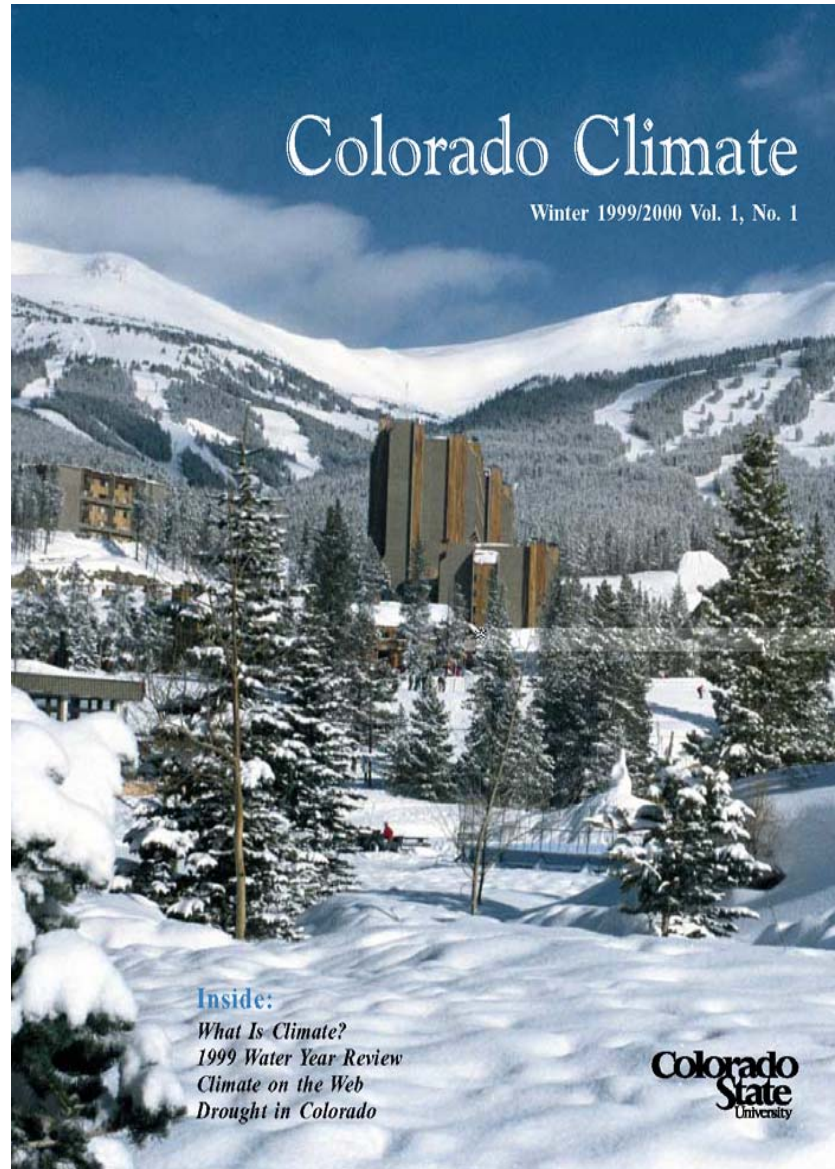


Colorado Climate

Winter 1999/2000 Vol. 1, No. 1



Inside:

What Is Climate?
1999 Water Year Review
Climate on the Web
Drought in Colorado

**Colorado
State
University**

2002 Drought History in Colorado – A Brief Summary



Colorado Climate Center

Roger Pielke, Sr, Director and Nolan Doesken, Research Associate

Prepared by Odie Bliss & Tara Green

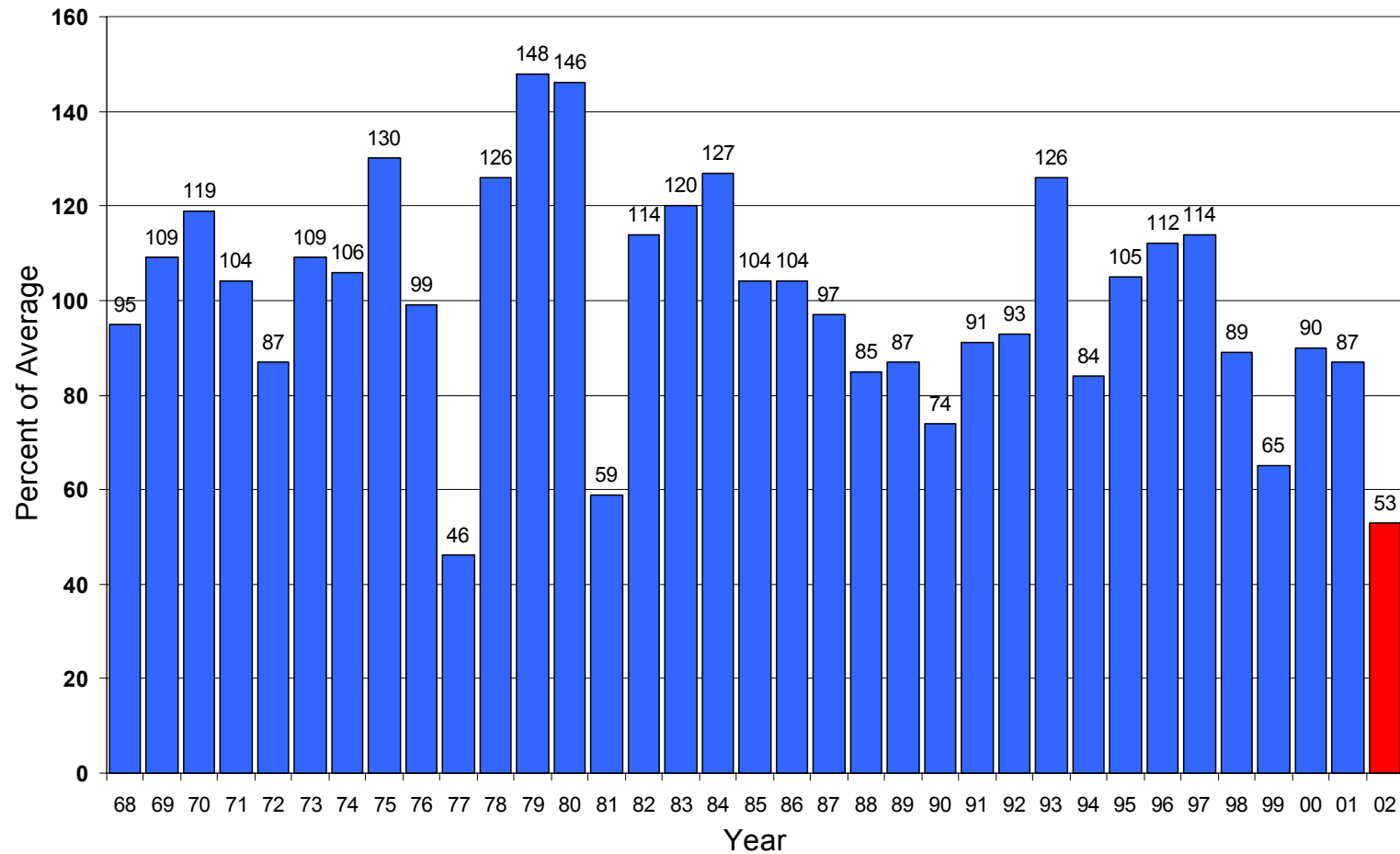
<http://climate.atmos.colostate.edu>

EXAMPLES OF DROUGHTS

- Snow does not fall in the mountains until late January
- It is dry in April-July, but soaking rains occur in eastern Colorado in August
- The weather of 2001-2002 repeats for the next five years
- Colorado's mountains have 90% of average snow for the next 20 years.

