

Drought Update

July 27, 2004 WATF Meeting

Roger A. Pielke,
Professor and State Climatologist
Odie Bliss, Coordinator

(presented at the WATF meeting, DOW Building, Denver)

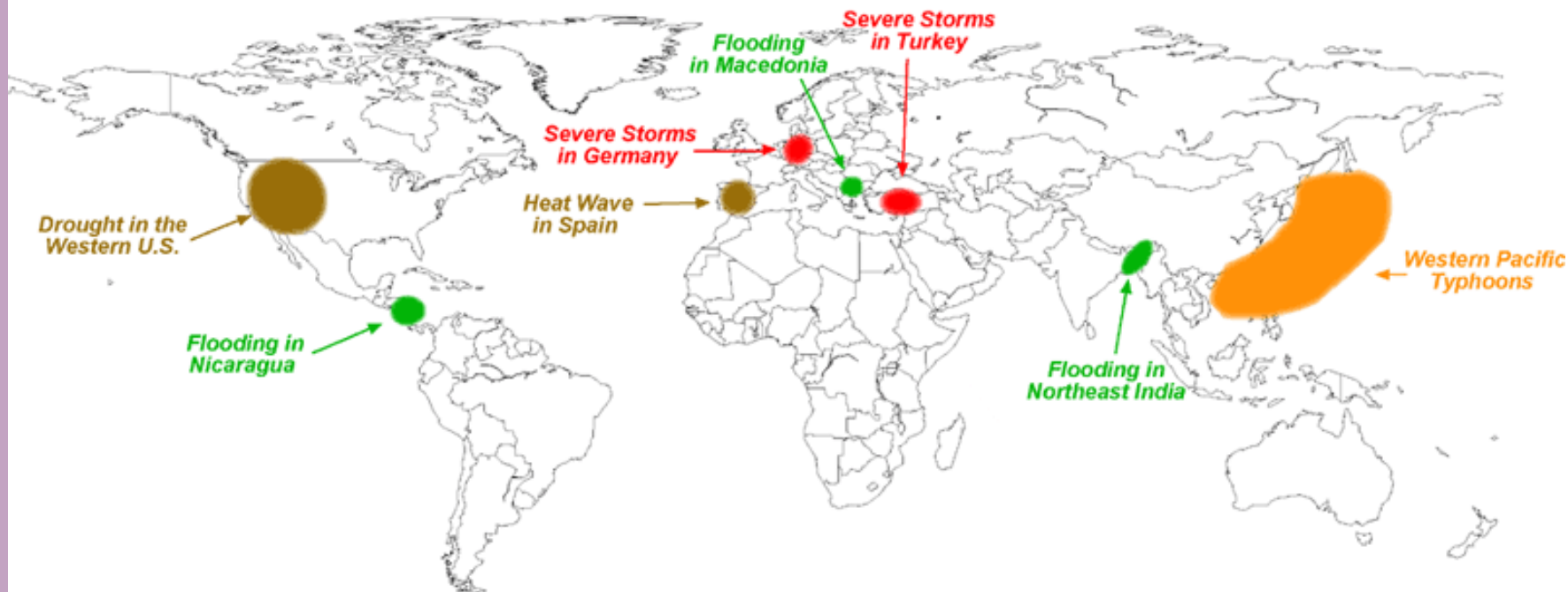
<http://ccc.atmos.colostate.edu>



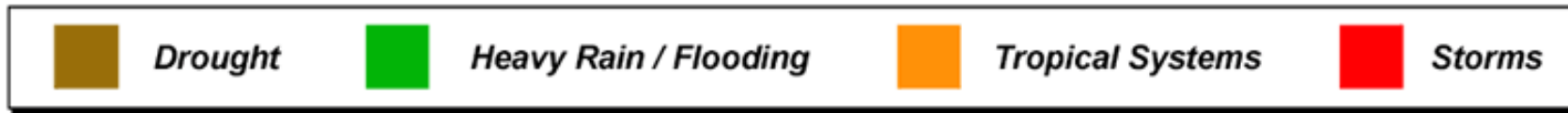


Selected Global Significant Events

JUNE 2004



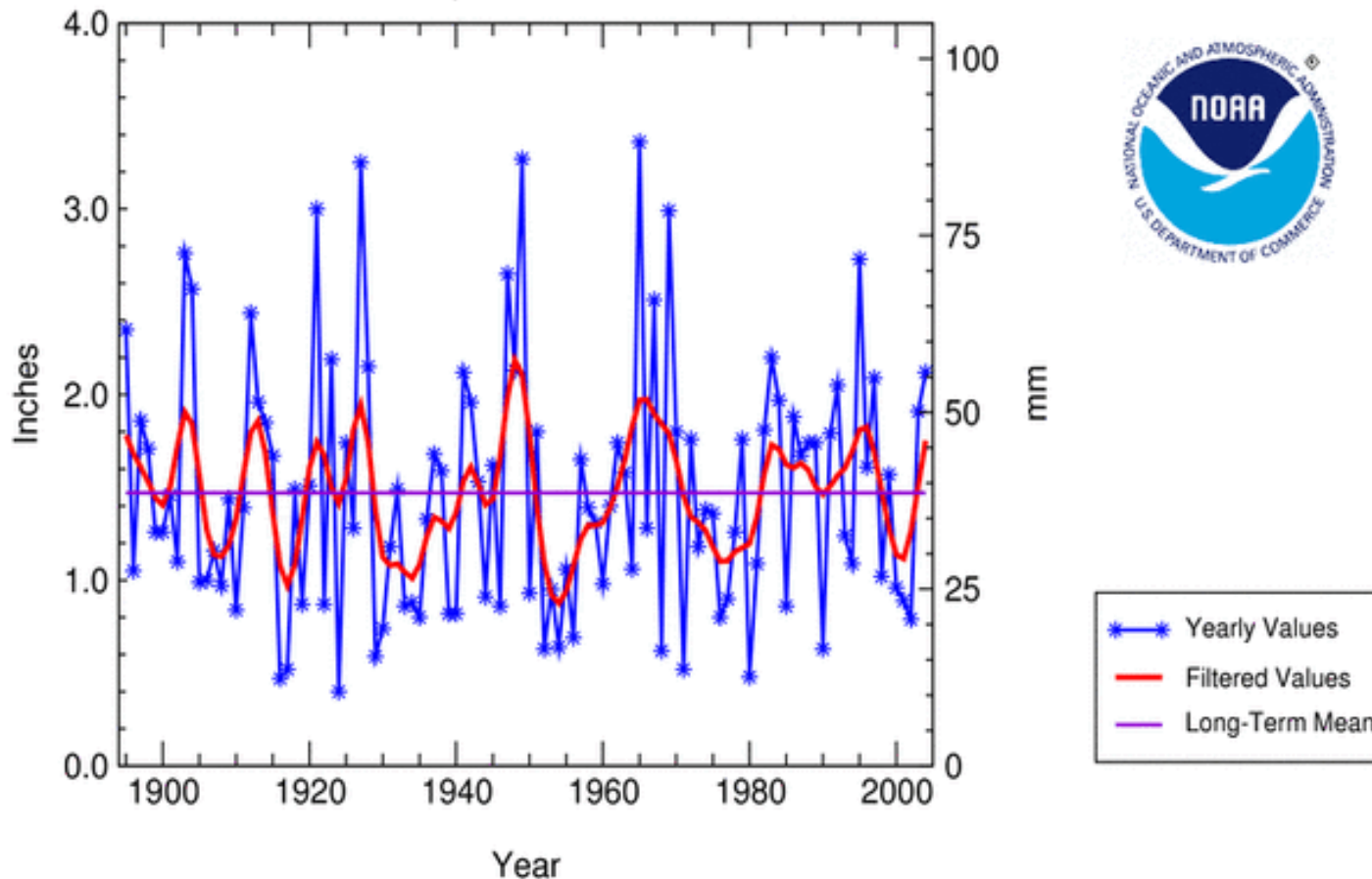
Click On A Shaded Area For More Information



<http://www.ncdc.noaa.gov/oa/climate/research/2004/jun/jun04.html>

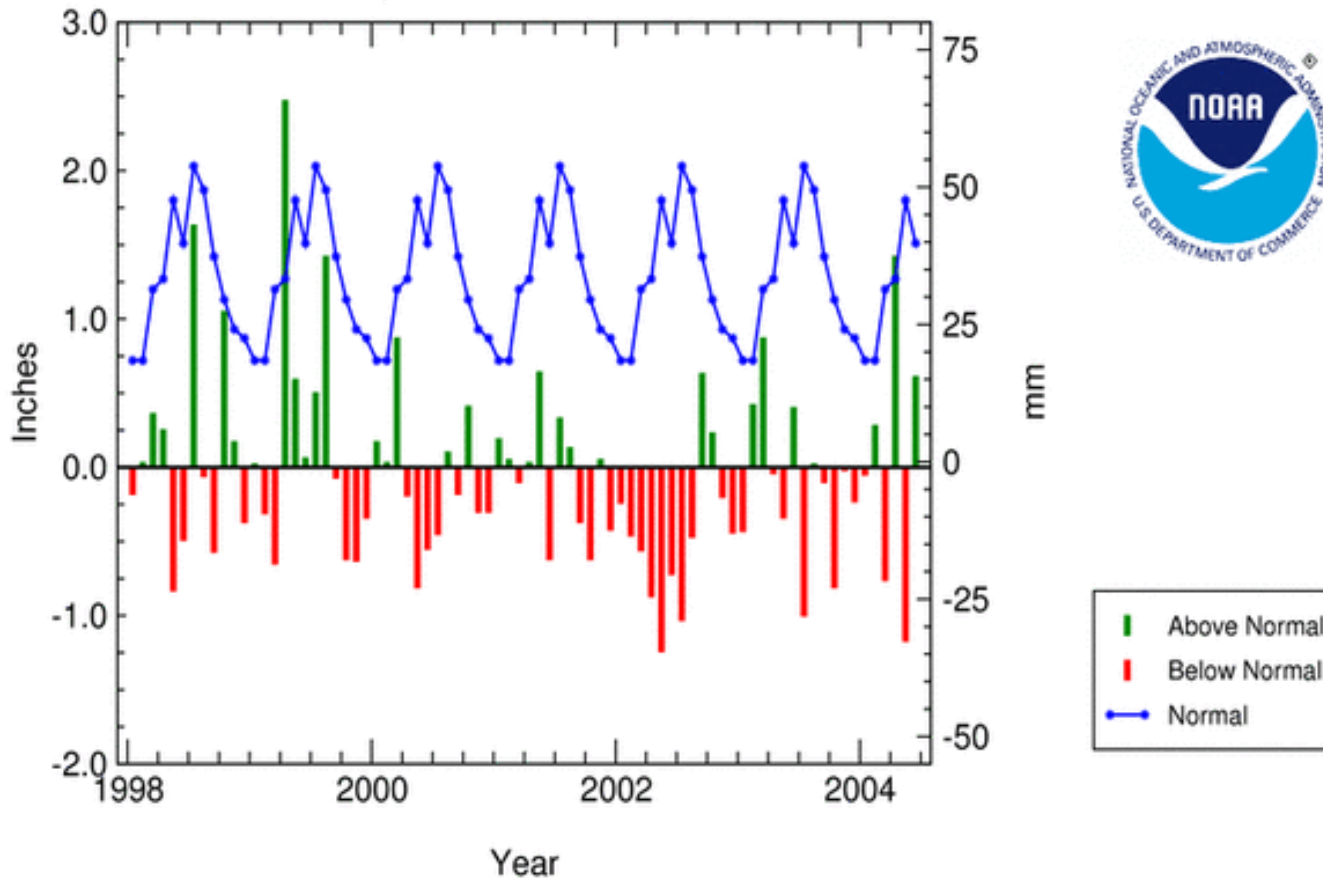
Colorado Statewide Precipitation

June, 1895 - 2004



National Climatic Data Center / NESDIS / NOAA

Colorado Statewide Precipitation Normal & Departure, Jan 1998 - Jun 2004

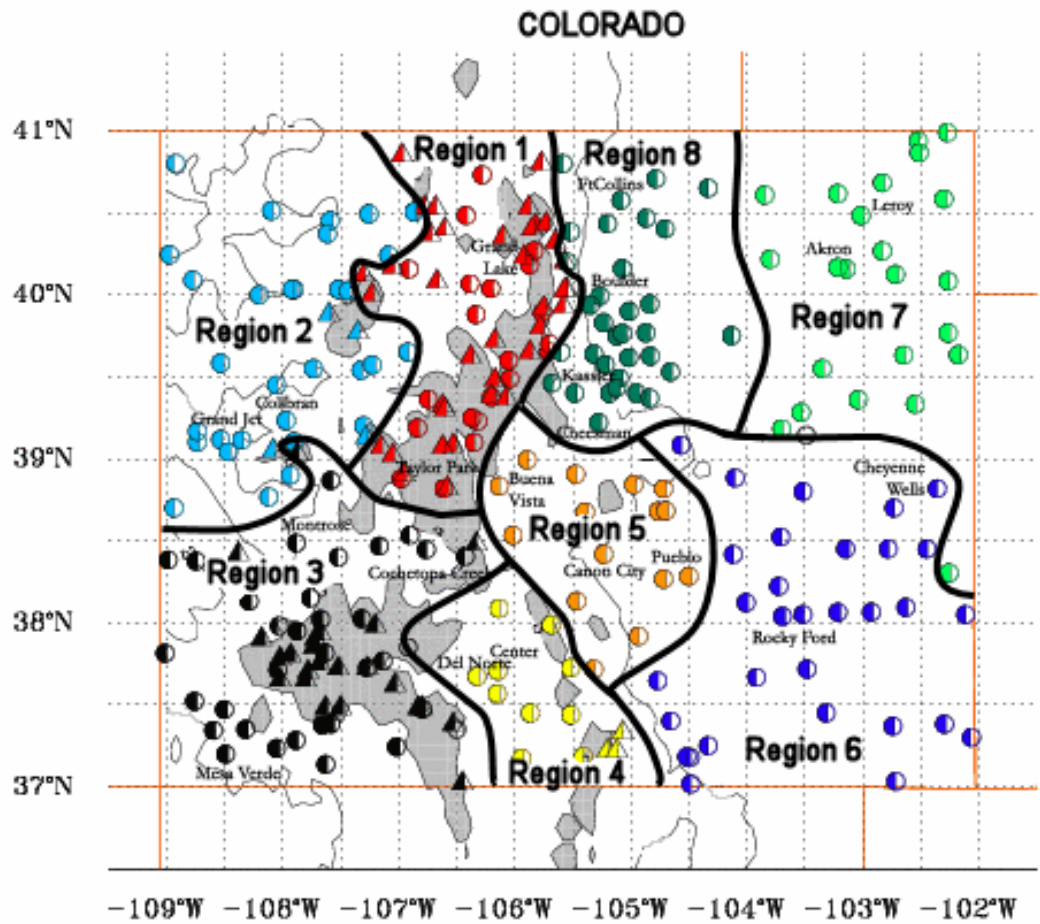


National Climatic Data Center / NESDIS / NOAA

Statewide Precipitation Ranks
for Colorado , 2003-2004

Period	Rank
Jun	<u>17th wettest</u> (<u>93rd driest</u>)
May-Jun	<u>38th driest</u>
Apr-Jun	<u>34th wettest</u> (<u>77th driest</u>)
Mar-Jun	<u>54th driest</u>
Feb-Jun	<u>52nd wettest</u> (<u>59th driest</u>)
Jan-Jun	<u>55th driest</u>
Dec-Jun	<u>52nd driest</u>
Nov-Jun	<u>54th driest</u>
Oct-Jun	<u>36th driest</u>
Sep-Jun	<u>33rd driest</u>
Aug-Jun	<u>38th driest</u>
Jul-Jun	<u>22nd driest</u>

Colorado
Precipitation
Ranking
1895-2004



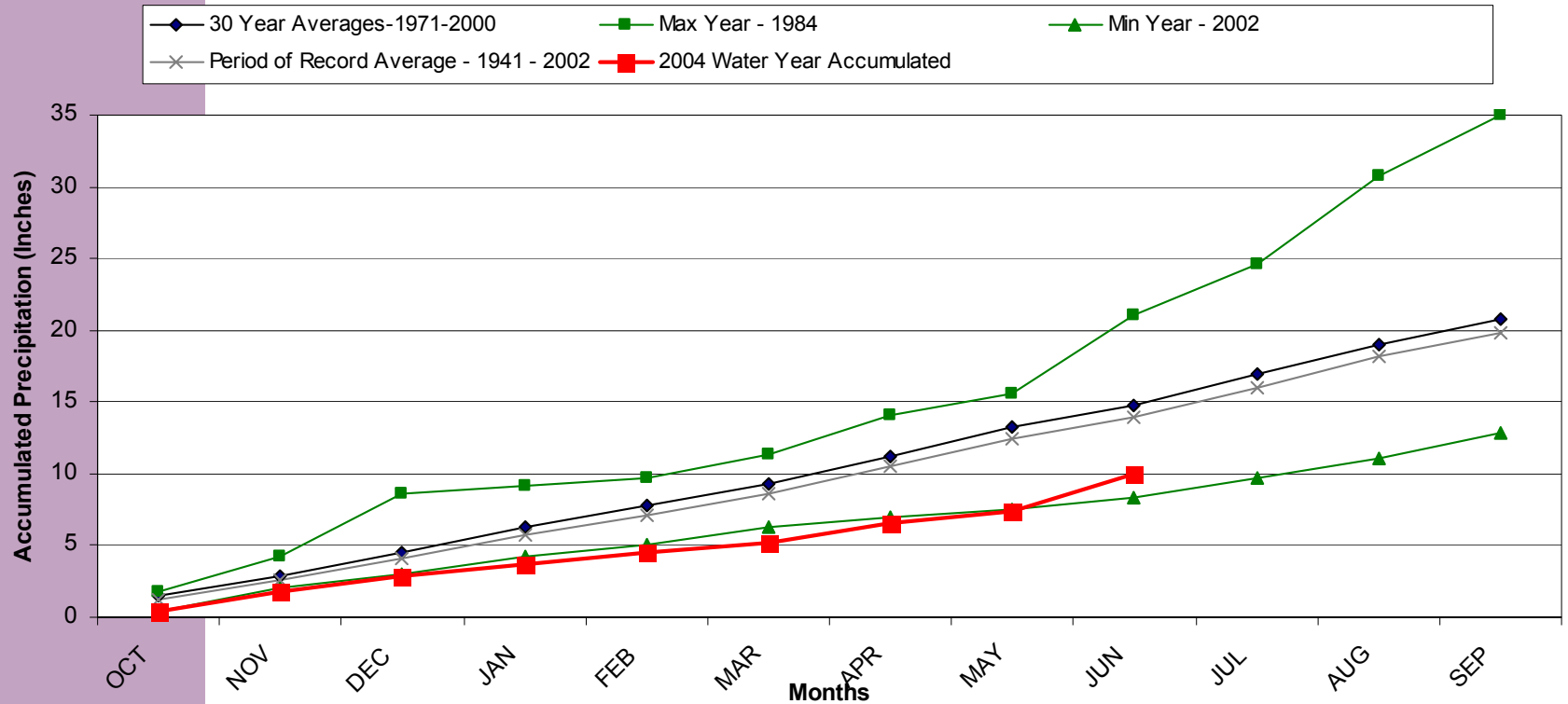
-109°W -108°W -107°W -106°W -105°W -104°W -103°W -102°W

