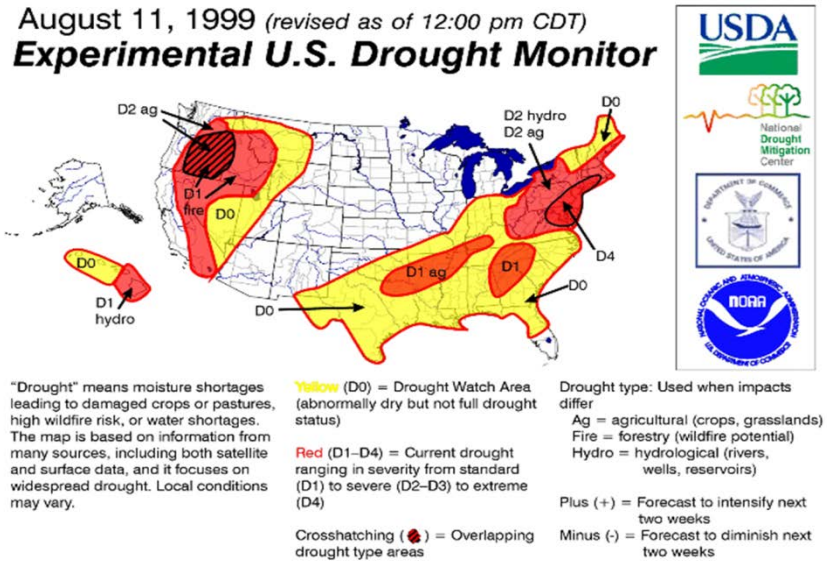
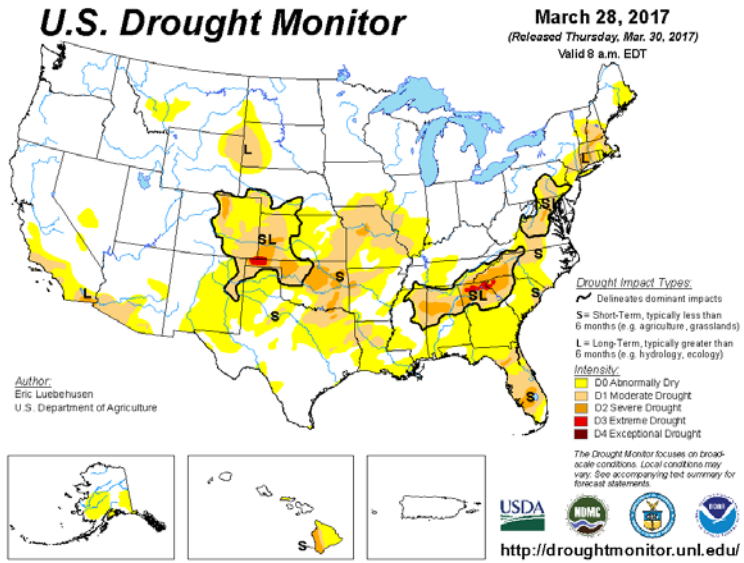
Dry Fusion: A Timeline of the U.S. Drought Monitor's Evolution





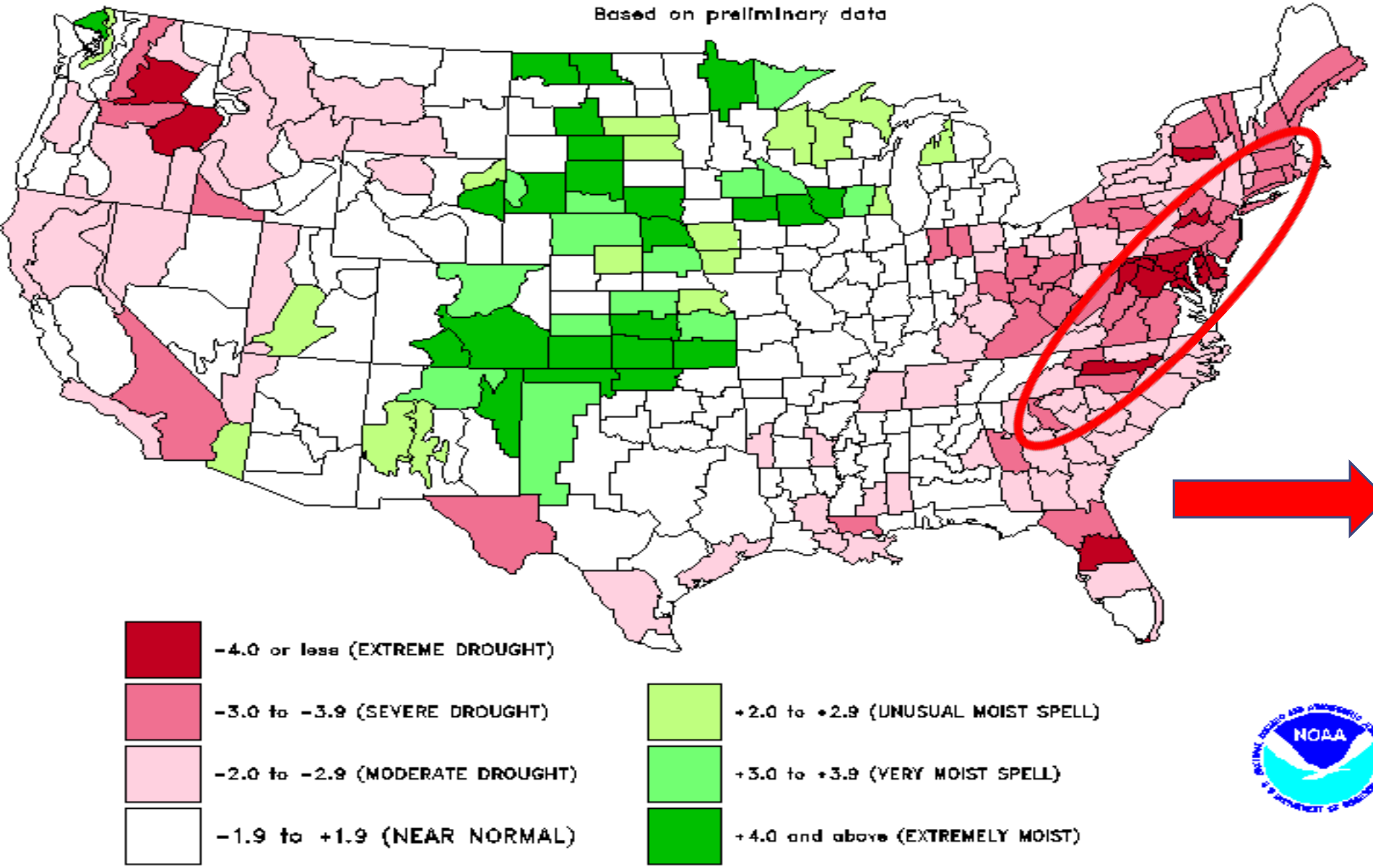
Mark Svoboda, PhD, Director
National Drought Mitigation Center
University of Nebraska-Lincoln

USDA Climate Hub Drought Workshop , Amarillo, TX, April 5, 2018

DROUGHT SEVERITY INDEX BY DIVISION
(LONG TERM PALMER)

AUG 7, 1999

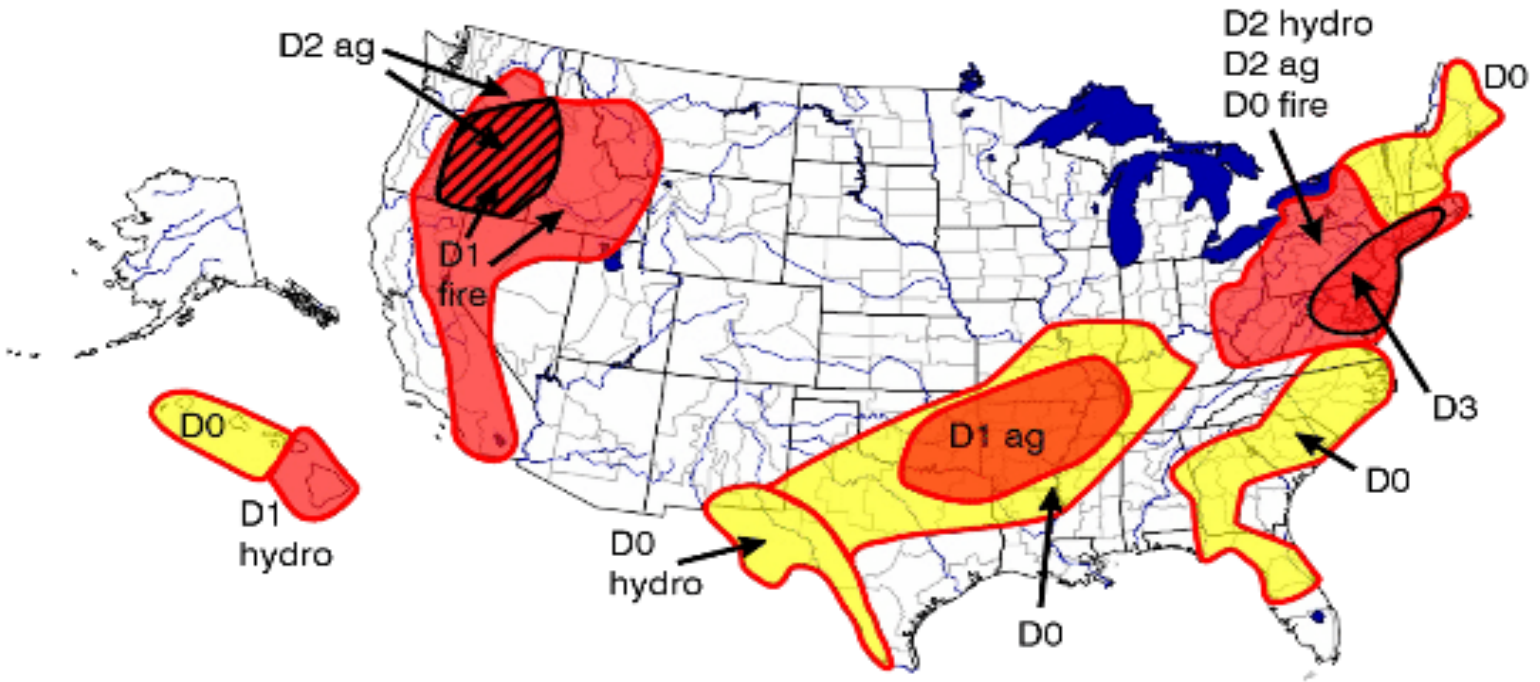
Based on preliminary data



CLIMATE PREDICTION CENTER, NOAA

August 3, 1999

Experimental U.S. Drought Monitor



"Drought" means moisture shortages leading to damaged crops or pastures, high wildfire risk, or water shortages. The map is based on information from many sources, including both satellite and surface data, and it focuses on widespread drought. Local conditions may vary.

