Drought and the Climate of Colorado: An Overview

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Colorado State University
http://ccc.atmos.colostate.edu

Presented to the Ditch and Reservoir Company Alliance,
February 26, 2004, Greeley, Colorado

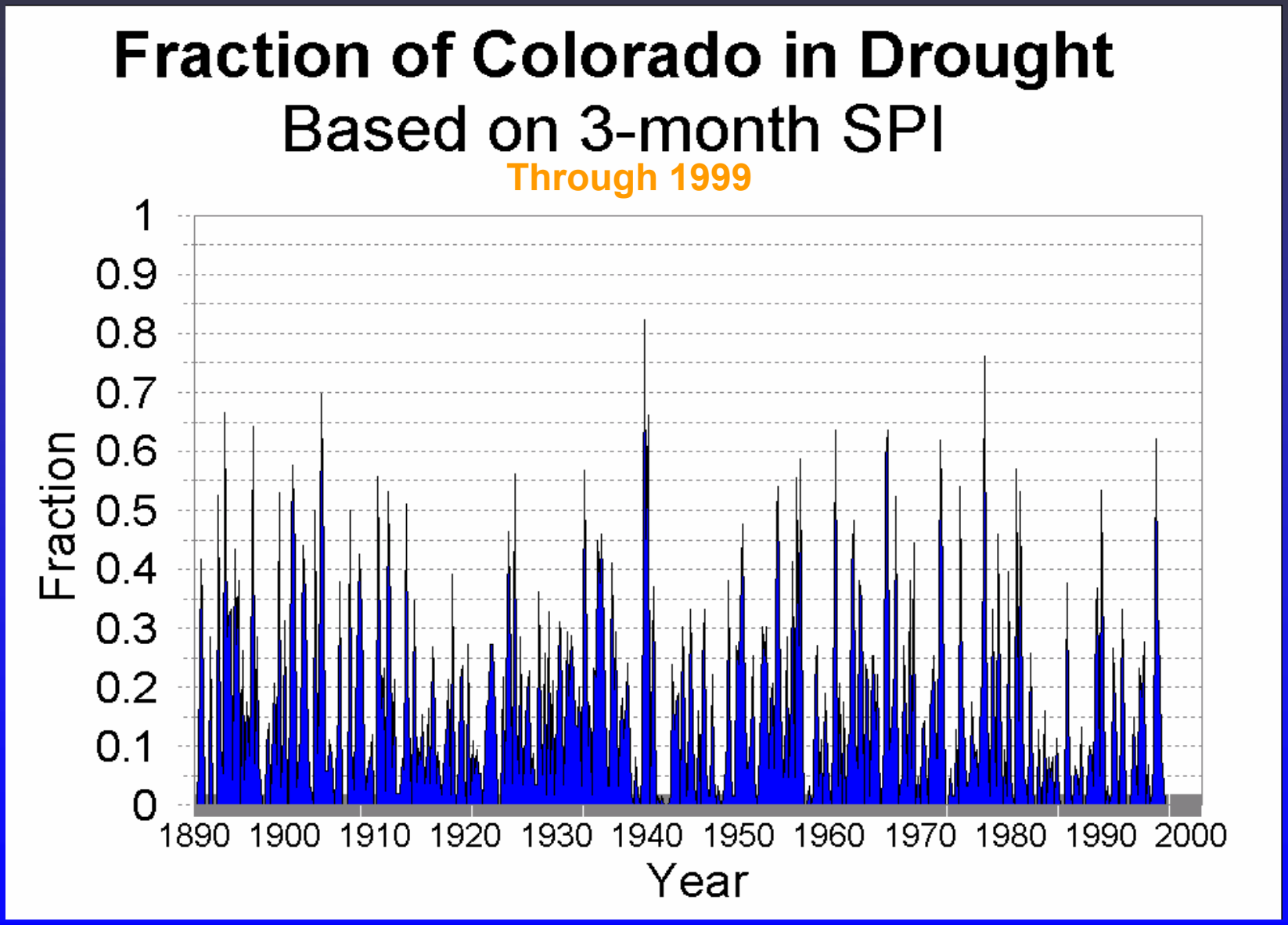
Prepared by Odie Bliss

The Evolution of Our Recent Drought

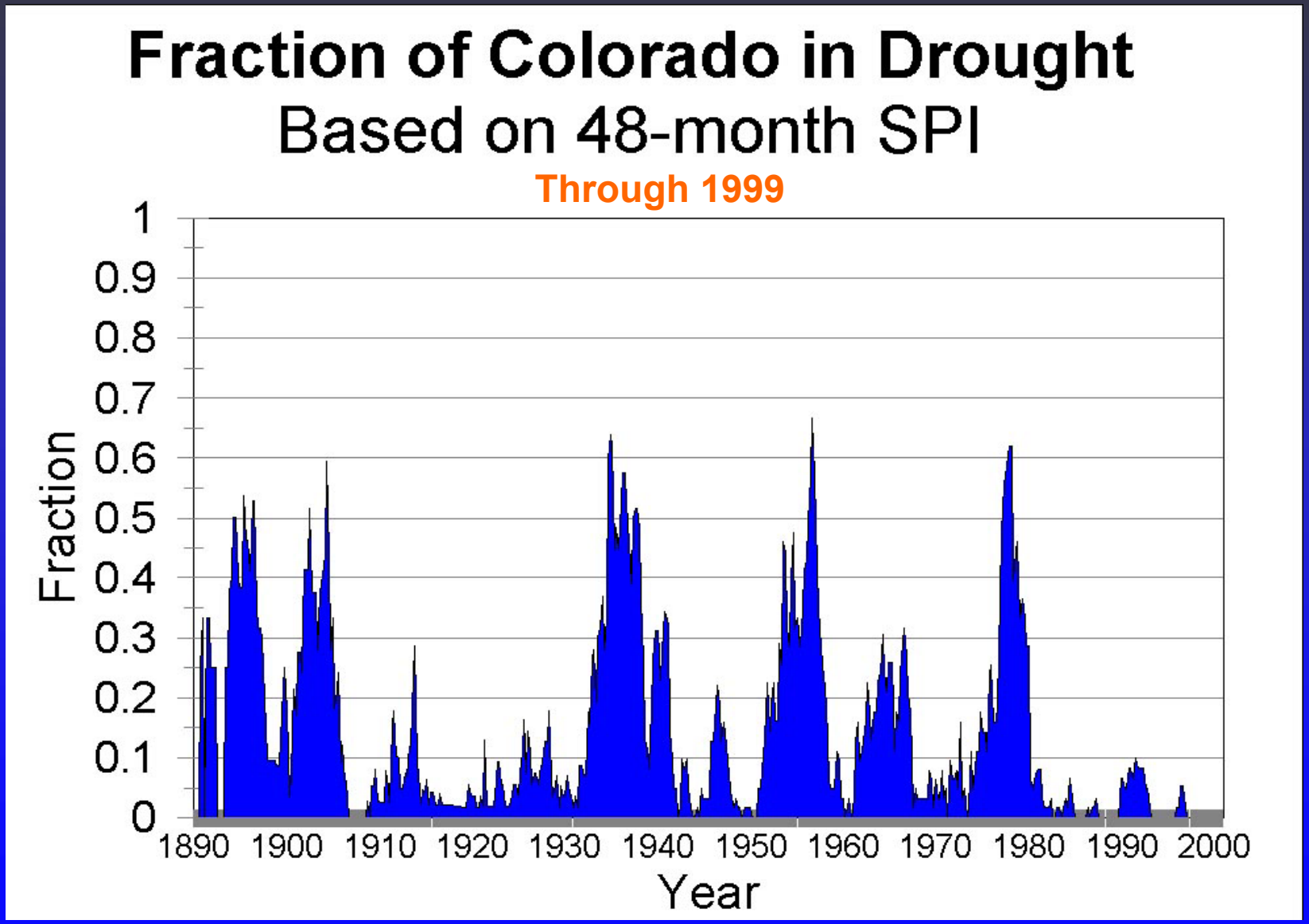
Lake Granby, 2002 drought

Grand Ditch, 2002 drought

3-Month SPI


Fraction of Colorado in Drought
Based on 3-month SPI
Through 1999
Fraction
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1890
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
Year

48-Month SPI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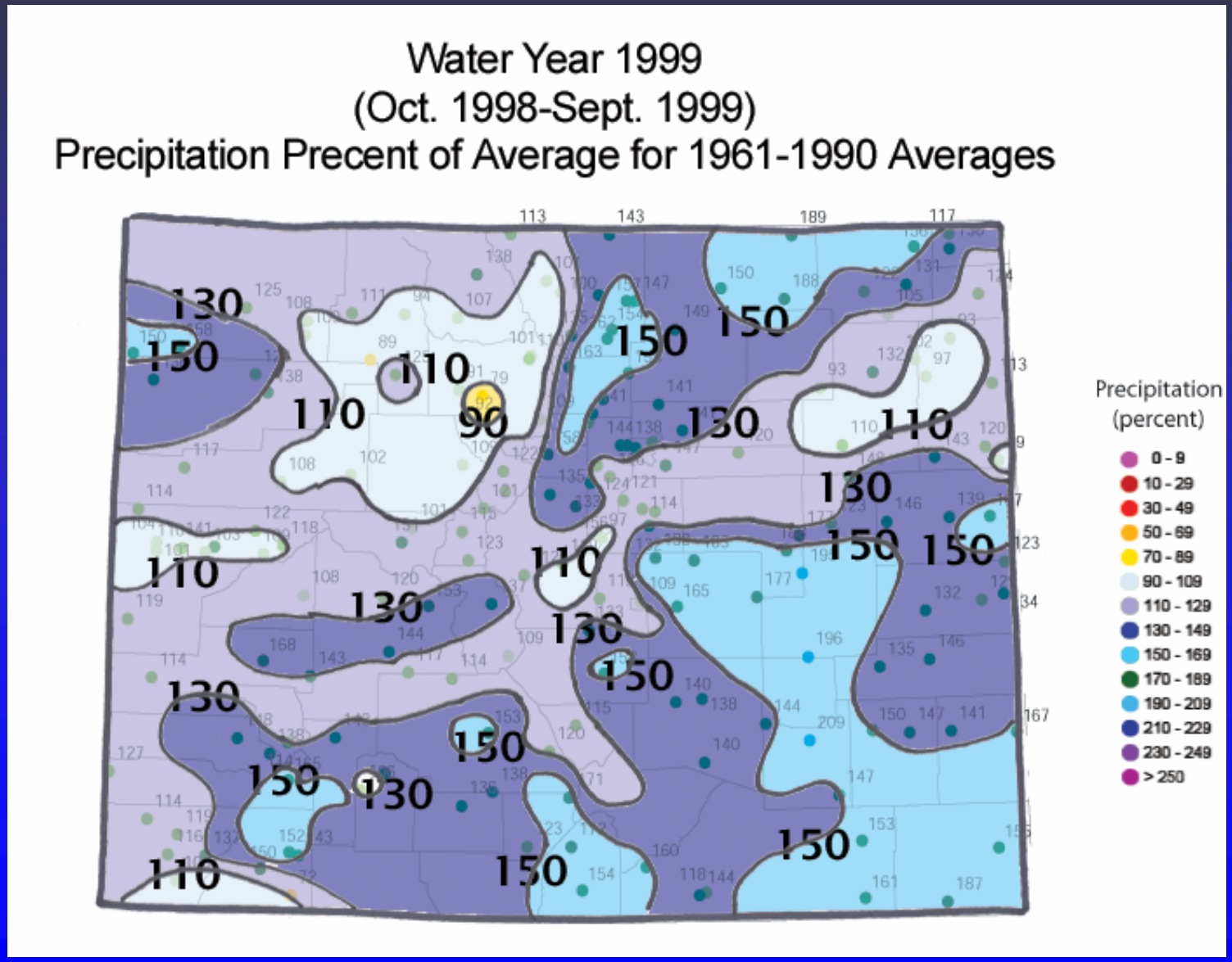
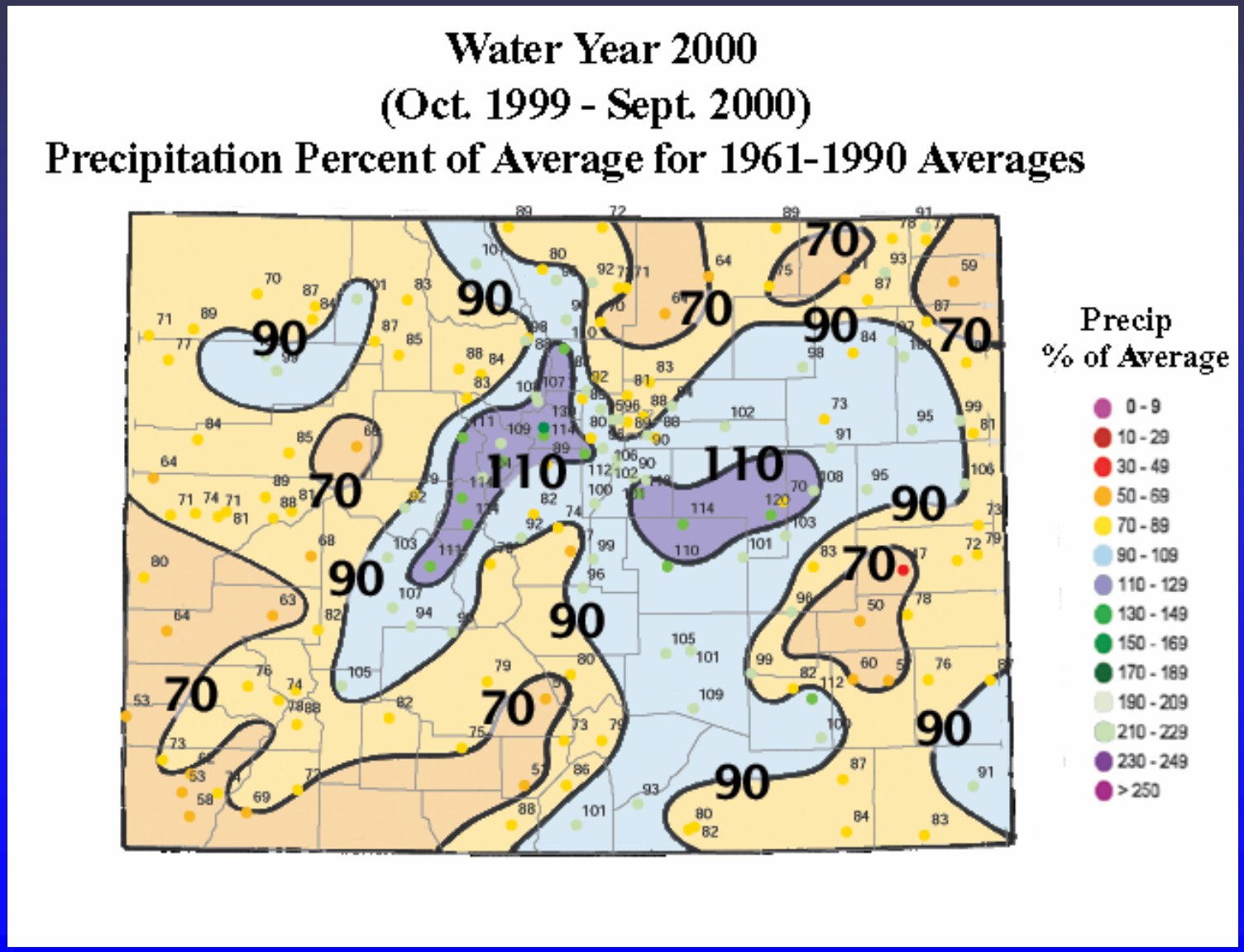
2000
Year

