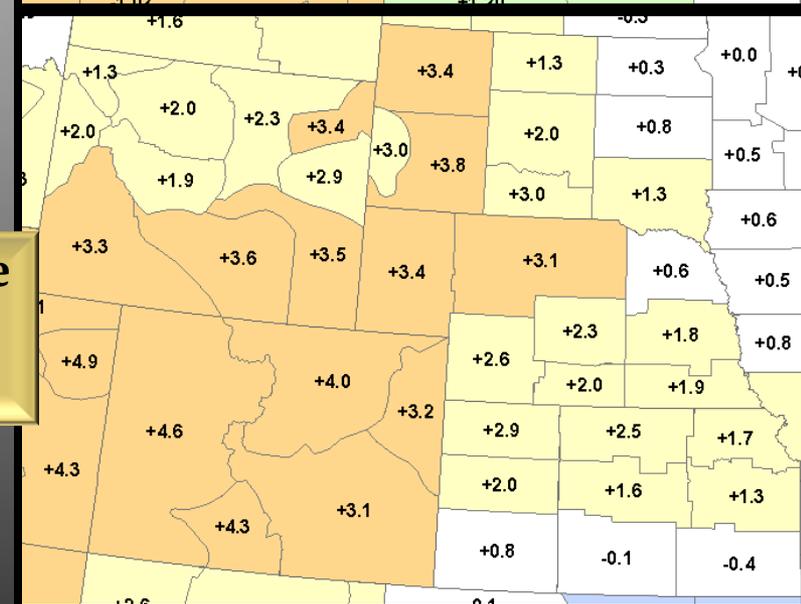
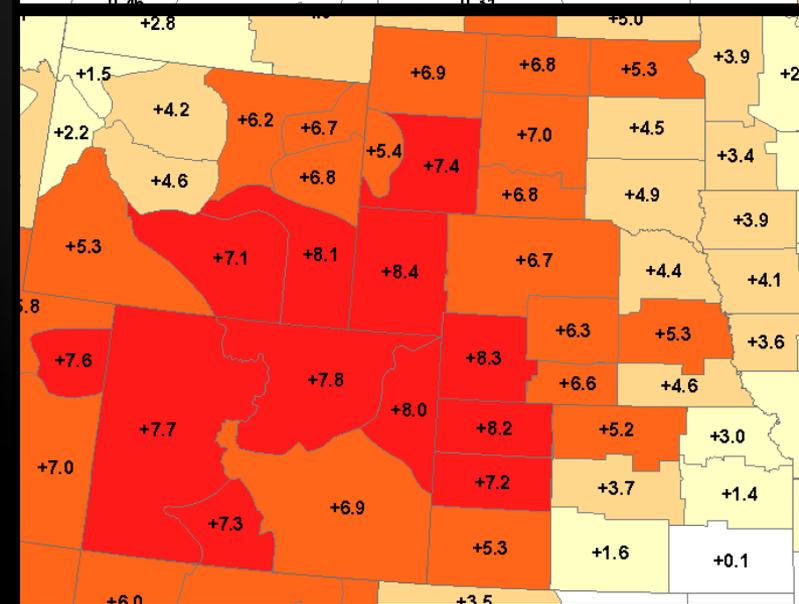
