

Funding provided by NOAA
Sectoral Applications Research Project

MONITORING DROUGHT

Basic Climatology
Oklahoma Climatological Survey

DEFINING DROUGHT

First off, just what is drought?



- Define a tornado
- Define a severe thunderstorm
- Define a hurricane
- Define a volcanic eruption
- When did it begin? Where was it? How bad was it? When did it end? Can you point to one on a map or radar display?
- *Okay, do the same for drought*

First off, just what is drought?



- Precipitation deficits?
- Soil moisture?
- Streamflow?
- Plants wilting?
- Wildfire?
- Famine?
- Other?

Drought defined by its impacts



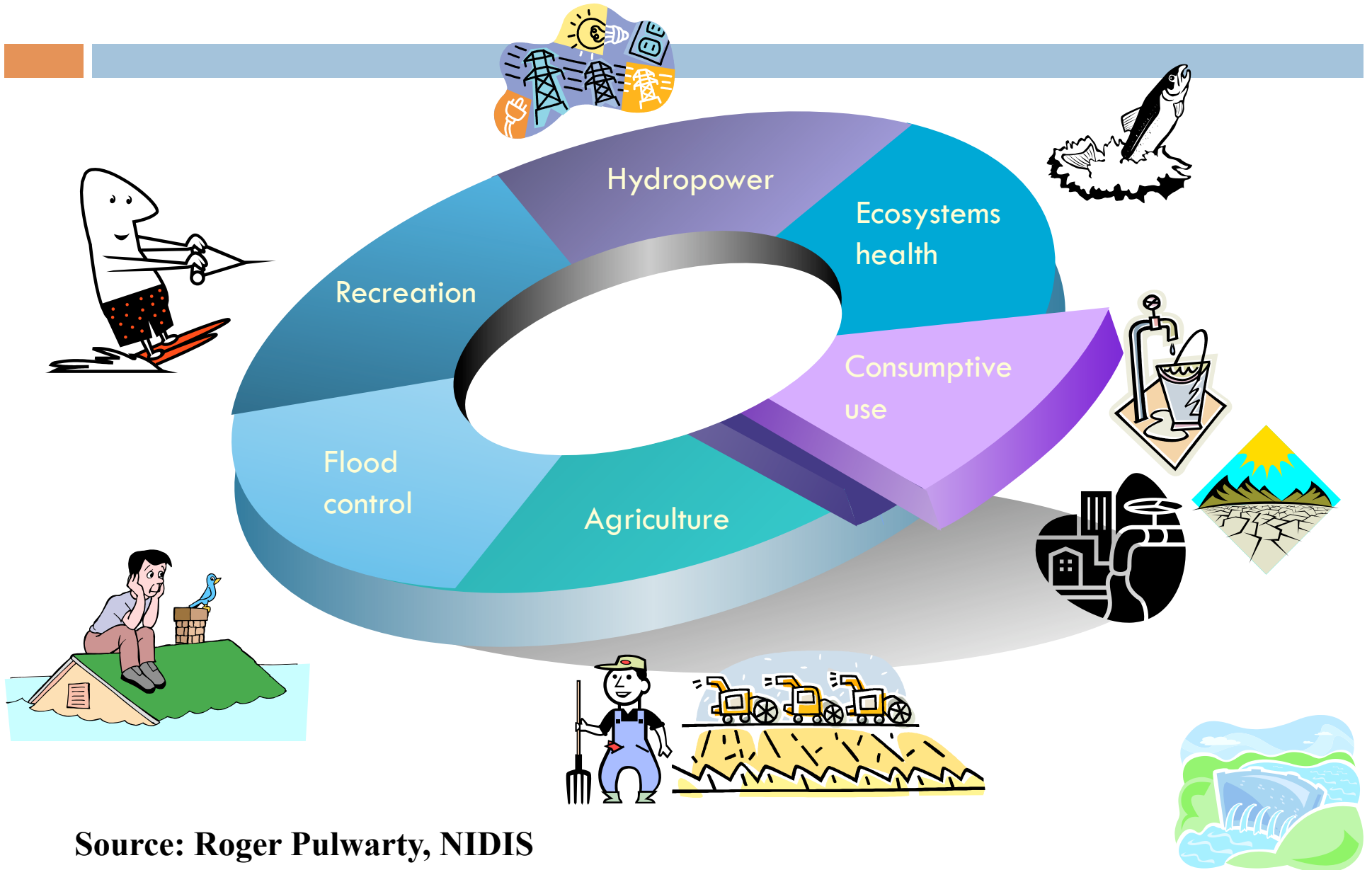
- **Meteorological Drought** – departures from “normal” precipitation
- **Agricultural Drought** – soil / groundwater deficits that affect vegetation
- **Hydrologic Drought** – deficiency of water in watersheds, rivers; often lags agriculture impacts
- **Socio-Economic Drought** – shortage of some item (water, food, fish, natural values) that affects the balance of supply and demand

What is drought?



- Drought is the condition that occurs when ***water resources are insufficient to meet water needs.***
- ... *in other words* ...
- ***Drought is a social phenomenon.***
 - ▣ It's what it does to people that counts!
 - ▣ We read about droughts in the Sahel, but not the Sahara. *Why?* Because people live in the Sahel.

Multiple competing values, Multiple competing objectives



Source: Roger Pulwarty, NIDIS

What is Drought?

- ***Drought is a multi-faceted issue and requires a multi-faceted assessment.***
 - Does a doctor take your temp, check a chart and say “based on your temp, you are moderately-to-severely sick”?
 - Instead, she uses the results of several patient-appropriate and symptom-appropriate tests. *i.e., well-chosen indicators in concert with each other.*
 - A responsible drought decision-maker (and those who supply her data) should take the same approach.

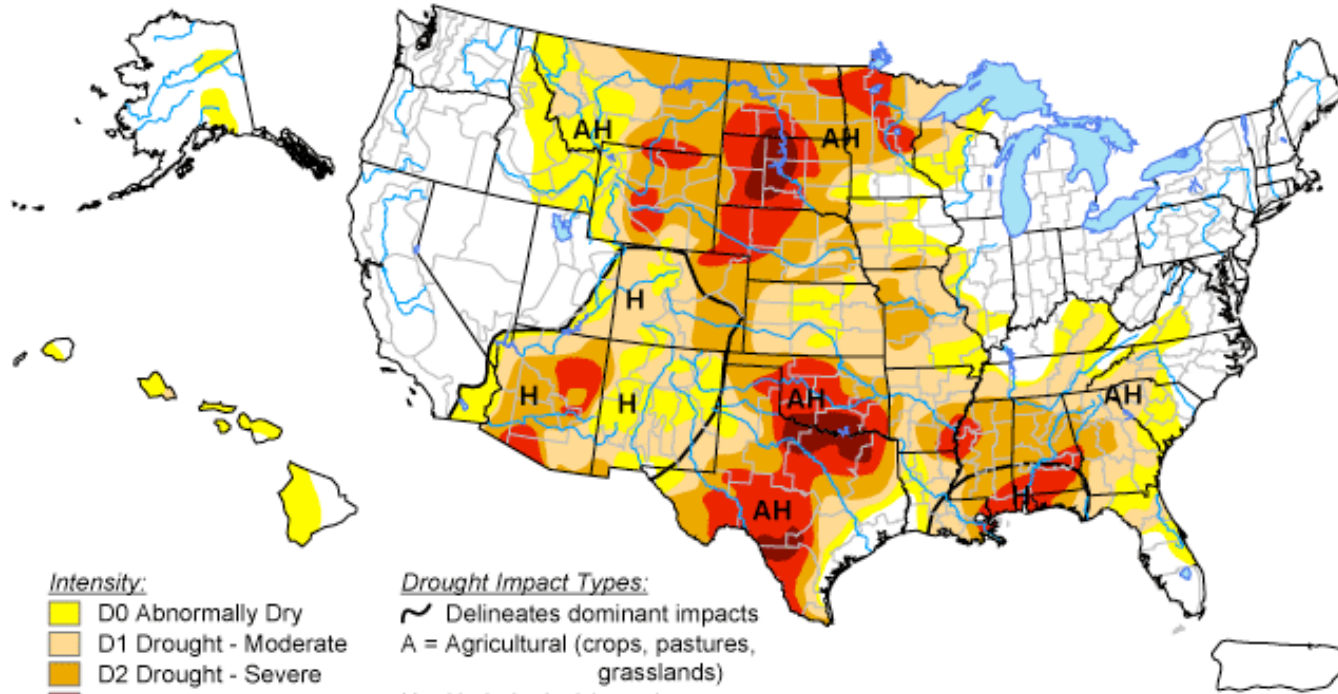
Why Monitor Drought Impacts?

- Drought is one of the **most costly** U.S. natural disasters
 - Estimated annual losses at **\$6-8 billion** (1995)
 - **1988: \$39 billion (\$68B in 2007 \$)**
 - **2002, 2003, 2004, 2005, 2006, 2007: ???**
 - Europe, 2003: **US\$13B**
 - Canada, 2001-02: **US\$5.7B**
- USDA/Risk Management Agency, 2006: US \$1.71 B indemnities
- Congress has appropriated approximately **\$30 billion** in drought relief since 1988

Approximate Peak of 2006 Drought

U.S. Drought Monitor

August 8, 2006
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)

