CoCoRaHS goes to the Colorado Farm Show

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Colorado Climate Center, Atmospheric Science Dept, Colorado State University

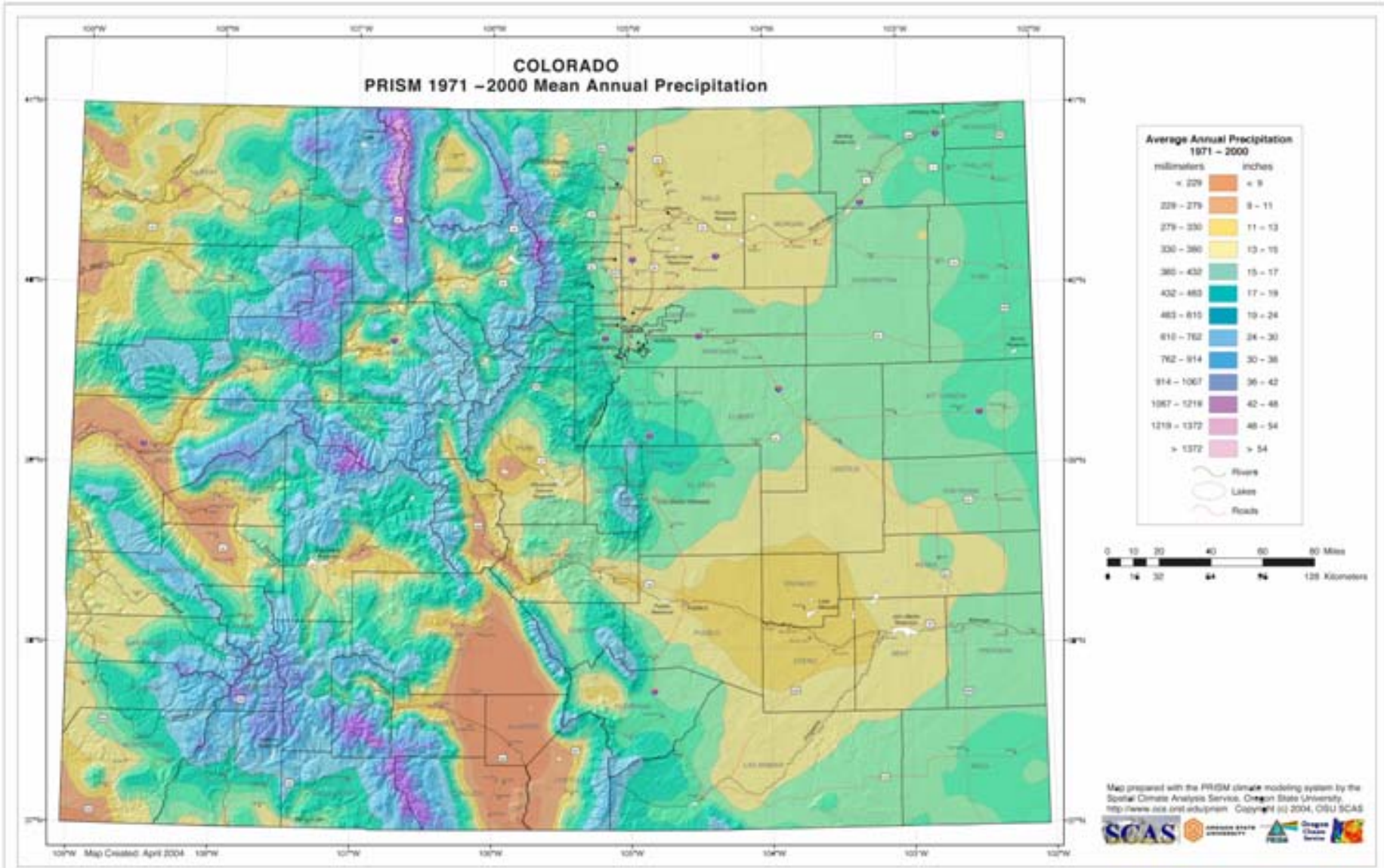
Presented January 25, 2006, Greeley, CO

Prepared by Odie Bliss

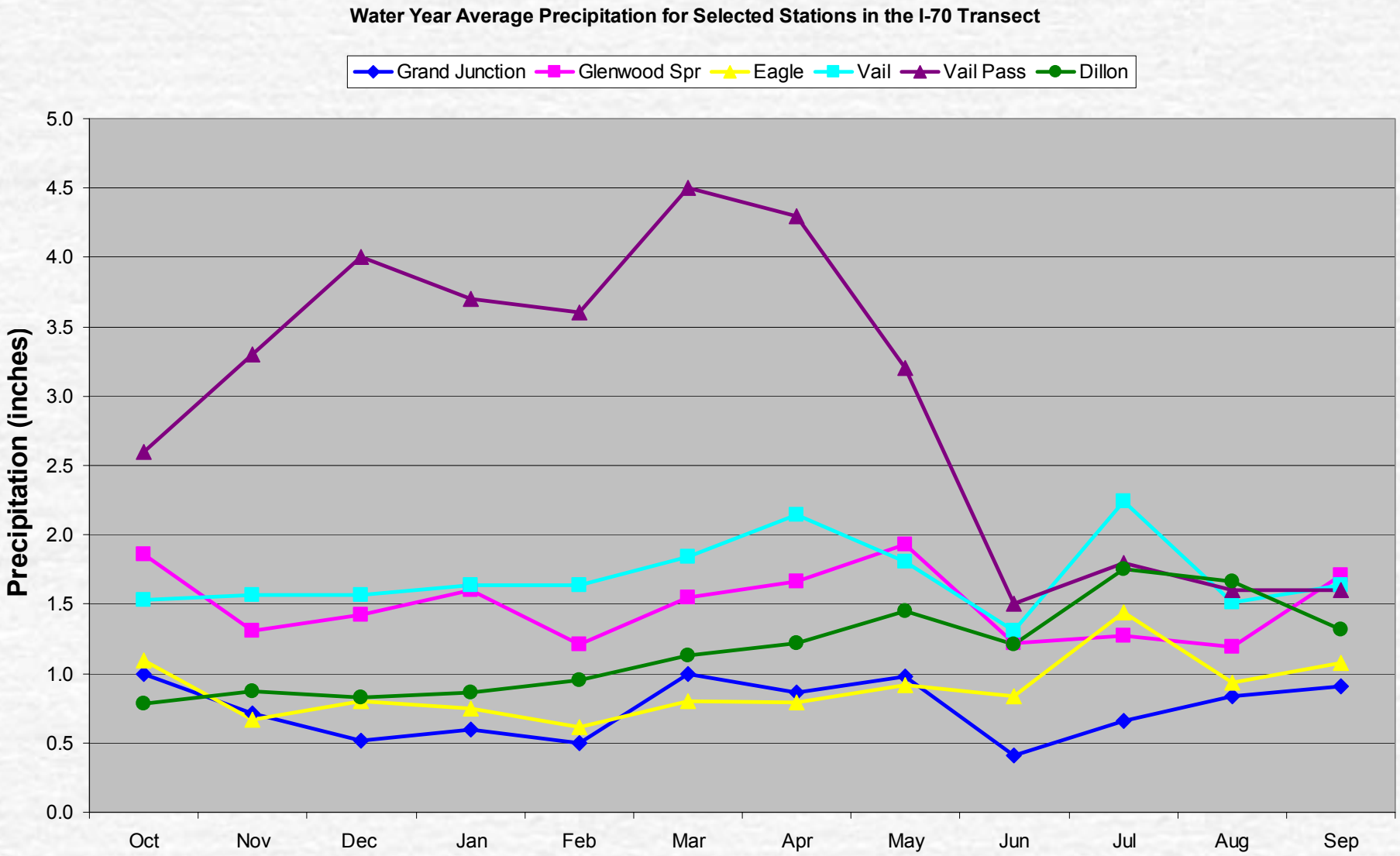
The Basics of the Climate of Colorado

Photo Lynn Kral

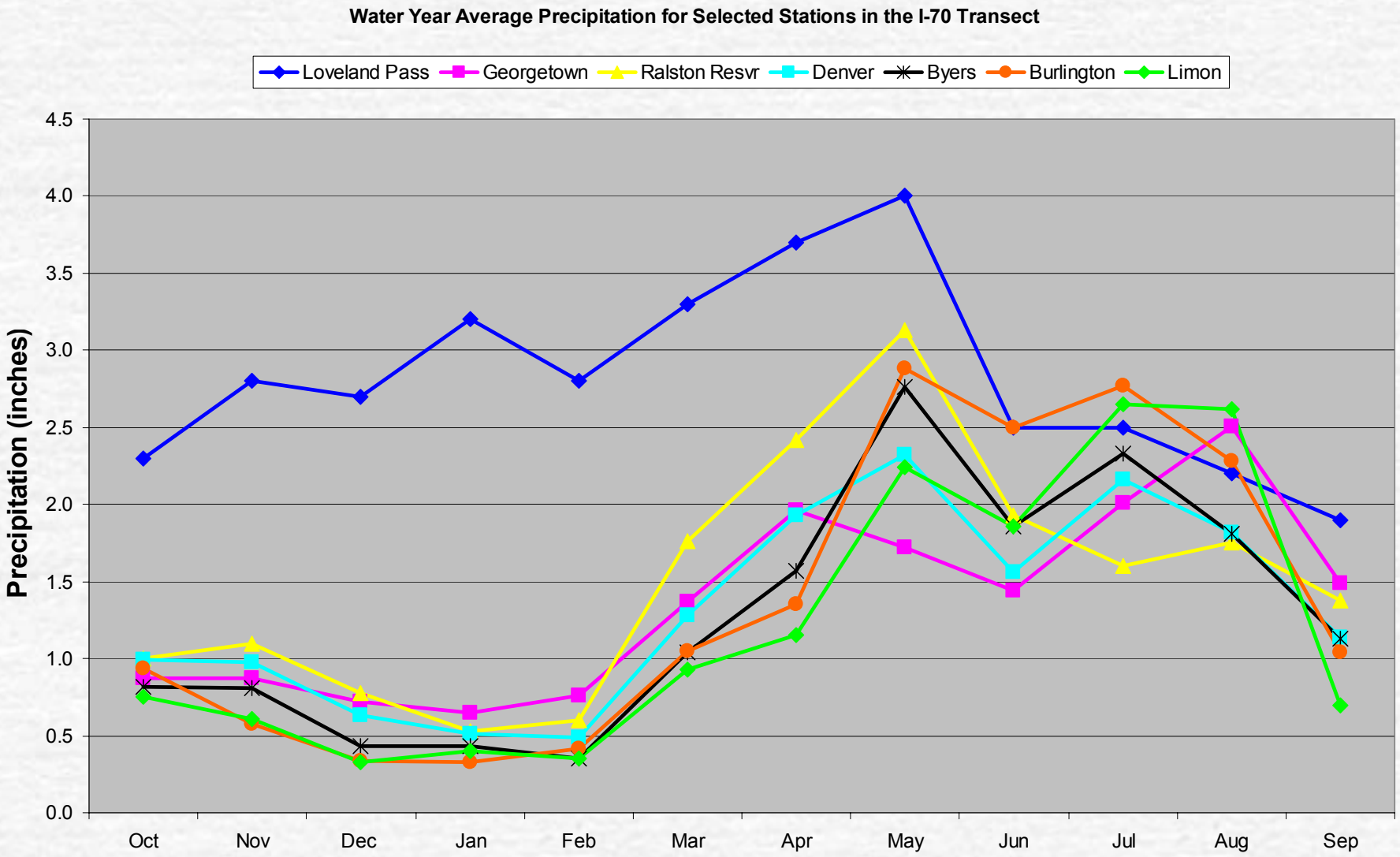
Colorado Average Annual Precipitation



Average Precipitation for Selected Locations

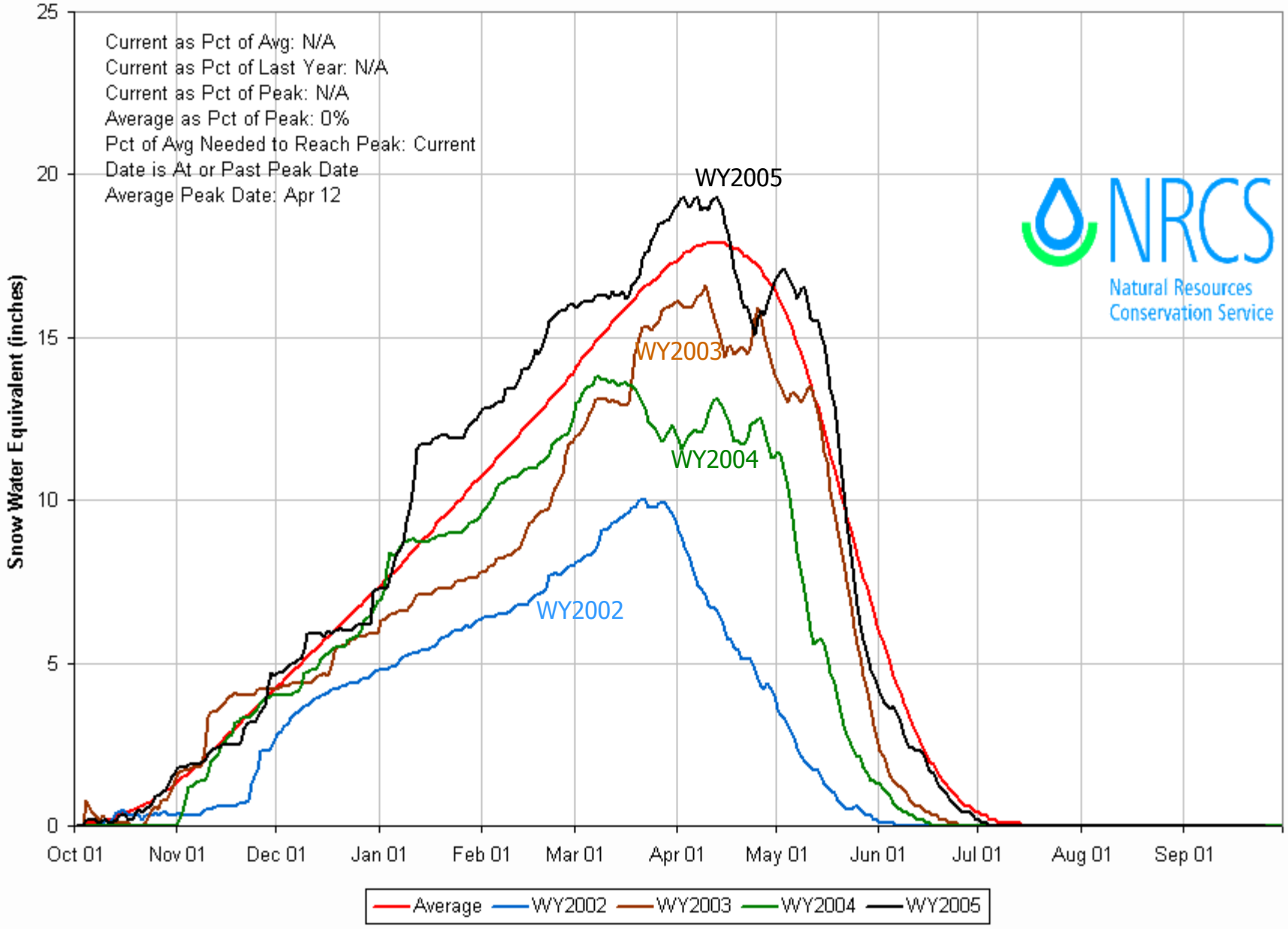


Average Precipitation for Selected Locations

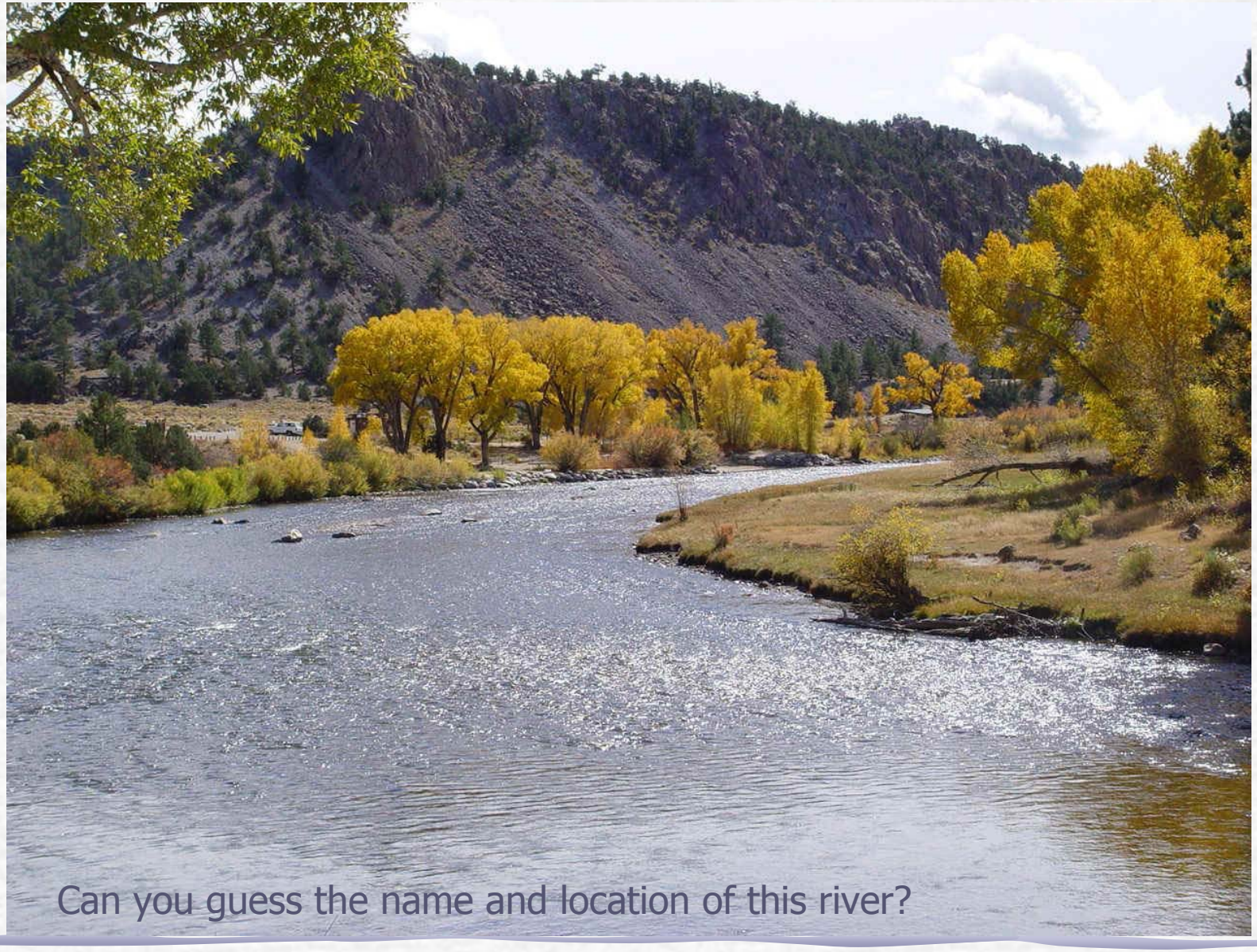


Colorado Statewide Snowpack

Based on Provisional SNOTEL data as of Sep 26, 2005



Typical Streamflow Patterns



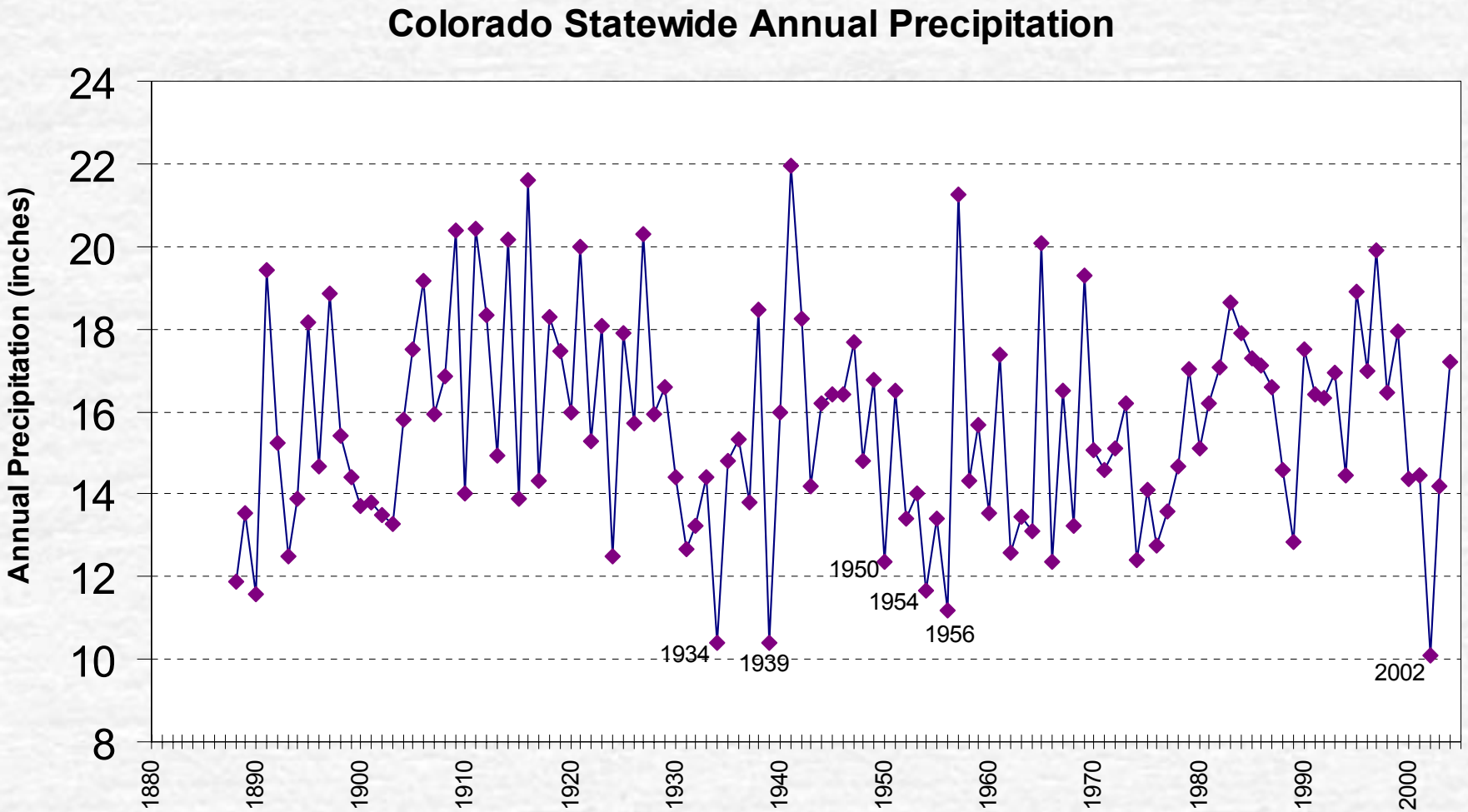
Can you guess the name and location of this river?

So, Where Have We Been?

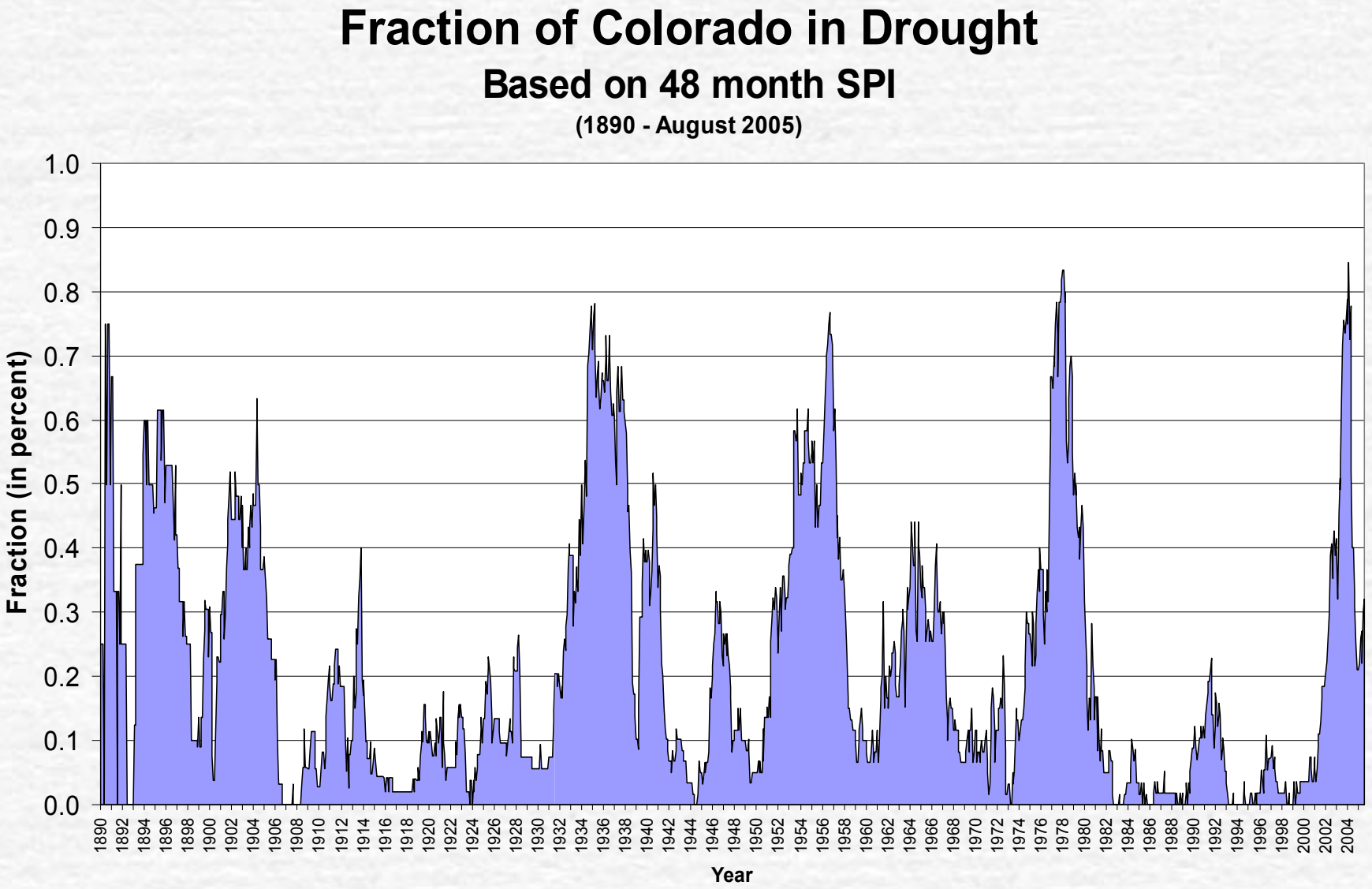
Photo by Matt Stark

Photo by MJ. Brodzik

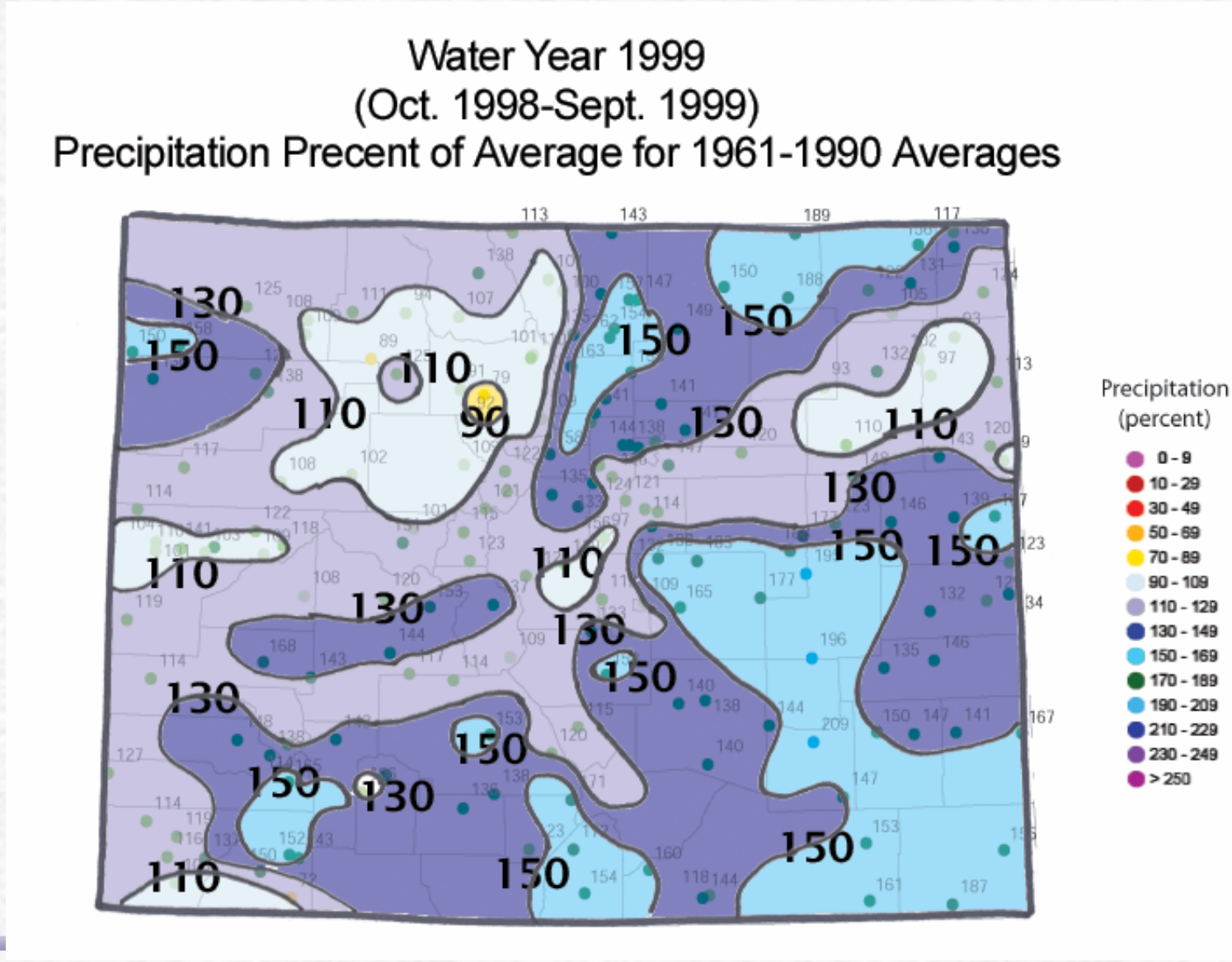
Statewide Annual Precipitation



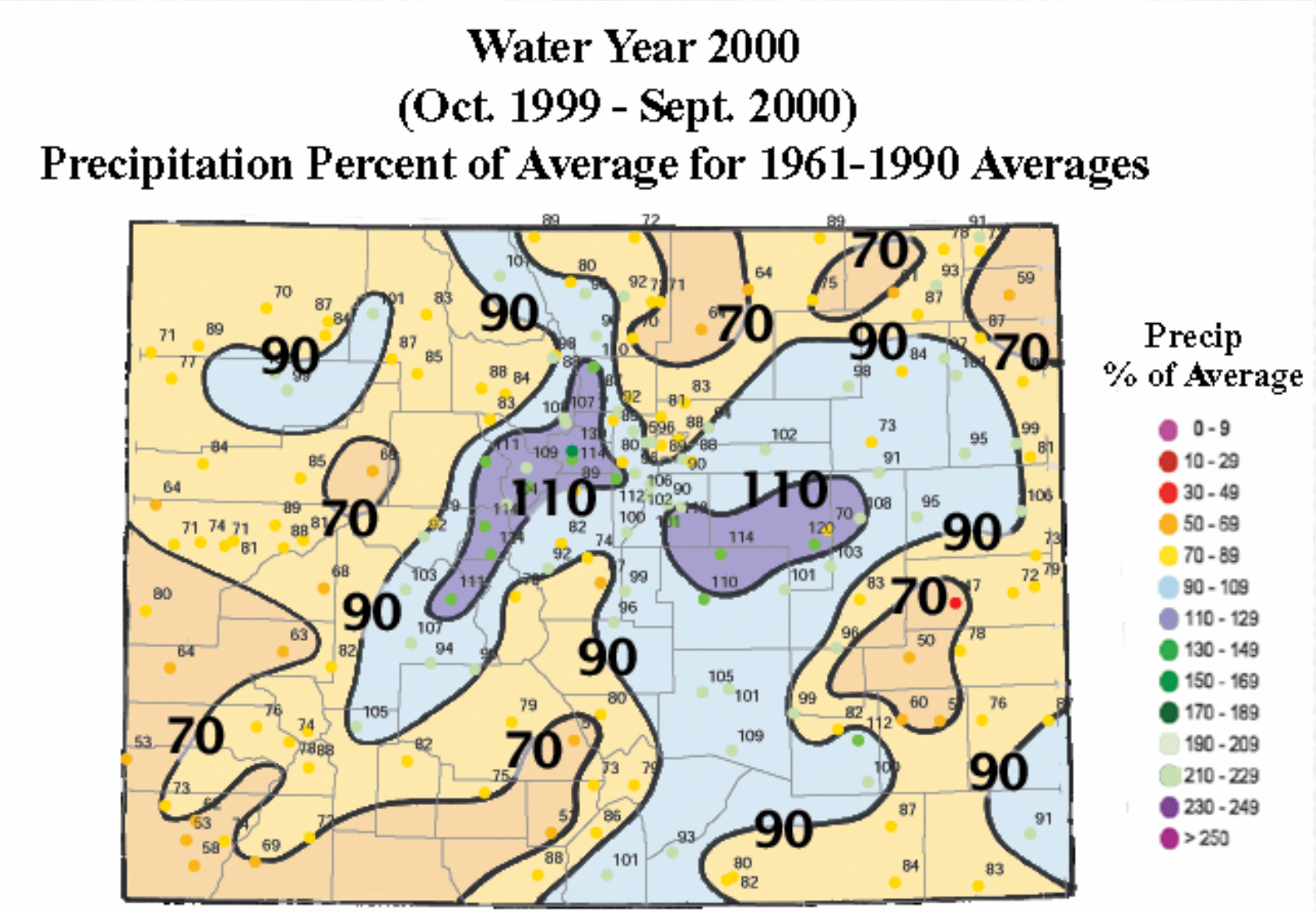
48 month SPI


Fraction of Colorado in Drought
Based on 48 month SPI
(1890 - August 2005)
Fraction (in percent)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1890 1892 1894 1896 1898 1900 1902 1904 1906 1908 1910 1912 1914 1916 1918 1920 1922 1924 1926 1928 1930 1932 1934 1936 1938 1940 1942 1944 1946 1948 1950 1952 1954 1956 1958 1960 1962 1964 1966 1968 1970 1972 1974 1976 1978 1980 1982 1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004
Year

