The Climate of Colorado: An update and status report

Nolan Doesken

Colorado Climate Center

Presented to: Colorado Conservation Tillage Association, Greeley, CO, February 1-2, 2005

http://ccc.atmos.colostate.edu

Prepared by Odie Bliss

Colorado State University

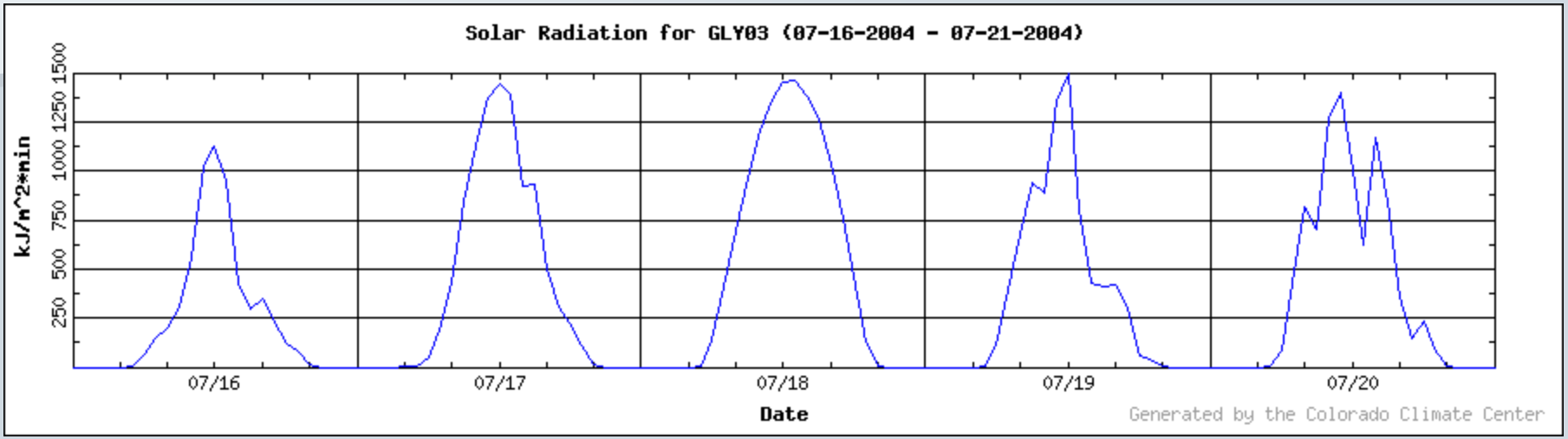
Knowledge to Go Places

Key Features of the Climate of Colorado

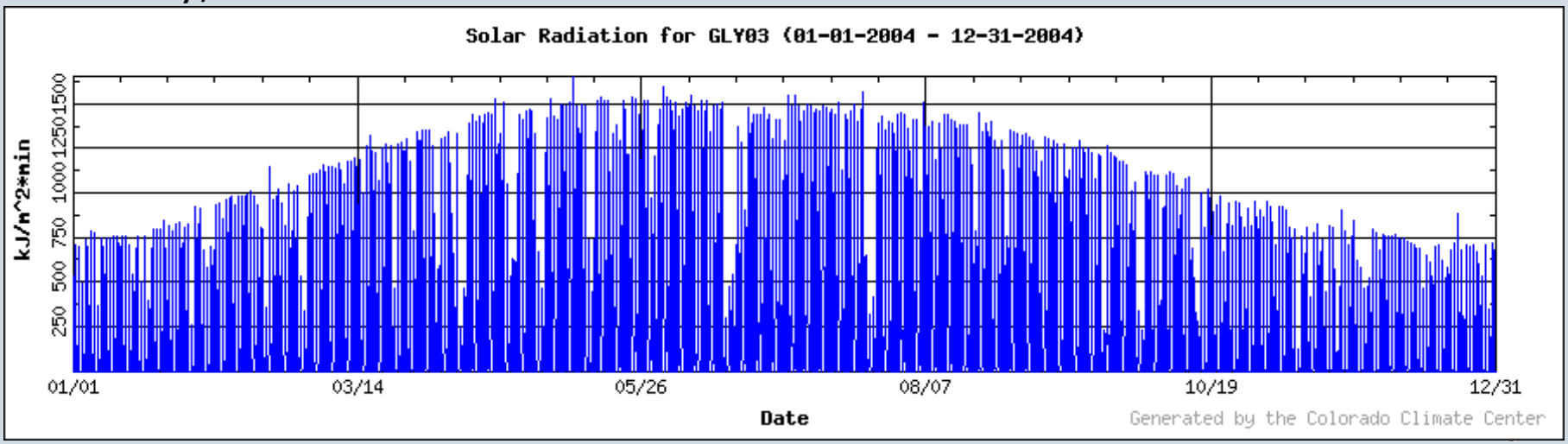
Photo by Ian Wittmeyer

Solar Energy Drives Our Climate

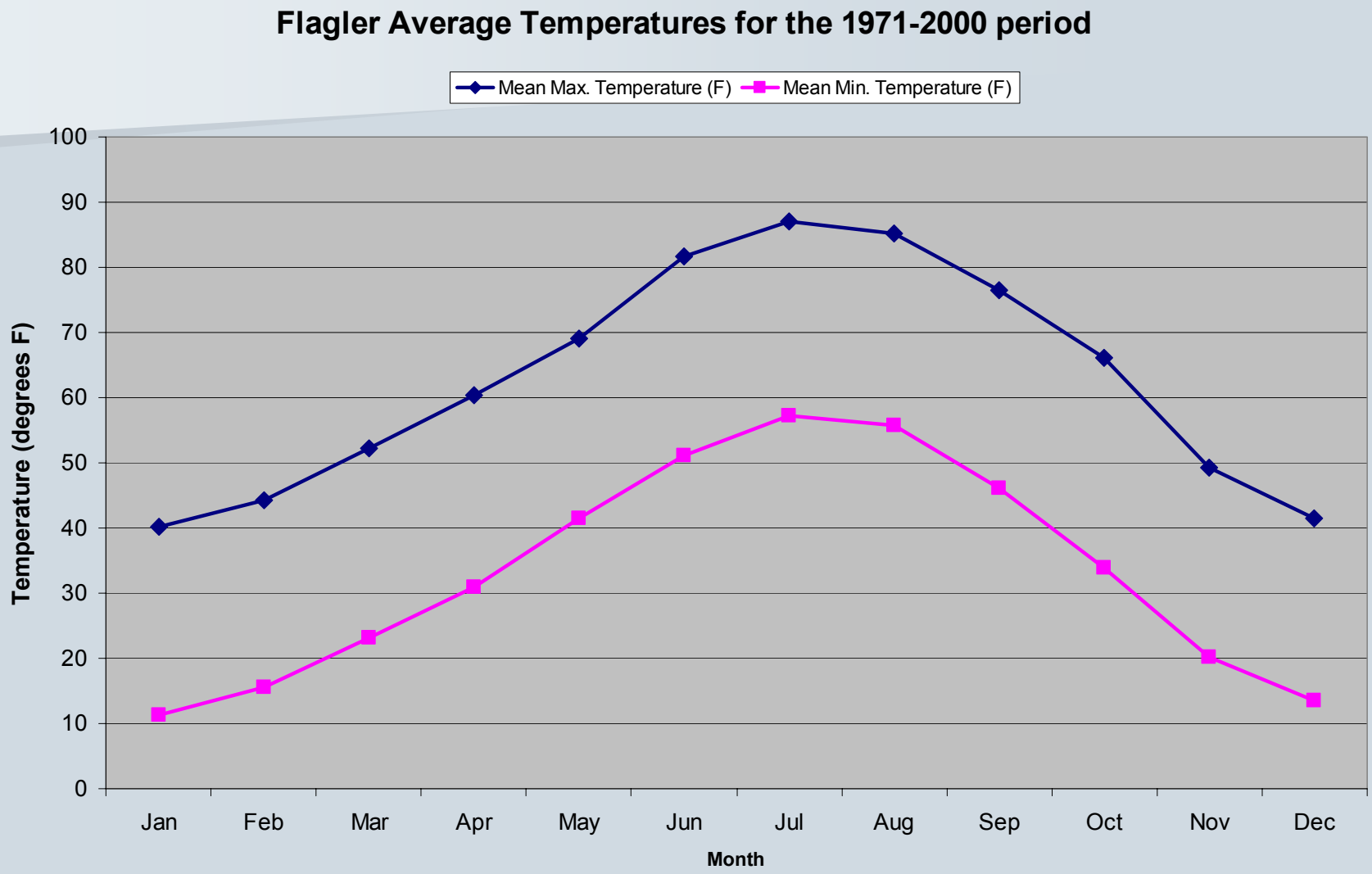
Greeley, July 16 – 21, 2004



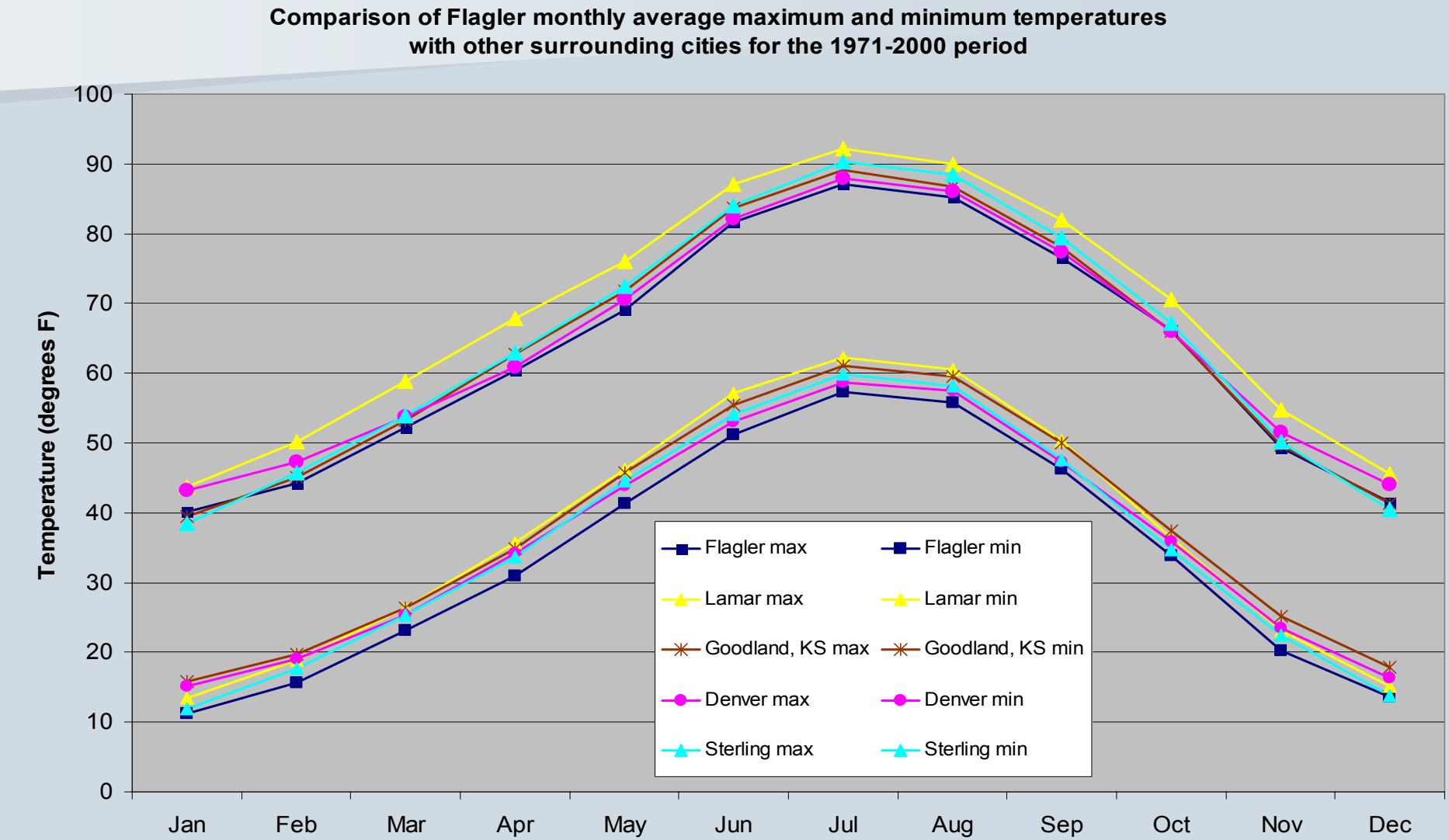
Greeley, Jan-Dec 2004



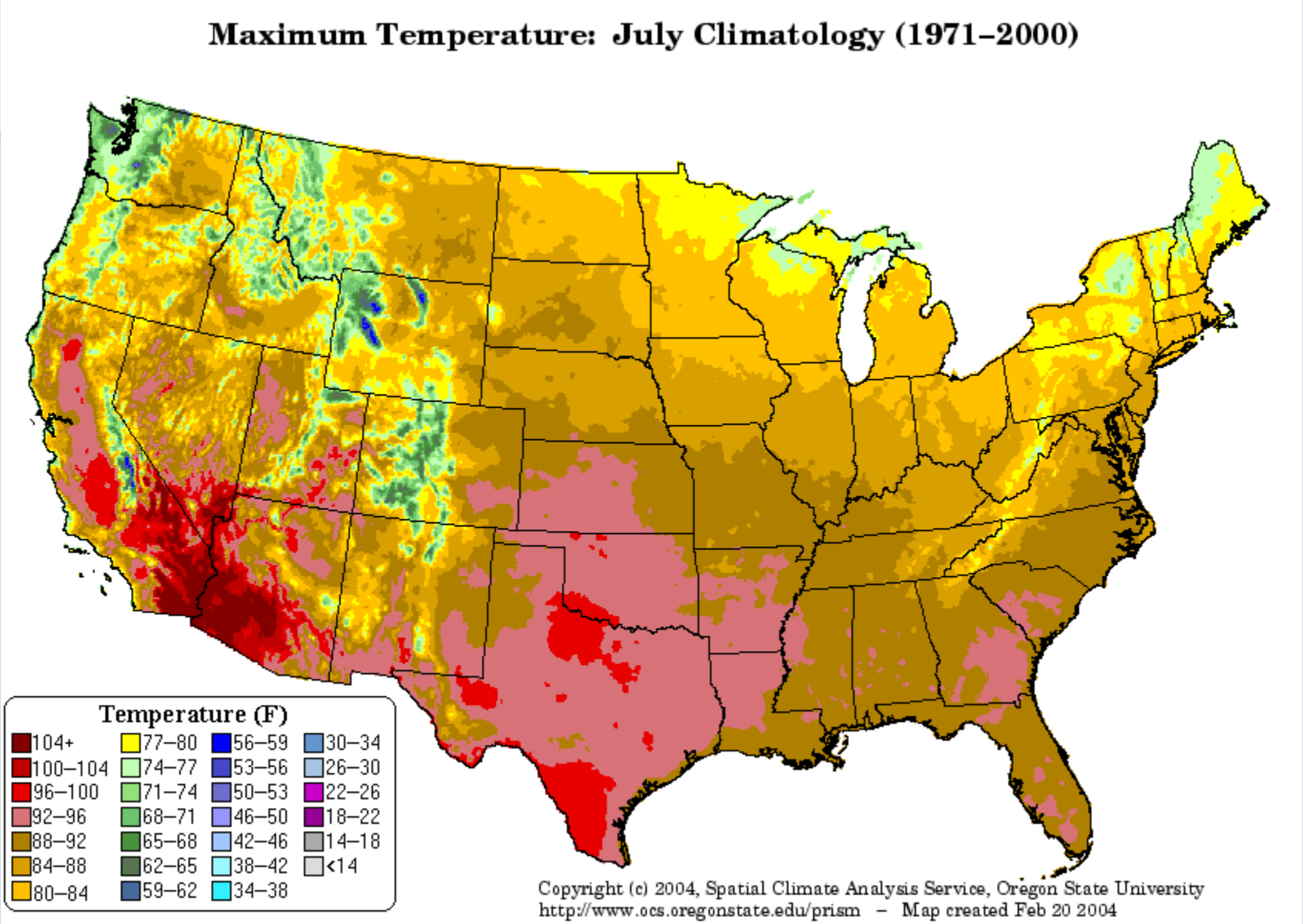
Flagler Temperature Averages



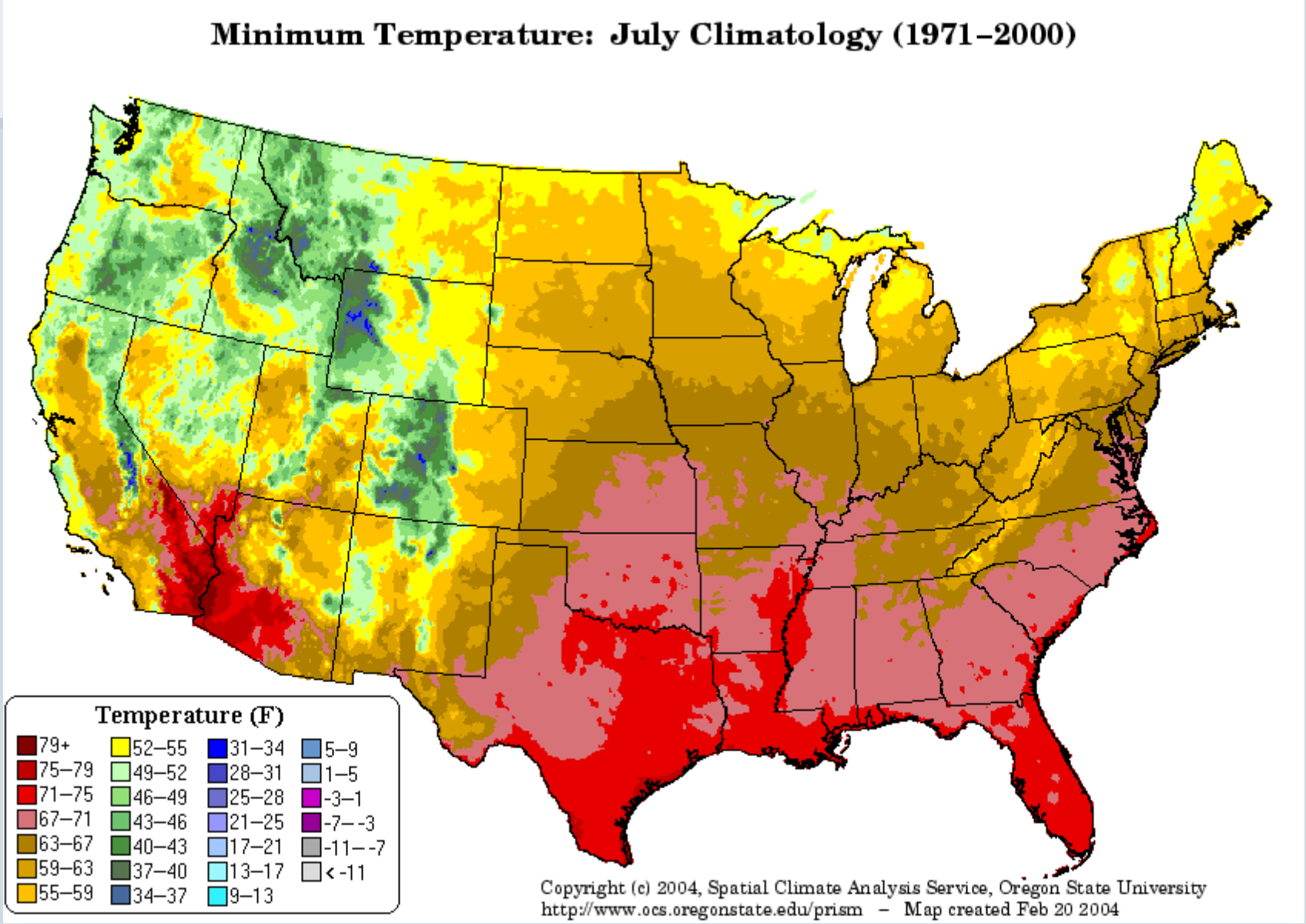
Average Temperatures: Selected Eastern Colorado Locations



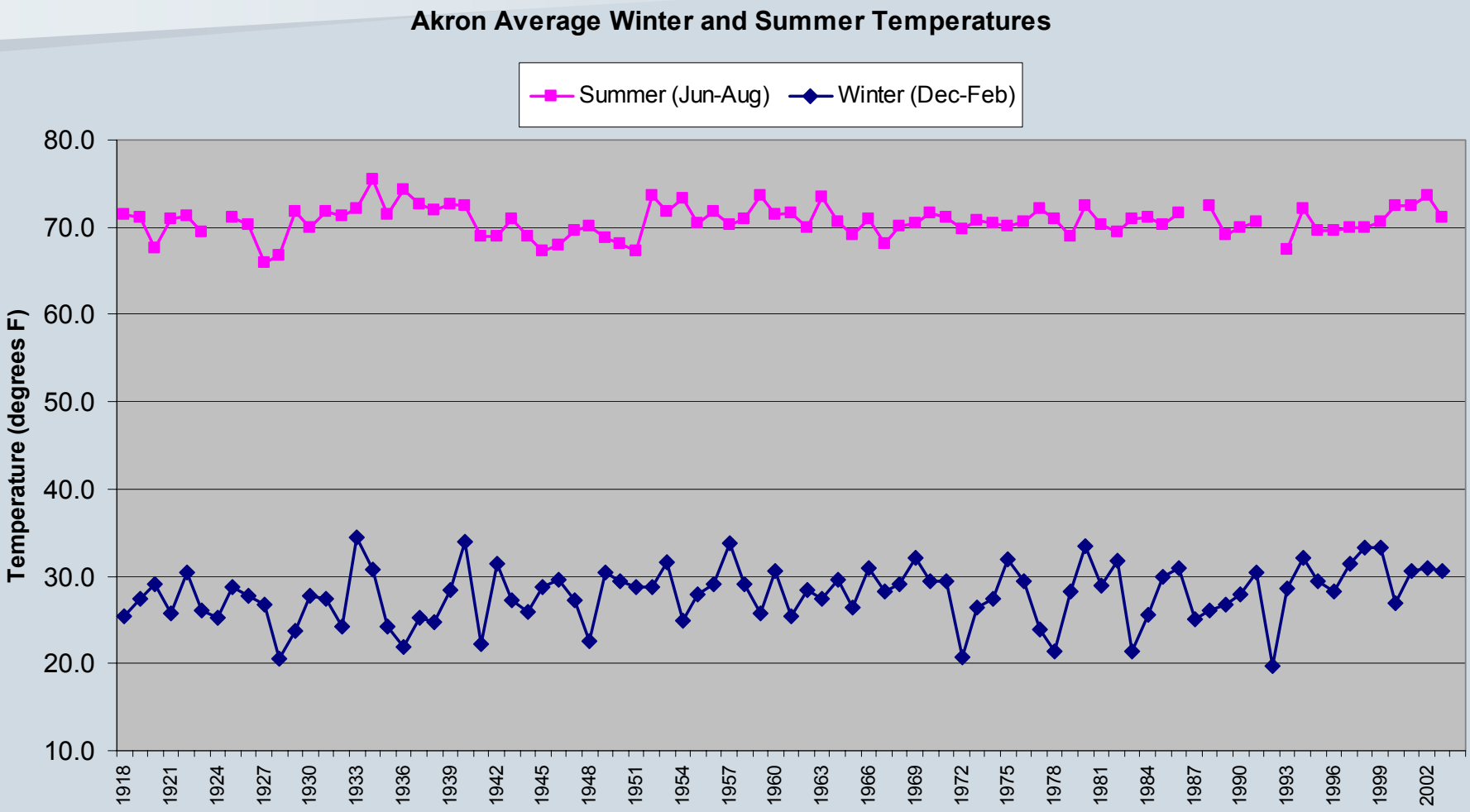
Summer Temperature Perspective



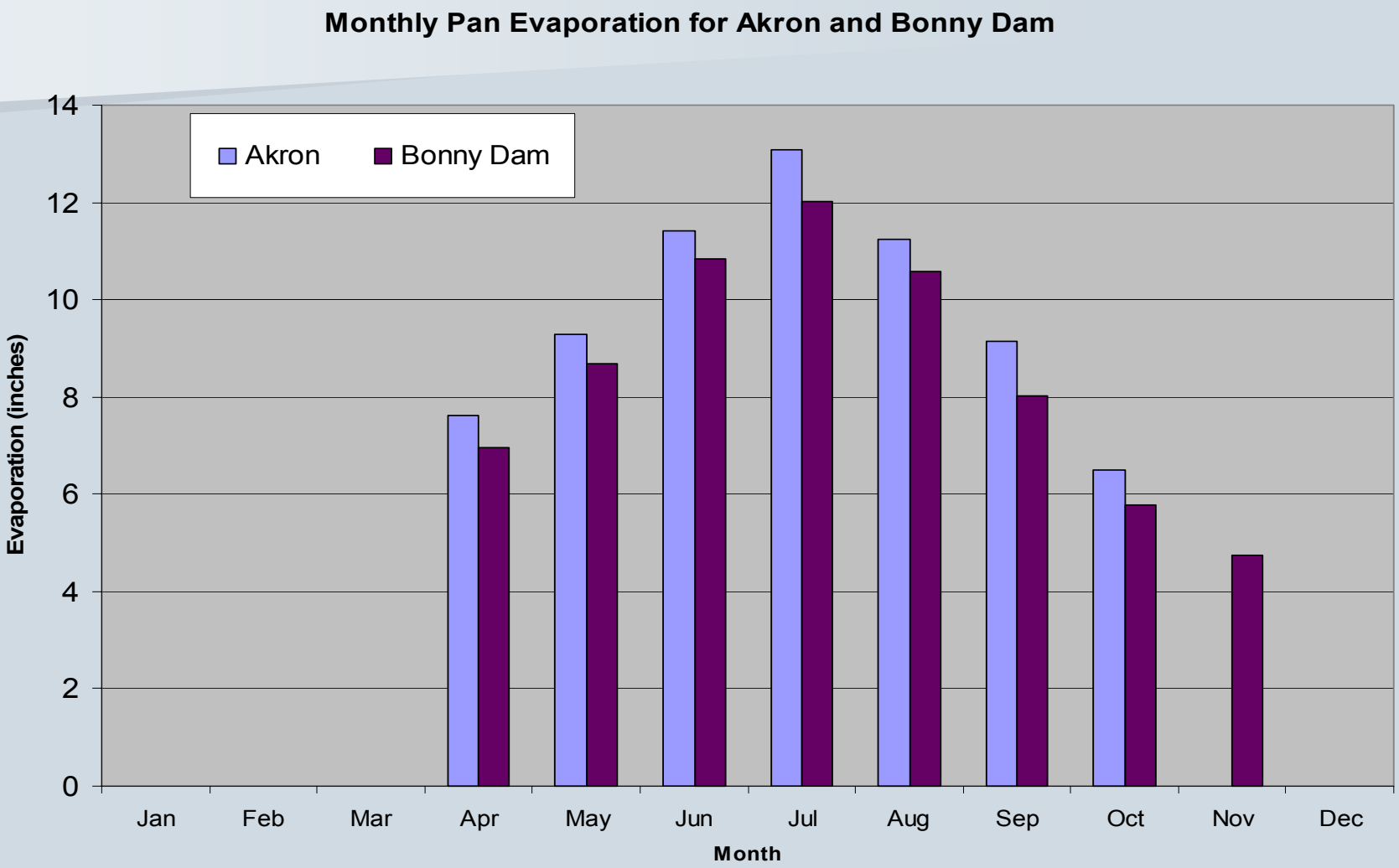
Summer Temperature Perspective



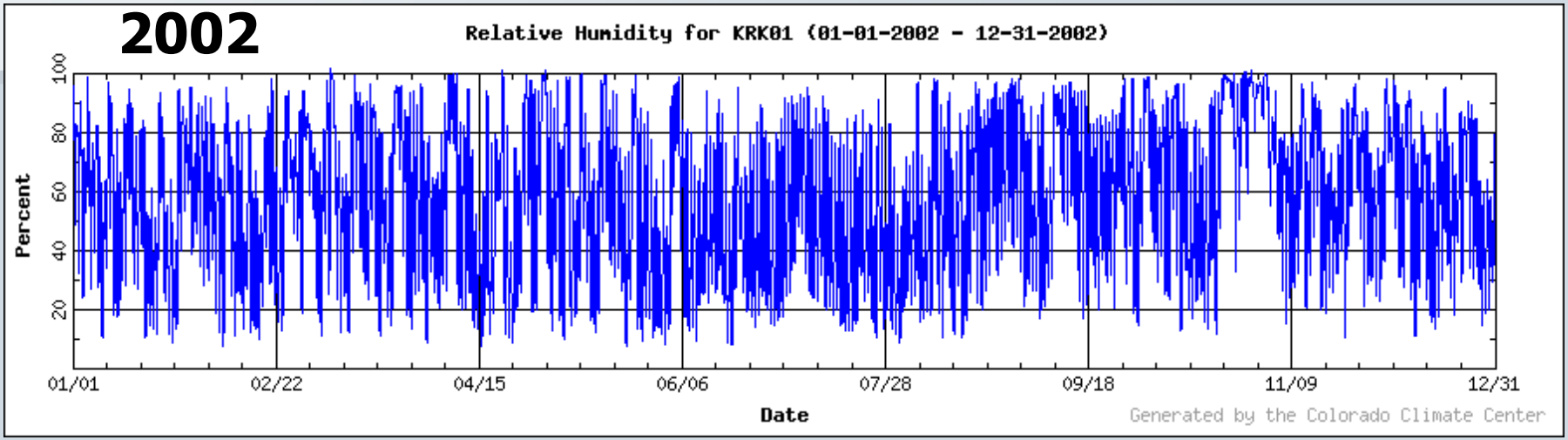
Akron Average Winter and Summer Temperature Comparison

