



# Upper Colorado River Basin Climate And Drought Update

Nolan Doesken

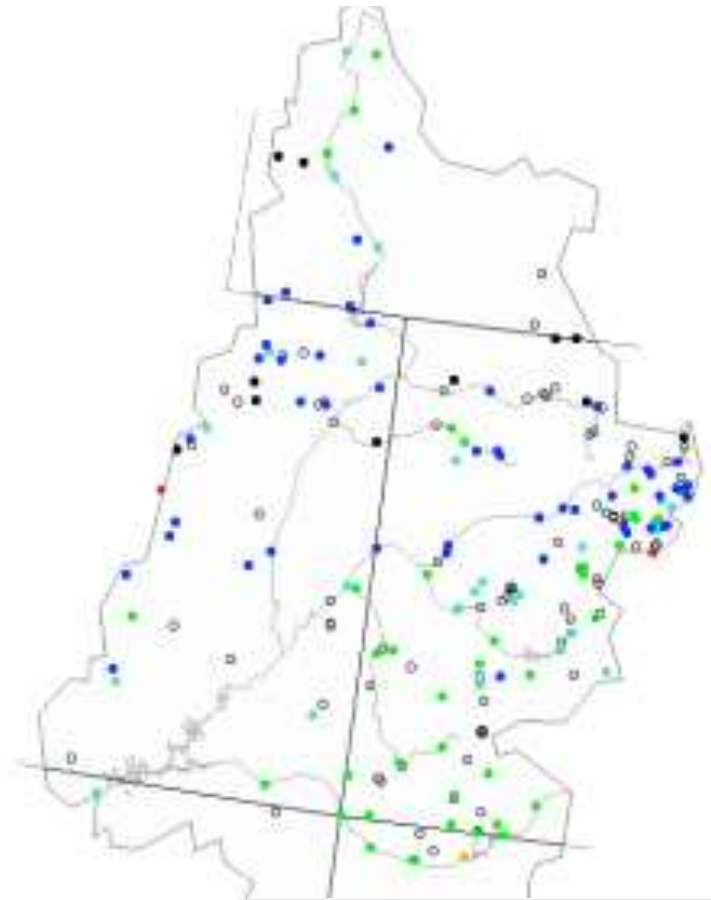
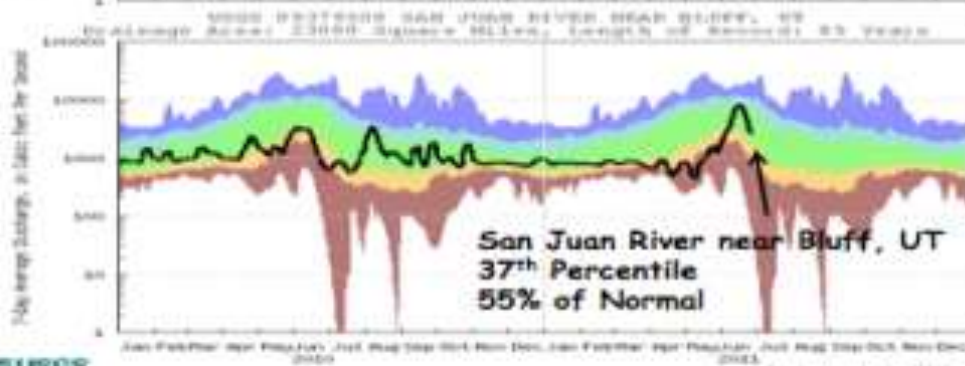
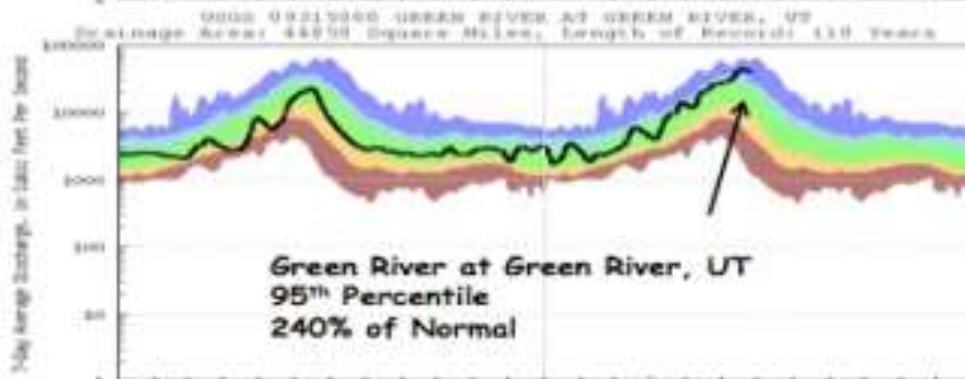
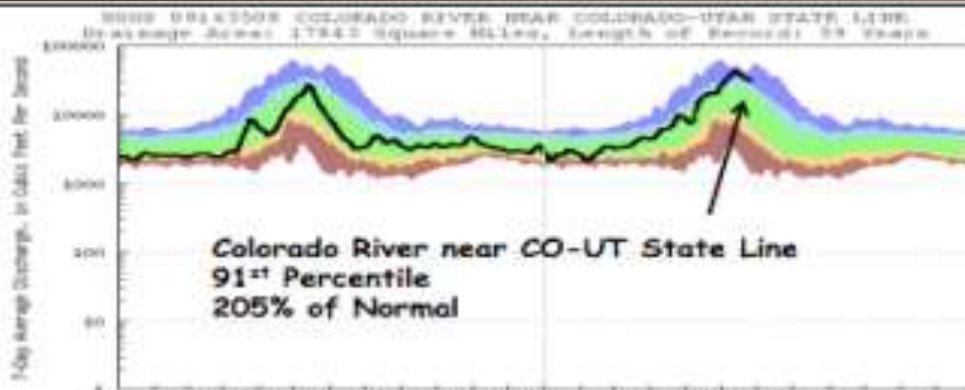
Wendy Ryan

Let's take a look at Current Conditions  
and their evolution since 2011



# 2011 Runoff

June 26, 2011



Explanation - Percentile classes

Low	<10 Much below normal	10-24 Below normal	25-75 Normal	76-90 Above normal	>90 Much above normal	High
						Not-ranked

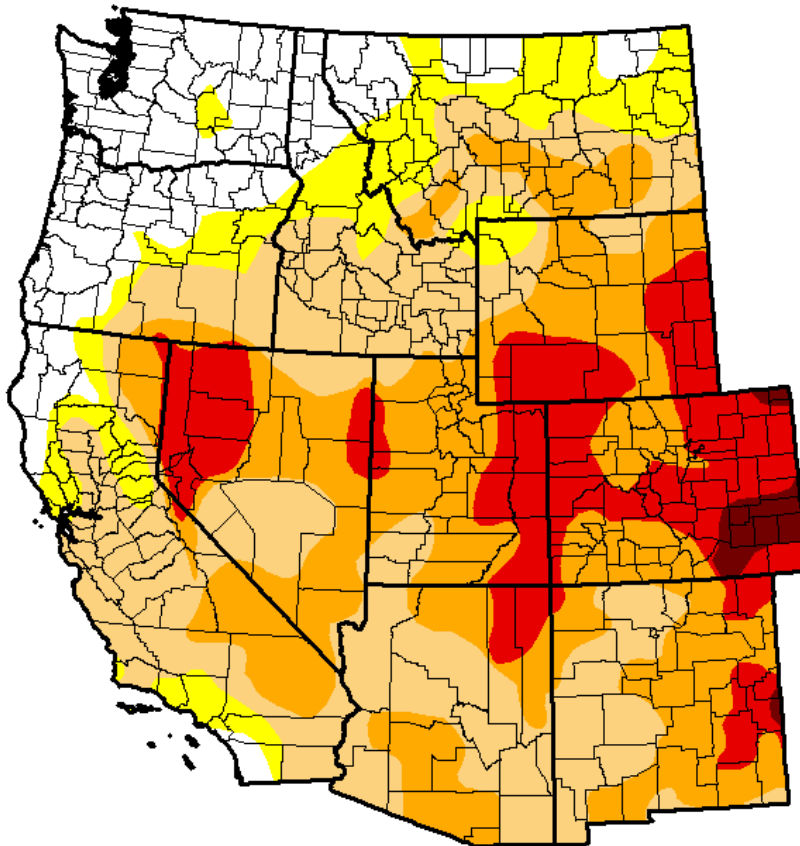
# 2012 Drought

## U.S. Drought Monitor West

**August 28, 2012**

*(Released Thursday, Aug. 30, 2012)*

Valid 7 a.m. EST



*Drought Conditions (Percent Area)*

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
<b>Current</b>	15.07	84.93	74.27	44.37	15.89	1.15
<b>Last Week</b> <i>8/21/2012</i>	15.32	84.68	74.24	48.34	14.68	0.85
<b>3 Months Ago</b> <i>5/29/2012</i>	29.34	70.66	53.34	31.06	4.86	0.00
<b>Start of Calendar Year</b> <i>1/3/2012</i>	50.20	49.80	28.05	11.84	2.67	0.78
<b>Start of Water Year</b> <i>9/27/2011</i>	66.72	33.28	19.04	14.99	9.30	3.81
<b>One Year Ago</b> <i>8/30/2011</i>	52.33	47.67	18.10	4.84	0.00	0.00

Intensity:



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

**Author:**

*Brian Fuchs*

*National Drought Mitigation Center*



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

# Drought and Water Discussion

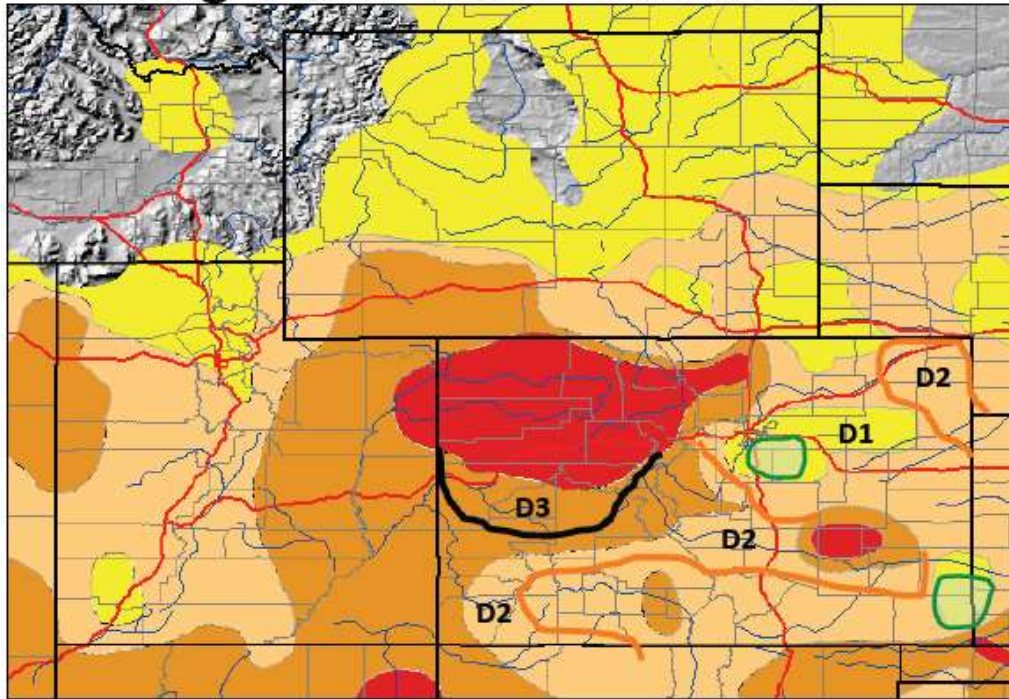
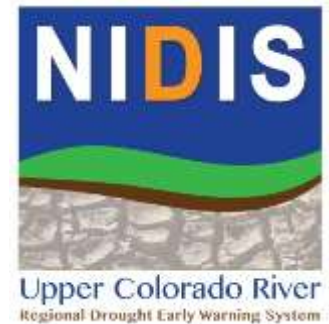


Fig. 7: June 12<sup>th</sup> release of U.S. Drought Monitor for the UCRB.

Drought – Exceptional	0 to 2 (D4)
Drought – Extreme	2 to 5 (D3)
Drought – Severe	5 to 10 (D2)
Drought – Moderate	10 to 20 (D1)
Abnormally Dry	20 to 30 (D0)

Drought categories and their associated percentiles



## UCRB:

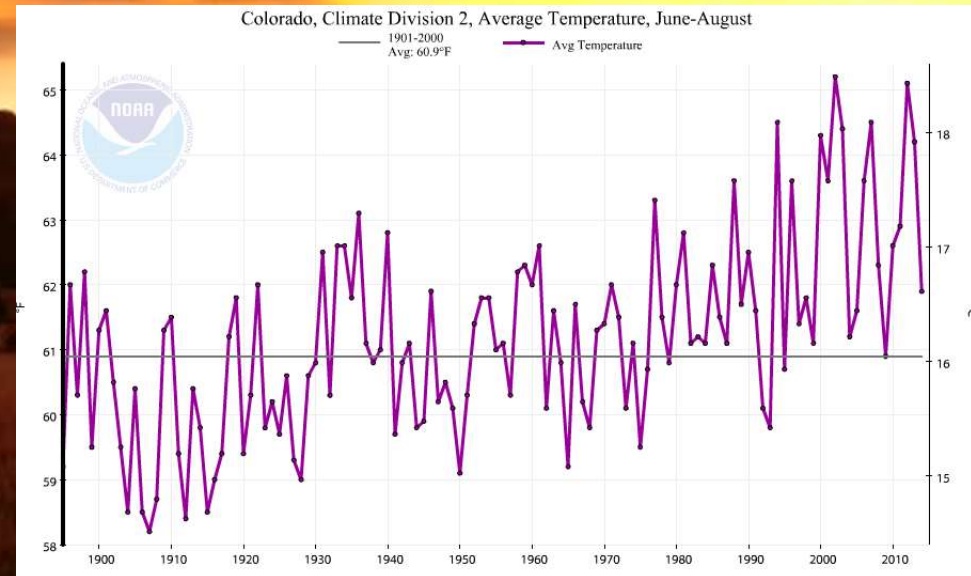
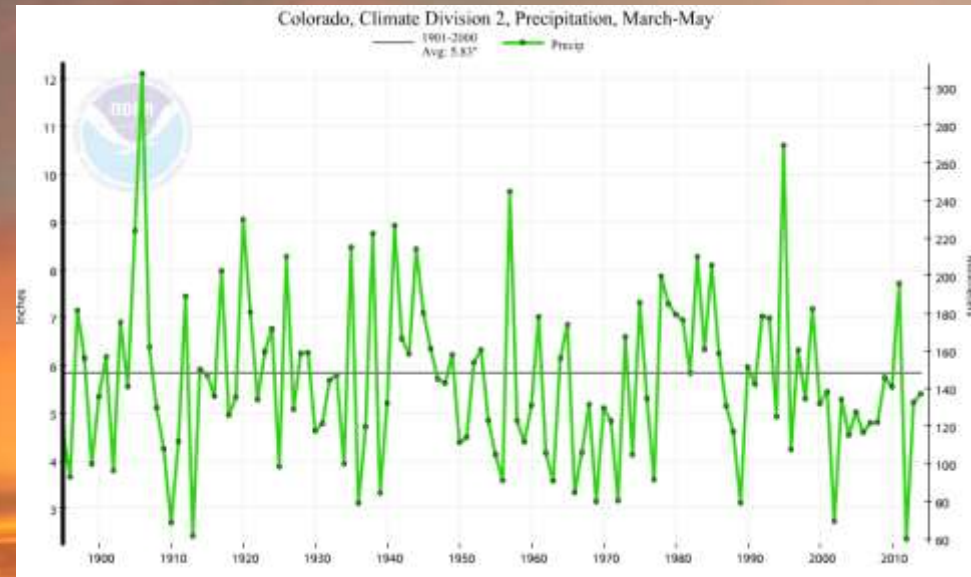
**D2** – Widespread expansion of D2 is recommended to cover more of the Four Corners region, but leaving out much of the San Juan mountains and the Rio Grande headwaters region (Fig. 7, orange line). The line is drawn to include the lower SNOTEL precipitation percentiles and standardized precipitation indices (SPIs) that are less than -1.5 on the 120-day timescale.

**D3** – It is recommended that D3 be expanded to cover more of the Gunnison River basin and extending into the Uncompahgres (Fig. 7, black line). This D3 will better represent the much below normal streamflows and the low SPIs on short and long timescales. Based on SPIs, VegDRI, and on-the-ground reports of extreme dryness in the lower elevations, D3 could cross into eastern UT into Grand County. However, since this is normally their dry season, status quo for UT is currently recommended.

