A Review of the 2009 Water Year in Colorado

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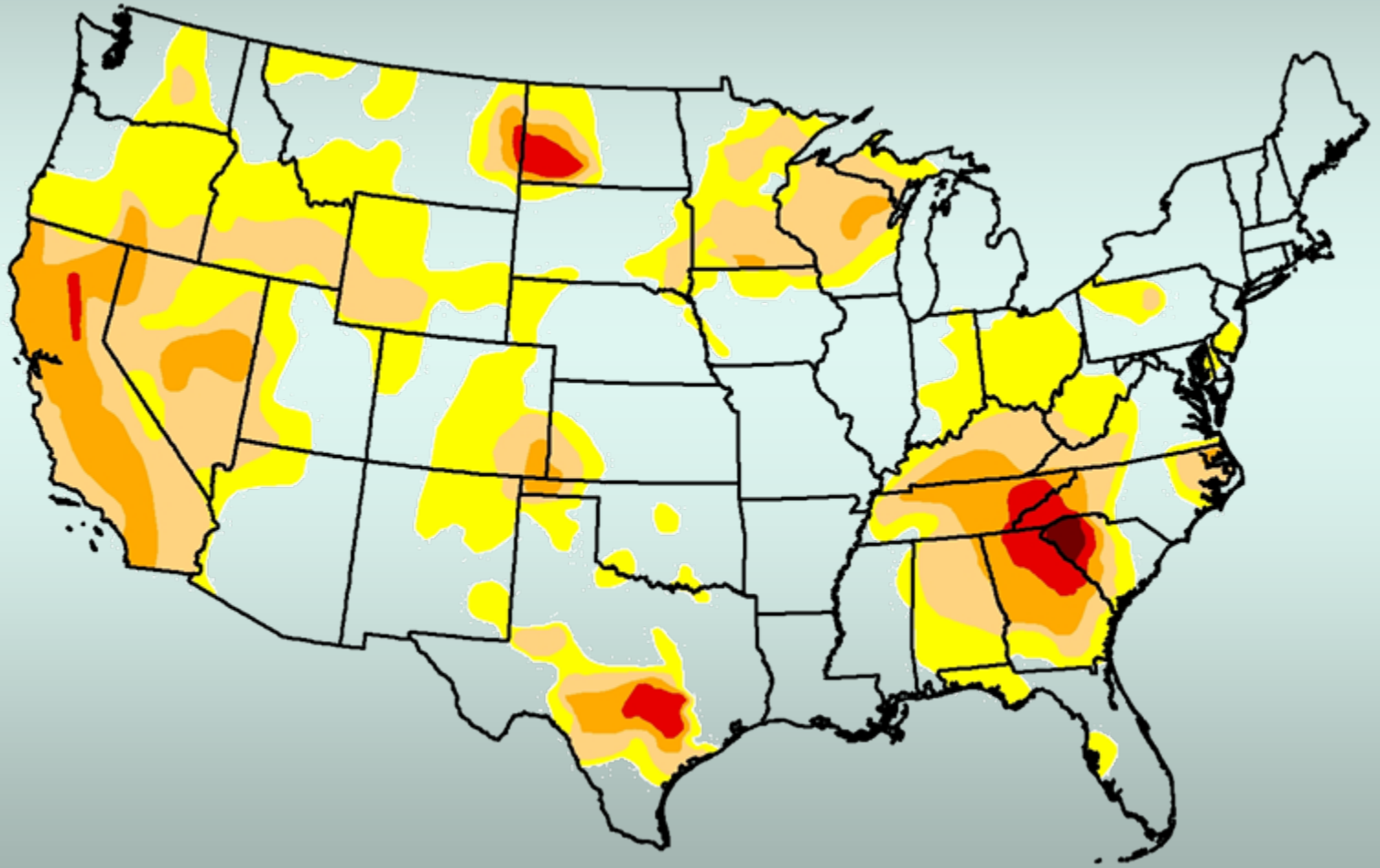
Presented at 30th Annual CSU Hydrology Days
Fort Collins, Colorado
22 March 2010

Colorado State University
Knowledge to Go Places

U.S. Drought Status at beginning of 2009 Water Year

Drought Monitor September 30, 2008



D0 Abnormally Dry

D1 Drought - Moderate

D2 Drought - Severe

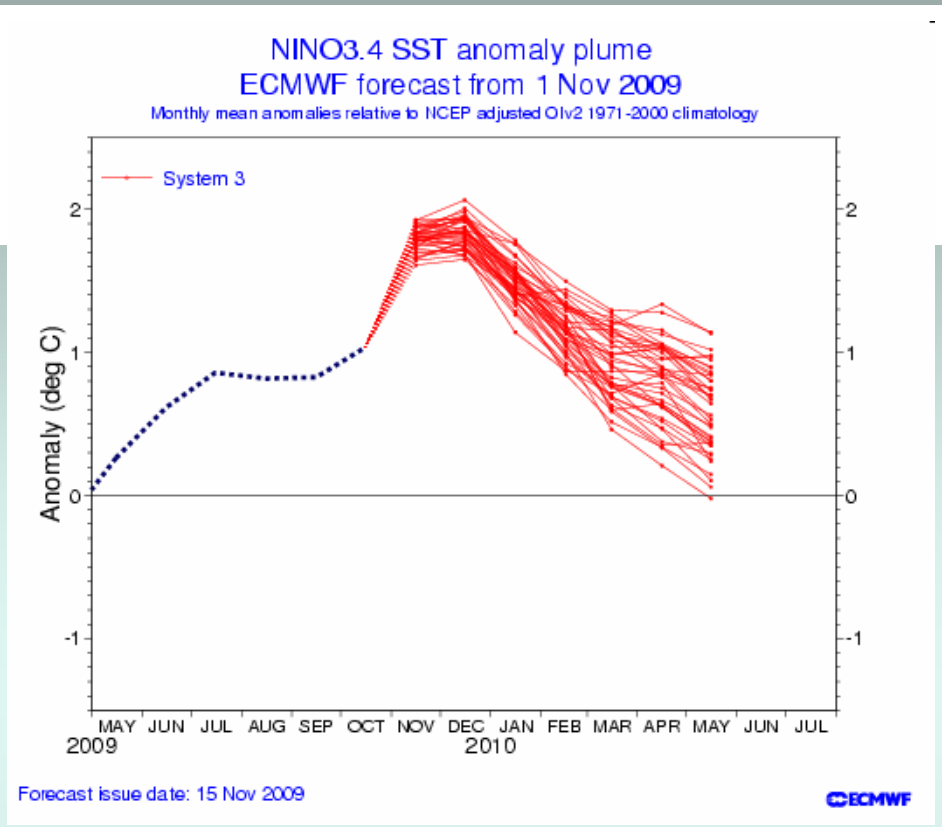
D3 Drought – Extreme

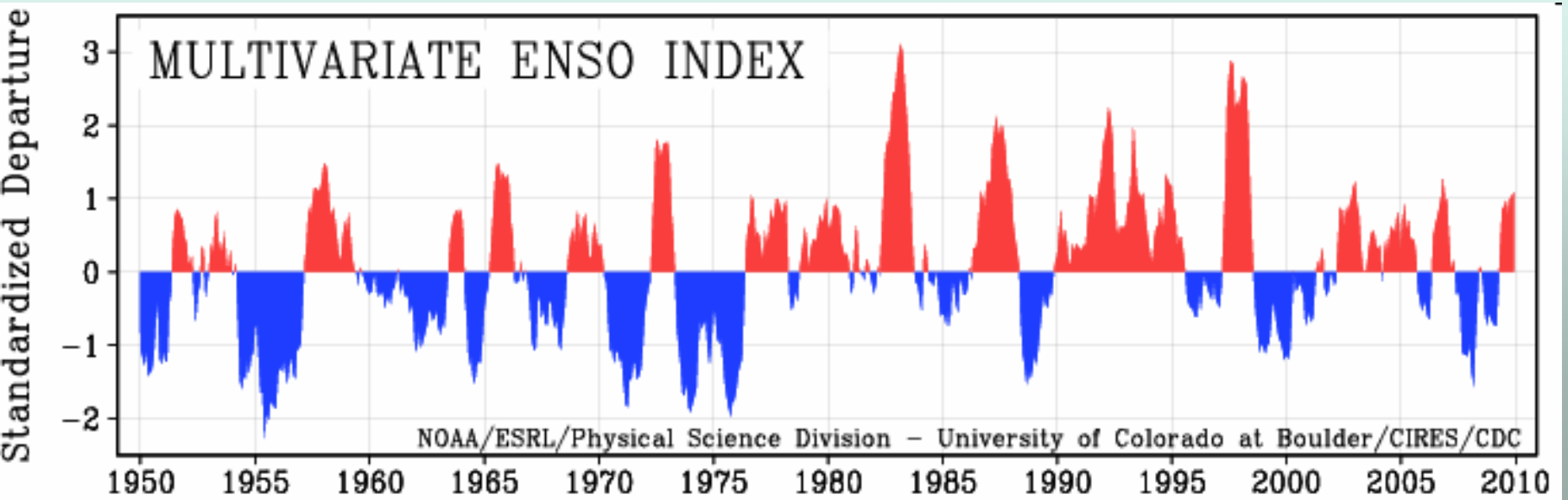
D4 Drought - Exceptional

Highlights of the 2009 Water Year in Colorado

MEI and SST

2009 -- El Nino emerges during the summer



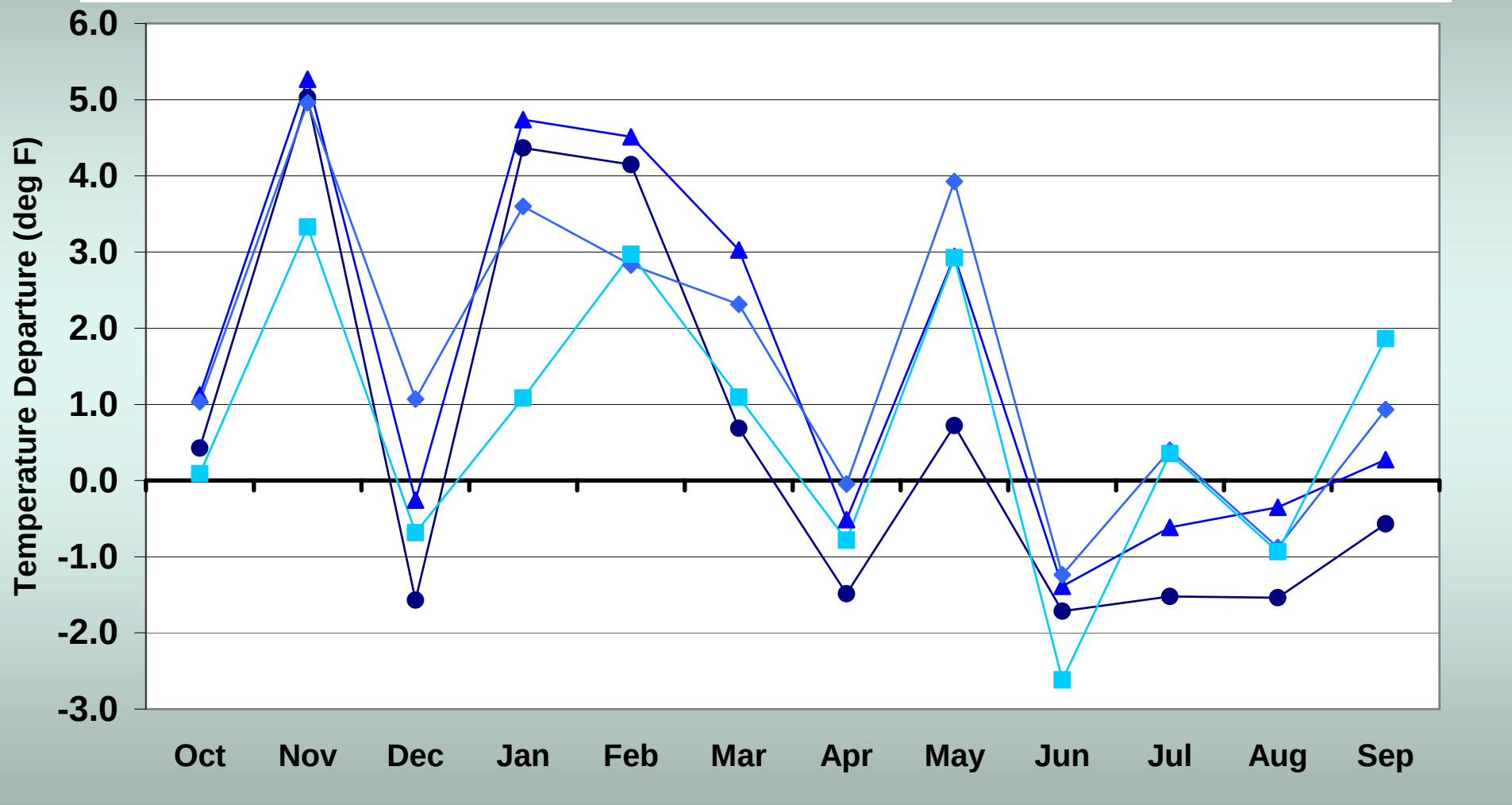


Additional Highlights of WY 2009

- No major floods, No major extremes
- Above average temperatures in Winter
- Below average temperature in Summer
- December, April, May and June brought good moisture to Mountains and Western Slope.
- Near normal snowpack began quick meltout in May, followed by cool, wet June which created a second peak in streamflow late June/early July
- October, February, April, June, July, August and September brought good moisture to Eastern Plains.
- Abnormally dry conditions shifted from SE to SW Colorado during the year

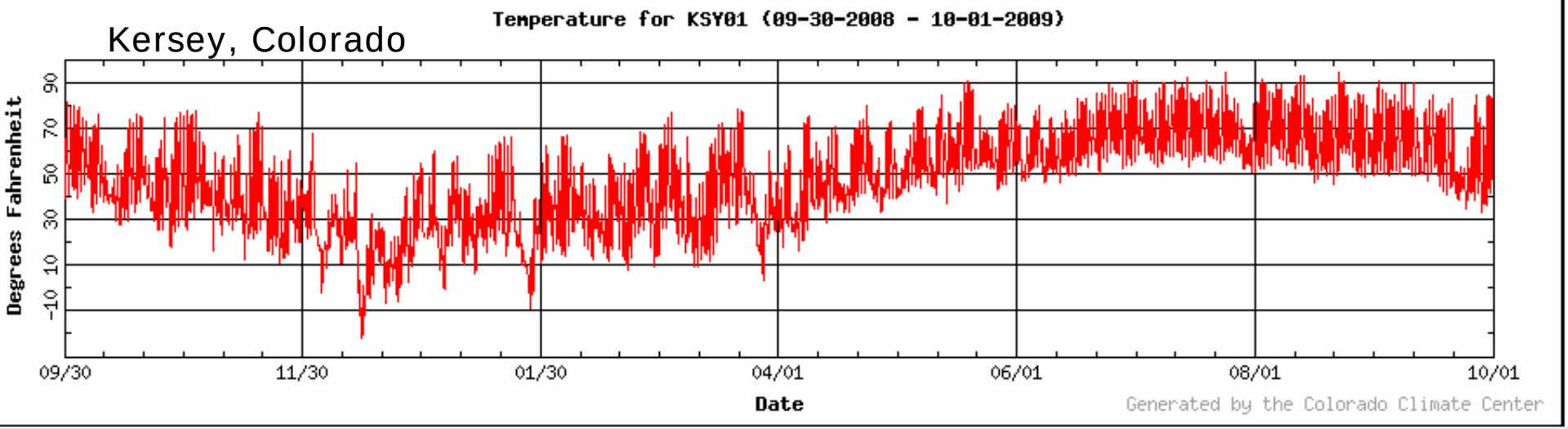
A closer look at the climate of
the 2009 Water Year in Colorado

