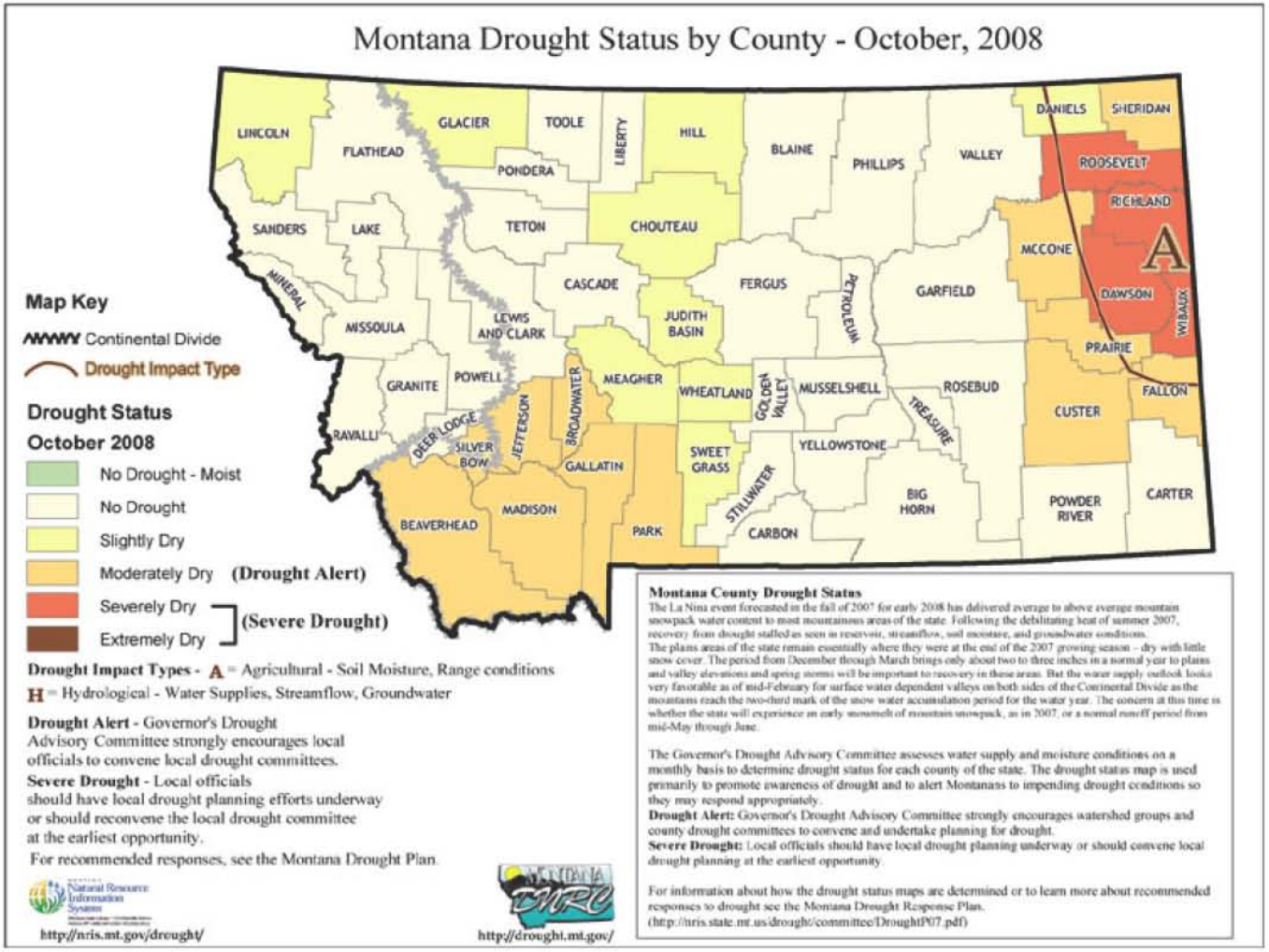
Drought Advisory Committee Water Year 2009

Water Policy Interim Committee

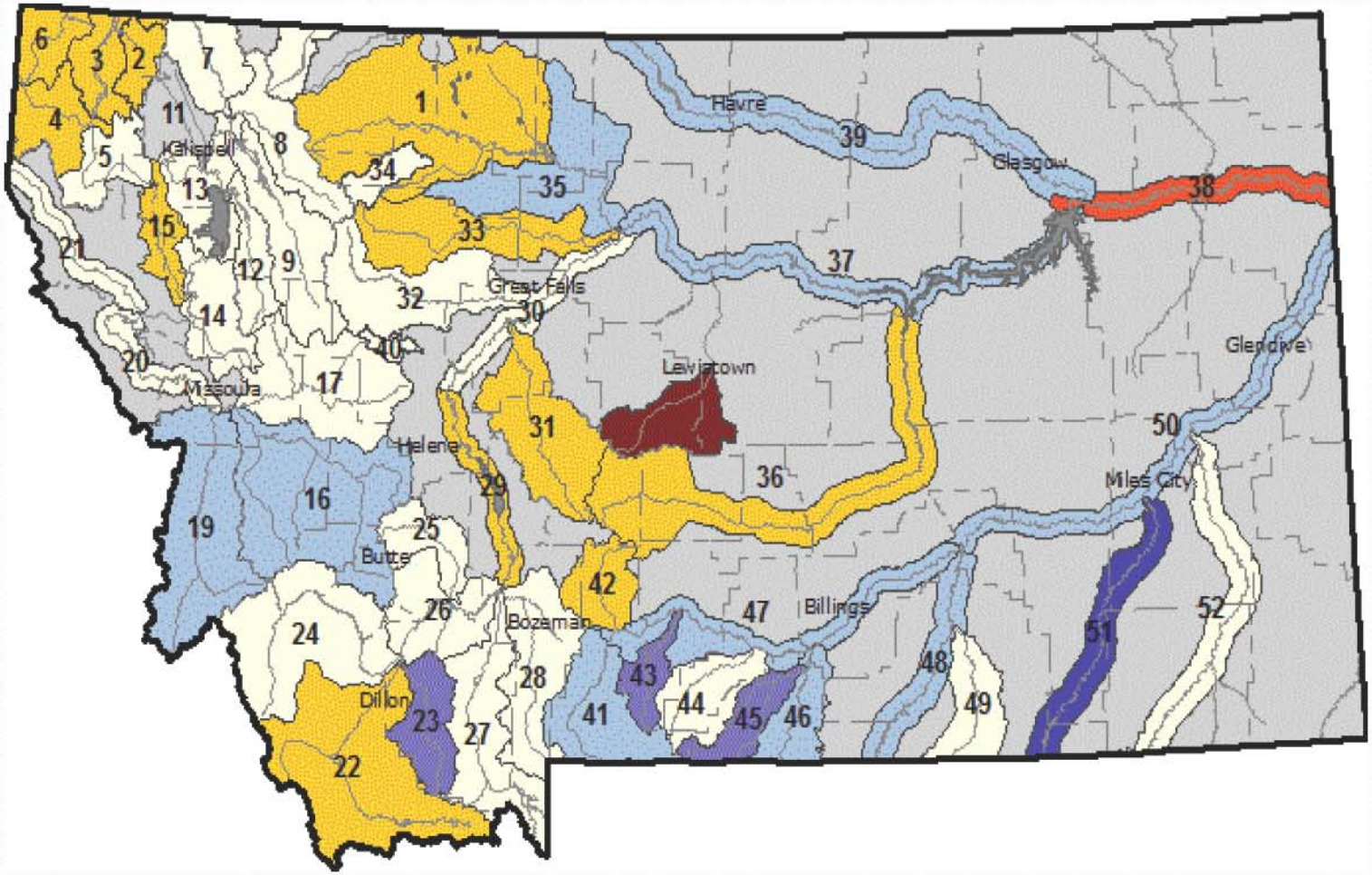
Jesse E. Aber, M.S., DNRC
Drought Committee Staff

September 21, 2009

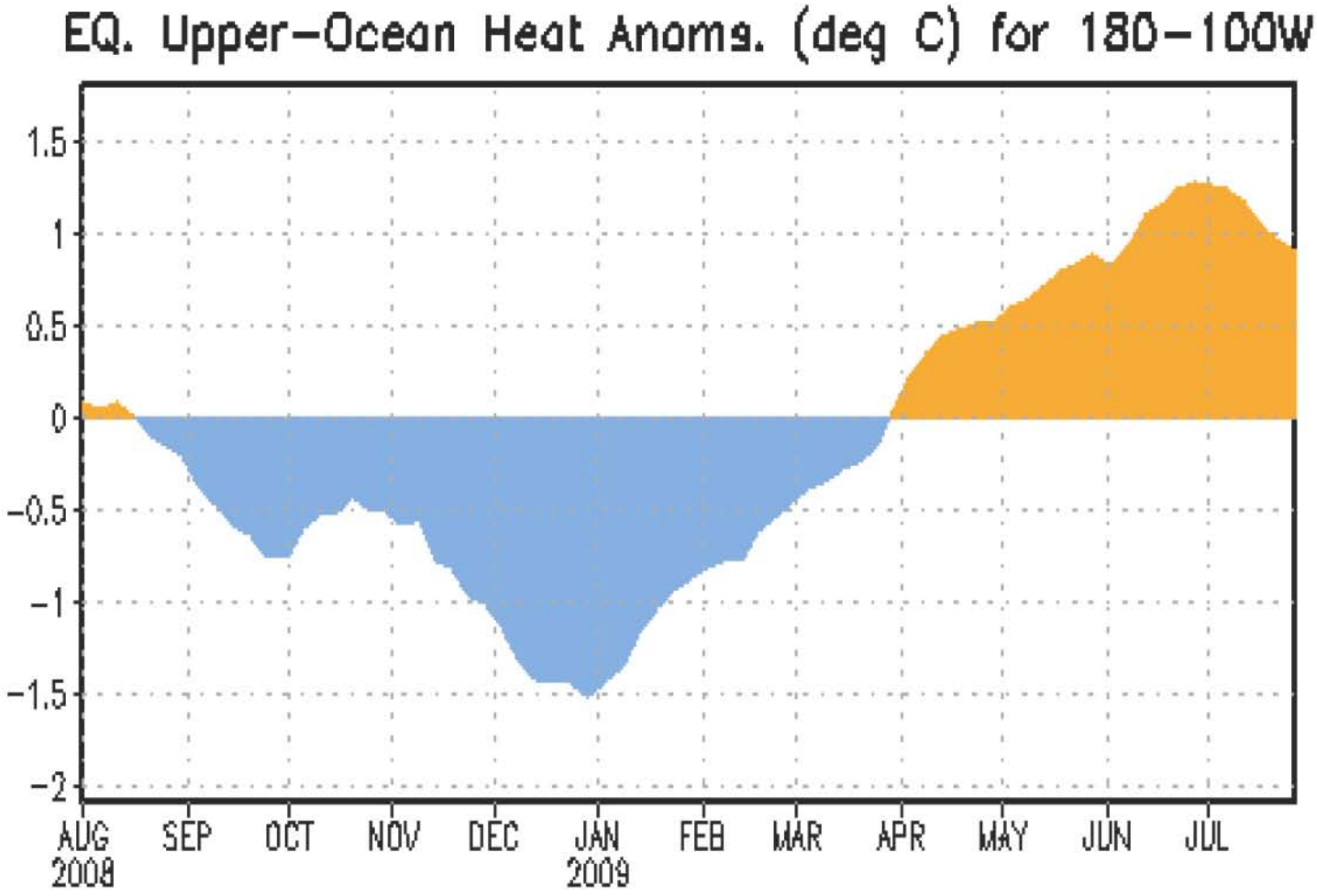
Water Year 2008 ends with residual drought from 2007 El Nino



September 2008 NRCS SWSI
La Nina Winter 2008-2009 begins



ENSO
El Nino / Southern Oscillation

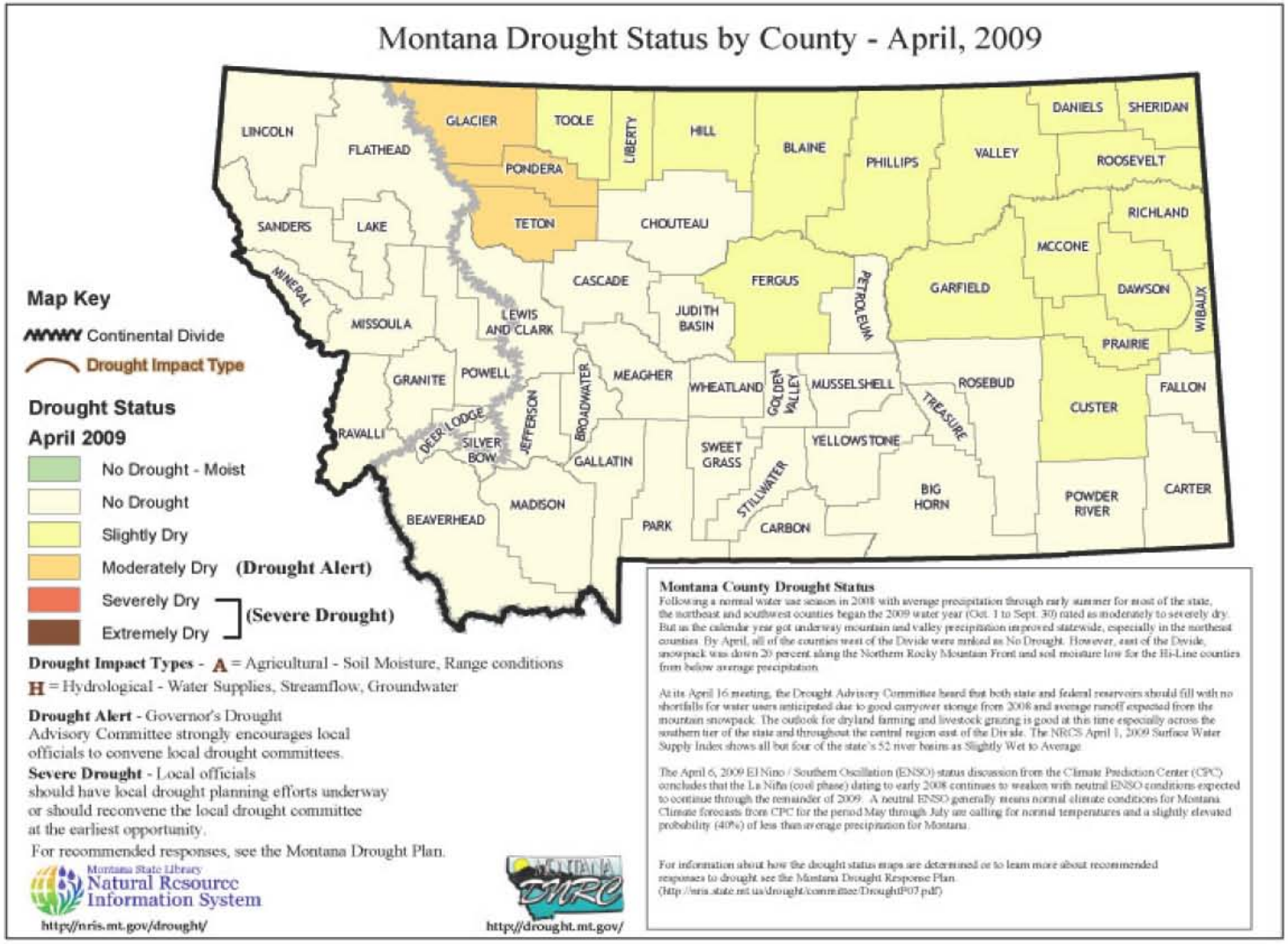


Mountain Snowpack near average NRCS Snow Survey

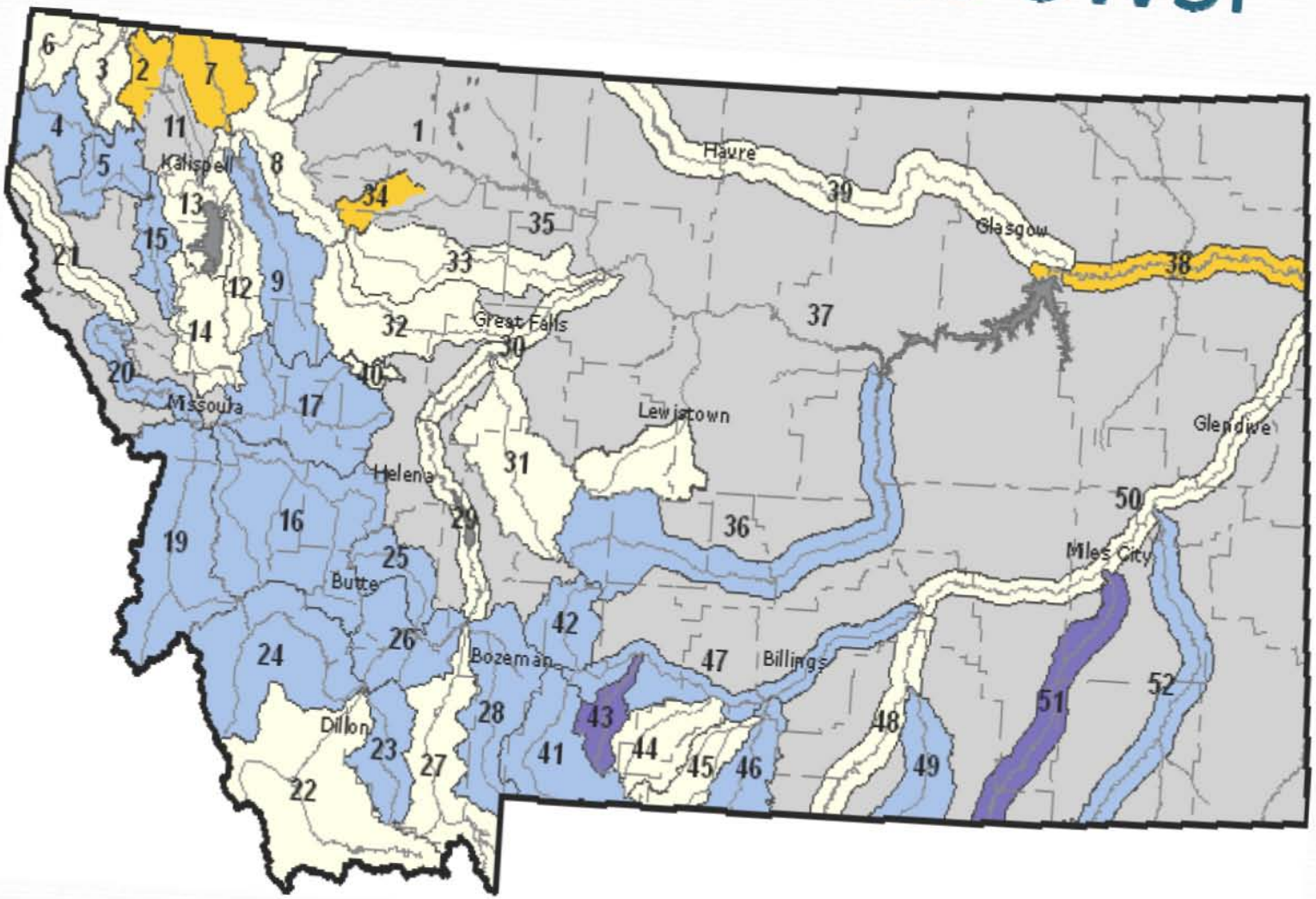
As of April 15, 2009:

- the Columbia River Basin snowpack was 97% of average;
- the Missouri Basin was 104% of average; and
- the Yellowstone Basin was 108% of average.

