Drought and the Climate of the Ogallala Aquifer

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Prepared by Odie Bliss
Drought Monitor Map

U.S. Drought Monitor
February 14, 2006
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
- 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, February 16, 2006
Author: David Miskus, JAWF/CPC/NOAA
But what does this mean?

We need some perspective.
Class A Pan Evaporation (May-Oct)

From NOAA Tech Report NWS 33
Burlington Temperatures

Burlington, CO, Average Temperatures

- Mean Max. Temperature (F)
- Mean Temperature (F)
- Mean Min. Temperature (F)

Month

Temperature (deg F)
Idalia CoAgMet Reference Evapotranspiration (ET)

Idalia Average Reference Evapotranspiration (ET) Values

ET (ln)

Month

Mar Apr May Jun Jul Aug Sep Oct
Monthly Average Precipitation for selected stations in the Ogallala Aquifer

Ogallala Aquifer

- N Platte, NE
- Goodland, KS
- Holyoke, CO
- Holly, CO
But are we ever "Average"?

Burlington Water Year (Oct-Sep)
Precipitation from 1892-2005
Climate Divisions
Kansas Northwest Basin (KS-04) Annual Precipitation Totals

Kansas (Div 4) Annual Precipitation Total

Year

Precipitation (inches)
48-Month SPI

Fraction of Colorado in Drought
Based on 48 month SPI
(1890 - 2005)
Where do we stand now, and how did we get there?
1999 Water Year Precipitation

Water Year 1999
Precipitation Precent of Average for 1961-1990 Averages
2000 Water Year Precipitation

Water Year 2000
Precipitation Percent of Average for 1961-1990 Averages
2001 Water Year Precipitation

Water Year 2001
(Oct. 2000 - Sept. 2001)
Precipitation Percent of Average for 1961-1990 Averages
2002 Water Year Precipitation

Water Year 2002
Precipitation Percent of Average for 1961-1990 Averages

Precip % Average
0 - 9
10 - 29
30 - 49
50 - 69
70 - 89
90 - 109
110 - 129
130 - 149
150 - 169
170 - 189
190 - 209
210 - 229
230 - 249
> 250
Water Year 2003
2004 Water Year Precipitation

2005 Water Year Precipitation as Percent of Average

Water Year 2005 (Oct 04 - Sept. 05) precipitation as a percent of the 1971-2000 average.
Cheyenne Wells Accumulated Precipitation Deficit since 1990 compared to 1971-2000 average
Holyoke Accumulated Precipitation

Holyoke, Colorado
Accumulated Precipitation Deficit
since 1990 compared to 1971-2005 average

Precipitation (Inches)

Year
Eastern Plains Temperature Departures from Average

From October 2000 to January 2006

Eastern Plains Departure from Average (deg F)

Temperature Departure (Deg F)

Akron Spring Temperatures

Akron Average Temperatures
Spring (Mar-May)

Temperature (deg F)

Akron Summer Temperatures

Akron Average Temperatures
Summer (Jun-Aug)
Akron Winter Temperatures

Akron Average Temperatures
Winter (Dec-Feb)

Temperature (deg F)

Idalia CoAgMet Reference ET

Idalia CoAgMet Reference ET Values

- **Average**
- **2002**
- **2004**
- **2005**

<table>
<thead>
<tr>
<th>Month</th>
<th>ET (ln)</th>
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<tbody>
<tr>
<td>Mar</td>
<td>0.15</td>
</tr>
<tr>
<td>Apr</td>
<td>0.20</td>
</tr>
<tr>
<td>May</td>
<td>0.30</td>
</tr>
<tr>
<td>Jun</td>
<td>0.40</td>
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<tr>
<td>Jul</td>
<td>0.50</td>
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<tr>
<td>Aug</td>
<td>0.45</td>
</tr>
<tr>
<td>Sep</td>
<td>0.35</td>
</tr>
<tr>
<td>Oct</td>
<td>0.20</td>
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</tbody>
</table>
Summer (May – Sep) 2005 precipitation as percent of average

Summer (May - September) 2005 precipitation as a percent of the 1971-2000 average.
October 2005 precipitation as a percent of the 1971 - 2000 average.
Akron 2005 daily precipitation compared to daily average

Akron 4E
Daily Accumulated Precipitation for Year 2005 and 30-Year Average
Holyoke, 2004 & 2005 daily accumulated precipitation compared to daily average
Akron 4E 2006 Water Year

**Accumulated Precipitation (Inches)**

- **30 Year Averages-1971-2000**
- **Max Year - 1915**
- **Min Year - 2002**
- **Period of Record Average - 1906 - 2002**
- **2006 Water Year Accumulated**

Months:
- OCT
- NOV
- DEC
- JAN
- FEB
- MAR
- APR
- MAY
- JUN
- JUL
- AUG
- SEP
Burlington 2006 Water Year