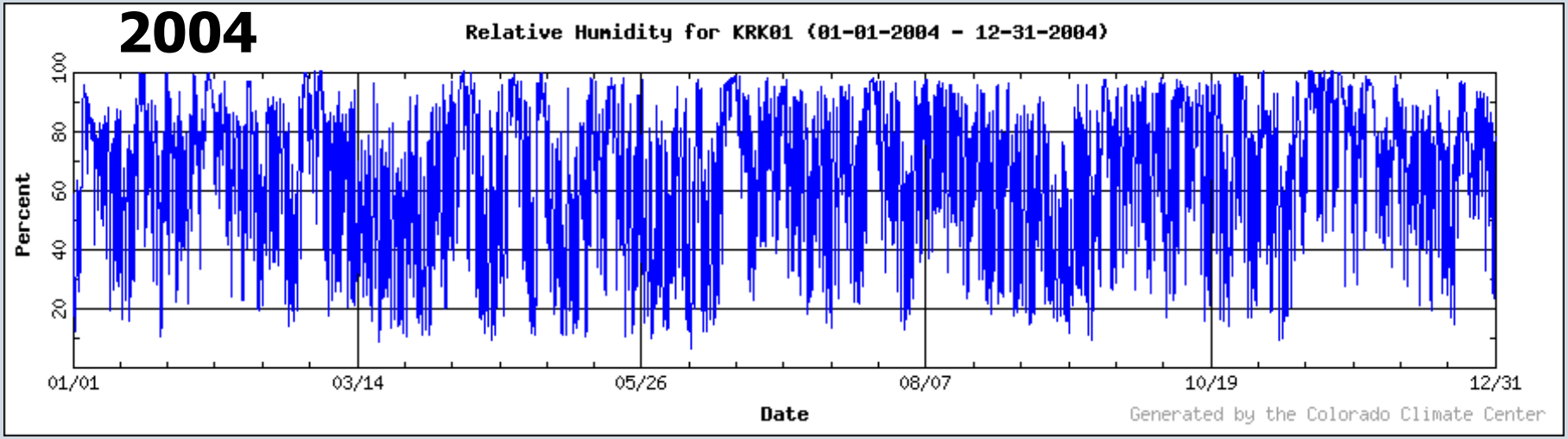


Mean Monthly Pan Evaporation

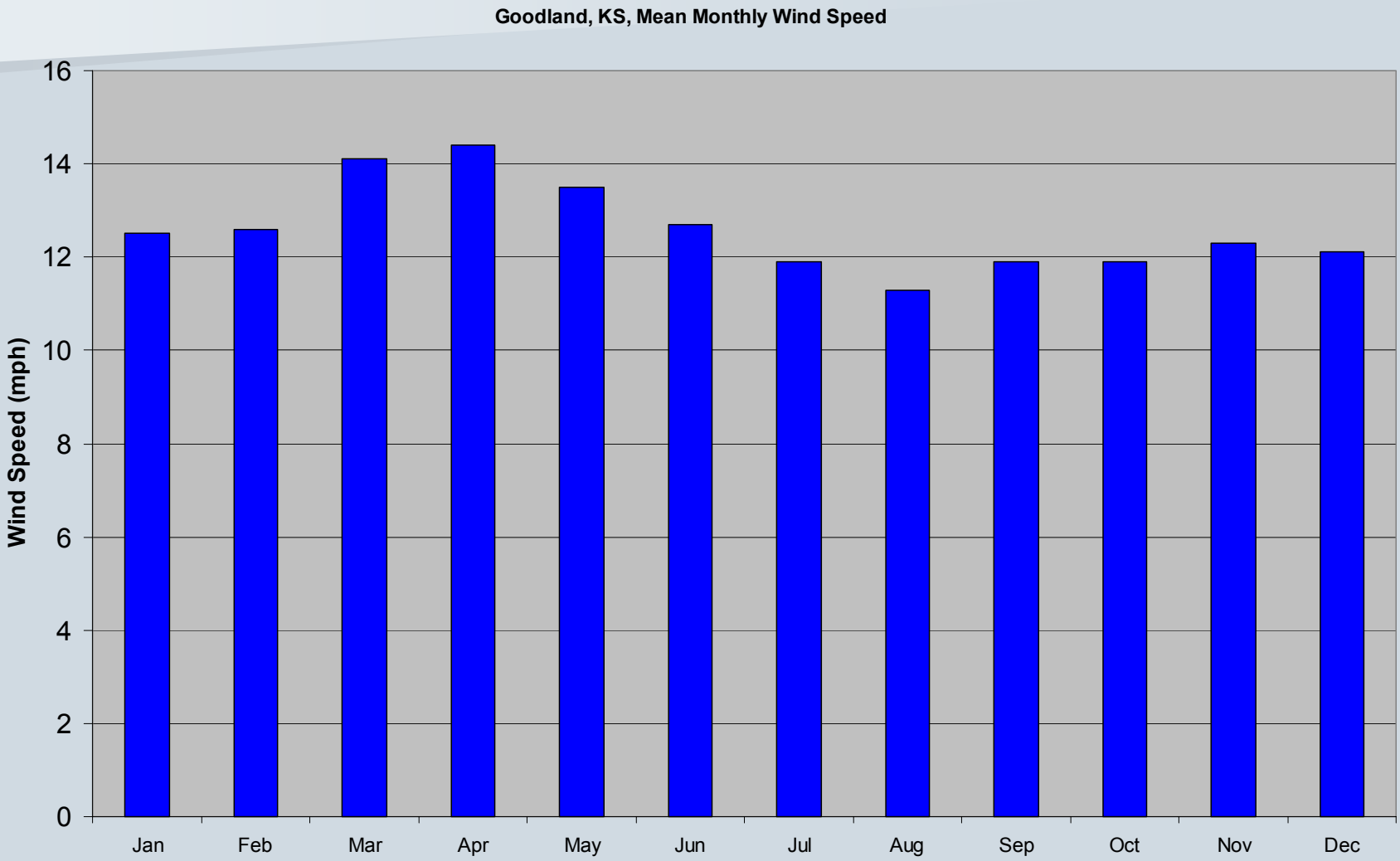


Relative Humidity for Kirk, Colo.





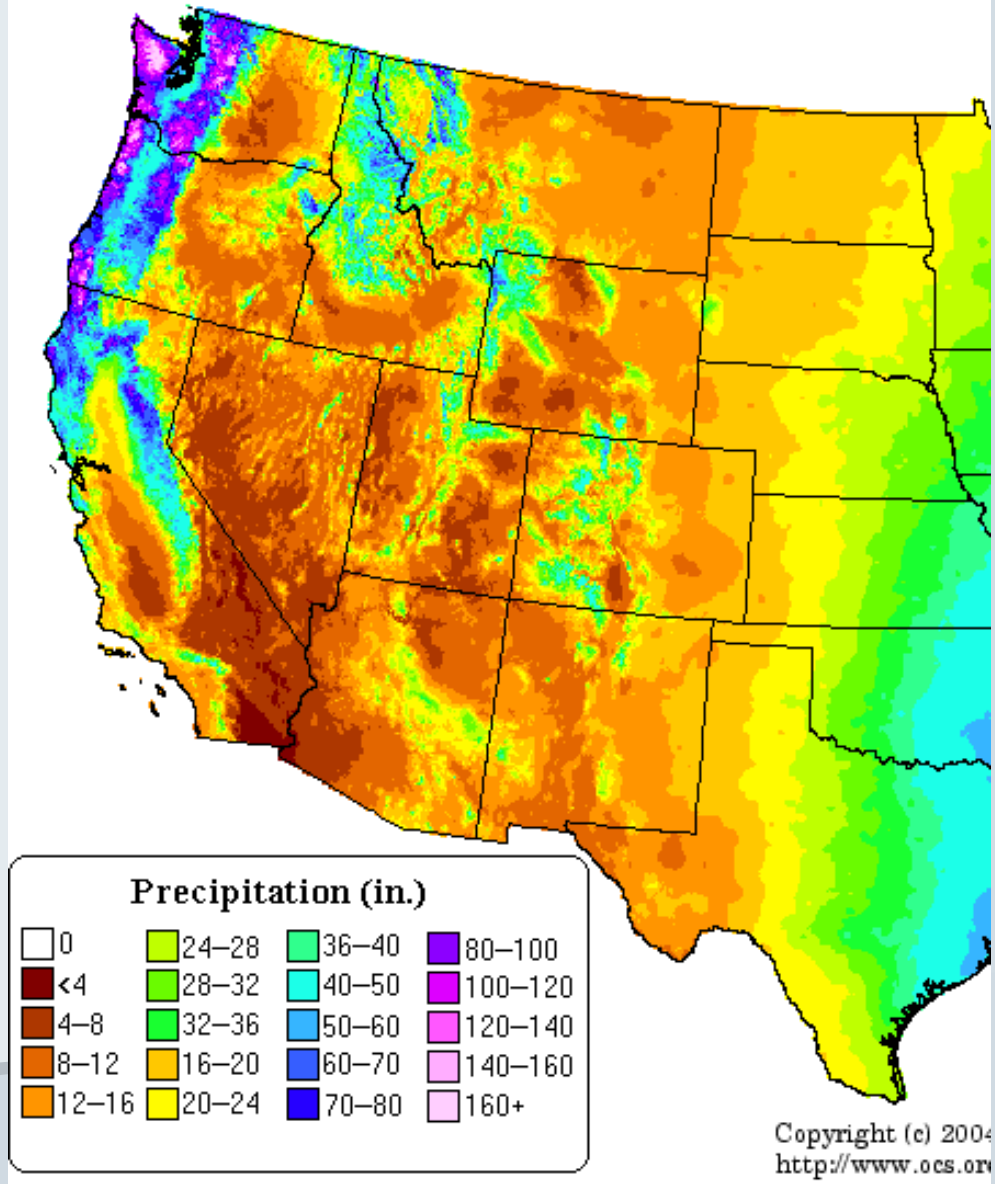
Goodland, KS, Average Wind Speed



Precipitation

Strasburg, Colo, Photo by Ian Wittmeyer

Precipitation: Annual Climatology (1971-2000)



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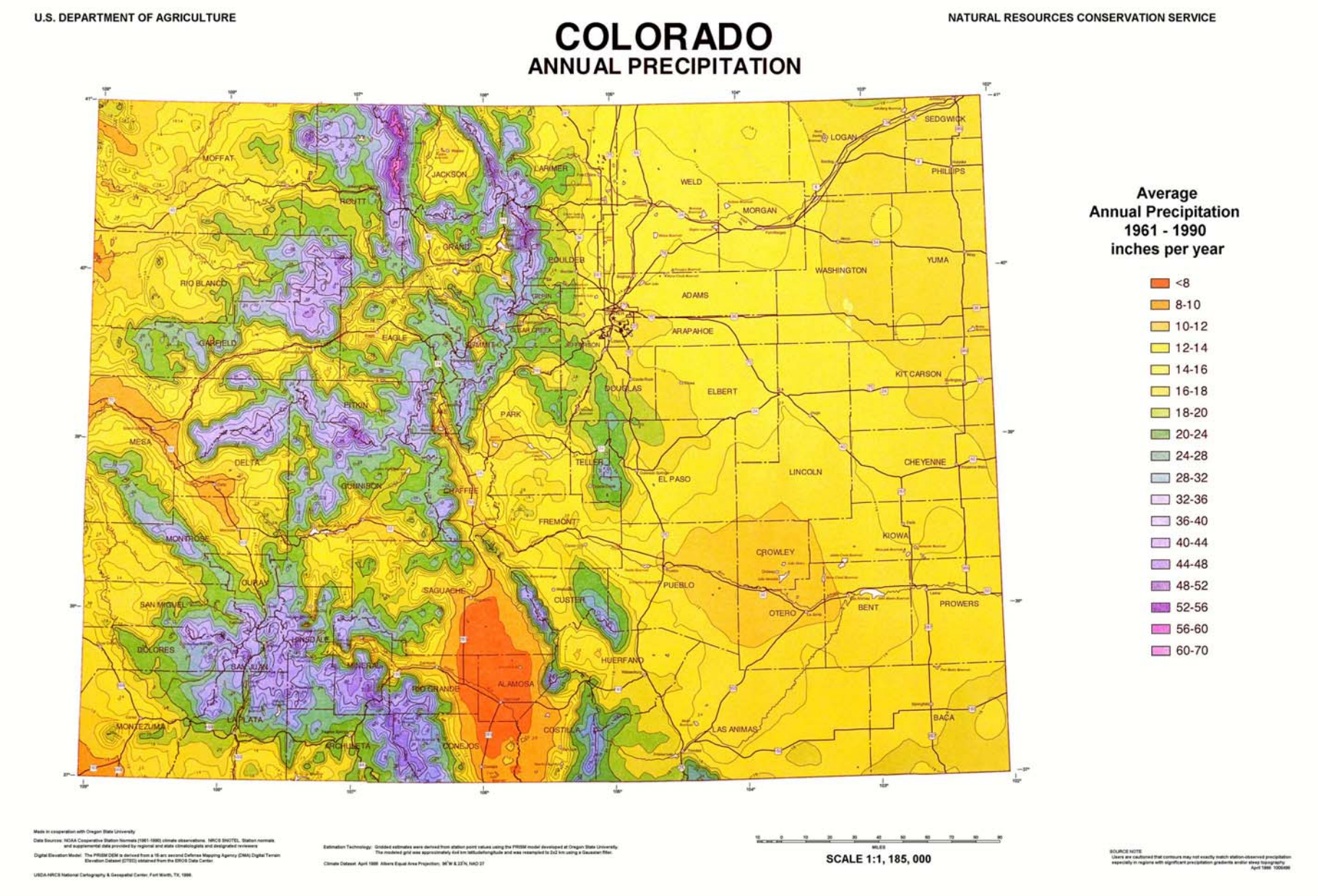
http://www.ocs.oregonstate.edu/prism - Map created Feb 20 2004

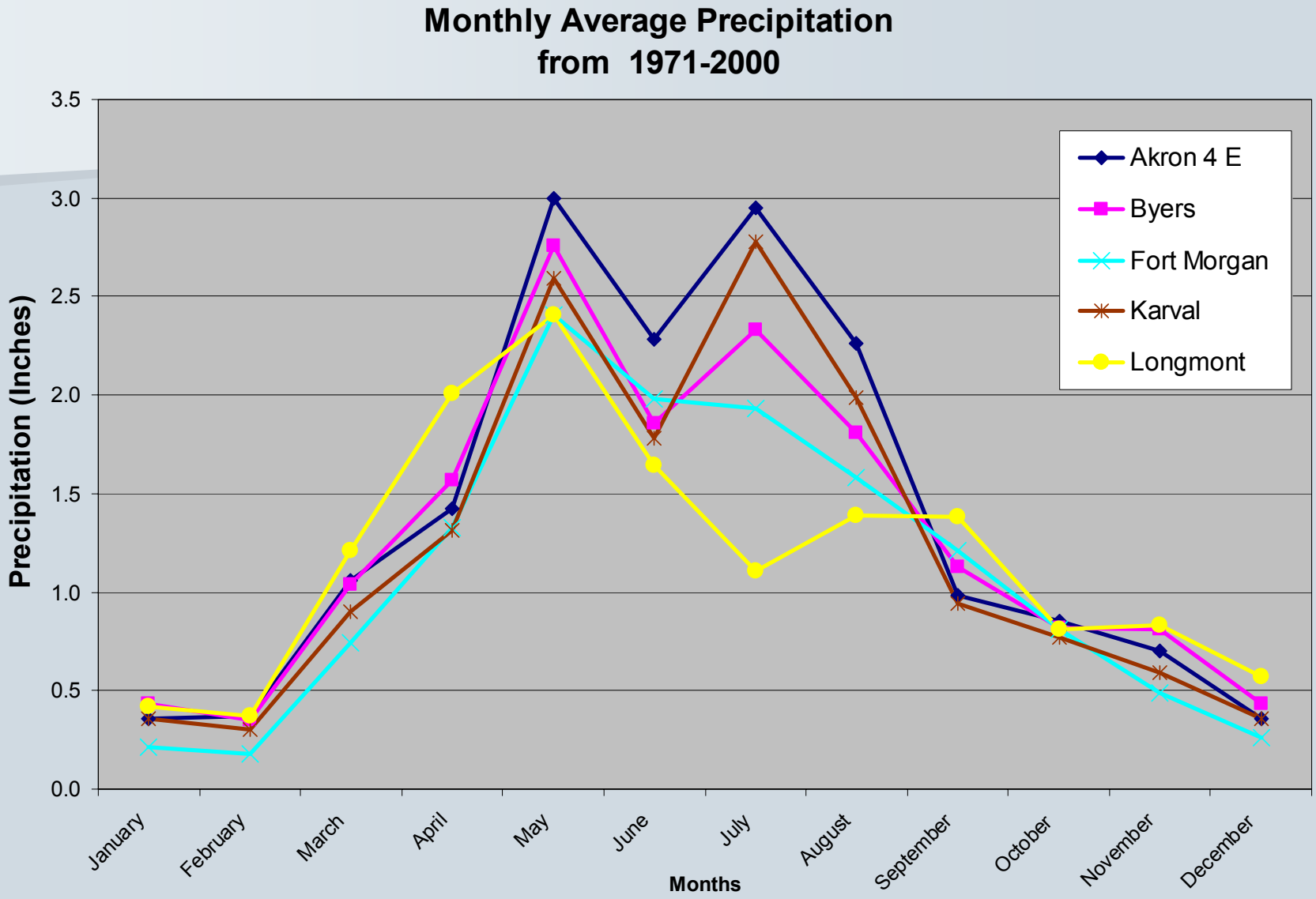
Colorado Average Annual Precipitation



Precipitation

- Highly seasonal, but seasonal pattern varies with topography
  - High mountains wet in winter-spring and again in later summer
  - Foothills and eastern plains very dry in winter, wetter in spring and summer

Precipitation Averages for Selected Sites



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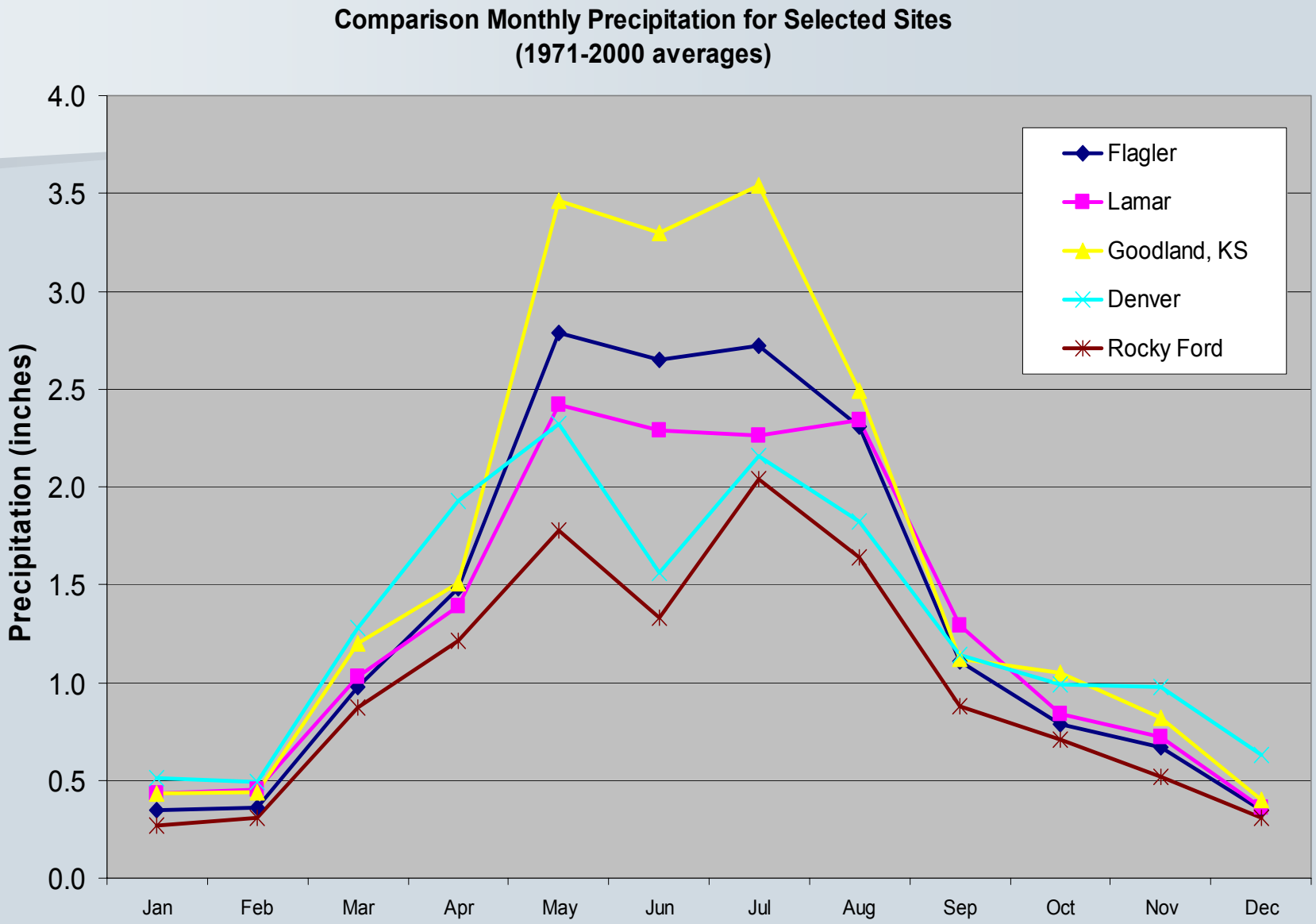
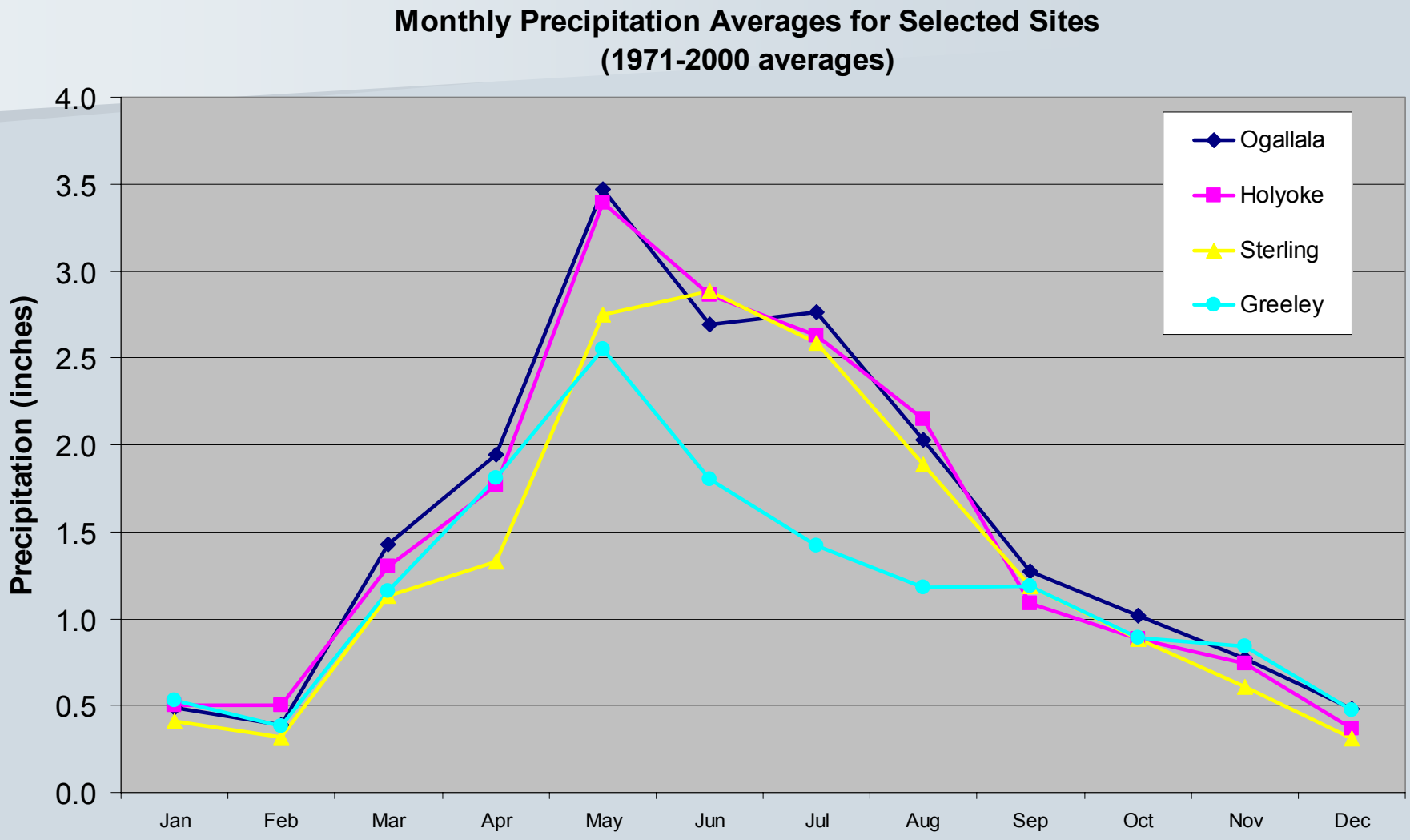