COOP	SNOTEL	IND	COOP	SNOTEL	IND
●	▲	1	●	▲	6
●	▲	2	●	▲	7
●	▲	3	●	▲	8
●	▲	4			
●	▲	5			
○	△	Stations not assigned to an index			

Climate divisions defined by Dr. Klaus Wolter of NOAA's Climate Diagnostic Center in Boulder, CO

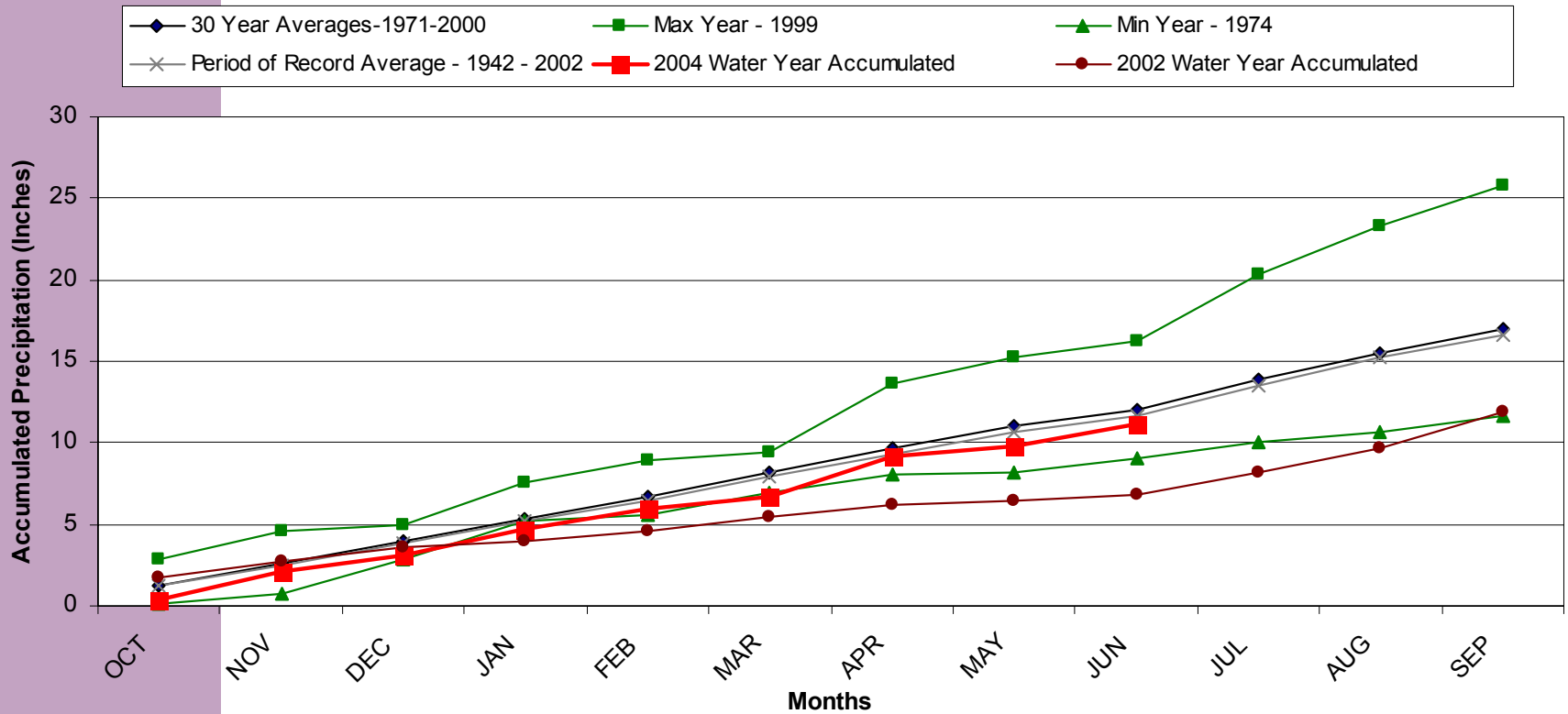
Division 1- Grand Lake 1NW

Grand Lake 1 NW 2004 Water Year (through Oct '03 - Jun '04)



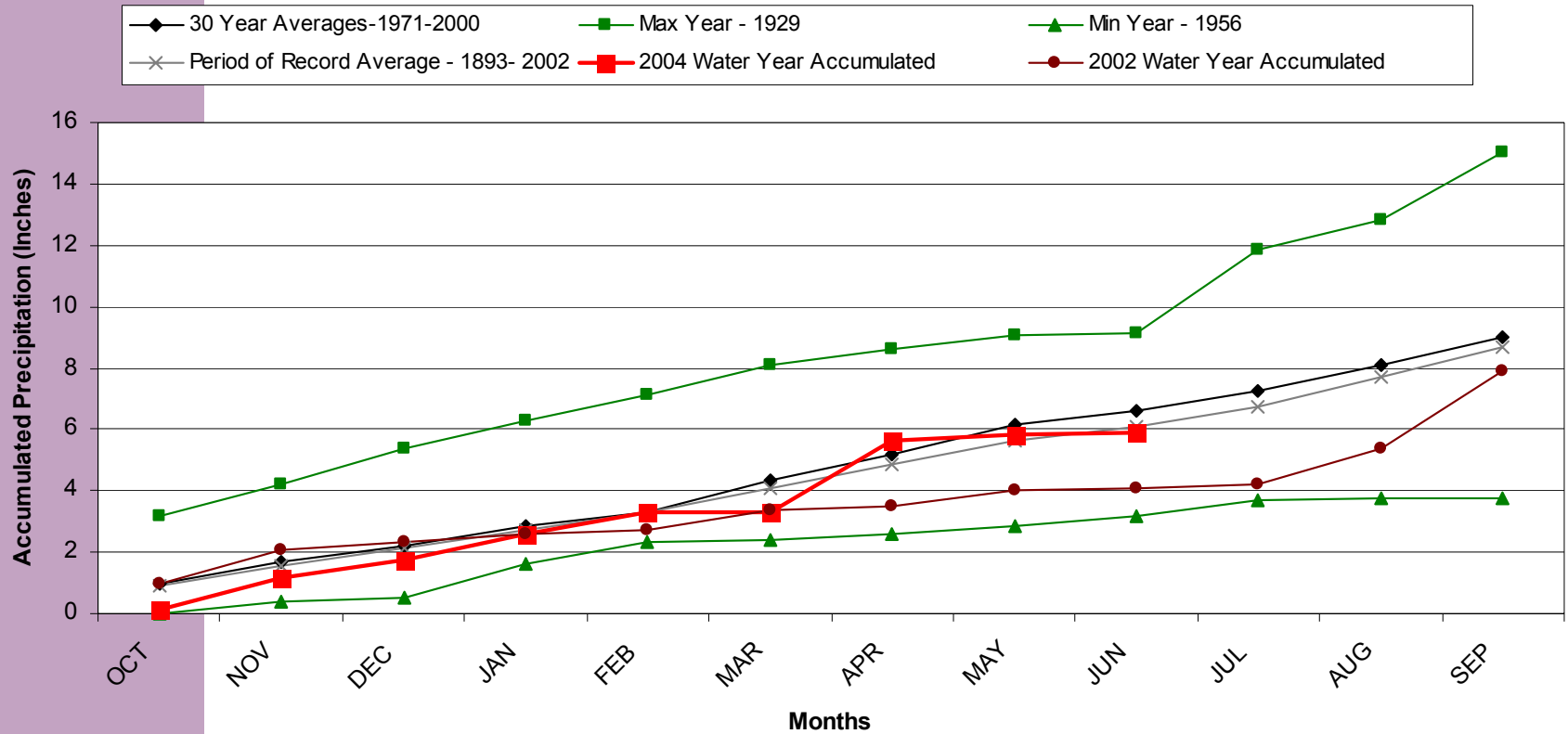
Division 1- Taylor Park

Taylor Park 2004 Water Year (through Oct '03 - Jun '04)



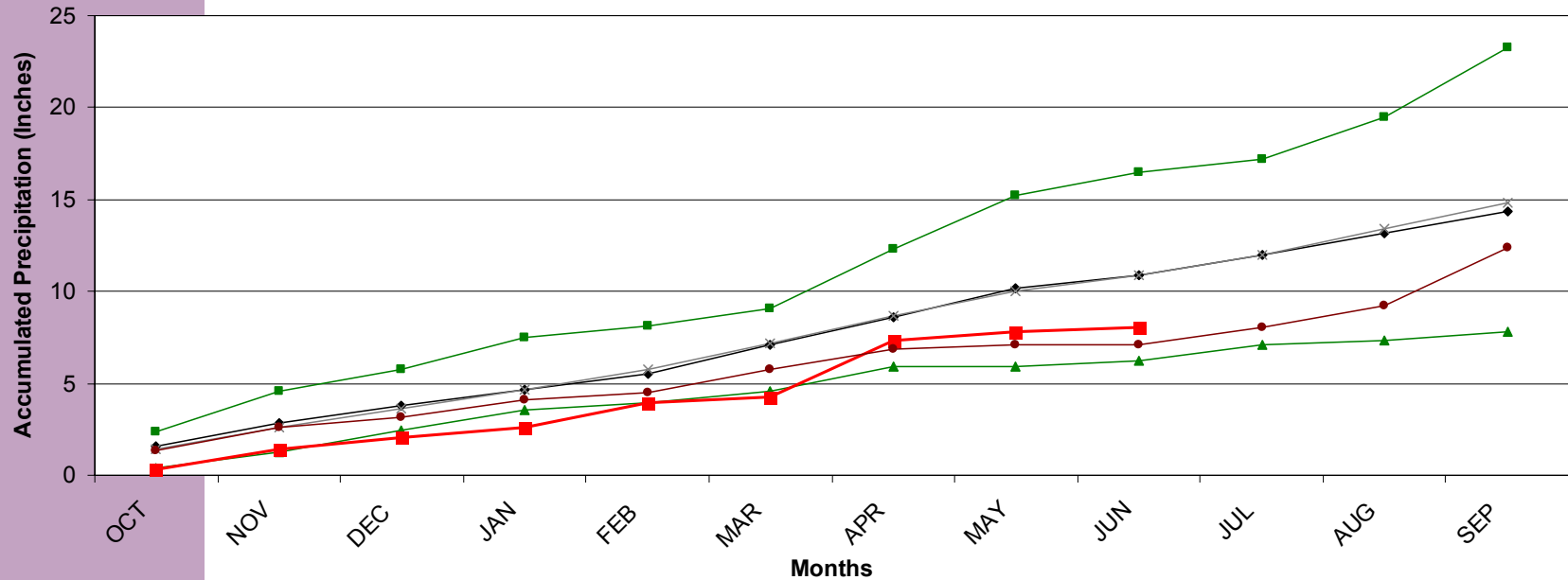
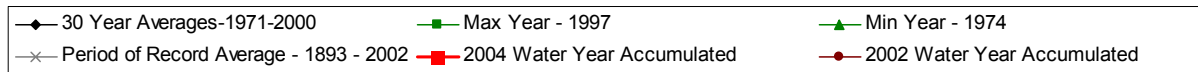
Division 2 – Grand Junction

Grand Junction WSFO 2004 Water Year (through Oct '03 - Jun '04)



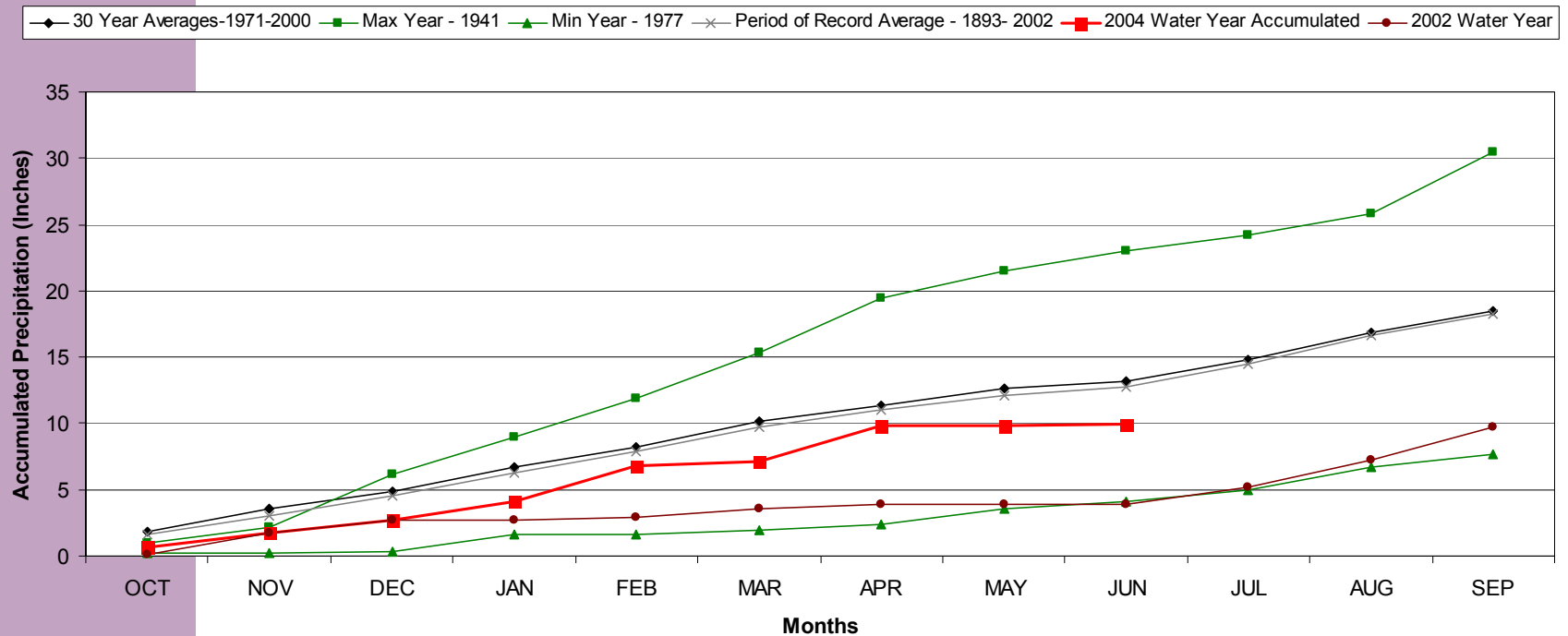
Division 2 – Collbran

Collbran 2SW 2004 Water Year (through Oct '03 - Jun '04)



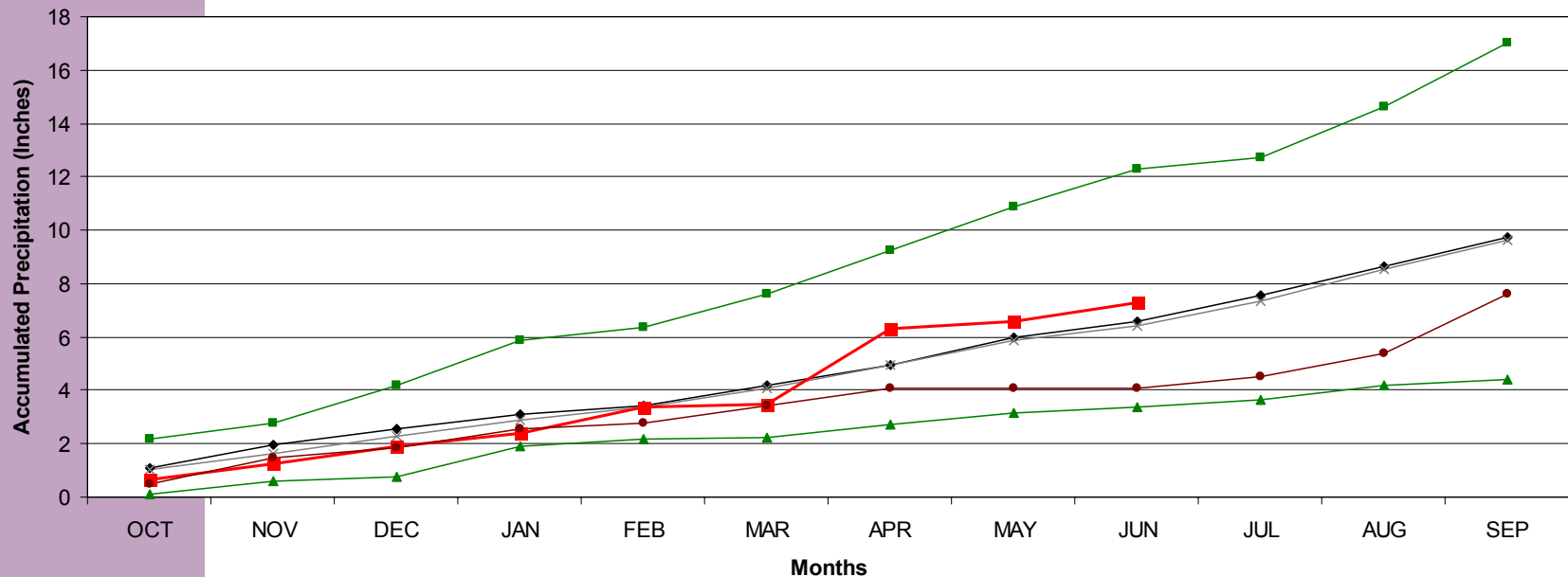
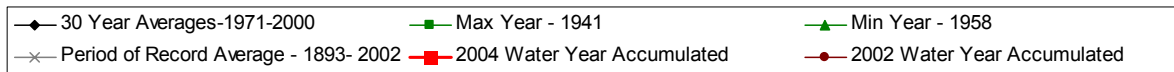
Division 3 – Mesa Verde

Mesa Verde NP 2004 Water Year (through Oct '03 - Jun '04)



