DROUGHT★MART:

Your One-Tool Drought Monitoring Super Store

Developing a New and Improved Drought Monitor for the U.S.

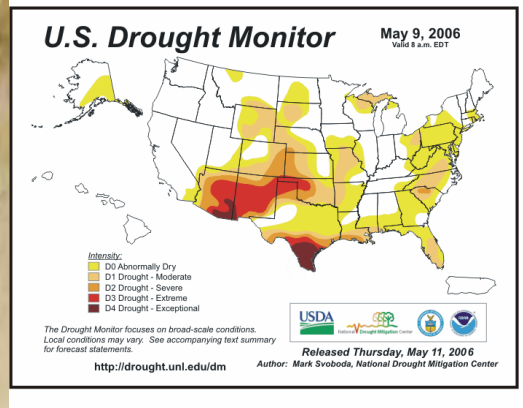
Brian Fuchs

National Drought Mitigation Center

University of Nebraska-Lincoln

USDA-RMA Workshop Bastrop, TX

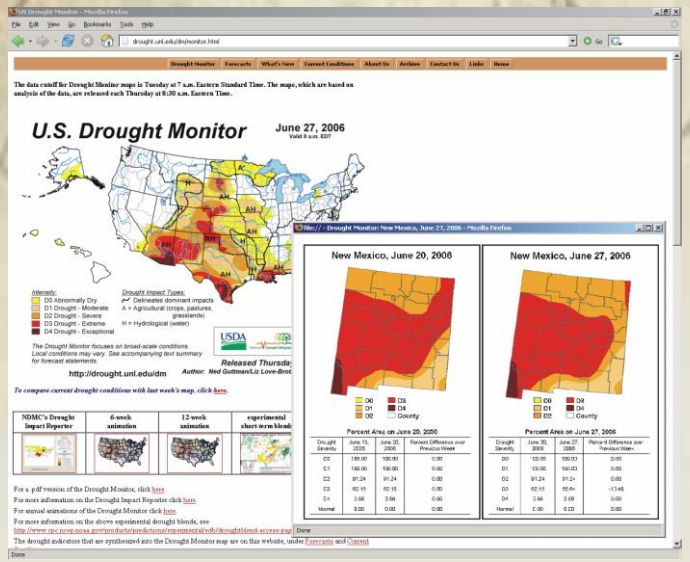
February 12, 2009



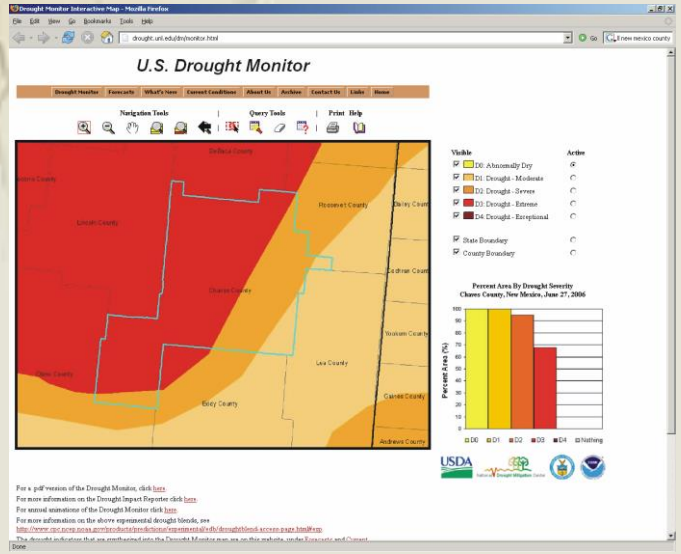
Drought Monitor Decision Support System (DM-DSS):

A Web-based Assessment Tool for Decision Makers

Mark Svoboda, Brian Fuchs, Dr. Michael Hayes, Dr. Jae Ryu, Soren Scott, and Ian Cottingham



Moving toward state-level trend analysis capabilities (left) and providing more county-level drought assessment information (right).



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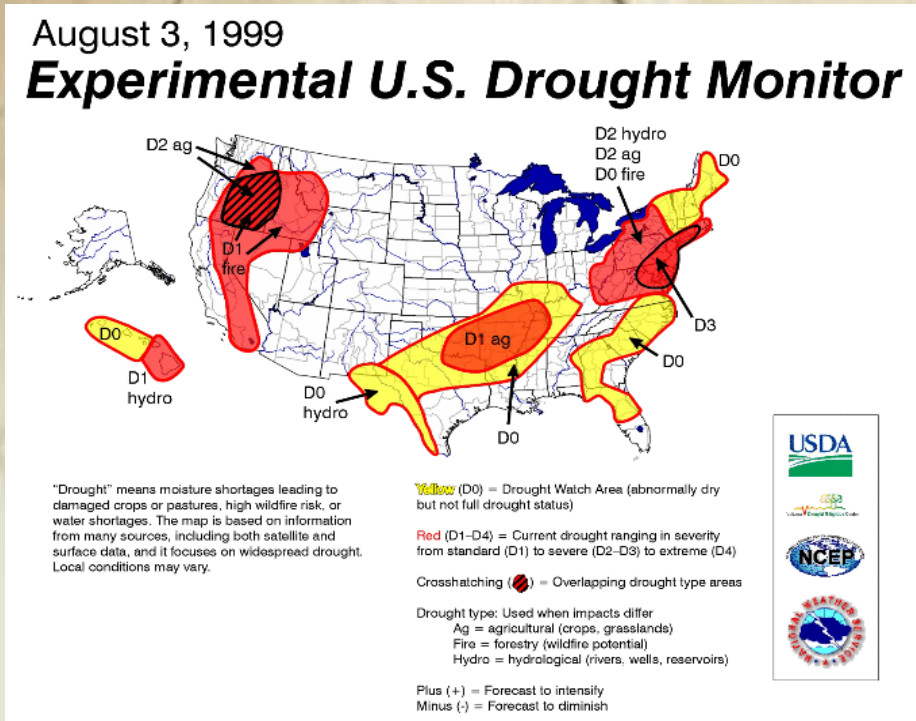
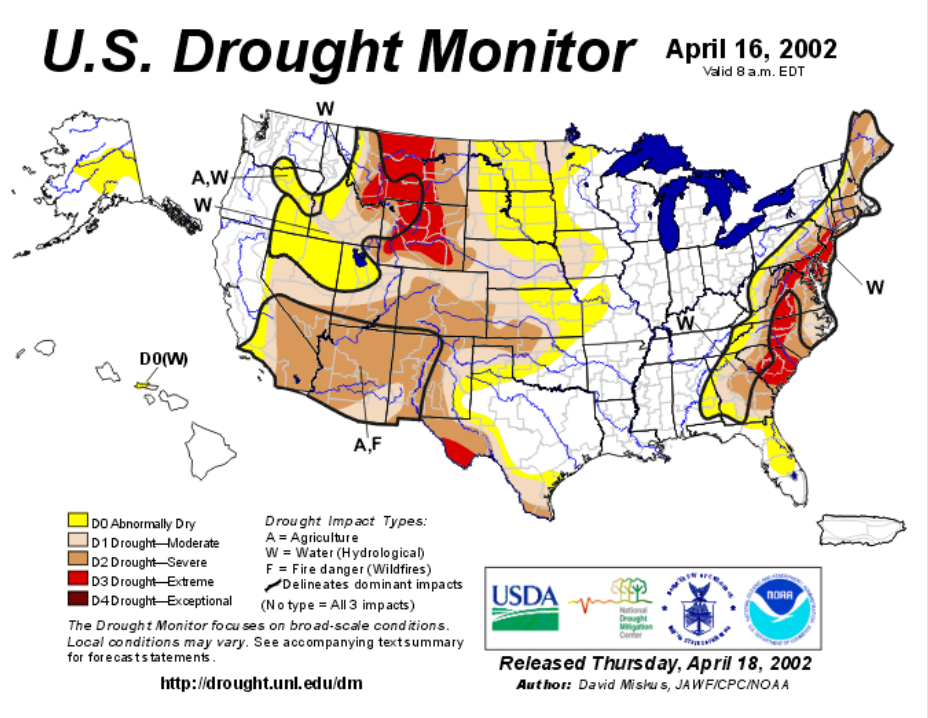
RMA