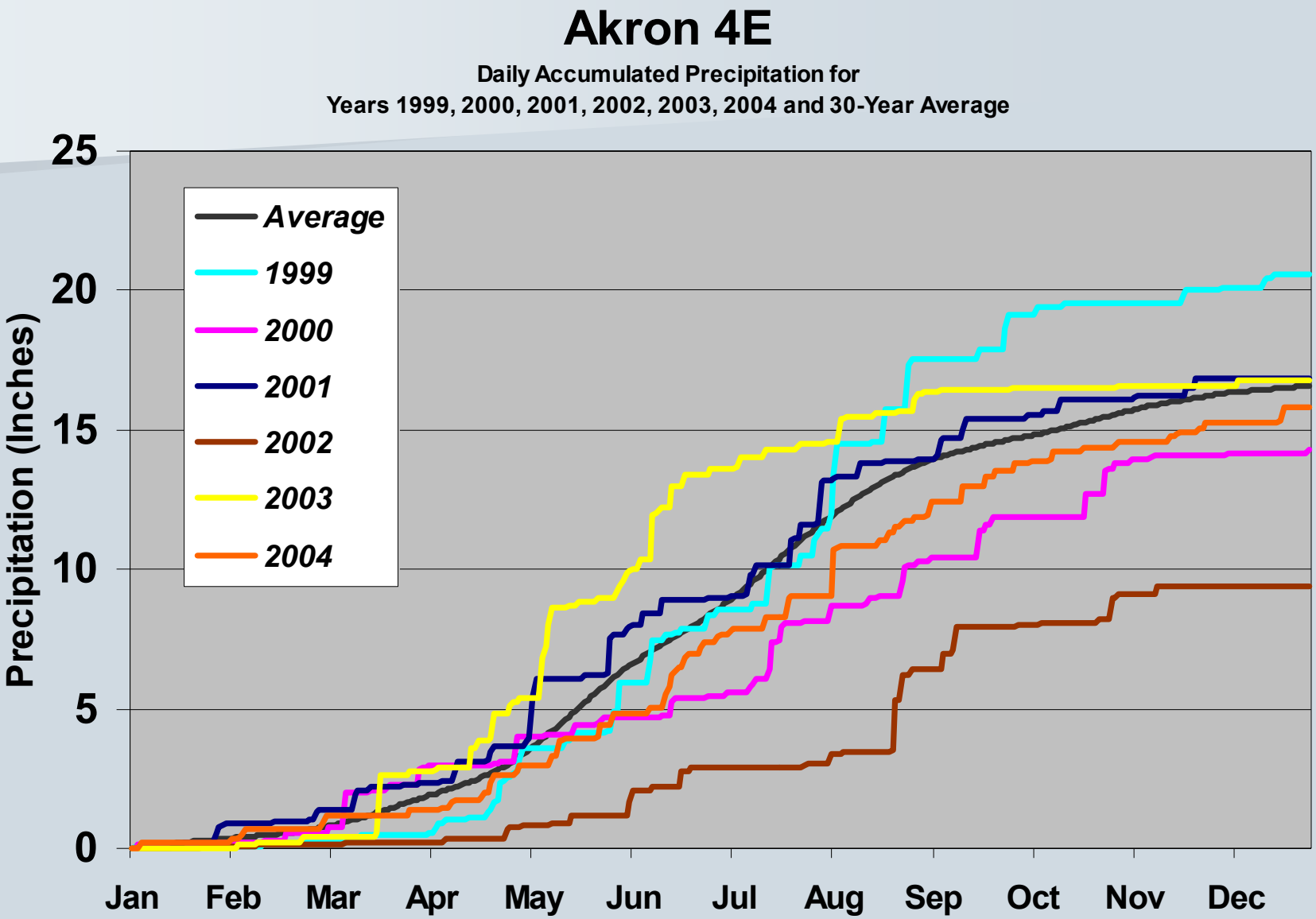
Precipitation Averages for Selected Sites



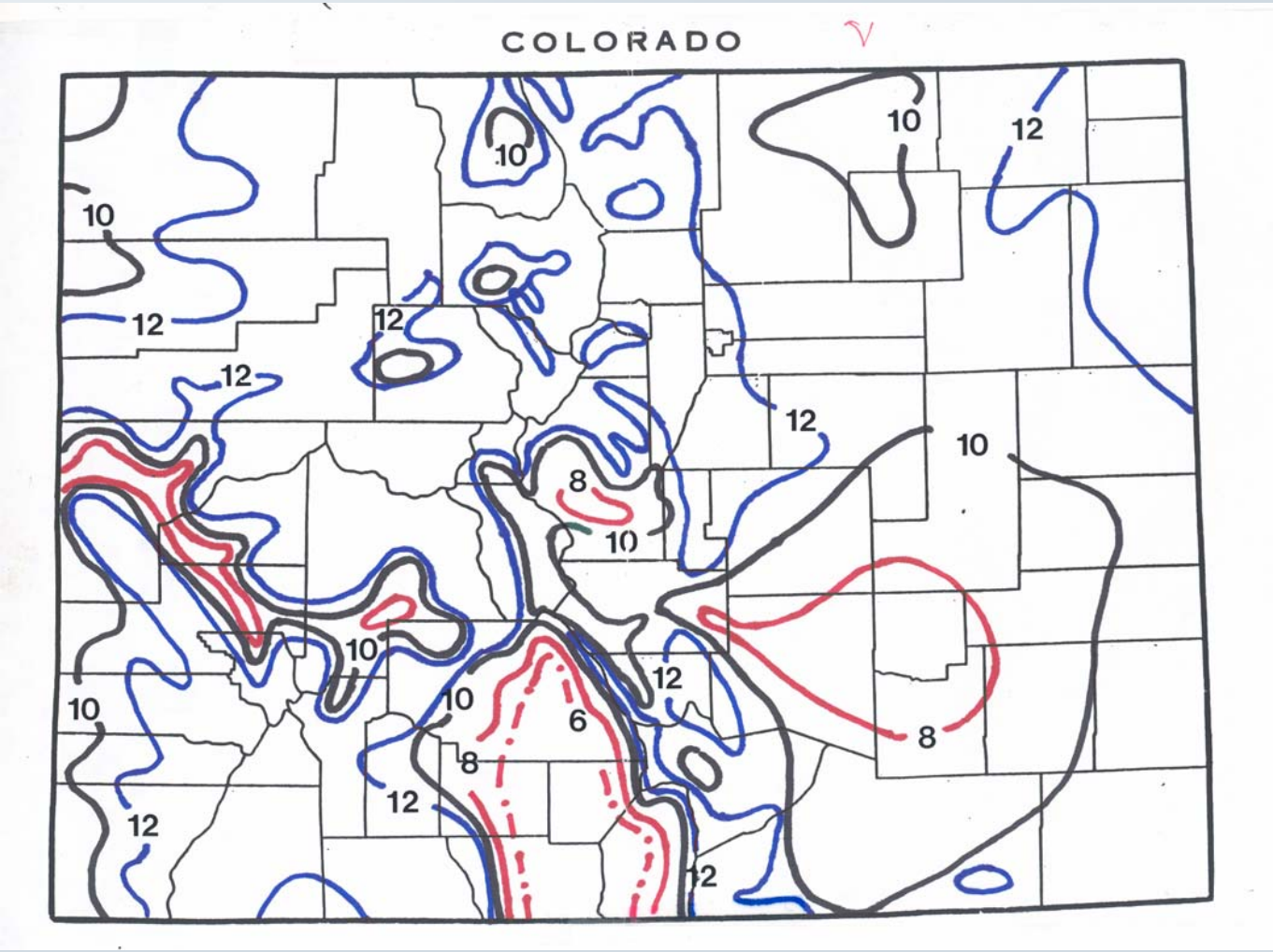
Precipitation

- A few storms contribute a large fraction of annual precipitation while many small events contribute a small fraction.

Akron Daily Accumulated Precipitation

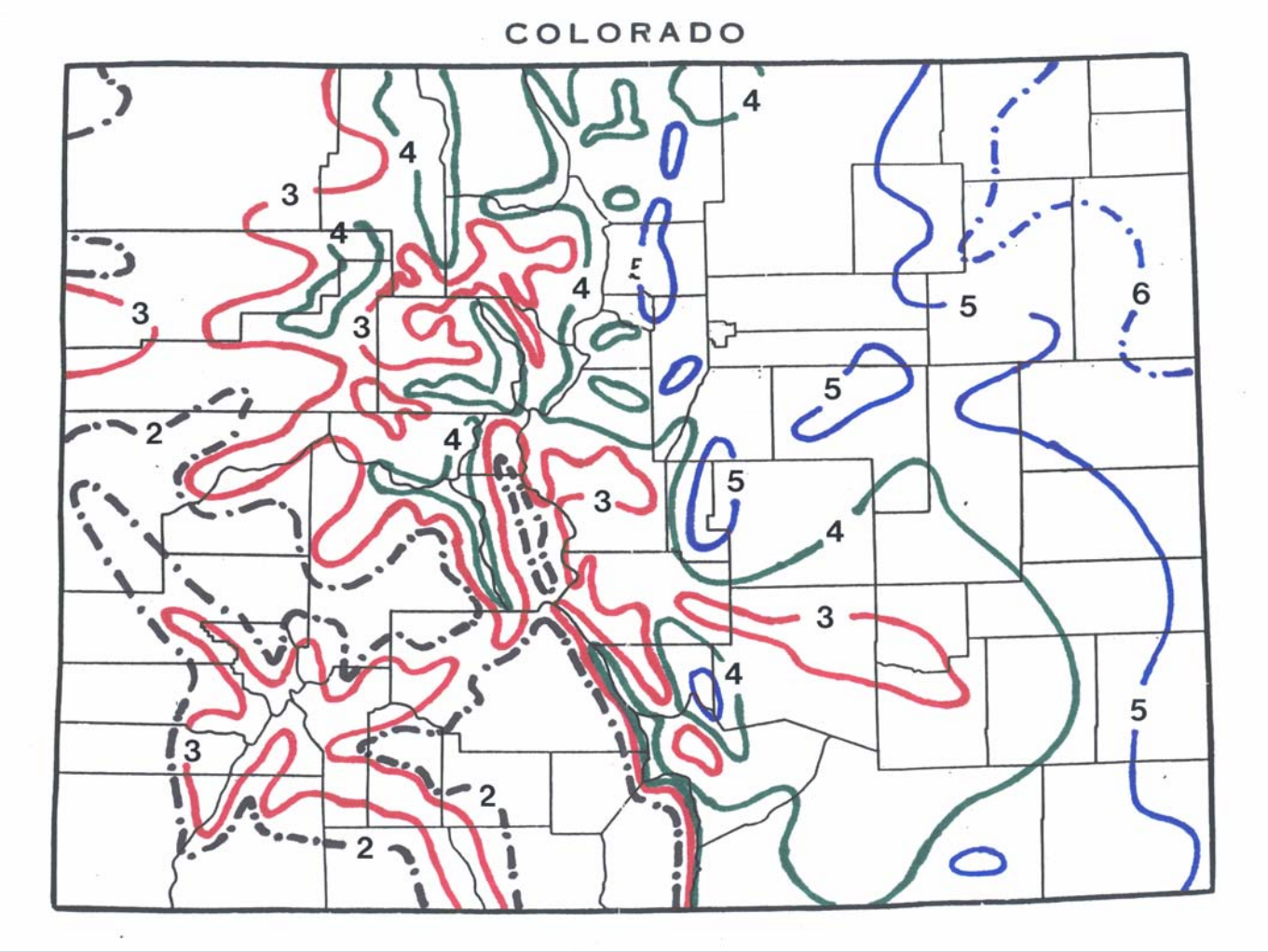


Average Wheat-Season Precipitation September – June (Inches) (Based on 1961-90 observed data)

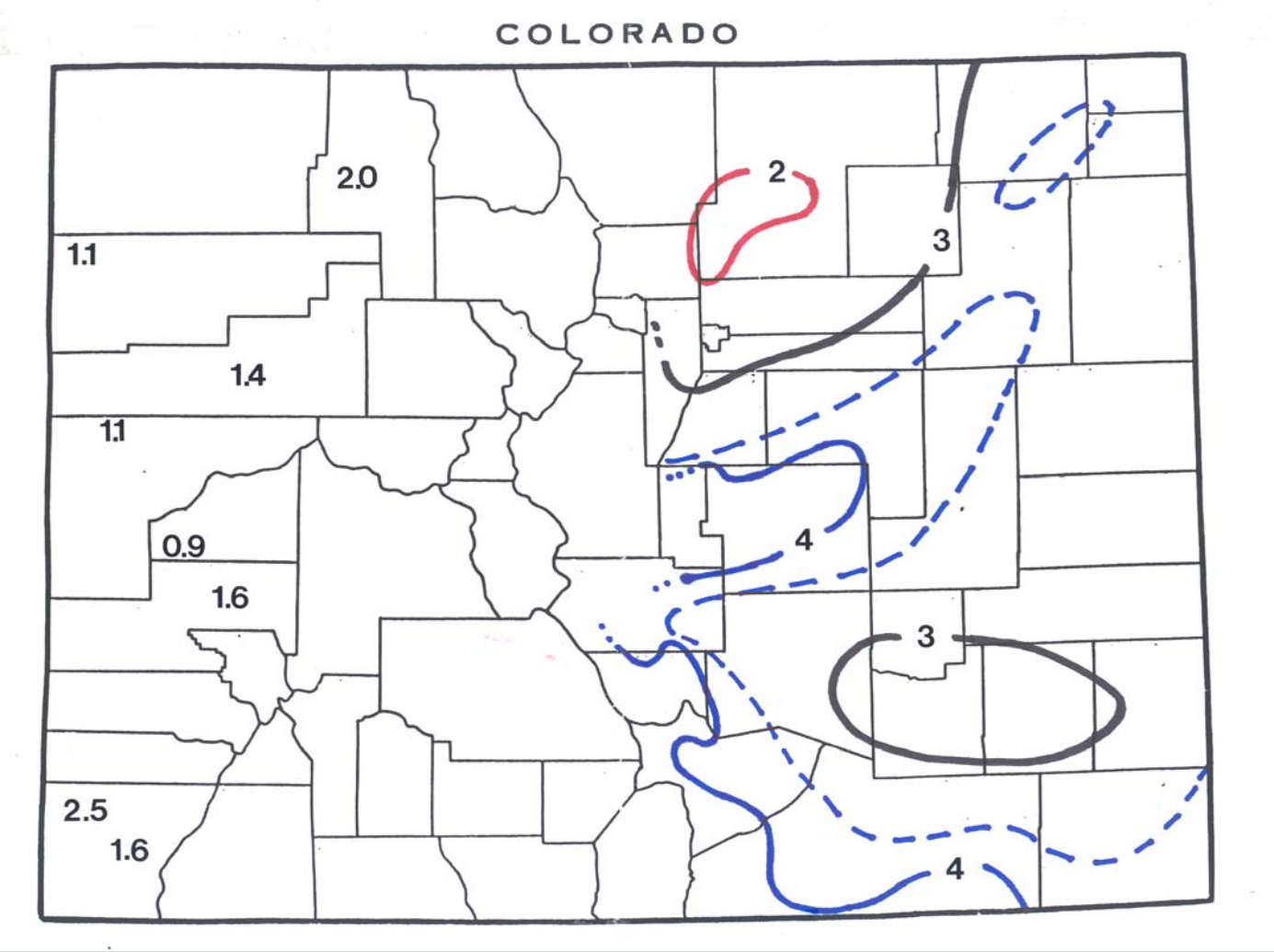


Provided by the Colorado Climate Center

Average May-June Precipitation (Inches) (Based on 1961-90 observed data)



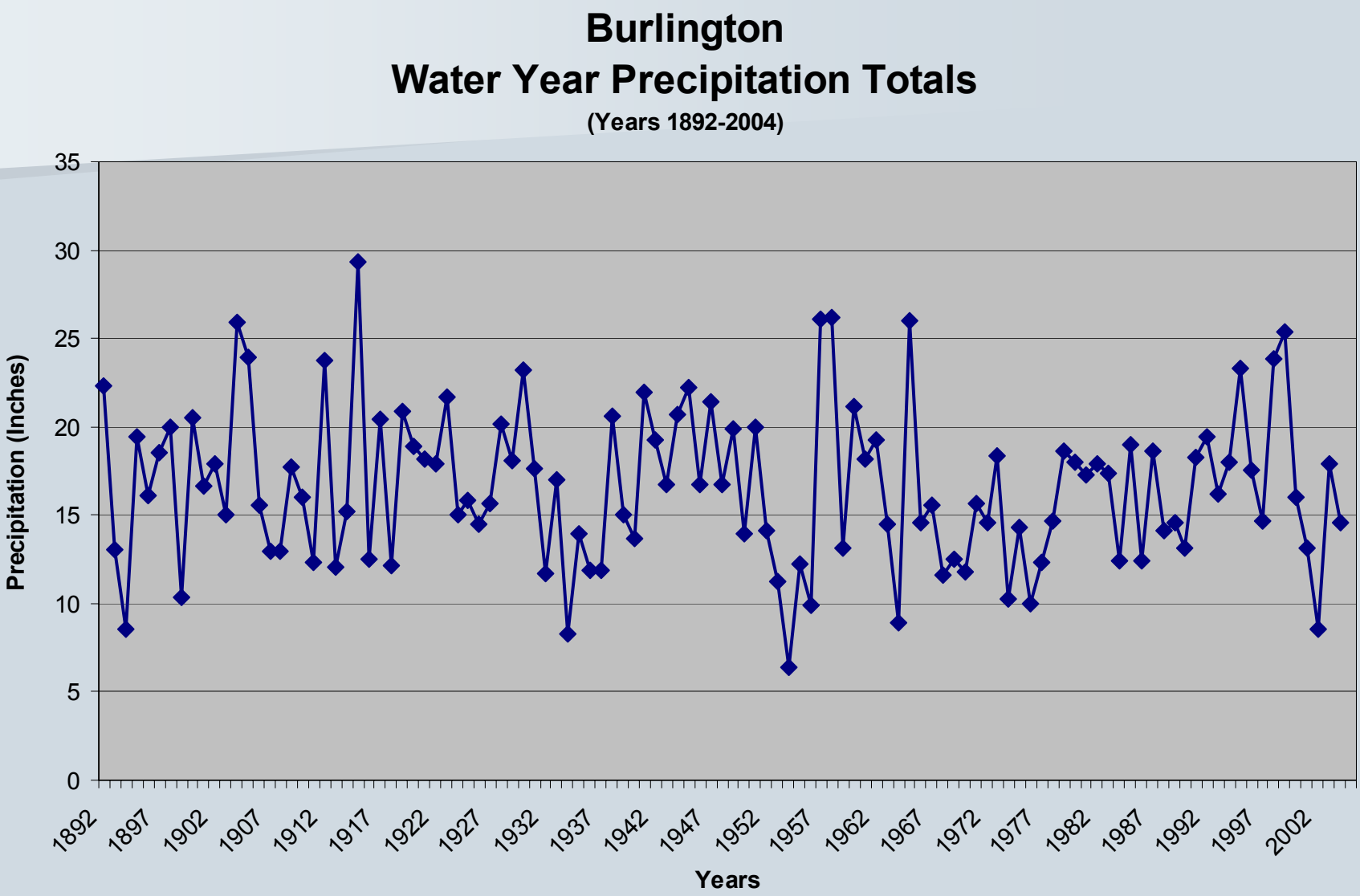
Average Precipitation (Inches) For the Period 15 July – 25 August (Based on 1961-1990 observed data)



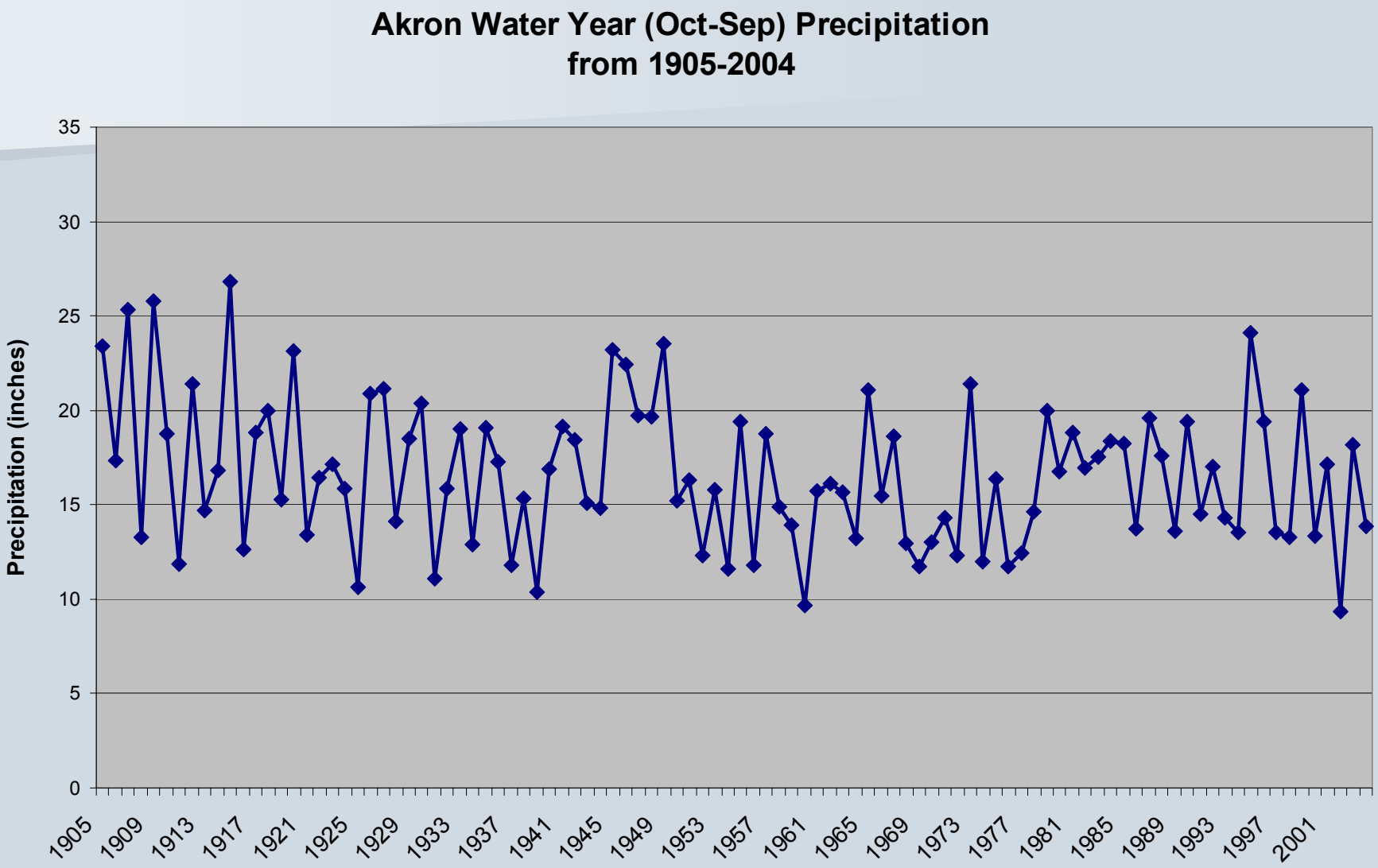
Precipitation

- No two years are ever the same.
- Annual precipitation varies greatly from year to year.

Burlington Water Year Precipitation Totals

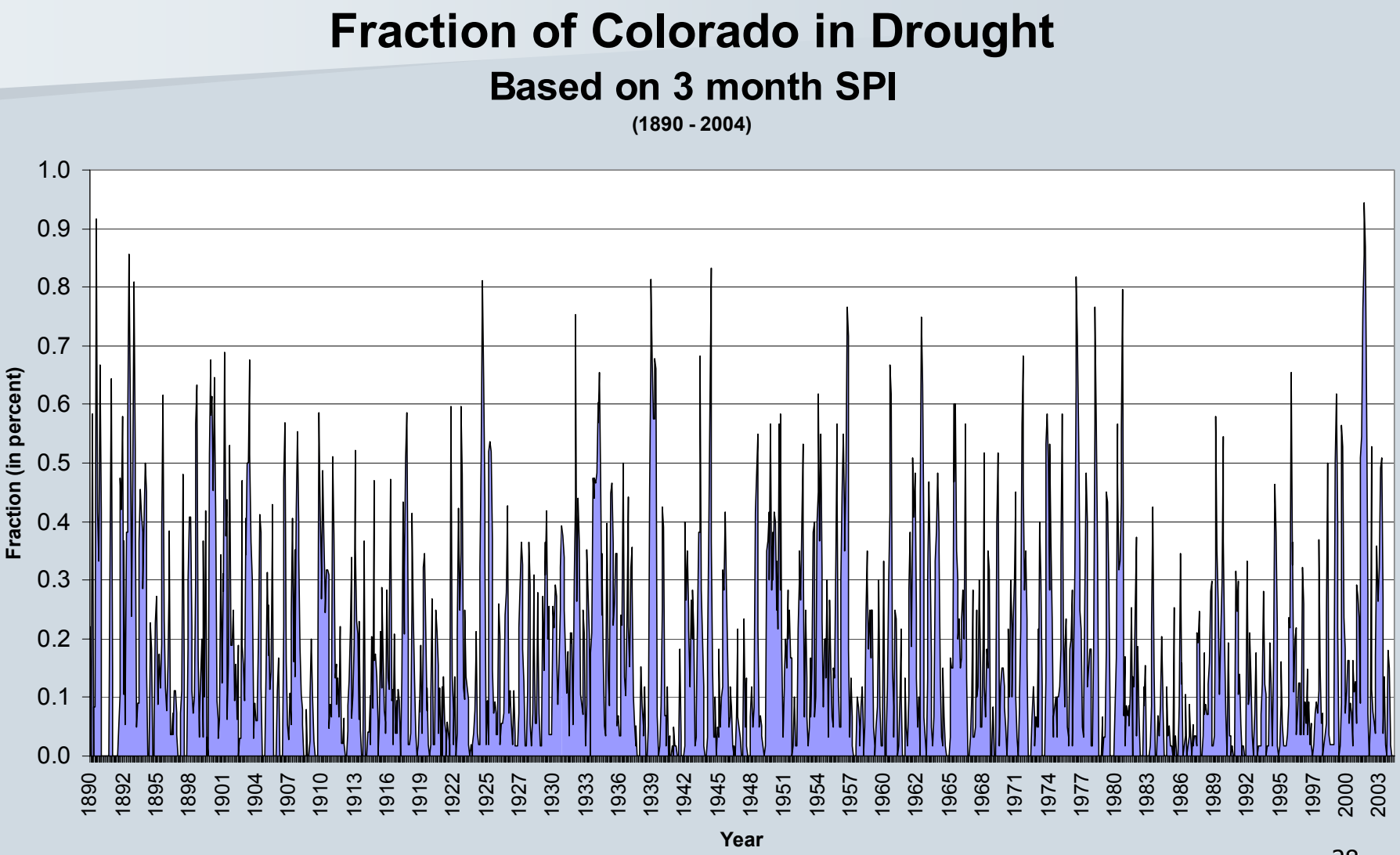


Akron Water Year Precipitation Totals



What's the Status of Drought Now??