1999 Water Year Precipitation

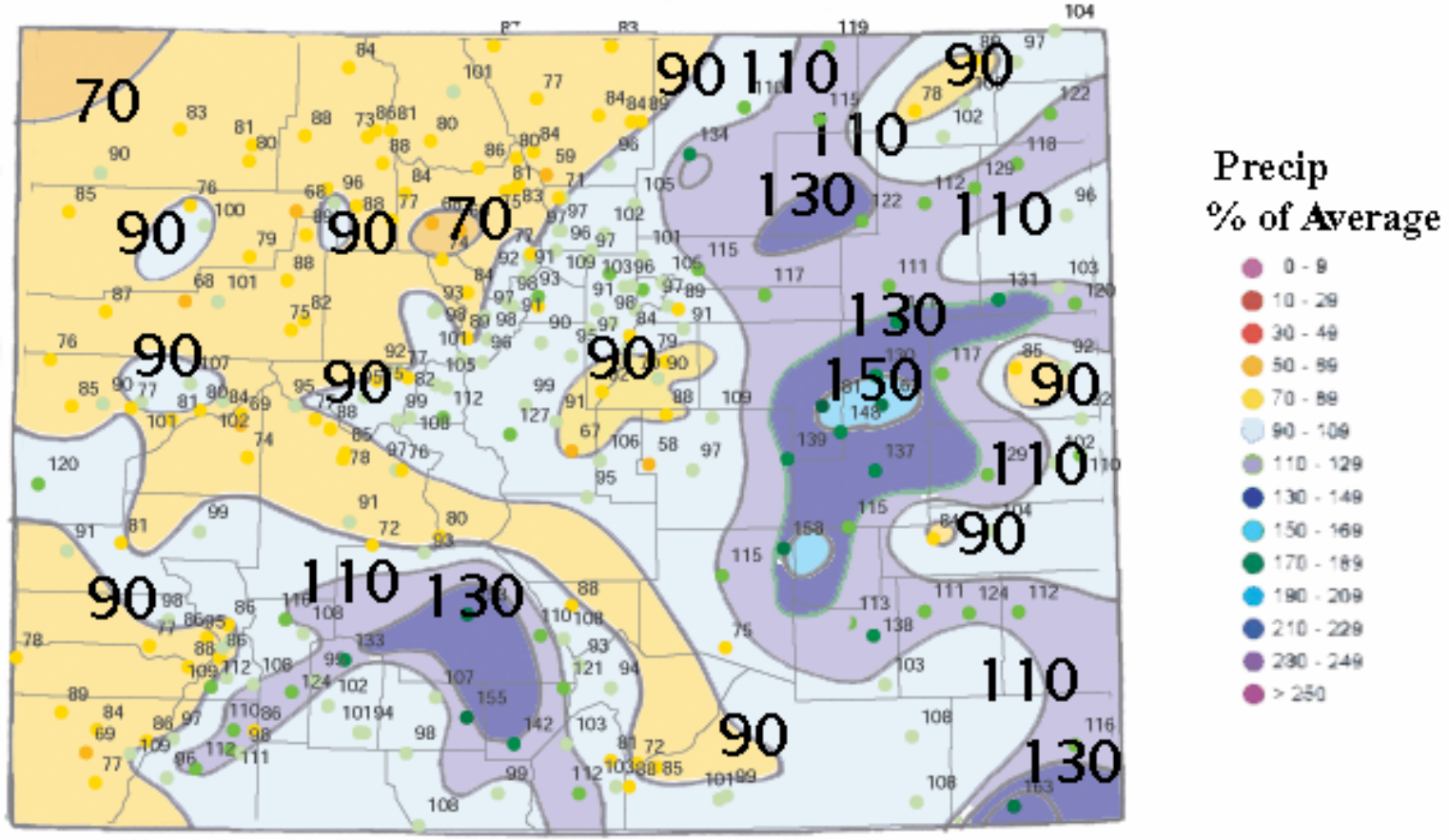


2000 Water Year Precipitation

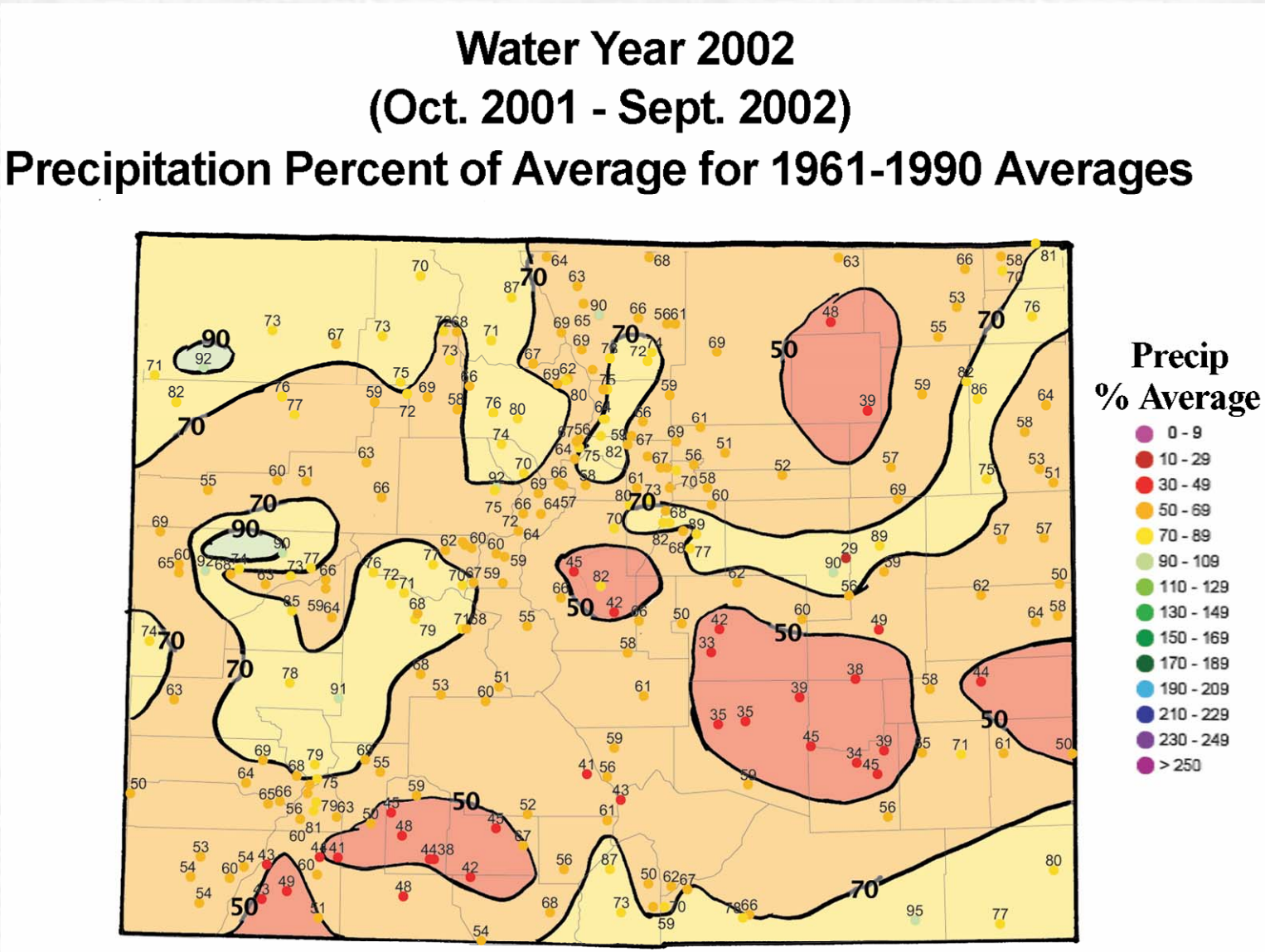


2001 Water Year Precipitation

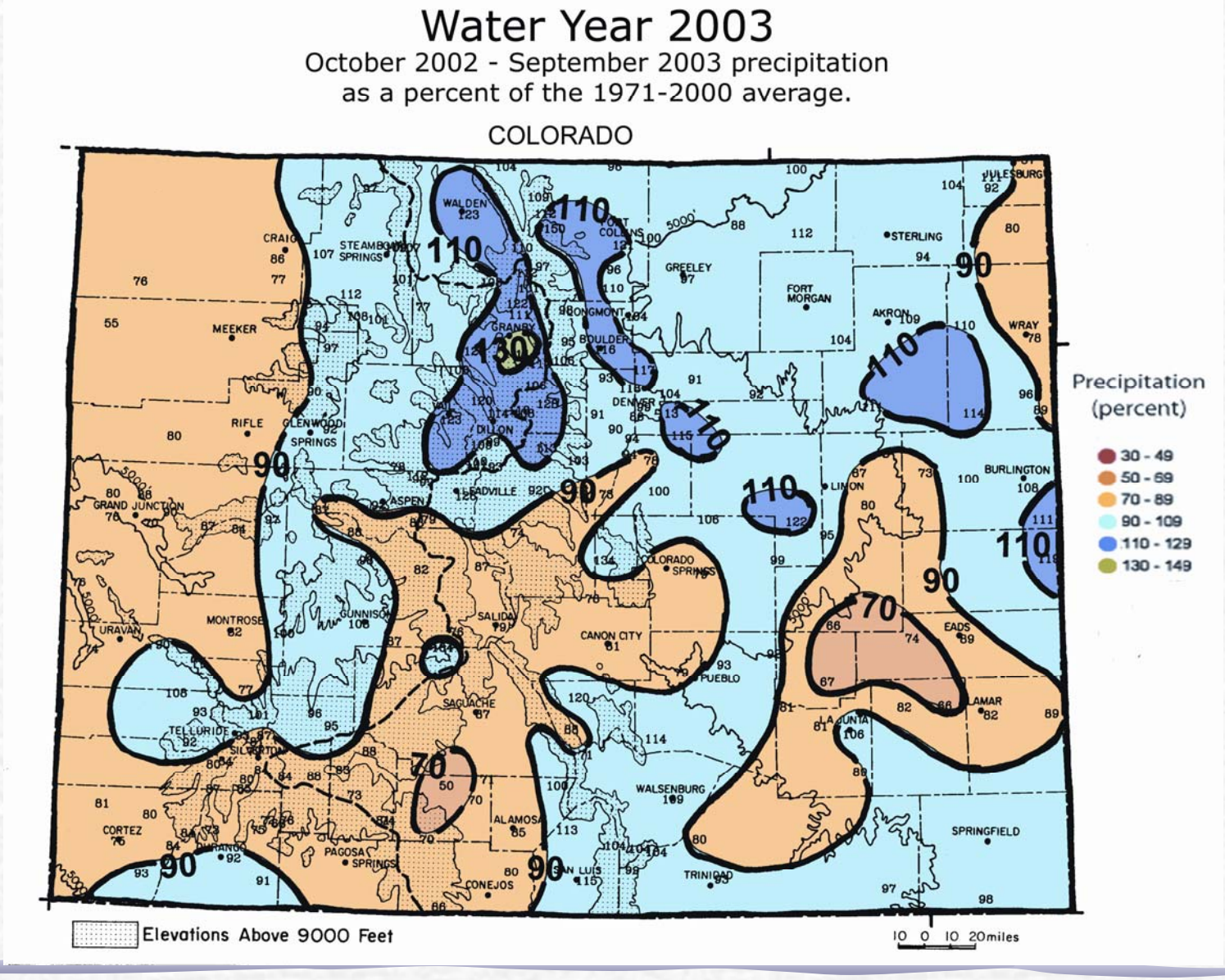
Water Year 2001
(Oct. 2000 - Sept. 2001)
Precipitation Percent of Average for 1961-1990 Averages



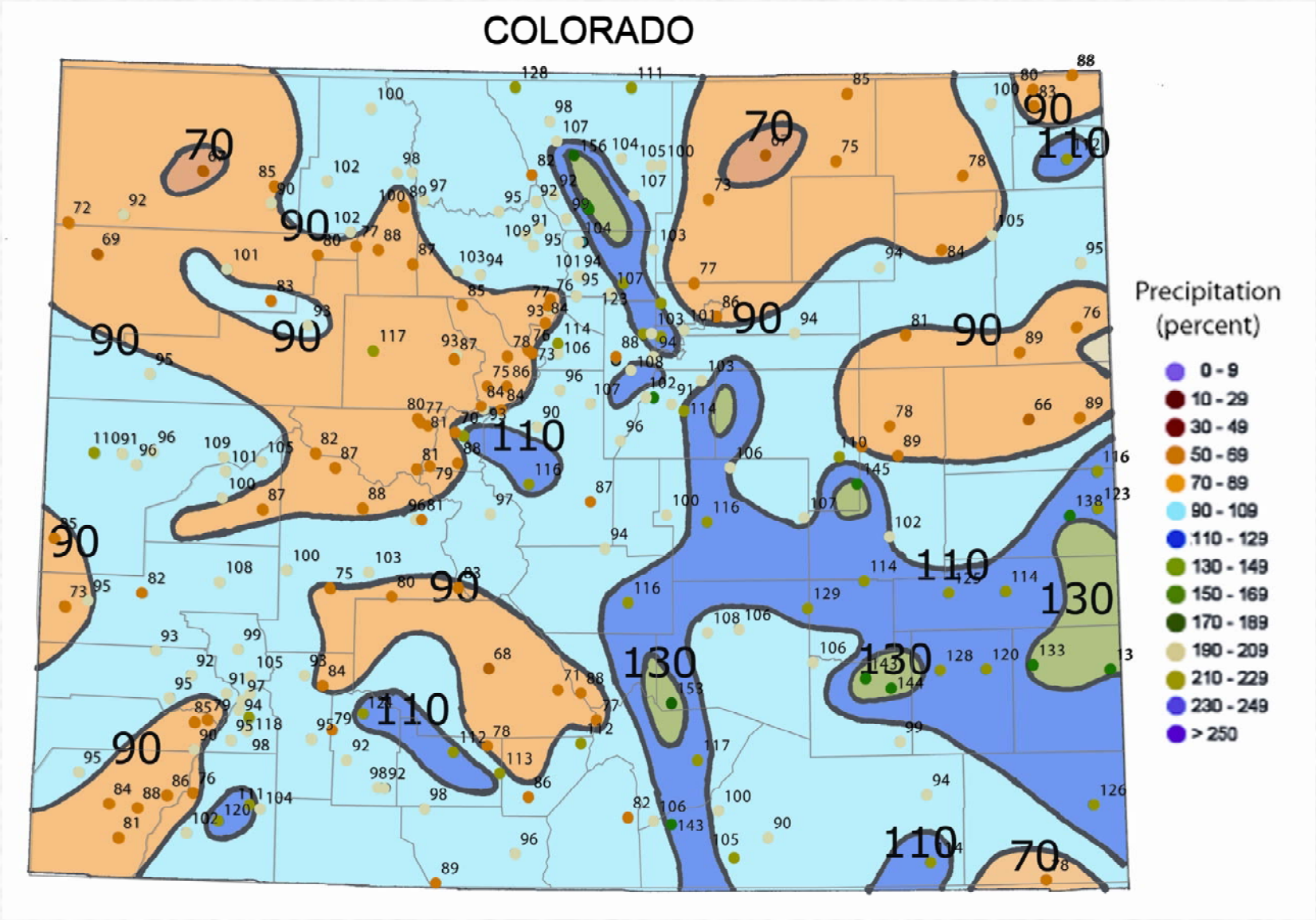
2002 Water Year Precipitation



2003 Water Year Precipitation

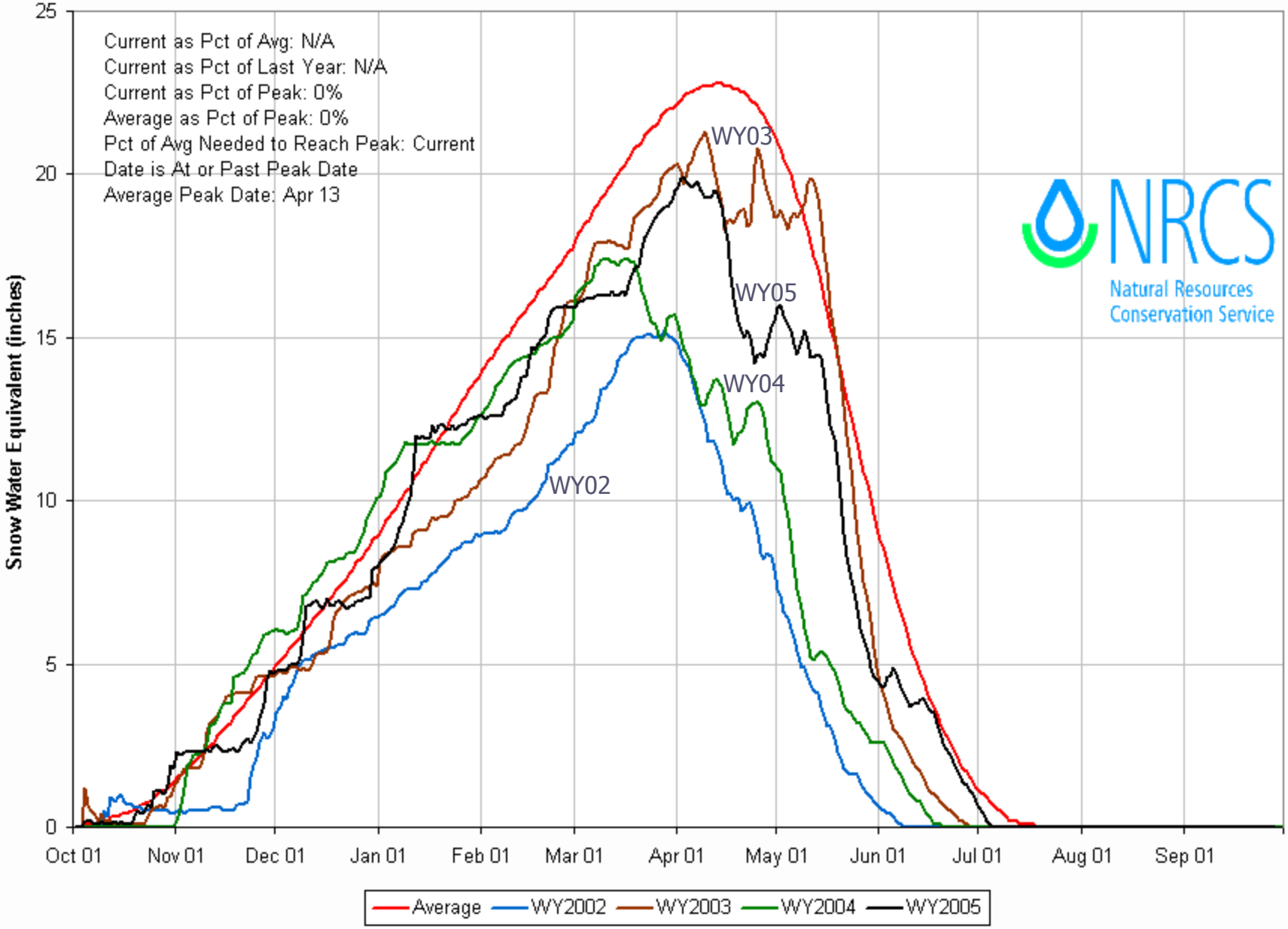


2004 Water Year Precipitation



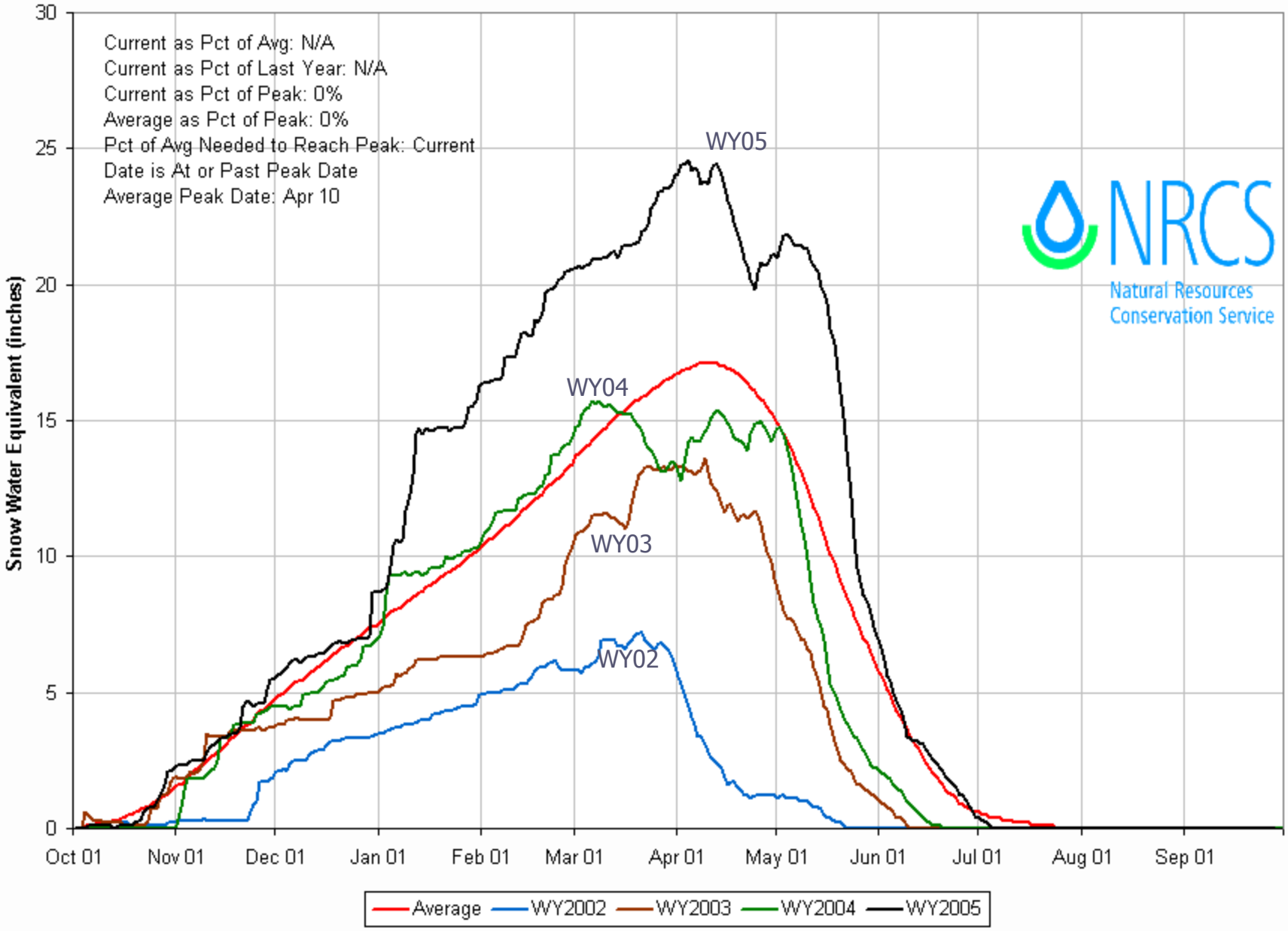
Yampa and White River Basins Snowpack

Based on Provisional SNOTEL data as of Sep 28, 2005

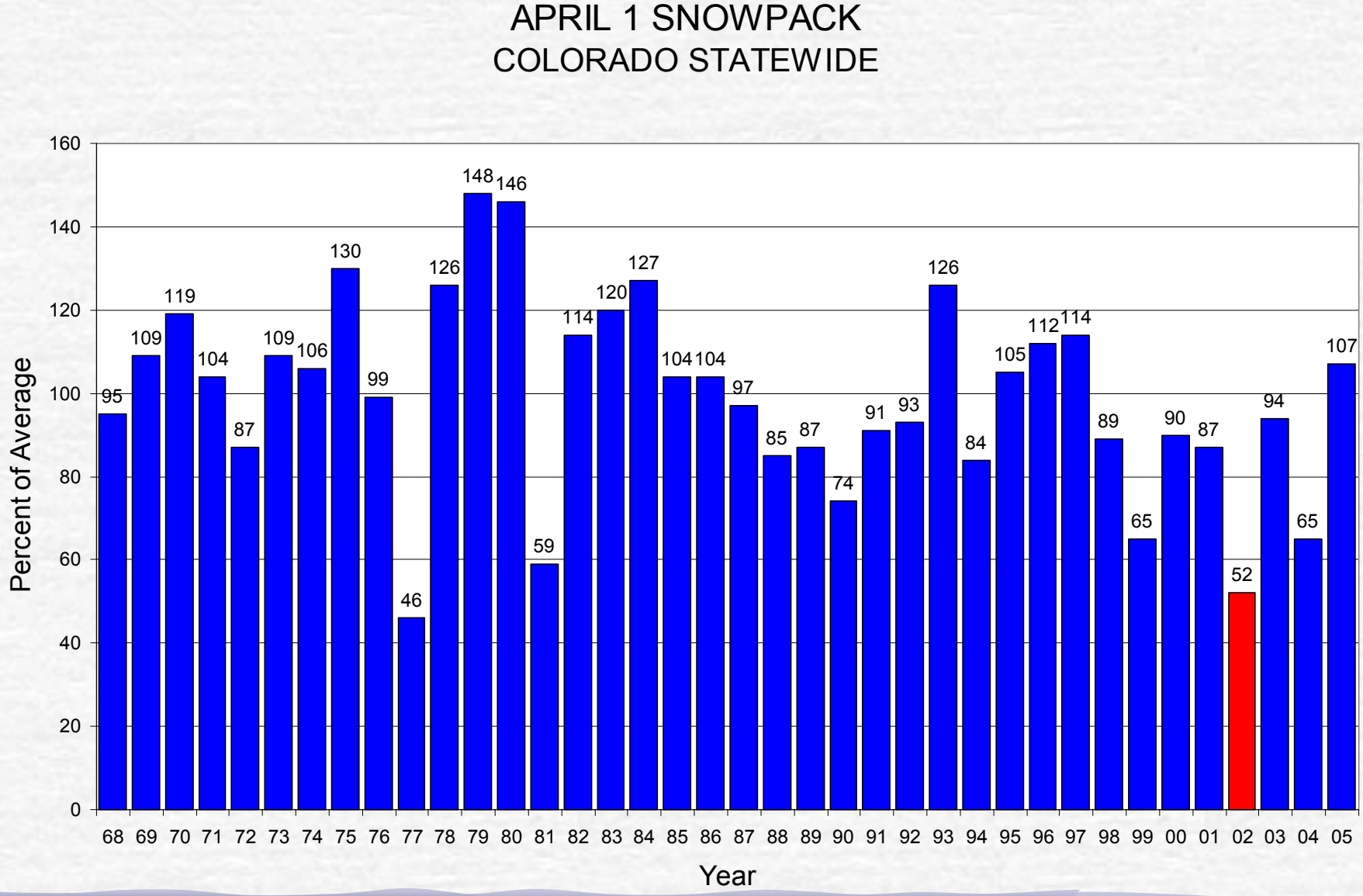


Upper Rio Grande Basin Snowpack

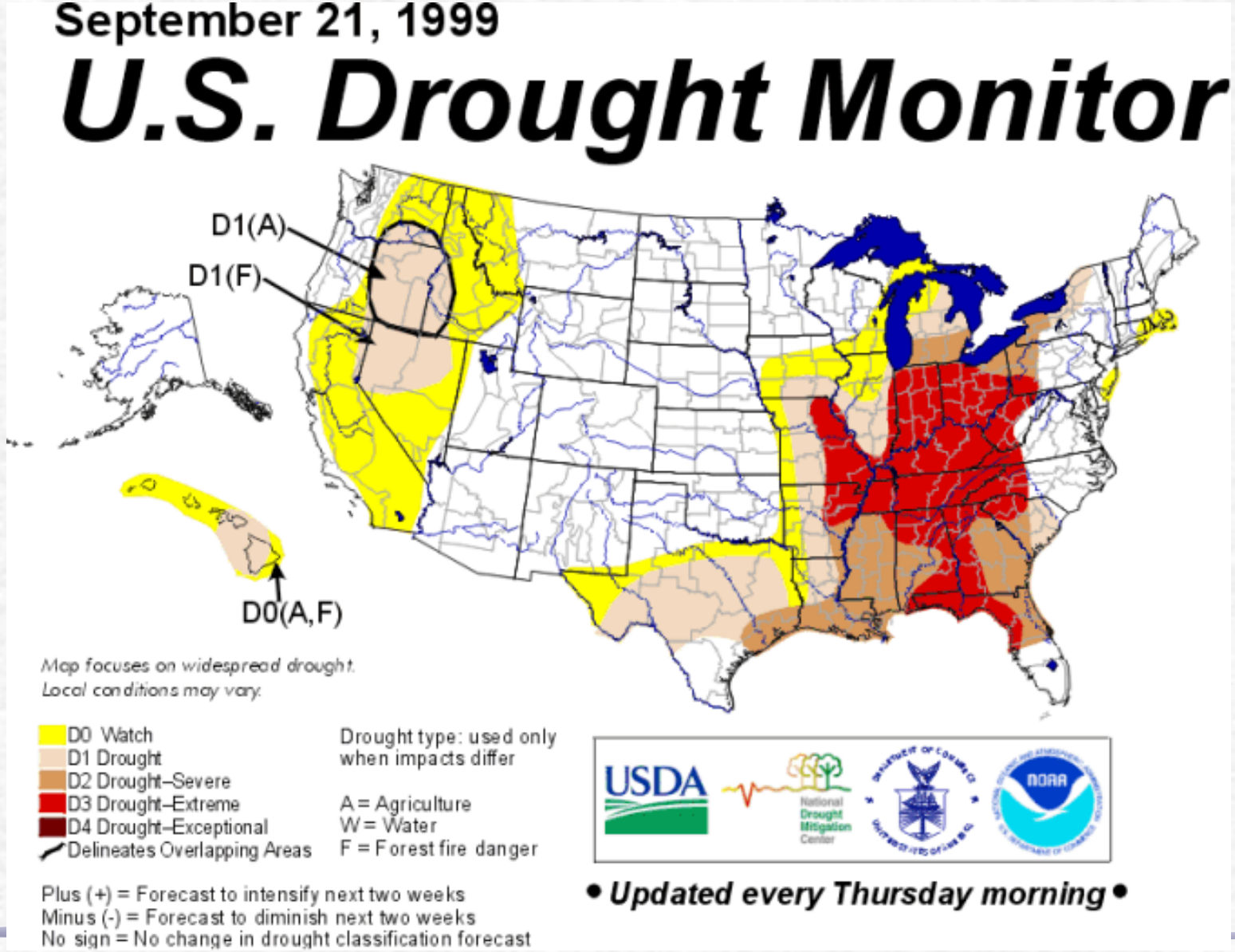
Based on Provisional SNOTEL data as of Sep 28, 2005