Water Year 2009 Temperature Departures From 1971-2000 Average

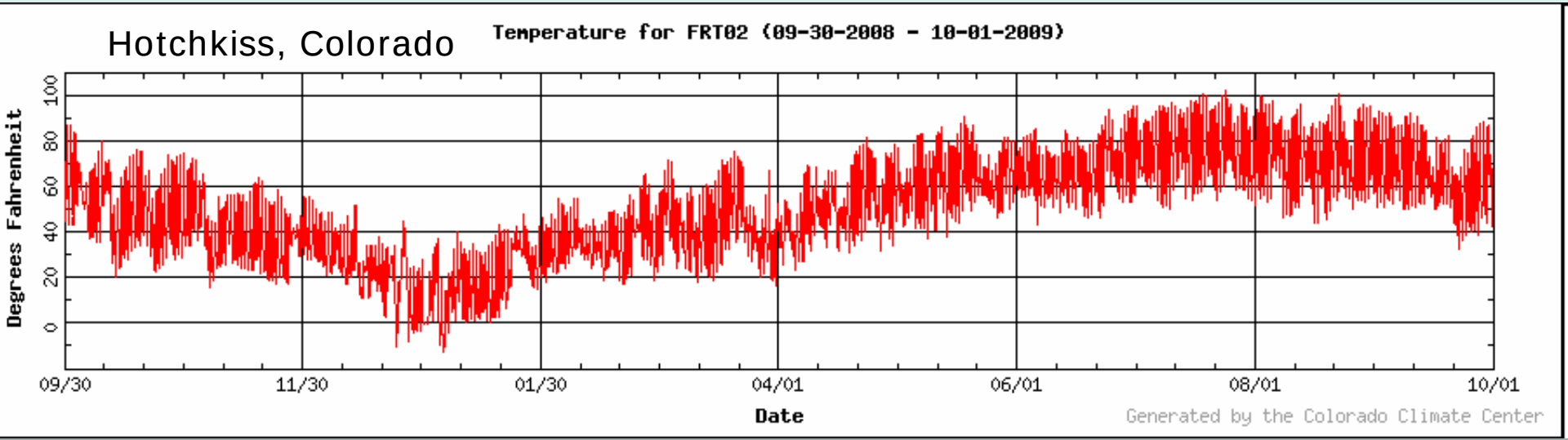


2009 WY Temperatures at selected stations east and west

Kersey, Colorado



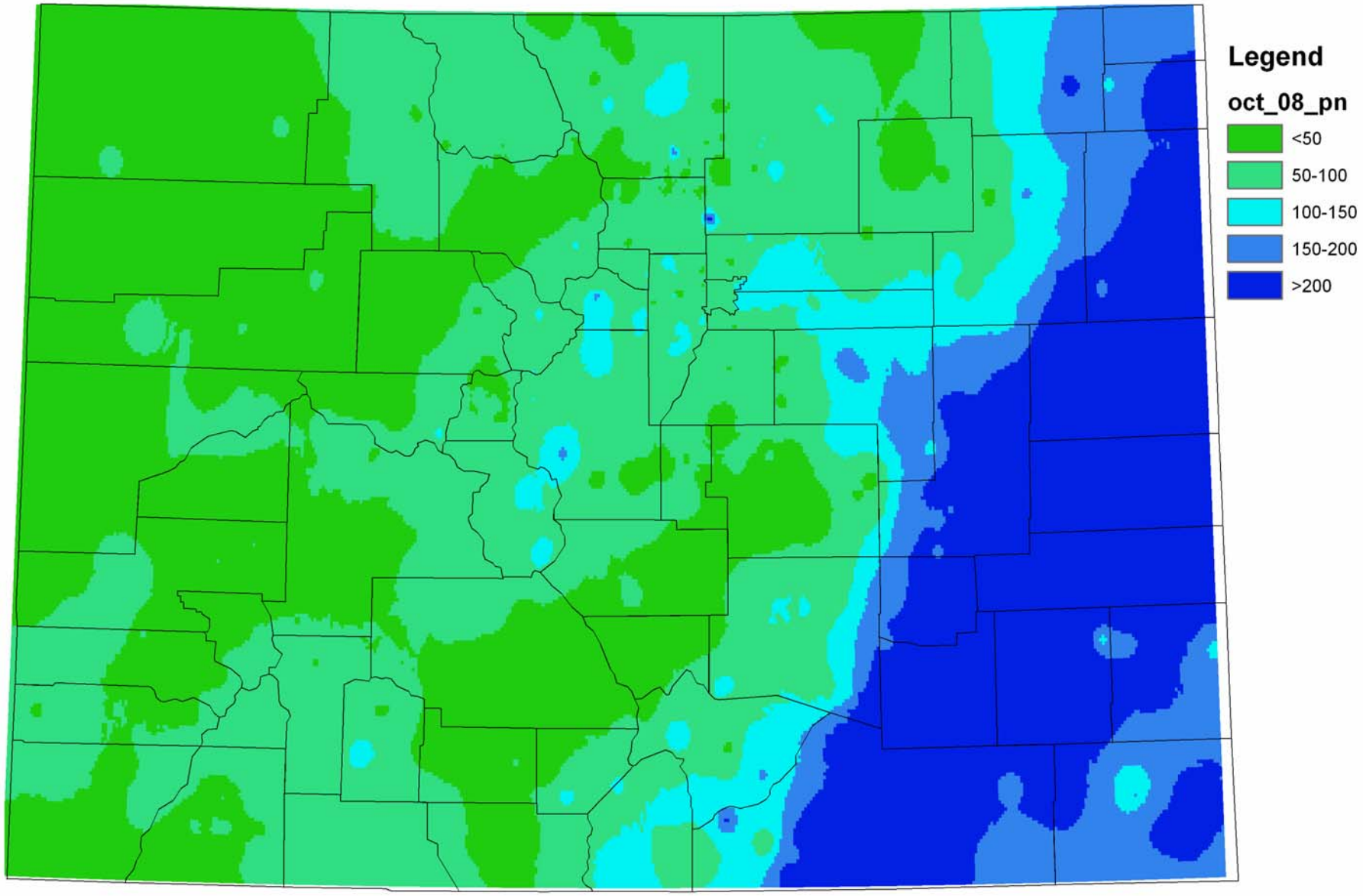
Hotchkiss, Colorado



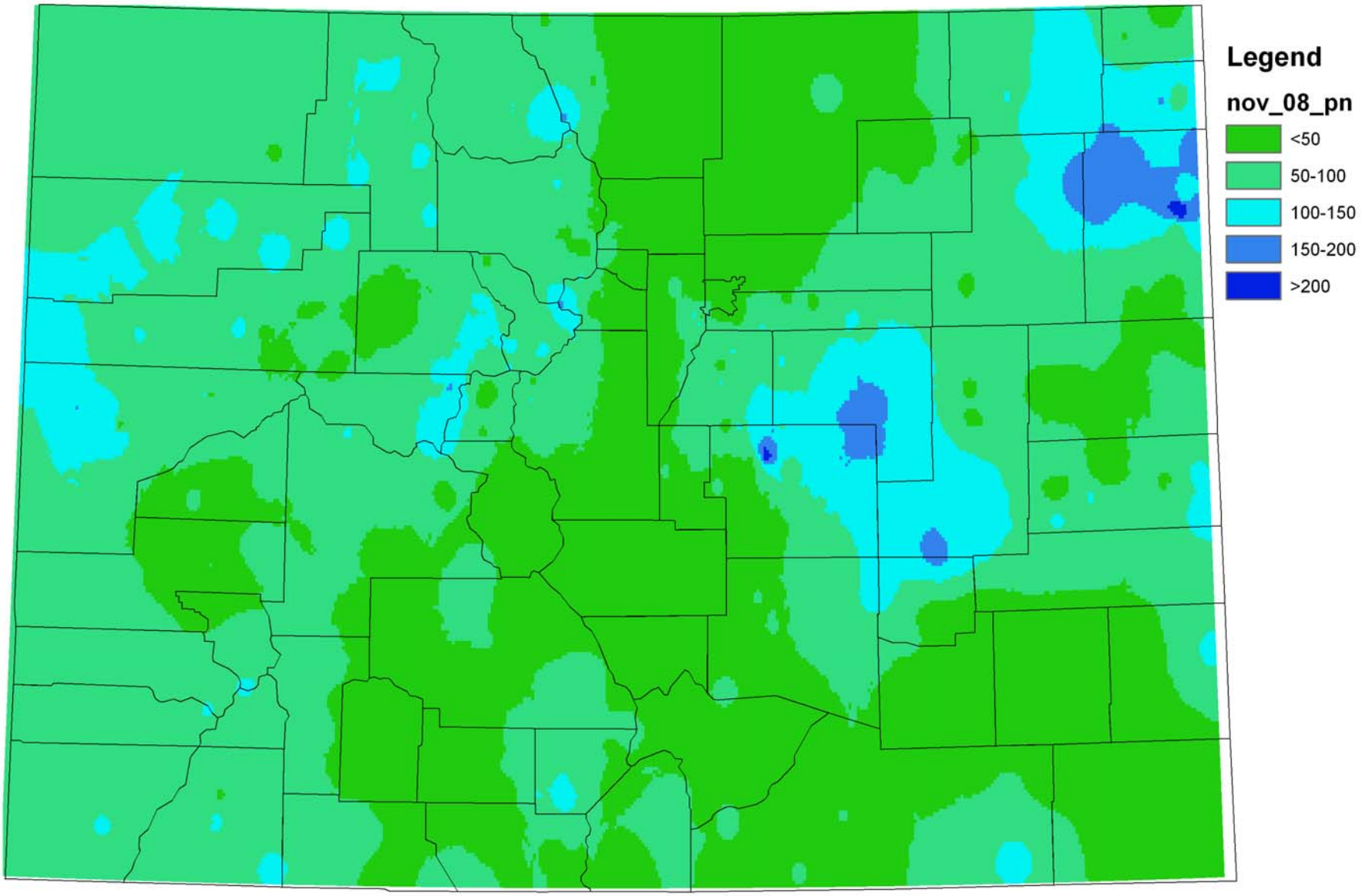
Month by Month Precipitation for 2009 Water Year

Statewide maps showing precipitation as a percent of 1971-2000 averages

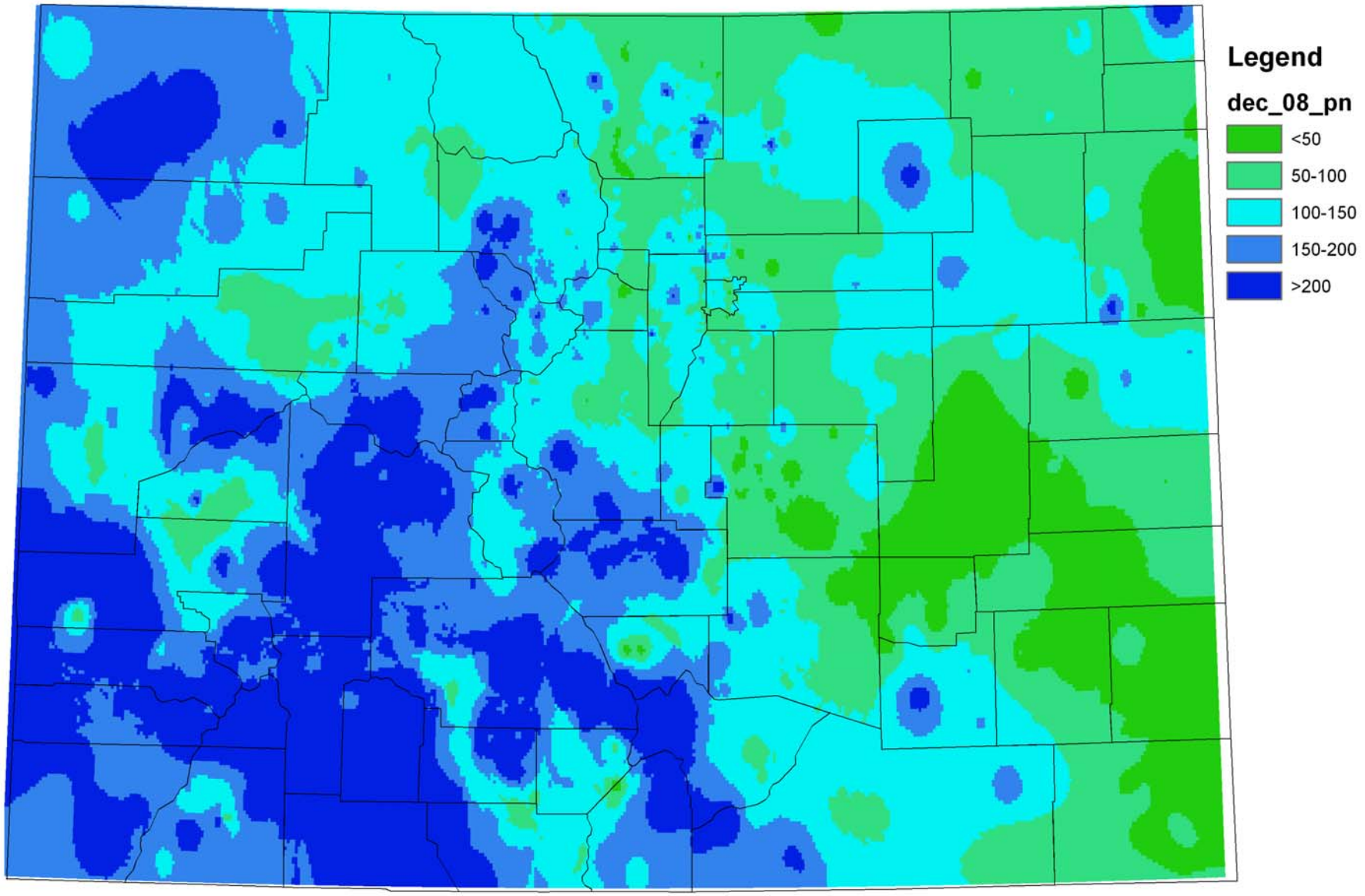
October 2008 Precipitation as Percent of Normal



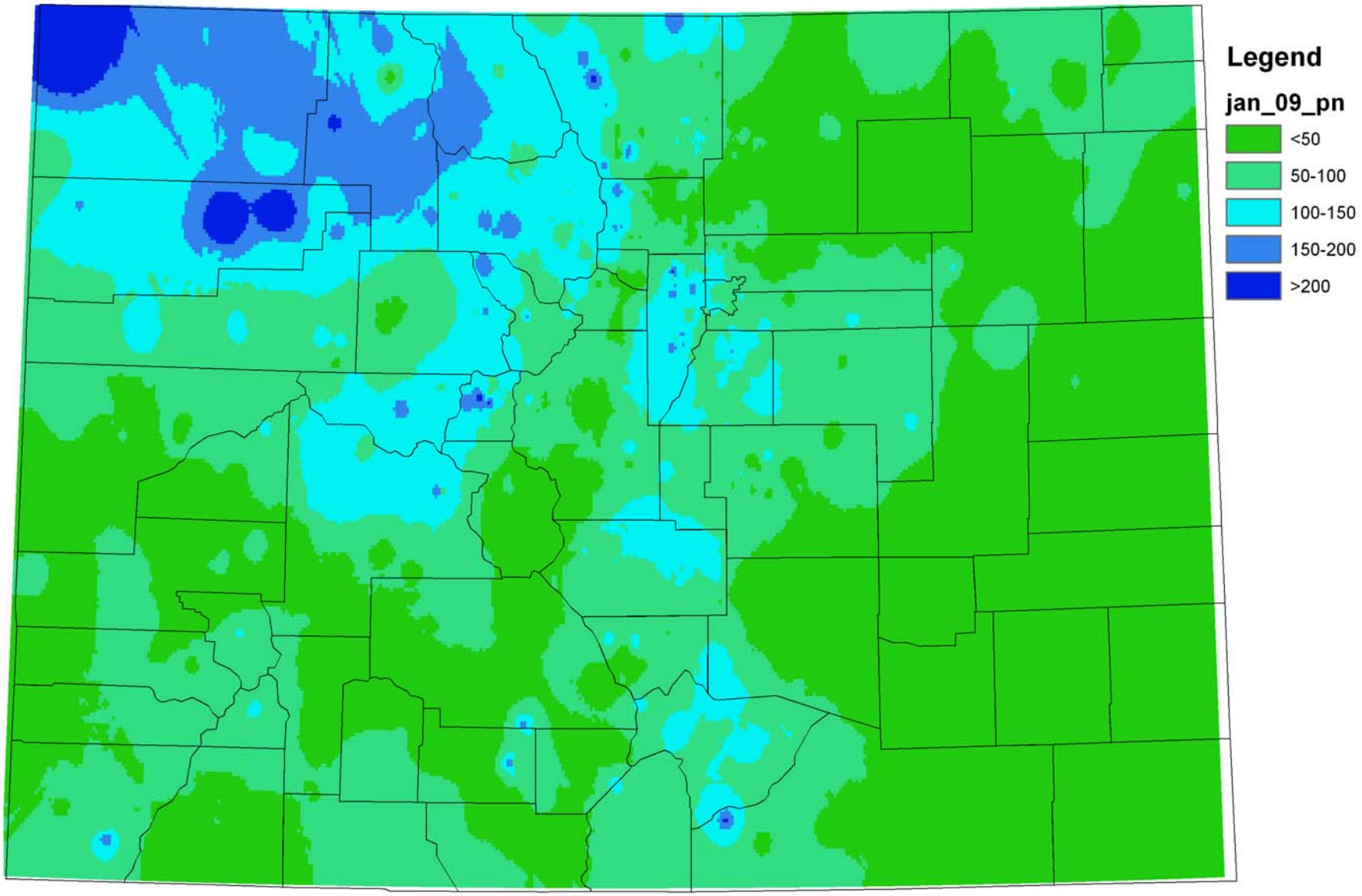
November 2008 Precipitation as Percent of Normal



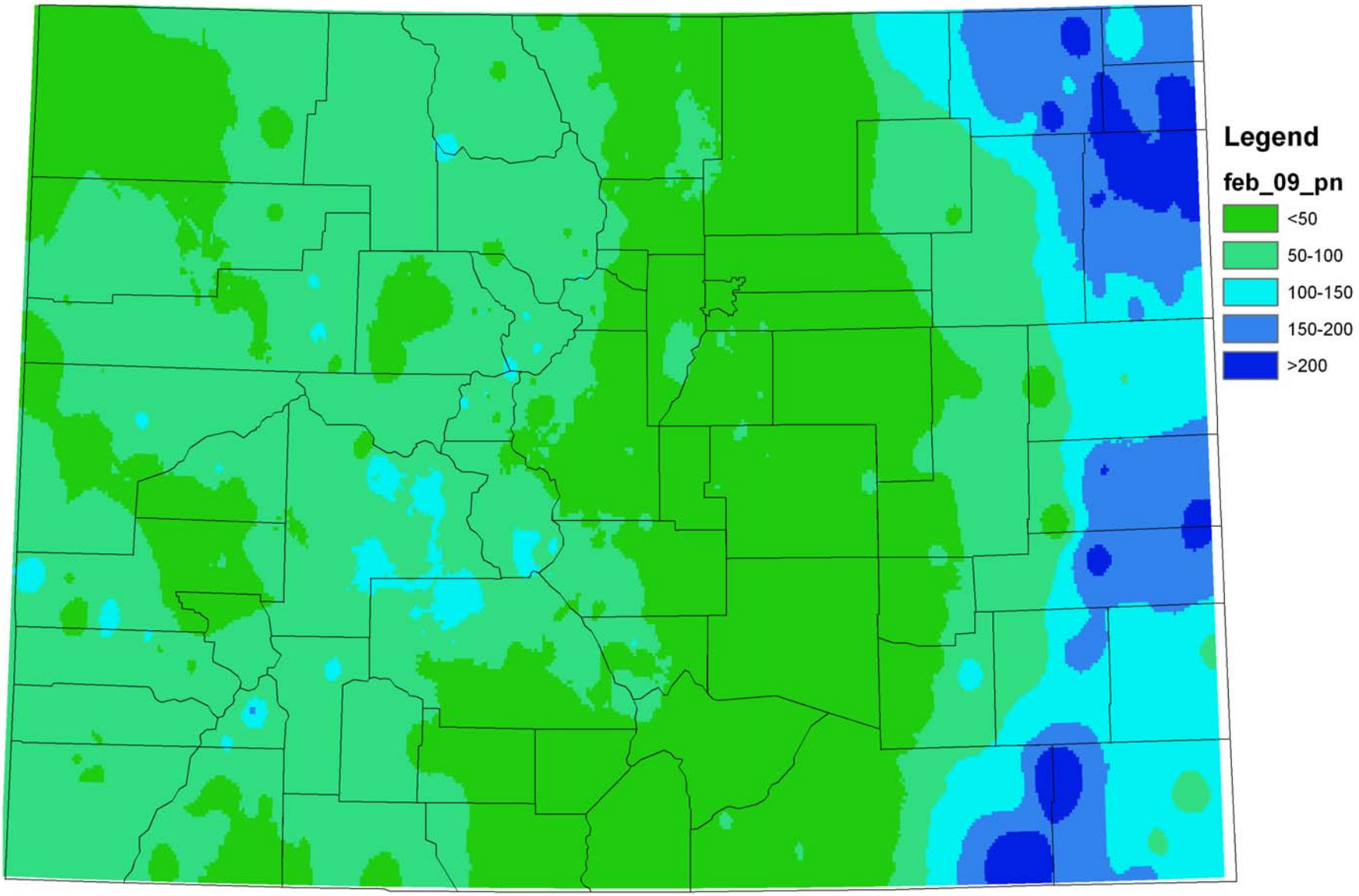
December 2008 Precipitation as Percent of Normal



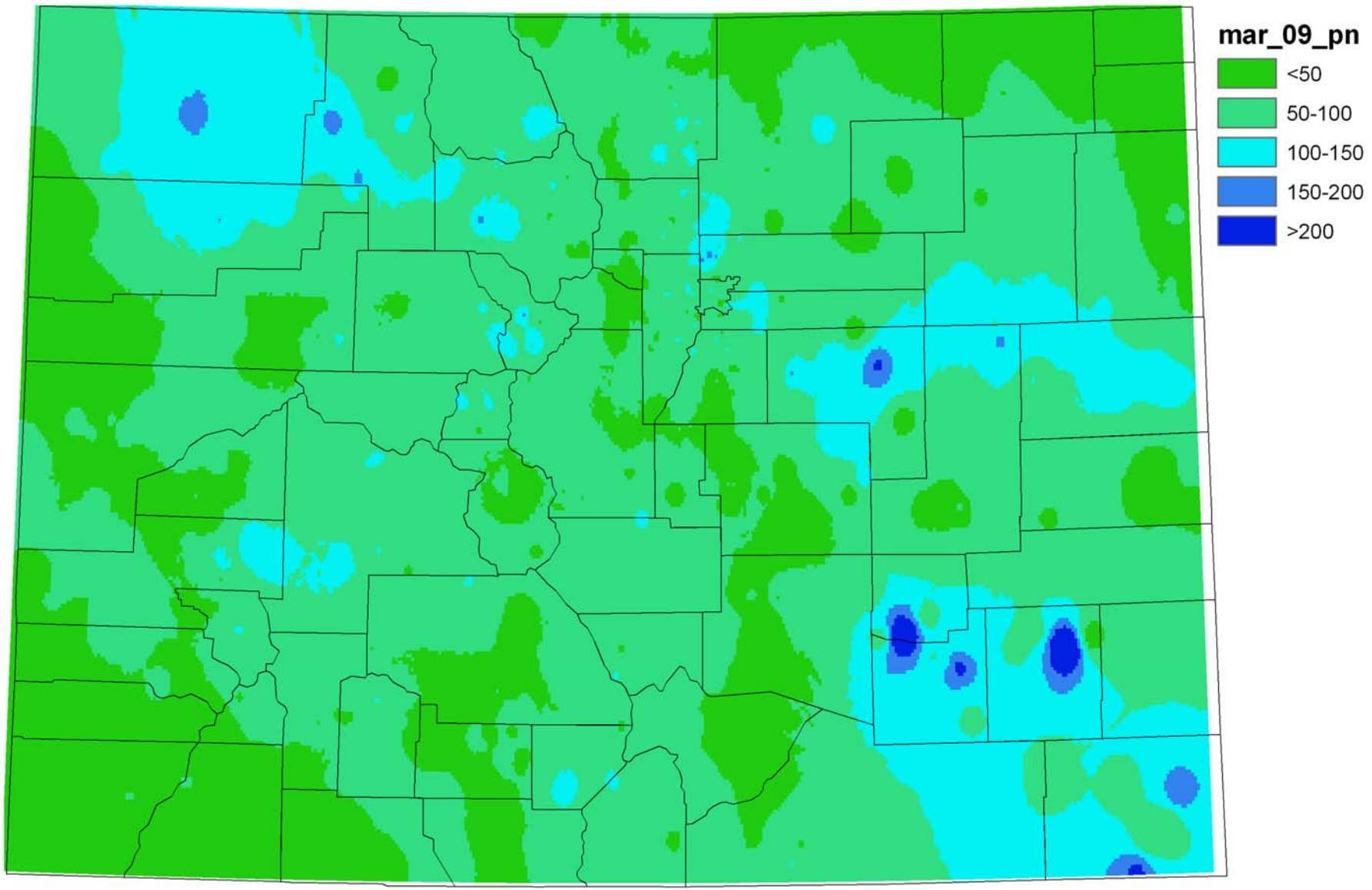
January 2009 Precipitation as Percent of Normal