The U.S. Drought Monitor

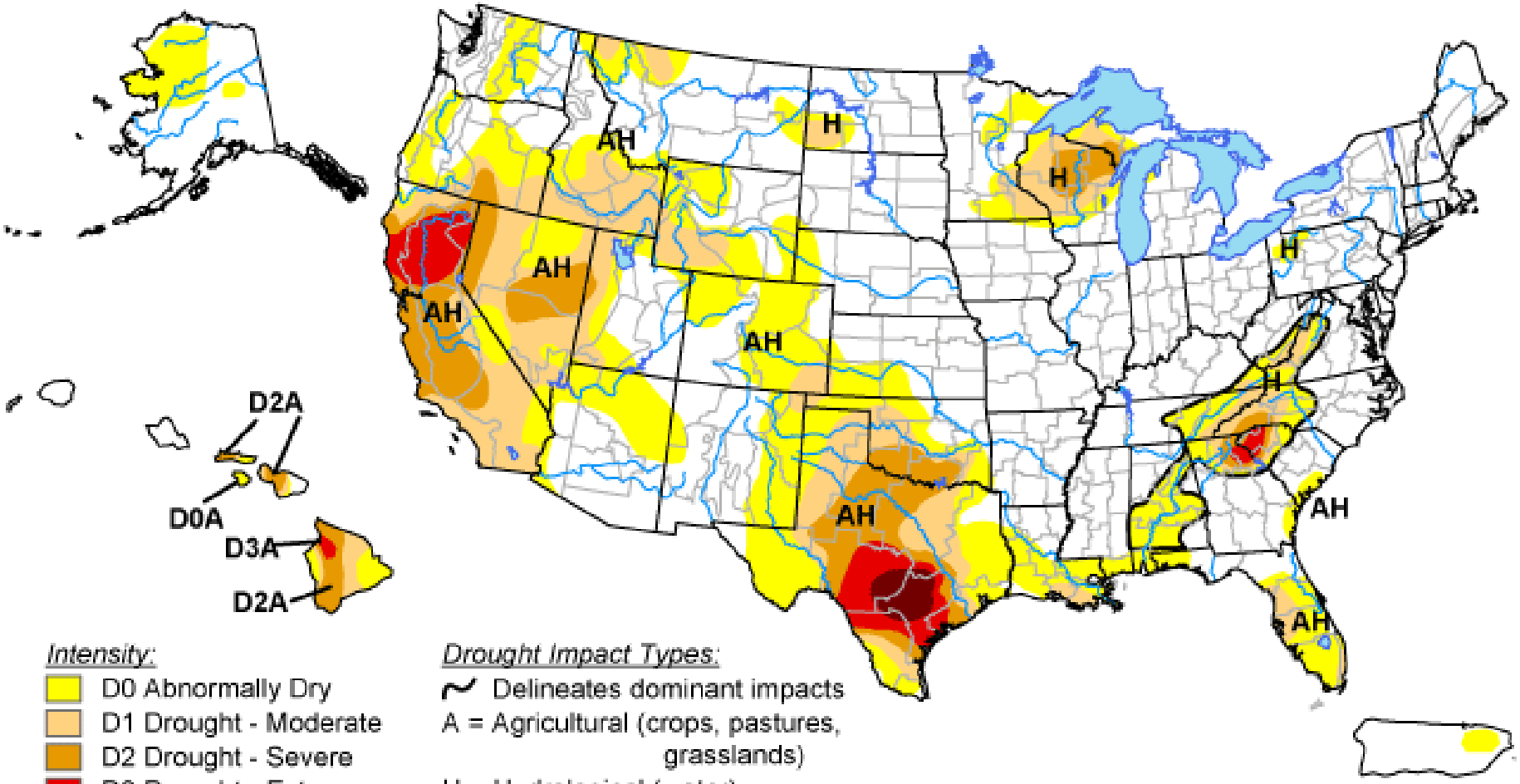
Since 1999, NOAA (CPC and NCDC), USDA, and the NDMC have produced a weekly composite drought map -- the U.S. Drought Monitor -- with input from numerous federal and non-federal partners





U.S. Drought Monitor

February 3, 2009
Valid 8 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 5, 2009

Author: Eric Luebehusen, U.S. Department of Agriculture

Do you currently use the United States Drought Monitor?

YES

NO

The Drought Monitor Concept

- A ***partnership*** between the NDMC, USDA and NOAA's CPC, NCDC, and RCC's (WRCC) ***(authors)***

- Incorporate relevant information and products from all entities (and levels of government) dealing with drought (RCC's, SC's, 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

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The Drought Monitor Concept

- A consolidation of indices and indicators into one comprehensive national drought map

- Trying to capture these characteristics:
  - the drought's magnitude (duration + intensity)
  - spatial extent
  - probability of occurrence
  - Impacts

- Rates drought intensity by **percentile ranks**

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Original Objectives

- **"Fujita-like"** scale
- ***NOT*** a forecast!
- ***NOT*** a drought declaration!
- Identify **impacts** (A, H)
- Assessment of **current** conditions
- Incorporate **local expert** input
- Be as **objective** as possible

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U.S. Drought Monitor Map

Drought Intensity Categories

D0 **Abnormally Dry (30%tile)**

D1 Drought – **Moderate (20%tile)**

D2 Drought – **Severe (10%tile)**

D3 Drought – **Extreme (5%tile)**

D4 Drought – **Exceptional (2%tile)**

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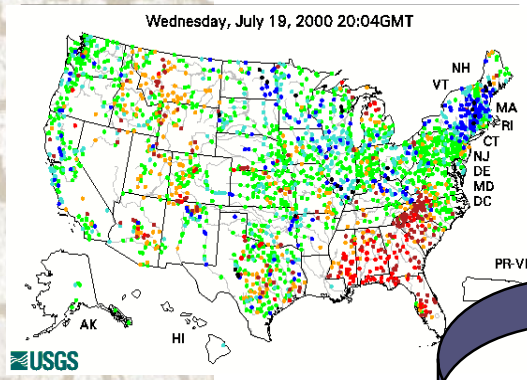
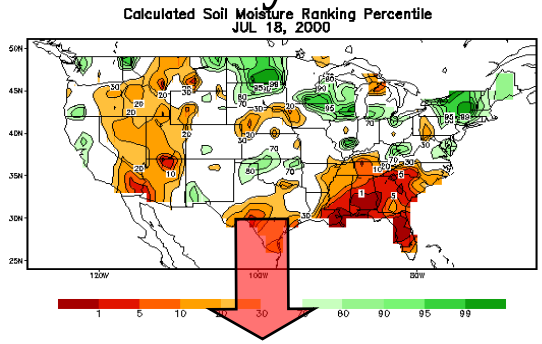
Principal Drought Monitor Inputs