3-Month SPI


Fraction of Colorado in Drought
Based on 3 month SPI
(1890 - 2004)
Fraction (in percent)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
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0.2
0.1
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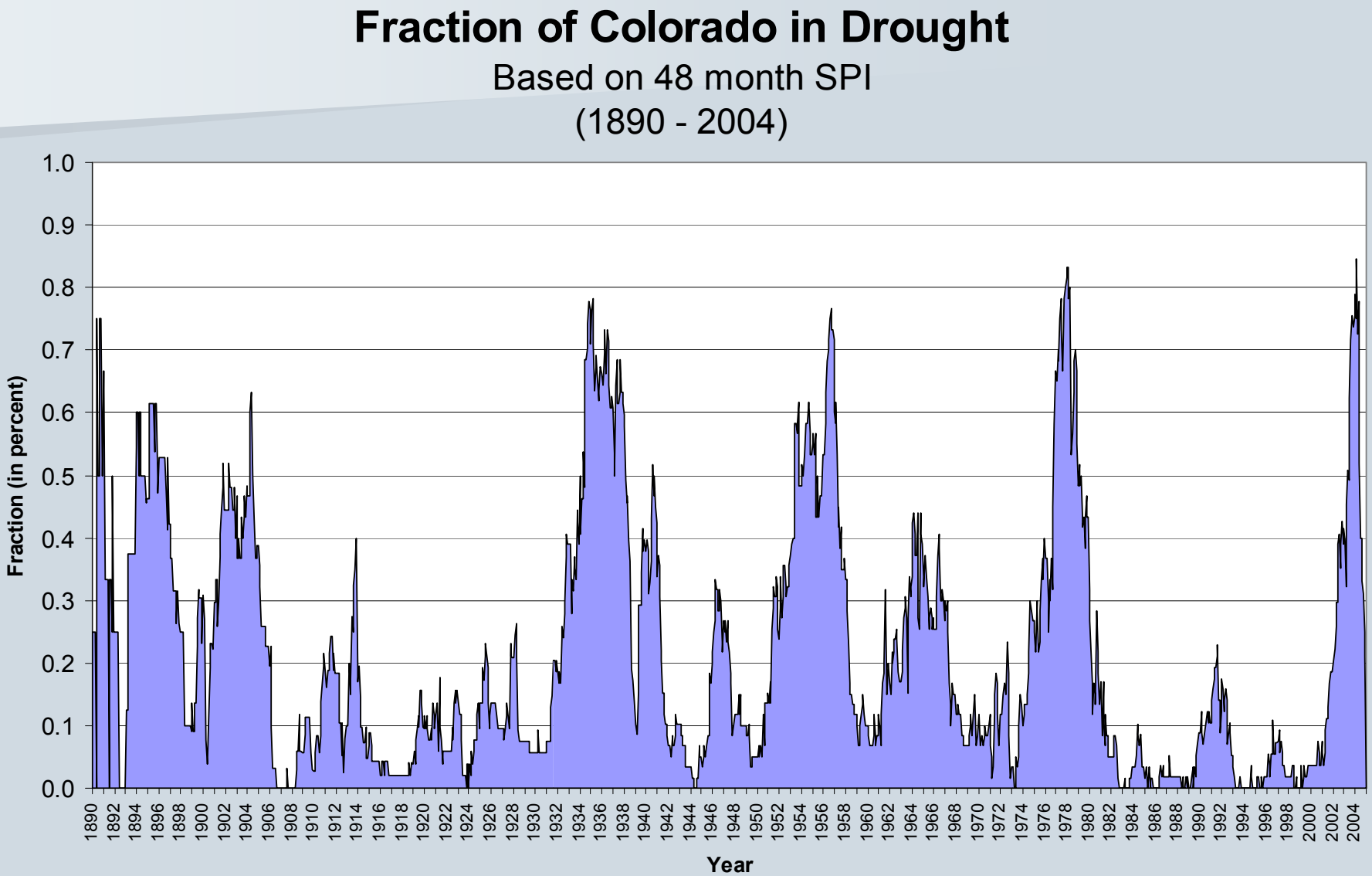
48-Month SPI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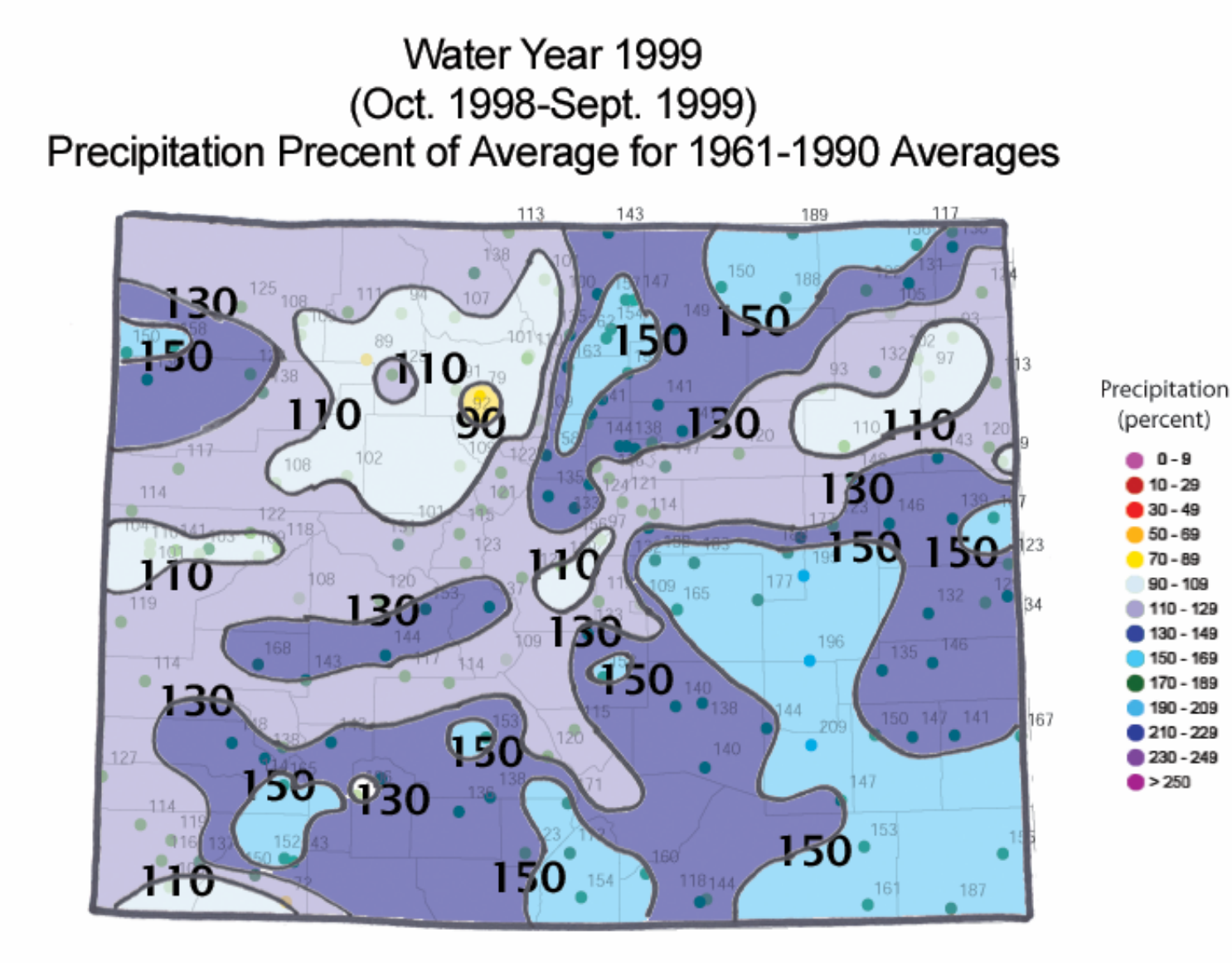
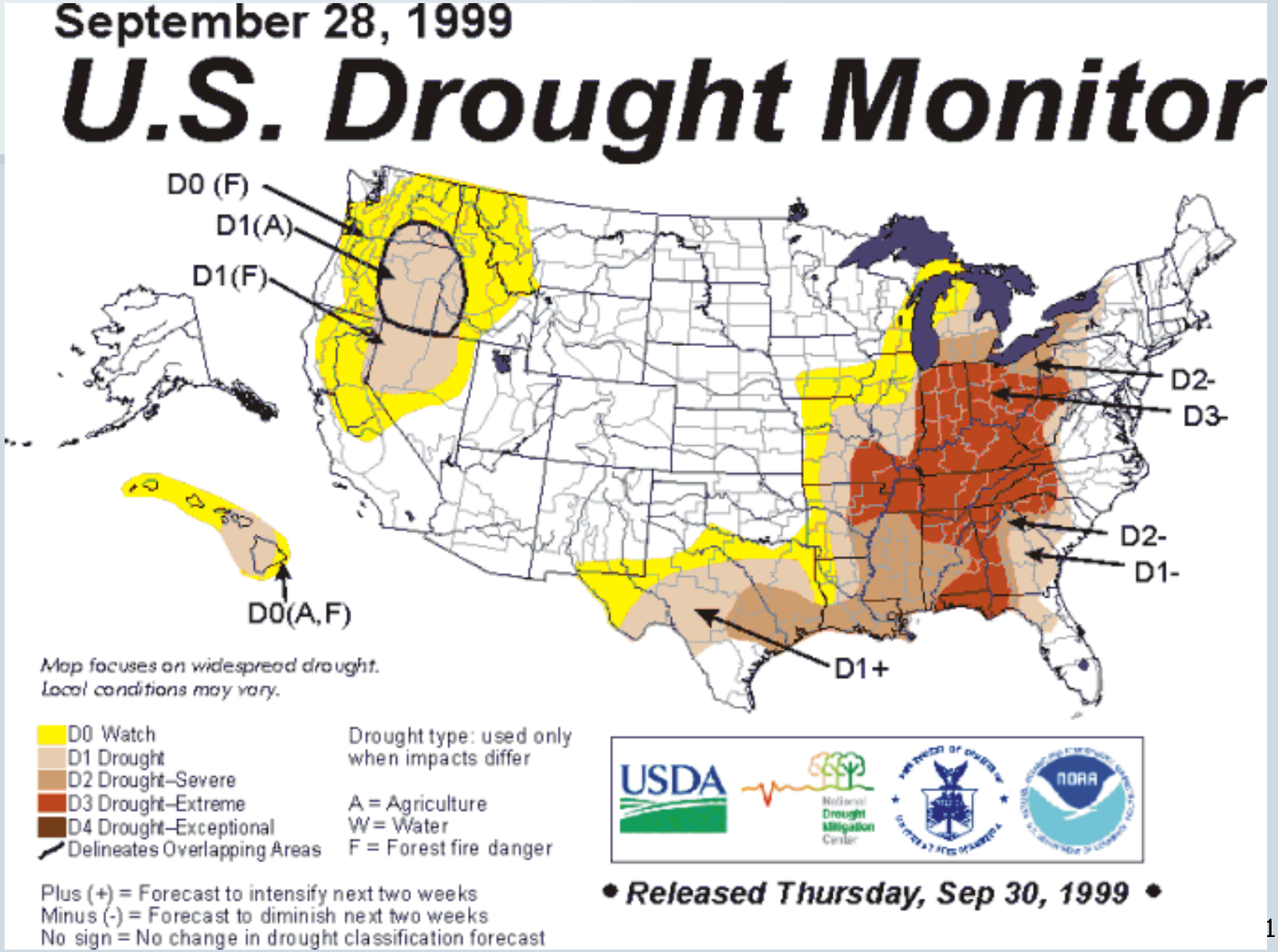
Year

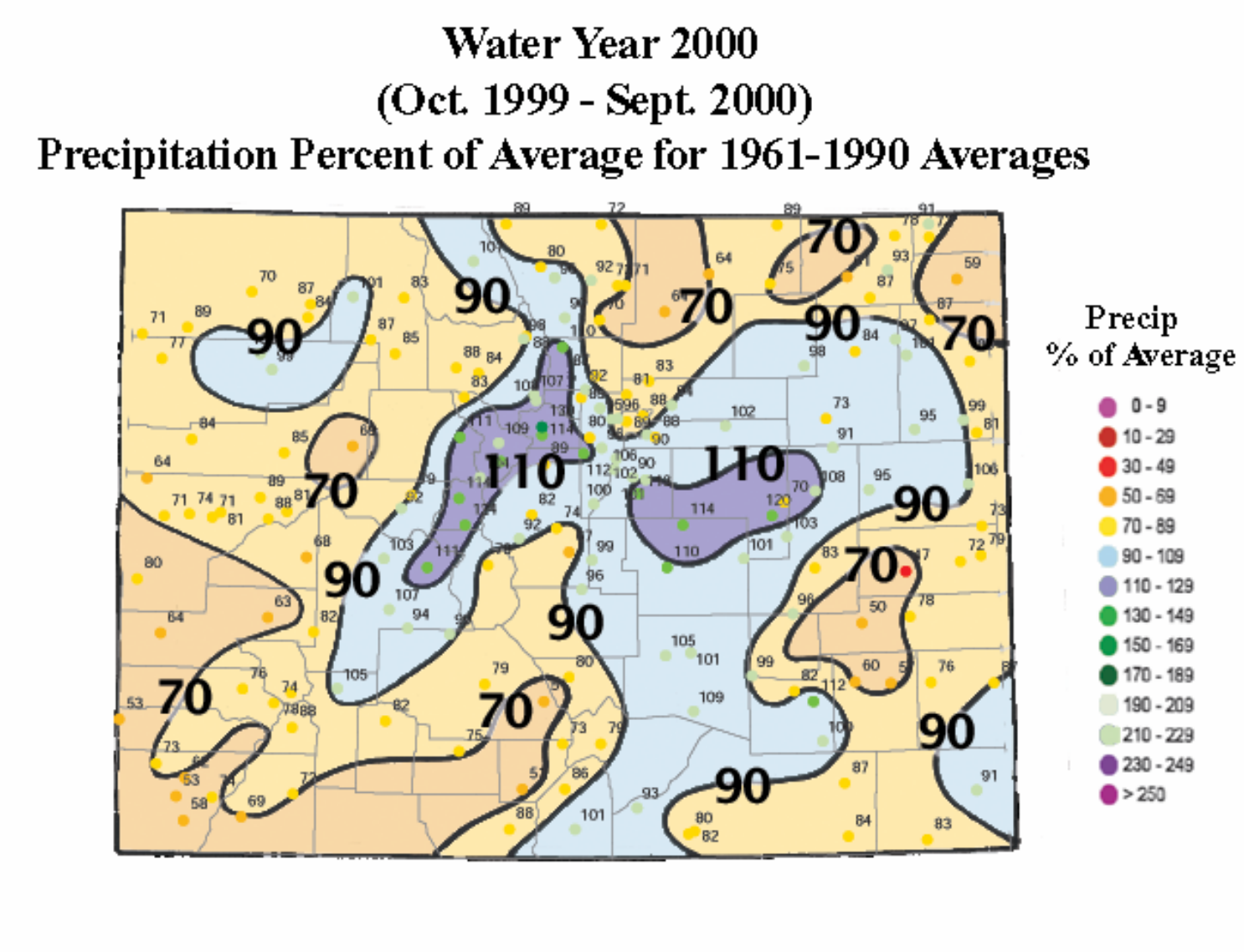
1999 Water Year Precipitation



September 1999 Drought Monitor Map



2000 Water Year Precipitation



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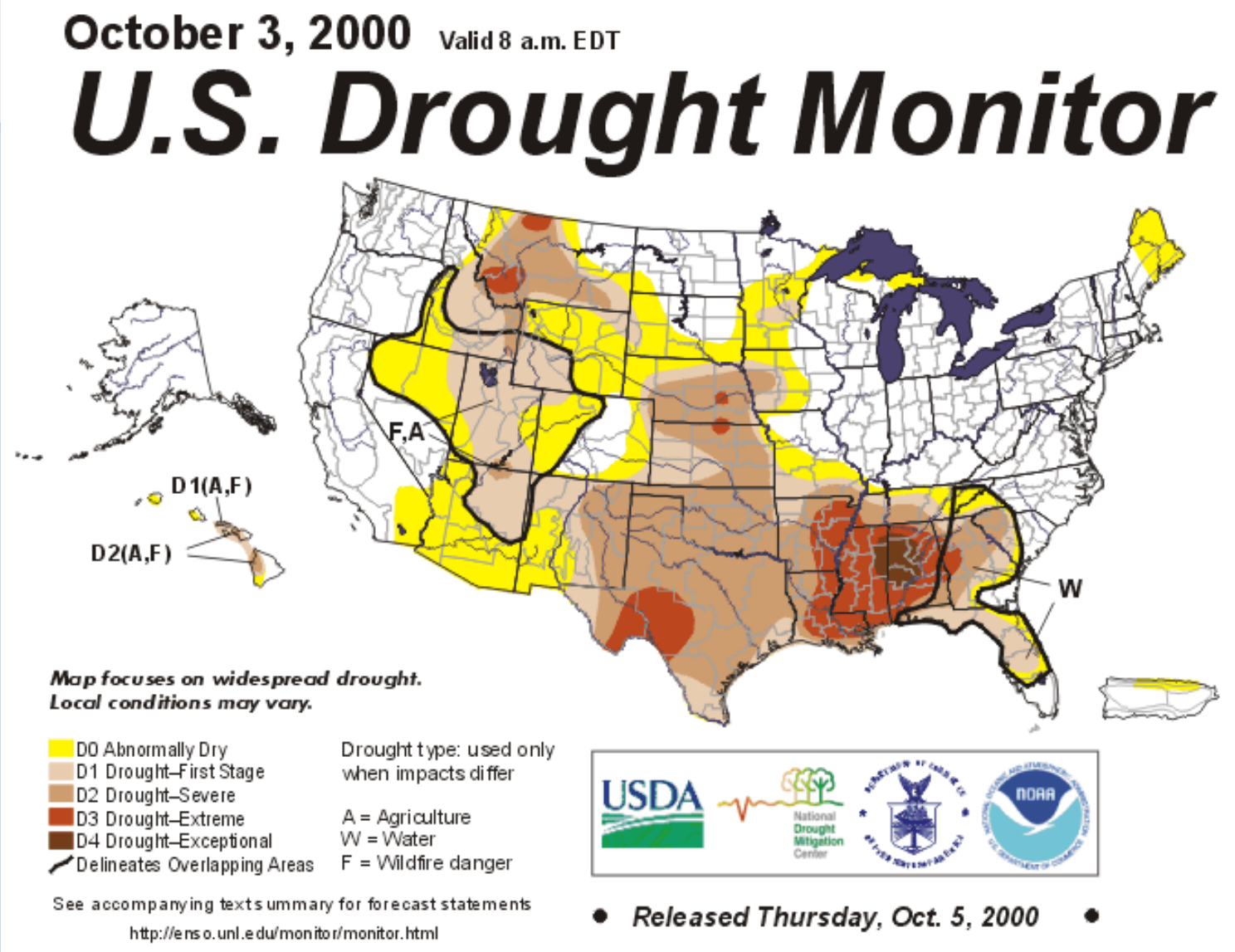
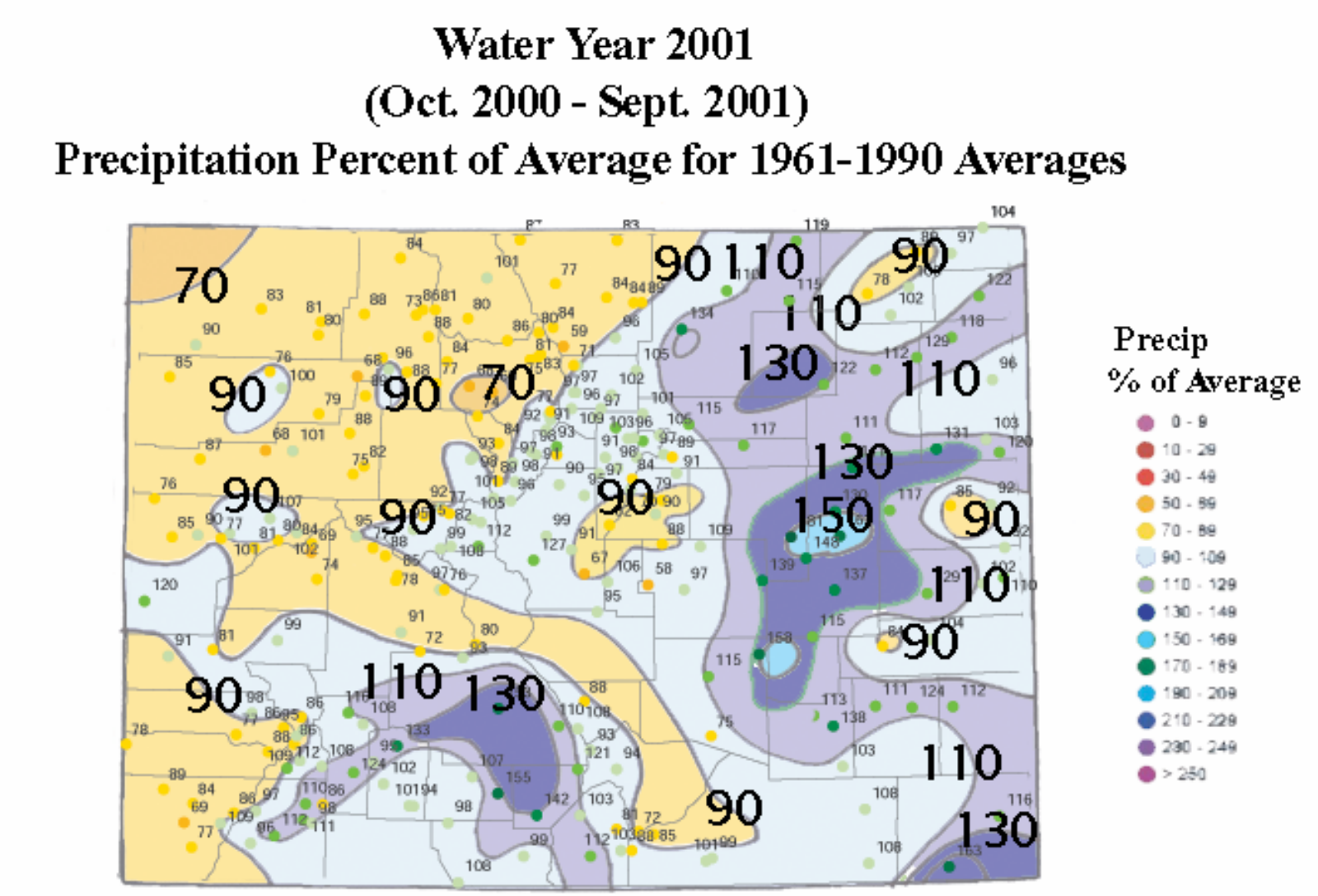
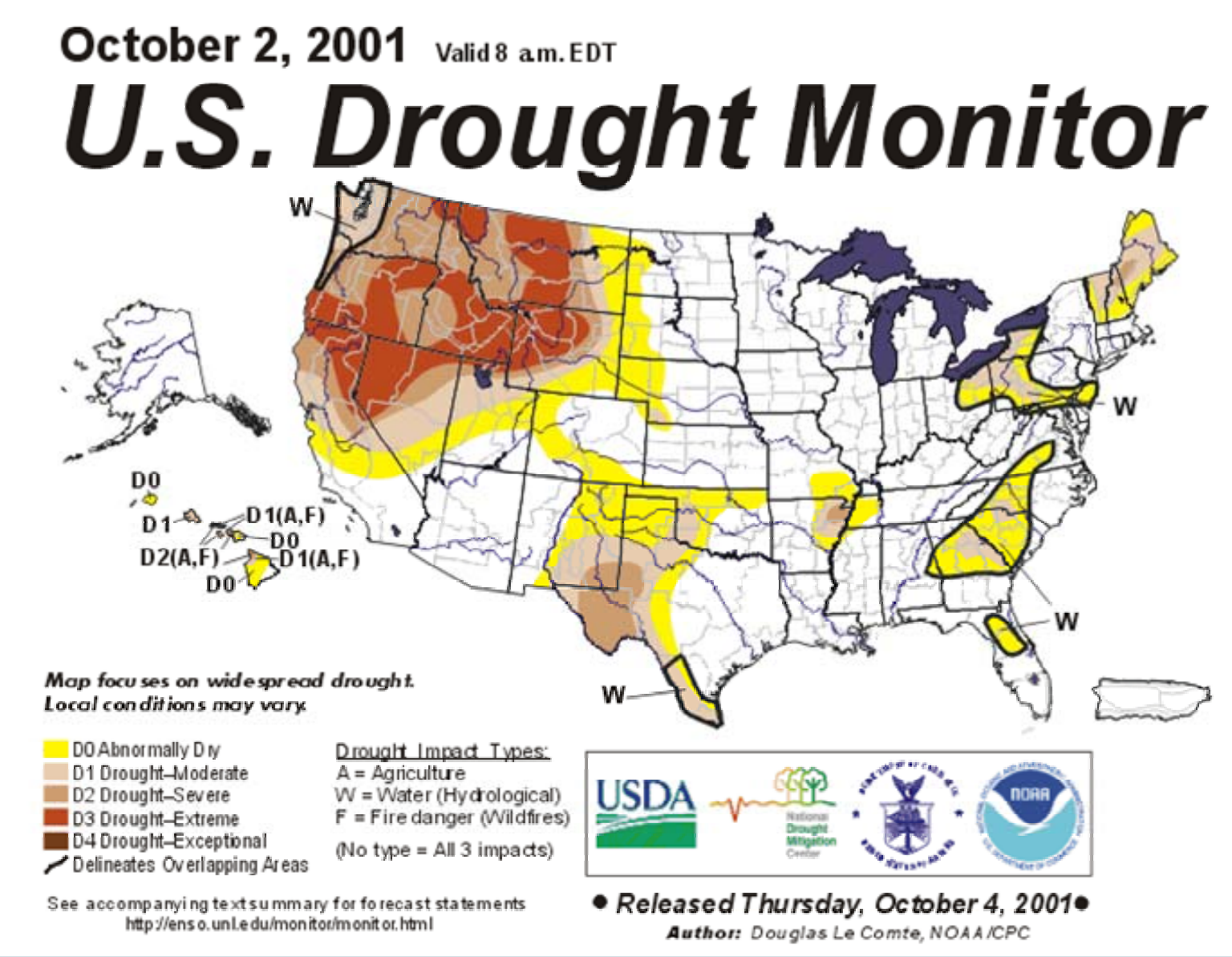


