

# Colorado's 2003 Moisture Outlook

**Nolan Doesken and Roger Pielke, Sr.**

**Colorado Climate Center**

Prepared by Tara Green and Odie Bliss

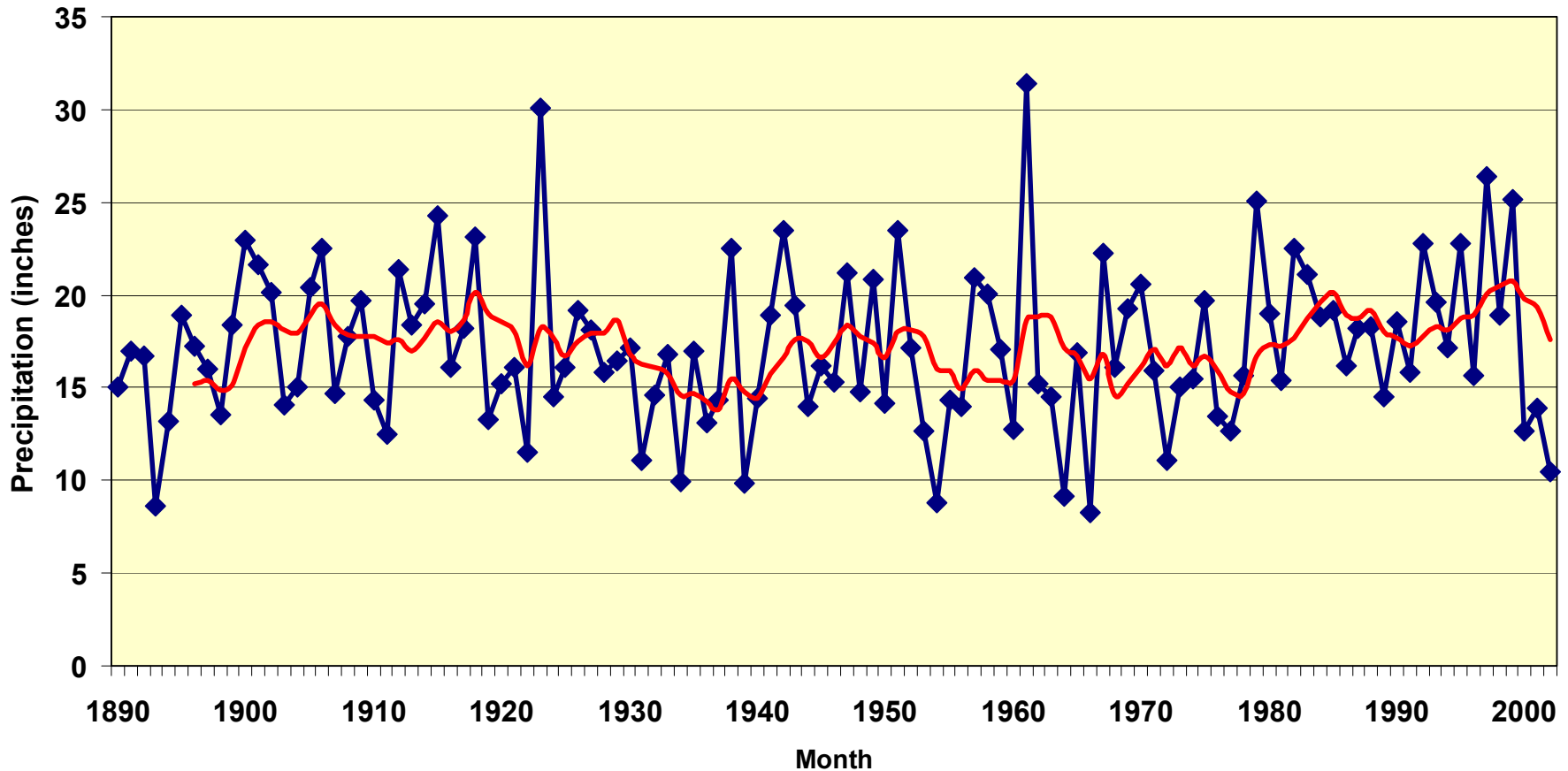
<http://climate.atmos.colostate.edu>



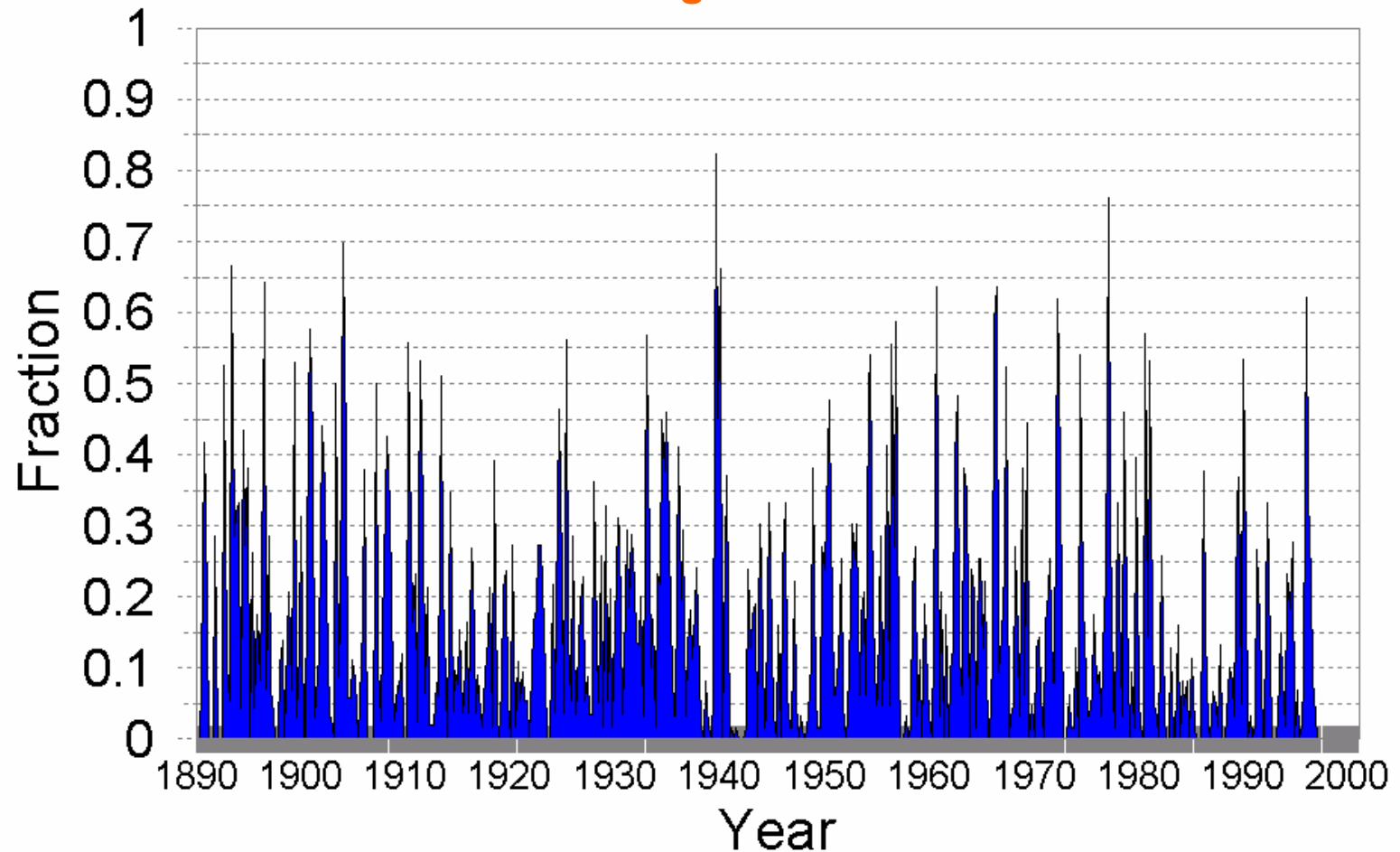
# How we got into this drought!



