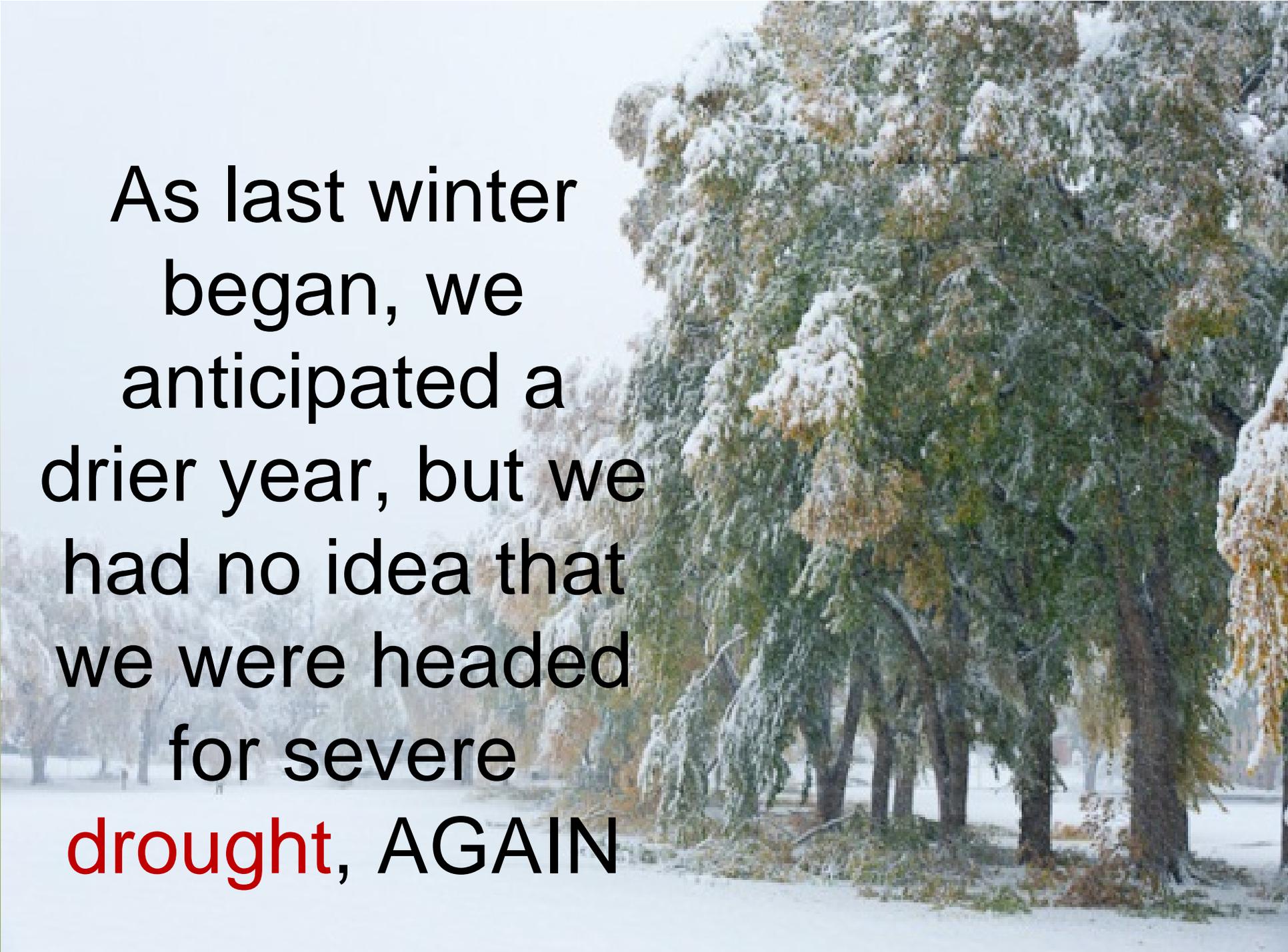




Another Crazy year in Colorado – Where does 2012 Fit in the Bigger “Climate” Picture?

Nolan Doesken
Colorado State Climatologist
Presented at the 2012 South Platte Forum
Longmont, Colorado
October 25, 2012



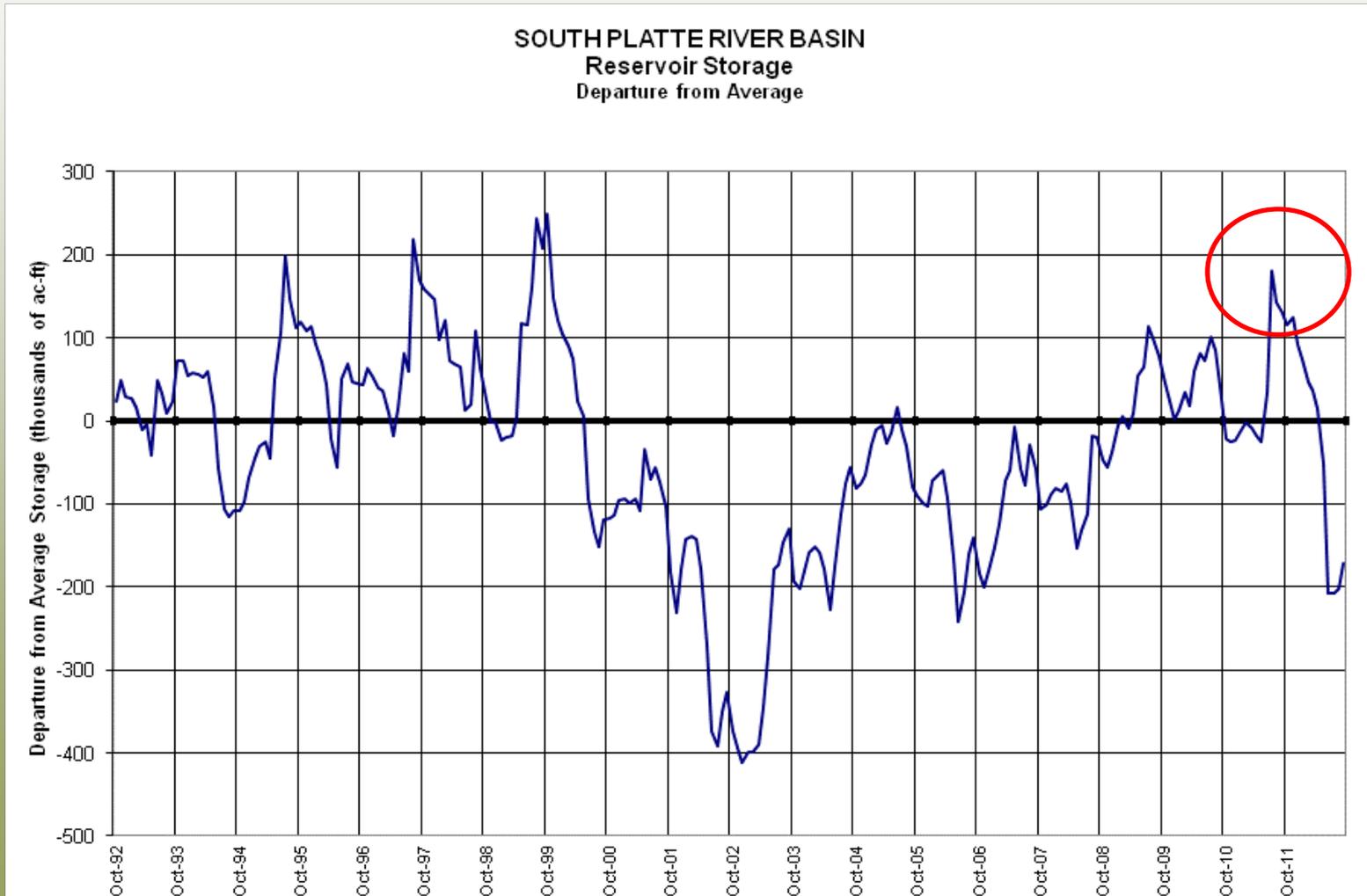
As last winter
began, we
anticipated a
drier year, but we
had no idea that
we were headed
for severe
drought, AGAIN

We had just “enjoyed” a year
(2011) with incredible snowpack
and generous streamflow

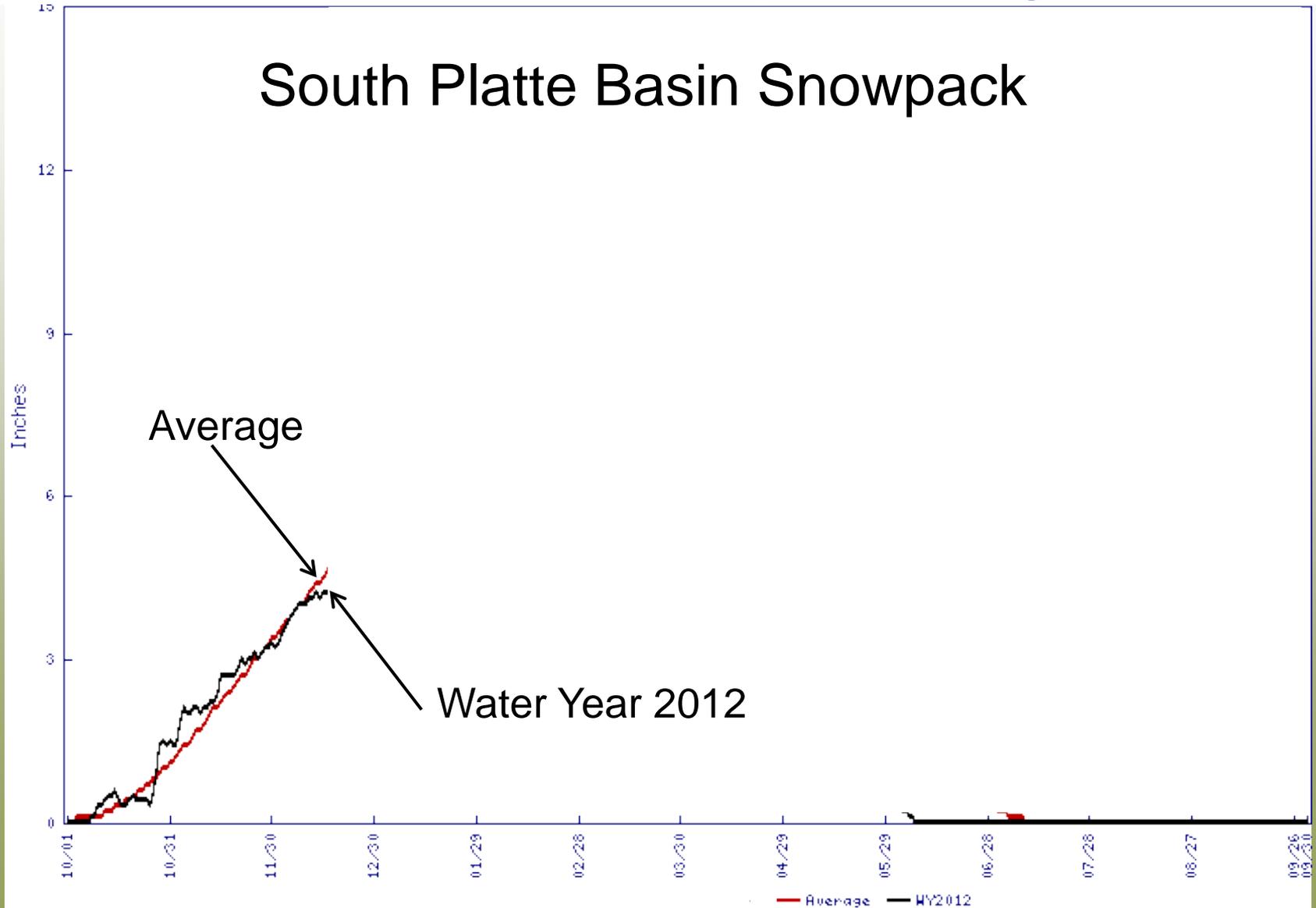


Cache La Poudre near Greeley, June 2011

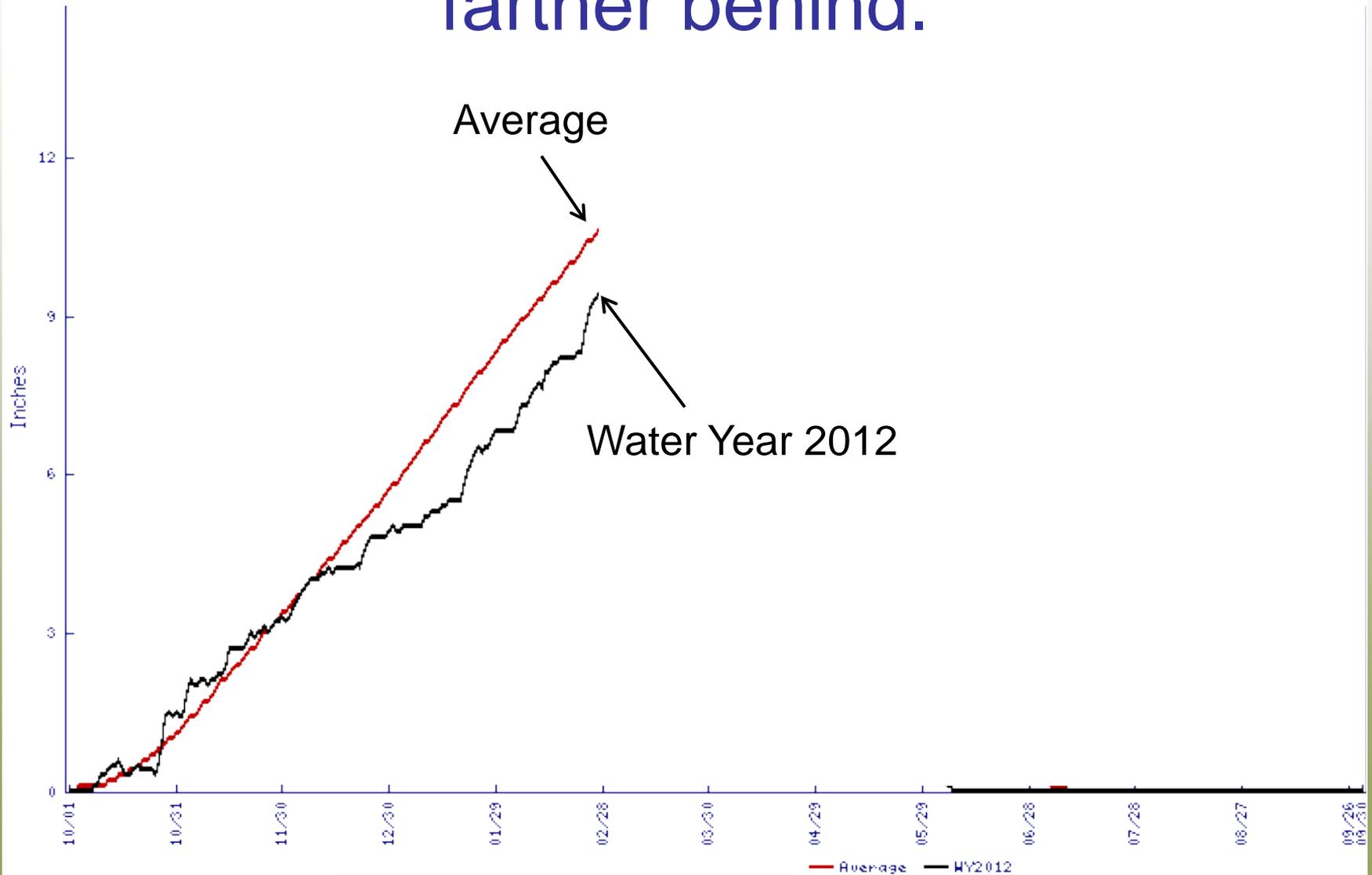
Despite a hot late summer in 2011,
we still ended the year with
abundant water supplies



This past winter snowpack got off to a “normal” start. Life looked good!

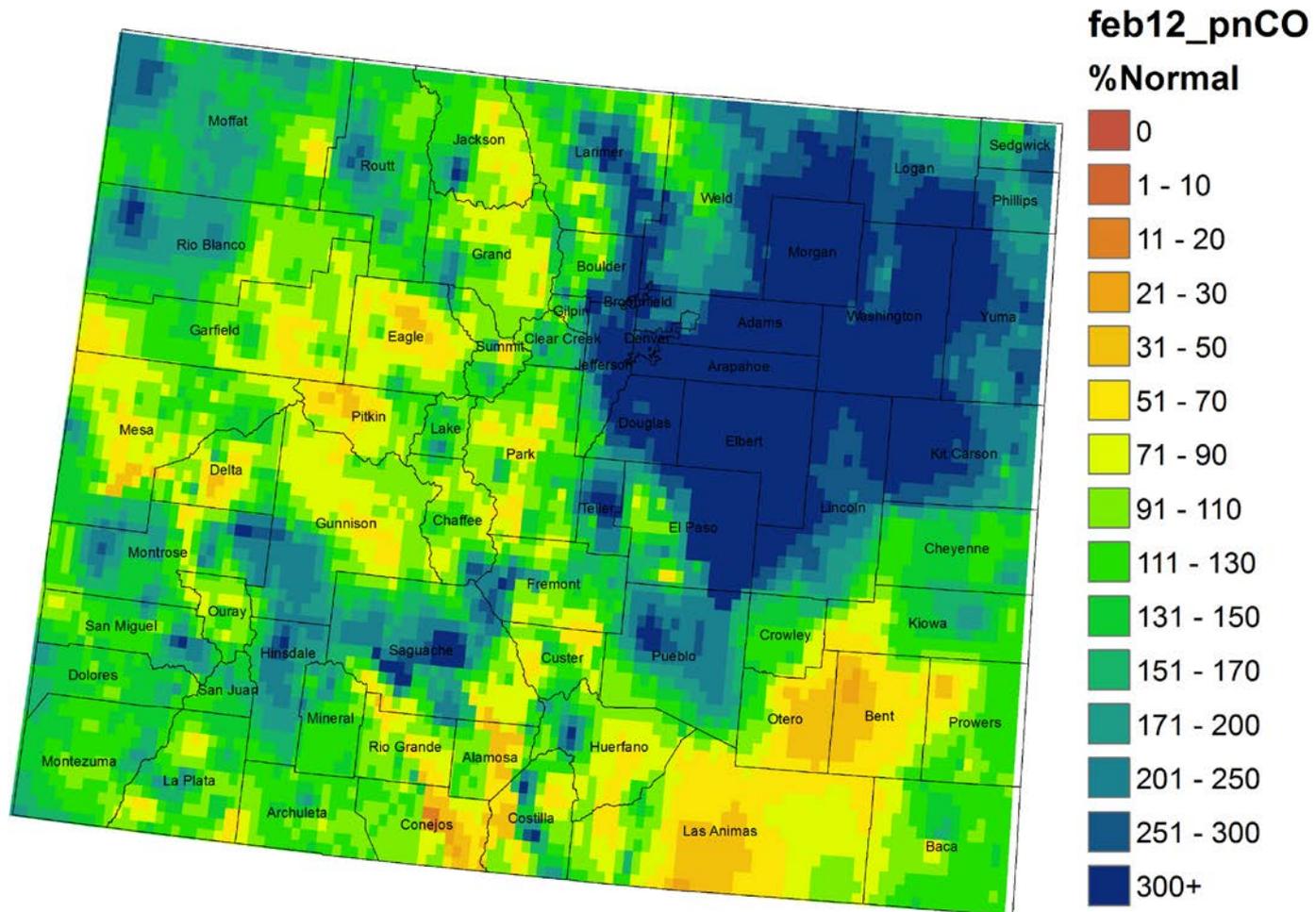


The high mountain snows then became fewer and lighter, and we gradually fell farther behind.



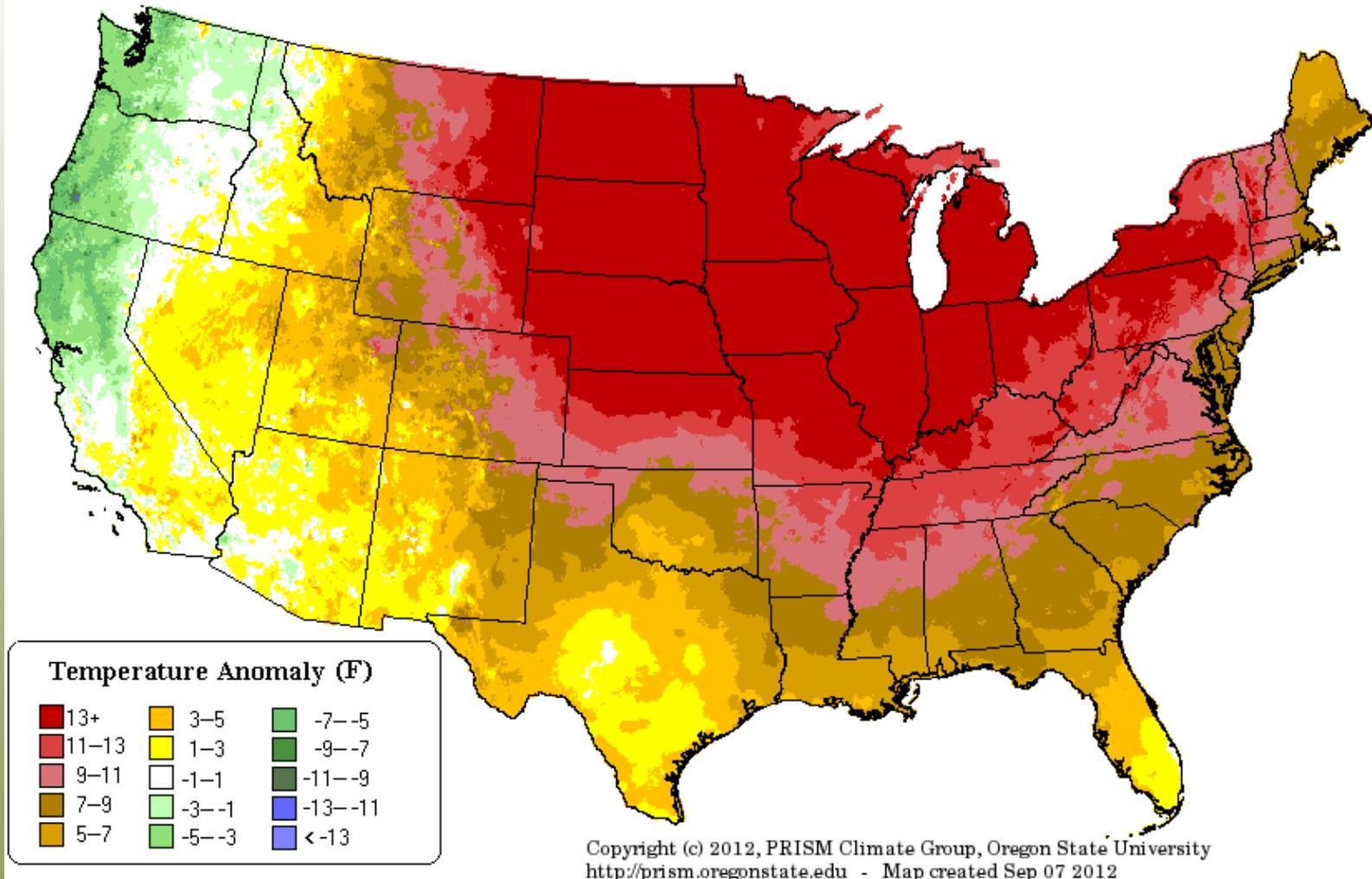
With generous February snowfall along the Front Range, drought still seemed very distant.