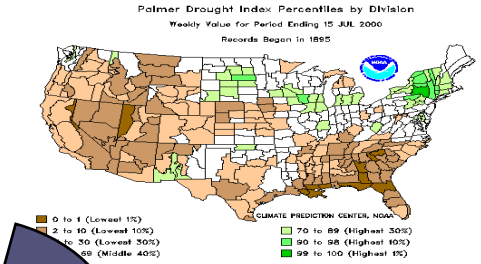
USGS Streamflow

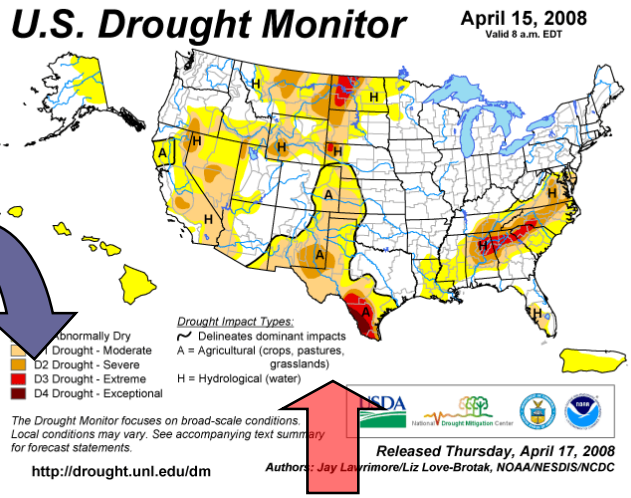


CPC Daily Soil Model

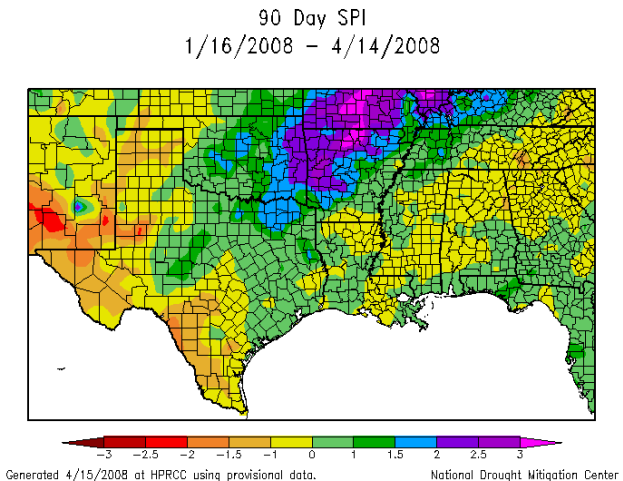


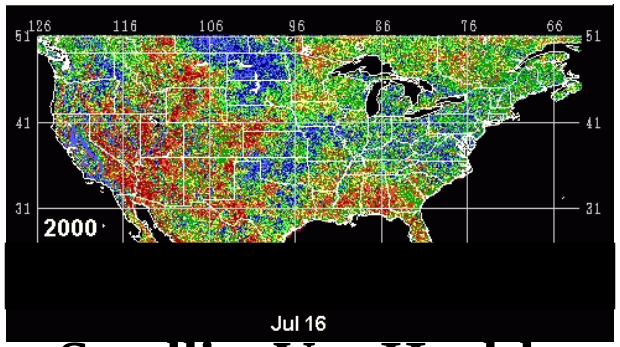
Palmer Drought Index





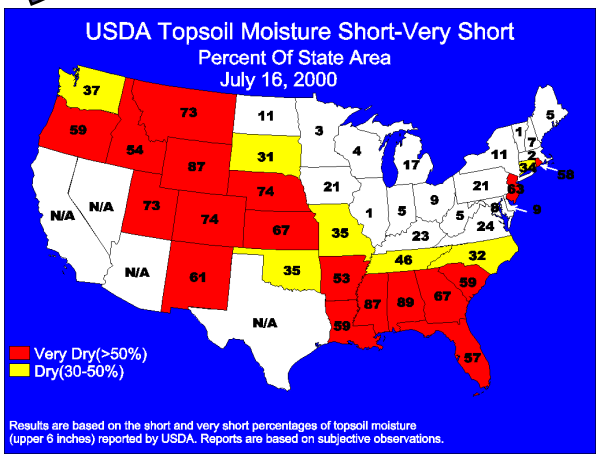
SPI Drought Index





Satellite Veg Health

USDA Soil Ratings



U.S. Drought Monitor

Integrates Key Drought Indicators:

- Palmer Drought Index
- SPI
- KBDI
- Modeled Soil Moisture
- 7-Day Avg. Streamflow
- Precipitation Anomalies

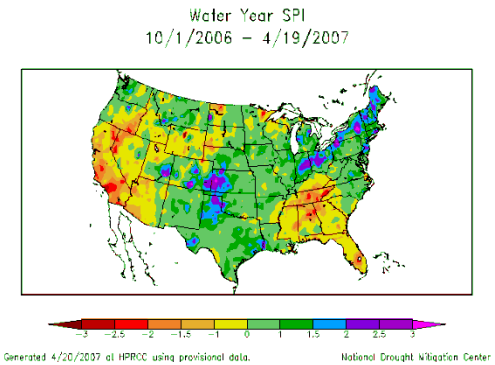
Growing Season:

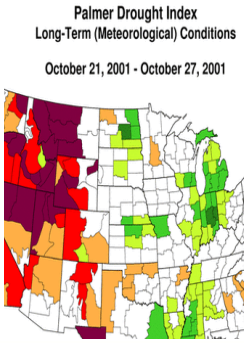
- Crop Moisture Index
- Sat. Veg. Health Index
- Soil Moisture
- Mesonet data

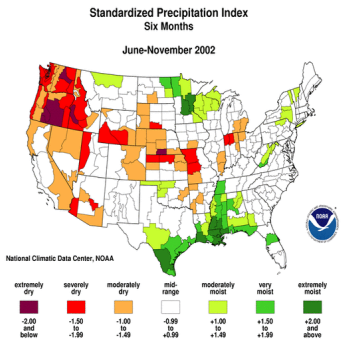
In The West:

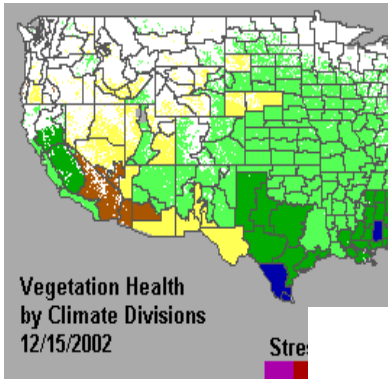
- SWSI
- Reservoir levels
- Snowpack
- Streamflow

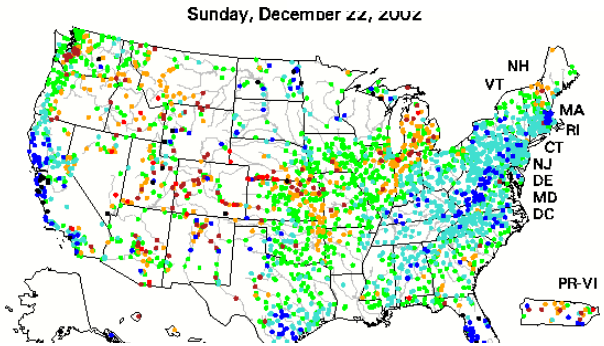
Created in ArcGIS

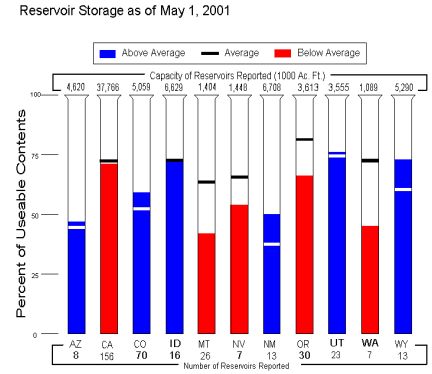


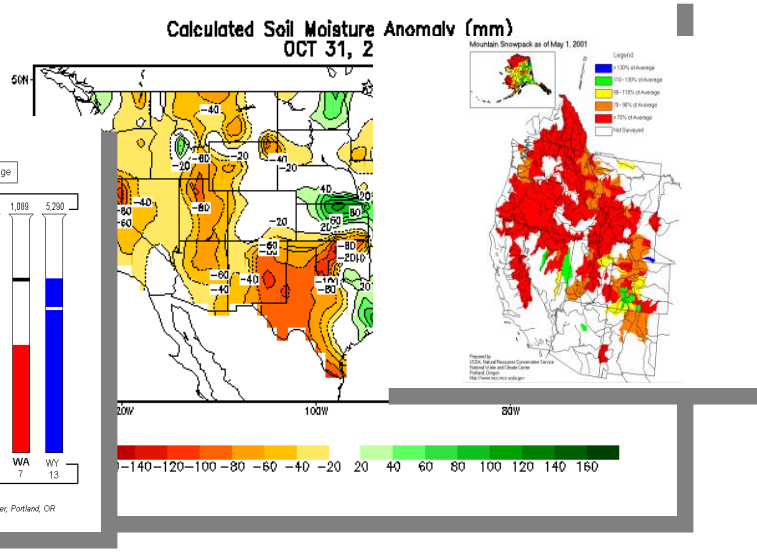












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Monitor Development *(Period starts 12Z last Tuesday)*