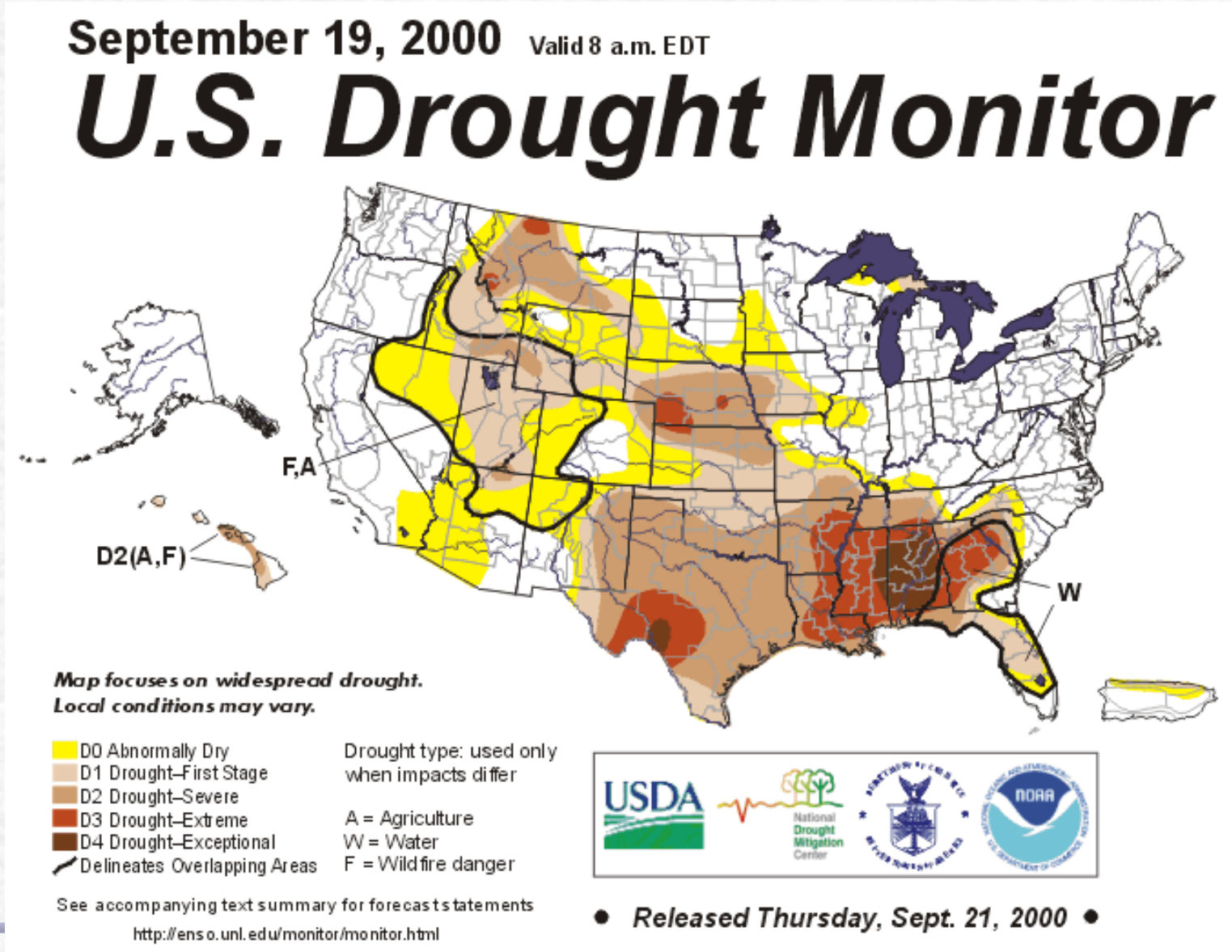
April 1 Snowpack



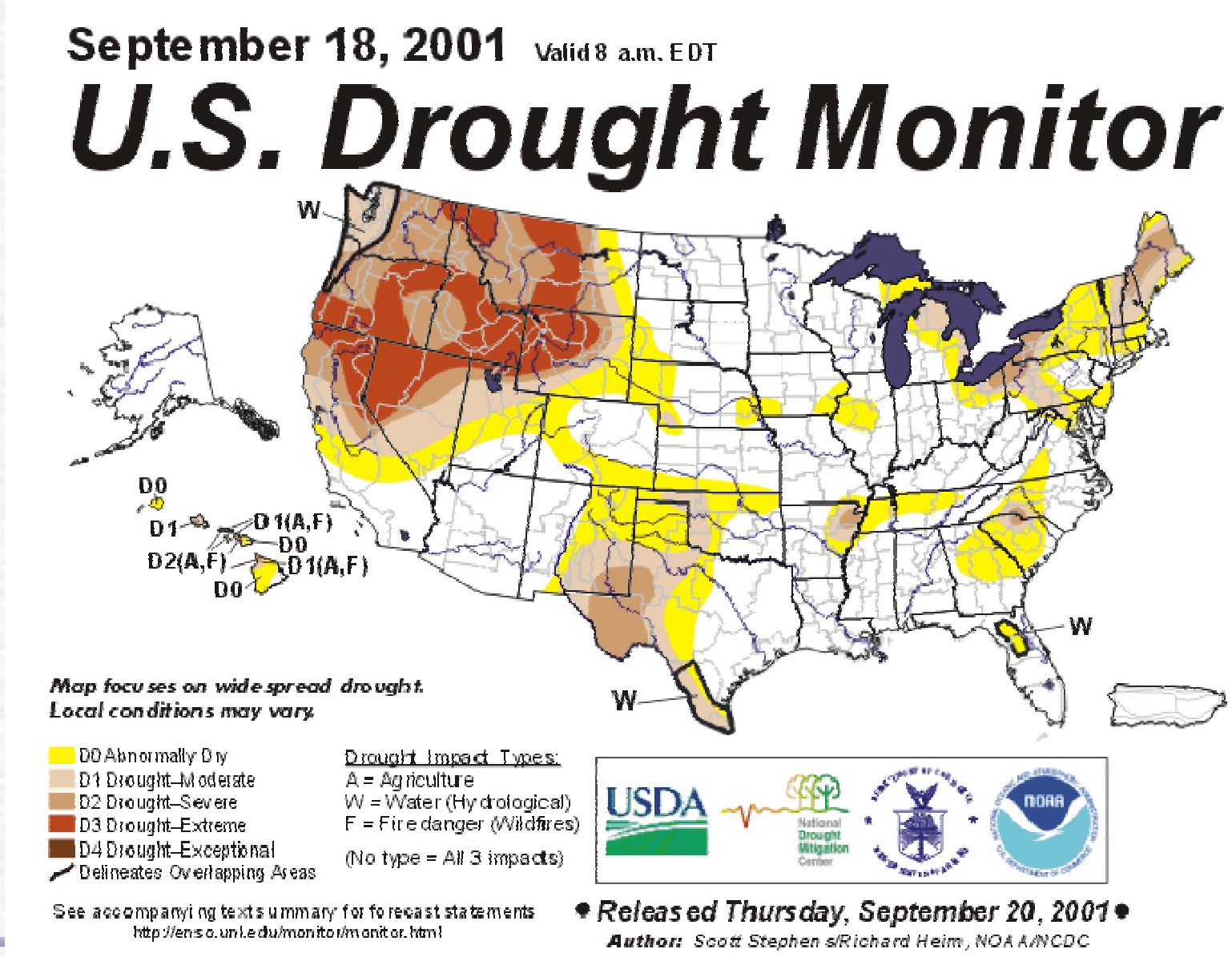
Drought Monitor – Sep 21, 1999



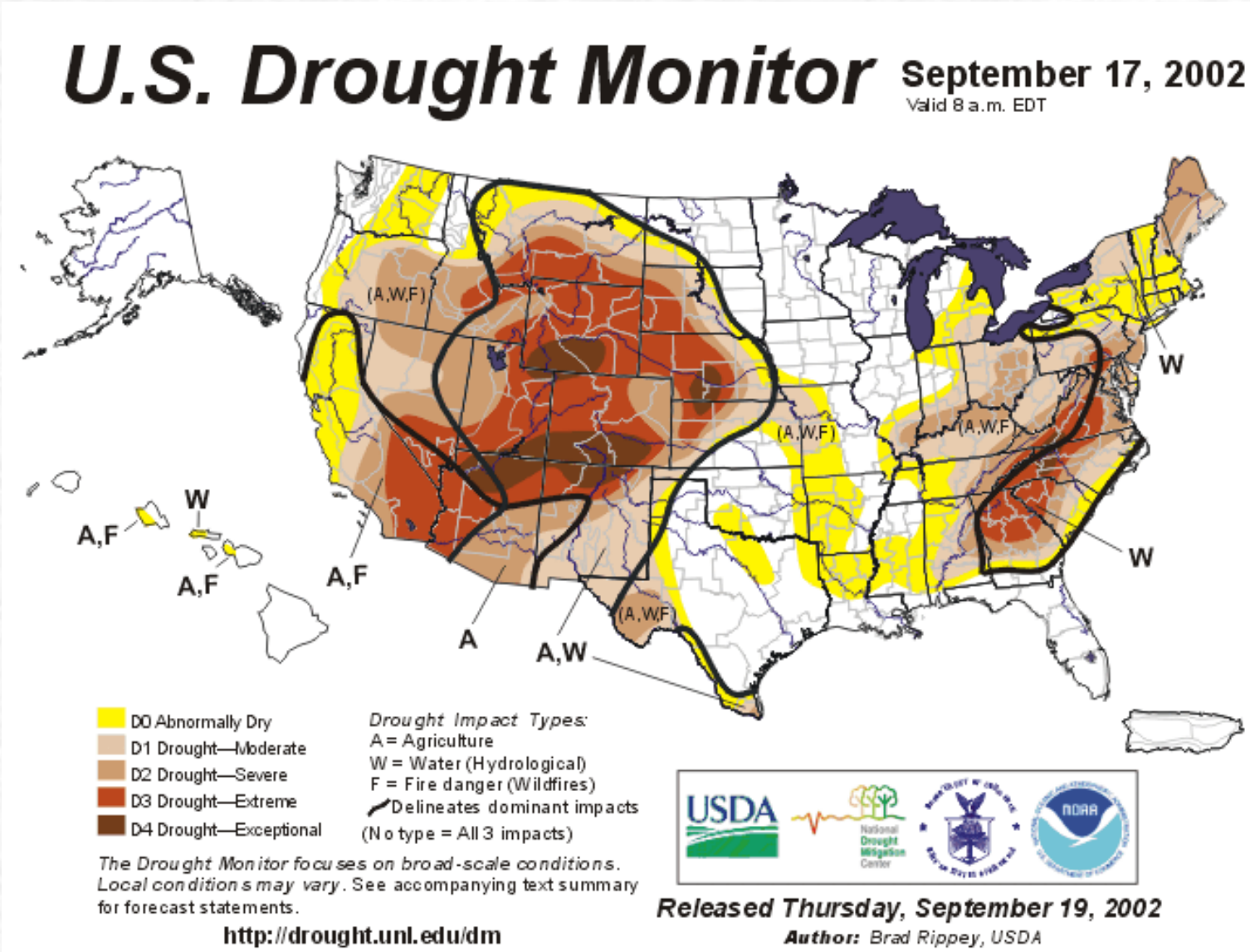
Drought Monitor – Sep 19, 2000



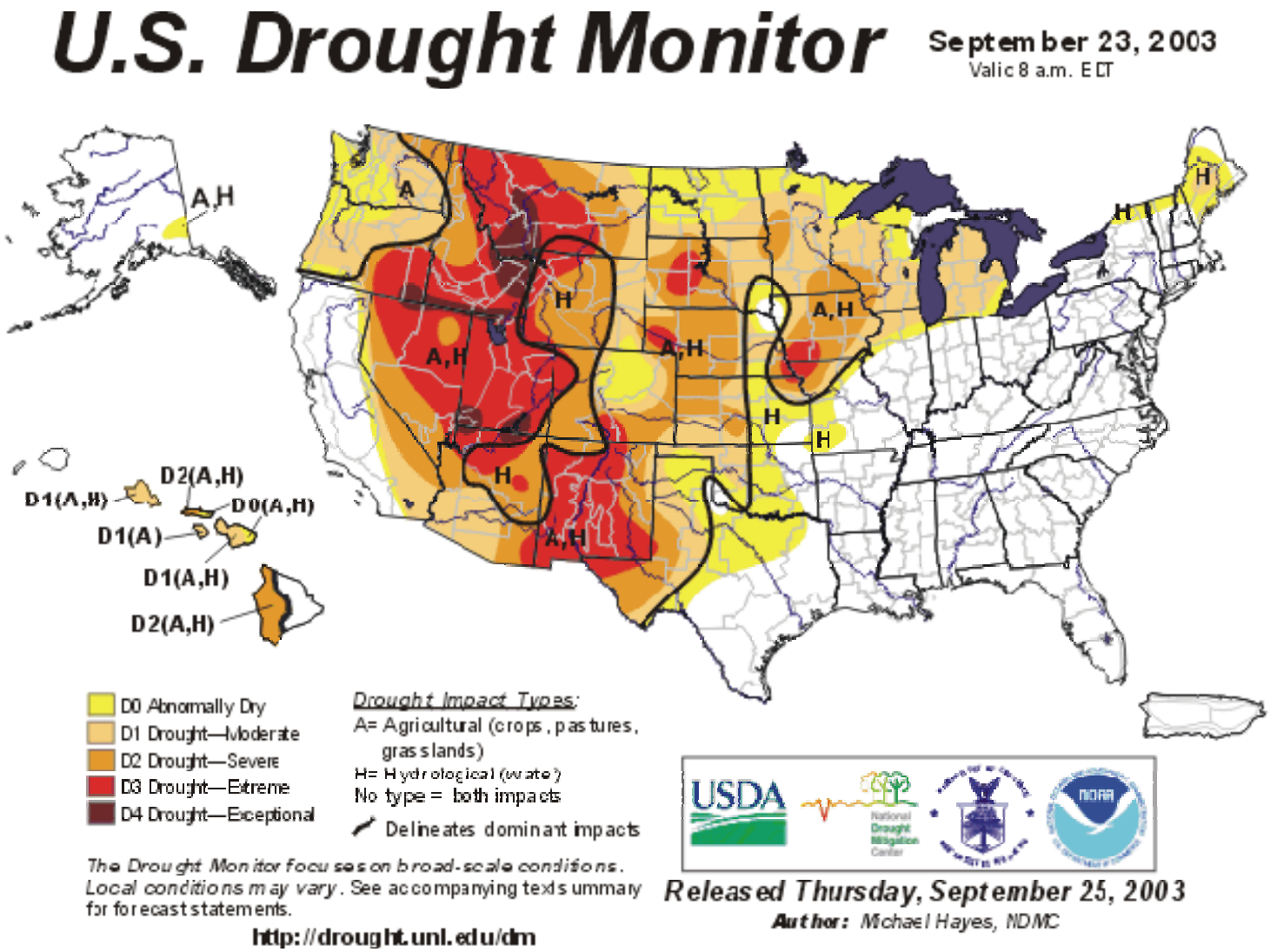
Drought Monitor – Sep 18, 2001



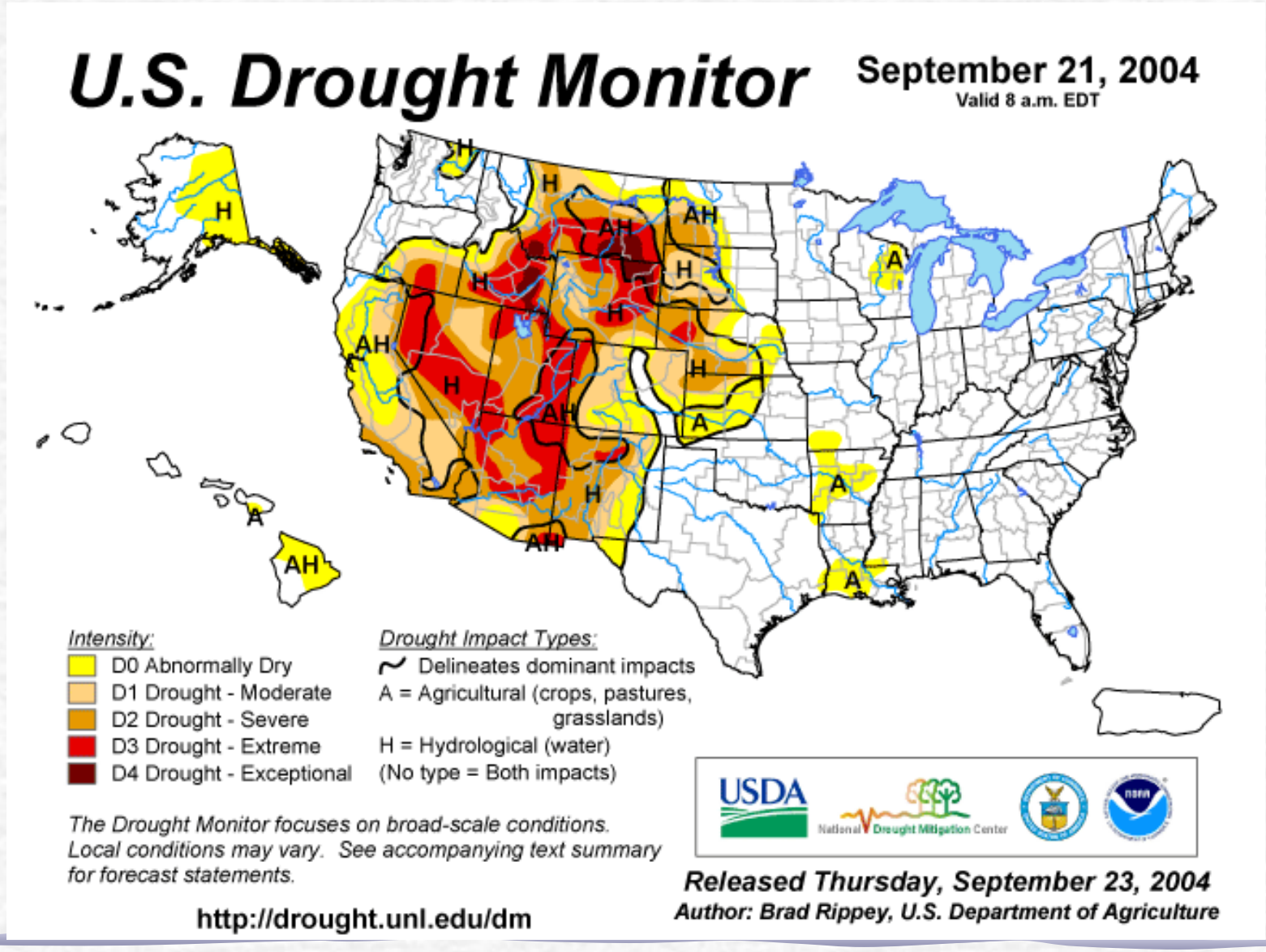
Drought Monitor – Sep 17, 2002



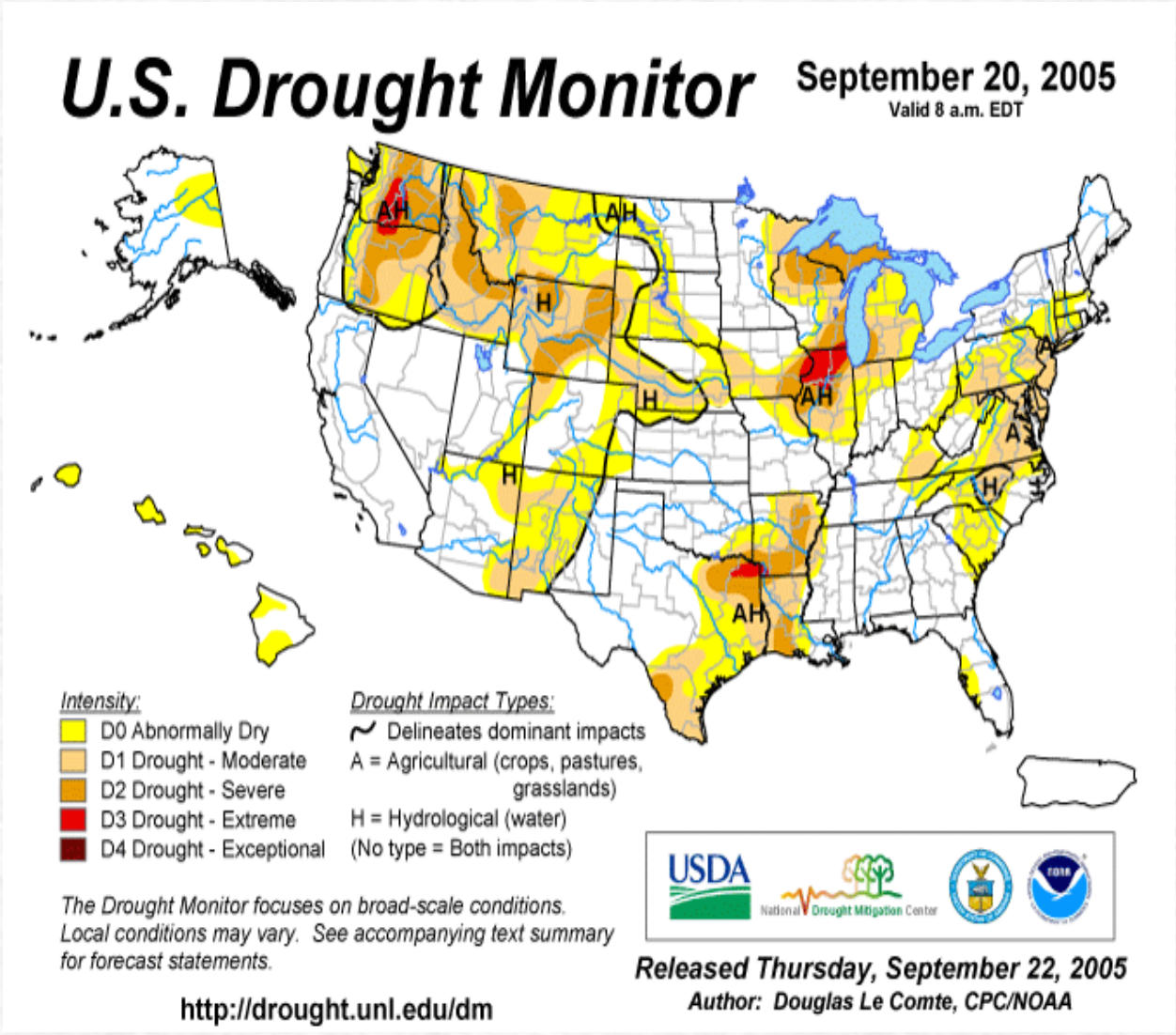
Drought Monitor – Sep 23, 2003



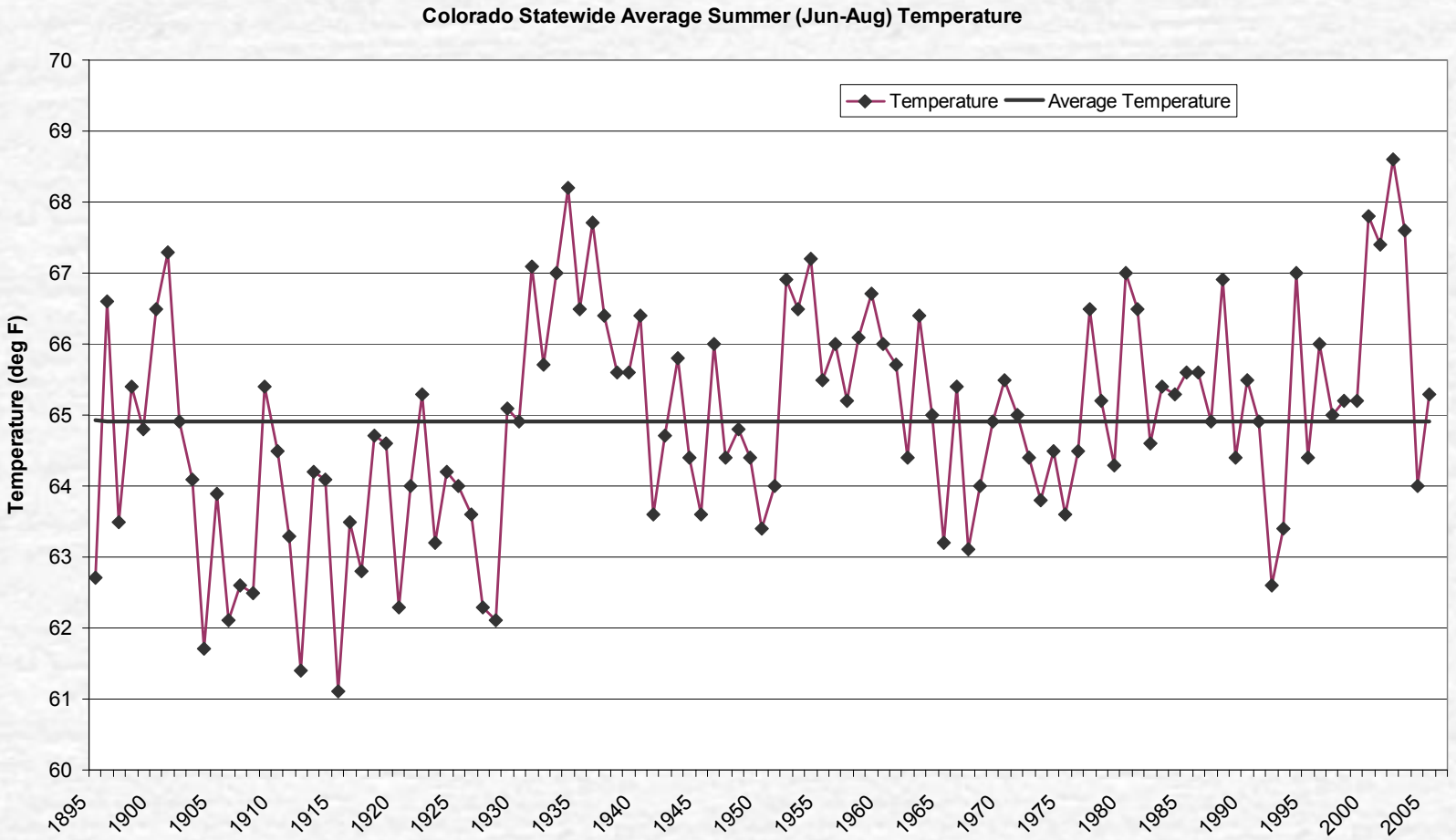
Drought Monitor – Sep 21, 2004



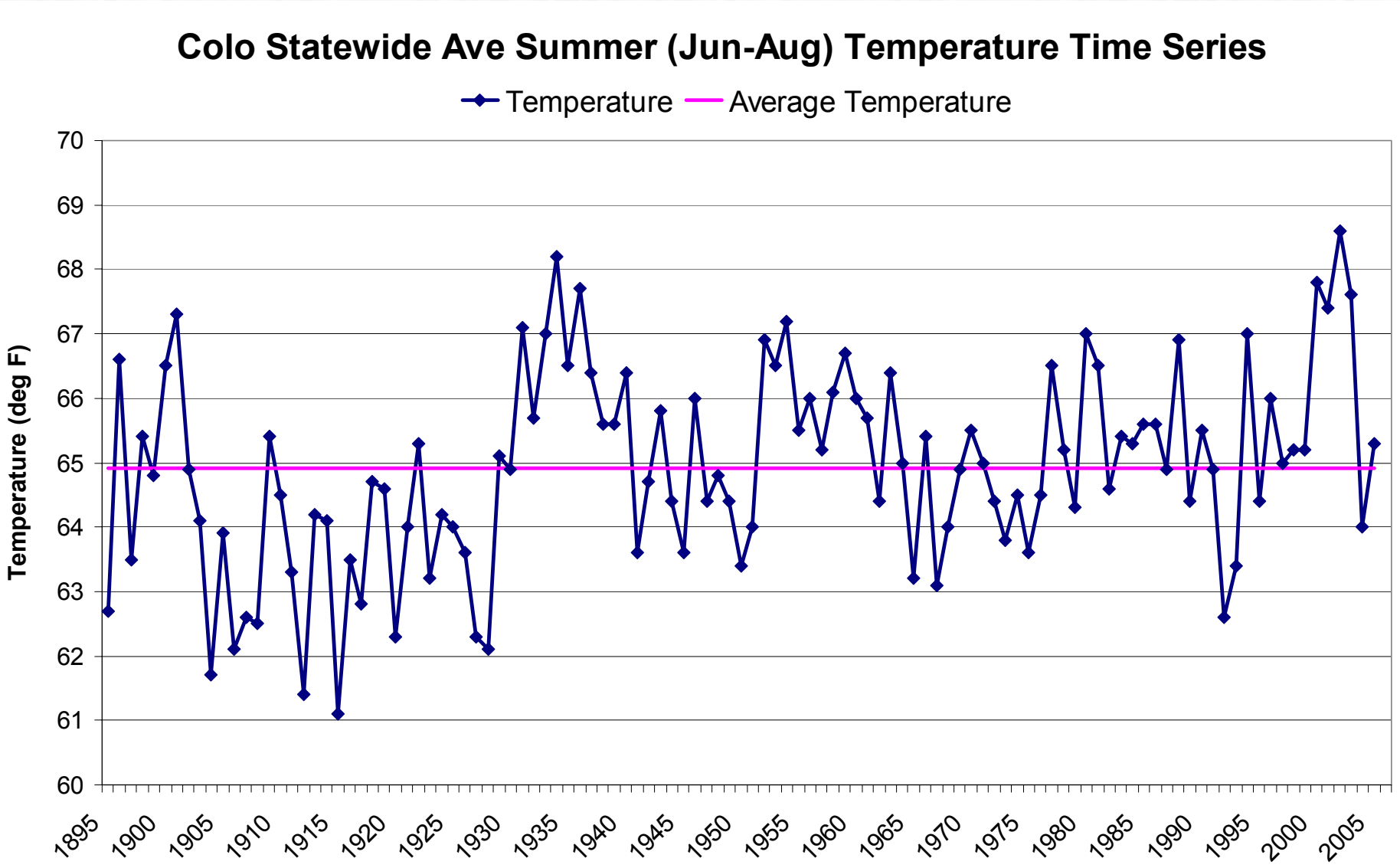
Drought Monitor – Sep 20, 2005



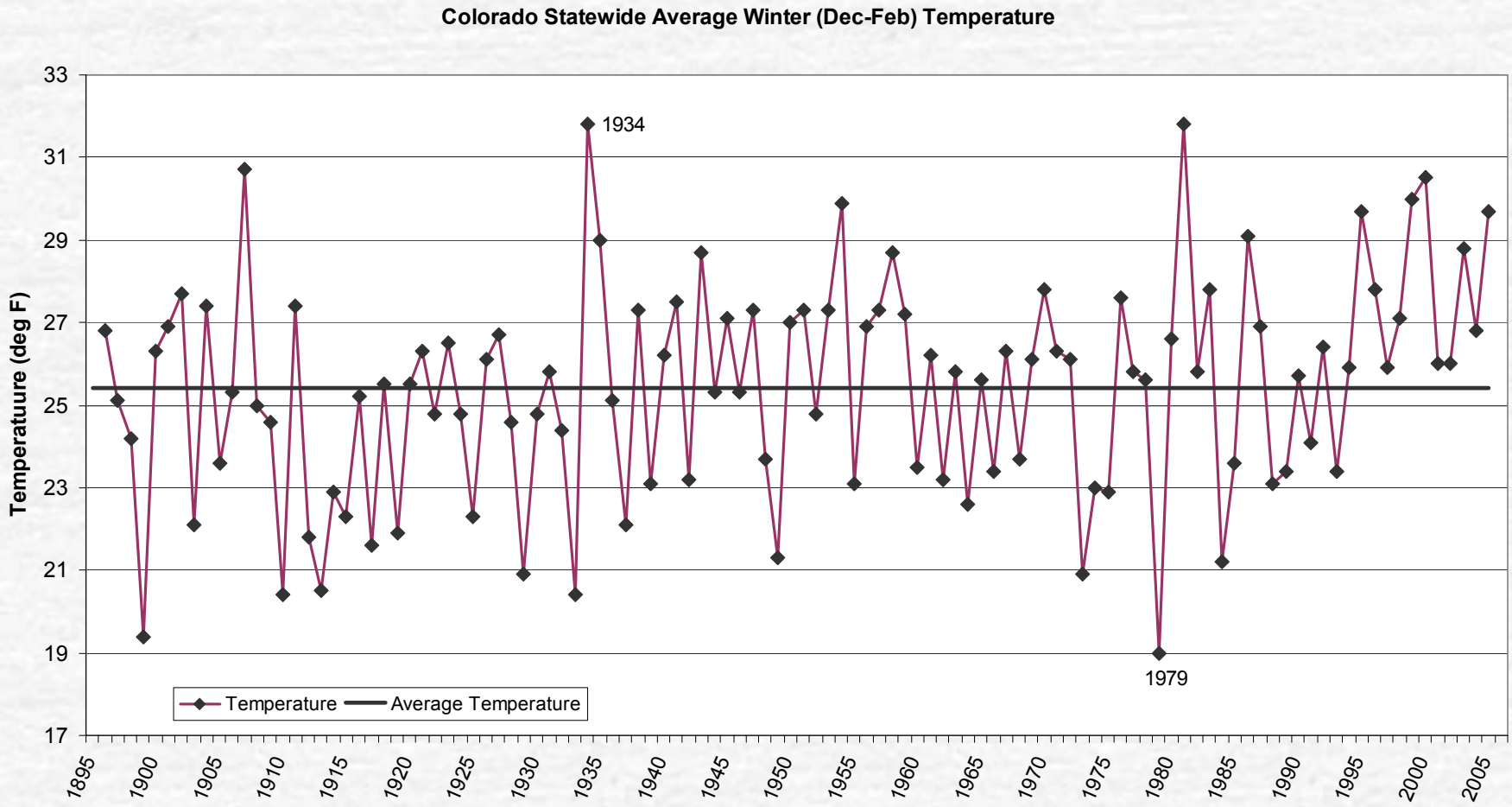
Colorado Average Summer (Jun-Aug) Temperature, 1895-2005

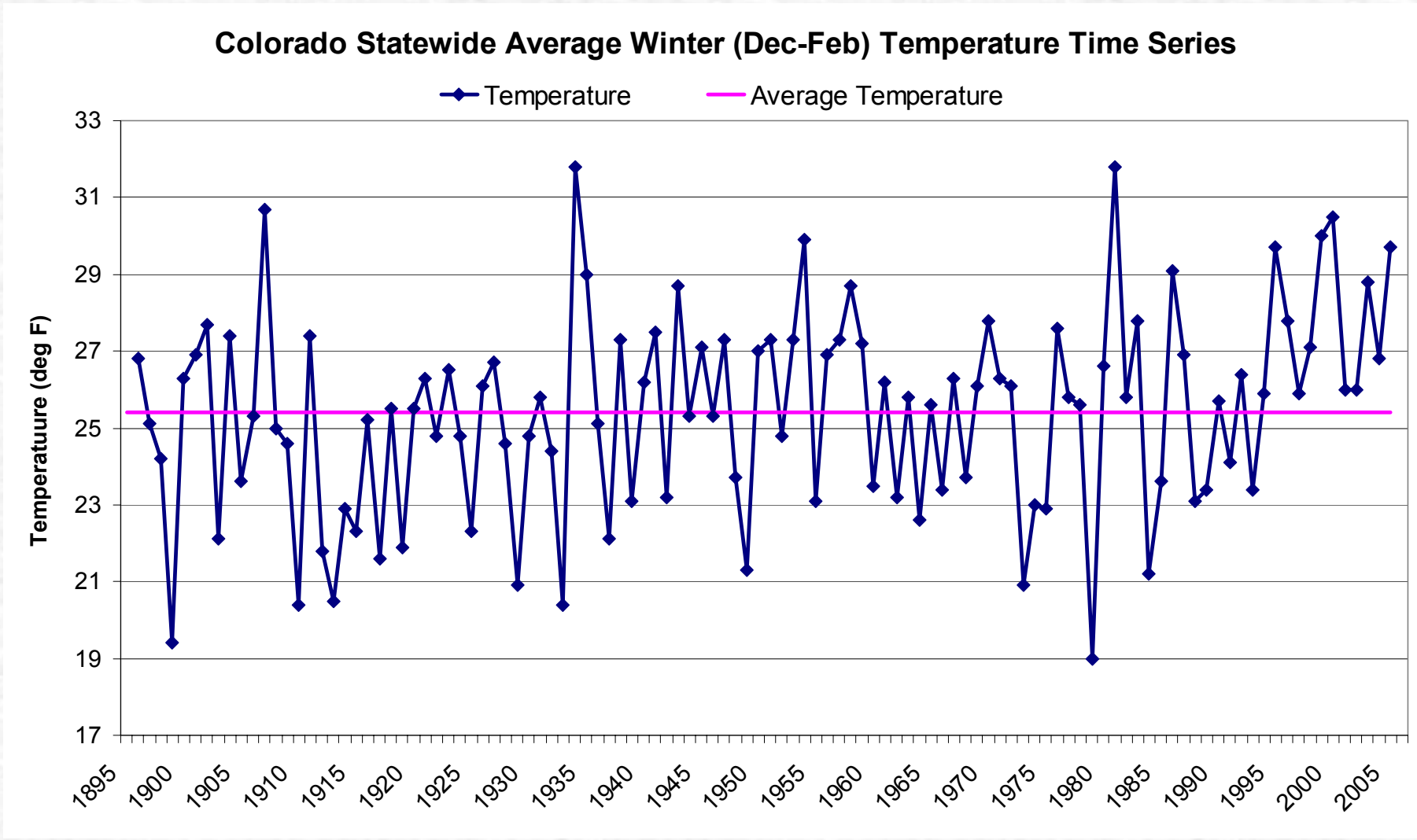


http://www.ncdc.noaa.gov/oa/climate/research/cag3/co.html

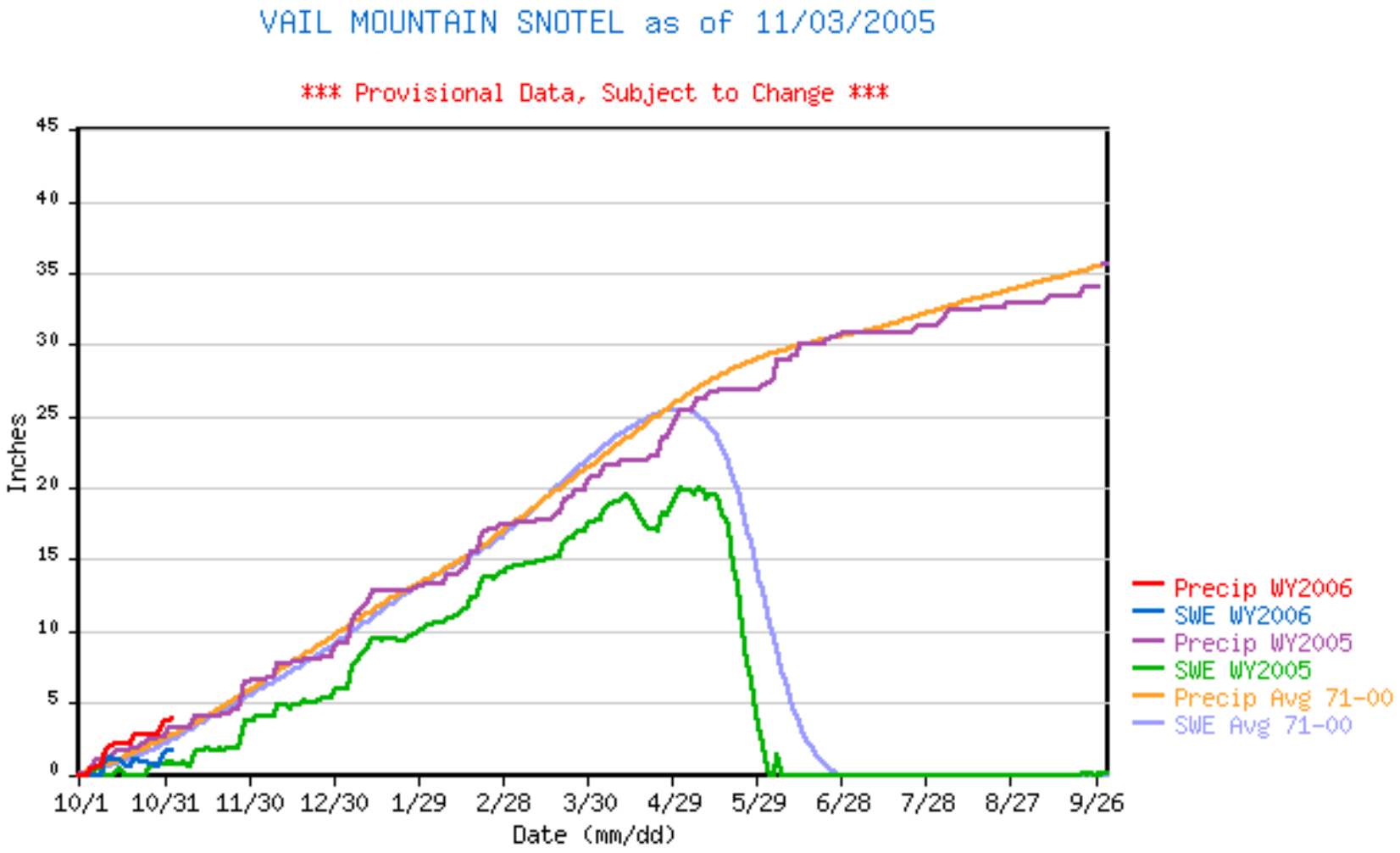

Colo Statewide Ave Summer (Jun-Aug) Temperature Time Series
Temperature
Average Temperature
Temperature (deg F)
70
69
68
67
66
65
64
63
62
61
60
1895
1900
1905
1910
1915
1920
1925
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005