Colorado February 2012 Precipitation as Percentage of Normal



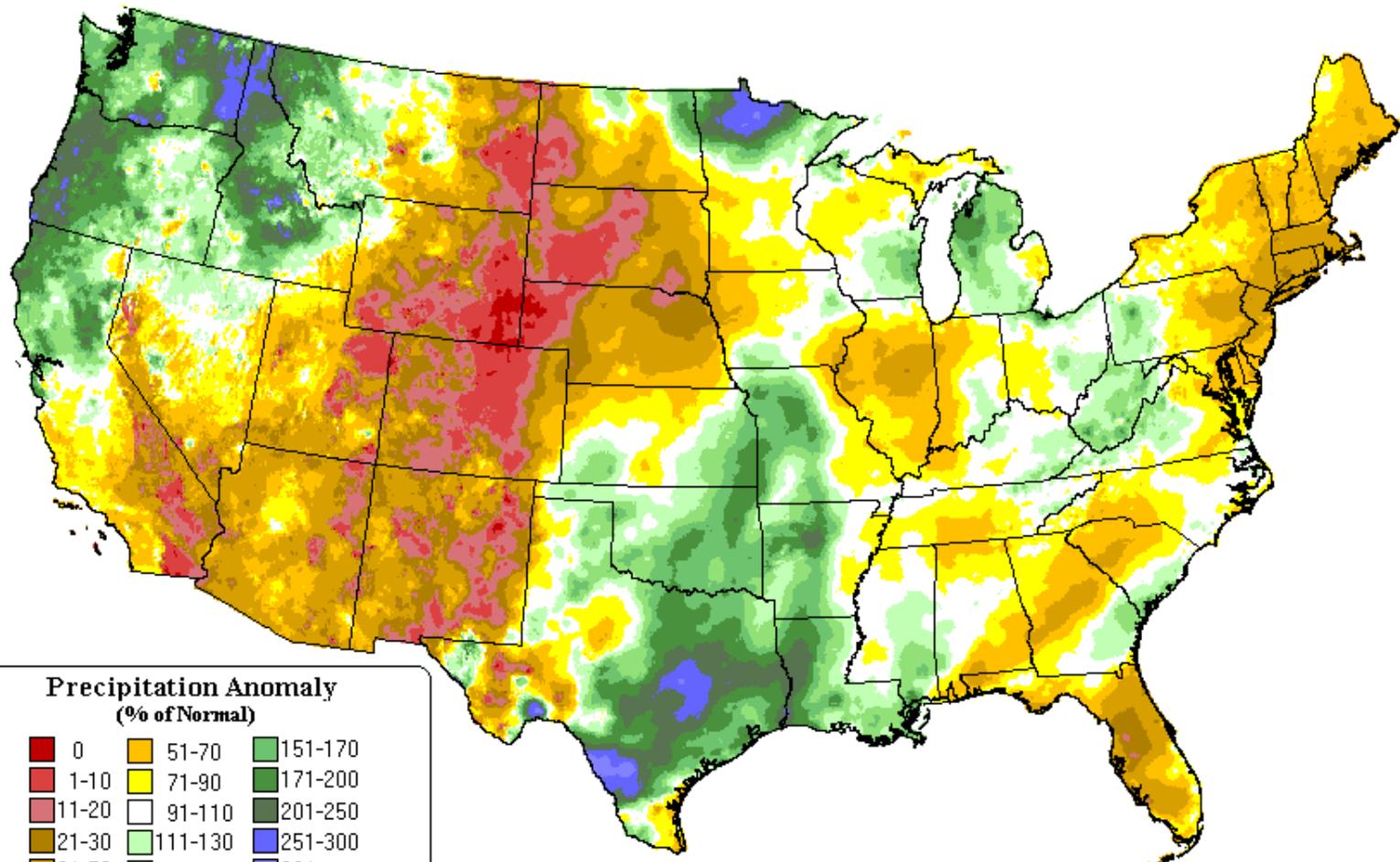
Then came March 2012 – the game changer

Maximum Temperature Anomaly: Mar 2012
Final Data



March 2012 Precipitation as percent of Average – DRY!

Precipitation Anomaly: Mar 2012
Final Data



Copyright (c) 2012, PRISM Climate Group, Oregon State University
<http://prism.oregonstate.edu> - Map created Sep 07 2012

With bare ground showing way too early...

Looking NW from Copper
Mountain

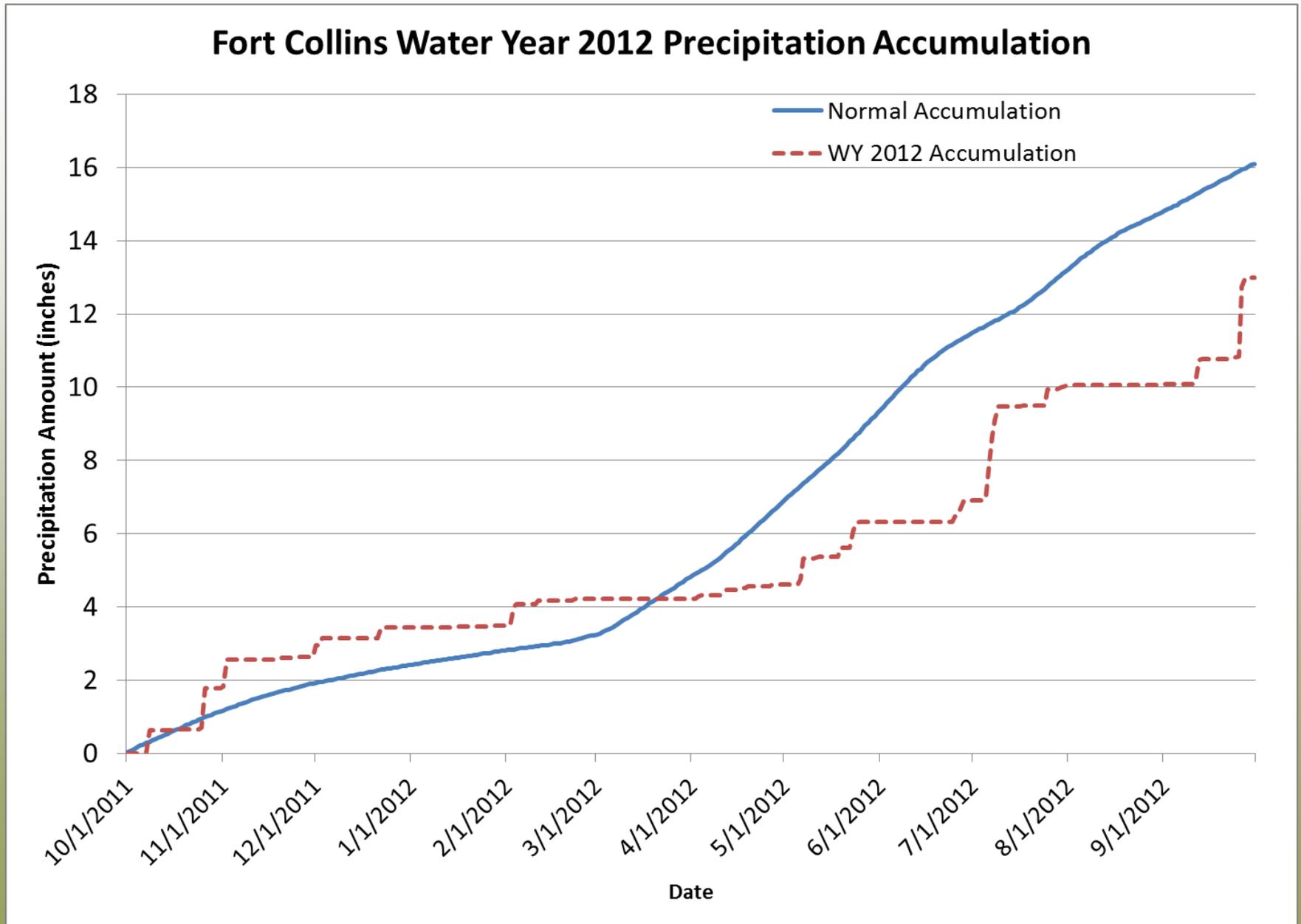
March 24, 2012

A lot of bare ground showing
-- trouble brewing --



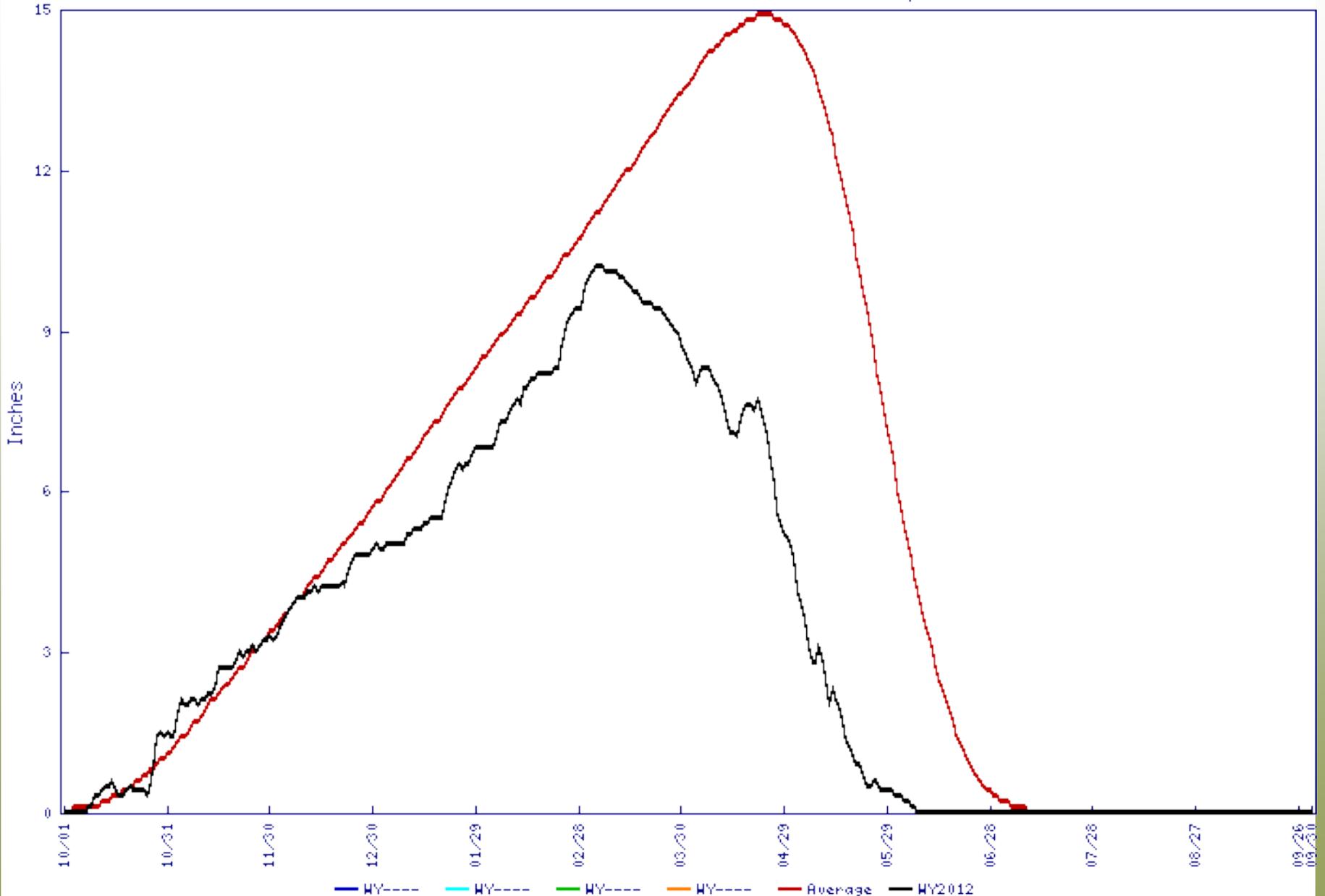
We were playing catch up

Our spring storms were fewer and weaker



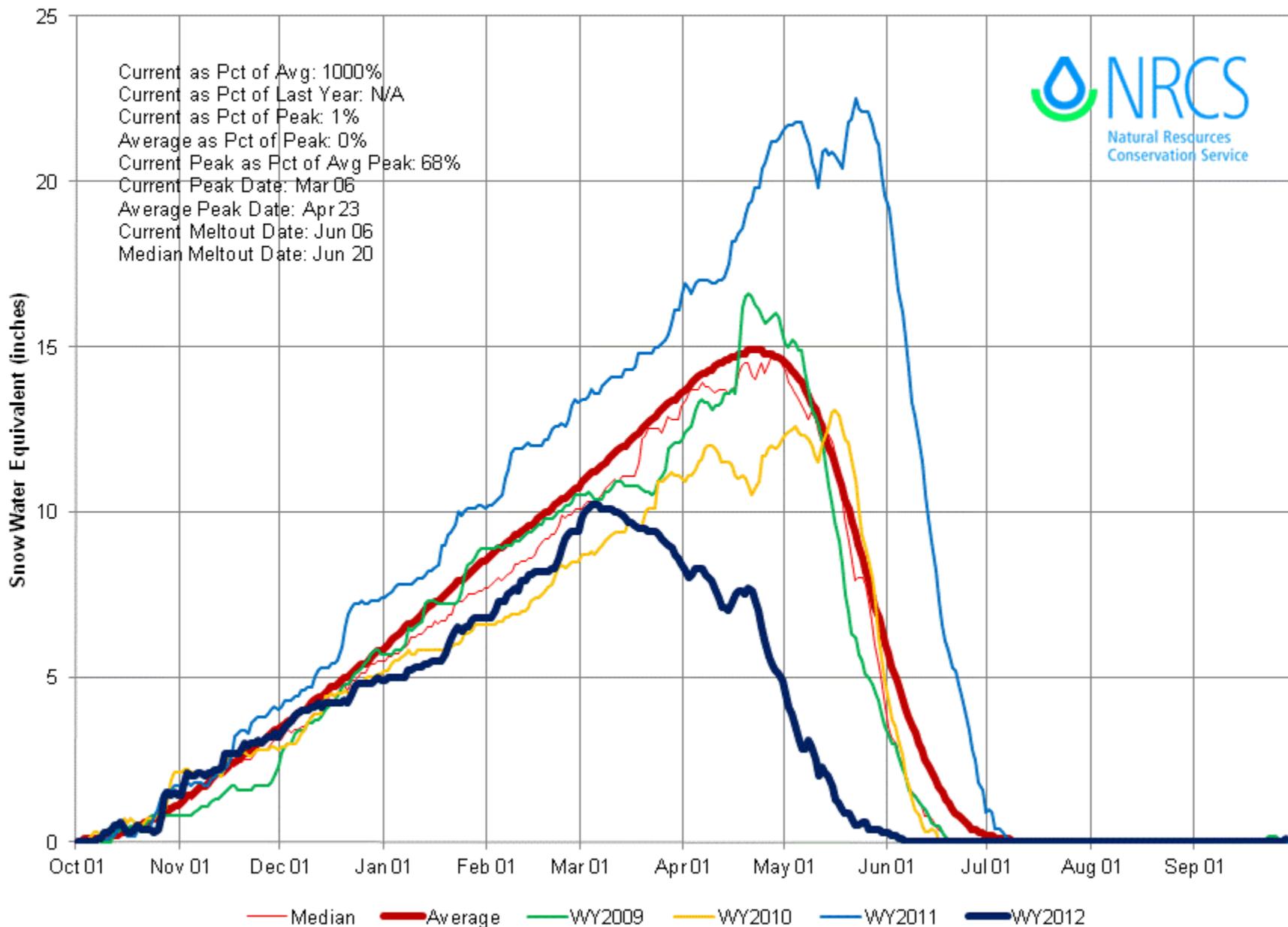
Snow melted fast and early

South Platte River Basin Snow Water Equivalent



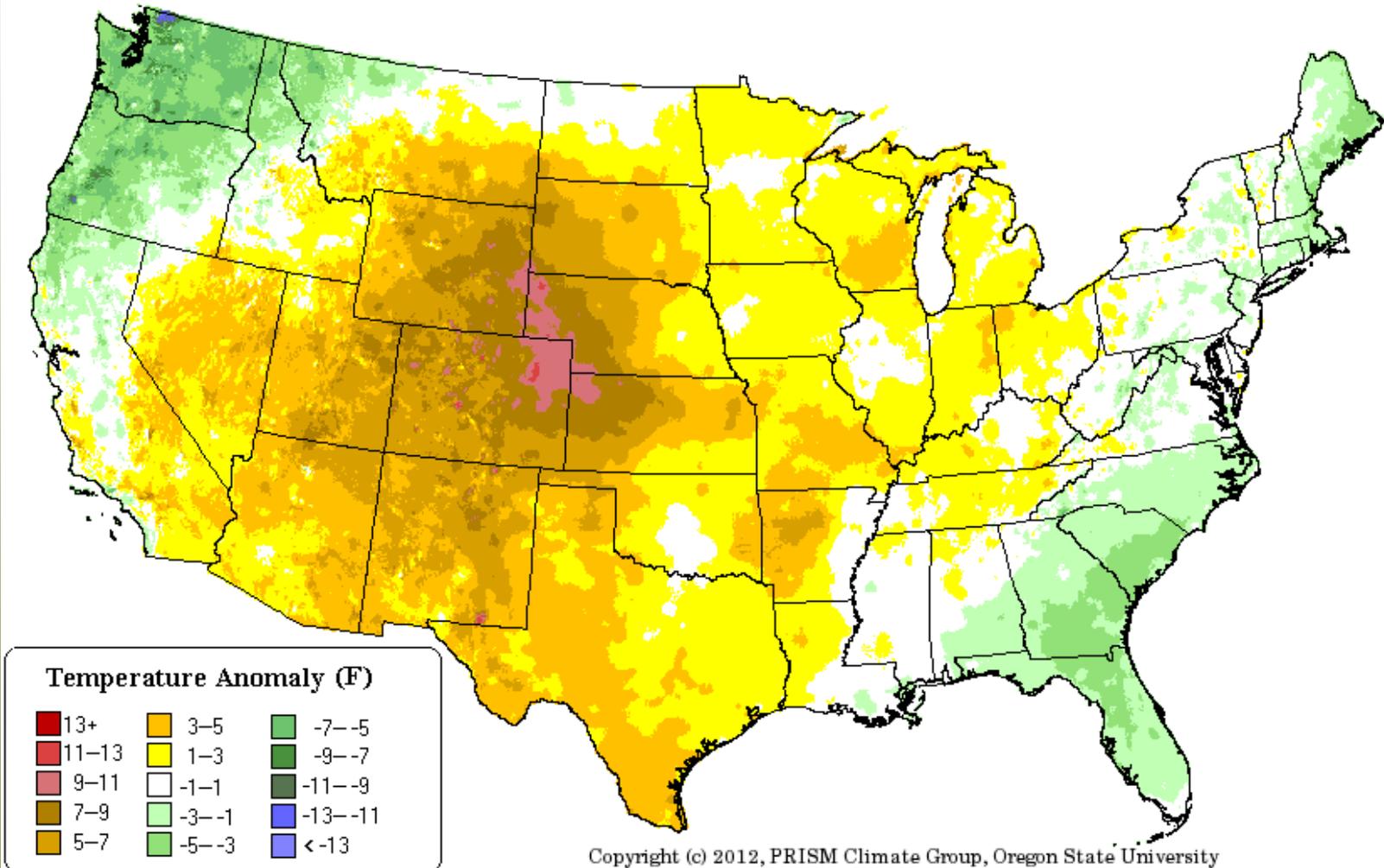
South Platte River Basin Time Series Snowpack Summary

Based on Provisional SNOTEL data as of Sep 28, 2012



Then came June, and we were immediately engulfed by midsummer heat.