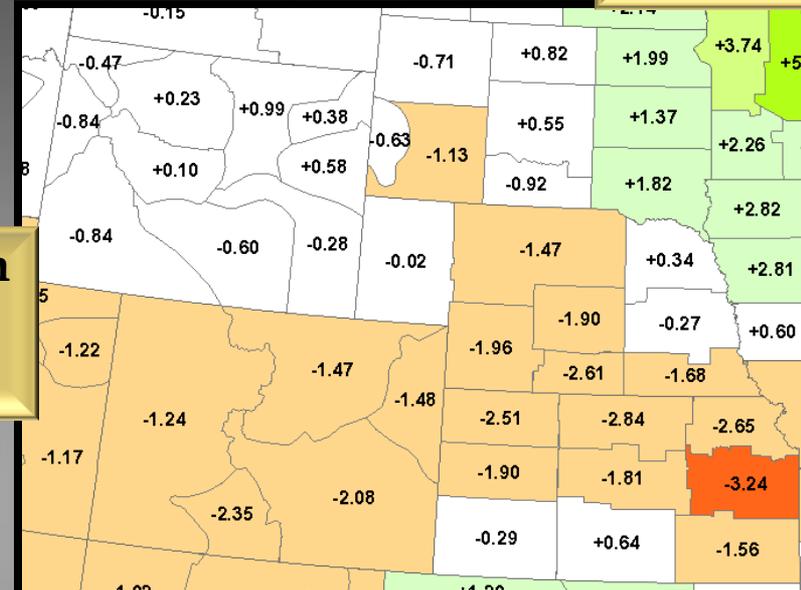
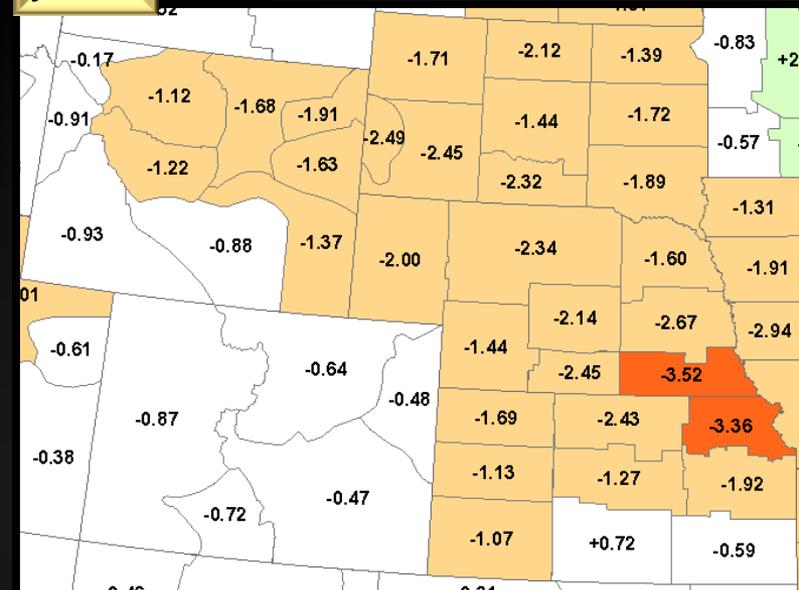
July-August

