DROUGHT★MART:

Your One-Tool Drought Monitoring Super Store

Developing an Improved Drought Monitor -DSS for the U.S.

Mark Svoboda, Climatologist

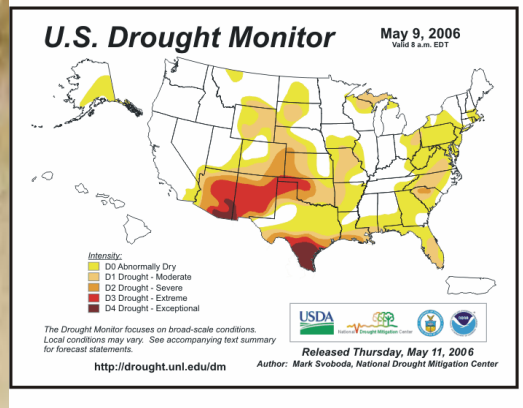
Monitoring Program Area Leader

National Drought Mitigation Center

University of Nebraska-Lincoln

USDA-RMA Workshop Woodland, CA

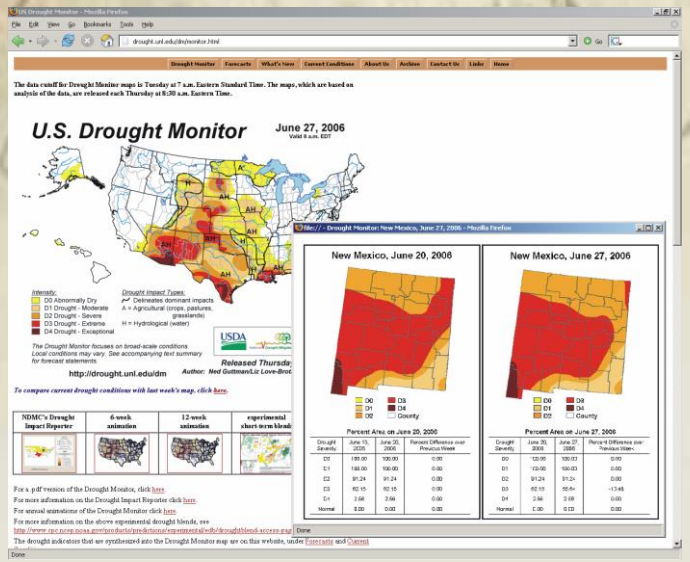
February 26, 2009



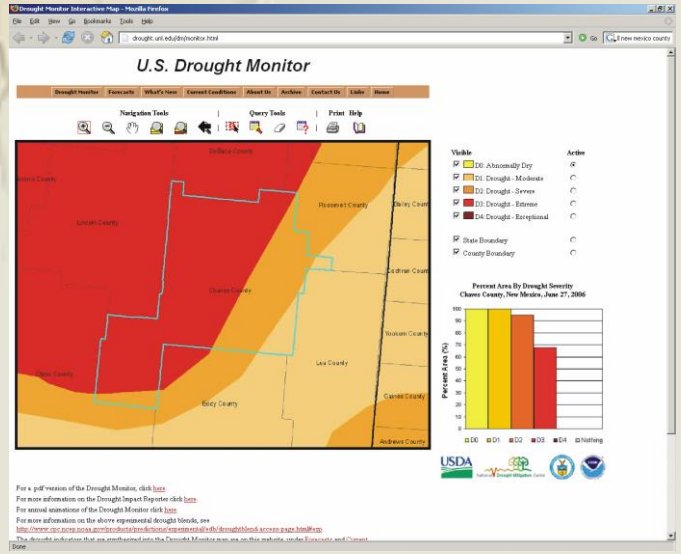
Drought Monitor Decision Support System (DM-DSS):

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).