Yellow (D0) = Drought Watch Area (abnormally dry but not full drought status)

Red (D1–D4) = Current drought ranging in severity from standard (D1) to severe (D2–D3) to extreme (D4)

Crosshatching (▨) = Overlapping drought type areas

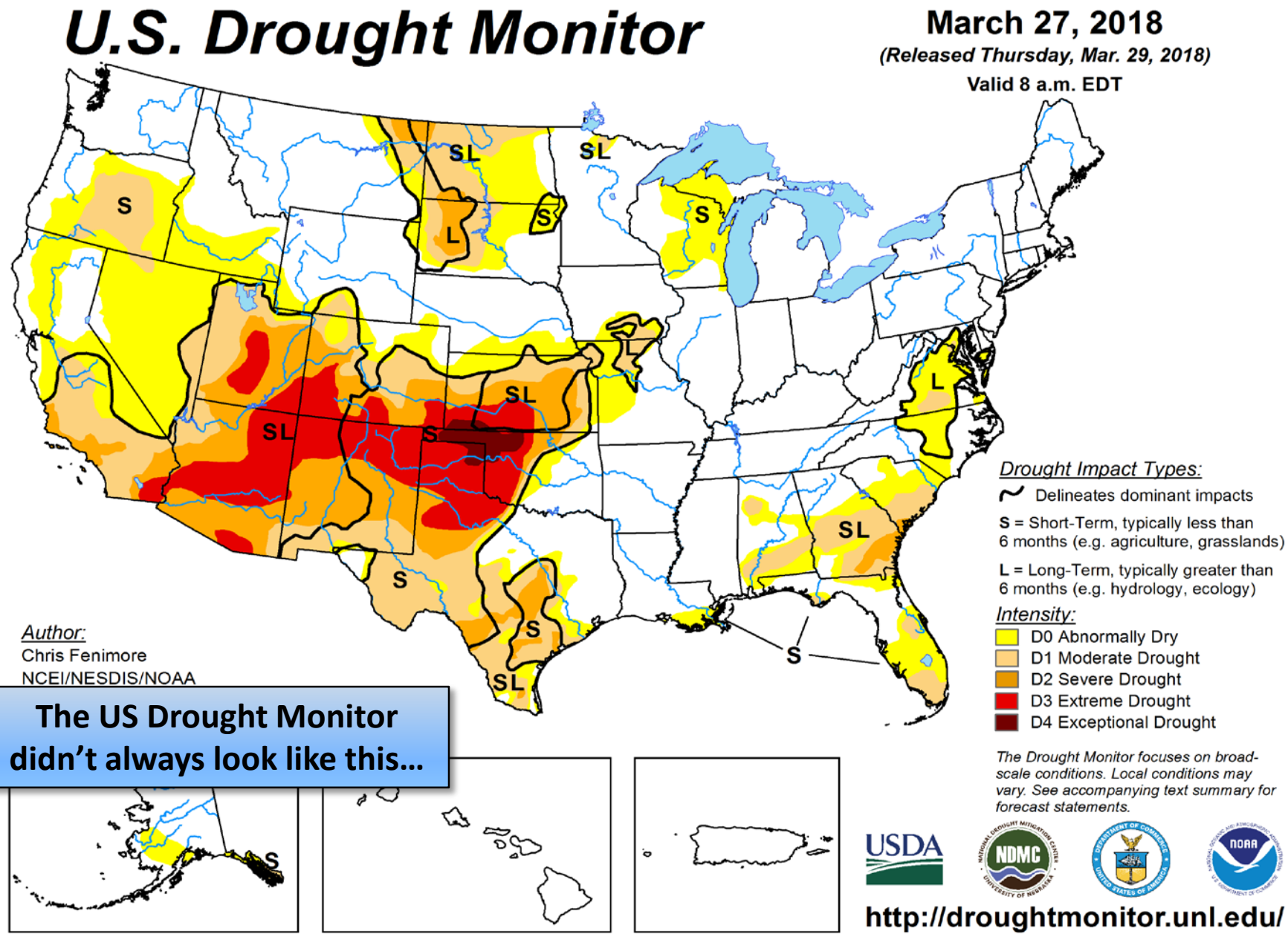
Drought type: Used when impacts differ
- Ag = agricultural (crops, grasslands)
- Fire = forestry (wildfire potential)
- Hydro = hydrological (rivers, wells, reservoirs)

Plus (+) = Forecast to intensify
Minus (-) = Forecast to diminish

USDA

NCEP

NATIONAL WEATHER SERVICE

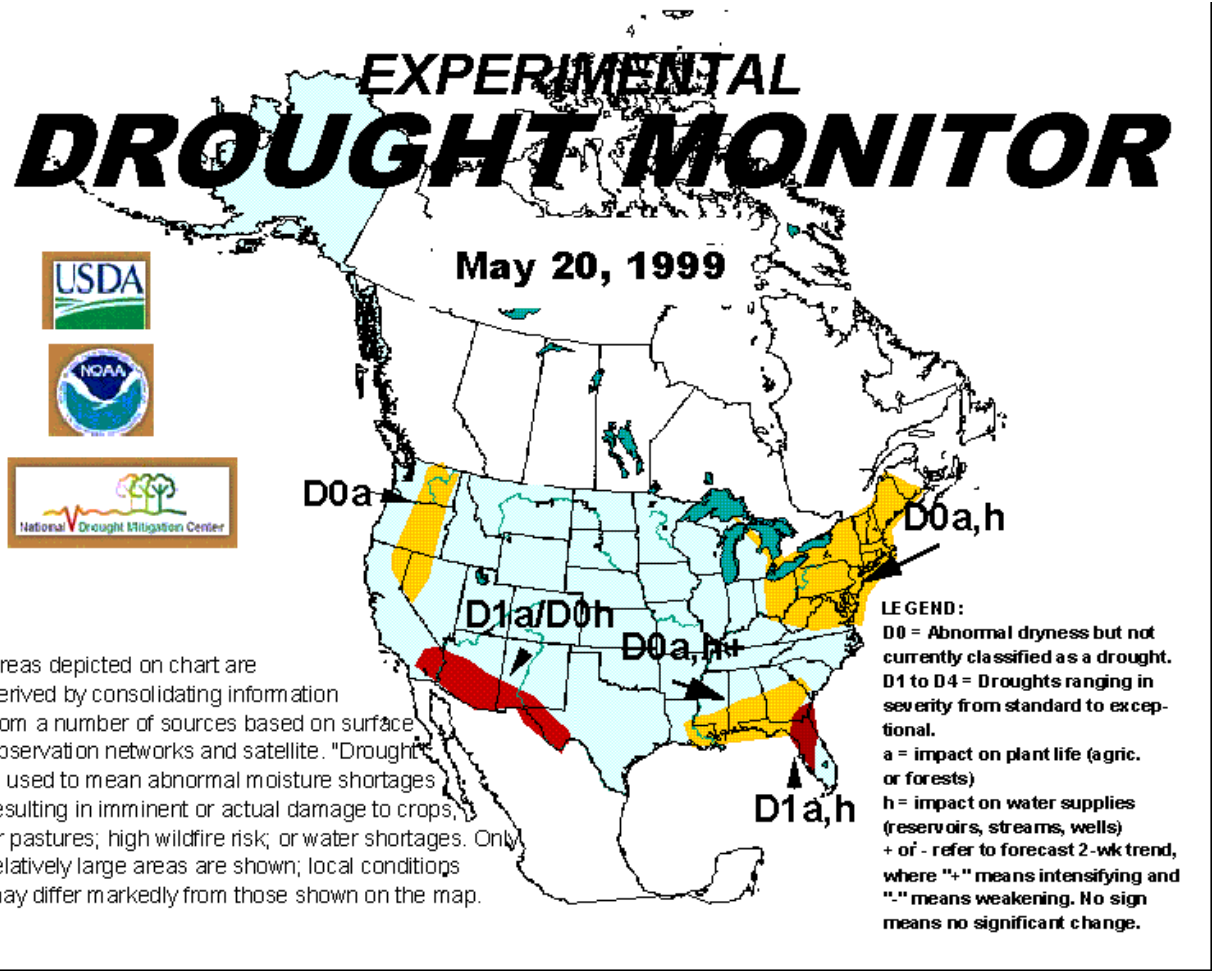

U.S. Drought Monitor
March 27, 2018
(Released Thursday, Mar. 29, 2018)
Valid 8 a.m. EDT
Drought Impact Types:
Delineates dominant impacts
S = Short-Term, typically less than 6 months (e.g. agriculture, grasslands)
L = Long-Term, typically greater than 6 months (e.g. hydrology, ecology)
Intensity:
D0 Abnormally Dry
D1 Moderate Drought
D2 Severe Drought
D3 Extreme Drought
D4 Exceptional Drought
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.
Author:
Chris Fenimore
NCEI/NESDIS/NOAA
The US Drought Monitor didn't always look like this…
USDA
NDMC
NOAA
http://droughtmonitor.unl.edu/

1999

The ***very first*** U.S. Drought Monitor!!