Maximum Temperature Anomaly: Jun 2012
Provisional Data

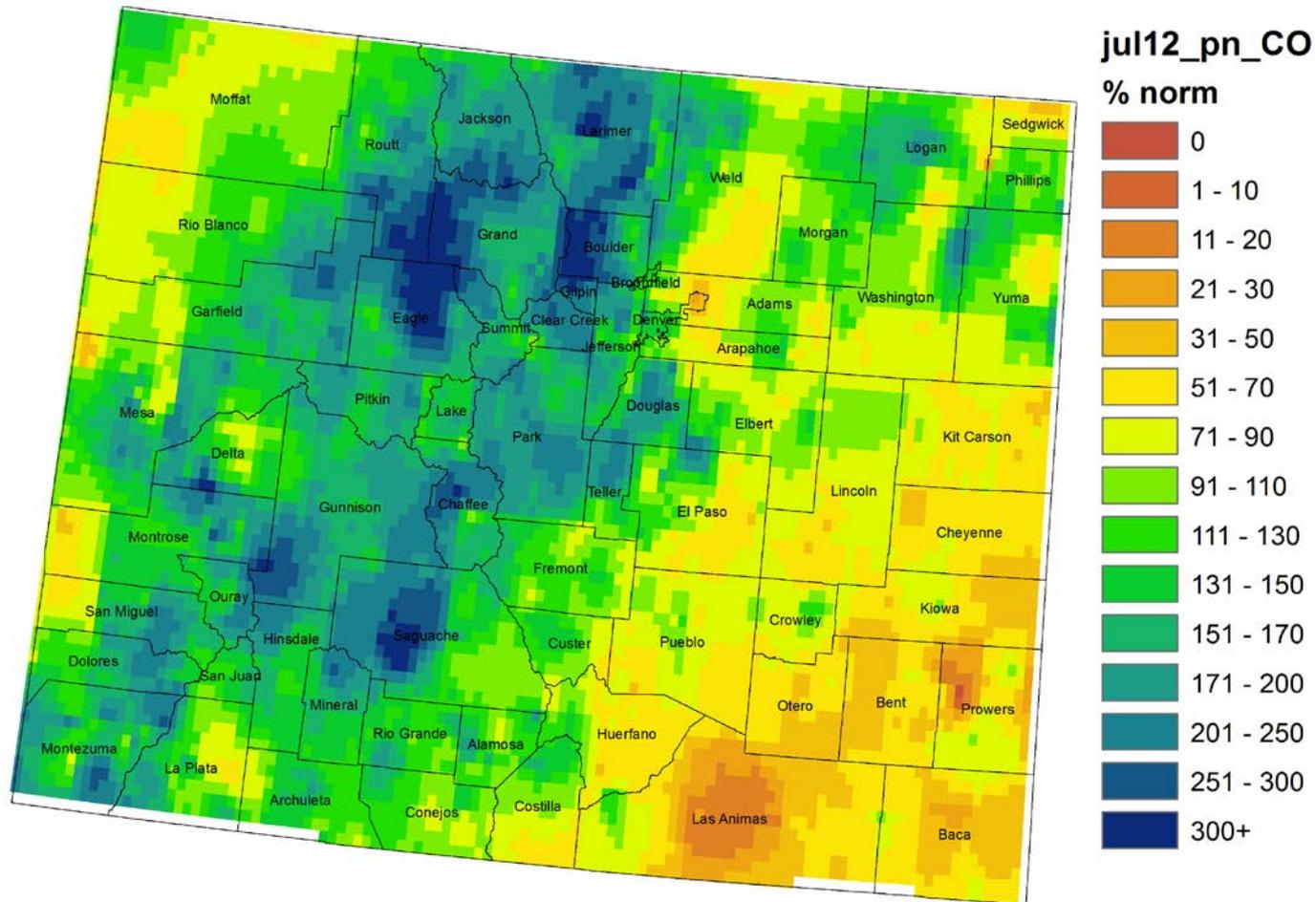


You'll recall the impacts!



July rains were beneficial in the South Platte Basin and parts of W Colorado

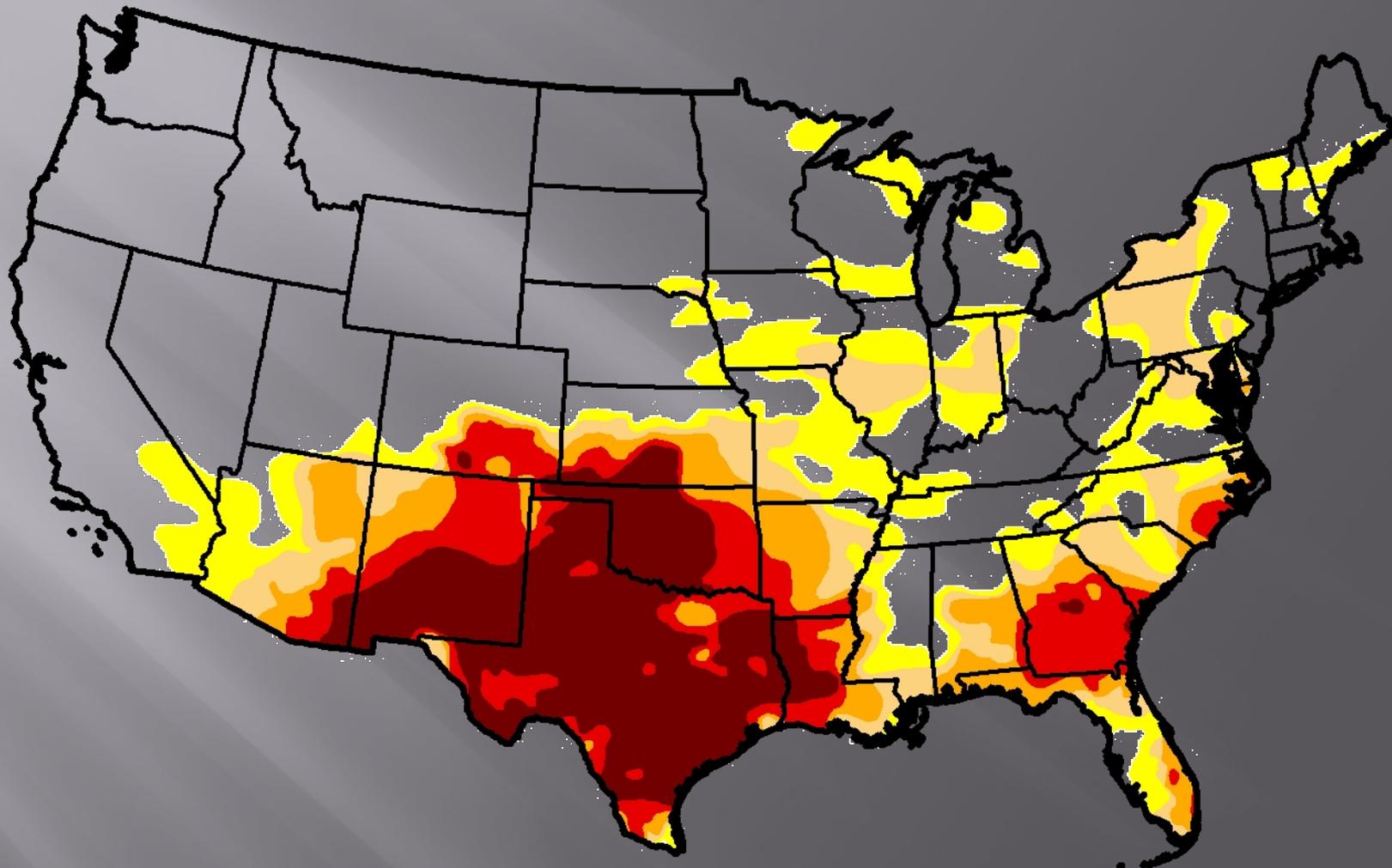
Colorado July 2012 Precipitation
as Percentage of Normal



A wide, flat, cracked landscape under a clear sky, illustrating the effects of drought. The ground is covered in a dense network of irregular, polygonal cracks, creating a mosaic-like pattern. The cracks are dark and deep, contrasting with the light-colored, parched soil. In the distance, a low, dark horizon line separates the cracked ground from a pale, clear sky. The overall scene conveys a sense of extreme dryness and desolation.

But summer heat persisted
and the U.S. drought spread

USDM: August 2011



Drought Severity



D0 - Abnormally Dry



D2 Drought - Severe



D4 Drought - Exceptional



D1 Drought - Moderate

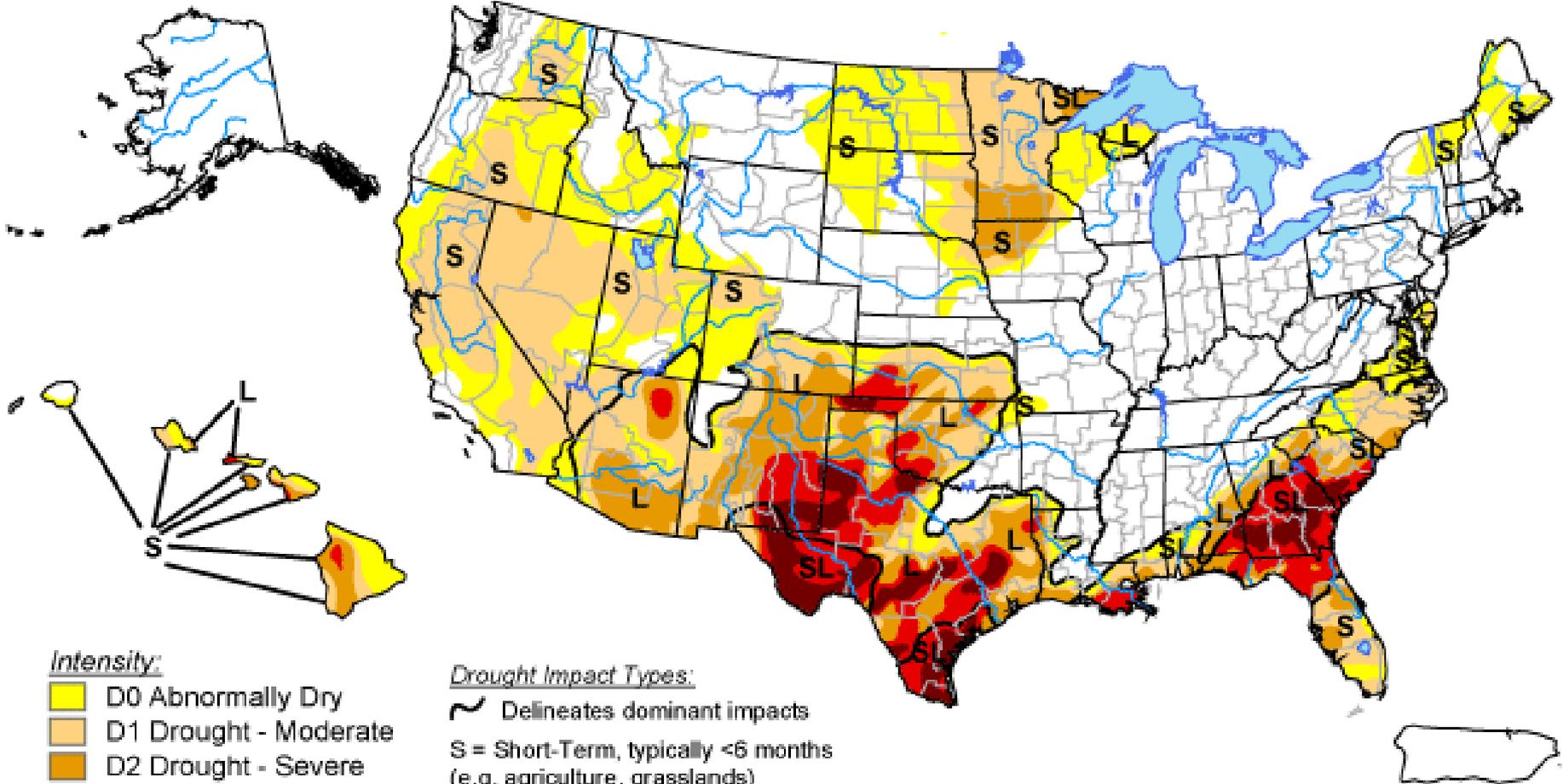


D3 Drought - Extreme

U.S. Drought Monitor

February 7, 2012

Valid 7 a.m. EST



Intensity:

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

Drought Impact Types:

-  Delineates dominant impacts
- S = Short-Term, typically <6 months
(e.g. agriculture, grasslands)
- L = Long-Term, typically >6 months
(e.g. hydrology, ecology)

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

<http://droughtmonitor.unl.edu/>



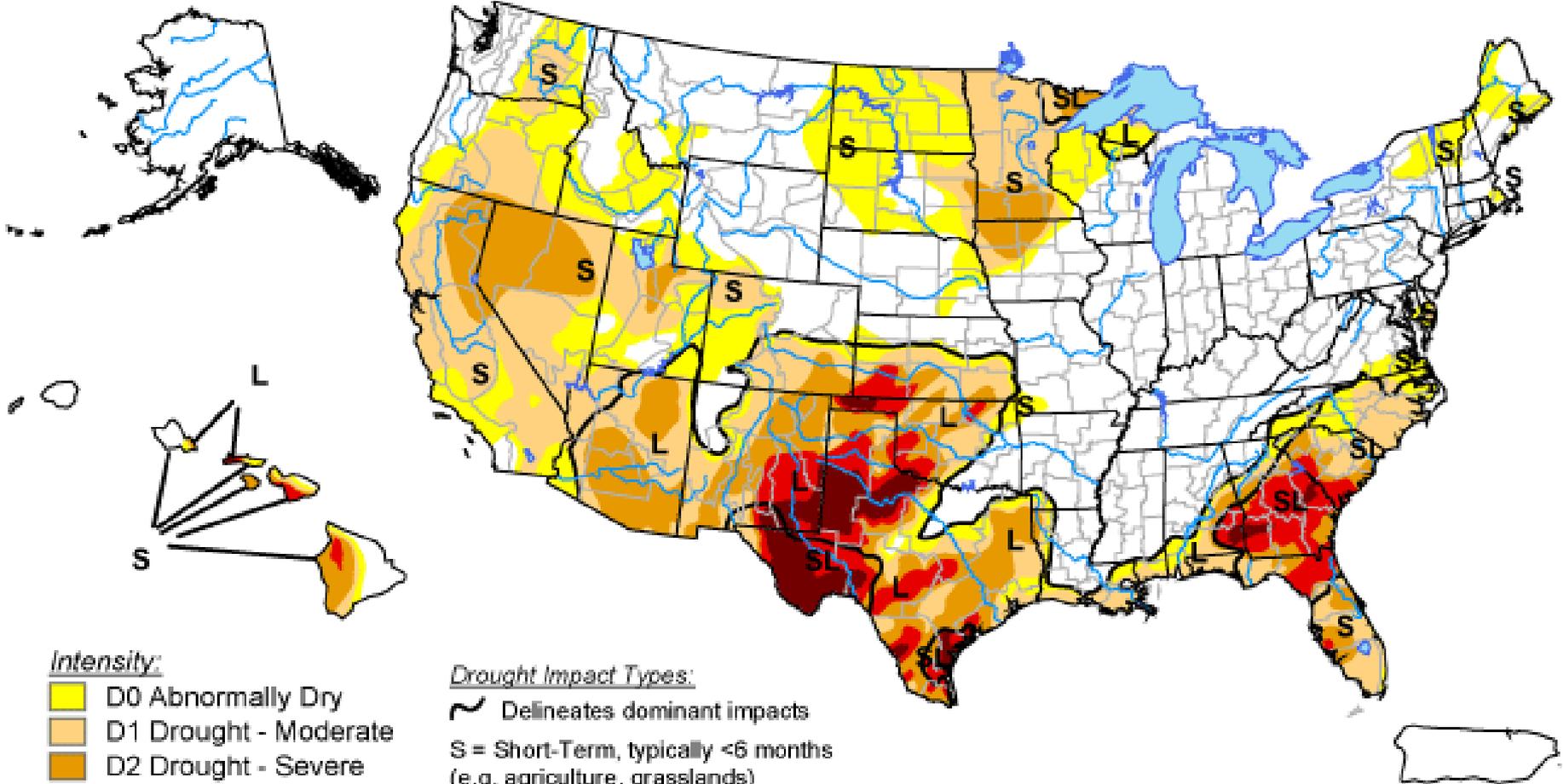
Released Thursday, February 9, 2012

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

U.S. Drought Monitor

March 6, 2012

Valid 7 a.m. EST



Intensity:

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

Drought Impact Types:

-  Delineates dominant impacts
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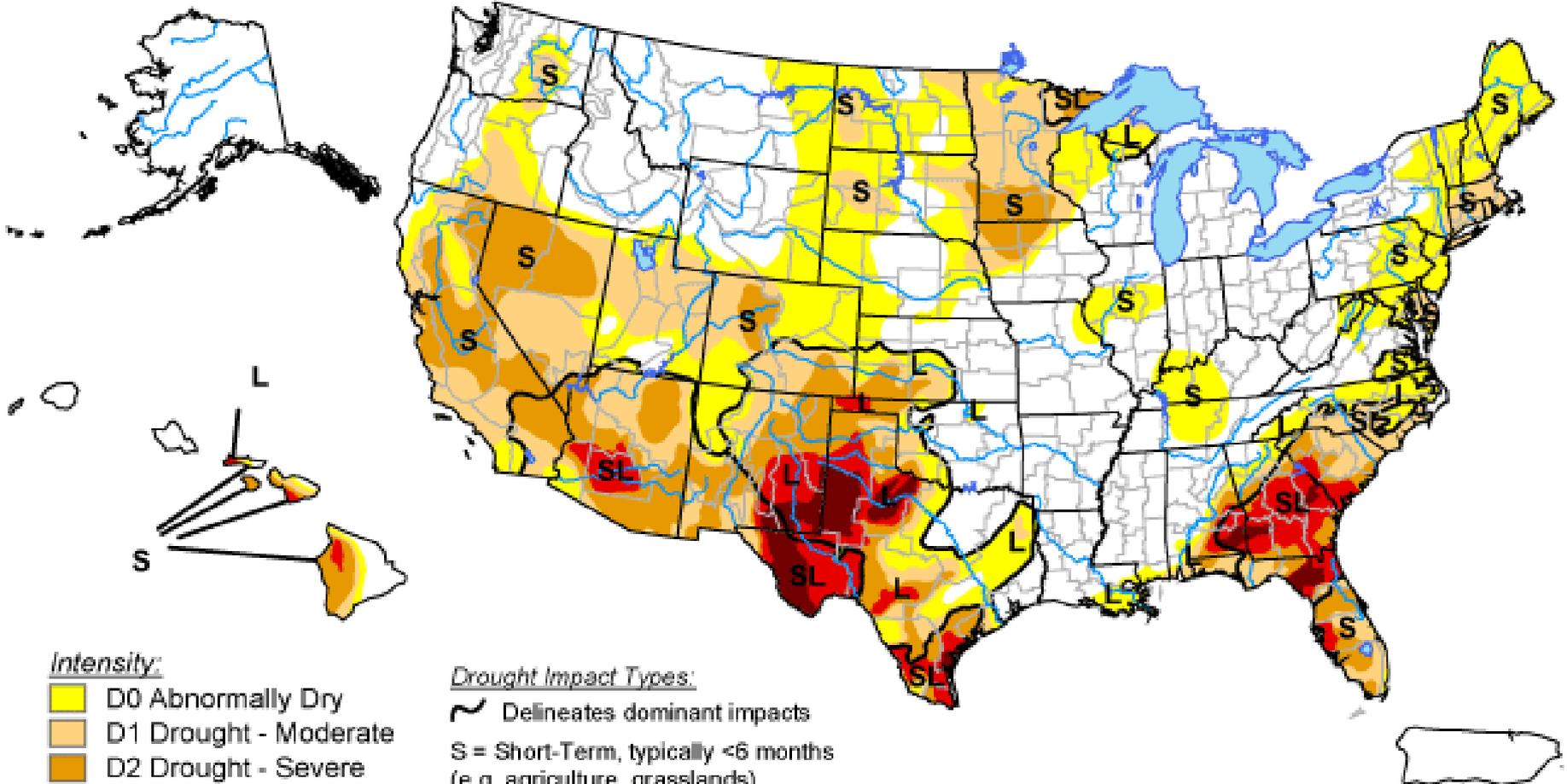
Released Thursday, March 8, 2012

Author: Michael Brewer/L. Love-Brotak, NOAA/NESDIS/NCDC

<http://droughtmonitor.unl.edu/>

U.S. Drought Monitor

April 3, 2012
Valid 7 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
- S = Short-Term, typically <6 months
(e.g. agriculture, grasslands)
- L = Long-Term, typically >6 months
(e.g. hydrology, ecology)

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for forecast statements.