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

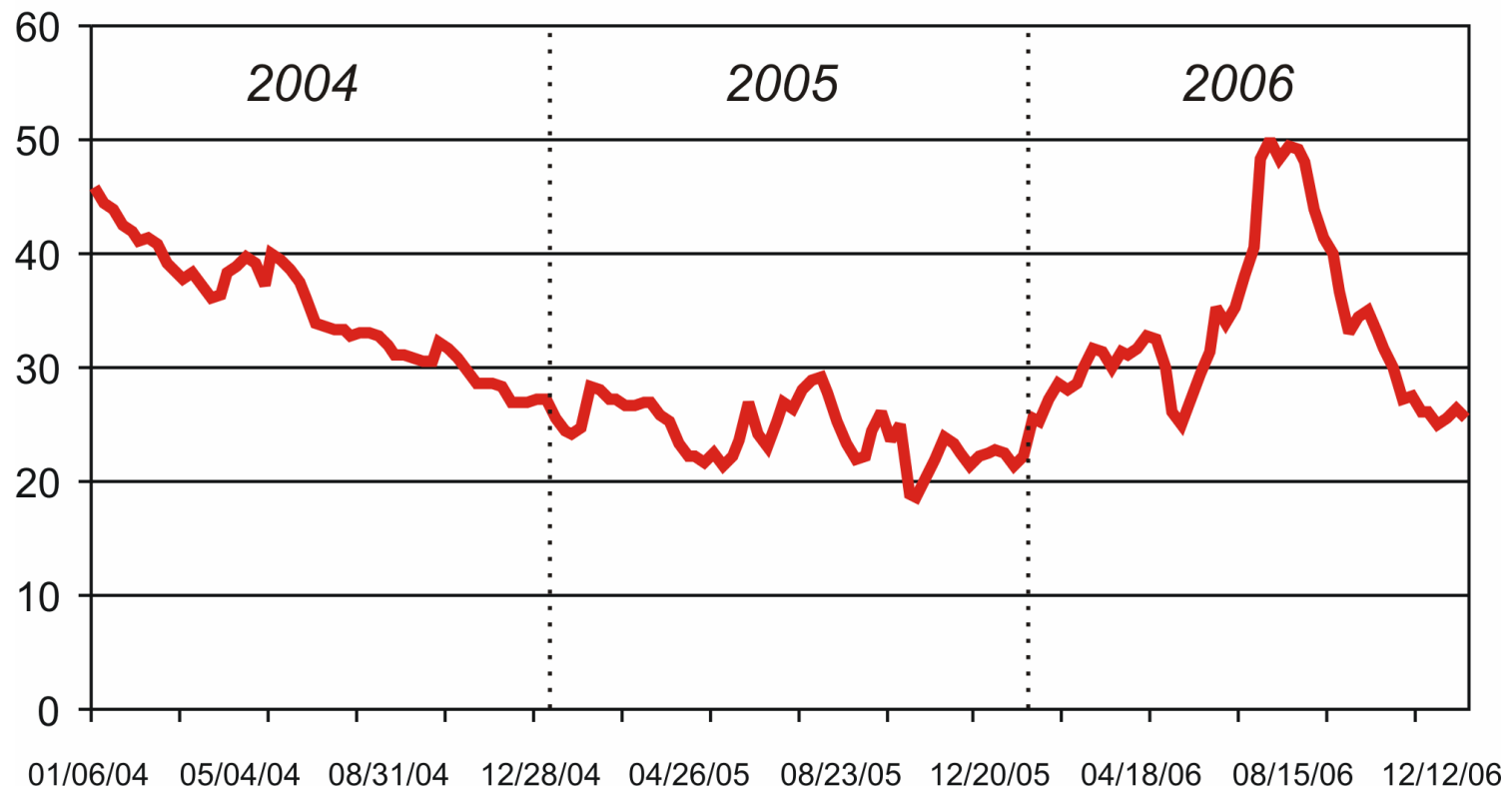
<http://drought.unl.edu/dm>



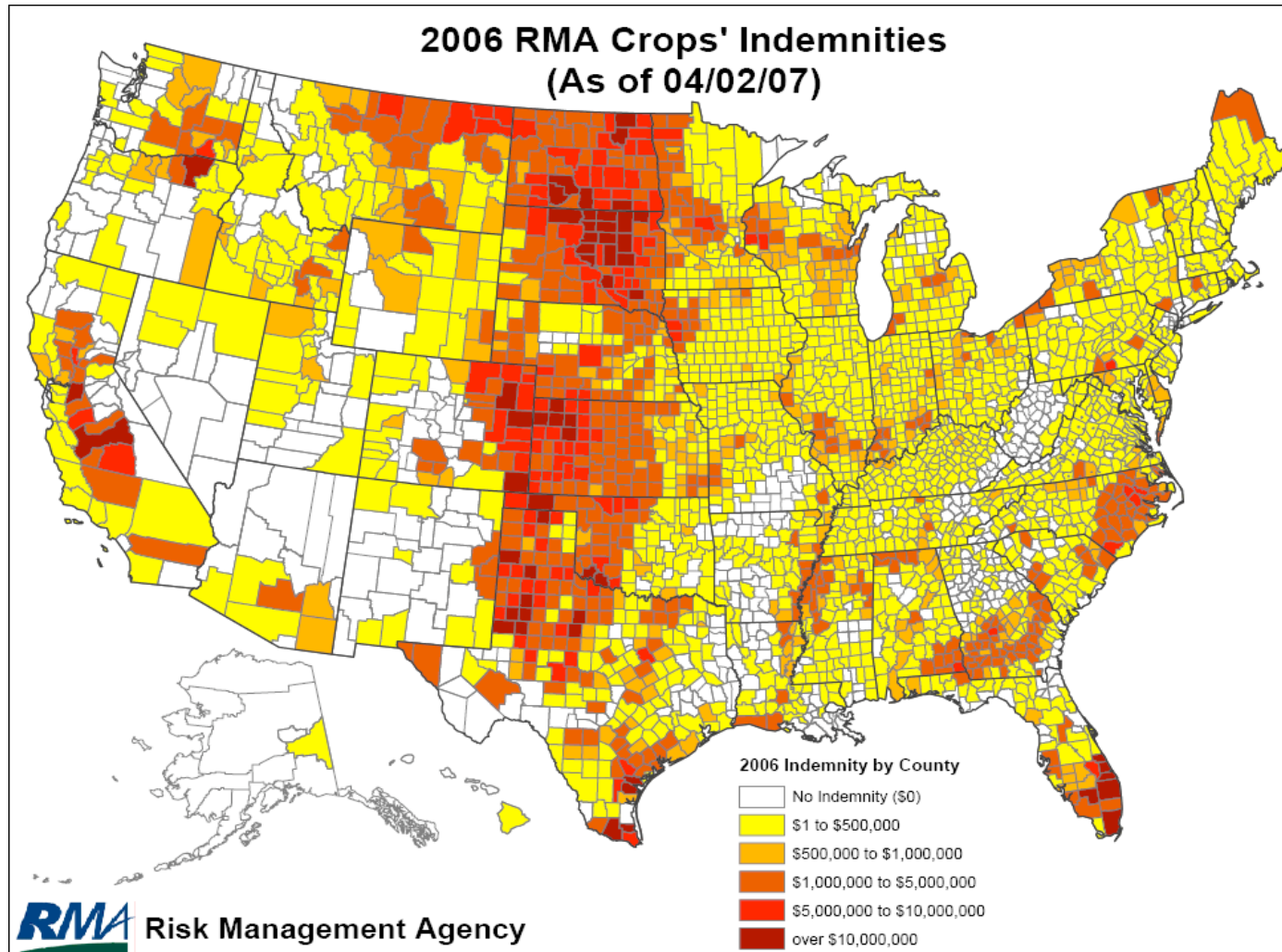
Released Thursday, August 10, 2006
Author: Rich Tinker, Climate Prediction Center, NOAA

50% of US in Drought

Percent Area of the United States in D1–D4 Drought, 2004–2006



Economic Impacts of Drought



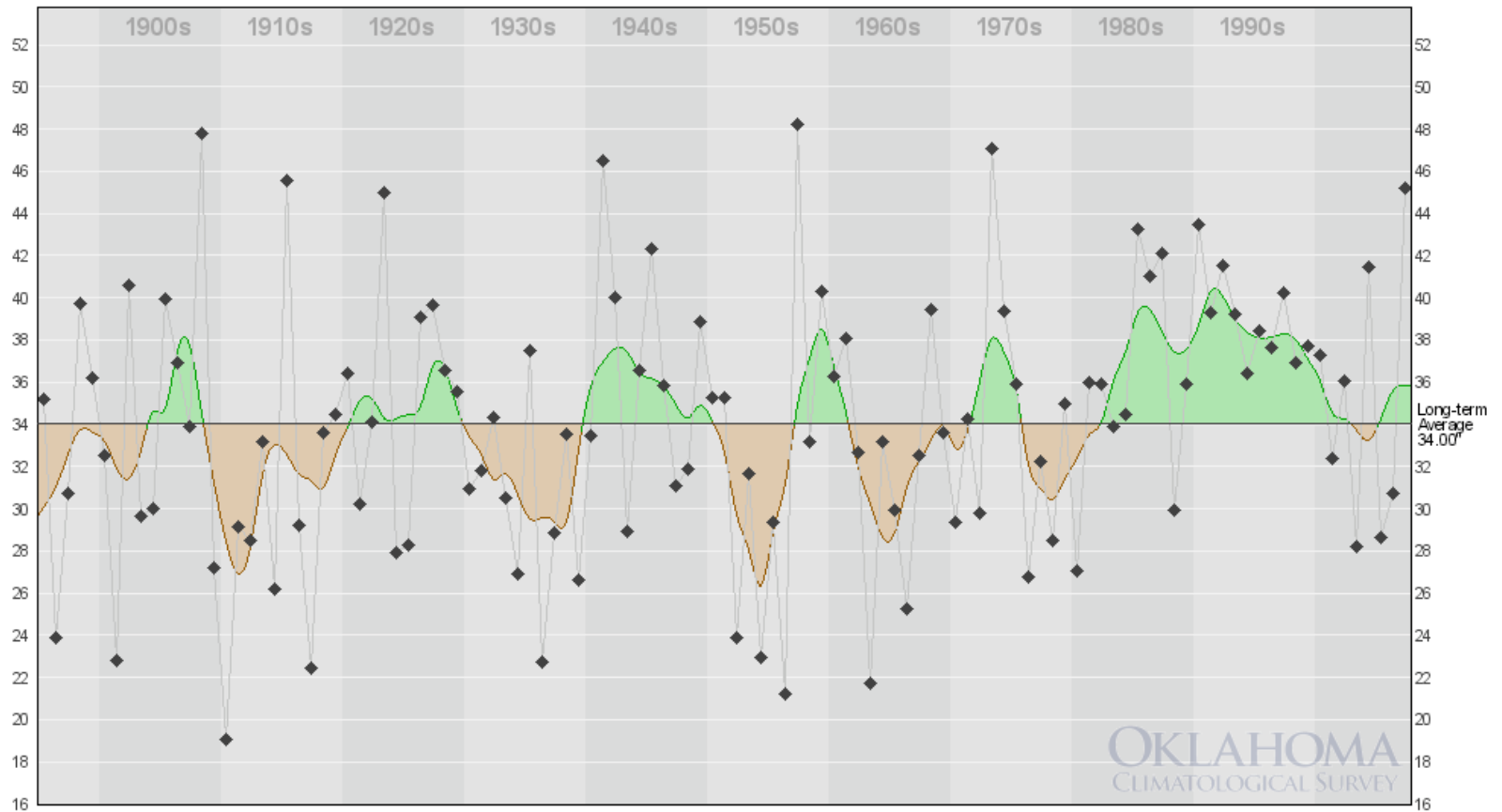
DROUGHT INDICATORS

Precipitation Departures






- ❑ Precipitation the key indicator for vegetation growth, water resources
 - ❑ Temperature effects also important, but precipitation dominates
- ❑ Measured virtually everywhere
- ❑ Easy to calculate
- ❑ Can be done for points or over areas (such as a state or climate division)

Droughts are a part of Oklahoma



USDA  Annual Precipitation History with 5-year Tendencies
Oklahoma Statewide: 1895-2007

-  Wetter historical periods
-  Drier historical periods
-  Individual Annual precipitation value

Lies, Darn Lies and Statistics

Microsoft Internet Explorer window showing a weather report for the last 90 days (February 9, 2003 through May 9, 2003).

Climate Division	AUTUMN TO DATE		WARM GROWING SEASON		YEAR TO DATE		WATER YEAR TO DATE	
	LAST 30 DAYS	LAST 60 DAYS	LAST 90 DAYS	LAST 120 DAYS	LAST 180 DAYS	LAST 365 DAYS		
Last 90 Days: February 9, 2003 through May 9, 2003								
Climate Division	Total Rainfall	Departure from Normal	Pct of Normal	Driest since	Wettest since	Rank since 1921 (83 periods)	Percentile Ranking	
Panhandle	2.73"	-2.19"	55%	2002 (1.11")	2001 (5.87")	28th driest	34th	
N. Central	5.98"	-1.91"	76%	2002 (4.13")	2001 (6.73")	38th driest	46th	
Northeast	8.00"	-2.68"	75%	2001 (6.88")	2002 (8.59")	28th driest	34th	
W. Central	3.87"	-3.36"	54%	2002 (3.80")	2001 (8.27")	16th driest	19th	
Central	5.55"	-4.19"	57%	1996 (3.91")	2002 (6.99")	11th driest	13th	
E. Central	7.62"	-4.24"	64%	1982 (5.33")	2002 (11.78")	9th driest	11th	
Southwest	3.65"	-3.67"	50%	1996 (2.25")	2002 (6.77")	8th driest	10th	
S. Central	4.37"	-6.15"	42%	1980 (3.88")	2002 (11.89")	2nd driest	2nd	
Southeast	7.47"	-5.59"	57%	1980 (6.80")	2002 (17.93")	4th driest	5th	
Statewide	5.49"	-3.75"	59%	1996 (4.15")	2002 (7.97")	8th driest	10th	
Climate Division	Driest on Record	Wettest on Record	Sep 29 25 cm FWI	Sep 29 KBDI	90-day SPI	Most Like (Arndt Score)		

Often, the raw statistics do not reveal the complete picture!