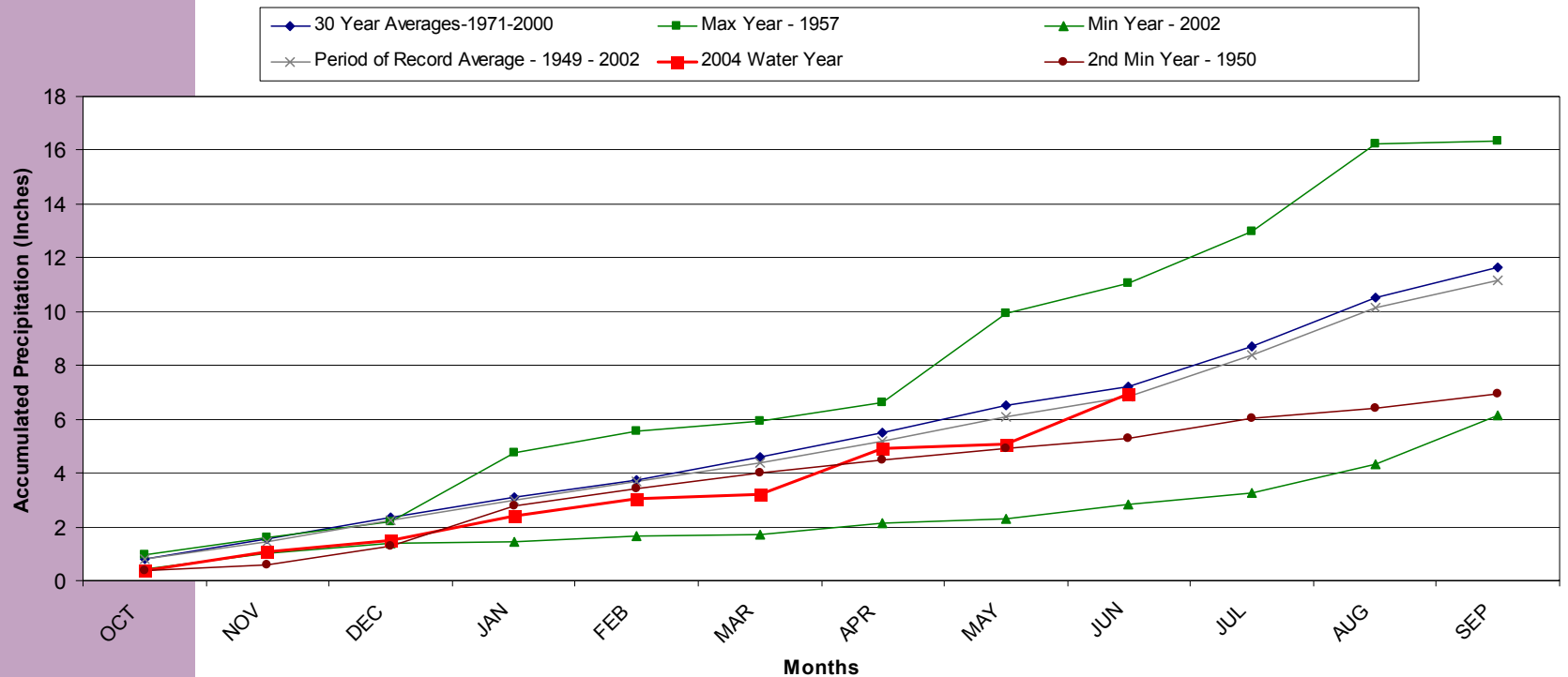
Division 3 - Montrose

Montrose #2 2004 Water Year (through Oct '03 - Jun '04)



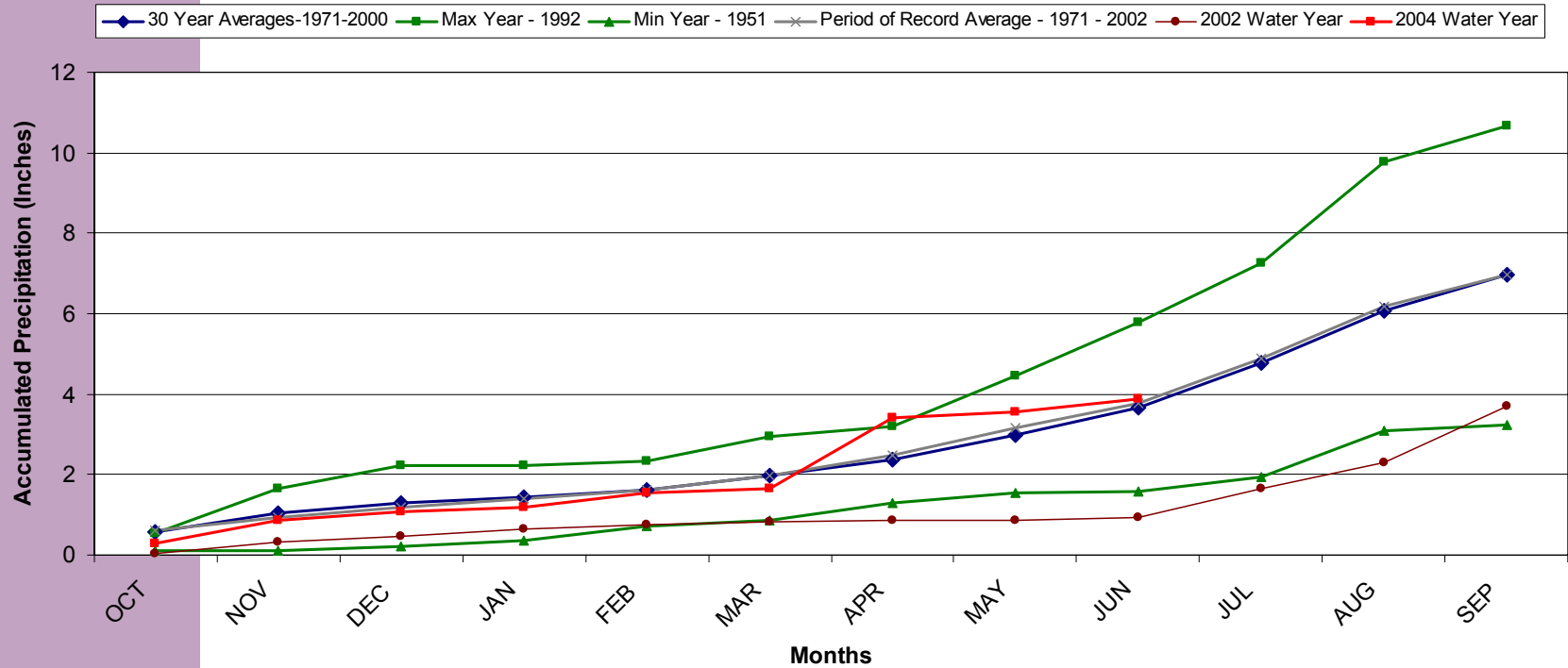
Division 3 – Cochetopa Creek

Cochetopa Creek 2004 Water Year (through Oct '03 - Jun '04)



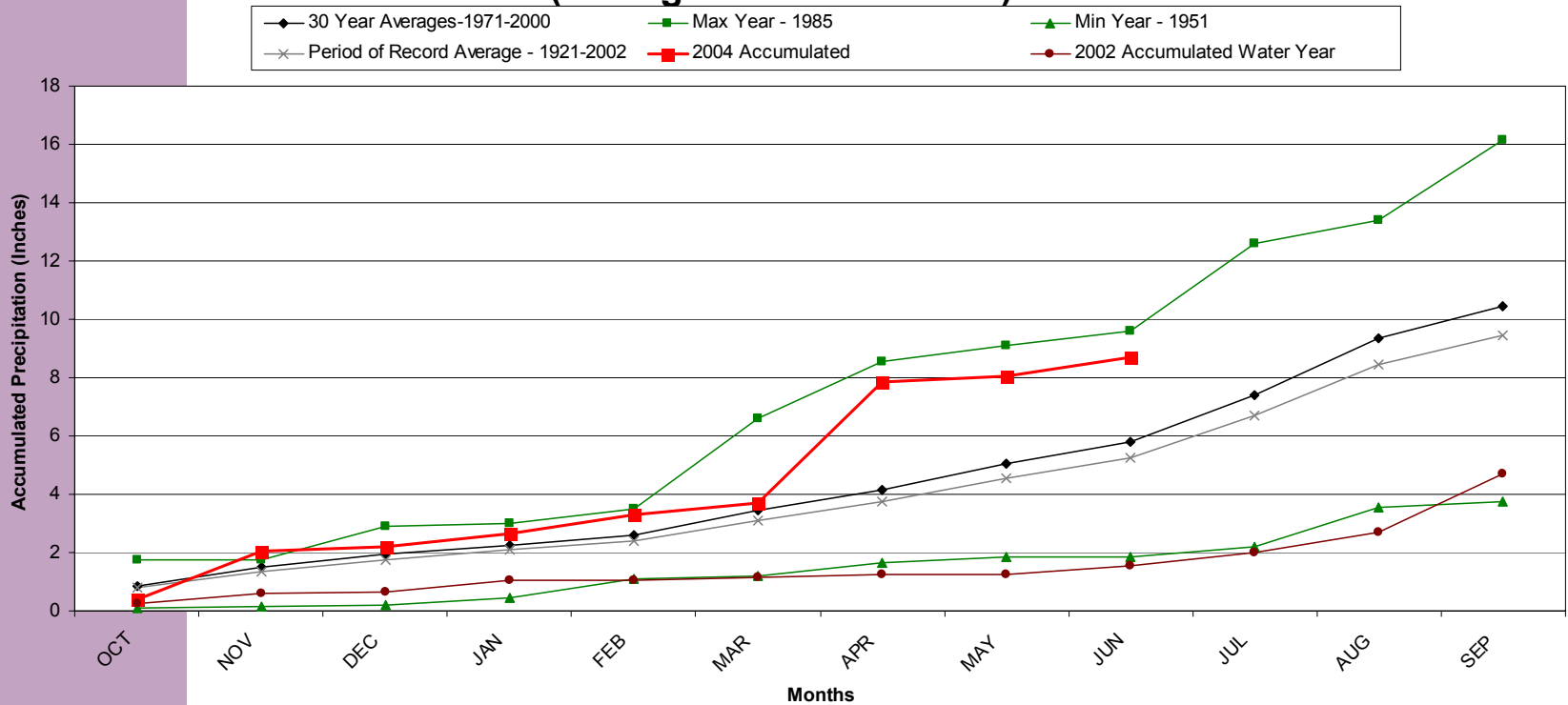
Division 4 - Center

Center 4SSW 2004 Water Year (through Oct '03 - Jun '04)



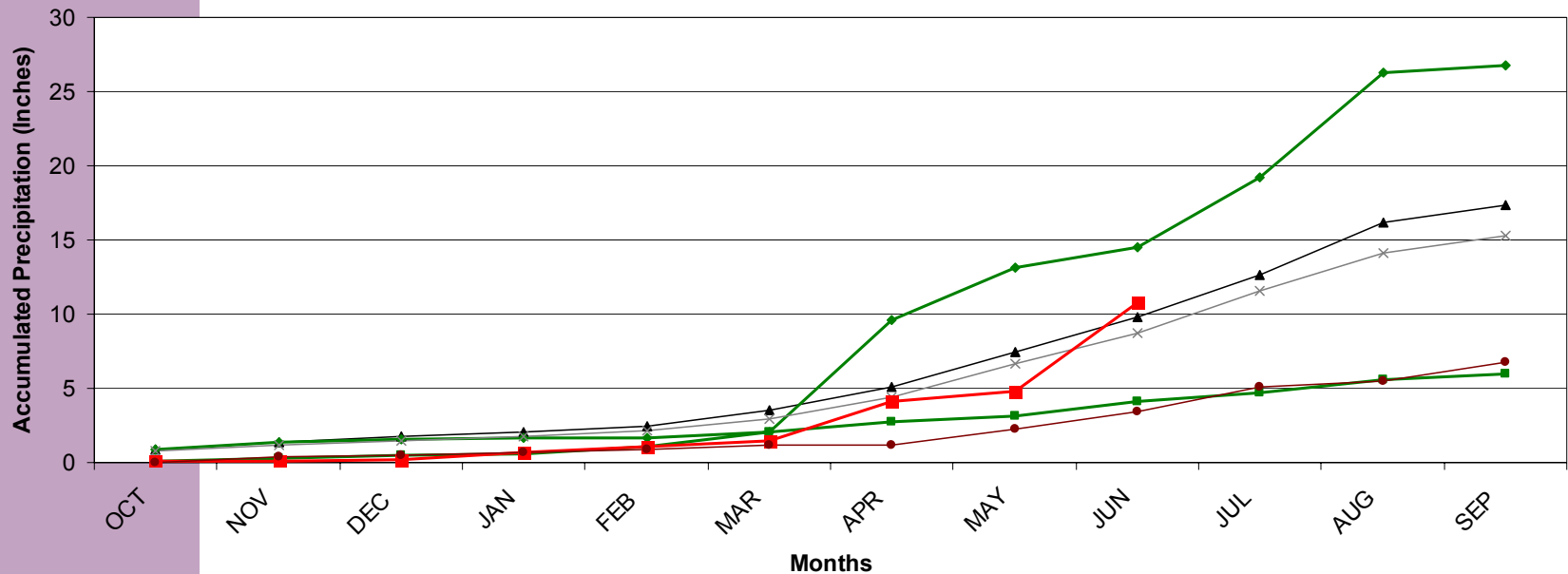
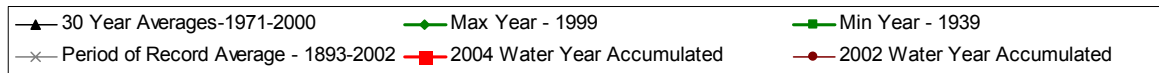
Division 4 – Del Norte

Del Norte 2004 Water Year (through Oct '03 - Jun '04)



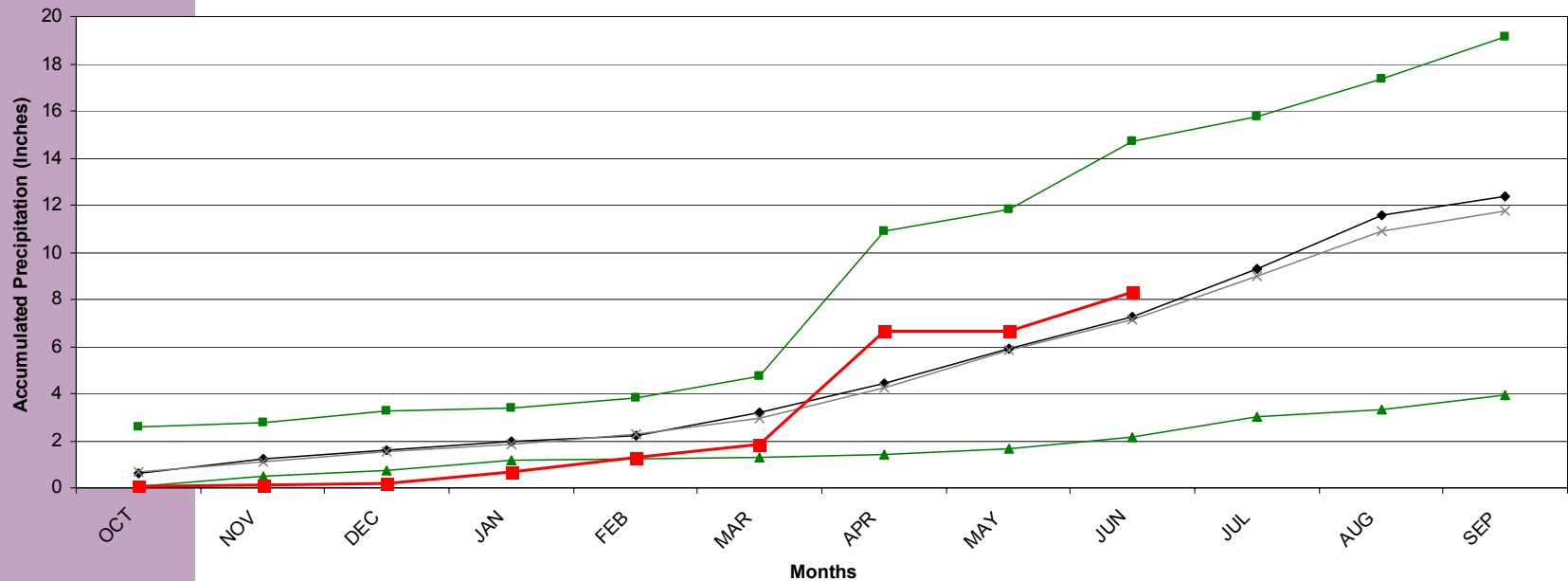
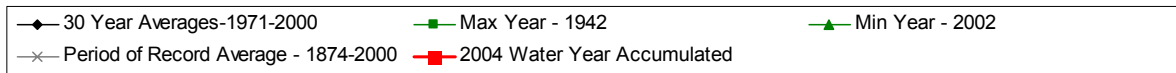
Division 5 – Colorado Springs

Colorado Springs 2004 Water Year (through Oct '03 - Jun '04)



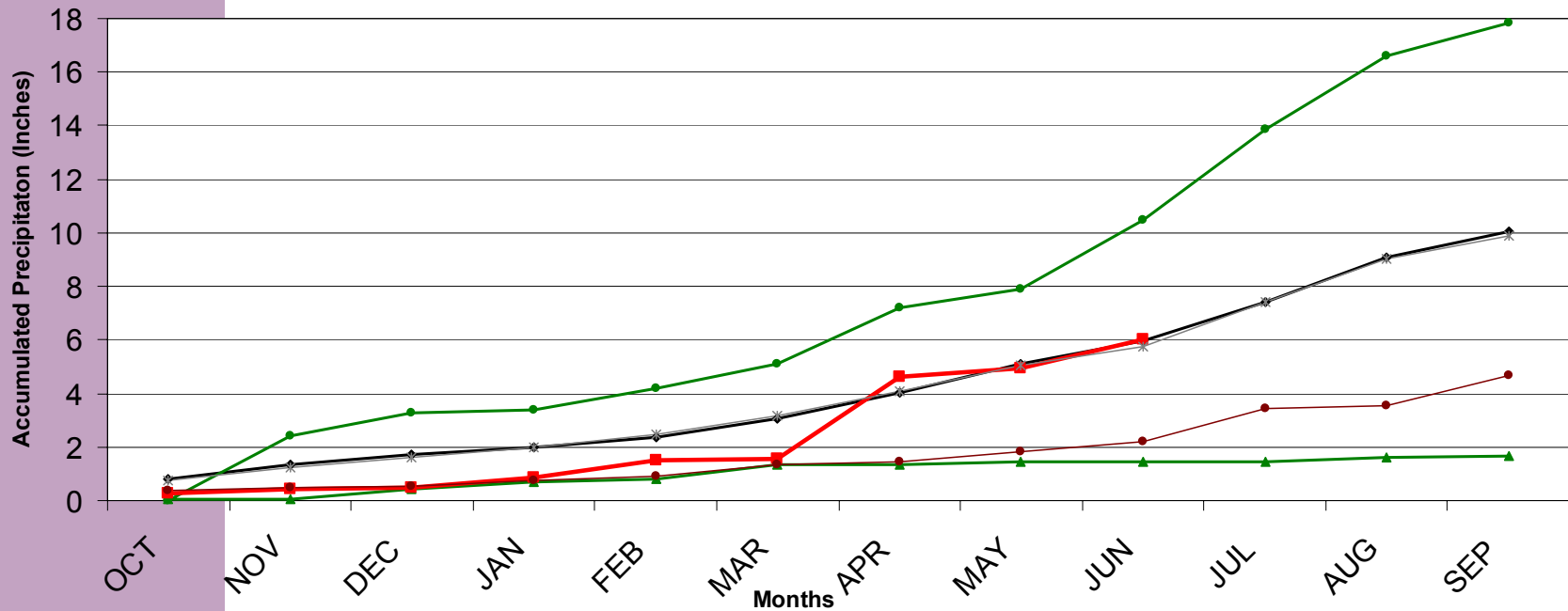
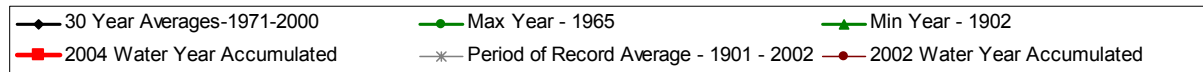
Division 5 - Pueblo