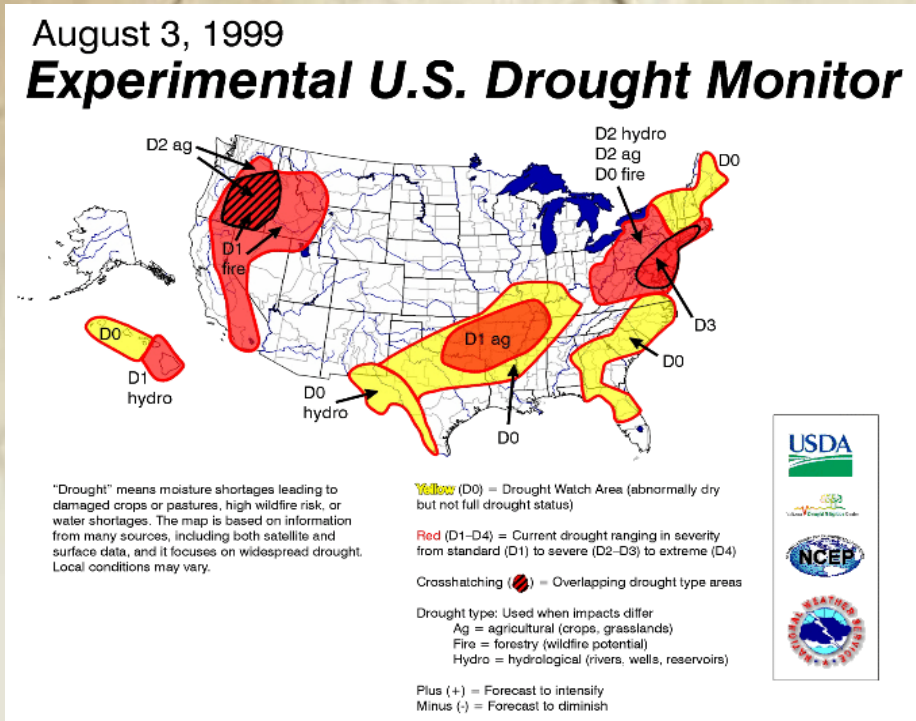
University of Nebraska

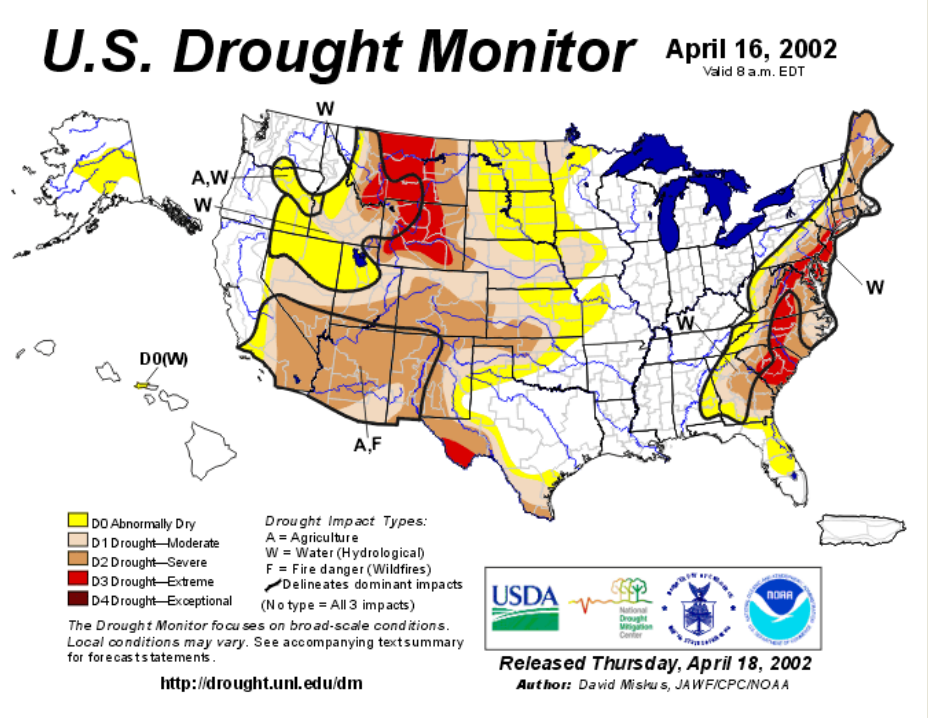
National Drought Mitigation Center

RMA

The U.S. Drought Monitor

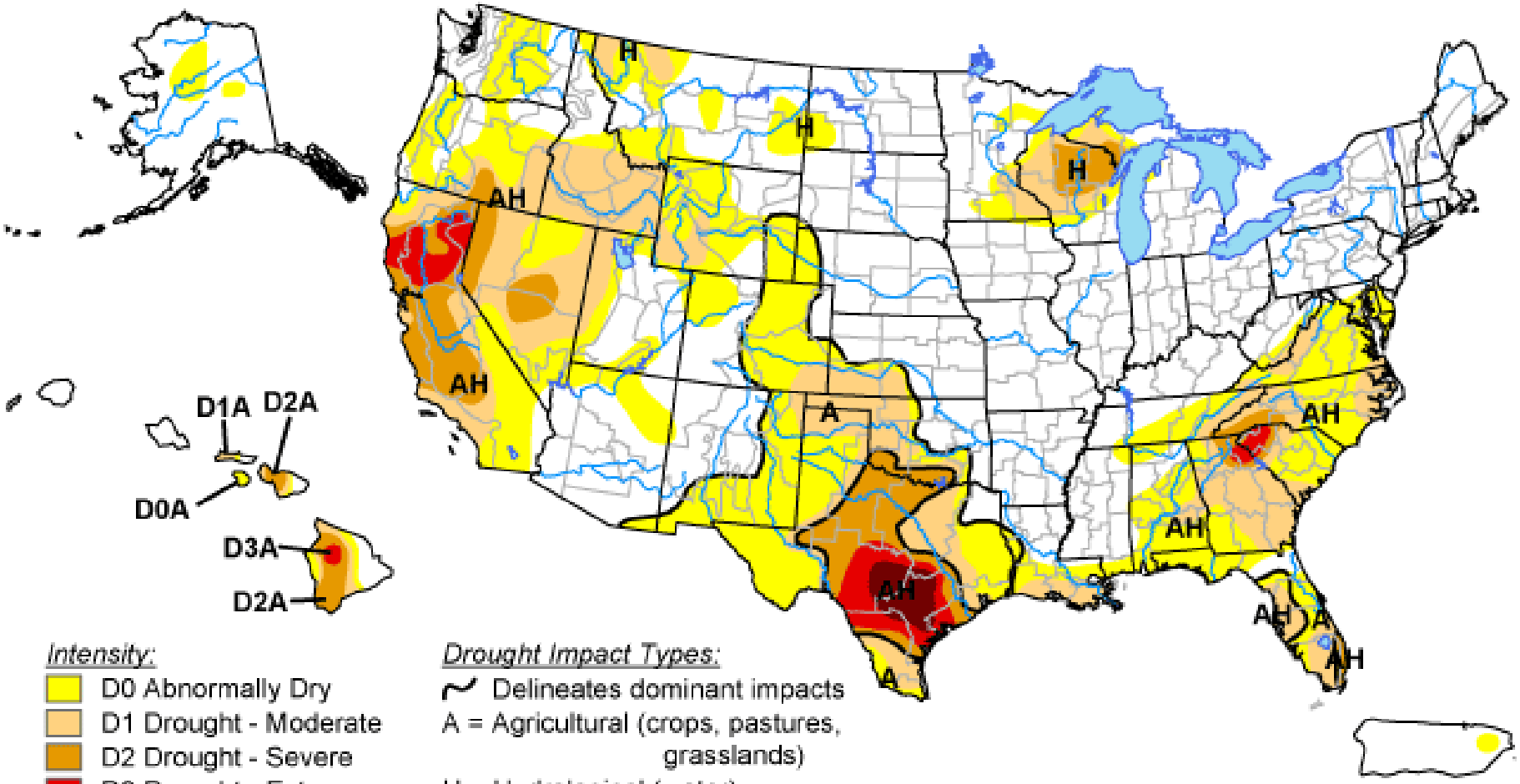
Since 1999, NOAA (CPC and NCDC), USDA, and the NDMC have produced a weekly composite drought map -- the U.S. Drought Monitor -- with input from numerous federal and non-federal partners





U.S. Drought Monitor

February 24, 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

USDA National Drought Mitigation Center

Released Thursday, February 26, 2009

Author: Rich Tinker, Climate Prediction Center, NOAA

The Drought Monitor Concept

- A ***partnership*** between the NDMC, USDA and NOAA's CPC, NCDC, and 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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U.S. Drought Monitor

Integrates Key Drought Indicators:

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

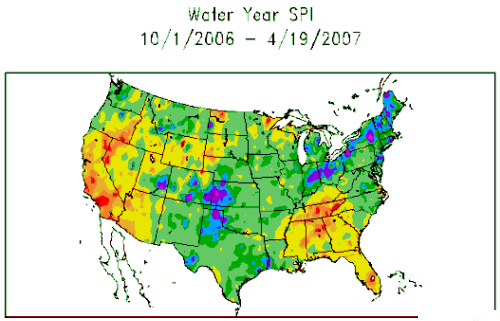
Growing Season:

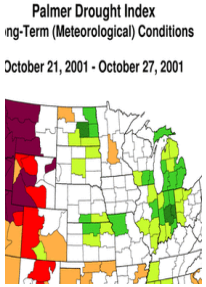
- Crop Moisture Index
- Sat. Veg. Health Index
- Soil Moisture
- Mesonet data

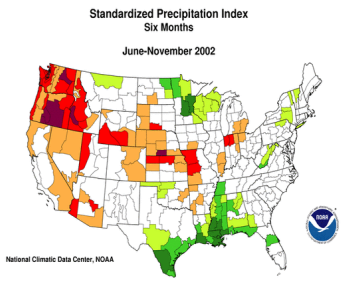
In The West:

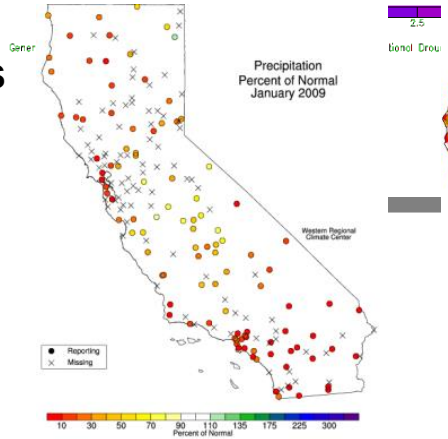
- SWSI
- Reservoir levels
- Snowpack
- Streamflow