55% vs. **57%** vs. **57%** doesn't necessarily mean they're all in the same situation!

Palmer Drought Severity Index (PDSI)

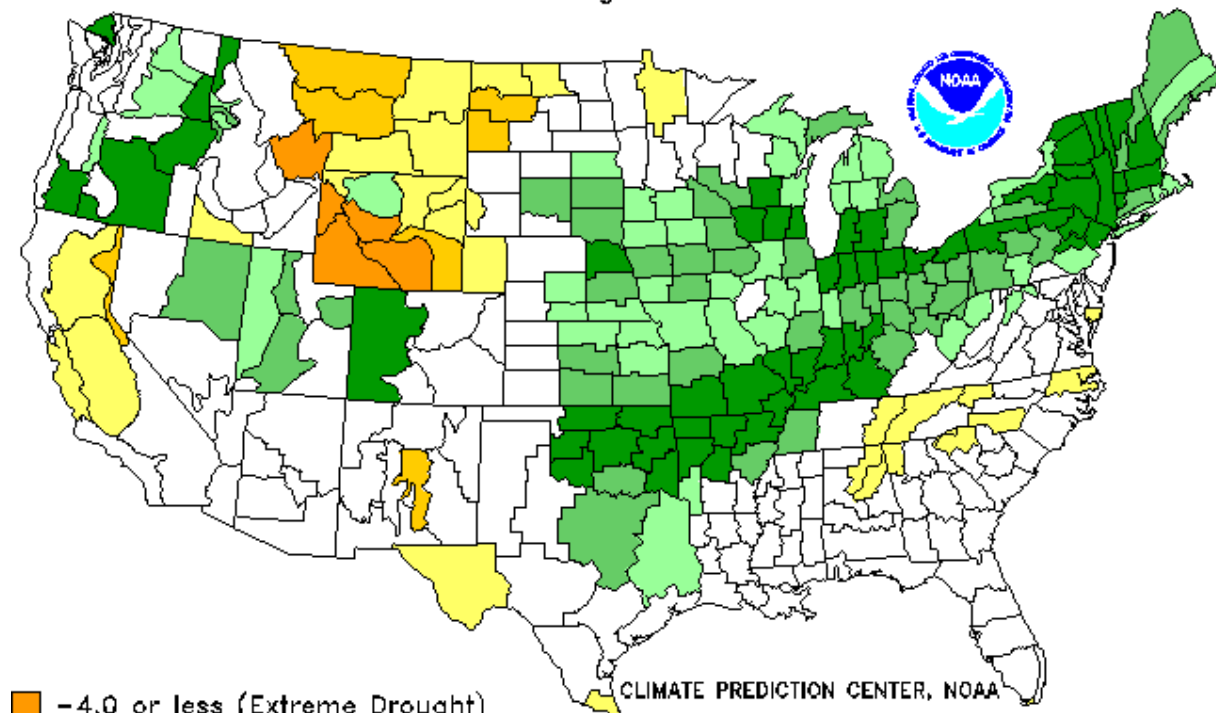
- ❑ Developed in 1965 (first widely used soil moisture model)
- ❑ Uses temperature and precipitation departures to determine dryness
- ❑ Ranges from -4 (extreme drought) to +4 (extreme wet)
- ❑ Standardized to local climate
 - ❑ Based on departures from local climate normals
- ❑ Good for measuring long-term drought in relatively uniform regions
 - ❑ Not good for short-term drought / rapid changes
 - ❑ Not good for variable terrain (i.e., mountains)
- ❑ May lag emerging drought conditions by several months

Palmer Drought Severity Index (PDSI)

Drought Severity Index by Division

Weekly Value for Period Ending 12 APR 2008

Long Term Palmer



- -4.0 or less (Extreme Drought)
- -3.0 to -3.9 (Severe Drought)
- -2.0 to -2.9 (Moderate Drought)
- -1.9 to +1.9 (Near Normal)

- +2.0 to +2.9 (Unusual Moist Spell)
- +3.0 to +3.9 (Very Moist Spell)
- +4.0 and above (Extremely Moist)

Crop Moisture Index (CMI)



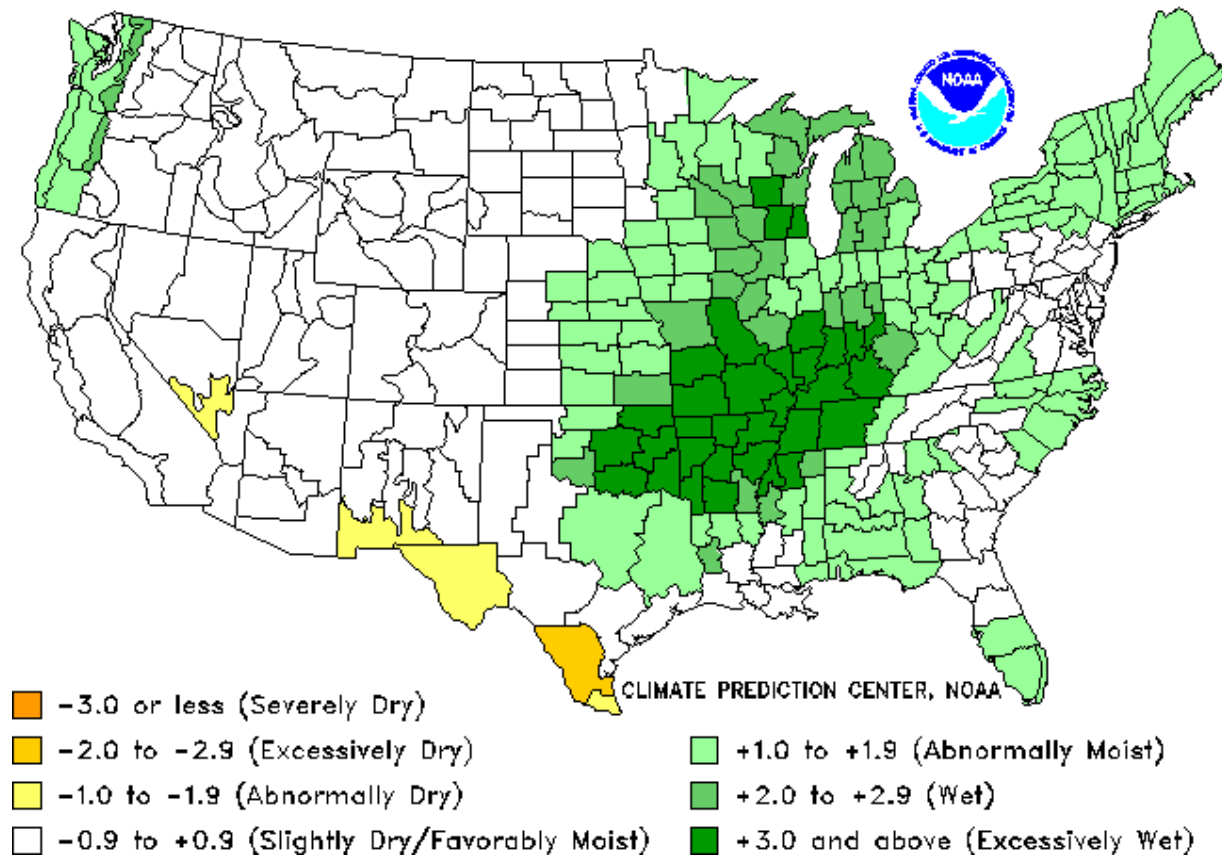
- ❑ Developed in 1968
- ❑ Geared for agricultural drought
- ❑ Uses same categories as PDSI
- ❑ Responds more rapidly than PDSI
 - ❑ Short-term dryness or wetness
- ❑ Starts and ends growing season at near zero
 - ❑ Not good for long-term assessments
- ❑ May overestimate recovery resulting from short-term rainfall

Crop Moisture Index (CMI)

Crop Moisture Index by Division

Weekly Value for Period Ending 12 APR 2008

Short Term Need vs. Available Water in 5 Ft Profile

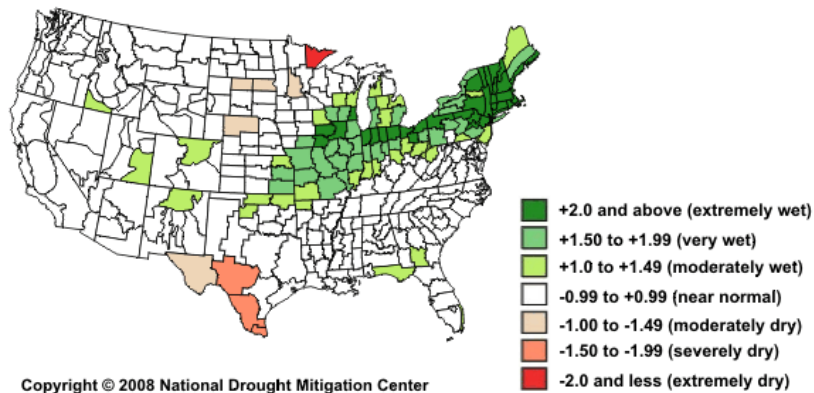


Standardized Precipitation Index (SPI)

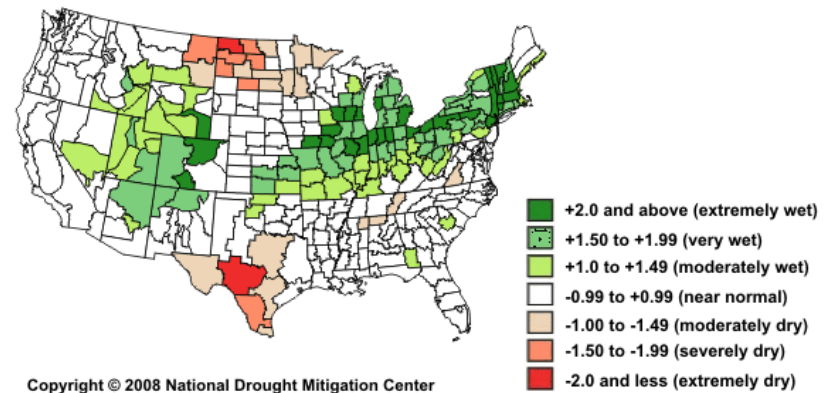
- ❑ Developed in 1990s
- ❑ Can be produced for a variety of time periods, depicting both short-term and long-term conditions
- ❑ Based on precipitation over an accumulation period compared to the station's historical distribution
 - ❑ Statistical “unusualness” of a period
- ❑ PDSI uses a water-balance model to estimate evaporation based on temperature
- ❑ Values of -2 or less are extremely dry; +2 and greater are extremely wet

Standardized Precipitation Index (SPI)