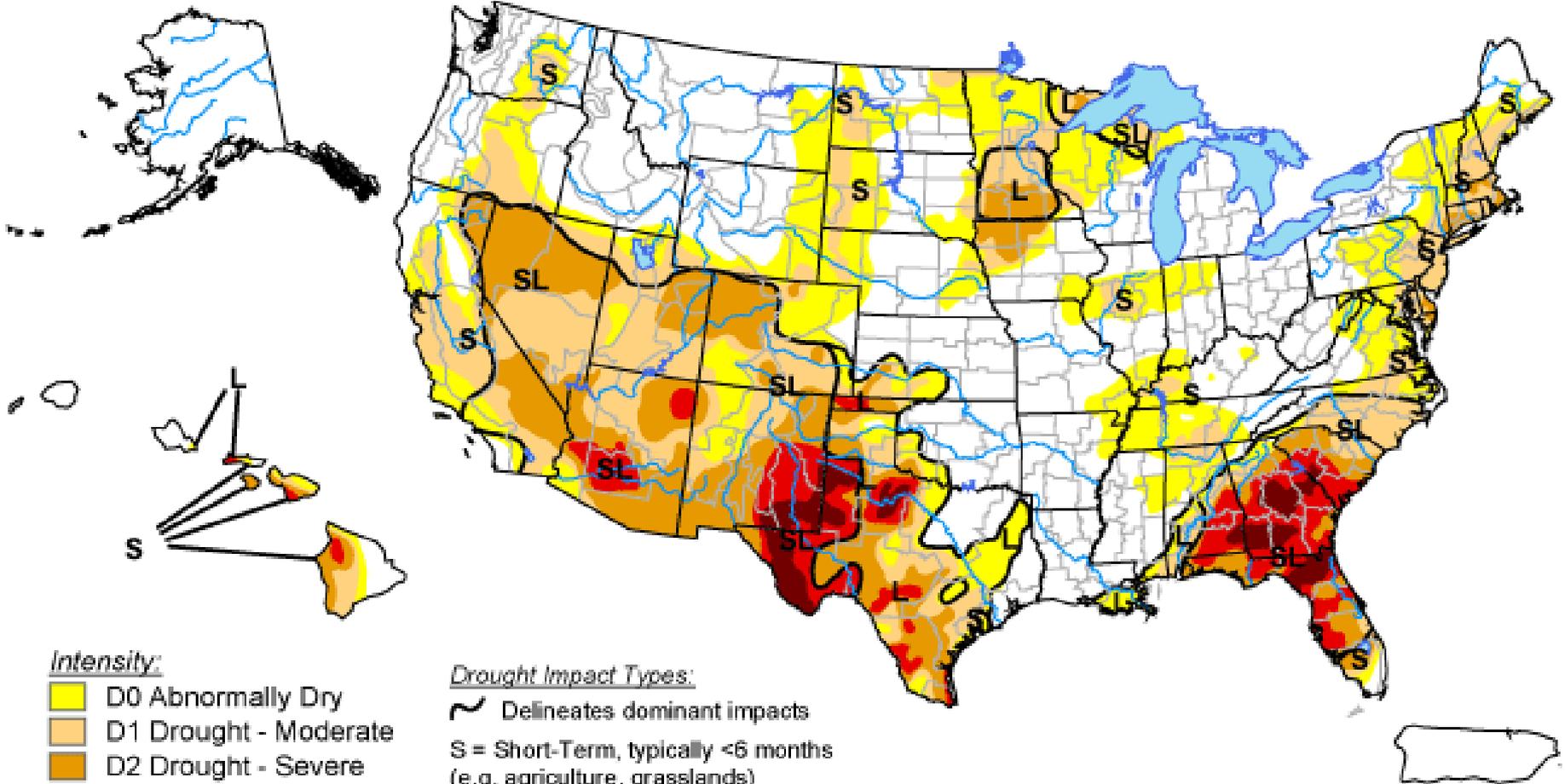


<http://droughtmonitor.unl.edu/>

Released Thursday, April 5, 2012
Author: Brian Fuchs, National Drought Mitigation Center

U.S. Drought Monitor

May 1, 2012
Valid 7 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
- S = Short-Term, typically <6 months
(e.g. agriculture, grasslands)
- L = Long-Term, typically >6 months
(e.g. hydrology, ecology)

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



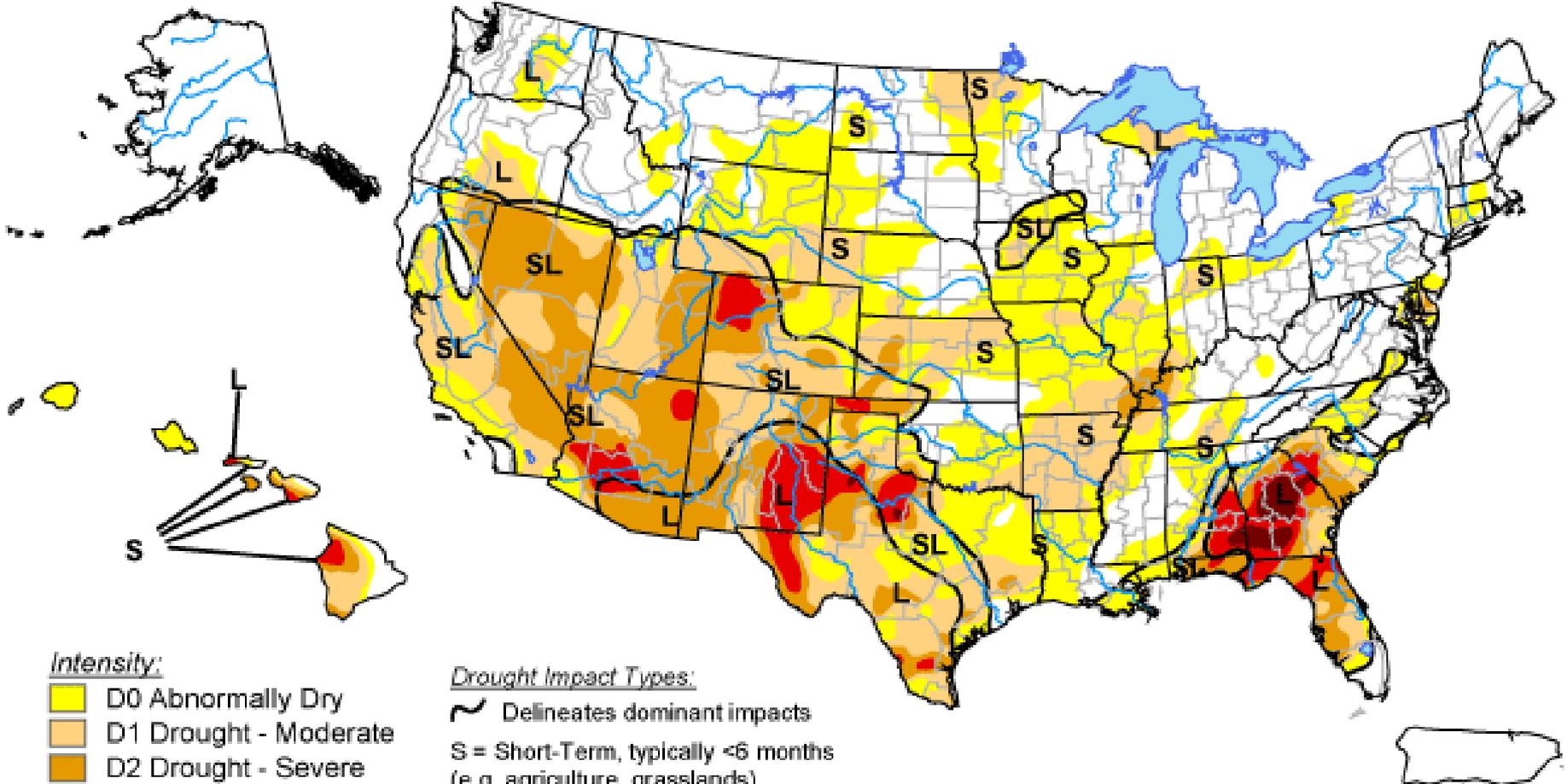
<http://droughtmonitor.unl.edu/>

Released Thursday, May 3, 2012
Author: Matthew Rosenkrans, NOAA/NWS/NCEP/CPC

U.S. Drought Monitor

June 5, 2012

Valid 7 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
- S = Short-Term, typically <6 months
(e.g. agriculture, grasslands)
- L = Long-Term, typically >6 months
(e.g. hydrology, ecology)

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

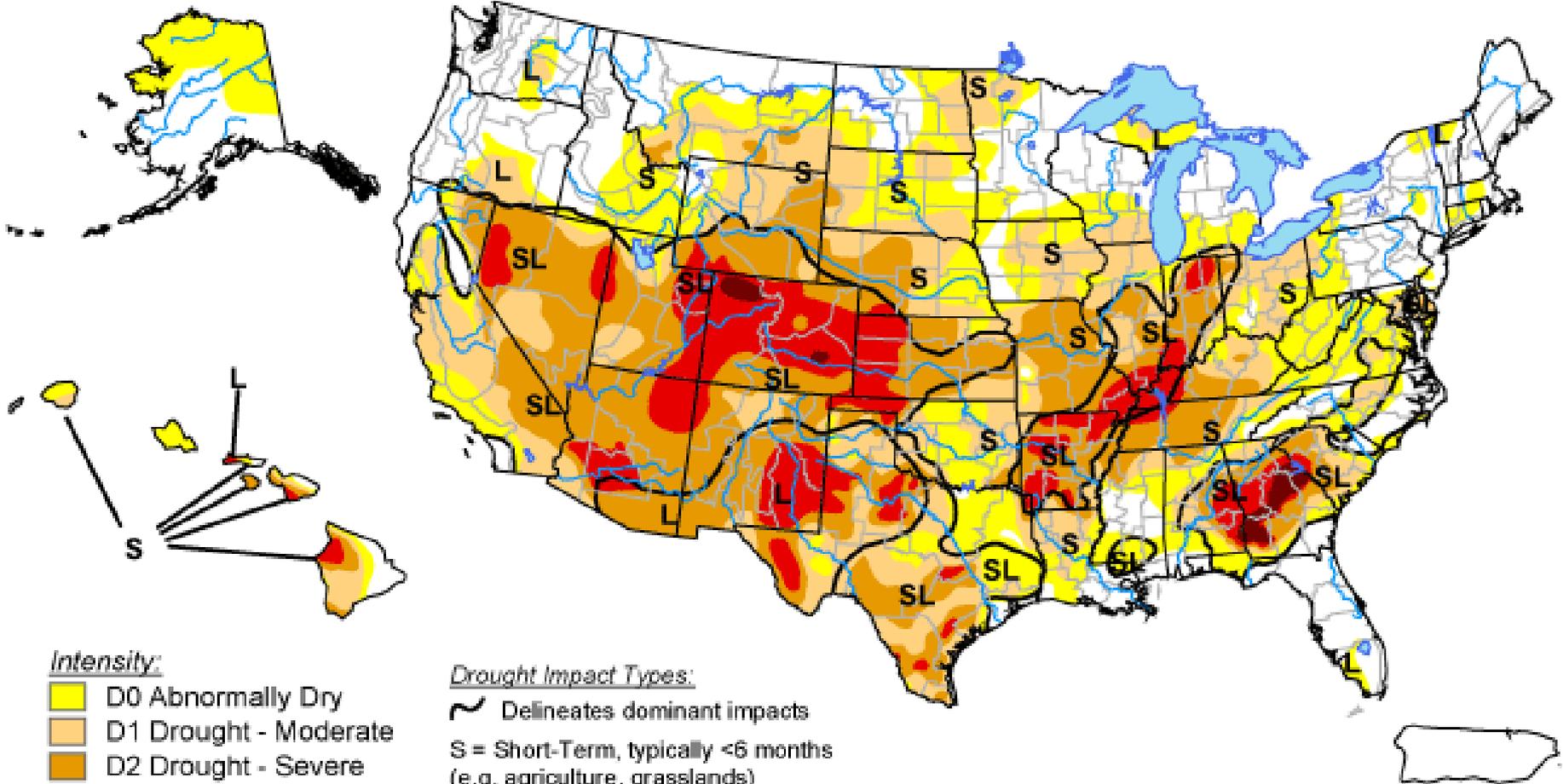
<http://droughtmonitor.unl.edu/>



Released Thursday, June 7, 2012
Author: David Miskus, NOAA/NWS/NCEP/CPC

U.S. Drought Monitor

July 3, 2012
Valid 7 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
- S = Short-Term, typically <6 months
(e.g. agriculture, grasslands)
- L = Long-Term, typically >6 months
(e.g. hydrology, ecology)

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for forecast statements.

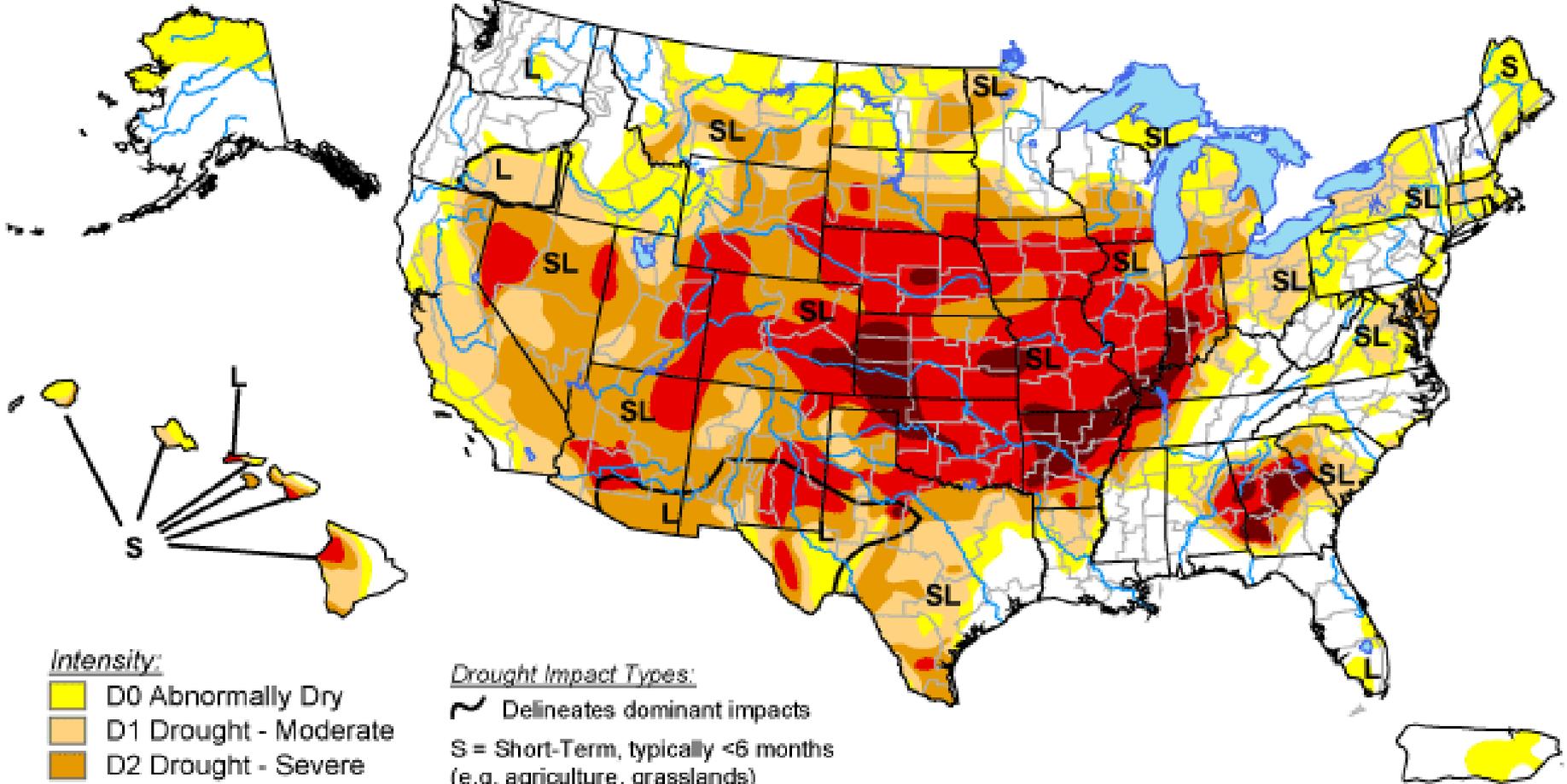
<http://droughtmonitor.unl.edu/>



Released Thursday, July 5, 2012
Author: Rich Tinker, NOAA/NWS/NCEP/CPC

U.S. Drought Monitor

August 7, 2012
Valid 7 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
- S = Short-Term, typically <6 months
(e.g. agriculture, grasslands)
- L = Long-Term, typically >6 months
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The Drought Monitor focuses on broad-scale conditions.
Local conditions may vary. See accompanying text summary
for forecast statements.



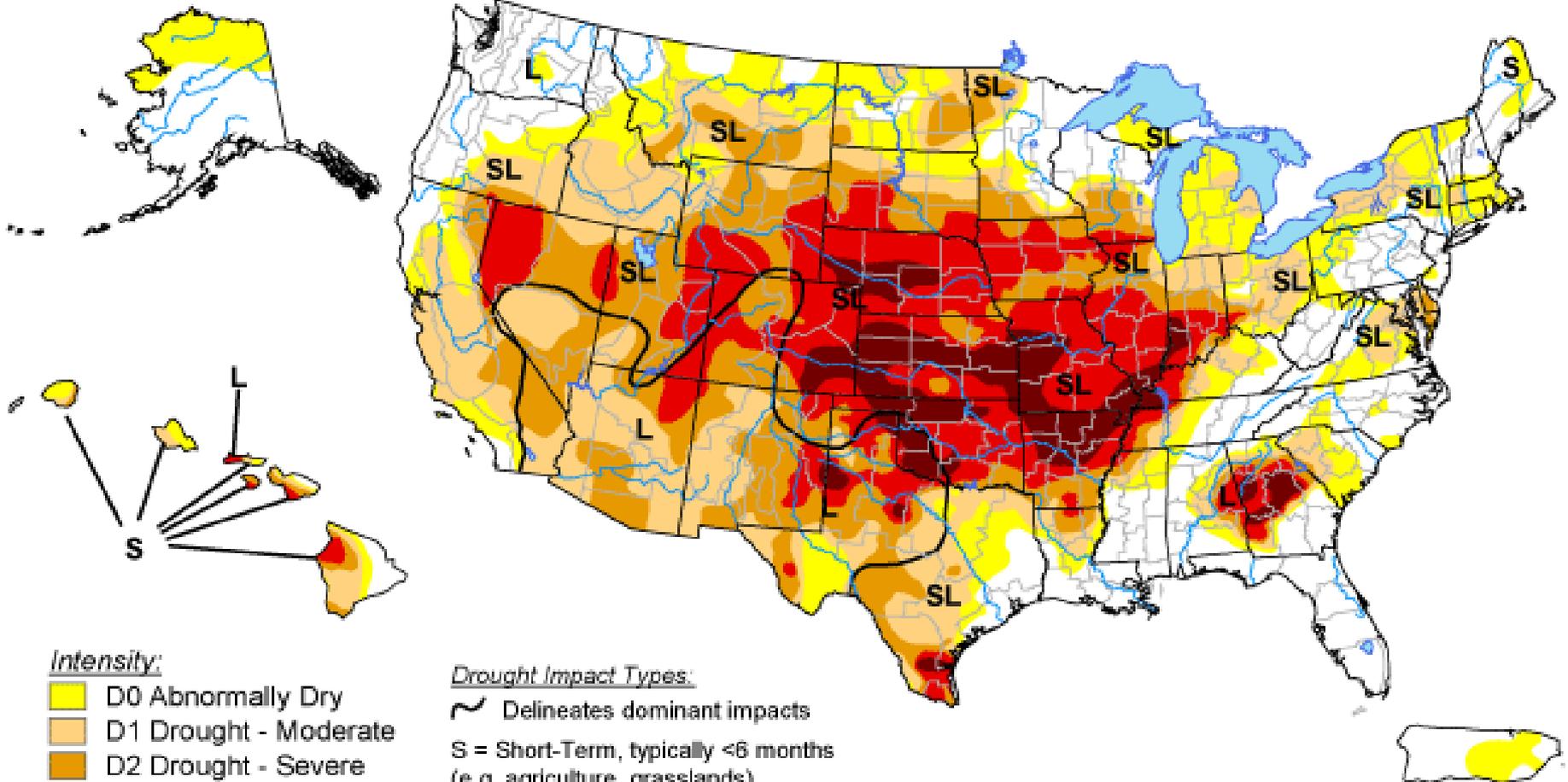
Released Thursday, August 9, 2012

Author: Mark Svoboda, National Drought Mitigation Center

<http://droughtmonitor.unl.edu/>

U.S. Drought Monitor

August 28, 2012
Valid 7 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
- S = Short-Term, typically <6 months (e.g. agriculture, grasslands)
- L = Long-Term, typically >6 months (e.g. hydrology, ecology)

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



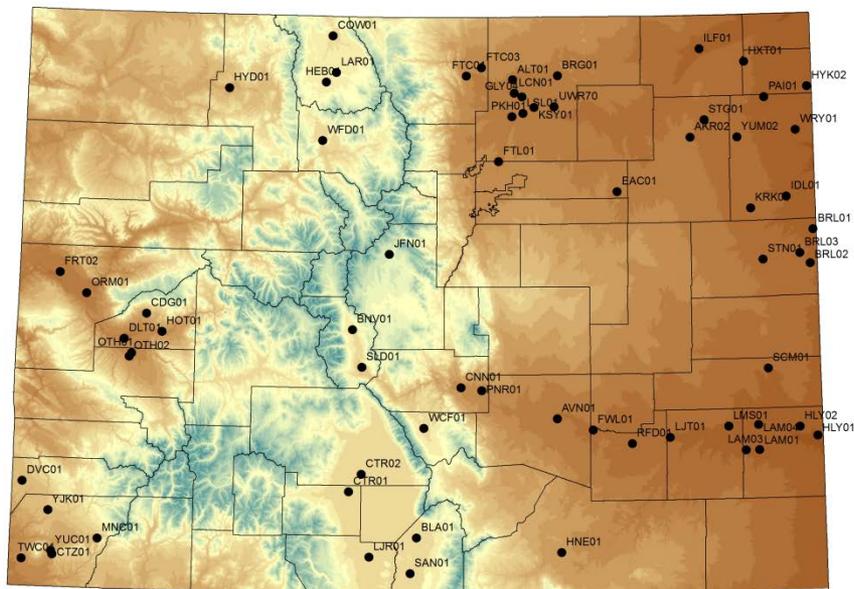
Released Thursday, August 30, 2012

Author: Brian Fuchs, National Drought Mitigation Center

<http://droughtmonitor.unl.edu/>

Based on 20 years of data from CoAgMet – our agricultural weather monitoring network -- 2012 was an **extreme** year for evapotranspiration