Burlington
2006 Water Year

Period of Record Average - 1892-2002

30 Year Averages-1971-2000
Max Year - 1915
Min Year - 1954

Accumulated Precipitation (Inches)

Months

2006 Water Year
2002 Water Year Accumulated
Precipitation – We could sure use more data!
What is CoCoRaHS?

CoCoRaHS is a unique, non-profit community based network of volunteers of all ages and backgrounds working together to measure and map precipitation (rain, hail and snow).
“By using low-cost measurement tools, stressing training and education, and utilizing an interactive Web-site, our aim is to provide the highest quality data for natural resource, education and research applications.”
Some reasons for measuring
1) Precipitation is important and highly variable
2) Existing weather stations are too far apart
3) Electronic measurements of precipitation are unsatisfactory.
4) Storm reports can save lives
What’s Involved?

Volunteer Application Form

Name: ____________________________ Date: __________

Address: __________________________________________

City: __________________________________ State: ___________ Zip: __________

Home Phone: _______ Daytime Phone: _______

E-mail Address: __________________________ Daily Internet Access: Yes/No

Give a brief description of your map location (Latitude/Longitude if available):

Nearest road, streets/roadway:

(Please use back of application if too small for your site, it is in a rural area — thanks!

Age: _______ Grade: _______

Parent/Guardian Name: ___________________________

What school do you attend:

How did you find out about this project?

Volunteers may qualify for:

- a free rain gauge sponsored by CoCoRaHS sponsors.
- I would like to: [ ] Donate $25 for rain gauge and other supplies to help offset supply costs!
- [ ] Receive Complimentary Gauge
- [ ] Use your own gauge. Describe:

(Rain gauge must be same type as CoCoRaHS rain gauge)

Rain gauge will be read and emptied daily as:

- 7:00 a.m. (highly recommended)
- 8:00 a.m.
- 1:00 p.m.
- Other time:

It is important to the project that your rain gauge is read and emptied in the same order each day. However, the CoCoRaHS staff does encourage flexible timing as a time for vacations. We do not ask that you read and empty your rain gauge for the sake of the project, but please report what you get each day.

If you or a family member would like to volunteer for additional duties, check here:

- [ ] YES, I would like to help — Call me!

Please give the names and ages of others who will help you take rain & hail measurements:

Name/Age: ____________________________

If you would prefer to: [ ] Train On-line [ ] Attend a Training Session [ ] Walk-in Training

Please return this form to:

Local CoCoRaHS Coordinator:

______________________________

For Staff Use Only

Station Name: ____________________________

Latitude: ____________________________ Longitude: ____________________________

Date Trained: ____________________________ Date Received/Uploaded: ____________________________

Date: ____________________________
How to sign up?

- See Me after talk
  or
- Fill out application at CoCoRaHS display
  or
- Fill out “Join Us” form online at www.cocorahs.org
Finally, what's ahead for this Spring and Summer?
Sea Surface Temperature Anomaly

SST ANOM 2/5/06-2/11/06
Base Period: 1982-96

http://www.cdc.noaa.gov/map/clim/sst.shtml
Multivariate ENSO Index (MEI)

Last update: February 6, 2006

http://www.cdc.noaa.gov/people/klaus.wolter/MEI/
El Nino Forecast

http://www.cdc.noaa.gov/people/klaus.wolter/SWcasts/
Precipitation
Mar-May 2006

From the Colorado Prediction Center
Temperature
Jun-Aug 2006

From the Colorado Prediction Center
U.S. Seasonal Drought Outlook
Through May 2006
Released February 16, 2006

<table>
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<tr>
<td><strong>Drought to persist or intensify</strong></td>
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<tr>
<td><strong>Drought ongoing, some improvement</strong></td>
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<tr>
<td><strong>Drought likely to improve, impacts ease</strong></td>
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<tr>
<td><strong>Drought development likely</strong></td>
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Depicts general, large-scale trends based on subjectively derived probabilities guided by numerous indicators, including short- and long-range statistical and dynamical forecasts. Short-term events -- such as individual storms -- cannot be accurately forecast more than a few days in advance, so use caution if using this outlook for applications -- such as crops -- that can be affected by such events.

"Ongoing" drought areas are approximated from the Drought Monitor (D1 to D4). For weekly drought updates, see the latest Drought Monitor map and text.

NOTE: the green improvement areas imply at least a 1-category improvement in the Drought Monitor intensity levels, but do not necessarily imply drought elimination.

Conclusion:
We're one dry spring away from being back in severe drought, and one wet spring away from being happier.
But in this land, any drought recovery is temporary.

15-18" of moisture is a lot better than nothing, but it doesn't leave you any margin.
Colorado Climate Center
Colorado State University

- Data and Power Point Presentations available for downloading

- [http://ccc.atmos.colostate.edu](http://ccc.atmos.colostate.edu)
  click on “Drought”
  then click on “Presentations”