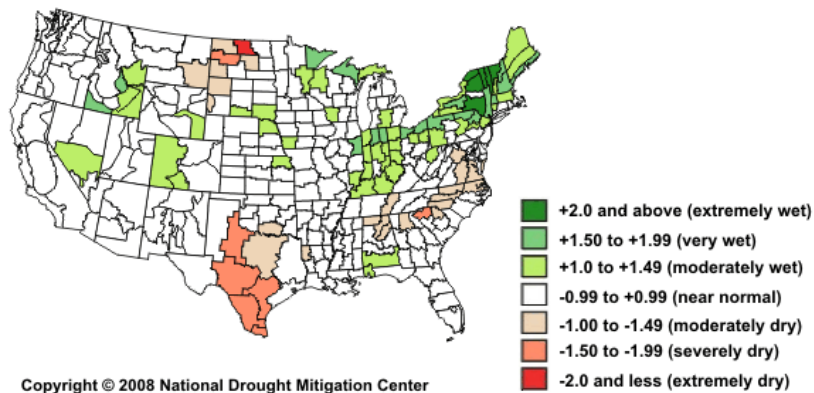
1-month SPI through the end of February 2008



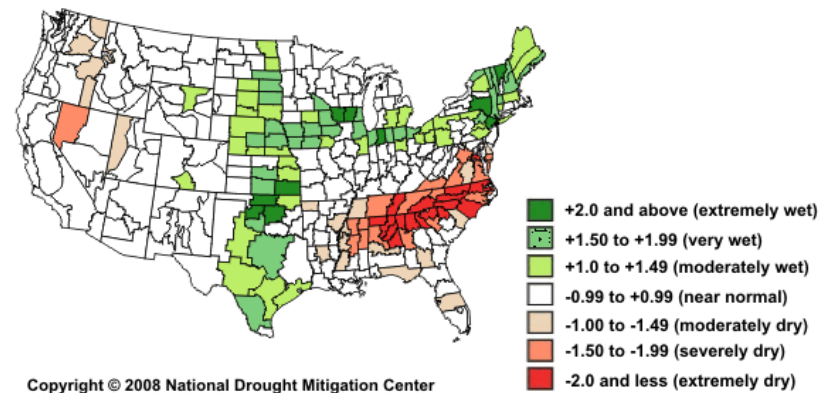
3-month SPI through the end of February 2008



6-month SPI through the end of February 2008



12-month SPI through the end of February 2008

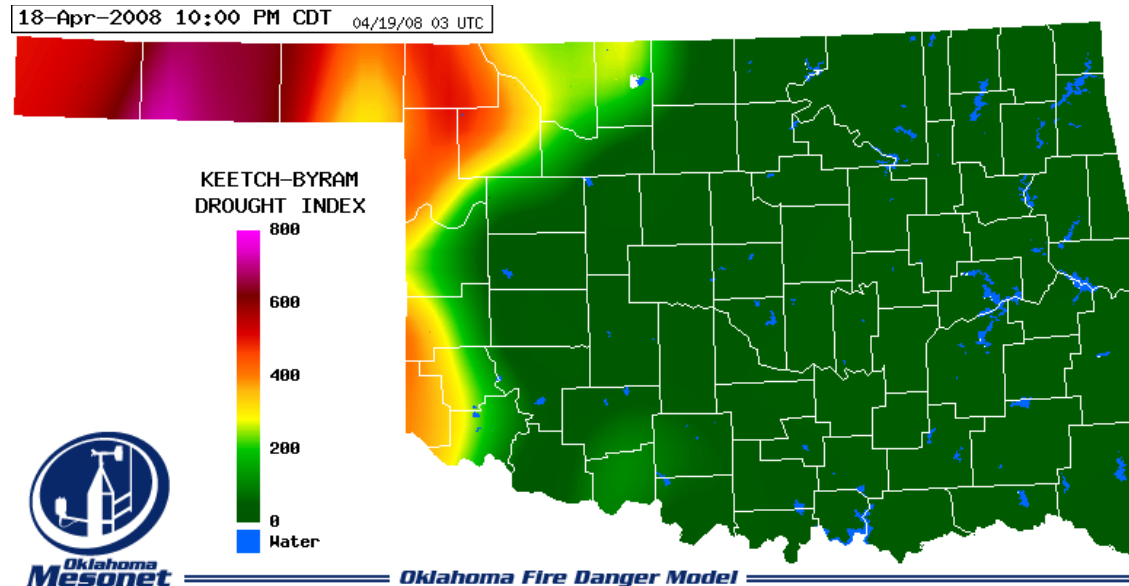


Keetch-Byram Drought Index (KBDI)



- Estimates dryness of soil and dead vegetation
- Ranges from 0 (saturated soil) to 800 (dry soil)
- Based on combination of recent precipitation and estimated evaporation
 - ▣ Soil may dry because of extended periods without precipitation or by high temperatures / strong winds
- Developed for fire management purposes, but also a good short-term drought indicator

Keetch-Byram Drought Index (KBDI)



KBDI Value	Interpretation
0-200	No Drought-Slight Drought. Fuels and ground are quite moist.
200-400	Moderate Drought. Dry vegetation begins to contribute to fire.
400-600	Severe Drought. Escaped fire is difficult to control.
600-800	Extreme Drought. Fire suppression is a major problem.

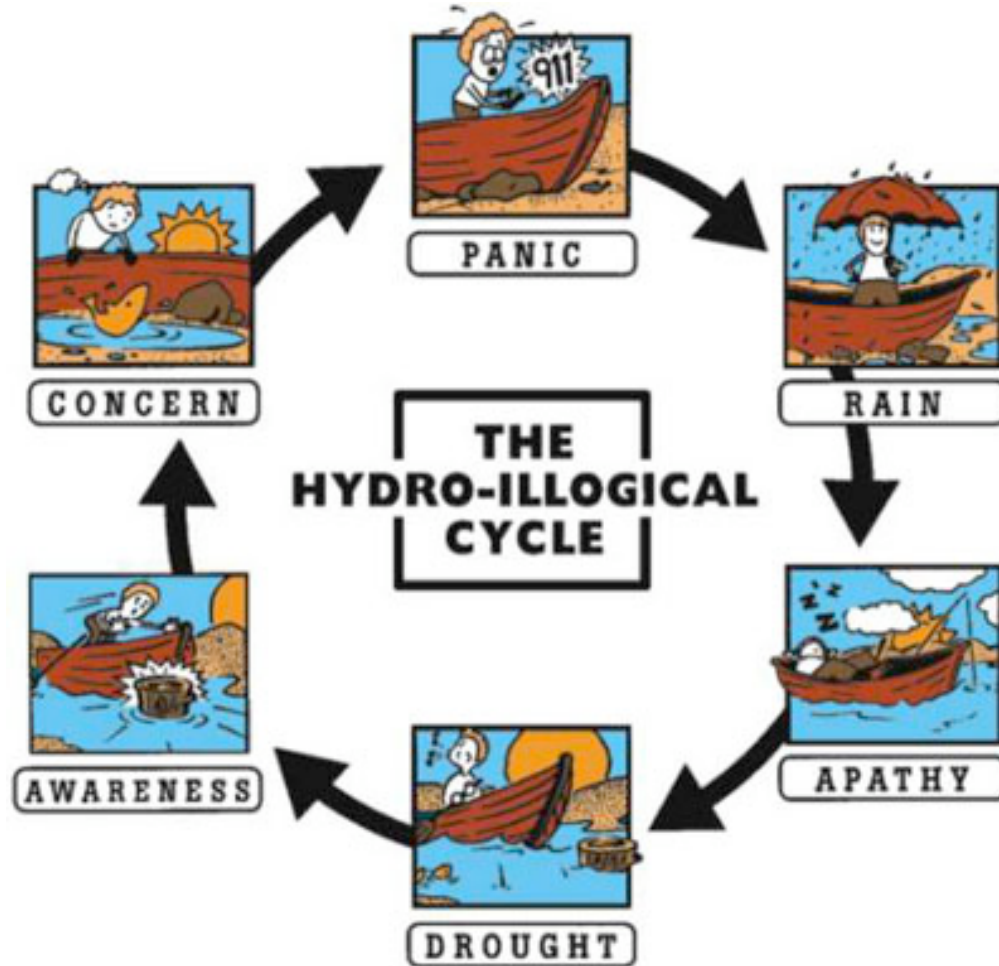
Other Drought Tools



- Evaporation models
 - ▣ Often the missing link in drought understanding
 - ▣ Direct measurement difficult and disappearing (pan evap)
 - ▣ ET models are getting more sophisticated
- Soil Moisture
 - ▣ Integrates precipitation deficits over time
 - ▣ Lagging indicator but strongly related to impacts
 - ▣ Valuable for assessing recovery

DROUGHT MONITORING

The “normal” reaction to drought



Source: Don Wilhite, National Drought Mitigation Center

NIDIS Drought Portal

<http://www.drought.gov>

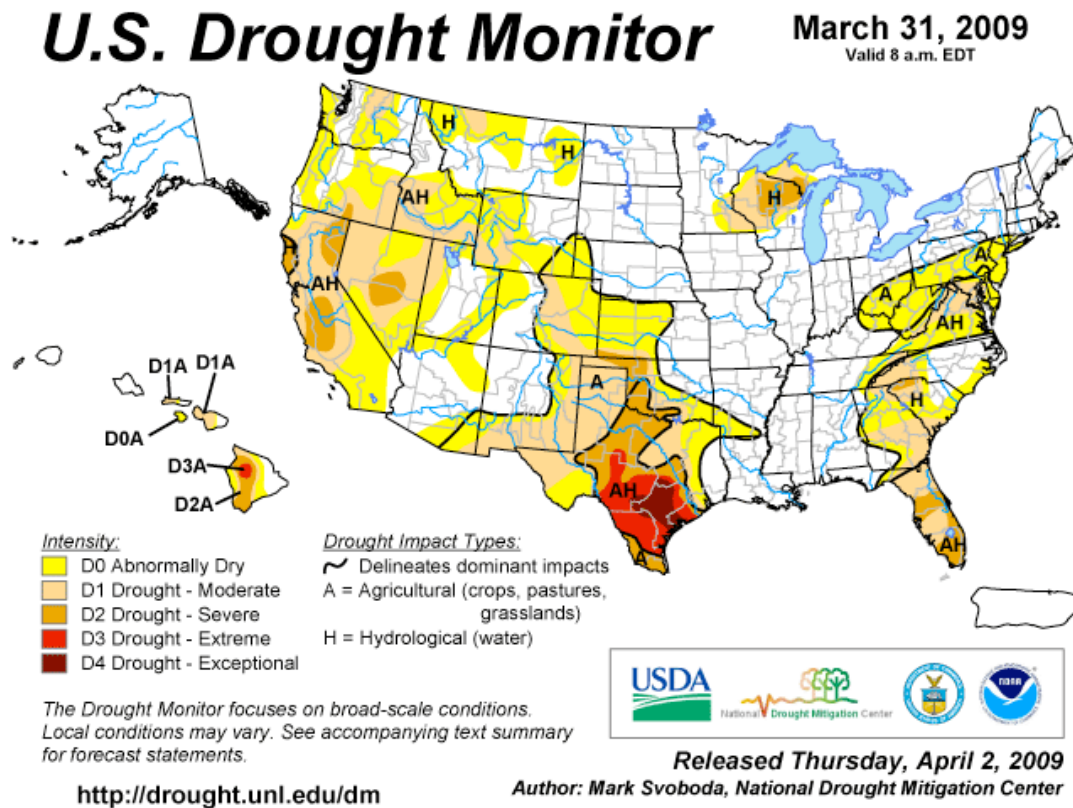
The screenshot shows the NIDIS U.S. Drought Portal website. At the top, the NIDIS logo is on the left, and the text "National Integrated Drought Information System" and "U.S. Drought Portal" are in the center. The URL "www.drought.gov" is below. On the right, there are links for "Contact Us", "Log In", and "Text-Only", along with a search bar. Below the header is a navigation menu with items: HOME, WHAT IS NIDIS?, CURRENT DROUGHT, FORECASTING, IMPACTS, PLANNING, EDUCATION, RESEARCH, and LOCAL FORECAST: City, State or Zip. The main content area is divided into several sections:

- Area Drought Information:** Includes dropdown menus for "Select State..." and "Select Region..." with "Go" buttons.
- Maps & Tools:** Lists "Map Viewer - updated!", "GIS Resources", and "Geodata Portal".
- Events & Announcements:** Lists several events such as "Climate Reference Network Soil Moisture Meeting - March 2009", "Monitoring Gaps Assessment Workshop - December 2008", "Wildfire: National Seasonal Assessment Workshop - February 2009", "National Hydrologic Warning Council - May 2009", and "Remote Sensing Workshop - February 2008 (Updated Summary)".
- Drought In The News:** Lists news items like "House approves special spending to fight wildfires - Sacramento Bee", "Sierra forests targeted for beetle treatment - Sacramento News", "Storms allow slight boost in federal water supply - Sacramento News", "NOAA - Major Midwest Flooding Highlighted in U.S. Spring Outlook", "Drought grips Texas cattle country - USATODAY.com", "Western States Water - Weekly Newsletter of the Western States Water Council", and "Drought a \$1 billion disaster in Texas - USATODAY.com".
- Featured Products:** A central section titled "U.S. Drought Monitor" dated "March 24, 2009". It includes a map of the United States color-coded by drought intensity (D0 to D4). A legend explains the intensity levels and impact types (A for Agricultural, H for Hydrological). It also includes logos for USDA, NIDIS, and other partners, and a release date of "Thursday, March 26, 2009" by Brad Rippey.
- Drought Conditions:** A section titled "Drought Conditions" showing a pie chart for the "Area for U.S., including, AK, HI & PR (As of 3.24.2009)". The pie chart data is: 0.52% (None), 1.08% (D0), 5.2% (D1), 15.5% (D2), 25.61% (D3), and 52.09% (D4). Below the chart are links for "Drought Classifications" and "View Time Series".
- Drought Information Statements:** A section with a map of the U.S. and text: "Click on a highlighted area to view the current NWS Drought Information Statement or Click Here to select from a list".
- US Streamflow Drought Conditions:** A section with a map of the U.S. showing streamflow drought conditions, dated "Tuesday, March 24, 2009".
- NIDIS Feature:** A section titled "Climate Change and Water Resources Management: A Federal Perspective" featuring a photo of a dam and reservoir.

Drought Monitor
Drought Impact Reporter
Drought Outlook

NIDIS Drought Portal

U.S. Drought Monitor



- D0 – Abnormally Dry
- Heads Up!
- D1 Drought – Moderate
- Some localized impacts
- D2 Drought – Severe
- Losses likely, water restrictions
- D3 Drought – Extreme
- Widespread & severe losses, water shortages
- D4 Drought – Exceptional
- Dust Bowl

The Drought Monitor Concept

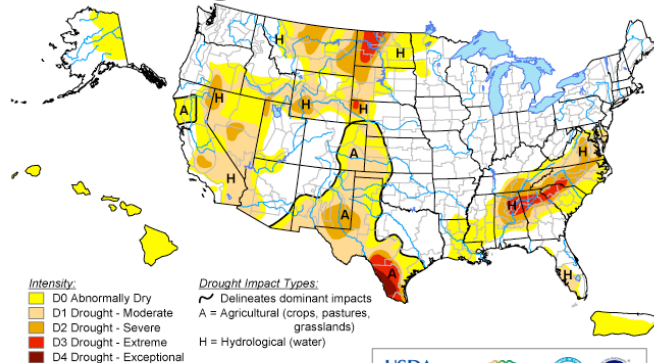


- A consolidation of indicators into one comprehensive national drought map
- Trying to capture these characteristics:
 - ▣ the drought's magnitude (duration + intensity)
 - ▣ spatial extent (how widespread)
 - ▣ how often similar conditions occur
 - ▣ Impacts
- Rates drought intensity by **percentile ranks**
- An assessment – not a forecast, not a declaration

From National to Local...

U.S. Drought Monitor

April 15, 2008
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)

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



Released Thursday, April 17, 2008

Authors: Jay Lawrimore/Liz Love-Brotak, NOAA/NESDIS/NCDC

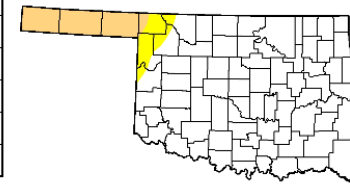
<http://drought.unl.edu/dm>

U.S. Drought Monitor

April 15, 2008
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	87.8	12.2	8.6	0.0	0.0	0.0
Last Week (04/08/2008 map)	81.5	18.5	11.1	0.0	0.0	0.0
3 Months Ago (01/22/2008 map)	58.7	41.3	8.5	0.0	0.0	0.0
Start of Calendar Year (01/01/2008 map)	83.4	16.6	7.1	0.0	0.0	0.0
Start of Water Year (10/02/2007 map)	95.6	4.4	0.0	0.0	0.0	0.0
One Year Ago (04/17/2007 map)	92.6	7.4	0.0	0.0	0.0	0.0



Intensity:
 D0 Abnormally Dry
 D1 Drought - Moderate
 D2 Drought - Severe
 D3 Drought - Extreme
 D4 Drought - Exceptional

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



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

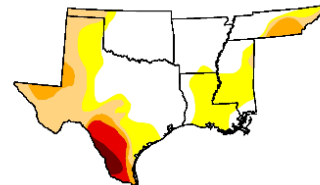
U.S. Drought Monitor South

April 15, 2008
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	49.8	50.2	27.3	11.1	5.3	1.7
Last Week (04/08/2008 map)	49.4	50.6	28.7	8.9	5.4	0.0
3 Months Ago (01/22/2008 map)	43.3	56.7	20.5	4.6	3.1	1.4
Start of Calendar Year (01/01/2008 map)	57.5	42.5	12.9	4.3	3.8	1.6
Start of Water Year (10/02/2007 map)	77.6	22.4	12.6	10.2	7.5	4.9
One Year Ago (04/17/2007 map)	69.8	30.2	12.8	4.2	0.0	0.0

Intensity:
 D0 Abnormally Dry
 D1 Drought - Moderate
 D2 Drought - Severe
 D3 Drought - Extreme
 D4 Drought - Exceptional



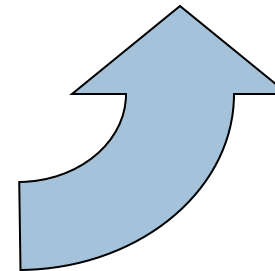
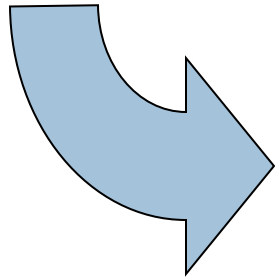
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Released Thursday, April 17, 2008

Author: J. Lawrimore/L. Love-Brotak, NOAA/NESDIS/NCDC

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



Key Variables for Monitoring Drought



- climate data
- soil moisture
- stream flow
- ground water
- reservoir and lake levels
- snow pack
- short, medium, and long range forecasts
- vegetation health/stress and fire danger

Who Makes the Drought Monitor?

- A **partnership** between the National Drought Mitigation Center, USDA and NOAA's Climate Prediction Center and National Climatic Data Center (**authors**)
- Incorporate relevant information and products from all entities (and levels of government) dealing with drought (Regional Climate Centers, State Climatologists, federal/state agencies, etc.) (**experts**)
- The **Drought Monitor** is **updated weekly** and provides a general up-to-date summary of current drought conditions across the 50 states, Puerto Rico and the Pacific possessions

Monitor Development *(Period starts 12Z last Tuesday)*

Monday (5 Days available)

- ✓ Draft map sent to local experts

Tuesday (6 Days available)

- ✓ Local expert feedback
- ✓ Draft map(s) sent to local experts
- ✓ Draft text sent to local experts

Wednesday (7 Days available; ending 12Z yesterday)

- ✓ Local expert feedback
- ✓ Draft map(s) sent to local experts
- ✓ Draft text(s) sent to local experts (Outlook)
- ✓ Final map and text sent to secured ftp server

Thursday

- ✓ Final map & text released on NDMC Website



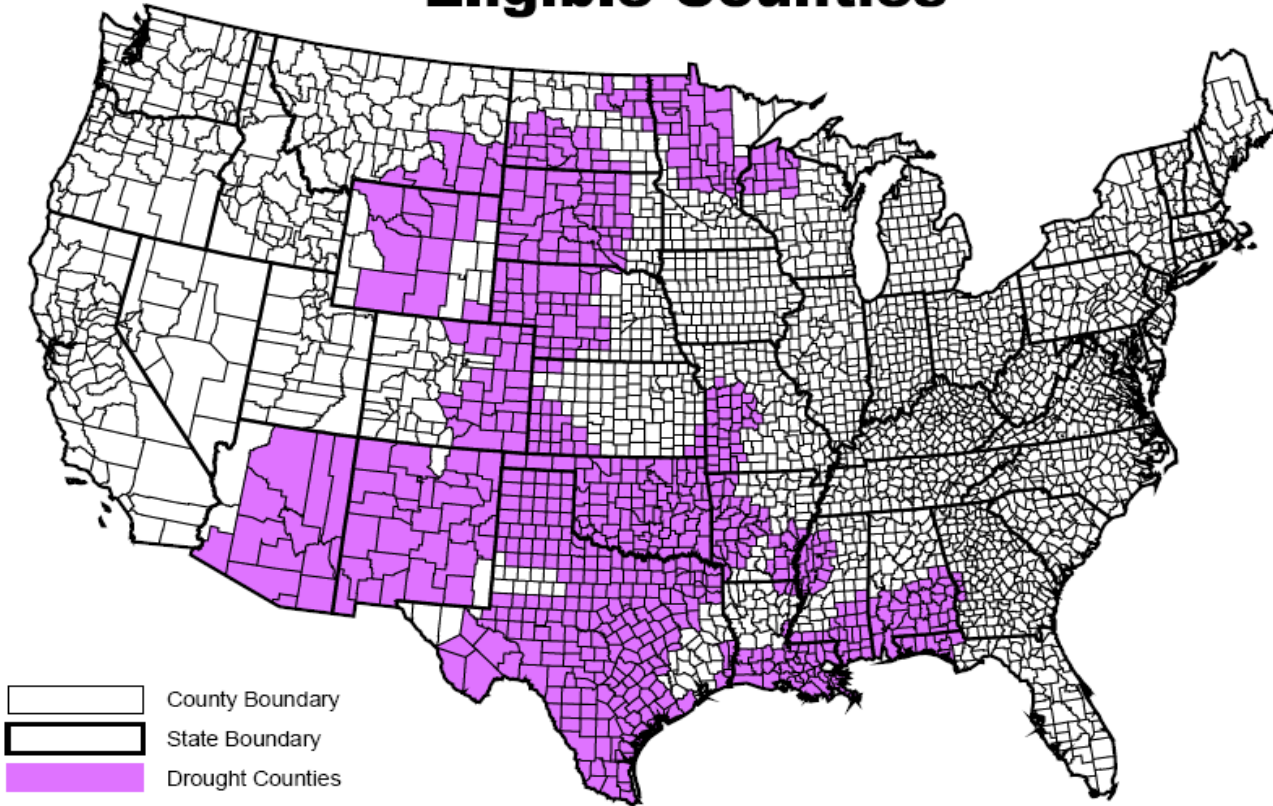
Why Does This Matter?