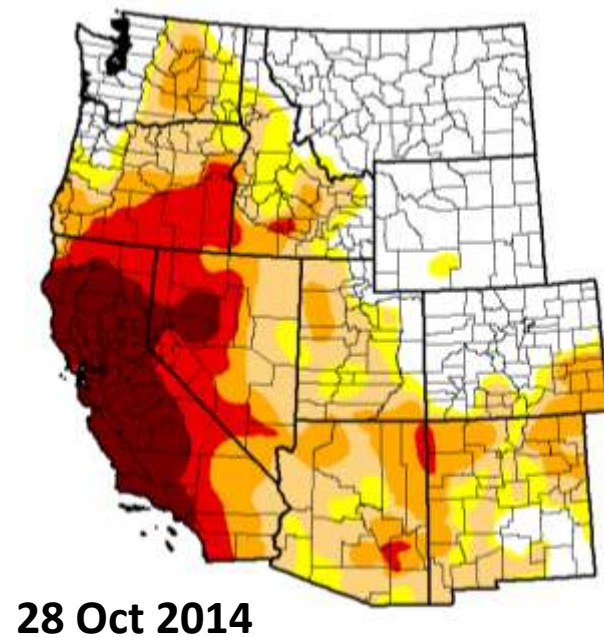
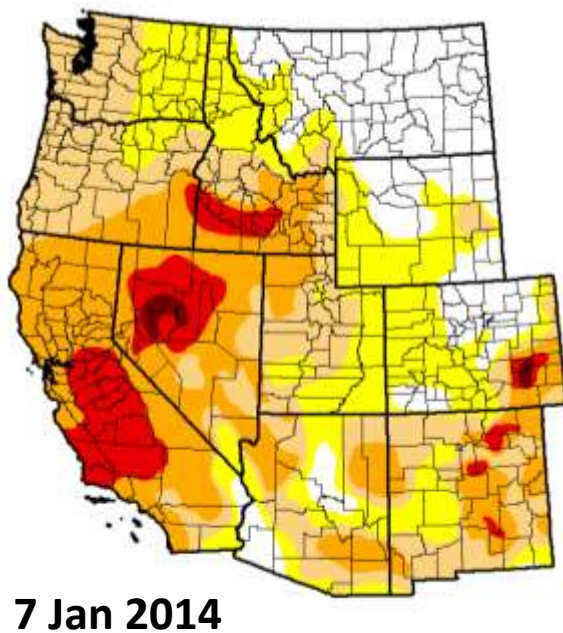
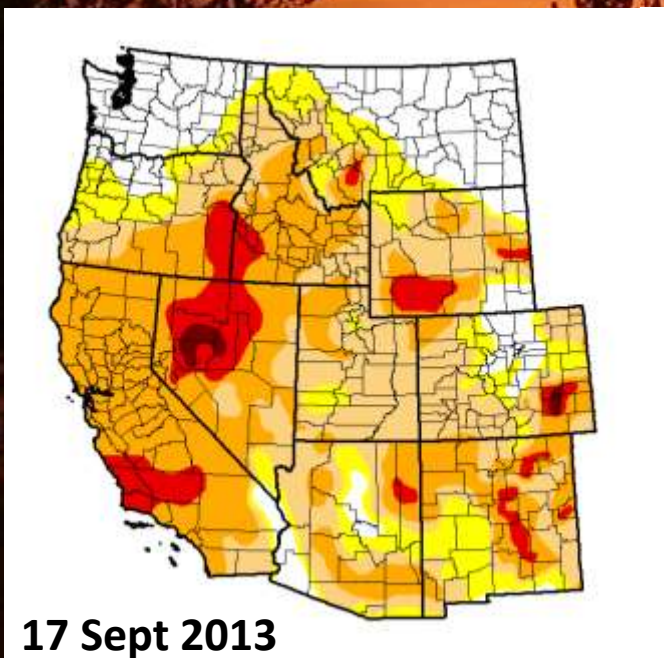
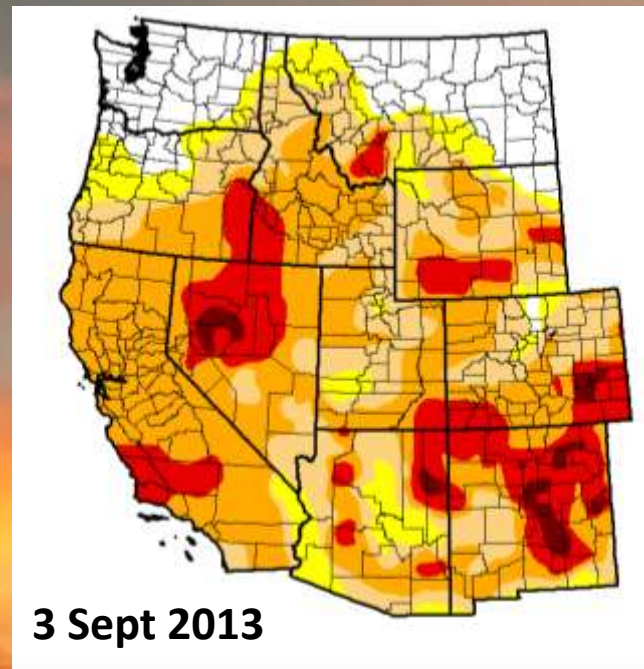
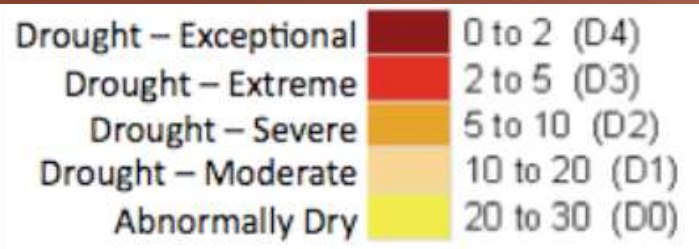
**D4** – no D4 this week, though northwest CO will be closely monitored for possible future degradations.

# 2012 for the Colorado Basin

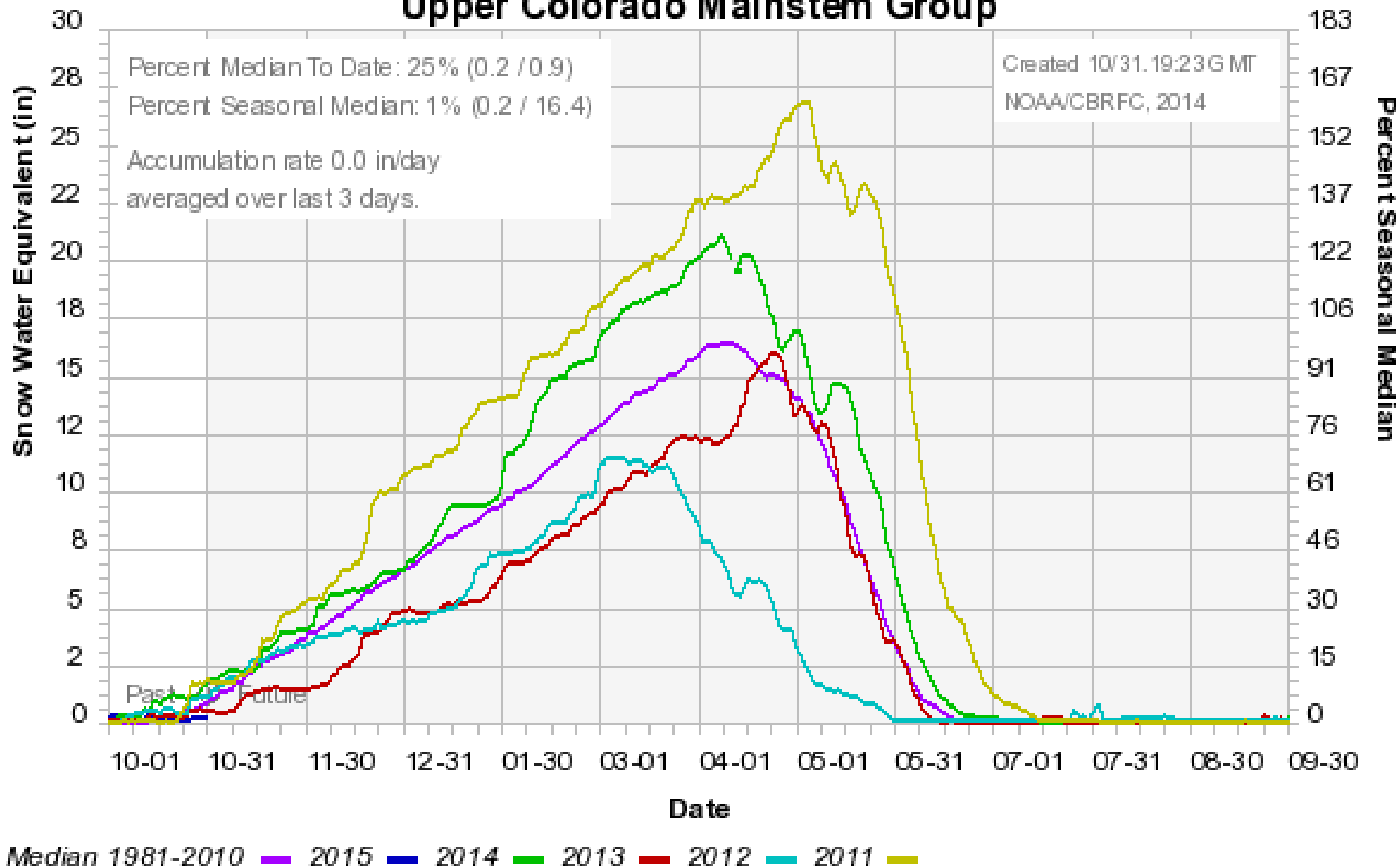
- Spring (March, April, May) precipitation was the driest since 1895
- Summer Temperatures were 2<sup>nd</sup> warmest (2002 was warmest) since 1895.
- Drought remained in the basin until the rains in September 2013 started slowly chipping away at the drought and moisture continued falling through WY2014.



