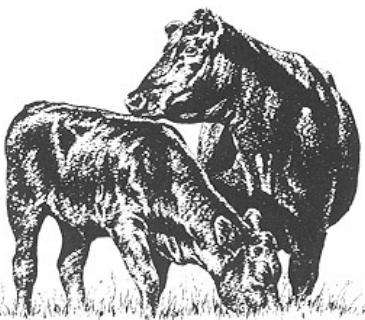


DROUGHT: An update and status report



**Nolan Doesken
Colorado Climate Center**

**Presented to: Colorado Cattleman's Association,
Pueblo, CO, June 19, 2006**

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

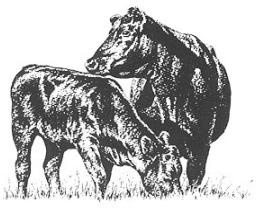
Prepared by Odie Bliss



Let's Talk About Precipitation

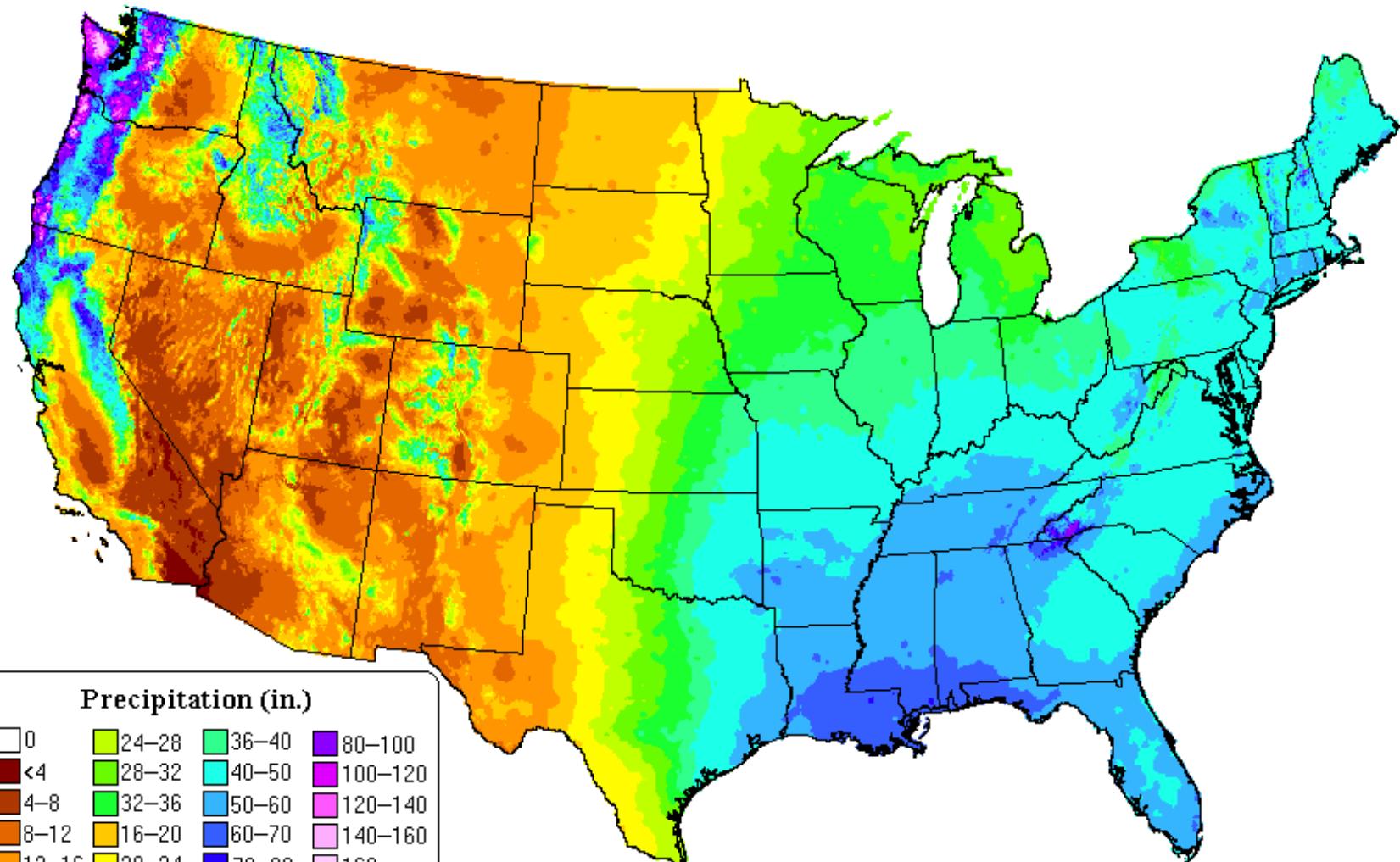
A wide-angle photograph of a massive, dark, funnel-shaped cloud, likely a supercell, dominating the sky. The base of the cloud is bright white and illuminated by lightning. The foreground shows a flat, open landscape with some green grass and brown dirt paths.

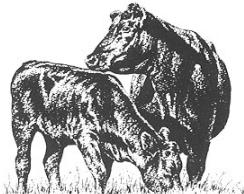
Strasburg, Colo, Photo by Ian Wittmeyer



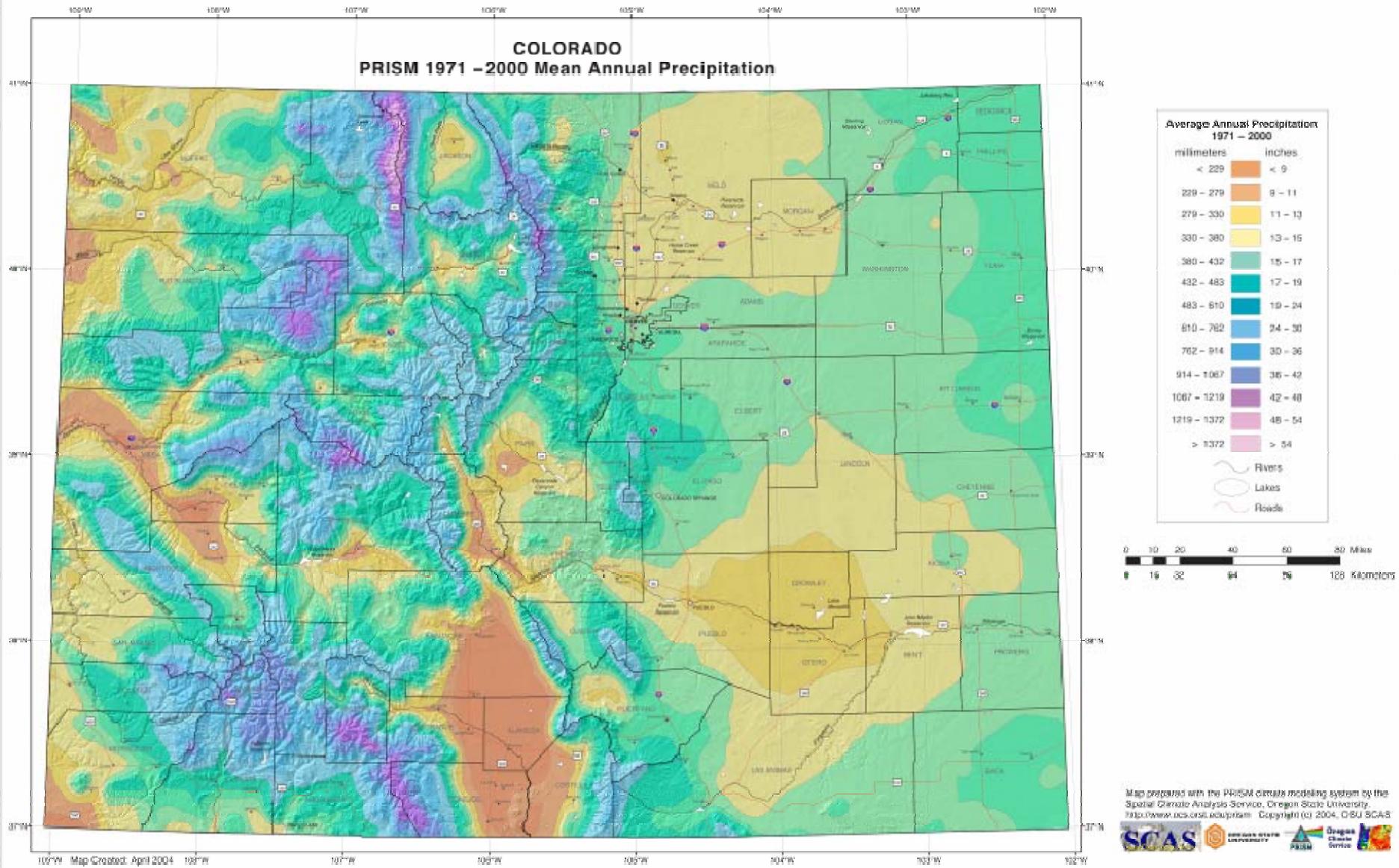
Precipitation: Annual Climatology (1971-2000)

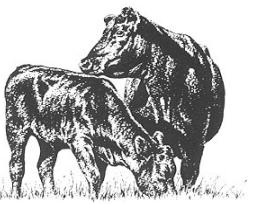
Precipitation: Annual Climatology (1971–2000)



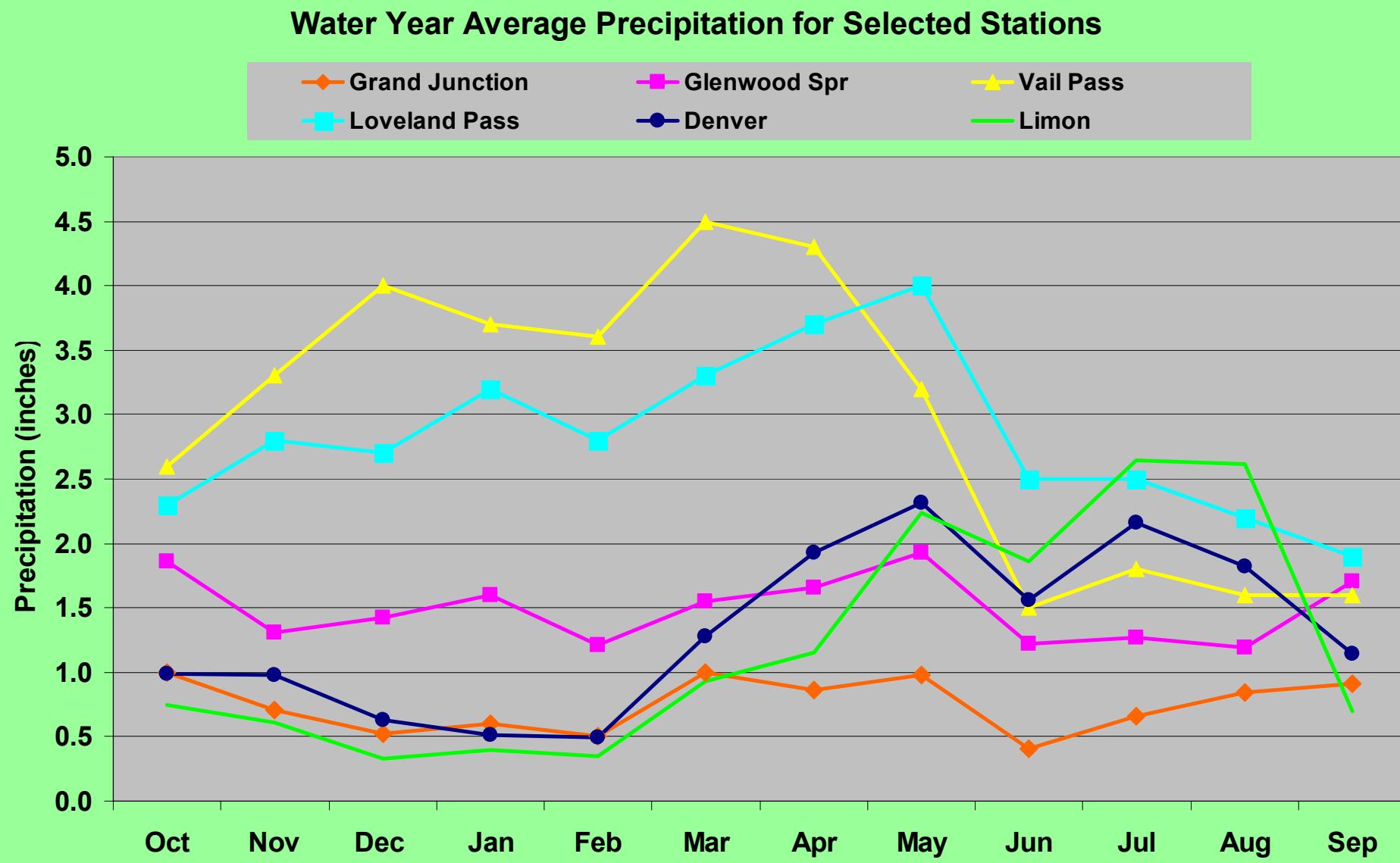


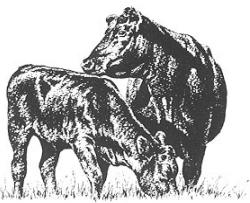
Colorado Average Annual Precipitation





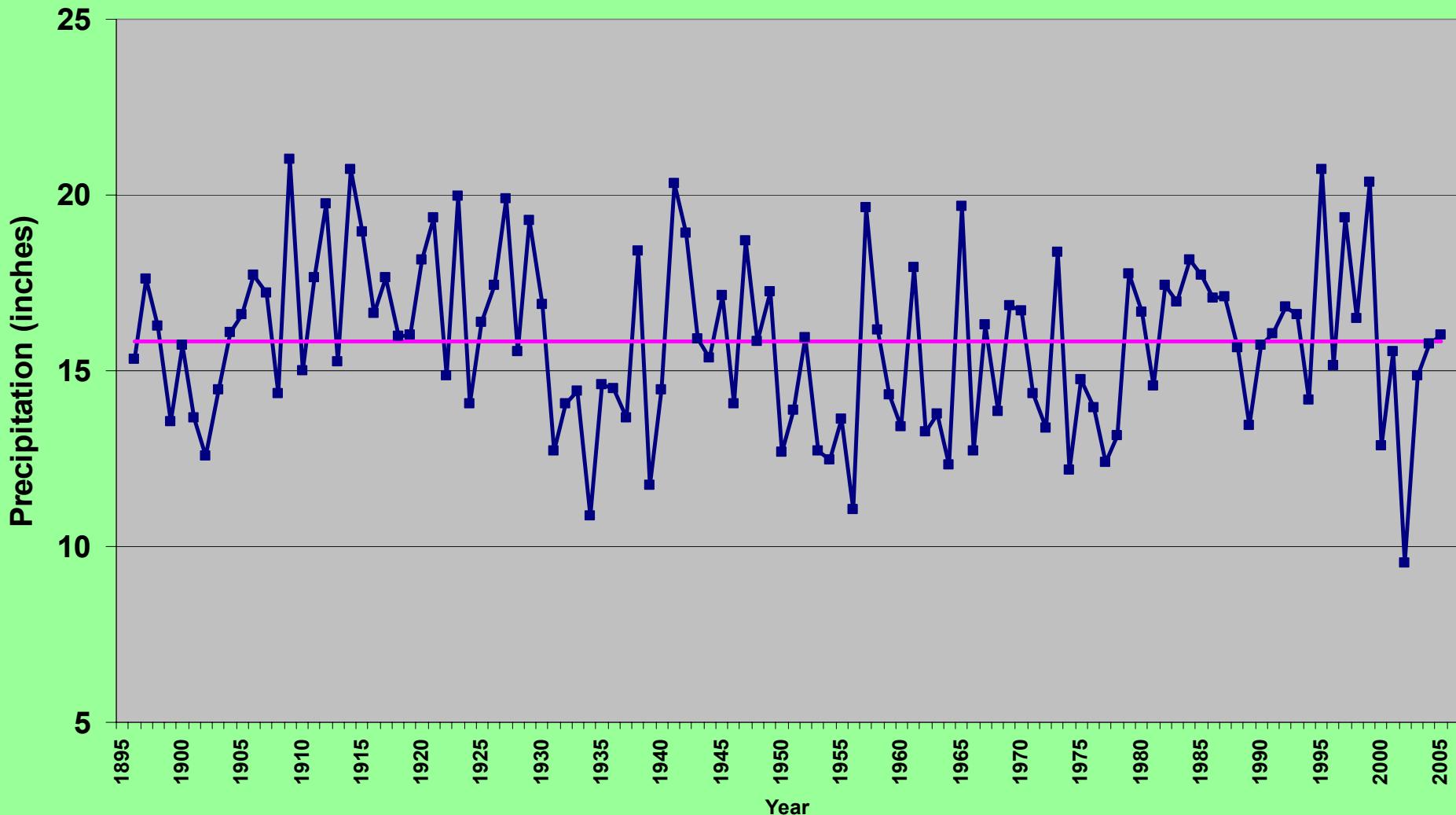
I-70 Transect ave pp graph

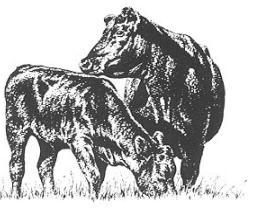




Have We Been Average?

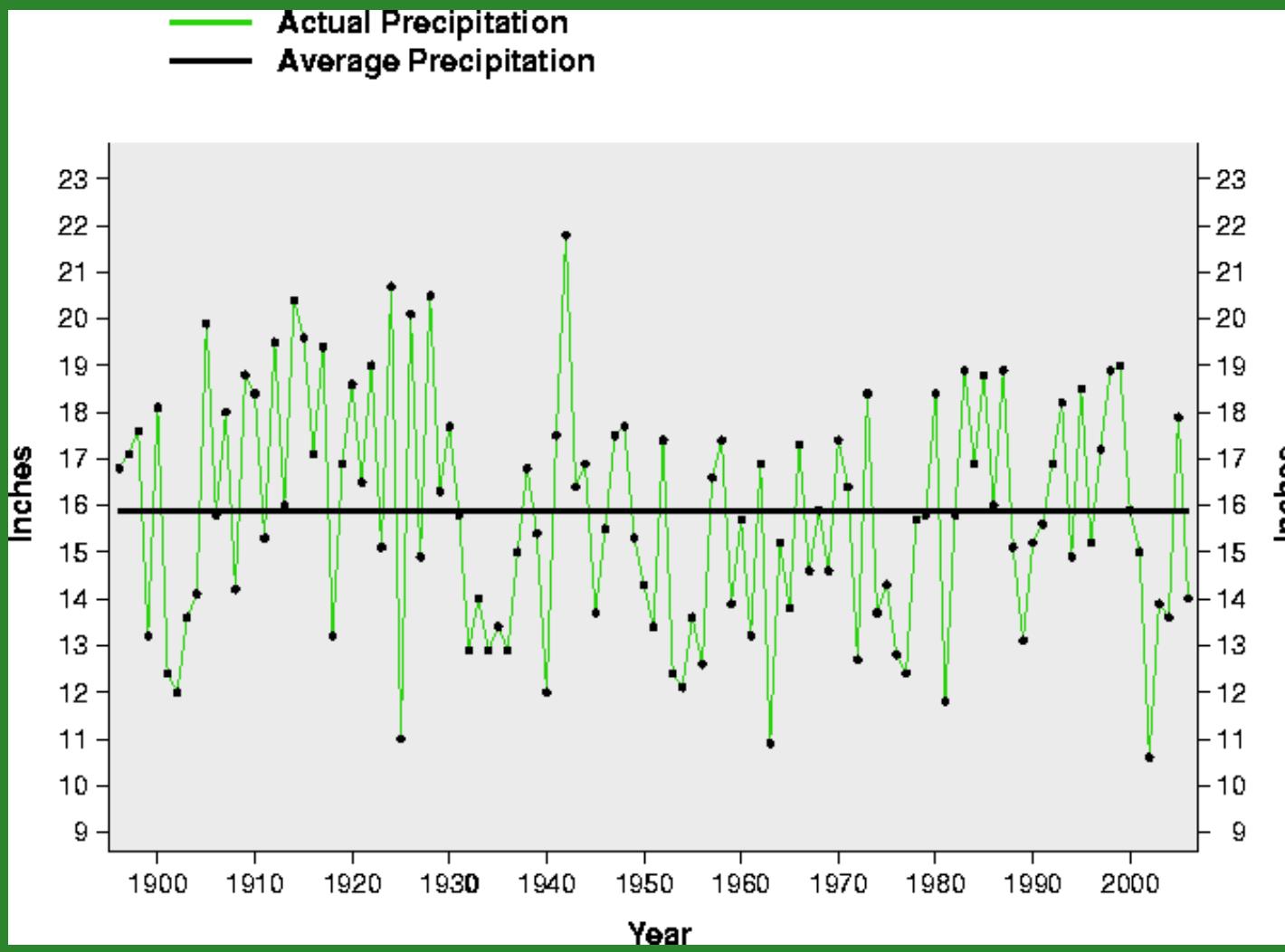
Colorado Statewide Water Year (Oct-Sep) Precipitation
from 1896 - 2005