Use of the DM in Decision-Making

- USDA Conservation Reserve Program Release hot spot trigger (D2)
- USDA Dried Milk Program 2002-03
- Numerous states use as a drought trigger (Governor's declarations)
- 2006 USDA Livestock Assistance (D3)
- 2006 IRS (tax deferral on livestock losses)

Livestock Assistance Grant Program Eligible Counties



Drought Data Source:
The Drought Monitor
National Drought Mitigation Center
Lincoln, NE

The purple area represents counties that were at level D3 or D4
at anytime from March 7th, 2006 through August 31st, 2006.



August 31st, 2006
Farm Service Agency

NIDIS Drought Portal

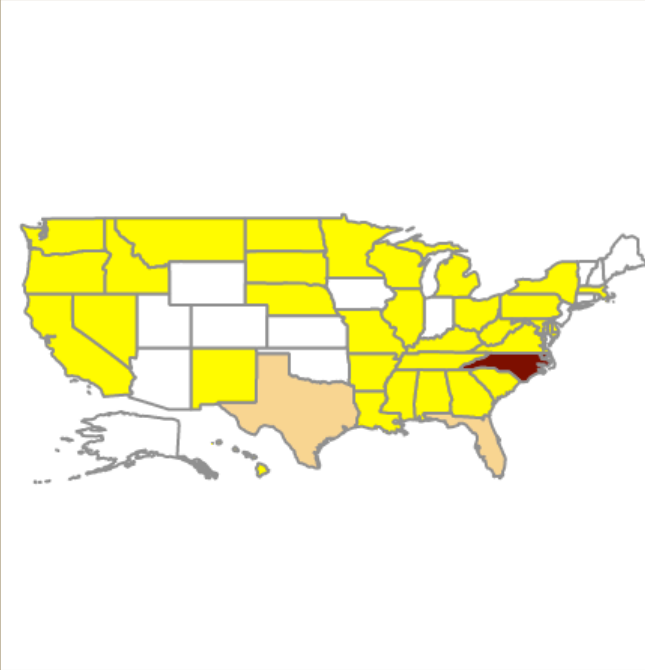
Drought Impact Reporter

Drought Impact Reporter

National Drought Mitigation Center



[View Drought Impacts](#) | [Add A Drought Impact](#) | [Time-Lapse Animation](#) | [About](#) | [Help](#) | [User Login](#)



Map Options

Impact Categories:

Agriculture Fire

Water/Energy Social

Environment Other

Source:

Time Period:

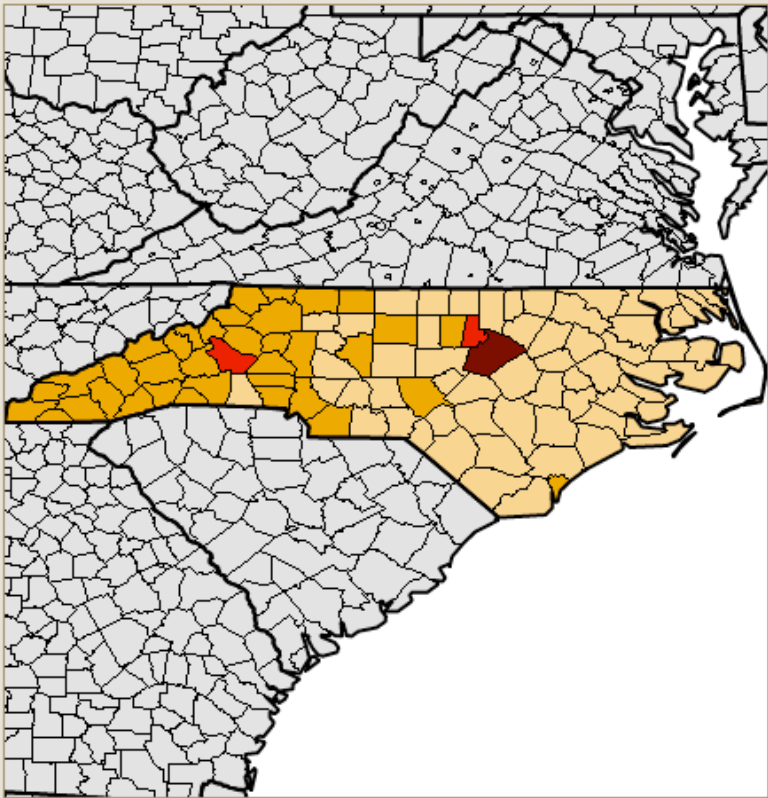
[Show Drought Monitor Layers](#)

Legend

<input type="checkbox"/>	No reported impacts
<input checked="" type="checkbox"/>	1 - 11 reported impacts
<input checked="" type="checkbox"/>	12 - 22 reported impacts
<input checked="" type="checkbox"/>	23 - 32 reported impacts
<input checked="" type="checkbox"/>	33 - 43 reported impacts
<input checked="" type="checkbox"/>	44 - 54 reported impacts

Instructions: Click on a state to see the reported drought impacts that affect that state.

Drought Impact Reporter



Map Options

Impact Categories:

- Agriculture
- Water/Energy
- Environment
- Fire
- Social
- Other

Source:

Time Period:

[Show Drought Monitor Layers](#)

Legend

- No reported impacts
- 1 - 4 reported impacts
- 5 - 8 reported impacts
- 9 - 11 reported impacts
- 12 - 15 reported impacts
- 16 - 19 reported impacts

[Zoom To Entire U.S.](#)

Instructions: Click on a county to list the reported drought impacts that affect it.

What can you find in the Drought Impact Reporter?

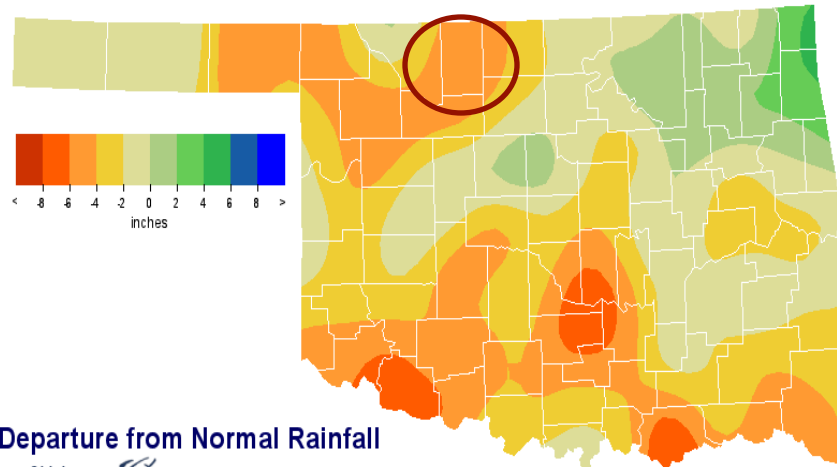
- Individual and media reports of drought “events”
- Color-coded maps to show counties, states reporting many impacts
- Number of reports does not necessarily indicate severity
 - ▣ Could have many reports from an organized community
 - ▣ Could have few (or zero) reports from sparse areas
 - ▣ Local “chatter” doesn’t make it into the DIR unless somebody submits it

The Importance of Reporting

A rancher submitted the following report: In Alfalfa County in NW Oklahoma for the month of June I recorded 1.3 inch of rainfall west of Manchester. **Wells are running dry** and we are drilling new wells. **Most all farm ponds are dry and many streams are dry.** Water is hauled to livestock from Manchester. We had two very short cuttings of alfalfa hay at **10 percent of average yield.** There will not be a 3rd cutting in many fields. The 4th of July we received .35 inch rain. **The Palmer Drought Index is off track once again.** The extreme drought leads much farther east than is shown on their map clear into Grant County. Kansas is receiving beneficial rains. As close as 15 miles north and east 2 inches of rain was recorded in Anthony, Kansas, and east of Anthony. **I would feed my cattle hay, if I had it or could afford to buy it.** - “Jack the Toad”

...but nothing particularly unusual in Alfalfa County compared to neighbors at first glance

The Indicators Told Different Stories

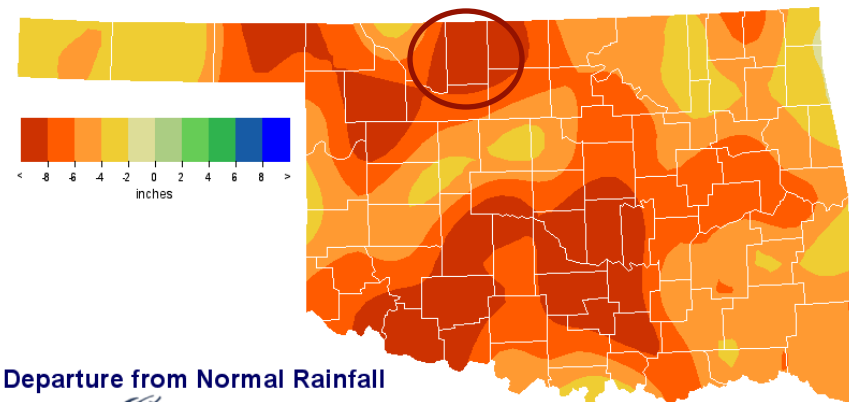


Departure from Normal Rainfall

Oklahoma Climatological Survey Web Request
Apr 20, 2006 through Jul 18, 2006
Copyright (c) 2007 Oklahoma Climatological Survey
All rights reserved. Rainfall data collected by Oklahoma Mesonet
map created 09:30 CD T Mon 4, 2007

The short-term
didn't look so bad

But the long-term
revealed underlying
problems



Departure from Normal Rainfall

Oklahoma Climatological Survey Web Request
Jan 1, 2006 through Jul 18, 2006
Copyright (c) 2007 Oklahoma Climatological Survey
All rights reserved. Rainfall data collected by Oklahoma Mesonet
map created 09:30 CD T Mon 4, 2007

Set off Discussion

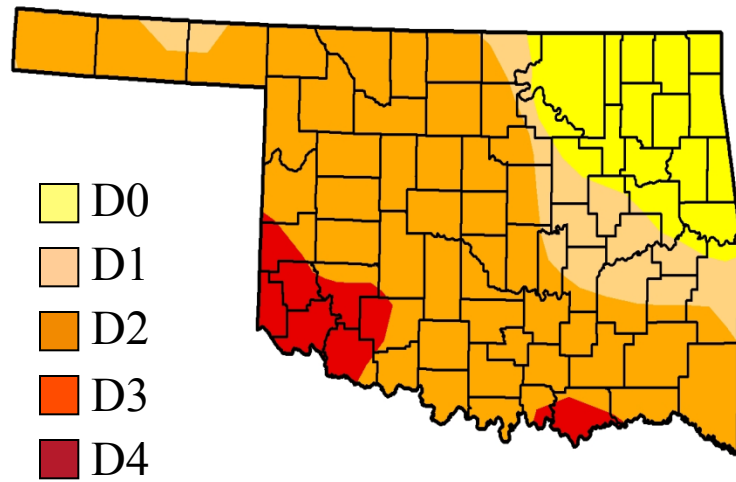


I often don't do such large, drastic changes but the last couple of weeks have made me think **we need to step this up** - that our precip-based indicators just aren't keeping up with impacts.