April 1 Snowpack

APRIL 1 SNOWPACK COLORADO STATEWIDE



Drought Status on April 1, 2002

- Entire State Dry
- Statewide Snowpack
 - 53% of Average
- Bad, but not as bad as 1977
- Optimism for a wet spring – esp. in N. Colorado

But then came April

- Very warm – especially in Mountains
- Very Dry
- Rapid Snowmelt
- Little Runoff

May also failed us

- Only one significant storm
- High evaporation rates
- Severe drought arrived !!

June 2002

- Some heavy rains on plains but little plant growth
- Evaporation rates very high
- Many grass fires
- Even when some heavy rains did come to eastern Colorado in early June, the ground was so hard, the vegetation on grazed lands was so short and the rains fell for such a short period of time, that little of the moisture soaked in – and vegetation remained parched. Grass fires popped up all over eastern Colorado, keeping local fire fighters on their toes.
- Extreme Drought in Mountains
- Forest Fires exploded

By late June 2002

- Raging wildfires
- Extreme low streamflows
- Rapidly depleted reservoirs
- Severe agricultural impacts
 - Wheat
 - Cattle
 - Irrigated crops in jeopardy
- Intense heat
- Urban water restrictions



**Hayman Fire
Largest in Recent History**

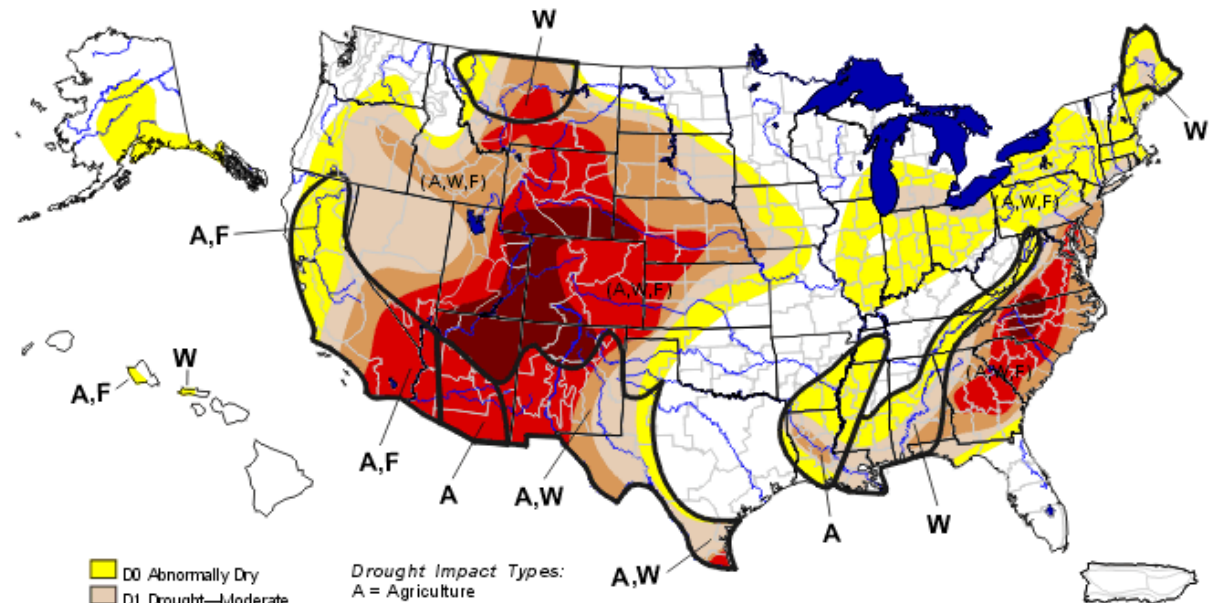
July 2002 – No Relief

- A few localized storms
- Hot & Dry weather continued
- Crops withering
- Urban water concerns growing
- Higher humidity and lighted winds calmed wildfires later in July

Widespread Drought

- By late July 2002, Colorado near epicenter of extensive regional drought
- Parts of nearly every state experiencing drought

U.S. Drought Monitor July 23, 2002 Valid 8 a.m. EDT



- D0 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.