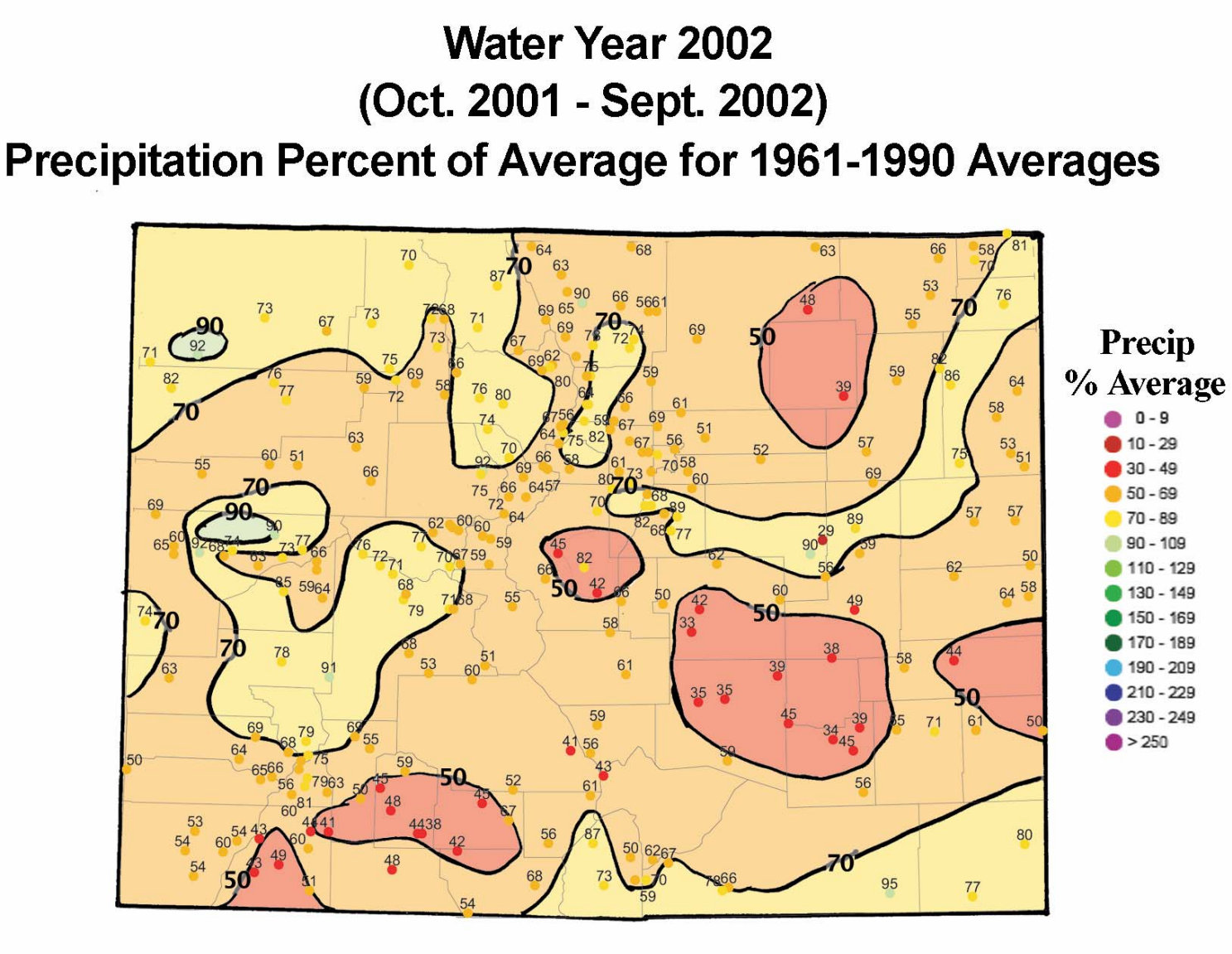
2001 Water Year Precipitation



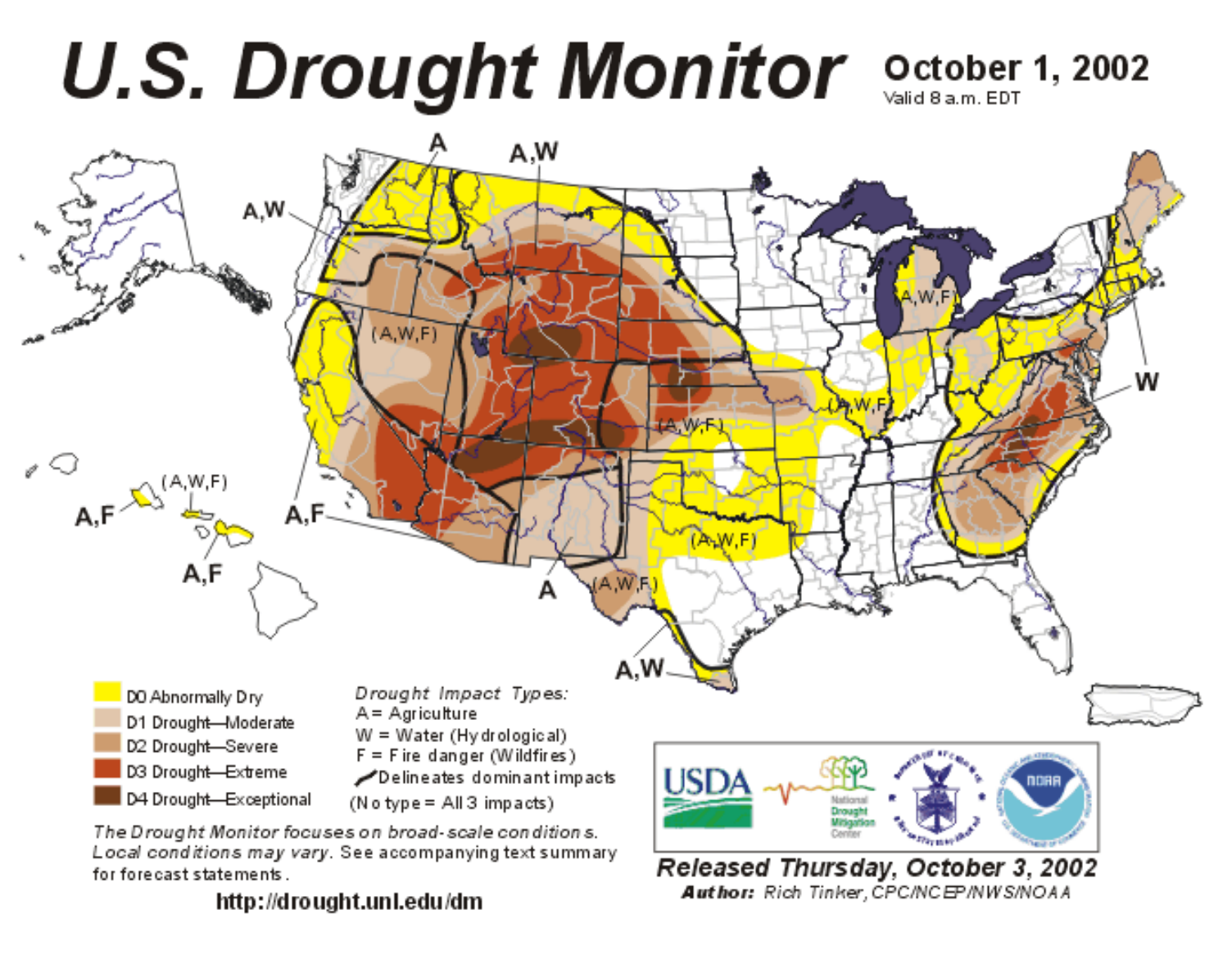
October 2001 Drought Monitor Map



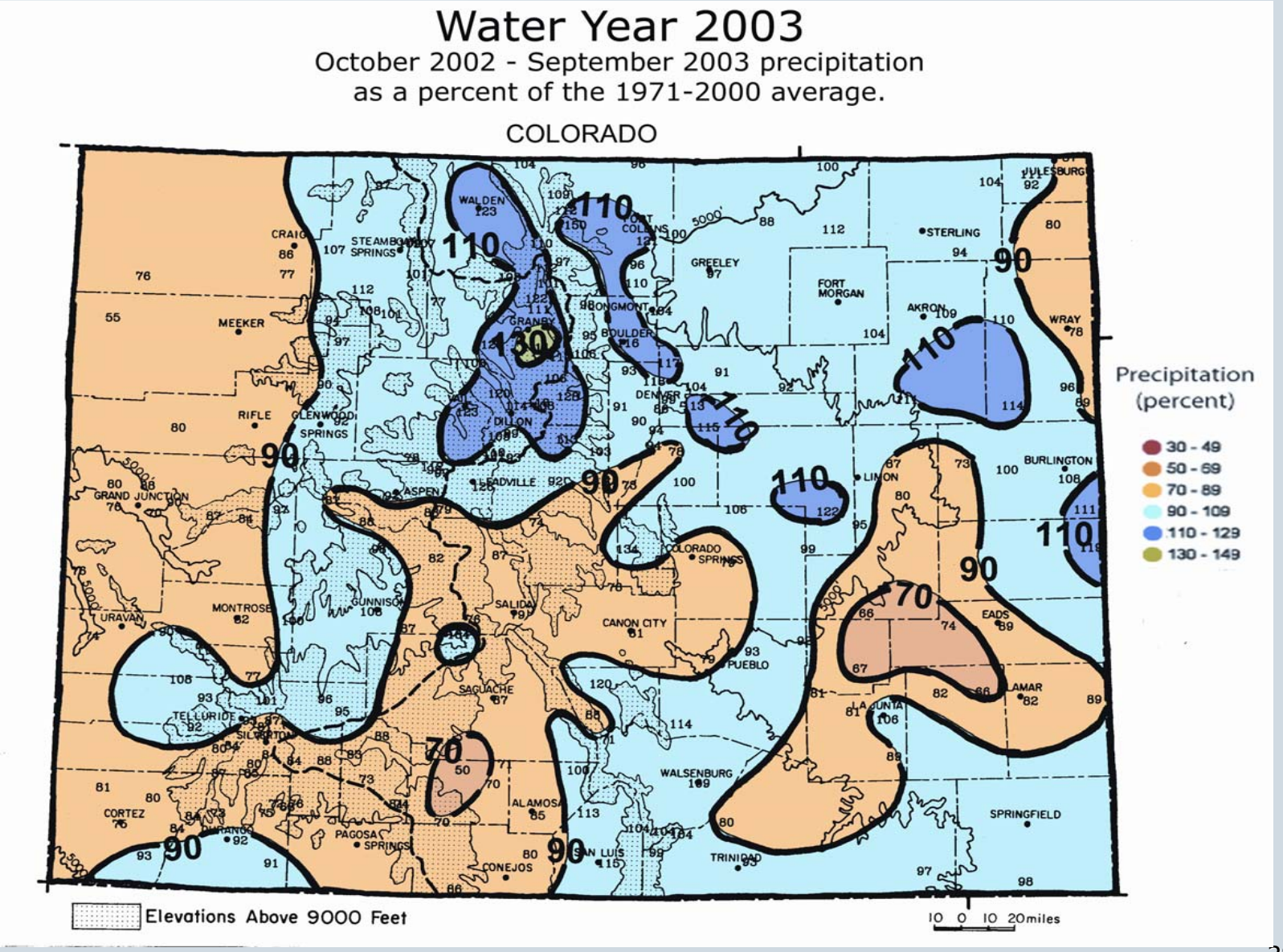
2002 Water Year Precipitation



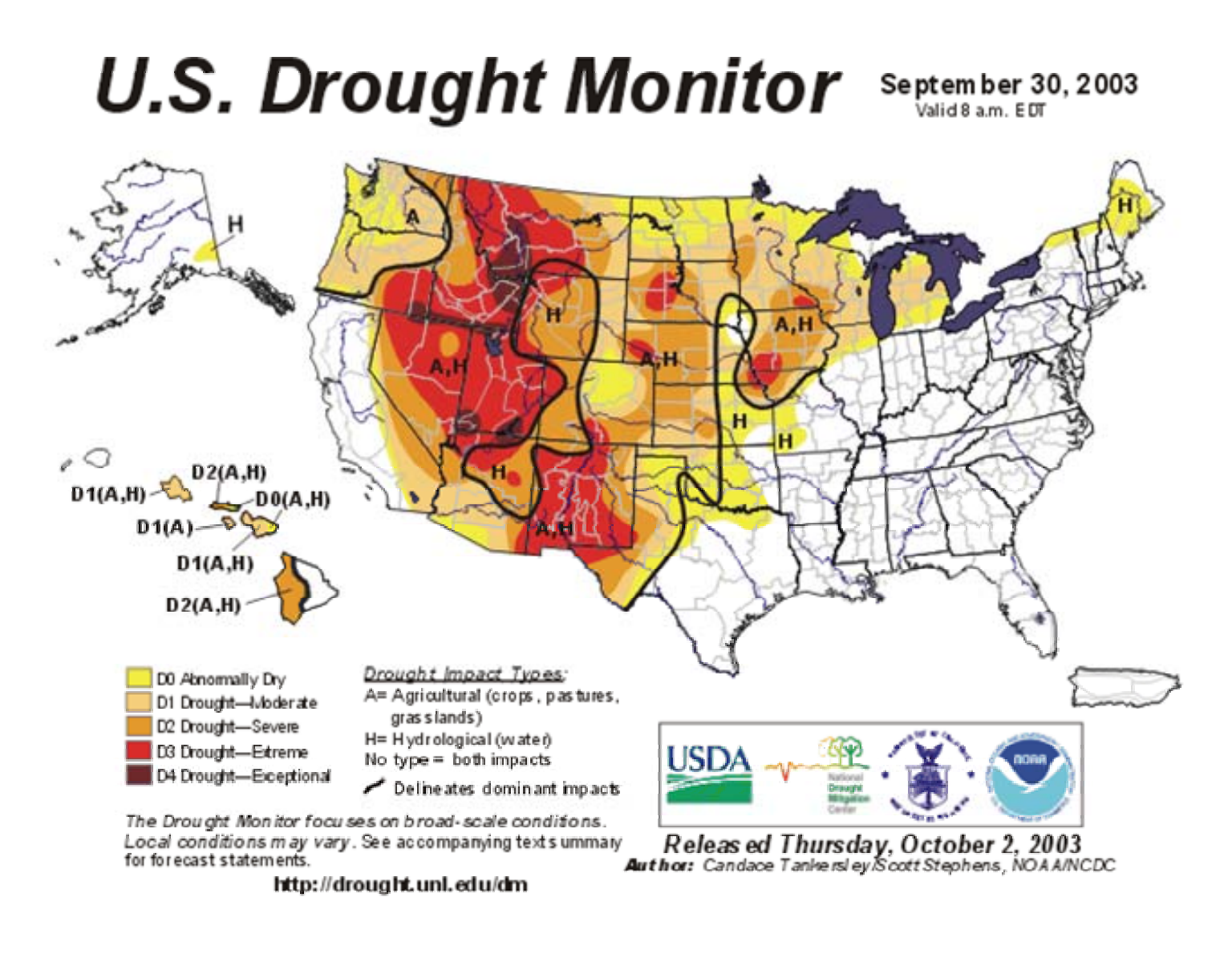
October 2002 Drought Monitor Map



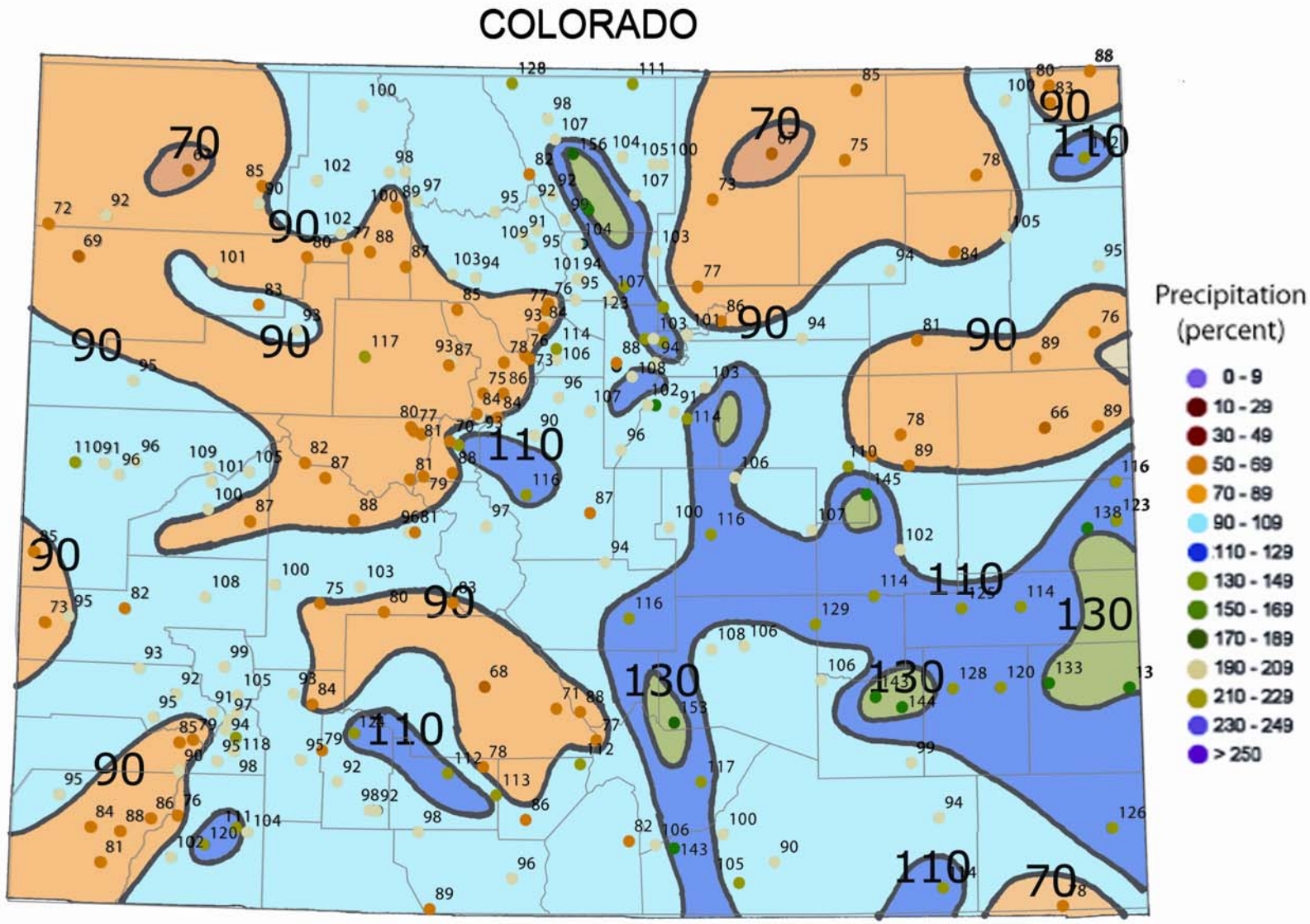
2003 Water Year Precipitation



September 2003 Drought Monitor Map

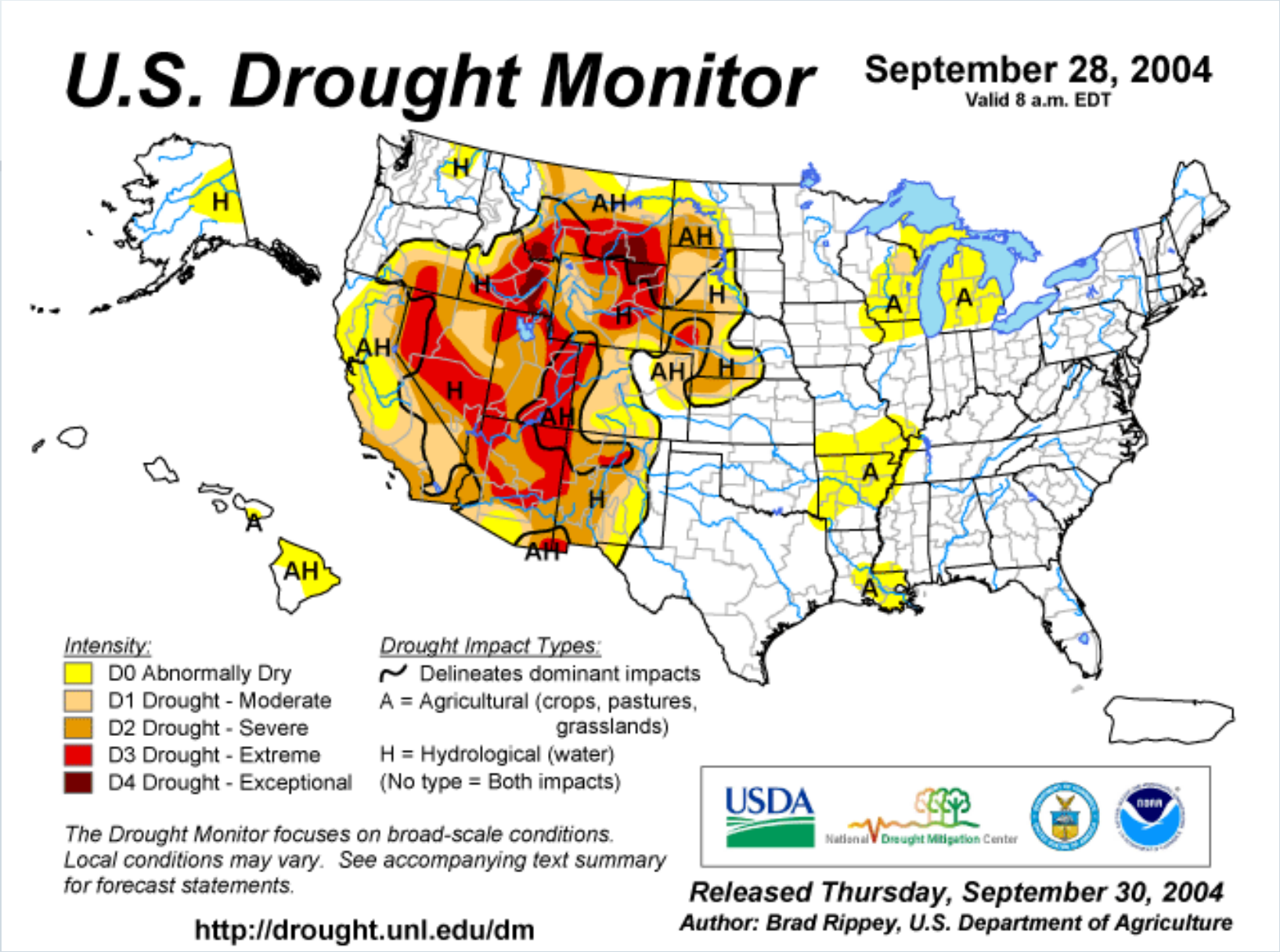


2004 Water Year Precipitation

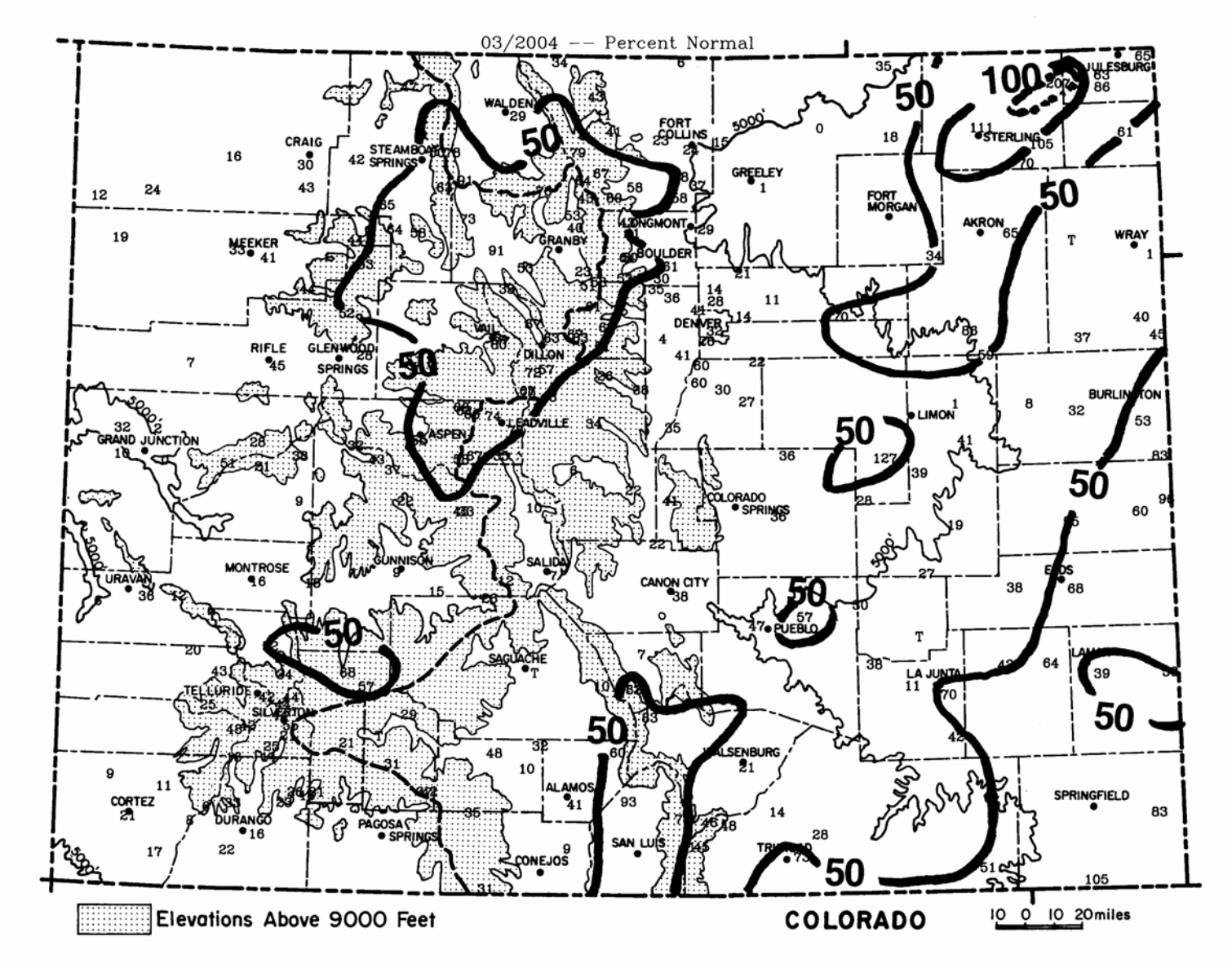


Water Year 2004 (October 2003 through September 2004) precipitation as a percent of the 1971-2000 average.