Colorado Average Winter (Dec-Feb) Temperature, 1895-2005

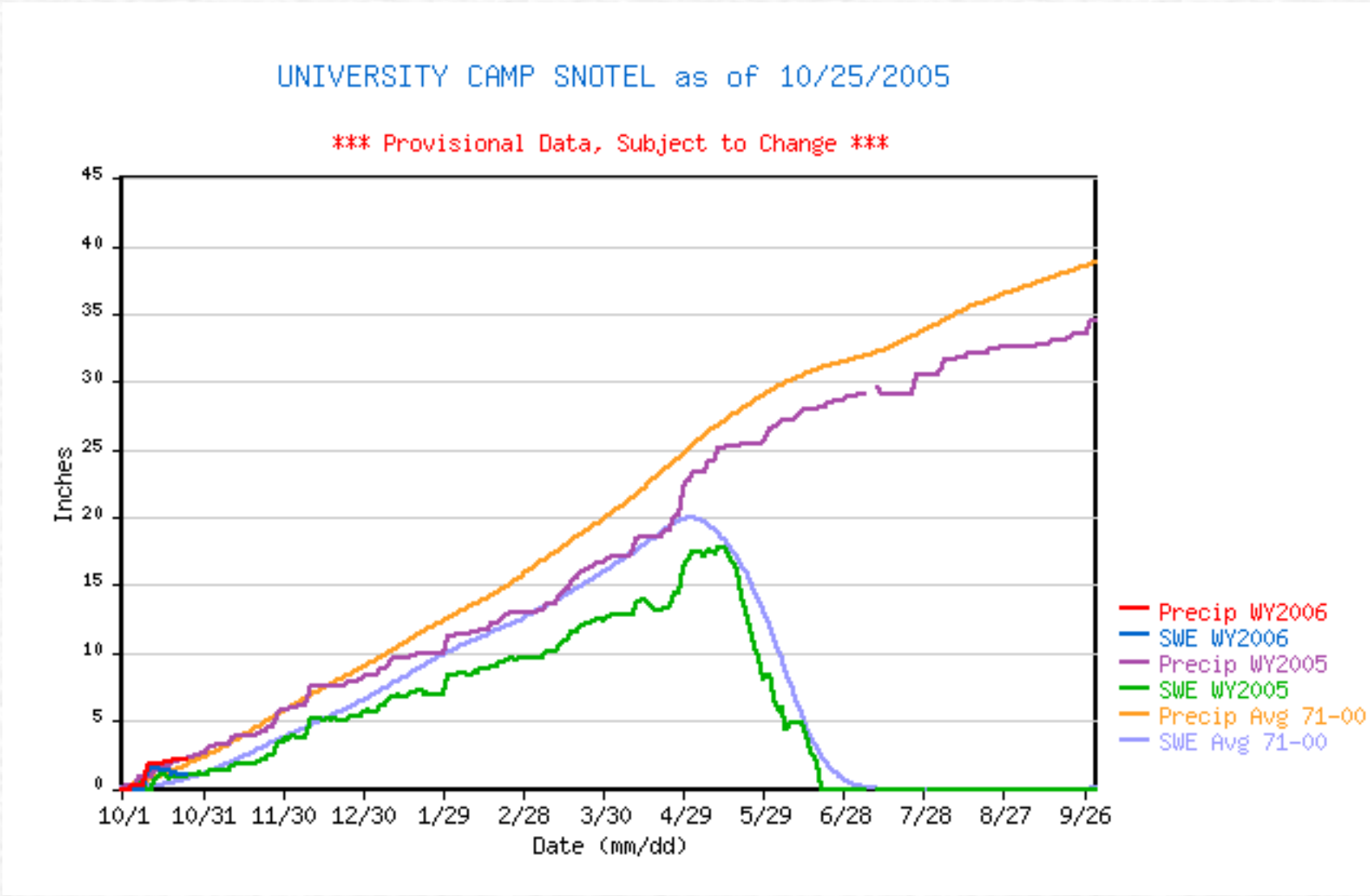



Colorado Statewide Average Winter (Dec-Feb) Temperature Time Series
Temperature
Average Temperature
Temperatuure (deg F)
33
31
29
27
25
23
21
19
17
1895
1900
1905
1910
1915
1920
1925
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005

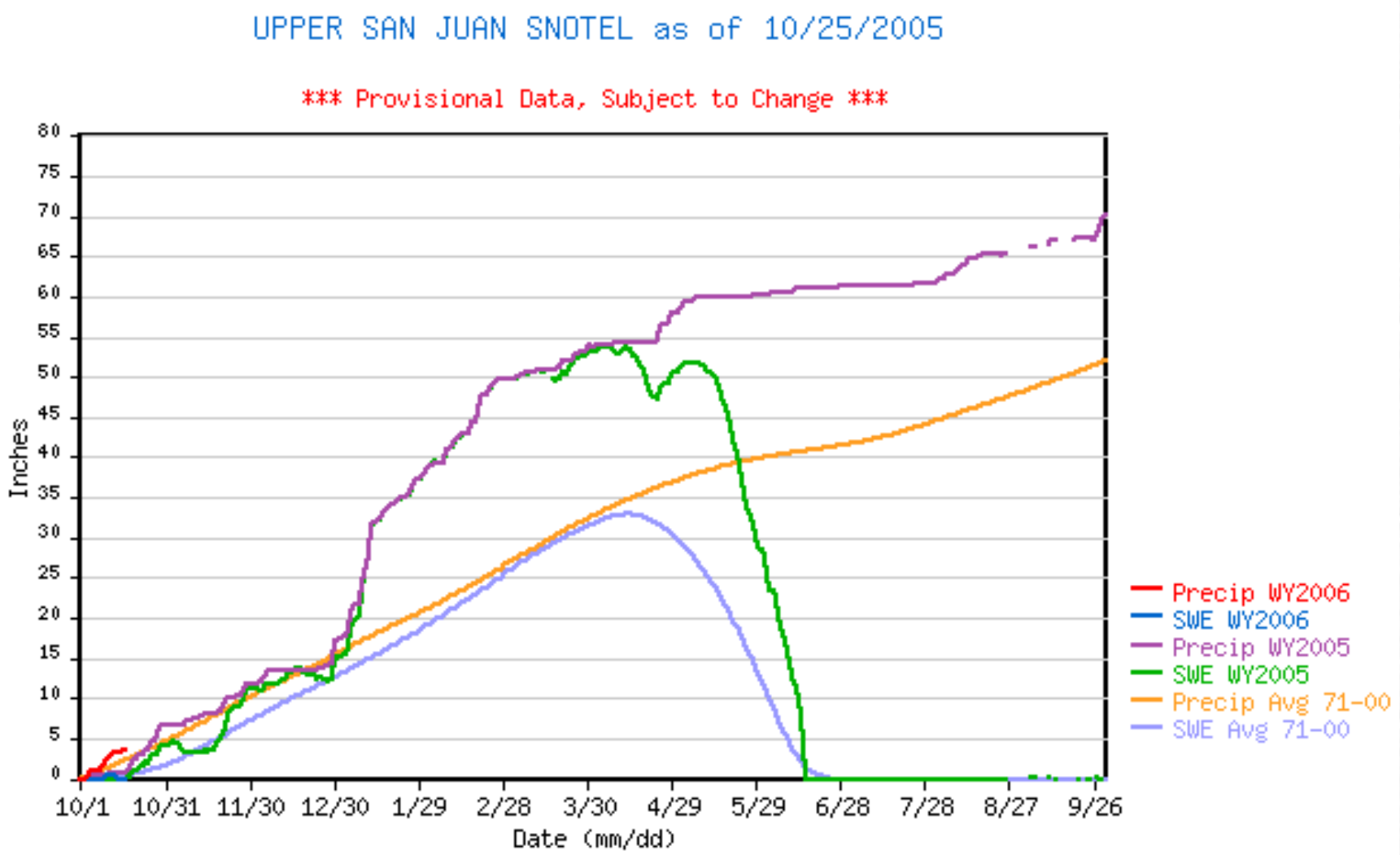
Vail Mountain Snotel



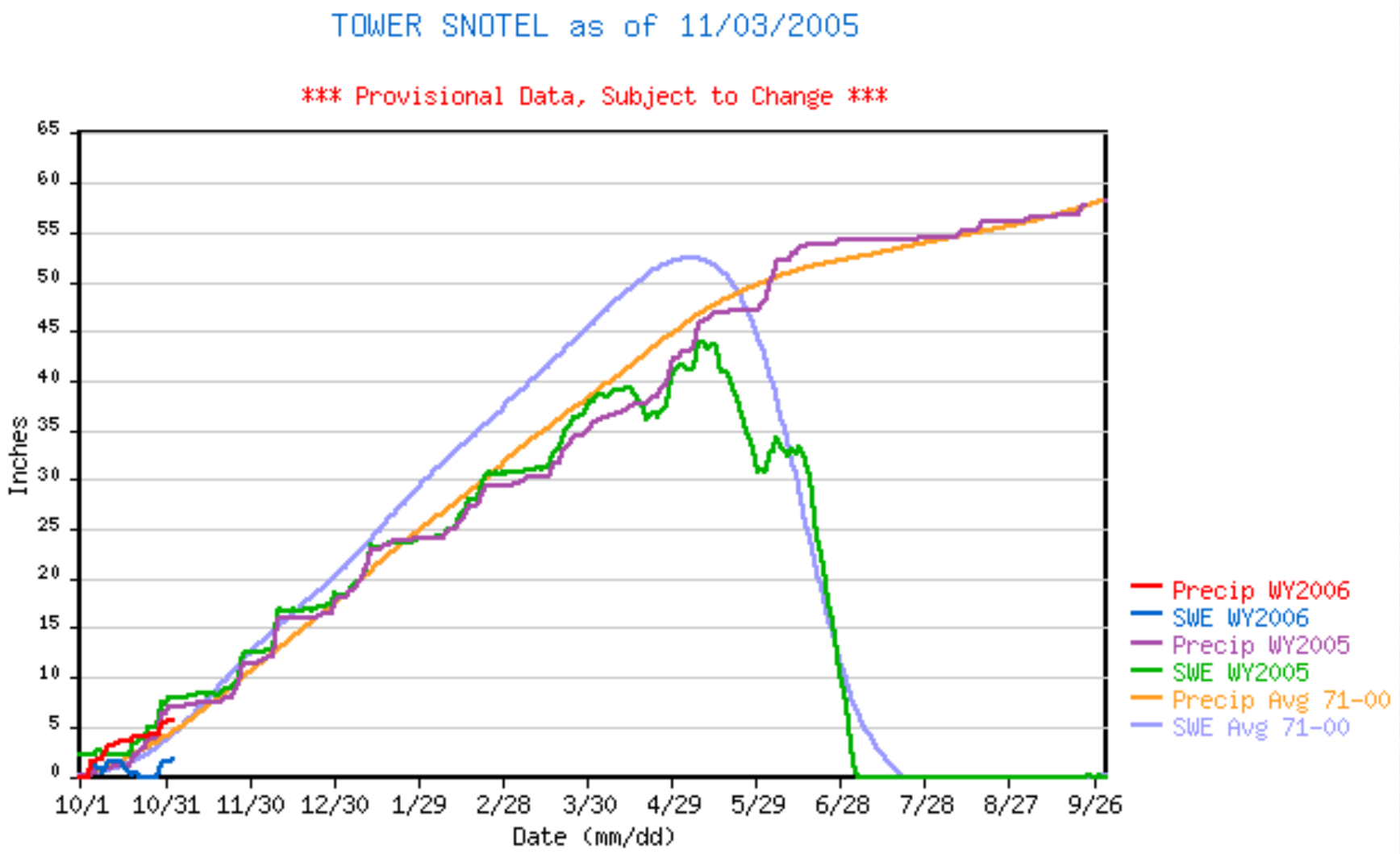
University Camp Snotel



Upper San Juan Snotel



Tower Snotel

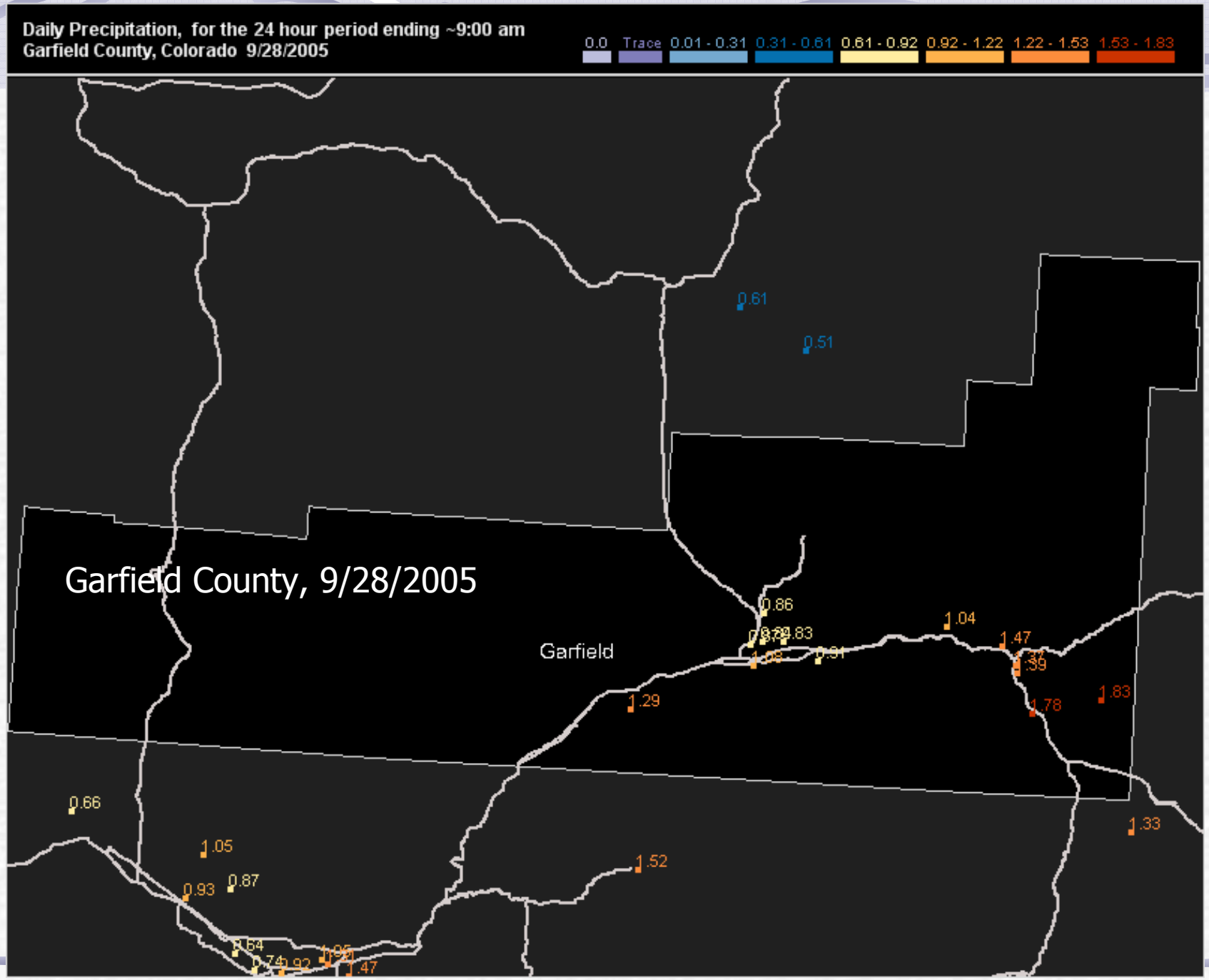


2005 Water Year In Review

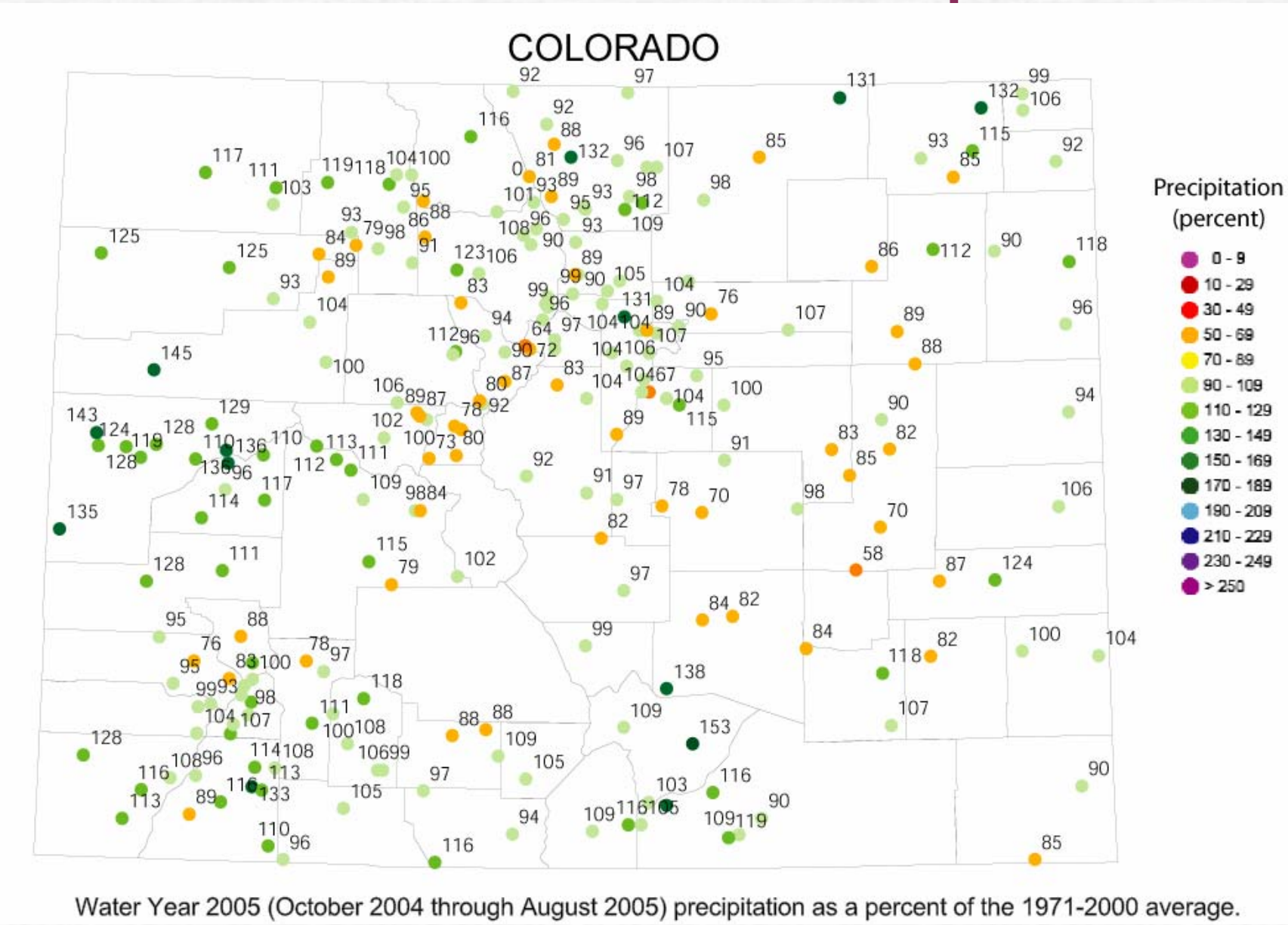
- Snow blitz across southern Rockies.
- Near-average snowpack in the South Platte basin.
- Mild winter (12th in a row).
- Beneficial April and early June precipitation.
- A hot and dry July.
- Below average growing season precipitation.
- A saving Denver-metro rain August 3-5th.
- Overall – Above average temperature, near to slightly below average precipitation.
- October 2005 – Great moisture on the Plains!