Current CoAgMet Station Locations - July 2012

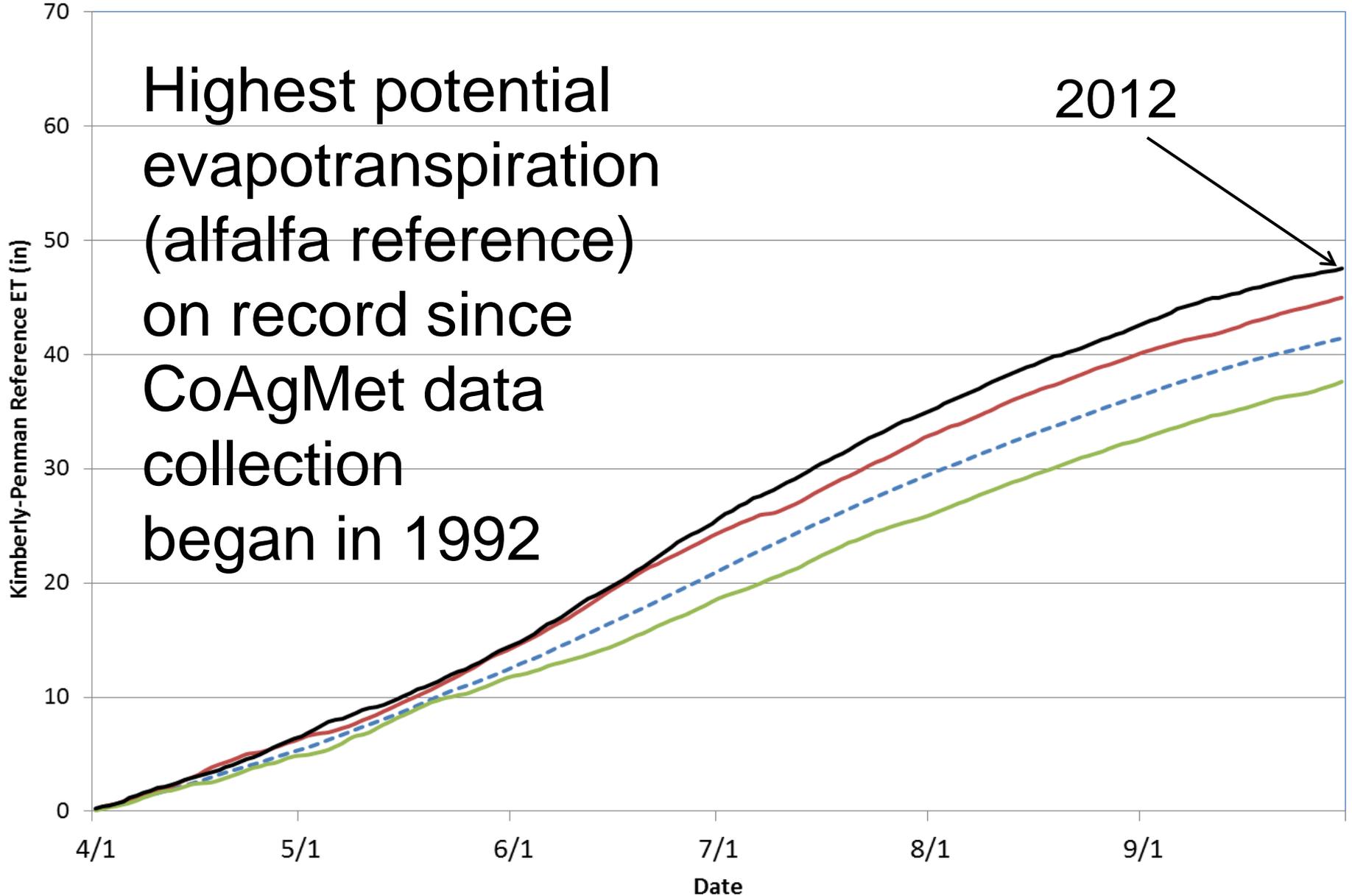


Lucerne Kimberly-Penman Reference ET (1992 - 2012)

--- Average — 2006 — 2009 — 2012

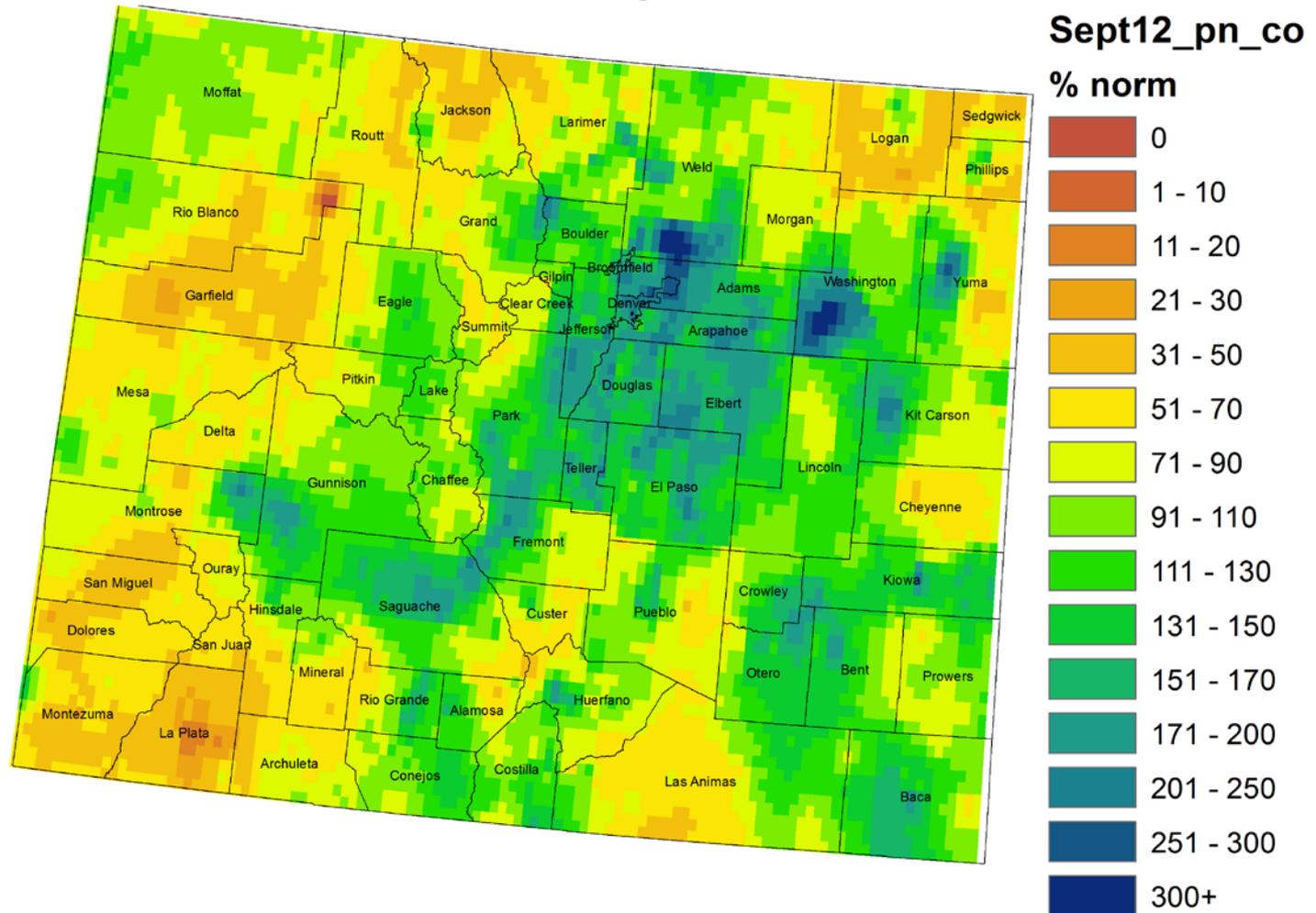
Highest potential
evapotranspiration
(alfalfa reference)
on record since
CoAgMet data
collection
began in 1992

2012



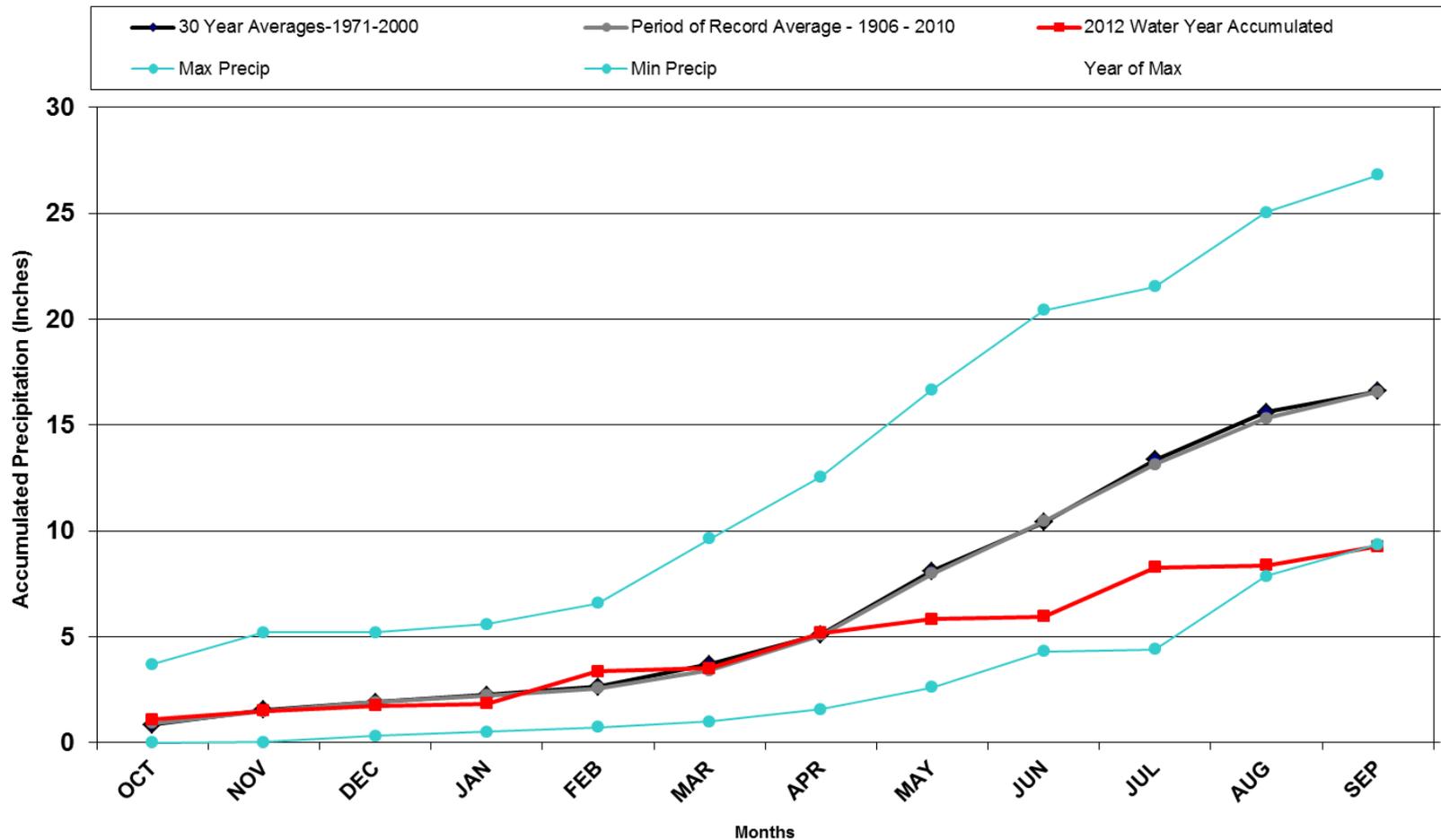
Another round of beneficial moisture in parts of the basin in September

Colorado September 2012 Precipitation
as Percentage of Normal



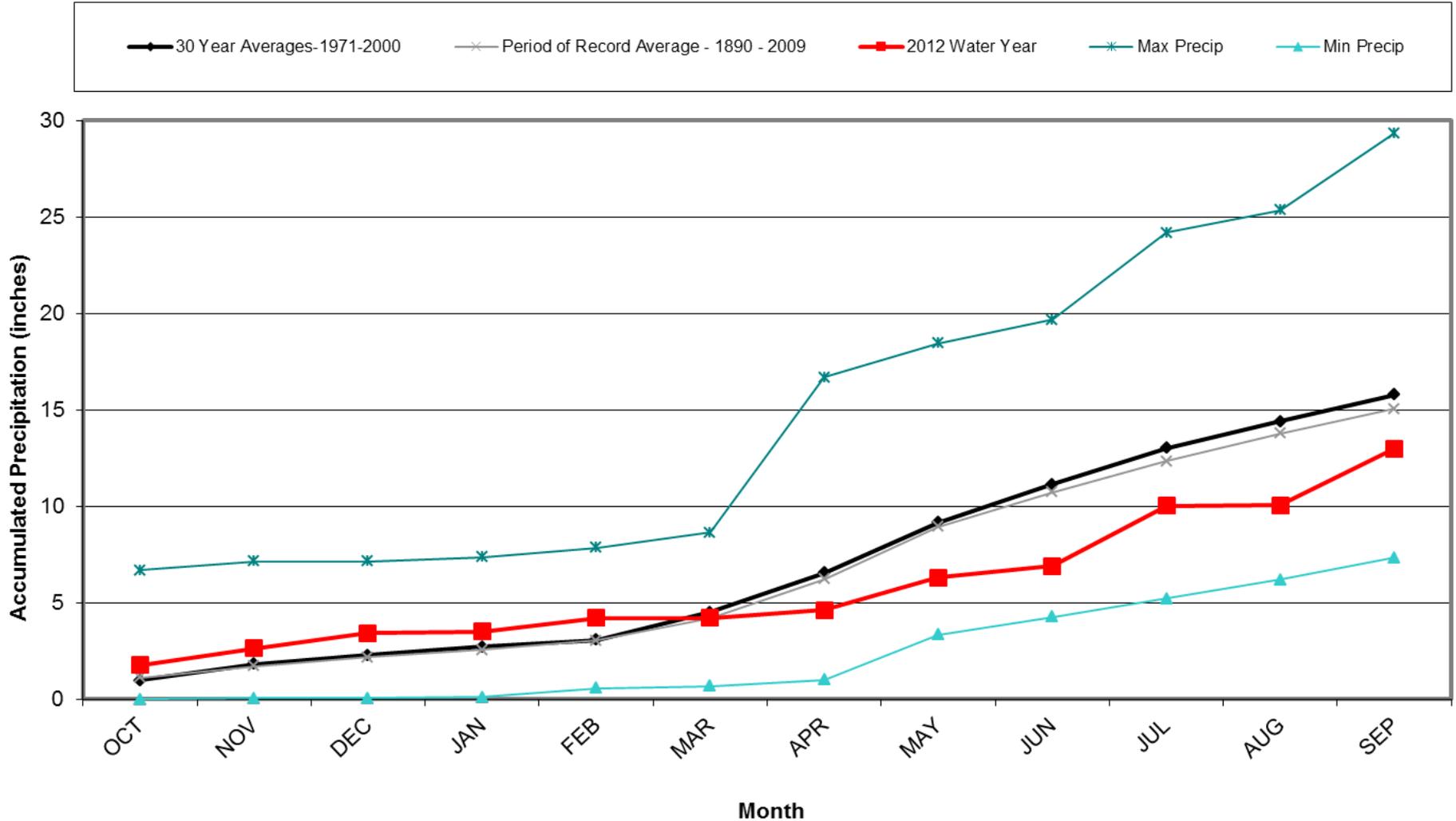
Precipitation was too little and too late for most agricultural needs