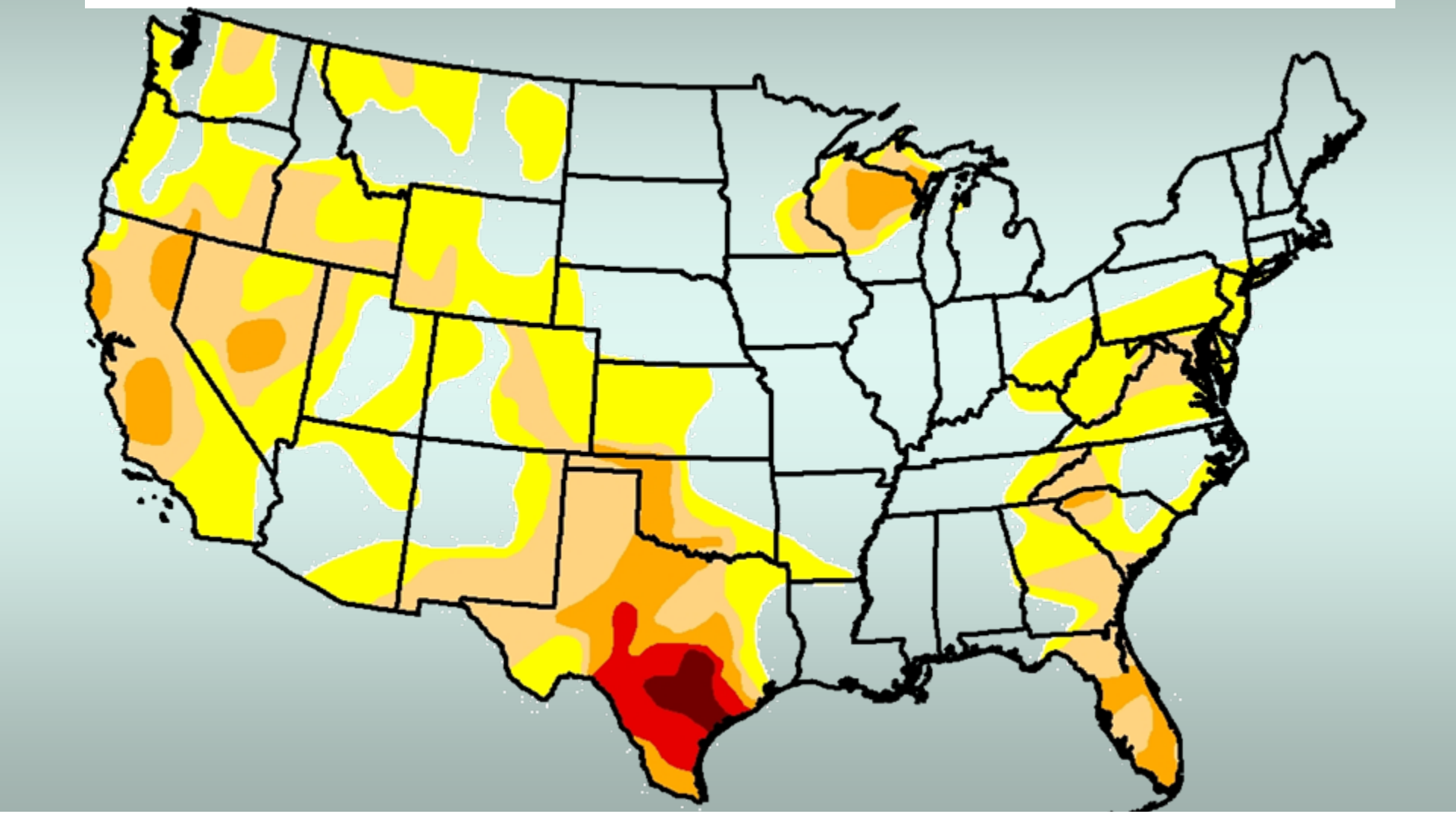
February 2009 Precipitation as Percent of Normal



March 2009 Precipitation as Percent of Normal



U.S. Drought Monitor March 31, 2009



D0 Abnormally Dry

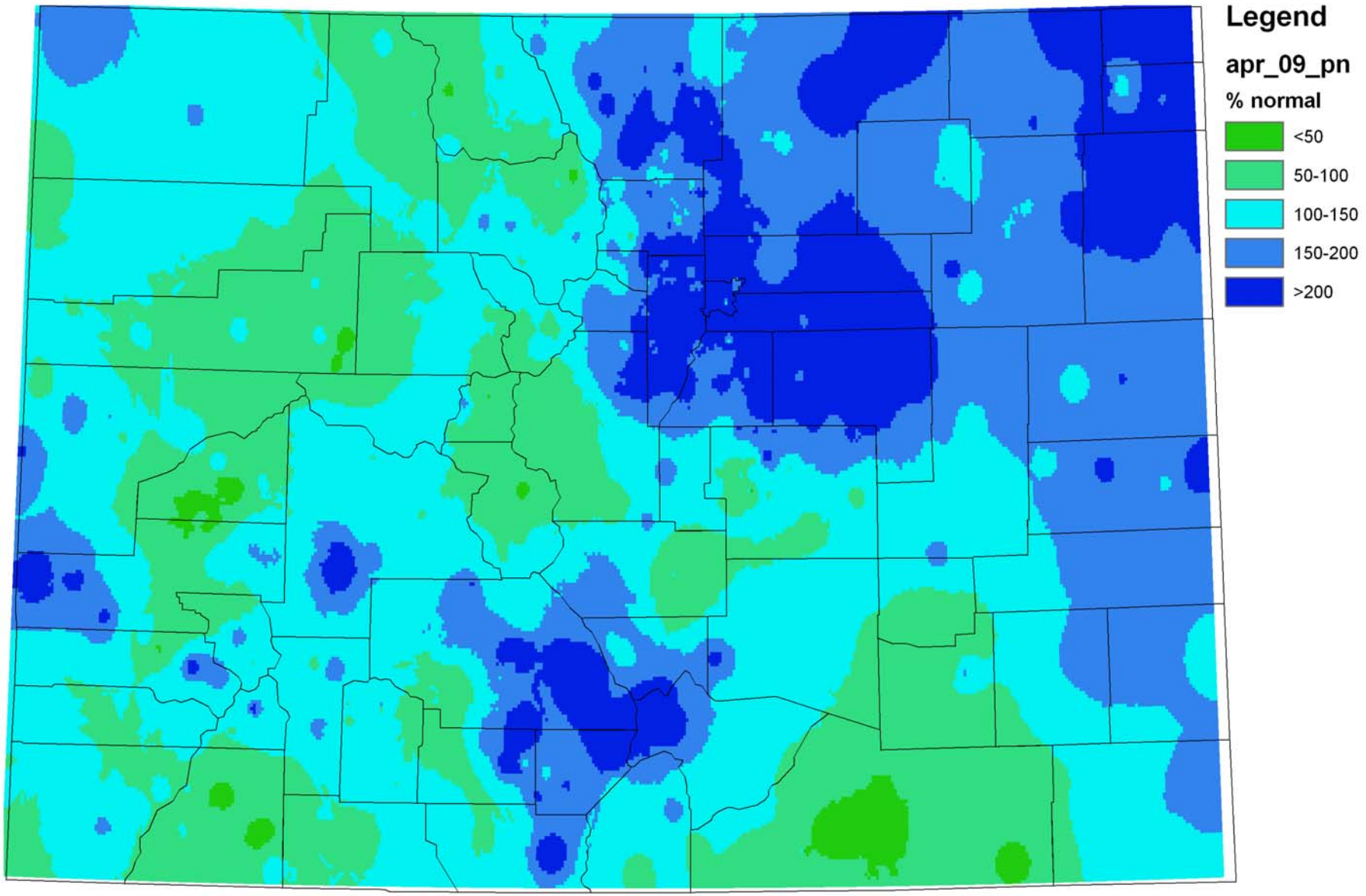
D1 Drought - Moderate

D2 Drought - Severe

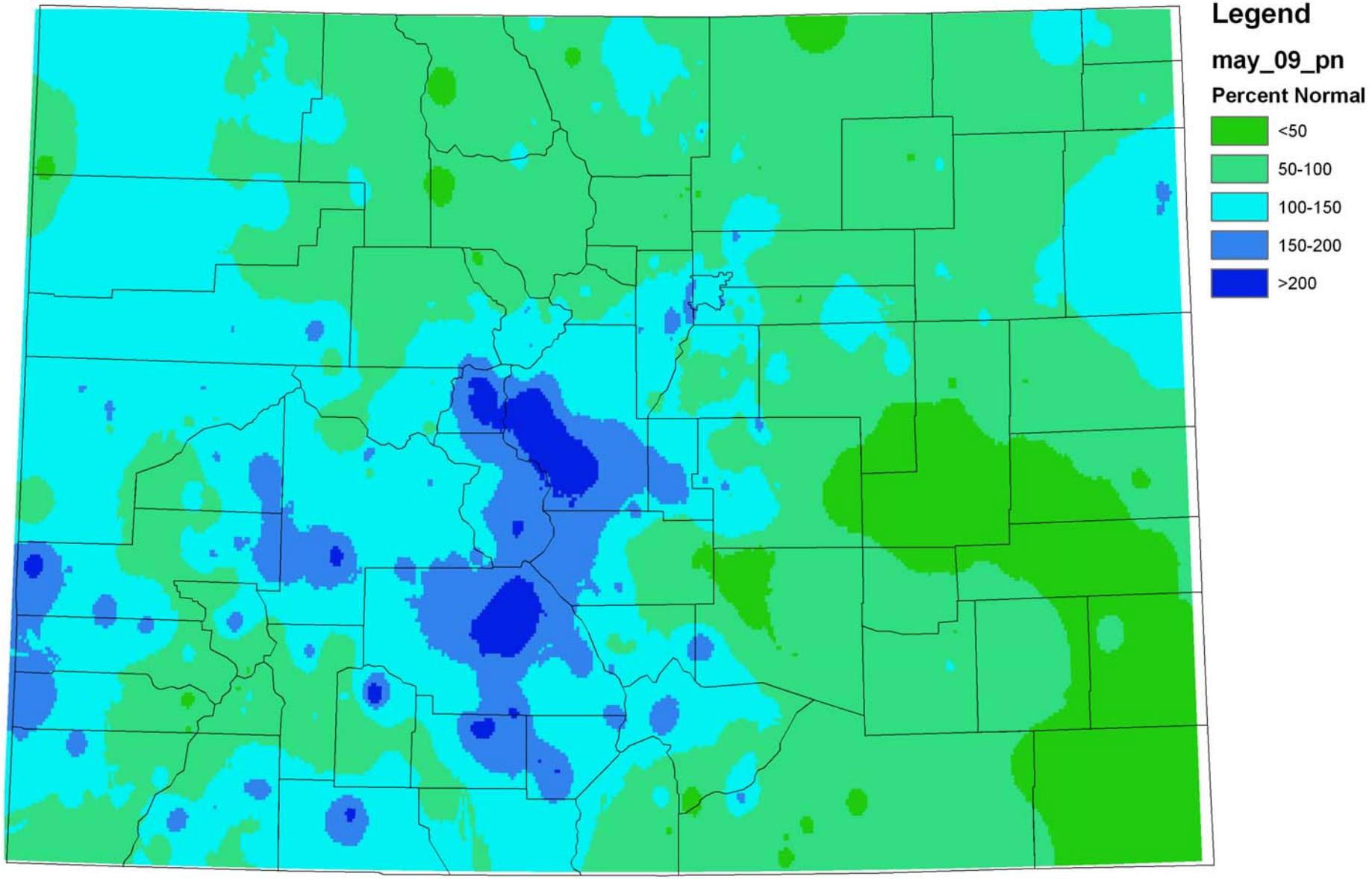
D3 Drought – Extreme

D4 Drought - Exceptional

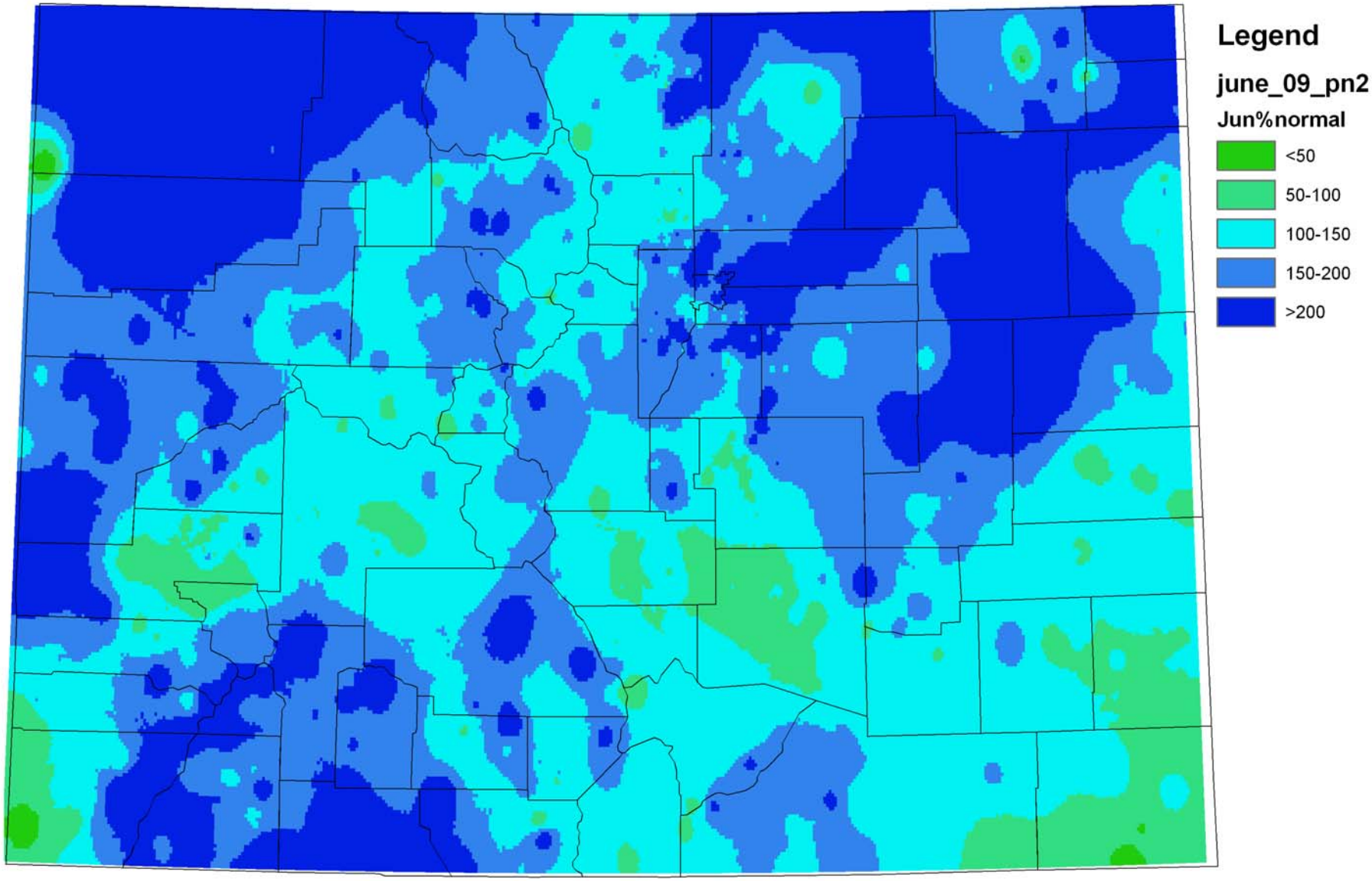
April 2009 Precipitation as Percent of Normal



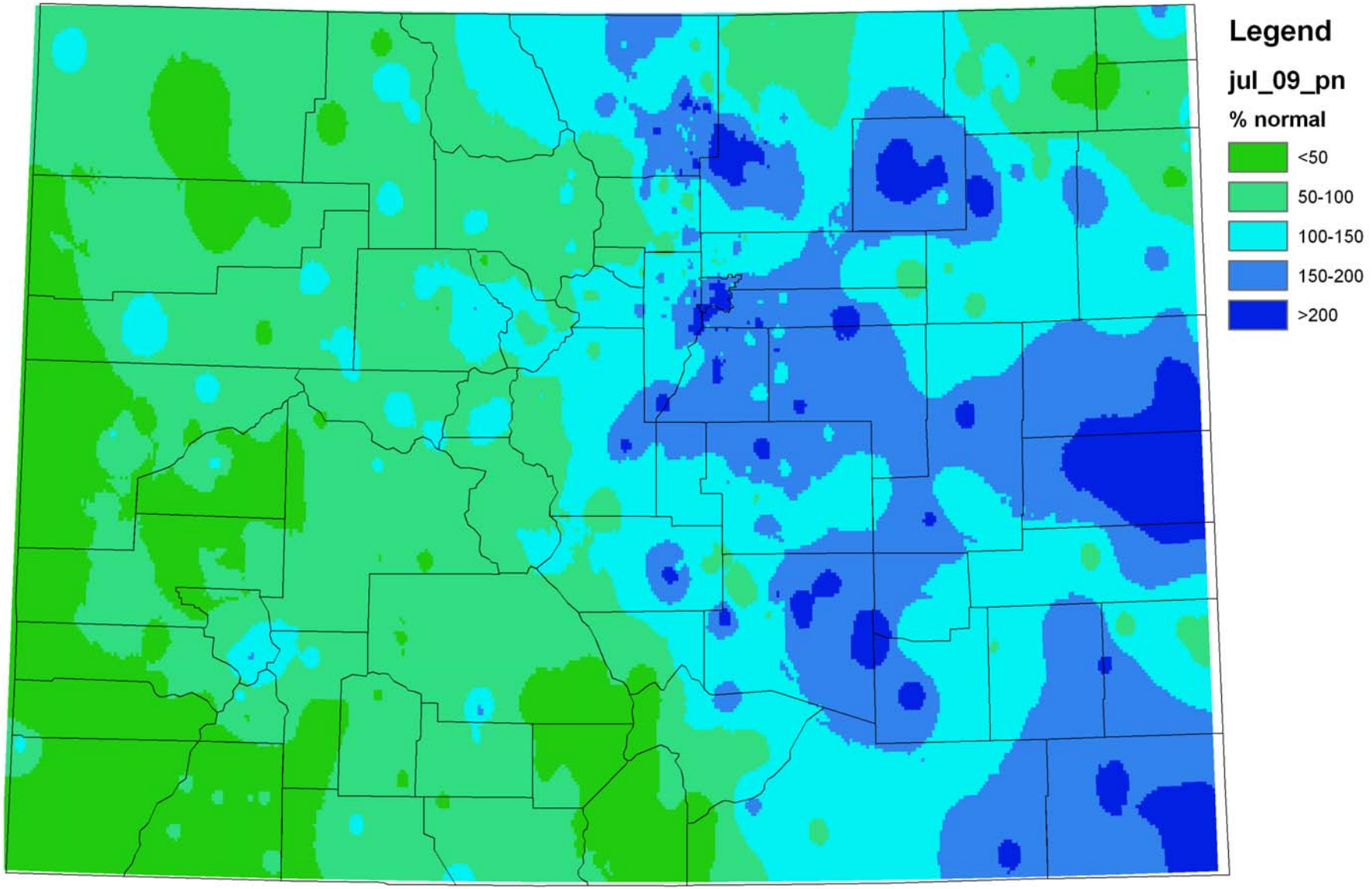
May 2009 Precipitation as Percent of Normal



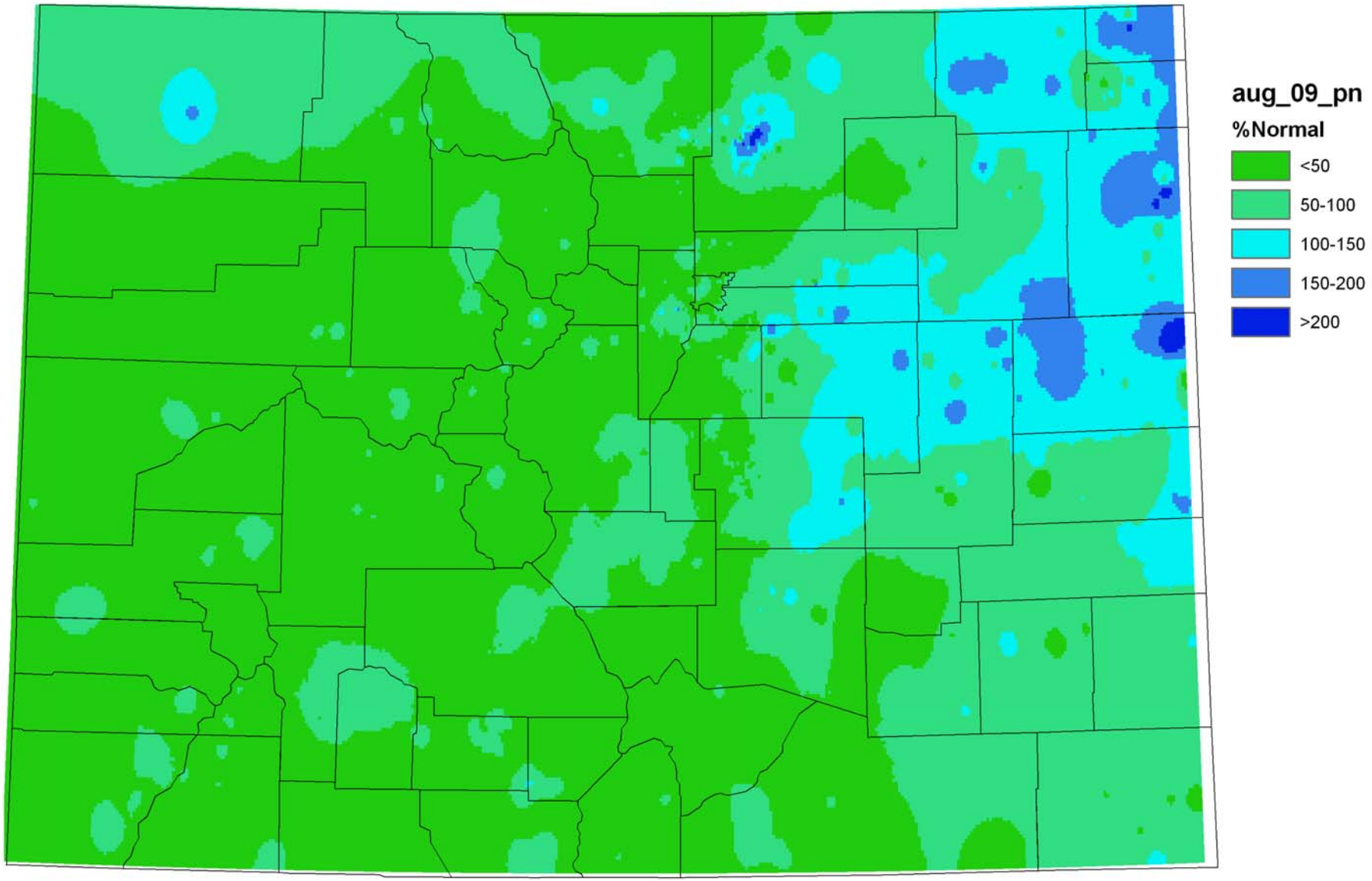
June 2009 Precipitation as Percent of Normal