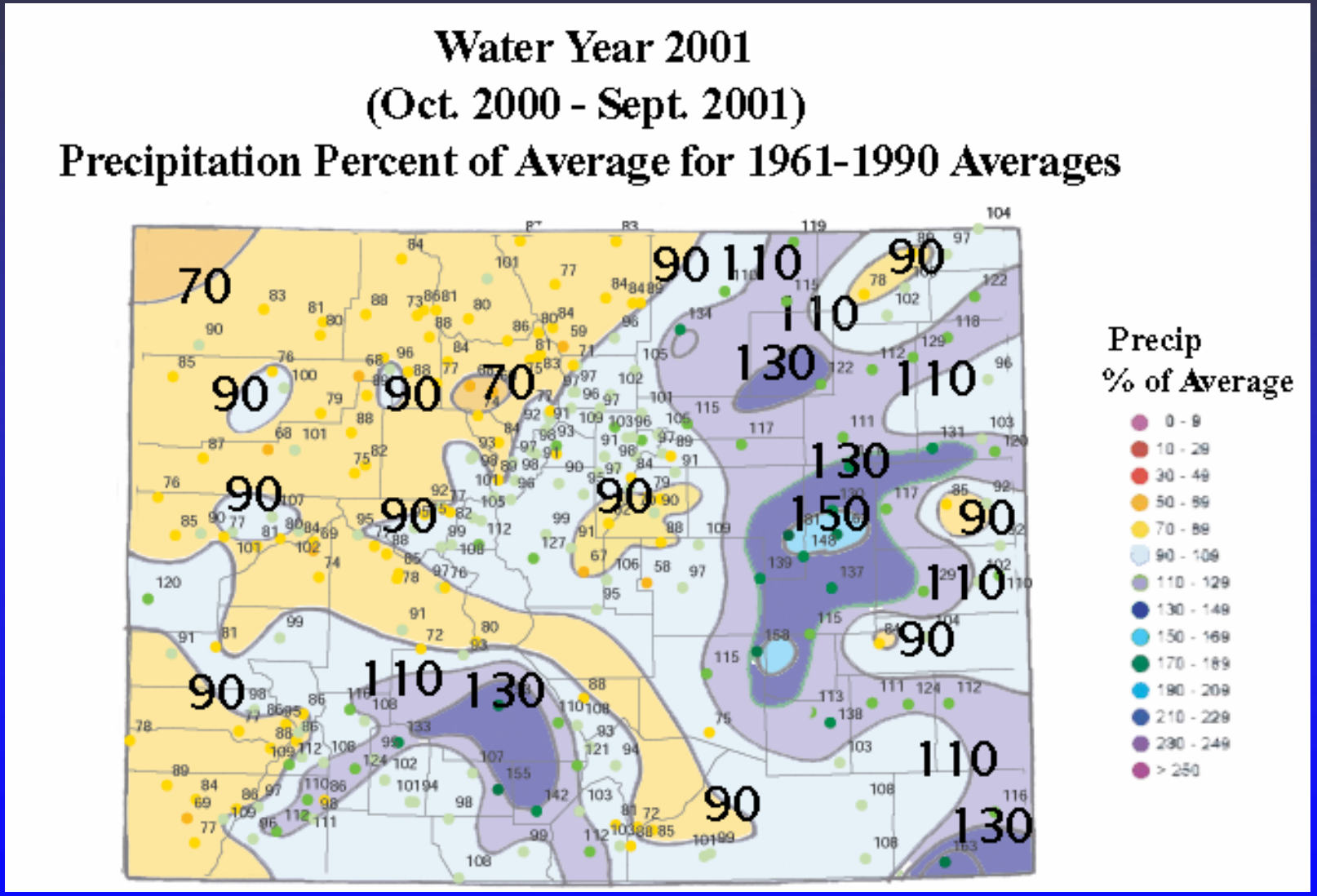
1999 Water Year Precipitation



2000 Water Year Precipitation



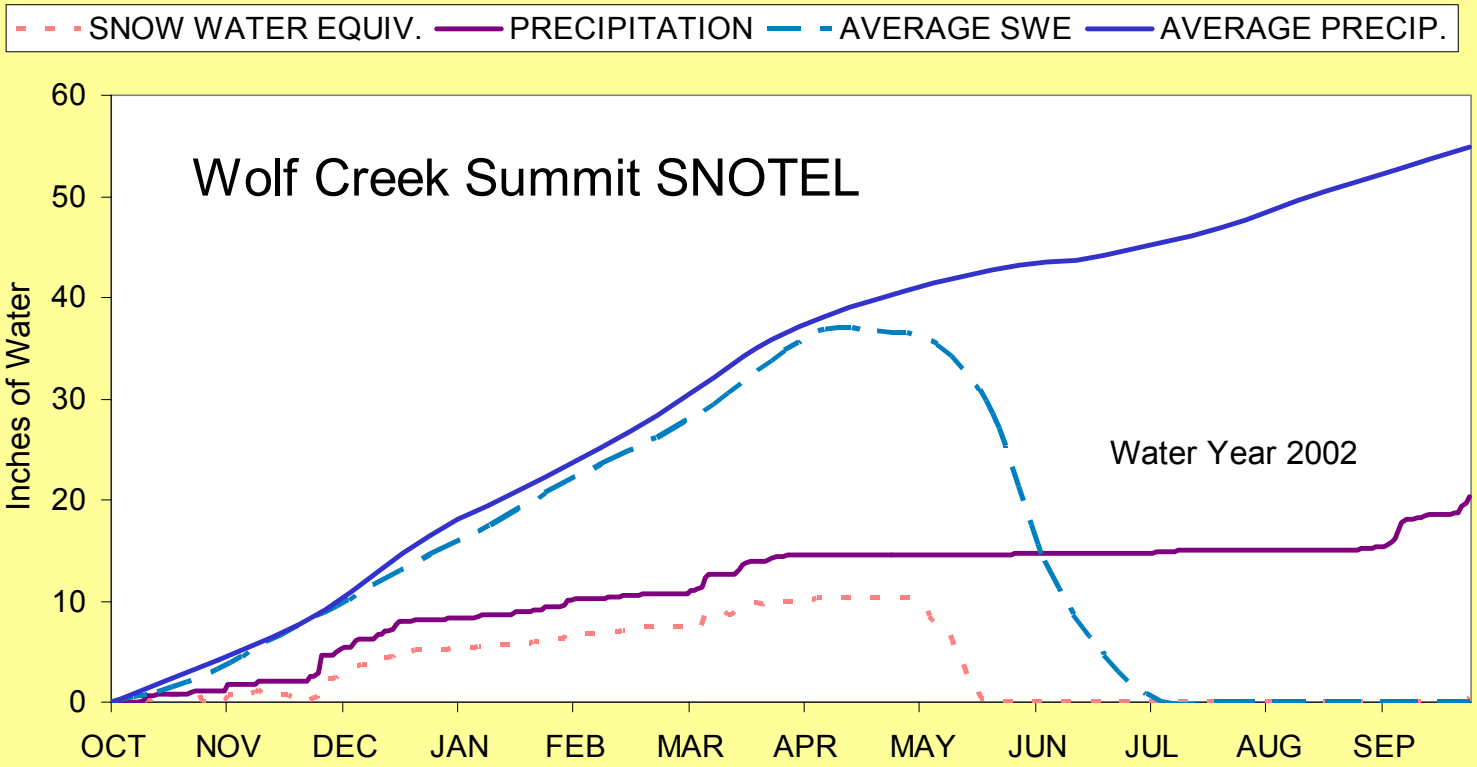
2001 Water Year Precipitation



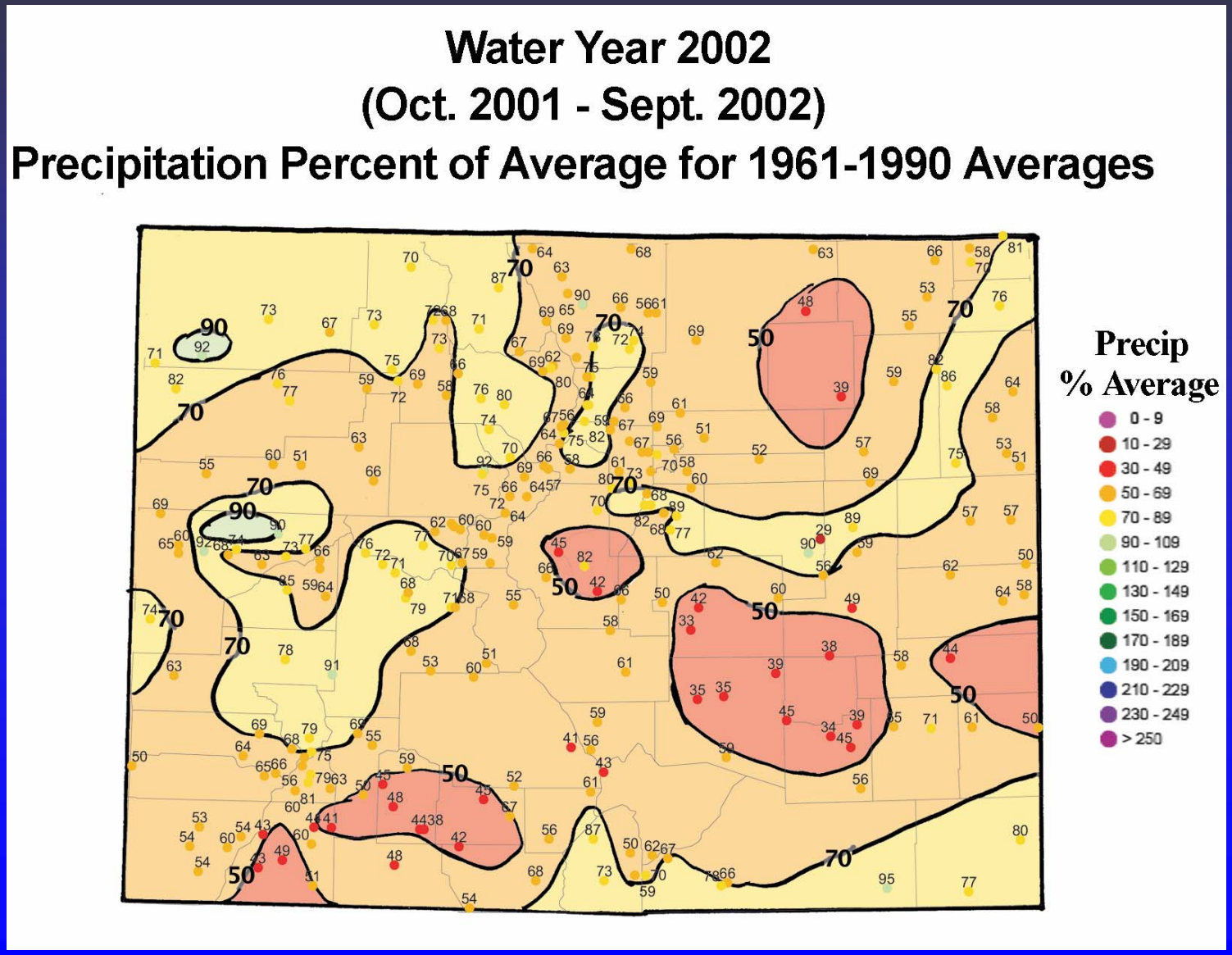
Negative Indicators

- Little late winter snow
- Missed opportunities
- Warm spring
- Brief, sporadic precipitation
- High intensity rainfall
- Frequent, strong winds
- Low humidity
- Abundant sunshine