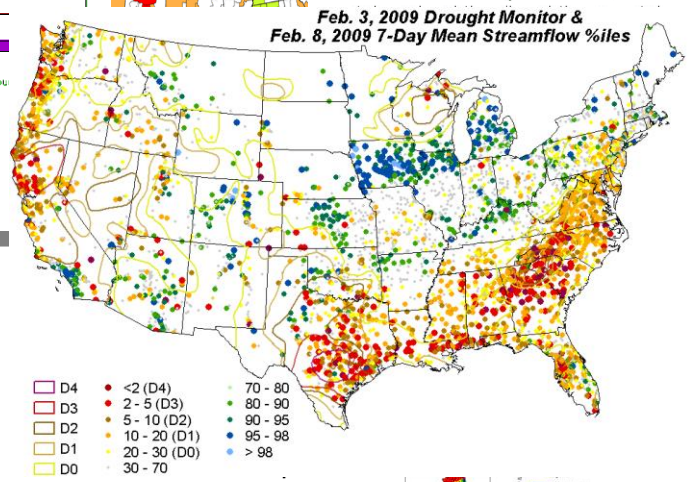
Created in ArcGIS

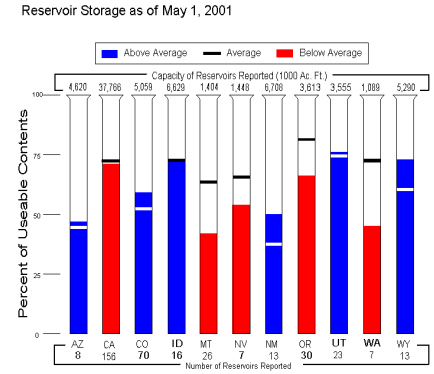


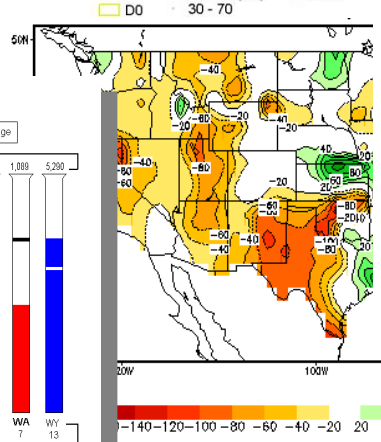


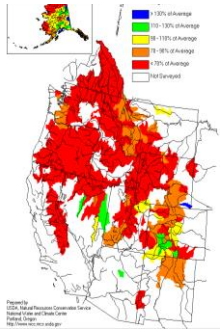












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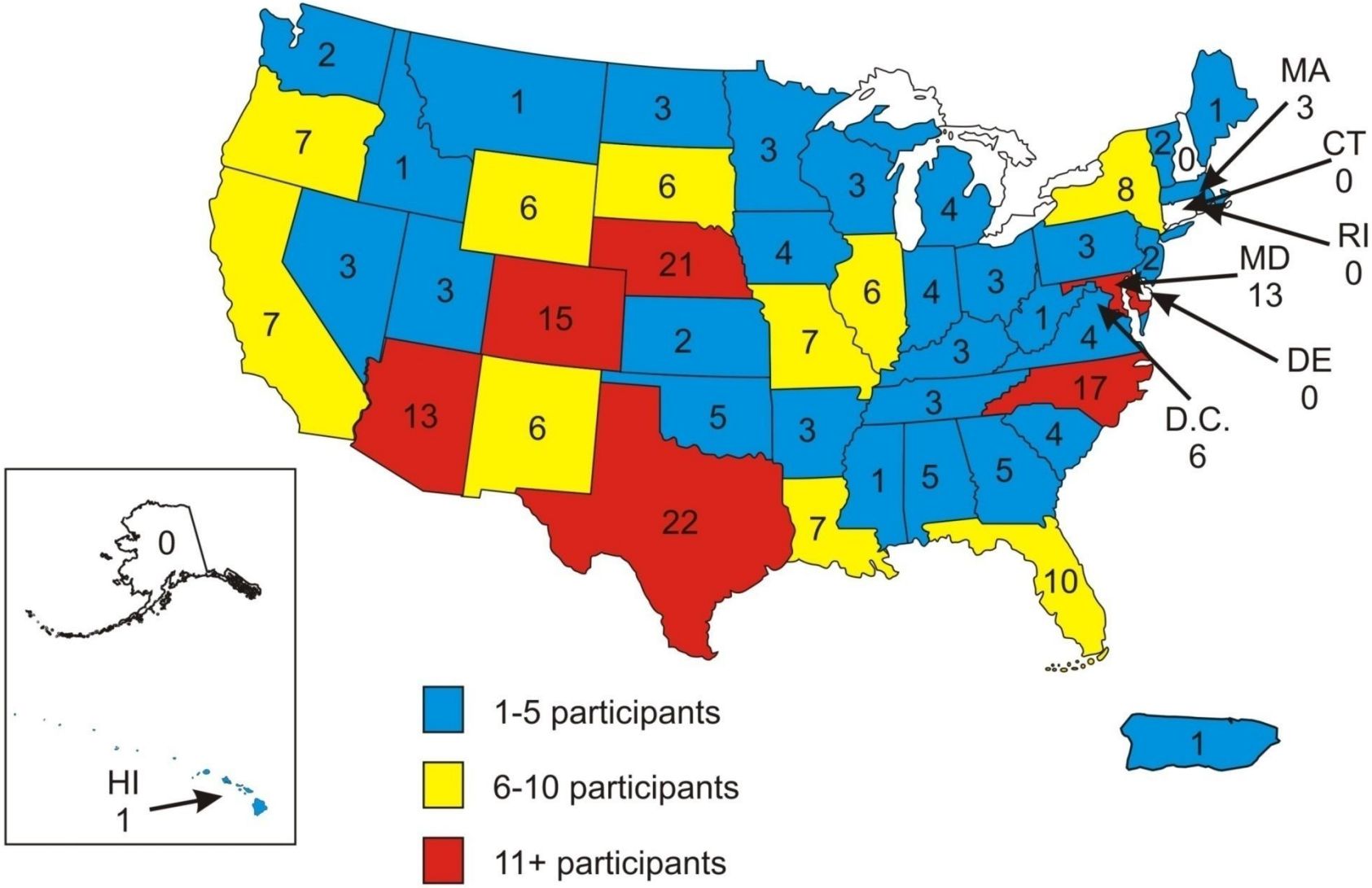
USDM Listserve Subscribers

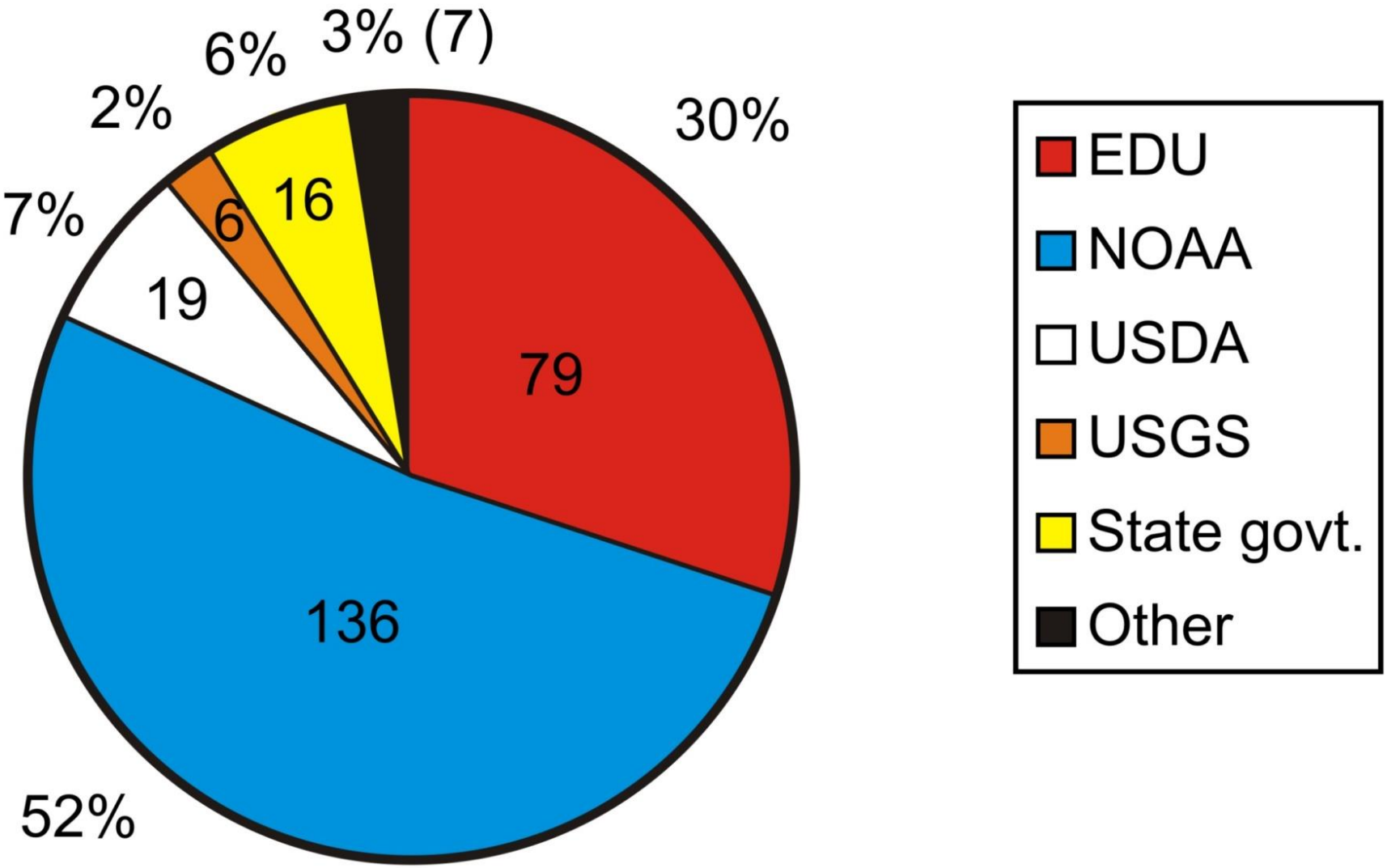
(as of February 2, 2009)