Where We Stand Today

Hotel Colorado photo by Frank Sterns

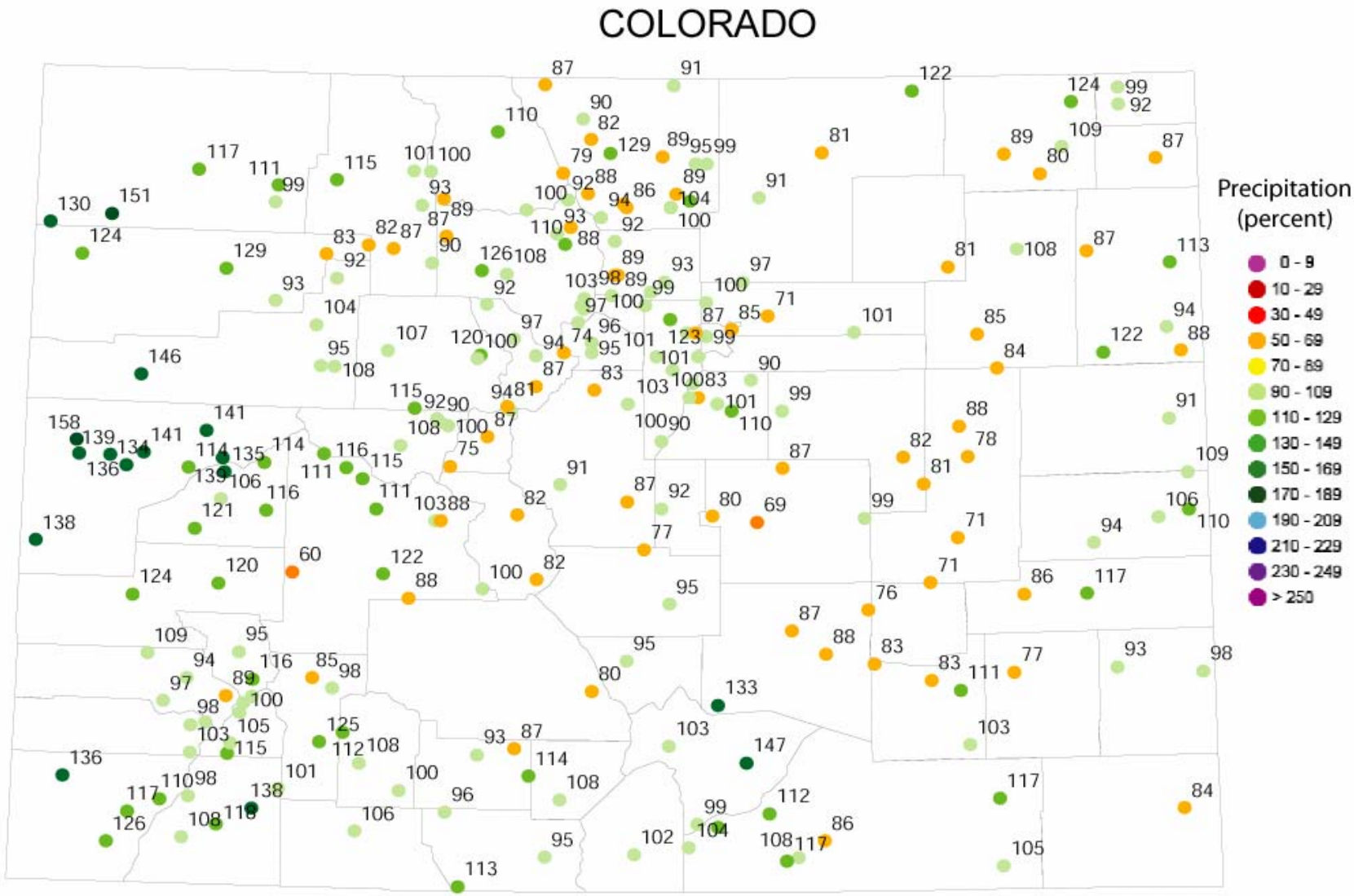

Daily Precipitation, for the 24 hour period ending ~9:00 am
Garfield County, Colorado 9/28/2005
0.0 Trace 0.01 - 0.31 0.31 - 0.61 0.61 - 0.92 0.92 - 1.22 1.22 - 1.53 1.53 - 1.83
Garfield County, 9/28/2005
Garfield
0.61
0.51
0.86
1.04
1.47
1.29
1.78
1.83
1.33
0.66
1.05
0.93
0.87
1.52
1.47

2005 Water Year Precipitation



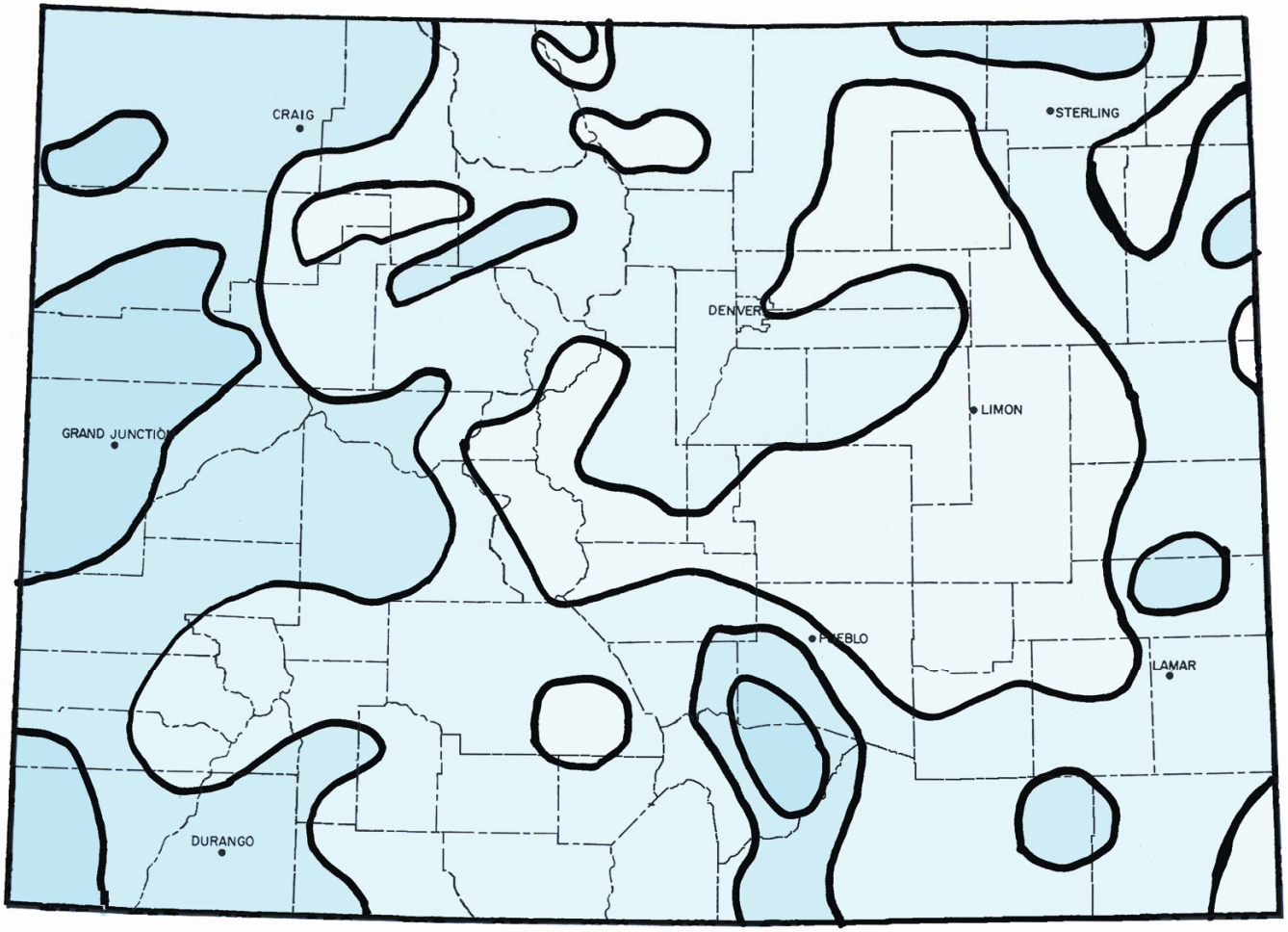
Water Year 2005 (October 2004 through August 2005) precipitation as a percent of the 1971-2000 average.

2005 Water Year Precipitation



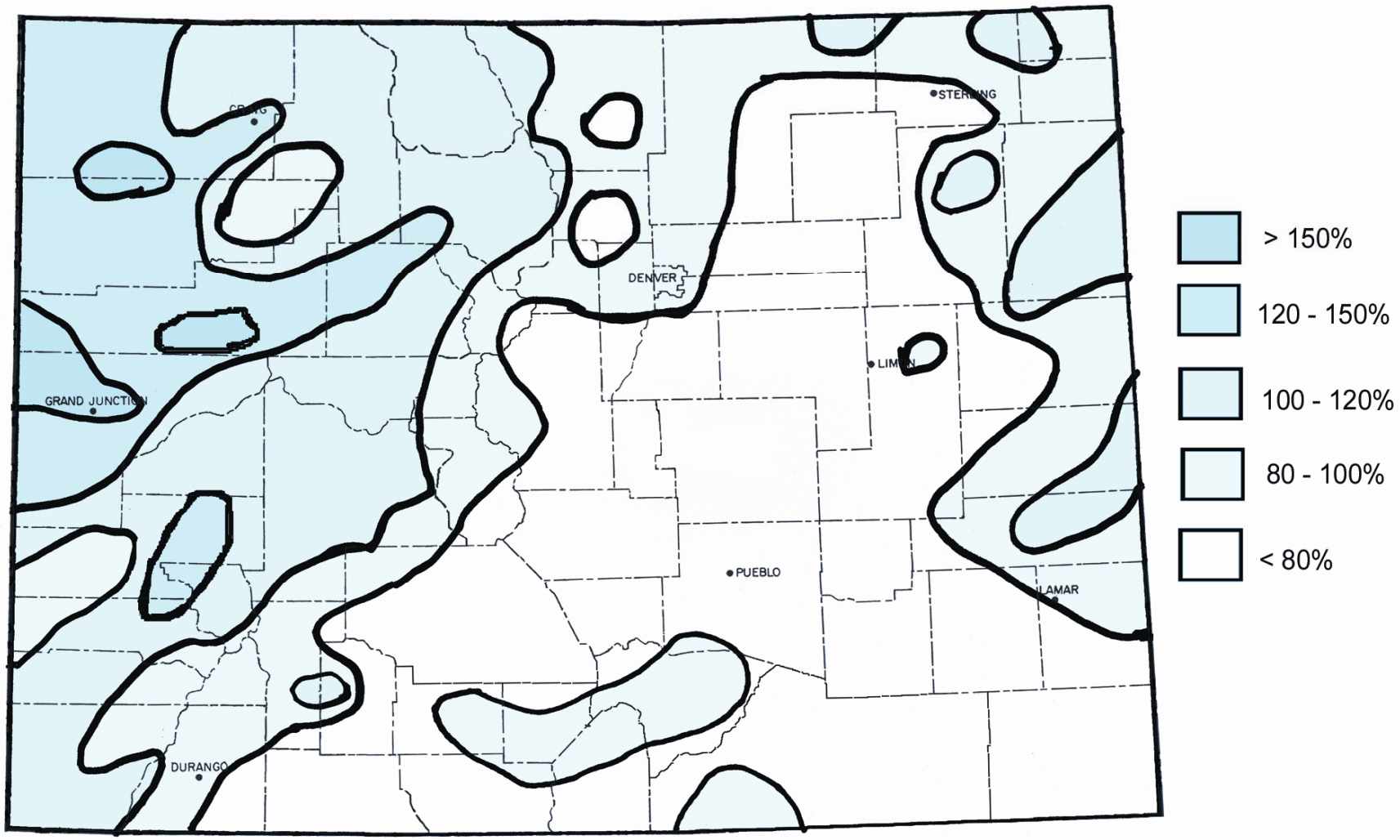
Water Year 2005 (October 2004 through September 2005) precipitation as a percent of the 1971-2000 average.

2005 Water Year Precipitation for Colorado



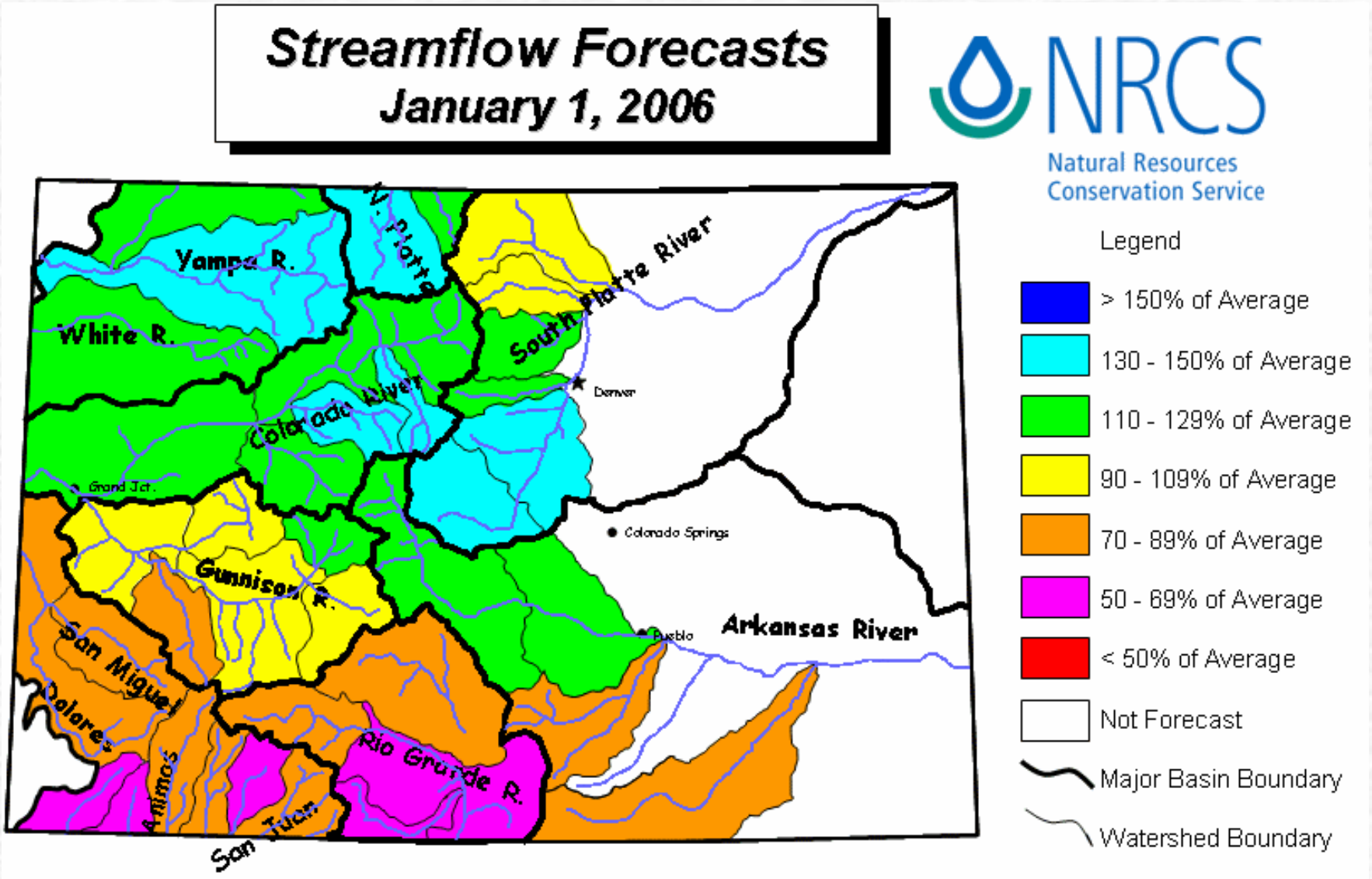
Water Year 2005 (Oct 04 - Sep 05) as a percent of the 1971-2000 average.

Summer 2005 (May-Sep)

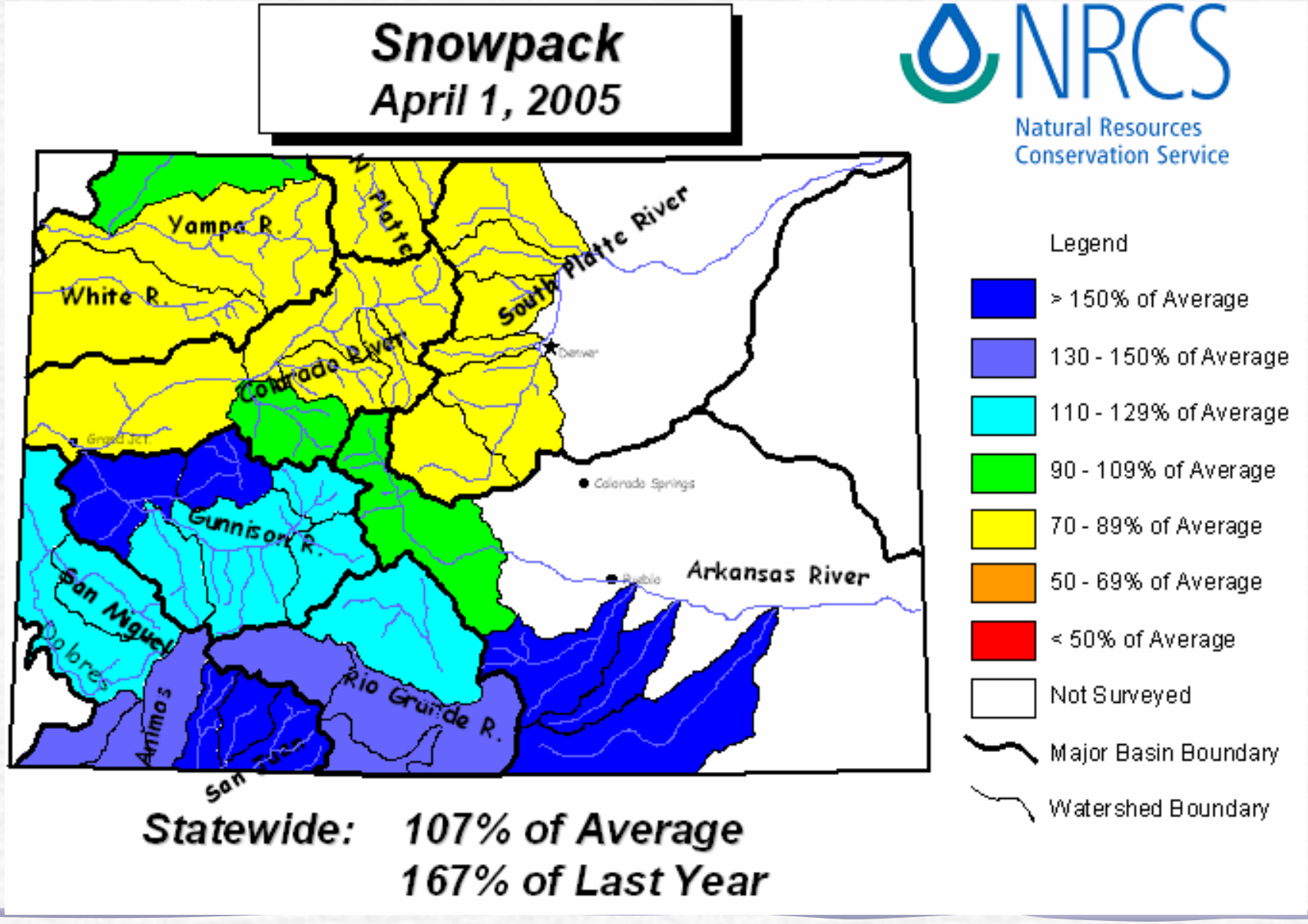


Summer 2005 (May - September) precipitation as a percent of the 1971-2000 average.