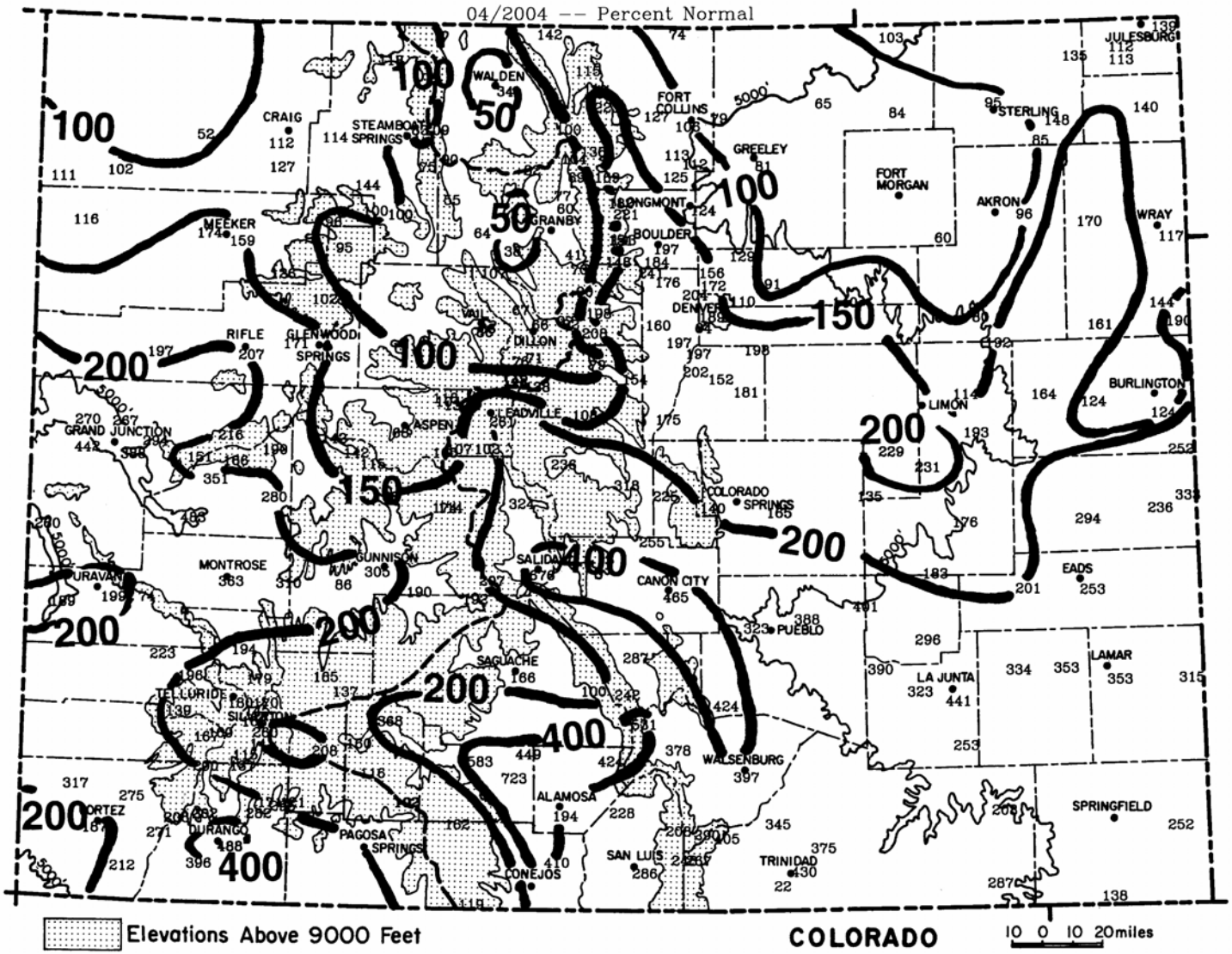
September 2004 Drought Monitor Map



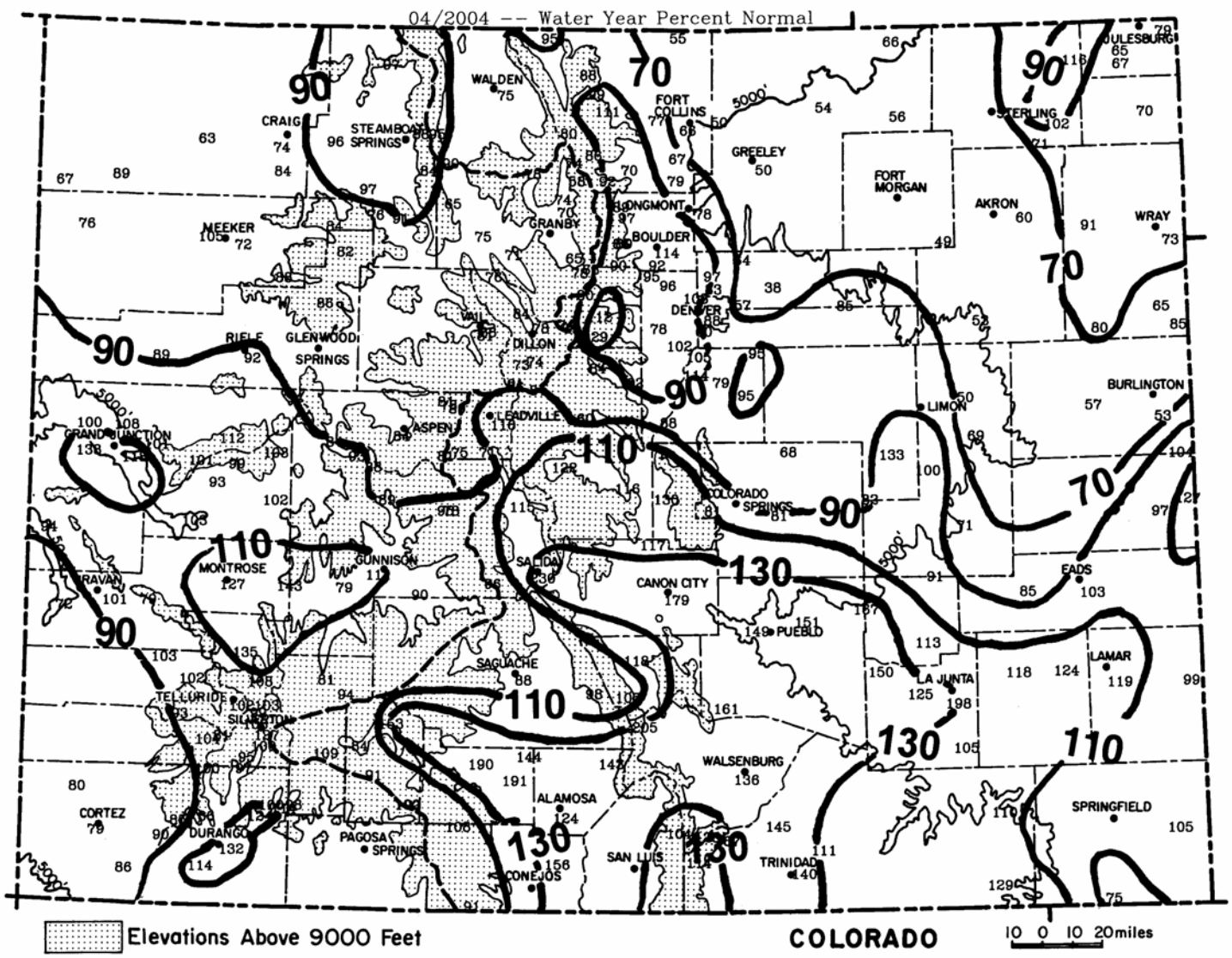
March 2004 Percent of Average



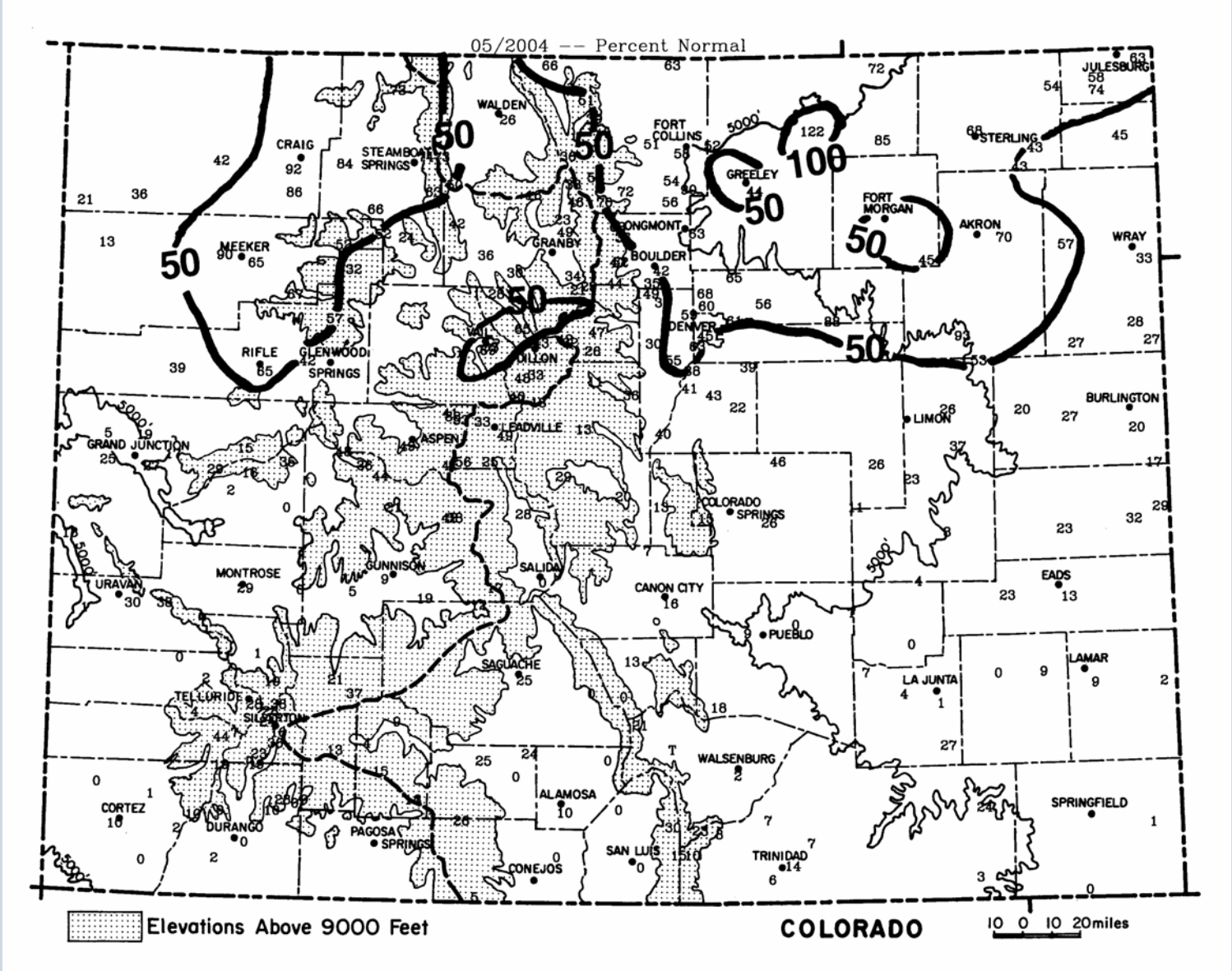
April 2004 Percent of Average



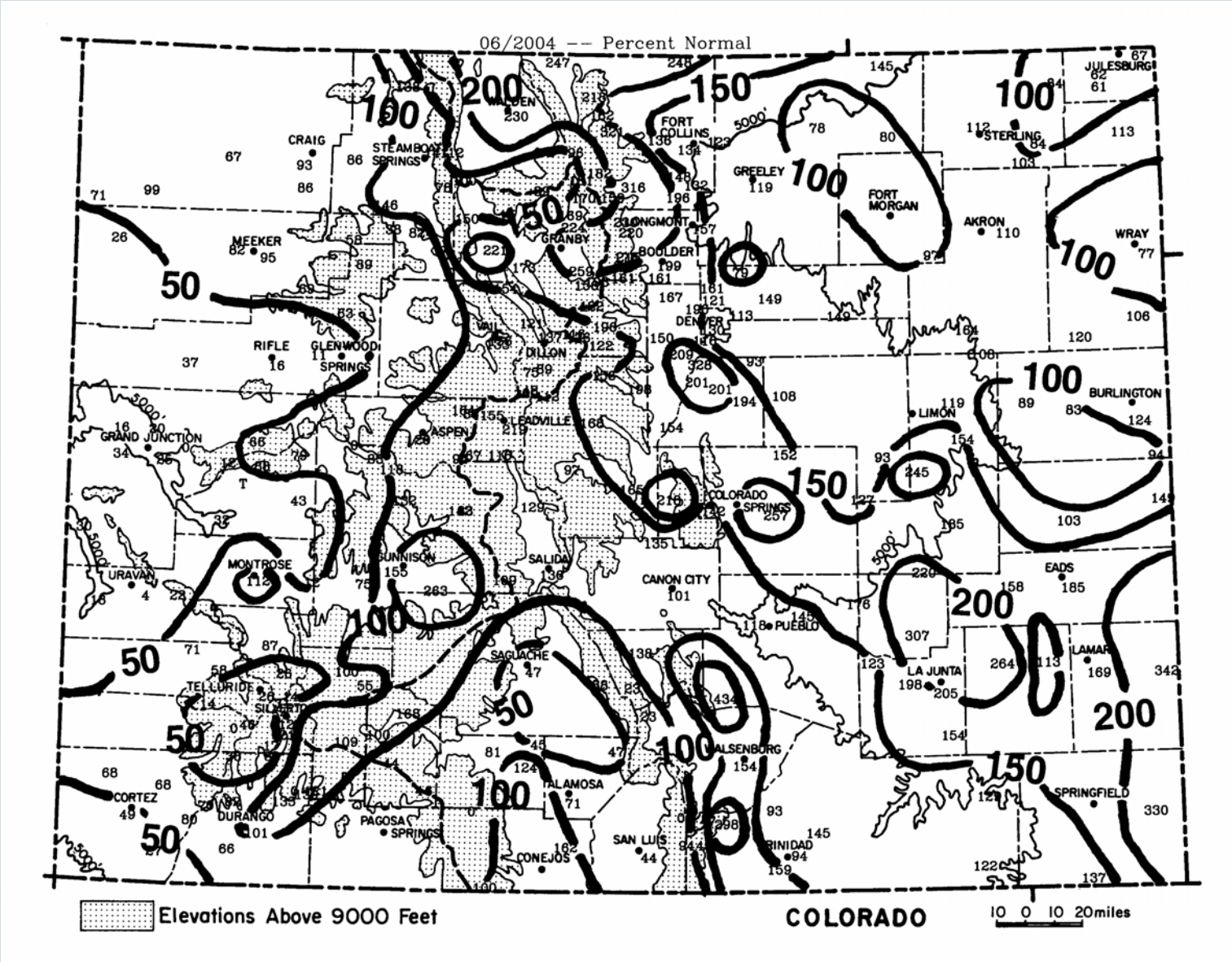
Winter 2004 (Oct 03-April 04) Percent of Average