Monday **(5 Days available)**

- ✓Draft map sent to local experts

Tuesday **(6 Days available)**

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

Wednesday **(7 Days available; ending 12Z yesterday)**

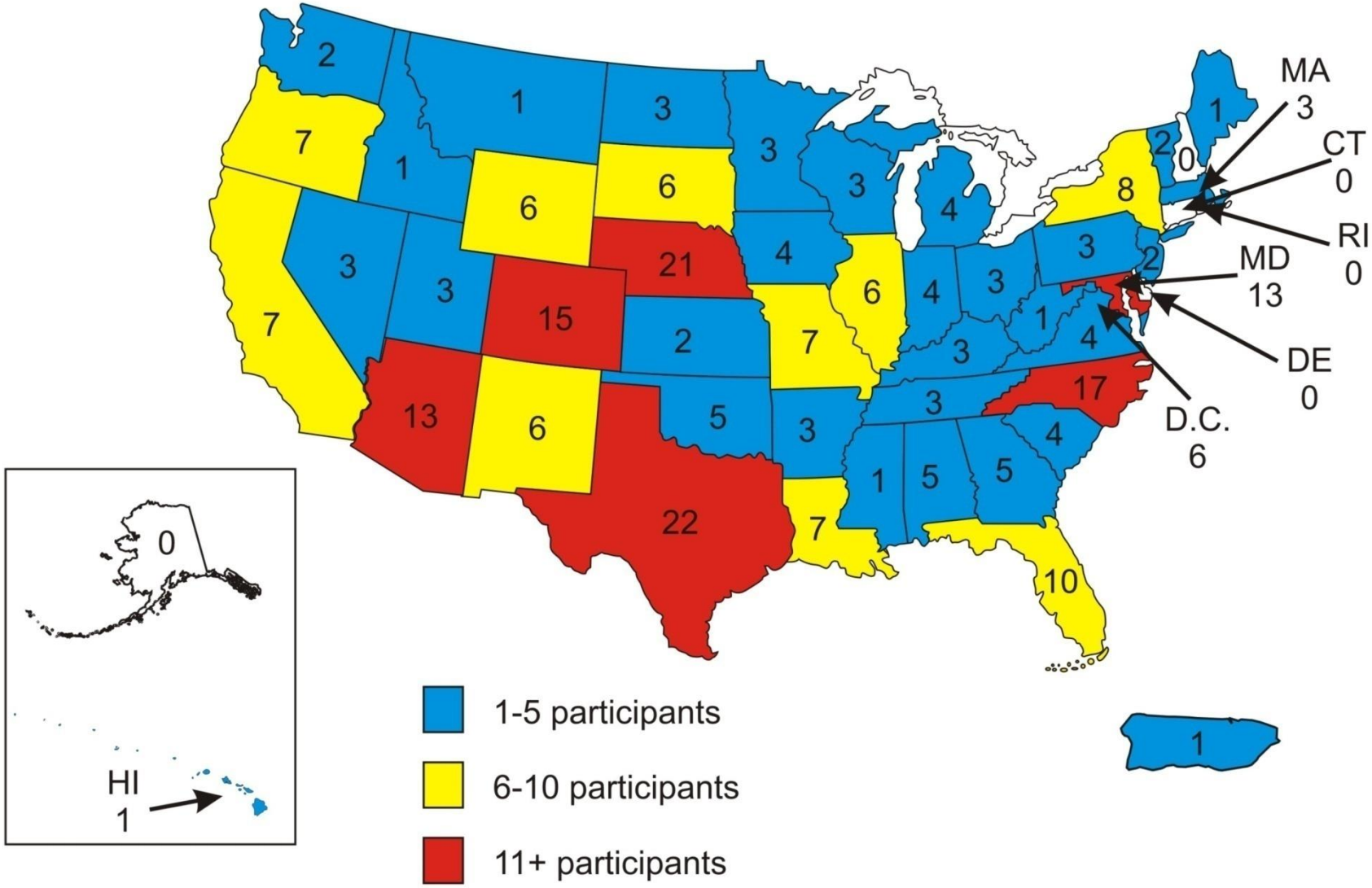
- ✓ Local expert feedback
- ✓ Draft map(s) sent to local experts
- ✓ Draft text(s) sent to local experts (Outlook)
- ✓ Final map and text sent to secured ftp server

Thursday

- ✓Final map & text released on NDMC Website

USDM Listserve Subscribers

(as of February 2, 2009)



Total: 260 (does not include 2 participants from unknown locations and 1 participant from Canada)

USDM Listserve Subscribers

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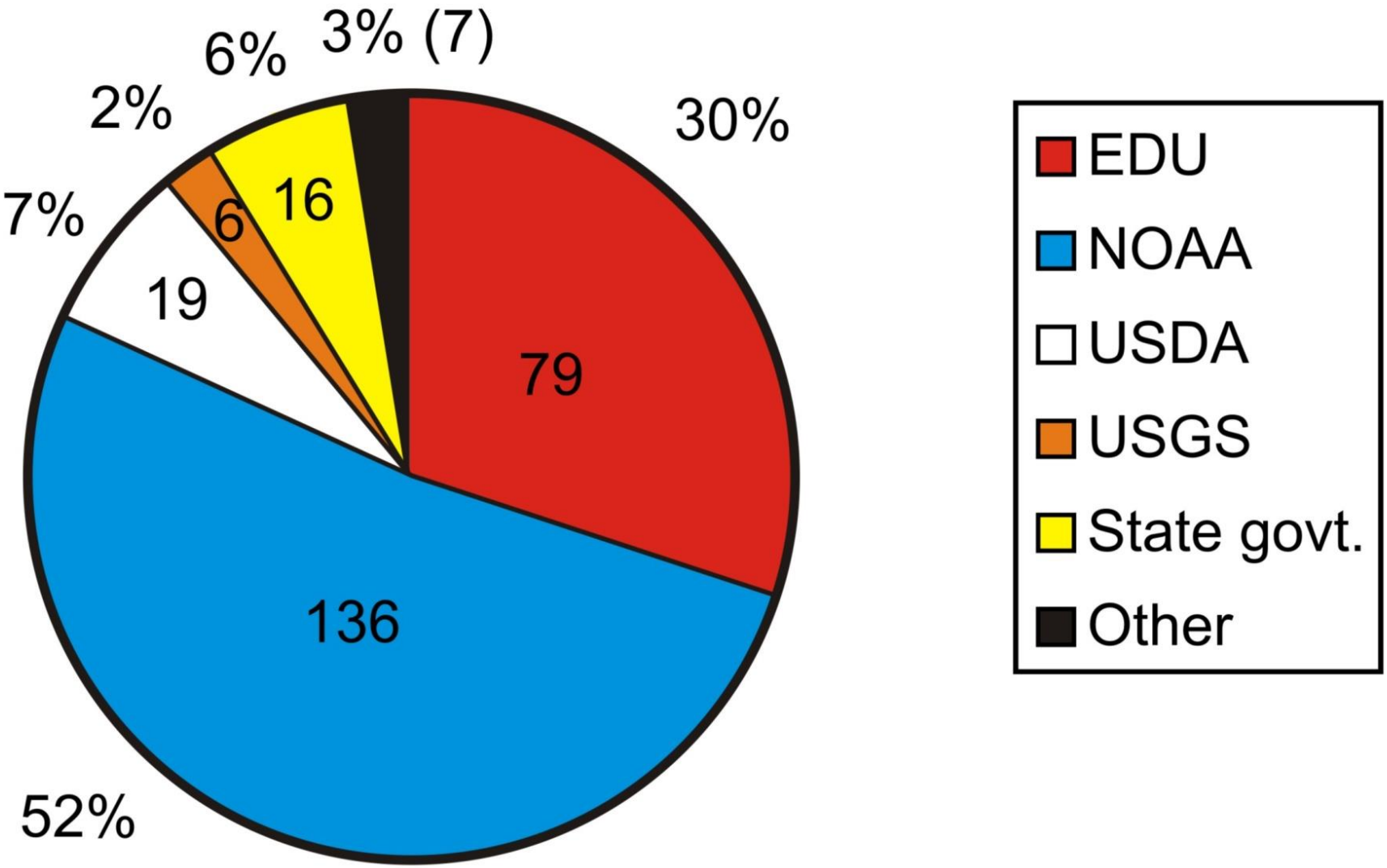

http://drought.unl.edu/dm/monitor.html

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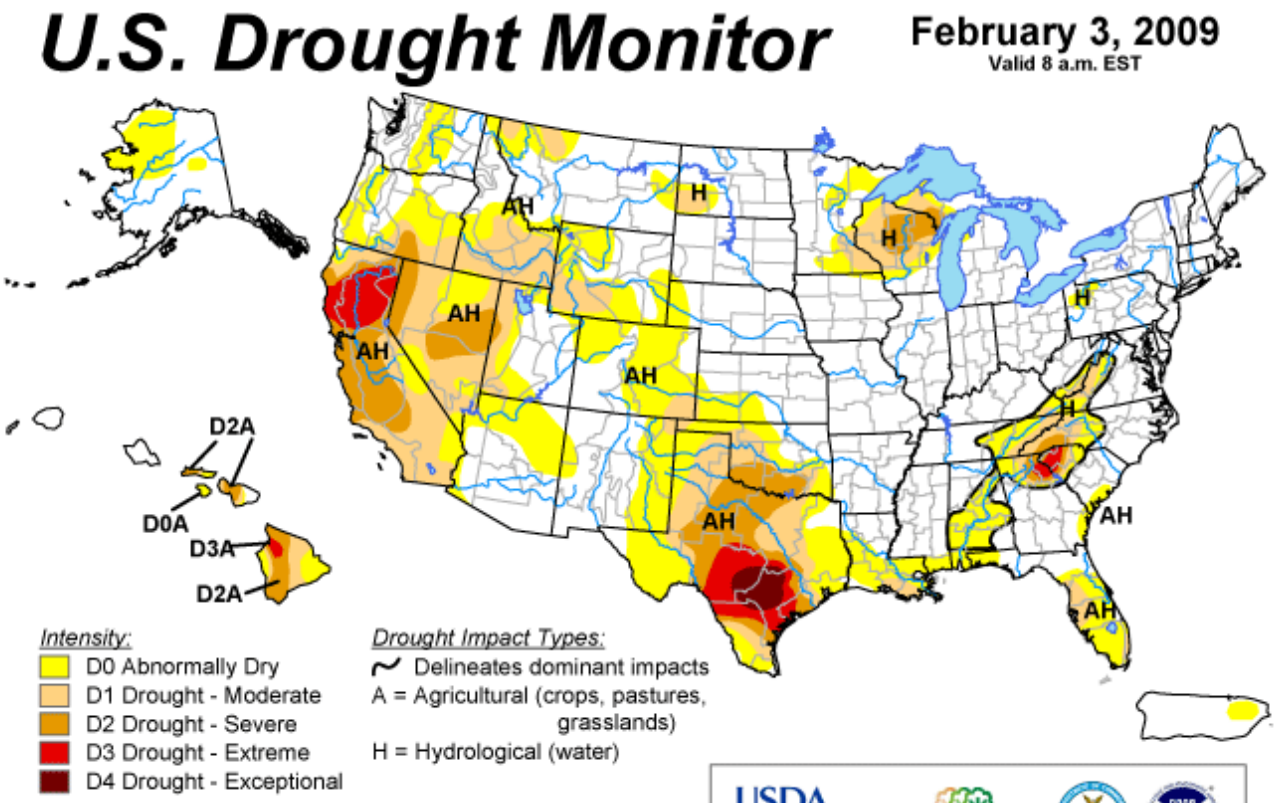
Visit the NDMC Photo Gallery to see photos of drought conditions in California, Georgia, South Carolina, and other states. If you have photos showing drought conditions, please consider submitting them to the Photo Gallery.