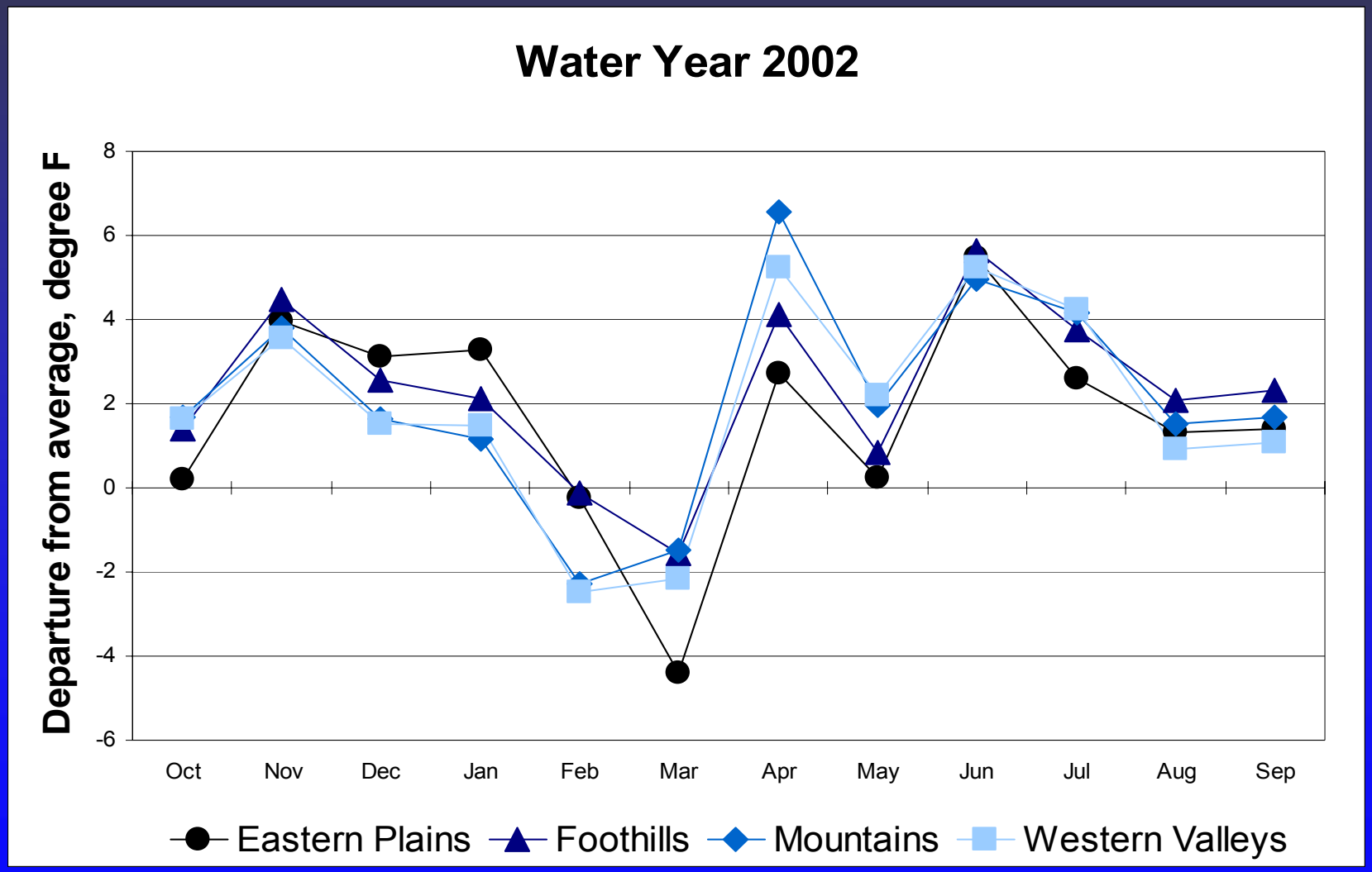
2002 Snow Water Equivalent



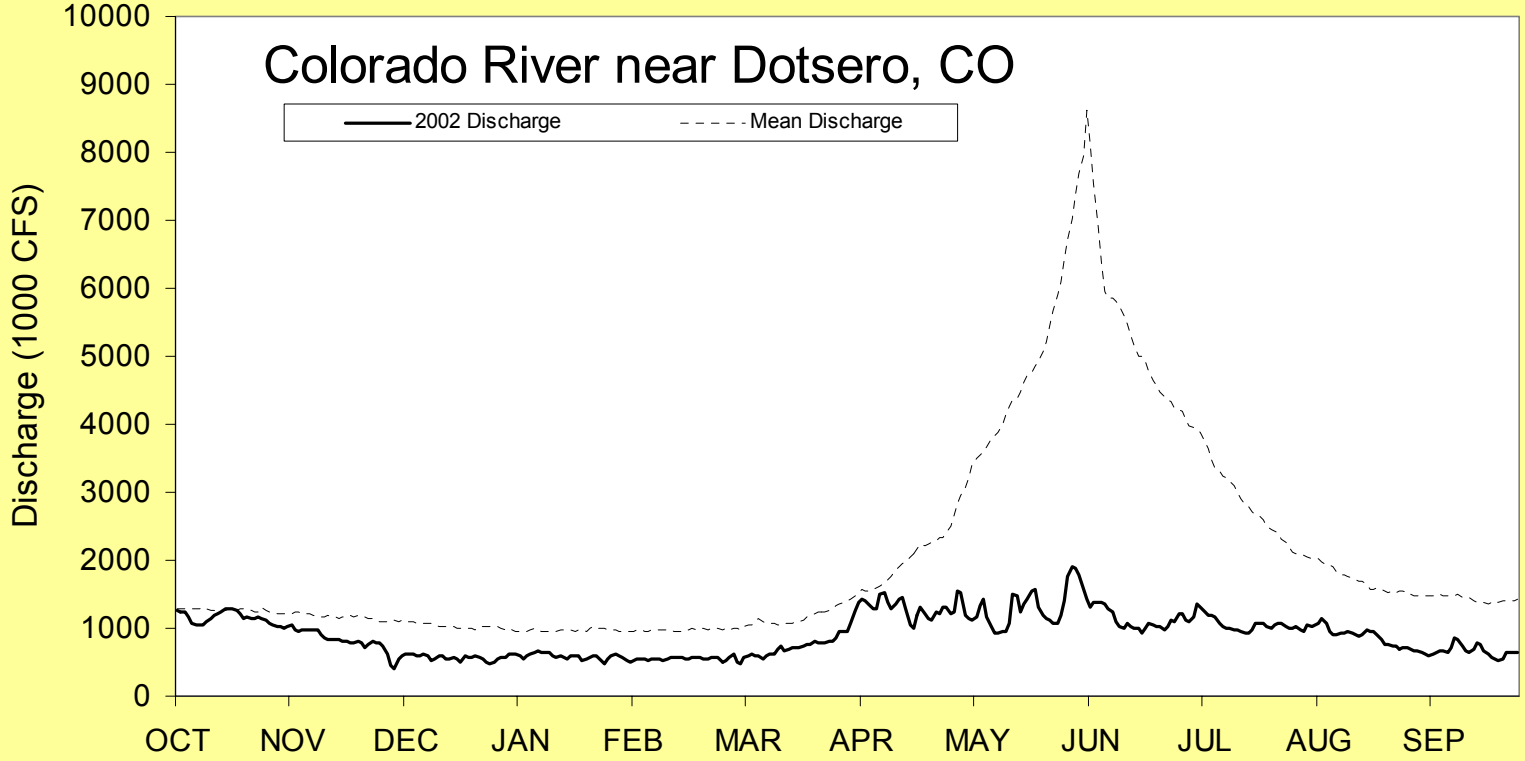
2002 Water Year Precipitation



WY2002 Temperature Departures



2002 Daily Streamflow



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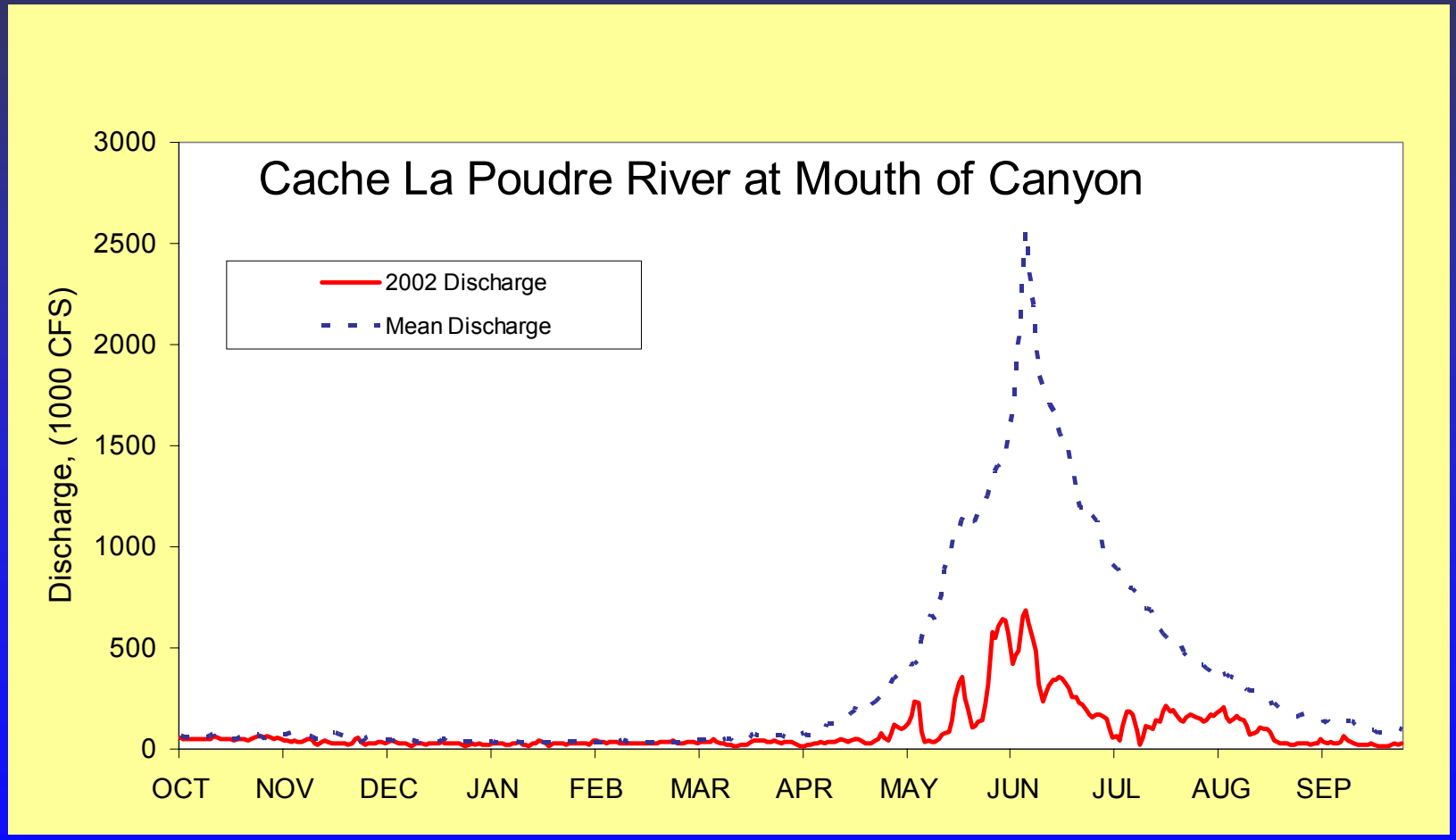
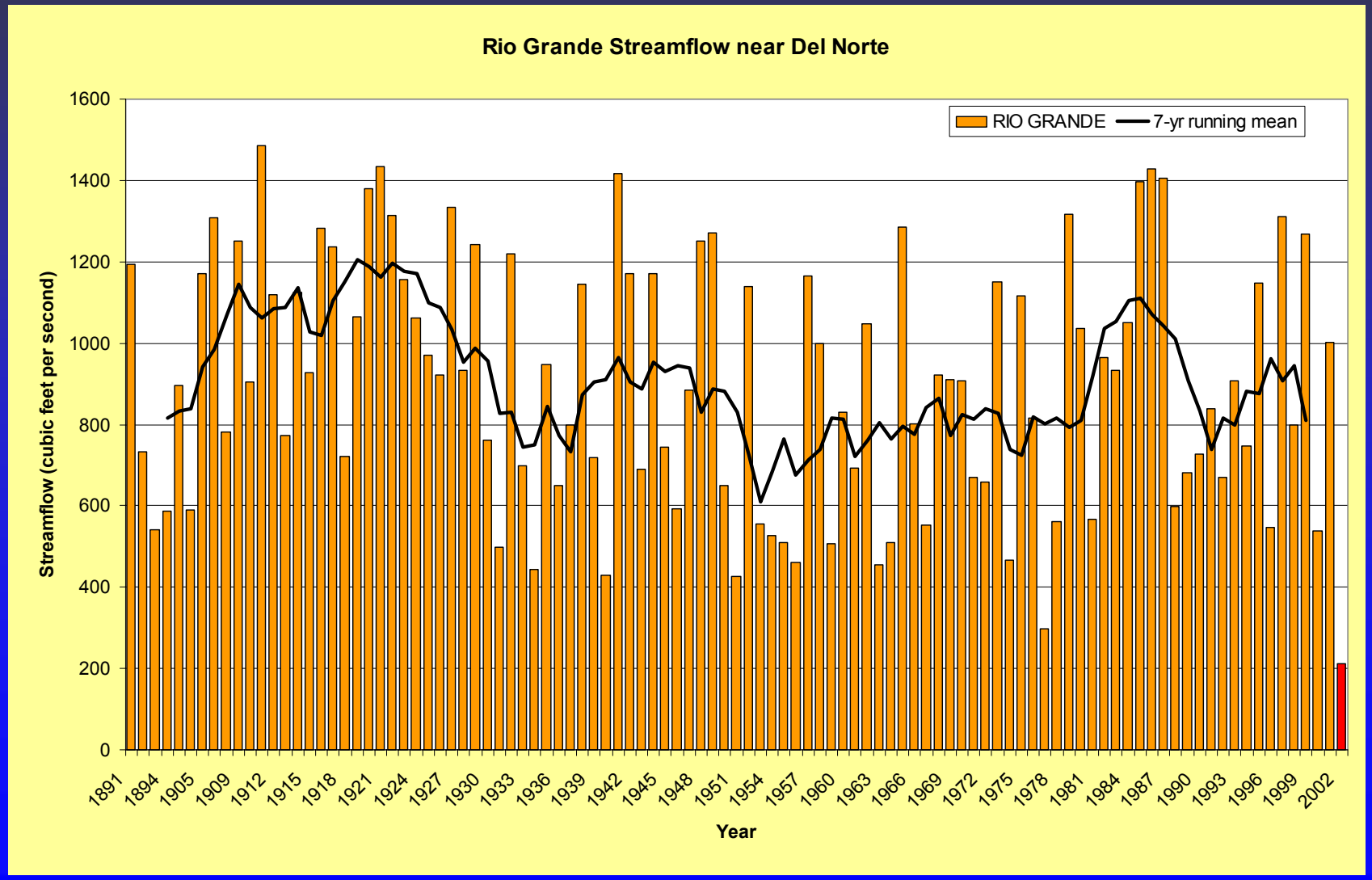
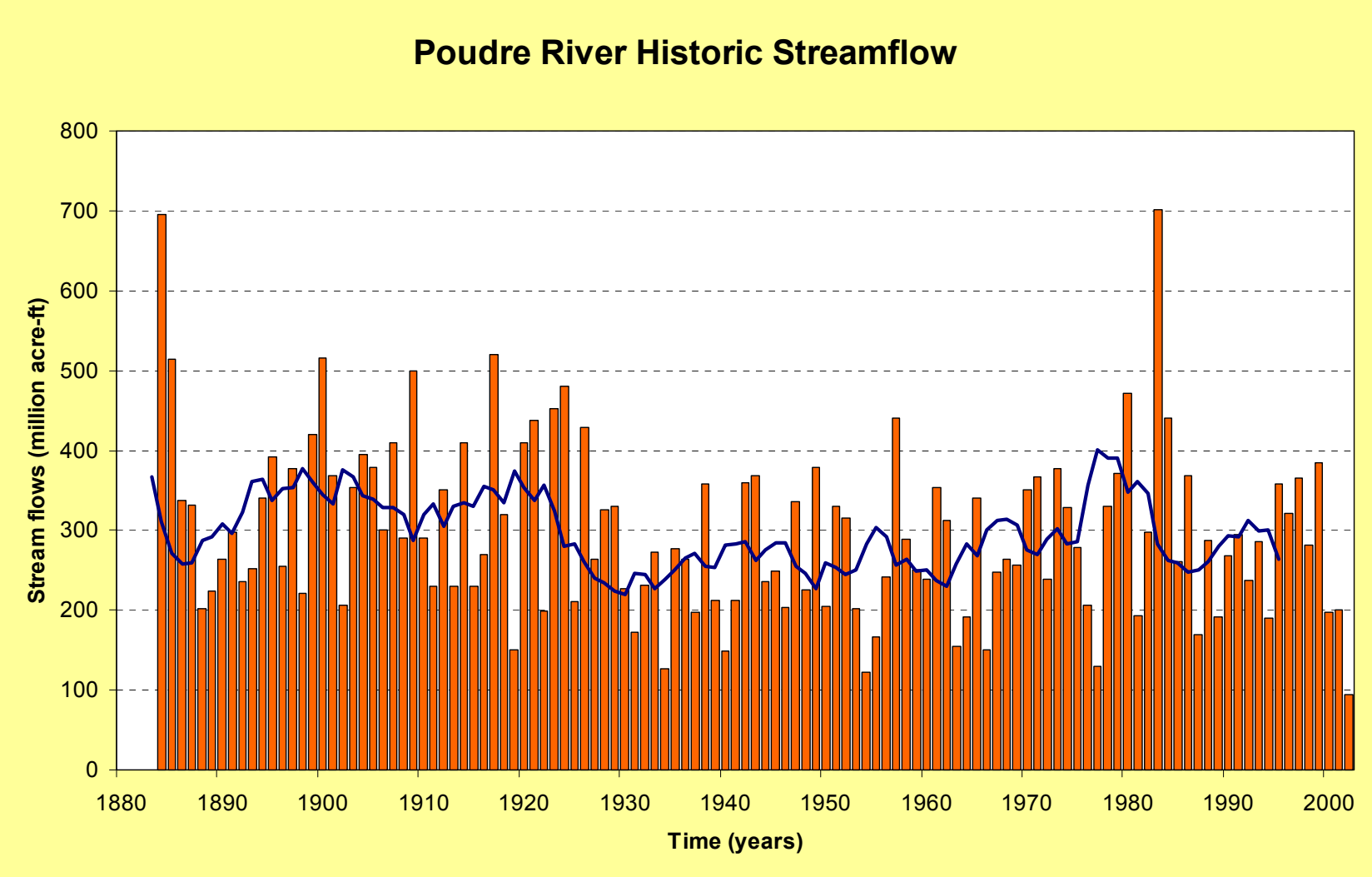