Collaborative effort between the NDMC, NOAA and USDA

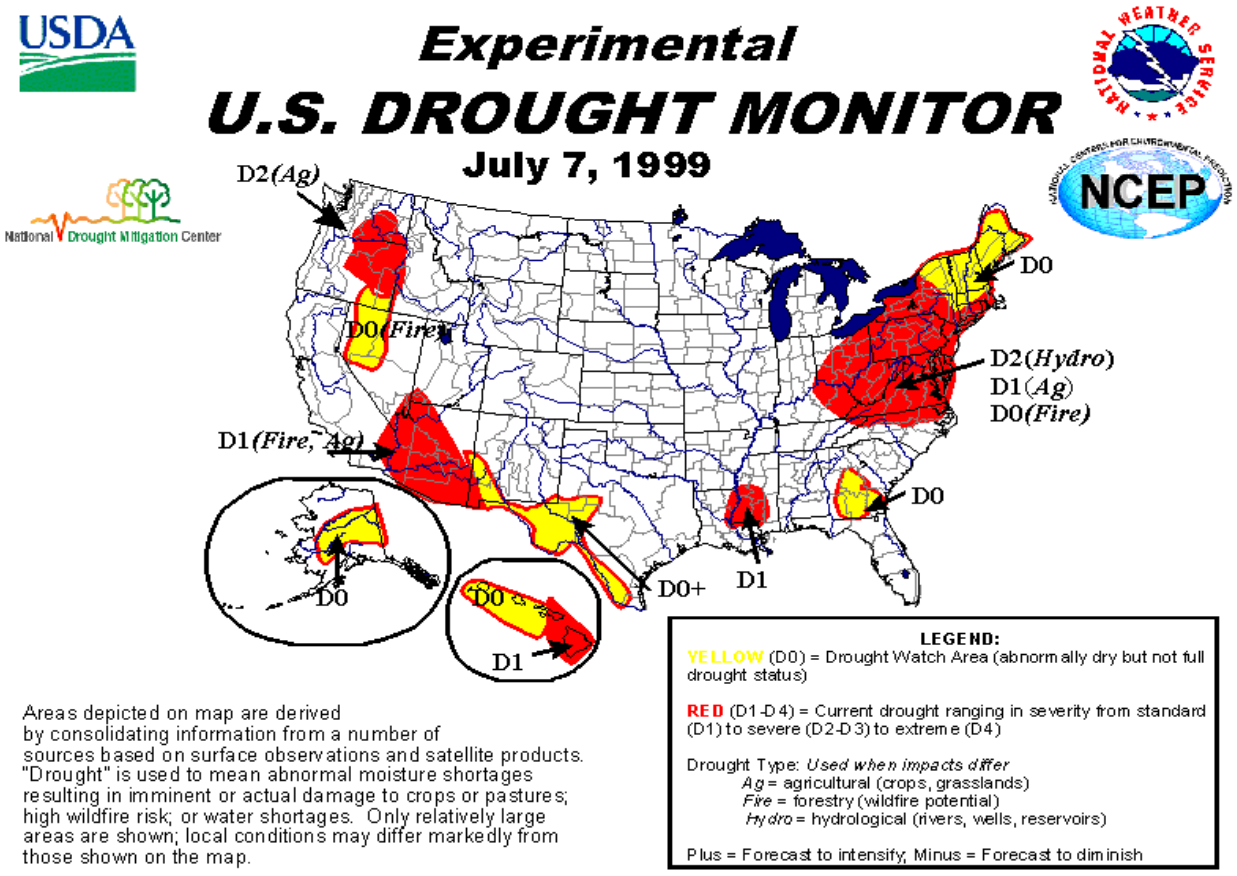
It was ***experimental***, and became operational, partially in response to intensifying dryness in the eastern U.S. and across portions of the West. **The map was created in CorelDRAW!** ☺



NDMC
NATIONAL DROUGHT MITIGATION CENTER
UNIVERSITY OF NEBRASKA

Summer 1999

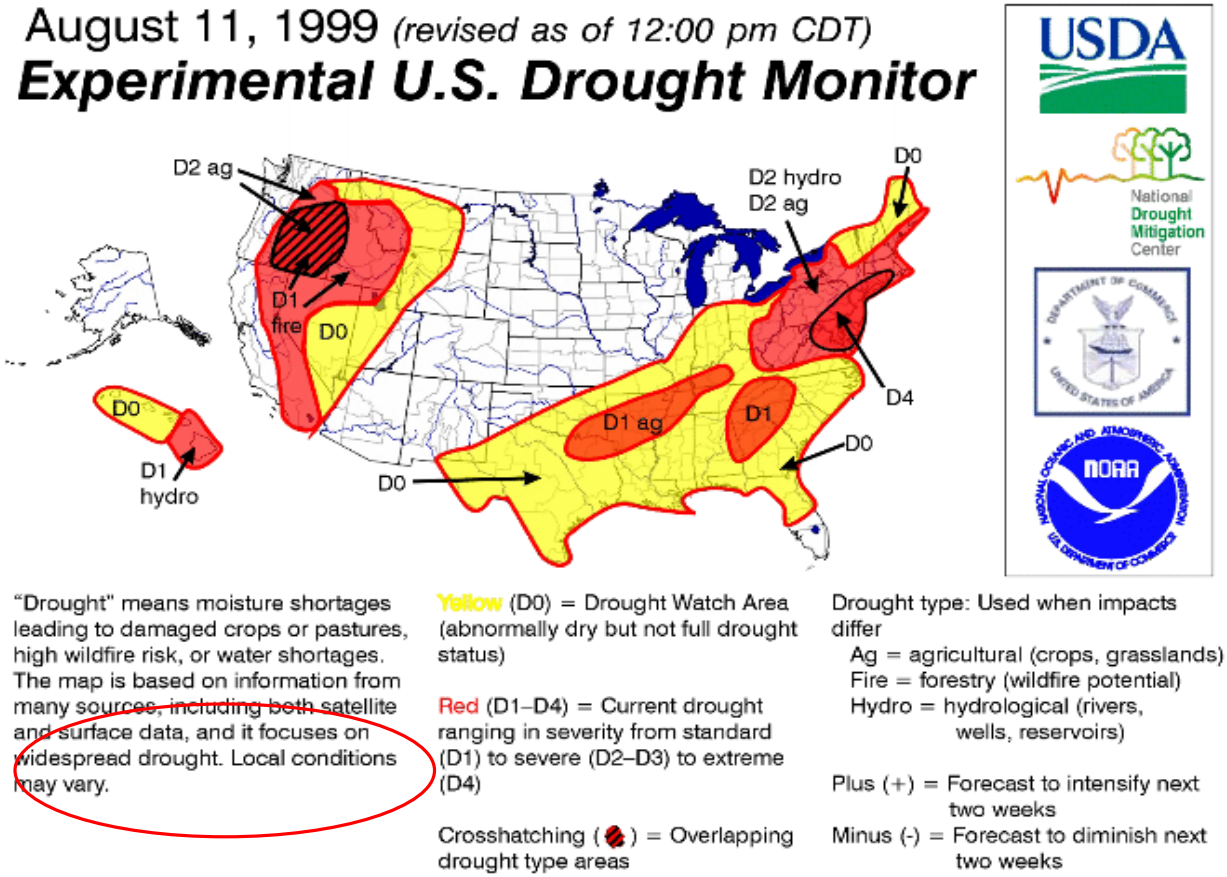
Authors refined the map areas and tweaked the colors



NDMC

August 11, 1999

The revised map was presented to senior-level government officials at a **Secretarial White House Briefing**. They liked it so much…



NDMC

August 18, 1999

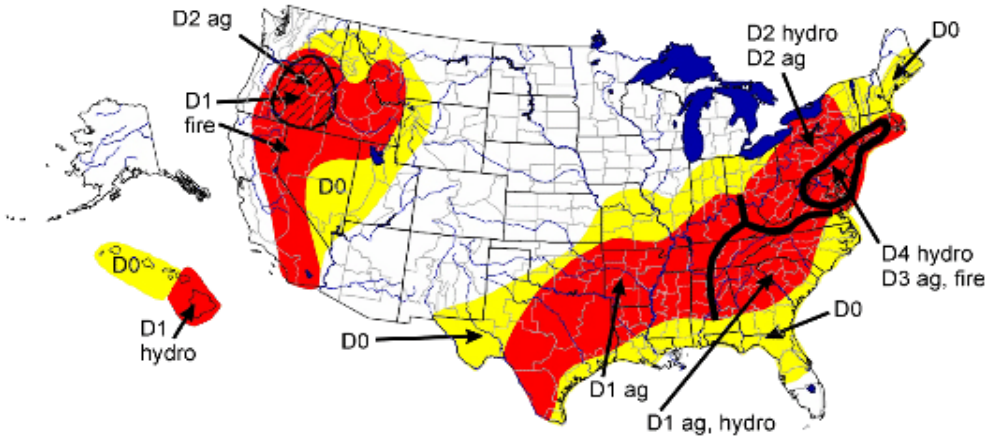
…the following week, it went operational, making this **the first "official" U.S. Drought Monitor!**

This might have been the ***fastest Experimental to Operational*** product in government history!

~24 experts make up the DROUGHT listserver

August 18, 1999 (scheduled release time Thursday a.m.)

U.S. Drought Monitor



USDA

National Drought Mitigation Center

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Plus (+) = Forecast to intensify next two weeks

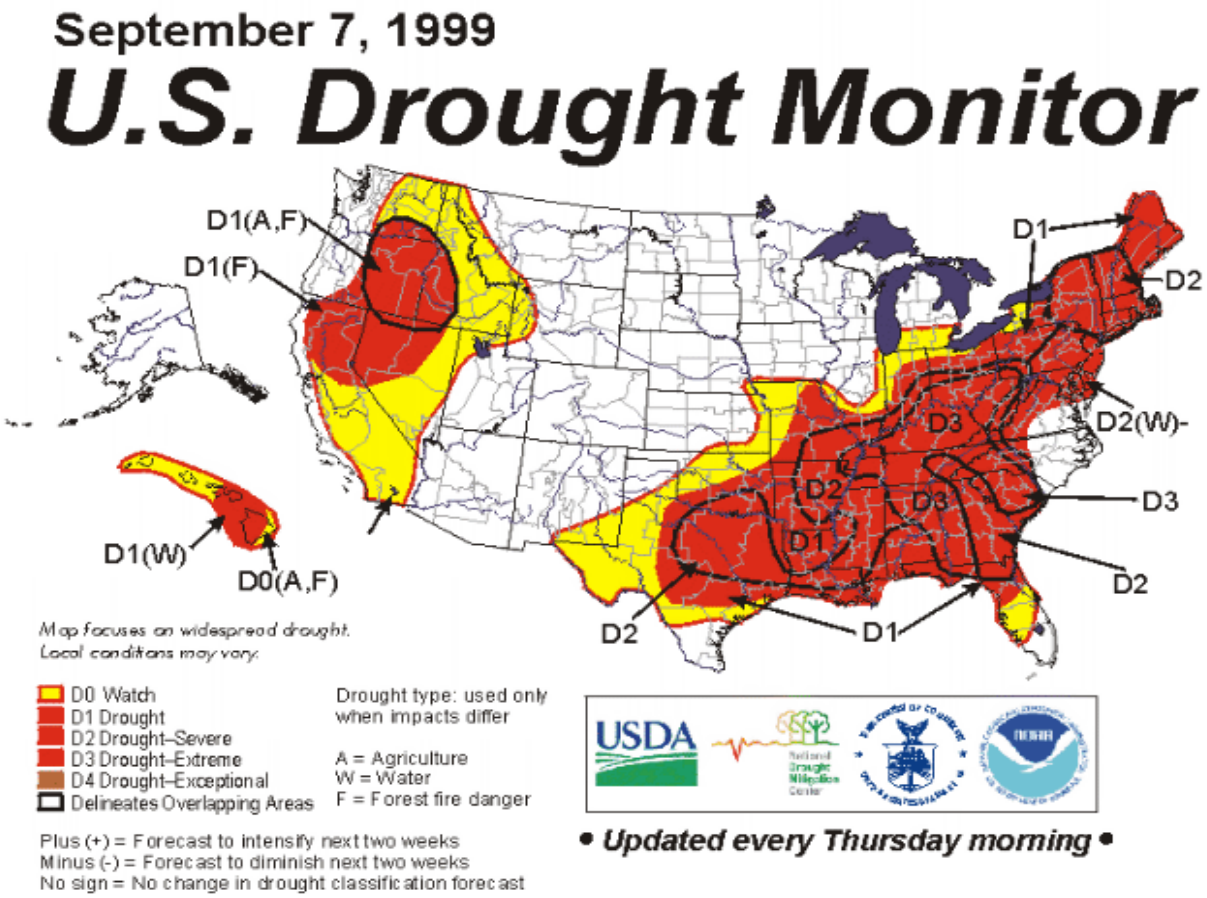
Minus (-) = Forecast to diminish next two weeks