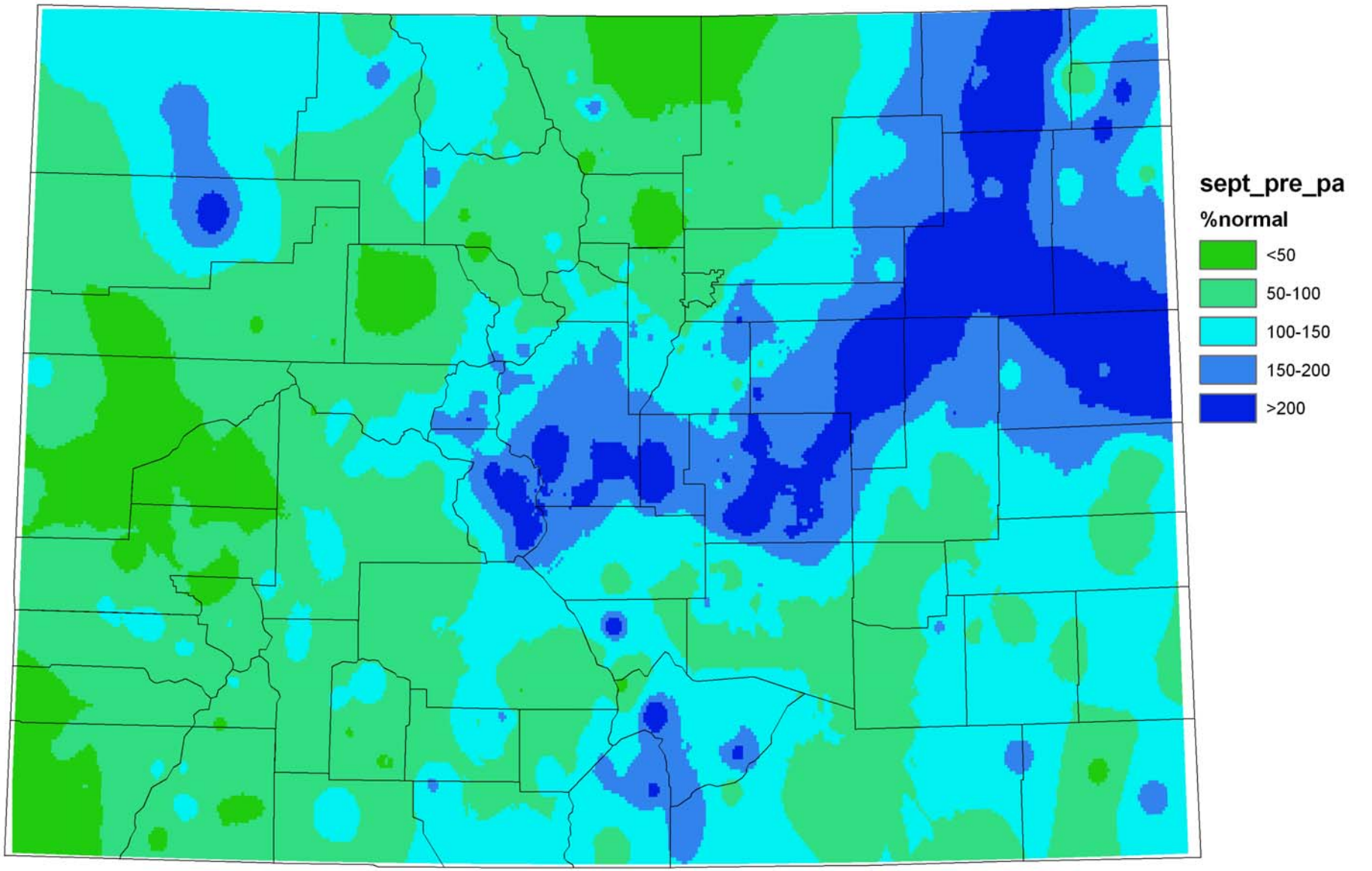
July 2009 Precipitation as Percent of Normal



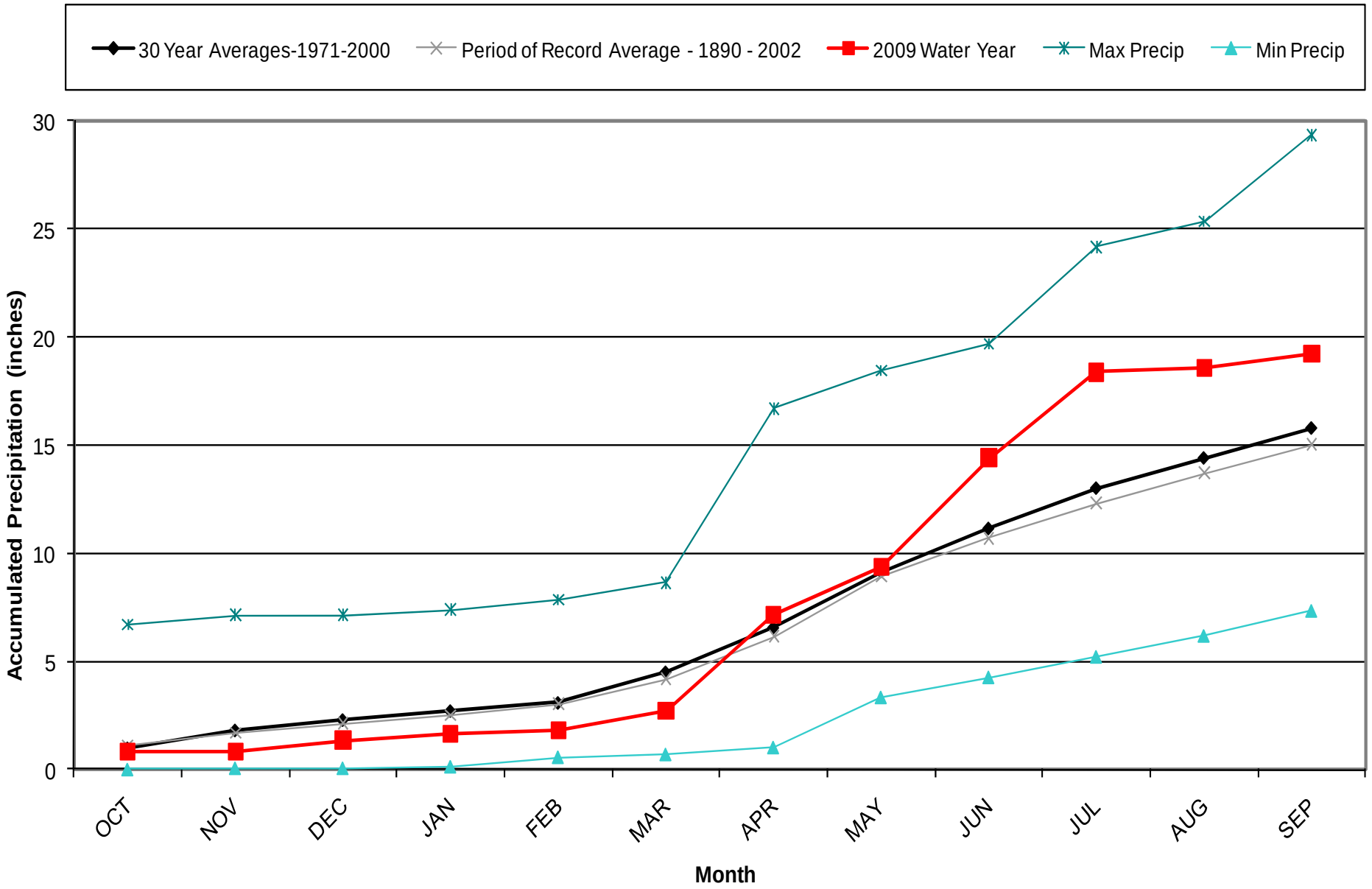
August 2009 Precipitation as Percent of Normal



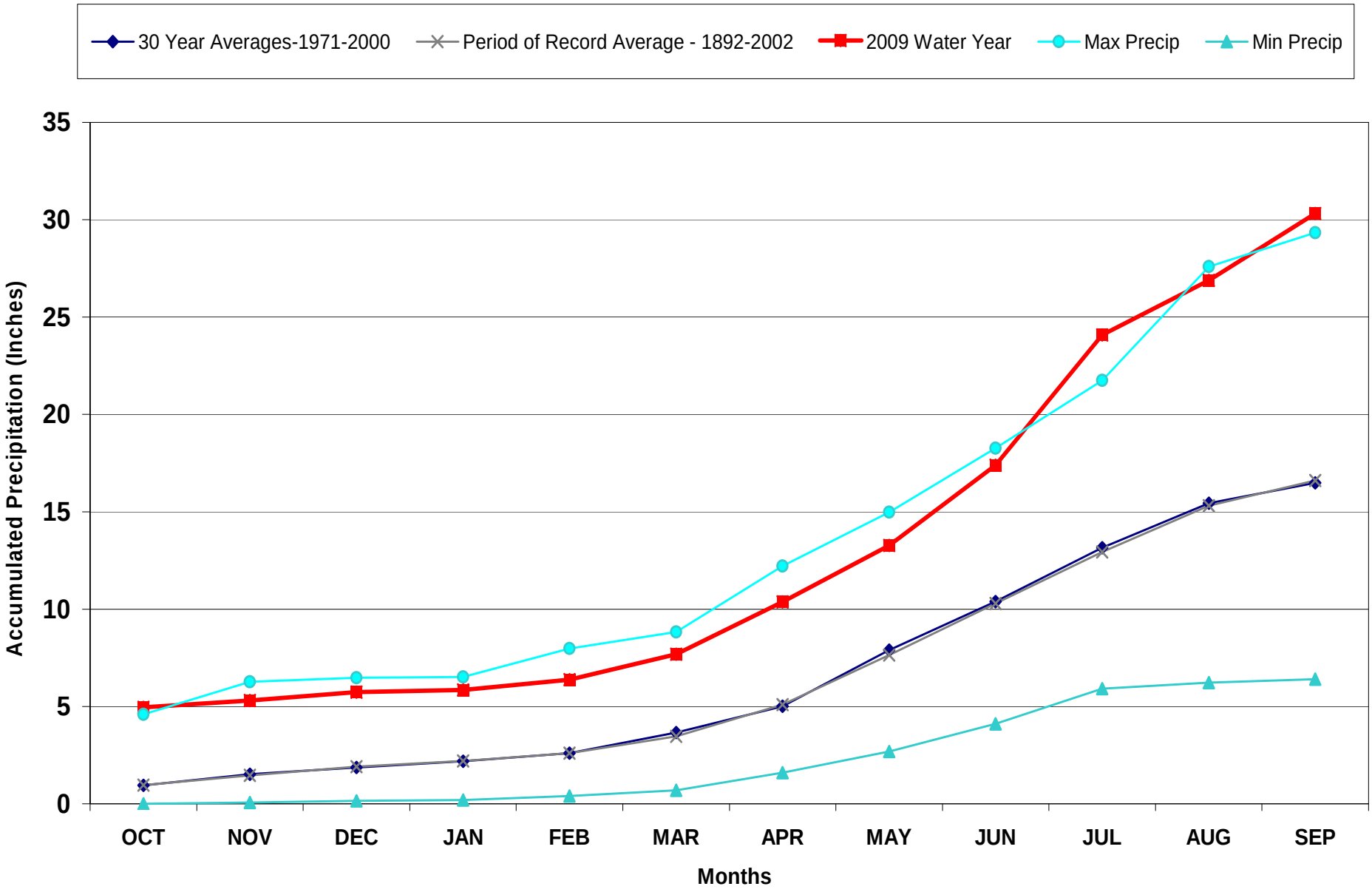
September 2009 Precipitation as Percent of Normal



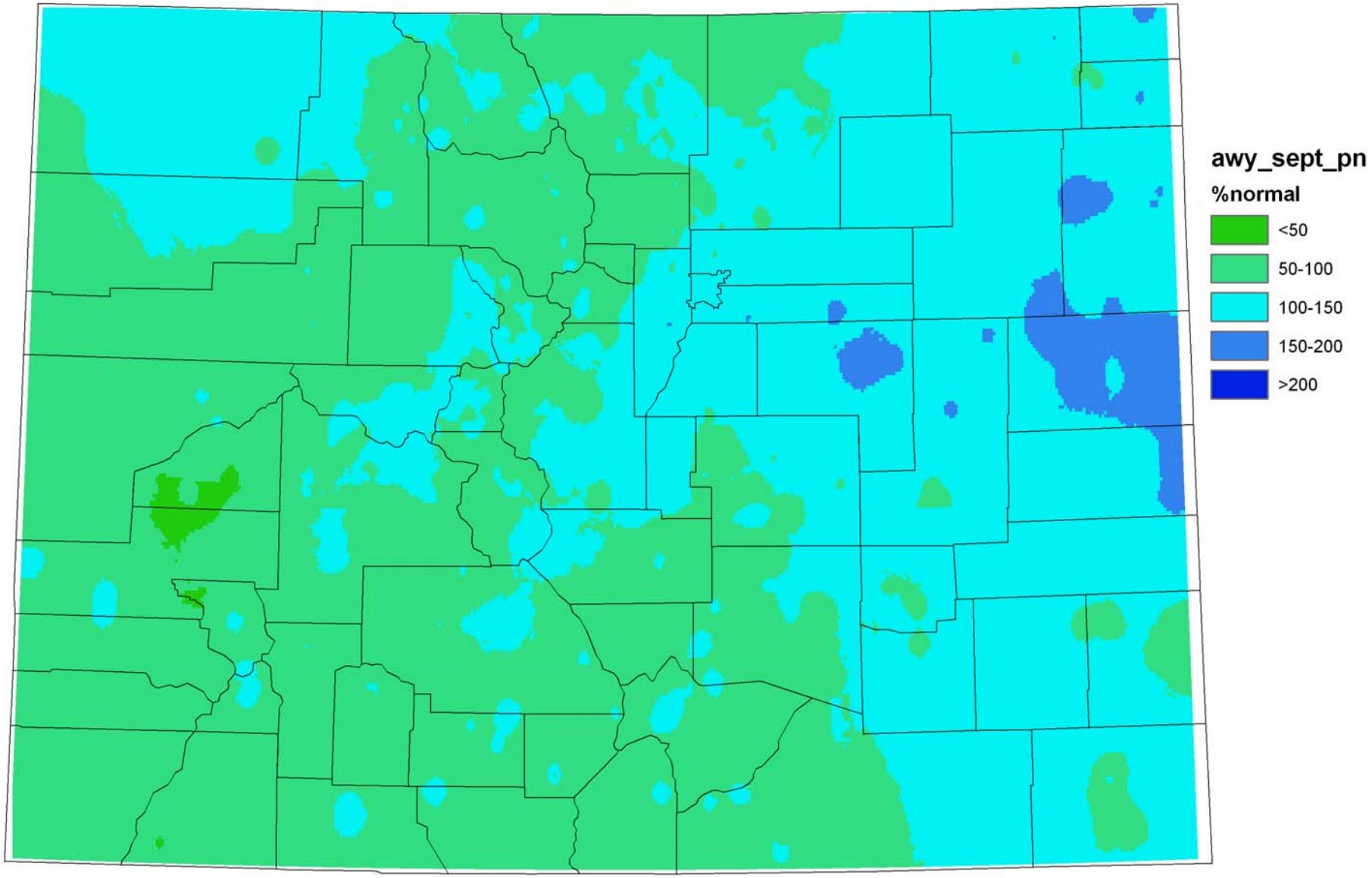
Fort Collins
2009 Water Year



Burlington
2009 Water Year

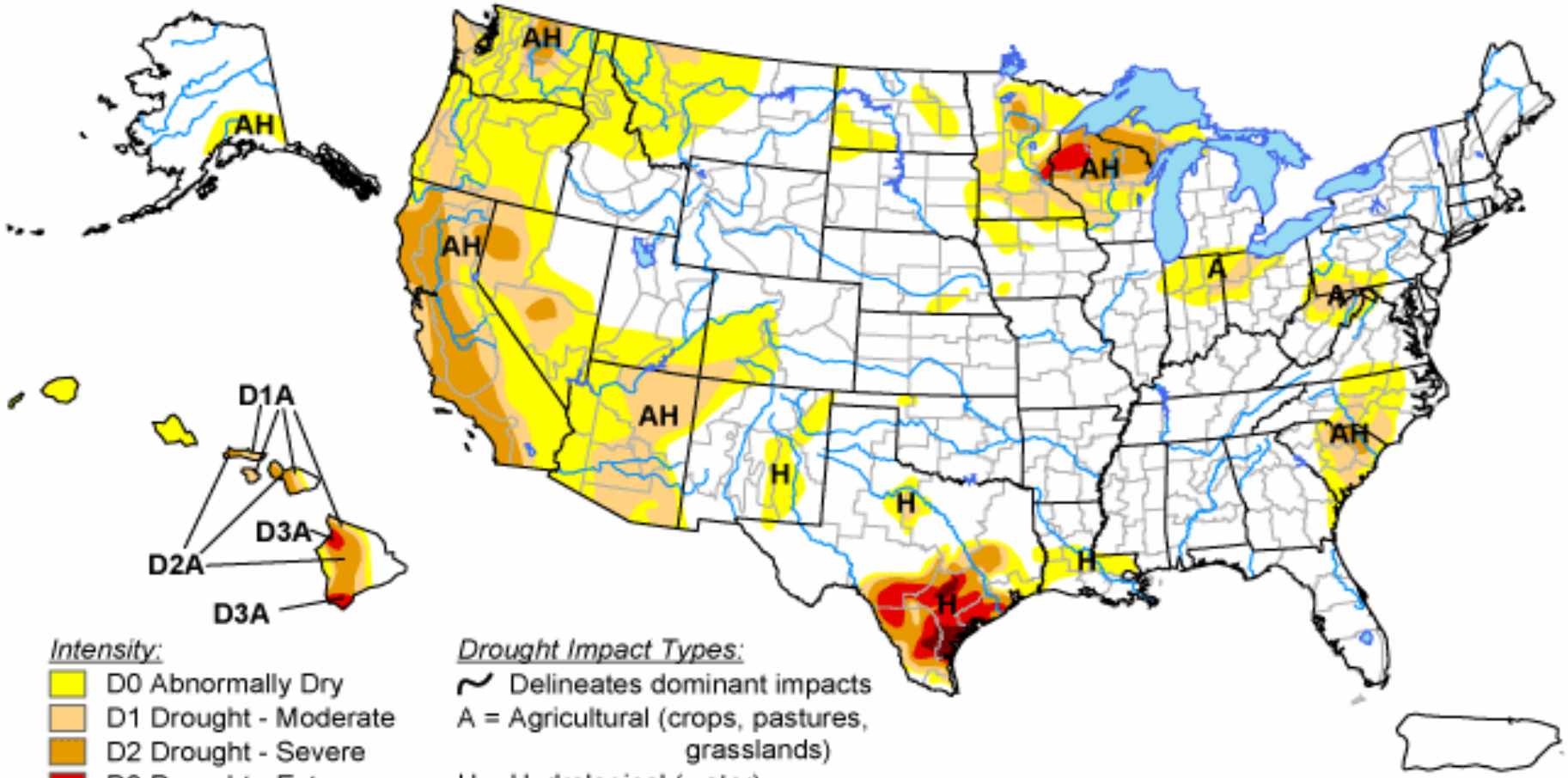


Water Year 2009 Precipitation as Percent of Normal
(Oct 08 - Sept 09)