# Fort Collins Total Water Year Precipitation (Oct-Sep)

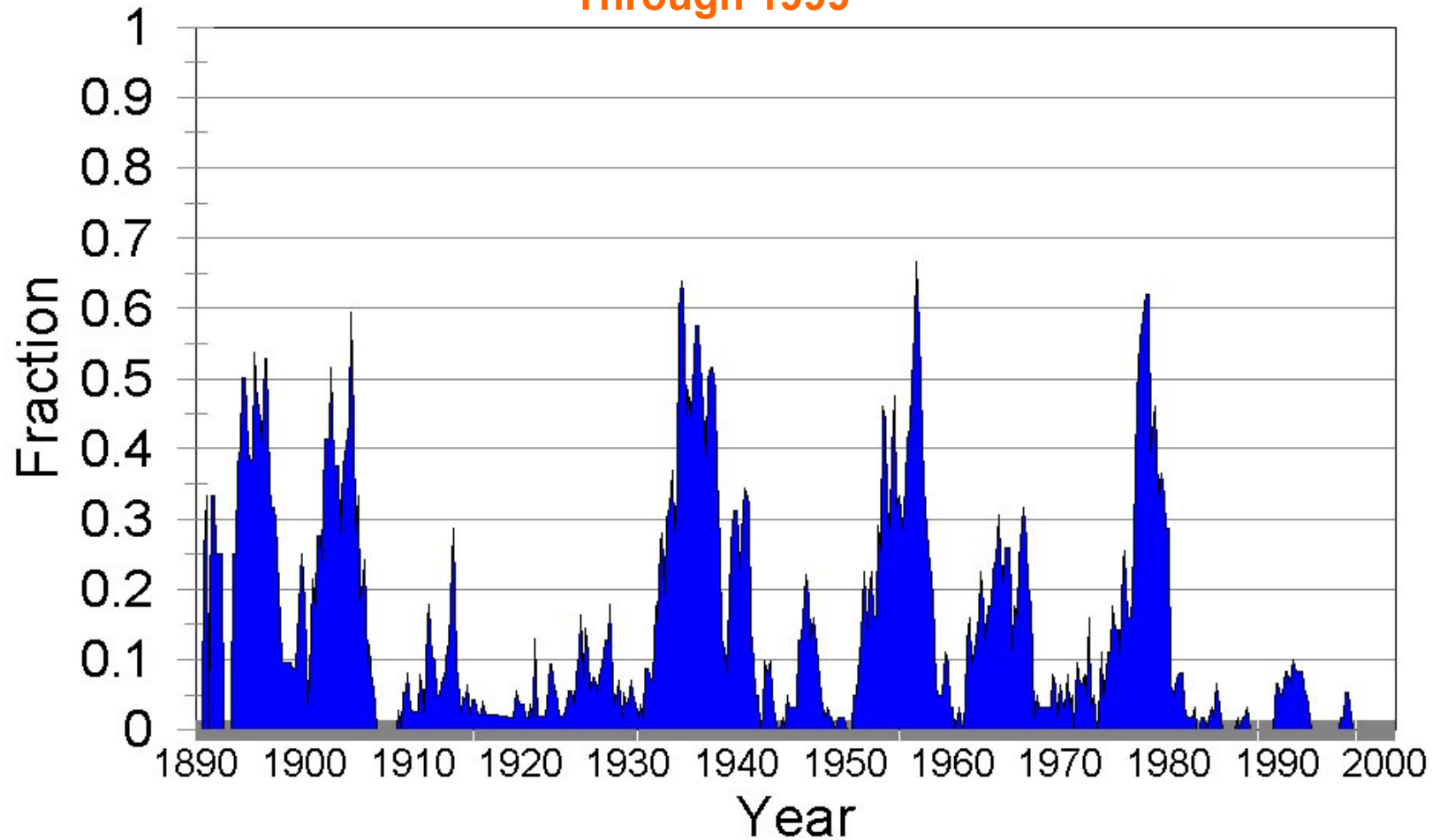


# Fraction of Colorado in Drought Based on 3-month SPI Through 1999



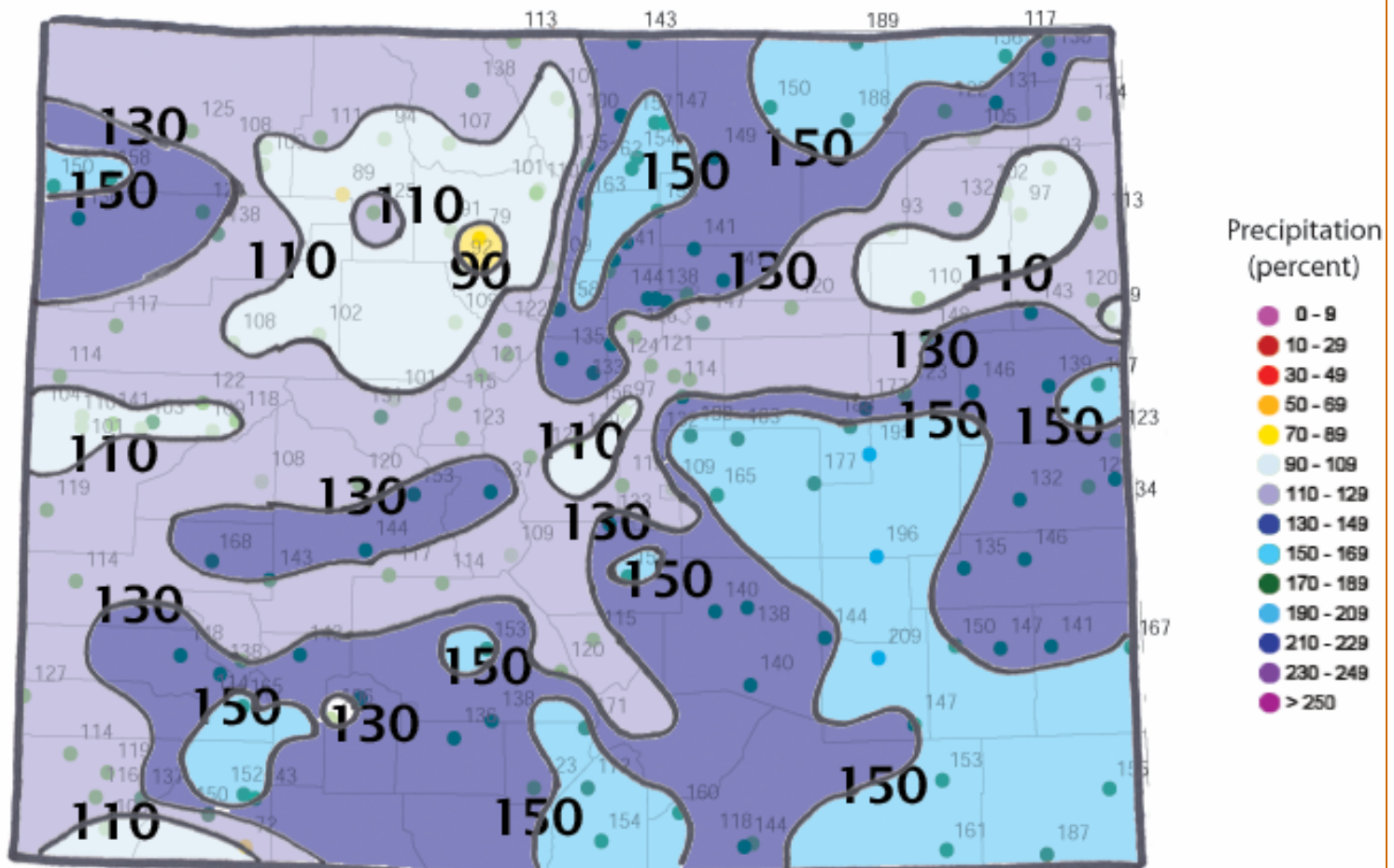
# Fraction of Colorado in Drought Based on 48-month SPI

Through 1999



# Water Year 1999 (Oct. 1998-Sept. 1999)

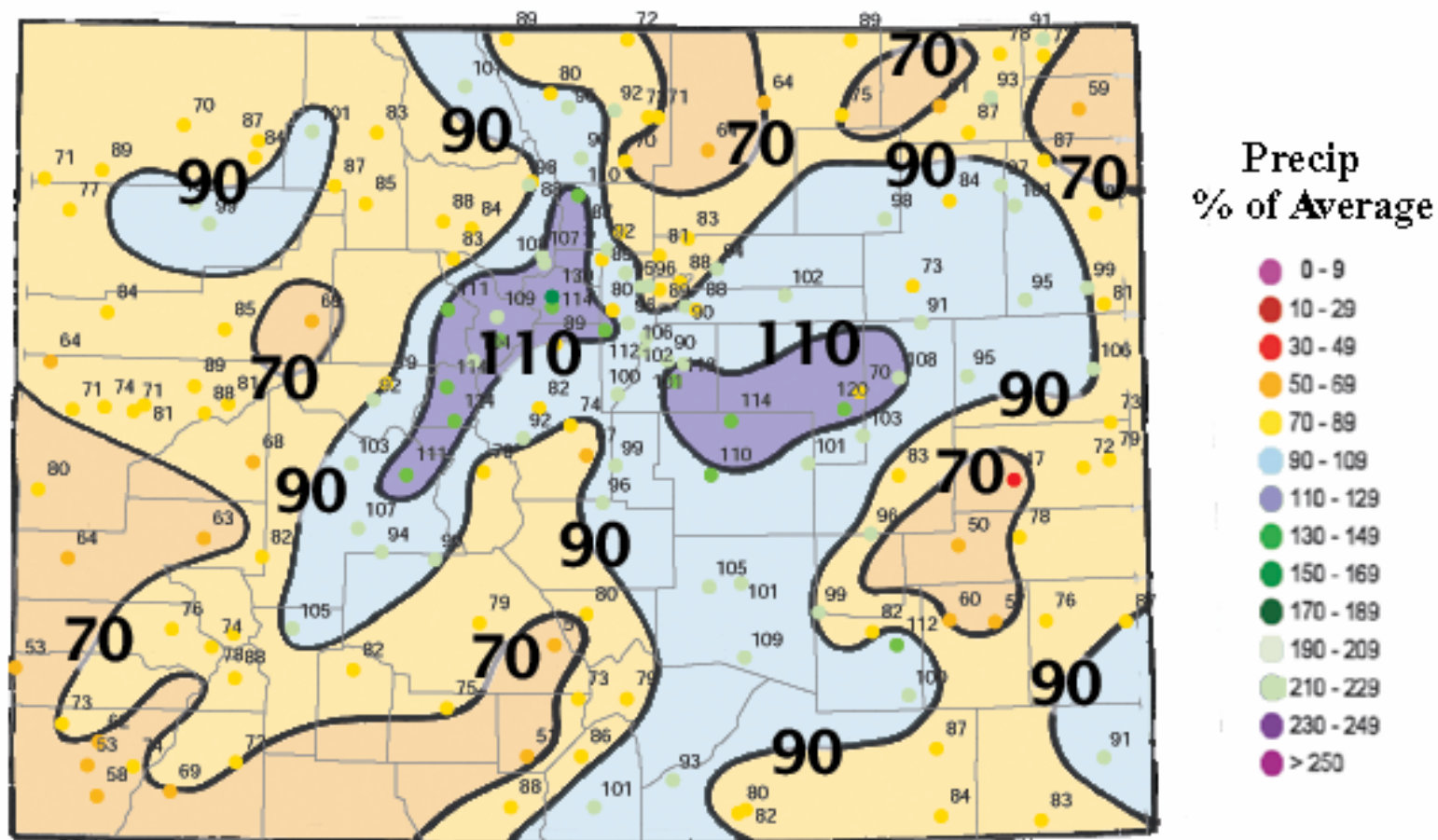
## Precipitation Percent of Average for 1961-1990 Averages





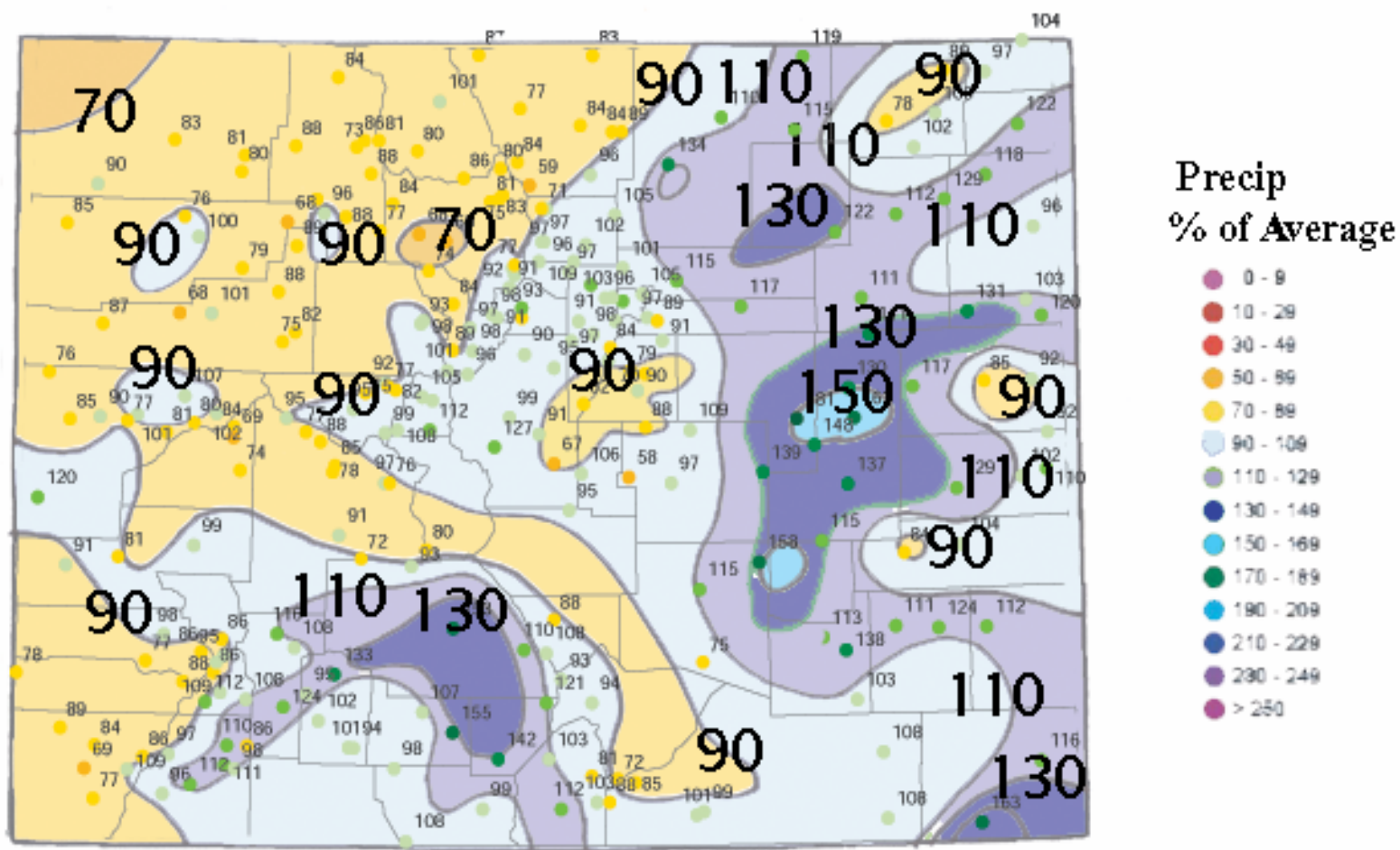
# Water Year 2000 (Oct. 1999 - Sept. 2000)

## Precipitation Percent of Average for 1961-1990 Averages



# Water Year 2001 (Oct. 2000 - Sept. 2001)

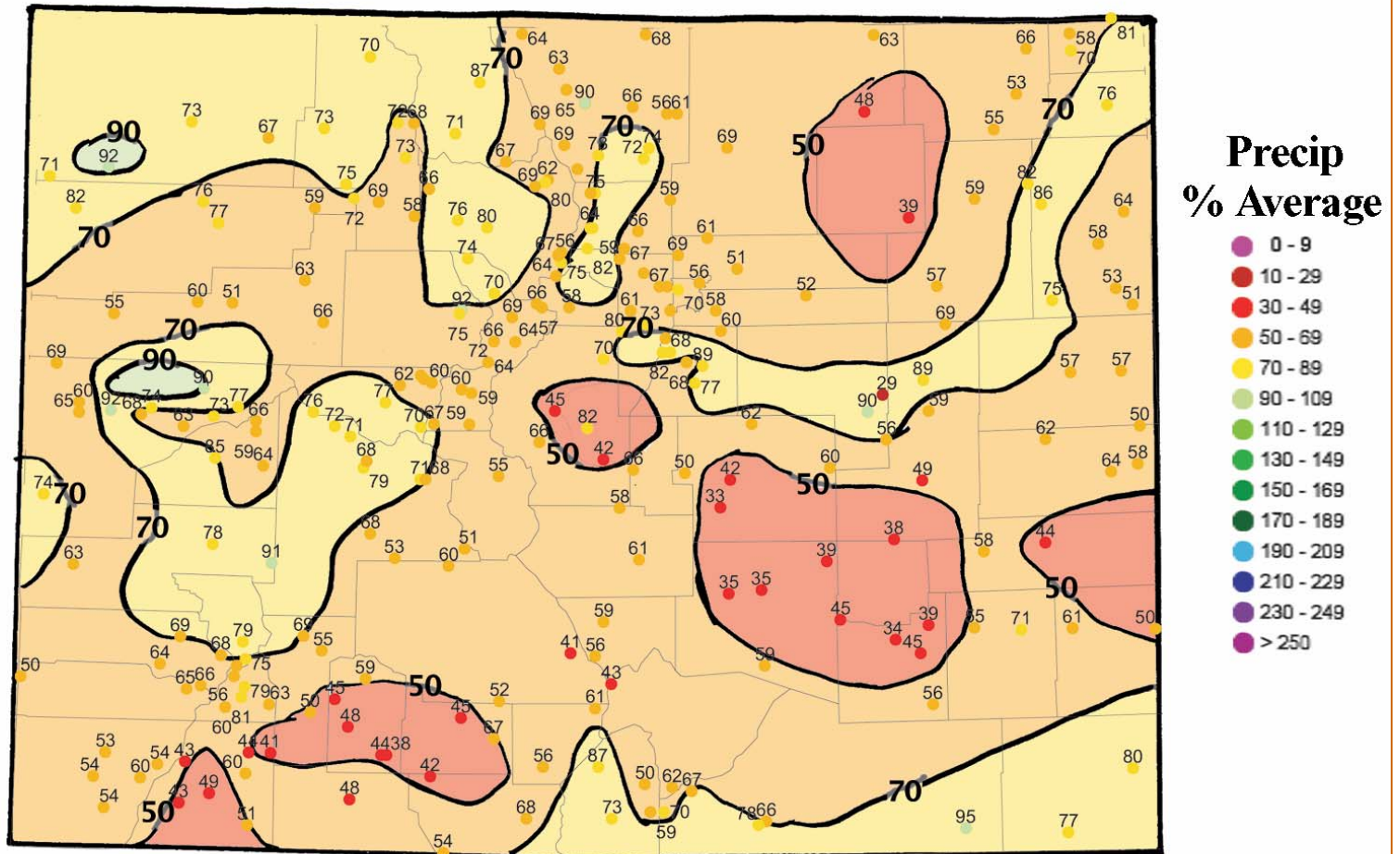
## Precipitation Percent of Average for 1961-1990 Averages