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

USDM Listserve Subscribers

(as of February 2, 2009)



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

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

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

US Drought Monitor

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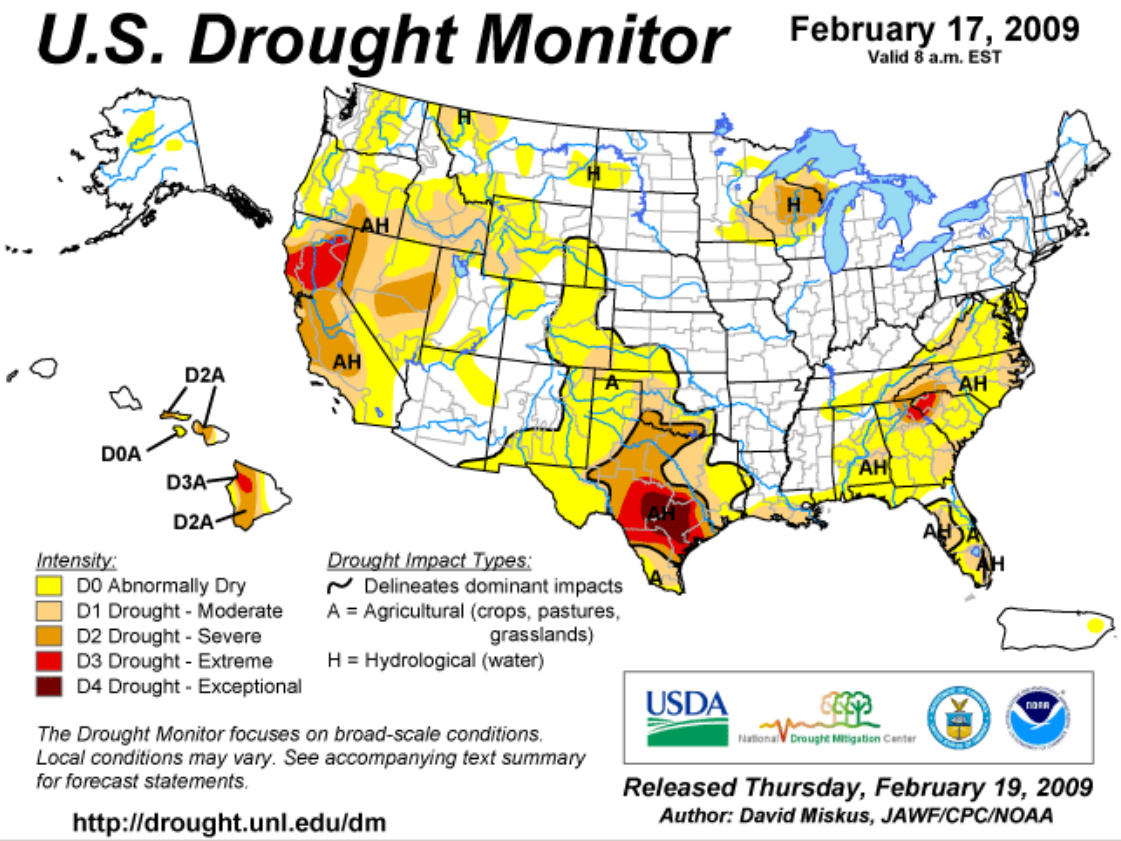
Visit the NDMC Photo Gallery to see photos of drought conditions in California, Georgia, South Carolina, and other states. If you have photos showing drought conditions, please consider submitting them to the Photo Gallery.

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.



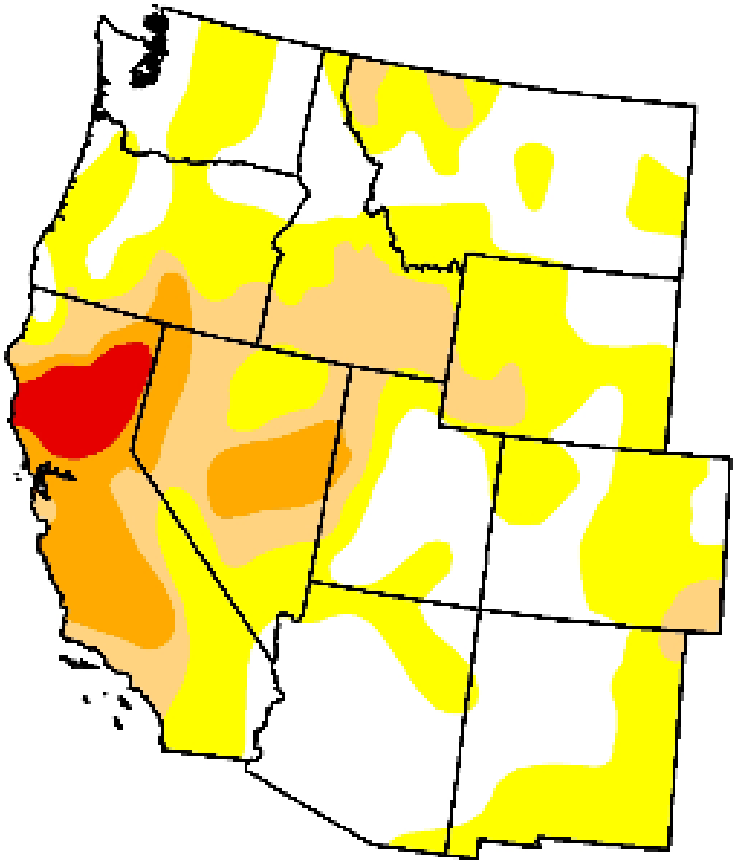
U.S. Drought Monitor

West

February 17, 2009
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	37.6	62.4	24.4	10.1	2.2	0.0
Last Week (02/10/2009 map)	37.1	62.9	26.2	10.7	2.5	0.0
3 Months Ago (11/25/2008 map)	36.0	64.0	29.3	8.6	0.0	0.0
Start of Calendar Year (01/06/2009 map)	37.4	62.6	28.9	8.8	0.4	0.0
Start of Water Year (10/07/2008 map)	41.3	58.7	28.6	10.4	0.1	0.0
One Year Ago (02/19/2008 map)	33.9	66.1	37.5	16.9	0.0	0.0