June

Active Fire Years - Temperature/Precipitation

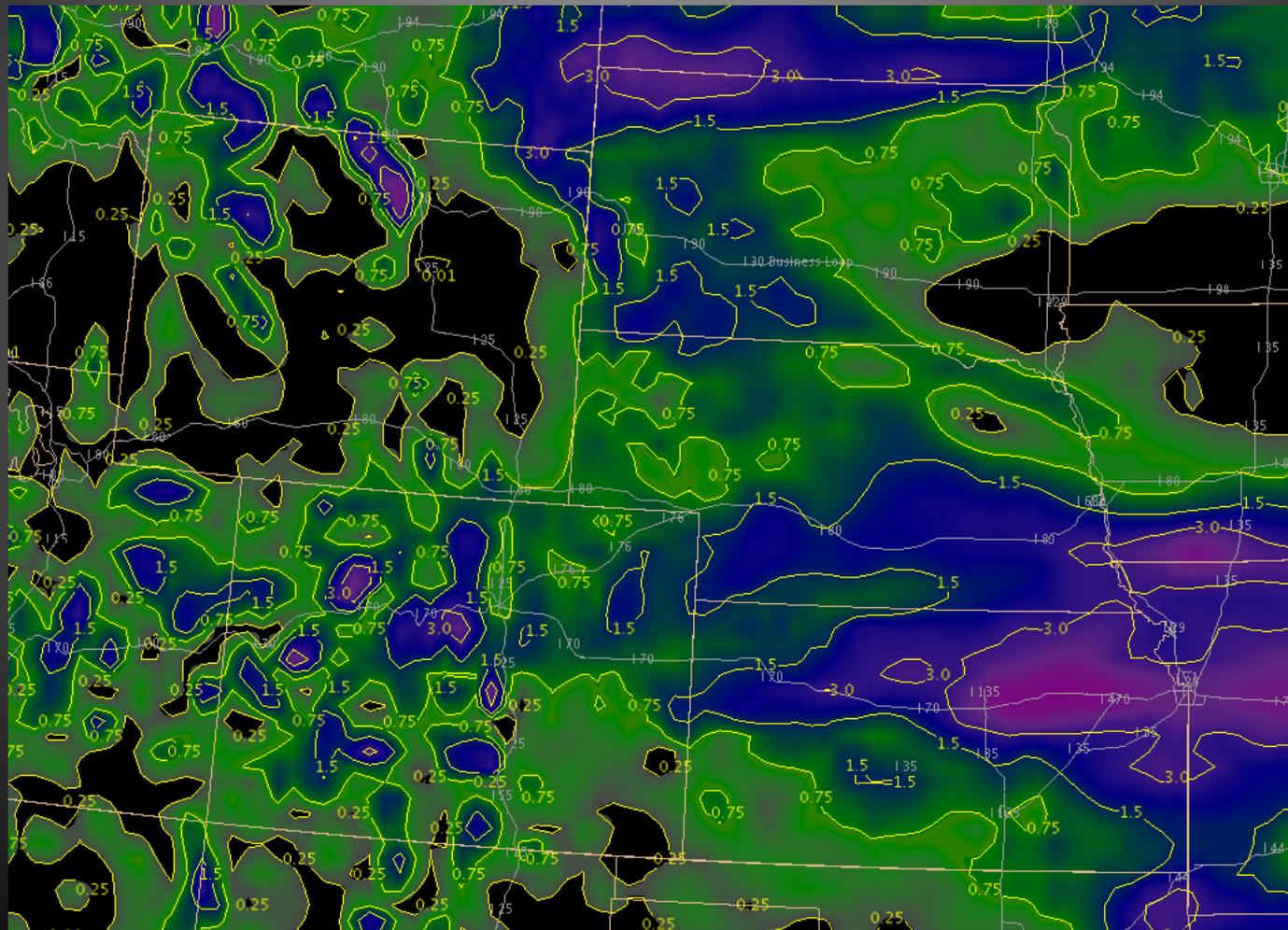
Precipitation Anomalies 2002

Temperature Anomalies 2002

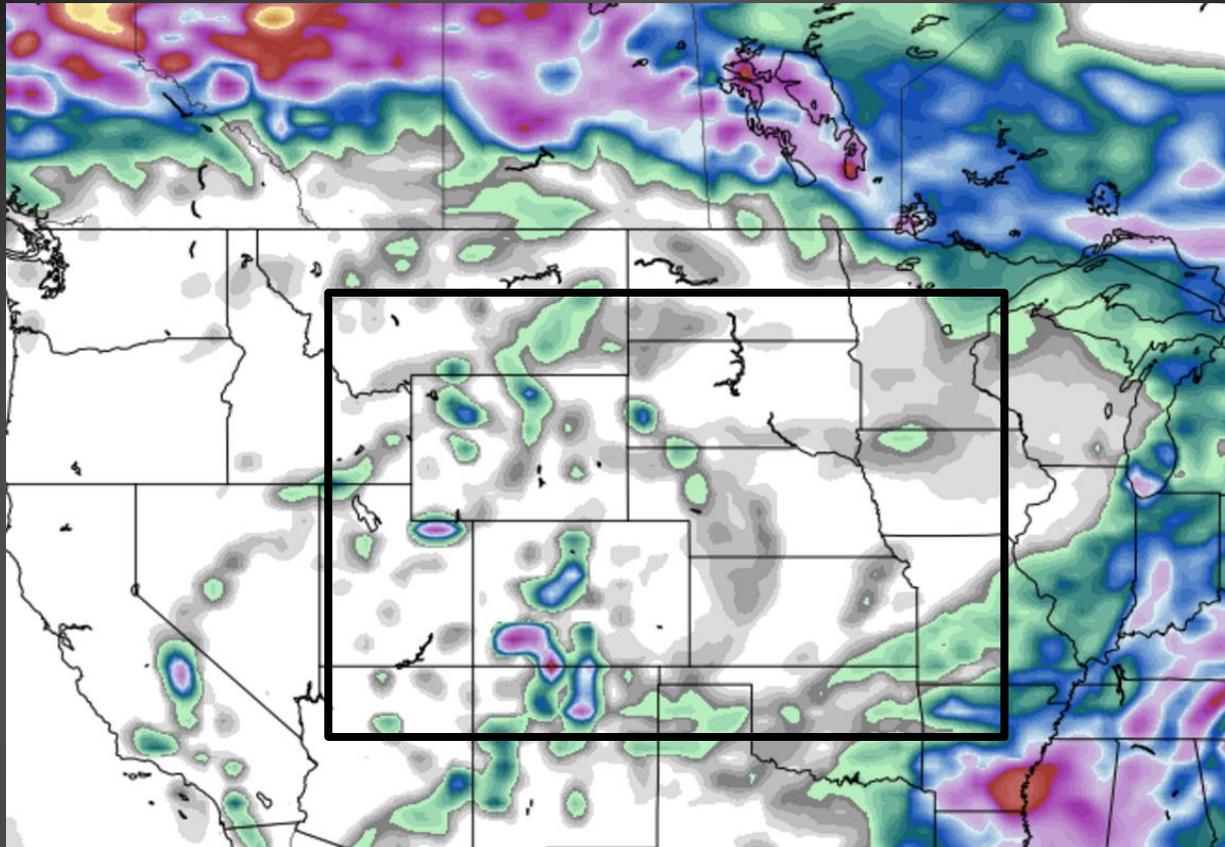


Seasonal Outlook – Forecast Precipitation

Forecast precipitation 7/1 through 7/9 indicates monsoonal moisture bringing showers and thunderstorms to much of the RMA, which is not unusual for this time of year (amounts in inches and tenths of an inch). Accumulations range from 0.25" to 1.50" (most