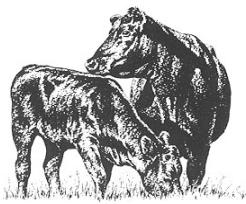




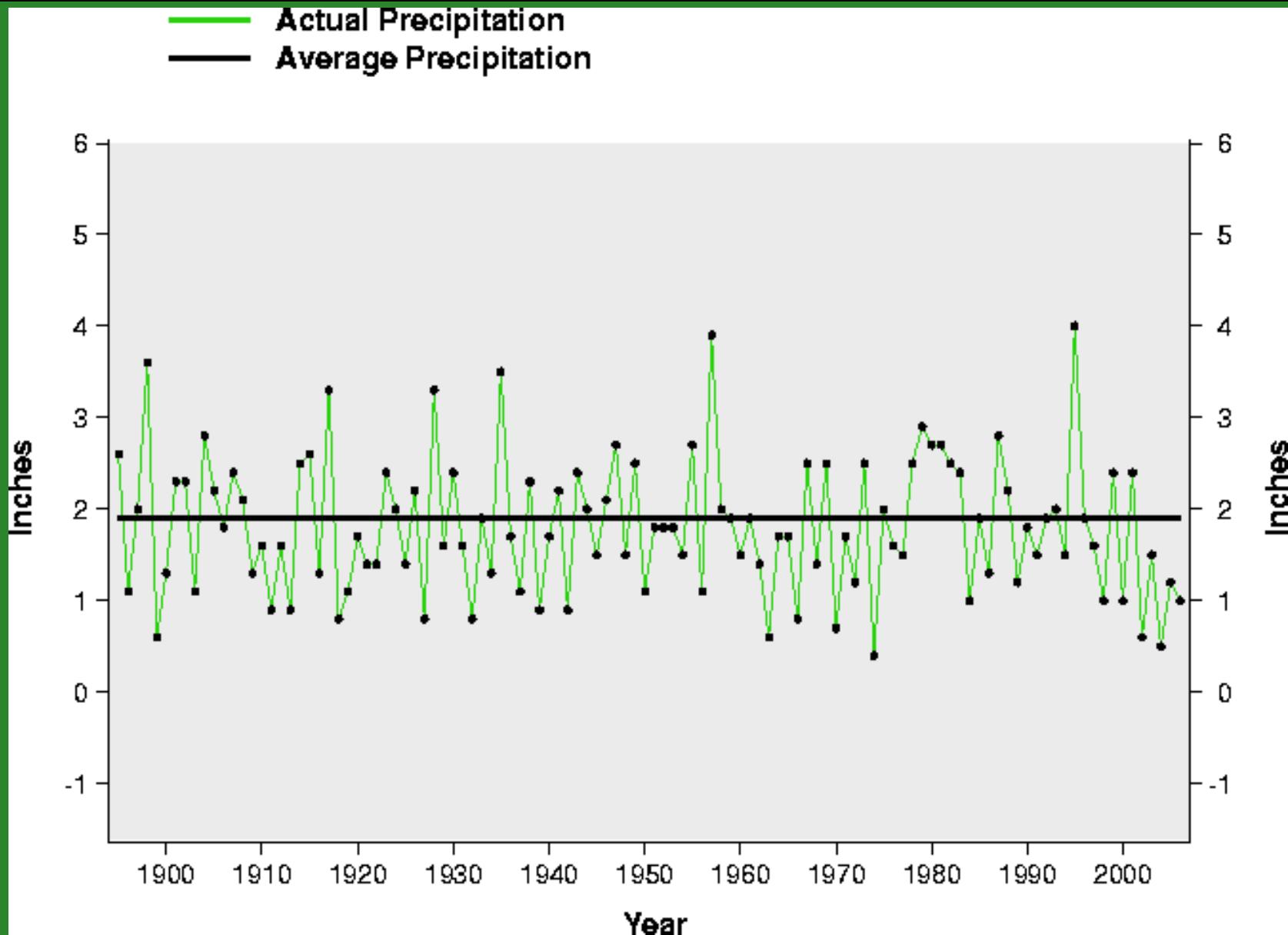
Jun-May (12-Month Period) Statewide Precipitation

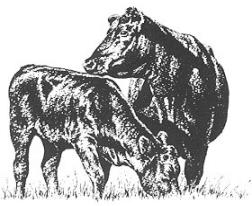
- Most Recent 12-Month Period (Jun - May) 1901 - 2000 Average = 15.89 Inches
- Most Recent 12-Month Period (Jun - May) 1896 - 2006 Trend = -0.09 Inches / Decade





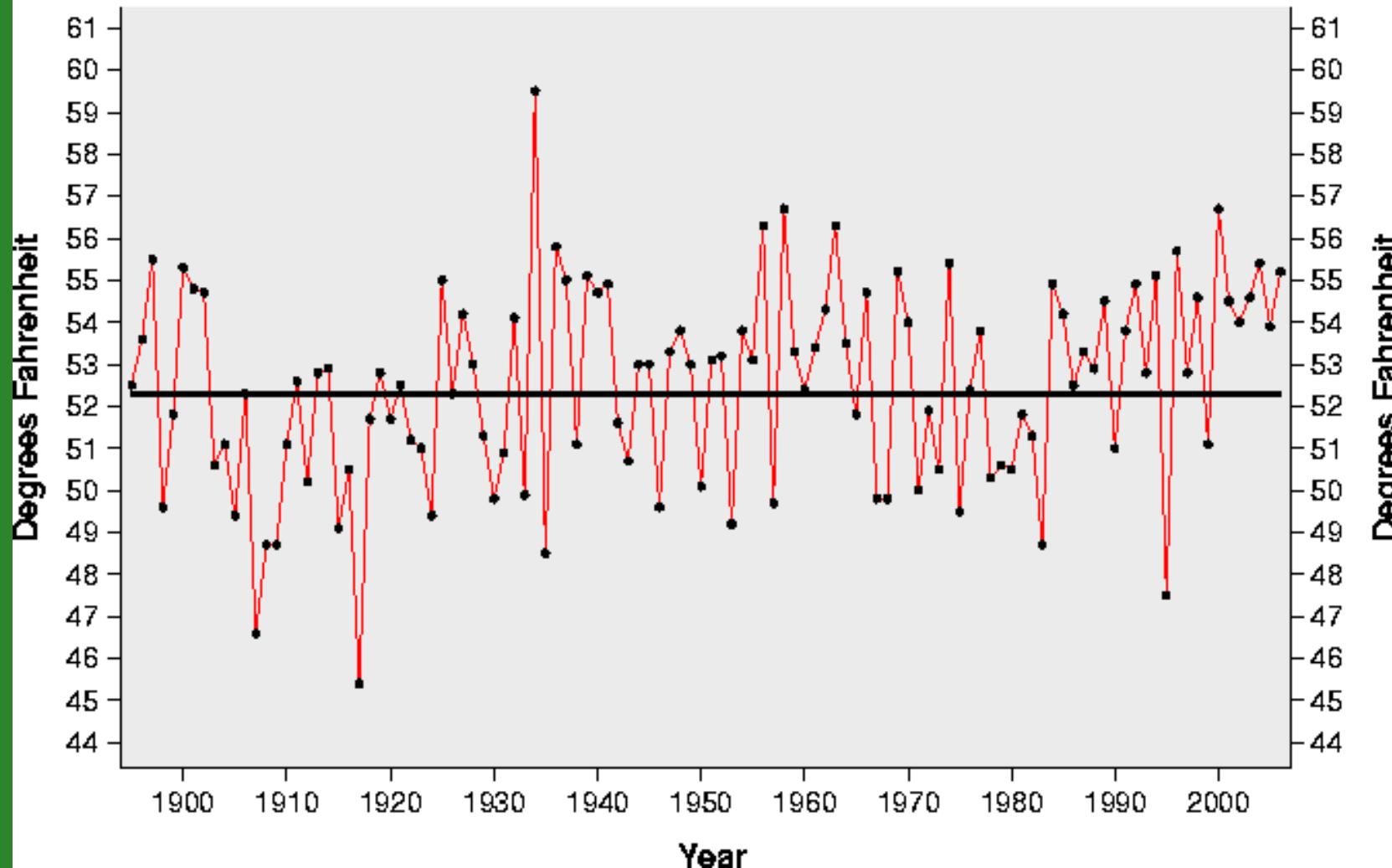
Colorado Statewide May Precipitation 1895-2006

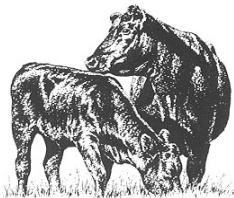




Colorado Statewide May Average Temperatures 1895-2006

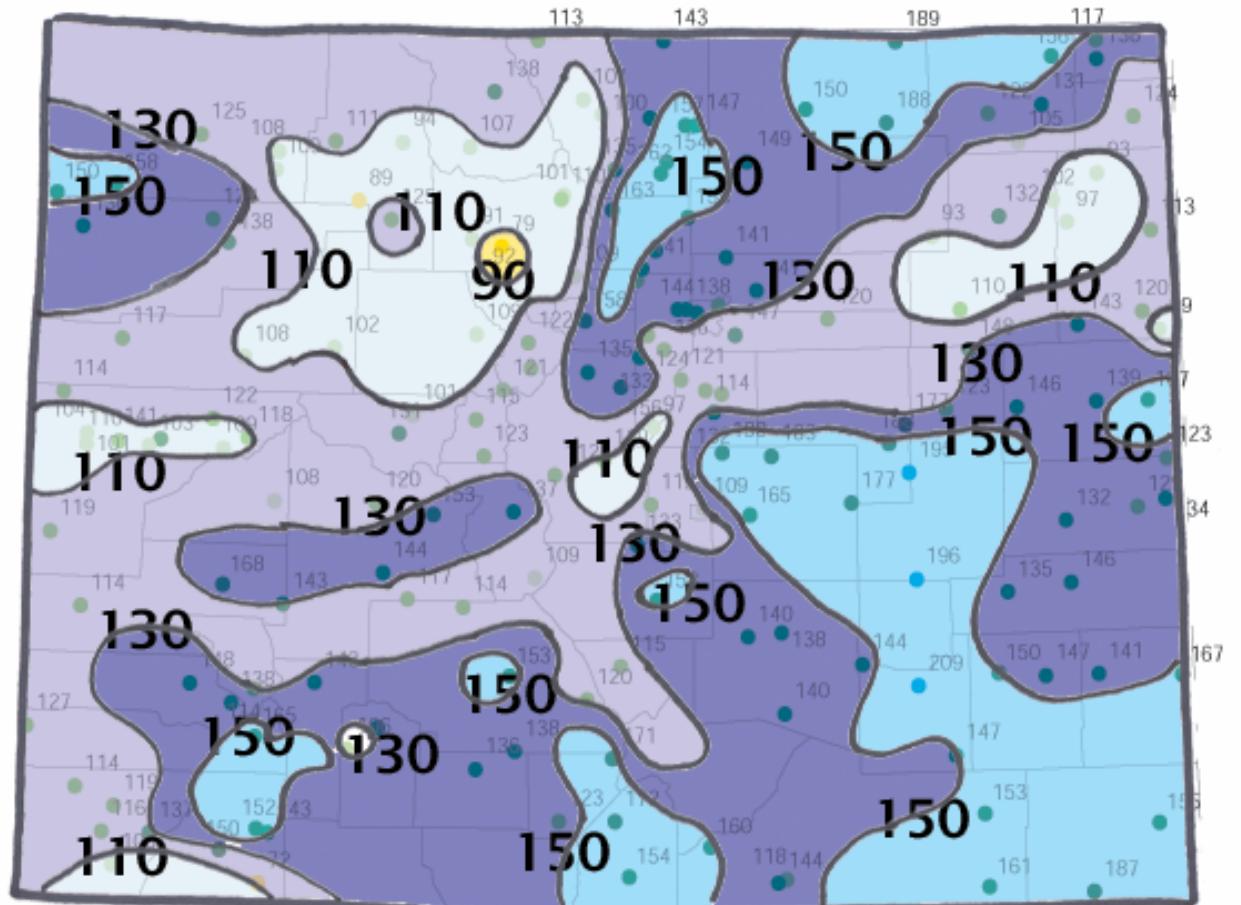
— Actual Temperature
— Average Temperature

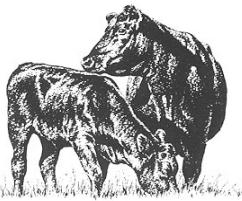




1999 Water Year Precipitation

Water Year 1999
(Oct. 1998-Sept. 1999)
Precipitation Percent of Average for 1961-1990 Averages

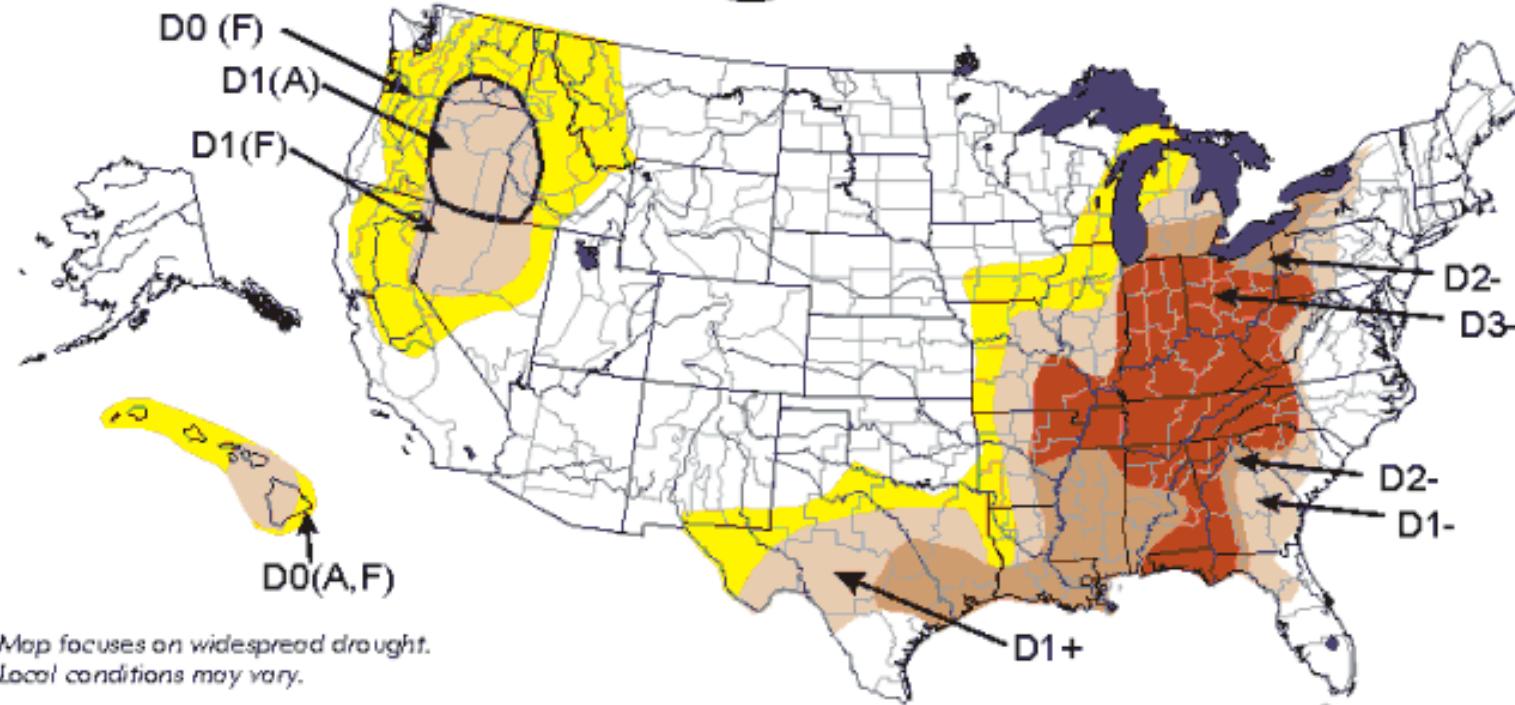




Sept 1999 Drought Monitor Map

September 28, 1999

U.S. Drought Monitor



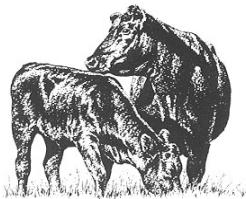
D0 Watch
D1 Drought
D2 Drought-Severe
D3 Drought-Extreme
D4 Drought-Exceptional
Delineates Overlapping Areas

Drought type: used only when impacts differ
A = Agriculture
W = Water
F = Forest fire danger



Plus (+) = Forecast to intensify next two weeks
Minus (-) = Forecast to diminish next two weeks
No sign = No change in drought classification forecast

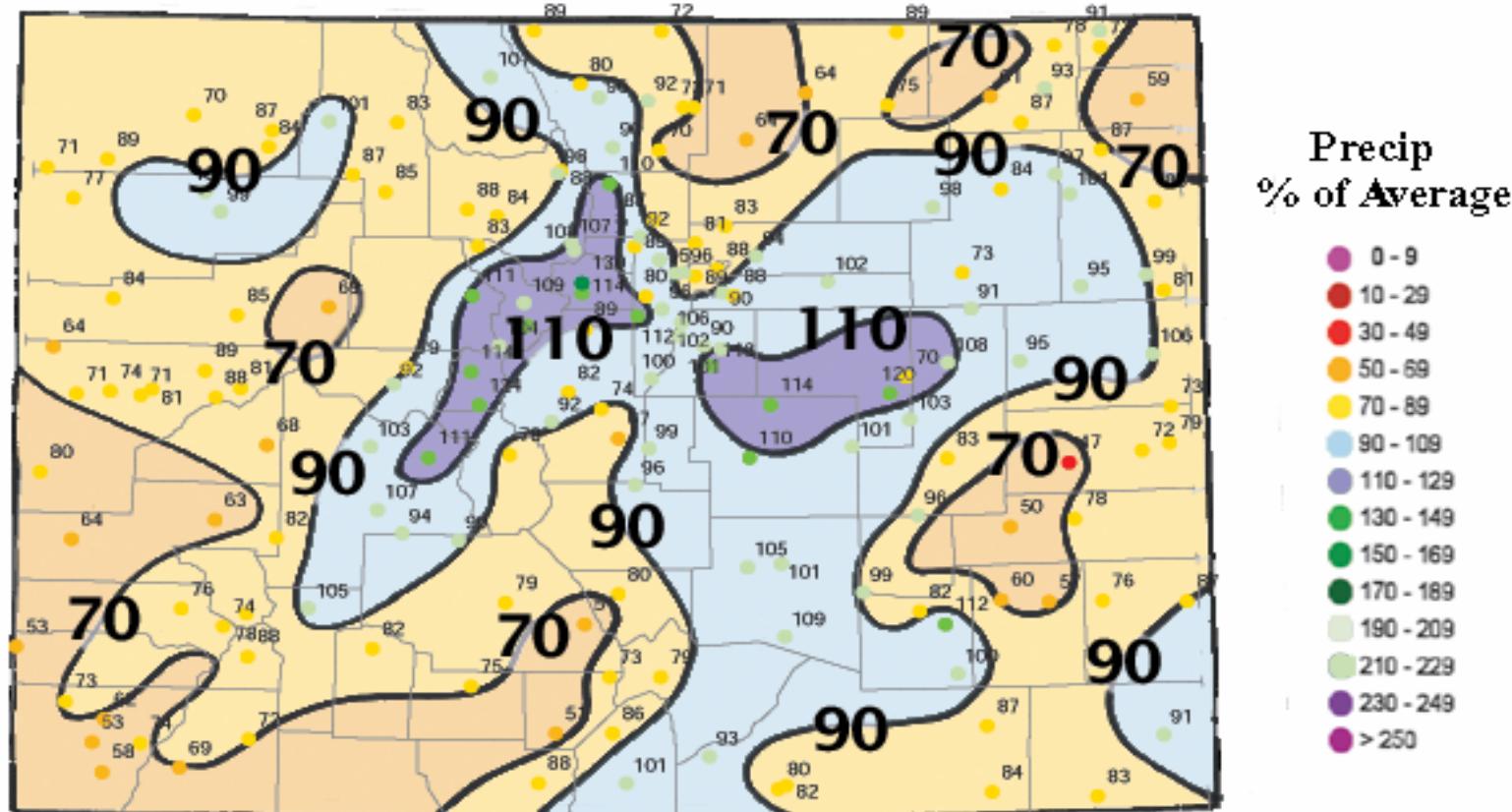
• Released Thursday, Sep 30, 1999 •

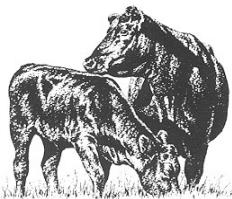


2000 Water Year Precipitation

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

Precipitation Percent of Average for 1961-1990 Averages

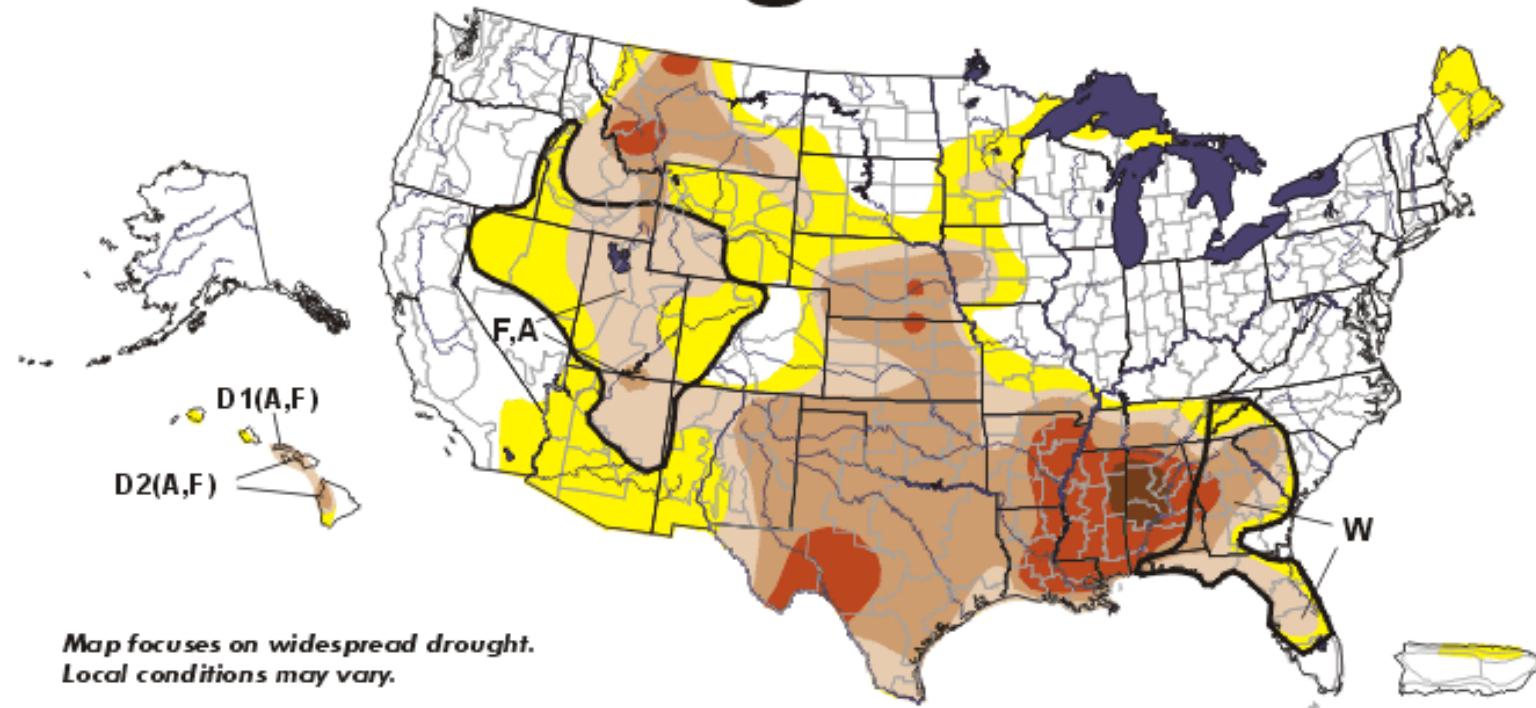




October 2000 Drought Monitor Map

October 3, 2000 Valid 8 a.m. EDT

U.S. Drought Monitor



Map focuses on widespread drought.
Local conditions may vary.