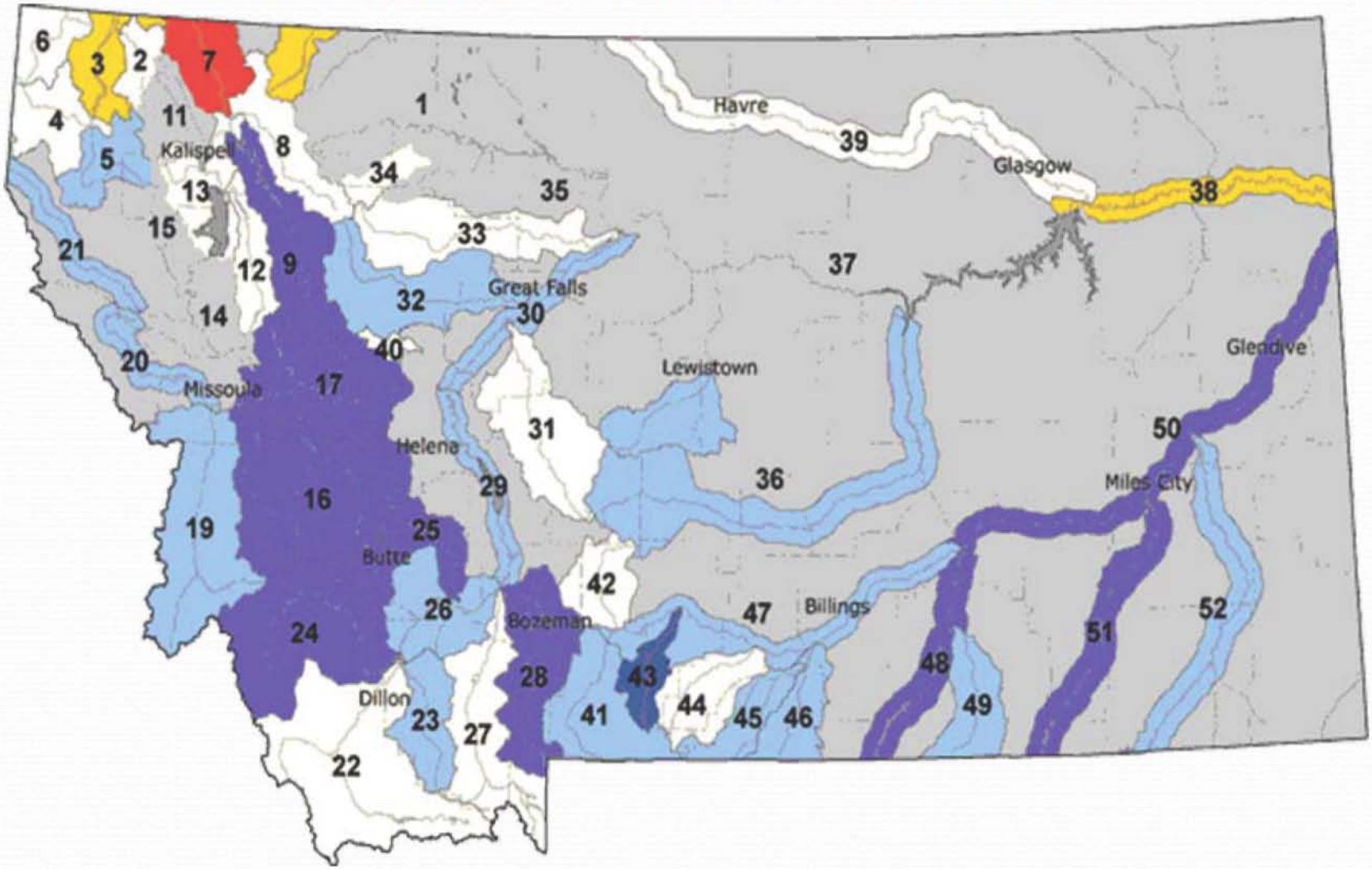
Crop Year 2009 with good start from La Nina winter



April 1, 2009 NRCS SWSI

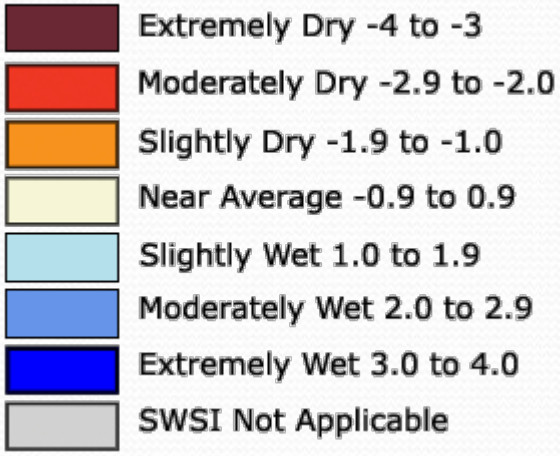


May 1, 2009 SWSI
La Nina Winter delivers

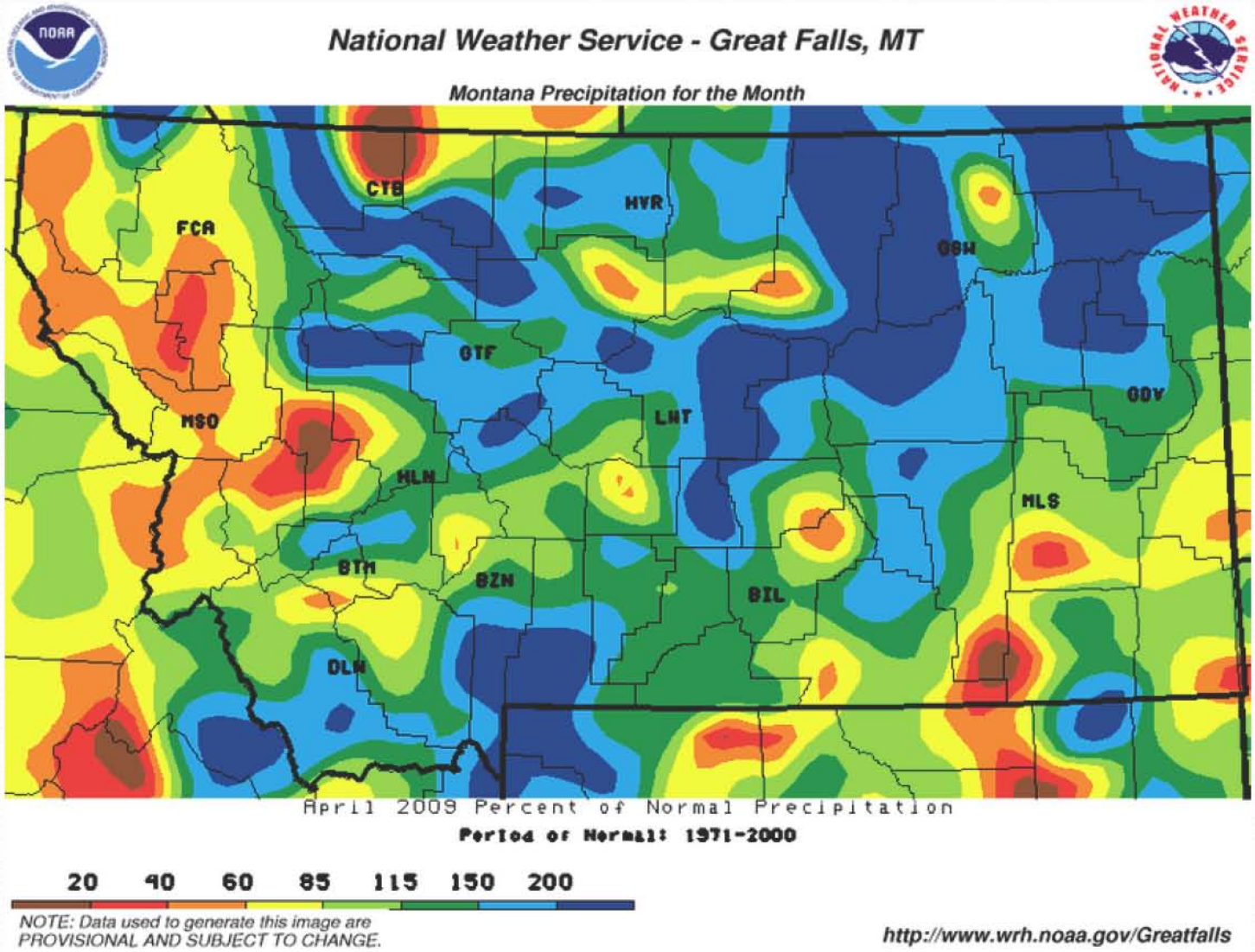


The SWSI is designed for areas that rely primarily on snowmelt runoff as the primary source of surface water.

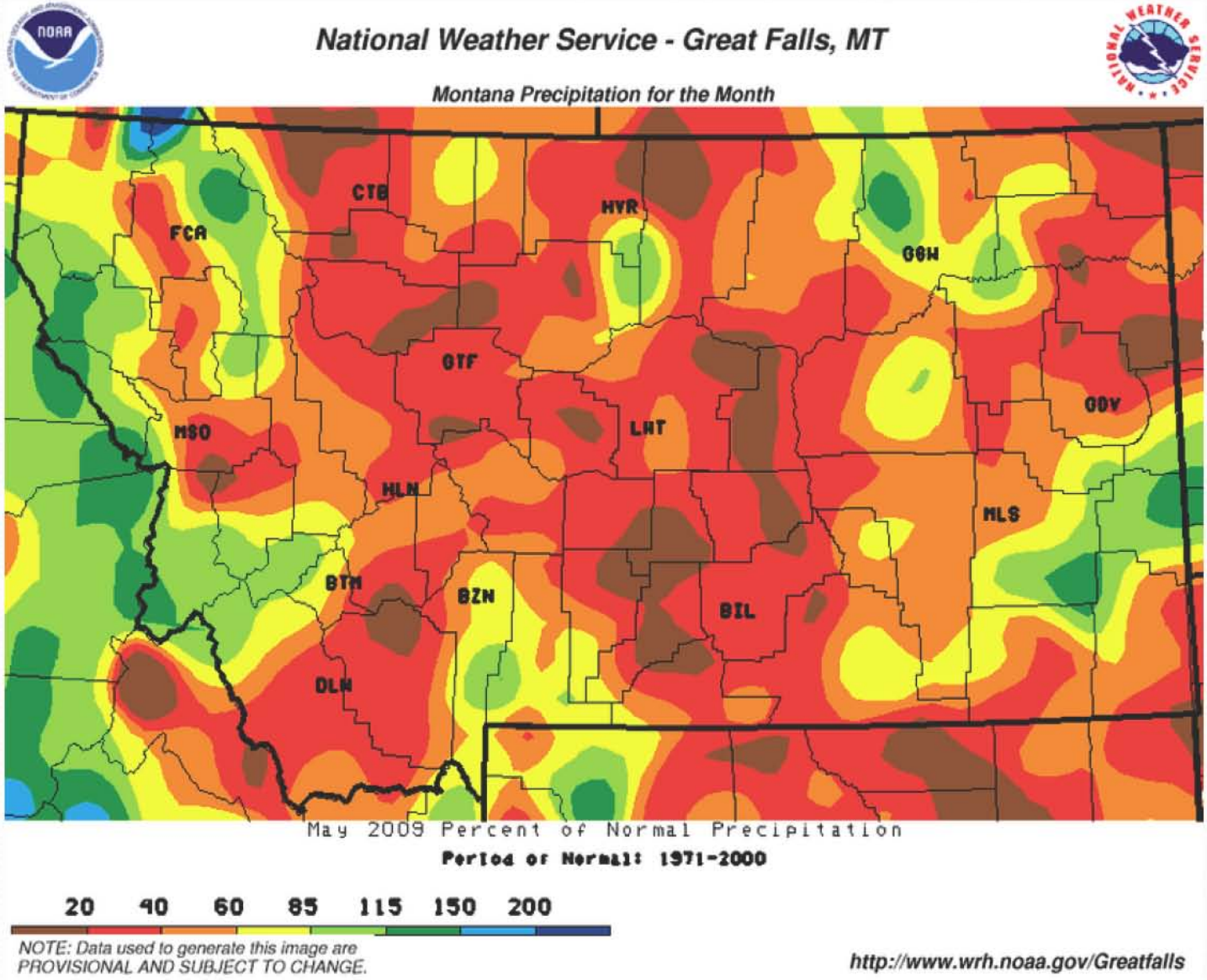
The SWSI accounts for snowpack, mountain precipitation, streamflow, reservoir contents, and soil moisture conditions.