from July 1st - 2nd) with isolated amounts up to 3.00" in some of the higher elevations and eastern plains. Not as much is predicted across the lower elevations of Wyoming with less than 0.25".



Seasonal Outlook – Forecast Precipitation

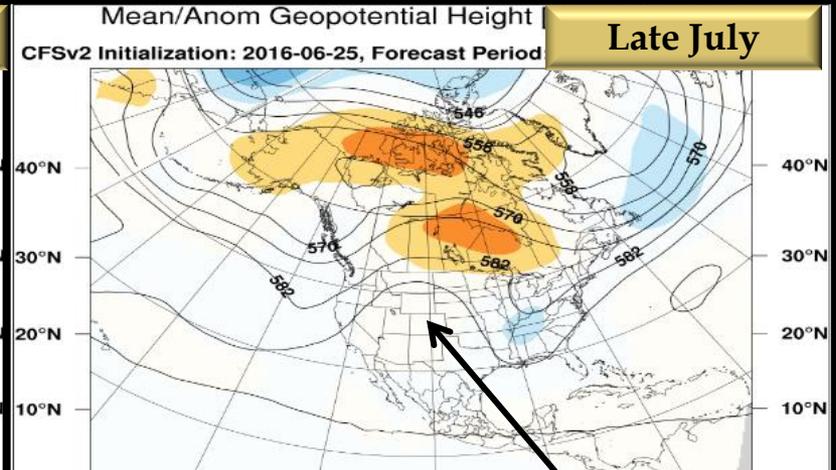
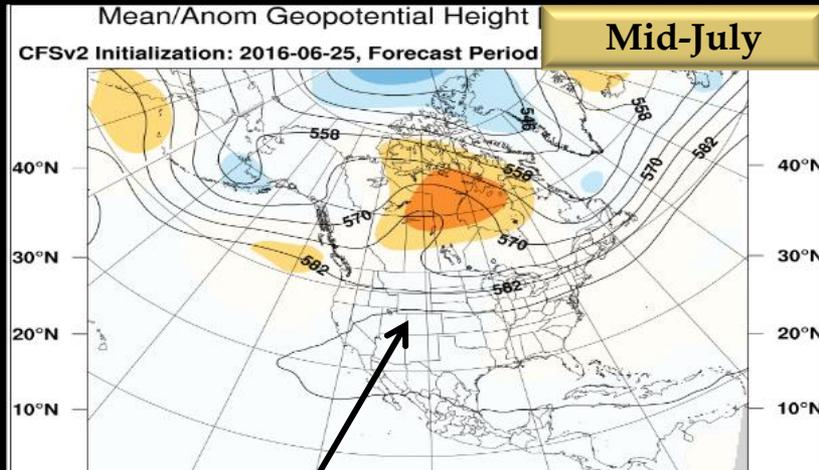


Forecast precipitation 7/10-7/17 shows limited rainfall for the RMA mainly over the higher elevations with 0.25" to 0.75", and isolated amounts in excess of 1.00".