- D0 Abnormally Dry
- D1 Drought-First Stage
- D2 Drought-Severe
- D3 Drought-Extreme
- D4 Drought-Exceptional
- Delineates Overlapping Areas

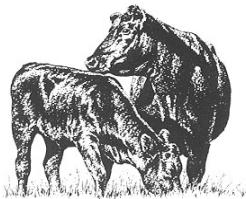
- Drought type: used only when impacts differ
- A = Agriculture
- W = Water
- F = Wildfire danger



See accompanying texts summary for forecast statements

<http://enso.unl.edu/monitor/monitor.html>

• Released Thursday, Oct. 5, 2000 •

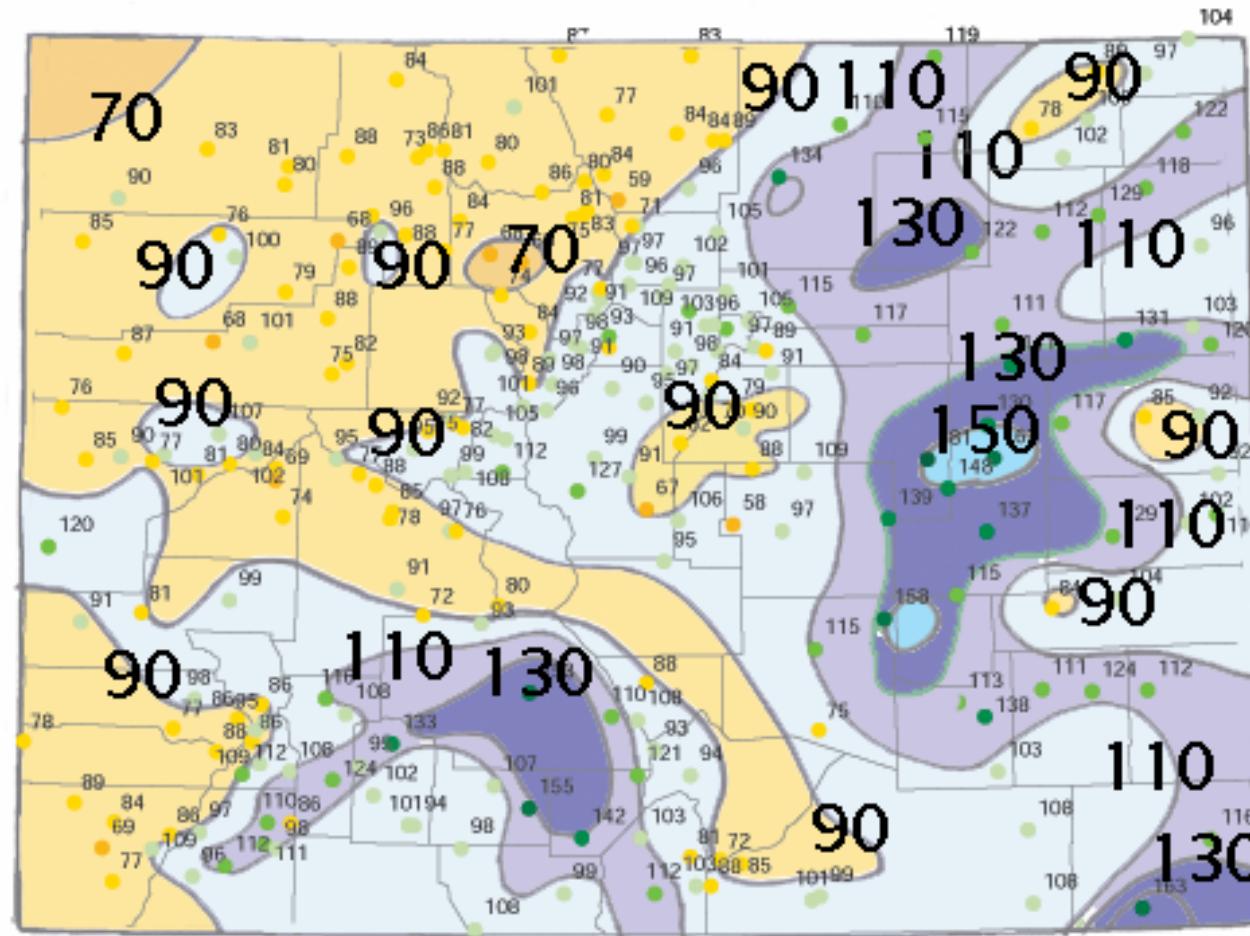


2001 Water Year Precipitation

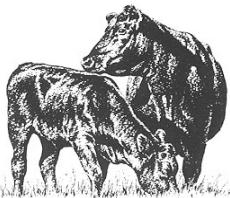
Water Year 2001

(Oct. 2000 - Sept. 2001)

Precipitation Percent of Average for 1961-1990 Averages



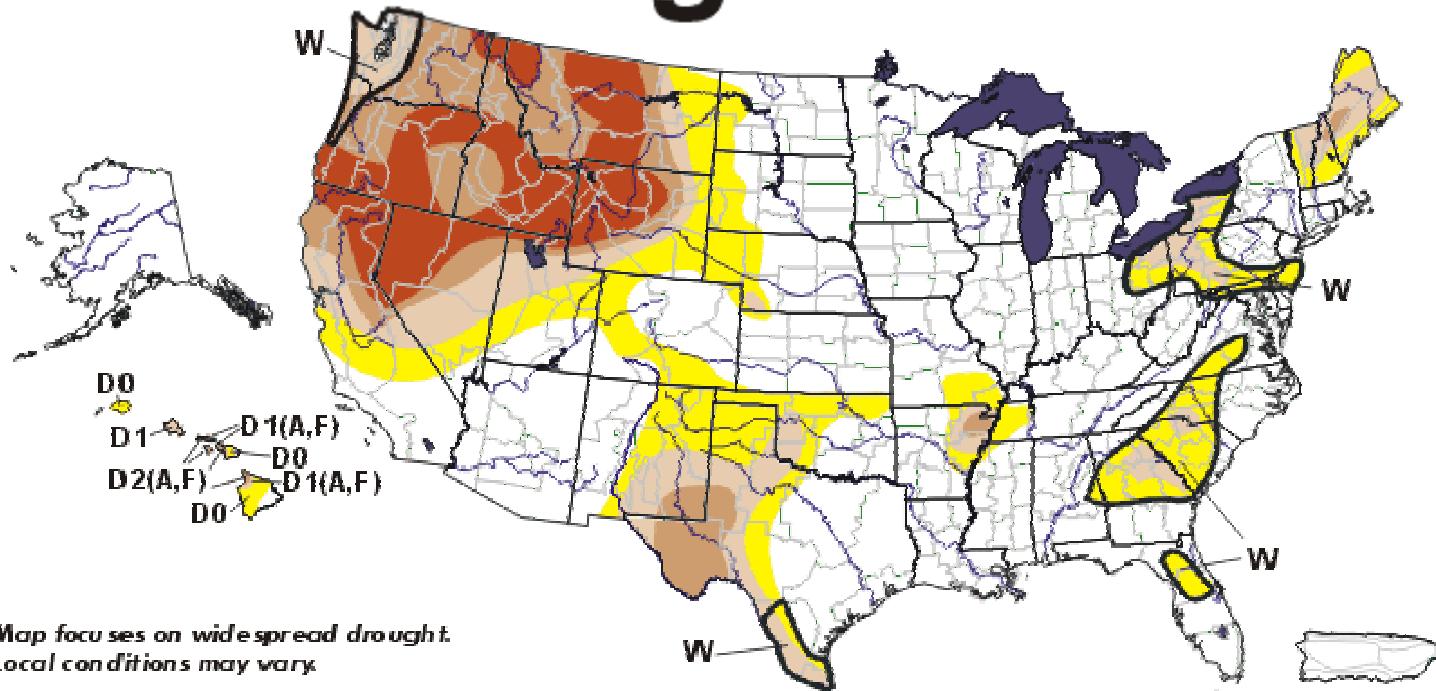
Precip
% of Average



October 2001 Drought Monitor Map

October 2, 2001 Valid 8 am. EDT

U.S. Drought Monitor



Map focuses on widespread drought.
Local conditions may vary.

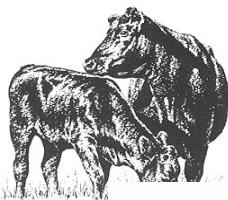
- [Yellow square] D0 Abnormally Dry
- [Light brown square] D1 Drought-Moderate
- [Brown square] D2 Drought-Severe
- [Dark brown square] D3 Drought-Extreme
- [Black square] D4 Drought-Exceptional
- [Black line icon] Delineates Overlapping Areas

- Drought Impact Types:
- A = Agriculture
 - W = Water (Hydrological)
 - F = Fire danger (Wildfires)
 - (No type = All 3 impacts)

See accompanying text summary for forecast statements
<http://enso.unl.edu/monitor/monitor.html>



• Released Thursday, October 4, 2001 •
Author: Douglas Le Comte, NOAA/CPC

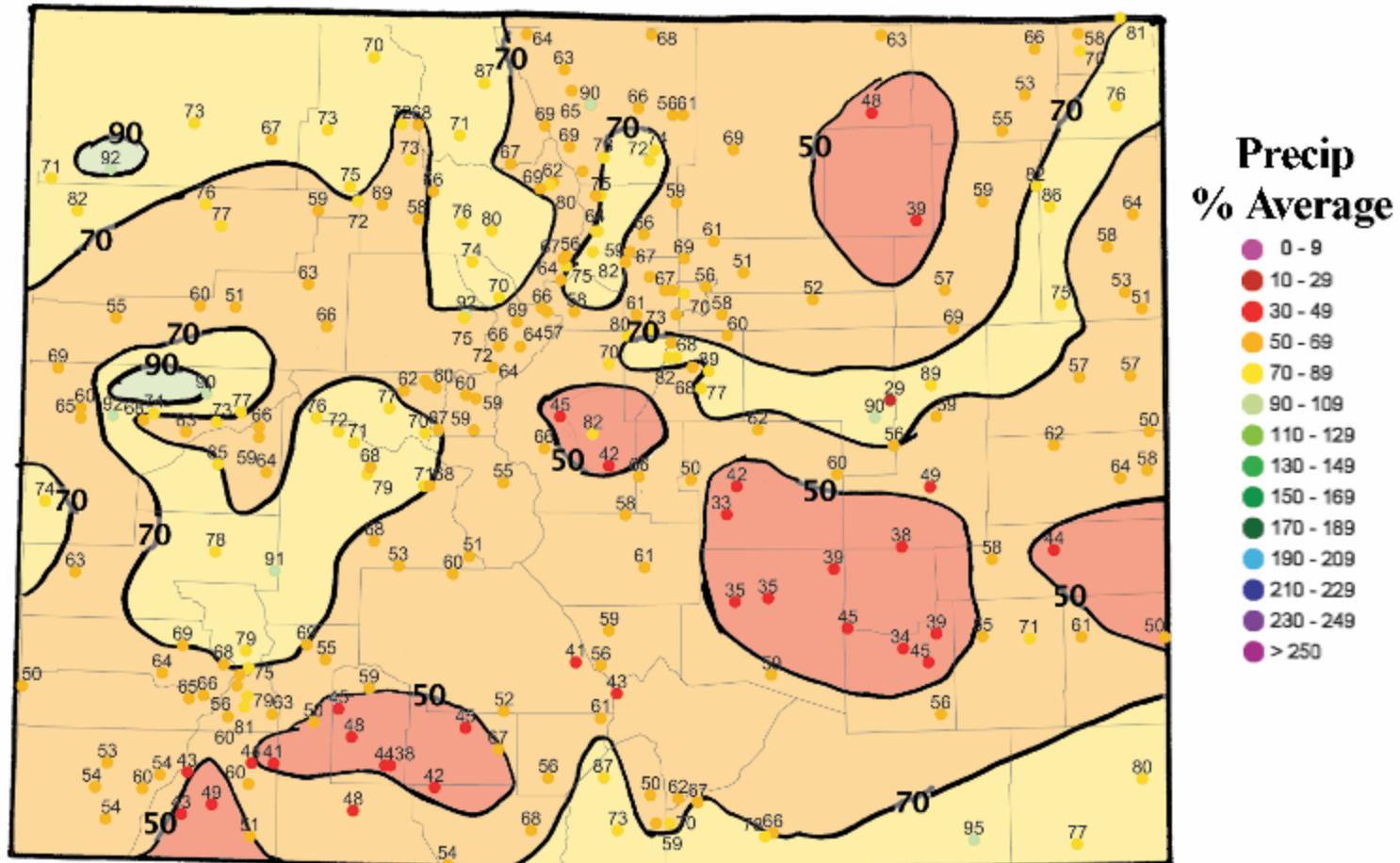


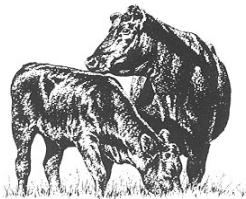
2002 Water Year Precipitation

Water Year 2002

(Oct. 2001 - Sept. 2002)

Precipitation Percent of Average for 1961-1990 Averages



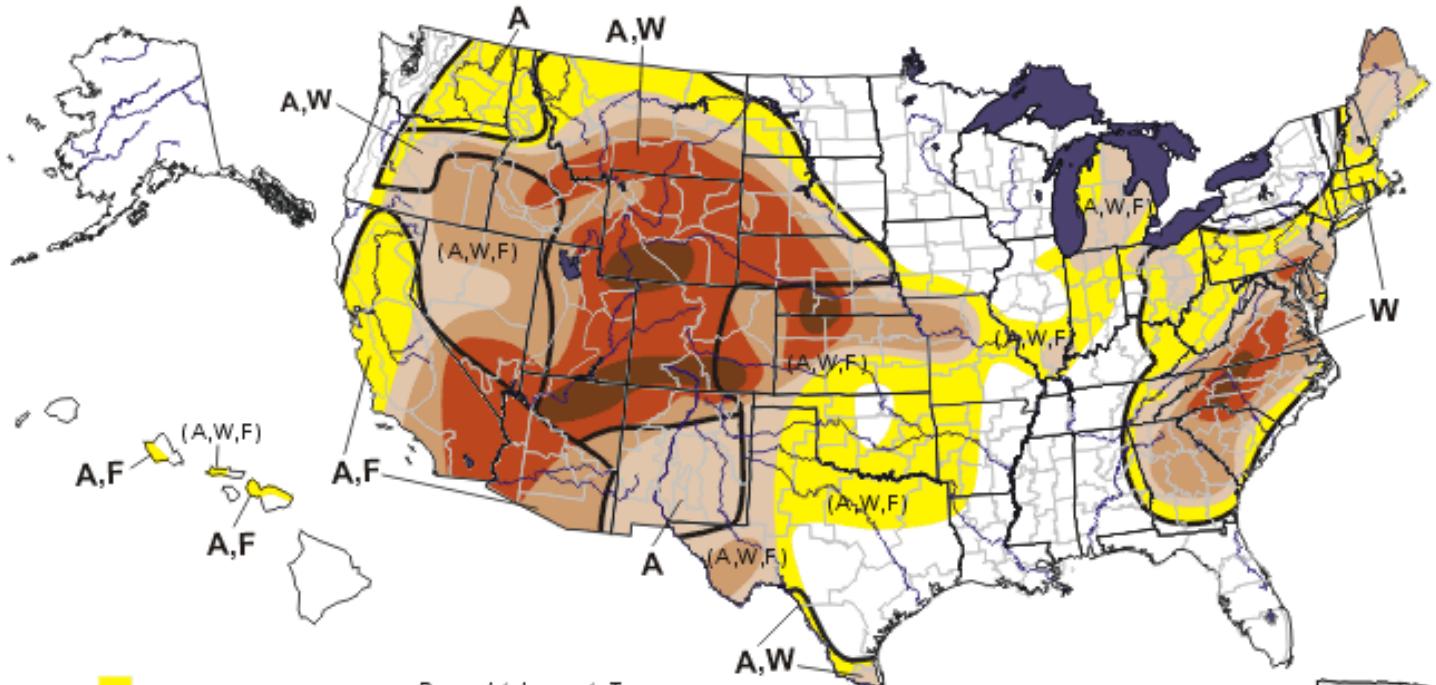


October 2002 Drought Monitor Map

U.S. Drought Monitor

October 1, 2002

Valid 8 a.m. EDT



- DO 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)

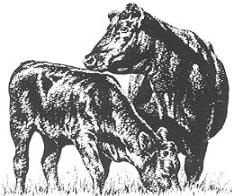
The Drought Monitor focuses on broad-scale conditions.
Local conditions may vary. See accompanying text summary
for forecast statements.

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



Released Thursday, October 3, 2002

Author: Rich Tinker, CPC/NCEP/NWS/NOAA

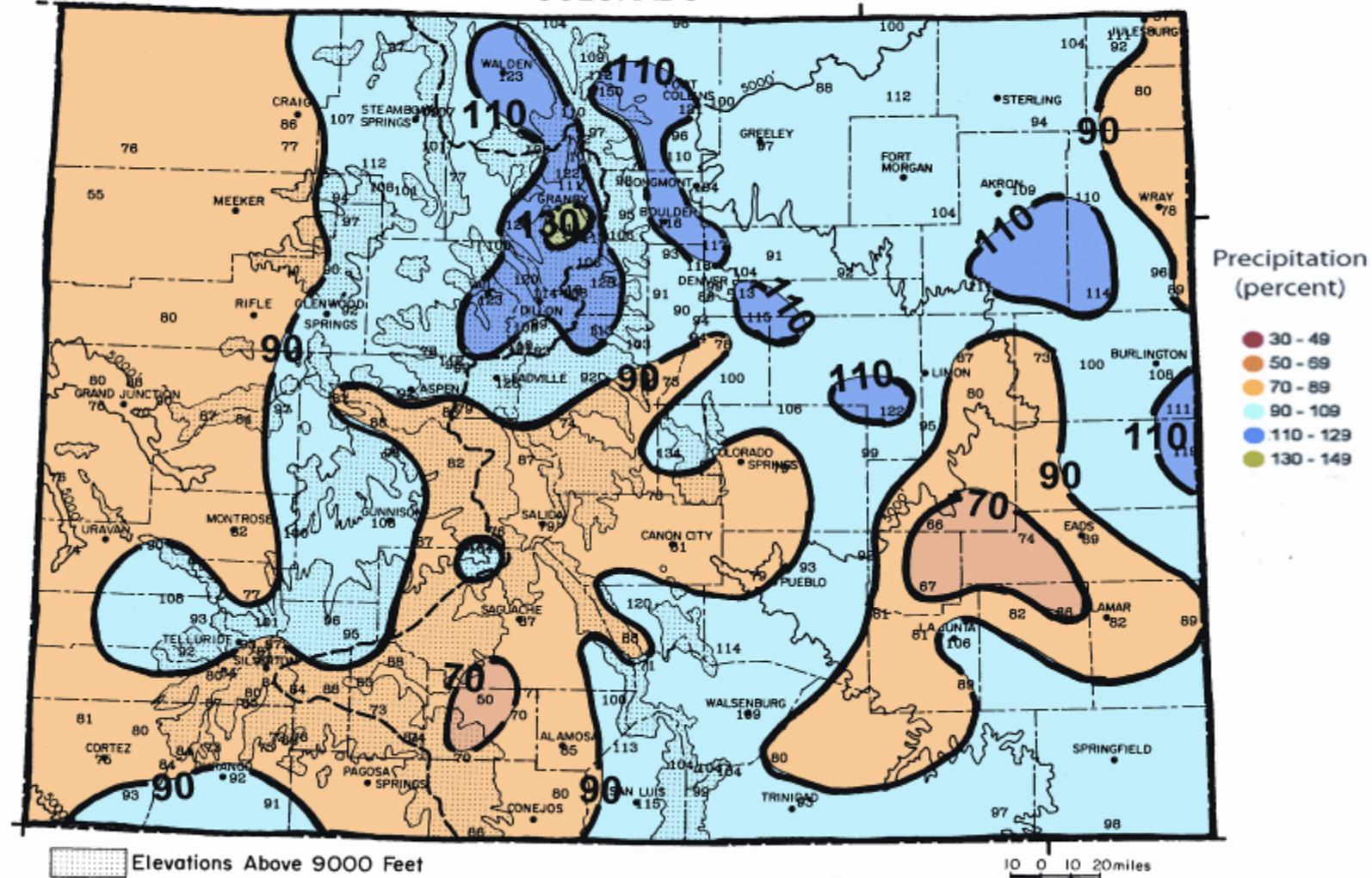


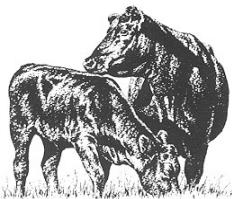
2003 Water Year Precipitation

Water Year 2003

October 2002 - September 2003 precipitation
as a percent of the 1971-2000 average.