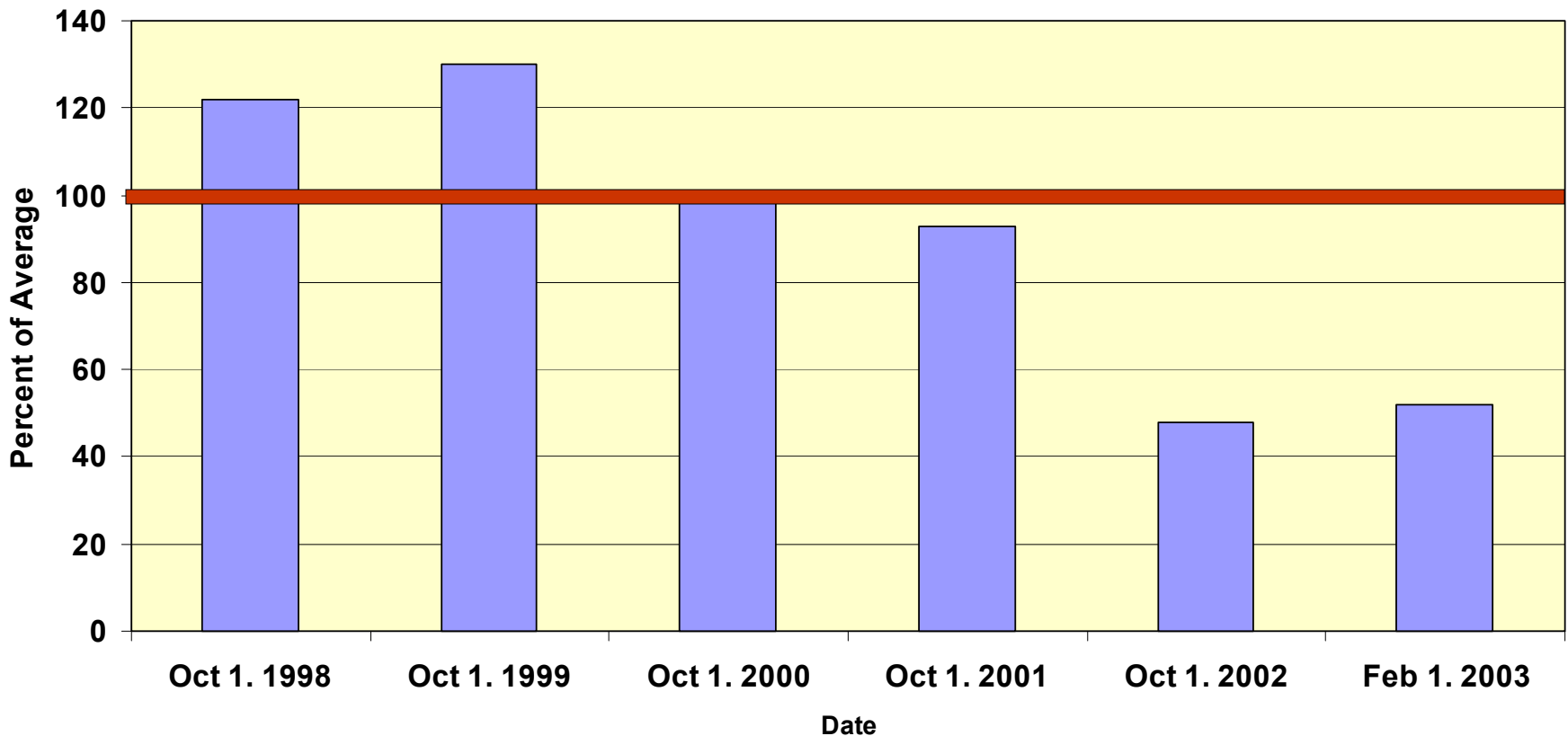
# Water Year 2002 (Oct. 2001 - Sept. 2002)

## Precipitation Percent of Average for 1961-1990 Averages



# Reservoir Storage

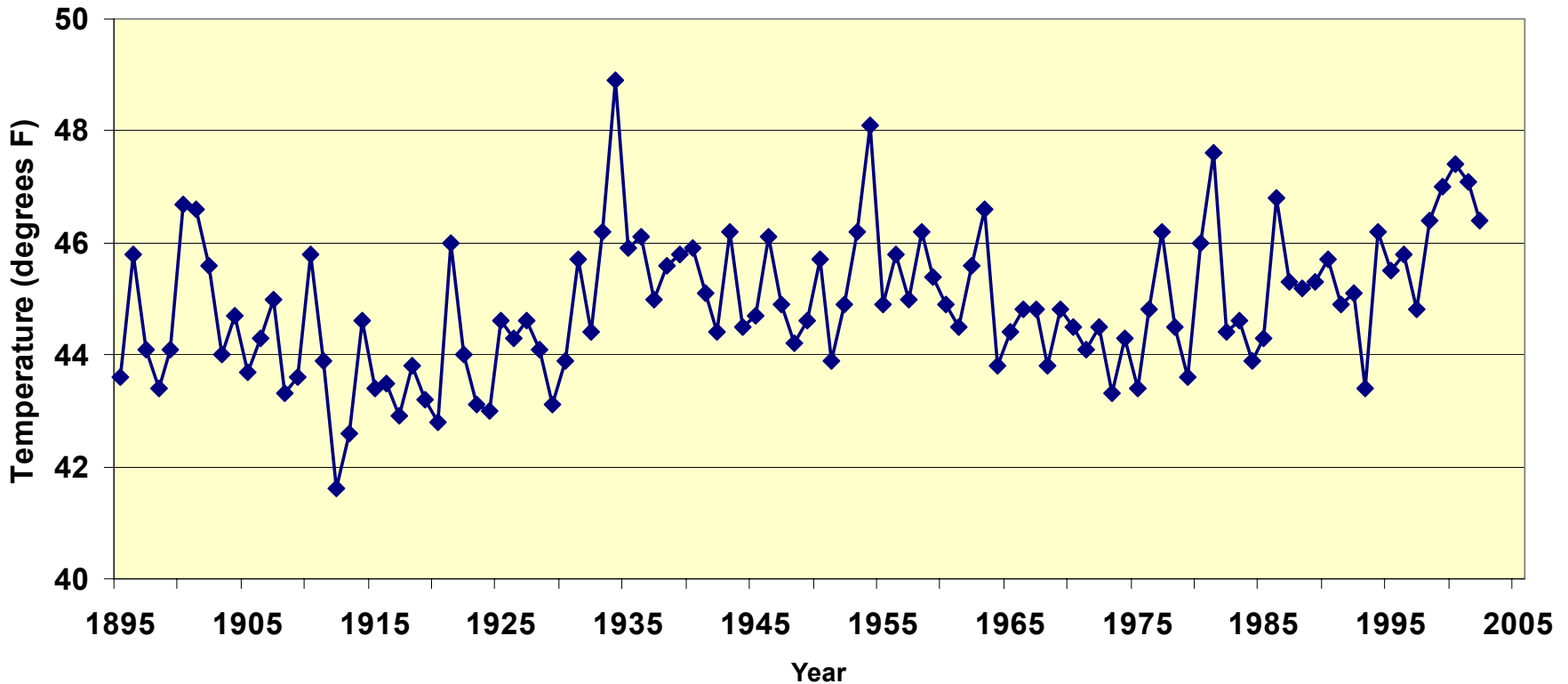
Statewide Reservoir Levels for Colorado



*Provisional Data Provided by NRCS*

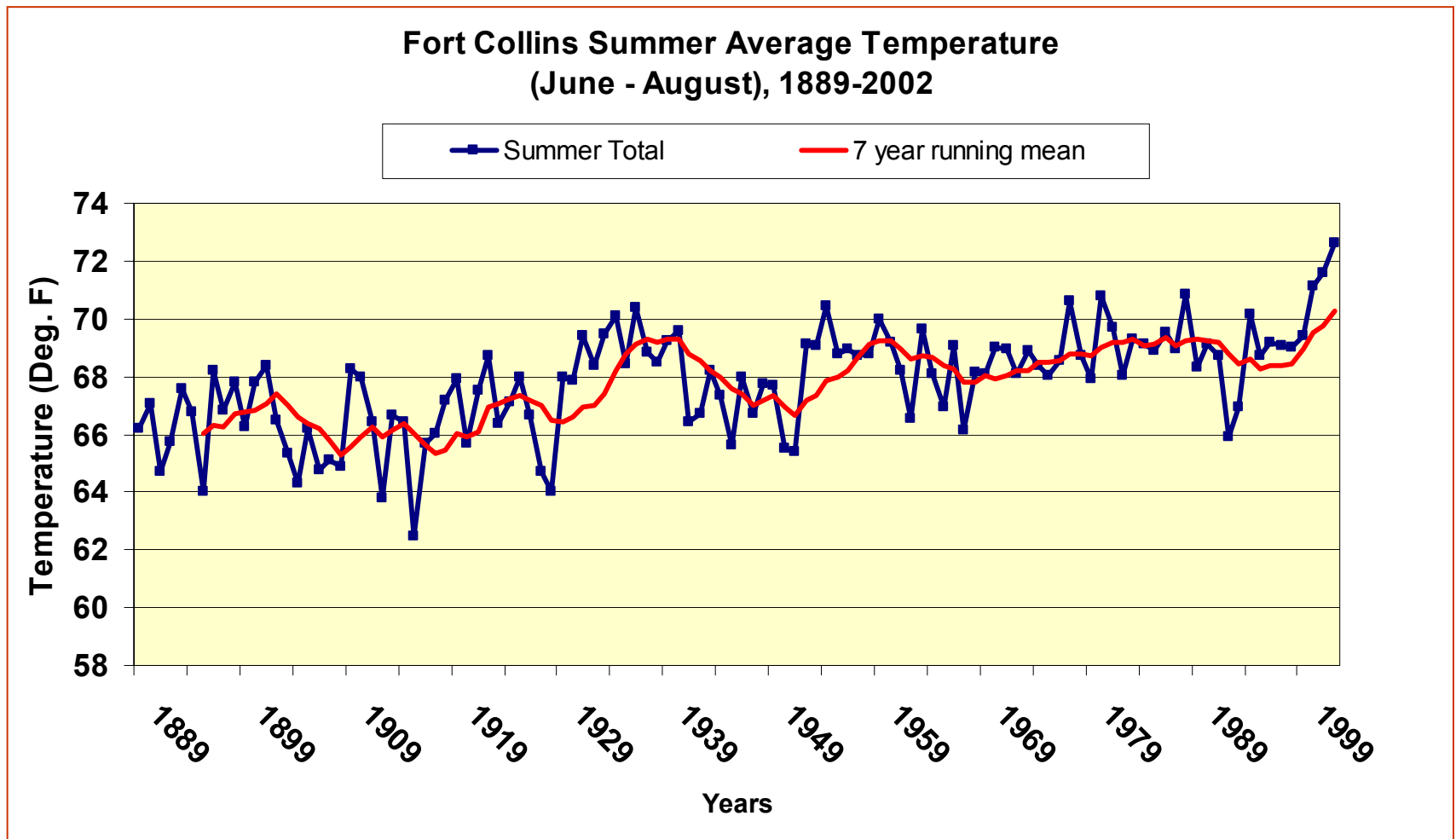
# Colorado Statewide Annual Temperatures through 2002

Colorado Average Annual Temperature  
(1895 - 2002)