The data cutoff for Drought Monitor maps is Tuesday at 7 a.m. Eastern Standard Time. The maps, which are based on analysis of the data, are released each Thursday at 8:30 a.m. Eastern Time.

NOTE: To view regional drought conditions, click on map below. State maps can be accessed from regional maps.



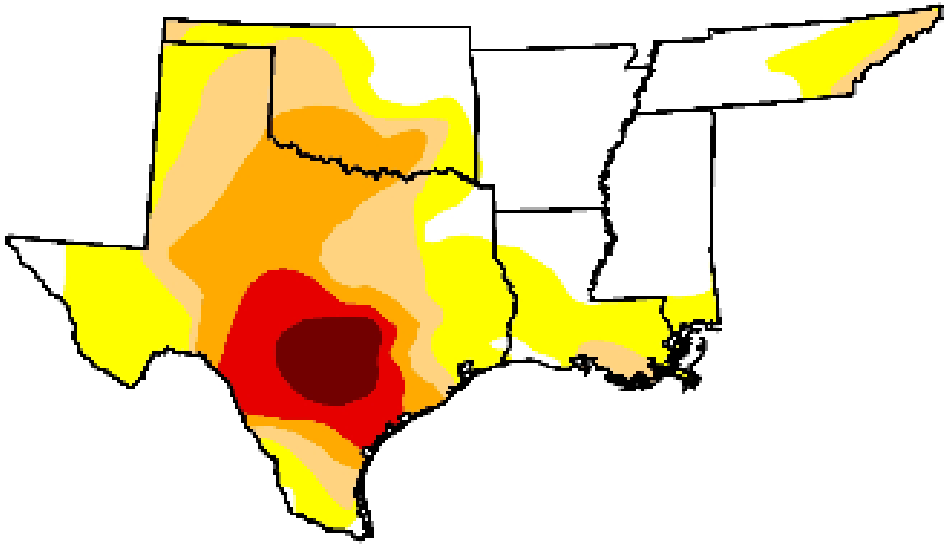
U.S. Drought Monitor

South

February 3, 2009
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	32.2	67.8	41.6	24.4	9.9	3.4
Last Week (01/27/2009 map)	32.6	67.4	38.1	20.6	8.3	2.1
3 Months Ago (11/11/2008 map)	67.1	32.9	16.5	11.1	5.2	0.0
Start of Calendar Year (01/06/2009 map)	54.4	45.6	18.0	8.0	4.6	2.1
Start of Water Year (10/07/2008 map)	73.3	26.7	17.3	10.7	2.9	0.0
One Year Ago (02/05/2008 map)	31.9	68.1	21.9	7.4	2.9	1.5



Intensity:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
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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 5, 2009

Author: Eric Luebehusen, U.S. Department of Agriculture

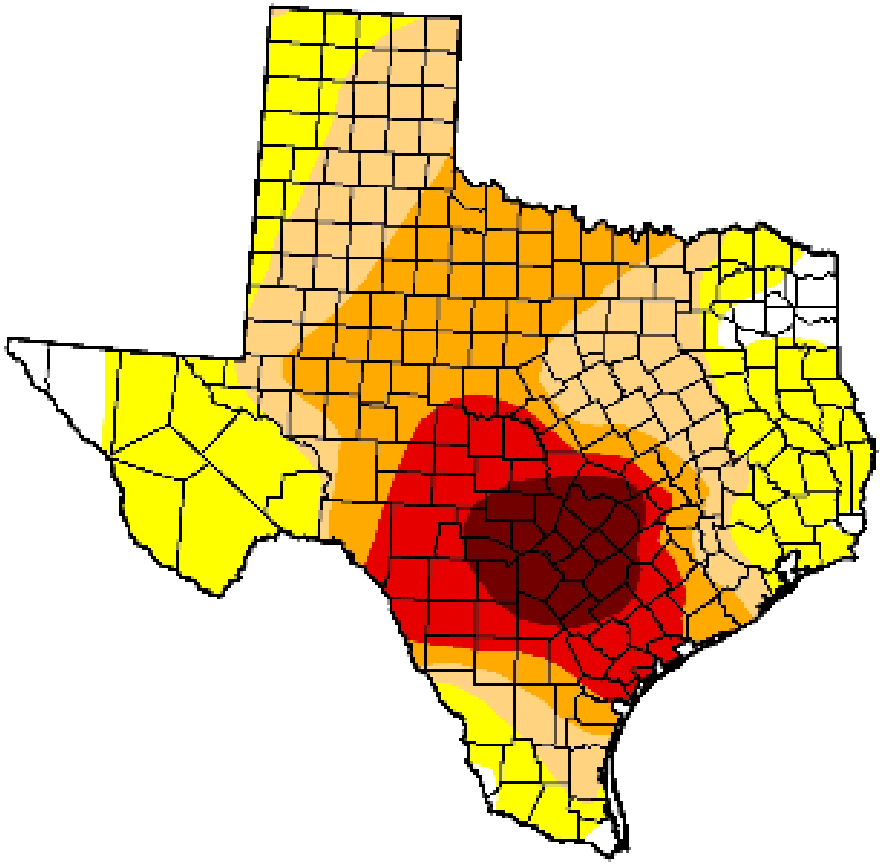
U.S. Drought Monitor

Texas

February 3, 2009
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	4.6	95.4	66.8	42.6	19.6	6.7
Last Week (01/27/2009 map)	11.6	88.4	62.1	37.5	16.5	4.2
3 Months Ago (11/11/2008 map)	59.2	40.8	22.4	14.5	6.8	0.0
Start of Calendar Year (01/06/2009 map)	41.7	58.3	24.5	15.0	9.1	4.2
Start of Water Year (10/07/2008 map)	67.2	32.8	20.5	11.0	3.6	0.0
One Year Ago (02/05/2008 map)	17.1	82.9	29.4	5.9	0.0	0.0



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

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Drought Monitor Archives

Maps | Tables | 1999 Archive | GIS Data

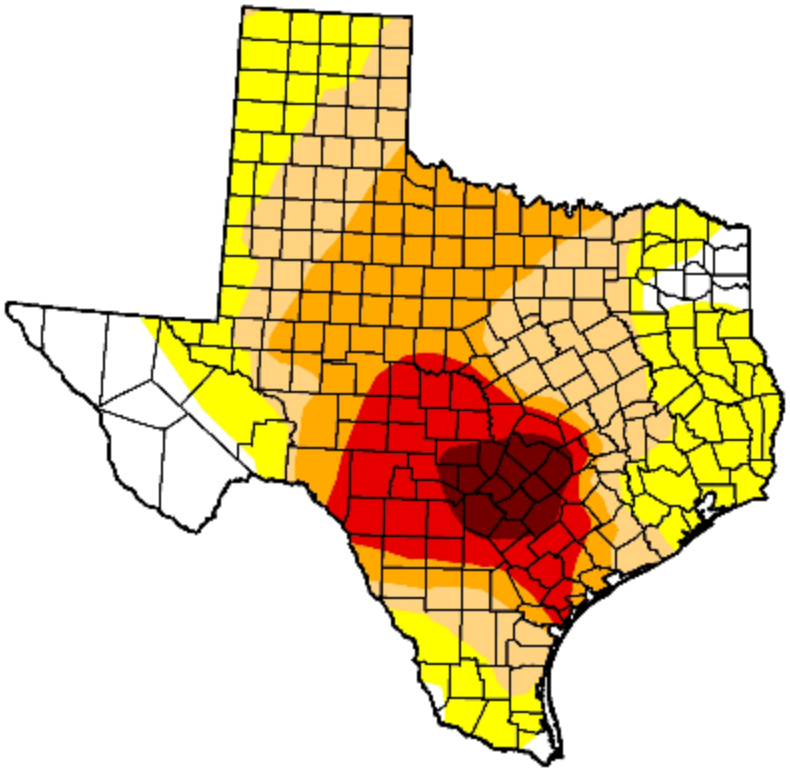
Select an area and click the 'Update' button to view the archive.