NDMC

September 1999

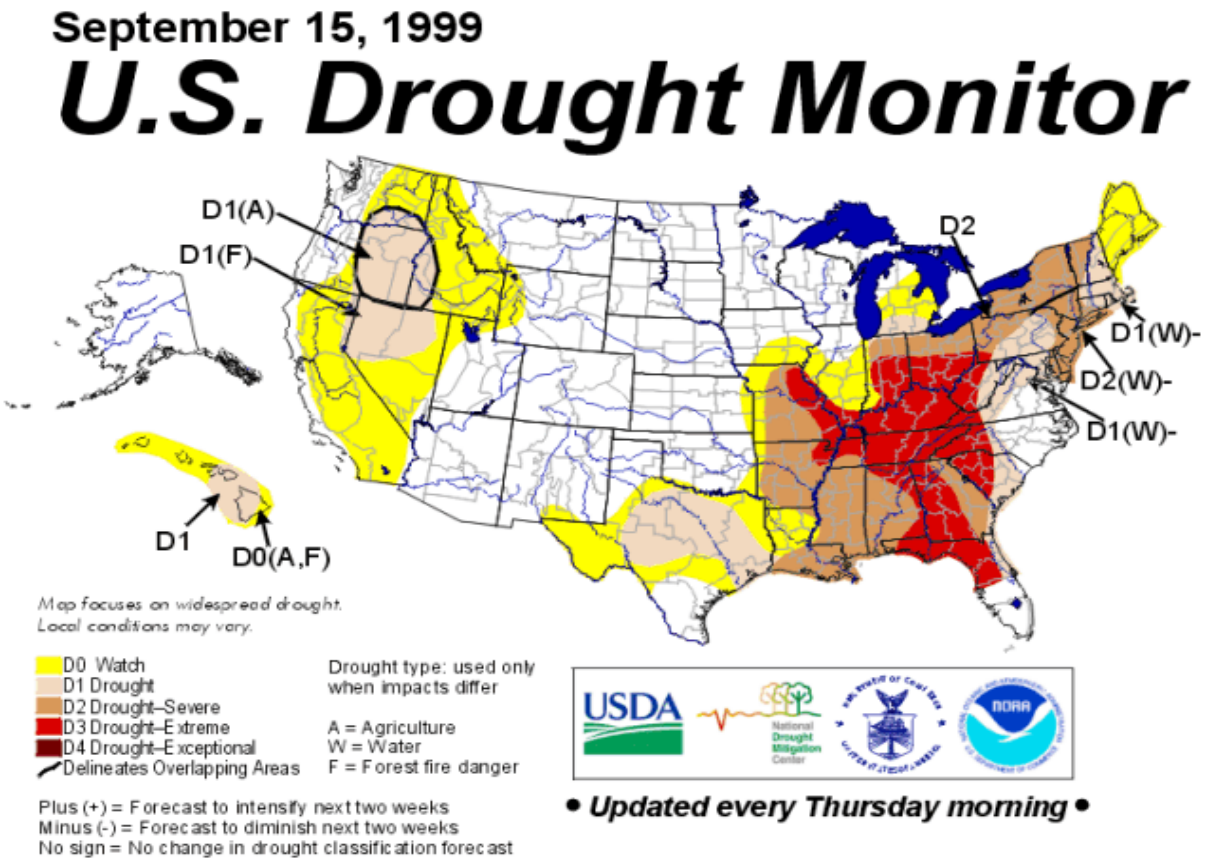
The format began to resemble the map we see today, although it remained clear that artistic flair was lacking

(Note the drought scale!)



September 1999

The ***color issue was finally resolved*** in **mid-September, 1999**; The USDM still had a "Watch" and Forecast component.



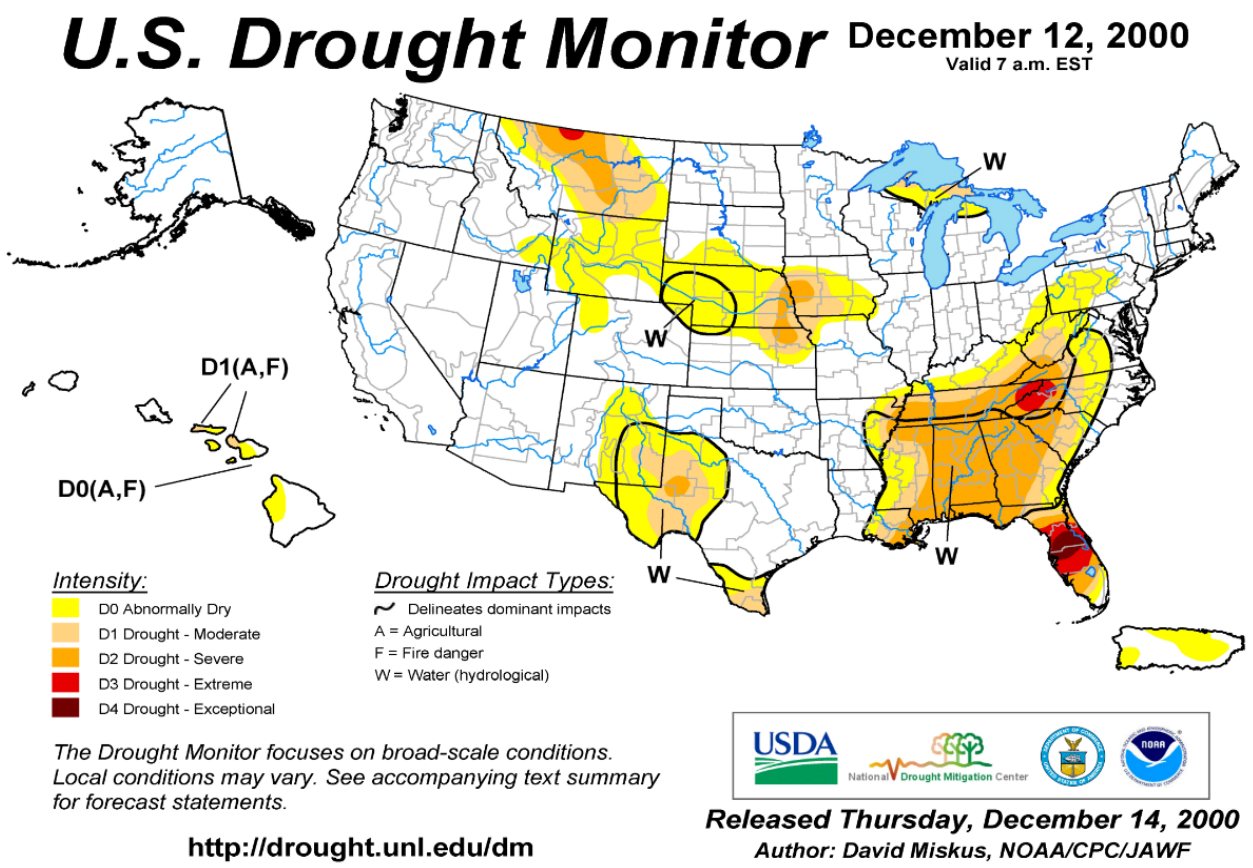
December 2000

Forecast component is dropped, D0 goes from "Watch" to "Abnormally Dry" (going into and coming out of drought) & authors put their names on the map.

- Accountability
- Transparency

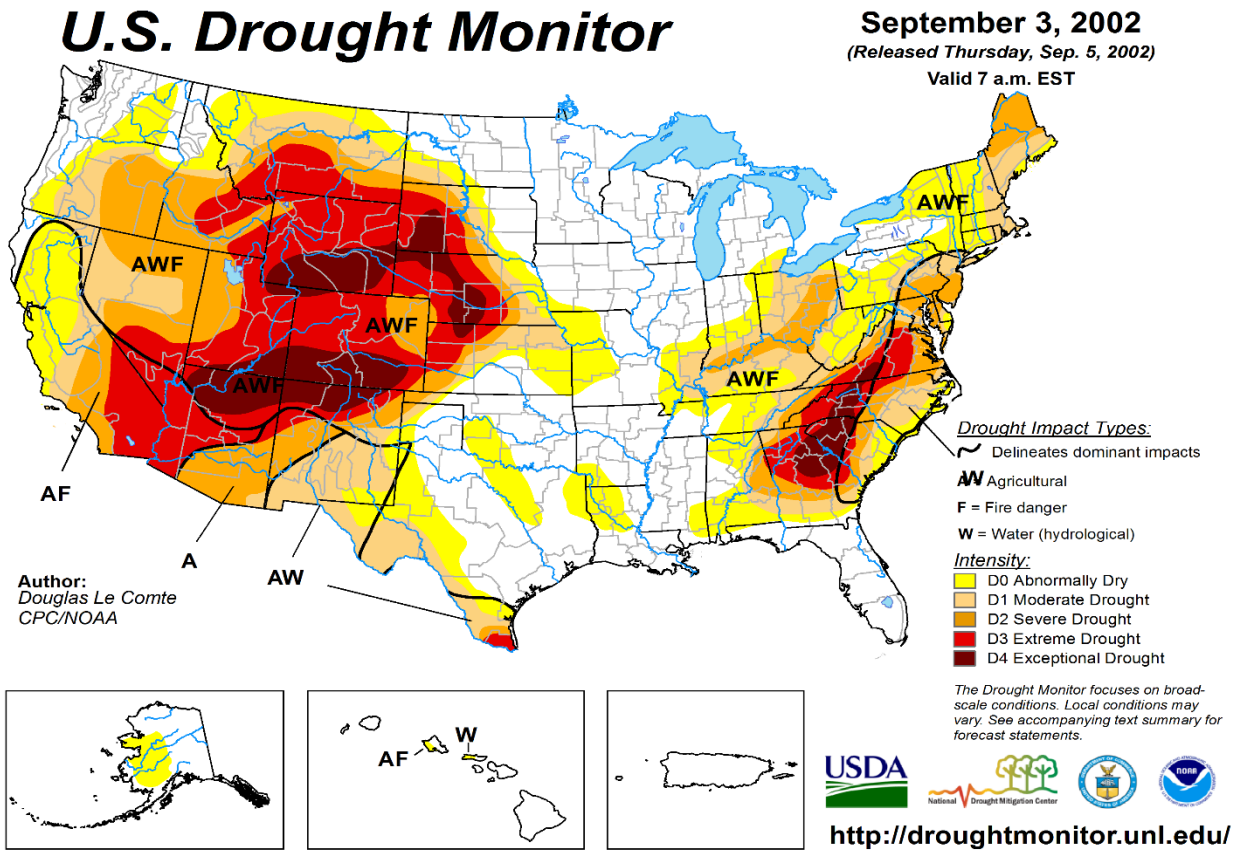
FIRST USDM User Forum hosted by NDMC in Lincoln, NE