COLORADO

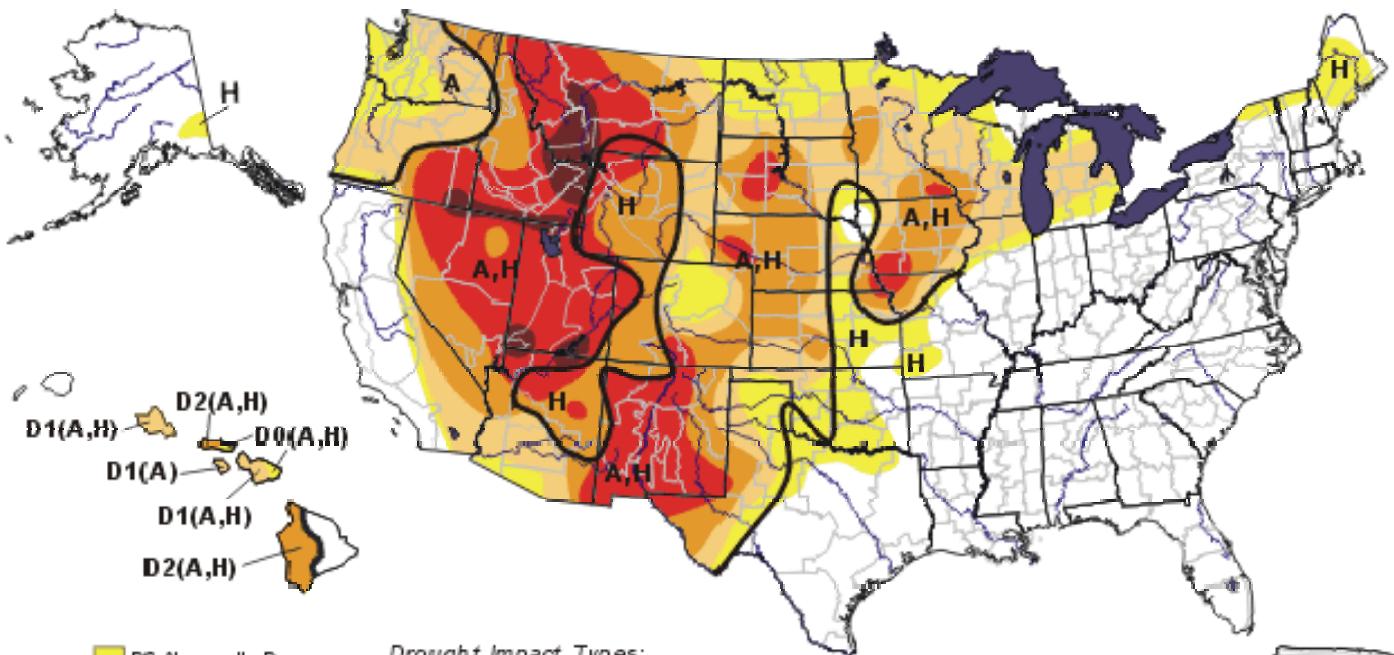




September 2003 Drought Monitor Map

U.S. Drought Monitor

September 30, 2003
Valid 8 a.m. EDT



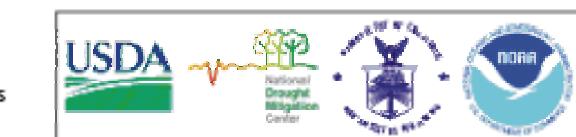
- D0 Abnormally Dry
- D1 Drought—Moderate
- D2 Drought—Severe
- D3 Drought—Extreme
- D4 Drought—Exceptional

Drought Impact Types:

- A= Agricultural (crops, pastures, grasslands)
H= Hydrological (water)
No type = both impacts
Delineates dominant 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>

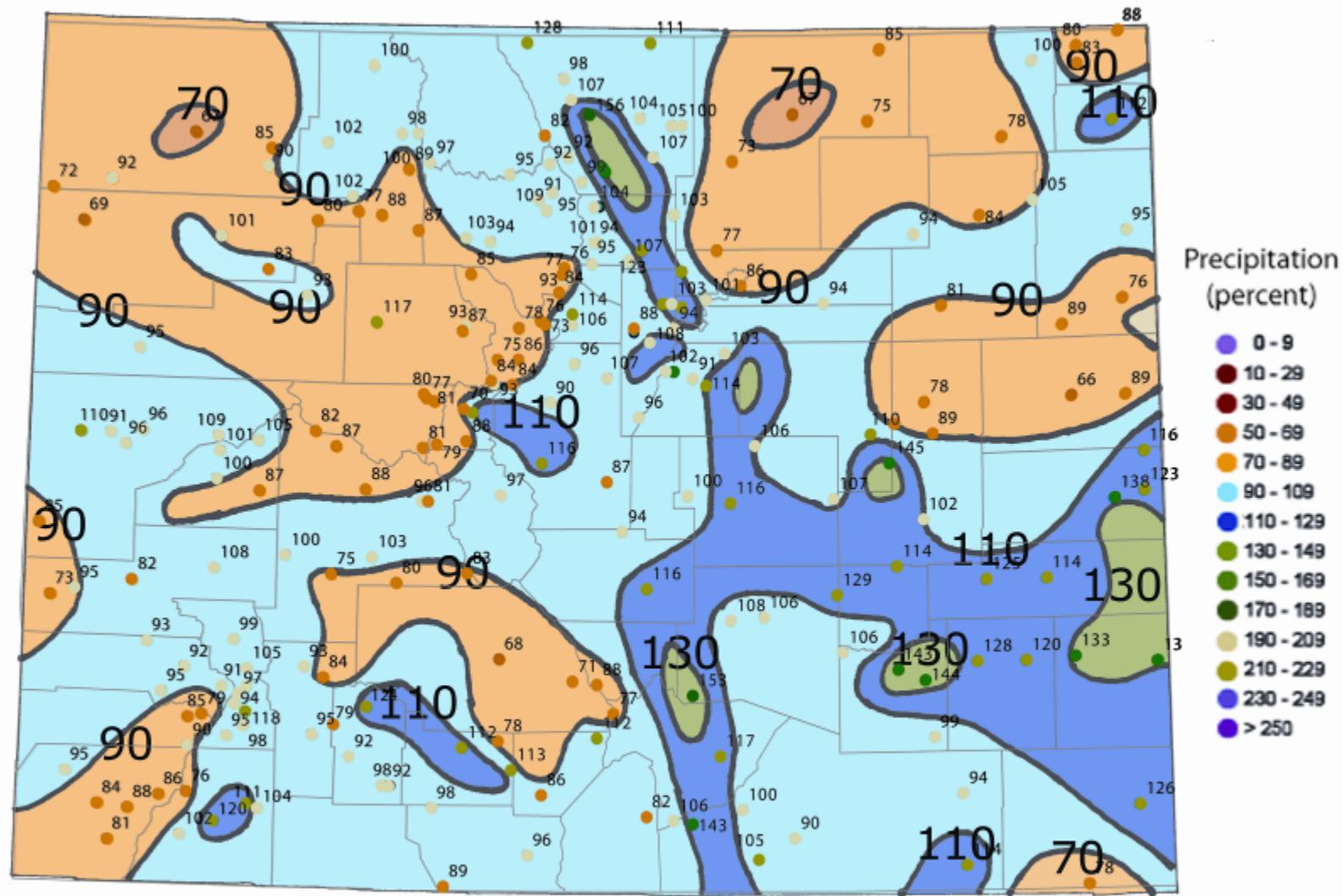


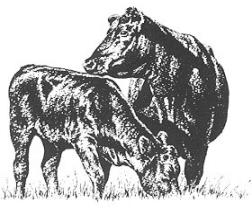
Released Thursday, October 2, 2003
Author: Candace Tankersley/Scott Stephens, NOAA/NCDC



2004 Water Year Precipitation

COLORADO

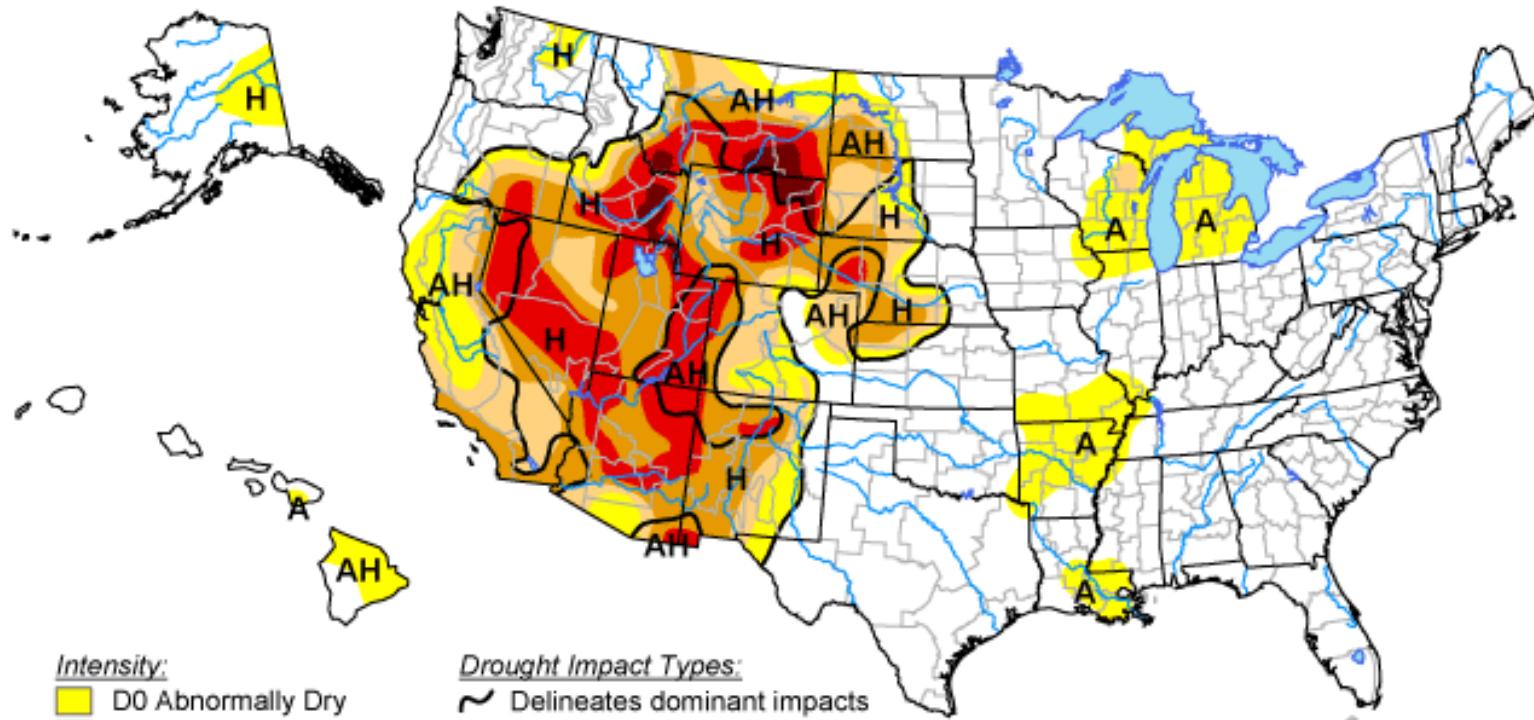




September 2004 Drought Monitor Map

U.S. Drought Monitor

September 28, 2004
Valid 8 a.m. EDT



Intensity:

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

Drought Impact Types:

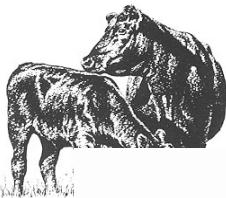
- ~ Delineates dominant impacts
- A = Agricultural (crops, pastures, grasslands)
- H = Hydrological (water)
(No type = Both impacts)

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

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

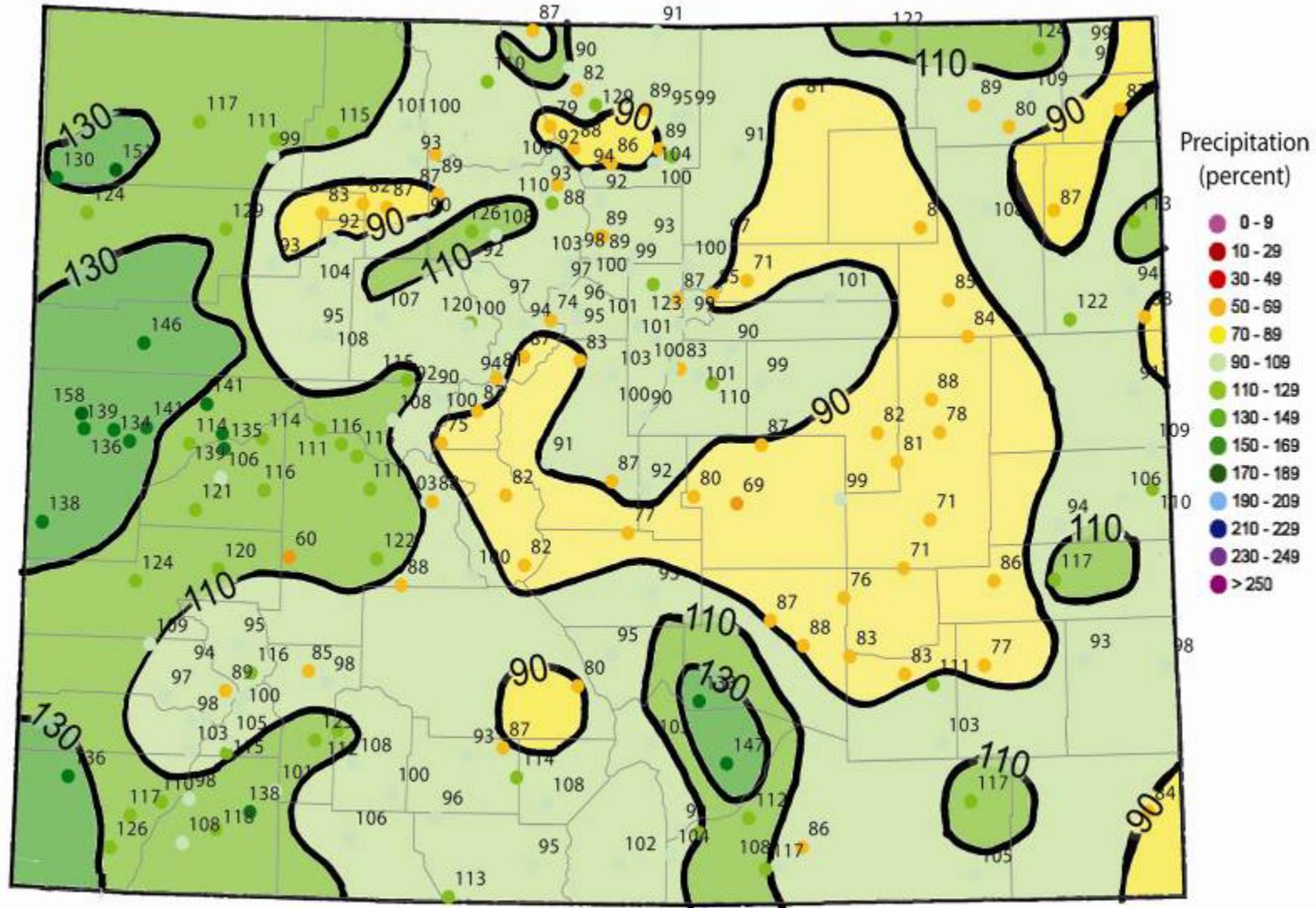


Released Thursday, September 30, 2004
Author: Brad Rippey, U.S. Department of Agriculture

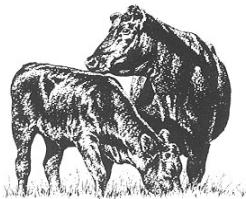


2005 Water Year Precipitation

COLORADO



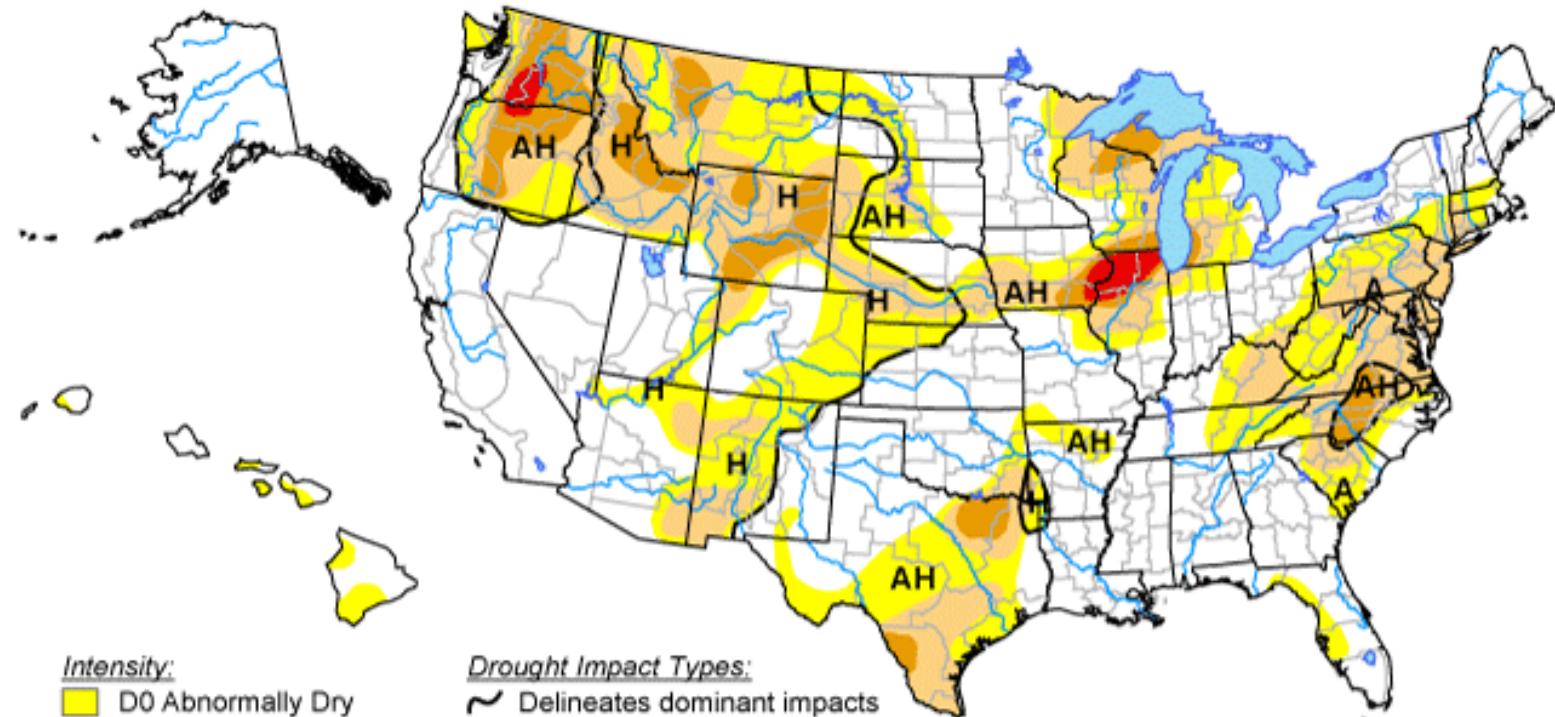
Water Year 2005 (Oct 04 - Sep 05) precipitation as a percent of the 1971-2000 average.