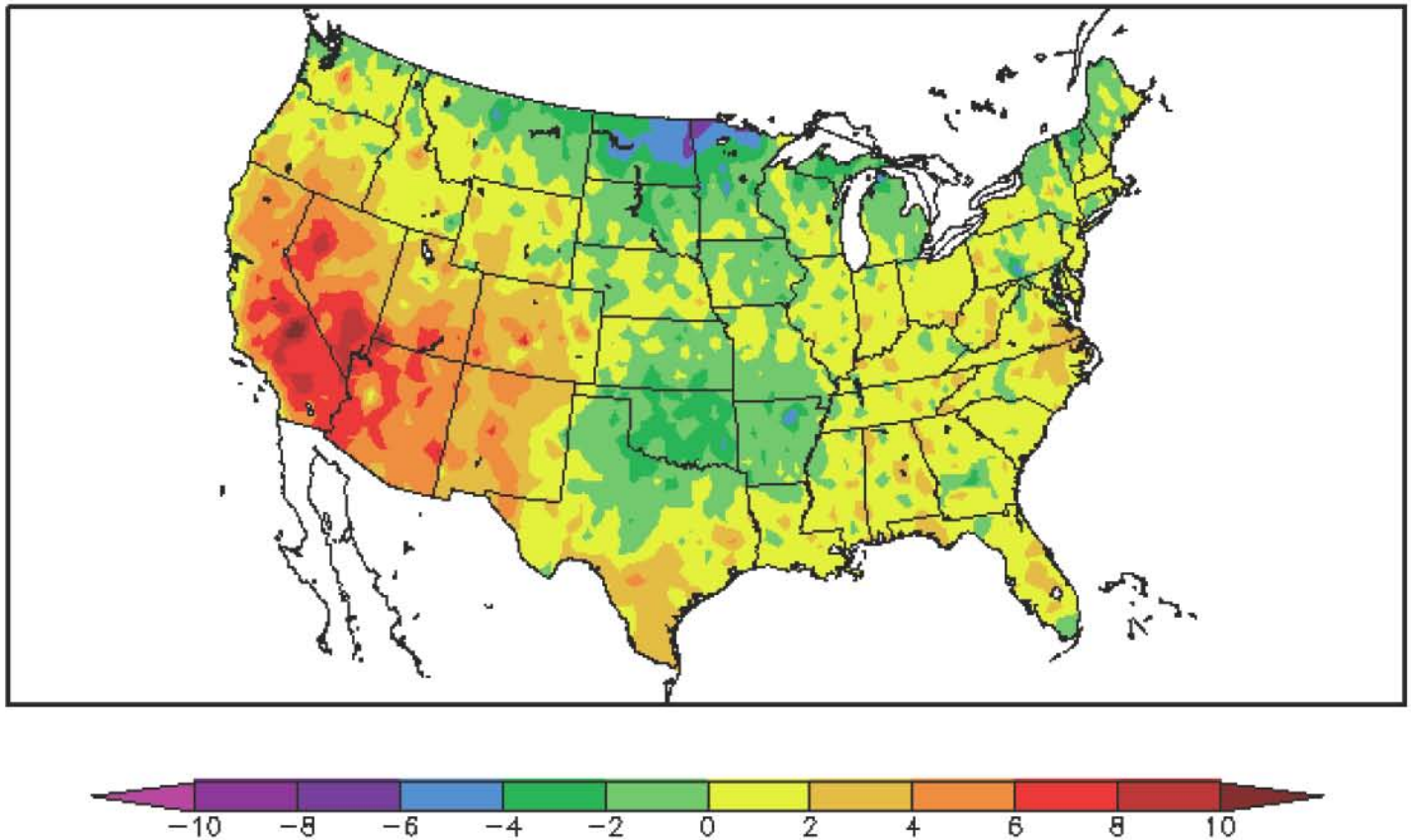
April 2009 Precipitation - NWS



May Precipitation - NWS



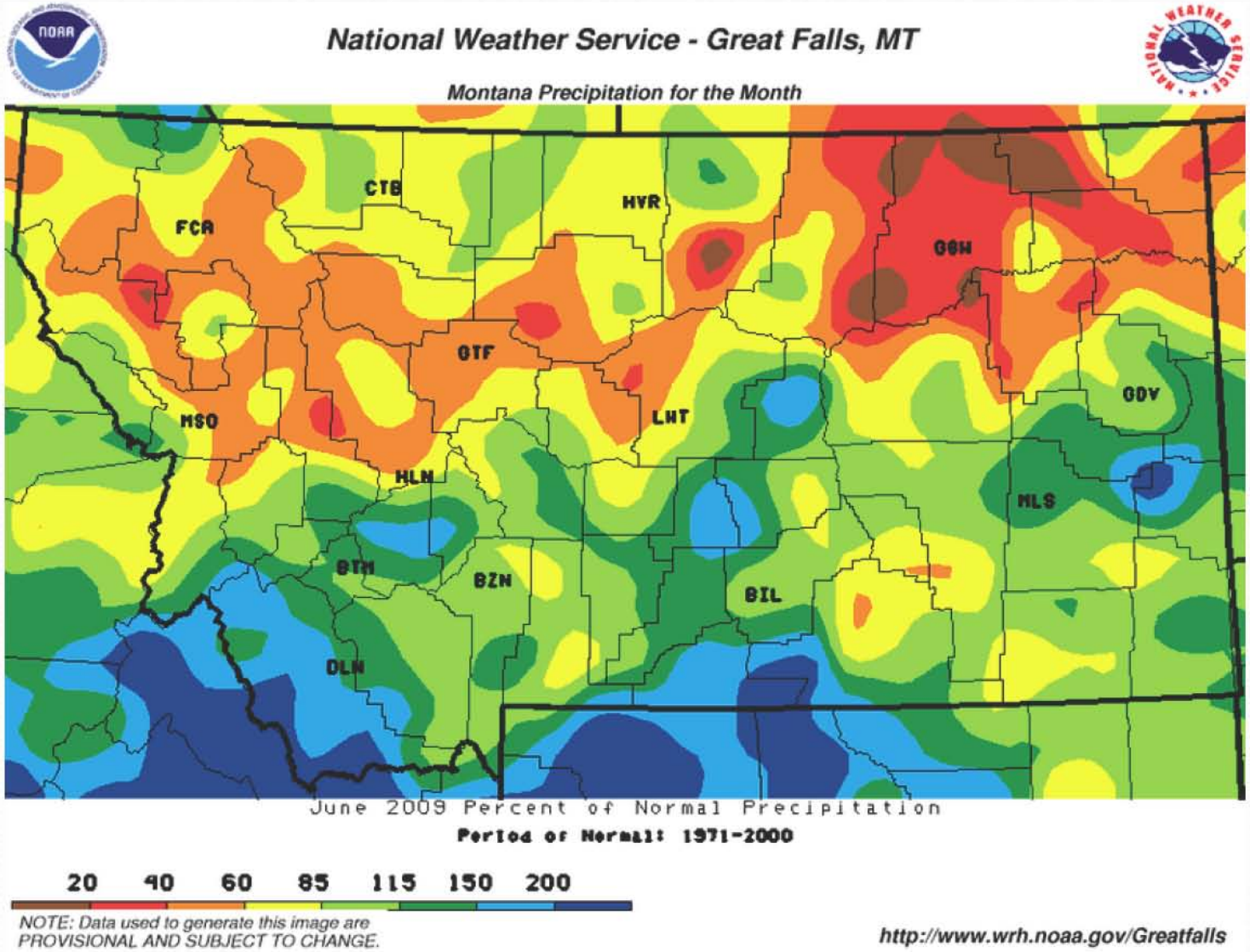
Departure from Normal Temperature (F)
5/1/2009 – 5/31/2009



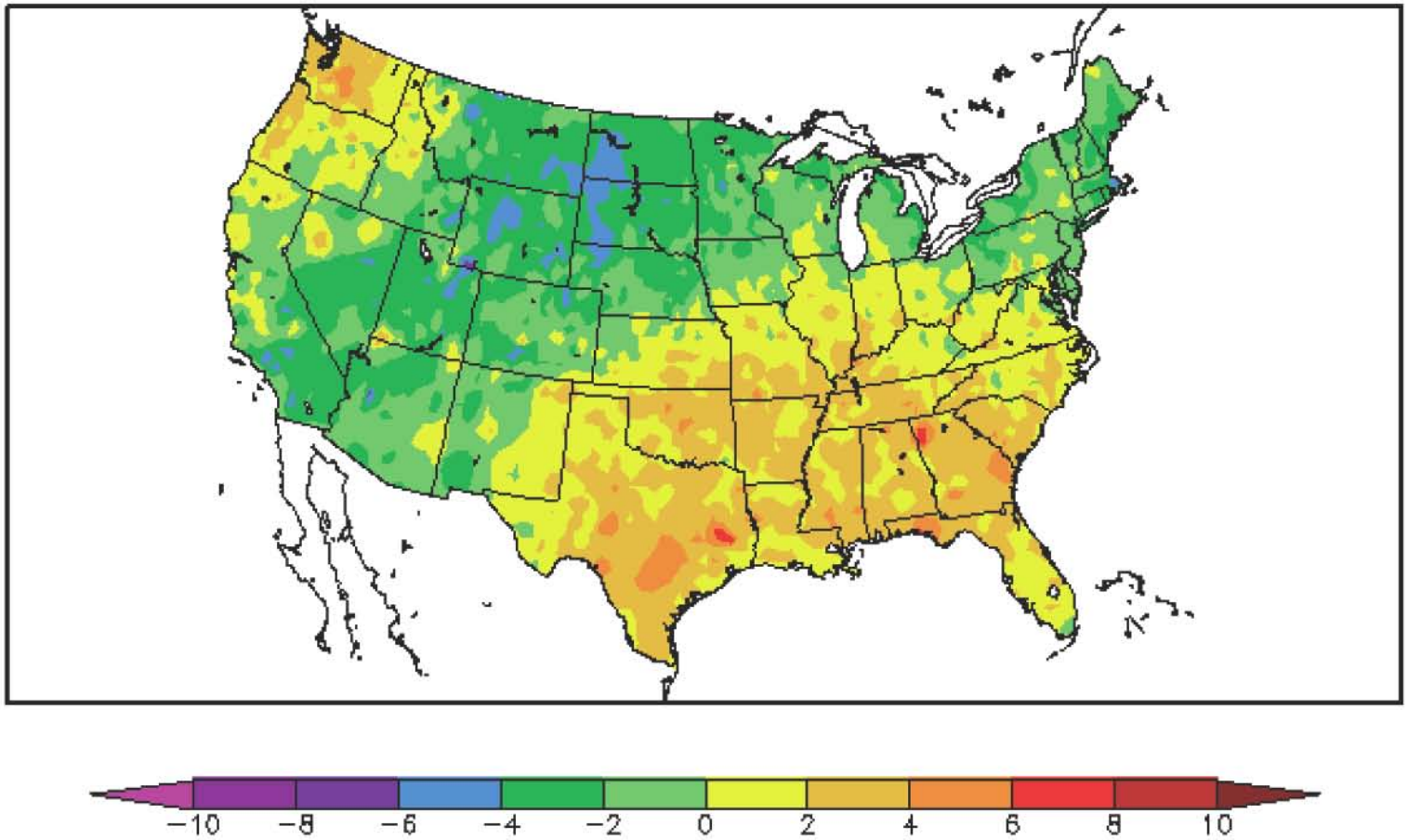
Generated 6/11/2009 at HPRCC using provisional data.

NOAA Regional Climate Centers

June Precipitation - NWS



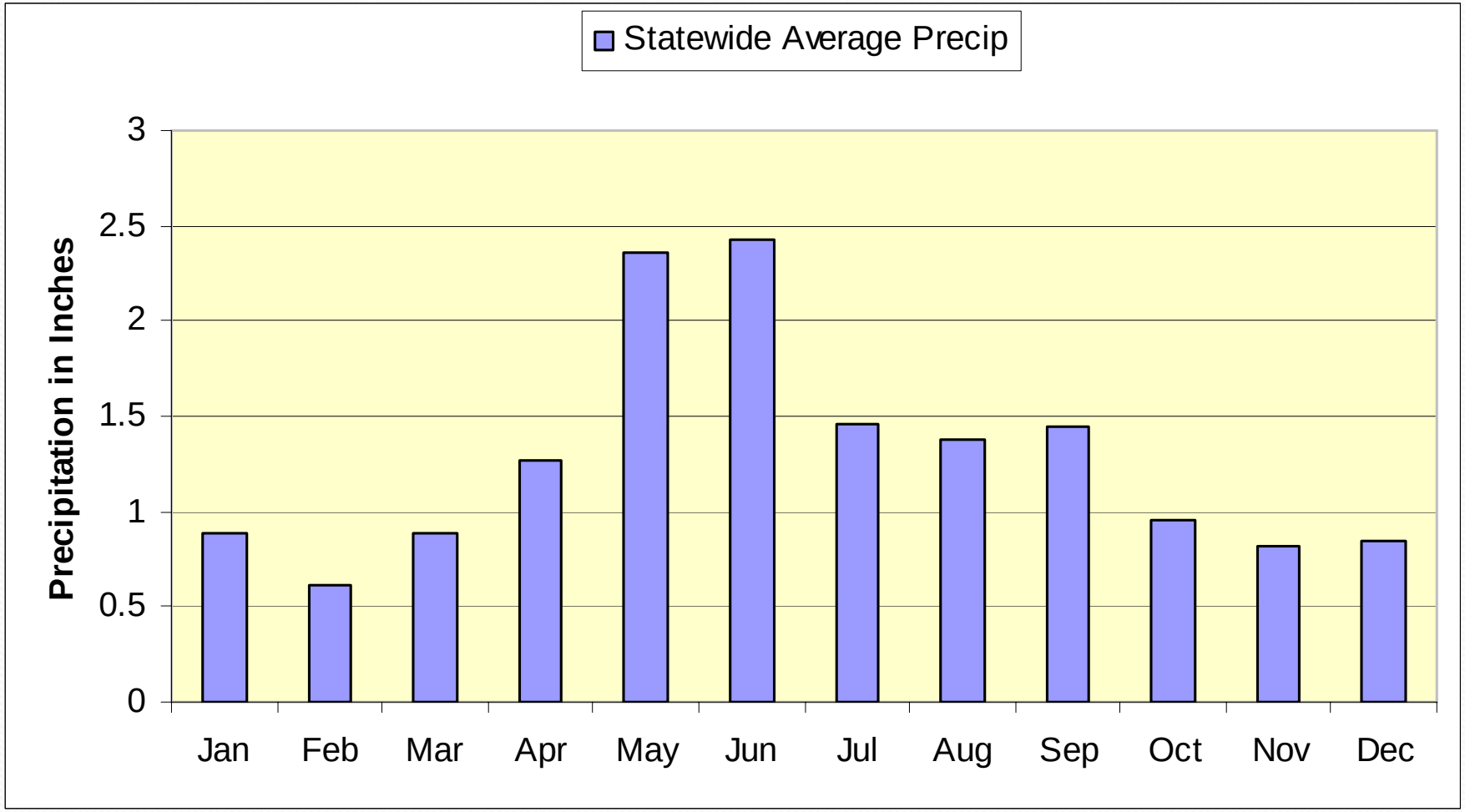
Departure from Normal Temperature (F)
6/1/2009 – 6/30/2009



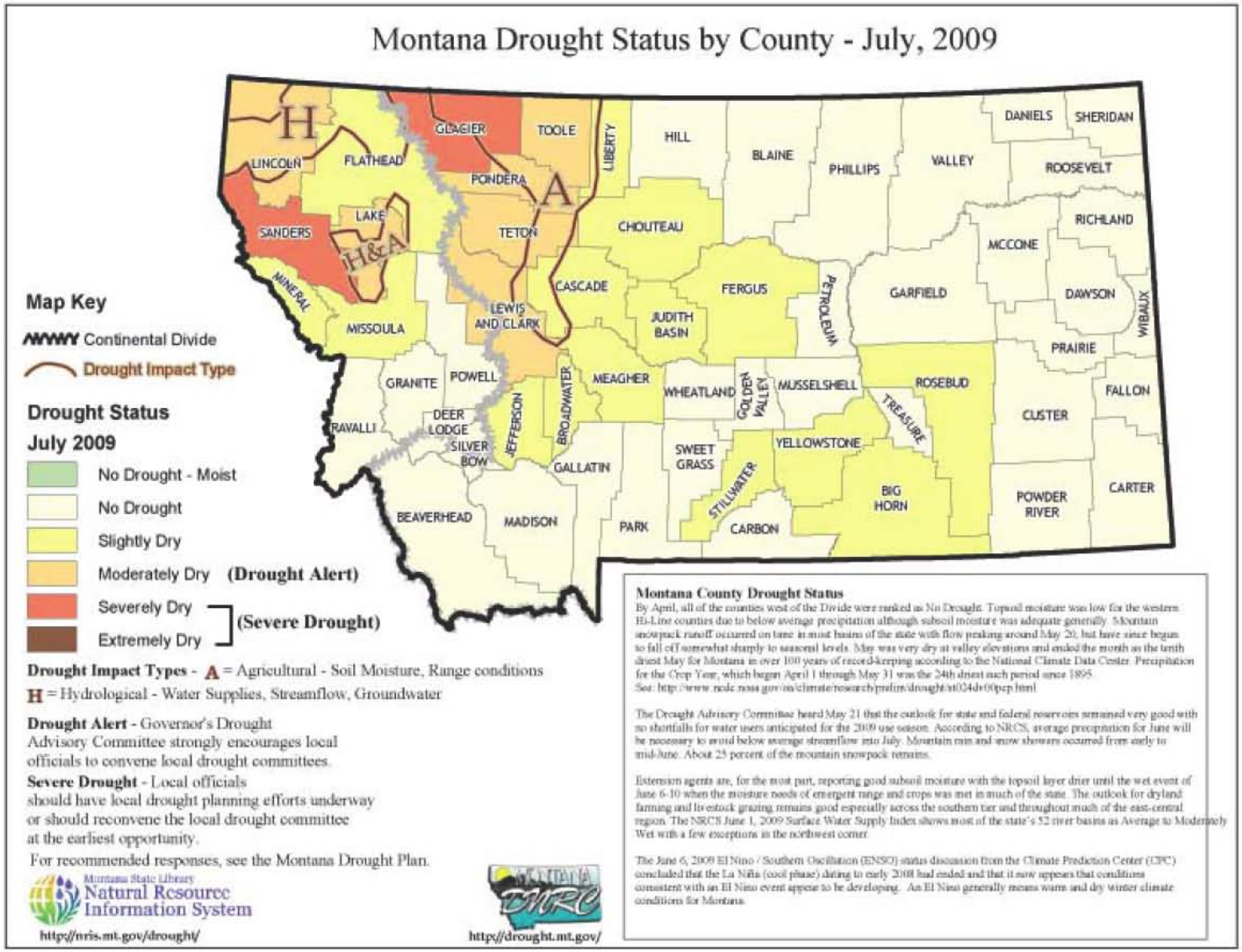
Generated 7/11/2009 at HPRCC using provisional data.