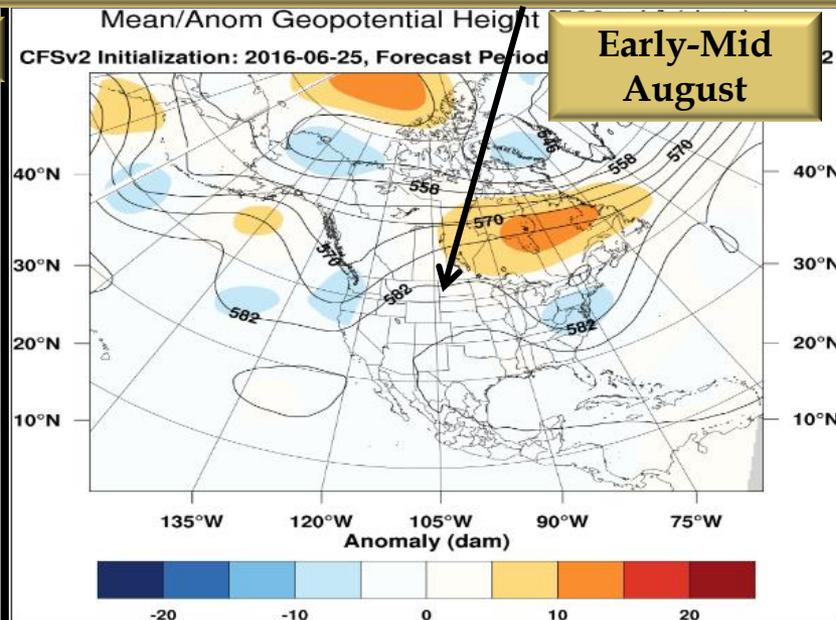
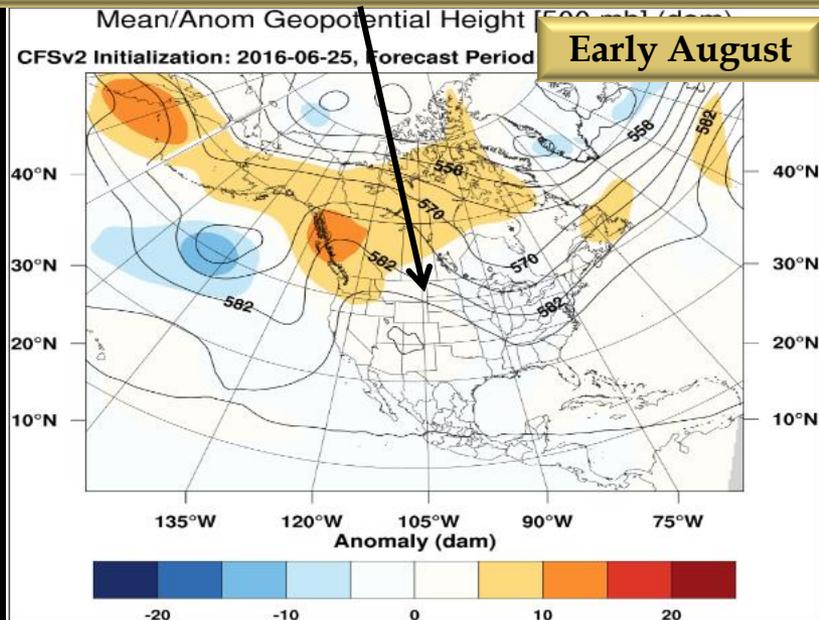