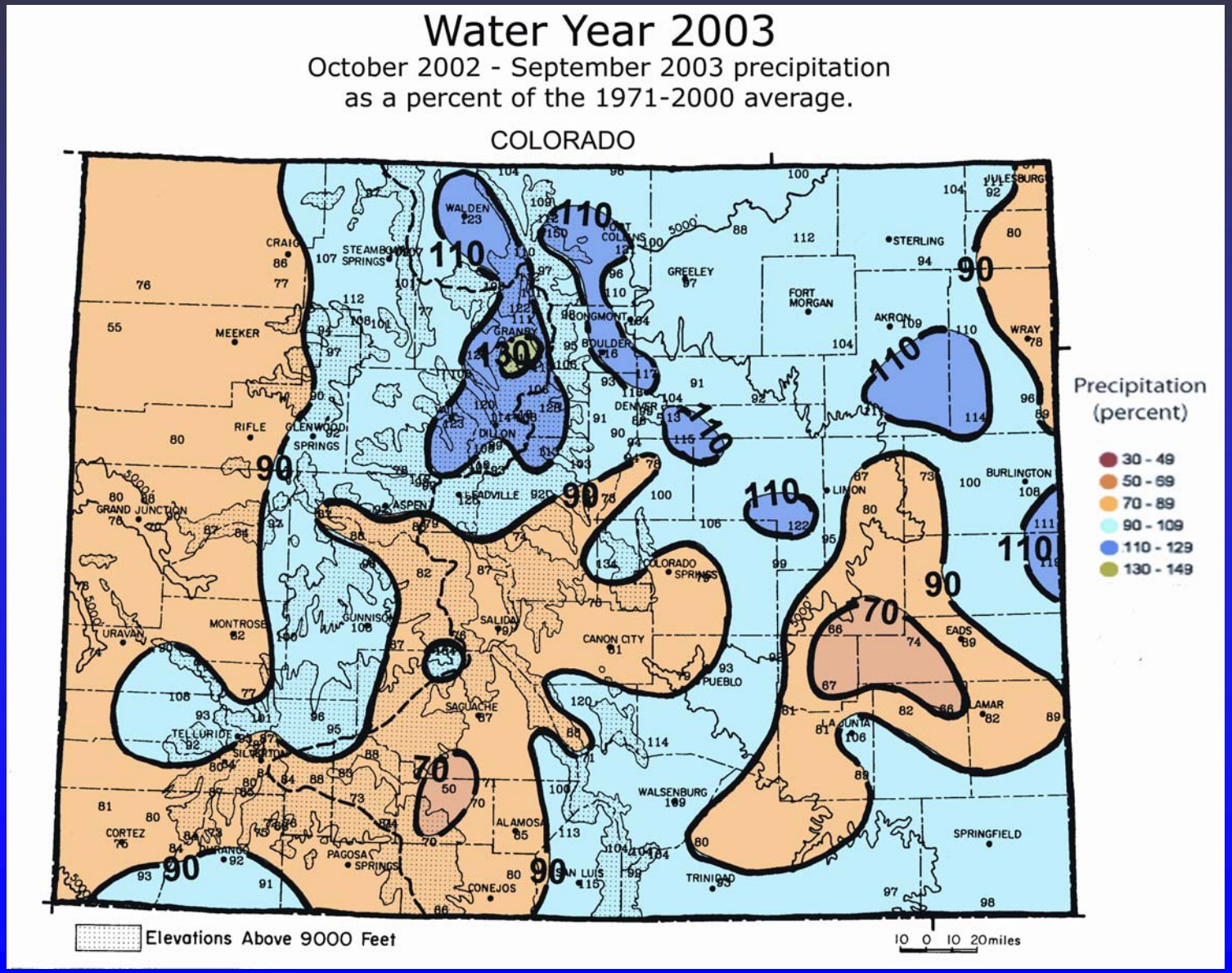
Rio Grande Streamflow History



Poudre River Streamflow History

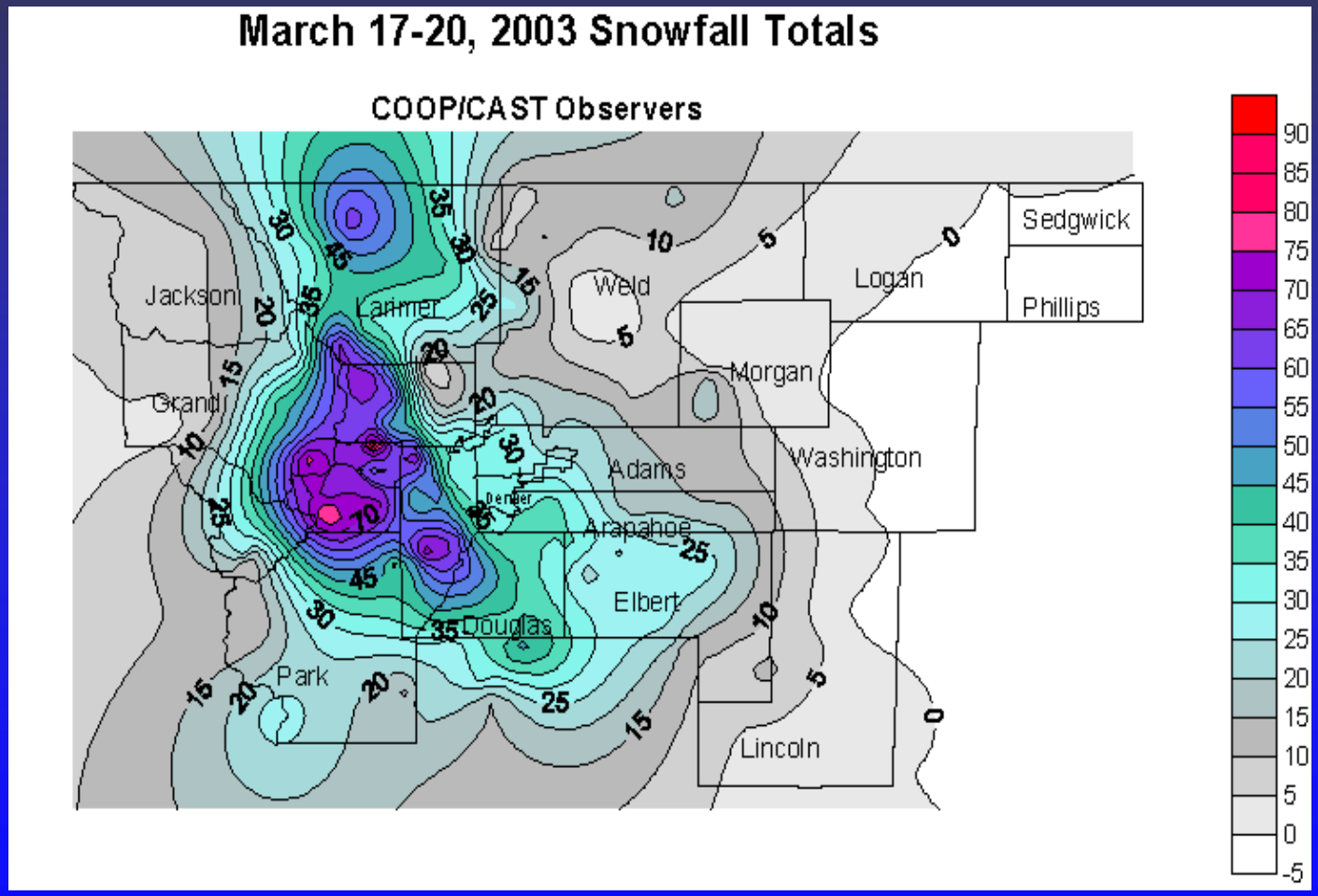


2003 Water Year Precipitation

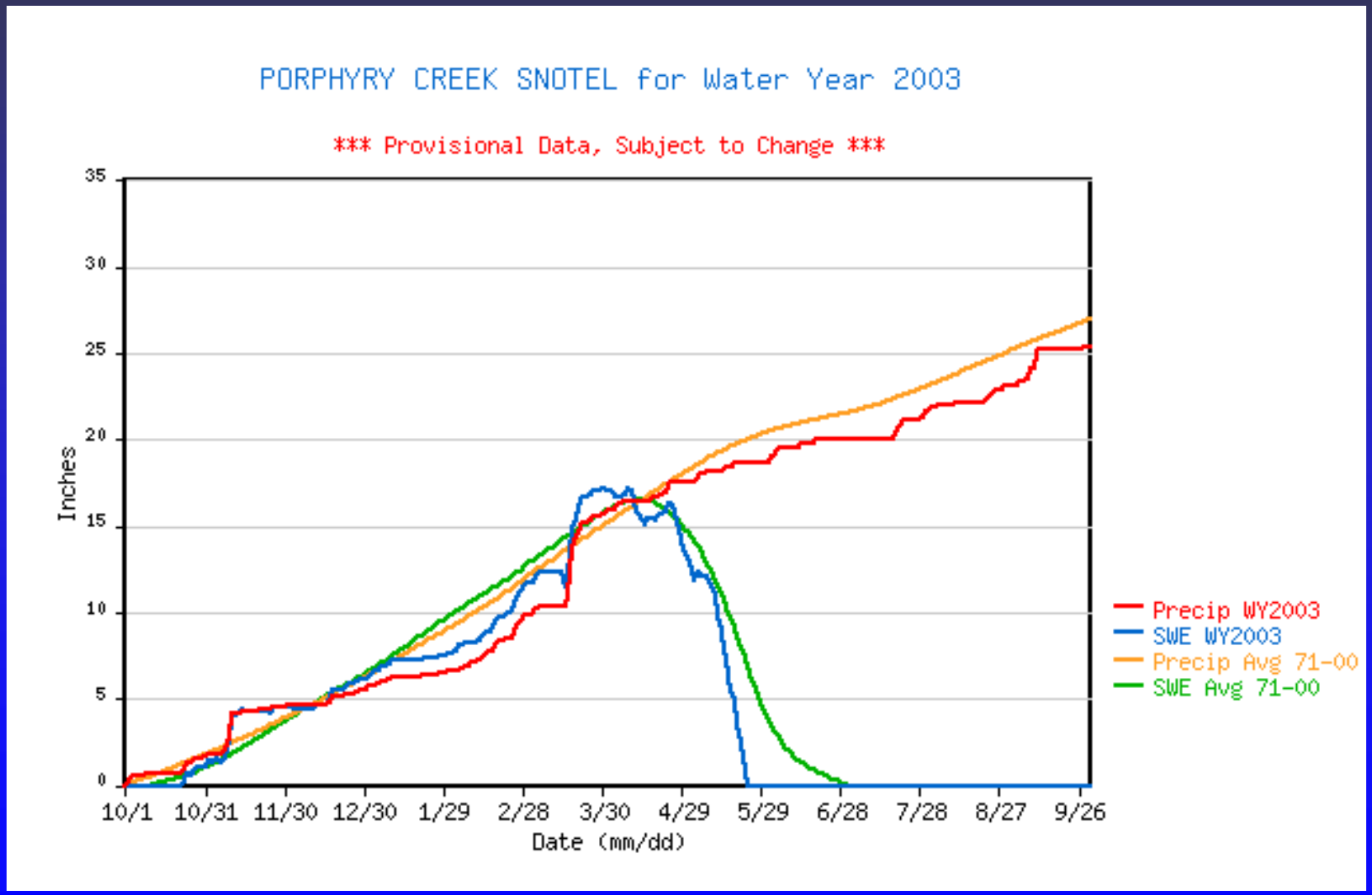


March 2003 Snowstorm

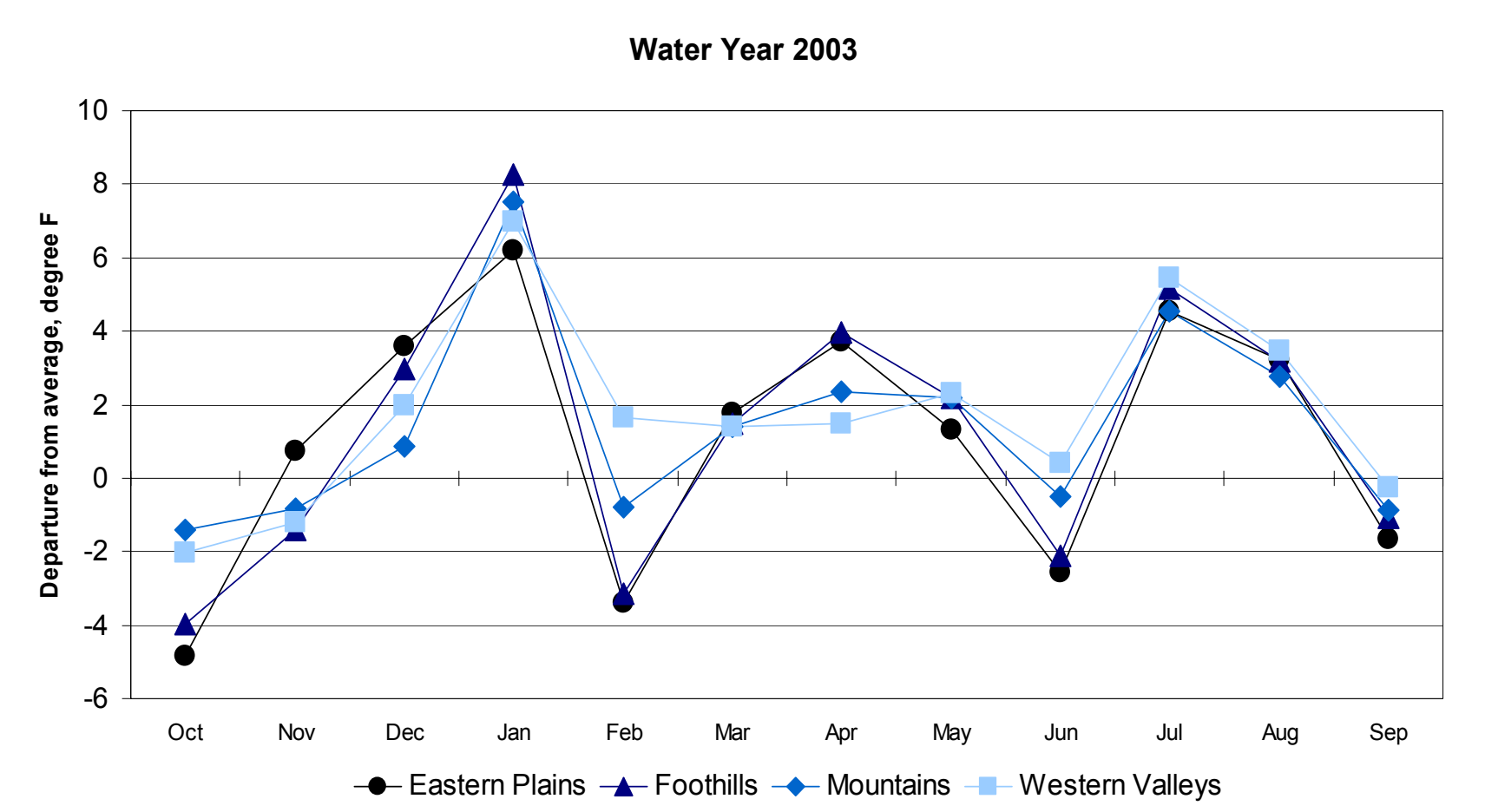
March 2003 Snowfall Totals



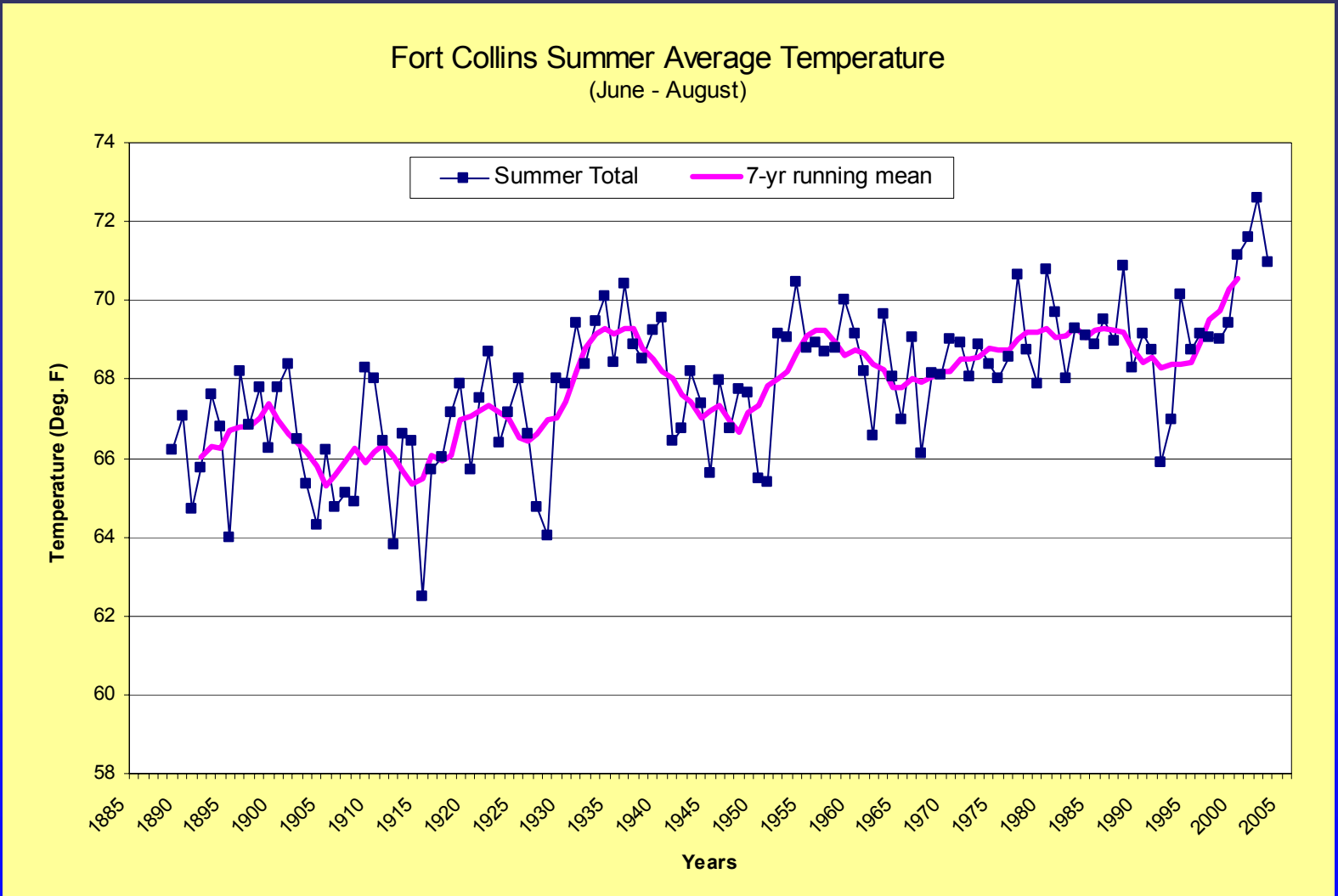
2003 SWE Porphyry Creek



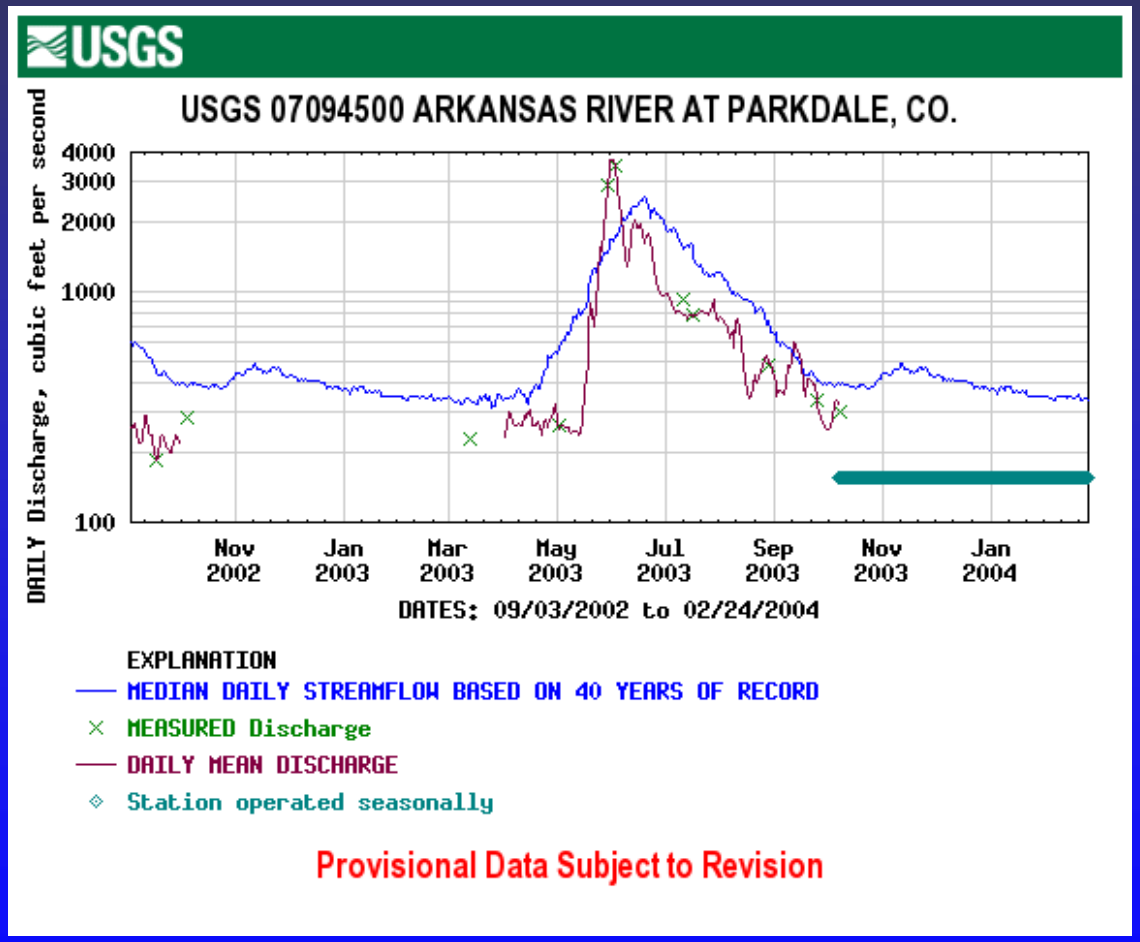
WY2003 Temperature Departures



Fort Collins Summer Temperatures

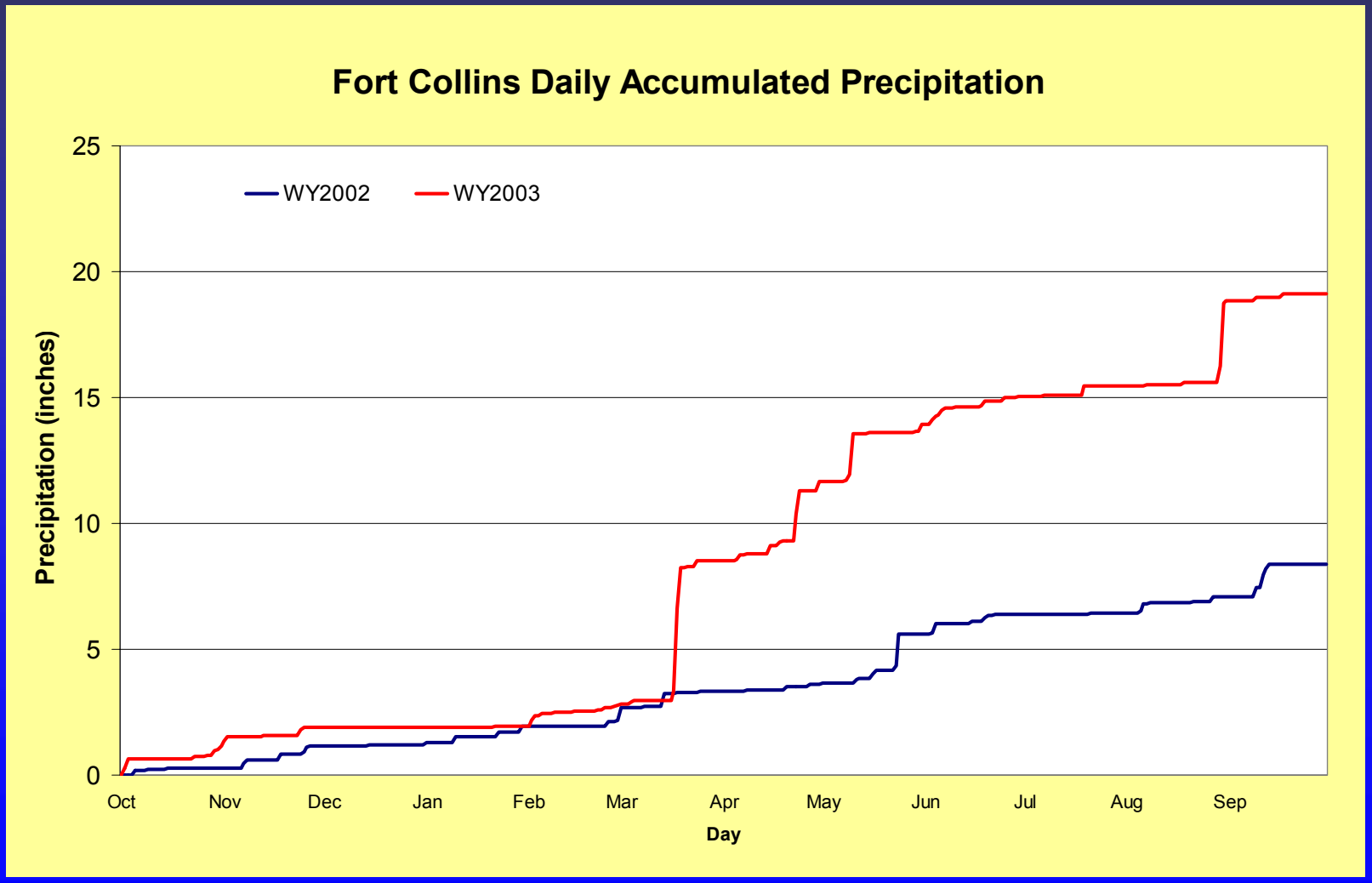


2003 Daily Streamflow



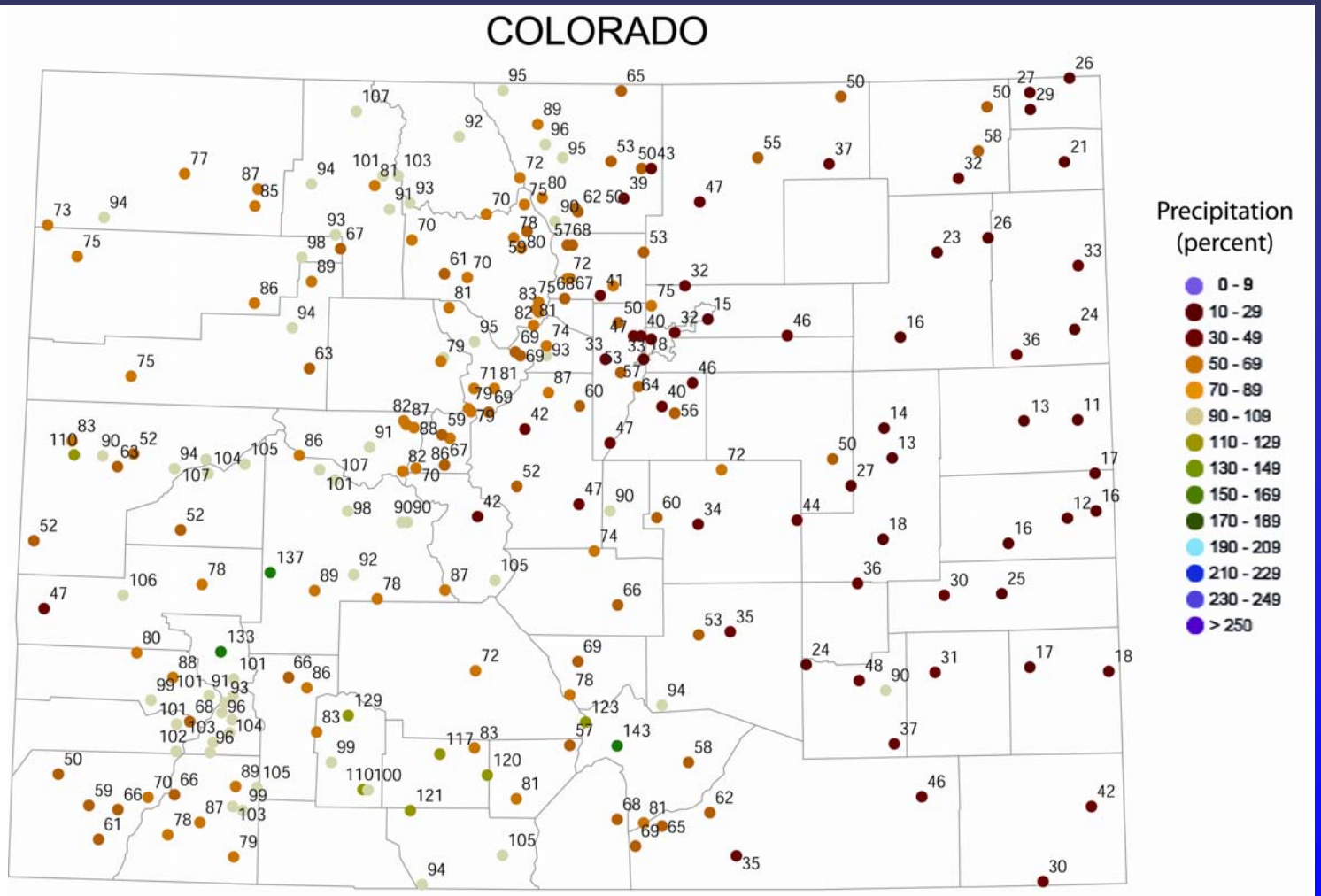
http://water.usgs.gov/cgi-bin/daily_flow?co