Akron 4E 2012 Water Year



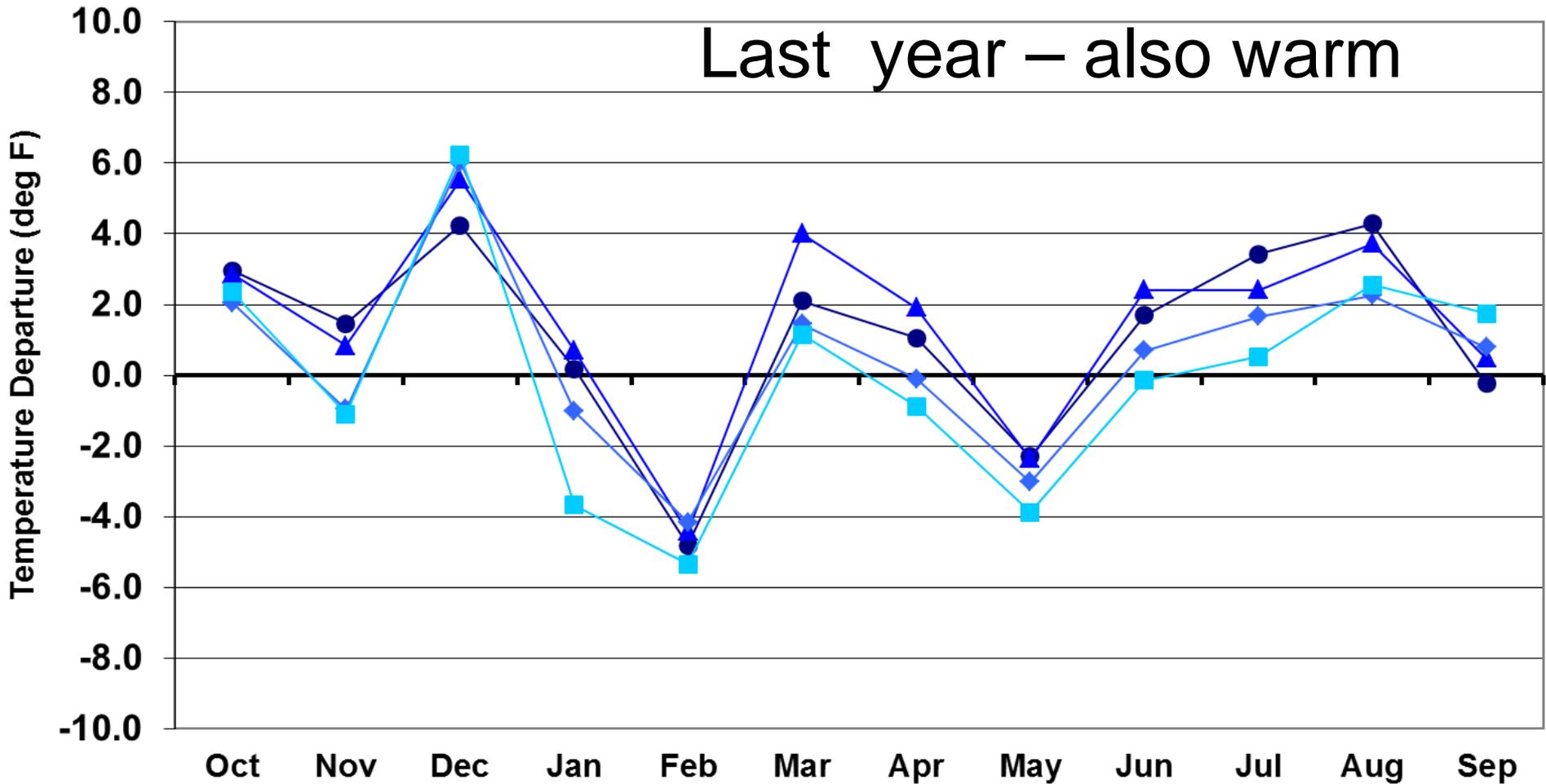
So let's put the year in perspective

Fort Collins 2012 Water Year



Water Year Temperature Departure

Water Year 2011



● Eastern Plains

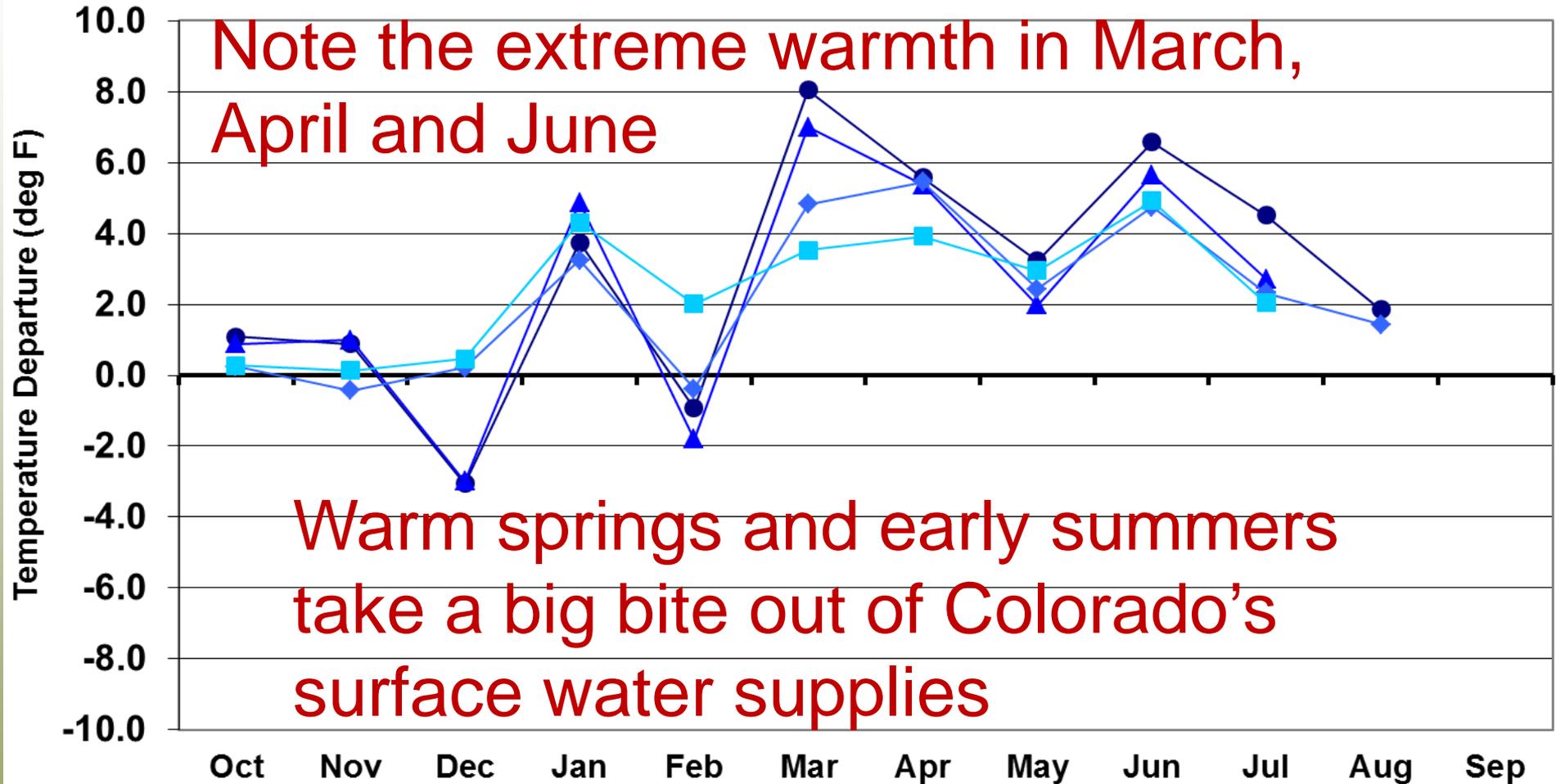
▲ Foothills

◆ Mountains

■ Western Valleys

Water Year Temperature Departure

Water Year 2012



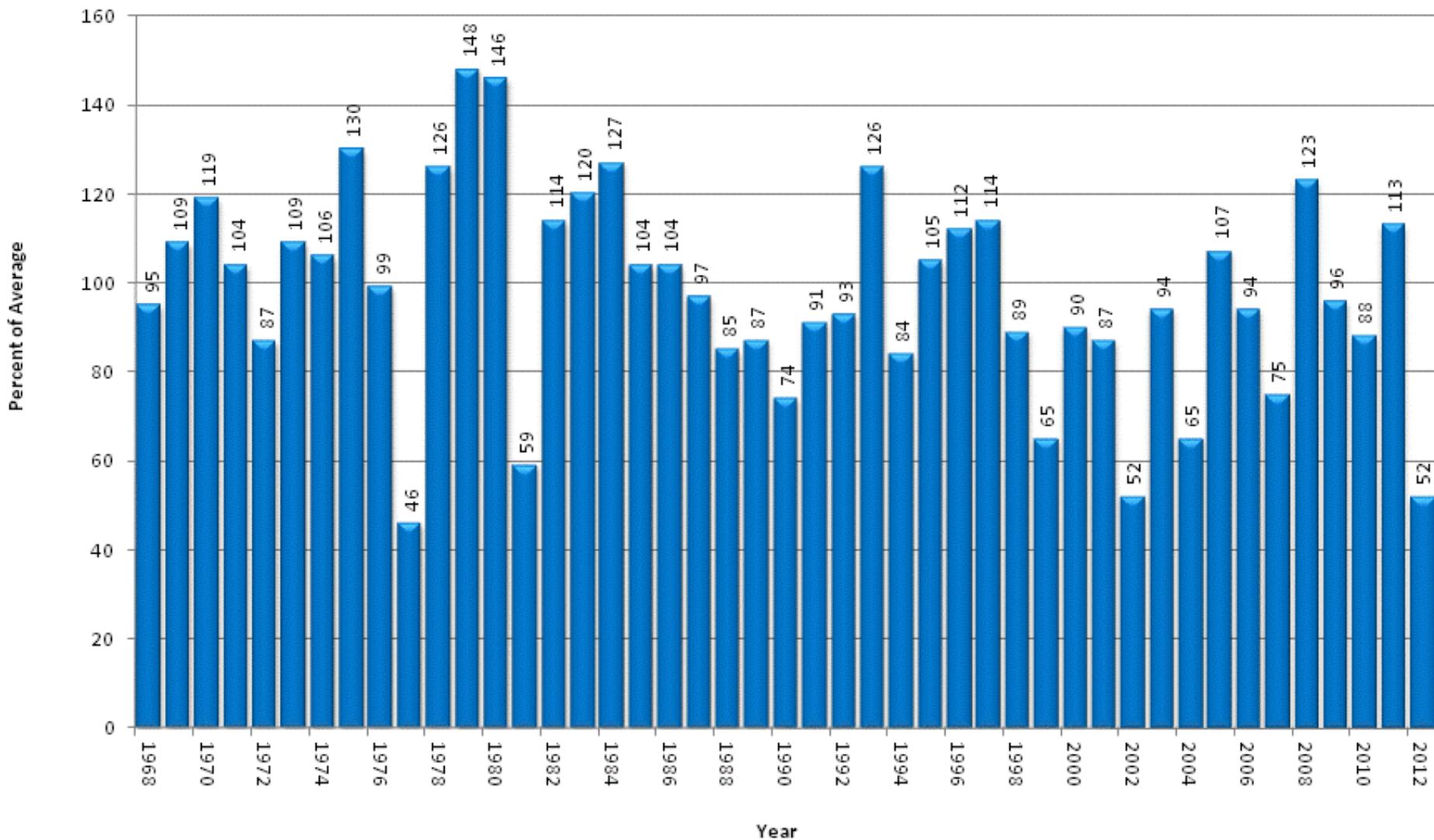
● Eastern Plains

▲ Foothills

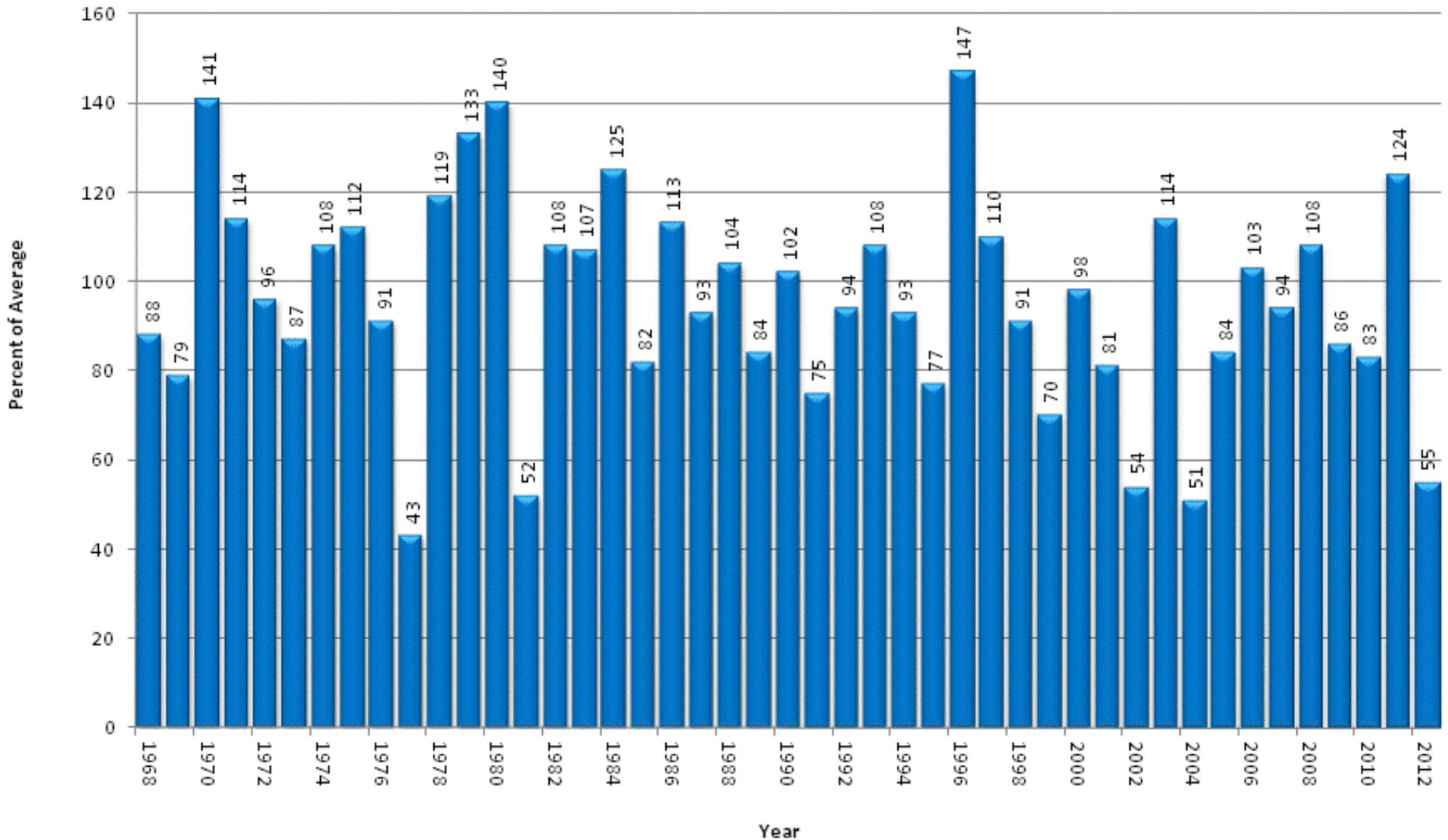
◆ Mountains

■ Western Valleys

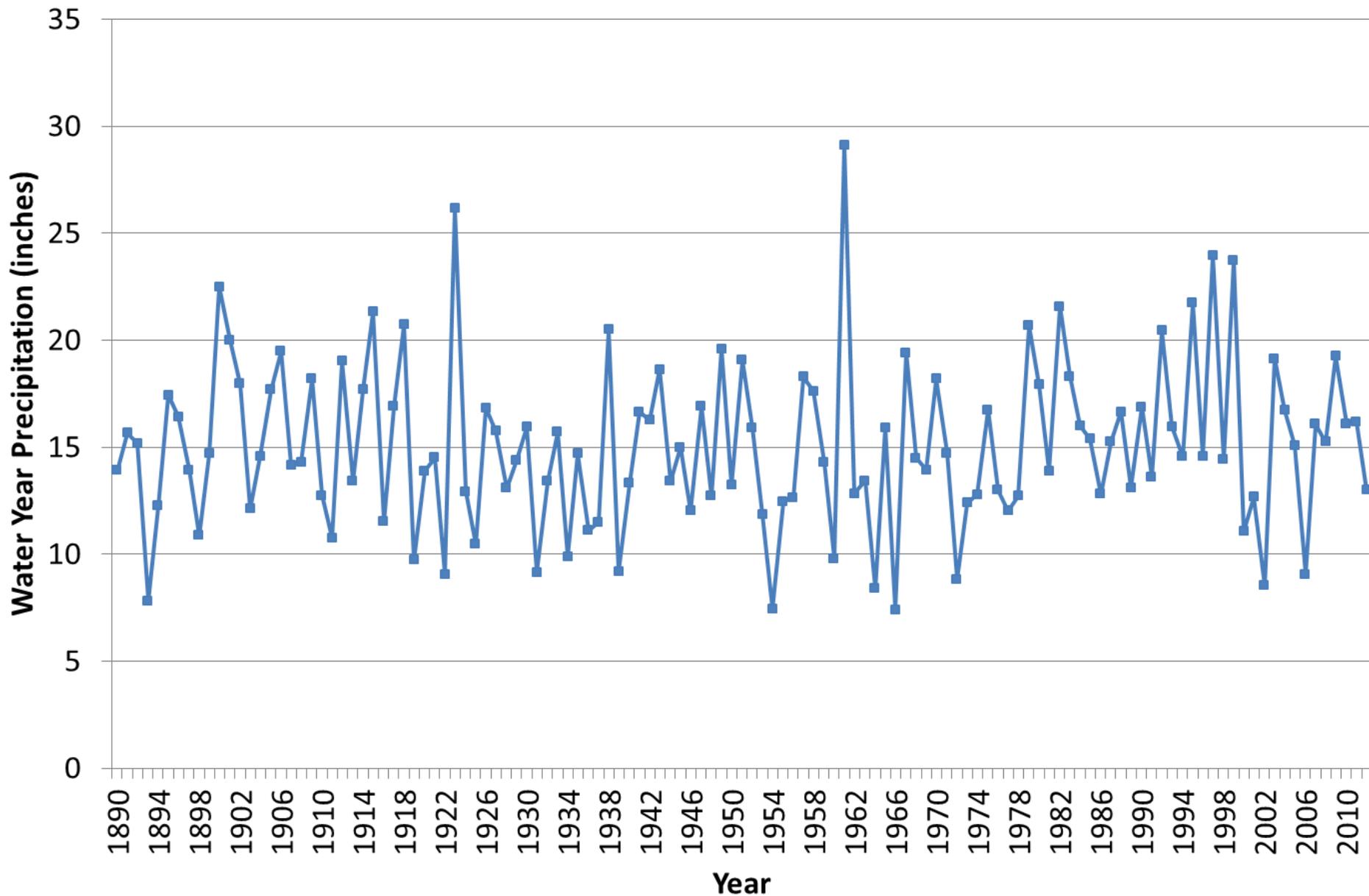
April 1 Colorado Statewide Snowpack



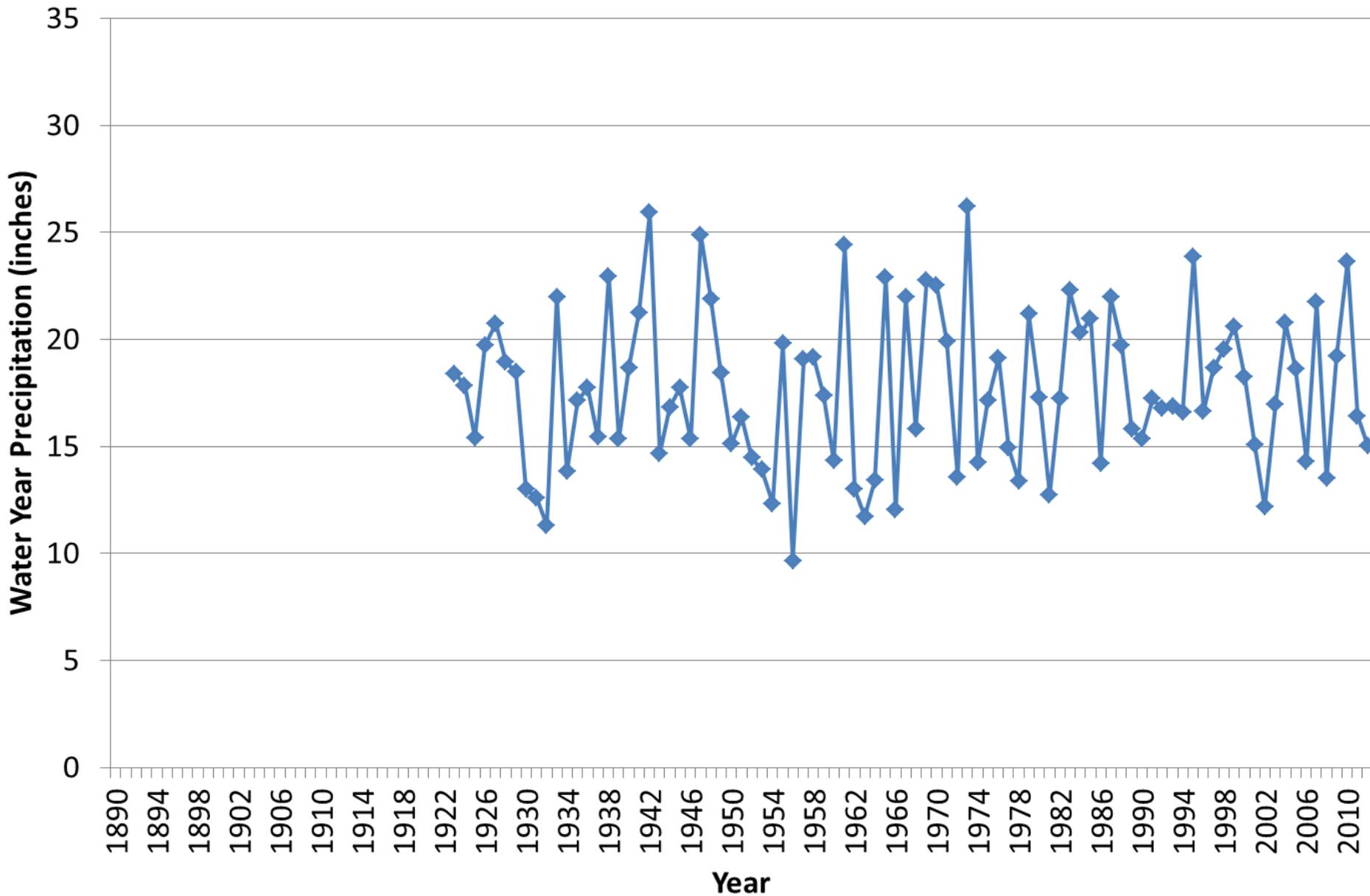
April 1 South Platte River Basin Snowpack



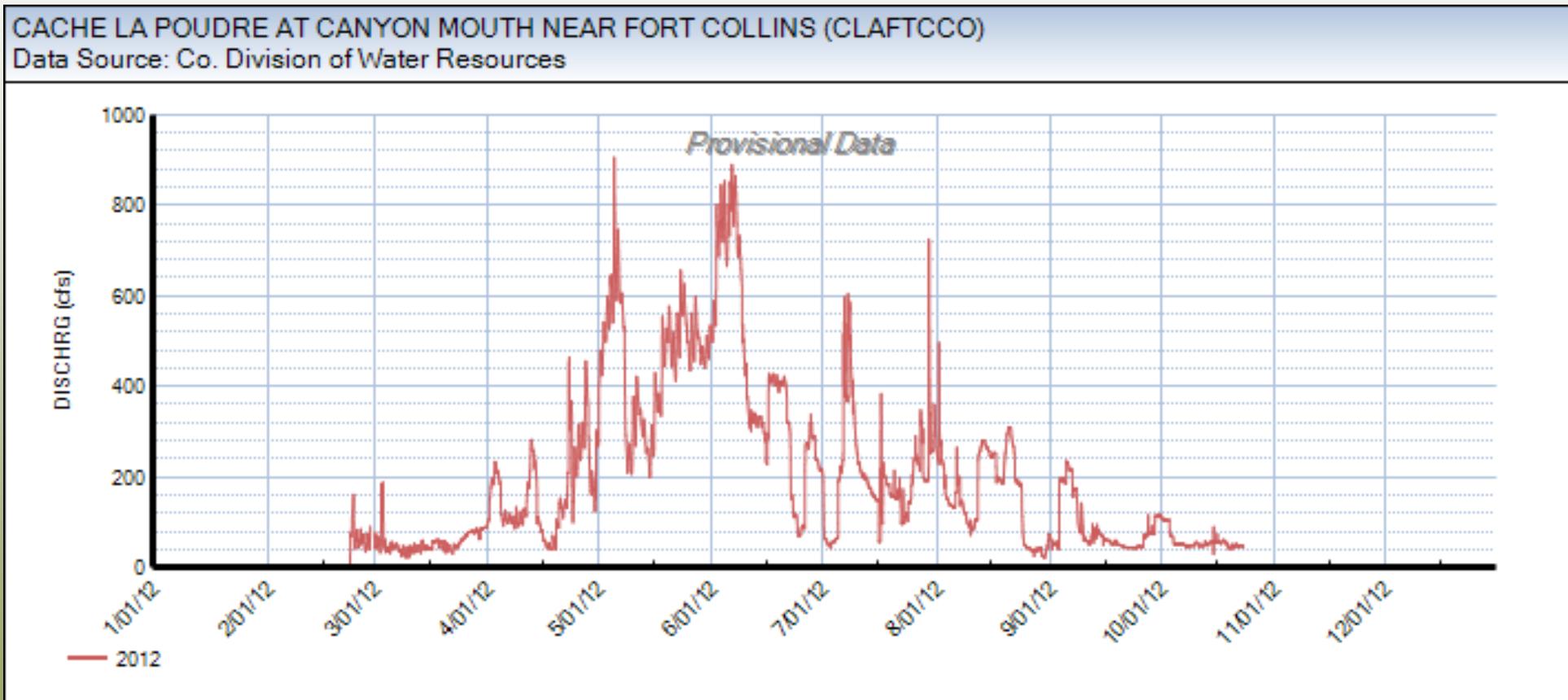
Fort Collins Water Year (Oct - Sep) Precipitation