NOAA Regional Climate Centers

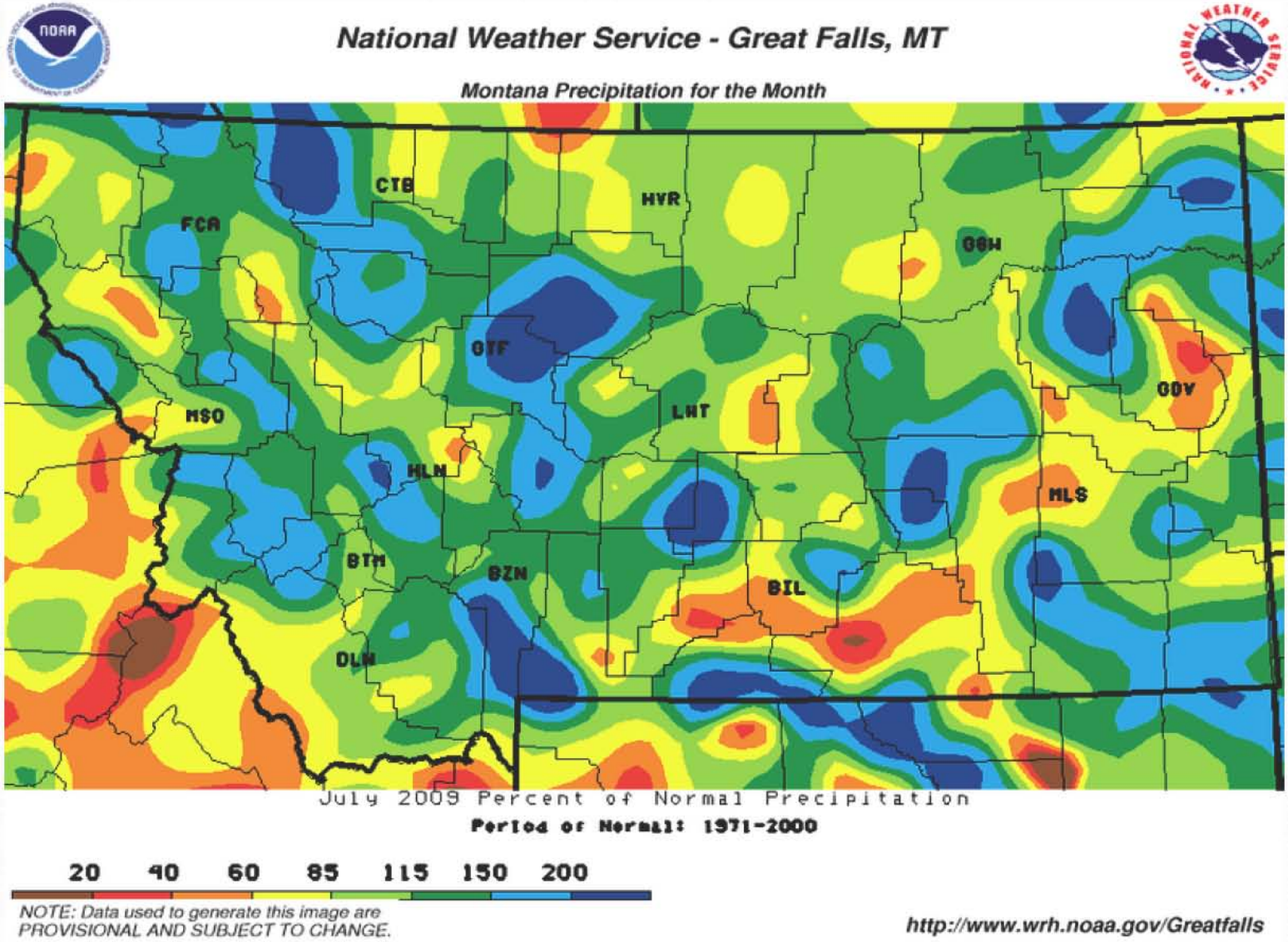
May & June are critical for valley-elevation moisture



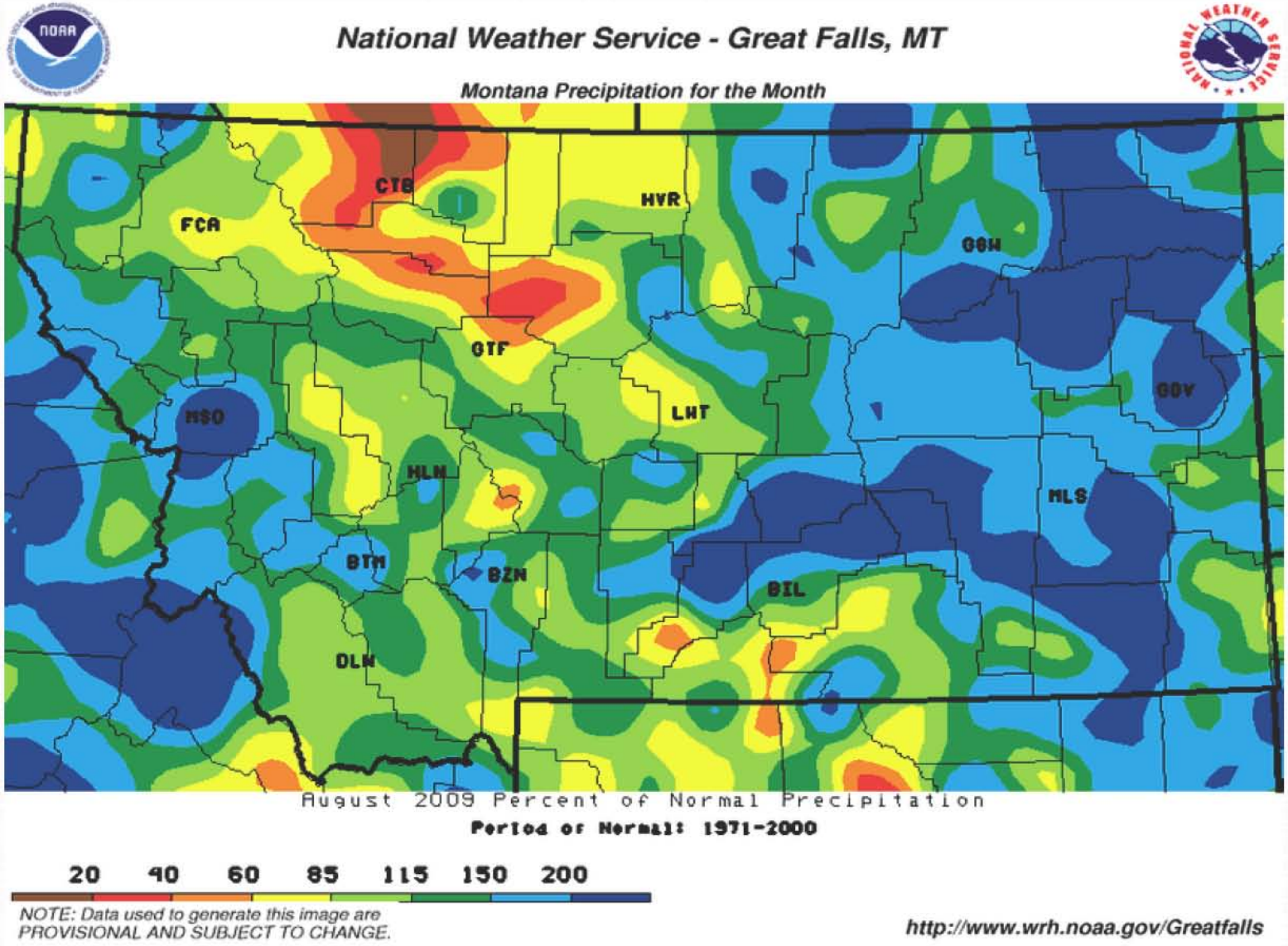
Results of May & June Precip.