Fort Collins Daily Accumulated Precipitation for WY2002 and WY2003



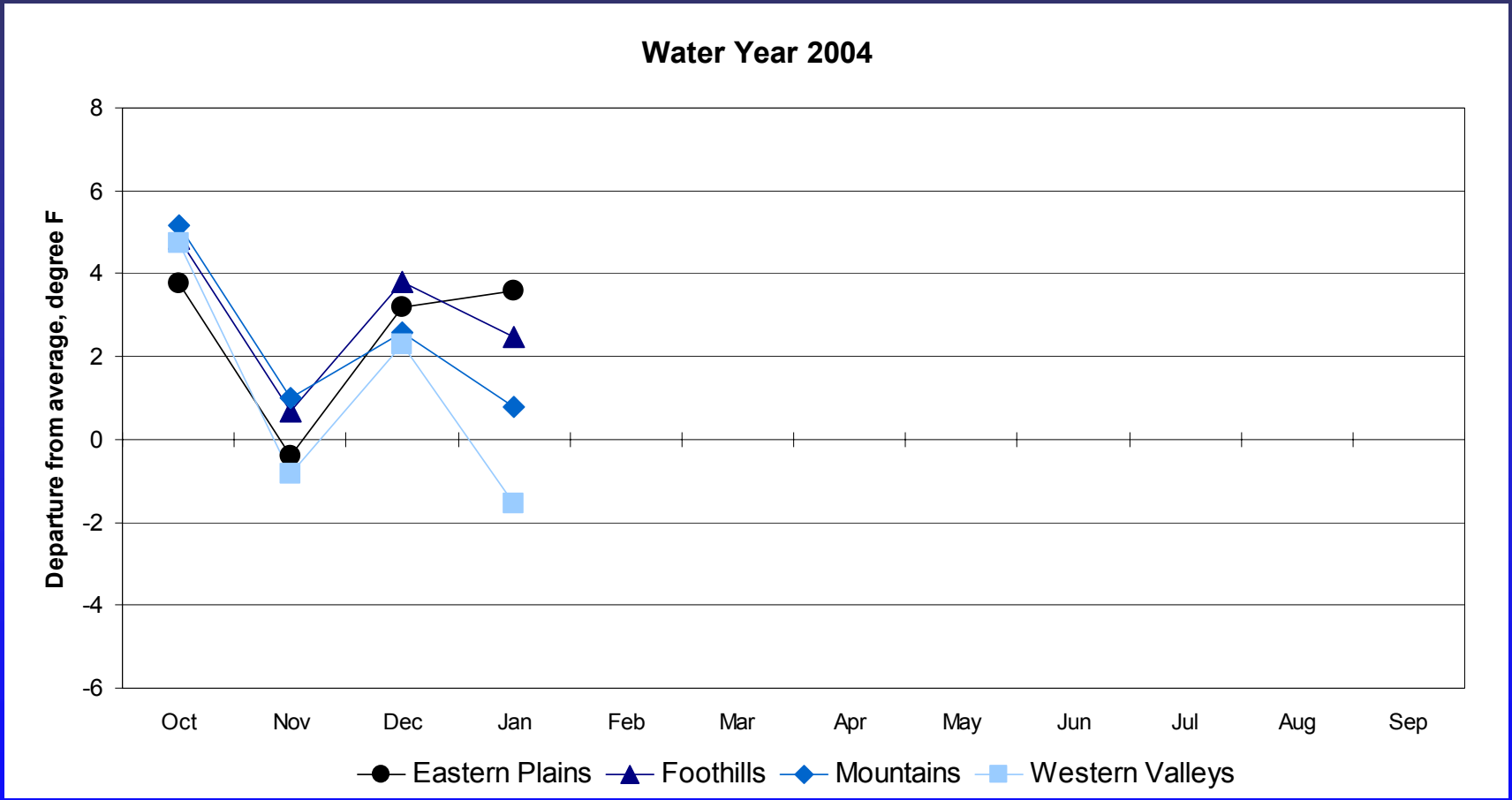
Where Do We Stand Now?

Water Year 2004 (Oct 03-Jan 04) Precipitation as Percent of Average

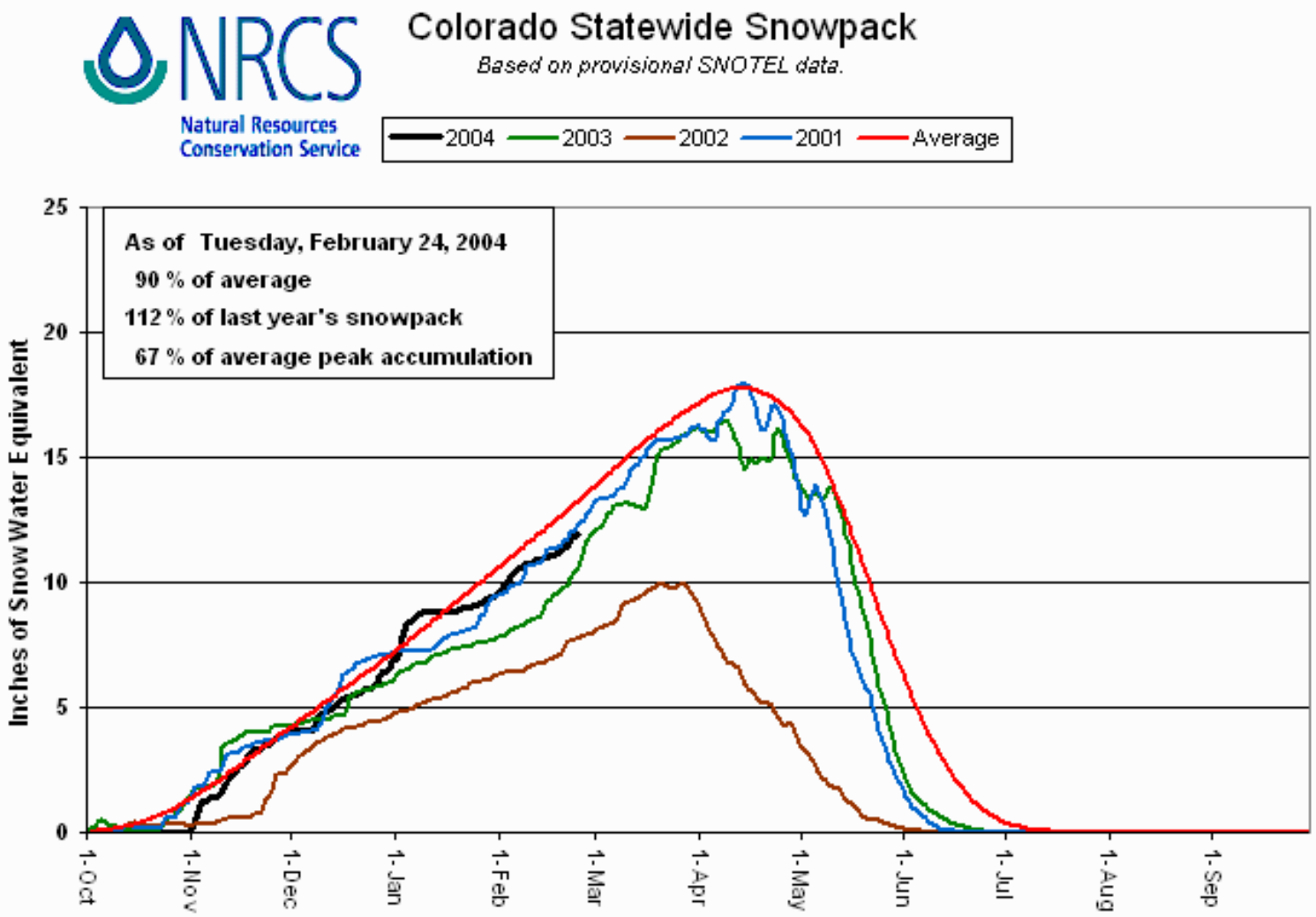


Water Year 2004 (October 2003 through January 2004) precipitation as a percent of the 1971-2000 average.

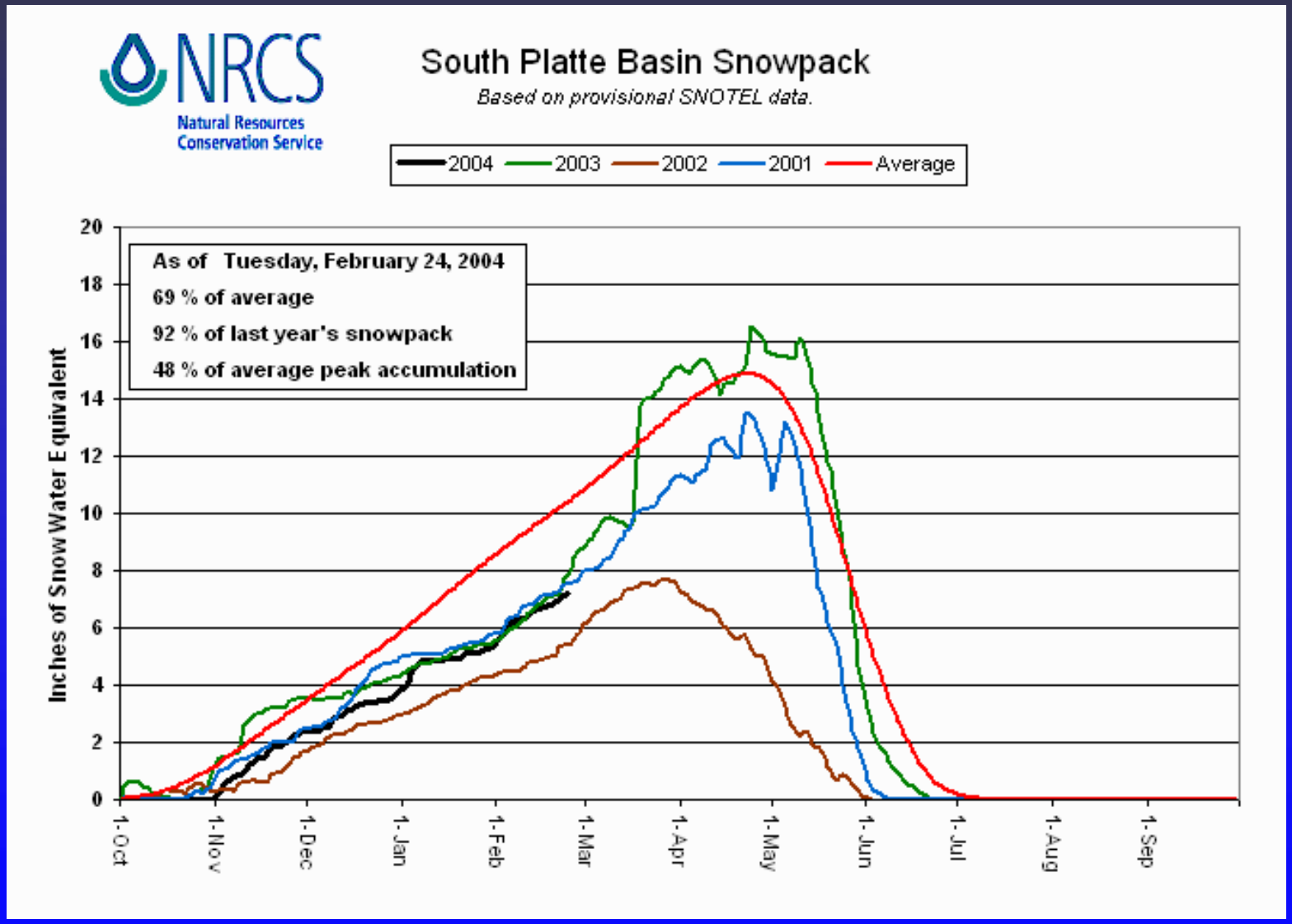
WY2004 (Oct 2003–Jan 2004) Temperature Departures