Kassler, CO Water Year (Oct - Sep) Precipitation

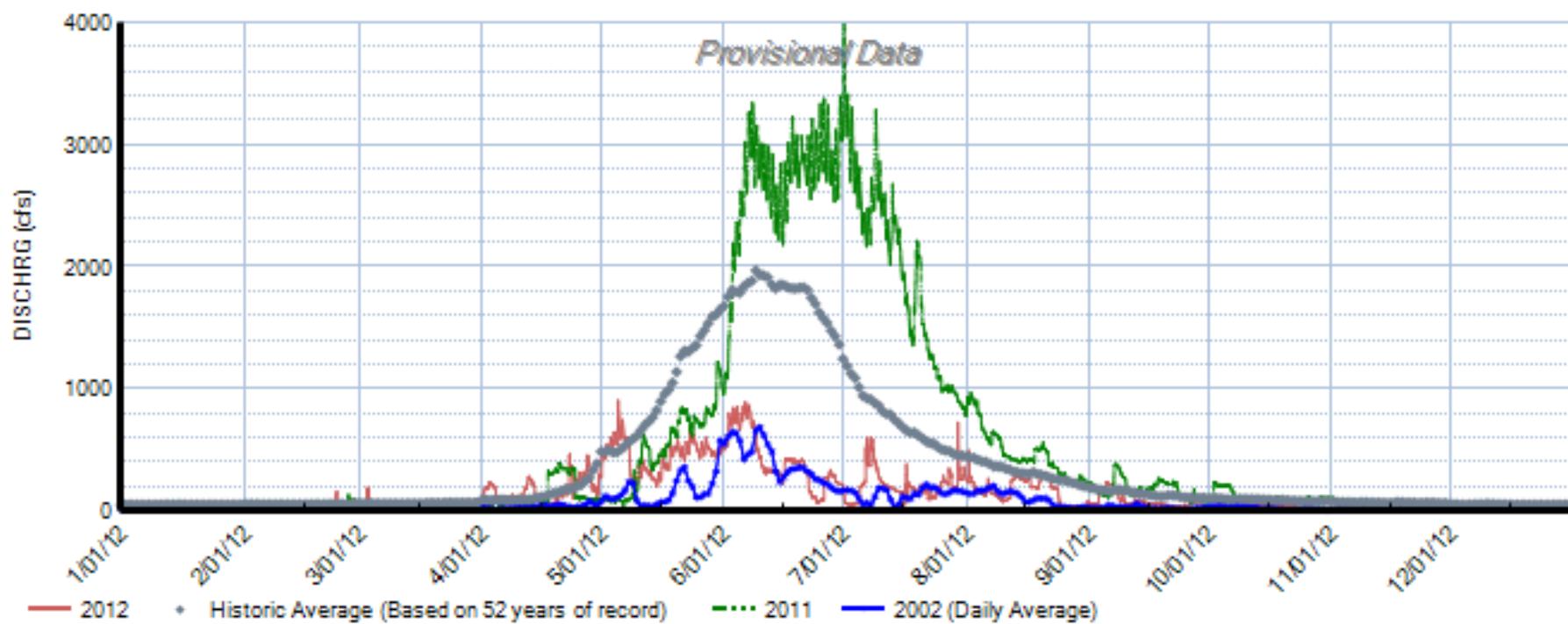


Cache La Poudre at Canyon Mouth near Fort Collins Streamflow

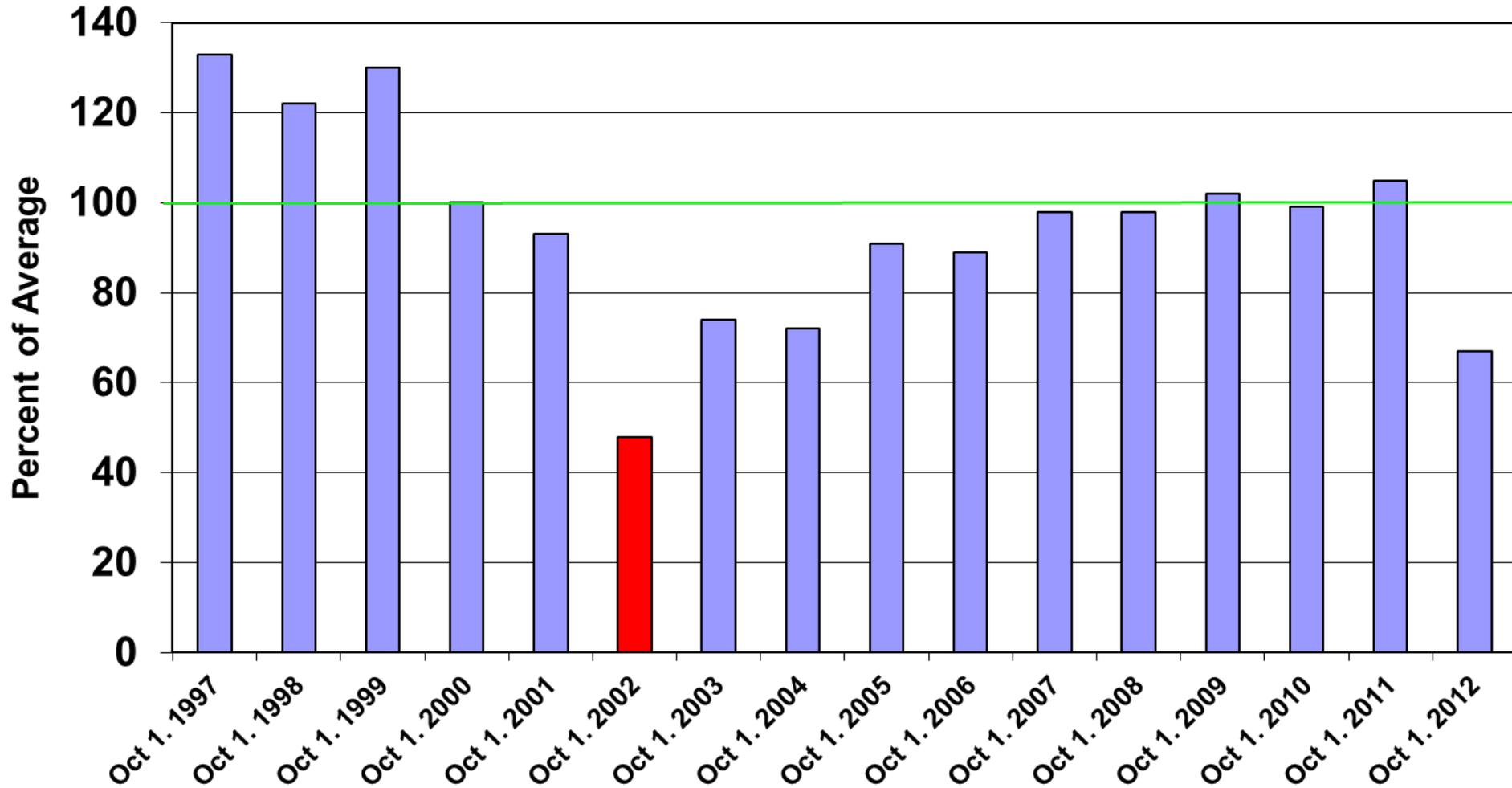


CACHE LA POUDBRE AT CANYON MOUTH NEAR FORT COLLINS (CLAFTCCO)

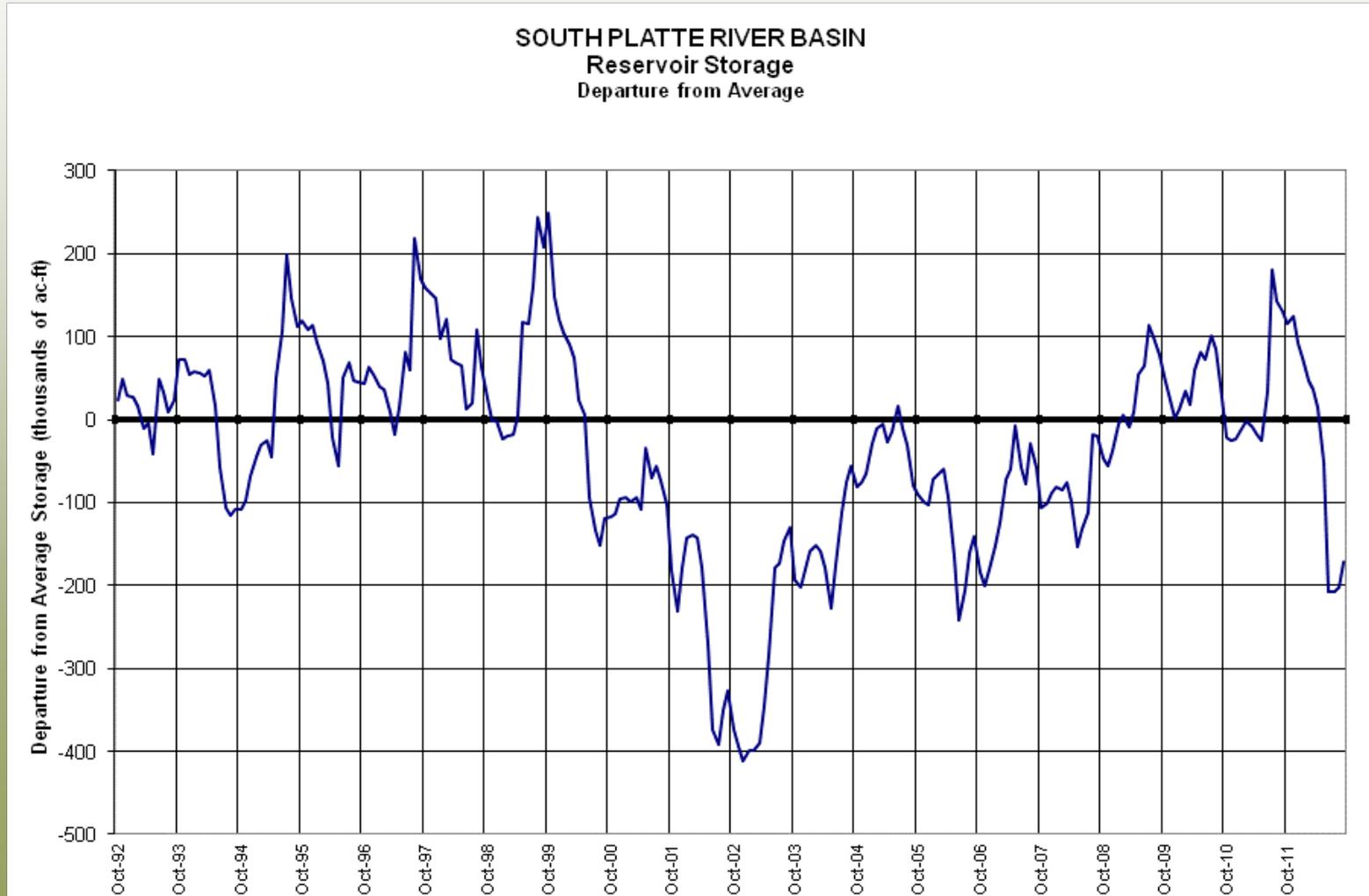
Data Source: Co. Division of Water Resources



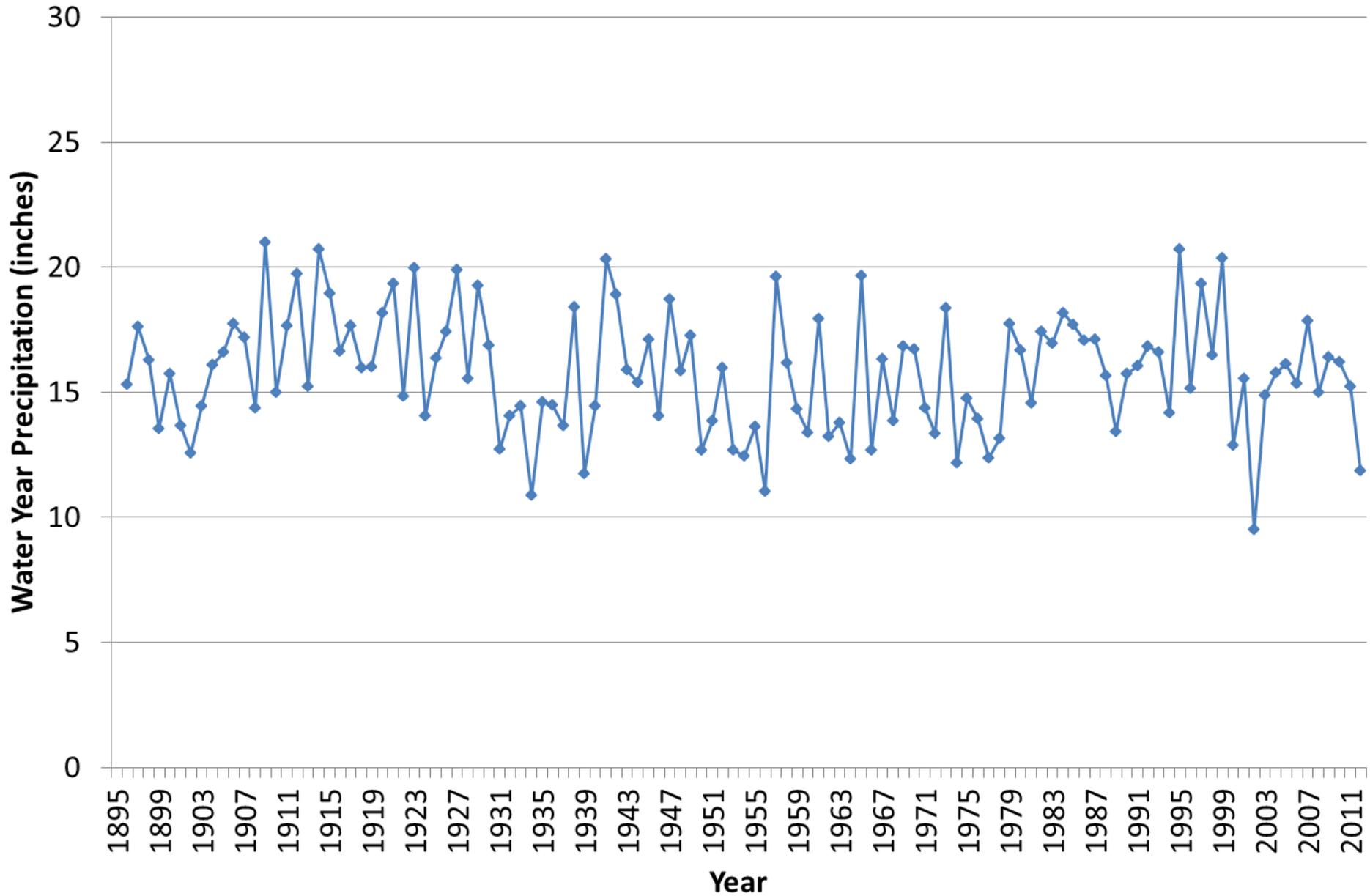
Colorado Statewide Reservoir Levels on October 1st for Years 1997- 2012



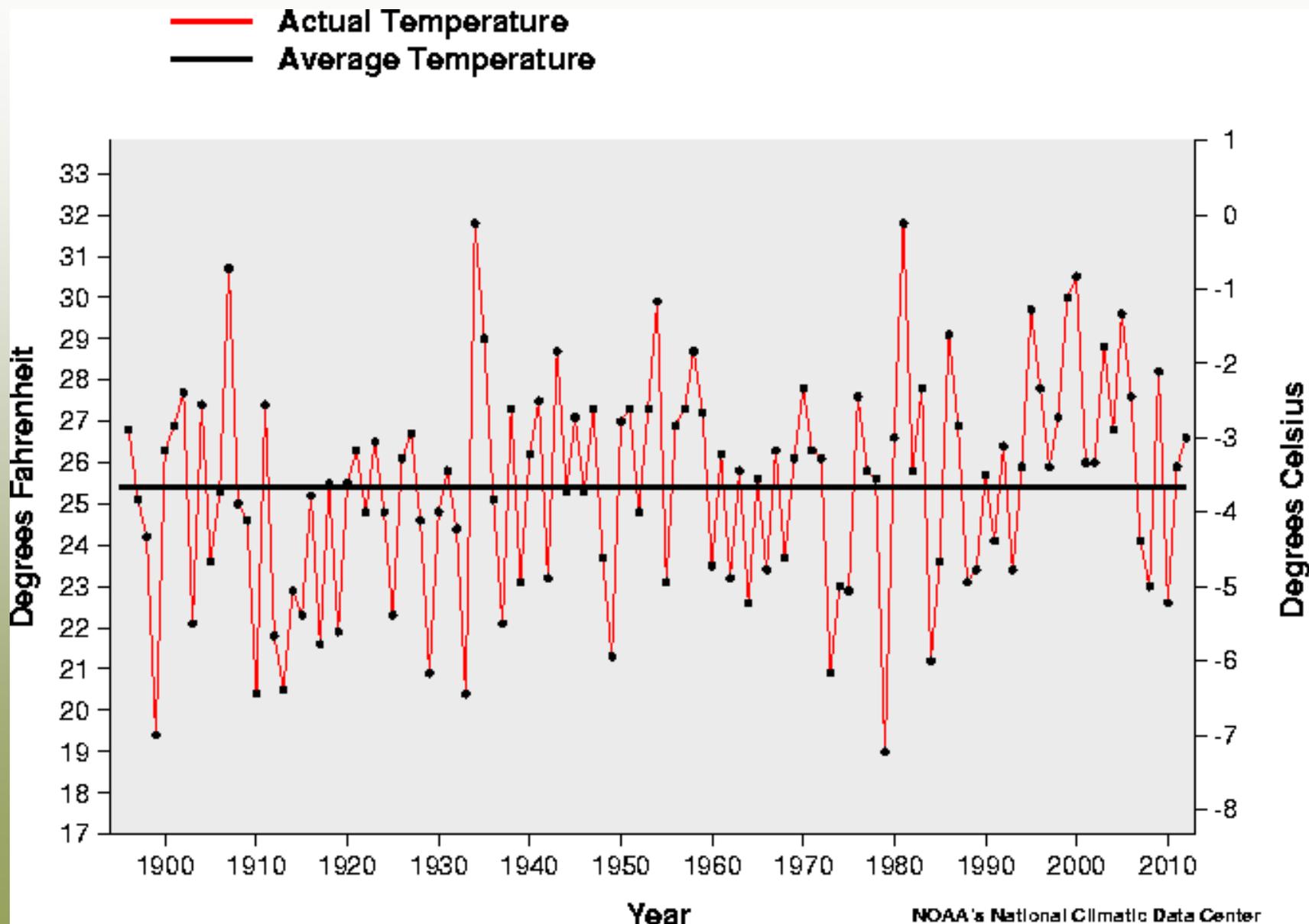
Imagine 2012 without reservoirs



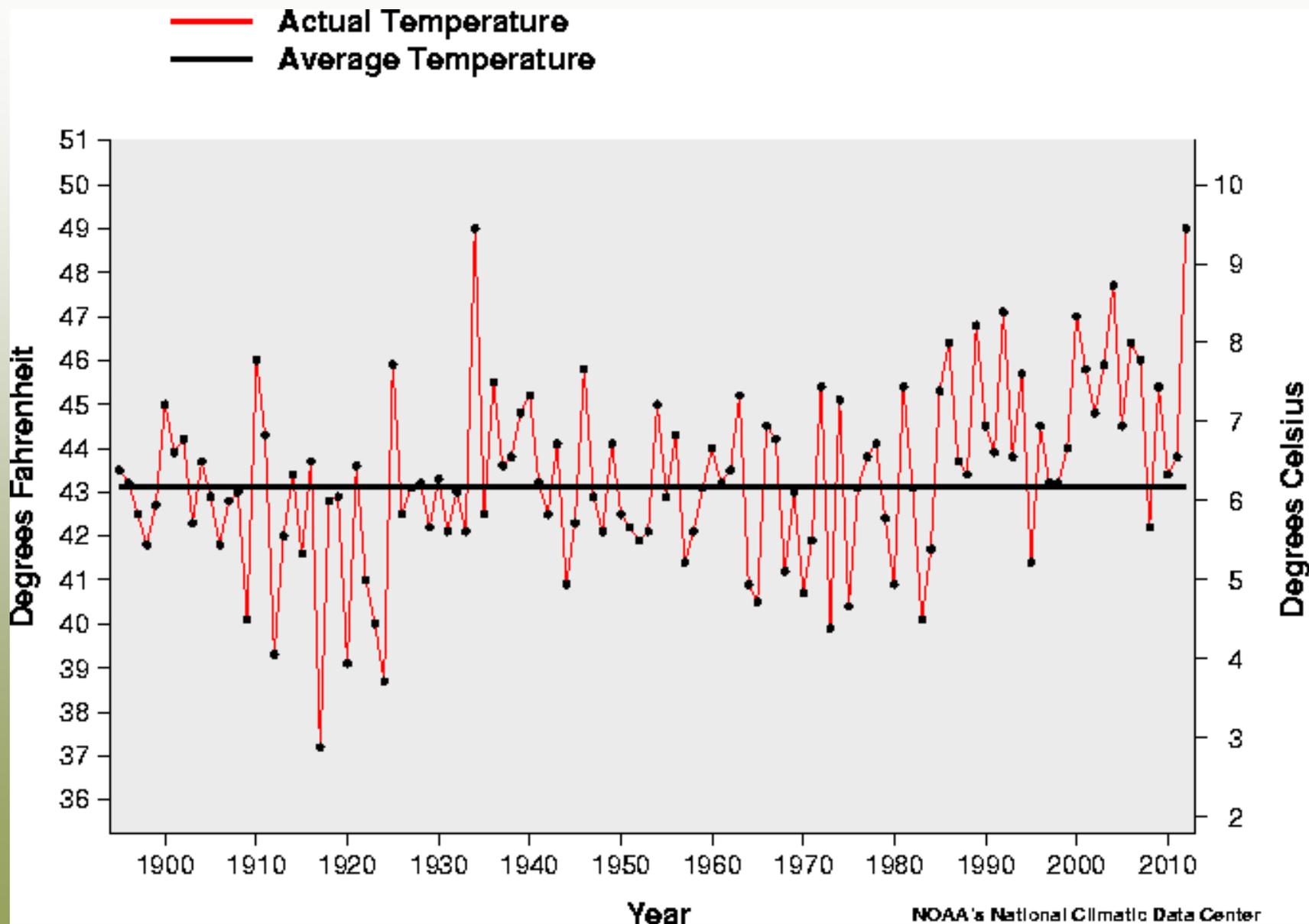
Colorado Statewide Water Year (Oct - Sep) Precipitation



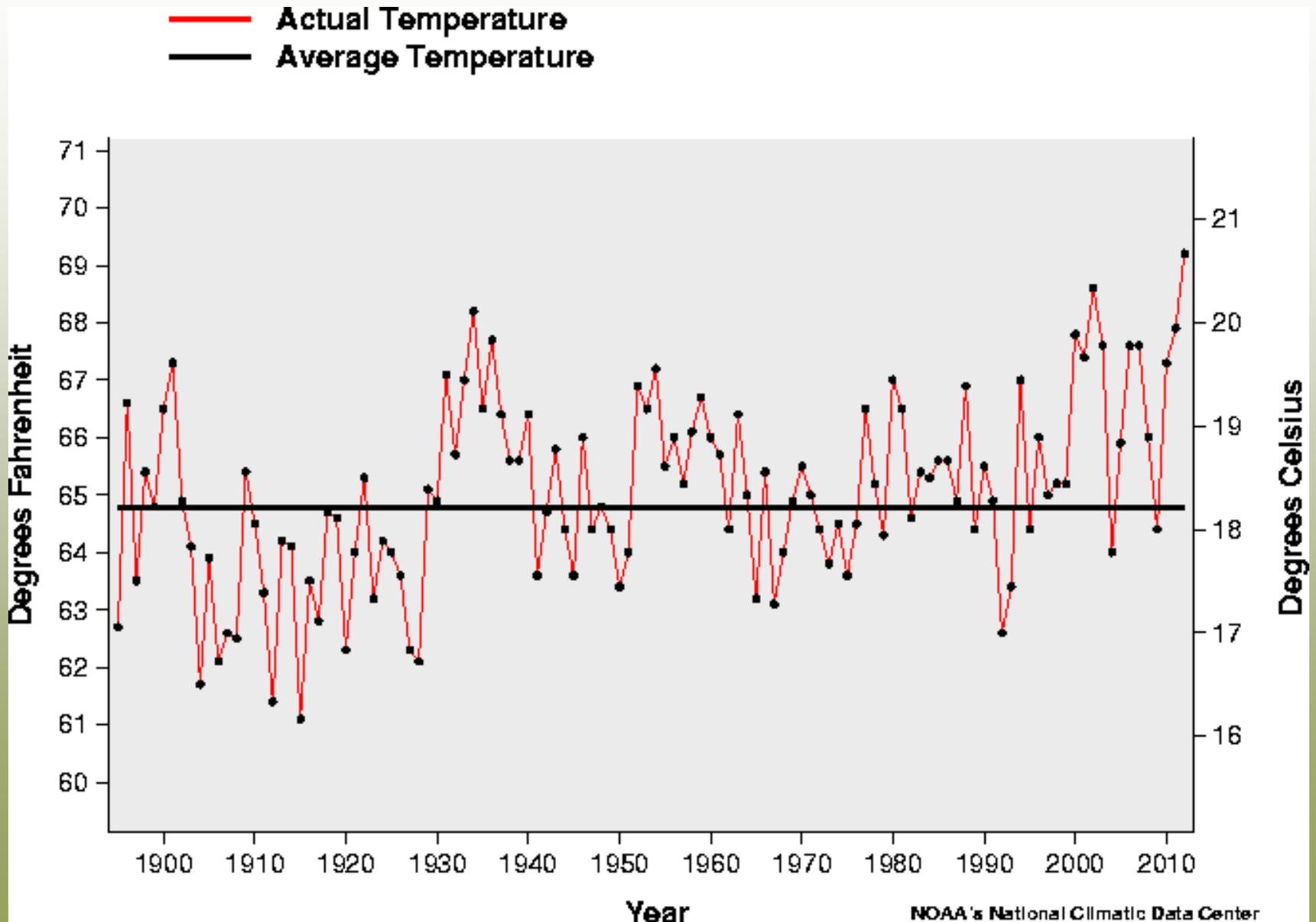
Colorado Statewide Mean Winter Temperature (Dec – Feb)