October 2005 Drought Monitor Map

U.S. Drought Monitor

October 4, 2005
Valid 8 a.m. EDT



Intensity:

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

Drought Impact Types:

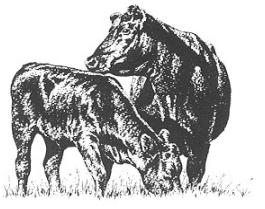
- ~ Delineates dominant impacts
- A = Agricultural (crops, pastures, grasslands)
- H = Hydrological (water)
- (No type = Both impacts)

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

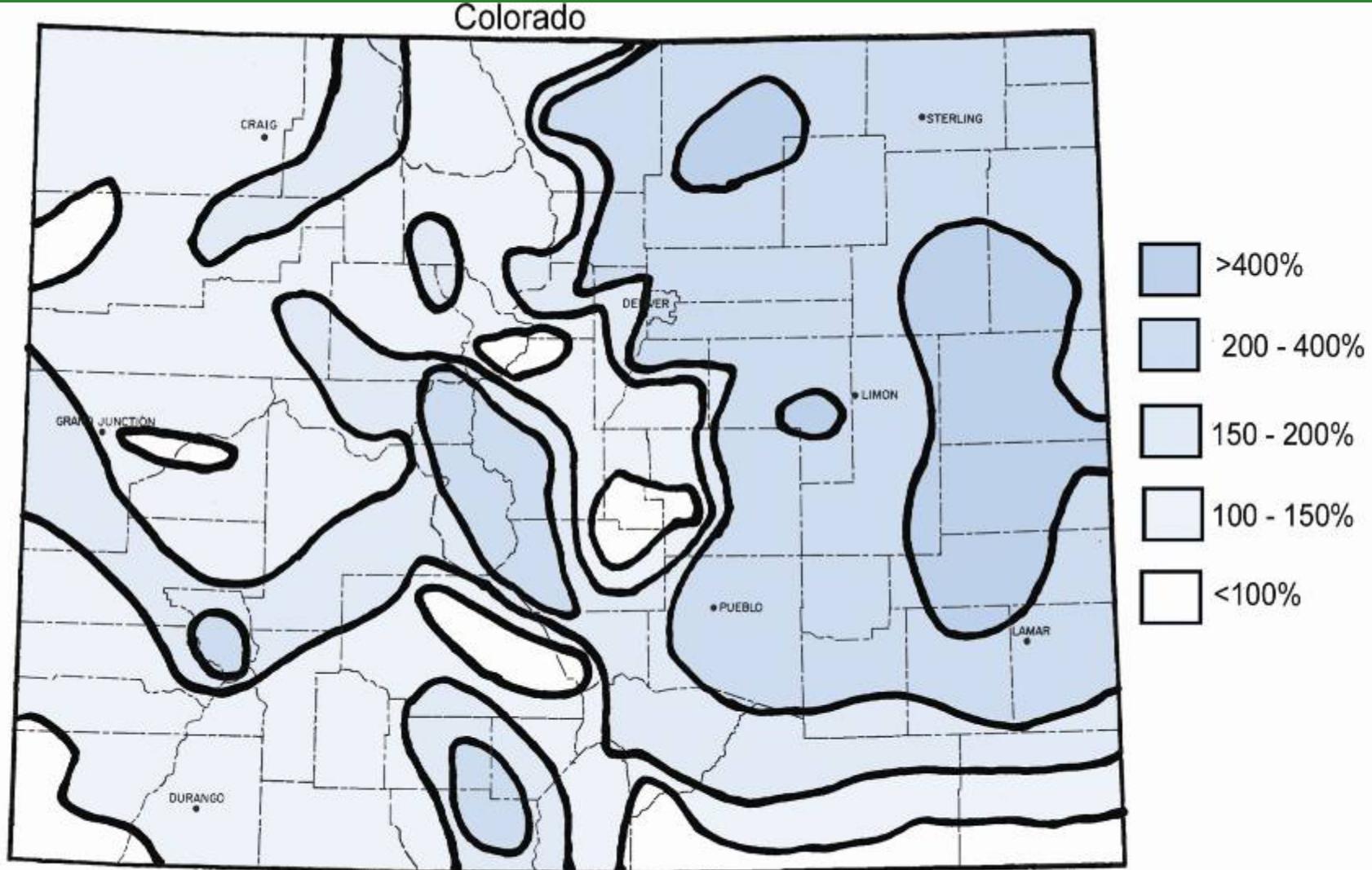
<http://drought.unl.edu/dm>



Released Thursday, October 6, 2005
Author: RichTinker, CPC/NCEP/NWS/NOAA



Oct 2005 map of precipitation as percent of average



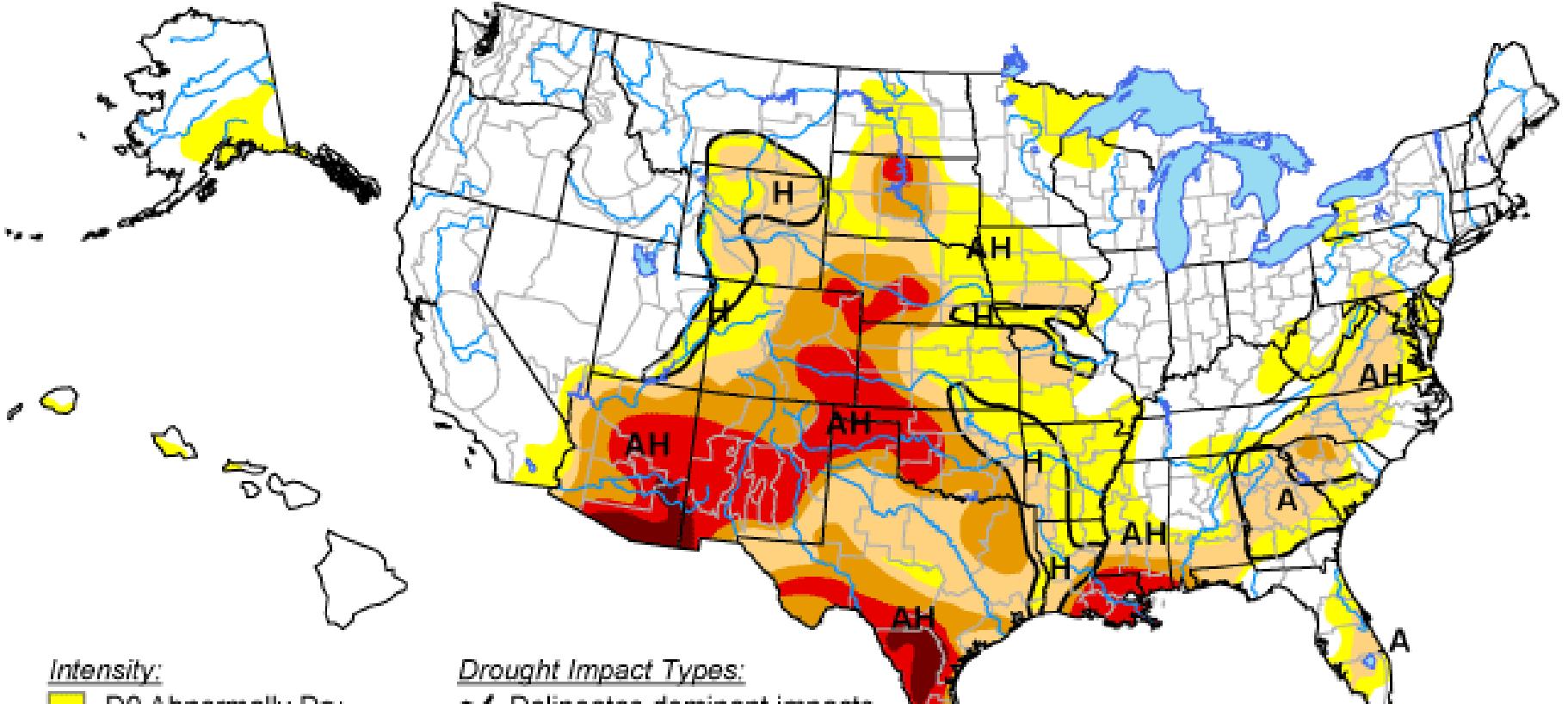
October 2005 precipitation as a percent of the 1971 - 2000 average.

What's the Status of Drought Now??



U.S. Drought Monitor

June 13, 2006
Valid 8 a.m. EDT



Intensity:

- [Yellow square] D0 Abnormally Dry
- [Light Orange square] D1 Drought - Moderate
- [Medium Orange square] D2 Drought - Severe
- [Red square] D3 Drought - Extreme
- [Dark Red square] D4 Drought - Exceptional

Drought Impact Types:

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

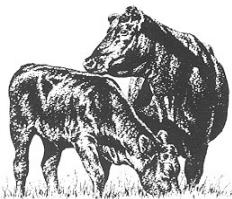
The Drought Monitor focuses on broad-scale conditions.
Local conditions may vary. See accompanying text summary
for forecast statements.

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



Released Thursday, June 15, 2006

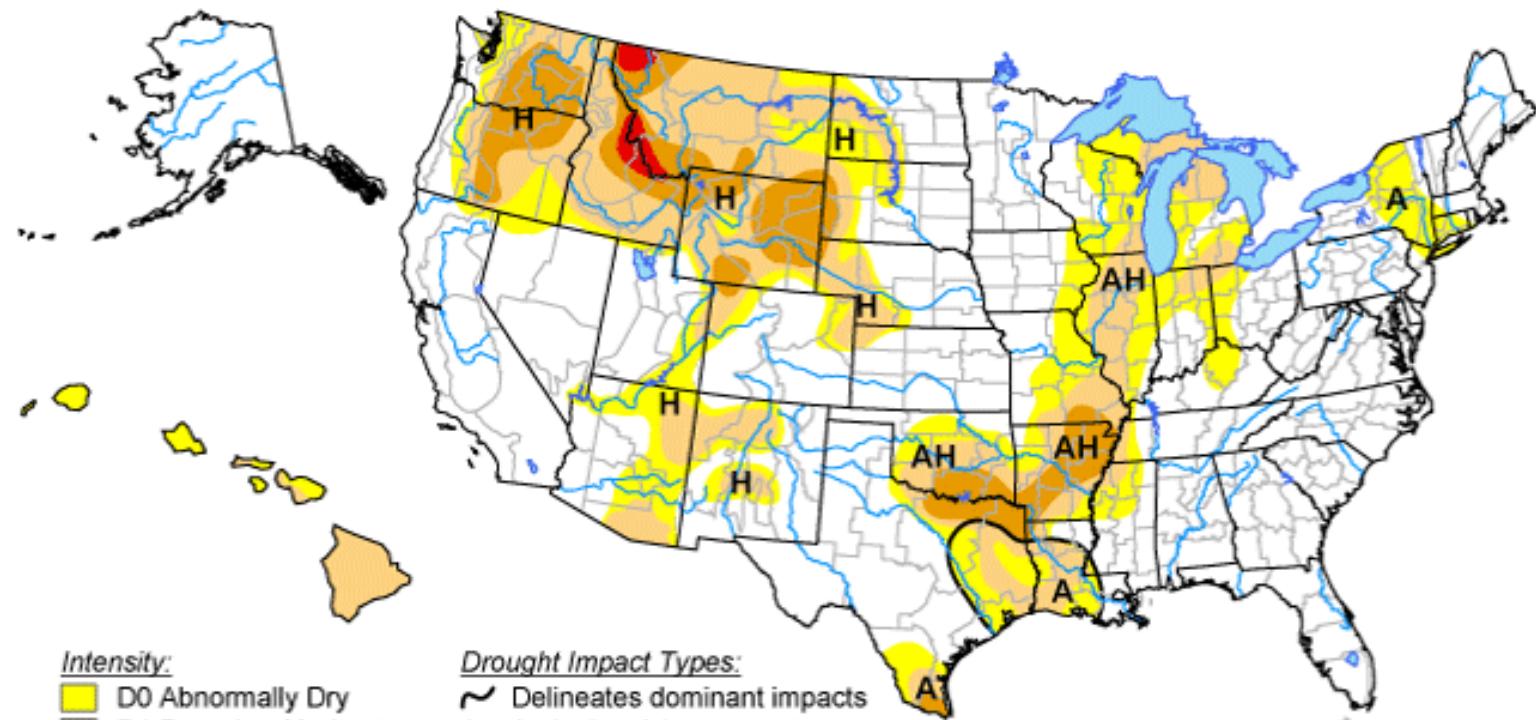
Author: Rich Tinker, Climate Prediction Center, NOAA



We've gone down hill since this time last year

U.S. Drought Monitor

June 14, 2005
Valid 8 a.m. EDT

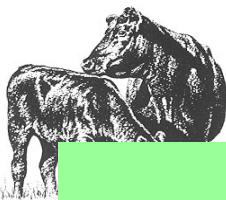


The Drought Monitor focuses on broad-scale conditions.
Local conditions may vary. See accompanying text summary
for forecast statements.

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



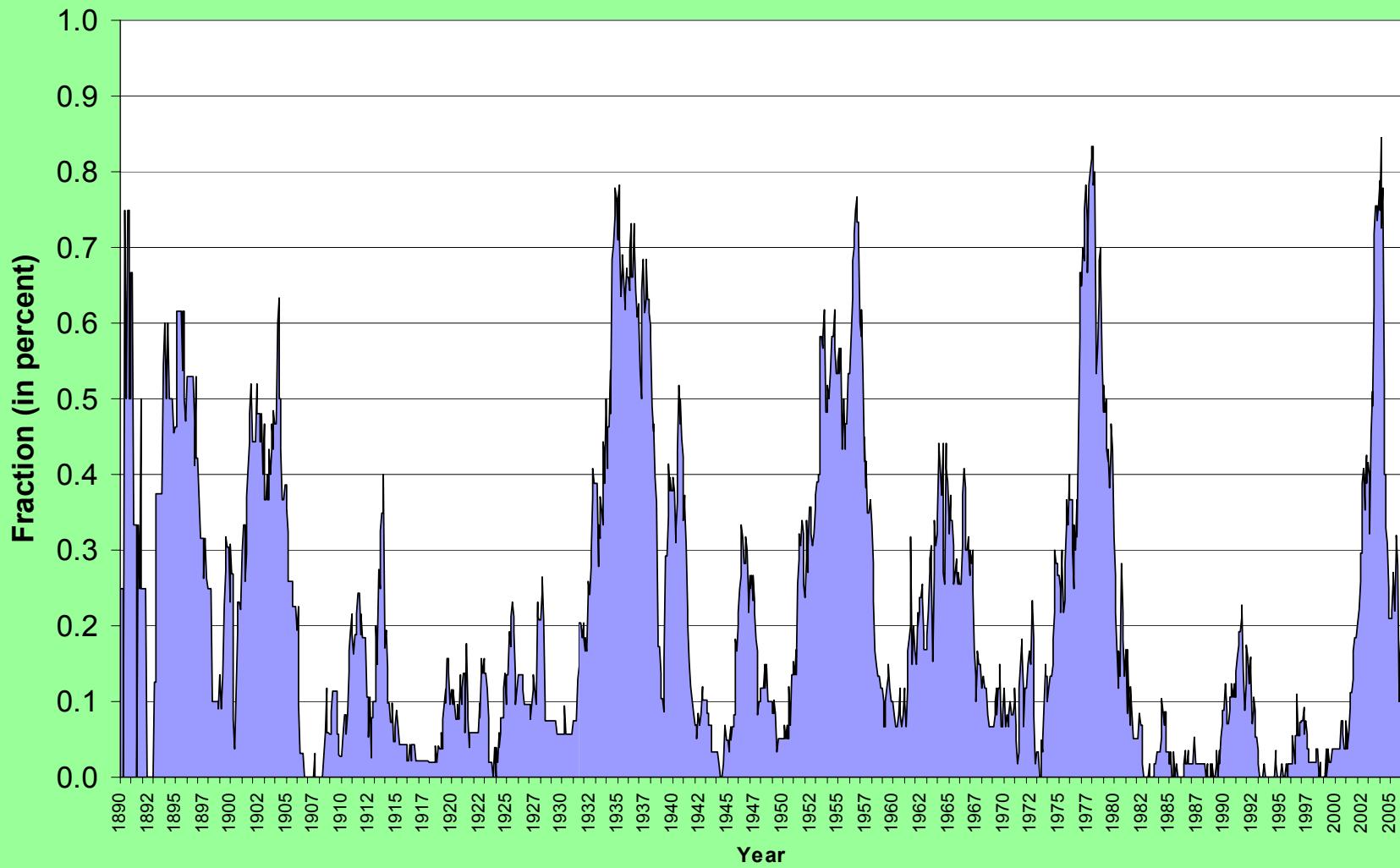
Released Thursday, June 16, 2005
Author: Michael Hayes, NDMC



48-Month SPI

Fraction of Colorado in Drought Based on 48 month SPI

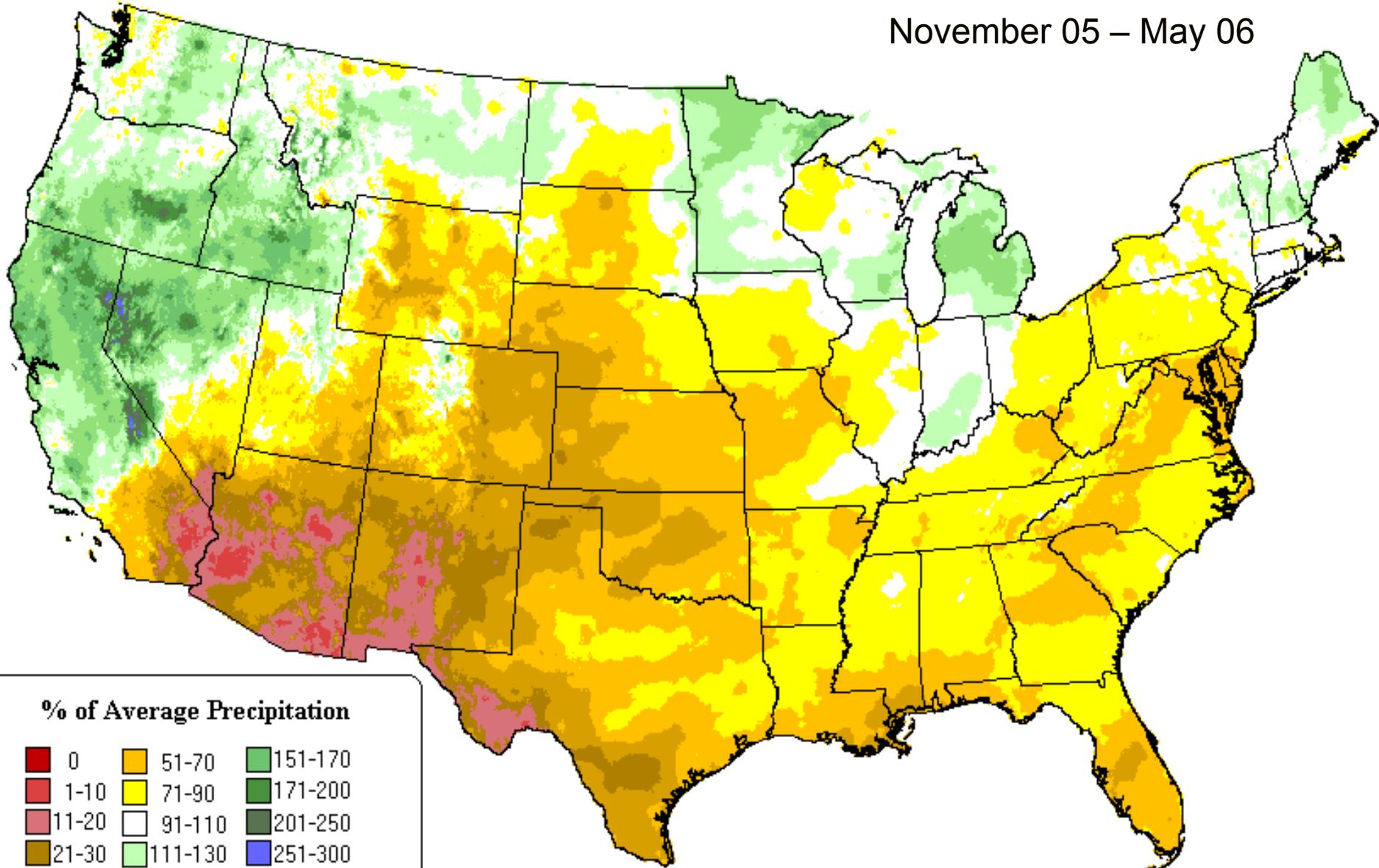
(1890 - April 2006)



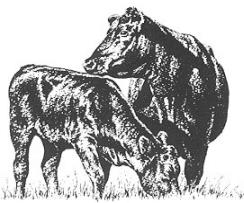
7-month Percent of Average Precipitation: May 2006

Provisional Data

November 05 – May 06

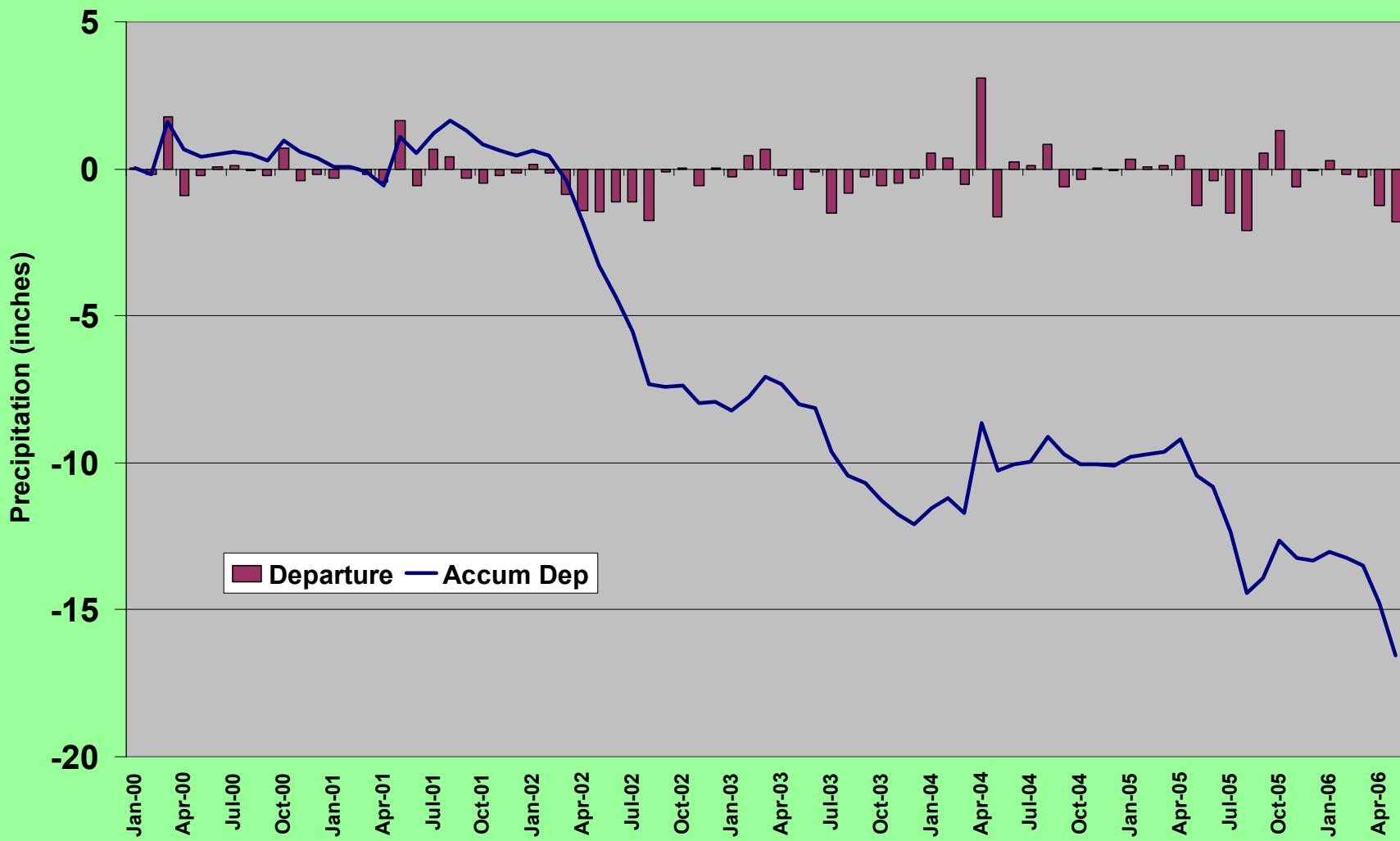


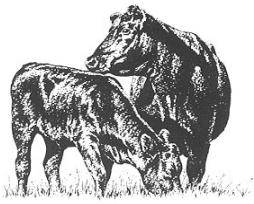
Copyright (c) 2006, Spatial Climate Analysis Service, Oregon State University
<http://www.ocs.oregonstate.edu/prism> – Map created Jun 07 2006