U.S. Drought Monitor

September 29, 2009
Valid 8 a.m. EDT



Intensity:
- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

Drought Impact Types:
- ~ Delineates dominant impacts
- A = Agricultural (crops, pastures, grasslands)
- H = Hydrological (water)

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

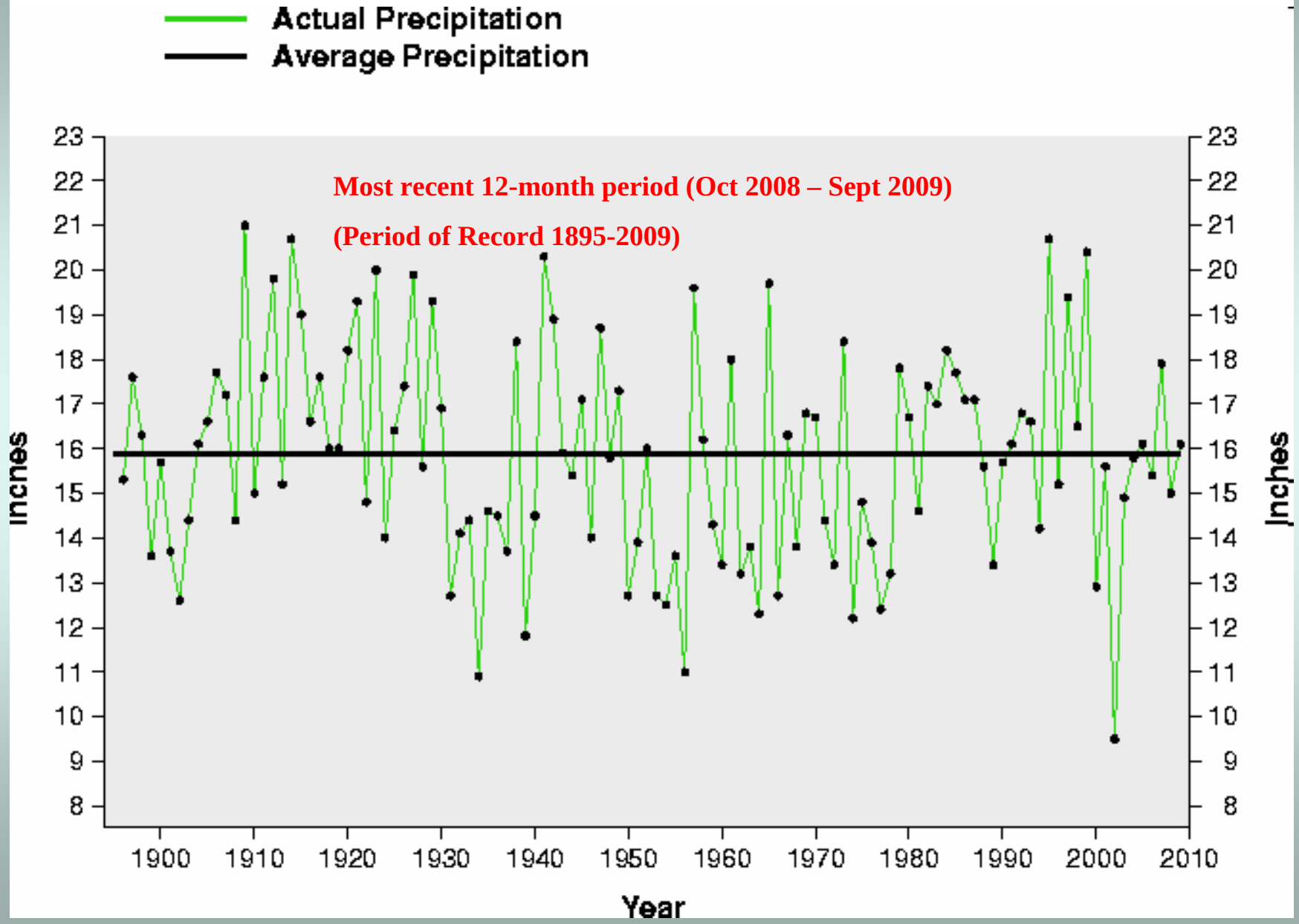
http://drought.unl.edu/dm

USDA National Drought Mitigation Center

Released Thursday, October 1, 2009

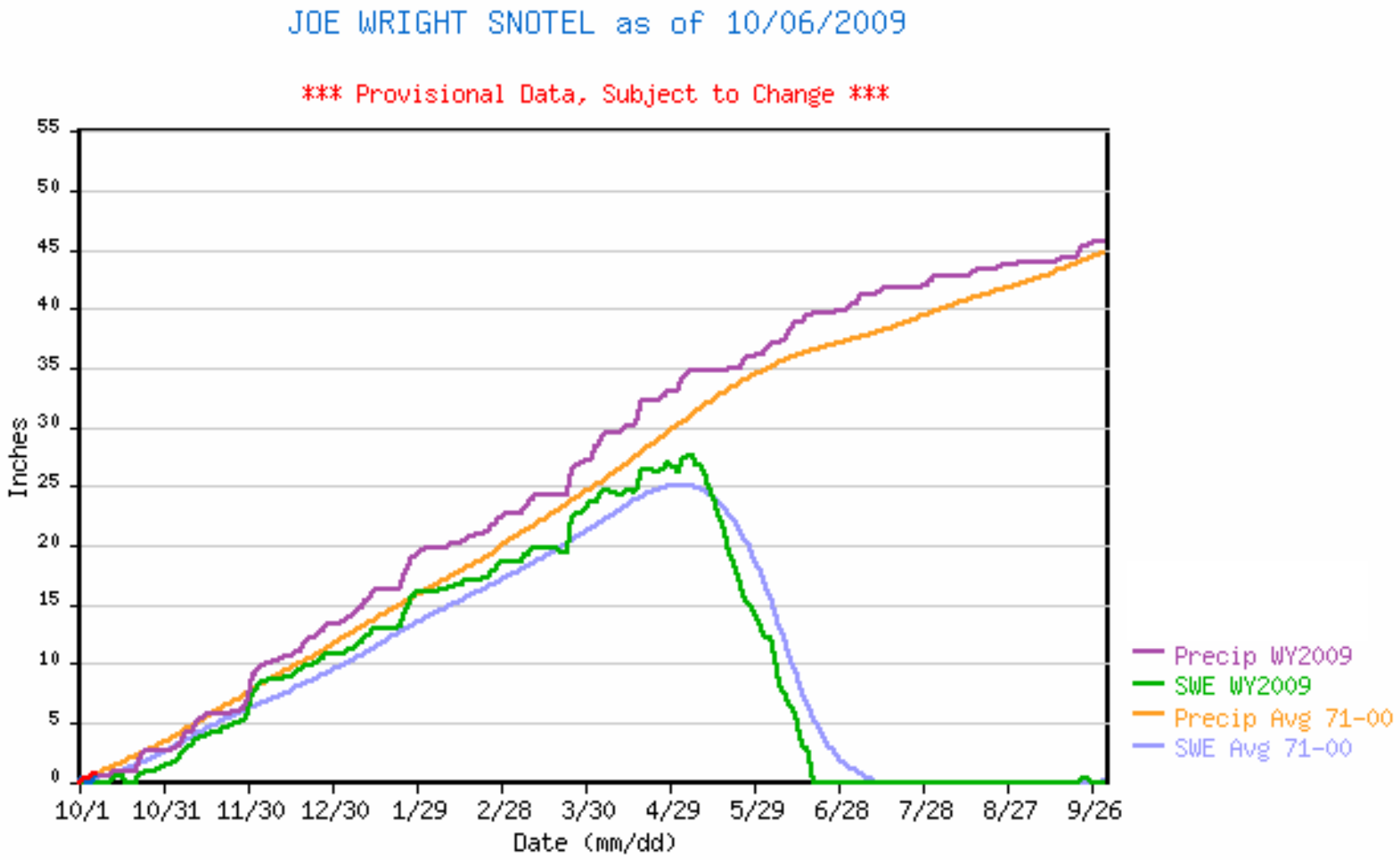
Author: David Miskus, JAWF/CPC/NOAA

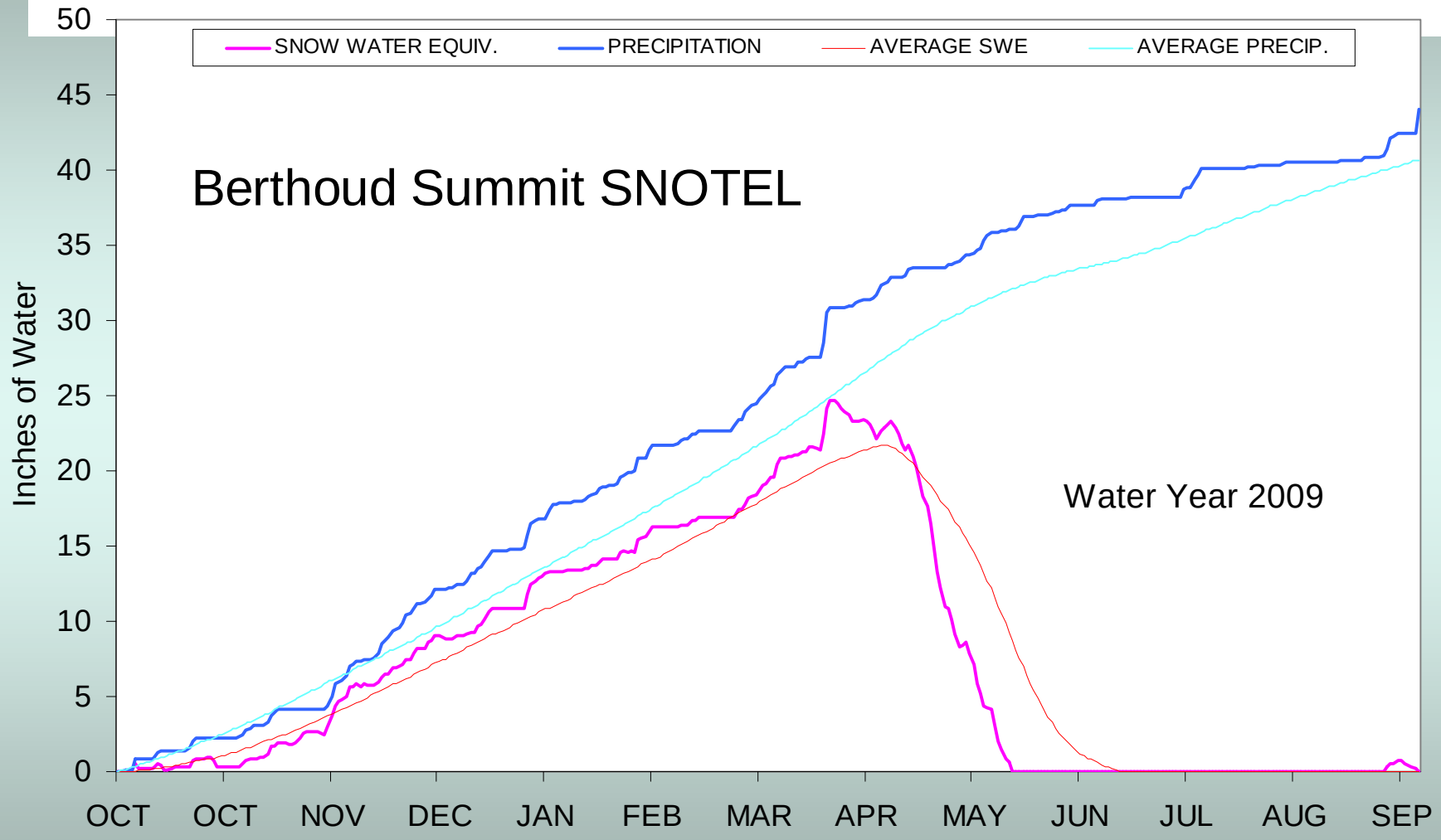
Colorado Precipitation in Historic Perspective



WY2009 Snowpack Accumulation and Meltout

Joe Wright Reservoir Snotel




SNOW WATER EQUIV.
PRECIPITATION
AVERAGE SWE
AVERAGE PRECIP.
Berthoud Summit SNOTEL
Water Year 2009
Inches of Water
50
45
40
35
30
25
20
15
10
5
0
OCT
OCT
NOV
DEC
JAN
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MAR
APR
MAY
JUN
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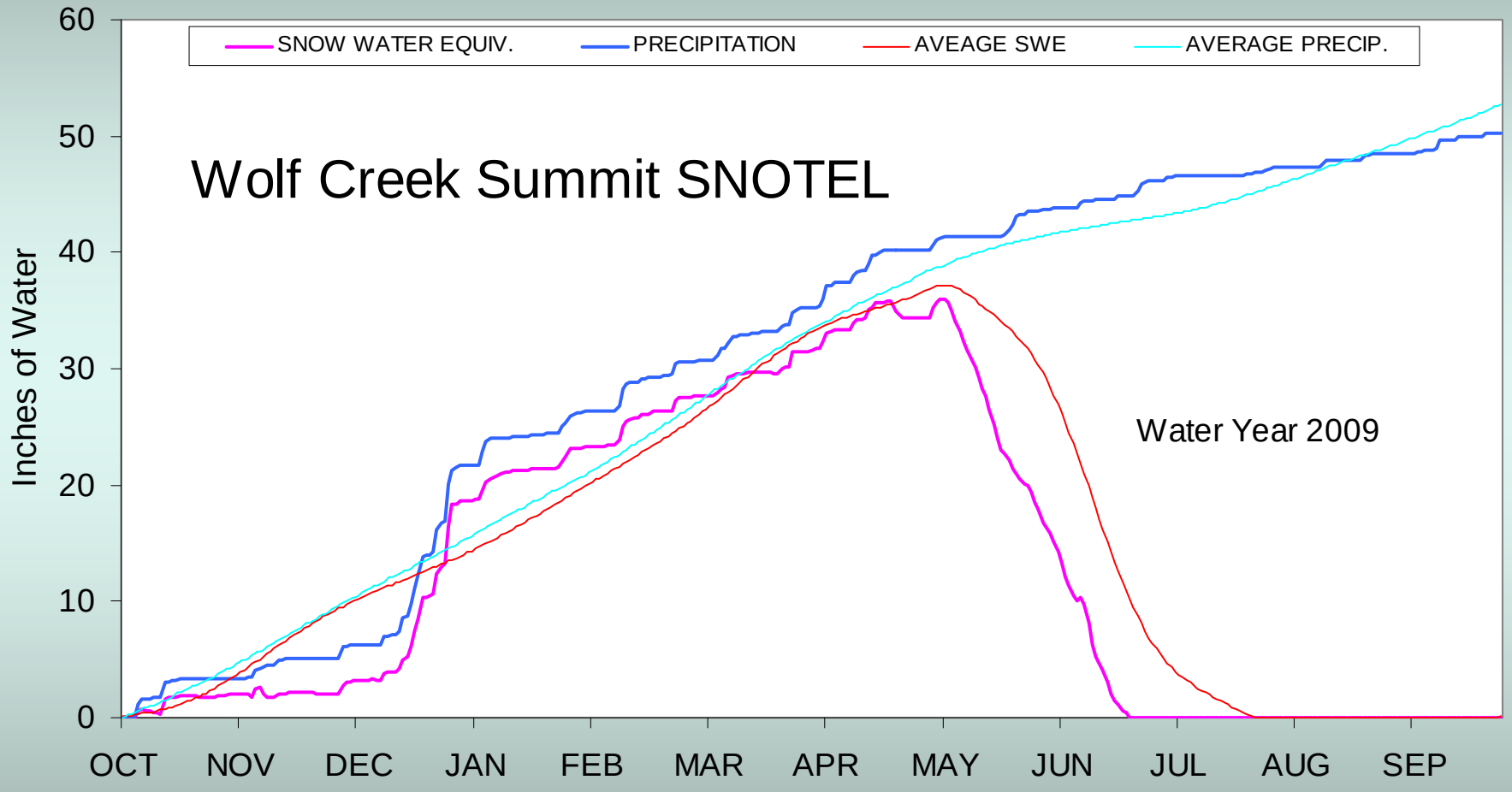
SNOW WATER EQUIV.
PRECIPITATION
AVEAGE SWE
AVERAGE PRECIP.
Wolf Creek Summit SNOTEL
Water Year 2009
Inches of Water
60
50
40
30
20
10
0
OCT
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DEC
JAN
FEB
MAR
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MAY
JUN
JUL
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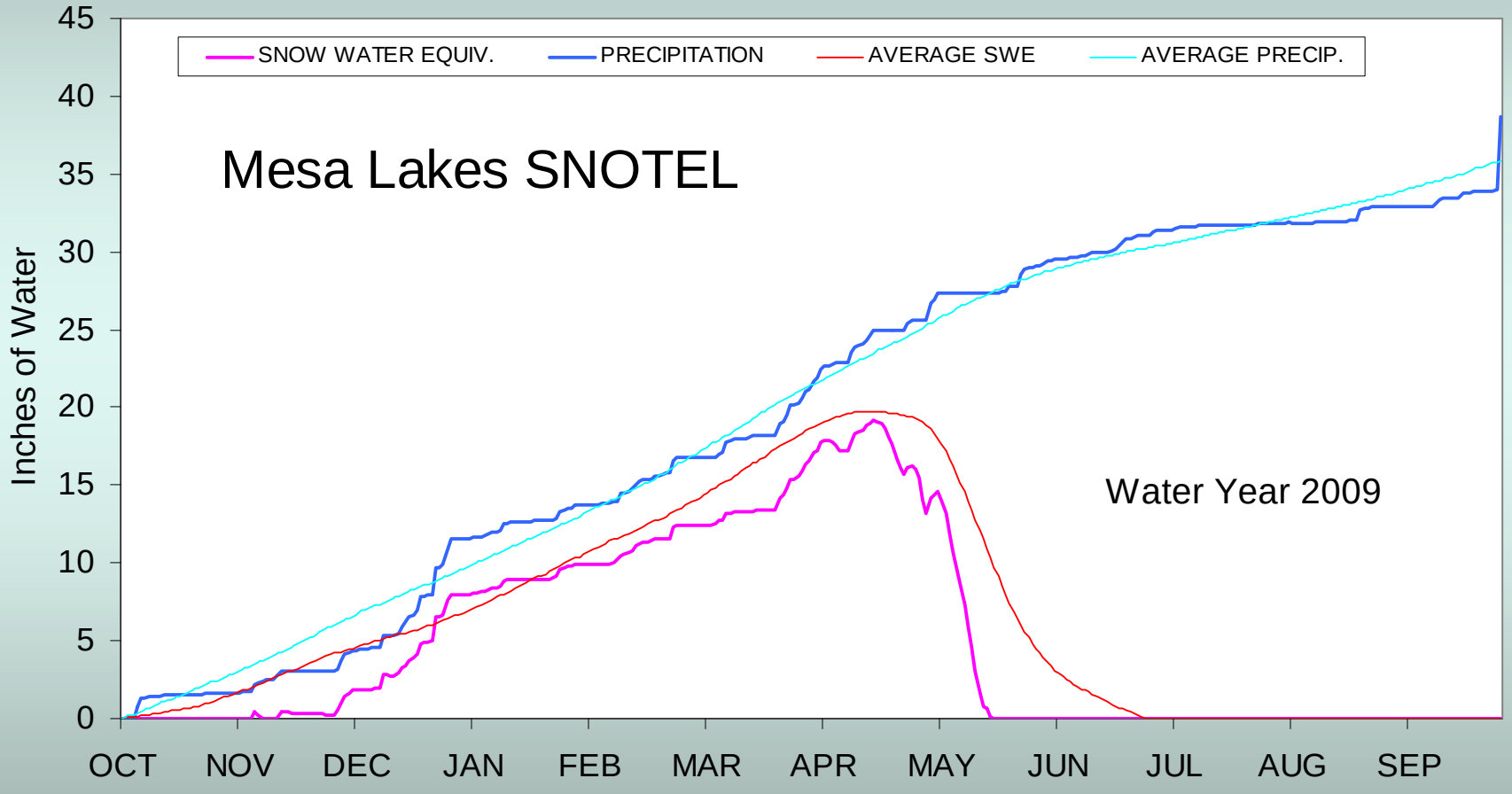
SEP