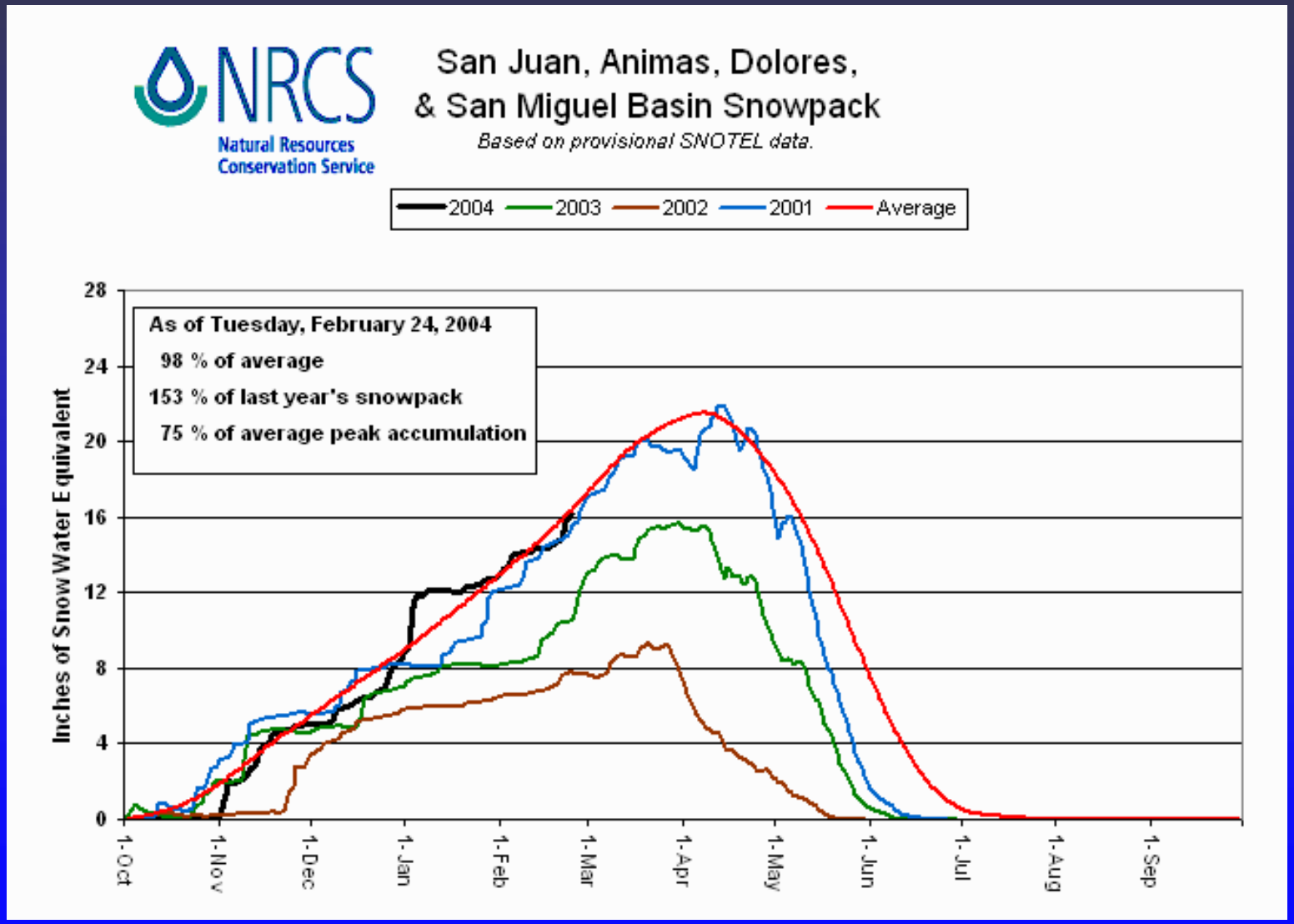
Colorado Statewide Snowpack



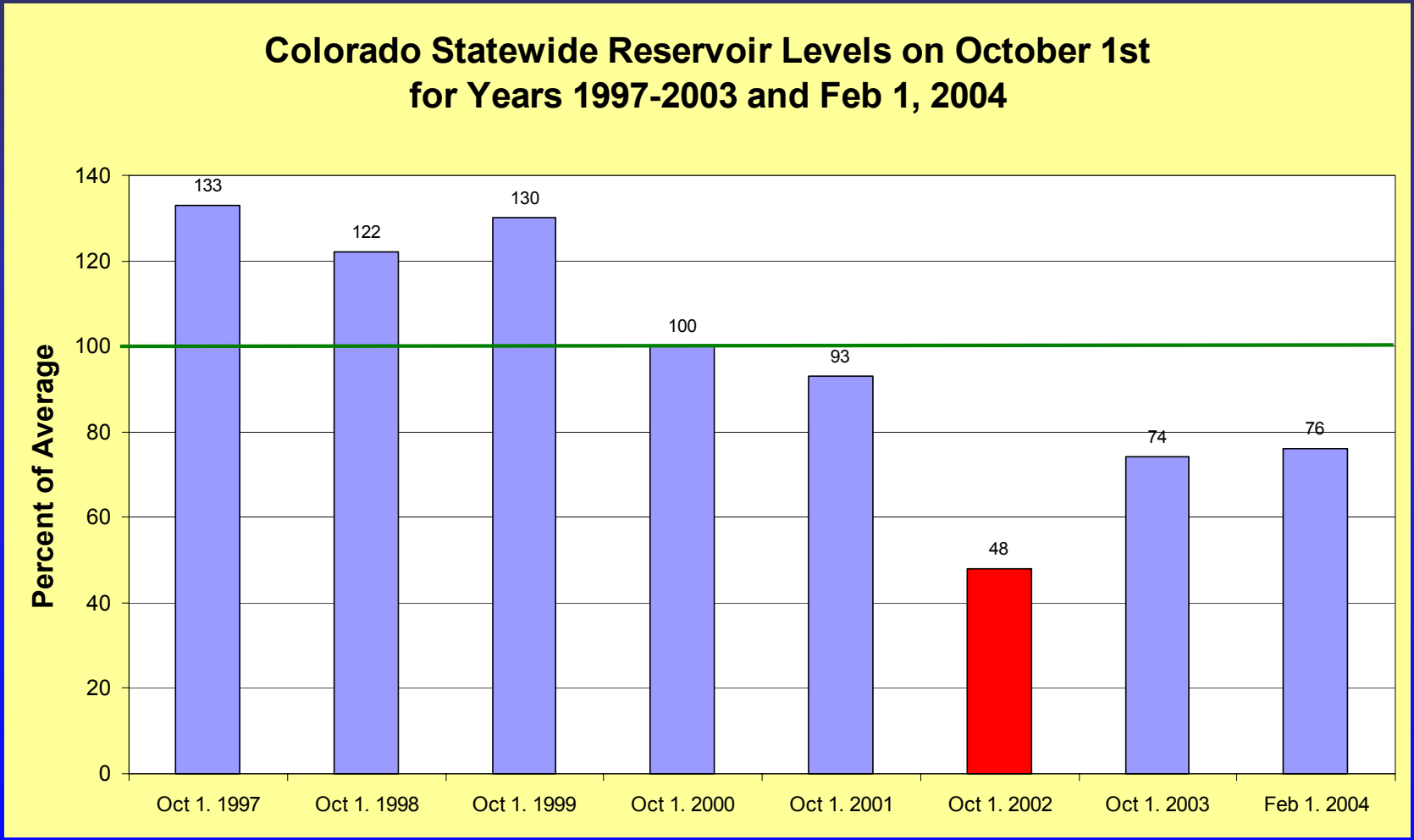
South Platte Snowpack



San Juan-Dolores-Animas Snowpack

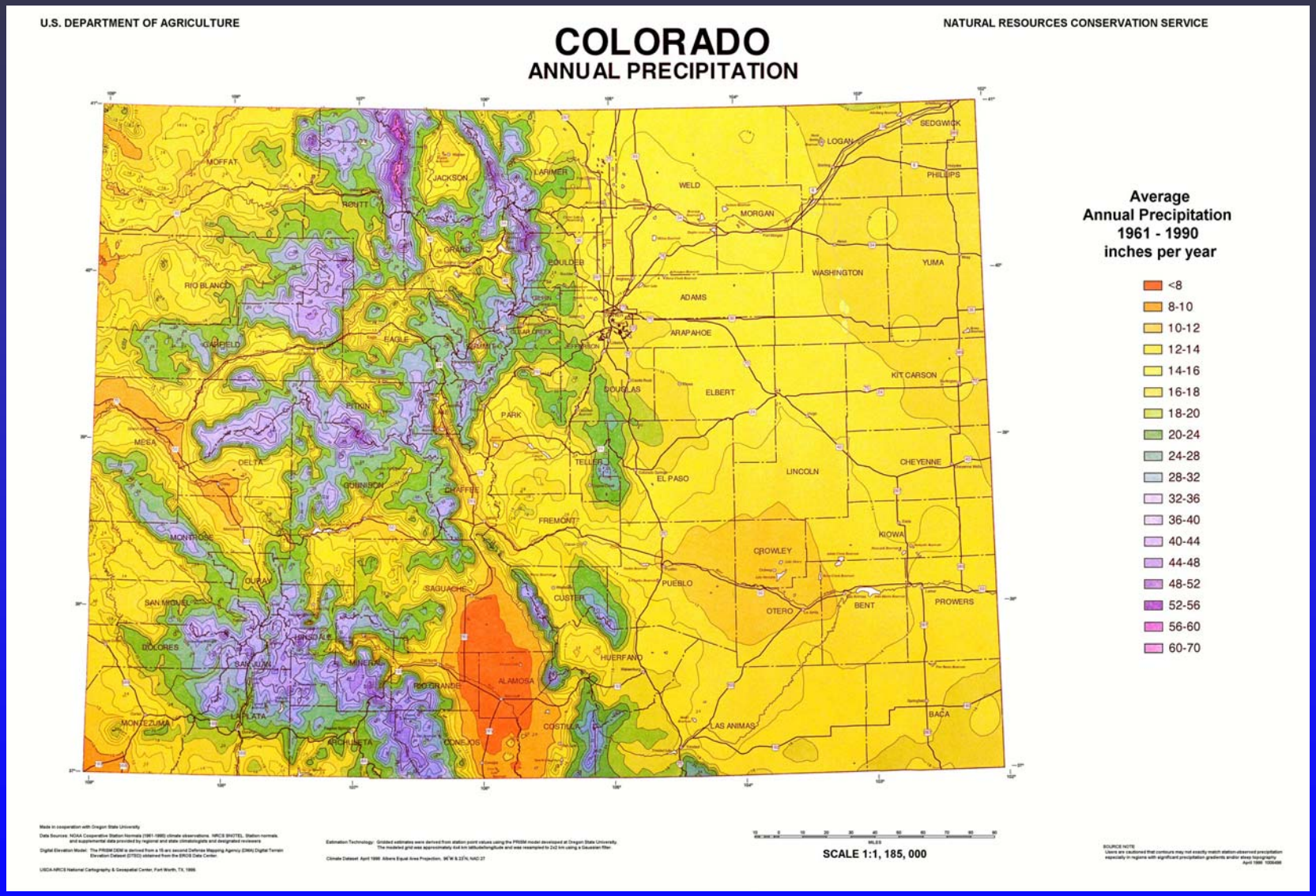


Reservoir Levels

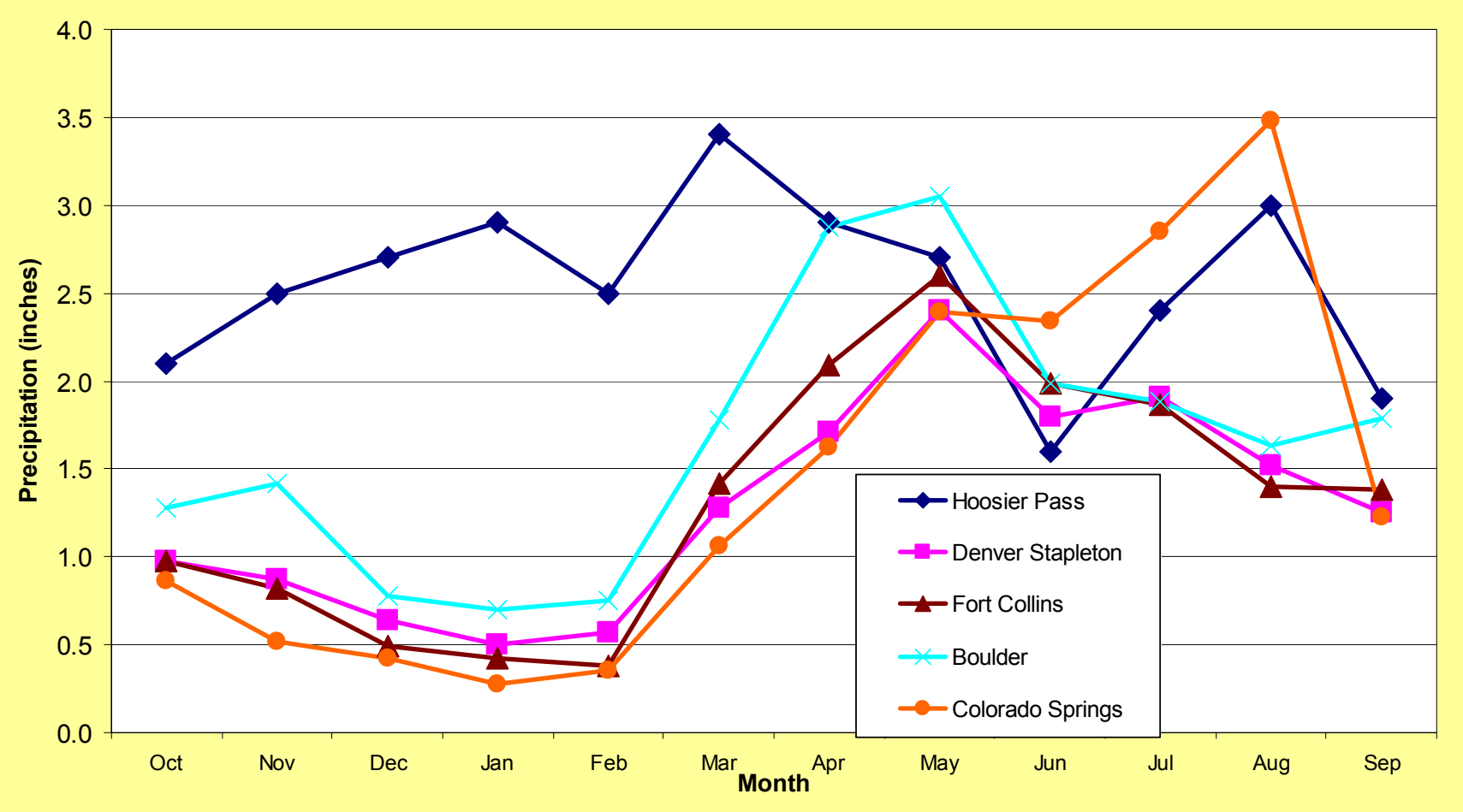


What Comes Next?

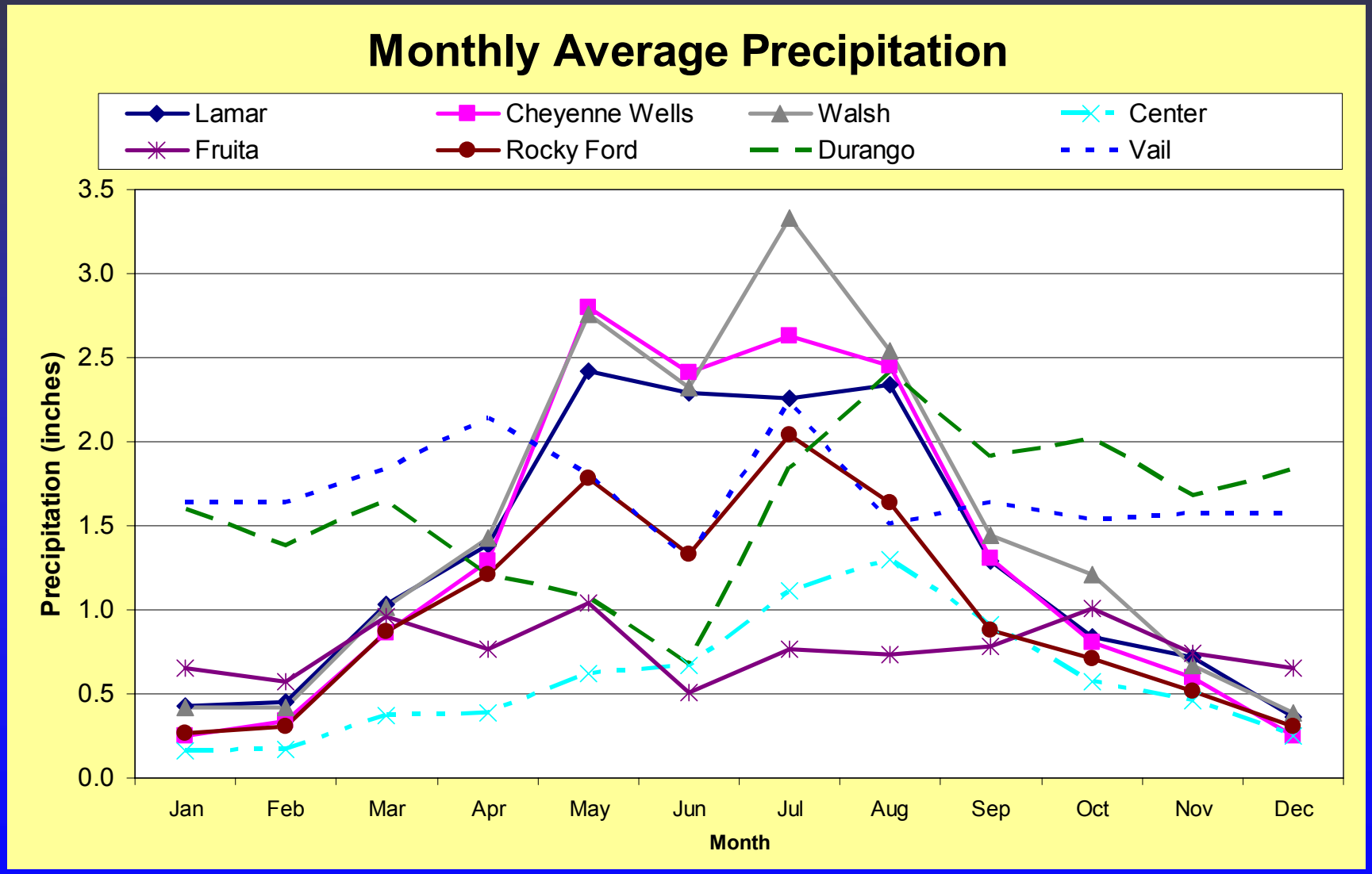
Colorado Average Precipitation



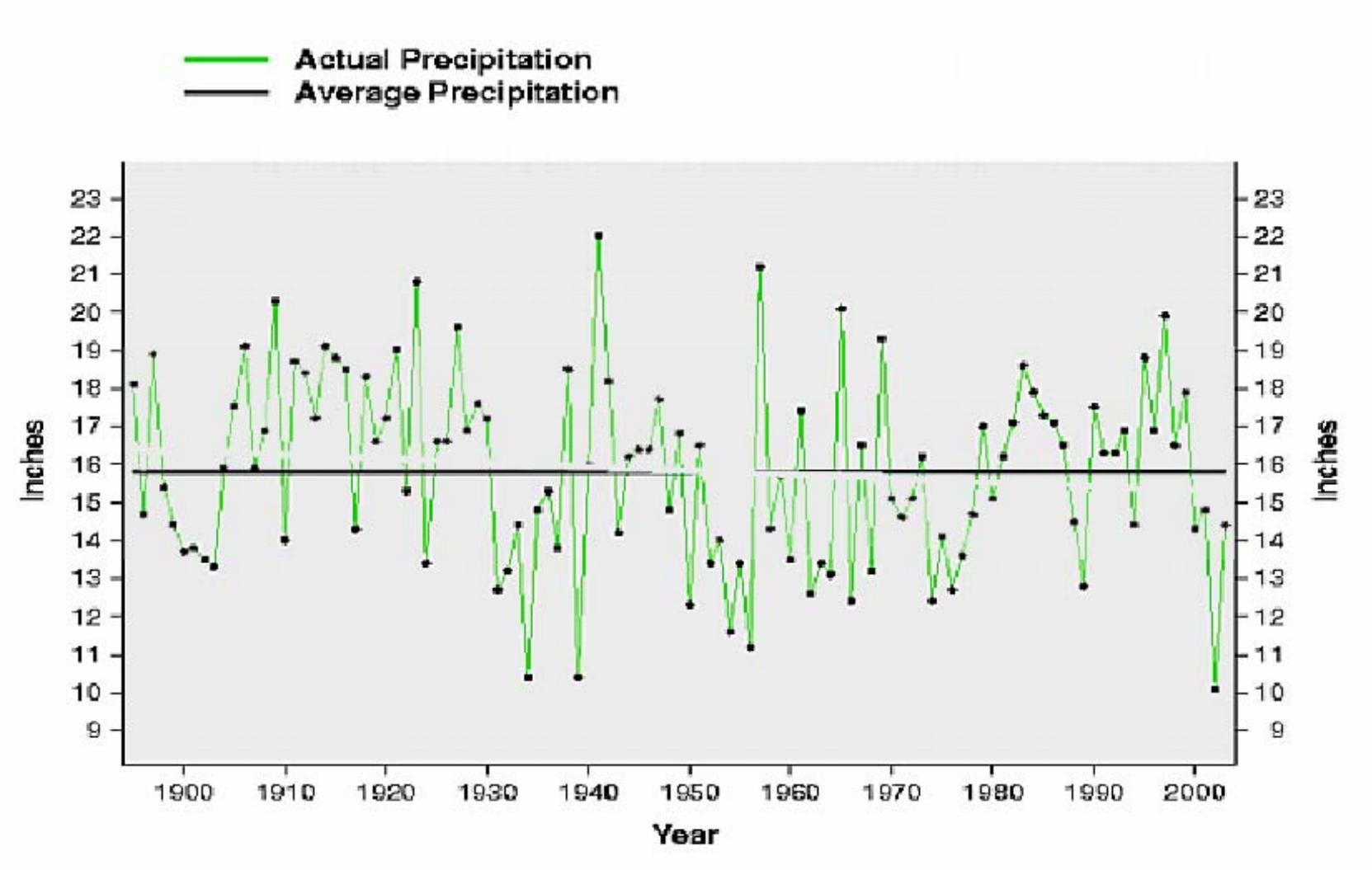
Front Range Monthly Average Precipitation