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http://drought.unl.edu/dm

Released Thursday, February 19, 2009

Author: David Miskus, JAWF/CPC/NOAA

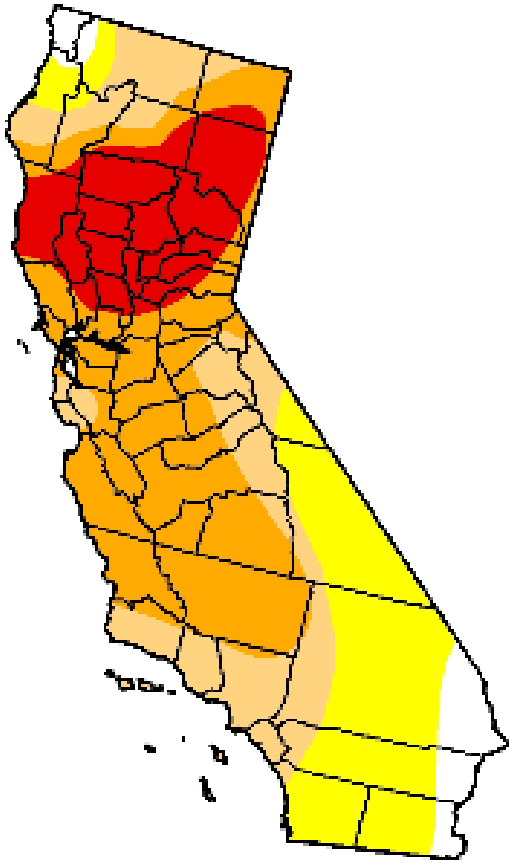
U.S. Drought Monitor

California

February 17, 2009
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	5.2	94.8	70.7	50.1	16.7	0.0
Last Week (02/10/2009 map)	0.9	99.1	78.8	54.7	19.0	0.0
3 Months Ago (11/25/2008 map)	4.7	95.3	86.0	41.3	0.0	0.0
Start of Calendar Year (01/06/2009 map)	1.7	98.3	88.2	41.3	2.8	0.0
Start of Water Year (10/07/2008 map)	0.0	100.0	95.9	55.0	0.0	0.0
One Year Ago (02/19/2008 map)	18.3	81.7	37.5	14.1	0.0	0.0



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http://drought.unl.edu/dm

Released Thursday, February 19, 2009

Author: David Miskus, JAWF/CPC/NOAA

U.S. Drought Monitor Archives - Windows Internet Explorer

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

Drought Monitor Archives

Maps | Tables | 1999 Archive | GIS Data

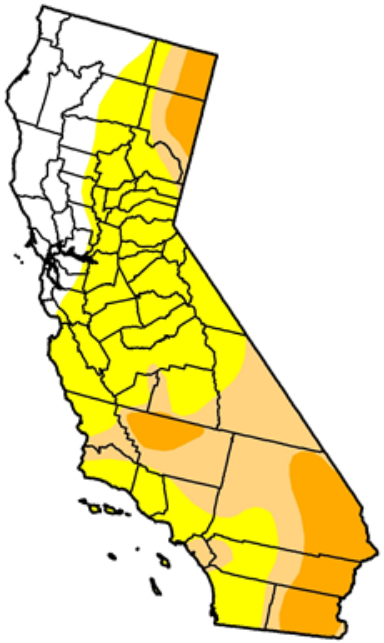
Select an area and click the 'Update' button to view the archive.

Contiguous United States | Region Northeast | State California | Update

Drought Severity

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

February 05, 2008



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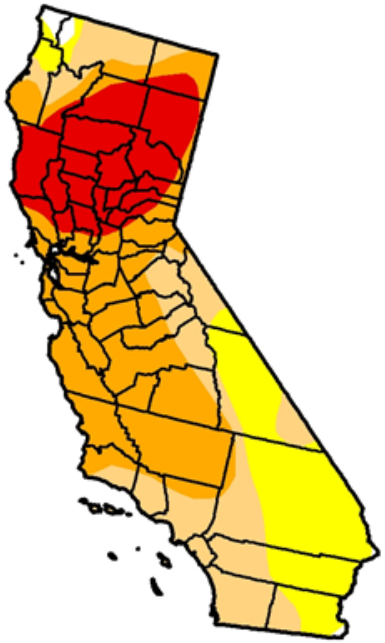
February 10, 2009



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Drought Monitor Data Downloads

For more information regarding the Drought Monitor datasets, please contact Soren Scott at the NDMC via e-mail or at 402-472-6717.

View the most current Drought Monitor in Google Earth: Current Drought Monitor

View the most current Drought Monitor WMS service: Current Drought Monitor WMS

For more information regarding the file formats, click on the appropriate format: Drought Monitor shapefiles, KML files, GML files, OGC WMS files, Excel files.

For more information regarding the Drought Monitor color scheme, please visit: DM Colors

Please cite the Drought Monitor by including the National Drought Mitigation Center (NDMC), the U.S. Department of Agriculture (USDA) and the National Oceanic and Atmospheric Association (NOAA).

2009 2008 2007 2006 2005 2004 2003 2002 2001 2000

2009						
Date	KML	Shapefile		GML	WMS	Excel
2009-02-17	KML	SHP	Impacts	GML	WMS	XLS
2009-02-10	KML	SHP	Impacts	GML	WMS	XLS
2009-02-03	KML	SHP	Impacts	GML	WMS	XLS
2009-01-27	KML	SHP	Impacts	GML	WMS	XLS
2009-01-20	KML	SHP	Impacts	GML	WMS	XLS
2009-01-13	KML	SHP	Impacts	GML	WMS	XLS
2009-01-06	KML	SHP	Impacts	GML	WMS	XLS
2008						
Date	KML	Shapefile		GML	WMS	Excel
2008-12-30	KML	SHP	Impacts	GML	WMS	XLS
2008-12-23	KML	SHP	Impacts	GML	WMS	XLS

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Drought Monitor Data Downloads

Maps | Tables | 1999 Archive | GIS Data

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For more information regarding the file form
shapefiles, KML files, GML files, OGC WMS

For more information regarding the Drought

Please cite the Drought Monitor by including
the U.S. Department of Agriculture (USDA)
Association (NOAA).

2009 2008 2007 2006 2

Date	KML	Shapef	
2009-02-17	KML	SHP	Im
2009-02-10	KML	SHP	Im
2009-02-03	KML	SHP	Im
2009-01-27	KML	SHP	Im
2009-01-20	KML	SHP	Im
2009-01-13	KML	SHP	Im
2009-01-06	KML	SHP	Im

Date	KML	Shapef	
2008-12-30	KML	SHP	Im
2008-12-23	KML	SHP	Im

Lincoln

Microsoft Excel

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Paste | Clipboard | Font | Alignment | Number | Styles | Cells | Editing

D1 | FIPS

dmstats_090203.xls [Read-Only] [Compatibility Mode]