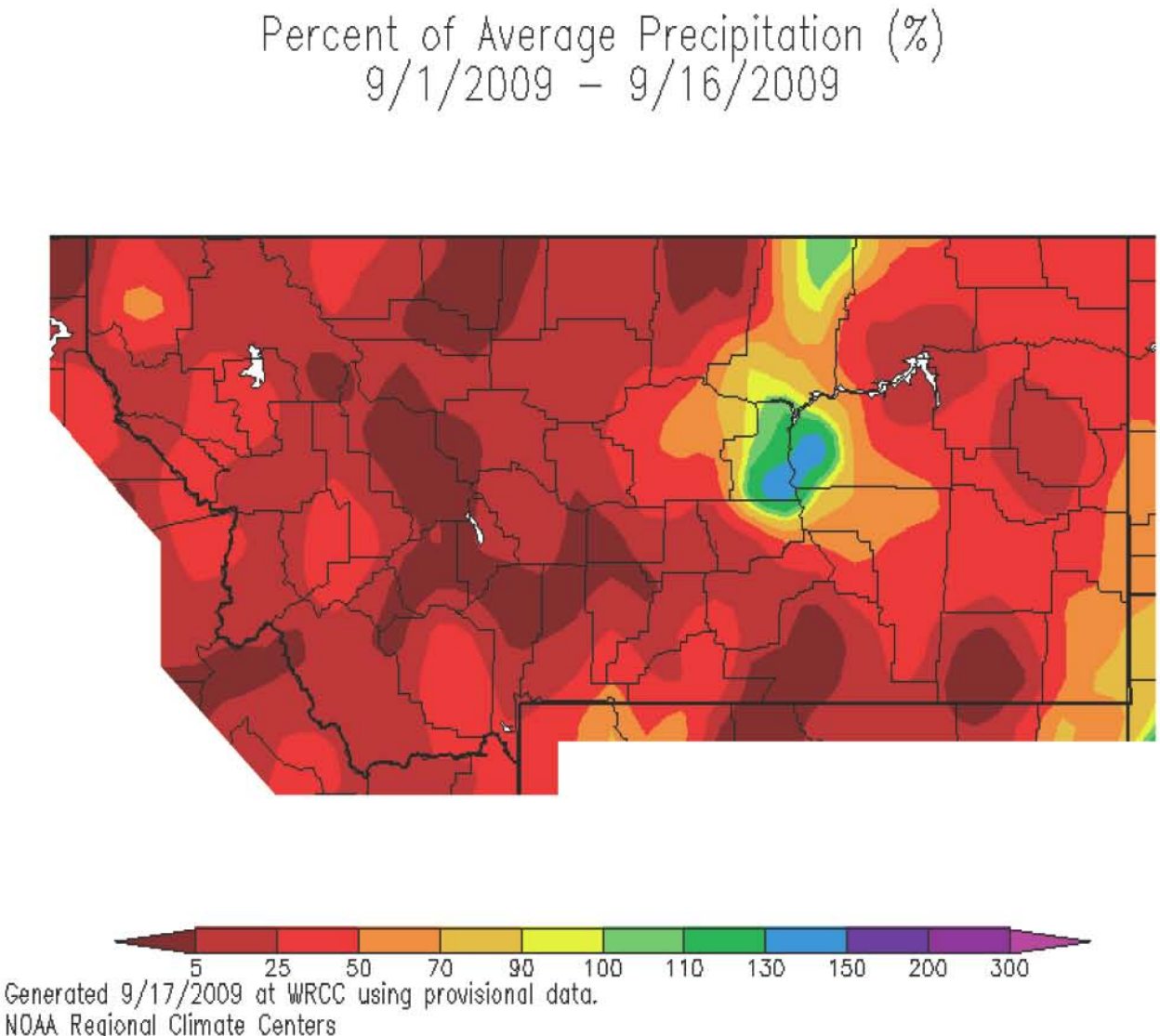
July Precipitation - NWS



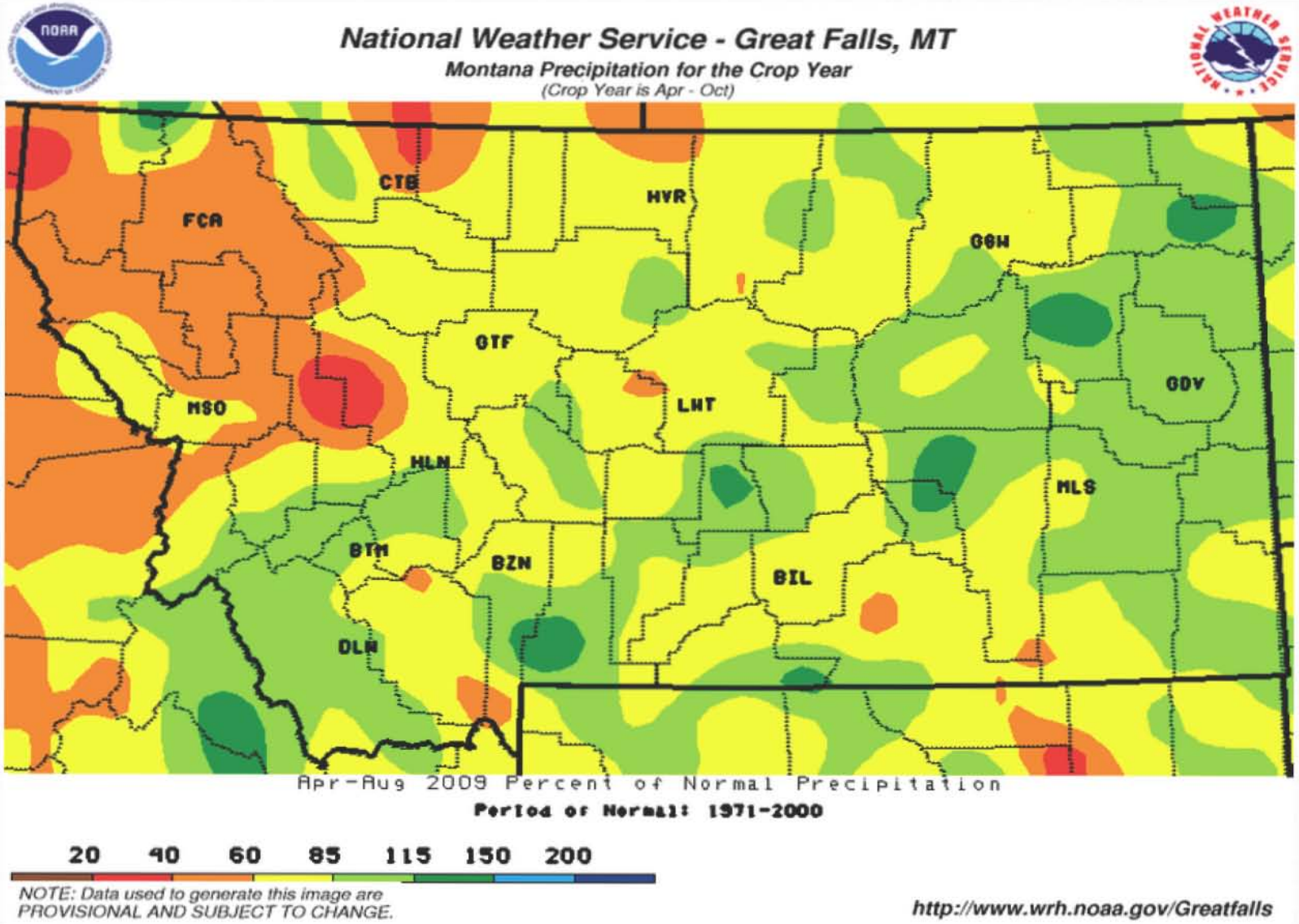
August Precipitation - NWS



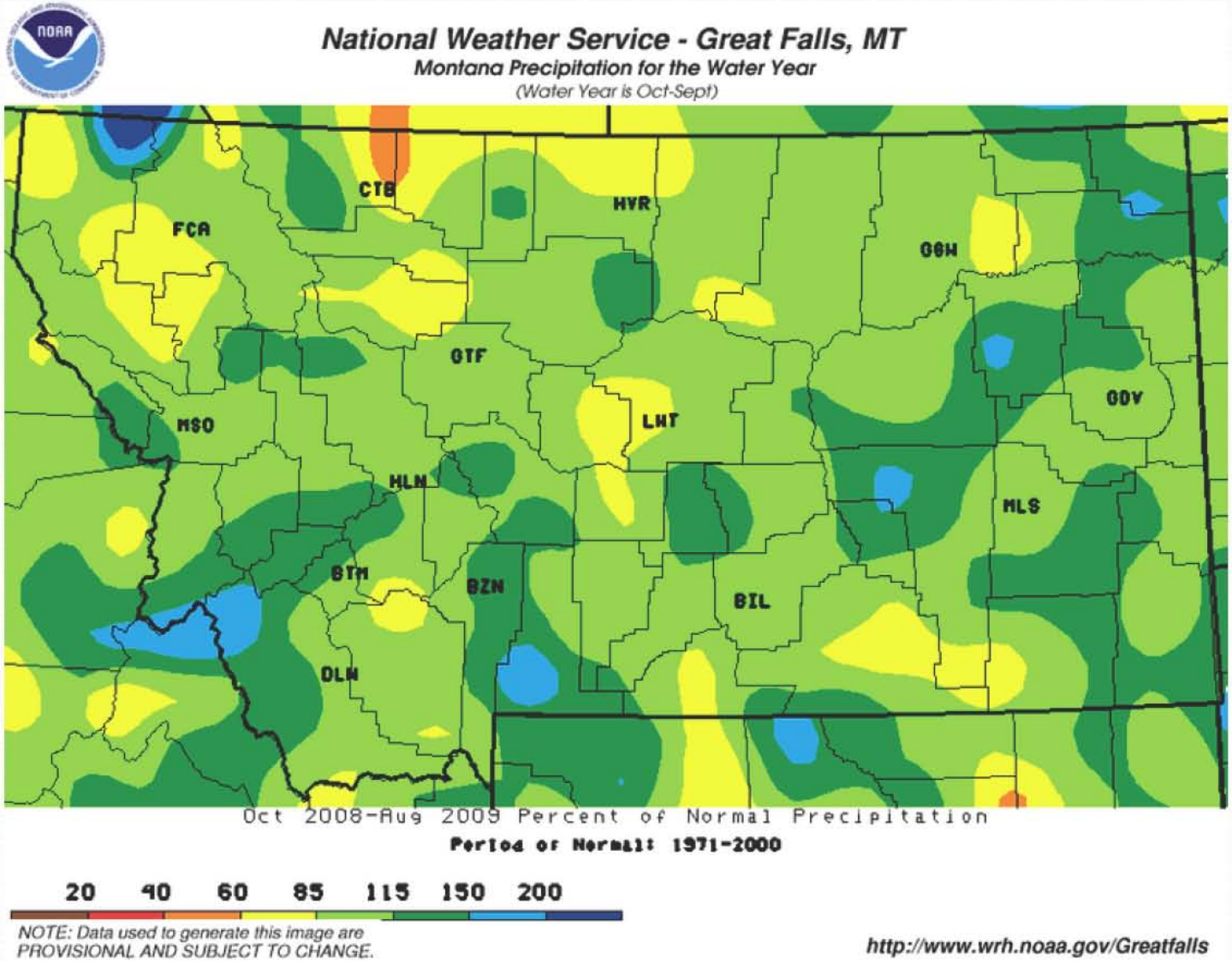
Precipitation 9/1-9/16



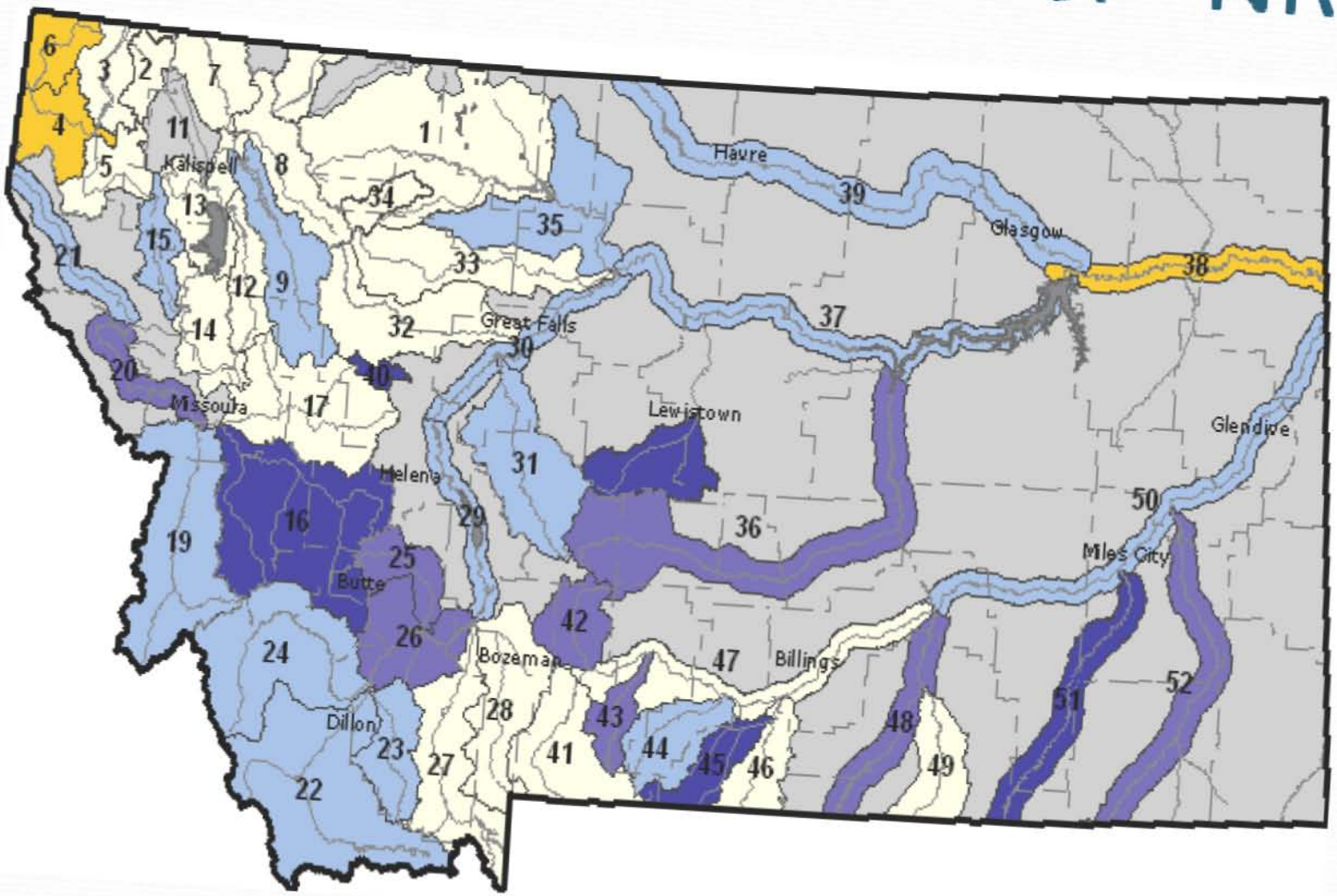
Crop Year precip. April 1 –Aug 31



Water Year Precip. through Aug.



September 1, 2009 SWSI - NRCS



Drought Status – September 2009

Montana Drought Status by County - September, 2009

Map Key

Continental Divide

Drought Impact Type

Drought Status September 2009

- No Drought - Moist
- No Drought
- Slightly Dry
- Moderately Dry **(Drought Alert)**
- Severely Dry
- Extremely Dry

(Severe Drought)

Drought Impact Types - **A** = Agricultural - Soil Moisture, Range conditions
H = Hydrological - Water Supplies, Streamflow, Groundwater

Drought Alert - Governor's Drought Advisory Committee strongly encourages local officials to convene local drought committees.

Severe Drought - Local officials should have local drought planning efforts underway or should reconvene the local drought committee at the earliest opportunity.

For recommended responses, see the Montana Drought Plan.

Montana State Library
Natural Resource Information System
http://nris.mt.gov/drought/

http://drought.mt.gov/

Montana County Drought Status

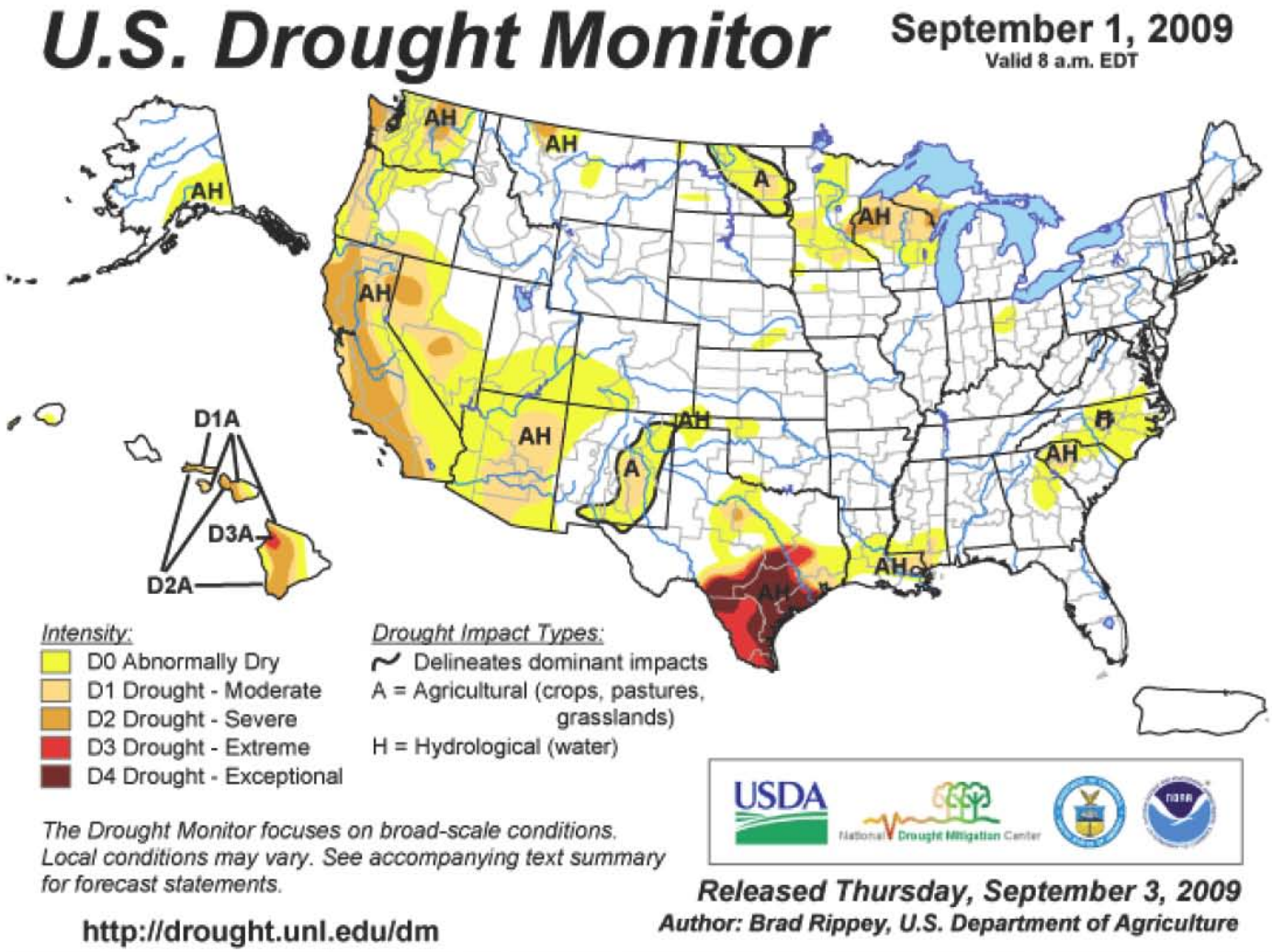
By April, all of the counties west of the Divide were ranked as No Drought. Topsoil moisture was low for the western Hi-Line counties due to below average precipitation although subsoil moisture was adequate generally. Mountain snowpack runoff occurred on time in most basins of the state with flow peaking around May 20, but have since begun to fall off somewhat sharply to seasonal levels. May was very dry at valley elevations and ended the month as the tenth driest May for Montana in over 100 years of record-keeping according to the National Climate Data Center. Precipitation for the Crop Year, which begin April 1 through May 31 was the 24th driest such period since 1895
See: http://www.ncdc.noaa.gov/oa/climate/research/prelim/drought/st024dv00pcp.html

The Drought Advisory Committee heard May 21 that the outlook for state and federal reservoirs remained very good with no shortfalls for water users anticipated for the 2009 use season. According to NRCS, average precipitation for June will be necessary to avoid below average streamflow into July. Mountain rain and snow showers occurred from early to mid-June. About 25 percent of the mountain snowpack remains.

Extension agents are, for the most part, reporting good subsoil moisture with the topsoil layer drier until the wet event of June 6-10 when the moisture needs of emergent range and crops was met in much of the state. The outlook for dryland farming and livestock grazing remains good especially across the southern tier and throughout much of the east-central region. The NRCS June 1, 2009 Surface Water Supply Index shows most of the state's 52 river basins as Average to Moderately Wet with a few exceptions in the northwest corner.

The June 6, 2009 El Nino / Southern Oscillation (ENSO) status discussion from the Climate Prediction Center (CPC) concluded that the La Niña (cool phase) dating to early 2008 had ended and that it now appears that conditions consistent with an El Nino event appear to be developing. An El Nino generally means warm and dry winter climate conditions for Montana.

Drought relief in Northern Great Plains



NASS Crop Weather Report
Week Ending September 13, 2009

- **Spring wheat** harvest almost caught up to last year's pace with yields **forecast at 28 bushels per acre**, ahead of the five-year average of 26.4.
- **Winter wheat** crop harvested with forecast yield **37 bu. per acre**, behind five-year average of 41.2.

Harvest running late; now catching up

- **Durum wheat** harvest well behind last year and the five-year average, but **forecast yield of 26 bushels per acre** ahead of the five-year average of 24.2.
- **Barley** harvest has caught up to the previous year, and state **yields of 50 bushels per acre** are off slightly from the five-year average of 52.

Where does WY 2009 leave us?

- Reservoir contents strong carryover;
- Hydrologic recovery good 2008-2009;
- Good subsoil moisture most areas;
- Seeding ahead of 5-year average;
- Some hay shortages, but price down;
- Average to above grain yields.

Natural Disaster Determination Requests for drought -9/18

- Glacier
- Teton
- Chouteau
- Richland
- Dawson
- McCone
- Valley
- Garfield

Other reasons cited for 2009 NDDs:

Hail, snowstorms, sawflies, grasshoppers.

New Big Hole real-time flow gauges
Reclamation Drought Relief Act

Between Jackson and Wisdom

Mrs. Jackson & Mike Roberts, DNRC

What about emergent El Nino?

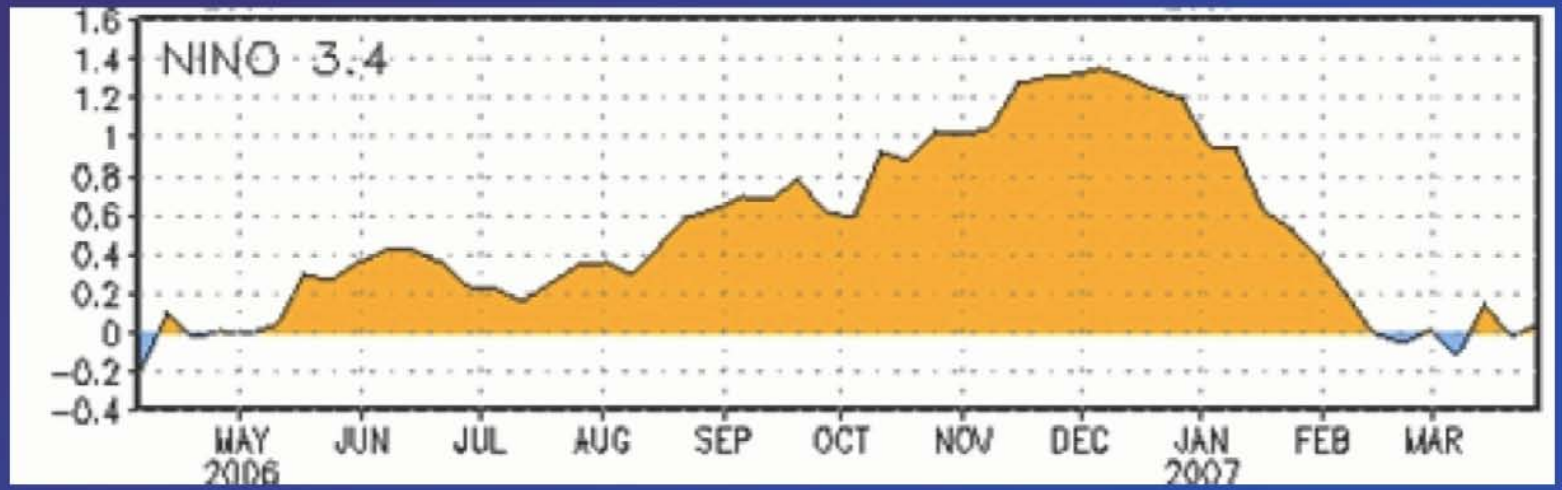
Swiftcurrent gauge – 11/07/06

Many Glacier 11/10/07
Temperatures moderate at last

El Nino 2006-2007 Building

El Niño / La Niña

- El Niño conditions (above normal sea surface temperatures) dominated during autumn and early winter
- El Niño conditions disappeared from eastern Pacific during February... currently in neutral phase
- Transition from neutral to La Niña conditions (below normal sea surface temperatures) possible during next 2-3 months



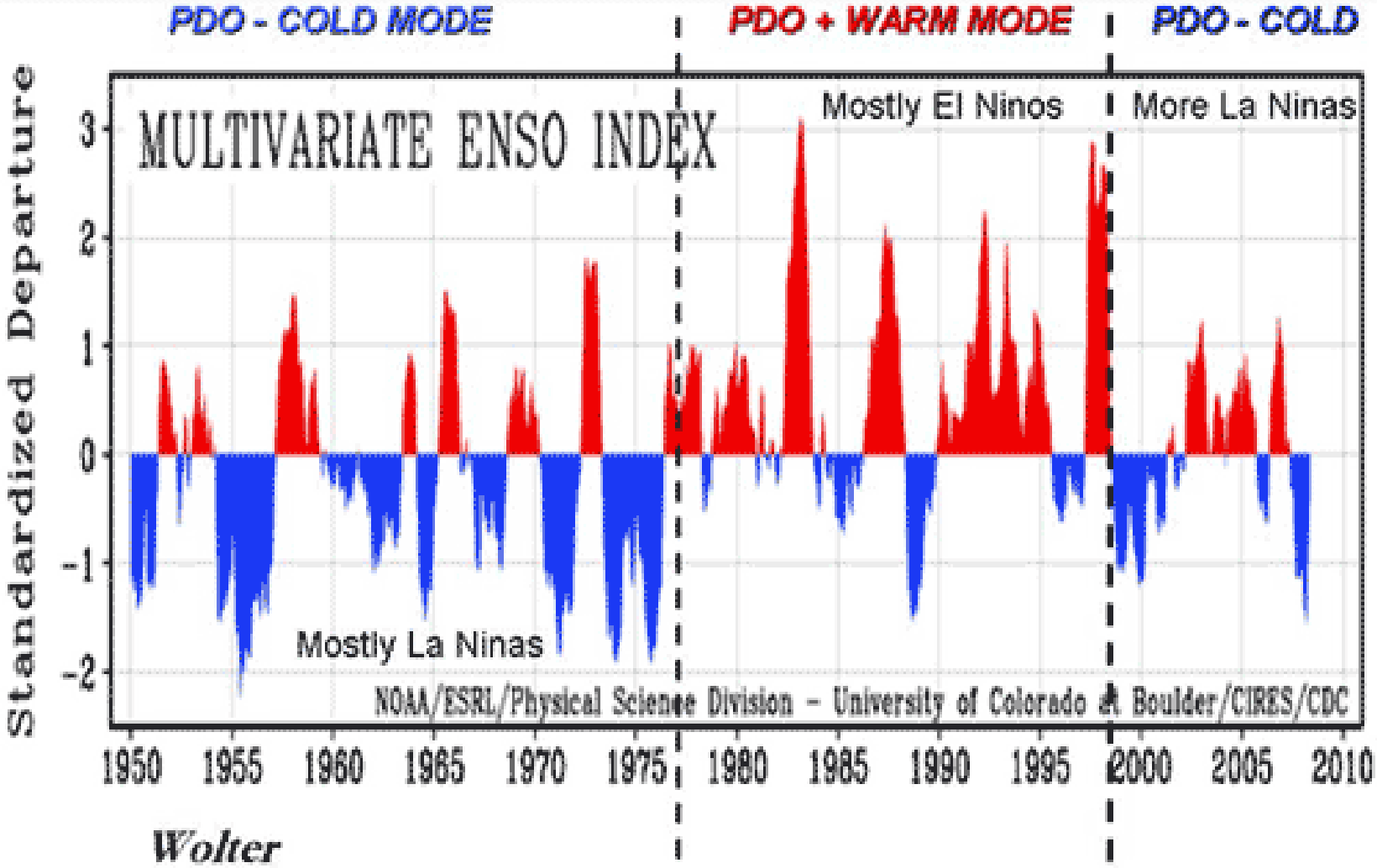
El Nino lifespan & effects

- Begins forming in June, peaks December, and ends in spring; but effects to come..
- Temperature anomaly more predictable than precipitation anomaly;
- Tends to bring rain instead of snow in early months of Water Year (Oct – Dec);
- Mountain snowpack can be small (vulnerable) heading into early spring from fall (and spring) warmth.