Pueblo Reservoir Precipitation Deficits

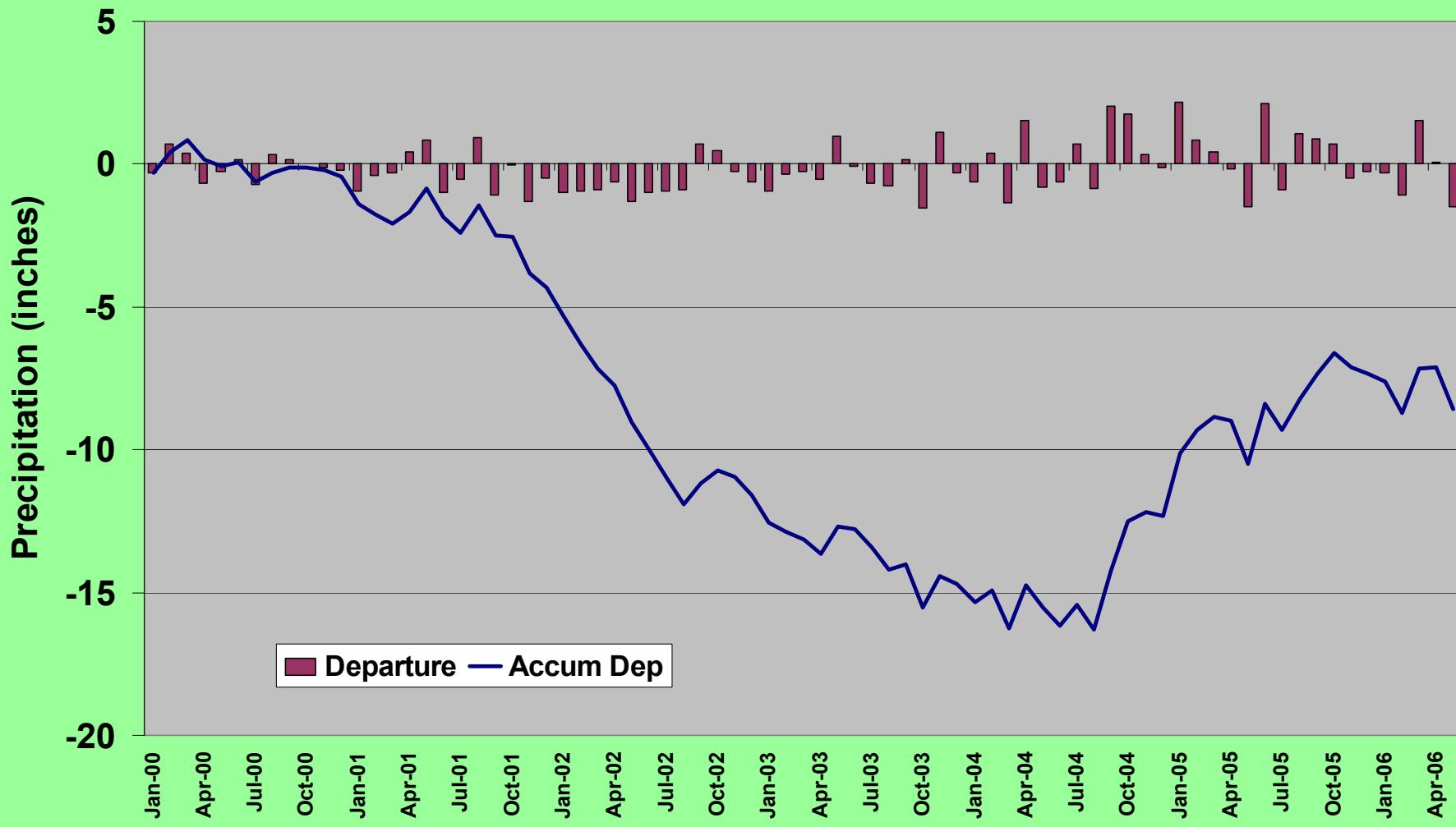
Pueblo Reservoir Precipitation Deficits

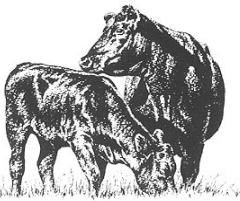




Altenbern Precipitation Deficits

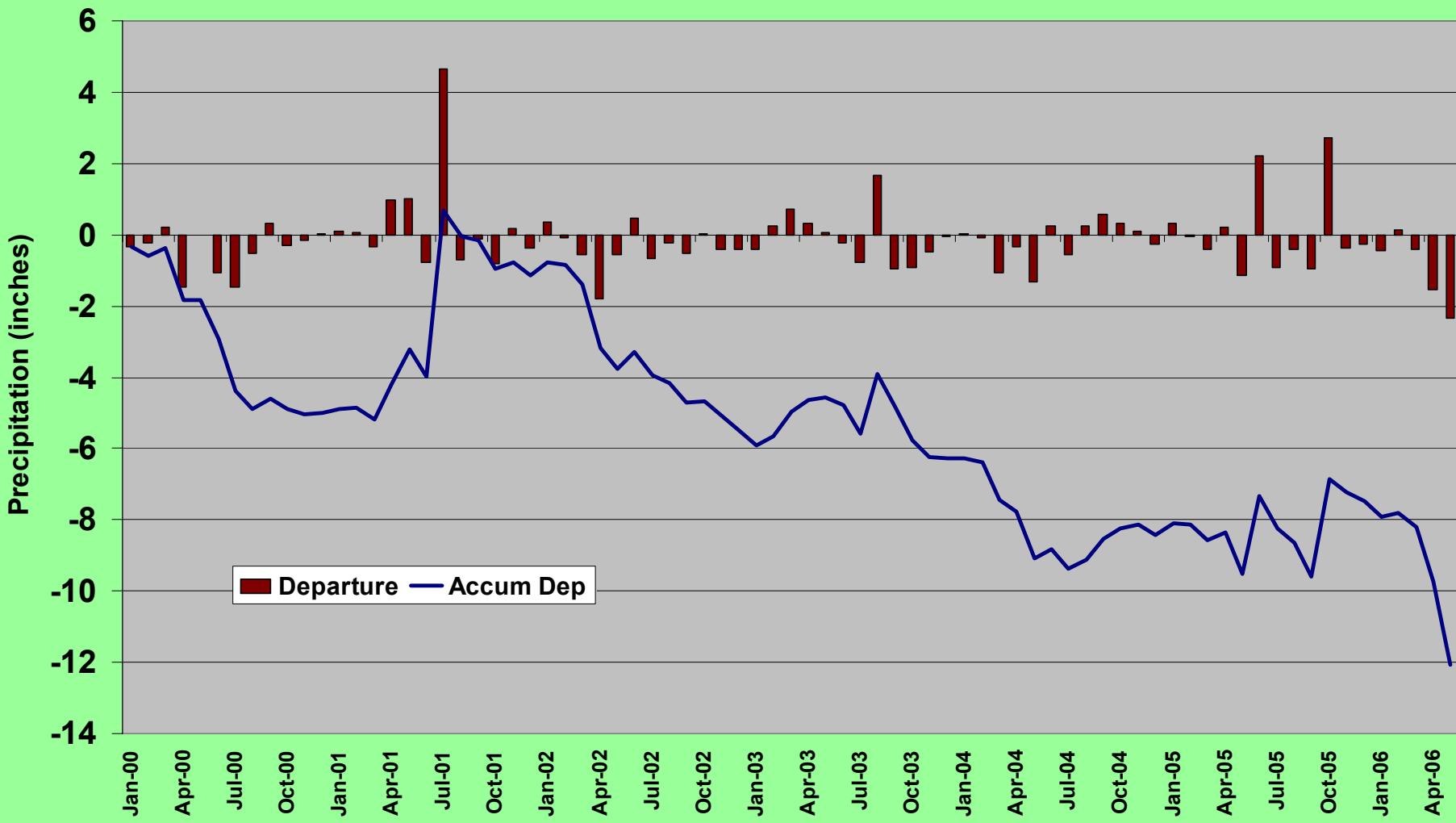
Altenbern Precipitation Deficits





Greeley Precipitation Deficits

Greeley Precipitation Deficits



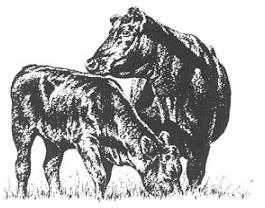


What Comes Next?

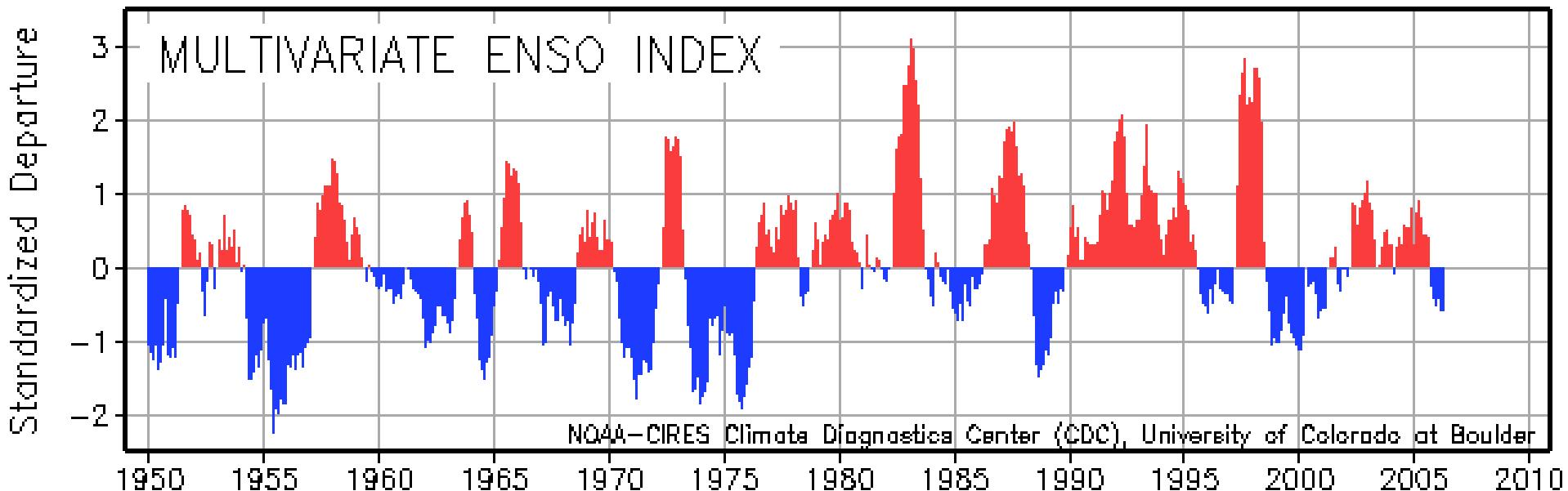
Drought or Flood?



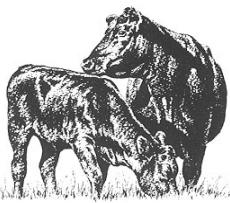
Which Will It Be?



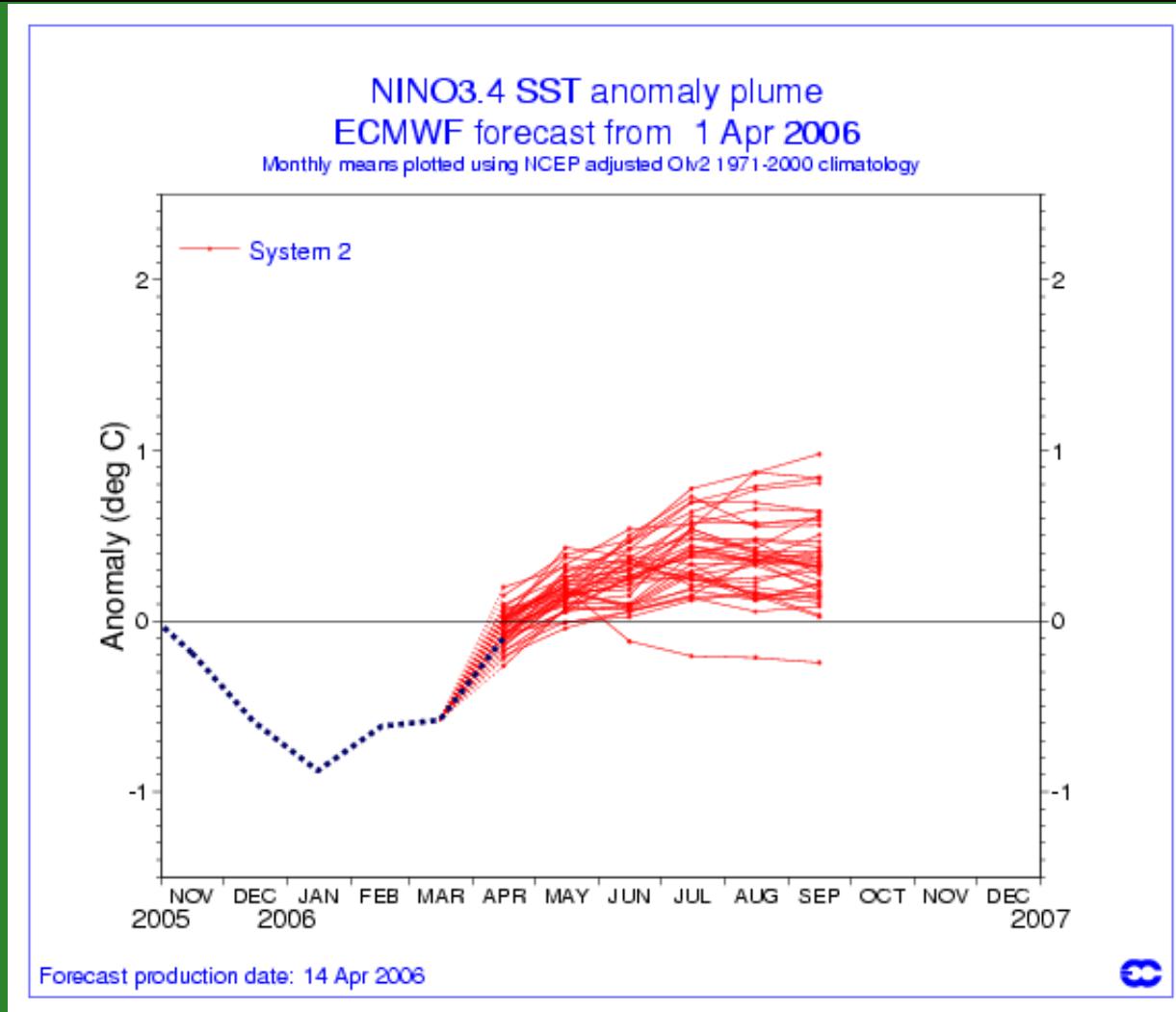
Multivariate ENSO Index (MEI)