Objective Blends were borne out of this first Forum…



Summer/Fall 2002

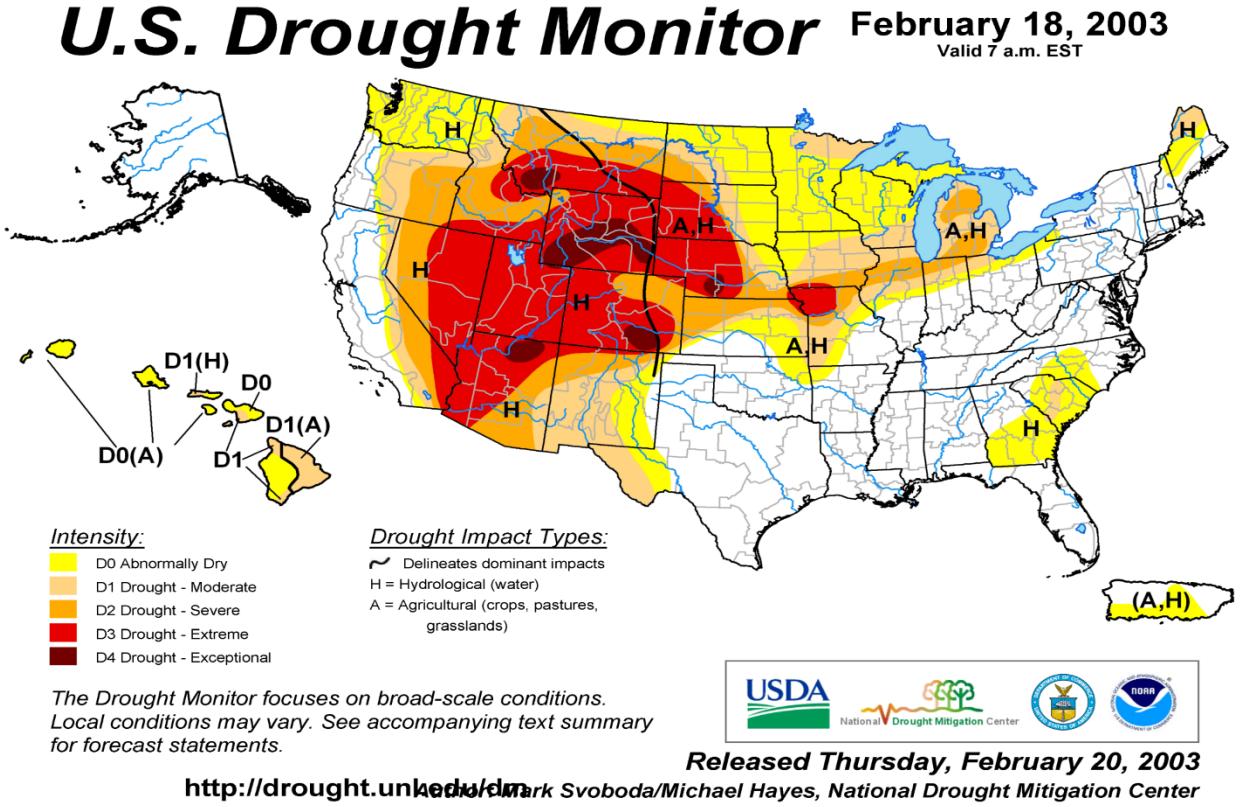
First federal use (USDA) of USDM as a trigger for drought response/relief (Dried Milk) for livestock.



2003

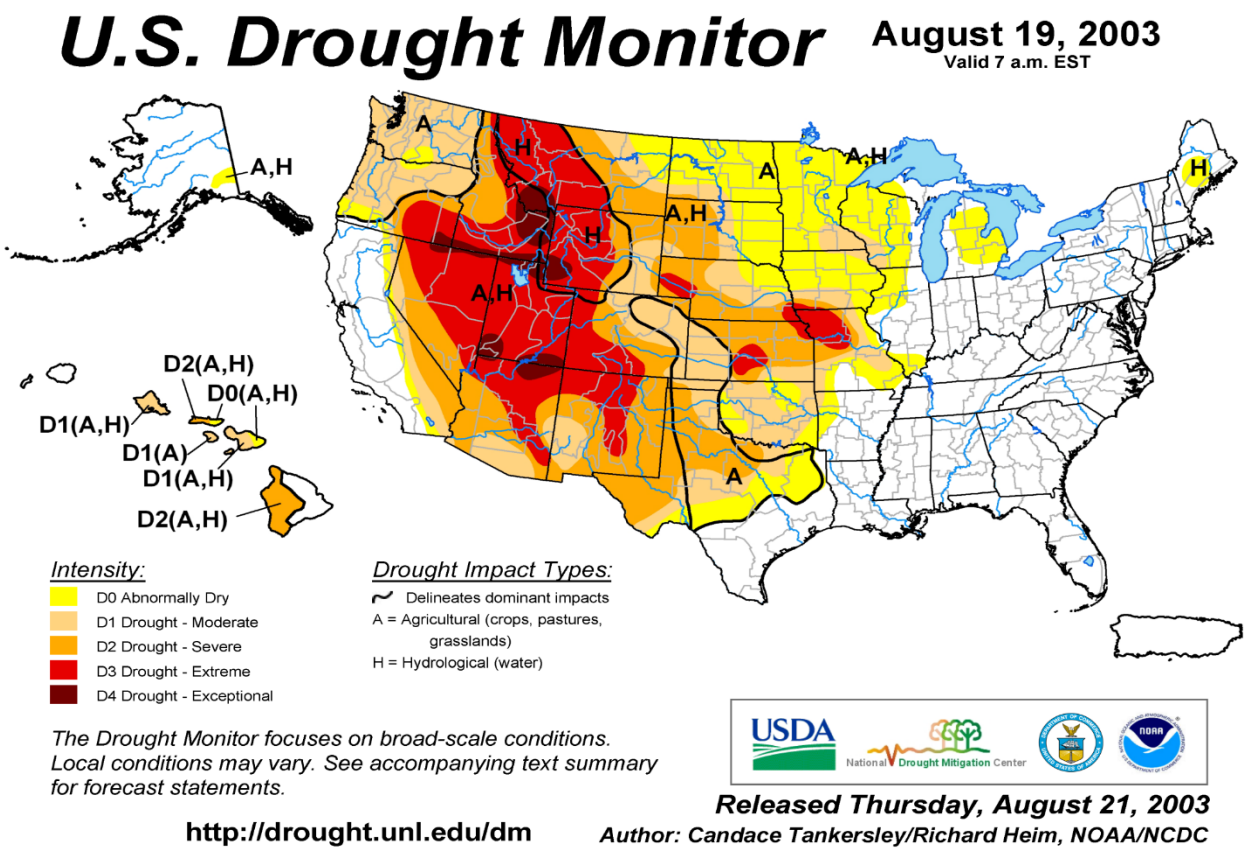
The Fire ("F") Impact type was dropped in early 2003 b/c there is always a fire season and it is hard to weigh the impact of drought on fire.

DROUGHT List Server grows to 150…



August 2003

USDM Authors make a transparent **switch from CorelDRAW to GIS** (Geographic Information System) to create the map. There was a steep learning curve, but it made the USDM a leader on the GIS front and would pay big dividends down the road in regards to timeliness and accuracy.