Average Precipitation for Selected Sites

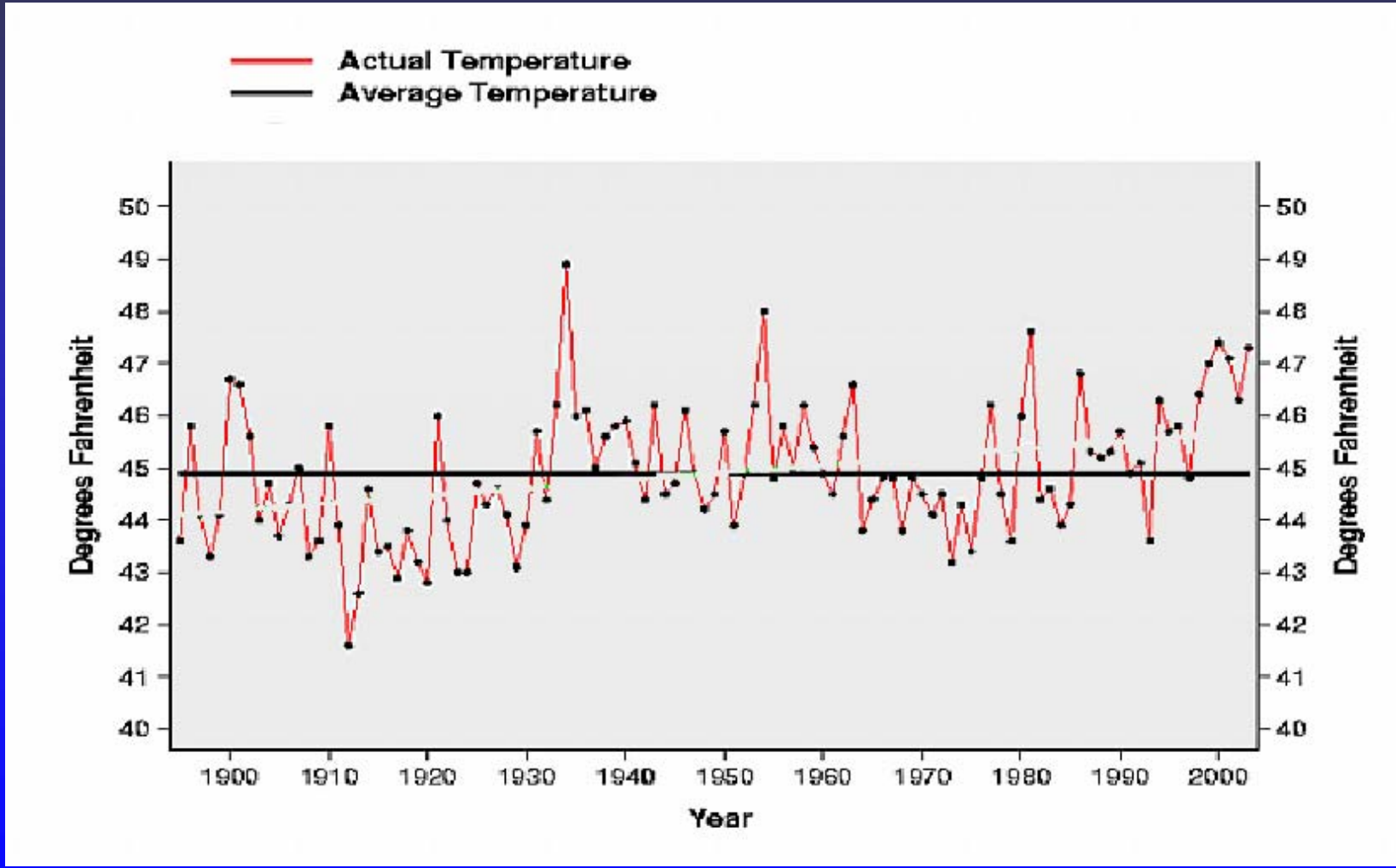


Statewide Annual Precipitation History



http://lwf.ncdc.noaa.gov/oa/climate/research/cag3/CO.html

Statewide Mean Annual Temperature



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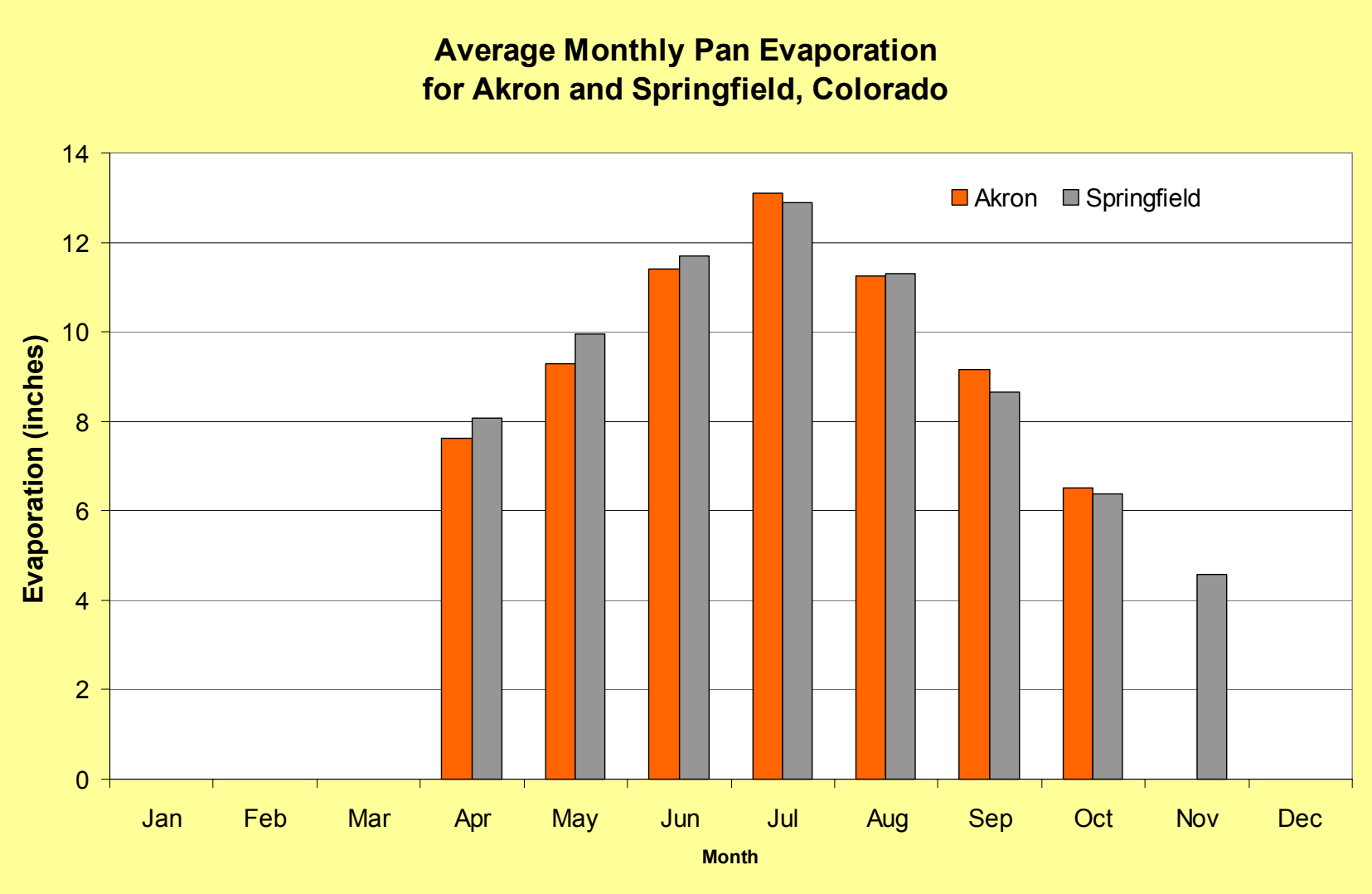
Monthly Average Pan Evaporation



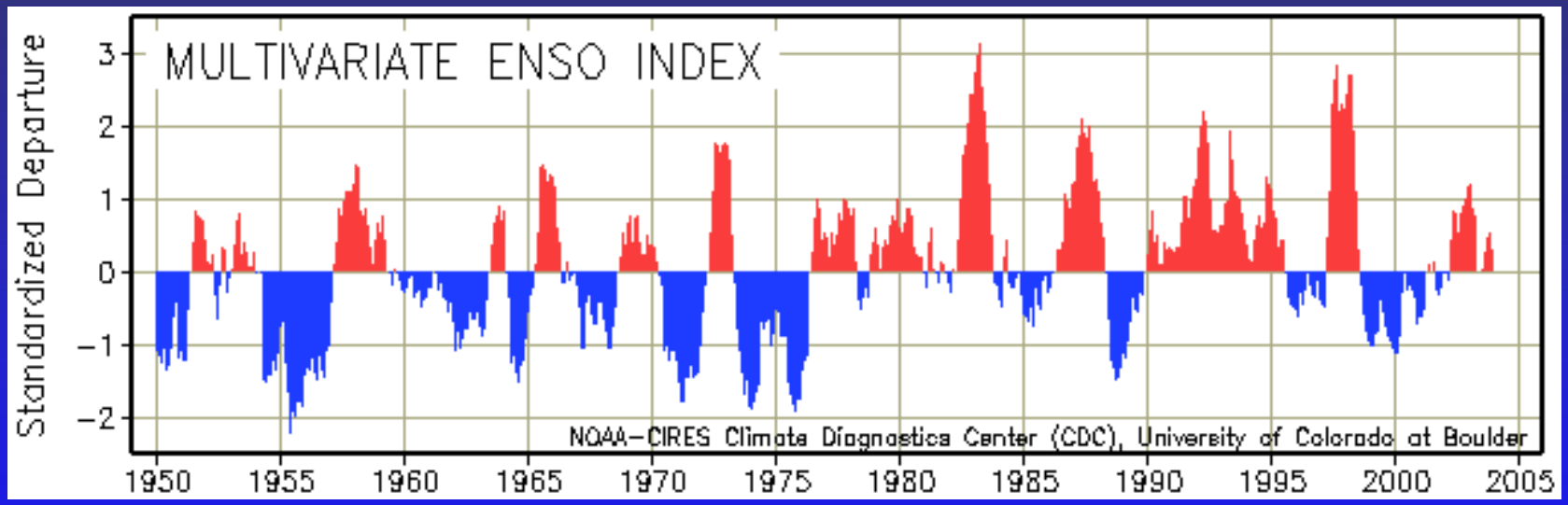
Positive Indicators

- Late winter snows
- Cool spring
- Multi-day precipitation
- Wet Snow
- Low intensity rainfall
- Light winds
- High humidity
- Abundant cloud cover

Negative Indicators

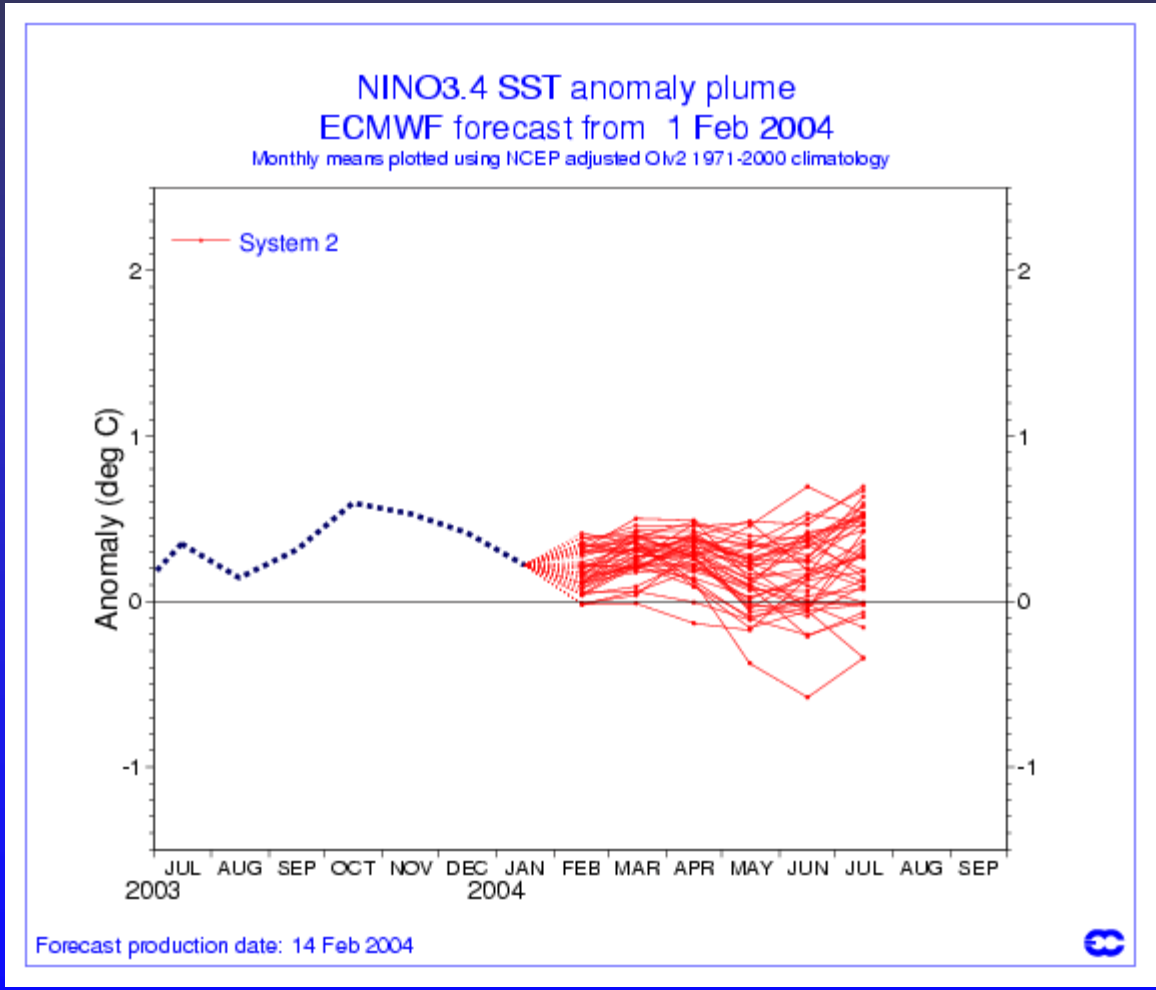
- Little late winter snow
- Missed opportunities
- Warm spring
- Brief, sporadic precipitation
- High intensity rainfall
- Frequent, strong winds
- Low humidity
- Abundant sunshine

Multivariate ENSO Index (MEI)