Contiguous United States Region Northeast State Texas Update

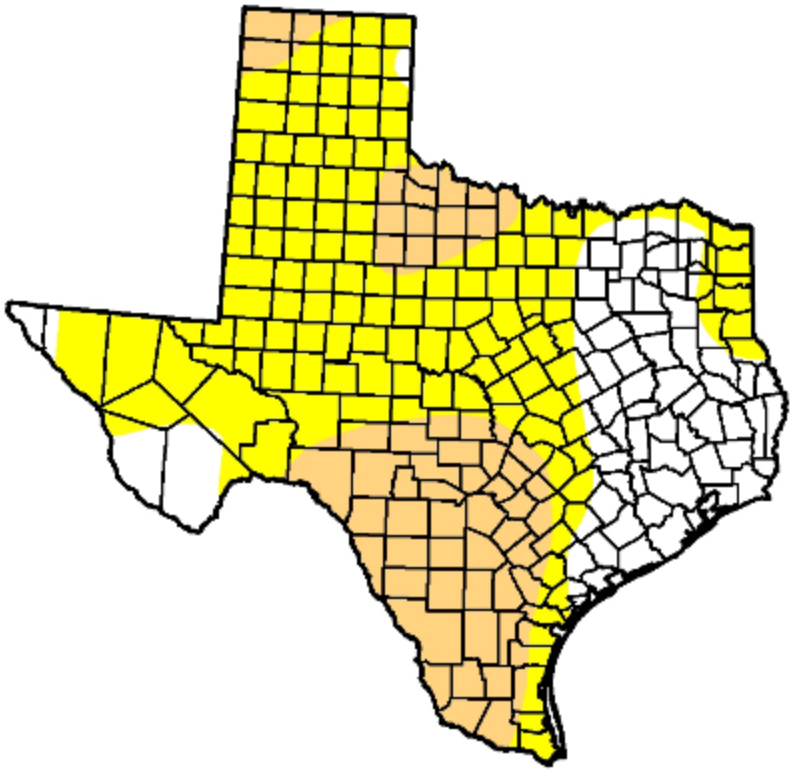
Drought Severity

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

January 27, 2009



January 29, 2008



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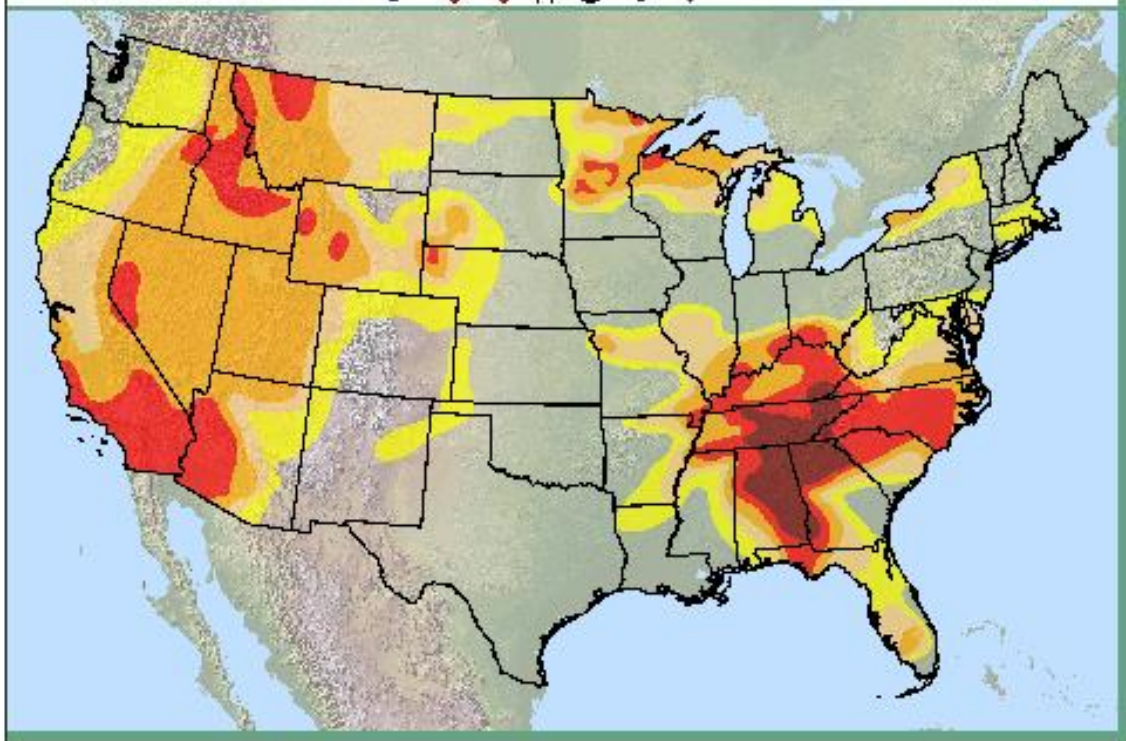
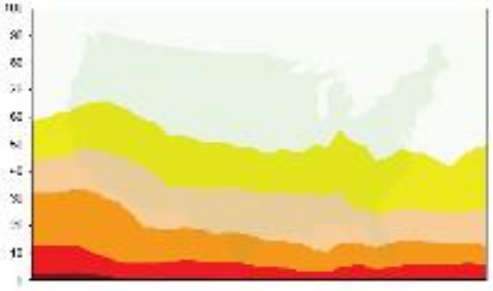


Continental United States | Alaska | Hawaii | Puerto Rico

Drought Conditions: 2007



Date	Nothing	D0	D1	D2	D3	D4
Sept. 18, 2007	41.4	58.6	49.5	32.88	1.25	1.51
Sept. 11, 2007	40.4	59.6	44.45	32.1	1.31	1.82
Sept. 4, 2007	39.40	61.62	45.47	32.33	1.17	2.4
Aug. 28, 2007	38.77	61.94	46.27	33.1	1.01	2.77
Aug. 21, 2007	35.76	64.6	46.24	33.79	1.5	2.97
Aug. 14, 2007	35.79	65.21	46.17	32.86	1.01	2.97
Aug. 7, 2007	35.64	65.17	46.15	33.01	1.35	1.52
July 31, 2007	35.95	64.05	46.1	33.74	1.79	2.66
July 24, 2007	37.53	62.47	45.74	34.83	1.31	0.4
July 17, 2007	41.16	58.84	45.1	34.21	1.11	1.1
July 10, 2007	41.26	58.74	45.4	34.4	1.23	1.51
July 3, 2007	48.17	52.83	44.54	34.62	1.09	1.77
June 26, 2007	46.43	53.58	44.34	34.08	1.36	1.92
June 19, 2007	47.47	52.6	44.17	34.05	1.01	1
June 12, 2007	49.43	51.57	43.4	34.30	1.11	1.16

Legend

Visible

[-] Drought Monitor
- D0
- D1
- D2
- D3
- D4

Date

September 18, 2007

Transparency

60%

[-] ACIS Stations

[-] Climate Layers
- Standardized Precipitation Index
- Palmer Drought Severity Index
- ACIS Precipitation/Temperature Overlay
- NWS Hybrid Radar/Gauge Precipitation Analysis

[-] Select Boundaries
- Rivers
- Hydrologic Units (HUCs)
- Congressional Districts
- Climate Divisions
- Counties
- Cities
- Roads
- County Warning Areas
- States