	A	B	C	D	E	F	G	H	I	J
184	2009.02.03	AR	Woodruff County	05147	100.000	0.000	0.000	0.000	0.000	0.000
185	2009.02.03	AR	Yell County	05149	100.000	0.000	0.000	0.000	0.000	0.000
186	2009.02.03	CA	Alameda County	06001	0.000	100.000	100.000	100.000	0.000	0.000
187	2009.02.03	CA	Alpine County	06003	0.000	100.000	100.000	49.291	0.000	0.000
188	2009.02.03	CA	Amador County	06005	0.000	100.000	100.000	98.044	0.000	0.000
189	2009.02.03	CA	Butte County	06007	0.000	100.000	100.000	100.000	100.000	0.000
190	2009.02.03	CA	Calaveras County	06009	0.000	100.000	100.000	88.866	0.000	0.000
191	2009.02.03	CA	Colusa County	06011	0.000	100.000	100.000	100.000	100.000	0.000
192	2009.02.03	CA	Contra Costa County	06013	0.000	100.000	100.000	100.000	0.000	0.000
193	2009.02.03	CA	Del Norte County	06015	66.321	33.679	0.000	0.000	0.000	0.000
194	2009.02.03	CA	El Dorado County	06017	0.000	100.000	100.000	100.000	7.391	0.000
195	2009.02.03	CA	Fresno County	06019	0.000	100.000	99.529	67.832	0.000	0.000
196	2009.02.03	CA	Glenn County	06021	0.000	100.000	100.000	100.000	100.000	0.000
197	2009.02.03	CA	Humboldt County	06023	0.000	100.000	73.276	47.918	0.000	0.000
198	2009.02.03	CA	Imperial County	06025	0.000	100.000	96.277	0.000	0.000	0.000
199	2009.02.03	CA	Inyo County	06027	0.000	100.000	55.439	2.179	0.000	0.000
200	2009.02.03	CA	Kern County	06029	0.000	100.000	100.000	99.940	0.000	0.000
201	2009.02.03	CA	Kings County	06031	0.000	100.000	100.000	100.000	0.000	0.000
202	2009.02.03	CA	Lake County	06033	0.000	100.000	100.000	100.000	100.000	0.000
203	2009.02.03	CA	Lassen County	06035	0.000	100.000	100.000	100.000	86.653	0.000
204	2009.02.03	CA	Los Angeles County	06037	0.000	100.000	100.000	25.972	0.000	0.000
205	2009.02.03	CA	Madera County	06039	0.000	100.000	100.000	64.357	0.000	0.000
206	2009.02.03	CA	Marin County	06041	0.000	100.000	100.000	100.000	0.000	0.000
207	2009.02.03	CA	Mariposa County	06043	0.000	100.000	100.000	61.613	0.000	0.000
208	2009.02.03	CA	Mendocino County	06045	0.000	100.000	100.000	100.000	98.081	0.000

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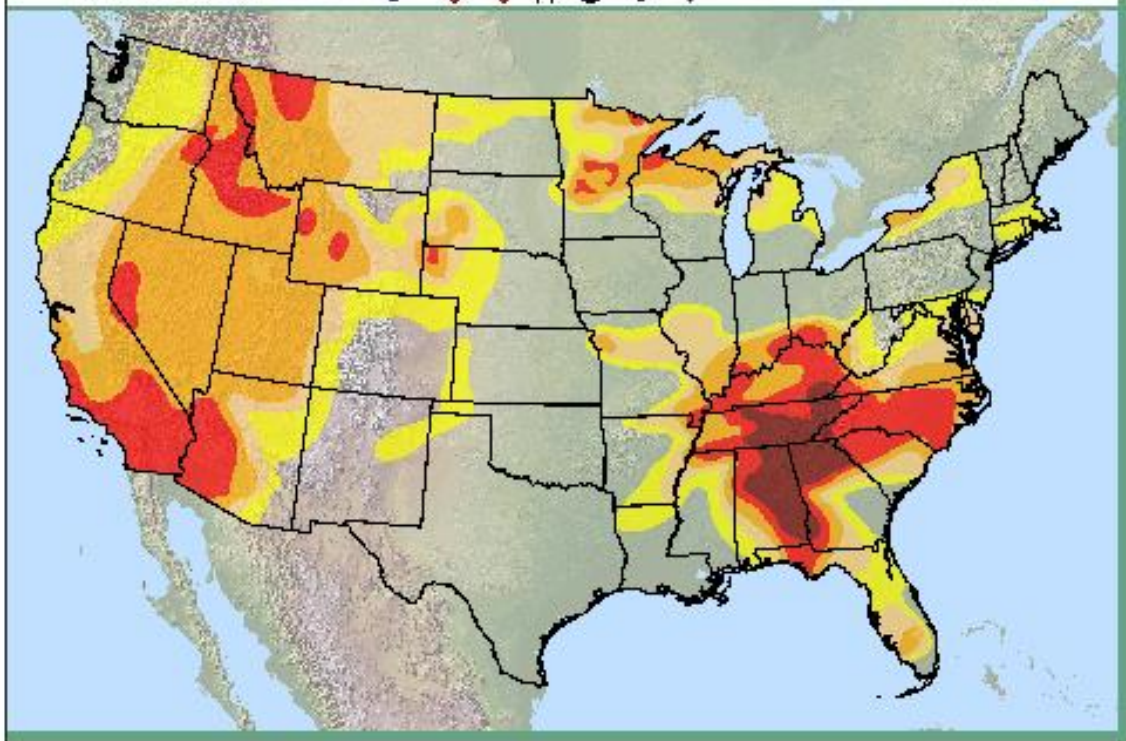
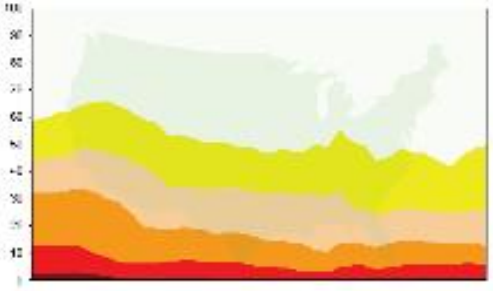


Continental United States | Alaska | Hawaii | Puerto Rico

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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Drought Monitor

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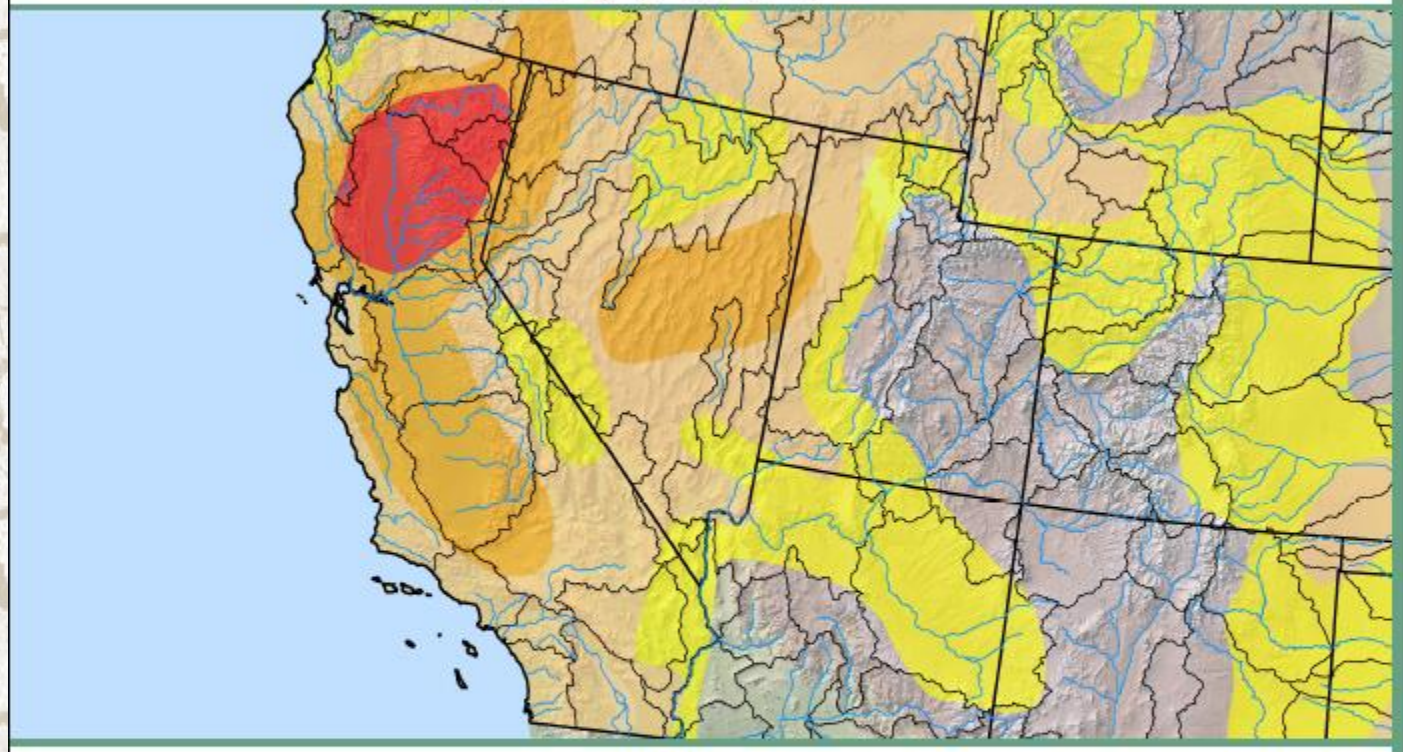