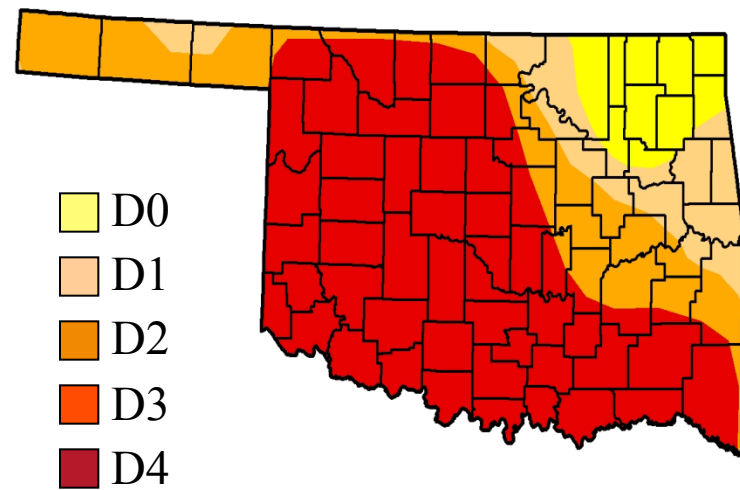
It shows a rapidly deteriorating conditions pretty much statewide. With more 100s on the way, any moisture that's left in the soil is getting sucked out quickly. **I'm giving up on rainfall as an indicator of drought** - it just doesn't last long enough now to make a difference.

And the most telling indicator of all - there are fewer campaign signs around this year even though we have some very contested races. It's tough to put those in the ground (especially the big signs).

We Listened!



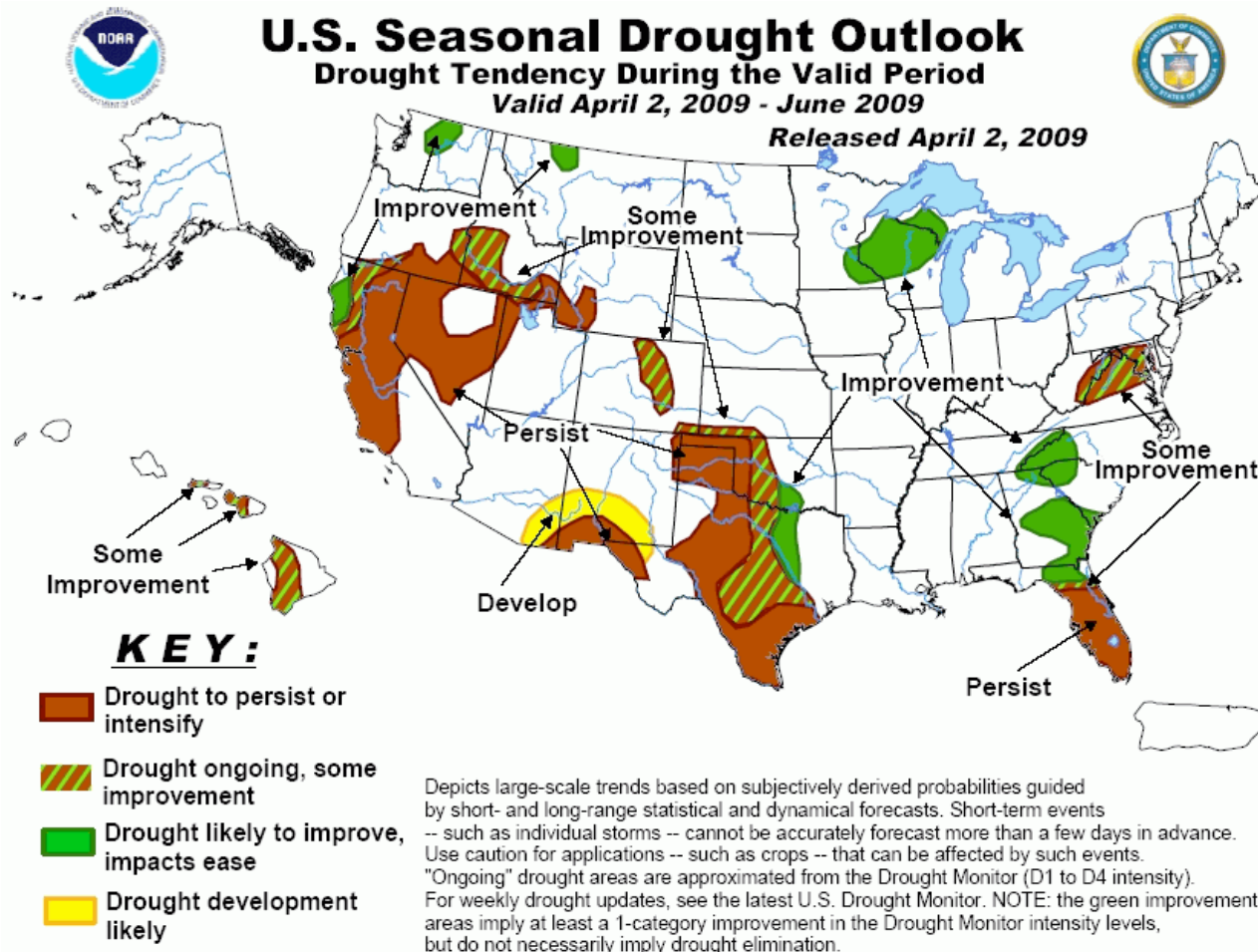
July 18, 2006



July 25, 2006

NIDIS Drought Portal

Drought Outlook



What Does the Drought Outlook Tell Us?

- Shows expected changes from current Drought Monitor (D1-D4)
 - ▣ Essentially a 3-month forecast
- Large-scale trends
 - ▣ Seasonal forecasts usually lack skill on small scales
 - ▣ Does not forecast impacts of a single event
- Subjective, based on models
- Forecasted development based on areas already depicted as abnormally dry (D0)
- Improvement may just be one category
 - ▣ Not necessarily elimination of drought

NIDIS Drought Portal

<http://www.drought.gov>

The screenshot shows the NIDIS U.S. Drought Portal website. At the top, there is a navigation bar with links for HOME, WHAT IS NIDIS?, CURRENT DROUGHT, FORECASTING, IMPACTS, PLANNING, EDUCATION, RESEARCH, and LOCAL FORECAST: City, State or Zip. The main content area is divided into several sections:

- Area Drought Information:** Includes dropdown menus for "Select State..." and "Select Region..." with "Go" buttons.
- Maps & Tools:** A red box highlights this section, containing links for "Map Viewer - updated!", "GIS Resources", and "Geodata Portal".
- Events & Announcements:** A list of recent events, including "Climate Reference Network Soil Moisture Meeting - March 2009" and "Monitoring Gaps Assessment Workshop - December 2008".
- Drought In The News:** A list of news articles, such as "House approves special spending to fight wildfires - Sacramento Bee" and "Sierra forests targeted for beetle treatment - Sacramento News".
- Featured Products:** Includes links for "Where are Drought Conditions Now?", "How is the Drought Affecting Me?", and "Will the Drought Continue?".
- U.S. Drought Monitor:** A map of the United States showing drought severity levels as of March 24, 2009. A legend indicates intensity levels from D0 (Abnormally Dry) to D4 (Exceptional). A red box highlights this section.
- Drought Conditions:** A pie chart showing the percentage area for U.S. states (including AK, HI & PR) as of 3.24.2009. The data is as follows:

Drought Classification	Percentage
None	0.52%
D0	1.08%
D1	5.2%
D2	15.5%
D3	25.6%
D4	52.0%
- Drought Information Statements:** A map of the United States with a red box highlighting a specific area. A red box also highlights this section.
- NIDIS Feature:** A section titled "Climate Change and Water Resources Management: A Federal Perspective" featuring a photo of a dam.
- US Streamflow Drought Conditions:** A map showing streamflow drought conditions as of March 31, 2009.

Drought Information Statements

Feature Story / Report

Map Viewer

NIDIS Drought Portal

Map Viewer

drought.gov > Map Viewer

Map Viewer

Select Drought Monitor Date | Zoom to Area | Zoom to Basin

Base Map & Layer Selector

- Check Layers to Activate
 - BaseMap
 - Monitoring
 - Precipitation
 - Precipitation Index
 - Total Precip (7)
 - Total Precip (30)
 - MaxConDryDays(7)
 - MaxConDryDays(30)
 - USSPI
 - NEXRAD
 - Precip-Daily-Anom
 - Precip-Daily-Total
 - Precip-Monthly-Anom
 - Precip-Monthly-Total
 - Precip-Monthly-Perc
 - Obs Precip
 - Indicators
 - Temperature
 - Remote Sensing
 - Hydrologic
 - Evaporation
 - Run Off
 - Soil Moisture
 - Impacts
 - Boundaries

Transparency Controls

Drought Monitor: 0% | NEXRAD: 0% | States: 0%

For more advanced GIS features, refer to [NOAA's Weather and Climate Toolkit](#) - (Launch Now).
For Drought Monitor KML (Google Earth) and GIS data download, refer to [NDMC Data Download](#).

NIDIS Drought Portal

<http://www.drought.gov>

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- Area Drought Information:** Includes dropdown menus for "Select State..." and "Select Region..." with "Go" buttons.
- Maps & Tools:** Lists "Map Viewer - updated!", "GIS Resources", and "Geodata Portal".
- Events & Announcements:** A list of recent events, including "Climate Reference Network Soil Moisture Meeting - March 2009", "Monitoring Gaps Assessment Workshop - December 2008", "Wildfire: National Seasonal Assessment Workshop - February 2009", "National Hydrologic Warning Council - May 2009", and "Remote Sensing Workshop - February 2008 (Updated Summary)".
- Drought In The News:** A list of news articles, such as "House approves special spending to fight wildfires - Sacramento Bee", "Sierra forests targeted for beetle treatment - Sacramento News", "Storms allow slight boost in federal water supply - Sacramento News", "NOAA - Major Midwest Flooding Highlighted in U.S. Spring Outlook", "Drought grips Texas cattle country - USATODAY.com", "Western States Water - Weekly Newsletter of the Western States Water Council", and "Drought a \$1 billion disaster in Texas - USATODAY.com".
- Featured Products:** Includes links for "Where are Drought Conditions Now?", "How is the Drought Affecting Me?", and "Will the Drought Continue?".
- U.S. Drought Monitor:** A map of the United States showing drought conditions as of March 24, 2009. The map is color-coded by intensity (D0 to D4) and includes a legend. A legend for "Drought Impact Types" is also provided, with symbols for Agricultural (A), Hydrological (H), and Delineates dominant impacts.
- Drought Conditions:** A pie chart showing the percentage area for U.S., including AK, HI & PR (As of 3.24.2009). The data is as follows:

Drought Classification	Percentage
None	52.09%
D0	25.61%
D1	15.55%
D2	5.2%
D3	1.08%
D4	0.52%
- Drought Information Statements:** A map of the United States with a highlighted area in the West, and a legend for "Drought Information Statements".
- US Streamflow Drought Conditions:** A map of the United States showing streamflow drought conditions as of March 31, 2009.

What about Oklahoma?