# USDM Sept 2013 – Oct 14



# Colorado Basin River Forecast Center Upper Colorado Mainstem Group

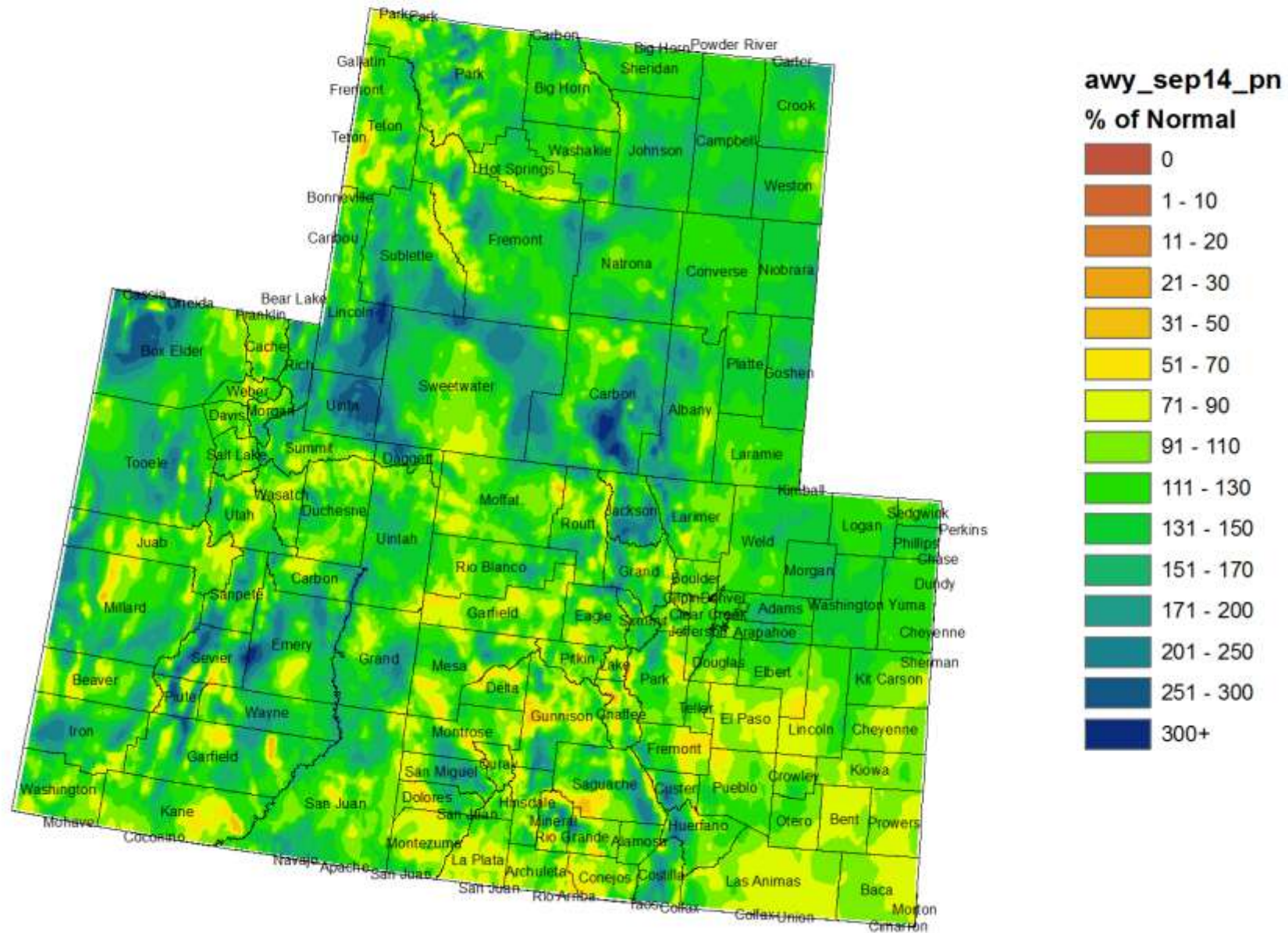




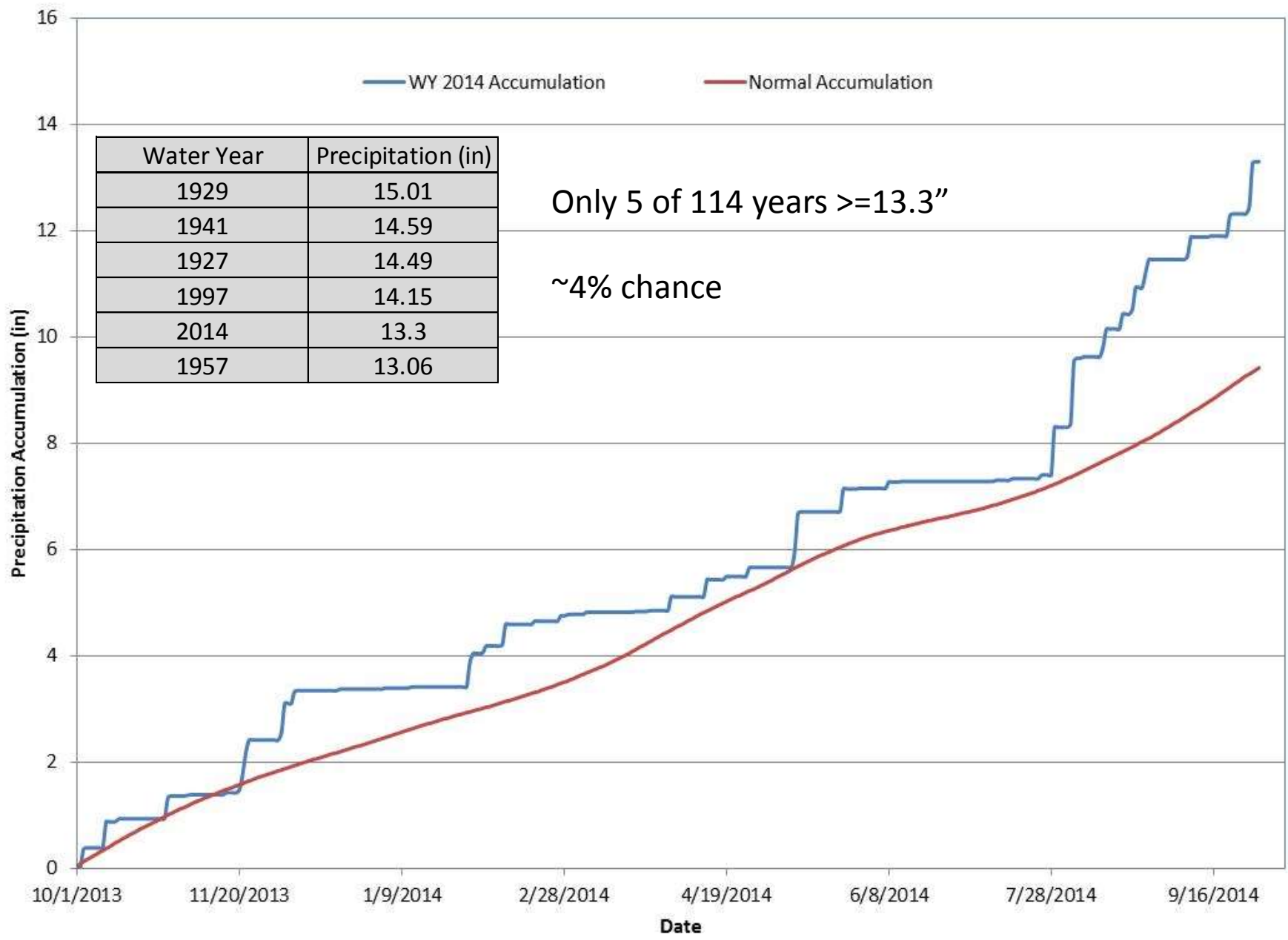
# Most Recent Conditions



# Colorado, Utah and Wyoming Water Year 2014 Precipitation as a Percentage of Normal



# Grand Junction Walker Field WY 2014 Precipitation Accumulation

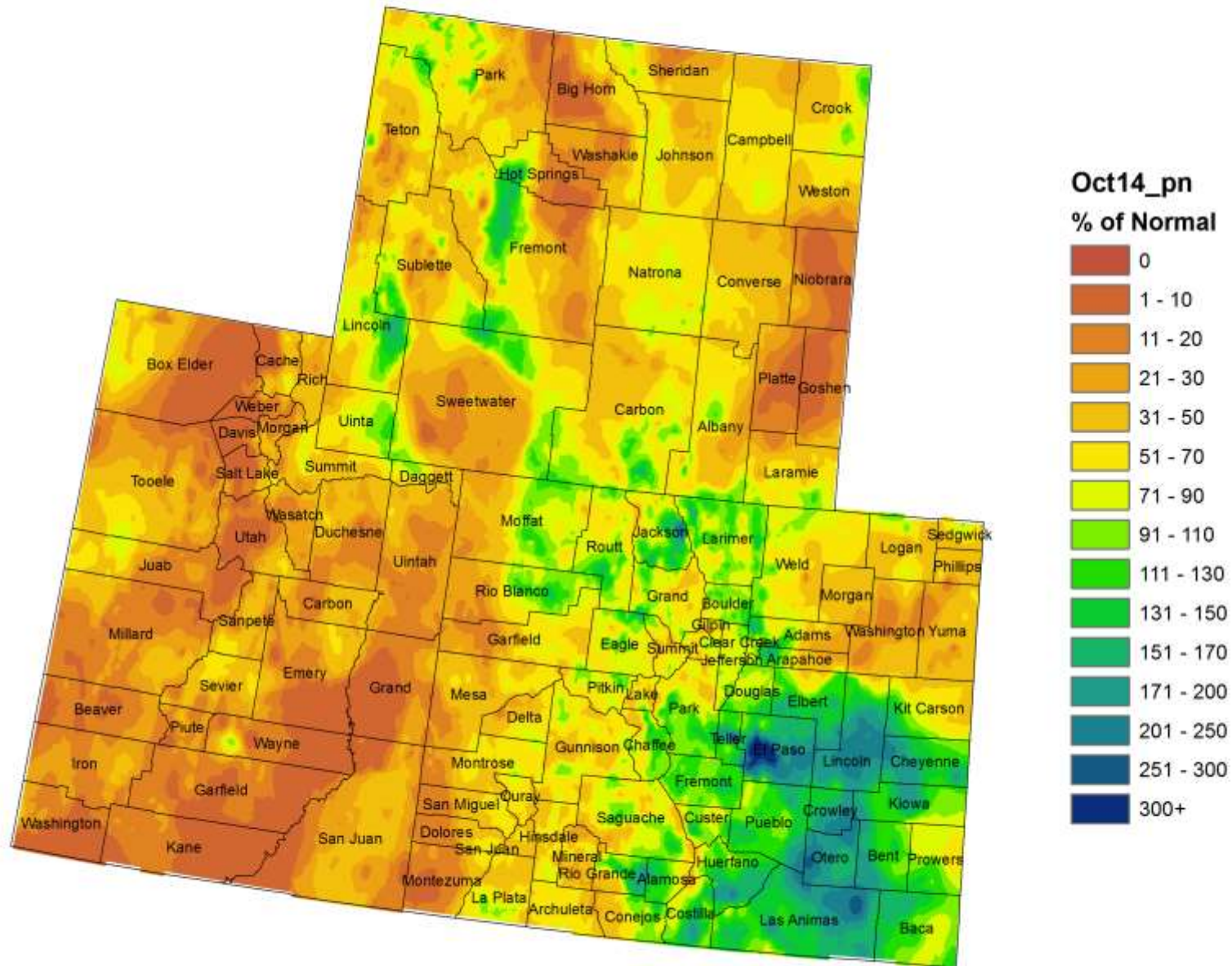


Water Year	Precipitation (in)
1929	15.01
1941	14.59
1927	14.49
1997	14.15
2014	13.3
1957	13.06

Only 5 of 114 years  $\geq 13.3''$

~4% chance

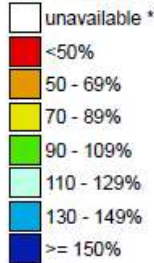
# Colorado, Utah and Wyoming October 2014 Precipitation as a Percentage of Normal



# Westwide SNOTEL Current Snow Water Equivalent (SWE) % of Normal

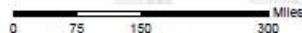
Nov 04, 2014

Current Snow Water Equivalent (SWE) Basin-wide Percent of 1981-2010 Median



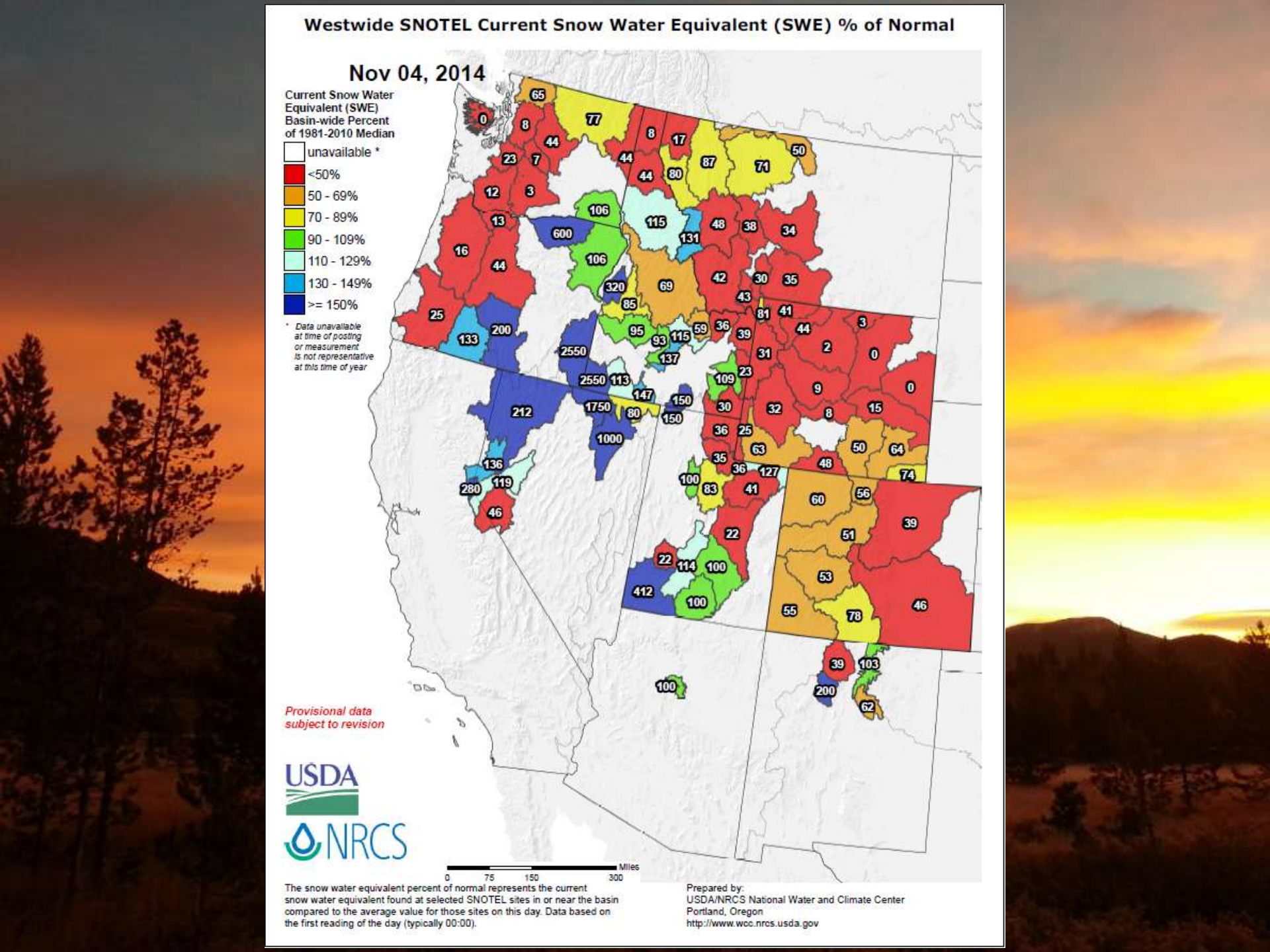
\* Data unavailable at time of posting or measurement is not representative at this time of year

Provisional data  
subject to revision

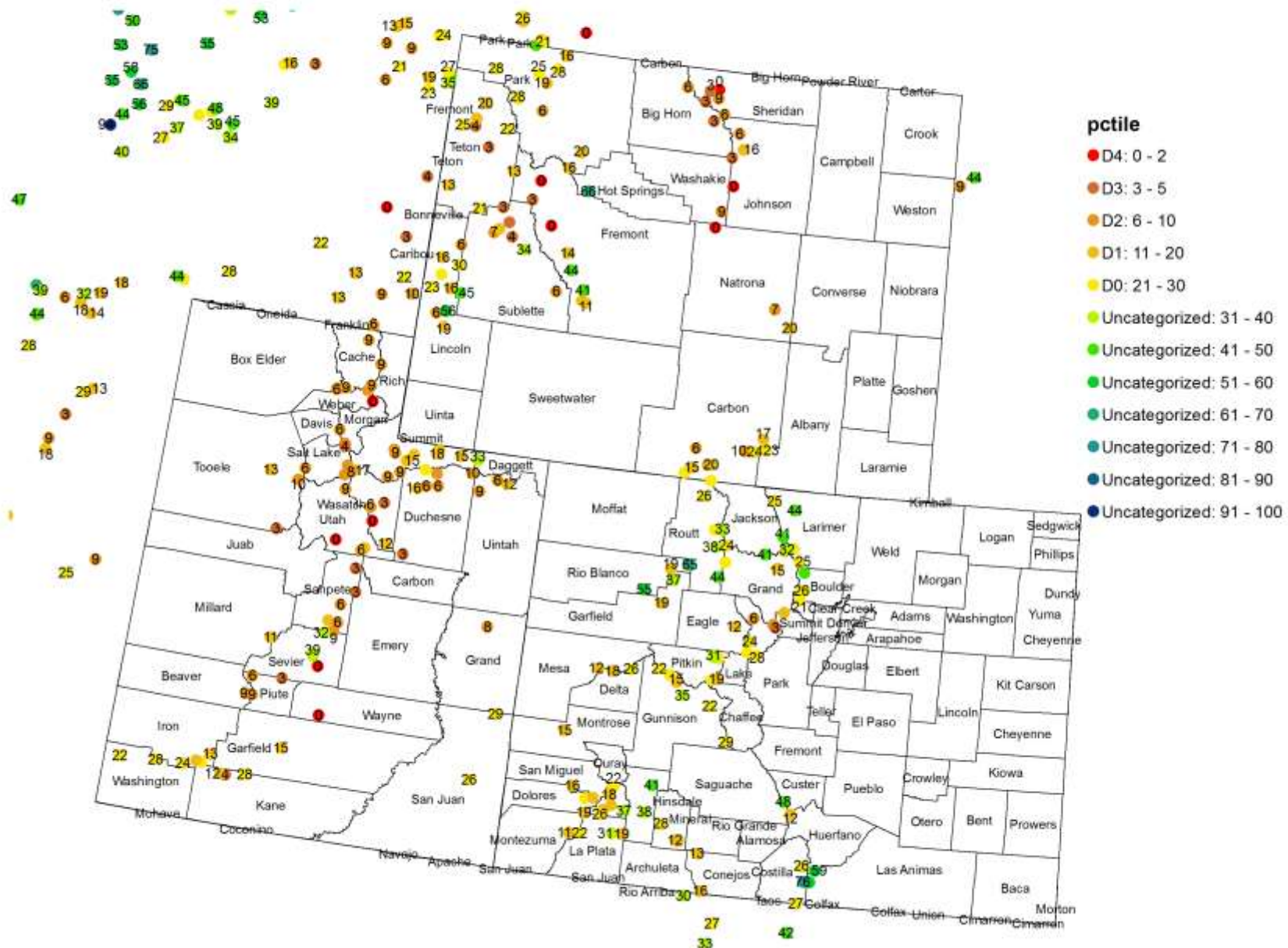


The snow water equivalent percent of normal represents the current snow water equivalent found at selected SNOTEL sites in or near the basin compared to the average value for those sites on this day. Data based on the first reading of the day (typically 00:00).

Prepared by:  
USDA/NRCS National Water and Climate Center  
Portland, Oregon  
<http://www.wcc.nrcs.usda.gov>