*From NOAA, National Climatic Data Center*

# Summer Temperatures Fort Collins, 1889-2002

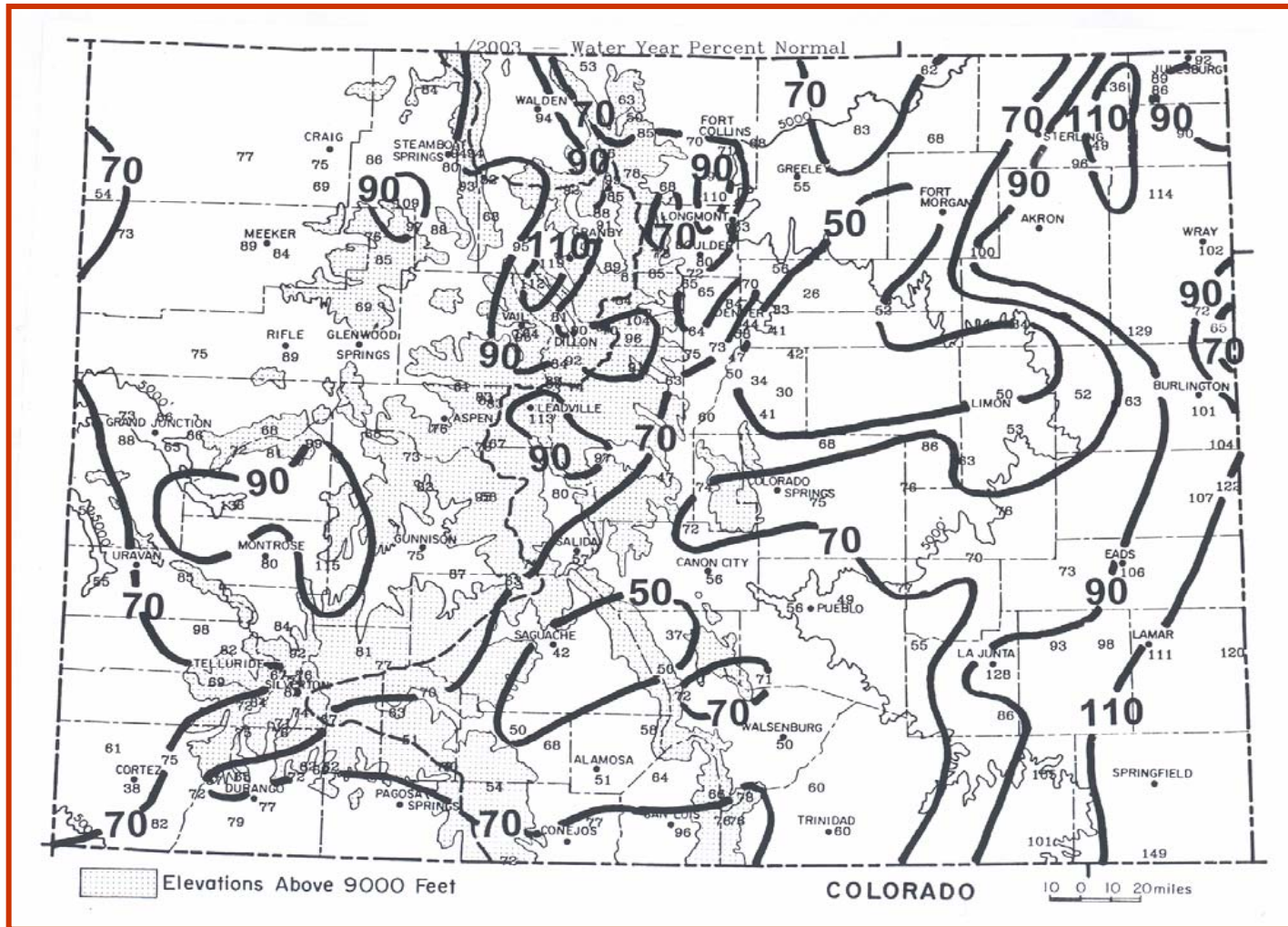


# Where do we stand now?



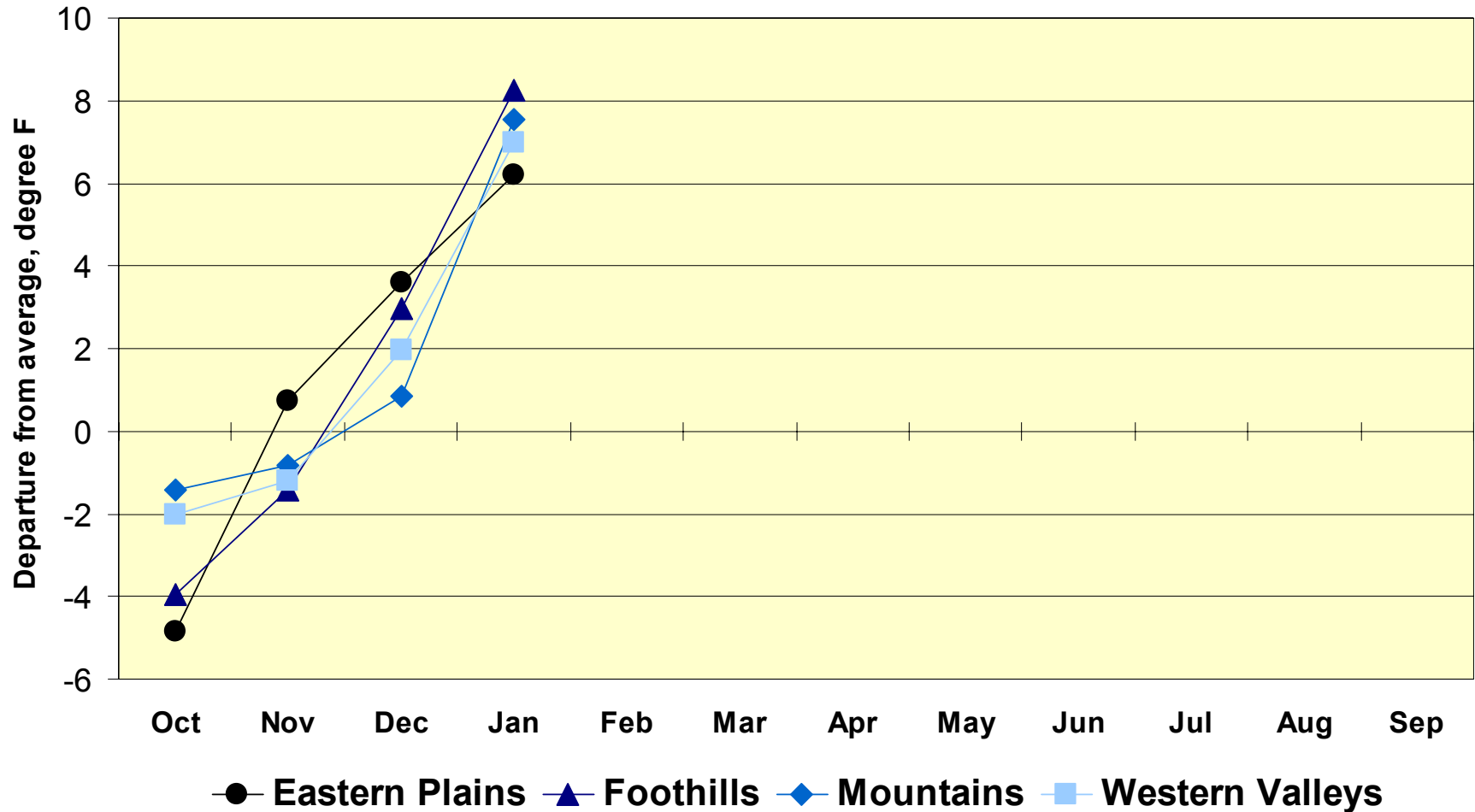


# Oct 2002 - Jan 2003 Precipitation as percent of average





# Temperature - Water Year 2003

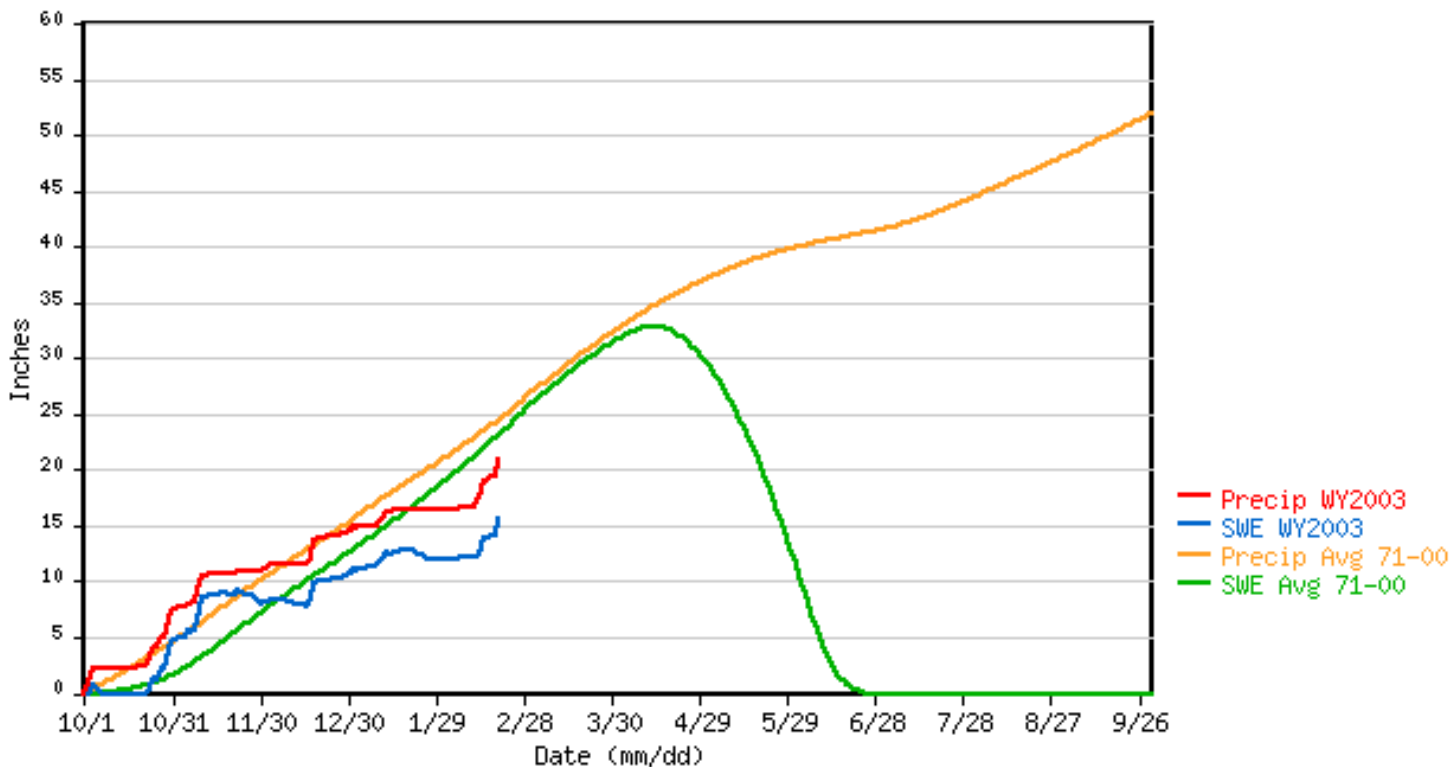


# Water Year 2003

## UPPER SAN JUAN SNOTEL

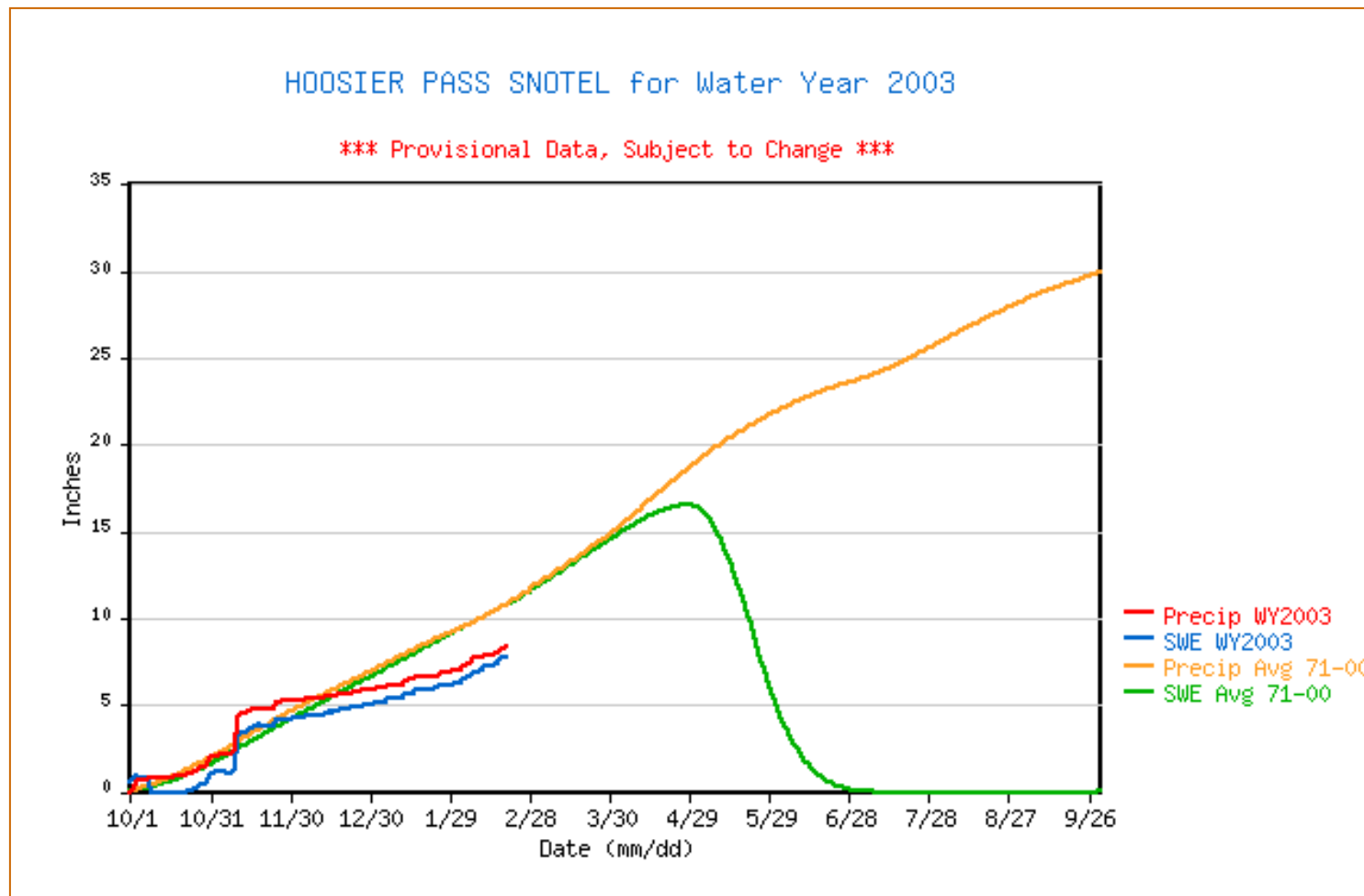
UPPER SAN JUAN SNOTEL for Water Year 2003