Pueblo WSO 2004 Water Year (through Oct '03 - Jun '04)



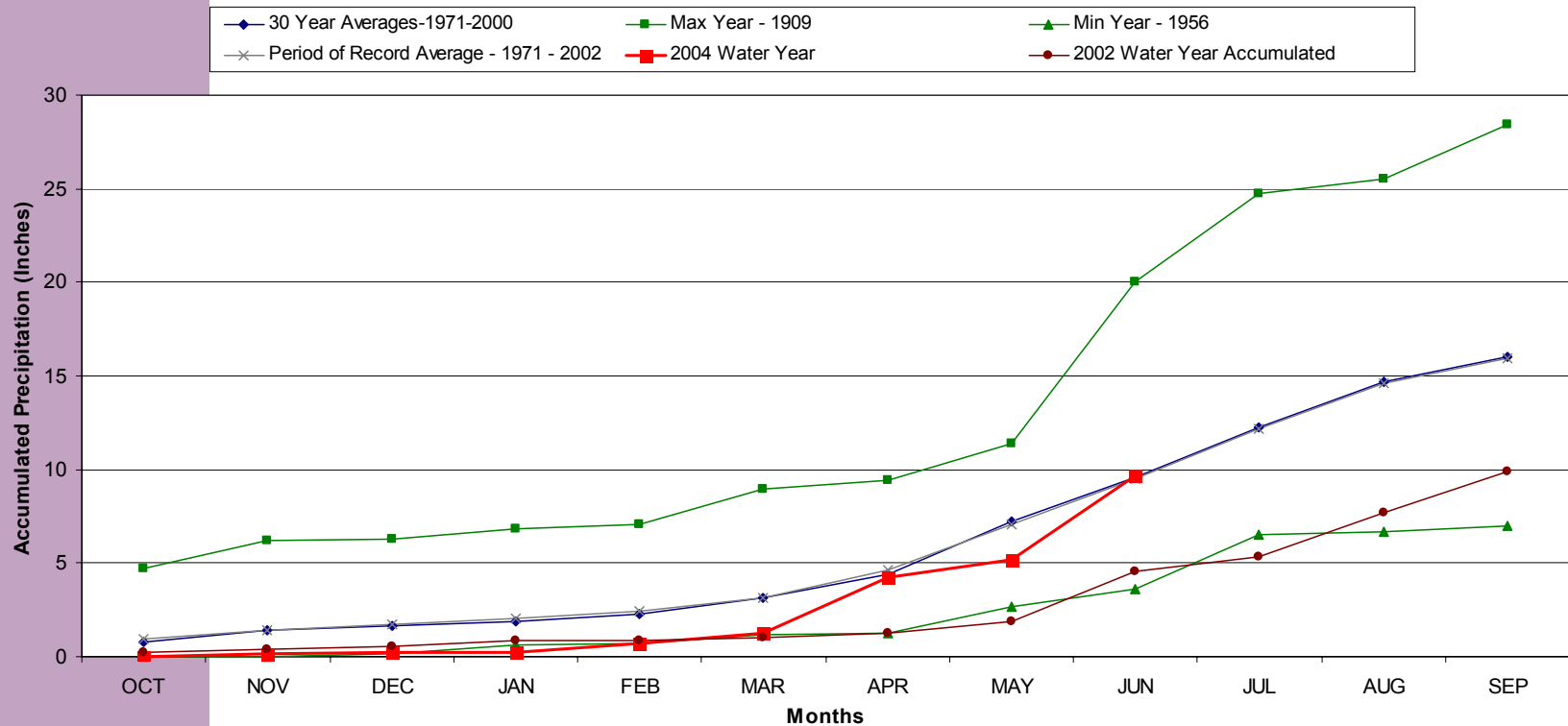
Division 5 – Buena Vista

Buena Vista 2004 Water Year through Oct '03 - Jun '04



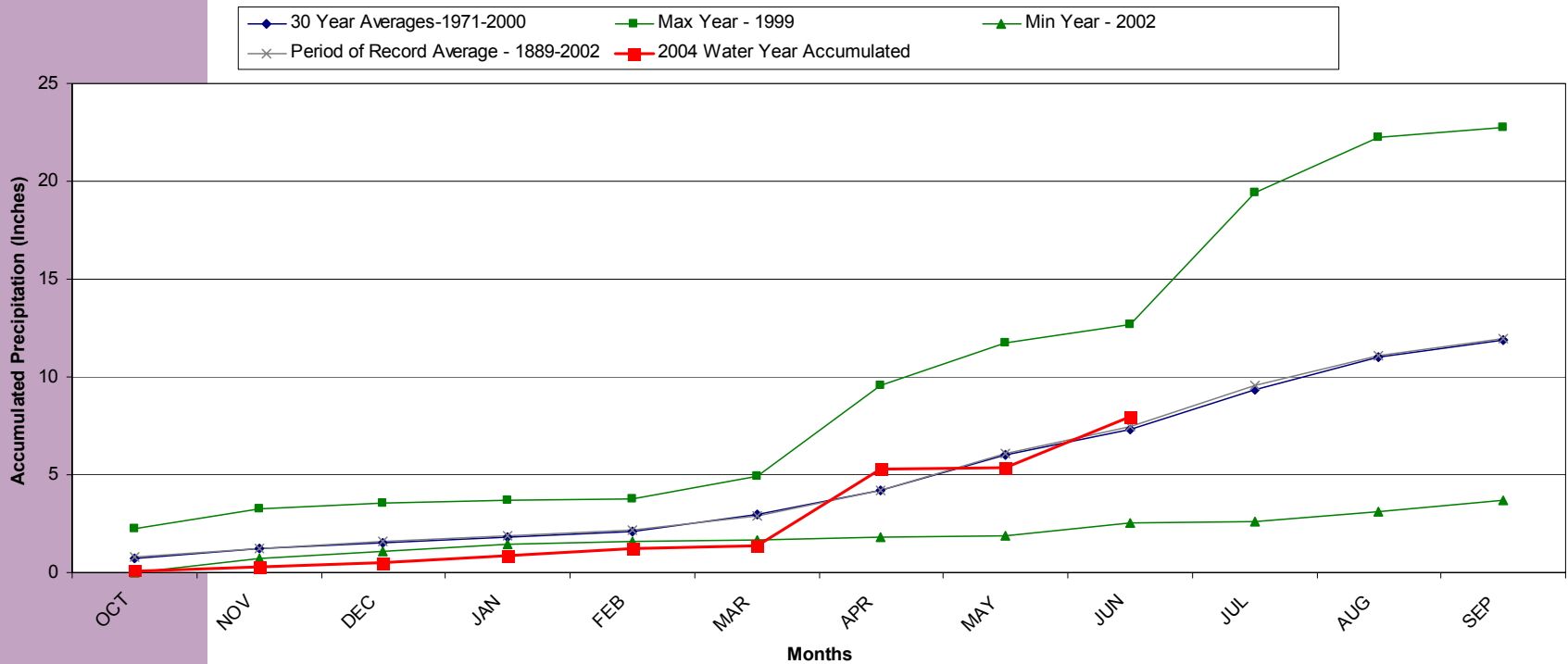
Division 6 – Cheyenne Wells

Cheyenne Wells 2004 Water Year (through Oct '03 - Jun '04)



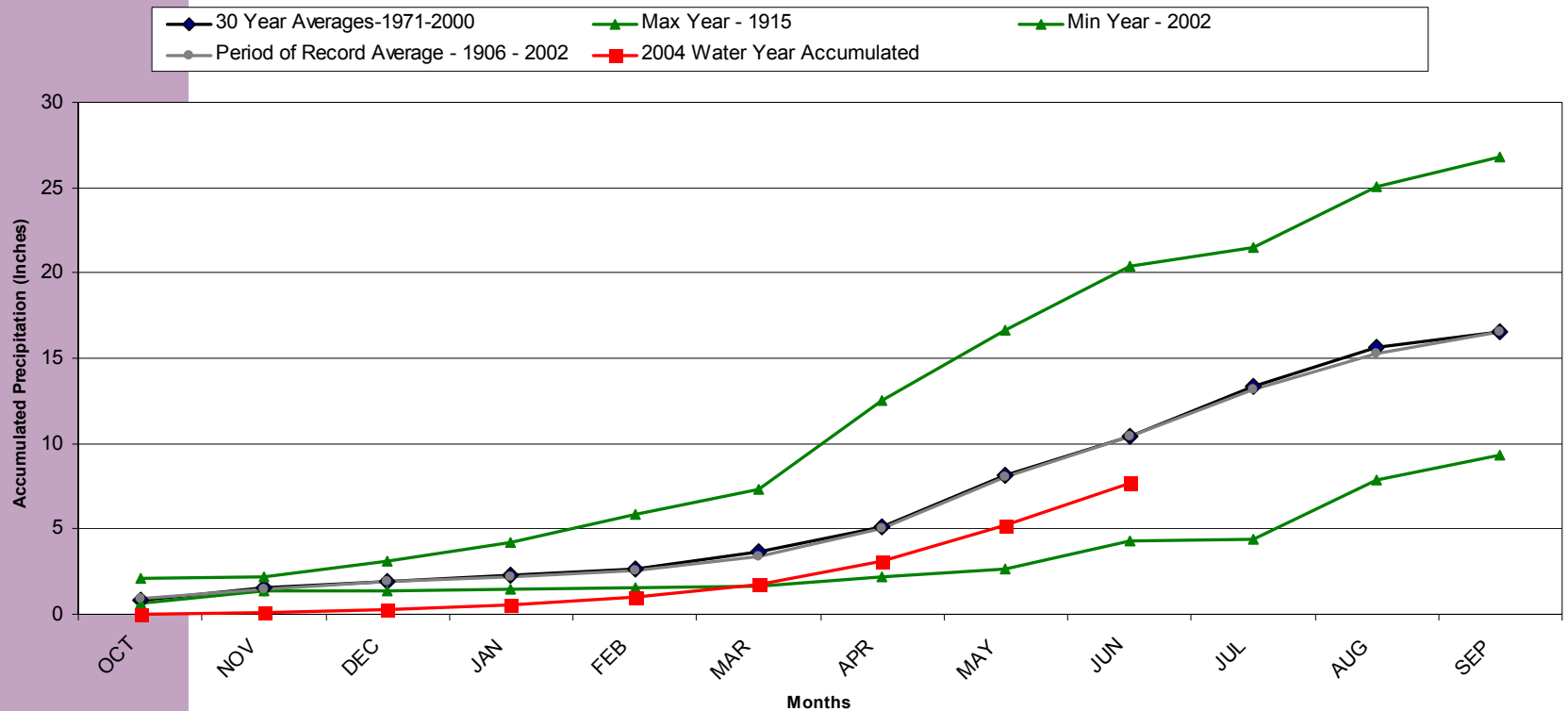
Division 6 – Rocky Ford

Rocky Ford 2004 Water Year (through Oct '03 - Jun '04)



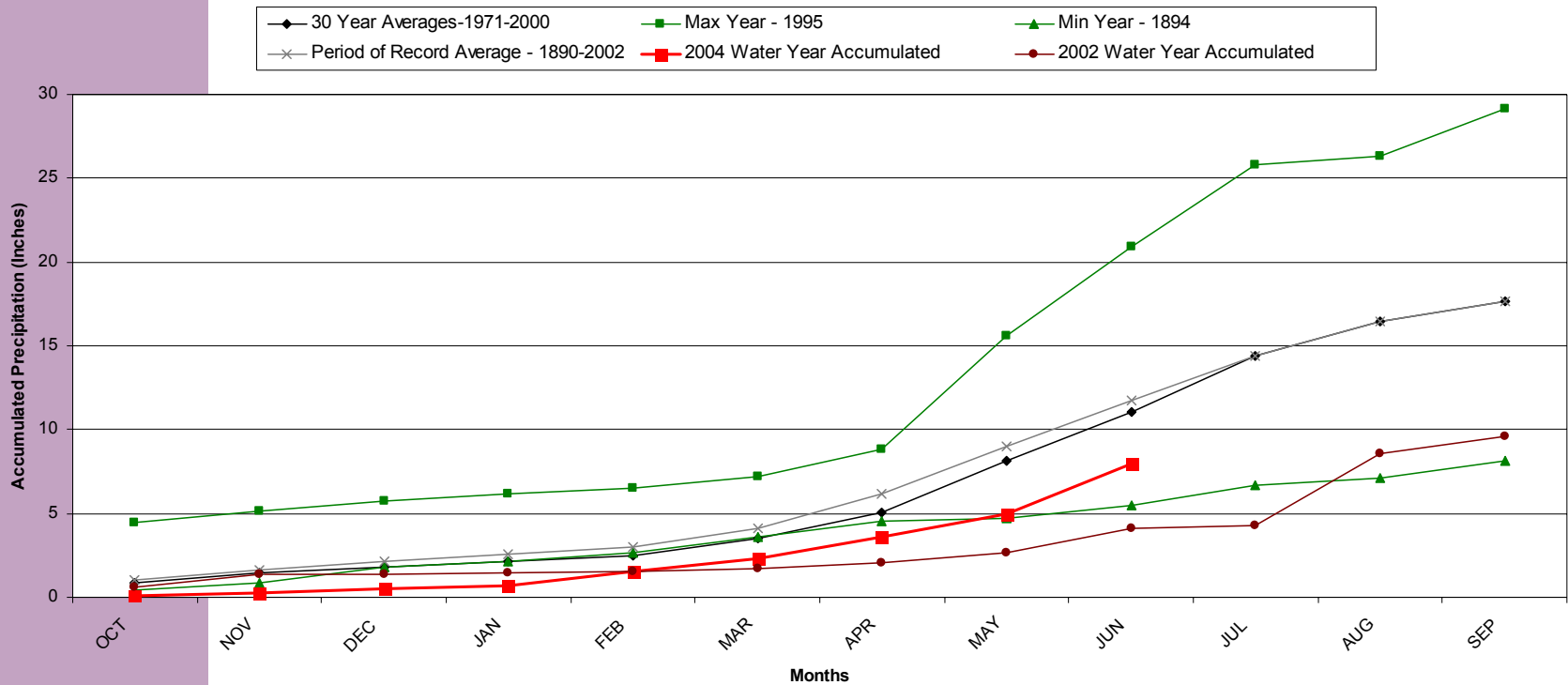
Division 7 – Akron

Akron 4E 2004 Water Year (through Oct '03 - Jun '04)



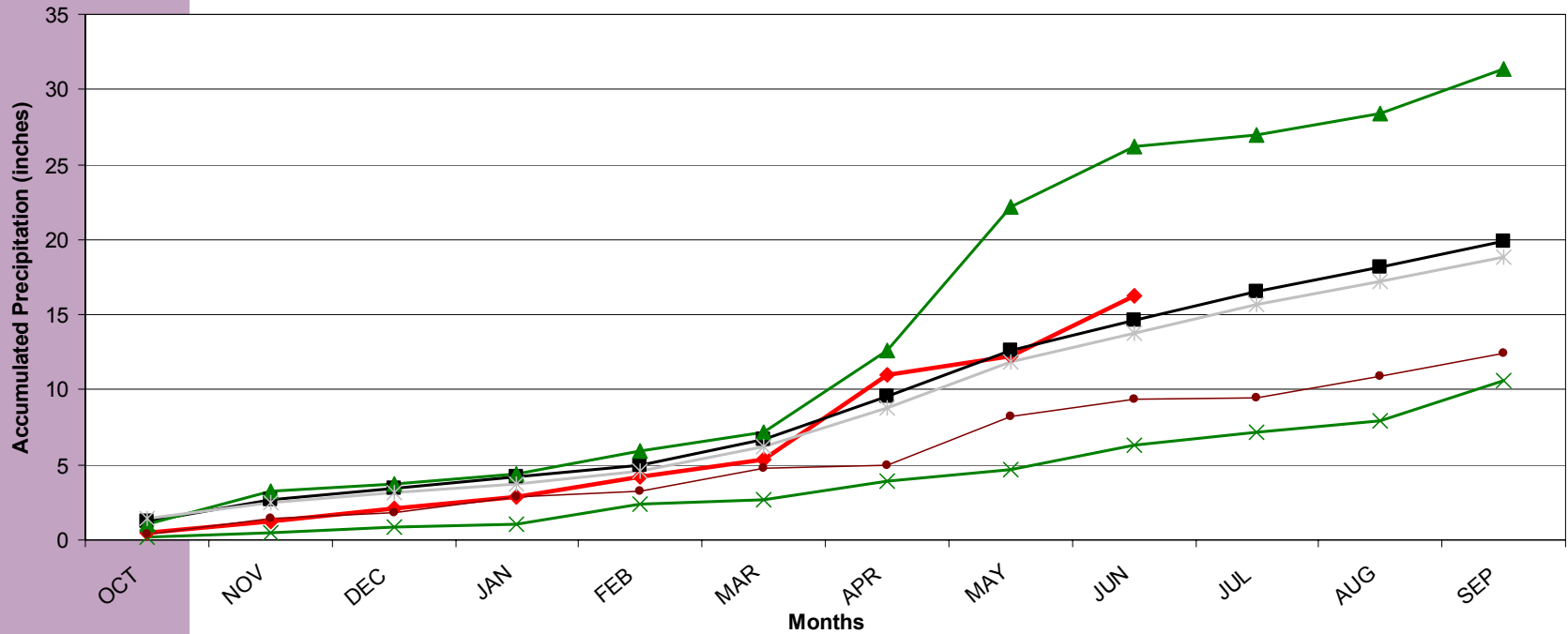
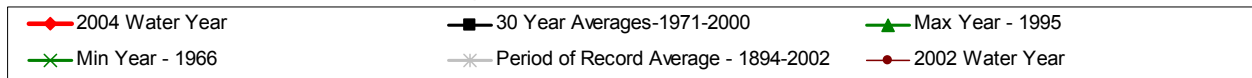
Division 7 - Leroy

Leroy 5SW 2004 Water Year (through Oct '03 - Jun '04)