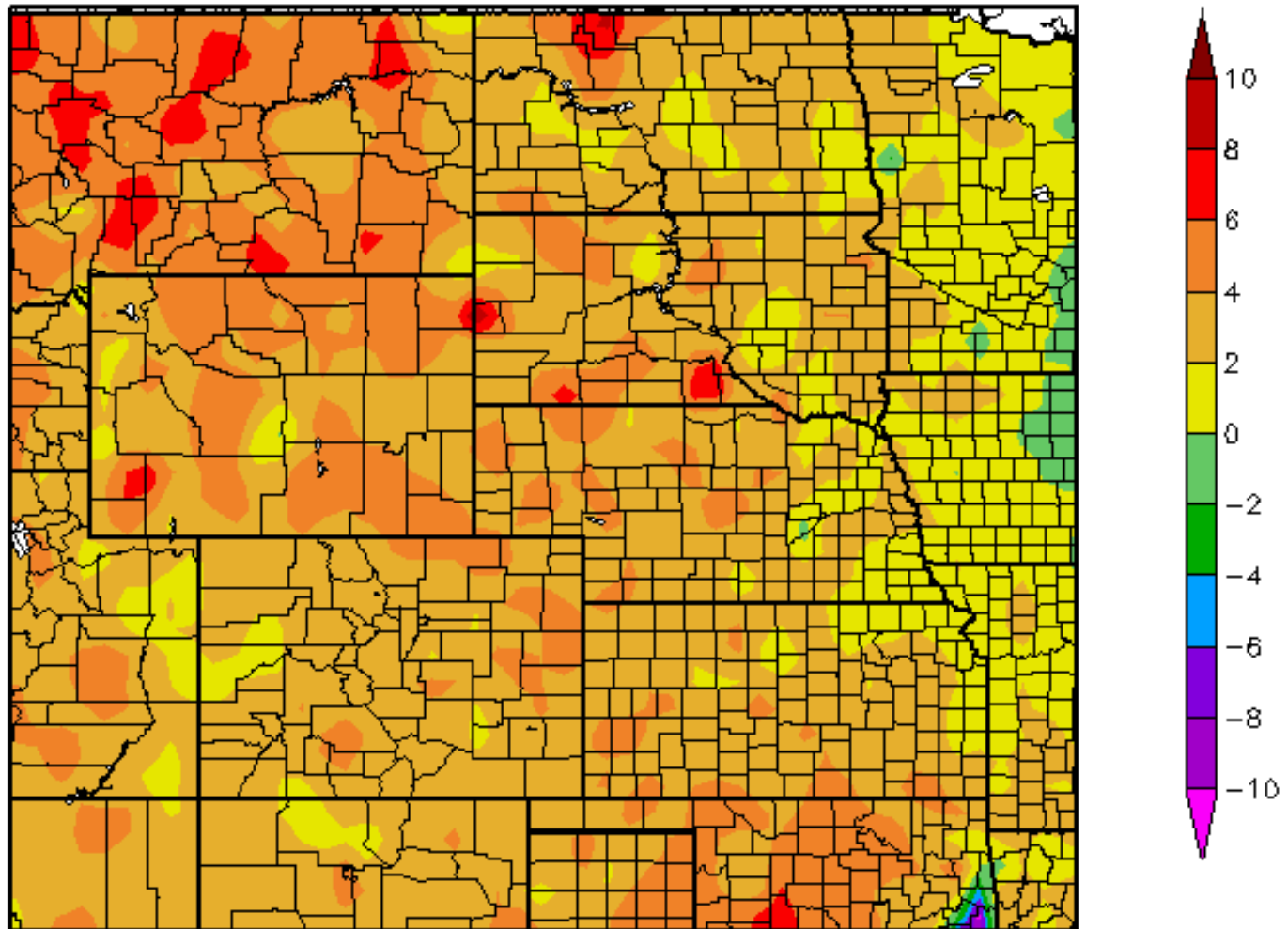


# Snotel Water Year 2015 Precipitation Percentile Ranking for 3 November 2014 (Stations with 15+ years of data only)



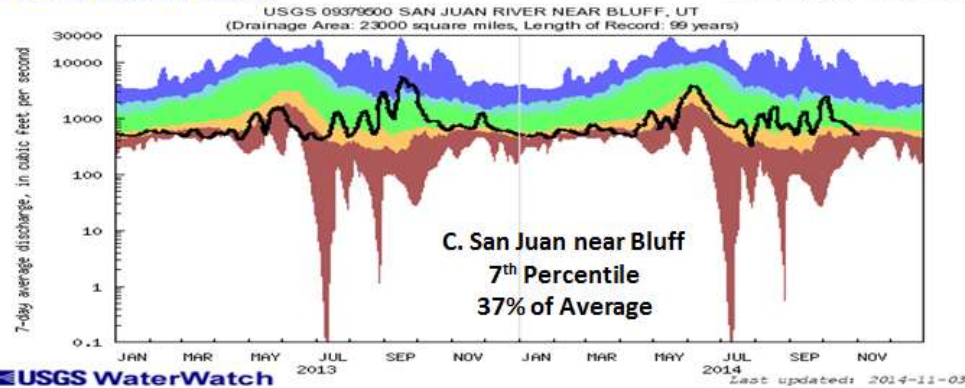
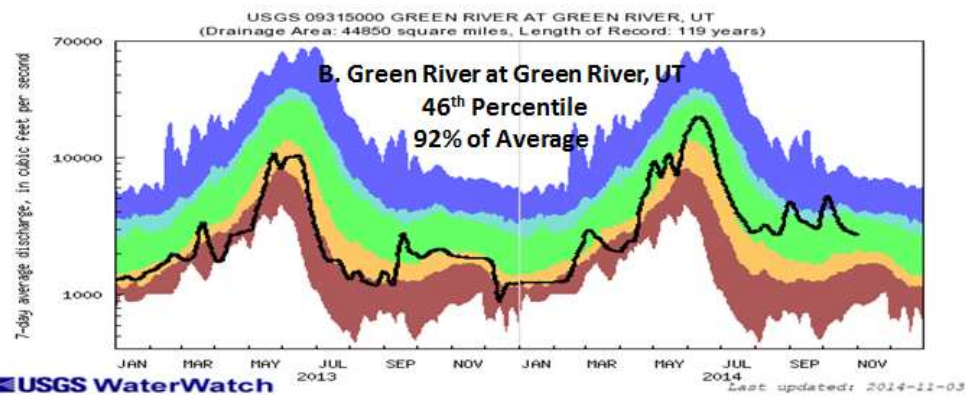
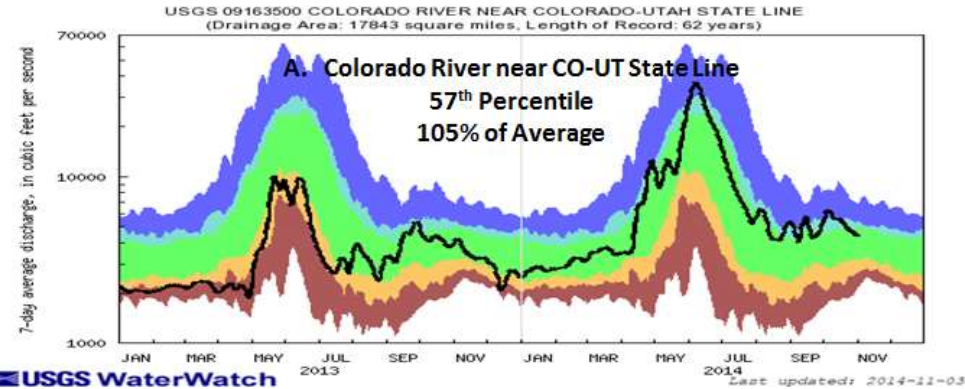
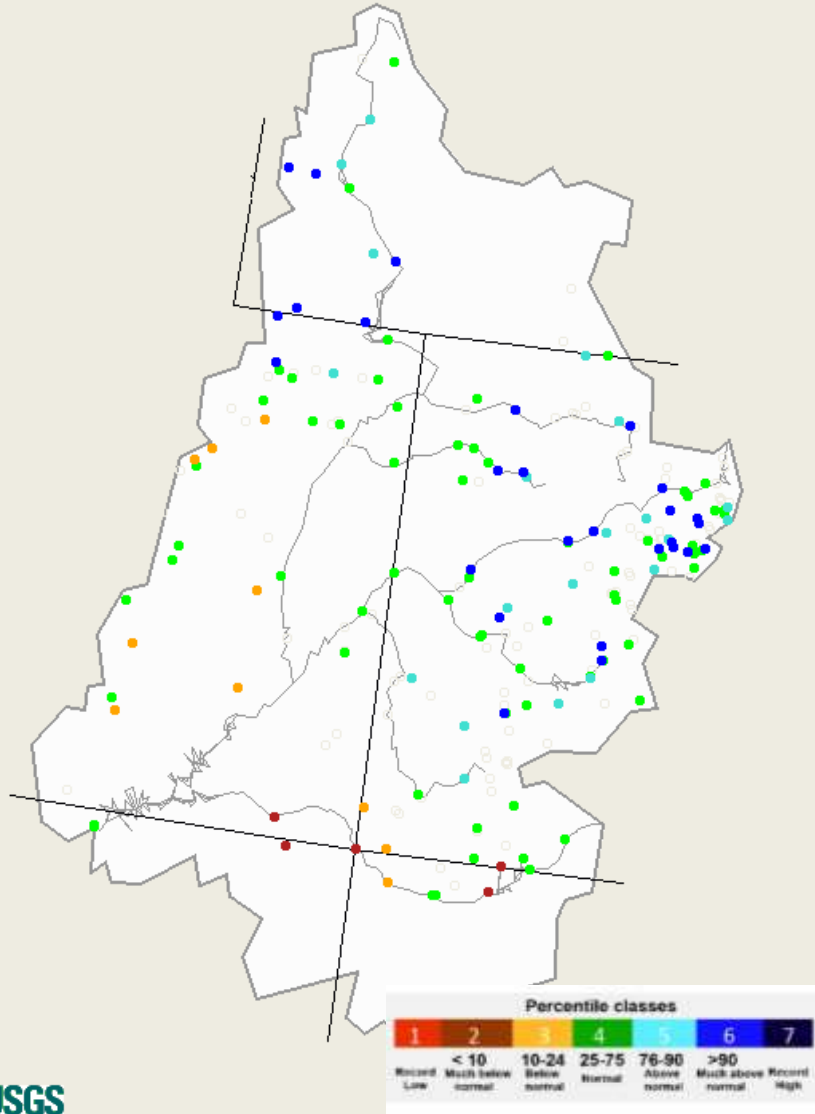
# Temperatures

Departure from Normal Temperature (F)  
10/1/2014 - 10/31/2014



# Streamflow

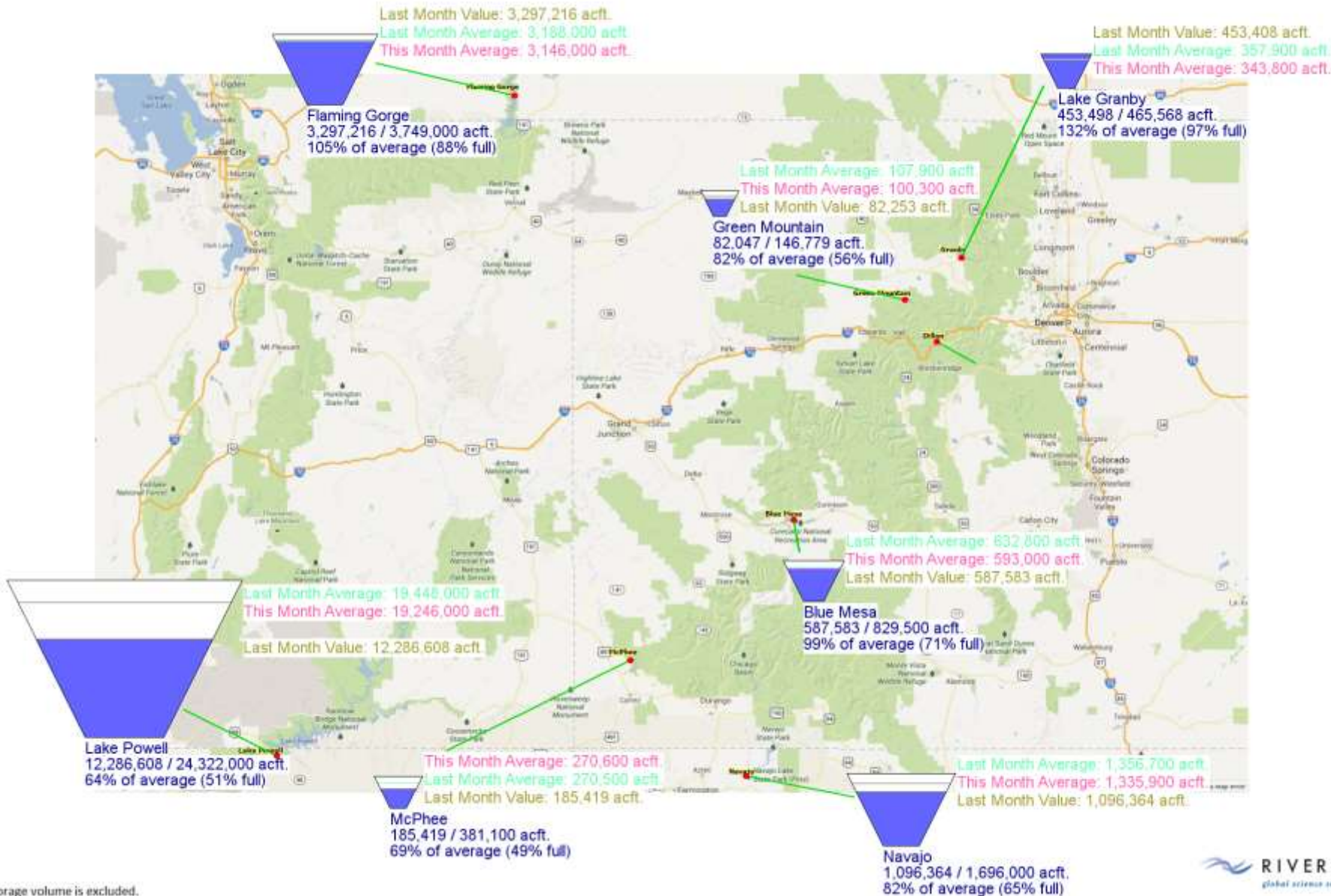
2 November 2014





# Reservoirs

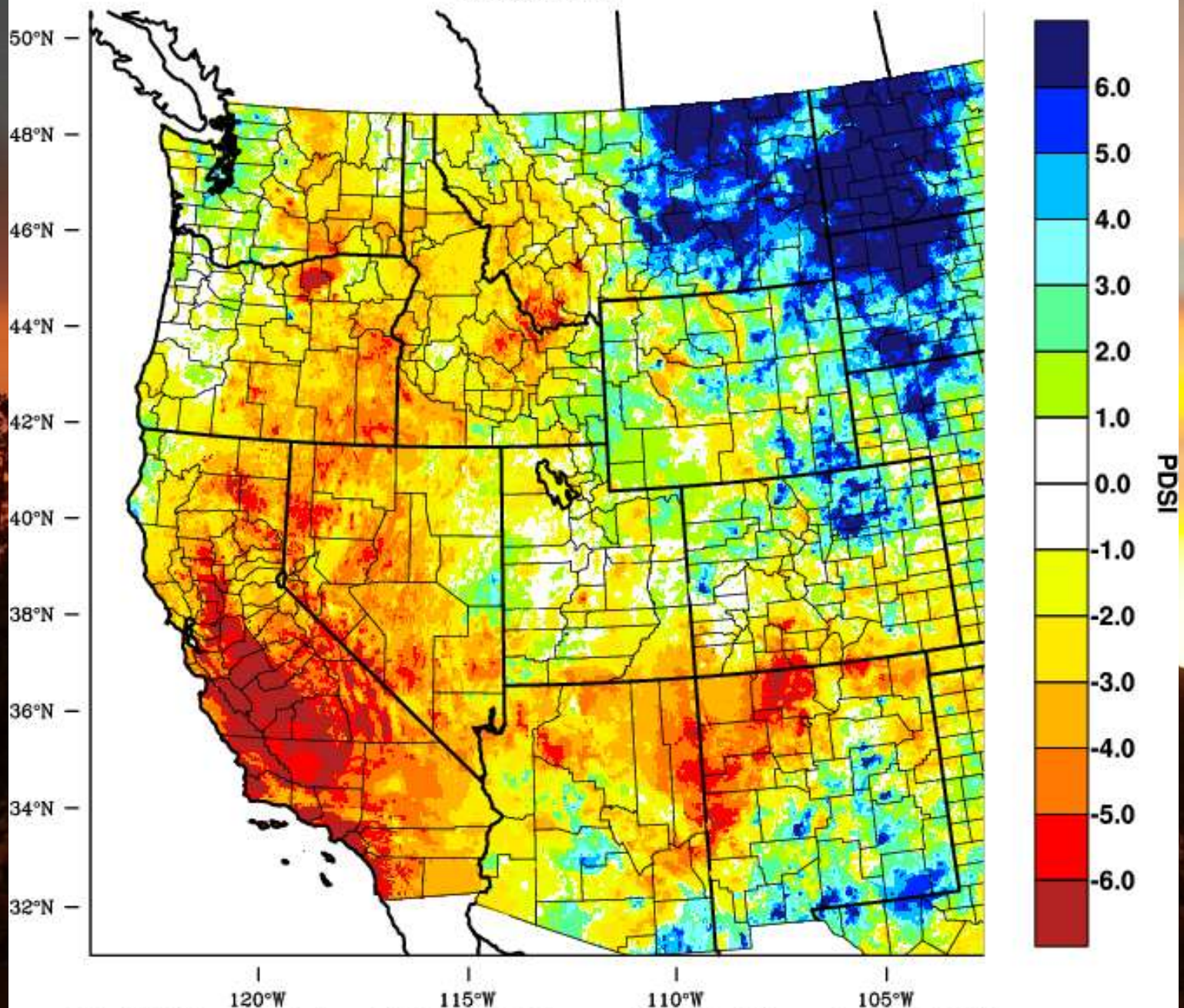
2014/11/03



Dead storage volume is excluded.

# Western United States - PDSI

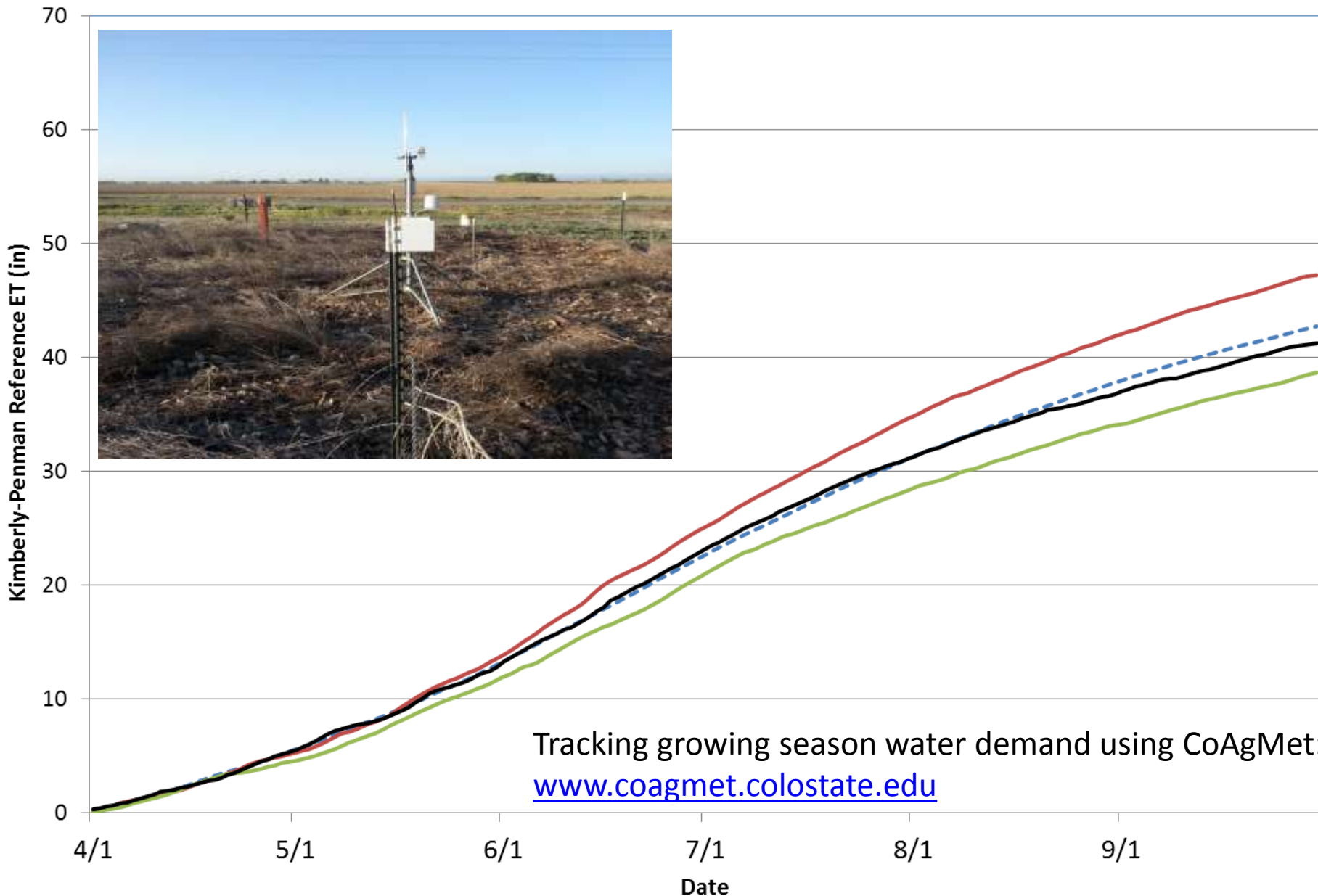
October 2014



WestWide Drought Tracker - WRCC/UI Data Source - PRISM (Prelim), created 2 NOV 2014