More than El Nino going on…..

- Natural wide range of climate variability;
- Climate warming more pronounced in Northern latitudes and in winter;
- “First Pulse” spring snowmelt comes earlier & anomalous events last longer;
- Decadal climate anomalies provide over-arching background influence – ex.
- Pacific Decadal Oscillation (PDO)

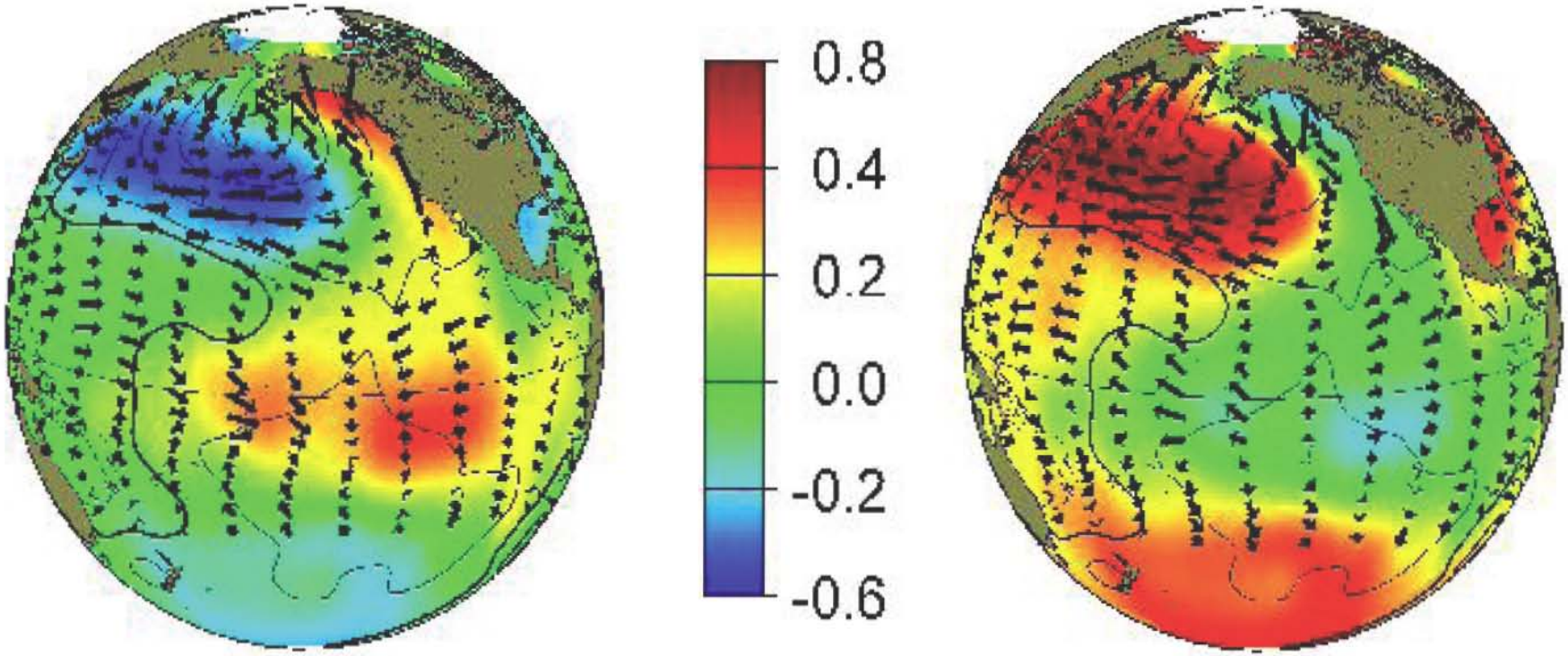
PDO can ameliorate or compound ENSO-2008-2009 La Nina and cool PDO



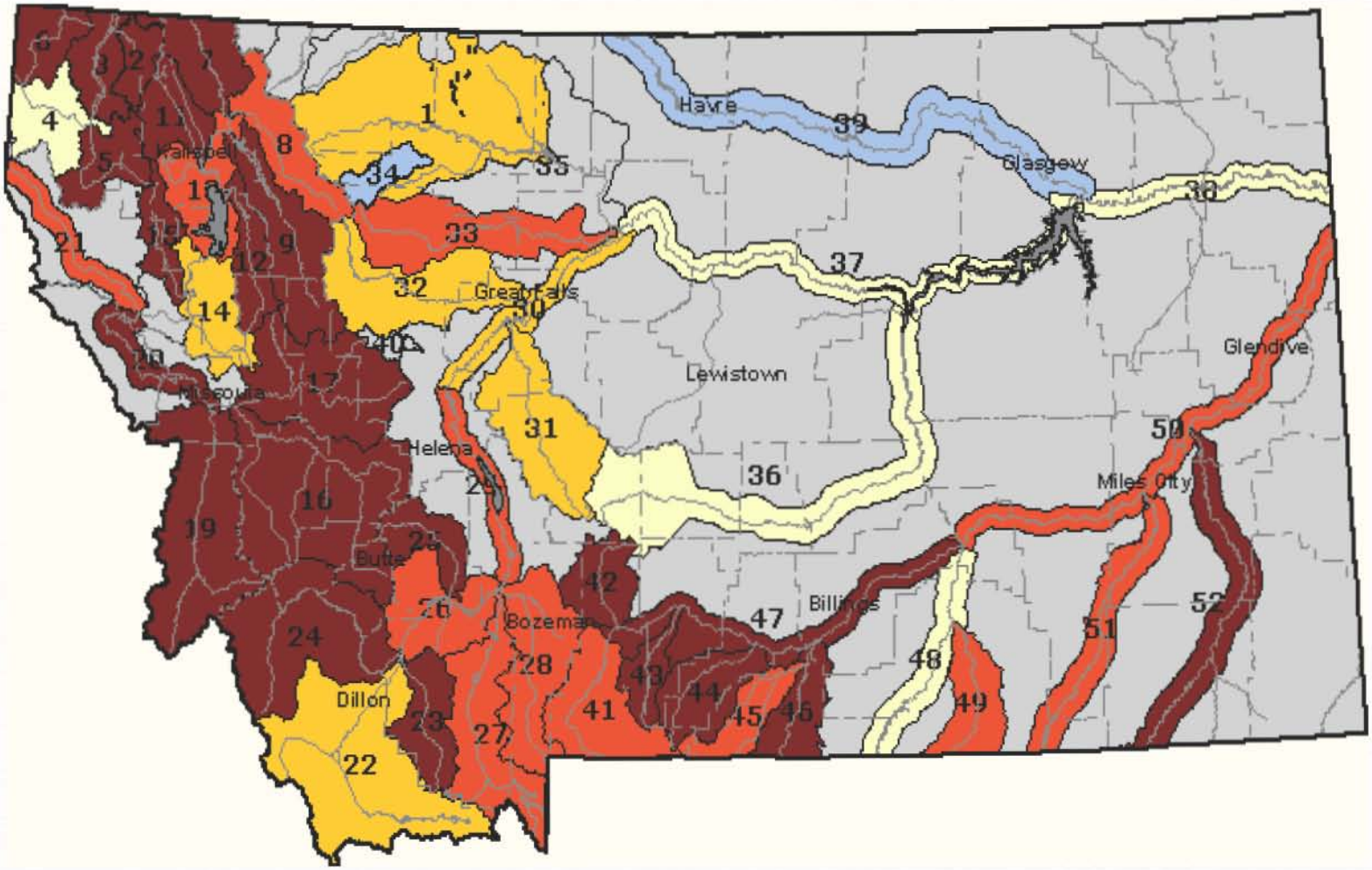
Last long cool phase of PDO 1947-1976 (30 years)

Warm phase

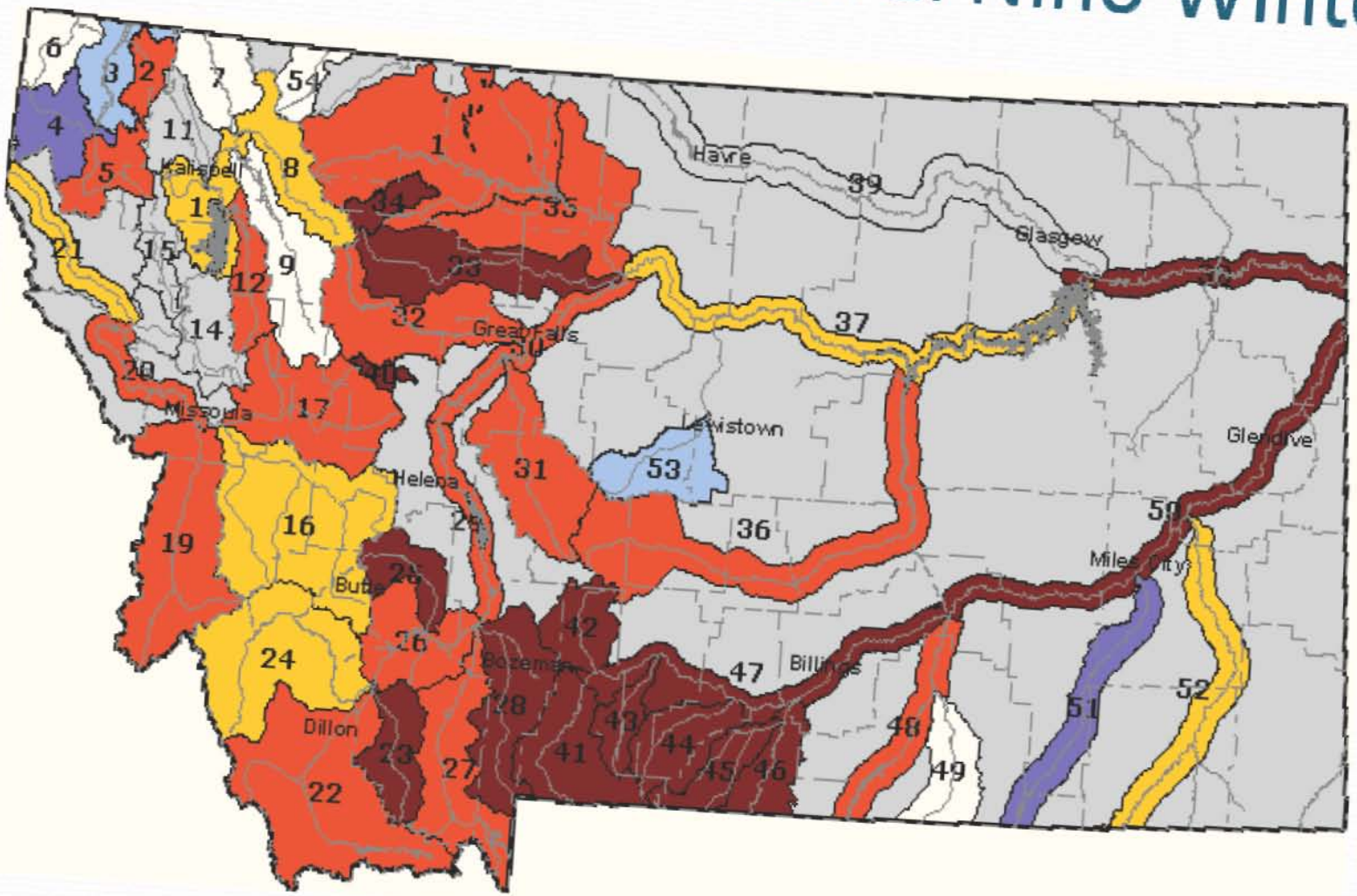
Cool phase



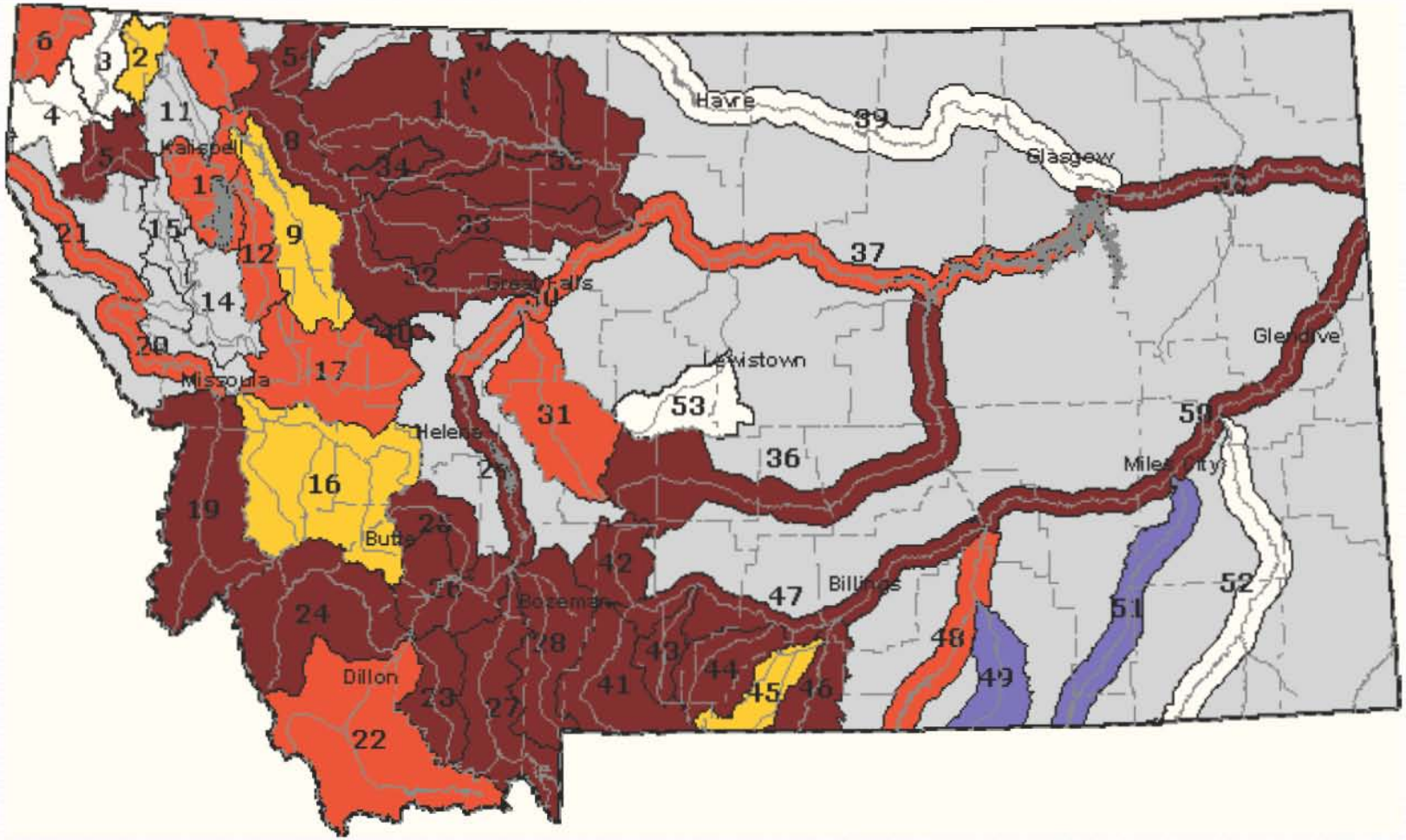
El Nino of 1993 leads to streamflow trouble of July-Sept 1994