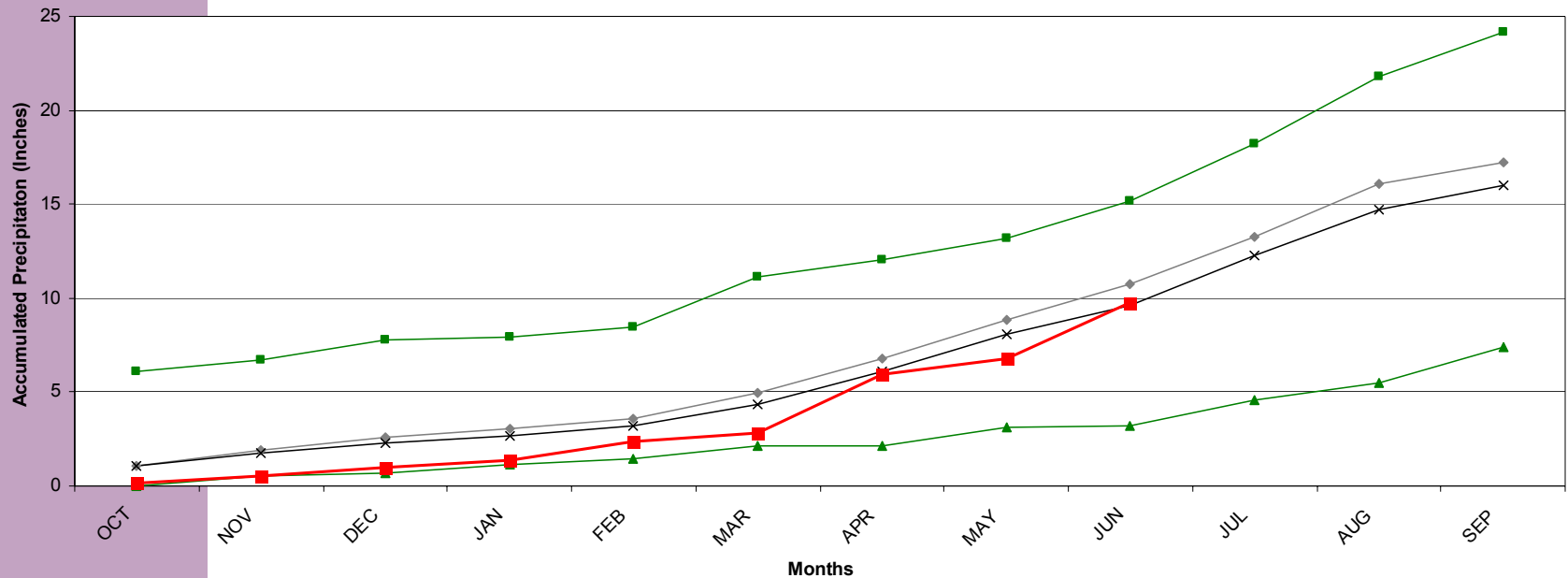
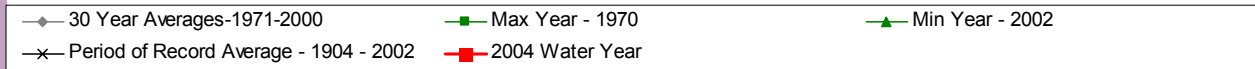
Division 8 – Boulder

Boulder 2004 Water Year through Oct '03 - Jun '04



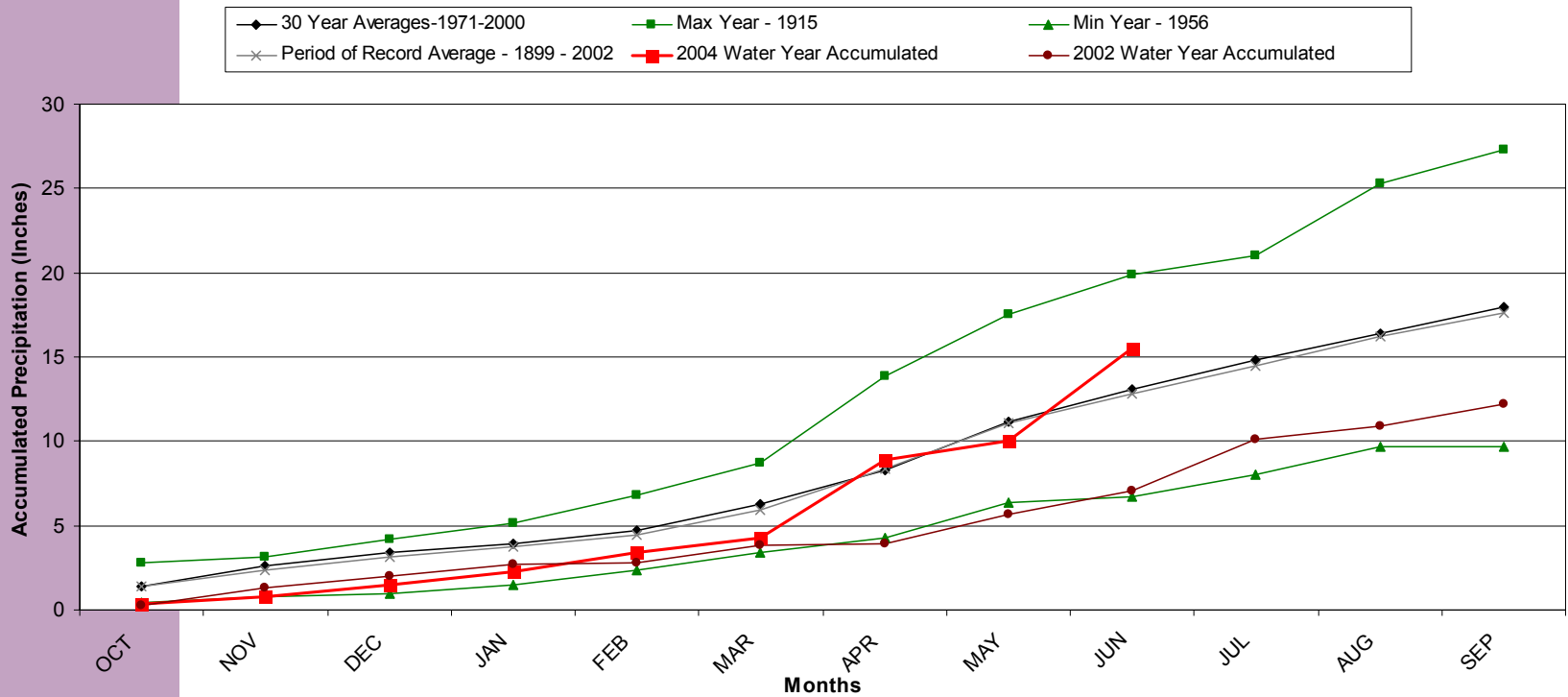
Division 8 – Cheesman

Cheesman 2004 Water Year (through Oct '03 - Jun '04)



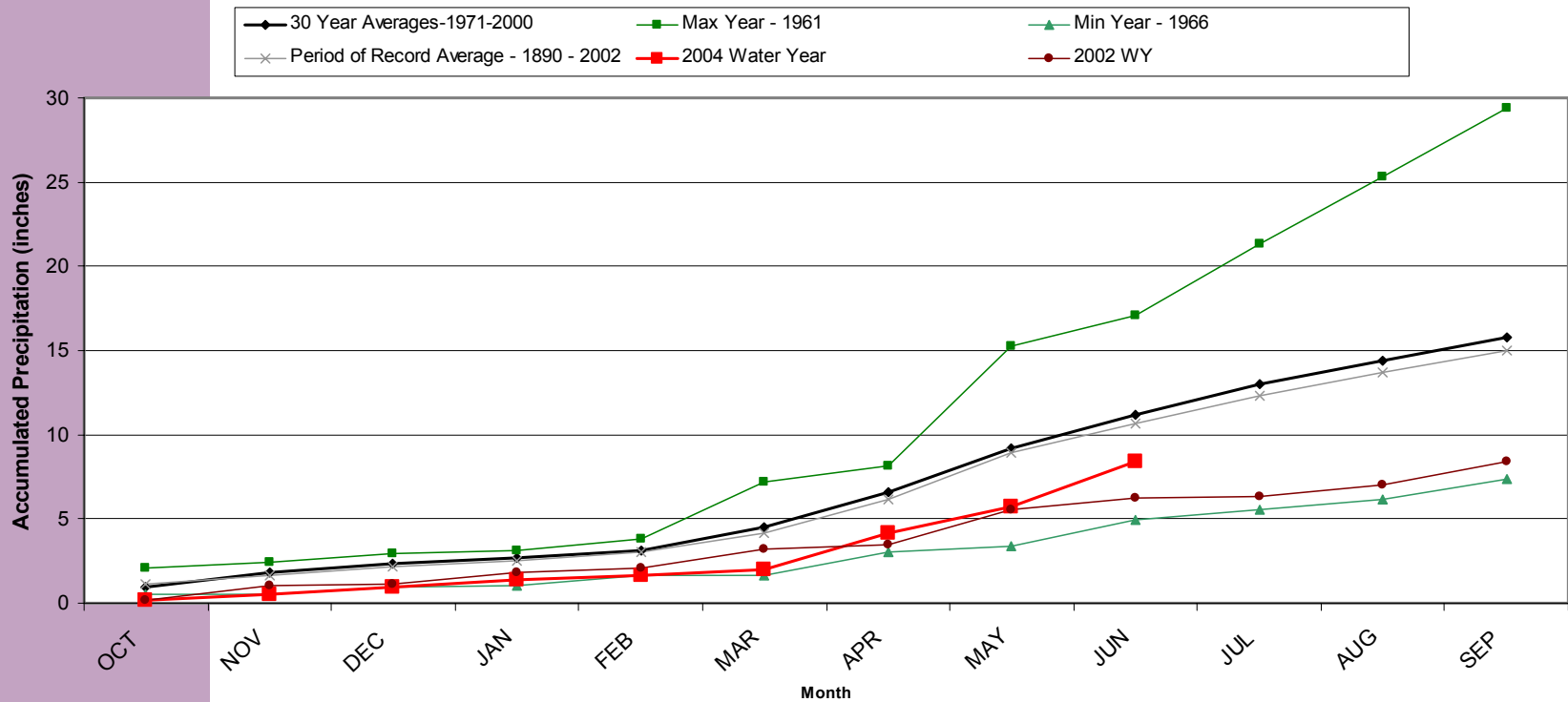
Division 8 – Kassler

Kassler 2004 Water Year (through Oct '03 - Jun '04)



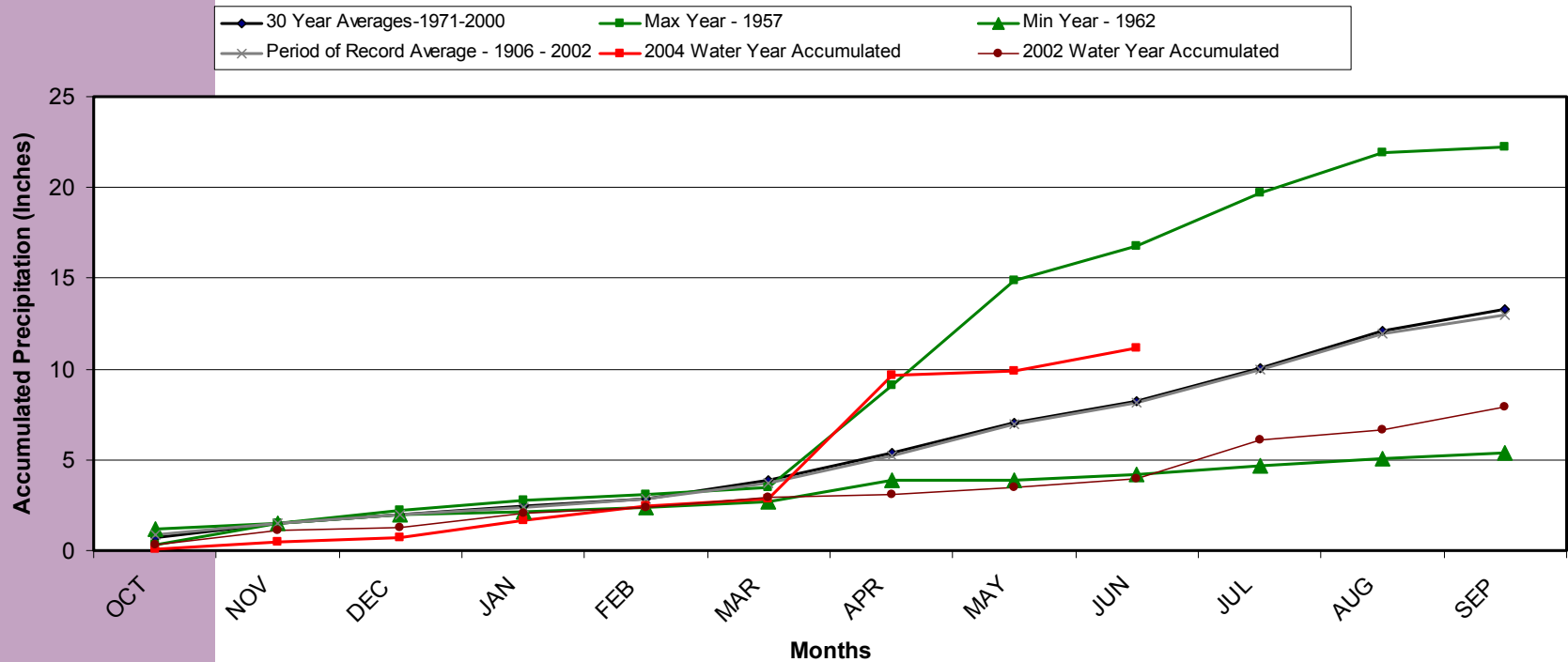
Division 8 – Fort Collins

Fort Collins 2004 Water Year (through Oct '03 - Jun '04)

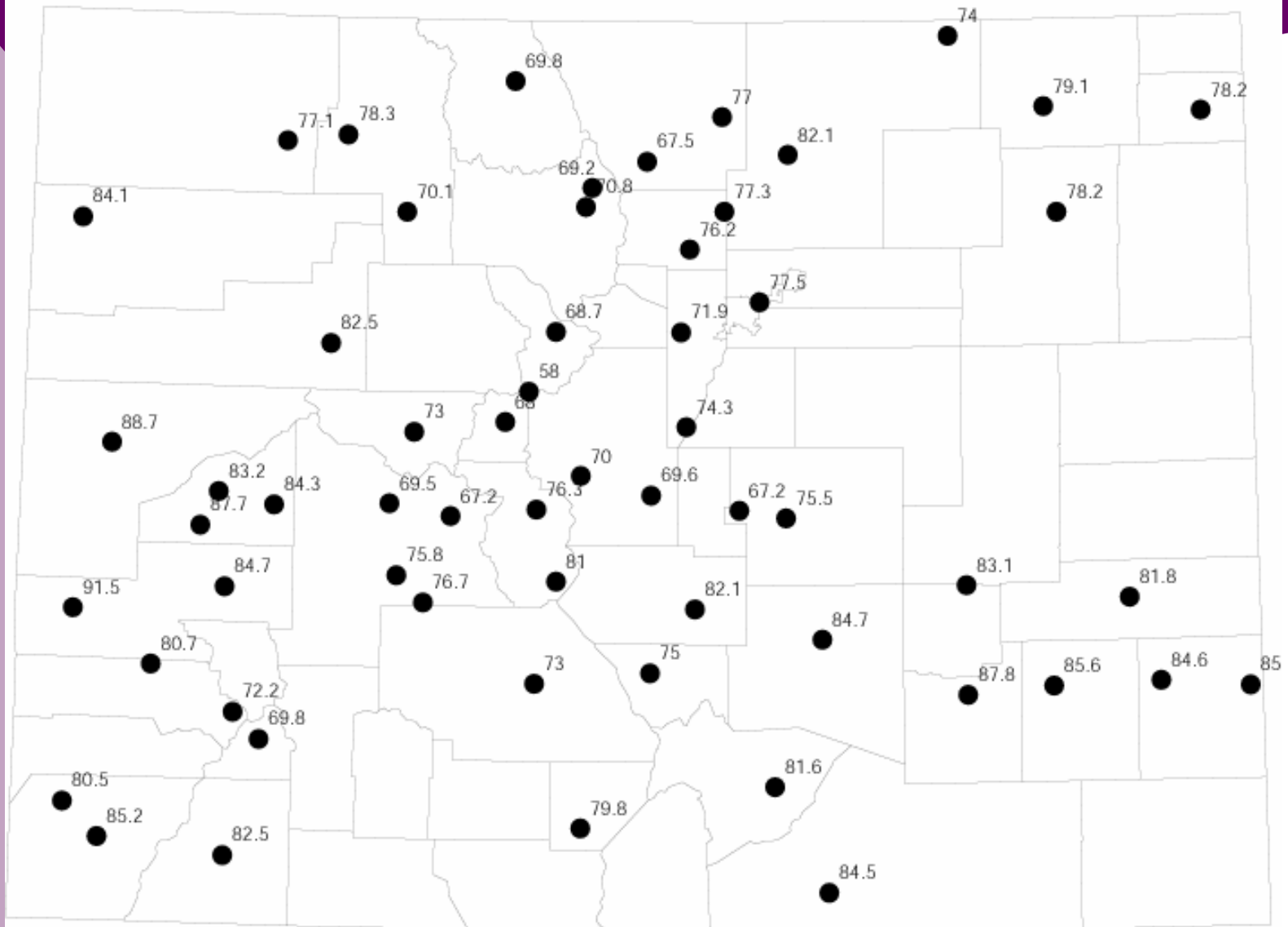


Division 5 – Canon City

Canon City 2004 Water Year (through Oct '03 - Jun '04)