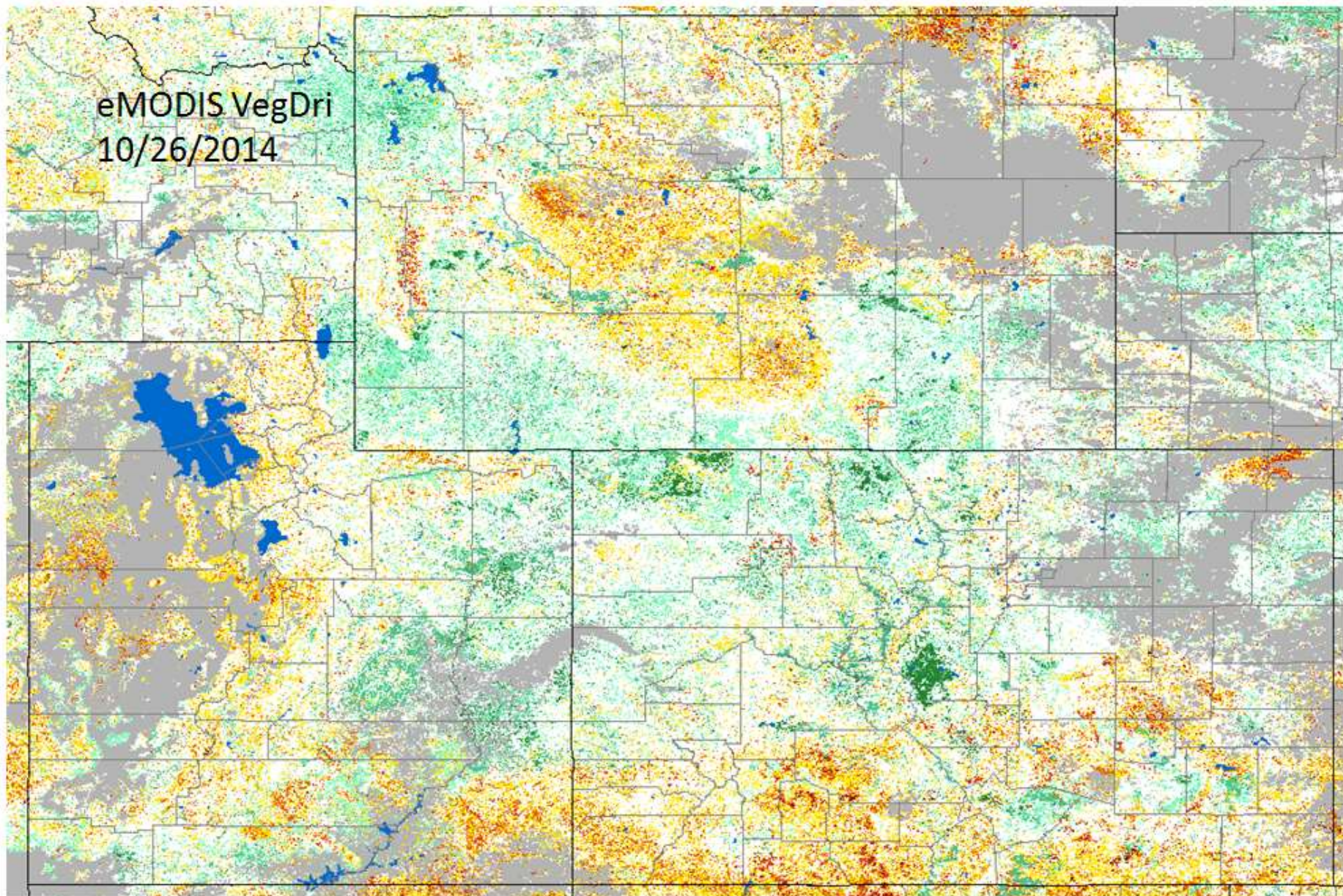
# Olathe Kimberly-Penman Reference ET (1993 - 2013)

--- Average    — 1994    — 1999    — 2014



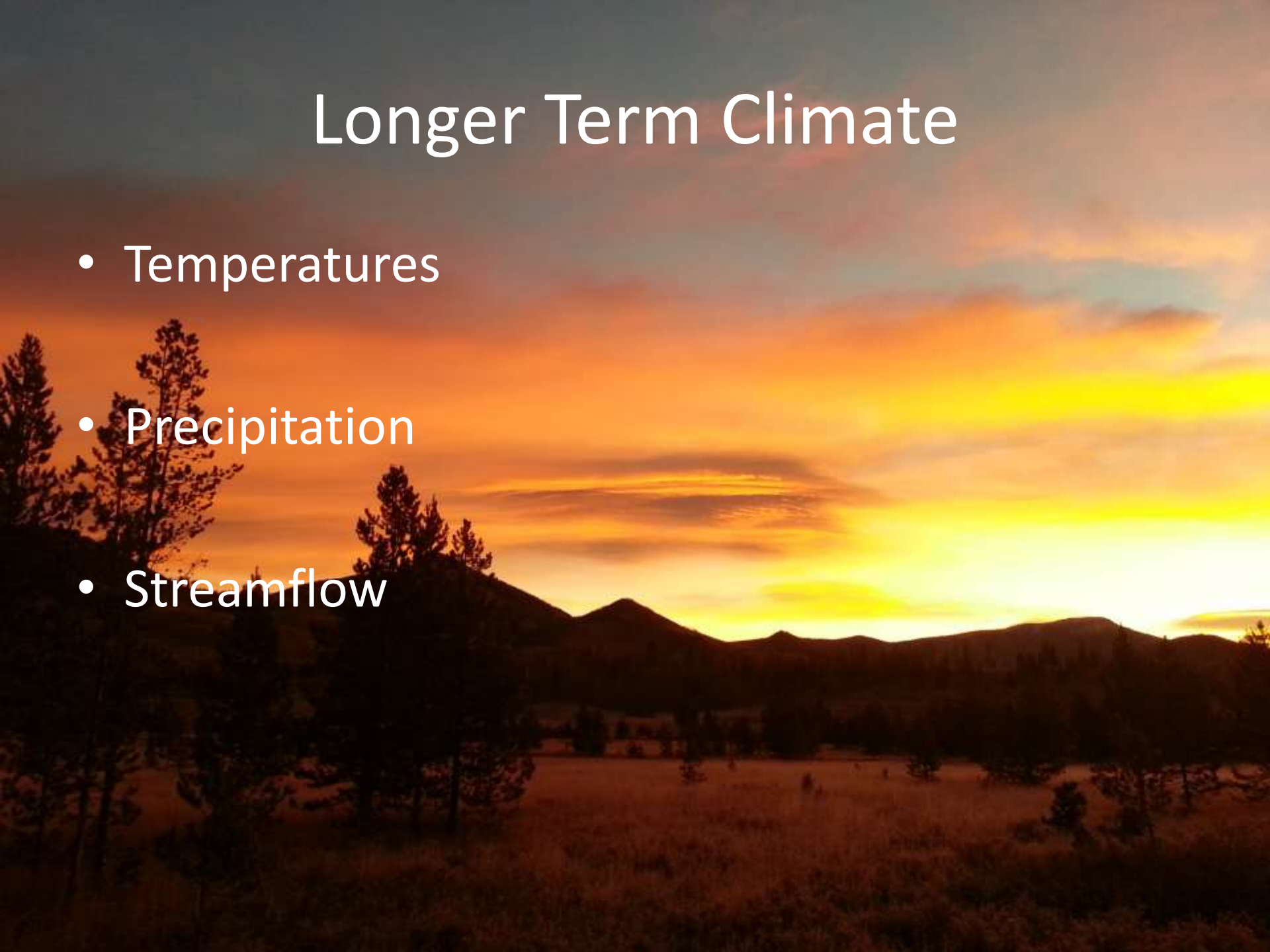
Tracking growing season water demand using CoAgMet:  
[www.coagmet.colostate.edu](http://www.coagmet.colostate.edu)

eMODIS VegDri  
10/26/2014

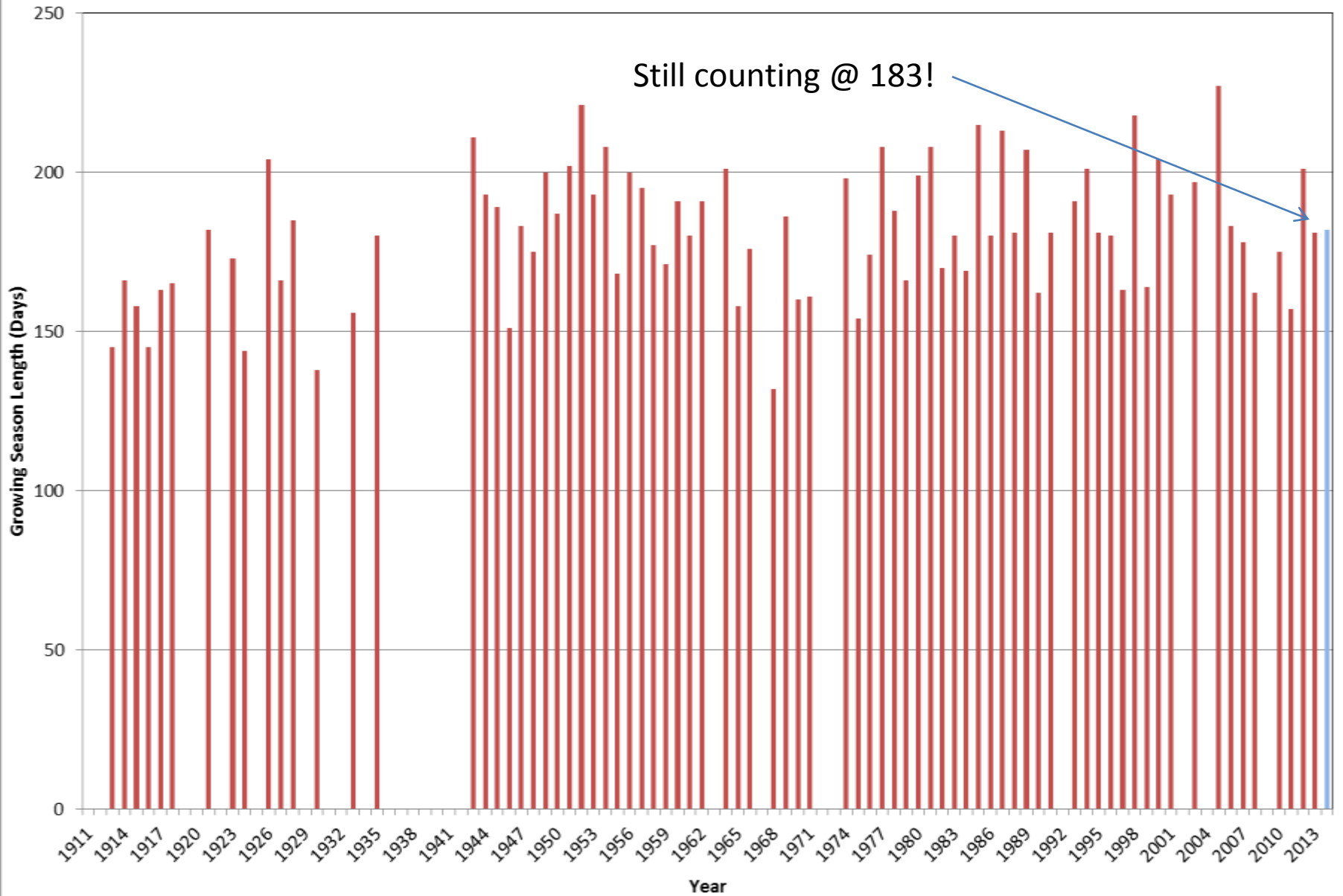


# Longer Term Climate

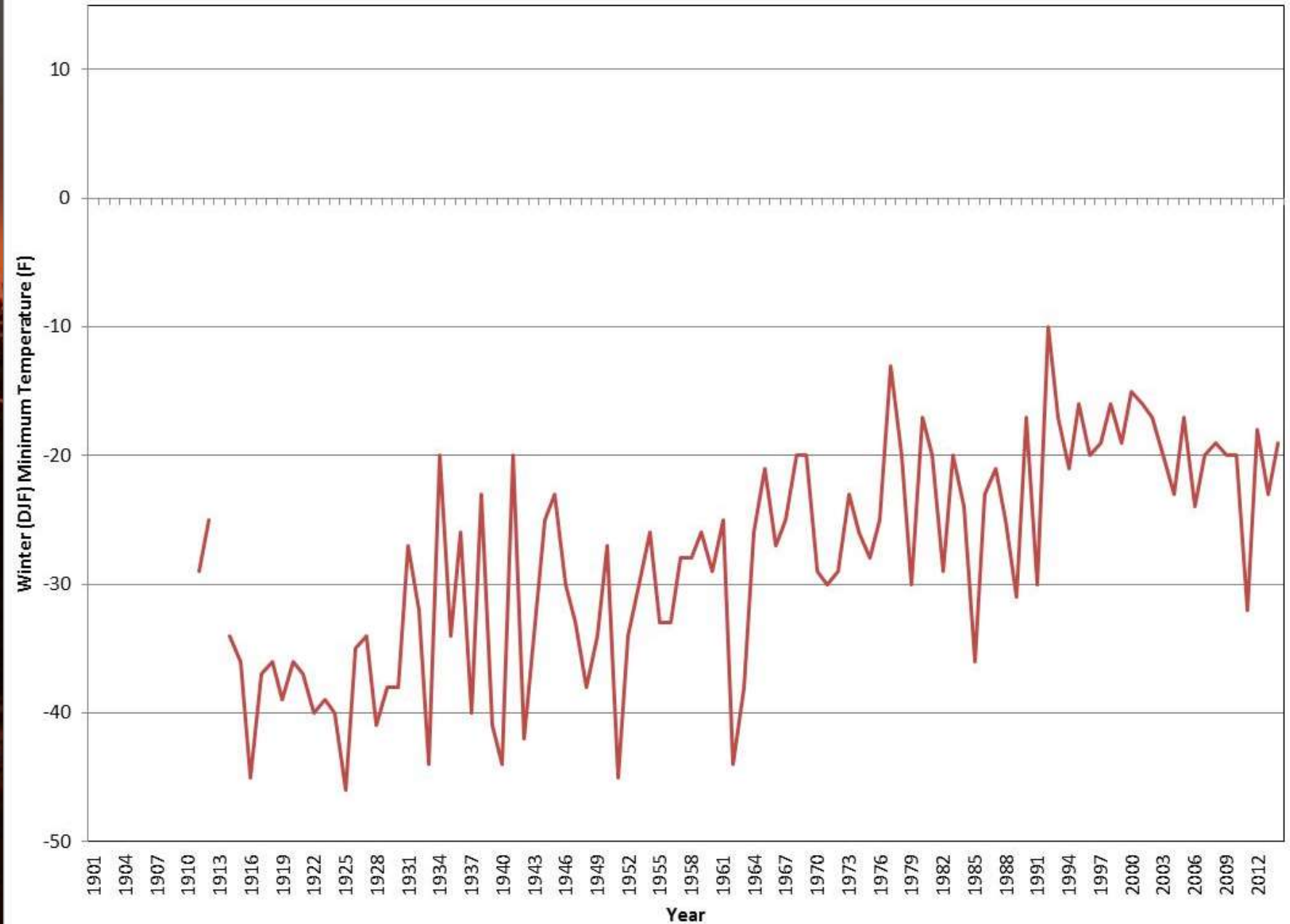
- Temperatures
- Precipitation
- Streamflow