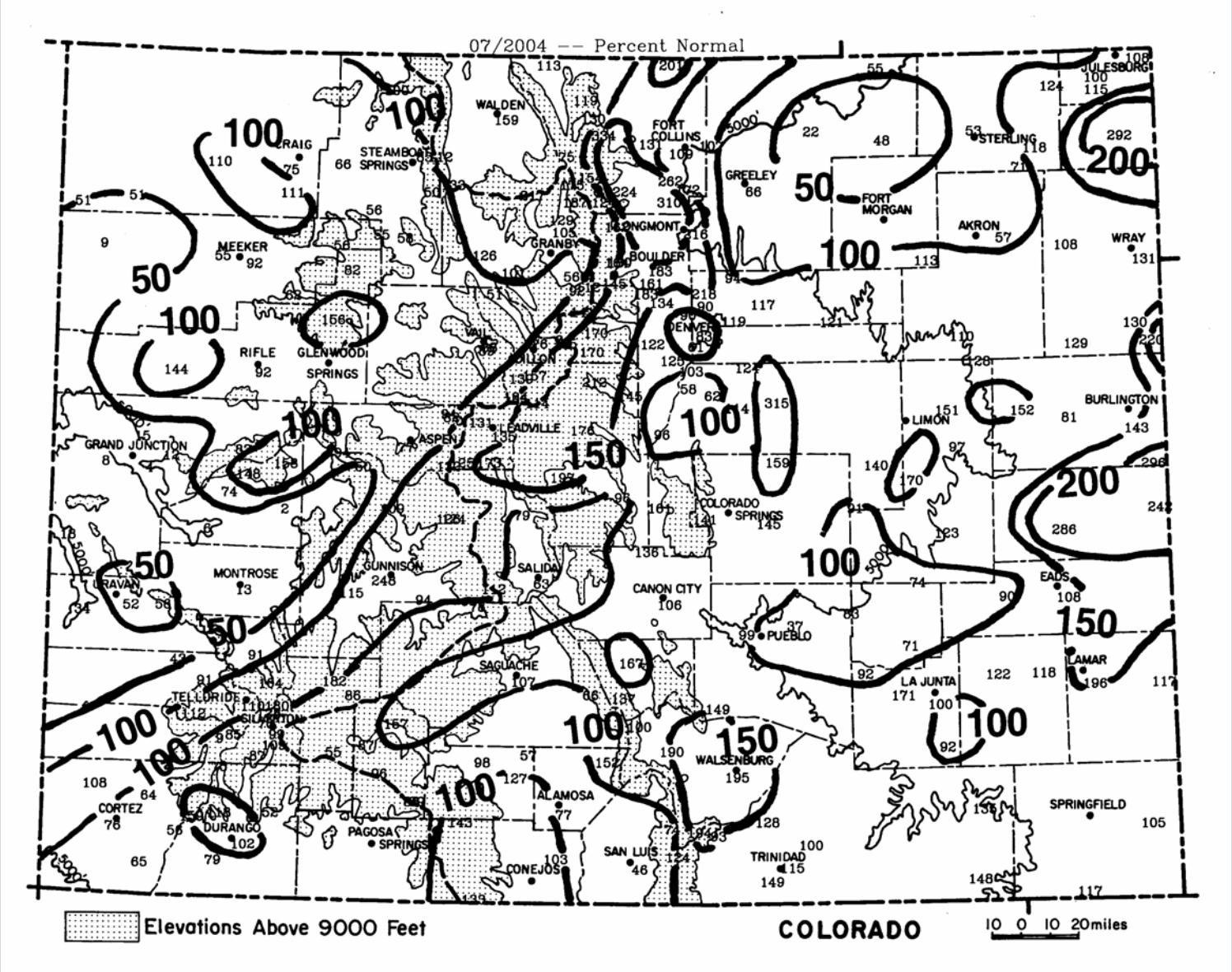
May 2004 Percent of Average



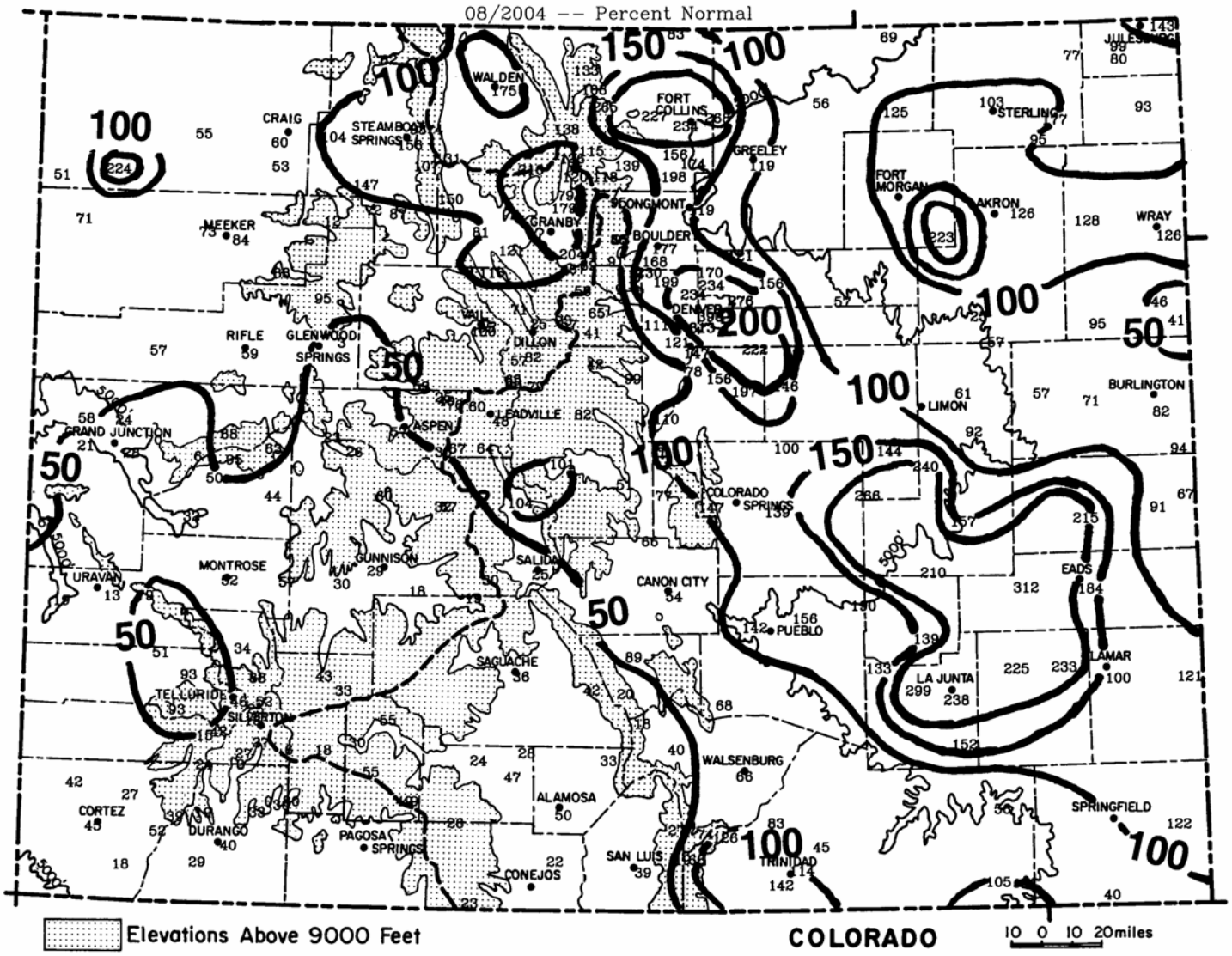
June 2004 Percent of Average



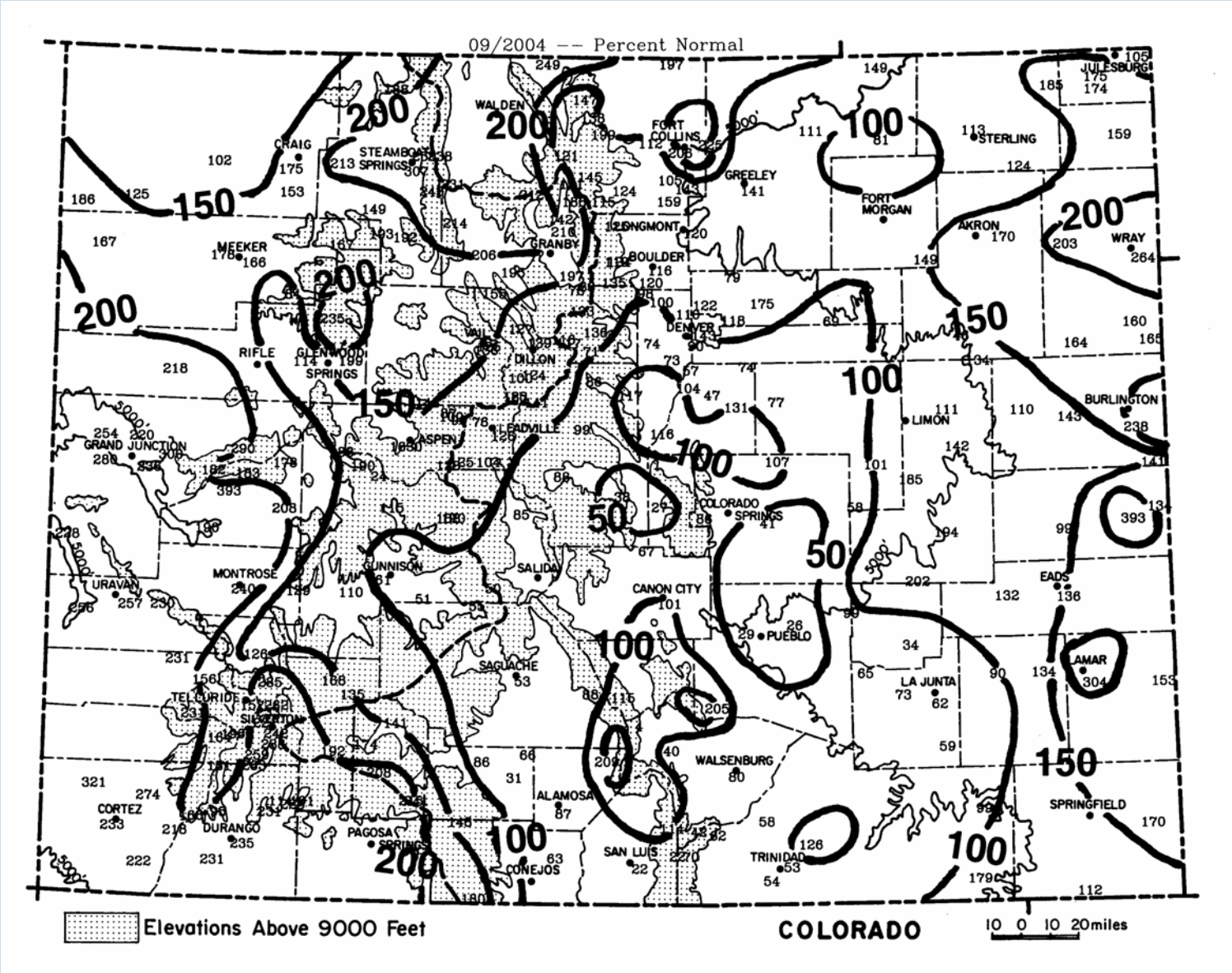
July 2004 Percent of Average



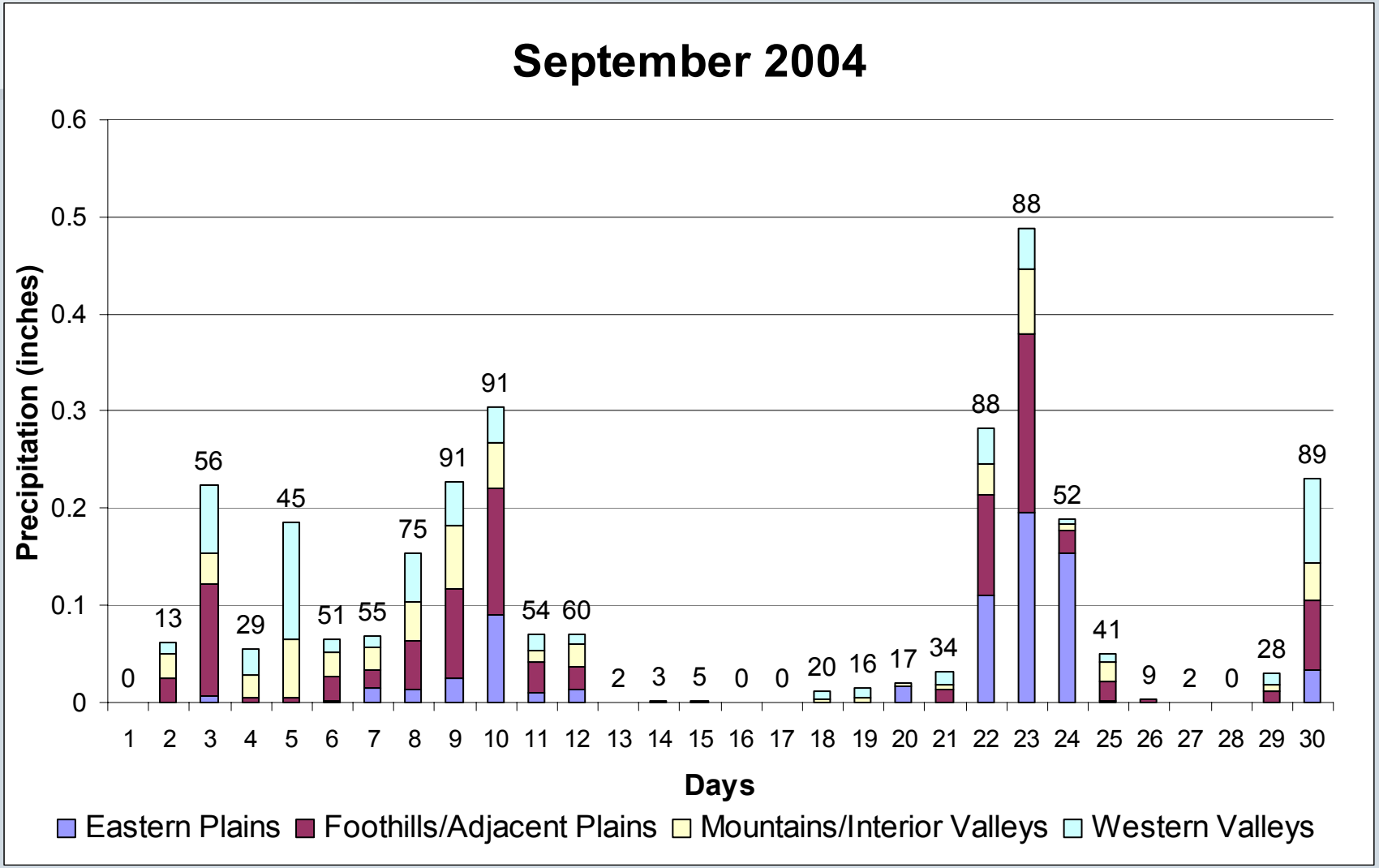
August 2004 Percent of Average



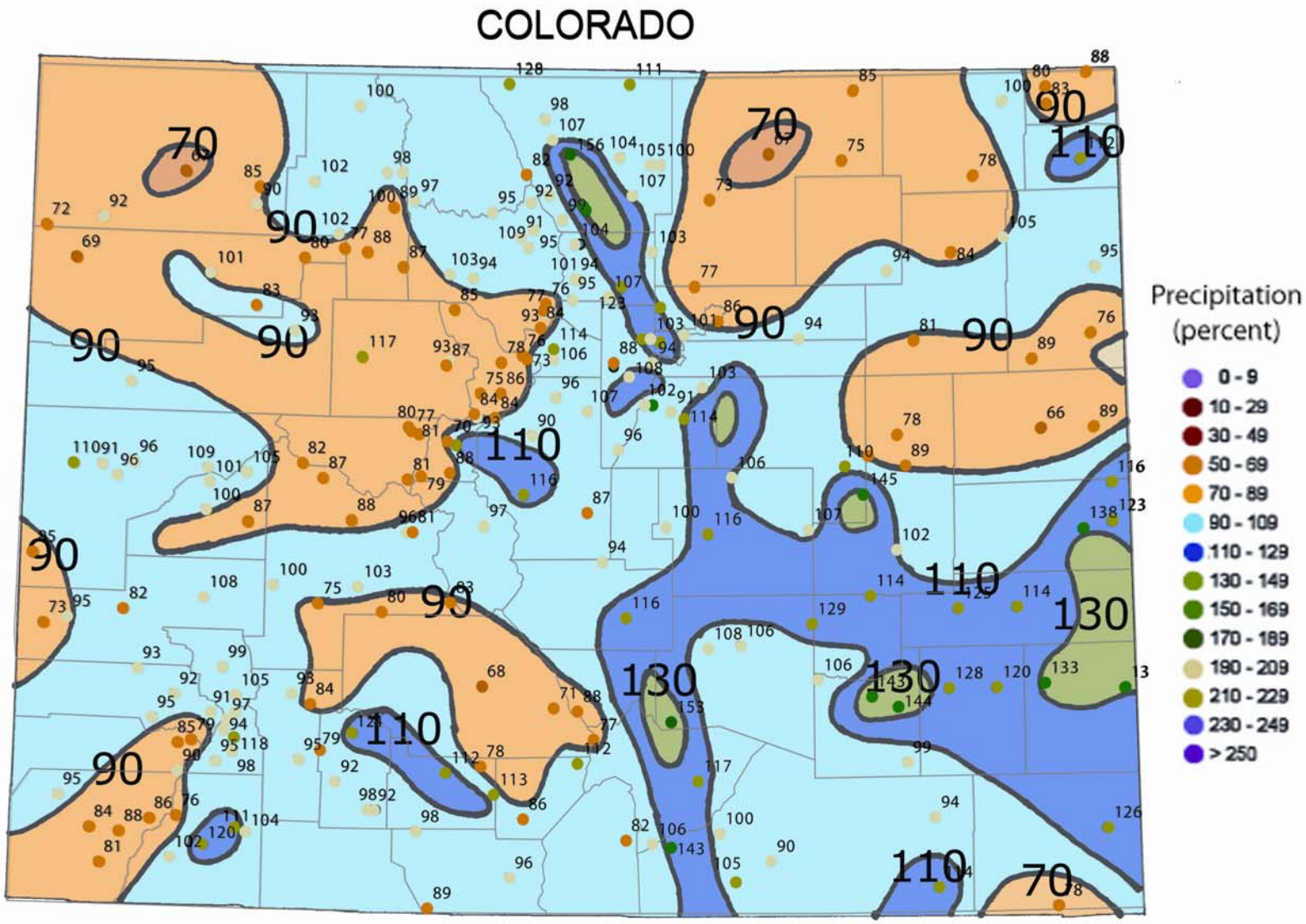
September 2004 Percent Average



September 2004 Daily Precipitation

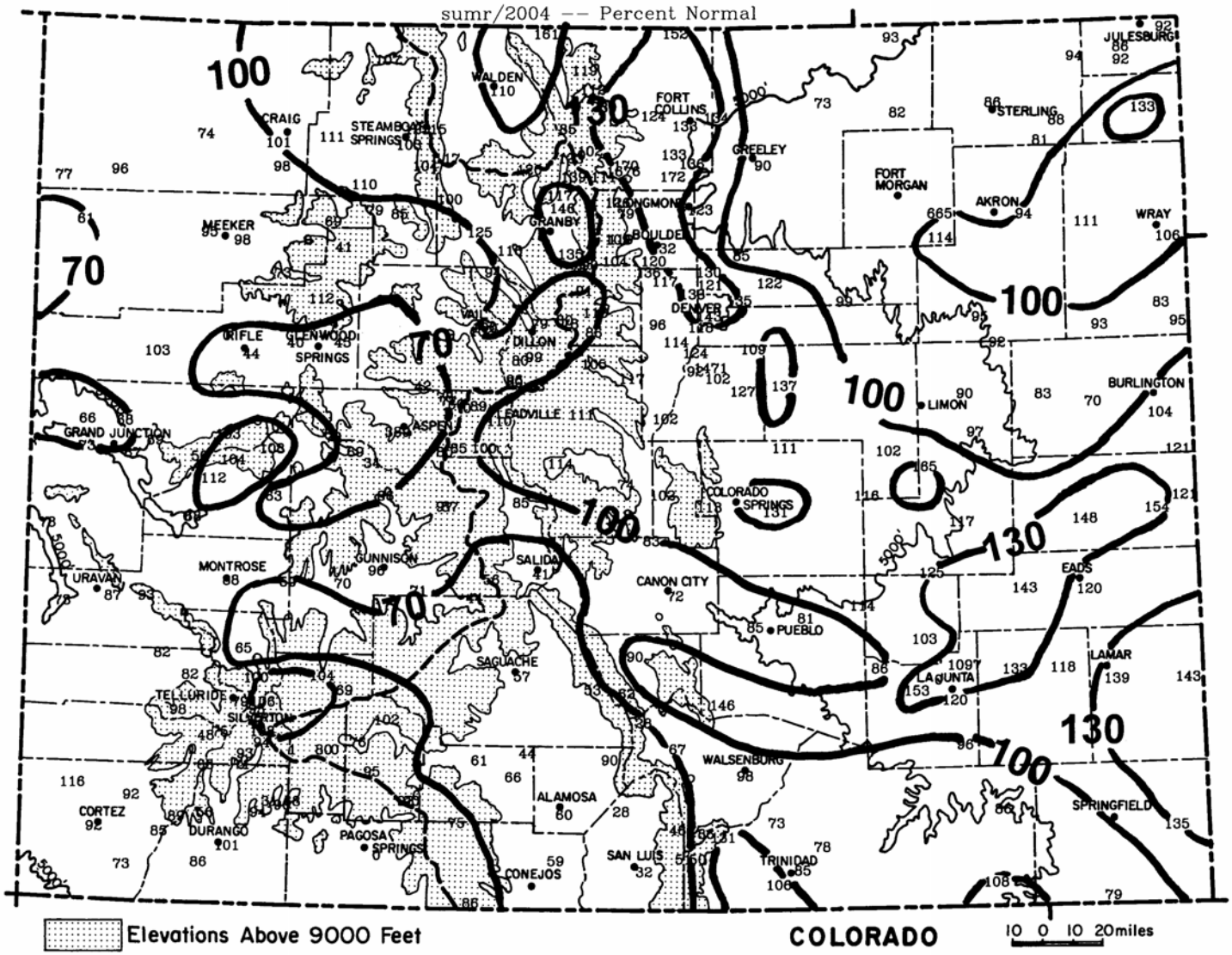


Oct 2003-Sept. 2004 WY Percent of Average

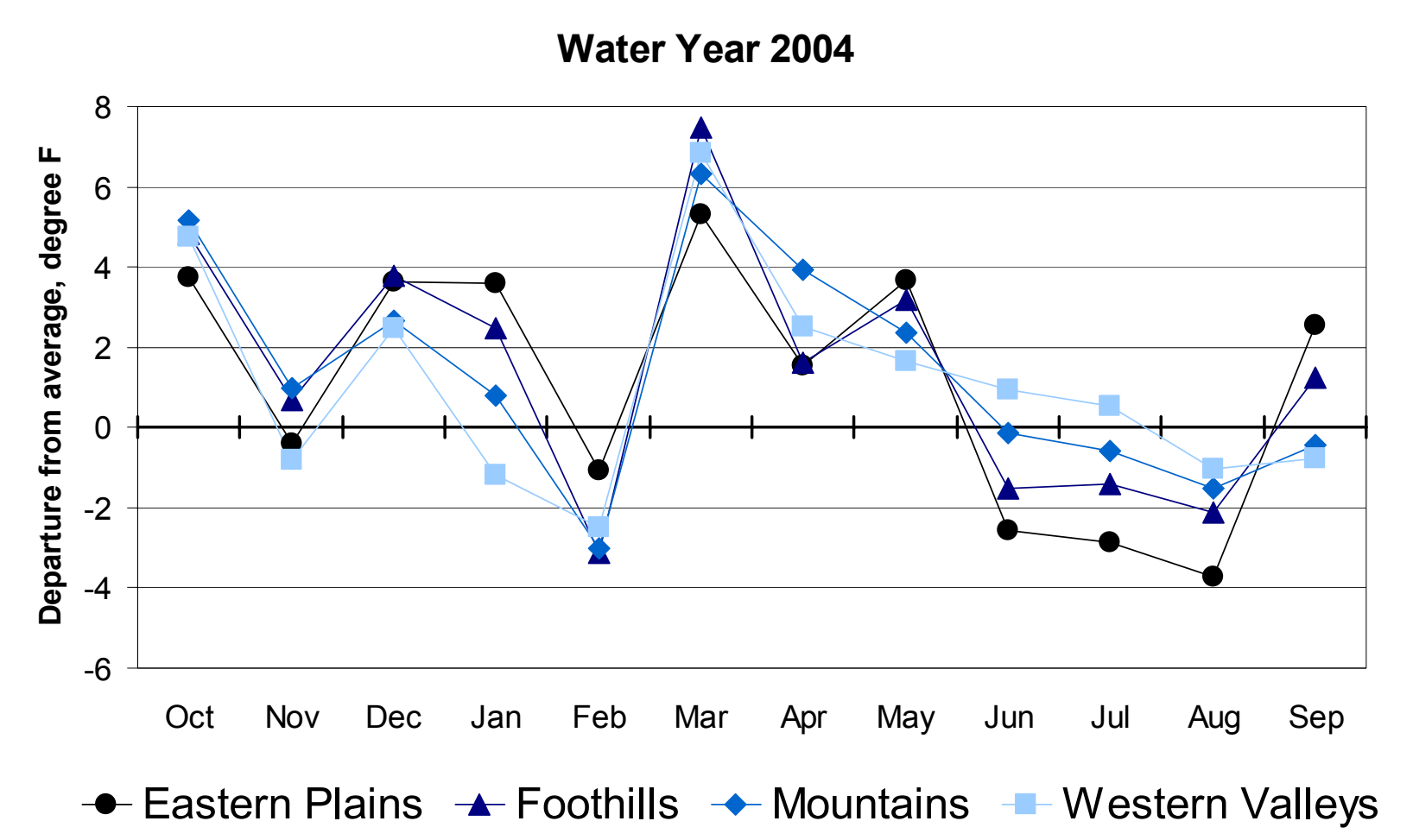


Water Year 2004 (October 2003 through September 2004) precipitation as a percent of the 1971-2000 average.

May-Sept 2004 Growing Season as Percent of Average



Water Year 2004 temperature departures from 1971-2000 average

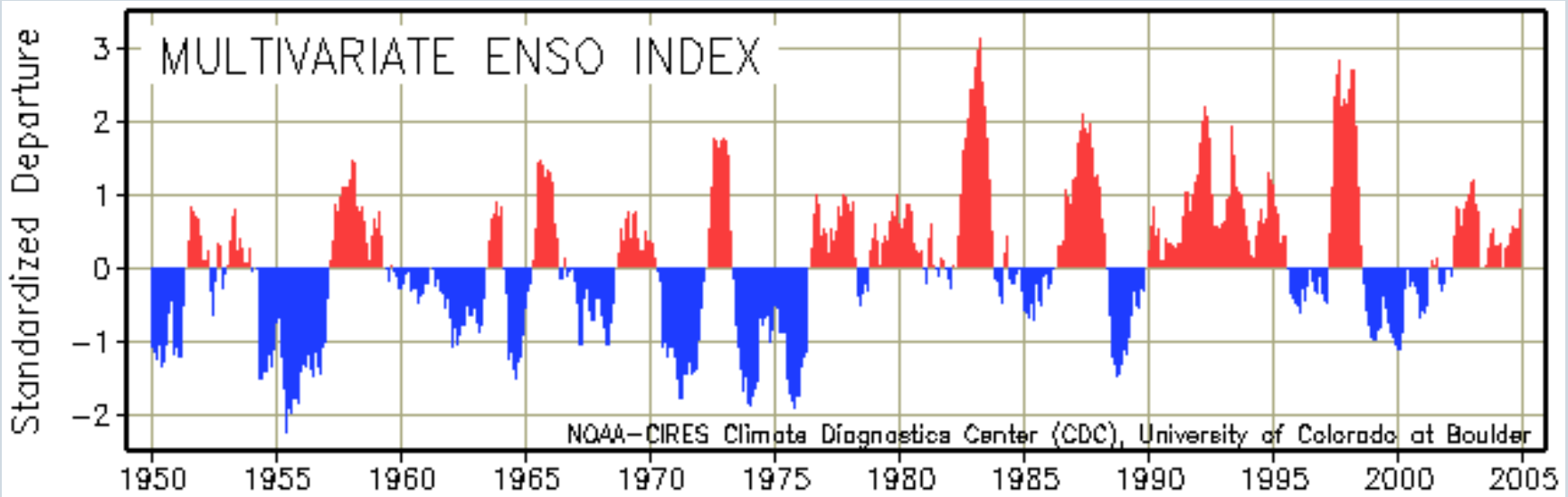


WY2004 Highlights

- Record warmth in October
- Freezing drizzle storm for Halloween, cloudy
- Good early snows over SW Colorado
- Cold and snowcovered on the Western Slope midwinter
- Fairly dry and dull midwinter elsewhere
- A cold February
- Very warm and dry March
- Wet April -- Hurray!
- Oops, warm and dry again in May
- Cool and damp summer east of mountains
- Hot and dry to the west
- Moisture onslaught into Western Colorado in September

What Comes Next?

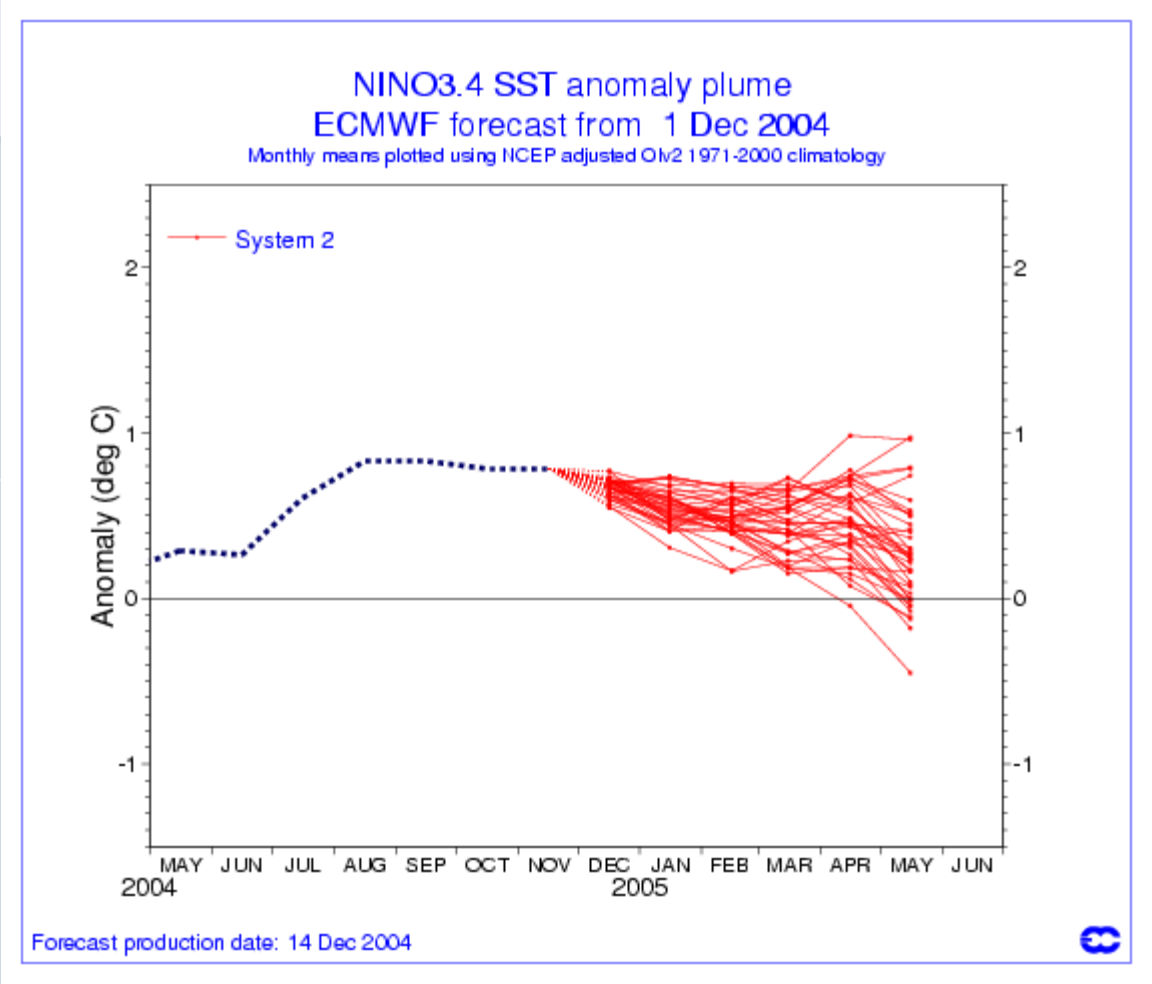
Multivariate ENSO Index (MEI)



Last update: January 7, 2005

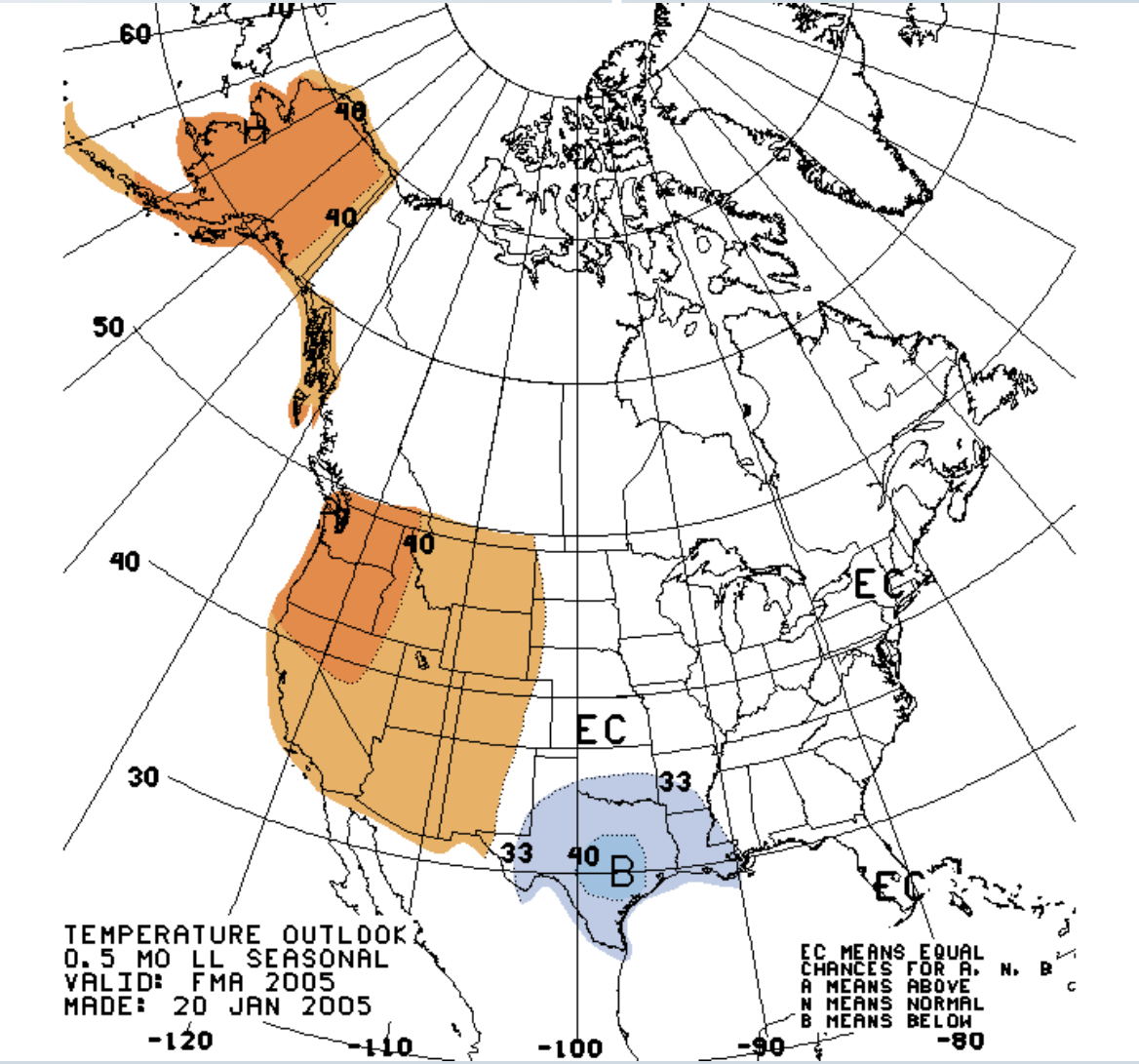
http://www.cdc.noaa.gov/people/klaus.wolter/MEI/

El Nino Forecast



http://www.cdc.noaa.gov/people/klaus.wolter/SWcasts/

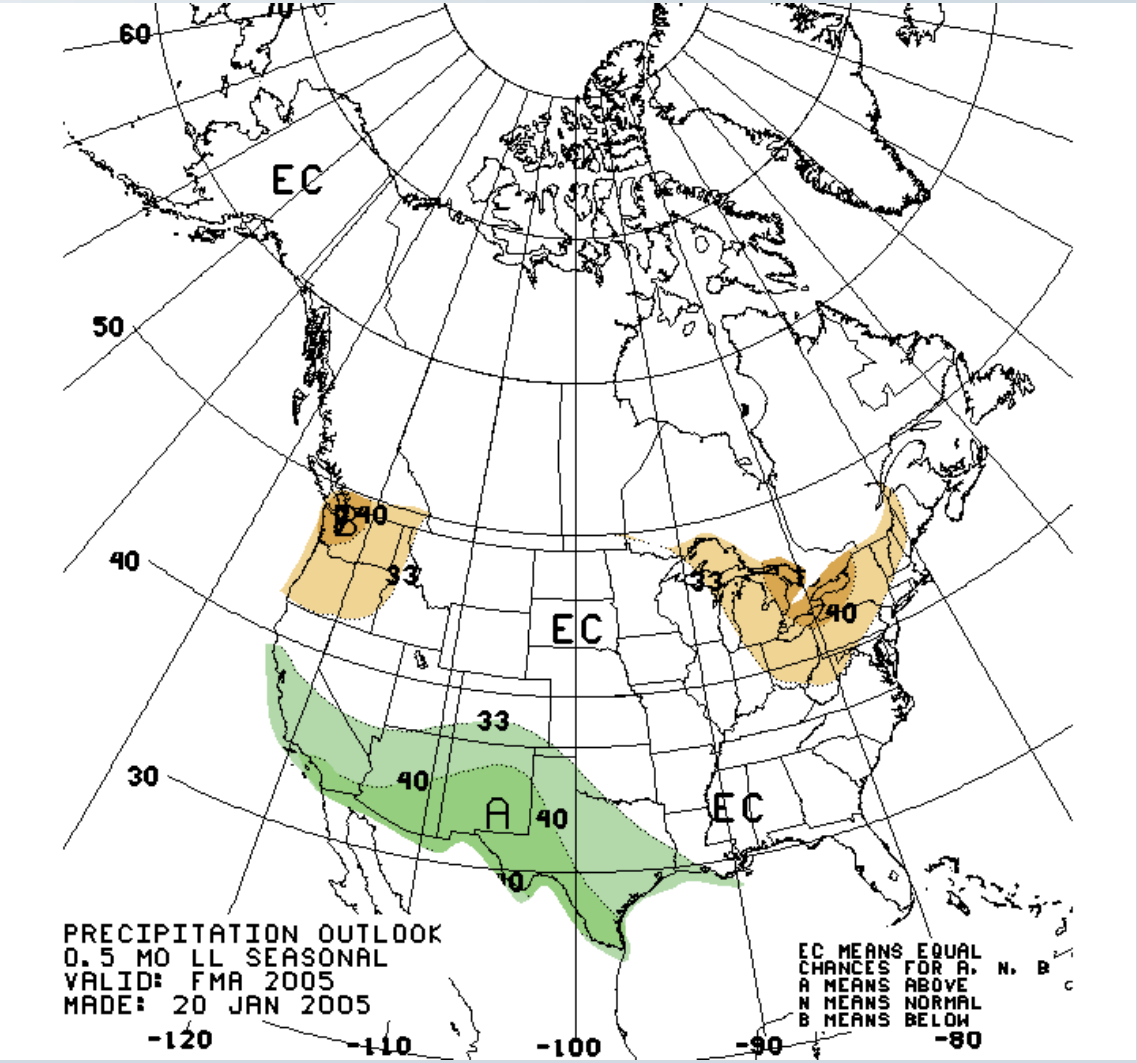
Temperature Feb-Apr 2005



From the Colorado Prediction Center

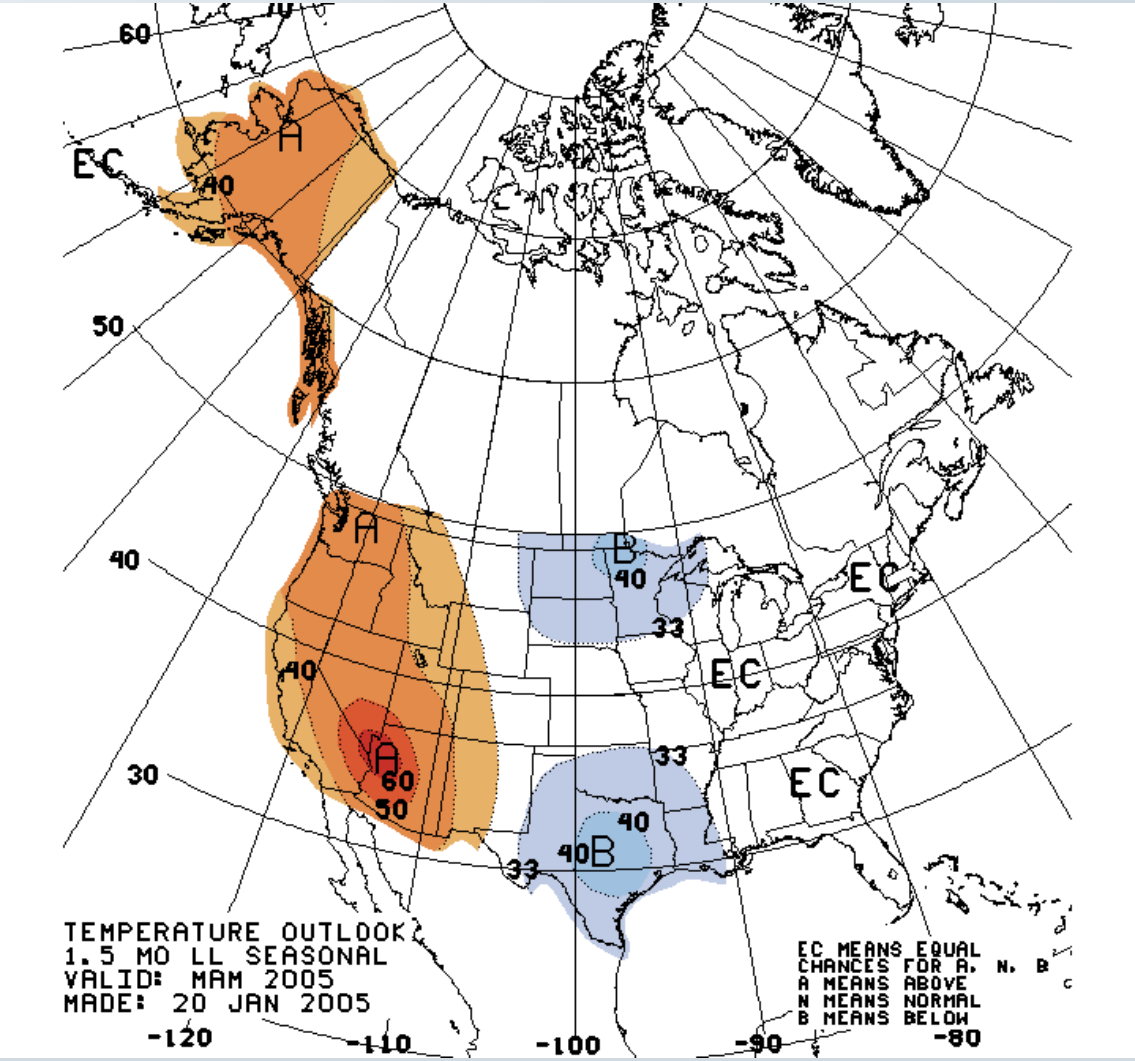
http://www.cpc.ncep.noaa.gov/products/predictions/multi_season/13_seasonal_outlooks/color/churchill.html

Precipitation
Feb-Apr 2005



From the Colorado Prediction Center
http://www.cpc.ncep.noaa.gov/products/predictions/multi_season/13_seasonal_outlooks/color/churchill.html