\*\*\* Provisional Data, Subject to Change \*\*\*



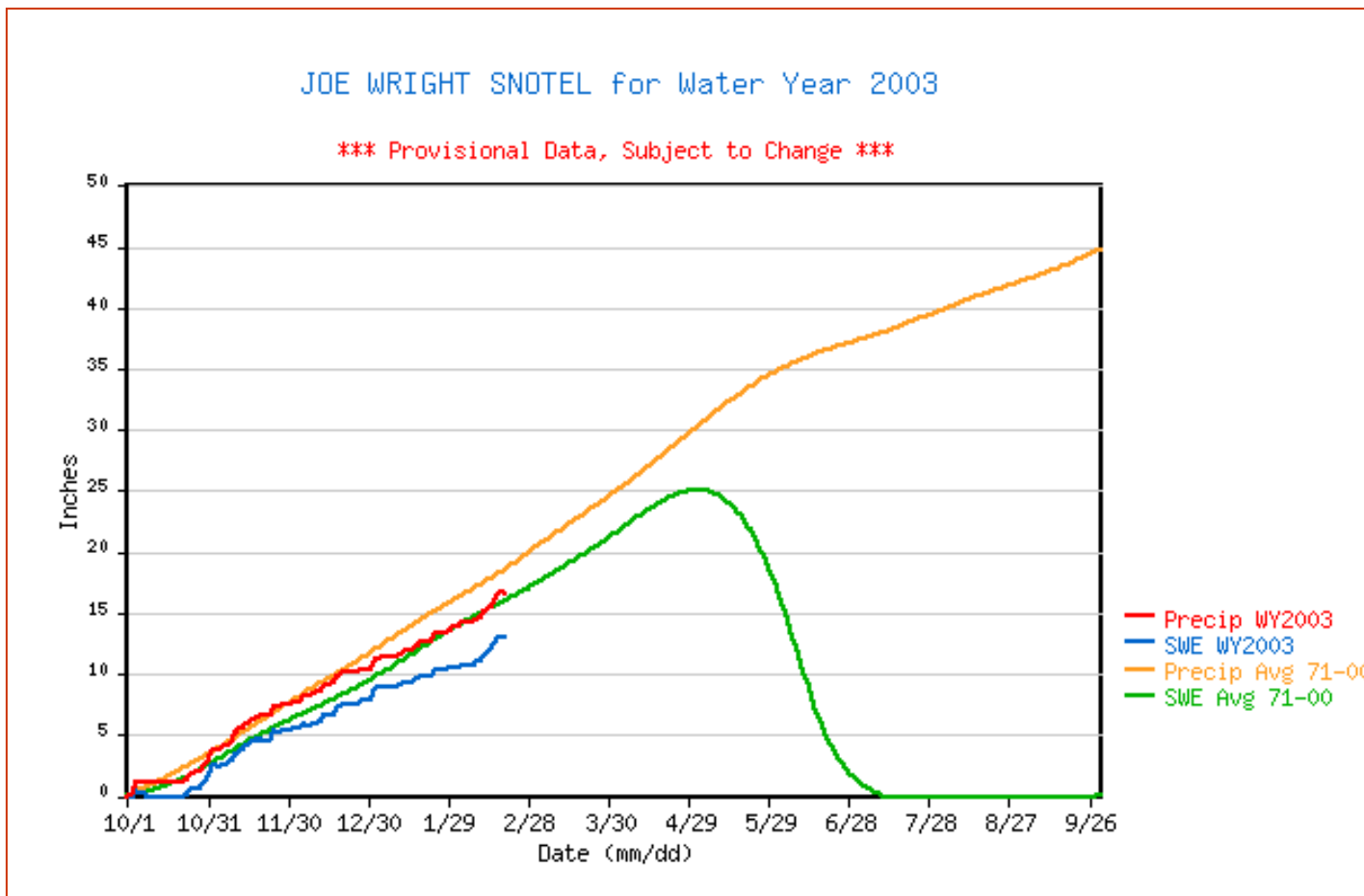
# Water Year 2003

## HOOSIER PASS SNOTEL

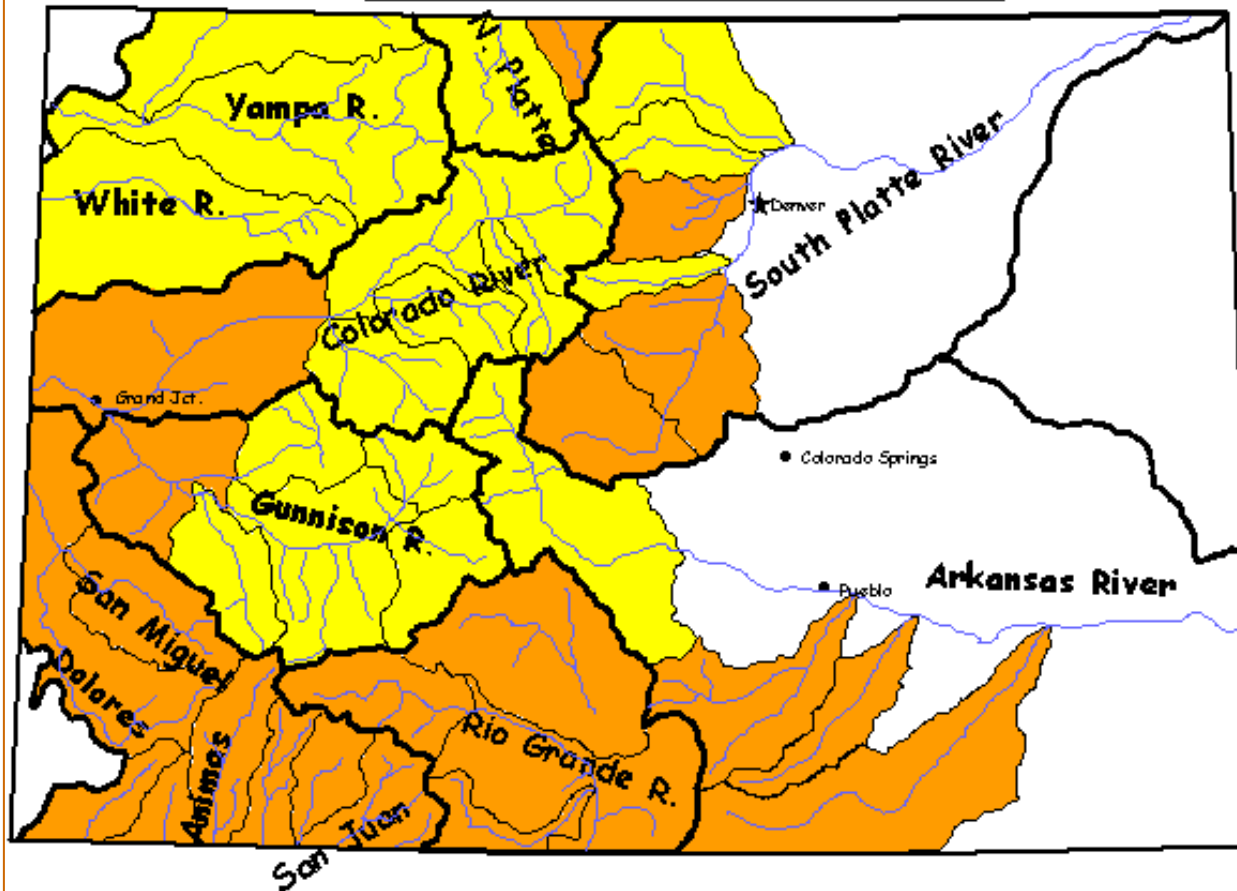


# Water Year 2003

## JOE WRIGHT SNOTEL



# Snowpack February 1, 2003



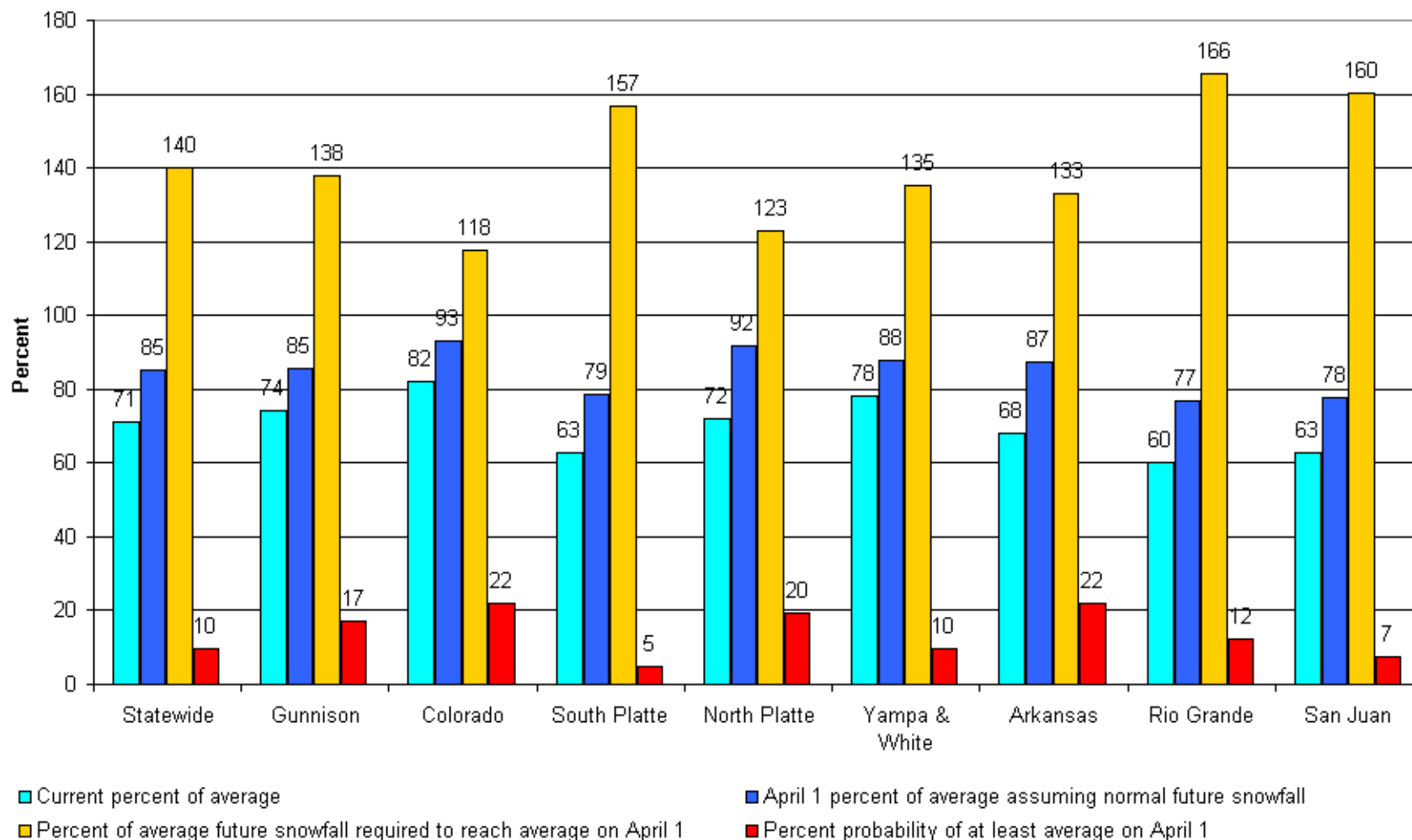
## Legend

- > 150% of Average
- 130 - 150% of Average
- 110 - 129% of Average
- 90 - 109% of Average
- 70 - 89% of Average
- 50 - 69% of Average
- < 50% of Average
- Not Surveyed
- Major Basin Boundary
- Watershed Boundary