Continental United States | Alaska | Hawaii | Puerto Rico

Legend

Visible

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

Date: January 27, 2009

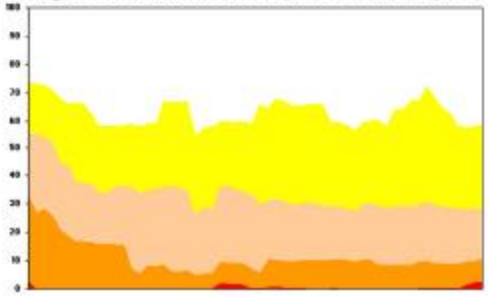
Transparency: 40%

[-] ACIS Stations

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

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

Drought Conditions: January 2008-January 2009



Week	Nothing	D0	D1	D2	D3	D4
February 3, 2009	41.13	58.87	28.64	10.68	2.53	0.00
January 27, 2009	42.00	58.00	28.19	9.79	2.13	0.00
January 20, 2009	43.19	56.81	28.18	9.79	1.73	0.00
January 12, 2009	41.93	58.07	28.49	9.15	0.37	0.00
January 6, 2009	37.37	62.63	28.90	8.77	0.37	0.00
December 30, 2008	35.35	64.65	28.90	9.00	0.37	0.00
December 23, 2008	31.54	68.46	30.10	9.00	0.37	0.00
December 16, 2008	27.46	72.54	31.00	10.03	0.78	0.00
December 9, 2008	32.78	67.22	29.92	9.83	0.43	0.00
December 2, 2008	32.78	67.22	29.61	8.55	0.00	0.00
November 25, 2008	35.99	64.01	29.26	8.55	0.00	0.00

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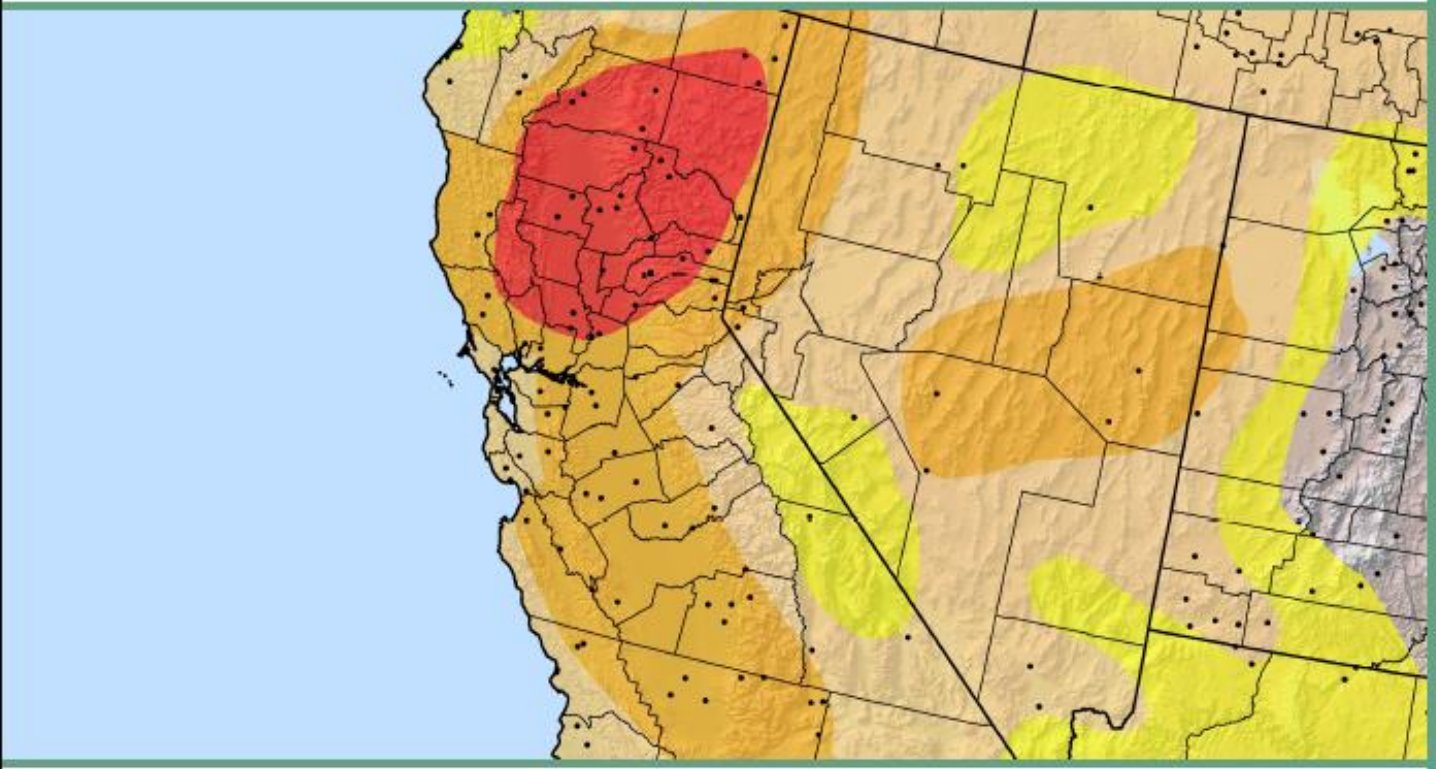

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Legend

Visible

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- D0
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[-] Boundaries (Select)
- Rivers
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Climate Links for California

Western Regional Climate Center:
http://www.wrcc.dri.edu

Ground-Water Climate Response Network:
http://groundwaterwatch.usgs.gov/StateMaps/CA.html