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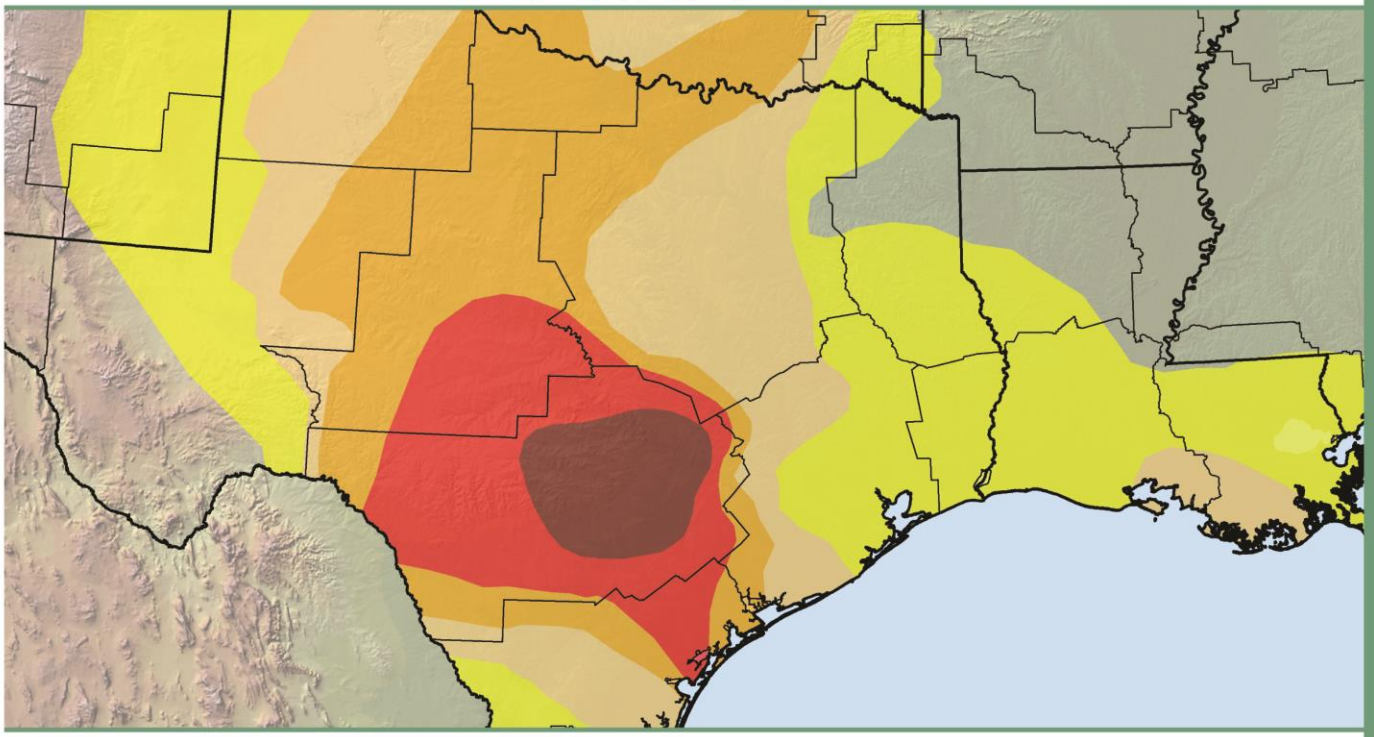

Continental United States | Alaska | Hawaii | Puerto Rico

Legend

Visible

[-] Drought Monitor
- D0
- D1
- D2
- D3
- D4

Date: January 27, 2009

Transparency: 40%

[-] ACIS Stations

[-] Climate Layers
- Standardized Precipitation Index
- Palmer Drought Severity Index

[-] Select Boundaries
- Rivers
- Hydrologic Units (HUCs)
- Congressional Districts
- Climate Divisions
- Counties
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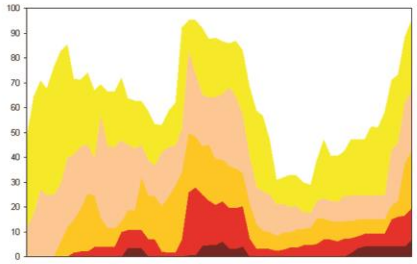
Drought Conditions: January 2008-January 2009



Week	Nothing	D0	D1	D2	D3	D4
January 27, 2009	11.61	88.39	62.14	37.54	16.48	4.15
January 20, 2009	26.86	73.14	45.84	22.22	16.04	4.15
January 13, 2009	28.95	71.05	43.02	20.59	15.05	4.15
January 6, 2009	41.67	58.33	24.52	14.96	9.07	4.15
December 30, 2008	48.06	51.94	24.52	14.96	9.07	4.15
December 23, 2008	47.65	52.35	24.56	14.96	9.07	4.15
December 16, 2008	52.90	47.10	24.56	14.96	9.07	4.15
December 9, 2008	52.90	47.10	24.56	14.96	8.12	3.20
December 2, 2008	53.01	46.99	24.54	14.23	7.46	1.25
November 25, 2008	57.82	42.18	24.25	14.23	7.13	0.00

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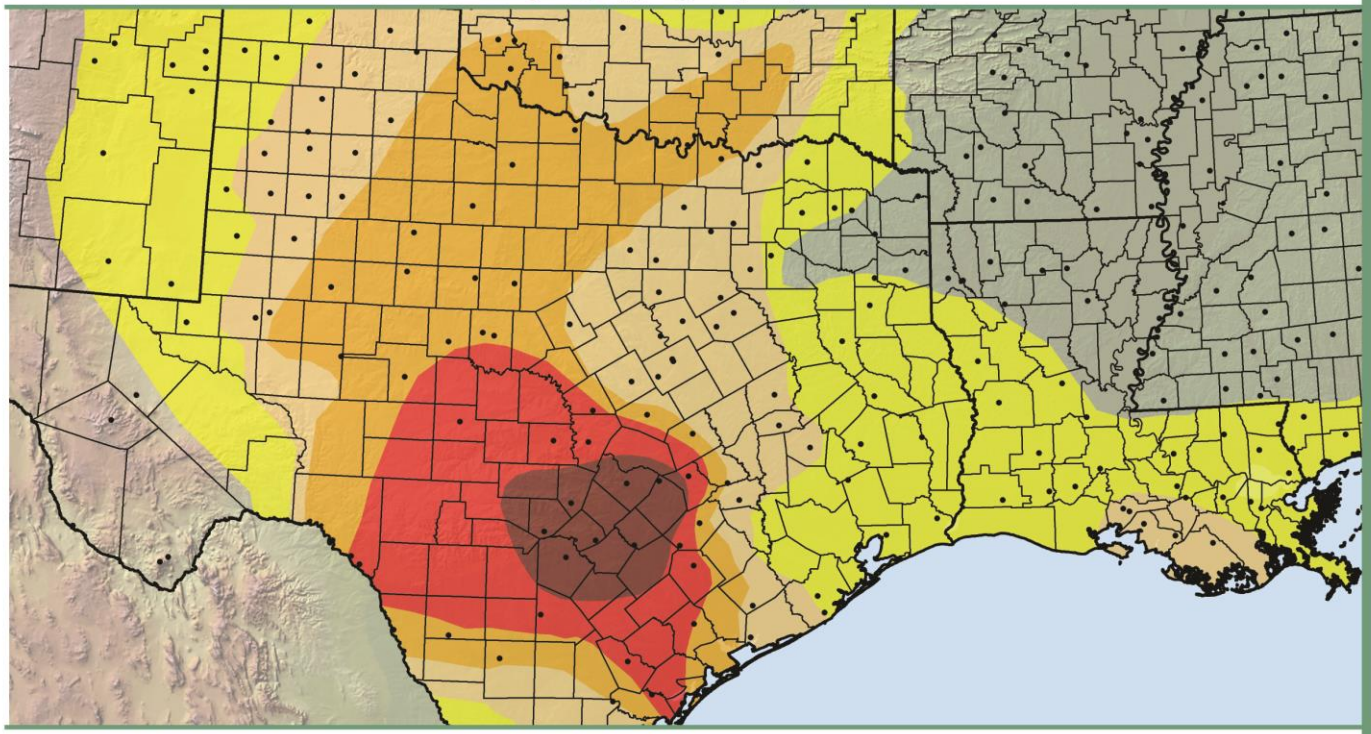

Continental United States | Alaska | Hawaii | Puerto Rico

Climate Links for Texas

Southern Regional Climate Center:
http://www.srcc.lsu.edu

Bureau of Reclamation Reservoir Levels:
http://www.usbr.gov/gp/water/rflow.cfm

USGS Real-Time Streamflow Data:
http://waterdata.usgs.gov/tx/nwis/rt

Legend

Visible

[-] Drought Monitor
- D0
- D1
- D2
- D3
- D4

Date: January 27, 2009

Transparency: 40%

[-] ACIS Stations

[-] Climate Layers
- Standardized Precipitation Index
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Drought Monitor