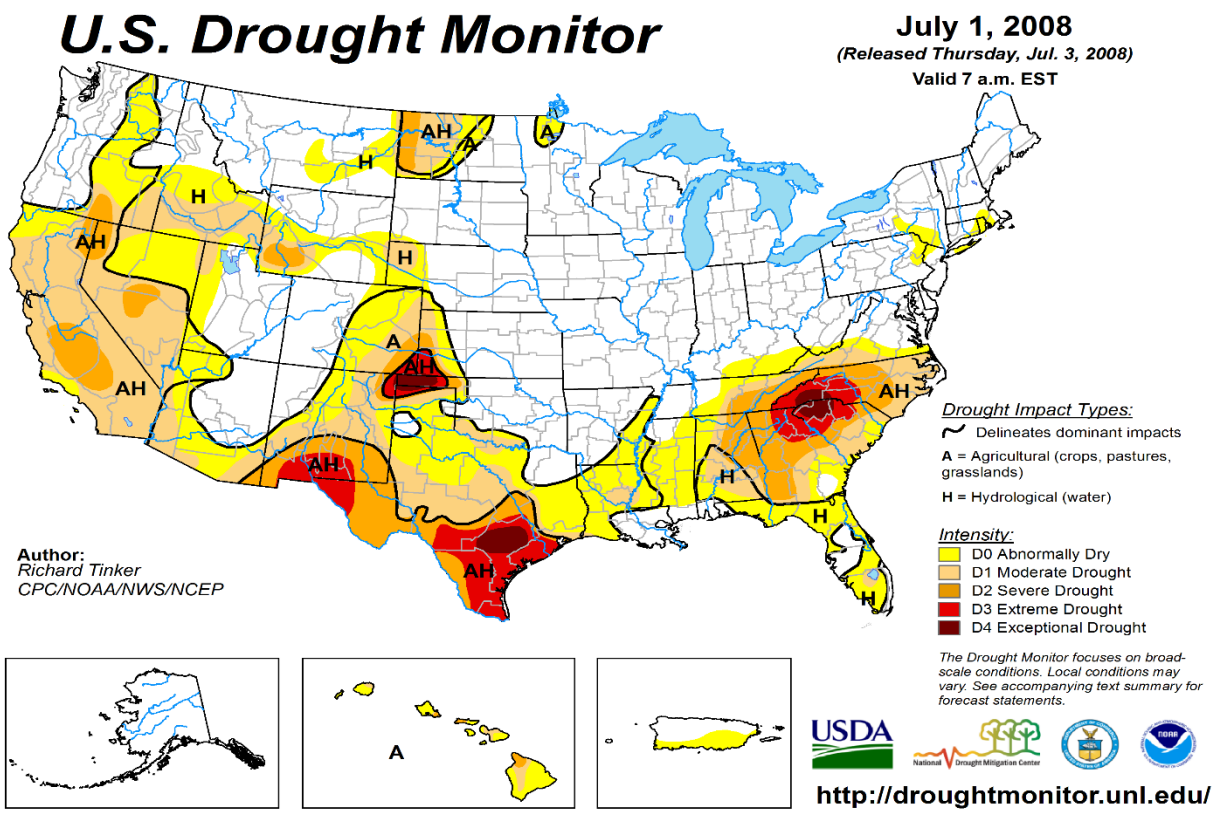


2008

USDM written in by Congress as a **"trigger" within the Farm Bill.**

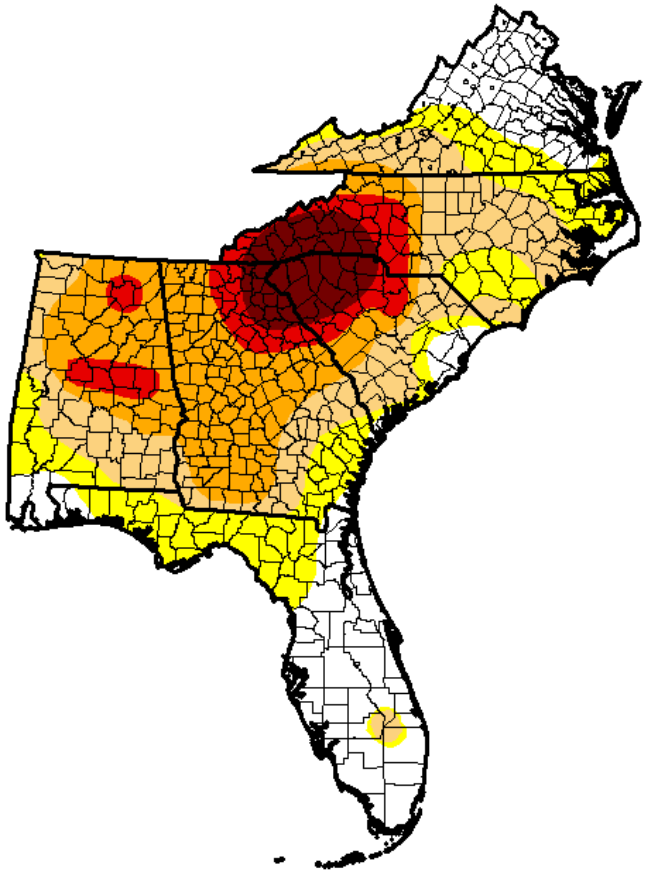
First launch of Regional and Sate (w/ counties) level zoom views and statistics

DROUGHT List Server grows to over 225 experts….



U.S. Drought Monitor

Southeast



August 5, 2008

(Released Thursday, Aug. 7, 2008)

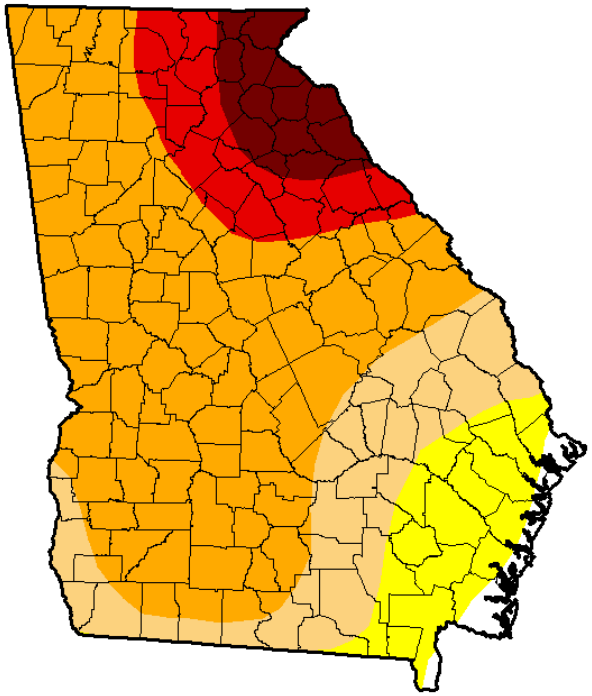
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	22.98	77.02	57.04	35.03	13.83	6.29
Last Week *7/29/2008*	22.98	77.02	58.69	34.36	12.23	6.29
3 Months Ago *5/6/2008*	26.41	73.59	43.56	23.25	8.93	0.00
Start of Calendar Year *1/1/2008*	9.61	90.39	74.26	58.47	40.96	22.00
Start of Water Year	10.38	89.62	76.74	58.97	40.98	15.49

U.S. Drought Monitor

Georgia



August 5, 2008

(Released Thursday, Aug. 7, 2008)

Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	1.95	98.05	87.17	69.71	15.50	6.25
Last Week *7/29/2008*	1.95	98.05	87.17	69.71	15.50	6.25
3 Months Ago *5/6/2008*	33.70	66.30	43.16	29.92	15.80	0.00
Start of Calendar Year *1/1/2008*	2.01	97.99	75.04	65.23	49.44	15.73
Start of Water Year *9/25/2007*	24.19	75.81	64.21	52.59	39.36	27.00
One Year Ago *8/7/2007*	0.00	100.00	86.01	67.35	47.92	22.87

Intensity:

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

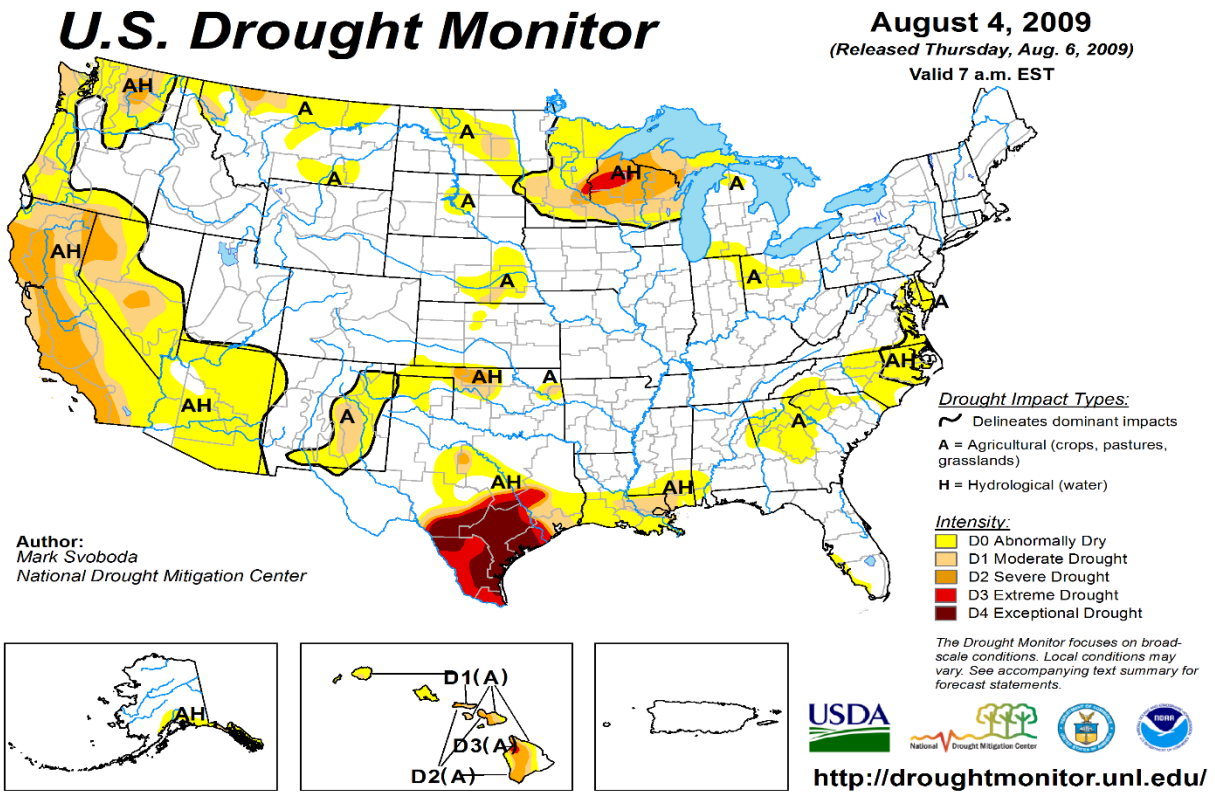
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:
Brian Fuchs
National Drought Mitigation Center

http://droughtmonitor.unl.edu/

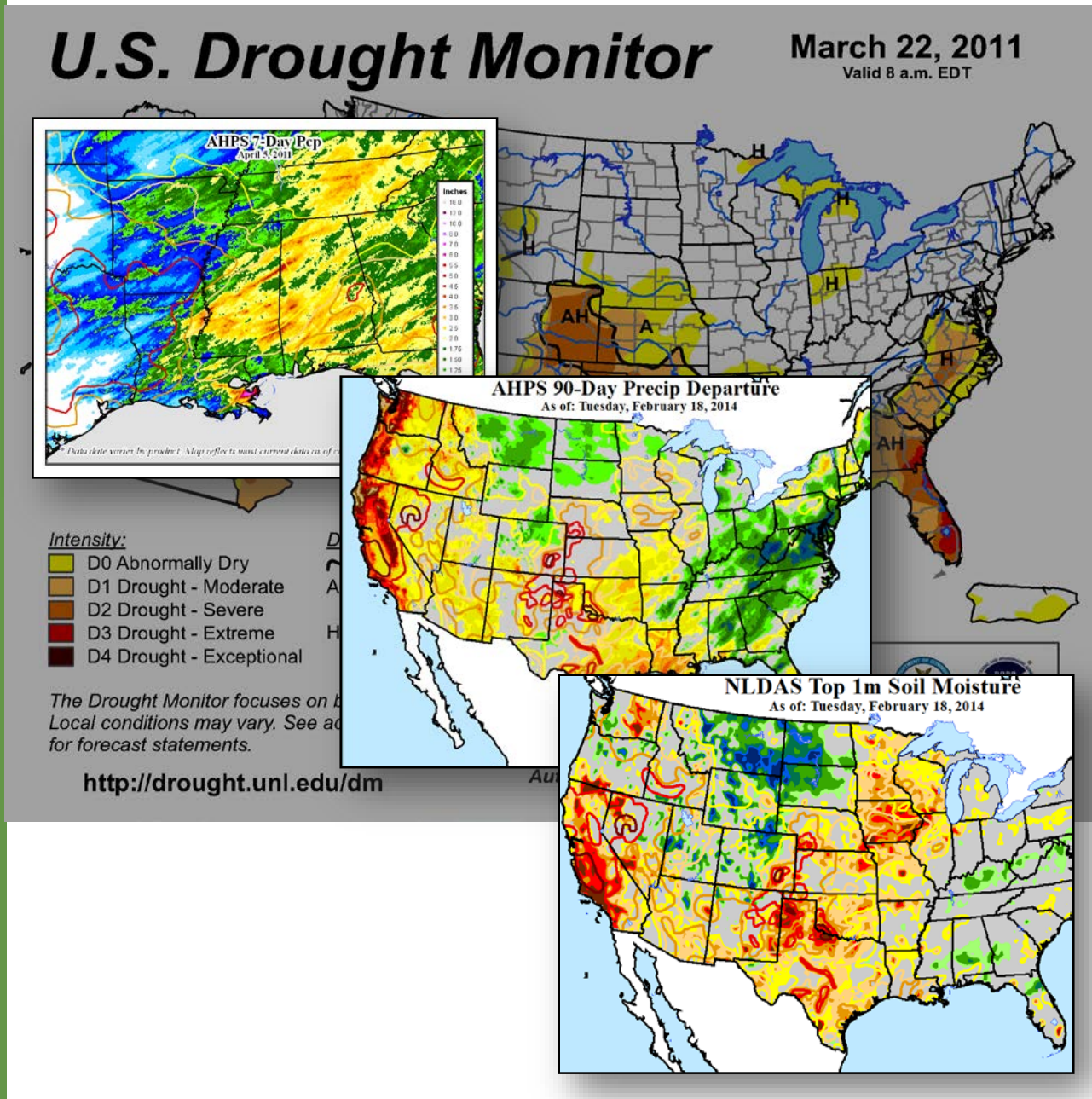
2009

USDM celebrates 10th year and 500th map!