Seasonal Outlook

Pressure Patterns Mid July–Early August

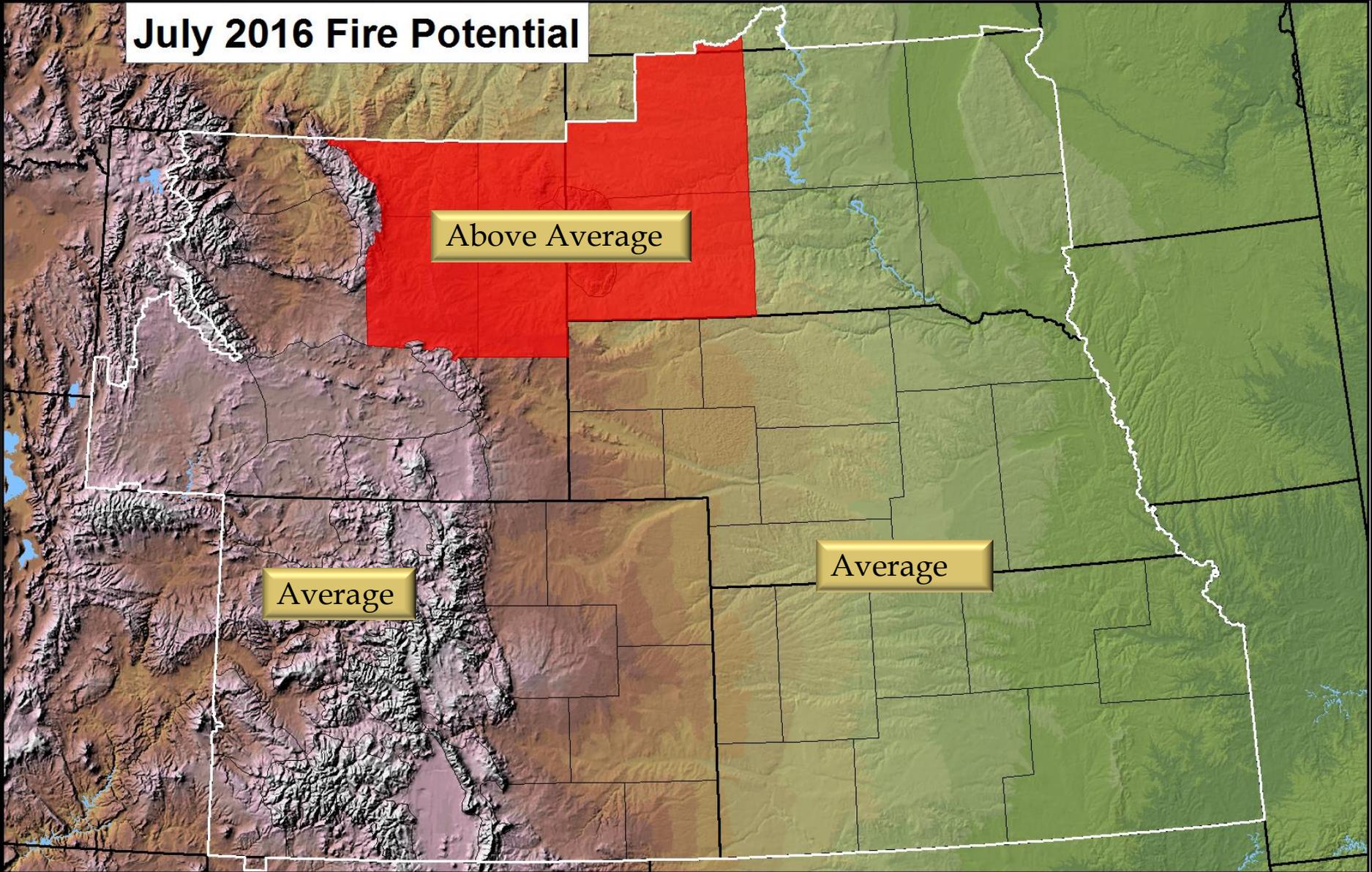


Long range upper-air models (mid-July through early August) show a strong upper ridge of high pressure controlling the RMA weather pattern, likely with very warm conditions, and occasional surges of monsoon moisture revolving through the ridge not unusual for this time of year.