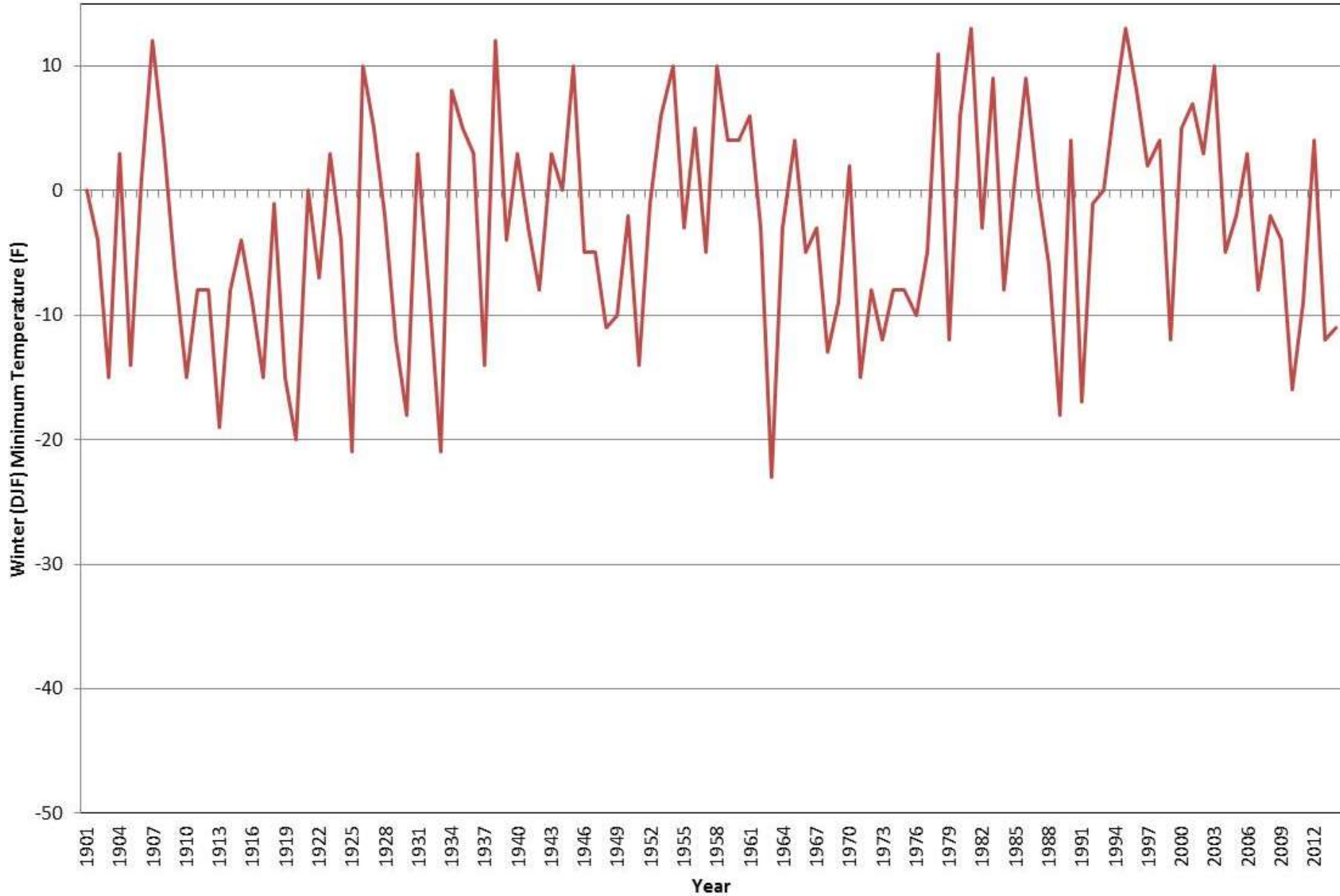
# Growing Season Length: Palisade, CO



# Dillon Winter (DJF) Coldest Minimum Temperature



# Grand Junction Winter (DJF) Coldest Minimum Temperature

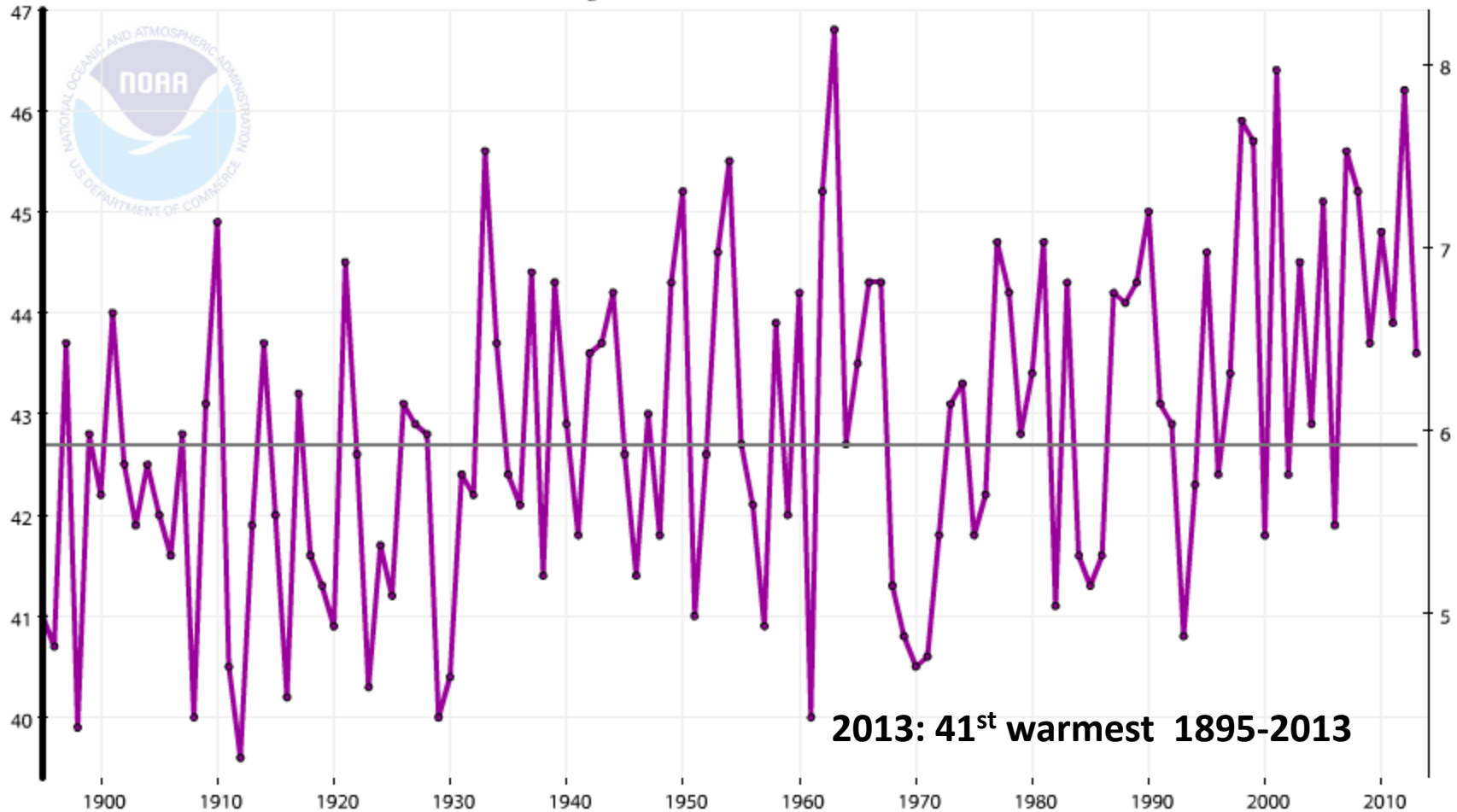




# CO Drainage Fall (SON) Temperatures

Colorado, Climate Division 2, Average Temperature, September-November

— 1901-2000 Avg: 42.7°F  
—●— Avg Temperature

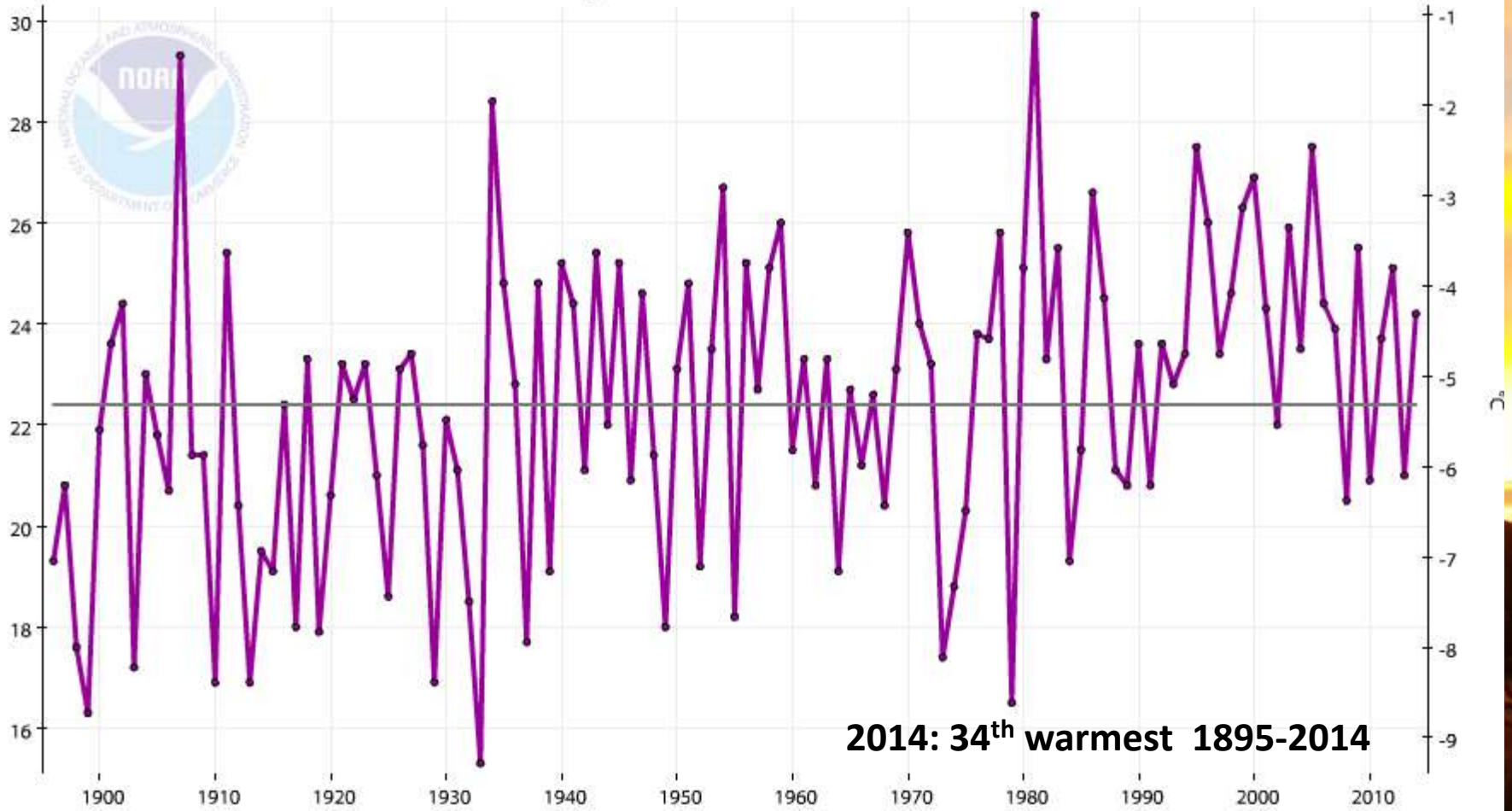


2013: 41<sup>st</sup> warmest 1895-2013

# CO Drainage Winter (DJF) Temperatures

Colorado, Climate Division 2, Average Temperature, December-February

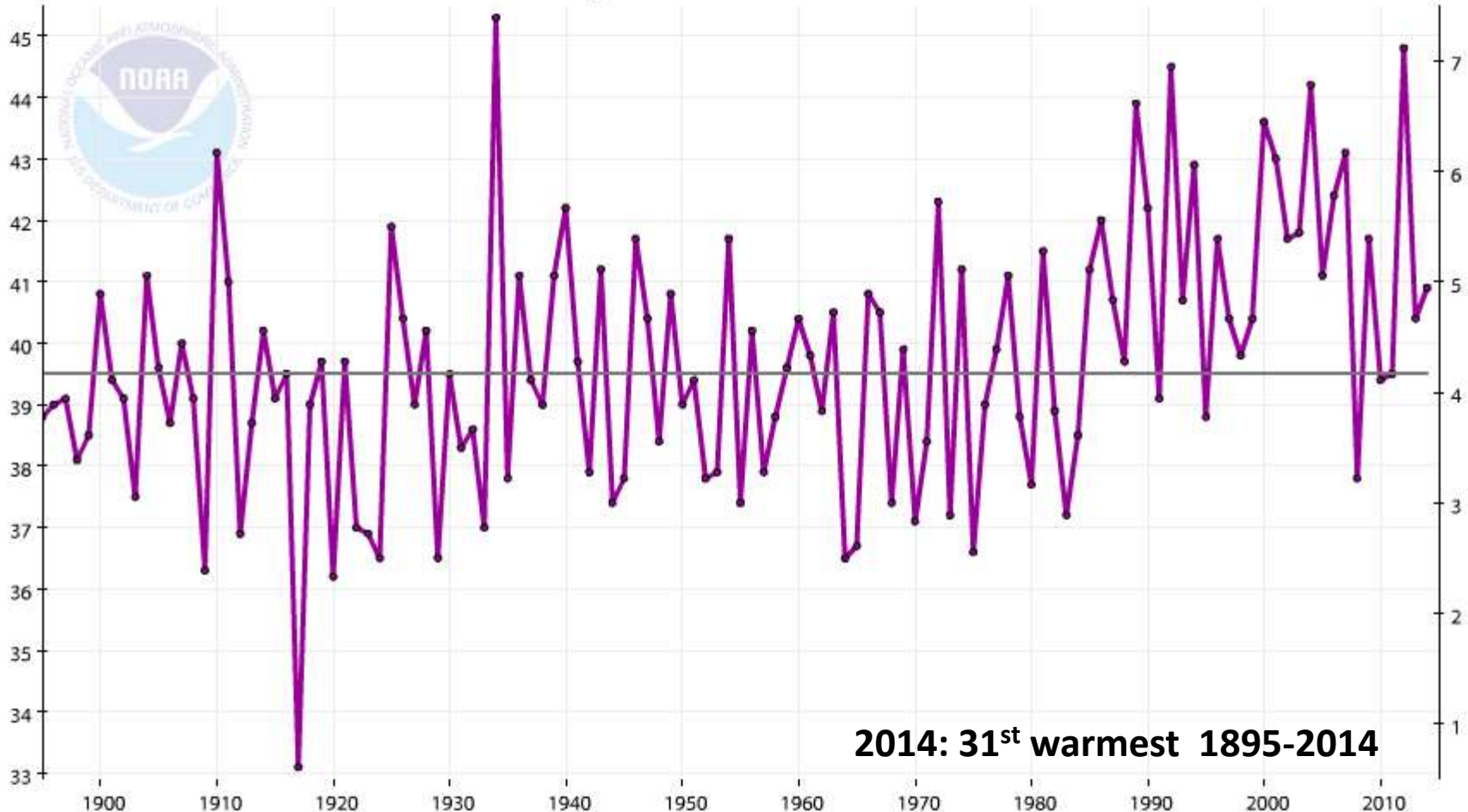
— 1901-2000 Avg: 22.4°F      —●— Avg Temperature