2008-2011

Several authors began **incorporating GIS weather, climate and hydrological data directly into the map-editing process**; consequently , accuracy and detail increase over the next several years – no more “eyeballing” it!



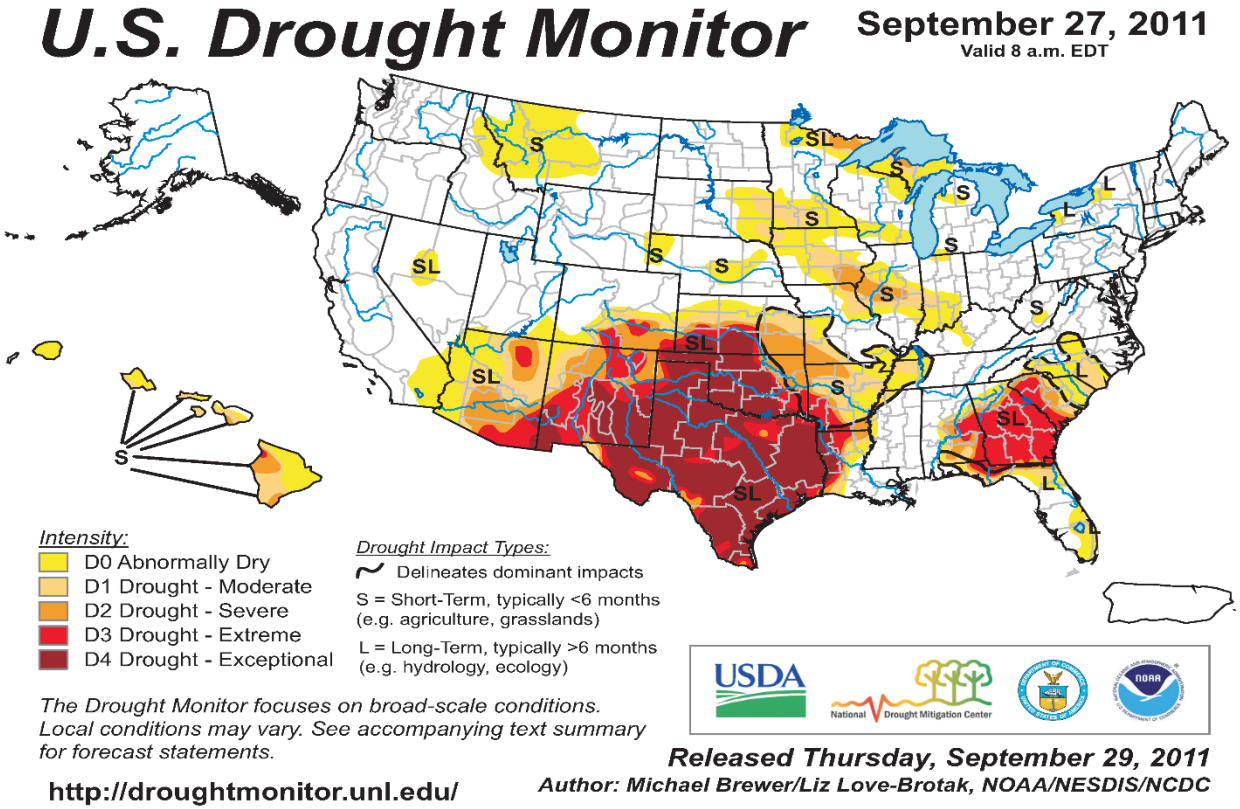
September 2011

USDM authors **changed the Drought Impact Types** from

"A" (Agricultural) and "H" (Hydrological) to "S" (Short-Term) and "L" (Long-Term),

removing ambiguity and confusion that was repeatedly reported while better accounting for **environmental/ecological droughts**

DROUGHT List Server exceeds 300 experts

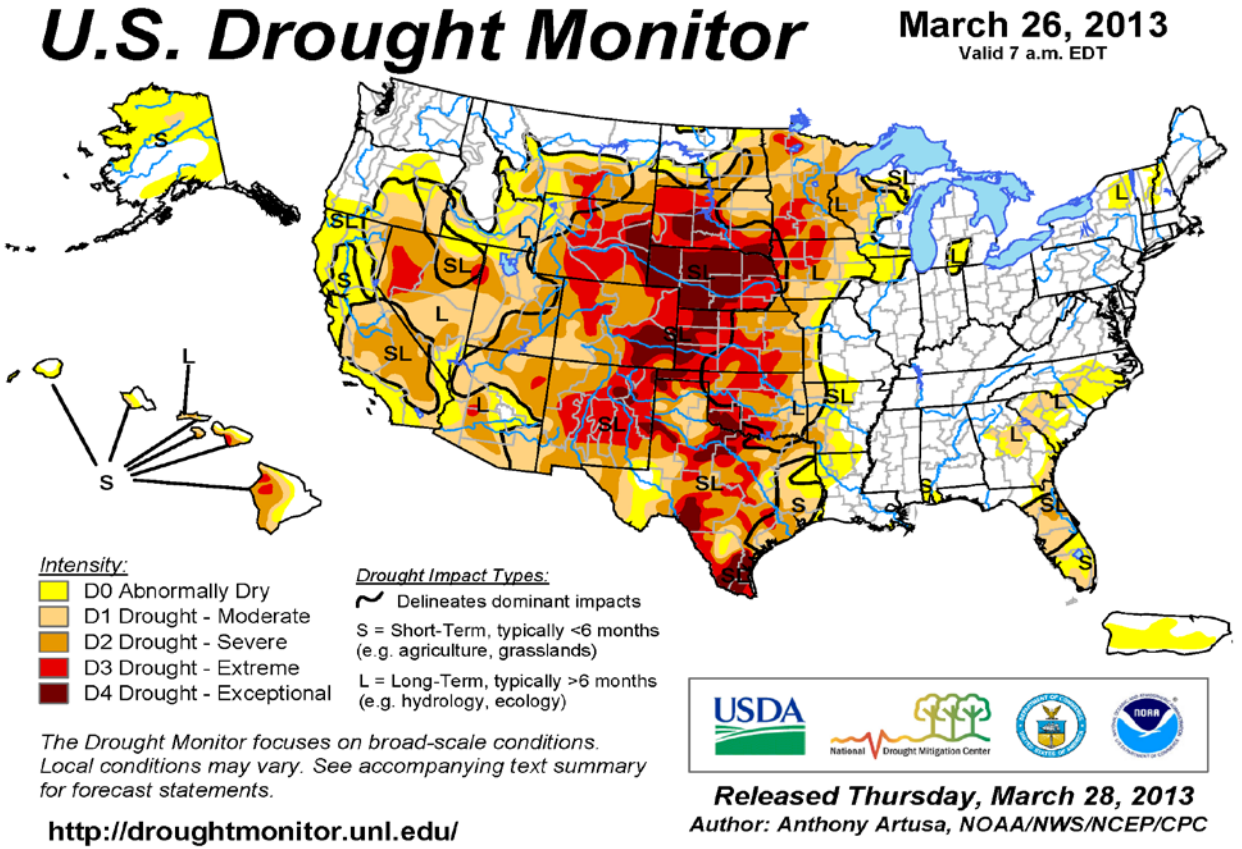


Early 2013

The **National Drought Mitigation Center took over the final map production** so the map is 100% consistent week to week in projection, size, and colors.

(USDM authors still modify drought areas)

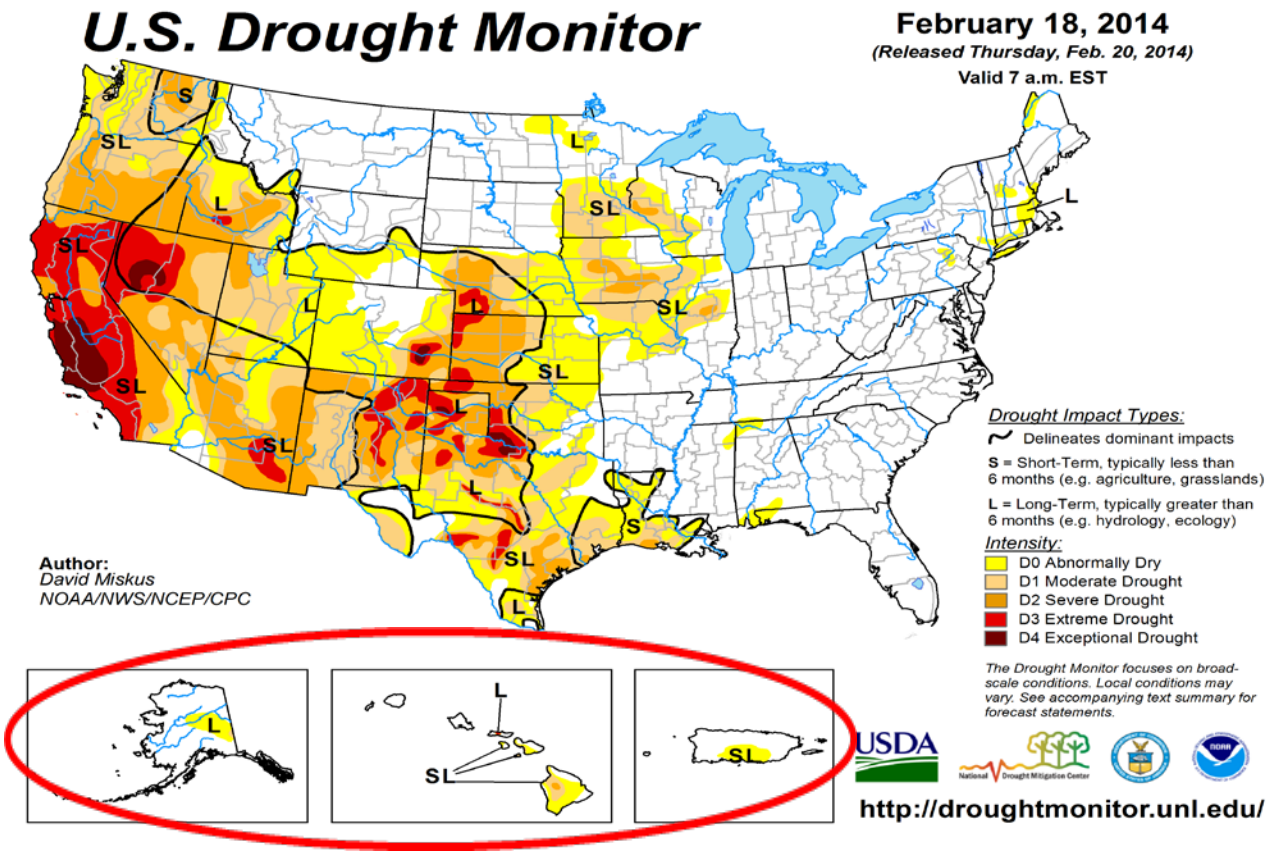
December 2013: 750th USDM made



Late 2013

The **NDMC changed the final map layout** to make sure the non-CONUS areas are clearly depicted as being as such, and are on their own scale.