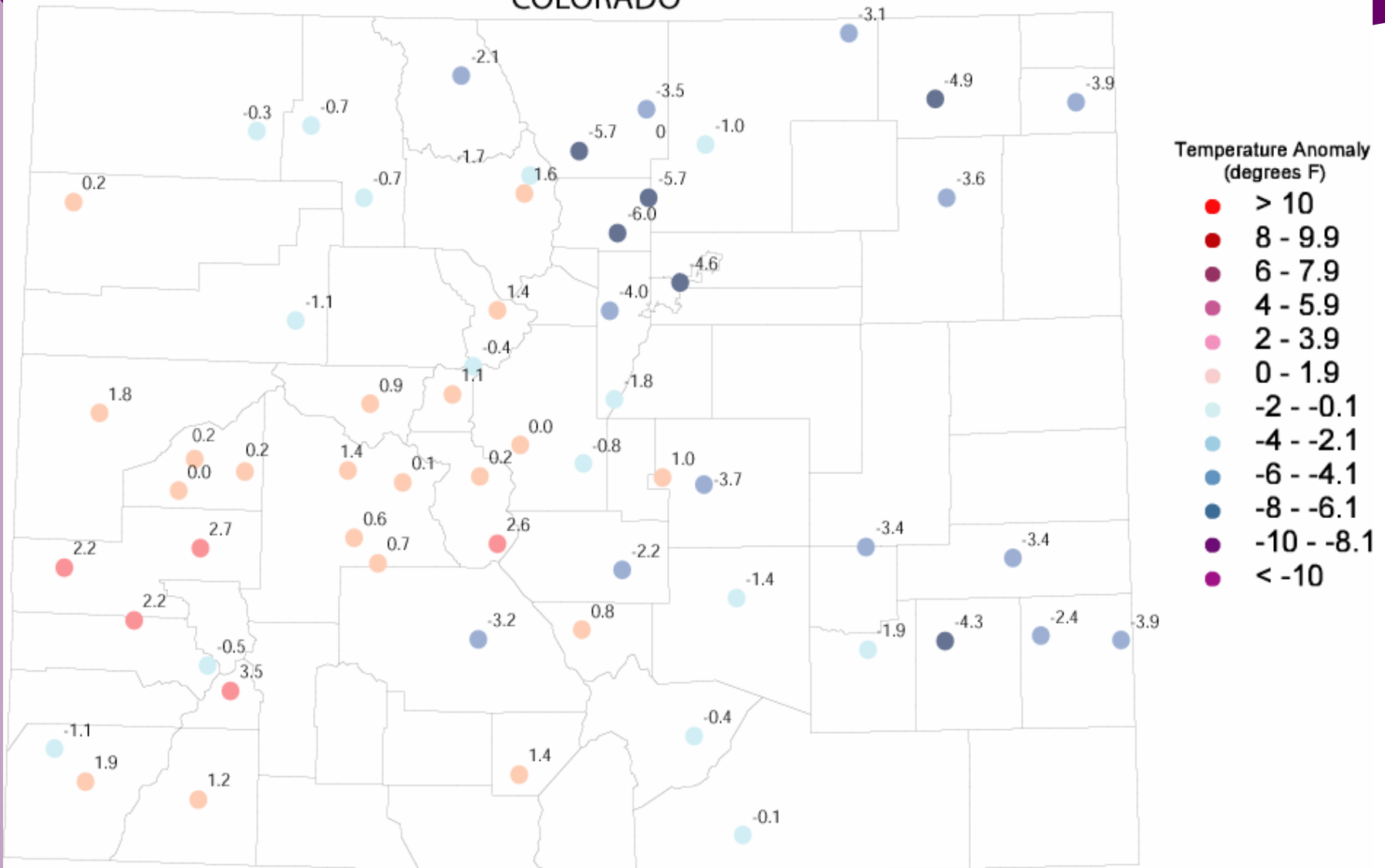


COLORADO

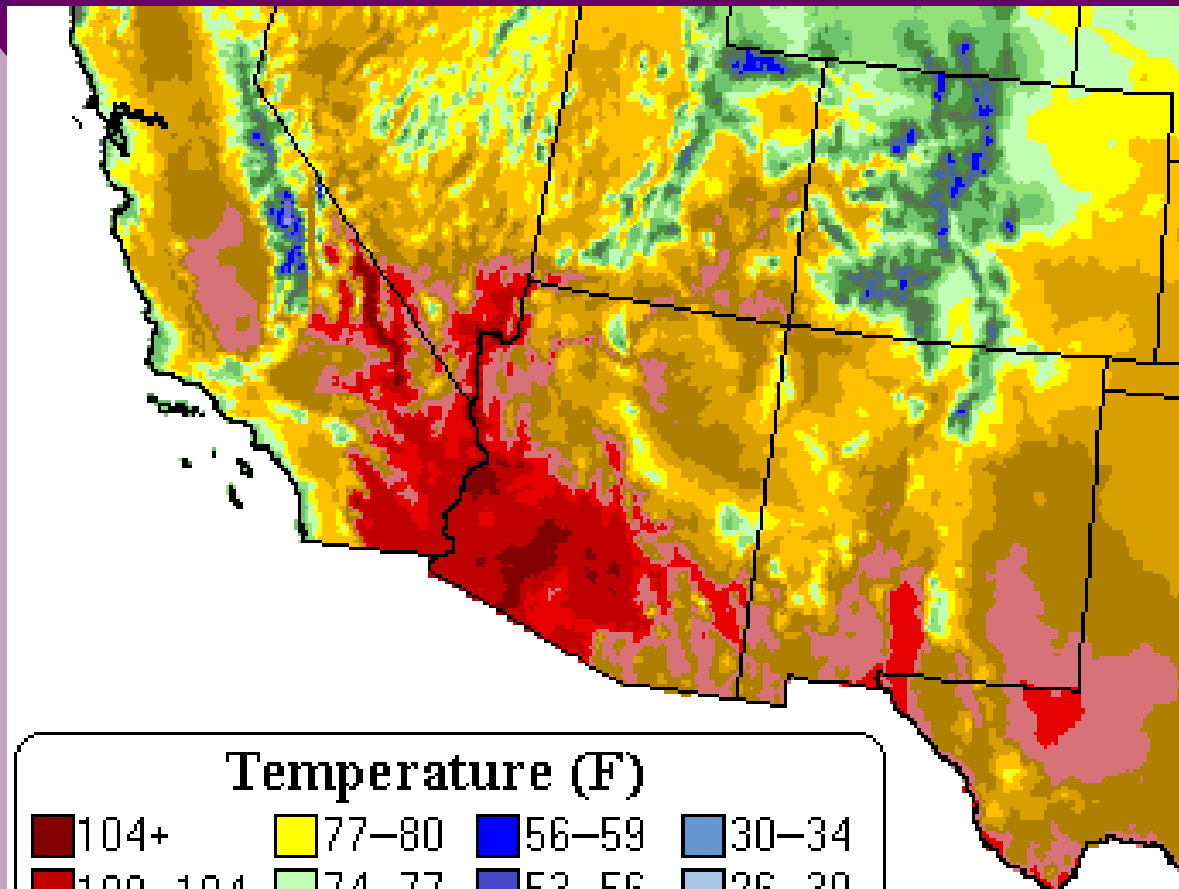


June average maximum temperatures (1971-2000 period).

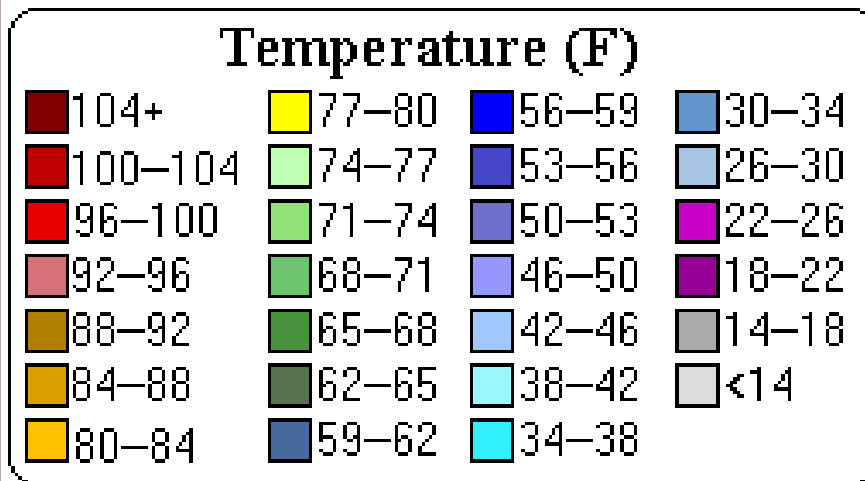
COLORADO



June 2004 maximum temperature departures from the 1971-2000 averages.

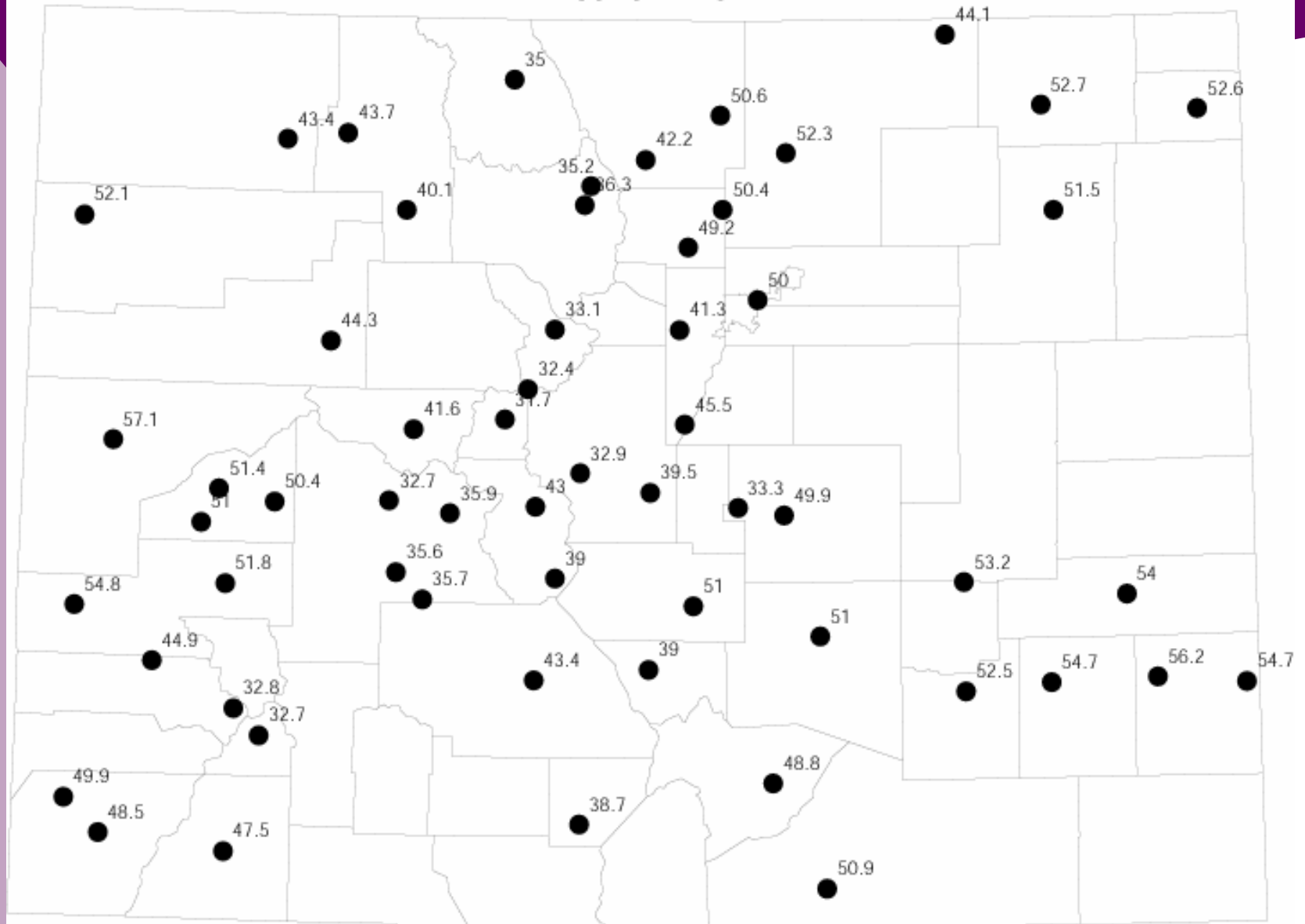


Maximum
Temperature:
June 2004



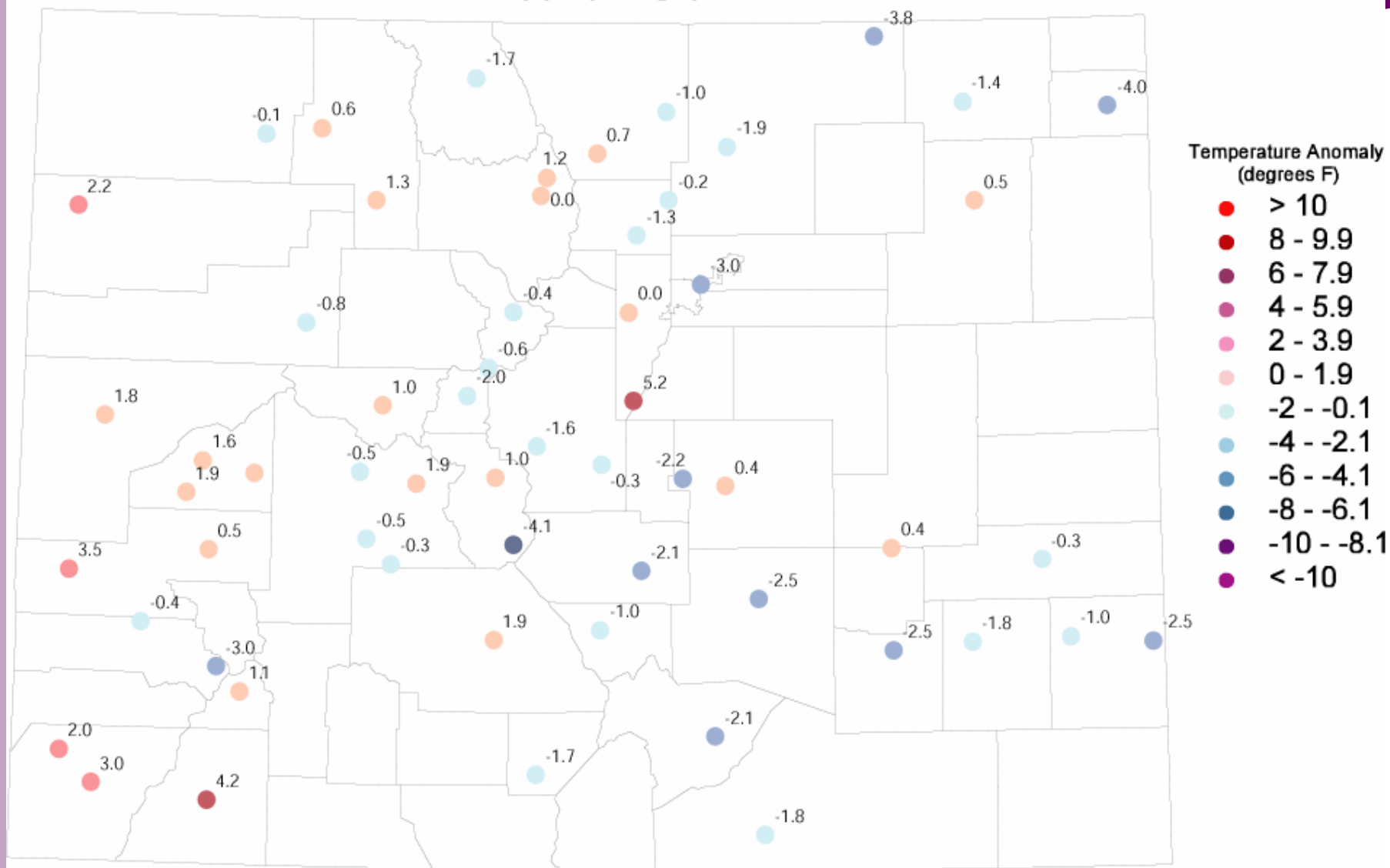
Courtesy of Oregon Climate Service, <http://www.ocs.orst.edu/prism>

COLORADO

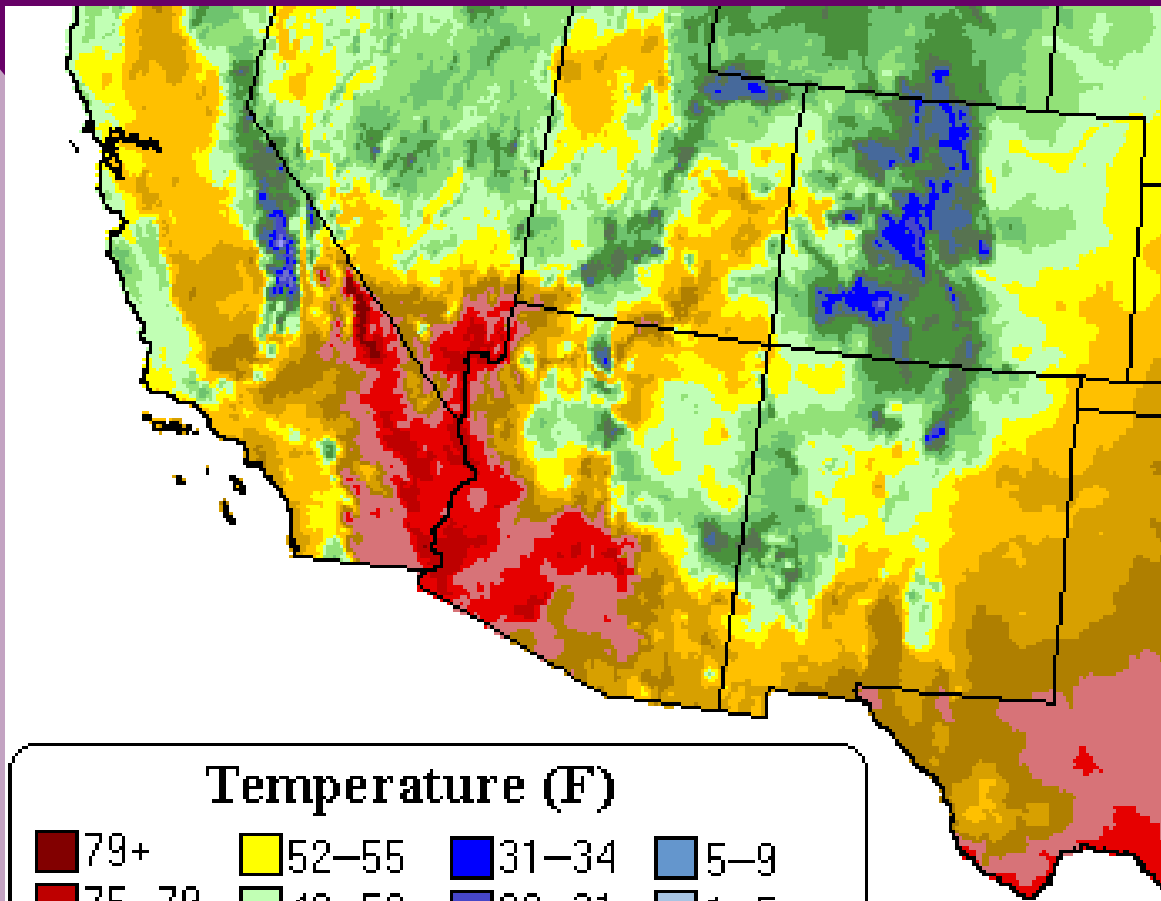


June average minimum temperatures (1971-2000 average).

COLORADO

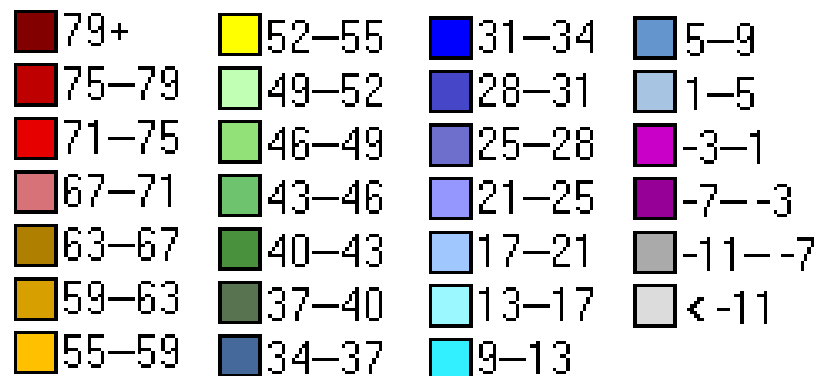


June 2004 minimum temperature departures from the 1971-2000 average.