Colorado Streamflow



Colorado Snowpack



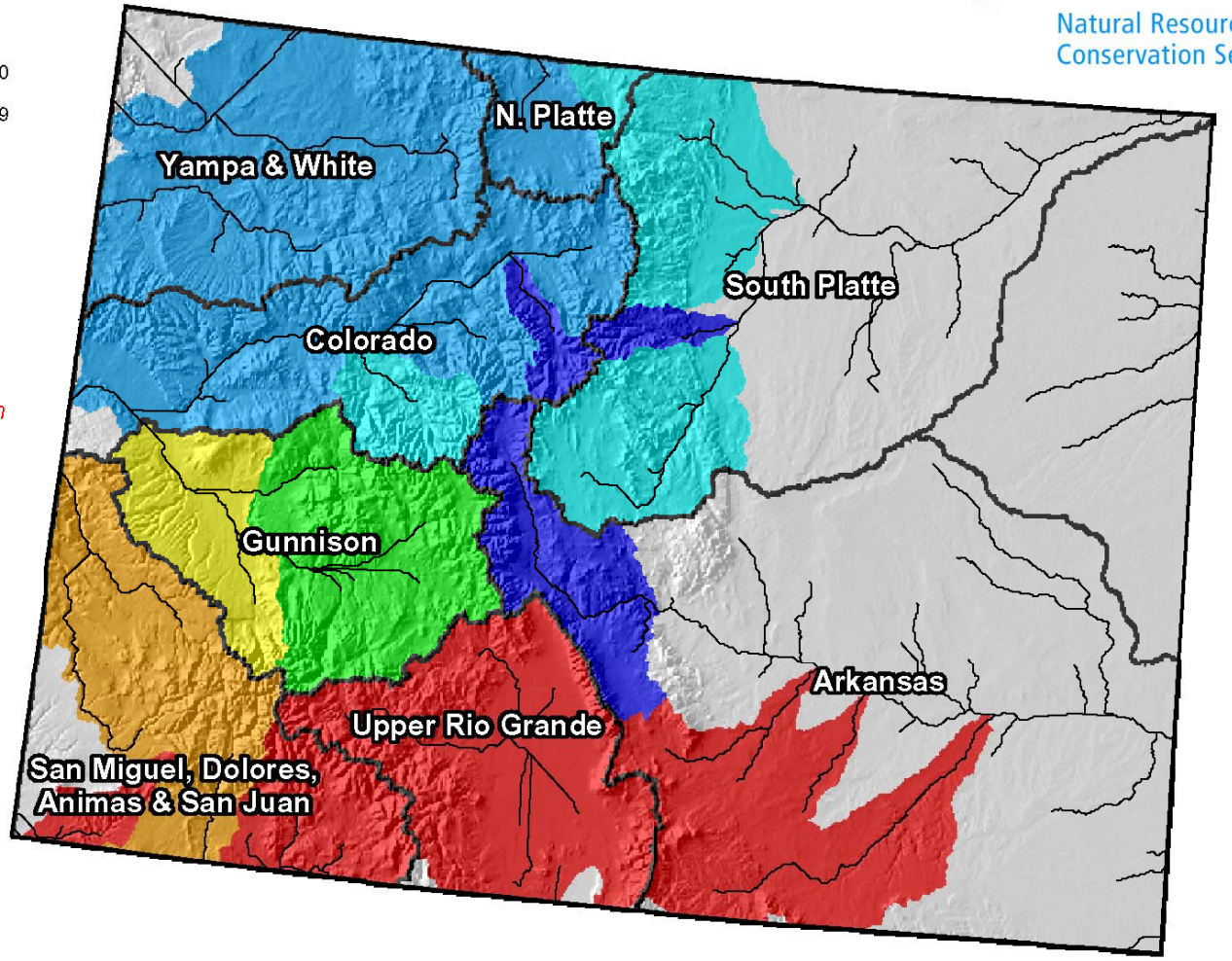
Colorado Snowpack Map

NRCS
Natural Resources
Conservation Service

Percent of Average

- > 150
- 130 - 150
- 110 - 129
- 90 - 109
- 70 - 89
- 50 - 69
- < 50

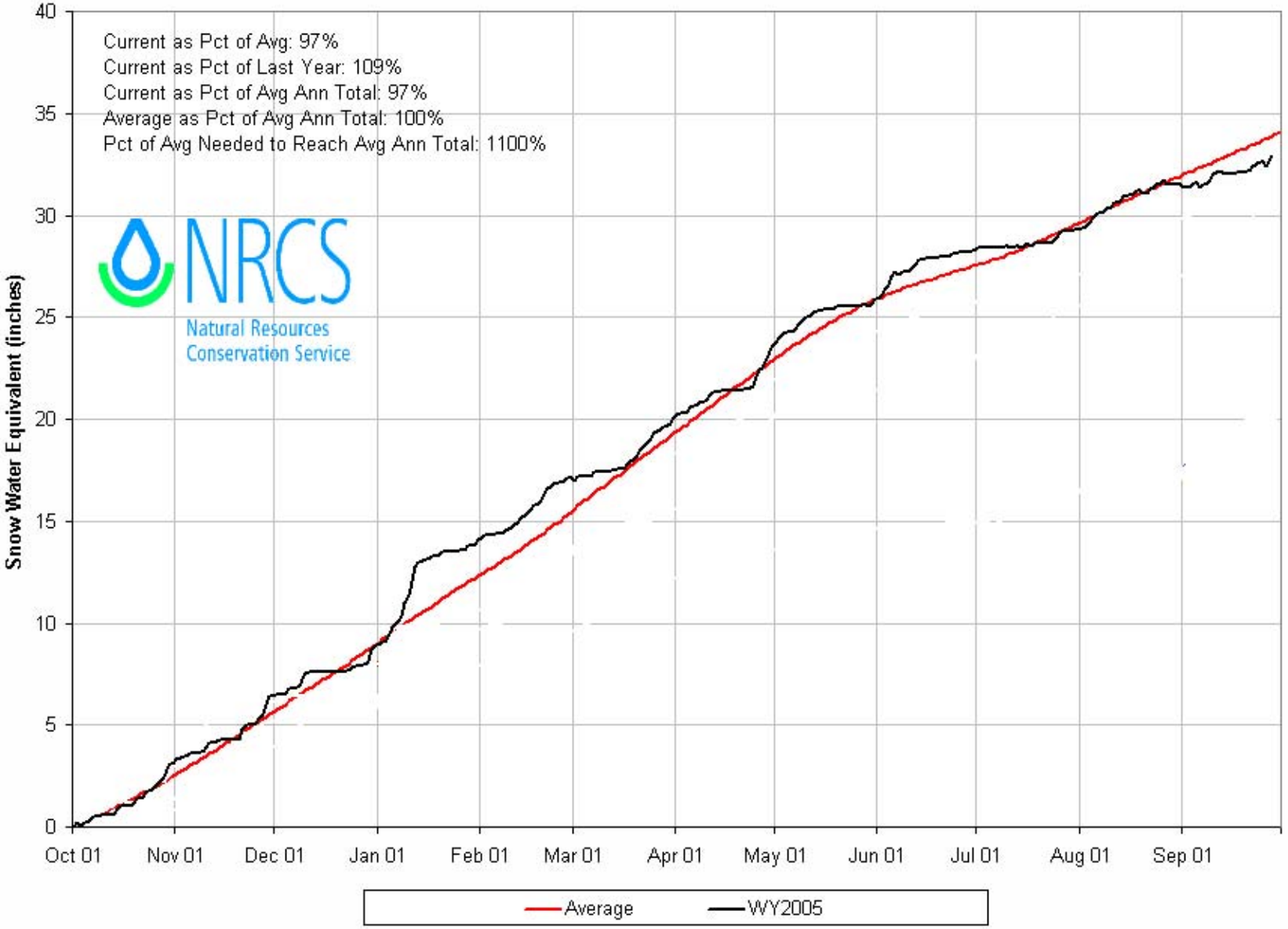
Provisional Data
Subject to Revision



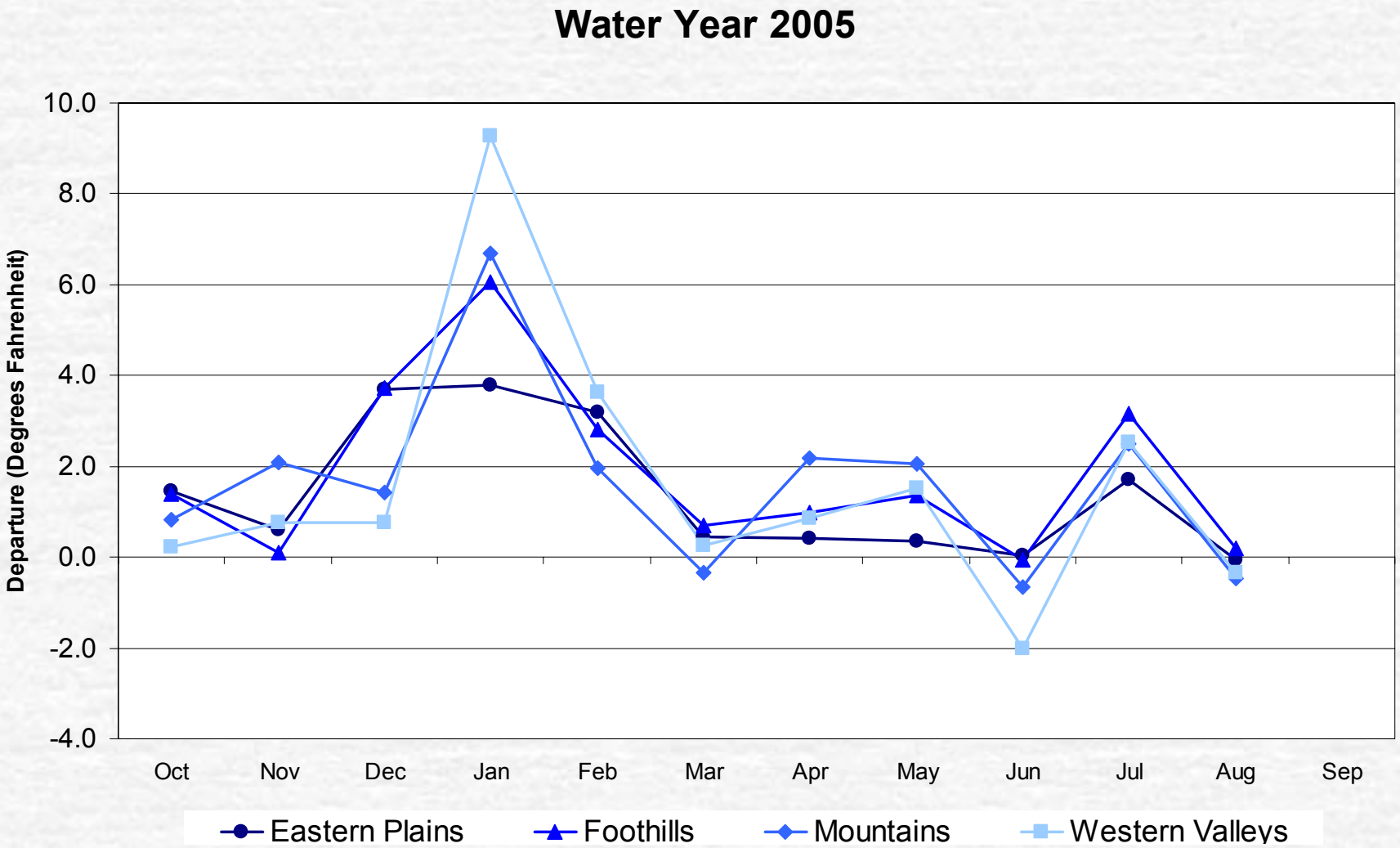
Current as of January 1, 2006

Colorado Statewide Time Series Year-to-Date Precipitation Summary

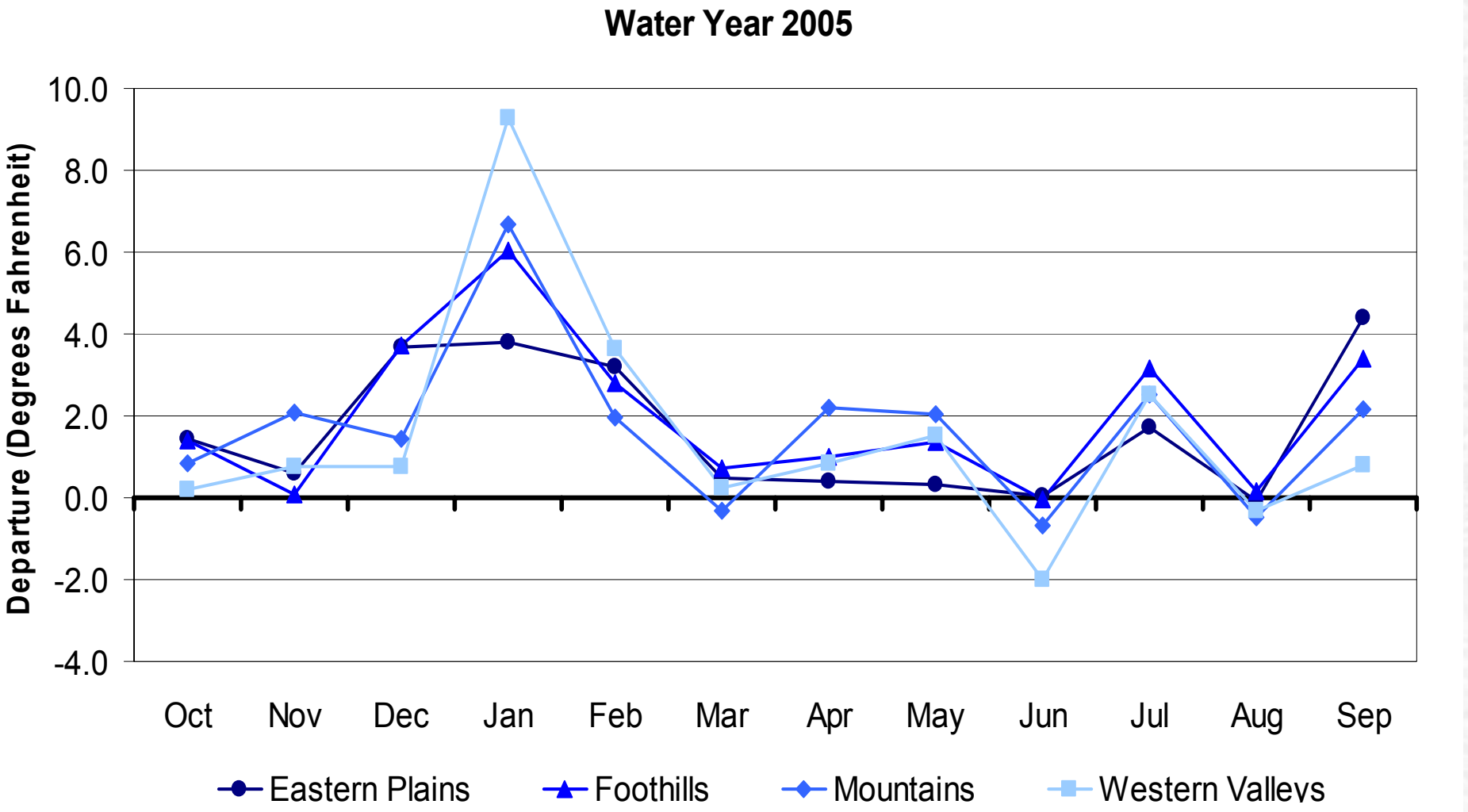
Based on Provisional SNOTEL data as of Sep 28, 2005



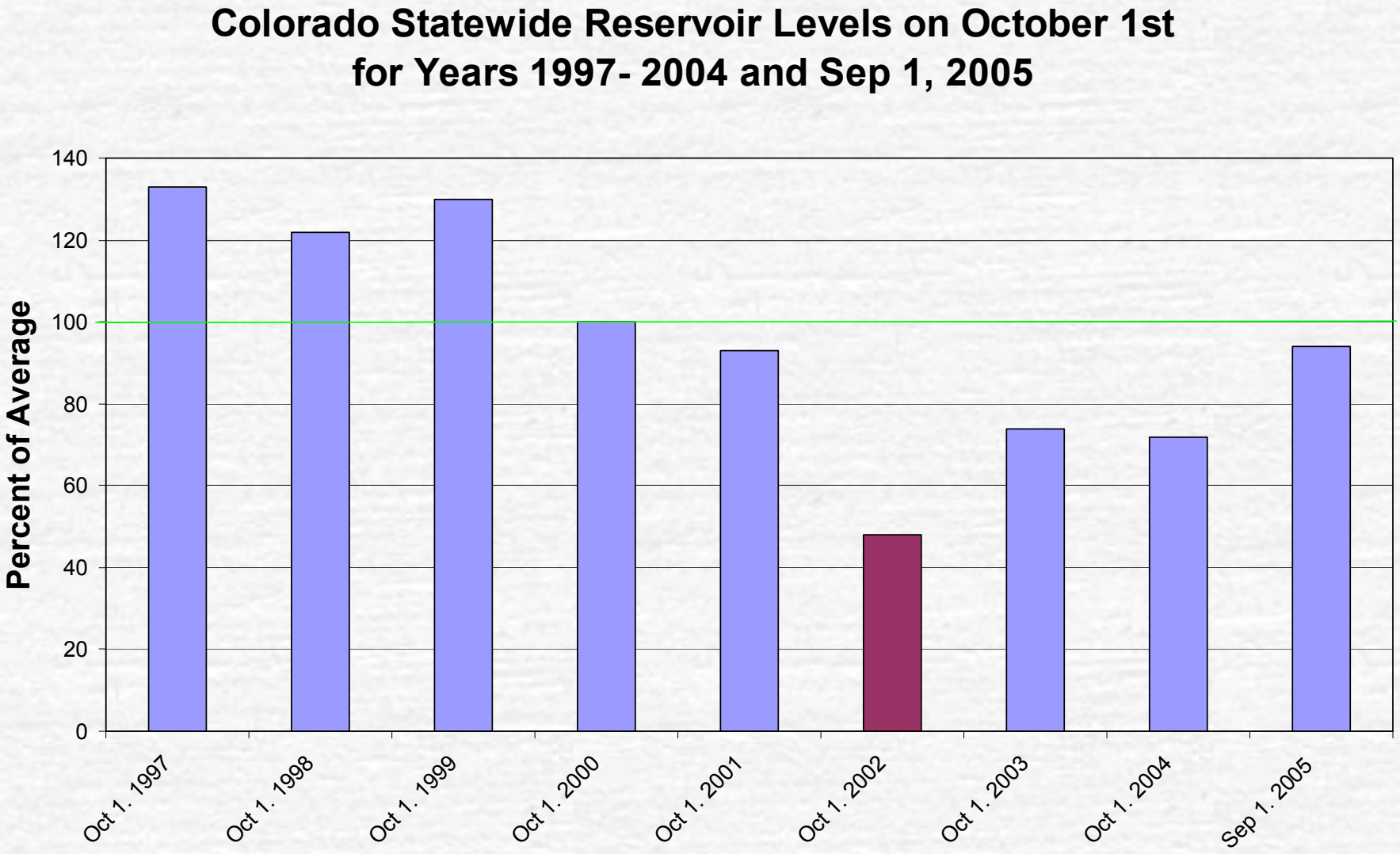
Colorado Temperature Departures



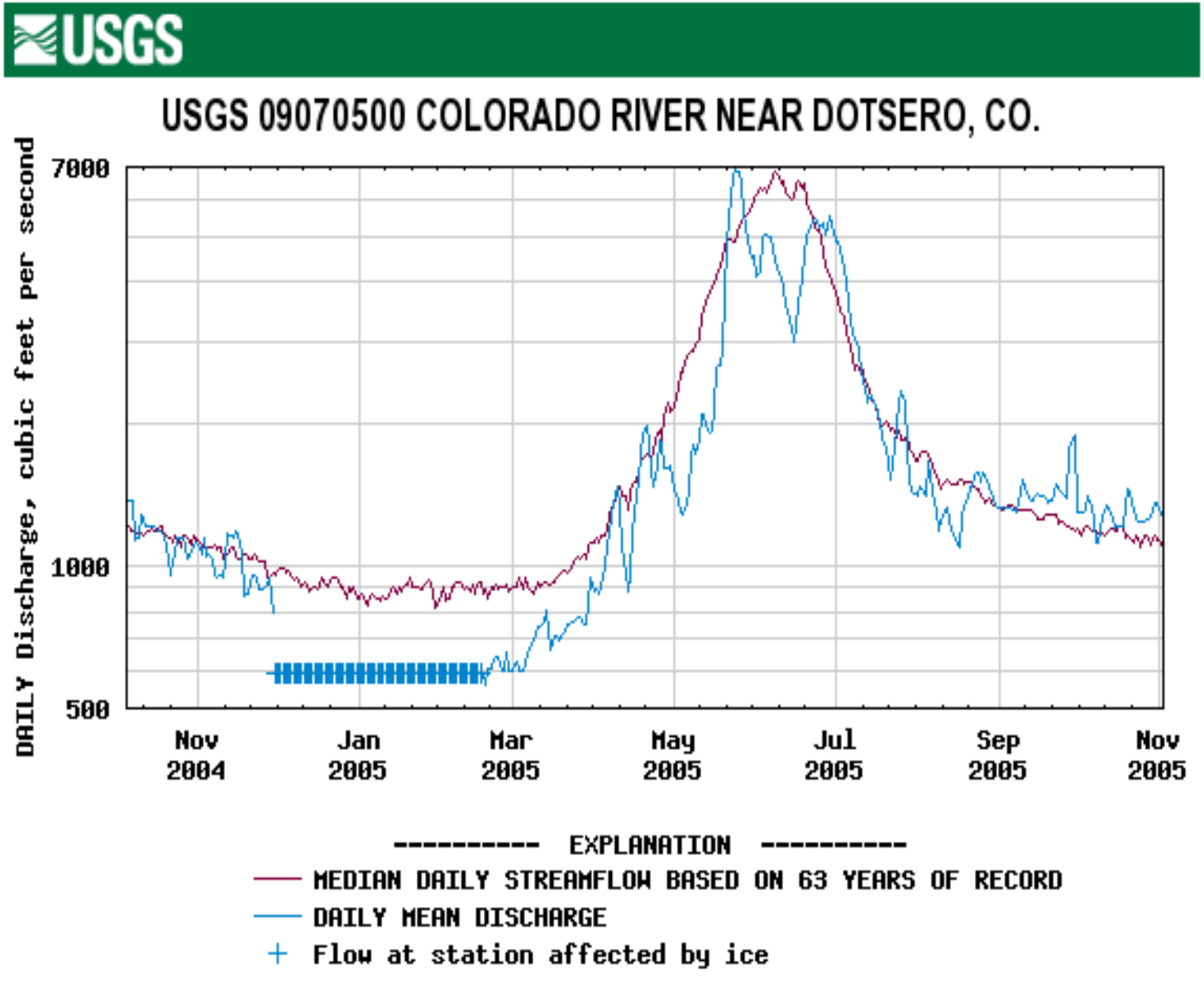
Colorado Temperature Departures



Colorado Reservoir Storage

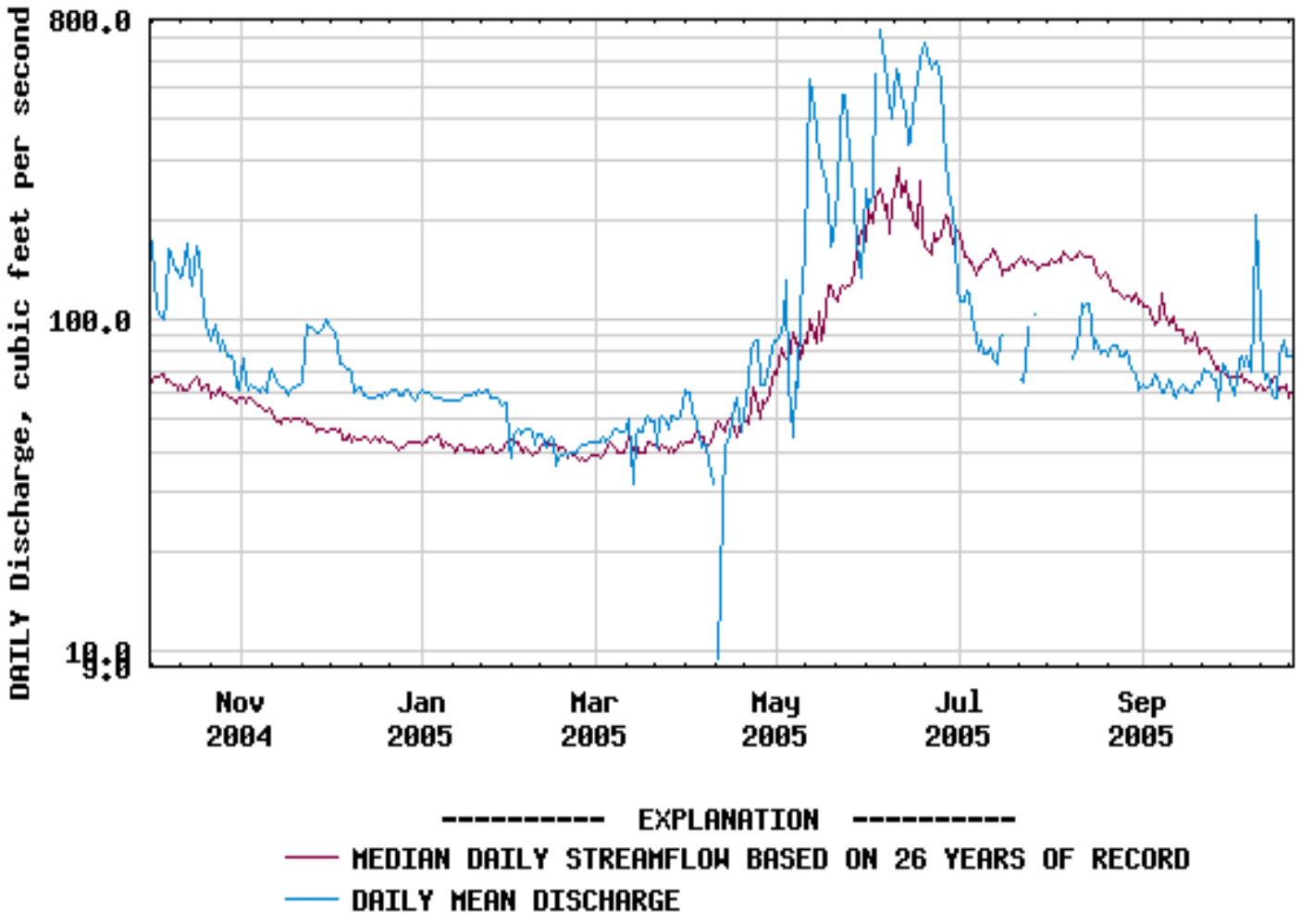


Provisional Data Provided by NRCS


USGS
USGS 09070500 COLORADO RIVER NEAR DOTSERO, CO.
DAILY Discharge, cubic feet per second
7000
1000
500
Nov 2004
Jan 2005
Mar 2005
May 2005
Jul 2005
Sep 2005
Nov 2005
EXPLANATION
MEDIAN DAILY STREAMFLOW BASED ON 63 YEARS OF RECORD
DAILY MEAN DISCHARGE
Flow at station affected by ice

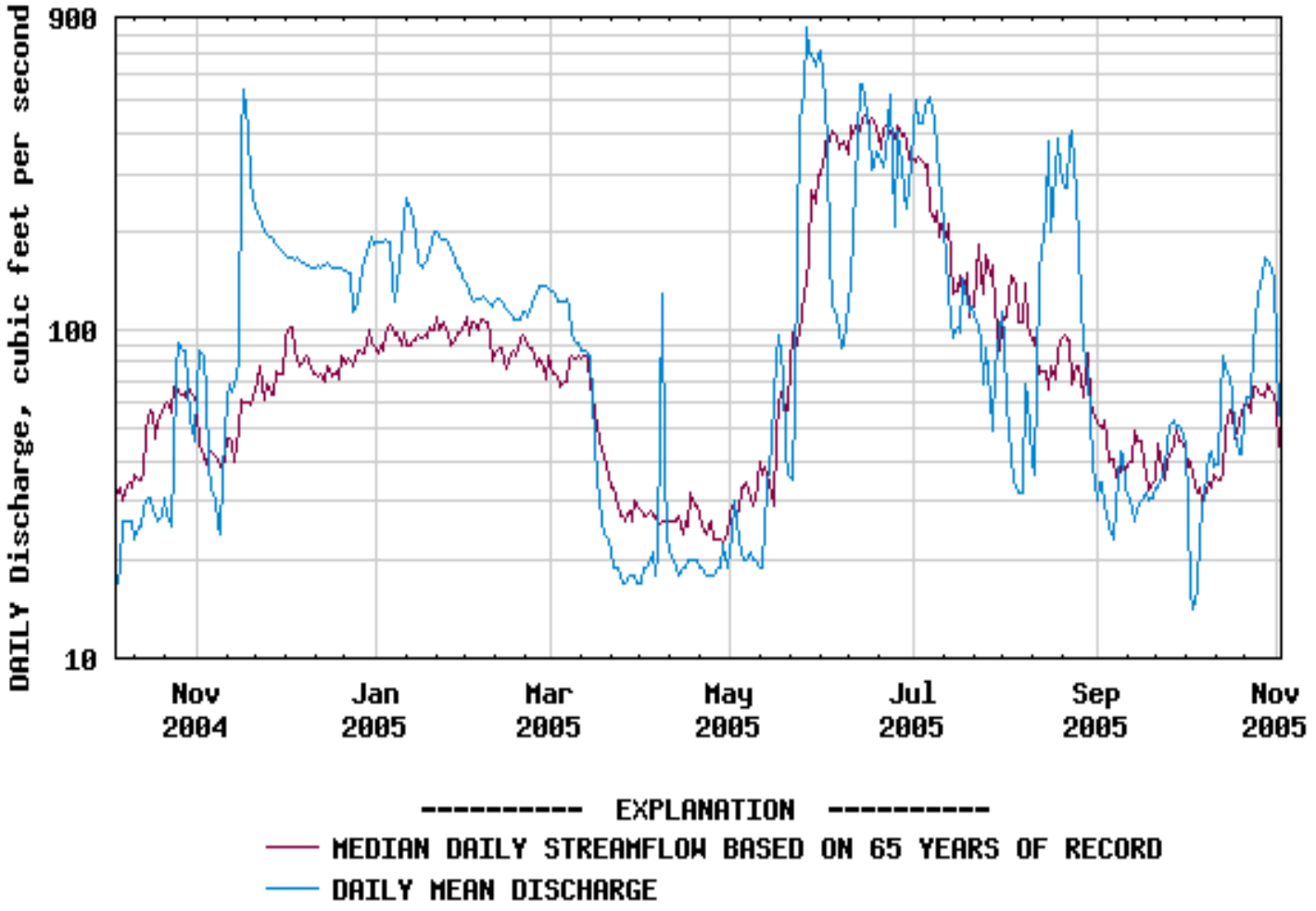
USGS

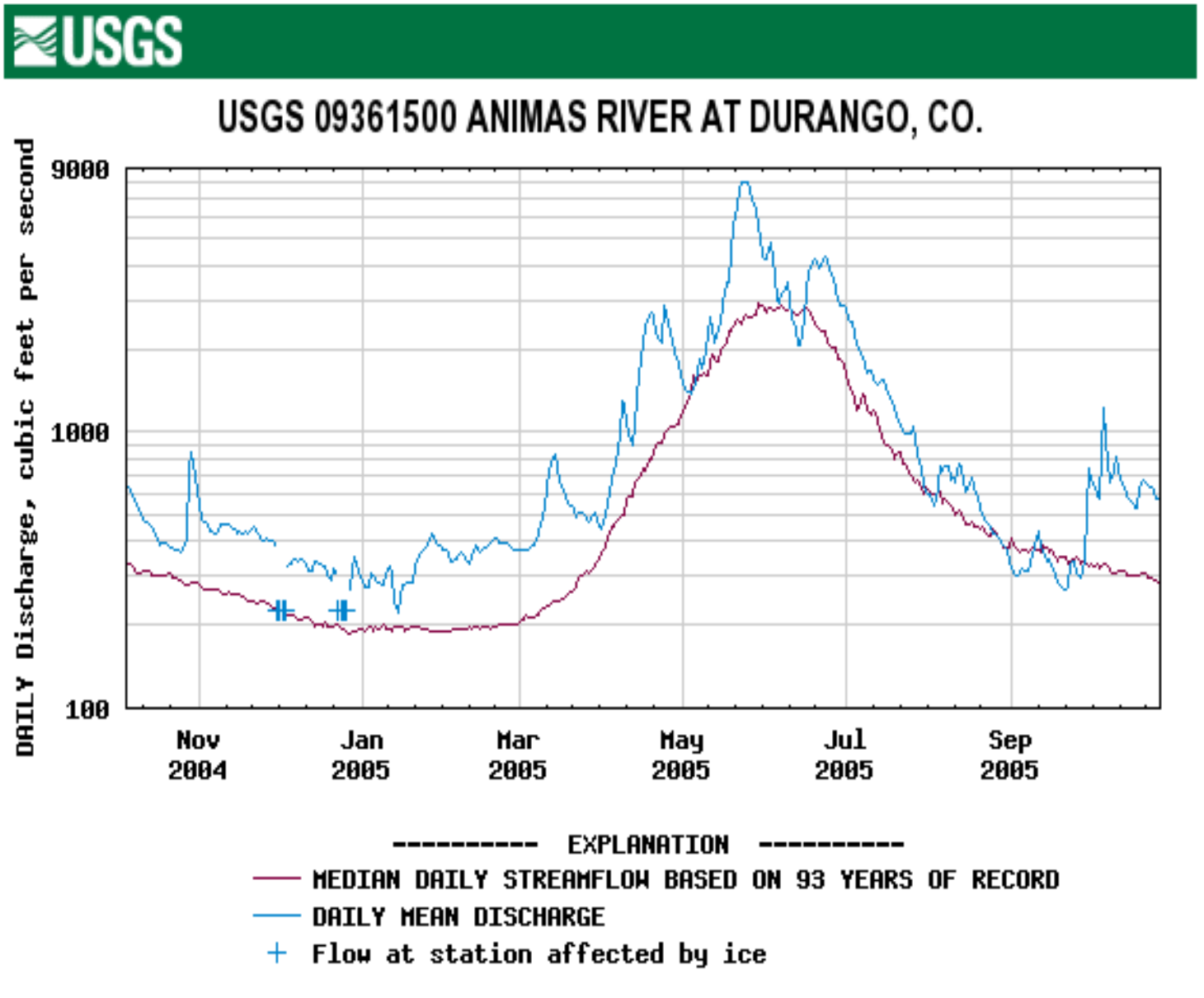
USGS 06725450 ST. VRAIN CREEK BELOW LONGMONT, CO.

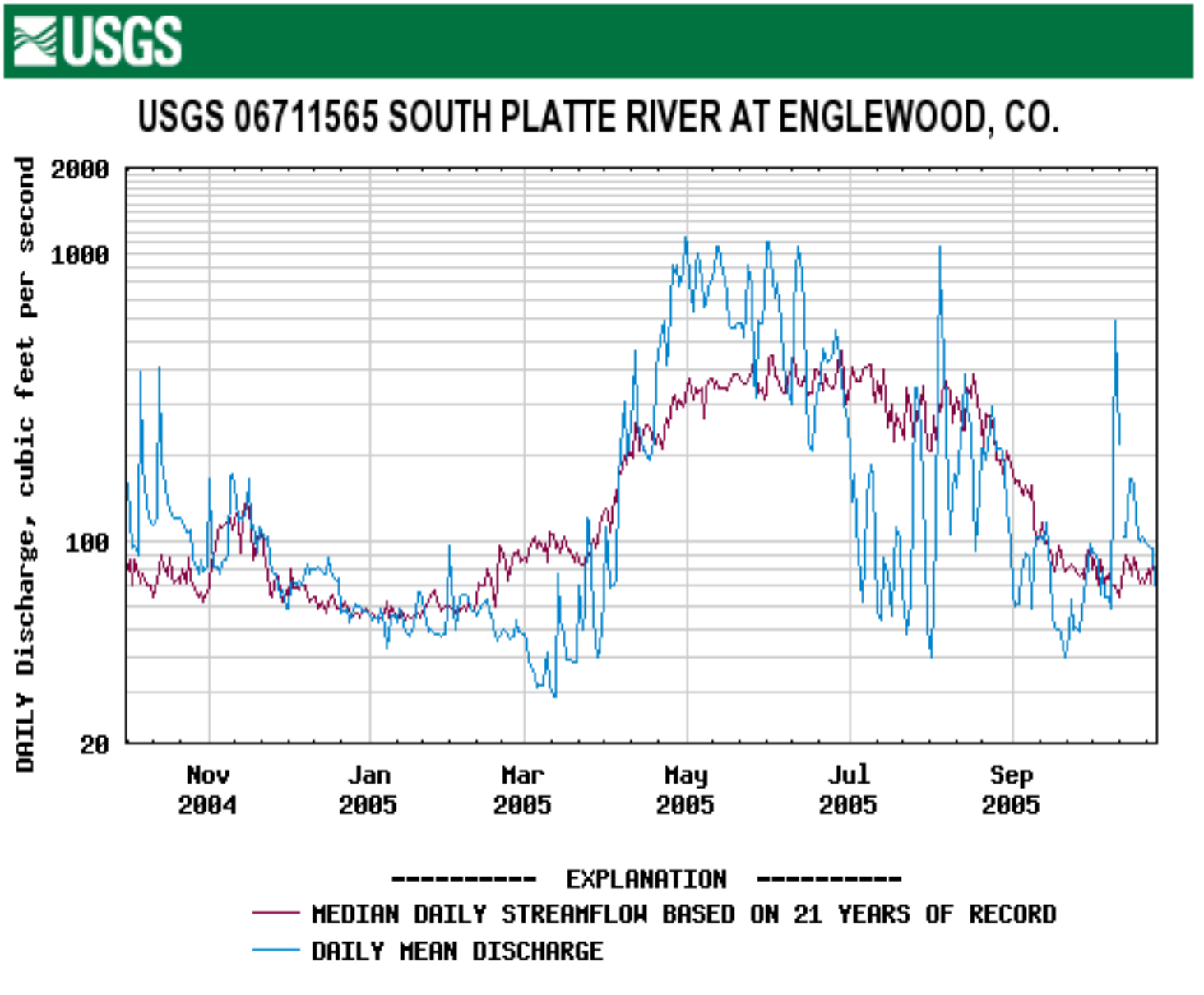


USGS

USGS 07124000 ARKANSAS RIVER AT LAS ANIMAS, CO.