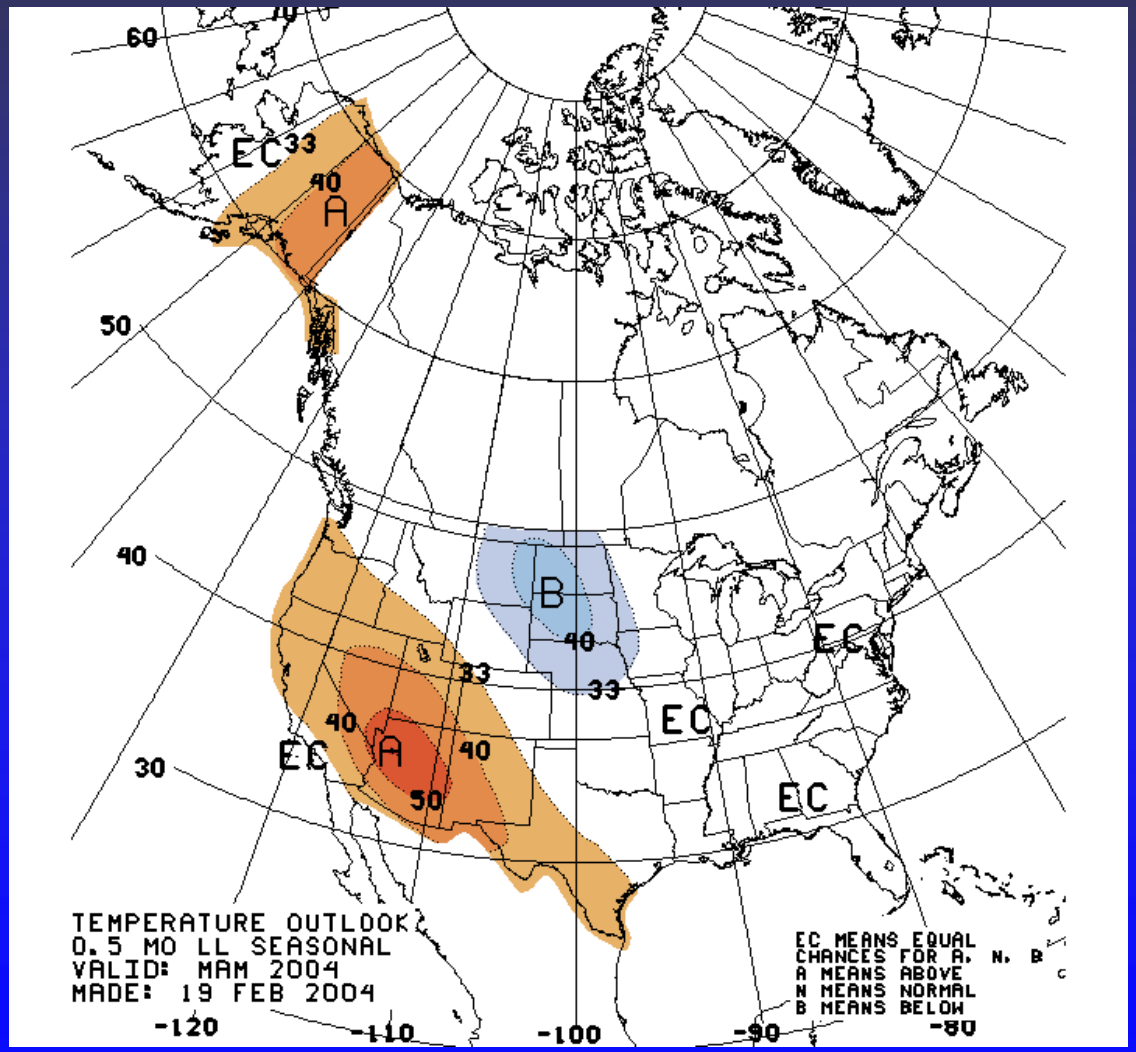
http://www.cdc.noaa.gov/~kew/MEI/

El Nino Forecast



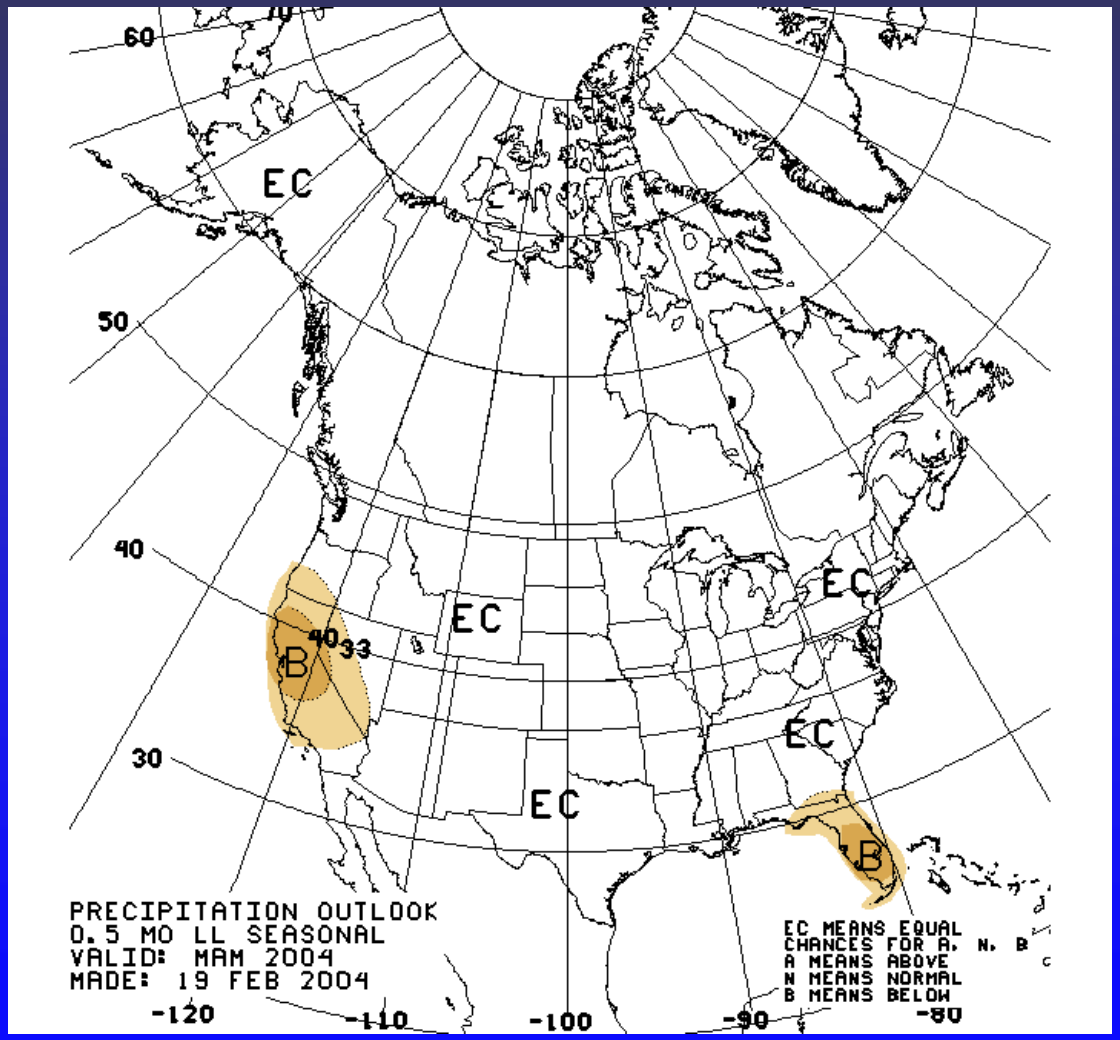
http://www.cdc.noaa.gov/~kew/SWcasts/

Temperature
March – May 2004



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

Precipitation
March – May 2004



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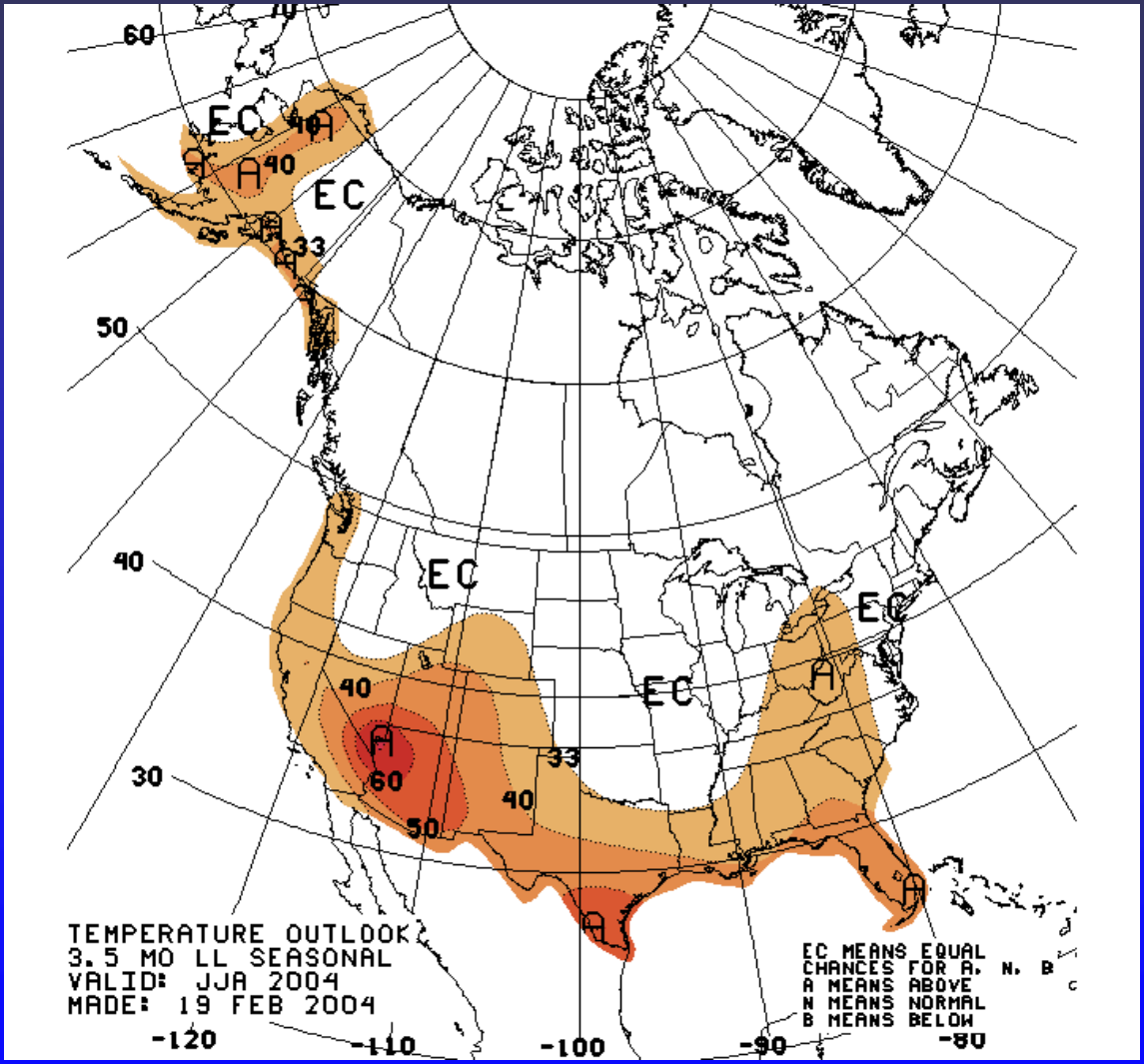
Temperature
June – August 2004



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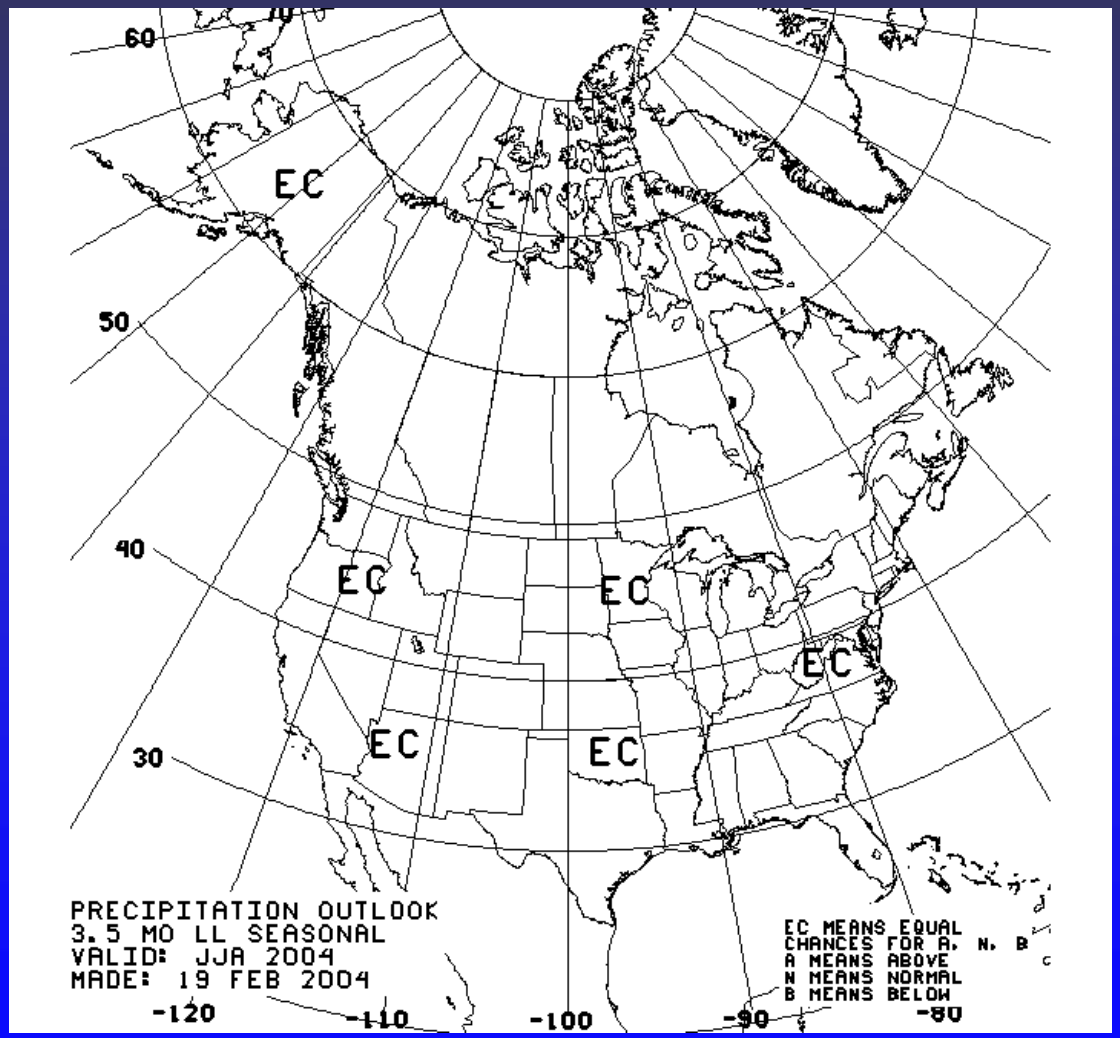
Precipitation
June – August 2004



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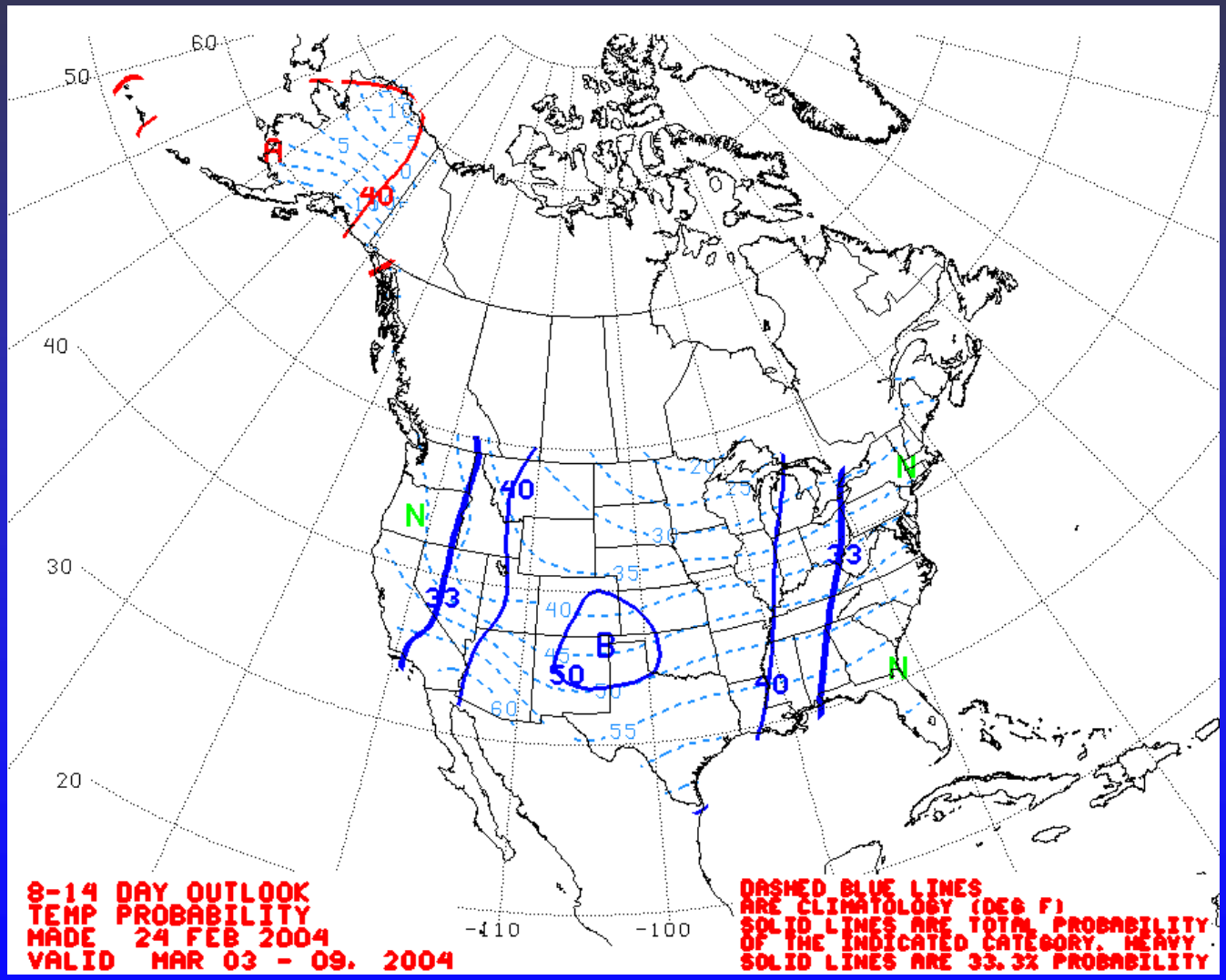
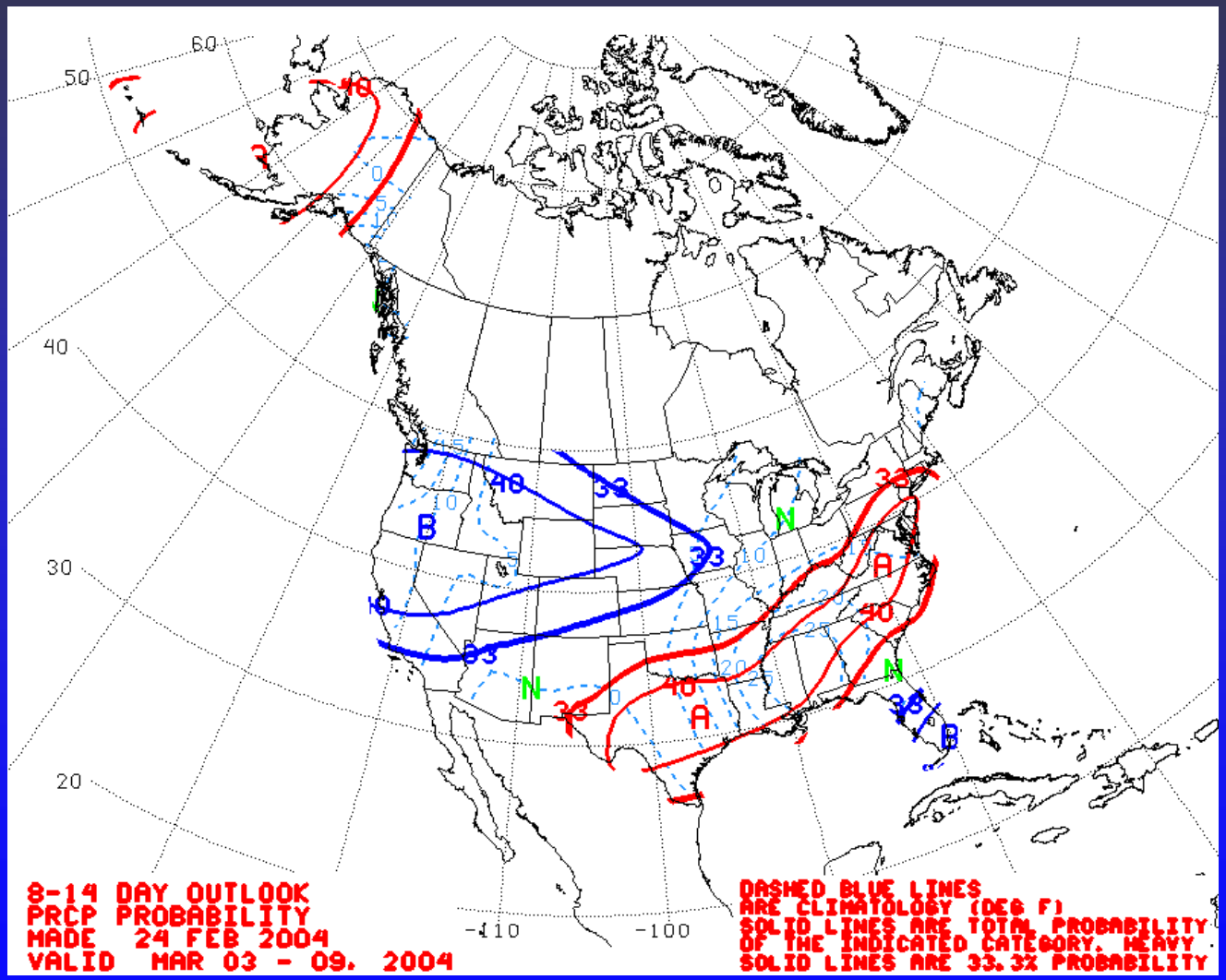
8-14 Day Temperature Forecast



http://www.cpc.ncep.noaa.gov/products/predictions/814day/

8-14 Day Precipitation Forecast



http://www.cpc.ncep.noaa.gov/products/predictions/814day/

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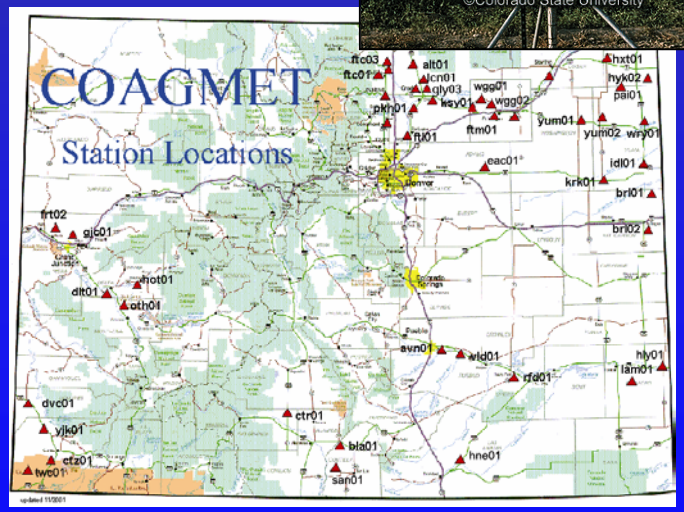
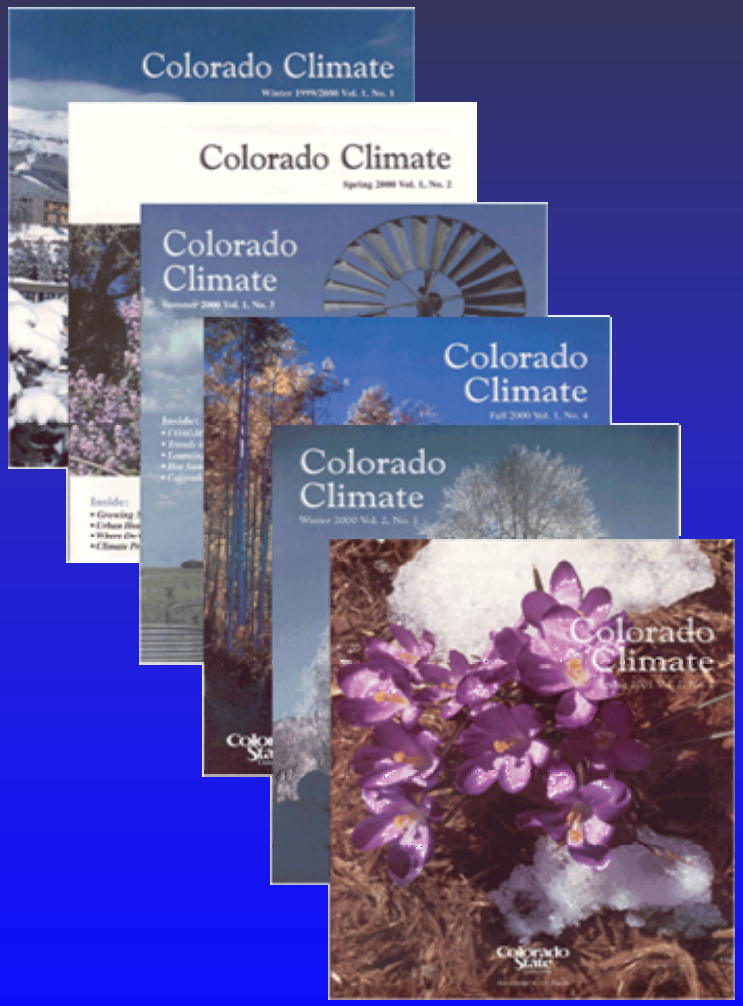
  - *Humidity*
  - *Wind*
  - *Precipitation*
  - *Solar energy*
  - *Evapotranspiration*



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

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"