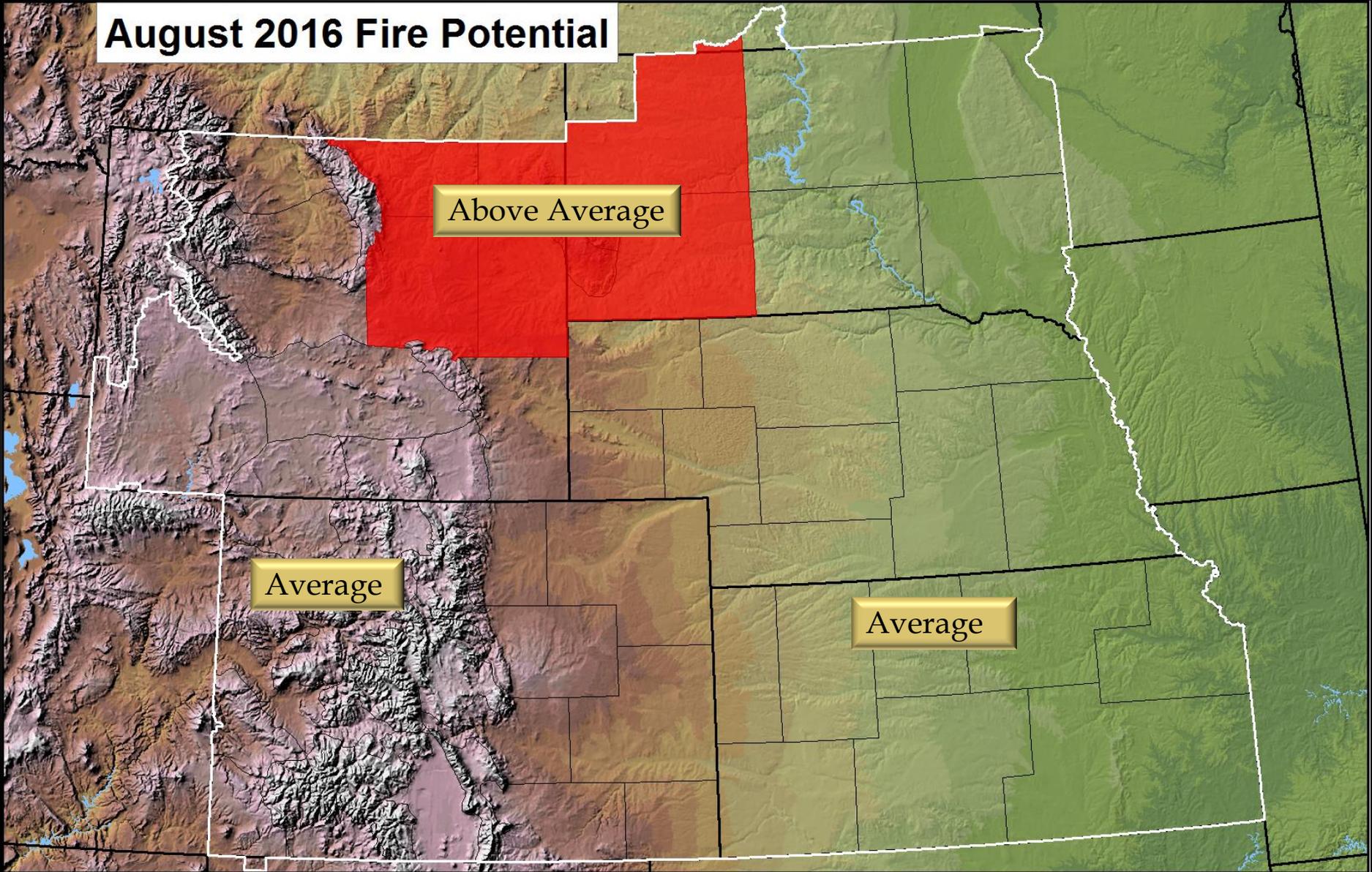
Seasonal Outlook

July 2016 Fire Potential



Seasonal Outlook

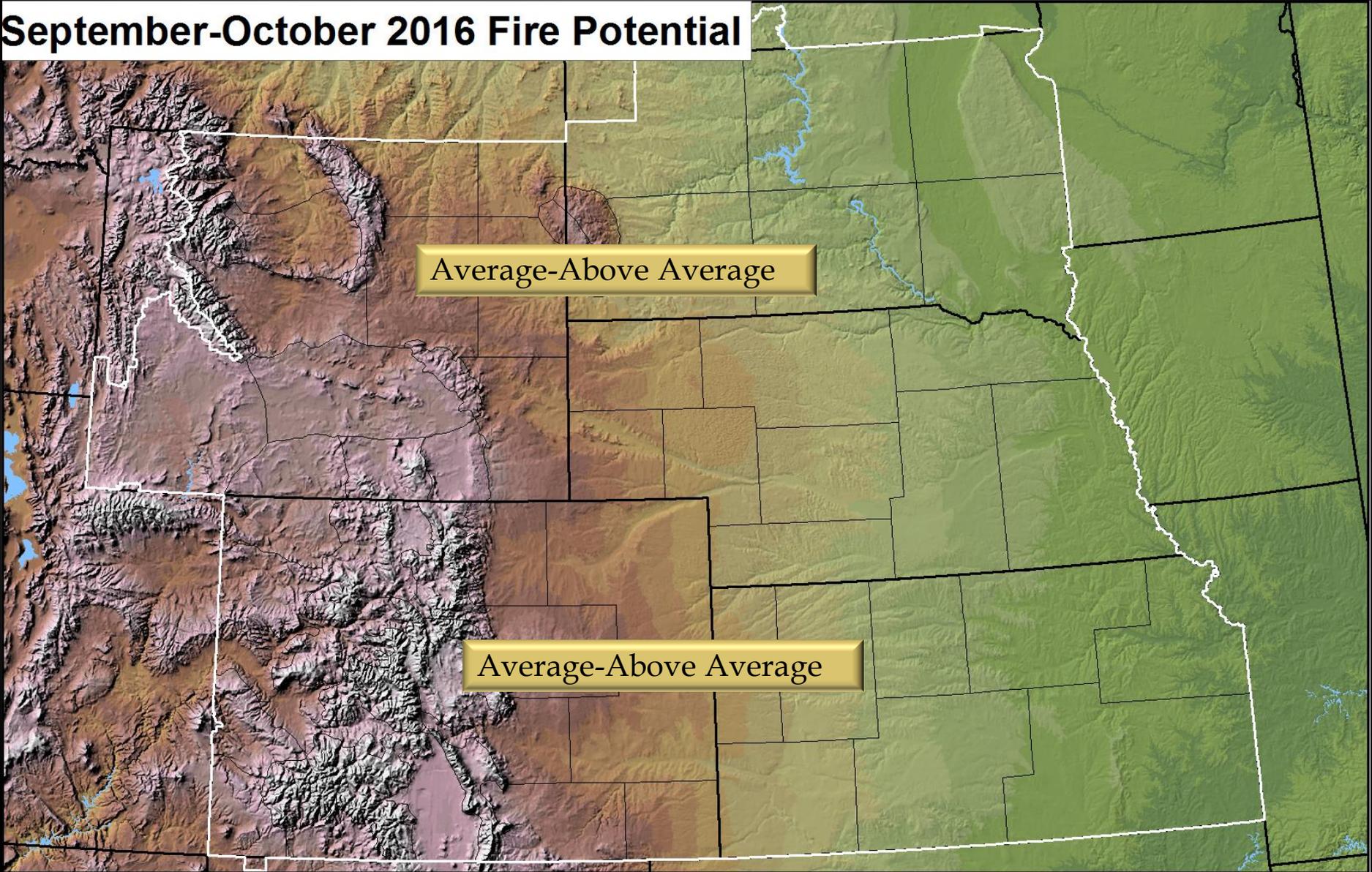
August 2016 Fire Potential





Seasonal Outlook

September-October 2016 Fire Potential



Average-Above Average

Average-Above Average



Seasonal Outlook – Summary

2016 Seasonal Fire Potential Outlook Summary-

Current Climatology

The RMA experienced above average temperatures during the month of June, especially in the north. Precipitation deficits were most notable west of the continental divide with values less than 50% of average, while precipitation east of the divide was mix of below and above average, with notable deficits portions of eastern Nebraska and Kansas, and the northern Black Hills. Drought indices improved from last month across north-central Wyoming with “severe” values decreasing into the “moderate” category in the Big Horn Mountains, while worsening drought was depicted across northeast Wyoming and western South Dakota as “severe” indices emerged (National Drought Mitigation Center).

Fuels

Lower elevation and foothill grasses are progressing through their curing phase across the region, while high elevations continue in green-up. An abundant dead grass fuel component remains in place in the lower elevations and foothills from previous growing seasons, and is expected to increase as a result of the wet spring/early summer cure out. This dead grass component will contribute to an increase in ignition and subsequent total acres burned for the RMA during 2016 fire season compared to the very slow 2015 season. ERCs as of the start of July are near to below seasonal averages in Colorado, near average in Wyoming, and above average in and around the Black Hills of northeast Wyoming and western South Dakota.

Weather Predictions