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

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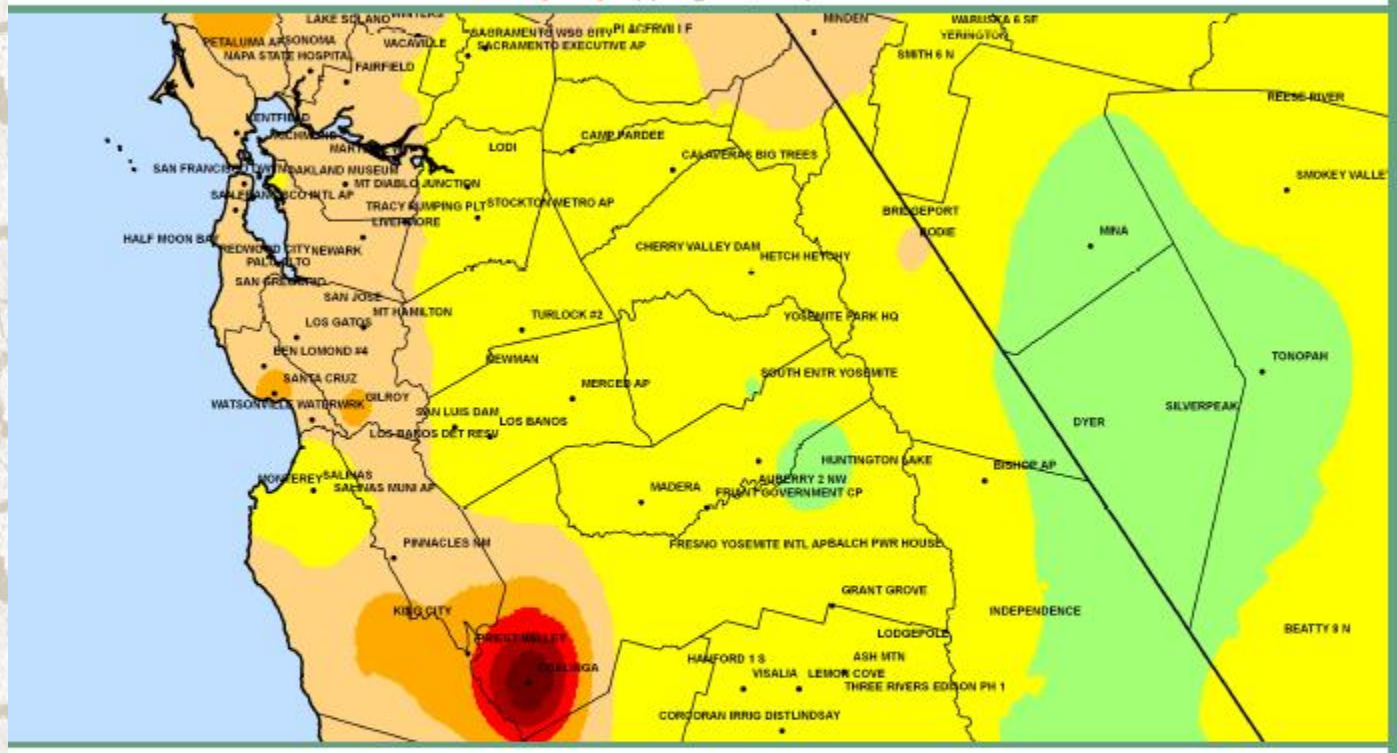

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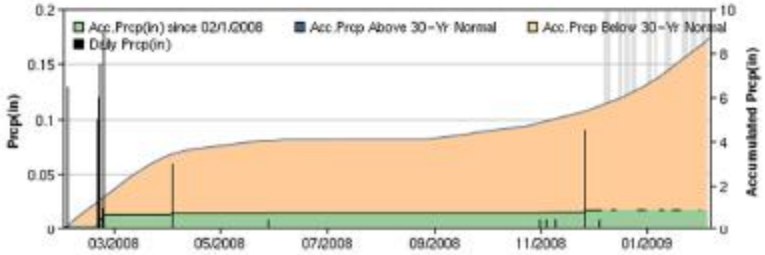
Coalinga: Precipitation (2008-2009)



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

Feature Enhancements Coming Soon to the DM-DSS:

- Incorporation of an enhanced electronic National Drought Atlas (historical aspect) for over 2,100 locations around the U.S.
- Incorporation of new Drought Impact Reporter v2
- Incorporation of new tools like the VegDRI and other local/state/regional tools and data
- Enhanced local contact/resource features for drought information and planning
- Integration into the NIDIS Web Portal

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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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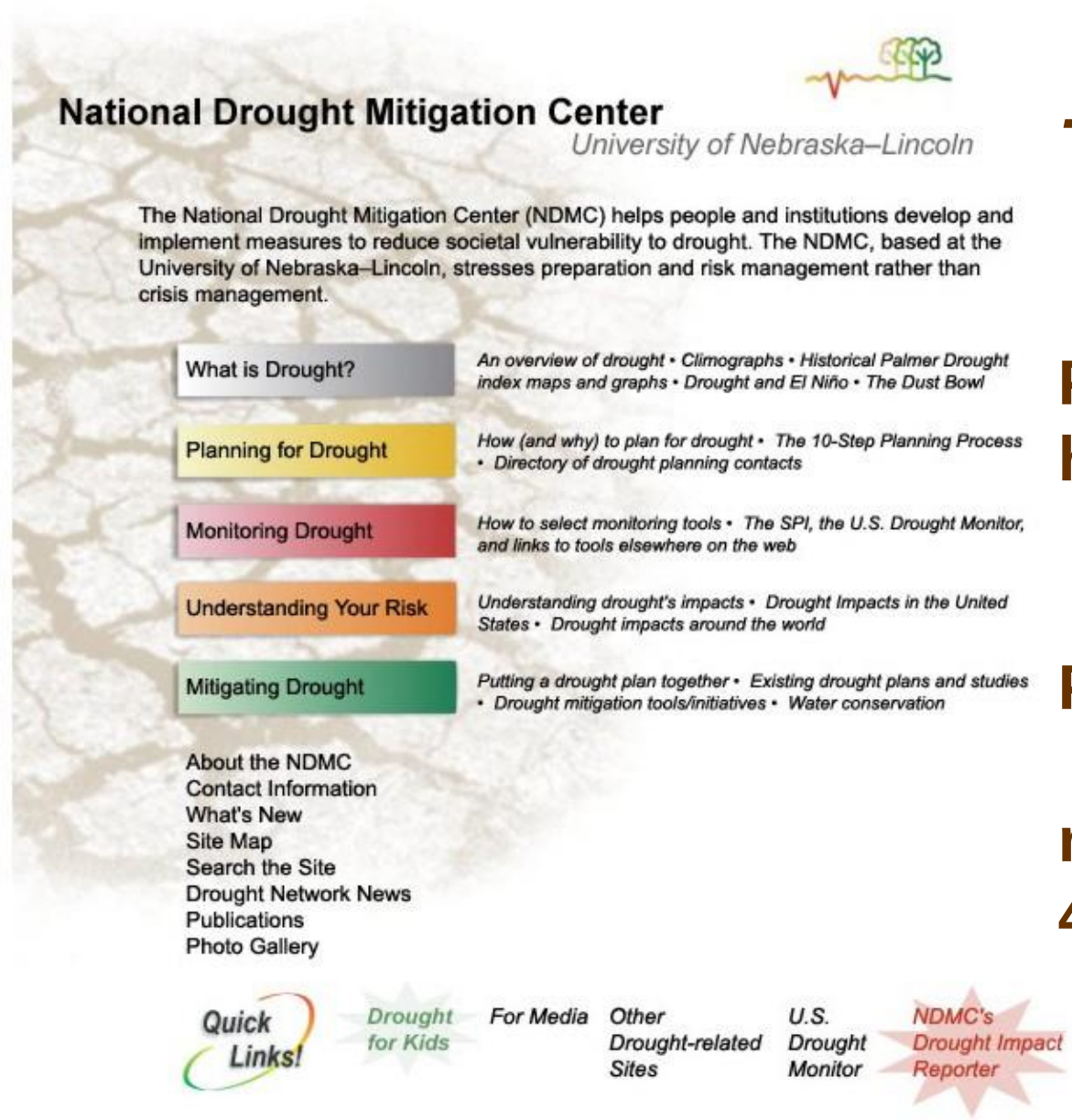

Thank you!

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

Please contact me at:

msvoboda2@unl.edu
402-472-8238

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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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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

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