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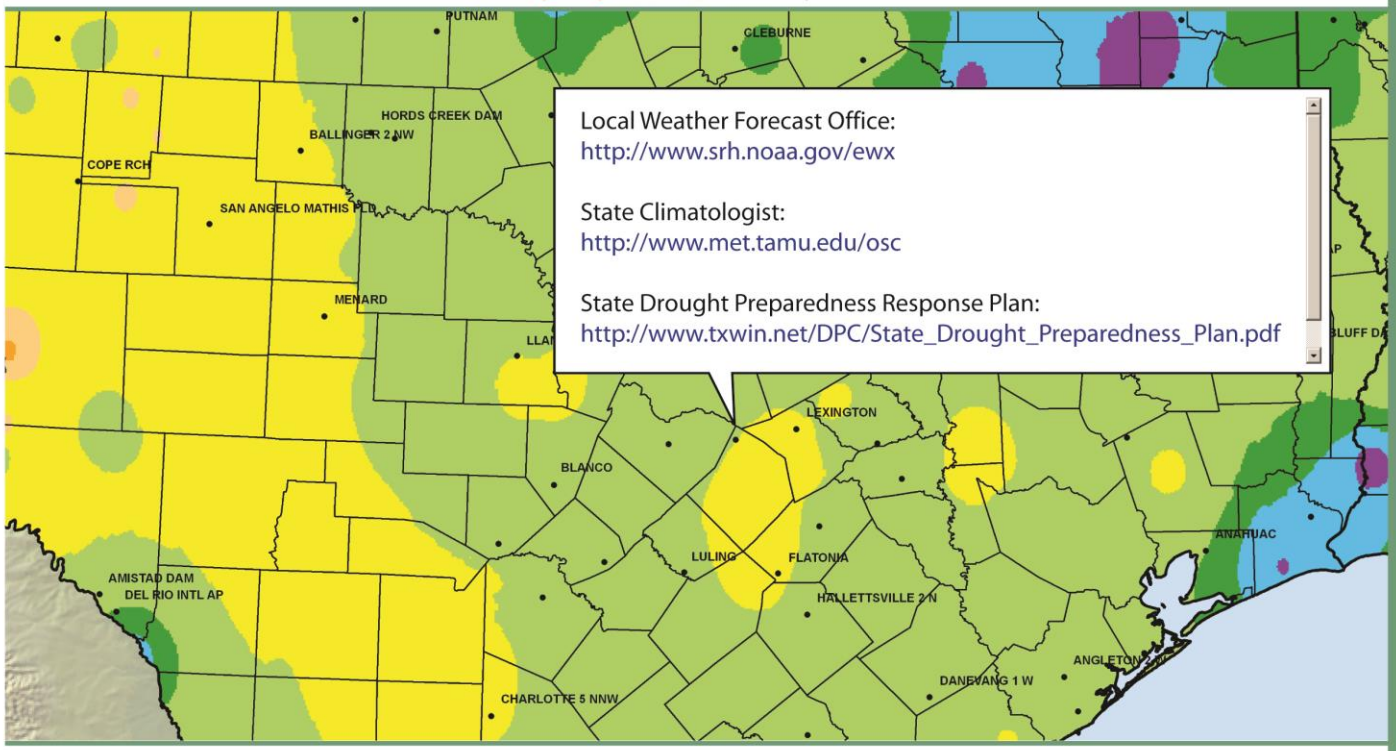


Local Weather Forecast Office:
http://www.srh.noaa.gov/ewx

State Climatologist:
http://www.met.tamu.edu/osc

State Drought Preparedness Response Plan:
http://www.txwin.net/DPC/State_Drought_Preparedness_Plan.pdf

◉ Continental United States ○ Alaska ○ Hawaii ○ Puerto Rico

Legend

Visible

[+] ☐ Drought Monitor

[-] ☐ ACIS Stations

- Station Name

[-] ☐ Climate Layers

☐ Standardized Precipitation Index

- < -3
- -3 to -2.5
- -2.5 to -2
- -2 to -1.5
- -1.5 to -1
- -1 to 0
- 0 to 1
- 1 to 1.5
- 1.5 to 2
- 2 to 2.5
- 2.5 to 3
- > 3

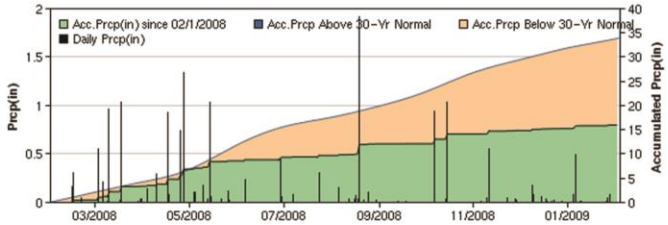
☐ Palmer Drought Severity Index

Select

[-] Boundaries

- ☐ ○ Rivers
- ☐ ○ Hydrologic Units (HUCs)
- ☐ ○ Congressional Districts
- ☐ ○ Climate Divisions
- ☐ ○ Counties
- ☐ ○ Cities
- ☐ ○ Roads
- ☐ ○ County Warning Areas

Precipitation: January 2008-January 2009



Drought Impacts for Austin , TX

Water Impact 12/11/2008
Austin, Texas—The Barton Springs/Edwards Aquifer Conservation District is in a critical stage drought. Those who pump groundwater in the district must reduce...

Some Examples of Decision Making Using the DM

- USDA Dried Milk Program 2002-03
- USDA CRP Release hot spot trigger
- Numerous states use as a drought trigger (Governor's declarations)
- 2006-07 USDA Livestock Assistance
- 2006-07 IRS (tax deferral on livestock losses)
- 2008 Farm Bill
- NWS Drought Information Statements

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What Resolution of the United States Drought Monitor is the most Useful to you?

- National
- Regional
- County
- Sub-County

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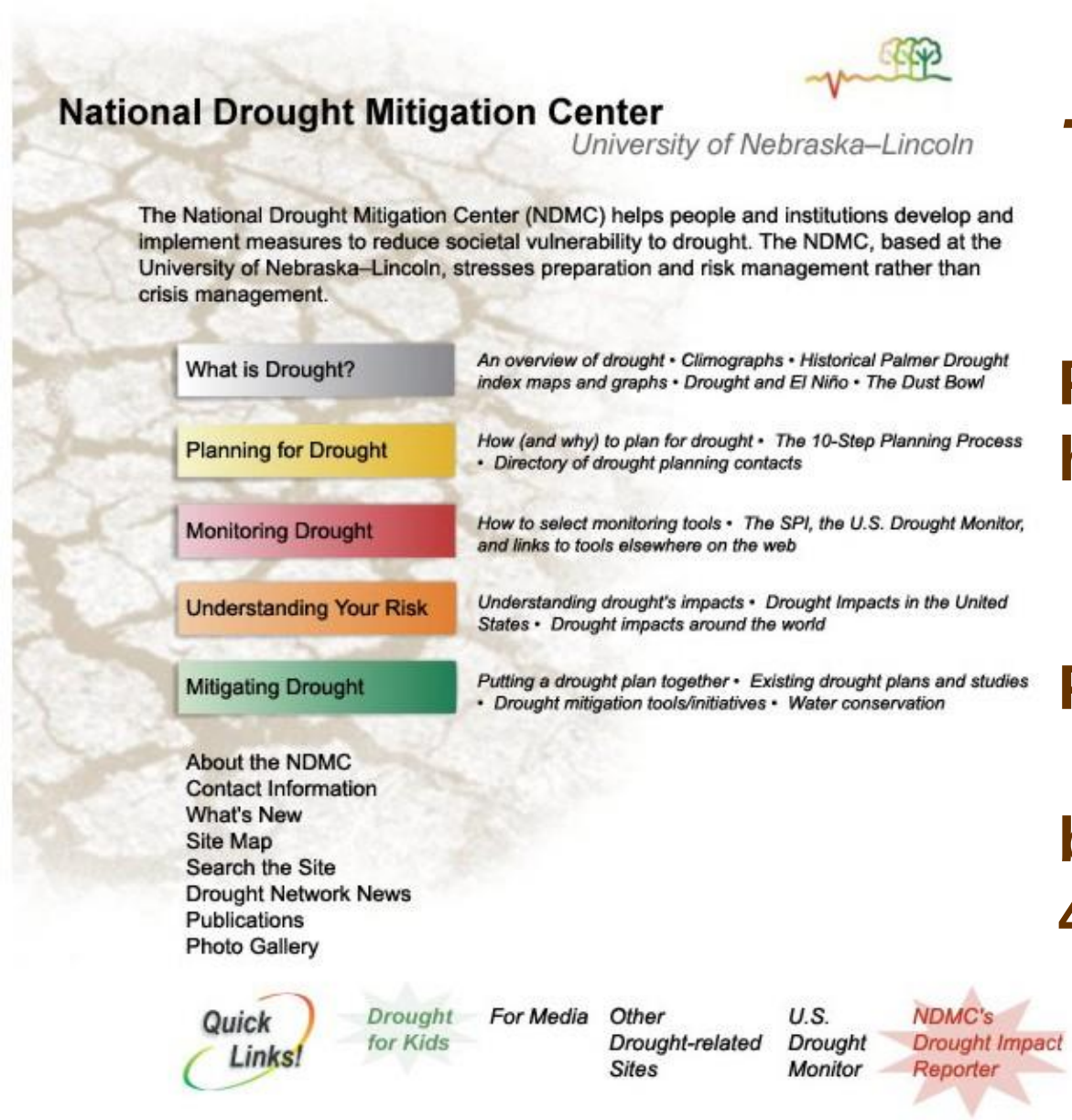

Thank you!

Please visit us at:
http://drought.unl.edu/

Please contact me at:

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University of Nebraska Lincoln

National Drought Mitigation Center

DM/DSS Discussion Questions

- What features did you like most from what were presented to you about the DM/DSS?
- What features are lacking or what would you like to see in the DM/DSS that are not currently there or proposed to be there?
- How do you currently use the information provided on the United States Drought Monitor now?
- Would a historical perspective of drought indices be helpful to compare current drought in magnitude and intensity?

http://drought.unl.edu/dm

National Drought Mitigation Center