**Statewide: 71% of Average  
121% of Last Year**

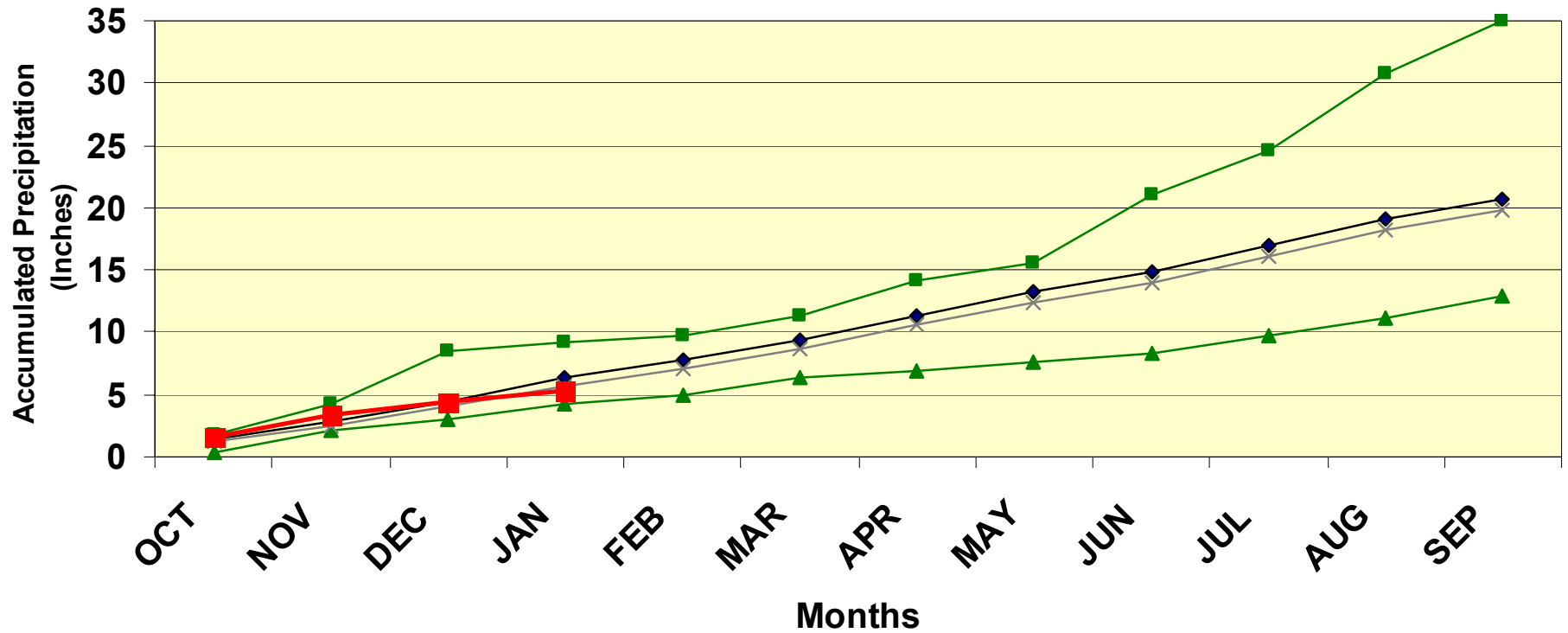
## Colorado Snowpack

### Current Conditions and Future Scenarios as of February 1, 2003

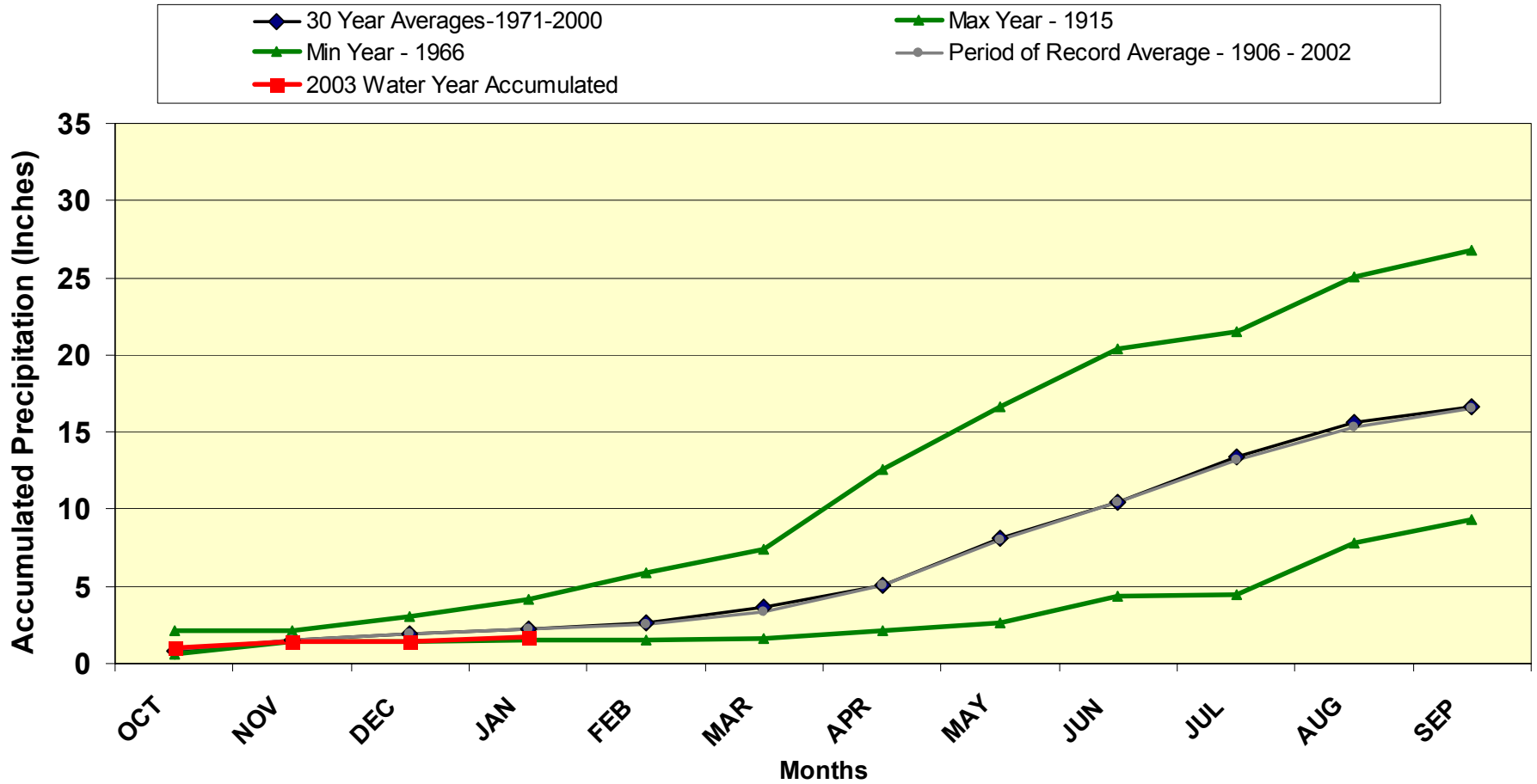




# Grand Lake 1 NW 2003 Water Year (through October '02-January '03)



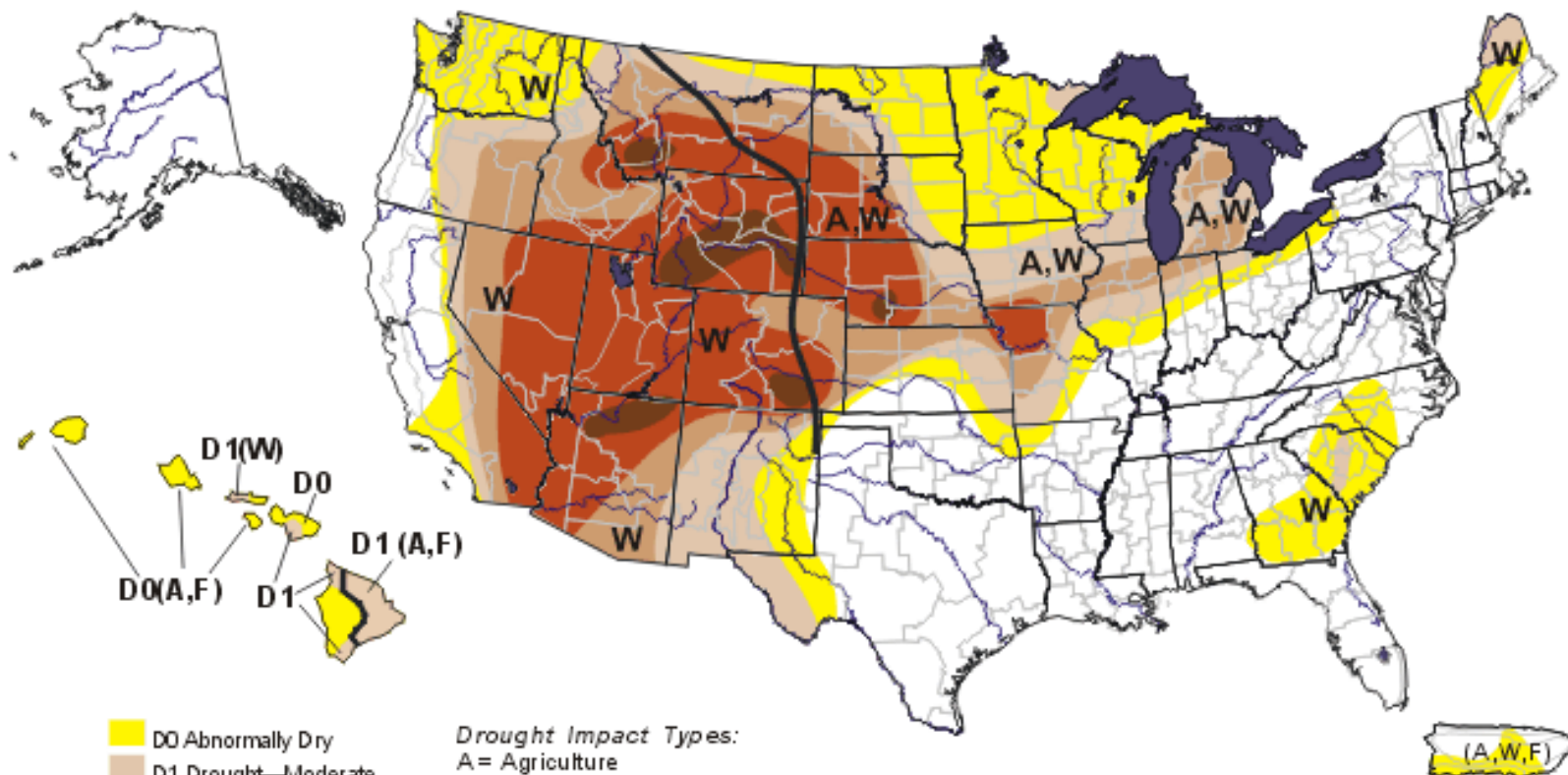
# Akron 4E 2003 Water Year (through October '02-January'03)








# U.S. Drought Monitor


February 11, 2003

Valid 7 a.m. EST



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

#### Drought Impact Types:

- A = Agriculture
- W = Water (Hydrological)
- F = Fire danger (Wildfires)
-  Delineates dominant impacts  
(No type = All 3 impacts)