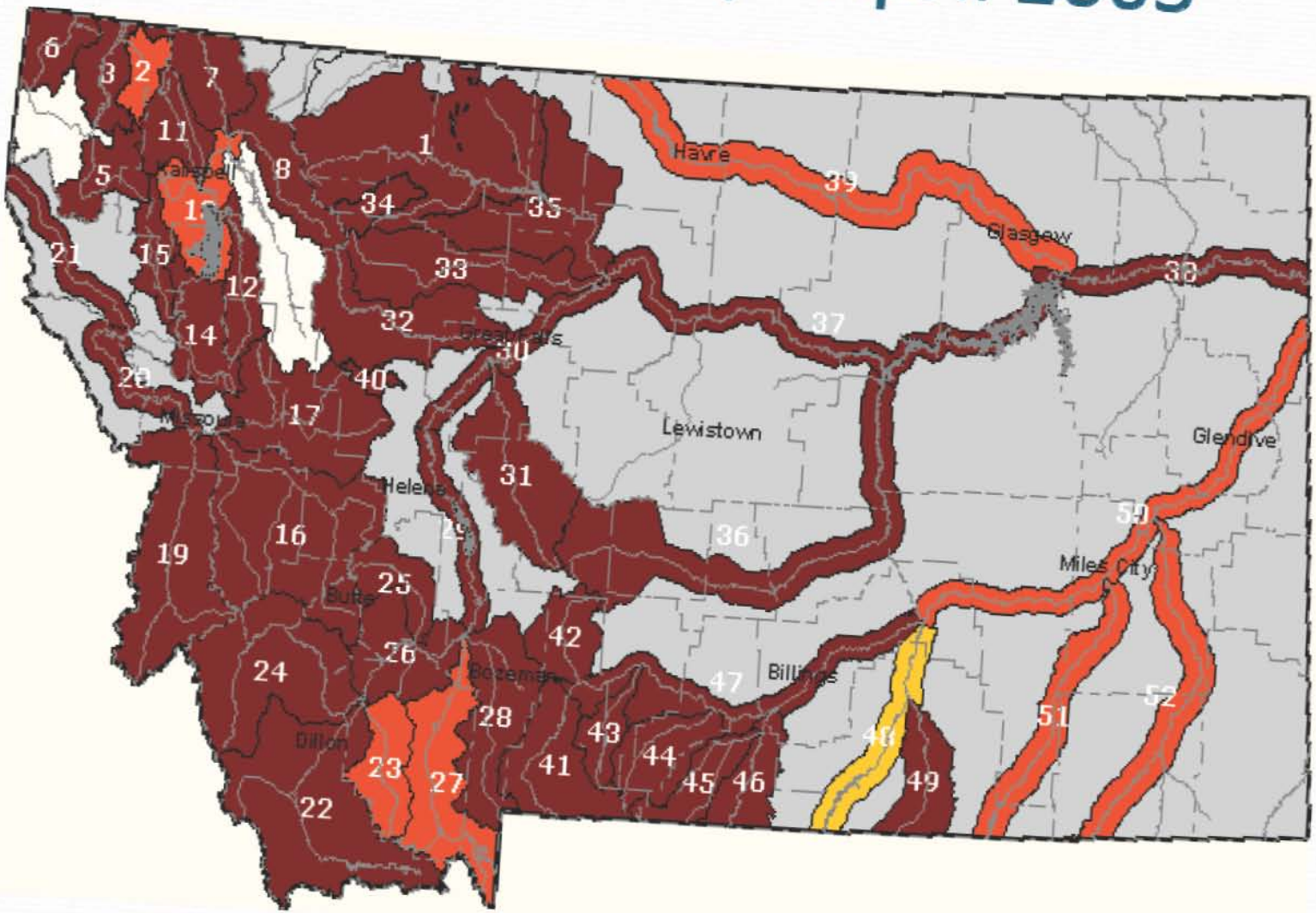
SWSI June 1, 2007
Following '06-'07 weak El Nino Winter



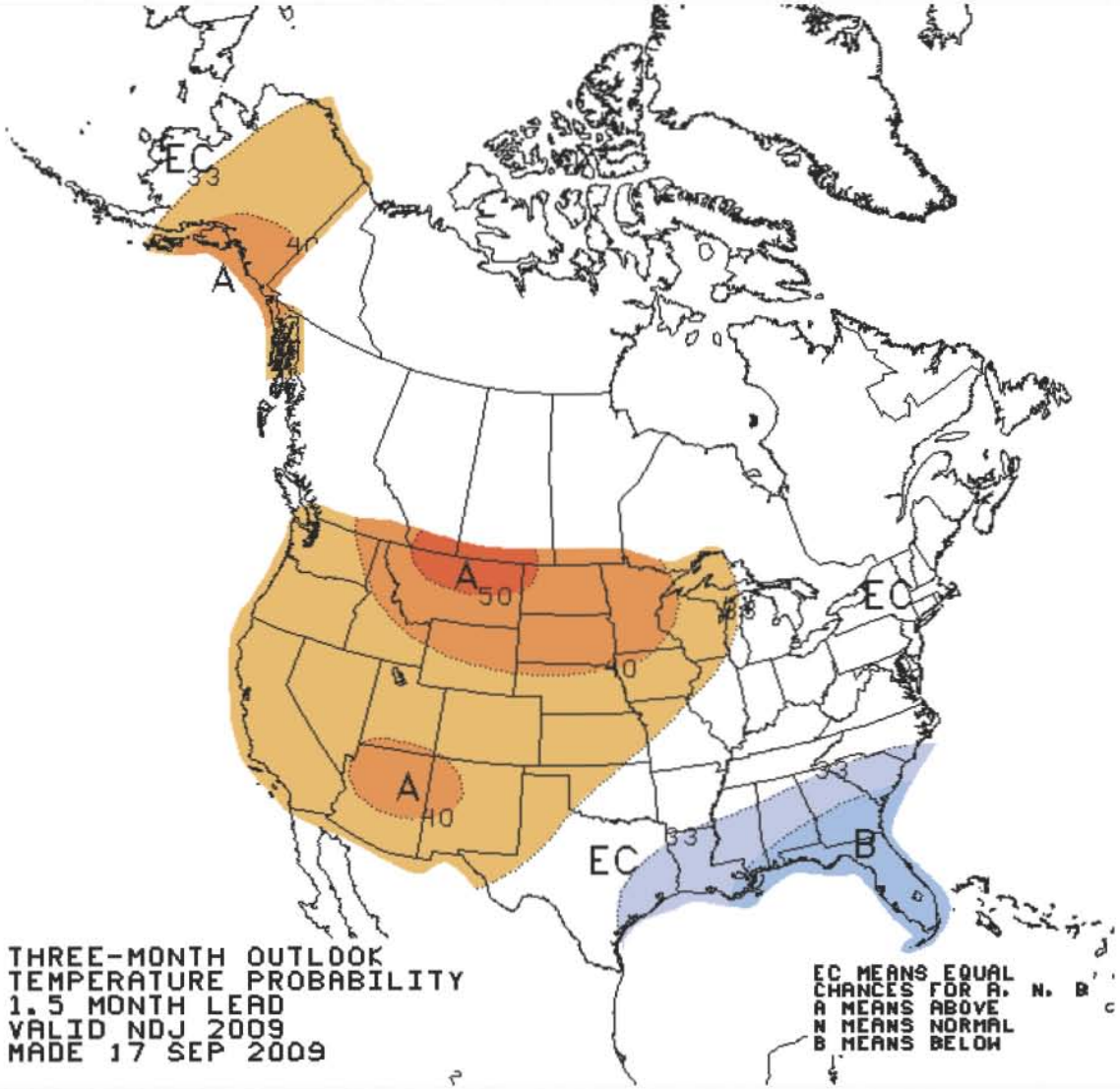
SWSI August 1, 2007
Following record heat wave of July



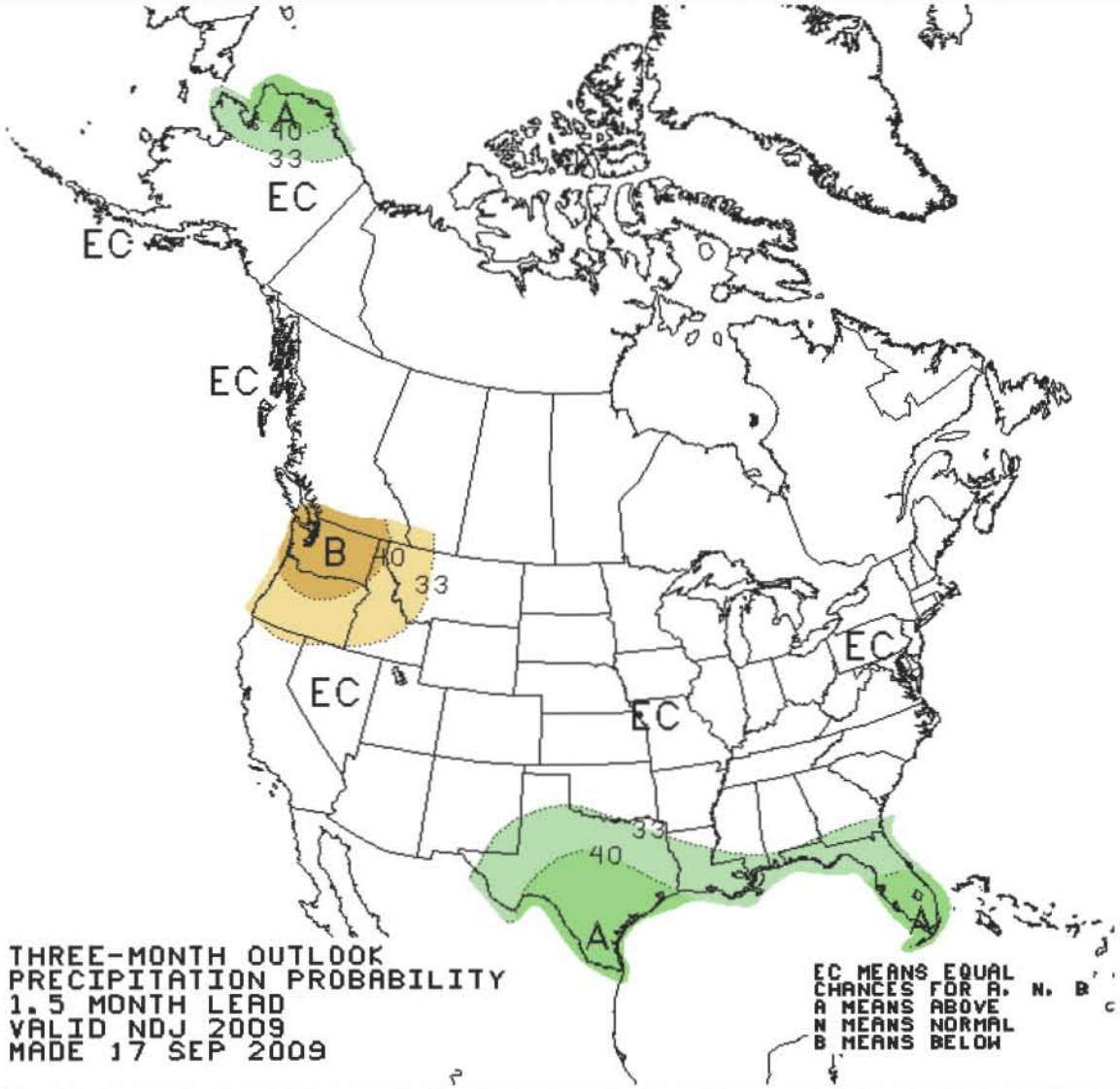
The El Nino of 2004 – 2005 Led to (SWSI) - April 2005