# CO Drainage Spring (MAM) Temperatures

Colorado, Climate Division 2, Average Temperature, March-May

— 1901-2000 Avg: 39.5°F      —●— Avg Temperature

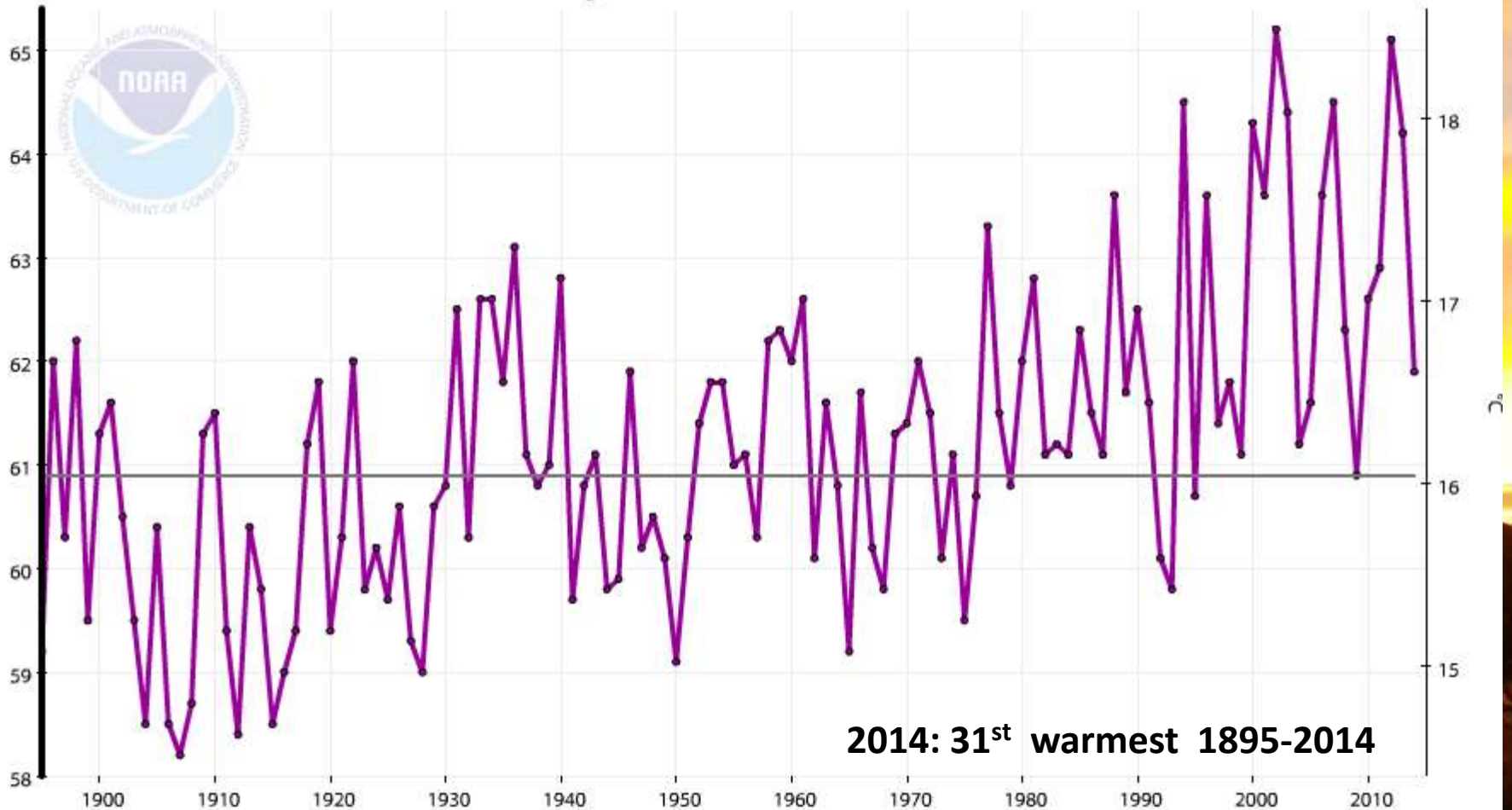


2014: 31<sup>st</sup> warmest 1895-2014

# CO Drainage Summer (JJA) Temperatures

Colorado, Climate Division 2, Average Temperature, June-August

— 1901-2000 Avg: 60.9°F      —●— Avg Temperature

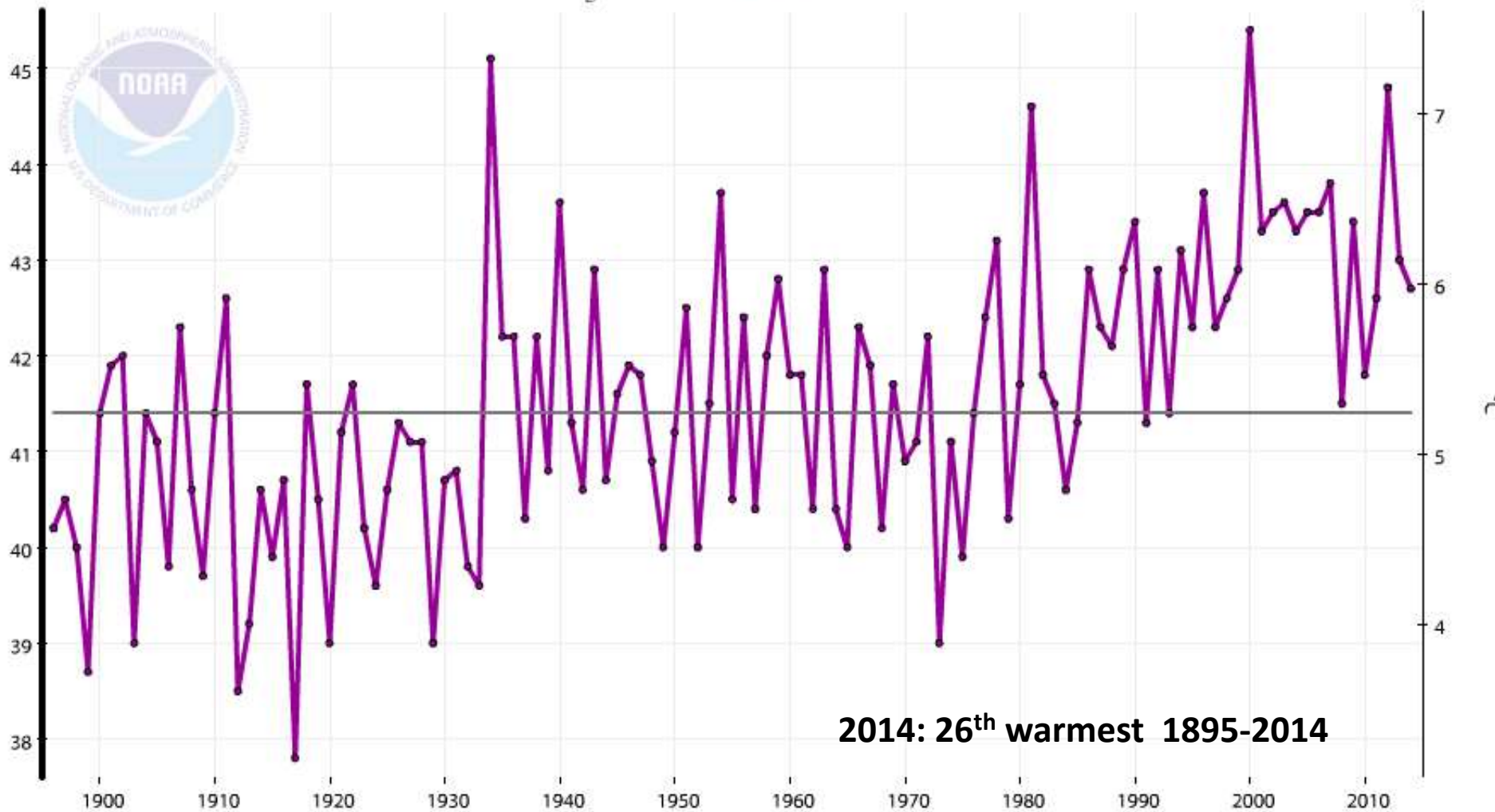


2014: 31<sup>st</sup> warmest 1895-2014

# CO Drainage WY Temperatures

Colorado, Climate Division 2, Average Temperature, October-September

— 1901-2000 Avg: 41.4°F      —●— Avg Temperature

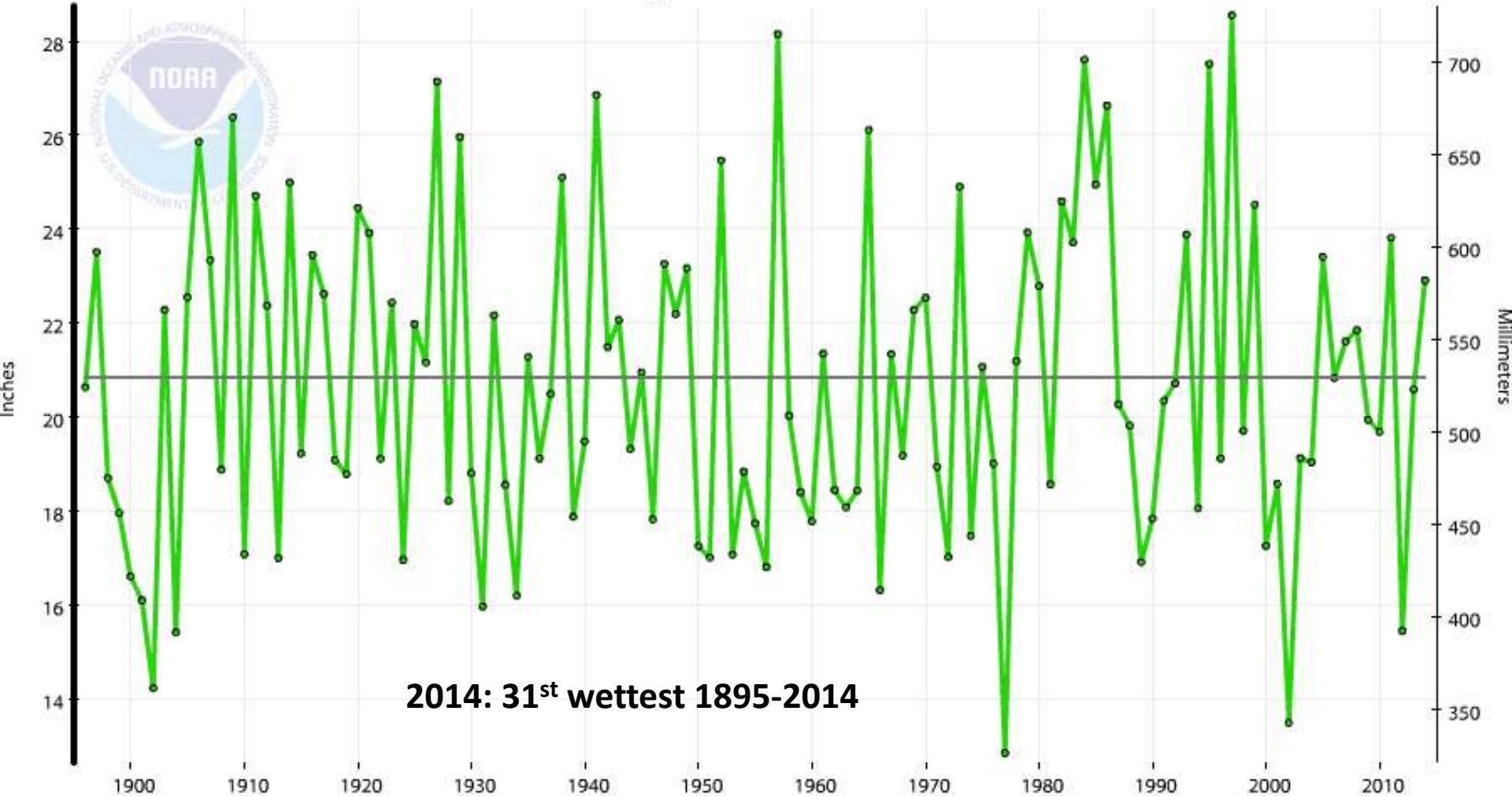


2014: 26<sup>th</sup> warmest 1895-2014

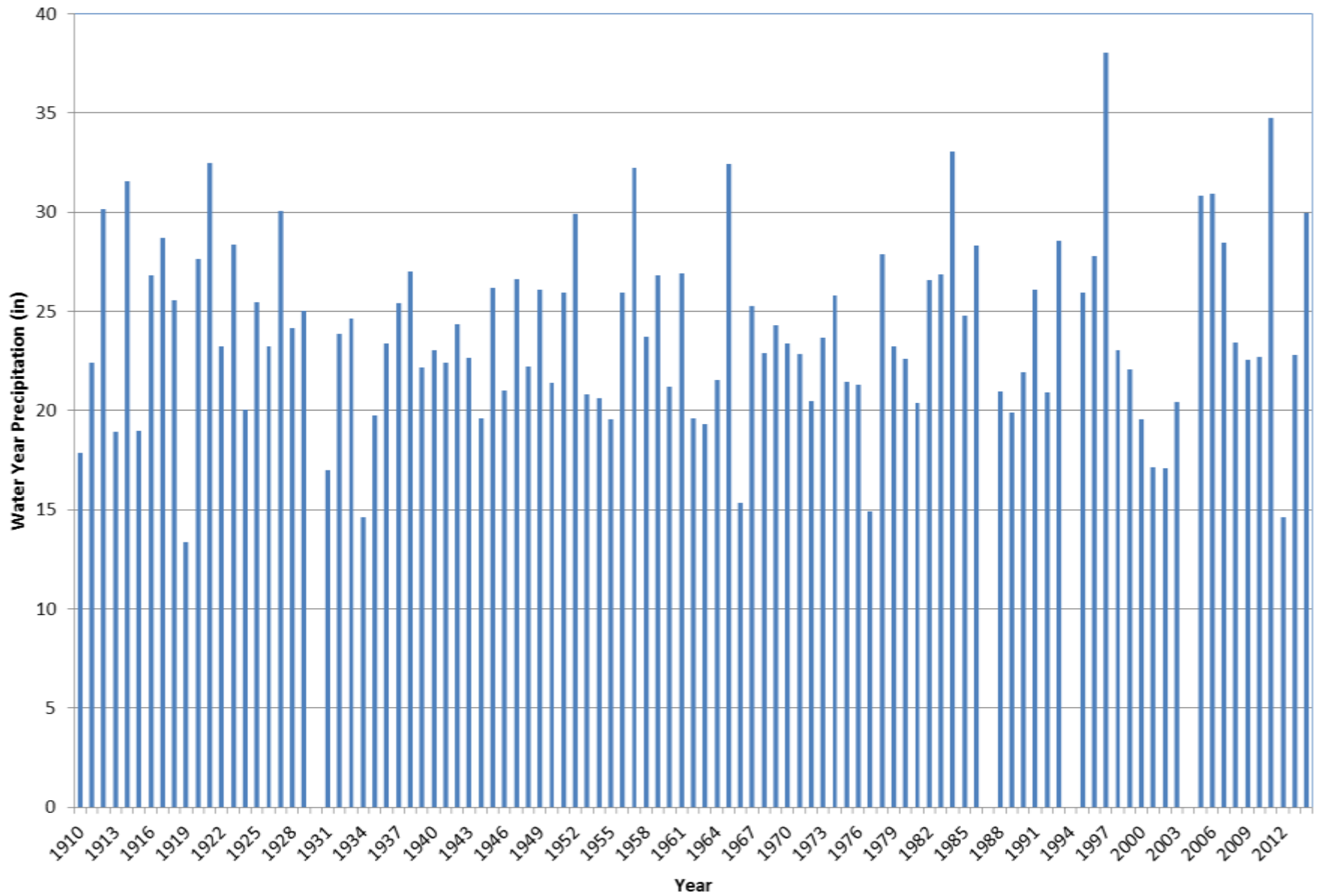
# CO Drainage WY Precipitation

Colorado, Climate Division 2, Precipitation, October-September

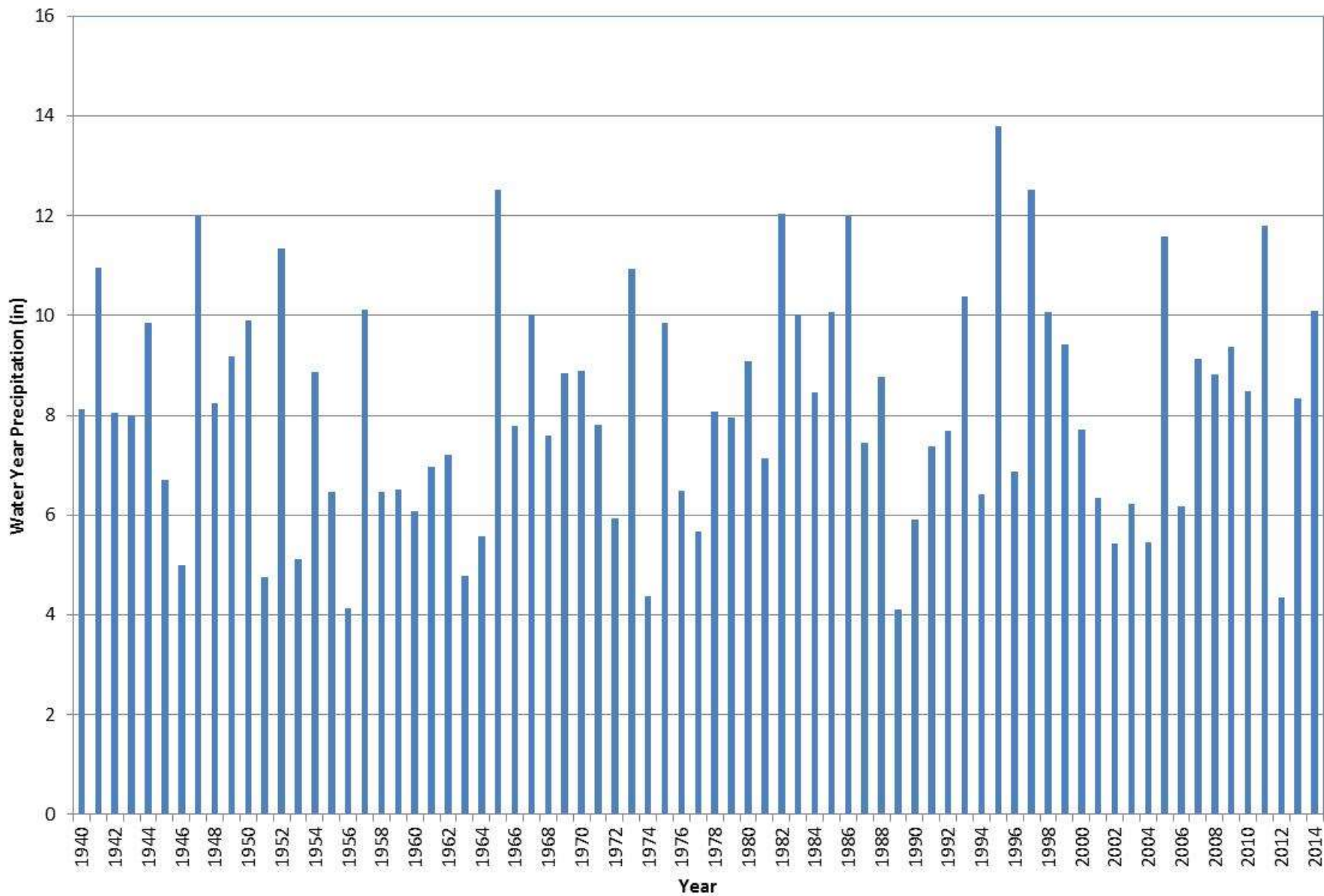