Forecasts for July indicate an average temperature and precipitation profile which includes occasional pulses of monsoon moisture revolving around strong upper level high pressure, with periods of dry and very warm conditions in between moisture surges. Additionally, early July forecasts indicate breezy to windy conditions at times as a result of a stronger than average upper level jet-stream for this time of year. Longer range predictors maintain average temperature/precipitation regimes through August as well. The recent El Nino phase in the tropical Pacific has ended with neutral sea-surface temperature anomalies at the present time, and La-Nina conditions are predicted by August or early fall along with the resultant possibility of a drier and warmer than average conditions across the RMA late in August into the fall.

Considerations and Fire Season Outlook

Core fire season has been delayed this year, especially east of the continental divide in Colorado as a result of a wet spring. However, dry and very warm conditions in the second half of June have brought fire potential back to seasonal averages across the RMA, with trends moving into the above average range for northeast Wyoming and the western South Dakota. The core wildfire season typically begins in late May over southern Colorado and gradually progresses northward across the RMA through the remainder of the summer months, but has been delayed into the second half of June, most notably in northern portions of the region and western Colorado. The typical northward progression of fire season is anticipated the remainder of the summer, and near average large fire activity is forecast for the RMA during July and August, except for above average potential in northeast Wyoming and western South Dakota. For late August through October, expectations are for near to above average fire potential.