Released Thursday, July 25, 2002

Author: Brad Rippey, USDA

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

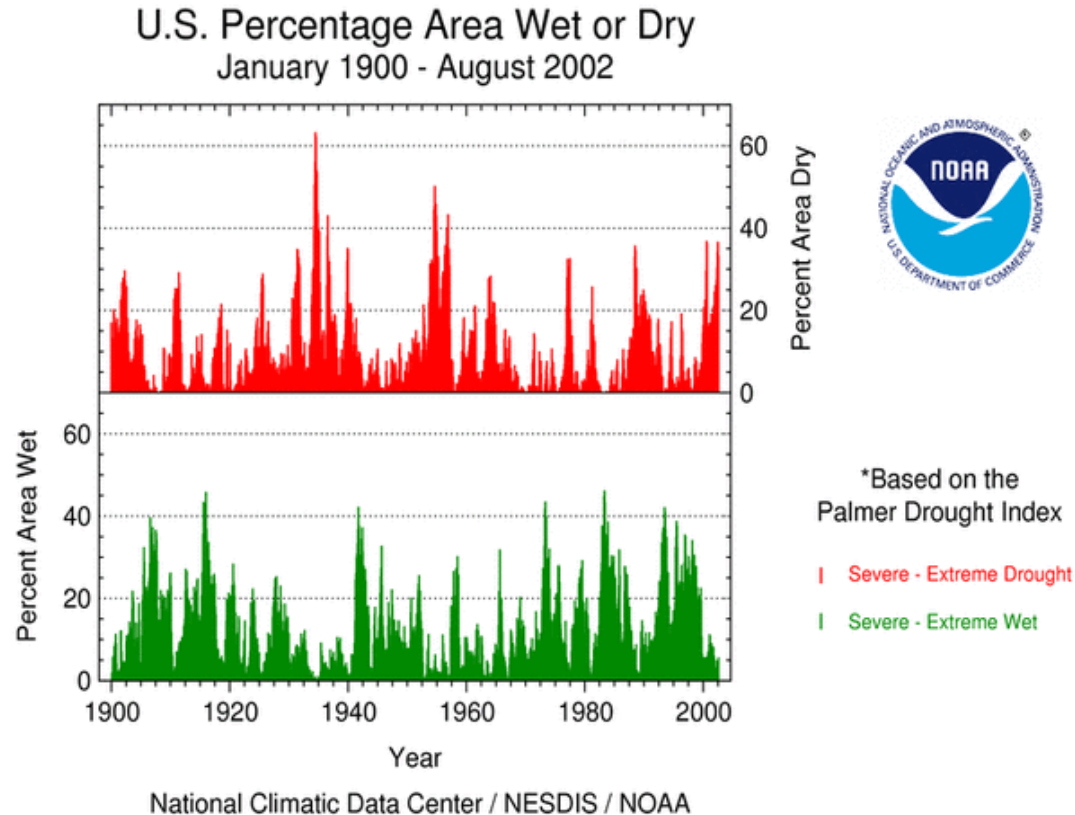
August 2002 Pattern Changes

- More extreme heat early
- Another wildfire flare up
- Severe storms late in August
- Real relief in portions of the Eastern Plains
- But most of Colorado still in extreme drought