SNOW WATER EQUIV.
PRECIPITATION
AVERAGE SWE
AVERAGE PRECIP.
Mesa Lakes SNOTEL
Water Year 2009
Inches of Water
45
40
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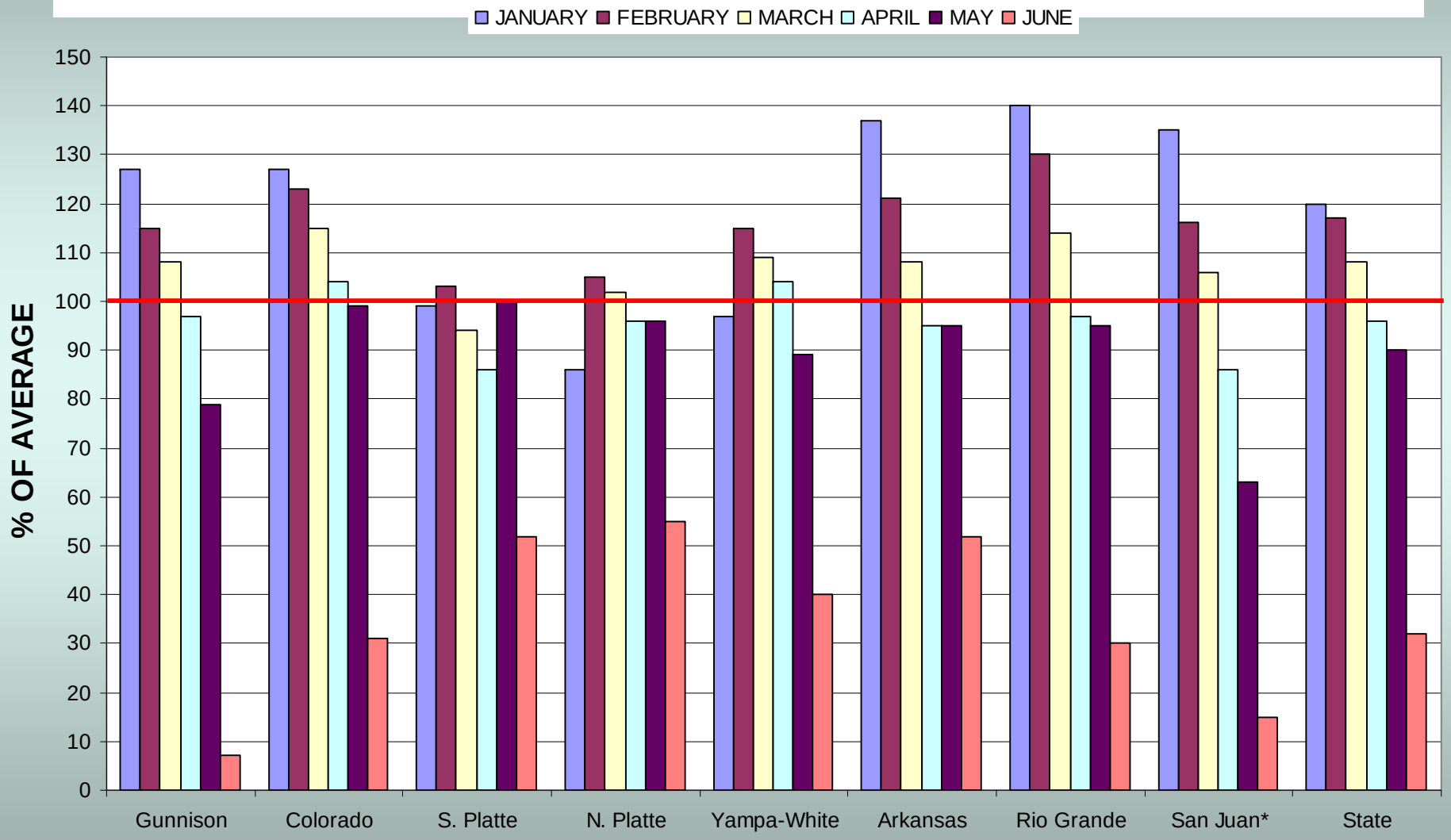
SEP

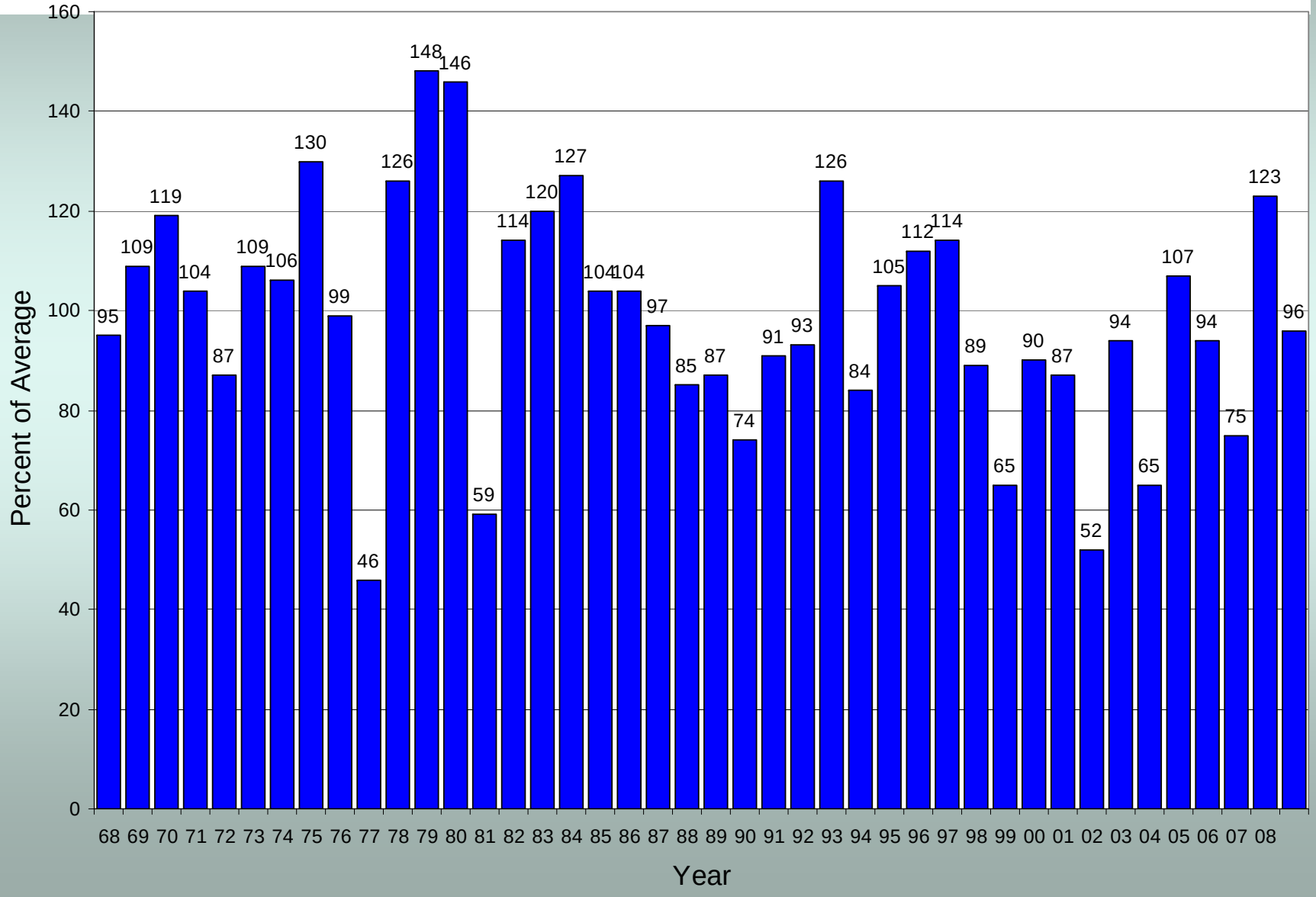
Progression of COLORADO Water Year 2009
Snowpack -- by basin

USDA Natural Resources Conservation Service



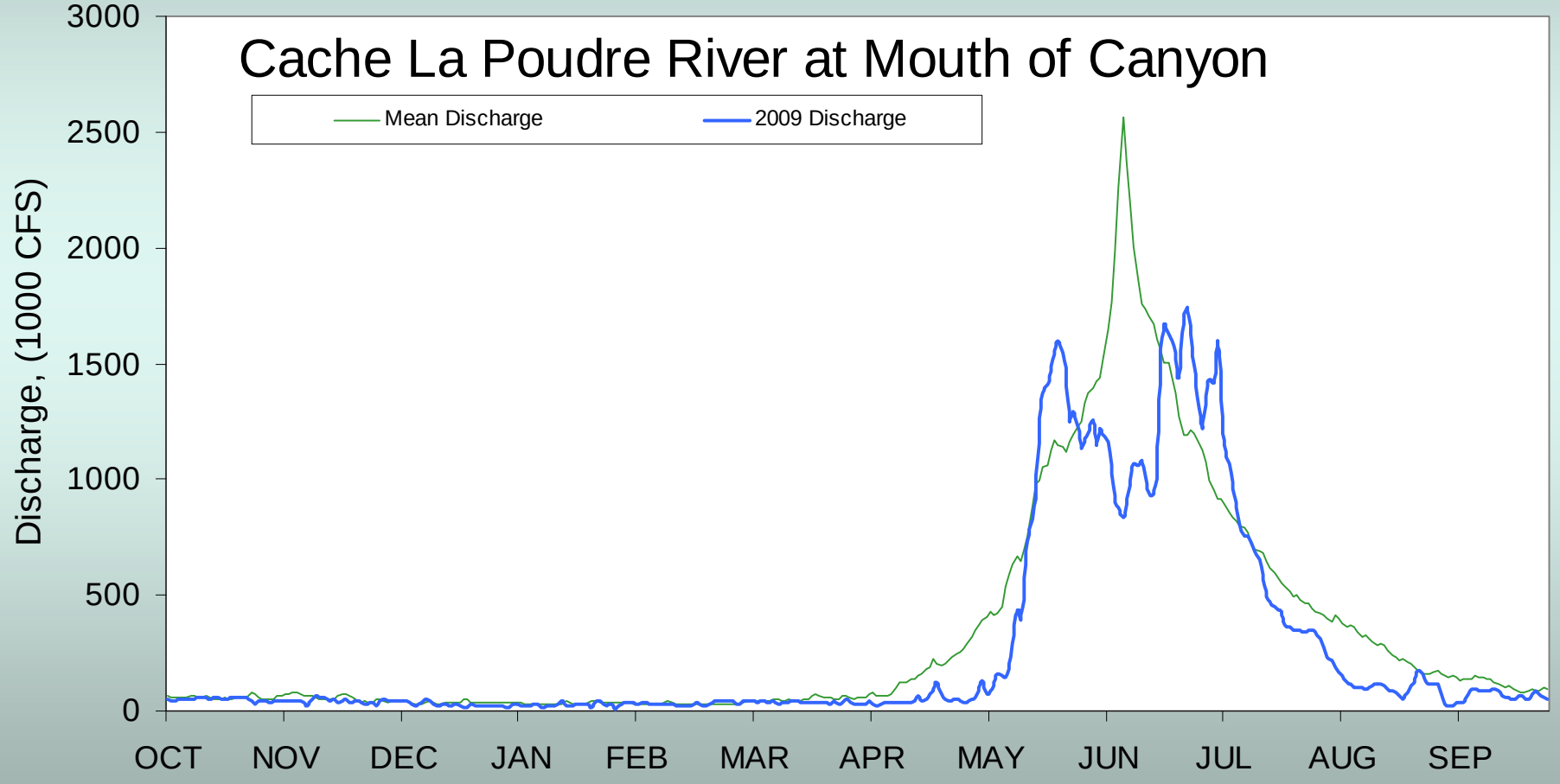
*Includes Animas, Dolores, San Miguel Basins

APRIL 1 SNOWPACK
COLORADO STATEWIDE

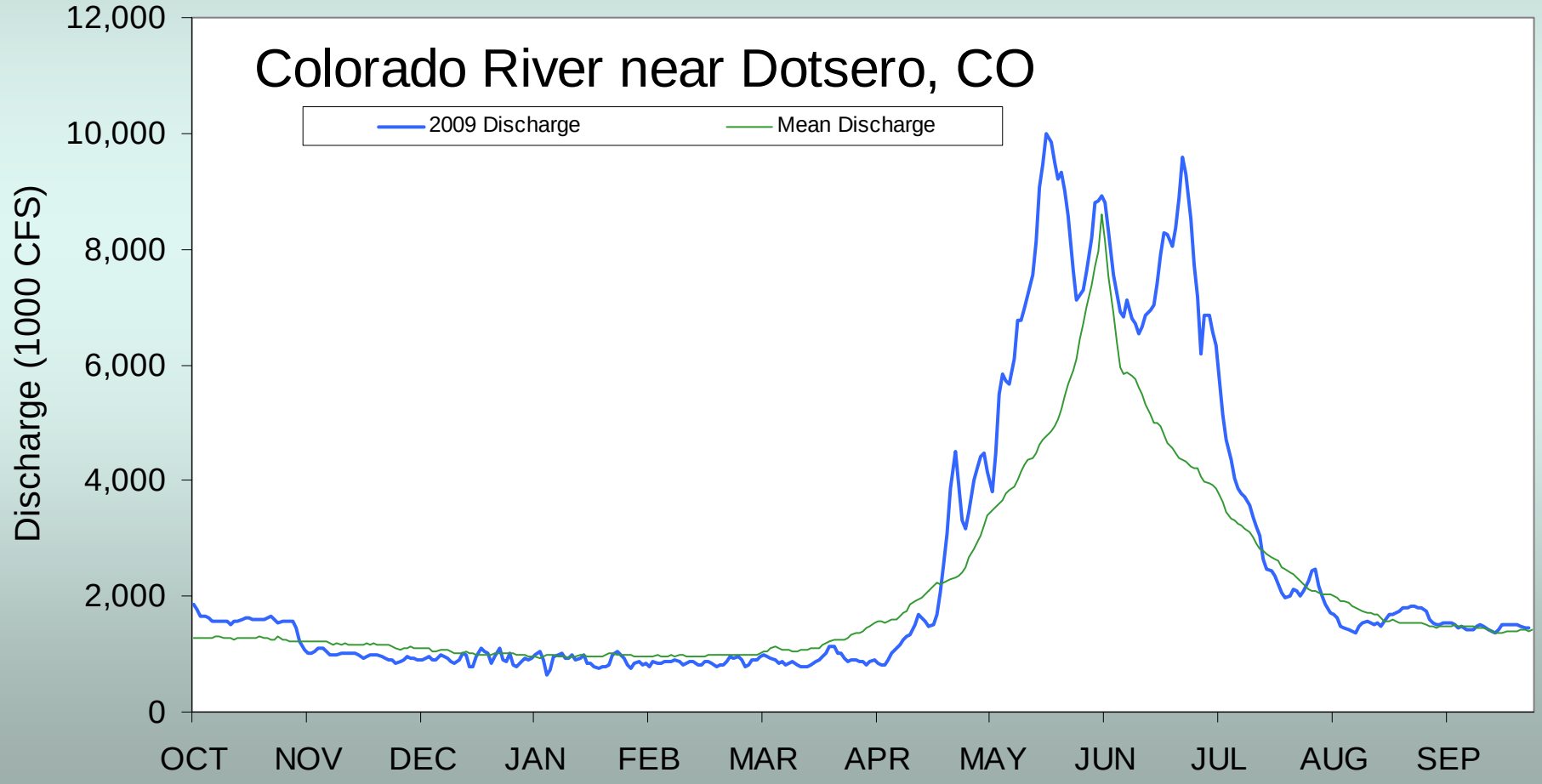


Streamflow

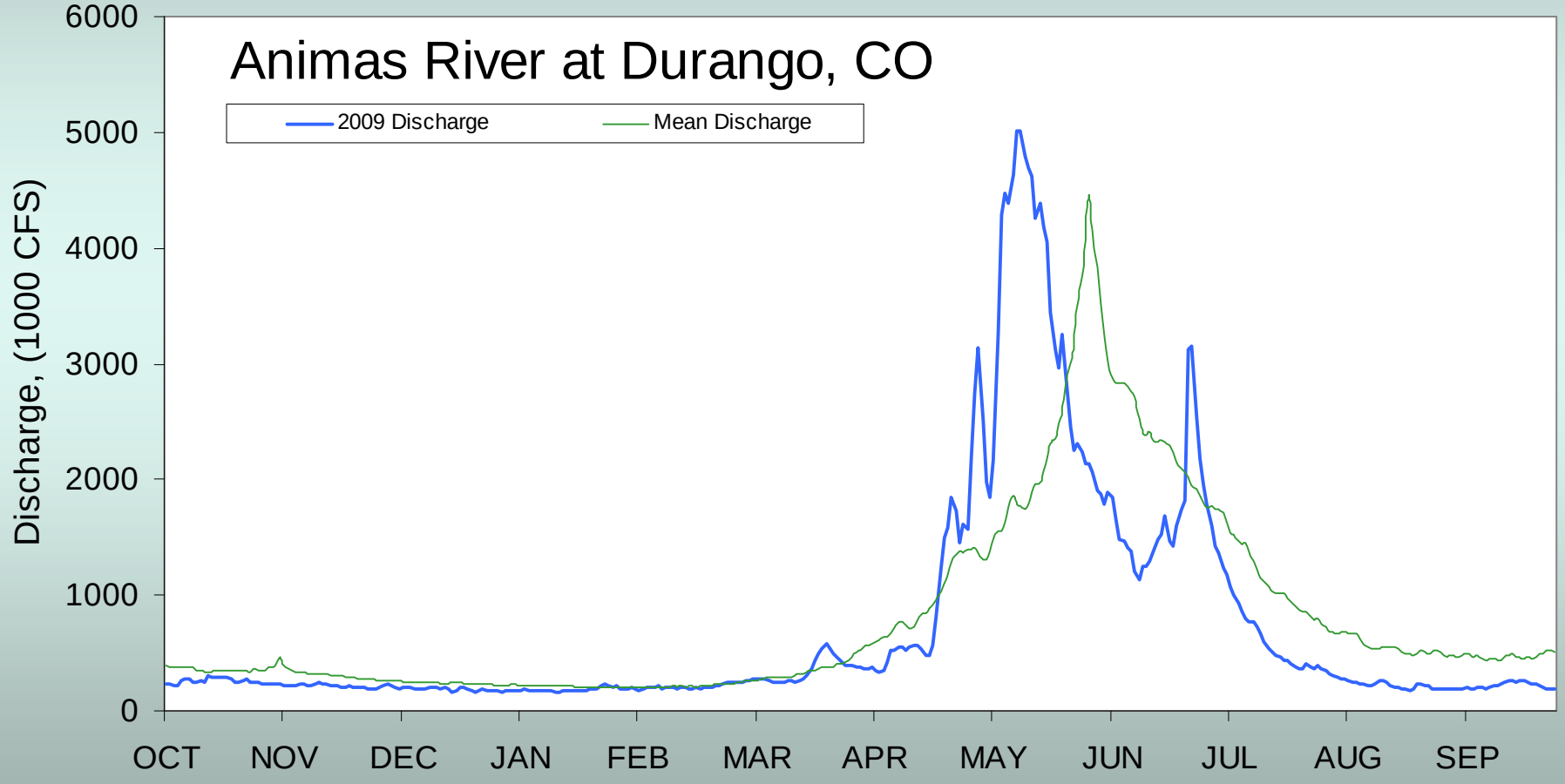
2009 Water Year Hydrograph compared to average



