The 2012 Drought in Historical Perspective

• Describing drought
• Soil water reservoir
• Outlook
Palmer Drought Severity Index - July

Maps showing drought severity for the years 1934, 1988, and 2007.
The latest -- a subjective blend
Searching for just the right blend...

**Objective Short-Term Drought Indicator Blend Percentiles**
November 10, 2012

**Objective Long-Term Drought Indicator Blend Percentiles**
November 10, 2012

**Inputs (as percentiles):**
- 35% Palmer Z-Index
- 25% 3-Month Precipitation
- 20% 1-Month Precipitation
- 13% CPC Soil Moisture Model
- 7% Palmer Drought Index

**Inputs (as percentiles):**
- 25% Palmer Hydrologic Index
- 20% 24-Month Precipitation
- 20% 12-Month Precipitation
- 15% 6-Month Precipitation
- 10% 60-Month Precipitation
- 10% CPC Soil Moisture Model

This map approximates impacts responding to precipitation over the course of several months to a few years, such as reservoir content, groundwater, and lake levels. HOWEVER, THE RELATIONSHIP BETWEEN INDICATORS AND WATER SUPPLIES CAN VARY MARKEDLY WITH LOCATION, SEASON, SOURCE, AND MANAGEMENT PRACTICE. Do not interpret this map too literally.

This map is based on preliminary climate division data. Local conditions and/or final data may differ. See the detailed product suite description for more details.
Drought Indices

• PDSI - Palmer Drought Severity Index
• Crop Moisture Index
• Drought Monitor (current)
• Drought Indicators: Short-term, Long-term
2012 Hydrologic Drought

Explanation - Percentile classes

- Low: <10, 10-24, 25-75, 76-90, >90
- High
- No Data

March

April

Sept

Oct
2006-2007 Drought
NW Wisconsin

Emerged June 2006
persisted through end of year
Drought Continued Through Growing Season
Standardized Precipitation Index

Compared to 1895-present statistics

SPI: 6-months, ending October

-1.24 to -0.75 (moderately dry)
-1.99 to -0.75 (very dry)
total for past 24 mo below median

Northwest Division, Wisconsin
Climate Division (04). Standardized Precipitation Index

Time Scale (months)

even with recent rains, 3-, 4-, 5-mo totals very unusual

past 6 years drier than normal

How likely?

3 0.01%
2 2.3%
1 ~16%
0 50%
-1 ~16%
-2 2.3%
<table>
<thead>
<tr>
<th>Year</th>
<th>SPI-months</th>
<th>Wet</th>
<th>Dry</th>
<th>Year</th>
<th>SPI-months</th>
<th>Wet</th>
<th>Dry</th>
</tr>
</thead>
<tbody>
<tr>
<td>1936</td>
<td>2.2</td>
<td>1.1</td>
<td>2.3</td>
<td>2012</td>
<td>.2/.8</td>
<td>1.4</td>
<td>1.3</td>
</tr>
<tr>
<td></td>
<td>2.2/.8</td>
<td></td>
<td></td>
<td></td>
<td>2.5/1.8</td>
<td>2.8</td>
<td>2.4</td>
</tr>
<tr>
<td></td>
<td>1.6/.4</td>
<td></td>
<td></td>
<td></td>
<td>2.4/1.1</td>
<td>2.3</td>
<td>1.1</td>
</tr>
<tr>
<td></td>
<td>3.1</td>
<td></td>
<td></td>
<td></td>
<td>3.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1988</td>
<td>3.1</td>
<td>3.1</td>
<td>3.1</td>
<td>2007</td>
<td>0/.1</td>
<td>1.1</td>
<td>0.9</td>
</tr>
<tr>
<td></td>
<td>3.1</td>
<td></td>
<td></td>
<td></td>
<td>1.5/1.1</td>
<td>1.6</td>
<td>1.3</td>
</tr>
<tr>
<td></td>
<td>1.6/1.3</td>
<td></td>
<td></td>
<td></td>
<td>2.3</td>
<td>1.6</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td>2.6</td>
<td></td>
<td></td>
<td></td>
<td>1.6/1.3</td>
<td>1.6</td>
<td>1.3</td>
</tr>
<tr>
<td></td>
<td>2/1.1</td>
<td></td>
<td></td>
<td></td>
<td>2.6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:**
- SPI-months: Standardized Precipitation Index - months
- Wet: Precipitation above normal
- Dry: Precipitation below normal
So just below-average rainfall not enough for drought.
Outlook

• how depleted is subsoil moisture?
• hangover effect
• do global conditions give clues about upcoming months?
• ENSO, etc
<table>
<thead>
<tr>
<th>Depth (cm)</th>
<th>Field texture</th>
<th>FC (-33 kPa)</th>
<th>PWP (-1500 kPa)</th>
<th>VMC (%)</th>
<th>deficit (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-15</td>
<td>Silty loam</td>
<td>31</td>
<td>11</td>
<td>8.3</td>
<td>3.4</td>
</tr>
<tr>
<td>25-35</td>
<td>Silty loam</td>
<td>31</td>
<td>11</td>
<td>11.7</td>
<td>1.9</td>
</tr>
<tr>
<td>50-60</td>
<td>Silty clay loam</td>
<td>38</td>
<td>22</td>
<td>14.2</td>
<td>2.4</td>
</tr>
<tr>
<td>80-90</td>
<td>Silty clay loam</td>
<td>38</td>
<td>22</td>
<td>16.7</td>
<td>2.1</td>
</tr>
<tr>
<td>110-120</td>
<td>Silty clay</td>
<td>41</td>
<td>27</td>
<td>19.2</td>
<td>2.2</td>
</tr>
<tr>
<td>140-150</td>
<td>Silty clay</td>
<td>41</td>
<td>27</td>
<td>27.5</td>
<td>1.4</td>
</tr>
</tbody>
</table>

**Total deficit** 29 cm (with some interpolation)  ~12 in

Edmund series
7/10, Verona, WI
Evans and Hartemink

[Image of crops]
Since start September, 5”-7” statewide.
For Dec-Jan-Feb:
EC - “Equal Chances”

Dec-Jan-Feb normals 3”- 5”
NW ➔ SE axis, more in SE

March ~2” statewide
April 2”- 4” (NW drier)
Summary

- about 1/2-way to being sure of soil profile refill statewide
- have EC of above-below normal winter precip
- many different drought indices in use