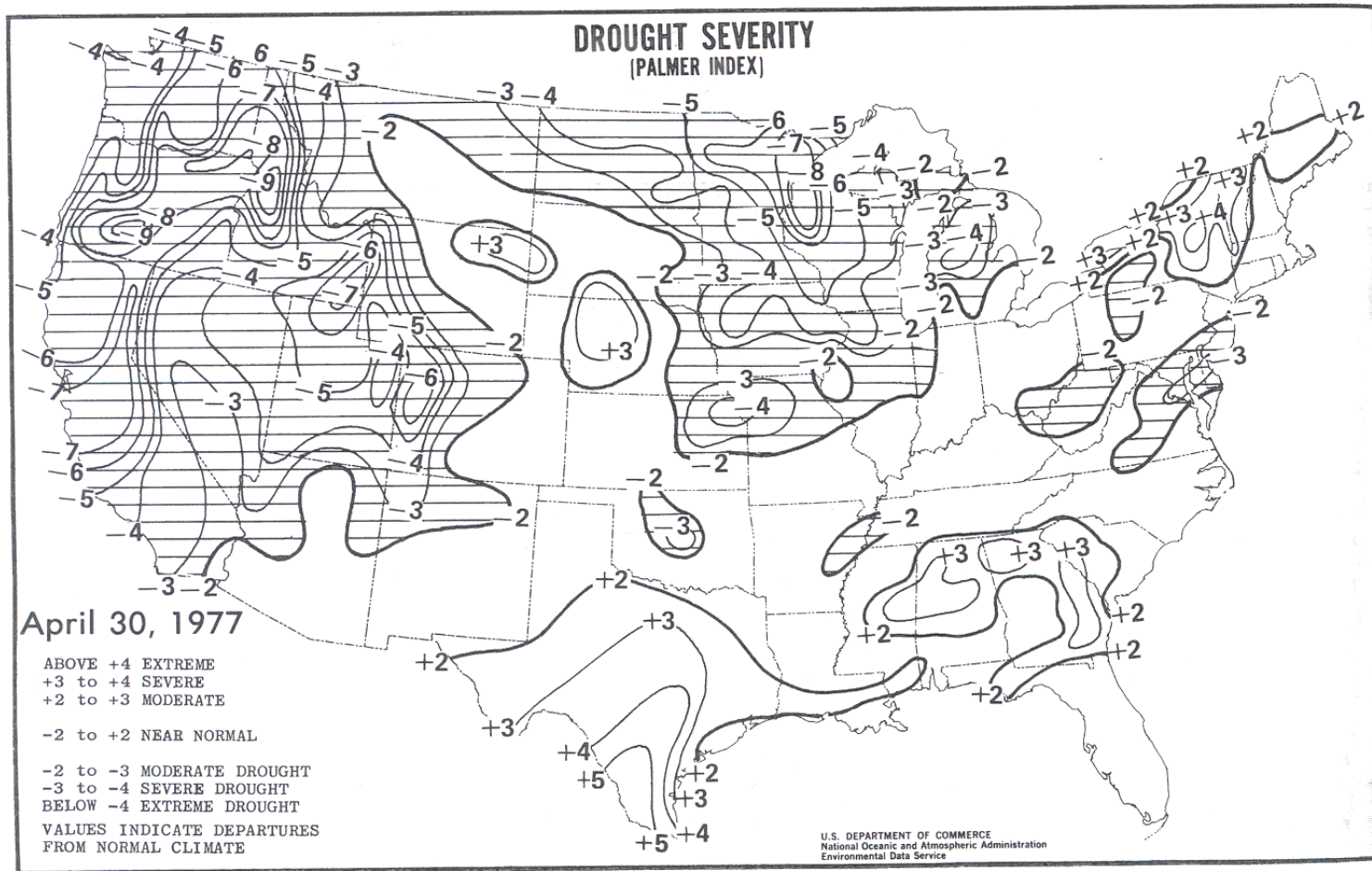


Steamboat Springs Fire
Photo from Steamboat Springs Fire Department

U.S. Drought most widespread since 1950's



The 1977 Drought



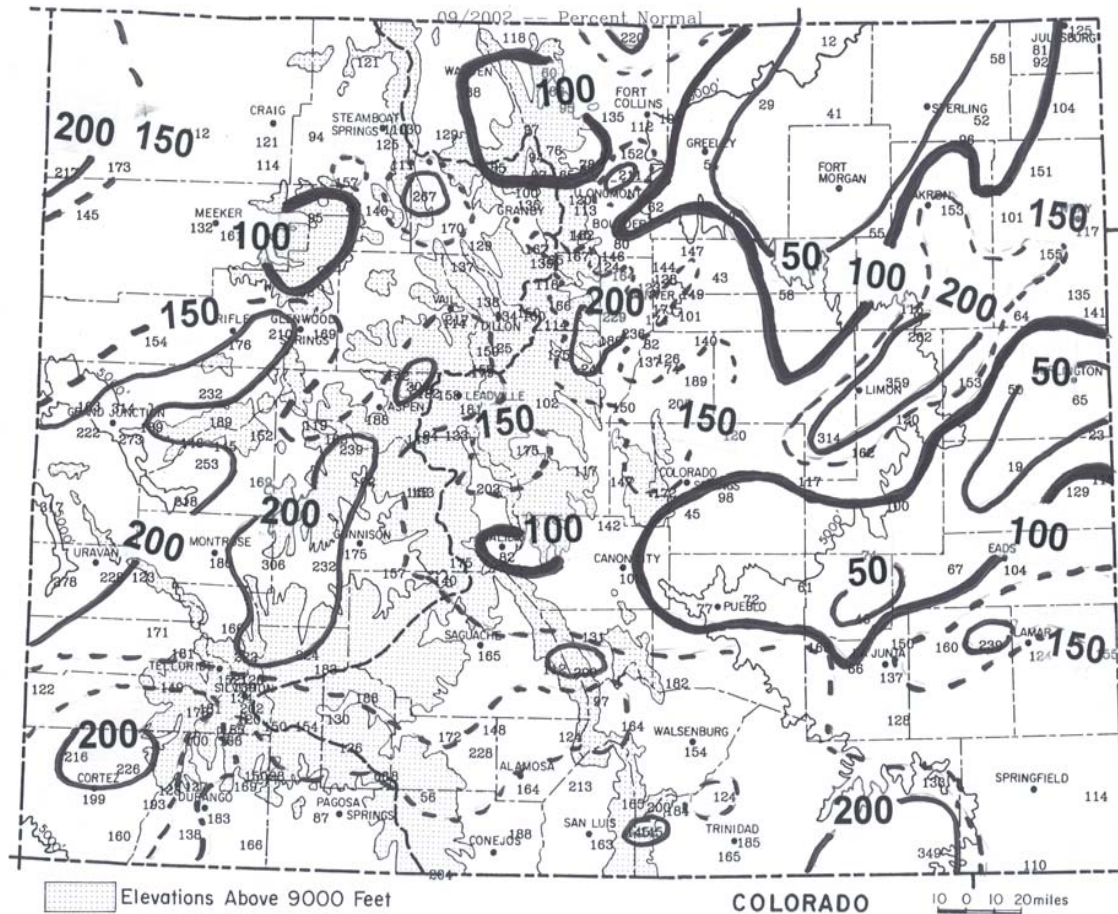
THE PALMER AND CROP MOISTURE INDICES

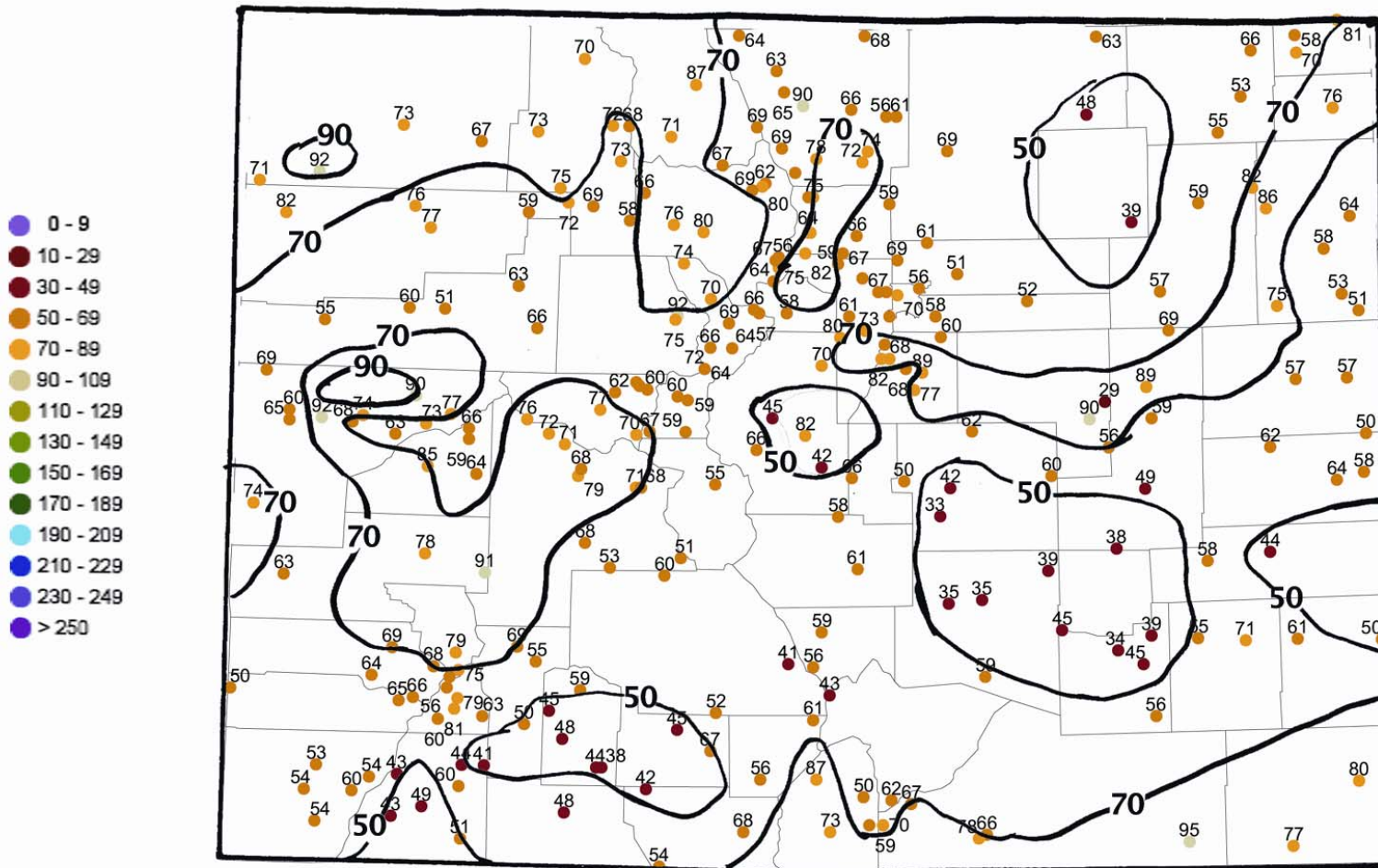
Total Precipitation Analysis

September 2001 – August 2002 Ranking by Station

Climatic Stations	Year of Record	Rank	Amount of Precipitation
Grand Lake 1 NW	1940-2002	1	12.55
Taylor Park	1941-2002	1	10.42
Grand Junction WSO A	1892-2002	8	5.54
Meeker	1891-2002	7	10.37
Montrose No. 2	1896-2002	3	5.83
Mesa Verde NP	1923-2002	1	7.43
Del Norte 2 E	1940-2002	1	3.19
Center 4 SSW	1891-2002	1	2.44
Colorado Springs WSO	1892-2002	1	6.5
Pueblo WSO	1891-2002	1	3.8
Rocky Ford 2 SE	1892-2002	1	3.62
Cheyenne Wells	1897-2002	4	9.16
Akron 4 E	1905-2002	1	9.4
Leroy 7 WSW	1891-2002	3	10.58
Kassler	1899-2002	8	12.56