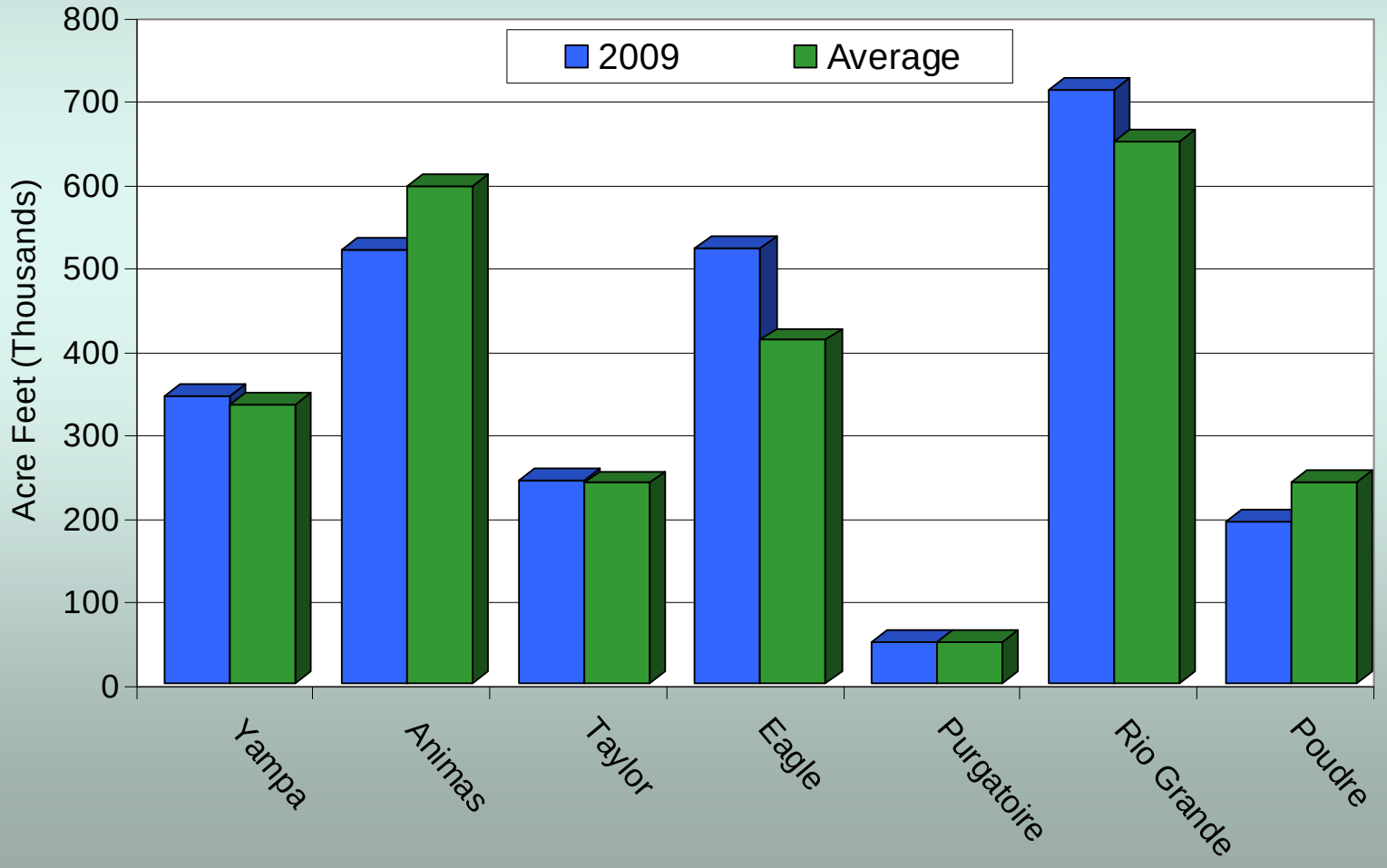
2009 Water Year Hydrograph compared to average



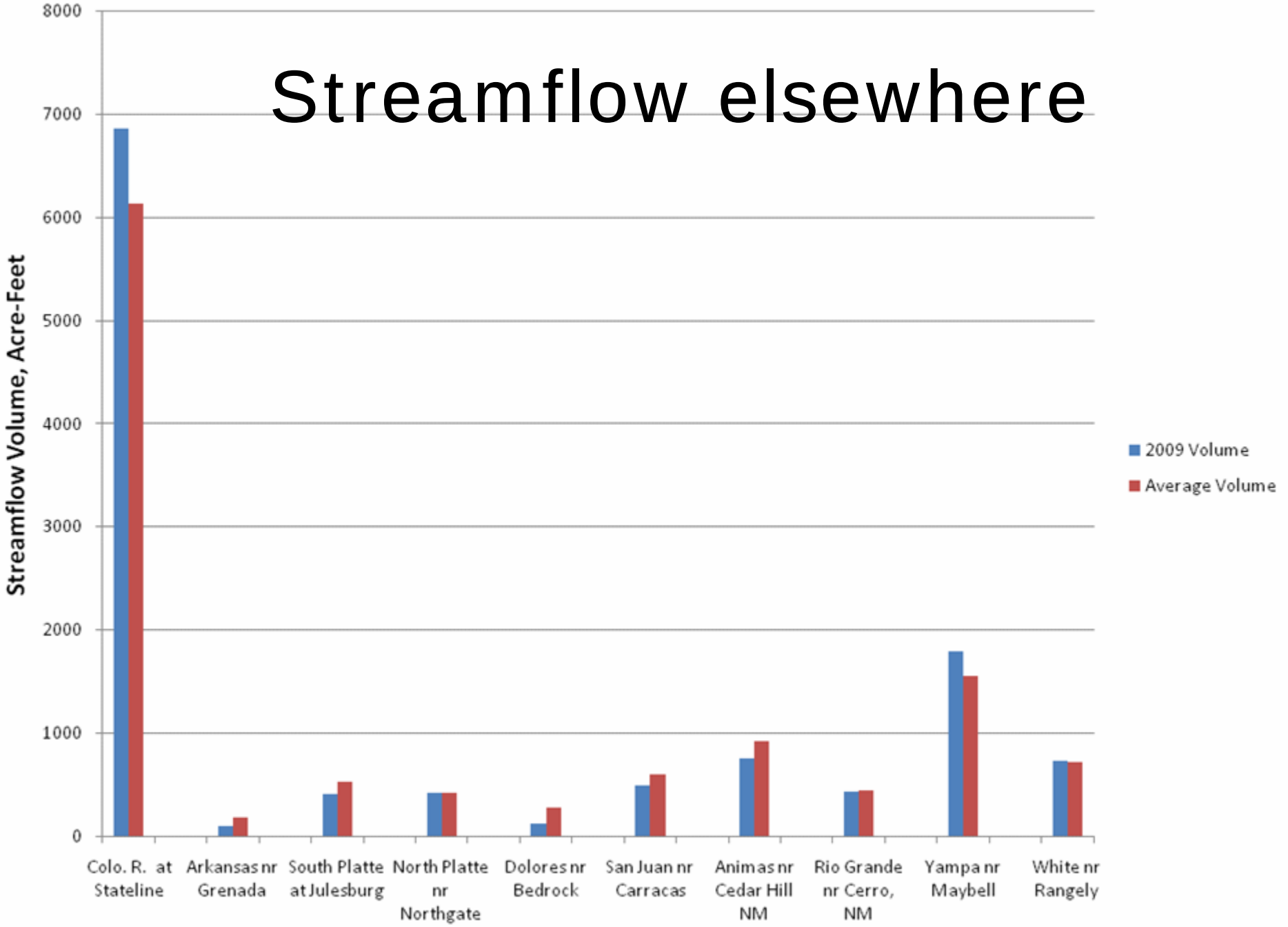
2009 Water Year Hydrograph compared to average



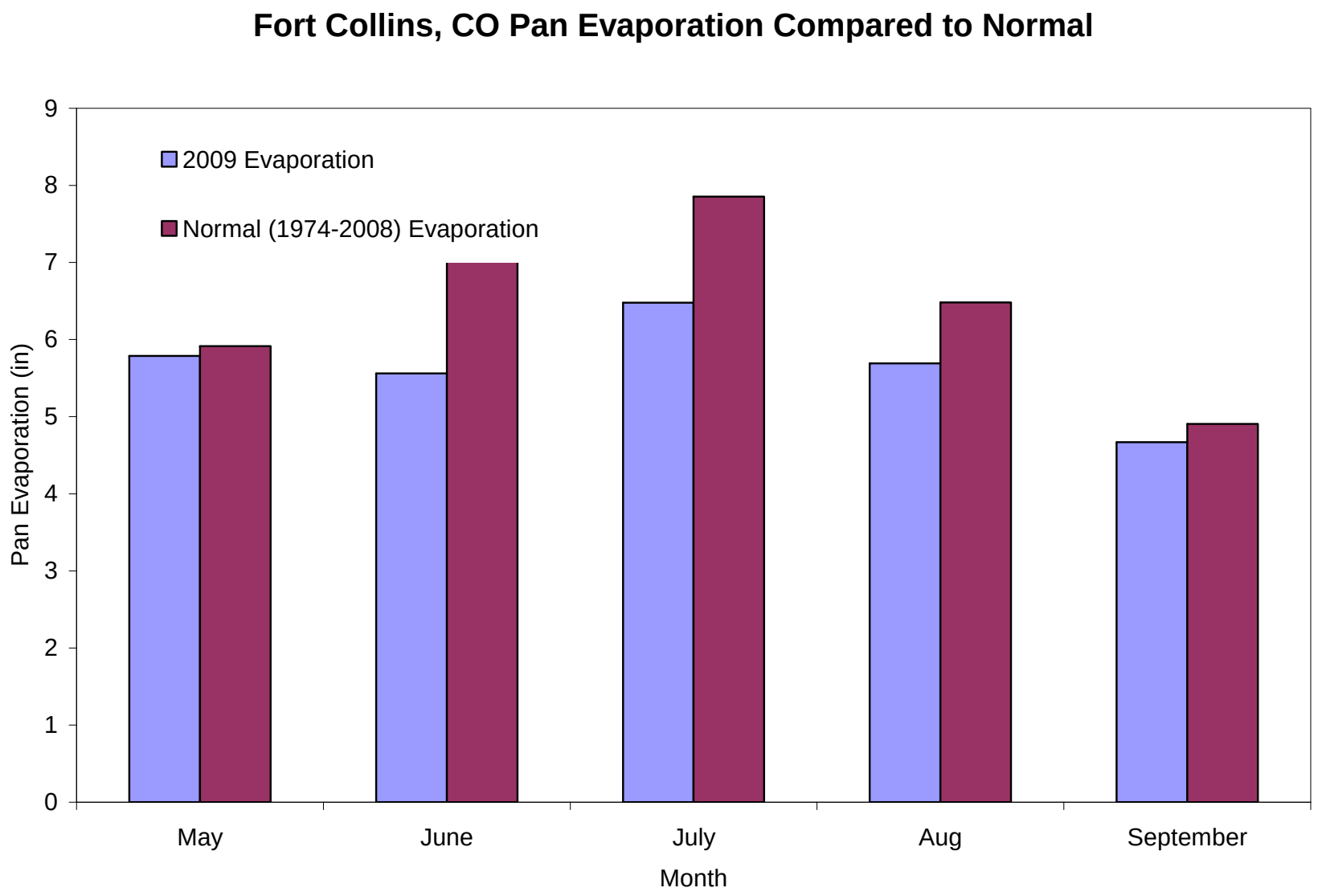
2009 Water Year Streamflow volumes for selected rivers compared to average.



Streamflow elsewhere

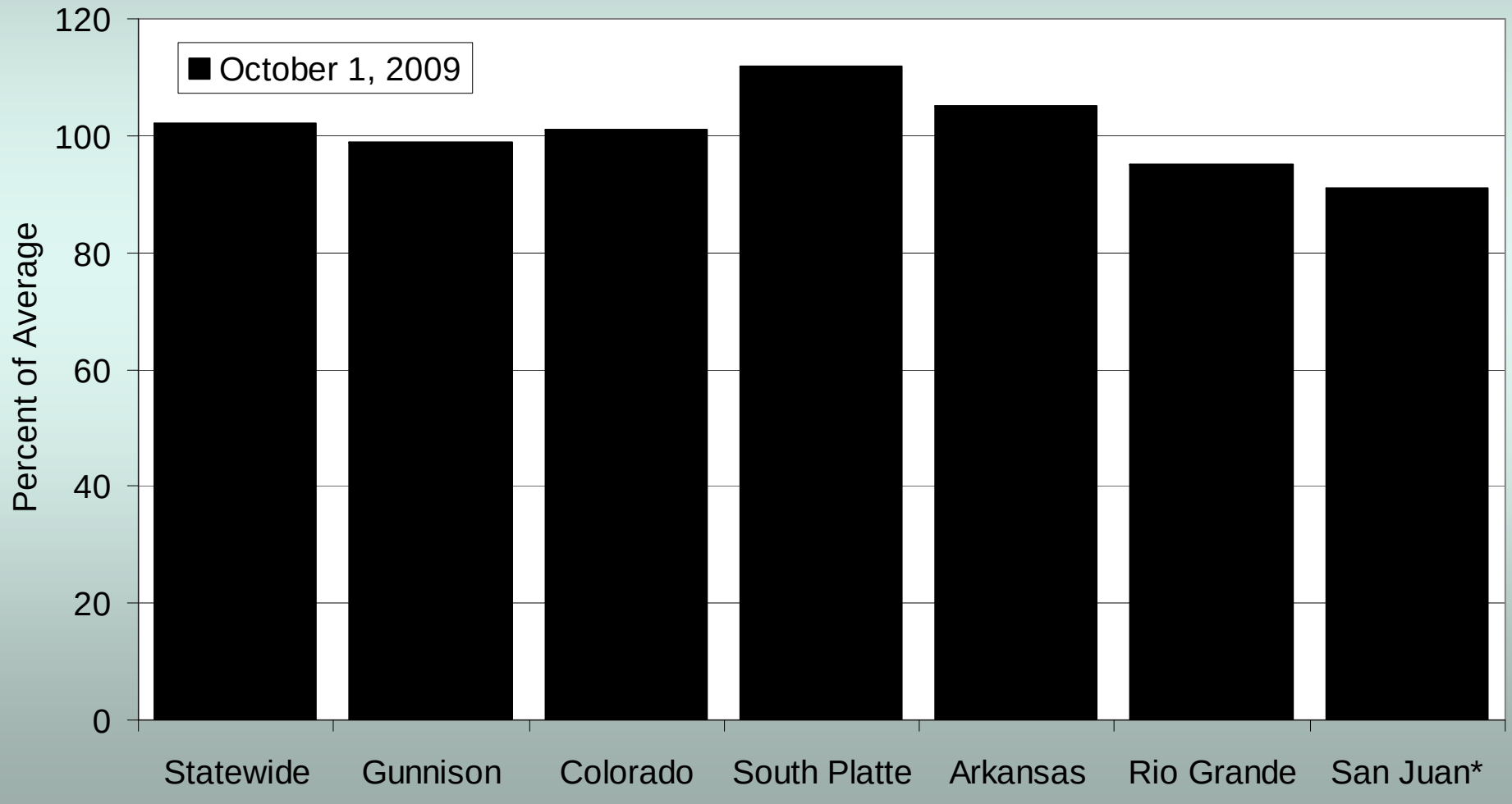


Pan Evaporation



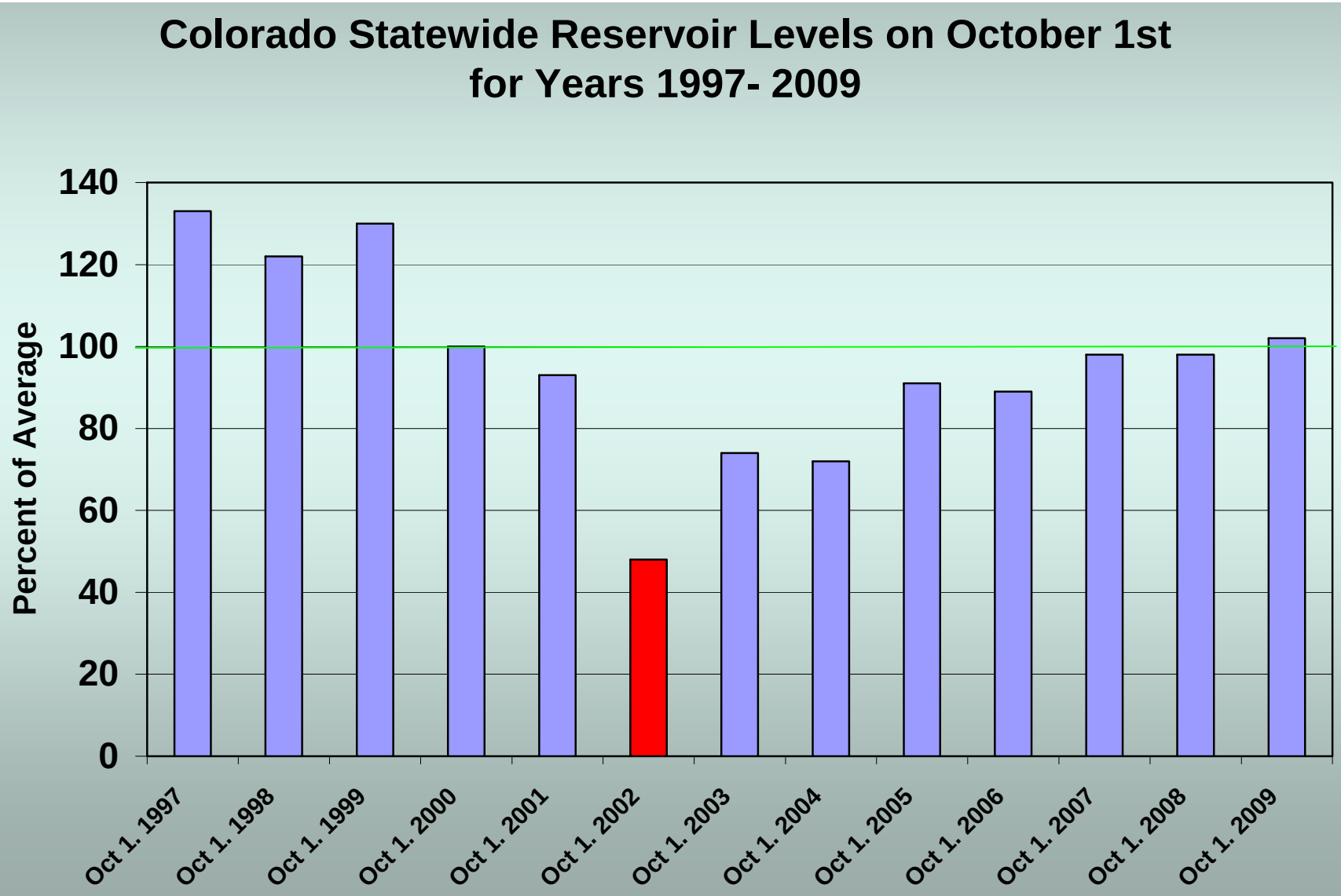
And How are Colorado's
Reservoirs Doing?