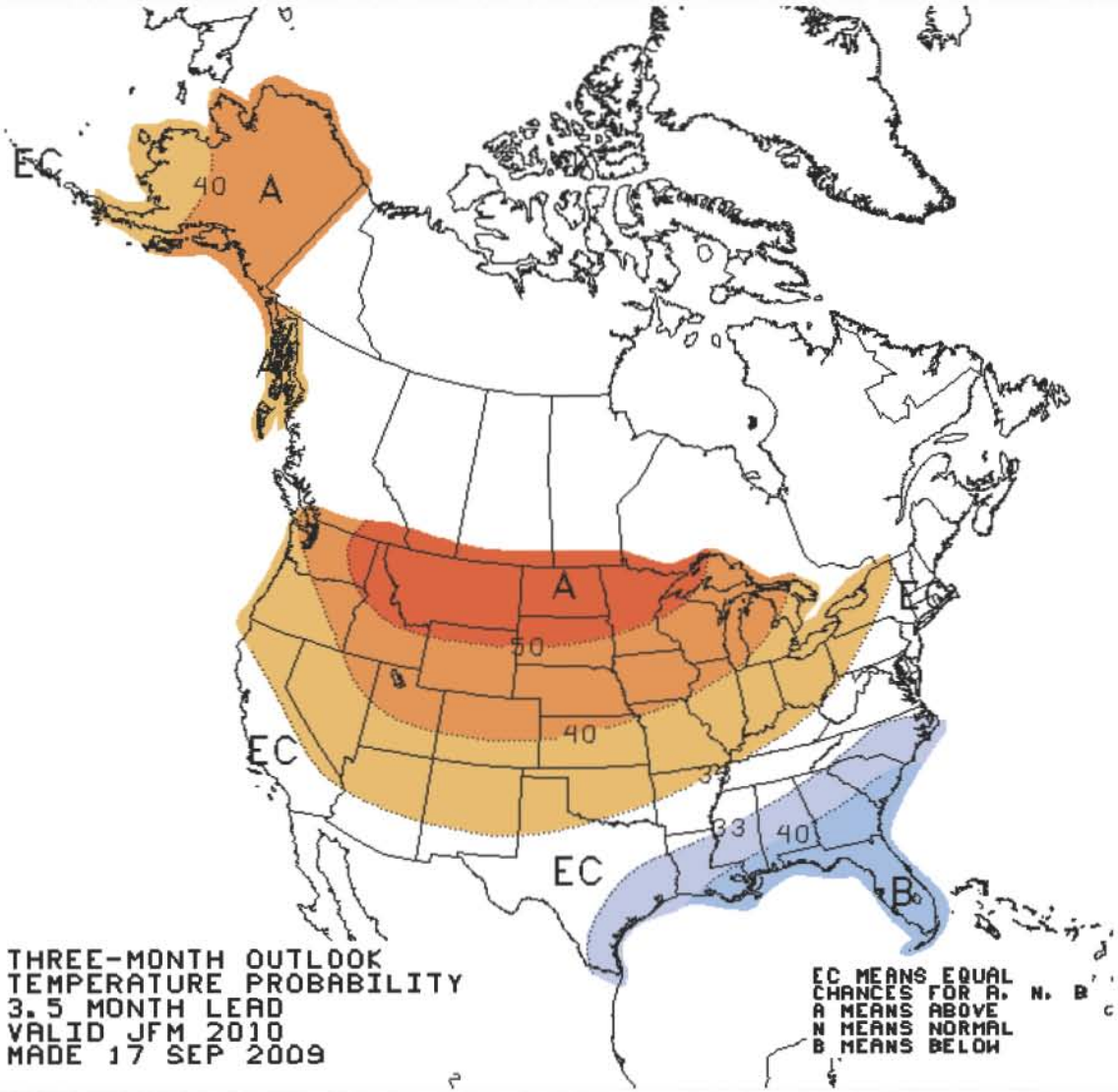
CPC Nov-Jan Temperature Outlook



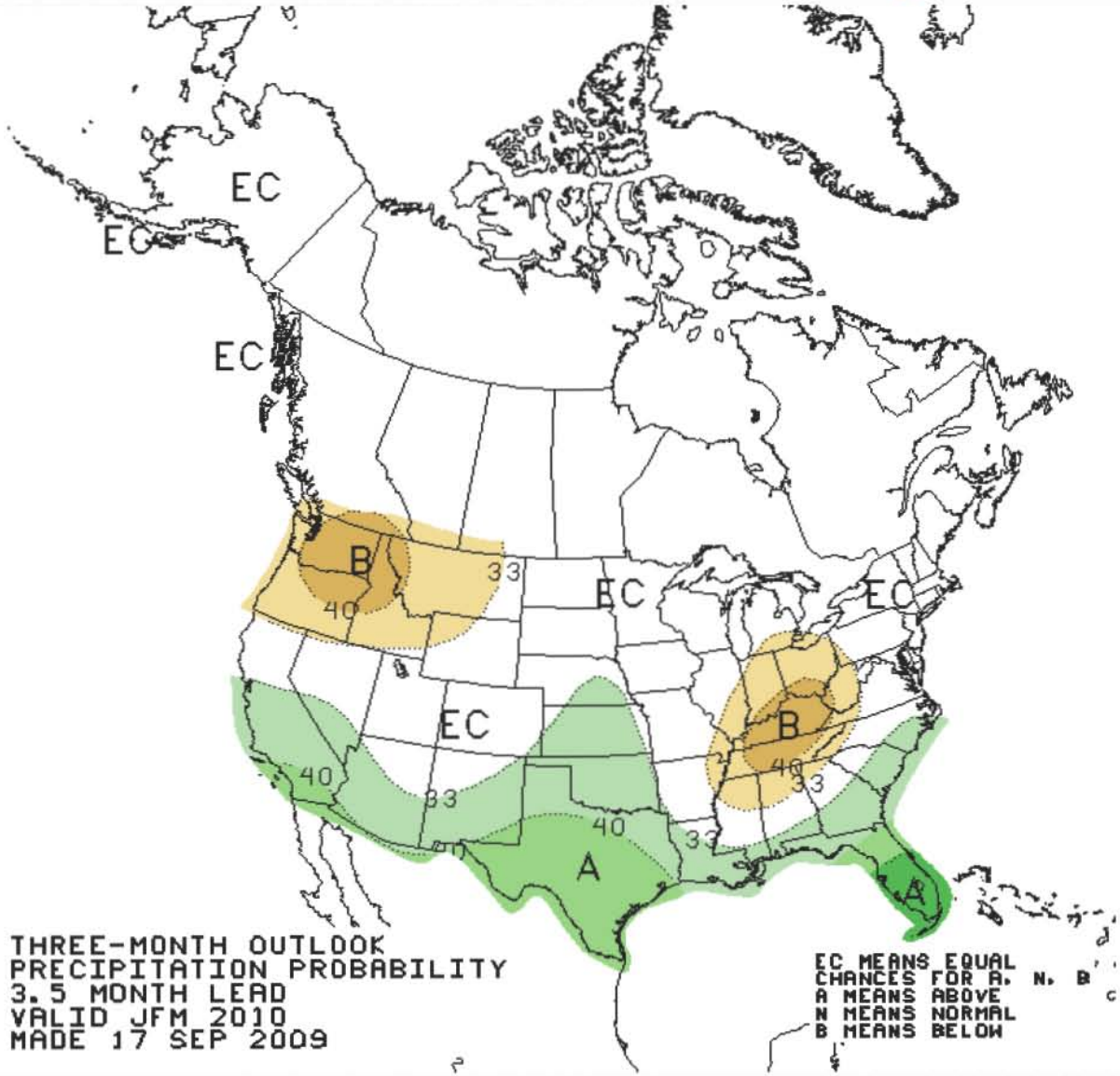
CPC Nov-Jan Precip. Outlook



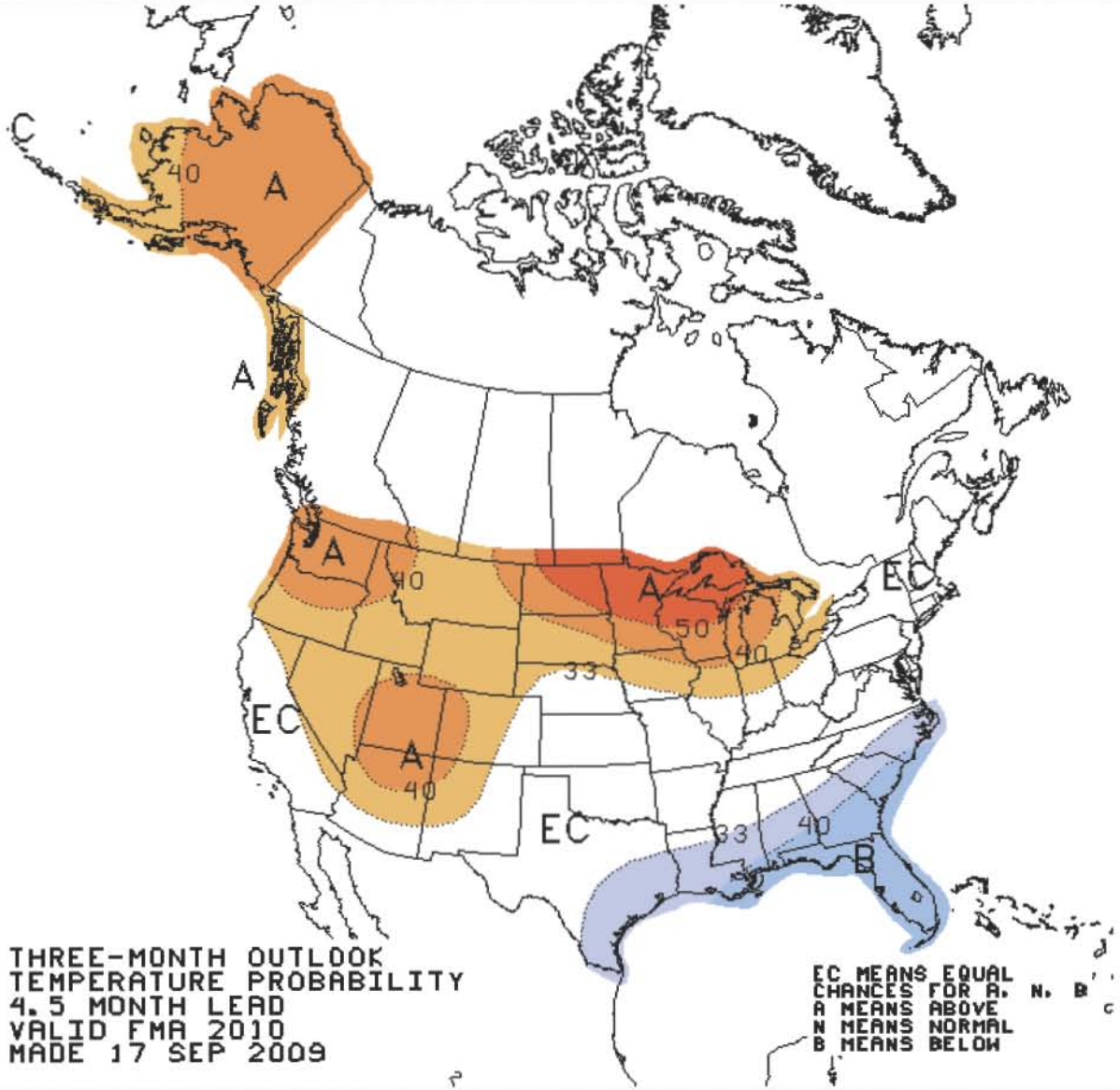
CPC Jan-March temperatures



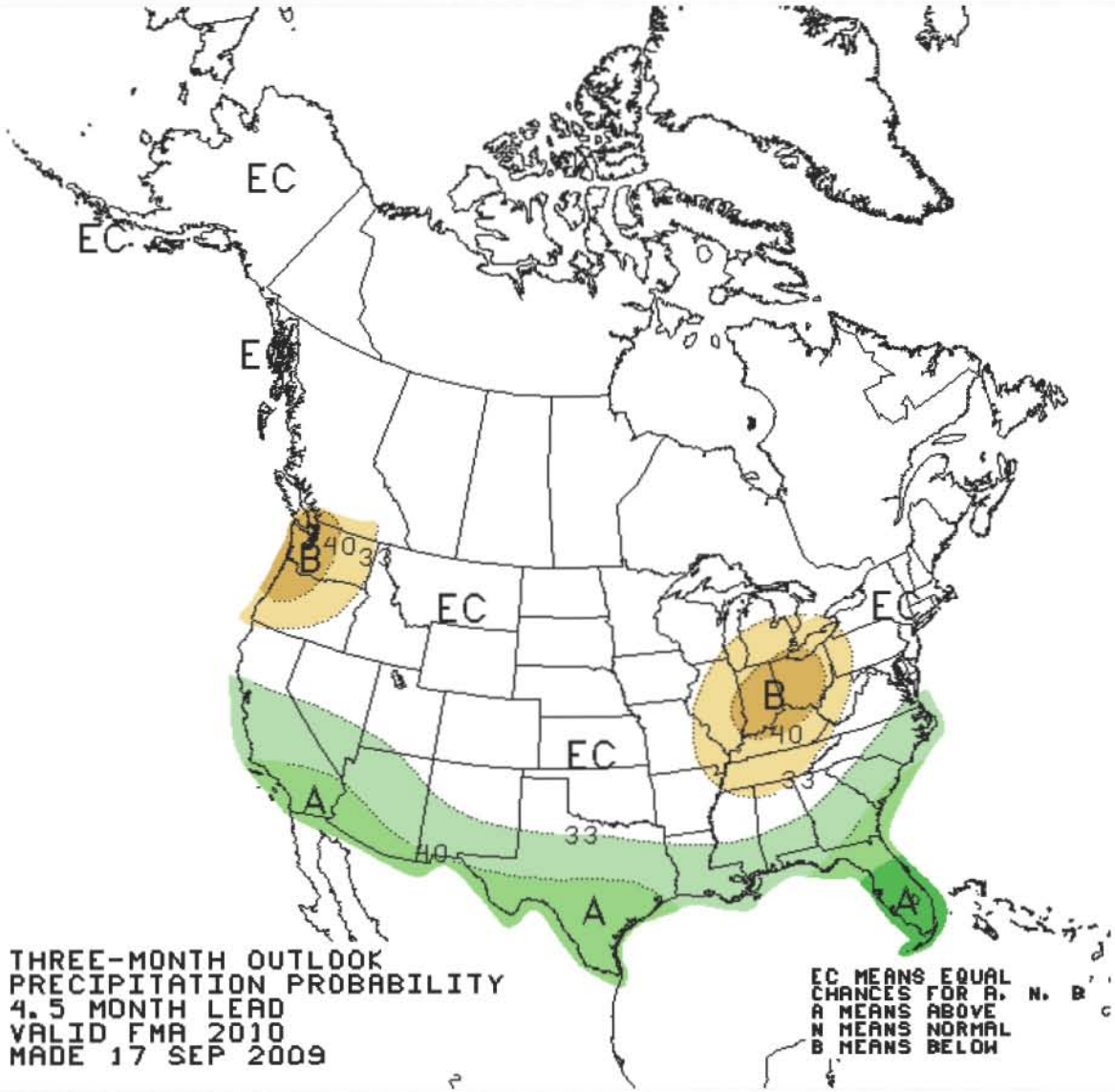
CPC Jan-March Precipitation



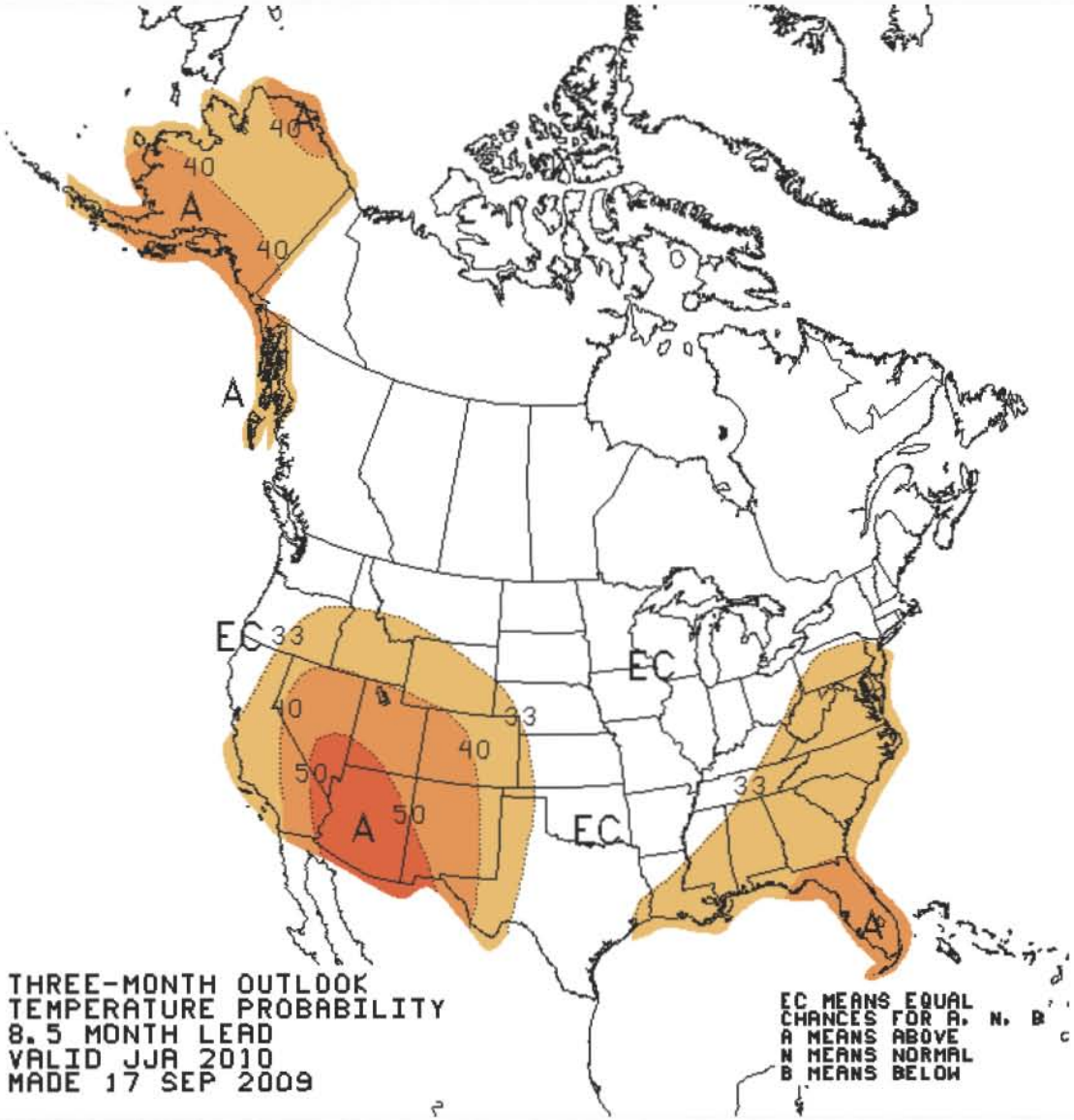
Temperatures Feb-April 2010



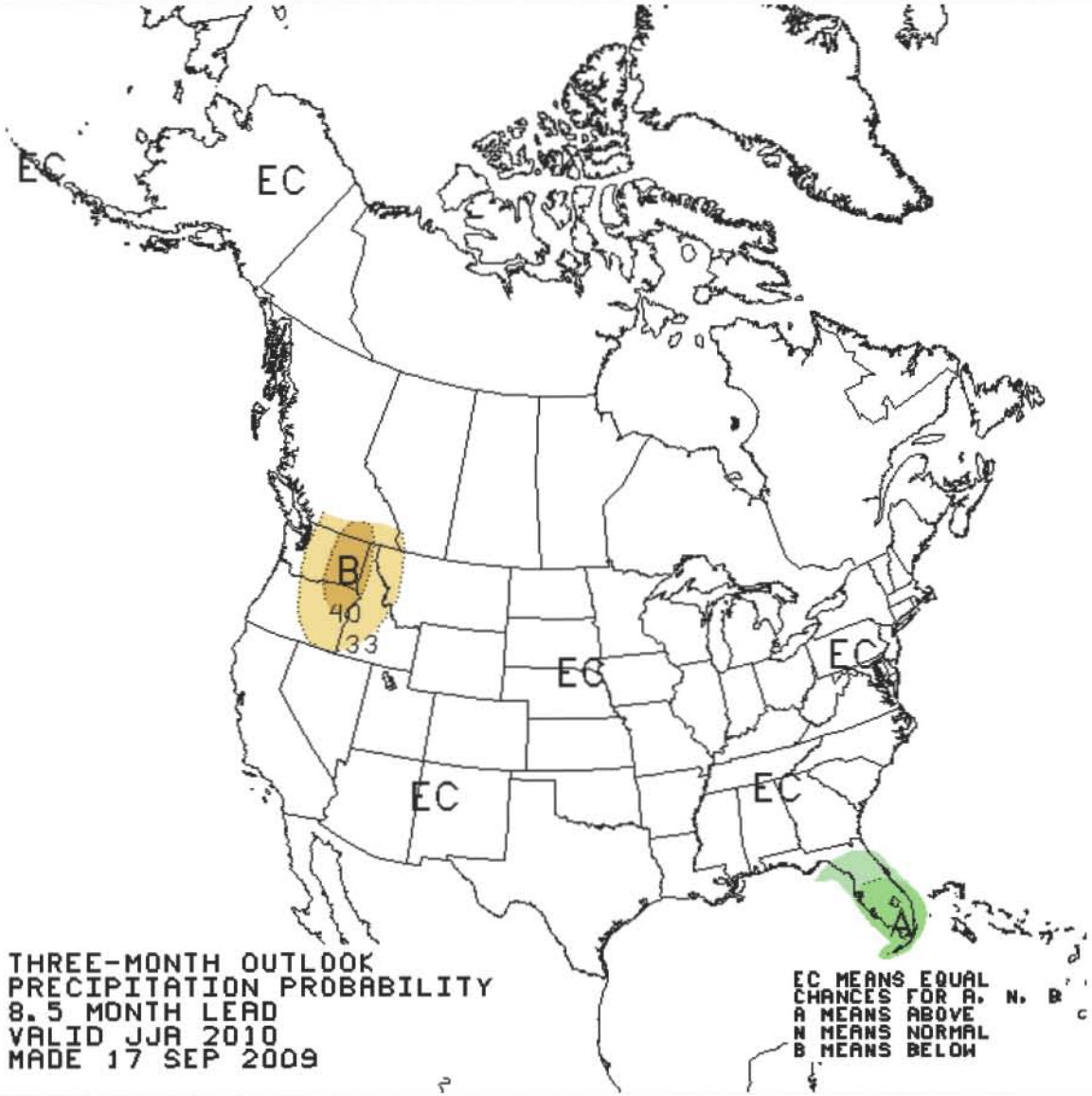
Precipitation Feb-April 2010



Temperatures June-Aug 2010



Precipitation - June-Aug 2010



The End

Thank you

Drought.mt.gov