— 1901-2000 Avg. 20.86" —●— Precip



# Steamboat Springs Water Year Precipitation

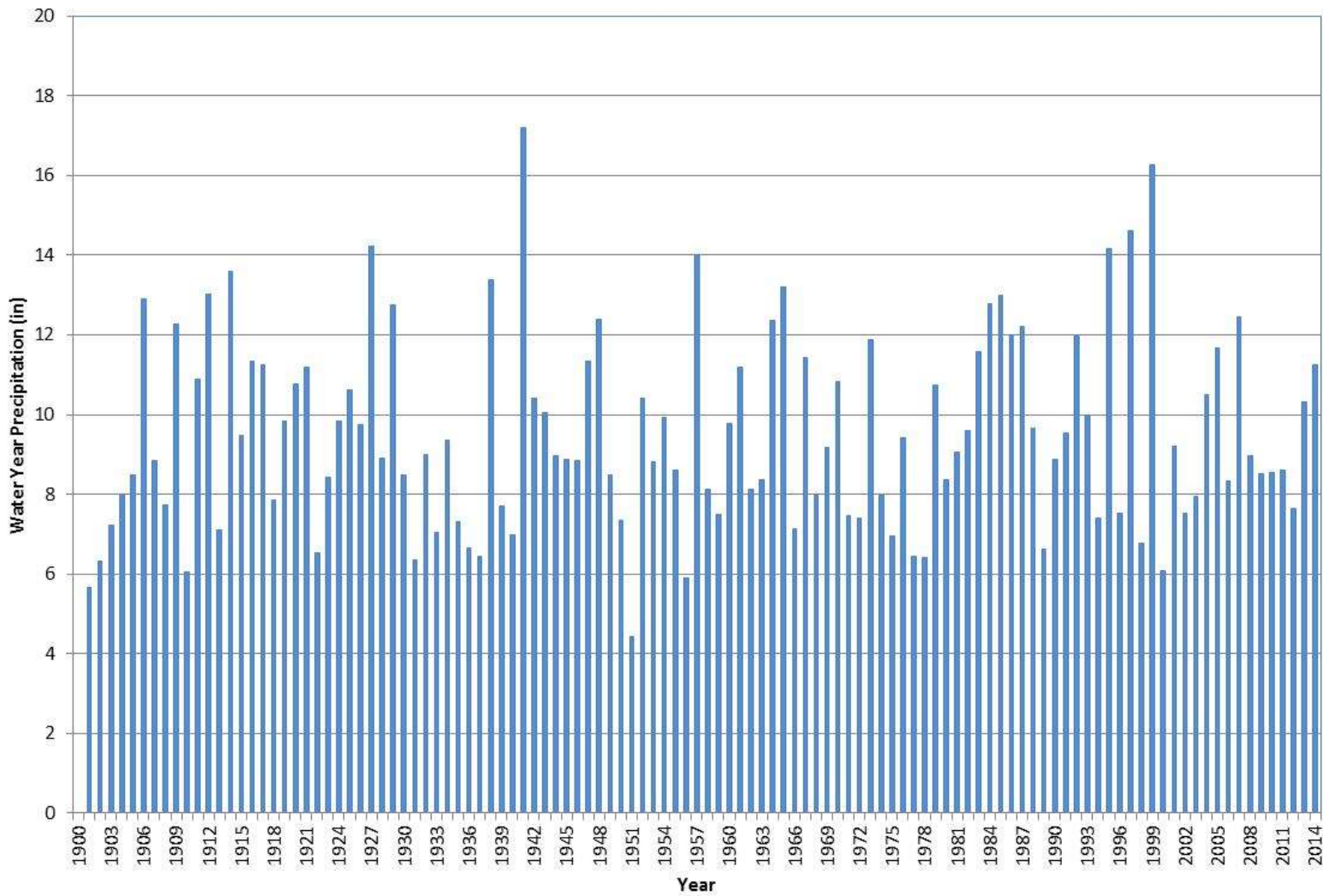


# Jensen, UT Water Year Precipitation

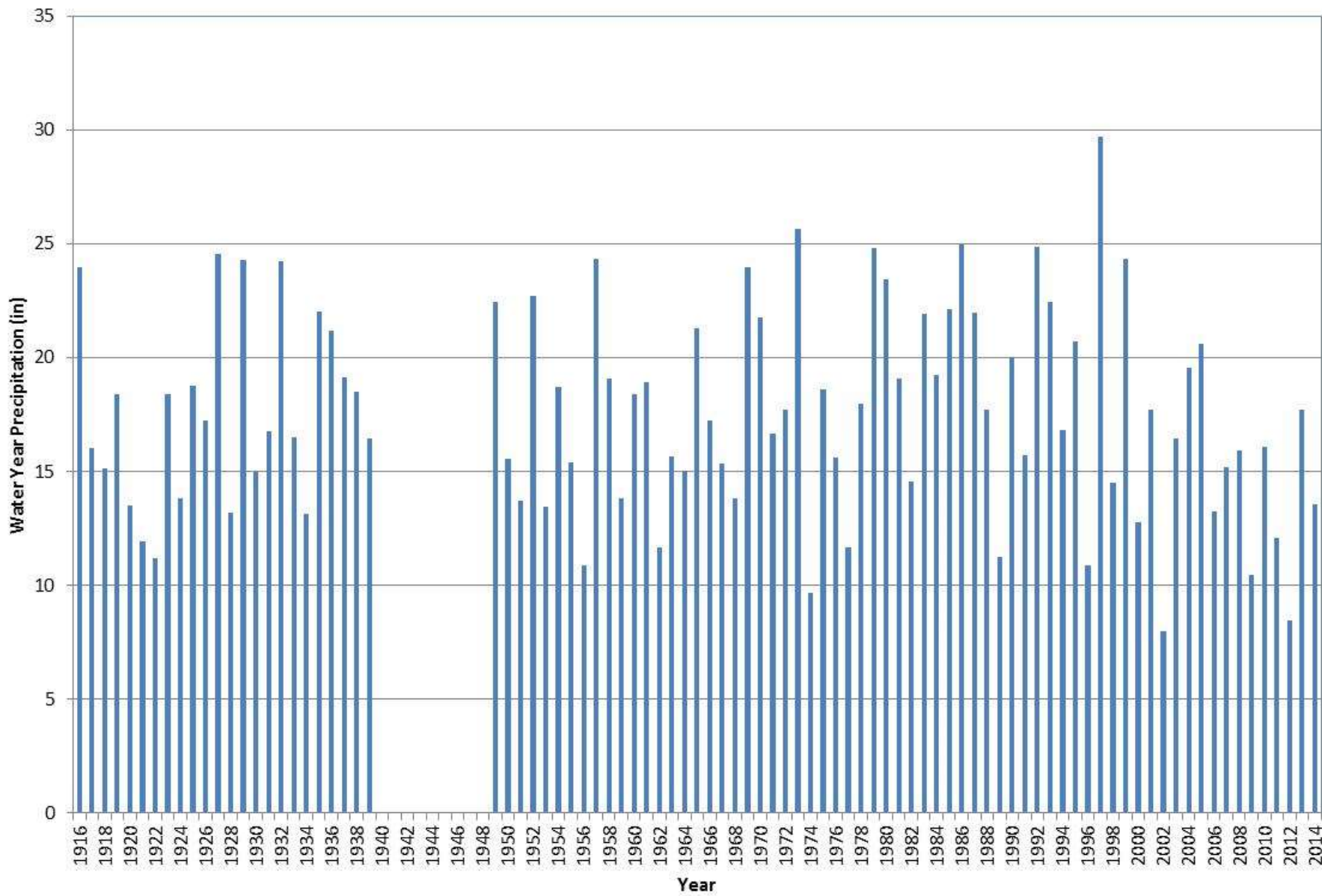




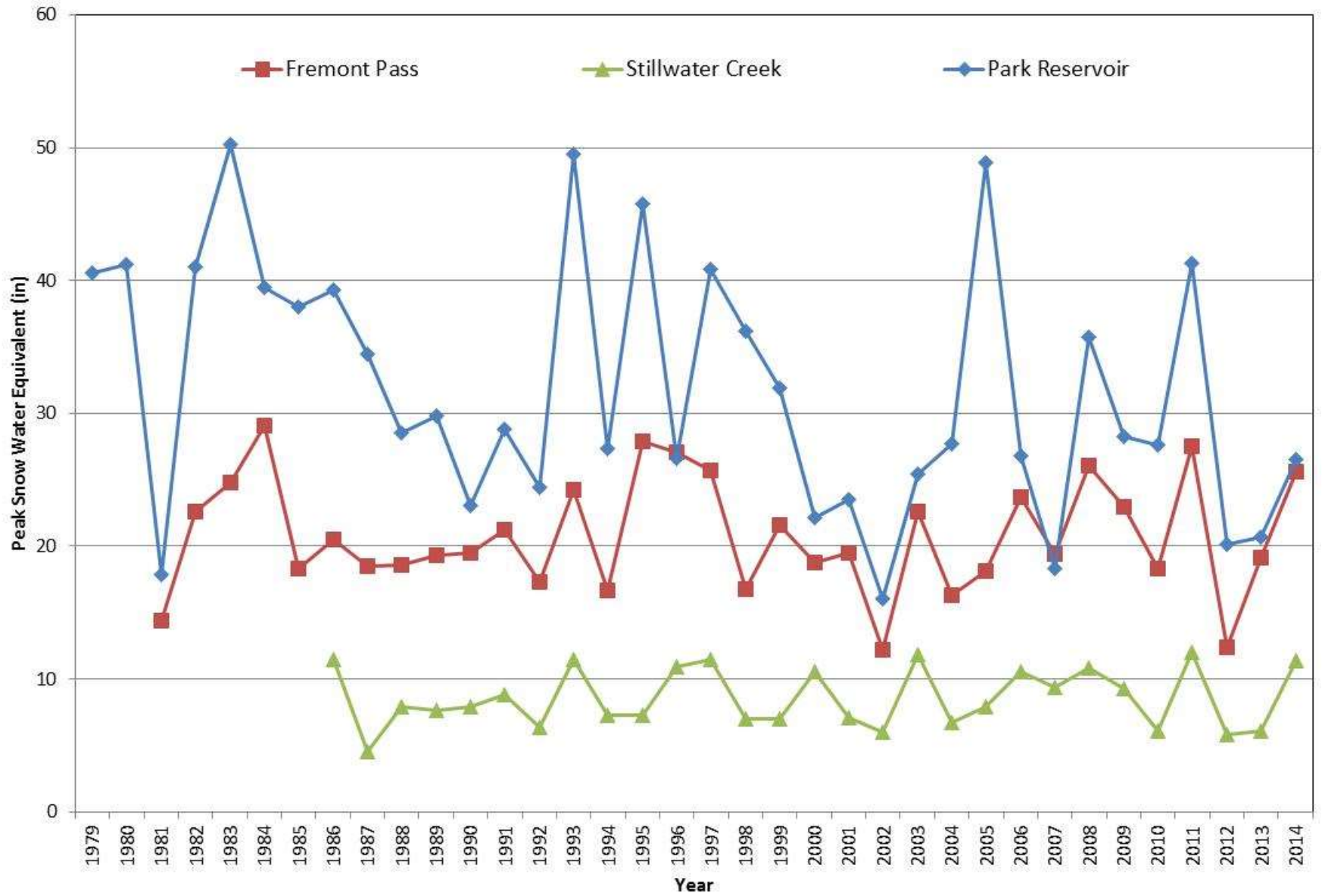
# Montrose #2 Water Year Precipitation



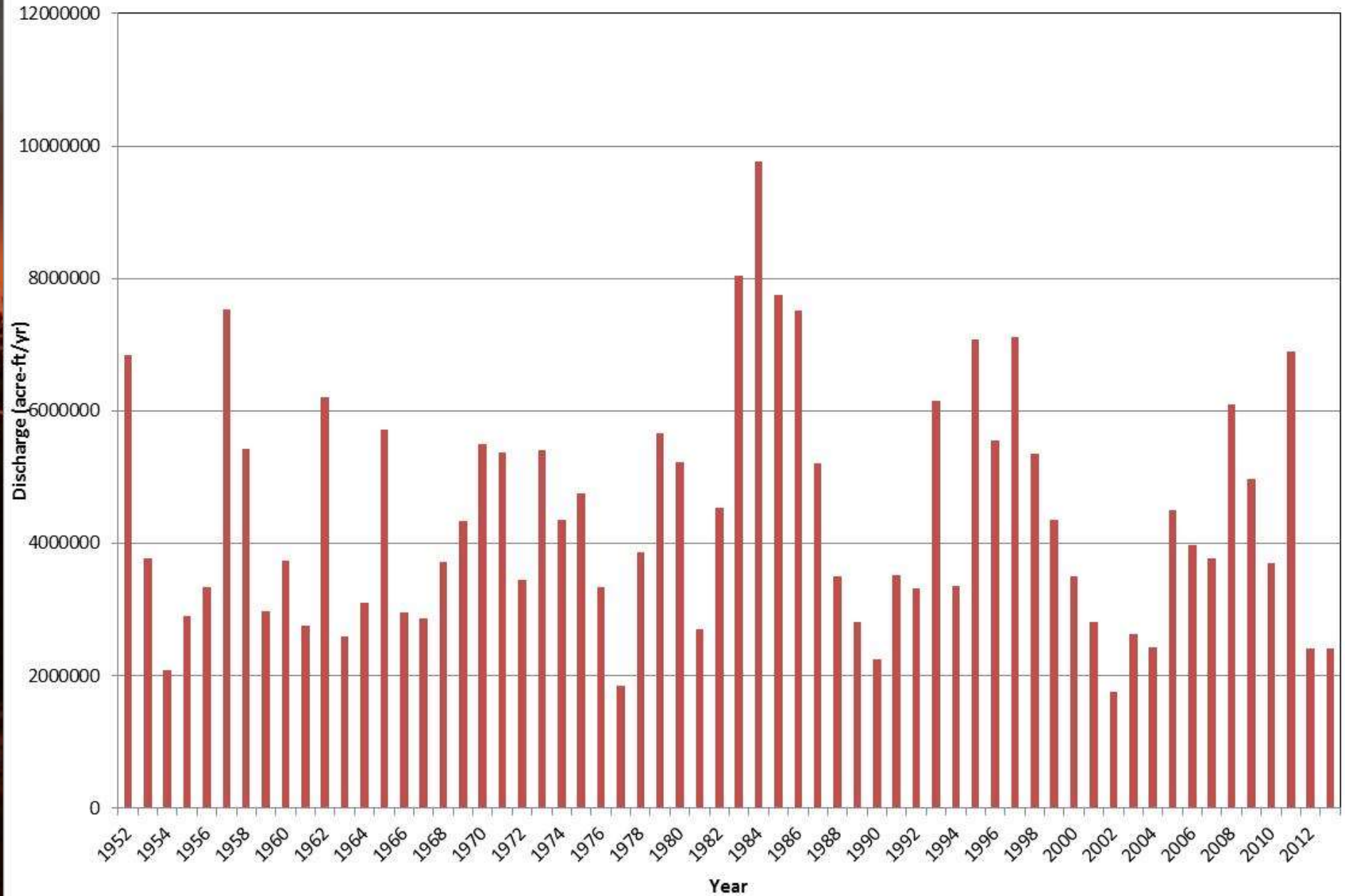
# Ft. Lewis Water Year Precipitation



# Maximum Daily SWE from Select Snotel Stations



# Colorado at CO-UT Stateline Discharge (ac-ft/year) 1952-2013



# NIDIS UCRB Weekly Climate and Drought Assessments!



**Upper Colorado River**  
Regional Drought Early Warning System

**Weekly Climate, Water & Drought Assessment**

- **Assessments done weekly on Tuesdays**
- **Webinars are held at critical times of year.**
- **Local input is needed to assess current conditions!**

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