Reservoir storage compared to averages – by basin

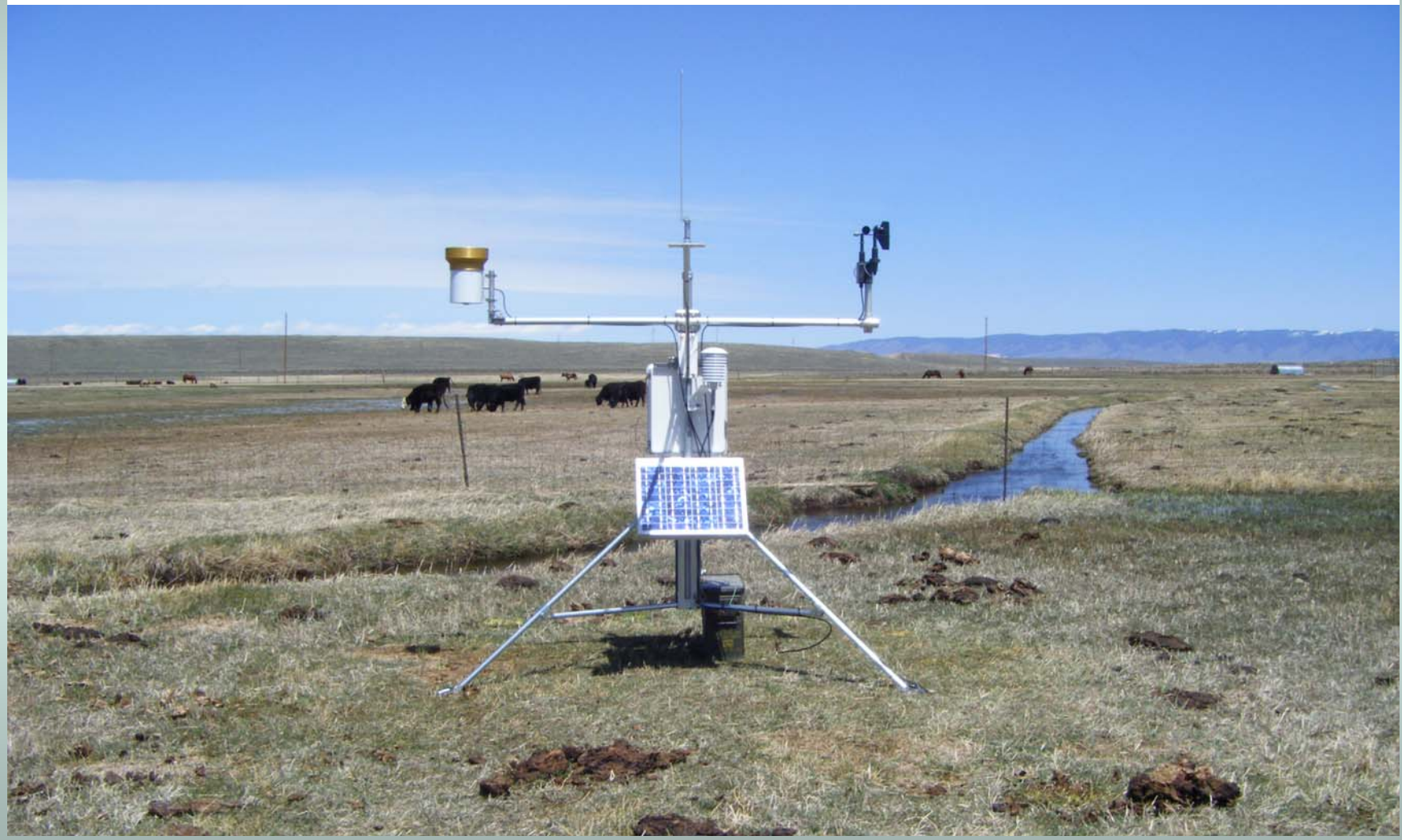


*includes the Animas and Dolores basins

Reservoir Storage Levels

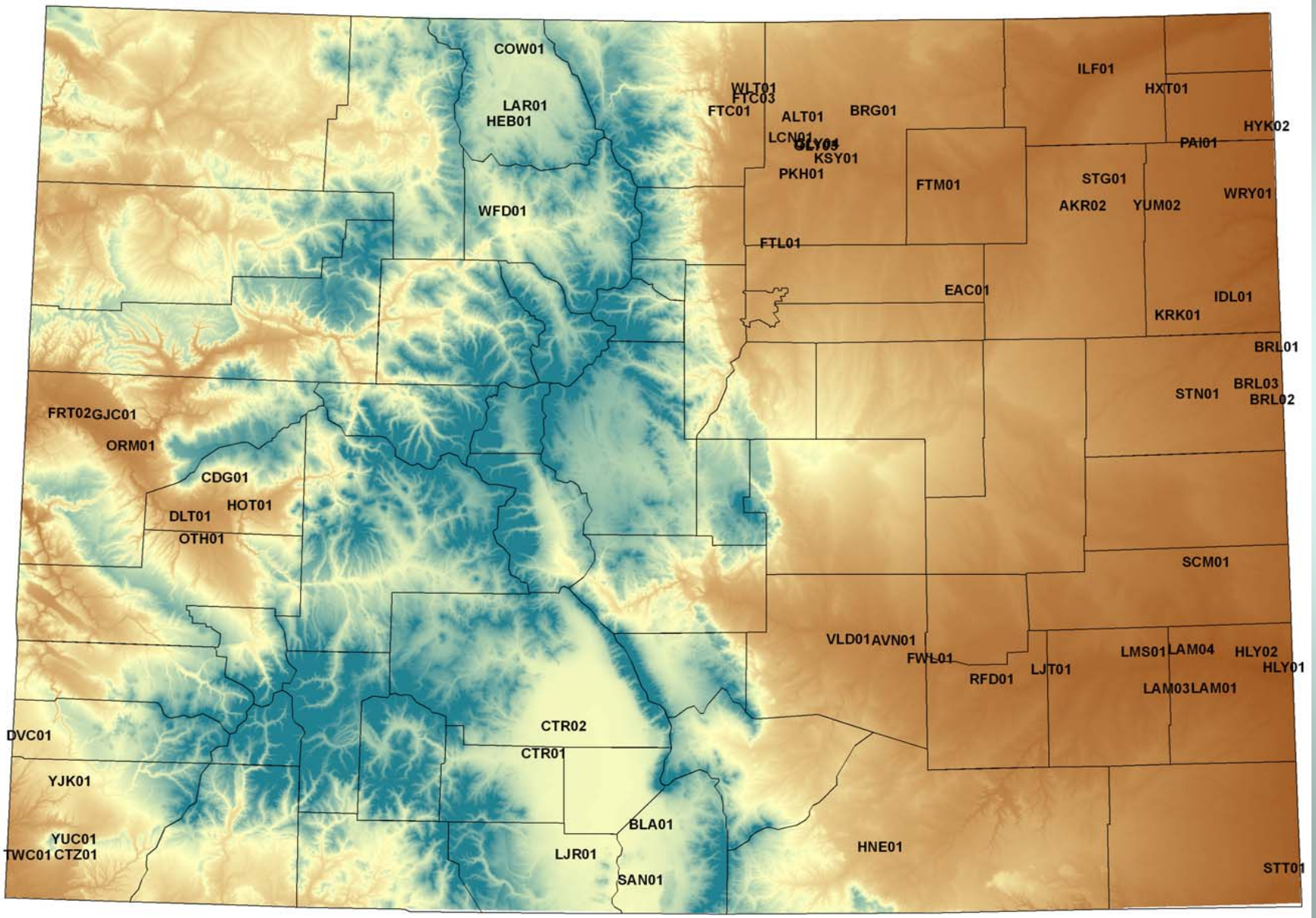


CoAgMet: Colorado Agricultural Meteorological Network -- Quick Update



ccc.atmos.colostate.edu/~coagmet

CoAgMet Network
-- currently downsizing and fund raising



Climate Trends Website

http://climatetrends.colostate.edu/

Colorado State University

Colorado Climate Center

Home | Products & Services | Resources | About the CCC | AASC

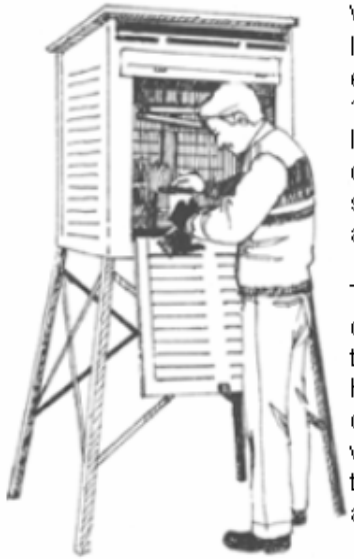
Colorado Climate Center » Climate Trends » Home

Search by Google

Welcome to the Colorado Climate Trends Website

Climate Trends | Station Map | Station Info | Data Access | Links + Resources | About

Climate Trends of Colorado



Welcome! The climate of Colorado is a valued natural resource affecting our lives and livelihoods. By nature, climate is variable. No two years are ever exactly alike. Instrumental observations of our climate dating back to the late 1800s give a sense of our average climate, typical variations, extremes and long-term trends. (For a description of historic weather observations in Colorado, click here). Tracking temperatures and precipitation through history reveal seasonal patterns, cold and warm periods, and episodes of drought and abundant water.

Today there is great interest in climate change. If our state is warming, these data will show it. This Website lets you view, graph and download historic temperature and precipitation data for selected weather stations in Colorado having the longest and most consistent historical data. Historic consistency is critical for accurately assessing climate trends. There have been hundreds of weather stations operated in Colorado since the 1890s, but very few have data that are complete and consistent. Even the best stations selected for this site are imperfect.

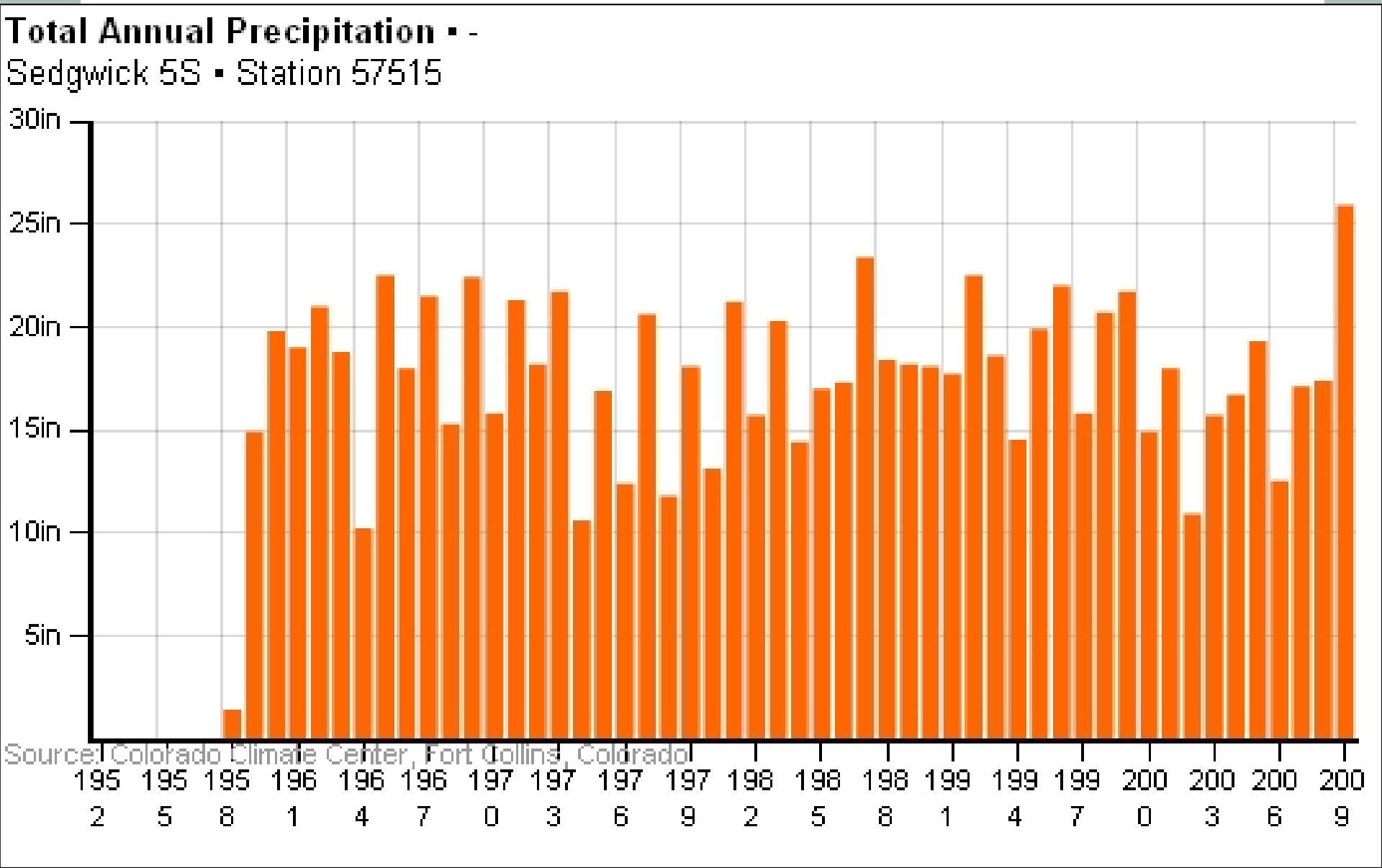
For each station shown here, a description of the history of the station is

National Weather Service Co-op Program

National Weather Service Cooperative Observer Program

Weather observations in Colorado using thermometers and rain gauges date back to the late 1800s. Some of the earliest weather stations were established in the largest cities during the 1870s by the U.S. Signal Service. In the 1880s Colorado formed a "State Weather Service" and began setting up more basic weather stations in smaller towns and rural areas. By 1890, the first nationwide civilian weather service was formed within the U.S. Department of Agriculture. State networks, such as Colorado's were combined to form a single nationwide volunteer weather observing network This same network continues today managed by the National Weather Service. What began as a few dozen stations in the

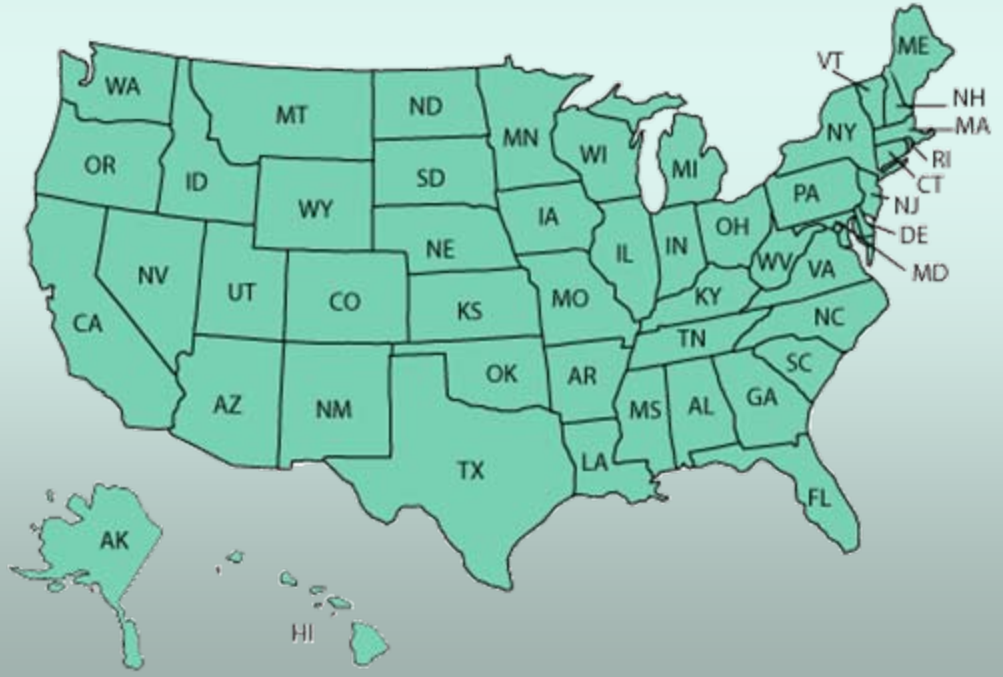
Sedgwick 5S Precipitation History



And How About CoCoRaHS?

Community Collaborative Rain, Hail and Snow network

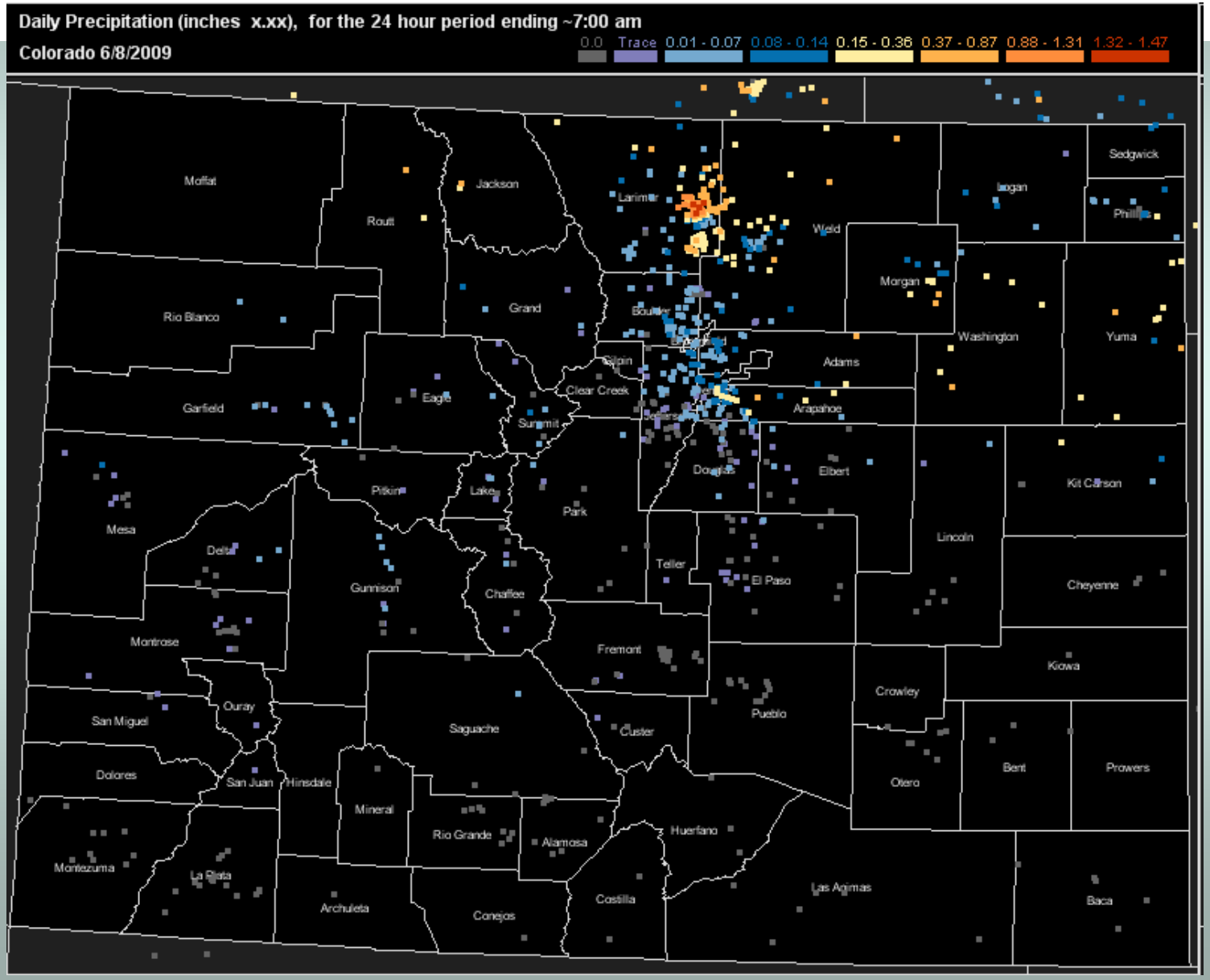
- Hundreds of new observers, especially from other states
- All 50 states on board!



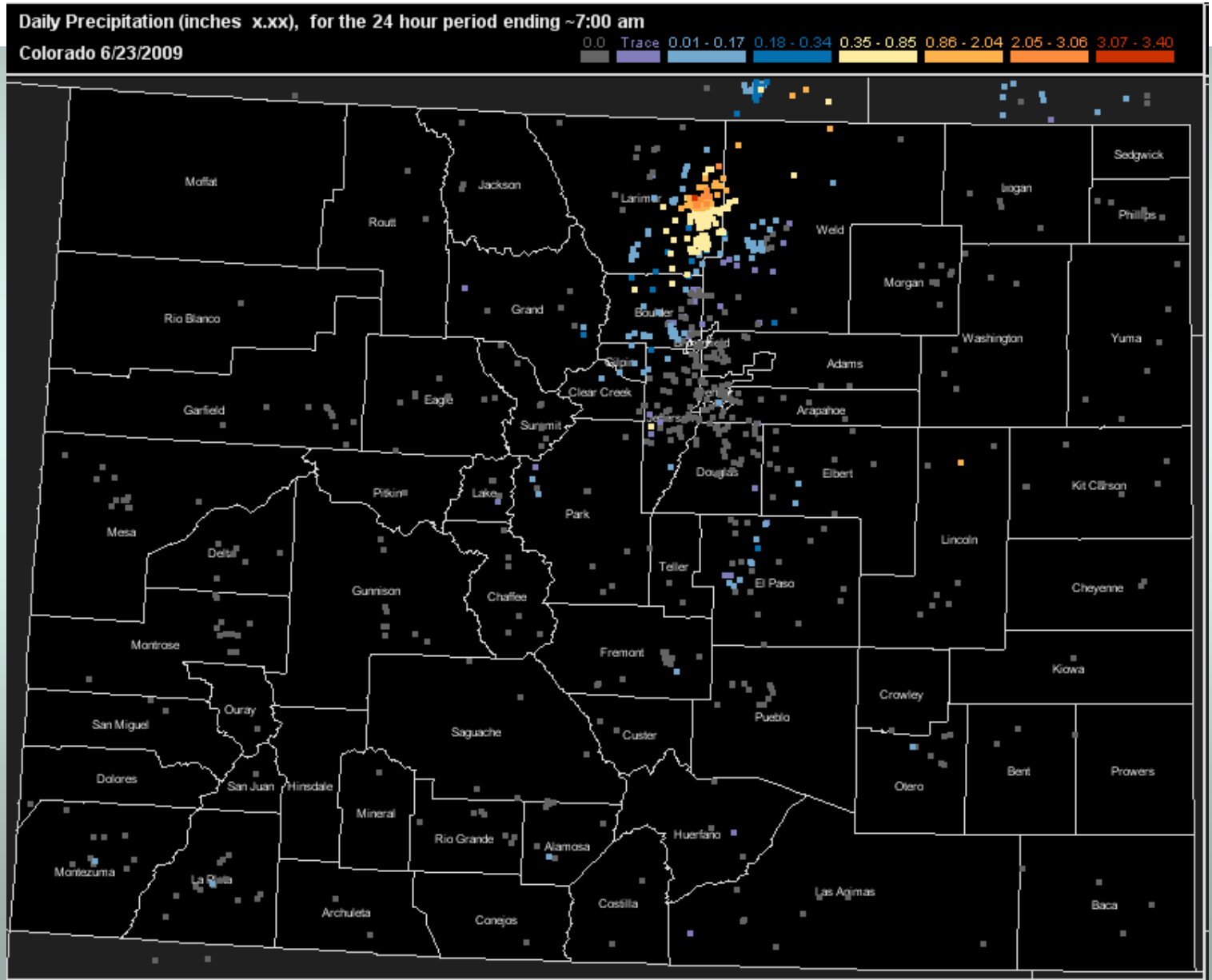
CoCoRaHS

Community Collaborative Rain, Hail, & Snow Network

CoCoRaHS June 8, 2009



CoCoRaHS June 23, 2009



For More Information, Visit the CoCoRaHS Web Site

We are always looking for new rain gauge volunteers.
Are you available??

http://www.cocorahs.org

Support for this project provided by
NSF Informal Science Education Program,
NOAA Environmental Literacy Program
and
many local charter sponsors.

Colorado Climate Center

Data and Power Point Presentations available for downloading

http://ccc.atmos.colostate.edu

- Click on “Presentations”

Colorado State University
Knowledge to Go Places

Colorado Climate Center