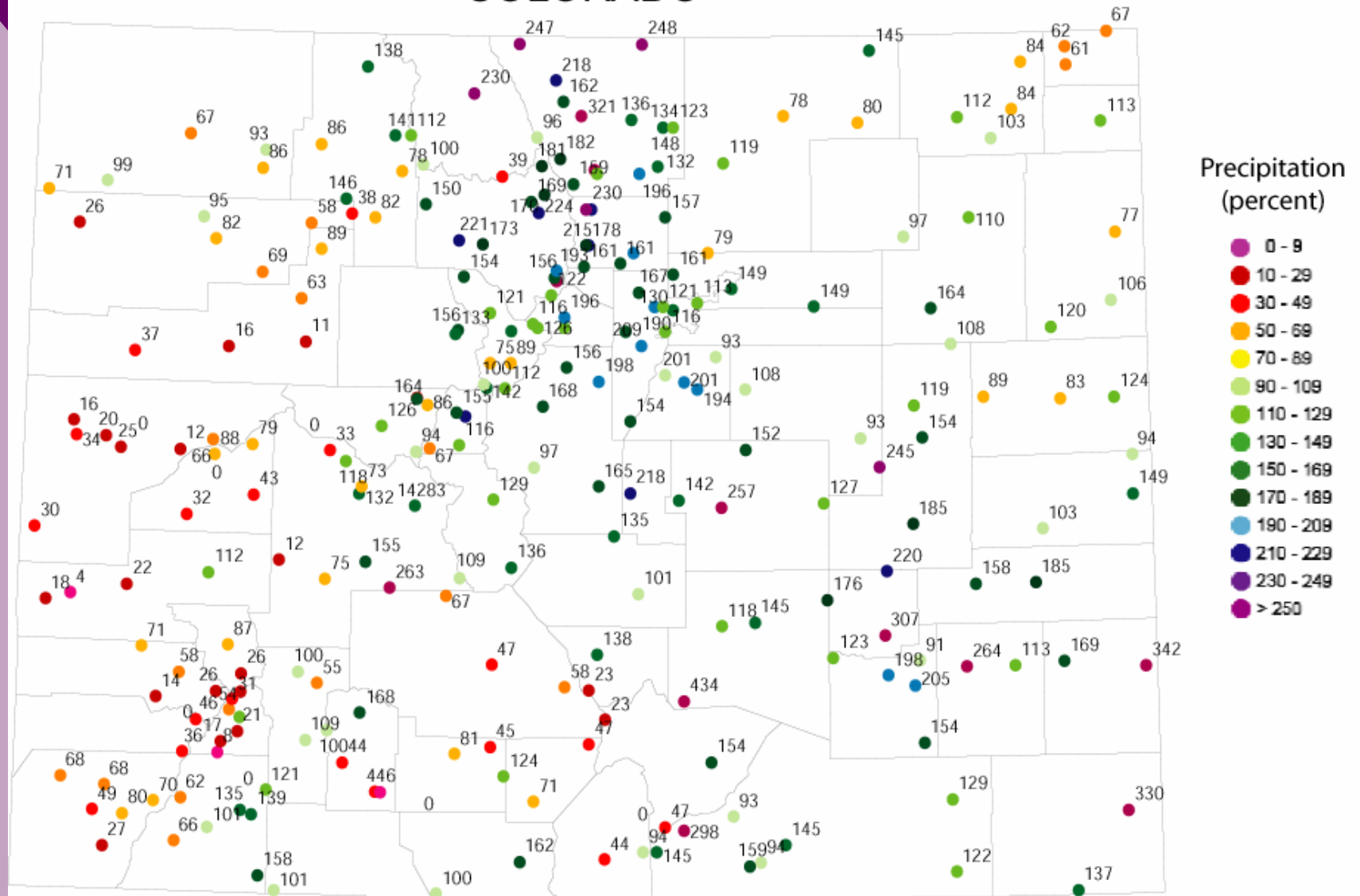
Minimum Temperature: June 2004

Temperature (F)



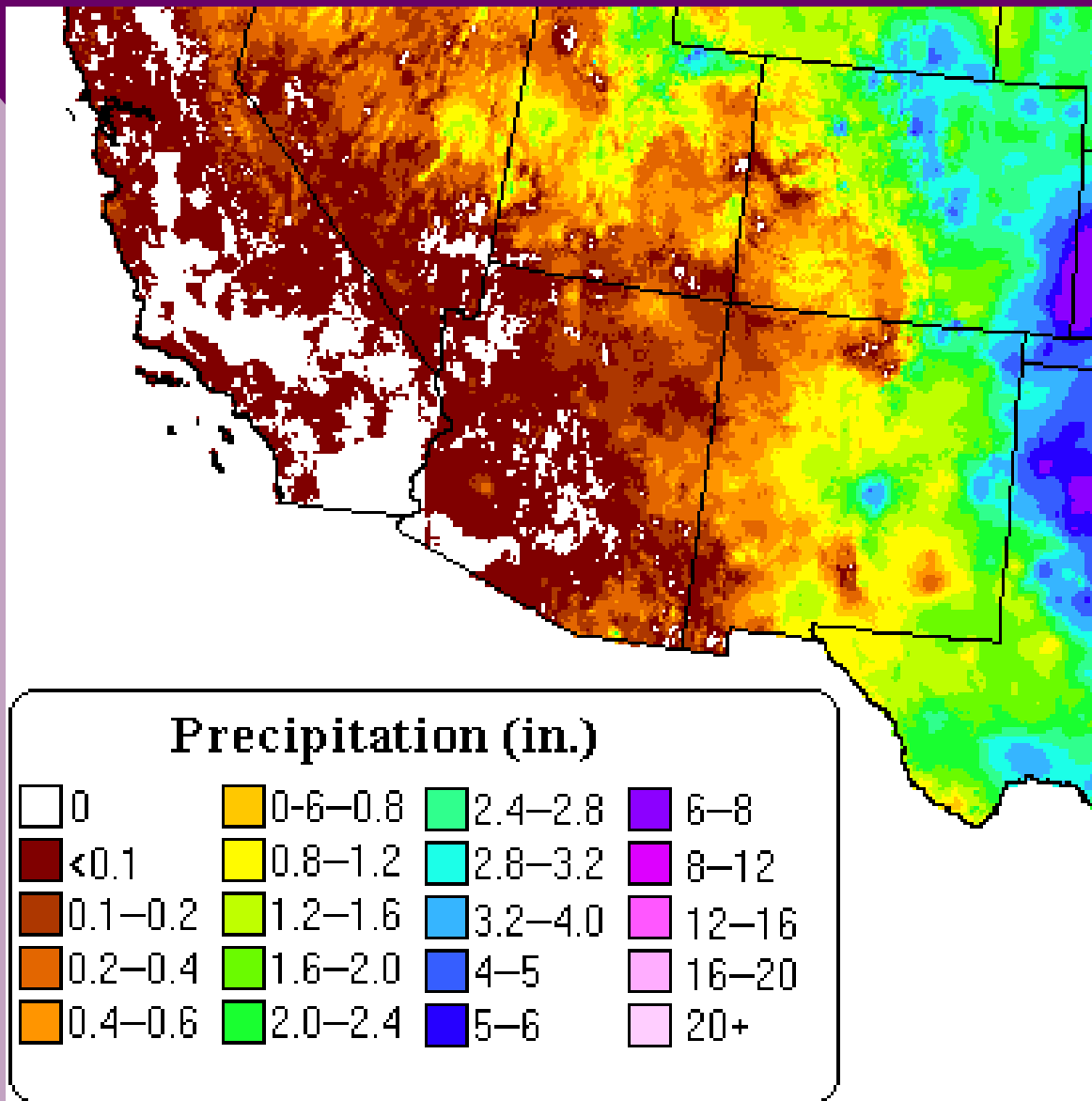
Courtesy of Oregon Climate Service, <http://www.ocs.orst.edu/prism>

COLORADO



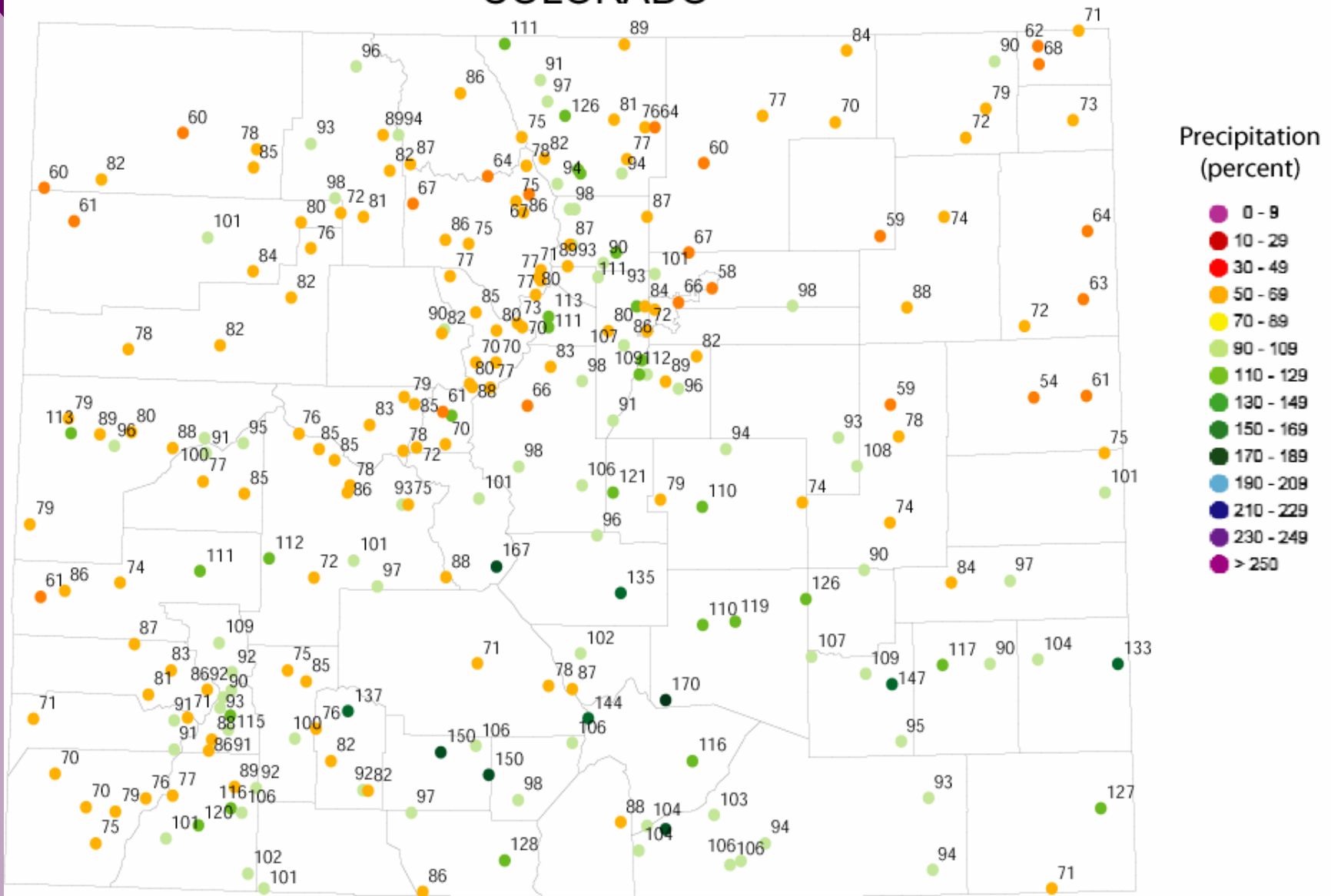
June 2004 precipitation as a percent of the 1971-2000 average.

Precipitation: June 2004

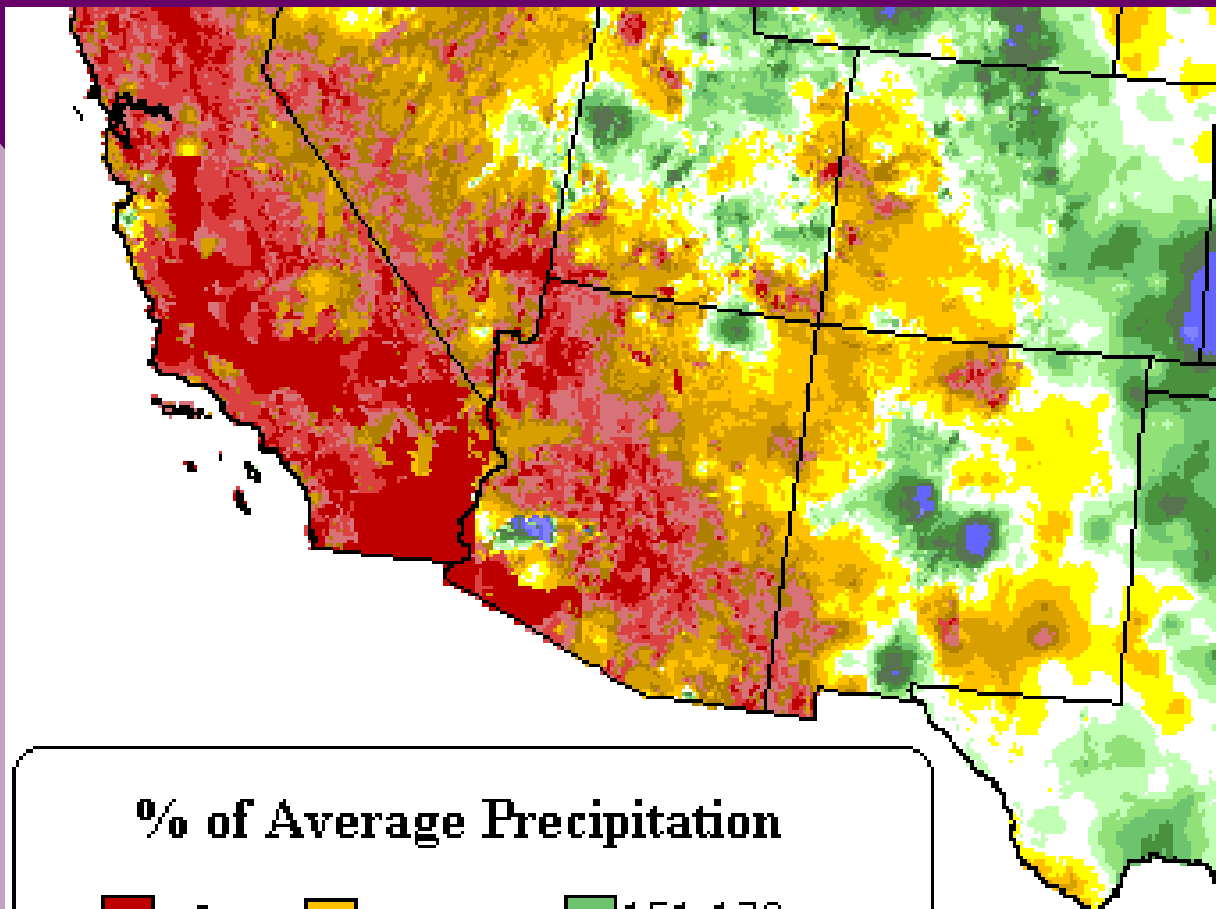


Courtesy of Oregon Climate Service, <http://www.ocs.orst.edu/prism>

COLORADO



Water Year 2004 (October 2003 through June 2004) precipitation as a percent of the 1971-2000 average.



1-month
Percent of
Average
Precipitation –
June 2004

% of Average Precipitation

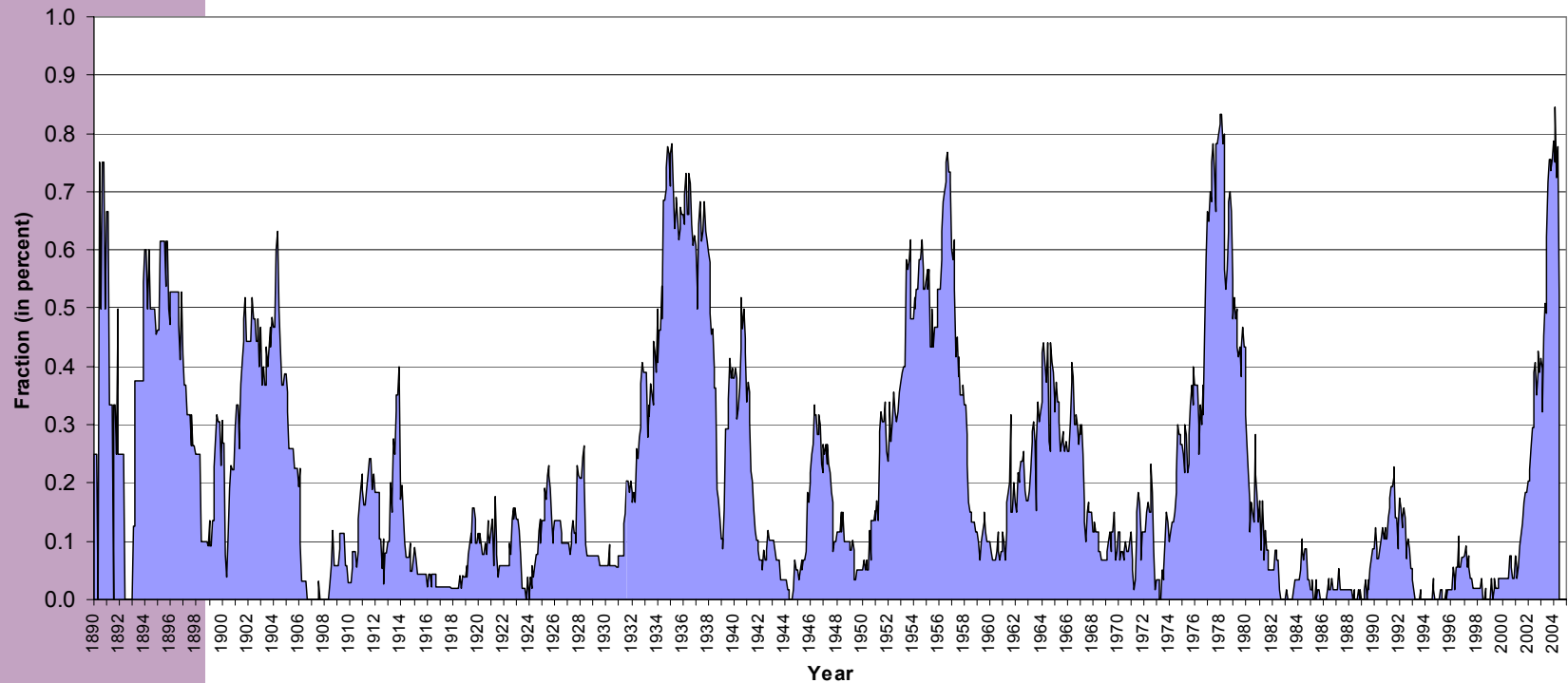
0	51-70	151-170
1-10	71-90	171-200
11-20	91-110	201-250
21-30	111-130	251-300
31-50	131-150	301+

Courtesy of Oregon Climate Service, <http://www.ocs.orst.edu/prism>

Fraction of Colorado in Drought

Fraction of Colorado in Drought

Based on 48 month SPI
(1890 - June 2004)



Calibration period is 1961-2000. Data values produced by John Kleist.