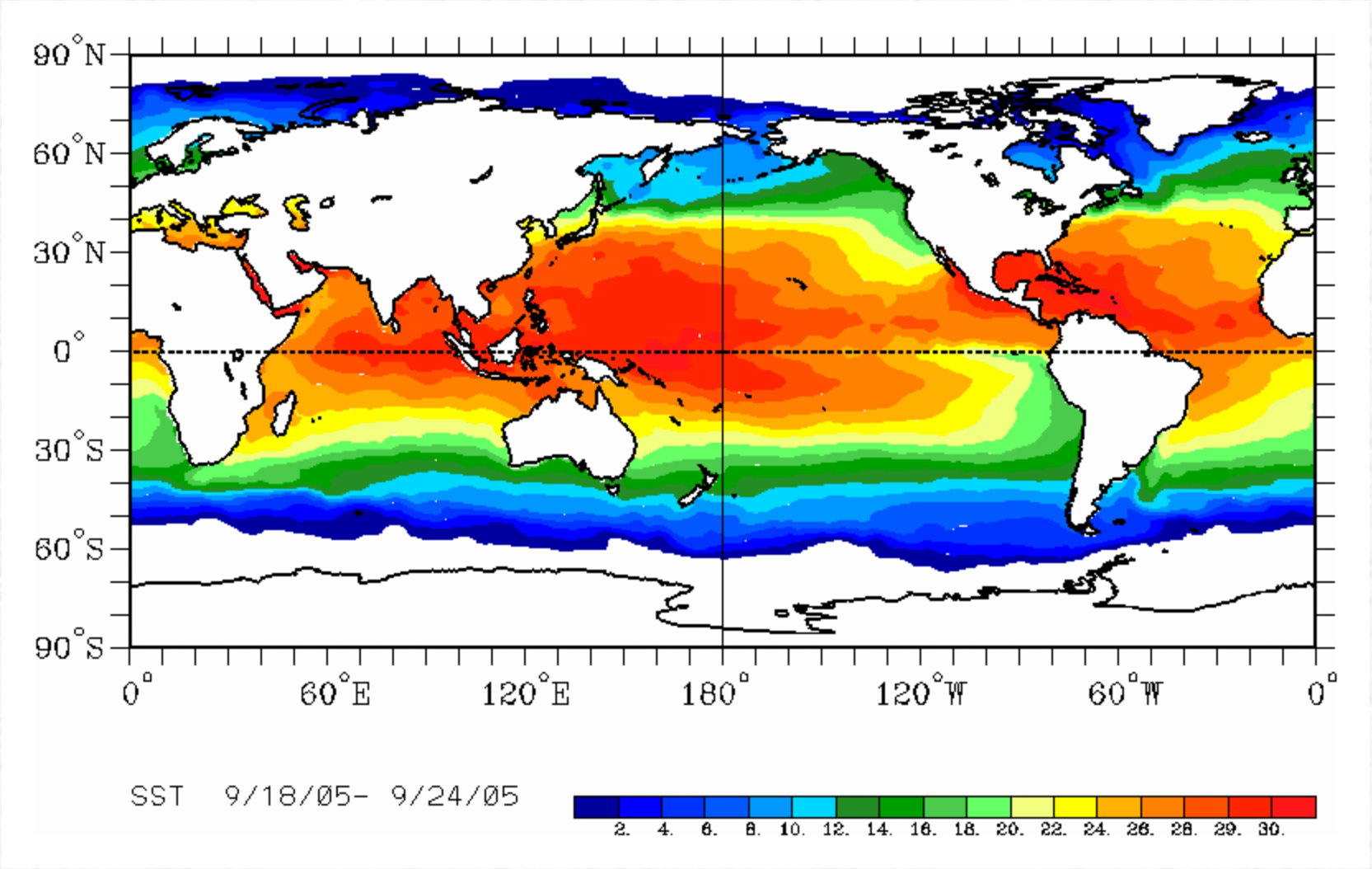

USGS
USGS 09361500 ANIMAS RIVER AT DURANGO, CO.
DAILY Discharge, cubic feet per second
9000
1000
100
Nov 2004
Jan 2005
Mar 2005
May 2005
Jul 2005
Sep 2005
EXPLANATION
MEDIAN DAILY STREAMFLOW BASED ON 93 YEARS OF RECORD
DAILY MEAN DISCHARGE
Flow at station affected by ice


USGS
USGS 06711565 SOUTH PLATTE RIVER AT ENGLEWOOD, CO.
DAILY Discharge, cubic feet per second
2000
1000
100
20
Nov 2004
Jan 2005
Mar 2005
May 2005
Jul 2005
Sep 2005
---------- EXPLANATION ----------
MEDIAN DAILY STREAMFLOW BASED ON 21 YEARS OF RECORD
DAILY MEAN DISCHARGE

So, What Comes Next?

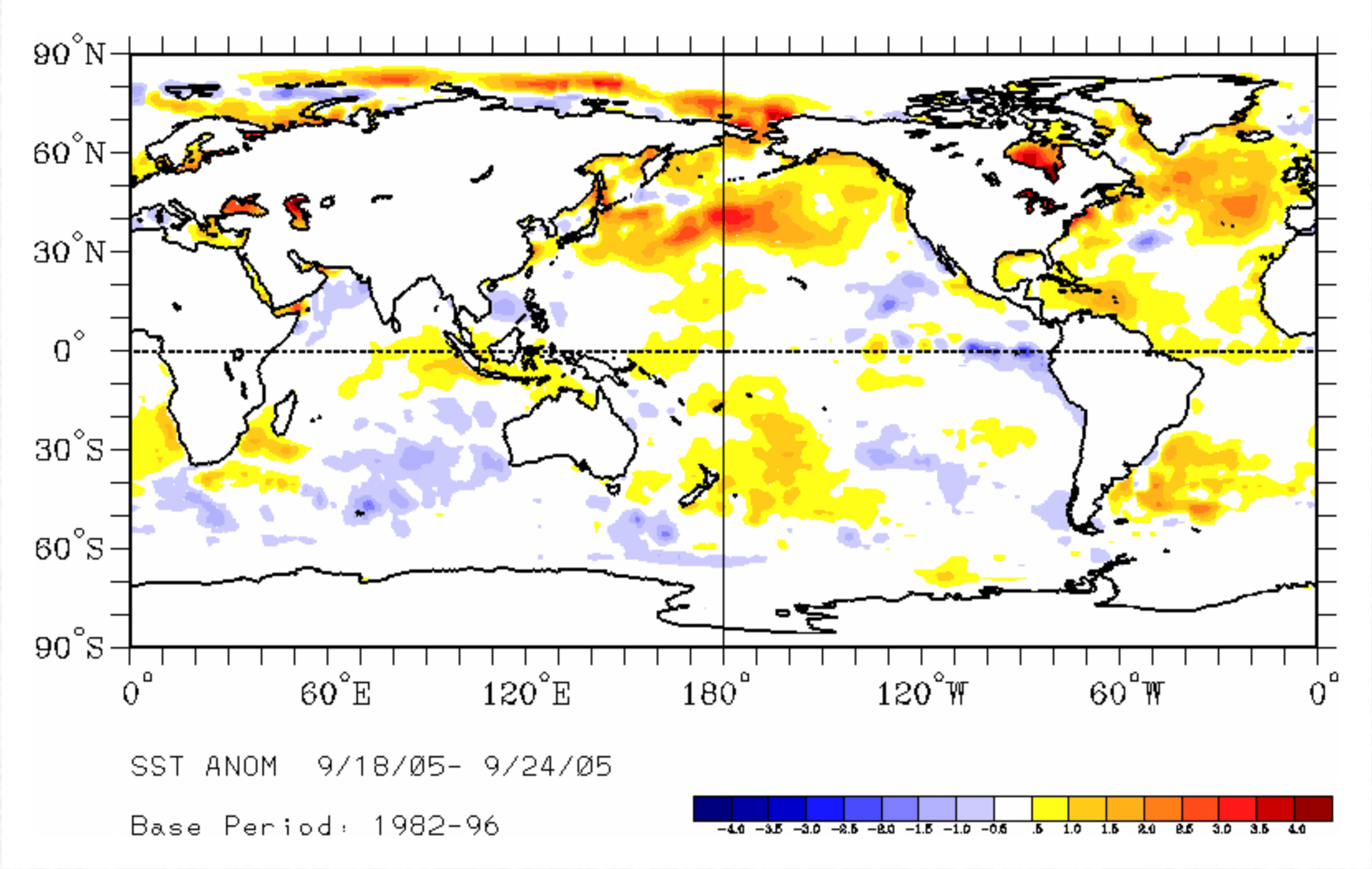
Photo by S. J. Lindquist

SST (Sea Surface Temperatures)



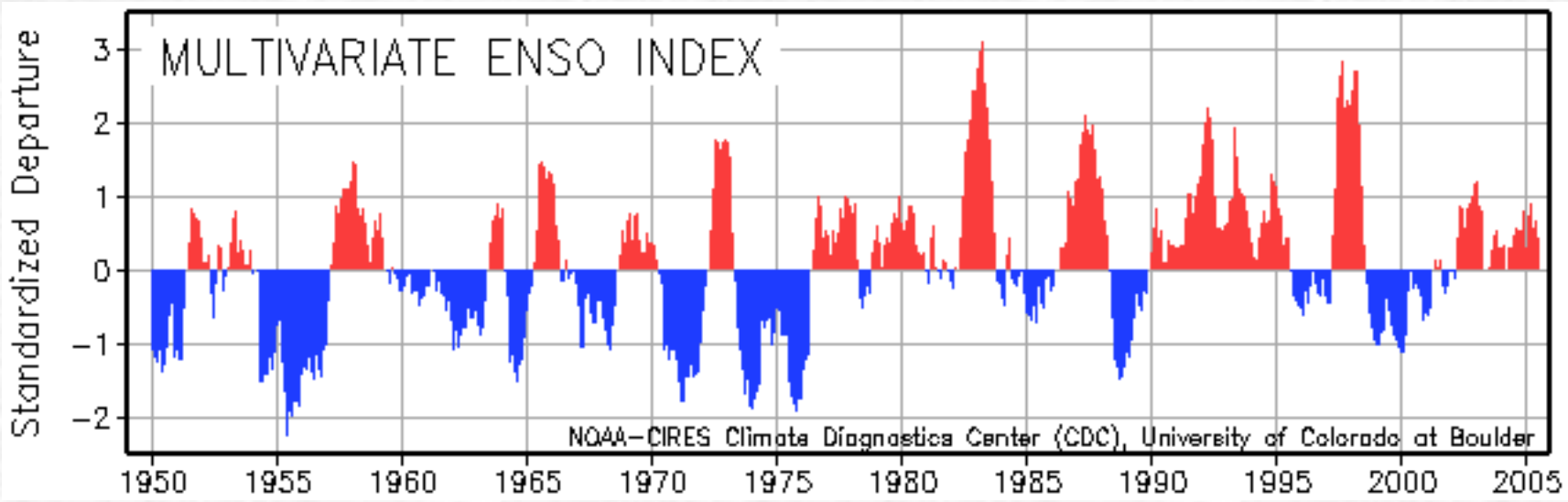
http://www.cdc.noaa.gov/map/clim/sst.shtml

SST Anomalies



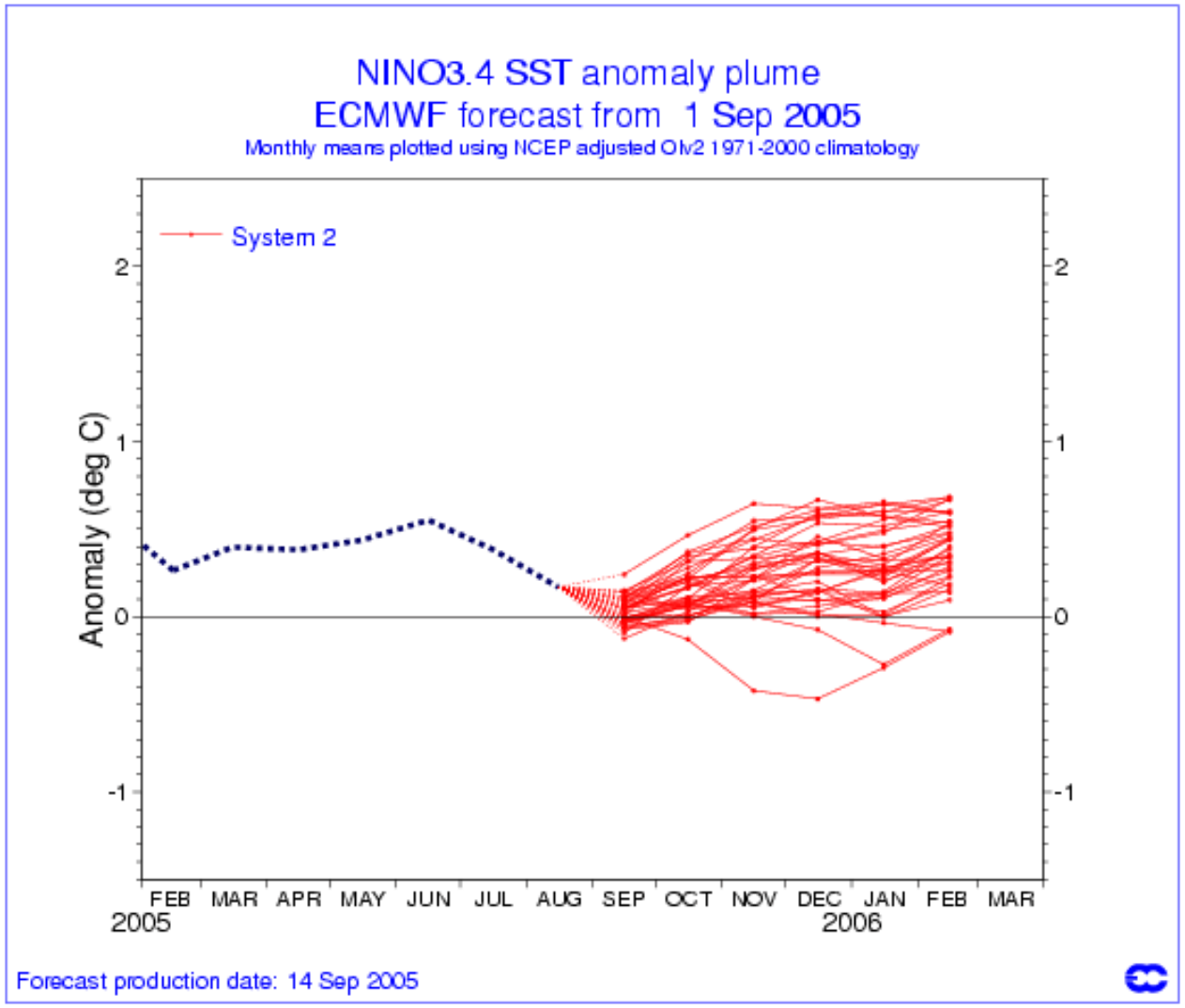
http://www.cdc.noaa.gov/map/clim/sst.shtml

El Nino Southern Oscillation



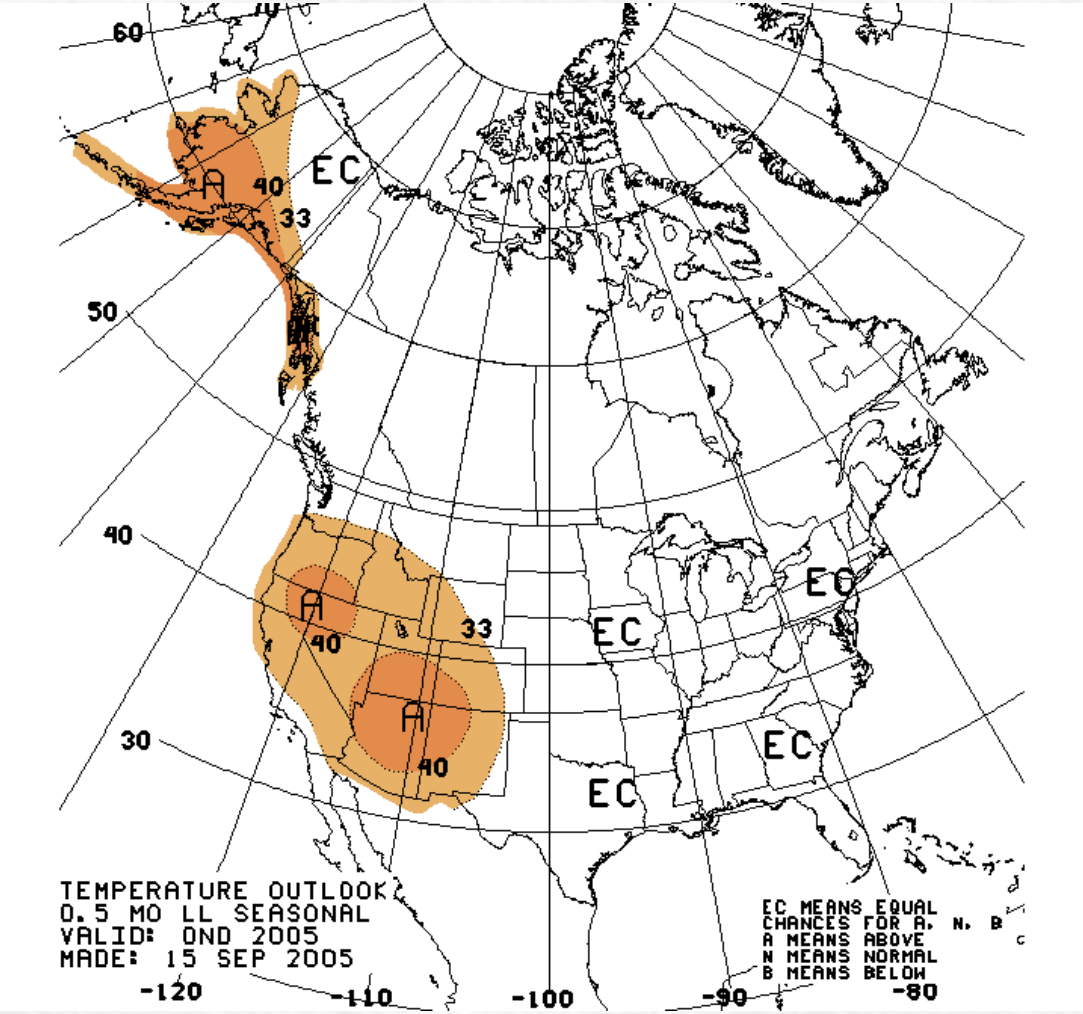
http://www.cdc.noaa.gov/people/klaus.wolter/MEI/

El Nino Forecast



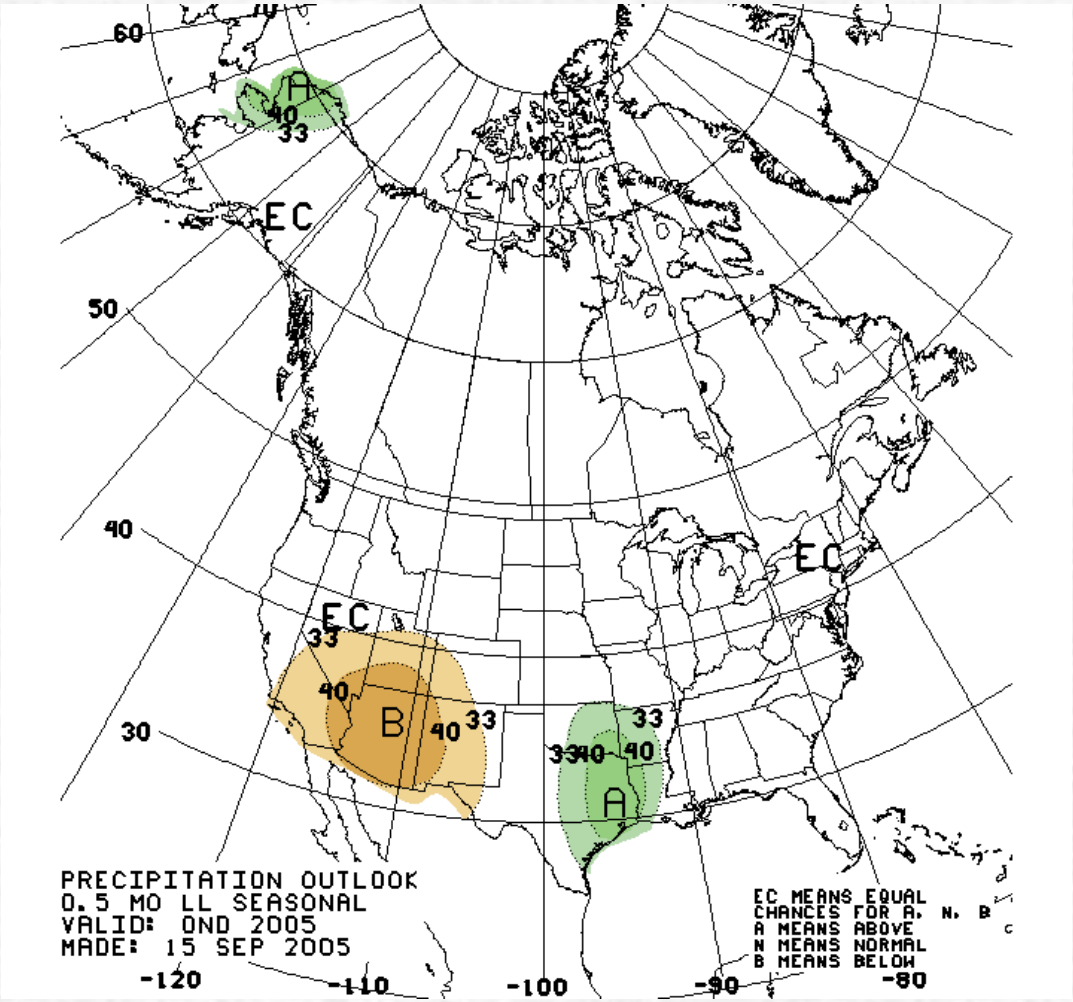
http://www.cdc.noaa.gov/people/klaus.wolter/SWcasts/

Temperature Oct-Dec 2005



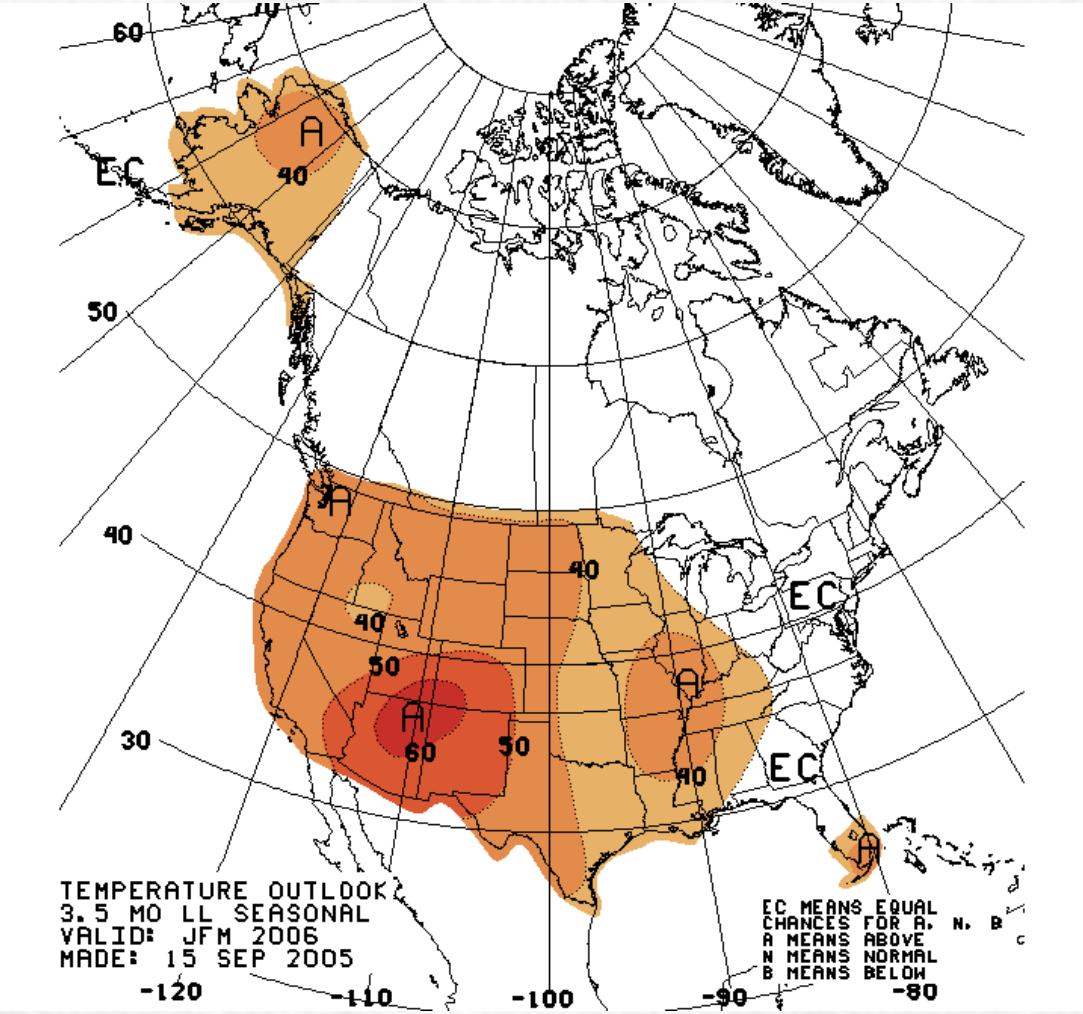
From the Colorado Prediction Center
http://www.cpc.ncep.noaa.gov/products/predictions/multi_season/13_seasonal_outlooks/color/churchill.html

Precipitation
Oct-Dec 2005



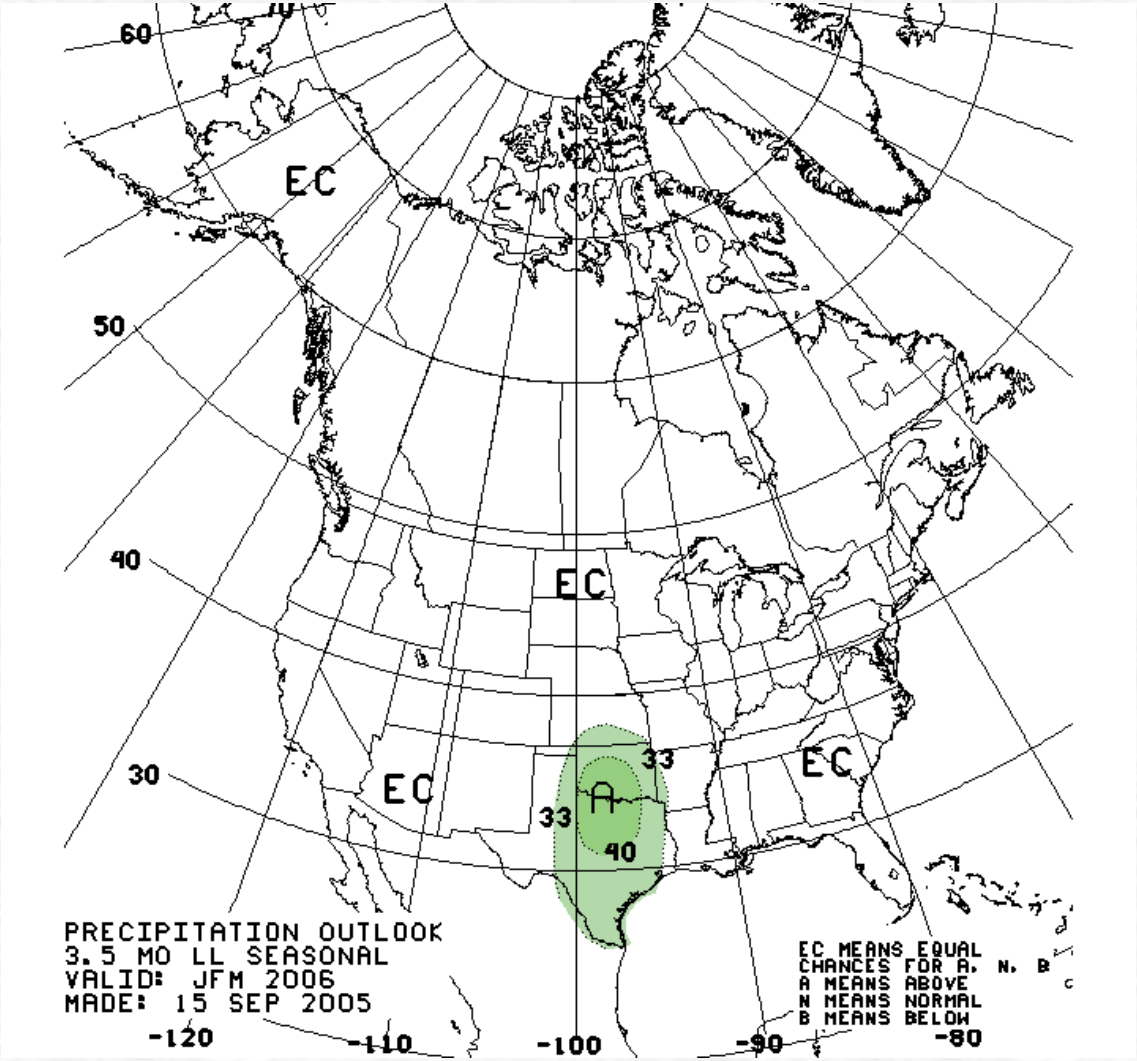
From the Colorado Prediction Center
http://www.cpc.ncep.noaa.gov/products/predictions/multi_season/13_seasonal_outlooks/color/churchill.html

Temperature
Jan-Mar 2006



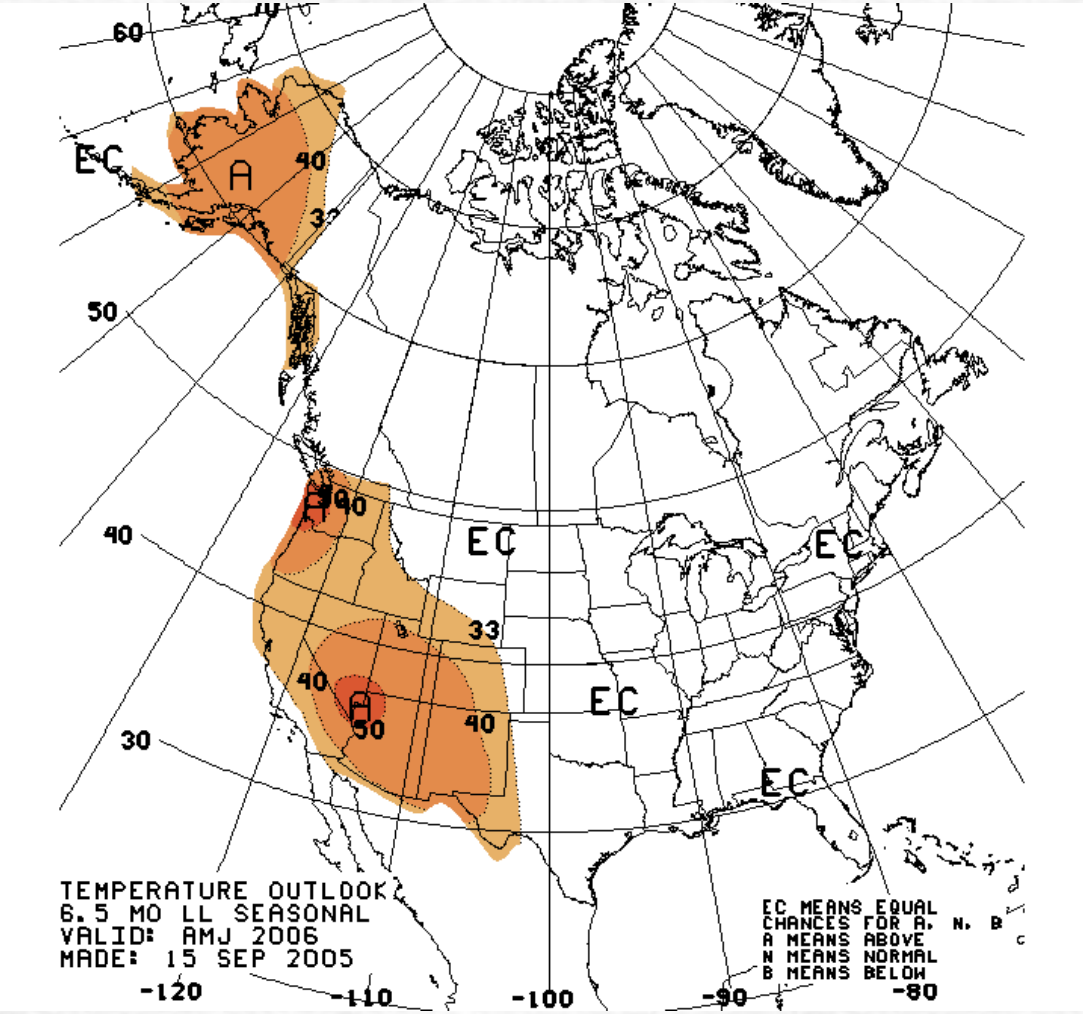
From the Colorado Prediction Center
http://www.cpc.ncep.noaa.gov/products/predictions/multi_season/13_seasonal_outlooks/color/churchill.html