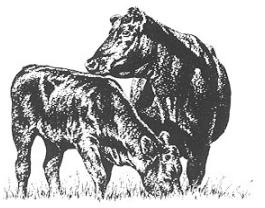


Last update: June 9, 2006

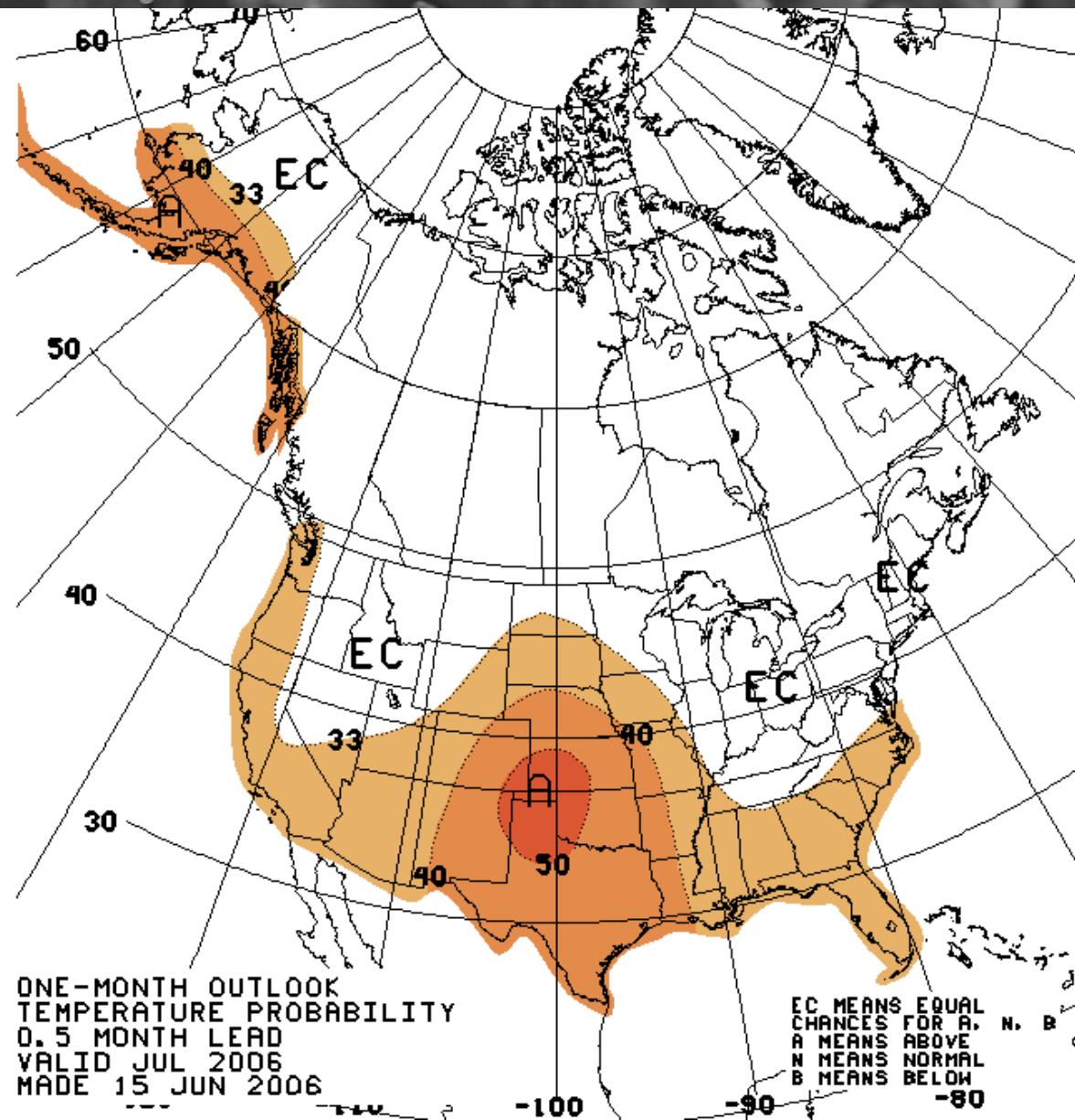


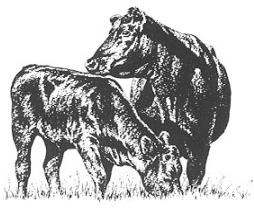
El Nino Forecast



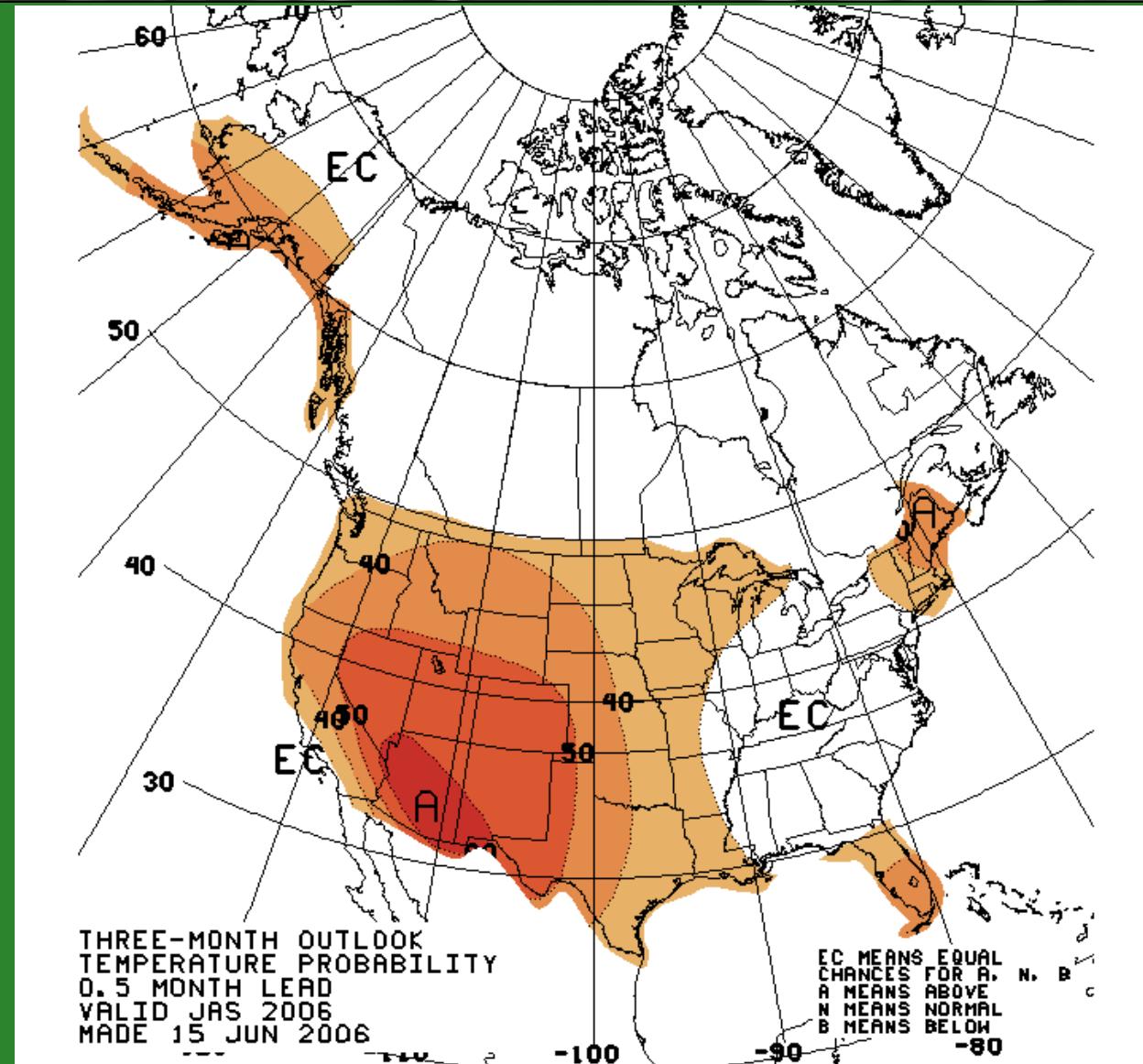


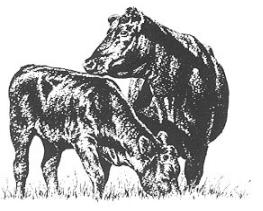
Temperature July 2006



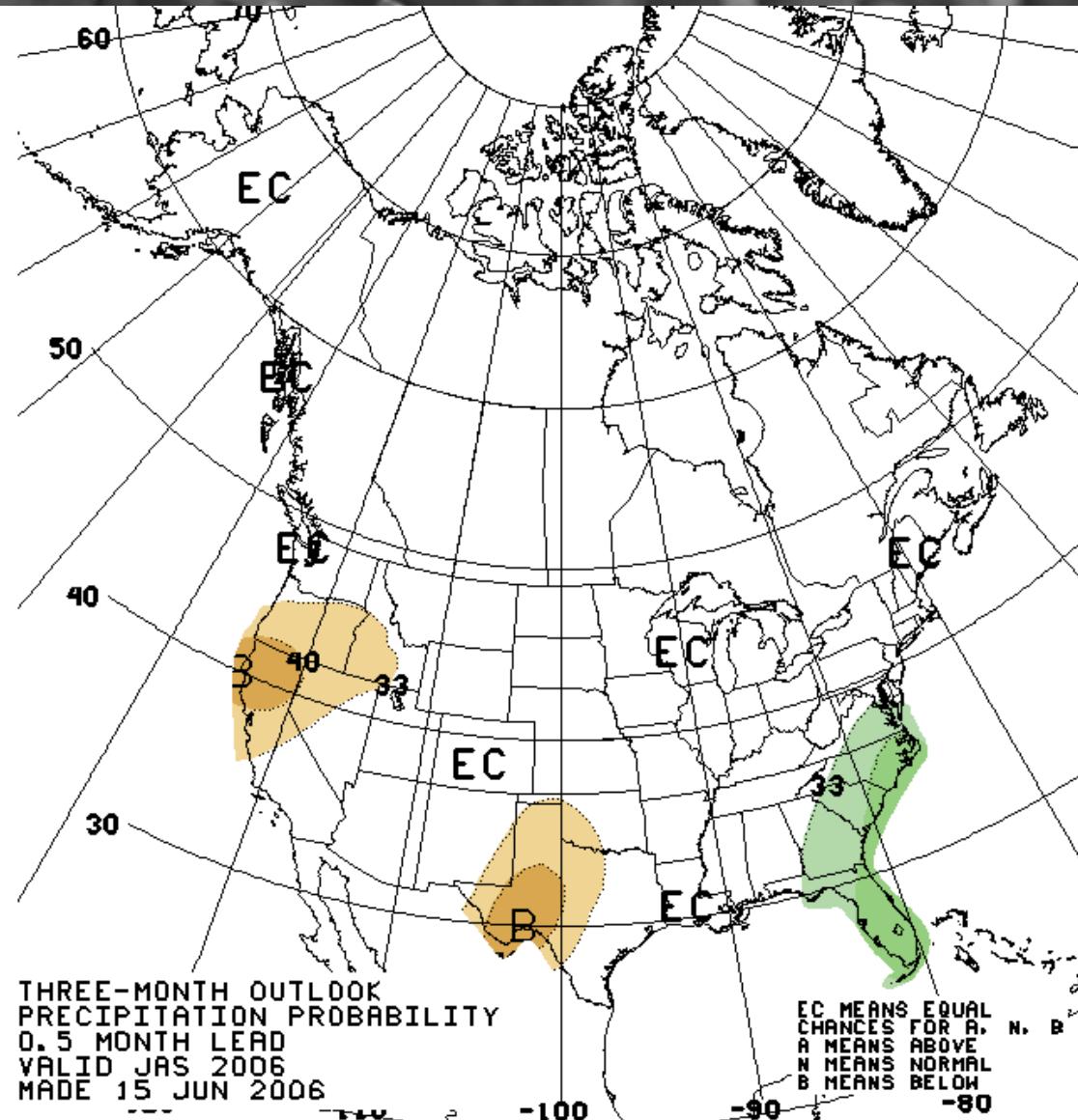


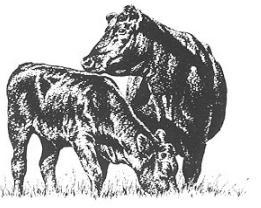
Temperature Jul-Sep 2006



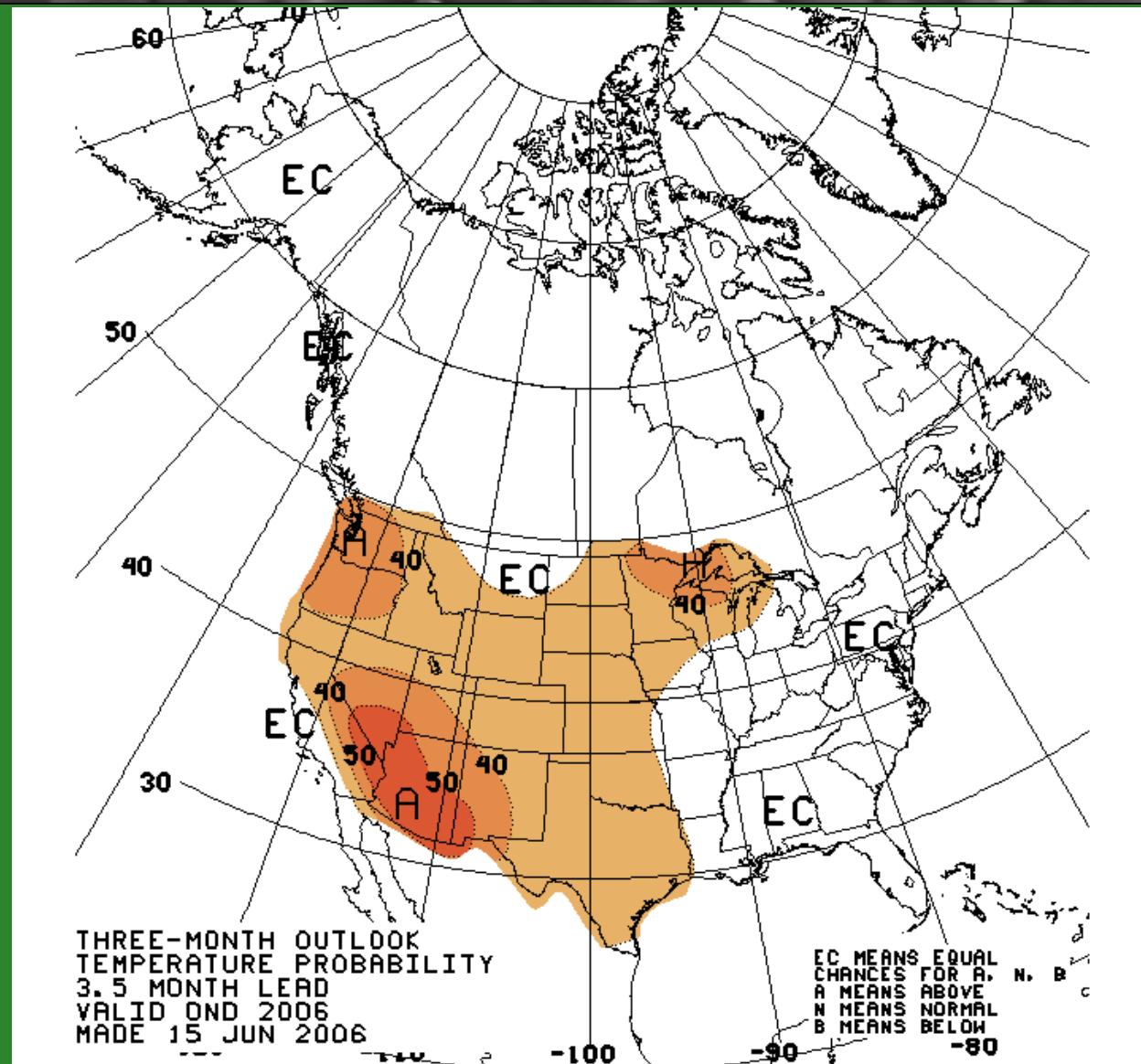


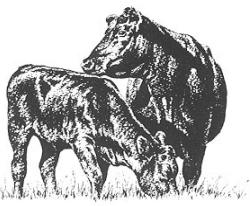
Precipitation Jul-Sep 2006



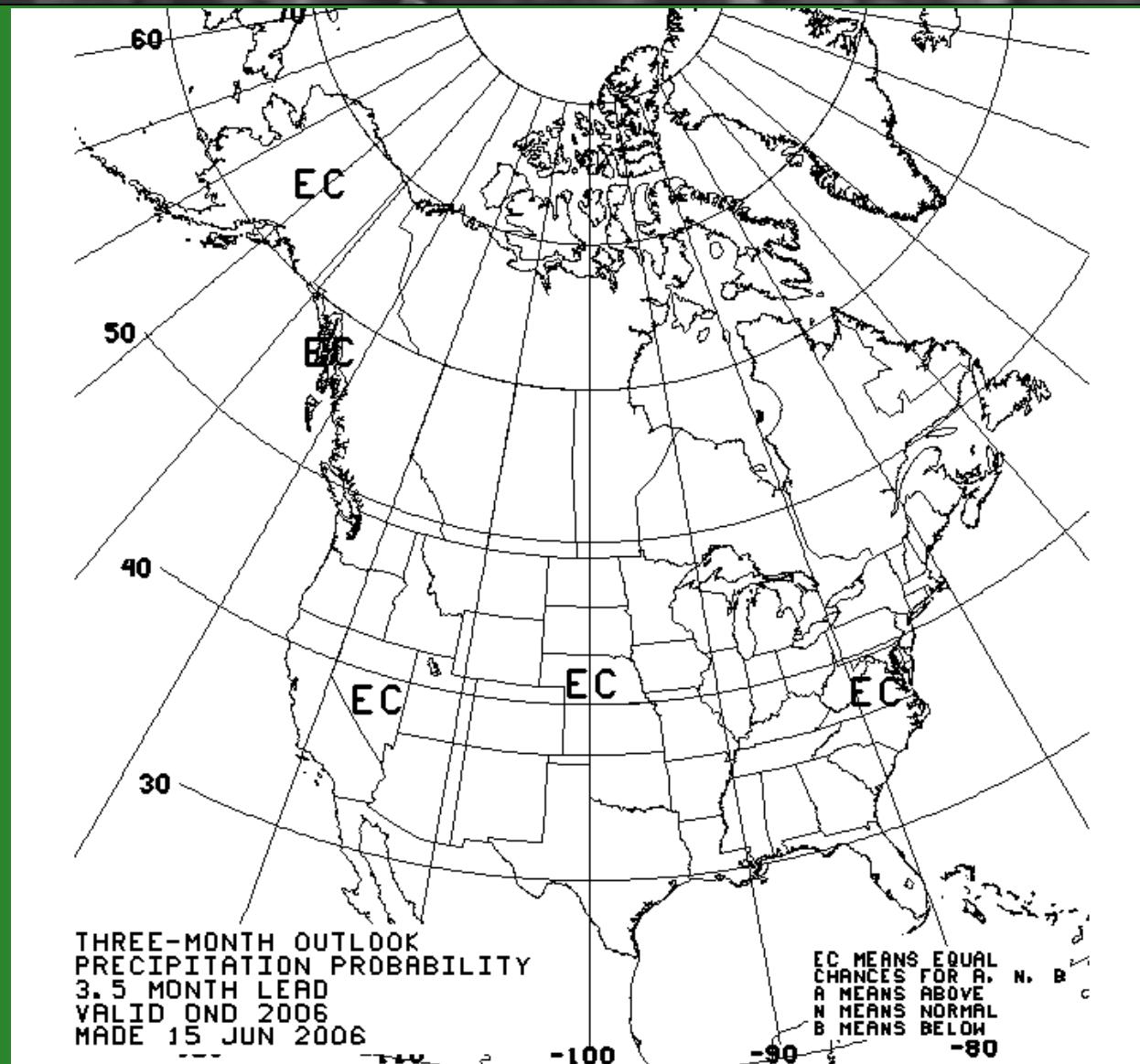


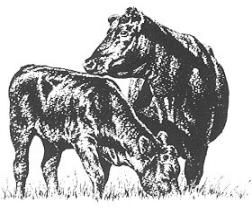
Temperature Oct-Dec 2006



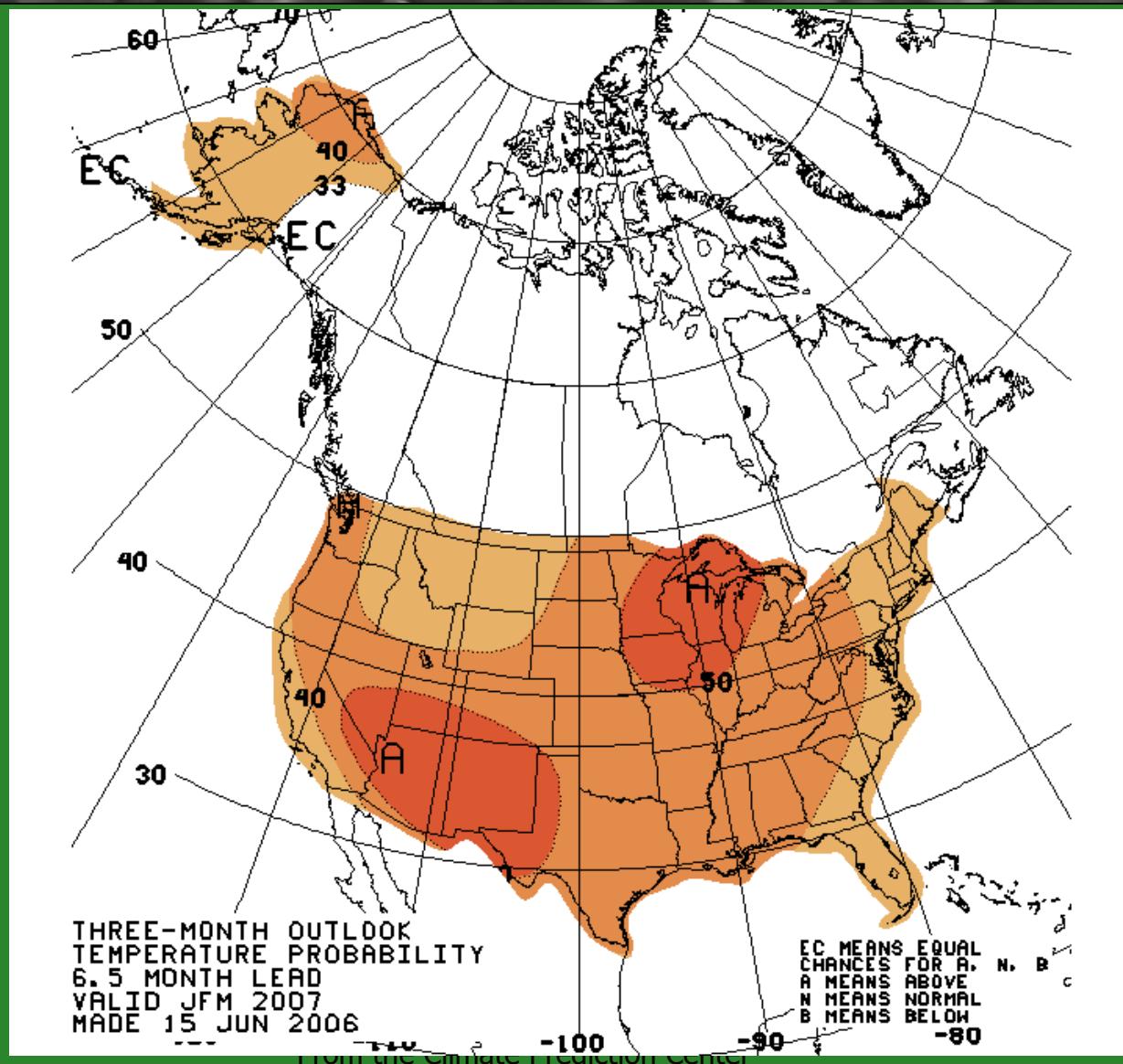


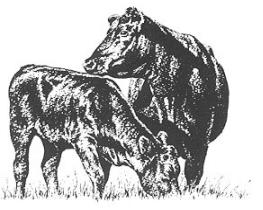
Precipitation Oct-Dec 2006



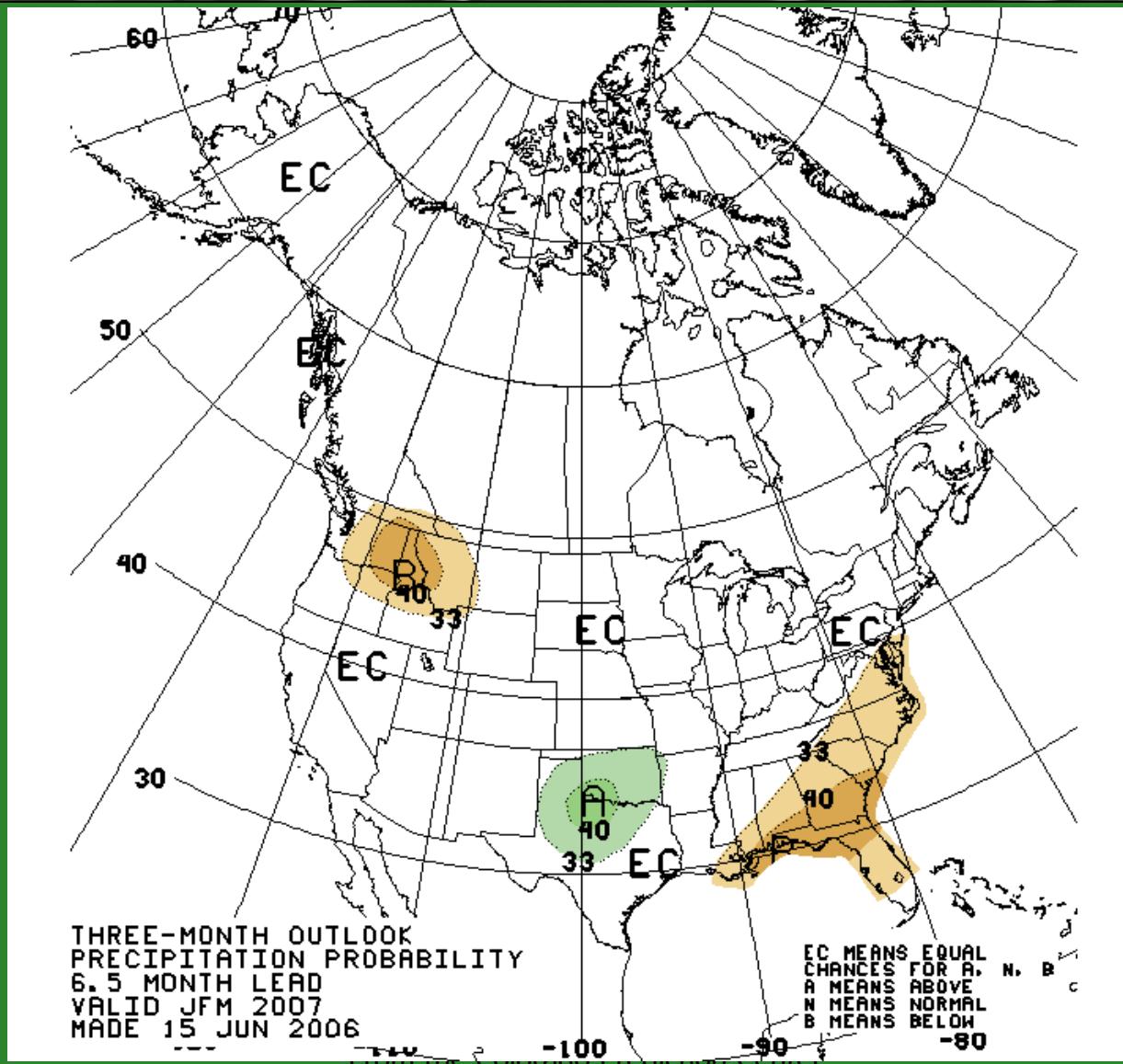


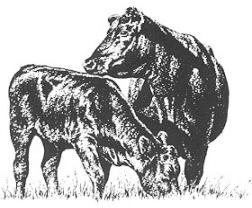
Temperature Jan-Mar 2007





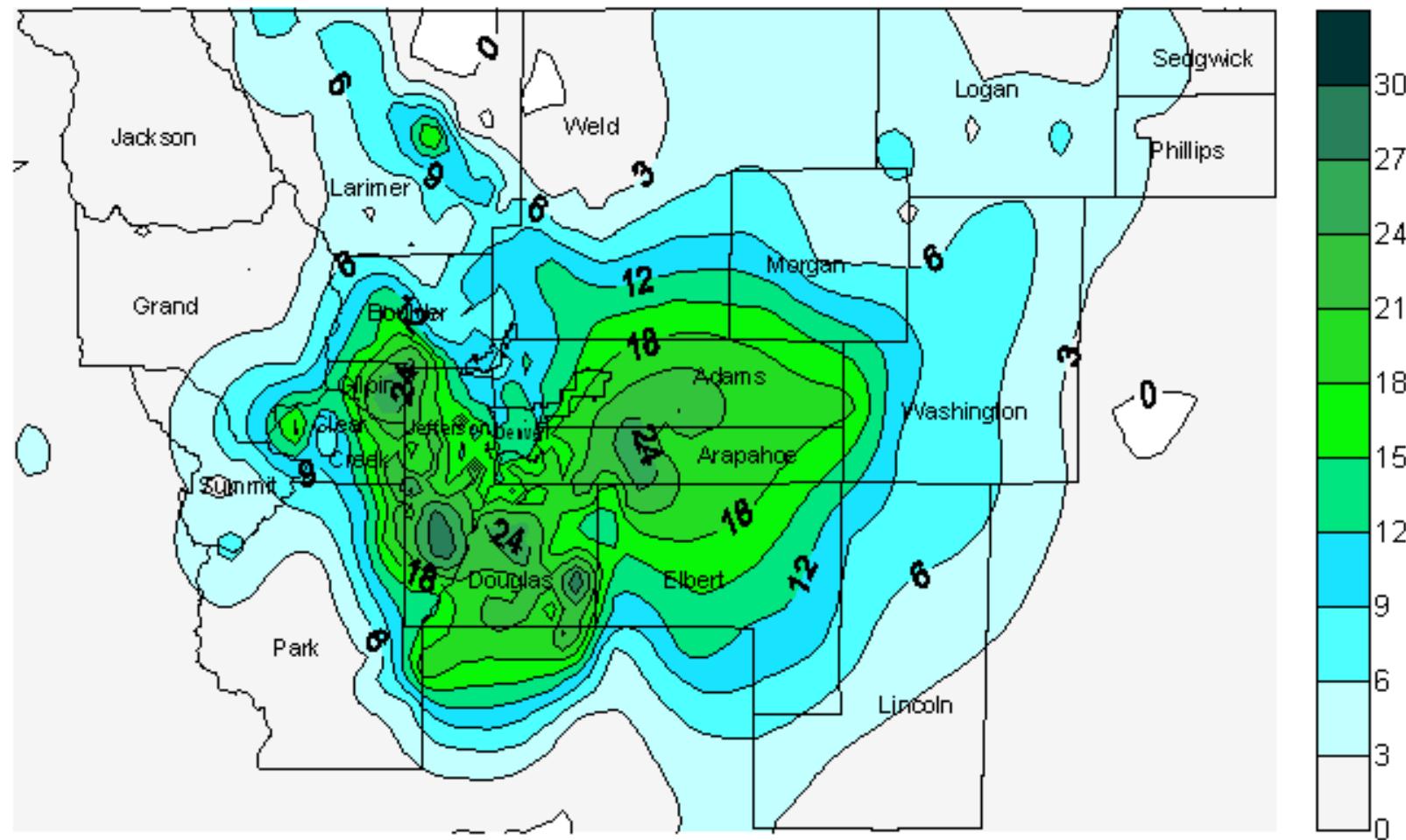
Precipitation Jan-Mar 2007



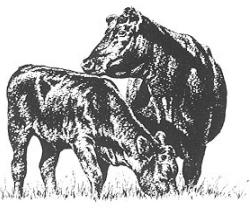


If we can't predict it, at least we can track it!