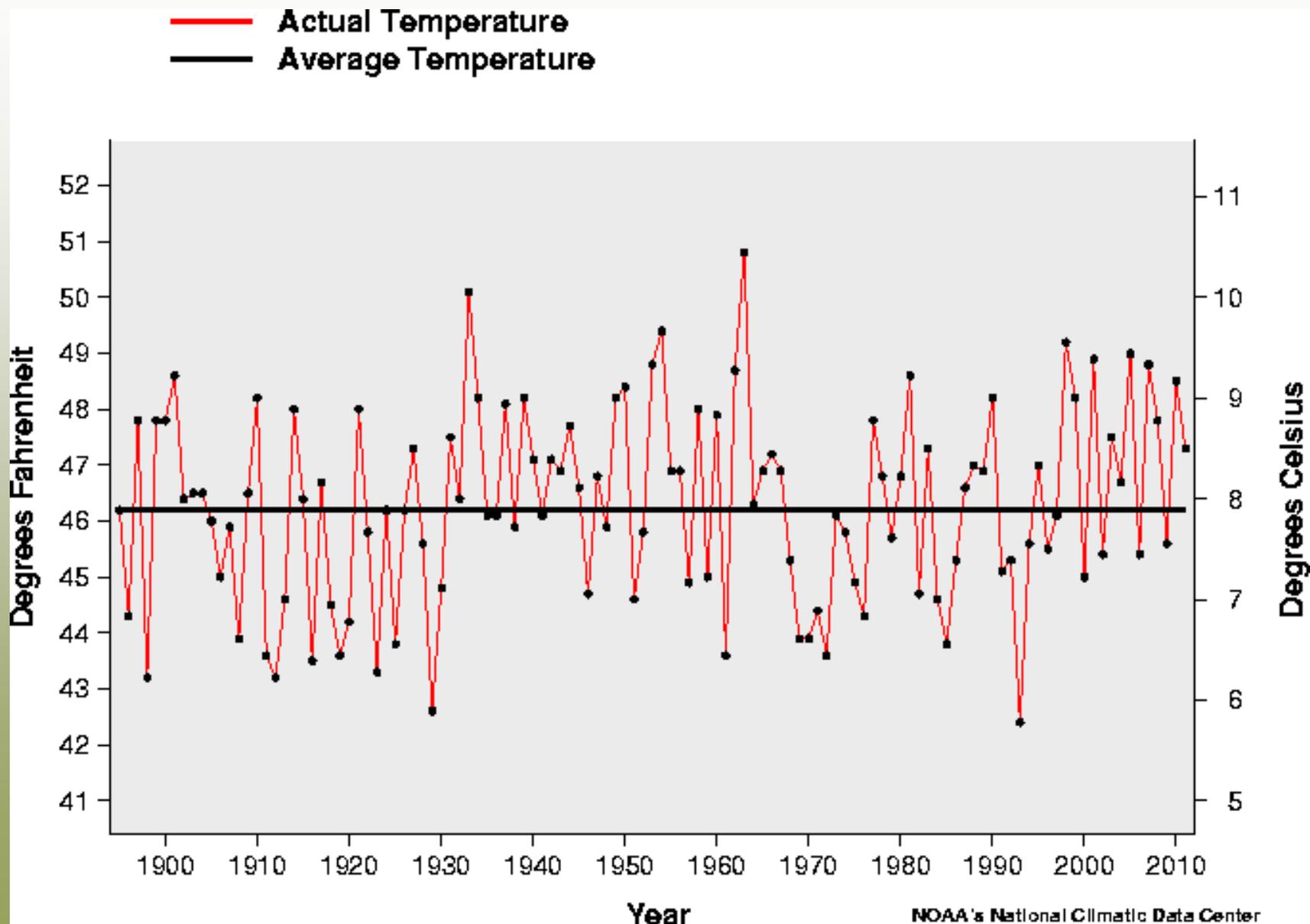
Colorado Statewide Mean Spring Temperature (Mar - May)



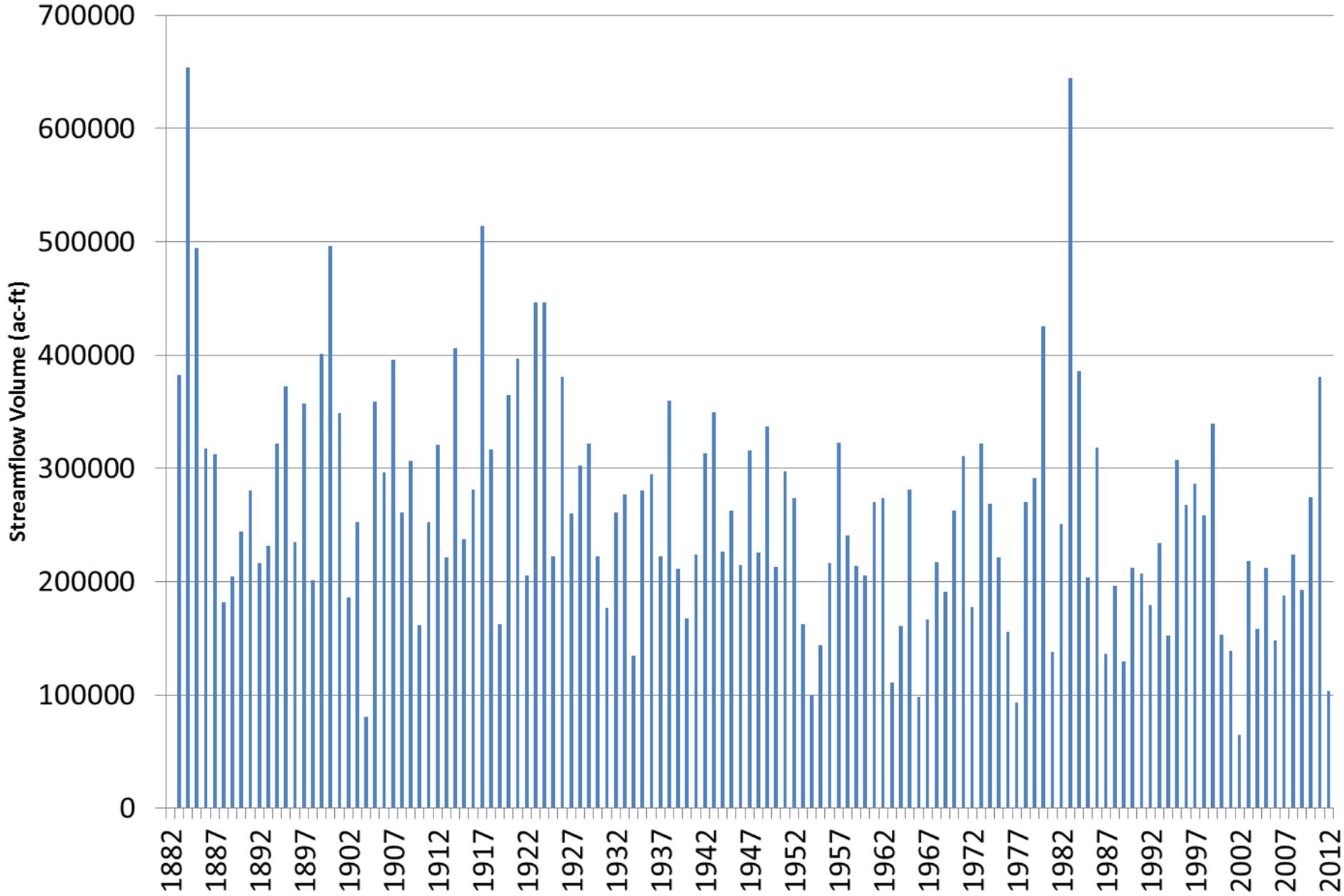
Colorado Statewide Mean Summer Temperature (Jun - Aug)



Colorado Statewide Mean Fall Temperature through 2011 (Sep – Nov)



Poudre River at Canyon Mouth Water Year Streamflow

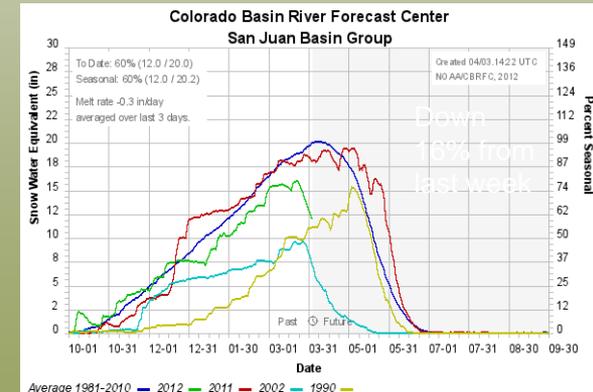
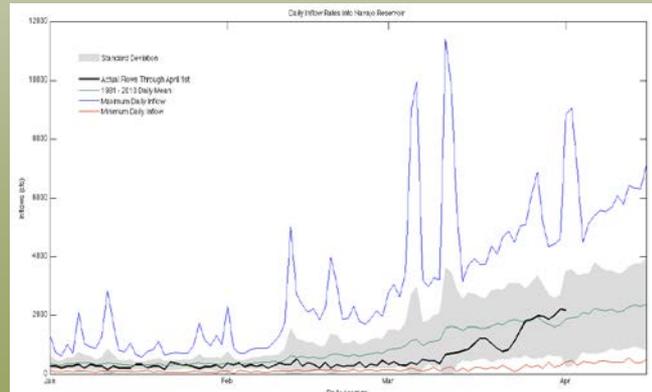
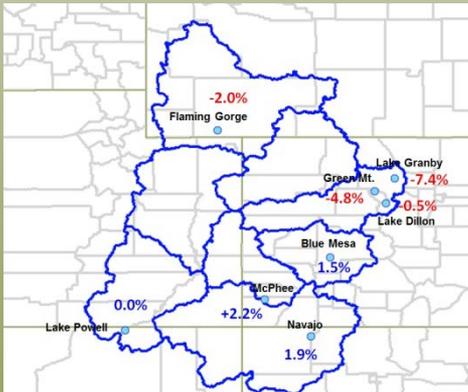
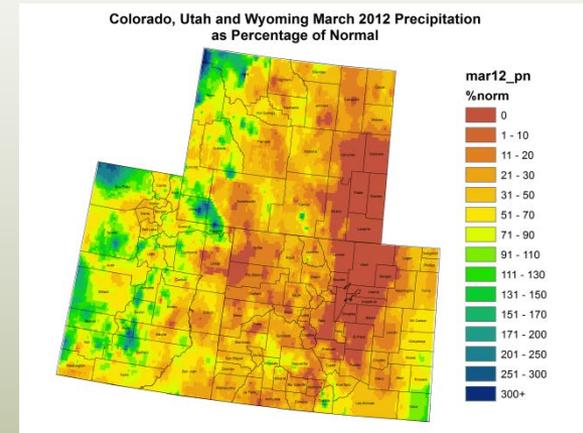
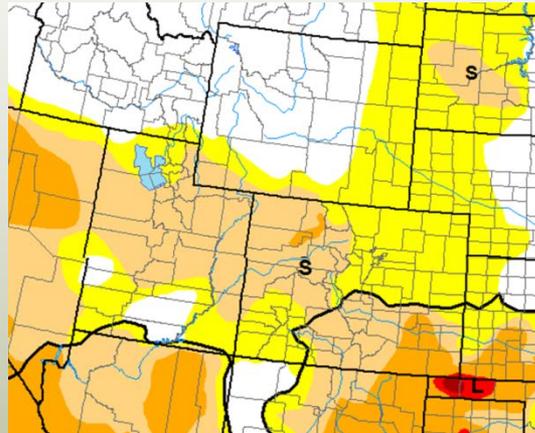
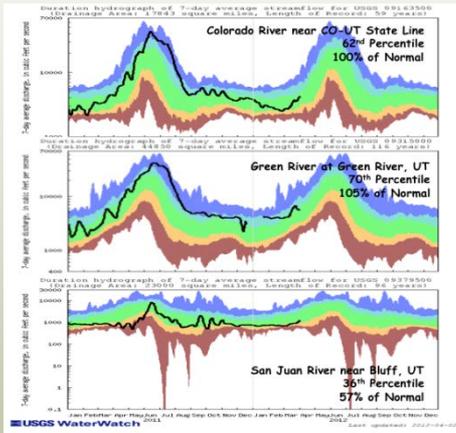


So now what??



Enhanced Drought Early Warning -- weekly updates

National Integrated Drought Information System (NIDIS)



Give me your business card today
and we'll get you on this
Drought Monitoring
e-mail list

You will never again go all week
without getting e-mail 😊



2012

www.water2012.org

CoCoRaHS and Colorado Water 2012

- CoCoRaHS offered free rain gauges to ALL schools in Colorado (1,800+)
- Local communities/organizations donated the gauges
- Over 100 schools signed up and received training
- Ongoing efforts to train, provide lesson plans and recruit

How Can you Help Beyond 2012?



www.cocorahs.org

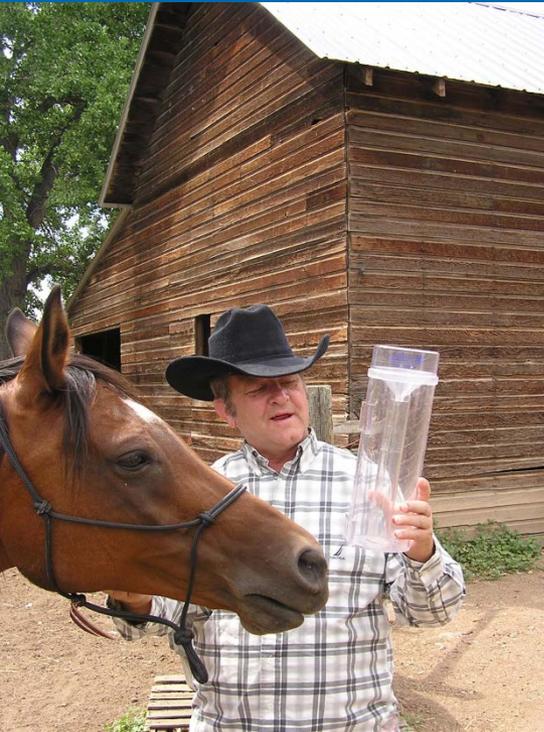


Contact:
education@cocorahs.org

**Sponsor a
gauge!**

**Mentor a
School!**

Also, Please Help Us Monitor Colorado's Climate!

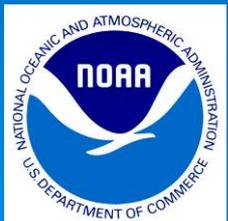


Photos by H. Reges

For information and to volunteer, visit the CoCoRaHS Web Site

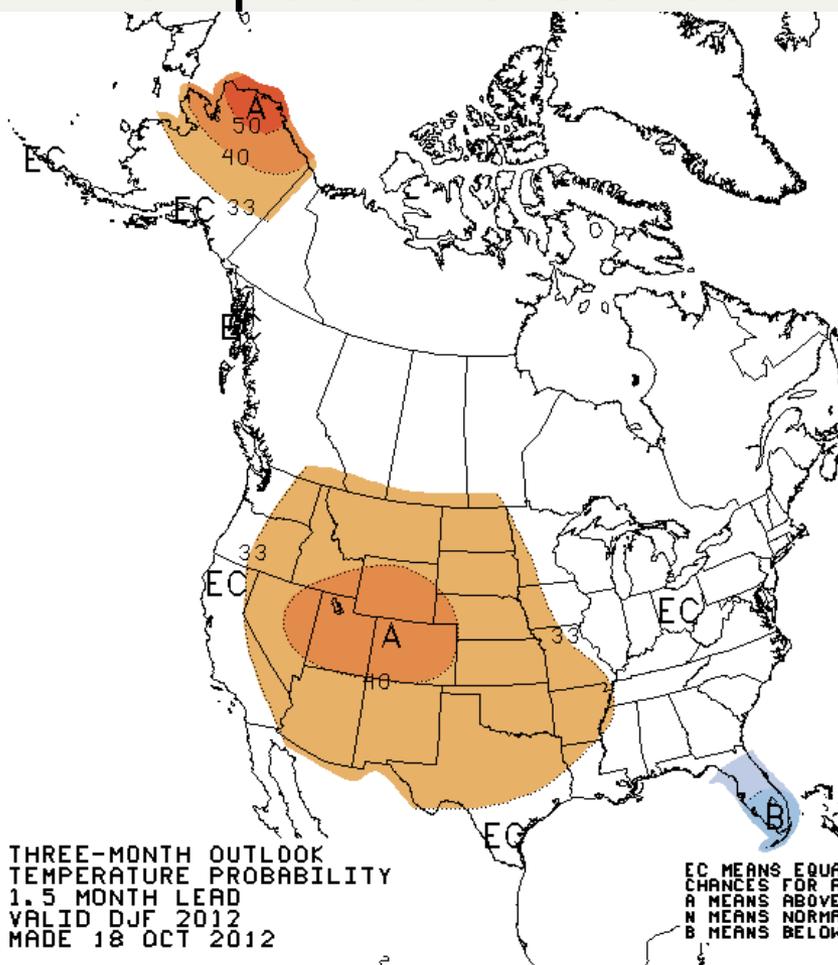


<http://www.cocorahs.org>

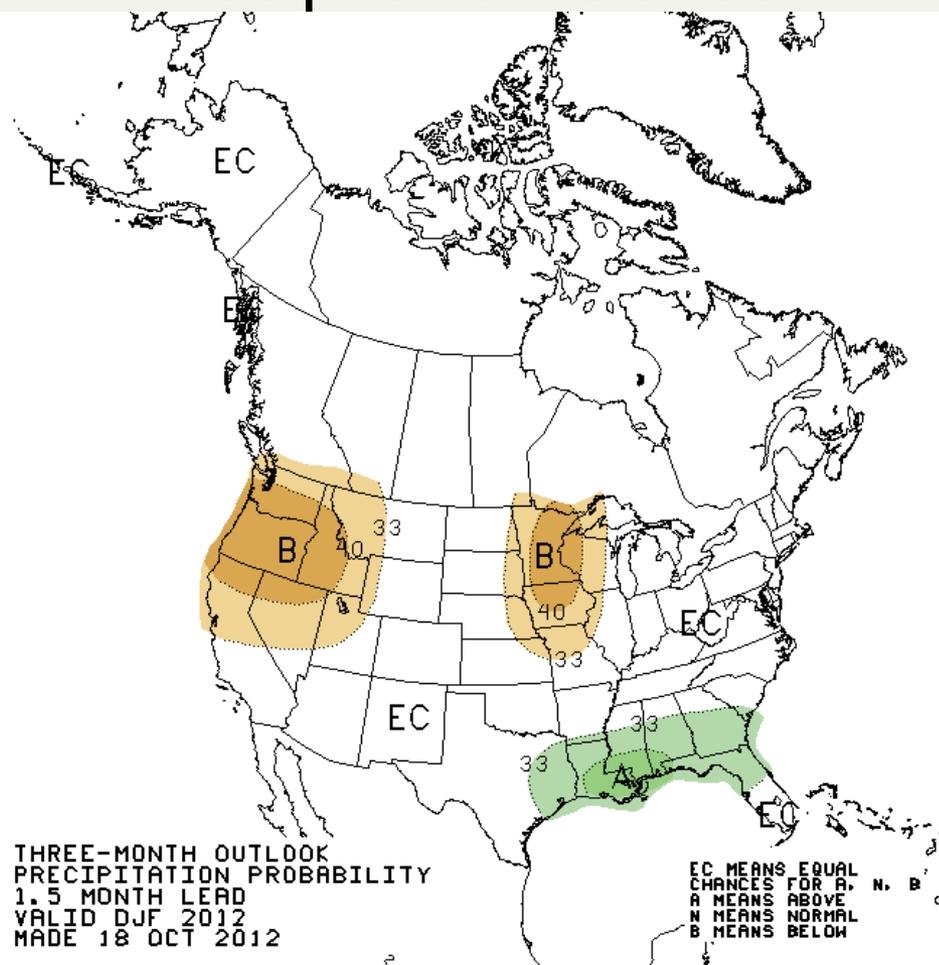


Support for this project provided by
NSF Informal Science Education Program,
NOAA Environmental Literacy Program
and
many local charter sponsors.

CPC December, January, February Temperature Outlook



CPC December, January, February Precipitation Outlook



Colorado Climate Center

Data and Power Point Presentations available for downloading

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

Nolan.Doesken@Colostate.edu