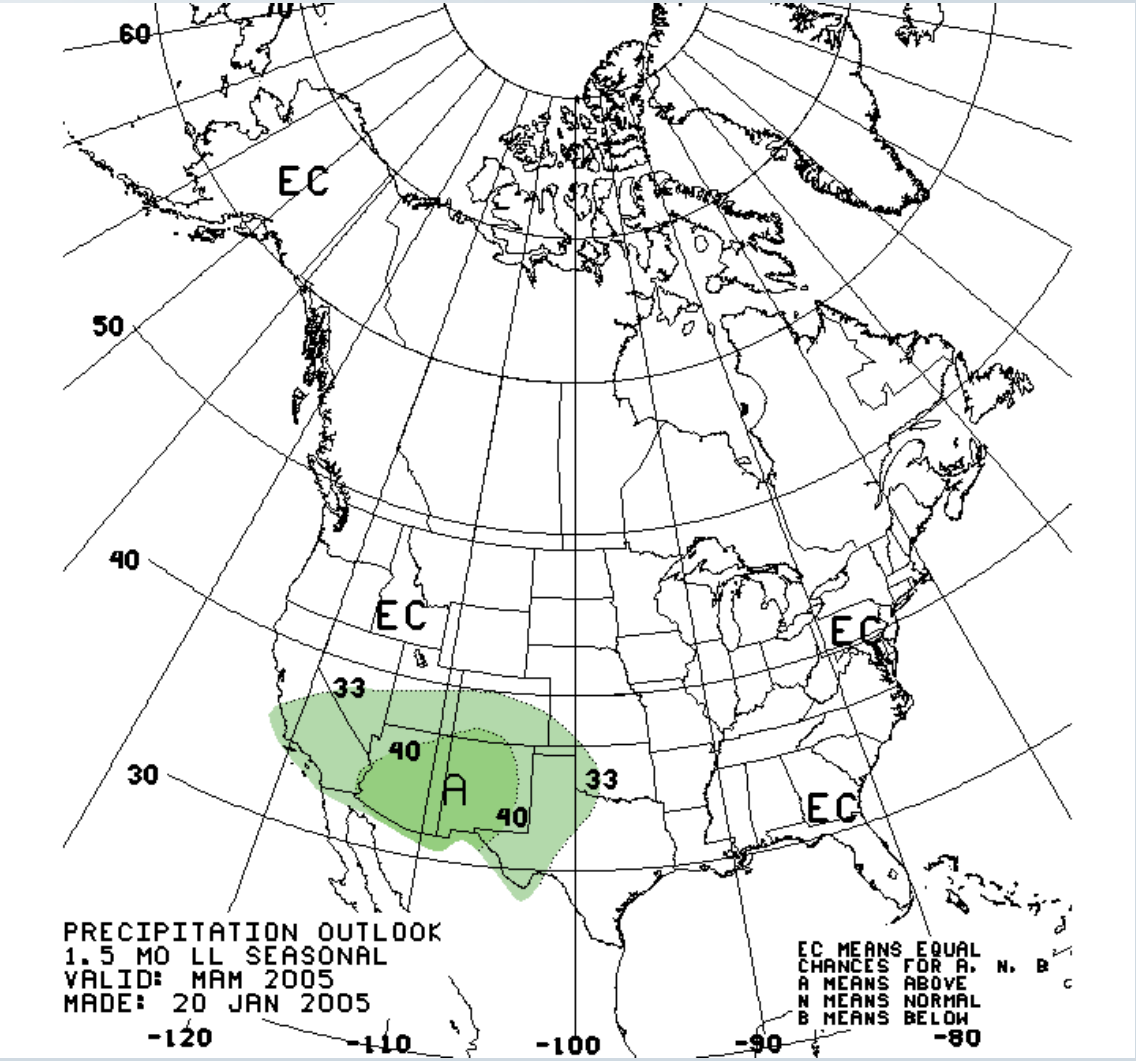
Temperature Mar-May 2005



From the Colorado Prediction Center

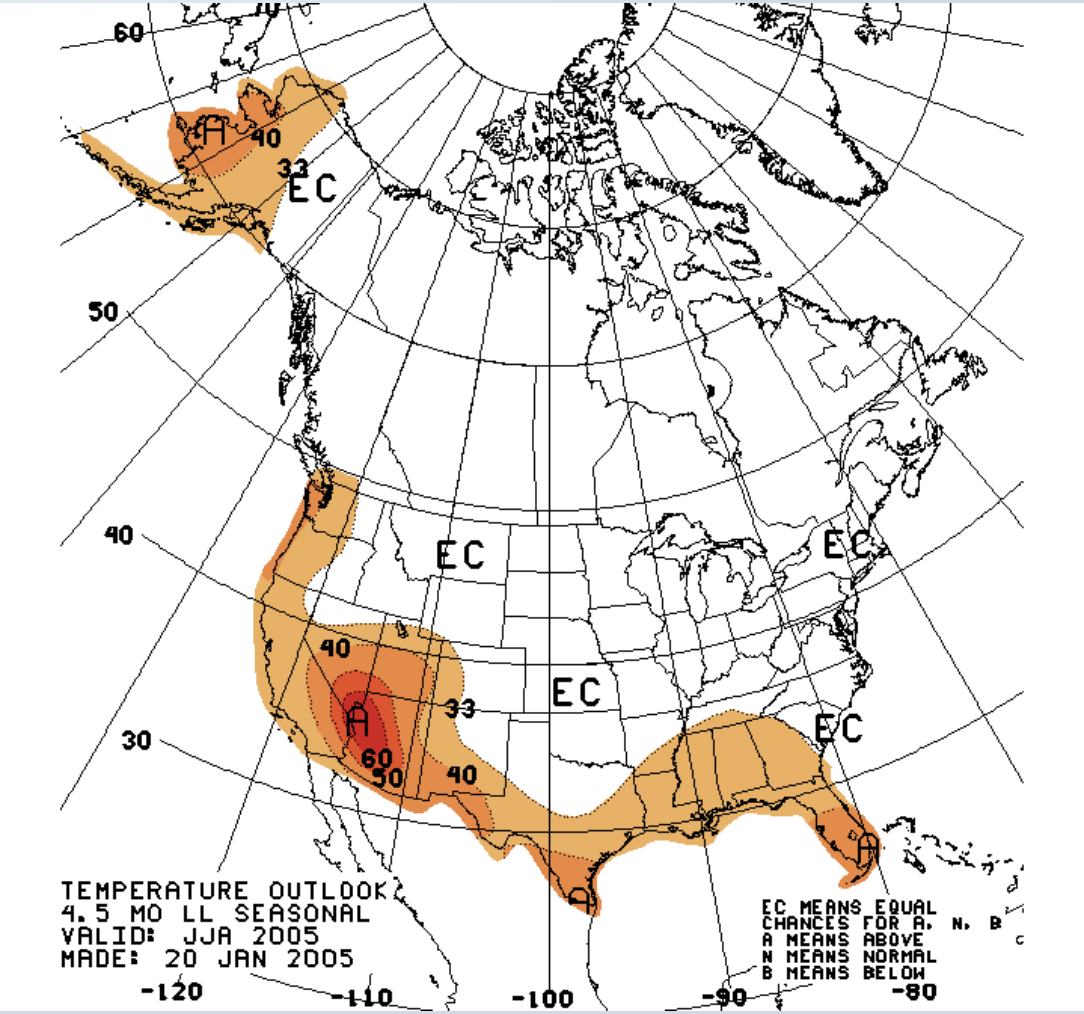
http://www.cpc.ncep.noaa.gov/products/predictions/multi_season/13_seasonal_outlooks/color/churchill.html

Precipitation
Mar-May 2005



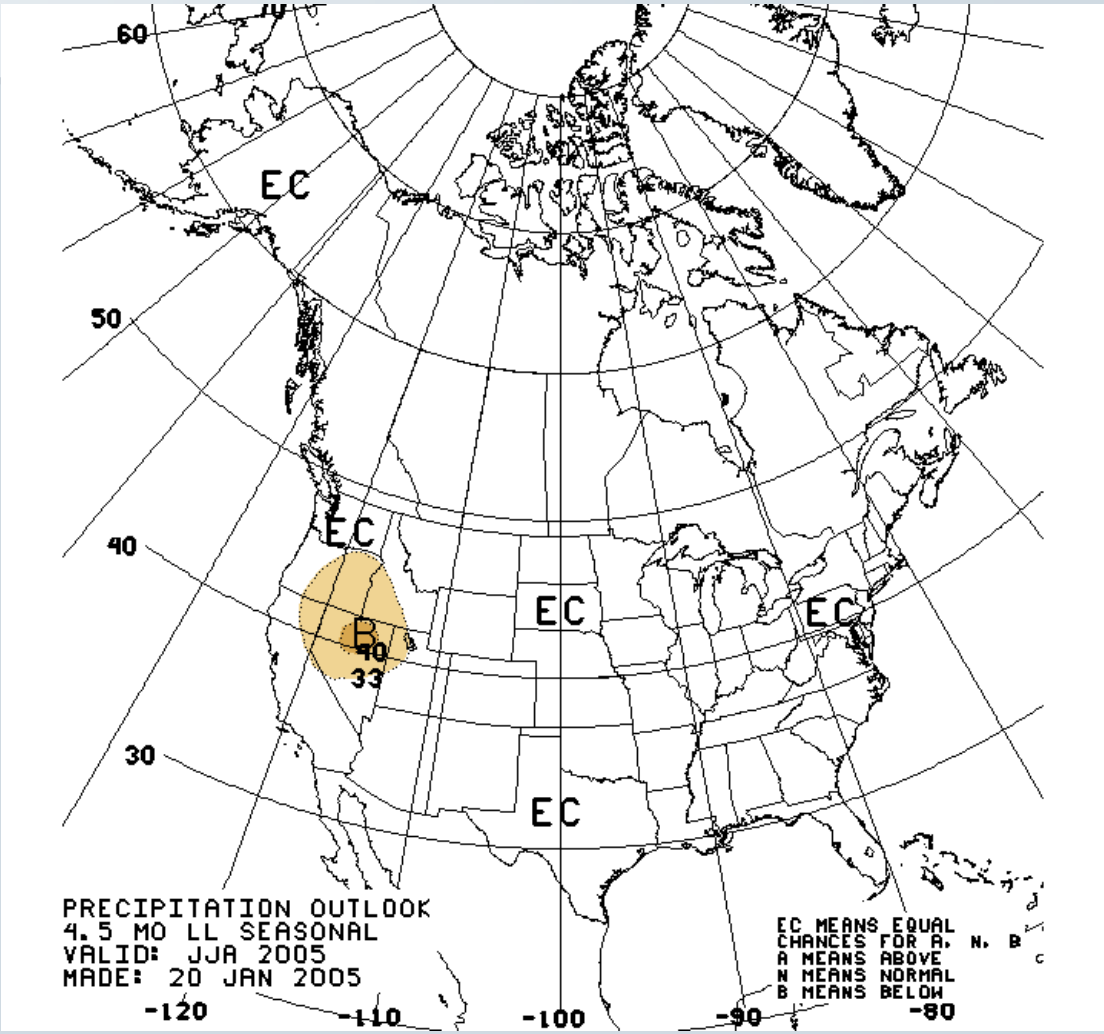
From the Colorado Prediction Center
http://www.cpc.ncep.noaa.gov/products/predictions/multi_season/13_seasonal_outlooks/color/churchill.html

Temperature Jun-Aug 2005



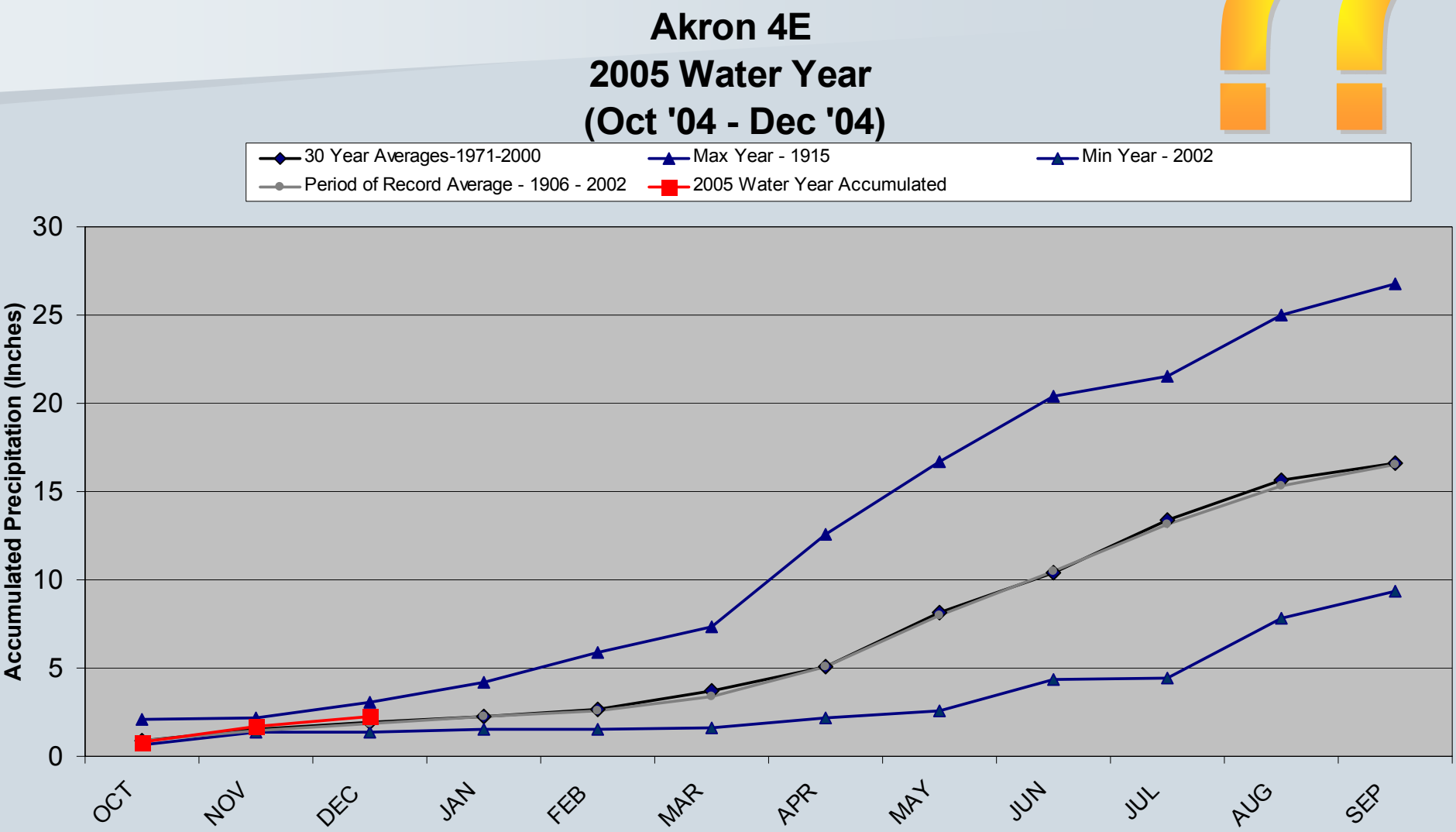
From the Colorado Prediction Center
http://www.cpc.ncep.noaa.gov/products/predictions/multi_season/13_seasonal_outlooks/color/churchill.html

Precipitation
Jun-Aug 2005



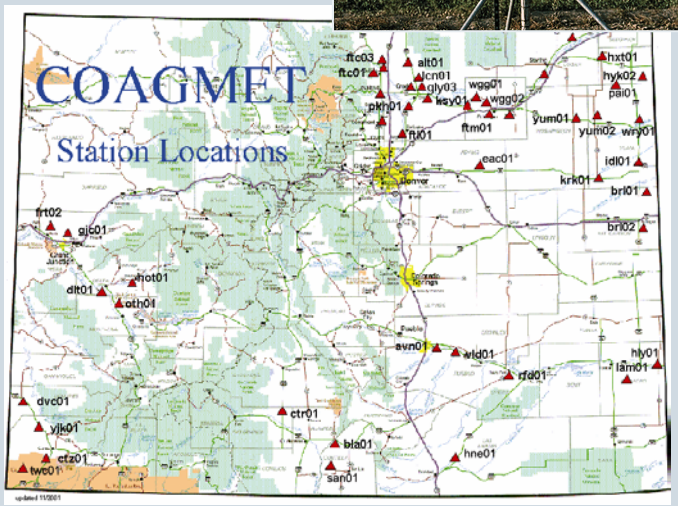
From the Colorado Prediction Center
http://www.cpc.ncep.noaa.gov/products/predictions/multi_season/13_seasonal_outlooks/color/churchill.html

Our Path For 2005



CoAgMet
Weather Data for Agriculture

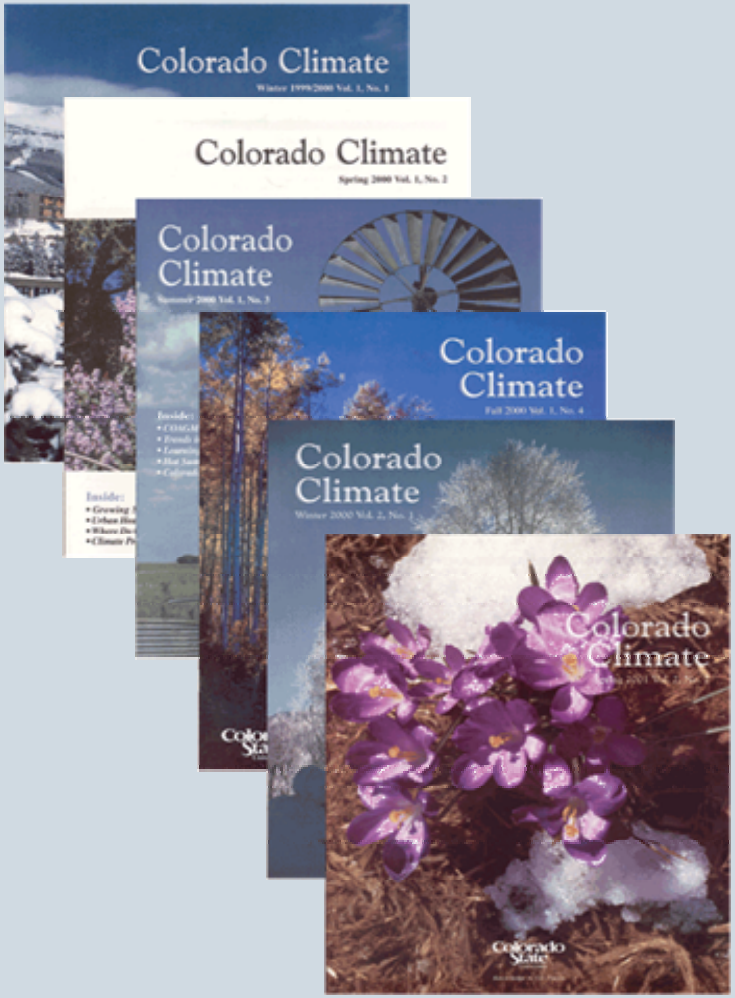
- *Automated weather stations with daily and hourly readings of:*
  - *Temperature*
  - *Humidity*
  - *Wind*
  - *Precipitation*
  - *Solar energy*
  - *Evapotranspiration*



http://www.coagmet.com

Colorado Climate Magazine

- *Good bedtime reading about the climate of Colorado -- recent and historic*
- *$15/year subscription pays printing and mailing costs*



http://ccc.atmos.colostate.edu/magazine.php

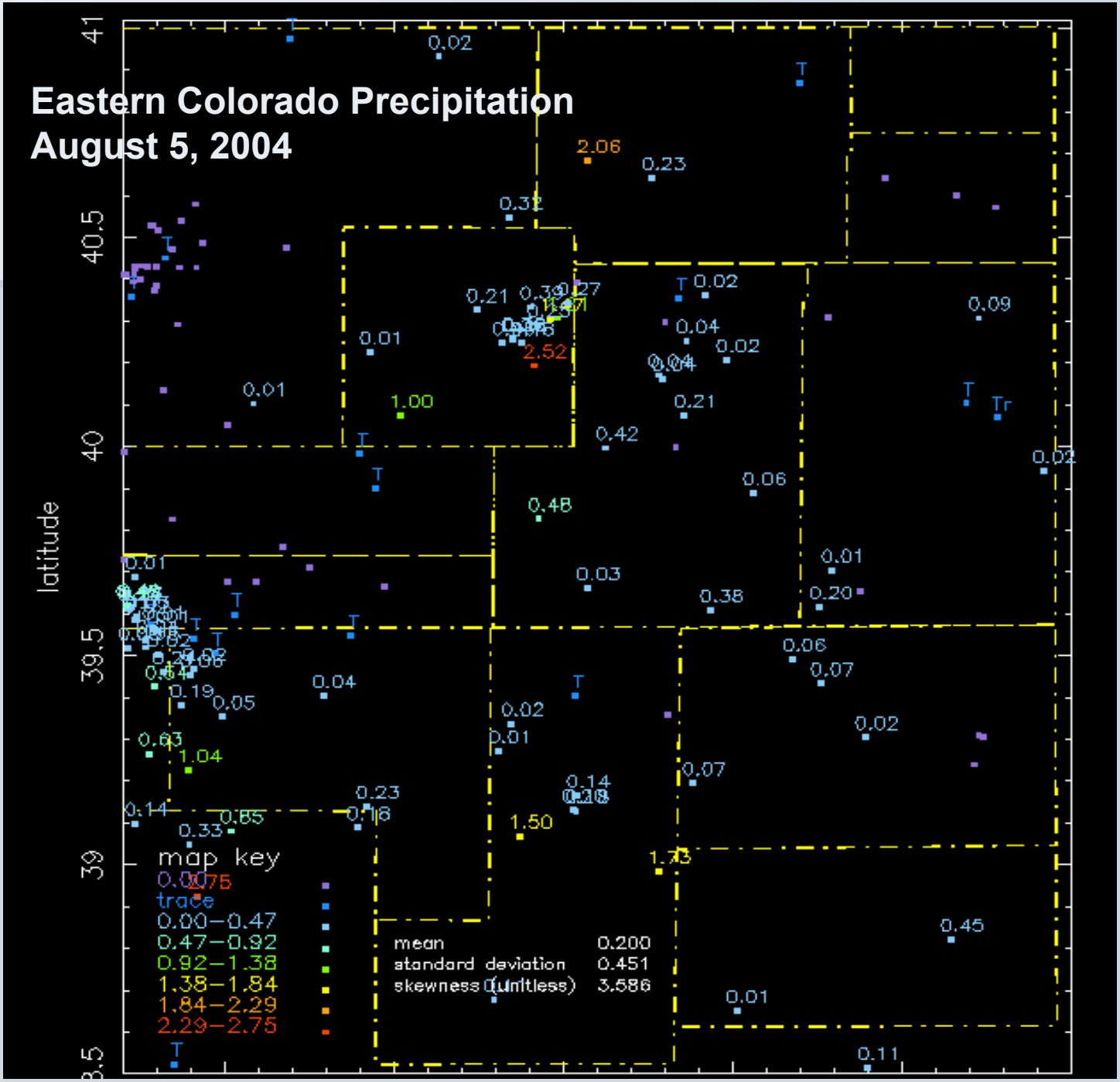
CoCoRaHS

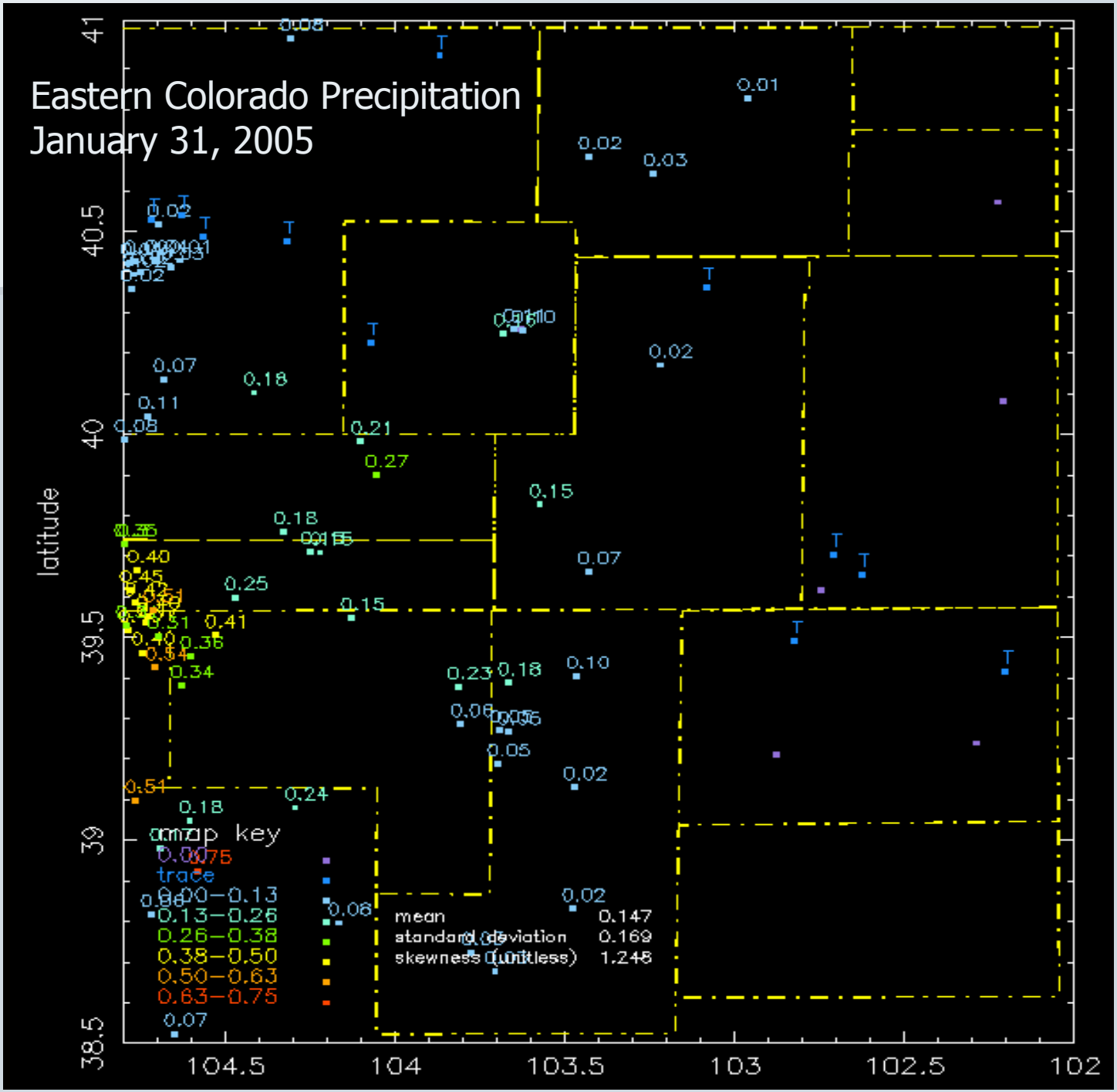
Community Collaborative Rain, Hail, and Snow Network

http://www.cocorahs.org

- Over 1,000 volunteers participate in rain, hail and snow measurements.
- More accurate maps, verifies forecasting, radar research, crop damage, drought/flooding, educational purposes.

Support for this project provided by Informal Science Education Program, National Science Foundation and *many* local charter sponsors.


Eastern Colorado Precipitation
August 5, 2004
latitude
41
40.5
40
39.5
39
38.5
map key
0.00–0.47
0.47–0.92
0.92–1.38
1.38–1.84
1.84–2.29
2.29–2.75
trace
mean 0.200
standard deviation 0.451
skewness (unitless) 3.586


Eastern Colorado Precipitation
January 31, 2005
latitude
41
40.5
40
39.5
39
38.5
104.5
104
103.5
103
102.5
102
omap key
trace
0.00–0.13
0.13–0.26
0.26–0.38
0.38–0.50
0.50–0.63
0.63–0.75
mean 0.147
standard deviation 0.169
skewness (unitless) 1.248

Colorado Climate Center
Colorado State University

- *Data and Power Point Presentations available for downloading*

- http://ccc.atmos.colostate.edu

  click on "Drought"

  then click on "Presentations"