April 10-11, 2005 Storm Total Snowfall



Data Courtesy of CoCoRahs and NWS COOP, CAST, and volunteer observers

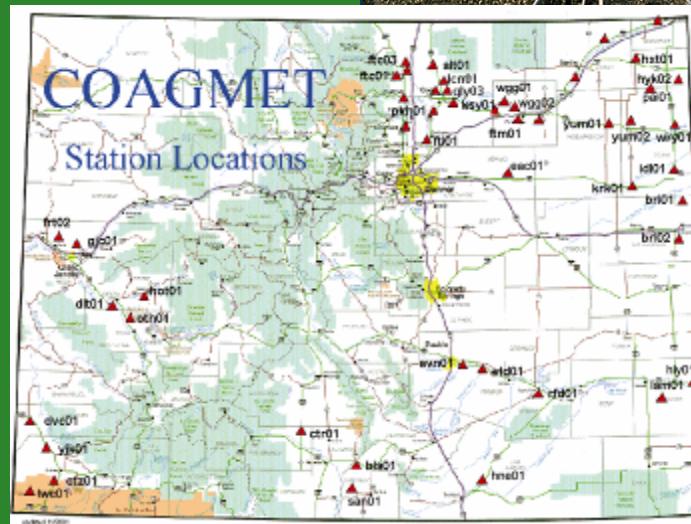


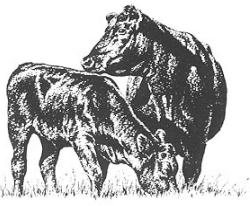
CoAgMet

Weather Data for Agriculture

<http://www.coagmet.com>

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

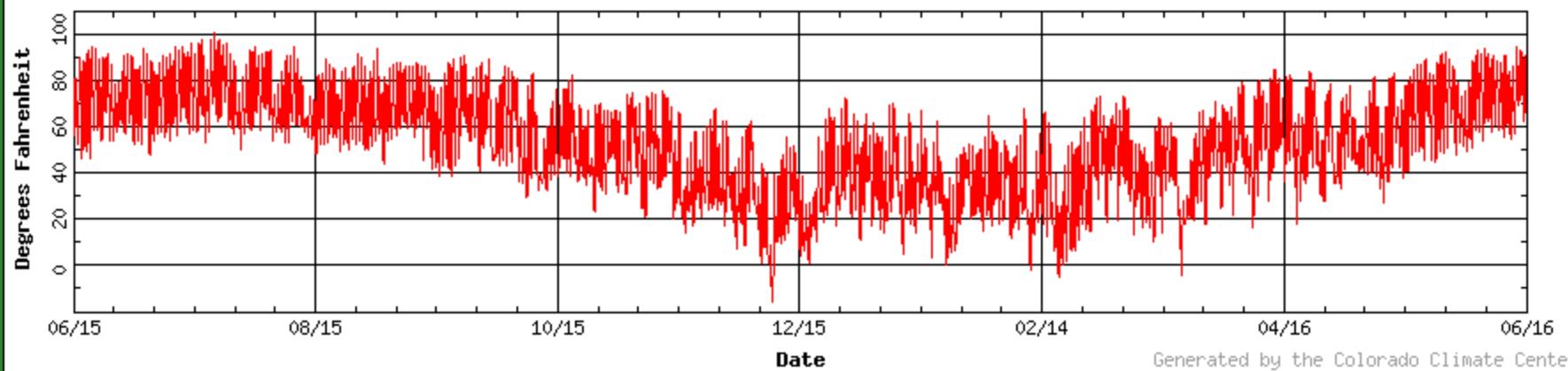




CoAgMet Temperatures

Hoehne, CO

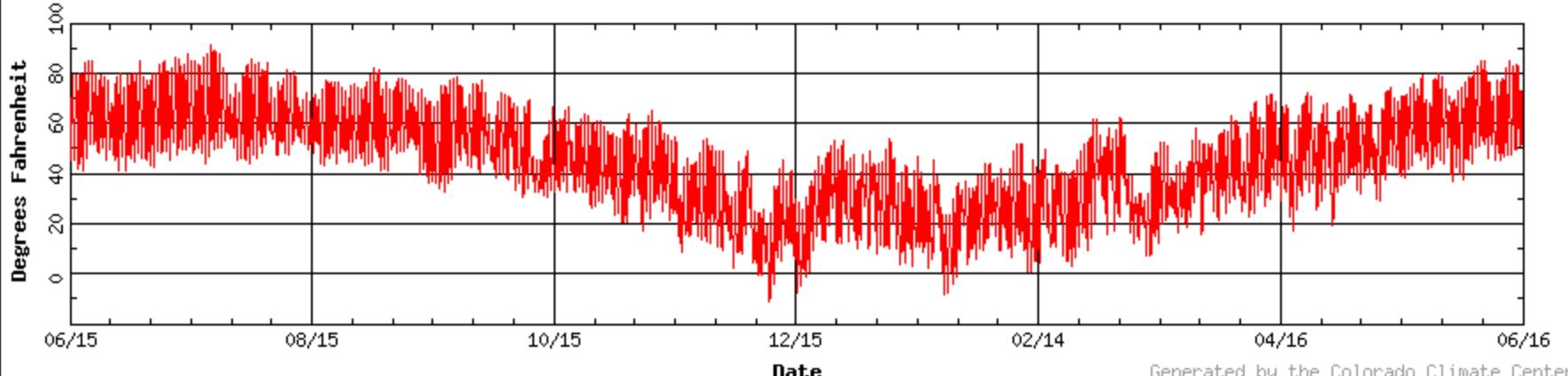
Temperature for HNE01 (06-15-2005 - 06-16-2006)



Generated by the Colorado Climate Center

Center, CO

Temperature for CTR01 (06-15-2005 - 06-16-2006)



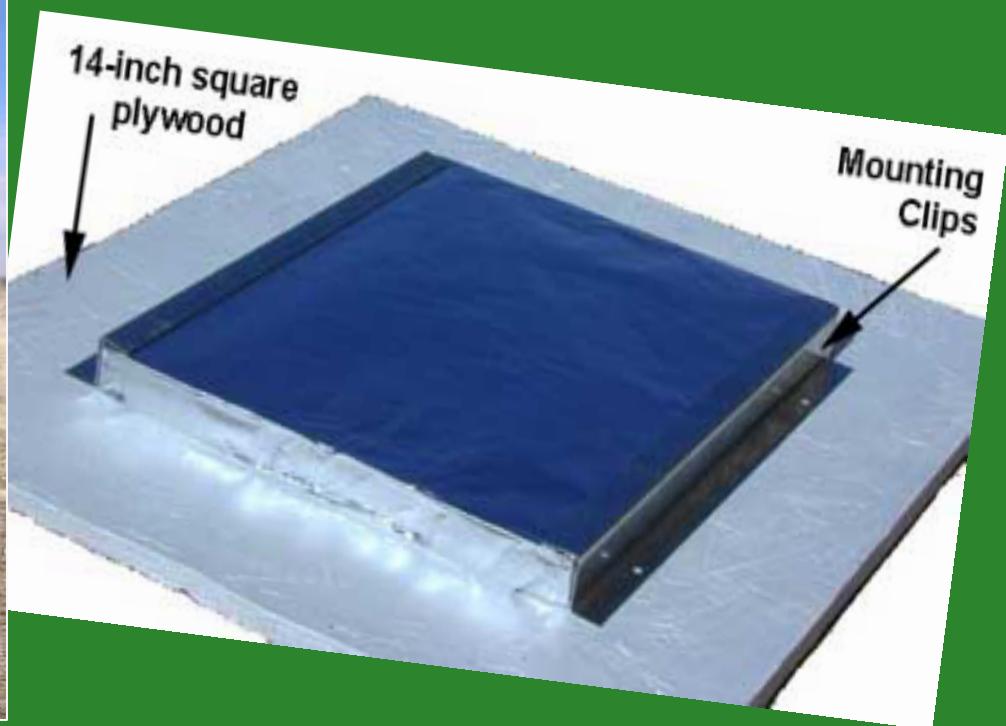
Generated by the Colorado Climate Center



CoCoRaHS

Community Collaborative Rain, Hail, and Snow Network

<http://www.cocorahs.org>



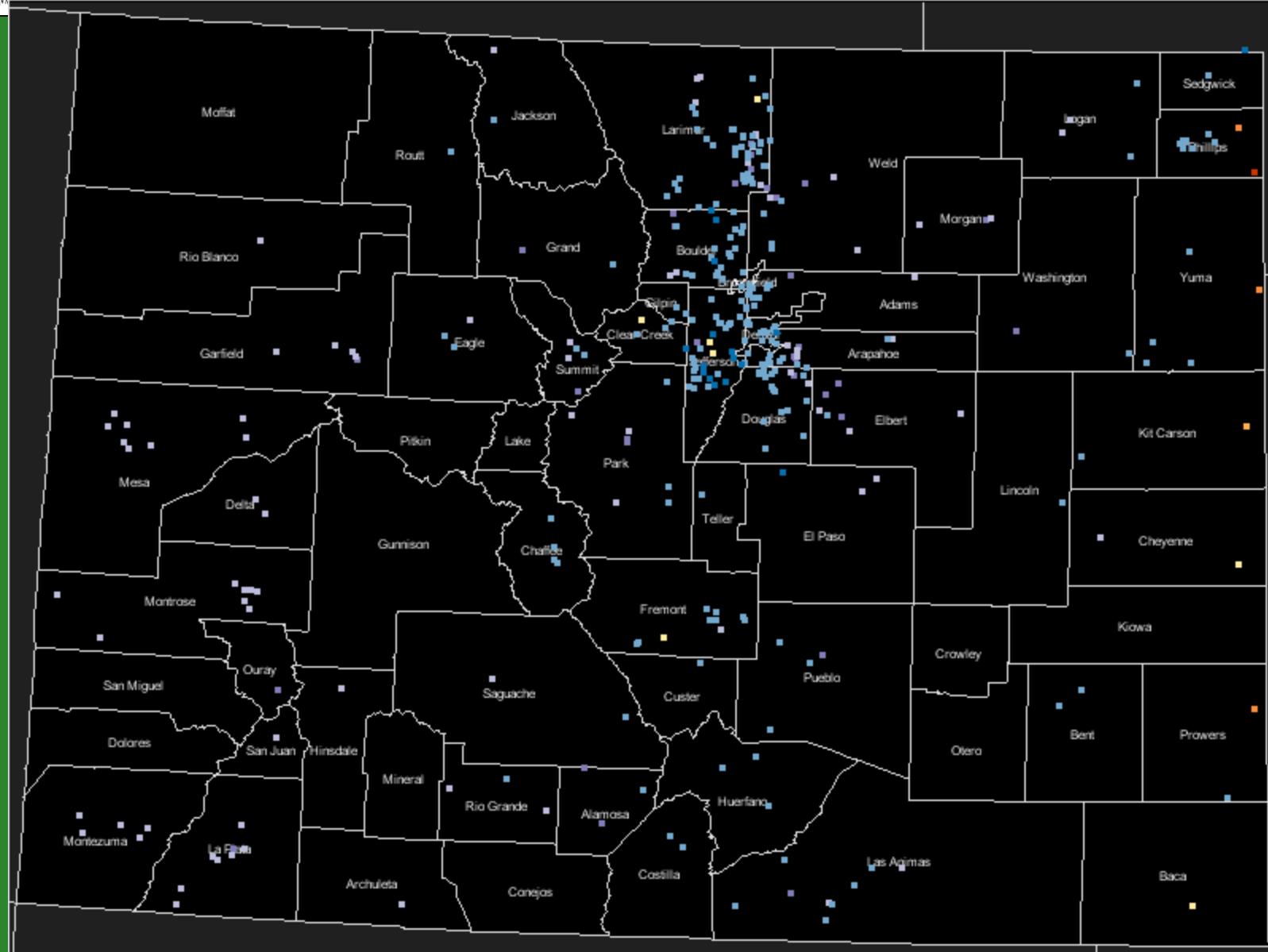
Support for this project provided by Informal Science Education Program,
National Science Foundation and many local charter sponsors.

Colorado 6/17/06

Daily Precipitation (inches x.xx), for the 24 hour period ending ~7:00 am

Colorado 6/17/2006

0.0 Trace 0.01 - 0.23 0.23 - 0.46 0.46 - 0.70 0.70 - 0.93 0.93 - 1.16 1.16 - 1.39



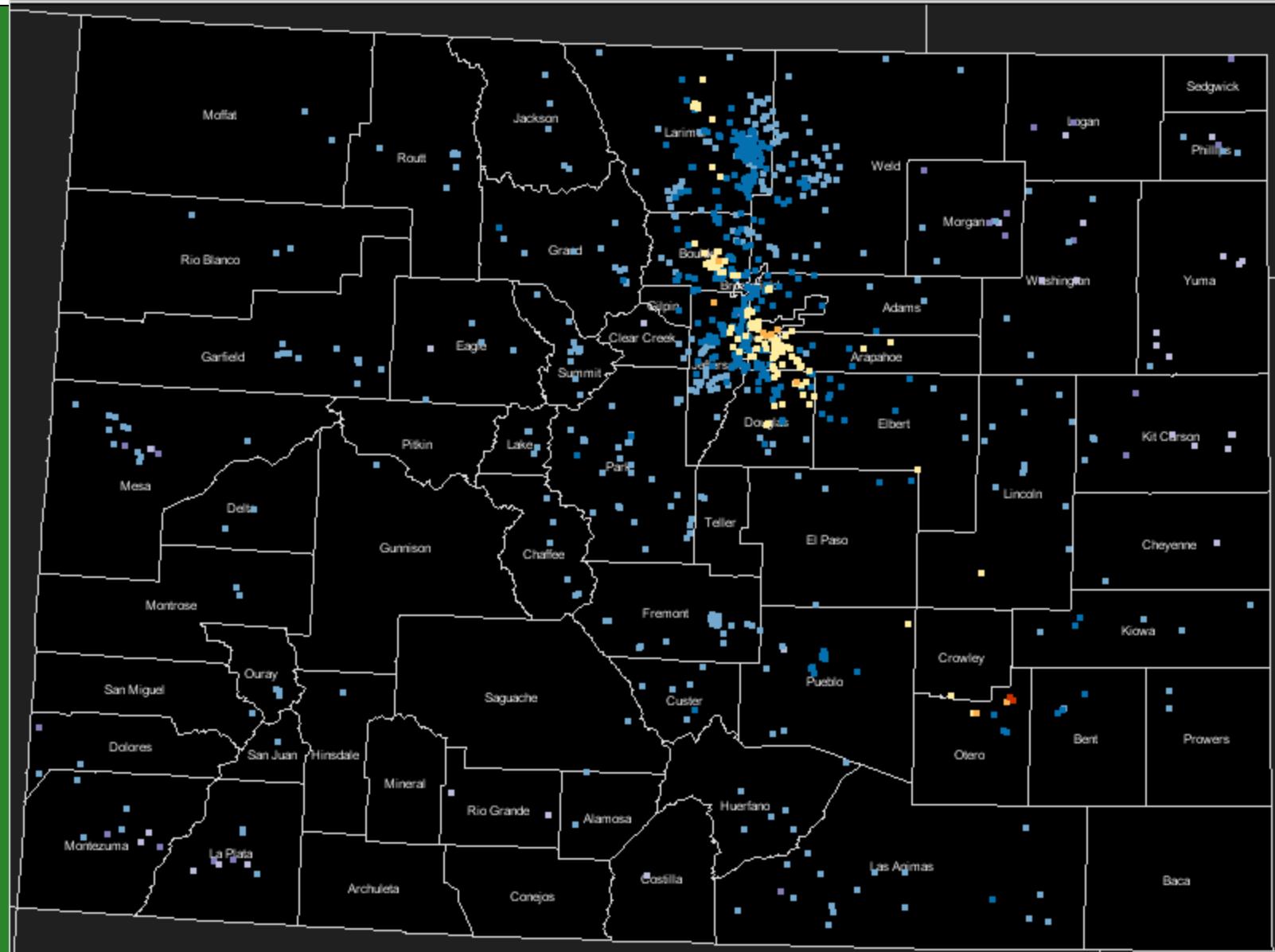
Colorado 8/19/2004



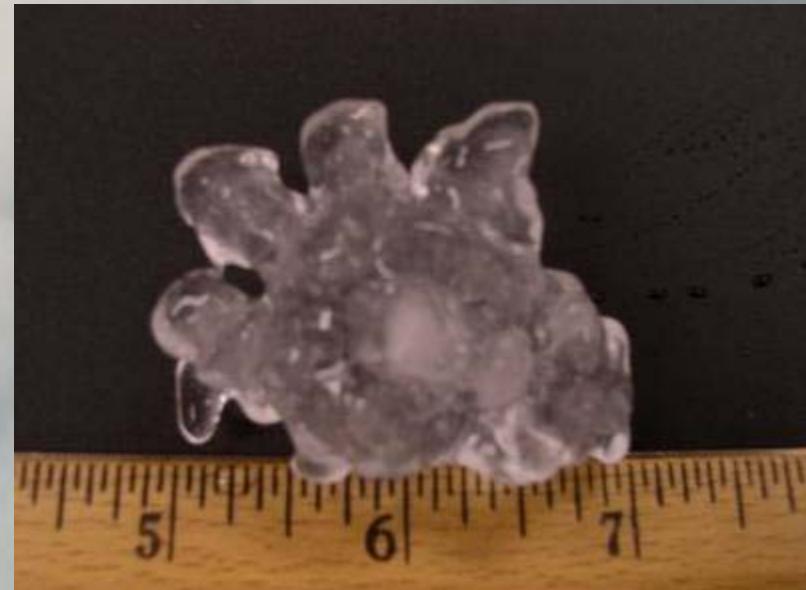
Daily Precipitation (inches x.xx), for the 24 hour period ending ~7:00 am

Colorado 8/19/2004

0.0 Trace 0.01 - 1.11 1.11 - 2.22 2.22 - 3.34 3.34 - 4.45 4.45 - 5.56 5.56 - 6.67



Clear Hail Stones



Photos courtesy of CoCoRaHS observer.

Damaged Hail Pad



And you can help too!

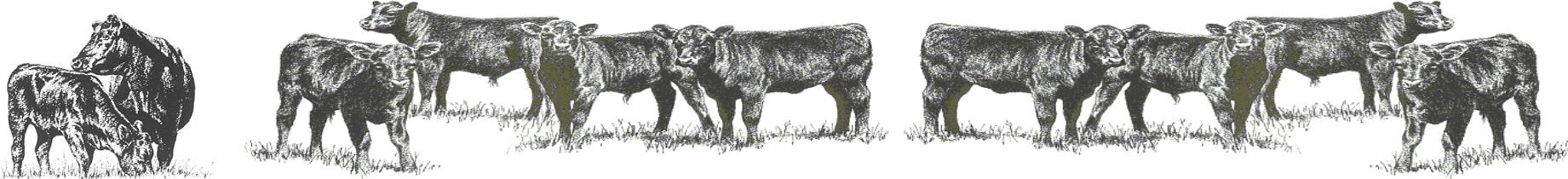


To help make it rain....

Sign up today!

Raingauges available today!

See me at the break.



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”*