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

<http://drought.unl.edu/dm>



Released Thursday, February 13, 2003

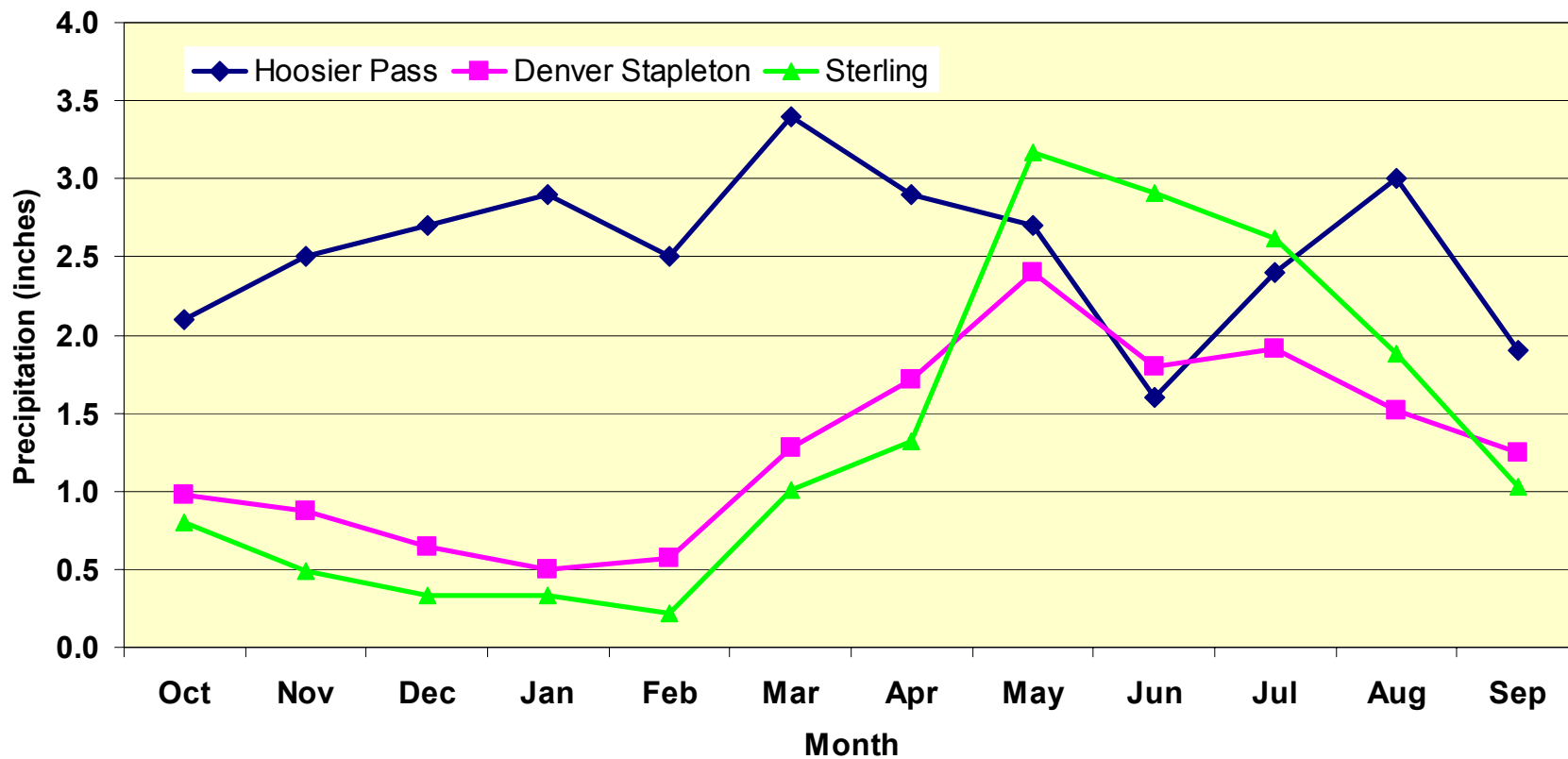
Author: Mark Svoboda, NDMC

# What May Be Ahead in 2003

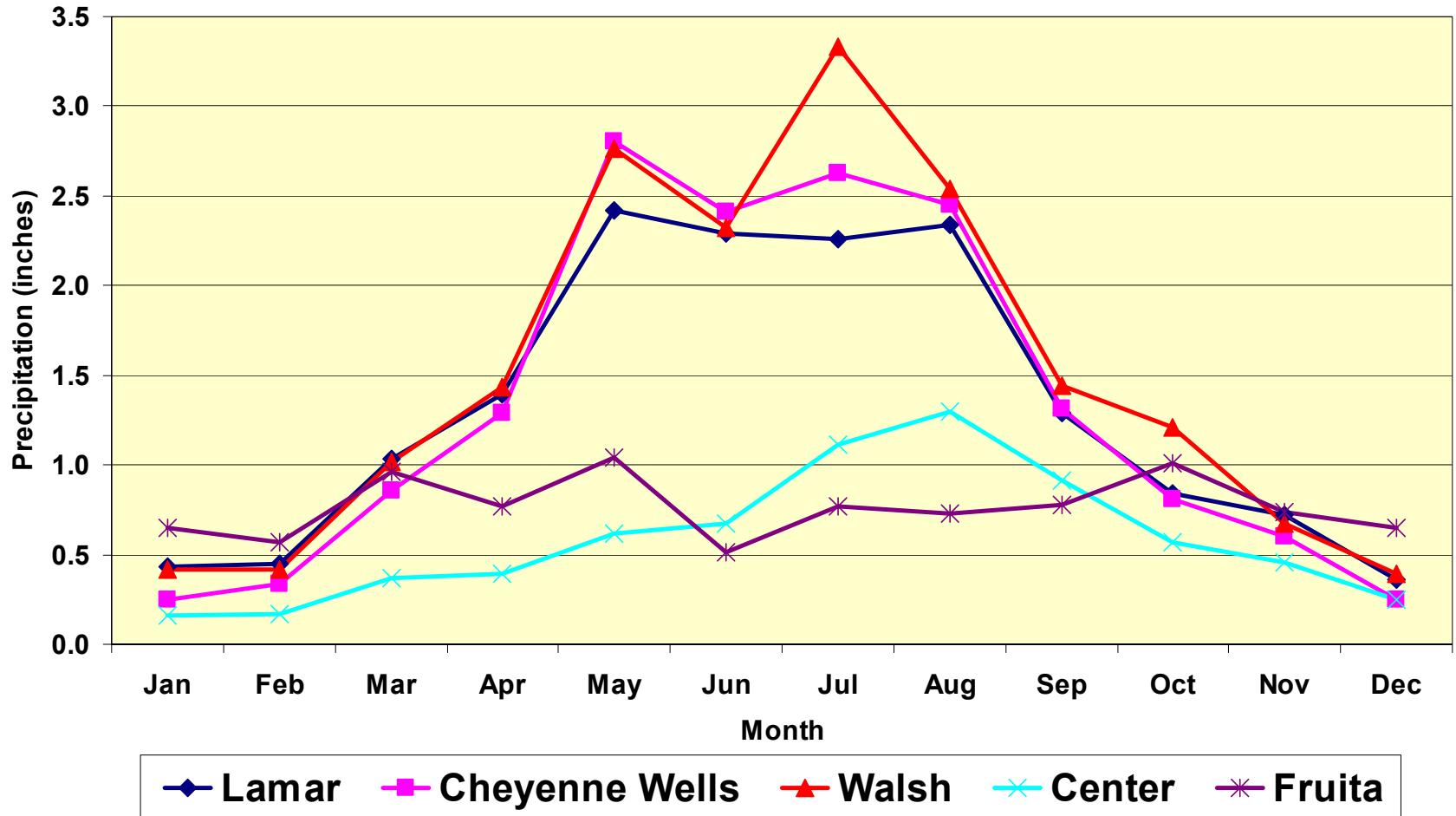


# Precipitation

Monthly Average Precipitation for Selected Sites  
in the South Platte Basin



# Monthly Average Precipitation for 1971-2000



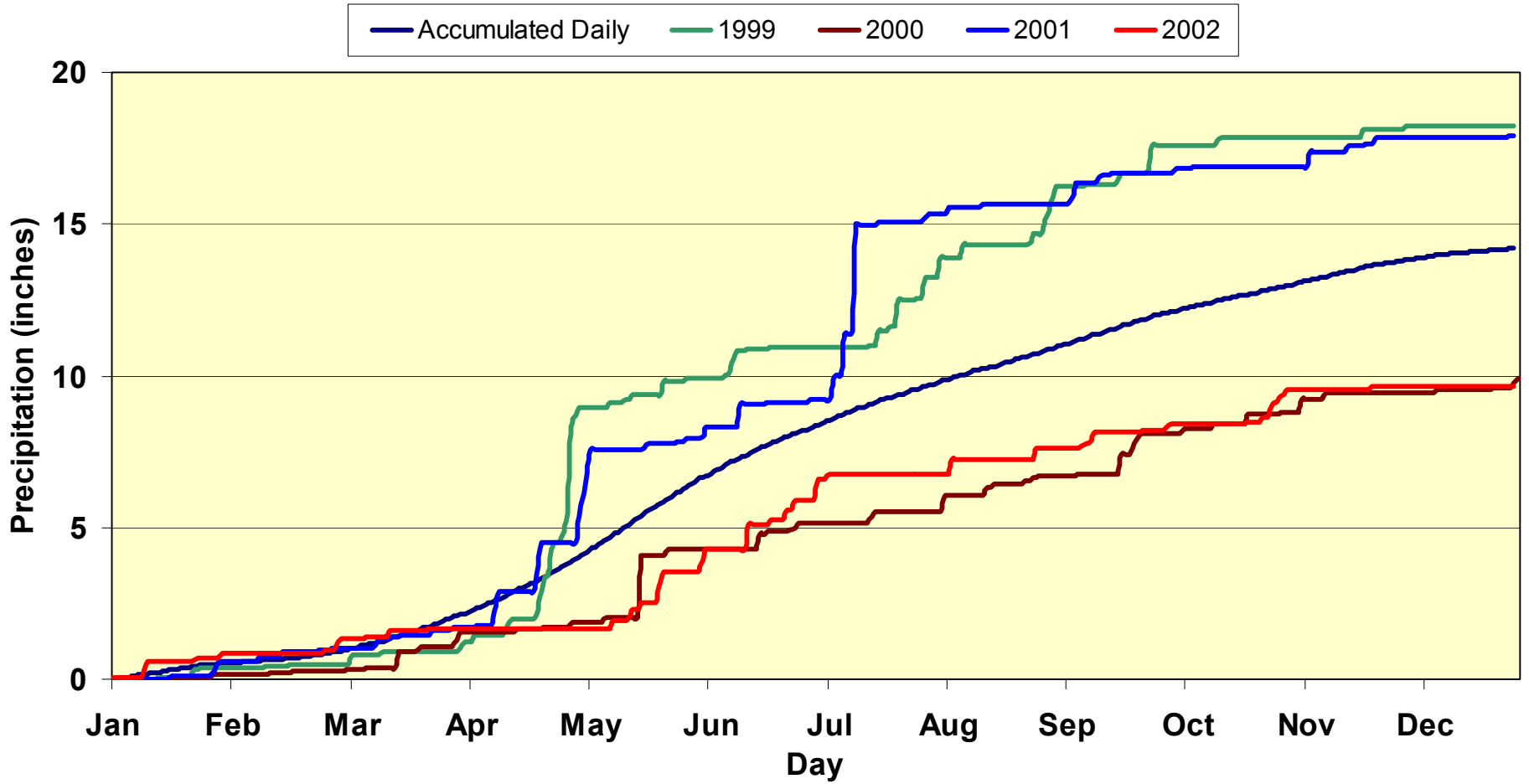


# Precipitation

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



# Greeley Daily Accumulated Precipitation





# What Happens Next

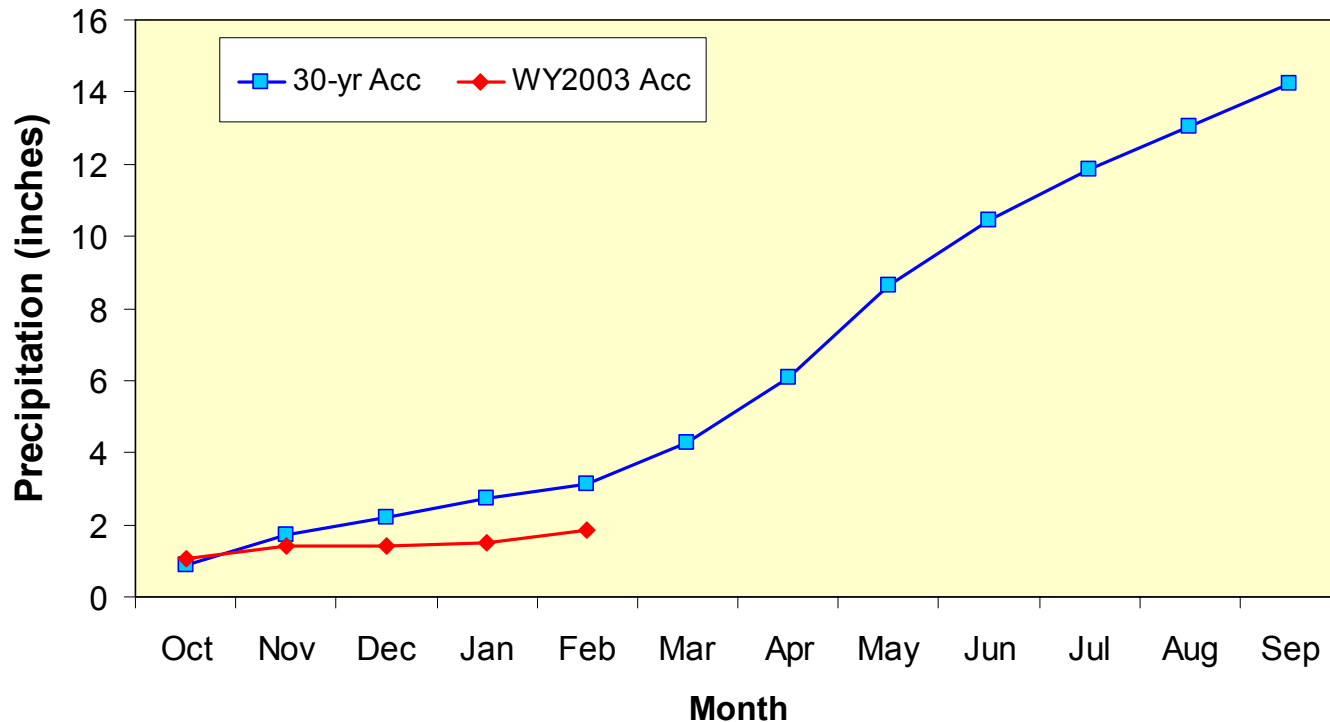
- We have never experienced 2 consecutive extreme statewide drought years.
- Past multi-year drought, characterized by one extreme year preceded and followed by other dry year.
- Entire State rarely all recovers quickly and at the same time.
- *Hope for the best, plan for the worst!!*

# Our Path For 2003



## Greeley, Colorado

Monthly Accumulated Precipitation for Water Year 2003  
vs. 30-year Averages (1971-2000).



# Positive Indicators

- Late winter snows
- Cool spring
- Multi-day precipitation
- 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





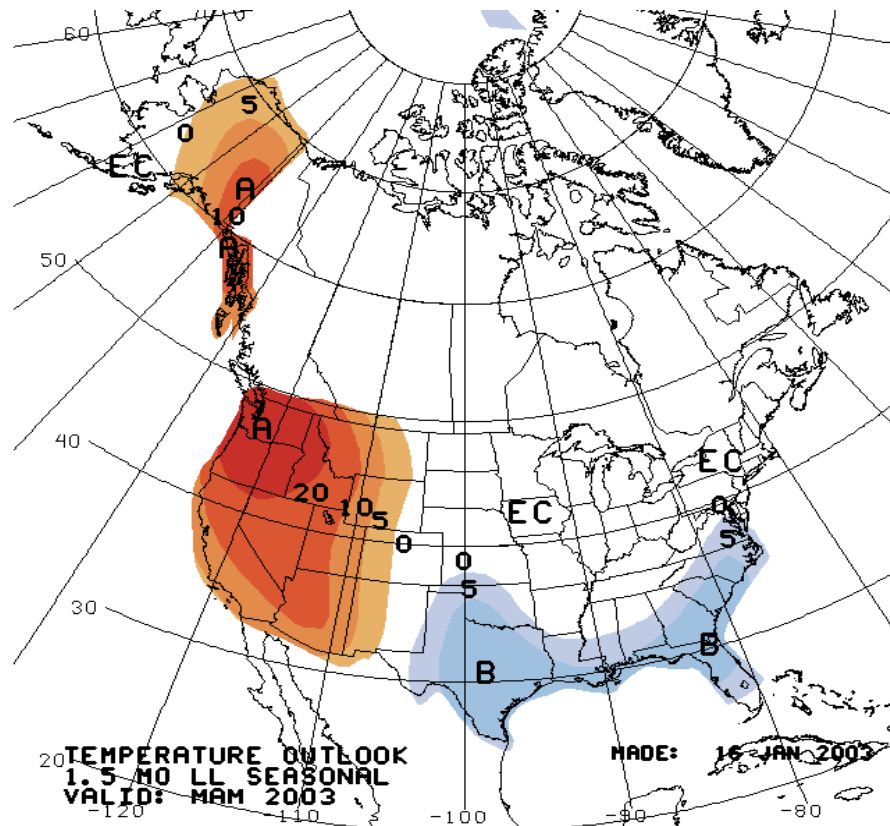
# Current Indicators

- El Niño still present
- Unfavorable Pacific decadal oscillation
- Missed opportunities
- February not a good indicator
- Wet often follows dry
- Most extreme dry periods last one year  
(Exceptions: SE CO)