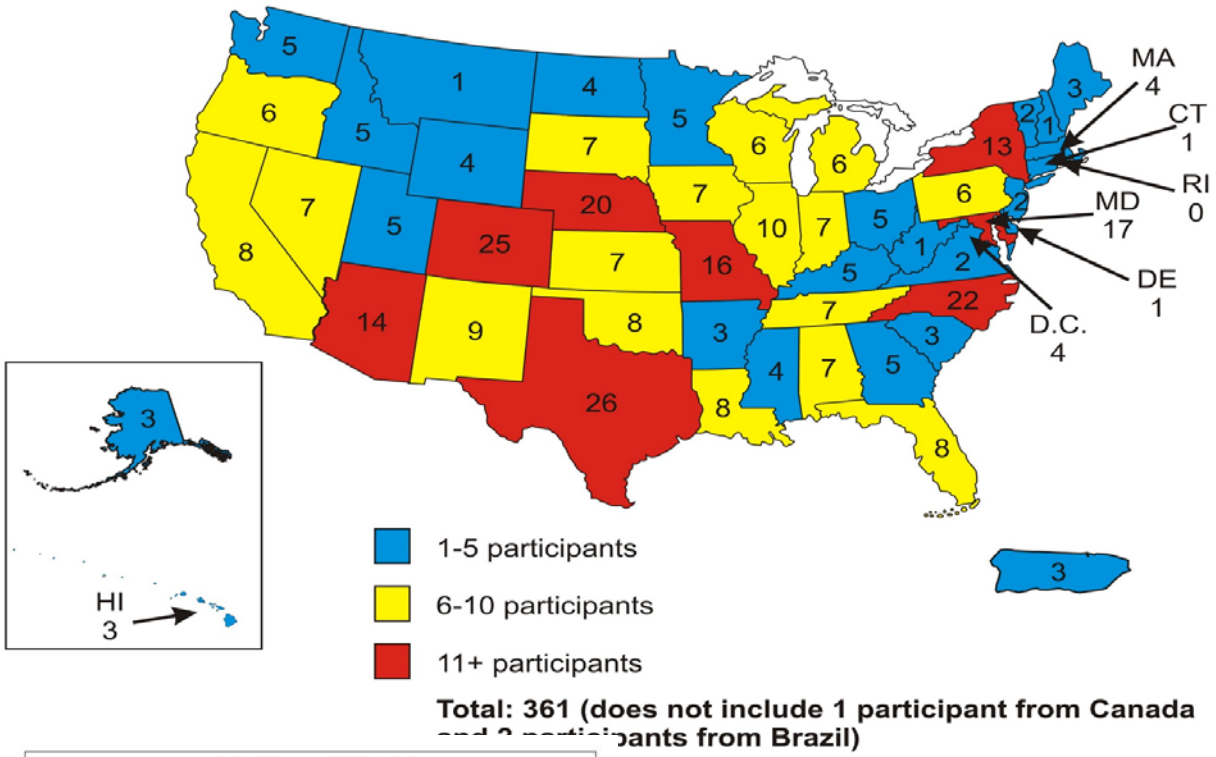
2013: 7M page views/2.6M user sessions

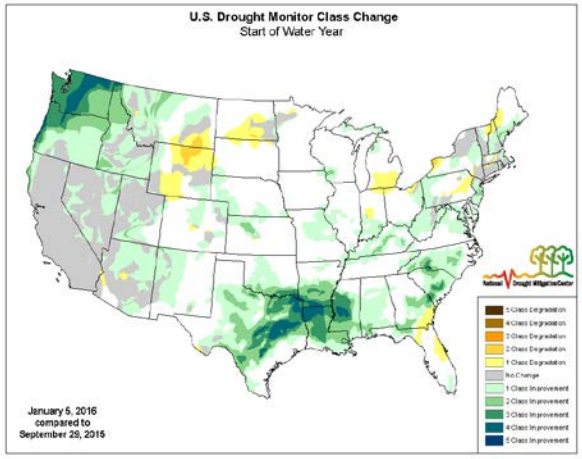


2015

Robust suite of web mapping services are available. 361 participants on the USDM list server.

2015: 7.7M page views/3.5M user sessions



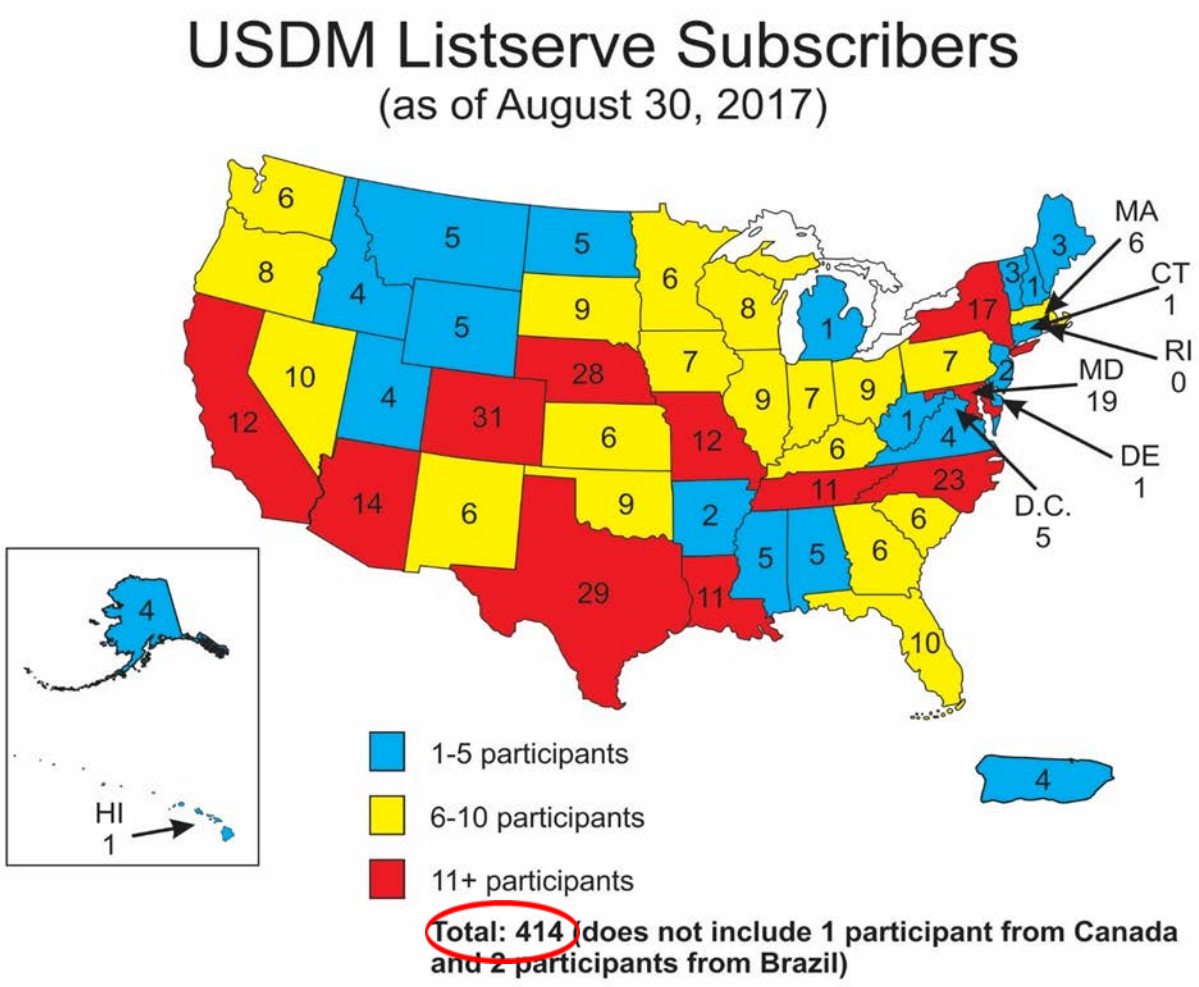


2017

Robust suite of web mapping services are available. 414 participants on the USDM list server.

2018

***1000th map* is approaching!**



USDM Next Steps

- **Continue *interactions* with local drought task forces, *State Climate Offices*, WFOs/RFCs, Regional Climate Centers, *University Extension* agents, *USDA Climate Hubs + field offices***
  - **Foster new basin/state interactions**
  - **NIDIS RDEWS basin briefings/outlooks…more coming?**
    - **MO Basin/PacNW-Columbia/ Midwest, others??**
- **Continue to evolve…encourage and incorporate *new/enhanced/innovative products via GIS and cloud environs*:**
  - **ACIS gridded SPI-SPEI/sc-PDSI**
  - ***2018: Gridded Objective Indice Blends + new regional/seasonal/thematic blends (e.g., flash, snow, forest)***
  - **Augment with more emerging satellite products (e.g., *ET-based: ESI, EDDI, QuickDRI, relative humidity, vapor pressure deficit*)**
  - **NLDAS, Composite Drought Indices, Soil Moisture**
  - ***"Uber" Drought DSS-Tool prototype***
  - ***Centralized Author "cloud environment" with USDM list serve interface***
- ***Integrate U.S. Virgin Islands?***

THANKS!
Questions, comments?

Mark Svoboda
msvoboda2@unl.edu
402-472-8238