September 2002 Wet Weather at Last



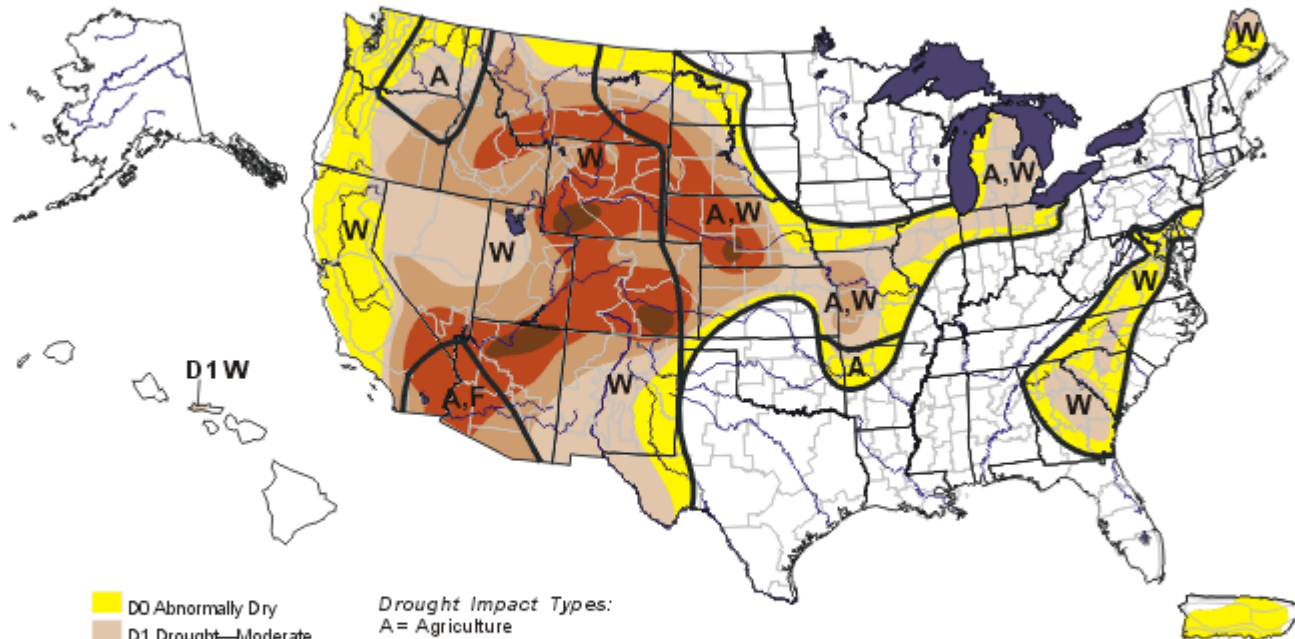


Water Year 2002 (Oct 2001-Sept 2002) precipitation percent of average for the 1961-1990 averages.

U.S. Drought Monitor

December 3, 2002

Valid 7 a.m. EST



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- D4 Drought—Exceptional

Drought Impact Types:
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<http://drought.unl.edu/dm>



Released Thursday, December 5, 2002

Author: Michael Hayes, ND MC

-
- Sept 1, 2001 to August 30,2002 was the driest for that period at most climate observing sites in Colorado.
 - Over a several year time period, however, the current drought is a garden variety drought. It is not exceptional.
 - Weather modification will not break a drought. At best, it slightly increases snowpack.
 - The current drought is not a consequence of a warmer atmosphere. In fact, the Earth's atmosphere is no warmer today than it was in 1979.
 - Models which have been used to predict climate a year or more in the future have demonstrated no skill in forecast ability.
 - We should adopt vulnerability assessments as the preferred paradigm, rather than primarily focusing financial resources on prediction.

COLORADO NEEDS

- What would be the impact today of historical droughts?
- What would be the impact today of paleo-droughts?
- What if the 2001-2002 dry, warm weather reoccurred for 2002-2003?
- How can we make Colorado more resilient to droughts?
- What are the definitions of the multi-dimensional character of droughts.

Vulnerability Assessment

- A vulnerability assessment of risk to climate and other environmental stress is, therefore, more appropriate as guides to Policy Makers, than trying to predict only a subset of possible future climate conditions.

Drought Analysis and Management Laboratory



Drought Lab

The Drought Analysis and Management Laboratory is a cooperative program between the Colorado Water Resources Research Institute and the Colorado Climate Center. Professor Robert C. Ward is the Director of the Water Center and Roger A. Pielke Sr. is Director of the Colorado Climate Center.

The Directors of the Drought Analysis and Management Laboratory are Professors Jose Salas (Civil Engineering) and Roger A. Pielke Sr. (Atmospheric Science)

<http://droughtlab.colostate.edu>