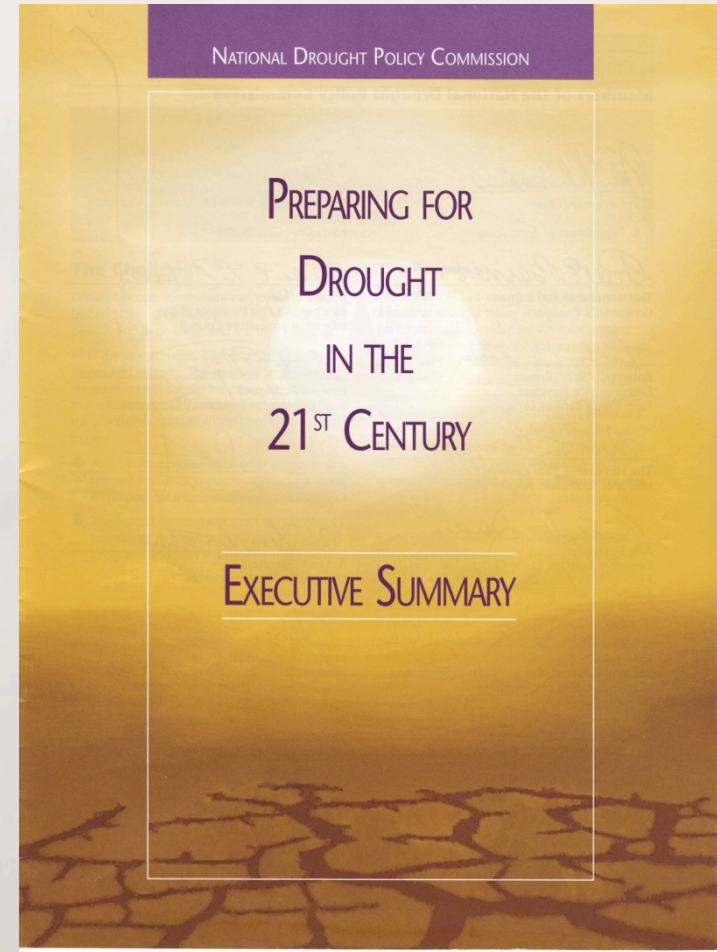
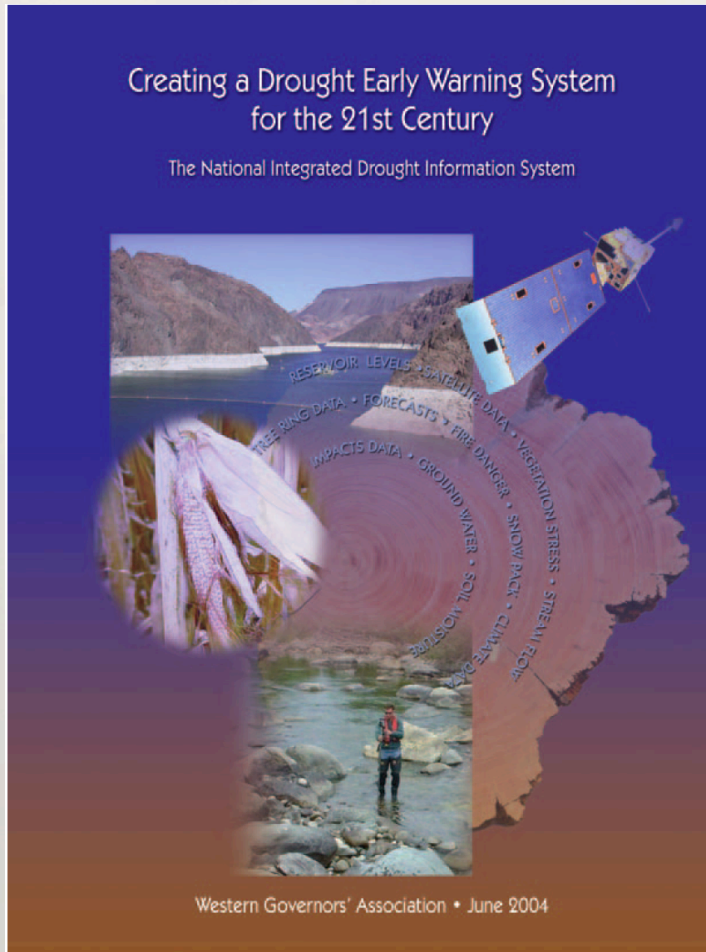
Tell me more!

I really, really want to know details

The logo consists of a solid orange square on the left and a blue rectangle on the right. The word "NIDIS" is written in white, uppercase, sans-serif font within the blue rectangle.

NIDIS

The Future of Drought?



NIDIS VISION and GOALS



“A dynamic and accessible drought information system that provides users with the ability to determine the potential impacts of drought and the associated risks they bring, and the decision support tools needed to better prepare for and mitigate the effects of drought.”

Public Law 109-430 (Signed by the President December 2006)

NIDIS Objectives

Creating a drought early warning information system

- Coordinating national drought monitoring and forecasting systems
- Providing an interactive drought information clearinghouse and delivery system for products and services—including an internet portal and standardized products (databases, forecasts, Geographic Information Systems (GIS), maps, etc)
- Designing mechanisms for improving and incorporating information to support coordinated preparedness and planning

Drought Information: NIDIS Early Warning (sub)Systems

- *Monitoring and forecasting subsystem*

National, regional and local levels

- *Risk assessment sub-system*

Enable disaster management authorities to generate risk and impact scenarios, trigger and tools development

- *Preparedness sub-system*

Outline and inform and coordinate actions required to reduce the loss and damage expected from an impending event and for post-event planning

NIDIS Pilot Projects

The National Integrated Drought Information System (NIDIS) envisions several pilot projects, one of which will be Oklahoma/Missouri (2010 or later)

Goals of the Pilots:

- ✧ *Facilitate development of a drought coordinator network*
- ✧ *Coordinate collaborative development of critical indicators and triggers*
- ✧ *Help secure funding, develop evaluation criteria, and conduct post-drought assessments*
- ✧ *Drought exercises or drought simulations for risk scenarios and generation of alternative options*
- ✧ *Facilitate the improvement of organizational networks*



NIDIS Pilots

Upper Colorado River Basin

Water management issues in a region with growing demand

Arid region with long-term climate change threats

Multi-year droughts recent occurrences (ongoing)

First Pilot, launched in 2008

- Federal Planning Meeting - NIDIS Pilot for the Colorado River Basin, Salt Lake City UT, **May 2008**
- Scoping Workshop for the Upper Colorado River Basin NIDIS Pilot, Boulder CO, **October 2008**



NIDIS Pilots

Southeast U.S.

Institutional issues governing water management across state boundaries

Southeast US Drought Workshop (Peachtree City, GA, April 2008)

- ✧ Overview of Federal Drought Products
- ✧ Overview of State Plans and Triggers: What Works & What is Needed
- ✧ Coastal and Estuarine Issues and Drought
- ✧ Current Long Range Forecast from NOAA

Status: Fall 2009 scoping workshop

NIDIS Feature



[view details](#) ▶

NIDIS Pilots

Oklahoma / Missouri

Transition area between semi-arid (west) to abundant precipitation (east)

Rain-fed agriculture, aquifers, small reservoirs

Technology transfer issues

Surveys being conducted of drought management & communication

- ✧ How do they manage drought?
- ✧ What are their sources of information?
- ✧ How do they convey that information

Phase I – interviews of participants on drought management teams (partially completed)

Phase II – surveys of local water, agriculture, and emergency officials (Fall 2009)



NIDIS Pilots

Montana / Northern Plains

Tourism and Recreation

Farming and Ranching in a semi-arid area

Dependent upon rainfall, snowfall

Short-term rapid-onset drought

Trans-boundary issues (Canada)



Status: Pending

NIDIS Pilots

Chesapeake Bay

Densely-populated urban
environment

Multiple environmental stressors

Low water storage capacity

Water quality issues

Focus on instream flows

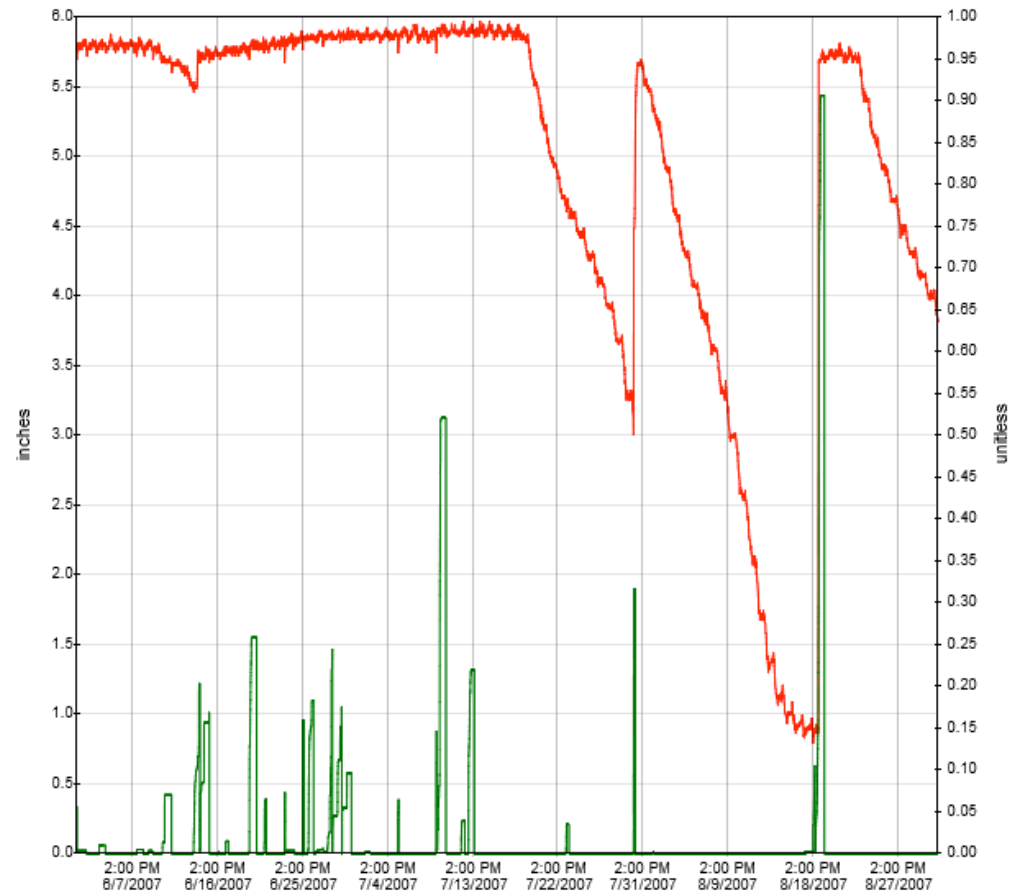
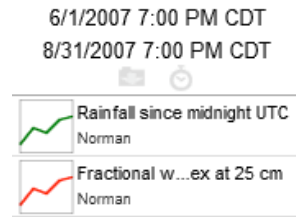


Status: Pending

SOME CLOSING THOUGHTS

Even the wet years have dry-downs

Soil Moisture
(10") & rainfall
for Norman,
OK; June-Aug
2007



Are Drought Designations Purely Objective?

SECRETARIAL DROUGHT DESIGNATIONS - CY2005
PRIMARY & CONTIGUOUS COUNTIES DESIGNATED BY THE SECRETARY - USDA
Unduplicated List as of 10/13/05 - through Designation No. S2142