Projected Conditions at 0.2 Probability Level 48 Month SPI at 12 months

Colorado

6/2004 48 mon. SPI – Projected 12 mon. at P=0.20



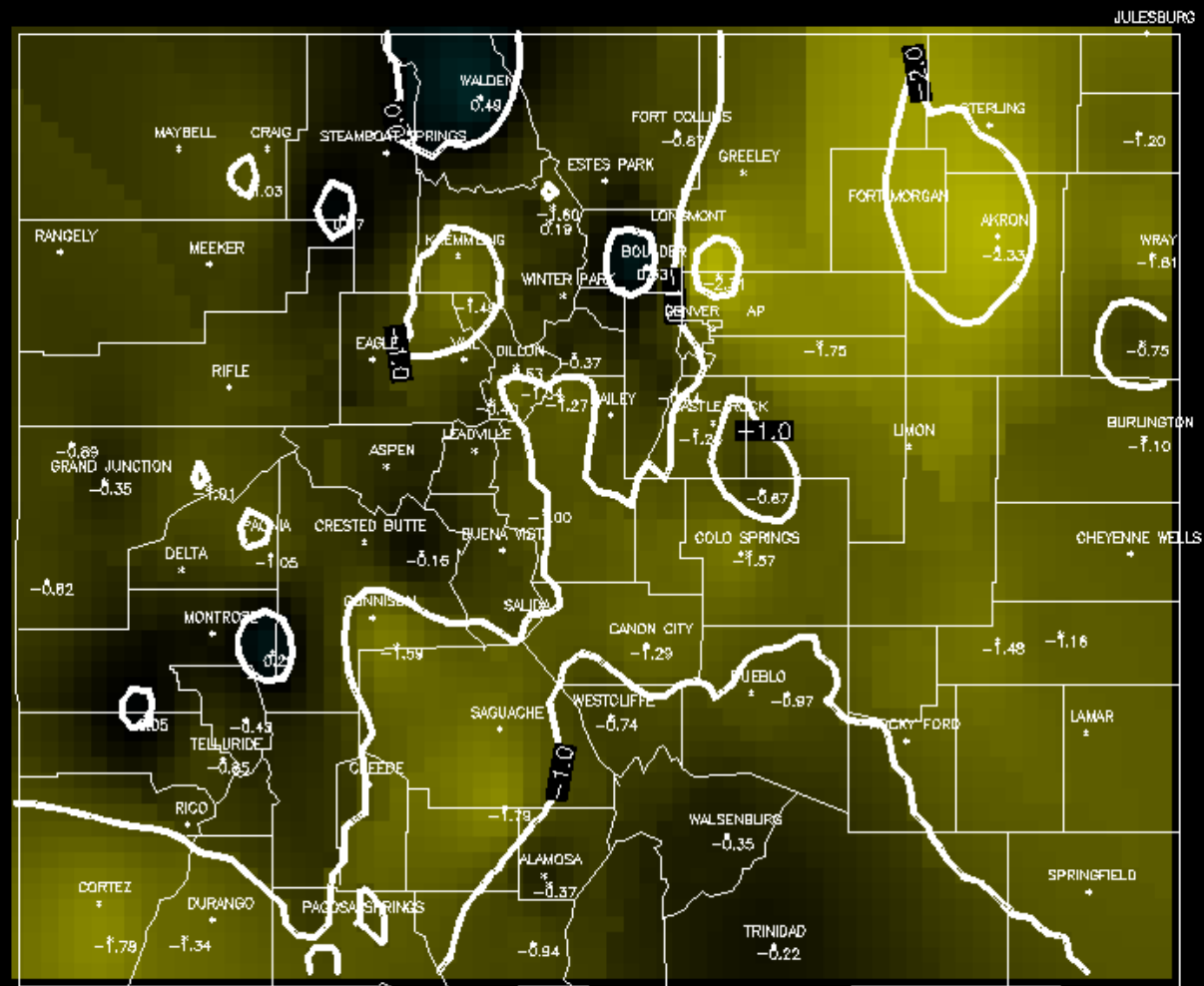
100 % < 2.0	78 % < -1.0
100 % < 1.0	12 % < -2.0
100 % < 0.0	0 % < -3.0

Produced by:
Colorado Climate Center
Fort Collins, CO

Projected Conditions at 0.5 Probability Level 48 Month SPI at 12 months

Colorado

6/2004 48 mon. SPI – Projected 12 mon. at P=0.50



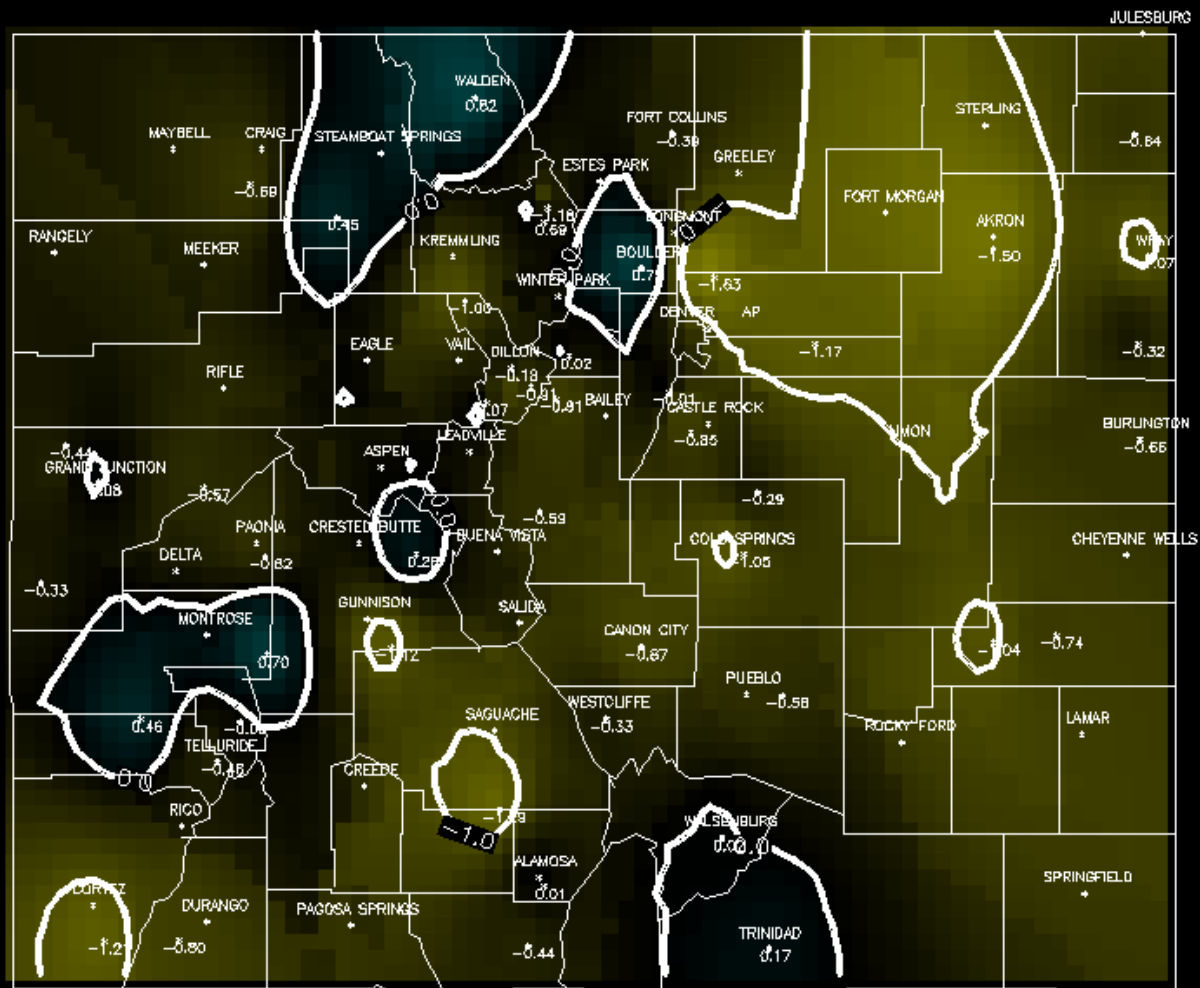
100 % 2.0
100 % 1.0
98 % 0.0
98 % 0.0
98 % 1.0
98 % 2.0
98 % 3.0

Produced by:
Colorado Climate Center
Fort Collins, CO

Projected Conditions at 0.8 Probability Level 48 Month SPI at 12 months

Colorado

6/2004 48 mon. SPI – Projected 12 mon. at P=0.80

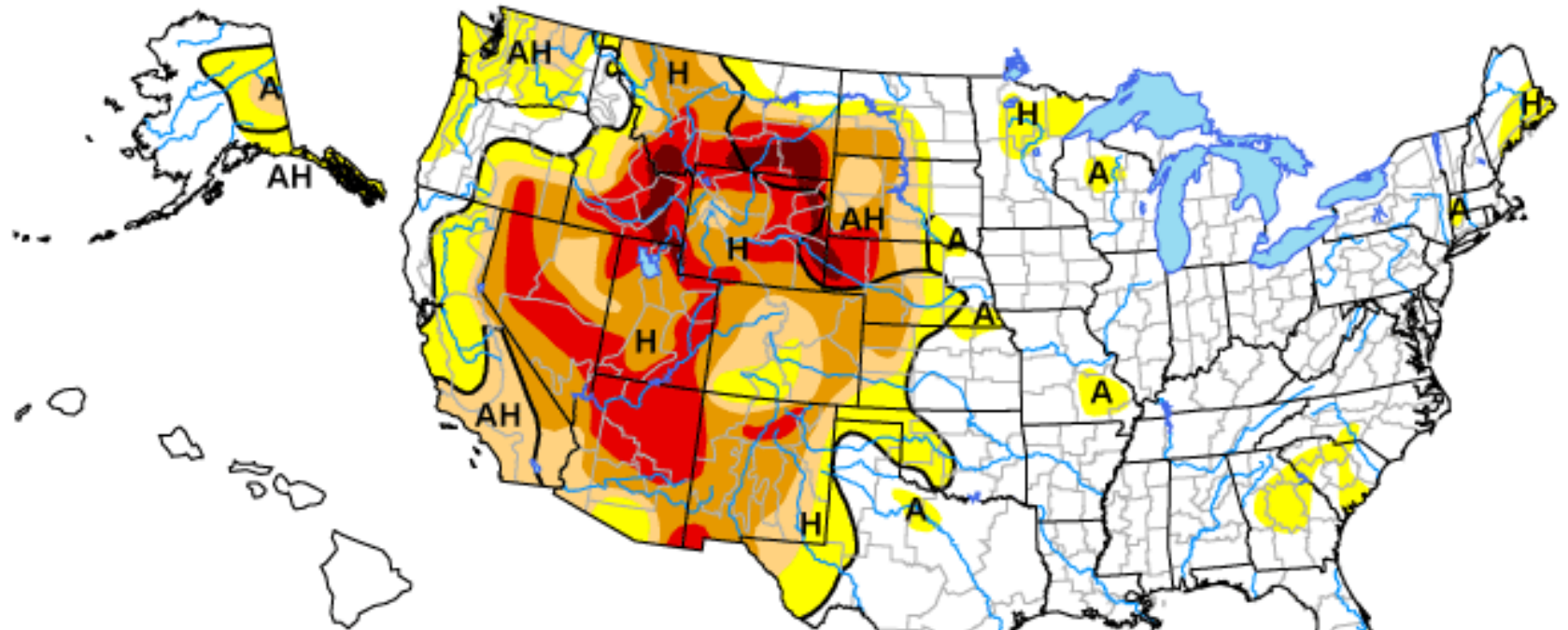


100 %	V.V.	2.0	11	AREA	-1.0
100 %	V.V.	1.0	0	AREA	-2.0
99 %	V.V.	0.0	0	AREA	-3.0






Produced by:
Colorado Climate Center
Fort Collins, CO

U.S. Drought Monitor


July 20, 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.

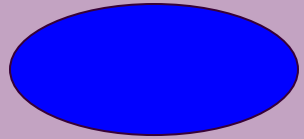


Released Thursday, July 22, 2004

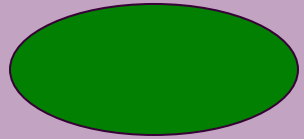
Authors: Candace Tankersley/Richard Heim, NOAA/NCDC

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

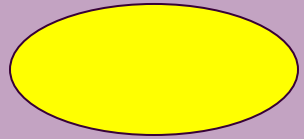
Resource Specific Impact Level



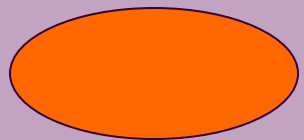
Negligible: Blue



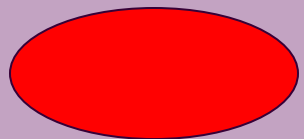
Minor: Green



Moderate: Yellow



Major: Orange



Exceptional: Red

Classifications designed by Dr. Roger A. Pielke, Sr. and Dr. Klaus Wolter

Resource Specific Impact Level

Examples from Larimer County

Negligible

Minor

Moderate

Major

Exceptional

Impacted Groups

- Fort Collins Municipal Water
- Grant Family Farms
- Anheuser-Busch

Fort Collins Municipal Water

Moderate

The drought has required careful management of supplies and cooperation among diverse water users.

- record low streamflows in the Poudre Basin reduced the yield of even senior rights,
- the City has several of the earliest rights in the basin so impact was somewhat mitigated,
- low storage volumes in the CBT Project have impacted allocations from that system for several years,
- low streamflows on the West Slope have impaired availability of Windy Gap water,
- water conservation efforts were quite successful at reducing demands allowing for more carryover storage,
- limited storage capacity has limited our ability to carry surplus supplies over for future dry years,
- temporary exchanges with irrigation companies and use of their storage vessels helped secure more supply,
- reduced supply has meant very little water available for rental to the agricultural community,
- reduced revenues from surplus water rentals and reduced use by treated water customers,
- increased expenses for acquisition of temporary supplemental supplies.

Email correspondence from Beth Molenaar, Water Engineer, City of Fort Collins, Water Resources Department.

Grant Family Farms

Major

The impact of the drought on our farm, and most around us, is Major for the following reasons:

- The late June rains came too late for our short growing season. Short season forage crops were planted or many fields not planted at all this year. These rains were a significant help to dryland pastures that were looking grim. Rains came too late for the dry land wheat crop, however, they may recharge soil moisture for next year's crop. The rain provided some relief to alfalfa crop but the amount of precipitation is still short of what will produce a decent cutting (approx. 6 inches).
- The rains did practically nothing to alleviate the hydrologic drought. Little water was put in reservoirs in our area and did essentially nothing for the drastically decreased water for irrigation wells.
- The supply of irrigation water was lengthened by reducing the requirement and thus allowing the irrigation water to be conserved for use later in the season. At the current rate of usage, irrigation water is going to be short later in the summer season. Further good rains could help with the extension of the irrigation water.
- It will take a good snowpack in the mountains to alleviate reservoir and irrigation well storage. For agriculture, the hydrologic drought is still severe.

Email correspondence from Lew Grant, Grant Family Farms, 7/22/04, Waverly, Colorado.

Anheuser-Busch, Fort Collins

Negligible

We would rate the drought impact to the brewery today as Negligible since Windy Gap has pumped and our water needs are secure in Horsetooth lake.

Email correspondence from John Stier, Environmental Affairs,
Anheuser-Busch, St. Louis, MO.

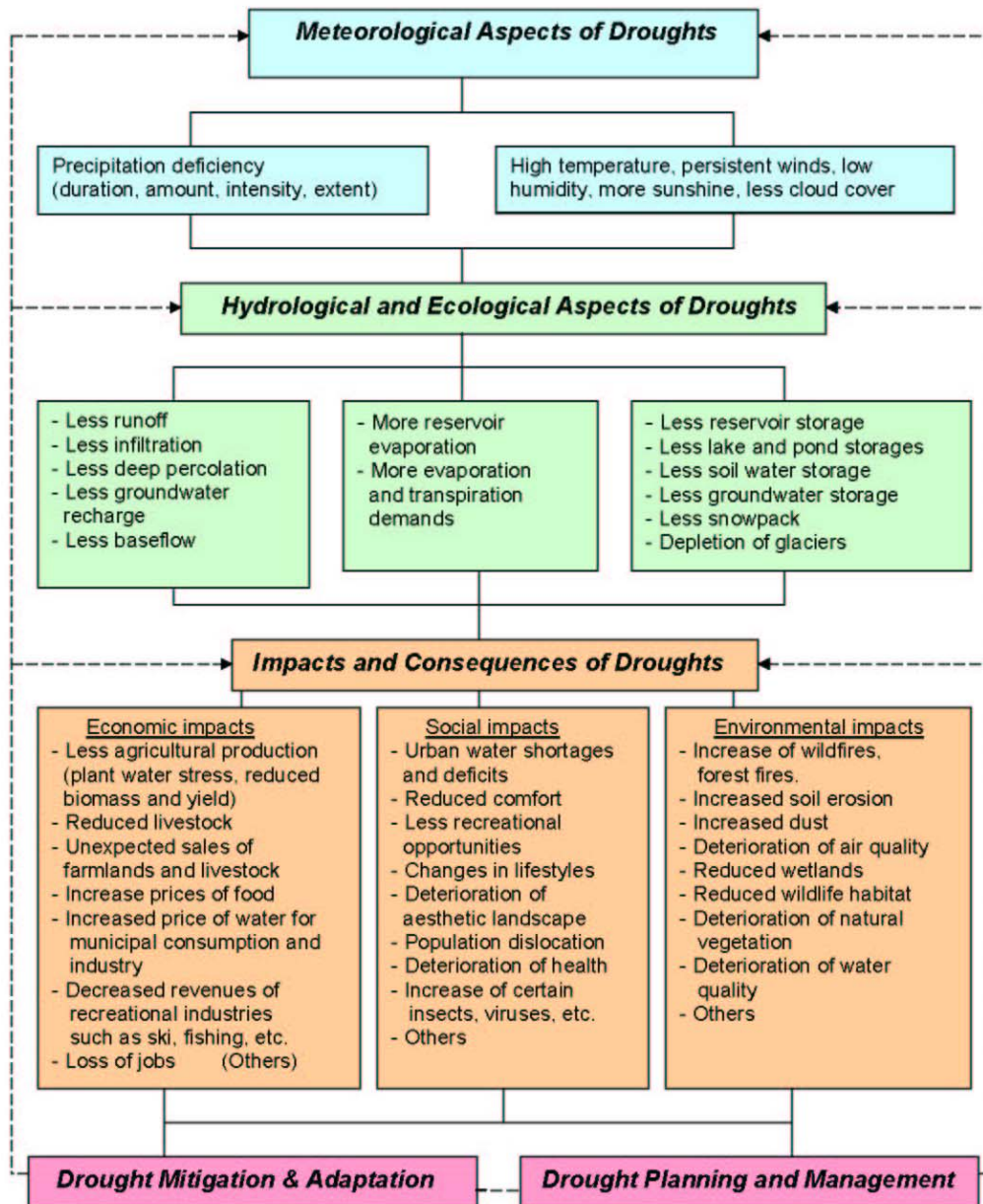


Figure courtesy
Dr. Jose (Pepe)
Salas, Civil
Engineering,
Colorado State
University

Fig. 1. Schematic of meteorological and hydrological aspects of droughts, impacts and consequences, and social response

Impact Committees

- Wildlife
- Agriculture
- Tourism
- Drinking Water
- Economics
- Local Affairs
- Denver Water
- Colorado Parks
- Energy
- Wildfires

Level of Drought

 = Abnormally Dry

 = Moderate Drought

 = Severe Drought

 = Extreme Drought

 = Exceptional Drought

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”



Division of Atmospheric Sciences