# Temperature

## March-May 2003

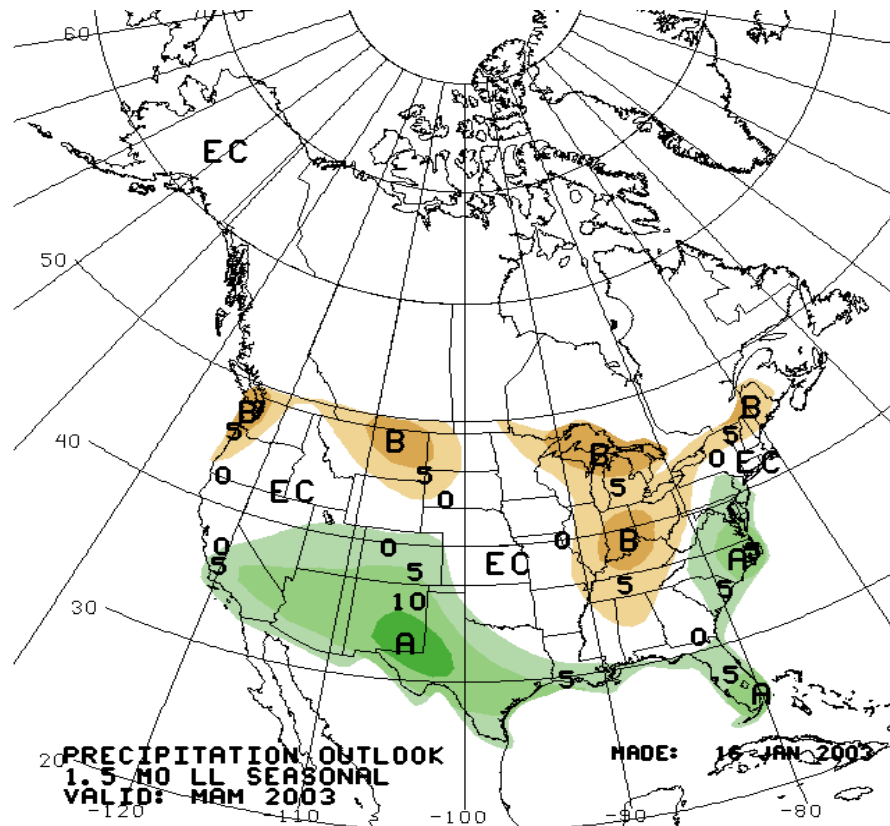


From the Colorado Prediction Center

[http://www.cpc.ncep.noaa.gov/products/predictions/multi\\_season/13\\_seasonal\\_outlooks/color/churchill.html](http://www.cpc.ncep.noaa.gov/products/predictions/multi_season/13_seasonal_outlooks/color/churchill.html)

# Precipitation

## March-May 2003

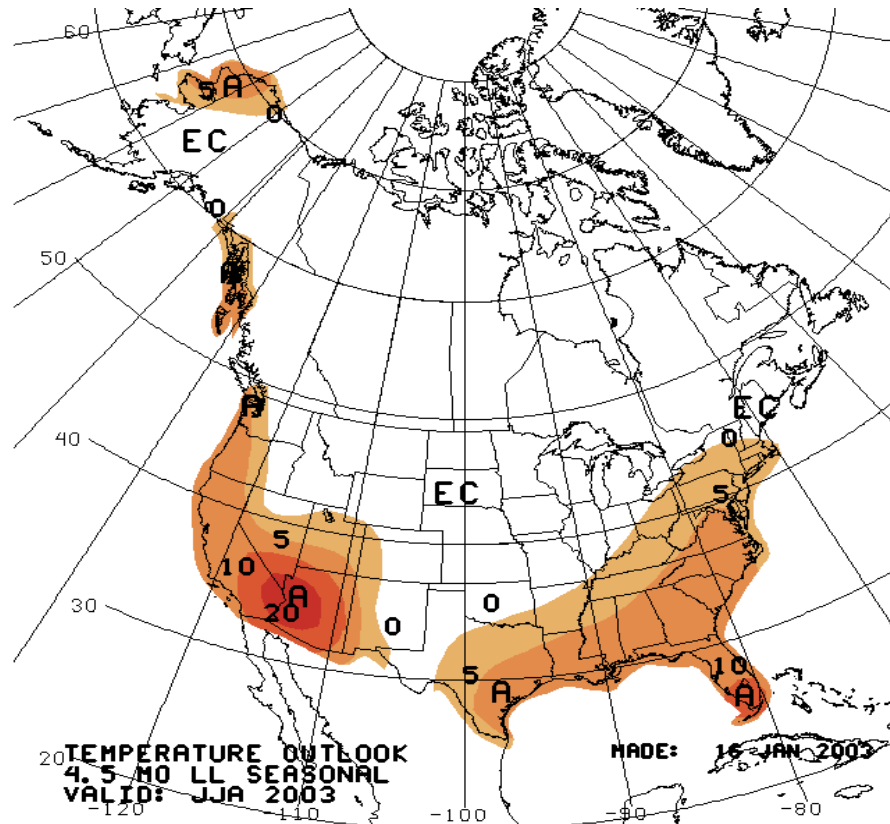


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# Temperature

## June-Aug 2003

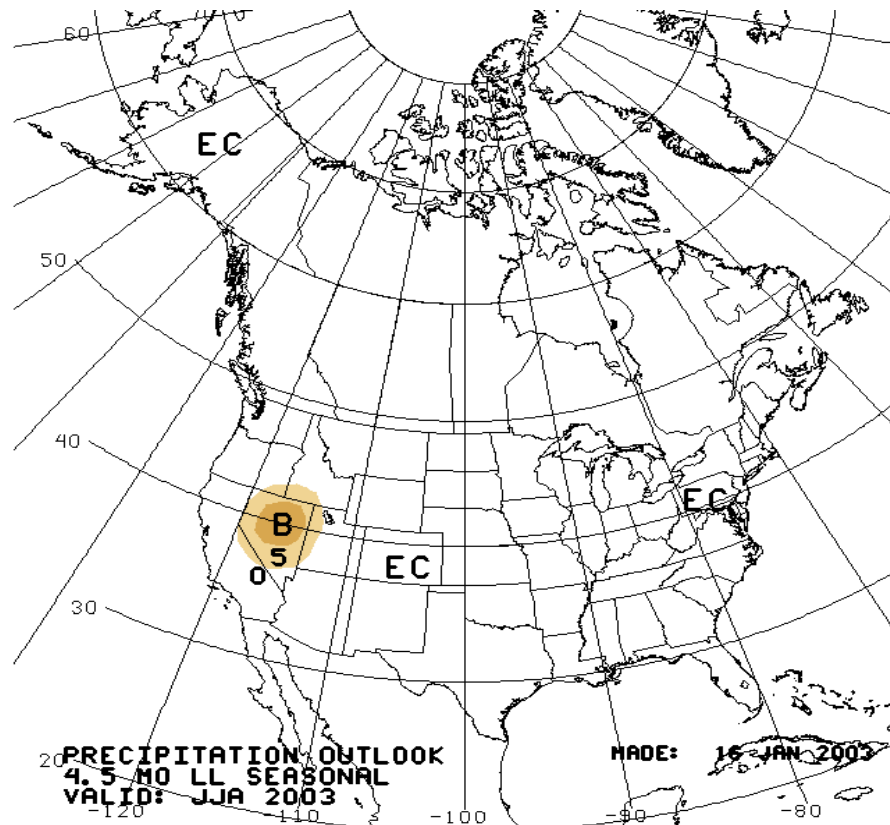


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# Precipitation

## June-Aug 2003



From the Colorado Prediction Center

[http://www.cpc.ncep.noaa.gov/products/predictions/multi\\_season/13\\_seasonal\\_outlooks/color/churchill.html](http://www.cpc.ncep.noaa.gov/products/predictions/multi_season/13_seasonal_outlooks/color/churchill.html)

# Breaking This Drought Will Be Tough

- A wet spring is essential to begin that process.

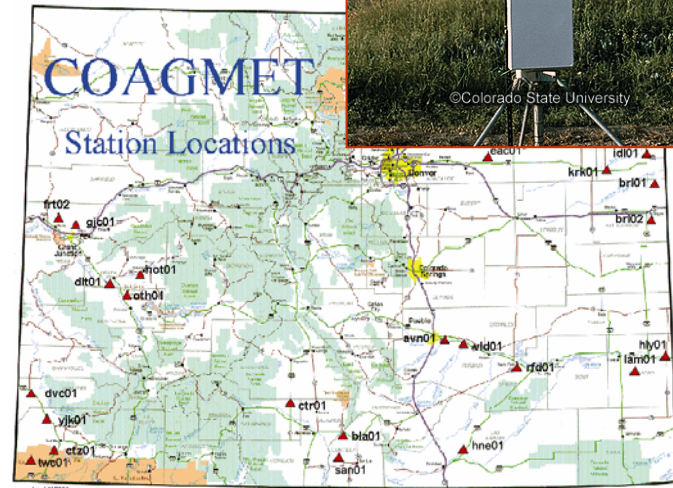


# COAGMET

## Weather Data for Agriculture

- Automated weather stations with daily and hourly readings of:

- Temperature
- Humidity
- Wind
- Precipitation
- Solar energy
- Evapotranspiration

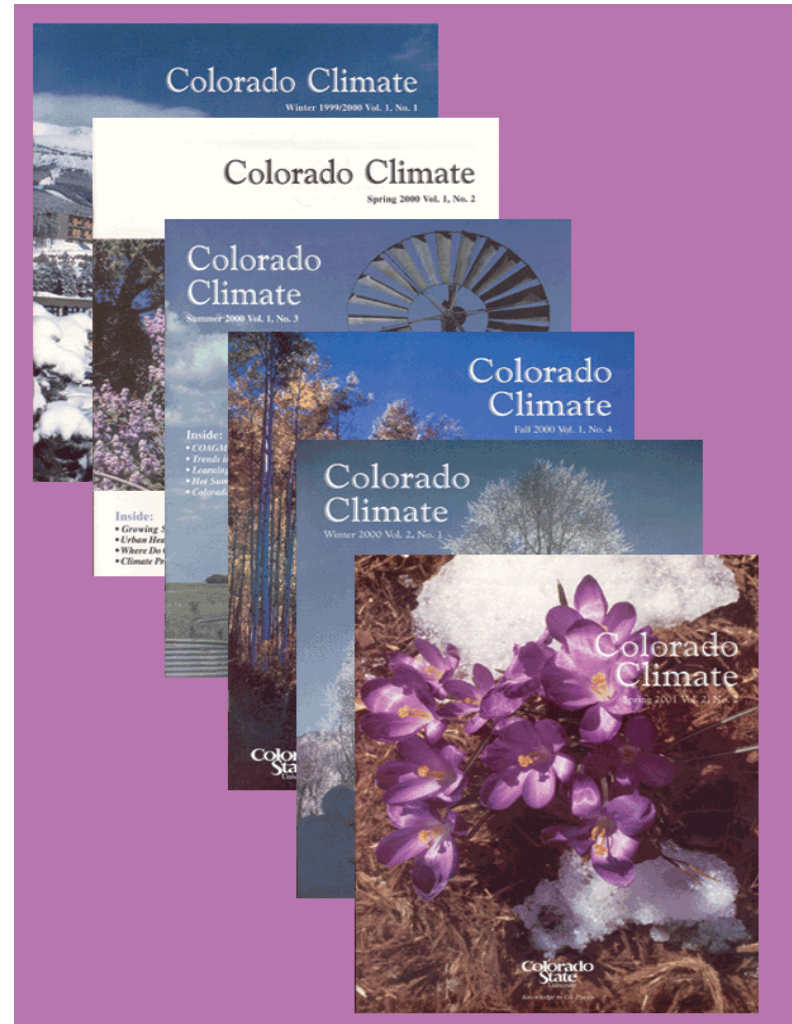


<http://www.COAGMET.com>



# Colorado Climate Magazine

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





CoCoRaHS

**Volunteers of all ages helping scientists study storms. The exploration begins in your back yard!**

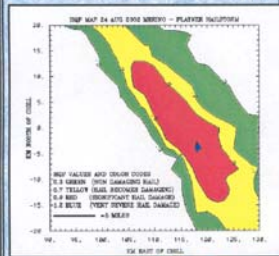


The Community Collaborative Rain and Hail Study (CoCoRaHS) needs you! Everyone can participate, both young and old. The only requirements are an enthusiasm for watching and reporting weather conditions and a desire to learn about the power and beauty of our natural world.

**CoCoRaHS needs your help!**

To register as an observer, please visit our web site at:

<http://www.cocorahs.com>



Funding for CoCoRaHS provided by:



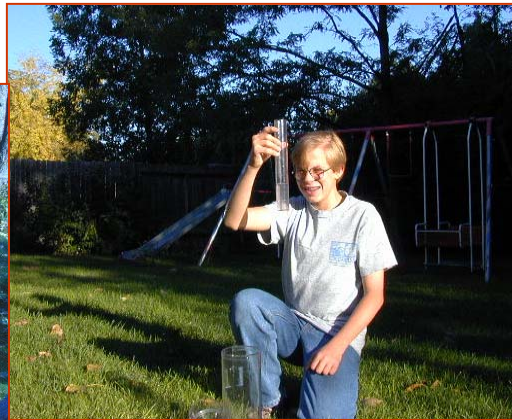
Colorado State University  
Knowledge to Go Places

Colorado Climate Center, Department of Atmospheric Science  
Colorado State University, Ft. Collins, CO 80523-1371  
Phone: 970-491-8545 FAX: 970-491-8449

# CoCo RaHS

YOU CAN HELP!

<http://www.cocorahs.com>





# Colorado Climate Center Colorado State University

- Data and Power Point Presentations available for downloading
- <http://climate.atmos.colostate.edu>  
click on “Drought”  
then click on “Presentations”