Precipitation Jan-Mar 2006



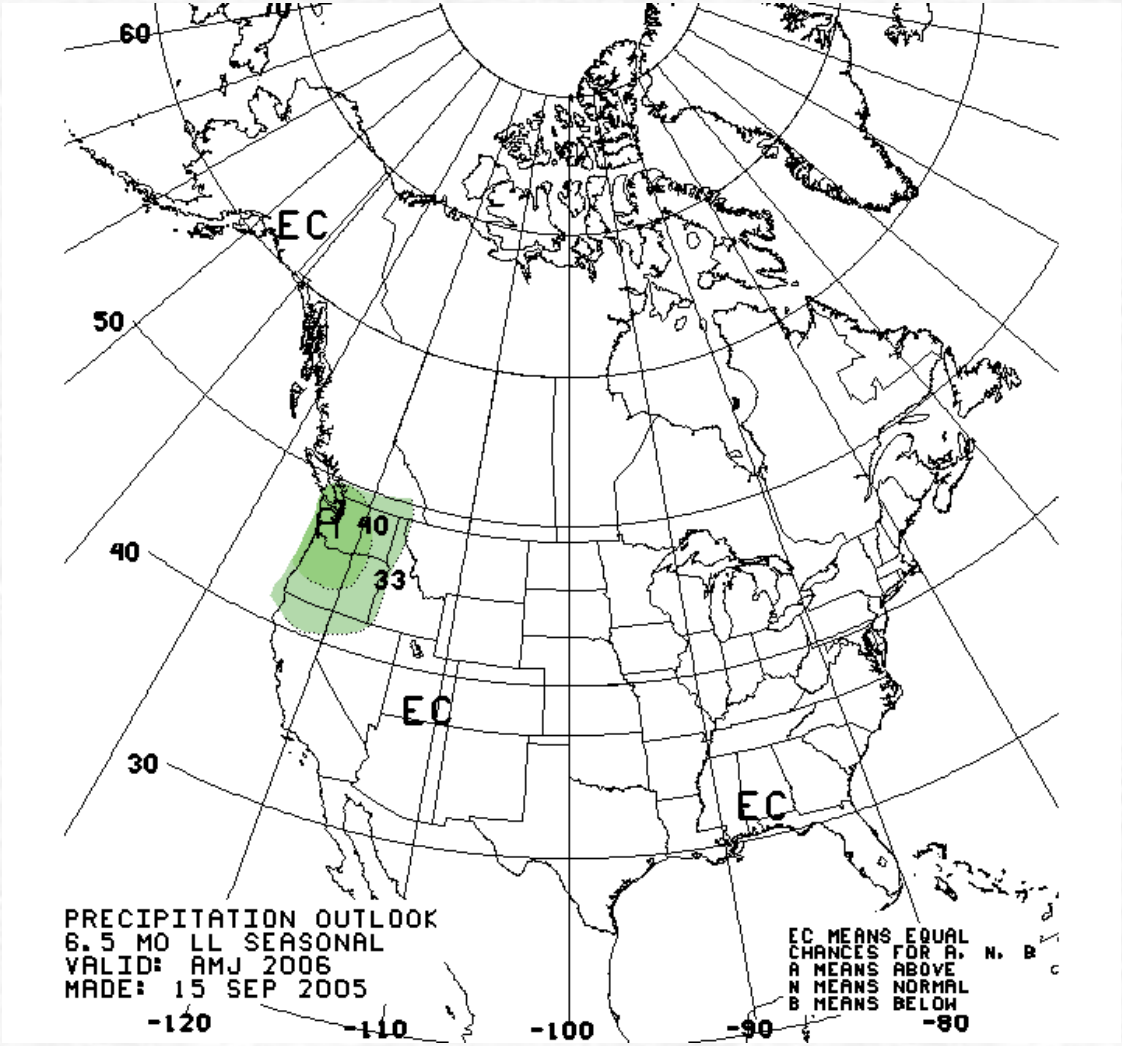
From the Colorado Prediction Center
http://www.cpc.ncep.noaa.gov/products/predictions/multi_season/13_seasonal_outlooks/color/churchill.html

Temperature
Apr-Jun 2006



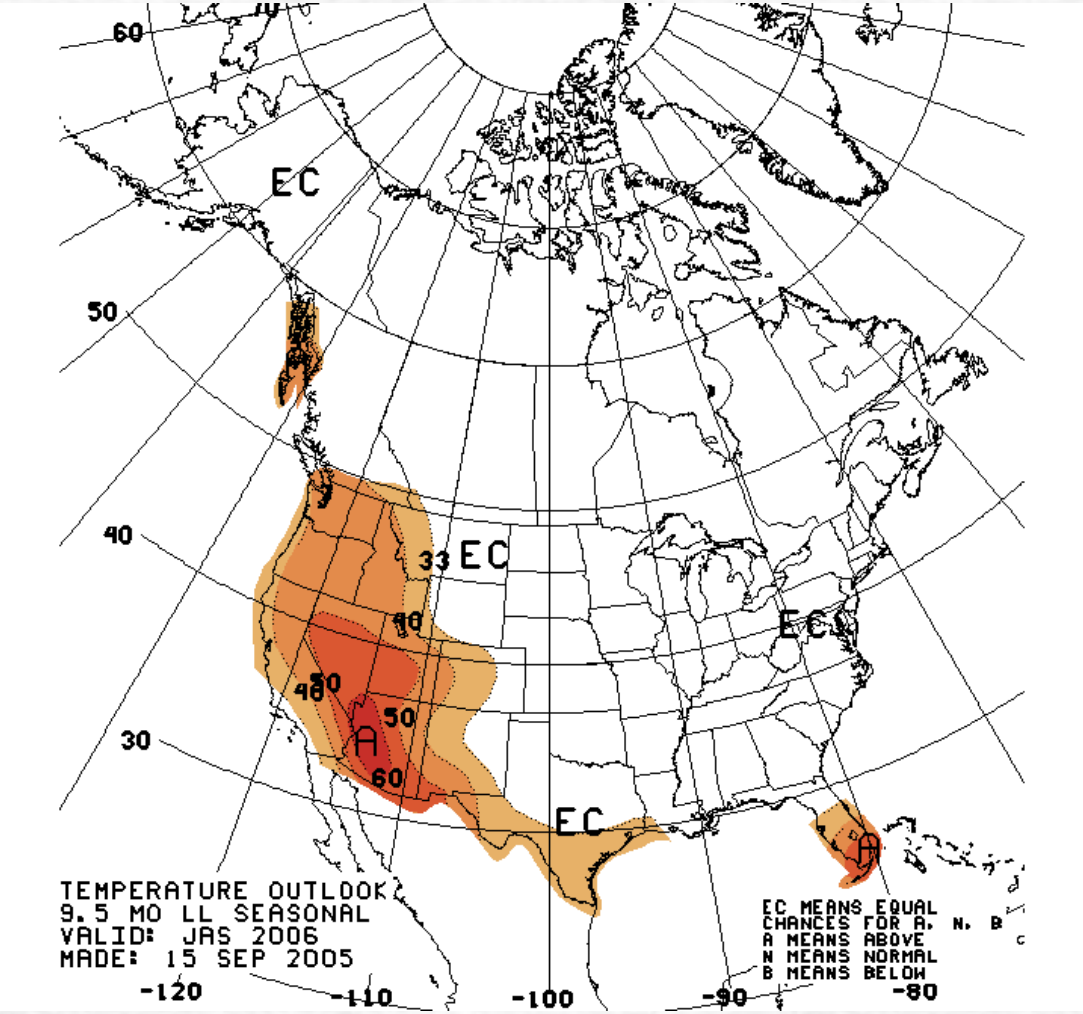
From the Colorado Prediction Center
http://www.cpc.ncep.noaa.gov/products/predictions/multi_season/13_seasonal_outlooks/color/churchill.html

Precipitation
Apr-Jun 2006



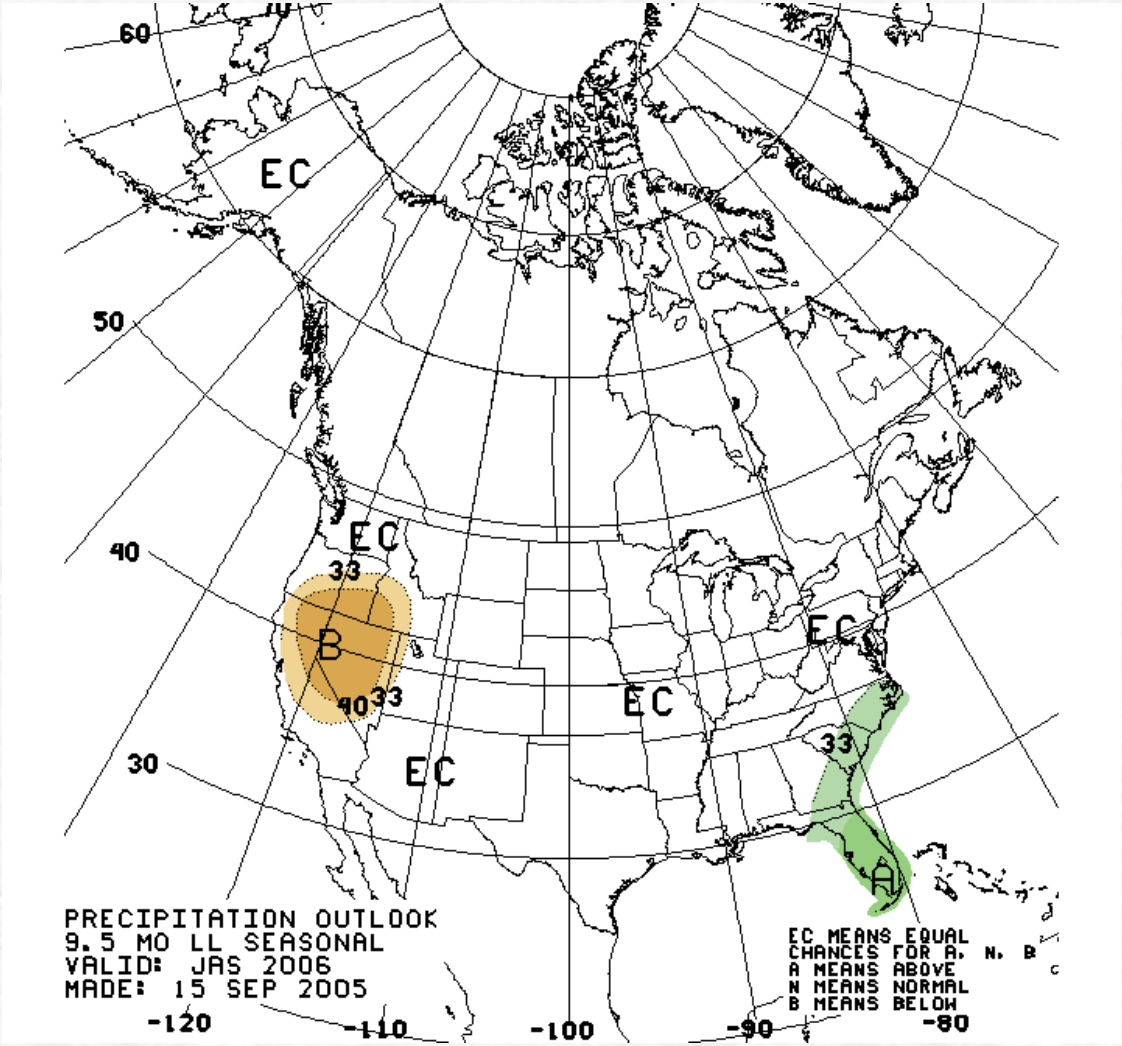
From the Colorado Prediction Center
http://www.cpc.ncep.noaa.gov/products/predictions/multi_season/13_seasonal_outlooks/color/churchill.html

Temperature
Jul-Sep 2006



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

Precipitation
Jul-Sep 2006

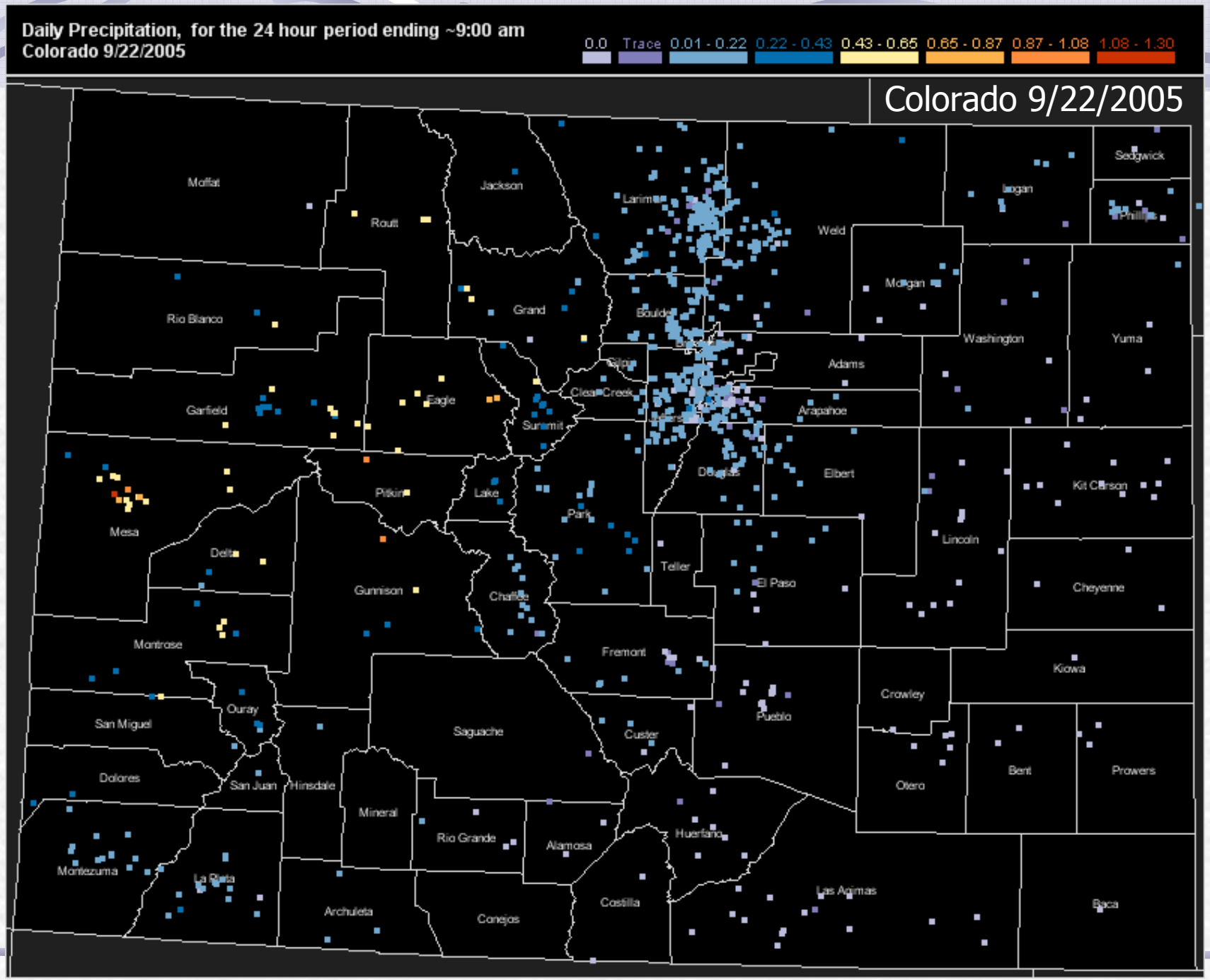


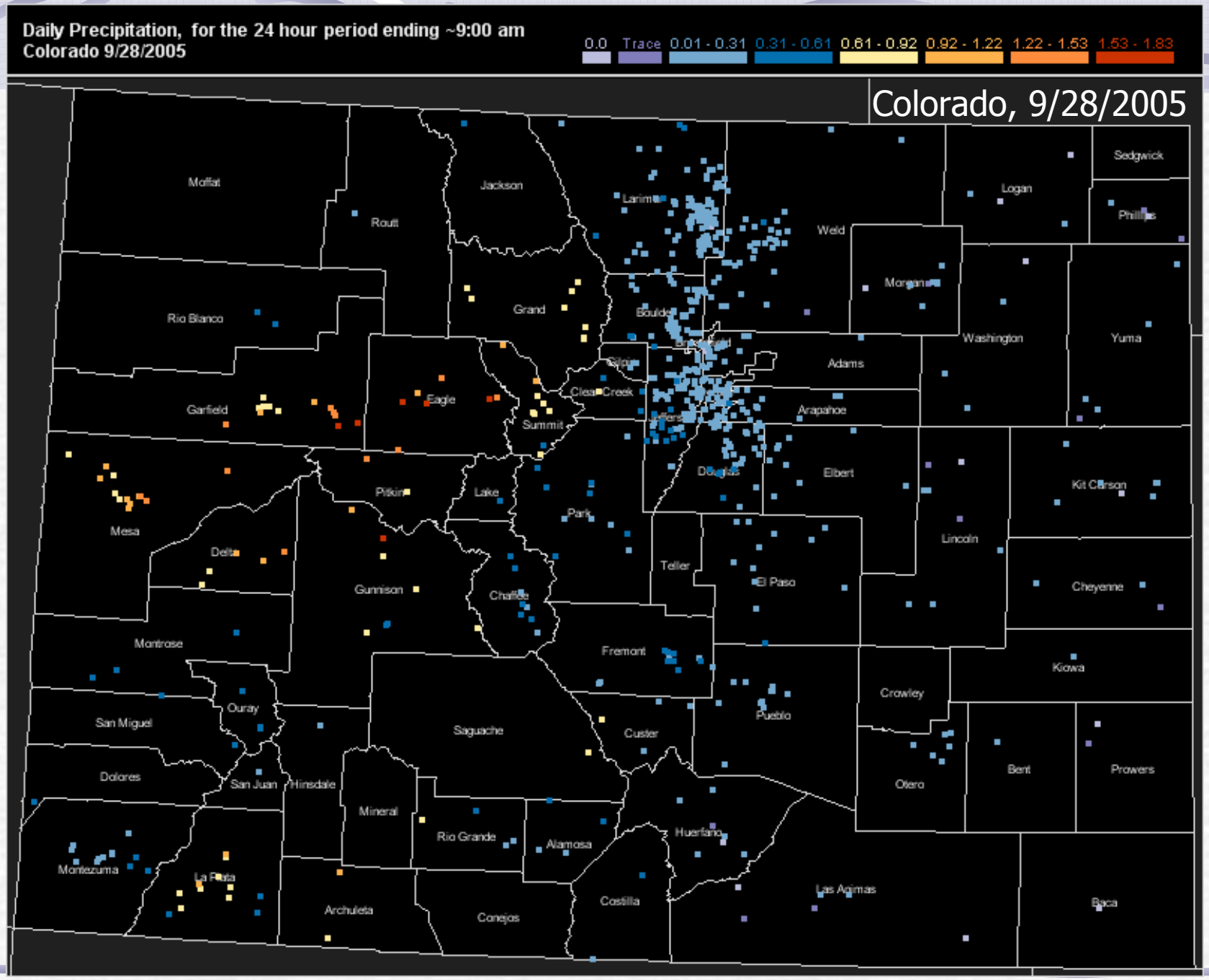
From the Colorado Prediction Center
http://www.cpc.ncep.noaa.gov/products/predictions/multi_season/13_seasonal_outlooks/color/churchill.html

My Suggestion?

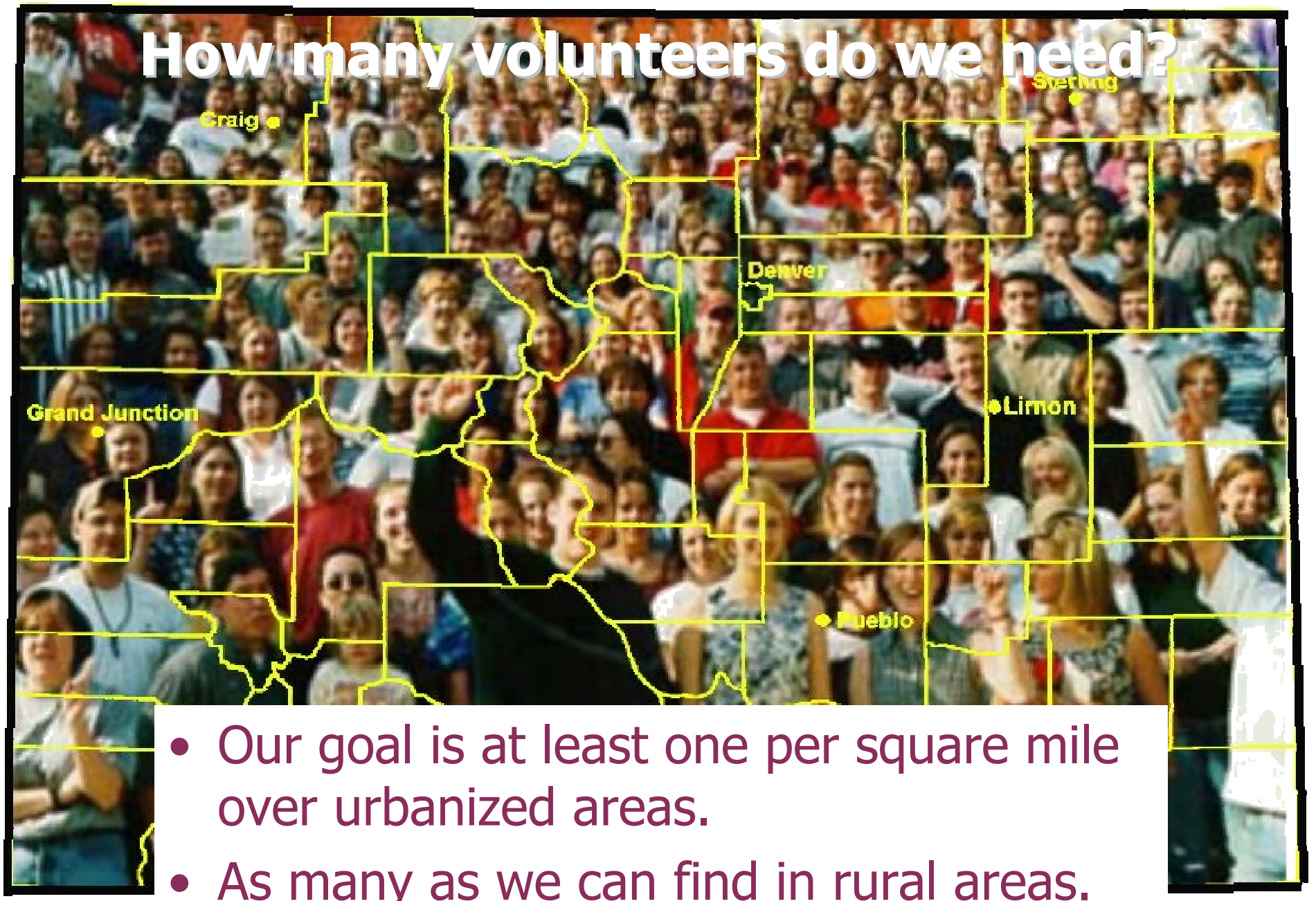
Sign up for CoCoRaHS!

Community Collaborative Rain, Hail and Snow Network


Daily Precipitation, for the 24 hour period ending ~9:00 am
Colorado 9/22/2005
0.0
Trace
0.01 - 0.22
0.22 - 0.43
0.43 - 0.65
0.65 - 0.87
0.87 - 1.08
1.08 - 1.30
Colorado 9/22/2005
Moffat
Routt
Jackson
Larimer
Weld
Logan
Sedgwick
Phillips
Rio Blanco
Grand
Boulder
Morgan
Washington
Yuma
Garfield
Eagle
Summit
Clear Creek
Adams
Arapahoe
Mesa
Pitkin
Lake
Park
Douglas
Elbert
Kit Carson
Lincoln
Delta
Gunnison
Chaffee
Teller
El Paso
Cheyenne
Montrose
Fremont
Kiowa
Ouray
San Miguel
Saguache
Custer
Pueblo
Crowley
Dolores
San Juan
Hinsdale
Mineral
Rio Grande
Alamosa
Huerfano
Otero
Bent
Prowers
Montezuma
La Plata
Archuleta
Conejos
Costilla
Las Animas
Baca


Daily Precipitation, for the 24 hour period ending ~9:00 am
Colorado 9/28/2005
0.0
Trace
0.01 - 0.31
0.31 - 0.61
0.61 - 0.92
0.92 - 1.22
1.22 - 1.53
1.53 - 1.83
Colorado, 9/28/2005
Moffat
Routt
Jackson
Larimer
Weld
Logan
Sedgwick
Phillips
Rio Blanco
Grand
Boulder
Morgan
Washington
Yuma
Garfield
Eagle
Summit
Clear Creek
Adams
Arapahoe
Mesa
Pitkin
Lake
Park
Douglas
Elbert
Kit Carson
Lincoln
Delta
Gunnison
Chaffee
Teller
El Paso
Cheyenne
Montrose
Fremont
Kiowa
Ouray
San Miguel
Saguache
Custer
Pueblo
Crowley
Dolores
San Juan
Hinsdale
Mineral
Rio Grande
Alamosa
Huerfano
Otero
Bent
Prowers
Montezuma
La Plata
Archuleta
Conejos
Costilla
Las Animas
Baca

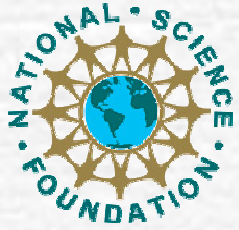
How many volunteers do we need?



- Our goal is at least one per square mile over urbanized areas.
- As many as we can find in rural areas.

For More Information, Visit the CoCoRaHS Web Site

http://www.cocorahs.org



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

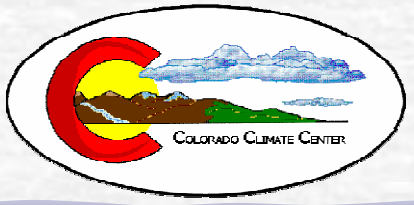
Colorado Climate Center

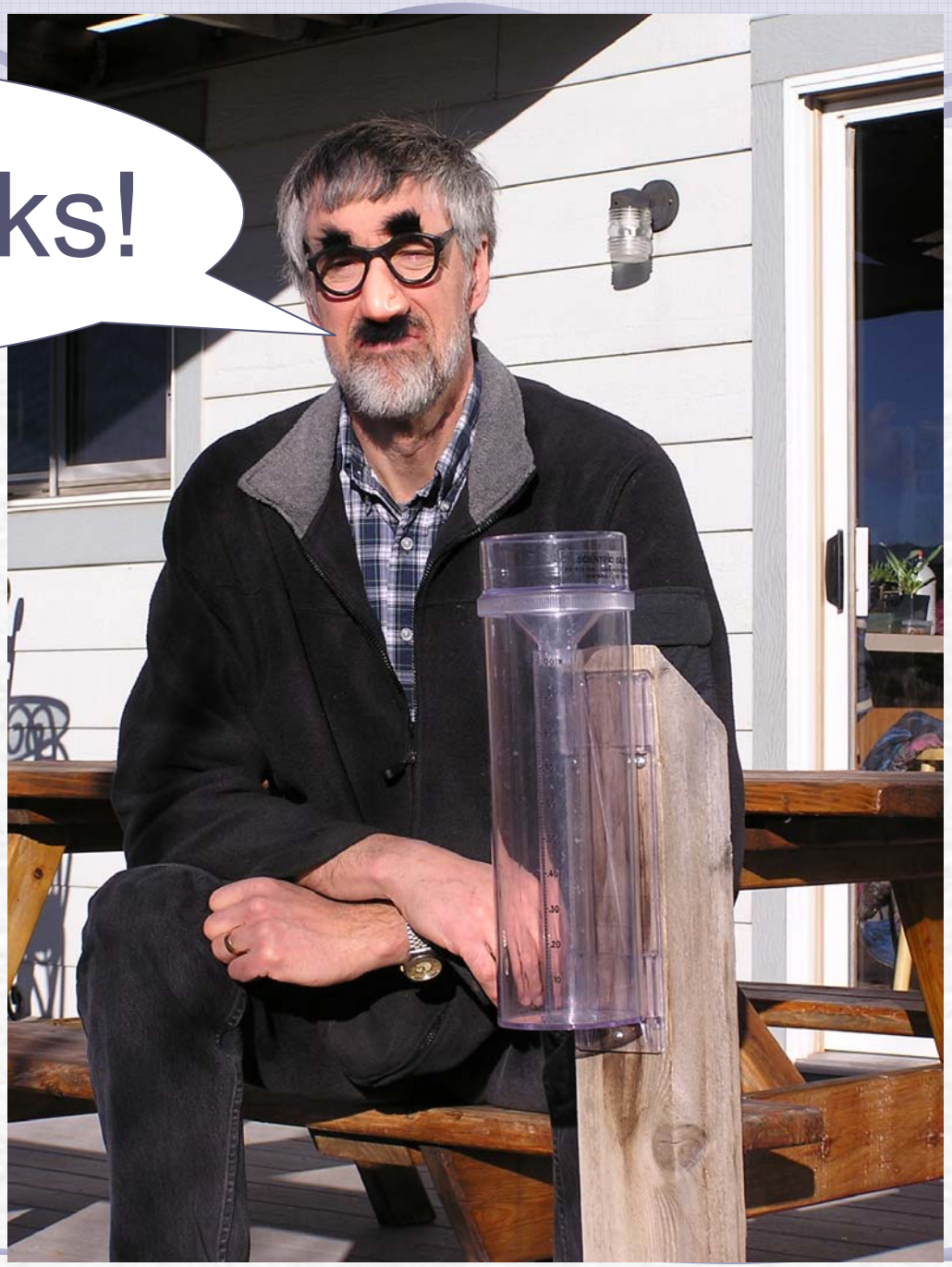
Data and Power Point Presentations available for downloading

http://ccc.atmos.colostate.edu

- click on "Drought"
- then click on "Presentations"

Colorado State University
Knowledge to Go Places



That's all folks!

THE END